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Revision History

Rev. No.	Date	Details of Rev.	Prepared By	Input/Reviewed By	Approved By
0	2023/04/28	Issued as "Approved for Use."	S. Rheubottom	S. Morris	M. Hughey
D3	2023/04/06	Issued for "Review and Comment."	S. Rheubottom	S. Brewer S. Faught C. Gallagher M. Hughey	N/A
D2	2023/03/17	Issued for "Review and Comment."	S. Rheubottom	E. Ballachey C. Bobzener S. Brewer A. Coulas A. Ghuman A. Golbabai B. Gummow S. Muccuth-Henry A. McMurray S. Mistry S. Morris C. O'Neill D. Thiru J. Turner N. van Dijk S. Whillier	N/A
D1	2023/02/01	Issued for "Input, Review and Comment."	S. Rheubottom	M. Barnett S. Beauchamp T. Bhatti C. Bobzener P. Estrada-Evans K. Fraser B. Gummow P. LeBel A. McMurray H. Simpson B. Smith D. Snowden N. van Dijk J. Vu S. Weeks S. Whillier	N/A

EXECUTIVE SUMMARY

This annual compliance monitoring report for the 2022 calendar year is produced to demonstrate that Canadian Nuclear Laboratories (CNL) has successfully met the requirements of the Nuclear Safety and Control Act, associated regulations, the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence WNSL-W1-2310.02/2022* (PHP Licence), and the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence Conditions Handbook* (PHP LCH). This report has been prepared based on Canadian Nuclear Safety Commission (CNSC) REGDOC -3.1.3, *Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed Equipment, Nuclear Substances and Radiation Devices*.

This stand-alone, unrestricted document provides CNL compliance monitoring and performance information for the Port Hope Project (PHP) and is organized by CNSC's 14 Safety and Control Areas (SCA). This report provides site-specific information to supplement information in the *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories* for 2022, which provides programmatic updates and performance of the 14 SCAs and CNL's Public Information and Disclosure program as applicable to all CNL sites.

The Port Hope Long-Term Low-Level Radioactive Waste Management Project (PHP) is part of the larger Port Hope Area Initiative (PHAI). The PHAI is a community-based project designed to develop and implement a safe, local, long-term management solution for historic low-level radioactive waste within the Port Hope and Clarington municipalities. The PHAI is defined by *An Agreement for the Cleanup and Long-Term Safe Management of Low-Level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington* (Legal Agreement), which took effect on 2001 March 29, between the Government of Canada and the municipalities of Port Hope and Clarington for the management of the low-level radioactive waste within each of the communities. CNL is responsible for the direction and execution of the PHAI in compliance with the Legal Agreement, licences, and Environmental Assessment decisions. CNL has overall responsibility for managing the PHAI on behalf of Atomic Energy of Canada Limited, a federal Crown corporation.

Land Acknowledgement

CNL's Historic Waste Program Management Office and the PHAI projects are situated on the traditional and treaty lands of the Williams Treaties First Nations, specifically the Gunshot Treaty signed with the Mississauga First Nations of Alderville, Curve Lake, Hiawatha and Scugog Island.

These Mississauga Nations are also signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. In 1923, the Mississauga First Nations and the Chippewa First Nations consisting of Rama, Beausoleil and Georgina Island signed the Williams Treaties and together, over 90 years later in June 2018, joined to ensure that their rights to and the relationship with these lands are respected through a renewed agreement with Canada and the Province of Ontario.

The area in which we are situated is also home to Indigenous Peoples from across the region and Canada. CNL is grateful to have the opportunity to work on these traditionally and culturally significant lands and waterways.

Engagement with Indigenous Communities and Organizations

Historically, the PHAI Phase 2 Public Information Program (PIP) had included Indigenous communities and organizations as a target audience. In support of CNL's objective to advance reconciliation through meaningful actions and movement toward increased inclusion and participation, the *PHAI Phase 2 and 3 Program for Engagement with Indigenous Communities and Organizations*, currently in development in collaboration with Indigenous representatives, will be implemented in tandem with the PIP and aligned with CNL company-wide Indigenous relations efforts. A total of 18 engagements with Indigenous communities and organizations took place in 2022 including meetings, site tours and community visits.

Overall Performance Highlights

Following a one-day hearing, the CNSC has renewed the licence for the PHAI (Summary Record of Decision - Port Hope Project Renewal), for a 10-year period beginning 2023 January 01. As part of the licence renewal, a single licence consolidates four previous licences for PHAI activities, authorizing CNL to continue the safe cleanup and management of low-level radioactive waste in Port Hope, Ontario. The licence will also facilitate the ongoing monitoring and maintenance of the Port Granby Long-Term Waste Management Facility.

During the reporting period, CNL continued to manage the PHP during remediation activities in accordance with approved procedures, as outlined in the PHP LCH. The following is a list of overall performance highlights at PHP for 2022:

- All licensed activities continue to be carried out safely and securely
- No members of the public received a radiation dose that exceeded any regulatory limit
- No worker at PHP received a dose in excess of any of the respective radiation dose limits for radiation workers, as defined by the Radiation Protection Regulations

Management System

CNL has a well-established and effective management system that defines the requirements to ensure that applicable work is conducted in accordance with requirements and best practices. Internal audits and self-assessments were conducted as required. ISO 9001:2015 certification was maintained. The management system was effectively implemented at the PHP during the reporting period.

Human Performance Management

CNL has a well-established and effective training program. It is in place to enhance human performance through the development and implementation of processes that ensure workers

are sufficient in numbers in all relevant job areas, and have the necessary knowledge, skills, and tools in place to safely carry out their duties. The PHP maintained a sufficient number of qualified workers to carry on the licensed activities safely. A range of mandatory and other job-specific training activities were carried out in the reporting period to ensure that all PHP employees and contractors acquired mandated training (including refresher training) as appropriate for their duties to ensure the safe operation of the PHP and to conduct work under the PHP Licence.

Operating Performance

CNL has a well-established and effective conduct of operations program. CNL completed all required reporting as outlined in Section 3.2.3 of the PHP LCH. There were 12 events reported to CNSC in the reporting period, as outlined in the applicable SCA.

Safety Analysis

As per the PHP LCH the Safety Analysis SCA is not applicable to the PHP.

Physical Design

Changes made to the physical facility, equipment, processes, procedures, or practices that could adversely affect the design basis are identified and assessed by key stakeholders through the Engineering Change Control program. In 2022 November, CNSC staff raised concerns with CNL's management oversight of changes and its adherence to the change control process. CNL acknowledged that the implementation of the change management process is an area needing improvement and initiated a Root Cause Analysis to identify and correct the programmatic issues. Program improvement continues through 2023.

Fitness for Service

As per the PHP LCH, the Fitness for Service SCA is not applicable to the PHP.

Radiation Protection

CNL has a well-established and effective Radiation Protection program. As Low As Reasonably Achievable (ALARA) initiatives and activities continued to be at the forefront of the PHP Radiation Protection Program. Radiation Protection doses for workers remained ALARA and estimated doses to the public remain low. There were no exceedances of regulatory limits or action levels in the dose monitoring program. There were no reportable Radiation Protection events at the PHP in the reporting period.

Conventional Health and Safety

CNL has a well-established and effective conventional health and safety program to manage non-radiological workplace safety hazards and to protect personnel and equipment. All licensed

activities continued to be carried out safely and securely. One reportable occupational health and safety event occurred in the reporting period.

Environmental Protection

CNL has a well-established and effective environmental and biophysical protection program that monitors radiological and hazardous substances to minimize risk to employees and the public. Environmental protection and mitigation continue to be effective; changes from the baseline are minimal and generally within the Environmental Assessment predictions. Environmental Assessment follow-up and operational monitoring continued in the reporting period. Five reportable environmental events occurred at the PHP in the reporting period. The reported events did not have any adverse effect on the health, safety and security of persons or the environment.

Emergency Management and Fire Protection

CNL has well-established emergency management and fire protection programs that are in place to reduce the risk of fires and assist emergency staff in responding to events, and assist in the protection of employees, the local community, and the environment. All required annual fire response drills, were completed as per program and regulatory requirements. Fire screening assessments were completed in support of CNL's Engineering Change Control process for capital and maintenance/repair projects. One reportable emergency event occurred at the PHP in the reporting period due to a false fire alarm. The reported event did not have any adverse effect on the health, safety and security of persons or the environment.

Waste Management

As per the PHP LCH, the Waste Management SCA is not applicable to the PHP.CNL has a well-established and effective waste management program, and it is included in this report for information. During the reporting period, on-site management of waste occurred safely and without incident. Waste deliveries were made to the Port Hope Long-Term Waste Management Facility originating from various sites including Cameco, Waterfront Sites, Small-Scale Sites, the Harbour sediment, and other waste sources such as on-site waste transfers. Process residual waste was received at the Port Hope Long-Term Waste Management Facility from the Port Granby Waste Water Treatment Plant.

Security

CNL has a well-established and effective security program that is in place to implement and support the security requirements stipulated in the relevant regulations and the PHP LCH. Contractors conducting work at the PHP site continued to follow CNL's corporate security policies and programs, as confirmed through CNL's oversight program. There were two reportable security events at the PHP in the reporting period. The reported events did not have any adverse effect on the health, safety and security of persons or the environment.

Safeguards and Non-Proliferation

CNL has a well-established and effective Nuclear Materials and Safeguards Management program. The program undertakes all required measures to ensure safeguards implementation in accordance International Atomic Energy Agency commitments. During the reporting period, inventory changes were documented and reported to the CNSC as required.

Packaging and Transport

The PHAI Transportation of Dangerous Goods Program continued to operate the safe off-site transport and shipment of dangerous goods by conforming to all applicable laws and regulations, including company policies and procedures. Shipments of dangerous goods continued to be received from off-site vendors at the PHP site (consumable chemicals, diesel fuel, and propane). There was one reportable Transportation of Dangerous Goods event at the PHP in the reporting period. The reported event did not have any adverse effect on the health, safety and security of persons or the environment.

Public Information Program

CNL has a well-established and effective public information program that includes a public disclosure protocol regarding events and developments involving PHP facilities or activities - seven public disclosures related to the PHP were made in the reporting period. Stakeholder and public engagement continued in 2022 in accordance with the PIP with a total of 12 presentations and six site tours of the PHP sites.

Conclusion

CNL is committed to achieving high standards of operational safety and security. The information and data presented in this report support the conclusion that safe and secure performance was achieved at the PHP, while enhancements were implemented to further improve results.

ACKNOWLEDGEMENTS

The “Author” of this document would like to thank the many contributors and reviewers from Facilities and Program for their production and review of the individual sections of the report.

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CNL's Historic Waste Program Management Office and the Port Hope Area Initiative projects are situated on the traditional and treaty lands of the Williams Treaties First Nations, specifically the Gunshot Treaty signed with the Mississauga First Nations of Alderville, Curve Lake, Hiawatha and Scugog Island.

These Mississauga Nations are also signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. In 1923, the Mississauga First Nations and the Chippewa First Nations consisting of Rama, Beausoleil and Georgina Island signed the Williams Treaties and together, over 90 years later in June 2018, joined to ensure that their rights to and the relationship with these lands are respected through a renewed agreement with Canada and the Province of Ontario.

The area in which we are situated is also home to Indigenous Peoples from across the region and Canada. CNL is grateful to have the opportunity to work on these traditionally and culturally significant lands and waterways.

Indigenous History of the Port Hope Area

This Indigenous history has been generously provided by Curve Lake First Nation - publication reference: *Gitiga Migizi and Julie Kapyrka, 2015 Before, During, and After: Mississauga Presence in the Kawarthas*. In Peterborough, Archaeology, Dirk Verhulst, editor, pp. 127-136. Peterborough, Ontario: Peterborough Chapter of the Ontario Archaeological Society.

The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.

The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the "Peacekeepers" among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.

Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the "Old Ones" who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and

Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.

The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.

Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.

The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people. Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated. The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.

Michi Saagiig Elder Gitiga Migizi (2017) recounts[1]:

"We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.

There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.

We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.

Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."

Often times, southern Ontario is described as being "vacant" after the dispersal of the HuronWendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.

The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.

The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day.

[1] This historical context was prepared by Gitiga Migizi, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation.

Introduction

Canadian Nuclear Laboratories (CNL) is Canada's premier nuclear science and technology organization, and a world leader in developing nuclear technology for peaceful and innovative applications. Using unique expertise, CNL is restoring and protecting the environment, advancing clean energy technology, and medical breakthroughs continue to improve the health of people around the world.

Atomic Energy of Canada Limited (AECL), a federal Crown corporation, has contracted CNL to manage and operate its sites and facilities across the country. CNL is also contracted to carry out AECL's mandate to enable nuclear science and technology and to protect the environment by fulfilling the government of Canada's radioactive waste and decommissioning responsibilities. Through its Historic Waste Program Management Office (HWP MO), CNL is implementing the Port Hope Area Initiative (PHAI) on behalf of AECL.

The PHAI represents the federal government's response to the community-requested solution for the cleanup and local, long-term, safe management of historic low-level radioactive waste in the municipalities of Port Hope and Clarington. The waste is the result of the refining practices of the former Crown Corporation, Eldorado Nuclear Ltd., and its private sector predecessors. The original Eldorado refining operation and plant were established in the 1930s without consultation with Indigenous peoples of the area.

An Agreement for the Cleanup and Long-Term Safe Management of -Low-level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington the (Legal Agreement) [1], finalized in 2001 March, between the Government of Canada and the two municipalities, launched the PHAI by defining the framework and setting out the responsibilities for the Port Hope Project (PHP) and the Port Granby Project.

Licence Information and Reporting Period

Name:	Port Hope Area Initiative - Port Hope Long-term Waste Management Facility
Location:	Plan 9R-734, Lots 13 and 14, Concession 2 Port Hope, Municipality of Hope, Northumberland County, Ontario L1A 3V7

This annual compliance monitoring report is produced to comply with Licence Condition 2.3 of the *Port Hope Long-Term Low Level Radioactive Waste Management Project Waste Nuclear Substance Licence* (WNSL-W1-2310.02/2022), hereinafter referred to as the Port Hope Project Licence (PHP Licence) [2], in accordance with the compliance verification criteria listed in the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence Conditions Handbook* [3], hereinafter referred to as the PHP LCH [3] and Section 4 Annual Compliance Report of Canadian Nuclear Safety Commission (CNSC) REGDOC-3.1.3, *Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed*

Equipment, Nuclear Substances and Radiation Devices [4]. Information included in this report is for the period of 2022 January 01 to 2022 December 31.

This report provides site-specific information to supplement information in the *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories* (ACMR for CNL) [5], which provides corporate updates to 14 Safety and Control Areas (SCA) as they are applied across all CNL.

The intent of this report is to provide sufficient detail to demonstrate how PHP programs are meeting the requirements of the *Nuclear Safety and Control Act* (NSCA) [6], associated regulations and requirements as specified in the PHP Licence [2] and the PHP LCH [3].

Following a one-day hearing in the reporting period, the CNSC has renewed the licence for the PHAI, for a 10-year period beginning 2023 January 01 [7]. As part of the licence renewal, a single licence consolidates four previous licences for PHAI activities, authorizing CNL to continue the safe cleanup and management of low-level radioactive waste in Port Hope, Ontario. The licence will also facilitate the ongoing monitoring and maintenance of the Port Granby Long-Term Waste Management Facility.

Changes to Organizational Structure

There were no changes to key positions or the organizational structure in the reporting period.

Facilities Included in this Report

Facilities included in this report are the Port Hope Long-Term Waste Management Facility (PH LTWMF) and the Port Hope Waste Water Treatment Plant (PH WWTP). The PH LTWMF and PH WWTP are located at 2376 Baulch Road, Port Hope, Ontario. The site is south of Highway 401 between Brand Road and Baulch Road.

Summary of Licensed Activities

The PHAI is defined by the Legal Agreement [1], which took effect on 2001 March 29, between the Government of Canada and the municipalities of Port Hope and Clarington for the management of low-level radioactive waste (LLRW) as prescribed under the PHP, and the Port Hope Long-Term Low-Level Radioactive Waste Management Project (PHP).

The PHAI includes two distinct and separate projects:

- The Port Hope Long-Term Low-Level Radioactive Waste Management Project (PHP) that comprises the long-term management of the LLRW removed from the former Welcome Waste Management Facility (WWMF), the construction of a new Port Hope Long-Term Waste Management Facility (PH LTWMF), the remediation of LLRW and specified industrial waste at various sites within the Municipality of Port Hope (MPH) and the safe transportation of the waste to PH LTWMF for long-term storage.
- The Port Granby Long-Term Low-Level Radioactive Waste Management Project.

The PHP will:

- Remediate sites containing historic LLRW and other specified industrial waste located in the MPH. These sites are described in the Legal Agreement [1].
- Consolidate and manage this waste in a new long-term waste management facility at the PH LTWMF, developed on lands comprised of and adjacent to the former WWMF. The contents of the former WWMF have been incorporated into the PH LTWMF.

The historic LLRW within the community currently exists within licensed temporary storage and management facilities and miscellaneous unlicensed remediation sites (including the Port Hope Harbour and the former municipal landfill site).

The PHP comprises:

- Phase 1 (complete):
  - Securing regulatory approvals.
  - The management of the waste in the WWMF, currently owned by the Government of Canada and operated by CNL on behalf of AECL, a federal Crown corporation.
- Phase 2 (2012-2030):
  - Development of a LTWMF on and adjacent to the present site of the WWMF.
  - Incorporation of the current inventory of waste from the WWMF into the new LTWMF.
  - Remediation of sites within the MPH that are contaminated with historic LLRW.
- Phase 3 (2031-2120):
  - Activities related to the post-closure operations of the PH LTWMF associated with long-term care and maintenance.

Additional Licenced Activities

A number of remediation sites in the MPH were subjects of separate licences [8] [9] issued to CNL under the *Nuclear Safety and Control Act* (NSCA) [6], each of which submit independent annual compliance monitoring reports to CNSC. In 2022, these licences were consolidated under the 10-year licence for the PHAI.

1. Management System

1.1 Management System Program

The PHP adheres to CNL's Management System Functional Support Area. See Section 1 of the *ACMR for CNL* for details [5].

The *Historic Waste Program Quality Plan* (Quality Plan) [10] is consistent with the corporate *Management System Manual* (Management System) [11] and summarizes the processes and practices applicable to the PHP licensed activities. These processes and practices comply with the quality management system defined in the CAN/CSA-ISO 9001:2015. CNL's third party registrar conducted the annual ISO 9001 audit which resulted in CNL successfully retaining its ISO 9001:2015 certificate effective 2021 April 21.

The CNSC was notified [12] of the revision to the *Quality Plan* [10], implemented in the reporting period.

1.2 Audits, Inspections and Self-Assessments

As per the requirements of the Management System, both SCAs and Facilities conduct various audits, inspections, and self-assessments to ensure that the management system is functioning according to expectations; and that any policy, programmatic, or procedural deficiencies are identified, and appropriate actions taken to resolve them.

1.2.1 Audits

See Section 1.2 of the *ACMR for CNL* [5] for a list of all CNL-wide Audits for the reporting period.

1.2.1.1 External Audits

The annual ISO 9001:2015 external audit was held by third party registrar SAI Global for the recertification of the HWP MO ISO 9001:2015 certification. The audit identified two opportunities for improvement (managed through the corporate ImpAct[2] system (DevonWay)) that have since been closed.

1.2.1.2 Internal Quality Audits

There were no internal audits completed by the Quality Audits and Processes branch specific to the PHP in the reporting period.

1.2.2 Regulatory Inspections

CNSC Inspections

[2] ImpAct – Abbreviation for Improvement and Action. It is an internal process used to identify events, problems, non-conformities, opportunities for improvements, and personnel injuries. The process also identifies and tracks actions to correct or remediate problems.

There were two CNSC compliance inspections associated with the PHP in the reporting period. The purpose of the inspections was to verify adherence with the NSCA, associated regulations, conditions of the applicable licences and associated LCHs, and other related licensing basis documentation. The CNSC inspections conducted at the PHP in the reporting period are summarized in Table 1.

A general inspection took place from 2022 March 28 to April 8 at the PH WWTP and PH LTWMF. The inspection included the Radiation Protection, Environmental Protection, and Conventional Health and Safety SCAs. CNL worked through 2022 to address CNSC staff comments related to the three issued non-conformances.

A baseline human performance management inspection took place from 2022 December 14 to 16. The inspection had a focus on the human performance management SCA, particularly CNL's corrective action plan and gap analysis in response to inspection CNL-PHAI-PHP-2019-02 conducted in 2019. The corporate ImpAct System (DevonWay) is used to track, manage, and close the corrective action plan for the Notices of Non-Compliance (NNCs) received from CNSC staff in 2023 February.

Table 1: CNSC Inspections

Inspection No.	Area Inspected	No. of NNCs	No. of Recommendations	No. of NNCs Closed [a]
CNL-PHAI-PHP-2022-01	General Inspection	3	3	3
CNL-PHAI-PHP-2022-02	Baseline Human Performance Management	6	4	0

NNC – Notice of Non-Compliance

a. Closed as of 2023 January 17

Inspections by Other Regulatory Bodies

There were no inspections by other regulatory bodies at the PHP in the reporting period.

1.2.3 Self-Assessments

The corporate ImpAct System (DevonWay) tracks the planned self-assessments from the *Environmental Remediation Management (ERM) Historic Waste Program Self-Assessment 2022/2023 Plan.* These are listed in Table 2~~Table 2~~. During the reporting period, two (2) self-assessments were planned to be conducted across all HWP MO sites covering various aspects of the Management System, including SCAs. Table 2

Table 2: List of Self-Assessments

Title	Facility/Safety and Control Area
ERM HWP Self-Assessments 2022/2023	HWP Quality Plan [10]
	PHAI Transportation of Dangerous Goods Plan [13]

1.3 Management Reviews

A Quality Assurance Program/Management System Review was completed for 2022/2023 to evaluate the effectiveness of the management system. The conclusion was that CNL's management system is suitable to meet the necessary requirements, adequate and aligned with the strategic direction, and effective at supporting CNL to achieve its objectives.

1.4 Compliance Oversight

An integrated approach to oversight, where all SCAs are streamlined into one process, is used by CNL to confirm the suitability, implementation, and effectiveness of processes applied to PHAI project activities. Compliance objectives for contractual obligations, licensing requirements, Acts and Regulations, environmental management and protection plans, compliance plans, and technical specifications are outlined in the *Historic Waste Program Management Office Field Oversight Activities* procedure [14].

Activities performed by CNL and by PHAI consultants, contractors, and service providers are subject to CNL's oversight program. Recommendations for improvement raised from CNL's compliance oversight activities were dispositioned and implemented.

2. Human Performance Management

2.1 Human Performance Program

The PHP adheres to CNL's Performance Assurance Functional Support Area. See Section 2 of the *ACMR for CNL* for details [5].

All CNL employees receive mandatory Human Performance Training. CNL's Human Performance and Training branch provides programs and support that help reduce human error and, as a result, the frequency and severity of unplanned events at CNL.

The effectiveness of the Human Performance program at the PHP has been enhanced through the following improvements:

- CNL created and launched a new Human Performance training course called *Leaders in Field Training*. This course complements *Human Performance Awareness – Fundamentals and Nuclear Safety Culture*. *Leaders in Field Training* is tailored to support employees and managers as a refresher of Human Performance fundamentals and safety culture. This course is available to all employees at CNL, and it is delivered remotely.
- A Field Checklist Observation card for the PHP was created in the DevonWay software system with updated buildings and work locations for HWP inspections. This is a robust data collection and reporting card that encompasses housekeeping, stairways and passageways, roadways and parking lots, Electrical Safety, Workplace Hazardous Materials Information System, Portable Tools and Equipment, Ladders, Emergency Equipment, Personal Protective Equipment, Fire Protection, and Emergency Preparedness.

2.2 Training Program

The PHP adheres to the Corporate Training and Development Functional Support Area. See Section 2 of the *ACMR for CNL* for details [5]. The *Port Hope Area Initiative* (*PHAI) Training Plan* [15] defines the training processes applied to the work performed at the PHP and promotes safe and effective workplaces through the cooperation of management, employees, contractors, and visitors. Compliance with the plan ensures that all project staff (including CNL employees and contractors) are qualified to perform their duties effectively and safely, using established processes and standards.

There were no revisions to the *PHAI Training Plan* [15] in the reporting period. A revision to the *PHAI Training Plan* [15] will be submitted to CNSC staff in 2023.

2.2.1 Required Training

The PHP maintained a sufficient number of qualified workers to carry on the licensed activities safely and in accordance with the NSCA and the regulations made under the NSCA [6]. All workers assigned to the PHP are required to attend a PHAI Awareness session to gain understanding of the project. Contractors are responsible to qualify staff to PHAI requirements as well as maintain their training. Records are inspected regularly by CNL staff during compliance oversight activities and audits.

The PHAI applies the Systematic Approach to Training for positions and roles identified on the *Controlled List* [16]. The Systematic Approach to Training enlists the Training Analysis method – Job/Task Analysis to identify training requirements to be documented in Training Plans. The positions and roles at the PHP that are on the *Controlled List* [16] are:

- Radiation Surveyor
- Health Physicist
- Certified Industrial Hygienist
- Shipper
- Handler
- Design Authority

Identified positions at PHP that do not meet the threshold criteria established in the *Process to Determine the Application of the Systematic Approach to Training at CNL* [17] for the *Controlled List* [16] have their training requirements defined using *CNL's Learning and Development Standard* [18]. These positions are:

- PH WWTP Operator
- PH WWTP Supervisor
- CNL Safety Specialist
- Environmental Technologist

Continued progress was made in developing both Systematic Approach to Training and Learning and Development based training programs for the above positions.

An established Curriculum Review Committee is scheduled to meet quarterly with required membership. In 2022, the second quarter Curriculum Review Committee meeting was not held within the scheduled quarter. In 2023, an ImpAct was raised in DevonWay Table 2to address the non-conformance and prevent recurrence. The Curriculum Review Committee Terms of Reference mandate includes review of staff qualifications, field performance, system, equipment and staffing changes and training compliance. Updates and improvements are monitored in the ongoing action list.

All PHP personnel, both employees and contractors, are adequately trained with initial and continuing training requirements to ensure safe operations and to conduct work under the PHP Licence [2]. Section 2 of the *ACMR for CNL* [5] details the 2022 CNL Employee and Manager/Supervisor required training. Table 3~~Table 3~~ provides a list of federally/provincially legislated training courses that appear in PHAI position-specific training plans. Section 2 of the *ACMR for CNL* [5] provides the established CNL performance benchmark. CNL is focused in 2023 to reach necessary performance benchmarks.

Table 3: Federally/Provincially Legislated Training in 2022

Course Title	Course Code	% Complete
Aerial Platform Practical	OSH-3003-D	77
Aerial Work Platform Theory	OSH-1003-Online	92
Arc Flash Safety for Canada	OSH-9070-Online	85
Electrical Safety Introduction for Canada	OSH-9071-Online	92
First Aid Standard & Defibrillation	OSH-1020	100
Ladder Safety	OSH-1033-Online	100
Lift Truck Operation - Counter Balance Practical	OSH-3002-C	100
Lift Truck Operation - Electric Pallet Truck Practical	OSH-3002-H	90
Lift Truck Operation - Non-Electric Pallet Truck Practical	OSH-3002-D	100
Lift Truck Operation - Theory	OSH-1002-Online	100
Lock Out / Tag Out	OSH-1004	100
Transportation of Dangerous Goods Class 7 Radioactive Material - Handler	TDG-1007-H	100
Utility Task Vehicle Rider	OSH-1013	100
Vehicle Spotter Training	OSH-1047-Online	100
Working at Heights Practical	OSH-3005	100
Working at Heights Theory	OSH-1005	100
Percent complete:	**-**	**96**

2.2.2 Contractor Training

Training records for all contractors are verified before work commencement. In addition, records are verified regularly through CNL Compliance Oversight activities.

Before accessing the PHP, contractors are required to complete following CNL training:

- Contractor Safety Orientation
- Radiation Protection Group 4 (if required)
- PHAI Awareness
- Step up to Safety
- CNL COVID Awareness

2.2.3 Training Evaluations Summary

See Section 2.2.3 of *ACMR for CNL* [5] for the inputs and mechanisms for on-going Training Evaluation.

3. Operating Performance

3.1 Operating Program

Although not formally part of the PHP LCH [3], the PHP adheres to CNL's Conduct of Operations Functional Support Area. See Section 3.1 and Section 11.2 of the *ACMR for CNL* for details [5].

3.1.1 Environmental Remediation Operations

The following sub-sections provide a summary of the project activities during the reporting period. Detailed written reports on the PHP activities, as well as a three-month look ahead were provided to CNSC staff on a quarterly basis [19] [20] [21] [22] as required by Section 3.2.3 (g) of the PHP LCH [3].

3.1.1.1 Port Hope Long-Term Waste Management Facility

The Phase 2 project activities associated with the PH LTWMF, located at the site of the former Welcome WWMF and adjacent lands, include construction of an engineered above ground mound and associated infrastructure and support facilities. These activities and upgrades include the following:

- Construct on-site infrastructure and support facilities, as part of PH LTWMF operations (in progress)
  - Leachate transfer system installation (e.g., pump house structures) were completed, and procurement of key equipment was also completed.
- Placement of waste from the WWMF site into the PH LTWMF (complete).
  - Excavation, remediation, and verification of residual contaminated lands (plumes) from the low-lying swamp area west of the mound, area also known as the 'Future Brush Area to be Cleared' were suspended due to a business decision related to contractor change-over. Activities are scheduled to resume for completion in 2023.
- Placement of waste from other PHP clean-up sites into the PH LTWMF (in progress).
  - Continued with the receipt and long-term storage of historic LLRW from various PHP remediation sites. Maintenance of the PH LTWMF facility was conducted in accordance with maintenance and operational procedures established by CNL and as outlined in Section 3.2 of the PHP LCH [3].
- Preparation of cover liner system and closure of mound (in progress)
  - Continued to monitor the design profile and shaping of cells 1, 3, and 2A; capping is scheduled to commence 2025.

3.1.1.2 Port Hope Waste Water Treatment Plant

The PH WWTP operated normally in 2022 and process interruptions were related only to maintenance activities, intermittent disruptions to the electrical power grid, and operational restrictions of the PH LTWMF. The facility was operational for >98% of the time.

Water Collection and Treatment System

The wastewater collection system consists of interceptor ditches, a main collection pond and three settling ponds. The water treatment systems include a former water treatment building (Old WTB) and the PH WWTP, and twin four-inch (100 mm) diameter discharge pipelines to Lake Ontario. The purpose of the Old WTB was to capture groundwater and surface water that came in contact with impacted materials deposited at the historic WWMF. The system was designed to reduce arsenic, radium-226 and uranium concentrations, and discharge the treated water to Lake Ontario. The Old WTB was not operated in 2022.

The PH WWTP utilizes the same collection ditches and collection pond as the Old WTB and employs reverse osmosis, sand filtration, mechanical vapor recompression evaporators, slurry dryers and inclined plate clarifiers, to treat the collected surface water and groundwater. The system utilizes these technologies to remove over 99% of the arsenic, uranium, and other heavy metals in the influent water. The system discharges liquid effluent three kilometers underground to Lake Ontario via the same twin four-inch (100 mm) diameter pipelines that were used from the Old WTB.

Water Treatment and Monitoring

Influent and effluent samples were collected from the PH WWTP from fixed locations on weekly intervals throughout 2022. Grab samples were taken from a sample point on the pipeline feeding the treatment system and represented the treatment inflow. The treated effluent from the facility was sampled continuously by means of an interval sampler. A composite sample was collected to provide data on the effluent discharge.

A total of 283,600 m^3 of influent was collected by the PH WWTP in 2022. This represents a decrease of 3% in volume from 2021 recorded volumes.

For the reporting period, the arithmetic mean values of the final effluent discharge weekly analyses for licensed discharge parameters were calculated and are provided in Appendix B, Table 13.

A total of 102,300 m^3 of effluent was discharged by the PH WWTP in 2022. This represents a decrease of approximately 18% in volume from 2021 recorded volumes.

Off-Site Sampling

Water samples were taken monthly from an off-site stream (Brand Creek) within the same watershed as the PH LTWMF. Samples from this location are intended to detect any migration of contaminants via leachate or runoff from the PH LTWMF. Brand Creek is the main stream in the watershed and is located west of the PH LTWMF. Brand Creek is sampled at the location where the creek crosses Marsh Road. Water samples were analysed for the same parameters as the PH WWTP design objectives. In 2022, results were generally found to be below the Provincial Water Quality Objectives (PWQO) [23] and Canada Water Quality Guidelines (CWQG) [24]. Minor exceedances of CWQG [24] guidelines for Copper and Lead were reported in the

2022 February, May, and June samples. There was one minor exceedance of PWQO [23] guideline for uranium in 2022 December. 2022 results are consistent with previous years. Additional details are provided in Appendix B, Table 16~~Table 16~~.

Operations of Residuals Management Systems

Regular operations of the residual management systems occurred in conjunction with normal water treatment activities throughout 2022. The residuals management equipment includes the clarifiers, evaporators, slurry dryers, and belt press systems. Both sludge and slurry processing streams continue to be optimized.

Waste Processing

The production and handling of residual wastes that were generated from the water treatment process was initiated upon final commissioning of the waste handling equipment (2017 December). Further testing and optimization of these and associated processes took place once commissioning activities were complete. Processing of the solids generated from operations began in 2018 April and has continued on a full-time basis since then. A total of approximately 5,260 tonnes of residual waste solids have been produced and transferred to the PH LTWMF to date.

Residual Solids Treatment and Disposal

The two solid waste streams operated as designed in 2022. As noted above, several key optimizations were made to improve the efficiency and throughput of these processes. The evaporators treat concentrate produced by the reverse osmosis systems and are designed to reduce the overall volume of this waste through the production of condensate. The condensate is combined with permeate generated from the reverse osmosis units and ultimately discharged to Lake Ontario. The evaporated concentrate (slurry) is fed to mechanical dryers for further dewatering. The dried slurry is transferred into bulk storage totes as a flowable solid which are transferred to the PH LTWMF for long term management.

Dissolved solids in the influent liquid waste stream are chemically precipitated and collected as sludge in the clarifier vessels. These solids are stabilized using polymer compounds and held in batches before dewatering in the belt filter press. The filtration step removes excess water from the sludge before deposition into bulk storage totes which are then transferred to the PH LTWMF for long term management. The decanted water is discharged back to the clarifiers or to the main collection pond for recirculating treatment.

A combined total of 1,126 tonnes of residual solid wastes were generated by the PH WWTP in 2022. This represents a decrease of 11% in production from recorded 2021 production.

3.1.1.3 Small-Scale Sites

The PHAI Small-Scale Sites project involves the radiological survey of Urban Area (formerly Ward 1) properties and a select number of Rural Area (formerly Ward 2) properties in Port

Hope (approximately 5,466 properties and 471 roads in total) for the presence of historic LLRW. Activities included remediation of LLRW and/or radiological artifacts on properties that were identified by the survey; the restoration of remediated properties; and the safe transportation of the waste to the PH LTWMF for storage.

Properties continued to be evaluated for evidence of Radon gas exceedances. Where exceedances were found to be a result of LLRW contamination on the property, mitigation systems were evaluated for installation. Mitigation system installations paused during the Covid-19 pandemic. A new radon mitigation contractor was brought online in 2022 and initial site visits to assess the radon mitigation requirements of the required properties were completed towards the end of 2022. Mitigation system installations will resume in early 2023.

Characterization of External Properties

Of the 5,249 properties with external lots, 4,919 have been characterized and 1,120 have been identified with LLRW based on our current clean-up criteria. Of the remainder of the 330 exterior properties that have not been characterized, 28 are in some stage of characterization field work planning/execution or are waiting for analytical results; 153 have refused to participate, or CNL has not been granted access by property owners; and 149 represent properties awaiting access determination (e.g., railway lands). The current estimated total number of external properties with LLRW and requiring remediation is 1,160 properties.

Characterization of Internal Properties

Of the 4,416 properties with interior spaces, 4,090 have been characterized and 225 have been identified with LLRW. Of the remaining 326 interiors that have not been characterized, 2 are in-progress and the remaining properties are on hold or property owners have not granted CNL access. Interior surveys resumed in 2022 following a pause during the COVID-19 pandemic. The estimated total number of interior properties with LLRW is 243 properties.

Characterization of Roads

Of the 471 municipal road allowance (RA) sites, 188 have undergone characterization and 132 of these roads were identified with LLRW. Of the 132 roads with identified LLRW, 117 have been delineated. The estimated total number of RA sites with LLRW is 329.

Based on adjacent property information, primarily from the delineation of residential sites with LLRW, several additional potential impact areas on the roads have been identified. The scope of this work was divided into two contracts – RA Contract 3 (RAC3) and RAC4 to align with current procurement strategies.

RAC3 was awarded to characterize and delineate 65 RA sites, and the field work for these sites was largely completed in the second and third quarters of 2022. An additional 10 RA sites was added to the scope of RAC3 in the third quarter of 2022, and this field work was completed in the fourth quarter of 2022.

RAC4 will include the characterization and delineation of 280 additional RA sites and include verification activities of RA sites with no identified LLRW to support close-out activities. This contract will be awarded as a Task Order under the new Characterization, Engineering Design, Remediation, and Restoration (CEDRR) procurement strategy. During 2022, RAC4 underwent a Request for Proposal evaluation and contractual commercial negotiations with an anticipated award in early 2023.

Design of Exterior Properties

To date, 250 property designs have been completed and 236 are actively in the design queue (pre-design survey, 60% design, 80% design, etc.). Pre-design activities were discontinued in the summer and fall months of 2022 to transfer scope of work to the upcoming CEDRR contract. Design production was also discontinued for 2022 to transfer scope of work to the CEDRR Task Order documentation and handover. Predesign and Design scope of work will be restarted in 2023 under the CEDRR contractors.

Design for Road Allowances

Revisions to six RA designs were completed in 2022 mainly in support of upcoming remediation in 2022 and 2023. RA designs have been strategically planned to align with the remediation of adjacent neighbourhoods.

Remaining Design development was on hold awaiting further development under two CEDRR Master Construction Contract Task Orders to be awarded in late 2022/early 2023. Design Consultant contract continued to support remediation through engineering oversight including review of field changes. Work in late 2022 focused on onboarding of CEDRR Contractors to execute 40 RA designs in 2023.

Remediation of Small-Scale Sites

In 2022, excavations of exterior historic LLRW and backfilling to existing grades was completed at 33 properties.

Interior remediation was completed at 12 properties.

3.1.1.4 Major Sites

Waterfront Area

The Waterfront Area consists of the following sites:

- Alexander Street Ravine
- Centre Pier
- Port Hope Harbour
- Canadian National/Canadian Pacific Viaducts area

- Strachan Street
- West Beach (former Waterworks West)
- 95 Mill Street South sites (restoration and remediation completed in 2021)
- Waterworks East (restoration and remediation completed in 2021)

The long-term contract for the remaining work at the Port Hope Harbour and Centre Pier was awarded. Production mechanical dredging commenced in 2021 June and is continuing. Hydraulic dredging was fully implemented in 2022, but operational challenges with the process necessitated a move back to mechanical dredging. Mechanical dredging will now be used as the primary removal mechanism for bulk sediment removal. The Portable Water Treatment System is operational and will continue to support the site for any water treatment needs. Replacement/reinforcement of the harbour walls is in progress with a focus on the pier west wall and Queen's wharf.

Remediation work at the Canadian National/Canadian Pacific Viaducts area continued through 2022. Remediation was completed in 2023 March, with restoration planned for spring/summer 2023.

Remediation of the Strachan Street site was completed in 2022 March. However, identification of residual contamination at depth resulted in the need to apply for a "special circumstance" within the road allowance. The special circumstances protocol has been developed for situations where the cleanup of waste is not practical, reasonably achievable or desired. Restoration of the site will occur in summer 2023.

In 2019, Package B work included additional characterization drilling for West Beach and completion of a preliminary design package for constructability review. The preliminary design package identified a need for further delineation to the west of the creek which bisects the property. Trees were removed from the west of the creek in 2021 winter to accommodate further delineation works and additional characterization. A "special circumstance" has been applied to a very small, targeted area of elevated arsenic, at depth within the beach area. Mobilization occurred in fall 2022, and waste haul commenced in 2023 April. There is ongoing discussion with the Ministry of Natural Resources and Forestry, Fisheries and Oceans Canada, Curve Lake, and Hiawatha First Nations in regards to the presence of fish in the creek. Fisheries and Oceans Canada had rescinded their previous authorization to perform work around this creek due to a change in their internal policy.

Due to various environmental constraints, CNL will apply a Special Circumstance to a large portion of the original Alexander Street Ravine site and to residentially-owned woodlot packages. CNL has begun discussions regarding these applications with the landowners and the municipality. The Special Circumstance Decision Package for the largest portion of the ravine property (privately owned) has been finalized and the property owner has approved the decision. There will be a targeted remediation performed on the municipality owned parcels.

The design work and corresponding Special Circumstance is in process. This work will be awarded as part of the new CEDRR task order.

Highland Drive Area

The Highland Drive Landfill Area is comprised of three (3) separate and unique sites: Highland Drive Landfill (HDLF) Site, Pine Street Consolidation (PSNE CS) Site and the Highland Drive South Ravine.

The remediation work in the HDLF is unique in that it involves the removal of LLRW in a former municipal solid waste landfill. As such, a site-specific Remedial Verification Approach is in development. The contractor mobilized to HDLF in fall 2022 and commenced waste haulage from the landfill area in January 2023. This project will continue until fall 2024.

Design for the Highland Drive South Ravine was awarded in March 2023, and the current target to start remediation is fall 2023.

Work on the PSNE CS site was completed in early 2022. In 2022, CNL continued to maintain, monitor, and inspect the PSNE CS and Strachan Street Ravine Consolidation Site as per the PHP Licence [1].

Industrial Sites

In accordance with the Legal Agreement [1], the MPH and the Government of Canada have agreed that CNL will remediate a total volume of 51,250 m^3 of waste at specified industrial (non-radioactive) sites within the MPH. This remediation work is outside of the scope of the PHP Licence [2] and PHP LCH [3]. These sites are: Centre Pier, Lions Recreation Centre Park, Former Coal Gasification Plant, Chemetron Lagoon, and the Sewage Treatment Plant Storage Cell. The work also calls for the filing of a Record of Site Condition per Ontario Regulation 153/04, which entails a Risk Assessment of the contamination identified and installation of Risk Management Measures.

The finalization of the total 51,250 m^3 volume allocation to the Industrial sites has been completed. Remediation activities commenced in 2022.

The following activities were completed at the Industrial Sites in 2022:

- Centre Pier: The Risk Assessment was completed and submitted to the Ministry of Environment, Conservation and Parks (MECP) for formal review. The MECP provided comments in 2022, and responses were formulated. The updated Risk Assessment will be sent to MECP in 2023. Remediation will be done after 2024 as part of the Harbour-Centre Pier works.
- Lions Park: The Risk Assessment was completed and submitted to the MECP for formal review. The MECP provided comments in 2022, responses were formulated, and an updated Risk Assessment was submitted to MECP in late 2022. Initial site preparation to facilitate the remediation was initiated at the request of MPH in the fall of 2022. This

was the removal of a small woodlot on the eastern portion of the property where excavations will be undertaken.

- Coal Gasification Plant: The Risk Assessment was completed and submitted to the MECP for formal review. The MECP provided comments in 2022, responses were formulated, and an updated Risk Assessment was submitted to MECP in late 2022.
- Chemetron Lagoon: At the start of 2022, CNL began an early phase of the project, being the removal of lagoon water, however, significant winter storms prevented that from completing. CNL awarded a new contract for the remediation of the site and begun site preparations including tree removal, fence re-alignment and building demolition. The lagoon remediation will start and complete in 2023, after which the Record of Site Condition process will commence.
- Sculthorpe Marsh: The MPH have indicated that the discussion on potential remediation would occur after the site characterization and assessment of that information was available. The characterization is expected to start in 2023, enabling a discussion with the MPH in 2023/2024.
- Sewage Treatment Plant Storage Cell: The Industrial Site portion of the work is complete (2018).

3.2 Reporting Requirements

The PHP maintains a program for reporting information to the CNSC in accordance with the PHP LCH [3]. This includes compliance monitoring, operational performance, event reporting, and various types of notifications. In the reporting period, CNL prepared and submitted the written reports required by the PHP LCH [3].

3.2.1 Reportable Events to CNSC

During the reporting period, there were 12 events that occurred at the PHP that were deemed reportable to the CNSC. Reportable events are listed in Table 4.

Table 4: Reportable Events to CNSC

Event No.	Title	SCA	Facility (if applicable)
ERM-22-1033	Failure to Provide CNSC Written Notification of Licence Document Revision	Management System, Physical Design and Operating Performance	PH LTWMF
ERM-22-1698	Exceedance of Discharge Criteria of Plant Effluent	Environmental Protection	PH WWTP
ERM-22-1705	Arsenic Action Level Exceedance	Environmental Protection	PH WWTP
ERM-22-1841	Matex Environmentally Safe Vegetable Oil-Based Rock Drill Lubricant Spill	Environmental Protection	PH Harbour Center Pier
ERM-22-2126	Toxicity Test Failure of Plant Effluent	Environmental Protection	PH WWTP
ERM-22-2149	False Fire Alarm Event	Emergency Management and Fire Protection	PH Small-Scale Sites – 39 Hayward Street
ERM-22-2209	Attempted Trespassing	Security	PH Harbour Centre Pier
ERM-22-2507	Hand Injury	Conventional Health and Safety	PH Small-Scale Sites
ERM-22-2612	Boiler Condensate Tank Overflow	Operating Performance and Environmental Protection	PH WWTP
ERM-22-3086	Reportable Transportation of Dangerous Goods Issues Related to Misclassification of Low Specific Activity-I Material as Surface Contaminated Object	Packaging and Transport	PH Harbour Center Pier
ERM-22-3601	Gasoline Spill into Port Hope Harbour	Environmental Protection	PH Harbour
ERM-22-3994	Perimeter Fencing Down at Various PHAI Sites	Security	PHAI Sites

3.2.2 Reportable Events to Other Regulators

During the reporting period, there were no Hazardous Occurrence Investigation Reports made to Employment and Social Development Canada (see Section 8, Conventional Health and Safety for further details).

There were no reports made to Environment and Climate Change Canada (see Section 9 Environmental Protection for further details).

The following reports were made to the MECP -Spills Action Centre:

- ERM-22-1841, Matex Environmentally Safe Vegetable Oil-Based Rock Drill Lubricant Spill
- ERM-22-3601 – Gasoline Spill into Port Hope Harbour

3.2.3 Corrective Action Program

3.2.3.1 Trending of Events Related to Operational Activities

As events at the PHP occur, they are recorded in the ImpAct system (DevonWay). This information is regularly reviewed to identify any trends.

Three ImpActs with cognitive trending analysis were opened in 2022 across the PHAI. All three were for the PHP, and one also included the Port Granby Project. The 2022 Trend ImpActs include the following event types:

- HWP - PH/PG MO - Adverse TREND "Dump Box Leaks" and Related Events / Issues
- HWP - PH Major Sites - Property damage to a monitoring well
- HWP - PH HCP - Adverse Trend on Non-reportable Ferric chloride spill

Two of the three ImpActs were processed, with a total of three corrective actions assigned to address the event types and contributing factors. One trending ImpAct is currently open and ongoing, with only one of ten corrective actions remaining open.

ImpActs raised at the PHP over the past five years by Significance Level[3] are summarized in Table 5. The increase in the number of ImpActs at PHP in 2022 compared to previous years is attributed to an increase in Significance Level 4 events, which are considered minor problems. The increase is indicative of a positive reporting culture. In 2022, there was a notable increase in worker hours since COVID-19 pandemic restrictions were reduced from previous years. In addition, there was a notable increase in non-reportable spills (e.g., hydraulic oil leaks) because of an internal requirement to raise an ImpAct, instituted in the fall of 2021.

[3] Significance Level: Levels assigned to an event (SL1 being most significant, SL4 being least significant) based on the actual or potential result in safety, environmental, or business consequences.

Table 5: Number of ImpActs Raised at PHP

Year	Level 0[a]	Level 1	Level 2	Level 3	Level 4	Total
2018	7	0	1	38	155	203
2019	0	0	1	21	122	150
2020	3	0	0	5	81	89
2021	1	0	5	31	132	169[bc]
2022	4	0	6	41	199	250[b]

a Level 0 will be assigned if the ImpAct is deemed to be a "non- problem" and a recommendation to close the Impact will be given.
b Total does not include committee-based ImpActs.
c Total does not include an additional five ImpActs and one committee-based ImpAct that were raised for tracking initiatives that span PHAI projects.

4. Safety Analysis

4.1 Safety Analysis Program

As per the PHP LCH [3] the Safety Analysis SCA is not applicable to the PHP.

5. Physical Design

5.1 Design Program

The PHP adheres to CNL's Design Authority and Design Engineering Functional Support Area. See Section 5.1 of the *ACMR for CNL* for details [5].

5.2 Changes to Design or Equipment

The PHP utilizes CNL's Engineering Change Control process, supplemented by *HWP MO Application of Engineering Change Control and Oversight* [25] to implement modifications and upgrades to existing equipment. The initial release of the application document was in 2022 January [26]. At the request of the CNSC, the document was revised and revision 1 was released in 2022 September. Revision 1 included additional references to the PH licensing basis documents for the Physical Design SCA [27].

During the reporting period, there were no major changes to design or equipment identified that required the change request to follow the full Engineering Change Control process (i.e., full assessment).

There were no notable activities at the PH LTWMF.

Notable activities at the PH WWTP included the following:

- In 2022 spring, CNL implemented an operational change to transfer liquid waste from the Port Granby WWTP to the PH WWTP. In 2022 August, CNL submitted the assessment for permitting the transfer of the liquid waste to CNSC [28]. In 2022 October, CNL submitted the licensing basis assessment for the transfer of liquid waste to CNSC [29]. To address CNSC comments, CNL continues to update documentation, which will be submitted to CNSC in 2023.
- Ongoing planning and design work supporting the installation of outdoor storage tanks to hold increased volume of soda-ash, sodium hydroxide, and sulphuric acid on site.
- Optimization and evaluation of heat recovery methods and process modification to assist in salt removal efficiency
- Modification of the design to recover residual solids from the belt press filtrate return line to the plant sump tank. This modification will significantly reduce the volume of free solids entering the sump and return to the Main Collection Pond.
- Evaporator stainless steel conversion
- Installation and commissioning of additional reverse osmosis units

In 2022 November, CNSC staff raised concerns with CNL's management oversight of changes and its adherence to the change control process. CNL acknowledged that the implementation of the change management process is an area needing improvement and initiated a Root Cause Analysis to identify and correct the programmatic issues. The root cause analysis identified five

corrective actions and eight remedial actions to be taken by CNL. The identified program improvements continue through 2023.

6. Fitness for Service

6.1 Fitness for Service Program

As per the PHP LCH [3], the Fitness for Service SCA is not applicable to the PHP.

7. Radiation Protection

7.1 Radiation Protection Program

The PHP adheres to the CNL's Radiation Protection (RP) Functional Support Area. See Section 7 of the *ACMR for CNL* for details [5].

The *Port Hope Area Initiative Radiation Protection Plan* (PHAI RP Plan) [30] defines the radiation protection measures applicable to PHAI projects at the PHP site and is consistent with CNL's Radiation Protection Program Requirements [31]. The purpose of these radiation protection measures is to ensure that the execution of PHAI projects complies with the level of radiation safety required by the relevant regulations pursuant to the NSCA [6].

The CNL PHP Contractors (PHP Contractors) responsible for operating various PHAI sites utilize a CNSC licensed Dosimetry Service Provider for monitoring dosimetry on site. Alternatively, CNL site and facility staff (i.e., CNL employees, contingent workers, and sub-contractors) utilize the Chalk River Laboratories Licensed Dosimetry Service Provider. Dose to CNL site and facility staff is not measured independently; only the total dose per person is recorded, irrespective of the site at which the person works (e.g., licensed activities at both Port Hope and Port Granby). CNL site and facility staff and the PHP Contractors who work in, or frequently enter Controlled Areas are assigned Thermoluminescent Dosimeters (TLDs) or Optically Stimulated Luminescent Dosimeters to monitor for external radiation deep and shallow dose radiation exposures.

There were no revisions to the *PHAI RP Plan* [30] in the reporting period.

7.1.1 ALARA Initiatives and Activities

As Low As Reasonably Achievable (ALARA) initiatives and activities continue to be at the forefront of the PHP RP Program. Recent CNL improvements and changes include Radiation Protection barriers, and Radiation Protection instrumentation. In 2022 the PHP RP program sought out to standardize RP barriers, specifically colouring with yellow and magenta, along with having the stands, posts and stanchions used in the barriers to be of a more robust nature. Radiation Protection instruments and equipment used for radiation measurements are selected, tested, and calibrated for the task and hazard for which they will be utilized. Instrumentation is calibrated to isotope(s) that closely represent the energy and type of radiation (α, β, γ) encountered in the LLRW found on the project.

ALARA initiatives and activities are practiced in every facet of the PHP activities and is specifically addressed through the implementation of the PHP environmental monitoring program's monthly and quarterly deployment of PHP Environmental Radon Monitors and TLDs. Results from the 2022 monitoring program confirm a public dose estimate to be 2.8% of the annual limit for the public based on the maximum readings from Radon and TLD dose measured along the fence line, with a conservative occupancy period of 60 hours per year. The integrity of the ALARA program is managed through routine monitoring and reviews of dose records to confirm that no adverse trends or exceedance have occurred.

7.1.2 Contamination Control

Routine monitoring across the project confirms that current activities have been executed while minimizing the spread of contamination. For the PHP, 2022 had one personal contamination event and no exceedances within radiological safety zone limits. No exceedances of radiation dose Action Levels or Administrative Controls were noted as a result of these contamination events.

Table 6 outlines contamination events that occurred at PHP over the past five-years.

Table 6: Contamination Events

	Skin and Clothing Contamination				Workplace Contamination	
	Skin[a]	**Personal Clothing[b]**	**Radiological Work Clothing[c]**	**Total**	**Surface[d]**	**Vehicle /Materials[e]**
2018	1	0	0	1	2	0
2019	0	3	0	3	0	0
2020	0	1	1	2	4	0
2021	1	3	0	4	1	0
2022	0	1	0	1	0	0

a Contamination found is greater than 4 Bq/cm^2 beta-gamma or 0.1 Bq/cm^2 alpha
b Contamination detected above background on personal clothing
c Contamination detected is greater than 850 Bq/cm^2 beta/gamma or greater than 30 Bq/cm^2 alpha
d Fixed/loose contamination in excess of limits specified for the applicable radiological zone
e Removable surface contamination detected above background

The contamination event noted in Table 6 occurred during planned routine work and regular operations. The total contamination was 0.18 Bq/cm^2 alpha and 0.19 Bq/cm^2 beta. Maximum skin dose received by the worker involved in the personal clothing contamination event was assessed to be 1.64E-01 µSv which is 0.003% of the PHAI action level and 0.02% of the public dose limit set by the CNSC.

7.2 Dosimetry

7.2.1 Interpretation of Reported Dose Quantities

The PHP uses the Chalk River Laboratories Licensed Dosimetry Service Provider for external and internal dosimetry for CNL staff, contingent workers, and some sub-contractors. CNL staff, contingent workers, and sub-contractors whose external and internal dosimetry are monitored using the dosimeters are not measured independent of the site location worked (i.e., staff or contractor may work at more than one PHAI project site); only the total dose per person is recorded, irrespective of the site at which the person works. PHP Contractors use an alternate CNL approved and CNSC licensed Dosimetry Service Provider, where dose is monitored for the assigned PHAI PHP sites where work is performed. In certain instances, contractors my work on multiple sites. All people who have a reasonable probability of receiving an occupational effective dose in connection with a nuclear substance or nuclear facility in excess of 1 mSv per calendar year will be designated a Nuclear Energy Worker (NEW) [30].

CNL staff, contingent workers, and sub-contractors who work at or frequently enter the Controlled Area(s), are assigned a passive radiation dosimeter to monitor for external deep and shallow radiation exposures. Alternatively, PHP Contractors use Optically Stimulated Luminescence Dosimetry equivalents. CNL dosimetry operates on a quarterly monitoring period. All external dosimetry is read on a routine basis. Visitors and non-NEWs are typically given Electronic Personal Dosimeters to track dose and to ensure trigger limits and dose control points identified within the *PHAI RP Plan* [30] are not exceeded.

The internal dosimetry program is primarily provided to the CNL Operations and RP staff who work in close proximity with radiological hazards within the PH WWTP. The bioassay is tested for the presence of uranium through in-vivo submissions. All results for uranium bioassay reported were well below CNL's Bioassay Recommendation Level of Minor, which indicates little to no potential for an uptake of activity.

CNL's personnel radon exposure program for PHP sites monitors employees, contingent workers, and sub-contractors and PHP contractors due to the increased work required to support Phase 2 construction. Phase 2 construction workers were assigned track-etch type Personal Radon detectors and doses are calculated and recorded if the monthly/quarterly average exceeds the trigger level of 150 Bq/m^3. No exceedances were identified in the reporting period.

PHP continues to ensure that doses to staff and contractors are kept ALARA by strict compliance to its Dosimetry program as stipulated in the *PHAI RP Plan* [30].

7.2.2 Radiation Doses to Personnel

The dose data in all tables in this section represents doses delivered at PHP for all monitored persons, which includes employees (including those in temporary employment such as students), contractors, sub-contractors, and visitors. However, doses have not been broken

down by individual sites because employees, contractors, sub-contractors, and visitors routinely move between sites without changing TLDs, making it difficult to accurately determine how much dose can be attributed to a CNL employee, contractor, or visitor at a single facility.

The maximum individual effective dose during the current five-year dosimetry period (from 2021 January 01 to 2025 December 31) is 1.02 mSv, received by a CNL sub-contractor tradesperson.

In 2022, there were no non-NEWs that had their effective dose assessed.

Table 7: Effective Dose for 2022

Monitored Person Type		Dose Range (mSv)							Total # of Persons	Individual Dose (mSv)			Collective Dose (person·mSv)
		0	0.01-0.50	0.51-1.00	1.01-5.00	5.01-10.00	10.01-20.00	>20.00		Max	Ø Avg[a]	Avg All[b]	
		Number of Persons											
NEW	Employee	112	98	0	0	0	0	0	210	0.34	0.08	0.04	7.42
NEW	Contractor	685	143	1	0	0	0	0	829	0.59	0.10	0.02	14.84
NEW	Visitor[c]	434	1	0	0	0	0	0	435	0.01	0.01	0.00	0.01
Non-NEW	Contractor	1	0	0	0	0	0	0	1	0	-	0	0
Non-NEW	Visitor	518	0	0	0	0	0	0	518	0	-	0	0
Totals		1750	242	1	0	0	0	0	1993	0.59	0.09	0.01	22.27

a Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
b Average of all measured doses that include the zero dose value, rounded to two decimal places.
c Visitor NEWs are persons who were historically employee and/or contractor NEWs but have returned to the site as visitor while retaining their historical NEW status, or frequented often enough to warrant NEW status as per *PHAI RP Plan* [30].

Table 8: Distribution of Equivalent Dose to the Skin for 2022

Monitored Person Type		Dose Range (mSv)							Total # of Persons	Individual Dose (mSv)			Collective Dose (person·mSv)
		0	0.01-0.50	0.51-1.00	1.01-5.00	5.01-10.00	10.01-20.00	>20.00		Max	Ø Avg[a]	Avg All[b]	
		Number of Persons											
NEW	Employee	111	99	0	0	0	0	0	210	0.34	0.08	0.04	7.62
NEW	Contractor	725	104	0	0	0	0	0	829	0.49	0.1	0.01	10.15
NEW	Visitor[c]	-	-	-	-	-	-	-	-	-	-	-	-
Non-NEW	Contractor	1	0	0	0	0	0	0	1	0	-	0	0
Non-NEW	Visitor[c]	1	0	0	0	0	0	0	1	0	-	0	0
Totals		838	203	0	0	0	0	0	1041	0.49	0.09	0.02	17.77

a Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
b Average of all measured doses that include the zero dose value, rounded to two decimal places.
c Visitors on contractor sites are not monitored for their equivalent dose to the skin. Visitors issued a TLD by CNL are monitored for their equivalent dose to the skin.

Table 9: Summary of Dose Components Received as a Result of Licensed Activities for 2022 [a]

Monitored Person Type		External Penetrating Dose					External Surface Dose					Extremity Dose				
		Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]	Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]	Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]
NEWs	Employee	210	7.42	0.34	0.08	0.04	210	7.62	0.34	0.08	0.04	-	-	-	-	-
	Contractor	829	14.84	0.59	0.10	0.02	829	10.15	0.49	0.1	0.03	-	-	-	-	-
	Visitor[de]	435	0.01	0.01	0.01	0.00	-[e]	-	-	-	-	-	-	-	-	-
Non-NEWs	Contractor	1	0	0	-	0	1	0	0	-	0	-	-	-	-	-
	Visitor[e]	518	0	0	-	0	1[e]	0	0	-	0	-	-	-	-	-
Total		1993	22.27	0.59	0.09	0.01	1041	17.77	0.49	0.09	0.02	-				

a All quantities are measured in mSv unless otherwise noted.
b Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
c Average of all measured doses that include the zero dose value, rounded to two decimal places.
d Visitor NEWs are persons who were historically employee and/or contractor NEWs but have returned to the site as visitor while retaining their historical NEW status, or frequented often enough to warrant NEW status as per *PHAI RP Plan* [30].
e Visitors on contractor sites are not monitored for their equivalent dose to the skin. Visitors issued a TLD by CNL are monitored for their equivalent dose to the skin.

7.2.2.1 Discussion of Dose Data

No anomalies were noted in the data above. All doses were measured to be less than the assigned dose control point (1 mSv) for all individuals on the project and well below all action levels for the PHP.

7.2.2.2 Radiation Dose Changes or Trends

As the project continues, Phase 2 doses were expected to remain unchanged from the prior 2021 calendar year. The 2022 whole body dose to all workers (employees, contractors, and students) was determined to be approximately 0.01 mSv for both worker categories. These results are expected given no significant change in scope of work.

7.2.3 Program Exceedances

There were no exceedances of regulatory limits and action levels in the dose monitoring program for the 2022 calendar year.

8. Conventional Health and Safety

8.1 Conventional Health and Safety Program

The PHP adheres to the CNL's Occupational Safety and Health Functional Support Area. See Section 8 of the *ACMR for CNL* for details [5]. The *Port Hope Area Initiative Occupational Safety and Health Plan* (PHAI OSH Plan) [32] has been developed to define the OSH program applicable to PHAI projects and is consistent with CNL's corporate OSH program.

Contractors conducting work for the PHP project submit site specific health and safety plans for CNL's review and approval to ensure compliance with the *PHAI OSH Plan* [32]. Contractor compliance with their project-specific health and safety plan is examined as part of CNL's oversight program. Compliance oversight is a health and safety initiative that has been implemented to ensure consistency with the requirements of the *PHAI OSH Plan* [32]. CNL conducts routine oversights of contractor project activities to ensure compliance with the approved site-specific health and safety plan.

CNL's OSH program priorities for 2022 included:

- Initiation of a comprehensive review to verify accuracy and completeness of the PH WWTP lock-out tag-out program and instructions in relation to requirements of the new CNL Hazardous Energy Standard
- Significant enhancements to the HWP MO formal contractor health and safety oversight process to implement formal programmatic auditing practices following ISO 45001 practices
- Re-establishment of the face-to-face Contractor Safety Forums
- Development and implementation a HWP wide minimum standard on working near overhead hazards across all project sites
- Completion of updates to the HWP Contractor Health and Safety Plan Submission Criteria
- Completion of chemical process maps for WWTP's and updated spill control procedures based on results. Facilitated advanced spill response training for applicable personnel
- Enhanced workplace health and safety recognition through awarding the Port Hope safety recognition award to various nominees
- Completion of hearing and self-contained breathing apparatus medical assessments
- Introduced wellness safety podcasts with a focus on psychological safety and resilience.

The CNSC was notified [33] of a revision to the *PHAI OSH Plan* [32].

8.1.1 Site Safety and Health Committee

The Site Safety and Health Committee (SSHC) had nine regular scheduled meetings and one special meeting in the reporting period. The SSHC continued to meet regularly by virtual meetings.

A significant number of HWP MO employees continued to work remotely and were permanently given that status. As a result, the pandemic and many other factors, a focus on mental health, reducing workplace stress, ergonomic and other safe working practices continued through the SSHC's Employee Awareness Campaigns.

No investigations were carried out in 2022 and there were no unresolved issues at the end of the year. The SSHC supported CNL's Safety Excellence initiative which spawned several new initiatives at the HWP including Safety Suggestion Boxes which have produced multiple proactive safety suggestions and ideas shared with the committee to date.

8.1.2 Inspections

During the reporting period:

- All inspections of PHAI workplaces were carried out and completed.
- The SSHC conducted 16 inspections.
- There were 1052 site health and safety inspections completed by the Field Safety Specialists.

8.1.3 Hazardous Occurrence Investigation Reports and Lost-Time Injuries

There were no hazardous occurrences at the PHP that were reported to Employment and Social Development Canada in 2022.

A summary of injury rate data for the last 5 years is provided in Table 10. The working days lost resulted from of a serious injury to a worker's hand in 2022 September. The event was reported to CNSC. All reportable events are summarized in Section 3.2.

Table 10: Summary of Injury Rate Data

	2018	2019	2020	2021	2022
Port Hope Project					
Person Hours Worked	-	298,378	391,875	389, 016	397,443
Lost-Time Injuries	0	1	0	2	0
Working Days Lost	0	33	0	12	0
Frequency[a]	0	0.68	0	1.03	0
Severity[b]	0	22.57	0	6.17	0
PHP Contractors[c]					
Lost Time Injuries	0	0	0	0	1
Working Days Lost	0	0	0	0	46

a Frequency rate equals # of Lost-Time Injuries x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time workers).
b Severity rate equals # of Working Days Lost x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time workers).
c The Number of Person Hours worked are not divulged by Contractors. As such, Frequency and Severity rates cannot be calculated.

9. Environmental Protection

9.1 Environmental Protection Program

The PHP adheres to CNL's Environmental Protection Functional Support Area. See Section 9 of the *ACMR for CNL* for details [5]. The *Port Hope Project Environmental and Biophysical Monitoring Plan* [34] defines the methodologies and protocols followed in performing the environmental monitoring.

There were no revisions to Environmental Protection documents in the reporting period.

9.2 Effluent Monitoring

9.2.1 Liquid Effluent Monitoring

9.2.1.1 Monitoring Points, Schedules and Parameters

A composite sample is collected weekly at the PH WWTP to provide data on the final effluent discharge. The sampling point is located at the final effluent tank. The sample is collected via an auto-sampler which collects a sample aliquot at a minimum frequency of every 15 minutes.

The samples are submitted to a third-party commercial laboratory on a weekly basis to determine concentrations of the following parameters:

- Aluminum
- Arsenic
- Copper
- Lead
- Uranium
- Zinc
- pH
- Total Suspended Solids (TSS)
- Radium-226
- Monthly samples are submitted for toxicity analysis

In 2022, monitoring of additional parameters was initiated as a result of the transfer of liquid waste from the Port Granby WWTP to the PH WWTP for processing.

9.2.1.2 Monitoring and Testing Methods

All compliance samples were submitted to a third-party commercial laboratory for analysis. The laboratory is certified by the Canadian Association for Laboratory Accreditation Inc.

Toxicity samples were sent to two commercial laboratories for toxicity analysis via approved reference methods, namely:

- *Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, Environment Canada* EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments
- *Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout, Environment Canada* EPS 1/RM/13 (Second Edition, December 2000, with May 2007 and February 2016 amendments

9.2.1.3 Monitoring Results

The effluent discharge limits for the PH WWTP, as listed in Appendix B of the PHP Licence [3], specifies the monthly arithmetic mean concentration (total) of the contaminants of concern in the effluent discharge water shall not exceed the stated release limits. Additionally, effluent should not be acutely toxic as determined by monthly testing of the effluent. During the reporting period, the effluent was found not to be toxic.

A summary of the PH WWTP influent monthly average concentrations is provided in Appendix B Table 13 for information. A summary of the PH WWTP effluent discharge monthly average concentrations is provided in Appendix B Table 14 (final effluent) and Table 15~~Table 15~~ (effluent toxicity). Histogram charts are presented in Figure 1~~Figure 1~~, Figure 2~~Figure 2~~, Figure 3~~Figure 3~~, and Figure 4~~Figure 4~~ for the purposes of comparing year over year final effluent results from 2018 to 2022. Note that radium-226 results were not graphed, since reported analytical results above the detection limit (0.005 Bq/L) are rarely reported.

A review of the data from Figures 1 to 4 yield the following observations:

- Since PH WWTP operations began in 2017, reported final effluent discharge analytical results for licensed parameters trended downwards, and during the period of 2019 to 2021 were generally stable.
- During the period of 2022 May to 2022 August, reported final effluent discharge analytical results for licensed parameters began to trend upwards. This was a result of high total dissolved solids in the PH WWTP influent water, coupled with relatively low influent water volumes, which was partially due to low precipitation in 2022. Aging reverse osmosis membranes also contributed to the higher reported results. With persistent desalting of the collection pond, and replacement of the reverse osmosis membranes on all reverse osmosis units, reported final effluent discharge analytical results for licensed parameters began to trend downwards again in late 2022, and are currently, in some cases, at record low levels.

- Beginning 2020 January, CNL changed the third-party commercial laboratory providing the analytical results. The current commercial laboratory generally has lower detection limits for licensed parameters than the previous commercial laboratory. This can be readily observed on the curves for zinc, aluminum, and lead, where more recent reported results are much lower than older results, owing to the lower detection limit.

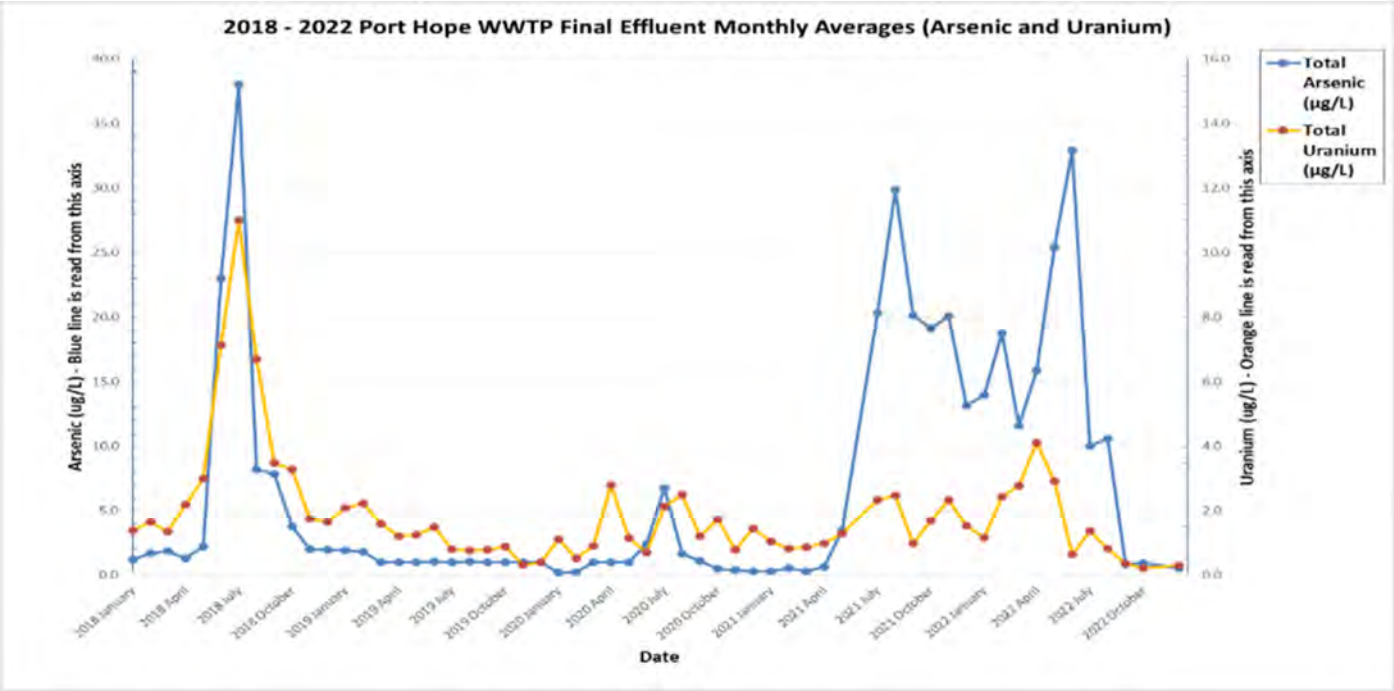

Figure 1: 2018 to 2022 PH WWTP Final Effluent Monthly Averages (Total Arsenic and Total Uranium)

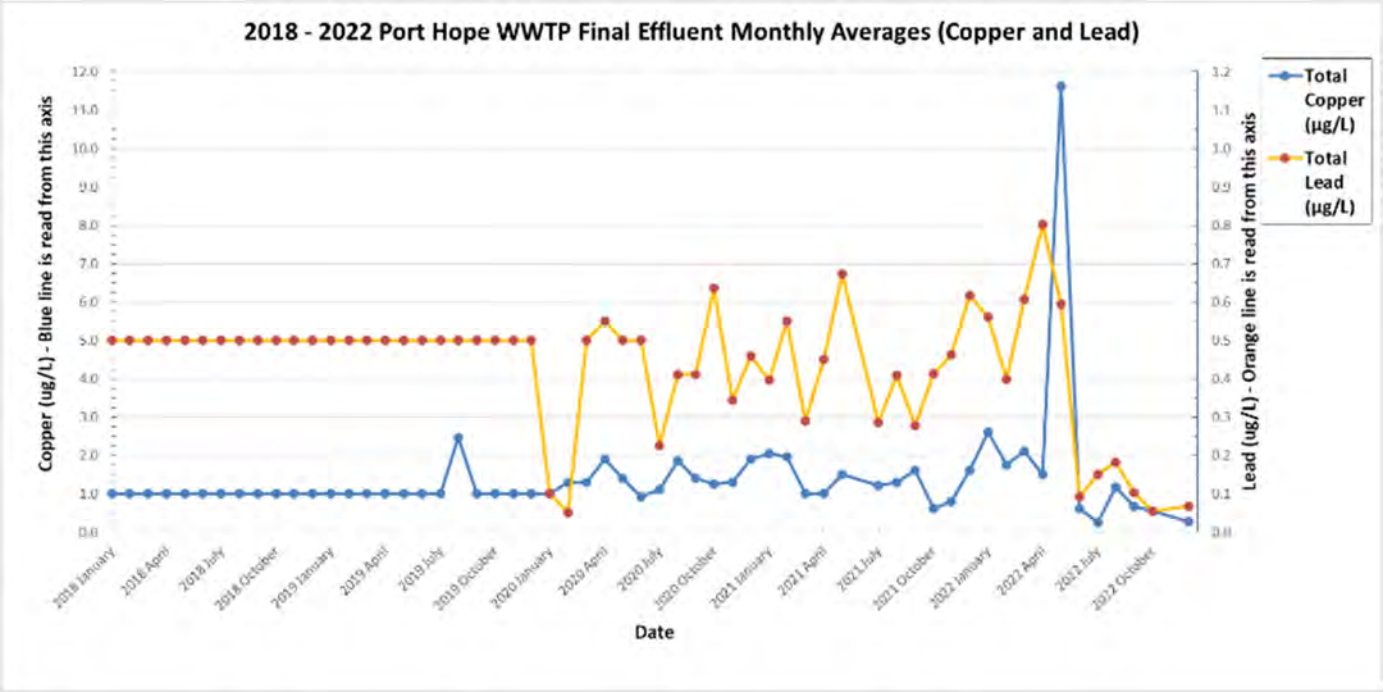

Figure 2: **2018 to 2022 PH WWTP Final Effluent Monthly Averages (Total Copper and Total Lead)**

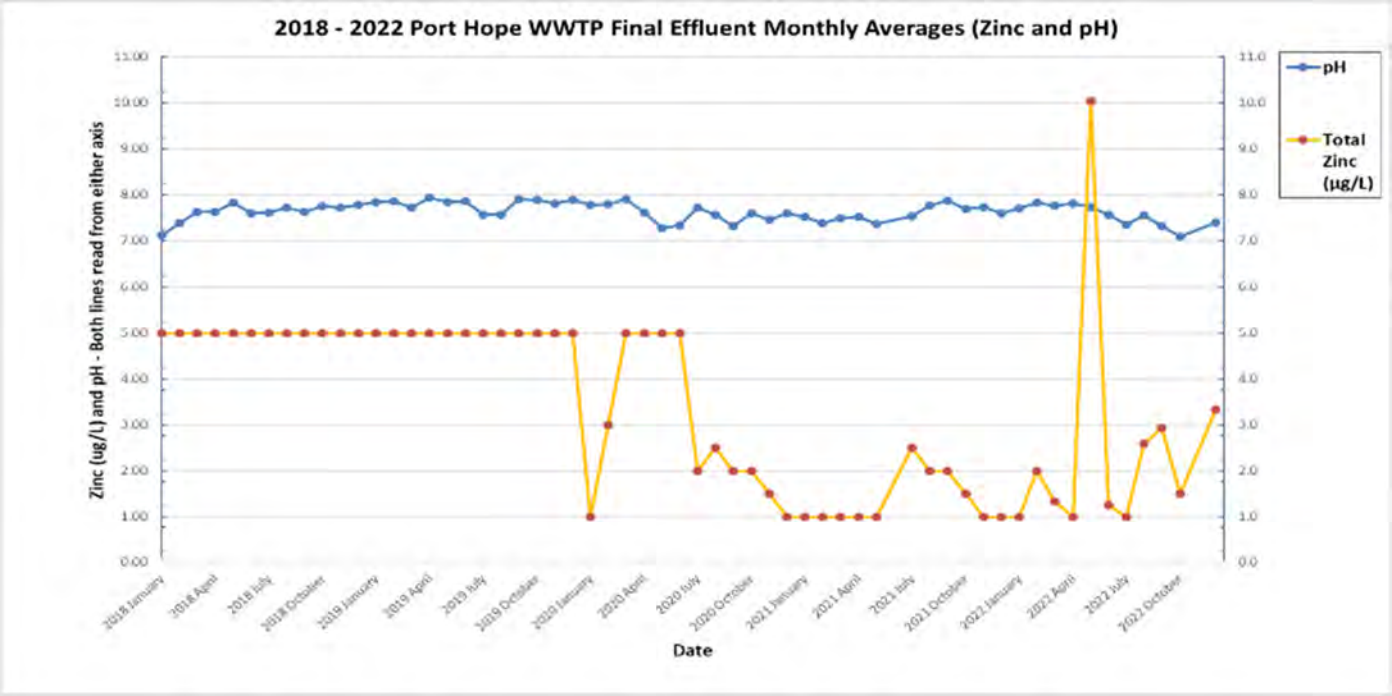

Figure 3: 2018 to 2022 PH WWTP Final Effluent Monthly Averages (Total Zinc and pH)

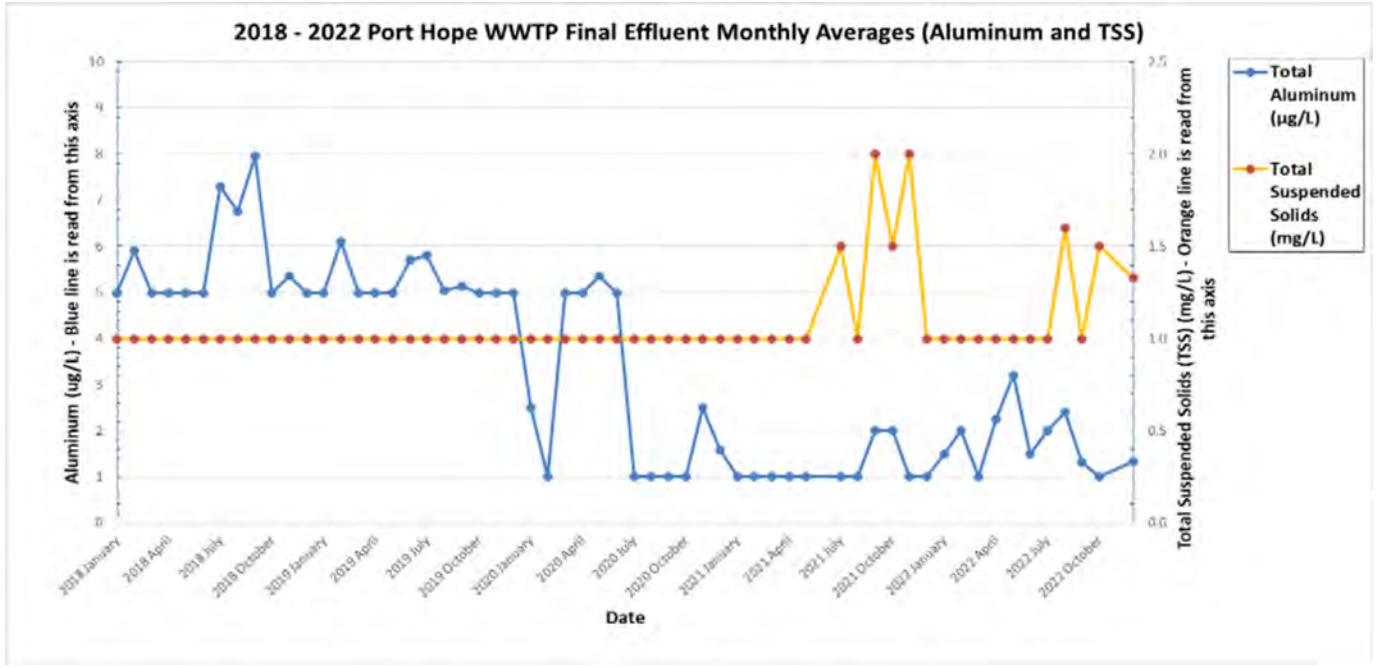

Figure 4: 2018 to 2022 PH WWTP Final Effluent Monthly Averages (Total Aluminum and Total Suspended Solids)

9.2.2 Quality Assurance and Quality Control

To confirm the accuracy and precision of laboratory analyses, a quality control regime is followed. For the purposes of the environmental compliance of the PH WWTP, both duplicate and blank sampling is conducted:

- Duplicate samples are collected at a minimum frequency of once per month;
- Duplicate final effluent toxicity samples are collected each month. To prevent laboratory bias, the duplicate toxicity sample is sent to a different certified laboratory; and,
- Blank samples are collected at a minimum frequency of once every two months.

Sample nomenclature on Quality Assurance/Quality Control samples is “blind” in nature, ensuring that the analytical laboratory cannot determine the source of the sample.

Blank samples are created using laboratory grade deionized water.

9.2.3 Regulatory Limit Exceedances and Contamination Incidents

All reportable events are summarized in Section 3.2. During the reporting period, there were three events related to regulatory limits, as outlined below.

During routine compliance sampling at the PH WWTP, it was determined that the final effluent produced by the plant for the week ending 2022 June 1 exceeded the regulated weekly composite release limit for copper and the action level for zinc. Upon confirmation of results, the PH WWTP ceased discharge to the environment.

The probable cause of the exceedance was brass and bronze components in contact with the final effluent. The following corrective actions were taken:

- A facility wide extent of condition study was completed with a focus on any brass or bronze process components that came into direct contact with the final effluent; and,
- A maintenance program (extent of condition) was undertaken to replace all of the identified brass and bronze components with a more suitable material.

During routine compliance sampling at the PH WWTP, it was determined that the final effluent produced by the plant for the week ending 2022 June 7 exceeded the regulated weekly composite action concentration limit for Arsenic. Arsenic concentrations were 41.5 ppb compared to the 41 ppb action level concentration limit. When the report was received, the PH WWTP was in recirculation mode with no discharges to the environment, thus no immediate action was required. The cause of the exceedance was aging reverse osmosis membranes. The following corrective actions were taken:

- Operational adjustments were made to optimize rejection of arsenic.
- Individual reverse osmosis systems were evaluated for arsenic rejection. Based on this evaluation, the reverse osmosis membranes were replaced on all units.

- A maintenance program was established to track reverse osmosis membrane performance on a semi-annual basis. Performance review tracking will alert CNL operations to replace aging membranes to prevent future exceedances.

During routine compliance sampling at the PH WWTP, a final effluent toxicity test indicated a mortality of 100% for Daphnia Magna, where a result of less than 50% is considered non-toxic. The investigation concluded that the test result was anomalous due to an unknown error at the external laboratory.

The reported events did not have any adverse effect on the health, safety and security of persons or the environment.

9.3 Operational Environmental Monitoring

The monitoring activities reported in this section were led by CNL, including the collection of the field data.

Laboratory analytical services were provided by an accredited laboratory under contract to CNL. The laboratories are accredited to the ISO 17025:2017.

The methodologies and protocols followed in performing the environmental monitoring are described in the *Port Hope Project Environmental and Biophysical Monitoring Plan* [34].

9.3.1 Operational Groundwater Monitoring

Fourteen (14) on-site PH LTWMF observation wells were scheduled to be sampled in 2022. The locations of the observation wells are depicted in Appendix A, Figure 14.

Note that:

- WC-OW1-75 was decommissioned in 2016 as it was within the footprint of the LTWMF, and it will not be replaced.
- WC-OW9-75 was damaged and was replaced by WC-LTWMF-MW-06 in 2017.
- WC-OW2-75, WC-OW12-75 and WC-OW18-76 were decommissioned in 2018 as part of the LTWMF activities, with no plans to replace.
- WC-OW2-87 and WC-OW5-79 were decommissioned in 2017. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (2-87) and WC-OW5-19 (5-79).
- WC-OW36-76 cannot be located with no plans to replace.
- The remaining seven wells were sampled in 2022 spring and fall.

A summary of the results of the analyses are provided in Appendix B, Table 12. All data points are provided in Appendix C. The 2022 results are consistent with historical data.

9.3.2 Domestic Wells

In 2022 December, CNL voluntarily sampled domestic wells on 15 residential properties near the WWMF and analysed the samples for arsenic, radium-226, uranium and nitrate concentrations as well as for pH. Residents were notified in writing about the results in 2023 February. Elevated nitrates were noted at one property. The elevated result is due to the agricultural processes taking place within the area. The nitrates exceedance has been noted historically at this property and before remedial activities at the PH LTWMF.

9.4 Environmental Assessment Follow-Up and Environmental Monitoring

For the 2022 reporting period, Section 3.2.9, Environmental Protection and Monitoring, Conditions 2.9 to 2.11 of the PHP LCH [3] applies specifically to the natural environment and associated monitoring.

The purpose of an EA Follow-up Program and the associated Environmental Monitoring Program is to confirm that the environmental effects of a project are consistent with the predictions of the EA and, if they are not, to identify mitigation measures.

The primary objectives of the Environmental Monitoring Program are the following:

- Confirm EA predicted effects by means of monitoring, sampling, measurements, and analysis.
- Demonstrate compliance with license requirements and EA Follow-Up Program requirements as stipulated in the *Port Hope Project Environmental and Biophysical Monitoring Plan* [34] (PHP Environmental and Biophysical Monitoring Plan).
- Demonstrate the effectiveness of containment and effluent control, and to provide public assurance of the effectiveness of containment and effluent control.
- Provide data to refine the EA predictions and identify any deviations, positive or negative, in environmental parameters and Contaminants of Potential Concern (COPC).

The secondary objectives of the program are the following:

- Provide data to support operations and plan future phases of the PHAI
- Provide resources and data that will be of value during unplanned events
- Demonstrate due diligence
- Meet stakeholder commitments

The EA monitoring program is structured using a framework of six sub-programs of follow up actions. These programs collectively incorporate all the individual activities required for tracking the follow-up actions prescribed in the *Screening Report for the Port Hope Long-Term Low-Level Radioactive Waste Management Project* (PHP Screening Report) [35]. These programs include the monitoring of the atmospheric environment (air quality, noise levels),

geology and groundwater (groundwater flow and quality) and aquatic environment (surface water, drainage water quality). The details of the program can be found in the *PHP Environmental and Biophysical Monitoring Plan* [34].

This report contains information collected during the 2022 monitoring programs. The status of the EA commitments for the biophysical effects follow-up monitoring are summarized in Appendix E.

9.4.1 Methodology

The monitoring activities reported in this section were led by CNL, including the collection of the field data. Laboratory analytical services were provided by a laboratory accredited to ISO 17025:2017, under contract to CNL.

The methodologies used and protocols followed in performing the environmental monitoring are described in the *PHP Environmental and Biophysical Monitoring Plan* [34].

9.4.2 Atmospheric Environmental Monitoring

The prescribed EA follow-up monitoring activities in the atmospheric environment include elements associated with air quality (radiological and non-radiological parameters), noise and odour monitoring.

9.4.2.1 Suspended Particulate Matter (TSP and $PM_{2.5}$)

Air quality monitoring addressed concentrations of suspended particulate that could have been caused by project activities. Two types of suspended particulate were measured:

- Total suspended particulate (TSP) comprising particle sizes < 44 µm in diameter.
- Particulate Matter 2.5 µm ($PM_{2.5}$) comprising particulate matter with particle sizes < 2.5 µm in diameter.

PH LTWMF

Air quality monitoring was conducted throughout 2022 around the PH LTWMF. A holiday shutdown took place from 2022 December 22 to 2023 January 04. The monitoring program used high-volume (Hi-Vol) air samplers operating at four locations for both TSP and $PM_{2.5}$. The locations included Welcome South, Welcome Northwest, Welcome Weather Station and 192 Toronto Road. Air quality monitoring locations are depicted in Appendix A, Figure 7 for the PH LTWMF.

Between 171 and 232 samples were collected from each air sampler (TSP and $PM_{2.5}$). A total of 1,688 samples were analyzed during the year. A summary of the sampling results is provided in Appendix B, Table 17, Table 18, Table 19, and Table 20. The Overriding Limit of 120 µg/m^3 for TSP, as defined in the *Dust Management Requirements and Plan* [36]~~[36]~~ was not exceeded in 2022 at the PH LTWMF. CNL notes that the same criteria are found in Ontario's *Ambient Air Quality Criteria* (AAQC) [37].

It should be noted that in 2012, the Canadian Council of Ministers of the Environment (CCME) adopted the Air Quality Management System as a new comprehensive approach to managing air issues [38]. Canadian Ambient Air Quality Standards for Fine Particulate Matter ($PM_{2.5}$) are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 $\mu g/m^3$ is used for $PM_{2.5}$. The 2020, 2021 and 2022 98^{th} percentile results were averaged and the $PM_{2.5}$ values were below the value of 27 $\mu g/m^3$ for the PH LTWMF. The $PM_{2.5}$ results (98^{th} percentile averaged over three years were compared to this value as a proactive approach to current industry guidelines. $PM_{2.5}$ values were below this level. The *PHP Screening Report* [35] predicted that $PM_{2.5}$ will exceed the 24-hour AAQC [37] at some off-site locations. This was not exceeded in 2022 at the PH LTWMF.

Additional Analysis – PH LTWMF

The sample containing the highest net weight of TSP collected each week at each of the high-volume monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. The *PHP Screening Report* [35] predicted that the 24-hour AAQC [37] will be exceeded on occasion for arsenic and cobalt at off-site locations. There were no exceedances for arsenic or cobalt in 2022. There were no other exceedances of the AAQC [37] in 2022. A summary of the results is provided in Appendix B, Table 21, Table 22, Table 23, and Table 24.

The *PHP Screening Report* [35] identified that predicted levels of radionuclides would be below Health Canada Reference Levels. Radium-226 and thorium-232 exceeded the predicted values for some of the filters in 2022; however, they remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (i.e., uncalculated laboratory results were less than the limit of detection for radium-226 and thorium-232).

There were exceedances of the *PHP Screening Report* [35] predicted values for uranium on some of the filters in 2022. The increasing trend in uranium in TSP from 2020 is due to a laboratory contract change that occurred in 2020 January resulting in an increase in the overall detection limit. As a result, there were a few detectable concentrations of uranium observed in 2022. Uranium concentrations remained well below the Health Canada reference values.

The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.

Highland Drive Landfill and Vicinity Sites

Air quality monitoring was conducted throughout 2022 around the Highland Drive Landfill and vicinity sites. PSNE CS is considered to be part of the vicinity sites. The locations for high volume stations were at the Jack Burger Sports Complex, Port Hope High School, and Cavan Candies. Monitoring of the PSNE CS took place from 2022 January to 2022 March and ceased as the remediation was complete. Monitoring recommenced in 2022 September as the Prime Contractor mobilized to the Highland Drive remediation site and continued through the end of

2022. The Highland Drive and vicinity sites air quality monitoring locations are depicted in Appendix A, Figure 8.

A summary of the sampling results is provided in Appendix B, Table 25, Table 26, and Table 27. There were 114 to 117 samples collected from each air sampler (TSP and $PM_{2.5}$). The Overriding Limit of 120 µg/m^3 for TSP, as defined in the *Dust Management Requirements and Plan* [36] was not exceeded in 2022 at the Highland Drive site. CNL notes that the same criteria are found in Ontario's AAQC [37]

It should be noted that in 2012, the CCME adopted the Air Quality Management System as a new comprehensive approach to managing air issues [38]. Canadian Ambient Air Quality Standards for Fine Particulate Matter are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 µg/m^3 is used for $PM_{2.5}$. The $PM_{2.5}$ results (98^{th} percentile averaged over 3 years) were compared to this value as a proactive approach to current industry guidelines. $PM_{2.5}$ values below this level. The *PHP Screening Report* [35] predicted that $PM_{2.5}$ will exceed the 24-hour AAQC [37] at some off-site locations. This was not exceeded in 2022 at the Highland Drive site.

Additional Analysis – Highland Drive and Vicinity Sites

The sample containing the highest net weight of TSP collected each week at each of the high-volume monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. The *PHP Screening Report* [35] predicted that the 24-hour AAQC [37] will be exceeded on occasion for arsenic and cobalt at off-site locations. There were no exceedances for arsenic or cobalt in 2022.

There were no exceedances of the AAQC [37] in 2022. A summary of the results is provided in Appendix B, Table 28, Table 29, and Table 30.

The *PHP Screening Report* [35] identifies that predicted levels of radionuclides would be below Health Canada Reference Levels. Thorium-232 exceeded the predicted values for some of the filters in 2022; however, remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (i.e., uncalculated laboratory results were less than the limit of detection for thorium-232).

There were exceedances of the *PHP Screening Report* [35] predicted values for uranium on some of the filters in 2022. The increasing trend in uranium in TSP from 2020 is due to a laboratory contract change that occurred in 2020 January, increasing the overall detection limit. As a result, there were a few detectable concentrations of uranium observed in 2022. Uranium concentrations remained well below the Health Canada reference values. The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.

9.4.2.2 Independent Dust Monitoring

In accordance with the *Dust Management Requirements and Plan* [36], an Independent Dust Monitoring Program is executed by a third party. The third-party monitoring is conducted in addition to that conducted by the Prime Contractor and CNL to ensure that perceived organizational conflicts regarding dust monitoring results and work activities are avoided. Continuous monitoring occurs during the work hours, and results are reported on a 15-minute interval.

The Independent Dust Monitoring Contractor uses real-time monitors to measure TSP at the work site perimeter. The *Dust Management Requirements and Plan* [36] identifies the dust action level for a TSP monitor reading at the work site perimeter to be > 120 µg/m^3 averaged over 15 minutes. An exceedance of a dust action level triggers an immediate response by CNL and the Prime Contractor to initiate corrective action(s) to reduce dust levels.

In 2022, there were no instances when the 15-minute average exceeded the action level of 120 µg/m^3 that were attributed to site activities at the PH LTWMF.

Real-time dust monitoring results from the Independent Dust Monitoring Program for the PH LTWMF construction are available at PHAI.ca. The weekly reports include daily real-time dust measurements and a site map illustrating the locations of the independent real-time dust monitors.

9.4.2.3 Volatile Organic Compound Monitoring

Volatile organic compound monitoring took place throughout 2022 and samples were collected weekly during Port Hope Harbour dredging activities in accordance with the *PHP Biophysical and Environmental Monitoring Plan* [34]. Summa canisters provided by a third-party laboratory are placed upwind and downwind of the dredging activities. Dredging activities were not continuous in 2022 for several unrelated reasons.

A summary of the results is provided in Appendix B, Table 31~~Table 31~~, Table 33~~Table 32~~, Table 35~~Table 33~~, Table 37~~Table 34~~, Table 39~~Table 35~~, and Table ~~Table 36~~. The results were compared to Ontario's AAQC [37] 24-hour average. Exceedances of the 24-hour average were observed in 2022 April and June and were attributed to on-site source(s) at both the up and downwind locations. Exceedances at the downwind location were observed in 2022 October, September, and November. The 2022 September and October exceedances are believed to be from an off-site source based on the wind direction. The 2022 November exceedances are due to detection limit issues at the laboratory.

9.4.2.4 Odour Monitoring

In accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34], an odour monitoring program is carried out during the sediment dredging, dewatering and remediation activities at the Port Hope Harbour. Twice daily off-site receptors upwind and downwind measurements are collected by a third-party consultant.

Based on the general understanding that odour annoyance for most offensive odours begins at about 5 dilution-to-threshold (D/T), this was applied as the threshold level above which mitigation measures were triggered, as per the *PHP Environmental and Biophysical Monitoring Plan* [34]. The higher the D/T ratio, the stronger the odours. In general, odour annoyance resulting in complaints can be expected when ambient odour concentrations reach a level of 5 times the threshold value (5 D/T).

Odour monitoring took place throughout 2022 and samples were collected twice daily when dredging or sediment handling activities occurred. Dredging activities were not continuous in 2022. There were no confirmed instances when the threshold level of 5 D/T was reached during dredging activities at Port Hope Harbour off-site receptors.

9.4.2.5 Noise Monitoring

EA follow-up monitoring with respect to noise is conducted to confirm the accuracy of predictions made during the EA and the effectiveness of any mitigation measures. Additional noise monitoring is also required at the remediation sites to confirm compliance with appropriate by-laws and regulations (*World Health Organization's Guideline for Community Noise* (WHO Guideline for Community Noise) [39]. It involves monitoring of noise levels at the PH LTWMF, intersection of the LTWMF Access Road and Toronto Road, selected remediation sites, and along the transportation routes.

In the 2022 monitoring period, noise monitoring was conducted at the PH LTWMF, Highland Drive, and vicinity sites, and along the North, Central, and South Transportation Routes.

PH LTWMF

Noise monitoring is performed quarterly at several locations around the PH LTWMF and at the intersection of the LTWMF Access Road and Toronto Road. The noise monitoring locations are depicted in Appendix A, Figure 9.

Four monitoring campaigns were conducted in 2022 (January, April, July, and October). The results of the campaigns, averaged logarithmically over three working days, are provided in Appendix B, Table ~~Table 37~~.

The *PHP Screening Report* [35] predicted an increase in noise levels of 12 decibels (dBA) for residents adjacent to the LTWMF during construction and development. In comparing 2022 results to the 2015 results from before the start of the Early Works 3a/Early Works 1 construction work packages (when levels of activity around the site were comparatively low), slight increases, 2 dBA to 3 dBA, were observed in the 2022 results. However, all values were below the predicted range of 12 dBA and the *WHO Guideline for Community Noise* [39] level of 70 dBA over a 24-hour period. The 2022 results are similar to 2021.

Highland Drive Landfill and Vicinity Sites

Noise monitoring is performed at three locations around the Highland Drive and vicinity sites. PSNE CS is considered to be part of the vicinity sites. The noise monitoring locations are depicted in Appendix A, Figure 13.

The spring/summer campaign was not conducted as the PSNE CS remediation was completed in 2022 March. Mobilization to the Highland Drive Landfill remediation site commenced in 2022 September. One monitoring campaign was conducted in 2022 December to represent the fall/winter seasons, in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The results of the campaign averaged logarithmically over three working days, are provided in Appendix B, Table ~~Table 39~~. In comparing 2022 results to the 2020 baseline results, no change at HD-N-0001 was observed, slight increases at HD-N-0002 of 3 dBA and at HD-N-0003 of 1 dBA were observed. All values were below the *WHO Guideline for Community Noise* [39] level of 70 dB over a 24-hour period.

North, Central and South Transportation Routes

Spot noise monitoring at 1-hour interval measurements, morning, and evening, is required seasonally during peak transportation activities as discussed in the *PHP Environmental Biophysical Monitoring Plan* [34]. In 2022, noise monitoring along the transportation routes took place on the North Transportation Route, Central Transportation Route (which includes Strachan Street), and South Transportation Route. The noise monitoring locations are depicted in Appendix A, Figure 10~~Figure 10~~, Figure 11, and Figure 12.

Results are provided in Appendix B, Table ~~Table 38~~. Additional baseline data was collected before the transportation routes being used by CNL in 2018, as provided in Appendix B, Table ~~Table 38~~. CNL collected hourly measurements from 7 am to 7 pm for each campaign. The daily averages are provided in Appendix B, Table ~~Table 38~~. Monitoring occurred during February, May, August and December along the North, South, and Central transportation routes.

Monitoring results for the South Transportation Route showed little to no increase from the 2018 baseline monitoring. The Central Transportation Route showed an increase in the 2022 monitoring when compared to the 2018 baseline at CTR-N-001. The North Transportation Route (NTR--001) showed a slight increase in the 2022 monitoring when compared to the revised 2020 baseline. In 2020, location NTR-002 from the Northern Transportation Route was relocated due to the loss of location to safely secure noise monitoring equipment. The new location for NTR-002 is within a few metres of the previous location. All values were below the *WHO Guideline for Community Noise* [39] level of 70 dB over a 24-hour period.

9.4.3 Geology and Groundwater Monitoring

The prescribed EA follow-up monitoring activities in the geology and groundwater environment include elements associated with groundwater flow and quality, soil quality, and drainage water quality. Results of the monitoring are summarized in the following sub-sections.

9.4.3.1 Groundwater (Flow and Quality) Monitoring

Groundwater flow and quality monitoring is performed twice per year at both the PH LTWMF and Highland Drive in accordance with the *PHP Environmental Biophysical Monitoring Plan* [34].

PH LTWMF

Of the 23 monitoring wells located around the PH LTWMF and monitored in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34], 19 wells were suitable for monitoring (levels and/or quality). These wells are depicted in Appendix A, Figure 14, and Appendix C.

Note that:

- WC-MW2-02 could not be located, as it is buried under the shoulder of Brand Road.
- WC-MW1-02 was not sampled in 2022 as it is in need of inspection.
- CNL is currently evaluating repair and/or re-installation of WC-MW1-02 and WC-MW2-02. If these wells cannot be recovered, they will be re-installed during the Maintenance and Monitoring Phase.
- Wells WC-OW2A-75, WC-OW2-87 and WC-OW5-79 were decommissioned as part of the pond expansion project. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (WC--OW2-87), WC-OW2A-19 (WC-OW2A-75) and WC-OW5-19 (WC-OW5-79).
- In 2017, WC--LTWMF-MW-06 was installed to replace WC- OW9-75, which was previously damaged and not operational.

Groundwater samples were collected and analyzed for contaminants twice in 2022. Results of these monitoring campaigns are provided in Appendix C. The results were compared against water quality criteria for potable groundwater conditions listed in Table A2.5 of the *PHP Screening Report* [35]. This is a conservative approach, as water is not potable on site, and ensures consistency with reporting from previous years. In addition, results were compared to the Ontario's groundwater standards; specifically, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition [40].

Samples collected at WC-MW3A-11R, barium exceeded Table A2.5 of the *PHP Screening Report* [35] and Ontario's groundwater standards; specifically, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition [40] in both monitoring campaigns in 2022. Exceedances for barium have been observed in previous years, and before the construction of the PH LTWMF. Monitoring of the groundwater conditions will continue through the phases of the project, and improvements to groundwater quality are expected to occur as the WWMF is remediated, and through natural attenuation.

Groundwater monitoring locations are depicted in Appendix A, Figure 14. Groundwater levels were measured quarterly in 2022 and are presented in Appendix B, Table 40. The average groundwater levels in monitoring wells are generally comparable to previous years.

Highland Drive Landfill

In 2022, groundwater monitoring at the Highland Drive site took place twice, as required by the *PHP Environmental Biophysical Monitoring Plan* [34]. Remediation activities were initiated in late 2022. Of the 29 monitoring wells located around the Highland Drive site and monitored as part of the *PHP Environmental Biophysical Monitoring Plan* [34] for groundwater quality, 24 wells were located/suitable for groundwater quality monitoring as depicted in Appendix A, Figure 15.

Note that:

- PH-95-18 was unable to be sampled in 2022 as it was damaged.
- PH95-I was decommissioned in 2021 April.
- PH-93-12-I was not found.
- PH-93-3-III was not sampled in the 2022 winter campaign as the well was dry, and partial samples, for metals and radionuclides, were collected in the 2022 fall campaign.
- PH-95-7 was not sampled as elevated radon levels were detected. After a brief venting period PH-95-7 radon levels remained elevated. Instrumentation was not lowered into the well to prevent the potential contamination of the equipment, as per PHAI Radiation Protection recommendation.

Results of these sampling campaigns are provided in Appendix D. The results were compared with water quality criteria for non-potable groundwater conditions as discussed in the *PHP Screening Report* [35] specifically, those depicted in Ontario's Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition [40].

Exceedances are the result of the effects of the LLRW wastes comingled with the municipal solid wastes at the Highland Drive Landfill site. Monitoring of the groundwater conditions will continue through the phases of the project, and improvements to groundwater quality are expected to occur as the site is remediated. Once remediated, the source that effects the groundwater will be removed. The groundwater in the vicinity and downgradient of the landfill, will naturally attenuate up through flushing and attenuation mechanisms. The installation of a permeable reactive barrier downgradient of the Highland Drive Landfill site will also assist with the remediation of the groundwater.

Groundwater levels were measured quarterly in 2022. Results are provided in Appendix B, Table 41. Of the 41 monitoring wells required to be monitored as part of the EA Follow-Up program, 31 wells were located and deemed suitable for groundwater level monitoring. Of the 31 wells, 26 had calculated water levels as reference groundwater elevation data was not available for five wells. These wells are depicted in Appendix A, Figure 15, and Appendix D. Groundwater levels in 2022 were similar to 2021 results.

9.4.3.2 Sentinel Well – PH LTWMF

Groundwater samples are collected twice per year (fall and spring) for the in-place management of arsenic under Cell 1 and Cell 2A/B at the PH LTWMF. The results are compared to averages from previous years to identify trends, as discussed in the *PHP Environmental and Biophysical Monitoring Plan* [34].

A trigger level concentration for arsenic that is 50% of the PWQO [23] is established. The trigger level has been created as the primary down-gradient receptor of groundwater leaving the site is the tributary to Brand Creek, and Brand Creek is located west of the PH LTWMF. The PWQO [23] for arsenic is 100 µg/L. Thus, the trigger level for arsenic groundwater monitoring at the sentinel wells at the PH LTWMF is 50 µg/L.

The sampling results are provided in Appendix B, Table 42. No groundwater results in 2022 exceeded the trigger level of 50 µg/L. Note that wells WC-OW2-87, WC-OW2A-75 and WC-OW5-79 were decommissioned in 2017 fall due to the pond expansion activities. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (WC-OW2-87), WC-OW2A-75 (WC-OW2A-19) and WC-OW5-19 (WC-OW5-79).

9.4.3.3 Soil Monitoring

Soil monitoring is conducted to determine if there has been an increase in contaminant concentrations as a result of windblown dust deposition. Soil quality monitoring activities involved the collection and analyses of surface soil samples at off-site perimeter locations at the PH LTWMF and the Highland Drive remediation site. The soil sampling locations are depicted in Appendix A, Figure 16, and Figure 17.

In 2022, soil located around the PH LTWMF and Highland Drive Landfill were sampled and analyzed for metals and radionuclides. Results are provided in Appendix B, Table 43 to Table 49.

PH LTWMF

PH LTWMF soil sampling location are depicted on Appendix A, Figure 16. Results are provided in Appendix B, Table 43 to Table 47. The *PHP Screening Report* [35] predicted maximum concentrations of arsenic and cobalt at the perimeter of the PH LTWMF to be 4.7 µg/g and 6.67 µg/g, respectively. In 2022, the concentration of arsenic (20 µg/g) was greater than the predicted concentration at location PH-WWMF-SS-05. At location PH-WWMF-SS-01, the concentration of cobalt (7.4 µg/g) was greater than the predicted concentration. All other sampling locations were below predicted concentrations. Values above the predicted concentrations have been observed in previous years at these locations.

The *PHP Screening Report* [35] also indicated that thorium-230 concentrations would increase 63% over baseline during the construction of the PH LTWMF, to a predicted mean concentration of 97.7 Bq/kg (0.0977 Bq/g), and a maximum predicted concentration of 141.9 Bq/kg (0.1419 Bq/g). Thorium-230 concentrations in 2022 are above predicted mean and maximum values at some locations due to the laboratory detection limits.

Highland Drive Landfill

Sampling locations are depicted in Appendix A, Figure 17. Data is provided in Appendix B, Table 48, and Table 49. Mobilization of the Prime Contractor to the site was completed in late 2022 and soil sampling for 2022 was conducted in 2022 summer. The 2022 results are similar to the data collected in previous years.

9.4.4 Aquatic Environmental Monitoring

The Aquatic Environment Monitoring Program includes sampling surface water at Brand Creek, and Lake Ontario to verify the accuracy of the predictions made during the EA. The expected long term environmental effect is the improved water quality of Brand Creek due to the expected decrease in the contaminated water that currently infiltrates from the underlying groundwater, which eventually discharges to the surface water. In addition, a considerable reduction in contaminant loading from the discharged leachate from the PH LTWMF is considered a long-term beneficial environmental effect of the project. However, slight increases are expected during the construction and remediation phase of the project. As a result, monitoring continues on a quarterly basis for these locations to confirm the EA predictions.

In 2022, additional monitoring data was obtained for Brewery Creek, Highland Drive South Creek, and Alexander Creek, in anticipation of upcoming remediation activities. Results of the monitoring are summarized in the following sub-sections.

9.4.4.1 Brand Creek Watershed

Surface Water Monitoring – Brand Creek

In accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]**, t**he water flowing in Brand Creek is sampled on a quarterly basis at four (4) locations. The surface water monitoring locations are depicted in Appendix A, Figure 18. Note that location BC-U was not sampled in 2022 July due to insufficient surface water.

The 2022 laboratory results are provided in Appendix B, Table 50, Table 51, Table 52, and Table 53. Results were compared to the PWQO [23] and CWQG [24] where available. Results are generally consistent with the monitoring data from 2017 to 2022, suggesting that construction of the PH LTWMF is not having an adverse effect on Brand Creek water quality.

An increase in uranium concentrations was observed in one of the tributaries of Brand Creek (sample location BC-T) relative to the other locations. Exceedances of the PWQO [23] were observed in the 2022 January and May samples for uranium. The PWQO [23] for cobalt was exceeded at BC-T in 2022 January and May. This tributary is fed mainly by Clark's Ditch, which receives surface water runoff from the PH LTWMF. Exceedances for uranium and arsenic have been observed in previous years, and before the construction of the PH LTWMF. The water quality of this tributary is expected to improve over time as remediation progresses. In 2022

October, the PWQO [23] for cobalt was exceeded at the location at Marsh Road (BC-M). In 2022 May, the PWQO [23] for pH was exceeded at the downstream location (BC-D).

It is noted that the provincial and/or federal criteria for iron, chloride and phosphorus were exceeded at the up and downstream locations in 2022; however, this is consistent with monitoring data from previous years. As discussed in the *PHP Screening Report* [35], the streams in the Local Study Area exceeded for phosphorus, iron, and aluminum, which is typical for agricultural/urban watersheds in the region. This suggests that an off-site source is responsible for these elevated levels. Elevated levels of chloride are consistent with monitoring from previous years. It is suspected that the elevated chloride concentration may be due to road salt as Highway 401 is located just to the north of the PH LTWMF.

Storm Event Monitoring

Brand Creek was monitored hourly during one storm event in 2022 April in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The laboratory results are provided in Appendix B, Table 54. The surface water monitoring location BC-M was sampled for the storm event (see Appendix A, Figure 18). The contaminant concentrations were observed to peak as TSS increased. Concentrations of iron, chloride and phosphorus were observed to exceed the PWQO [23] and/or CWQG [24] as TSS increased. As noted above, elevated concentrations of iron, phosphorus and chloride are typical for agricultural/urban watersheds in the region. Concentrations of COPCs associated with the PHAI are predicted to improve in surface water once the project is completed.

Surface Water Monitoring – Lake Ontario Diffuser

The surface water quality of Lake Ontario is sampled at the PH WWTP effluent diffuser to verify that the water quality in the vicinity of the PH LTWMF effluent discharge pipe and the associated mixing zone is not affected by PH LTWMF operations. The mixing zone is approximately 12 m around the diffuser. Sampling is conducted at the diffuser (location BC-LO-D) and approximately 20 m east and west of the diffuser (location BC-LO-E and BC-LO-W respectively), as depicted in Appendix A, Figure 18.

Results are provided in Appendix B, Table 55, Table 56, and Table 57. Exceedances of fluoride were noted when compared to the CWQG [24] in 2022 June at BC-LO-W. As discussed in the *PHP Screening Report* [35], the elevated fluoride concentrations are typical for the nearshore zone of the lake in this region. There were no other exceedances of the PWQO [23] or CWQG [24]. Other monitoring results are generally consistent with the monitoring data for the past few years, suggesting that PHAI operations are not having an adverse effect on water quality.

Drainage Water – PH LTWMF

The drainage water (storm water and leachate) from the PH LTWMF mound is collected in the treatment ponds and was sampled twice in 2022 (June and November), in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The locations are depicted in Appendix A, Figure 19. Note that the drainage water location WC-SW4-02 was not sampled in 2022 due to insufficient water. Historically, this location has intermittent drainage water present, and samples cannot always be collected.

Results are presented in Appendix B, Table 58, Table 59, Table 60, and Table 61. Elevated concentrations of some COPCs are identified in the results and are consistent with previous years. Changes in drainage water quality and volume were expected to occur after remediation work commenced. It is noted that drainage water on site is treated before release to the environment.

9.4.4.2 Brewery Creek Watershed

Surface Water Monitoring

The *PHP Screening Report* [35] predicted that the removal of contaminated materials from the remediation sites is expected to result in improvements to down-gradient surface water quality. For example, concentrations of arsenic and uranium in Brewery Creek should decrease by 78% to 88% in the longer term.

The water flowing in Brewery Creek is sampled on a quarterly basis at two (2) locations, GRT-3 (upstream) and GRT-3B (downstream). Brewery Creek is located just north of the Highland Drive Landfill site. The monitoring locations are depicted in Appendix A, Figure 20.

The 2022 laboratory results are provided in Appendix B, Table 62, and Table 63. Results were compared to the PWQO [23] or CWQG [24] where available. Chloride and phosphorus were outside of the range of the PWQO [23]/CWQG [24] for most monitoring campaigns in 2022, which is typical downstream of a landfill as stated in the *PHP Screening Report* [35]. As discussed in the *PHP Screening Report* [35], exceedances of phosphorus are typical for agricultural/urban watersheds in the region. No other exceedances of the PWQO [23] or CWQG [24] were noted in the Brewery Creek watershed.

9.4.4.3 Highland Drive South Creek Watershed

Surface Water Monitoring

Highland Drive South Creek is subject to the influences of the Highland Drive Landfill as it is located downgradient. As discussed in the *Port Hope Project Environmental Assessment Study Report* (PHP EA Study Report) [41] the evaluation of water quality changes in Highland Drive South Creek based on expected changes in loadings from groundwater, indicating that concentrations of key contaminants in the creek (uranium and arsenic) would not be increased during the site remediation and would decrease by 78% to 88% in the longer term.

The water flowing in Highland Drive South Creek is sampled on a quarterly basis at two locations, HC-U (upstream) and HC-D (downstream) in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The monitoring locations are depicted in Appendix A, Figure 21.

The 2022 laboratory results are provided in Appendix B Table 64 and Table 65. Results were compared to the PWQO [23] or CWQG [24] where available. The 2022 results are below the PWQO [23] or CWQG [24] with the exception of arsenic, boron, chloride, fluoride, phosphorus, and uranium at both the up- and down-stream locations and iron at the upstream location. Zinc was elevated at the upstream location in 2022 April. Results are consistent with the results from the baseline sampling in 2013.

Sediment Monitoring

The sediments in Highland Drive South Creek are required to be sampled twice in 2022, as outlined in the pre-construction phase in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The monitoring locations are depicted in Appendix A, Figure 21. Sediment samples were collected at the upstream location only (HC-U). Sufficient sediment was not available at the downstream location (HC-D) to collect a sample for both campaigns in 2022.

The 2022 laboratory results are provided in Appendix B, Table 66, and Table 67. Results were less than the Ontario's *Provincial Sediment Quality Guidelines* (PSQG) [42], and the CCME *Sediment Quality Guidelines for the Protection of Aquatic Life* [43], with the exception of arsenic and magnesium. Arsenic exceeded the PSQG [42] Lowest Effect Level and CCME Interim Sediment Quality Guideline [43] in 2022 November. Magnesium exceeded the PSQG [43] Lowest Effect Level and Severe Effect Level in 2022 April and November. These exceedances were predicted in the *PHP EA Study Report* [41]~~[41]~~, due to the influence of the Highland Drive Landfill. The *PHP Screening Report* [35]~~[35]~~ states that the effects on sediment quality are directly related to the effects on the surface water. Therefore, contaminant concentrations are expected to decrease in the longer term, after the remediation of the Highland Drive Landfill is complete.

Storm Event Monitoring

Highland Drive South Creek was monitored hourly during one storm event in 2022 June. The monitoring locations are depicted in Appendix A, Figure 21. The sampling took place at the downstream location (HC-D) of the Highland Drive South Creek, in accordance with the *PHP Environmental Biophysical Monitoring Plan* [34].

The 2022 laboratory results are provided in Appendix B, Table 68. The contaminant concentrations were observed to peak as TSS increased. Concentrations of chloride, arsenic, boron, iron, phosphorus, and uranium were observed to exceed the PWQO [23] and/or CWQG [24] as TSS increased. Concentrations subsequently reduced as TSS levels declined. COPC concentrations associated with the source of contamination are predicted to decline in surface water once the remediation of the Highland Drive Landfill is complete.

9.4.4.4 Alexander Creek Watershed

Surface Water Monitoring

The Alexander Creek watershed surface water is required to be sampled quarterly at two (2) locations, AC-1 (upstream) and AC-3 (downstream), in accordance with the *PHP Environmental Biophysical Monitoring Plan* [34]The *PHP EA Study Report* [41] states that the removal of contaminated materials from the Alexander Street Ravine is expected to result in a long-term improvement to the down-gradient surface water quality.

The sampling in 2022 was conducted in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34]. The 2022 laboratory results are provided in Appendix B, Table 69, and Table 70. The results were compared to the PWQO [23] or CWQG [24], where available. The results are less than the PWQO [23] or CWQG [24] with the exception of phosphorus, chloride and iron at both sampling locations, AC-1, and AC-3. Uranium exceeded at the downstream location only. The uranium exceedances were observed in the 2022 January, April, and October results. As discussed in the *PHP Screening Report* [35], the streams in the Local Study Area exceeded for phosphorus and iron, which is typical for agricultural/urban watersheds in the region. As well, uranium is historically elevated in Alexander Creek, likely due to the influence from the Alexander Street Ravine.

[34]

9.4.4.5 Port Hope Harbour

Surface Water Monitoring

Lake Ontario Surface Water Quality

Surface water quality was monitored at three (3) locations in the Port Hope Harbour, in accordance with the *PHP Environmental and Biophysical Monitoring Plan* [34] and as depicted in Appendix A, Figure 23. Note that:

- Monitoring at PHH-1 was not completed in 2022 due to severe weather (2022 June). Although sampling by boat was not completed at PHH-1, shoreline samples were collected at PHH-1a. A discussion of the shoreline sampling results is presented in the next section - Surface Water Quality – During Dredging Activities.
- PHH-1 and PHH-2 were not sampled in 2022 September or 2022 November due to access issues. Although sampling by boat was not completed at PHH-1 and PHH-2, shoreline samples were collected at PHH-1a and PHH-2a. A discussion of the shoreline sampling results is presented in the next section - Surface Water Quality – During Dredging Activities.

The 2022 sampling results are provided in Appendix B, Table 71, Table 72, and Table 73. Sampling results from PHH-1a and PHH-2a were consistent with the results from PHH-2. Phosphorus was observed outside the range of the PWQO [23] at PHH-1a, PHH-2a, PHH-2 and PHH-4 throughout some sampling campaigns in 2022. As discussed in the *PHP Screening Report* [35], concentrations for phosphorus were occasionally elevated above guideline levels in the Port Hope Harbour. Arsenic and uranium exceeded the PWQO [23] and/or CWQG [24] at PHH-2 in the 2022 June sample. Concentrations of lead, iron, cobalt, and copper were also observed to exceed the PWQO [23] and CWQG [24] at PHH-2. In 2022 September, there were short-term exceedances of the PWQO [23] and/or CWQG [24] for arsenic and uranium at PHH-4.

The *PHP Screening Report* [35] predicted concentrations of uranium would increase in the area between the harbour and Ganaraska River. Once contaminated sediment is removed from the harbour, water quality is predicted to improve as noted in the *PHP EA Study Report* [41]. Predictions from the *PHP EA Study Report* [41] used theoretical/predicted data inputs to a model. Actual conditions related to daily inputs of water to the inner harbour during dredging have resulted in a different set of conditions, requiring that the proposed EA mitigation measures be modified. CNL engaged Responsible Authorities to ensure a path forward for the protection of Lake Ontario and the Ganaraska River. This has resulted in the creation of a robust monitoring program to ensure the protection of the aquatic environment while dredging activities continue at the Port Hope Harbour.

Surface Water Quality – During Dredging Activities

During dredging operations at the Port Hope Harbour, the *PHP Environmental and Biophysical Monitoring Plan* [34] requires weekly sampling in the confluence area beyond the temporary wave attenuator and fish/silt curtain, and in the Ganaraska River above the confluence (PHH-1 and PHH-2). Sampling locations are depicted in Appendix A, Figure 23. Weekly samples during dredging are currently being collected at PHH-1a and PHH-2a as depicted in Appendix A, Figure 24. An Algae Barrier System was also installed close to PHH-2 in 2021. PHH-2a was determined to be more representative of what is entering the Outer Harbour and the confluence. This adjustment to the sampling locations occurred due to safety reasons, and to ensure consistent monitoring points throughout the calendar year.

In 2022, samples were collected weekly during Port Hope harbour dredging activities. Please note that dredging activities were not continuous in 2022. Results are provided in Appendix B, Table 74 to Table 79. Exceedances of phosphorus and iron above the PWQO [23] and/or CWQG [24] were noted at both the PHH-1a and PHH-2/PHH-2a locations. Additional exceedances for arsenic, uranium, cobalt, and lead were observed at the PHH-2/PHH-2a locations. The *PHP Screening Report* [35] predicted concentrations of iron and phosphorus are typical for the nearshore zone of the lake in this region and during dredging operations, and concentrations of uranium would be expected to increase in the area between the harbour and the Ganaraska River.

Predictions from the *PHP EA Study Report* [41] used theoretical/predicted data inputs to a model. Actual conditions related to daily inputs of water to the inner harbour during dredging have resulted in a different set of conditions, requiring that the proposed EA mitigation measures be modified. CNL engaged Responsible Authorities to ensure a path forward for the protection of Lake Ontario and the Ganaraska River. This has resulted in the creation of a robust monitoring program to ensure the protection of the aquatic environment while dredging activities continue at the Port Hope Harbour.

Turbidity Monitoring

Daily turbidity monitoring during dredging activities, including in-water and near-water works, in the Port Hope Harbour, is required by the *PHP Environmental and Biophysical Monitoring Plan* [34].

Daily turbidity monitoring was conducted in 2022 by the Prime Contractor during in-water and near-water works at four locations as outlined in the *Port Hope Harbour Turbidity Monitoring Plan* [44] (one location upstream in the Ganaraska River, two locations south of the Wave Attenuator and one location near the entrance channel in Lake Ontario). Dredging activities continued in 2022 until the holiday shutdown on 2022 December 23. Please note, dredging at the Port Hope Harbour was not continuous in 2022 due to statutory holidays, routine maintenance and safety stand down. Monthly reports are provided to CNL with a summary of the turbidity monitoring completed by the Prime Contractor.

Remote turbidity monitors were removed by the Prime Contractor in 2021 December 10 for the winter season. Re-installation of the monitors took place in 2022 August. On 2022 December 06, remote turbidity monitors were removed for the winter season. Manual turbidity measurements were collected on days in which the remote monitors were not installed during in-water works and/or dredging was taking place as outlined in *Port Hope Harbour Turbidity Monitoring Plan* [44]. No turbidity exceedances were noted in 2022 that were attributable to CNL activities.

10. Emergency Management and Fire Protection

10.1 Emergency Preparedness Program

The PHP adheres to CNL's Emergency Preparedness Functional Support Area. See Section 10.1 of the *ACMR for CNL* for details [5].

The *Port Hope Area Initiative Emergency Plan* (PHAI Emergency Plan) [45] has been developed to describe the planning and operational requirements for the response to an emergency directly or indirectly affecting the PHAI. The *PHAI Emergency Plan* is consistent with CNL's Corporate Emergency Preparedness Program which ensures that all components of emergency preparedness and response are effectively maintained. Contractors conducting work as part of the PHAI submit emergency preparedness plans to CNL for review and approval to ensure that contractor site plans meet the requirements of the *PHAI Emergency Plan* [45]. Contractor compliance with project-specific emergency preparedness plans is examined as part of CNL's oversight program.

There were no revisions to the *PHAI Emergency Plan* [45] in the reporting period.

10.1.1 Drills and Exercises

In the reporting period, the comprehensive PHAI five-year drill and exercise plan continued to be implemented, this plan outlines all drills that are to be conducted, and an approximate timeline for those drills. All drills were completed as per regulatory and programmatic requirements.

10.1.2 Training

In the reporting period, Emergency Steward and Officer in Charge training was conducted for staff at all PHAI facilities. Attendees for this training totalled nearly 50% of HWP non-remote work staff.

10.1.3 External Collaborations

In the reporting period, there was repeated engagement with Port Hope and Northumberland Region first responders. Port Hope Fire Department and Emergency Services were engaged on remediation site activities and the operation of the waste water treatment plant. Port Hope Police and Northumberland Paramedic Service were also engaged on various topics.

10.1.4 Unplanned Emergency Events

No PHP incidents required activation of the Emergency Operations Centre in 2022.

In the reporting period, there was one unplanned emergency event reported to CNSC (See Section 3.2.1 for details). On 2022 July 30, the fire alarm was activated at a CNL field office at 39 Hayward St. and emergency personnel were dispatched. This was determined to be a false alarm, likely due to dust and humidity.

10.2 Fire Protection Program

The PHP adheres to CNL's Fire Protection Functional Support Area. See Section 10.2 of the *ACMR for CNL* for details [5]. The *Port Hope Area Initiative Fire Protection Program* [46] includes a combination of site level fire plans, fire notification and protection systems, inspections and training on hazard identification, control, emergency response and fire extinguisher training.

The *PHAI Fire Protection Plan* [46] was approved for use in the reporting period.

10.2.1 Fire Response Drills

During the reporting period, all required annual fire response drills were completed. Drill responses identified requirements for updated notification processes, improved training, and awareness on response procedures for previously newly assigned Emergency Stewards. Updated Officer in Charge and Emergency Steward Training was conducted for all CNL sites to correct the deficiencies noted.

10.2.2 External Collaborations

During the reporting period, PHP tours were conducted with Port Hope Fire and Emergency Services.

10.2.3 Third Party Audits & Inspections

During the reporting period, all required routine CNL fire protection program inspections were completed at the PHP. Inspections were completed using standard inspection forms and processes. No significant deficiencies were noted with respect to fire hazards and necessary protective measures. Third-party fire system experts conducted inspections and follow-up maintenance on the PH WWTP updated fire system sensors.

10.2.4 Fire Protection Screening Assessments

In the reporting period, several fire screening assessments were completed for various maintenance and capital improvement projects in accordance with CNL's Engineering Change Control program. Fire protection screening assessments were also completed for work outside the scope of the Engineering Change Control process that affected fire protection, either from the modification itself, or from the implementation of the modification. Fire screenings were completed in accordance with the CNL Fire Protection Screening Process [47].

11. Waste Management

11.1 Waste Management Program

As per the PHP LCH [3], the Waste Management SCA is not applicable to the PHP. It is included in this report for information. The PHP adheres to CNL's Waste Management Functional Support Area. See Section 11.1 of the *ACMR for CNL* for details [5].

The PHP follows Waste Management Plans to ensure continued support to all waste generators in meeting the strategic priorities and CNL business needs:

- Management of Historic Artefact Recovery Program
- PHP – Management of Historic LLRW
- Cameco Decommissioning Waste Management Plan
- Reconfiguration of Administration Building at 196 Toronto Rd

In 2022, a new standalone document [48] to list the Waste Acceptance Criteria for the PH LTWMF was developed to align the existing CNL documentation with CNSC REGDOC-2.11.1, Volume I [49]. This document specifies criteria that CNL uses for accepting LLRW at the PH LTWMF. The PH LTWMF waste acceptance criteria also informs waste generators, both CNL and select external, of the criteria for accepting waste, aiding them to make decisions on how to manage their waste.

11.1.1 Waste Management Operations

LLRW located at remediation sites in Port Hope is transported to the PH LTWMF. The PH LTWMF site includes a wastewater treatment plant, an aboveground engineered storage mound (currently in operation) and supporting infrastructure. The LTWMF has a capacity of approximately 2 million cubic metres comprised of LLRW and non-radioactive Industrial Waste (including contingencies and daily clean soil cover materials).

The engineered aboveground mound at the PH LTWMF has been designed to isolate the historic LLRW that is received from the remediation sites by securely encasing it on the top, bottom, and sides with thick, multiple layers of natural and specially manufactured materials. These layers form components of the cover and baseliner that, independently, are robust enough to prevent contaminants from entering the environment.

Systems are being installed within and around the mound that will monitor it for hundreds of years. Inspections and monitoring of the collection system for contaminated water (leachate) will confirm the effectiveness of the cover system. Sensors in both the cover and the baseliner will monitor performance, while groundwater quality will be monitored through ongoing testing of specially designed wells surrounding the base.

The waste is generated in accordance with the remediation project plans and is transported from the remediation sites to the PH LTWMF via tandem or triaxle dump trucks. Other non-

radiological waste such as clean construction debris, hazardous waste (e.g., fuel spill product, residual chemicals), and general/lunchroom garbage is diverted away from the PH LTWMF site, and is delivered to off-site facilities for management, recycling, and/or disposal. The waste deemed acceptable for receipt at the PH LTWMF [48], is received and placed in the mound in accordance with standard operating procedures.

11.1.2 Waste Inventory

Table 11: Estimated Stored Waste Inventory in PH LTWMF

Waste Type	Source	Total Estimated Quantity (Metric tonnes)	Total Estimated Radioactivity (Bq) [Calculated][a]	Primary Radionuclides
Radioactive	PH WWTP[b]	4,231	3.51E+10	Uranium and Uranium Progeny
Radioactive	PH LTWMF – On-Site Waste Placement (Welcome Site, Pond Expansion, Forested Area, Auto Debris from former site)	875,246	1.67E+14	Uranium and Uranium Progeny
Radioactive	Cameco Waste	41,824	4.32E+13	Uranium and Uranium Progeny
Radioactive	Small-Scale Sites (Package 1, 2, 3, 3.1, 3.2, 4, 5, 5.1, Interiors)	118,049	2.32+11	Uranium and Uranium Progeny
Radioactive	Temporary Storage Sites (Centre Pier, Pine St Extension, Sewage Treatment Plant, Storage Cell)	78,721	2.45E+11	Uranium and Uranium Progeny
Radioactive	Harbour Centre Pier	70,593	1.19E+13	Uranium and Uranium Progeny
Radioactive	Pine Street Extension	77,930	6.81E+11	Uranium and Uranium Progeny
Radioactive	Waterfront Sites (Viaducts, Waterworks East, Strachan St, Mill St)	147,739	3.26E+11	Uranium and Uranium Progeny
Radioactive	Construction Monitoring Program	3,513	6.09E+9	Uranium and Uranium Progeny
Radioactive	Port Granby LTWMF	1,815	1.19E+10	Uranium and Uranium Progeny
Radioactive	**Total Waste Placed at the PH LTWMF**	**1,419,661**	**2.22E+14**	**Uranium and Uranium Progeny**

a – Total activity data up to 2022 December 31.
b – Includes inventory contribution from offsite waste water, and PG reverse osmosis concentrate/brine.

11.1.3 Waste Transfers

There were no transfers of low-level radioactive waste out of the PH LTWMF in 2022.

12. Security

12.1 Security Program

The PHP adheres to CNL's Security Functional Support Area. See Section 12 of the *ACMR for CNL* for details [5]. The *Port Hope Area Initiative Security Plan* (PHAI Security Plan) [50] has been implemented for the PHP. The *PHAI Security Plan* [50] establishes the security arrangements that are required for PHAI project sites. It addresses the responsibilities, linkages with local law enforcement, functions, and elements of the security plan such as training, drills, exercises, and various physical security components. The purpose of the *PHAI Security Plan* [50] is to ensure the physical protection of the PHP assets and safeguarding of the public and personnel. The *PHAI Security Plan* [50] is based on applicable legislation, regulations and operating licences and is consistent with CNL's corporate security policies and programs.

Contractors conducting work as part of the PHAI submit security plans to CNL for review and approval. As confirmed through CNL's mandated review and acceptance process, contractor plans are consistent with the requirements of the *PHAI Security Plan* [50]. Contractors' compliance with project-specific security plans is examined as part of CNL's oversight program.

In the reporting period, the PHAI implemented a graded personnel security assessment program. In addition, an updated threat risk assessment was conducted for PHAI facilities.

The CNSC was notified [51] of revisions to the *PHAI Security Plan* [50]. Major updates included the newly implemented graded security assessment process and additional cascaded changes to the visitor process.

12.1.1 Security Events

In the reporting period, there were two security events reported to CNSC (See Section 3.2.1 for details):

- On 2022 July 25, an individual attempted to trespass on to the Harbour Centre Pier site, however, were unsuccessful due intervention by on-site security.
- On 2022 December 23, due to a significant winter storm, multiple perimeter fences were blown down. Fences were repaired as soon as it was safe to do so.

The reported events did not have any adverse effect on the health, safety and security of persons or the environment.

13. Safeguards and Non-Proliferation

13.1 Safeguards Program

The PHP adheres to CNL's Nuclear Materials and Safeguards Management Functional Support Area. See Section 13 of the *ACMR for CNL* for details [5].

13.1.1 International Atomic Energy Agency Activities

The International Atomic Energy Agency (IAEA) conducted various types of activities as part of the safeguards approach for CNL, including, but not limited to, IAEA safeguards seals changes, human surveillance, repair, and maintenance of IAEA safeguards monitoring equipment, and technical visits. A list of IAEA inspections conducted at all CNL sites can be found in Section 1.2, Management System of the *ACMR for CNL* for details [5].

14. Packaging and Transport

14.1 Packaging and Transport Program

The PHP adheres to CNL's Transportation of Dangerous (TDG) Goods Functional Support Area, which includes the requirements of the Packaging and Transport SCA. See Section 14 of the *ACMR for CNL* for details [5]. The *Port Hope Area Initiative Transportation of Dangerous Goods Plan* (PHAI TDG Plan) [13] applies to any activities involving the transportation of dangerous goods to, or from CNL sites. The TDG program provides an operational framework for the safe off-site transport of dangerous goods by conforming to all applicable laws and regulations, as well as CNL policies and procedures.

In addition, firms or contractors performing work on behalf of CNL for the PHAI project under the PHP Licence [1] adhere to project specific work plans, which are compliant with the PHAI TDG Plan [13].

There were no revisions to the *PHAI TDG Plan* [13] in the reporting period.

14.1.1 Shipments

Shipments of dangerous goods have occurred throughout 2022. Ongoing oversight of each contractor is performed to ensure continuous adherence to the project specific work plan. Recommended incremental improvements to the means and methods to deliver a project are provided when deemed necessary.

In the reporting period, there was one event related to the TDG program reported to CNSC (See Section 3.2.1 for details). There were no adverse effects on the health, safety and security or persons or the environment.

15. Engagement with Indigenous Communities and Organizations

In alignment with the Truth and Reconciliation Commission Call to Action #92 Business and Reconciliation [52], CNL is committed to advancing truth and reconciliation through meaningful actions, continued inclusion of and participation by Indigenous peoples in the planning and execution of CNL's missions including seeking input into project-related engagement plans such as this document.

CNL prioritizes the recognition of Indigenous rights and interests as we continue to build relationships with local Indigenous communities through ongoing learning about their values and interests. CNL continues to enhance its corporate Indigenous relations program, in collaboration with Indigenous communities, with the development of a formal reconciliation action plan, and the establishment of an Indigenous procurement policy, both underway.

All communications, plans and reporting are reviewed to ensure balanced language and acknowledgement of Constitutional Indigenous rights and worldviews and Indigenous knowledge systems will be integrated into CNL project planning and activities.

Historically, the *PHAI Phase 2 Public Information Program* (PIP) [53] had included Indigenous communities and organizations as a target audience. In support of CNL's objective to advance reconciliation through meaningful actions and movement toward increased inclusion and participation, the *PHAI Phase 2 and 3 Program for Engagement with Indigenous Communities and Organizations*, currently in development in collaboration with Indigenous representatives, will be implemented in tandem with the PIP. The *Program for Engagement with Indigenous Communities and Organizations* will be reviewed on an annual basis and updated as necessary to ensure it continues to provide appropriate direction.

As part of the commitment to undertake meaningful actions toward Truth and Reconciliation, corporately CNL is enhancing its overall Indigenous Relations program and in 2022, CNL expanded its resources for the PHAI with the addition of a Senior Advisor, Indigenous Relations.

In 2022, CNL staff worked closely with representatives of Indigenous communities and organizations to increase project awareness and enhance relationship building through a variety of approaches, as depicted in Figure 5.

Figure 5: 2022 Engagement with Indigenous Communities and Organizations

15.1 Indigenous Communities and Organizations

CNL is committed to timely engagement with Indigenous communities and organizations about projects and operations.

From the start of the planning process, the Mississauga communities of the Williams Treaties First Nations have been involved in the PHAI and participated in the EA through more than 40 engagements. When the EA was approved and the PHAI moved into the implementation phase (Phase 2) in 2012, the Mississauga communities asked to receive regular updates about the projects.

These communities continued to receive routine updates about the PHAI projects through regular meetings and dialogue with CNL staff. Since 2021, engagements have become more frequent, and the Williams Treaties First Nations have become increasingly more involved.

CNL also shares PHAI project updates with representatives from the Anishinabek Nation, Mohawks of the Bay of Quinte, and Métis Nation of Ontario as Indigenous communities/organizations with interests in the area.

Communities with Rights

- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation

Communities with Interests

- Mohawks of the Bay of Quinte
- Métis Nation of Ontario, Regions 6, 8 and local constituent Councils

Indigenous Organizations

- Anishinabek Nation
- Métis Nation of Ontario

15.1.1 Monitoring Concerns and Incorporating Feedback

CNL maintains open dialogue with Indigenous communities and organizations to strengthen understanding of Indigenous worldviews and relationship to the land and monitor concerns about PHAI activities.

Throughout all engagement activities any questions, concerns, and input about the PHAI and project-related impacts are recorded in writing and implemented where applicable.

15.1.2 Indigenous Input and Involvement

CNL seeks Indigenous input on the development of its engagement programs and provides opportunity for Indigenous communities and organizations (particularly those with Treaty rights in a project area) to review and comment on draft reports and plans and communications products, for technical and procedural aspects of the projects.

CNL responds to all comments and questions and provides information as to how input was incorporated and if not, why.

When comments are received on draft plans, reports, etc. a record of disposition of the feedback is circulated to all reviewers with the updated document outlining how each comment was dispositioned and applied.

In 2022, CNL circulated two draft documents for formal review and comment. In support of the CNL application for a 10-year licence renewal, CNL circulated the *PHAI Indigenous Communications and Engagement Supplementary Report (April – July 2022)* [54] for review and comment. Feedback received on the supplementary report was integrated into the final version, where applicable, before it was submitted to the CNSC in August 2022.

CNL also circulated a first draft of the *PHAI Phase 2 and 3 Program for Engagement with Indigenous Communities and Organizations* for review and comment. Feedback received was incorporated into a second draft circulated to the communities and organizations for additional comment.

In conjunction with the CNL application for a 10-year renewal of the PHAI Waste Nuclear Substance Licence, CNL reviewed formal interventions submitted to the CNSC by Curve Lake and Mississaugas of Scugog Island First Nations and documented all questions and comments.

In 2023, a response was prepared for each community responding to each comment and with details on how each comment was applied.

In addition to topic-specific questions and requests, feedback often includes requests and suggestions on use of language and inclusion of specific content in CNL plans, reports, and communications. Where applicable, this input is applied not only to the specific document under review but more broadly to other relevant CNL communications and materials as appropriate.

15.1.3 Contribution/Relationship Agreements

CNL supports the development of contribution/relationship agreements to provide funding to ensure Indigenous communities remain actively involved in CNL communications, engagement, and project planning.

Contribution/relationship agreements may include financial support for staff time related to administration, community liaison activities and meetings; technical documentation review; and environmental and habitat assessments as well as community capacity building through skills training and job shadowing.

Currently, PHAI has a contribution agreement with Curve Lake First Nation that will be renewed in 2023 and is in discussions with the Mississaugas of Scugog Island First Nation and Hiawatha First Nation to develop a contribution agreement in 2023.

15.1.4 Indigenous Knowledge Systems

Guided by the CNSC's *Indigenous Knowledge Policy Framework* [55], CNL is in the process of applying guidance and direction from Indigenous knowledge systems into its projects.

As noted in the CNSC framework,

'*IK is a body of knowledge gathered by generations of Indigenous peoples living in close contact with their traditional territories and resources. IK is cumulative and dynamic. It is built on the historic experiences of a people and adapts to social, economic, environmental, spiritual and political change.*'

In 2022, CNL began to incorporate Indigenous Knowledge Systems into Port Hope area projects. An example was the tree and shrub plantings at the Alexander Street Ravine site. Curve Lake First Nation provided insight on which species should be planted with a focus on native species. In addition, brush piles were created as habitat for smaller mammals and insects.

Later in 2022, CNL began preliminary consultation with Curve Lake regarding a trout habitat located at the Waterworks West. Representatives of Curve Lake will assist in assessing the site and provide direction to ensure that the habitat remains viable after remediation.

By collaborating with local Indigenous communities on remediation projects that promote environmental protection, CNL is also respecting local treaty and treaty rights. CNL will continue

to engage on this subject in greater depth and work to incorporate Indigenous ontological worldviews into environmental programming and project planning and execution.

15.1.5 Archaeology Program

CNL's *Protocol for Archaeological and Forensic Discovery* [56] outlines the required procedure should items of potential archaeological, Indigenous, or cultural heritage significance be uncovered during PHAI work. The protocol requires that the archaeologist overseeing the site engage with cultural heritage liaisons from Indigenous communities. CNL will ensure that Indigenous communities remain engaged and involved in all stages of the archaeological work.

In the summer of 2022, concern was raised by local residents that there could be Indigenous artifacts within Lions Park, a site scheduled for remediation in 2023. CNL informed the member communities of the Williams Treaties First Nations out of abundance of caution and subsequent engagement led to the planned participation of Curve Lake and Hiawatha First Nations through their archaeological liaisons. The exact nature of this participation including an archaeological protocol will be mutually agreed upon in early 2023.

15.1.6 Engagement with Indigenous Communities and Organizations

Through discussion with Indigenous communities and organizations over the course of the PHAI, CNL has noted preferences for communications and engagement and remains open to continual refinement of approaches based on the interest and needs of the communities.

The broad range of methods, products and activities is reviewed, revised and/or supplemented as required to reflect lessons learned during ongoing engagement.

Williams Treaties First Nations Monthly Meetings

At the request of Curve Lake First Nation, CNL's Indigenous Relations team established monthly meetings in 2021 with representatives from the Mississauga First Nations as well as the Chippewa communities (Beausoleil, Georgina Island and Rama First Nations). Meetings are organized with input from the community representatives and each meeting is focused on CNL environmental remediation projects and/or the interests identified by these Nations.

In 2022, nine meetings were held with the June meeting taking place in-person at the CNL office. Discussions focused on the PHAI and included a tour of PHAI project sites.

Meetings and Site Tours

Meetings with Indigenous communities and organizations provide the opportunity for CNL to strengthen relationships through mutual sharing of updates and information. CNL provides presentations and updates on project plans and activities and particular areas of interest to ensure all interested parties have the opportunity to receive and provide comment on information on the PHAI. Guided tours of project remediation sites and construction areas, led by expert CNL staff, provide a first-hand look at PHAI work, promoting an in-depth

understanding and appreciation for the complexity and importance of the projects. Tours illustrate the project scope, planning, implementation, and progress, including environmental protection, compliance with occupational health and safety requirements, and conformance with Environmental Assessment monitoring obligations and adaptive management practices.

In May 2022, representatives of the Anishinabek Nation Grand Council visited the CNL office in Port Hope for a project update and site tour.

CNL held a planning meeting with Métis Nation of Ontario representatives, staff, and Region 6 and 8 Councillors in June 2022 followed by a PHAI update in July. In October, members of Métis Nation of Ontario visited Port Hope for a tour of the project sites.

Special Events

Where possible, CNL engages formally and informally to deepen the relationship with Indigenous communities in the project area.

CNL Indigenous Relations and environmental monitoring staff were invited to visit the Savannah Lands at Alderville First Nation in September 2022 to learn more about these protected lands. On September 30, staff attended the National Day for Truth and Reconciliation event held at Port Hope Town Hall in conjunction with representatives from Alderville First Nation.

At the invitation of Curve Lake First Nation, CNL staff travelled to the community in October 2022 for a visit that included traditional teaching from an Elder.

CNL staff visited Alderville First Nation again in November, at the invitation of Chief Dave Mowat, to attend the Treaty 27 200th Commemoration Symposium to better understand this treaty and its relevance.

Indigenous Business and Trade Liaison

To facilitate access to CNL supply chain opportunities, the PHAI website includes links to a Contractor Portal, Supply Chain Registration and Vendor Portal to connect potential or current suppliers with information on procurement opportunities for goods, services, equipment, decommissioning and construction. A dedicated procurement policy for working with Indigenous communities is in development to further facilitate economic involvement in CNL projects.

Information on business and career events, including CNL's industry days and career fairs, is circulated to Indigenous communities and organizations. In April 2022, CNL met with representatives of Mississaugas of Scugog Island First Nation to discuss future business opportunities.

Information Updates

CNL routinely distributes PHAI newsletters, media releases, public disclosures, and invitations to special events to Indigenous communities and organizations and in 2022, in addition to these general information products, an invitation to CNL's webinar on the licence renewal application was circulated.

15.2 Public Information Program

CNL is committed to providing effective access to timely information about the PHAI. The *PHAI Phase 2 Public Information Program* [53] is aimed at strengthening understanding of and confidence in the projects, information is provided to ensure the public, Indigenous communities and organizations and key stakeholders are knowledgeable about upcoming work and project activities. Reports are also available on programs, schedules, environmental protection and mitigation measures, long-term benefits, and economic opportunities.

CNL responds to the diverse needs of a wide range of audiences to increase project awareness and enhance relationship building through a variety of approaches, as depicted in Figure 6.

Figure 6: 2022 PHAI and Port Hope Project Public Engagement

15.2.1 General Communications Tactics

Project Information Office

CNL's Project Information Office is open Monday to Friday, 8:30 a.m. to 4:30 p.m. Printed material provides information on the planning, design, implementation, environmental assessment, monitoring, and mitigation of the projects, and on the Complaints Resolution and the Property Value Protection programs. Three-dimensional models of the Port Hope and Port Granby long-term waste management facilities are also on display.

Due to COVID-19 pandemic restrictions, the office was closed to the public until it reopened in April 2022. Staff members remained available to provide information and answer questions through email, telephone, and social media. After-hours calls are received by an external agency and routed to a single point of contact for follow-up. In 2022, 13 visits to the Project Information Office took place.

Website

The PHAI website – PHAI.ca – provides information on the Port Hope and Port Granby projects, including descriptions of current and upcoming work, environmental monitoring reports, public disclosures, the Complaints Resolution Program, and the Property Value Protection Program. The website also provides telephone and email points of contact for enquiries.

In April 2022, CNL launched a redesigned website with streamlined access to details on the cleanup of historic low-level radioactive waste in the community, how work is performed on private properties, interactive maps of active and remediated sites around town and one-click access to request Radiological Status Letters.

In 2022, the PHAI.ca website received a total of 33,817 visits (individual visits to the website itself) and 75,055 individual pages viewed.

Social Media

The PHAI Facebook, Twitter, LinkedIn and Instagram social media accounts are used to engage the community and drive users to the PHAI website for more detailed information about current construction progress or events. CNL responds to questions or comments posted by members of the public on PHAI social media accounts as expeditiously as possible, to reflect the rapid response of internet communications. Dialogue of relevance to the PHAI on other social media accounts is monitored and consideration given to posting timely corrections to inaccurate information about the PHAI.

In 2022, 111 inquiries were received via Facebook. CNL circulated 362 Facebook/Twitter posts and 104 Instagram posts covering subjects from project updates to interesting facts about project work.

Media Releases

CNL issued two media releases in 2022, via Canada Newswire, one in May to announce the Completion of the Port Granby Project and the second in December to announce the CNSC renewal of the PHAI Waste Nuclear Substance Licence for 10 years.

Port Hope Project Newsletters

PHP newsletters update the community on the status of the projects, upcoming work, and changes to planned work or programs. Newsletters are distributed to every household in the Municipality of Port Hope and to an extensive list of federal, provincial, regional, and municipal stakeholders; newsletters are also available online at PHAI.ca.

The 2022 spring bulletin was distributed by mail to approximately 8,000 homes, businesses, and farms in the Municipality of Port Hope and to approximately 400 contacts via email. The bulletin provided an overview of the complex process involved in remediating private properties. The PHP newsletter issued in summer 2022 covered a range of topics including updates on CNL's ongoing commitment to safety, work underway in the community, CNL's application to the CNSC for a 10-year renewal of the PHAI Waste Nuclear Substance Licence and details on public participation in the process.

15.2.2 Presentations

Presentations are provided on current and planned project activities, and the Property Value Protection Program, to varied audiences including Indigenous groups and organizations, elected officials, and staff at all levels of government, community groups, service clubs, and local/national/international education, scientific, technical, and business communities.

During the reporting period, 12 presentations were provided to the public on the PHAI and PHP.

Education and Science & Technology Communities

Presentations, site tours and program-specific information and demonstrations are provided on request to students at the elementary, high school, college, and university level, and CNL participates on program advisory committees to provide industry perspective on the development of new programs and courses.

CNL participates in the annual Take Our Kids to Work Day event and other education initiatives including the Junior Achievement World of Opportunity program and judging local science fairs. National and international education institutions, industry and professional groups also participate in PHAI presentations and site tours and CNL continues to develop outreach activities related to Science, Technology, Engineering, and Math education.

In 2022, CNL provided an overview of the PHAI for four education audiences: Carlton University Architecture Workshop, Ontario Tech University Nuclear Engineering and two Fleming College Monitoring in Waste Management classes.

During the reporting period, three presentations were provided to science and technology audiences on the PHAI and PHP.

15.2.3 Public Site Tours

In alignment with COVID-19 restrictions in 2022, CNL's communications were adapted, and virtual tours were provided through detailed photographs, diagrams, and video until in-person began to resume in April 2022.

Six public tours of the PHP sites were provided in 2022.

15.2.4 Public Information Sessions

Information sessions are held as required to inform the community about PHAI work, provide updates on planned or changed project activity and programs, and receive feedback from the public.

Four information sessions were held in 2022 including a community meeting on cleanup plans for the Lions Recreation Centre Park; a webinar to provide an overview of the CNL application to CNSC for a 10-year licence renewal and an overview of cleanup plans in the Highland Drive area.

15.2.5 Special Events

CNL hosts special events on occasion to highlight project milestones and, as project ambassadors, staff participates in external events to provide information about PHAI activities to a broader audience and increase awareness and understanding of the projects.

CNL staff participated in three special events in 2022 including a return to the Port Hope Fall Fair after two years under COVID restrictions and hosting a booth at the Run, Salmon, Run Festival in Port Hope, and a booth at the CNL Open House in Chalk River to share information about the PHAI.

15.2.6 Community Notifications

Residents and business owners in close proximity to PHAI-related activity are notified in advance of planned work and of notable changes to the schedule or nature of the work. Notification can occur through website postings, phone calls, emails, or door-to-door visits / information drop-offs, depending on the timeframe and the capacity of to receive the notification.

During the reporting period, CNL staff delivered 14 notifications to Port Hope homes and business.

15.2.7 Dedicated Engagement Campaigns

CNL may implement dedicated campaigns to support specific initiatives with targeted engagement to inform, educate and discuss specific topics with the public, property owners and stakeholders.

In 2022, CNL continued public and stakeholder engagement in support of its application to the CNSC for the renewal of the PHP waste nuclear substance licence and the consolidation of the four existing licences associated with the PHAI portfolio. A variety of tactics were used to provide information, encourage, and facilitate feedback including distribution of information in Port Hope newsletters, advertising, and an information webinar.

In November 2022, CNL submitted its *PHAI Licence Renewal Public Engagement Report 2021 September to 2022 September* [57] to the CNSC, summarizing public communications and engagement in support of the application, undertaken from September 1, 2021 to September 30, 2022 which outlined more than 35 communications and engagement initiatives including a dedicated webpage, feature feed stories and links to additional resources, extensive advertising in print, radio and online, newsletter stories, fact sheets and overviews in all presentations provided during the engagement period. Information and updates on the process were provided at quarterly updates to Municipality of Port Hope Council, quarterly Agreement Monitoring Group meetings and all PHAI events such as the Fall Fair. In June, a webinar was held to provide information and respond to questions about the hearing process and the process for public participation.

15.2.8 Private Property Communications

All property owners in the urban Port Hope area receive a Consent & Scheduling Package explaining the Property Radiological Survey process and requesting written confirmation of their participation. Individual phone calls are made to schedule survey appointments and provide testing results for those properties with LLRW requiring remediation. Dedicated design meetings are then held with owners to review remediation and restoration plans for each property, explain the process, and review the Remedial Action Plan. Before the start of work, a Neighbourhood Information Session is held for property owners where CNL and contractor staff explain work plans, answer questions and address concerns.

Communications staff is available by phone, email and in person to respond to property owner inquiries and concerns, and communications field staff are on site to address emerging issues.

More than 5,300 interactions related to private properties took place in 2022 including 4,394 phone calls and emails; 290 property owner meetings and 680 site visits.

On request by a property owner, CNL provides a Radiological Status Letter confirming available results of any radiological investigation and remediation activities on the property to date. In 2022, CNL issued 345 Radiological Status Letters for Port Hope properties.

Decline-to-Participate Letter Campaigns

In an ongoing effort to encourage participation in the Property Radiological Survey, CNL makes every effort to contact property owners to confirm whether they wish to have their property tested and, if required, remediated. Letters are issued on an ongoing basis to new owners of properties that have not previously been tested as well as current owners that have not confirmed participating or declined to participate. In 2022, CNL issued a total of 458 letters.

15.2.9 Key Stakeholder Relations

Municipal Liaison

CNL regularly liaises with elected officials and staff of the host municipalities. As part of an agreed-upon framework for dialogue to keep municipalities abreast of PHAI plans and progress, CNL provides regular project and communications updates to municipal councils, committees, and staff through a variety of media, as well as topical presentations upon request.

In 2022, CNL provided quarterly updates to the Municipality of Port Hope on PHAI progress and provided updates on the CNSC licence renewal application as stakeholder engagement progressed. In anticipation of the municipal election, CNL held an information session in September 2022 to provide information and address any questions or concerns from candidates for municipal council.

Agreement Monitoring Group

Quarterly meetings of the Agreement Monitoring Group bring together representatives of both municipalities, as signatories to the Legal Agreement [1], and representatives of AECL and CNL to provide updates on project activities, budget, and schedule and to ensure project commitments outlined in the agreement are reviewed and actioned. Four meetings were held in 2022.

Business Community Liaison

CNL is a member of the Port Hope and District Chamber of Commerce, and staff provide monthly updates related to project progress, communications, and PHP-related economic opportunities.

To provide access to CNL supply chain opportunities, the PHAI website includes links to a Contractor Portal, Supply Chain Registration and Vendor Portal to connect potential or current suppliers with information on procurement opportunities for goods, services, equipment, decommissioning and construction.

CNL hosted two project site tours in collaboration with the Port Hope and District Chamber of Commerce to provide local business owners with an opportunity to see PHP progress.

15.2.10 Internal Communications

As representatives of the PHAI, CNL employees must be aware of PHAI project activities on an ongoing basis. A wide variety of opportunities are provided to update employees on a weekly, monthly, and quarterly basis.

In 2022, 45 internal communications initiatives were undertaken including weekly project updates, all-staff emails, virtual coffee chats with the General Manager, quarterly all-staff meetings, and regular project update emails.

15.3 Monitoring Public Opinion and Media Coverage

CNL monitors and analyzes public opinion, including social media and media coverage to record public understanding, perceptions, concerns and opinions about the PHAI and project-related impacts; gauge stakeholder awareness of and support for the PHAI; and be aware of trends in public opinion, social media and/or media coverage and how they may affect public perception of the PHAI to promptly and effectively respond.

15.3.1 Issues Management

For the purposes of the *PHAI PIP* [53], an issue is defined as something that could positively or negatively impact on CNL operations, credibility, or reputation. Where questions and issues arise, CNL attempts to identify the issue, determine its basis or cause, assess its implications, and, if possible, identify means to inform on the issue to the satisfaction of the concerned parties and the public.

CNL maintains a formal Complaints Resolution Process to help resolve public complaints arising from tangible, physical issues caused directly by the Port Hope and Port Granby projects.

15.4 Documentation and Reporting

To measure the effectiveness of this engagement plan, all written, telephone and electronic communications, as well as follow-up actions or requests for information, are tracked and recorded in writing. Comments and questions at meetings are recorded in writing for follow-up where required and responses are made available to all interested parties.

PHAI staff provide regular updates and reports on communications and engagement activities to a number of audiences.

15.4.1 Atomic Energy of Canada Limited

CNL's client, AECL, is kept apprised of CNL communications activities through ongoing engagement and weekly and monthly updates, and informed of relevant communications issues and public disclosures as they arise.

In 2022, 47 notifications were provided to AECL staff on matters related to the PHP and CNL provided a tour of project sites for AECL staff.

15.4.2 Canadian Nuclear Safety Commission

CNL keeps the CNSC apprised of activities through quarterly and annual reporting and ongoing engagement on relevant regulatory issues. CNSC and CNL interactions are supplemented by regular meetings with regulatory, licensing, project, and program staff.

In 2022, CNL provided quarterly reports on PHP communications activities.

In November 2022, CNL submitted a *PHAI Licence Renewal Public Engagement Report (2021 September – 2022 September)* [57] summarizing the activities undertaken to support the CNL application for a 10-year renewal of the Waste Nuclear Substance Licence.

15.4.3 Performance Reports

Information is posted on PHAI.ca regarding environmental impact including environmental monitoring program results and PHAI Annual Compliance Reports to the CNSC.

15.4.4 Public Disclosures

CNL is committed to providing open and transparent public disclosure.

In 2022, CNL issued seven public disclosures related to the PHP, including indications of higher-than-predicted contaminants in the harbour, truck travelling in Port Hope to the viaducts site snagged an overhead telephone cable and pulled it down; Waste Water Treatment Plant exceedance for zinc in effluent above CNL's action level and for copper above the regulatory weekly discharge limit and waste mislabeled for transportation.

Public Disclosures are posted on the PHAI.ca website. In 2022, there were 2,593 visits to the Public Disclosures website page.

16. Acronyms

AAQC	Ambient Air Quality Criteria
ACMR	Annual Compliance Monitoring Report
ALARA	As Low As Reasonably Achievable
AECL	Atomic Energy of Canada Limited
CCME	Canadian Council of Ministers of the Environment
CEDRR	Characterization, Engineering Design, Remediation, and Restoration
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CLG	Citizen Liaison Group
COPC	Contaminants of Potential Concern
COVID-19	Novel Coronavirus Disease 2019
CWQG	Canada Water Quality Guidelines
dBA	Decibels
EA	Environmental Assessment
EQ	Equalization
ERM	Environmental Remediation Management
HDLF	Highland Drive Landfill
HWP	Historic Waste Program
HWP MO	Historic Waste Program Management Office
IAEA	International Atomic Energy Agency
ImpAct	Improvement Action
LCH	Licence Conditions Handbook
LLRW	Low Level Radioactive Waste

MECP	Ministry of the Environment, Conservation, and Parks (Ontario)
MPH	Municipality of Port Hope
NEW	Nuclear Energy Worker
NNC	Notice of Non-Compliance
NSCA	Nuclear Safety and Control Act
OSH	Occupational Safety and Health
PIP	Public Information Program
PM	Particulate Matter
PG LTWMF	Port Granby Long-term Waste Management Facility
PHAI	Port Hope Area Initiative
PHP	Port Hope Project
PH LTWMF	Port Hope Long-Term Waste Management Facility
PH WWTP	Port Hope Waste Water Treatment Plant
PSNE CS	Pine Street Consolidation
PWQO	Provincial Water Quality Objectives
RA	Road Allowance
RP	Radiation Protection
SCA	Safety and Control Area
SSHC	Site Safety and Health Committee
TDG	Transportation of Dangerous Goods
TLD	Thermoluminescent Dosimeter
TSP	Total Suspended Particulate
TSS	Total Suspended Solids

WHO	World Health Organization
WTB	Water Treatment Building
WWMF	Welcome Waste Management Facility

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Appendix A Environmental Assessment Monitoring Locations

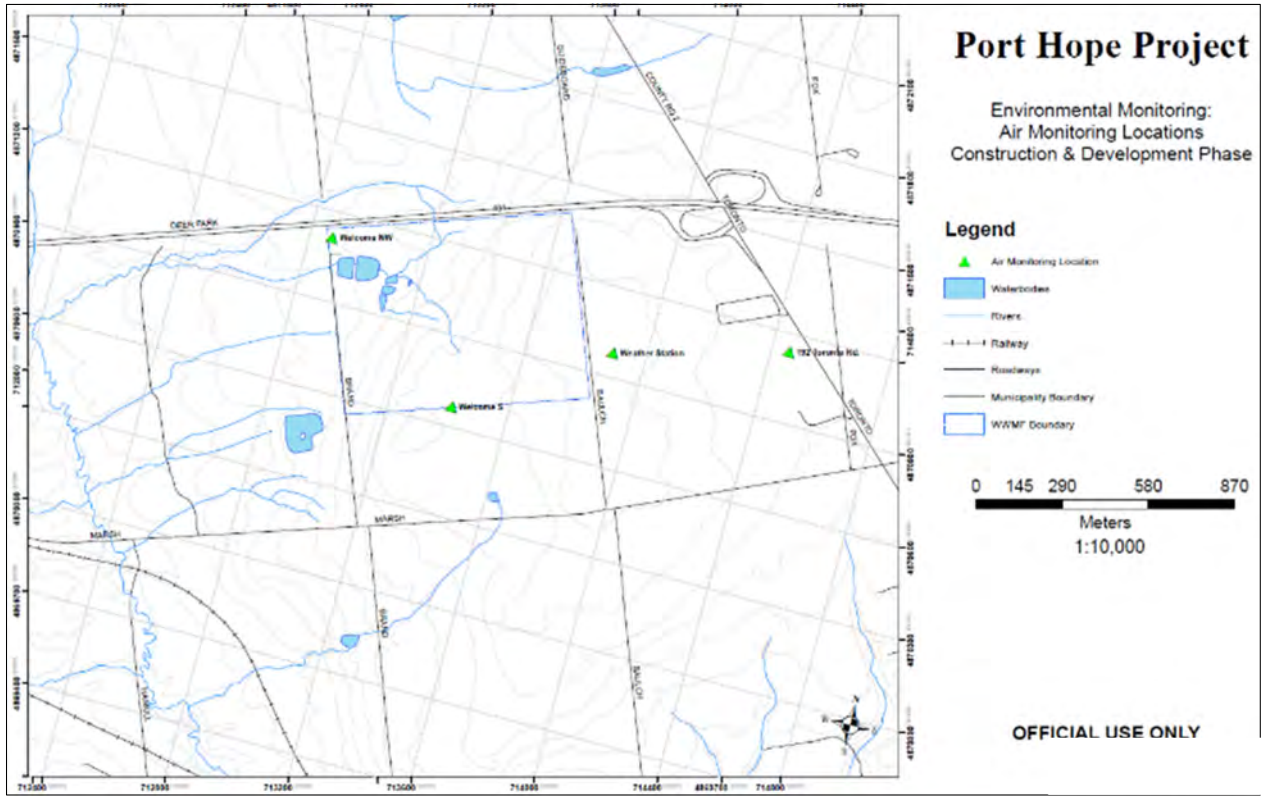

Figure 7: PHP LTWMF High-Volume Air Sampler Locations

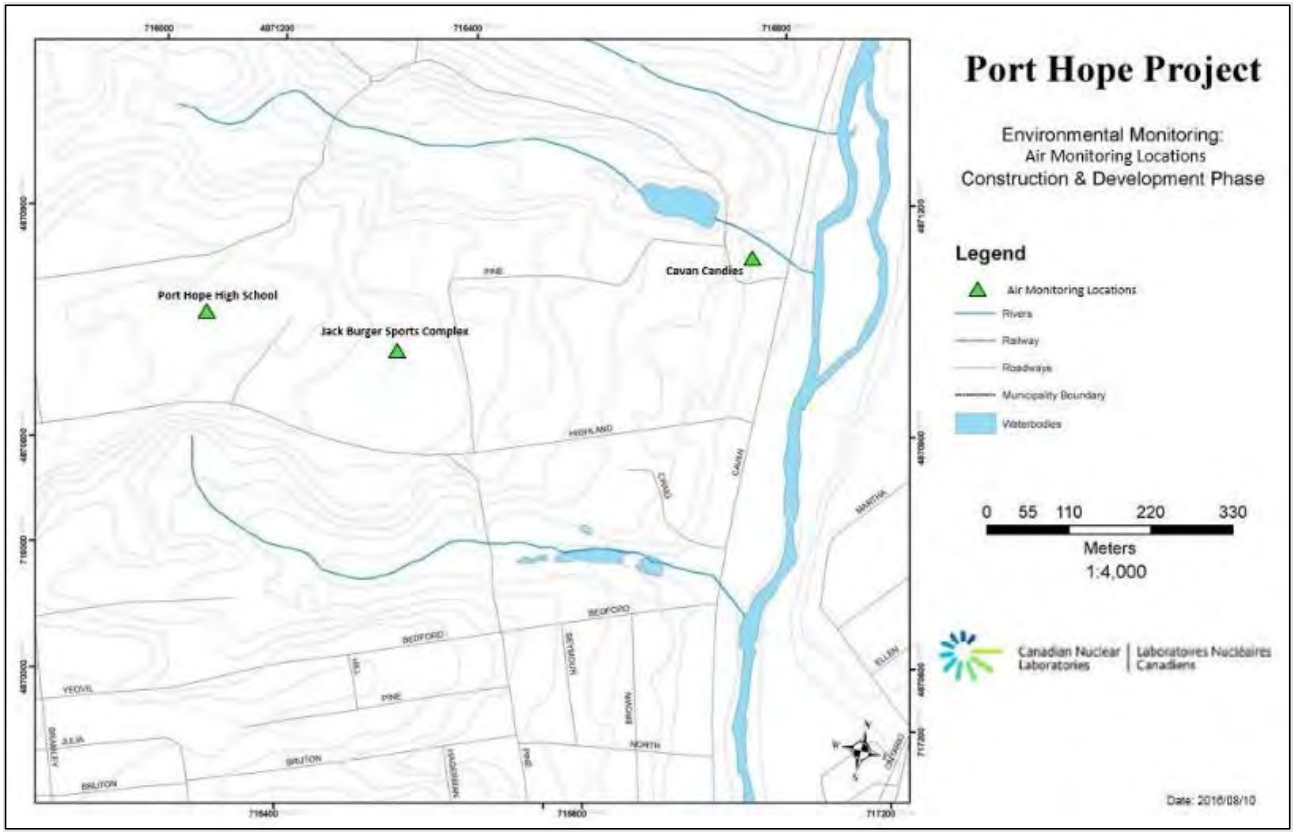

Figure 8: Highland Drive and Vicinity Sites Air Monitoring Locations

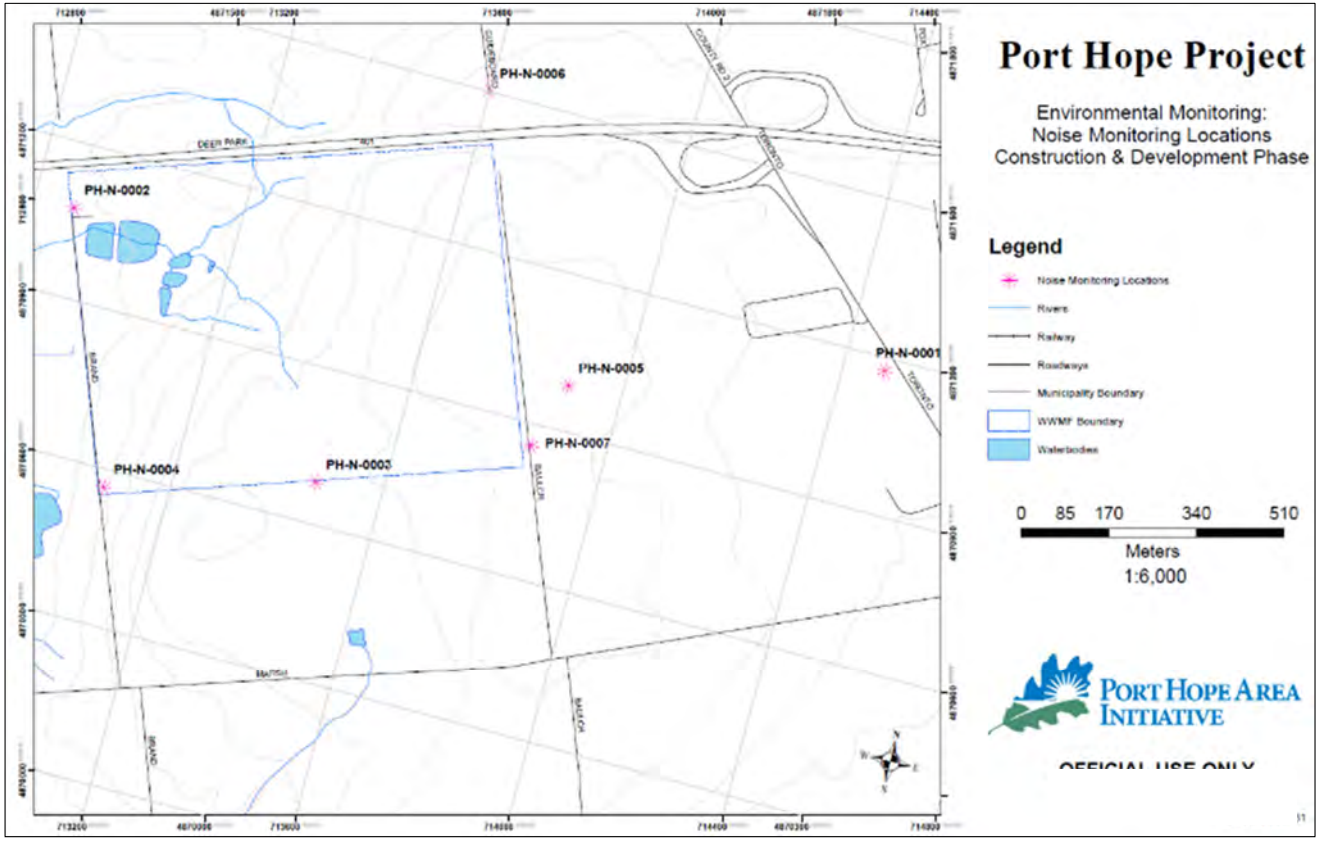

Figure 9: PH LTWMF Noise Monitoring Locations

Figure 10: Central Transportation Route Noise Monitoring Locations

Figure 11: Northern Transportation Route Noise Monitoring Locations

Figure 12: Southern Transportation Route Noise Monitoring Locations

Figure 13: Highland Drive and Vicinity Sites Noise Monitoring Locations

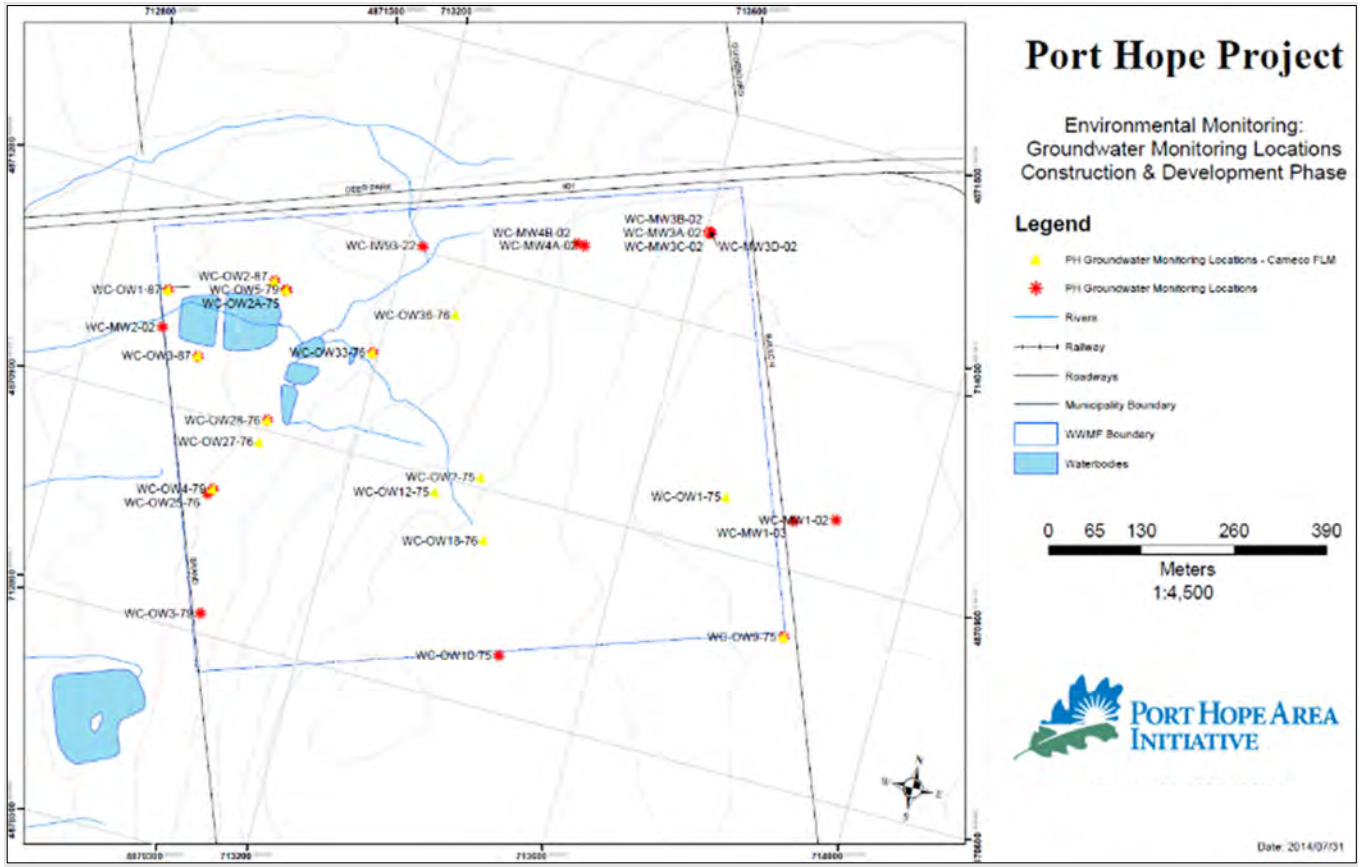

Figure 14: PH LTWMF Groundwater Monitoring Locations

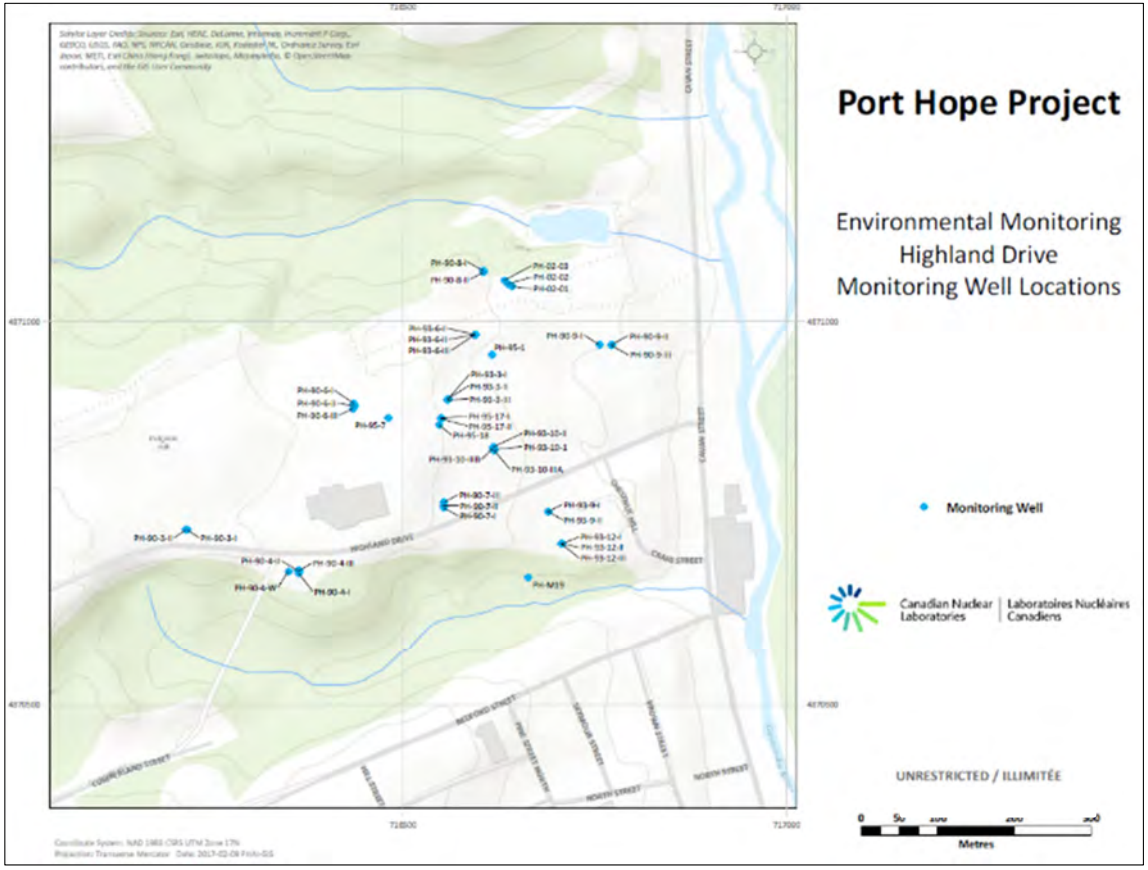

Figure 15: Highland Drive Groundwater Monitoring Locations

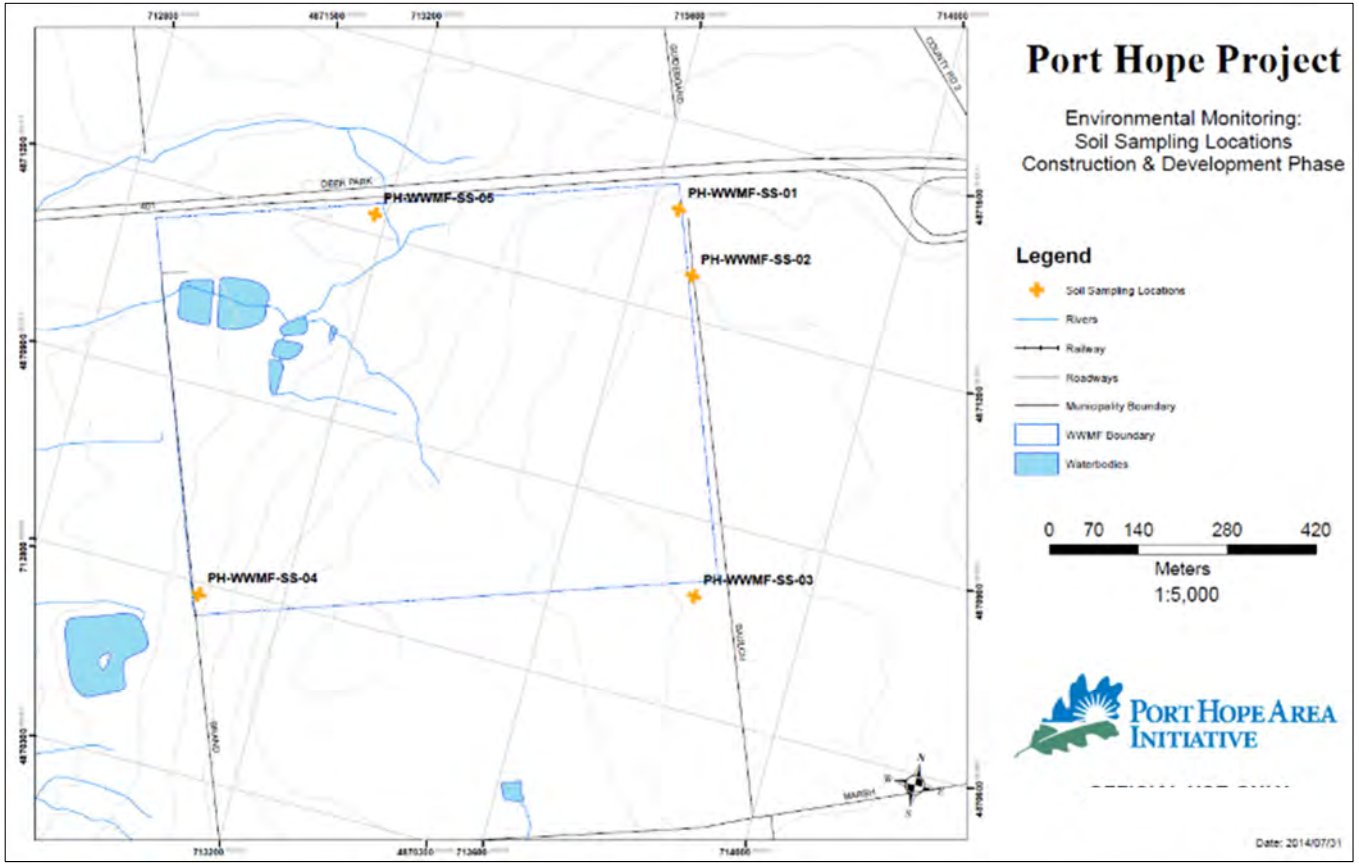

Figure 16: PH LTWMF Soil Sampling Locations

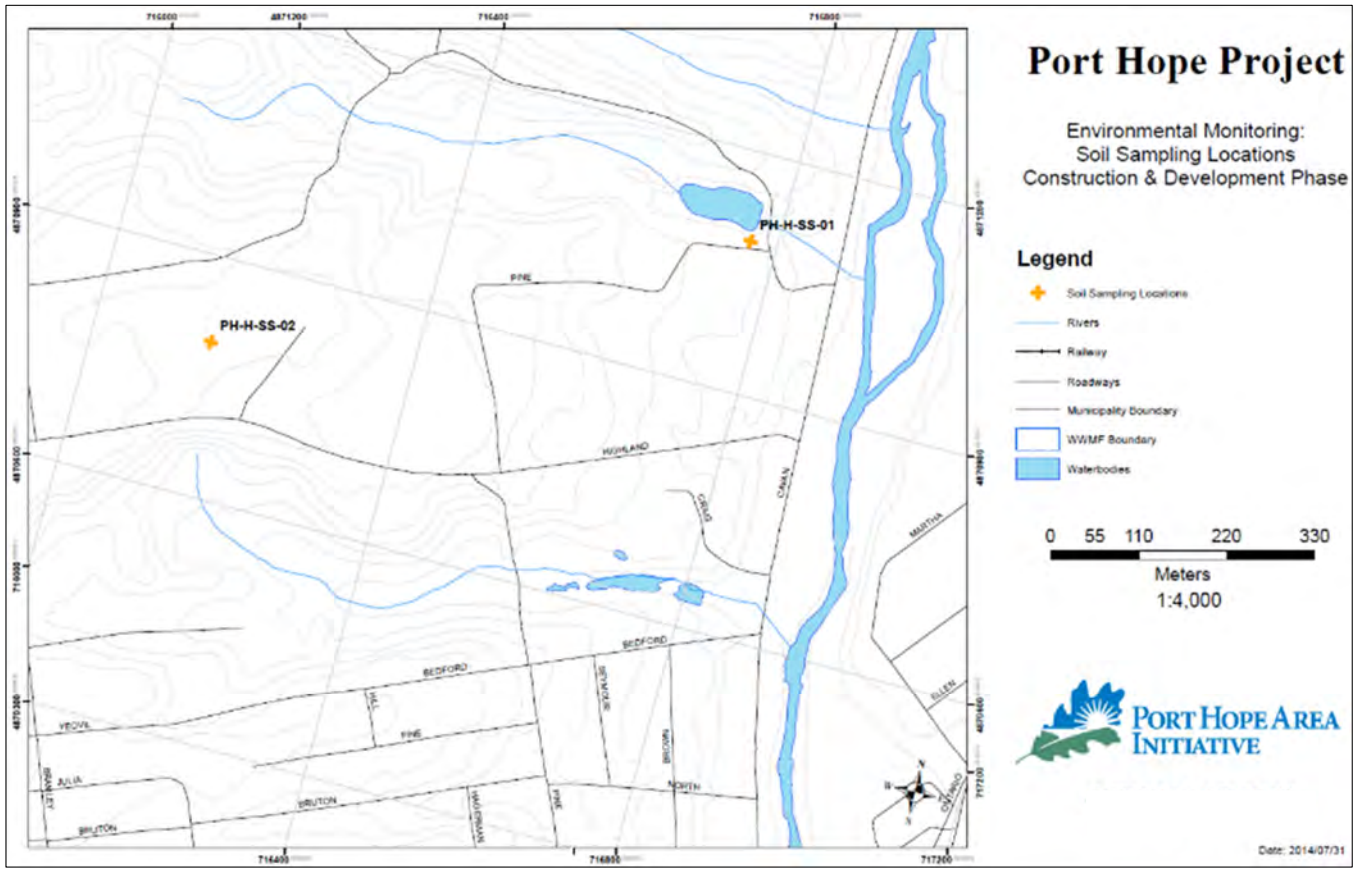

Figure 17: Highland Drive Landfill Soil Sampling Locations

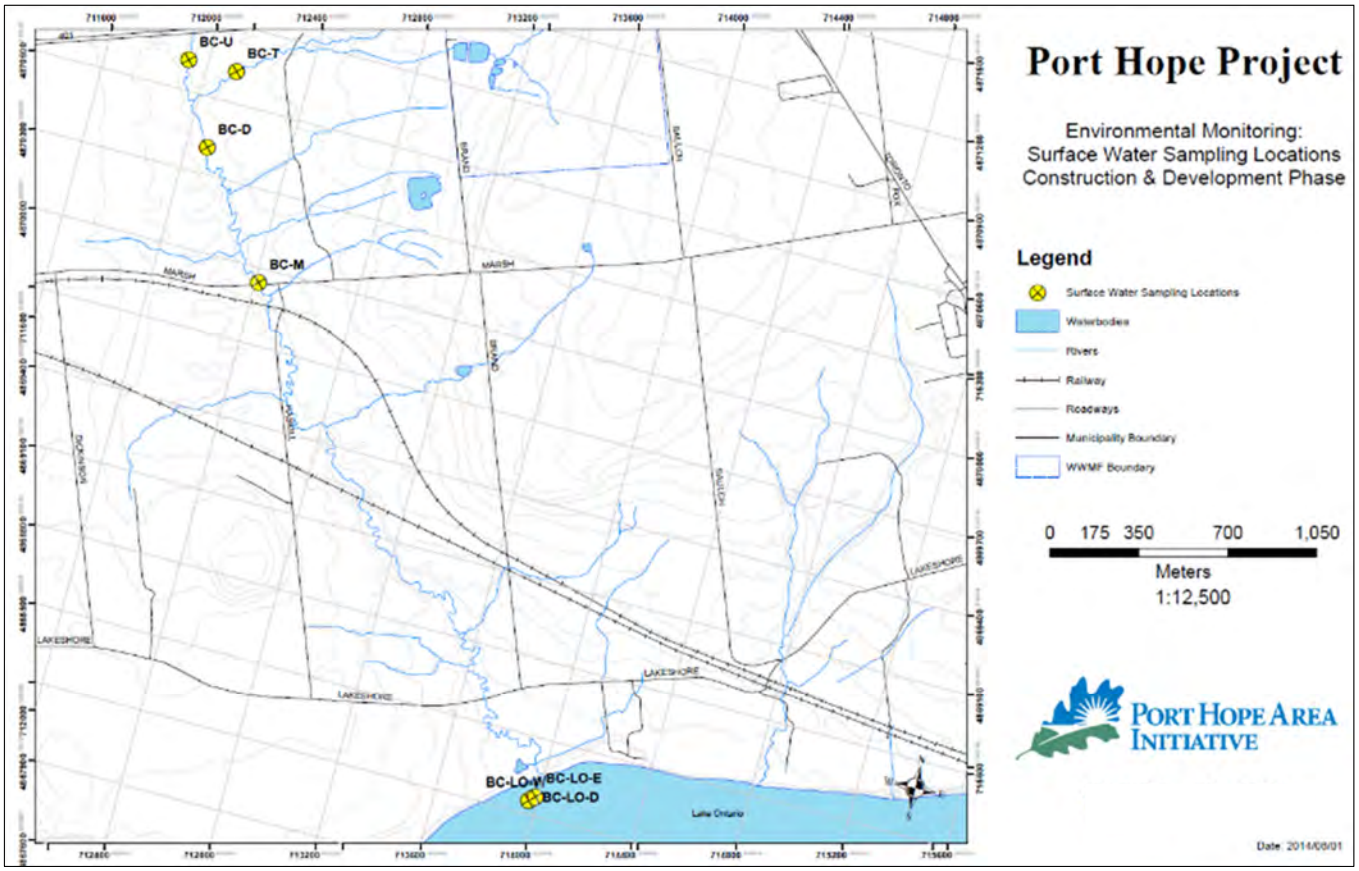

Figure 18: Brand Creek and Lake Ontario Surface Water Sampling Locations

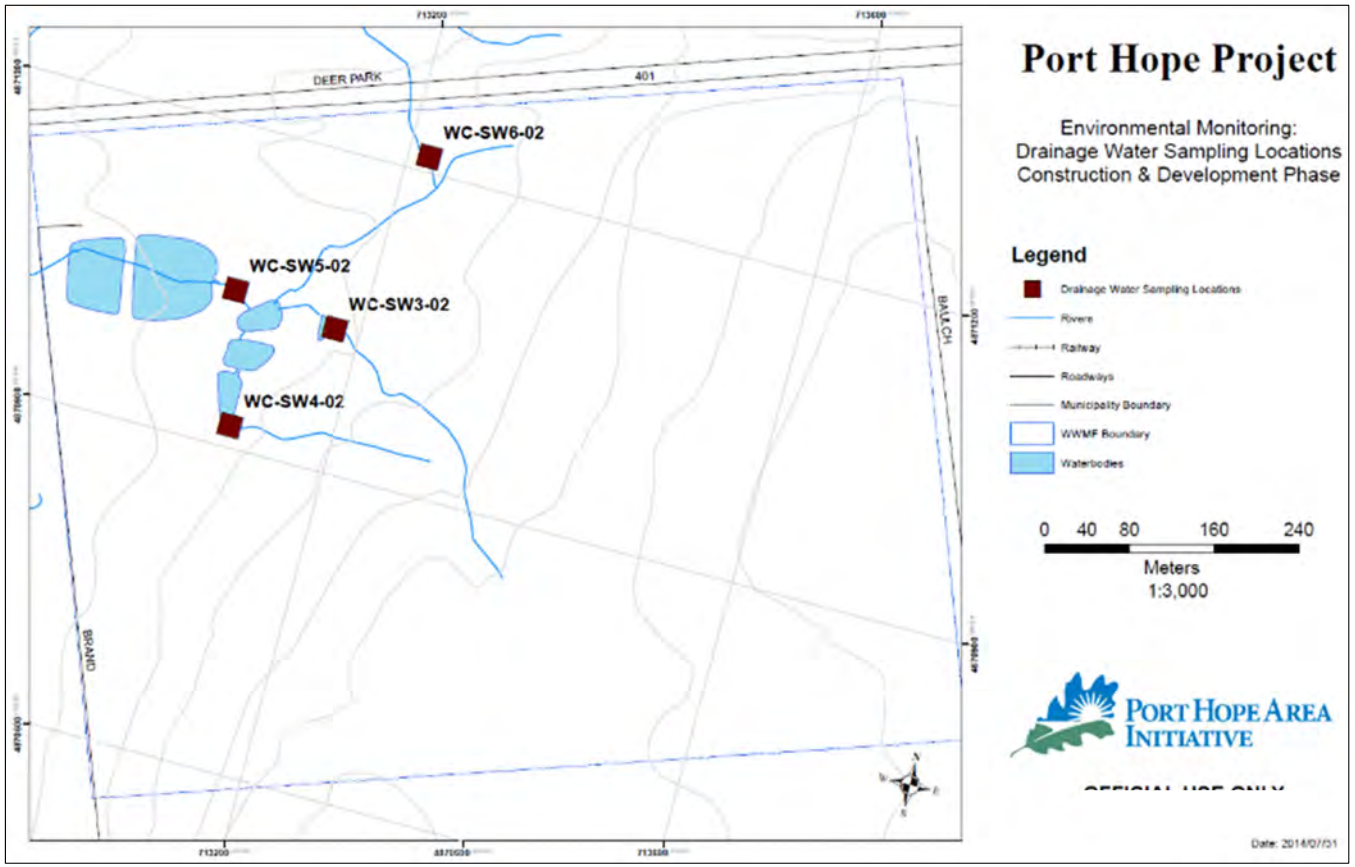

Figure 19: PH LTWMF Drainage Water Sampling Locations

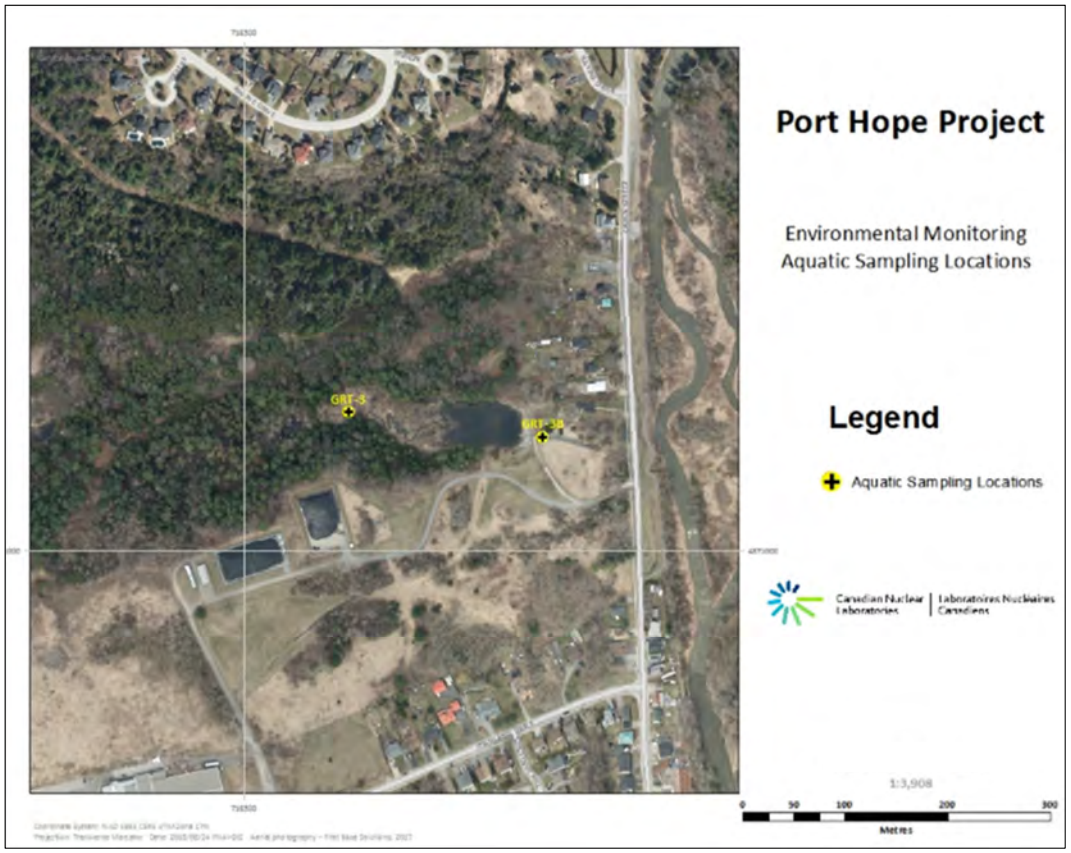

Figure 20: Brewery Creek Aquatic Sampling Locations

Figure 21: Highland Drive South Creek Aquatic Sampling Locations

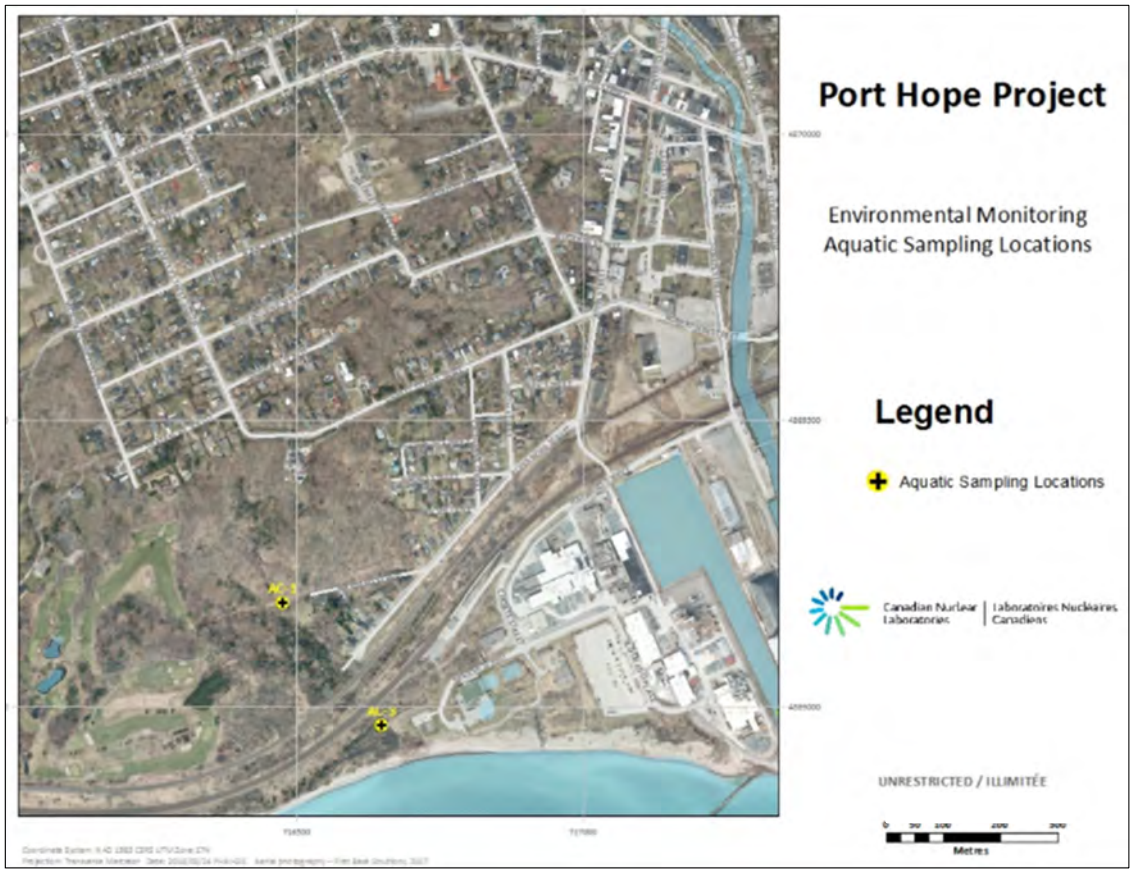

Figure 22: Alexander Creek Aquatic Sampling Locations

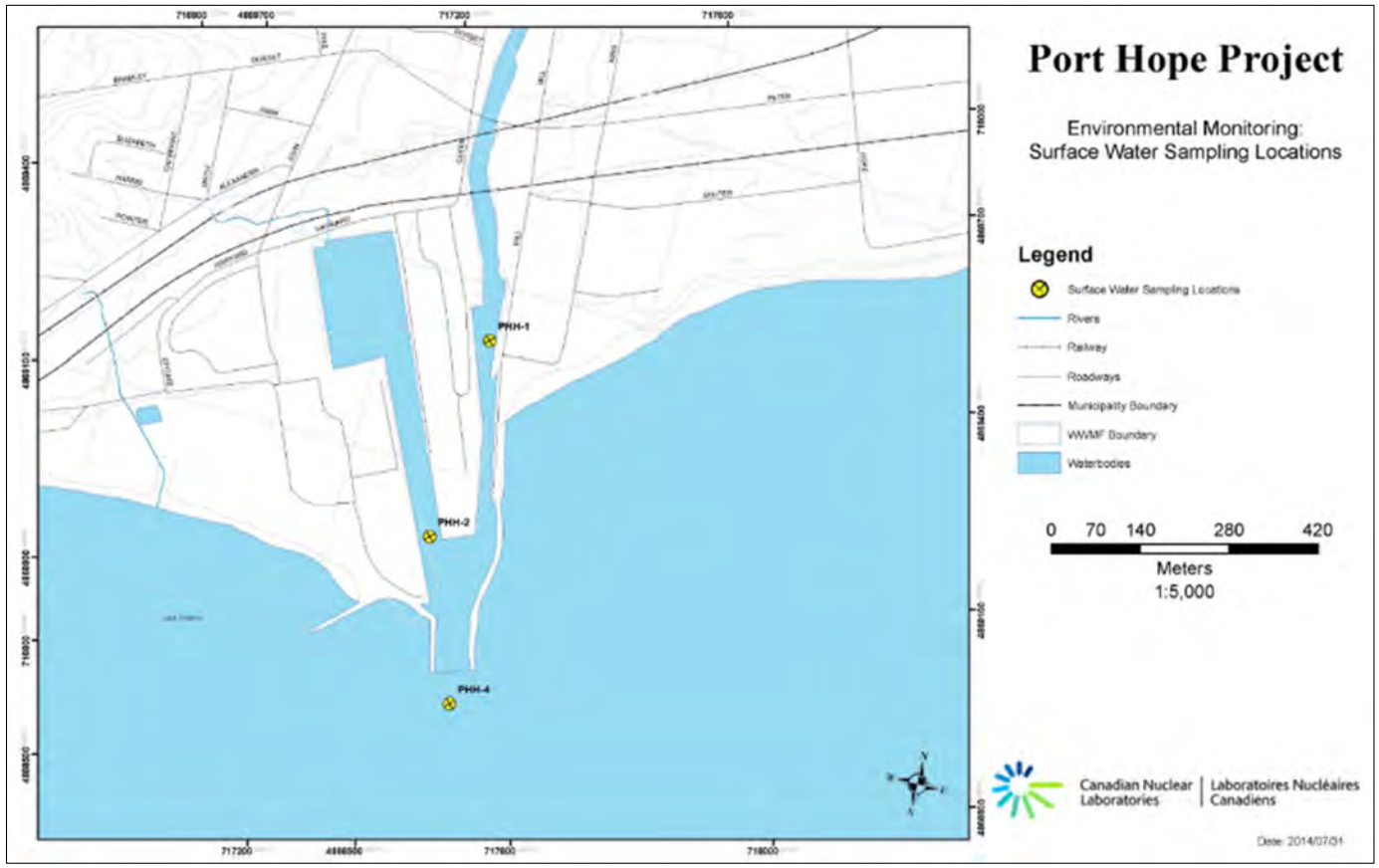

Figure 23: Port Hope Harbour Surface Water Sampling Locations

Figure 24: Port Hope Harbour Surface Water Weekly Sampling Locations

Appendix B Port Hope Environmental Monitoring Results

Table 12: 2022 PH LTWMF Operational Observation Well Sampling Results

Observation Well Number	Arsenic (µg/L)	Uranium (µg/L)	Radium-226 (Bq/L)	pH	Notes
	Average				
1-75	--	--	--	--	**Well Decommissioned in 2016**
1-87	1.2	2.80	<0.01	7.43	--
2-75	--	--	--	--	**Well Decommissioned in 2018**
WC-OW2-19 [1]	1.3	0.09	<0.01	7.58	--
3-87	5.7	0.09	<0.01	7.86	--
4-79	0.6	0.09	<0.01	7.65	--
WC-OW5-19 [2]	2.7	0.06	<0.01	7.32	--
WC-LTWMF-MW-06 [3]	1.8	0.86	<0.01	8.16	--
12-75	--	--	--	--	**Well Decommissioned in 2018**
18-76	--	--	--	--	**Well Decommissioned in 2018**
27-76	0.4	0.13	0.01	7.57	--
28-76	0.5	0.18	<0.01	--	--
33-76	1.2	2.90	<0.01	7.50	--
36-76	--	--	--	--	No sample – well not found

Notes:

Sampling is conducted semi-annually (spring and fall).

-- - No data.

[1] - Replaced 2-87 in 2019

[2] - Replaced 5-79 in 2019

[3] - Replaced 9-75 in 2017

Table 13: 2020 to 2022 Port Hope Waste Water Treatment Plant – Results of Water Sampling Analysis (Influent)

Influent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)(1)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Totalized Influent Volume (m^3)
2020 January	3	8.51	25	119	105	112	25.1	309	50	0.555	38,083
2020 February	4	8.58	32	109	117	103	21.5	305	50	0.505	39,912
2020 March	7	8.41	37	110	120	230	46.0	340	68	0.420	40,817
2020 April	18	8.49	110	90	--	330	75.0	705	140	0.700	35,230
2020 May	13	8.39	85	68	--	180	37.5	485	71	0.475	17,601
2020 June	11	8.61	120	140	--	41	12.0	350	38	0.540	20,485
2020 July	7	9.26	38	377	--	22	17.6	340	27	0.455	20,938
2020 August	9	8.83	259	252	--	39	33.3	319	41	0.455	23,933
2020 September	7	8.75	190	202	--	54	45.2	298	45	0.240	10,499
2020 October	8	8.47	178	123	--	32	44.3	326	60	0.155	19,494
2020 November	5	8.46	87	112	--	19	30.7	291	47	0.150	11,154
2020 December	2	7.99	29	114	--	134	47.8	379	54	0.140	18,636
2021 January	1	8.45	15	126	--	162	51	366	48	0.175	31,150
2021 February	2	8.61	14	171	--	144	52	303	51	0.190	11,912

Influent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)(1)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Totalized Influent Volume (m^3)
2021 March	4	8.27	61	86	--	52	28	239	44	0.139	29,028
2021 April	4	8.05	57	206	--	95	48	394	58	0.203	28,320
2021 May	6	8.48	106	524	--	81	72	470	69	0.337	14,419
2021 June	7	8.28	100	752	--	23	41	416	78	0.244	20,485
2021 July	4	9.55	49	680	--	36	32	281	42	0.200	22,304
2021 August	6	9.17	31	999	--	33	40	397	70	0.371	15,659
2021 September	6.5	8.91	157	610	--	14	30	318	69	0.335	12,488
2021 October	6	8.21	127	574	--	27	46	317	49	0.428	40,754
2021 November	5	8.33	60	747	--	43	55	531	51	0.36	31,825
2021 December	8	8.12	79	479	--	151	76	440	49	0.414	29,019
2022 January	5	8.07	46	626	--	234	89	465	46	0.37	20,918
2022 February	9	8.25	102	878	--	167	65	652	63	0.36	26,045
2022 March	16	8.35	131	623	--	224	100	501	57	0.56	44,758
2022 April	13	8.69	122	763	--	176	110	660	54	0.51	38,604
2022 May	28	8.70	185	975	--	49	73	574	57	0.40	29,015

Influent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)(1)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Totalized Influent Volume (m^3)
2022 June	22	9.21	442	705	--	28	65	455	59	0.40	19,901
2022 July	25	9.05	629	464	--	19	40	429	37	0.33	19,294
2022 August	16	8.97	308	375	--	24	65	533	63	0.32	20,647
2022 September	30	8.92	417	352	--	22	99	588	75	0.28	16,182
2022 October	14	9.15	144	215	--	14	40	352	39	0.16	16,097
2022 November	10	8.90	69	183.3	--	51	54	403	66	0.11	10,537
2022 December	9	8.58	130	187.5	--	64	83	489	61	0.16	21,577

Notes:

(1) - Regulated monitoring of Boron was removed from the requirement of the PHP Licence [1] as of 2020 April 20.

Table 14: 2020 to 2022 Port Hope Waste Water Treatment Plant– Results of Water Sampling Analysis (Effluent)

Final Effluent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)[2]	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Toxicity (Pass/Fail)	Totalized Effluent Volume (m^3)
Monthly Composite Release Limit	15	6 - 9	110	150	--	15	23	150	210	0.37	PASS	--
Action Level[1]	7.5	6.5 - 8.5	100	41	--	5	5	100	15	0.050	FAIL	--
2020 January	1	7.79	2.5	0.2	27	1.0	0.1	1.11	1.0	0.0065	PASS	19,382
2020 February	1	7.80	1.0	0.3	28	1.3	0.1	0.53	3.0	0.005	PASS	22,856
2020 March	1	7.90	5.0	1.0	28	1.3	0.5	0.91	5.0	0.005	PASS	22,756
2020 April	1	7.61	5.0	1.0	--	1.9	0.6	2.80	5.0	0.005	PASS	18,656
2020 May	1	7.28	5.4	1.0	--	1.4	0.5	1.15	5.0	0.005	PASS	8,221
2020 June	1	7.34	5.0	2.4	--	0.9	0.5	0.70	5.0	0.007	PASS	3,735
2020 July	1	7.73	1.0	6.8	--	1.1	0.2	2.15	2.0	0.008	PASS	7,600
2020 August	1	7.57	1.0	1.7	--	1.9	0.4	2.50	2.5	0.0055	PASS	10,621
2020 September	1	7.32	1.0	1.1	--	1.4	0.4	1.22	2.0	0.008	PASS	3,927
2020 October	1	7.59	1.0	0.5	--	1.3	0.6	1.75	2.0	0.005	PASS	9,591
2020 November	1	7.46	2.5	0.4	--	1.3	0.3	0.79	1.5	0.005	PASS	4,183
2020 December	1	7.60	1.6	0.3	--	1.9	0.5	1.45	1.0	0.005	PASS	8,689
2021 January	1	7.52	1.0	0.3	--	2.1	0.4	1.05	1.0	0.005	PASS	15,554
2021 February	1	7.38	1.0	0.6	--	2.0	0.6	0.83	1.0	0.005	PASS	3,870

Final Effluent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)[2]	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Toxicity (Pass/Fail)	Totalized Effluent Volume (m^3)
2021 March	1	7.49	1.0	0.3	--	1.0	0.3	0.87	1.0	0.005	PASS	15,329
2021 April	1	7.52	1.0	0.7	--	1.0	0.5	1.00	1.0	0.005	PASS	14,488
2021 May	1	7.36	1.0	3.5	--	1.5	0.7	1.30	1.0	0.005	PASS	4,254
2021 June	NO EFF*	NO EFF	NO EFF	NO EFF	--	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	0
2021 July	1.5	7.53	1	20.4	--	1.2	0.29	2.34	2.5	0.005	PASS	7,130
2021 August	1	7.77	1	29.9	--	1.3	0.409	2.49	2.0	0.005	PASS	6,381
2021 September	2	7.88	2	20.2	--	1.6	0.278	0.98	2.0	0.005	PASS	9,089
2021 October	1.5	7.70	2	19.2	--	0.6	0.41	1.70	1.5	0.005	PASS	20,642
2021 November	2	7.74	1	20.1	--	0.8	0.46	2.34	1.0	0.005	PASS	15,581
2021 December	1	7.59	1	13.2	--	1.6	0.62	1.54	1.0	0.005	PASS	12,656
2022 January	1	7.71	1.5	14.0	--	2.6	0.6	1.17	1.0	0.005	PASS	7,218
2022 February	1	7.83	2.0	18.8	--	1.8	0.4	2.45	2.0	0.005	PASS	11,096
2022 March	1	7.77	1.0	11.6	--	2.1	0.6	2.79	1.3	0.005	PASS	22,104
2022 April	1	7.81	2.3	15.9	--	1.5	0.8	4.11	1.0	0.005	PASS	18,676
2022 May	1	7.73	3.2	25.4	--	11.6	0.6	2.92	10.0	0.005	PASS	12,319
2022 June	1	7.57	1.5	32.9	--	0.6	0.1	0.63	1.3	0.005	PASS	3,936
2022 July	1	7.35	2	10.1	--	0.3	0.2	1.37	1.0	0.005	PASS	2,953
2022 August	1.6	7.55	2.4	10.6	--	1.2	0.2	0.84	2.6	0.005	PASS	6,963

Final Effluent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)(2)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Toxicity (Pass/Fail)	Totalized Effluent Volume (m^3)
2022 September	1	7.32	1.3	0.9	--	0.7	0.1	0.35	2.9	0.005	PASS	4,384
2022 October	1.5	7.10	1	1.0	--	0.6	0.1	0.23	1.5	0.005	PASS	2,931
2022 November	NO EFF*	NO EFF	NO EFF	NO EFF	--	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	0
2022 December	1.3	7.40	1.3	0.5	--	0.3	0.1	0.30	3.3	0.005	PASS	9,735

Notes:

(1) - The values shown are based on PHP LCH [3]~~[3]~~. Revised values proposed by CNL were reviewed by the CNSC with formal acceptance provided on 2020 April 20.

(2) - Regulated monitoring of Boron was removed from the requirement of the Waste Nuclear Substance Licence WSNL-W1-2310.01/2022 as of 2020 April 20.

** NO EFF refers to No Effluent sampling. No effluent discharges from the PH WWTP occurred during these months.*

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Table 15: 2020-2022 Port Hope Waste Water Treatment Plant and Old Water Treatment Building Operations - Results of Water Sampling Analysis (Effluent Toxicity)

Sample Date	48 Hour Result	96 Hour Result	Old WTB 48 Hour Result	Old WTB 96 Hour Result
2020 January 14	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 February 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 March 10	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 April 07	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 May 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 June 09	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 July 07	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 August 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 September 08	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 October 06	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 November 10	Pass (0.0% mortality)	Pass (30% mortality)	--	--
2020 November 24	Pass (3.3% mortality)	Pass (20% mortality)	--	--
2020 December 08	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 January 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 February 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 March 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 April 20	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 May 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 June 01	NO EFF	NO EFF	--	--
2021 July 13	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 August 24	Pass (0.0% mortality)	Pass (30% mortality)	--	--

Sample Date	48 Hour Result	96 Hour Result	Old WTB 48 Hour Result	Old WTB 96 Hour Result
2021 September 14	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2021 October 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 November 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 December 14	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 January 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 February 15	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 March 8	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 April 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 May 10	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 June 7	Pass (13.3% mortality)	Pass (0.0% mortality)	--	--
2022 July 12	Pass (0.0% mortality)	Pass (20.0% mortality)	--	--
2022 August 9	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 September 6	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2022 October 25	Pass (0.0% mortality)	Pass (20.0% mortality)	--	--
NO DISCHARGE	NO EFF	NO EFF	--	--
2022 December 13	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--

Table 16: 2020 to 2022 PHWWTP Operations - Results of Brand Creek Surface Water Sampling

Parameter/Criteria	Total Suspended Solids (mg/L)	pH	Total Aluminum[4] (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)
PWQO[(1)]	**NV**	**6.5:8.5**	**75**	**100**	**200**	**5**	**5**	**5**	**30**	**1**
CCME FWA-LT[(2)]	**NV**	**6.5:9.0**	**100**	**5**	**1,500**	**2**	**1**	**15**	**30**	**NV[(3)]**
Sample Date										
2020 January 07	20	8.30	260	0.8	<20	1.4	0.32	3.4	<10	0.007
2020 February 04	33	8.22	798	0.8	8	1.2	0.57	3.0	4.0	0.008
2020 March 17	14	8.16	350	<1.0	<10	<1.0	<0.50	2.5	<5.0	<0.0050
2020 April 21	13	8.17	410	<1.0	13	<1.0	<0.50	2.1	<5.0	<0.0050
2020 May 19	56	8.19	230	<1.0	13	<1.0	<0.50	2.8	<5.0	<0.0050
2020 June 02	14	8.14	220	1.1	<10	1.2	<0.50	2.0	<5.0	<0.0050
2020 July 14	44	8.13	1,720	3.3	16	**2.6**	**1.04**	2.8	9.0	0.006
2020 August 11	15	8.19	570	3.2	21	1.6	0.45	2.7	7.0	0.01
2020 September 01	24	8.17	621	3.8	17	1.5	0.46	2.4	7.0	0.008
2020 October 13	7	8.31	304	2.4	18	1.1	0.133	2.3	4.0	0.008
2020 November 03	5	8.09	284	1.5	60	0.9	0.23	3.1	4.0	0.01
2020 December 15	4	8.2	95	1.5	13	1.0	0.29	**5.7**	2.0	<0.0050
2021 January 24	13	8.17	143	0.5	11	0.7	<0.01	2.2	2.0	<0.005
2021 February 21	8	8.21	298	1.0	12	**2.1**	0.30	2.5	3.0	<0.005
2021 March 16	6	8.17	161	0.7	10	0.7	0.10	3.9	4.0	0.018
2021 April 24	8	8.4	243	0.9	0.9	0.9	0.18	3.2	2.0	<0.005
2021 May 18	11	8.24	342	1.2	13	1.0	0.32	2.8	3.0	<0.005

Parameter/Criteria	Total Suspended Solids (mg/L)	pH	Total Aluminum[4] (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)
2021 June 13	35	8.25	1,470	3.1	18	**2.2**	**1.0**	1.8	9.0	0.01
2021 July 23	11	8.16	213	3.5	37	1.6	0.7	3.4	6.0	<0.005
2021 August 10	18	7.98	477	4.6	19	1.1	0.4	2.4	3.0	<0.005
2021 September 21	20	7.99	445	3.7	19	1.1	0.6	2.0	5.0	<0.005
2021 October 23	7	8.15	187	**6.0**	22	0.8	0.2	3.4	4.0	0.006
2021 November 20	13	8.15	155	1.2	16	1.0	0.2	2.5	3.0	<0.005
2021 December 14	14	8.15	237	0.8	29	0.9	0.3	2.5	8.0	<0.005
2022 February 22	94	7.89	1,396	1.3	15	**4.4**	**1.25**	2.8	12.0	<0.005
2022 March 8	26	8.14	1,040	1.3	19	1.8	0.69	2.9	6.0	<0.005
2022 March 29	48	8.04	241	0.7	22	1	0.30	2.3	3.2	<0.005
2022 April 12	12	8.26	257	0.8	10	0.9	0.26	3.2	2.5	<0.005
2022 May 3	56	8.17	1,227	1.7	13	**2.3**	**1.28**	3.3	8.8	<0.005
2022 June 7	51	8.02	1,310	2.1	24	**2.6**	0.9	2.3	<1	<0.005
2022 July 5	14	8.02	583	1.7	17	1.0	0.5	2.3	3.0	<0.005
2022 August 9	16	8.11	749	1.9	17	1.0	0.4	2.0	4.0	<0.005
2022 September 11	45	8.21	1,180	3.1	24	1.6	0.8	2.0	5.0	0.009
2022 October 4	9	8.1	655	1.8	25	1.0	0.5	1.8	3.0	0.008
2022 November 8	14	8.04	584	1.8	31	1.2	0.6	2.8	4.0	<0.005
2022 December 13	31	8.03	617	1.5	10	1.3	0.6	**7.5**	6.0	<0.005
Notes:										
1 - Ontario Ministry of the Environment and Energy Provincial Water Quality Objectives (1994)										

Parameter/Criteria	Total Suspended Solids (mg/L)	pH	Total Aluminum[4] (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)
2 - *Canadian Council of Ministers of the Environment - Protection of Fresh Water Aquatic Life* (Long Term)										
3 - NA refers to "No Value" for selected criteria										
4 - These results represent total aluminum sample concentrations that are not clay-free, nor monomeric aluminum concentrations.										
Legend:										
Bold -***Exceedance of PWQO criteria***										
Bold and Underlined -***Exceedance of CCME criteria***										

Table 17: Air Quality Monitoring – PH LTWMF Weather Station

	2017		2018		2019		2020		2021		2022	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	194	196	252	248	240	237	171	169	223	222	232	227
Geometric Mean	6	22	8	23	5	16	5	18	7	19	8	21
Arithmetic Mean	7	27	10	29	5	19	8	22	9	24	11	26
Median	7	22	9	25	4	17	6	19	8	19	9	24
98th Percentile	25	-	20	-	18	-	20	-	20	-	24 [1]	-
Maximum	20	116	50	104	17	158	21	85	49	116	33	110
Exceedances (%)	0%	0%	0%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%

Note:

[1] 98th Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98th percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 18: Air Quality Monitoring – PH LTWMF Northwest

	2017		2018		2019		2020		2021		2022	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	194	192	248	255	240	240	166	158	219	220	210	177
Geometric Mean	6	18	9	26	4	21	6	21	7	21	9	20
Arithmetic Mean	7	21	10	30	5	24	8	25	9	25	11	24
Median	7	18	9	26	4	19	6	22	8	21	9	21
98^{th} Percentile	24	-	19	-	18	-	19	-	20	-	24 [1]	-
Maximum	18	73	28	150	17	96	21	179	52	97	27	95
Exceedances (%)	0%	0%	0%	0.4%	0%	0%	0%	0.63%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 19: Air Quality Monitoring – PH LTWMF South

	2017		2018		2019		2020		2021		2022	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	196	194	259	253	240	240	136	169	217	220	229	217
Geometric Mean	6	14	9	20	5	14	6	15	7	17	8	17
Arithmetic Mean	7	16	10	23	5	17	8	18	9	21	10	20
Median	6	16	10	20	4	14	8	17	9	18	9	19
98^{th} Percentile	22	-	19	-	19	-	19	-	20	-	24 [1]	-
Maximum	31	53	37	162	22	85	22	73	53	84	26	52
Exceedances (%)	0%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 20: Air Quality Monitoring – Transportation Route, 192 Toronto Road

	2017		2018		2019		2020		2021		2022	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	196	194	259	253	240	240	136	169	217	220	229	217
Geometric Mean	6	14	9	20	5	14	6	15	7	17	8	17
Arithmetic Mean	7	16	10	23	5	17	8	18	9	21	10	20
Median	6	16	10	20	4	14	8	17	9	18	9	19
98^{th} Percentile	22	-	19	-	19	-	19	-	20	-	24 [1]	-
Maximum	31	53	37	162	22	85	22	73	53	84	26	52
Exceedances (%)	0%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 21: Metals and Radionuclides Concentrations in Total Suspended Particulates – PH LTWMF Weather Station

					Weather Station						
					2017	2018	2019	2020	2021	2022	
				Number of Samples Analyzed	38	50	51	38	49	49	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	0.01	0.08	0.89	1.06	1.15	1.25
Silver	ng/m³	1000			3	3	4	23	23	20	25
Arsenic	ng/m³	300			3.5	3.7	3.8	3.1	3.2	2.5	4.3
Barium	ng/m³	10000			9	9	8	5	6	7	21
Beryllium	ng/m³	10			0.58	0.58	0.55	0.03	0.03	0.03	0.05
Boron	ng/m³	120000			4	4	4	12	21	12	12
Cadmium	ng/m³	25			1.2	1.2	1.1	0.3	0.3	0.3	0.7
Cobalt	ng/m³	100			1.2	1.6	1.5	0.3	0.3	0.3	1.6
Copper	ng/m³	50000			10	13	13	13	11	12	68
Molybdenum	ng/m³	120000			1.8	1.8	1.9	2.8	3.5	2.5	3.1
Nickel	ng/m³	200			2	2	2	1	3	1	4
Lead	ng/m³	500			3	3	3	3	3	5	32
Antimony	ng/m³	25000			6	6	6	7	7	6	17
Selenium	ng/m³	10000			6	6	6	4	4	3	10
Uranium	ng/m³	300	1.8	4070	0.3	0.3	0.5	**3.0**	**3.0**	**2.7**	**7.0**
Vanadium	ng/m³	2000			2.9	2.9	2.8	0.4	0.4	0.5	1.7
Zinc	ng/m³	12000			20	24	22	24	19	19	44
Lead-210	Bq/m³	-			0.0005	0.0009	0.0009	0.0007	0.0007	0.0006	0.0023
Radium-226	Bq/m³	-	0.000049	0.05	**0.000058**	**0.000060**	**0.000072**	0.000030	0.000033	0.000029	0.000035
Thorium-230	Bq/m³	-	0.00042	0.01	0.00029	0.00030	0.00029	0.00006	0.00006	0.00006	0.00022
Thorium-232	Bq/m³	-	0.000057	0.006	**0.000289**	**0.000289**	**0.000278**	**0.000059**	**0.000063**	**0.000061**	**0.000223**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 22: Metals and Radionuclides Concentrations in Total Suspended Particulates – PH LTWMF Northwest

					Welcome Northwest						
					2017	2018	2019	2020	2021	2022	
				Number of Samples Analyzed	38	51	51	34	49	41	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	0.01	0.08	0.94	1.03	1.13	1.18
Silver	ng/m³	1000			3	3	4	22	22	21	24
Arsenic	ng/m³	300			3.4	4.2	3.4	3.1	3.3	2.6	3.0
Barium	ng/m³	10000			17	20	26	11	7	9	19
Beryllium	ng/m³	10			0.56	0.56	0.54	0.03	0.03	0.03	0.03
Boron	ng/m³	120000			4	3	4	11	20	11	12
Cadmium	ng/m³	25			1.1	1.1	1.2	0.3	0.3	0.3	0.5
Cobalt	ng/m³	100			1.1	2.5	1.1	0.4	0.3	0.3	1.0
Copper	ng/m³	50000			9	11	12	11	10	10	29
Molybdenum	ng/m³	120000			1.7	1.7	1.8	2.8	7.9	2.7	6.4
Nickel	ng/m³	200			2	3	2	1	3	1	3
Lead	ng/m³	500			3	3	2	3	2	4	19
Antimony	ng/m³	25000			6	6	6	8	9	11	87
Selenium	ng/m³	10000			6	6	6	4	4	3	10
Uranium	ng/m³	300	**1.8**	**4070**	0.3	0.3	0.4	**3.0**	**2.9**	**2.8**	**7.4**
Vanadium	ng/m³	2000			2.8	2.8	2.7	0.4	0.4	0.4	1.4
Zinc	ng/m³	12000			22	26	26	23	21	22	42
Lead-210	Bq/m³	-			0.0006	0.0009	0.0007	0.0006	0.0007	0.0005	0.0014
Radium-226	Bq/m³	-	**0.000049**	**0.05**	**0.000056**	**0.000059**	**0.000060**	0.000030	0.000031	0.000028	0.000030
Thorium-230	Bq/m³	-	**0.00042**	**0.01**	0.00028	0.00030	0.00027	0.00006	0.00006	0.00007	0.00022
Thorium-232	Bq/m³	-	**0.000057**	**0.006**	**0.000281**	**0.000281**	**0.000274**	0.000056	**0.000062**	**0.000061**	**0.000218**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 23: Metals and Radionuclides Concentrations in Total Suspended Particulates – PH LTWMF South

					Welcome South						
					2017	2018	2019	2020	2021	2022	
				Number of Samples Analyzed	38	50	51	38	49	49	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	0.01	0.08	0.87	1.04	1.13	1.22
Silver	ng/m³	1000			3	3	4	21	23	19	24
Arsenic	ng/m³	300			3.4	3.8	3.4	3.0	3.2	2.5	5.1
Barium	ng/m³	10000			6	7	7	5	5	6	19
Beryllium	ng/m³	10			0.57	0.57	0.54	0.03	0.03	0.02	0.03
Boron	ng/m³	120000			4	4	4	11	22	11	12
Cadmium	ng/m³	25			1.1	1.1	1.1	0.3	0.3	0.2	0.4
Cobalt	ng/m³	100			1.1	1.9	1.1	0.3	0.3	0.3	1.3
Copper	ng/m³	50000			8	11	12	12	10	10	33
Molybdenum	ng/m³	120000			1.7	1.7	1.9	3.4	6.7	2.4	3.1
Nickel	ng/m³	200			2	2	2	1	3	1	5
Lead	ng/m³	500			3	3	2	3	2	4	27
Antimony	ng/m³	25000			6	6	6	7	8	6	23
Selenium	ng/m³	10000			6	6	6	4	4	3	10
Uranium	ng/m³	300	1.8	4070	0.3	0.3	0.4	**2.7**	**3.0**	**2.7**	**9.6**
Vanadium	ng/m³	2000			2.8	2.8	2.7	0.3	0.4	0.3	0.9
Zinc	ng/m³	12000			17	20	19	19	18	17	39
Lead-210	Bq/m³	-			0.0005	0.0009	0.0008	0.0007	0.0007	0.0006	0.0020
Radium-226	Bq/m³	-	0.000049	0.05	**0.000057**	**0.000059**	**0.000060**	0.000028	0.000032	0.000028	0.000034
Thorium-230	Bq/m³	-	0.00042	0.01	0.00028	0.00029	0.00027	0.00006	0.00006	0.00007	0.00022
Thorium-232	Bq/m³	-	0.000057	0.006	**0.000283**	**0.000284**	**0.000271**	0.000056	**0.000062**	**0.000060**	**0.000224**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 24: Metals and Radionuclides Concentrations in Total Suspended Particulates – 192 Toronto Road

					192 Toronto Rd						
					2017	2018	2019	2020	2021	2022	
				Number of Samples Analyzed	38	50	51	38	5	39	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	0.01	0.08	0.87	1.17	1.12	1.17
Silver	ng/m³	1000			3	3	4	21	23	18	23
Arsenic	ng/m³	300			3.5	3.4	3.4	2.8	3.3	2.3	4.7
Barium	ng/m³	10000			7	9	9	6	6	8	18
Beryllium	ng/m³	10			0.58	0.57	0.54	0.03	0.03	0.02	0.03
Boron	ng/m³	120000			4	4	4	11	12	11	12
Cadmium	ng/m³	25			1.2	1.1	1.1	0.3	0.3	0.2	0.5
Cobalt	ng/m³	100			1.2	1.1	1.1	0.3	0.5	0.3	1.3
Copper	ng/m³	50000			9	10	14	12	11	8	37
Molybdenum	ng/m³	120000			1.8	1.7	1.8	2.9	4.6	2.3	2.9
Nickel	ng/m³	200			2	2	2	1	20	1	9
Lead	ng/m³	500			2	2	2	3	2	5	24
Antimony	ng/m³	25000			6	6	6	10	22	10	61
Selenium	ng/m³	10000			6	6	6	4	3	3	9
Uranium	ng/m³	300	1.8	4070	0.3	0.3	0.4	**2.8**	**3.3**	**2.4**	**6.3**
Vanadium	ng/m³	2000			2.9	2.8	2.7	0.3	0.4	0.5	1.7
Zinc	ng/m³	12000			19	23	22	23	16	16	48
Lead-210	Bq/m³	-			0.0005	0.0008	0.0008	0.0007	0.0007	0.0006	0.0024
Radium-226	Bq/m³	-	0.000049	0.05	**0.000058**	**0.000057**	**0.000056**	0.000030	0.000029	0.000028	0.000029
Thorium-230	Bq/m³	-	0.00042	0.01	0.00029	0.00028	0.00027	0.00006	0.00006	0.00006	0.00006
Thorium-232	Bq/m³	-	0.000057	0.006	**0.000285**	**0.000283**	**0.000271**	0.000056	**0.000059**	0.000056	**0.000059**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 25: Air Quality Monitoring – Highland Drive and Vicinity Sites, Cavan Candies

	2020		2021		2022	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	36	177	179	114	117
Geometric Mean	3	9	6	17	4	11
Arithmetic Mean	4	11	8	21	6	14
Median	3	10	8	20	5	12
98^{th} Percentile	10	-	20	-	21 [1]	-
Maximum	11	22	53	83	25	39
Exceedances (%)	0%	0%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 26: Air Quality Monitoring – Highland Drive and Vicinity Sites, Jack Burger Sports Complex

	2020		2021		2022	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	35	179	177	117	117
Geometric Mean	2	10	6	16	5	12
Arithmetic Mean	3	12	9	20	7	15
Median	2	11	8	17	5	14
98^{th} Percentile	10	-	24	-	24 [1]	-
Maximum	13	45	52	89	24	40
Exceedances (%)	0%	0%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 27: Air Quality Monitoring – Highland Drive and Vicinity Sites, Port Hope High School

	2020		2021		2022	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	34	177	172	115	114
Geometric Mean	3	9	7	15	4	11
Arithmetic Mean	4	11	9	19	6	13
Median	2	9	8	16	5	12
98^{th} Percentile	12	-	23	-	24 [1]	-
Maximum	13	26	51	86	26	36
Exceedances (%)	0%	0%	0%	0%	0%	0%

Note:

[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2020,2021 & 2022).

TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.

$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 28: Metals and Radionuclides Concentrations in Total Suspended Particulates – Highland Drive and Vicinity Sites, Cavan Candies

					Cavan Candies			
					2020	2021	2022	
				Number of Samples Analyzed	9	43	27	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average		Average	Maximum
Total Mercury (Hg)	ng/m³	-			1.14	0.96	1.09	1.20
Silver	ng/m³	**1000**			23	22	22	24
Arsenic	ng/m³	**300**			2.8	2.9	2.7	3.0
Barium	ng/m³	**10000**			4	6	10	28
Beryllium	ng/m³	**10**			0.03	0.03	0.03	0.03
Boron	ng/m³	**120000**			11	25	11	12
Cadmium	ng/m³	**25**			0.3	0.3	0.3	0.3
Cobalt	ng/m³	**100**			0.3	0.3	0.3	0.7
Copper	ng/m³	**50000**			4	9	12	43
Molybdenum	ng/m³	**120000**			4.1	3.7	2.7	3.0
Nickel	ng/m³	**200**			1	2	1	4
Lead	ng/m³	**500**			3	3	3	7
Antimony	ng/m³	**25000**			11	7	7	12
Selenium	ng/m³	**10000**			3	3	3	5
Uranium	ng/m³	**300**	**1.8**	**4070**	**3.0**	**2.9**	**3.0**	**6.4**
Vanadium	ng/m³	**2000**			0.3	0.3	0.3	0.5
Zinc	ng/m³	**12000**			12	19	21	52
Lead-210	Bq/m³	-			0.0008	0.0007	0.0007	0.0023
Radium-226	Bq/m³	-	**0.000049**	**0.05**	0.000028	0.000032	0.000028	0.000041
Thorium-230	Bq/m³	-	**0.00042**	**0.01**	0.00006	0.00007	0.00005	0.00006
Thorium-232	Bq/m³	-	**0.000057**	**0.006**	0.000057	**0.000062**	0.000055	**0.000060**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 29: Metals and Radionuclides Concentrations in Total Suspended Particulates – Highland Drive and Vicinity Sites, Jack Burger Sports Complex

					Jack Burger Sports Complex				
					2018	2020	2021	2022	
Number of Samples Analyzed					15	9	43	26	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average			Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	1.14	0.97	1.14	1.19
Silver	ng/m³	**1000**			3	23	22	23	24
Arsenic	ng/m³	**300**			3.3	2.8	3.0	2.8	3.0
Barium	ng/m³	**10000**			5	3	5	7	17
Beryllium	ng/m³	**10**			0.55	0.03	0.03	0.03	0.03
Boron	ng/m³	**120000**			3	11	26	11	12
Cadmium	ng/m³	**25**			1.1	0.3	0.3	0.3	0.5
Cobalt	ng/m³	**100**			1.1	0.3	0.3	0.3	0.7
Copper	ng/m³	**50000**			5	3	9	12	30
Molybdenum	ng/m³	**120000**			1.7	2.9	3.1	2.8	3.0
Nickel	ng/m³	**200**			2	1	2	1	3
Lead	ng/m³	**500**			2	3	2	3	6
Antimony	ng/m³	**25000**			6	11	7	7	24
Selenium	ng/m³	**10000**			6	3	3	3	11
Uranium	ng/m³	**300**	**1.8**	**4070**	0.3	**2.8**	**3.0**	**3.0**	**5.1**
Vanadium	ng/m³	**2000**			2.8	0.3	0.3	0.3	0.7
Zinc	ng/m³	**12000**			15	12	18	23	39
Lead-210	Bq/m³	-			0.0008	0.0009	0.0007	0.0008	0.0024
Radium-226	Bq/m³	-	**0.000049**	**0.05**	**0.000055**	0.000028	0.000032	0.000029	0.000046
Thorium-230	Bq/m³	-	**0.00042**	**0.01**	0.00028	0.00006	0.00006	0.00006	0.00006
Thorium-232	Bq/m³	-	**0.000057**	**0.006**	**0.000277**	0.000057	**0.000063**	0.000057	**0.000059**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 30: Metals and Radionuclides Concentrations in Total Suspended Particulates – Highland Drive and Vicinity Sites, Port Hope High School

					Port Hope High School				
					2018	2020	2021	2022	
Number of Samples Analyzed					20	9	43	26	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average			Average	Maximum
Total Mercury (Hg)	ng/m³	-			0.01	1.14	0.97	1.14	1.21
Silver	ng/m³	**1000**			3	23	22	23	24
Arsenic	ng/m³	**300**			3.4	2.9	2.9	2.8	3.0
Barium	ng/m³	**10000**			6	3	4	7	16
Beryllium	ng/m³	**10**			0.56	0.03	0.03	0.03	0.03
Boron	ng/m³	**120000**			3	11	22	11	12
Cadmium	ng/m³	**25**			1.1	0.3	0.3	0.3	0.4
Cobalt	ng/m³	**100**			1.1	0.3	0.4	0.3	0.8
Copper	ng/m³	**50000**			6	9	9	13	25
Molybdenum	ng/m³	**120000**			1.7	2.9	11.3	2.9	3.3
Nickel	ng/m³	**200**			2	1	2	2	8
Lead	ng/m³	**500**			2	3	3	4	9
Antimony	ng/m³	**25000**			6	10	7	11	64
Selenium	ng/m³	**10000**			6	3	3	3	9
Uranium	ng/m³	**300**	**1.8**	**4070**	0.3	**3.0**	**2.9**	**3.5**	**7.7**
Vanadium	ng/m³	**2000**			2.8	0.3	0.3	0.3	0.8
Zinc	ng/m³	**12000**			16	14	17	22	39
Lead-210	Bq/m³	-			0.0009	0.0007	0.0007	0.0008	0.0023
Radium-226	Bq/m³	-	**0.000049**	**0.05**	**0.000056**	0.000029	0.000033	0.000029	0.000045
Thorium-230	Bq/m³	-	**0.00042**	**0.01**	0.00028	0.00006	0.00006	0.00006	0.00006
Thorium-232	Bq/m³	-	**0.000057**	**0.006**	**0.000282**	**0.000057**	**0.000063**	0.000057	**0.000060**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 31: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Downwind Location (2022 January to April)

			2022-01-20	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-08	2022-03-16	2022-03-21	2022-03-31	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Monitoring Location			**SE of Dredging Area (Downwind)**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**SE of Dredging Area (Downwind)**	**NE of Dredging Area (Downwind)**	**North of Dredging Area (Downwind)**	**SE of Dredging Area (Downwind)**	**NE of Dredging Area (Downwind)**	**No Sample**	**NW of Dredging Area (Downwind)**	**No Sample**	**Centre of West Transport Road (Downwind)**
Wind Direction at time of Deployment			**NW**						**NW**	**SW**	**S**	**NW**	**SW**		**SW**		**SW**
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**															
Benzene	µg/m³	**2.3**	< 0.64						< 0.64	< 0.64	< 0.64	< 0.64	1.20		< 0.64		< 0.64
Ethylbenzene	µg/m³	**1000**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87		< 0.87
Toluene	µg/m³	**2000**	< 0.75						< 0.75	< 0.75	< 0.75	< 0.75	0.75		2.10		< 0.75
m,p-Xylene	µg/m³	**730**	< 0.87						< 0.87	< 0.87	1.2	< 0.87	< 0.87		2		< 0.87
o-Xylene	µg/m³	**730**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87		< 0.87
Naphthalene	µg/m³	**22.5**	< 1.0						< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0		< 1.0
PHC F1 (C6-C10)	µg/m³		6.8						12	26	20	13	22		17		67
PHC F1 (C6-C10) - BTEX	µg/m³		< 6						12	24	17	12	19		12		65
PHC F2 (>C10-C16)	µg/m³		< 3.5						< 3.5	< 3.5	< 3.5	< 3.5	13		9.9		5.8
PHC F2 (>C10-C16) - Nap	µg/m³		< 3.5						< 3.5	< 3.5	< 3.5	< 3.5	13		9.9		5.2
Aliphatics C6-C8 (Unadj.)	µg/m³		< 3.5						6	16	6.3	5.3	13		6.7		57.5
Aliphatics >C8-C10 (Unadj.)	µg/m³		3.1						8.4	10	14	8.4	6.3		6.3		5.2
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 3.5						< 3.5	< 3.5	< 3.5	< 3.5	13		8.1		5.8
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3						< 2.3	< 2.3	< 2.3	< 2.3	< 2.3		< 2.3		< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0						< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0		< 2.0
MS Volatiles (TO-15)																	
Acetone (2-Propanone)	µg/m³	**11880**	4.3						3.3	< 11	4.5	4.8	11		5.9		5
1,3-Butadiene	µg/m³	**2**	< 0.44						< 0.44	< 0.44	< 0.44	< 0.44	< 0.44		< 0.44		< **4.4**
Benzene	µg/m³	**2.3**	0.64						< 0.64	< 0.64	< 0.64	< 0.64	1.30		0.70		< **6.4**
Bromodichloromethane	µg/m³		< 1.3						< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3		< 13
Bromoform	µg/m³	**55**	< 2.1						< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1		< 21
Bromomethane	µg/m³		< 0.78						< 0.78	< 0.78	< 0.78	< 0.78	< 0.78		< 0.78		< 7.8
Bromoethene	µg/m³		< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87		< 8.7
Benzyl Chloride	µg/m³		< 1.0						< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0		< 10
Carbon disulfide	µg/m³		< 0.62						< 0.62	< 0.62	< 0.62	< 0.62	< 0.62		< 0.62		< 6.2
Chlorobenzene	µg/m³		< 0.92						< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92		< 9.2
Chloroethane	µg/m³		< 0.53						< 0.53	< 0.53	< 0.53	< 0.53	< 0.53		< 0.53		< 5.3
Chloroform	µg/m³	**1**	< 0.98						< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98		**133**
Chloromethane	µg/m³	**5600**	0.89						< 0.95	< 0.41	1.2	< 1.1	1.1		1.4		< 4.1
3-Chloropropene	µg/m³		< 0.63						< 0.63	< 0.63	< 0.63	< 0.63	< 0.63		< 0.63		< 6.3
2-Chlorotoluene	µg/m³		< 1.0						< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0		< 10
Carbon tetrachloride	µg/m³	**2.4**	< 1.3						< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3		**109**
Cyclohexane	µg/m³	**6100**	< 0.69						< 0.69	< 0.69	< 0.69	< 0.69	< 0.69		< 0.69		< 6.9
1,1-Dichloroethane	µg/m³	**165**	< 0.81						< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81		< 8.1
1,1-Dichloroethylene	µg/m³		< 0.79						< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79		< 7.9
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5						< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5		< **15**
1,2-Dichloroethane	µg/m³		< 0.81						< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81		< 8.1
1,2-Dichloropropane	µg/m³		< 0.92						< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92		< 9.2
1,4-Dioxane	µg/m³		< 0.72						< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72		< 7.2
Dichlorodifluoromethane	µg/m³		1.9						1.8	< 0.99	2.7	2.6	1.9		2.4		< 9.9
Dibromochloromethane	µg/m³		< 1.7						< 1.7	< 1.7	< 1.7	< 1.7	< 1.7		< 1.7		< 17
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79						< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79		< 7.9
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79						< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79		< 7.9
cis-1,3-Dichloropropene	µg/m³		< 0.91						< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91		< 9.1
m-Dichlorobenzene	µg/m³		< 1.2						< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2		< 12

Table 32~~2~~21: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Downwind Location (2022 January to April) – Continued

			2022-01-20	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-08	2022-03-16	2022-03-21	2022-03-31	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Monitoring Location			**SE of Dredging Area (Downwind)**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**SE of Dredging Area (Downwind)**	**NE of Dredging Area (Downwind)**	**North of Dredging Area (Downwind)**	**SE of Dredging Area (Downwind)**	**NE of Dredging Area (Downwind)**	**No Sample**	**NW of Dredging Area (Downwind)**	**No Sample**	**Centre of West Transport Road (Downwind)**
Wind Direction at time of Deployment			**NW**						**NW**	**SW**	**S**	**NW**	**SW**		**SW**		**SW**
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**															
o-Dichlorobenzene	µg/m³	**30500**	< 1.2						< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2		< 12
p-Dichlorobenzene	µg/m³	**95**	< 1.2						< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2		< 12
trans-1,3-Dichloropropene	µg/m³		< 0.91						< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91		< 9.1
Ethanol	µg/m³		16						15	< 13	29.2	22.6	21.1		66.7		19.6
Ethylbenzene	µg/m³	**1000**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87		< 8.7
Ethyl Acetate	µg/m³		< 0.72						< 0.72	< 27	< 0.72	4.7	2.8		8.3		< 7.2
4-Ethyltoluene	µg/m³		< 0.98						< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98		< 9.8
Freon 113	µg/m³		< 1.5						< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5		< 15
Freon 114	µg/m³	**700000**	< 1.4						< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4		< 14
Heptane	µg/m³	**11000**	< 0.82						< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82		< 8.2
Hexachlorobutadiene	µg/m³		< 2.1						< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1		< 21
Hexane	µg/m³	**7500**	< 0.7						< 0.7	1.9	1.7	< 0.7	1.1		< 0.7		< 7
2-Hexanone	µg/m³		< 0.82						< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82		< 8.2
Isopropyl Alcohol	µg/m³	**7300**	1.7						1.1	7.1	2.9	1.3	2.9		2.4		< 4.9
Methylene chloride	µg/m³	**220**	1.6						1.2	12	5.6	2	0.83		0.94		9
Methyl ethyl ketone	µg/m³	**1000**	< 0.59						< 0.59	< 1.2	< 0.59	< 0.59	1.1		0.8		< 5.9
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82						< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82		< 8.2
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72						< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72		< 7.2
Methylmethacrylate	µg/m³		< 0.82						< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82		< 8.2
Naphthalene	µg/m³	**22.5**	< 1.0						< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0		< 10
Propylene	µg/m³	**4000**	< 0.86						< 0.86	< 0.86	< 0.86	< 0.86	< 0.86		< 0.86		< 8.6
Styrene	µg/m³	**400**	< 0.85						< 0.85	< 0.85	< 0.85	< 0.85	< 0.85		< 0.85		< 8.5
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1						< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1		< 11
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4						< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4		< 14
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4						< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4		< 14
1,1,2-Trichloroethane	µg/m³		< 1.1						< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1		< 11
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5						< 1.5	< 1.5	1.5 b	1.5 b	< 1.5		< 1.5		< 15
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98						< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98		< 9.8
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98						< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98		< 9.8
2,2,4-Trimethylpentane	µg/m³		< 1						< 0.93	< 0.93	< 0.93	< 0.93	< 0.93		< 0.93		< 9.3
Tertiary Butyl Alcohol	µg/m³		< 0.61						< 0.61	1.5	< 0.61	< 0.61	< 0.61		< 0.61		< 6.1
Tetrachloroethylene	µg/m³		< 0.27						< 0.27	< 0.27	< 0.27	< 0.27	< 0.27		< 0.27		22
Tetrahydrofuran	µg/m³	**93000**	< 0.59						< 0.59	< 0.59	< 0.59	< 0.59	< 0.59		< 0.59		< 5.9
Toluene	µg/m³	**2000**	< 0.75						< 0.75	< 0.75	< 0.75	< 0.75	0.83		2.3		< 7.5
Trichloroethylene	µg/m³	**12**	< 0.21						< 0.21	< 0.21	< 0.21	< 0.21	< 0.21		< 0.21		**22**
Trichlorofluoromethane	µg/m³	**6000**	1.3						1.3	1.5	1.9	1.5	1.3		1.7		< 11
Vinyl chloride	µg/m³	**1**	< 0.51						< 0.51	< 0.51	< 0.51	< 0.51	< 0.51		< 0.51		< **5.1**
Vinyl Acetate	µg/m³		< 0.7						< 0.7	< 0.7	< 0.7	< 0.7	< 0.7		< 0.7		< 7
m,p-Xylene	µg/m³	**730**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		1.2		< 8.7
o-Xylene	µg/m³	**730**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87		< 8.7
Xylenes (total)	µg/m³	**730**	< 0.87						< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		1.2		< 8.7

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site

Table 33~~32~~: Air Quality Monitoring – Harbour/Centre Pier –Volatile Organic Compound Monitoring – Downwind Location (2022 May to August)

			2022-05-04	2022-05-09	2022-05-17	2022-05-25	2022-05-30	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-02	2022-08-09[1]	2022-08-16	2022-08-24
Monitoring Location			**SW of Transport Road (Downwind)**	**NW of Dredging Area (Downwind)**	**SW of Transport Road (Downwind)**	**NW of Dredging Area (Downwind)**	**NW of Dredging Area (Downwind)**	**W of Transport Road (Downwind)**	**SW of SPA (Downwind)**	**SW Corner of Site, E of Dredging Area (Downwind)**	**SW Corner of Sediment Processing Area (Downwind)**	**NE of Barge on shoreline (Downwind)**	**SW of access road (Downwind)**	**NE of Dredging Area (Downwind)**	**NW of Site, at fenceline (Downwind)**	**NW of Harbour Turning Basin (Downwind)**	**No Sample**	**W of transport road (Downwind)**	**N of Harbour (Downwind)**
Wind Direction at time of Deployment			**N**	**SE**	**NW**	**E**	**SW**	**NW**	**E**	**S**	**W**	**S**	**W**	**SW**	**SW**	**NW**		**S**	**SW**
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**																	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	0.83	< 0.64	< 0.64	< 0.64	1.20	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64		< 0.64	< 0.64
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87
Toluene	µg/m³	**2000**	< 0.75	0.75	< 0.75	< 0.75	0.79	< 0.75	3.40	1.50	< 0.75	0.87	< 0.75	0.87	1.50	1.30		< 0.75	< 0.75
m,p-Xylene	µg/m³	**730**	< 0.87	1.3	< 0.87	< 0.87	2.7	< 0.87	8.7	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	1.6	1.6		< 0.87	< 0.87
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	2.9	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0
PHC F1 (C6-C10)	µg/m³		< 6	9	12	25	17	9	58	16	10	12	17	30	23	23		17	15
PHC F1 (C6-C10) - BTEX	µg/m³		< 6	6	10	24	13	8	43	13	9	11	16	28	19	20		15	14
PHC F2 (>C10-C16)	µg/m³		< 3.5	8.7	< 3.5	9.3	9.9	< 3.5	32	< 3.5	5.8	< 3.5	< 3.5	4.9	8.7	16		< 3.5	4.9
PHC F2 (>C10-C16) - Nap	µg/m³		< 3.5	8.7	< 3.5	9.3	9.9	< 3.5	32	< 3.5	5.8	< 3.5	< 3.5	4.9	8.7	16		< 3.5	4.9
Aliphatics C6-C8 (Unadj.)	µg/m³		< 3.5	< 3.5	4.6	13	5.6	5.6	21	8.8	4.2	7.4	10	19	9.2	11		9.2	8.5
Aliphatics >C8-C10 (Unadj.)	µg/m³		< 3.1	4.5	6.8	14	9.4	< 3.1	29	4.9	6.3	4.1	7.3	11	13	12		7.9	6.8
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 3.5	7.6	< 3.5	9.3	9.9	< 3.5	25	< 3.5	5.8	< 3.5	< 3.5	4.9	8.7	16		< 3.5	3.7
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3		< 2.3	< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	5.9	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	< 2.0
MS Volatiles (TO-15)																			
Acetone (2-Propanone)	µg/m³	**11880**	5	5.5	7.1	8.1	15	5.5	8.6	10	4.8	8.3	5.9	13	9.7	9.7		7.1	7.1
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 1.80	< 1.80	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44		< 0.44	< 0.44
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	0.80	< 0.64	< 0.64	< **2.6**	< **2.6**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	0.67	< 0.64		< 0.64	< 0.64
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 5.4	< 5.4	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	< 1.3
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.3	< 8.3	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	< 2.1
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 3.10	< 3.10	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78		< 0.78	< 0.78
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87
Benzyl Chloride	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1	< 4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 2.5	< 2.5	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62		< 0.62	< 0.62
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7	< 3.7	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	< 0.92
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 2.1	< 2.1	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53		< 0.53	< 0.53
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< **3.9**	< **3.9**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98
Chloromethane	µg/m³	**5600**	0.97	1	1.1	1.3	1.1	< 1.7	< 1.7	1	1	0.89	0.97	0.91	1.2	1.2		0.99	1
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 2.5	< 2.5	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63		< 0.63	< 0.63
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1	< 4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< **5**	< **5**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	< 1.3
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 2.8	< 2.8	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	2.7	< 0.69		< 0.69	< 0.69
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2	< 3.2	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	< 0.81
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	< 0.79
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< **6.1**	< **6.1**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2	< 3.2	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	< 0.81
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7	< 3.7	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	< 0.92
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 2.9	< 2.9	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	< 0.72
Dichlorodifluoromethane	µg/m³		1.5	1.5	1.5	1.5	1.5	< 4	< 4	1.6	1.6	1.6	2	2	3	2.4		2	2
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 6.8	< 6.8	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7		< 1.7	< 1.7
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	< 0.79
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	3.20	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	2.5		< 0.79	< 0.79
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6	< 3.6	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	< 0.91
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2

Table 34342: Air Quality Monitoring – Harbour/Centre Pier –Volatile Organic Compound Monitoring – Downwind Location (2022 May to August) – Continued

			2022-05-04	2022-05-09	2022-05-17	2022-05-25	2022-05-30	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-02	2022-08-09[1]	2022-08-16	2022-08-24
Monitoring Location			**SW of Transport Road (Downwind)**	**NW of Dredging Area (Downwind)**	**SW of Transport Road (Downwind)**	**NW of Dredging Area (Downwind)**	**NW of Dredging Area (Downwind)**	**W of Transport Road (Downwind)**	**SW of SPA (Downwind)**	**SW Corner of Site, E of Dredging Area (Downwind)**	**SW Corner of Sediment Processing Area (Downwind)**	**NE of Barge on shoreline (Downwind)**	**SW of access road (Downwind)**	**NE of Dredging Area (Downwind)**	**NW of Site, at fenceline (Downwind)**	**NW of Harbour Turning Basin (Downwind)**	**No Sample**	**W of transport road (Downwind)**	**N of Harbour (Downwind)**
Wind Direction at time of Deployment			**N**	**SE**	**NW**	**E**	**SW**	**NW**	**E**	**S**	**W**	**S**	**W**	**SW**	**SW**	**NW**		**S**	**SW**
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**																	
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6	< 3.6	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	< 0.91
Ethanol	µg/m³		13	32.4	16	12	26.9	19.2	17	18	22	17	22	17	11	9.2		17	27.3
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	1.7	< 0.87		< 0.87	< 0.87
Ethyl Acetate	µg/m³		< 0.72	11	< 0.72	1.5	1.2	< 2.9	< 2.9	6.5	3.6	2.9	< 0.72	2.3	2.9	1.6		< 0.72	< 0.72
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	10	< 0.98		< 0.98	< 0.98
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 6.1	< 6.1	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.6	< 5.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	8.2	< 0.82		< 0.82	< 0.82
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.5	< 8.5	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	< 2.1
Hexane	µg/m³	**7500**	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 2.8	< 2.8	1.2	< 0.7	< 0.7	< 0.7	2.5	7.8	5.3		< 0.7	< 0.7
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	1.9
Isopropyl Alcohol	µg/m³	**7300**	2.2	6.9	2.9	2.2	5.2	< 2	< 2	2	1.7	2.2	2.1	2.7	8.1	2.2		2.5	2
Methylene chloride	µg/m³	**220**	2.7	0.9	2.7	1.5	6.3	2.8	< 2.8	5.2	0.87	1.3	< 0.69	8.3	1.2	16		1.1	0.8
Methyl ethyl ketone	µg/m³	**1000**	< 0.59	< 0.59	0.77	1	1.6	< 2.4	< 2.4	1.6	< 0.59	0.94	0.8	1.6	1.5	1.3		1.1	0.77
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	3.7	< 0.82		< 0.82	< 0.82
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 2.9	< 2.9	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	< 0.72
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	< 0.82
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.2	< 4.2	< 1.0	< 1.0	1.3	< 1.0	< 1.0	2.6	< 1.0		< 1.0	< 1.0
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 3.4	< 3.4	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	3.3	< 0.86		< 0.86	< 0.86
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 3.4	< 3.4	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85		< 0.85	< 0.85
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4	< 4.4	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	< 1.1
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5	< 5.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5	< 5.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4	< 4.4	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	< 1.1
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 5.9	< 5.9	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	40	< 0.98		< 0.98	< 0.98
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 3.7	< 3.7	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	137	< 0.93		< 0.93	< 0.93
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 2.4	< 2.4	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61		< 0.61	< 0.61
Tetrachloroethylene	µg/m³		< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 1.1	< 1.1	< 0.27	< 0.27	0.54	< 0.27	< 0.27	0.65	54		0.31	< 0.27
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	1.1	< 0.59	< 0.59	< 2.4	< 2.4	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59		< 0.59	< 0.59
Toluene	µg/m³	**2000**	< 0.75	0.75	< 0.75	< 0.75	0.79	< 3	3	1.2	< 0.75	< 0.75	< 0.75	< 0.75	2.8	1.2		< 0.75	< 0.75
Trichloroethylene	µg/m³	**12**	< 0.21	< 0.21	< 0.21	**19**	< 0.21	< 0.86	< 0.86	< 0.21	< 0.21	0.25	< 0.21	< 0.21	3.7	1		< 0.21	< 0.21
Trichlorofluoromethane	µg/m³	**6000**	1.8	1.2	2.2	1.3	1.8	< 4.5	< 4.5	3	1.2	2.3	1.2	2.4	2.1	2.7		1.3	1.3
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< **2**	< **2**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51		< 0.51	< 0.51
Vinyl Acetate	µg/m³		< 0.7	< 0.7	< 0.7	1.9	< 0.7	< 2.8	< 2.8	< 0.7	< 0.7	< 0.7	< 0.7	0.8	< 0.7	1.2		< 0.7	< 0.7
m,p-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	1.5	< 3.5	4.3	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	16	< 0.87		< 0.87	< 0.87
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	4.3	< 0.87		< 0.87	< 0.87
Xylenes (total)	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	1.5	< 3.5	4.3	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	20	< 0.87		< 0.87	< 0.87

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site

Table 35~~353~~: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Downwind Location (2022 September to December)

			2022-09-01	2022-09-06	2022-09-13	2022-09-22	2022-09-28	2022-10-03	2022-10-11	2022-10-20	2022-10-25	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-12-01	2022-12-08	2022-12-12	2022-12-21[1]
Monitoring Location			**NW of HCP (Downwind)**	**NW of Dredging Area (Downwind)**	**North of Western Access Road (Downwind)**	**W on Access Road (Downwind)**	**W of SPA along walkway (Downwind)**	**NW of HCP (Downwind)**	**NW of HCP (Downwind)**	**SW of transport road (Downwind)**	**SW of transport road (Downwind)**	**SW of SPA (Downwind)**	**W side of transport road (Downwind)**	**W side of transport road (Downwind)**	**No Sample**	**NW of SPA (Downwind)**	**SW of SPA (Downwind)**	**SW of SPA (Downwind)**	**No Sample**
Wind Direction at time of Deployment			**SW**	**S**	**W**	**NW**	**N**	**SW**	**SE**	**SW**	**SE**	**W**	**NE**	**NE**		**W**	**N**	**NE**	
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**																	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	0.80	< 0.64	< 0.64	0.80	< 0.64	1.6		< 0.64	0.80	0.86	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	2.7		< 0.87	< 0.87	< 0.87	
Toluene	µg/m³	**2000**	7.2	6.0	1.0	< 0.75	< 0.75	< 0.75	3.1	2.0	1.0	1.7	< 0.75	12		< 0.75	< 0.75	1.2	
m,p-Xylene	µg/m³	**730**	< 0.87	2.1	0.91	< 0.87	< 0.87	1.1	2.6	2.2	1.7	1.5	< 0.87	37		0.91	1.5	1.4	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	16		< 0.87	< 0.87	< 0.87	
Naphthalene	µg/m³	**22.5**	< 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	
PHC F1 (C6-C10)	µg/m³		26	64	239	15	14	19	91	34	21	23	10	682		15	14	24	
PHC F1 (C6-C10) - BTEX	µg/m³		18	55	237	14	12	17	84	28	18	18	8	618		13	11	20	
PHC F2 (>C10-C16)	µg/m³		< 3.5	9.3	15	43	< 3.5	39	5	< 3.5	< 3.5	< 3.5	< 3.5	93.1		< 3.5	6.4	4.5	
PHC F2 (>C10-C16) - Nap	µg/m³		< 3.5	9.3	15	43	< 3.5	38	4.1	< 3.5	< 3.5	< 3.5	< 3.5	93.1		< 3.5	6.4	4.5	
Aliphatics C6-C8 (Unadj.)	µg/m³		14	39.8	203	8.1	7	4.9	26	14	7.4	10	< 3.5	465		4.9	5.6	8.1	
Aliphatics >C8-C10 (Unadj.)	µg/m³		5	17	27	7.3	5.8	16	77.6	17	14	10	6.8	161		10	6.8	16	
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 3.5	9.3	15	43	< 3.5	39	5	< 3.5	< 3.5	< 3.5	< 3.5	82.6		< 3.5	6.4	4.5	
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	6		< 2.3	< 2.3	< 2.3	
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	9.3		< 2.0	< 2.0	< 2.0	
MS Volatiles (TO-15)																			
Acetone (2-Propanone)	µg/m³	**11880**	6.4	14	6.9	3.8	4.3	3.6	13	5.2	6.7	8.3	5.9	< 1.9		2.4	3.3	2.6	
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 1.8		< 0.44	< 0.44	< 0.44	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	0.73	< 0.64	< 0.64	< 0.64	< 0.64	< **2.6**		< 0.64	0.77	0.73	
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 5.4		< 1.3	< 1.3	< 1.3	
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.3		< 2.1	< 2.1	< 2.1	
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 3.1		< 0.78	< 0.78	< 0.78	
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5		< 0.87	< 0.87	< 0.87	
Benzyl Chloride	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1		< 1.0	< 1.0	< 1.0	
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 2.5		< 0.62	< 0.62	< 0.62	
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7		< 0.92	< 0.92	< 0.92	
Chloroethane	µg/m³		< 0.53	< 0.53	1.7	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 2.1		< 0.53	< 0.53	< 0.53	
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	**1.5**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< **3.9**		< 0.98	< 0.98	< 0.98	
Chloromethane	µg/m³	**5600**	0.91	1.1	0.93	0.83	0.74	0.76	1	1	0.95	1.20	0.81	< 1.7		0.93	0.93	0.81	
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 2.5		< 0.63	< 0.63	< 0.63	
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1		< 1.0	< 1.0	< 1.0	
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	1.4	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< **5**		< 1.3	< 1.3	< 1.3	
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	2.4	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	6.5		< 0.69	< 0.69	< 0.69	
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	62.3	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2		< 0.81	< 0.81	< 0.81	
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	19	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2		< 0.79	< 0.79	< 0.79	
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< **6.1**		< 1.5	< 1.5	< 1.5	
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2		< 0.81	< 0.81	< 0.81	
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7		< 0.92	< 0.92	< 0.92	
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 2.9		< 0.72	< 0.72	< 0.72	
Dichlorodifluoromethane	µg/m³		2	2.1	2.1	1.5	1.8	1.4	2.3	2.2	1.9	2.1	2.1	< 4		2.2	2.4	2.2	
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 6.8		< 1.7	< 1.7	< 1.7	
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	5.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2		< 0.79	< 0.79	< 0.79	
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	**436**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2		< 0.79	< 0.79	< 0.79	
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6		< 0.91	< 0.91	< 0.91	
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8		< 1.2	< 1.2	< 1.2	

Table 363~~63~~: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Downwind Location (2022 September to December) – Continued

			2022-09-01	2022-09-06	2022-09-13	2022-09-22	2022-09-28	2022-10-03	2022-10-11	2022-10-20	2022-10-25	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-12-01	2022-12-08	2022-12-12	2022-12-21[1]
Monitoring Location			**NW of HCP (Downwind)**	**NW of Dredging Area (Downwind)**	**North of Western Access Road (Downwind)**	**W on Access Road (Downwind)**	**W of SPA along walkway (Downwind)**	**NW of HCP (Downwind)**	**NW of HCP (Downwind)**	**SW of transport road (Downwind)**	**SW of transport road (Downwind)**	**SW of SPA (Downwind)**	**W side of transport road (Downwind)**	**W side of transport road (Downwind)**	**No Sample**	**NW of SPA (Downwind)**	**SW of SPA (Downwind)**	**SW of SPA (Downwind)**	**No Sample**
Wind Direction at time of Deployment			**SW**	**S**	**W**	**NW**	**N**	**SW**	**SE**	**SW**	**SE**	**W**	**NE**	**NE**		**W**	**N**	**NE**	
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**																	
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8		< 1.2	< 1.2	< 1.2	
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8		< 1.2	< 1.2	< 1.2	
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6		< 0.91	< 0.91	< 0.91	
Ethanol	µg/m³		6.8	1030	10	12	8.7	6.2	58.8	64.8	7.9	11	4.5	11		12	21.3	86.7	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5		< 0.87	< 0.87	< 0.87	
Ethyl Acetate	µg/m³		< 0.72	37.8	< 0.72	1.3	< 0.72	< 0.72	43.9	8.6	< 0.72	1.6	< 0.72	< 2.9		< 0.72	< 0.72	15	
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9		< 0.98	< 0.98	< 0.98	
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 6.1		< 1.5	< 1.5	< 1.5	
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.6		< 1.4	< 1.4	< 1.4	
Heptane	µg/m³	**11000**	< 0.82	< 0.82	7.4	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	6.1		< 0.82	< 0.82	< 0.82	
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.5		< 2.1	< 2.1	< 2.1	
Hexane	µg/m³	**7500**	< 0.7	< 0.7	24	< 0.7	< 0.7	< 0.7	1.8	1.1	4.2	< 0.7	7	14		2.5	< 0.7	0.85	
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3		< 0.82	< 0.82	< 0.82	
Isopropyl Alcohol	µg/m³	**7300**	1.2	31.7	1.5	0.7	0.98	0.5	3.4	1	1.9	1.1	0.9	< 2		< 0.5	0.6	1.6	
Methylene chloride	µg/m³	**220**	2.3	2.5	3.8	< 0.69	< 0.69	< 0.69	11	2.7	11	0.97	21	7.6		4.9	< 0.69	3	
Methyl ethyl ketone	µg/m³	**1000**	0.94	2.3	0.77	0.86	< 0.59	< 0.59	2.9	0.77	0.62	1.1	< 0.59	< 2.4		< 0.59	< 0.59	< 0.59	
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3		< 0.82	< 0.82	< 0.82	
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	6.1		< 0.72	< 0.72	< 0.72	
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3		< 0.82	< 0.82	< 0.82	
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.2	< 4.2		< 1.0	< 1.0	< 1.0	
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	0.91	< 0.86	< 0.86	< 0.86	< 3.4		< 0.86	< 0.86	< 0.86	
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 3.4		< 0.85	< 0.85	< 0.85	
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	50	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4		< 1.1	< 1.1	< 1.1	
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5		< 1.4	< 1.4	< 1.4	
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5		< 1.4	< 1.4	< 1.4	
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4		< 1.1	< 1.1	< 1.1	
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 5.9		< 1.5	< 1.5	< 1.5	
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	2	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	6.9		< 0.98	< 0.98	< 0.98	
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	5.9		< 0.98	< 0.98	< 0.98	
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	23	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	100		< 0.93	< 0.93	< 0.93	
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 2.4		< 0.61	< 0.61	< 0.61	
Tetrachloroethylene	µg/m³		< 0.27	18	32	< 0.27	< 0.27	2.1	8.8	0.68	< 0.27	< 0.27	< 0.27	< 1.1		< 0.27	0.29	< 0.27	
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	13	0.59	< 0.59	< 0.59	< 0.59	< 2.4		< 0.59	< 0.59	< 0.59	
Toluene	µg/m³	**2000**	7.9	6.4	1	< 0.75	< 0.75	0.75	2.3	1.8	0.87	1.1	< 0.75	12		< 0.75	< 0.75	1.2	
Trichloroethylene	µg/m³	**12**	< 0.21	1.2	**16**	< 0.21	< 0.21	0.91	< 0.21	0.59	< 0.21	< 0.21	< 0.21	< 0.86		< 0.21	< 0.21	< 0.21	
Trichlorofluoromethane	µg/m³	**6000**	2.3	1.8	2	< 1.1	1.3	< 1.1	1.6	1.5	1.5	1.3	1.6	< 4.5		1.3	1.5	1.5	
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	**322**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	**< 2**		< 0.51	< 0.51	< 0.51	
Vinyl Acetate	µg/m³		< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	1.2	< 0.7	< 0.7	< 0.7	< 0.7	< 2.8		< 0.7	< 0.7	< 0.7	
m,p-Xylene	µg/m³	**730**	< 0.87	1.1	< 0.87	< 0.87	< 0.87	< 0.87	1	1.1	< 0.87	< 0.87	< 0.87	15		< 0.87	< 0.87	0.87	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	13		< 0.87	< 0.87	< 0.87	
Xylenes (total)	µg/m³	**730**	< 0.87	1.1	< 0.87	< 0.87	< 0.87	< 0.87	1.0	1.1	< 0.87	< 0.87	< 0.87	28		< 0.87	< 0.87	0.87	

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site

Table 37~~374~~: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 January to April)

			2022-01-20[2]	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-08	2022-03-16	2022-03-21	2022-03-31	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Monitoring Location			**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**NW of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**West of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**South Side of West Transport Road (Upwind)**	**No Sample**	**Centre of West Transport Road (Upwind)**	**No Sample**	**NW of Dredging Area (Upwind)**
Wind Direction at time of Deployment									**NW**	**SW**	**S**	**NW**	**SW**		**SW**		**W**
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**															
Benzene	µg/m³	**2.3**							< 0.64	< 0.64	< 0.64	< 0.64			< 0.64		< 0.64
Ethylbenzene	µg/m³	**1000**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 0.87
Toluene	µg/m³	**2000**							< 0.75	< 0.75	< 0.75	< 0.75			< 0.75		< 0.75
m,p-Xylene	µg/m³	**730**							< 0.87	< 0.87	0.96	< 0.87			< 0.87		< 0.87
o-Xylene	µg/m³	**730**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 0.87
Naphthalene	µg/m³	**22.5**							< 1.0	< 1.0	< 1.0	< 1.0			< 1.0		< 1.0
PHC F1 (C6-C10)	µg/m³								12	14	21	18			6		< 6
PHC F1 (C6-C10) - BTEX	µg/m³								12	13	19	17			< 6		< 6
PHC F2 (>C10-C16)	µg/m³								< 3.5	< 3.5	< 3.5	< 3.5			< 3.5		< 3.5
PHC F2 (>C10-C16) - Nap	µg/m³								< 3.5	< 3.5	< 3.5	< 3.5			< 3.5		< 3.5
Aliphatics C6-C8 (Unadj.)	µg/m³								5.3	4.2	9.9	5.6			< 3.5		< 3.5
Aliphatics >C8-C10 (Unadj.)	µg/m³								9.4	12	12	16			3.6		< 3.1
Aliphatics >C10-C12 (Unadj.)	µg/m³								< 3.5	< 3.5	< 3.5	< 3.5			< 3.5		< 3.5
Aromatics >C8-C10 (Unadj.)	µg/m³								< 2.3	< 2.3	< 2.3	< 2.3			< 2.3		< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³								< 2.0	< 2.0	< 2.0	< 2.0			< 2.0		< 2.0
MS Volatiles (TO-15)																	
Acetone (2-Propanone)	µg/m³	**11880**							4.0	< 3.6	9.0	6.7			5.2		< 3.8
1,3-Butadiene	µg/m³	**2**							< 0.44	< 0.44	< 0.44	< 0.44			< 0.44		< **3.5**
Benzene	µg/m³	**2.3**							< 0.64	< 0.64	0.67	< 0.64			< 0.64		< **5.1**
Bromodichloromethane	µg/m³								< 1.3	< 1.3	< 1.3	< 1.3			< 1.3		< 11
Bromoform	µg/m³	**55**							< 2.1	< 2.1	< 2.1	< 2.1			< 2.1		< 17
Bromomethane	µg/m³								< 0.78	< 0.78	< 0.78	< 0.78			< 0.78		< 6.2
Bromoethene	µg/m³								< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 7
Benzyl Chloride	µg/m³								< 1.0	< 1.0	< 1.0	< 1.0			< 1.0		< 8.2
Carbon disulfide	µg/m³								< 0.62	< 0.62	< 0.62	< 0.62			< 0.62		< 5
Chlorobenzene	µg/m³								< 0.92	< 0.92	< 0.92	< 0.92			< 0.92		< 7.4
Chloroethane	µg/m³								< 0.53	< 0.53	< 0.53	< 0.53			< 0.53		< 4.2
Chloroform	µg/m³	**1**							< 0.98	< 0.98	< 0.98	< 0.98			< 0.98		< **7.8**
Chloromethane	µg/m³	**5600**							< 0.78	< 0.41	1.3	< 1.3			1.3		< 3.3
3-Chloropropene	µg/m³								< 0.63	< 0.63	< 0.63	< 0.63			< 0.63		< 5
2-Chlorotoluene	µg/m³								< 1.0	< 1.0	< 1.0	< 1.0			< 1.0		< 8.3
Carbon tetrachloride	µg/m³	**2.4**							< 1.3	< 1.3	< 1.3	< 1.3			< 1.3		< **10**
Cyclohexane	µg/m³	**6100**							< 0.69	< 0.69	< 0.69	< 0.69			< 0.69		< 5.5
1,1-Dichloroethane	µg/m³	**165**							< 0.81	< 0.81	< 0.81	< 0.81			< 0.81		< 6.5
1,1-Dichloroethylene	µg/m³								< 0.79	< 0.79	< 0.79	< 0.79			< 0.79		< 6.3
1,2-Dibromoethane (EDB)	µg/m³	**3**							< 1.5	< 1.5	< 1.5	< 1.5			< 1.5		< **12**
1,2-Dichloroethane	µg/m³								< 0.81	< 0.81	< 0.81	< 0.81			< 0.81		< 6.5
1,2-Dichloropropane	µg/m³								< 0.92	< 0.92	< 0.92	< 0.92			< 0.92		< 7.4
1,4-Dioxane	µg/m³								< 0.72	< 0.72	< 0.72	< 0.72			< 0.72		< 5.8
Dichlorodifluoromethane	µg/m³								1.6	< 0.99	2.6	2.6			2.3		< 7.9
Dibromochloromethane	µg/m³								< 1.7	< 1.7	< 1.7	< 1.7			< 1.7		< 14
trans-1,2-Dichloroethylene	µg/m³	**105**							< 0.79	< 0.79	< 0.79	< 0.79			< 0.79		< 6.3
cis-1,2-Dichloroethylene	µg/m³	**105**							< 0.79	< 0.79	< 0.79	< 0.79			< 0.79		< 6.3
cis-1,3-Dichloropropene	µg/m³								< 0.91	< 0.91	< 0.91	< 0.91			< 0.91		< 7.3
m-Dichlorobenzene	µg/m³								< 1.2	< 1.2	< 1.2	< 1.2			< 1.2		< 9.6

Table 38384: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 January to April) – Continued

			2022-01-20[2]	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-08	2022-03-16	2022-03-21	2022-03-31	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Monitoring Location			**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**NW of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**West of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**South Side of West Transport Road (Upwind)**	**No Sample**	**Centre of West Transport Road (Upwind)**	**No Sample**	**NW of Dredging Area (Upwind)**
Wind Direction at time of Deployment									**NW**	**SW**	**S**	**NW**	**SW**		**SW**		**W**
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**															
o-Dichlorobenzene	µg/m³	**30500**							< 1.2	< 1.2	< 1.2	< 1.2			< 1.2		< 9.6
p-Dichlorobenzene	µg/m³	**95**							< 1.2	< 1.2	< 1.2	< 1.2			< 1.2		< 9.6
trans-1,3-Dichloropropene	µg/m³								< 0.91	< 0.91	< 0.91	< 0.91			< 0.91		< 7.30
Ethanol	µg/m³								30.7	< 4.7	32.4	12			17		49.9
Ethylbenzene	µg/m³	**1000**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 6.90
Ethyl Acetate	µg/m³								0.83	< 5.4	2.5	< 0.72			2.7		< 5.8
4-Ethyltoluene	µg/m³								< 0.98	< 0.98	< 0.98	< 0.98			< 0.98		< 7.9
Freon 113	µg/m³								< 1.5	< 1.5	< 1.5	< 1.5			< 1.5		< 12
Freon 114	µg/m³	**700000**							< 1.4	< 1.4	< 1.4	< 1.4			< 1.4		< 11
Heptane	µg/m³	**11000**							< 0.82	< 0.82	< 0.82	< 0.82			< 0.82		< 6.6
Hexachlorobutadiene	µg/m³								< 2.1	< 2.1	< 2.1	< 2.1			< 2.1		< 17
Hexane	µg/m³	**7500**							< 0.70	< 0.70	< 0.70	< 0.70			< 0.70		< 5.6
2-Hexanone	µg/m³								< 0.82	< 0.82	< 0.82	< 0.82			< 0.82		< 6.5
Isopropyl Alcohol	µg/m³	**7300**							4.2	1.1	7.9	0.96			1.4		7.4
Methylene chloride	µg/m³	**220**							1.2	1.0	1.3	1.4			0.87		< 5.6
Methyl ethyl ketone	µg/m³	**1000**							< 0.59	< 0.59	1.3	< 0.59			< 0.59		< 4.7
Methyl Isobutyl Ketone	µg/m³	**1200**							< 0.82	< 0.82	< 0.82	< 0.82			< 0.82		< 6.6
Methyl Tert Butyl Ether	µg/m³	**7000**							< 0.72	< 0.72	< 0.72	< 0.72			< 0.72		< 5.8
Methylmethacrylate	µg/m³								< 0.82	< 0.82	< 0.82	< 0.82			< 0.82		< 6.6
Naphthalene	µg/m³	**22.5**							< 1.0	< 1.0	< 1.0	< 1.0			< 1.0		< 8.4
Propylene	µg/m³	**4000**							< 0.86	< 0.86	< 0.86	< 0.86			< 0.86		< 6.9
Styrene	µg/m³	**400**							< 0.85	< 0.85	< 0.85	< 0.85			< 0.85		< 6.8
1,1,1-Trichloroethane	µg/m³	**115000**							< 1.1	< 1.1	< 1.1	< 1.1			< 1.1		< 8.7
1,1,1,2-Tetrachloroethane	µg/m³								< 1.4	< 1.4	< 1.4	< 1.4			< 1.4		< 11
1,1,2,2-Tetrachloroethane	µg/m³								< 1.4	< 1.4	< 1.4	< 1.4			< 1.4		< 11
1,1,2-Trichloroethane	µg/m³								< 1.1	< 1.1	< 1.1	< 1.1			< 1.1		< 8.7
1,2,4-Trichlorobenzene	µg/m³	**400**							< 1.5	< 1.5	< 1.5	< 1.5			< 1.5		< 12
1,2,4-Trimethylbenzene	µg/m³	**220**							< 0.98	< 0.98	< 0.98	< 0.98			< 0.98		< 7.9
1,3,5-Trimethylbenzene	µg/m³	**220**							< 0.98	< 0.98	< 0.98	< 0.98			< 0.98		< 7.9
2,2,4-Trimethylpentane	µg/m³								< 0.93	< 0.93	< 0.93	< 0.93			< 0.93		< 7.5
Tertiary Butyl Alcohol	µg/m³								< 0.61	< 0.61	< 0.61	< 0.61			< 0.61		< 4.9
Tetrachloroethylene	µg/m³								< 0.27	< 0.27	< 0.27	< 0.27			< 0.27		< 2.2
Tetrahydrofuran	µg/m³	**93000**							< 0.59	< 0.59	< 0.59	< 0.59			< 0.59		< 4.7
Toluene	µg/m³	**2000**							< 0.75	< 0.75	< 0.75	< 0.75			0.87		< 6.0
Trichloroethylene	µg/m³	**12**							< 0.21	< 0.21	1.2	< 0.21			< 0.21		< 1.7
Trichlorofluoromethane	µg/m³	**6000**							1.2	1.2	1.7	1.5			2.0		< 9.0
Vinyl chloride	µg/m³	**1**							< 0.51	< 0.51	< 0.51	< 0.51			< 0.51		< **4.1**
Vinyl Acetate	µg/m³								< 0.70	< 0.70	< 0.70	< 0.70			< 0.70		< 5.6
m,p-Xylene	µg/m³	**730**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 6.9
o-Xylene	µg/m³	**730**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 6.9
Xylenes (total)	µg/m³	**730**							< 0.87	< 0.87	< 0.87	< 0.87			< 0.87		< 6.9

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site
[2] No Sample due to equipment issues

Table 39~~395~~: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 May to August)

			2022-05-04	2022-05-09	2022-05-17	2022-05-25	2022-05-30	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-02	2022-08-09[1]	2022-08-16	2022-08-24[2]
Monitoring Location			**NE of Dredging Area (Upwind)**	**SE of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**SE of Dredging Area (Upwind)**	**SW of Transport Road (Upwind)**	**NW of Dredging Area (Upwind)**	**SW Corner of Site (Upwind)**	**South End of HCP Site (Upwind)**	**W of Transport Road (Upwind)**	**South of Barge (Upwind)**	**NW of Harbour (Upwind)**	**NW of Zone 1 Area (Upwind)**	**NW of Dredging Area (Upwind)**	**SW of Sediment Processing Area (Upwind)**	**No Sample**	**S side on Hayward Street (Upwind)**	**No Sample**
Wind Direction at time of Deployment			**N**	**SE**	**NW**	**E**	**SW**	**NW**	**E**	**S**	**W**	**S**	**W**	**SW**	**SW**	**NW**		**S**	
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**																	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	1.20	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64		< 0.64	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	
Toluene	µg/m³	**2000**	4.9	< 0.75	< 0.75	< 0.75	0.79	< 0.75	1.7	10	< 0.75	0.83	0.83	0.87	1.2	1.8		< 0.75	
m,p-Xylene	µg/m³	**730**	1.4	< 0.87	< 0.87	1.2	1.7	< 0.87	4.8	1.2	< 0.87	< 0.87	< 0.87	< 0.87	1.3	< 0.87		< 0.87	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	2	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	
Naphthalene	µg/m³	**22.5**	< 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	
PHC F1 (C6-C10)	µg/m³		31	14	18	19	38	13	45	57	11	15	19	28	18	19		23	
PHC F1 (C6-C10) - BTEX	µg/m³		24	12	17	16	34	11	37	45	10	13	18	26	15	16		21	
PHC F2 (>C10-C16)	µg/m³		5.8	8.1	6.4	10	98.9	< 3.5	35	19	15	< 3.5	< 3.5	< 3.5	4.4	7		5.8	
PHC F2 (>C10-C16) - Nap	µg/m³		5.8	8.1	6.4	10	98.9	< 3.5	35	19	15	< 3.5	< 3.5	< 3.5	4.4	7		5.8	
Aliphatics C6-C8 (Unadj.)	µg/m³		19	< 3.5	8.5	< 3.5	7.4	7.4	16	21	< 3.5	8.8	10	17	8.1	7.8		14	
Aliphatics >C8-C10 (Unadj.)	µg/m³		5.2	12	11	17	37	4.6	27	31	8.9	4.9	9.4	10	8.4	11		8.4	
Aliphatics >C10-C12 (Unadj.)	µg/m³		4.9	7.6	6.4	10	98.9	< 3.5	27	17	15	< 3.5	< 3.5	< 3.5	4.4	7		5.8	
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3		< 2.3	
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	6.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	
MS Volatiles (TO-15)																			
Acetone (2-Propanone)	µg/m³	**11880**	33.5	8.3	4.3	6.2	13	5.2	6.7	16	6.2	7.8	6.7	12	8.6	7.1		6.9	
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 1.8	< 1.8	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44		< 0.44	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	1.2	< 0.64	< **2.6**	< **2.6**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64		< 0.64	
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 5.4	< 5.4	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.3	< 8.3	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 3.1	< 3.1	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78		< 0.78	
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	
Benzyl Chloride	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1	< 4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 2.5	< 2.5	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62		< 0.62	
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7	< 3.7	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 2.1	< 2.1	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53		< 0.53	
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< **3.9**	< **3.9**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	
Chloromethane	µg/m³	**5600**	1.2	1.1	0.95	1.1	1.1	< 1.7	< 1.7	1.2	1.1	0.87	1.2	0.97	1.1	1.1		0.97	
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 2.5	< 3	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63		< 0.63	
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.1	< 4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< **5.0**	< **5.0**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 2.8	< 2.8	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69		< 0.69	
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2	< 3.2	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< **6.1**	< **6.1**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 3.2	< 3.2	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 3.7	< 3.7	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 2.9	< 2.9	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	
Dichlorodifluoromethane	µg/m³		1.6	1.5	1.4	1.5	1.6	< 4.0	< 4.0	1.5	1.7	1.6	2.4	2.1	2.4	2.2		1.8	
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 6.8	< 6.8	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7		< 1.7	
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 3.2	< 3.2	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6	< 3.6	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	

Table ~~35~~40: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 May to August) – Continued

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			2022-05-04	2022-05-09	2022-05-17	2022-05-25	2022-05-30	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-02	2022-08-09[1]	2022-08-16	2022-08-24[2]
Monitoring Location			**NE of Dredging Area (Upwind)**	**SE of Dredging Area (Upwind)**	**NW of Dredging Area (Upwind)**	**SE of Dredging Area (Upwind)**	**SW of Transport Road (Upwind)**	**NW of Dredging Area (Upwind)**	**SW Corner of Site (Upwind)**	**South End of HCP Site (Upwind)**	**W of Transport Road (Upwind)**	**South of Barge (Upwind)**	**NW of Harbour (Upwind)**	**NW of Zone 1 Area (Upwind)**	**NW of Dredging Area (Upwind)**	**SW of Sediment Processing Area (Upwind)**	**No Sample**	**S side on Hayward Street (Upwind)**	**No Sample**
Wind Direction at time of Deployment			**N**	**SE**	**NW**	**E**	**SW**	**NW**	**E**	**S**	**W**	**S**	**W**	**SW**	**SW**	**NW**		**S**	
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**																	
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 4.8	< 4.8	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 3.6	< 3.6	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	
Ethanol	µg/m³		34.1	9.8	37.9	16	16	20.9	16	65	15	27.9	20	13	9.8	4.3		8.3	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	1.0	< 0.87		< 0.87	
Ethyl Acetate	µg/m³		22	< 0.72	3.5	1.7	2.5	< 2.9	< 2.9	94.3	3.2	1.3	0.94	3.5	1.8	0.97		< 0.72	
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	1.1	< 0.98		< 0.98	
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 6.1	< 6.1	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.6	< 5.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	1.3	< 0.82		< 0.82	
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 8.5	< 8.5	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	
Hexane	µg/m³	**7500**	< 0.70	< 0.70	< 0.70	< 0.70	0.81	< 2.8	< 2.8	2.0	< 0.70	< 0.70	< 0.70	2.0	1.2	4.2		< 0.70	
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		1.60	
Isopropyl Alcohol	µg/m³	**7300**	5.9	3.4	10	3.2	2.4	3.4	< 2.0	3.7	1.3	1.7	2.7	3.7	7.9	2.2		1.8	
Methylene chloride	µg/m³	**220**	1.2	0.83	1.7	1.5	5.9	3.2	< 2.8	5.9	0.87	1.4	0.94	6.3	1.0	12		< 0.69	
Methyl ethyl ketone	µg/m³	**1000**	17	0.59	< 0.59	< 0.59	2.4	< 2.4	< 2.4	4.7	0.65	0.86	0.86	1.4	1.3	1.0		1.0	
Methyl Isobutyl Ketone	µg/m³	**1200**	9.4	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 2.9	< 2.9	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 3.3	< 3.3	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 4.2	< 4.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 3.4	< 3.4	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	3.4	< 0.86		< 0.86	
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 3.4	< 3.4	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85		< 0.85	
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4	< 4.4	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5	< 5.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 5.5	< 5.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 4.4	< 4.4	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 5.9	< 5.9	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 3.9	< 3.9	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	3.6	< 0.98		< 0.98	
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 3.7	< 3.7	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	14	< 0.93		< 0.93	
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 2.4	< 2.4	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61		< 0.61	
Tetrachloroethylene	µg/m³		< 0.27	< 0.27	5.6	< 0.27	< 0.27	< 1.1	< 1.1	0.43	< 0.27	< 0.27	< 0.27	< 0.27	0.68	109		< 0.27	
Tetrahydrofuran	µg/m³	**93000**	2.7	< 0.59	< 0.59	< 0.59	< 0.59	< 2.4	< 2.4	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59		< 0.59	
Toluene	µg/m³	**2000**	5.3	< 0.75	< 0.75	< 0.75	0.83	< 3.0	< 3.0	8.3	< 0.75	< 0.75	0.79	< 0.75	1.5	1.4		< 0.75	
Trichloroethylene	µg/m³	**12**	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.86	< 0.86	0.48	< 0.21	< 0.21	0.24	< 0.21	2.8	0.75		< 0.21	
Trichlorofluoromethane	µg/m³	**6000**	1.2	1.4	1.7	1.3	2.3	< 4.5	< 4.5	2.2	1.3	2.6	1.6	2.2	1.7	2.5		1.2	
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< **2.0**	< **2.0**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51		< 0.51	
Vinyl Acetate	µg/m³		1.7	< 0.70	< 0.70	< 0.70	< 0.70	< 2.8	< 2.8	3.9	< 0.70	< 0.70	< 0.70	< 0.70	0.95	0.81		< 0.70	
m,p-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	0.96	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	2.5	< 0.87		< 0.87	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	0.87	< 0.87		< 0.87	
Xylenes (total)	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	0.96	< 3.5	< 3.5	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	3.4	< 0.87		< 0.87	

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site
[2] No Sample due to equipment issues

Table ~~36~~41: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 September to December)

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			2022-09-01	2022-09-06	2022-09-13	2022-09-22	2022-09-28	2022-10-03	2022-10-11	2022-10-20	2022-10-25	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-12-01[2]	2022-12-08	2022-12-12	2022-12-21[1]
Monitoring Location			**E of Harbour Wall (Upwind)**	**W of Transport Road (Upwind)**	**NW of HCP (Upwind)**	**NW of Harbour Turning Basin (Upwind)**	**Along fenceline on Hayward (Upwind)**	**W of Transport Road (Upwind)**	**E of Harbour Wall (Upwind)**	**SW of Sediment Processing Area (Upwind)**	**SE of Sediment Processing Area (Upwind)**	**NW of SPA (Upwind)**	**SE of geotubes (Upwind)**	**NW corner of HCP (Upwind)**	**No Sample**	**No Sample**	**NW of SPA (Upwind)**	**NW of SPA (Upwind)**	**No Sample**
Wind Direction at time of Deployment			**SW**	**E**	**W**	**NW**	**N**	**SW**	**SE**	**SW**	**SE**	**W**	**NE**	**NE**			**N**	**NE**	
MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**																	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	2.2	< 0.64	< 0.64	< 0.64	0.64	0.73			< 0.64	< 0.64	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87			< 0.87	< 0.87	
Toluene	µg/m³	**2000**	11	2.6	< 0.75	< 0.75	2.2	< 0.75	2	1.2	0.87	1.2	4.9	4.1			< 0.75	0.75	
m,p-Xylene	µg/m³	**730**	1.1	4.8	< 0.87	< 0.87	2.3	1.5	3.4	2.5	1.5	1.5	3	7.4			< 0.87	1.4	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	2.6			< 0.87	< 0.87	
Naphthalene	µg/m³	**22.5**	< 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	< 1	
PHC F1 (C6-C10)	µg/m³		39	28	15	13	24	18	56	33	23	25	40	120			17	24	
PHC F1 (C6-C10) - BTEX	µg/m³		26	19	13	11	19	15	48	28	20	21	31	106			15	21	
PHC F2 (>C10-C16)	µg/m³		< 3.5	5.7	5.5	113	9.9	5.8	22	< 3.5	< 3.5	< 3.5	< 3.5	25			< 3.5	10	
PHC F2 (>C10-C16) - Nap	µg/m³		< 3.5	5.1	5.5	113	9.9	5.8	22	< 3.5	< 3.5	< 3.5	< 3.5	25			< 3.5	10	
Aliphatics C6-C8 (Unadj.)	µg/m³		20	7.8	8.1	6	9.2	8.1	20	13	7.8	7.8	13	74			6	14	
Aliphatics >C8-C10 (Unadj.)	µg/m³		6.3	15	6.3	6.8	13	9.4	37	20	17	18	24	37			12	8.9	
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 3.5	5.7	5.5	113	9.9	5.8	22	< 3.5	< 3.5	< 3.5	< 3.5	21			< 4	10	
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3			< 2.3	< 2.3	
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	3.3			< 2.0	< 2.0	
MS Volatiles (TO-15)																			
Acetone (2-Propanone)	µg/m³	**11880**	6.9	6.7	5.9	3.8	4.8	3.6	8.6	3.8	7.8	8.1	10	5.7			4.3	7.8	
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44			< 0.44	< 0.44	
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	1.6	< 0.64	< 0.64	< 0.64	< 0.64	0.73			< 0.64	< 0.64	
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3			< 1.3	< 1.3	
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1			< 2.1	< 2.1	
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78			< 0.78	< 0.78	
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87			< 0.87	< 0.87	
Benzyl Chloride	µg/m³		< 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	
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62			< 0.62	< 0.62	
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92			< 0.92	< 0.92	
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53			< 0.53	< 0.53	
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98			< 0.98	< 0.98	
Chloromethane	µg/m³	**5600**	0.91	0.91	0.83	0.7	0.81	0.76	0.95	1	1.1	1	0.85	1.1			0.97	1.3	
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63			< 0.63	< 0.63	
2-Chlorotoluene	µg/m³		< 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	
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3			< 1.3	< 1.3	
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	0.83	< 0.69	< 0.69	< 0.69	< 0.69	1			< 0.69	< 0.69	
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81			< 0.81	< 0.81	
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79			< 0.79	< 0.79	
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5			< 1.5	< 1.5	
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81			< 0.81	< 0.81	
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92			< 0.92	< 0.92	
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72			< 0.72	< 0.72	
Dichlorodifluoromethane	µg/m³		1.9	2.1	2.0	1.6	1.8	1.6	2.3	2.4	2.0	2.3	2.0	2.5			2.4	2.1	
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7			< 1.7	< 1.7	
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79			< 0.79	< 0.79	
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79			< 0.79	< 0.79	
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91			< 0.91	< 0.91	
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2			< 1.2	< 1.2	

Table ~~3642~~: Air Quality Monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring – Upwind Location (2022 September to December) – Continued

			2022-09-01	2022-09-06	2022-09-13	2022-09-22	2022-09-28	2022-10-03	2022-10-11	2022-10-20	2022-10-25	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-12-01[2]	2022-12-08	2022-12-12	2022-12-21[1]
Monitoring Location			**E of Harbour Wall (Upwind)**	**W of Transport Road (Upwind)**	**NW of HCP (Upwind)**	**NW of Harbour Turning Basin (Upwind)**	**Along fenceline on Hayward (Upwind)**	**W of Transport Road (Upwind)**	**E of Harbour Wall (Upwind)**	**SW of Sediment Processing Area (Upwind)**	**SE of Sediment Processing Area (Upwind)**	**NW of SPA (Upwind)**	**SE of geotubes (Upwind)**	**NW corner of HCP (Upwind)**	**No Sample**	**No Sample**	**NW of SPA (Upwind)**	**NW of SPA (Upwind)**	**No Sample**
Wind Direction at time of Deployment			**SW**	**E**	**W**	**NW**	**N**	**SW**	**SE**	**SW**	**SE**	**W**	**NE**	**NE**			**N**	**NE**	
MS Volatiles (TO-15)	**Units**	**Criteria (AAQC)**																	
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2			< 1.2	< 1.2	
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2			< 1.2	< 1.2	
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91			< 0.91	< 0.91	
Ethanol	µg/m³		5.3	15	12	36.4	35.8	5.3	9.2	34.1	7.2	9.8	39.6	13			53.7	15	
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87			< 0.87	< 0.87	
Ethyl Acetate	µg/m³		1.3	1.0	2.8	1.0	16	< 0.72	1.0	< 0.72	0.9	1.5	37.4	9.7			< 0.72	< 0.72	
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98			< 0.98	< 0.98	
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5			< 1.5	< 1.5	
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4			< 1.4	< 1.4	
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	1.1			< 0.82	< 0.82	
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1			< 2.1	< 2.1	
Hexane	µg/m³	**7500**	< 0.70	0.70	< 0.70	< 0.70	0.81	< 0.70	2.4	0.92	3.5	< 0.70	2.5	9.5			< 0.70	< 0.70	
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82			< 0.82	< 0.82	
Isopropyl Alcohol	µg/m³	**7300**	1.8	1.5	2.1	0.93	2.0	< 0.49	1.1	0.54	1.8	0.81	4.2	2.1			2.5	0.64	
Methylene chloride	µg/m³	**220**	2.0	1.0	1.6	< 0.69	3.8	0.73	5.9	1.0	9.7	0.97	7.3	15			< 0.69	< 0.69	
Methyl ethyl ketone	µg/m³	**1000**	1.1	0.74	0.97	0.91	2.1	< 0.59	0.83	< 0.59	0.8	1.0	0.68	< 0.59			< 0.59	0.83	
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82			< 0.82	< 0.82	
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72			< 0.72	< 0.72	
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82			< 0.82	< 0.82	
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.2	< 1.0			< 1.0	< 1.0	
Propylene	µg/m³	**4000**	1.3	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	1.2			< 0.86	< 0.86	
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85			< 0.85	< 0.85	
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1			< 1.1	< 1.1	
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4			< 1.4	< 1.4	
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4			< 1.4	< 1.4	
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1			< 1.1	< 1.1	
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5			< 1.5	< 1.5	
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	1.1	< 0.98	< 0.98	< 0.98	< 0.98	1.1			< 0.98	< 0.98	
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98			< 0.98	< 0.98	
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	13			< 0.93	< 0.93	
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61			< 0.61	0.91	
Tetrachloroethylene	µg/m³		< 0.27	< 0.27	< 0.27	< 0.27	0.33	2.7	< 0.27	1.0	< 0.27	< 0.27	< 0.27	0.81			< 0.27	< 0.27	
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59			< 0.59	< 0.59	
Toluene	µg/m³	**2000**	11	1.9	< 0.75	< 0.75	2.3	< 0.75	1.4	1.2	0.75	1.0	3.4	3.4			< 0.75	< 0.75	
Trichloroethylene	µg/m³	**12**	0.28	< 0.21	< 0.21	< 0.21	< 0.21	0.31	< 0.21	0.86	< 0.21	< 0.21	< 0.21	0.39			< 0.21	< 0.21	
Trichlorofluoromethane	µg/m³	**6000**	2.1	2.4	2.1	< 1.1	2.0	1.1	2.1	1.4	1.5	1.3	1.3	1.8			1.4	1.3	
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51			< 0.51	< 0.51	
Vinyl Acetate	µg/m³		< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70			< 0.7	< 0.7	
m,p-Xylene	µg/m³	**730**	< 0.87	1.7	< 0.87	< 0.87	1.2	< 0.87	1.2	1.5	< 0.87	< 0.87	< 0.87	2.6			< 0.87	< 0.87	
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	0.87	< 0.87	< 0.87	< 0.87	1.8			< 0.87	< 0.87	
Xylenes (total)	µg/m³	**730**	< 0.87	1.7	< 0.87	< 0.87	1.2	< 0.87	1.2	2.4	< 0.87	< 0.87	< 0.87	4.3			< 0.87	< 0.87	

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
[1] No dredging activities occuring on site
[2] No Sample due to equipment issues

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Table ~~37~~43: Noise Monitoring Levels – PH LTWMF

	2017 Average L_{eq} (dBA) During Early Works 1			2018 Average L_{eq} (dBA)			2019 Average L_{eq} (dBA)			2020 Average L_{eq} (dBA)			2021 Average L_{eq} (dBA)			2022 Average L_{eq} (dBA)		
Monitoring Location	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
PH-N-0001 - 192 Toronto Rd	67	63	61	66	63	60	67	62	61	65	62	59	66	61	60	65	61	59
PH-N-0002 - NW WWMF, Brand Rd	66	67	64	66	66	64	66	66	64	65	66	63	64	64	63	62	62	61
PH-N-0003 - South WWMF	54	54	53	58	55	53	58	54	51	53	52	49	54	52	51	55	56	54
PH-N-0004 - SW WWMF, Brand Rd	58	55	55	58	56	55	56	57	55	56	58	55	56	54	54	54	55	54
PH-N-0005 - Welcome Weather Station	63	54	54	65	56	55	62	55	56	57	52	50	58	53	55	57	53	53
PH-N-0006 - Welcome North	67	67	65	67	67	65	66	65	63	64	65	63	67	67	65	66	66	64
PH-N-0007 - SE Corner WWMF	59	56	52	56	55	53	58	56	55	56	52	52	55	55	54	55	55	54

Note:
-- = Data not available
Noise monitoring results are compared to:
1. 12 dBA difference from Baseline (2015) monitoring results
2. 70 dB over a 24 hour period as per the World Health Organization's *Guideline for Community Noise*, 1999

Table ~~38~~44: Noise Monitoring Levels – Port Hope Central, North and South Transportation Routes

Central Transporation Route	Yearly Average Hourly Measurements Leq (dBA)				February Hourly Measurements Leq (dBA)	May Hourly Measurements Leq (dBA)	August Hourly Measurements Leq (dBA)	November Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021	2022				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
CTR-N-001	61	64	62	64	63	63	65	64	64
CTR-N-002	69	71	69	69	71	69	68	68	69

North Transporation Route	Yearly Average Hourly Measurements Leq (dBA)				February Hourly Measurements Leq (dBA)	May Hourly Measurements Leq (dBA)	August Hourly Measurements Leq (dBA)	November Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021	2022				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
NTR-N-001	63	61	62	62	64	65	63	63	64
NTR-N-002	62	61	65	68	66	64	65	63	65

South Transporation Route	Yearly Average Hourly Measurements Leq (dBA)				February Hourly Measurements Leq (dBA)	May Hourly Measurements Leq (dBA)	July Hourly Measurements Leq (dBA)	November Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021	2022				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
STR-N-001	70	70	70	69	69	69	69	70	69
STR-N-002	69	70	70	70	69	69	68	70	69
STR-N-003	68	68	68	68	68	67	67	68	68
STR-N-004	63	65	65	65	63	65	67	62	64
STR-N-005	61	60	61	61	61	62	58	61	61

Table ~~39~~45: Noise Monitoring Levels – Highland Drive and Vicinity Sites – PSE CS

Monitoring Location	2020 Average L_{eq} (dBA)			2021 Average L_{eq} (dBA)			2022 Average L_{eq} (dBA)		
	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
HD-N-0001	48	48	47	45	47	46	48	50	48
HD-N-0002	50	48	48	53	51	52	53	53	52
HD-N-0003	61	55	54	61	56	52	62	59	54

Table 40460: PH LTWMF Groundwater Levels

Well ID	2017	2018	2019	2020	2021	2022		
	Average (mASL)					Min	Max	Average
WC-IW93-22	123.94	123.81	123.74	123.47	123.48	122.92	123.69	123.18
WC-MW1-02	127.87	128.57	Well Damaged					
WC-MW1-03	148.26	148.30	148.48	148.16	148.25	147.51	149.84	148.39
WC-MW2-02	Well Not Found							
WC-MW3A-11R [1]	--	--	--	--	--	--	--	--
WC-MW3B-02	129.57	129.66	130.93	130.72	130.11	129.53	129.80	129.67
WC-MW3C-02	135.52	135.98	136.15	135.81	135.56	134.66	136.26	135.58
WC-MW3D-02	136.53	136.91	136.85	136.86	136.46	135.55	137.22	136.45
WC-MW4A-02	127.03	127.15	127.09	126.87	126.62	126.46	126.89	126.66
WC-MW4B-02	127.18	127.25	127.17	126.92	126.94	126.33	127.15	126.74
WC-OW1-75	Well Decommissioned							
WC-OW1-87	116.80	116.67	116.57	116.42	116.43	115.10	115.86	115.57
WC-OW2-75	134.86	Well Decommissioned						
WC-OW2A-75	120.23	Well Decommissioned						
WC-OW2A-19 [2]	--		120.14	119.76	120.04	118.77	120.44	119.45
WC-OW2-87	119.63	Well Decommissioned						
WC-OW2-19 [3]	--		120.02	120.38	120.54	119.39	120.86	120.06
WC-OW3-79	119.47	119.50	119.31	116.73	116.71	115.16	115.65	115.41
WC-OW3-87	117.08	117.01	117.00	118.76	118.79	115.98	119.01	118.02
WC-OW4-79	119.16	119.14	119.20	120.23	120.34	119.28	120.51	119.91
WC-OW5-79	119.68	Well Decommissioned						
WC-OW5-19 [4]	--		120.22	120.23	120.34	119.28	120.51	119.91
WC-OW9-75	Well Decommissioned							
LTWMF-MW-06 [5]	148.40	148.58	148.30	148.06	148.61	147.64	148.52	148.08
WC-OW10-75	140.33	140.56	140.30	140.14	140.33	139.03	140.41	139.85
WC-OW12-75	133.45	Well Decommissioned						
WC-OW18-76	136.39	Well Decommissioned						
WC-OW25-76	118.75	118.74	118.76	118.66	118.71	118.10	118.78	118.52
WC-OW-27-76	120.80	120.58	120.83	120.71	120.93	119.98	120.97	120.60
WC-OW28-76	120.66	120.51	120.55	120.36	120.48	119.87	121.38	120.45
WC-OW33-76	123.87	124.04	123.81	123.54	123.43	123.16	125.68	123.94

Note:
mASL – meters above sea level.
- = Data not available.
[1] WC-MW3A-11R was installed in 2011 to replace WC-MW3A-02.
[2] WC-OW2A-19 was installed in 2019 to replace WC-OW2A-75.
[3] WC-OW2-19 was installed in 2019 to replace WC-OW2-87.
[4] WC-OW5-19 was installed in 2019 to replace WC-OW5-79.
[5] LTWMF-MW-06 was installed in 2017 to replace WC-OW9-75.

Table 41471: Highland Drive Groundwater Levels

Well ID	2018	2019	2020	2021	2022		
	Average				Min	Max	Average
	(mASL)						
PH-02-01	104.08	104.20	104.13	103.89	103.79	104.08	103.96
PH-02-02	104.07	104.29	104.11	103.88	103.85	104.07	103.99
PH-02-03	104.08	105.58	104.11	103.90	103.77	104.11	103.96
PH-90-3-I	110.16	110.00	110.19	109.89	109.75	109.86	109.82
PH-90-3-II	--	119.54	120.19	119.45	117.95	119.26	118.79
PH-90-4-W	107.29	107.67	107.77	107.57	107.35	107.51	107.43
PH-90-4-I	106.38	106.38	106.43	106.16	--	--	--
PH-90-4-II	107.27	--	--	--	--	--	--
PH-90-4-III	115.58	115.50	115.47	115.16	114.81	115.33	115.08
PH-90-6-I	107.36	111.34	107.30	107.06	105.90	107.01	106.71
PH-90-6-II	114.16	114.70	109.94	112.54	107.07	108.66	107.53
PH-90-6-III	115.92	116.25	115.88	116.44	115.46	115.81	115.59
PH-90-7-I	--	105.01	105.01	104.54	104.38	104.83	104.59
PH-90-7-II	105.42	105.48	105.36	105.12	104.90	105.18	105.07
PH-90-7-III	112.49	112.79	112.57	112.17	111.73	112.20	111.97
PH-90-8-I	104.03	104.07	103.99	103.88	103.80	103.98	103.87
PH-90-8-II	104.08	104.15	104.09	103.93	103.73	104.05	103.92
PH-90-9-I	Well Not Found						
PH-90-9-II	--	94.77	90.40	90.25	--	--	Dry
PH-90-9-III	95.18	96.85	96.18	95.92	94.95	96.65	95.89
PH-93-3-I	--	106.09	106.21	105.74	105.71	105.89	105.78
PH-93-3-II	105.98	106.09	106.06	105.70	105.55	105.80	105.69
PH-93-3-III	112.46	112.58	112.50	112.10	111.99	112.48	112.29
PH-93-6-I	--	--	--	--	--	--	--
PH-93-6-II	--	--	--	--	--	--	--
PH-93-6-III	--	--	--	--	--	--	--
PH-93-9-I	--	--	--	--	--	--	--
PH-93-9-II	--	--	--	--	--	--	--
PH-93-10-I	105.39	105.50	105.48	105.15	104.92	105.32	105.15
PH-93-10-II	105.44	105.50	105.49	105.14	104.95	105.36	105.18
PH-93-10-IIIA	--	--	--	--	--	--	--
PH-93-10-IIIB	--	110.15	110.19	110.00	110.03	110.12	110.07
PH-93-12-I	Well Not Found						
PH-93-12-II	--	--	--	--	--	--	--
PH-93-12-III	Well Not Found						
PH-95-I	105.37	105.53	105.49	106.33	Decommissioned		
PH-95-7	--	--	--	--	--	--	--
PH-95-17-I	106.04	106.13	106.09	105.77	105.55	105.98	105.78
PH-95-17-II	112.91	113.00	113.00	112.61	112.47	112.95	112.76
PH-95-18	106.11	106.16	106.22	Well Damaged			
PH-M-19	100.17	100.17	100.16	100.12	100.07	100.20	100.13

Note:
mASL – meters above sea level.
-- = Data not available.

Table 42482: PH LTWMF Sentinel Well Monitoring Program

Arsenic (dissolved) PWQO *Trigger Level* 50 (µg/L)							
	2018	2019	2020	2021	2022		
Well ID	Average				Sample Dates		Average
WC-IW93-22	1.4	1.3	1.5	1.5	2022-06-13: 1.4	2022-11-03: 1.8	1.6
WC-OW1-87	<1.0	<1.0	0.8	0.9	2022-05-26: 1.0	2022-10-11: 1.3	1.2
WC-OW2A-75	WELL DECOMMISSIONED						
WC-OW2A-19 [1]	--	1.4	0.6	0.7	2022-04-28: 0.4	2022-10-07: 0.4	0.4
WC-OW2-87	WELL DECOMMISSIONED						
WC-OW2-19 [2]	--	<1.0	1.5	1.8	2022-04-28: 1.4	2022-10-07: 1.1	1.3
WC-OW3-79	3.1	3.2	3.8	3.7	2022-05-16: 4.1	2022-10-19: 3.9	4.0
WC-OW3-87	4.5	4.2	5.1	5.0	2022-05-26: 6.2	2022-10-14: 5.2	5.7
WC-OW4-79	1.1	<1.0	0.7	0.8	2022-05-19: 0.4	2022-10-06: 0.8	0.6
WC-OW5-79	WELL DECOMMISSIONED						
WC-OW5-19 [3]	--	2.8	3.4	2.6	2022-06-08: 3.8	2022-10-07: 1.6	2.7
WC-OW25-76	<1.0	<1.0	0.8	0.7	2022-05-19: --[4]	2022-10-06: 0.8	0.8
WC-OW27-76	<1.0	<1.0	0.4	0.4	2022-05-19: 0.3	2022-10-06: 0.4	0.4
WC-OW28-76	<1.0	<1.0	0.6	0.5	2022-05-19: --[4]	2022-10-06: 0.5	0.5
WC-OW33-76	<1.0	<1.0	1.2	0.6	2022-06-03: 1.2	2022-11-04: --[5]	1.2

PWQO Trigger Level based on 50% of the Provincial Water Quality Objective of 100 µg/L for arsenic.
Waste Nuclear Substance Licence, Port Hope Long-Term Low-Level Radioactive Waste Management Project.
-- = Data not available.
[1] WC-OW2A-19 was installed in 2019 to replace WC-OW2A-75.
[2] WC-OW2-19 was installed in 2019 to replace WC-OW2-87.
[3] WC-OW5-19 was installed in 2019 to replace WC-OW5-79.
[4] Insufficient volume of groundwater for full sample collection.
[5] Well not accessed during monitoring campaign.

Table 43~~493~~: Soil Monitoring- PH LTWMF – Location 1 (PH-WWMF-SS-01)

Parameter	Units	PH-WWMF-SS-01					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.50	0.51	0.54	< 0.50	< 0.50	1.40
Mercury	µg/g	0.067	< 0.05	< 0.05	0.06	0.05	0.06
Silver	µg/g	< 0.40	0.22	0.25	0.47	0.48	0.52
Arsenic	µg/g	5.7	4.0	4.1	4.8	5.3	4.6
Barium	µg/g	52	48	53	66	55	62
Beryllium	µg/g	0.43	0.37	0.45	0.40	0.37	0.41
Boron	µg/g	< 5.0	5.6	6.4	5.0	5.0	6.0
Cadmium	µg/g	0.34	0.35	0.31	0.49	0.42	0.99
Cobalt	µg/g	8.8	6.0	6.7	8.2	6.6	7.4
Copper	µg/g	13	11	11	18	12	13
Molybdenum	µg/g	< 0.50	0.53	< 0.50	0.60	0.40	0.50
Nickel	µg/g	11	8.3	9.1	12	9.0	10.0
Lead	µg/g	20	20	20	23	21	22
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	0.24	0.22	< 0.20	< 0.80	< 0.80	< 0.80
Uranium	µg/g	3.1	2.4	3.4	4.1	4.0	4.1
Vanadium	µg/g	22	22	27	23	19	23
Zinc	µg/g	75	510	310	80	120	140
Lead-210	Bq/g	0.10	0.14	0.10	0.40	0.12	0.13
Radium-226	Bq/g	< 0.10	< 0.05	0.06	0.10	0.19	< 0.09
Thorium-230	Bq/g	< 0.50	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.02	0.02	0.02

Table 44: Soil Monitoring- PH LTWMF – Location 2 (PH-WWMF-SS-02)

Parameter	Units	PH-WWMF-SS-02					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.75	0.69	0.70	< 0.50	< 0.50	< 0.50
Mercury	µg/g	0.052	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	0.15	0.15	0.15
Arsenic	µg/g	2.4	3.3	3.8	3.5	3.7	3.2
Barium	µg/g	30	36	39	40	38	42
Beryllium	µg/g	0.25	0.29	0.32	0.26	0.25	0.28
Boron	µg/g	< 5.0	< 5.0	< 5.0	3.0	3.0	4.0
Cadmium	µg/g	0.20	0.27	0.22	0.26	0.23	0.24
Cobalt	µg/g	3.4	4.1	4.8	4.9	4.1	4.9
Copper	µg/g	5.3	6.7	7.5	7.9	7.0	7.9
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	0.30	0.30	0.30
Nickel	µg/g	5.2	6.0	6.8	7.0	5.7	6.5
Lead	µg/g	14	17	16	17	16	16
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	< 0.20	< 0.20	< 0.20	< 0.80	< 0.80	< 0.80
Uranium	µg/g	0.9	1.2	1.3	1.4	1.2	1.2
Vanadium	µg/g	18	20	24	19	14	20
Zinc	µg/g	37	38	44	44	35	42
Lead-210	Bq/g	< 0.05	0.06	0.08	0.08	0.08	0.09
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	0.13	0.12	< 0.07
Thorium-230	Bq/g	< 0.50	< 0.40	< 0.40	< 0.08	< 0.30	< 0.30
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.01	0.01	0.01

Table 45: Soil Monitoring- PH LTWMF – Location 3 (PH-WWMF-SS-03)

Parameter	Units	PH-WWMF-SS-03					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.42	0.57	0.59	< 0.50	< 0.50	< 0.50
Mercury	µg/g	0.064	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	0.08	0.06	0.05
Arsenic	µg/g	3.2	3.5	3.8	3.4	3.7	2.9
Barium	µg/g	87	110	98	100	94	77
Beryllium	µg/g	0.54	0.57	0.56	0.50	0.44	0.39
Boron	µg/g	< 5.0	6.6	7.3	5.0	4.0	5.0
Cadmium	µg/g	0.20	0.22	0.23	0.28	0.21	0.19
Cobalt	µg/g	6.1	7.1	6.5	7.5	6.2	5.8
Copper	µg/g	11	13	13	14	12	11
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	0.40	0.30	0.30
Nickel	µg/g	12	13	13	14	11	10
Lead	µg/g	11	13	13	12	11	10
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	0.22	< 0.20	< 0.20	< 0.80	< 0.80	< 0.80
Uranium	µg/g	1.1	1.3	1.3	1.4	1.2	1.1
Vanadium	µg/g	31	35	35	35	28	27
Zinc	µg/g	54	62	58	63	49	50
Lead-210	Bq/g	0.06	0.07	< 0.05	0.10	0.09	0.10
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	0.08	< 0.05	0.20
Thorium-230	Bq/g	< 0.50	< 0.40	< 0.40	< 0.20	< 0.20	< 0.30
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.02	0.02	0.02

Table 46: Soil Monitoring- PH LTWMF – Location 4 (PH-WWMF-SS-04)

Parameter	Units	PH-WWMF-SS-04					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.58	0.59	0.58	< 0.50	< 0.50	< 0.50
Mercury	µg/g	< 0.050	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	< 0.05	< 0.05	< 0.05
Arsenic	µg/g	1.8	2.1	1.4	2.5	2.9	2.4
Barium	µg/g	21	34	20	28	36	22
Beryllium	µg/g	< 0.20	< 0.20	< 0.20	0.22	0.23	0.21
Boron	µg/g	< 5.0	< 5.0	< 5.0	4.0	3.0	4.0
Cadmium	µg/g	0.22	0.19	0.12	0.21	0.26	0.22
Cobalt	µg/g	2.2	2.4	1.8	3.0	2.8	2.7
Copper	µg/g	4.0	4.6	4.1	6.7	5.8	5.5
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	0.30	0.20	0.30
Nickel	µg/g	3.7	4.1	3.2	5.1	4.5	4.4
Lead	µg/g	11	40	10	11	19	12
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	< 0.20	< 0.20	0.23	< 0.80	< 0.80	< 0.80
Uranium	µg/g	0.56	0.50	0.43	0.67	0.6	0.5
Vanadium	µg/g	14	13	15	15	11	13
Zinc	µg/g	140	220	550	260	99	74
Lead-210	Bq/g	< 0.05	0.07	< 0.05	0.08	0.08	0.09
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	< 0.04	0.09	< 0.05
Thorium-230	Bq/g	< 0.50	< 0.40	< 0.40	< 0.30	< 0.30	< 0.20
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.01	0.01	0.01

Table 47: Soil Monitoring- PH LTWMF – Location 5 (PH-WWMF-SS-05)

Parameter	Units	PH-WWMF-SS-05					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.54	0.71	0.46	< 0.50	< 0.50	< 0.50
Mercury	µg/g	< 0.050	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	< 0.05	< 0.05	< 0.05
Arsenic	µg/g	50	34	30	2	19	20
Barium	µg/g	50	62	69	81	78	62
Beryllium	µg/g	0.31	0.33	0.36	0.41	0.32	0.28
Boron	µg/g	< 5.0	6.4	7.0	6.0	6.0	6.0
Cadmium	µg/g	0.24	0.22	0.19	0.26	0.17	0.18
Cobalt	µg/g	3.4	4.1	4.4	6.3	4.4	4.3
Copper	µg/g	8.3	11	9.6	14	9.7	9.6
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	0.40	0.30	0.40
Nickel	µg/g	6.9	7.6	8.3	12	8.6	8.3
Lead	µg/g	19	24	22	34	21	20
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	< 0.20	0.21	< 0.20	< 0.80	< 0.80	< 0.80
Uranium	µg/g	9.5	8.9	6.5	0.6	7.5	6.2
Vanadium	µg/g	20	22	25	29	21	21
Zinc	µg/g	45	180	59	84	55	58
Lead-210	Bq/g	0.07	0.06	0.06	0.08	0.08	0.09
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	0.09	0.13	< 0.06
Thorium-230	Bq/g	< 0.50	< 0.40	< 0.40	< 0.20	< 0.20	< 0.30
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.02	0.02	0.01

Table 48: Soil Monitoring- Highland Drive – Location 1 (PH-H-SS-01)

Parameter	Units	PH-H-SS-01					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.42	0.34	0.30	< 0.50	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	0.07	0.06	0.07
Arsenic	µg/g	1.6	2.0	2.3	2.4	2.2	1.9
Barium	µg/g	66	120	110	140	95	95
Beryllium	µg/g	0.34	0.56	0.52	0.50	0.38	0.41
Boron	µg/g	5.8	7.1	6.6	6.0	5.0	5.0
Cadmium	µg/g	0.14	0.14	0.19	0.22	0.15	0.18
Cobalt	µg/g	4.7	7.2	7.0	8.9	6.0	6.5
Copper	µg/g	10	15	14	19	13	13
Molybdenum	µg/g	< 0.50	< 0.50	< 0.50	0.40	0.30	0.40
Nickel	µg/g	8.7	15	13	18	12	12
Lead	µg/g	8.4	16	14	14	8.9	9.3
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	< 0.20	0.25	< 0.20	< 0.80	< 0.80	< 0.80
Uranium	µg/g	0.51	0.78	0.70	0.89	0.60	0.57
Vanadium	µg/g	25	38	36	44	29	33
Zinc	µg/g	43	87	71	89	50	52
Lead-210	Bq/g	0.06	< 0.05	0.06	< 0.20	0.11	0.08
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	0.08	< 0.04	0.09
Thorium-230	Bq/g	< 0.5	< 0.40	< 0.40	0.07	< 0.30	< 0.30
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.02	0.02	0.02

Table 49: Soil Monitoring- Highland Drive – Location 2 (PH-H-SS-02)

Parameter	Units	PH-H-SS-02					
		2017	2018	2019	2020	2021	2022
Water Soluble Boron	µg/g	0.57	0.47	0.40	< 0.50	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	< 0.20	< 0.20	< 0.20	0.10	0.12	0.15
Arsenic	µg/g	3.1	3.9	3.2	4.2	4.0	2.9
Barium	µg/g	82	99	96	95	108	100
Beryllium	µg/g	0.44	0.52	0.45	0.38	0.42	0.38
Boron	µg/g	6.2	6.3	6.5	5.0	5.0	5.0
Cadmium	µg/g	0.19	0.22	0.19	0.19	0.19	0.17
Cobalt	µg/g	5.8	6.9	6.2	6.5	6.4	6.6
Copper	µg/g	13	15	13	15	15	16
Molybdenum	µg/g	< 0.50	0.52	< 0.50	0.40	0.30	0.40
Nickel	µg/g	11	13	12	13	12	12
Lead	µg/g	12	15	13	19	16	15
Selenium	µg/g	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70
Antimony	µg/g	0.21	0.24	0.21	< 0.80	< 0.80	< 0.80
Uranium	µg/g	1.4	2.3	2.0	1.7	2.3	2.3
Vanadium	µg/g	30	34	33	31	30	32
Zinc	µg/g	54	53	49	54	49	54
Lead-210	Bq/g	0.05	0.06	0.07	< 0.20	0.06	0.09
Radium-226	Bq/g	< 0.10	< 0.05	< 0.05	< 0.03	< 0.04	0.20
Thorium-230	Bq/g	< 0.5	< 0.40	< 0.40	0.10	< 0.30	< 0.40
Thorium-232	Bq/g	< 0.30	< 0.04	< 0.30	0.01	0.02	0.02

Table 50: Surface Water Quality – Brand Creek – Downstream of PH LTWMF (BC-D)

		Criteria		BC-D									
				2017	2018	2019	2020	2021	2022				
Parameter	Units	PWQO	CWQG	Average					2022-01-07	2022-05-12	2022-07-14	2022-10-19	Average
Total Suspended Solids	mg/L			13	72	24	21	8	7	25	51	10	23
pH	no unit	6.5-8.5	6.5-9.0	8.18	8.11	8.14	8.07	7.96	8.02	**8.96**	8.01	7.95	8.24
Alkalinity	mg/L as $CaCO_3$			275	285	273	262	282	302	312	257	249	280
Carbonate	mg/L as $CaCO_3$			3.9	3.4	3.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			273	278	265	262	282	302	312	257	249	280
Total Dissolved Solids	mg/L			505	620	609	630	625	563	551	831	854	700
Fluoride	mg/L		**0.12**	0.10	< 0.10	0.10	0.08	0.09	0.06	0.07	0.11	< 0.06	0.08
Total Organic Carbon	mg/L			3	4	3	3	4	2	2	2	3	2
Ammonia+Ammonium (N)	as N mg/L			< 0.05	0.06	0.07	0.06	0.08	0.04	0.06	< 0.04	< 0.04	0.05
Chloride (dissolved)	mg/L		**120**	100	**165**	**159**	**203**	**169**	**120**	**150**	**280**	**300**	**213**
Sulphate (dissolved)	mg/L			21	22	22	25	23	23	22	30	29	26
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	0.02	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	4.19	3.85	3.36	4.08	4.79	6.84	4.95	4.46	3.15	4.85
Nitrate + Nitrite (as N)	as N mg/L			4.20	3.85	3.37	4.08	4.79	6.84	4.95	4.46	3.15	4.85
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			315	340	340	384	388	383	367	398	382	383
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			288	813	480	434	194	499	965	830	319	653
Aluminum (0.2µm)	µg/L	**75**	**100**	< 5	< 5	< 5	26	4	2	4	4	2	3
Arsenic (total)	µg/L	**100**	**5**	1.5	1.7	1.4	1.6	2.0	0.7	1.2	2.5	1.6	1.5
Barium (total)	µg/L			59.3	83.0	78.3	88.8	70.6	71.7	73.7	125.0	125.0	98.9
Beryllium (total)	µg/L	**1100**		< 0.5	< 0.5	< 0.5	0.018	0.010	0.020	0.036	0.019	0.015	0.023
Boron (total)	µg/L	**200**	**1500**	16	10	12	14	22	10	31	14	21	19
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.040	0.011	0.020	< 0.010	< 0.010	< 0.010	0.013
Calcium (total)	µg/L			106750	117500	112500	125000	131500	130000	124000	128000	123000	126250
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	< 0.10	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Cobalt (total)	µg/L	**0.9**		< 0.500	0.630	< 0.500	0.301	0.414	0.522	0.862	0.406	0.252	0.461
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	0.91	0.81	0.96	1.86	1.41	0.72	1.19
Copper (total)	µg/L	**5**		< 1.1	1.7	1.2	1.7	1.0	1.0	1.5	1.2	1.2	1.2
Iron (total)	µg/L	**300**	**300**	**343**	**968**	**565**	**484**	253	**627**	**1020**	**835**	**424**	**727**
Potassium (total)	µg/L			1575	1600	1700	1735	1808	1460	1710	1880	2500	1845
Magnesium (total)	µg/L			11650	15000	14750	17300	14375	14100	14200	18600	18200	16350
Manganese (total)	µg/L			30	79	47	69	97	78.6	83.7	62.1	74.3	75
Molybdenum (total)	µg/L	**40**	**73**	< 0.50	0.51	< 0.50	0.43	0.47	0.25	0.35	0.51	0.77	0.50
Sodium (total)	µg/L			57500	96250	93750	96525	76350	64900	79700	143000	146000	108400
Nickel (total)	µg/L	**25**	**25**	1.1	1.4	1.0	0.7	0.8	0.9	1.2	0.9	0.5	0.9
Phosphorus (total)	µg/L	**10-30**		**35**	**75**	**46**	**36**	**37**	30	**51**	**49**	**32**	**41**
Lead (total)	µg/L	**5**	**7**	< 0.50	0.83	0.56	0.37	0.22	0.47	0.78	0.53	0.25	0.51
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	< 2.0	0.19	0.22	0.22	0.24	0.21	0.12	0.20
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.09	0.09	0.10	0.07	0.07	0.06	0.08
Strontium (total)	µg/L			256	295	285	335	324	324	310	408	391	358
Titanium (total)	µg/L			17.3	45.7	29.5	21.4	10.5	26.5	47.7	38.30	17.50	32.5
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.05	< 0.05	< 0.05	0.008	0.006	0.008	0.012	0.015	0.006	0.010
Uranium (total)	µg/L	**5**	**15**	2.25	2.03	1.60	2.02	2.24	1.88	1.84	1.39	1.24	1.59
Vanadium (total)	µg/L	**6**		1.28	2.11	1.63	1.51	1.09	1.47	2.51	2.43	1.03	1.86
Zinc (total)	µg/L	**30**	**30**	< 5	6	5	5	3	6	7	4	3	5
Lead-210	Bq/L			0.03	< 0.10	< 0.10	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.03	< 0.04	< 0.04	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.06	< 0.07	< 0.07	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			[2]	[2]	[2]	[2]	[2]	[1]	129.1	101	81.9	--
ORP	mV			[2]	[2]	[2]	[2]	[2]	[1]	175.8	132.9	149.5	--
SPC	µs/cm			[2]	[2]	[2]	[2]	[2]	[1]	1010	1400	1351	--
Temperature	°C			[2]	[2]	[2]	[2]	[2]	[1]	17.677	24.071	8.071	--
Turbidity	FNU			[2]	[2]	[2]	[2]	[2]	[1]	12.18	34.29	12.78	--
pH	Units			[2]	[2]	[2]	[2]	[2]	[1]	8.18	7.98	7.69	--
Staff Gauge	cm			[2]	[2]	[2]	[2]	[2]	[1]	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] No field parameters - Water quality units out for repair.

[2] Field parameters included for current sampling year only.

-- - No data.

Table 51: Surface Water Quality – Brand Creek – Upstream of PH LTWMF (BC-U)

		Criteria		BC-U										
				2017	2018	2019	2020	2021	2022					
Parameter	Units	PWQO	CWQG	Average					2022-01-07	2022-05-12	2022-07-14	2022-10-19	Average
Total Suspended Solids	mg/L			9	34	165	16	3	8	8	No Sample[2]	30	15
pH	no unit	6.5-8.5	6.5-9.0	8.11	8.06	8.06	8.03	8.05	7.94	8.17		8.02	8.04
Alkalinity	mg/L as $CaCO_3$			275	255	250	245	279	292	281		122	232
Carbonate	mg/L as $CaCO_3$			3.3	3.1	3.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			268	250	248	245	279	292	281		122	232
Total Dissolved Solids	mg/L			438	554	469	418	465	443	457		506	469
Fluoride	mg/L		0.12	0.11	0.11	< 0.10	0.10	0.09	0.08	0.07		**0.12**	0.09
Total Organic Carbon	mg/L			3	4	9	6	2	2	3		6	4
Ammonia+Ammonium (N)	as N mg/L			0.05	0.08	0.27	0.11	0.06	< 0.04	0.08		0.04	0.05
Chloride (dissolved)	mg/L		120	59	**138**	103	75	60	57	77		**220**	118
Sulphate (dissolved)	mg/L			20	21	13	11	20	20	19		14.0	18
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.01	< 0.01	0.02	< 0.03	< 0.03	< 0.03	< 0.03		< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	4.37	3.27	2.72	3.74	7.14	7.96	5.71		0.35	4.67
Nitrate + Nitrite (as N)	as N mg/L			4.37	3.27	2.74	3.74	7.14	7.96	5.71		0.35	4.67
Mercury (dissolved)	µg/L	0.2	0.026	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			305	300	305	301	372	381	364		157	301
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	0.11	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05
Total Aluminium (Al)	µg/L			182	685	6200	423	65	189	230		244	221
Aluminium (0.2µm)	µg/L	75	100	5	54	< 5	16	4	3	3		7	4
Arsenic (total)	µg/L	100	5	< 1.0	1.1	1.7	2.0	< 0.2	< 0.2	0.3		0.2	0.2
Barium (total)	µg/L			48.9	58.5	113.5	46.9	49.9	52.3	51.3		44.0	49.4
Beryllium (total)	µg/L	1100		< 0.5	< 0.5	0.6	0.918	< 0.007	0.008	0.007		0.013	0.009
Boron (total)	µg/L	200	1500	16	12	17	16	24	10	25		24	21
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.017	0.508	< 0.010	< 0.010		0.010	0.010
Calcium (total)	µg/L			108250	103000	112250	100467	128000	131000	125000		98500	104167
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.22	0.02	0.01	0.009	0.018		0.014	0.01
Cobalt (total)	µg/L	0.9		< 0.500	0.808	**3.625**	0.444	0.074	0.131	0.163		0.161	0.152
Chromium (total)	µg/L			< 5.0	< 5.0	12.3	0.89	0.48	0.74	0.51		1.16	0.80
Copper (total)	µg/L	5		1.7	1.9	**7.5**	1.9	0.6	0.7	0.8		5.9	1.8
Iron (total)	µg/L	300	300	220	853	**7478**	569	66	230	226		**318**	268
Potassium (total)	µg/L			1700	1775	3085	1827	1590	1510	1730		1460	1587
Magnesium (total)	µg/L			11500	11500	12500	11933	12800	12900	12600		3840	9786
Manganese (total)	µg/L			29	96	776	603	16	46.1	66.2		11.0	42
Molybdenum (total)	µg/L	40	73	< 0.50	2.03	0.63	0.43	0.21	0.19	0.27		2.36	0.84
Sodium (total)	µg/L			34250	79500	57500	40467	29767	28300	38300		119000	61867
Nickel (total)	µg/L	25	25	1.2	1.4	6.8	1.0	0.3	0.3	0.4		0.8	0.5
Phosphorus (total)	µg/L	10-30		35	**71**	**604**	**74**	18	15	22		**53**	28
Lead (total)	µg/L	5	7	< 0.50	0.63	**5.13**	0.43	0.08	0.22	0.27		0.29	0.26
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9		1.1	1.0
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	< 2.0	0.28	0.29	0.23	0.18		0.12	0.18
Tin (total)	µg/L			< 1.0	< 1.0	1.1	0.08	0.10	0.17	< 0.06		0.11	0.11
Strontium (total)	µg/L			248	263	250	245	278	309	275		274	286
Titanium (total)	µg/L			12.98	37.75	287	18.75	3.59	9.81	11.90		12.30	11.34
Thallium (total)	µg/L	0.3	0.8	< 0.05	< 0.05	0.10	0.007	< 0.005	< 0.005	0.005		0.005	0.005
Uranium (total)	µg/L	5	15	1.103	0.528	0.673	0.467	0.743	0.590	0.653		0.170	0.471
Vanadium (total)	µg/L	6		1.08	2.02	**13.06**	1.68	0.67	0.84	1.15		1.00	1.00
Zinc (total)	µg/L	30	30	< 5	6	36	5	2	4	< 2		7	4
Lead-210	Bq/L			< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Radium-226	Bq/L	1		< 0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01
Thorium-230	Bq/L			< 0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	130.9	--	84.7	--
ORP	mV			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	172.2	--	141.7	--
SPC	µs/cm			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	789	--	867	--
Temperature	°C			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	18.332	--	8.006	--
Turbidity	FNU			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	4.91	--	4.65	--
pH	Units			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	8.17	--	7.92	--
Staff Gauge	cm			-[3]	-[3]	-[3]	-[3]	-[3]	-[3]	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] No field parameters - Water quality units out for repair.

[2] Field parameters included for current sampling year only.

[3] Insufficient surface water at this location for sample collection.

-- - No data.

Table 52: Surface Water Quality – Brand Creek – Marsh Road (BC-M)

		Criteria		BC-M									
				2017	2018	2019	2020	2021	2022				
Parameter	Units	PWQO	CWQG	Average					2022-01-07	2022-05-12	2022-07-14	2022-10-19	Average
Total Suspended Solids	mg/L			20	26	32	45	9	25	7	36	15	21
pH	no unit	6.5-8.5	6.5-9.0	8.18	8.14	8.19	8.13	8.06	7.99	8.19	8.24	7.98	8.10
Alkalinity	mg/L as $CaCO_3$			275	280	268	254	273	288	267	244	245	261
Carbonate	mg/L as $CaCO_3$			3.9	3.6	3.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			270	280	265	254	273	288	267	244	245	261
Total Dissolved Solids	mg/L			482	575	574	545	554	534	506	731	754	631
Fluoride	mg/L		0.12	< 0.10	< 0.10	< 0.10	0.08	0.08	0.06	0.07	0.09	< 0.06	0.07
Total Organic Carbon	mg/L			3	3	3	3	3	3	2	2	3	3
Ammonia+Ammonium (N)	as N mg/L			< 0.05	0.06	0.08	0.06	0.08	0.04	< 0.04	0.04	< 0.04	< 0.04
Chloride (dissolved)	mg/L		120	84	**129**	**135**	**161**	**141**	**120**	**130**	**230**	**240**	**180**
Sulphate (dissolved)	mg/L			21	22	22	23	23	24	22	29	28	26
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.01	0.01	0.01	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	4.14	3.81	3.80	4.00	4.67	6.31	4.65	4.56	3.22	4.69
Nitrate + Nitrite (as N)	as N mg/L			4.15	3.82	3.80	4.01	4.67	6.31	4.65	4.56	3.22	4.69
Mercury (dissolved)	µg/L	0.2	0.025	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			310	335	360	374	385	393	353	361	388	374
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.10	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			538	473	635	580	199	648	95	486	2380	897
Aluminum (0.2 µm)	µg/L	75	100	8	< 5	< 5	44	9	3	8	3	8	5
Arsenic (total)	µg/L	100	5	1.3	1.3	1.4	1.5	1.3	0.9	1.0	2.0	3.1	1.8
Barium (total)	µg/L			58.5	68.3	74.8	78.2	64.6	70.8	60	93.2	131	88.8
Beryllium (total)	µg/L	1100		< 0.5	< 0.5	< 0.5	0.028	0.012	0.024	< 0.007	0.011	0.128	0.043
Boron (total)	µg/L	200	1500	15	< 10	13	14	30	10	46	13	20	22
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.032	0.014	0.020	< 0.010	0.010	0.030	0.018
Calcium (total)	µg/L			108500	119000	115000	122500	130250	134000	119000	115000	125000	122250
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	< 0.10	0.03	0.02	0.020	< 0.003	0.010	0.104	0.03
Cobalt (total)	µg/L	0.9		0.553	< 0.500	0.533	0.435	0.353	0.643	0.262	0.250	**1.670**	0.706
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	1.24	0.75	1.06	0.40	0.97	3.42	1.47
Copper (total)	µg/L	5		2.2	1.2	1.3	1.9	0.9	1.1	0.7	1.6	3.7	1.6
Iron (total)	µg/L	300	300	653	575	780	673	247	763	121	477	2840	1050
Potassium (total)	µg/L			1625	1550	1875	2048	1860	1460	1450	1580	3010	1875
Magnesium (total)	µg/L			12150	14250	14250	16375	14500	14300	13500	18000	18300	16025
Manganese (total)	µg/L			48	50	59	72	41	55	51	32	254	105
Molybdenum (total)	µg/L	40	73	< 0.50	0.54	< 0.50	0.40	0.36	0.27	0.35	0.53	0.52	0.42
Sodium (total)	µg/L			48250	75750	76000	68750	61950	62400	65000	109000	114000	87600
Nickel (total)	µg/L	25	25	1.1	1.1	1.1	0.8	0.8	1.1	0.5	0.6	2.4	1.2
Phosphorus (total)	µg/L	10-30		**48**	**46**	**59**	**52**	**34**	**35**	10	**36**	**220**	**75**
Lead (total)	µg/L	5	7	0.62	0.54	0.57	0.56	0.22	0.53	0.18	0.32	2.59	0.91
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	< 2.0	0.17	0.22	0.18	0.17	0.15	0.17	0.17
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.11	0.11	0.13	0.06	< 0.06	< 0.06	0.08
Strontium (total)	µg/L			253	280	280	318	315	332	299	369	377	344
Titanium (total)	µg/L			32.4	27.9	37.0	28.9	10.5	34.1	8.2	23.0	111.0	43.6
Thallium (total)	µg/L	0.3	0.8	0.05	< 0.05	< 0.05	0.016	0.006	0.010	< 0.005	0.013	0.025	0.013
Uranium (total)	µg/L	5	15	2.70	2.38	1.98	2.22	3.22	2.78	2.37	1.28	1.25	1.92
Vanadium (total)	µg/L	6		1.90	1.62	2.10	2.00	1.13	1.75	0.97	2.04	5.70	2.62
Zinc (total)	µg/L	30	30	7	< 5	6	6	3	4	< 2	2	15	6
Lead-210	Bq/L			0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		0.03	< 0.04	< 0.04	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.05	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	149.6	110.6	73.8	--
ORP	mV			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	200.4	171	145.5	--
SPC	µs/cm			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	940	1200	1235	--
Temperature	°C			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	17.308	20.6	8.23	--
Turbidity	FNU			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	3.17	168.93	34.37	--
pH	Units			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	8.23	8.09	7.92	--
Staff Gauge	cm			-[3]	-[3]	-[3]	-[3]	-[3]	-[1]	27	--[3]	--[3]	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] No field parameters - Water quality units out for repair.

[2] Field parameters included for current sampling year only.

[3] Water level too low for staff gauge reading.

-- - No data.

Table 53: Surface Water Quality – Brand Creek – Tributary of Brand Creek (BC-T)

		Criteria		BC-T									
				2017	2018	2019	2020	2021	2022				
Parameter	Units	PWQO	CWQG	Average					2022-01-07	2022-05-12	2022-07-14	2022-10-19	Average
Total Suspended Solids	mg/L			9	20	27	31	23	78	16	49	33	44
pH	no unit	6.5-8.5	6.5-9.0	8.22	8.13	8.23	8.21	8.18	8.08	8.21	8.23	8.17	8.17
Alkalinity	mg/L as $CaCO_3$			285	285	270	249	272	304	275	256	249	271
Carbonate	mg/L as $CaCO_3$			4.3	3.8	4.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			280	283	265	249	272	304	275	256	249	271
Total Dissolved Solids	mg/L			803	958	874	817	940	980	871	877	957	921
Fluoride	mg/L		0.12	0.11	< 0.10	< 0.10	0.10	0.09	0.06	0.10	0.10	0.06	0.08
Total Organic Carbon	mg/L			5	4	3	3	4	4	3	2	4	3
Ammonia+Ammonium (N)	as N mg/L			< 0.05	0.06	0.12	0.05	0.04	0.04	0.06	< 0.04	< 0.04	0.05
Chloride (dissolved)	mg/L		120	**280**	**368**	**323**	**345**	**365**	**400**	**390**	**350**	**390**	**383**
Sulphate (dissolved)	mg/L			27	29	29	30	40	39	31	32.0	30.0	33
Bromide (dissolved)	mg/L			2.3	< 1.0	< 5.0	0.3	0.4	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	1.48	1.43	1.37	2.20	1.79	2.49	1.85	2.78	1.50	2.16
Nitrate + Nitrite (as N)	as N mg/L			1.48	1.43	1.37	2.20	1.79	2.49	1.85	2.78	1.50	2.16
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$			330	358	368	401	425	412	362	383	389	392
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.10	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			183	714	284	830	401	209	351	654	157	343
Aluminum (0.2µm)	µg/L	75	100	< 5	< 5	< 5	53	11	5	6	4	2	4
Arsenic (total)	µg/L	100	5	5.3	4.2	3.3	3.5	3.1	1.9	3.0	4.1	2.0	2.8
Barium (total)	µg/L			87.5	115.3	100.5	112.3	109.6	109	103	124	131	116.8
Beryllium (total)	µg/L	1100		< 0.5	< 0.5	< 0.5	0.027	0.019	0.008	0.010	0.016	0.012	0.012
Boron (total)	µg/L	200	1500	15	12	14	14	22	11	38	15	18	21
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.031	0.019	0.020	< 0.010	< 0.010	< 0.010	0.013
Calcium (total)	µg/L			120000	132500	122500	131750	141750	137000	127000	123000	125000	128000
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	< 0.10	0.02	0.03	0.024	0.022	0.012	0.012	0.02
Cobalt (total)	µg/L	0.9		< 0.500	0.750	< 0.500	0.557	**1.393**	**1.390**	**0.902**	0.307	0.144	0.686
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	1.61	1.23	0.54	0.85	1.22	0.47	0.77
Copper (total)	µg/L	5		1.4	2.1	1.8	2.4	1.7	1.1	1.3	1.2	1.2	1.2
Iron (total)	µg/L	300	300	288	**945**	**378**	**961**	**521**	283	**351**	**652**	210	**374**
Potassium (total)	µg/L			1348	1700	1675	1840	1600	1330	1800	1800	2810	1885
Magnesium (total)	µg/L			15600	16500	16500	17750	17400	16800	15800	16600	16960	17450
Manganese (total)	µg/L			39	73	34	63	43	39	33	29	15	29
Molybdenum (total)	µg/L	40	73	0.64	0.61	0.57	0.60	0.54	0.43	0.68	0.74	0.74	0.64
Sodium (total)	µg/L			170000	232500	192500	161000	173250	201000	197000	182000	189000	192250
Nickel (total)	µg/L	25	25	< 1.0	1.5	< 1.0	1.2	2.2	2.1	1.5	0.8	0.4	1.2
Phosphorus (total)	µg/L	10-30		26	24	**73**	**51**	**38**	< 3	22	**43**	20	22
Lead (total)	µg/L	5	7	< 0.50	0.90	< 0.50	0.68	0.48	0.26	0.32	0.41	0.17	0.29
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	< 2.0	0.13	0.13	0.13	0.11	0.13	0.08	0.11
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.10	0.11	0.09	0.09	0.06	< 0.06	0.08
Strontium (total)	µg/L			340	393	385	397	414	420	423	433	414	423
Titanium (total)	µg/L			12	40	18	40.62	22.91	11.00	19.30	32.00	9.09	17.85
Thallium (total)	µg/L	0.3	0.8	< 0.05	< 0.05	< 0.05	0.022	0.009	< 0.005	0.008	0.010	< 0.005	0.007
Uranium (total)	µg/L	5	15	9	7	6	5	10	8.43	5.55	1.76	1.50	4.30
Vanadium (total)	µg/L	6		0.97	1.91	1.12	2.26	1.33	0.69	1.33	1.93	0.63	1.15
Zinc (total)	µg/L	30	30	< 5	8	5	9	5	4	6	4	3	4
Lead-210	Bq/L			< 0.03	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		< 0.03	< 0.04	< 0.04	0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			[2]	[2]	[2]	[2]	[2]	[1]	111	99.4	85.6	--
ORP	mV			[2]	[2]	[2]	[2]	[2]	[1]	191.9	117.6	149.6	--
SPC	µs/cm			[2]	[2]	[2]	[2]	[2]	[1]	1609	1568	1566	--
Temperature	°C			[2]	[2]	[2]	[2]	[2]	[1]	16.093	19.576	7.438	--
Turbidity	FNU			[2]	[2]	[2]	[2]	[2]	[1]	15.88	23.19	5.15	--
pH	Units			[2]	[2]	[2]	[2]	[2]	[1]	8.26	8.33	8.02	--
Staff Gauge	cm			[2]	[2]	[2]	[2]	[2]	[1]	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] No field parameters - Water quality units out for repair.

[2] Field parameters included for current sampling year only.

-- - No data.

Table 54: Storm Event Sampling – Brand Creek Watershed (BC-M)

Analysis	Units	Criteria		BC-M					
		PWQO	CWQG	2022/04/21 8:40AM	2022/04/21 9:45AM	2022/04/21 10:50AM	2022/04/21 11:50AM	2022/04/21 12:50PM	2022/04/21 1:45PM
Total Suspended Solids	mg/L			5	2	4	11	15	21
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.16	8.16	8.14	8.16	8.08	8.03
Alkalinity	mg/L as $CaCO_3$			265	276	267	255	248	209
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			265	276	267	255	248	209
Total Dissolved Solids	mg/L			523	549	520	503	814	360
Fluoride	mg/L		**0.12**	0.07	0.05	0.07	0.11	< 0.05	< 0.05
Total Organic Carbon	mg/L			3	3	3	3	5	5
Ammonia+Ammonium (N)	as N mg/L			< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04
Chloride (Dissolved)	mg/L		**120**	100	100	99	96	**300**	**230**
Sulphate (dissolved)	mg/L			21	21	21	20	25	20
Bromide (dissolved)	mg/L			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	5.04	4.97	4.83	4.74	3.60	3.34
Nitrate + Nitrite (as N)	as N mg/L			5.04	4.97	4.83	4.74	3.60	3.34
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			326	332	324	329	335	288
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			68	73	139	232	250	413
Aluminum (0.2µm)	µg/L	**75**	**100**	1	2	2	26	4	4
Arsenic (total)	µg/L	**100**	**5**	0.6	0.6	0.7	0.7	0.9	0.8
Barium (total)	µg/L			50.9	52.5	50.8	51.2	68.0	61.7
Beryllium (total)	µg/L	**1100**		< 0.007	< 0.007	< 0.007	0.013	0.009	0.017
Boron (total)	µg/L	**200**	**1500**	10	10	10	10	11	12
Bismuth (total)	µg/L			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.020
Calcium (total)	µg/L			108000	110000	108000	110000	113000	96900
Cadmium (total)	µg/L	**0.20**	**0.09**	0.009	0.017	0.012	0.013	0.019	0.019
Cobalt (total)	µg/L	**0.9**		0.345	0.340	0.349	0.405	0.451	0.53
Chromium (total)	µg/L			0.40	0.47	0.39	0.59	0.85	1.60
Copper (total)	µg/L	**5**		0.8	0.9	1.1	0.9	2.1	2.9
Iron (total)	µg/L	**300**	**300**	110	117	199	281	**323**	**568**
Potassium (total)	µg/L			1340	1380	1370	1440	1590	1610
Magnesium (total)	µg/L			13400	13800	13300	13300	13000	11300
Manganese (total)	µg/L			41	46	54	55	63	58
Molybdenum (total)	µg/L	**40**	**73**	0.28	0.26	0.23	0.24	0.43	0.56
Sodium (total)	µg/L			55800	57000	54500	56400	177000	147000
Nickel (total)	µg/L	**25**	**25**	0.7	0.6	0.7	0.9	1.0	1.3
Phosphorus (total)	µg/L	**10-30**		7	11	16	24	27	**35**
Lead (total)	µg/L	**5**	**7**	< 0.09	0.15	0.15	0.21	0.35	0.48
Antimony (total)	µg/L	**20**		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.14	0.19	0.14	0.14	0.14	0.13
Tin (total)	µg/L			0.27	0.06	< 0.06	< 0.06	0.09	0.15
Strontium (total)	µg/L			280	283	274	277	331	285
Titanium (total)	µg/L			3.7	3.8	6.9	11.9	13.6	22.7
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007
Uranium (total)	µg/L	**5**	**15**	2.81	2.85	2.84	2.80	2.70	2.41
Vanadium (total)	µg/L	**6**		0.66	0.63	0.82	0.96	1.11	1.62
Zinc (total)	µg/L	**30**	**30**	< 2	< 2	< 2	3	6	10
Lead-210	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1.0**		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			110.7	111.4	110.4	111.5	107.0	106.4
ORP	mV			221.4	213.8	211.1	218	226.7	217
SPC	us/cm			873	864	849	848	1368	1147
Temperature	°C			5.078	5.22	5.417	5.567	5.853	6.122
Turbidity	FNU			2.88	76.56	313.87	124.92	68.96	18.29
pH	Units			8.18	8.15	8.12	8.12	8.02	8.02
Staff Gauge	cm			30	30	30	31	32	34

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value

Table 55: Surface Water – Lake Ontario Diffuser (BC-LO-D)

		Criteria		BC-LO-D								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-06-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			3.0	< 1.0	2.0	3.0	8.0	4.0	< 2.0	< 2.0	2.7
pH	no unit	6.5-8.5	6.5-9.0	8.14	8.15	8.21	8.02	8.03	8.18	7.95	8.11	8.08
Alkalinity	mg/L as $CaCO_3$			97	99	95	92	94	96	94	95	95
Carbonate	mg/L as $CaCO_3$			1.3	1.3	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			95	98	93	92	94	96	94	95	95
Total Dissolved Solids	mg/L			185	135	177	185	174	163	129	229	174
Fluoride	mg/L		**0.12**	**0.12**	**0.12**	0.10	**0.12**	**0.12**	0.11	0.11	0.10	0.11
Total Organic Carbon	mg/L			2.4	2.3	2.1	1.5	2.0	2.0	2.0	3.0	2.3
Ammonia+Ammonium (N)	as N mg/L			< 0.05	< 0.05	< 0.05	0.06	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	22	26	23	24	25	29	23	25	26
Sulphate (dissolved)	mg/L			23	31	23	22	23	25	20.0	21.0	22
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.24	0.29	0.26	0.31	0.36	0.39	0.38	0.21	0.33
Nitrate + Nitrite (as N)	as N mg/L			0.24	0.29	0.26	0.31	0.36	0.39	0.38	0.21	0.33
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			125	130	130	119	125	119	118	119	118
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			48	18	43	32	52	10	11	2	8
Aluminum (0.2µm)	µg/L	**75**	**100**	< 5.0	< 5.0	< 5.0	4.0	1.0	3.0	2.0	4.0	3.0
Arsenic (total)	µg/L	**100**	**5**	< 1.0	2.4	< 1.0	0.8	1.0	1.2	0.8	0.8	0.9
Barium (total)	µg/L			23.0	22.0	21.0	23.2	22.1	22.9	20.5	22.9	22.1
Beryllium (total)	µg/L	**1100**		< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	0.014	0.009
Boron (total)	µg/L	**200**	**1500**	23	22	23	20	38	26	23	22	24
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.011	0.029	< 0.010	0.010	< 0.010	< 0.010
Calcium (total)	µg/L			33500	34500	36333	34150	35935	33800	32800	34100	33567
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.100	< 0.100	< 0.100	0.006	0.006	0.012	0.007	0.015	0.011
Cobalt (total)	µg/L	**0.9**		< 0.500	< 0.500	< 0.500	0.062	0.079	0.045	0.016	0.012	0.024
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	0.21	0.29	0.17	0.26	0.11	0.18
Copper (total)	µg/L	**5**		1.7	1.5	< 1.0	0.9	0.8	1.0	1.5	1.1	1.2
Iron (total)	µg/L	**300**	**300**	< 100	< 100	< 100	43	66	11	74	< 7	31
Potassium (total)	µg/L			1700	1550	1533	1580	1613	1640	1470	1660	1590
Magnesium (total)	µg/L			8700	8800	8733	8205	8507	8220	8330	8190	8247
Manganese (total)	µg/L			3.9	3.2	3.4	3.11	4.04	1.06	1.88	1.38	1.44
Molybdenum (total)	µg/L	**40**	**73**	1.2	1.2	1.1	1.18	1.18	1.17	1.10	1.16	1.14
Sodium (total)	µg/L			13500	17500	14667	12550	14167	14700	12800	12300	13267
Nickel (total)	µg/L	**25**	**25**	< 1.0	1.2	< 1.0	0.8	0.6	0.6	0.6	0.4	0.5
Phosphorus (total)	µg/L	**10-30**		8	6	10	10	12	8	3	5	5
Lead (total)	µg/L	**5**	**7**	< 0.50	< 0.50	< 0.50	0.09	0.11	< 0.09	0.10	< 0.09	< 0.09
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	< 2.0	0.11	0.15	0.17	0.14	0.18	0.16
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.09	0.08	0.06	< 0.06	0.32	0.15
Strontium (total)	µg/L			165	170	163	184	175	169	173	176	173
Titanium (total)	µg/L			5.10	< 5.00	5.70	1.45	2.57	0.46	0.56	0.22	0.42
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	< 0.050	0.008	0.005	0.005	0.006	0.007	0.006
Uranium (total)	µg/L	**5**	**15**	0.360	**9.690**	0.377	0.351	0.451	0.495	0.373	0.368	0.412
Vanadium (total)	µg/L	**6**		0.51	< 0.50	0.59	0.25	0.32	0.20	0.20	0.19	0.20
Zinc (total)	µg/L	**30**	**30**	< 5.0	< 5.0	< 5.0	3.0	< 2.0	4.0	< 2.0	< 2.0	2.7
Lead-210	Bq/L			< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	< 0.04	0.01	0.01	0.02	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	106.4	84.7	111.6	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	187.8	79.8	152.9	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	313.6	308.8	298.5	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.402	9.608	12.121	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	4.76	0.28	0.82	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.34	7.86	8.36	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
--- No data.

Table 56: Surface Water – Lake Ontario Diffuser – Outside Eastern Edge of Mixing Zone (BC-LO-E)

		Criteria		BC-LO-E								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-06-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			3.0	< 1.0	1.7	3.5	18.3	3.0	2.0	3.0	2.7
pH	no unit	6.5-8.5	6.5-9.0	8.20	8.18	8.21	8.06	8.03	8.29	8.07	8.11	8.16
Alkalinity	mg/L as $CaCO_3$			97	98	98	89	100	92	97	101	97
Carbonate	mg/L as $CaCO_3$			1.4	1.4	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			95	96	94	89	100	92	97	101	97
Total Dissolved Solids	mg/L			157	113	235	182	165	151	154	163	156
Fluoride	mg/L		0.12	0.11	**0.12**	0.11	**0.13**	**0.12**	0.11	0.11	0.11	0.11
Total Organic Carbon	mg/L			2.4	2.0	2.1	1.5	2.0	2.0	2.0	3.0	2.3
Ammonia+Ammonium (N)	as N mg/L			< 0.05	< 0.05	< 0.05	0.05	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		120	22	22	23	25	25	36	22	24	27
Sulphate (dissolved)	mg/L			23	23	23	22	23	24	20.0	21.0	22
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	0.24	0.28	0.27	0.30	0.38	0.34	0.38	0.22	0.31
Nitrate + Nitrite (as N)	as N mg/L			0.24	0.28	0.27	0.30	0.38	0.34	0.38	0.22	0.31
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$			125	120	130	125	128	123	119	116	119
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			65	12	35	40	32	11	14	1	9
Aluminum (0.2µm)	µg/L	75	100	< 5.0	< 5.0	< 5.0	11.0	1.3	2.0	2.0	< 1.0	1.7
Arsenic (total)	µg/L	100	5	< 1.0	< 1.0	< 1.0	0.9	0.9	1.0	0.7	0.8	0.8
Barium (total)	µg/L			23.0	22.0	22.7	24.6	23.0	23.7	22.2	21.5	22.5
Beryllium (total)	µg/L	1100		< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	0.012	0.009
Boron (total)	µg/L	200	1500	23	22	22	22	33	26	23	21	23
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			34500	32500	36667	35150	36833	35200	33600	33400	34067
Cadmium (total)	µg/L	0.2	0.09	< 0.100	< 0.100	< 0.100	0.004	0.005	0.009	0.005	0.008	0.007
Cobalt (total)	µg/L	0.9		< 0.500	< 0.500	< 0.500	0.059	0.040	0.005	0.016	0.011	0.011
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	0.74	0.26	0.18	0.31	0.12	0.20
Copper (total)	µg/L	5		2.0	1.4	1.0	1.0	0.6	0.8	1.2	0.8	0.9
Iron (total)	µg/L	300	300	120	< 100	< 100	43	38	10	17	< 7	11
Potassium (total)	µg/L			1650	1500	1533	1655	1637	1560	1530	1600	1563
Magnesium (total)	µg/L			8800	8550	8933	8250	8853	8430	8460	7890	8260
Manganese (total)	µg/L			5.6	< 2.0	3.0	2.61	2.71	0.79	1.74	0.45	0.99
Molybdenum (total)	µg/L	40	73	1.2	1.2	1.2	1.96	1.22	1.16	1.18	1.16	1.17
Sodium (total)	µg/L			13500	13500	14000	12800	14333	14000	13100	11700	12933
Nickel (total)	µg/L	25	25	< 1.0	< 1.0	< 1.0	0.8	0.6	0.8	0.5	0.4	0.5
Phosphorus (total)	µg/L	10-30		11	5	8	8	9	5	4	6	5
Lead (total)	µg/L	5	7	< 0.50	< 0.50	< 0.50	0.02	0.10	0.10	0.10	< 0.09	0.10
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	< 2.0	0.14	0.18	0.20	0.15	0.24	0.20
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.09	0.08	0.09	< 0.06	< 0.06	0.07
Strontium (total)	µg/L			165	165	163	205	184	177	178	166	174
Titanium (total)	µg/L			5.55	< 5.00	5.25	1.78	1.51	0.5	0.70	0.13	0.45
Thallium (total)	µg/L	0.3	0.8	< 0.050	< 0.050	< 0.050	0.007	0.006	0.005	0.005	0.007	0.006
Uranium (total)	µg/L	5	15	0.355	0.540	0.380	0.381	0.374	0.503	0.378	0.340	0.407
Vanadium (total)	µg/L	6		0.58	< 0.50	0.62	0.45	0.26	0.16	0.21	0.18	0.18
Zinc (total)	µg/L	30	30	< 5.0	< 5.0	< 5.0	< 2.0	2.3	2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L			< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	< 0.04	< 0.01	0.01	0.02	< 0.01	< 0.01	0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	0.03	0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	106.6	83.9	112.3	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	192.8	75.6	156.8	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	277.6	309	298.6	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.25	9.51	12.123	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-1.24	-0.13	0.2	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.23	7.82	8.39	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
--- No data.

Table 57: Surface Water – Lake Ontario Diffuser – Outside Western Edge of Mixing Zone (BC-LO-W)

		Criteria		BC-LO-W								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-06-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			3.5	1.0	1.7	3.0	6.3	2.0	2.0	< 2.0	2.0
pH	no unit	6.5-8.5	6.5-9.0	8.18	8.16	8.26	8.09	8.06	8.22	7.98	8.07	8.09
Alkalinity	mg/L as $CaCO_3$			97	98	99	95	95	96	95	97	96
Carbonate	mg/L as $CaCO_3$			1.4	1.3	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			95	96	94	95	95	96	95	97	96
Total Dissolved Solids	mg/L			199	143	162	214	162	149	154	163	155
Fluoride	mg/L		0.12	0.11	**0.13**	0.10	0.11	0.11	**0.12**	0.11	0.10	0.11
Total Organic Carbon	mg/L			2.3	2.1	2.3	1.5	2.0	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.05	< 0.05	0.05	0.05	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		120	22	22	22	24	24	29	22	24	25
Sulphate (dissolved)	mg/L			23	24	23	22	22	24	19.0	21.0	21
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	0.23	0.30	0.28	0.30	0.33	0.35	0.38	0.22	0.32
Nitrate + Nitrite (as N)	as N mg/L			0.23	0.30	0.28	0.30	0.33	0.35	0.38	0.22	0.32
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			125	120	137	125	130	222	115	123	153
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			45	12	43	50	92	133	17	2	51
Aluminum (0.2µm)	µg/L	75	100	< 5.0	< 5.0	< 5.0	4.5	1.3	2.0	2.0	< 1.0	1.7
Arsenic (total)	µg/L	100	5	< 1.0	< 1.0	< 1.0	0.9	0.8	0.6	0.8	0.9	0.7
Barium (total)	µg/L			22.0	22.5	22.3	23.3	23.6	61.4	21.6	21.9	35.0
Beryllium (total)	µg/L	1100		< 0.5	< 0.5	< 0.5	< 0.007	0.007	< 0.007	< 0.007	0.008	0.007
Boron (total)	µg/L	200	1500	24	22	23	20	35	22	39	21	27
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	0.010	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			33500	32000	38667	38050	37500	34000	32600	35100	33900
Cadmium (total)	µg/L	0.2	0.09	< 0.100	< 0.100	< 0.100	0.007	0.008	0.014	0.005	0.007	0.009
Cobalt (total)	µg/L	0.9		< 0.500	< 0.500	< 0.500	0.047	0.059	0.091	0.021	0.020	0.044
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	0.25	0.40	0.42	0.29	0.19	0.30
Copper (total)	µg/L	5		1.7	2.0	< 1.0	1.1	0.9	0.5	0.8	0.9	0.7
Iron (total)	µg/L	300	300	< 100	< 100	< 100	63	112	203	20	< 7	77
Potassium (total)	µg/L			1600	1500	1533	1640	1693	1570	1500	1700	1590
Magnesium (total)	µg/L			3750	8350	9000	8385	8820	8950	8230	8560	8580
Manganese (total)	µg/L			3.8	< 2.0	3.0	4.54	6.28	22.60	1.89	0.45	11.65
Molybdenum (total)	µg/L	40	73	1.2	1.2	1.1	1.24	1.39	0.41	1.15	1.32	0.96
Sodium (total)	µg/L			14000	13500	13667	12599	14133	14300	13000	12800	13300
Nickel (total)	µg/L	25	25	< 1.0	< 1.0	< 1.0	0.8	0.7	0.3	0.6	0.5	0.5
Phosphorus (total)	µg/L	10-30		9	5	9	9	14	29	6	6	12
Lead (total)	µg/L	5	7	< 0.50	< 0.50	< 0.50	0.09	0.15	0.52	< 0.09	< 0.09	0.23
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	< 2.0	0.13	0.16	0.10	0.16	0.11	0.12
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.09	0.08	0.10	< 0.06	< 0.06	0.07
Strontium (total)	µg/L			165	160	167	191	197	183	176	179	179
Titanium (total)	µg/L			< 5.00	< 5.00	< 5.40	2.34	4.51	6.5	0.82	0.07	2.45
Thallium (total)	µg/L	0.3	0.8	< 0.050	< 0.050	< 0.050	0.007	0.006	< 0.005	0.006	0.008	0.006
Uranium (total)	µg/L	5	15	0.355	0.325	0.380	0.353	0.359	0.650	0.355	0.347	0.517
Vanadium (total)	µg/L	6		0.56	< 0.50	< 0.59	0.21	0.39	0.90	0.21	0.20	0.44
Zinc (total)	µg/L	30	30	< 5.0	< 5.0	< 5.0	2.5	2.3	2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L			< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	0.03	< 0.02	< 0.02	0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	108.6	87.1	112.4	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	185.2	68.5	155.2	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	811.4	309.1	296.3	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.365	9.656	12.229	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	4.66	0.42	1.75	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.36	7.91	8.38	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
--- No data.

Table 58: Drainage Water Quality – PH LTWMF – Location 1 (WC-SW3-02)

		WC-SW3-02							
		2017	2018	2019	2020	2021	2022		
Parameter	**Units**	**Average**					2022-06-13	2022-11-03	**Average**
Total Suspended Solids	mg/L	5	190	11	38	82	202	134	168
pH	no unit	8.17	8.16	8.07	8.10	7.95	7.78	7.84	7.81
Alkalinity	mg/L as $CaCO_3$	305	300	265	256	387	205	359	282
Carbonate	mg/L as $CaCO_3$	4.2	4.2	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	300	300	255	256	387	205	359	282
Total Dissolved Solids	mg/L	337	610	1190	1210	1602	1050	1820	1435
Fluoride	mg/L	< 0.10	< 0.10	< 0.10	< 0.06	0.12	0.13	0.10	0.12
Total Organic Carbon	mg/L	3.5	4.3	3.3	3.0	4.5	11	18	14.5
Ammonia+Ammonium (N)	as N mg/L	< 0.05	0.06	< 0.05	0.05	0.13	0.64	0.44	0.54
Chloride (Dissolved)	mg/L	15	99	385	455	460	330	710	520
Sulphate (dissolved)	mg/L	25	40	64	68	182	76	150	113
Bromide (dissolved)	mg/L	< 1	2	7	6	8	2.6	9.9	6
Nitrite (as N)	as N mg/L	< 0.014	< 0.010	< 0.020	< 0.030	1.165	0.32	< 0.30	0.31
Nitrate (as N)	as N mg/L	1.41	1.56	2.21	1.64	2.00	2.49	1.87	2.18
Nitrate + Nitrite (as N)	as N mg/L	1.41	1.56	2.23	1.64	3.16	2.81	1.87	2.34
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$	310	455	780	915	960	622	1090	856
Silver (total)	µg/L	< 0.10	0.23	< 0.10	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L	130	3000	51	69	623	805	1990	1398
Aluminum (0.2µm)	µg/L	< 5	21	6	6	11	7	5	6
Arsenic (total)	µg/L	830	890	335	430	1125	177	58	117
Barium (total)	µg/L	30	81	106	90	217	156	244	200
Beryllium (total)	µg/L	< 0.50	< 0.50	< 0.50	< 0.007	0.018	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	32	42	51	53	123	166	149	158
Bismuth (total)	µg/L	< 1.0	5.5	< 1.0	0.3	47.9	2.5	1.5	2.0
Calcium (total)	µg/L	107500	170000	220000	267000	242500	181000	250000	215500
Cadmium (total)	µg/L	< 0.10	< 0.10	< 0.10	0.09	2.50	0.29	0.37	0.33
Cobalt (total)	µg/L	1.4	54.1	3.0	39.0	2230.2	256	695	477
Chromium (total)	µg/L	< 5.0	< 5.0	< 5.0	0.6	1.8	1.24	0.79	1.02
Copper (total)	µg/L	1.4	52.6	2.9	22.8	2224.1	173	195	184
Iron (total)	µg/L	200	3150	140	433	3171	2030	1920	1975
Potassium (total)	µg/L	870	1650	2150	1910	5390	10900	10800	10850
Magnesium (total)	µg/L	13500	20500	51500	60200	86600	41400	113000	77200
Manganese (total)	µg/L	58	175	75	212	1968	449	1050	750
Molybdenum (total)	µg/L	2.6	3.2	2.0	2.6	6.9	9.1	5.5	7.3
Sodium (total)	µg/L	23000	36000	53500	57100	144350	66900	141000	103950
Nickel (total)	µg/L	3.6	41.7	4.7	26.0	1552.8	189	624.0	407
Phosphorus (total)	µg/L	40	215	43	9	64	113	13	63
Lead (total)	µg/L	< 0.50	9.75	< 0.50	4.62	641.60	120	107	114
Antimony (total)	µg/L	2.5	3.8	2.6	2.5	6.1	2.9	3.4	3.2
Selenium (total)	µg/L	< 2.0	< 2.0	< 2.0	1.9	0.5	0.31	0.51	0.41
Tin (total)	µg/L	< 1.0	< 1.0	< 1.0	0.1	0.1	1.12	0.08	0.60
Strontium (total)	µg/L	200	405	635	803	774	849	1300	1075
Titanium (total)	µg/L	7.6	145	7	2.8	30.5	39.1	0.07	19.6
Thallium (total)	µg/L	< 0.05	0.05	< 0.05	< 0.005	0.048	0.033	0.006	0.020
Uranium (total)	µg/L	450	425	445	528	1976	541	638	590
Vanadium (total)	µg/L	1.9	7.3	1.5	1.6	2.9	2.24	1.72	1.98
Zinc (total)	µg/L	9	22	8	15	362	58	128	93
Lead-210	Bq/L	0.03	0.15	< 0.10	0.18	39.90	4.0	3.0	4
Radium-226	Bq/L	< 0.04	0.28	0.16	0.08	0.19	0.20	0.45	0.33
Thorium-230	Bq/L	< 0.07	0.28	< 0.07	< 0.02	0.05	0.02	0.02	0.02
Thorium-232	Bq/L	< 0.06	< 0.06	< 0.06	< 0.02	0.06	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[1]	-[1]	-[1]	-[1]	-[1]	112.7	81.9	--
ORP	mV	-[1]	-[1]	-[1]	-[1]	-[1]	156.4	161.9	--
SPC	us/cm	-[1]	-[1]	-[1]	-[1]	-[1]	1412	2716	--
Temperature	°C	-[1]	-[1]	-[1]	-[1]	-[1]	20.702	13.38	--
Turbidity	FNU	-[1]	-[1]	-[1]	-[1]	-[1]	65.48	204.57	--
pH	Units	-[1]	-[1]	-[1]	-[1]	-[1]	7.95	7.47	--

Note:
[1] Field parameters included for current sampling year only.
-- - No data.

Table 59: Drainage Water Quality – PH LTWMF – Location 2 (WC-SW4-02)

		WC-SW4-02					
		2017	2018	2019	2020	2021	2022
Parameter	**Units**	**Average**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**
Total Suspended Solids	mg/L	310					
pH	no unit	7.92					
Alkalinity	mg/L as $CaCO_3$	310					
Carbonate	mg/L as $CaCO_3$	2.4					
Bicarbonate	mg/L as $CaCO_3$	300					
Total Dissolved Solids	mg/L	492					
Fluoride	mg/L	< 0.10					
Total Organic Carbon	mg/L	12.0					
Ammonia+Ammonium (N)	as N mg/L	< 0.05					
Chloride (Dissolved)	mg/L	80					
Sulphate (dissolved)	mg/L	56					
Bromide (dissolved)	mg/L	< 1					
Nitrite (as N)	as N mg/L	< 0.010					
Nitrate (as N)	as N mg/L	< 0.10					
Nitrate + Nitrite (as N)	as N mg/L	< 0.10					
Mercury (dissolved)	µg/L	< 0.01					
Hardness	mg/L as $CaCO_3$	360					
Silver (total)	µg/L	< 0.10					
Aluminium (total)	µg/L	1500					
Aluminium (0.2µm)	µg/L	< 5.0					
Arsenic (total)	µg/L	23					
Barium (total)	µg/L	44					
Beryllium (total)	µg/L	< 0.50					
Boron (total)	µg/L	19					
Bismuth (total)	µg/L	< 1.0					
Calcium (total)	µg/L	140000					
Cadmium (total)	µg/L	< 0.10					
Cobalt (total)	µg/L	6.8					
Chromium (total)	µg/L	< 5.0					
Copper (total)	µg/L	5.7					
Iron (total)	µg/L	4400					
Potassium (total)	µg/L	420					
Magnesium (total)	µg/L	6800					
Manganese (total)	µg/L	420					
Molybdenum (total)	µg/L	< 0.5					
Sodium (total)	µg/L	48000					
Nickel (total)	µg/L	4.7					
Phosphorus (total)	µg/L	110					
Lead (total)	µg/L	3.10					
Antimony (total)	µg/L	< 0.5					
Selenium (total)	µg/L	< 2.0					
Tin (total)	µg/L	< 1.0					
Strontium (total)	µg/L	330					
Titanium (total)	µg/L	64.0					
Thallium (total)	µg/L	< 0.05					
Uranium (total)	µg/L	2					
Vanadium (total)	µg/L	3.1					
Zinc (total)	µg/L	9					
Lead-210	Bq/L	0.08					
Radium-226	Bq/L	0.15					
Thorium-230	Bq/L	0.31					
Thorium-232	Bq/L	< 0.06					
Field Parameters							
DO 0 % Sat	%	-*					
ORP	mV	-*					
SPC	us/cm	-*					
Temperature	°C	-*					
Turbidity	FNU	-*					
pH	Units	-*					

Note:
* Field parameters included for current sampling year only
- - No data

Table 60: Drainage Water Quality – PH LTWMF – Location 3 (WC-SW5-02)

		WC-SW5-02							
		2017	2018	2019	2020	2021	2022		
Parameter	**Units**	**Average**					2022-06-13	2022-11-03	**Average**
Total Suspended Solids	mg/L	7	68	31	16	59	84	6	45
pH	no unit	8.10	8.16	7.66	8.08	7.97	7.75	8.03	7.89
Alkalinity	mg/L as $CaCO_3$	245	270	158	302	373	368	237	303
Carbonate	mg/L as $CaCO_3$	3.0	3.9	2.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	240	260	158	302	373	368	237	303
Total Dissolved Solids	mg/L	1347	663	1650	3240	1565	1570	1290	1430
Fluoride	mg/L	0.18	0.10	< 0.10	0.08	0.12	0.11	< 0.06	0.09
Total Organic Carbon	mg/L	11	6	6	13	4	18	6	12
Ammonia+Ammonium (N)	as N mg/L	0.06	0.08	0.10	< 0.04	0.12	1.08	< 0.04	0.56
Chloride (Dissolved)	mg/L	330	125	890	810	450	410	480	445
Sulphate (dissolved)	mg/L	415	81	732	743	178	160	94	127
Bromide (dissolved)	mg/L	< 1.0	2.5	9.5	9.9	7.3	6.0	6.6	6.3
Nitrite (as N)	as N mg/L	< 0.01	< 0.01	0.02	0.17	1.03	0.49	0.09	0.29
Nitrate (as N)	as N mg/L	0.34	1.10	0.99	1.51	1.84	4.04	0.83	2.44
Nitrate + Nitrite (as N)	as N mg/L	0.34	1.10	1.01	1.52	2.87	4.53	0.92	2.73
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$	795	450	555	833	960	980	774	877
Silver (total)	µg/L	< 0.10	< 0.10	< 0.10	< 0.05	0.06	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L	150	1590	466	366	481	1140	97	619
Aluminum (0.2µm)	µg/L	5.5	21	< 7	21	9	5	3	5
Arsenic (total)	µg/L	170	585	168	205	1020	269	69	169
Barium (total)	µg/L	56	83	81	67	196	235	116	176
Beryllium (total)	µg/L	< 0.50	< 0.50	< 0.50	0.01	0.01	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	47	42	63	58	120	225	72	149
Bismuth (total)	µg/L	< 1.0	1.6	< 1.0	0.2	43.9	4.90	0.43	2.7
Calcium (total)	µg/L	265000	135000	160000	240000	241000	273000	218000	245500
Cadmium (total)	µg/L	< 0.10	< 0.10	< 0.10	0.18	2.30	0.562	0.082	0.32
Cobalt (total)	µg/L	22	19.5	11.5	104.8	2041.5	588	159	374
Chromium (total)	µg/L	< 5.0	< 5.0	< 5.0	1.4	2.1	2.30	0.23	1.3
Copper (total)	µg/L	9.6	20.0	18.4	61.5	1900.0	363	65	214
Iron (total)	µg/L	275	1625	965	903	3430	3360	447	1904
Potassium (total)	µg/L	6900	2150	5750	5930	19545	15800	3720	9760
Magnesium (total)	µg/L	36000	23500	39500	56500	86700	72500	55700	64100
Manganese (total)	µg/L	122	145	219	389	1876	921	36	479
Molybdenum (total)	µg/L	5.0	2.9	1.4	5.7	18.1	7.16	2.24	4.7
Sodium (total)	µg/L	132500	54000	724500	511300	312000	108700	69600	89150
Nickel (total)	µg/L	16.3	18.2	35.6	78.2	1421.0	397	142	270
Phosphorus (total)	µg/L	42	90	52	28	62	115	9	62
Lead (total)	µg/L	< 0.50	4.05	1.49	12.94	568.95	264	27.6	146
Antimony (total)	µg/L	1.3	2.3	1.3	1.7	5.5	3.5	1.0	2.3
Selenium (total)	µg/L	< 2.0	< 2.0	< 2.0	2.1	0.7	0.47	0.64	0.56
Tin (total)	µg/L	< 1.0	< 1.0	< 1.0	0.2	0.1	0.44	0.08	0.26
Strontium (total)	µg/L	570	410	500	517	773	1180	748	964
Titanium (total)	µg/L	9.1	67	25	20	23	< 0.1	0.1	0.1
Thallium (total)	µg/L	< 0.05	< 0.05	< 0.05	0.01	0.04	0.048	0.009	0.029
Uranium (total)	µg/L	460	295	346	388	1646	985	427	706
Vanadium (total)	µg/L	0.9	3.9	1.8	1.9	2.7	3.58	0.51	2.04
Zinc (total)	µg/L	39	15	16	29	329	129	44	87
Lead-210	Bq/L	0.02	0.12	0.46	0.65	30.17	9.50	0.72	5.11
Radium-226	Bq/L	0.06	0.27	0.36	0.12	0.17	0.37	0.08	0.23
Thorium-230	Bq/L	< 0.07	0.26	0.18	< 0.02	0.06	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[1]	-[1]	-[1]	-[1]	-[1]	118	102.3	--
ORP	mV	-[1]	-[1]	-[1]	-[1]	-[1]	139.4	166.3	--
SPC	us/cm	-[1]	-[1]	-[1]	-[1]	-[1]	2232	1919	--
Temperature	°C	-[1]	-[1]	-[1]	-[1]	-[1]	22.203	10.836	--
Turbidity	FNU	-[1]	-[1]	-[1]	-[1]	-[1]	3187.6	1.76	--
pH	Units	-[1]	-[1]	-[1]	-[1]	-[1]	7.91	7.75	--

Note:
[1] Field parameters included for current sampling year only.
-- - No data.

Table 61: Drainage Water Quality – PH LTWMF – Location 4 (WC-SW6-02)

		WC-SW6-02							
		2017	2018	2019	2020	2021	2022		
Parameter	**Units**	**Average**					2022-06-13	2022-11-03	**Average**
Total Suspended Solids	mg/L	19	29	7	309	79	32	53	43
pH	no unit	8.05	8.04	8.01	7.93	8.02	8.11	7.94	8.03
Alkalinity	mg/L as $CaCO_3$	190	190	220	294	207	221	189	205
Carbonate	mg/L as $CaCO_3$	2.0	2.0	2.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	185	185	215	294	207	221	189	205
Total Dissolved Solids	mg/L	231	315	353	549	960	763	931	847
Fluoride	mg/L	< 0.10	< 0.10	< 0.10	< 0.06	0.06	< 0.06	< 0.06	0.06
Total Organic Carbon	mg/L	5.8	6.9	7.8	2.0	3.0	7.0	4.0	5.5
Ammonia+Ammonium (N)	as N mg/L	< 0.05	0.08	< 0.05	0.04	0.04	0.07	< 0.04	0.06
Chloride (Dissolved)	mg/L	16	31	36	137	310	170	320	245
Sulphate (dissolved)	mg/L	10	16	21	41	60	57	86	72
Bromide (dissolved)	mg/L	< 1	< 1	< 1	2	4	2.0	4	3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	< 0.010	< 0.030	0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.45	0.50	0.72	1.97	1.51	0.07	0.07	0.07
Nitrate + Nitrite (as N)	as N mg/L	0.45	0.50	0.72	1.97	1.51	0.07	0.07	0.07
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	210	250	290	520	756	506	647	577
Silver (total)	µg/L	< 0.10	< 0.10	< 0.10	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L	340	129	50	4780	554	651	617	634
Aluminum (0.2µm)	µg/L	6.0	6.5	6.0	9.0	4.5	13	2	8
Arsenic (total)	µg/L	81	126	83	43	63	15.5	13.1	14
Barium (total)	µg/L	29	32	37	137	115	91	98	94
Beryllium (total)	µg/L	< 0.50	< 0.50	< 0.50	0.17	0.03	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	26	25	24	34	48	75	36	56
Bismuth (total)	µg/L	< 1.0	< 1.0	< 1.0	0.03	0.05	< 0.01	< 0.01	< 0.01
Calcium (total)	µg/L	75000	78500	89000	177500	237000	172000	207000	189500
Cadmium (total)	µg/L	< 0.10	< 0.10	< 0.10	0.02	0.01	0.005	0.003	0.005
Cobalt (total)	µg/L	< 0.5	< 0.5	< 0.5	2.7	1.4	0.4	0.1	0.3
Chromium (total)	µg/L	< 5.0	< 5.0	< 5.0	6.6	1.0	0.9	0.1	0.5
Copper (total)	µg/L	1.1	< 1.0	1.1	7.9	2.2	1.6	0.6	1.1
Iron (total)	µg/L	415	295	140	5200	672	622	< 7	315
Potassium (total)	µg/L	710	685	890	2750	1760	1510	1270	1390
Magnesium (total)	µg/L	6150	7100	8100	18700	39950	18500	31900	25200
Manganese (total)	µg/L	25	30	18	182	104	82	19	51
Molybdenum (total)	µg/L	1.2	1.3	1.2	1.3	1.6	1.6	0.9	1.3
Sodium (total)	µg/L	7850	10200	13000	21300	28450	23800	27500	25650
Nickel (total)	µg/L	< 1.0	1.1	< 1.0	4.4	2.2	1.2	0.4	0.8
Phosphorus (total)	µg/L	37	37	40	263	104	23	6	15
Lead (total)	µg/L	0.67	0.60	< 0.50	2.11	0.74	0.35	< 0.09	0.22
Antimony (total)	µg/L	< 0.50	< 0.50	< 0.50	< 0.90	0.90	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	< 2.0	< 2.0	< 2.0	1.2	2.0	0.17	0.08	0.13
Tin (total)	µg/L	< 1.0	< 1.0	< 1.0	0.2	0.1	0.12	< 0.06	0.09
Strontium (total)	µg/L	125	130	160	402	543	396	590	493
Titanium (total)	µg/L	16.4	9	< 5	256	26	33.9	0.15	17
Thallium (total)	µg/L	< 0.05	< 0.05	< 0.05	0.06	0.01	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	42	57	75	66	325	19	79	49
Vanadium (total)	µg/L	1.4	1.3	1.0	10.8	2.3	2.5	0.6	1.5
Zinc (total)	µg/L	< 5	< 5	< 5	14	40	3	< 2	3
Lead-210	Bq/L	0.02	< 0.10	< 0.10	< 0.02	0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	< 0.04	< 0.04	< 0.04	0.01	0.02	0.02	< 0.01	0.02
Thorium-230	Bq/L	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[1]	-[1]	-[1]	-[1]	-[1]	93.2	95.1	--
ORP	mV	-[1]	-[1]	-[1]	-[1]	-[1]	153.2	105.7	--
SPC	us/cm	-[1]	-[1]	-[1]	-[1]	-[1]	1171	1414	--
Temperature	°C	-[1]	-[1]	-[1]	-[1]	-[1]	25.461	13.154	--
Turbidity	FNU	-[1]	-[1]	-[1]	-[1]	-[1]	143.4	6.64	--
pH	Units	-[1]	-[1]	-[1]	-[1]	-[1]	7.77	7.93	--

Note:
[1] Field parameters included for current sampling year only.
-- - No data.

Table 62: Surface water quality – Brewery Creek – Upstream (GRT-3)

		Criteria		GRT-3								
				2018	2019	2020	2021	2022				
Analysis	**Units**	**PWQO**	**CWQG**	Average				2022-01-13	2022-04-05	2022-07-21	2022-10-04	Average
Total Suspended Solids	mg/L			12	12	13	5	5	9	< 2	24	10
pH	no unit	6.5-8.5	6.5-9.0	8.20	8.21	8.24	8.20	8.18	8.22	8.3	8.2	8.23
Alkalinity	mg/L as $CaCO_3$			258	248	248	247	258	272	267	241	260
Carbonate	mg/L as $CaCO_3$			3.8	3.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			258	243	248	247	258	272	267	241	260
Total Dissolved Solids	mg/L			560	584	570	607	577	600	631	629	609
Fluoride	mg/L		0.12	< 0.10	0.11	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	2	1	2	< 1.0	< 1.0	2.0	1.0	1
Ammonia+Ammonium(N)	as N mg/L			0.06	0.06	0.04	0.04	0.05	< 0.04	0.04	0.04	0.04
Chloride (Dissolved)	mg/L		120	145	150	172	185	200	190	210	180	195
Sulphate (dissolved)	mg/L			24	25	24	24	26	26	23.0	24.0	25
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	3.34	3.43	3.83	4.11	4.19	3.96	3.89	4.16	4.05
Nitrate + Nitrite (as N)	as N mg/L			3.34	3.43	3.83	4.11	4.19	3.96	3.89	4.16	4.05
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			313	330	355	360	359	359	328	339	346
Silver (total)	µg/L	0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum(total)	µg/L			82	58	111	27	45	20	86	20	43
Aluminum(0.2µm)	µg/L	75	100	6	5	3	4	3	3	1	14	5
Arsenic (total)	µg/L	100	5	< 1.0	< 1.0	0.4	0.4	0.3	0.4	0.3	0.3	0.3
Barium (total)	µg/L			120	115	123	134	129	122	123	136	128
Beryllium(total)	µg/L	1100		< 0.500	< 0.500	0.009	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	200	1500	33	32	30	34	29	31	29	31	30
Bismuth (total)	µg/L			< 1.0	< 1.0	0.008	0.014	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium(total)	µg/L			99000	99250	112250	113250	113000	109000	103000	103000	107000
Cadmium(total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.012	0.006	0.003	0.004	0.012	0.005	0.006
Cobalt (total)	µg/L	0.9		< 0.50	< 0.50	0.102	0.065	0.045	0.061	0.025	0.062	0.048
Chromium(total)	µg/L			< 5.0	< 5.0	1.92	1.27	1.21	1.22	0.63	1.12	1.05
Copper (total)	µg/L	5		< 1.0	< 1.1	1.1	0.5	0.4	0.3	< 0.2	0.3	0.3
Iron (total)	µg/L	300	300	170	139	168	108	103	58	< 7	79	62
Potassium (total)	µg/L			1125	1150	1250	1415	1320	1280	1170	1270	1260
Magnesium (total)	µg/L			18750	17750	18200	18625	18600	21300	17000	19700	19150
Manganese (total)	µg/L			18.3	16.0	17.2	12.8	11.6	10.7	8.8	14.0	11.3
Molybdenum(total)	µg/L	40	73	< 0.50	< 0.50	0.24	0.20	0.16	0.16	0.22	0.23	0.19
Sodium (total)	µg/L			85500	80500	83400	84625	89300	103000	81000	94500	92200
Nickel (total)	µg/L	25	25	< 1.0	< 1.0	0.4	0.8	0.6	0.3	0.2	0.1	0.3
Phosphorus (total)	mg/L	10-30		18	17	19	13	3	< 3	< 3	7	4
Lead (total)	µg/L	5	7	0.54	0.51	0.34	0.21	0.22	0.17	< 0.09	0.15	0.16
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	0.34	0.29	0.35	0.35	0.33	0.26	0.32
Tin (total)	µg/L			< 1.0	< 1.0	0.09	0.11	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Strontium (total)	µg/L			230	228	248	275	269	261	270	264	266
Titanium (total)	µg/L			5.70	6.13	4.11	3.15	1.81	0.60	0.06	0.95	0.86
Thallium (total)	µg/L	0.3	0.8	< 0.050	< 0.050	0.006	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	5	15	1.07	1.03	0.89	1.07	1.06	1.01	1.00	1.05	1.03
Vanadium (total)	µg/L	6		0.94	0.90	0.89	0.69	0.62	0.64	0.64	0.61	0.63
Zinc (total)	µg/L	30	30	< 5	< 5	4	3	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	< 0.01	0.02	< 0.01	0.01	0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	109.8	90.8	91.1	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	166.9	150.4	75.4	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1053	1090	1115	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	7.754	15.073	10.226	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	2.13	0.63	0.83	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	8.22	8.23	8.08	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG = Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 63: Surface Water Quality – Brewery Creek – Downstream (GRT-3B)

		Criteria		GRT-3B								
				2018	2019	2020	2021	2022				
Analysis	**Units**	**PWQO**	**CWQG**	Average				2022-01-13	2022-04-05	2022-07-21	2022-10-04	Average
Total Suspended Solids	mg/L			1	6	2	2	4	3	4	< 2	3
pH	no unit	6.5-8.5	6.5-9.0	8.09	8.17	8.18	8.12	8.13	8.28	8.23	8.06	8.18
Alkalinity	mg/L as $CaCO_3$			253	233	244	234	251	253	196	217	229
Carbonate	mg/L as $CaCO_3$			2.9	3.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			248	228	244	234	251	253	196	217	229
Total Dissolved Solids	mg/L			551	535	565	598	557	569	514	600	560
Fluoride	mg/L		0.12	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	3	2	2	1.0	2.0	5.0	2.0	3
Ammonia+Ammonium(N)	as N mg/L			0.09	0.11	0.05	0.05	0.09	0.06	0.04	0.08	0.07
Chloride (Dissolved)	mg/L		120	145	145	166	180	190	200	170	180	185
Sulphate (dissolved)	mg/L			38	23	23	23	24	27	18.0	23.0	23
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.02	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04	0.03
Nitrate (as N)	as N mg/L		13	2.71	2.67	3.40	3.55	4.02	3.71	1.84	3.18	3.19
Nitrate + Nitrite (as N)	as N mg/L			2.72	2.68	3.40	3.56	4.02	3.71	1.84	3.21	3.20
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			305	313	352	343	361	359	253	309	321
Silver (total)	µg/L	0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum(total)	µg/L			17	71	15	10	47	11	7	8	18
Aluminum(0.2µm)	µg/L	75	100	< 5	5	4	3	5	4	< 1	1	3
Arsenic (total)	µg/L	100	5	< 1.0	< 1.0	0.4	0.4	0.4	0.3	0.3	0.2	0.3
Barium (total)	µg/L			110	109	118	127	127	121	94	138	120
Beryllium(total)	µg/L	1100		< 0.500	< 0.500	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	200	1500	34	35	35	35	29	32	32	35	32
Bismuth (total)	µg/L			< 1.0	< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium(total)	µg/L			92750	95000	110825	107500	113000	109000	77300	92100	97850
Cadmium(total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.005	0.005	0.003	0.010	0.007	< 0.003	0.006
Cobalt (total)	µg/L	0.9		< 0.50	< 0.50	0.051	0.055	0.071	0.048	0.027	0.043	0.047
Chromium(total)	µg/L			< 5.0	< 5.0	0.93	0.99	1.13	0.99	12.40	0.54	3.76
Copper (total)	µg/L	5		1.0	1.1	0.9	0.3	0.4	0.3	0.2	0.3	0.3
Iron (total)	µg/L	300	300	100	193	44	98	193	50	< 7	32	71
Potassium(total)	µg/L			1173	1300	1328	1368	1450	1610	1110	1310	1370
Magnesium(total)	µg/L			18500	17250	18375	18200	19000	21200	14700	19300	18550
Manganese (total)	µg/L			25.0	42.0	13.6	15.5	43.0	14.2	0.3	6.4	16.0
Molybdenum(total)	µg/L	40	73	< 0.50	< 0.50	0.21	0.19	0.19	0.22	0.37	0.44	0.31
Sodium(total)	µg/L			83750	80750	83425	81400	88900	101000	63800	92500	86050
Nickel (total)	µg/L	25	25	< 1.0	< 1.0	0.2	0.5	0.7	0.2	0.3	0.1	0.3
Phosphorus (total)	mg/L	10-30		7	22	6	9	15	7	< 3	6	8
Lead (total)	µg/L	5	7	< 0.50	0.89	0.85	0.11	0.28	< 0.09	< 0.09	< 0.09	0.14
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium(total)	µg/L	100	1	< 2.0	< 2.0	0.26	0.29	0.35	0.26	0.26	0.15	0.26
Tin (total)	µg/L			< 1.0	< 1.0	0.07	0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Strontium(total)	µg/L			223	213	250	270	270	262	224	256	253
Titanium(total)	µg/L			< 5.00	6.33	0.62	0.45	2.15	0.53	0.06	0.36	0.78
Thallium(total)	µg/L	0.3	0.8	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium(total)	µg/L	5	15	1.85	1.85	1.56	1.50	1.74	1.59	1.38	1.35	1.51
Vanadium(total)	µg/L	6		0.74	0.88	0.64	0.60	0.66	0.61	0.50	0.44	0.55
Zinc (total)	µg/L	30	30	5	< 5	3	2	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	128.8	122.7	104.9	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	126.7	127.5	70.5	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1038	648	1077	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	7.522	23.871	11.411	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	0.86	11.95	20.93	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	8.25	8.10	7.76	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG = Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 64: Surface Water Quality – Highland Drive South Creek – Downstream (HC-D)

		Criteria		HC-D								
				2018	2019	2020	2021	2022				
Analysis	**Units**	**PWQO**	**CWQG**	Average				2022-01-21	2022-04-11	2022-07-28	2022-11-07	Average
Total Suspended Solids	mg/L			2	8	5	2	3	< 2	2	< 2	2
pH	no unit	6.5-8.5	6.5-9.0	8.14	8.19	8.17	8.17	8.09	8.19	8.22	8.01	8.13
Alkalinity	mg/L as $CaCO_3$			295	280	279	278	290	291	273	294	287
Carbonate	mg/L as $CaCO_3$			3.8	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			293	275	279	278	290	291	273	294	287
Total Dissolved Solids	mg/L			670	673	659	689	709	643	635	814	700
Fluoride	mg/L		**0.12**	**0.14**	0.11	**0.13**	0.12	**0.13**	0.11	0.11	0.07	**0.11**
Total Organic Carbon	mg/L			2	3	3	2	2	2	3	2	2
Ammonia+Ammonium (N)	as N mg/L			0.10	0.11	0.08	0.07	0.22	0.12	0.05	0.06	0.11
Chloride (Dissolved)	mg/L		**120**	**175**	**173**	**195**	**193**	**240**	**220**	**200**	**210**	**218**
Sulphate (dissolved)	mg/L			35	32	34	35	39	38	33	33	36
Bromide (dissolved)	mg/L			< 1.0	1.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.02	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.54	3.16	3.79	3.81	4.24	3.79	3.18	3.54	3.69
Nitrate + Nitrite (as N)	as N mg/L			3.56	3.19	3.79	3.81	4.24	3.79	3.18	3.54	3.69
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			400	395	448	431	469	395	395	450	428
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			16	40	31	6	10	9	21	5	11
Aluminum (0.2µm)	µg/L	**75**	**100**	5	< 5	2	4	2	1	4	3	3
Arsenic (total)	µg/L	**100**	**5**	**7.9**	**8.4**	**8.0**	**7.1**	**5.3**	**5.6**	**10.4**	**6.1**	**6.9**
Barium (total)	µg/L			195	180	208	202	213	200	191	223	207
Beryllium (total)	µg/L	**1100**		< 0.500	< 0.500	0.015	< 0.007	< 0.007	< 0.007	< 0.007	0.093	0.029
Boron (total)	µg/L	**200**	**1500**	**460**	**458**	**484**	**438**	**406**	**404**	**507**	**620**	**485**
Bismuth (total)	µg/L			< 1.0	< 1.0	0.010	0.017	0.030	< 0.010	< 0.010	< 0.010	0.015
Calcium (total)	µg/L			120000	117500	137250	131000	142000	119000	116000	138000	129250
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.006	0.007	< 0.003	0.008	0.003	0.112	0.032
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.221	0.136	0.032	0.135	0.186	0.171	0.131
Chromium (total)	µg/L			< 5.0	< 5.0	0.48	0.53	0.38	0.50	0.36	0.36	0.40
Copper (total)	µg/L	**5**		< 1.0	< 1.0	1.1	0.3	0.3	0.3	0.5	0.4	0.4
Iron (total)	µg/L	**300**	**300**	229	315	290	217	288	216	183	12	175
Potassium (total)	µg/L			3025	3175	3833	3290	3520	3080	3060	4040	3500
Magnesium (total)	µg/L			25250	24000	25450	25200	27600	23800	24300	25800	25375
Manganese (total)	µg/L			37.0	52.0	38.2	32.6	55.9	35.8	18.3	13.9	31.0
Molybdenum (total)	µg/L	**40**	**73**	0.94	0.67	2.21	0.64	0.58	0.60	0.69	0.65	0.63
Sodium (total)	µg/L			80250	88250	87625	80875	101000	87300	84100	108000	95100
Nickel (total)	µg/L	**25**	**25**	1.2	< 1.0	1.1	0.9	1.0	0.9	0.8	1.2	1.0
Phosphorus (total)	µg/L	**10-30**		8	17	**35**	10	12	< 3	13	**36**	16
Lead (total)	µg/L	**5**	**7**	< 0.50	< 0.50	0.39	0.12	0.11	< 0.09	0.14	< 0.08	0.11
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.65	0.36	0.34	0.36	0.30	0.14	0.29
Tin (total)	µg/L			< 1.0	< 1.0	0.12	0.10	0.12	0.06	0.15	0.09	0.11
Strontium (total)	µg/L			313	298	347	367	376	318	347	353	349
Titanium (total)	µg/L			< 5.0	5.40	3.01	0.38	0.49	0.38	1.09	2.15	1.03
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	0.023	0.006	< 0.005	< 0.005	0.007	0.012	0.007
Uranium (total)	µg/L	**5**	**15**	**36.3**	**33.8**	**35.3**	**32.9**	**45.1**	**43.7**	**37.0**	**32.1**	**39.5**
Vanadium (total)	µg/L	**6**		0.65	0.74	0.53	0.37	0.34	0.31	0.57	0.31	0.38
Zinc (total)	µg/L	**30**	**30**	< 5	5	3	5	2	4	< 2	< 2	3
Lead-210	Bq/L			< 0.10	0.11	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.01	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	113.8	96.8	94.4	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	190.9	117.6	180.6	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1181	1153	1197	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	6.606	17.13	10.598	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	1.58	0.62	0.37	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	8.15	8.09	7.99	--
Staff Gauge	cm			-[1]	-[1]	-[1]	-[1]	-[2]	37	24	33	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
--- No data.

Table 65: Surface Water Quality – Highland Drive South Creek – Upstream (HC-U)

		Criteria		HC-U								
				2018	2019	2020	2021	2022				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**				2022-01-21	2022-04-11	2022-07-28	2022-11-07	**Average**
Total Suspended Solids	mg/L			5	6	9	5	11	5	5	4	6
pH	no unit	6.5-8.5	6.5-9.0	8.07	8.17	8.05	8.03	7.98	8.04	8.06	7.88	7.99
Alkalinity	mg/L as $CaCO_3$			295	278	277	278	275	278	282	301	284
Carbonate	mg/L as $CaCO_3$			3.2	3.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			288	275	277	278	275	278	282	301	284
Total Dissolved Solids	mg/L			666	695	693	681	657	689	590	820	689
Fluoride	mg/L		0.12	0.13	0.12	0.14	0.11	0.08	0.11	0.12	0.10	0.10
Total Organic Carbon	mg/L			3	3	2	2	2	2	3	2	2
Ammonia+Ammonium (N)	as N mg/L			0.07	0.06	0.05	0.05	0.14	0.08	< 0.04	0.07	0.08
Chloride (Dissolved)	mg/L		120	152	173	213	198	220	230	200	210	215
Sulphate (dissolved)	mg/L			30	35	36	36	40	40	35	34	37
Bromide (dissolved)	mg/L			< 1.0	2.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	3.75	3.64	3.89	4.06	4.35	4.12	3.67	3.80	3.99
Nitrate + Nitrite (as N)	as N mg/L			3.75	3.64	3.89	4.06	4.35	4.12	3.67	3.80	3.99
Mercury (dissolved)	µg/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			398	393	450	435	458	402	395	467	430
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			35	34	27	34	34	21	20	141	56
Aluminum (0.2µm)	µg/L	75	100	8	< 5	4	3	3	1	2	2	2
Arsenic (total)	µg/L	100	5	4.6	2.9	3.9	< 5	2.7	1.1	5.4	2.8	3.0
Barium (total)	µg/L			200	190	217	209	220	211	201	232	216
Beryllium (total)	µg/L	1100		< 0.500	< 0.500	0.010	< 0.007	< 0.007	< 0.007	< 0.007	0.098	0.030
Boron (total)	µg/L	200	1500	490	433	462	397	387	383	450	596	454
Bismuth (total)	µg/L			< 1.0	< 1.0	0.018	0.012	0.050	< 0.010	< 0.010	< 0.010	0.020
Calcium (total)	µg/L			125000	122500	138500	132750	138000	121000	119000	143000	130250
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.008	0.007	0.005	0.006	< 0.003	0.005	0.005
Cobalt (total)	µg/L	0.9		< 0.50	< 0.50	0.229	0.165	0.060	0.116	0.176	0.149	0.125
Chromium (total)	µg/L			< 5.0	< 5.0	0.63	0.83	0.55	0.54	0.42	< 0.08	0.40
Copper (total)	µg/L	5		< 1.0	< 1.0	1.5	0.5	0.3	0.3	0.3	0.4	0.3
Iron (total)	µg/L	300	300	503	445	452	794	509	318	360	< 7	299
Potassium (total)	µg/L			2675	2550	3515	2648	2830	2230	2330	3370	2690
Magnesium (total)	µg/L			26250	25000	25350	25425	27400	24300	23900	26600	25550
Manganese (total)	µg/L			52.3	47.0	54.0	56.2	60	33	55	43	47.5
Molybdenum (total)	µg/L	40	73	0.69	0.65	0.47	0.65	0.58	0.58	0.68	1	0.64
Sodium (total)	µg/L			81250	84500	96300	80100	89600	84800	80500	114000	92225
Nickel (total)	µg/L	25	25	1.2	1.1	1.1	0.9	1.0	1.0	0.8	1.1	1.0
Phosphorus (total)	µg/L	10-30		11	14	37	19	15	< 3	14	6	10
Lead (total)	µg/L	5	7	< 0.50	< 0.50	0.18	0.38	0.27	0.13	0.20	< 0.08	0.17
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	1.82	0.41	0.35	0.37	0.27	< 0.04	0.26
Tin (total)	µg/L			< 1.0	< 1.0	0.17	0.11	0.08	0.17	0.15	0.07	0.12
Strontium (total)	µg/L			315	300	340	362	366	313	335	362	344
Titanium (total)	µg/L			5.2	5.13	2.60	1.82	1.4	1.1	1.3	0.4	1.05
Thallium (total)	µg/L	0.3	0.8	< 0.050	< 0.050	0.015	0.007	< 0.005	0.005	0.005	0.013	0.007
Uranium (total)	µg/L	5	15	8.7	8.8	8.7	9.1	13.2	6.4	7.9	8.4	9.0
Vanadium (total)	µg/L	6		0.67	0.74	0.57	0.64	0.47	0.39	0.62	0.26	0.44
Zinc (total)	µg/L	30	30	< 5	5	4	5	2	112	2	3	30
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.03	< 0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	0.01	0.02	0.02	< 0.01	0.01	0.02	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	102	85.1	84.9	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	53.7	113.8	44.9	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1178	1142	1191	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	7.228	14.176	9.649	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	4.00	1.52	5.19	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	7.97	8.02	7.64	--
Staff Gauge	cm			-[1]	-[1]	-[1]	-[1]	-[2]	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
--- No data.

Table 66: Sediment Quality – Highland Drive South Creek – Downstream (HC-D)

		Criteria				HC-D					
		PSQG		CCME		2012	2018	2019	2020	2021	2022
Parameter	**Units**	**LEL**	**SEL**	**ISQG**	**PEL**	**Average**					
Water Soluble Boron	µg/g					8.8	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**
Mercury	µg/g	**0.2**	**2**	**0.17**	**0.486**	0.07					
Silver	µg/g					< 0.20					
Aluminum	µg/g					3800					
Arsenic	µg/g	**6.0**	**33**	**5.9**	**17**	**28**					
Barium	µg/g					150					
Beryllium	µg/g					0.20					
Boron	µg/g					-[1]					
Cadmium	µg/g	**0.6**	**10**	**0.6**	**3.5**	0.38					
Calcium	µg/g					120000					
Cobalt	µg/g					4.4					
Copper	µg/g	**16**	**110**	**35.7**	**197**	12					
Chromium	µg/g	**26**	**110**			15					
Iron	µg/g					14000					
Magnesium	µg/g	**460**	**1100**			**3400**					
Manganese	µg/g					810					
Molybdenum	µg/g					0.59					
Nickel	µg/g	**16**	**75**			6.0					
Lead	µg/g	**31**	**250**	**35**	**91.3**	24					
Phosphorus	µg/g					760					
Potassium	µg/g					420					
Antimony	µg/g					0.81					
Selenium	µg/g					1.6					
Sodium	µg/g					300					
Strontium	µg/g					140					
Thallium	µg/g					0.10					
Tin	µg/g					-[1]					
Titanium	µg/g					-[1]					
Uranium	µg/g					29					
Vanadium	µg/g					19					
Zinc	µg/g	**120**	**820**			**120**					
Lead-210	Bq/g					< 0.50					
Radium-226	Bq/g					0.10					
Thorium-230	Bq/g					0.10					
Thorium-232	Bq/g					< 0.01					

Note:
PSQG = Provincial Sediment Quality Guidelines , LEL - lowest effect level, SEL - severe effect level
CCME = Canadian Council of Ministers of the Environment, Sediment Quality Guidelines for the Protection of Aquatic Life,
ISQG = Interim Sediment Quality Guidelines, PEL = Probable Effect Level
Bold values indicate an exceedance of a PSQG or CCME value.
[1] Analysis not included in laboratory contract.

Table 67: Sediment Quality – Highland Drive South Creek – Upstream (HC-U)

		Criteria				HC-U							
		PSQG		CCME		2012	2018	2019	2020	2021	2022		
Parameter	Units	LEL	SEL	ISQG	PEL	Average					2022-04-11	2022-11-07	Average
Water Soluble Boron	µg/g					3.9	0.4	0.7	1.2	< 0.5	< 0.5	< 0.5	< 0.5
Mercury	µg/g	**0.2**	**2**	**0.17**	**0.486**	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g					< 0.20	< 0.20	< 0.20	0.05	< 0.05	< 0.05	1100	550
Aluminum	µg/g					1700	1500	1950	2500	1450	1700	< 0.8	850
Arsenic	µg/g	**6.0**	**33**	**5.9**	**17**	**23**	**6**	**10**	**32**	**8**	5	**7**	**6**
Barium	µg/g					79	28	39	98	31	31	28	30
Beryllium	µg/g					< 0.20	< 0.20	< 0.20	0.16	0.07	0.10	0.03	0.07
Boron	µg/g					-[1]	< 5	< 5	6	2	2	2	2
Cadmium	µg/g	**0.6**	**10**	**0.6**	**3.5**	0.16	< 0.10	< 0.10	0.11	0.04	< 0.05	< 0.05	< 0.05
Calcium	µg/g					65000	71000	67000	102000	59000	59000	59000	59000
Cobalt	µg/g					2.2	1.2	1.4	2.6	1.2	1.4	3.7	2.6
Copper	µg/g	**16**	**110**	**35.7**	**197**	5.7	1.7	2.3	5.2	1.4	2.2	0.8	1.5
Chromium	µg/g	**26**	**110**			10	5.3	6.1	11.2	4.7	5.0	0.4	2.7
Iron	µg/g					13000	8650	8900	18850	6500	6000	6100	6050
Magnesium	µg/g	**460**	**1100**			**3200**	**2700**	**3350**	**3750**	**2900**	**3000**	**1850**	**2425**
Manganese	µg/g					500	135	195	470	145	160	137	149
Molybdenum	µg/g					< 0.50	< 0.50	< 0.50	1.20	0.20	0.2	137	68.60
Nickel	µg/g	**16**	**75**			3.5	2.0	2.3	4.0	2.0	2.1	0.3	1.2
Lead	µg/g	**31**	**250**	**35**	**91.3**	9.5	4.0	4.5	9.7	3.5	4.7	1.2	3.0
Phosphorus	µg/g					700	630	675	590	605	570	499	535
Potassium	µg/g					< 200	< 200	245	320	175	200	119	160
Antimony	µg/g					0.38	< 0.20	< 0.20	< 0.80	< 0.80	< 0.80	< 0.70	0.75
Selenium	µg/g					0.62	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70	< 0.05	0.38
Sodium	µg/g					140	86	175	155	135	150	72	111
Strontium	µg/g					110	100	93	137	100	100	77	89
Thallium	µg/g					0.25	< 0.05	< 0.05	0.05	< 0.02	< 0.02	< 0.02	< 0.02
Tin	µg/g					-[1]	< 1.0	2.8	2.4	0.8	4.7	1.6	3.2
Titanium	µg/g					-[1]	245	255	170	180	170	126	148
Uranium	µg/g					1.10	0.46	0.64	1.18	0.44	0.46	0.60	0.53
Vanadium	µg/g					12	11	11	14	8	7	6	7
Zinc	µg/g	**120**	**820**			37	17	18	71	14	15	12	14
Lead-210	Bq/g					< 0.50	< 0.05	< 0.05	0.12	0.12	< 0.03	0.02	0.03
Radium-226	Bq/g					< 0.10	0.08	< 0.05	0.04	0.03	< 0.05	0.04	0.05
Thorium-230	Bq/g					< 0.10	0.45	< 0.40	0.17	0.07	< 0.20	< 0.09	0.15
Thorium-232	Bq/g					< 0.01	< 0.04	< 0.04	0.01	0.01	0.004	0.007	0.01

Note:
PSQG = Provincial Sediment Quality Guidelines , LEL - lowest effect level, SEL - severe effect level
CCME = Canadian Council of Ministers of the Environment, Sediment Quality Guidelines for the Protection of Aquatic Life,
ISQG = Interim Sediment Quality Guidelines, PEL = Probable Effect Level
Bold values indicate an exceedance of a PSQG or CCME value.
[1] Analysis not included in laboratory contract.

Table 68: 2022 Storm Event Sampling – Highland Drive South Creek Watershed (HC-D)

Analysis	Units	Criteria		HC-D					
		PWQO	CWQG	2022/06/07 8:30AM	2022/06/07 9:30AM	2022/06/07 10:30AM	2022/06/07 11:30AM	2022/06/07 12:30PM	2022/06/07 1:30PM
Total Suspended Solids	mg/L			6	8	7	18	18	17
pH	no unit	6.5-8.5	6.5-9.0	8.23	8.23	8.23	8.21	8.18	8.21
Alkalinity	mg/L as $CaCO_3$			282	273	273	256	278	269
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			282	273	273	256	278	269
Total Dissolved Solids	mg/L			631	634	657	634	623	663
Fluoride	mg/L		0.12	0.10	0.10	0.10	0.10	0.11	0.11
Total Organic Carbon	mg/L			3.0	3.0	3.0	3.0	4.0	5.0
Ammonia+Ammonium (N)	as N mg/L			0.05	0.09	0.04	0.08	0.07	0.07
Chloride (Dissolved)	mg/L		120	**180**	**190**	**180**	**180**	**160**	**160**
Sulphate (dissolved)	mg/L			32	36	30	31	25	29
Bromide (dissolved)	mg/L			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	3.29	3.18	3.11	2.96	2.60	2.38
Nitrate + Nitrite (as N)	as N mg/L			3.29	3.18	3.11	2.96	2.60	2.38
Mercury (dissolved)	µg/L	0.2	0.026	0.01	**0.03**	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			406	390	408	422	382	363
Silver (total)	µg/L	0.1	0.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			49	52	63	166	222	245
Aluminum (0.2µm)	µg/L	75	100	2	4	5	3	4	4
Arsenic (total)	µg/L	100	5	**8.0**	**7.7**	**8.5**	**11.6**	**10.5**	**11.2**
Barium (total)	µg/L			202	204	199	206	195	191
Beryllium (total)	µg/L	1100		< 0.007	< 0.007	< 0.007	0.010	0.011	0.009
Boron (total)	µg/L	200	1500	**510**	**509**	**539**	**652**	**607**	**601**
Bismuth (total)	µg/L			< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.010
Calcium (total)	µg/L			123000	119000	125000	128000	117000	111000
Cadmium (total)	µg/L	0.2	0.09	0.003	0.004	0.006	0.007	0.018	0.011
Cobalt (total)	µg/L	0.9		0.101	0.151	0.190	0.289	0.294	0.312
Chromium (total)	µg/L			0.74	0.91	0.97	1.35	1.15	1.36
Copper (total)	µg/L	5		2.0	0.7	0.7	1.8	1.0	1.5
Iron (total)	µg/L	300	300	**726**	**512**	**390**	**1040**	**914**	**1270**
Potassium (total)	µg/L			3250	3180	3360	3530	3670	3650
Magnesium (total)	µg/L			23700	22700	23200	24900	21800	21100
Manganese (total)	µg/L			35.7	34.0	39.6	90.5	67.4	75.6
Molybdenum (total)	µg/L	40	73	0.62	0.58	0.65	0.64	0.62	0.62
Sodium (total)	µg/L			80900	77000	79000	85300	75700	74800
Nickel (total)	µg/L	25	25	16.2	1.2	1.0	1.9	1.2	1.6
Phosphorus (total)	µg/L	10-30		17	19	27	**45**	**50**	**52**
Lead (total)	µg/L	5	7	0.33	0.36	0.37	0.90	1.16	1.39
Antimony (total)	µg/L	20		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	0.3	0.3	0.2	0.4	0.4	0.3
Tin (total)	µg/L			0.10	0.08	0.09	0.11	0.10	0.12
Strontium (total)	µg/L			335	309	327	329	301	293
Titanium (total)	µg/L			2.32	2.28	7.09	7.55	9.98	11.50
Thallium (total)	µg/L	0.3	0.8	0.005	0.005	0.006	0.007	0.007	0.008
Uranium (total)	µg/L	5	15	**30.9**	**30.8**	**30.6**	**29.2**	**27.9**	**28.3**
Vanadium (total)	µg/L	6		0.51	0.54	0.57	0.96	1.08	1.15
Zinc (total)	µg/L	30	30	4	3	3	7	6	7
Lead-210	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	1		0.02	0.02	0.02	0.02	0.01	0.02
Thorium-230	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			100.1	98.4	99.9	100.6	99.8	99.5
ORP	mV			155.6	142	146.3	145	151.4	169.3
SPC	us/cm			1122	1119	1102.7	1067.3	1026.1	993.5
Temperature	°C			12.872	12.917	12.807	12.718	12.708	12.726
Turbidity	FNU			2.72	7.29	2.36	6.48	9.09	8.46
pH	Units			8.07	8.07	8.13	8.09	8.12	8.14
Staff Gauge	cm			23	23.5	25	33	30	28

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value

Table 69: Surface Water Quality – Alexander Creek – Upstream (AC-1)

		Criteria		AC-1								
				2018	2019	2020	2021	2022				
Analysis	Units	PWQO	CWQG	Average				2022-01-13	2022-04-05	2022-07-21	2022-10-12	Average
Total Suspended Solids	mg/L			22	32	30	13	23	9	189	22	61
pH	no unit	6.5-8.5	6.5-9.0	8.00	8.09	8.02	7.97	7.93	8.00	8.04	8.01	8.00
Alkalinity	mg/L as $CaCO_3$			295	278	277	275	278	285	287	268	280
Carbonate	mg/L as $CaCO_3$			2.7	3.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			288	278	277	275	278	285	287	268	280
Total Dissolved Solids	mg/L			711	713	697	743	671	700	677	746	699
Fluoride	mg/L		0.12	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.3	2.2	1.8	2.0	1.0	2.0	2.0	1.0	1.5
Ammonia+Ammonium(N)	as N mg/L			0.06	0.06	0.05	0.04	0.07	0.04	< 0.04	< 0.04	0.05
Chloride (Dissolved)	mg/L		120	**193**	**190**	**213**	**233**	**230**	**230**	**240**	**220**	**230**
Sulphate (dissolved)	mg/L			31	30	30	31	32	34	30	33	32
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	4.04	3.95	4.22	4.34	4.48	4.24	3.98	4.22	4.23
Nitrate + Nitrite (as N)	as N mg/L			4.04	3.95	4.22	4.34	4.48	4.24	3.98	4.22	4.23
Mercury (dissolved)	µg/L	0.2	0.026	< 0.010	< 0.010	0.013	< 0.010	< 0.010	< 0.010	0.020	< 0.010	0.013
Hardness	mg/L as $CaCO_3$			400	408	438	425	435	424	382	427	417
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			183	164	251	103	198	66	51	101	104
Aluminum (0.2µm)	µg/L	75	100	< 5	< 5	3	3	3	3	1	4	3
Arsenic (total)	µg/L	100	5	2.0	1.9	2.2	1.5	1.5	1.0	2.2	1.5	1.6
Barium (total)	µg/L			138	120	140	147	142	142	131	153	145
Beryllium (total)	µg/L	1100		< 0.50	< 0.50	0.01	0.01	0.009	< 0.007	< 0.007	0.015	0.010
Boron (total)	µg/L	200	1500	53	51	53	55	49	56	44	61	53
Bismuth (total)	µg/L			< 1.0	< 1.0	0.028	0.017	0.020	< 0.010	< 0.010	< 0.010	0.013
Calcium (total)	µg/L			120000	125000	136750	132750	136000	128000	119000	127000	127500
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.01	0.01	0.011	< 0.003	0.014	0.010	0.010
Cobalt (total)	µg/L	0.9		< 0.50	< 0.50	0.12	0.10	0.198	0.064	0.023	0.132	0.104
Chromium (total)	µg/L			< 5.0	< 5.0	1.7	1.1	1.14	1.04	0.67	1.29	1.01
Copper (total)	µg/L	5		1.0	< 1.0	1.4	0.6	0.9	0.5	< 0.2	0.7	0.6
Iron (total)	µg/L	300	300	348	303	419	187	406	110	< 7	299	203
Potassium (total)	µg/L			1425	1500	1580	1670	1710	1560	1510	1730	1628
Magnesium (total)	µg/L			23750	22500	23450	22775	23700	25500	20900	25600	24150
Manganese (total)	µg/L			25.8	25.0	32.4	17.2	21.2	8.8	0.6	29.9	15.1
Molybdenum (total)	µg/L	40	73	< 0.50	< 0.50	0.20	0.21	0.20	0.23	0.54	0.24	0.30
Sodium (total)	µg/L			93000	90750	94975	94575	105000	114000	90500	107000	104125
Nickel (total)	µg/L	25	25	< 1.0	< 1.0	0.5	0.6	0.9	0.4	0.3	0.3	0.5
Phosphorus (total)	µg/L	10-30		38	34	46	29	57	11	4	28	25
Lead (total)	µg/L	5	7	0.80	0.69	0.69	0.40	0.84	0.20	< 0.09	0.46	0.40
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	0.83	0.87	0.89	0.93	1.12	0.93	0.97
Tin (total)	µg/L			< 1.0	< 1.0	0.07	0.12	< 0.06	< 0.06	< 0.06	0.06	< 0.06
Strontium (total)	µg/L			288	278	310	327	343	301	320	327	323
Titanium (total)	µg/L			11.4	10.9	11.5	3.3	10.7	3.5	0.1	5.4	4.9
Thallium (total)	µg/L	0.3	0.8	< 0.05	< 0.05	0.01	< 0.01	< 0.005	< 0.005	< 0.005	0.005	< 0.005
Uranium (total)	µg/L	5	15	3.05	3.30	2.95	3.18	3.23	3.05	2.57	3.38	3.06
Vanadium (total)	µg/L	6		1.23	1.25	1.24	0.90	1.08	0.86	0.84	0.91	0.92
Zinc (total)	µg/L	30	30	5	6	4	3	< 2	< 2	< 2	3	2
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.03	< 0.02	0.02
Radium-226	Bq/L	1		< 0.04	< 0.04	0.01	0.01	0.02	0.02	0.01	0.02	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	96.7	77.7	83.3	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	173.7	167.6	113.1	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1224	1328	1290	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	9.368	14.743	11.744	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	2.22	58.85	39.61	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	7.87	7.90	7.69	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 70: Surface Water Quality – Alexander Creek – Downstream (AC-3)

		Criteria		AC-3								
				2018	2019	2020	2021	2022				
Analysis	**Units**	**PWQO**	**CWQG**	Average				2022-01-13	2022-04-05	2022-07-21	2022-10-12	Average
Total Suspended Solids	mg/L			14	20	39	15	12	14	9	24	15
pH	no unit	6.5-8.5	6.5-9.0	8.17	8.21	8.24	8.21	8.20	8.25	8.27	8.28	8.25
Alkalinity	mg/L as $CaCO_3$			288	270	270	275	266	282	281	262	273
Carbonate	mg/L as $CaCO_3$			4.0	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			283	265	270	275	266	282	281	262	273
Total Dissolved Solids	mg/L			675	656	647	666	626	643	706	677	663
Fluoride	mg/L		0.12	< 0.10	< 0.10	0.07	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.1	2.7	1.8	1.8	1.0	1.0	2.0	1.0	1.3
Ammonia+Ammonium(N)	as N mg/L			0.06	0.08	0.05	< 0.04	0.07	< 0.04	< 0.04	< 0.04	0.05
Chloride (Dissolved)	mg/L		120	**163**	**165**	**184**	**200**	**190**	**200**	**210**	**190**	**198**
Sulphate (dissolved)	mg/L			31	32	31	32	33	35	32	32	33
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		13	3.67	3.65	3.81	3.94	4.24	3.88	3.57	3.80	3.87
Nitrate + Nitrite (as N)	as N mg/L			3.67	3.65	3.81	3.94	4.24	3.88	3.57	3.80	3.87
Mercury (dissolved)	µg/L	0.2	0.026	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Hardness	mg/L as $CaCO_3$			403	405	437	420	440	429	376	351	399
Silver (total)	µg/L	0.1	0.25	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			125	177	229	153	136	70	49	153	102
Aluminum (0.2µm)	µg/L	75	100	5	< 5	5	3	5	3	< 1	1	3
Arsenic (total)	µg/L	100	5	2.3	2.4	3.0	2.3	1.7	1.8	1.5	2.0	1.8
Barium (total)	µg/L			140	138	155	149	145	157	133	149	146
Beryllium (total)	µg/L	1100		< 0.50	< 0.50	0.01	0.01	< 0.007	< 0.007	< 0.007	0.013	0.009
Boron (total)	µg/L	200	1500	47	47	51	47	41	49	38	46	44
Bismuth (total)	µg/L			< 1.0	< 1.0	0.030	0.026	0.010	0.010	< 0.010	0.020	0.013
Calcium (total)	µg/L			117500	122500	136250	131000	136000	129000	116000	104000	121250
Cadmium (total)	µg/L	0.2	0.09	< 0.10	< 0.10	0.02	0.01	0.013	0.021	0.006	0.011	0.013
Cobalt (total)	µg/L	0.9		0.50	< 0.50	0.26	0.21	0.154	0.130	0.030	0.193	0.127
Chromium (total)	µg/L			< 5.0	< 5.0	1.4	1.3	0.97	1.15	0.49	1.23	0.96
Copper (total)	µg/L	5		1.6	1.7	1.7	0.9	0.7	0.6	< 0.2	0.9	0.6
Iron (total)	µg/L	300	300	**540**	**375**	**554**	**352**	**354**	183	< 7	**422**	242
Potassium (total)	µg/L			1400	1500	1573	1675	1900	1680	1330	1560	1618
Magnesium (total)	µg/L			23250	22750	23360	22625	24200	26000	20900	21900	23225
Manganese (total)	µg/L			26.3	29.8	56.9	34.0	25.5	18.5	11	41.8	21.7
Molybdenum (total)	µg/L	40	73	< 0.50	< 0.50	0.25	0.27	0.27	0.31	0.28	0.27	0.28
Sodium (total)	µg/L			73500	73000	77275	75100	85300	94400	71400	73300	81100
Nickel (total)	µg/L	25	25	1.1	1.3	0.8	0.9	0.9	0.5	0.3	0.5	0.5
Phosphorus (total)	µg/L	10-30		26	**37**	**46**	**36**	27	12	**4**	30	18
Lead (total)	µg/L	5	7	0.63	0.99	1.17	0.77	0.51	0.43	0.74	0.77	0.61
Antimony (total)	µg/L	20		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	< 2.0	< 2.0	0.72	0.82	0.80	0.70	0.87	0.74	0.78
Tin (total)	µg/L			3.5	< 1.0	0.10	0.12	< 0.06	< 0.06	< 0.06	0.14	0.09
Strontium (total)	µg/L			275	270	306	316	337	299	308	274	305
Titanium (total)	µg/L			8.5	11.7	10.6	7.3	6.8	3.8	0.1	7.1	4.5
Thallium (total)	µg/L	0.3	0.8	< 0.05	< 0.05	0.01	0.01	< 0.005	< 0.005	< 0.005	0.006	0.006
Uranium (total)	µg/L	5	15	**7.10**	**8.78**	**7.03**	**6.26**	**6.31**	**8.74**	4.62	**5.15**	**6.21**
Vanadium (total)	µg/L	6		0.99	1.15	1.22	1.03	0.85	0.81	0.68	0.88	0.81
Zinc (total)	µg/L	30	30	5	6	7	5	< 2	3	< 2	8	4
Lead-210	µg/L			< 0.10	< 0.10	0.03	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	0.03
Radium-226	Bq/L	1		< 0.04	< 0.04	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[1]	-[2]	106.6	88	94.7	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[2]	169.8	131.8	89	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[2]	1109	1147	1160	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[2]	8.568	15.859	12.236	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[2]	5.20	24.53	209.8	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[2]	8.20	8.23	8.02	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 71: Surface Water Quality – Lake Ontario Port Hope Harbour – Location 1 (PHH-1)

		Criteria		PHH-1								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-06-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			10.5	5.3	2.7	4.0	4.0	No Sample[2]	No Sample[3]	No Sample[3]	--
pH	no unit	6.5-8.5	6.5-9.0	8.29	8.36	8.38	8.36	8.36				--
Alkalinity	mg/L as $CaCO_3$			205	203	200	197	197				--
Carbonate	mg/L as $CaCO_3$			3.8	4.3	4.4	3.5	6.3				--
Bicarbonate	mg/L as $CaCO_3$			205	203	193	194	191				--
Total Dissolved Solids	mg/L			326	207	245	270	256				--
Fluoride	mg/L		0.12	0.10	< 0.10	< 0.10	0.07	0.06				--
Total Organic Carbon	mg/L			4.8	3.2	2.8	2.0	2.3				--
Ammonia+Ammonium (N)	as N mg/L			0.06	< 0.05	0.16	0.10	0.05				--
Chloride (Dissolved)	mg/L		120	15	22	14	15	17				--
Sulphate (dissolved)	mg/L			13	15	13	13	14				--
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3				--
Nitrite (as N)	as N mg/L			0.01	< 0.01	0.02	< 0.03	< 0.03				--
Nitrate (as N)	as N mg/L		13	0.71	1.09	0.77	0.68	0.84				--
Nitrate + Nitrite (as N)	as N mg/L			0.72	1.09	0.79	0.68	0.84				--
Mercury (dissolved)	ug/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01				--
Hardness	mg/L as $CaCO_3$			225	220	237	218	221				--
Silver (total)	ug/L	0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05				--
Aluminium (total)	ug/L			182	75	44	88	40				--
Aluminum (0.2um)	ug/L	75	100	7.5	< 5.0	6.0	8.0	1.3				--
Arsenic (total)	ug/L	100	5	< 1.0	< 1.0	< 1.0	0.7	0.5				--
Barium (total)	ug/L			59.5	51.3	53.7	55.0	59.4				--
Beryllium (total)	ug/L	1100		< 0.5	< 0.5	< 0.5	< 0.007	< 0.007				--
Boron (total)	ug/L	200	1500	17	15	15	17	25				--
Bismuth (total)	ug/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010				--
Calcium (total)	ug/L			73000	66000	70000	68700	68900				--
Cadmium (total)	ug/L	0.2	0.09	< 0.1	< 0.1	< 0.1	0.006	0.006				--
Cobalt (total)	ug/L	0.9		< 0.500	< 0.500	< 0.500	0.064	0.053				--
Chromium (total)	ug/L			< 5.0	< 5.0	< 5.0	0.70	0.30				--
Copper (total)	ug/L	5		1.5	1.1	< 1.0	0.6	0.4				--
Iron (total)	ug/L	300	300	290	157	117	141	115				--
Potassium (total)	ug/L			1550	1063	1013	1155	1148				--
Magnesium (total)	ug/L			11000	10700	11667	11350	11867				--
Manganese (total)	ug/L			32.0	22.3	22.7	22.6	19.1				--
Molybdenum (total)	ug/L	40	73	< 0.50	0.51	< 0.50	1.09	0.46				--
Sodium (total)	ug/L			9650	9833	9533	9290	9753				--
Nickel (total)	ug/L	25	25	< 1.0	< 1.0	< 1.0	0.2	0.1				--
Phosphorus (total)	ug/L	10-30		39	16	37	22	15				--
Lead (total)	ug/L	5	7	< 0.50	< 0.50	< 0.50	0.14	0.14				--
Antimony (total)	ug/L	20		< 0.5	< 0.5	< 0.5	< 0.3	< 0.9				--
Selenium (total)	ug/L	100	1	< 2.0	< 2.0	< 2.0	0.09	0.10				--
Tin (total)	ug/L			< 1.0	< 1.0	< 1.0	0.09	0.07				--
Strontium (total)	ug/L			170	160	163	202	182				--
Titanium (total)	ug/L			9.00	6.43	5.70	2.81	1.61				--
Thallium (total)	ug/L	0.3	0.8	< 0.05	< 0.05	< 0.05	0.006	< 0.006				--
Uranium (total)	ug/L	5	15	0.75	0.84	0.74	0.78	0.77				--
Vanadium (total)	ug/L	6		1.11	0.72	0.95	0.88	0.63				--
Zinc (total)	ug/L	30	30	< 5	< 5	< 5	2	2				--
Lead-210	Bq/L			0.03	< 0.10	< 0.10	< 0.02	< 0.02				--
Radium-226	Bq/L	1		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01				--
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02				--
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02				--
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]				--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]				--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]				--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]				--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]				--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]				--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
[2] No sample due to weather conditions
[3] Access not possible to sample based on lake conditions.
--- No data.

Table 72: Surface Water Quality – Lake Ontario Port Hope Harbour – Location 2 (PHH-2)

		Criteria		PHH-2								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-05-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			5.0	18.3	2.0	4.0	5.0	6.0	No Sample[3]	No Sample[3]	6.0
pH	no unit	6.5-8.5	6.5-9.0	8.22	8.25	8.32	8.19	8.20	8.52			8.52
Alkalinity	mg/L as $CaCO_3$			185	190	150	188	184	142			142
Carbonate	mg/L as $CaCO_3$			2.9	3.2	2.9	< 1.0	< 1.0	15			15
Bicarbonate	mg/L as $CaCO_3$			185	187	147	188	184	128			128
Total Dissolved Solids	mg/L			270	215	200	270	248	200			200
Fluoride	mg/L		0.12	< 0.10	< 0.10	< 0.10	< 0.06	0.07	0.11			0.11
Total Organic Carbon	mg/L			3.5	3.8	2.7	3.0	2.7	2.0			2.0
Ammonia+Ammonium (N)	as N mg/L			0.12	0.06	0.11	0.04	0.05	< 0.04			< 0.04
Chloride (Dissolved)	mg/L		120	18	20	19	15	20	35			35
Sulphate (dissolved)	mg/L			14	16	18	13	15	17			17
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3			< 0.3
Nitrite (as N)	as N mg/L			0.02	< 0.01	0.03	< 0.03	< 0.03	< 0.03			< 0.03
Nitrate (as N)	as N mg/L		13	0.57	0.94	0.49	0.47	0.79	0.46			0.46
Nitrate + Nitrite (as N)	as N mg/L			0.59	0.94	0.51	0.47	0.79	0.46			0.46
Mercury (dissolved)	ug/L	0.2	0.026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01
Hardness	mg/L as $CaCO_3$			200	203	193	224	204	178			178
Silver (total)	ug/L	0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.05	0.06	0.12			0.12
Aluminium (total)	ug/L			64	157	40	158	39	319			319
Aluminum (0.2um)	ug/L	75	100	< 5.0	< 5.0	5.3	10.0	1.3	8			8
Arsenic (total)	ug/L	100	5	2.0	3.0	2.5	2.3	8.4	54			54
Barium (total)	ug/L			52.5	52.0	40.7	66.5	54.2	52.9			52.9
Beryllium (total)	ug/L	1100		< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	0.011			0.011
Boron (total)	ug/L	200	1500	23	18	20	18	39	28			28
Bismuth (total)	ug/L			< 1.0	< 1.0	< 1.0	0.009	0.407	4.280			4.280
Calcium (total)	ug/L			82500	63000	53000	71100	62933	54700			54700
Cadmium (total)	ug/L	0.2	0.09	< 0.1	< 0.1	< 0.1	0.005	0.005	0.014			0.014
Cobalt (total)	ug/L	0.9		< 0.500	< 0.500	< 0.500	0.129	0.315	1.783			1.783
Chromium (total)	ug/L			< 5.0	< 5.0	< 5.0	0.54	0.28	0.85			0.85
Copper (total)	ug/L	5		2.4	2.3	< 1.5	0.6	1.1	5.2			5.2
Iron (total)	ug/L	300	300	185	297	< 100	253	319	419			419
Potassium (total)	ug/L			1600	1267	1333	1260	1240	1480			1480
Magnesium (total)	ug/L			10500	10367	10267	11200	11290	9960			9960
Manganese (total)	ug/L			31.9	40.3	16.7	50.6	21.5	44.1			44.1
Molybdenum (total)	ug/L	40	73	0.56	0.55	0.76	0.48	0.68	1.07			1.07
Sodium (total)	ug/L			11500	10833	12333	8660	10867	14100			14100
Nickel (total)	ug/L	25	25	< 1.0	< 1.0	< 1.0	0.3	0.6	3.4			3.4
Phosphorus (total)	ug/L	10-30		30	42	23	23	19	44			44
Lead (total)	ug/L	5	7	0.57	1.37	< 0.50	0.35	4.63	40.8			40.8
Antimony (total)	ug/L	20		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	0.9			0.9
Selenium (total)	ug/L	100	1	< 2.0	< 2.0	< 2.0	0.10	0.13	0.16			0.16
Tin (total)	ug/L			< 1.0	< 1.0	< 1.0	0.12	0.07	0.13			0.13
Strontium (total)	ug/L			160	153	167	190	179	183			183
Titanium (total)	ug/L			6.95	10.37	< 5.00	6.53	2.01	19.65			19.65
Thallium (total)	ug/L	0.3	0.8	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	0.008			0.008
Uranium (total)	ug/L	5	15	3.80	2.70	2.30	1.67	35.35	112			112
Vanadium (total)	ug/L	6		0.91	0.91	0.84	0.96	0.62	1.28			1.28
Zinc (total)	ug/L	30	30	< 5	< 5	< 5	3	< 2	6			6
Lead-210	Bq/L			< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02			< 0.02
Radium-226	Bq/L	1		< 0.04	0.05	< 0.04	0.03	0.07	0.37			0.37
Thorium-230	Bq/L			< 0.07	0.10	< 0.07	< 0.02	< 0.02	< 0.02			< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02			< 0.02
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	111.9			--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	191.6			--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	364.3			--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	17.338			--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	6.22			--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.32			--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
[2] No sample due to weather conditions
[3] Access not possible to sample based on lake conditions.
--- No data.

Table 73: Surface Water Quality – Lake Ontario Port Hope Harbour – Location 3 (PHH-4)

		Criteria		PHH-4								
				2017	2018	2019	2020	2021	2022			
Parameter	Units	PWQO	CWQG	Average					2022-06-15	2022-09-23	2022-11-02	Average
Total Suspended Solids	mg/L			1.0	1.5	2.0	3.0	2.3	4.0	2.0	< 2.0	2.7
pH	no unit	6.5-8.5	6.5-9.0	8.18	8.34	8.31	8.15	8.04	8.25	8.12	8.07	8.15
Alkalinity	mg/L as $CaCO_3$			94	144	122	96	93	94	131	94	106
Carbonate	mg/L as $CaCO_3$			1.3	3.4	2.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			93	143	118	96	93	94	131	94	106
Total Dissolved Solids	mg/L			255	158	185	180	151	146	169	180	165
Fluoride	mg/L		**0.12**	**0.13**	0.11	< 0.10	0.11	**0.12**	0.11	0.08	0.10	0.10
Total Organic Carbon	mg/L			2.3	2.6	2.4	1.5	2.0	2.0	2.0	3.0	2.3
Ammonia+Ammonium (N)	as N mg/L			< 0.05	< 0.05	0.05	0.05	< 0.04	< 0.04	0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	22	20	21	24	25	35	20	24	26
Sulphate (dissolved)	mg/L			23	19	20	21	22	23	18	20	20
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.20	0.50	0.36	0.29	0.31	0.35	0.47	0.21	0.34
Nitrate + Nitrite (as N)	as N mg/L			0.20	0.50	0.36	0.29	0.31	0.35	0.47	0.21	0.34
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$			120	165	160	125	130	125	149	123	132
Silver (total)	µg/L	**0.1**	**0.25**	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			20	26	76	45	24	8	40	1	16
Aluminum (0.2µm)	µg/L	**75**	**100**	< 5.0	< 5.0	< 5.3	4.5	2.0	2	15	2	6.3
Arsenic (total)	µg/L	**100**	**5**	< 1.0	< 1.0	1.0	0.9	0.8	1.0	**8.0**	0.8	3.3
Barium (total)	µg/L			21.5	36.0	27.7	25.6	22.7	24.4	36.4	22.4	27.7
Beryllium (total)	µg/L	**1100**		< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	0.010	0.008
Boron (total)	µg/L	**200**	**1500**	21	19	21	22	26	27	27	20	25
Bismuth (total)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	0.300	< 0.010	0.107
Calcium (total)	µg/L			32500	45500	45333	38550	37433	36100	44000	35300	38467
Cadmium (total)	µg/L	**0.2**	**0.09**	< **0.1**	< **0.1**	< **0.1**	0.005	0.006	0.008	0.003	0.011	0.007
Cobalt (total)	µg/L	**0.9**		< 0.500	< 0.500	< 0.500	0.036	0.017	0.009	0.171	0.020	0.067
Chromium (total)	µg/L			< 5.0	< 5.0	< 5.0	0.74	0.27	0.27	0.31	5.51	2.36
Copper (total)	µg/L	**5**		1.6	1.1	< 1.1	0.9	0.8	0.8	1.5	1.1	1.1
Iron (total)	µg/L	**300**	**300**	< 100	105	< 163	49	31	8	73	50	44
Potassium (total)	µg/L			1500	1200	1400	1635	1717	1600	1380	1690	1557
Magnesium (total)	µg/L			8500	9100	9100	8295	8853	8560	9600	8370	8843
Manganese (total)	µg/L			< 2.0	12.0	12.3	2.8	1.8	1.0	10.1	1.37	4.2
Molybdenum (total)	µg/L	**40**	**73**	1.10	0.75	0.93	1.56	1.42	1.17	0.93	1.14	1.08
Sodium (total)	µg/L			13500	11500	13333	12200	14967	14100	11500	12800	12833
Nickel (total)	µg/L	**25**	**25**	< 1.0	< 1.0	< 1.0	0.6	0.6	0.5	0.6	0.6	0.6
Phosphorus (total)	µg/L	**10-30**		6	9	10	8	**9**	**4**	**9**	**7**	**7**
Lead (total)	µg/L	**5**	**7**	< 0.50	< 0.50	< 0.50	0.08	0.09	< 0.09	3.48	< 0.09	1.22
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	< 2.0	0.12	0.16	0.14	0.12	0.24	0.17
Tin (total)	µg/L			< 1.0	< 1.0	< 1.0	0.19	0.07	0.08	< 0.06	< 0.06	0.07
Strontium (total)	µg/L			160	160	163	205	190	185	178	183	191
Titanium (total)	µg/L			< 5.00	5.20	< 5.00	1.87	1.14	0.48	1.80	0.21	0.83
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.05	< 0.05	< 0.05	0.006	0.005	< 0.005	< 0.005	0.007	0.006
Uranium (total)	µg/L	**5**	**15**	0.35	0.62	0.45	0.40	0.39	0.50	**29.7**	0.50	**10.27**
Vanadium (total)	µg/L	**6**		< 0.50	0.54	0.77	0.46	0.26	0.20	0.42	0.24	0.29
Zinc (total)	µg/L	**30**	**30**	< 5	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L			0.11	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	0.01	0.05	< 0.01	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	104.3	88.4	112.1	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	187.3	85.4	183.3	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	271.7	363.3	298.7	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	12.265	10.638	12.2	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	3.14	1.07	-0.07	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.07	8.09	8.42	--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Field parameters included for current sampling year only.
--- No data.

Table 74: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-1a) - 2022 January to April

		Criteria		PHH-1a														
Analysis	**Units**	**PWQO**	**CWQG**	2022-01-20[2]	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-09	2022-03-16	2022-03-21	2022-03-29	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Total Suspended Solids	mg/L			**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	**No Sample**	6	27	42	47	17	**No Sample**	6	**No Sample**	10
Hardness	mg/L as CaCO3									234	211	242	238	264		234		225
Silver (total)	µg/L	**0.1**	**0.25**							< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05		< 0.05
Aluminum (total)	µg/L									121	425	587	1040	214		138		197
Arsenic (total)	µg/L	**100**	**5**							0.5	0.4	0.4	0.5	0.4		0.4		0.4
Barium (total)	µg/L									55.3	51.1	57.2	51.4	51.7		49.9		50.4
Beryllium (total)	µg/L	**1100**								< 0.007	0.024	0.028	0.039	0.007		< 0.007		0.018
Boron (total)	µg/L	**200**	**1500**							13	13	14	12	17		16		19
Bismuth (total)	µg/L									< 0.01	< 0.01	< 0.01	0.03	< 0.01		< 0.01		0.02
Calcium (total)	µg/L									76100	71700	79700	82300	88300		76600		73600
Cadmium (total)	µg/L	**0.2**	**0.09**							0.011	0.014	0.017	0.027	0.019		0.006		0.006
Cobalt (total)	µg/L	**0.9**								0.088	0.214	0.275	0.484	0.124		0.095		0.105
Chromium (total)	µg/L									0.44	0.77	1.07	1.40	0.17		0.44		0.46
Copper (total)	µg/L	**5**								0.3	0.9	0.9	1.3	0.8		0.5		0.9
Iron (total)	µg/L	**300**	**300**							198	**512**	**808**	**1100**	297		185		244
Potassium (total)	µg/L									1190	1740	1440	1940	1320		1130		1210
Magnesium (total)	µg/L									10800	7670	10500	8010	10600		10400		9940
Manganese (total)	µg/L									20.4	42.7	53.0	72.0	36.2		23.1		25.1
Molybdenum (total)	µg/L	**40**	**73**							0.42	0.29	0.37	0.31	0.38		0.34		0.37
Sodium (total)	µg/L									19500	12600	20300	11800	13500		11900		13100
Nickel (total)	µg/L	**25**	**25**							0.2	0.5	0.6	1.0	0.2		0.3		0.3
Phosphorus (total)	µg/L	**10-30**								24	**59**	**71**	**100**	**31**		12		24
Lead (total)	µg/L	**5**	**7**							0.23	0.53	0.68	0.95	0.27		0.26		0.52
Antimony (total)	µg/L	**20**								< 0.9	< 0.9	< 0.9	< 0.9	< 0.9		< 0.9		< 0.9
Selenium (total)	µg/L	**100**	**1**							0.13	0.14	0.16	0.17	0.22		0.16		0.16
Tin (total)	µg/L									0.17	< 0.06	0.10	0.10	< 0.06		< 0.06		< 0.06
Strontium (total)	µg/L									185	154	175	148	188		174		172
Titanium (total)	µg/L									5.24	19.60	26.10	41.30	9.04		5.16		7.89
Thallium (total)	µg/L	**0.3**	**0.8**							< 0.005	0.007	0.005	0.012	< 0.005		< 0.005		0.006
Uranium (total)	µg/L	**5**	**15**							0.93	0.78	0.92	0.74	0.90		0.74		0.71
Vanadium (total)	µg/L	**6**								0.68	1.20	1.48	2.16	0.80		0.67		0.74
Zinc (total)	µg/L	**30**	**30**							3	4	5	5	5		< 2		< 2
Radium-226	Bq/L	**1**								< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005		< 0.005

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site
[2] Frozen, unable to collect surface water sample.

Table 75: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-1a) - 2022 May to August

Analysis	Units	Criteria		PHH-1a																
		PWQO	CWQG	2022-05-04	2022-05-10	2022-05-17	2022-05-23[1]	2022-05-31	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-04	2022-08-09	2022-08-16	2022-08-24	2022-08-31
Total Suspended Solids	mg/L			133	4	4	No Sample	3	16	9	6	4	7	7	11	32	8	6	8	10	13
Hardness	mg/L as CaCO3			280	286	234		241	232	123	240	224	190	169	196	209	198	184	193	215	191
Silver (total)	µg/L	0.1	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
Aluminum (total)	µg/L			898	42	56		38	239	11	66	83	78	651	228	662	96	67	70	87	195
Arsenic (total)	µg/L	100	5	0.7	0.4	0.6		0.6	0.6	0.8	0.5	0.7	0.7	1.1	0.7	0.9	0.7	0.7	0.5	0.6	0.6
Barium (total)	µg/L			68.6	63.1	53.2		62.1	58.8	24.0	55.2	59.1	60.5	54.1	64.9	68.9	65.7	70.7	59.4	60.6	66.8
Beryllium (total)	µg/L	1100		0.058	< 0.007	< 0.007		< 0.007	0.009	< 0.007	< 0.007	< 0.007	< 0.007	0.022	0.008	0.036	0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	200	1500	20	33	17		24	28	25	16	26	26	20	18	30	28	23	17	21	17
Bismuth (total)	µg/L			< 0.01	0.04	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01
Calcium (total)	µg/L			96200	91100	73200		73600	76100	35300	69000	67600	54800	53200	61100	64100	58900	54100	56000	67500	59400
Cadmium (total)	µg/L	0.2	0.09	0.034	0.003	0.007		< 0.003	0.008	0.007	0.006	0.006	0.003	0.026	0.018	0.007	0.003	0.012	0.004	0.007	< 0.003
Cobalt (total)	µg/L	0.9		0.547	0.052	0.064		0.044	0.163	0.019	0.080	0.069	0.082	0.391	0.151	0.434	0.098	0.079	0.069	0.112	0.157
Chromium (total)	µg/L			1.14	0.28	0.47		0.18	0.58	0.27	0.86	0.48	0.47	1.84	0.63	0.95	2.41	0.44	0.43	0.33	0.43
Copper (total)	µg/L	5		2.0	0.5	0.4		< 0.2	0.7	0.9	0.4	0.4	0.6	2.9	0.7	3.2	0.5	0.4	0.3	0.5	0.7
Iron (total)	µg/L	300	300	1190	106	123		120	416	12	161	142	156	821	338	868	166	146	155	140	356
Potassium (total)	µg/L			1720	1400	1160		1090	1300	1570	1010	1020	932	1170	1280	1240	1220	981	1030	1290	1400
Magnesium (total)	µg/L			9760	13900	12300		13800	10300	8440	11300	13400	12800	8840	10200	11900	12000	11800	13000	11200	10300
Manganese (total)	µg/L			130.0	24.2	23.2		23.5	43.8	1.0	22.9	21.0	15.5	47.7	38.2	58.7	22.8	17.7	16.4	22.0	32.7
Molybdenum (total)	µg/L	40	73	0.27	0.42	0.53		0.54	0.44	1.10	0.43	0.48	0.51	0.46	0.47	0.60	0.48	0.45	0.45	0.54	0.48
Sodium (total)	µg/L			13800	14000	11900		12800	13600	13900	10300	10600	11400	9420	9660	12000	10800	9030	9570	9220	8430
Nickel (total)	µg/L	25	25	0.9	0.2	0.2		< 0.1	0.8	0.6	0.2	0.2	0.2	0.7	0.4	0.8	0.5	0.2	0.2	0.3	0.3
Phosphorus (total)	µg/L	10-30		105	22	21		12	45	10	17	24	15	63	34	28	72	21	14	28	35
Lead (total)	µg/L	5	7	1.39	0.16	0.17		0.24	0.46	< 0.09	0.37	0.36	0.32	3.51	0.46	0.85	0.34	0.32	0.31	0.34	0.64
Antimony (total)	µg/L	20		< 0.9	< 0.9	< 0.9		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	0.17	0.12	0.11		0.13	0.16	0.13	0.13	0.12	0.09	0.14	0.16	0.09	1.69	0.17	< 0.04	0.09	< 0.04
Tin (total)	µg/L			< 0.06	< 0.06	< 0.06		< 0.06	0.07	0.08	0.07	< 0.06	0.06	0.79	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.07	< 0.06
Strontium (total)	µg/L			221	201	181		195	175	178	195	189	162	165	178	211	171	177	167	174	163
Titanium (total)	µg/L			31.20	2.09	2.48		1.57	10.70	0.62	2.88	3.50	3.69	25.40	9.14	30.70	5.10	2.98	3.15	7.51	9.21
Thallium (total)	µg/L	0.3	0.8	0.008	< 0.005	< 0.005		< 0.005	0.005	0.006	< 0.005	< 0.005	< 0.005	0.011	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.012	< 0.005
Uranium (total)	µg/L	5	15	0.84	0.99	0.81		0.90	0.79	0.52	0.99	0.79	0.75	0.58	0.74	0.96	0.78	0.89	0.80	0.84	0.66
Vanadium (total)	µg/L	6		2.51	0.62	0.67		0.67	1.25	0.22	0.80	0.79	0.72	2.13	1.32	2.80	1.63	0.81	0.75	0.93	1.06
Zinc (total)	µg/L	30	30	7	< 2	< 2		4	3	< 2	2	< 2	4	18	2	6	< 2	< 2	< 2	< 2	< 2
Radium-226	Bq/L	1		0.008	< 0.005	< 0.005		< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.005	0.017	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.005

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site

Table 76: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-1a) - 2022 September to December

Analysis	Units	Criteria		PHH-1a															
		PWQO	CWQG	2022-09-06	2022-09-13	2022-09-21	2022-09-28	2022-10-03	2022-10-11	2022-10-18	2022-10-24	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-11-29	2022-12-08	2022-12-12	2022-12-21
Total Suspended Solids	mg/L			2	10	8	9	7	4	< 2	3	3	5	7	**No Sample**	7	2	10	3
Hardness	mg/L as CaCO3			203	208	225	210	216	216	248	188	204	183	232		229	223	273	251
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			36	87	94	105	37	33	65	35	28	42	60		77	48	94	58
Arsenic (total)	µg/L	**100**	**5**	0.5	0.5	0.6	0.5	0.5	0.4	0.5	2.0	0.4	0.3	0.3		0.3	0.3	0.4	0.3
Barium (total)	µg/L			62.0	62.8	62.9	64.9	60.4	63.8	61.6	71.4	70.7	67.3	62.1		65.2	56.3	68.4	64.7
Beryllium (total)	µg/L	**1100**		< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	0.310	0.011	0.018	< 0.007		< 0.007	0.008	0.010	0.007
Boron (total)	µg/L	**200**	**1500**	19	19	16	26	14	15	19	17	15	16	16		35	14	22	19
Bismuth (total)	µg/L			< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01		< 0.01	0.02	0.01	< 0.01
Calcium (total)	µg/L			61700	64700	70600	66000	64500	65800	78100	57500	63400	57200	73700		71500	69100	86400	78900
Cadmium (total)	µg/L	**0.2**	**0.09**	0.007	0.012	0.004	0.018	< 0.003	< 0.003	< 0.003	0.441	0.019	0.006	0.003		< 0.003	< 0.003	0.009	0.005
Cobalt (total)	µg/L	**0.9**		0.071	0.087	0.103	0.112	0.046	0.043	0.073	0.202	0.039	0.053	0.049		0.059	0.041	0.075	0.055
Chromium (total)	µg/L			0.21	0.43	0.35	0.43	0.24	0.23	0.38	2.16	0.30	0.33	0.36		0.70	< 0.08	0.38	< 0.08
Copper (total)	µg/L	**5**		0.3	0.3	0.5	0.4	0.3	0.3	0.5	0.6	0.3	0.3	0.3		0.2	0.3	0.5	0.4
Iron (total)	µg/L	**300**	**300**	116	171	189	188	111	95	140	85	98	106	184		161	140	236	150
Potassium (total)	µg/L			1080	1210	1290	1320	1170	1120	1590	1200	1140	1040	1220		1110	1090	1260	1170
Magnesium (total)	µg/L			11900	11200	11900	11000	13400	12500	12800	10800	11200	9820	11700		12300	12200	13900	13000
Manganese (total)	µg/L			12.9	20.9	25.4	20.7	15.3	13.4	17.2	13.2	11.6	11.7	16.0		15.7	17.8	26.3	17.6
Molybdenum (total)	µg/L	**40**	**73**	0.47	0.48	0.47	0.46	0.44	0.45	0.76	1.10	0.43	0.60	0.42		0.39	0.35	0.46	0.47
Sodium (total)	µg/L			9120	8550	9770	8350	9190	8690	10000	8870	8530	7200	9540		10100	10100	21900	14900
Nickel (total)	µg/L	**25**	**25**	0.3	0.2	0.3	0.3	< 0.1	0.2	0.2	0.7	< 0.1	0.6	0.2		0.1	0.2	0.2	< 0.1
Phosphorus (total)	µg/L	**10-30**		12	19	25	**37**	28	25	**44**	**111**	7	17	17		15	15	19	9
Lead (total)	µg/L	**5**	**7**	0.27	0.36	0.26	0.24	0.19	0.16	0.20	0.20	< 0.09	0.17	0.20		0.23	0.10	0.34	0.36
Antimony (total)	µg/L	**20**		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9		< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.08	0.11	0.09	0.26	0.07	0.12	0.07	5.70	0.28	0.40	0.07		0.10	0.22	0.13	0.14
Tin (total)	µg/L			< 0.06	< 0.06	< 0.06	< 0.06	0.12	< 0.06	0.13	0.12	< 0.06	0.07	< 0.06		0.06	< 0.06	0.06	0.07
Strontium (total)	µg/L			171	171	188	187	183	185	201	192	195	204	192		193	177	198	214
Titanium (total)	µg/L			1.51	3.95	4.75	5.13	1.93	1.60	3.04	9.07	1.56	2.22	3.06		3.10	2.37	4.32	2.52
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.028	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	0.87	0.66	0.95	0.74	0.84	0.80	0.65	0.86	0.70	1.07	0.92		0.82	0.77	0.89	0.93
Vanadium (total)	µg/L	**6**		0.65	0.73	0.75	0.71	0.54	0.48	0.57	0.74	0.44	0.44	0.42		0.49	0.43	0.51	0.43
Zinc (total)	µg/L	**30**	**30**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2		< 2	< 2	3	11
Radium-226	Bq/L	**1**		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.009	0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.008

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site

Table 77: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-2a) - 2022 January to April

Analysis	Units	Criteria		PHH-2a														
		PWQO	CWQG	2022-01-20	2022-01-24[1]	2022-01-31[1]	2022-02-07[1]	2022-02-17[1]	2022-02-21[1]	2022-03-03	2022-03-09	2022-03-16	2022-03-21	2022-03-29	2022-04-04[1]	2022-04-12	2022-04-20[1]	2022-04-26
Total Suspended Solids	mg/L			2	No Sample	No Sample	No Sample	No Sample	No Sample	4	22	21	40	8	No Sample	2	No Sample	4
Hardness	mg/L as CaCO3			221						238	216	238	235	257		247		222
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05						< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05		< 0.05
Aluminum (total)	µg/L			40						79	407	373	875	122		115		195
Arsenic (total)	µg/L	**100**	**5**	1.2						1.4	2.3	3.3	4.5	3.4		2.8		1.5
Barium (total)	µg/L			59.7						54.5	52.3	49.4	50.8	53.4		53.9		52.4
Beryllium (total)	µg/L	**1100**		< 0.007						< 0.007	0.020	0.018	0.029	< 0.007		< 0.007		0.014
Boron (total)	µg/L	**200**	**1500**	15						12	13	13	13	27		21		19
Bismuth (total)	µg/L			0.06						0.10	0.26	0.41	0.47	0.23		0.11		0.10
Calcium (total)	µg/L			68800						77500	73500	78700	81000	85900		80900		72700
Cadmium (total)	µg/L	**0.2**	**0.09**	0.004						0.003	0.017	0.014	0.018	0.016		0.004		0.004
Cobalt (total)	µg/L	**0.9**		0.093						0.138	0.324	0.364	0.623	0.202		0.137		0.146
Chromium (total)	µg/L			0.42						0.25	0.86	0.82	1.45	0.11		0.30		0.48
Copper (total)	µg/L	**5**		0.6						0.5	1.1	1.1	1.6	0.8		0.6		0.6
Iron (total)	µg/L	**300**	**300**	93						143	**477**	**537**	**943**	212		163		203
Potassium (total)	µg/L			1010						1280	1830	1430	1980	1300		1210		1220
Magnesium (total)	µg/L			12000						10800	7890	10000	8070	10400		11000		9840
Manganese (total)	µg/L			12.1						18.8	36.8	37.3	60.1	31.2		21.7		22.4
Molybdenum (total)	µg/L	**40**	**73**	0.45						0.42	0.37	0.39	0.39	0.40		0.40		0.43
Sodium (total)	µg/L			14500						19600	13700	19900	13500	15400		13200		13000
Nickel (total)	µg/L	**25**	**25**	0.2						0.4	0.7	0.7	1.2	0.4		0.4		0.4
Phosphorus (total)	µg/L	**10-30**		5						23	**55**	**48**	**94**	27		14		19
Lead (total)	µg/L	**5**	**7**	1.21						1.67	3.62	4.42	4.67	2.9		1.2		1.3
Antimony (total)	µg/L	**20**		< 0.9						< 0.9	< 0.9	< 0.9	< 0.9	< 0.9		< 0.9		< 0.9
Selenium (total)	µg/L	**100**	**1**	0.12						0.11	0.17	0.12	0.21	0.17		0.16		0.15
Tin (total)	µg/L			0.09						0.06	< 0.06	0.13	0.08	< 0.06		0.07		< 0.06
Strontium (total)	µg/L			197						182	154	173	150	191		184		168
Titanium (total)	µg/L			1.88						4.65	19.60	17.90	35.90	5.35		4.77		7.74
Thallium (total)	µg/L	**0.3**	**0.8**	0.006						< 0.005	0.006	< 0.005	0.011	< 0.005		< 0.005		0.005
Uranium (total)	µg/L	**5**	**15**	4.80						4.46	**6.09**	**8.56**	**12.9**	**11.8**		**10.6**		4.11
Vanadium (total)	µg/L	**6**		0.43						0.54	1.19	1.08	1.86	0.64		0.64		0.73
Zinc (total)	µg/L	**30**	**30**	3						< 2	5	3	4	3		< 2		3
Radium-226	Bq/L	**1**		0.035						0.030	0.008	0.025	0.019	0.024		0.019		0.014

PWQO = Provincial Water Quality Objectives, Ministry of the Environment, February 1999
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site

Table 78: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-2a) - 2022 May to August

Analysis	Units	Criteria		PHH-2a																
		PWQO	CWQG	2022-05-04	2022-05-10	2022-05-17	2022-05-23[1]	2022-05-31	2022-06-09	2022-06-15	2022-06-21	2022-06-27	2022-07-06	2022-07-12	2022-07-19	2022-07-26	2022-08-04	2022-08-09	2022-08-16	2022-08-24	2022-08-31
Total Suspended Solids	mg/L			55	5	6	No Sample	3	14	7	4	7	5	7	14	17	5	5	6	11	87
Hardness	mg/L as CaCO3			256	266	228		205	217	187	183	212	188	188	188	193	189	176	167	231	222
Silver (total)	µg/L	0.1	0.25	< 0.05	0.06	< 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	0.07	< 0.05
Aluminum (total)	µg/L			1270	62	79		33	191	98	43	115	76	525	283	252	77	90	50	141	843
Arsenic (total)	µg/L	100	5	4.9	**48.5**	**26.9**		**26.6**	**13.5**	**10.0**	**40.4**	**7.7**	**9.0**	**7.7**	**9.2**	**10.2**	**8.2**	**9.1**	2.9	**12.3**	**6.8**
Barium (total)	µg/L			62.2	61.2	53.6		53.9	55.5	53.4	43.2	58.5	59.5	64.9	55.6	58.9	64.6	69.6	48.7	59.3	81.0
Beryllium (total)	µg/L	1100		0.055	0.011	< 0.007		< 0.007	0.011	0.007	< 0.007	< 0.007	< 0.007	0.021	0.011	0.010	0.008	0.008	< 0.007	< 0.007	0.033
Boron (total)	µg/L	200	1500	18	41	17		25	24	23	18	26	24	19	23	32	19	21	20	19	18
Bismuth (total)	µg/L			0.41	4.08	1.10		0.27	0.67	0.29	0.49	0.09	0.31	0.46	0.43	0.89	0.14	0.31	0.09	0.43	0.47
Calcium (total)	µg/L			86400	84500	71300		62000	70000	58700	53900	63800	54700	57500	58900	59000	55800	52000	48100	72200	70600
Cadmium (total)	µg/L	0.2	0.09	0.025	0.007	0.011		0.008	0.014	0.007	< 0.003	< 0.003	< 0.003	0.013	0.013	0.014	< 0.003	0.012	0.003	0.126	0.026
Cobalt (total)	µg/L	0.9		0.724	**2.110**	0.637		0.208	0.440	0.189	0.245	0.141	0.293	0.483	0.337	0.569	0.173	0.211	0.089	0.361	0.747
Chromium (total)	µg/L			1.73	0.69	0.49		0.60	5.35	0.19	0.44	0.57	0.38	0.90	0.66	0.81	2.15	0.30	0.34	0.44	1.34
Copper (total)	µg/L	5		2.0	3.7	1.5		0.9	1.2	0.9	1.4	0.6	1.5	1.5	1.2	1.9	0.6	0.7	0.5	1.2	2.2
Iron (total)	µg/L	300	300	**1470**	133	149		278	285	150	93	190	170	**722**	**399**	**412**	164	188	140	215	**1270**
Potassium (total)	µg/L			1760	1730	1320		1250	1340	1110	1430	1040	975	1070	1300	1260	1340	1060	1190	1460	1560
Magnesium (total)	µg/L			9740	13300	12200		12300	10200	9900	9880	12800	12500	10800	10000	11100	12100	11100	11300	12200	11000
Manganese (total)	µg/L			75.0	29.2	30.5		25.4	40.0	35.4	20.8	33.6	20.4	66.5	41.2	54.6	29.8	27.8	16.4	30.9	96.7
Molybdenum (total)	µg/L	40	73	0.41	0.92	0.80		0.96	0.60	0.59	0.94	0.57	0.54	0.56	0.66	0.84	0.55	0.52	0.65	0.57	0.53
Sodium (total)	µg/L			13600	17600	13100		13700	13800	11800	13000	10600	11400	9360	10100	11900	10900	9510	12400	10100	8210
Nickel (total)	µg/L	25	25	1.6	3.8	1.6		3.5	1.1	0.5	1.1	0.3	0.5	0.5	0.7	2.0	0.7	0.4	0.4	0.8	1.4
Phosphorus (total)	µg/L	10-30		**81**	27	21		12	**35**	28	19	26	21	**54**	**43**	27	**76**	27	18	**39**	**123**
Lead (total)	µg/L	5	7	3.0	**31.6**	**7.56**		2.2	**7.2**	2.47	3.62	1.06	2.37	3.83	3.40	**6.00**	1.22	3.02	1.03	4.70	**6.17**
Antimony (total)	µg/L	20		< 0.9	1.1	< 0.9		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	0.11	0.18	0.16		0.09	0.22	0.12	0.12	0.11	0.10	0.15	0.16	0.17	1.96	0.22	< 0.04	0.18	< 0.04
Tin (total)	µg/L			< 0.06	0.09	0.06		0.06	< 0.06	0.06	< 0.06	< 0.06	0.16	0.08	0.27	< 0.06	< 0.06	< 0.06	< 0.06	0.06	< 0.06
Strontium (total)	µg/L			208	209	187		194	170	174	198	191	166	192	171	192	170	175	162	191	185
Titanium (total)	µg/L			55.60	2.86	3.71		1.69	8.44	4.64	1.71	4.52	4.04	22.20	11.40	12.00	4.01	4.08	2.39	5.47	41.60
Thallium (total)	µg/L	0.3	0.8	0.015	0.006	< 0.005		< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	0.008	< 0.005	0.005	0.005	< 0.005	< 0.005	0.009	0.010
Uranium (total)	µg/L	5	15	**14.2**	**99.4**	**57.2**		**83**	**29.8**	**26.5**	**63.4**	**8.15**	**6.53**	4.81	**6.21**	**8.75**	**5.80**	**10.80**	**5.21**	**36.80**	**20.30**
Vanadium (total)	µg/L	6		2.92	0.84	0.78		0.69	1.23	0.73	0.68	0.90	0.77	1.66	1.29	1.18	1.41	0.84	0.53	1.20	2.32
Zinc (total)	µg/L	30	30	6	3	9		< 2	2	< 2	4	< 2	3	4	3	4	< 2	< 2	< 2	< 2	8
Radium-226	Bq/L	1		0.028	0.526	0.255		0.177	0.108	0.078	0.177	0.051	0.046	< 0.005	0.037	0.037	0.037	0.062	0.009	0.078	0.016

PWQO = Provincial Water Quality Objectives, Ministry of the Environment, February 1999
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site

Table 79: Surface Water Quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-2a) - 2022 September to December

Analysis	Units	Criteria		PHH-2a															
		PWQO	CWQG	2022-09-06	2022-09-13	2022-09-21	2022-09-28	2022-10-03	2022-10-11	2022-10-18	2022-10-24	2022-11-01	2022-11-08	2022-11-15	2022-11-24[1]	2022-11-29	2022-12-08	2022-12-12	2022-12-21
Total Suspended Solids	mg/L			16	29	8	6	10	5	11	6	2	3	17	No Sample	11	11	6	4
Hardness	mg/L as CaCO3			220	210	231	207	223	214	247	187	195	185	205		229	228	264	241
Silver (total)	µg/L	0.1	0.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	0.11	< 0.05	< 0.05	< 0.05		< 0.05	0.10	< 0.05	< 0.05
Aluminum (total)	µg/L			90	246	80	89	63	44	192	84	41	47	92		139	191	83	62
Arsenic (total)	µg/L	100	5	**8.2**	**20.6**	**8.9**	**12.6**	**8.9**	**17.5**	**11.5**	**13.6**	**5.7**	**13.2**	1.8		**6.2**	**12.1**	3.0	1.1
Barium (total)	µg/L			65.0	62.8	64.6	65.1	64.6	64.1	68.0	71.1	69.2	68.0	55.0		60.9	61.7	64.7	62.2
Beryllium (total)	µg/L	1100		0.007	0.010	< 0.007	< 0.007	0.010	0.008	< 0.007	0.293	0.027	0.027	0.009		0.008	0.015	0.010	< 0.007
Boron (total)	µg/L	200	1500	22	18	16	29	17	18	21	22	18	20	16		23	21	24	20
Bismuth (total)	µg/L			0.19	1.04	0.30	0.41	0.25	0.54	1.87	1.41	0.66	1.36	0.14		0.76	3.00	0.33	0.11
Calcium (total)	µg/L			67900	65300	72300	64600	67100	64900	77200	57100	60400	58300	64600		71500	70400	83300	76200
Cadmium (total)	µg/L	0.2	0.09	0.006	0.009	< 0.003	0.007	0.005	< 0.003	0.010	0.440	0.022	0.006	0.010		< 0.003	0.009	0.003	0.003
Cobalt (total)	µg/L	0.9		0.210	0.593	0.263	0.218	0.168	0.320	**0.940**	0.898	0.448	0.670	0.164		0.499	**1.420**	0.271	0.113
Chromium (total)	µg/L			0.49	0.98	0.39	0.29	0.13	0.33	0.99	2.03	0.33	0.42	0.30		0.42	0.43	0.40	< 0.08
Copper (total)	µg/L	5		0.8	1.6	0.9	0.7	0.7	1.0	2.5	2.0	1.0	1.6	0.8		1.1	3.9	0.8	0.4
Iron (total)	µg/L	300	300	217	**406**	185	160	152	120	**351**	147	122	115	208		244	**370**	192	155
Potassium (total)	µg/L			1210	1290	1360	1310	1250	1200	1750	1490	1180	1280	1260		1250	1540	1320	1160
Magnesium (total)	µg/L			12300	11300	12300	11100	13500	12700	13100	10700	10700	9720	10700		12200	12600	13600	12400
Manganese (total)	µg/L			28.5	35.0	30.5	22.1	19.3	18.3	32.8	25.5	17.5	21.1	19.7		22.4	39.9	25.1	18.2
Molybdenum (total)	µg/L	40	73	0.59	0.62	0.57	0.67	0.56	0.67	0.62	1.03	0.52	0.60	0.57		0.46	0.54	0.49	0.46
Sodium (total)	µg/L			9970	8620	9920	8460	9670	9540	10800	9500	8430	8420	9520		11900	13400	17100	14400
Nickel (total)	µg/L	25	25	0.5	1.2	0.6	0.6	0.3	0.7	1.4	1.9	0.8	1.8	0.4		0.9	2.1	0.5	0.1
Phosphorus (total)	µg/L	10-30		26	**45**	29	**31**	29	22	**60**	**118**	10	21	22		25	30	9	6
Lead (total)	µg/L	5	7	2.51	**9.80**	3.61	3.92	2.69	**6.80**	**11.90**	**9.27**	4.91	**10.70**	1.89		**6.20**	**19.70**	2.62	1.08
Antimony (total)	µg/L	20		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9		< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	100	1	0.05	0.10	0.12	0.12	0.09	< 0.04	0.07	5.37	0.34	0.26	0.09		< 0.04	0.20	0.12	0.12
Tin (total)	µg/L			< 0.06	0.06	0.07	0.11	< 0.06	< 0.06	< 0.06	0.14	< 0.06	0.06	< 0.06		< 0.06	0.08	< 0.06	0.09
Strontium (total)	µg/L			186	178	196	187	191	188	211	193	185	206	182		202	185	194	204
Titanium (total)	µg/L			4.69	11.20	4.25	3.44	2.96	2.19	8.97	10.88	2.20	2.64	4.25		5.63	8.80	3.86	2.77
Thallium (total)	µg/L	0.3	0.8	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.029	0.006	0.006	< 0.005		< 0.005	< 0.005	0.005	< 0.005
Uranium (total)	µg/L	5	15	**25.20**	**62.50**	**23.20**	**46.70**	**30.70**	**58.30**	**35.50**	**64.20**	**23.20**	**78.80**	4.88		**23.50**	**52.10**	**13.70**	**5.30**
Vanadium (total)	µg/L	6		0.87	1.12	0.80	0.73	0.63	0.55	0.85	0.91	0.48	0.51	0.46		0.62	0.75	0.49	0.45
Zinc (total)	µg/L	30	30	3	2	< 2	5	2	< 2	2	3	< 2	< 2	3		< 2	3	2	5
Radium-226	Bq/L	1		0.047	0.026	0.060	0.066	0.051	0.200	0.128	0.200	0.096	0.239	0.033		0.029	0.178	0.049	< 0.005

PWQO = Provincial Water Quality Objectives, Ministry of the Environment, February 1999
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No dredging activities occuring on site

Appendix C Port Hope Long-Term Waste Management Facility Groundwater Monitoring Results

Table 80: WC-IW93-22

		Criteria		WC-IW93-22							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-06-13	2022-11-03	**Average**
pH	pH			8.26	8.24	8.23	8.30	8.35	8.27	8.14	8.21
Alkalinity	mg/L as $CaCO_3$			100	100	98	99	103	123	103	113
Carbonate	mg/L as $CaCO_3$			1.7	1.6	1.6	1.5	2.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			98	99	96	98	101	123	103	113
Total Dissolved Solids	mg/L			131	78	80	127	120	149	137	143
Fluoride	mg/L	**1.5**		0.33	0.30	0.32	0.33	0.33	0.30	0.30	0.30
Total Organic Carbon	mg/L			0.49	0.57	0.62	< 1.00	1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.43	0.52	0.59	< 1.00	1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.16	0.26	0.20	0.18	0.20	0.19	0.19	0.19
Chloride (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.6	0.6	0.60	0.60	0.60
Sulphate (dissolved)	mg/L			8.9	9.1	9.2	9.8	10.3	12	11	12
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	0.012	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$			76	75	75	78	85	88.6	83.0	85.8
Silver (dissolved)	µg/L		**1.5**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	4.0	2.0	1.0	1.0	1
Arsenic (dissolved)	µg/L	**25**	**1900**	1.3	1.4	1.3	1.6	1.5	1.4	1.8	1.6
Barium (dissolved)	µg/L	**1000**	**29000**	52	54	54	57	58	57.7	60.0	58.9
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	70	73	73	70	64	76	82	79
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			12000	12000	12000	13400	13250	15100	13200	14150
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10	< 0.10	< 0.10	< 0.00	< 0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	< 0.50	< 0.50	0.01	0.02	0.013	0.004	0.009
Chromium (dissolved)	µg/L		**810**	< 5.0	< 5.0	< 5.0	0.4	0.3	0.14	< 0.08	0.11
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 1.0	< 1.0	< 0.2	0.3	< 0.20	< 0.20	< 0.20
Iron (dissolved)	µg/L			< 100	< 100	< 100	33	33	34	24	29
Potassium (dissolved)	µg/L			595	610	580	612	618	660	733	697
Magnesium (dissolved)	µg/L			11500	11000	11000	11300	11600	12600	11800	12200
Manganese (dissolved)	µg/L			< 2.0	< 2.0	< 2.0	1.8	1.5	1.56	1.78	1.67
Molybdenum (dissolved)	µg/L		**9200**	1.8	1.9	1.9	1.8	1.9	1.75	1.86	1.81
Sodium (dissolved)	µg/L			15000	14000	14000	14000	14950	16600	14500	15550
Nickel (dissolved)	µg/L		**490**	< 1.0	< 1.0	< 1.0	< 0.1	< 0.1	< 0.10	< 0.10	< 0.10
Phosphorus (dissolved)	µg/L			11	9	8	3	< 3	3	23	13
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.50	< 0.50	0.01	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			480	490	490	589	513	562	627	595
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	< 0.1	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L		**510**	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	< 0.10	< 0.10	< 0.10	0.03	0.04	0.009	0.009	0.009
Vanadium (dissolved)	µg/L		**250**	< 0.50	< 0.50	< 0.50	0.01	0.03	< 0.01	0.01	0.01
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 5.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		0.06	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.04	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		--	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	36.5	45.6	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	130.5	96.4	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	212.2	216.4	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.135	10.321	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	5.96	0.05	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.59	8.37	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 81: WC-LTWMF-MW-06

		Criteria		WC-LTWMF-MW-06[2]							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-06-03	2022-10-07	**Average**
pH	pH			8.15	8.14	8.25	7.96	8.21	8.10	8.21	8.16
Alkalinity	mg/L as $CaCO_3$			145	140	135	159	165	165	148	157
Carbonate	mg/L as $CaCO_3$			1.9	1.8	2.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			135	140	135	159	165	165	148	157
Total Dissolved Solids	mg/L			223	213	263	250	256	291	306	299
Fluoride	mg/L	**1.5**		0.79	0.70	0.68	0.76	0.74	0.63	0.76	0.70
Total Organic Carbon	mg/L			0.88	1.03	0.88	< 1.00	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.6	0.6	0.6	1.0	1.0	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.184	0.068	0.073	0.050	0.065	< 0.04	0.08	0.06
Chloride (dissolved)	mg/L			22	20	26	35	39	31	73	52
Sulphate (dissolved)	mg/L			34	38	41	43	47	57	57	57
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	0.011	< 0.030	< 0.030	< 0.03	< 0.03	< 0.030
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	0.08	< 0.06	0.08	< 0.06	< 0.07
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	0.08	< 0.06	0.08	< 0.06	< 0.07
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			115	115	120	233	254	174	173	174
Silver (dissolved)	µg/L		**1.5**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			56.5	9.8	8.3	3.0	5.0	3.0	41	22
Arsenic (dissolved)	µg/L	**25**	**1900**	1.6	2.1	1.9	1.3	1.5	1.1	2.5	1.8
Barium (dissolved)	µg/L	**1000**	**29000**	60	54	59	35	73	81.10	76.20	79
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	165	165	155	94	138	165	162	164
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.0	< 0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			22000	17000	17500	15050	22750	26400	22800	24600
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10	< 0.10	< 0.10	0.02	0.00	< 0.003	0.003	0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	< 0.50	< 0.50	0.01	0.01	0.027	0.012	0.02
Chromium (dissolved)	µg/L		**810**	< 5.0	< 5.0	< 5.0	0.1	0.2	0.49	< 0.08	0.29
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 1.0	< 1.0	0.5	0.3	0.5	0.2	0.4
Iron (dissolved)	µg/L			115	< 100	< 100	< 7	< 7	358	15	187
Potassium (dissolved)	µg/L			3900	1950	1800	1267	2020	2110	1980	2045
Magnesium (dissolved)	µg/L			14000	17500	18500	10165	20600	21200	22700	21950
Manganese (dissolved)	µg/L			13.4	< 2.0	< 2.0	0.4	0.5	2.05	0.26	1.16
Molybdenum (dissolved)	µg/L		**9200**	17.5	10.1	8.8	3.2	8.3	8.71	8.65	8.7
Sodium (dissolved)	µg/L			42500	42500	43500	21660	49100	54300	53100	53700
Nickel (dissolved)	µg/L		**490**	< 1.0	< 1.0	< 1.0	12.4	< 0.1	0.8	0.1	0.5
Phosphorus (dissolved)	µg/L			76	75	103	5	6	9	5	7
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.50	< 0.50	0.03	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 2.0	< 2.0	0.1	< 0.1	0.09	< 0.04	0.07
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.2	0.1	0.10	0.07	0.09
Strontium (dissolved)	µg/L			490	625	695	374	819	882	847	865
Titanium (dissolved)	µg/L			5.6	< 5.0	< 5.0	< 0.1	0.1	0.10	1.23	0.67
Thallium (dissolved)	µg/L		**510**	< 0.050	< 0.050	< 0.050	0.008	0.007	0.007	0.007	0.007
Uranium (dissolved)	µg/L	**20**	**420**	1.40	0.95	0.79	0.33	0.94	1.320	0.408	0.86
Vanadium (dissolved)	µg/L		**250**	1.7	1.8	1.5	0.6	1.3	1.30	1.01	1.16
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 5.0	< 5.0	22.5	< 2.0	< 2.0	< 2	< 2.0
Lead-210	Bq/L	**0.20**		0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		--	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	34.3	58.9	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	21	81.9	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	675	501.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	12.000	12.663	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	26.48	56.76	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	--	8.24	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Installation took place in 2017 to replace WC-OW9-75.
-- - No data.

Table 82: WC-MW1-02

		Criteria		WC-MW1-02					
		COPC	Table 3	2017	2018	2019	2020	2021	2022
Parameter	**Units**			Average		Well Damaged			
pH	pH			8.26	8.31				
Alkalinity	mg/L as $CaCO_3$			160	200				
Carbonate	mg/L as $CaCO_3$			2.7	3.8				
Bicarbonate	mg/L as $CaCO_3$			155	200				
Total Dissolved Solids	mg/L			197	200				
Fluoride	mg/L	1.5		0.68	0.76				
Total Organic Carbon	mg/L			1.08	1.10				
Dissolved Organic Carbon	mg/L			0.83	0.78				
Ammonia+Ammonium (N)	as N mg/L			0.63	0.60				
Chloride (dissolved)	mg/L			8.8	8.1				
Sulphate (dissolved)	mg/L			9.9	9.3				
Bromide (dissolved)	mg/L			< 1.0	< 1.0				
Nitrite (as N)	as N mg/L			< 0.010	< 0.010				
Nitrate (as N)	as N mg/L			< 0.10	< 0.10				
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10				
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10				
Hardness	mg/L as $CaCO_3$			59	54				
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10				
Aluminum (dissolved)	µg/L			44.5	16.0				
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 1.0				
Barium (dissolved)	µg/L	1000	29000	78	81				
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50				
Boron (dissolved)	µg/L	5000	45000	270	250				
Bismuth (dissolved)	µg/L			< 1.0	< 1.0				
Calcium (dissolved)	µg/L			12000	11000				
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10				
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50				
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0				
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0				
Iron (dissolved)	µg/L			< 100	< 100				
Potassium (dissolved)	µg/L			2550	2600				
Magnesium (dissolved)	µg/L			6800	6500				
Manganese (dissolved)	µg/L			6.3	2.9				
Molybdenum (dissolved)	µg/L		9200	2.2	2.2				
Sodium (dissolved)	µg/L			49500	47000				
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0				
Phosphorus (dissolved)	µg/L			270	160				
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50				
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50				
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0				
Tin (dissolved)	µg/L			< 1.0	< 1.0				
Strontium (dissolved)	µg/L			760	770				
Titanium (dissolved)	µg/L			< 5.0	< 5.0				
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050				
Uranium (dissolved)	µg/L	20	420	0.14	< 0.10				
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50				
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0				
Lead-210	Bq/L	0.20		< 0.02	< 0.10				
Radium-226	Bq/L	0.49		< 0.040	< 0.040				
Thorium-230	Bq/L	0.65		< 0.070	< 0.070				
Thorium-232	Bq/L	0.60		< 0.060	< 0.060				
Field Parameters									
ODO % Sat	%			-[1]	-[1]				
ORP	mV			-[1]	-[1]				
SPC	µs/cm			-[1]	-[1]				
Temperature	°C			-[1]	-[1]				
Turbidity	FNU			-[1]	-[1]				
pH	Units			-[1]	-[1]				

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 83: WC-MW1-03

		Criteria		WC-MW1-03							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-26	2022-11-04	**Average**
pH	pH			7.90	7.62	7.70	7.52	7.24	7.34	No Sample[2]	7.34
Alkalinity	mg/L as $CaCO_3$			430	450	400	460	399	354		354
Carbonate	mg/L as $CaCO_3$			3.2	1.8	2.0	< 1.0	< 1.0	< 1.0		< 1.0
Bicarbonate	mg/L as $CaCO_3$			425	450	400	460	399	354		354
Total Dissolved Solids	mg/L			496	678	648	715	826	960		960
Fluoride	mg/L	1.5		0.24	0.21	0.19	0.25	0.21	0.24		0.24
Total Organic Carbon	mg/L			9.0	3.7	4.2	2.5	3.0	2.0		2.0
Dissolved Organic Carbon	mg/L			3.4	2.7	2.3	2.5	3.0	3.0		3.0
Ammonia+Ammonium (N)	as N mg/L			0.11	0.09	0.09	0.06	0.04	0.08		0.08
Chloride (dissolved)	mg/L			51	61	85	115	165	220		220
Sulphate (dissolved)	mg/L			16	71	67	104	76	49		49
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.3	0.7	1.4		1.4
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03		< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06		< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06		< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	0.01	< 0.01	< 0.01		< 0.01
Hardness	mg/L as $CaCO_3$			455	560	540	524	615	677		677
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05		< 0.05
Aluminum (dissolved)	µg/L			132.5	< 31.0	< 5.0	1.5	1.5	< 1.0		< 1.0
Arsenic (dissolved)	µg/L	25	1900	1.2	1.3	1.2	0.9	1.0	1.1		1.1
Barium (dissolved)	µg/L	1000	29000	115	140	160	140	166	182		182
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007		< 0.007
Boron (dissolved)	µg/L	5000	45000	26	38	29	24	25	25		25
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010		< 0.010
Calcium (dissolved)	µg/L			130000	160000	155000	111100	182000	185000		185000
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.00	< 0.00	0.005		0.005
Cobalt (dissolved)	µg/L		66	0.62	0.87	< 0.50	0.15	0.43	1.660		1.660
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.4	0.2	0.23		0.23
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.4	0.4	0.20		0.20
Iron (dissolved)	µg/L			750	1510	560	25	2095	2380		2380
Potassium (dissolved)	µg/L			1030	1500	2200	2135	1805	2100		2100
Magnesium (dissolved)	µg/L			32000	38500	37500	25200	39000	45100		45100
Manganese (dissolved)	µg/L			94	127	145	35	203	329		329
Molybdenum (dissolved)	µg/L		9200	5.4	1.9	3.7	10.0	3.2	4.02		4.02
Sodium (dissolved)	µg/L			33000	33500	36000	29350	38400	43900		43900
Nickel (dissolved)	µg/L		490	1.7	1.4	< 1.0	0.6	1.1	5.00		5.00
Phosphorus (dissolved)	µg/L			1450	185	182	< 3	19	10		10
Lead (dissolved)	µg/L	10	25	0.51	< 0.50	< 0.50	0.02	< 0.09	< 0.09		< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90		< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.0	0.1	< 0.04		< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	< 0.1	< 0.06		< 0.06
Strontium (dissolved)	µg/L			550	670	755	762	1105	1110		1110
Titanium (dissolved)	µg/L			7.5	< 5.0	< 5.0	0.1	0.1	< 0.05		< 0.05
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005		< 0.005
Uranium (dissolved)	µg/L	20	420	7.6	4.2	4.9	5.6	5.1	5.810		5.810
Vanadium (dissolved)	µg/L		250	0.8	< 0.5	1.0	1.2	0.2	0.18		0.18
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	3.0	2.0	< 2.0		< 2.0
Lead-210	Bq/L	0.20		0.05	< 0.10	< 0.10	< 0.02	< 0.02	0.08		0.08
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	0.01	< 0.01	< 0.01		< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02		< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02		< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	32		--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-27.2		--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	1416		--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.887		--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	6.55		--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	7.03		--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Well not accessed during monitoring campaign.
-- - No data.

Table 84: WC-MW2-02

		Criteria		WC-MW2-02					
		COPC	Table 3	2017	2018	2019	2020	2021	2022
Parameter	**Units**			WELL NOT FOUND					
pH	pH								
Alkalinity	mg/L as $CaCO_3$								
Carbonate	mg/L as $CaCO_3$								
Bicarbonate	mg/L as $CaCO_3$								
Total Dissolved Solids	mg/L								
Fluoride	mg/L	1.5							
Total Organic Carbon	mg/L								
Dissolved Organic Carbon	mg/L								
Ammonia+Ammonium (N)	as N mg/L								
Chloride (dissolved)	mg/L								
Sulphate (dissolved)	mg/L								
Bromide (dissolved)	mg/L								
Nitrite (as N)	as N mg/L								
Nitrate (as N)	as N mg/L								
Nitrate + Nitrite (as N)	as N mg/L								
Mercury (dissolved)	µg/L	1	0.29						
Hardness	mg/L as $CaCO_3$								
Silver (dissolved)	µg/L		1.5						
Aluminum (dissolved)	µg/L								
Arsenic (dissolved)	µg/L	25	1900						
Barium (dissolved)	µg/L	1000	29000						
Beryllium (dissolved)	µg/L		67						
Boron (dissolved)	µg/L	5000	45000						
Bismuth (dissolved)	µg/L								
Calcium (dissolved)	µg/L								
Cadmium (dissolved)	µg/L	5	2.7						
Cobalt (dissolved)	µg/L		66						
Chromium (dissolved)	µg/L		810						
Copper (dissolved)	µg/L	1000	87						
Iron (dissolved)	µg/L								
Potassium (dissolved)	µg/L								
Magnesium (dissolved)	µg/L								
Manganese (dissolved)	µg/L								
Molybdenum (dissolved)	µg/L		9200						
Sodium (dissolved)	µg/L								
Nickel (dissolved)	µg/L		490						
Phosphorus (dissolved)	µg/L								
Lead (dissolved)	µg/L	10	25						
Antimony (dissolved)	µg/L	6	20000						
Selenium (dissolved)	µg/L	10	63						
Tin (dissolved)	µg/L								
Strontium (dissolved)	µg/L								
Titanium (dissolved)	µg/L								
Thallium (dissolved)	µg/L		510						
Uranium (dissolved)	µg/L	20	420						
Vanadium (dissolved)	µg/L		250						
Zinc (dissolved)	µg/L		1100						
Lead-210	Bq/L	0.20							
Radium-226	Bq/L	0.49							
Thorium-230	Bq/L	0.65							
Thorium-232	Bq/L	0.60							
Field Parameters									
ODO % Sat	%								
ORP	mV								
SPC	µs/cm								
Temperature	°C								
Turbidity	FNU								
pH	Units								

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
--- No data.

Table 85: WC-MW3A-11R

		Criteria		WC-MW3A-11R[2]							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-06-02	2022-10-17	**Average**
pH	pH			7.63	7.64	7.65	7.64	7.45	7.32	7.63	7.48
Alkalinity	mg/L as $CaCO_3$			130	140	145	152	155	141	163	152
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			130	140	145	152	155	141	163	152
Total Dissolved Solids	mg/L			7980	4210	4010	4885	4285	7730	2930	5330
Fluoride	mg/L	1.5		0.28	0.29	0.37	0.49	0.52	0.37	0.63	0.50
Total Organic Carbon	mg/L			1.5	1.5	1.4	1.0	1.0	1.0	< 1.0	1.0
Dissolved Organic Carbon	mg/L			0.90	1.23	0.87	1.00	1.00	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L			4.9	4.5	4.0	4.4	4.0	6.14	3.04	4.6
Chloride (dissolved)	mg/L			2800	2300	2050	2600	2450	4400	1900	3150
Sulphate (dissolved)	mg/L			12	< 2	< 10	1	< 2	< 2	< 2	< 2
Bromide (dissolved)	mg/L			35	38	32	34	32	59	21	40
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.300	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.60	0.33	< 0.60	< 0.06	0.33
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.60	0.45	< 0.60	< 0.30	0.45
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			2300	1850	1600	2220	2180	4090	1350	2720
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	0.28	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 5	33	9	2	9	13	11
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 1.0	< 1.0	1.4	< 0.2	2.7	< 0.2	1.5
Barium (dissolved)	µg/L	1000	29000	3550	2800	2650	3060	3180	6900	1930	4415
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	0.04	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	440	380	455	453	434	419	425	422
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.039	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			485000	390000	340000	513500	577000	765000	279000	522000
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.02	< 0.00	0.009	0.003	0.006
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.04	0.07	0.121	0.106	0.11
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.6	0.6	< 0.08	0.22	0.2
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	1.1	< 0.2	< 0.20	0.40	0.3
Iron (dissolved)	µg/L			800	440	520	656	723	1180	12	596
Potassium (dissolved)	µg/L			26500	22000	19500	21100	20350	35400	13400	24400
Magnesium (dissolved)	µg/L			270000	215000	180000	213500	195000	396000	123000	259500
Manganese (dissolved)	µg/L			46	34	23	29	21	61.0	14.9	38
Molybdenum (dissolved)	µg/L		9200	0.7	0.5	< 0.5	0.5	0.2	0.18	0.25	0.2
Sodium (dissolved)	µg/L			850000	665000	605000	636500	605500	977000	460000	718500
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.6	0.2	0.20	1.70	1.0
Phosphorus (dissolved)	µg/L			81	34	56	17	17	14	9	12
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.06	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	4.95	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.2	0.1	0.06	< 0.04	0.05
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.3	0.1	0.06	< 0.06	0.06
Strontium (dissolved)	µg/L			42000	32500	31000	35350	37900	80400	23300	51850
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.3	0.1	0.40	0.59	0.50
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.028	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	< 0.1	< 0.1	< 0.1	0.0	0.0	0.005	0.009	0.007
Vanadium (dissolved)	µg/L		250	0.5	< 0.5	< 0.5	0.2	0.2	0.21	0.26	0.24
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	11.0	4.0	3.0	< 2.0	2.5
Lead-210	Bq/L	0.20		< 0.02	0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		0.11	< 0.04	0.07	0.02	0.07	0.08	0.05	0.07
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	17.3	36.2	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-10.5	-11.8	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	12.98	5161.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	12.659	11.377	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	32.63	37.91	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	10.57	7.49	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Installation took place in 2011 to replace WC-MW3A-02.
-- - No data.

Table 86: WC-MW3B-02

		Criteria		WC-MW3B-02							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	Units			Average					2022-06-03	2022-10-18	Average
pH	pH			8.19	8.24	8.29	8.36	8.33	8.50	8.41	8.46
Alkalinity	mg/L as $CaCO_3$			120	140	150	383	325	1030	8840	4935
Carbonate	mg/L as $CaCO_3$			1.8	2.3	2.8	2.5	2.0	9.0	688	349
Bicarbonate	mg/L as $CaCO_3$			120	140	145	381	323	1020	8150	4585
Total Dissolved Solids	mg/L			--	480	480	280	308	650	208	429
Fluoride	mg/L	**1.5**		0.44	0.38	0.43	0.45	0.43	0.46	0.43	0.45
Total Organic Carbon	mg/L			--	1.9	9.2	1.0	1.0	2.0	3.0	2.5
Dissolved Organic Carbon	mg/L			--	0.75	1.35	1.00	1.00	2.0	< 3.0	2.5
Ammonia+Ammonium (N)	as N mg/L			--	0.230	0.062	0.055	0.055	0.12	0.08	0.10
Chloride (dissolved)	mg/L			2.5	2.1	4.3	2.9	2.3	3	3	2.9
Sulphate (dissolved)	mg/L			14	13	18	14	12	15	21	18
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	0.011	< 0.030	< 0.030	< 0.03	< 0.03	< 0.030
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06	0.11	0.09
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06	0.11	0.09
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			53	55	56	987	699	1240	533	887
Silver (dissolved)	µg/L		**1.5**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 5	5	3	58	283	3210	1747
Arsenic (dissolved)	µg/L	**25**	**1900**	1.2	< 1.0	1.4	1.4	1.2	1.8	2.7	2.3
Barium (dissolved)	µg/L	**1000**	**29000**	34	39	34	30	30	34	601	317
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.50	< 0.50	< 0.01	0.01	0.024	0.122	0.073
Boron (dissolved)	µg/L	**5000**	**45000**	97	98	110	100	91	122	135	129
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	0.070	0.040
Calcium (dissolved)	µg/L			11000	12000	12400	16450	16100	15600	115000	65300
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10	< 0.10	< 0.10	0.01	0.01	0.006	0.125	0.066
Cobalt (dissolved)	µg/L		**66**	< 0.50	< 0.50	< 0.50	0.04	0.11	0.326	2.560	1.443
Chromium (dissolved)	µg/L		**810**	< 5.0	< 5.0	< 5.0	0.3	0.3	0.69	6.09	3.39
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 1.0	3.6	0.4	0.2	0.40	6.30	3.35
Iron (dissolved)	µg/L			< 100	< 100	< 100	10	90	252	3140	1696
Potassium (dissolved)	µg/L			920	860	815	940	702	775	2970	1873
Magnesium (dissolved)	µg/L			6000	6300	5950	6200	6370	6050	26600	16325
Manganese (dissolved)	µg/L			< 2.0	4.2	2.1	3.2	6.8	11.0	119.0	65.0
Molybdenum (dissolved)	µg/L		**9200**	9	8	13	6	7	10.20	8.44	9.32
Sodium (dissolved)	µg/L			37000	34000	36000	30950	34050	41100	45000	43050
Nickel (dissolved)	µg/L		**490**	< 1.0	< 1.0	1.1	0.2	0.2	0.4	4.4	2.4
Phosphorus (dissolved)	µg/L			--	1700	2280	5	10	19	270	145
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.50	< 0.50	0.02	0.13	0.24	3.09	1.67
Antimony (dissolved)	µg/L	**6**	**20000**	3.4	1.3	1.6	1.1	< 0.9	< 0.90	0.90	0.9
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	0.04	0.06	0.05
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.4	0.1	0.10	0.30	0.20
Strontium (dissolved)	µg/L			340	370	350	398	370	375	868	622
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.3	3.7	15.38	152	83.69
Thallium (dissolved)	µg/L		**510**	< 0.050	< 0.050	< 0.050	< 0.005	0.005	< 0.005	0.052	0.029
Uranium (dissolved)	µg/L	**20**	**420**	0.49	0.45	0.71	0.31	0.32	0.73	2.21	1.47
Vanadium (dissolved)	µg/L		**250**	0.5	0.7	1.5	0.2	0.5	2.84	6.91	4.88
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 5.0	5.3	2.5	< 2.0	2.0	127	65
Lead-210	Bq/L	**0.20**		0.03	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.04	< 0.04	< 0.01	0.01	< 0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	34.7	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	76.3	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	295.7	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	10.239	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	1827.9	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	8.43	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for field parameters.
-- - No data.

Table 87: WC-MW3C-02

		Criteria		WC-MW3C-02							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-18	Average
pH	pH			8.19	8.23	8.21	7.95	7.93	7.23	7.43	7.33
Alkalinity	mg/L as $CaCO_3$			180	180	195	722	344	495	548	522
Carbonate	mg/L as $CaCO_3$			2.5	2.9	2.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			175	175	190	722	344	495	548	522
Total Dissolved Solids	mg/L			195	210	273	473	363	466	474	470
Fluoride	mg/L	1.5		0.29	0.26	0.30	0.25	0.24	0.19	0.20	0.20
Total Organic Carbon	mg/L			1.4	4.2	2.0	2.5	3.0	4.0	5.0	4.5
Dissolved Organic Carbon	mg/L			0.8	0.8	1.4	3.0	3.0	4.0	5.0	4.5
Ammonia+Ammonium (N)	as N mg/L			0.26	0.34	0.09	0.13	0.23	0.22	0.20	0.21
Chloride (dissolved)	mg/L			2.2	2.4	3.0	19.5	14.5	22	24	23.0
Sulphate (dissolved)	mg/L			25	24	25	22	21	22	19	21
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.031	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.11	0.12	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.11	0.13	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.02	< 0.01	0.02
Hardness	mg/L as $CaCO_3$			130	135	140	1675	823	623	336	480
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 5	< 5	22	6	3.0	1480.0	742
Arsenic (dissolved)	µg/L	25	1900	4.4	4.4	3.0	4.3	2.9	7.3	3.0	5.2
Barium (dissolved)	µg/L	1000	29000	82	97	95	116	179	203	512	358
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	0.036	0.022
Boron (dissolved)	µg/L	5000	45000	48	38	38	44	40	50	65	58
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	0.210	0.110
Calcium (dissolved)	µg/L			20000	19500	21000	26700	45450	72400	89800	81100
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	< 0.00	0.01	0.003	0.059	0.031
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.07	0.15	0.460	0.479	0.470
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.4	0.2	< 0.08	2.55	1.3
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.3	0.9	< 0.20	3.00	1.6
Iron (dissolved)	µg/L			< 100	< 100	< 100	23	38	125	1020	573
Potassium (dissolved)	µg/L			1500	1350	1400	1565	1670	1740	2580	2160
Magnesium (dissolved)	µg/L			19500	20500	20500	22300	31700	40500	42400	41450
Manganese (dissolved)	µg/L			5.9	5.9	3.7	3.3	11.9	57.1	21.7	39.4
Molybdenum (dissolved)	µg/L		9200	10.3	6.2	11.6	6.7	3.9	2.74	2.26	2.50
Sodium (dissolved)	µg/L			34500	24500	35500	63900	71850	58200	50400	54300
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.2	0.7	1.30	2.20	1.8
Phosphorus (dissolved)	µg/L			2	4	2	5	< 3	9	35	22
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.09	< 0.09	1.43	0.76
Antimony (dissolved)	µg/L	6	20000	0.80	< 0.50	0.55	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.1	0.0	0.05	0.08	0.07
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	< 0.1	< 0.06	0.07	0.07
Strontium (dissolved)	µg/L			440	460	435	572	830	1040	1020	1030
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.6	0.4	0.17	84.2	42.2
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	0.020	0.013
Uranium (dissolved)	µg/L	20	420	1.35	0.76	1.67	2.16	2.55	2.650	3.070	2.86
Vanadium (dissolved)	µg/L		250	1.1	0.6	1.7	1.0	1.4	0.26	3.57	1.92
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	3.0	< 2.0	< 2.0	108	55
Lead-210	Bq/L	0.20		0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.040	< 0.040	0.025	0.010	0.02	< 0.01	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.070	< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060	< 0.060	< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	34.8	59.7	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	137.1	18.4	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	741	704.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	10.803	10.515	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	298.02	268.9	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	7.20	7.38	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 88: WC-MW3D-02

		Criteria		WC-MW3D-02							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-18	Average
pH	pH			8.24	8.11	8.00	7.71	7.56	7.27	-[2]	7.27
Alkalinity	mg/L as $CaCO_3$			310	445	510	788	730	782	-[2]	782
Carbonate	mg/L as $CaCO_3$			4.9	5.4	4.7	< 1.0	< 1.0	< 1.0	-[2]	< 1.0
Bicarbonate	mg/L as $CaCO_3$			300	440	500	788	730	782	-[2]	782
Total Dissolved Solids	mg/L			291	498	600	722	833	869	-[2]	869
Fluoride	mg/L	1.5		0.29	0.23	0.19	0.18	0.16	0.13	-[2]	0.13
Total Organic Carbon	mg/L			3.3	6.8	8.5	9.0	9.5	11.0	-[2]	11.0
Dissolved Organic Carbon	mg/L			2.4	5.9	7.6	8.5	9.5	11.0	-[2]	11.0
Ammonia+Ammonium (N)	as N mg/L			0.065	0.120	0.074	0.255	0.150	0.10	-[2]	0.10
Chloride (dissolved)	mg/L			15	25	33	63	72	76	-[2]	76
Sulphate (dissolved)	mg/L			23	18	14	16	16	15	-[2]	15
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.8	0.9	0.9	-[2]	0.9
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	-[2]	< 0.030
Nitrate (as N)	as N mg/L			0.13	0.17	0.17	0.26	0.25	0.10	-[2]	0.10
Nitrate + Nitrite (as N)	as N mg/L			0.13	0.17	0.17	0.26	0.25	0.10	-[2]	0.10
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.06	-[2]	0.06
Hardness	mg/L as $CaCO_3$			160	240	285	1071	1055	675	-[2]	675
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			26.5	< 5.0	< 5.0	8.5	< 1.0	< 1.0	3.0	< 2
Arsenic (dissolved)	µg/L	25	1900	4.4	3.4	2.8	4.6	1.8	1.7	2.1	1.9
Barium (dissolved)	µg/L	1000	29000	83	140	155	208	359	339	307	323
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	53	48	51	53	54	59	62	61
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			20500	31500	36500	56450	87400	102000	81900	91950
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.01	0.01	0.019	0.009	0.014
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.22	0.51	0.599	0.602	0.601
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.3	0.2	< 0.08	0.54	< 0.3
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.2	0.5	0.40	0.90	0.7
Iron (dissolved)	µg/L			< 100	< 100	< 100	158	17	68	13	41
Potassium (dissolved)	µg/L			1950	2300	2450	3120	3265	3440	3420	3430
Magnesium (dissolved)	µg/L			26500	39500	47000	62350	87800	99800	85600	92700
Manganese (dissolved)	µg/L			10.1	8.9	17.7	19.6	12.5	24.9	10.9	17.9
Molybdenum (dissolved)	µg/L		9200	6.2	4.9	5.0	5.1	4.4	3.23	9.07	6.2
Sodium (dissolved)	µg/L			87500	97500	120000	110300	93800	98500	89400	93950
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.1	1.0	1.9	2.10	2.00	2.1
Phosphorus (dissolved)	µg/L			256	350	665	32	< 3	9	20	15
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	0.58	0.61	0.75	1.35	1.05	< 0.90	2.40	< 1.7
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.2	0.3	0.20	0.32	0.26
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	0.1	< 0.06	0.15	< 0.11
Strontium (dissolved)	µg/L			685	1075	1200	1730	2740	2780	2340	2560
Titanium (dissolved)	µg/L			5.5	< 5.0	< 5.0	0.5	0.3	0.33	0.46	0.40
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	0.006	< 0.005	0.006
Uranium (dissolved)	µg/L	20	420	3.1	2.6	3.4	3.2	3.3	3.140	4.560	3.85
Vanadium (dissolved)	µg/L		250	1.4	1.6	0.8	2.2	3.8	2.30	7.42	4.86
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.040	< 0.040	0.020	< 0.010	0.01	0.01	0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.070	< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060	< 0.060	< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	105.2	50.4	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	159	-20.4	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	1438	1407.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	12.222	10.9	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	40.87	101.3	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	7.57	7.18	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for full sample collection.
-- - No data.

Table 89: WC-MW4A-02

		Criteria		WC-MW4A-02							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	Units			Average					2022-06-03	2022-10-18	Average
pH	pH			8.09	7.92	8.07	7.96	8.10	8.02	8.02	8.02
Alkalinity	mg/L as $CaCO_3$			190	190	180	216	265	174	197	186
Carbonate	mg/L as $CaCO_3$			2.2	1.5	2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			190	185	180	216	265	174	197	186
Total Dissolved Solids	mg/L			224	233	215	243	243	260	223	242
Fluoride	mg/L	1.5		0.19	0.17	0.16	0.21	0.20	0.19	0.20	0.20
Total Organic Carbon	mg/L			0.77	0.78	1.19	< 1.00	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.60	0.56	< 0.50	1.00	< 1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.078	0.093	0.078	0.075	0.050	0.06	0.07	0.07
Chloride (dissolved)	mg/L			6	6	14	6	6	5	6.70	5.9
Sulphate (dissolved)	mg/L			31	29	28	36	27	23	25	24
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	0.11	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	0.11	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			200	200	190	247	468	194	191	193
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	0.07	0.06
Aluminum (dissolved)	µg/L			6	11	< 5	6	3	< 1.0	23.0	12
Arsenic (dissolved)	µg/L	25	1900	3.7	4.6	6.1	5.5	5.2	5.6	5.0	5.3
Barium (dissolved)	µg/L	1000	29000	100	100	88	97	99	100	314	207
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	28	19	18	20	20	19	50	35
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	0.010	0.010
Calcium (dissolved)	µg/L			42500	43000	41000	45000	44250	42000	47600	44800
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.00	< 0.00	0.003	0.062	0.033
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.03	0.03	0.033	0.087	0.060
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.1	0.2	0.11	0.38	0.2
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	< 0.2	< 0.2	< 0.20	0.30	0.3
Iron (dissolved)	µg/L			255	175	< 100	85	90	93	56	75
Potassium (dissolved)	µg/L			1700	1700	1700	1715	1670	1660	1880	1770
Magnesium (dissolved)	µg/L			22500	22000	21500	21450	21750	21900	22800	22350
Manganese (dissolved)	µg/L			7.1	37.0	13.0	10.7	9.1	8.9	2.0	5.4
Molybdenum (dissolved)	µg/L		9200	1.7	1.8	2.6	1.5	1.9	1.59	1.70	1.6
Sodium (dissolved)	µg/L			9400	9450	11100	9160	9915	10400	10100	10250
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	1.1	0.1	< 0.1	< 0.10	0.50	0.3
Phosphorus (dissolved)	µg/L			77	257	69	7	5	3	3	3
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.03	< 0.09	< 0.09	0.23	0.16
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			325	325	285	349	326	351	372	362
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.3	0.1	0.09	0.77	0.43
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	0.008	0.007
Uranium (dissolved)	µg/L	20	420	0.2	0.4	2.7	0.8	0.5	0.417	0.316	0.367
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	0.06	0.04	0.02	0.32	0.17
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	2.5	< 2.0	< 2.0	90.0	46.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.040	< 0.040	0.010	< 0.010	< 0.01	0.02	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.070	< 0.070	< 0.020	< 0.020	0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060	< 0.060	< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	22.2	59.3	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-33.7	70	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	403.6	402.5	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	12.089	10.72	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	4.97	34.06	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	--	7.97	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 90: WC-MW4B-02

		Criteria		WC-MW4B-02							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-19	**Average**
pH	pH			8.04	7.94	8.05	8.03	8.03	7.89	7.90	7.90
Alkalinity	mg/L as $CaCO_3$			195	160	170	220	212	206	228	217
Carbonate	mg/L as $CaCO_3$			2.0	1.3	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			195	155	170	220	212	206	228	217
Total Dissolved Solids	mg/L			240	318	303	259	295	323	351	337
Fluoride	mg/L	1.5		0.18	0.18	0.17	0.19	0.18	0.17	0.16	0.17
Total Organic Carbon	mg/L			2.3	2.2	2.0	1.0	1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			1.37	1.04	0.79	1.00	1.00	1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.050	0.081	< 0.050	< 0.040	< 0.040	0.04	< 0.04	0.04
Chloride (dissolved)	mg/L			8	59	28	20	28	36	60	48
Sulphate (dissolved)	mg/L			36	62	49	48	44	41	35	38
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	0.4	0.4	0.6	0.5
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			205	195	205	395	341	267	381	324
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			7.1	< 5.0	< 5.0	2.0	< 1.0	1.0	< 1.0	1.0
Arsenic (dissolved)	µg/L	25	1900	1.4	< 1.0	1.1	1.0	1.1	1.3	1.4	1.4
Barium (dissolved)	µg/L	1000	29000	109	85	105	141	130	136	142	139
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	28	30	24	30	22	26	20	23
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			43500	51500	47500	96850	50600	46900	55300	51100
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.01	0.01	< 0.003	0.008	0.006
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.34	0.02	0.026	0.022	0.024
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.4	0.2	< 0.08	0.11	0.10
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.4	0.4	0.30	0.30	0.3
Iron (dissolved)	µg/L			< 100	< 100	< 100	654	< 7	< 7	< 7	< 7
Potassium (dissolved)	µg/L			2350	3250	2750	2515	2590	2380	2850	2615
Magnesium (dissolved)	µg/L			23000	16500	20500	31600	25050	27900	28900	28400
Manganese (dissolved)	µg/L			5.0	4.3	2.6	120	2	1.0	1.6	1.3
Molybdenum (dissolved)	µg/L		9200	13	19	13	8	11	9.59	9.48	9.5
Sodium (dissolved)	µg/L			11500	50500	27000	26050	21400	19700	19700	19700
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.8	0.3	0.30	0.20	0.3
Phosphorus (dissolved)	µg/L			1245	375	620	9	6	< 3	9	6
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	0.55	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.1	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	< 0.1	< 0.06	0.08	0.07
Strontium (dissolved)	µg/L			350	330	380	686	437	510	513	512
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	0.1	0.09	0.15	0.12
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.4	2.2	1.6	3.1	1.2	1.3	1.1	1.2
Vanadium (dissolved)	µg/L		250	0.85	0.64	0.60	0.54	0.95	1.00	1.02	1.01
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	2.5	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.040	< 0.040	< 0.010	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.070	< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060	< 0.060	< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	61.8	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	57.3	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	323.9	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	11.054	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	53.31	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	8.00	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for field parameters.
-- - No data.

Table 91: WC-OW1-87

		Criteria		WC-OW1-87							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-26	2022-10-11	**Average**
pH	pH			7.94	7.80	7.82	7.58	7.43	7.50	7.36	7.43
Alkalinity	mg/L as $CaCO_3$			345	325	320	323	323	326	317	322
Carbonate	mg/L as $CaCO_3$			2.9	1.9	2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			345	325	315	323	323	326	317	322
Total Dissolved Solids	mg/L			403	345	468	452	523	506	354	430
Fluoride	mg/L	1.5		< 0.10	0.12	0.10	0.09	0.11	0.06	0.08	0.07
Total Organic Carbon	mg/L			2.1	1.7	2.0	1.5	2.0	2.0	3.0	2.5
Dissolved Organic Carbon	mg/L			1.7	1.6	1.7	2.0	2.0	2.0	3.0	2.5
Ammonia+Ammonium (N)	as N mg/L			< 0.050	0.095	< 0.050	< 0.040	< 0.040	0.10	< 0.04	0.07
Chloride (dissolved)	mg/L			12	14	31	31	58	38	94	66
Sulphate (dissolved)	mg/L			11	26	46	56	81	70	90	80
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	0.4	< 0.3	0.6	0.5
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			325	325	360	463	452	433	389	411
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	< 1.0	1.5	< 1.0	1.0	1.0
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 1.0	< 1.0	0.8	0.9	1.0	1.3	1.2
Barium (dissolved)	µg/L	1000	29000	80	79	84	89	104	96	133	114
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	0.018	0.013
Boron (dissolved)	µg/L	5000	45000	28	21	15	16	15	15	13	14
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			105000	103000	110000	116500	117500	113000	116000	114500
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.00	0.01	< 0.003	0.020	0.012
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.51	0.51	0.45	0.72	0.660	0.782	0.721
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.1	0.2	0.39	0.17	0.28
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	1.8	0.3	0.4	0.30	0.30	0.3
Iron (dissolved)	µg/L			190	175	200	203	237	448	288	368
Potassium (dissolved)	µg/L			705	615	580	657	655	641	696	669
Magnesium (dissolved)	µg/L			16500	16500	20500	21050	24450	24700	24700	24700
Manganese (dissolved)	µg/L			55	55	61	63	76	84.2	86.2	85
Molybdenum (dissolved)	µg/L		9200	0.51	< 0.50	< 0.50	0.35	0.39	0.43	0.37	0.40
Sodium (dissolved)	µg/L			26000	18000	17000	21400	24150	24100	27800	25950
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.6	1.2	1.5	1.5	1.5
Phosphorus (dissolved)	µg/L			130	71	46	< 3	6	< 3	< 3	< 3
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	0.20	0.12
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			225	220	245	268	303	281	331	306
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	0.1	< 0.05	0.22	0.14
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	0.008	< 0.005	0.007	0.006
Uranium (dissolved)	µg/L	20	420	8.1	5.8	5.0	3.8	3.9	2.7	2.9	2.8
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	0.11	0.12	0.10	0.13	0.12
Zinc (dissolved)	µg/L		1100	< 5.0	5.5	5.2	2.0	2.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.06	< 0.10	< 0.10	< 0.02	< 0.02	0.03	< 0.02	0.03
Radium-226	Bq/L	0.49		< 0.03	< 0.04	< 0.04	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		0.04	0.04	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		--	0.04	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			.[1]	.[1]	.[1]	.[1]	.[1]	36.2	35.6	--
ORP	mV			.[1]	.[1]	.[1]	.[1]	.[1]	60.5	74.7	--
SPC	µs/cm			.[1]	.[1]	.[1]	.[1]	.[1]	793	932	--
Temperature	°C			.[1]	.[1]	.[1]	.[1]	.[1]	11.189	11.955	--
Turbidity	FNU			.[1]	.[1]	.[1]	.[1]	.[1]	65.16	21.54	--
pH	Units			.[1]	.[1]	.[1]	.[1]	.[1]	7.29	7.32	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 92: WC-OW2-75

		Criteria		WC-OW2-75	
		COPC	Table 3	2017	2018
Parameter	Units			Average	WELL DECOMMISSIONED
pH	pH			8.06	
Alkalinity	mg/L as $CaCO_3$			185	
Carbonate	mg/L as $CaCO_3$			2.1	
Bicarbonate	mg/L as $CaCO_3$			185	
Total Dissolved Solids	mg/L			234	
Fluoride	mg/L	1.5		< 0.10	
Total Organic Carbon	mg/L			1.5	
Dissolved Organic Carbon	mg/L			1.5	
Ammonia+Ammonium (N)	as N mg/L			< 0.050	
Chloride (dissolved)	mg/L			10.3	
Sulphate (dissolved)	mg/L			7	
Bromide (dissolved)	mg/L			< 1.0	
Nitrite (as N)	as N mg/L			< 0.010	
Nitrate (as N)	as N mg/L			0.60	
Nitrate + Nitrite (as N)	as N mg/L			0.60	
Mercury (dissolved)	µg/L	1	0.29	< 0.10	
Hardness	mg/L as $CaCO_3$			170	
Silver (dissolved)	µg/L		1.5	< 0.10	
Aluminum (dissolved)	µg/L			10	
Arsenic (dissolved)	µg/L	25	1900	**310**	
Barium (dissolved)	µg/L	1000	29000	13	
Beryllium (dissolved)	µg/L		67	< 0.50	
Boron (dissolved)	µg/L	5000	45000	15	
Bismuth (dissolved)	µg/L			< 1.0	
Calcium (dissolved)	µg/L			60000	
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	
Cobalt (dissolved)	µg/L		66	1.05	
Chromium (dissolved)	µg/L		810	< 5.0	
Copper (dissolved)	µg/L	1000	87	< 0.5	
Iron (dissolved)	µg/L			< 100	
Potassium (dissolved)	µg/L			400	
Magnesium (dissolved)	µg/L			3900	
Manganese (dissolved)	µg/L			< 2	
Molybdenum (dissolved)	µg/L		9200	1.5	
Sodium (dissolved)	µg/L			15500	
Nickel (dissolved)	µg/L		490	< 1.0	
Phosphorus (dissolved)	µg/L			32	
Lead (dissolved)	µg/L	10	25	< 0.50	
Antimony (dissolved)	µg/L	6	20000	3.7	
Selenium (dissolved)	µg/L	10	63	< 2.0	
Tin (dissolved)	µg/L			< 1.0	
Strontium (dissolved)	µg/L			101	
Titanium (dissolved)	µg/L			< 5.0	
Thallium (dissolved)	µg/L		510	< 0.050	
Uranium (dissolved)	µg/L	20	420	**130**	
Vanadium (dissolved)	µg/L		250	0.92	
Zinc (dissolved)	µg/L		1100	< 5.0	
Lead-210	Bq/L	0.20		< 0.02	
Radium-226	Bq/L	0.49		< 0.040	
Thorium-230	Bq/L	0.65		< 0.070	
Thorium-232	Bq/L	0.60		--	
Field Parameters					
ODO % Sat	%			-[1]	
ORP	mV			-[1]	
SPC	µs/cm			-[1]	
Temperature	°C			-[1]	
Turbidity	FNU			-[1]	
pH	Units			-[1]	

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 93: WC-OW2A-75 and WC-OW2A-19

		Criteria		WC-OW2A-75		WC-OW2A-19					
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	Units			Average	WELL DECOMMISSIONED	Average			2022-04-28	2022-10-07	Average
pH	pH			7.82	Replaced by WC-OW2A-19	7.76	7.50	7.42	7.30	7.44	7.37
Alkalinity	mg/L as $CaCO_3$			470		420	478	516	556	493	525
Carbonate	mg/L as $CaCO_3$			3.1		2.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			470		420	478	516	556	493	525
Total Dissolved Solids	mg/L			610		450	497	504	511	509	510
Fluoride	mg/L	**1.5**		< 0.10		< 0.10	0.07	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.7		1.7	1.5	1.0	1.0	< 1.0	1.0
Dissolved Organic Carbon	mg/L			2.1		1.1	1.0	1.5	1.0	2.0	1.5
Ammonia+Ammonium(N)	as N mg/L			0.076		0.061	< 0.040	0.045	0.07	< 0.04	0.06
Chloride (dissolved)	mg/L			4.6		6.6	6.7	7.5	8.3	9.3	8.8
Sulphate (dissolved)	mg/L			58		31	28	24	23	22	23
Bromide (dissolved)	mg/L			< 1.0		< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010		< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10		< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			385		465	1372	1355	5770	538	3154
Silver (dissolved)	µg/L		**1.5**	< 0.10		< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5		< 5	< 1	3	4	< 1	3
Arsenic (dissolved)	µg/L	**25**	**1900**	1.5		< 1.0	0.6	0.7	0.4	0.4	0.4
Barium (dissolved)	µg/L	**1000**	**29000**	240		135	146	117	90	109	99
Beryllium (dissolved)	µg/L		**67**	< 0.50		< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	11		11	11	11	7	22	15
Bismuth (dissolved)	µg/L			< 1.0		< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			110000		125000	130000	128500	124000	95100	109550
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10		< 0.10	< 0.00	0.01	0.006	< 0.003	0.005
Cobalt (dissolved)	µg/L		**66**	< 0.50		0.97	0.41	0.53	0.617	0.272	0.445
Chromium (dissolved)	µg/L		**810**	< 5.0		< 5.0	0.4	0.2	0.16	< 0.08	0.12
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0		< 1.0	0.5	0.4	0.3	< 0.2	0.3
Iron (dissolved)	µg/L			1750		355	452	269	262	< 7	135
Potassium (dissolved)	µg/L			1700		1150	1100	999	834	1300	1067
Magnesium (dissolved)	µg/L			28000		36500	35350	36300	34600	36900	35750
Manganese (dissolved)	µg/L			22		51	20	17	16.4	2.3	9
Molybdenum (dissolved)	µg/L		**9200**	0.68		0.68	0.39	0.30	0.47	0.70	0.59
Sodium (dissolved)	µg/L			68500		11000	11000	11800	11300	13400	12350
Nickel (dissolved)	µg/L		**490**	< 1.0		1.5	0.7	0.9	1.00	0.70	0.9
Phosphorus (dissolved)	µg/L			148		1165	< 3	< 3	4	< 3	4
Lead (dissolved)	µg/L	**10**	**25**	< 0.50		< 0.50	0.03	0.08	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50		< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0		< 2.0	0.1	0.1	0.17	0.09	0.13
Tin (dissolved)	µg/L			< 1.0		< 1.0	< 0.1	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			300		320	344	340	342	354	348
Titanium (dissolved)	µg/L			< 5.0		< 5.0	0.1	0.2	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L		**510**	< 0.050		< 0.050	< 0.005	< 0.005	< 0.005	0.005	0.005
Uranium (dissolved)	µg/L	**20**	**420**	< 0.1		4.1	2.7	5.6	5.580	5.480	5.5
Vanadium (dissolved)	µg/L		**250**	< 0.50		< 0.50	0.21	0.30	0.25	0.11	0.18
Zinc (dissolved)	µg/L		**1100**	< 5		< 5	2	5	6	< 2	4
Lead-210	Bq/L	**0.20**		0.03		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040		< 0.04	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		< 0.060		< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]		-[1]	-[1]	-[1]	94.7	71.9	--
ORP	mV			-[1]		-[1]	-[1]	-[1]	114.4	38.7	--
SPC	µs/cm			-[1]		-[1]	-[1]	-[1]	832	845.0	--
Temperature	°C			-[1]		-[1]	-[1]	-[1]	9.416	12.474	--
Turbidity	FNU			-[1]		-[1]	-[1]	-[1]	2818.4	610.95	--
pH	Units			-[1]		-[1]	-[1]	-[1]	7.39	7.10	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
--- No data.

Table 94: WC-OW2-87 and WC-OW2-19

		Criteria		WC-OW2-87		WC-OW2-19					
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	Units			Average	WELL DECOMMISSIONED	Average			2022-04-28	2022-10-07	Average
pH	pH			7.77	Replaced by WC-OW2-19	7.77	7.66	7.42	7.47	7.68	7.58
Alkalinity	mg/L as $CaCO_3$			495		440	413	409	424	390	407
Carbonate	mg/L as $CaCO_3$			2.7		2.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			495		440	413	409	424	390	407
Total Dissolved Solids	mg/L			631		680	646	650	646	637	642
Fluoride	mg/L	1.5		< 0.10		< 0.10	0.08	0.06	0.09	< 0.06	0.08
Total Organic Carbon	mg/L			2.8		3.0	2.5	2.0	3.0	2.0	2.5
Dissolved Organic Carbon	mg/L			2.5		2.8	2.5	3.0	3.0	3.0	3.0
Ammonia+Ammonium (N)	as N mg/L			0.105		0.050	0.045	< 0.040	0.05	0.04	0.05
Chloride (dissolved)	mg/L			6.6		4.8	4.9	5.1	5.20	5.60	5.4
Sulphate (dissolved)	mg/L			79		150	135	92	120	110	115
Bromide (dissolved)	mg/L			< 1.0		< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010		< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10		< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			320		305	262	260	238	276	257
Silver (dissolved)	µg/L		1.5	< 0.10		< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0		< 5.0	5.0	2.0	1.0	< 1.0	1.0
Arsenic (dissolved)	µg/L	25	1900	1.3		1.4	1.5	1.8	1.4	1.1	1.3
Barium (dissolved)	µg/L	1000	29000	135		27	25	26	26.1	26.5	26
Beryllium (dissolved)	µg/L		67	< 0.50		< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	< 10		< 10	9	9	7	10	9
Bismuth (dissolved)	µg/L			< 1.0		< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			95000		90500	78800	77400	74100	78000	76050
Cadmium (dissolved)	µg/L	5	2.7	< 0.10		< 0.10	< 0.00	0.03	0.009	< 0.003	0.006
Cobalt (dissolved)	µg/L		66	< 0.50		< 0.50	0.06	0.07	0.093	0.051	0.07
Chromium (dissolved)	µg/L		810	< 5.0		< 5.0	< 0.1	0.2	< 0.08	< 0.08	< 0.08
Copper (dissolved)	µg/L	1000	87	< 1.0		< 1.0	< 0.2	0.3	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			1650		1350	1165	1130	946	41	494
Potassium (dissolved)	µg/L			1600		1600	1445	1420	1460	1620	1540
Magnesium (dissolved)	µg/L			20000		19500	16750	16500	15000	16700	15850
Manganese (dissolved)	µg/L			19		18	16	16	16	12	14
Molybdenum (dissolved)	µg/L		9200	1.15		8.2	9.5	11.6	12.0	14.8	13.4
Sodium (dissolved)	µg/L			115000		150000	137500	139500	136000	145000	140500
Nickel (dissolved)	µg/L		490	< 1.0		< 1.0	0.2	0.2	0.3	0.3	0.3
Phosphorus (dissolved)	µg/L			51		9	4	12	9	< 3	6
Lead (dissolved)	µg/L	10	25	< 0.50		< 0.50	0.02	0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50		< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0		< 2.0	0.1	0.1	0.12	0.08	0.10
Tin (dissolved)	µg/L			< 1.0		< 1.0	0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			225		150	138	139	135	139	137
Titanium (dissolved)	µg/L			< 5.0		< 5.0	0.1	0.1	0.35	< 0.05	0.20
Thallium (dissolved)	µg/L		510	< 0.050		< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.11		0.14	0.13	0.10	0.089	0.089	0.09
Vanadium (dissolved)	µg/L		250	< 0.50		< 0.50	0.08	0.07	0.11	0.04	0.08
Zinc (dissolved)	µg/L		1100	< 5.0		< 5.0	< 2.0	5.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.02		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040		< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060		< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]		-[1]	-[1]	-[1]	39.7	39.5	--
ORP	mV			-[1]		-[1]	-[1]	-[1]	1.3	-88.2	--
SPC	µs/cm			-[1]		-[1]	-[1]	-[1]	960	1000.0	--
Temperature	°C			-[1]		-[1]	-[1]	-[1]	10.476	11.748	--
Turbidity	FNU			-[1]		-[1]	-[1]	-[1]	7.74	1.18	--
pH	Units			-[1]		-[1]	-[1]	-[1]	7.44	7.40	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
--- No data.

Table 95: WC-OW3-79

		Criteria		WC-OW3-79							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-16	2022-10-19	Average
pH	pH			8.05	7.95	8.06	8.17	7.97	7.96	8.06	8.01
Alkalinity	mg/L as $CaCO_3$			170	175	170	172	167	163	166	165
Carbonate	mg/L as $CaCO_3$			1.8	1.5	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			170	175	170	172	167	163	166	165
Total Dissolved Solids	mg/L			172	158	213	229	222	226	237	232
Fluoride	mg/L	1.5		0.18	0.21	0.17	0.18	0.18	0.19	0.17	0.18
Total Organic Carbon	mg/L			0.59	0.68	0.71	< 1.00	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.54	0.59	0.55	< 1.00	< 1.00	1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.060	0.080	0.068	0.055	0.060	0.08	0.11	0.10
Chloride (dissolved)	mg/L			1.5	1.7	1.8	1.8	2.1	1.70	2.50	2.1
Sulphate (dissolved)	mg/L			25	26	26	25	25	25	23	24
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			133	170	180	176	172	203	194	199
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			127.5	< 5.0	< 5.0	1.5	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	25	1900	1.9	3.1	3.2	3.8	3.7	4.1	3.9	4.0
Barium (dissolved)	µg/L	1000	29000	85	135	140	135	138	151	145	148
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	15	20	19	20	20	23	19	21
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			33000	37000	40000	41150	42750	43800	41300	42550
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.00	0.01	< 0.003	0.003	0.003
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.01	0.01	0.008	0.010	0.009
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.4	0.1	0.08	< 0.08	0.08
Copper (dissolved)	µg/L	1000	87	2.5	< 1.0	< 1.0	0.4	< 0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			160	200	215	215	227	217	244	231
Potassium (dissolved)	µg/L			985	1400	1400	1465	1555	1520	1540	1530
Magnesium (dissolved)	µg/L			12650	19000	19500	19450	19450	22200	19000	20600
Manganese (dissolved)	µg/L			23	15	14	16	16	15.4	17.3	16
Molybdenum (dissolved)	µg/L		9200	0.9	1.2	1.2	1.2	1.1	1.25	1.26	1.3
Sodium (dissolved)	µg/L			7900	8300	8500	8710	9375	10000	8140	9070
Nickel (dissolved)	µg/L		490	1.1	< 1.0	< 1.0	< 0.1	1.0	< 0.1	< 0.1	< 0.1
Phosphorus (dissolved)	µg/L			18	12	19	8	33	< 3	8	6
Lead (dissolved)	µg/L	10	25	0.74	< 0.50	< 0.50	0.04	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			240	385	380	417	406	415	422	419
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	< 0.1	< 0.05	0.19	0.12
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.4	< 0.1	< 0.1	0.0	0.0	0.042	0.046	0.04
Vanadium (dissolved)	µg/L		250	0.62	< 0.50	< 0.50	0.02	0.07	0.02	0.01	0.02
Zinc (dissolved)	µg/L		1100	23	< 5.0	< 5.0	3.5	2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			.[1]	.[1]	.[1]	.[1]	.[1]	36.1	45.2	--
ORP	mV			.[1]	.[1]	.[1]	.[1]	.[1]	-8.9	-47.6	--
SPC	µs/cm			.[1]	.[1]	.[1]	.[1]	.[1]	363.7	204.6	--
Temperature	°C			.[1]	.[1]	.[1]	.[1]	.[1]	11.16	9.324	--
Turbidity	FNU			.[1]	.[1]	.[1]	.[1]	.[1]	2.07	-0.01	--
pH	Units			.[1]	.[1]	.[1]	.[1]	.[1]	7.97	7.72	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 96: WC-OW3-87

		Criteria		WC-OW3-87							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-26	2022-10-14	Average
pH	pH			8.07	7.92	8.10	7.99	7.87	7.89	7.82	7.86
Alkalinity	mg/L as $CaCO_3$			185	195	185	185	207	190	195	193
Carbonate	mg/L as $CaCO_3$			2.1	1.5	2.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			185	195	185	185	207	190	195	193
Total Dissolved Solids	mg/L			190	235	265	245	232	217	263	240
Fluoride	mg/L	1.5		0.12	0.12	0.11	0.11	0.12	0.08	0.11	0.10
Total Organic Carbon	mg/L			1.8	1.8	2.0	1.5	2.0	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L			1.55	1.70	1.70	2.00	2.00	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.050	0.075	0.052	0.060	0.050	0.09	0.04	0.07
Chloride (dissolved)	mg/L			4.1	4.0	6.0	4.9	6.7	4.20	7.00	5.6
Sulphate (dissolved)	mg/L			9.2	7.9	8.7	8.5	9.0	9	8	9
Bromide (dissolved)	mg/L			3.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			180	180	190	196	202	220	190	205
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	6.0	1.5	3.0	74.0	38.5
Arsenic (dissolved)	µg/L	25	1900	5.0	4.5	4.2	5.1	5.0	6.2	5.2	5.7
Barium (dissolved)	µg/L	1000	29000	160	155	165	160	160	169	178	174
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	12	10	11	12	14	13	13	13
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.0	< 0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			54500	54000	58500	60650	59100	61900	56200	59050
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	0.00	< 0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.02	0.03	0.026	0.043	0.03
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.3	0.2	0.16	0.23	0.2
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	2.1	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			200	155	< 155	162	122	194	111	153
Potassium (dissolved)	µg/L			1000	970	975	1065	1008	1110	1070	1090
Magnesium (dissolved)	µg/L			10500	10000	10450	10450	10130	11200	10100	10650
Manganese (dissolved)	µg/L			9.9	10.1	10.8	9.6	9.1	10.7	4.7	8
Molybdenum (dissolved)	µg/L		9200	< 0.5	< 0.5	< 0.5	0.2	0.4	0.29	0.68	0.5
Sodium (dissolved)	µg/L			5000	5000	5600	5250	5770	5690	5330	5510
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.2	0.2	0.20	0.20	0.2
Phosphorus (dissolved)	µg/L			27	43	23	4	4	11	< 3	7
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.01	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	0.1	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			195	195	205	207	215	214	231	223
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.3	0.2	0.17	3.66	1.92
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.14	0.16	0.30	0.15	0.68	0.095	0.081	0.09
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	0.07	0.13	0.04	0.15	0.10
Zinc (dissolved)	µg/L		1100	< 5	< 5.0	< 5.0	2.5	2.5	2.0	< 2.0	2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	0.01	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	68.2	52	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	33.2	-25.1	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	355.8	375.7	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	13.257	12.103	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	40.66	50.36	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	7.72	7.41	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 97: WC-OW4-79

		Criteria		WC-OW4-79							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-06	**Average**
pH	pH			8.09	7.85	8.17	7.99	7.66	7.72	7.58	7.65
Alkalinity	mg/L as $CaCO_3$			150	150	145	162	155	180	141	161
Carbonate	mg/L as $CaCO_3$			1.7	1.2	2.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			145	150	140	162	155	180	141	161
Total Dissolved Solids	mg/L			101	158	183	151	159	177	169	173
Fluoride	mg/L	1.5		0.21	0.20	0.21	0.23	0.18	0.23	0.22	0.23
Total Organic Carbon	mg/L			0.8	1.1	1.3	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.62	0.77	0.83	1.00	< 1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.10	0.11	0.12	0.09	0.07	0.08	0.09	0.09
Chloride (dissolved)	mg/L			1.3	1.8	1.6	1.9	2.2	1.80	3.00	2.4
Sulphate (dissolved)	mg/L			9.1	13.5	10.9	13.0	13.5	14	12	13
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.08	< 0.01	0.05
Hardness	mg/L as $CaCO_3$			135	140	140	232	164	162	126	144
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	7.0	2.5	1.0	< 1.0	1.0
Arsenic (dissolved)	µg/L	25	1900	< 1.0	1.1	< 1.0	0.7	0.8	0.4	0.8	0.6
Barium (dissolved)	µg/L	1000	29000	102	110	91	74	112	101	118	110
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.02	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	24	24	22	42	31	43	24	34
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			28500	30500	30000	32400	34000	36200	23500	29850
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	< 0.00	< 0.00	< 0.003	0.025	0.014
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.10	0.19	0.200	0.096	0.15
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.3	0.2	< 0.08	< 0.08	< 0.08
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.4	0.3	0.2	< 0.2	0.2
Iron (dissolved)	µg/L			2600	2950	1765	341	3375	2520	6120	4320
Potassium (dissolved)	µg/L			900	950	1025	836	891	813	648	731
Magnesium (dissolved)	µg/L			15000	15500	15000	13850	14200	14900	10500	12700
Manganese (dissolved)	µg/L			78	69	53	25	80	152.0	84.3	118
Molybdenum (dissolved)	µg/L		9200	1.4	1.2	2.0	1.1	1.1	1.15	1.25	1.2
Sodium (dissolved)	µg/L			8900	9350	9500	9550	9055	8950	7070	8010
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.3	0.6	1.80	0.30	1.1
Phosphorus (dissolved)	µg/L			8	12	39	< 3	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.02	0.20	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	0.13	0.09
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	0.2	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			305	320	315	468	365	469	260	365
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.4	0.1	0.13	0.22	0.18
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	< 0.10	< 0.10	0.18	0.09	0.08	0.153	0.017	0.09
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	0.90	0.02	< 0.01	0.01	0.01
Zinc (dissolved)	µg/L		1100	< 5	< 5.0	< 5.0	12.0	14.0	6.0	12.0	9.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	59.5	-[2]	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-85.6	-[2]	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	356.9	-[2]	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	10.64	-[2]	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	48.35	-[2]	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.15	-[2]	--

COPC = Contaminants of Potential Concern criteria for Potable [2] Insufficient volume of groundwater for field parameters.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 98: WC-OW5-79 and WC-OW5-19

		Criteria		WC-OW5-79		WC-OW5-19					
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average	WELL DECOMMISSIONED	Average			2022-06-08	2022-10-07	Average
pH	pH			7.85	Replaced by WC-OW5-19	7.44	7.20	7.32	7.34	7.29	7.32
Alkalinity	mg/L as $CaCO_3$			260		280	327	304	365	361	363
Carbonate	mg/L as $CaCO_3$			1.7		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			255		280	327	304	365	361	363
Total Dissolved Solids	mg/L			412		1620	1557	1588	214	1560	887
Fluoride	mg/L	**1.5**		0.15		< 0.10	0.07	< 0.09	< 0.06	0.08	0.07
Total Organic Carbon	mg/L			2		14	9	11.0	8.0	7.0	7.5
Dissolved Organic Carbon	mg/L			2		12	8	10.0	7.0	8.0	7.5
Ammonia+Ammonium(N)	as N mg/L			0.15		0.20	0.13	0.17	0.18	0.26	0.22
Chloride (dissolved)	mg/L			2.9		8.5	6.0	7.2	4.20	5.10	4.7
Sulphate (dissolved)	mg/L			99		885	780	833	800	790	795
Bromide (dissolved)	mg/L			< 1.0		< 1.0	< 0.3	< 0.7	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010		< 0.010	< 0.030	< 0.020	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.08	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10		< 0.10	< 0.06	< 0.08	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	**0.29**	< 0.10		< 0.10	< 0.01	< 0.06	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			290		1000	897	948	816	983	900
Silver (dissolved)	µg/L		**1.5**	< 0.10		< 0.10	< 0.05	< 0.08	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0		< 5.0	4.0	4.5	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	**25**	**1900**	1.5		2.8	3.4	3.1	3.8	1.6	2.7
Barium (dissolved)	µg/L	**1000**	**29000**	165		29	24	26	24	18	21
Beryllium (dissolved)	µg/L		**67**	< 0.50		< 0.50	< 0.01	0.254	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	21		22	18	20	19	17	18
Bismuth (dissolved)	µg/L			< 1.0		< 1.0	< 0.007	0.504	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			76000		335000	299500	317250	261000	267000	264000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10		< 0.10	< 0.00	< 0.052	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50		< 0.51	0.35	0.43	0.416	0.287	0.35
Chromium (dissolved)	µg/L		**810**	< 5.0		< 5.0	0.1	2.6	0.21	< 0.08	0.15
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0		< 1.0	< 0.2	< 0.6	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			695		5300	5340	5320	4720	20	2370
Potassium (dissolved)	µg/L			1150		1500	1320	1410	1300	1560	1430
Magnesium (dissolved)	µg/L			23000		48000	43300	45650	41300	44500	42900
Manganese (dissolved)	µg/L			15		79	73	76	64.6	30.6	48
Molybdenum (dissolved)	µg/L		**9200**	1.3		1.8	0.6	1.2	0.81	1.84	1.3
Sodium (dissolved)	µg/L			33500		120000	112000	116000	154000	158000	156000
Nickel (dissolved)	µg/L		**490**	< 1.0		< 1.0	0.8	0.9	0.9	0.9	0.9
Phosphorus (dissolved)	µg/L			9		20	10	15	7	< 3	5
Lead (dissolved)	µg/L	**10**	**25**	< 0.50		< 0.50	0.01	< 0.26	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50		< 0.50	< 0.90	< 0.70	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0		< 2.0	0.3	1.13	0.21	0.22	0.22
Tin (dissolved)	µg/L			< 1.0		< 1.0	0.1	0.54	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			475		460	471	466	451	478	465
Titanium (dissolved)	µg/L			< 5.0		< 5.0	0.5	2.73	0.22	0.11	0.17
Thallium (dissolved)	µg/L		**510**	< 0.050		< 0.050	< 0.005	< 0.028	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	< 0.10		1.23	0.11	0.67	0.063	0.048	0.06
Vanadium (dissolved)	µg/L		**250**	< 0.50		< 0.50	0.20	0.35	0.20	0.12	0.16
Zinc (dissolved)	µg/L		**1100**	10.0		< 5.0	< 2.0	< 3.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.10		< 0.10	< 0.02	0.06	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040		< 0.04	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070		< 0.07	< 0.02	< 0.05	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		< 0.060		< 0.06	< 0.02	< 0.04	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]		-[1]	-[1]	-[1]	21.2	30.9	--
ORP	mV			-[1]		-[1]	-[1]	-[1]	-65.2	-76.0	--
SPC	µs/cm			-[1]		-[1]	-[1]	-[1]	1996.9	1888.0	--
Temperature	°C			-[1]		-[1]	-[1]	-[1]	12.99	10.612	--
Turbidity	FNU			-[1]		-[1]	-[1]	-[1]	1.94	5.29	--
pH	Units			-[1]		-[1]	-[1]	-[1]	6.93	7.07	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
--- No data.

Table 99: WC-OW10-75

		Criteria		WC-OW10-75							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-06-08	2022-10-11	**Average**
pH	pH			8.08	8.05	8.05	8.01	8.00	7.93	7.94	7.94
Alkalinity	mg/L as $CaCO_3$			170	180	170	165	214	184	195	190
Carbonate	mg/L as $CaCO_3$			1.9	1.9	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			170	180	170	165	214	184	195	190
Total Dissolved Solids	mg/L			183	555	230	260	242	246	229	238
Fluoride	mg/L	1.5		0.19	0.15	0.13	0.15	0.15	0.15	0.18	0.17
Total Organic Carbon	mg/L			1.15	1.09	0.84	< 1.00	< 1.00	< 1.0	1.0	1.0
Dissolved Organic Carbon	mg/L			0.72	0.71	0.57	1.00	< 1.00	< 1.0	2.0	1.5
Ammonia+Ammonium (N)	as N mg/L			0.065	0.145	0.069	0.065	0.090	0.10	0.07	0.09
Chloride (dissolved)	mg/L			2.5	3.6	4.2	4.2	5.2	5	5	5
Sulphate (dissolved)	mg/L			28	35	39	39	40	44	41	43
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			170	190	195	207	446	242	198	220
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	< 1.0	2.0	11	< 1.0	6.0
Arsenic (dissolved)	µg/L	25	1900	1.5	2.0	2.6	2.8	2.8	2.9	3.2	3.1
Barium (dissolved)	µg/L	1000	29000	125	135	135	154	154	160	165	163
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	0.023	0.015
Boron (dissolved)	µg/L	5000	45000	23	15	16	12	13	16	11	14
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.0	0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			31000	35500	39500	43550	45400	41700	37500	39600
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	< 0.00	0.02	< 0.003	0.022	0.013
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.01	0.03	0.034	0.023	0.03
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.3	0.2	0.20	0.26	0.2
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	< 0.2	0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			< 100	125	245	258	250	269	275	272
Potassium (dissolved)	µg/L			1200	1250	1200	1255	1415	1220	1220	1220
Magnesium (dissolved)	µg/L			22500	24500	24500	23000	23400	25100	21500	23300
Manganese (dissolved)	µg/L			12.5	11.5	10.4	9.2	10.4	12.2	10.1	11.2
Molybdenum (dissolved)	µg/L		9200	1.15	0.99	0.85	0.75	0.98	0.95	0.84	0.9
Sodium (dissolved)	µg/L			9200	7350	5950	5740	6995	6550	5580	6065
Nickel (dissolved)	µg/L		490	< 1.0	1.7	< 1.0	< 0.1	1.5	0.1	< 0.1	< 0.1
Phosphorus (dissolved)	µg/L			34	5	18	3	34	9	9	9
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.02	0.07	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	0.26	0.15
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			380	390	360	350	360	357	338	348
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	0.2	0.82	0.37	0.60
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	< 0.10	< 0.10	< 0.10	0.03	0.03	0.041	0.023	0.03
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	< 0.01	0.07	0.06	0.02	0.04
Zinc (dissolved)	µg/L		1100	< 5	< 5.0	< 5.0	< 2.0	2.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.040	< 0.040	0.015	0.010	0.02	< 0.01	< 0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.070	< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.060	< 0.060	< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	47.4	38.1	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	4.7	-64.9	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	402.7	199.4	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	11.447	11.796	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	160.72	382.56	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	7.91	7.94	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 100: WC-OW12-75

		Criteria		WC-OW12-75	
		COPC	Table 3	2017	2018
Parameter	**Units**			Average	WELL DECOMMISSIONED
pH	pH			7.84	
Alkalinity	mg/L as $CaCO_3$			220	
Carbonate	mg/L as $CaCO_3$			1.5	
Bicarbonate	mg/L as $CaCO_3$			220	
Total Dissolved Solids	mg/L			309	
Fluoride	mg/L	1.5		< 0.10	
Total Organic Carbon	mg/L			1.00	
Dissolved Organic Carbon	mg/L			0.97	
Ammonia+Ammonium (N)	as N mg/L			< 0.050	
Chloride (dissolved)	mg/L			16.0	
Sulphate (dissolved)	mg/L			28	
Bromide (dissolved)	mg/L			< 1.0	
Nitrite (as N)	as N mg/L			< 0.010	
Nitrate (as N)	as N mg/L			2.93	
Nitrate + Nitrite (as N)	as N mg/L			2.93	
Mercury (dissolved)	µg/L	1	0.29	< 0.10	
Hardness	mg/L as $CaCO_3$			255	
Silver (dissolved)	µg/L		1.5	< 0.10	
Aluminum (dissolved)	µg/L			< 5.0	
Arsenic (dissolved)	µg/L	25	1900	< 1.0	
Barium (dissolved)	µg/L	1000	29000	26	
Beryllium (dissolved)	µg/L		67	< 0.50	
Boron (dissolved)	µg/L	5000	45000	11	
Bismuth (dissolved)	µg/L			< 1.0	
Calcium (dissolved)	µg/L			93500	
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	
Cobalt (dissolved)	µg/L		66	< 0.50	
Chromium (dissolved)	µg/L		810	< 5.0	
Copper (dissolved)	µg/L	1000	87	< 1.0	
Iron (dissolved)	µg/L			< 100	
Potassium (dissolved)	µg/L			575	
Magnesium (dissolved)	µg/L			5000	
Manganese (dissolved)	µg/L			< 2.0	
Molybdenum (dissolved)	µg/L		9200	< 0.50	
Sodium (dissolved)	µg/L			7850	
Nickel (dissolved)	µg/L		490	< 1.0	
Phosphorus (dissolved)	µg/L			6	
Lead (dissolved)	µg/L	10	25	< 0.50	
Antimony (dissolved)	µg/L	6	20000	< 0.50	
Selenium (dissolved)	µg/L	10	63	< 2.0	
Tin (dissolved)	µg/L			< 1.0	
Strontium (dissolved)	µg/L			170	
Titanium (dissolved)	µg/L			< 5.0	
Thallium (dissolved)	µg/L		510	< 0.050	
Uranium (dissolved)	µg/L	20	420	0.60	
Vanadium (dissolved)	µg/L		250	< 0.50	
Zinc (dissolved)	µg/L		1100	< 5.0	
Lead-210	Bq/L	0.20		< 0.02	
Radium-226	Bq/L	0.49		< 0.04	
Thorium-230	Bq/L	0.65		< 0.07	
Thorium-232	Bq/L	0.60		--	
Field Parameters					
ODO % Sat	%			-[1]	
ORP	mV			-[1]	
SPC	µs/cm			-[1]	
Temperature	°C			-[1]	
Turbidity	FNU			-[1]	
pH	Units			-[1]	

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 101: WC-OW18-76

		Criteria		WC-OW18-76	
		COPC	Table 3	2017	2018
Parameter	**Units**			Average	WELL DECOMMISSIONED
pH	pH			7.97	
Alkalinity	mg/L as $CaCO_3$			200	
Carbonate	mg/L as $CaCO_3$			1.7	
Bicarbonate	mg/L as $CaCO_3$			200	
Total Dissolved Solids	mg/L			246	
Fluoride	mg/L	1.5		< 0.10	
Total Organic Carbon	mg/L			5.70	
Dissolved Organic Carbon	mg/L			0.91	
Ammonia+Ammonium (N)	as N mg/L			< 0.050	
Chloride (dissolved)	mg/L			19.0	
Sulphate (dissolved)	mg/L			12	
Bromide (dissolved)	mg/L			< 1.0	
Nitrite (as N)	as N mg/L			< 0.010	
Nitrate (as N)	as N mg/L			< 0.10	
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	
Mercury (dissolved)	µg/L	1	0.29	< 0.10	
Hardness	mg/L as $CaCO_3$			200	
Silver (dissolved)	µg/L		1.5	< 0.10	
Aluminum (dissolved)	µg/L			< 5.0	
Arsenic (dissolved)	µg/L	25	1900	4.0	
Barium (dissolved)	µg/L	1000	29000	27	
Beryllium (dissolved)	µg/L		67	< 0.50	
Boron (dissolved)	µg/L	5000	45000	< 10	
Bismuth (dissolved)	µg/L			< 1.0	
Calcium (dissolved)	µg/L			65000	
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	
Cobalt (dissolved)	µg/L		66	< 0.50	
Chromium (dissolved)	µg/L		810	< 5.0	
Copper (dissolved)	µg/L	1000	87	< 1.0	
Iron (dissolved)	µg/L			2100	
Potassium (dissolved)	µg/L			770	
Magnesium (dissolved)	µg/L			8500	
Manganese (dissolved)	µg/L			55	
Molybdenum (dissolved)	µg/L		9200	0.97	
Sodium (dissolved)	µg/L			20000	
Nickel (dissolved)	µg/L		490	3.2	
Phosphorus (dissolved)	µg/L			850	
Lead (dissolved)	µg/L	10	25	< 0.50	
Antimony (dissolved)	µg/L	6	20000	< 0.50	
Selenium (dissolved)	µg/L	10	63	< 2.0	
Tin (dissolved)	µg/L			< 1.0	
Strontium (dissolved)	µg/L			170	
Titanium (dissolved)	µg/L			< 5.0	
Thallium (dissolved)	µg/L		510	< 0.050	
Uranium (dissolved)	µg/L	20	420	**120**	
Vanadium (dissolved)	µg/L		250	< 0.50	
Zinc (dissolved)	µg/L		1100	**1200**	
Lead-210	Bq/L	0.20		< 0.02	
Radium-226	Bq/L	0.49		< 0.040	
Thorium-230	Bq/L	0.65		< 0.070	
Thorium-232	Bq/L	0.60		< 0.060	
Field Parameters					
ODO % Sat	%			-[1]	
ORP	mV			-[1]	
SPC	µs/cm			-[1]	
Temperature	°C			-[1]	
Turbidity	FNU			-[1]	
pH	Units			-[1]	

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 102: WC-OW25-76

		Criteria		WC-OW25-76							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-06	Average
pH	pH			7.77	--	8.19	7.75	--	-[2]	-[2]	--
Alkalinity	mg/L as $CaCO_3$			160	--	140	163	--	-[2]	-[2]	--
Carbonate	mg/L as $CaCO_3$			< 1.0	--	2.1	< 1.0	--	-[2]	-[2]	--
Bicarbonate	mg/L as $CaCO_3$			--	--	140	163	--	-[2]	-[2]	--
Total Dissolved Solids	mg/L			--	--	--	160	--	-[2]	-[2]	--
Fluoride	mg/L	1.5		--	--	--	0.24	--	-[2]	-[2]	--
Total Organic Carbon	mg/L			2.3	--	--	< 1.0	--	-[2]	-[2]	--
Dissolved Organic Carbon	mg/L			2.9	--	--	1.0	--	-[2]	-[2]	--
Ammonia+Ammonium (N)	as N mg/L			1.7	--	--	0.07	--	-[2]	-[2]	--
Chloride (dissolved)	mg/L			--	--	--	1.9	--	-[2]	-[2]	--
Sulphate (dissolved)	mg/L			--	--	--	14	--	-[2]	-[2]	--
Bromide (dissolved)	mg/L			--	--	--	< 0.30	--	-[2]	-[2]	--
Nitrite (as N)	as N mg/L			--	--	--	< 0.03	--	-[2]	-[2]	--
Nitrate (as N)	as N mg/L			--	--	--	< 0.06	--	-[2]	-[2]	--
Nitrate + Nitrite (as N)	as N mg/L			--	--	--	< 0.06	--	-[2]	-[2]	--
Mercury (dissolved)	µg/L	1	0.29	< 0.10	--	< 0.10	< 0.01	--	-[2]	-[2]	--
Hardness	mg/L as $CaCO_3$			--	110	115	159	--	-[2]	-[2]	--
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	-[2]	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			8.0	< 5.0	< 5.0	2.0	1.0	-[2]	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 1.0	< 1.0	0.8	0.7	-[2]	0.8	0.8
Barium (dissolved)	µg/L	1000	29000	30	25	35	69.50	35.30	-[2]	31	31
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	< 0.007	< 0.007	-[2]	0.009	0.009
Boron (dissolved)	µg/L	5000	45000	70	62	63	41	61	-[2]	54	54
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.007	< 0.007	-[2]	< 0.010	< 0.010
Calcium (dissolved)	µg/L			28000	26500	25500	27700	33600	-[2]	31100	31100
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	< 0.003	0.005	-[2]	0.012	0.012
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.097	0.042	-[2]	0.041	0.04
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.32	0.19	-[2]	0.09	0.1
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.25	< 0.20	-[2]	0.60	0.6
Iron (dissolved)	µg/L			< 100	< 100	< 100	1289	29	-[2]	< 7	< 7
Potassium (dissolved)	µg/L			955	695	715	760	716	-[2]	705	705
Magnesium (dissolved)	µg/L			11000	11500	11500	12600	14900	-[2]	12900	12900
Manganese (dissolved)	µg/L			30	5	12	28	11	-[2]	1.2	1.2
Molybdenum (dissolved)	µg/L		9200	1.6	1.5	1.7	1.35	1.23	-[2]	1.22	1.2
Sodium (dissolved)	µg/L			11000	11000	10500	9385	11100	-[2]	10000	10000
Nickel (dissolved)	µg/L		490	< 1.0	< 1.0	< 1.0	0.3	< 0.1	-[2]	0.10	0.1
Phosphorus (dissolved)	µg/L			410	--	--	6	< 3	-[2]	4	4
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.07	0.01	-[2]	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	-[2]	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	< 0.04	0.05	-[2]	0.05	0.05
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.08	< 0.06	-[2]	< 0.06	< 0.06
Strontium (dissolved)	µg/L			420	430	425	402	676	-[2]	529	529
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.07	< 0.05	-[2]	0.15	0.15
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	-[2]	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.12	0.11	0.14	0.142	0.134	-[2]	0.119	0.12
Vanadium (dissolved)	µg/L		250	1.4	1.5	3.2	0.88	1.47	-[2]	1.44	1.44
Zinc (dissolved)	µg/L		1100	< 5.0	< 5.0	< 5.0	10	2	-[2]	5.0	5.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	-[2]	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	0.01	< 0.01	0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	0.60		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]	-[3]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for full sample collection.
[3] Insufficient volume of groundwater for field parameters.
-- - No data.

Table 103: WC-OW27-76

		Criteria		WC-OW27-76							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-06	**Average**
pH	pH			8.00	7.88	8.04	7.81	7.62	7.28	7.85	7.57
Alkalinity	mg/L as $CaCO_3$			215	210	210	255	216	213	214	214
Carbonate	mg/L as $CaCO_3$			2.1	1.5	2.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			210	210	205	255	216	213	214	214
Total Dissolved Solids	mg/L			338	680	390	353	376	423	491	457
Fluoride	mg/L	**1.5**		0.14	0.13	0.11	0.14	0.17	0.12	0.12	0.12
Total Organic Carbon	mg/L			1.4	9.4	1.6	1.0	1.0	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L			1.2	1.3	1.3	1.5	1.0	1.0	2.0	1.5
Ammonia+Ammonium (N)	as N mg/L			0.093	0.210	0.077	0.065	0.100	0.06	0.05	0.06
Chloride (dissolved)	mg/L			28	31	46	54	79	82	130	106
Sulphate (dissolved)	mg/L			29	26	31	32	33	33	31	32
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	< 0.3	0.5	0.5	0.7	0.6
Nitrite (as N)	as N mg/L			< 0.010	0.022	0.023	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	0.07	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			270	250	305	417	351	319	256	288
Silver (dissolved)	µg/L		**1.5**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	2.0	1.5	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 1.0	< 1.0	0.4	0.4	0.3	0.4	0.4
Barium (dissolved)	µg/L	**1000**	**29000**	125	110	155	158	156	166	177	172
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	45	46	40	39	45	37	42	40
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.0	0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			70000	65500	82500	88300	95550	103000	74700	88850
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10	< 0.10	< 0.10	0.01	0.00	0.009	0.023	0.016
Cobalt (dissolved)	µg/L		**66**	< 0.50	< 0.50	< 0.50	0.05	0.07	0.082	0.048	0.07
Chromium (dissolved)	µg/L		**810**	< 5.0	< 5.0	< 5.0	0.3	0.2	< 0.08	0.09	0.1
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 1.0	< 1.0	0.3	0.3	0.30	0.20	0.3
Iron (dissolved)	µg/L			< 100	< 100	< 100	8	8	< 7	8	8
Potassium (dissolved)	µg/L			820	810	885	939	956	887	804	846
Magnesium (dissolved)	µg/L			22000	21500	23500	24700	25250	29300	21600	25450
Manganese (dissolved)	µg/L			19	78	46	36	38	30.3	20.2	25.3
Molybdenum (dissolved)	µg/L		**9200**	0.56	0.55	0.51	0.52	0.48	0.67	0.52	0.60
Sodium (dissolved)	µg/L			9650	9700	11000	12450	14200	15700	14000	14850
Nickel (dissolved)	µg/L		**490**	< 1.0	< 1.0	1.2	0.5	0.5	0.40	0.30	0.4
Phosphorus (dissolved)	µg/L			47	18	38	< 3	< 3	< 3	3	3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.50	< 0.50	0.02	0.09	0.31	< 0.09	0.20
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	< 0.04	0.11	0.08
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	0.1	< 0.06	0.06	0.06
Strontium (dissolved)	µg/L			695	715	765	928	915	1010	779	895
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	0.1	0.08	0.27	0.18
Thallium (dissolved)	µg/L		**510**	< 0.050	< 0.050	< 0.050	0.006	< 0.005	< 0.005	0.011	0.008
Uranium (dissolved)	µg/L	**20**	**420**	0.14	0.15	0.13	0.14	0.13	0.127	0.139	0.13
Vanadium (dissolved)	µg/L		**250**	0.54	< 0.50	< 0.50	0.56	0.42	0.53	0.44	0.49
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 5.0	< 5.0	2.0	5.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.04	< 0.04	0.01	< 0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	-[2]	-[2]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for field parameters.
-- - No data.

Table 104: WC-OW28-76

		Criteria		WC-OW28-76							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-05-19	2022-10-06	Average
pH	pH			--	--	8.19	8.10	--	[2]	[2]	--
Alkalinity	mg/L as $CaCO_3$			--	--	140	132	--	[2]	[2]	--
Carbonate	mg/L as $CaCO_3$			--	--	2.05	< 1	--	[2]	[2]	--
Bicarbonate	mg/L as $CaCO_3$			--	--	140	132	--	[2]	[2]	--
Total Dissolved Solids	mg/L			--	--	205	166	--	[2]	[2]	--
Fluoride	mg/L	**1.5**		--	--	0.22	0.24	--	[2]	[2]	--
Total Organic Carbon	mg/L			1.2	--	1.3	1.0	--	[2]	[2]	--
Dissolved Organic Carbon	mg/L			--	--	1.0	1.0	--	[2]	[2]	--
Ammonia+Ammonium(N)	as N mg/L			0.079	--	0.067	< 0.040	--	[2]	[2]	--
Chloride (dissolved)	mg/L			--	--	16	18	--	[2]	[2]	--
Sulphate (dissolved)	mg/L			--	--	13	12	--	[2]	[2]	--
Bromide (dissolved)	mg/L			--	--	1.0	< 0.3	--	[2]	[2]	--
Nitrite (as N)	as N mg/L			--	--	0.02	< 0.03	--	[2]	[2]	--
Nitrate (as N)	as N mg/L			--	--	< 0.10	< 0.06	--	[2]	[2]	--
Nitrate + Nitrite (as N)	as N mg/L			--	--	0.11	< 0.06	--	[2]	[2]	--
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.10	< 0.10	< 0.01	--	[2]	[2]	--
Hardness	mg/L as $CaCO_3$			--	120	130	146	--	[2]	[2]	--
Silver (dissolved)	µg/L		**1.5**	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	[2]	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	6.7	< 5.0	1.5	13.0	[2]	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 1.0	< 1.0	0.6	0.5	[2]	0.5	0.5
Barium (dissolved)	µg/L	**1000**	**29000**	64	63	73	81	101	[2]	93	93
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.50	< 0.50	< 0.01	< 0.01	[2]	0.013	0.013
Boron (dissolved)	µg/L	**5000**	**45000**	81	74	80	93	80	[2]	70	70
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.0	< 0.0	[2]	< 0.010	< 0.010
Calcium (dissolved)	µg/L			29500	28000	30000	34600	41900	[2]	35800	35800
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.10	< 0.10	< 0.10	0.00	< 0.00	[2]	0.007	0.007
Cobalt (dissolved)	µg/L		**66**	< 0.50	< 0.50	< 0.50	0.03	0.03	[2]	0.061	0.061
Chromium (dissolved)	µg/L		**810**	< 5.0	< 5.0	< 5.0	0.4	0.3	[2]	0.17	0.17
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 1.0	< 1.0	0.5	1.2	[2]	0.60	0.60
Iron (dissolved)	µg/L			< 100	< 100	< 100	< 7	14	[2]	< 7	< 7
Potassium (dissolved)	µg/L			710	690	715	747	842	[2]	790	790
Magnesium (dissolved)	µg/L			13500	12500	13500	14600	18800	[2]	15100	15100
Manganese (dissolved)	µg/L			6.5	3.0	< 2.4	3.0	2.2	[2]	1.6	1.59
Molybdenum (dissolved)	µg/L		**9200**	1.6	1.5	1.6	1.2	1.2	[2]	1.33	1.33
Sodium (dissolved)	µg/L			11000	11000	11000	11750	14500	[2]	13200	13200
Nickel (dissolved)	µg/L		**490**	< 1.0	< 1.0	< 1.0	0.4	1.0	[2]	5.5	5.5
Phosphorus (dissolved)	µg/L			9	--	7	4	< 3	[2]	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.50	< 0.50	0.05	0.04	[2]	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	[2]	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 2.0	< 2.0	< 0.0	< 0.0	[2]	0.09	0.09
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.1	< 0.1	[2]	< 0.06	< 0.06
Strontium (dissolved)	µg/L			500	520	525	686	892	[2]	650	650
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	0.1	0.8	[2]	0.23	0.23
Thallium (dissolved)	µg/L		**510**	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	[2]	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.17	0.17	0.16	0.17	0.19	[2]	0.178	0.18
Vanadium (dissolved)	µg/L		**250**	< 0.50	< 0.50	2.76	0.84	0.64	[2]	0.80	0.80
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 5.0	< 5.0	3.5	< 2.0	[2]	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.10	< 0.10	0.02	< 0.02	[2]	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.04	< 0.04	0.01	< 0.01	0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--
ORP	mV			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--
SPC	µs/cm			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--
Temperature	°C			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--
Turbidity	FNU			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--
pH	Units			[1]	[1]	[1]	[1]	[1]	[3]	[3]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for full sample collection.
[3] Insufficient volume of groundwater for field parameters.
-- - No data.

Table 105: WC-OW33-76

		Criteria		WC-OW33-76							
		COPC	Table 3	2017	2018	2019	2020	2021	2022		
Parameter	**Units**			Average					2022-06-03	2022-11-04	Average
pH	pH			7.82	7.85	7.63	7.36	7.60	7.50	No Sample[2]	7.50
Alkalinity	mg/L as $CaCO_3$			380	385	370	380	754	692		692
Carbonate	mg/L as $CaCO_3$			2.4	2.7	1.5	< 1.0	< 1.0	< 1.0		< 1.0
Bicarbonate	mg/L as $CaCO_3$			380	385	370	380	752	692		692
Total Dissolved Solids	mg/L			445	423	435	460	460	503		503
Fluoride	mg/L	1.5		< 0.10	< 0.10	< 0.10	0.07	< 0.06	0.06		0.06
Total Organic Carbon	mg/L			2.9	2.6	2.5	2.0	2.0	3.0		3.0
Dissolved Organic Carbon	mg/L			2.2	2.2	2.0	2.5	2.5	3.0		3.0
Ammonia+Ammonium (N)	as N mg/L			< 0.050	0.058	< 0.050	0.040	< 0.040	0.05		0.05
Chloride (dissolved)	mg/L			4.8	5.0	6.8	23.5	21.0	4		4
Sulphate (dissolved)	mg/L			34	30	30	27	28	21		21
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 1.0	0.4	0.4	< 0.3		< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.03		< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06		< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06		< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	0.01		0.01
Hardness	mg/L as $CaCO_3$			265	265	295	337	5297	730		730
Silver (dissolved)	µg/L		1.5	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05		< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 5.0	5.7	93.5	< 1.0	< 1.0		< 1.0
Arsenic (dissolved)	µg/L	25	1900	1.4	< 1.0	< 1.0	1.2	0.6	1.2		1.2
Barium (dissolved)	µg/L	1000	29000	78	78	77	76	87	90		90
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.50	< 0.50	0.01	< 0.01	< 0.007		< 0.007
Boron (dissolved)	µg/L	5000	45000	38	38	43	92	38	38		38
Bismuth (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	< 0.01	< 0.01	< 0.01		< 0.01
Calcium (dissolved)	µg/L			91000	92500	99500	68450	114500	91100		91100
Cadmium (dissolved)	µg/L	5	2.7	< 0.10	< 0.10	< 0.10	< 0.003	0.003	< 0.003		< 0.003
Cobalt (dissolved)	µg/L		66	< 0.50	< 0.50	< 0.50	0.12	0.24	0.18		0.18
Chromium (dissolved)	µg/L		810	< 5.0	< 5.0	< 5.0	0.7	0.1	0.11		0.1
Copper (dissolved)	µg/L	1000	87	< 1.0	< 1.0	< 1.0	0.5	0.4	0.30		0.3
Iron (dissolved)	µg/L			910	240	410	139	24	126		126
Potassium (dissolved)	µg/L			1100	1100	1150	1545	1315	1330		1330
Magnesium (dissolved)	µg/L			9050	9000	10000	14950	10500	9880		9880
Manganese (dissolved)	µg/L			64	65	87	58	121	88		88
Molybdenum (dissolved)	µg/L		9200	2.9	2.8	3.0	4.9	3.4	3.3		3.3
Sodium (dissolved)	µg/L			69000	61000	61000	47250	58700	87300		87300
Nickel (dissolved)	µg/L		490	1.3	< 1.0	< 1.0	0.3	0.6	7.7		7.7
Phosphorus (dissolved)	µg/L			264	45	52	17	< 3	< 3		< 3
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.50	< 0.50	0.16	< 0.09	< 0.09		< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90		< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 2.0	< 2.0	0.1	< 0.0	0.06		0.06
Tin (dissolved)	µg/L			< 1.0	< 1.0	< 1.0	0.1	0.1	< 0.06		< 0.06
Strontium (dissolved)	µg/L			195	200	205	538	235	221		221
Titanium (dissolved)	µg/L			< 5.0	< 5.0	< 5.0	5.0	< 0.1	0.05		0.05
Thallium (dissolved)	µg/L		510	< 0.050	< 0.050	< 0.050	0.013	< 0.005	< 0.005		< 0.005
Uranium (dissolved)	µg/L	20	420	2.5	2.1	2.0	1.5	3.4	2.9		2.9
Vanadium (dissolved)	µg/L		250	< 0.50	< 0.50	< 0.50	0.88	0.02	0.10		0.10
Zinc (dissolved)	µg/L		1100	7.2	6.2	< 5.0	< 2.0	< 2.0	< 2.0		< 2.0
Lead-210	Bq/L	0.20		< 0.02	< 0.10	< 0.10	< 0.02	0.03	< 0.02		< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.04	< 0.04	0.01	< 0.01	< 0.01		< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	0.05		0.05
Thorium-232	Bq/L	0.60		--	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02		< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	-[3]		--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Well not accessed during monitoring campaign.
[3] Insufficient volume of groundwater for field parameters.
-- - No data.

Appendix D Highland Drive Groundwater Monitoring Results

Table 106: PH-02-01

		Criteria		PH-02-01					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	7.46	7.43	7.46	7.48	7.37	7.43
Alkalinity	mg/L as $CaCO_3$			325	318	434	262	434	348
Carbonate	mg/L as $CaCO_3$			1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			325	318	434	262	434	348
Total Dissolved Solids	mg/L			423	356	459	363	571	467
Fluoride	mg/L	1.5		< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3.4	2.0	2.0	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L			2.3	2.0	2.0	2.0	2.0	2.0
Total Ammonia-N	mg/l			0.10	< 0.04	0.04	< 0.04	0.06	0.05
Chloride	mg/L			15	8	18	33	53	43
Sulphate	mg/L			6.4	6.0	10.2	8.6	8.4	8.5
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	0.6	0.5
Nitrite (N)	mg/L			< 0.010	0.73	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.81	0.61	2.42	1.62	2.84	2.23
Nitrate + Nitrite (N)	mg/L			0.81	1.29	2.42	1.62	2.84	2.23
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			350	390	559	392	587	490
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6	3	3	23	13
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	24	22	33	20	49	35
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	27	25	25	16	25	21
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			130000	122500	166500	111000	235000	173000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		66	< 0.50	0.05	0.06	0.035	0.132	0.084
Chromium (dissolved)	µg/L		810	< 5.0	0.2	0.1	0.30	0.24	0.27
Copper (dissolved)	µg/L	1000	87	1.3	1.6	1.1	1.2	1.5	1.4
Iron (dissolved)	µg/L			< 100	10	< 7	7	45	26
Potassium (dissolved)	µg/L			2050	2295	3015	1810	4330	3070
Magnesium (dissolved)	µg/L			7100	6485	8335	5690	9860	7775
Manganese (dissolved)	µg/L			< 2.0	1.9	0.5	0.30	5.23	2.77
Molybdenum (dissolved)	µg/L		9200	0.50	0.44	0.40	0.60	0.26	0.43
Sodium (dissolved)	µg/L			3450	5380	5220	8560	10300	9430
Nickel (dissolved)	µg/L		490	< 1.0	0.3	0.2	0.20	0.40	0.3
Phosphorus (total)	µg/L			215	8	5	< 3	22	13
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.6	0.4	0.58	0.35	0.47
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			200	210	288	197	402	300
Titanium (dissolved)	µg/L			< 5.0	0.3	0.2	0.08	1.73	0.91
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	0.005	0.005
Uranium (dissolved)	µg/L	20	420	< 3.4	2.9	3.0	2.7	3.55	3.13
Vanadium (dissolved)	µg/L		250	< 0.50	0.31	0.35	0.26	0.61	0.44
Zinc (dissolved)	µg/L		1100	< 5.0	< 2.0	2.5	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	0.02	0.01	0.01	0.01	0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	0.02	0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	73.7	28.1	--
ORP	mV			-[1]	-[1]	-[1]	166.7	156.2	--
SPC	us/cm			-[1]	-[1]	-[1]	616.0	900	--
Temperature	°C			-[1]	-[1]	-[1]	10.235	11.82	--
Turbidity	FNU			-[1]	-[1]	-[1]	51.27	36.21	--
pH	Units			-[1]	-[1]	-[1]	7.43	6.81	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 107: PH-02-02

		Criteria		PH-02-02					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/10/25	Average
pH	pH	6.5-8.5	6.5-9.0	7.47	7.37	7.50	7.19	7.44	7.32
Alkalinity	mg/L as $CaCO_3$			335	347	390	429	312	371
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			335	347	390	429	312	371
Total Dissolved Solids	mg/L			415	375	407	566	446	506
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.6	2.0	1.5	3.0	3.0	3.0
Dissolved Organic Carbon	mg/L			2.0	2.5	2.0	2.0	4.0	3.0
Total Ammonia-N	mg/l			0.08	0.12	0.13	0.17	0.19	0.18
Chloride	mg/L			14	4	18	39	48	44
Sulphate	mg/L			5.6	5.5	7.1	12.0	12.0	12.0
Bromide	mg/L			< 1.0	< 0.3	0.4	0.5	< 0.3	0.4
Nitrite (N)	mg/L			0.017	0.500	0.040	0.08	0.04	0.06
Nitrate (N)	mg/L			0.81	0.67	1.05	2.22	0.35	1.29
Nitrate + Nitrite (N)	mg/L			0.82	1.12	1.07	2.30	0.38	1.34
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			360	473	462	591	203	397
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			5	21	28	1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.3	< 0.2	0.4	0.8	0.6
Barium (dissolved)	µg/L	1000	29000	37	33	48	55	43	49
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	0.048	0.028
Boron (dissolved)	µg/L	5000	45000	34	32	30	39	31	35
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			130000	131000	144500	185000	77200	131100
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.005	0.004	0.011	0.142	0.077
Cobalt (dissolved)	µg/L		66	< 0.50	0.13	0.10	0.119	0.200	0.160
Chromium (dissolved)	µg/L		810	< 5.0	0.1	0.1	0.27	0.75	0.51
Copper (dissolved)	µg/L	1000	87	1.6	1.8	1.4	1.7	3.8	2.8
Iron (dissolved)	µg/L			< 100	37	< 7	< 7	< 7	< 7
Potassium (dissolved)	µg/L			2400	2810	3185	3220	2860	3040
Magnesium (dissolved)	µg/L			7950	8160	6835	10100	3830	6965
Manganese (dissolved)	µg/L			70	195	179	278	150.00	214
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.28	0.46	0.34	1.21	0.78
Sodium (dissolved)	µg/L			5700	4255	4300	4080	74400	39240
Nickel (dissolved)	µg/L		490	< 1.0	0.8	0.3	0.80	1.00	0.9
Phosphorus (total)	µg/L			73	< 3	< 3	4	29	17
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.05	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.3	0.3	0.43	2.00	1.22
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	0.07	0.09	0.08
Strontium (dissolved)	µg/L			205	206	247	319	164	242
Titanium (dissolved)	µg/L			< 5.0	1.1	0.1	< 0.05	2.47	1.26
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	0.005	0.005
Uranium (dissolved)	µg/L	20	420	2.2	2.1	2.9	3.41	2.58	3.00
Vanadium (dissolved)	µg/L		250	< 0.50	0.43	0.37	0.30	0.46	0.38
Zinc (dissolved)	µg/L		1100	< 5.0	< 2.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	< 0.01	0.01	0.02	< 0.01	0.02
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	37.1	49.5	--
ORP	mV			-[1]	-[1]	-[1]	185.7	123.9	--
SPC	us/cm			-[1]	-[1]	-[1]	984.1	738.0	--
Temperature	°C			-[1]	-[1]	-[1]	11.157	11.931	--
Turbidity	FNU			-[1]	-[1]	-[1]	50.92	37.67	--
pH	Units			-[1]	-[1]	-[1]	6.81	7.29	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 108: PH-02-03

		Criteria		PH-02-03					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	7.65	7.43	7.53	7.28	7.65	7.47
Alkalinity	mg/L as $CaCO_3$			300	285	275	280	298	289
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			295	285	275	280	298	289
Total Dissolved Solids	mg/L			403	323	467	691	406	549
Fluoride	mg/L	1.5		< 0.10	0.07	< 0.06	< 0.06	0.11	0.09
Total Organic Carbon	mg/L			2.5	2.0	2.0	2.0	3.0	2.5
Dissolved Organic Carbon	mg/L			2.1	2.0	2.0	1.0	3.0	2.0
Total Ammonia-N	mg/l			0.13	0.10	0.16	0.14	0.15	0.15
Chloride	mg/L			11	7	75	130	85	108
Sulphate	mg/L			6.9	3.3	8.1	9.0	5.0	7.0
Bromide	mg/L			< 1.0	< 0.3	1.0	1.6	0.8	1.2
Nitrite (N)	mg/L			< 0.010	0.330	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.24	0.18	0.28	1.20	0.97	1.09
Nitrate + Nitrite (N)	mg/L			0.24	0.47	0.28	1.20	0.97	1.09
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			325	345	407	458	150	304
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	8	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	23	20	28	34	25	29
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	30	22	23	28	11	20
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			120000	114500	157500	168000	84500	126250
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	0.003	0.006	0.005	0.006
Cobalt (dissolved)	µg/L		66	< 0.50	0.13	0.21	0.247	0.191	0.219
Chromium (dissolved)	µg/L		810	< 5.0	0.1	0.1	0.13	0.09	0.11
Copper (dissolved)	µg/L	1000	87	1.7	1.5	1.6	1.3	3.8	2.6
Iron (dissolved)	µg/L			< 100	< 7	< 7	< 7	< 7	< 7
Potassium (dissolved)	µg/L			1850	2080	3395	2350	2970	2660
Magnesium (dissolved)	µg/L			5700	5330	5050	6320	2730	4525
Manganese (dissolved)	µg/L			475	194	432	693	51.60	372
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.23	0.30	0.24	0.57	0.41
Sodium (dissolved)	µg/L			5450	3425	5945	3660	106000	54830
Nickel (dissolved)	µg/L		490	< 1.0	0.7	0.5	0.60	0.80	0.7
Phosphorus (total)	µg/L			11	< 3	3	< 3	16	10
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.1	0.1	0.10	0.08	0.09
Tin (dissolved)	µg/L			< 1.0	0.1	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			185	198	266	271	135	203
Titanium (dissolved)	µg/L			< 5.0	0.1	0.1	0.10	< 0.05	0.08
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	0.008	0.007
Uranium (dissolved)	µg/L	20	420	13.5	10.5	14.1	12.0	15.70	13.9
Vanadium (dissolved)	µg/L		250	< 0.50	0.16	0.21	0.15	0.32	0.24
Zinc (dissolved)	µg/L		1100	< 5.0	< 2.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	0.03	< 0.02	< 0.03	< 0.03
Radium-226	Bq/L	0.49		< 0.04	0.01	< 0.01	0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	49.4	30.5	--
ORP	mV			-[1]	-[1]	-[1]	184.9	148.8	--
SPC	us/cm			-[1]	-[1]	-[1]	957.0	668.0	--
Temperature	°C			-[1]	-[1]	-[1]	10.36	11.31	--
Turbidity	FNU			-[1]	-[1]	-[1]	76.78	16.79	--
pH	Units			-[1]	-[1]	-[1]	7.16	7.26	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 109: PH-90-3-I

		Criteria		PH-90-3-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/13	2022/10/27	Average
pH	pH	6.5-8.5	6.5-9.0	8.02	7.88	7.80	7.76	7.83	7.80
Alkalinity	mg/L as $CaCO_3$			210	260	217	214	236	225
Carbonate	mg/L as $CaCO_3$			2.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			205	260	217	214	236	225
Total Dissolved Solids	mg/L			465	579	522	537	463	500
Fluoride	mg/L	1.5		< 0.10	0.07	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Ammonia-N	mg/l			0.09	< 0.04	0.06	0.09	< 0.04	0.07
Chloride	mg/L			104	140	150	120	150	135
Sulphate	mg/L			38	40	38	35	35	35
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.56	1.94	2.01	1.62	1.89	1.76
Nitrate + Nitrite (N)	mg/L			1.56	1.94	2.01	1.62	1.89	1.76
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			330	807	724	917	588	753
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	5	1	2	1	2
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	275	287	309	281	262	272
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	0.007	0.007
Boron (dissolved)	µg/L	5000	45000	15	13	13	11	35	23
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			84500	98750	112500	108000	93400	100700
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	< 0.003	< 0.003	0.008	0.006
Cobalt (dissolved)	µg/L		66	< 0.50	0.17	0.09	0.045	0.185	0.115
Chromium (dissolved)	µg/L		810	< 5.0	0.2	0.3	0.26	< 0.08	0.17
Copper (dissolved)	µg/L	1000	87	< 1.0	0.4	< 0.2	0.5	< 0.2	0.4
Iron (dissolved)	µg/L			170	151	230	167	119	143
Potassium (dissolved)	µg/L			1800	1780	2005	1910	1880	1895
Magnesium (dissolved)	µg/L			28000	31000	33500	31500	33300	32400
Manganese (dissolved)	µg/L			15.0	13.8	12.1	8.46	13.40	10.9
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.41	0.35	0.33	0.43	0.38
Sodium (dissolved)	µg/L			35000	29500	26050	25000	21600	23300
Nickel (dissolved)	µg/L		490	< 1.0	< 0.1	0.1	< 0.10	0.10	0.1
Phosphorus (total)	µg/L			4150	< 3	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	10	25	< 0.50	0.04	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.3	0.3	0.43	0.32	0.38
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			395	429	505	403	469	436
Titanium (dissolved)	µg/L			< 5.0	0.2	0.1	0.18	0.24	0.21
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	1.7	2.0	1.9	1.6	1.87	1.74
Vanadium (dissolved)	µg/L		250	< 0.50	0.21	0.22	0.23	0.21	0.22
Zinc (dissolved)	µg/L		1100	< 5.0	4.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	0.06	< 0.02	0.04
Radium-226	Bq/L	0.49		< 0.04	< 0.01	0.01	0.02	0.02	0.02
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	70.1	52.2	---
ORP	mV			-[1]	-[1]	-[1]	-40.0	36.8	---
SPC	us/cm			-[1]	-[1]	-[1]	648.0	385.3	---
Temperature	°C			-[1]	-[1]	-[1]	12.1	10.141	---
Turbidity	FNU			-[1]	-[1]	-[1]	722.7	257.37	---
pH	Units			-[1]	-[1]	-[1]	7.74	7.57	---

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[1] Field parameters included for current sampling year only.
--- No data

Table 110: PH-90-4-III

		Criteria		PH-90-4-III					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/14	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	6.81	6.76	6.61	6.58	6.77	6.68
Alkalinity	mg/L as $CaCO_3$			740	669	679	692	727	710
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			740	669	679	692	727	710
Total Dissolved Solids	mg/L			2735	3920	4157	4360	4910	4635
Fluoride	mg/L	1.5		< 0.10	0.52	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3.8	2.5	5.0	4.0	4.0	4.0
Dissolved Organic Carbon	mg/L			3.2	3.5	5.5	4.0	4.0	4.0
Total Ammonia-N	mg/l			0.48	0.44	0.32	0.30	0.38	0.34
Chloride	mg/L			1215	1800	2000	2100	2700	2400
Sulphate	mg/L			19	28	28	33	37	35
Bromide	mg/L			7.5	0.4	1.8	0.6	< 3.0	1.8
Nitrite (N)	mg/L			0.023	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			< 0.10	< 0.06	0.38	0.06	< 0.60	0.33
Nitrate + Nitrite (N)	mg/L			< 0.10	0.45	0.45	< 0.30	< 0.60	0.45
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			1300	1614	1990	1550	1680	1615
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	2	1	1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	7.3	8.1	12.0	7.3	10.3	8.8
Barium (dissolved)	µg/L	1000	29000	305	352	530	531	889	710
Beryllium (dissolved)	µg/L		67	< 0.50	0.012	0.008	0.008	< 0.007	0.008
Boron (dissolved)	µg/L	5000	45000	300	501	2085	1130	768	949
Bismuth (dissolved)	µg/L			< 1.0	0.024	0.014	< 0.010	0.010	0.010
Calcium (dissolved)	µg/L			450000	544500	659500	555000	716000	635500
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.007	0.009	0.004	0.006	0.005
Cobalt (dissolved)	µg/L		66	15	16.7	28.6	19.90	26.30	23.1
Chromium (dissolved)	µg/L		810	< 5.0	0.33	0.56	0.36	0.56	0.46
Copper (dissolved)	µg/L	1000	87	< 1.0	1.7	0.3	< 0.2	0.5	0.4
Iron (dissolved)	µg/L			48500	47150	68950	52700	67100	59900
Potassium (dissolved)	µg/L			2050	2365	2580	2340	3440	2890
Magnesium (dissolved)	µg/L			41500	38150	48950	39400	50600	45000
Manganese (dissolved)	µg/L			4150	4900	5640	5200	5290	5245
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.36	0.35	0.22	0.34	0.28
Sodium (dissolved)	µg/L			525000	715500	788500	895000	1213000	1054000
Nickel (dissolved)	µg/L		490	4.3	5.8	9.2	4.6	7.9	6.3
Phosphorus (total)	µg/L			23	7	7	3	24	14
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	< 0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.21	0.13	0.13	0.06	0.10
Tin (dissolved)	µg/L			< 1.0	0.13	0.17	0.12	0.18	0.15
Strontium (dissolved)	µg/L			1010	1355	1720	1590	1980	1785
Titanium (dissolved)	µg/L			< 5.0	0.34	0.34	0.22	0.26	0.24
Thallium (dissolved)	µg/L		510	< 0.05	< 0.005	0.005	< 0.005	0.008	0.007
Uranium (dissolved)	µg/L	20	420	**30**	**40**	**67**	**46**	**56**	**51**
Vanadium (dissolved)	µg/L		250	< 0.50	0.39	0.42	0.27	0.45	0.36
Zinc (dissolved)	µg/L		1100	< 5.0	3	2	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	0.03	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	0.03	0.05	0.04	0.04	0.04
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	66.3	29.1	--
ORP	mV			-[1]	-[1]	-[1]	-87.6	-46.2	--
SPC	us/cm			-[1]	-[1]	-[1]	7112.0	8497	--
Temperature	°C			-[1]	-[1]	-[1]	13.161	11.812	--
Turbidity	FNU			-[1]	-[1]	-[1]	8.00	4.08	--
pH	Units			-[1]	-[1]	-[1]	6.74	6.47	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 111: PH-90-6-I

		Criteria		PH-90-6-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/10	2022/10/05	Average
pH	pH	6.5-8.5	6.5-9.0	7.69	7.65	7.46	7.80	7.37	7.59
Alkalinity	mg/L as $CaCO_3$			155	165	163	152	151	152
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			150	165	163	152	151	152
Total Dissolved Solids	mg/L			2960	3105	3255	3010	3431	3221
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			0.7	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.6	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Ammonia-N	mg/l			0.10	0.07	0.08	0.08	0.07	0.08
Chloride	mg/L			1750	1800	2000	1900	2500	2200
Sulphate	mg/L			36	38	39	38	36	37
Bromide	mg/L			3.0	1.7	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.300	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			< 0.10	0.33	0.08	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	0.33	< 0.30	< 0.30	< 0.30	< 0.30
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			1200	1185	1335	1160	1310	1235
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	2	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.8	0.5	0.4	0.3	0.4
Barium (dissolved)	µg/L	1000	29000	575	551	569	555	605	580
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	17	20	42	36	13	25
Bismuth (dissolved)	µg/L			< 1.0	0.011	0.015	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			300000	319500	358000	293000	310000	301500
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	< 0.003	< 0.003	0.004	0.004
Cobalt (dissolved)	µg/L		66	< 1	0.255	0.427	0.232	0.260	0.246
Chromium (dissolved)	µg/L		810	< 5.0	1.0	0.4	0.35	0.31	0.33
Copper (dissolved)	µg/L	1000	87	< 1.0	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			1500	1510	1805	1570	1480	1525
Potassium (dissolved)	µg/L			4150	4555	4995	4340	4760	4550
Magnesium (dissolved)	µg/L			105000	96800	109000	95900	113000	104450
Manganese (dissolved)	µg/L			46.5	46.3	49.6	45.2	50	47.8
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.32	0.45	0.34	0.50	0.42
Sodium (dissolved)	µg/L			620000	635000	765500	638000	747000	692500
Nickel (dissolved)	µg/L		490	< 1.0	0.3	0.2	0.1	0.3	0.2
Phosphorus (total)	µg/L			16	7	6	6	< 3	5
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.1	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	0.4	0.1	0.37	0.07	0.22
Strontium (dissolved)	µg/L			1700	1770	1955	1690	1710	1700
Titanium (dissolved)	µg/L			< 5.0	0.1	< 0.1	0.05	0.15	0.10
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	1	1	1	1.10	1.19	1.15
Vanadium (dissolved)	µg/L		250	< 0.50	0.25	0.20	0.14	0.09	0.12
Zinc (dissolved)	µg/L		1100	< 5.0	< 2.0	6.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	0.03	0.02	0.03	0.03	0.03
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	70.3	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	-68.6	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	5881	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	11.609	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	6.85	--
pH	Units			-[1]	-[1]	-[1]	-[2]	7.34	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 112: PH-90-6-II

		Criteria		PH-90-6-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/10	2022/10/05	Average
pH	pH	6.5-8.5	6.5-9.0	7.55	7.41	7.42	7.75	6.85	7.30
Alkalinity	mg/L as $CaCO_3$			765	456	328	323	732	528
Carbonate	mg/L as $CaCO_3$			3.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			765	456	328	323	732	528
Total Dissolved Solids	mg/L			880	667	537	540	991	766
Fluoride	mg/L	1.5		0.11	0.13	0.11	0.13	0.12	0.13
Total Organic Carbon	mg/L			20	8	2	2	16	9
Dissolved Organic Carbon	mg/L			20	7	2	2	15	9
Total Ammonia-N	mg/l			44	20	6	2.4	3.3	2.9
Chloride	mg/L			133	115	145	120	180	150
Sulphate	mg/L			14	28	41	37	3	20
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	0.3	0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			540	431	447	412	638	525
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	1	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	9.9	10.4	13.2	11.2	10.0	10.6
Barium (dissolved)	µg/L	1000	29000	910	477	306	274	520	397
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	605	140	100	57	366	212
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			140000	125000	124500	110000	178000	144000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	0.003	< 0.003	0.016	0.010
Cobalt (dissolved)	µg/L		66	1.22	0.38	0.16	0.105	0.468	0.287
Chromium (dissolved)	µg/L		810	< 5.0	0.3	0.3	0.12	0.33	0.23
Copper (dissolved)	µg/L	1000	87	< 1.0	< 0.2	0.7	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			13700	10320	6695	6220	18500	12360
Potassium (dissolved)	µg/L			35500	16250	6505	3630	5340	4485
Magnesium (dissolved)	µg/L			49000	40150	33400	25600	42400	34000
Manganese (dissolved)	µg/L			235	219	170	209.0	316	263
Molybdenum (dissolved)	µg/L		9200	0.50	0.47	0.88	0.58	0.10	0.34
Sodium (dissolved)	µg/L			109000	53150	55850	48800	75000	61900
Nickel (dissolved)	µg/L		490	12.6	3.7	0.8	0.70	7.50	4.1
Phosphorus (total)	µg/L			255	18	7	9	52	31
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.07	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.1	< 0.0	< 0.04	0.63	0.34
Tin (dissolved)	µg/L			< 1.0	0.5	0.1	0.17	0.35	0.26
Strontium (dissolved)	µg/L			745	544	395	347	707	527
Titanium (dissolved)	µg/L			< 5.0	0.1	0.2	0.24	0.29	0.27
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	< 0.1	0.1	0.0	0.04	0.03	0.04
Vanadium (dissolved)	µg/L		250	< 0.61	0.24	0.18	0.10	0.40	0.25
Zinc (dissolved)	µg/L		1100	< 5.0	< 2.0	2.5	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.04	0.05	0.02	0.02	0.03	0.03
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	40.4	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	-74.4	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	1663	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	10.898	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	168	--
pH	Units			-[1]	-[1]	-[1]	-[2]	6.74	--

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Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 113: PH-90-6-III

		Criteria		PH-90-6-III					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/10	2022/10/05	Average
pH	pH	6.5-8.5	6.5-9.0	6.99	7.16	6.86	7.62	6.76	7.19
Alkalinity	mg/L as $CaCO_3$			485	498	681	575	605	590
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			485	498	681	575	605	590
Total Dissolved Solids	mg/L			535	586	713	390	734	562
Fluoride	mg/L	1.5		0.52	0.63	0.52	0.47	0.50	0.49
Total Organic Carbon	mg/L			13	6	9	7	8	8
Dissolved Organic Carbon	mg/L			5	6	9	7	8	8
Total Ammonia-N	mg/l			13.5	10.5	20.3	13.6	14.6	14.1
Chloride	mg/L			48	56	71	54	99	77
Sulphate	mg/L			1.2	0.9	0.9	1.7	0.2	1.0
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	0.4	0.4
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.030	0.13	< 0.03	0.08
Nitrate (N)	mg/L			0.12	< 0.06	0.08	0.07	< 0.06	< 0.07
Nitrate + Nitrite (N)	mg/L			0.12	< 0.06	0.08	0.20	< 0.06	0.13
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			440	494	657	544	498	521
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			9	5	3	4	3	4
Arsenic (dissolved)	µg/L	25	1900	6.6	7.8	6.9	5.4	6.4	5.9
Barium (dissolved)	µg/L	1000	29000	660	583	**1261**	969	**1120**	**1045**
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.01	< 0.007	0.021	0.014
Boron (dissolved)	µg/L	5000	45000	545	506	935	502	568	535
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			155000	180000	231500	190000	173000	181500
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	0.006	< 0.003	0.011	0.007
Cobalt (dissolved)	µg/L		66	0.80	0.89	1.61	0.997	1.020	1.01
Chromium (dissolved)	µg/L		810	< 5.0	1.2	1.7	1.13	1.21	1.17
Copper (dissolved)	µg/L	1000	87	< 1.0	0.2	0.4	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			29500	29250	42400	36900	37400	37150
Potassium (dissolved)	µg/L			9850	10175	15100	12600	9940	11270
Magnesium (dissolved)	µg/L			10950	11750	19000	14800	13000	13900
Manganese (dissolved)	µg/L			515	552	749	642.0	527	585
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.13	0.17	0.11	0.09	0.10
Sodium (dissolved)	µg/L			31500	32800	53700	39900	42100	41000
Nickel (dissolved)	µg/L		490	< 1.0	1.0	1.7	1.00	0.90	1.0
Phosphorus (total)	µg/L			285	218	189	104	213	159
Lead (dissolved)	µg/L	10	25	< 0.50	0.03	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.1	0.1	0.09	0.38	0.24
Tin (dissolved)	µg/L			< 1.0	0.3	0.5	0.38	0.40	0.39
Strontium (dissolved)	µg/L			340	421	603	480	440	460
Titanium (dissolved)	µg/L			< 5.0	0.6	0.5	0.40	0.45	0.43
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	0.5	0.8	1.8	0.73	0.70	0.7
Vanadium (dissolved)	µg/L		250	0.70	0.86	1.30	0.79	1.28	1.0
Zinc (dissolved)	µg/L		1100	< 5.0	3.0	2.0	2	4	3
Lead-210	Bq/L	0.20		< 0.10	0.02	0.02	0.06	< 0.02	0.04
Radium-226	Bq/L	0.49		0.08	0.07	0.09	0.14	0.15	0.15
Thorium-230	Bq/L	0.65		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	64.7	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	-90.7	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	1415	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	13.227	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	64.51	--
pH	Units			-[1]	-[1]	-[1]	-[2]	6.69	--

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[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 114: PH-90-7-III

		Criteria		PH-90-7-III					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	**Units**		**(MECP)**	**Average**			2022/06/08	2022/10/25	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.41	7.17	7.20	7.71	7.42	7.57
Alkalinity	mg/L as $CaCO_3$			505	683	572	591	554	573
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			505	683	572	591	554	573
Total Dissolved Solids	mg/L			1195	830	897	731	914	823
Fluoride	mg/L	**1.5**		< 0.10	0.09	0.07	0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			8	6	5	4	4	4
Dissolved Organic Carbon	mg/L			4	6	5	4	5	5
Total Ammonia-N	mg/l			0.08	0.04	0.06	< 0.04	0.04	0.04
Chloride	mg/L			395	185	235	90	180	135
Sulphate	mg/L			18	21	117	22	32	27
Bromide	mg/L			3.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.15	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			0.15	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			755	4080	489	325	554	440
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	11	3	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	**25**	**1900**	**32**	**51**	**28**	17.1	**32.0**	24.6
Barium (dissolved)	µg/L	**1000**	**29000**	135	109	108	72.6	152	112
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.01	< 0.007	0.053	0.030
Boron (dissolved)	µg/L	**5000**	**45000**	19	17	36	95	35	65
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			255000	199000	169500	107000	156000	131500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.004	0.015	0.003	0.017	0.010
Cobalt (dissolved)	µg/L		**66**	1.60	1.57	3.22	2.7	6.113	4.42
Chromium (dissolved)	µg/L		**810**	< 5.0	0.5	0.3	0.21	0.21	0.21
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.5	0.7	0.6	0.5	0.6
Iron (dissolved)	µg/L			1700	1311	273	28	229	129
Potassium (dissolved)	µg/L			1055	1195	1205	796	945	871
Magnesium (dissolved)	µg/L			28000	20050	16850	11900	16200	14050
Manganese (dissolved)	µg/L			465	458	360	201	579.00	390
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.19	0.15	0.31	0.27	0.29
Sodium (dissolved)	µg/L			165000	139000	153500	155000	149000	152000
Nickel (dissolved)	µg/L		**490**	1.2	0.9	1.3	1.0	1.1	1.1
Phosphorus (total)	µg/L			8300	6	4	6	< 3	5
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.02	< 0.09	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	1.45	0.95	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	0.1	0.05	0.04	0.05
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	< 0.06	0.50	0.28
Strontium (dissolved)	µg/L			435	342	326	198	365	282
Titanium (dissolved)	µg/L			< 5.0	0.5	1.3	< 0.05	0.08	0.07
Thallium (dissolved)	µg/L		**510**	< 0.05	0.01	< 0.01	< 0.005	0.010	0.008
Uranium (dissolved)	µg/L	**20**	**420**	15	**24**	15	19	**23**	**21**
Vanadium (dissolved)	µg/L		**250**	1.34	0.90	0.32	0.55	0.31	0.43
Zinc (dissolved)	µg/L		**1100**	< 5.0	3.0	2.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.04	0.05	0.04	0.04	0.08	0.06
Thorium-230	Bq/L	**0.65**		< 0.07	0.05	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	51.0	91.5	--
ORP	mV			-[1]	-[1]	-[1]	50.1	119.2	--
SPC	us/cm			-[1]	-[1]	-[1]	11.9	756	--
Temperature	°C			-[1]	-[1]	-[1]	10.061	13.204	--
Turbidity	FNU			-[1]	-[1]	-[1]	734.89	775.85	--
pH	Units			-[1]	-[1]	-[1]	7.31	7.16	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- = No data.

Table 115: PH-90-8-I

		Criteria		PH-90-8-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	7.64	7.50	7.57	7.51	7.59	7.55
Alkalinity	mg/L as $CaCO_3$			220	431	628	283	444	364
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			220	431	628	283	444	364
Total Dissolved Solids	mg/L			1700	1730	1613	1557	1690	1624
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	1	1	1	1	1
Dissolved Organic Carbon	mg/L			1	1	1	1	1	1
Total Ammonia-N	mg/l			0.09	0.04	0.05	0.05	0.06	0.06
Chloride	mg/L			840	860	875	830	820	825
Sulphate	mg/L			48	49	50	52	44	48
Bromide	mg/L			5.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.050	< 0.300	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			0.55	0.58	0.52	0.60	0.55	0.58
Nitrate + Nitrite (N)	mg/L			0.60	0.58	0.52	0.60	0.55	0.58
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			725	1460	760	1730	1910	1820
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	3.5	< 49.5	2	< 1	2
Arsenic (dissolved)	µg/L	25	1900	< 1.0	2.7	0.5	0.3	0.4	0.4
Barium (dissolved)	µg/L	1000	29000	520	451	458	382	489	436
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	27	29	40	48	36	42
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			205000	209500	203000	161000	201000	181000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.0	< 0.0	0.006	< 0.003	0.005
Cobalt (dissolved)	µg/L		66	< 0.5	0.2	0.3	0.320	0.368	0.344
Chromium (dissolved)	µg/L		810	< 5.0	0.6	0.2	0.18	0.17	0.18
Copper (dissolved)	µg/L	1000	87	< 1.0	0.4	< 0.2	0.3	0.6	0.5
Iron (dissolved)	µg/L			575	418	273	264	320	292
Potassium (dissolved)	µg/L			3350	3685	3685	3110	4350	3730
Magnesium (dissolved)	µg/L			54500	54050	47650	44000	49300	46650
Manganese (dissolved)	µg/L			36	35	40	41.9	48.70	45
Molybdenum (dissolved)	µg/L		9200	0.57	0.51	0.89	0.63	0.56	0.60
Sodium (dissolved)	µg/L			280000	326500	334500	359000	373000	366000
Nickel (dissolved)	µg/L		490	< 1.0	0.4	0.4	0.80	1.00	0.9
Phosphorus (total)	µg/L			2100	10	< 3	< 3	13	8
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.5	< 0.9	< 0.9	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	< 0.0	0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	0.1	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			835	848	765	673	800	737
Titanium (dissolved)	µg/L			< 5.0	0.2	0.2	0.15	< 0.05	0.10
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	0.01	< 0.005	0.008	0.007
Uranium (dissolved)	µg/L	20	420	**27**	**36**	**38**	**31.6**	**37**	**34**
Vanadium (dissolved)	µg/L		250	< 0.50	0.12	0.27	0.04	0.17	0.11
Zinc (dissolved)	µg/L		1100	< 5.0	3.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	0.020	0.015	0.02	0.01	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	51.1	21.8	--
ORP	mV			-[1]	-[1]	-[1]	115.4	34.2	--
SPC	us/cm			-[1]	-[1]	-[1]	2849	2833.0	--
Temperature	°C			-[1]	-[1]	-[1]	11.776	10.968	--
Turbidity	FNU			-[1]	-[1]	-[1]	914.43	1227.7	--
pH	Units			-[1]	-[1]	-[1]	7.34	7.16	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 116: PH-90-8-II

		Criteria		PH-90-8-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	7.40	7.25	7.40	7.47	7.45	7.46
Alkalinity	mg/L as $CaCO_3$			390	379	399	414	421	418
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			390	379	399	414	421	418
Total Dissolved Solids	mg/L			543	587	548	509	549	529
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	2	2	1	2	2
Dissolved Organic Carbon	mg/L			1	2	3	1	1	1
Total Ammonia-N	mg/l			0.066	0.040	< 0.040	< 0.04	0.05	0.05
Chloride	mg/L			43	66	60	27	32	30
Sulphate	mg/L			14	23	19	18	16	17
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	0.165	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			4.58	6.91	2.46	1.81	1.79	1.80
Nitrate + Nitrite (N)	mg/L			4.58	6.91	2.46	1.81	1.79	1.80
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			475	526	477	383	551	467
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	3.5	59.5	< 1	2	2
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 0.2	0.2	0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	63	70	74	64	88	76
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	44	44	38	45	35	40
Bismuth (dissolved)	µg/L			< 1.0	0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			165000	183500	166500	149000	201000	175000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.0	< 0.0	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		66	< 0.50	0.16	0.11	0.047	0.198	0.123
Chromium (dissolved)	µg/L		810	< 5.0	0.6	0.3	0.28	0.43	0.36
Copper (dissolved)	µg/L	1000	87	< 1.0	0.8	0.4	0.6	0.7	0.7
Iron (dissolved)	µg/L			< 100	15	9	< 7	15	11
Potassium (dissolved)	µg/L			5950	6630	6730	5250	7970	6610
Magnesium (dissolved)	µg/L			15000	16450	13800	14100	15800	14950
Manganese (dissolved)	µg/L			2.0	7.9	5.7	0.25	9.08	4.7
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.07	0.30	0.08	0.10	0.09
Sodium (dissolved)	µg/L			7250	10250	20800	22800	25100	23950
Nickel (dissolved)	µg/L		490	< 1.0	0.3	0.2	0.40	0.40	0.4
Phosphorus (total)	µg/L			51	7	5	< 3	31	17
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.5	0.5	0.44	0.40	0.42
Tin (dissolved)	µg/L			< 1.0	< 0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			290	352	322	279	343	311
Titanium (dissolved)	µg/L			< 5.0	0.3	0.2	< 0.05	0.07	0.06
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	0.009	0.007
Uranium (dissolved)	µg/L	20	420	5	5	17	14.1	16.90	16
Vanadium (dissolved)	µg/L		250	< 0.50	0.18	0.39	0.41	0.33	0.37
Zinc (dissolved)	µg/L		1100	< 5.0	3.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	0.03	0.03
Radium-226	Bq/L	0.49		< 0.040	< 0.010	< 0.010	0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	79.1	53.3	--
ORP	mV			-[1]	-[1]	-[1]	70.5	135.2	--
SPC	us/cm			-[1]	-[1]	-[1]	944.0	951.0	--
Temperature	°C			-[1]	-[1]	-[1]	10.536	11.6	--
Turbidity	FNU			-[1]	-[1]	-[1]	16.60	25.81	--
pH	Units			-[1]	-[1]	-[1]	7.16	6.98	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 117: PH-90-9-III

		Criteria		PH-90-8-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/10	Average
pH	pH	6.5-8.5	6.5-9.0	7.40	7.25	7.40	7.47	7.45	7.46
Alkalinity	mg/L as $CaCO_3$			390	379	399	414	421	418
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			390	379	399	414	421	418
Total Dissolved Solids	mg/L			543	587	548	509	549	529
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	2	2	1	2	2
Dissolved Organic Carbon	mg/L			1	2	3	1	1	1
Total Ammonia-N	mg/l			0.066	0.040	< 0.040	< 0.04	0.05	0.05
Chloride	mg/L			43	66	60	27	32	30
Sulphate	mg/L			14	23	19	18	16	17
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	0.165	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			4.58	6.91	2.46	1.81	1.79	1.80
Nitrate + Nitrite (N)	mg/L			4.58	6.91	2.46	1.81	1.79	1.80
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			475	526	477	383	551	467
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	3.5	59.5	< 1	2	2
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 0.2	0.2	0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	63	70	74	64	88	76
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	44	44	38	45	35	40
Bismuth (dissolved)	µg/L			< 1.0	0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			165000	183500	166500	149000	201000	175000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.0	< 0.0	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		66	< 0.50	0.16	0.11	0.047	0.198	0.123
Chromium (dissolved)	µg/L		810	< 5.0	0.6	0.3	0.28	0.43	0.36
Copper (dissolved)	µg/L	1000	87	< 1.0	0.8	0.4	0.6	0.7	0.7
Iron (dissolved)	µg/L			< 100	15	9	< 7	15	11
Potassium (dissolved)	µg/L			5950	6630	6730	5250	7970	6610
Magnesium (dissolved)	µg/L			15000	16450	13800	14100	15800	14950
Manganese (dissolved)	µg/L			2.0	7.9	5.7	0.25	9.08	4.7
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.07	0.30	0.08	0.10	0.09
Sodium (dissolved)	µg/L			7250	10250	20800	22800	25100	23950
Nickel (dissolved)	µg/L		490	< 1.0	0.3	0.2	0.40	0.40	0.4
Phosphorus (total)	µg/L			51	7	5	< 3	31	17
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.5	0.5	0.44	0.40	0.42
Tin (dissolved)	µg/L			< 1.0	< 0.1	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			290	352	322	279	343	311
Titanium (dissolved)	µg/L			< 5.0	0.3	0.2	< 0.05	0.07	0.06
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	0.009	0.007
Uranium (dissolved)	µg/L	20	420	5	5	17	14.1	16.90	16
Vanadium (dissolved)	µg/L		250	< 0.50	0.18	0.39	0.41	0.33	0.37
Zinc (dissolved)	µg/L		1100	< 5.0	3.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	0.03	0.03
Radium-226	Bq/L	0.49		< 0.040	< 0.010	< 0.010	0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	79.1	53.3	--
ORP	mV			-[1]	-[1]	-[1]	70.5	135.2	--
SPC	us/cm			-[1]	-[1]	-[1]	944.0	951.0	--
Temperature	°C			-[1]	-[1]	-[1]	10.536	11.6	--
Turbidity	FNU			-[1]	-[1]	-[1]	16.60	25.81	--
pH	Units			-[1]	-[1]	-[1]	7.16	6.98	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 118: PH-93-3-III

		Criteria		PH-93-3-III					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	**Units**		(MECP)	Average			2022/02/07	2022/11/22	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.70	7.35	-[3]	No Sample[2]	-[3]	-[3]
Alkalinity	mg/L as $CaCO_3$			370	352	-[3]		-[3]	-[3]
Carbonate	mg/L as $CaCO_3$			1.7	< 1.0	-[3]		-[3]	-[3]
Bicarbonate	mg/L as $CaCO_3$			370	352	-[3]		-[3]	-[3]
Total Dissolved Solids	mg/L			440	374	-[3]		-[3]	-[3]
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	-[3]		-[3]	-[3]
Total Organic Carbon	mg/L			1	1	-[3]		-[3]	-[3]
Dissolved Organic Carbon	mg/L			1	1	-[3]		-[3]	-[3]
Total Ammonia-N	mg/l			0.54	2.90	-[3]		-[3]	-[3]
Chloride	mg/L			12	29	-[3]		-[3]	-[3]
Sulphate	mg/L			3.7	3.9	-[3]		-[3]	-[3]
Bromide	mg/L			< 1.0	< 0.3	-[3]		-[3]	-[3]
Nitrite (N)	mg/L			0.166	0.080	-[3]		-[3]	-[3]
Nitrate (N)	mg/L			2.22	1.61	-[3]		-[3]	-[3]
Nitrate + Nitrite (N)	mg/L			2.39	1.69	-[3]		-[3]	-[3]
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01		< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			360	425	-[3]		-[3]	-[3]
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.1		< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6	4		2	2
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	< 0.2		< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	45	52	49		50.6	50.6
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.01		< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	250	243	71		201	201
Bismuth (dissolved)	µg/L			< 1.0	< 0.0	< 0.0		< 0.010	< 0.010
Calcium (dissolved)	µg/L			130000	129000	89500		124000	124000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.0	< 0.0		< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.18	0.10		0.130	0.130
Chromium (dissolved)	µg/L		**810**	< 5.0	0.3	0.2		0.26	0.26
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.5	0.6		0.7	0.7
Iron (dissolved)	µg/L			< 100	12	< 7		< 7	< 7
Potassium (dissolved)	µg/L			3800	5420	4960		4030	4030
Magnesium (dissolved)	µg/L			10000	10400	9020		10400	10400
Manganese (dissolved)	µg/L			< 2	4	0		1.90	1.90
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.06	0.14		0.10	0.10
Sodium (dissolved)	µg/L			12000	10800	4910		9340	9340
Nickel (dissolved)	µg/L		**490**	< 1.0	0.1	0.3		0.30	0.30
Phosphorus (total)	µg/L			33	8	6		9	9
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.09		< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90		< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.4	0.3		0.54	0.54
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1		< 0.06	< 0.06
Strontium (dissolved)	µg/L			230	226	178		207	207
Titanium (dissolved)	µg/L			< 5.0	0.6	0.1		0.08	0.08
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.01		< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	9	9	**37**		**30**	**30**
Vanadium (dissolved)	µg/L		**250**	0.56	0.53	0.73		0.72	0.72
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	< 2.0		< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.06		-[3]	-[3]
Radium-226	Bq/L	**0.49**		< 0.040	< 0.010	< 0.010		-[3]	-[3]
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020	< 0.020		-[3]	-[3]
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020		-[3]	-[3]
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]		71.5	--
ORP	mV			-[1]	-[1]	-[1]		138.9	--
SPC	us/cm			-[1]	-[1]	-[1]		703	--
Temperature	°C			-[1]	-[1]	-[1]		7.407	--
Turbidity	FNU			-[1]	-[1]	-[1]		314.72	--
pH	Units			-[1]	-[1]	-[1]		7.75	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] Insufficient volume of groundwater for sample collection.
[3] Insufficient volume of groundwater for full sample collection.
-- - No data.

Table 119: PH-93-6-I

		Criteria		PH-93-6-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/24	2022/11/17	Average
pH	pH	6.5-8.5	6.5-9.0	7.89	7.61	7.64	8.09	7.15	7.62
Alkalinity	mg/L as $CaCO_3$			290	286	421	2015	503	1259
Carbonate	mg/L as $CaCO_3$			2.6	< 1.0	< 1.0	229	< 1.0	115
Bicarbonate	mg/L as $CaCO_3$			290	286	421	1790	503	1147
Total Dissolved Solids	mg/L			1635	1457	1536	280	1609	945
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	0.16	0.13	0.15
Total Organic Carbon	mg/L			6	2	2	7.0	2.0	5
Dissolved Organic Carbon	mg/L			6	2	2	6.0	2.0	4
Total Ammonia-N	mg/l			23.6	0.57	0.18	0.23	0.64	0.44
Chloride	mg/L			795	800	705	120	680	400
Sulphate	mg/L			37.5	34.0	33.5	10	37	23
Bromide	mg/L			< 5.5	< 0.3	0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.041	0.530	0.165	0.06	< 0.30	< 0.18
Nitrate (N)	mg/L			1.46	0.70	1.31	0.16	1.24	0.70
Nitrate + Nitrite (N)	mg/L			1.50	1.21	1.31	0.22	1.24	0.73
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			520	668	1220	60	4230	2145
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			5.1	2.0	16.5	40.0	1.0	21
Arsenic (dissolved)	µg/L	25	1900	1.4	0.7	0.5	0.7	1.4	1.1
Barium (dissolved)	µg/L	1000	29000	320	334	381	18	336	177
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.01	< 0.007	0.008	0.008
Boron (dissolved)	µg/L	5000	45000	47	87	71	20	128	74
Bismuth (dissolved)	µg/L			< 1.0	< 0.0	0.0	0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			145000	175000	190500	19800	168000	93900
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.0	0.1	0.004	0.006	0.005
Cobalt (dissolved)	µg/L		66	0.71	1.10	0.87	0.185	2.050	1.118
Chromium (dissolved)	µg/L		810	< 5.0	0.4	0.3	< 0.08	0.42	0.25
Copper (dissolved)	µg/L	1000	87	< 1.0	0.8	0.8	2.2	0.4	1.3
Iron (dissolved)	µg/L			225	120	41	32	2250	1141
Potassium (dissolved)	µg/L			36500	4805	4640	3130	5950	4540
Magnesium (dissolved)	µg/L			39500	37700	40300	2200	39200	20700
Manganese (dissolved)	µg/L			400	665	519	46	1180	613
Molybdenum (dissolved)	µg/L		9200	0.67	0.45	0.50	0.89	0.35	0.62
Sodium (dissolved)	µg/L			335000	298500	300500	103000	345000	224000
Nickel (dissolved)	µg/L		490	2.0	2.1	1.7	0.30	2.30	1.3
Phosphorus (total)	µg/L			605	32	33	68	42	55
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.4	0.4	0.47	0.22	0.35
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	< 0.06	0.07	0.07
Strontium (dissolved)	µg/L			535	612	790	103	726	415
Titanium (dissolved)	µg/L			< 5.0	0.1	1.1	1.72	0.31	1.02
Thallium (dissolved)	µg/L		510	< 0.05	0.01	0.02	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	2	2	2	1.55	3	2
Vanadium (dissolved)	µg/L		250	0.73	0.53	0.58	1.13	1.68	1.41
Zinc (dissolved)	µg/L		1100	74	43	19	2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	0.020	< 0.010	< 0.01	0.02	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	52.6	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	-32.2	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	2858	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	9.317	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	831.21	--
pH	Units			-[1]	-[1]	-[1]	-[2]	7.12	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 120: PH-93-6-II

		Criteria		PH-93-6-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/24	2022/11/17	Average
pH	pH	6.5-8.5	6.5-9.0	7.37	7.30	7.37	7.26	7.60	7.43
Alkalinity	mg/L as $CaCO_3$			525	428	475	415	431	423
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			520	428	475	415	431	423
Total Dissolved Solids	mg/L			598	472	687	477	626	552
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			13	3	4	3	4	4
Dissolved Organic Carbon	mg/L			4	3	4	3	4	4
Total Ammonia-N	mg/l			1.53	0.07	0.05	0.22	0.15	0.19
Chloride	mg/L			10	8	28	14	32	23
Sulphate	mg/L			20.5	15.0	25.5	22	19	21
Bromide	mg/L			< 1.0	< 0.3	0.4	< 0.3	< 3.0	1.7
Nitrite (N)	mg/L			0.053	< 0.030	< 0.030	0.04	0.06	0.05
Nitrate (N)	mg/L			0.41	1.34	3.02	3.02	7.18	5.10
Nitrate + Nitrite (N)	mg/L			0.46	1.34	3.02	3.06	7.24	5.15
Mercury (dissolved)	µg/L	1	0.29	< 0.10	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			570	516	667	419	592	506
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			8.0	3.0	< 1.0	13.0	2.0	7.5
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.4	0.2	0.4	0.4	0.4
Barium (dissolved)	µg/L	1000	29000	58	50	82	45	45	45
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	26	45	49	32	60	46
Bismuth (dissolved)	µg/L			< 1.0	< 0.0	0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			200000	181000	255000	148000	202000	175000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.0	0.0	0.011	< 0.003	0.007
Cobalt (dissolved)	µg/L		66	1.00	0.38	0.60	0.506	0.582	0.544
Chromium (dissolved)	µg/L		810	< 5.0	0.1	0.2	< 0.08	0.13	0.11
Copper (dissolved)	µg/L	1000	87	2.6	1.0	1.0	1.2	1.9	1.6
Iron (dissolved)	µg/L			1500	202	83	19	862	441
Potassium (dissolved)	µg/L			3350	2935	3750	5760	4200	4980
Magnesium (dissolved)	µg/L			16000	12265	12000	10000	13200	11600
Manganese (dissolved)	µg/L			211	213	364	137	410	274
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.13	0.14	0.18	0.10	0.14
Sodium (dissolved)	µg/L			5850	6380	7680	21500	7290	14395
Nickel (dissolved)	µg/L		490	1.2	0.8	1.2	0.60	1.20	0.9
Phosphorus (total)	µg/L			1028	38	19	72	185	129
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.1	0.16	0.18	0.17
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.1	0.77	< 0.06	0.42
Strontium (dissolved)	µg/L			350	297	415	554	300	427
Titanium (dissolved)	µg/L			< 5.0	0.2	0.2	0.17	0.41	0.29
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	13	**36**	**59**	2.8	**40**	**21**
Vanadium (dissolved)	µg/L		250	< 0.50	0.27	0.38	0.60	0.39	0.50
Zinc (dissolved)	µg/L		1100	< 5	3	4	6	< 2	4
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.010	0.015	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	89.5	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	-44.3	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	1003	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	7.887	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	253.98	--
pH	Units			-[1]	-[1]	-[1]	-[2]	7.57	--

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Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 121: PH-93-9-I

		Criteria		PH-93-9-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/09	2022/11/16	Average
pH	pH	6.5-8.5	6.5-9.0	7.26	7.08	7.09	7.46	6.95	7.21
Alkalinity	mg/L as $CaCO_3$			600	604	666	715	753	734
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			600	604	666	715	753	734
Total Dissolved Solids	mg/L			905	863	982	960	991	976
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			6	6	6	6	6	6
Dissolved Organic Carbon	mg/L			6	6	6	6	6	6
Total Ammonia-N	mg/l			11.0	11.5	15.1	15.30	16.40	15.9
Chloride	mg/L			175	160	165	99	92	96
Sulphate	mg/L			34.5	34	55	55	65	60
Bromide	mg/L			1.2	0.3	0.4	0.4	0.4	0.4
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.43	< 0.09	< 0.06	< 0.06	0.31	0.19
Nitrate + Nitrite (N)	mg/L			0.43	< 0.09	0.06	< 0.06	0.31	0.19
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			645	799	744	583	676	630
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			12.5	1.0	11.5	< 1.0	1.0	1.0
Arsenic (dissolved)	µg/L	25	1900	1.4	0.6	0.6	0.4	0.4	0.4
Barium (dissolved)	µg/L	1000	29000	180	166	222	252	246	249
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.007	0.008	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	1100	949	1285	1660	1670	1665
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			185000	192000	197500	222000	203000	212500
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.005	0.005	< 0.003	0.005	0.004
Cobalt (dissolved)	µg/L		66	2.35	2.7	2.9	2.510	3.200	2.855
Chromium (dissolved)	µg/L		810	< 5.0	0.38	0.53	0.26	0.41	0.34
Copper (dissolved)	µg/L	1000	87	3.6	4.3	3.6	2.2	8.3	5.3
Iron (dissolved)	µg/L			115	69	119	36	10	23
Potassium (dissolved)	µg/L			21000	22250	30800	46600	42500	44550
Magnesium (dissolved)	µg/L			43000	41450	45700	40300	42600	41450
Manganese (dissolved)	µg/L			390	479	536	610	675.00	643
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.24	0.25	0.22	0.17	0.20
Sodium (dissolved)	µg/L			87000	80300	82300	59400	66900	63150
Nickel (dissolved)	µg/L		490	7.7	8.9	8.5	6.60	7.80	7.2
Phosphorus (total)	µg/L			102	14	10	17	13	15
Lead (dissolved)	µg/L	10	25	< 0.50	0.03	0.25	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.3	0.33	3.59	1.96
Tin (dissolved)	µg/L			< 1.0	0.3	0.4	0.57	0.99	0.78
Strontium (dissolved)	µg/L			745	830	936	1020	875	948
Titanium (dissolved)	µg/L			< 5.0	0.1	0.2	0.12	0.35	0.24
Thallium (dissolved)	µg/L		510	< 0.05	< 0.005	< 0.005	0.007	0.011	0.009
Uranium (dissolved)	µg/L	20	420	**2200**	**2075**	**7150**	**12100**	**7730**	**9915**
Vanadium (dissolved)	µg/L		250	< 0.50	0.33	0.48	0.30	1.31	0.81
Zinc (dissolved)	µg/L		1100	< 17.0	5	3	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	**0.38**	0.12	< 0.02	0.07
Radium-226	Bq/L	0.49		< 0.040	0.02	0.02	0.03	0.01	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	52.2	49.6	--
ORP	mV			-[1]	-[1]	-[1]	163.9	146	--
SPC	us/cm			-[1]	-[1]	-[1]	814.0	1654	--
Temperature	°C			-[1]	-[1]	-[1]	11.019	9.718	--
Turbidity	FNU			-[1]	-[1]	-[1]	1.36	3.77	--
pH	Units			-[1]	-[1]	-[1]	6.87	6.95	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 122: PH-93-9-II

		Criteria		PH-93-9-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/09	2022/11/16	Average
pH	pH	6.5-8.5	6.5-9.0	7.51	7.33	7.48	7.65	7.49	7.57
Alkalinity	mg/L as $CaCO_3$			390	413	357	409	457	433
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			390	413	357	409	457	433
Total Dissolved Solids	mg/L			448	542	540	463	726	595
Fluoride	mg/L	1.5		< 0.10	0.09	0.08	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	1	2	1	1	1
Dissolved Organic Carbon	mg/L			2	2	1	1	1	1
Total Ammonia-N	mg/l			0.63	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Chloride	mg/L			25	82	200	33	140	87
Sulphate	mg/L			6.4	12.3	11.5	9	21	15
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.54	3.75	3.57	4.05	4.09	4.07
Nitrate + Nitrite (N)	mg/L			0.54	3.75	3.57	4.05	4.09	4.07
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			410	488	391	588	337	463
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	25	< 1.0	< 1.0	33	17
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.2	< 0.2	< 0.2	0.3	0.3
Barium (dissolved)	µg/L	1000	29000	29	46	53	32	69	51
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	12	35	747	68	130	99
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			155000	174500	153000	142000	[redacted]	[redacted]
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.0	0.0	< 0.003	[redacted]	[redacted]
Cobalt (dissolved)	µg/L		66	< 0.50	0.15	0.12	[redacted]	[redacted]	[redacted]
Chromium (dissolved)	µg/L		810	< 5.0	0.8	1.0	[redacted]	2.18	[redacted]
Copper (dissolved)	µg/L	1000	87	< 1.0	0.6	0.5	[redacted]	0.6	0.5
Iron (dissolved)	µg/L			< 100	43	9	< [redacted]	38	23
Potassium (dissolved)	µg/L			580	879	1341	[redacted]	[redacted]	997
Magnesium (dissolved)	µg/L			5300	7200	5845	6960	[redacted]	6755
Manganese (dissolved)	µg/L			12	2.4	0.1	[redacted]	[redacted]	4.05
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.76	0.61	[redacted]	[redacted]	0.44
Sodium (dissolved)	µg/L			8050	49350	72950	[redacted]	[redacted]	89150
Nickel (dissolved)	µg/L		490	< 1.0	< 0.1	0.3	[redacted]	[redacted]	0.4
Phosphorus (total)	µg/L			320	12	3	[redacted]	[redacted]	23
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.05	< [redacted]	< [redacted]	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.8	0.7	0.78	0.74	0.76
Tin (dissolved)	µg/L			< 1.0	< 0.1	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			255	326	298	253	293	273
Titanium (dissolved)	µg/L			< 5.0	2.1	0.3	< 0.05	2.12	1.09
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	3	8	8	13	**23**	18
Vanadium (dissolved)	µg/L		250	< 0.50	0.35	0.27	0.38	0.57	0.48
Zinc (dissolved)	µg/L		1100	8.5	3.5	3.0	7	3	5
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.010	0.015	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	92	80.6	--
ORP	mV			-[1]	-[1]	-[1]	143.9	102.6	--
SPC	us/cm			-[1]	-[1]	-[1]	631	644.0	--
Temperature	°C			-[1]	-[1]	-[1]	10.487	11.313	--
Turbidity	FNU			-[1]	-[1]	-[1]	18.90	41.61	--
pH	Units			-[1]	-[1]	-[1]	7.35	7.36	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 123: PH-93-10-I

		Criteria		PH-93-10-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/08	2022/10/27	Average
pH	pH	6.5-8.5	6.5-9.0	7.22	7.11	6.98	7.24	6.98	7.11
Alkalinity	mg/L as $CaCO_3$			620	588	520	593	626	610
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			620	588	520	593	626	610
Total Dissolved Solids	mg/L			898	842	873	906	894	900
Fluoride	mg/L	1.5		< 0.10	0.07	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			13	11	9	8	7	8
Dissolved Organic Carbon	mg/L			12	11	9	7	8	8
Total Ammonia-N	mg/l			8.8	12.9	10.0	10.20	12.50	11.35
Chloride	mg/L			150	155	225	210	250	230
Sulphate	mg/L			15.0	25	21	17	15	16
Bromide	mg/L			< 1.0	0.30	< 0.30	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.30	< 0.17
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	0.30	0.18
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			575	689	610	626	550	588
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	447	2	3	2	3
Arsenic (dissolved)	µg/L	25	1900	17.5	24.3	20.5	**29.9**	**31.9**	**30.9**
Barium (dissolved)	µg/L	1000	29000	500	623	494	568	560	564
Beryllium (dissolved)	µg/L		67	< 0.50	0.019	< 0.007	< 0.007	0.012	0.010
Boron (dissolved)	µg/L	5000	45000	560	683	378	521	599	560
Bismuth (dissolved)	µg/L			< 1.0	0.010	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			150000	171000	165000	163000	145000	154000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.008	< 0.003	< 0.003	0.005	0.004
Cobalt (dissolved)	µg/L		66	6.50	8.245	6.370	6.7	6.720	6.685
Chromium (dissolved)	µg/L		810	< 5.0	1.40	0.36	0.45	< 0.08	0.27
Copper (dissolved)	µg/L	1000	87	< 1.0	2.2	0.5	< 0.2	0.3	0.3
Iron (dissolved)	µg/L			13000	14750	9815	13700	13800	13750
Potassium (dissolved)	µg/L			15000	18300	14050	16500	14900	15700
Magnesium (dissolved)	µg/L			46000	49150	43050	43700	43000	43350
Manganese (dissolved)	µg/L			615	745.0	771.0	628	579	603.50
Molybdenum (dissolved)	µg/L		9200	0.64	0.73	0.70	0.74	0.65	0.70
Sodium (dissolved)	µg/L			89500	82000	97550	93200	97100	95150
Nickel (dissolved)	µg/L		490	10.1	11.4	9.1	8.4	7.8	8.1
Phosphorus (total)	µg/L			350	47	22	26	23	25
Lead (dissolved)	µg/L	10	25	< 0.50	0.31	0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.1	0.1	0.13	0.15	0.14
Tin (dissolved)	µg/L			< 1.0	0.51	0.24	0.26	0.26	0.26
Strontium (dissolved)	µg/L			645	787	706	698	673	686
Titanium (dissolved)	µg/L			< 5.0	34.17	0.21	0.29	0.37	0.33
Thallium (dissolved)	µg/L		510	< 0.05	0.027	0.008	0.008	0.008	0.008
Uranium (dissolved)	µg/L	20	420	7	5	3	3	3	3
Vanadium (dissolved)	µg/L		250	< 0.50	1.49	0.43	0.38	0.43	0.41
Zinc (dissolved)	µg/L		1100	< 5.0	5	2	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	0.04	< 0.02	0.04	0.03
Radium-226	Bq/L	0.49		< 0.040	0.03	0.02	0.04	0.02	0.03
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	45.5	37.7	--
ORP	mV			-[1]	-[1]	-[1]	-79.4	-70.6	--
SPC	us/cm			-[1]	-[1]	-[1]	1649.0	1633.0	--
Temperature	°C			-[1]	-[1]	-[1]	11.848	10.5	--
Turbidity	FNU			-[1]	-[1]	-[1]	27.25	22.06	--
pH	Units			-[1]	-[1]	-[1]	6.96	6.89	--

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Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 124: PH-93-10-II

		Criteria		PH-93-10-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/08	2022/10/27	Average
pH	pH	6.5-8.5	6.5-9.0	7.17	6.99	6.88	7.06	6.9	6.98
Alkalinity	mg/L as $CaCO_3$			805	709	817	780	836	808
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			805	709	817	780	836	808
Total Dissolved Solids	mg/L			1008	893	1095	1026	1014	1020
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	6	8	6	7	7
Dissolved Organic Carbon	mg/L			6	6	7	5	7	6
Total Ammonia-N	mg/l			17.0	17.9	21.1	19.5	22.3	20.9
Chloride	mg/L			71	70	100	79	120	100
Sulphate	mg/L			66	62	71	64	74	69
Bromide	mg/L			< 1.0	0.5	0.5	0.4	0.5	0.5
Nitrite (N)	mg/L			0.018	0.09	0.03	0.17	< 0.03	0.10
Nitrate (N)	mg/L			1.58	2.30	2.25	1.35	2.04	1.70
Nitrate + Nitrite (N)	mg/L			1.59	2.39	2.26	1.52	2.04	1.78
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			705	830	786	699	709	704
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	2	2	2	1	1.5
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.6	0.6	0.6	0.6	0.6
Barium (dissolved)	µg/L	1000	29000	175	168	207	174	192	183
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.007	< 0.007	< 0.007	0.008	0.008
Boron (dissolved)	µg/L	5000	45000	2850	3290	3980	3000	3530	3265
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			210000	212500	221000	215000	195000	205000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.005	0.004	0.004	0.005	0.005
Cobalt (dissolved)	µg/L		66	3.15	2.71	3.13	2.9	3.390	3.17
Chromium (dissolved)	µg/L		810	< 5.0	0.90	0.61	0.66	< 0.08	0.37
Copper (dissolved)	µg/L	1000	87	4.5	7.5	7.7	6.3	7.2	6.8
Iron (dissolved)	µg/L			< 100	18	< 7	11	14	13
Potassium (dissolved)	µg/L			40000	39250	48250	40500	44800	42650
Magnesium (dissolved)	µg/L			44500	39550	43100	44100	45700	44900
Manganese (dissolved)	µg/L			485	424	583	606	747	677
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.17	0.21	0.16	0.16	0.16
Sodium (dissolved)	µg/L			72000	75600	92900	77900	75500	76700
Nickel (dissolved)	µg/L		490	6.6	7.0	8.7	7.80	8.60	8.2
Phosphorus (total)	µg/L			415	13	17	19	24	22
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.5	0.3	0.21	0.36	0.29
Tin (dissolved)	µg/L			< 1.0	0.30	0.32	0.32	0.89	0.61
Strontium (dissolved)	µg/L			815	801	976	919	918	919
Titanium (dissolved)	µg/L			< 5.0	0.27	0.20	0.36	0.29	0.33
Thallium (dissolved)	µg/L		510	< 0.05	0.020	0.020	0.018	0.022	0.020
Uranium (dissolved)	µg/L	20	420	**5450**	**4970**	**6650**	**5790**	**5480**	**5635**
Vanadium (dissolved)	µg/L		250	0.72	0.87	0.74	0.71	0.70	0.71
Zinc (dissolved)	µg/L		1100	< 5	< 2	< 2	2	< 2	2
Lead-210	Bq/L	0.20		< 0.10	0.03	< 0.03	0.04	< 0.02	0.03
Radium-226	Bq/L	0.49		< 0.040	0.02	< 0.02	0.02	0.01	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	56.2	49.5	--
ORP	mV			-[1]	-[1]	-[1]	44.2	94.5	--
SPC	us/cm			-[1]	-[1]	-[1]	1739.0	1806.0	--
Temperature	°C			-[1]	-[1]	-[1]	12.076	9.994	--
Turbidity	FNU			-[1]	-[1]	-[1]	57.07	4.71	--
pH	Units			-[1]	-[1]	-[1]	6.83	6.71	--

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Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 125: PH-93-12-II

		Criteria		PH-93-12-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/09	2022/11/16	Average
pH	pH	6.5-8.5	6.5-9.0	7.39	7.07	7.05	7.17	7.08	7.13
Alkalinity	mg/L as $CaCO_3$			540	3210	2189	820	684	752
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			540	3210	2189	820	684	752
Total Dissolved Solids	mg/L			655	633	675	840	840	840
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			6	3	3	4	3	4
Dissolved Organic Carbon	mg/L			3	3	4	4	4	4
Total Ammonia-N	mg/l			7.8	8.5	6.3	5.79	9.65	7.7
Chloride	mg/L			57	52	60	53	55	54
Sulphate	mg/L			33	31	34	34	43	39
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	0.3	0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.18	1.12	1.85	1.96	0.32	1.14
Nitrate + Nitrite (N)	mg/L			1.18	1.12	1.85	1.96	0.32	1.14
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			535	6795	10185	1400	770	1085
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	0.28	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			6	70	6	< 1	1	1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.3	1.1	0.3	0.3	0.3
Barium (dissolved)	µg/L	1000	29000	165	193	214	154	203	179
Beryllium (dissolved)	µg/L		67	< 0.50	0.008	< 0.007	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	785	779	729	649	1030	840
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.054	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			175000	194500	202500	168000	161000	164500
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.012	0.017	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		66	0.65	0.77	0.80	0.568	0.727	0.65
Chromium (dissolved)	µg/L		810	< 5.0	0.40	0.61	0.41	0.43	0.42
Copper (dissolved)	µg/L	1000	87	1.5	3.4	1.7	1.4	2.0	1.7
Iron (dissolved)	µg/L			< 100	81	40	< 7	< 7	< 7
Potassium (dissolved)	µg/L			23500	26900	26800	17400	28800	23100
Magnesium (dissolved)	µg/L			23500	23000	24500	19900	23800	21850
Manganese (dissolved)	µg/L			75	69	99	58.10	112.00	85
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.15	0.27	0.12	0.16	0.14
Sodium (dissolved)	µg/L			33500	33250	37050	32500	35200	33850
Nickel (dissolved)	µg/L		490	2.2	2.4	2.6	1.70	2.50	2.1
Phosphorus (total)	µg/L			15500	15	17	< 3	10	7
Lead (dissolved)	µg/L	10	25	< 0.50	0.09	0.46	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.3	0.25	0.28	0.27
Tin (dissolved)	µg/L			< 1.0	0.25	0.38	0.26	0.49	0.38
Strontium (dissolved)	µg/L			520	612	626	503	588	546
Titanium (dissolved)	µg/L			< 5.0	4.13	1.25	< 0.05	0.17	0.11
Thallium (dissolved)	µg/L		510	< 0.05	0.008	0.028	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	**3450**	**3330**	**3680**	**2440**	**3500**	**2970**
Vanadium (dissolved)	µg/L		250	< 0.50	0.61	0.47	0.43	0.45	0.44
Zinc (dissolved)	µg/L		1100	< 12.0	8	13	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	0.02	0.08	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	0.01	0.02	0.02	< 0.01	< 0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	45.0	42.1	--
ORP	mV			-[1]	-[1]	-[1]	169.0	145.8	--
SPC	us/cm			-[1]	-[1]	-[1]	1143.0	617.0	--
Temperature	°C			-[1]	-[1]	-[1]	9.641	9.124	--
Turbidity	FNU			-[1]	-[1]	-[1]	642.0	77.21	--
pH	Units			-[1]	-[1]	-[1]	7.00	6.86	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 126: PH-95-I

		Criteria		PH-95-I			
		COPC	Table 3	2019	2020	2021	2022
Analysis	Units		(MECP)	Average			Decommissioned
pH	pH	6.5-8.5	6.5-9.0	7.64	7.62	7.20	
Alkalinity	mg/L as $CaCO_3$			335	290	339	
Carbonate	mg/L as $CaCO_3$			1.5	< 1.0	< 1.0	
Bicarbonate	mg/L as $CaCO_3$			330	290	339	
Total Dissolved Solids	mg/L			360	315	343	
Fluoride	mg/L	1.5		< 0.10	0.08	< 0.06	
Total Organic Carbon	mg/L			5	2	2	
Dissolved Organic Carbon	mg/L			2	2	2	
Total Ammonia-N	mg/l			0.13	< 0.04	< 0.04	
Chloride	mg/L			4	2	3	
Sulphate	mg/L			6	4	9	
Bromide	mg/L			< 1.0	< 0.3	< 0.3	
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.01	
Hardness (dissolved)	mg/L as $CaCO_3$			345	363	1120	
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	
Aluminum (dissolved)	µg/L			< 5	< 1	4	
Arsenic (dissolved)	µg/L	25	1900	< 1.0	< 0.2	< 0.2	
Barium (dissolved)	µg/L	1000	29000	16	13	17	
Beryllium (dissolved)	µg/L		67	< 0.50	< 0.007	< 0.007	
Boron (dissolved)	µg/L	5000	45000	19	21	29	
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.007	
Calcium (dissolved)	µg/L			125000	109500	155000	
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	< 0.003	< 0.003	
Cobalt (dissolved)	µg/L		66	< 0.50	0.05	0.03	
Chromium (dissolved)	µg/L		810	< 5.0	0.21	0.17	
Copper (dissolved)	µg/L	1000	87	1.9	0.4	0.4	
Iron (dissolved)	µg/L			< 100	< 7	< 7	
Potassium (dissolved)	µg/L			725	694	882	
Magnesium (dissolved)	µg/L			6100	4845	6780	
Manganese (dissolved)	µg/L			4	26	1	
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.24	0.96	
Sodium (dissolved)	µg/L			2200	1855	2500	
Nickel (dissolved)	µg/L		490	< 1.0	< 0.1	0.2	
Phosphorus (total)	µg/L			2595	7	3	
Lead (dissolved)	µg/L	10	25	< 0.50	0.03	0.01	
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.4	
Tin (dissolved)	µg/L			< 1.0	0.09	< 0.06	
Strontium (dissolved)	µg/L			185	167	220	
Titanium (dissolved)	µg/L			< 5.0	< 0.05	0.45	
Thallium (dissolved)	µg/L		510	< 0.05	< 0.005	< 0.005	
Uranium (dissolved)	µg/L	20	420	9	8	8	
Vanadium (dissolved)	µg/L		250	< 0.50	0.28	0.31	
Zinc (dissolved)	µg/L		1100	< 5.0	2	< 2	
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	
Radium-226	Bq/L	0.49		< 0.040	< 0.01	< 0.01	
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	
Field Parameters							
ODO % Sat	mg/L			-[1]	-[1]	-[1]	
ORP	mV			-[1]	-[1]	-[1]	
SPC	us/cm			-[1]	-[1]	-[1]	
Temperature	°C			-[1]	-[1]	-[1]	
Turbidity	FNU			-[1]	-[1]	-[1]	
pH	Units			-[1]	-[1]	-[1]	

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 127: PH-95-17-I

		Criteria		PH-95-17-I					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/07	2022/10/27	Average
pH	pH	6.5-8.5	6.5-9.0	7.35	7.15	7.04	6.81	6.88	6.85
Alkalinity	mg/L as $CaCO_3$			805	947	847	935	900	918
Carbonate	mg/L as $CaCO_3$			1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			800	947	847	935	900	918
Total Dissolved Solids	mg/L			1023	842	992	977	1089	1033
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	6	7	6	8	7
Dissolved Organic Carbon	mg/L			6	6	6	7	9	8
Total Ammonia-N	mg/l			12.8	10.4	14.7	9.5	18.4	13.9
Chloride	mg/L			52	49	61	57	100	79
Sulphate	mg/L			104	45	43	44	42	43
Bromide	mg/L			1.1	0.4	0.5	0.50	0.50	0.5
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	0.30	0.17
Nitrate (N)	mg/L			< 0.10	0.15	0.16	0.18	1.73	0.96
Nitrate + Nitrite (N)	mg/L			< 0.10	0.15	0.16	0.18	1.73	0.96
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			790	1585	973	1540	862	1201
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	4	4	4.0	3.0	4
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.4	0.6	0.7	0.5	0.6
Barium (dissolved)	µg/L	1000	29000	240	191	233	271	260	266
Beryllium (dissolved)	µg/L		67	< 0.50	0.011	0.020	0.020	0.017	0.019
Boron (dissolved)	µg/L	5000	45000	1500	1340	1630	1910	3620	2765
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			260000	238000	232000	261000	229000	245000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.009	0.035	0.045	0.012	0.029
Cobalt (dissolved)	µg/L		66	4.55	3.95	4.48	4.580	7.140	5.86
Chromium (dissolved)	µg/L		810	< 5.0	0.25	0.51	0.47	< 0.08	0.28
Copper (dissolved)	µg/L	1000	87	2.2	2.5	2.8	2.5	2.7	2.6
Iron (dissolved)	µg/L			< 100	33	40	45	96	71
Potassium (dissolved)	µg/L			32500	31650	35050	36300	36200	36250
Magnesium (dissolved)	µg/L			33500	33150	35900	33900	32200	33050
Manganese (dissolved)	µg/L			7550	6615	7890	8090	8420	8255
Molybdenum (dissolved)	µg/L		9200	0.65	0.51	0.64	0.67	1.20	0.94
Sodium (dissolved)	µg/L			43500	40000	44400	42600	68100	55350
Nickel (dissolved)	µg/L		490	5.3	4.7	5.4	5.00	7.60	6.3
Phosphorus (total)	µg/L			840	11	17	34	32	33
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	< 0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.4	0.54	4.10	2.32
Tin (dissolved)	µg/L			< 1.0	0.27	0.29	0.63	1.92	1.28
Strontium (dissolved)	µg/L			930	935	970	1030	961	996
Titanium (dissolved)	µg/L			< 5.0	0.43	0.21	2.36	0.72	1.54
Thallium (dissolved)	µg/L		510	< 0.05	0.034	0.086	0.035	0.006	0.021
Uranium (dissolved)	µg/L	20	420	**6150**	**9735**	**12500**	**12000**	**13900**	**12950**
Vanadium (dissolved)	µg/L		250	< 0.50	0.50	0.62	0.53	0.68	0.61
Zinc (dissolved)	µg/L		1100	< 5.0	5	6	2	< 2	2
Lead-210	Bq/L	0.20		< 0.10	0.05	**0.35**	**0.21**	< 0.02	0.12
Radium-226	Bq/L	0.49		< 0.040	0.03	0.03	0.03	0.02	0.03
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	51.1	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	66.8	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	857.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	10.2	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	145.37	--
pH	Units			-[1]	-[1]	-[1]	-[2]	6.82	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 128: PH-95-17-II

		Criteria		PH-95-17-II					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/02/07	2022/10/27	Average
pH	pH	6.5-8.5	6.5-9.0	7.42	7.19	7.37	7.32	7.37	7.35
Alkalinity	mg/L as $CaCO_3$			530	1015	587	426	734	580
Carbonate	mg/L as $CaCO_3$			1.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			530	1015	587	426	734	580
Total Dissolved Solids	mg/L			558	546	523	354	363	359
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	5	4	2	2	2
Dissolved Organic Carbon	mg/L			5	6	4	2	2	2
Total Ammonia-N	mg/l			21.0	22.2	14.2	7.46	4.86	6.2
Chloride	mg/L			30	35	33	15	19	17
Sulphate	mg/L			7	6	5	3	2	3
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.011	0.11	0.08	< 0.03	0.52	0.28
Nitrate (N)	mg/L			0.77	1.12	1.24	1.27	1.44	1.36
Nitrate + Nitrite (N)	mg/L			0.77	1.22	1.30	1.27	1.96	1.62
Mercury (dissolved)	µg/L	1	0.29	< 0.10	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			400	3996	476	906	2200	1553
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	4	45	3	4	4
Arsenic (dissolved)	µg/L	25	1900	1.9	2.4	1.6	1.2	0.8	1.0
Barium (dissolved)	µg/L	1000	29000	225	192	137	96	76	86
Beryllium (dissolved)	µg/L		67	< 0.50	0.009	< 0.007	0.012	< 0.007	0.010
Boron (dissolved)	µg/L	5000	45000	1350	1150	648	477	351	414
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			120000	131000	123500	114000	106000	110000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.008	0.007	0.047	0.004	0.026
Cobalt (dissolved)	µg/L		66	4.10	4.90	3.37	2.220	1.080	1.65
Chromium (dissolved)	µg/L		810	< 5.0	0.53	0.31	0.42	< 0.08	0.25
Copper (dissolved)	µg/L	1000	87	< 1.0	1.3	1.1	1.0	2.7	1.9
Iron (dissolved)	µg/L			4000	3770	1920	731	< 7	369
Potassium (dissolved)	µg/L			36000	35850	21600	13400	9430	11415
Magnesium (dissolved)	µg/L			22500	21750	16750	11800	11300	11550
Manganese (dissolved)	µg/L			735	706	705	407	218	313
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.18	0.58	0.13	0.08	0.11
Sodium (dissolved)	µg/L			35500	36100	22250	12900	11400	12150
Nickel (dissolved)	µg/L		490	4.8	4.9	1.9	1.2	1.0	1.1
Phosphorus (total)	µg/L			20850	22	12	20	6	13
Lead (dissolved)	µg/L	10	25	< 0.50	< 0.01	0.05	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.2	0.53	0.56	0.55
Tin (dissolved)	µg/L			< 1.0	0.26	0.11	0.10	0.08	0.09
Strontium (dissolved)	µg/L			490	506	416	279	238	259
Titanium (dissolved)	µg/L			< 5.0	0.39	0.07	1.66	0.24	0.95
Thallium (dissolved)	µg/L		510	< 0.05	0.078	0.052	0.087	0.017	0.052
Uranium (dissolved)	µg/L	20	420	**31**	**99**	5	6	2	4
Vanadium (dissolved)	µg/L		250	0.79	1.09	1.00	0.77	0.73	0.75
Zinc (dissolved)	µg/L		1100	< 5.0	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	0.02	0.02	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	93.0	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	119.2	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	18.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	11.8	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	2084.30	--
pH	Units			-[1]	-[1]	-[1]	-[2]	7.29	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Table 129: PH-95-18

		Criteria		PH-95-18			
		COPC	Table 3	2019	2020	2021	2022
Analysis	**Units**		(MECP)	Average		Well Damaged	
pH	pH	6.5-8.5	6.5-9.0	7.14			
Alkalinity	mg/L as $CaCO_3$			870			
Carbonate	mg/L as $CaCO_3$			1.1			
Bicarbonate	mg/L as $CaCO_3$			860			
Total Dissolved Solids	mg/L			1080			
Fluoride	mg/L	1.5		< 0.10			
Total Organic Carbon	mg/L			11.0			
Dissolved Organic Carbon	mg/L			8.8			
Total Ammonia-N	mg/l			40.00			
Chloride	mg/L			46			
Sulphate	mg/L			120.0			
Bromide	mg/L			< 1.0			
Nitrite (N)	mg/L			< 0.010			
Nitrate (N)	mg/L			0.59			
Nitrate + Nitrite (N)	mg/L			0.59			
Mercury (dissolved)	µg/L	1	0.29	< 0.10			
Hardness (dissolved)	mg/L as $CaCO_3$			710			
Silver (dissolved)	µg/L		1.5	< 0.1			
Aluminum (dissolved)	µg/L			250.0			
Arsenic (dissolved)	µg/L	25	1900	< 1.0			
Barium (dissolved)	µg/L	1000	29000	160			
Beryllium (dissolved)	µg/L		67	< 0.50			
Boron (dissolved)	µg/L	5000	45000	2000			
Bismuth (dissolved)	µg/L			< 1.0			
Calcium (dissolved)	µg/L			220000			
Cadmium (dissolved)	µg/L	5	2.7	< 0.1			
Cobalt (dissolved)	µg/L		66	18.00			
Chromium (dissolved)	µg/L		810	< 5.0			
Copper (dissolved)	µg/L	1000	87	18.0			
Iron (dissolved)	µg/L			430			
Potassium (dissolved)	µg/L			61000			
Magnesium (dissolved)	µg/L			42000			
Manganese (dissolved)	µg/L			5700			
Molybdenum (dissolved)	µg/L		9200	0.57			
Sodium (dissolved)	µg/L			48000			
Nickel (dissolved)	µg/L		490	15.0			
Phosphorus (total)	µg/L			1800			
Lead (dissolved)	µg/L	10	25	0.51			
Antimony (dissolved)	µg/L	6	20000	< 0.50			
Selenium (dissolved)	µg/L	10	63	< 2.0			
Tin (dissolved)	µg/L			< 1.0			
Strontium (dissolved)	µg/L			1100			
Titanium (dissolved)	µg/L			11.0			
Thallium (dissolved)	µg/L		510	0.27			
Uranium (dissolved)	µg/L	20	420	**5000**			
Vanadium (dissolved)	µg/L		250	1.40			
Zinc (dissolved)	µg/L		1100	5.2			
Lead-210	Bq/L	0.20		< 0.10			
Radium-226	Bq/L	0.49		< 0.040			
Thorium-230	Bq/L	0.65		< 0.070			
Thorium-232	Bq/L			< 0.060			
Field Parameters							
ODO % Sat	mg/L			-[1]			
ORP	mV			-[1]			
SPC	us/cm			-[1]			
Temperature	°C			-[1]			
Turbidity	FNU			-[1]			
pH	Units			-[1]			

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
--- No data.

Table 130: PH-M-19

		Criteria		PH-M-19					
		COPC	Table 3	2019	2020	2021	2022		
Analysis	Units		(MECP)	Average			2022/06/10	2022/11/23	Average
pH	pH	6.5-8.5	6.5-9.0	7.85	7.57	7.48	7.70	7.52	7.61
Alkalinity	mg/L as $CaCO_3$			370	363	474	337	356	347
Carbonate	mg/L as $CaCO_3$			2.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			365	363	474	337	356	347
Total Dissolved Solids	mg/L			820	737	836	637	771	704
Fluoride	mg/L	1.5		< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	2	1	2	2	2
Dissolved Organic Carbon	mg/L			2	2	2	2	2	2
Total Ammonia-N	mg/l			0.1	< 0.04	0.05	< 0.04	< 0.04	< 0.04
Chloride	mg/L			250	235	335	160	260	210
Sulphate	mg/L			11	9	10	15	10	13
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.11	0.93	0.83	0.46	0.36	0.41
Nitrate + Nitrite (N)	mg/L			1.11	0.93	0.83	0.46	0.36	0.41
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			365	676	419	310	478	394
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6	< 1	< 1	< 1	1
Arsenic (dissolved)	µg/L	25	1900	**310**	**379**	**355**	**393**	**270**	**332**
Barium (dissolved)	µg/L	1000	29000	50	48	56	40	51	46
Beryllium (dissolved)	µg/L		67	< 0.50	0.017	< 0.007	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	31	33	27	32	104	68
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.009	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			115000	110000	135000	85700	117000	101350
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.004	0.007	0.003	0.007	0.005
Cobalt (dissolved)	µg/L		66	< 0.50	0.11	0.12	0.095	0.125	0.11
Chromium (dissolved)	µg/L		810	< 5.0	0.65	0.53	0.38	0.20	0.29
Copper (dissolved)	µg/L	1000	87	< 1.0	0.6	0.5	0.5	0.4	0.5
Iron (dissolved)	µg/L			< 100	10	15	< 7	19	13
Potassium (dissolved)	µg/L			935	1055	1032	872	950	911
Magnesium (dissolved)	µg/L			16000	12550	17150	11400	18500	14950
Manganese (dissolved)	µg/L			2	5	3	2.13	4.44	3
Molybdenum (dissolved)	µg/L		9200	0.73	0.91	0.86	1.19	0.57	0.88
Sodium (dissolved)	µg/L			170000	164000	207500	155000	150000	152500
Nickel (dissolved)	µg/L		490	< 1.0	0.3	0.2	0.20	0.20	0.2
Phosphorus (total)	µg/L			330	28	10	10	13	12
Lead (dissolved)	µg/L	10	25	< 0.50	0.03	0.05	< 0.09	< 0.09	0.09
Antimony (dissolved)	µg/L	6	20000	3.20	2.70	3.70	3.90	3.10	3.50
Selenium (dissolved)	µg/L	10	63	< 2.0	1.5	1.4	1.09	1.09	1.09
Tin (dissolved)	µg/L			< 1.0	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			375	334	414	265	332	299
Titanium (dissolved)	µg/L			< 5.0	0.49	0.13	< 0.05	0.22	0.14
Thallium (dissolved)	µg/L		510	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	**225**	**187**	**204**	**156**	**160**	**158**
Vanadium (dissolved)	µg/L		250	4.10	5.19	5.38	5.58	2.87	4.23
Zinc (dissolved)	µg/L		1100	< 5.0	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.65		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			-[1]	-[1]	-[1]	-[2]	53.2	--
ORP	mV			-[1]	-[1]	-[1]	-[2]	161.2	--
SPC	us/cm			-[1]	-[1]	-[1]	-[2]	1417.0	--
Temperature	°C			-[1]	-[1]	-[1]	-[2]	7.428	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[2]	49.42	--
pH	Units			-[1]	-[1]	-[1]	-[2]	7.67	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment, Conservation and Parks.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
[2] No field parameters - Water quality units out for repair.
-- - No data.

Appendix E Environmental Assessment Follow-Up Program Summary Table

Table 131: Scope of Biophysical Effects EA Follow-Up Monitoring Plan, 2022

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
Atmospheric Environment						
Air Quality 24-hour average Ambient Air Quality Criteria (AAQC) will be exceeded for arsenic and cobalt on occasions at offsite locations, including public receptor locations. Total suspended particulates of PM_{10}, $PM_{2.5}$ and NO_2 will exceed the 24-hour AAQC at some offsite locations.	Reduce travel distances within LTWMF from 200 m to 50 m, for equipment distributing off-loaded contaminants. Install a fence-type barrier or other movable barrier at specific targeted locations. Construction equipment to meet Off-Road Compression-Ignition Engine Emission Regulations for use in areas of denser urbanization, where practicable.	No residual adverse effects.	Construction equipment met Off-Road Compression-Ignition Engine Emission Regulations for PH LTWMF activities.	Verify implementation of mitigation measures. Monitor arsenic and cobalt at offsite locations, including public receptor locations. Compare measured concentrations to predictions. Monitor levels of $PM_{2.5}$ at offsite locations. Compare measured levels of $PM_{2.5}$ to correlate the predicted air quality relationships between PM_{10} and $PM_{2.5}$; and relationships between NO_2 and $PM_{2.5}$.	There were no exceedances of the 24-hour AAQC [37] for arsenic or cobalt in 2022. CCME adopted the Air Quality Management System [38]. Canadian Ambient Air Quality Standards for Fine Particulate Matter ($PM_{2.5}$) are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 µg/m^3 is used for $PM_{2.5}$ (98th percentile averaged over 3 years) was not exceeded in 2022. As described in the *Port Hope Environmental and Biophysical Monitoring Plan* [34], compliance with this criterion will also be protective of the potential effects from PM_{10} and NO_2.	Air quality monitoring was conducted throughout 2022 at the PH LTWMF Site. A holiday shutdown took place from 2022 December 23 to 2023 January 03. The Overriding Limit of 120 µg/m^3 for TSP, as defined in the *Dust Management Requirements and Plan* [36] was not exceeded in 2022. The Canadian Ambient Air Quality Standards for $PM_{2.5}$ of 27 µg/m^3 (98th percentile averaged over 3 years) was not exceeded in 2022. The sample containing the highest net weight of TSP collected each week at each of the monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. There were no exceedances of the AAQC [37] for metals in 2022. Radionuclide analysis results are discussed under *Radiological, Particulate Radioactivity*.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
Odour MECP guideline for odour may be exceeded at properties near Highland Drive Landfill and the Port Hope Harbour.	Lime may be added to waste, for sulphur-related odours; foaming agents may be used to minimize surface odours; odour suppression sprays may be used.	No residual adverse effects.	Contractors are required to submit Odour Control Plans prior to odour generating activities that are reviewed by CNL. Any odour suppressants are reviewed by CNL prior to use.	During pre-construction and construction phases, conduct odour analysis at Highland Drive Landfill and Port Hope Harbour sites. Implement mitigation measures if odour analysis indicates they are necessary.	A third-party odour monitoring contractor performed pre-construction and construction phase odour monitoring to support the dredging activities at the Port Hope Harbour in 2022. Twice daily off-site upwind and downwind odour measurements were performed when dredging was taking place in 2022. There were 0 confirmed instances when the threshold level of 5 dilution-to-threshold was reached during dredging activities at Port Hope Harbour off-site receptors. Pre-construction odour monitoring was conducted in 2021 June ahead of the commencement of dredging in 2021 July.	A third-party odour monitoring contractor was procured in 2020 to support the monitoring during dredging in the Port Hope Harbour. Odour monitoring commenced in 2021 June. Mobilization of the Highland Drive Landfill took place in 2022 fall. CNL has procured a third-party odour monitoring contractor and is currently working to mobilize prior to odour-generating activities.
Noise Noise levels will increase by 12 dBA, to 63 dBA, for residents adjacent to the LTWMF, during construction and development; by 13 dBA, to 67 dBA, for residents adjacent to the Alexander Ravine; and by 12 dBA, to 61 dBA, for residents along the Strachan Street transportation route.	Hours of work will comply with Port Hope By-Law No 30/2002, which prohibits construction between 11:00 pm and 7:00 am. At small and medium scale remediation sites in residential areas, activities would be limited to daylight hours and would conclude by 7:00 p.m. Construction equipment will	Nuisance noise impacts on local receptors.	Complied with Port Hope By-Law No 30/2002 and World Health Organization's 70 dBA over a 24-hour period [39]. Trucks and other equipment will be equipped with mufflers. Tailgate banging was avoided. Physical and operational elements were built into	Verify implementation of mitigation measures. Measure noise levels at the LTWMF including the intersection of the proposed access road [now constructed] and Toronto Road during construction; at Alexander Ravine during remediation; and along the Strachan Street transportation route, to verify accuracy of predictions and effectiveness of mitigation	Noise monitoring was conducted around the LTWMF in 2022. The 2022 results are compared to 2015 results prior to the start of the EW3a construction (when levels of activity around the site were comparatively low), it can be observed that the 2022 results are similar to 2021 with no notable increases of results.	Implementation of mitigation measures is verified during compliance inspections. Work was scheduled in compliance with local by laws. Four main monitoring campaigns (January, April, August, and November) were completed for noise monitoring in 2022 at the PH LTWMF. The 2022 results are similar to 2021 with no

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
	comply with emission standards as outlined in Noise Pollution Control-115 of the Ontario Model Municipal Noise Control By-Law. Trucks and other equipment will be equipped with mufflers. Tailgate banging will be avoided. Empty trucks will be required to reduce speed at construction sites and on local roads to avoid excessive cargo box and tray noise. Construction hoarding will be erected where practical. Develop and implement a noise mitigation plan for the intersection of the new access road and Toronto Road involving physical (e.g., berms) and operational (e.g., transportation protocols) elements.		the design of the new access road; construction of a berm and installation of traffic lights.	measures. Monitor noise levels for compliance with appropriate by laws and regulations governing hours of work and levels of noise.	All values were below the predicted range of 12 dBA and the World Health Organization's *Guideline for Community Noise* level of 70 dBA over a 24-hour period [39]. The North, South and Central Transportation Routes were also monitored in 2022. Monitoring along the Transportation Routes showed little to no increase from the baseline monitoring that took place prior to the remedial activities.	notable increases. The North, South and Central Transportation Routes were also monitored in 2022. Please note, the Central Transportation Route monitoring incorporates Strachan Street Consolidation Site. Remediation at the Strachan Street Consolidation Site was completed in 2022 summer. Monitoring along the Transportation Routes showed little to no increase from the baseline monitoring that took place prior to the remedial activities.
Radiological, Radon Annual average radon concentrations, downwind from the LTWMF during construction and development, are expected to be 25.3 Bq/m^3. The radon pathway will be	Covering stockpiles and exposed areas overnight and on weekends. Applying dust suppressants. Restricting or ceasing work under high wind conditions.	No residual adverse effects.	CNL approved dust suppressants are used. Work was restricted or ceased under high wind conditions Revegetation of the work areas is to be completed at	Verify implementation of mitigation measures at times appropriate to the measure. During construction and during development, measure concentrations of radon and long-lived alpha emitters downwind from the LTWMF to verify modelling predictions.	Radon measurements are taken monthly at the fence line as a representative reading to the public and around the existing mound. Measurements taken are located at the fence line around boundary. At the fence line, the average radon	Radon gas and radon progeny was monitored on a routine monthly basis at the LTWMF during the 2022 calendar year.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
eliminated.	Minimizing the exposed working face. Re-vegetation of completed cells and excavation areas as soon as possible. Modify methane gas piping exit vents to mitigate radon gas emanating from Cell 3 of the LTWMF.		the end of the PH LTWMF project. On-site remediation continued in 2022. Activities were performed by the contractor in accordance with a radiation protection plan, approved by CNL. Requirements of the plan include ALARA principles, completion of a radiological safety assessment and use of radiological work permits/assessments. Dose tracking and work planning measures are in place to ensure worker dose is ALARA.	During construction and operations measure radon gas concentrations in the area immediately surrounding the methane gas piping exit vents at Cell 3 of the LTWMF. Length of monitoring would be limited to several years if no impact demonstrated.	measurements ranged between 15 Bq/m^3 to 152 Bq/m^3. The trigger level for radon monitoring is 150 Bq/m^3. Results from the 2022 radon monitoring program confirm a public dose estimate to be 25 µSv (or 2.5% of the annual limit for the public) based on the maximum readings from Radon measured along the fence line, with a conservative occupancy period of 60 hours per year. The integrity of the ALARA program is managed through routine monitoring and reviews of dose records to confirm that no adverse trends or exceedances have occurred.	
Radiological, Particulate Radioactivity The predicted levels for the following radionuclides are below Health Canada reference levels: ^{226}Ra (0.000049 Bq/m^3, compared with 0.05 Bq/m^3); ^{230}Th (0.00042 Bq/m^3, compared with 0.01 Bq/m^3), ^{232}Th (0.000057 $\mu g/m^3$ compared with 0.006 Bq/m^3); and uranium (0.0018 $\mu g/m^3$ compared with 4.07 $\mu g/m^3$).	Implement watering, to control dust on unpaved roads and excavation areas. Implement vacuum sweeping and water flushing on paved roads.	No residual adverse effects.	Watering trucks and spray on technology used in areas of excavation.	Verify implementation of mitigation measures. Measure levels of ^{226}Ra; ^{230}Th; ^{232}Th, and uranium at work sites and along haul roads, to verify modelling predictions.	TSP high volume air sampler filters were sent for additional laboratory analysis in 2022. Radium-226 thorium-232, and uranium exceeded the predicted values for some of the filters in 2022; however, they remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (uncalculated laboratory results were less than the	The sample containing the highest net weight of TSP collected each week at each of the monitoring stations was sent for additional analysis to determine the concentration of Contaminants of Potential Concern (COPC) in suspended dust.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
					limit of detection for radium-226 and thorium-232). The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.	
Aquatic Environment						
Sediment Quality (Sculthorpe Marsh) If remediation work is carried out in the Sculthorpe Marsh, the effect resulting from the sediment removal is expected to reduce invertebrate productivity temporarily. (See also, *Terrestrial Environment Component*)	Conduct sediment toxicity testing to confirm the need for remediation and /or refine area/extent/scope of any required sediment removal. Develop a Marsh Protection and Restoration Plan, which could include replacement of coarse organic matter and re-planting of shoreline vegetation.	No residual adverse effects.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.	The remediation of the Sculthorpe Marsh is not required at this time. The following follow up actions with respect to the Sculthorpe Marsh; monitor recovery of benthic invertebrates and aquatic communities against predicted timelines are not incorporated into this plan.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.
Surface Water Quality, Radiological Concentrations of arsenic and uranium will decrease by 78-88% in the Highland Drive, South Creek, and Brewery Creek. Concentrations of uranium and ^{226}Ra would decrease similarly in Alexander Creek. Concentrations of ^{226}Ra and uranium are expected to increase in the area between	The mitigation measures include the design (e.g., the low-permeability cover on the LTWMF and permeable reactive barriers installed in Highland Drive South Ravine), operation and management (e.g., storm water management) features of the project proposal. An Emergency Response Plan will be developed to address unexpected events.	No residual adverse effects.	A temporary wave attenuator and use of turbidity curtain(s) are present at the Harbour. Emergency Response Plans are developed for project sites and reviewed by CNL. A Spill Contingency Plan has been developed to deal with unexpected spills of fuels and lubricants. Spill control and clean-up equipment is provided at	Measure concentrations of arsenic and uranium at the Highland Drive South Creek and Brewery Creek; and concentrations of uranium and ^{226}Ra in Alexander Creek; concentrations of ^{226}Ra and uranium in the area between the harbour and the Ganaraska River during dredging of the harbour; and uranium concentrations in the groundwater and down-gradient surface water in the area of the LTWMF, to verify	No residual adverse effects on surface water. There was no observable decrease in uranium concentrations in Brand Creek (downgradient of the LTWMF). This is not expected until the project evolves, and the waste is remediated. In the Port Hope Harbour, uranium concentrations were observed to exceed the PWQO [23] during dredging. The original EA prediction	Monitoring of surface water at the Highland Drive South Ravine Creek, Brewery Creek, Brand Creek, and Alexander Creek was completed in 2022. Surface water sampling was completed during the Port Hope Harbour dredging activities. Uranium exceeded the PWQO [23] and CWQG [24] at PHH-2 in 2022 June. Monitoring of the surface

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
the harbour and the Ganaraska River, during dredging of the harbour, but to remain below Provincial Water Quality Guidelines (PWQOs). Uranium concentrations in the groundwater and down-gradient surface water in the area of the LTWMF are expected to decrease by 63%.	A Spill Contingency Plan will be developed to deal with unexpected spills of fuels and lubricants. Spill control and clean-up equipment will be provided in all work locations. Erosion and sediment control structures will be in place and will be inspected and maintained regularly.		all work locations. Erosion and sediment control structures are in place and are inspected and maintained regularly.	accuracy of predictions. Review Emergency Response Plan, Spill Contingency Plan and require revisions if necessary, until plans are deemed acceptable. Verify presence of spill control and clean-up equipment at all work locations. Verify presence of erosion and sediment control structures, and review inspection and maintenance protocol.	used theoretical/predicted data inputs to the model. Actual conditions related to daily inputs of water to the inner harbour during dredging have resulted in a different set of conditions, requiring that the proposed EA mitigation measures be modified. CNL engaged Responsible Authorities to ensure a path forward for the protection of Lake Ontario and the Ganaraska River. This has resulted in the creation of a robust monitoring program to ensure the protection of the aquatic environment while dredging activities continue at the Port Hope Harbour.	water downgradient of the LTWMF (including Lake Ontario) is performed on a continuous, quarterly basis. (Section 9.4.4.1). Oversight is used by CNL personnel to confirm the suitability, implementation and effectiveness of processes applied to PHAI project activities in order to comply with contractual obligations, licensing requirements, federal/provincial acts and regulations, environmental management and protection plans, compliance plans and technical specifications. Oversight is applied by CNL taking into consideration the importance and complexity of activities and the organization(s) involved in the management of these activities. Activities performed by PHAI consultants, contractors and service providers are subject to oversight.
Surface Water Quality, Non-Radiological Long-term improvement to down-gradient surface water quality; reduced contaminant loadings to down-gradient streams; and	Groundwater, stormwater, and drainage water collection and treatment systems, including flow control and quality control, will be in place.	No residual adverse effects.	Required sampling of groundwater, storm water and drainage water took place during the PH LTWMF construction activities.	Verify predicted improvements in surface water. Proponent must ensure that discharge is not deleterious to aquatic environment (fish) at	There was no observable decrease in contaminant concentrations to downgradient Brand Creek; however, this is not expected until the project evolves, and the waste is remediated.	Monitoring of surface water at the Highland Drive South Ravine Creek, Brewery Creek, Brand Creek, and Alexander Creek was completed in 2022.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
no measurable change to Ganaraska River are the effects predicted. Any storm water flow which permeates the dike during harbour cleanup is not expected to raise contaminant concentrations above PWQOs in the harbour or Ganaraska River. Surface water infiltration into and through contaminated materials, to groundwater and down-gradient surface water, is expected to decrease. Contaminant loadings from LTWMF leachate, discharging to the lake, would be reduced by 44%.	Dike and silt screen will isolate harbour work from Lake Ontario.		No residual adverse effects for the PH LTWMF construction work. Sampling took place at Highland Drive South Ravine Creek, Brewery Creek, Brand Creek, and Alexander Creek in 2022 and will continue to take place in 2023. It is to be noted that subsequent to the acceptance of the Environmental Assessment by the RAs, the preliminary design for the PHP continued to be refined in support of the licence application and some changes to preliminary design concepts were made. Among the design changes was the substitution of the proposed dike for purposes of separating the Approach Channel and Turning Basin from the Outer Harbour during dredging operations with a series of silt curtains to prevent transmission of suspended solids out of the Harbour during dredging; with the curtains being protected from wave damage by a floating wave	point of discharge and appropriate monitoring must be employed to confirm this. Monitor contaminant concentrations in the harbour and Ganaraska River during the harbour cleanup following any storms. Monitor mercury and levels of other COPCs in fish tissue to verify predictions. Verify reduction of contaminant loadings due to leachate discharging to Lake Ontario. Monitor the maintenance of silt curtains.	Sampling took place at Highland Drive South Ravine Creek, Brewery Creek, Port Hope Harbour, and Alexander Creek in 2022.	Monitoring of surface water at the Port Hope Harbour and Ganaraska River Confluence was completed in 2022 and will continue in 2023. Monitoring of the surface water downgradient of the LTWMF (including Lake Ontario) is performed on a continuous, quarterly basis. The PH LTWMF construction activities did not appear to be affecting surface water quality (Section 9.4.4). Monitoring of COPCs in fish tissue to occur during the Maintenance and Monitoring Phase. Monitoring of the maintenance of the silt curtains will occur during the construction period around water features at Alexander Creek, Highland Drive South Creek, Brand Creek, if necessary, and near Lake Ontario.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2022	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2022	Status of EA Commitments - 2022
			attenuator designed for the dissipation of wave energy in harbours. This (and all other design refinements), and the potential environmental effects associated with the change, were described in the Engineering Change Summary Report, which was submitted to, and approved by, the RAs. Therefore, the silt barrier and wave attenuator are incorporated into the detailed design description report.			
Sediment Quality (Harbour) A long-term improvement to harbour sediment quality and habitat conditions is predicted.	Beneficial effects will be enhanced by the development of fish habitat enhancement incorporated into the harbour detailed design.	Beneficial effect.	Design of harbour incorporates enhancement to fish habitat. Monitoring to take place in the maintenance and monitoring phase.	Verify design enhancements have improved the fish habitat in the harbour. Monitor sediment quality and habitat conditions.	Not applicable. Expected to be a beneficial effect. Monitoring to take place in the maintenance and monitoring phase.	Monitoring to occur during Maintenance and Monitoring Phase.
Geology and Groundwater Environment						
Soil Quality, Radiological The mean incremental concentrations of radiological contaminants are expected to be less than 10% of background at remediation sites. The incremental concentrations at the LTWMF would be less than 20% of background. The exception is ^{230}Th, with an expected 63% increase in concentration over baseline,	Reduce travel distances within LTWMF from 200 m to 50 m, for equipment distributing off-loaded contaminants. Implementation of a Dust Management Requirements and Plan.	No residual adverse effects.	The *Dust Management and Requirements Plan* [36] was implemented during the PH LTWMF construction activities and remediation at major sites. The *Dust Management and Requirements Plan – Small-Scale Sites Remediation* [58]~~[57]~~ was implemented and used for the Small-Scale Sites remediation in 2022.	Measure concentrations of all radiological contaminants at all remediation sites and at the LTWMF to verify modelling predictions. Monitor concentrations of 230^{Th} at the LTWMF perimeter fence, and in the surface soils adjacent to it.	No residual adverse effects. LTWMF: In 2022, Thorium-230 soil concentrations have not increased from baseline (Section 9.4.3).	Surface soil monitoring for radiological contaminants of interest around the PH LTWMF and the Highland Drive Landfill Site were monitored in 2022. Monitoring is planned annually for the remainder of the project for both Sites.

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during construction and development of the LTWMF, to a predicted mean concentration of 97.7 Bq/kg, with a maximum predicted concentration of 141.9 Bq/kg.						
Soil Quality, Non-Radiological Relates to potential disposition of contaminants on surface at perimeter of LTWMF (see *Atmospheric Environmental Component*). Predicted maximum concentrations: arsenic 4.7 mg/kg; cobalt – 6.67 mg/kg.	See *Atmospheric Environment Component*.	No residual adverse effects.	No residual adverse effects for PH LTWMF construction work. Watering trucks and spray on technology used in areas of excavation.	Verify predicted soil concentrations of arsenic and cobalt at perimeter of LTWMF.	LTWMF: In 2022, concentration of arsenic (20 µg/g) was greater than the predicted concentration at PH-WWMF-SS-05. At PH-WWMF-SS-01, the concentration of cobalt (7.4 µg/g) was greater than the predicted concentration for cobalt. All other sampling locations were below predicted concentrations. (Section 9.4.3.3). There are no immediate environmental concerns.	Surface soil monitoring for non-radiological contaminants of interest around the perimeter of the PH LTWMF and the Highland Drive Landfill Site occurred in the 2022. Monitoring is planned annually for the remainder of the project for both Sites.
Groundwater Quality, Radiological With removal of source contamination, uranium concentrations at Mill Street and Alexander Street sites are predicted to decline below applicable criterion value within approximately 25 years.	No mitigation required.	No residual effects	Pre-construction groundwater monitoring at the Mill Street South site occurred in 2012-2013. Monitoring of selected remediated sites will occur following remediation to verify EA predictions.	Measure uranium concentrations at remediated Mill Street and Alexander Street sites. Report measurements annually to verify modelling predictions.	No residual adverse effects.	Pre-construction groundwater monitoring at the Mill Street South site occurred in 2012-2013. Monitoring of selected remediated sites will occur following remediation to verify EA predictions.
Groundwater Quality Volume of groundwater collected for treatment in the LTWMF groundwater drainage water collection	Collected groundwater water will be treated to requirements set by the CNSC during licensing of the LTWMF.	No residual adverse effects.	WWTP construction was completed in 2016 – active commissioning commenced in the Fall of 2016.	Measure volume and concentrations of contaminants in LTWMF groundwater collection system annually to verify predictions.	Elevated concentrations of some COPCs are identified in samples collected of drainage water in 2022. Changes in drainage water	Monitoring of LTWMF groundwater-drainage water collection system occurred in 2022.

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system would decrease by approximately 30%; contaminant concentrations expected to decline over time.					quality and volume were expected to occur after remediation work commenced. It should be noted that drainage water on site is treated prior to release to the environment.	Monitoring of groundwater and drainage water will continue throughout the Construction and Development Phase.
Drainage water volume A 66% reduction is predicted for the volume of drainage water to be collected in the groundwater/drainage water collection and treatment system, to 27,380 m^3/a after the cover is placed on the LTWMF. A reduction of 92,110 m^3/a to 116,280 m^3/a is predicted for the sum of groundwater and drainage water discharge, an overall volume reduction of 44%.	Not applicable.	No applicable.	Not applicable.	Measure volume of drainage water at the LTWMF annually to verify predictions.	Not applicable. Predictions to be verified in the Maintenance & Monitoring Phase when the cover is placed on the LTWMF.	Monitoring of groundwater and drainage water will continue throughout the Construction and Development Phase.
Groundwater Flow It is predicted that the water table will be lower by 10 m, and that the groundwater mounding under the existing facility will dissipate. Groundwater discharge to Brand Creek is predicted to decrease by 2%. Groundwater discharge to the onsite drainage system is predicted to decrease by 30%.	Not applicable.	Not applicable.	Not applicable.	Confirm lowering of water table. Confirm dissipation of mounding by monitoring water table beneath and adjacent to the LTWMF. Monitor stream flow and perform base flow separation to get groundwater discharge, to confirm 2 % decrease is not exceeded, and that there is a 30 % decrease in groundwater discharge to the onsite	No residual adverse effects.	The average water levels in groundwater monitoring wells in 2022 are generally comparable to previous years. Monitoring will continue throughout the Construction and Development Phase. The volume of treated effluent discharged to Lake Ontario is monitored on a continuous basis. Monthly Effluent volumes discharged to Lake Ontario

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The treated effluent volume to be discharged to Lake Ontario is predicted to decrease by 42%.				drainage system, and a 42% decrease in the volume of treated effluent discharged to Lake Ontario. Monitor groundwater flow and direction to verify assessment assumption. Continue monitoring to increase understanding.		are provided in Table 14. The total effluent volume in 2022 was 102,300 m^3.
Groundwater Quality and Quantity No measurable changes of quality or quantity of groundwater and drainage water during LTWMF construction. Maximum breakthrough of COPCs through the LTWMF would be 1% of PWQO and Ontario Drinking Water Standards criteria.	Not applicable.	Not applicable.	Not applicable.	Monitor quantity and quality of groundwater and drainage water intercepted during construction to confirm prediction of no measurable change.	No measurable change to groundwater and drainage water quality was observed in 2022 sampling results (Section 9.4.3.1).	Drainage water and groundwater were monitored in 2022 and will continue to be monitored throughout the Construction and Development Phase.
Design of LTWMF, including liners and covers Primary and secondary liner units would have maximum hydraulic conductivity of $1x10^{-7}$ cm/s. Cover would have a maximum hydraulic conductivity of 10^{-8} cm/s. Volume (annual) of leachate generated within the LTWMF is predicted to be 150 m^3 based on the assumption of 1 mm/a leakage through the cover.	Not applicable.	Not applicable.	Not applicable.	Monitor leakage through the primary liner using collection system installed between the primary and secondary liners to verify hydraulic conductivity of the liner units. Monitor settlement of the LTWMF cover, to confirm the assumption that there will not be excessive settlements of the waste under the cover that would compromise the cover performance.	Not applicable until Maintenance and Monitoring Phase.	Monitoring to occur in the Maintenance and Monitoring Phase.

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				Monitor rate of infiltration through the LTWMF cover to verify the hydraulic conductivity of the cover and confirm the assumed leakage rate through the cover system.		
Volumes of Excavated Wastes Volumes of excavated wastes to be stored in the LTWMF are predicted to be as follows: 620,000 m^3 of low-level radioactive waste (LLRW); 572,000 m^3 of material mixed with LLRW; 51,250 m3 of industrial waste; and 150,000 m3 of Cameco decommissioning and stored waste. Predictions of contaminant concentrations are found in Tables 9.2.2-1 and 9.2.1-2 of the *PHP EA Study Report* [41].	Not applicable.	Not applicable.	Not applicable.	Verify the volume and concentrations of excavated waste prior to emplacement in the LTWMF, to confirm the source term volumes and contaminant concentrations used to predict long-term environmental effects.	On-site waste movement occurred from 2022 January 01 to 2022 December 31 (Section 11.1.3).	Volume of waste will be monitored as waste is placed in the cells of the PH LTWMF.
Terrestrial Environment						
Preparation of the LTWMF site will result in temporary loss of vegetation of 3% in Local Study Area and 11% in Site Study Area, with permanent conversion of vegetation communities in 11% of Local Study Area and 47% of Site Study Area. Remediation of sites within Ward 1 will result in temporary loss of 7.6% of	Relocation of the LTWMF storm water management pond out of the wooded area into an area of Cultural Meadow vegetation. Development of new vegetation communities at the LTWMF site, rather than re-establishing pre-construction conditions. Development of a protection	No residual adverse effects.	CNL performed oversight on a regular basis to ensure compliance with the approved Environmental Protection and Management Plans. CNL-approved dust suppressant was used when needed to aid in the dust management for the construction activities.	Verify relocation of stormwater management pond. Verify development of protection and rehabilitation plans for the fen and beach vegetation at the Waterworks site. Verify implementation of erosion and sediment control structures; application of dust	No residual adverse effects.	CNL performed oversight on a regular basis to ensure compliance with the approved Environmental Protection and Management plans. More details of the compliance oversight are discussed in Section 1.4. A Dust Monitoring Program was carried out by an independent contractor (not

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vegetation within Local Study Area and 53% in Site Study Area. Remediation of sites outside the Highland Drive Site Local Study Area will result in temporary loss of 34% (18.3 ha) of vegetation.	and rehabilitation plan for the fen and beach vegetation at the waterworks site. Implementation of erosion and sediment control structures around cleared sites. Application of dust suppression techniques. Rehabilitation of sites after completion of waste removal. Development of a site-specific landscape plan of each work site. Vegetation clearing should not take place in migratory bird habitat during the breeding season. In exceptions, when the breeding season cannot be avoided, an avian biologist will conduct a nest survey immediately prior (e.g., within 2 days) to starting any work potentially impacting migratory bird habitat, to identify and locate active nests of species covered by the Migratory Birds Convention Act. A mitigation plan would be developed to address any potential		Site-specific rehabilitation and landscape plans will be created at the end of the construction and remediation activities.	suppression techniques; and rehabilitation of sites. Verify extent and duration of temporary and permanent loss/change. Confirm that no vegetation clearing is occurring during breeding season. In exceptions, confirm that nest survey was conducted and reviewed. Review site-specific remediation plans to confirm incorporation of structural habitat qualities and variability.		the prime contractor or CNL) for the PH LTWMF activities to ensure that perceived organizational conflicts regarding dust monitoring results and work activities had been avoided. Continuous monitoring occurs during the work hours and results are reported on a 15-minute interval. Any exceedances as identified in *Dust Management and Requirements Plan* [36] are immediately reported to CNL and the Prime Contractor to initiate corrective action. CNL-approved dust suppressant was used when needed to aid in the dust management for the PH LTWMF construction activities. The PH LTWMF site clearing activities were completed from November-March which is outside the migratory bird breeding season for this area.

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	impacts on migratory birds or their active nests and forwarded for review to Environment Canada prior to implementation. Site-specific rehabilitation plans will incorporate features to re-establish structural habitat qualities and variability for sites (including at Sculthorpe Marsh, if its remediation is warranted).					
Terrestrial (Sculthorpe Marsh)	If remediation occurs (in the Marsh), a Protection and Restoration Plan would be developed to ensure no net loss of wetland function, and should include: No excavation into beach bar; Protection of willow trees along public trails, from excavation or onsite movement of machinery; Erosion prevention, and; Accelerated soil stabilization and plant growth.		Not currently applicable, remediation is still being discussed with MPH. A Site-Specific Risk Assessment will be conducted prior to any remediation activities.	Follow-up actions with respect to the Sculthorpe Marsh, including the requirement for its remediation, are the subjects of a separate report. Should remediation of Sculthorpe Marsh be required, EA follow-up monitoring would comprise: Verify development of Protection and Restoration Plan that is acceptable to provincial and federal regulatory agencies. Verify no net loss of wetland functions.	Not currently applicable, remediation is still being discussed with MPH. An MECP approved Site-Specific Risk Assessment will be conducted prior to any remediation activities.	Remediation of Sculthorpe Marsh is still being discussed with MPH. A Site-Specific Risk Assessment will be conducted prior to any remediation activities.
Human Health and Safety						
Workers, Non-Radiological Maximum dust exposures to non-radiological conventional contaminants -	(See *Atmospheric Environmental Component*). Personal protection equipment would be	No residual adverse effects.	CNL reviewed and approved contractor plan for Health and Safety for the PH LTWMF projects.	Monitor compliance with relevant federal legislation related to protection of health and safety.	No residual adverse effects. For construction activities at	Construction contractors are required to adhere to federal and provincial legislation related to the protection of

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within established weighted average criteria (AAQC) for acute 8-hour exposures. For construction activities: annual accident rate of 2.0 to 3.0 Lost time Accidents, and 8.0 to 10.0 Total Recordable Accidents per 100 workers. This equates to 24.4 recordable accidents during construction and development, with 7.3 of the accidents resulting in lost time; 7.8 recordable accidents during site remediation work, with 2.3 of the accidents resulting in lost time. Noise levels would reach 88 to 96 dBA in construction areas.	supplied to mitigate noise effects. All workers would be provided with and required to implement worker protection measures as set out by the Port Hope Site Health and Safety Plan. Implement a policy that all occupational illnesses and injuries are preventable and adopt an operational objective of zero occupational illnesses and injuries (For details, see the specific elements of this policy as listed under Mitigation Measures in Table 11.9.1 of the *PHP Screening Report*) [35]. Implement a Health and Safety Plan procedure and an Environmental Protection Plan protocol to address the demolition of buildings and the appropriate management of debris materials generated from these activities. Notify residents when activities are expected to result in a 6 dBA increase in noise. Establish an operational protocol that will maintain noise levels at the fence line below 70 dBA. Prevent public access to		Construction contractors are required to adhere to federal and provincial legislation related to the protection of health and safety. Compliance oversights occurred during the PH LTWMF activities. An overview of the compliance oversight is in Section 8.1. Implemented a Health and Safety Plan procedure and an Environmental Protection Plan protocol to address the demolition of buildings and the appropriate management of debris materials generated from these activities. Residents were notified when activities were expected to result in a 6 dBA increase in noise. Noise levels at the fence line of the Port Hope LTWMF did not exceed 70 dBA. Public access was restricted to the PH LTWMF site.	Monitor accident rate. Verify the development of an operational policy, and confirm the details conform to the elements proposed as mitigation measures. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of worker health and safety).	the PH LTWMF there were no recordable events in 2022.	health and safety. Compliance oversight occurred during the PH LTWMF activities. An overview of the compliance oversight is in Section 8.1. Incident rates are being monitored (Section 8.1.3). Contractors conducting work on behalf of the PHAI submit health and safety plans, for CNL's review and acceptance, which are consistent with the requirements of the *PHAI OSH Plan* [32]. Noise monitoring was completed by CNL over four campaigns in 2022 around the PH LTWMF. It can be observed that there are some increases in 2022 but below the predicted range of 12 dBA and the *World Health Organization's Guideline for Community Noise* level of 70 dBA over a 24-hour period [39].

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	areas where noise levels may exceed 70 dBA.					
Members of the Public, Non-Radiological Air quality; Noise and Non radiological contaminants: See *Atmospheric Environment Component* for predicted effects; mitigation measures; residual effects after mitigation; and follow-up program features. General Health and Well-being. 22% of people surveyed expect their level of satisfaction with the community to increase with completion of the project; 14%, to decrease.	(See *Atmospheric Environmental Component)* Implement protocols for delivering information to and receiving concerns from, residents to address their concerns for health, sense of well-being, feelings of safety and security and of satisfaction with their community.	Increased stress and adverse effects to health and general well-being resulting from negative changes to people's feelings of health and sense of well-being, feelings of personal security, and feelings of satisfaction with their community.	In 2022, one hundred and seventy-two Tier 1 complaints were received and resolved at the CNL level. Twenty-six Tier 2 complaints were received, eighteen of which were resolved at the CNL level with one escalated to AECL and resolved. The remaining seven complaints carried over into 2023 under active investigation. Public attitude survey was completed in 2018. Next public attitude survey was to take place in 2022 but was postponed due to relicensing.	Monitor communications protocol. Survey members of the public to confirm level of satisfaction with the community.	Public attitude survey was completed in 2018. The next public attitude survey is to take place in 2023.	Since 2002, the CNL has commissioned bi-annual public attitude surveys to monitor public awareness of the PHAI, identify issues and concerns, determine communication needs of the public, and provide data regarding public attitudes. (Section 15.2) discusses PHAI interactions within the community of Port Hope. The next scheduled public attitude survey will take place in 2023.
Workers, Radiological Workers excavating onsite wastes and placing on- and offsite wastes are expected to receive annual radiation doses between 1.6 and 2.7 mSv/a. Workers dewatering sediment during harbour cleanup are expected to receive doses up to 7.6 mSv/a.	(See *Atmospheric Environmental Component*) If necessary, workers would be rotated in and out of positions where there is a risk of receiving a higher dose.	No residual adverse effects.		Monitor radiation doses to confirm accuracy of predictions. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of worker health and safety).	For Port Hope Sites, individual annual doses ranged from 0.01 mSv to 0.59 mSv. The collective radiation dose was 22.47 person-mSv. The average annual dose was 0.01 mSv.	Upon comparison between the actual and predicted doses, the doses exposed to the workers were below the predicted levels. This has proven the mitigation measures were effectively executed.
Members of the Public, Radiological	(See *Atmospheric Environment Component*)	No residual adverse effects.	Remediation activities continued in 2022.	Monitor radiation doses to confirm accuracy of	Fence line gamma dose in 2022 contributed to 0.4% of	The radiation dose to public was measured to be

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During remediation, Ward 1 adjacent residents: radiation dose of 0.074 mSv/a for adult on median diet, 0.16 mSv/a, for infant on upper bound diet. During construction and development, Ward 1 residents: 0.06 mSv/a for an adult, to 0.25 mSv/a, for an infant. Ward 2 residents: 0.12 mSv/a, for an adult on a median diet, to 0.25 mSv/a, for an infant on an upper bound diet.	No additional proposed mitigation.			predictions. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of the health and safety of members of the public).	the annual dose limited for occupational exposures for members of the public of 1 mSv/a. Total dose to the public was assessed with the inclusion of radon exposure at the fence line. A total effective dose was estimated to be 2.8% for occupational exposures for members of the public.	0.02 mSv/a, which is 2% of the annual dose limit for occupational exposures for members of the public of 1 mSv/a (1000 µSv/a).
Cumulative Effect (in the Biophysical Environment)						
Radiological Incremental annual average radon concentrations would be indistinguishable from background at a distance of 2 km; radiological constituents of re-suspended dust would not be measurable beyond approximately 1 km.	(See *Atmospheric Environment Component*).	No residual adverse effects.	Remediation activities continued in 2022.	Verify radon concentrations, radiological constituents of re suspended dust, at distance of 2 km and 1 km, respectively. (Note that this follow-up monitoring requirement is incorporated into the *Atmospheric Environment* follow-up program.)	Radon monitoring commenced at four (4) locations around the PH LTWMF in 2018. These locations were positioned at approximately 2 km distance from the LTWMF Controlled Area fenced boundary. The average radon concentration for 2022 across all locations was calculated to be 10.1 Bq/m^3. The highest noted radon concentration level was 26 Bq/m^3 which is below the environmental trigger level for radon 150 Bq/m^3.	Assessment of average radon concentrations at 2 km will be performed on a quarterly basis to receive better statistics. In 2018 July, CNL deployed a dust fall jar monthly, following the MECP siting requirements, to measure the potential dust deposition at 1 km from the site. The location was approximately 1 km north of the PH LTWMF site. The dustfall jar was deployed until one year of data was collected, in which the EA prediction that radiological constituents of re-suspended dust will not be measurable beyond

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						approximately 1 km from the Site was verified.