1337 Queen Street West, Toronto, Ontario

Risk Assessment

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CreateTO

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Risk Assessment Report

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ACRONYMS/DEFINITIONS

All abbreviated terms in the RA are defined below.

ADI	Allowable Daily Intake
ANSI	Area of Natural or Scientific Interest
APEC	Area of Potential Environmental Concern
ASTM	American Society for Testing Materials
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BV	Bureau Veritas Laboratories
CALA	Canadian Association for Laboratories Accreditation
CCME	Canadian Council of Ministers of the Environment
Cis-1,2-DCE	Cis-1,2-Dichloroethylene
City	City of Toronto
CN^-	Cyanide

COC	Contaminant of Concern
CPU	Certificate of Property Use
CR	Concentration Ratio
Cr (VI)	Chromium VI
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
1,1 DCE	1,1-Dichloroethylene
EC	Electrical Conductivity
ECSM	Ecological Conceptual Site Model
ECxx	Effect Concentration Endpoints
EPC	Exposure Point Concentration
ER	Exposure Ratio
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
EXP	EXP Services Inc.
GWMP	Groundwater Management Plan
HASP	Health and Safety Plan
Hg	Mercury
HHCSM	Human Health Conceptual Site Model
HHRA	Human Health Risk Assessment
HWS-B	Hot Water Soluble Boron
HQ	Hazard Quotient
ILCR	Incremental Lifetime Cancer Risk
J&E	Johnson and Ettinger
LADD	Lifetime Average Daily Dose
LDPE	Low Density Polyethylene Tubing
LOAEL	Lowest Observed Adverse Effect Level
NOAEL	No-Observed Adverse Effect Level
m bgs	Meters Below Ground Surface
MECP	Ministry of Environment, Conservation and Parks
MGRA	Modified Generic Risk Assessment
MNRF	Ontario Ministry of Natural Resources and Forestry
MOL	Ministry of Labour
O. Reg. 153/04	Environmental Protection Act, Ontario Regulation 153/04, Records of Site Condition Part XV.I of the Act
ORP	Other Regulated Parameter
OSWER	Office of Solid Waste and Emergency Response
OTR	Ontario Typical Range
PAH	Polycyclic Aromatic Hydrocarbon
PCA	Potentially Contaminating Activity
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene

pCOC	Potential Contaminant of Concern
PHC	Petroleum Hydrocarbon
POD	Point of Departure
PPE	Personal Protective Equipment
PRB	Permeable Reactive Barrier
PSF	Pre-Submission Form
PSS	Property-Specific Standard (same as Risk Assessment Standard in Regulation)
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action
RDL	Reporting Detection Limit
REM	Reasonable Estimate of the Maximum Concentration (maximum concentration + 20%)
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable Maximum Exposure
RMM	Risk Management Measure
RMP	Risk Management Plan
RPD	Relative Percent Difference
RSC	Record of Site Condition
SAR	Sodium Adsorption Ratio
SARO	Species at Risk in Ontario
SCS	Site Condition Standard (Referring to Tables 1 through 9 in O. Reg. 153/04)
SGMP	Soil and Groundwater Management Plan
SVIMS	Soil Vapour Mitigation System
TCE	Trichloroethylene
TEC	Trafalgar Environmental Consultants
Trans-1,2-DCE	Trans-1,2-Dichloroethylene
TRV	Toxicity Reference Value
UCLM	Upper Confidence Limit on the Mean
UF	Uncertainty Factor
US EPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile Organic Compound
VECs	Valued Ecological Components
WAA	Wider Area of Abatement

1. Summary of Recommendations/Findings

1.1 Risk Assessment Objectives and Approach

EXP Services Inc. (EXP) was retained by CreateTO (the "Client") to conduct a Risk Assessment (RA) for contaminants found in soil and groundwater at the property with the municipal addresses of 1337 Queen Street West in Toronto, Ontario, herein referred to as the "Site" or "RA property". A Site Location Plan is provided as Figure 1 (Appendix B).

The RA was conducted in accordance with Ontario Regulation 153/03 (O. Reg. 153/04) and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Our terms and conditions, the limitation of liability, scope of report, and third-party reliance is outlined in Appendix A.

This RA is considered as an "other" RA (i.e. other than those identified in O. Reg. 153/04 Schedule C Part II) based on the following:

- The RA is not conducted as a "limited scope" RA.
- Due to the Site conditions, the RA cannot be conducted as a Modified Generic Risk Assessment (MGRA or Tier 2).
- The RA is not based on a community assessment report.
- The RA is not conducted as "an estimation of natural local background concentrations".
- The risk assessment is not a "new science" RA. No contaminants of concern (COCs) are identified at the RA property for which there are no applicable Site Condition Standards (SCS). In addition, no new computer models are used that are not available to the public or the Ontario Ministry of the Environment, Conservation and Parks (MECP), and no probabilistic models are applied.
- At this time, it is not expected that the RA will be classified as a "Wider Area of Abatement" (WAA) RA, unless otherwise requested by the District Office.

The Site is located on the south side of Queen Street West, south of the intersection of Queen Street West and O'Hara Avenue (refer to Figure 1 of Appendix B). The Site is irregularly shaped and has an area of approximately 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 square metres (m^2) in area. The Site building is located on the eastern portion of the Site with asphalt paved parking spaces to west and south.

It is EXP's understanding that the Site is to be the Client intends to re-develop the Site with a sixteen (16) storey residential condominium building with a basement level. The basement level and ground floor are proposed to be occupied by community space. Given the intended change to a more sensitive (i.e., most sensitive being residential) land use, a Record of Site Condition (RSC) is required. As such, a Tier 3 RA to address existing contamination is required prior to filing an RSC. The objective of the investigation was to prepare an RA which will support the filing of an RSC in accordance with O. Reg. 153/04, as amended.

Based on a review of historical aerial photographs, chain of title information, and other records in Phase One Environmental Site Assessments (ESAs) by EXP (EXP, 2022a and 2024), the Site was historically addressed as 1331-1343 Queen Street West and was developed with two (2) residential structures since circa 1890. The Site was then developed with a rectangular shaped commercial building circa 1910, which was occupied by various tenants, including the Bank of Commerce, several coal companies, and several battery service centres between 1890 and 1965. In 1966, the Site was redeveloped for commercial use and is currently occupied by Dollarama.

There is no surface water bodies located on or within 30 metres of the RA property. The nearest surface water feature is Lake Ontario, located approximately 950 m to the south/ southeast direction. Based on ground water elevation data, the primary localized groundwater flow in the overburden across the Site was determined to be to the southeast, towards Lake Ontario.

Based on local topography, the predominant groundwater flow direction for the Study Area is determined to be south/southeast towards Lake Ontario.

The RA is not considered an Environmentally Sensitive Area under Section 41 of O. Reg. 153/04 as discussed further in Section 3.3 and the Phase Two CSM (Appendix B), and the applicable generic SCS are those provided in Table 3 of MECP document "Soil, Sediment and Ground Water Standards for Use Under Part XV.1 of the Environmental Protection Act (2011a)" for sites in a non-potable groundwater condition for a residential/parkland/institutional land use with medium/fine grained soil (herein referred to as Table 3 SCS).

The RA was completed in full compliance with the mandatory requirements contained in Table 1: Mandatory Requirements for Risk Assessment Reports contained in O. Reg. 153/04. This RA was required to assess the potential risks associated with exposure to COCs in the soil of the RA property. The Property Specific Standards (PSS) developed via the RA will be utilized in the preparation of a forthcoming RSC for the site.

COCs were identified as any substances which met any of the following criteria:

- Have reported measured concentrations exceeding the applicable MECP (2011a) Table 3 SCS;
- Were detected and have no MECP (2011a) Table 3 SCS value and were identified as potential contaminants of concern (pCOCs)in the Phase One ESAs; or,
- Were detected on the RA property at concentrations within the applicable MECP (2011a) SCS but had laboratory reporting detection limits (RDLs) in excess of the applicable SCS and were identified as pCOCs in the Phase One ESAs.

The CSMs developed for this RA consider soil and groundwater COCs and include:

- A human health conceptual site model (HHCSM); and
- An ecological conceptual site model (ECSM).

The CSMs depict the exposure routes, pathways, and potential receptors, both on and off the RA property. As risk management measures (RMMs) are required for the protection of human and ecological health, HHCSMs and ECSMs are provided to depict exposure routes and pathways both with and without RMM (Figures 25A and 25B, and 26A and 26B for the HHCSMs and ECSMs, respectively).

A human health and an ecological RA were carried out to support PSS developed for the RA property. The RA was conducted using both qualitative and quantitative approaches. A quantitative approach was taken to assess the risks associated with exposure of the most sensitive and significant receptors to the final list of COCs.

The objectives of the human health risk assessment (HHRA) are to:

- Assess the potential risks, if any, related to COCs identified in soil, to potential human receptors associated with the property. This includes on-Site residents, visitors, and workers to the RA property, with and without RMMs in place;
- Identify PSS that are protective of the most sensitive of all potential human receptors that may be present on or off the RA property; and,
- Identify any RMM necessary to mitigate exposures by on- and off-Site human receptors based on the results of the HHRA, if required.

The objectives of the ecological risk assessment (ERA) are to:

- Assess the potential risk of exposure to COCs in soil, to plant, soil invertebrate, avian and mammalian receptors, both on and off the RA property, as well as aquatic receptors in off-Site surface waters, with and without RMMs in place;
- Identify PSS that provide protection to the most sensitive of all ecological receptors; and,
- Identify any RMM necessary to mitigate exposures by on- and off-Site ecological receptors based on the results of the ERA, if required.

1.2 Deviations from Pre-Submission Form

A copy of the Pre-Submission Form (PSF) is provided in the supporting documentation zip file (Appendix H). A copy of the MECP comments on the PSF are included in Appendix D. EXP's responses to the MECP comments have been added in text boxes. An updated zip file containing all available environmental reports, laboratory certificates of analysis for submissions by EXP and borehole logs is also provided in Appendix H of the RA report (provided electronically).

Deviations from the information provided in the PSF are summarized in Table 1 below.

Table 1: Deviations from the Pre-Submission Form

Deviation	Reference
Additional site characterization activities, including a soil and groundwater sampling program and one (1) IAQ sampling event, have been completed at the Site since the submission of the PSF. Trichloroethylene (TCE) in groundwater has now been identified to exceed Table 7 SCS and retained as a COC. The results have been incorporated into the RA.	Risk Assessment - Section 3, Appendix B, Appendix C and Appendix H
The Phase Two CSM has been revised to address the MECP comments and include a summary of the additional site characterization activities that have been conducted since the submission of the PSF	Phase Two CSM (Appendix B)
The ecological Conceptual Site Models have been reviewed and updated as required.	Sections 5, Figures 26A and 26B (Appendix B)

1.3 Risk Assessment Standards

O. Reg. 153/04 requires that a PSS be developed for each COC, which is identified as a contaminant found on, in or under a property with a concentration that exceeds the applicable SCS for the property, or for which no applicable SCS is prescribed. The process of screening for and selection of COCs for this RA is described in Section 3.3.

The PSS for soil and groundwater developed during the RA process are provided in Appendix E (see Tables E6-1 and E6-2). The development of the PSS, and selection of final values using data from the HHRA and ERA, is described in Section 6.1.

1.4 Risk Assessment Assumptions

The RA was conducted, and PSS developed, using the following assumptions:

- For human and ecological receptors, the Table 3 SCS, considered to be protective of a non-potable groundwater condition are suitable for use in the screening of pCOCs in soil and groundwater;
- Human and ecological receptors present on the RA property are reflective of the intended land use outlined in Section 1.1 (residential and community land use);

- Substances that were never detected during Phase Two ESAs, and were not identified as pCOCs in the Phase One ESAs, are assumed not to be present on the property;
- Substances that were detected but for which there are no applicable Table 3 SCS and were considered pCOCs in the Phase One ESAs, are assessed in the RA as COCs; and,
- Maximum COC concentrations found on the RA property are deemed acceptable if no unacceptable risks are identified in the quantitative or qualitative RA, or if RMM are used to block exposure routes and alleviate those risks.

1.5 Risk Management Requirements

As unacceptable risks were predicted for exposure of some human and ecological receptors to impacted soil (Sections 4 and 5), RMM have been recommended for the RA property (Section 7) as follows:

- Potential risks from indoor air vapour inhalation for future residential and/or commercial/community buildings will be mitigated by the implementation of administrative and engineering measures to mitigate vapour intrusion.
- Vapour intrusion RMM are not recommended for the existing on-site commercial building. However, the maintenance of existing building operating conditions is required for the current commercial building. Additionally, changes to the footprint of the existing building are restricted unless it can be demonstrated that there will be no impacts in indoor air concentrations of COCs in soil.
- Potential risks from direct contact of impacted soil for Site residents, Site visitors (recreational and trespasser), terrestrial plants, soil invertebrates, mammals and birds will be mitigated by a soil barrier (hard cap and/or soft cap cover systems).
- Potential risks from direct contact of impacted groundwater will be mitigated by implementation of a pathway-specific health and safety plan (HASP) for construction/subsurface utility workers.
- Potential risks from ingestion of garden produce will be mitigated by an administrative a restriction on planting of fruit and vegetables for consumption unless planted in above ground containers such that they are isolated from the subsurface conditions.
- A soil and groundwater management plan (SGMP) is required to properly manage contaminated soil and groundwater on-Site.

Monitoring and maintenance during construction of a Soil Vapour Intrusion Mitigation System (SVIMS) is required. Furthermore, a pressure differential and indoor air quality/sub-slab soil vapour monitoring program is required for this RMM. For the existing commercial building (i.e. the Dollarama), the monitoring of the building floor slab and HVAC system will be required. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspections.

Monitoring of the soil barrier will be required to ensure the integrity of all barriers, as applicable. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspection of the barriers. Additional details on maintenance, monitoring and possible contingencies are provided in the risk management plan (RMP; Appendix P).

No maintenance or monitoring is required pertaining to the garden produce restriction and the slab-on-grade administrative restriction.

No maintenance is necessary for RMM pertaining to the HASP or SGMP. Monitoring for the HASP and SGMP will be required for the duration of time that the HASP and SGMP are implemented (as a result of exposing impacted soil). Monitoring requirements should be outlined in the HASP and SGMP.

2. Risk Assessment Team Membership

This RA was completed by EXP and the team members, along with their respective areas of expertise, are listed in Table 2.

Table 2: Risk Assessment Team

Discipline	Name
Human Health Risk Assessment	Mr. Shane Ward, B.Sc. (QP_{RA}) Mr. Nuo Heng Kong, M.E.S.
Ecological Risk Assessment	Mr. Shane Ward, B.Sc. (QP_{RA}) Mr. Nuo Heng Kong, M.E.S.
Environmental Chemistry, Geoscience	Ms. Jennifer Hayman, P. Geo. (QP_{ESA})
Hydrogeology	Ms. Jennifer Hayman, P. Geo. (QP_{ESA})
Environmental Engineering	Mr. Eric Wong, P.Eng.

All team members have the necessary experience and expertise to conduct an RA in a manner acceptable to the MECP as shown below. Additional information (including curriculum vitae), related to the qualifications of the EXP team members, is provided in Appendix F. Mandatory certifications signed by the Qualified Person for Risk Assessment ($QP_{RA)}$ are provided in Appendix I.

Shane Ward is the QP_{RA} for this RA.

Mr. Ward has over fourteen (14) years of experience in the areas of human health and ecological risk assessment, fate and transport modelling, risk assessment modeling, project management, due diligence and risk management. He is currently a Senior Risk Assessment Specialist at EXP and provides senior oversight and technical review on risk assessment projects. Mr. Ward has conducted numerous human health and ecological risk assessments for contaminated Sites in Ontario (under Ontario Regulation 153/04, as amended) and across Canada (under Federal Contaminated Sites Action Plan protocols). To date, he has been involved in over twenty (20) RAs that have been successfully accepted by the MECP. He has also conducted over one hundred (100) Screening Level Risk Assessments in Ontario and across Canada to support due diligence and financing purposes. Moreover, he has conducted third-party peer review of O. Reg. 153/04 and due diligence RAs on behalf of local municipalities or clients.

Nuo Heng Kong, M.E.S. was responsible for preparation of the HHRA and ERA.

Mr. Kong graduated from University of Toronto with a Master of Environmental Science degree, having previously completed an Honours Bachelor of Science degree in Environmental Chemistry at University of Toronto. While completing his undergraduate degree, Mr. Kong had the opportunity to work in various scientific positions including Research Chemist in a hydrogen fuel cell research and development lab and Climate Analyst with Environment and Climate Change Canada. Since Joining EXP in 2022, Mr. Kong has been involved in the preparation of various Pre-Submission Forms, Screening-Level Risk Assessments, and Tier 3 Risk Assessments, providing technical support at all stages of human and ecological risk assessment.

Jennifer Hayman, P. Geo., is the QP_{ESA} for the Site and provided support of the Site characterization, geological and hydrogeological interpretation of the Site.

Ms. Hayman is a senior environmental scientist and specialist in the completion of Phase I/One and II/Two ESA and soil and rock management plans for environmental and construction projects. She has 18 years of experience in environmental consulting and is proficient in the interpretation and application of provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended), RSC filing process and working knowledge of O. Reg. 406/19 (Excess Soils). Jennifer has personally completed over 300 Phase I/One ESAs in the private and public sectors, including commercial, agricultural, residential and industrial properties. As a Qualified Person for ESA (QP_{ESA}), Jennifer reviews reports prepared by others including conducting peer review of other consultants reports on behalf of mutual clients.

Mr. Eric Wong is the P.Eng., is the P. Eng. for the Site and oversaw the preparation of the RMP.

Eric Wong has over ten (10) years of experience and is an Environmental Engineer and Senior Project Manager in EXP's Markham Office and started with EXP in 2021. Prior to working at EXP, Eric worked at GHD from 2018 to 2021. Mr. Wong obtained his Bachelor of Science in Engineering Degree from Queen's University in 2009 and is a licensed Professional Engineer (P. Eng.) within Ontario since 2014. He is an experienced environmental engineer, having worked on a variety of environmental assessment, remediation, and risk assessment projects. His current responsibilities include project management, reporting, QA/QC and client liaison with a multitude of clients (private and public sectors). Eric manages and coordinates Phase I and II/One and ESAs, in-situ and ex-situ remediations, risk assessments, excess soil management, demolitions and hazardous materials/designated substances surveys/abatements.

3. Property Information, Site Plan and Geological Interpretation

3.1 Property Information

The RA property is located on the south side of Queen Street West, south of the intersection of Queen Street West and O'Hara Avenue. The Site is irregularly shaped and has an area of approximately 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 m^2 in area. The Site building is located on the eastern portion of the RA property with asphalt paved parking spaces to west and south. The site location plan is shown in Figure 1.

The legal description, PIN, and assessment roll number of the RA property is provided in Table 3, below.

Table 3: RA Property Description Summary

Municipal Address	Legal Description	PIN	Assessment Roll Number
1337 Queen Street West, Toronto, ON	All of Lot 5 and Part of Lots 4, 6 and 92 on Plan 382 Parkdale, designated as PART 1 on Plan 66R-33321, being the whole of PIN 21302-0043(LT)	21302-0043 (LT)	19-04-021-290-03700

A Survey Plan prepared by Land & Property Surveys is attached as Appendix J. A lawyer's letter stating the name of the property owner and the legal description of the RA property (including PIN and assessment roll number) is also included in Appendix J.

Based on a review of historical aerial photographs, chain of title information, and other records in Phase One ESA by EXP (EXP, 2022a and 2024), the Site was historically addressed as 1331-1343 Queen Street West and was developed with two (2) residential structures since circa 1890. The Site was then developed with a rectangular shaped commercial building circa 1910, which was occupied by various tenants, including the Bank of Commerce, several coal companies, and several battery service centres between 1890 and 1965. In 1966, the Site was redeveloped for commercial use. It is currently occupied by Dollarama.

It is EXP's understanding that the Site is to be the Client intends to re-develop the Site with a sixteen (16) storey residential condominium building with a basement level. The basement level and ground floor are proposed to be occupied by community space. Given the intended change to a more sensitive land use (i.e., residential and community), an RSC is required. The RA will support the filing of the RSC and will be completed in accordance with O. Reg. 153/04. It is possible the existing commercial use building (i.e. Dollarama) may remain in operation until redevelopment. As such, potential risks to occupants of the existing commercial use building will be evaluated in the RA.

Surrounding properties include mixed residential, commercial, and community land uses to the north and west; commercial land use to the east; and mixed residential, community, and parkland land uses the south. Surrounding land uses are shown in Figure 2. Therefore, relevant off-Site human receptors include property residents (including toddlers), property visitors (recreational and trespasser), long-term indoor workers, and outdoor maintenance workers. Construction/subsurface utility workers are also considered present due to potential redevelopment activities as well as potential for utility maintenance. The nearest off-Site terrestrial receptors for soil COCs are terrestrial plants, invertebrates, mammals, and birds which may frequent the surrounding properties as well as aquatic receptors within Lake Ontario, located approximately 950 m south/southeast of the Site.

The history and characterization of the property is summarized in the Phase One Summary provided in Appendix K. Electronic copies of the Phase One ESA reports or similar documents reports are provided in the zip file presented as Appendix H.

The QP_{ESA} determined that select potentially contaminating activities (PCAs) may contribute to an area of potential environmental concern (APEC) for the property, while several PCAs were determined to not contribute to an APEC at the Site due to various factors including, but not limited to, relative distance to the Phase One Property/Site, orientation to the Phase One Property/Site: degree and nature of PCA operations, potentially impacted media, etc. The PCAs are listed below:

- PCA#6 – Battery Manufacturing, Recycling and Bulk Storage
- PCA#8 – Chemical Manufacturing, Processing and Bulk Storage
- PCA#11 – Commercial Trucking and Container Terminals
- PCA#28 – Gasoline and Associated Products in Fixed Tanks
- PCA#29 – Glass Manufacturing
- PCA#30 – Importation of Fill Materials of Unknown Quality
- PCA#31 – Ink Manufacturing, Processing and Bulk Storage
- PCA#32 – Iron and Steel Manufacturing and Processing
- PCA#33 – Metal Treatment, Coating, Plating and Finishing
- PCA#34 – Metal Fabrication
- PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)
- PCA#39 - Paints Manufacturing, Processing, and Bulk Storage
- PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing
- PCA#45 – Pulp, Paper and Paperboard Manufacturing and Processing
- PCA#47 – Rubber Manufacturing and Processing
- PCA#48 – Salt Manufacturing, Processing and Bulk Storage
- PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems
- PCA#55 – Transformer Manufacturing, Processing and Use
- PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products
- PCA 'Other' – Spill
- PCA ‘Other’ – Coal Storage
- PCA 'Other' – Salt Application
- PCA 'Other' – PCB Storage

All other PCAs identified within the Phase One Study Area are considered *de minimis* and therefore do not contribute to an APEC on-site (see Appendix B for additional details). The locations of the PCAs are shown on Figure 2. Off-site PCAs that are considered to be *de minimis* are shown in green on Figure 2.

Based on the evaluation of the PCAs located within the Phase One Study Area, APECs were identified, as presented in Figure 4:

- APEC 1a: Importation of Fill Material of Unknown Quality
- APEC 1b: Historic Industrial Operations
- APEC 1c: Historic Industrial Operations
- APEC 1d: Salt Application
- APEC 2: Off-Site PCAs to the west (historic dry-cleaners, historic underground storage tanks [USTs], and vehicle maintenance)
- APEC 3: Off Site PCAs to the east (historic USTs, gasoline service station, vehicle maintenance, and manufacturing)
- APEC 4: Off Site PCAs to the north (historic manufacturing, USTs, vehicle maintenance, dry cleaning)

Based on the identification of APECs in the Phase One ESAs, several Phase Two ESAs were conducted. The findings from the Phase Two ESAs are summarized in Appendix K, and the Phase Two CSM is provided in Appendix B. The purpose of the report was to assess the potential for soil and groundwater impacts associated with each APEC and the extent of these impacts. Copies of the previous reports, where available, are provided on the zip file provided in Appendix H.

Based on the findings of the Phase Two ESA, the petroleum hydrocarbon (PHC), volatile organic compounds (VOC), polycyclic aromatic hydrocarbon (PAH), and metal impacts identified in soil and/or groundwater on Site will need to be addressed during or prior to future redevelopment activities, through the Risk Assessment process, following which a Record of Site Condition can be filed. The specific areas of impact are shown in Figures 7 to 24 of the Phase Two CSM (Appendix B). Further details of each COC are presented in Section 3.2 of the Phase Two CSM (Appendix B).

3.2 Site Plan and Hydrogeological Interpretation of RA Property

The following ESAs were completed for the RA property, and the findings were summarized in the following reports:

1. Trafalgar Environmental Consultants. 2022. Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario, dated May 20, 2022.
2. EXP Services Inc. 2022a. Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub), dated December 7, 2022.
3. EXP Services Inc. 2022b. Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub), dated December 9, 2022.
4. EXP Services Inc. 2024. Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub), dated July 4, 2024.
5. EXP Services Inc. 2025a. Supplemental Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub), In progress.
6. EXP Services Inc. 2025b. DRAFT PRB Installation Oversight, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub), In progress

All the above-mentioned environmental reports were available for review by EXP and are included in Appendix H, with the exception of the EXP (2025a) Phase Two ESA and the EXP (2025b) PRB Oversight reports, which are currently in progress. The locations of all boreholes and groundwater monitoring wells are shown on the Borehole /Monitoring Well Location Plan presented in Figure 5A.

3.2.1 Geology

Regional Geology

The Site and surrounding areas are expected to consist of Glaciolacustrine deposits that predominantly consist of sand, gravelly sand and gravel, nearshore and beach deposits from the Pleistocene era. The bedrock in the general area of the Site is part of a group belonging to the Georgian Bay Formation; Blue Mountain Formation; Billings Formation; Collingwood Member; and Eastview Member consisting of shale, limestone, dolostone, ad siltstone.

According to the topographic map from Natural Resources of Canada (Toporama), the elevation of the Site is approximately 97 m above sea level. A review of the topographic map indicated that the closest body of water is Lake Ontario, which is situated approximately 950 m south/southeast of the Site. Based on the information available at the time of this Phase One ESA, the inferred direction of groundwater flow in the area of the Site is expected to be in a south/southeast direction.

Local Geology

The soil investigation conducted at the Site for the environmental assessment consisted of the advancement of a total of twenty-two (22) boreholes into the fill material and the underlying native materials to a maximum depth of 18.77 mbgs. The borehole logs describing geologic details of the soil cores recovered during the Site drilling activities are presented in Appendix H. Boundaries of soil indicated on the log sheets are intended to reflect transition zones for the purpose of environmental assessment and should not be interpreted as exact planes of geological change.

A brief description of the soil stratigraphy at the Site, in order of depth, is summarized in the following sections.

At each of the boreholes, with the exception of BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114, a surficial pavement structure layer, comprising of asphalt ranging in thickness between 75 to 160 mm, followed by granular base material ranging in thickness between 100 to 228 mm.

At BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114, a surficial concrete layer was encountered with a thickness ranging between 100 to 160 mm, followed by a granular base material ranging in thickness between 100 to 315 mm. It is noted that BH/MW113 and BH/MW114 were located within the building.

A fill unit was encountered below the pavement structure in each of the boreholes and extended to depths of between 0.20 m to 2.29 m below ground surface (m bgs). The fill was brown to dark brown and grey in colour and composed of sandy silt to silt with some clay and gravel and/or clayey silt to silty clay with some sand and gravel. A trace amount of brick fragments and/or wood chips were observed in BH/MW2-D, BH/MW3-D, BH106, BH/MW113, BH/MW102 and BH/MW103, respectively. Black staining was observed in BH108.

A deposit of native silt was encountered below the fill material at all borehole locations, with the exception of BH/MW3-S. The silt layer ranged in depth of approximately 0.76-8.23 m bgs. The silt was brown or grey in colour and contained a trace of sand, some clay, and a trace of gravel.

Silty clay was encountered in BH/MW3-D below the fill, extending to a depth of 6.1 m bgs. It was brown in colour and contained a trace of sand.

Silty sand till was encountered below the silt at all borehole locations, with the exception of BH/MW104, BH/MW105, BH105A, BH/MW1-S, BH/MW2-S, BH/MW3S, BH/MW3D and BH108. The till extended to the termination depth or until shale bedrock was encountered at a maximum depth of 15.24 m bgs. The sandy silt till was brown to grey in colour, wet, and contained trace clay and gravel.

During the drilling investigation, shale bedrock was encountered in BH/MW1-D, BH/MW2-D, BH/MW3-D, BH/MW101, BH/MW102, and BH/MW103 during the advancement of boreholes at a maximum depth of 18.77 m bgs. Assumed bedrock was tri-coned at BH/MW101, BH/MW102, and BH/MW103.

3.2.2 Hydrology

There is no surface water bodies located on or within 30 metres of the RA property. The nearest surface water feature is Lake Ontario, located approximately 950 m to the south/ southeast.

The topography in the vicinity of the subject property is relatively flat. The Ontario Base Map Series does not provide coverage of downtown Toronto. Based on the information available at the time of this Phase One ESA, the inferred direction of groundwater flow in the area of the Site is expected to be in a south/southeast direction.

3.2.3 Hydrogeology

Groundwater levels within the overburden were measured on various dates between October 26 and November 29, 2024. The depth to groundwater within the overburden ranged between approximately 4.50 m bgs (BH/MW2-D) and 6.88 m bgs (MW109). Groundwater elevations ranged between 89.785 meters above sea level (m asl) (MW113) and 91.694 m asl (MW2-D).

Groundwater levels within the bedrock were measured on March 11 and March 13, 2024. The depth to groundwater ranged between 6.29 m bgs (MW102) and 15.08 m bgs (MW101). Groundwater elevations ranged between 81.206 m asl (MW101) and 89.825 m asl (MW102).

Based on the groundwater contour map (overburden) delineated for the Site, it is expected that the groundwater in the overburden is anticipated to flow in a southeastern direction at the Site. A groundwater contour map (overburden) is presented in Figure 6A.

Based on the groundwater contour map (bedrock) prepared for the Site, the groundwater in the bedrock flows in a north to northeastern direction at the Site. The groundwater contour map (bedrock) is presented in Figure 6B.

The horizontal hydraulic gradients were calculated based on groundwater contours, provided in Figure 6A. Results of groundwater monitoring activities indicate the horizontal hydraulic gradient on-Site ranged from 0.040 m/m (between BH/MW2-D and BH/MW1-D) and 0.067 m/m (between BH/MW3-D and BH/MW2-D) within the burden. On the other hand, the horizontal hydraulic gradient on-Site ranged from 0.030 m/m (between BH/MW102 and BH/MW103) and 0.204 m/m (between BH/MW101 and BH/MW103) in the bedrock.

3.2.4 Subsurface Structures and Utilities

The utilities and services were identified at the site based on information provided in environmental records, relevant utility infrastructure observed during the site reconnaissance, and public and private locates completed at the site. Given minimum depth to groundwater was measured at approximately 4.50 mbgs, it is possible that local groundwater flow conditions would be influenced by the underground utilities at the site. The utilities and services identified at the site are listed below in Table 4.

Table 4: Locations of Utilities On-Site

Utility	Source	Location	Site Entry
Natural Gas	Enbridge Gas	Underground	Enters Site building on the southern side
Sanitary Sewer	City of Toronto	Underground	Enters Site Building at the southeast corner and runs east to west in the southern portion of the Site.
Storm Sewer	City of Toronto	Underground	Catch basin located in the southern portion of the Site, southeast of the Site building.
Water	City of Toronto	Underground	Enters Site building on the northern exterior
Electricity	Toronto Hydro	Overhead	Enters Site from the north boundary and the Site building along the southwest exterior.
Telecommunications	Unknown	Unknown	Enters Site Building at the southeast corner.

The location of the utilities and services are shown in Figure 3.

3.3 Contaminants of Concern

O. Reg. 153/04 outlines the specific criteria that determine the selection of appropriate SCS for screening COCs. Results of prior ESAs have indicated the presence of pCOCs in the soil of the RA property. The screening process for the selection of COCs in the RA was based on three (3) criteria: (1) the maximum on-site concentration exceeds the applicable SCS; (2) no SCS exists and the parameter cannot be screened for exclusion based on Ontario Typical Range (OTR) or other background values; or (3) the parameter was not detected at concentrations in excess of analytical RDLs, however, the RDLs exceed the applicable SCS. The evaluation of the third criterion also took into consideration the potential for the chemical constituent to have been used at the site and the factors affecting the RDLs.

3.3.1 Selection of Appropriate Site Condition Standards

Using the following evaluation criteria, EXP determined the appropriate SCS for the property per O. Reg. 153/04:

Is the site within 30 metres of a water body?

The site is not located within 30 metres of a water body. The nearest surface water body to the site is Lake Ontario, located approximately 950 m south/southeast of the site.

Is this a shallow soil site?

The site is not within shallow soil condition shale bedrock was encountered in BH/MW1-D, BH/MW2-D, BH/MW3-D, BH/MW101, BH/MW102, and BH/MW103 during the advancement of boreholes at a maximum depth of 18.77 m bgs in the environmental investigations (EXP, 2024b). Given that more than two-thirds of the site has overburden greater than 2 metres in thickness, and the site is not considered to be within a shallow soil condition, as per O. Reg. 153/04, Section 43.1.

What is the soil pH?

The Table 3 SCS criteria are applicable if soil pH is in the range of 5 to 9 for surface soil (less than 1.5 m below soil surface) and 5 to 11 for subsurface soil (greater than 1.5 m below soil surface).

Therefore, the site is not considered to be a "Sensitive Site" as per O. Reg. 153/04, Section 41.

Is the property located within or adjacent to an area of natural significance?

Information available on the MNRF website and the City of Toronto Official Plan (2024) indicated that the site is not located on or within 30 metres of any areas of natural significance as defined by O. Reg. 153/04 as follows:

1. An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006.
2. An area of natural and scientific interest (ANSI; life science or earth science) identified by the Ministry of Natural Resources as having provincial significance.
3. A wetland identified by the Ministry of Natural Resources as having provincial significance.
4. An area designated by a municipality in its official plan as environmentally significant.
5. An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act.
6. Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies.
7. An area set apart as a wilderness area under the Wilderness Areas Act.

To determine whether threatened or endangered species may frequent the site, MNRF "Make a Map: Natural Heritage Areas" listings were searched for threatened or engendered species. The map is divided into one (1) -square-kilometer quadrants in which species at risk can be searched. As such, two (2) quadrants that included the site and within 250 metres of the site boundaries were searched (i.e., 17PJ2633 [Site] and 17PJ2632). Using the SARO status as a criterion, species that were found to be threatened or endangered within these quadrants are tabulated below.

Table 5: Threatened and Endangered Species In and Around the Site

Common Name	Scientific Name	SARO Status	Grid Identifier	Habitat[1]
Queensnake	*Regina septemvittata*	Endangered	*17PJ2633 (Site)* *17PJ2632*	Queensnakes are most commonly found in stream or river habitats, with rock or gravel in the channel and along the banks to provide cover; however, they can less commonly be found in marshes, ponds, lake shores, and quarries. They

Common Name	Scientific Name	SARO Status	Grid Identifier	Habitat[1]
				require permanent still or flowing bodies of water with temperatures at or above 18˚C for most of the active season and a large population of crawfish. They are usually confined to within 3 metres of a shoreline.
Chimney Swift	*Chaetura pelagica*	Threatened	*17PJ2633 (Site)* *17PJ2632*	Chimney Swift mainly used large hollow trees for nesting and roosting, before urbanization and have since adopted chimneys and other man-made structures for both nesting and roosting. These birds typically concentrate near water where insects (main food source) are abundant.
Piping Plover	*Charadrius melodus*	Endangered	*17PJ2632*	Piping Plovers nest exclusively on dry sandy or gravelly beaches just above the reach of high water and waves. When not migrating, this bird spends virtually all of its time between the water's edge and the back of the beach.
Eastern Meadowlark	*Sturnella magna*	Threatened	*17PJ2632*	The Eastern Meadowlark prefers grassland habitats, including native prairies and savannahs as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows, and airfields. Nests are built in depressions in the ground, in well-concealed areas of grasslands.

[1] Habitat requirements obtained from MECP Ontario Species at Risk website (Published 2018, Updated 2025).

Although the endangered/threatened species above were found to be within or adjacent to the 1 km quadrant comprising the site, none were retained as viable species currently inhabiting the site, or properties within 250 metres of the site. A rationale is provided for each of the species in Table 6, below.

Table 6: Rationale for Exclusion of Sensitive Species Habitat

Common Name	Habitat Present On-Site	Habitat Present Off-Site[1]	Rationale
Queensnake	No	No	Given there are no water bodies on or in the vicinity of the Site, this species was not retained as viable species inhabiting the site or within 250 metres of the Site. Given the current commercial use of the Site within a highly developed area, suitable habitat is not present on, or around the Site and it is not anticipated that this species be present on-Site or within the surrounding properties.
Chimney Swift	No	No	Given that the Chimney Swift nests and roosts in chimneys and other man-made structures, it is considered possible that this species may be present on-Site or within 250 metres of the Site. However, given that the Site is in a highly urban area and the closest surface water body is located 950 m south of the Site, there are no suitable food resources available at the site or within 250 metres of the Site. Therefore, the presence of this species is considered low and are not considered a valued ecological component (VEC) in the ERA.

Common Name	Habitat Present On-Site	Habitat Present Off-Site[1]	Rationale
Piping Plover	No	No	Given that the Site is in a highly urban area and the closest surface water body is located 950 m south of the Site, there are no suitable food resources available at the site or within 250 metres of the site. Given there are no water bodies on or in the vicinity of the Site, this species was not retained as viable species inhabiting the site or within 250 metres of the Site.
Eastern Meadowlark	No	No	As the Site has been used for industrial and/or commercial uses since the early 1900s and is located within a highly urban area, no habitat is considered to be present for the Easter Meadowlark on-Site or within 250 metres of the Site. Therefore, the Eastern Meadowlark is not considered a VEC in the ERA.

[1]Off-Site refers to properties within 30 metres of the Site boundary.

Is groundwater used for potable purposes?

The area is fully serviced with municipal water supplied by the City of Toronto. The City obtains its water supply from Lake Ontario, which is located approximately 950 m south/southeast of the RA property. A request letter for applying non-potable groundwater use for the purposes of filing RSC was sent to the City of Toronto on May 15, 2024. The City of Toronto has provided a response to the request for the application of non-potable groundwater use and has no objection to use the non-potable standard accordance to O.Reg. 153/04, as amended. The letters to the City and the City's responses are attached in Appendix H.

What is the soil texture?

The predominant soil type on the Site is considered to be medium and fine textured, as per the soil description identified in the borehole logs in Appendix H, and the results of the grain size analyses included in Appendix N.

What is the intended land use of the RA property?

Development plans have not been finalized, but the Site is intended to be re-developed with a sixteen (16) storey residential condominium building with a basement level. The basement level and ground floor are proposed to be occupied by community space. The intended land use of the RA property will be mixed residential and community land use.

Which depth of soil restoration will be used?

The RA considers a full depth soil condition for evaluation of the risks associated with COCs.

Conclusion

Based on the above information, the appropriate generic remediation Standards for the site were determined to be Table 3 Generic SCS for a residential/parkland/institutional land use with medium/fine textured soil in a non-potable groundwater condition, as listed in the MECP technical document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* referenced by O. Reg. 153/04.

As discussed in Section 3.2.3, the shallowest depth to groundwater (from grade) at the Site is approximately 4.50 mbgs. Based on the proposed one level of basement, there may be less than 1 m separating the basement floor slab and the groundwater table. As such, this scenario is not consistent with the assumptions applied by the MECP in the evaluation of the indoor air vapour intrusion pathway using the Johnson and Ettinger (J&E, 1991) approach under the Table 3 SCS. As such, pCOCs that were considered sufficiently volatile for vapour inhalation pathways (Henry's Law constants greater than 1.0E-05 atm-m^3/mol at the average groundwater temperature of 15^{o}C and/or a vapour pressure greater than 1 Torr (MECP, 2019) were also screened against the Table 7 SCS (applicable to Sites with shallow groundwater). The Table 7 SCS is considered suitable as it is considered protective of Sites where biodegradation cannot be assured, and soil may not provide attenuation (MECP, 2011c).

If the maximum detected concentrations of the identified chemical constituents, found in environmental media from the RA property, were below the Table 3 SCS (or Table 7 SCS for volatile groundwater parameters), these substances were not identified as COCs and are considered to not pose unacceptable risks to human and/or ecological receptors. However, if the maximum analytical results for soil or groundwater exceed the Table 3 SCS (and/or Table 7 SCS for volatile groundwater parameters), these substances are considered COCs and PSS will be set based on other jurisdictions, a qualitative RA, or a quantitative RA approach. Substances with reported measured concentrations within the applicable Table 3 (and/or Table 7 SCS for volatile groundwater parameters), but for which the laboratory RDL was greater than the Table 3 (and/or Table 7 SCS for volatile groundwater parameters), were also considered COCs, and a PSS was derived.

3.3.2 Selection of Contaminants of Concern in Soil

COCs in soil were screened by comparing maximum concentrations reported from the ESAs to the Table 3 SCS. The screening of COCs in soil was based on the analytical results presented in the investigative reports listed in Section 3.2. The screening of PHCs, VOCs, PAHs, metals (including hydride-forming metals), and ORPs (including HWS-B, Cr VI, Hg, CN^-, electrical conductivity [EC], and sodium adsorption ratio [SAR]) in soil is summarized in Table 1 of contaminant inventory in Appendix C. The analytical data for all parameters measured in soil are provided in Tables 3 to 7 of Appendix C.

Based on soil samples collected from the RA property, the following COCs were identified:

VOCs:

- Tetrachloroethylene (PCE)

PAHs:

- Acenaphthylene
- Anthracene
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(ghi)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- 1- and 2-Methylnaphthalene
- Naphthalene
- Phenanthrene
- Pyrene

Metals:

- Lead

It is noted that elevated levels of EC and SAR were identified in soil and are deemed to be associated with the application of de-icing and salting substances on the site and on Queen Street West and Cowan Avenue, located immediately adjacent to the site. As per Section 49.1 (1) of O. Reg. 153/04, as amended, it is the QPESA's opinion that the applicable Table 3 SCS for EC and SAR at the site were exceeded solely because salt was used on-site and the adjacent roadways for the purpose of keeping the roadways safe for traffic under conditions of snow, ice, or both. Therefore, these parameters were not considered COCs and are deemed to not be in exceedance of the MECP Table 3 SCS.

The following RDL exceedances were also identified:

VOCs:

- Bromomethane
- Carbon Tetrachloride
- 1,4-Dichlorobenzene
- 1,2-Dichloroethane
- 1,1-Dichloroethylene
- 1,2-Dichloropropane
- 1,3-Dichloropropene
- Ethylene Dibromide (1,2-Dibromoethane)
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- Vinyl Chloride (VC)

It is noted that various soil VOCs, analyzed in soil sample BH3 SS8, had RDL exceedances above the Table 3 SCS. Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a RA. Refer to Appendix B for additional details.

Analytical results for soil are presented in Figures 7 through 13. A summary of each area of contamination in soil is presented in Table 11 of the Phase Two CSM (Appendix B).

3.3.3 Selection of Contaminants of Concern in Groundwater

COCs in groundwater were screened by comparing maximum measured concentrations or maximum RDLs to the Table 3 SCS. The screening of PHCs, VOCs, PAHs, metals (including hydride-forming metals), ORPs, and PCBs in groundwater is summarized in Table 2 of contaminant inventory in Appendix C. The analytical data for all parameters measured in groundwater are provided in Tables 8 to 13 of Appendix C.

Based on soil samples collected from the RA property, the following COCs were identified:

VOCs:

- cis-1,2-Dichloroethylene (cis-1,2-DCE)
- trans-1,2-Dichloroethylene (trans-1,2-DCE)
- PCE
- Trichloroethylene (TCE)
- VC

The following volatile groundwater parameters in groundwater had measurable maximum detected concentrations or highest detection limit within the Table 3 SCS, but exceeded the Table 7 SCS (considered suitable for assessment of Sites with a shallow water table), and will also be carried forward as COCs in the RA:

- PHC F1

As such PHC F1 was retained as a groundwater COC for further evaluation in the RA.

Under O.Reg.153/04, the MECP framework requires the consideration of the degradation of the parent compounds of VC (i.e., PCE, TCE, cis-1,2-DCE, trans-1,2-DCE and 1,1-dichloroethylene (1,1-DCE). As such, using the maximum measured concentrations of the parent compounds of VC, a maximum predicted concentration was calculated for VC in groundwater using the following formula:

Predicted [VC] = ((max[PCE] + max[TCE] + max[cDCE] + max[tDCE] + max[1,1-DCE]) * 10% + max[VC])

Therefore, using the abovementioned formula, the theoretical maximum concentration of vinyl chloride is 555.5 µg/L, which is the concentration used in the RA.

Analytical results for groundwater are presented in Figures 14 through 20. A summary of each area of contamination in groundwater is presented in Table 12 of the Phase Two CSM (Appendix B).

3.3.4 Sampling Programs

Intrusive sampling programs were conducted at the RA property to evaluate soil and groundwater quality for potential impacts based on the APECs identified during the Phase One ESAs and similar documents, provided in Appendix H. The locations of the PCAs are identified in Figure 2. The APECs resulting from on- and off-site PCAs are presented in Figure 4.

Phase Two ESA field work completed between 2022 and 2025 by Trafalgar Environmental Consultants (TEC) (TEC, 2022) and EXP (EXP, 2022b and 2025a), are relied on in preparation of this RA, involved in the advancement of boreholes within each APEC. Select borehole locations were completed as groundwater monitoring wells. Soil and groundwater samples were collected for pCOCs to characterize and delineate soil and groundwater impacts at the site.

This RA was based on the cumulative results of the chemical analyses reported for the soil and groundwater samples collected across the RA property by Trafalgar Environmental Consultants (TEC, 2022) and EXP (EXP, 2022b, 2025a and 2025b). A discussion this sampling program that was relied upon in the RA is presented in Appendix K. The raw data tables presenting the soil and groundwater analytical results for all parameters measured on-site are provided In Appendix C. The locations of boreholes and monitoring wells are presented in Figure 5A. Assessment of APECs are summarized in the Phase Two CSM (Appendix B). A summary of the total number of samples collected per parameter group for soil and groundwater are presented in Tables K-2 and K-3 of the Phase Two ESA Summary (Appendix K), respectively.

Complete electronic copies of the Phase Two ESAs and other investigative reports, where available, are provided in Appendix H.

3.3.5 Quality Assurance and Quality Control

QA/QC measures were implemented during all supplemental sampling and analysis programs, to ensure the collection of high-quality data that met the objectives of the RA.

3.3.5.1 Project Quality Management

The EXP sampling programs were performed in accordance with the MECP document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996 (MECP, 1996) and O. Reg. 153/04.

As part of the EXP sampling programs, analyses were performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for groundwater developed by EXP were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, on-going, EXP training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analyses were performed using generally accepted principles in accordance with the MECP document Protocol for Analytical methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (Protocol) (MECP, 2011b).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic Standards, as defined in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011a). This included providing written instruction to the participating analytical laboratory describing the required analyses on a Chain of Custody prepared and delivered with the samples.

3.3.5.2 Field Quality Assurance/Quality Control

The EXP soil and groundwater sampling plans were prepared and executed based on previous environmental investigations conducted at the RA property.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by EXP. EXP field sampling QA/QC protocols are tailored to the investigations and include, where appropriate:

- The collection of at least one (1) field duplicate sample for soil and groundwater (where ten (10) or more such samples are collected);
- Use of dedicated sampling equipment – bailer, LDPE tubing for low flow sampling, latex gloves, nylon string;
- Thorough cleaning of groundwater level measuring meter using soap and water, followed by a distilled water rinse and a methanol rinse. Equipment is allowed to air dry between sampling locations; and,
- Inclusion of one (1) trip blank for volatiles in groundwater analyses.

A trip blank was submitted for each groundwater sampling event, all samples were below the laboratory RDL for all VOCs analyzed as discussed in Appendix K.

3.3.5.3 Laboratory Quality Assurance/Quality Control

EXP contracted Bureau Veritas (BV) Laboratories (formerly Maxxam Analytics) laboratories, for analytical testing of soil and groundwater at the site. The laboratories performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol (MECP, 2011b).

EXP has accepted the data provided by BV Laboratories based on their assurance that, at minimum, the following requirements have been met and documentation to demonstrate compliance can be produced upon request:

- The method performance criteria in the Protocol were met;
- Sampling storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from EXP staff;
- The results of all laboratory QC samples were within statistically determined control limits; and,

- Certificates of Analysis with all the QA/QC sample data, has been received from the laboratory and is included within the appropriate reports in Appendix H.

A summary of the soil and groundwater samples collected during the Phase Two ESAs is provided in the Phase Two ESA Summary in Appendix K. Appendix K also includes a summary of the RPDs of the soil and groundwater field duplicate samples collected during the Phase Two ESAs.

QA/QC programs were also carried out by BV Laboratories to evaluate the accuracy of the data. As part of the laboratory's analytical program, standard laboratory QA/QC protocols were accepted which included the analysis of method blanks, matrix spikes and 10% replicates for every sampling batch.

The following QA/QC analyses were conducted for soil and groundwater analyses, were applicable:

- Laboratory Duplicates / Laboratory Control Sample Duplicates;
- Surrogate Standard Recovery;
- Matrix Spikes;
- Method Blanks; and,
- Method Blank Spikes.

3.3.6 Adequacy of Data

The Phase Two ESA completed by EXP was conducted at the RA property to assess the quality of soil and groundwater within each APEC identified in EXP's Phase One ESA. The analytical data from Phase Two ESA was assessed by EXP with respect to the evaluation of the APECs and potential data gaps. Based on this review, it is the opinion of the QP_{ESA} and QP_{RA} that the sampling program is adequate for the RA objectives.

Based on the APECs identified in the Phase One ESA and Phase One ESA Update (EXP, 2022a; 2024), boreholes were advanced and soil samples were collected to assess for pCOCs that may have been associated with these activities. Groundwater monitoring wells were installed in select boreholes and screened at specific intervals for the collection of groundwater samples to assess for pCOCs. The rationale for the selection of the investigative locations and the laboratory chemical analyses was presented in the previous reports provided in Appendix H, where available. The selected analytical test groups were considered appropriate to assess site conditions based on past activities and the chemicals potentially used or handled at the site, or that may potentially have been transported to the site via groundwater migration.

This RA was based on the cumulative results of the chemical analyses reported for the soil and groundwater samples collected across the RA property between 2022 and 2025.

The analytical data tables presenting the soil and groundwater analytical results for all parameters measured on-site are provided in Appendix C. A summary of the sampling frequency is provided in Tables K-2 and K-3 for soil and groundwater, respectively, in the Phase One and Two Summary (Appendix K).

The soil and groundwater sampling programs conducted at the RA property facilitated the evaluation of the potential presence of COCs associated with the APECs. The coverage of the Site soil and groundwater sampling program was sufficient to define the extent and magnitude of the COCs that were identified at the site. Overall, it is the opinion of the QP_{ESA} that the extent of the sampling and the quality of the soil and groundwater data obtained was sufficient to meet the objectives of the RA for the following reasons:

- All APECs identified in Phase One ESA have been assessed;

- Soil and groundwater impacts have been sufficiently delineated horizontally and vertically;
- Site geology and hydrogeology have been sufficiently characterized; and,
- QA/QC measures were in place during EXP sampling and based on the results of the QA/QC, the quality of the data was considered sufficient to meet the objectives of the RA.

4. Human Health Risk Assessment (HHRA)

The HHRA follows the standard RA process: Problem Formulation, Exposure Assessment, Hazard Assessment, and Risk Characterization.

Problem Formulation

The first stage of HHRA is problem formulation. It involves the collection of data and definition of the areas of concern to be evaluated in the HHRA. The main components of problem formulation include:

1. Site characterization, as described in Sections 3.1 and 3.2. This involves the collection and review of data that can influence the transport and availability of COCs to potential receptors, such as geological and hydrogeological information of the RA property.
2. Chemical characterization, as described in Section 3.3. This involves the identification of COCs based on the chemical analytical data collected from the RA property.
3. Receptor characterization, which will be discussed in Sections 4.1 and 4.2. This involves the identification of receptors of concern – receptors with the greatest probability of exposure to the COCs and/or are more sensitive to the COCs.
4. Exposure pathway characterization, which will be discussed in Section 4.2. This involves the identification of the relevant pathways of exposure, based on the COCs chemical properties, such as volatility and solubility in water, and the characteristics of the receptors of concern, such as their physiology and behavior.

Exposure Assessment

The second stage of the HHRA is the exposure assessment, in which the exposures of receptors of concern to COCs are evaluated. An exposure assessment may be carried out by measuring the concentrations of a COC in the tissues and cells of the receptor of concern, or the dose at which the receptors were actually exposed. More realistically, exposure can be estimated based on the concentration of the COC in the source media. The degree of exposure depends on several factors pertaining to the fate and transport of the COC in the environment, the source media and the characteristics of the receptors of concern. These factors include:

- The concentration of the COC in the environmental medium at the source(s), as well as background or ambient concentrations;
- The physical and chemical properties of the COC that influence environmental fate and transport, such as volatility, solubility and hydrophobicity;
- Site characteristics, such as the geology and hydrogeology, which also influence the fate and transport of the COC in the environment;
- The physiological and behavioural characteristics of the receptor, such as respiration rate, ingestion rate and amount of time spent in each area of concern; and,
- Other physical, chemical, and biological factors that can influence the bioavailability of COCs.

Hazard Assessment

The toxic potency of a COC is a function of its inherent toxicity, or its ability to activate the biological mechanism of toxicity within the receptor. This is dependent upon its ability to reach the site of activation, as well as receptor-specific factors, such as the age, sex, and species of the receptor and its ability to resist, repair, or adapt to the toxic impact.

Hazard assessment is based on the dose-response concept that is fundamental to the responses of biological systems to chemicals (Filov et al., 1979; Amdur et al., 1991). The dose-response of an organism to a chemical is derived via observations of the toxicological effects on organisms when exposed to chemicals in the environment from various point and non-point sources, or in the laboratory under controlled conditions (Doull et al., 1980; FDA, 1982). The dose response data are used to derive an exposure limit, the concentration or dose, where no adverse effects are anticipated.

When setting an exposure limit for a chemical, considerations must be given to factors that can affect the degree of impact on a receptor. These may include:

- The exposure scenario, such as the duration or levels of exposure. Different exposure scenarios may result in impacts on different target organs. Therefore, the exposure scenario should be representative of the "real-world" conditions for the receptor of concern.
- The route of exposure. Exposure via different routes, such as inhalation, ingestion, or dermal contact, may impact tissues. It is recommended that different exposure limits be set for exposures via different routes.
- Receptor characteristics. The toxic potency of a chemical can be dependent on the characteristics of the receptors, such as the age, sex, and species. For instance, children are generally more sensitive to the toxicity of a chemical than adults and would warrant a greater level of protection. It is sometimes prudent to set different exposure limits for different life stages.

Risk Characterization

The assessment of the potential for adverse effects, as defined by the Environmental Protection Act is fundamental to risk characterization.

For COCs with a threshold-type dose-response, risk characterization involves a comparison of the total estimated exposure with the exposure limit. For COCs with a non-threshold-type dose-response, i.e., carcinogens, risk characterization involves the calculation of the predicted risk of an individual in a population of a given size developing cancer over a lifetime. Further details are provided in Section 4.4.

4.1 Problem Formulation

The problem formulation process for the HHRA includes identifying COCs, exposure pathways and receptors to be addressed in the Exposure Assessment. In order to do so, an HHCSM is prepared (Section 4.1.1) and the RA objectives are defined (Section 4.1.2).

4.1.1 Human Health Conceptual Site Model

The HHCSM combines the information gathered during the problem formulation phase and provides a summary of the exposure scenarios to be evaluated in the HHRA. These conceptual exposure scenarios represent the interactions of the COCs with receptors via the various exposure pathways.

An HHCSM was developed based on information obtained during the investigations of the RA property describing the site geologic and hydrogeologic conditions, the COCs, and their distribution in soil and groundwater (see Section 3). Based on the site information, review of the chemical and physical properties of the COCs and the anticipated future mixed residential and community land use, potentially complete exposure pathways were identified for quantitative or qualitative evaluation in the HHRA.

A graphical representation of the HHCSM based on the existing and intended site conditions is presented in Figure 25A. However, as RMM (Section 7) are required for protection of human receptors on the RA property, an additional HHCSM is provided to show exposure scenarios in the presence of RMM (Figure 25B). Details of the receptors and exposure scenarios are described below and in the Exposure Assessment in Section 4.2.

Contaminants of Concern

The soil COCs are listed in Section 3.3.2 and include select PAHs, PCE, and lead. The Groundwater COCs are listed in Section 3.3.3 and include PHC Fraction F1, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC.

As per MECP guidance, as multiple carcinogenic PAHs were retained as COCs in soil, all other carcinogenic PAHs will be retained for further assessment, and the sum of the total carcinogenic effects will be evaluated for the applicable exposure pathways. A list of the carcinogenic PAHs as defined by the MECP (2018) is provided below:

- Acenaphthene;
- Acenaphthylene;
- Anthracene;
- Benz(a)anthracene;
- Benzo(a)pyrene;
- Benzo(b)fluoranthene;
- Benzo(g,h,i)perylene;
- Benzo(k)fluoranthene;
- Chrysene;
- Dibenz(a,h)anthracene;
- Fluoranthene;
- Indeno(1,2,3-cd)pyrene; and,
- Pyrene.

It is recognized that some, but not all, PAHs are considered volatile. The Henry's Law Constant (in unit of atm-m^3/mol) or vapour pressure (in unit of torr) may be used to determine if a contaminant is sufficiently volatile to warrant an assessment via vapour inhalation exposure pathways. As such, any PAH with a Henry's Law Constant (at 15 °C) greater than $1x10^{-5}$ atm-m^3/mol and vapor pressure greater than 1 Torr is considered volatile for the purposes of the RA. The following PAHs are considered sufficiently volatile and will be evaluated for inhalation-based exposure pathways as applicable:

- Acenaphthene;
- Acenaphthylene;
- Anthracene;
- 1- and 2-Methylnaphthalene;
- Naphthalene; and,
- Phenanthrene.

In the case of volatile carcinogenic PAHs, only volatile PAHs will be assessed for the sum of total carcinogenic exposure via inhalation-based exposure pathways. As such, for inhalation-based exposure pathways the assessment of total carcinogenic PAHs will only include acenaphthene, acenaphthylene and anthracene.

Based on the assessment of physical properties and the distribution of the COCs in soil and groundwater, relevant receptors at the RA property can come into potential contact with the COCs by both direct and indirect exposure routes. Potential exposure to all soil COCs, which may be bound to soil mineral particles and soil organic matter or dissolved in pore water, may occur by direct dermal contact, incidental ingestion, or soil particulate inhalation. The degree of solid phase and dissolved phase partitioning of the VOCs from soil or groundwater to soil vapour and thus indoor air, outdoor air, or trench/excavation air, is determined to a large extent by their polar/non polar characteristics.

Exposure Pathways and Receptors

The future land use of the RA property is a mix of community and residential land uses. Under these land use scenarios, five (5) human receptor groups were identified for evaluating potential human health risks associated with exposure to COCs in on-site soil including:

- Site residents (toddler, pregnant adult female, and composite);
- Site visitors (recreational or trespassers; toddler, pregnant adult female, and composite adult);
- Long-term indoor workers (adult or pregnant female);
- Outdoor maintenance workers (adult or pregnant female); and,
- Construction/subsurface utility workers (adult and pregnant female).

The potential pathways by which the site receptors may be exposed to the COCs include:

- Incidental soil ingestion and dermal contact for the Site residents (toddler and composite), Site visitor, outdoor maintenance worker and construction/subsurface utility worker;
- Inhalation of soil particulates for the Site residents (toddler and composite), Site visitor, outdoor maintenance worker and construction/subsurface utility worker;
- Inhalation of indoor air for the Site residents (toddler and composite), Site visitor, and long-term indoor worker;
- Inhalation of outdoor air for the Site residents (toddler and composite), Site visitor, outdoor maintenance worker and construction/subsurface utility worker;
- Inhalation of trench air for construction/subsurface utility worker;
- Vapour skin contact for the Site residents (toddler and composite), Site visitor, trespasser, long-term indoor worker, outdoor maintenance worker and construction/subsurface utility worker;
- Garden produce ingestion for the Site residents (toddler and composite) and Site visitor; and,
- Direct exposure to groundwater through dermal contact and incidental contact for the construction/subsurface utility worker.

It is possible that until development plans have been finalized, and all required permits have been obtained, the existing commercial use building (i.e. Dollarama) may remain in operation. As such, potential indoor air risks to long-term indoor workers and property visitors of the existing commercial use building have been evaluated in the RA. Specifically, an indoor air sampling program has been conducted within the existing building. Additional details are provided in Section 4.4.3.6.

Off-Site Receptors

Off-Site receptors on neighboring properties may potentially encounter the COCs present in the soil and groundwater of the RA property. The RA property is bound by mixed residential, commercial, and community land uses to the north and west; commercial land use to the east; and mixed residential, community, and parkland land uses the south. Potential off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers. The potential exposure pathways by which these receptors can be exposed to the site COCs include:

- Inhalation of soil/dust particles blown off-site during high intensity soil works/development;
- Inhalation and vapour dermal contact exposure to volatile COCs released to indoor air from groundwater;

- Inhalation and vapour dermal contact exposure to volatile COCs released to outdoor air (including trench air) from groundwater;
- Direct exposure to groundwater through dermal contact and incidental ingestion; and,
- Indirect exposure to groundwater COCs via ingestion of garden produce.

Further details pertaining to receptors and exposure pathways are provided in Sections 4.2.1 and 4.2.2, respectively.

4.1.2 Risk Assessment Objectives

The objectives of the HHRA are to:

- Qualitatively or quantitatively evaluate the potential on-site human health risks arising from exposure to identified COCs in soil and groundwater for a mixed residential and community land use;
- Develop PSS that are protective of human health under residential and community land use; and,
- Identify any RMM necessary to mitigate exposures by on-site human receptors based on the results of the HHRA, if required.

This RA is considered as an “other” RA (i.e. other than those identified in O. Reg. 153/04 Schedule C Part II) based on the details provided in Section 1.1. The “other” RA approach is applied to this RA.

The environmental conditions of the RA property were investigated through Phase Two ESAs conducted by TEC and EXP between 2022 and 2025. The data collected were used to characterize conditions for the current RA. The work completed by TEC and EXP included the collection of soil and groundwater samples for chemical analysis from different locations to assess conditions at the APECs. Sampling programs were conducted following acceptable field protocols and QA/QC measures to provide representative data of acceptable accuracy and precision. The programs were evaluated as to their representativeness, completeness, accuracy, and precision to minimize uncertainty and meet the RA data quality objectives. Analytical programs were undertaken by qualified laboratories employing applicable QA/QC protocols to minimize uncertainty and provide accurate and representative data.

As discussed in Section 3.3.6, the extent and magnitude of the soil and groundwater impacts have been sufficiently defined and, in the opinion of the QP_{ESA} and QP_{RA}, meet the data quality objectives of the current HHRA. Furthermore, assessment of laboratory QA/QC data (Section 3.3.5), showed that analytical data of acceptable quality meeting the objectives of the RA were provided.

The HHRA objectives were set by identifying the receptors and exposure pathways relevant to the RA property as summarized in Table 7 in Section 4.2.2. The HHRA assumes a hypothetical human receptor, who may be an infant, toddler, child, teenager, or adult. The receptor works in, lives in, or is a visitor to, the area being assessed and could potentially be exposed directly or indirectly to the COCs. The HHRA assumes general physical and behavioural characteristics specific to the receptor type, such as body weight, inhalation rate and length of exposure, to quantify the chemical exposure of the receptor.

The HHRA is designed to provide a comprehensive assessment of the risks to human health. As it is not possible to consider all individual human receptors that may potentially be exposed to the COCs on the RA property, receptors that are at greatest risk are chosen for the assessment, such as people with the greatest probability of being exposed to the COCs, and those that are likely to be the most sensitive to COCs. The receptors relevant to the intended mixed residential and community use of the RA property include a Site resident (toddler and composite), a Site visitor (recreational or trespasser; toddler and composite), a long-term indoor worker, an outdoor maintenance worker, and a construction/subsurface utility worker (during redevelopment). Based on the surrounding land uses, the relevant off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers.

Both qualitative and quantitative approaches were used to assess potential risks to the relevant receptors and exposure pathways identified in the HHCSM. The undertaking of a quantitative assessment for each COC was determined from a secondary screening against pathway specific health-based component values presented in MECP (2016a) applicable to the site receptors and exposure pathways. A COC was carried forward for quantitative risk analysis if the screening concentration exceeded the applicable MECP pathway specific component value and for exposure pathways where no component value is available (i.e., inhalation of vapours in a trench), where sufficient information is available to allow for quantitative evaluation. For details of the screening process see Sections 4.4.3.1 and 4.4.3.2.

In undertaking any RA, there are various sources of uncertainty, which must be considered when setting the RA objectives. These uncertainties are associated with the field sampling and analytical programs, the characterization of the Site geologic and hydrogeologic conditions, the evaluation of contaminant fate and transport mechanisms, the evaluation of receptor characteristics and behaviour patterns and the assessment of chemical toxicological effects.

Conservative models and parameter values are applied in the assessment of contaminant fate and transport through different environmental media, resulting in overestimates at points of exposure. Conservative assumptions are also applied in the evaluation of receptor characteristics and behaviour patterns that are representative of the current and future land uses at the RA property. Toxicity reference values (TRVs) used to characterize hazards and risks from exposure tend to be very conservative as orders of magnitude of uncertainty factors are applied. The overall tendency, therefore, is to apply conservative assumptions in all areas of the risk analysis to compensate for data and information limitations and uncertainty. As a result, it is more likely that overestimates of exposures, hazards and risks are reported in the RA than underestimates. The uncertainties associated with the exposure assessment, hazard assessment and risk characterization are discussed further in the individual sections below.

4.2 Exposure Assessment

The primary objective of the exposure assessment is to predict the rate of exposure (expressed in mg/kg body weight/day for oral and dermal pathways) and/or concentration in a medium to which receptors are exposed (as in the case of air concentrations of vapours, which are expressed as mg/m^3) of representative human receptors to COCs. These predictions are made using the exposure scenarios and pathways identified in the problem formulation phase. In the process, several conservative assumptions, pertaining to the characteristics of the receptors, site conditions and other factors, are applied.

An exposure assessment may be carried out by measuring the concentrations of COC in the tissues and cells of the receptor of concern, or, if applicable, recording the dose of a COC to which a receptor was directly exposed (i.e., via gavage or injection). In an environmental RA, however, neither of these approaches is typically feasible, since they require direct communication, historical records of potential exposure pathways (i.e., consumption/inhalation) and/or biological samples from all humans visiting the site. Consequently, most exposure assessments consist of estimations of exposure based on the concentrations of COC in the source media (e.g., soil, sediment, and groundwater). The degree of exposure depends on several factors pertaining to the fate and transport of the COC in the environment, the source media, and the characteristics of the receptors of concern. These factors include:

- The concentration of the COC in the environmental media at the source(s), as well as background or ambient concentrations;
- The physical and chemical properties of the COC that influence their environmental fate and transport, such as volatility, solubility, and hydrophobicity;
- Site characteristics, such as the geology and hydrogeology, which also influence the fate and transport of the COC in the environment;
- The physiological and behavioural characteristics of the receptor, such as respiration rate, ingestion rate and amount of time spent on the areas of concern; and,
- Other physical, chemical, and biological factors that can influence the bioavailability of the COC.

4.2.1 Receptor Characteristics

A series of standard human receptor characteristics and activity patterns (e.g., body weight, surface areas, and time on-site) were used in the exposure assessment. The *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* (MECP, 2011c) was the key source of human exposure parameters used in the current assessment. For the assessment of lead, the *Technical Update: Dealing with Lead in Soil in Human Health Risk Assessments under O. Reg. 153/*04 MECP (2024c) was also considered. For receptor characteristics and activity patterns which lacked an applicable MECP (2011c) value, conservative default values were applied based on other jurisdictions or professional judgement. Table E4-5 in Appendix E provides a summary of the characteristics of all the human receptors evaluated quantitatively in the HHRA.

Exposure Scenarios

Toddler Resident

Under the toddler resident scenario, it was assumed that a toddler could potentially be directly exposed to COCs in soil via dermal contact, dust inhalation and incidental ingestion. The toddler resident could be exposed to COCs in soil or groundwater via the inhalation of indoor air through the migration of vapours from underlying impacted soil and groundwater. The toddler could also be exposed via inhalation of volatile COCs that have migrated from soil and groundwater to outdoor air and to soil COCs indirectly via garden produce ingestion. It was assumed that the toddler resident spends 24 hours/day, 7 days/week and 50 weeks/year indoor on the RA property for a duration of 4.5 years (MECP, 2011c).

MECP (2011c) does not specify the duration of time that on-site residents spend outdoors at a site. The US EPA reports an average daily outdoor exposure duration of 258 minutes (4.3 h) for children under the age of 11 years old using the data provided by Wiley et al. (1991) (Table 16-14 of Exposure Factor Handbook, US EPA, 2011). In addition, the total time spent indoors and outdoors was estimated by US EPA (2011) using the data provided by Timmer et al. (1985). The maximum time spent outdoors is associated with the age group of 3 to 5 years old who spend 2.5 hours outdoors on weekdays and 3.1 hours outdoors during the weekends (i.e. on average 2.7 hours/day). Based on the data presented in US EPA (1996), the average time spent outdoors at a residence by adults of 18 years and older was 141 minutes/ day (2.35 hours/day). To be conservative, the maximum daily outdoor exposure duration in the present RA, was assumed to be the longest estimate, of 4.3 hours, for all age groups including toddlers. It was also assumed that the toddler spends 7 days/week and 39 weeks/year outdoors at the RA property.

Composite Resident

Under the composite resident scenario, it was assumed that this receptor lives on the RA property from birth, through life stages of infant, toddler, child, teen, and adult. Composite residents could potentially be exposed to COCs in soil while spending time on-site, via dermal contact, dust inhalation, and incidental ingestion. The composite resident could also be indirectly exposed to COCs in soil and groundwater via the inhalation of vapours released to outdoor and indoor air and indirectly to soil and groundwater COCs via garden produce ingestion. It was assumed that the composite resident spends 21.83 to 24 hours/day depending on the stage of lifetime and 7 days/week and 50 weeks/year indoors for all life stages on the RA property throughout a cumulative lifetime of 76 years (MECP, 2011c). As discussed above, it was assumed that the composite resident spends 4.3 hours/day outdoors during all life stages. It was also assumed that the composite resident spends this time each day, 7 days/week and 39 weeks/year outdoors at the RA property.

Pregnant Resident

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant resident was also considered. The pregnant resident was assumed to spend 24 hours/day, 7 days/week and 52 weeks/year for their entire adult life of 56 years on the RA property.

Toddler Site Visitor (Recreational and Trespasser)

Under the toddler visitor scenario, it was assumed that a toddler could potentially be directly exposed to COCs in soil via dermal contact, dust inhalation, and incidental ingestion. The toddler visitor could be exposed to COCs in soil and groundwater via the inhalation of indoor air that has been impacted through the migration of vapours from underlying impacted soil and groundwater. The toddler visitor could also be exposed via inhalation of volatile COCs that have migrated from soil and groundwater to outdoor air and indirectly to soil and groundwater COCs via garden product ingestion. It was assumed that the toddler visitor spends 1.5 hours/day, 7 days/week and 39 weeks/year on the RA property for a duration of 4.5 years. Due to having a much greater exposure rate, the toddler resident was evaluated as a surrogate for the toddler site visitor.

Composite Visitor (Recreational and Trespasser)

Under the composite visitor scenario, it was assumed that this receptor is a visitor to the RA property from birth, through life stages of infant, toddler, child, teen, and adult. A composite visitor could potentially be exposed to COCs in soil and groundwater via the inhalation of indoor air and outdoor air that has been impacted through the infiltration of vapours from underlying impacted soil and groundwater. This receptor may also be exposed to soil COCs via direct contact, dust inhalation and incidental ingestion and indirectly to soil COCs via garden produce ingestion. It was assumed that the composite visitor spends 1.5 hours/day, 7 days/week and 39 weeks/year on the RA property for all life stages throughout a lifetime of 76 years. Due to having a much greater exposure rate, the composite resident was evaluated as a surrogate for the composite Site visitor.

Pregnant Visitor (Recreational and Trespasser)

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant visitor was also considered. The pregnant visitor was assumed to spend 24 hours/day, 7 days/week and 52 weeks/year for their entire adult life of 56 years on the RA property. Due to having a much greater exposure rate, the pregnant resident was evaluated as a surrogate for the pregnant visitor.

Long-term Indoor Worker

A long-term indoor worker may be exposed to on-Site COCs via vapour inhalation of volatile COCs released from soil and groundwater that have migrated to an enclosed indoor air space. This receptor is conservatively assumed to spend their entire working career at the Site where they may potentially be exposed to volatile COCs. The indoor worker is assumed to spend 9.8 hours/day, 5 days/week and 50 weeks/year indoors on the RA property, for a duration of 56 years (MECP, 2011b).

Pregnant Long-term Indoor Worker

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant indoor worker was also considered. The pregnant indoor worker was assumed to spend 24 hours/day, 7 day/week, 52 weeks/year for their entire adult life of 56 years on the RA property.

Outdoor Maintenance Worker

Under the outdoor maintenance worker scenario, it was assumed that an adult maintenance worker, responsible for work such as lawn care and some light gardening, could potentially be exposed to volatile COCs via the inhalation of ambient outdoor air impacted through the migration of vapours from soil and groundwater. It was also assumed that an outdoor maintenance worker could also potentially be exposed to COCs in soil via direct dermal contact, dust inhalation, and incidental ingestion. Given the non-potable groundwater condition and the minimum depth to groundwater of approximately 4.50 mbgs, it was deemed unlikely that maintenance workers would come into contact with groundwater at the Site. As such, the groundwater dermal contact and incidental ingestion pathways for the outdoor maintenance worker are considered incomplete in this RA.

Consistent with MECP (2011c), the maintenance worker was assumed to be exposed outdoors for 39 weeks/year given that exposure to soil COCs is limited for 3 winter months of the year. In summary, the maintenance worker was assumed to be exposed while working outdoors for 9.8 hours/day, 5 day/week, 39 weeks/year for the entire 56-year adult life stage (MECP, 2011c).

Pregnant Outdoor Maintenance Worker

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant outdoor maintenance worker was also considered. The pregnant outdoor maintenance worker was assumed to spend 24 hours/day, 7 day/week, 52 weeks/year for their entire adult life of 56 years on the RA property.

To evaluate direct contact exposure with lead impacts in soil, a pregnant maintenance worker was also considered. As recommended by MECP (2024b), the pregnant outdoor maintenance worker was assumed to spend 9.8 hours per day, 5 days a week, 52 weeks per year for 56 years on the RA property.

Construction/Subsurface Utility Worker

Under the construction/subsurface utility workers scenario, exposures of an adult worker involved in construction and utility maintenance, or any other high intensity, short-term, sub-grade activity, were evaluated. The worker was assumed to be exposed to COCs while working on the RA property 9.8 hours/day, 5 days/week, 39 weeks/year for 1.5 years (MECP, 2011c). While at work, it was conservatively assumed that workers could be exposed to volatile soil and groundwater COCs via inhalation of vapours in ambient air at ground surface. A construction/subsurface utility worker could also be directly exposed to COCs in soil by dermal contact, incidental ingestion, and soil particulate inhalation.

During time spent in an on-Site trench or narrow excavation, workers would be exposed to COCs via inhalation of vapours in trench air. During trench/excavation dewatering, construction/subsurface utility workers may also be exposed to groundwater COCs through direct contact and this was considered a complete pathway in the HHRA. MECP (2011c) has not recommended specific exposure parameters for a construction/subsurface utility worker working within an on-Site trench or narrow excavation. As such, this RA has been conducted based on the assumption that the construction/subsurface utility worker would spend 100% of their time on-site (i.e., 9.8 hours/day, 5 days/week) for a total of 4 weeks per year working within a trench or narrow excavation conducting subsurface activities. EXP has derived this exposure scenario based on professional experience from oversight and management of various construction projects across Ontario that have required monitoring of workers within trenches and narrow excavations. In the opinion of the QP, this assumed exposure scenario of spending 20 working days per year within a trench or narrow excavation is considered to be sufficiently conservative in evaluating the trench-related exposure pathways for the construction/subsurface utility worker at the Site.

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant female construction/subsurface utility worker was also considered. The pregnant construction/subsurface utility worker was assumed to spend 24 hours/day, 7 day/week, 52 weeks/year for their entire adult life of 56 years on the RA property.

Due to the strenuous nature of the activities involved in construction/subsurface utility work, an elevated breathing rate was assumed for the construction/subsurface utility worker while at work. As recommended by the US EPA (1997) and applied by MECP (2011c), the breathing rate while working was assumed to be 1.5 m^3/hr.

Pregnant Construction/Subsurface Utility Worker

To evaluate threshold effects for parameters with developmental endpoints in the HHRA (i.e. TCE), a pregnant construction/ subsurface utility worker was also considered. The pregnant construction/subsurface utility worker was assumed to spend 24 hours/day, 7 days/week, 52 weeks/year for 1.5 years on the RA property.

To evaluate direct contact exposure with lead impacts in soil, a pregnant construction/subsurface utility worker was also considered in the HHRA. In this scenario, the pregnant construction/subsurface utility worker was assumed to be on the property 9.8 hours per day, 5 days a week, 52 weeks per year for a working life of 56 years.

Off-Site Human Receptors

As described in Section 4.1.1, the surrounding properties consist of mixed residential, commercial, and community land uses to the north and west; commercial land use to the east; and mixed residential, community, and parkland land uses the south. Therefore, the relevant off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers.

Off-Site human receptors may be exposed to soil COCs via inhalation of dust/particles originating from the RA property. Due to the low mobility of soil and non-potable groundwater condition, all other soil exposure pathways are considered incomplete for off-Site receptors. The on-Site human receptors could serve as surrogates indicative of worst-case potential risks to the nearest off-Site human receptors, arising from migration of COCs off-Site.

Similar exposure pathways to groundwater COCs described for on-Site human receptors may be applied for off-Site human receptors. The on-Site human receptors could serve as surrogates indicative of worst-case potential risks to the nearest off-Site human receptors, arising from migration of COCs off-Site.

4.2.2 Pathway Analysis

An exposure pathway is the path that a contaminant follows from the environmental medium that the receptor may be exposed to, such as air, soil, and water, to reach the receptor. From the medium, the COC enters the receptor via exposure routes, which may include inhalation, ingestion, or dermal absorption.

The COCs identified in soil include volatile chemical constituents that will partition into soil gas and migrate through the soil unsaturated zone to outdoor air or the indoor air of an overlying building. Receptors at the RA property was also evaluated for potential exposure to COCs in soil via direct dermal contact, incidental ingestion, soil particulate inhalation in addition to inhalation of indoor air and outdoor air (ground level and within a trench).

As a volatile COCs were found in groundwater at the RA property, receptors were evaluated for potential exposure to COCs in groundwater via indoor air inhalation or outdoor air inhalation (ground level and within a trench). As a future construction/subsurface utility worker could undertake excavation work at depths below the groundwater table during redevelopment, these receptors were also evaluated for dermal contact and incidental ingestion exposure to COCs in groundwater.

It is noted that only parameters considered sufficiently volatile are evaluated for inhalation pathways. A parameter was considered volatile if its Henry's Law constants are greater than 1.0E-05 atm-m^3/mol at the average groundwater temperature of 15^{o}C and/or the parameter has a vapour pressure greater than 1 Torr, in keeping with MECP (2019) guidance.

The exposure pathways and routes evaluated in the current assessment are summarized in the HHCSM provided as Figure 25A. The exposure pathways and routes considered complete in this RA for on-site receptors are summarized in Table 7 below, and were evaluated qualitatively or quantitatively in the RA.

Table 7: Summary of Human Health Exposure Pathways (On-Site)

COC	Media	Exposure Pathway	Receptors
PCE Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene	Soil	Direct contact (dermal contact, incidental ingestion, soil particulate inhalation)	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, construction/subsurface utility worker,
		Ingestion of homegrown garden produce	Site resident, Site visitor/trespasser

COC	Media	Exposure Pathway	Receptors
Benzo(ghi)perylene Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene Fluoranthene Indeno(1,2,3-cd)pyrene 1- and 2-Methylnaphthalene Naphthalene Phenanthrene Pyrene and/or Lead		Indoor air inhalation – residential building with basement	Site resident, Site visitor/trespasser
		Indoor air inhalation – current and/or future commercial slab-on-grade building	long-term indoor worker, Site visitor/trespasser
		Inhalation of outdoor (ground level) air	Site resident, Site visitor/trespasser, long-term outdoor maintenance worker, construction/subsurface utility worker
		Inhalation of trench air	Construction/subsurface utility worker
		Vapour skin contact (indoor and/or outdoor)	Site resident, Site visitor/trespasser, long-term indoor worker, long-term outdoor maintenance worker, construction/subsurface utility worker
PHC Fraction F1 cis-1,2-DCE trans-1,2-DCE PCE TCE and/or VC	Groundwater	Direct contact (dermal contact, incidental ingestion)	Construction/subsurface utility worker
		Indoor air Inhalation – residential building with basement	Site resident, Site visitor/trespasser
		Indoor air inhalation – current and/or future commercial slab-on-grade building	long-term indoor worker, Site visitor/trespasser
		Inhalation of outdoor (ground level) air	Site residents, Site visitor, outdoor maintenance worker, construction/subsurface utility worker
		Inhalation of trench air	Construction/subsurface utility worker
		Vapour skin contact (indoor and/or outdoor air)	Site resident, Site visitor, long-term indoor worker, outdoor maintenance worker, construction/subsurface utility worker
		Ingestion of homegrown garden produce	Site resident, Site visitor/trespasser

Off-Site receptors on neighbouring properties may potentially come into contact with the COCs present in the soil and groundwater off the RA property. As outlined in Section 4.2.1, off-Site receptors include property residents, property visitors (recreational and trespassers), long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers. The potential exposure pathways by which these receptors can be exposed to the site COCs include:

- Inhalation of soil/dust particles blown off-Site during high intensity soil works/development for property residents, property visitors (recreational and trespassers), outdoor maintenance workers, and construction/subsurface utility workers;
- Inhalation and vapour dermal contact exposure to volatile COCs released to outdoor air from groundwater for property residents, property visitors (recreational and trespassers), outdoor maintenance workers and construction/subsurface utility workers;
- Inhalation and vapour dermal contact exposure to volatile COCs released to indoor air from groundwater for property residents, property visitors (recreational and trespasser) and long-term indoor workers; and,
- Direct exposure to groundwater through dermal contact and incidental ingestion by construction/subsurface utility workers.

The following pathways were considered incomplete in the HHRA and were therefore not assessed:

- All indoor exposure pathways (i.e. inhalation of indoor air, vapour skin contact with indoor air) were considered incomplete in the RA for on and off-Site outdoor maintenance workers and construction/subsurface utility workers given that these receptors are assumed to stay outdoors at all times;
- All outdoor exposure pathways (i.e. inhalation of outdoor air, vapour skin contact with outdoor air, direct contact with soil) is considered incomplete for the long-term indoor worker as they are assumed to spend negligible time outdoors;
- As soil has limited mobility, dermal contact and incidental ingestion, indoor and/or outdoor air inhalation and vapour skin contact exposure pathways for soil were considered negligible for off-Site receptors and therefore were considered incomplete; and,
- Direct contact (ingestion and dermal contact) with groundwater to all human receptors (with exception of the construction worker) was considered incomplete given the depth to groundwater and non-potable condition of the Site

It should be noted that the indoor air inhalation pathway for the existing commercial building on-Site is further qualitatively assessed in Section 4.4.3.6 using measured indoor air concentrations.

4.2.3 Exposure Estimates

The soil parameters and exposure pathways that were carried forward for quantitative assessment in the HHRA, based on the screening of COCs to their component values (Section 4.4.3.1 and Table E4-1 of Appendix E) are summarized in Table 8.

It is noted that although the reasonable estimate of the maximum (REM) concentration of benzo(a)pyrene is above it's respective S-OA component value, the parameter is not considered volatile based on the Henry's Law constant less than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15 ^oC or the parameter has a vapour pressure less than 1 Torr (MECP, 2019). Therefore, benzo(a)pyrene was not retained for further quantitative assessment of the outdoor air inhalation pathways.

MECP has not derived component values protective of the trench air inhalation pathway for construction/subsurface utility workers. As a conservative measure, all volatile COCs in soil were conservatively retained for quantitative assessment of this exposure pathway. It should be noted that a parameter is considered volatile if the Henry's Law constant is greater than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15 ^oC or the parameter has a vapour pressure greater than 1 Torr (MECP, 2019). Furthermore, although the REM soil concentrations of all COCs were below their respective S-OA component value protective of the outdoor air inhalation pathway, all volatile COCs in soil were retained for quantitative assessment of the outdoor air inhalation pathway for the construction/subsurface utility worker in order to calculate exposure and risk estimates associated with the total outdoor air (i.e., ground level and trench air) exposure.

Table 8: Soil COCs and Exposure Pathways to be Quantitatively Assessed in the HHRA

Direct Contact (S1; Resident)	Direct Contact (S2; Outdoor Maintenance Worker)	Direct Contact (S3; Construction / Subsurface Utility Worker)	Indoor Air – residential (S-IA; Resident)	Indoor Air – commercial (S-IA; Long-term Indoor Worker)	Outdoor Air (S-OA; resident and outdoor maintenance worker)	Outdoor and Trench Air (Construction/ Subsurface Utility Worker)
Acenaphthene* Acenaphthylene* Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene* Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene Fluoranthene Indeno(1,2,3-cd)pyrene Phenanthrene Pyrene* Total carcinogenic PAHs Lead	Acenaphthene* Acenaphthylene* Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene* Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene Fluoranthene Indeno(1,2,3-cd)pyrene Phenanthrene Pyrene* Total carcinogenic PAHs Lead	Phenanthrene Lead	PCE 1- and 2-Methylnaphthalene Naphthalene Phenanthrene	PCE 1- and 2-Methylnaphthalene Phenanthrene	Acenaphthene* Acenaphthylene* Anthracene* 1- and 2-Methylnaphthalene Phenanthrene	PCE Acenaphthene* Acenaphthylene* Anthracene* 1- and 2-Methylnaphthalene Naphthalene Phenanthrene Total Carcinogenic PAHs

* REM did not exceed the component value; however, the parameter was retained for evaluation of total carcinogenic PAHs.

It is possible that until development plans have been finalized and all required permits have been obtained, the existing commercial use building (i.e. Dollarama) may remain in operation. As such, potential indoor air risks to long-term indoor workers and visitors of the existing commercial use building have been evaluated in the RA. Specifically, an indoor air sampling program has been conducted within the existing building to evaluate potential indoor air risks associated with soil COCs where potential risks were identified based on either comparison to the industrial/commercial/community S-IA component values and/or modeling. Additional details are provided in Section 4.4.3.6.

The groundwater parameters and exposure pathways that were carried forward for quantitative assessment in the HHRA, based on the screening against component values (Section 4.4.3.2 and Table E4-2 of Appendix E) are summarized in Table 9.

MECP has not derived component values protective of the groundwater to outdoor air and trench air inhalation pathways for construction/subsurface utility workers during an excavation. Additionally, MECP has not derived component values protective of the groundwater to outdoor air inhalation pathways for Site visitors (recreational and trespassers), and outdoor maintenance workers. Although it is likely that the GW2 component values are protective of these outdoor receptors, the current HHRA acknowledges that a direct correlation between an indoor air component value and an outdoor receptor may be inappropriate. As a result, all volatile COCs in groundwater were retained for quantitative assessment of the outdoor air and trench air inhalation pathways. It should be noted that, as discussed previously, a parameter is considered volatile if the Henry's Law constant is greater than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15 ^{0}C or the parameter has a vapour pressure greater than 1 Torr (MECP, 2019).

Table 9: Groundwater COCs and Exposure Pathways to be Quantitatively Assessed in HHRA

Dermal Contact and Incidental Ingestion (Modified GW1; Construction/ Subsurface Utility Worker)	Indoor Air (GW2-residential; Resident)	Indoor Air (GW2-commercial; Long-Term Indoor Worker)	Outdoor Air (Resident and Outdoor Maintenance Worker)	Outdoor Air and Trench Air (Construction/ Subsurface Utility Worker)
PCE VC	PHC F1 Cis-1,2-DCE Trans-1,2-DCE PCE TCE VC	PHC F1 Cis-1,2-DCE Trans-1,2-DCE PCE TCE VC	PHC F1 Cis-1,2-DCE Trans-1,2-DCE PCE TCE VC	PHC F1 Cis-1,2-DCE Trans-1,2-DCE PCE TCE VC

It is possible that until development plans have been finalized and all required permits have been obtained, the existing commercial use building (i.e. Dollarama) may remain in operation. As such, potential indoor air risks to indoor workers and visitors of the existing commercial use building have been evaluated in the RA. Specifically, an indoor air sampling program has been conducted within the existing building to evaluate potential indoor air risks associated with soil COCs with soil COCs where potential risks were identified based on either comparison to the industrial/commercial/community S-IA component values and/or modeling or groundwater COCs with REM concentrations above their respective industrial/commercial/ community GW2 component values (as outlined in Table 9 above). Additional details are provided in Section 4.4.3.6.

A "point estimate" or "deterministic" approach was used to estimate exposure rates for each of the human receptors, using the previously discussed receptors and exposure parameters. This approach entails predicting the REM of each receptor using an exposure point concentration (EPC) of each COC in soil and groundwater. The chosen EPC is intended to represent the COC concentration to which each receptor can realistically be anticipated to be exposed over time. While the US EPA Risk Assessment Guidance for Superfund (US EPA, 1989) recommends estimating the RME using the upper 95% confidence limit on the arithmetic mean of the data set (i.e., the 95% UCLM), the recommendations of the MECP, which are to use the maximum measured concentration of each COC, were followed. This ensures a conservative assessment based on what is assumed to be a "worst-case" exposure scenario.

The calculated exposure is expressed as the amount of contaminant entering the body per unit of body weight per unit of time (mg chemical/kg body weight/day). For COCs in air, prorated concentrations of COCs in air (mg/m^3), adjusted for receptor specific exposure conditions, were used to assess exposure and risk.

The REM COC concentrations measured in soil and groundwater, as summarized in Tables E4-1 and E4-2 of Appendix E, were applied as EPCs in the quantitative HHRA, as shown in Tables E4-3 and E4-4. The REM is calculated as the maximum measured concentration + 20% to account for sampling and analytical variability.

4.2.3.1 Exposure to COCs via Inhalation of Vapours in Indoor Air

Migration of volatile chemicals from soil and groundwater to indoor air can create a potential exposure pathway to receptors of concern. The fundamental underlying principle for vapour transport is based on observations that small but persistent pressure differences established between the exterior and interior of buildings may cause infiltration of soil gas through the substructure of buildings. Based on measurements of the advective flow of radon from soil air into buildings, various methodologies have been developed to estimate the entry of vaporized chemicals. The majority of these methodologies are theoretical in nature and have not been extensively validated with empirical data. However, the methodologies can be used to provide a conservative estimate of exposures to vapours from subsurface sources.

The evaluation of the indoor air pathway is based on the vapour intrusion model developed by Johnson and Ettinger (J&E,1991).

Johnson and Ettinger (1991) and Little et al. (1992) reported that the flux of volatile chemicals through the substructure of buildings is based on the concentration and pressure gradients affecting the transport of vapours in the soil adjacent to the substructure. It is assumed a zone (hereafter referred to as the zone of influence) surrounds the substructure of the building, within which vapours will be transported by convection and/or diffusion through the substructure of the building (shown in the schematic diagram below). Hence, the concentration of vapours within the zone of influence arising from a soil or groundwater source can be used to estimate the concentration of vapours inside the building.

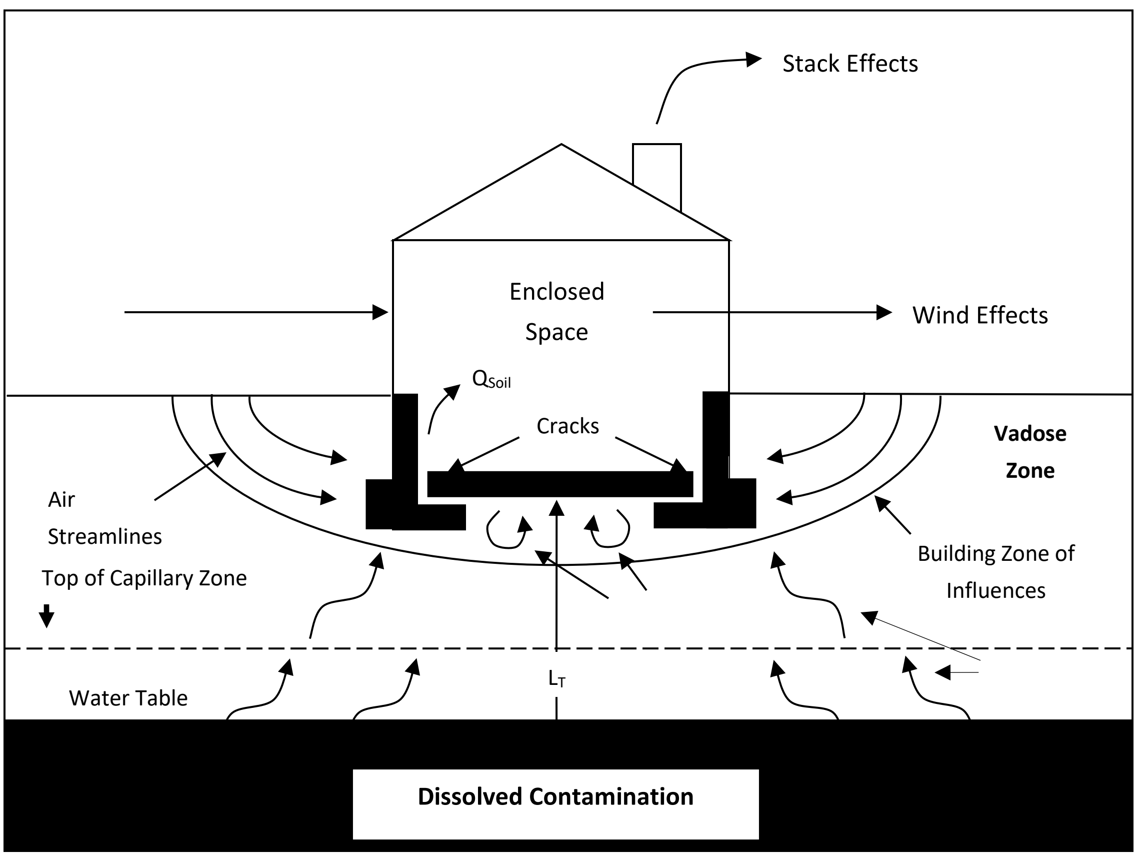

Figure 4-1 The Vapour Infiltration Pathway (US EPA, 2004a)

J&E (1991) developed a heuristic model describing single component chemical transport through one or more soil layers of the unsaturated zone to the indoor air space of an overlying building. The J&E model is a multi-compartment model combining an analytical solution of the one-dimensional advective-dispersion equation, describing vapour transport from the unsaturated zone into an overlying building, with a solution of the diffusion equation, describing vapour and liquid diffusive transport through the unsaturated zone from an underlying source, and a steady-state building ventilation mass balance equation. The model calculates the soil gas attenuation factor relating the chemical concentration in soil gas to the concentration in indoor air. The J&E modelling approach has been adapted to describe volatile chemical transport from soil and groundwater sources assuming linear equilibrium phase partitioning with soil gas.

As cited in MECP Rationale Document (2011c), there are a number of precluding subsurface conditions, which affect the validity of applying the J&E model for different sites. The precluding factors outlined in Section 7.3.3.1 of the Rationale document were reviewed. Based on the Site-specific properties of the RA property, the application of the J&E model was reviewed in detail with respect to the bedrock characteristics found on the RA property, and depth to groundwater. These conditions were evaluated based on the residential building with basement and commercial slab-on-grade building evaluated by MECP (2011c). The building characteristics applied in the J&E modeling are presented in Table E4-9.

The J&E model is not applicable for buildings constructed on media with high gas permeability such as vertically or near-vertically fractured bedrock, karst, or cobbles. As discussed in the Phase Two CSM in Appendix B, bedrock is encountered at a depth of 15.24 m bgs. Therefore, any potential future residential/community building on-Site is anticipated to have more than 1 m thickness of soil beneath its slab in all areas before bedrock begins. Therefore, this precluding factor recommended by MECP for the use of J&E model does not apply on the RA property.

Further, as outlined in MECP (2011c), the vapour intrusion model cannot be used for the groundwater to indoor air exposure pathway to generate an attenuation factor under circumstances where shallow groundwater exists, and the shallowest water table is expected to be within the gravel crush layer beneath the floor slab. This limitation is set to fulfill the J&E model assumption which requires that “the top of the capillary fringe must be below the bottom of the building floor in contact with the soil” (US EPA, 2004a). The minimum depth to groundwater encountered on the RA property is approximately 4.50 mbgs. However, based on the potential development plan of one (1) level of basement, it is assumed that future basement may be in close proximity to water table. As such, for assessment of vapour intrusion sourced from groundwater, the empirical attenuation factor recommended by MECP (2011c) for a residential building (α=0.02) was conservatively used to predict indoor air concentrations of groundwater COCs for future buildings. Although the use of the J&E model for the current slab-on-grade commercial building may be acceptable, the MECP (2011c) recommended attenuation factor for commercial buildings (α=0.004) was conservatively used to predict indoor air concentrations of groundwater COCs for the existing and/or future commercial buildings.

Based on the above evaluation, the J&E model is applicable to estimate the vapour infiltration of soil COCs for a future residential building with basement and commercial slab-on-grade building. Since development plans have not yet been finalized, both generic building types have been assessed to determine the potential for unacceptable indoor air risks and the requirement for RMMs. For soil parameters that exceeded the residential/commercial S-IA component values, the REM soil concentrations of each COC were used to predict indoor air concentrations for a residential building with basement and a commercial slab-on-grade building.

For soil COCs, the depth to contamination was assumed to be directly below the gravel crush layer, in keeping with MECP (2016) as presented in Table E4-7. The Site-specific vapour intrusion modeling for soil COCs in excess of applicable residential/commercial indoor air component values were conducted under the residential building with basement and commercial slab-on-grade building exposure scenarios.

Indoor air concentrations sourced from soil were estimated using the J&E model as applied in the US EPA (2004a) Excel spreadsheet program “SL-ADV” version 3.1. It is acknowledged that the US EPA no longer supports the use of the J&E model for predicting indoor air concentrations based on measured soil concentrations to be consistent with the Office of Solid Waste and Emergency Response (US EPA OSWER, 2015). US EPA OSWER (2015) does not recommend the use of soil data for estimating the potential for vapour intrusion risks due to the potential for vapour loss due to volatilization during soil sampling, preservation, and chemical analysis. Furthermore, US EPA OSWER (2015) indicates that there are uncertainties with soil partitioning calculations. In the absence of soil vapour sampling data that can be applied to the future building and reduce the uncertainty in indoor air concentration estimates, the J&E model was applied to predict indoor air concentrations within the future buildings for soil COCs in this RA. Uncertainty associated with the use of this model is discussed in Section 4.2.4.

Three (3) soil layers were assumed in the J&E modeling as presented in Table E4-7. The soil stratigraphy from the ground surface to the bottom of the enclosed space (Soil Stratum A) was conservatively set as a loam unit based on the medium/fine textured soil at the site and the varied soil types at the Site. Soil Stratum B was set to the 30 cm gravel crush base layer beneath the basement slab, following MECP (2011c and 2016) and Soil Stratum C was set to 0.1 cm of loam, in keeping with the layers assumed by MECP (2016a). Advective transport was evaluated based on the default soil gas flow rates applied by MECP (2011c) for the generic residential building with basement with medium/fine soils (1 LPM). For the generic commercial slab-on-grade building, the default gas flow rate was set to 1.5 LPM for medium/fine soils.

Physical and chemical properties of the soil and groundwater COCs are provided in Table E4-6A and E4-6B, respectively. It is noted that the physical and chemical properties of the COCs were updated in the J&E spreadsheet to be consistent with those provided in MECP (2016a). A summary of the soil properties applied in the indoor air model is provided in Table E4-7.

Predicted soil gas concentrations, attenuation factors and indoor air concentrations calculated for the future residential building with basement and commercial slab-on-grade building scenario for soil are summarized in Tables E4-15. The J&E input and output worksheets for soil COCs are included in Appendix H.

The source vapour concentrations resulting from infiltration of vapours from impacted soil were predicted using the equation below (PCE in soil applied as an example).

$$C_v = \frac{H' \; x \; C_S \; x \; P_b}{\theta_w + (K_{oc} x \; foc) x \; P_b + H' \; x \; \theta_a} \text{ x CF}$$

where:

C_v	=	Soil vapour concentration (µg/m^3)
C_s	=	Soil REM concentration (µg/kg) (20,000 µg/kg for PCE)
H’	=	Dimensionless Henry’s Law constant at average soil temperature (15°C) (4.29E-01 for PCE)
Pb	=	Soil dry bulk density (1.59 g/cm^3; MECP [2016])
Θw	=	Soil water-filled porosity (0.148 cm^3/cm^3; MECP [2016])
Θa	=	Soil air-filled porosity (0.251 cm^3/cm^3; MECP [2016])
K_{oc}	=	Soil organic carbon partition coefficient (2.14E+02 cm^3/g; MECP [2016])
F_{oc}	=	Soil organic carbon (0.005; MECP default)
CF	=	Conversion factor (1E+06 cm^3/m^3)

The predicted source vapour concentration for PCE was calculated to be 7.13E+06 µg/m^3.

Indoor air COC concentrations resulting from infiltration of vapours from impacted soil under a residential building with basement or commercial slab-on-grade scenario were predicted using the source vapour concentration multiplied by the respective calculated attenuation factor. Predicted soil gas concentrations, attenuation factors and indoor air concentrations calculated for the residential building with basement scenario for soil is summarized in Table E4-15.

Exposure for the indoor air vapour intrusion pathway is calculated as the adjusted or prorated indoor air exposure concentration as follows (example for the toddler resident exposed to PCE in indoor air sourced from soil for the existing building is shown):

$$EXP_{IA,} = \frac{C_{IA} \times EF}{HPY}$$

where:

EXP_{IA}	=	Prorated indoor air exposure concentration of COCs sourced from soil (mg/m^3)
C_{IA}	=	Indoor air concentration (2.57E+00 mg/m^3 for PCE in soil)
EF	=	Exposure frequency (hr/yr, = 24 hr/d x 7 d/wk x 50 wk/yr)
HPY	=	Hours per year (365 d/yr x 24 hr/d)

Therefore, the prorated indoor air exposure concentration of PCE sourced from soil for the toddler resident is 2.46E+00 mg/m^3. The prorated indoor air exposure concentrations for the toddler resident, composite resident and long-term indoor worker exposed to soil COCs via indoor air inhalation are provided in Tables E4-25A to E4-26, respectively.

As discussed above, the empirical attenuation factor recommended by MECP was used to predict indoor air concentrations of groundwater COCs for a hypothetical future residential or commercial building on-Site. The source vapour concentrations resulting from infiltration of vapours from impacted groundwater were predicted using the following equation (VC in residential scenario applied as an example):

$C_v = C_g$ x H' x CF

where:

C_v	=	Soil vapour concentration (µg/m^3)
C_g	=	Groundwater concentration (µg/L) (667 µg/L for VC)
H'	=	Dimensionless Henry's Law constant at average groundwater temperature (15°C) (8.83E-01 for VC)
CF	=	Conversion factor (1,000 L/m^3)

The predicted source vapour concentration for benzene was calculated to be 5.89E+05 µg/m^3.

Indoor air COC concentrations resulting from infiltration of vapours from impacted groundwater were predicted using the source vapour concentration multiplied by the empirical attenuation factor of 0.02 and 0.0004, recommended by MECP (2011c) for residential or commercial scenario, respectively. The indoor air concentration for VC in residential scenario was calculated to be 1.18E+04 µg/m^3.

Predicted soil gas concentrations, attenuation factors and indoor air concentrations calculated for the future residential building with basement and commercial slab-on-grade building scenario for groundwater COCs are summarized in Table E4-18.

Exposure for the indoor air vapour intrusion pathway is calculated as the adjusted or prorated indoor air exposure concentration as follows (example for the toddler resident exposed to VC in indoor air sourced from groundwater for the residential building with basement scenario is shown):

$$EXP_{IA,} = \frac{C_{IA} \times EF}{HPY}$$

where:

EXP_{IA}	=	Prorated indoor air exposure concentration of COCs sourced from soil or groundwater (mg/m^3)

C_{IA} = Indoor air concentration (1.18E+01 mg/m^3 for VC in groundwater)
EF = Exposure frequency (hr/yr, = 24 hr/d x 7 d/wk x 50 wk/yr)
HPY = Hours per year (365 d/yr x 24 hr/d)

Therefore, the prorated indoor air exposure concentration of VC sourced from groundwater for the toddler resident is 1.13E+01 mg/m^3. The prorated indoor air exposure concentrations for the resident exposed to groundwater COCs via indoor air inhalation are provided in Tables E4-31A to E4-32, respectively.

The Site is currently occupied by Dollarama. Since the Dollarama remains operational, an indoor air quality sampling program was conducted at the Site in winter 2025 to evaluate the potential for indoor air inhalation risks to building occupants. The results of the IAQ sampling program are discussed in Section 4.4.3.6 and summary report is provided in Appendix O.

4.2.3.2 Exposure to COCs via Direct Contact with Soil/Dust

Through typical outdoor activities, human receptors are brought into direct dermal contact with soil and dust, may accidentally ingest soil or dust particles, or may be exposed to soil COCs through inhalation of airborne dust. The Site resident is assumed to touch, ingest, and inhale soil/dust while spending time on-Site. Exposures via incidental ingestion of soil and dust, dermal contact and soil particulate inhalation for the Site resident is estimated as follows (an example is provided for toddler exposure to benzo(a)pyrene):

Exposure via Incidental Ingestion of Soil and Dust

$$EXP_{ING} = \frac{AO \times CF \times C_{soil} \times RAF \times EF}{BW \times HPY}$$

where:

EXP_{ING} = Exposure from incidental ingestion of soil (mg/kg/day)
AO = Amount of soil/dust ingested (200 mg/day for the toddler visitor)
C_{soil} = Concentration of contaminant in soil (86 mg/kg for benzo(a)pyrene)
RAF = Ingestion relative absorption factor (1.0, unitless)
EF = Number of days spent on-Site per year (7 days/wk x 39 wk/yr for the toddler resident)
BW = Body weight (16.5 kg for the toddler resident)
HPY = Days per year (365 days/yr)
CF = Conversion factor (1.0E-06 kg/mg)

Therefore, the predicted incidental ingestion exposure for the toddler resident exposed to benzo(a)pyrene in soil is 7.82E-04 mg/kg/day.

Exposure via Dermal Contact with Soil and Dust

$$EXP_{DER} = \frac{(AES \times DAF_B) \times C_{soil} \times EF \; x \; RAF}{BW \times HPY}$$

where:

EXP_{DER}	=	Dermal exposure from contact with outdoor soil/dust (mg/kg/day)
AES	=	Skin surface area exposed (1,745 cm^2 for the toddler visitor)
DAF_B	=	Soil adherence factor whole body (2.00E-07 $kg/cm^2/day$)
C_{soil}	=	Concentration of contaminant in soil (86 mg/kg for benzo(a)pyrene)
EF	=	Number of days spent on-Site per year (7 days/wk x 39 wk/yr for the toddler visitor)
RAF	=	Dermal relative absorption factor (0.13 for benzo(a)pyrene, unitless)
BW	=	Body weight (16.5 kg for the toddler visitor)
HPY	=	Days per year (365 days/yr)

Therefore, the predicted dermal contact exposure for the toddler resident exposed to benzo(a)pyrene in soil is 1.77E-04 mg/kg/day.

Exposure via Inhalation of Re-suspended Dusts

$$EXP_{INH} = \frac{C_{soil} \times PM_{10} \times CF \times FPM_{10} \times IR \times EF \times FR_{soil}}{AI \times DPY}$$

where:

EXP_{INH}	=	Inhalation exposure to substance from outside airborne dust (mg/m^3);
AI	=	Inhalation rate (20 m^3/d; MECP, 2011c)
C_{soil}	=	Concentration of contaminant in soil (86 mg/kg for benzo(a)pyrene)
PM_{10}	=	Concentration of PM_{10} in the air (100 $\mu g/m^3$)
CF	=	Conversion factor (1.00E-09 kg/µg)
FPM_{10}	=	Fraction of PM10 which is deposited (0.6, unitless)
IR	=	Inhalation rate (0.83 m^3/hr for the toddler visitor; MECP, 2011c)
EF	=	Number of hours spent outside per year (4.3 hrs/day x 7 days/wk x 39 wks/yr)
FR_{soil}	=	Fraction of airborne dust originating from on-Site soil (1, unitless)
DPY	=	Days per year (365 days)

Therefore, the average prorated soil particulate air concentration of benzo(a)pyrene for the toddler resident was estimated to be 6.91E-07 mg/m^3.

Tables E4-12A to E4-14 provide the predicted exposures of toddler and composite Site residents, outdoor maintenance workers, and construction/subsurface utility workers to those soil COCs for which a quantitative assessment for the direct contact pathway was performed, respectively.

4.2.3.3 Exposure to COCs via Inhalation of Vapours from Soil to Ground-Level Ambient Outdoor Air

A toddler/composite resident, outdoor maintenance worker, construction/subsurface utility worker including pregnant adult receptors were all assumed to be exposed to COCs via inhalation of vapours migrating from soil to ambient outdoor air. This exposure was predicted by estimating the volatilization rates from the exposed soil and the effect that they would have on the air concentrations within a theoretical box. It is noted that as all soil COCs met applicable soil to outdoor air component values for all receptors (see Section 4.4.3.1), however outdoor ground-level outdoor air was quantitatively evaluated for the construction/subsurface utility worker for evaluation of total outdoor air exposure (ground level and trench air). An example calculation for phenanthrene is provided below.

A surface soil volatilization factor (VF_{ss}) was outlined in ASTM Standard E1739–95 (1995, Reapproved 2010 and 2015). This factor is the steady-state ratio of the concentration of an organic substance within a defined zone of ambient air to the source concentration in surface soil (RBCA, 1995). This value is calculated based on the flux of vapours from the surface soil and the mixing of the vapours within the air above the ground's surface. Calculation of this value assumes there is an infinite source of the substance assessed within the surface soils. As the vapours migrate from the soil surface, they are mixed and diluted with the surrounding ambient air. This dilution is calculated using a simple box model approach for surface soil and ambient air vapours (Table x2.5 in ASTM, 1995, Reapproved 2010 and 2015). The air mixing zone characteristics at ground level are provided in Table E4-10.

The VF_{ss} was calculated for each volatile COC. The VF_{ss} was calculated as follows (phenanthrene is used as an example):

$$VF_{SS} = \frac{2 \times C \times W \times B \times \left[\sqrt{\frac{D_{eff} \times H}{\pi \times (\theta_{ws} + k_{oc} \times f_{oc} \times B + \theta_{as} \times H) \times t}} \right]}{\mu_{air} \times \delta_{air}}$$

where:

VF_{ss}	=	Surface soil volatilization factor from soils (mg/m^3-air/mg/kg-soil)
W	=	Width of source area parallel to wind (1,300 cm)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
B	=	Soil bulk density (1.59 g/cm^3 for loam)
D_{eff}	=	Effective molecular diffusion through soil (2.08E-03 cm^2/s for phenanthrene)
H	=	Henry's law constant (unitless, 1.79E-03 for phenanthrene)
π	=	Pi (3.14)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.148 cm^3-water/cm^3-soil)
K_{oc}	=	Organic carbon-water partition coefficient (4.16E+04 cm^3/g for phenanthrene)
f_{oc}	=	Fraction organic carbon (0.005, MECP (2016) default value)
θ_{as}	=	Volumetric air content in vadose zone soils (0.251 cm^3-air/cm^3-soil)
t	=	Averaging time for flux (1.0E+07 s for the construction/subsurface utility worker)
μ_{air}	=	Wind speed above ground surface (410 cm/s; MECP, 2011c)
d_{air}	=	Ambient air mixing zone height (200 cm)

From the above equation, the effective molecular diffusion through soil (D_{eff}) was calculated as follows:

$$D_{eff} = D^{air} \times \frac{\theta_{as}^{3.33}}{\theta_T^{2}} + \left[\frac{D^{wat}}{H} \times \frac{\theta_{ws}^{3.33}}{\theta_T^{2}} \right]$$

where:

D_{eff}	=	Effective molecular diffusion through soil
D^{air}	=	Diffusion coefficient in air (3.24E-02 cm^2/s for phenanthrene)
θ_{as}	=	Volumetric air content in vadose zone soils (0.251 cm^3-air/cm^3-soil)
θ_T	=	Total soil porosity (0.399 cm^3/cm^3)
D^{wat}	=	Diffusion coefficient in water (6.69E-06 cm^2/s for phenanthrene)
H	=	Henry's law constant (unitless, 1.79E-03 for phenanthrene)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.148 cm^3-water/cm^3-soil)

Therefore, the calculated D_{eff} and VF_{ss} for phenanthrene were calculated to be 2.08E-03 cm^2/s and 9.40E-07 mg/m^3-air/mg/kg-soil, respectively.

The concentration in ambient outdoor air was then calculated as follows:

$$C_{air} = C_{soil} \times VF_{ss}$$

where:

C_{air}	=	Concentration of contaminant in air (mg/m^3)
C_{soil}	=	Concentration of contaminant in soil (289 mg/kg for phenanthrene)
VF_{ss}	=	Surface soil volatilization factor from surface soils (9.40E-07 mg/m^3 air/mg/kg-soil for phenanthrene)

The predicted concentration of phenanthrene volatilizing to the ambient outdoor air from impacted soil is 2.72E-04 mg/m^3. Predicated outdoor air concentrations for all volatile soil COCs are presented in Table E4-16A.

The construction/subsurface utility worker exposure to ground level outdoor air is evaluated as the adjusted or prorated outdoor air exposure concentration as follows:

$$EXP_{OA} = \frac{C_{OA} \times EF \times INH_{CW} \times ED}{INH_{TRV} \times HPY \times AP}$$

where:

EXP_{OA}	=	Prorated ground level outdoor air concentration (mg/m^3)
C_{OA}	=	Concentration in ground level outdoor air from impacted soil (2.72E-04 mg/m^3 for phenanthrene)
IN_{HCW}	=	Construction/subsurface utility worker inhalation rate (1.5 m^3/hr)
EF	=	Exposure frequency (hr/yr, = 9.8 hr/d x 5 d/wk x 35 wk/yr)
ED	=	Exposure duration (1.5 years for construction/subsurface utility worker)
INH_{TRV}	=	Assumed inhalation rate for derivation of TRVs (0.83 m^3/hr)
HPY	=	Hours per year (365 d/yr x 24 hr/d)
AP	=	Averaging period (1.5 years for non-cancer and 56 years for cancer for the construction/subsurface utility worker)

It is noted that it is assumed that the construction/subsurface utility worker is exposed to ground level outdoor ambient air for 35 weeks of the year based on the assumption that they are working within a trench for four (4) of the total 39 weeks outdoors on-Site during the year.

Therefore, the prorated non-cancer exposure concentration of phenanthrene in ground level outdoor air from impacted soil is 9.58E-05 mg/m^3.

The predicted prorated exposure concentrations of soil COCs volatilizing to the ambient outdoor air from impacted soil are presented in Table E4-27 to Table E4-29 for Site residents, outdoor maintenance workers, and construction/subsurface utility workers.

4.2.3.4 Exposure to COCs via Inhalation of Vapours from Soil to Ambient Air within a Trench

While spending time working within an on-Site trench, it was assumed that a construction/subsurface utility worker would be exposed to COCs via inhalation of vapours migrating from impacted soil. This exposure was predicted using the REM concentrations of COCs in soil and by estimating the volatilization rates and the effects that they would have on the air concentrations within the trench. The air mixing characteristics for the trench scenario are presented in Table E4-11.

The construction/subsurface utility worker was assumed to be exposed to these vapours for 9.8 hours per day, 5 days per week for 4 weeks per year. To account for reduced air flow and mixing within a trench, the wind speed within the trench was reduced to one-tenth of the ground surface wind speed (0.41 m/s) which is generally equivalent to the windspeed applied in trench models by US EPA Region 8 (US EPA, 1999a) of 0.45 m/s, as reported by Meridian (2011).

To estimate the concentration of contaminants in trench air, the VF_{TS} were calculated as outlined in ASTM Standard E1739–95 (1995, Reapproved 2010 and 2015).

The trench was assumed to be 2 m deep x 1 m wide x 13 m long. The wind direction was assumed to be parallel to the length of the trench. The VF_{TS} was calculated for each volatile soil COC as follows, with an example for phenanthrene provided:

$$VF_{TS} = \frac{(W_c \times L_c + 2 \times L_c \times D_c + 2 \times W_c \times D_c) \times C \times 2 \times B \times \left[\sqrt{\frac{D_{eff} \times H}{\pi \times (\theta_{ws} + k_{oc} \times f_{oc} \times B + \theta_{as} \times H) \times t}}\right]}{V_t \times A}$$

where:

VF_{TS}	=	Surface soil volatilization factor from trench soils (mg/m^3-air/mg/kg- soil)
W_c	=	Width of trench and contaminant source (100 cm)
L_c	=	Length of trench and contaminant source (1,300 cm)
D_c	=	Depth of trench and contaminant source (200 cm)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
B	=	Soil bulk density (1.59 g/cm^3 for loam)
D_{eff}	=	Effective molecular diffusion through soil (2.08E-03 cm^2/s for phenanthrene)
H	=	Henry's law constant (unitless, 1.79E-03 for phenanthrene)
π	=	Pi (3.14)
θ_{ws}	=	Volumetric water content in vadose zone soil (0.148 cm^3-water/cm^3 soil)
K_{oc}	=	Organic carbon-water partition coefficient (4.16E+04 cm^3/g for phenanthrene)
F_{oc}	=	Fraction organic carbon (0.005; MECP (2016a) default value)
θ_{as}	=	Volumetric air content in vadose zone soils (0.251 cm^3-air/cm^3-soil)
t	=	Averaging time for flux (1.03E+07 s for the construction/subsurface utility worker)
V_t	=	Volume of trench (2.60E+07 cm^3)
A	=	Air exchange rate (3.15 s^{-1})

Note that the value of effective molecular diffusion through soil was calculated using the equation provided in Section 4.2.3.3.

From the above equation, the air exchange rate (A) is calculated as follows:

$$A = \frac{U_{air}}{Lc}$$

where:

A	=	Air exchange rate (s^{-1})
U_{air}	=	Wind speed through trench (cm/s)
Lc	=	Length of trench and contaminant source (cm)

The trench air exchange rate was set to 3.15 s^{-1} for a trench based on an assumed reduced wind speed 1/10 of that of ground level air. The concentration of contaminant in the air within the trench was then calculated as follows:

$$C_{air} = C_{soil} \times VF_{Ts}$$

where:

C_{air}	=	Concentration of contaminant in air in trench (mg/m^3)
C_{soil}	=	Concentration of contaminant in soil (289 mg/kg for phenanthrene)
VF_{TS}	=	Surface soil volatilization factor from trench soils (4.99E-07 mg/m^3-air/mg/kg- soil for phenanthrene)

The concentration of phenanthrene in trench air from impacted soil is 1.44E-04 mg/m^3. The concentration of COCs in the trench air from impacted soil is presented in Table E4-16B.

The construction/subsurface utility worker exposure to trench level outdoor air is evaluated as the adjusted or prorated outdoor air exposure concentration, calculated using the same equation provided in Section 4.2.3.3 and based on a trench exposure scenario of 4 weeks/year.

The predicted prorated exposure concentrations of soil COCs volatilizing to trench air from impacted soil are presented in Table E4-29.

4.2.3.5 Exposure to COCs via Inhalation of Vapours from Groundwater to Ground-Level Ambient Outdoor Air

Site residents, outdoor maintenance workers, and construction/subsurface utility workers including pregnant female adult receptors on the RA property were assumed to be exposed to COCs via inhalation of vapours migrating from groundwater to ambient outdoor air. Exposures were predicted using the REM concentrations of COCs in groundwater and by estimating the volatilization rates from the groundwater and the effect that they would have on air concentrations in ground-level ambient air. An example calculation is provided below for TCE.

To estimate this exposure pathway, a groundwater volatilization factor (VF_{wamb}) was calculated as outlined in ASTM Standard E1739–95 (1995, Reapproved 2010 and 2015). The groundwater volatilization factor is the steady-state ratio of the concentration of a substance in ambient air to the concentration in underlying impacted groundwater. The VF_{wamb} factor accounts for the steady state partitioning of dissolved substances in groundwater to the soil vapour phase, the flux rate of soil vapour to ground surface, and the mixing of soil vapours in the breathing zone of a receptor (RBCA, 1995).

The VF_{wamb} was calculated as follows:

$$VF_{wamb} = \frac{H \times C}{1 + \left(\frac{(U_{air} \times \delta_{air} \times L_{GW})}{D_{eff\,GW} \times W} \right)}$$

where:

VF_{wamb}	=	Groundwater volatilization factor (mg/m^3-air/mg/L-water)
H	=	Henry's law constant (unitless, 2.54E-01 for TCE)
C	=	Conversion factor (1,000 cm^3-kg/m^3-g)
U_{air}	=	Wind speed above ground surface (410 cm/s)
δ_{air}	=	Mixing zone height (200 cm)
L_{GW}	=	Depth to groundwater (450 cm)
$D_{eff\,GW}$	=	Effective molecular diffusion above groundwater table (4.95E-03 cm^2/s for TCE)
W	=	Width of source area parallel to wind (1,300 cm, MECP (2011c) default value)

The value of effective molecular diffusion through soil above the groundwater table was determined from the US EPA Vapour Infiltration Model which uses the following equation:

$$D_{eff\ GW} = (h_{cap} + h_v)\ x \left(\frac{h_{cap}}{D_{eff\ cap}} + \frac{h_v}{D_{eff}} \right)^{-1}$$

where:

$D_{eff\ GW}$	=	Effective molecular diffusion above groundwater table (cm^2/s)
h_{cap}	=	Thickness of capillary fringe (17.05 cm)
h_v	=	Thickness of vadose zone (379.95 cm)
$D_{eff\ cap}$	=	Effective diffusivity in the capillary zone (4.95E-03 cm^2/s for TCE)
D_{eff}	=	Effective diffusivity in the vadose zone soil (4.95E-03 cm^2/s for TCE)

The concentration of contaminant in ambient outdoor air as a result of volatilization from groundwater was then calculated as follows:

$$C_{air} = C_{GW} \times VF_{wamb}$$

where:

C_{air}	=	Concentration of contaminant in ambient outdoor air (mg/m^3)
C_{GW}	=	Concentration of contaminant in groundwater (3.24E-01 mg/L for TCE)
VF_{wamb}	=	Groundwater volatilization factor for ambient air (4.42E-05 mg/m^3-air/mg/L-water for TCE)

Therefore, the concentration of TCE in ambient outdoor air, sourced from groundwater, is 1.43E-05 mg/m^3. Table E4-19 presents intermediate parameters used in the calculations, and predicted concentrations of groundwater COCs in outdoor air.

The predicted prorated exposure concentrations of groundwater COCs volatilizing to outdoor air from impacted groundwater are presented in Tables E4-27 to E4-29.

4.2.3.6 Exposure to COCs via Inhalation of Vapours from Groundwater to Ambient Air within a Trench

While spending time working within an on-Site trench, it was conservatively assumed that a construction/subsurface utility worker including pregnant female construction/subsurface utility worker would be exposed to volatile COCs via inhalation of vapour migrating from impacted subsurface groundwater. This exposure rate was predicted by estimating the volatilization rate from groundwater and the ambient air concentration resulting from mixing with air within the trench. The same volatilization factor applied for inhalation of vapours from ground level ambient air was applied as summarized in 4.2.3.5 with modifications to account for the trench characteristics.

The construction/subsurface utility worker was assumed to be exposed to vapours within a trench for 9.8 hours per day, 5 days per week for 4 weeks per year. To account for reduced air flow and mixing within a trench, the wind speed within the trench was reduced to one-tenth (1/10) of the ground surface wind speed (0.41 m/s) which is generally equivalent to the windspeed applied in trench models by US EPA Region 8 (US EPA, 1999a) of 0.45 m/s, as reported by Meridian (2011).

The trench air volatilization factor (VFT_{GW}) was calculated as follows (TCE provided as an example):

$$VF_{TGW} = \frac{H \times C}{1 + \left(\frac{(U_{air} \times \delta_{air} \times L_{GW})}{D_{eff\,GW} \times W}\right)}$$

VF_{TGW} = Groundwater volatilization factor for trench air (mg/m^3-air/mg/L-water)

H = Henry's law constant (unitless, 2.54E-01 for TCE)

C = Conversion factor (1,000 cm^3-kg/m^3-g)

U_{air} = Wind speed within the trench (41 cm/s)

δ_{air} = Mixing zone height (200 cm)

L_{GW} = Depth to groundwater (10 cm; assumed due to dewatering activities)

$D_{eff\,GW}$ = Effective molecular diffusion above groundwater table (4.95E-03 cm^2/s for TCE)

W = Width of source area parallel to wind (1,300 cm, MECP as cited by Meridian Inc. (2011))

The overall effective molecular diffusion coefficient for chemical transport through soil above the groundwater table is calculated as the distance weighted average of the effective diffusion coefficients for the capillary fringe and unsaturated zone soils using the same equation provided in Section 4.2.3.5. The effective diffusivity in the capillary zone and unsaturated zone is calculated using the same equation as provided in Section 4.2.3.5.

Therefore, the contaminant trench air concentration is calculated as follows:

$$Cair_{trench} = VF_{TGW} \times C_{GW}$$

$Cair_{trench}$ = Contaminant trench air concentration (mg/m^3)

C_{GW} = Contaminant groundwater concentration (3.24E-01 mg/L for TCE)

VF_{TGW} = Trench air volatilization factor (1.99E-04 mg/m^3 air/mg/L water for TCE)

Therefore, the concentration of TCE in trench air, sourced from groundwater, is 6.45E-05 mg/m^3. Table E4-20 presents the intermediate parameters used in the calculations and predicted concentrations of groundwater COCs in trench air.

The construction/subsurface utility worker exposure to trench air is evaluated as the adjusted or prorated outdoor air exposure concentration, calculated using the same equation provided in Section 4.2.3.5.

The predicted prorated exposure concentrations of groundwater COCs volatilizing to trench air from impacted groundwater for the construction/subsurface utility worker are presented in Table E4-35.

4.2.3.7 Direct Contact with Groundwater within an On-Site Trench

Given that the intended development is a residential building with one (1) level of basement and minimum depth to groundwater is approximately 4.50 m bgs, direct contact with groundwater is possible during Site redevelopment. Therefore, a construction/subsurface utility worker was conservatively assumed to be exposed to COCs in groundwater that has pooled within the bottom of an open trench via direct dermal contact and incidental ingestion. The exposed skin surface area recommended by MECP (2011c) was used. The construction/subsurface utility worker was assumed to be subject to dermal absorption through direct contact with impacted groundwater as a result of continuous submersion of the skin surface exposed, in groundwater, for two 15-minute events per day, 195 days per year, for 1.5 years.

Exposure via Dermal Contact

The method used to predict dermal absorption was taken from the US EPA Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Portion E: Supplemental Guidance for Dermal Risk Assessment) (US EPA, 2004b). In this method, the absorption of contaminants from water is a function of the thickness of the stratum corneum and the duration of the exposure event. This model assumes that absorption continues after the exposure event has ended. The final absorbed dose (DA_{event}) considers the net fraction available for absorption on the stratum corneum after the exposure event (FA). For the current assessment, the FA for all COC in groundwater was assumed to be 1.0. Since the length of the daily exposure events are relatively short (two 15-minute events), it was assumed that a steady-state would not be reached and that neither the viable epidermis nor the cutaneous blood flow would limit the dermal absorption of the COC (US EPA, 2004b).

The permeability coefficient (Kp) of an organic chemical is a function of the path length of chemical diffusion (i.e., the thickness of the stratum corneum), the chemical-specific membrane/vehicle partition coefficient (i.e., the octanol/water partition coefficient), and the effective diffusion coefficient of the chemical in the stratum corneum (US EPA, 2004b).

<u>For organics (PCE provided as an example):</u>

$$DA_{event} = 2 * FA * K_p * C_{GW} * \sqrt{\frac{6 * \tau_{event} * t_{event}}{\pi}} * CF$$

where:

DA_{event}	=	Absorbed dose per event (mg/cm^2-event)
FA	=	Fraction absorbed water (1.0 unitless)
K_p	=	Dermal permeability coefficient of chemical in water (3.28E-02 cm/hr for PCE)
C_{GW}	=	Concentration of chemical in groundwater (4,920 µg/L for PCE)
T_{event}	=	Lag time per event (8.91E-01 hr/event for PCE)
t_{event}	=	Event duration (0.25 hr/event)
π	=	pi (3.14)
CF	=	Conversion factor (1.00E+06 (mg/cm^3) /(µg/L))

Kp and Tevent values were derived based on the following equations provided by the US EPA (2004b):

$$\log Kp = -2.80 + 0.66 \log K_{ow} - 0.0056\ MW$$

where:

Kp	=	Dermal permeability coefficient of chemical in water (cm/hr)
$\log_{Kow}$	=	Log Octanol-water partition coefficient (3.40E+00 for PCE)
MW	=	Molecular weight (1.66E+02 g/mol for PCE)

And

$$\tau_{event} = \frac{l_{sc}^2}{6\,D_{sc}} = 0.105\ x\ 10^{(0.0056\,MW)}$$

where:

τ_{event}	=	Lag time per event (hr/event)
Isc	=	Apparent thickness of stratum corneum (0.001 cm)
Dsc	=	Effective diffusion coefficient for chemical transfer through the stratum corneum (cm^2/hr)
MW	=	Molecular weight (1.66E+02 g/mol for PCE)

The total daily exposure to groundwater COC via absorption from dermal contact with groundwater during construction activities within the trench were predicted as follows:

$$EXP_{DermTrench} = \frac{DA_{event} * SA * EV * EF * ED}{BW * DPY * AP}$$

where:

$EXP_{Derm\ Trench}$	=	Daily dermal exposure via direct contact with groundwater within the trench (mg/kg/day)
DA_{event}	=	Absorbed dose per event (2.10E-04 mg/cm^2-event for TCE)
SA	=	Exposed surface area (3,400 cm^2 for the construction/subsurface utility worker)
EV	=	Event frequency (2 events/day)
EF	=	Exposure frequency (20 days/year for the construction/subsurface utility worker)
ED	=	Exposure duration (1.5 years for the construction/subsurface utility worker)
BW	=	Body weight (70.7 kg for the construction/subsurface utility worker)
DPY	=	Days per year (365 days/year)
AP	=	Averaging period (1.5 years for non-cancer and 56 years for cancer for the construction/ subsurface utility worker)

Therefore, the predicted dermal contact (non-cancer) exposure for the construction/subsurface utility worker exposed to PCE in groundwater is 1.08E-02 mg/kg/day.

Exposure via Incidental Ingestion

For completeness, the construction/subsurface utility worker was also assumed to have direct exposure to groundwater while working in a trench or excavation via incidental ingestion. The exposure via incidental ingestion of groundwater was envisioned to occur as the result of splashing of pooled water in a trench. The US EPA Region IV (2014) estimates an incidental ingestion rate of 10 mL/hr for adults while wading. This value is considered to be overly conservative for the application to a construction/subsurface utility worker working in a trench while the pooled groundwater is not as deep as a wading scenario. It is anticipated that as part of construction activity, the trench is dewatered prior to entering and the potential incidental ingestion of groundwater will be limited to the trench dewatering activities. Therefore, the exposure duration of 2 hours (i.e. the time that construction/subsurface worker spends in a trench) was not used to estimate the incidental ingestion rate of groundwater. Instead, an ingestion rate of 0.005 L/d was applied assuming exposure duration of 0.5 hour and the conservative incidental ingestion rate of 10 mL/hr while wading.

The estimates of exposure via ingestion of groundwater are calculated as follows (using PCE as an example):

$$DWEF = \frac{IIIR \times EF_a \times EF_b \times ED}{BW \times AP \times C}$$

where:

DWEF	=	Exposure factor for groundwater ingestion (L/kg-bw/d)
IIIR	=	Incidental ingestion intake rate (0.005 L/d for the construction/subsurface utility worker)
EF_a	=	Exposure frequency (5 d/w)
EF_b	=	Exposure frequency (4 w/y)
ED	=	Exposure duration (1.5 y for the pregnant construction/subsurface utility worker)
BW	=	Body weight (70.7 kg)
AP	=	Averaging period (1.5 years for non-cancer and 56 years for cancer for the construction/subsurface utility worker)
C	=	Unit conversion factor (365)

$$EXP_{Ingestion} = \frac{DWEF \times C_{GW} \times RAF_{oral}}{1000}$$

where:

$EXP_{Ingestion}$	=	Exposure via incidental ingestion of groundwater (mg/kg/d)
DWEF	=	Drinking water exposure factor (7.90E-05 L/kg-bw/d for the construction/subsurface utility worker)
C_{GW}	=	Concentration of COC in groundwater (4,920 µg/L for PCE)
RAF_{oral}	=	Relative absorption factor, oral from water (1.00, unitless)

Therefore, the exposure estimate for incidental ingestion of PCE in groundwater for a the construction/subsurface utility worker on the RA property is 1.86E-04 mg/kg-bw/d.

Table E4-17 presents all the assumptions and intermediate parameters used in the calculation of dermal contact and incidental ingestion of groundwater COCs for construction/subsurface utility workers at the RA property.

4.2.4 Uncertainties in the Exposure Assessment

In the HHRA, every effort is made to ensure data and assumptions adequately represent conditions for the Site. However, where property-specific data are not available, assumptions are made, which can result in uncertainty in the assessment. It is necessary to ensure the RA is adequately protective of all receptors. Therefore, the choice is generally made to choose the more conservative of assumptions, which is likely to result in over-estimates of exposure and, likewise, risk. The following are examples of assumptions made during exposure estimates and how they may have affected the conclusions of this RA:

- Exposure estimates were calculated assuming that the receptor is exposed to the maximum soil and groundwater concentrations throughout the exposure duration. This is likely an overestimation of the actual exposure given that humans are mobile and are unlikely to spend all their time within the area of the maximum soil and groundwater concentrations. In addition, it is highly conservative to assume that soil and groundwater COCs are ubiquitous throughout the entire site at the maximum concentration. A more likely scenario is one of heterogeneity and that humans are generally exposed (on average) to much lower concentrations of each COC. Therefore, this assumption is expected to result in a significantly higher exposure estimate than is likely to occur in reality.
- Similarly, exposure estimates for indoor air via volatilization were calculated assuming that the maximum soil and groundwater concentrations are encountered across the entire footprint of the building. As it is more probable that a

range of concentrations exists below the building floor slab, the calculated indoor air concentration is likely overestimated.

- Outdoor maintenance workers were assumed to work for 56 years at the same location. However, statistics presented in MECP (2011c) suggest that this is a significant overestimation of the actual amount of time that an outdoor maintenance worker would spend on a given site being exposed to the maximum concentration of COCs in soil.
- The use of vapour infiltration models to predict indoor air concentrations presents uncertainties in the HHRA. Typically, such models are based on studies involving measurements of advective flow of radon from soil air into buildings. The models can be used to estimate the COC concentrations in indoor air from subsurface sources. However, it should be noted that the models are theoretical when used to describe the transport of chemical contaminants and are often not validated with empirical or field data. The following assumptions and limitations of the models should be considered:
    - Contaminant vapours are assumed to enter structures through cracks and openings in the walls and foundation;
    - Convective transport or pressure driven flow occurs primarily within the building zone of influence;
    - The conservative assumption is made that the floors and walls are imperfect as vapour barriers and that 100% of vapours originating from below the building will enter the building;
    - All soil properties in any one horizontal layer are homogenous;
    - Contaminants are ubiquitous and concentrations are homogenous, within the zone of contamination;
    - The area of the zone of contamination is greater than the building footprint;
    - The model does not account for transformation processes (e.g., biodegradation, etc.); and,
    - Conditions within the building, such as ventilation rate and pressure differentials between the interior and the sub-slab space are considered constant.

The above assumptions and limitations are discussed in detail within the US EPA (2004a) document. The application of these assumptions results, in general, in an overly conservative estimate of vapour intrusion of COC. However, it is noted that the use of J&E to predict indoor air concentrations using soil concentrations may provide an underestimate of risk due to the potential for vapour loss due to volatilization during soil sampling, preservation, and chemical analysis (US EPA OSWER, 2015). Measures taken to reduce potential for vapour loss were applied during field programs by collecting samples using generally accepted principles, using appropriate sampling equipment and in accordance with the MOEE (1996) and O. Reg. 153/04. Laboratory analyses were completed in accordance with MECP (2011b) protocols. It is further noted that there is uncertainty associated with soil partitioning calculations (US EPA OSWER, 2015) that may under or overpredict indoor air concentrations.

As described before, several assumptions made in estimating the flux rate of contaminants from groundwater into the trench air as follows:

- Wind velocity within the trench was assumed to be reduced relative to that at the ground surface; and,
- Mixing at the ground surface is conservatively assumed to be in one dimension under steady-state conditions with no consideration given to dispersion. Multi-dimensional mixing with a significant dispersion component can be expected at ground surface.
- Isothermal conditions are assumed, however, volatilization rates, through the strong functional dependence of Henry's Law constants, can be greatly affected by temperature.
- Well mixed conditions in the bulk liquid are assumed, however, less than uniform mixing can be expected resulting in concentration gradients that can limit volatilization rates.

For inhalation exposure to volatile contaminants within outdoor air at ground surface and for the general trench scenario sourced from soil these additional assumptions were made:

- Chemical transport through the unsaturated zone soils and capillary fringe was conservatively assumed to occur by one dimensional binary molecular diffusion obeying Fick's Law under steady-state conditions and within homogenous porous media with uniform properties. Multi-dimensional chemical transport, multiple chemical fluxes and heterogenous porous media would be encountered under field conditions and, therefore, result in lower rates of chemical transport through unsaturated zone soils. Soil heterogeneity even at relatively short scales of less than 1 m can result in a variations of transport properties approaching an order of magnitude or more;
- Non-depleting soil and groundwater sources are assumed, whereas due to continuous partition and biodegradation of contaminants, continuous source reduction can be expected;
- Equilibrium phase partitioning was assumed at the soil and groundwater contaminant sources. Non-equilibrium rate-limited processes can be expected to prevail as soil and groundwater sources become depleted; and
- Contaminant fluxes can be affected by the bulk movement of soil gas arising from pressure gradients created by barometric pressure and water table fluctuations.

In general, the assumptions applied in the exposure and risk calculations are selected so as to err on the conservative side. Each of the individual conservative assumptions contributes to the overall estimation of actual risks. Compounding effects of multiple conservative assumptions, that were applied throughout the exposure and risk characterization phases, are, therefore, likely to result in a cumulative overestimation of risks.

4.3 Toxicity Assessment

4.3.1 Nature of Toxicity (Hazard Assessment)

The toxicity of a chemical or agent is the ability of that substance to temporarily or permanently damage cells, tissues etc. of the body resulting in a loss of structure or function. Information pertaining to the toxicity of chemicals is typically obtained from laboratory studies using animals and controlled conditions (FDA, 1982), or epidemiological and occupational studies of human exposure.

For the purpose of a RA, the chronic toxicity of a substance is typically of more interest than acute toxicity. That is, effects of lower concentrations over a prolonged period of time are generally of more concern for environmental contaminants. It is also necessary to discern between substances for which the chronic effects have a threshold, below which no adverse effect is anticipated, or no threshold (i.e., the potential for an effect is anticipated at any concentration), as is the case for mutagenic/ carcinogenic substances.

The assessment of the COCs carried forward for quantitative evaluation in the HHRA showed that potential exposure to these chemical constituents can result in either, and in some cases both, threshold (non-carcinogenic) and non-threshold (carcinogenic) health effects. The potential adverse health effects are manifested through the oral and dermal exposure routes and, for the majority of the volatile COCs, through the inhalation exposure route. Descriptions of the potential adverse health effects often associated with exposure to each of the COCs in the HHRA are provided in Table E4-21A and E4-21B for soil and groundwater COCs, respectively. The mode of action, whether via threshold, non-threshold (e.g., mutagenic, DNA adduct formation), developmental or carcinogenic effects, is also indicated in the table for each COC.

4.3.2 Dose Response Assessment

Toxicity is a function of the "dose", or amount of chemical taken into the body, and the duration of exposure. For every substance, there is a specific dose and duration of exposure necessary to produce a toxic effect in an individual. The relationship between dose and toxic effect is known as the dose-response relationship. The dose-response concept is fundamental to the responses of biological systems to chemicals (Filov et al., 1979; Amdur et al., 1991; Doull et al., 1980) and is the principle upon which the hazard assessment is based. The maximum dose to which humans can be exposed and still have a low probability of experiencing adverse health effects, is known as the exposure limit, or TRV. This term applies to both threshold and non-threshold substances, in that the TRV for a carcinogen is the concentration at which the probability of an adverse effect is considered to be within acceptable limits.

The point of departure (POD) is the preferred method used for the estimation of toxicological criteria for threshold effects, where enough data are available. The mathematical model unit risk estimation method is used for non-threshold substances. The threshold approach results in a TRV which is often referred to as a reference dose (RfD), or allowable daily intake (ADI). Estimates of this type of TRV are based on a modeled dose (based on a dose-response curve) corresponding to an incremental effect (e.g., lower confidence limit of a dose or concentration corresponding to a 10% increase in response [LED10 or LEC10]). However, as the majority of toxicological data is derived from animal studies, the POD must be adjusted for use in the evaluation of risks to humans. This is done using "uncertainty factors" (UFs) (FDA, 1982; US EPA, 1989; Health Canada, 1993), the magnitude of which depend on several factors. The level of confidence in available data is a key factor in the uncertainty which, in turn, depends on differences in species and duration of exposure, safety of sensitive species and individuals, and the quality of available data (i.e., the weight of evidence of the supporting data). Some conservative assumptions may be made concerning the relative effects of substances in different species. Where available, route-specific exposure limits (e.g., inhalation reference concentrations [RfCs] and oral RfDs) are used to characterize the hazard of chemicals. If a route-specific TRV is not available, additional conservative assumptions and UFs may be used for route-to-route extrapolation. In cases where insufficient data are available to derive a POD value, no observed adverse effect levels (NOAELs) or lowest observed adverse effect levels (LOAELs) may be used, with UFs applied, to derive a TRV.

The TRVs used for each COC in this RA are provided in Tables E4-21A and E4-21B for soil and groundwater COCs, respectively. In all cases, the TRVs were those recommended by the MECP (2011c), MECP (2016a), MECP (2024a) or MECP (2024b). In these cases, a rationale was provided for the selection of the TRV provided in Appendix L. When setting an exposure limit for a substance, considerations must be given to factors that can affect the degree of impact on a receptor. These may include:

- Exposure scenario, such as the duration or levels of exposure. Different exposure scenarios may result in impacts on different target organs. Therefore, the exposure scenario should be representative of the “real-world” conditions for the receptor of concern.
- Route of exposure. A toxic endpoint is generally dependent on the route of exposure; exposure via different routes, such as inhalation, ingestion, or dermal contact, may impact tissues only at the site of entry. It is recommended that different exposure limits be set for exposures via different routes.
- Receptor characteristics. The toxic potency of a chemical is dependent on the characteristics of the receptors, such as the age, sex, and species. For instance, children are generally more sensitive to the toxicity of a chemical than adults and would warrant a greater level of protection. It is therefore sometimes recommended that different exposure limits be set for different life stages.

A rationale for the selection of any alternative TRV, including an evaluation of the available data, is provided in Appendix L (i.e., phenanthrene).

Where available, route-specific exposure limits (e.g., inhalation RfCs and oral RfDs) were used to characterize the hazard of contaminants. In cases where more than one toxicological endpoint has been reported for a chemical (i.e., threshold and non-threshold), both endpoints have been reported in Tables E4-21A and E4-21B for soil and groundwater COCs, respectively.

4.3.3 Uncertainties in the Toxicity Assessment

The use of UFs and conservative assumptions for the selection of TRVs in the toxicity assessment may contribute to an overestimation of actual health risks to human receptors on the RA property. Assumptions made during the toxicity assessment include the following:

- For genotoxic substances (mutagens and carcinogens), it was assumed that genetic lesions do not undergo repair within the affected tissues. However, organisms produce certain enzymes for the purpose of repairing routine damage to DNA. Thus, the potential adverse effects arising from exposure to a substance causing damage to DNA would only be observed if the ability of these repair enzymes to "fix" the damage was exceeded. Moreover, the majority of the human genome contains non-coding DNA, damage to which would have no effect on cellular activity. In addition, due to the robustness of the human genome, functional analogs and the duplication of genes, genetic damage at one position in a chromosome does not necessarily manifest as an adverse phenotypical effect.
- Large UFs (i.e., typically 1000-fold) were applied in the estimation of RfDs and RfCs for the threshold acting contaminants. These UFs were applied to exposure levels from studies where no adverse effects are observed (i.e., to the NOAEL). Thus, exceeding the toxicological criterion means that there is less compensation for uncertainty, however this does not imply that adverse effects would necessarily occur.
- When recommending TRVs based on animal data, all jurisdictions assume that humans are the most sensitive species with respect to the toxic effects of the COCs. Also, toxicological data (incorporating UFs) from the most sensitive laboratory species are used in the estimation of toxicological criteria for humans. Unless it can be demonstrated conclusively that the animal used in the study is significantly more sensitive due to a specific difference in physiology, TRVs for humans will be derived that are orders of magnitude lower than those for the most sensitive animal species. As a result, there is a likelihood that some TRVs are highly conservative.
- The application of conservative relative absorption factors accounting for difference between experimental and environmental conditions would tend to overestimate potential risks.
- When deriving TRVs, it is assumed that the MECP took into account study and experimental uncertainty, and the most sensitive toxicological endpoints for each substance were selected from the available scientific literature to represent the exposure limit. This approach was not necessarily applied in the derivation of TRVs where MECP did not provide one, or where new scientific literature/interpretation was available, as it may often be found that the most sensitive endpoints are not the result of a high-quality study or do not conform with the consensus of the literature.
- In some cases, TRVs are not available and toxicity data from surrogate chemicals are used. While the selection of the surrogate was based on choosing a chemical of similar, or representative, structure and properties, there is uncertainty in the assessment of toxicity for these parameters and groups for which insufficient toxicological data are available.

The toxicity of all parameters was assumed to be independent. In the event that two or more parameters exhibit similar toxicological effects and modes of action (i.e., synergistic or additive effects), this assumption may have resulted in an underestimate of the overall toxicological effects arising from exposure to environmental media at the site.

4.4 Risk Characterization

4.4.1 Interpretation of Health Risks

For COCs with a threshold-type (non-carcinogenic) dose-response, risk characterization involves a comparison of the total estimated exposure with the exposure limit. This comparison is known as the exposure ratio (ER) for oral and dermal routes of exposures and the concentration ratio (CR) for inhalation exposures. The ER is calculated as the quotient of the predicted daily exposure (average daily dose) and the oral RfD. For the inhalation route, the CR is calculated as the quotient of the predicted indoor or outdoor air concentration and the RfC.

Calculations for ER and CR are as follows:

$$Concentration\ Ratio = \frac{Air\ Concentration\ (\frac{\mu g}{m^3})}{Exposure\ Limit\ (\frac{\mu g}{m^3})}$$

or

$$Exposure\ Ratio = \frac{Estimated\ Exposure\ \left(\frac{\mu g/_{kg}}{day}\right)}{Exposure\ Limit\ \left(\frac{\mu g/_{kg}}{day}\right)}$$

To be consistent with the terminology used in the MECP Rationale Document (MECP, 2011c), both CR and ER are referred to as HQs in this RA.

For COCs with a non-threshold-type dose-response, i.e., carcinogens, risk characterization involves the calculation of the predicted risk of an individual in a population of a given size developing cancer over a lifetime, also known as the incremental lifetime cancer risk (ILCR). For estimating non-threshold risks, the mathematical model unit risk estimation approach assumes that there would be no risk of experiencing an adverse effect if the rate of exposure or dose was zero. However, it does assume a risk at any given concentration of a substance, and the absence of a threshold. This approach, generally applied to mutagenic/carcinogenic substances, yields an estimate of a cancer slope factor (CSF) or unit risk cancer potency estimate (q1*). The q1* may be used directly in risk characterization to yield predicted risks of cancer incidence in a population.

The ILCR is calculated based on the average lifetime daily exposure. The ILCR is expressed as a fraction representing the prediction that 1 person per *n* people would develop cancer, where the magnitude of *n* reflects the risk to that population. The risk of developing cancer is higher for a chemical with a higher ILCR value; for example, if the ILCR is 0.1 (representing 1 person per 10), the predicted risk of any individual developing cancer would be higher than if the ILCR is 0.001 (1 per 1,000). In this RA, under the guidance of the MECP, ILCR levels that are less than one-in-one million are considered acceptable (MECP, 2011c).

The lifetime average daily dose (LADD), as a measure of exposure, is the product of daily exposure and the ratio of the exposure duration and the carcinogenic averaging time. In the case of the composite lifetime resident, the lifetime daily exposure is the time weighted average of the individual life stage daily exposures. For the oral and dermal pathways, the ILCR is the product of the lifetime daily exposure and the CSF. For the inhalation routes, the ILCR is the product of the lifetime daily exposure (prorated concentration) and the q1*.

The ILCR for oral and dermal routes of exposures is calculated as follows:

$$ILCR = Estimated\ Exposure\ \left(\frac{\mu g/_{kg}}{day}\right)\ x\ q_*^1 \left(\frac{\mu g/_{kg}}{day}\right)^{-1}$$

where q1* represents the CSF.

The ILCR for the inhalation route of exposure is calculated as follows:

$$ILCR = Air\ Concentration\ \left(\frac{\mu g}{m^3}\right)\ x\ Unit\ Risk\ (\frac{\mu g}{m^3})^{-1}$$

HQ and ILCR are effective tools for expressing potential adverse health effects from exposures to COC in that:

- They allow comparisons of potential adverse effects on health between substances and different exposure scenarios (e.g., typical Ontario versus site-specific conditions);
- Potential adverse effects can be estimated from exposures to mixtures of substances that act on similar biological systems (e.g., all substances that cause liver toxicity, or kidney toxicity, or respiratory tract cancers); and,
- They help simplify the presentation of the RA results so that the reader may have a clear understanding of the significance of these results, and an appreciation of their significance.

For human exposures to non-carcinogens, no adverse health effects would be expected if the total exposure from all sources and all media, including background sources, resulted in a HQ of less than or equal to 1.0. It is, however, more common for an RA to assess the risk associated with a single medium via an exposure scenario, in order to derive a site-specific component value for the exposure scenario. The selection of an HQ of 1.0 would then be inappropriate. The MECP attempts to address this by applying an HQ of 0.2 (0.5 for PHCs, TCE [for inhalation pathways only] and 0.8 for adult exposure to lead) for each exposure scenario (MECP, 2011c).

For human exposures to carcinogens, the risk level is evaluated by comparing the ILCR value for the exposure to a benchmark level that is considered to have negligible cancer risk, generally in the range of 1.0E-04 to 1.0E-06. According to Appendix C – Essentially Negligible Cancer Risk for Contaminated Site Risk Assessment from Health Canada PQRA Part 1, although 1 in 1 million (10^{-6}) cancer risk is the most frequently used risk level for the management of risks posed by environmental contamination, many agencies and provinces (including US EPA), identify a range of increased cancer incidence risk; generally from 1.0E-04 to 1.0E-06 is considered an acceptable risk range, depending on the situation and circumstances of exposure (Health Canada, 2012). The MECP considers 1.0E-06 to be an acceptable cancer risk level. Health Canada considers 1.0E-05 to be a generally acceptable cancer risk level for many potential carcinogens (Health Canada, 2012). Although the MECP conservatively considers an increased chance of cancer developing of one in a million (1.0E-06) to be the acceptable rate of risk for environmental pollutants, such an increase rate of risk is generally not considered measurable with statistical uncertainty, among risk assessors of other jurisdictions. Nonetheless, for the purpose of this RA, a 1.0E-06 risk level was adopted for preliminary quantifications and assessment of cancer risks.

When the HQ or ILCR values are below the threshold levels, it can be concluded that the exposure to the COC is not expected to result in any observable adverse health effects. On the other hand, a predicted HQ value that is greater than the acceptable level does not necessarily indicate potential risks associated with a given exposure scenario. RAs commonly apply overly conservative estimates, such as overestimating the exposure duration, to ensure that the process does not underestimate the potential impacts on human health. HQ values above 0.2 (0.5 for PHCs and TCE [for inhalation pathways only]) may reflect the conservatism and may require a re-evaluation of the model parameters, such as the chemical concentration at the point of exposure and toxicological criteria.

The following subsections describe the results of the risk characterization phase. For COC and pathways that were evaluated quantitatively, ILCR and HQ were approximated for threshold and non-threshold COC, respectively. Predicted risks and calculated risk-based concentration (RBCs) are provided in Section 4.4.2.

For COC and pathways that were evaluated qualitatively, that qualitative assessment is provided in Section 4.4.3.

Proposed RBCs protective of all human receptors for COCs in soil and groundwater are provided in Section 4.4.4.

4.4.2 Quantitative Interpretation of Health Risks

A quantitative comparison of the estimated exposures and the selected exposure limits for receptors under each of the scenarios assessed is provided below in Table 10.

As discussed in Section 4.4.1, for non-carcinogenic effects, where background exposures to COCs are not taken into consideration, the MECP has apportioned 20% (50% for PHCs) of the total exposure to any of environmental medium (e.g., soil or groundwater) under consideration. HQ values for non-carcinogens that are less than 0.2 (0.5 for PHCs and TCE; 0.8 for adult exposure to lead) are considered to represent a situation in which medium-related exposures account for less than 20% (50% for PHCs and TCE; 80% for adult exposure to lead) of the toxicological criterion, and no adverse effects are expected to be associated with the estimated level of exposure. For carcinogenic compounds, the MECP has adopted an acceptable ILCR of 1-in-1,000,000 (1.0E-06).

Table 10: Summary of Quantitative Interpretation of Human Health Risks

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Site Resident (also surrogate for Site visitor, where applicable)	Direct Contact	Soil	**HQ:** Benzo(a)pyrene and lead	E4-22
			ILCR: Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and total carcinogenic PAHs	E4-22
	Indoor Air Inhalation – Residential Building with Basement	Soil	**HQ:** PCE and naphthalene	E4-25A
			ILCR: PCE	E4-25B
		Groundwater	**HQ:** cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, VC, and PHC F1	E4-31A
			ILCR: PCE, TCE, and VC	E4-31B
	Outdoor Air Inhalation	Soil	NA (no risk predicted)	E4-27
		Groundwater	NA (no risk predicted)	E4-33
Long-term Indoor Worker	Indoor Air Inhalation – Future Commercial Slab-on-Grade Building*	Soil	**HQ:** PCE	E4-26
			ILCR: PCE	E4-26
		Groundwater	**HQ:** cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC	E4-32
			ILCR: NA (no risk predicted)	E4-32
Outdoor Maintenance Worker	Direct Contact	Soil	**HQ:** Benzo(a)pyrene	E4-23
			ILCR: Anthracene, benz(a)anthracene, benzo(a)pyrene,	E4-23

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
			benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and total carcinogenic PAHs	
	Outdoor Air Inhalation	Soil	NA (no risk predicted)	E4-28
		Groundwater	NA (no risk predicted)	E4-34
Construction/ Subsurface Utility Workers	Direct Contact	Soil	NA (no risk predicted)	E4-24
		Groundwater	**HQ:** PCE, VC	E4-30
			ILCR: NA (no risk predicted)	E4-30
	Outdoor Air Inhalation (ground level)	Soil	NA (no risk predicted)	E4-29
		Groundwater	NA (no risk predicted)	E4-35
	Trench Air Inhalation	Soil	NA (no risk predicted)	E4-29
		Groundwater	NA (no risk predicted)	E4-35

NA - not applicable.
*No unacceptable risks were identified for the existing commercial building. See Section 4.4.3.6 for additional details.

RMM are required for pathways for which unacceptable risks were predicted as discussed in Section 7 and Appendix P.

The RBCs for each pathway are provided in the individual tables noted in Table 10, above.

4.4.3 Qualitative Interpretation of Health Risks

4.4.3.1 Screening of COCs in Soil

As discussed in Section 3, several parameters were retained as COCs in soil based on exceedances of the Table 3 SCS. The screening of soil COCs against pathway-specific component values is considered a qualitative assessment as no calculations for uptake/dose have been performed and no additional considerations have been given to site-specific parameters that may affect exposure. This screening is summarized in Table E4-1.

The relevant component pathways evaluated in the pathway-specific screening were as follows:

- S1 - soil direct contact including dermal contact and incidental ingestion for a high frequency and low intensity exposure in a residential/parkland/institutional setting;
- S2 - soil dermal contact and incidental ingestion at a lower frequency and intensity in a commercial/industrial/community setting or a residential setting at depth;
- S3 - soil dermal contact, incidental ingestion and soil particulate inhalation protective of workers undertaking excavation works in commercial/industrial/community sites;

- S-IA - soil to indoor air;
- Indoor Air Odour; and,
- S-OA - soil to outdoor air.

The S1 and S2 component values are protective of Site residents (also used as a surrogate for Site visitors in the current RA) and outdoor maintenance worker direct contact soil exposure, respectively, with the exception of dust inhalation, and the S3 values are protective of construction/subsurface utility worker direct contact soil exposure.

The S1 and S2 component values are lower frequency and lower intensity human health exposure scenarios. The dust inhalation exposure pathway was not incorporated in calculating the S1 and S2 component values by the MECP. Given that these component values are calculated using only a soil ingestion and dermal exposure model, without the incorporation of the dust inhalation pathway, we assume that the impact of inhalation of dust particles is deemed minimal by MECP (in comparison to the oral and dermal exposure routes) when considering risks to Site residents and outdoor maintenance workers. Therefore, the dust inhalation pathway was only assessed for soil COCs that exceeded their respective S1 and S2 component values.

Parameters for which the REM concentrations met the applicable component value, no unacceptable risk is anticipated, and the component value was considered as a candidate RBC. For parameters for which the REM concentrations exceeded the component value or no component value was provided, either a qualitative or quantitative evaluation was performed.

It is noted that component values used for screening were updated based on updated TRVs provided by MECP (2024), where applicable.

The parameters in soil for which the REM exceeded a component value, or a component value was not available and was quantitatively assessed is summarized in Table 8 of Section 4.2.3.

It is noted that although the REM for benzo(a)pyrene is above it's respective S-OA component value, the parameter is not considered volatile based on the Henry's Law constant less than 1.05E-05 atm-m^3/mol at the average groundwater temperature of 15 ^oC or the parameter has a vapour pressure less than 1 Torr (MECP, 2019). Therefore, benzo(a)pyrene was not considered to pose a potential risk for the outdoor air inhalation pathways.

As there are no MECP (2011c) component values for the soil to trench air pathway, all volatile COCs were assessed for this exposure pathway as shown in Table 8 of Section 4.2.3.

According to MECP (2011c), the indoor air inhalation component value (S-IA) is protective of indoor air odour. Therefore, this pathway is assessed via the indoor air inhalation component value.

There are no soil component values available that represent exposure to human receptors via ingestion of homegrown produce that may be affected by impacted soil. Exposure to COCs via this pathway is evaluated qualitatively in Section 4.4.3.3.

4.4.3.2 Screening of COCs in Groundwater

As discussed in Section 3, several parameters were retained as COCs in groundwater based on exceedance of the Table 3/7 SCS. This screening is summarized in Table E4-2.

The relevant component pathways evaluated in the pathway-specific screening were as follows:

- GW1 - groundwater direct contact including incidental dermal contact and ingestion;
- GW2 - soil to indoor air; and,

- GW2 Odour.

For parameters for which the REM concentrations met the applicable component value, no unacceptable risk is anticipated, and the component value was considered as a candidate RBC. For parameters for which the REM concentrations exceeded the component value or no component value was provided, either a qualitative or quantitative evaluation was performed.

Component values used for screening were updated based on updated TRVs provided by MECP (2024a, 2024b), where applicable.

The parameters in groundwater for which the REM exceeded a component value and therefore will be quantitatively assessed are summarized in Table 9 of Section 4.2.3.

As there are no MECP (2011c) component values for the groundwater to outdoor air pathway, all COCs, which are considered to be sufficiently volatile, were carried forward for further assessment of this exposure pathway. For construction/subsurface utility workers, the outdoor air pathway also considers the more intense trench exposure scenario as outlined in Section 4.2.3.6.

4.4.3.3 Ingestion of Homegrown Garden Produce

Given the depths to groundwater measured at the Site, and the minimum measured depth of approximately 4.50 m bgs, it is assumed that groundwater will not be in direct contact with the roots of seasonal crop vegetables grown on-Site for consumption purposes. It is unlikely that any seasonal produce grown at the Site will not have roots that extend below 1.5 m bgs.

Based on the Government of Canada's Canadian Environmental Protection Act, 1999, Persistence and Bioaccumulation Regulation (SOR/2000-107), a chemical is bioaccumulative if the logarithm of its octanol-water partition coefficient (log K_{ow}) is equal to or greater than 5. As such, several PAHs (benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene and indeno(1,2,3-cd)pyrene) in soil exceed this criterion. The log K_{ow} values for PCE and several PAHs (anthracene, naphthalene and phenanthrene) in soil were below this criterion. No log K_{ow} values is available for lead. The log Kow of soil COCs on-Site are provided in Table E4-6A.

As such, resident and visitor/trespasser exposure to PAHs (including benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene and indeno(1,2,3-cd)pyrene) in soil via ingestion of homegrown garden produce was considered a complete pathway in the HHRA based on the exceedance of the log Kow criterion. Additionally, as a log K_{ow} is not available lead in soil, exposure to lead was conservatively considered as complete via ingestion of homegrown garden produce in the HHRA. However, it is not anticipated that a significant portion of a resident and/or visitor/trespassers diet would be comprised of homegrown produce and therefore this pathway is considered negligible compared to other applicable pathways (e.g. direct contact, vapour inhalation). However, it was conservatively assumed that unacceptable risks may occur as a result of exposure to select PAHs and lead in soil and therefore RMM are proposed for this pathway as outlined in Section 7 and Appendix P. Any produce garden to be grown at the Site, should be confined to raised planter boxes, separated from direct contact with the known soil impacts.

4.4.3.4 Vapour Skin Contact

The vapour skin contact pathway must be evaluated qualitatively, as the methodology to evaluate dermal transport of vapours across the skin has not developed to a level where exposure can be reliably quantified. This is partly because the vapour permeability coefficient for air used in the transport equation is not well characterized for many substances. In addition, toxicity information for dermal exposure is commonly obtained from studies involving oral exposures, which would add an additional degree of uncertainty to a quantitative assessment. Thus, there is little opportunity for vapour exposure at concentrations that could reasonably be anticipated to penetrate the outer skin layer. It is also expected that relatively low levels of COCs will off-gas from soil and groundwater to ambient air. Thus, risks due to the vapour skin contact pathway are assumed to be negligible and were not considered further in the RA.

4.4.3.5 Risks to Site Visitors

Although Site visitors (recreational users and trespassers) are possible receptors on the RA property upon future residential redevelopment, it is not anticipated that their exposure rates would be greater than the rates for Site residents or long-term indoor workers. Any RMM proposed for the Site residents is assumed to be protective of the Site visitor/trespasser on the RA property, under a residential land use.

Therefore, risks to future Site visitors, under the anticipated future redevelopment scenario, were not calculated and the Site resident is considered a surrogate for these receptors. Any RMM proposed for the protection of the Site resident upon future redevelopment will also be protective of Site visitors (recreational users and trespassers). Soil barriers and vapour mitigation systems are proposed for the direct contact and indoor air inhalation pathways, respectively, as outlined in Section 7 and Appendix P.

4.4.3.6 Risks to Human Receptors (Existing Commercial Site Scenario)

The Site building is anticipated to remain under the current commercial land use and Site configuration, for operation by the Dollarama until such a time as redevelopment of the Site occurs. At this time, the schedule of redevelopment is not known at this time and therefore the existing commercial use of the Site was included for assessment in this HHRA.

As discussed in Section 4.2.2, the assessment of the exposure pathways applicable for the future long-term indoor workers, outdoor maintenance worker, Site visitor/trespasser, and construction/subsurface utility worker are assumed to also be representative of the human receptors present for the existing commercial land use scenario, and no separate calculations have been performed for the receptors anticipated to be present at the Site under the current land use, with the exception of the indoor air inhalation exposure pathway from soil and groundwater impacts at the Site. Based on the quantitative assessment, the following COCs were identified for potential for unacceptable risk via inhalation of indoor air: cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC. PHC F1 was also analyzed due to it's exceedance of the GW2-2 component value. Additionally, 1,1-DCE was analysed as a part of PCE degradation daughter product group.

To evaluate the soil and groundwater to indoor air inhalation exposure pathways within the existing Site building, one (1) Indoor Air Quality (IAQ) sampling event was conducted.

A winter IAQ sampling program was conducted at the existing commercial building at the Site on January 27th, 2025, in a report entitled "Indoor Air Quality Sampling Program (Winter 2025) 1337 Queen Street West, Toronto, ON" prepared by EXP issued on February 12th, 2025. A copy of the referenced IAQ report is provided in Appendix O. Based on the building footprint of approximately 788 m^2 and Table 8b.2 of the MGRA User Guide (MECP, 2016b), three (3) IAQ samples were determined to meet the recommended minimum number of indoor air samples. During the pre-sampling survey, no significant signs of cracking, pitting, weathering and repair marks that are possible entry points were observed. The assessment involved the collection of three (3) IAQ samples and a duplicate to account for spatial variability. In addition, an ambient outdoor air reference sample and a trip blank were submitted with the IAQ samples collected from the building. The ambient outdoor air sample was collected from within the southern portion of the parking lot at the rear of the Site building. The samples were submitted for laboratory analysis of PHC F1, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC. The analytical results of the sampling program were compared against the Human Health Based Indoor Air Criteria (HBIAC) for industrial/commercial/community land use. Based on the results of the IAQ program, all contaminants of concern were within the applicable MECP (2016a) HBIAC, protective of the current commercial land use. To evaluate seasonable variability, a second IAQ event will be completed in the summer of 2025.

Notably, the outdoor air reference sample was identified to have concentrations of all tested parameters below the laboratory RDL, with the exception of PHC F1 (total). This result suggests that exterior sources of PHC F1 (total) may be influencing interior air conditions within Site building. All parameters were identified to be below their respective analytical detection limits within the Trip Blank sample, and all RDLs were identified to be below the applicable HBIAC. Based on field and laboratory quality control measures, the results are deemed acceptable, and no data qualifications are required.

Based on the information provided above, no RMM have been proposed for vapour intrusion within the existing commercial building.

4.4.4 Human Health Property-Specific Standards

RBCs were derived for soil and groundwater COCs that would be protective of human health under each exposure scenario evaluated quantitatively. For carcinogens, the RBCs were derived to ensure that receptors do not experience an increased cancer risk level of greater than 1.0E-06 from exposure to each environmental medium exposure pathway. For non-carcinogens, RBCs were derived to ensure that receptors do not receive an estimated dose exceeding 20% (50% for PHCs and TCE [for inhalation pathways only] or 80% for adult exposure to lead) of the RfD for each environmental medium exposure pathway. The derivation of the RBC is shown below:

$$PSS_{S/GW,carcinogenic\ effects} = \frac{1 \times 10^{-6} \times C_{S/GW}}{ILCR}$$

$$PSS_{S/GW,\ non-carcinogenic\ effects} = \frac{0.2\ (0.5\ for\ PHCs\ and\ TCE, 0.8\ for\ adult\ exposure\ to\ lead) \times C_{S/GW}}{HQ}$$

where:

PSS $_{S/GW,\ Carcinogenic\ effects}$	=	Property Specific Soil/Sediment/Groundwater Standard protective of carcinogenic effects
PSS $_{S/GW,\ non-carcinogenic\ effects}$	=	Property Specific Soil/Sediment/Groundwater Standard protective of non-carcinogenic effects
$C_{S/GW}$	=	Concentration of soil, groundwater, or sediment COC (mg/kg or µg/L)
1x10-6	=	Acceptable ILCR per each environmental medium exposure pathway
0.2	=	Acceptable HQ per each environmental medium exposure pathway (0.5 for PHCs and TCE [inhalation pathway only] or 0.8 for adult exposure to lead)
ILCR	=	Predicted ILCR
HQ	=	Predicted HQ

Proposed risk-based soil RBCs for individual receptors and pathways are provided in Appendix E, Tables E4-36A to E4-39 for toddler residents, composite residents, long-term indoor workers, outdoor maintenance workers, and construction/subsurface utility workers, respectively. Proposed risk-based groundwater RBCs for individual receptors and pathways are provided in Appendix E, Tables E4-41 to E4-44 for Site residents, long-term indoor workers, outdoor maintenance workers and construction/subsurface utility workers, respectively. For COCs where there was more than one pathway for the route of exposure (i.e., inhalation of ambient and trench air), the risks were summed for each medium. For each COC, the minimum of the risk-based back calculated values and/or component values protective of carcinogenic and non-carcinogenic effects and each exposure pathway was selected as the risk-based RBC for each receptor as presented in predicted risk tables for each pathway (Tables E4-22 through E4-29 for soil and E4-30 through E4-35 for groundwater).

RBCs were quantitatively and/or qualitatively derived for all applicable pathways for a COC found in soil and groundwater on the RA property. For exposure scenarios in which the REM concentration was not in excess of the component value, the component value was selected as the RBC for that particular exposure pathway.

Final human health candidate RBC values for soil and groundwater COCs were set at the lowest of the pathway-specific/ receptor-specific values, where the calculated risks for all pathways were within acceptable levels. However, it is recognized that the MECP Guidelines for RA indicate PSS largely in excess of site concentrations are not desirable. As such, if no risk was predicted and the minimum RBC was greater than the REM concentration (i.e. maximum concentration plus 20% to account for sampling and analytical variability), the REM was selected as the final candidate PSS. Proposed RBCs, for COCs for which unacceptable levels of risk were predicted (for any one pathway), were set as the REM in the presence of RMM. These are presented in Tables E4-40 and E4-45 for soil and groundwater, respectively.

Soil COCs

A summary of the final human health RBCs derived for each receptor is provided in Appendix E, Table E4-40.

The final candidate human health PSS values were carried forward for consideration in the selection of the final soil PSS in Section 6.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

Groundwater COCs

A summary of the final human health RBCs derived for each receptor is provided in Appendix E, Table E4-45.

The final candidate human health PSS values were carried forward for consideration in the selection of the final groundwater PSS in Section 6.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

4.4.5 Special Considerations

Section 41 of O. Reg. 153/04 dictates certain restrictions in application of SCS for environmentally sensitive areas. The site was not identified as an environmentally sensitive area as discussed in Section 3.3.1.

Section 43.1 of O. Reg. 153/04 defines the restrictions in application of SCS for shallow soil property or water body. As discussed in Section 3.2.1, bedrock was not encountered at depths of 2 m bgs or less. Thus, the site is not considered to be shallow soil property. Furthermore, the RA property is not located adjacent to, nor within 30 m of, a surface water body.

Based on the above information, and as discussed in Section 3.3.1, the COCs for the site were determined based on a comparison to Table 3 (and/or 7 Standards for volatile groundwater parameters). Therefore, no further considerations are required to justify the PSS values that were proposed in the HHRA.

4.4.6 Interpretation of Off-Site Health Risks

The proposed human health PSS were evaluated as to whether they would result in a concentration greater than the applicable full depth SCS for the nearest off-site receptor.

Surrounding properties include mixed residential, commercial, and community land uses to the north and west; commercial land use to the east; and mixed residential, community, and parkland land uses the south. The nearest off-site receptors downgradient of the site are property residents (including toddlers), property visitors (recreational and trespasser), long-term indoor workers, and outdoor maintenance workers of the neighbouring residential/community/parkland properties. Construction/subsurface utility workers may also be present at these properties.

Movement of soil off-site is assumed to be minimal under normal site conditions but might result in concentrations exceeding the Table 3 SCS at the nearest off-site receptors during development or other soil works where excessive dust is generated. Hard and/or fill capping is required as an RMM to protect on-Site receptors and a SGMP is also recommended during any future Site works. These RMMs will provide protection to off-site receptors in addition to those on-Site.

On any site with groundwater contamination, the potential for migration of impacted groundwater to downgradient off-Site locations presents a possible risk of exposure and adverse effects on the health of off-Site human receptors. As discussed in Section 3.2.2, regional and local groundwater flow is anticipated to be south/ southeast toward Lake Ontario, located approximately 950 m away from the Site.

Based on the most sensitive adjacent land use, the Table 3 SCS for residential/parkland/institutional property use was identified as the applicable full depth Standard for the nearest downgradient off-Site human receptors. The nearest off-Site receptors downgradient of the Site are the residents of the residential building and the visitors of the community building southeast of the Site.

Given the anticipated groundwater flow to the southeast, concentrations of groundwater COCs along the south and east property boundaries were reviewed with respect to Table 3 SCS. Based on the results of the groundwater sampling along the south and east property boundaries, the concentrations of cis-1,2-DCE, trans-1,2-DCE, PCE, and TCE have the potential to exceed the Table 3 SCS at the nearest off-site human receptors in the south/southeast direction. To control the potential for off-Site groundwater migration within the southern portion of the Site, a boundary control measure in the form of an injectable permeable reactive barrier (PRB) has been proposed within Section 7 and the RMP (Appendix P). The boundary control has been installed along the southern property boundary in order to mitigate the potential off-Site migration of COCs in groundwater.

Based off the results of the vertical delineation of the well pairs BH/MW1-D and BH/MW101, BH/MW2-D and BH/MW2-S, and MW2 and BH/MW3-D, the PRB was proposed to be installed at a depth of six (6) to nine (9) m bgs to target the interval of identified groundwater impacts. Green Infrastructure Partners (GIP) was retained to install the PRB which spans a distance of approximately 40 m long by 3.0 m wide and extends between depths of 6 to 9 m bgs. It was installed through the completion of approximately 40 direct-push injection points to a maximum depth of 9 m bgs. A total of 12,010 L of an approximately 25% concentration of Geoform ER slurry was injected under pressure into the injection points, at approximately 300 L per injection point. The injection of Geoform ER promotes the degradation of the VOCs via in-situ chemical reduction (ISCR) and anaerobic bioremediation. GeoForm ER can create expanded treatment areas beyond the injection area, to provide additional zones for treating VOCs in soil and groundwater. In addition to abiotic degradation, GeoForm ER can also promote biotic degradation for better performance of PRB applications.

Three (3) boreholes BH/MW201 to BHMW203 were drilled up to a depth of approximately 9 m bgs and terminated within the silty sand till along the southern property line and installed as monitoring wells in December 2024 to evaluate performance of the PRB following installation. An ongoing post-installation monitoring program – six (6) months of monthly groundwater monitoring from the newly installed downgradient wells after the completion of the PRB installation, including the collection of groundwater samples for the laboratory analysis of VOCs from the three (3) newly installed monitoring wells as well as three (3) existing wells. At the time of each sampling event, one (1) field duplicate and one (1) trip blank sample will be collected and submitted to the laboratory as a measure of QA/QC. Currently, the program has not been completed. A PRB summary report will be completed to include the details of the supplemental drilling, PRB installation and the PRB performance monitoring program once they are completed.

4.4.7 Discussion of Uncertainty

Given the many assumptions used in the HHRA, there are uncertainties in the risk characterization, as discussed below. However, as the HHRA adopts a high degree of conservatism, the uncertainties are not likely to result in underestimation of potential health risks.

- The assessment assumes that all human receptors are exposed to the REM soil and groundwater concentrations for the full exposure duration used in risk calculation. In reality, the REM soil concentrations are not found throughout the entire RA property, and human receptors are not expected to stay only within the area of maximum concentrations throughout the entire duration of exposure. These assumptions will result in over estimation of risks.
- It is assumed that outdoor maintenance workers spend 56 years on-site, which is highly conservative. Canadian statistics show that it is highly unlikely that a person would spend a lifetime at one job. It is even more unlikely that the person would spend all of his or her on-site time in the vicinity of the maximum soil and/or groundwater concentrations throughout the 56 years. Thus, the risks to outdoor maintenance worker are likely overestimated.
- The breathing rate of the construction/subsurface utility worker was assumed to be elevated compared to the average person, for the duration of this receptor's time spent on the RA property. In reality, the breathing rate of this receptor is likely to be elevated for only a portion of the day.
- The prediction of indoor air concentration of COCs is likely to be highly conservative. The US EPA Vapour Intrusion Model and the assumptions used are widely regarded as very conservative such as assuming that the entire building footprint is underlain by soil and/or groundwater COCs at maximum concentrations. However, it is noted that the use of the J&E model using soil concentrations may underestimate risk due to the potential for vapour loss due to volatilization during soil sampling, preservation and chemical analysis (OSWER, 2015).
- The assessment assumes that maximum soil and/or groundwater concentrations exist throughout the entire RA property, and the concentrations remain constant over time. In reality, the concentrations and bioavailability of most COCs will decrease over time due to natural processes such as dilution from surface infiltration, dispersion, chemical and/or biological degradation, precipitation, and sorption.
- The characterization of risks to non-carcinogenic COCs assumed that the acceptable HQ was 0.2 (0.5 for PHCs and TCE for adult exposure to lead) per exposure pathway (e.g. inhalation of indoor air, dermal contact). This assumption conservatively reserves 80% (50% for PHCs and TCE and 20% for adult exposure to lead) of the RfD to other exposure pathways and sources of exposure (e.g., food items, consumer products, etc.). For instance, a toddler resident who spends 24 hours indoors, under the assumptions of the GW2 exposure pathway, would have minimal exposure to contaminants via ingestion of soil outdoors. For many contaminants, sources of exposure other than contaminated environmental media may be negligible.

Each of the individual assumptions made in the exposure and toxicity assessments are most often conservative in nature, so as to err on the side of caution when addressing uncertainties. The compounding effect of multiple conservative assumptions is that the overall estimate of risks is also likely to be very conservative. As a result, the RA conclusions are assumed to be based on overestimations of the actual risks to human receptors on a given property.

5. Ecological Risk Assessment (ERA)

5.1 Problem Formulation

As required by O. Reg. 153/04, an ERA was conducted as part of the current RA. The purpose was to evaluate the potential impacts of contaminants in soil and groundwater on ecological receptors.

The Problem Formulation for the ERA includes preparation of an ECSM and defining the RA objectives.

5.1.1 Ecological Conceptual Site Model

The conceptual model combines the information gathered during the problem formulation phase and provides a summary of the exposure scenarios to be evaluated in the ERA. These conceptual exposure scenarios represent the interactions of the COCs with receptors via the various exposure pathways.

An ECSM was developed based on information obtained during the investigations of the RA property describing the site geologic and hydrogeologic conditions, the COCs, and their distribution in soil and groundwater (see Section 3). Based on the site information, review of the chemical and physical properties of the COCs and the anticipated future mixed residential and community land use, potentially complete exposure pathways were identified for quantitative or qualitative evaluation in the ERA.

Regardless of future development plans for the property, the current RA is required to assess risks to ecological receptors, assuming the potential for direct contact with all on-site soils without any barriers or restrictions and must consider the potential for contact with groundwater beneath the property and/or soil and groundwater COCs in any nearby surface water bodies.

The ECSM provides an outline of the general exposure scenarios to be evaluated by bringing together the COCs, receptors and exposure pathways into one overall conceptual framework (Figure 26A). As RMM (Section 7) are required for protection of ecological receptors on the RA property, an additional ECSM is provided to show exposure scenarios in the presence of RMM (Figure 26B).

Contaminants of Concern

The soil COCs are listed in Section 3.3.2 and include select PAHs, PCE, and lead. The Groundwater COCs are listed in Section 3.3.3 and include PHC F1, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC.

Exposure Pathways and Receptors

It is not possible to evaluate risks to all species within a complex ecosystem. Therefore, for the purpose of the ERA, VECs are selected to represent groups of organisms with a variety of feeding and behavioural characteristics. Terrestrial VECs are generally selected based on recommended representative species from the MECP Rationale Document (2011c) and are considered by MECP to be "typical of agricultural or natural ecosystems in Southern Ontario". Terrestrial VECs include plants, soil invertebrates and terrestrial wildlife. VECs have also been identified for the off-Site aquatic environment, for the purpose of assessing the soil leaching and erosion pathway and the groundwater migration to sediment and surface water pathway in this RA. These receptors are discussed in Section 5.2.

Based on the COCs identified, the potential pathways by which the on-Site receptors can be exposed to the COCs include:

- Direct exposure to soil COCs through root uptake (plants);
- Direct exposure to soil COCs through dermal contact, incidental ingestion and/or soil particulate inhalation (soil invertebrates and terrestrial mammals and birds);
- Ingestion of impacted food/prey by soil invertebrates and terrestrial mammals and birds;

- Indirect exposure to volatile COCs released from soil and groundwater to ambient air through atmospheric deposition (plants); and,
- Indirect exposure to volatile COCs released from soil and groundwater to ambient air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds).

The potential pathways are further discussed in Section 5.3.1.

Off-Site terrestrial receptors may come into contact with soil/dust containing soil COCs as well as soil COCs through volatilization and subsequent stem and foliar uptake (plants) and inhalation (soil invertebrates, mammals and birds). Therefore, these pathways are marked complete on the ECSM (Figure 26A). Due to the low mobility of soil, all other exposure pathways are considered incomplete for off-Site terrestrial receptors. Furthermore, given that on-site ecological receptors are assumed to spend 100% of their time on-Site (see Section 5.3), off-Site receptors are not assumed to be exposed to soil COCs via ingestion of plant and animal tissue.

Based on the minimum depth to groundwater of approximately 4.50 mbgs, groundwater on-Site is not found within the depth at which plant root uptake is considered to be likely and therefore, these pathways are considered incomplete for off-Site terrestrial plants in the ECSM (Figure 26A).

Off-Site aquatic and semi-aquatic receptors, in addition to terrestrial mammals and birds, may be exposed to soil COCs indirectly via soil leaching to groundwater and the subsequent migration to surface water and to groundwater COCs via migration to surface water. Based on the separation distance between the Site and nearest downgradient surface water body, Lake Ontario located approximately 950 m south/southeast of the Site, the soil erosion exposure pathway was considered to be incomplete.

5.1.2 Risk Assessment Objectives

The objectives of the current ERA are to:

- Quantitatively or qualitatively evaluate ecological risks associated with exposure to impacted soil and groundwater;
- Develop PSS that are protective of ecological receptors under the future mixed community and residential land use of the Site; and,
- Identify any RMM necessary to mitigate on-site ecological receptors’ exposures based on the results of the ERA, if required.

The current assessment assumed that ecological receptors would be exposed to soil and groundwater COCs at levels currently found on-Site. The potential risks to aquatic receptors in the off-Site water body were assessed for soil COCs leaching to groundwater and subsequently migrating to the nearest surface water body and for groundwater COCs migrating to the nearest surface water body. To assess the potential risks to ecological receptors, both quantitative and qualitative assessment approaches are used in the current ERA.

The environmental conditions of the RA property were investigated through Phase Two ESAs conducted by TEC and EXP between 2022 and 2025. The data collected were used to characterize conditions for the current RA. The work completed by TEC and EXP included the collection of soil and groundwater samples for chemical analysis from different locations to assess conditions at the APECs. Sampling programs were conducted following acceptable field protocols and QA/QC measures in order to provide representative data of acceptable accuracy and precision. The programs were evaluated as to their representativeness, completeness, accuracy, and precision to minimize uncertainty and meet the RA data quality objectives. Analytical programs were undertaken by qualified laboratories employing applicable QA/QC protocols to minimize uncertainty and provide accurate and representative data.

As discussed in Section 3.3.6, the extent and magnitude of the soil and groundwater impacts have been sufficiently defined and, in the opinion of the QP_{ESA}, meet the data quality objectives of the current ERA. Furthermore, assessment of laboratory QA/QC data (Section 3.3.5), showed that analytical data of acceptable quality meeting the objectives of the RA were provided.

The ERA objectives were set by identifying the receptors and exposure pathways relevant to the RA property. The ERA assumes a hypothetical ecological receptor that could potentially be exposed directly or indirectly to the COCs. The ERA assumes general physical and behavioural characteristics specific to the receptor type, such as body weight, soil and food ingestion rates, to quantify the chemical exposure of the receptor.

The ERA is designed to provide a comprehensive assessment of the risks to ecological health. In this ERA, VECs are receptors selected to be representative of groups of species that are common components of natural ecosystems found in southern Ontario and are the same as those recommended by MECP (2011c) as further discussed in Section 5.2. The receptors selected to be VECs are intended to represent the variety of organisms found on-site and address their different characteristics such as feeding habits and behavioural traits. VECs include on- and off-site terrestrial receptors and off-site semi-aquatic and aquatic VECs. The protection of VECs is intended to be on a community/population level. Based on the COCs identified, the relevant pathways evaluated in the ERA were identified as outlined in Section 5.3.1.

To assess the potential risks to ecological receptors, both quantitative and qualitative assessment approaches are used in the present ERA as presented in Sections 5.5.2 and 5.5.3.

In undertaking any RA, there are various sources of uncertainty, which must be taken into account when setting the RA objectives. These uncertainties are associated with the field sampling and analytical programs, the characterization of the site geologic and hydrogeologic conditions, the evaluation of contaminant fate and transport mechanisms, the evaluation of receptor characteristics and behaviour patterns and the assessment of chemical toxicological effects. Conservative assumptions are also applied in the evaluation of receptor characteristics and behaviour patterns that are representative of the current and future land uses at the RA property. The overall tendency is to apply conservative assumptions in all areas of the risk analysis to compensate for data and information limitations and uncertainty. As a result, it is more likely that overestimated exposures, hazards, and risks are reported in the RA than underestimates. The uncertainties associated with the exposure assessment, hazard assessment and risk characterization are discussed further in the individual sections, below.

5.2 Receptor Characterization

In this RA, VECs are receptors selected to be representative of groups of species that are common components of natural ecosystems found in Southern Ontario. The selection of VECs is generally based on natural feature studies conducted on the area of interest or on areas that have a similar land use and ecological state. The receptors selected to be VECs are intended to represent the variety of organisms found on-site and address their different characteristics such as feeding habits and behavioural traits. However, because the RA property is located in an urban area and protection is intended to be on a community/population level, and not for individual organisms, surrogate representative species were used. For the purpose of this RA, all terrestrial VECs were chosen from those recommended by MECP (2011c). These terrestrial receptors “represent groups of species that are typical of agricultural and natural ecosystems in Southern Ontario and include most of Ontario in their breeding range” (MECP, 2011c). VECs have been identified for the on- and off-site terrestrial and off-site aquatic environments.

As it is not possible to evaluate all ecological species at a Site, representative VECs are selected based on several criteria (Suter, 1989; CCME, 1997), including:

- Threatened or endangered species;
- Sensitivity to the COCs on the property;
- Biological and ecological relevance;
- Ability to measure or predict effects; and,
- Social relevance (species of recreational, commercial, or social importance).

To determine whether threatened or endangered species may frequent the site, MNRF “Make a Map: Natural Heritage Areas” listings were searched for threatened or endangered species. As discussed in Section 3.3.1, no threatened or endangered species were retained as VECs for the site.

The individual VECs considered for the RA are discussed in the following sub-sections.

5.2.1 VECs in the Aquatic Environment

As discussed in Section 3.2.2, the nearest surface water body is Lake Ontario, located approximately 950 m south/southeast of the Site. Therefore, within this assessment, potential risks to various species of fish, invertebrates, amphibians, and aquatic plant species were evaluated to ensure that populations of these groups can successfully survive, grow, and reproduce in off-site bodies of surface water that may be influenced by the migration of COCs from on-Site soil and groundwater. Semi-aquatic birds such as the Mallard Duck and Canada Goose and semi-aquatic mammals such as the American mink were also identified as potential VECs near Lake Ontario. All the above-noted VECs were assessed as a group using MECP (2011c) screening component values (see Section 5.5.3). Per the MECP (2011c), the S-GW3 component value assesses the movement of a substance from soil to groundwater then to aquatic receptors in a surface water body, and the GW3 component value addresses the potential for environmental impacts to aquatic biota when contaminated groundwater discharges into surface water bodies. Therefore, the S-GW3 and GW3 component values present protection to a population level of all aquatic receptors identified in the ERA. It is noted that current knowledge and information on the toxicology and exposure characterization for amphibians are limited. Given the current toxicity data for amphibians is not adequate to perform a quantitative assessment in the ERA, these VECs were not evaluated separately from the MECP (2011c) component values. The uncertainty associated with applying the MECP (2011c) component values for amphibians is discussed in Section 5.5.7.

5.2.2 VECs in the Terrestrial Environment

Given the location of the Site in an urban environment and the intended mixed community and residential land use of the RA property, terrestrial vegetation, soil invertebrates, mammals and birds were considered possible groups of VECs for the current assessment, which are exposed to COCs in on-Site soil and groundwater. These were assessed as a group using MECP (2011c) screening component values. As discussed above and in Section 5.1.2, protection is intended to be on a community/population level, and not for individual organisms, however for the purpose of the RA, surrogate species were used to represent each trophic group.

The RA property may be frequented by some common bird species that would consume earthworms and other invertebrates, as well as seeds or fruit. The American Woodcock, Red-Winged Blackbird and Red-Tailed Hawk were selected to represent birds that consume significant amounts of soil invertebrates only (American Woodcock), vegetation only (Red-Winged Black Bird) and prey on small mammals and are readily subjected to increased exposure of chemicals that may bioaccumulate (Red-Tailed Hawk).

A few common mammals may also frequent the RA property, such as the Meadow Vole and Short-Tailed Shrew. Meadow Voles and Shrews are likely to receive relatively large chemical doses because they consume a large amount of food relative to their body weight. They will also commonly ingest soil during feeding. The Meadow Vole and Short-Tailed Shrew were selected to represent small mammals. The Meadow Vole is estimated to have a diet composed of 100% vegetation while the Short-Tailed Shrew is assumed to consume 100% soil invertebrates. The Red Fox was considered a VEC to represent large mammals. It is noted that given the current and intended configuration of the Site, it is not anticipated that suitable breeding habitat will be present for mammals and birds on the RA property.

Thus, the following terrestrial VECs were considered:

- Earthworms (soil invertebrates)
- Plants (trees, grasses, etc.) representative of landscaping on a residential/commercial/parkland property
- Meadow Vole – represents an herbivorous small mammal
- Short-Tailed Shrew – represents a vermivorous small mammal (consumes mostly terrestrial invertebrates)
- Red Fox – represents a carnivorous large mammal
- Red-Winged Blackbird – represents an herbivorous bird

- American Woodcock – represents a vermivorous bird (consumes mostly soil invertebrates)
- Red-Tailed Hawk - represent carnivore birds that prey on small mammals and are readily subject to increased exposure of chemicals that may bioaccumulate

Although large mammals are not likely to inhabit the property given the location of the property in a commercial/residential area of a highly developed urban area, the Red Fox was conservatively considered a VEC in the RA.

Given the Site is in a highly urban area and away from any bodies of water, reptiles and amphibians are not expected to be present on-Site. It is assumed that the same terrestrial VECs as on-Site may be present off-Site.

In connection with the selection of VECs, assessment endpoints are identified for the ERA. Assessment endpoints are the explicit expressions of the actual environmental value that is to be protected (Suter, 1989). The assessment endpoints selected for evaluation in this ERA are survival, growth, and reproduction. Thus, risks to all terrestrial VECs were evaluated based on these assessment endpoints and no others i.e., metabolic or biochemical endpoints or biomarkers. The assessment endpoints selected for evaluation in this ERA are outlined in MECP (2011c), which describes how the MECP component values were derived.

Given the current toxicity data for reptiles and amphibians is not adequate to perform a quantitative assessment in the ERA, these VECs were not evaluated separately from the MECP (2011c) component values. The uncertainty associated with applying the MECP (2011c) component values for reptiles and amphibians is discussed in Section 5.5.7.

5.3 Exposure Assessment

The exposure assessment includes an analysis of the pathways through which VECs may be exposed to COCs and an estimate of the levels to which they are exposed.

The REM COC concentrations measured in soil and groundwater, as summarized in Tables E5-1 and E5-2 of Appendix E, respectively, were applied as EPCs in the ERA. The REM is calculated as the maximum measured concentration + 20% to account for sampling and analytical variability.

5.3.1 Pathway Analysis

Ecological receptors may be exposed to chemicals via several potential exposure pathways which are listed below:

- Direct exposure to soil COCs through root uptake (plants);
- Direct exposure to soil COCs through dermal contact, incidental ingestion, and/or soil particulate inhalation (soil invertebrates and terrestrial mammals and birds);
- Ingestion of impacted food/prey by soil invertebrates and terrestrial mammals and birds;
- Indirect exposure to volatile COCs released from soil and groundwater to outdoor air through atmospheric deposition (plants); and,
- Indirect exposure to volatile COCs released from soil and groundwater to outdoor air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds).

Off-Site receptors on neighbouring properties, as well as the nearest surface water body may potentially encounter the COCs present in the soil and groundwater of the RA property. The potential exposure pathways by which these receptors can be exposed to the Site COCs include:

- Direct exposure to soil COCs through particulate inhalation (terrestrial birds and mammals);
- Indirect exposure to volatile COCs released from soil and groundwater to outdoor air through atmospheric deposition (plants);

- Indirect exposure to volatile COCs released from soil and groundwater to outdoor air through inhalation and dermal contact (soil invertebrates and terrestrial mammals and birds);
- Direct exposure to surface water through root uptake (aquatic plants);
- Direct exposure to surface water through dermal contact and ingestion (terrestrial birds and mammals, aquatic invertebrates, aquatic birds and mammals, amphibians, and fish);
- Indirect exposure through ingestion of impacted plant and animal tissue by terrestrial birds and mammals, aquatic invertebrates, aquatic birds and mammals, amphibians, and fish; and,
- Direct exposure to surface water through gill intake (aquatic invertebrates, amphibians, and fish).

The following pathways were considered incomplete in the ERA and were therefore not assessed in the ERA:

- Direct contact with impacted groundwater is not anticipated for on- or off-Site terrestrial plants, soil invertebrates, mammals and birds given the depth to groundwater is below typical rooting depths for urban vegetation and that these receptors typically avoid saturated soils (see additional details below);
- Since there are no surface water bodies on-site, surface water exposure pathways for on-Site ecological receptors are incomplete;
- As soil has limited mobility, dermal contact and incidental ingestion pathways were considered negligible for off-Site receptors and therefore were considered incomplete; and,
- Given that on-Site ecological receptors are assumed to spend 100% of their time on-Site, off-Site terrestrial ecological receptors are not assumed to be exposed to soil COCs via ingestion of plant and animal tissue.

The exposure pathways that were included in the ERA are described in further detail below for each VEC and are depicted in the ECSM (Figure 26A).

Terrestrial Plants

The ERA assumed terrestrial plants would be exposed primarily to COCs in soil via root uptake. Roots generally remain within the top 1 m of soil, which provides the most favourable conditions for root growth (Craul, 1992). Studies have shown that 80% of the roots of most trees lie within the top 30 cm of soil (Himelick, 1986), while 94% of Kentucky bluegrass roots are found within this zone (Stewart et al., 2004). Under nursery conditions, it was demonstrated that the natural root distributions of seven species of trees (Norway, Red and Sugar Maple, Green Ash, Redbud, Ginkgo, Pin Oak) were most developed at 13-38 cm (Watson and Himelick, 1982). As the minimum depth to groundwater at the site was measured to be approximately 4.50 m bgs, root uptake of groundwater COCs is not considered a complete exposure pathway.

Plants could also potentially be exposed to soil COCs via the atmospheric deposition of on-site COCs being transferred to the atmosphere via volatilization. However, exposure via volatilization was considered to be insignificant compared to the direct contact exposure pathway due to dilution of vapours in outdoor air. Therefore, this exposure pathway was not assessed separately. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is often based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway. Therefore, exposure and risks to terrestrial plants are predicted by comparing COC concentrations in soil to concentrations that have been determined to be acceptable for growing plants. The direct contact component values protective of terrestrial plants and soil invertebrates (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Soil Invertebrates

The feeding and burrowing habits of soil invertebrates determine the exposure of these organisms to COCs in soil. Invertebrates that may be exposed to COCs in soil include mites, woodlice, snails and slugs, nematodes, insects, spiders, centipedes, carabid beetles, and many others. Some invertebrates, such as many earthworm species, are exposed to COCs in soil because they ingest large amounts of soil during feeding. Soil invertebrates could also be exposed to soil COCs via direct dermal contact and inhalation of vapours of soil COCs in ambient air. The exposure to soil COC via inhalation of vapours in ambient air was considered to be insignificant compared to the direct contact and ingestion exposure pathways. However, there is insufficient information to evaluate this pathway for individual organisms. Therefore, this pathway was not assessed separately. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is usually based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway. To assess exposure and risk to soil invertebrates, COC concentrations in soil are compared to concentrations that have been deemed acceptable for soil invertebrate populations. The direct contact component values protective of terrestrial plants and soil invertebrates (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Terrestrial invertebrates are likely to avoid water-saturated soils at and within a groundwater table, as this zone would not have suitable organic substrates or oxygen required for survival. They are generally found within the first 30 cm of soil, where the bulk of plant roots and biological activity takes place. Thus, terrestrial invertebrates are not anticipated to come into contact with groundwater on the RA property and this exposure pathway was considered to be incomplete in the ERA.

Terrestrial Wildlife

Wildlife may be exposed to COCs in the environment via three distinct pathways: ingestion, inhalation, and dermal contact. Ingestion of COCs can occur via consumption of food containing the COC and by incidental ingestion of impacted soil. Inhalation is a potential exposure pathway for chemicals that are volatile, or if they are attached to fine particulate matter suspended in ambient air. Inhalation toxicity data for mammalian wildlife are limited for endpoints of interest in the ERA (e.g., reproduction) and little data exists for avian species.

Dermal exposure occurs when COCs contact and/or are absorbed through the skin, as a result of direct contact with impacted soil. Dermal exposure is generally assumed to be negligible for birds and mammals because feathers on birds and fur on mammals reduce dermal exposure by limiting the contact of skin with chemicals in soil (Sample et al., 1997). It should be noted that, as per MECP (2011c), there is currently insufficient information to add modeling for inhalation and dermal exposure of terrestrial wildlife to this process, and it is commonly thought that inhalation and dermal exposure are not significant pathways of exposure. As such, these pathways were not analyzed quantitatively for the purposes of this ERA and were assessed qualitatively in Section 5.5.3. However, incidental ingestion of soil may occur during feeding and grooming, and exposure to soil COCs that have accumulated in food items is also considered a possible exposure route. Hence, exposure via ingestion of food and soil is the only exposure pathway considered quantitatively in this ERA for both mammalian and avian receptor groups. This pathway is generally the most significant exposure route of terrestrial species to environmental contaminants. The direct contact component values protective of terrestrial wildlife (MECP, 2011c) were used as the screening benchmark, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

Only terrestrial mammals that burrow have the potential to come into direct contact with groundwater. Potential for direct contact to groundwater by the Short-Tailed Shrew and Meadow Vole is considered to be minimal as these small mammals have shallow burrows and are likely to avoid water-saturated soils. Short-Tailed Shrews tend to burrow in leaf litter and fallen grasses within 0.1 m of the surface (Ballenger, 2000), while Meadow Voles create shallow surface tunnels or runways and use existing burrows only occasionally. As a result, it is unlikely for terrestrial mammals on the RA property to come into direct contact with groundwater and, therefore, direct contact to this medium was considered an incomplete exposure pathway.

Off-Site Receptors

Off-Site terrestrial receptors may be exposed to COCs in soil via direct contact with soil/dust. Although movement of dust off-Site is possible, particularly that generated during redevelopment activities, inhalation of dust is not considered to be a significant exposure pathway for ecological receptors.

Off-Site aquatic receptors may be exposed to COCs in soil indirectly via soil leaching to groundwater and the subsequent migration to surface water. Various aquatic species including fish, invertebrates, reptiles, amphibians, and aquatic plant species were considered as aquatic VECs present in an off-Site water body that may be influenced by the migration of COCs from on-Site soil. Generally, aquatic animals including fish, invertebrates and amphibians can be exposed to the COCs in a water body via skin/scale absorption, water ingestion and food ingestion. Based on the physical chemical properties of a compound, any of the above exposure pathways might be considered either significant or negligible. For example, hydrophobic compounds, if they are released to a water body, will generally partition to organic particulate matter and ultimately precipitate into the sediment. As long as these compounds partition to the particulate matter they are less bioavailable for direct uptake by fish.

Aquatic vegetation will be exposed to COCs in a water body via root uptake of surface water and stem uptake through direct contact with surface water.

The S-GW3 and GW3 component values protective of the soil leaching to groundwater and subsequent migration to surface water and groundwater migration to surface water (MECP, 2011c), was used as the screening benchmarks for evaluation of risks to aquatic receptors, where available. This screening is considered a qualitative assessment and is provided in Section 5.5.3.

5.3.2 Exposure Estimates

The soil and groundwater ecological component values for plants and soil invertebrates, and for aquatic receptors, are point of contact values, since the majority of toxicological literature for these receptor groups is based on studies where exposures are reported in terms of media concentrations, as opposed to uptake or dose metrics. Therefore, no calculations for uptake/dose have been performed for these pathways/receptors. As the aerial extent of the maximum COC concentration (and, thus, the REM) was assumed to be the entire site footprint, exposure was assumed to take place at all times, while the receptor is present on-site for these pathways and receptor groups. Although birds and mammals are mobile receptors that will forage from a large home range, risks to these receptors were also based on the REM of the COCs in soil. To be conservative it is assumed that the applicable ecological receptors are present on-site and would be exposed to COCs in soil 100% of the time. Therefore, the REM soil and groundwater COC concentrations were used to predict risks to all ecological receptors in the ERA.

The REM concentrations in soil and groundwater are presented in Tables E5-1 and E5-2 of Appendix E.

Exposure modeling for uptake via soil ingestion and dietary food items by terrestrial mammals and birds is presented in Section 5.3.2.1, below. Note that exposure modeling was only performed for parameters carried forward for assessment of this pathway where the benchmark was based on a dose (i.e. mg/kg-bw/day) rather than a soil concentration (see Table E5-8B).

5.3.2.1 Exposure Modeling for Terrestrial Wildlife

Exposure of wildlife (mammals and birds) to soil COCs may occur by consumption of COCs in soil directly or through consumption of food sources that have been exposed to COCs, as represented by the following equation:

$$E_{ingestion} = E_{food} + E_{soil}$$

where:

$E_{ingestion}$	=	Total ingestion exposure (mg/kg/day)
E_{food}	=	Exposure from food consumption (mg/kg/day)
E_{soil}	=	Exposure from soil consumption (mg/kg/day)

Exposure from food ingestion is estimated by the following equation:

$$E_{food} = (C_{food} \times IR_{food}) / BW$$

where:

E_{food}	=	Exposure from food consumption (mg/kg/day)
C_{food}	=	Concentration of chemical in food (mg/kg)
IR_{food}	=	Ingestion rate (kg/d)
BW	=	Body weight (kg)

Similarly, exposure from soil ingestion is estimated by the following equation:

$$E_{soil} = (C_{soil} \times IR_{soil}) / BW$$

where:

E_{soil}	=	Exposure from soil consumption (mg/kg/day)
C_{soil}	=	Concentration of chemical in soil (mg/kg)
IR_{soil}	=	Soil ingestion rate (kg/d)
BW	=	Body weight (kg)

To ensure a conservative RA approach, it was assumed that 100% percent of the terrestrial receptor diet originated from on-site resources. The moisture content of dietary items was assumed to be 84% for earthworms and 70% for terrestrial vegetation (Sample and Suter, 1994). The wet weight consumption rates for the American Woodcock and Red-Winged Blackbird in Table E5-4 were converted into dry weight consumption rates using the moisture content of dietary items. As such, dry weight consumption rates are calculated as follows:

Consumption of invertebrates for American Woodcock

$$0.15 \text{ kg wet weight/ day} \times (1-0.84) = 0.024 \text{ kg dry weight/ day}$$

Consumption of plants for Red-Winged Blackbird

$$0.091 \text{ kg wet weight/ day} \times (1-0.7) = 0.0273 \text{ kg dry weight/ day}$$

The dry weight consumption rates of the other bird, Short-Tailed Shrew, Meadow Vole, Red Fox, and Red-Tailed Hawk were calculated using the same rationale.

In the current ERA, the contaminant concentrations in food items (*e.g.*, plants and soil invertebrates) consumed by mammals and birds were calculated using the following methods:

Tissue Concentrations in Plants - Organic Chemicals

To estimate plant tissue concentrations of organic chemicals, the maximum COC concentration in soil was multiplied by the chemical-specific soil-to-plant bioconcentration factor (BCF). An example is provided below for benz(a)anthracene.

$$C_{plants} = C_{soil} \text{ x BCF}$$

where:

C_{plants}	=	Concentration of chemical in plants on a dry weight basis (mg/kg)
C_s	=	Soil concentration (mg/kg) (89 mg/kg for benz(a)anthracene)
BCF	=	Bioconcentration factor (1.81E-02 for benz(a)anthracene)

To estimate the soil-to-plant BCF, the following equation, expressed in Travis and Arms (1988), was used:

$$\text{Log(BCF)} = 1.588 - 0.578 \text{ x Log}(K_{ow})$$

where:

$\text{Log}K_{ow}$	=	Log Octanol-water partitioning coefficient (unitless; 5.76E+00 for benz(a)anthracene)

Log K_{OW} values used in this RA are provided in Table E5-5. The plant tissue concentrations of soil COCs are presented in Table E5-6.

Tissue Concentrations in Soil Invertebrates – Organic Chemicals

To calculate the uptake of non-ionic organic contaminants from soil into the soil invertebrates, the model described in *Attachment 4-1* of *the US EPA Guidance for Developing Ecological Soil Screening Levels* (2007) was used. In this model, concentrations of non-ionic organic contaminants moving from soil into soil invertebrates are calculated as a function of the degree of partitioning between soil pore water and invertebrates. The following equations explain this phenomenon (benz(a)anthracene provided as an example):

$$C_{worm} = K_{ww} \text{ x } C_w$$

where:

C_{worm}	=	Concentration in worm (mg/kg dry weight)
K_{ww}	=	Biota to soil water partitioning coefficient (L soil pore water/kg wet weight tissue; 1.03E+03 L soil pore water/kg wet weight tissue for benz(a)anthracene, accounting for 16% solids, see below)

C_w = Concentration in the soil pore water (mg/L soil pore water; 7.70E-02 mg/L soil pore water for benz(a)anthracene)

In the case of lipophilic chemicals, K_{ww} is a function of the octanol-water partition coefficient (K_{ow}) and the fraction lipid content of the organism. The following regression equation for K_{ww} in earthworms was developed:

$$\text{Log}(K_{ww}) = 0.87 \times \text{Log}(K_{ow}) - 2$$

Note that K_{ww} was converted from wet to dry tissue weight basis by assuming a 16% solid content for tissue and thus dividing K_{ww} (wet weight basis) by 0.16.

The concentration of a chemical in soil pore water (C_w) is related to the concentration in soil using the following equation:

$$C_w = C_s/K_d$$

where:

C_s = Concentration in soil (mg/kg soil)
K_d = Soil to water partitioning coefficient (L soil pore water / kg dw soil)

For non-ionic organic compounds, Kd is calculated as:

$$K_d = f_{oc} \times K_{oc}$$

where:

f_{oc} = Fraction of organic carbon in soil (kg organic carbon/kg soil)
K_{oc} = Soil organic carbon to water partitioning coefficient (L soil pore water/kg organic carbon)

In the absence of any measurement for f_{OC} on the RA property, the f_{OC} was set to 0.005 which is the MECP default value for f_{OC} in a medium/fine textured soil.

Therefore,

$$C_{worm} = 10^{0.87 \times \text{Log(Kow)} - 2} / 0.16 \times C_s/(f_{oc} \times K_{oc})$$

The predicted concentration of benz(a)anthracene in the tissue of invertebrates is predicted to be 4.94E+02 mg/kg dw. The concentrations of soil COCs in the tissue of invertebrates are presented in Table E5-6.

Tissue Concentrations in Small Mammals and Birds – Organic Chemicals

To estimate the secondary or tertiary exposure levels of mammals and birds such as the Red Fox and Red-Tailed Hawk, through their diet, it was necessary to calculate the concentration of COCs in their food items, i.e., small mammals and birds.

The Travis and Arms biotransfer factor model presented in MECP (2011c) was used in the present RA to estimate the concentration of contaminants in the tissues of small mammals and birds. This model is also used by US EPA to calculate food item- and media-to-animal BCFs (US EPA, 1999b). Travis and Arms (1988) developed a regression model for deriving biotransfer factors of organic compounds to beef. A biotransfer factor was defined as the ratio of the chemical concentration in animal tissue to daily intake of chemical by the animal through ingestion of food and soil. The regression model related the biotransfer factor of a chemical to its octanol water partitioning coefficient, and is presented as follows:

$$LogB_{b/mammals} = -7.6 + LogK_{OW}$$

where:

$B_{b/mammals}$ = biotransfer factor (day/kg fresh weight tissue)

The biotransfer factor for birds was derived by multiplying the mammal biotransfer factor by 0.8 to account for the difference in fat content of birds versus mammals (US EPA, 1999b).

The biotransfer factor was used to estimate the tissue concentration based on the calculated daily intake of COCs.

$$C_{mammals/bird} = B_{b/\ mammals\ or\ birds} \text{ x Daily Intake of Chemical }_{b/\ mammals/birds}$$

where:

$C_{mammals/bird}$ = Concentration of soil COCs in tissue of mammals/bird (mg/kg fresh weight)

$B_{b/mammals\ or\ birds}$ = Biotransfer factor (day/kg fresh weight tissue)

Daily Intake of Chemical $_{b/\ mammals/birds}$ = Daily Intake of Chemicals by mammals and birds (mg/d)

The predicted concentration of COCs in wildlife food items is presented in Table E5-6. The wildlife exposure estimates are presented as doses in Table E5-7.

Tissue Concentrations in Plants – Inorganics

To calculate the plant tissue concentrations of lead found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_p = EXP^{(0.561 \times \ln(Cs) - 1.328)}$

where:

C_p = Concentration in plant tissue (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

Tissue Concentrations in Soil Invertebrates – Inorganics

To calculate the soil to earthworm uptake of lead found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_e = EXP^{(0.807 \times \ln(Cs) - 0.218)}$

where:

C_e = Concentration in earthworm (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

Tissue Concentrations in Small Mammals and Birds – Inorganics

To calculate the soil to small mammals and birds uptake of lead found on the property, the following regression equation was used from *Attachment 4-1* of the *US EPA Guidance for Developing Ecological Soil Screening Levels* (2007):

$C_e = EXP^{(0.4422 \times \ln(Cs) + 0.0761)}$

where:

C_e = Concentration in earthworm (mg/kg dry weight)

C_s = Concentration in soil (mg/kg)

The predicted concentration of COCs in wildlife food items is presented in Table E5-6. The wildlife exposure estimates are presented as doses in Table E5-7.

5.3.3 Discussion of Uncertainty in the Exposure Assessment

The ERA was conducted using a "deterministic" approach, which is preferred by the MECP. "A deterministic" approach assumes that the maximum measured concentrations of COCs in soil are, in fact, found across the entire RA property. Therefore, it is expected that the exposure estimates for terrestrial mammals and birds are significantly over-estimated. The approach also over-predicts the risks to plant and soil invertebrate communities. Within a community, some organisms may be exposed to the maximum soil concentrations, but for the community as a whole, which exists over a wider area and depth, the assumption that each individual organism is exposed to the maximum COC concentrations will likely over-predict the exposure, and hence the risk to the community.

The ERA also over-predicts risks to VECs by assuming that they consume plants and soil invertebrates exposed to the maximum soil concentrations and would ingest only soil containing COCs at maximum concentrations. It is highly unlikely that a mobile receptor, such as a rodent or bird would consume plants or soil invertebrates or ingest soil only within the area of maximum COC concentrations in soil.

The use of regression models to estimate the biotransfer values, and their use in estimations of compound concentrations in small mammals and birds, may introduce uncertainty. Bioavailability, metabolic rate, type of digestive system, and feeding behaviour are the key factors that affect the uptake of a compound by wildlife species. By using the regression models to estimate the biotransfer factors, some assumptions are made regarding the above outlined key parameters which introduce uncertainties to estimated tissue concentrations in mammals and birds in higher trophic levels. In addition, biotransfer values have been developed using data from a limited number of empirical studies. The studied compounds, species and exposure pathways may differ from those at the site. Also, the regression model developed by Travis and Arms (1988) applies to beef. Therefore, data used in developing the regression model are specific to tissue/organ analysis versus whole body. As a result, the exposure levels may be under- or over-estimated to an unknown degree which causes uncertainties in estimating exposure (US EPA, 1999b). In summary, as cited in the US EPA (1999b), major uncertainties associated with this approach are the 1) amount of bioconcentration of various organic compounds in fatty tissues, and 2) variation in lipid content, metabolism, and feeding characteristics between species.

The soil ingestion rates, dietary compositions, and dietary consumption rates used in the exposure assessment were taken from reputable sources but may have been based on animals in captivity. These values may not be completely representative of parameters for individuals in the wild. This may result in over- or underestimations of exposure.

5.4 Hazard Assessment

5.4.1 Benchmark and Exposure Limits

Benchmarks and exposure limits are concentrations or doses derived using scientific data from toxicological studies that are considered as acceptable limits which provide protection to VECs. These benchmarks and exposure limits were utilized by the MECP (2011c) to derive the component values protective of ecological receptors. The component values derived by the MECP (2011c) were used to assess risks in the ERA. Where an MECP (2011c) benchmark was unavailable, a rationale for the selection of the benchmark and/or exposure limits used in the ERA is provided in Appendix M. Soil benchmark values are provided in Tables E5-8A and E5-8B for soil invertebrates and terrestrial plants and for mammals and birds, respectively.

5.4.2 Discussion of Uncertainty in the Hazard Assessment

Uncertainties associated with the hazard assessment include the following:

- With respect to most TRVs/benchmarks for common rodent test species (i.e., mouse) were selected as surrogates for the Meadow Vole and Short-Tailed Shrew. This is based on the assumption that these species will have a similar toxicological response as the test species. If the target species are more or less sensitive than the test species, risks may be over or under-predicted, respectively.
- The chemical form of the COC used to derive the TRV/benchmark may differ from the form found in on-Site soils or in food items which may over or under-predict risks.
- Soil benchmarks are meant to be conservative values designed to rule out risks; it can be safely assumed that concentrations below the benchmarks are not expected to pose any adverse effects. However, when NOAELs are used, the values are not an exact threshold of toxicity and tend to be overly conservative. Concentrations that exceed the NOAELs do not necessarily result in adverse effects. It is therefore preferred to assess the risk based on LOAELs or ECxx.
- As individual benchmark concentrations were not derived by the MECP for each of the plant and soil invertebrate groups, the selected values are assumed to be protective of both types of receptors. However, there are differences in the sensitivities of each receptor type and use of these values to predict risks may over- predict risks to the less sensitive of the two groups.
- For the assessment of risks to plants and soil invertebrates, the bioavailability of COCs in soil was assumed to be equivalent to the bioavailability in the soils of the studies used to derive the benchmark concentrations. If the bioavailability of COCs in on-site soil is greater or less than in the study soils, the predicted risks may be under- or over-estimated, respectively.
- Toxicological effects data are more readily available for domestic and laboratory mammals, such as rats and mice than for other mammals. The use of this data may result in over- or under-estimations of risk, if applied to exposure estimates for wildlife species that are less or more sensitive, respectively, than the test species.
- In this RA, the GW3 value is also assumed to be protective of terrestrial animal indirect exposure to ground water COCs via surface water. However, if these assumptions are untrue, the predicted risks may be under-estimated for these pathways

5.5 Risk Characterization

5.5.1 Interpretation of Ecological Risks

There are several ways that ecological risks may be characterized. For the current ERA, the method used was the calculation of a "hazard quotient" (HQ), which is a unitless value defined as:

Hazard Quotient = Level of Exposure / TRV (or Benchmark)

Hazard quotients are calculated for each VEC/COC combination. The selection of HQ = 1 as an indicator of risk levels for ecological assessment is an arbitrary one. A value of <1 indicates that there is an unlikely potential for an adverse effect at either the species or population level. A value of >1 indicates that there may be the potential for an adverse effect at the species level. However, this does not indicate that there is a risk at the population level.

An HQ range of greater than 1, although representative of a possible elevated ecological risk, may be appropriate in some cases, particularly where it would be inappropriate (more environmentally damaging) to remediate the associated natural environment as opposed to accepting an elevated HQ threshold. It might also be appropriate to allow the HQ to exceed 1 in cases where it can be demonstrated that the percentage of soil on the RA property with COC concentrations exceeding the TRV is such that an acceptable fraction of individual VECs might be at risk, but the population on a whole is protected. This approach is also considered appropriate when the following information for the site is considered:

- The property is not considered environmentally sensitive as it is not located within 30 m of an ANSI or part of such an area and the assessment of risks does not include threatened or endangered species; and,
- An HQ greater than 1 is not conclusively indicative of unacceptable risk at the individual species level and is even less indicative of the potential to negatively impact ecological receptors at the population level since there is enough inherent conservatism in our approach to compensate for benchmark exceedances.

Conservative steps in our approach include:

- REM concentrations used in exposure assessment;
- No compensation for heterogeneity of the contaminant distribution within the ecosystem; the REM concentrations were used to represent the entire site; and,
- The most sensitive test species were used to represent potential toxicity to all other species.

Furthermore, the US EPA describes the HQ as a screening tool for determining if an adverse effect is likely, but not indicative of the magnitude of risk. Thus, in cases where HQ > 1, further evaluation (e.g., statistical (probabilistic) analysis) may be warranted to determine if ecological risks are significant and whether RMM or remediation are justified.

Estimated risks are reported for ecological receptors based on the quantitative and qualitative assessment in Sections 5.5.2 and 5.5.3, respectively. RBCs protective of all VECs and candidate ecological PSS are provided in Section 5.5.4.

5.5.2 Quantitative Interpretation of Ecological Risks

A summary of the quantitative evaluation of risks to VECs is provided in Table 11, below.

Table 11: Summary of Quantitative Interpretation of Ecological Risks

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
Terrestrial Plants and Soil Invertebrates	Direct Contact	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 1- and 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, PCE, and lead	E5-9
Mammals and Birds	Direct Contact	Soil	Benzo(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene,	E5-10A

Receptor	Pathway	Media	COC with Risk Predicted	Table Reference (Appendix E)
			chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, PCE, and lead	

RMM are required for pathways for which unacceptable risks were predicted as discussed in Section 7 and Appendix P.

The RBCs for each pathway are provided in Tables E5-9 and E5-10B for plants and invertebrates and mammals and birds, respectively.

5.5.3 Qualitative Interpretation of Ecological Risks

5.5.3.1 Screening of COCs Against Ecological Component Values

Soil COCs

The REM concentrations of soil COCs were compared to the applicable ecological component values provided by MECP (2011c) as shown in Table E5-1. The ecological component values for plants, soil invertebrates, mammals, birds, and for aquatic receptors, are point of contact values, since the majority of toxicological literature for these receptor groups is based on studies where exposures are reported in terms of media concentrations, as opposed to uptake or dose metrics. This constitutes as a qualitative assessment, since no calculations for uptake/dose have been performed and no additional considerations have been given to site-specific parameters that may affect exposure. For parameters for which the REM concentrations meet the applicable component value, no unacceptable risk is anticipated. Therefore, no further assessment of risks is required. For parameters for which an REM concentration exceeded a component value, or where no component value was available for a given pathway, the pathway was assessed either quantitatively or qualitatively as discussed in Sections 5.5.2 or 5.5.3, respectively.

As shown in Table E5-1, the REM concentrations of all parameters for which a component value protective of plants and invertebrates was available, were in excess of their respective component values. Therefore, these parameters were assessed quantitatively in Section 5.5.2.

The following REM concentrations met the component values protective of mammals and birds, as shown in Table E5-1:

- Anthracene
- Benzo(a)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

Therefore, no risk is anticipated as a result of exposure to these parameters. The REM concentrations of all other parameters for which a component value protective of mammals and birds was available, were in excess of their respective component values. Therefore, these parameters were assessed quantitatively in Section 5.5.2.

The REM concentrations of soil COCs were compared to the ecological component values protective of soil leaching to groundwater (S-GW3) as shown in Table E5-1. All parameters for which component values are provided by the MECP were within the generic S-GW3 component values, with the exception of acenaphthylene and anthracene. No S-GW3 value was available for lead. Qualitative evaluation of parameters exceeding the generic S-GW3 value and parameters without an S-GW3 value is discussed in Section 5.5.3.4.

Groundwater COCs

All groundwater COCs were compared to their respective GW3 component values protective of off-Site aquatic life. As shown in Table E5-2, the REM concentrations of the groundwater COC met its respective GW3 component values and, therefore, no risk is anticipated to off-Site ecological receptors as a result of exposure to this parameter in groundwater migrating to surface water.

5.5.3.2 Terrestrial Wildlife

As discussed in Section 5.3.1, wildlife may be exposed to COCs in the environment via three distinct pathways: ingestion, inhalation, and dermal contact. However, this RA follows the guidance of the US EPA (1999b) and Environment Canada (1994) who consider ingestion to be the major pathway of concern for wildlife and consider the inhalation and dermal contact exposure pathways to be negligible in relative terms. Therefore, in terms of a qualitative evaluation, the later pathways were not considered significant in this RA and risks to wildlife via these exposure pathways are not anticipated to exceed acceptable limits.

5.5.3.3 Terrestrial Plants and Soil Invertebrates

As outlined in Section 5.3.1, plants could be exposed to volatile COCs via stem and foliar uptake of vapours. Furthermore, soil invertebrates could also potentially be exposed to volatile COCs via inhalation of vapours. However, exposure to these receptors via volatilization was considered to be insignificant compared to the direct contact exposure pathway as most chemicals are rapidly diluted and dispersed. Therefore, these pathways were not assessed separately for these receptors. While this represents an uncertainty in the evaluation, it should be noted that dose-response data on the direct contact pathway for volatile substances is often based on analytical findings carried out under controlled head-space analytical procedures with concentrations expressed as the sum of soil vapour, soil water and soil particle concentrations. As such, assessment of the direct contact pathway for these receptors via the use of total soil analytical data is assumed to be protective of the exposure to volatiles via this pathway and these pathways are not anticipated to are not anticipated to exceed acceptable limits.

5.5.3.4 Soil Leaching

The REM concentrations of soil COCs were compared to the ecological component values protective of soil leaching to groundwater (S-GW3) as shown in Table E5-1. All parameters for which a component value was provided were within the generic S-GW3 component value, with the exception of acenaphthylene and anthracene. Also, no S-GW3 value is available for lead. As shown in Table E5-1, the S-GW3 component value was modified within the MGRA Model (MECP, 2016a) by applying the Site-specific distance to the receiving surface water body, Lake Ontario located 950 m south/southeast of the Site. The REM concentration for acenaphthylene meets its respective Site-specific GW3 component value. Exceedances of the modified S-GW3 component value was identified for anthracene, and no value is available for lead. The maximum groundwater concentrations of these parameters were compared against the groundwater Table 3 GW3 component values, as shown in Table E5-3. The maximum groundwater concentrations of anthracene and lead were below their respective groundwater Table 3 GW3 component values. Therefore, significant leaching of anthracene and lead from soil to groundwater is not anticipated. As such, no unacceptable risk is anticipated for off-Site aquatic receptors via the soil leaching pathway.

5.5.4 Ecological Property-Specific Standards

For parameters having an REM concentration within all applicable MECP (2011c) ecotoxicity component values, and there are no applicable exposure pathways with no available MECP (2011c) component value, the lowest component value was selected as the candidate PSS. It is recognized that the MECP Guidelines for RA indicate PSS largely in excess of site concentrations are not desirable. As such, if the component value was greater than the REM, the REM was selected as the final candidate PSS. For parameters wherein the REM concentration exceeded an ecotoxicity component value or an MECP (2011c) component value was unavailable for an ecological pathway, the lowest of the component value or risk-based back-calculated value protective of all ecological receptors was determined (“minimum RBC”). This minimum RBC was selected as the final candidate ecological PSS except where the candidate RBC value was lower than the on-Site REM concentration. Where the minimum RBC is less than then on-site REM concentration, RMM are necessary, and the final candidate ecological PSS was set as the REM concentration (i.e. maximum concentration + 20% to account for sampling and analytical variability).

Ecological Property-Specific Soil Standards

A summary of the ecological RBCs derived for each receptor is presented in Table E5-11. The final candidate ecological PSS (Table E5-11) was carried into Section 6 of the RA for selection of the final PSS for the site.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

Ecological Property-Specific Groundwater Standards

The groundwater ecological RBCs are presented in Table E5-12. The final candidate ecological PSS (Table E5-12) were carried into Section 6 of the RA for selection of the final PSS for the Site.

Risks at the proposed PSS values were not calculated as the REM concentrations were used to assess risk in this RA and the final PSS, as selected in Section 6, do not exceed the REM concentrations.

5.5.5 Special Considerations

Section 41 of O. Reg. 153/04 dictates certain restrictions in the application of SCS for environmentally sensitive areas. The site was not identified as an environmentally sensitive area as discussed in Section 3.3.1.

Section 43.1 of O. Reg. 153/04 defines the restrictions in application of SCS for shallow soil property or water body. As discussed in Section 3.2.1, bedrock was not encountered at depths of 2 mbgs or less. Thus, greater than two-thirds of the site has overburden greater than 2 metres in thickness, and the site is not considered to be within a shallow soil condition, as per O. Reg. 153/04, Section 43.1.

The RA property is not located adjacent to, nor within 30 metres of a surface water body. The nearest surface water body is Lake Ontario, located approximately 950 m to the south/southeast.

Based on the above, no additional special considerations were required to justify the PSS that were proposed in the ERA.

5.5.6 Interpretations of Off-Site Ecological Risks

The proposed ecological PSS were evaluated as to whether they would result in a concentration greater than the applicable full depth SCS for the nearest off-Site receptor.

Surrounding properties include mixed residential, commercial, and community land uses to the north and west; commercial land use to the east; and mixed residential, community, and parkland land uses the south. Based on the current surrounding land uses, the Table 3 SCS for residential/parkland/institutional use was identified as the applicable full depth standards for the nearest off-Site ecological receptors.

The nearest off-site terrestrial ecological receptors for soil COCs are terrestrial plants, invertebrates, mammals and birds which may frequent occur at the surrounding properties. The COCs found in soil are not expected to be transported across the RA property and be present at concentrations exceeding Table 3 SCS at the nearest off-Site terrestrial receptors due to the limited mobility of soil. Although there is potential for off-Site receptors to be exposed to soil and dust from the RA property through soil/dust inhalation pathways, the off-Site migration of soil/dust is not likely to result in off-Site soil concentrations in excess of the Table 3 SCS. There is also potential for exposure to volatile COCs released from soil via stem and foliar uptake (terrestrial plants) and vapour inhalation by soil invertebrates, mammals, and birds. However, these pathways are considered negligible as discussed in Section 5.5.3 and are not considered likely to result in concentrations greater than the Table 3 SCS off-Site.

The nearest off-Site ecological receptors for leaching of soil COCs to groundwater and subsequent migration off-site are aquatic receptors within Lake Ontario, located approximately 950 m south/southeast of the Site. Therefore, off-Site aquatic receptors (various species of fish, invertebrates, amphibians, and aquatic plant species), semi-aquatic and terrestrial mammals and birds may be exposed to soil COCs via leaching to groundwater and the subsequent discharge to the lake.

As discussed in Section 5.5.3.4, leaching of soil COCs to groundwater is anticipated to be negligible. As discussed in Section 5.5.3.1, all groundwater COCs were within the GW3 component value. Therefore, no unacceptable risk is anticipated to aquatic receptors in downgradient surface water bodies.

5.5.7 Discussion of Uncertainty

The RA relies on site-specific data, as well as data from scientific literature and where data is limited, or impractical to collect, assumptions are often made. Uncertainties could arise during the process of data collection and/or from the assumptions made. It is important to understand the sources of uncertainty that could be introduced at any stage of the RA, when interpreting the RA conclusions. The RA adopts a conservative approach where uncertainty exists, recognizing that any uncertainty could potentially alter the conclusions of the RA. This ensures that the potential impacts would more likely be overestimated in the RA.

Some of the key sources of uncertainty associated with the current ERA include the following:

- Screening benchmarks for soil invertebrates and plants, published in the literature and by regulatory agencies, are meant to be conservative. The benchmarks facilitate the ruling out of risks, rather than prediction. It can be safely assumed that concentrations that are below these benchmark levels would not result in unacceptable impacts. However, the reverse may not be true; concentrations that exceed these levels do not necessarily result in adverse effects. The use of benchmark concentrations to predict risks is likely to result in the derivation of PSS values that are very conservative.
- It was assumed that the Meadow Vole, Short-Tailed Shrew, Red Fox, American Woodcock, Red-Winged Blackbird, and Red-Tailed Hawk would only consume food items living and growing within on-site soils that contain COCs at the maximum concentration. It is more realistic to assume that wildlife would forage throughout a larger area that contained soils with COC concentrations significantly lower than the maximum on-site concentrations.
- It was assumed that all COCs in soil were 100% bioavailable for wildlife receptors. However, that is not always the case, considering that COCs may be found at depths to which VECs are not exposed. In addition, it is assumed that conditions in the wild, to which VECs are exposed, are similar to those in the laboratory studies from which TRVs are derived. This may not always be the case, as some studies may be based on direct dose or dermal applications of contaminants, while others may be based on uptake from soil with different properties than the RA property soil, which may, in turn, affect sorption and bioavailability.
- TRVs for birds are based on limited available data and by species-to-species extrapolation. Thus, an inherent uncertainty exists in the applicability of these TRVs due to species differences in sensitivity which may result in over- or under-estimations of risk.
- It is assumed that the screening benchmarks for aquatic life are protective of reptiles and amphibians given the lack of toxicity data for these organisms. However, given the inherent conservative nature of these benchmarks, the likelihood of these screening benchmarks underestimating risks to these receptors is considered low.
- The use of a site maximum concentration is not representative of the site as a whole. Although within the area of the site maximum, certain adverse effects may be observed for some ecological receptors, the goal of an ERA is not to protect specific ecological receptors, but the community as a whole. As such, although specific portions of a site might be heavily impacted by contaminants, this does not mean that a healthy community of ecological species cannot thrive.
- Risks predicted using the HQ approach applies to individual organisms, whereas the assessment endpoint for the ERA is focused on the protection of populations and communities of wildlife, plants, and invertebrates. Thus, derived RBC for ecological receptors is likely to be more conservative than is necessary.

- The use of an HQ of 1 is arbitrary. Risks predicted using HQ = 1 as a limit may apply to individual organisms, depending on the TRV that is used, whereas the assessment endpoint for the ERA is focused on the protection of populations and communities of wildlife, plants, and invertebrates. Thus, derived RBC for ecological receptors is likely to be more conservative than is necessary.

6. Conclusions and Recommendations

The main findings from the RA pertaining to unacceptable risks to receptors are summarized in Table 12:

Table 12: Summary of Unacceptable Risks to Human and Ecological Health

Receptor	Pathway with Risk	Media	Contaminant of Concern
Site Resident (also surrogate for Site visitor)	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, total carcinogenic PAHs, and lead
	Indoor Air Inhalation – Residential Building with Basement	Soil	PCE and naphthalene
		Groundwater	cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, VC, and PHC F1
Long-term Indoor Worker	Indoor Air Inhalation – Future Commercial Slab-on-grade Building	Soil	PCE
		Groundwater	cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC
Outdoor Maintenance Worker	Direct Contact *)	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and total carcinogenic PAHs
Construction/ Subsurface Utility Workers	Direct Contact (dermal contact and incidental ingestion)	Groundwater	PCE, VC
Plants and Soil Invertebrates	Direct Contact	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 1- and 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, PCE, and lead
Mammals and Birds	Direct Contact	Soil	Benz(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, PCE, and lead

* No unacceptable risks were predicted for soil particulate inhalation.

RMM are proposed for protection of the receptors via the exposure pathways noted in Table 12, above, as described in Section 7 and Appendix P.

6.1 Recommended Standards

The final property-specific soil and groundwater standards, derived to be protective of human health and ecological receptors, are provided in Tables E6-1 and E6-2, respectively. The lowest of the human health and ecological RBC values for each COC were evaluated for consideration of the candidate final PSS values. However, as discussed in Sections 4.4.4 and 5.5.4, it is recognized that the MECP Guidelines for risk assessment indicate PSS largely in excess of site concentrations are not desirable. Since the MECP Approved MGRA Model limits PSS values to the maximum site concentration + 20% (MECP, 2016a), this approach has been applied in the RA. Therefore, if the minimum human health or ecological RBC exceeded the site maximum by more than 20%, the REM concentration (i.e. site maximum + 20% to account for sampling and analytical variability) was chosen as the final candidate PSS for consideration as the Final PSS. In addition, where a risk-based human health or ecological RBC value is lower than the on-site COC maximum concentration, RMM are necessary, and the final candidate RBC carried forward into Section 6 was set at the maximum concentration + 20% with RMM.

The final PSS for all soil and groundwater COCs on the RA property were set at the REM concentration (Table E6-1 and E6-2).

RMM are proposed in Section 7 for the protection of the applicable human and ecological receptors. A detailed RMP is provided in Appendix P.

As discussed under the uncertainty analyses in Sections 4 and 5 of the RA report, the conservative assumptions made in the RA process are generally thought to contribute to a potential overestimation of the actual risks rather than underestimation of risks. Therefore, it is expected that the proposed Standards are adequately protective of on-site human health and ecological receptors.

7. Risk Management Plan

7.1 Risk Management Plan

An RMP is required to address risks to human and ecological receptors on-site. The objective of the RMP is to establish RMM to minimize the risk of exposure to the COCs to acceptable levels, by reducing the exposure to the COCs, or by completely eliminating the exposure risk, by blocking the exposure pathway of concern between the COCs and the potential receptors. It is understood that the RMM will be presented on a CPU for the RA property.

7.1.1 Risk Management Performance Objectives

Risk reduction can be achieved by addressing any component of the exposure pathway by a) removing or treating the source, b) interrupting contaminant transport mechanisms, or c) controlling activities at the point of exposure. The RMP outlines the RMMs that may be implemented, where applicable and once the intended land use, on-site activities and/or construction plans for the property are finalized, to achieve risk reduction.

The COCs and pathways which require RMM are summarized in Table 12 in Section 6. Table 13 presents an overview of the RMM and their performance objectives. The required reduction in exposure concentration to achieve acceptable target levels (HQ less than or equal to 0.2 (0.5 for PHCs or TCE [for inhalation pathways only]) for human health), or 1 for ecological health and/or a cancer risk level to less than or equal to 1E-06 for human health) is provided in Tables 14 and 15 for soil and groundwater, respectively. Details of the RMM are discussed in Appendix M.

Table 13: Summary of RMM Performance Objectives

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Vapour Mitigation Systems for Future Buildings	Indoor Air Inhalation (sourced from soil and groundwater)	Site residents, Site visitors, and long-term indoor workers	Reduction of COC concentrations in indoor air to within target levels.
Soil Barrier	Direct contact with soil	Site Resident, Site visitors, outdoor maintenance workers, terrestrial plants and soil invertebrates, mammals and birds	100% blockage of direct contact pathways through implementation of a physical barrier.
Prohibition of planting of fruit and vegetables for consumption	Garden produce ingestion	All human receptors	100% blockage of the garden produce ingestion pathway.
Health and Safety Plan	Direct Contact with Groundwater	Construction/Subsurface Utility Workers	100% blockage of direct contact pathways by use of personal protective equipment (PPE).

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Soil and Groundwater Management Plan	Direct Contact with Soil	All receptors	100% blockage of direct contact pathways by use of personal protective equipment (PPE).
Site Restriction (i.e., Maintenance of Existing Building Operating Conditions and Restriction on Building Footprint Changes)	Indoor Air Inhalation – Existing Building (sourced from soil and groundwater)	Site Visitors, Indoor Workers	Maintenance of existing building operating conditions
Groundwater Boundary Control Measure	Direct and Indirect Contact with Groundwater	All off-Site receptors	Reduction in exposure to within acceptable levels.

Table 14: Summary of Required Exposure Concentration Reduction Levels for Soil COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Direct Contact (Site resident and Site visitor)	Anthracene	98	0.74	57	57	41.8%
	Benz(a)anthracene	89	0.63	5.7	5.7	93.6%
	Benzo(a)pyrene	86	0.3	0.57	0.57	99.3%
	Benzo(b)fluoranthene	87	0.78	5.7	5.7	93.4%
	Benzo(k)fluoranthene	33	0.78	5.7	5.7	82.7%
	Chrysene	79	7.8	57	57	27.8%
	Dibenz(a,h)anthracene	11	0.1	0.57	0.57	94.8%
	Fluoranthene	220	0.69	57	57	74.1%
	Indeno(1,2,3-cd)pyrene	46	0.48	5.7	5.7	87.6%
	Lead	516	120	18	120	76.7%
Direct Contact (Outdoor maintenance worker)	Anthracene	98	0.74	70	70	28.6%
	Benz(a)anthracene	89	0.63	7	7	92.1%
	Benzo(a)pyrene	86	0.3	0.7	0.7	99.2%
	Benzo(b)fluoranthene	87	0.78	7	7	92.0%
	Benzo(k)fluoranthene	33	0.78	7	7	78.8%
	Chrysene	79	7.8	70	70	11.4%
	Dibenz(a,h)anthracene	11	0.1	0.7	0.7	93.6%
	Fluoranthene	220	0.69	70	70	68.2%

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
	Indeno(1,2,3-cd)pyrene	46	0.48	7	7	84.8%
Indoor Air Inhalation (Residential Building with Basement - Site resident and Site visitor)	PCE	20	2.3	0.034	2.3	88.5%
	Naphthalene	38	0.75	4.52	4.52	88.1%
Indoor Air Inhalation (Future Commercial Slab-on-Grade Building - Long-term indoor worker and Site visitor)	PCE	20	2.3	0.83	2.3	88.5%
Plants and Soil Invertebrates	Anthracene	98	0.74	3.1	3.1	96.8%
	Benz(a)anthracene	89	0.63	0.63	0.63	99.3%
	Benzo(a)pyrene	86	0.3	25	25	70.9%
	Benzo(b)fluoranthene	87	0.78	1.2	1.2	98.6%
	Benzo(ghi)perylene	45	7.8	8.3	8.3	81.6%
	Benzo(k)fluoranthene	33	0.78	9.5	9.5	71.2%
	Chrysene	79	7.8	8.8	8.8	88.9%
	Fluoranthene	220	0.69	63	63	71.4%
	Indeno(1,2,3-cd)pyrene	46	0.48	0.48	0.48	99.0%
	1- and 2-Methylnaphthalene	23	3.4	20	20	13.0%
	Naphthalene	38	0.75	0.75	0.75	98.0%
	Phenanthrene	289	7.8	7.8	7.8	97.3%
	Pyrene	184	78	10	78	57.6%
	PCE	20	2.3	4.8	4.8	76.0%
	Lead	516	120	310	310	39.9%
Mammals and Birds	Benz(a)anthracene	89	0.63	1.1	1.1	98.8%
	Benzo(b)fluoranthene	87	0.78	3.6	3.6	95.9%
	Benzo(ghi)perylene	45	7.8	2.2	7.8	82.7%
	Benzo(k)fluoranthene	33	0.78	1.9	1.9	94.2%

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
	Chrysene	79	7.8	2.7	7.8	90.1%
	Dibenz(a,h)anthracene	11	0.1	2.6	2.6	74.6%
	Fluoranthene	220	0.69	186	186	15.5%
	Indeno(1,2,3-cd)pyrene	46	0.48	2	2	95.7%
	PCE	20	2.3	0.5	0.5	97.5%
	Lead	516	120	79	120	76.7%

All values in µg/g.
[1] Minimum risk-based concentration (RBC) for given exposure pathway for all relevant receptors from Human and Ecological Candidate Property Specific Standard (PSS) Tables (Tables E4-36A/B to E4-39 and E5-9 and E5-10B, respectively, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

Table 15: Summary of Required Exposure Concentration Reduction Levels for Groundwater COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Table 7 SCS[1]	Minimum RBC[2]	Target Concentration[3]	Percent Concentration Reduction[4]
Indoor Air Inhalation (Residential Building with Basement - Site resident and Site visitor)	PHC F1	564	750	420	3.35	420	25.5%
	cis-1,2-DCE	180	17	1.6	3.62	3.62	98.0%
	trans-1,2-DCE	66	17	1.6	1.58	1.6	97.6%
	PCE	4,920	17	0.5	0.498	0.5	100.0%
	TCE	324	17	0.5	0.053	0.5	99.8%
	VC	667	1.7	0.5	0.0075	0.5	99.9%
Indoor Air Inhalation (Future Commercial Slab-on-Grade Building - Long-term indoor worker and Site visitor)	cis-1,2-DCE	180	17	1.6	62	62	65.6%
	trans-1,2-DCE	66	17	1.6	27	27	59.1%
	PCE	4,920	17	0.5	0.5	0.5	100.0%
	TCE	324	17	0.5	0.24	0.5	99.8%
	VC	667	1.7	0.5	0.23	0.5	99.9%
Incidental Direct Contact (Construction/ Subsurface Utility Workers)	PCE	4,920	17	0.5	537	0.5	100.0%
	VC	4,920	1.7	0.5	160	0.5	100.0%

All values in µg/L.
[1] Due to the shallow groundwater table, the Table 7 SCS have been used for the purposes of determining concentration reductions for volatile groundwater COCs.
[2] Minimum RBC for given exposure pathway for all relevant receptors from Human Candidate PSS Tables (Tables E4-41 to E4-44, Appendix E).
[3] Where the minimum RBC was lower than the Table 7 SCS, the target concentration was set as the SCS.
[4] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

7.1.2 Risk Management Measures

7.1.2.1 Engineered Measures for Vapour Intrusion

RMMs are required to mitigate indoor air vapour intrusion for future residential and/or community buildings constructed on-Site.

Development plans have not been finalized but the current proposed re-development plan for the Site includes the construction of a sixteen (16) storey residential condominium building with community use in the basement and ground floor levels.

The proposed vapour mitigation system is a sub-slab vapour membrane barrier with a passive sub-slab venting system (with the option to convert to an active system).

The actual design of the system must be conducted by a qualified professional, in consultation with the QP_{RA}. Specific requirements of these engineered RMM are provided in Appendix P.

7.1.2.2 Maintenance of Building Operating Conditions – Existing Building

Vapour mitigation RMMs are not recommended for the existing on-site building. One (1) round of indoor air sampling at the Site, completed in Winter of 2025, yielded COC concentrations below the applicable human health criterion (i.e., commercial/industrial HBIAC). As such, no unacceptable indoor air inhalation risk to on-Site long-term indoor workers (and property visitors) for the existing commercial building were identified. A second indoor air sampling event is planned for the summer of 2025 to assess potential for seasonal variability. However, the maintenance of existing building operating conditions is required for the current commercial building (i.e., Dollarama). Additionally, changes to the footprint of the existing building are restricted unless it can be demonstrated that there will be no impacts in indoor air concentrations of COCs in soil and/or groundwater.

The purpose of this measure is to ensure that there are no increases in indoor air concentrations of benzene, xylenes, PHC F1 and PHC F2. This measure includes the following:

- Maintenance of building floor slab integrity and the repair of any identified cracks/damage;
- Maintenance of the existing HVAC system(s) to ensure it is in good working order;
- Continued operation of HVAC system(s) to maintain existing air exchange/ventilation rate; and,
- No changes to existing building footprint unless it can be demonstrated that there will be no impacts in indoor air concentrations of COCs in soil and/or groundwater.

7.1.2.3 Soil Barrier

The proposed soil barrier RMM serves to mitigate risks for all receptors from all direct soil contact pathways by blocking these pathways. The nature of the barrier may vary in thickness and in type across the site, and further details are provided in Appendix P.

7.1.2.4 Health and Safety Plan

There are potential risks posed to construction/subsurface utility workers from exposure to PCE and VC in groundwater via the direct contact pathway.

Under the Ontario Occupational Health and Safety Act, every employer is required to provide a health and safety policy and program. The Act also provides the framework and the tools to provide a safe and healthy workplace. It sets out the rights and duties of all parties in the workplace and establishes procedures for dealing with workplace hazards. Where compliance has not been achieved voluntarily, the Act provides for enforcement of the law. The implementation of a HASP is, therefore, the duty of every employer and the scope of the RMP is limited to HASP which is specific to unacceptable risks identified for the construction worker. At the time of work, the HASP should be prepared by a qualified person with respect to health and safety practices in the workplace and pertaining to the COCs noted in Table 15 (Section 6). The HASP is to be specific to the exposure pathways that may pose potential risks above acceptable levels and is to be developed in accordance with all MOL and other occupational health and safety requirements.

Details of the minimum requirements of the HASP are described in Appendix P.

7.1.2.5 Soil and Groundwater Management Plan

In the event of any earthworks at the RA property involving potential contact with or the re-distribution of impacted soil and groundwater, a SGMP is recommended for the protection of human and ecological receptors.

Details of the minimum requirements of an SMP are described in Appendix P.

7.1.2.6 Garden Produce Restriction

Given that there may be potential risks if a community or individual garden is planted in native soils as a result of soil COCs, prohibition of planting fruit or vegetable for consumption unless planted in above ground containers, isolated from the subsurface is included as an RMM.

7.1.2.7 Groundwater Boundary Control

The southern groundwater boundary control measure consists of an injectable permeable reactive barrier (PRB), installed to a maximum depth of approximately nine (9) m bgs to reduce the potential for the off-Site migration of VOC parameters in the groundwater at the Site. At the time of this RA, a PRB has been installed, and a post-installation monitoring program is currently on-going.

Details of the PRB are described in Appendix P

7.1.2.6 Implications for Off-Site Receptors

The RMM pertaining to vapour intrusion, the maintenance of the existing building operating conditions, the HASP for on-site workers and the restriction on garden produce will have no impact on off-site human or ecological receptors.

The RMM pertaining to the soil barrier and SGMP may provide some level of protection to off-site human and ecological receptors by minimizing off-site migration of soil/dust and preventing exposure to soil COCs through direct contact, ingestion, and dust inhalation pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-site exposure pathway, it is assumed the implications for off-site receptors are minimal.

The installation of the boundary control measure along the southern property boundary will mitigate the off-Site migration of groundwater impacts.

7.1.3 Duration of Risk Management Measures

Indoor Air Vapour Intrusion

The proposed engineering controls protective of the indoor air vapour intrusion pathway are permanent RMM. These RMM must be maintained as long the concentrations of the applicable volatile COCs in soil and groundwater posing potential risks above acceptable levels are in excess of the MECP Table 3 SCS for soil COCs or Table 7 SCS for groundwater COCs.

Soil Barrier

The installation and maintenance of the soil barrier is required for as long as the applicable soil COC concentrations exceed the Table 3 SCS.

Health and Safety Plan

The implementation of HASP, where applicable, is required for as long as soil COCs exceed the Table 3 SCS.

Prohibition of Planting of Fruit and Vegetables for Consumption

The prohibition on the planting of fruit and vegetables for consumption is required for as long as soil COC concentrations exceed the Table 3 SCS.

Soil and Groundwater Management Plan

The SGMP is required for as long as soil and groundwater COC concentrations exceed the Table 3 SCS and/or Table 7 SCS.

Groundwater Boundary Control Measure

The groundwater boundary control measure is required for as long as groundwater COC concentrations exceed the MECP Table 3 or 7 SCS.

7.1.4 Requirements for Monitoring and Maintenance

Monitoring and maintenance during construction of a SVIMS is required. Furthermore, an indoor air or sub-slab vapour monitoring program is required for this RMM.

For the existing commercial building (i.e. Dollarama), the monitoring of the building floor slab and HVAC system will be required. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspections.

Monitoring of the soil barrier measures will be required to ensure the integrity of all barriers, as applicable. Maintenance will involve the continued repair of any damage, deterioration or compromises noted during inspection of the barriers.

The maintenance and monitoring of all barriers will be the responsibility of the RA property owner, who must keep a written record of all inspections including visual observations and, where applicable, analytical test results. The property owner will ensure that a full program of monitoring is conducted and documented for as long as COCs exceed the applicable MECP SCS, or until a new RA is performed resulting in a new RSC.

No maintenance is necessary for RMM pertaining to the HASP or SGMP. When work is to be undertaken which requires implementation of a HASP or SMP, these plans must be specific to the work to be undertaken, including outlining the necessary monitoring requirements, and must be prepared prior to initiating the work. Monitoring of the proper implementation of the HASP and SMP will be required for the duration of time that the HASP and SMP are implemented. In addition, no maintenance or monitoring is required pertaining to the garden produce restriction.

Further details pertaining to monitoring and maintenance are provided in Appendix P.

8. Public Communication Plan

8.1 Optional Communication Plans

No optional public communication plan was prepared as part of the RA.

8.2 Required Communication Plans for RA Properties in Wider Area of Abatement

As the RA property was not located within a WAA, the preparation of a public communications plan was not a requirement of the RA.

Appendix A: Limitations and Use of Report

LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

The Report is based on site conditions known or inferred by the investigation undertaken as of the date of the Report. Should changes occur which potentially impact the condition of the site the recommendations of EXP may require re-evaluation. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and EXP's recommendations. Any reduction in the level of services recommended will result in EXP providing qualified opinions regarding the adequacy of the work. EXP can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

RELIANCE ON INFORMATION PROVIDED

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to EXP.

STANDARD OF CARE

This report ("Report") has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to EXP by the Client, communications between EXP and the Client, other reports, proposals or documents prepared by EXP for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. EXP is not responsible for use by any party of portions of the Report.

USE OF REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. No other party may use or rely upon the Report in whole or in part without the written consent of EXP. Any use of the Report, or any portion of the Report, by a third party are the sole responsibility of such third party. EXP is not responsible for damages suffered by any third party resulting from unauthorized use of the Report.

REPORT FORMAT

Where EXP has submitted both electronic file and a hard copy of the Report, or any document forming part of the Report, only the signed and sealed hard copy shall be the original documents for record and working purposes. In the event of a dispute or discrepancy, the hard copy shall govern. Electronic files transmitted by EXP utilize specific software and hardware systems. EXP makes no representation about the compatibility of these files with the Client's current or future software and hardware systems. Regardless of format, the documents described herein are EXP's instruments of professional service and shall not be altered without the written consent of EXP.

Appendix B: Phase Two Conceptual Site Model

Phase Two Conceptual Site Model – 1337 Queen Street West, Toronto, ON

Figures

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Tables

1 Phase Two Conceptual Site Model

This section presents a Phase Two Conceptual Site Model (P2CSM), as it relates to the Site designated at 1337 Queen Street West, in Toronto, Ontario (Figure 1), providing a narrative, graphical and tabulated description integrating information related to the Site geologic and hydrogeologic conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of potential contaminants of concern, contaminant fate and transport, and potential exposure pathways. These components are discussed in the following sections. The Phase Two CSM was completed in accordance with O. Reg.153/04 as defined by the Ministry of the Environment, Conservation, and Parks (MECP).

1.1 Introduction and Background

The Site is located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an approximate area of 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 square metres (m^2) (8,482 square feet (ft^2)) in area. The Site building is located on the eastern portion of the Site with asphalt paved parking spaces to west and south. Additionally, sea cans used for storage purposes, were located on the south exterior portion of the Site.

The Site is bound by Queen Street West to the north, a commercial building to the west, a parking lot followed by community buildings to the east and residential land use to the south. The Site was first developed in the early 1890s for residential purposes. It was then developed with a rectangular shaped commercial building in approximately 1910 for commercial/industrial purposes. In 1966, the Site was redeveloped for commercial use (a bank, a grocery store and then a retail store).

Based on a review of historical aerial photographs, chain of title information, and other records, the Site was historically addressed as 1331-1343 Queen Street West and was developed with two (2) residential structures since circa 1890. The Site was then developed with a rectangular shaped commercial building circa 1910, which was occupied by various tenants, including the Bank of Commerce, several coal companies, and several battery service centres between 1890 and 1965. In 1966, the Site was redeveloped for commercial use. It is currently occupied by Dollarama.

Refer to Table 1 for the Site identification information.

Table 1: Site Identification Information

Municipal Address	1337 Queen Street West, Toronto, ON
Current Land Use	Commercial
Proposed Land Use	Residential/Community
Legal Description	Lot 5, Pt Lots 4, 6 & 92 Plan 382 Parkdale as in CA268851
Property Identification Number (PIN)	21302-0043 (LT)
Approximate Universal Transverse Mercator (UTM) coordinates	NAD83 17T 626306 m E 4833192 m N
Accuracy Estimate of UTM	10-15 m
Measurement Method	Global Positioning System
Site Area	0.20 hectares (0.49 acres)
Property Owners, Owner Contact and Address	City of Toronto 100 Queen Street West,

	Toronto, ON
Name of Any Other Person Who Engaged the Qualified Person	CreateTO 61 Front Street West, 3rd Floor Toronto, Ontario M5J 1E5 T: 416-981-3889 E: JSlidders@createto.ca

1.2 Previous Investigations

The following reports were available for review at the time of this CSM:

1. "Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario", dated May 20, 2022, prepared by Trafalgar Environmental Consultants (TEC). The following pertinent information was noted:
   - The Phase II ESA was conducted according to CSA standard Z769-00 and selected portions of O.Reg. 153/04. The report was not conducted in support of a RSC.
   - As part of the Phase II ESA, two (2) boreholes were advanced on Site and equipped as monitoring wells upon completion.
   - The applicable Site Condition Standards (SCS) selected for the Phase II ESA was the Table 3 SCS.
   - Four (4) soil samples were collected and submitted for the laboratory analysis of Volatile Organic Compounds (VOCs), Petroleum Hydrocarbons (PHCs), Polycyclic Aromatic Hydrocarbons (PAHs), and Metals and Inorganics.
   - The soil samples submitted for analysis were below the applicable Table 3 SCS, with the exception of:
     - Several PAHs in Soil Sample 1 0-5;
     - EC/SAR in Soil Sample 1 0-5; and
     - SAR in Soil Sample 2 0-5
   - Two (2) groundwater samples were collected and submitted for the laboratory analysis of VOCs, PHCs, PAHs, and Metals and Inorganics.
   - The groundwater samples submitted for analysis were below the applicable Table 3 SCS, with the exception of:
     - Several VOCs in MW1 and MW2
   - Based on the results of the Phase II ESA, the Site was deemed to be impacted by the historical gasoline service station and automotive repair facility that were located east adjacent to the Site. The presence of VOCs in the groundwater at the Site was attributed to the handling/storage of solvents associated with the historical automotive repair facility that was located east adjacent to the Site.

2. "Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, ON", dated December 7, 2022, prepared by EXP Services Inc. for CreateTO.
   - The Site was located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an approximate area of 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupied a footprint of approximately 788 square metres (m^2) (8,482 square feet (ft^2)) in area. The Site building is located on the eastern portion of the Site with

asphalt paved parking spaces to west and south. Additionally, sea cans used for storage purposes, were located on the south exterior portion of the Site.

- The Site is bound by Queen Street West to the north, a commercial building to the west, a parking lot followed by community buildings to the east and residential land use to the south.
- The Site was first developed in the early 1890s for residential purposes. It was then developed with a rectangular shaped commercial building in approximately 1910 for commercial/industrial purposes. In 1966, the Site was redeveloped for commercial use (a bank, a grocery store and then a retail store).
- Fire insurance plans (FIP)s indicated the following regarding buildings on the Site:
  - A residential building located along the west property boundary (residential) and a larger building was present on near the southern property boundary Site in 1989 and 1903.
  - A single building with no basement was present on the Site in 1913 and 1924 and was located near the north boundary property. This building was indicated as vacant in 1933, 1939-1941.
  - Grocery store in 1969 in similar configuration to current day with the majority of the store occupied by the grocery store with offices and a storage room at the south end of the building.
  - No aboveground and/or underground storage tanks (ASTs/USTs), fuel dispensing area(s), fuel distribution lines, coal storage areas, hoists, trenches, pits, drains, oil-water separators, oil, solvent, paint, or other chemical storage, storage areas, paint spray booths, waste storage areas, etc were indicated on the FIPs for these dates.
- City directories indicated the following:
  - Coal storage (between 1890-1895 and between 1907-1919) (Outwood Coal Co. or Seddon Coal)
  - Canadian Bank of Commerce (between 1913-1929)
  - Parkdale Battery Service (1929)
  - Sheddon's Battery & Radio Service (1934)
  - Hill A G & Son (between 1950-1965)
  - Great Atlantic & Pacific Tea Co. Ltd. (1970)
  - Bi-Way Stores Ltd. (between 1980 – 2000)
- Based on the Phase One ESA findings, the Areas of Potential Environmental Concern were noted:
  - APEC 1a: Importation of Fill Material of Unknown Quality (PCA Identifier 1a)
  - APEC 1b: Historic Industrial Operations (PCA identifier 1b)
  - APEC 1c: Historic Industrial Operations (PCA identifier 1c)
  - APEC 1d: Salt Application (PCA identifier 1d)
  - APEC 2: Off-Site PCAs to the west (historic dry-cleaners, historic USTs, and vehicle maintenance) (PCA Identifier 8, 11, and 13)
  - APEC 3: Off Site PCAs to the east (historic USTs, gasoline service station, vehicle maintenance, and manufacturing) (PCA Identifier 2, 6, 9, 10, and 12)
  - APEC 4: Off Site PCAs to the north (historic manufacturing, USTs, vehicle maintenance, dry cleaning) (PCA Identifier 3, 4, 7, 14, 15, 18, 21, 22, 43, 48, 49)

- Based on the findings of the Phase One ESA and conclusions, a Phase Two ESA wa required to assess the soil and groundwater conditions at the Site prior to submitting an RSC.

3. "Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto, ON", dated July 24, 2024, prepared by EXP Services Inc. for CreateTO.
    - The Site was located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an approximate area of 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupied a footprint of approximately 788 square metres (m^2) (8,482 square feet (ft^2)) in area. The Site building is located on the eastern portion of the Site with asphalt paved parking spaces to west and south. Additionally, sea cans used for storage purposes, were located on the south exterior portion of the Site.
    - The Site is bound by Queen Street West to the north, a commercial building to the west, a parking lot followed by community buildings to the east and residential land use to the south.
    - The Site was first developed in the early 1890s for residential purposes. It was then developed with a rectangular shaped commercial building in approximately 1910 for commercial/industrial purposes. In 1966, the Site was redeveloped for commercial use (a bank, a grocery store and then a retail store).
    - Based on the Phase One ESA findings, the Areas of Potential Environmental Concern were noted:
        - APEC 1a: Importation of Fill Material of Unknown Quality (PCA Identifier 1a)
        - APEC 1b: Historic Industrial Operations (PCA identifier 1b)
        - APEC 1c: Historic Industrial Operations (PCA identifier 1c)
        - APEC 1d: Salt Application (PCA identifier 1d)
        - APEC 2: Off-Site PCAs to the west (historic dry-cleaners, historic USTs, and vehicle maintenance) (PCA Identifier 8, 11, and 13)
        - APEC 3: Off Site PCAs to the east (historic USTs, gasoline service station, vehicle maintenance, and manufacturing) (PCA Identifier 2, 6, 9, 10, and 12)
        - APEC 4: Off Site PCAs to the north (historic manufacturing, USTs, vehicle maintenance, dry cleaning) (PCA Identifier 3, 4, 7, 14, 15, 18, 21, 22, 43, 48, 49)

~~1.2~~1.3 Potentially Contaminating Activities

A Phase One ESA, in accordance with O.Reg.153/04, has been conducted by EXP in December 2022 for the Phase One Property. One hundred and sixteen (116) potentially contaminating activities (PCAs) were identified on-Site and within 250 m from the Phase One Property Site boundaries.

The QP determined that select PCAs may contribute to an APEC for the property, while several PCAs were determined to not contribute to an APEC at the Phase One Property/Site due to various factors including, but not limited to, relative distance to the Phase One Property/Site, orientation to the Phase One Property/Site; degree and nature of PCA operations, potentially impacted media, etc. Refer to Table I (attached) and Figure 2 for the list of potentially contaminating activities (PCAs) that have occurred within the Phase One Study Area, which includes the Site and properties within 250 m radius of the Site boundaries. A summary of the PCAs are as follows:

- PCA#6 – Battery Manufacturing, Recycling and Bulk Storage
- PCA#8 – Chemical Manufacturing, Processing and Bulk Storage
- PCA#11 – Commercial Trucking and Container Terminals
- ~~PCA#17 – Dye Manufacturing, Processing and Bulk Storage~~*
- PCA#28 – Gasoline and Associated Products in Fixed Tanks

- PCA#29 – Glass Manufacturing
- PCA#30 – Importation of Fill Materials of Unknown Quality
- PCA#31 – Ink Manufacturing, Processing and Bulk Storage
- PCA#32 – Iron and Steel Manufacturing and Processing
- PCA#33 – Metal Treatment, Coating, Plating and Finishing
- PCA#34 – Metal Fabrication
- PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)
- PCA#39 - Paints Manufacturing, Processing, and Bulk Storage
- PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing
- PCA#45 – Pulp, Paper and Paperboard Manufacturing and Processing
- PCA#47 – Rubber Manufacturing and Processing
- PCA#48 – Salt Manufacturing, Processing and Bulk Storage
- PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems
- ~~PCA#54 – Textile Manufacturing and Processing~~*
- PCA#55 – Transformer Manufacturing, Processing and Use
- PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products
- PCA 'Other' – Spill
- PCA ‘Other’ – Coal Storage
- PCA 'Other' – Salt Application
- PCA 'Other' – PCB Storage

Note: * refer to Response to Comments

~~1.3~~1.4 Areas of Potential Environmental Concern

Based on the evaluation of the PCAs located within the Phase One Study Area, the following areas of potential environmental concern (APECs) were identified, as presented below on Table 2 and on Figure 4.

Table 2: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)[3]	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1a: Importation of Fill Material of Unknown Quality (PCA Identifier 1a)	Entire Site	PCA#30 – Importation of Fill Material of Unknown Quality.	On-Site	Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Metals (including hydride-forming metals)	Soil
APEC 1b: Historic Industrial Operations (PCA identifier 1b)	Entire Site	PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	On-Site	PHCs, BTEX, Volatile Organic Compounds (VOCs), Metals, HFM, Hg, pH	Soil and Groundwater
APEC 1c: Historic Industrial Operations (PCA identifier 1c)	Entire Site	PCA “Other” – Coal Storage	On-Site	PHCs, BTEX, PAHs, Metals, HFM, Hg, pH	Soil and Groundwater
APEC 1d: Salt Application (PCA identifier 1d)	Western and Southern Portion	PCA ‘Other’ – Salt Application	On-Site	Electrical Conductivity (EC), Sodium Absorption Ratio (SAR)	Soil
APEC 2: Off-Site PCAs to the west (historic dry-cleaners, historic USTs, and vehicle maintenance) (PCA Identifier 8, 11, and 13)	West boundary of the Site	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-Site	PHCs, BTEX, Metals (including Hydride-Forming Metals), VOCs, PAHs	Groundwater
APEC 3: Off Site PCAs to the east (historic USTs, gasoline service station,	East boundary of the Site	PCA#28 - Gasoline and Associated Products in Fixed Tanks.	Off-Site	PHCs, BTEX, Polychlorinated Biphenyls (PCBs), VOCs and	Groundwater

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)[3]	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
vehicle maintenance, and manufacturing) (PCA Identifier 2, 6, 9, 10, and 12)		PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.		Metals (including hydride-forming metals), PAHs	
APEC 4: Off Site PCAs to the north (historic manufacturing, USTs, vehicle maintenance, dry cleaning) (PCA Identifier 3, 4, 7, 14, 15, 18, 21, 22, 43, 49)	North boundary of the Site	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#31 – Ink Manufacturing, Processing and Bulk Storage. ~~PCA#17 – Dye Manufacturing, Processing and Bulk Storage.~~* PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing. ~~PCA#54 – Textile Manufacturing and Processing.~~* PCA#55 – Transformer Manufacturing, Processing and Use	Off-Site	PHCs, BTEX, VOCs, metals (including hydride forming metals), PCBs, PAHs	Groundwater

(1) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg.153/04, as amended) that is occurring or has occurred in a Phase One Study area.
Note: * refer to Response to Comments

Refer to Figure 4 for the location of APECs on the Site. A boreholes/monitoring well advanced on the Site to investigate the identified APEC are shown on Figure 5B.

~~1.4~~1.5 Underground Utilities

The Site utilities and services were identified at the Site based on information provided in environmental records, relevant utility infrastructure observed during the Site reconnaissance. The Site utilities are summarized in the table below and noted on Figure 3, where available. It should be noted that COCs in soil and groundwater were identified at the Site. The existing subsurface structures or utilities are located within the Site, and it will affect the migration of the COCs in groundwater.

Utility	Source	Location	Site Entry
Natural Gas	Enbridge Gas	Underground	Enters Site building on the southern side
Sanitary Sewer	City of Toronto	Underground	Enters Site Building at the southeast corner and runs east to west in the southern portion of the Site.
Storm Sewer	City of Toronto	Underground	Catch basin located in the southern portion of the Site, southeast of the Site building.
Water	City of Toronto	Underground	Enters Site building on the northern exterior
Electricity	Toronto Hydro	Overhead	Enters Site from the north boundary and the Site building along the southwest exterior.
Telecommunications	Unknown	Unknown	Enters Site Building at the southeast corner.

2 Physical Site Description

2.1 Stratigraphy from Ground Surface to Deepest Aquifer

The Site and surrounding areas are expected to consist of Glaciolacustrine deposits that predominantly consist of sand, gravelly sand and gravel, nearshore and beach deposits from the Pleistocene era. The bedrock in the general area of the Site is part of a group belonging to the Georgian Bay Formation; Blue Mountain Formation; Billings Formation; Collingwood Member; and Eastview Member consisting of shale, limestone, dolostone, ad siltstone.

According to the topographic map from Natural Resources of Canada (Toporama), the elevation of the Site is approximately 97 m above sea level. A review of the topographic map indicated that the closest body of water is Lake Ontario, which is situated approximately 950 m south/southeast of the Site. Based on the information available at the time of this Phase One ESA, the inferred direction of groundwater flow in the area of the Site is expected to be in a south/southeast direction.

Based on the review of available resources from the City of Toronto website on May 16, 2022, no areas of natural significance were identified at the Site or within 30 m of the Site.

A brief description of the soil stratigraphy at the Site, in order of depth, is summarized in the following sections.

2.1.1 Surface Material

At each of the boreholes, with the exception of BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114, a surficial pavement structure layer, comprising of asphalt ranging in thickness between 75 to 160 mm, followed by granular base material ranging in thickness between 100 to 228 mm.

At BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114, a surficial concrete layer was encountered with a thickness ranging between 100 to 160 mm, followed by a granular base material ranging in thickness between 100 to 315 mm. It is noted that BH/MW113 and BH/MW114 were located within the building.

2.1.2 Fill Material

A fill unit was encountered below the pavement structure in each of the boreholes and extended to depths of between 0.20 m to 2.29 m below ground surface (m bgs). The fill was brown to dark brown and grey in colour and composed of sandy silt to silt with some clay and gravel and/or clayey silt to silty clay with some sand and gravel. A trace amount of brick fragments and/or wood chips were observed in BH/MW2-D, BH/MW3-D, BH106, BH/MW113, BH/MW102 and BH/MW103, respectively. Black staining was observed in BH108.

2.1.3 Native Material

A deposit of native silt was encountered below the fill material at all borehole locations, with the exception of BH/MW3-S. The silt layer ranged in depth of approximately 0.76-8.23 m bgs. The silt was brown or grey in colour and contained a trace of sand, some clay, and a trace of gravel.

Silty clay was encountered in BH/MW3-D below the fill, extending to a depth of 6.1 m bgs. It was brown in colour and contained a trace of sand.

Silty sand till was encountered below the silt at all borehole locations, with the exception of BH/MW104, BH/MW105, BH105A, BH/MW1-S, BH/MW2-S, BH/MW3S, BH/MW3D and BH108. The till extended to the termination depth or until shale bedrock was encountered at a maximum depth of 15.24 m bgs. The sandy silt till was brown to grey in colour, wet, and contained trace clay and gravel.

2.2 Approximate Depth to Bedrock

During the drilling investigation, shale bedrock was encountered in BH/MW1-D, BH/MW2-D, BH/MW3-D, BH/MW101, BH/MW102, and BH/MW103 during the advancement of boreholes at a maximum depth of 18.77 m bgs. Assumed bedrock was tri-coned at BH/MW101, BH/MW102, and BH/MW103.

2.3 Hydrogeology

Groundwater levels within the overburden were measured on various dates between October 26 and January 16, 2025. The depth to groundwater within the overburden ranged between 4.501 m bgs (BH/MW2-D) and 6.88 m bgs (MW109). Groundwater elevations ranged between 89.785 meters above sea level (m asl) (MW113) and 91.694 m asl (MW2-D).

Groundwater levels within the bedrock were measured on March 11 and March 13, 2024. The depth to groundwater ranged between 6.29 m bgs (MW102) and 15.08 m bgs (MW101). Groundwater elevations ranged between 81.206 m asl (MW101) and 89.825 m asl (MW102).

Based on the groundwater contour map (overburden) delineated for the Site, it is expected that the groundwater in the overburden is anticipated to flow in a southeastern direction at the Site. A groundwater contour map (overburden) is presented in Figure 6.

Based on the groundwater contour map (bedrock) prepared for the Site, the groundwater in the bedrock flows in a north to northeastern direction at the Site. The groundwater contour map (bedrock) is presented in Figure 6A.

It is noted that at two (2) of recently installed shallow monitoring wells, groundwater was noted to be marginally above the screen (BH/MW104 and BH/MW105). The well screens were installed based on observations in the field (i.e. the presence of grey soils; the typical indicator of the presence of the water table and/or the presence of moisture in the soils). It is the QPESAs opinion that while the water is marginally above the well screen at two (2) locations, the potential presence of light non-aqueous phase liquids (LNAPLs), in the wells, has not been impacted by the depth of the screens, given the presence of VOCs across the Site in for monitoring wells installed above the bedrock.

No evidence of non-measurable non-aqueous phase liquids (NAPL) was observed during the groundwater sampling activities.

Refer to Table 3 for the Site hydrogeology characteristics based on groundwater monitoring observations.

Table 3: Site Hydrogeology Characteristics

Location	Observation
Depth to Groundwater (shallow)	4.499 m bgs (MW2-D) and 6.88 m bgs (MW109)
Groundwater Elevation	89.825 m asl (MW113) and 91.694 m asl (MW2-D)
Depth to Groundwater (bedrock)	6.29 m bgs (MW102) and 15.08 m bgs (MW101)
Groundwater Elevation	81.206 m asl (MW101) and 89.825 m asl (MW102)
Horizontal Hydraulic Gradient (shallow)	0.067 m/m (between BH/MW3-D and BH/MW2-D)
	0.040 m/m (between BH/MW2-D and BH/MW1-D)
Horizontal Hydraulic Gradient (bedrock)	0.204 m/m (between BH/MW101 and BH/MW103)
	0.030 m/m (between BH/MW102 and BH/MW103)
Vertical Hydraulic Gradient	-0.029 m/m (between BH/MW1-S and BH/MW1-D)
	0.136 m/m (between BH/MW3-S and BH/MW3-D)

2.4 Considerations with Respect to Sections 35, 41 or 43.1 of Regulation

The Site Sensitivity classification with respect to the conditions set out under Section 35, Section 41 and 43.1 of O.Reg.153/04 were evaluated to determine if the Site is sensitive, as presented below in Table 4.

Table 4: Site Sensitivity

Sensitivity	Classification	Does Sensitivity Apply to Site?
Section 35 applies if	(i) The full depth generic site condition standards in a non-potable groundwater condition	Yes
	(ii) The stratified site condition standards in a non-potable groundwater condition	No
	(iii) The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system	Yes
	(iv) The record of site condition does not specify agricultural or other use as the type of property use	Yes
	(v) The property is located in an area designated in the municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of groundwater	No
	(vi) The property or one of the properties in the Phase One Study Area has a well, used or intended for use as a source of water for human consumption or agriculture.	No
	(vii) A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the standards in preparing a record of site condition for the property; A. A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the non-portable ground water standards. No response has been received from the lower tier municipalities	Yes

Sensitivity	Classification	Does Sensitivity Apply to Site?
	(City of Toronto) within 30 days from the date of notification letter; therefore, it is assumed that the City of Toronto has on objection to use the non-potable standard accordance to O.Reg. 153/04, as amended.	
Section 41 applies if	(i) property is within an area of natural significance	No
	(ii) property includes or is adjacent to an area of natural significance or part of such an area	No
	(iii) property includes land that is within 30 m of an area of natural significance or part of such an area	No
	(iv) soil at property has a pH value for surface soil less than 5 or greater than 9	No
	(v) soil at property has a pH value for sub-surface soil less than 5 or greater than 11	No
	(vi) a qualified person is of the opinion that, given the characteristics of the property and the certifications the qualified person would be required to make in a record of site condition in relation to the property as specified in Schedule A, it is appropriate to apply this section to the property	No
Section 43.1 applies if	(i) property is a shallow soil property	No
	(ii) property includes all or part of a water body or is adjacent to a water body or includes land that is within 30 m of a water body	No

2.5 Areas On, In or Under the Phase Two Property Where Excess Soil is Finally Placed

Fill material is typically brought to a property as a base for buildings and pavement areas. Fill can also be used to re-grade a property, and to backfill excavations.

No excess soil has been brought to the Site during the Phase Two ESA.

2.6 Current and Proposed Land Use

At the time of the Phase Two ESA, the Site was occupied by one (1) commercial building that is currently occupied by a Dollarama.

It is EXP's understanding that the Client intends to re-develop the Site for residential use with a sixteen (16) storey condominium building with a basement level occupied by community space. Development plans had not been finalized at the time of this CSM.

3 Appropriate Standards Selection for Identification of Areas of Contamination

For assessment purposes, EXP selected the MECP (2011) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition Soil – Residential/Parkland/Institutional Property Use - ~~Coarse~~ Medium/fine Textured Soils (Table 3 SCS). The criteria were considered applicable for determining contaminants of concern (COCs), based on the rationale presented below in Table 6.

Table 6: Site Specific Condition

Description	Site Specific Condition
Section 35 Site Sensitivity	• Applicable
Section 41 Site Sensitivity	Not Applicable • A total of three (3) surface and two (2) subsurface pH samples were submitted by EXP. Additionally, two (2) surface soil samples were submitted by TEC (refer to Section 1.2). • The soil at the Site has pH values between 5 and 9 for surficial soil; and, between 5 and 11 for subsurface soil, which is within the acceptable range for the Table 3 SCS~~.~~ • The Site is not located within a Significant Area, and/or located adjacent to an area of natural significance/an environmentally sensitive area.
Section 43.1 Site Sensitivity	Not Applicable • The Site is not considered a shallow soil property, based on the recovered soil cores, which indicated that more than two-thirds of the Site has an overburden thickness in excess of 2 m. • The Site is not located within 30 m of a surface water body.
Ground Water	Non-Potable • The Site and surrounding properties within 250 m of the Site are supplied by municipal drinking water system. The City of Toronto confirmed on May 21, 2024, that they do not object to the use of the Table 3 SCS.
Land Use	Residential • The proposed future use of the Site is for residential use.
Soil Texture	Coarse textured • The predominant texture of soils at the Site is considered to be ~~coarse~~ medium/fine textured, based on soil characteristics identified in the borehole logs. • A total of five (5) grain size analysis and/or full hydrometer analysis was completed. The analysis indicates the following: silty sand, trace gravel and clay, silty sand, trace clay and gravel, clayey silt with trace sand (Figure 5C).

3.1 Areas Where a Contaminant is Present

A chemical constituent was selected as a COC if it was detected in soil or groundwater samples obtained from the Site at a concentration in excess of the applicable Table 3 SCS. Soil conditions at the Site were evaluated through reliable data from the Phase Two ESA completed by EXP. A summary of the assessment of APECs is presented in Table 7 below:

Table 7: Summary of APECs and Samples Collected

APEC	Location of APEC on Phase Two Property	PCA[1]	Location of PCA	COPC and Media Affected	Phase Two Assessments
1A	Entire Site	PCA#30 – Importation of Fill Materials of Unknown Quality	On-site	**Soil** PAHs, PHCs, BTEX, Metals, As, Sb, Se	Soil BH1, BH2, BH3, BH105, BH107, BH108, Borehole 1, Borehole 2
1B	Entire Site	PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	On-site	**Soil and Groundwater** PHCs, BTEX, VOCs	Soil BH1, BH2, BH3, BH104, BH114, Borehole 1, Borehole 2 Groundwater MW1-D, MW2-S, MW3-D, MW104, MW105, MW113, MW114
1C	Entire Site	PCA "Other" – Coal Storage	On-site	**Soil** PAHs, PHCs, BTEX	Soil BH1, BH2, BH3, BH107, BH108, BH113, Borehole 1, Borehole 2
1D	Western and Southern Portion	PCA 'Other' - Salt Application	On-site	**Soil** EC, SAR	Soil BH1, BH2, BH3, Borehole 1, Borehole 2
2	West Boundary of Site	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-site	**Groundwater** PHCs, BTEX, Metals, CrVI, Hg, NA, VOCs	Groundwater MW1-D, MW2-S, MW2-D, MW104, MW105, MW107
3	East Boundary of the Site	PCA#28 - Gasoline and Associated Products in Fixed Tanks. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-site	**Groundwater** PHCs, BTEX, PCBs, Metals, CrVI, Hg, NA	Groundwater MW3-D, MW113, MW114

APEC	Location of APEC on Phase Two Property	PCA[1]	Location of PCA	COPC and Media Affected	Phase Two Assessments
4	North boundary of the Site	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#31 – Ink Manufacturing, Processing and Bulk Storage. PCA#17 – Dye Manufacturing, Processing and Bulk Storage. PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing. PCA#54 – Textile Manufacturing and Processing. PCA#55 – Transformer Manufacturing, Processing and Use	Off-site	**Groundwater** PAHs, PHCs, BTEX, VOCs, Metals, CrVI, Hg, NA, PCBs	Soil BH/MW1, BH/MW101, BH/MW107 Groundwater MW1-D, MW104, MW105, MW114,

3.1.1 Soil Quality

Soil samples were submitted for the analysis Petroleum Hydrocarbons (PHCs), Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Metals (including Hydride-Forming Metals), Other Parameters – (Mercury (Hg), Chromium VI (CrVI), Hot-Water Soluble Boron (HWS-B)), Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), pH, and 75-micron sieve.

Based on the reported analytical results, the parameters that were detected at concentrations above the applicable MECP Table 3 SCS are presented in Table 8 below:

Table 8 Concentrations Above the Table 3 SCS in Soil

Parameter	Maximum Concentration (µg/g)	Location of Maximum Concentration	Table 3 Site Condition Standard (µg/g)
Volatile Organic Compounds (VOCs)			
Bromomethane	<0.16*	BH/MW3-D SS8	0.05
Carbon Tetrachloride	<0.16	BH/MW3-D SS8	0.12
1,4-Dichlorobenzene	<0.16	BH/MW3-D SS8	0.097
1,2-Dichloroethane	<0.20	BH/MW3-D SS8	0.05
1,1-Dichloroethylene	<0.16	BH/MW3-D SS8	0.05
1,2-Dichloropropane	<0.16	BH/MW3-D SS8	0.085
cis-1,3-Dichloropropene	<0.12	BH/MW3-D SS8	0.083
trans-1,3-Dichloropropene	<0.16	BH/MW3-D SS8	0.083
1,3-Dichloropropene (cis+trans)	<0.20	BH/MW3-D SS8	0.083
Ethylene Dibromide	<0.16	BH/MW3-D SS8	0.05
1,1,1,2-Tetrachloroethane	<0.16	BH/MW3-D SS8	0.05
1,1,2,2-Tetrachloroethane	<0.16	BH/MW3-D SS8	0.05

Parameter	Maximum Concentration (µg/g)	Location of Maximum Concentration	Table 3 Site Condition Standard (µg/g)
Tetrachloroethylene	17	BH105 SS9	2.3
1,1,2-Trichloroethane	<0.16	BH/MW3-D SS8	0.05
Vinyl Chloride	<0.076	BH/MW3-D SS8	0.022
Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthylene	0.301	Borehole 1 0-5	0.17
Anthracene	82	Borehole 1 0-5	0.74
Benzo(a)anthracene	74.1	Borehole 1 0-5	0.63
Benzo(a)pyrene	71.9	Borehole 1 0-5	0.3
Benzo(b/j)fluoranthene	72.3	Borehole 1 0-5	0.78
Benzo(g,h,i)perylene	37.3	Borehole 1 0-5	7.8
Benzo(k)fluoranthene	27.8	Borehole 1 0-5	0.78
Chrysene	66.2	Borehole 1 0-5	7.8
Dibenzo(a,h)anthracene	9.1	Borehole 1 0-5	0.1
Fluoranthene	183	Borehole 1 0-5	0.69
Indeno(1,2,3-cd)pyrene	38.1	Borehole 1 0-5	0.48
1-Methylnaphthalene	7.11	Borehole 1 0-5	3.4
2-Methylnaphthalene	11.7	Borehole 1 0-5	3.4
Naphthalene	32	Borehole 1 0-5	0.75
Phenanthrene	241	Borehole 1 0-5	7.8
Pyrene	153	Borehole 1 0-5	78
Metals (including Hydride-Forming Metals)			
Lead	430	BH105 SS1	120

Analytical results of soil samples collected on the Site are presented in a plan view on Figures 7A to 13. Cross-sections are provided following each plan view.

3.1.1.1 Averaging Programs

An elevated concentration for tetrachloroethylene was found at BH105A SS6A. Per Section 48(2) and 48(4) of O.Reg. 153/04, averaging of soil results from locations within 2 m of the original sample location and same depth interval is permitted. The resulting tetrachloroethylene was 2.2 µg/g at this location. Refer to Figure 9A and 9E for the results of the tetrachloroethylene averaging program.

3.1.1.2 Data Validation

It is noted that various soil VOCs, analyzed in soil sample BH3 SS8, had reported detection limit (RDL) exceedances above the Table 3 SCS as noted in Table 8. A review of these samples is presented in Table 9 below and indicated:

Table 9: Data Validation in Soil

Parameter Group	Parameter	Total No. of Samples	No. of Samples with RDL > Table 3 SCS	Rationale for Exclusion
VOCs	Bromomethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to “high moisture content and/or low weight of soil provided”. As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the

Parameter Group	Parameter	Total No. of Samples	No. of Samples with RDL > Table 3 SCS	Rationale for Exclusion
				parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	Carbon Tetrachloride	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,4-Dichlorobenzene	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,2-Dichloroethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,1-Dichloroethylene	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCS	1,2-Dichloropropane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or

Parameter Group	Parameter	Total No. of Samples	No. of Samples with RDL > Table 3 SCS	Rationale for Exclusion
				below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	cis-1,3-Dichloropropene	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,1,1,2-Tetrachloroethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	trans-1,3-Dichloropropene	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,3-Dichloropropene (cis+trans)	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	Ethylene Dibromide	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided".

Parameter Group	Parameter	Total No. of Samples	No. of Samples with RDL > Table 3 SCS	Rationale for Exclusion
				As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,1,1,2-Tetrachloroethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to “high moisture content and/or low weight of soil provided”. As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,1,2,2-Tetrachloroethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to “high moisture content and/or low weight of soil provided”. As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	1,1,2-Trichloroethane	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to “high moisture content and/or low weight of soil provided”. As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.
VOCs	Vinyl Chloride	23	1	Based on the review of the laboratory certificate of analysis, the detection limits were raised due to “high moisture content and/or low weight of soil provided”. As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.

~~. Based on the review of the laboratory certificate of analysis, the detection limits were raised due to "high moisture content and/or low weight of soil provided". As these VOC parameters were either not-detected or below Table 3 SCS for the remaining soil samples, the parameters with RDLs above the Table 3 SCS in soil sample BH3 SS8 are considered to not be elevated over the Table 3 SCS for the purposes a Risk Assessment.~~

The analytical results of the remaining tested soil samples and the laboratory RDLs were below the Table 3 SCS. Analytical results of soil samples collected on the Site are presented in a plan view on Figures 7 to 13.

Elevated levels of salt-related parameters (EC and SAR) were present in multiple soil samples, however, they are likely associated with the application of de-icing materials for the purpose of snow and ice removal as the areas where the boreholes are located are utilized as a parking lot. In accordance with O.Reg. 153/04, s. 49.1 (1) and at the discretion of the Qualified Person, the elevated EC and SAR concentrations are deemed to not exceed the Table 3 SCS.

3.1.2 Groundwater Quality

Groundwater samples were submitted for the analysis PHCs, BTEX, VOCs, PAHs, Polychlorinated Biphenyls (PCBs), Metals (including Hydride-Forming Metals), and Other Parameters (Mercury (Hg), Chromium VI (CrVI), and Sodium).

Based on the reported analytical results, the parameters that were detected at concentrations above the applicable MECP Table 3 SCS are presented in Table 10 below:

Table 10: Concentrations Above the Table 3 SCS in Groundwater

Parameter	Maximum Concentration (µg/L)	Location of Maximum Concentration	Table 3 Site Condition Standard (µg/L)
Volatile Organic Compounds (VOCs)			
cis-1,2-Dichloroethylene	~~65.3~~150	MW2-S~~MW1~~	17
trans-1,2-Dichloroethylene	54.8	MW2	17
Tetrachloroethylene	~~1600~~4100	MW1	17
Trichloroethylene	~~191~~270	MW2-S	17
Vinyl Chloride	5.4	MW11D (field duplicate of MW1D)	1.7

The analytical results of the remaining tested soil samples and the laboratory RDLs were below the Table 3 SCS. Analytical results of groundwater samples collected on the Site are presented in a plan view on Figures 14 to 20.

3.2 Contaminants Associated with Area of Impact

3.2.1 Soil Media

The soil COCs noted at the Site from the current and previous investigation included:

- VOCs: Bromomethane, Carbon Tetrachloride, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 1,1-Dichloroethylene, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, 1,3-Dichloropropene (cis+trans), Ethylene Dibromide, 1,1,1,2-Tetrachloroethane, 1,1,2,2-Tetrachloroethane, Tetrachloroethylene, 1,1,2-Trichloroethane, Vinyl Chloride
- PAHs: Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b/j)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, 1-Methylnaphthalene, 2-Methylnaphthalene, Naphthalene, Phenanthrene, Pyrene
- Metals: Lead

The VOC exceedances in soil are likely associated with the historic on-Site industrial operations and historical dry-cleaning operations within the Phase One Study Area. The Metals and PAH exceedances in soil are likely associated with poor quality fill material.

3.2.2 Delineation of Soil Impacts

Samples collected on the Site that meet or exceed the Table 3 SCS are shown in plan view on Figure 7 through Figure 13 for soil. Details of the delineation, source and distribution of all impacts are summarized in Table 11 below~~.~~:

Table 11: Delineation of Soil Impacts

Parameter Group and Media	Horizontal Delineation	Associated Figures	Vertical Delineation	Associated Figures
VOCs in Soil	VOCs were noted in subsurface soils on the northern part of the Site and were horizontally delineated by property boundary to the west and north and by BH/MW1-D, BH/MW104 and BH/MW106 to the east and BH107 to the south.	9, 9A, 9B	Impacts were noted between 6.10-6.71 m bgs (BH105 SS9) Vertical delineation was achieved at a depth of 8.38-8.99 m bgs at a nearby location (BH106).	9, 9A, 9B
	VOCs were noted in subsurface soils on the southern part of the Site and were horizontally delineated by the property boundary to the south, and BH110 to the west, BH115 to the east and BH/MW103 to the north.		Impacts were noted between 7.62-8.23 m bgs (BH3 SS8) Vertical delineation was achieved at a depth of 8.38-8.99 m bgs at a nearby location (BH110).	
PAHs (various parameters) in Soil	PAHs were noted in surface soils on the east portion of the Site and were horizontally delineated by the property boundary to the east, BH114 to the north, and MW2 to the south and BH/MW2-D to the west.	10, 10A, 10B	Impacts were noted between 0.0 – 0.61m bgs (BH113 SS1)	10, 10A, 10B
Metals (lead) in Soil	Lead was noted in subsurface soils on the northwest portion of the Site and were horizontally delineated by the property boundary to the west, MW1 and BH/MW2-D to the south, MW114 to the east and MW104 and the property boundary to the north.	11, 11A, 11B	Impacts were noted between 0.0 – 0.61 m bgs (BH1 SS1, BH105 SS1, and BH106 SS1) Vertical delineation was achieved at BH106 (0.76 – 1.52 m bgs) and nearby locations at 0.76 - 1.37 m bgs (MW101)	11, 11A, 11B

3.2.3 Groundwater Media

The groundwater COCs noted at the Site from the current and previous investigation included:

- VOCs: cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride

The various VOC exceedances in groundwater in each of the monitoring wells are likely associated with the historic industrial operations on-Site and the historical dry-cleaning operations throughout the Phase One Study Area.

3.2.4 Delineation of Groundwater Impacts

Samples collected on the Site that meet or exceed the Table 3 SCS are shown in plan view on Figure 14 through Figure 20 for soil. Details of the delineation, source and distribution of all impacts are summarized in Table 12 below.

Table 12: Delineation of Groundwater Impacts

Parameter Group and Media	Horizontal Delineation	Associated Figures	Vertical Delineation	Associated Figures
VOCs in Groundwater	VOCs were noted in groundwater in multiple locations across the Site.	16, 16A, 16B	Impacts were generally noted in wells screened above 8 m (i.e. 4.57-7.62 m bgs). Vertical delineation was achieved within multiple wells installed between 6.20-9.25 m bgs and between 16.88-18.40 m bgs).	16, 16A, 16B
	VOCs were noted in groundwater at 1 interior monitoring well (BH/MW113)		Impacts were noted in BH/MW113 screened between 4.43-7.48 m bgs. Vertical delineation was achieved within BH/MW101 (17.25-18.77 m bgs) to the north, BH/MW102 (17.22-18.74 m bgs) to the west, BH/MW103 (16.88-18.40 m bgs) to the south, and by the property boundary to the east. ~~This monitoring well will be re-sampled twice to confirm concentrations.~~	

3.3 Medium Associated with Area of Impact

COCs were identified in soil and groundwater. No sediment was present at the Site.

3.4 Description of What is Known about Area of Impacts

The VOC exceedances in soil is likely associated with the historical on-Site industrial operations on Site and the historical dry-cleaning operations within the Phase One Study Area. The Metals and PAH exceedances in soil is likely associated with poor quality fill material.

The various VOC exceedances in groundwater in each of the monitoring wells are likely associated with the historical industrial operations on Site and the historical dry-cleaning operations throughout the Phase One Study Area.

3.5 Distribution of Contaminant Impacts

Soil samples were collected from various locations across the Site, within the APECs, and submitted for analysis of PHCs, BTEX, VOCs, PAHs, Metals (including hydride-forming metals), Other Parameters (Hg, CrVI, HWS-B), EC, and SAR. Elevated concentrations above the Table 3 SCS were found as follows:

- VOCs at two (2) locations across the Site at a depth of from 7.62 m bgs to 8.23 m bgs (BH3 SS8) and 6.10 – 6.71 m bgs (BH105 SS9).
- PAHs at three (3) locations across the Site at a depth of 0 – 1.52 m bgs (1 0-5), 0.22 -0.33 m bgs (BH105A SS1B) and 0.0 – 0.61 m bgs (BH113 SS1).
- Metals at three (3) locations across the Site at a depth of 0 – 0.61 m bgs (BH1 SS1, BH105 SS1, BH106 SS1).

Groundwater samples were collected from various locations across the Site, within the APECs, and submitted for analysis of PHCs, BTEX, VOCs, PCBs, PAHs, Metals (including hydride-forming metals), Hg, CrVI, and Sodium. Elevated concentrations above the Table 3 SCS were found as follows:

- VOCs at six (6) locations across the Site at depths ranging from 3.05 m bgs to 7.62 m bgs.

The locations where samples were collected and analyzed for each parameter group are shown in plan view on Figures 7 to 13 for soil parameters, and on Figures 14 through 20 for groundwater parameters.

3.6 Migration of Contaminants from APECs, Identification of Preferential Pathways, if Any

~~3.6 Migration of Contaminants~~

The preferential pathways for contaminants present in soil and groundwater media, include various underground utilities, building footings and subsurface features.

Underground utilities were identified at the Site which included: a water utility line, communications utility line, hydro utility line, natural gas utility line, and sanitary sewer line (refer to Figure 3). As such, there is a potential for underground utilities to affect the distribution and transport of soil vapour contaminants located on the Site.

Subsurface utilities at the Site are expected to be located about 1.0 to 2.0 m below grade corresponding to approximate elevations of 95.0 to 94.0 m asl, within fill materials. PAHs, Metals were identified on the Site, in fill materials, were delineated at a depth below the utilities in soil. While VOCs were identified below the assumed depth of the utilities across the Site.

As reported in Section 2.3, the minimum depth to groundwater is 4.499 mbgs, below the assumed depth of the utility corridors.

Therefore, the presence of the current subsurface utilities are not expected to affect vapour distribution and transport and contaminant distribution and transport.~~Underground utilities were identified at the Site. As such, there is a potential for underground utilities to affect the distribution and transport of soil vapour contaminants located on the Site~~.

Details on the preferential pathways for the impacts are summarized in Table 13~~1~~.

Table 13: Preferential Pathways

Anything known about migration of the contaminants present on, in or under the Phase Two property at a concentration greater than	Current utilities are unlikely to ~~may~~ affect groundwater and soil vapour migration. Future utilities may affect groundwater and soil vapour migration.

the applicable site condition standard away from any area of potential environmental concern, including the identification of any preferential pathways.	Current and future building footings may affect groundwater and soil vapour and migration.

3.7 Influence of Climatic or Meteorological Conditions

It is noted that climatic or meteorological conditions may influence the distribution and migration of COCs at the Site. Seasonal fluctuations in groundwater due to cyclical increases and decreases in precipitation can affect groundwater recharge. Groundwater levels may be elevated in the spring and fall due to snow melt and/or increases in precipitation; and, groundwater levels may be lowered in the winter and summer due to snow storage and/or increased evaporation. Such fluctuations can increase the vertical distribution of COCs in the capillary zone, as well as alter the direction of groundwater flow paths based on changes in infiltration rates. However, based on the conditions observed at the Site, it is not anticipated that the climatic or meteorological changes will result in significant alterations in the distribution of contaminants.

Details on the climatic or meteorological conditions are summarized below:

Table 14: Climatic or Meteorological Conditions

Climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels, and;	Seasonal groundwater fluctuations are expected at the Site.

3.8 Soil Vapour Migration

The VOC ~~and PAH impacts~~ in soil and ~~VOCs~~ in groundwater may be present under the current and future buildings constructed on-Site and may present a risk to receptors via vapour intrusion. Based on the results of the RA, the PAH impacts in soil are not considered to present a potential risk to receptors via vapour intrusion.

To further evaluate potential risks to receptors within the current Site Building, an indoor air quality (IAQ) sampling event was completed on January 27th, 2025. Based on the results of the IAQ program, all contaminants of concern were within the applicable MECP ~~(2016a)~~ Health Based Indoor Air Criteria, protective of the current commercial land use. To evaluate seasonable variability, a second IAQ event will be completed in the summer of 2025 (refer to Appendix O of the RA).

4 Exposure Pathways

4.1 Human Health Receptors and Exposure Pathways

The selection of human receptors is based on the proposed future residential and community use of the Site. Therefore, the receptors chosen for analysis are those standard receptors found at residential and community properties and includes: Site residents (all ages), Site visitor/trespassers (all ages), long-term indoor workers, and outdoor maintenance workers are also considered possible receptors. Construction/subsurface utility workers may also be present during redevelopment of the site and as such, are also considered. Considering COC with developmental toxicity (i.e. TCE) was retained after screening against applicable SCS, pregnant female receptors will be assessed as well.

Based on the COCs identified at the Site, possible routes of exposure for human receptors include the following:

- Incidental soil ingestion, dermal contact, and inhalation of soil particulates for the Site residents, Site visitors/trespassers, outdoor maintenance workers and Construction/subsurface utility workers;
- Ingestion of homegrown garden produce for the Site residents and Site visitors/trespassers;
- Inhalation of indoor air for the Site residents, Site visitors/trespassers, and long-term indoor workers;
- Inhalation of outdoor and/or trench air for the Site residents, Site visitors/trespassers, outdoor maintenance workers and Construction/subsurface utility workers;
- Vapour skin contact for the Site residents, Site visitors/trespassers, long-term indoor workers, outdoor maintenance workers and Construction/subsurface utility workers; and,
- Incidental groundwater ingestion and dermal contact for Construction/subsurface utility workers.

The potential exposure routes for human receptors are summarized in Figure 25A. As risk management measures (RMM) are intended for the Site, a human health conceptual site model (HHCSM) in the presence of RMM is provided as Figure 25B.

4.2 ~~Release Mechanisms, Contaminant Transport Pathways, Human and~~ Ecological Receptors and Exposure Pathways

The selection of ecological receptors takes into consideration the location of the Site in an urban area and that Lake Ontario is located approximately 950 m south/southeast of the Site. Relevant on-site receptors consist of terrestrial VECs such as plants, soil invertebrates, mammals and birds.

On-Site exposure routes include the following:

- Root, stem and foliar uptake and contact by terrestrial plants;
- Soil particulate inhalation, dermal contact, and incidental ingestion by ~~soil invertebrates and~~ mammals and birds;
- Ingestion of impacted plant and animal tissue by soil invertebrates and mammals and birds; and,
- Vapour inhalation by soil invertebrates and mammals and birds.

Off-Site ecological receptors consist of the same terrestrial receptors found on-Site, in addition to aquatic species. Relevant exposure pathways for off-Site aquatic receptors such as aquatic plants, aquatic invertebrates, aquatic birds and mammals, amphibians, and fish include the following:

- Root, stem, and foliar uptake of surface water for aquatic plants;
- Ingestion and dermal contact of surface water for aquatic invertebrates, mammals, birds, amphibians, and fish;
- Ingestion of impacted plant and animal tissue for aquatic invertebrates, mammals, birds, amphibians, and fish; and
- Gill uptake of surface water for aquatic invertebrates, amphibians, and fish.

The potential exposure routes for ecological receptors are summarized in Figure 26A. As RMM are intended for the Site, the ecological conceptual site model (ECSM) in the presence of RMM is provided as Figure 26B.

5 Uncertainty in the Phase Two Investigation

Quality Control/Quality Assurance measures were implemented during sample collection, storage and transport to provide accurate data representative of conditions in the surficial fill and upper overburden soils. The QA/QC measures included decontamination procedures to minimize the potential for sample cross contamination, the execution of standard operating procedures to collect representative and unbiased samples, the collection of quality control samples to evaluate sample precision and accuracy, and the implementation of measures to preserve sample integrity.

Soil samples were collected into pre-cleaned laboratory-supplied jars provided with analytical test group specific preservatives, as required. Recommended analytical test group specific sample volumes were collected as specified by the contractual laboratory.

Measures were followed to preserve sample integrity between collection and receipt by the laboratory. Immediately upon collection, all samples were placed in insulated coolers pre-chilled with ice for storage and transport to the contractual laboratory. Samples were received by the contractual laboratory within specific analytical test group holding time requirements.

Documentation procedures were followed to confirm sample identification and tracked sample movement. Each sample was assigned a unique identification ID number, which was recorded along with the date, time of sampling and requested analyses on labels affixed to the sampling containers, and in a field notebook. Chain of Custody protocols were followed to track sample handling and movement until receipt by the contractual laboratory.

Field QA/QC samples were collected during soil sampling. Duplicate samples were collected to evaluate sampling precision.

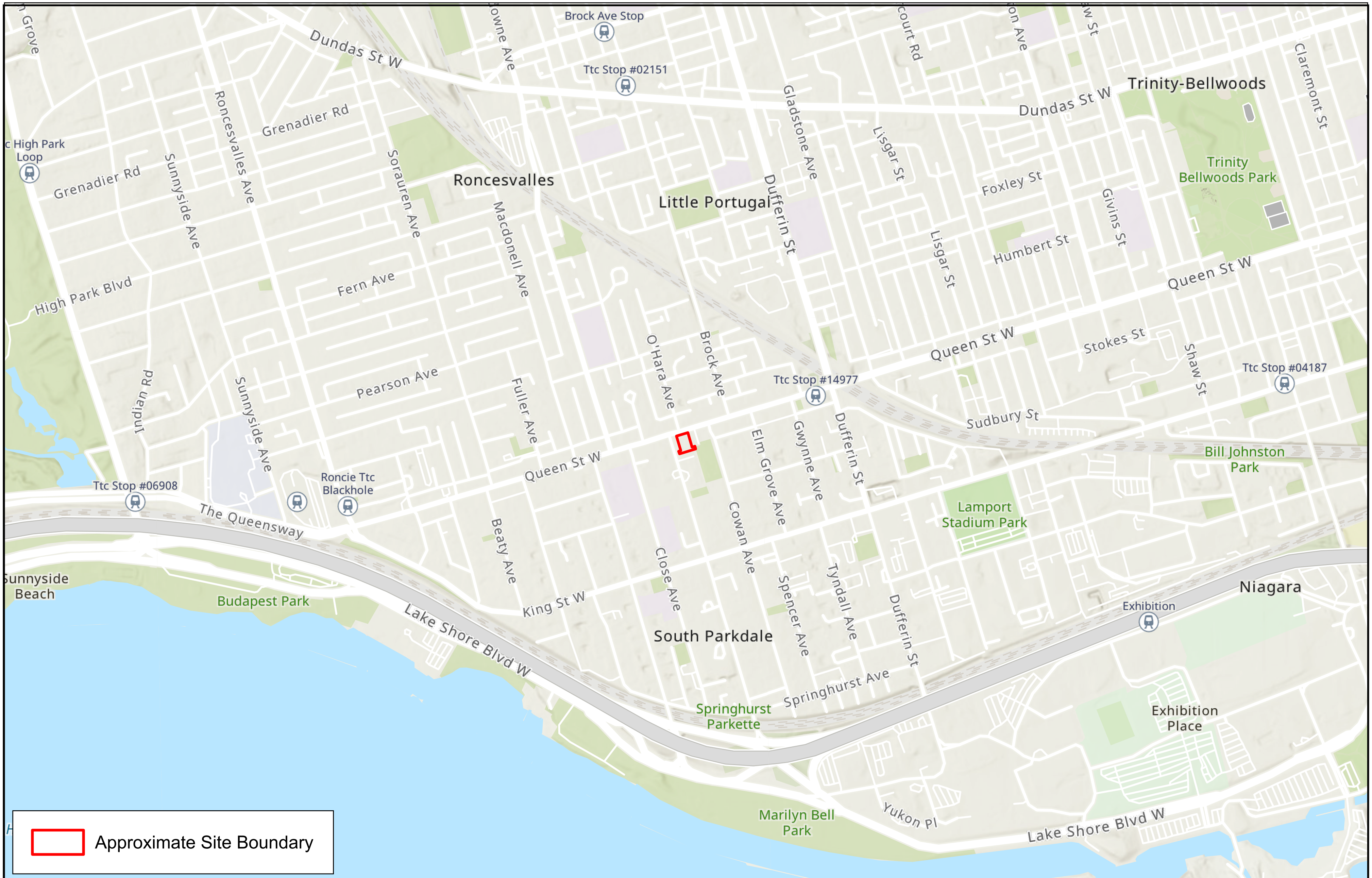
Details of the field duplicates samples collected during and following remedial activities and the laboratory quality assurance program are provided in Section 6.8 of the Phase Two ESA Report.

The contractual laboratory selected to perform the chemical analyses was Bureau Veritas (BV) Laboratories of Mississauga, ON. BV Labs in an accredited laboratories under the Standards Council of Canada/Canadian Association of Laboratory Accreditation (Accredited Laboratory No. 97) in accordance with ISO/IEC 17025:2005 – “General Requirements for the Competence of Testing and Calibration Laboratories”. Certificates of Analysis were received from BV reporting the results of all the chemical analyses performed on the submitted soil and groundwater samples. Copies of the Certificates of Analysis are provided in Appendix E of the Phase Two ESA. Review of the Certificates of Analysis, prepared by BV indicates that they were in compliance with the requirements set out under subsection 47(3) of O. Reg. 153/04.

The investigation undertaken by EXP, and any conclusions or recommendations resulting from the work, reflect EXP’s judgment based on the conditions observed at the time of EXP’s inspections and on information available at the time of preparation of the work. EXP has confirmed neither the completeness nor the accuracy of the records that were provided by others; as such, the historical records review is identified as a potential source of uncertainty during the investigation. The CSM is developed using multiple lines of evidence, searches and source information to make every reasonable attempt to ensure that findings of environmental significance are captured.

Any uncertainty or absence of information in the records review, interviews, and site reconnaissance components of the Phase One investigation, or any uncertainty or absence of information within the Phase Two or subsequent investigations, are not anticipated to materially affect the validity of the Phase Two CSM.

Figures



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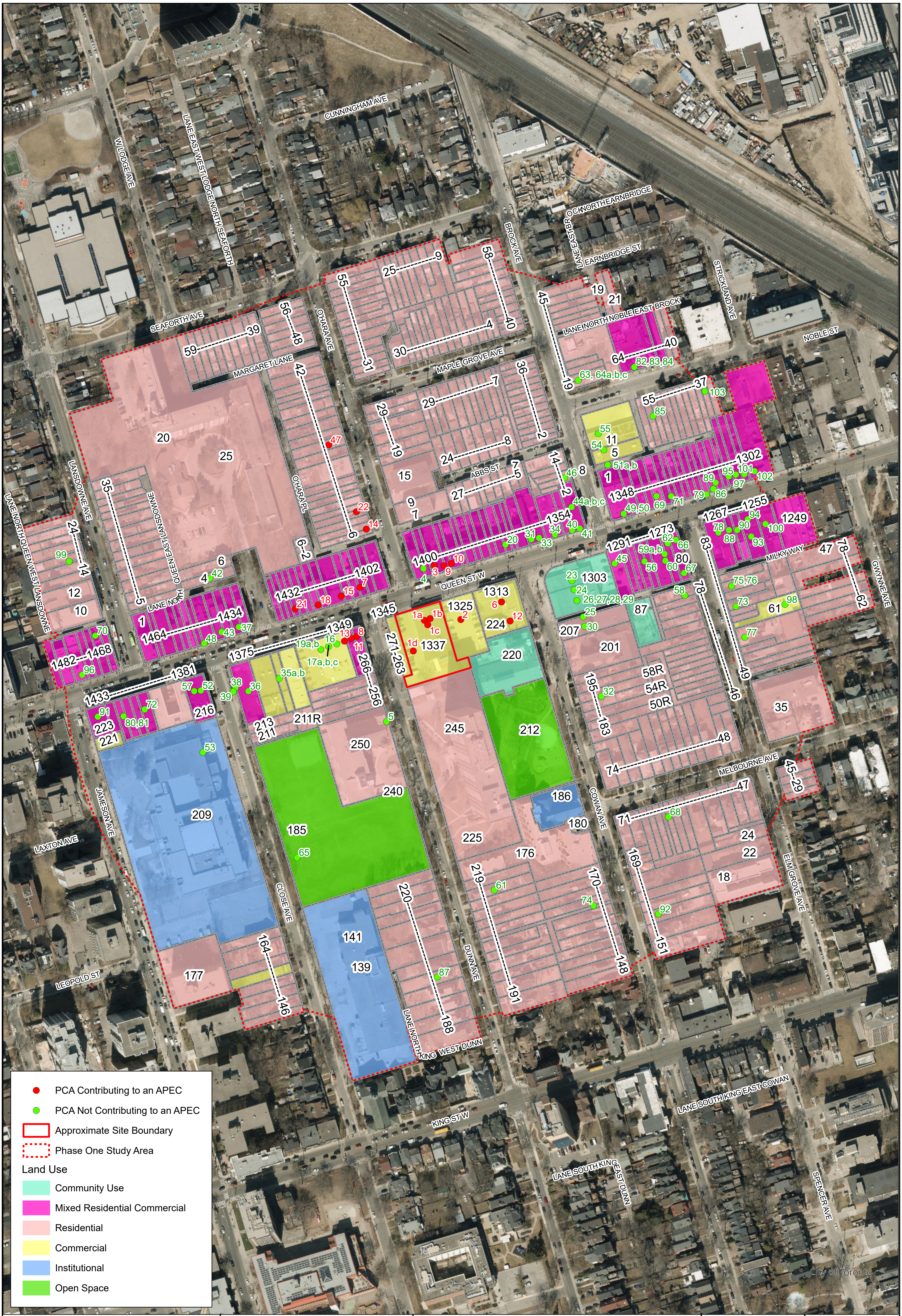
N

0 150 300 450 600 750 m

TITLE AND LOCATION:

SITE LOCATION PLAN
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 1



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N

0 25 50 75 100 125 m

TITLE AND LOCATION:

PHASE ONE STUDY AREA, SURROUNDING LAND USE AND POTENTIALLY CONTAMINATING ACTIVITIES
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 2

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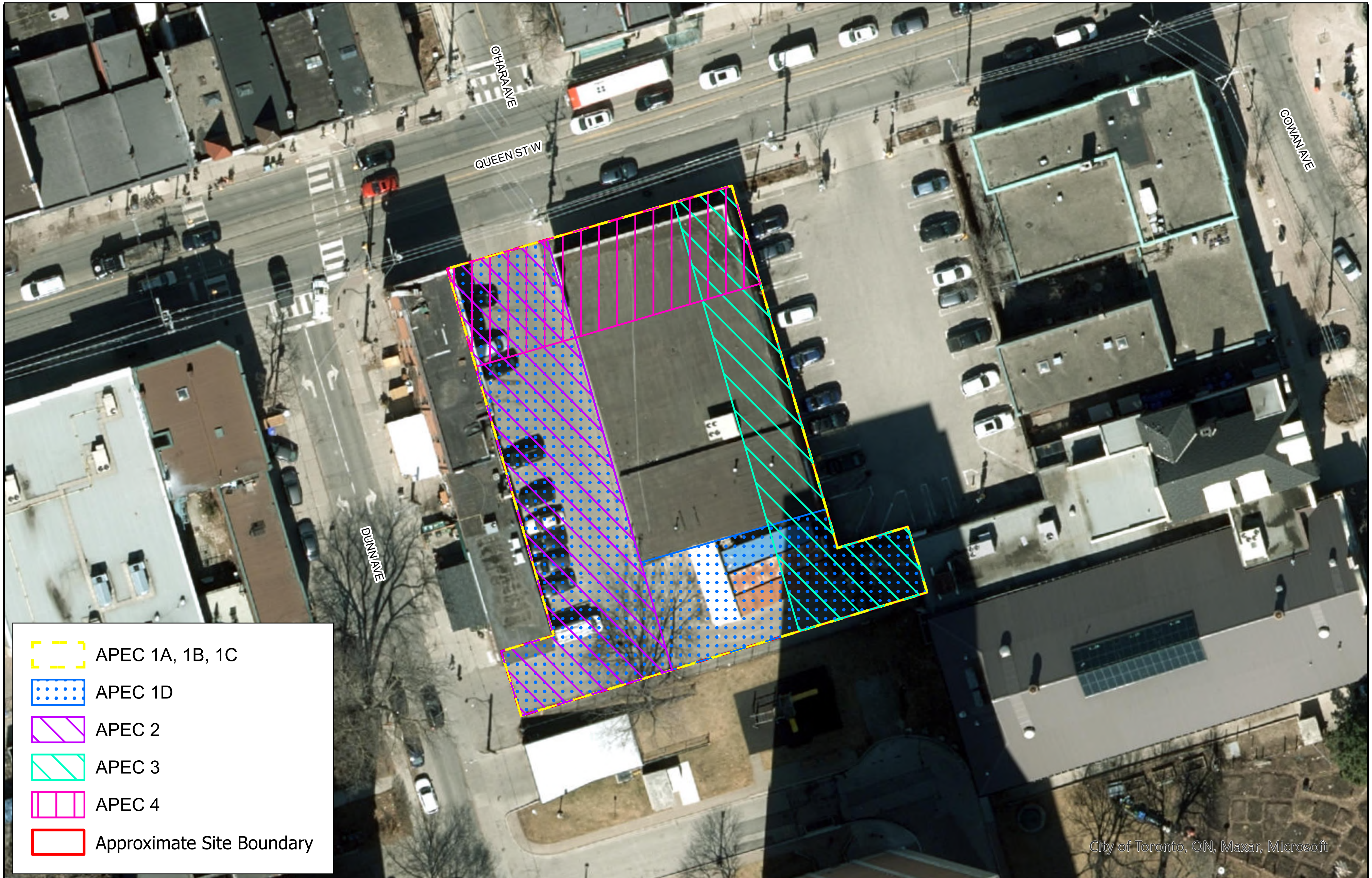
TITLE AND LOCATION:

SITE PLAN AND UTILITIES
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 3



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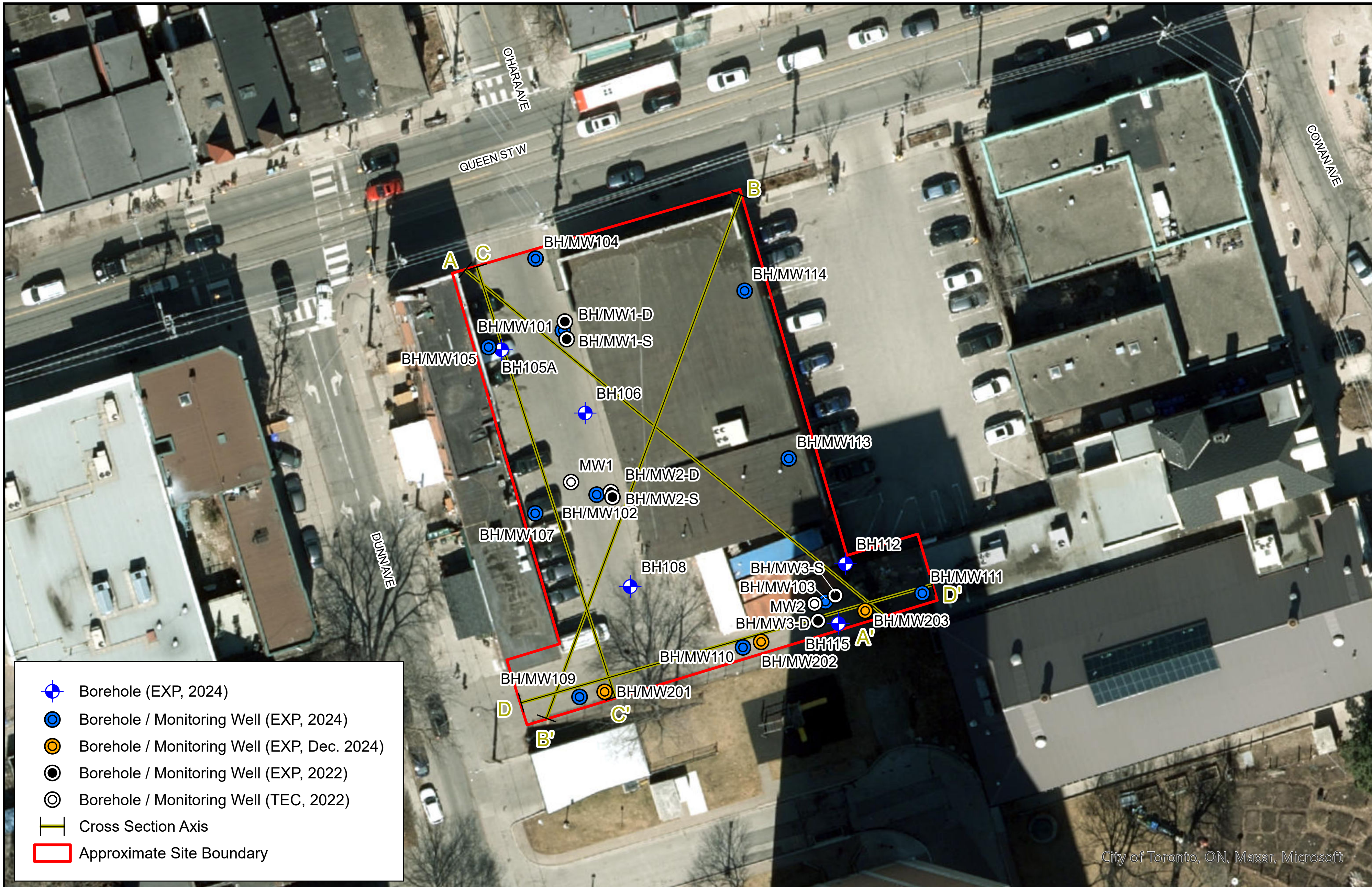
TITLE AND LOCATION:

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN (APECs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 4



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N

0 5 10 15 20 25 m

TITLE AND LOCATION:

BOREHOLE/MONITORING WELL LOCATION PLAN
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 5A

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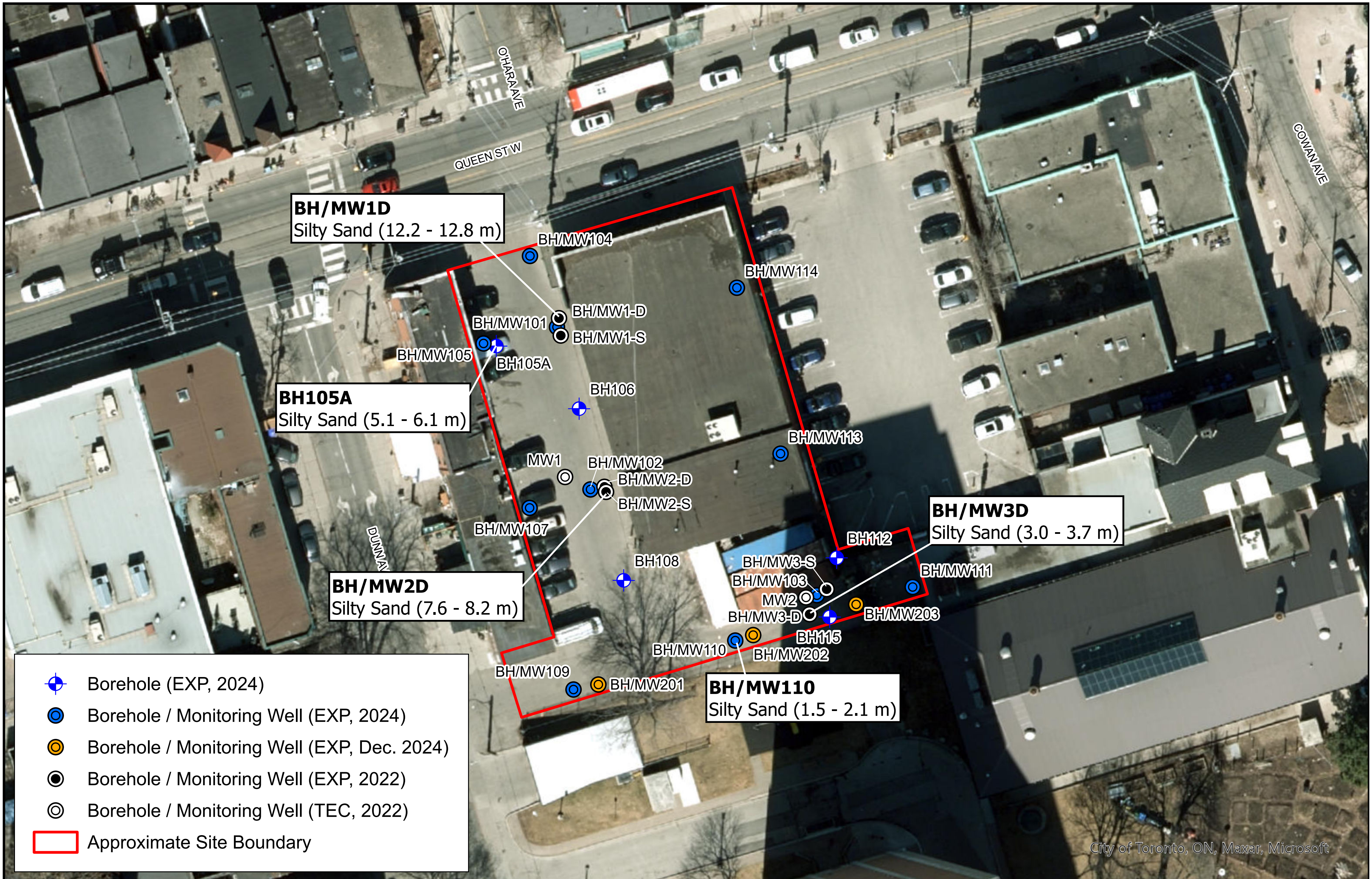
TITLE AND LOCATION:

BOREHOLE/MONITORING WELL
LOCATION PLAN AND APECs
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 5B



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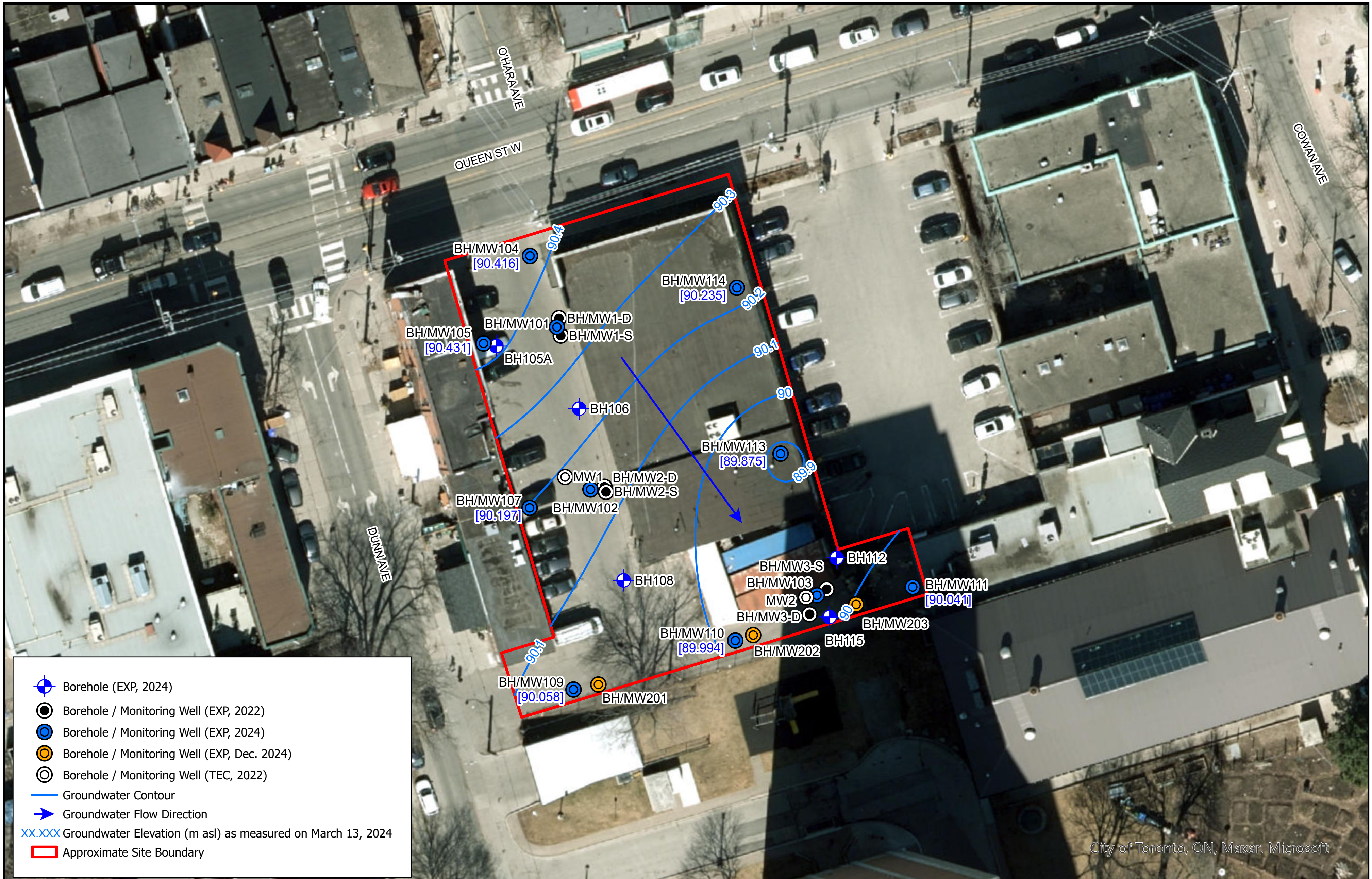
TITLE AND LOCATION:	GRAIN SIZE SAMPLE LOCATION PLAN Phase Two Environmental Site Assessment 1337 Queen Street West Toronto, Ontario
PROJECT No.:	GTR-21003722-B0
DWN:	MS
SCALE:	AS NOTED
CHKD:	NM
DATE:	MAY 2025
FIG. No.:	5C



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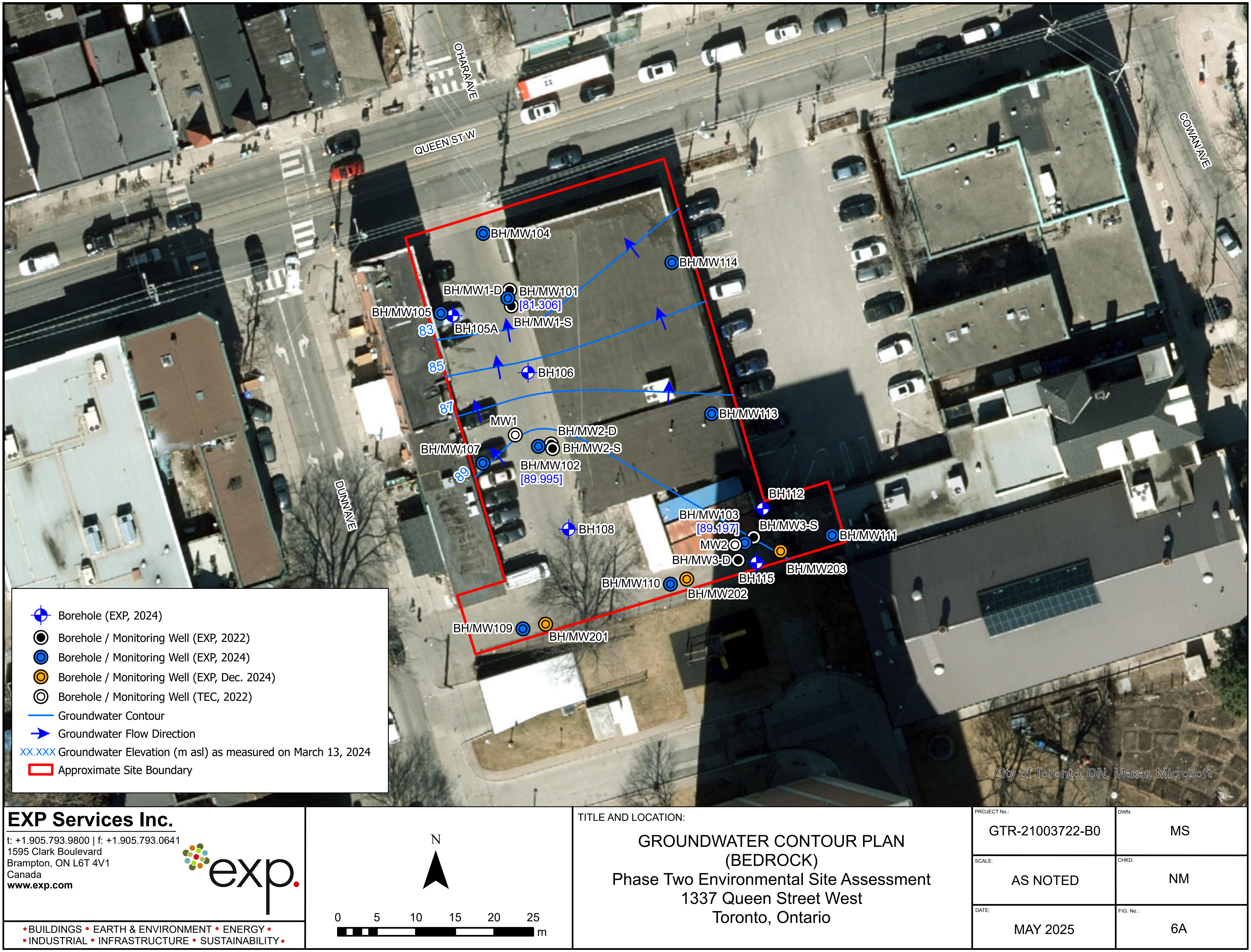
TITLE AND LOCATION:

GROUNDWATER CONTOUR PLAN
(OVERBURDEN)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: JH
DATE: MAY 2025	FIG. No.: 6



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TITLE AND LOCATION:

GROUNDWATER CONTOUR PLAN
(BEDROCK)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 6A

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TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
PETROLEUM HYDROCARBONS (PHCs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 7

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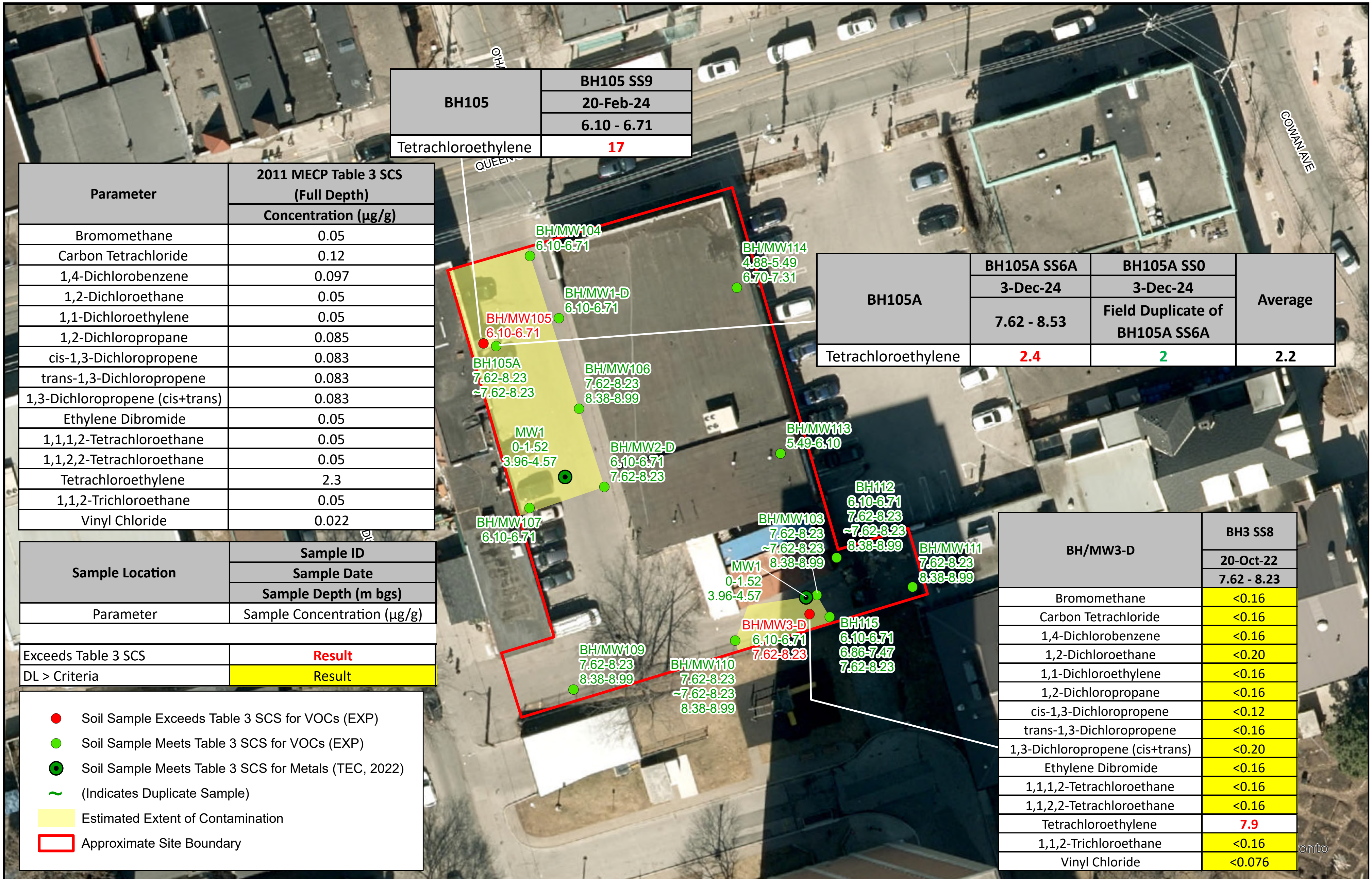
N

0 5 10 15 20 25 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
BENZENE, TOLUENE, ETHYLBENZENE
XYLENE (BTEX)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 8



BH105	BH105 SS9
	20-Feb-24
	6.10 - 6.71
Tetrachloroethylene	17

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Bromomethane	0.05
Carbon Tetrachloride	0.12
1,4-Dichlorobenzene	0.097
1,2-Dichloroethane	0.05
1,1-Dichloroethylene	0.05
1,2-Dichloropropane	0.085
cis-1,3-Dichloropropene	0.083
trans-1,3-Dichloropropene	0.083
1,3-Dichloropropene (cis+trans)	0.083
Ethylene Dibromide	0.05
1,1,1,2-Tetrachloroethane	0.05
1,1,2,2-Tetrachloroethane	0.05
Tetrachloroethylene	2.3
1,1,2-Trichloroethane	0.05
Vinyl Chloride	0.022

BH105A	BH105A SS6A	BH105A SS0	Average
	3-Dec-24	3-Dec-24	
	7.62 - 8.53	Field Duplicate of BH105A SS6A	
Tetrachloroethylene	2.4	2	2.2

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)
Exceeds Table 3 SCS	Result
DL > Criteria	Result

- Soil Sample Exceeds Table 3 SCS for VOCs (EXP)
- Soil Sample Meets Table 3 SCS for VOCs (EXP)
- Soil Sample Meets Table 3 SCS for Metals (TEC, 2022)
- ~ (Indicates Duplicate Sample)
- Estimated Extent of Contamination
- Approximate Site Boundary

BH/MW3-D	BH3 SS8
	20-Oct-22
	7.62 - 8.23
Bromomethane	<0.16
Carbon Tetrachloride	<0.16
1,4-Dichlorobenzene	<0.16
1,2-Dichloroethane	<0.20
1,1-Dichloroethylene	<0.16
1,2-Dichloropropane	<0.16
cis-1,3-Dichloropropene	<0.12
trans-1,3-Dichloropropene	<0.16
1,3-Dichloropropene (cis+trans)	<0.20
Ethylene Dibromide	<0.16
1,1,1,2-Tetrachloroethane	<0.16
1,1,2,2-Tetrachloroethane	<0.16
Tetrachloroethylene	7.9
1,1,2-Trichloroethane	<0.16
Vinyl Chloride	<0.076

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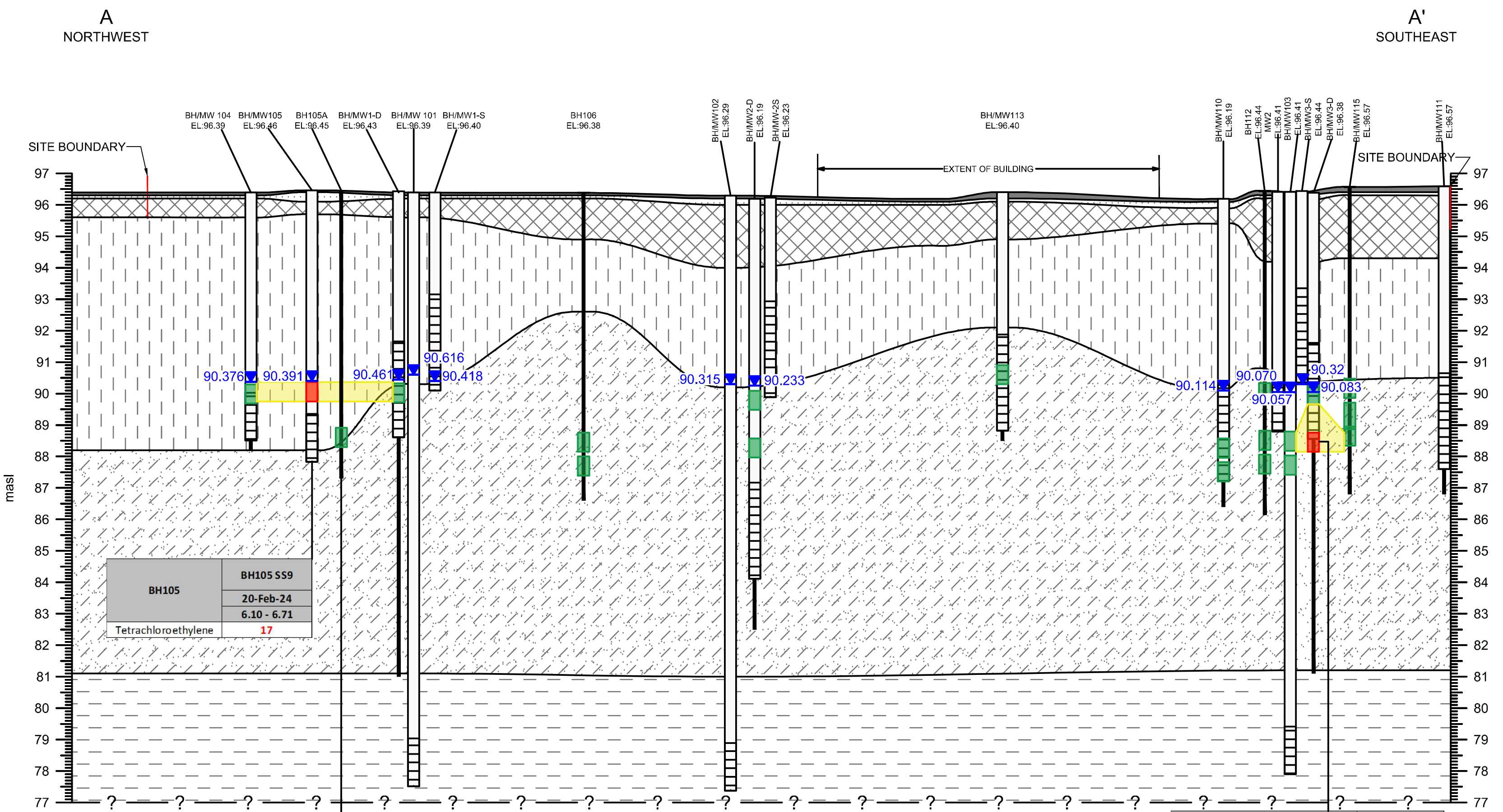
N

0 5 10 15 20 25 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 9



BH105	BH105 SS9
	20-Feb-24
	6.10 - 6.71
Tetrachloroethylene	17

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Bromomethane	0.05
Carbon Tetrachloride	0.12
1,4-Dichlorobenzene	0.097
1,2-Dichloroethane	0.05
1,1-Dichloroethylene	0.05
1,2-Dichloropropane	0.085
cis-1,3-Dichloropropene	0.083
trans-1,3-Dichloropropene	0.083
1,3-Dichloropropene (cis+trans)	0.083
Ethylene Dibromide	0.05
1,1,1,2-Tetrachloroethane	0.05
1,1,2,2-Tetrachloroethane	0.05
Tetrachloroethylene	2.3
1,1,2-Trichloroethane	0.05
Vinyl Chloride	0.022

BH105A	BH105A SS6A	BH105A SS0	Average
	3-Dec-24	3-Dec-24	
	7.62 - 8.53	Field Duplicate of BH105A SS6A	
Tetrachloroethylene	2.4	2	2.2

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 5 10 15 20 25 30 m

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result
DL > Criteria	Result

BH/MW3-D	BH3 SS8
	20-Oct-22
	7.62 - 8.23
Bromomethane	<0.16
Carbon Tetrachloride	<0.16
1,4-Dichlorobenzene	<0.16
1,2-Dichloroethane	<0.20
1,1-Dichloroethylene	<0.16
1,2-Dichloropropane	<0.16
cis-1,3-Dichloropropene	<0.12
trans-1,3-Dichloropropene	<0.16
1,3-Dichloropropene (cis+trans)	<0.20
Ethylene Dibromide	<0.16
1,1,1,2-Tetrachloroethane	<0.16
1,1,2,2-Tetrachloroethane	<0.16
Tetrachloroethylene	7.9
1,1,2-Trichloroethane	<0.16
Vinyl Chloride	<0.076

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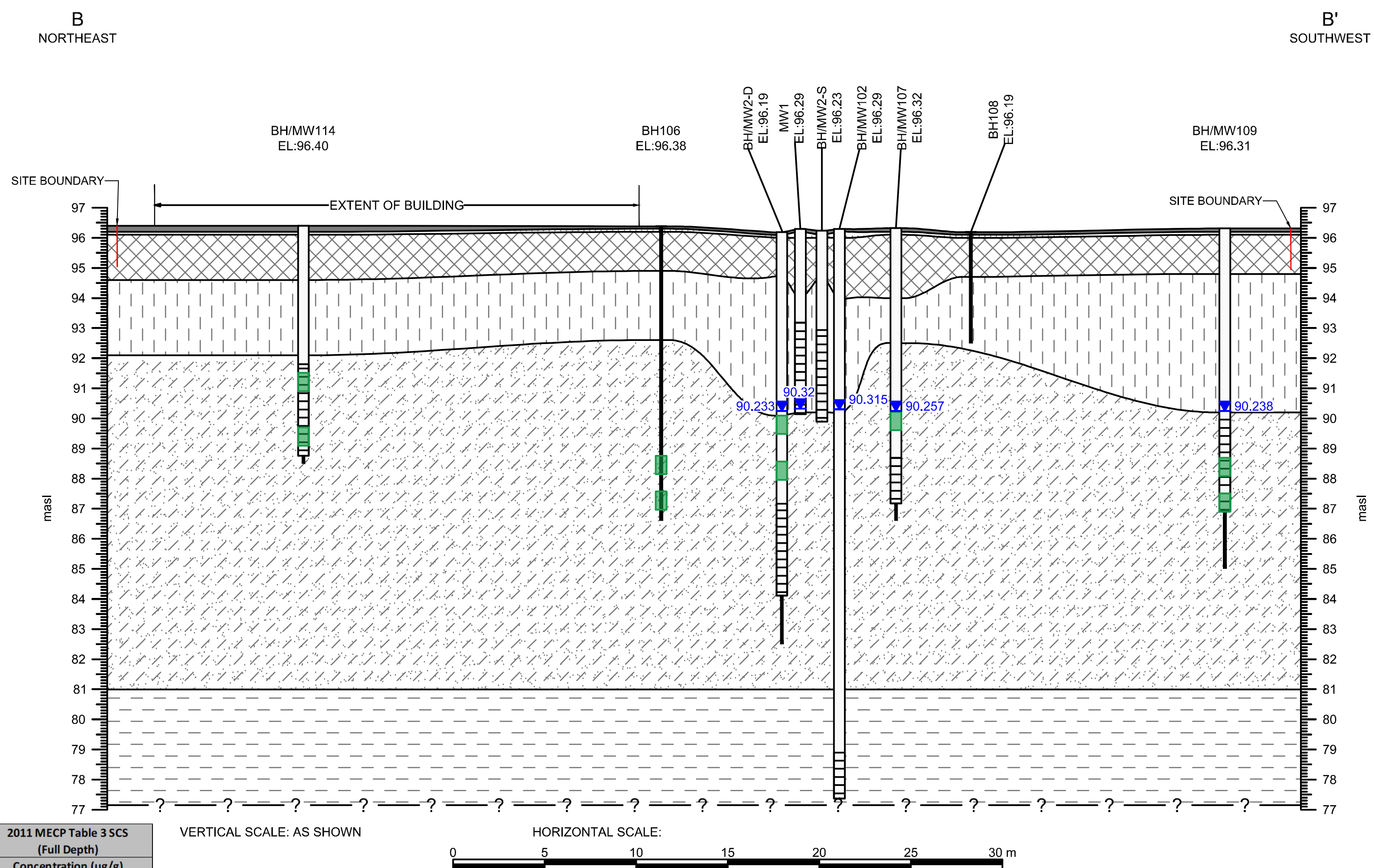
LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR VOCs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'
SOIL ANALYTICAL RESULTS -
VOLATILE ORGANIC COMPOUNDS
(VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 9A

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Env\CAD\2024 Cross Section\GTR-21003722-B0.dwg



Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Bromomethane	0.05
Carbon Tetrachloride	0.12
1,4-Dichlorobenzene	0.097
1,2-Dichloroethane	0.05
1,1-Dichloroethylene	0.05
1,2-Dichloropropane	0.085
cis-1,3-Dichloropropene	0.083
trans-1,3-Dichloropropene	0.083
1,3-Dichloropropene (cis+trans)	0.083
Ethylene Dibromide	0.05
1,1,1,2-Tetrachloroethane	0.05
1,1,2,2-Tetrachloroethane	0.05
Tetrachloroethylene	2.3
1,1,2-Trichloroethane	0.05
Vinyl Chloride	0.022

Sample Location	Sample ID Sample Date Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result
DL > Criteria	Result

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LEGEND:

- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE MEETS TABLE 3 SCS FOR VOCs
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION B-B'
SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 9B

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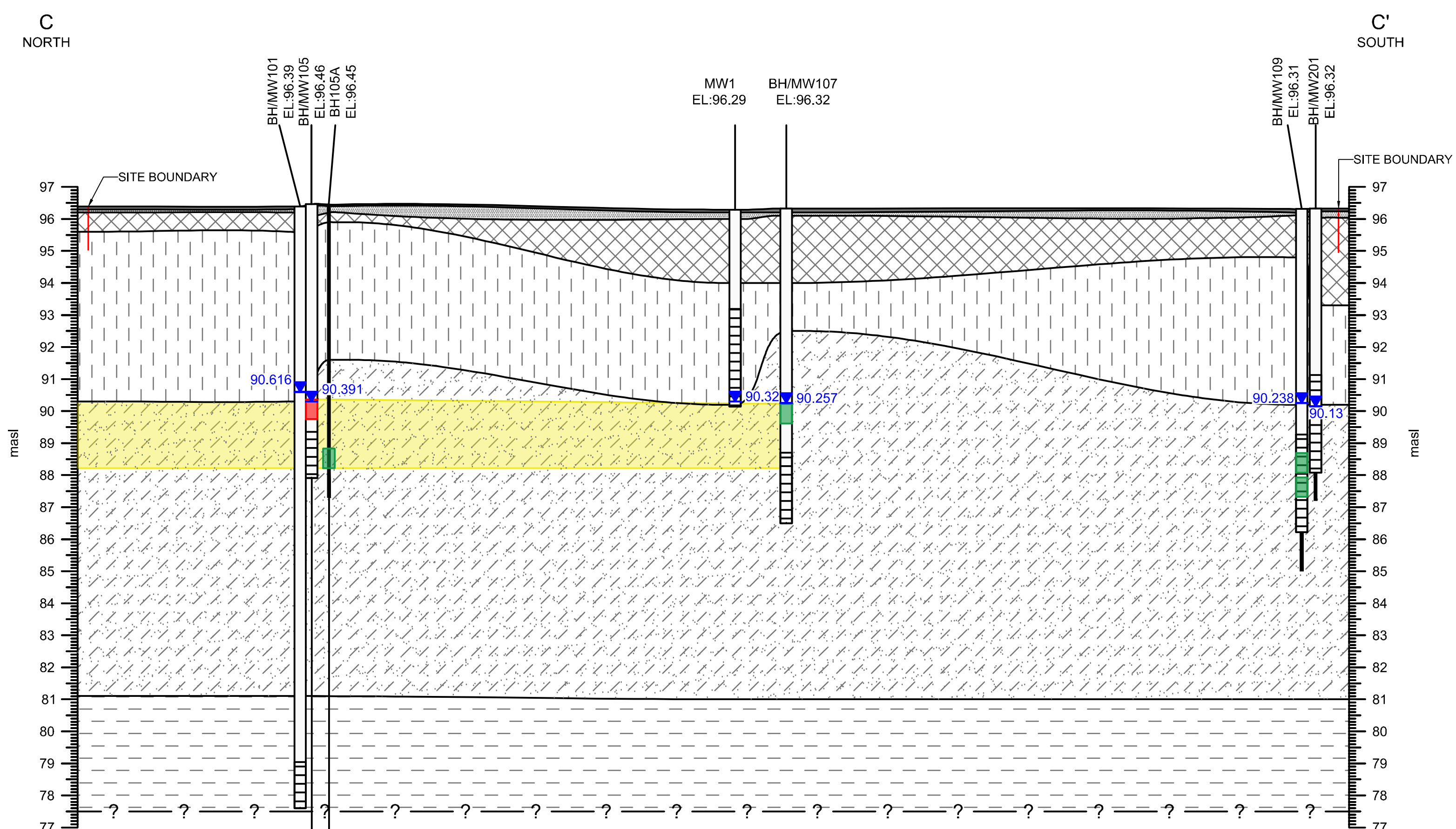

BH105A	BH105A SS6A	BH105A SS0	Average
	3-Dec-24	3-Dec-24	
	7.62 - 8.53	Field Duplicate of BH105A SS6A	
Tetrachloroethylene	2.4	2	2.2

BH105	BH105 SS9
	20-Feb-24
	6.10 - 6.71
Tetrachloroethylene	17

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Bromomethane	0.05
Carbon Tetrachloride	0.12
1,4-Dichlorobenzene	0.097
1,2-Dichloroethane	0.05
1,1-Dichloroethylene	0.05
1,2-Dichloropropane	0.085
cis-1,3-Dichloropropene	0.083
trans-1,3-Dichloropropene	0.083
1,3-Dichloropropene (cis+trans)	0.083
Ethylene Dibromide	0.05
1,1,1,2-Tetrachloroethane	0.05
1,1,2,2-Tetrachloroethane	0.05
Tetrachloroethylene	2.3
1,1,2-Trichloroethane	0.05
Vinyl Chloride	0.022

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result
DL > Criteria	Result

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR VOCs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION C-C'
SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 9C

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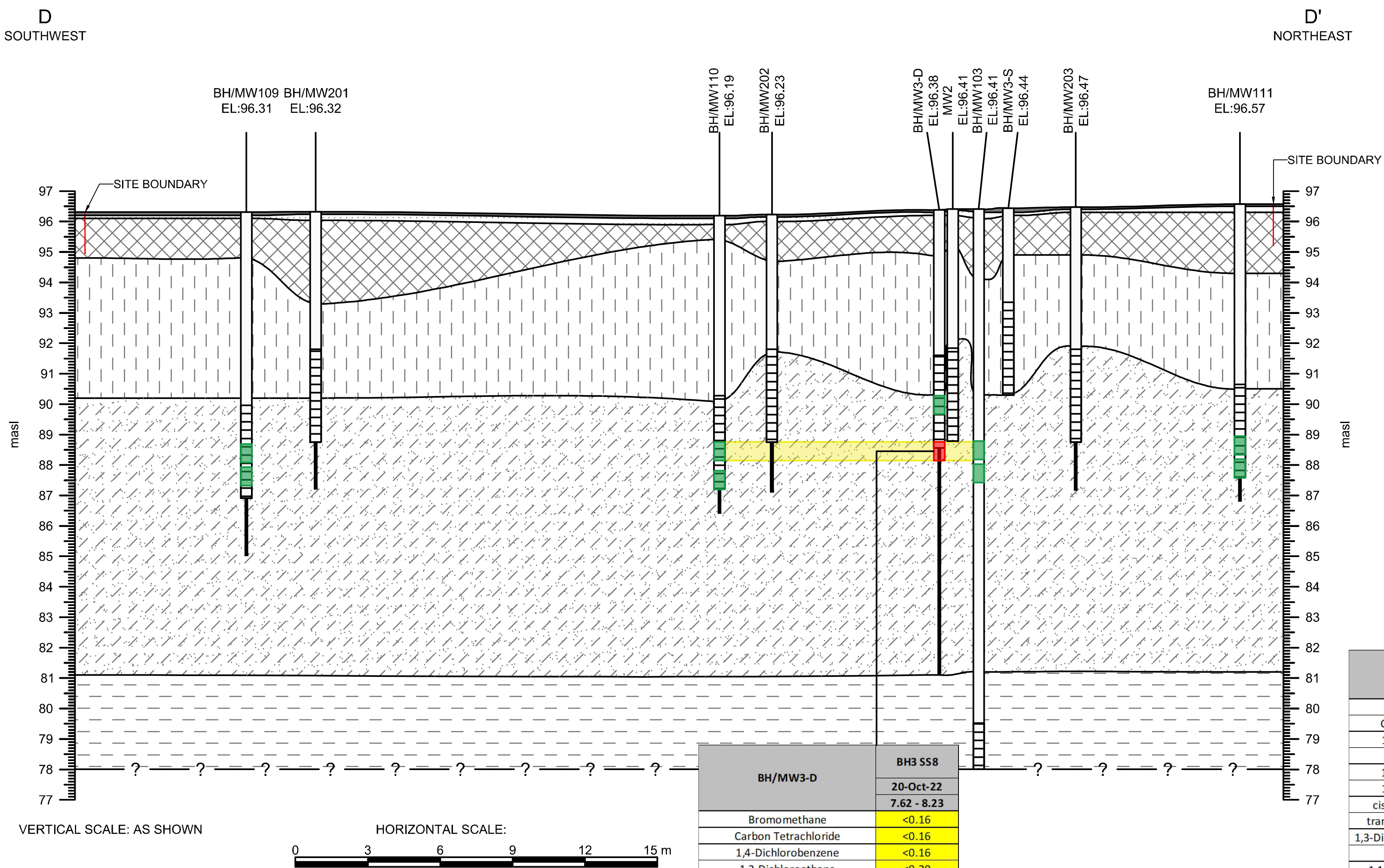

BH/MW3-D	BH3 SS8
	20-Oct-22
	7.62 - 8.23
Bromomethane	<0.16
Carbon Tetrachloride	<0.16
1,4-Dichlorobenzene	<0.16
1,2-Dichloroethane	<0.20
1,1-Dichloroethylene	<0.16
1,2-Dichloropropane	<0.16
cis-1,3-Dichloropropene	<0.12
trans-1,3-Dichloropropene	<0.16
1,3-Dichloropropene (cis+trans)	<0.20
Ethylene Dibromide	<0.16
1,1,1,2-Tetrachloroethane	<0.16
1,1,2,2-Tetrachloroethane	<0.16
Tetrachloroethylene	7.9
1,1,2-Trichloroethane	<0.16
Vinyl Chloride	<0.076

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Bromomethane	0.05
Carbon Tetrachloride	0.12
1,4-Dichlorobenzene	0.097
1,2-Dichloroethane	0.05
1,1-Dichloroethylene	0.05
1,2-Dichloropropane	0.085
cis-1,3-Dichloropropene	0.083
trans-1,3-Dichloropropene	0.083
1,3-Dichloropropene (cis+trans)	0.083
Ethylene Dibromide	0.05
1,1,1,2-Tetrachloroethane	0.05
1,1,2,2-Tetrachloroethane	0.05
Tetrachloroethylene	2.3
1,1,2-Trichloroethane	0.05
Vinyl Chloride	0.022

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result
DL > Criteria	Result

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LEGEND:
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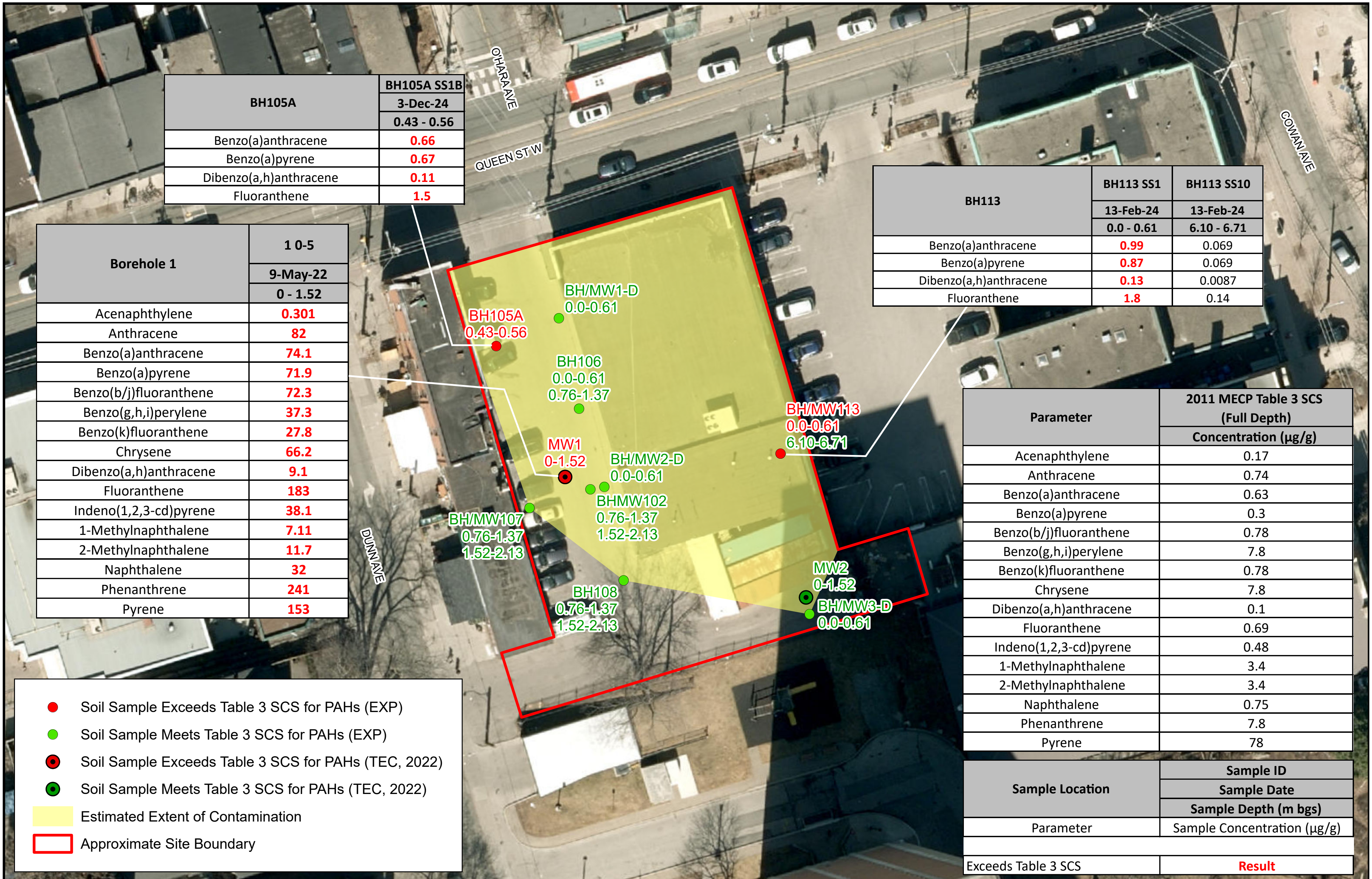
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR VOCs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION D-D' SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)

PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 9D



BH105A	BH105A SS1B
	3-Dec-24
	0.43 - 0.56
Benzo(a)anthracene	0.66
Benzo(a)pyrene	0.67
Dibenzo(a,h)anthracene	0.11
Fluoranthene	1.5

Borehole 1	1 0-5
	9-May-22
	0 - 1.52
Acenaphthylene	0.301
Anthracene	82
Benzo(a)anthracene	74.1
Benzo(a)pyrene	71.9
Benzo(b/j)fluoranthene	72.3
Benzo(g,h,i)perylene	37.3
Benzo(k)fluoranthene	27.8
Chrysene	66.2
Dibenzo(a,h)anthracene	9.1
Fluoranthene	183
Indeno(1,2,3-cd)pyrene	38.1
1-Methylnaphthalene	7.11
2-Methylnaphthalene	11.7
Naphthalene	32
Phenanthrene	241
Pyrene	153

BH113	BH113 SS1	BH113 SS10
	13-Feb-24	13-Feb-24
	0.0 - 0.61	6.10 - 6.71
Benzo(a)anthracene	0.99	0.069
Benzo(a)pyrene	0.87	0.069
Dibenzo(a,h)anthracene	0.13	0.0087
Fluoranthene	1.8	0.14

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Acenaphthylene	0.17
Anthracene	0.74
Benzo(a)anthracene	0.63
Benzo(a)pyrene	0.3
Benzo(b/j)fluoranthene	0.78
Benzo(g,h,i)perylene	7.8
Benzo(k)fluoranthene	0.78
Chrysene	7.8
Dibenzo(a,h)anthracene	0.1
Fluoranthene	0.69
Indeno(1,2,3-cd)pyrene	0.48
1-Methylnaphthalene	3.4
2-Methylnaphthalene	3.4
Naphthalene	0.75
Phenanthrene	7.8
Pyrene	78

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)
Exceeds Table 3 SCS	Result

- Soil Sample Exceeds Table 3 SCS for PAHs (EXP)
- Soil Sample Meets Table 3 SCS for PAHs (EXP)
- Soil Sample Exceeds Table 3 SCS for PAHs (TEC, 2022)
- Soil Sample Meets Table 3 SCS for PAHs (TEC, 2022)
- Estimated Extent of Contamination
- Approximate Site Boundary

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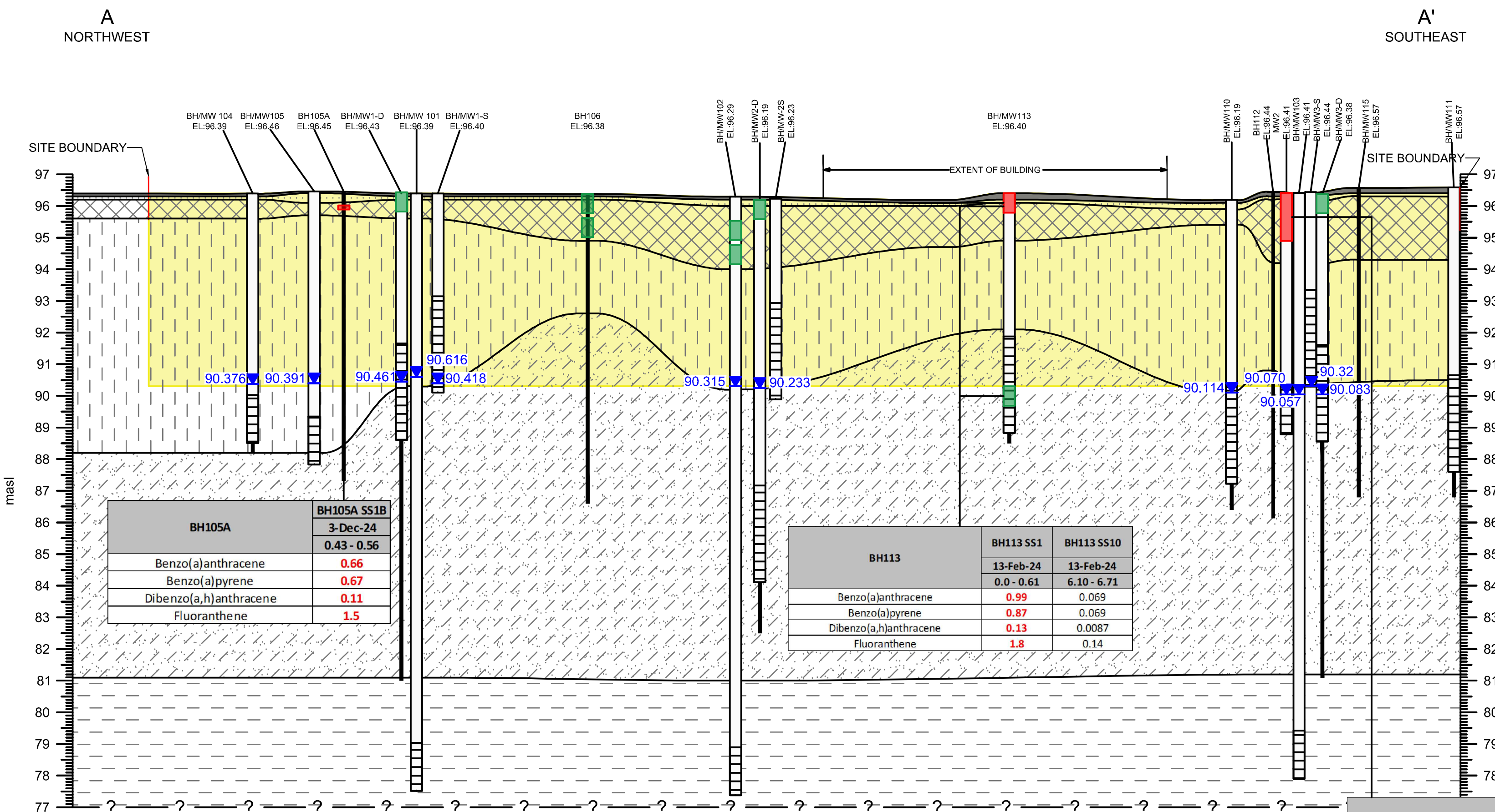
TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
POLYCYCLIC AROMATIC
HYDROCARBONS (PAHs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 10



BH105A	BH105A SS1B
	3-Dec-24
	0.43 - 0.56
Benzo(a)anthracene	0.66
Benzo(a)pyrene	0.67
Dibenzo(a,h)anthracene	0.11
Fluoranthene	1.5

BH113	BH113 SS1	BH113 SS10
	13-Feb-24	13-Feb-24
	0.0 - 0.61	6.10 - 6.71
Benzo(a)anthracene	0.99	0.069
Benzo(a)pyrene	0.87	0.069
Dibenzo(a,h)anthracene	0.13	0.0087
Fluoranthene	1.8	0.14

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Acenaphthylene	0.17
Anthracene	0.74
Benzo(a)anthracene	0.63
Benzo(a)pyrene	0.3
Benzo(b/j)fluoranthene	0.78
Benzo(g,h,i)perylene	7.8
Benzo(k)fluoranthene	0.78
Chrysene	7.8
Dibenzo(a,h)anthracene	0.1
Fluoranthene	0.69
Indeno(1,2,3-cd)pyrene	0.48
1-Methylnaphthalene	3.4
2-Methylnaphthalene	3.4
Naphthalene	0.75
Phenanthrene	7.8
Pyrene	78

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 5 10 15 20 25 30 m

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)
Exceeds Table 3 SCS	Result

Borehole 1	1 0-5
	9-May-22
	0 - 1.52
Acenaphthylene	0.301
Anthracene	82
Benzo(a)anthracene	74.1
Benzo(a)pyrene	71.9
Benzo(b/j)fluoranthene	72.3
Benzo(g,h,i)perylene	37.3
Benzo(k)fluoranthene	27.8
Chrysene	66.2
Dibenzo(a,h)anthracene	9.1
Fluoranthene	183
Indeno(1,2,3-cd)pyrene	38.1
1-Methylnaphthalene	7.11
2-Methylnaphthalene	11.7
Naphthalene	32
Phenanthrene	241
Pyrene	153

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LEGEND:

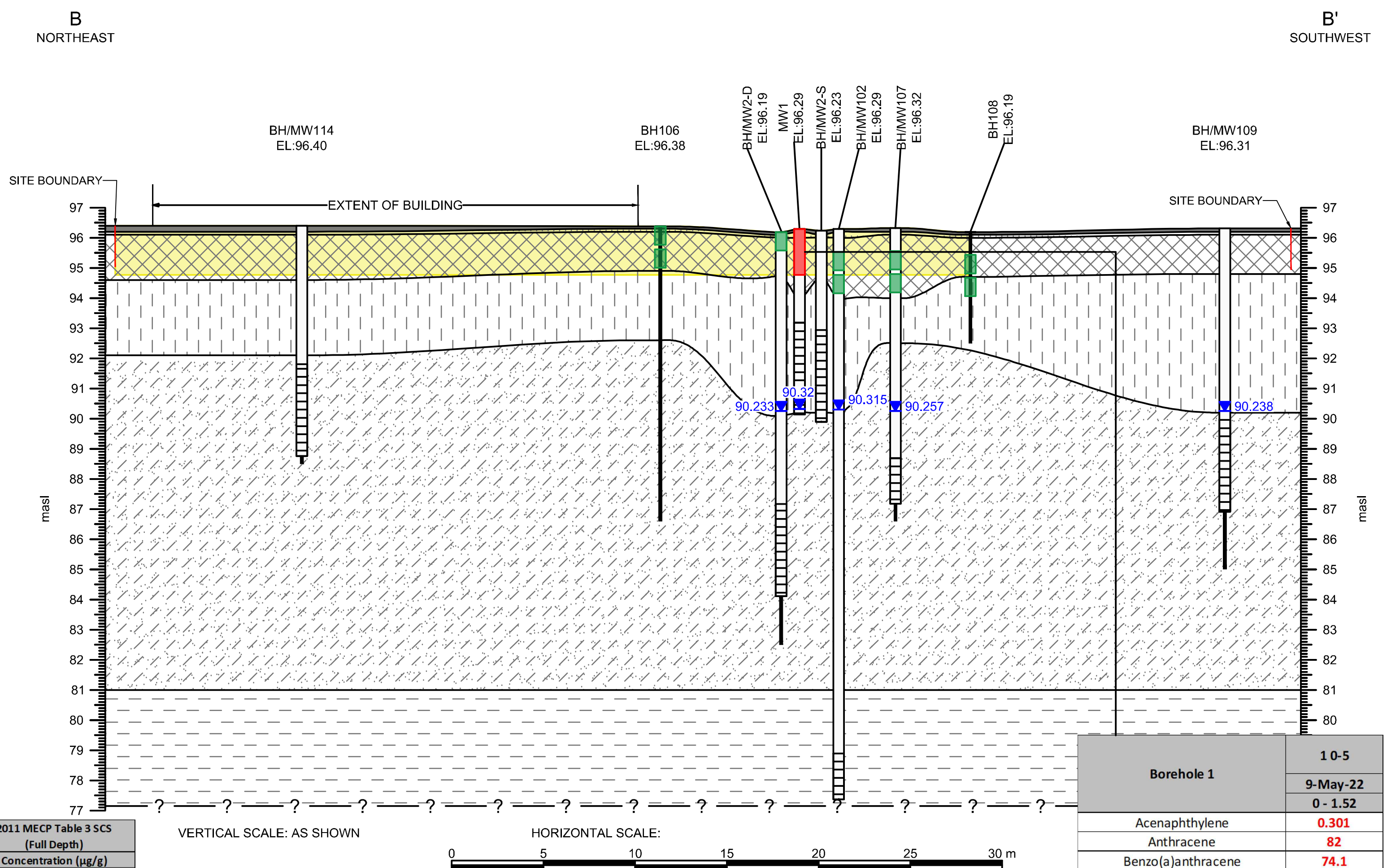
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR PAHs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR PAHs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION A-A' SOIL ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 10A

\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Env\CAD\2024 Cross Section\GTR-21003722-B0.dwg



Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Acenaphthylene	0.17
Anthracene	0.74
Benzo(a)anthracene	0.63
Benzo(a)pyrene	0.3
Benzo(b/j)fluoranthene	0.78
Benzo(g,h,i)perylene	7.8
Benzo(k)fluoranthene	0.78
Chrysene	7.8
Dibenzo(a,h)anthracene	0.1
Fluoranthene	0.69
Indeno(1,2,3-cd)pyrene	0.48
1-Methylnaphthalene	3.4
2-Methylnaphthalene	3.4
Naphthalene	0.75
Phenanthrene	7.8
Pyrene	78

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)
Exceeds Table 3 SCS	Result

Borehole 1	1 0-5
	9-May-22
	0 - 1.52
Acenaphthylene	0.301
Anthracene	82
Benzo(a)anthracene	74.1
Benzo(a)pyrene	71.9
Benzo(b/j)fluoranthene	72.3
Benzo(g,h,i)perylene	37.3
Benzo(k)fluoranthene	27.8
Chrysene	66.2
Dibenzo(a,h)anthracene	9.1
Fluoranthene	183
Indeno(1,2,3-cd)pyrene	38.1
1-Methylnaphthalene	7.11
2-Methylnaphthalene	11.7
Naphthalene	32
Phenanthrene	241
Pyrene	153

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR PAHs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR PAHs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION B-B'
SOIL ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 10B

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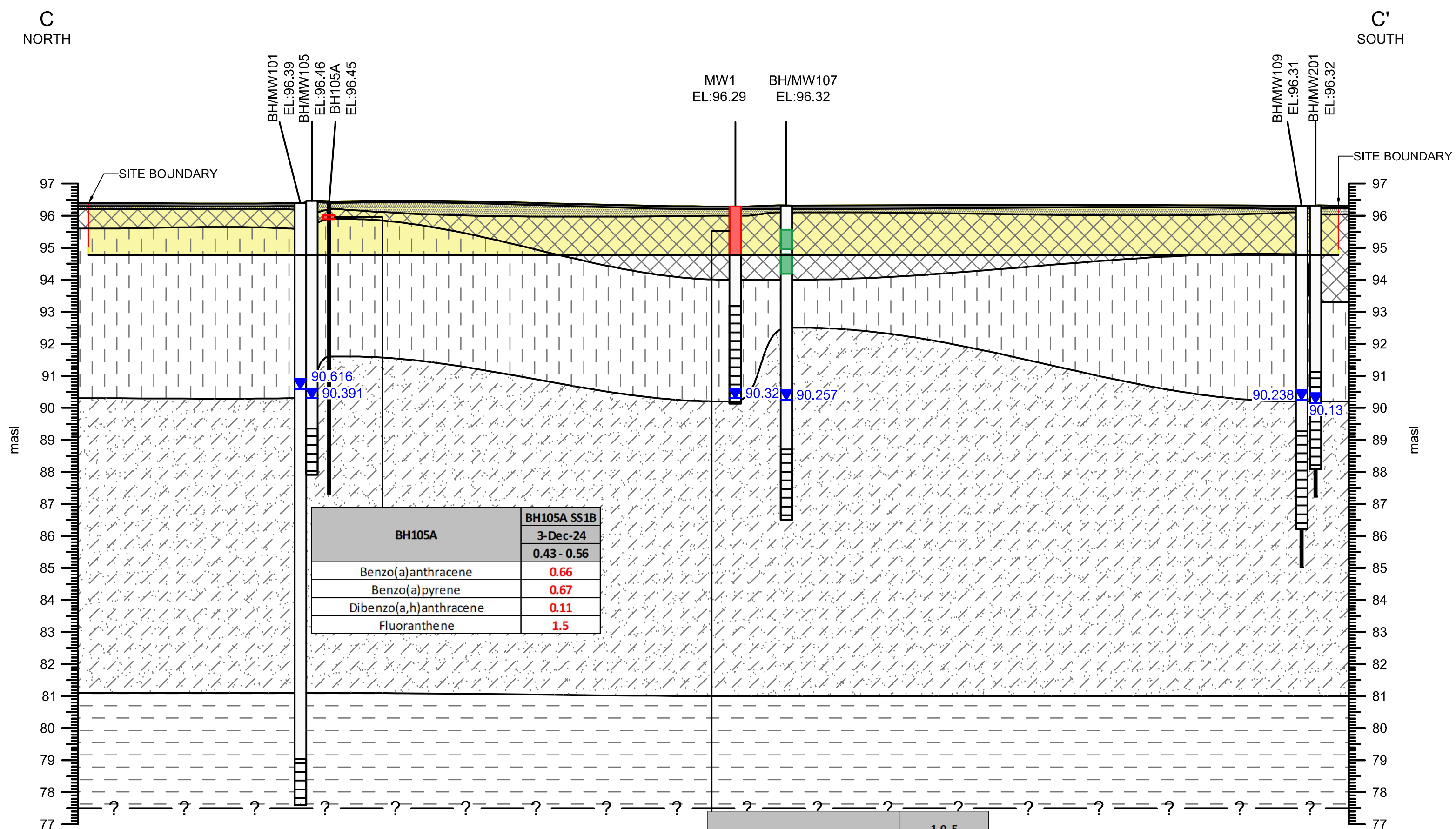

BH105A	BH105A SS1B
	3-Dec-24
	0.43 - 0.56
Benzo(a)anthracene	0.66
Benzo(a)pyrene	0.67
Dibenzo(a,h)anthracene	0.11
Fluoranthene	1.5

Borehole 1	1 0-5
	9-May-22
	0 - 1.52
Acenaphthylene	0.301
Anthracene	82
Benzo(a)anthracene	74.1
Benzo(a)pyrene	71.9
Benzo(b/j)fluoranthene	72.3
Benzo(g,h,i)perylene	37.3
Benzo(k)fluoranthene	27.8
Chrysene	66.2
Dibenzo(a,h)anthracene	9.1
Fluoranthene	183
Indeno(1,2,3-cd)pyrene	38.1
1-Methylnaphthalene	7.11
2-Methylnaphthalene	11.7
Naphthalene	32
Phenanthrene	241
Pyrene	153

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Acenaphthylene	0.17
Anthracene	0.74
Benzo(a)anthracene	0.63
Benzo(a)pyrene	0.3
Benzo(b/j)fluoranthene	0.78
Benzo(g,h,i)perylene	7.8
Benzo(k)fluoranthene	0.78
Chrysene	7.8
Dibenzo(a,h)anthracene	0.1
Fluoranthene	0.69
Indeno(1,2,3-cd)pyrene	0.48
1-Methylnaphthalene	3.4
2-Methylnaphthalene	3.4
Naphthalene	0.75
Phenanthrene	7.8
Pyrene	78

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 3 6 9 12 15 m

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR PAHs
- SOIL SAMPLE MEETS TABLE 3 SCS FOR PAHs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION C-C' SOIL ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 10C

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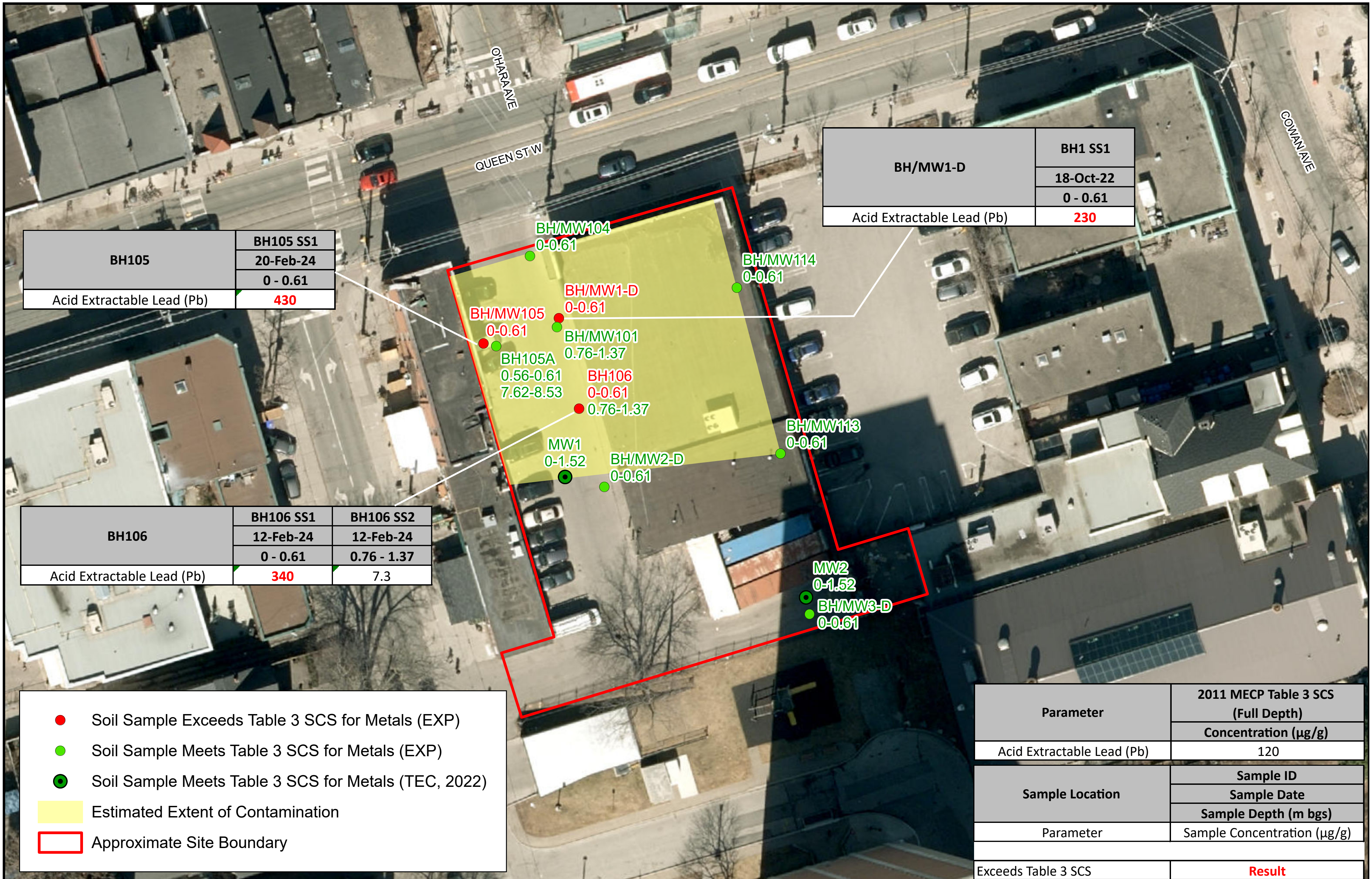

BH/MW1-D	BH1 SS1
	18-Oct-22
	0 - 0.61
Acid Extractable Lead (Pb)	230

BH105	BH105 SS1
	20-Feb-24
	0 - 0.61
Acid Extractable Lead (Pb)	430

BH106	BH106 SS1	BH106 SS2
	12-Feb-24	12-Feb-24
	0 - 0.61	0.76 - 1.37
Acid Extractable Lead (Pb)	340	7.3

- Soil Sample Exceeds Table 3 SCS for Metals (EXP)
- Soil Sample Meets Table 3 SCS for Metals (EXP)
- Soil Sample Meets Table 3 SCS for Metals (TEC, 2022)
- Estimated Extent of Contamination
- Approximate Site Boundary

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Acid Extractable Lead (Pb)	120

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)
Exceeds Table 3 SCS	Result

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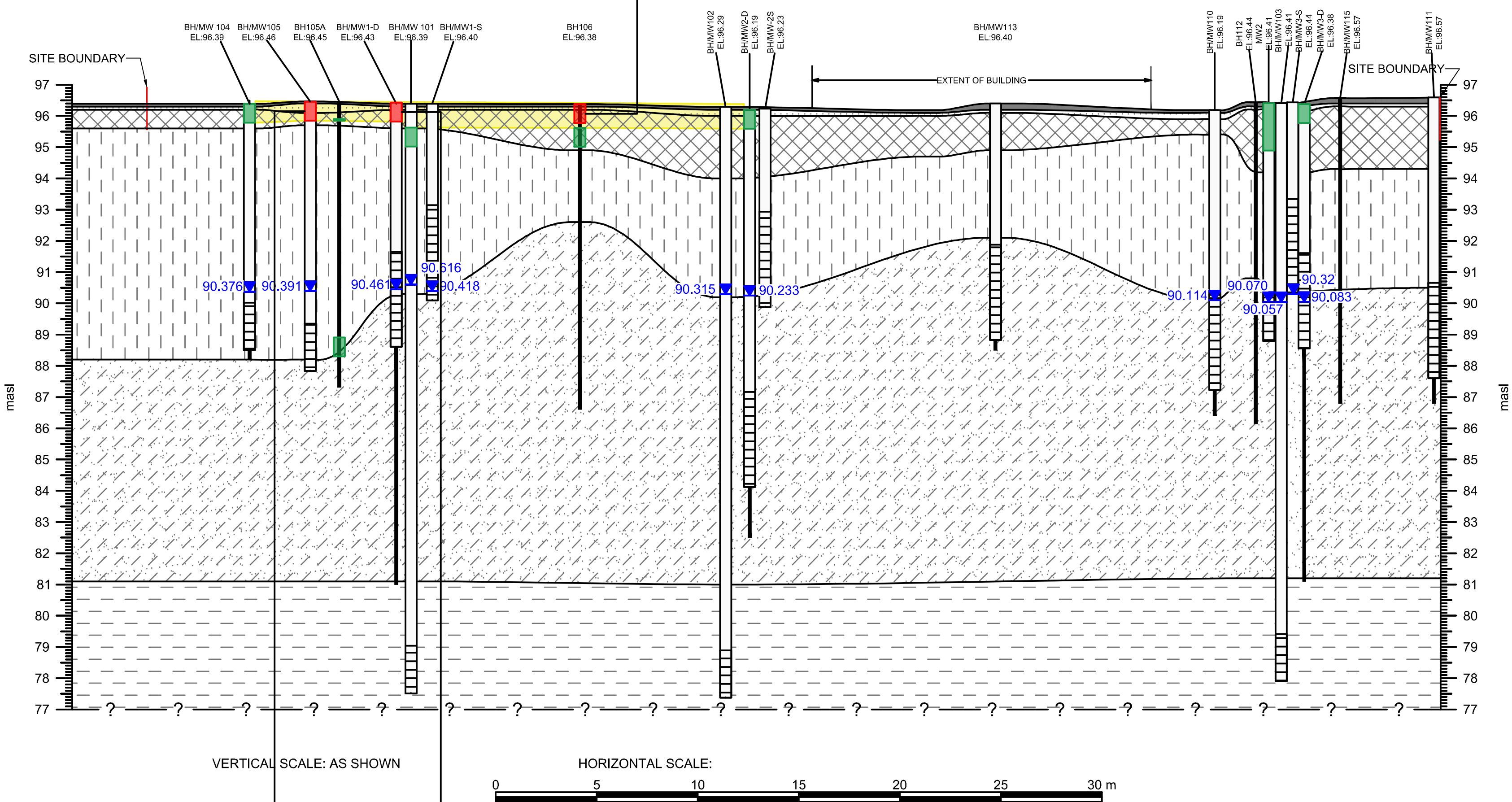
TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
METALS (INCLUDING HYDRIDE-FORMING METALS)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 11

BH106	BH106 SS1	BH106 SS2
	12-Feb-24	12-Feb-24
	0 - 0.61	0.76 - 1.37
Acid Extractable Lead (Pb)	**340**	7.3



Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Acid Extractable Lead (Pb)	120

BH/MW1-D	BH1 SS1
	18-Oct-22
	0 - 0.61
Acid Extractable Lead (Pb)	**230**

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

BH105	BH105 SS1
	20-Feb-24
	0 - 0.61
Acid Extractable Lead (Pb)	**430**

Exceeds Table 3 SCS	**Result**

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR METALS
- SOIL SAMPLE MEETS TABLE 3 SCS FOR METALS
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

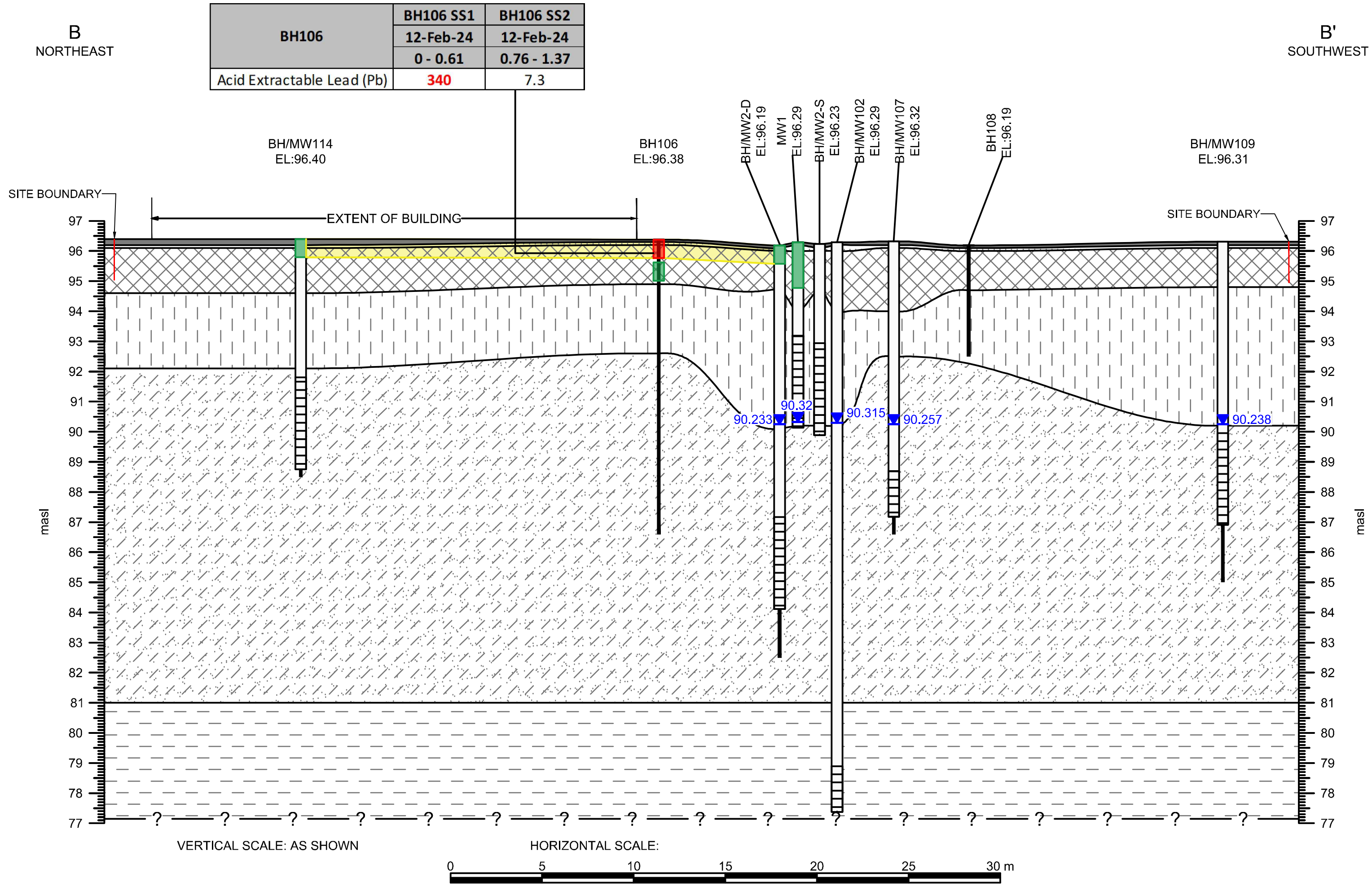
TITLE AND LOCATION:

CROSS SECTION A-A'
SOIL ANALYTICAL RESULTS - METALS (INCLUDING HYDRIDE-FORMING METALS)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 11A

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Env\CAD\2024 Cross Section\GTR-21003722-B0.dwg

BH106	BH106 SS1	BH106 SS2
	12-Feb-24	12-Feb-24
	0 - 0.61	0.76 - 1.37
Acid Extractable Lead (Pb)	340	7.3



Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Acid Extractable Lead (Pb)	120

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR METALS
- SOIL SAMPLE MEETS TABLE 3 SCS FOR METALS
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:
CROSS SECTION B-B'
SOIL ANALYTICAL RESULTS - METALS (INCLUDING HYDRIDE-FORMING METALS)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 11B

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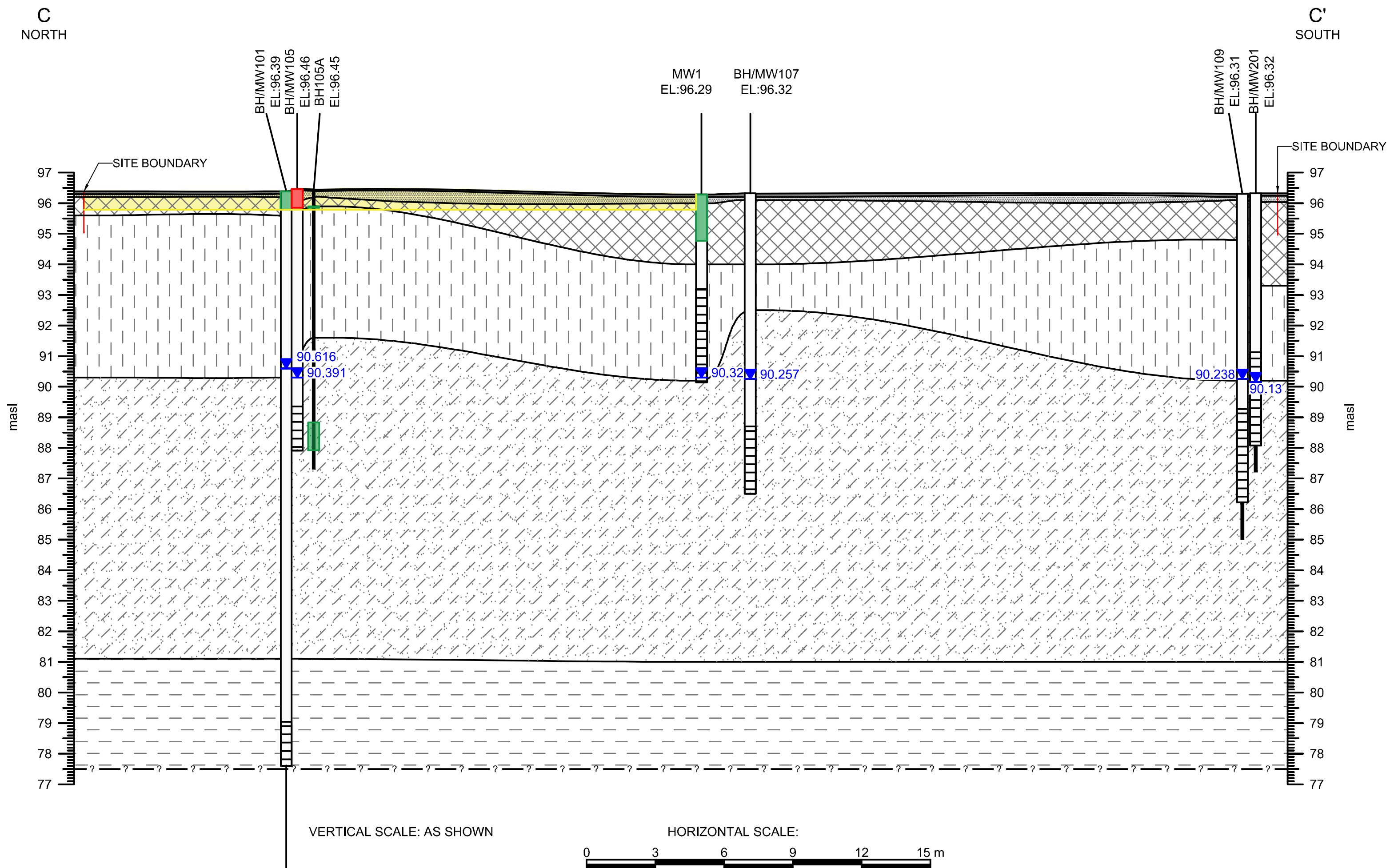

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/g)
Acid Extractable Lead (Pb)	120

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

Exceeds Table 3 SCS	Result

BH105	BH105 SS1
	20-Feb-24
	0 - 0.61
Acid Extractable Lead (Pb)	430

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- SOIL SAMPLE EXCEEDS TABLE 3 SCS FOR METALS
- SOIL SAMPLE MEETS TABLE 3 SCS FOR METALS
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:
CROSS SECTION C-C'
SOIL ANALYTICAL RESULTS - METALS (INCLUDING HYDRIDE-FORMING METALS)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 11C

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Envi\CAD\2024 Cross Section\GTR-21003722-B0.dwg

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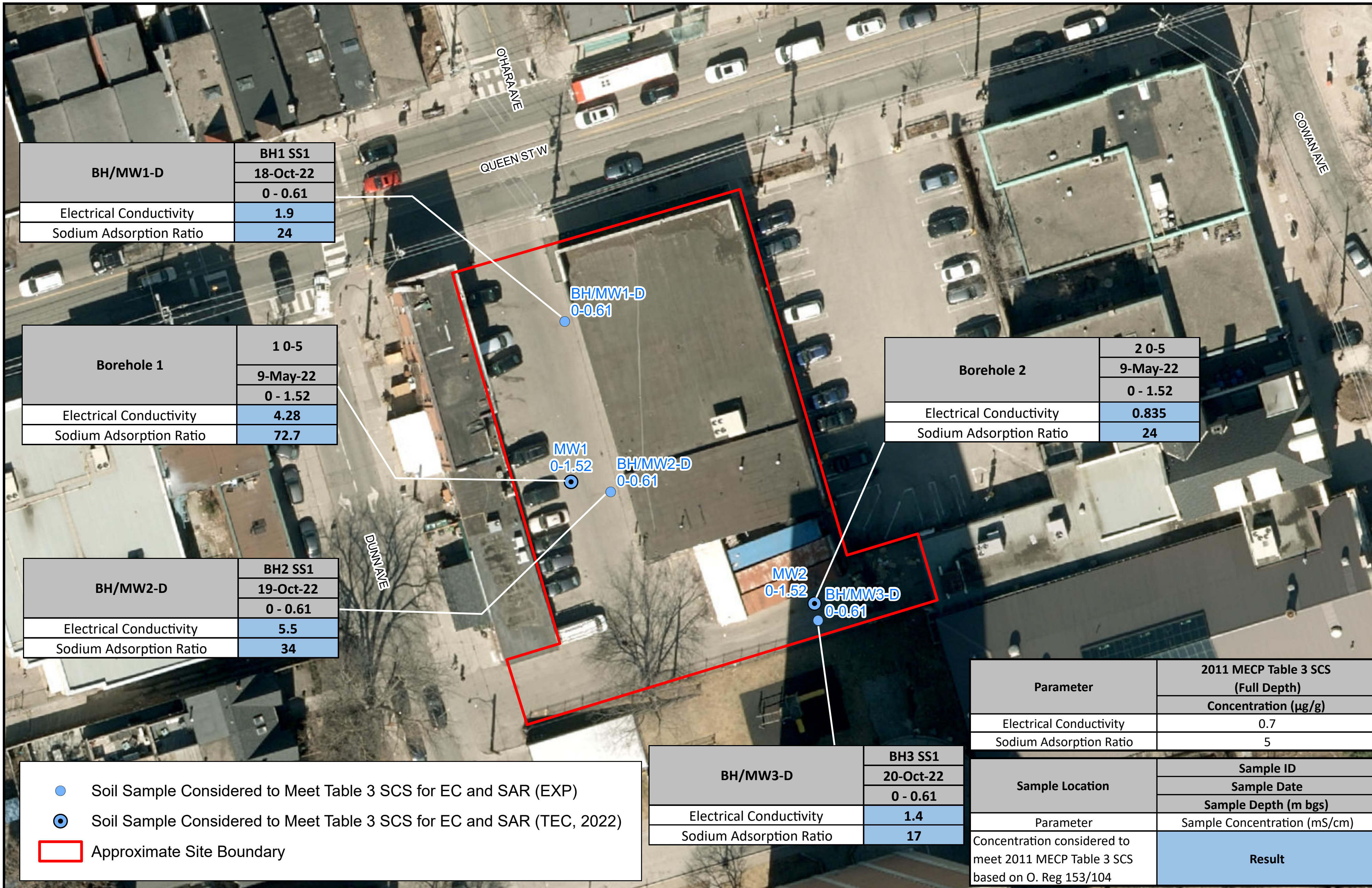
TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS - OTHER PARAMETERS (B-HWS, Cr(VI), Hg, pH)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 12



BH/MW1-D	BH1 SS1
	18-Oct-22
	0 - 0.61
Electrical Conductivity	1.9
Sodium Adsorption Ratio	24

Borehole 1	1 0-5
	9-May-22
	0 - 1.52
Electrical Conductivity	4.28
Sodium Adsorption Ratio	72.7

BH/MW2-D	BH2 SS1
	19-Oct-22
	0 - 0.61
Electrical Conductivity	5.5
Sodium Adsorption Ratio	34

Borehole 2	2 0-5
	9-May-22
	0 - 1.52
Electrical Conductivity	0.835
Sodium Adsorption Ratio	24

BH/MW3-D	BH3 SS1
	20-Oct-22
	0 - 0.61
Electrical Conductivity	1.4
Sodium Adsorption Ratio	17

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/g)
Electrical Conductivity	0.7
Sodium Adsorption Ratio	5

Sample Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (mS/cm)
Concentration considered to meet 2011 MECP Table 3 SCS based on O. Reg 153/104	Result

Soil Sample Considered to Meet Table 3 SCS for EC and SAR (EXP)

Soil Sample Considered to Meet Table 3 SCS for EC and SAR (TEC, 2022)

Approximate Site Boundary

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N

0 5 10 15 20 25 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS - ELECTRICAL CONDUCTIVITY (EC) AND SODIUM ADSORPTION RATIO (SAR)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 13

Groundwater Sample Meets Table 3 SCS for PHCs (EXP)

~ (Indicates Duplicate Sample)

Approximate Site Boundary

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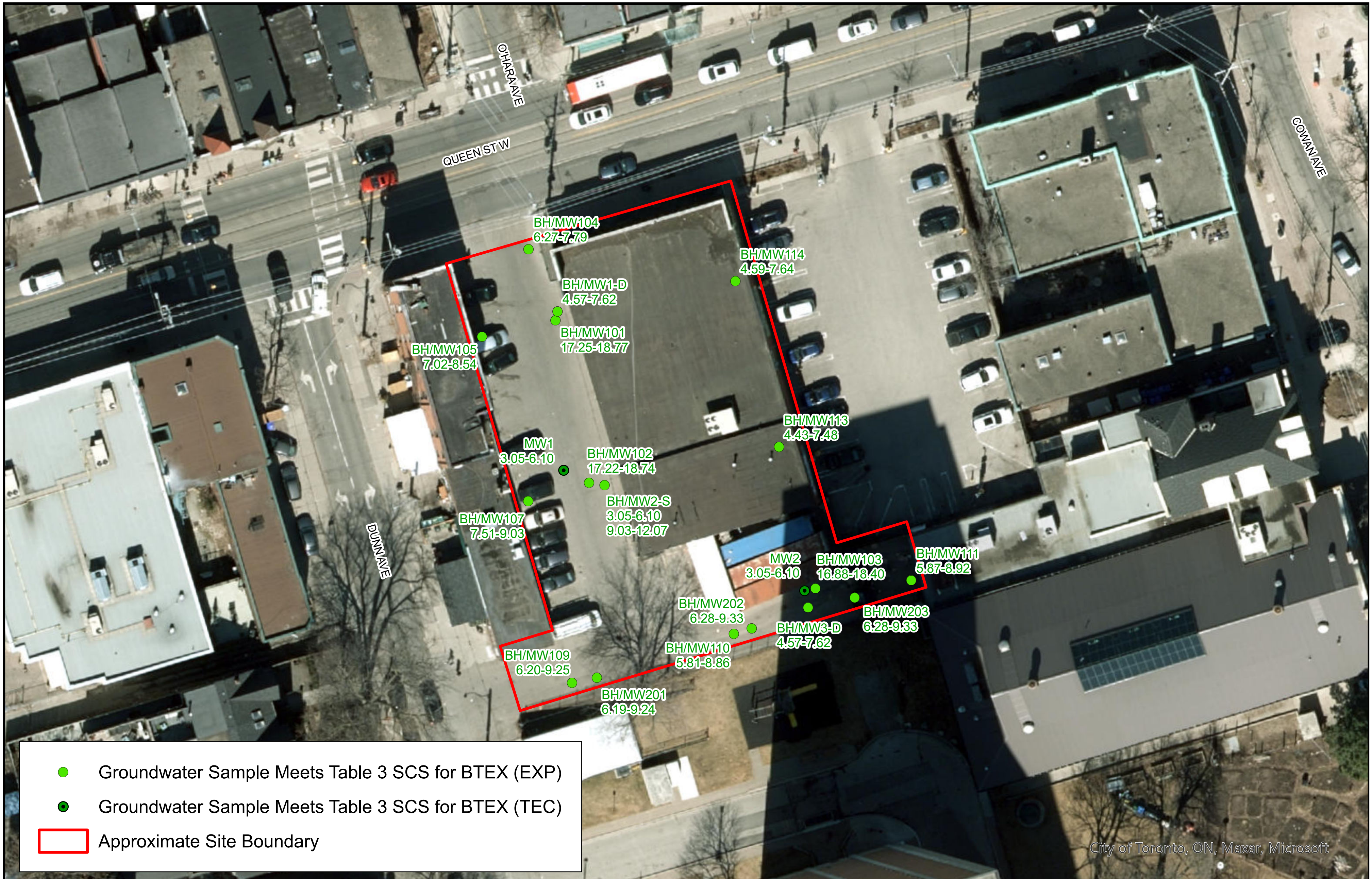
N

0 5 10 15 20 25 m

TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS -
PETROLEUM HYDROCARBONS (PHCs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 14



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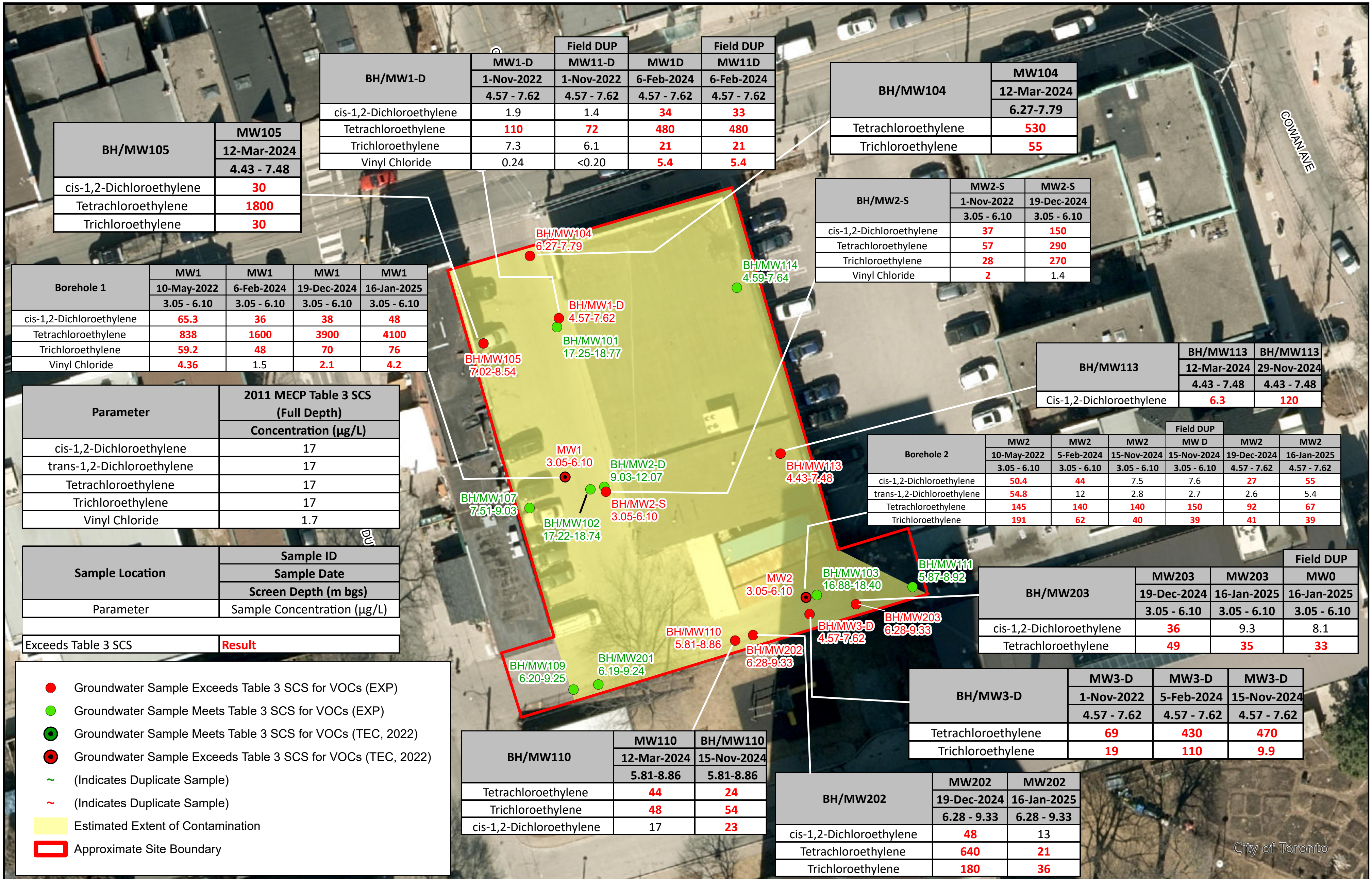
TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - BENZENE, TOLUENE, ETHYLBENZENE XYLENE (BTEX)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 15



BH/MW1-D	MW1-D	Field DUP MW11-D	MW1D	Field DUP MW11D
	1-Nov-2022	1-Nov-2022	6-Feb-2024	6-Feb-2024
	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62
cis-1,2-Dichloroethylene	1.9	1.4	34	33
Tetrachloroethylene	110	72	480	480
Trichloroethylene	7.3	6.1	21	21
Vinyl Chloride	0.24	<0.20	5.4	5.4

BH/MW104	MW104
	12-Mar-2024
	6.27-7.79
Tetrachloroethylene	530
Trichloroethylene	55

BH/MW105	MW105
	12-Mar-2024
	4.43 - 7.48
cis-1,2-Dichloroethylene	30
Tetrachloroethylene	1800
Trichloroethylene	30

BH/MW2-S	MW2-S	MW2-S
	1-Nov-2022	19-Dec-2024
	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	37	150
Tetrachloroethylene	57	290
Trichloroethylene	28	270
Vinyl Chloride	2	1.4

Borehole 1	MW1	MW1	MW1	MW1
	10-May-2022	6-Feb-2024	19-Dec-2024	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	65.3	36	38	48
Tetrachloroethylene	838	1600	3900	4100
Trichloroethylene	59.2	48	70	76
Vinyl Chloride	4.36	1.5	2.1	4.2

BH/MW113	BH/MW113	BH/MW113
	12-Mar-2024	29-Nov-2024
	4.43 - 7.48	4.43 - 7.48
Cis-1,2-Dichloroethylene	6.3	120

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/L)
cis-1,2-Dichloroethylene	17
trans-1,2-Dichloroethylene	17
Tetrachloroethylene	17
Trichloroethylene	17
Vinyl Chloride	1.7

Borehole 2	MW2	MW2	MW2	Field DUP MW D	MW2	MW2
	10-May-2022	5-Feb-2024	15-Nov-2024	15-Nov-2024	19-Dec-2024	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	4.57 - 7.62	4.57 - 7.62
cis-1,2-Dichloroethylene	50.4	44	7.5	7.6	27	55
trans-1,2-Dichloroethylene	54.8	12	2.8	2.7	2.6	5.4
Tetrachloroethylene	145	140	140	150	92	67
Trichloroethylene	191	62	40	39	41	39

Sample Location	Sample ID
	Sample Date
	Screen Depth (m bgs)
Parameter	Sample Concentration (µg/L)
Exceeds Table 3 SCS	Result

BH/MW203	MW203	MW203	Field DUP MW0
	19-Dec-2024	16-Jan-2025	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	36	9.3	8.1
Tetrachloroethylene	49	35	33

BH/MW3-D	MW3-D	MW3-D	MW3-D
	1-Nov-2022	5-Feb-2024	15-Nov-2024
	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62
Tetrachloroethylene	69	430	470
Trichloroethylene	19	110	9.9

BH/MW110	BH/MW110	BH/MW110
	12-Mar-2024	15-Nov-2024
	5.81-8.86	5.81-8.86
Tetrachloroethylene	44	24
Trichloroethylene	48	54
cis-1,2-Dichloroethylene	17	23

BH/MW202	MW202	MW202
	19-Dec-2024	16-Jan-2025
	6.28 - 9.33	6.28 - 9.33
cis-1,2-Dichloroethylene	48	13
Tetrachloroethylene	640	21
Trichloroethylene	180	36

- Groundwater Sample Exceeds Table 3 SCS for VOCs (EXP)
- Groundwater Sample Meets Table 3 SCS for VOCs (EXP)
- Groundwater Sample Meets Table 3 SCS for VOCs (TEC, 2022)
- Groundwater Sample Exceeds Table 3 SCS for VOCs (TEC, 2022)
- ~ (Indicates Duplicate Sample)
- ~ (Indicates Duplicate Sample)
- Estimated Extent of Contamination
- Approximate Site Boundary

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TITLE AND LOCATION:

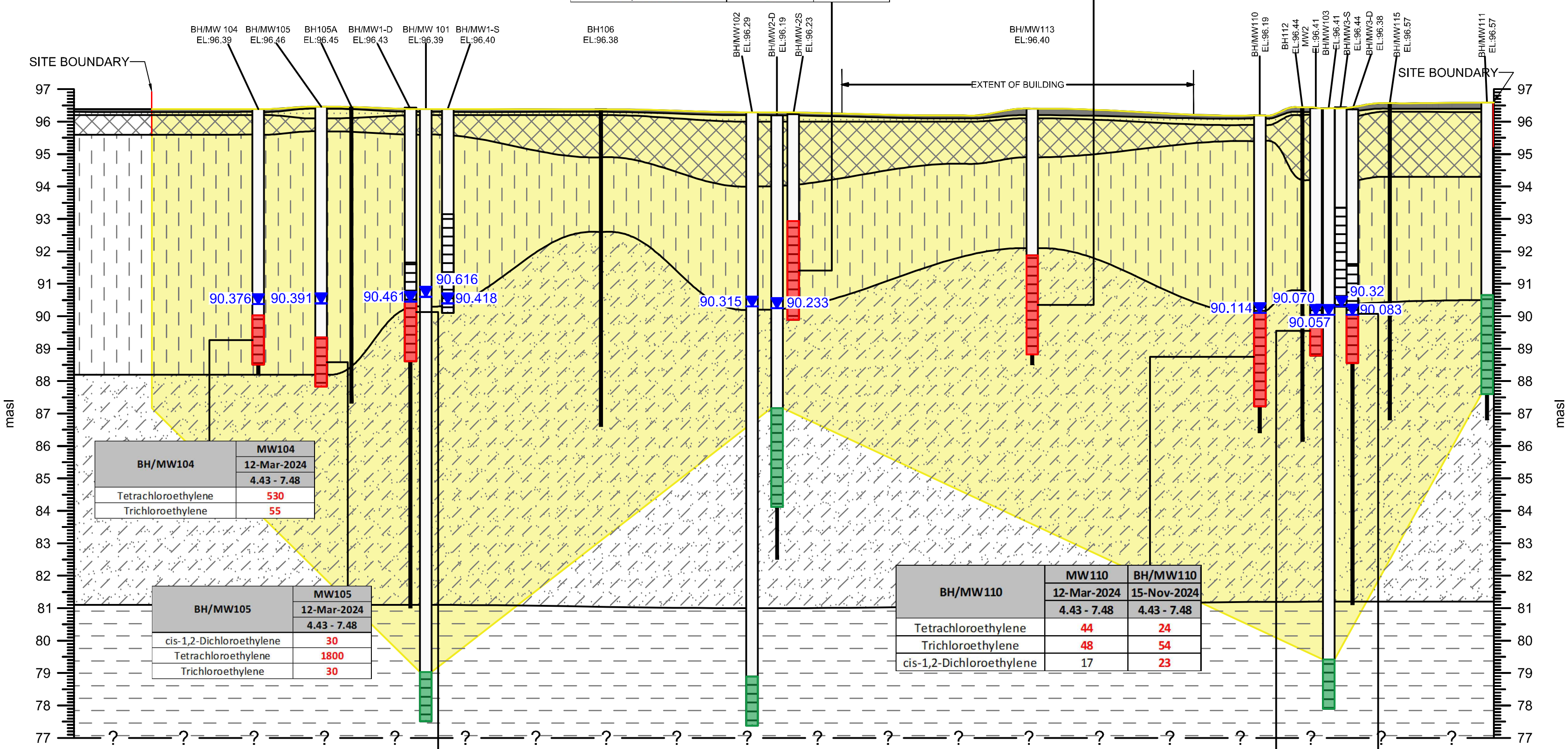
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)

Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 16

BH/MW2-S	MW2-S	MW2-S
	1-Nov-2022	19-Dec-2024
	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	37	150
Tetrachloroethylene	57	290
Trichloroethylene	28	270
Vinyl Chloride	2	1.4

BH/MW113	MW113	BH/MW113
	12-Mar-2024	29-Nov-2024
	4.43 - 7.48	4.43 - 7.48
Cis-1,2-Dichloroethylene	6.3	120



BH/MW104	MW104
	12-Mar-2024
	4.43 - 7.48
Tetrachloroethylene	530
Trichloroethylene	55

BH/MW105	MW105
	12-Mar-2024
	4.43 - 7.48
cis-1,2-Dichloroethylene	30
Tetrachloroethylene	1800
Trichloroethylene	30

BH/MW110	MW110	BH/MW110
	12-Mar-2024	15-Nov-2024
	4.43 - 7.48	4.43 - 7.48
Tetrachloroethylene	44	24
Trichloroethylene	48	54
cis-1,2-Dichloroethylene	17	23

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 5 10 15 20 25 30 m

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/L)
cis-1,2-Dichloroethylene	17
trans-1,2-Dichloroethylene	17
Tetrachloroethylene	17
Trichloroethylene	17
Vinyl Chloride	1.7

Sample Location	Sample ID
	Sample Date
	Screen Depth (m bgs)
Parameter	Sample Concentration (µg/L)

Exceeds Table 3 SCS	Result

BH/MW1-D	MW1-D	MW1D	Field DUP MW11D
	1-Nov-2022	6-Feb-2024	6-Feb-2024
	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62
cis-1,2-Dichloroethylene	1.9	34	33
Tetrachloroethylene	110	480	480
Trichloroethylene	7.3	21	21
Vinyl Chloride	0.24	5.4	5.4

BH/MW2	MW2	MW2	MW2	Field DUP MW D
	10-May-2022	5-Feb-2024	15-Nov-2024	15-Nov-2024
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	50.4	44	7.5	7.6
Trans-1,2-Dichloroethylene	54.8	12	2.8	2.7
Tetrachloroethylene	145	140	140	150
Trichloroethylene	191	62	40	39

BH/MW3-D	MW3-D	MW3-D
	1-Nov-2022	5-Feb-2024
	4.57 - 7.62	4.57 - 7.62
Tetrachloroethylene	69	430
Trichloroethylene	19	110

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LEGEND:

- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- GROUNDWATER SAMPLE MEETS TABLE 3 SCS FOR VOCs
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

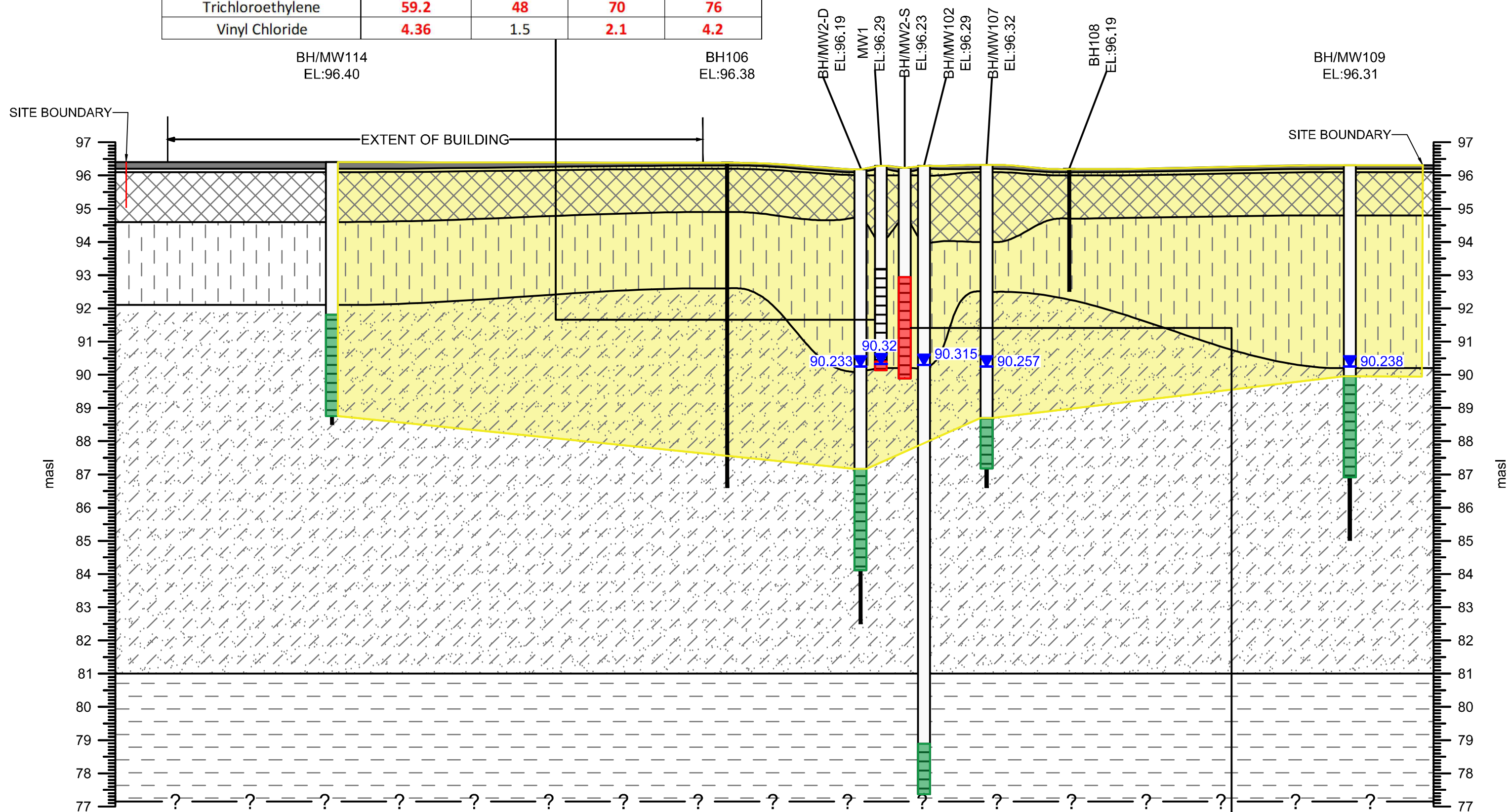
PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 16A

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Envi\CAD\2024 Cross Section\GTR-21003722-B0.dwg

B
NORTHEAST

B'
SOUTHWEST

Borehole 1	MW1	MW1	MW1	MW1
	10-May-2022	6-Feb-2024	19-Dec-2024	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	65.3	36	38	48
Tetrachloroethylene	838	1600	3900	4100
Trichloroethylene	59.2	48	70	76
Vinyl Chloride	4.36	1.5	2.1	4.2



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 5 10 15 20 25 30 m

BH/MW2-S	MW2-S	MW2-S
	1-Nov-2022	19-Dec-2024
	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	37	150
Tetrachloroethylene	57	290
Trichloroethylene	28	270
Vinyl Chloride	2	1.4

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/L)
cis-1,2-Dichloroethylene	17
trans-1,2-Dichloroethylene	17
Tetrachloroethylene	17
Trichloroethylene	17
Vinyl Chloride	1.7

Sample Location	Sample ID
	Sample Date
	Screen Depth (m bgs)
Parameter	Sample Concentration (µg/L)

Exceeds Table 3 SCS	Result

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- GROUNDWATER SAMPLE MEETS TABLE 3 SCS FOR VOCs
- ESTIMATED EXTENT OF CONTAMINATION
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION B-B'
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.: GTR-21003722-B0	DWN.: MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 16B

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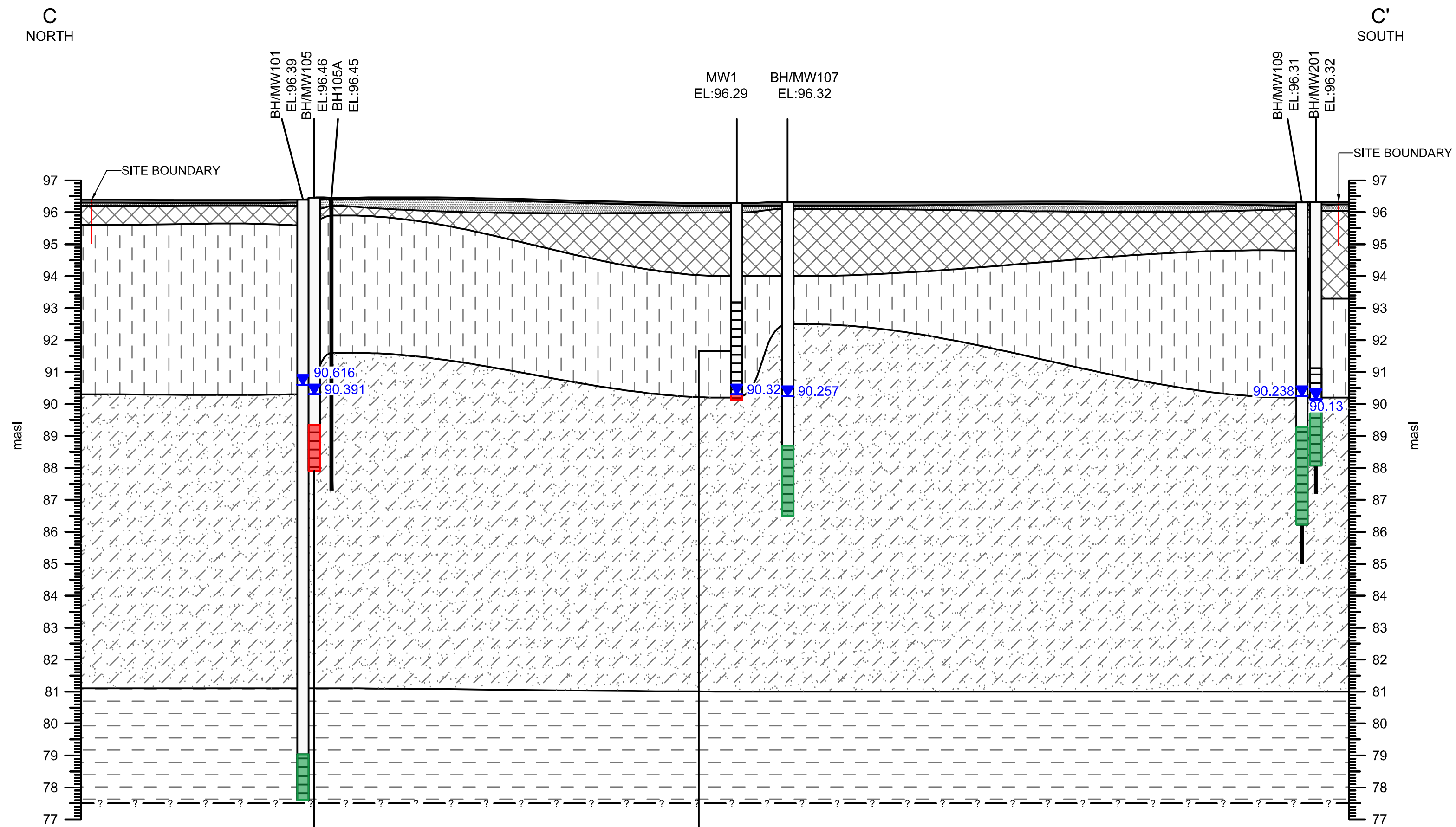

BH/MW105	MW105
	12-Mar-2024
	4.43 - 7.48
cis-1,2-Dichloroethylene	**30**
Tetrachloroethylene	**1800**
Trichloroethylene	**30**

Borehole 1	MW1	MW1	MW1	MW1
	10-May-2022	6-Feb-2024	19-Dec-2024	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	**65.3**	**36**	**38**	**48**
Tetrachloroethylene	**838**	**1600**	**3900**	**4100**
Trichloroethylene	**59.2**	**48**	**70**	**76**
Vinyl Chloride	**4.36**	1.5	**2.1**	**4.2**

Parameter	2011 MECP Table 3 SCS (Full Depth)
	Concentration (µg/L)
cis-1,2-Dichloroethylene	17
trans-1,2-Dichloroethylene	17
Tetrachloroethylene	17
Trichloroethylene	17
Vinyl Chloride	1.7

Sample Location	Sample ID
	Sample Date
	Screen Depth (m bgs)
Parameter	Sample Concentration (µg/L)

Exceeds Table 3 SCS	Result

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 3 6 9 12 15 m

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LEGEND:

- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- GROUNDWATER SAMPLE MEETS TABLE 3 SCS FOR VOCs
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION C-C'
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 16C

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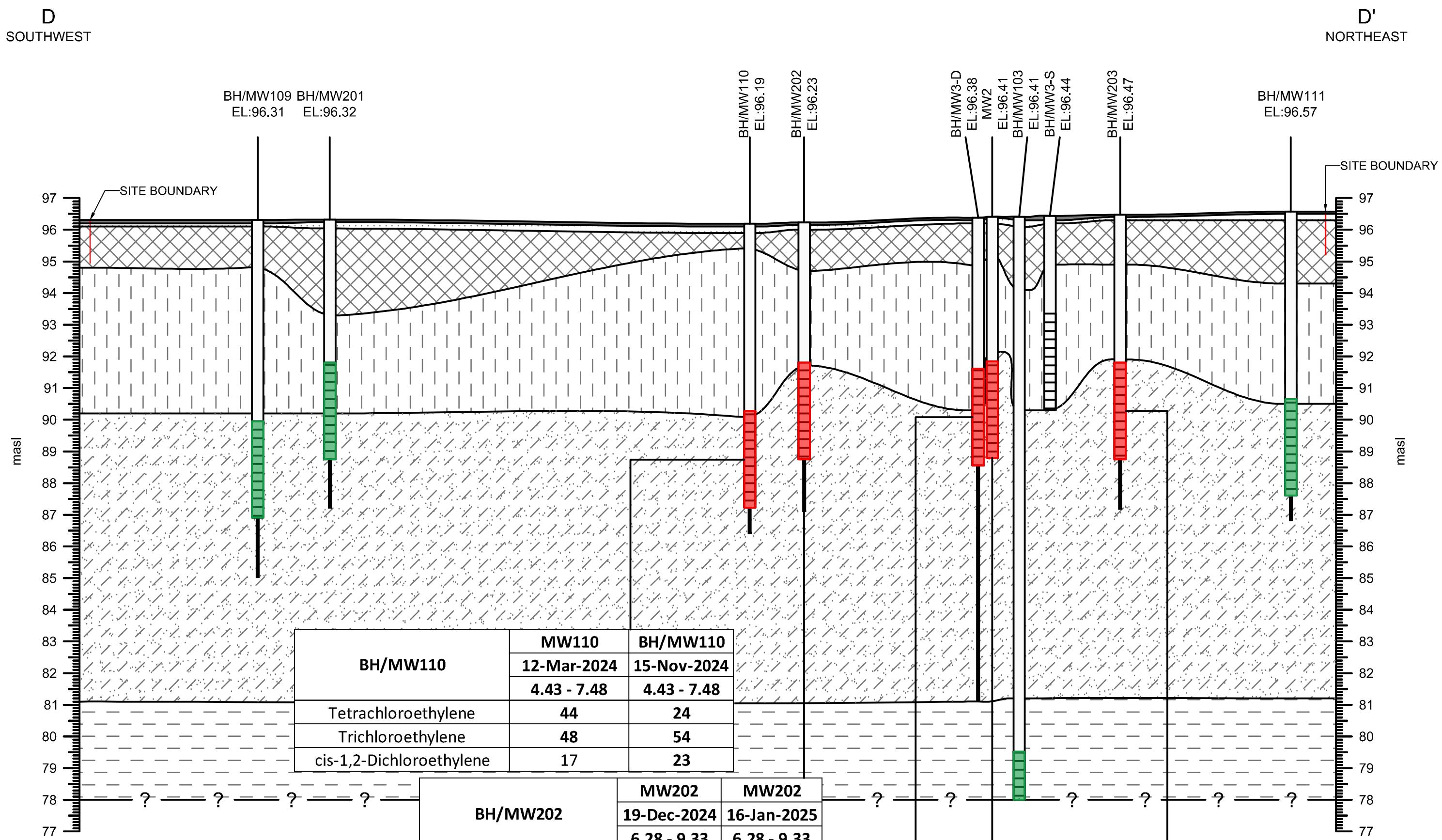

BH/MW110	MW110	BH/MW110
	12-Mar-2024	15-Nov-2024
	4.43 - 7.48	4.43 - 7.48
Tetrachloroethylene	44	24
Trichloroethylene	48	54
cis-1,2-Dichloroethylene	17	23

BH/MW202	MW202	MW202
	19-Dec-2024	16-Jan-2025
	6.28 - 9.33	6.28 - 9.33
cis-1,2-Dichloroethylene	48	13
Tetrachloroethylene	640	21
Trichloroethylene	180	36

BH/MW3-D	MW3-D	MW3-D	MW3-D
	1-Nov-2022	5-Feb-2024	15-Nov-2024
	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62
Tetrachloroethylene	69	430	470
Trichloroethylene	19	110	9.9

BH/MW203	MW203	MW203	Field DUP MW0
	19-Dec-2024	16-Jan-2025	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10
cis-1,2-Dichloroethylene	36	9.3	8.1
Tetrachloroethylene	49	35	33

Borehole 2	MW2	MW2	MW2	Field DUP MW D	MW2	MW2
	10-May-2022	5-Feb-2024	15-Nov-2024	15-Nov-2024	19-Dec-2024	16-Jan-2025
	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	4.57 - 7.62	4.57 - 7.62
cis-1,2-Dichloroethylene	50.4	44	7.5	7.6	27	55
trans-1,2-Dichloroethylene	54.8	12	2.8	2.7	2.6	5.4
Tetrachloroethylene	145	140	140	150	92	67
Trichloroethylene	191	62	40	39	41	39

Parameter	2011 MECP Table 3 SCS (Full Depth) Concentration (µg/L)
cis-1,2-Dichloroethylene	17
trans-1,2-Dichloroethylene	17
Tetrachloroethylene	17
Trichloroethylene	17
Vinyl Chloride	1.7

Sample Location	Sample ID Sample Date Screen Depth (m bgs)
Parameter	Sample Concentration (µg/L)

Exceeds Table 3 SCS	Result

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LEGEND:
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- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER SAMPLE EXCEEDS TABLE 3 SCS FOR VOCs
- GROUNDWATER SAMPLE MEETS TABLE 3 SCS FOR VOCs
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION D-D'
GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE:	CK:
AS NOTED	NM
DATE:	FIG. NO.:
MAY 2025	16D

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TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - POLYCHLORINATED BIPHENYLS (PCBs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 17

Groundwater Sample Meets Table 3 SCS for Metals (EXP)

Approximate Site Boundary

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TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - METALS (INCLUDING HYDRIDE-FORMING METALS)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 18

Groundwater Sample Meets Table 3 SCS for OPs (EXP)

Approximate Site Boundary

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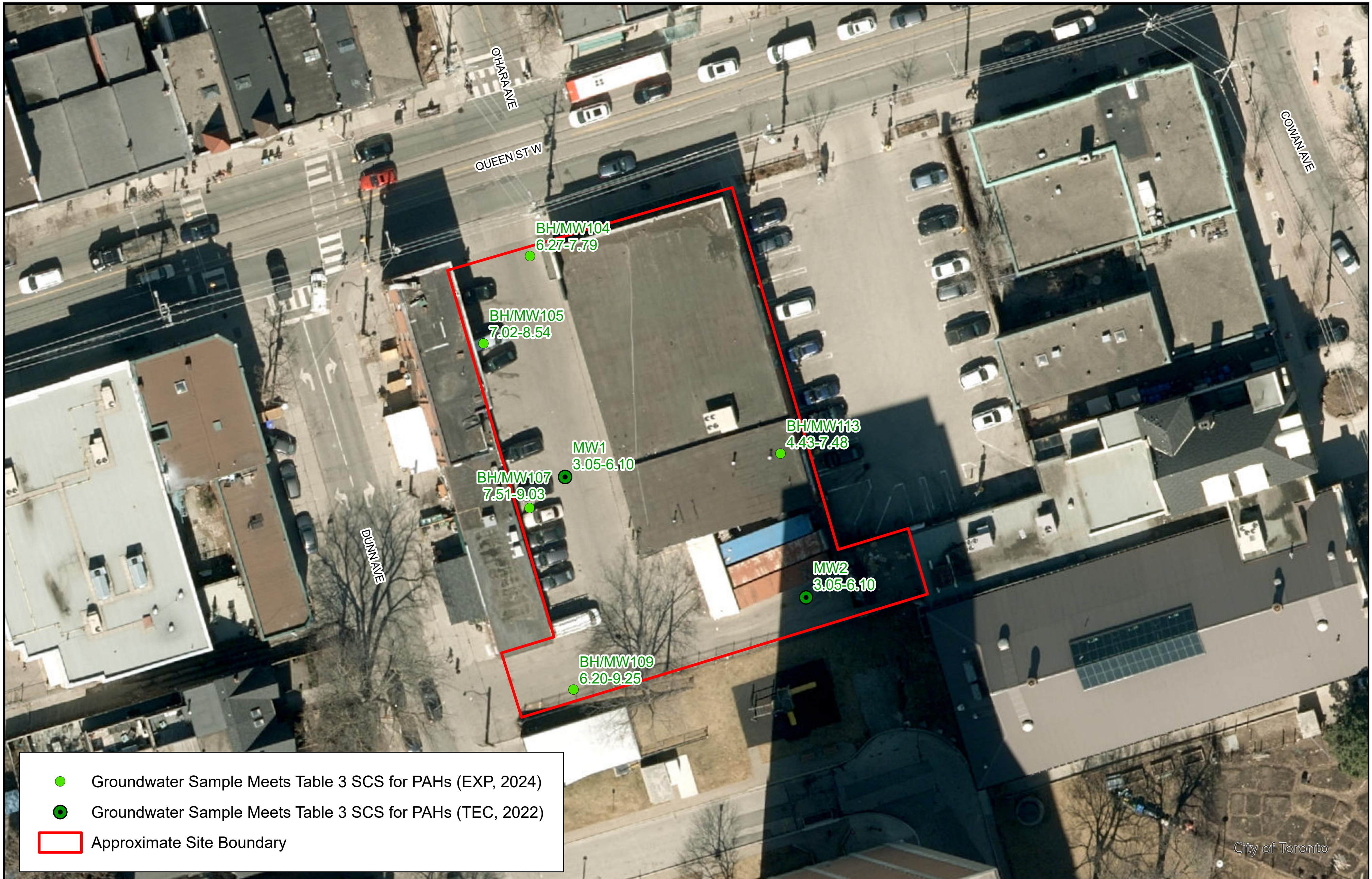
0 5 10 15 20 25 m

TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS -
OTHER PARAMETERS (Na, Cr(VI), Hg)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.:	DWN:
GTR-21003722-B0	MS
SCALE:	CHKD:
AS NOTED	NM
DATE:	FIG. No.:
MAY 2025	19



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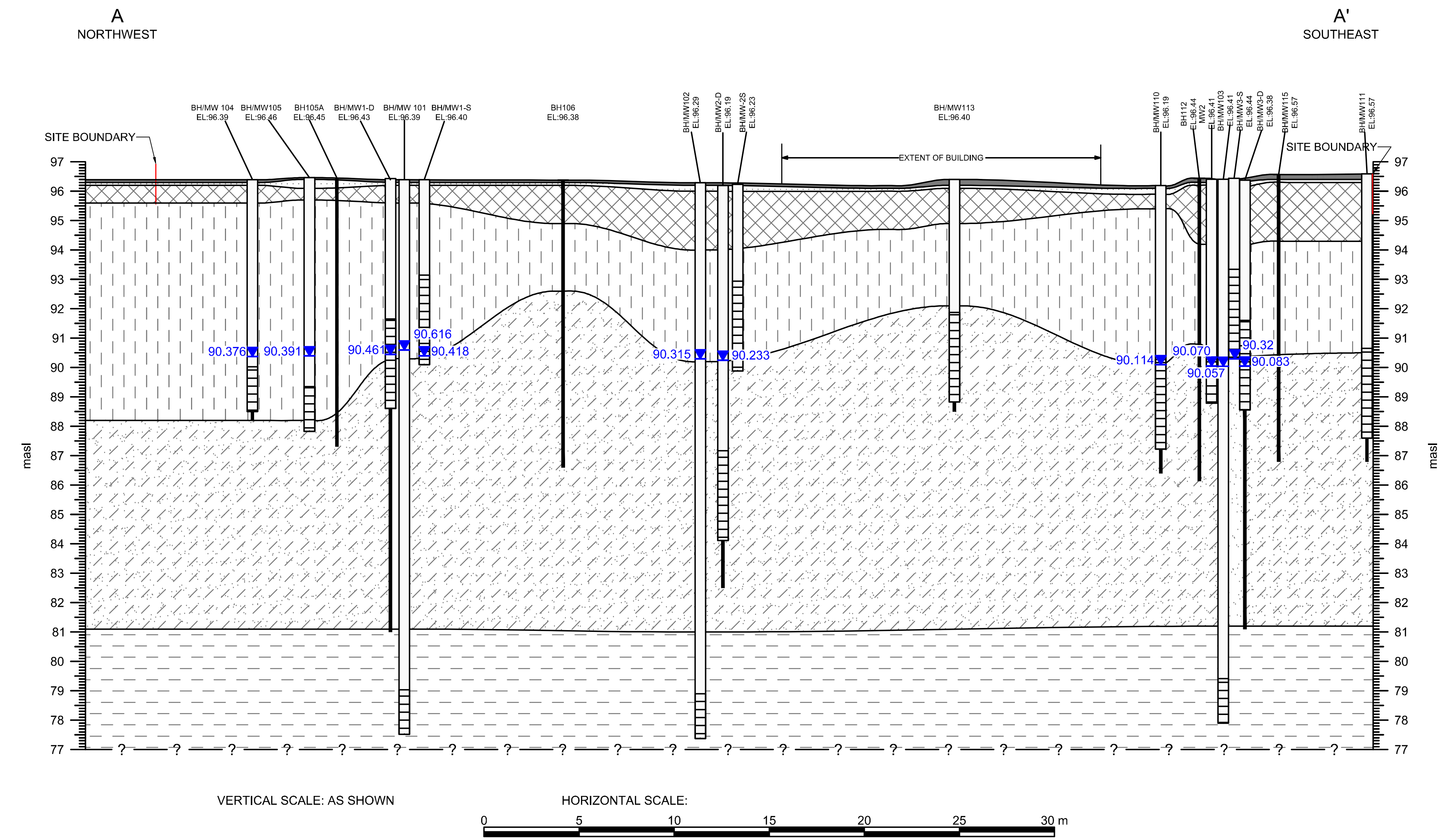
TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Phase Two Environmental Site Assessment
1337 Queen Street West
Toronto, Ontario

PROJECT No.: GTR-21003722-B0	DWN: MS
SCALE: AS NOTED	CHKD: NM
DATE: MAY 2025	FIG. No.: 20



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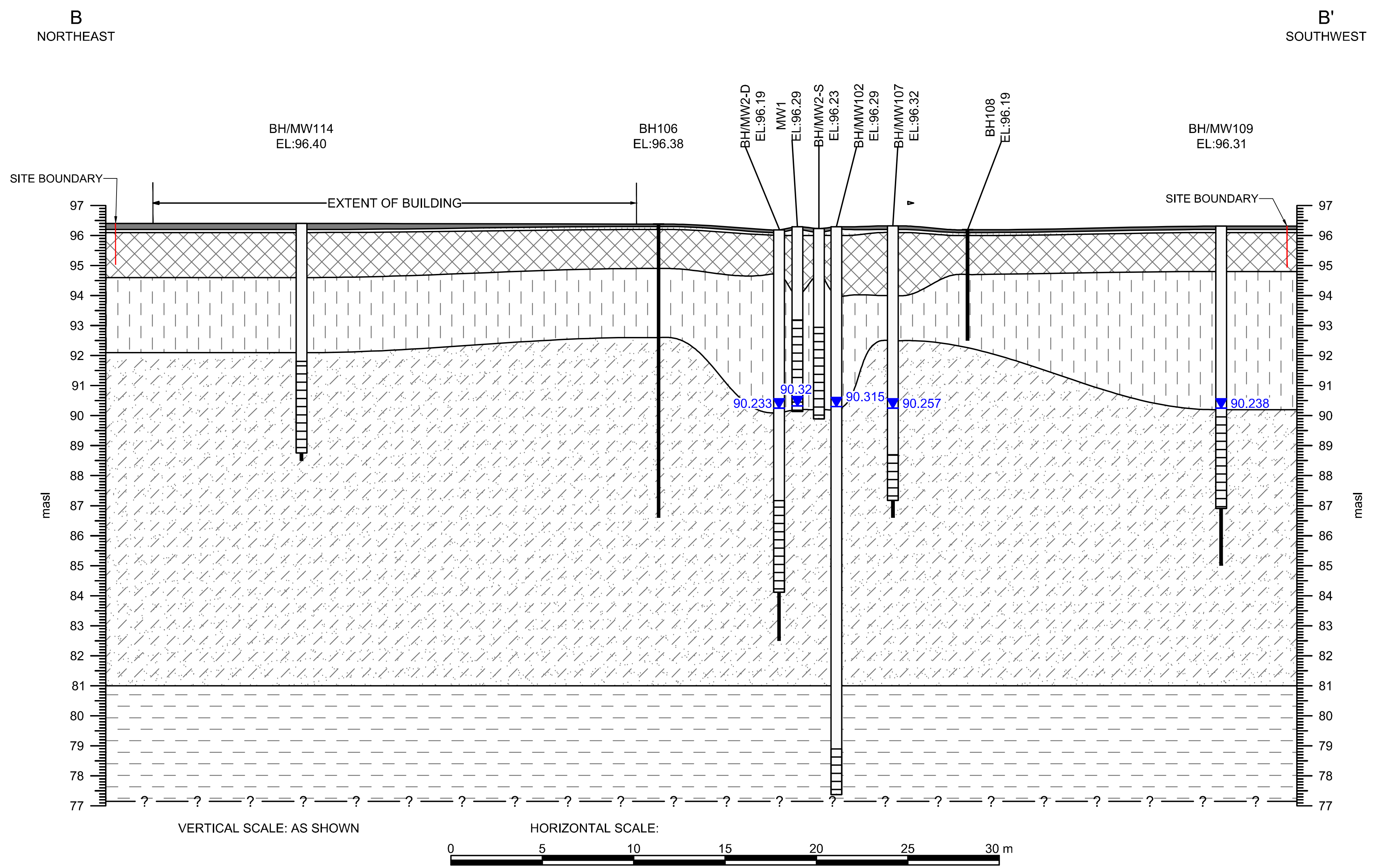
LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 21



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LEGEND:
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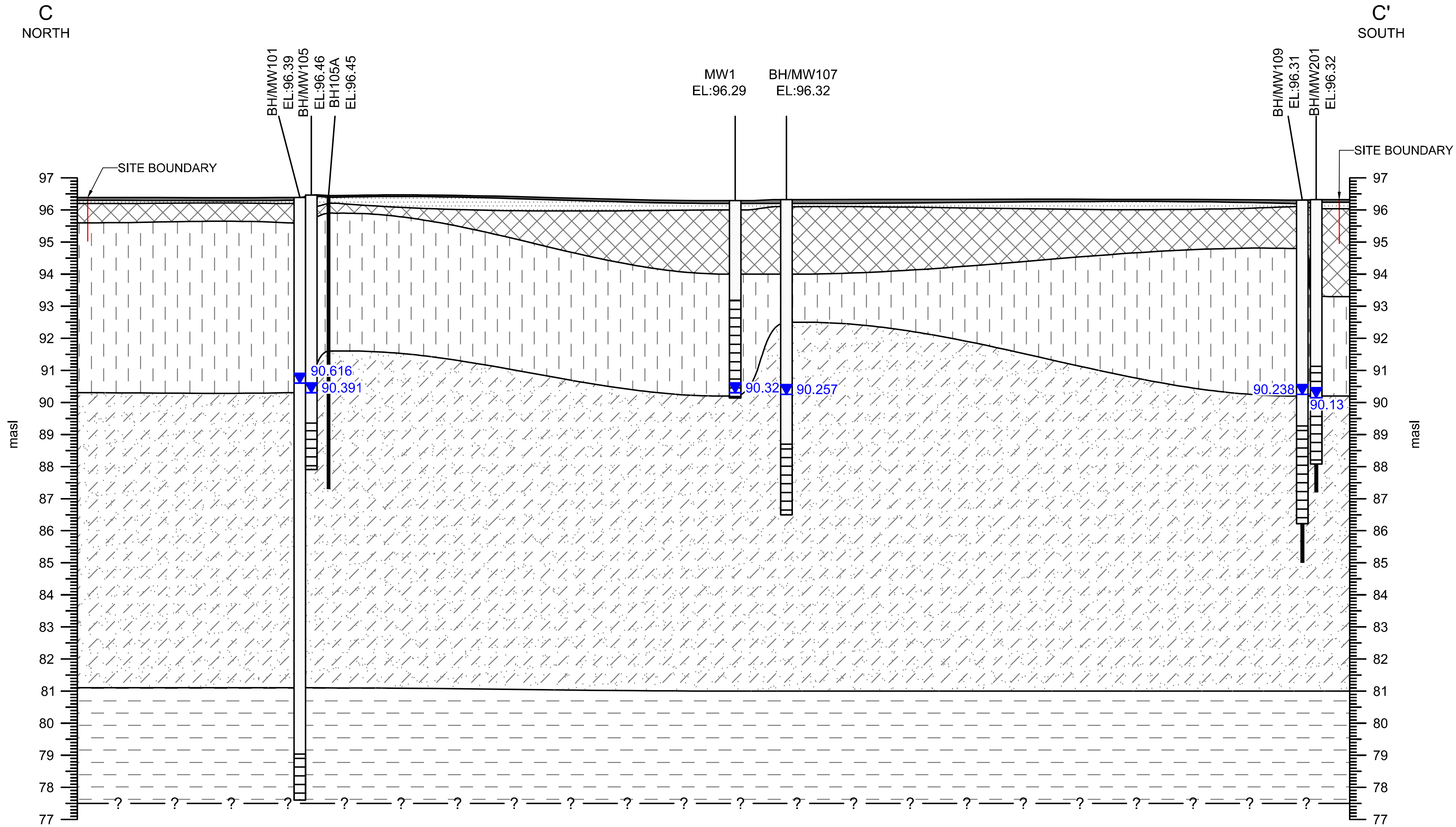
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:
CROSS SECTION B-B'
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.: GTR-21003722-B0	DWN.: MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 22



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 3 6 9 12 15 m

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LEGEND:
- ASPHALT
- SAND
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- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION C-C'
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 23

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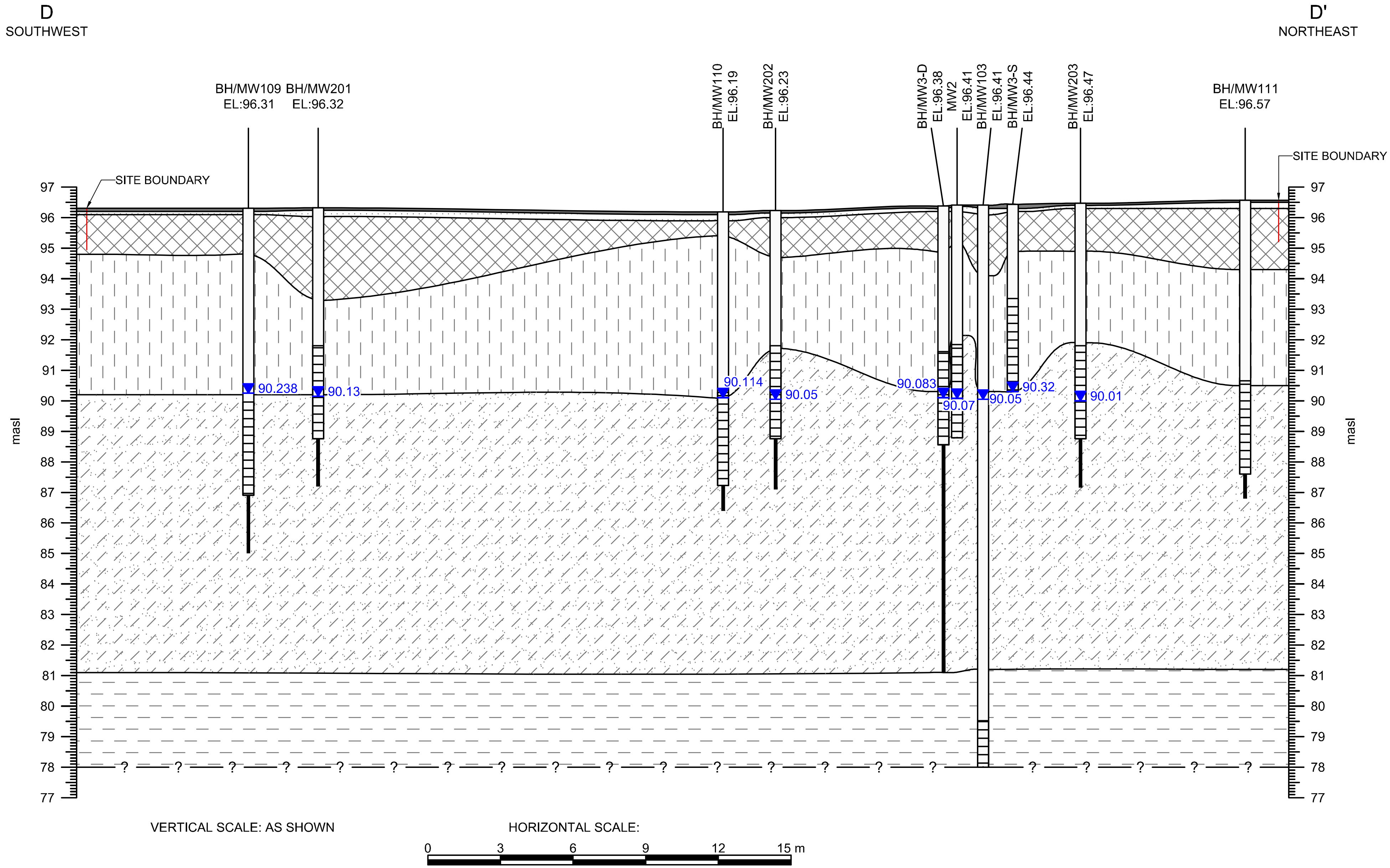

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LEGEND:
- ASPHALT
- SAND
- FILL
- SILT
- SANDY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON DECEMBER 19, 2024

TITLE AND LOCATION:

CROSS SECTION D-D'
PHASE TWO ESA
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	MS
SCALE: AS NOTED	CK: NM
DATE: MAY 2025	FIG. NO.: 24

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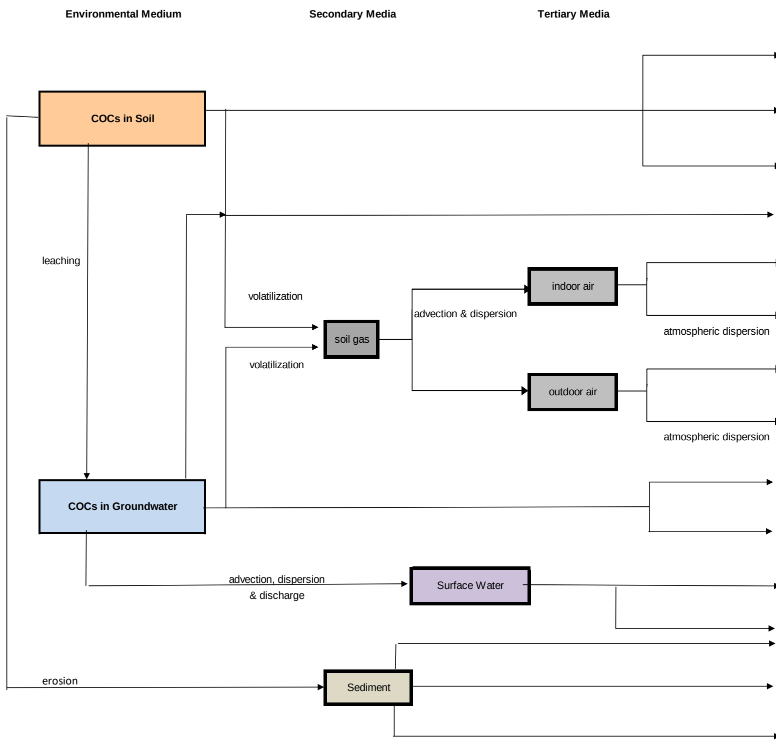
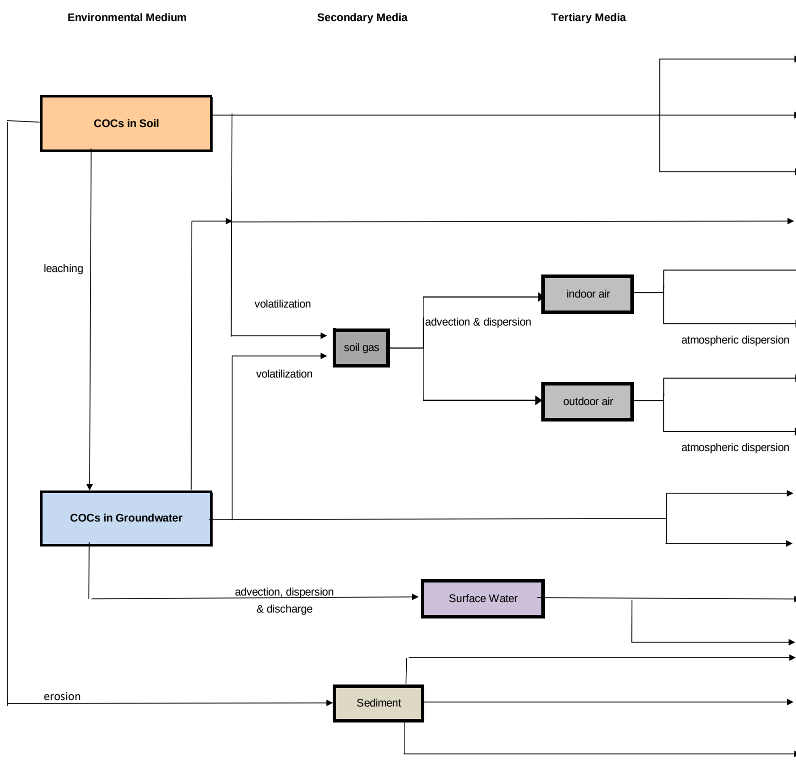


Receptor/Exposure Pathway	On-Site Receptors					Off-Site Receptors				
	Site Residents - Toddler and Lifetime Composite (Incl. pregnant female)	Site Visitors/ Trespassers - Toddler and Lifetime Composite (Incl. pregnant female)	Long Term Indoor Worker (Incl. pregnant female)	Long Term Outdoor Worker (Incl. pregnant female)	Construction/Subsurface Utility Worker (Incl. pregnant female)	Site Residents - Toddler and Lifetime Composite (Incl. pregnant female)	Site Visitors/ Trespassers - Toddler and Lifetime Composite (Incl. pregnant female)	Long Term Indoor Worker (Incl. pregnant female)	Long Term Outdoor Worker (Incl. pregnant female)	Construction/Subsurface Utility Worker (Incl. pregnant female)
soil particulate inhalation	✓	✓		✓	✓	✓	✓		✓	✓
soil-dermal contact	✓	✓		✓	✓					
incidental soil ingestion	✓	✓		✓	✓					
ingestion of homegrown garden produce	✓	✓								
indoor air inhalation	✓	✓	✓			✓	✓	✓		
vapour skin contact	✓	✓	✓			✓	✓	✓		
outdoor/trench air inhalation	✓	✓		✓	✓	✓	✓		✓	✓
vapour skin contact	✓	✓		✓	✓	✓	✓		✓	✓
groundwater dermal contact					✓					✓
incidental groundwater ingestion					✓					✓
Incidental ingestion and dermal contact of surface water										
Ingestion of fish										
dermal contact										
Incidental ingestion										

Legend:

(black cell)	Pathway is incomplete
✓	Pathway is complete

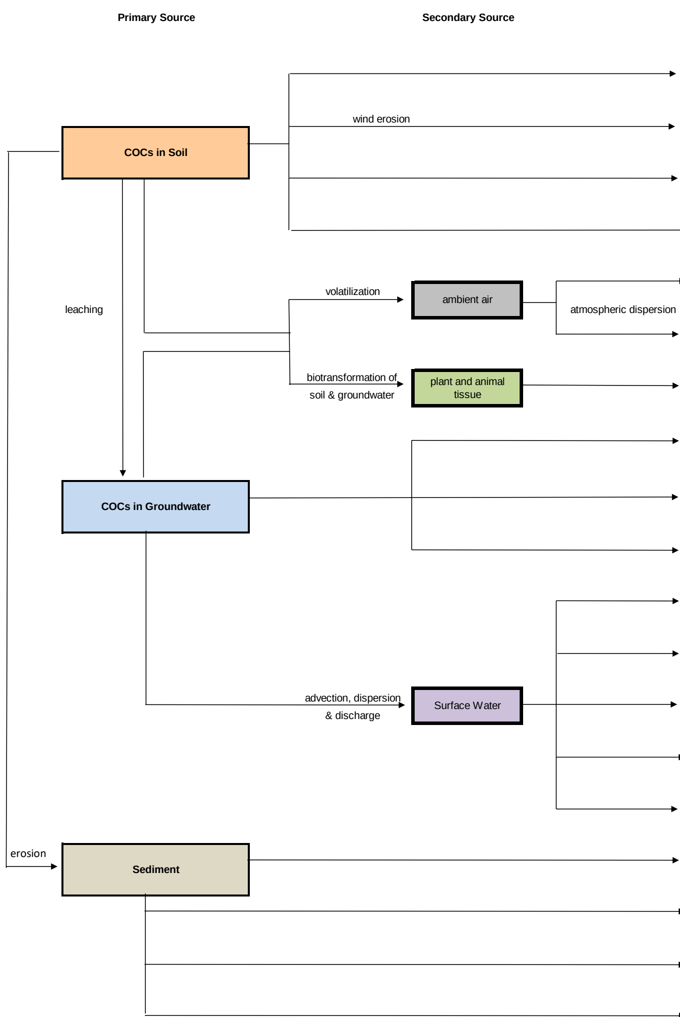


Receptor/Exposure Pathway	On-Site Receptors					Off-Site Receptors				
	Site Residents - Toddler and Lifetime Composite (Incl. pregnant female)	Site Visitors/ Trespassers - Toddler and Lifetime Composite (Incl. pregnant female)	Long Term Indoor Worker (Incl. pregnant female)	Long Term Outdoor Worker (Incl. pregnant female)	Construction/Subsurface Utility Worker (Incl. pregnant female)	Site Residents - Toddler and Lifetime Composite (Incl. pregnant female)	Site Visitors/ Trespassers - Toddler and Lifetime Composite (Incl. pregnant female)	Long Term Indoor Worker (Incl. pregnant female)	Long Term Outdoor Worker (Incl. pregnant female)	Construction/Subsurface Utility Worker (Incl. pregnant female)
soil particulate inhalation	X$^{(1)}$	X$^{(1)}$		X$^{(1)}$	--	X$^{(1)}$	X$^{(1)}$		X$^{(1)}$	X$^{(1)}$
soil-dermal contact	X$^{(1)}$	X$^{(1)}$		X$^{(1)}$	--					
incidental soil ingestion	X$^{(1)}$	X$^{(1)}$		X$^{(1)}$	--					
ingestion of homegrown garden produce	X$^{(2)}$	X$^{(2)}$								
indoor air inhalation	X$^{(3)}$	X$^{(3)}$	X$^{(3)}$			--	--	--		
vapour skin contact	X$^{(3)}$	X$^{(3)}$	X$^{(3)}$			--	--	--		
outdoor/trench air inhalation	--	--		--	X$^{(4)}$	--	--		--	--
vapour skin contact	--	--		--	X$^{(4)}$	--	--		--	--
groundwater dermal contact					X$^{(4)}$					--
incidental groundwater ingestion					X$^{(4)}$					--
Incidental ingestion and dermal contact of surface water										
Ingestion of fish										
dermal contact										
Incidental ingestion										

Prposed RMMs will likely include:
(1) Hard/fill cap barrier
(2) Homegrown garden produce restriction
(3) VIMS engineering measures
(4) Health and safety plan
Soil and groundwater management plan

Legend:

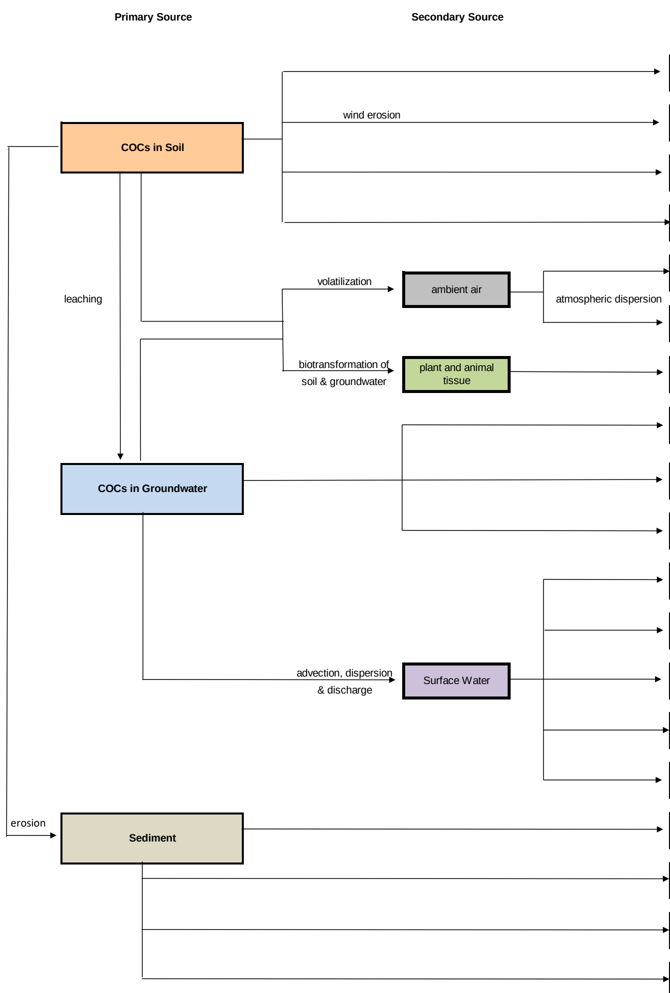
	Pathway is incomplete
--	Pathway is complete but potential risks will likely be negligible
X	Pathway is Blocked by RMM



Receptor/Exposure Pathway	Terrestrial (On-Site): terrestrial vegetation	Terrestrial (On-Site): soil invertebrates	Terrestrial (On-Site): terrestrial birds and mammals	Terrestrial (Off-Site): terrestrial vegetation	Terrestrial (Off-Site): soil invertebrates	Terrestrial (Off-Site): terrestrial birds and mammals	Aquatic (Off-Site): aquatic vegetation	Aquatic (Off-Site): aquatic invertebrates	Aquatic (Off-Site): aquatic birds and mammals	Aquatic (Off-Site): amphibians	Aquatic (Off-Site): fish
root uptake/contact	✓										
soil particle inhalation			✓			✓					
dermal contact		✓	✓								
incidental ingestion		✓	✓								
stem and foliar uptake	✓			✓							
vapour inhalation		✓	✓		✓	✓					
ingestion of plant and animal tissue		✓	✓								
root uptake/contact											
dermal contact											
incidental ingestion											
root, stem and foliar uptake of surface water							✓				
surface water dermal contact								✓	✓	✓	✓
surface water ingestion								✓	✓	✓	✓
ingestion of plant and animal tissue								✓	✓	✓	✓
gill uptake								✓		✓	✓
Stem and Foliar Uptake											
Direct Contact/ Root Uptake											
Direct Contact											
Incidental Ingestion											

Legend:

(black)	Pathway is incomplete
✓	Pathway is complete



Primary/Secondary Source	Receptor/Exposure Pathway	Terrestrial (On-Site): terrestrial vegetation	Terrestrial (On-Site): soil invertebrates	Terrestrial (On-Site): terrestrial birds and mammals	Terrestrial (Off-Site): terrestrial vegetation	Terrestrial (Off-Site): soil invertebrates	Terrestrial (Off-Site): terrestrial birds and mammals	Aquatic (Off-Site): aquatic vegetation	Aquatic (Off-Site): aquatic invertebrates	Aquatic (Off-Site): aquatic birds and mammals	Aquatic (Off-Site): amphibians	Aquatic (Off-Site): fish
COCs in Soil	root uptake/contact	X(1)										
COCs in Soil	soil particle inhalation			X(1)			X(1)					
COCs in Soil	dermal contact		X(1)	X(1)								
COCs in Soil	incidental ingestion		X(1)	X(1)								
ambient air	stem and foliar uptake	--			--							
ambient air	vapour inhalation		--	--		--	--					
plant and animal tissue	ingestion of plant and animal tissue		X(1)	X(1)								
COCs in Groundwater	root uptake/contact											
COCs in Groundwater	dermal contact											
COCs in Groundwater	incidental ingestion											
Surface Water	root, stem and foliar uptake of surface water							--				
Surface Water	surface water dermal contact								--	--	--	--
Surface Water	surface water ingestion								--	--	--	--
Surface Water	ingestion of plant and animal tissue								--	--	--	--
Surface Water	gill uptake								--		--	--
Sediment	Stem and Foliar Uptake											
Sediment	Direct Contact/ Root Uptake											
Sediment	Direct Contact											
Sediment	Incidental Ingestion											

Proposed RMMs will likely include:
(1) Hard and/or fill cap barrier
Soil and groundwater Management Plan

Legend:

(black)	Pathway is incomplete
--	Pathway is complete but potential risks are not anticipated
X	Pathway is blocked by RMM

Table

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA
1337 Queen Street West, Toronto, Ontario
GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
On-Site					
1a	1337 Queen Street West	On-Site	PCA#30 – Importation of Fill Materials of Unknown Quality	Based on a review of the FIPs, aerial photographs, and municpal records, several structures have resided on Site between 1890 and 1966.	Yes, based on the PCA occurring on-Site.
1b		On-Site	PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	Based on the municipal records the property was occupied by Seddon Coal and Outwood Coal Co between 1900 to 1934. In addition, based on the municipal records the property was occupied by Parkdale Battery Service and Sheddon's Battery 7 Radio Service in 1929 and 1934, respectively.	Yes, based on the PCA occurring on-Site.
1c		On-Site	PCA"Other" – Coal Storage.		Yes, based on the PCA occurring on-Site.
1d		on-Site	PCA 'Other' - Salt Application	Based on a review of the aerial photographs and observations made at the time of the Site visit, the southern and western portions of the Site were utilized as a parking area for the Site building.	Yes, based on the PCA occurring on-Site.
Off-Site					
2	1325 - 1329 Queen Street West (historically 1323 Queen Street Wet)	East Adjacent	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the municipal records the property was occupied by service stations between 1929 to 1978/79. Based on the 1933 and 1939 - 41 FIPs and the ERIS report the property was occupied by a Gasoline Service Station with oiling and three (3) USTs along the northwestern boundary. In addition, based on the 1969 FIP the property was occupied by an Auto Service Station with one (1) UST along the northwestern boundary.	Yes, based on the close proximity of the PCA to the Site.
3	1396 Queen Street West	20 m north	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). ~~PCA#17 – Dye Manufacturing, Processing and Bulk Storage.~~ PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the 1933, 1939 - 41 and 1969 FIPs the property was occupied by Machell Garage. In addition, based on the municipal records the property was occupied by Machell's Garage between 1940 to 1965 and by United Cleaners & Dyers in 1934. Based on the ERIS report Davenport Electric (Davenport E) was listed on the Anderson's Storage Tanks database in 1924. In addition, based on the Site reconnaissance Sun King Clears previous occupied the property.	Yes, based on the up-gradient relation relative to groundwater flow direction.
4	1398 Queen Street West	20 m north	~~PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.~~	Based on the municipal records the property was occupied by Melrose Furniture between 1960 and 1972 and Mr. Furniture from 1995 to 2000.	~~No, Yes, based on the close proximity of the PCA to the Site. the~~ No, based on the retail listing, and no operations occuring.
5	251 Dunn Avenue	20 m southwest	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report J. A. Rayson was permitted to install one (1) fuel oil tank in 1926.	No, based on the down-gradient relation relative to groundwater flow direction.
6	1313 Queen Street West (historically 1315 Queen Street West)	25 m east	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed 1933 and 1939 - 41 FIPs the property was occupied by a Police Station with a garage.	Yes, based on the close proximity of the PCA to the Site.
7	1408 Queen Street West	25 m northwest	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the ERIS report Paradise Cleaner Ltd. was listed as a registered waste generator of halogenated solvents from 1986 until 1998. Based on the municipal records the property was occupied by Dry-Cleaningfacilities between 1972 to 1985/86.	Yes, based on the close proximity of the PCA to the Site.
8	1349 Queen Street West	25 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Cadet Cleaners between 1965 to 2000.	Yes, based on the close proximity of the PCA to the Site.
9	1390 Queen Street West	25 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by McCaul Saint Cleaners & Tailors LTD between 1995 and 2000.	Yes, based on the close proximity of the PCA to the Site.

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA

1337 Queen Street West, Toronto, Ontario

GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
10	1388 Queen Street West	25 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Coin Laundromat from 1965 to 1972.	Yes, based on the close proximity of the PCA to the Site.
11	1351 Queen Street West	25 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Dry-Cleaningfacilities between 1955 to 2000.	Yes, based on the close proximity of the PCA to the Site.
12	224 Cowan Avenue	25 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report the property was occupied by Cowan Avenue Fire Hall and was permitted to install one (1) gasoline tank in 1916.	Yes, based on the close proximity of the PCA to the Site.
13	1355 Queen Street West	35 m west	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the ERIS report the property was listed on the Anderson's Storage Tanks database in 1924 for one (1) gas pump on the curb. In addition, based on the municipal records the property was occupied by Kemp's D J Garage in 1945. Additionally, in the 1920 FIP the property was occupied by Columbia Garage. Two (2) USTs were located on the exterior portion of the building at 1355 Queen Street West. One (1) additional UST was located on the exterior portion of the building at 264 Dunn Avenue.	Yes, based on the close proximity of the PCA to the Site.
14	9 O'Hara Place	40 m northwest	PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing.	Based on the municipal records the property was occupied by Small Fibre Stampings in 1955.	Yes, based on the up-gradient relation relative to groundwater flow direction.
15	1414 - 1416 Queen Street West	40 m northwest	PCA#54 – Textile Manufacturing and Processing.	Based on the municipal records the property was occupied by Finer Fabrics LTD between 1965 to 1978/79.	Yes, based on the upgradient relation relative to groundwater flow direction.
16	1357 Queen Street West	40 m west	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report the property was listed on the Anderson's Storage Tanks database in 1932 for two (2) fuel oil tanks.	No, based on the trans-gradient relation relative to groundwater flow direction.
17a	1359 - 1361 Queen Street West	50 m west	PCA#8 – Chemical Manufacturing, Processing and Bulk Storage. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1933 FIP the property was occupied by Cleaning & Press with a room labelled manufacturing cleaning compound.	No, based on the trans-gradient relation relative to groundwater flow direction.
17b	1359 Queen Street West		PCA"Other" – Coal Storage.	Based on the municipal records the property was occupied by Harrison Coal between 1907 to 1925.	
17c	1361 Queen Street West		PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Cleaner & Presser in 1925.	
18	1420 Queen Street West	55 m northwest	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1969 FIP and municipal directories the property was occupied by Cleaners between 1960 and 1969.	Yes, based on the upgradient relation relative to groundwater flow direction.
19a	1363 Queen Street West	60 m west	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the 1939 - 41 FIP and municipal directories the property was occupied by Woodworking and Furniture facilities.	No, based on the trans-gradient relation relative to groundwater flow direction.
19b			PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	Based on the ERIS report Smith [W H] Battery & Ignition Co. was permitted to install one (1) 500-gallon gasoline tanked under the sidewalk with a pump on the curb in 1924 in relation to a Battery and Ignition Shop.	
20	1376 Queen Street West	60 m northeast	PCA#17 – Dye Manufacturing, Processing and Bulk Storage. PCA#54 – Textile Manufacturing and Processing.	Based on the municipal records the property was occupied by European Dur Dyers Co in 1985/86 and Baldwin textiles in 1995.	No, based on the trans-gradient relation relative to groundwater flow direction.
21	1426 Queen Street West	65 m northwest	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Rolston Laundry in 1900.	Yes, based on the upgradient relation relative to groundwater flow direction.
22	13 O'Hara Avenue	75 m north	PCA#31 – Ink Manufacturing, Processing and Bulk Storage.	Based on the municipal records the property was occupied by British Empire Ink & Mucilage Co. in 1907.	Yes, based on the up-gradient relation relative to groundwater flow direction.
23	1297 - 1303 Queen Street West	75 m east	PCA#45 – Pulp, Paper and Paperboard Manufacturing and Processing.	Based on the reviewed municipal records Novelty Paper Box Co LTD was listed in 1929.	No, based on the trans-gradient relation relative to groundwater flow direction.

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA
1337 Queen Street West, Toronto, Ontario
GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
24	1303 Queen Street West	75 m east	PCA#33 – Metal Fabrication.	Based on the municipal records the Site was occupied by various manufacturing operations such as Thermos Bottle Co., Can Button 7 Buckle Mfrs., Duffle Electric Mfg. Co. and Novelty Paper Box between 1900 and 1925. Based on the chain of title, the Site was owned by Copeland Chatterson Ltd., a company specializing in stationery, loose-leaf binders and sheets, from 1920 to 1923.	No, based on the trans-gradient relation relative to groundwater flow direction.
25	Behind 1303 Queen Street West	75 m east	PCA 'Other' - Spill	Based on the ERIS report Toronto Hydro Energy Services Inc. reported a spill in 2010 for 9.09 L of non-PCB mineral oil from a pad-mounted transformer to the alleyway behind 1303 Queen Street West (Milky Way Drive). Environmental impact was confirmed.	No, based on the trans-gradient relation relative to groundwater flow direction.
26	1305 Queen Street West (historic address)	75 m east	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed 1933 and 1939 - 41 FIPs and municipal records the Site was occupied by a Chinese Laundry from at least 1914 to 1941.	No, based on the trans-gradient relation relative to groundwater flow direction.
27	1307 Queen Street West (historic address)	75 m east	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed 1933 and 1939 - 41 FIPs the Site was occupied by Cobbler Motors.	No, based on the trans-gradient relation relative to groundwater flow direction.
28	1309 Queen Street West (historic address)	75 m east	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed 1933 and 1939 - 41 FIPs and municipal records the Site was occupied by a Cleaning and Pressing facility.	No, based on the trans-gradient relation relative to groundwater flow direction.
29	1311 Queen Street West (historic address)	75 m east	PCA 'Other' – Coal Storage. PCA#6 – Battery Manufacturing, Recycling and Bulk Storage. PCA#47 – Rubber Manufacturing and Processing. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed 1933 and 1939 - 41 FIPs the Site was occupied by a building described as vulcanizing. In addition, based on the reviewed municipal records Bradon Coal occupied the Site in 1900, and Parkdale Tire and Battery Service in 1940.	No, based on the trans-gradient relation relative to groundwater flow direction.
30	207 Cowan Avenue	75 m east	PCA#54 – Textile Manufacturing and Processing. PCA#34 – Metal Fabrication. PCA#29 – Glass Manufacturing.	Based on the reviewed 1969 FIP and municipal directories, the property was occupied by Cushions etc. Manufacturing between 1955 to 1972. In addition, based on the ERIS report and municipal directories the property was occupied by Star Lite Aluminum Products Inc., a "Metal Window and Door Manufacturing, Finish Carpentry Contractors, Glass Product Manufacturing from Purchased Glass and Metal Window and Door Manufacturing" between 1978/79 to 2000.	No, based on the trans-gradient relation relative to groundwater flow direction.
31	1368 Queen Street West	80 m northeast	PCA"Other" – Coal Storage.	Based on the reviewed municipal records the property was occupied by Rogers Elias Coal Co from 1907 to 1919.	No, based on the trans-gradient relation relative to groundwater flow direction.
32	191 Cowan Avenue	85 m southeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report two (2) fuel oil tanks were permitted to be installed at the property in 1933.	No, based on the down-gradient relation relative to groundwater flow direction.
33	1366 Queen Street West	85 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal records the property was occupied by Lee Peter Laundry in 1907.	No, based on the trans-gradient relation relative to groundwater flow direction.
34	1360 Queen Street West	90 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal records the property was occupied by Parisian Laundry in 1900.	No, based on the trans-gradient relation relative to groundwater flow direction.
35a	1365 - 1367 Queen Street West	90 m west	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by Sunnyside Motor Sales Co in 1929, Homes Motors in 1940 and Renshaw Auto Repairs in 1940. In addition, based on the municipal records the property was occupied by Dales Furniture in 1950 to 1991.	No, based on the trans-gradient relation relative to groundwater flow direction.
35b	1367 - 1369 Queen Street West		PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 and 1939-41 FIPs the property was occupied by a Garage and Show Room with one (1) UST observed on Queen Street West, north adjacent to the property.	

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA

1337 Queen Street West, Toronto, Ontario

GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
36	1371 Queen Street West	90 m west	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by Consumers Gasoline Supply Co station No3 in 1919, Imperial Oil LTD from 1925 to 1934 and Holmes Motor Used Car Lot from 1940 to 1945. In addition, based on the municipal records the property was occupied by Stuart's Interiors Furniture in 1972 and Lansdowne Furniture in 1978/79.	No, based on the trans-gradient relation relative to groundwater flow direction.
37	1434 Queen Street West	105 m northwest	PCA#48 – Salt Manufacturing, Processing and Bulk Storage.	Based on the municipal records the property was occupied by Canadian Salt Co and Cweco Industries Ltd. in 1955.	No, based on the trans-gradient relation relative to groundwater flow direction.
38	1373 Queen Street West	105 m west	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 and 1939-41 FIPs the property was occupied by Imperial Oil Ltd. Gasol. Service Station with four (4) USTs. In addition, based on the 1969 FIP and municipal directories the property was occupied by an Auto Service Station with one (1) UST and car service facilities between 1955 to 1965.	No, based on the trans-gradient relation relative to groundwater flow direction.
39	1375 Queen Street West	110 m west	PCA"Other" – Spill of unknown quantity. PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks.	Based on the ERIS report and municipal directories the property has been occupied by service stations between 1940 and 2019. Esso Petroleum Canada reported a spill in 1992 for an unknown quantity of gasoline to the ground. Environmental impact was confirmed. In addition, based on the ERIS report, Southland Canada 2830 Attn: Maryann Grahovac was listed on the Private and Retail Fuel Storage Tanks database as "retail"; Esso Imperial Oil Ltd. was listed on the Waste Generators Summary database in 2003 and 2004; Imperial Oil was listed as a registered waste generator of light fuels from 2003 until/as of 2019; oil skimmings & sludges from 2007 until/as of 2019; waste oils & lubricants from 2010 until/as of 2019; 7-Eleven Canada Inc. – National Gas Dept. was listed as an expired fuel safety facility with expired fuel safety piping; 7-Eleven Canada Inc. – National Gas Dept. was listed as having three (3) expired liquid fuel tanks; and 7-Eleven Canada Inc. – National Gas Dept. was listed as having three (3) steel gasoline USTs, each with a 25,00 L capacity.	No, based on the trans-gradient relation relative to groundwater flow direction.
40	1356 Queen Street West	110m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal records the property was occupied by Clean-It-Eria between 1950 to 1955.	No, based on the trans-gradient relation relative to groundwater flow direction.
41	1354 Queen Street West	115 m northeast	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the reviewed municipal records the property was occupied by Meyer's Furniture from 1945 to 1950 and Melrose Furniture between 1955 to 1960.	No, based on the trans-gradient relation relative to groundwater flow direction.
42	4 West Lodge Avenue	120 m northwest	PCA#32 – Iron and Steel Manufacturing and Processing. PCA#33 – Metal Treatment, Coating, Plating and Finishing. PCA#34 – Metal Fabrication.	Based on the municipal records the property was occupied by Howard W D Blacksmith, Parkdale Machine Shop, Roofing Sheet Metal Co., Cweco Industries Ltd. Machinists, West End Auto Trim Upholsters, Elcome & Schneider Tinsmith and Schneider Carl Tinsmith between 1900 and 1978/79.	No, based on the trans-gradient relation relative to groundwater flow direction.
43	1438 Queen Street West	120 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#17 – Dye Manufacturing, Processing and Bulk Storage. PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by King Charles Laundry in 1907 and Blue Ribbon Cleaners & Dyers in 1929. In addition, based on the municipal records the property was occupied by furniture stores between 1929 and 1965.	No, based on the trans-gradient relation relative to groundwater flow direction.
44a	4-6 Brock Avenue	120 m northeast	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the municipal records the property was occupied by Gadowski Service Station in 1925 and McKerrow's Garage in 1929.	No, based on the trans-gradient relation relative to groundwater flow direction.
44b			PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by Melrose Furniture from 1965 to 1972.	

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA

1337 Queen Street West, Toronto, Ontario

GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
44c	6 Brock Avenue		PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 and 1939 - 41 FIPs the property was occupied by a Garage with one (1) UST along Brock Avenue.	
45	1293 Queen Street West	125 m east	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal records Lee Hem Laundry occupied the Site from 1907 to 1914 and Chinese Laundry from 1925 to 1929.	No, based on the trans-gradient relation relative to groundwater flow direction.
46	8 Brock Avenue	125 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1933, 1939 - 41 and 1969 FIPs and the municipal records the property was occupied by a Chinese Laundry from 1914 to 1966.	No, based on the trans-gradient relation relative to groundwater flow direction.
47	26 O'Hara Avenue	125 m north	PCA#55 – Transformer Manufacturing, Processing and Use	Based on the municipal records the property was occupied by Ferranti Meter & Transformers Mfg Co LTD in 1925.	Yes, based on the upgradient relation relative to groundwater flow direction.
48	1448 Queen Street West	140 m northwest	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Dry-Cleaningfacilities between 1907 and 1919.	No, based on the trans-gradient relation relative to groundwater flow direction.
49	1350 Queen Street West (currently 1346 Queen Street West and approximately 140 m northeast)	140 m northeast	PCA"Other" – Coal Storage.	Based on the reviewed municipal records the property was occupied by People's Coal Co. and Connell Anrthracite Mining Co., a coal producer in 1907.	No, based on the trans-gradient relation relative to groundwater flow direction.
50	1352 Queen Street West (currently 1346 Queen Street West and approximately 140 m northeast)	140 m northeast	PCA"Other" – Coal Storage.	Based on the reviewed municipal records the property was occupied by Elias Rogers Coal Co. in 1900 and Mann Coal Co in 1907.	No, based on the trans-gradient relation relative to groundwater flow direction.
51a	5 - 7 Brock Avenue	140 m northeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 and 1939 - 41 FIPs, ERIS report and municipal directories the property was occupied by various garages and had one (1) UST west of the property along Brock Avenue.	No, based on the trans-gradient relation relative to groundwater flow direction.
51b			PCA#54 – Textile Manufacturing and Processing. PCA#34 – Metal Fabrication. PCA"Other" – Coal Storage.	Based on the ERIS report Johnston Silvercraft Trading Inc., established in 1944, was listed as a "Jewellery and Watch Wholesaler-Distributers, All Other Wholesaler-Distributers, All Other Textile Product Mills, All Other Miscellaneous Fabricated Metal Product Manufacturing, and Jewellery and Silverware Manufacturing". In addition, based on the municipal directories the property was occupied by Canadian Silk Mfg Co from 1945 to 1955. Based on the municipal records the property was occupied by Connell Coal Co in 1914.	
52	1383 Queen Street West	145 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal records the property was occupied by a cleaners & dyers in 1925.	No, based on the trans-gradient relation relative to groundwater flow direction.
53	209 Jameson Avenue	145 m west	PCA 'Other' - PCB Storage	Based on the ERIS Report, Parkdale Collegiate was listed on the National PCB Inventory between 1991 and 1998, with stored askarel noted for disposal.	No, based on the trans-gradient relation relative to groundwater flow direction.
54	9 Brock Avenue	150 m northeast	PCA#39 - Paints Manufacturing, Processing, and Bulk Storage	Based on the 1920 FIP the property was occupied by a paint shop.	No, based on the trans-gradient relation relative to groundwater flow direction.
55	9 - 11 Brock Avenue	150 m northeast	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#32 – Iron and Steel Manufacturing and Processing.	Based on the 1933 FIP and the municipal directories the property was occupied by a Garage from 1929 to 1933. In addition, based on the municipal records the property was occupied by McQuillen Blacksmith in 1907 and Walker & Angeleri Blacksmiths in 1925.	No, based on the trans-gradient relation relative to groundwater flow direction. No, based on the trans-gradient relation relative to groundwater flow direction.

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA
1337 Queen Street West, Toronto, Ontario
GTR-21003722-C0

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
56	1281 Queen Street West	150 m east	PCA#33 – Metal Treatment, Coating, Plating and Finishing. PCA#31 – Ink Manufacturing, Processing and Bulk Storage.	Based on the reviewed 1969 FIP and municipal records the property was occupied by Aluminum Door Manufacturing, Star Aluminum between 1965 and 1972 and Star Industries in 1965. In addition, based on the municipal records the property was occupied by various manufacturing operations such as Thermos Bottle Co., Can Button 7 Buckle Mfrs., Duffle Electric Mfg. Co. and Novelty Paper Box between 1900 and 1925.	No, based on the trans-gradient relation relative to groundwater flow direction.
57	1381 Queen Street West	150 m west	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks.	Based on the EIRS Report, Imperial Oil Co Ltd. was listed on the Anderson's Storage Tanks database in 1929 for a building permit for a gasoline service station and three (3) gasoline storage tanks.	No, based on the trans-gradient relation relative to groundwater flow direction.
58	76 Elm Grove	155 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report McMillar Co was permitted to install one (1) gasoline tank in 1919.	No, based on the trans-gradient relation relative to groundwater flow direction.
59a	1277 Queen Street West	160 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 and 1939 - 41 FIPs the property was occupied by a Garage with a UST along Queen Street West between 1925 to 1941.	No, based on the trans-gradient relation relative to groundwater flow direction.
59b			PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#54 – Textile Manufacturing and Processing.	Based on the reviewed 1969 FIP the property was occupied by Gerrard Bedding Co. Ltd. Two (2) fuel oil tanks were identified on the southwest interior portion of the building.	
60	1279 Queen Street West	160 m east	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#54 – Textile Manufacturing and Processing.	Based on the municipal records the property was occupied by Allwell Garage in 1934 and Gerrard Bedding Co. LTD from 1960 to 1972.	No, based on the trans-gradient relation relative to groundwater flow direction.
61	213 Dunn Avenue	160 m south	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report Jackson was permitted to install one (2) fuel oil tank in 1926.	No, based on the down-gradient relation relative to groundwater flow direction.
62	1275 Queen Street West	160 m east	PCA#31 – Ink Manufacturing, Processing and Bulk Storage.	Based on the reviewed 1969 FIPs the property was occupied by a Printing facility.	No, based on the trans-gradient relation relative to groundwater flow direction.
63	13 Brock Avenue	165 m northeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1920 FIP the property was occupied by Brock Garage. One (1) UST was noted on the exterior portion of the Site building.	No, based on the trans-gradient relation relative to groundwater flow direction.
64a	13 - 17 Brock Avenue	165 m northeast	PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the municipal records the property was occupied by garages between 1925 and 1934.	No, based on the trans-gradient relation relative to groundwater flow direction.
64b	17 Brock Avenue		PCA#11 – Commercial Trucking and Container Terminals.	Based on the municipal records the property was occupied by Scobie Transport between 1950 to 1955.	
64c	13 - 19 Brock Avenue		PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the 1933 FIP the property was occupied by a Kelly's Garage with two (2) USTs located north and west of the property on Brock Avenue and Noble Street.	
65	171 Close Avenue	170 m southwest	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks	Based on the ERIS Report, T.H. Yeoman was permitted to install one (1) fuel oil tank in 1926.	No, based on the down-gradient relation relative to groundwater flow direction.
66	1273 Queen Street West	175 m east	PCA#54 – Textile Manufacturing and Processing PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the 1933 and 1939 - 41 FIPs the property was occupied by an Upholstering facility. In addition, based on the municipal records the property was occupied by Torcan Mfg Co. from 1945 to 1950; Dorval Hand Laundry from 1950 to 1960; and Tony's Furniture from 1972 to 2000.	No, based on the trans-gradient relation relative to groundwater flow direction.

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA

1337 Queen Street West, Toronto, Ontario

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PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
67	80 Elm Grove Avenue	175 m east	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by Torcan Mfg Co.	No, based on the trans-gradient relation relative to groundwater flow direction.
68	61 Melbourne Avenue	175 m southeast	PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	Based on the municipal records the property was occupied by Battery Source Inc. in 2000.	No, based on the down-gradient relation relative to groundwater flow direction.
69	1338 Queen Street West	180 m northeast	PCA#54 – Textile Manufacturing and Processing	Based on the municipal records the property was occupied by Baldwin Textiles in 2000.	No, based on the trans-gradient relation relative to groundwater flow direction.
70	8 Lansdowne Avenue	185 m northwest	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by several dry-cleaners (Regina Cleaners & Pressers, Tip Top Cleaners) between 1929 and 1965.	No, based on the trans-gradient relation relative to groundwater flow direction.
71	1334 Queen Street West	190 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Danforth Cleaners in 1955.	No, based on the trans-gradient relation relative to groundwater flow direction.
72	1395 Queen Street West	195 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Pearl Brite Dry-Cleaners and Clean-it-Eria between 1940 and 1986.	No, based on the trans-gradient relation relative to groundwater flow direction.
73	67 Elm Grove Avenue	195 m east	PCA#54 – Textile Manufacturing and Processing PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the review of the 1969 FIP the property was occupied by Upholstery & Fabrics and Woodworking. In addition, based on the municipal directories Allen's Upholstery occupied the property in 1960 and Quality Fabrics in 1965.	No, based on the trans-gradient relation relative to groundwater flow direction.
74	162 Cowan Avenue	195 m southeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report S. J. Carter was permitted to install one (1) fuel oil tank in 1926.	No, based on the down-gradient relation relative to groundwater flow direction.
75	75 Elm Grove Avenue	200 m east	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal directories, the property was occupied by Laundry in 1945 and by Louie Co Laundry in 1950. Based on the 1933, 1939 - 41 and 1969 FIPs and the municipal records the property was occupied by Chinese Laundry facilities from 1914 to 1969.	No, based on the trans-gradient relation relative to groundwater flow direction.
76	75 - 77 Elm Grove Avenue			Based on the municipal directories, the property was occupied by various laundry services from 1914 until 1965.	
77	59 Elm Grove Avenue	200 m southeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the 1969 FIP, one (1) UST was located on the north central portion of the property.	No, based on the down-gradient relation relative to groundwater flow direction.
78	1267 Queen Street West	210 m east	PCA#17 – Dye Manufacturing, Processing and Bulk Storage.	Based on the municipal records the property was occupied by Parker & Co Dyers in 1900.	No, based on the trans-gradient relation relative to groundwater flow direction.
79	1322 Queen Street West	210 m northeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#54 – Textile Manufacturing and Processing.	Based on the ERIS report Criterion Cafe Co. was listed on the Anderson's Storage Tanks database in 1924. In addition, based on the municipal records the property was occupied by Lockwood Textile Co. in 1940.	No, based on the trans-gradient relation relative to groundwater flow direction.
80	1407 Queen Street West	210 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the reviewed municipal directories the property was occupied by Harris Cleaners & Dyers between 1934 and 1945.	No, based on the trans-gradient relation relative to groundwater flow direction.
81	1409 Queen Street West	210 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1933 FIP the property was occupied by a cleaner & presser.	No, based on the trans-gradient relation relative to groundwater flow direction.
82	50 Noble Street	210 m northeast	PCA#54 – Textile Manufacturing and Processing.	Based on the ERIS report Rai Sportswear Ltd., established in 1978, was listed as a "Broadwoven Fabric Mills (Cotton, Manmade Fiber and Silk), Men's & Boys' Underwear and Nightwear, Men's And Boys' Clothing (N.E.C.) and Women's, Misses', and Juniors' Outerwear (N.E.C)".	No, based on the trans-gradient relation relative to groundwater flow direction.
83	50 - 52 Noble Street		PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products. PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the 1933 FIP the property was occupied by I.G. Pickering Limited Cabinet M.F.G. In addition, based on the ERIS report Builders Moulding Co. was permitted to install two (2) gasoline tanks in 1921.	
84	46 - 52 Noble Street		PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the municipal records the property was occupied by furniture manufacturing facilities and cabinet makers between 1934 to 1978/79.	
85	49 Noble Street	210 m northeast	PCA#28 -– Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report George Wilkins was permitted to install one (1) gasoline storage tank in 1930.	No, based on the trans-gradient relation relative to groundwater flow direction.
86	1324 Queen Street West	215 m northeast	PCA#17 – Dye Manufacturing, Processing and Bulk Storage.	Based on the municipal records the property was occupied by Parker's Dye Works from 1907 to 1925.	No, based on the trans-gradient relation relative to groundwater flow direction.

TABLE F1 - Potentially Contaminating Activities (PCAs)

Phase Two ESA

1337 Queen Street West, Toronto, Ontario

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PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Description and Approximate timeline that PCA occurred	Does it Contribute to an APEC?
87	196 Dunn Avenue	215 m southwest	PCA#28 -– Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS Report H.M East was permitted to install two (2) fuel oil tanks in 1928.	No, based on the down-gradient relation relative to groundwater flow direction.
88	1265 Queen Street West	220 m east	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Biksner Clnr & Presr in 1925.	No, based on the trans-gradient relation relative to groundwater flow direction.
89	1320 Queen Street West	220 m northeast	PCA#54 – Textile Manufacturing and Processing.	Based on the municipal records the property was occupied by Discount Drapery & Fabrics in 2000.	No, based on the trans-gradient relation relative to groundwater flow direction.
90	1263 Queen Street West	220 m east	PCA#17 – Dye Manufacturing, Processing and Bulk Storage. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by British Am Dyeing Co in 1900.	No, based on the trans-gradient relation relative to groundwater flow direction.
91	1431 Queen Street West	225 m west	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Dorval Hand Laundry between 1940 and 1950.	No, based on the trans-gradient relation relative to groundwater flow direction.
92	155 Cowan Avenue	225 m southeast	PCA#28 -– Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS Report W. A. Taylor was permitted to install one (1) fuel oil tank in 1926.	No, based on the down-gradient relation relative to groundwater flow direction.
93	1257 Queen Street West	230 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report M. Hilbert was listed on the Anderson's Storage Tanks database for having one (1) gas pump on the curb ordered to be removed in 1923.	No, based on the trans-gradient relation relative to groundwater flow direction.
94	1259 - 1261 Queen Street West	230 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.	Based on the 1933 FIP the property was occupied by a Plunkett's Garage with one (1) UST north of the property along Queen Street West. Based on the municipal records the property was occupied by multiple garages from 1914 to 1929. In addition, based on the 1939-41 FIP and municipal directories the property was occupied by a Furniture Store with one (1) UST north of the property along Queen Street West.	
95	1316 Queen Street West	230 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the municipal records the property was occupied by Parkdale Hat Cleaners in 1950.	No, based on the trans-gradient relation relative to groundwater flow direction.
96	1476 Queen Street West	230 m west	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS Report Loblaw Groceterias Ltd. was permitted to install two (2) fuel oil tanks in 1927.	No, based on the trans-gradient relation relative to groundwater flow direction.
97	1314 Queen Street West	235 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1939 - 41 and 1969 FIPs and municipal directories the property was occupied by Chinese Laundry and Cleaners.	No, based on the trans-gradient relation relative to groundwater flow direction.
98	61 Elm Grove Avenue	235 m east	PCA#34 – Metal Fabrication. PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing.	Based on the ERIS report May Marx Sculptor was listed as a "Copper Rolling, Drawing, Extruding and Alloying" company in the business directory. Cortex Designs Inc. was listed as a "Engineering Services, Industrial Design Services, Other Specialized Design Services, All Other Miscellaneous Manufacturing, All Other Plastic Product Manufacturing, and Engineering Services".	No, based on the trans-gradient relation relative to groundwater flow direction.
99	18 Lansdowne Avenue	240 m northwest	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS Report EJ Houghton was permitted to install two (2) fuel oil tanks in 1930.	No, based on the trans-gradient relation relative to groundwater flow direction.
100	1255 Queen Street West	245 m east	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#31 – Ink Manufacturing, Processing and Bulk Storage.	Based on the ERIS report Craig Norman A. was permitted to install one (1) fuel oil tank in 1925. In addition, based on the municipal records the property was occupied by Litera Printing Co between 1960 to 1965 and Leib Service Printing Ltd. between 1972 - 1985/86.	No, based on the trans-gradient relation relative to groundwater flow direction.
101	1312 Queen Street West	245 m northeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report Coney Island Lunch was listed on the Anderson's Storage Tanks database in 1924.	No, based on the trans-gradient relation relative to groundwater flow direction.
102	1310 Queen Street West	250 m northeast	PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used).	Based on the 1933 FIP and municipal directories the property was occupied by Chinese Laundry between 1907 to 1950.	No, based on the trans-gradient relation relative to groundwater flow direction.
103	35 Noble Street	250 m northeast	PCA#28 – Gasoline and Associated Products in Fixed Tanks.	Based on the ERIS report Broeckh Co. Ltd. was permitted to install one (1) gasoline tank in 1936.	No, based on the trans-gradient relation relative to groundwater flow direction.

Appendix C: Contaminant Inventory and Analytical Data Tables

TABLE 1: CONTAMINANT INVENTORY FOR FULL DEPTH SOIL
1337 Queen Street West, Toronto, ON
GTR-21003722-B0

Contaminant Identifier	Contaminant	Maximum Measured Concentration	Units	Reporting Detection Limit (RDL)	MECP Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential / Parkland / Institutional Land Use (Medium/Fine Textured Soil)	Potential for Exceedence of Applicable SCSs at nearest off-Site receptors?		Retained as a contaminant for RA?	
						Yes	No	Yes	No
PHCF1	PHC F1 (C6-C10)	10	ug/g	10	65		X		X
PHCF2	PHC F2 (C10-C16)	21	ug/g	10	150		X		X
PHCF3	PHC F3 (C16-C34)	250	ug/g	50	1300		X		X
PHCF4	PHC F4 (C34-C50)	3800	ug/g	50	5600		X		X
67641	Acetone	<2.0	ug/g	0.49	28		X		X
71432	Benzene	<0.024	ug/g	0.006	0.17		X		X
75274	Bromodichloromethane	<0.16	ug/g	0.040	13		X		X
75252	Bromoform	<0.16	ug/g	0.040	0.26		X		X
74839	Bromomethane	<0.16	ug/g	0.040	0.05		X		X
56235	Carbon Tetrachloride	<0.16	ug/g	0.040	0.12		X		X
108907	Chlorobenzene	<0.16	ug/g	0.040	2.7		X		X
67663	Chloroform	<0.16	ug/g	0.040	0.17		X		X
124481	Dibromochloromethane	<0.16	ug/g	0.040	9.4		X		X
95501	1,2-Dichlorobenzene	<0.16	ug/g	0.040	4.3		X		X
541731	1,3-Dichlorobenzene	<0.16	ug/g	0.040	6		X		X
106467	1,4-Dichlorobenzene	<0.16	ug/g	0.040	0.097		X		X
75718	Dichlorodifluoromethane	<0.16	ug/g	0.040	25		X		X
75343	1,1-Dichloroethane	<0.16	ug/g	0.040	11		X		X
107062	1,2-Dichloroethane	<0.20	ug/g	0.049	0.05		X		X
75354	1,1-Dichloroethylene	<0.16	ug/g	0.040	0.05		X		X
156592	cis-1,2-Dichloroethylene	<0.16	ug/g	0.040	30		X		X
156605	trans-1,2-Dichloroethylene	<0.16	ug/g	0.040	0.75		X		X
78875	1,2-Dichloropropane	<0.16	ug/g	0.040	0.085		X		X
542756	1,3-Dichloropropene	<0.20	ug/g	0.050	0.083		X		X
100414	Ethylbenzene	<0.04	ug/g	0.020	15		X		X
106934	Ethylene Dibromide (1,2-Dibromoethane)	<0.16	ug/g	0.040	0.05		X		X
11053	Hexane (n)	<0.16	ug/g	0.040	34		X		X
75092	Methylene chloride (Dichloromethane)	<0.20	ug/g	0.040	0.96		X		X
78933	Methyl ethyl ketone (2-Butanone)	<1.6	ug/g	0.40	44		X		X
108101	Methyl Isobutyl Ketone	<1.6	ug/g	0.049	4.3		X		X
1634044	Methyl t-butyl ether (MTBE)	<0.40	ug/g	0.40	1.4		X		X
100425	Styrene	<0.16	ug/g	0.040	2.2		X		X
630206	1,1,1,2-Tetrachloroethane	<0.16	ug/g	0.040	0.05		X		X
79345	1,1,2,2-Tetrachloroethane	<0.16	ug/g	0.040	0.05		X		X
127184	Tetrachloroethylene	17	ug/g	0.040	2.3		X	X	
108883	Toluene	<0.08	ug/g	0.020	6		X		X
71556	1,1,1-Trichloroethane	<0.16	ug/g	0.040	3.4		X		X
79005	1,1,2-Trichloroethane	<0.16	ug/g	0.040	0.05		X		X
79016	Trichloroethylene	0.25	ug/g	0.010	0.52		X		X
75694	Trichlorofluoromethane	<0.16	ug/g	0.040	5.8		X		X
75014	Vinyl Chloride	<0.076	ug/g	0.019	0.022		X		X
1330207	Xylenes (total)	<0.08	ug/g	0.020	25		X		X
83329	Acenaphthene	44.2	ug/g	0.0050	58		X		X
208968	Acenaphthylene	0.301	ug/g	0.0050	0.17		X	X	
120127	Anthracene	82	ug/g	0.0050	0.74		X	X	
56553	Benzo(a)anthracene	74.1	ug/g	0.0050	0.63		X	X	
50328	Benzo(a)pyrene	71.9	ug/g	0.0050	0.3		X	X	
205992	Benzo(b)fluoranthene	72.3	ug/g	0.0050	0.78		X	X	
191242	Benzo(ghi)perylene	37.3	ug/g	0.0050	7.8		X	X	
207089	Benzo(k)fluoranthene	27.8	ug/g	0.0050	0.78		X	X	
218019	Chrysene	66.2	ug/g	0.0050	7.8		X	X	
53703	Dibenz(a,h)anthracene	9.1	ug/g	0.0050	0.1		X	X	
206440	Fluoranthene	183	ug/g	0.0050	0.69		X	X	
86737	Fluorene	43.2	ug/g	0.0050	69		X		X
193395	Indeno(1,2,3-cd)pyrene	38.1	ug/g	0.0050	0.48		X	X	
91576	1&2-Methylnaphthalene	18.81	ug/g	0.0071	3.4		X	X	
91203	Naphthalene	32	ug/g	0.0050	0.75		X	X	
85018	Phenanthrene	241	ug/g	0.0050	7.8		X	X	
129000	Pyrene	153	ug/g	0.0050	78		X	X	
7440360	Antimony	3.2	ug/g	0.2	7.5		X		X
7440382	Arsenic	4.5	ug/g	1.0	18		X		X
7440393	Barium	92.7	ug/g	0.5	390		X		X
7440417	Beryllium	<0.5	ug/g	0.2	5		X		X
7440428	Boron (Total)	5.6	ug/g	5.0	120		X		X
7440428HWS	Boron (Hot water soluble)	1.09	ug/g	0.05	1.5		X		X
7440439	Cadmium	<0.5	ug/g	0.1	1.2		X		X
16065831	Chromium (total)	21.5	ug/g	0.1	160		X		X
18540299	Chromium VI	<0.18	ug/g	0.18	10		X		X
7440484	Cobalt	9	ug/g	0.1	22		X		X
7440508	Copper	44	ug/g	0.5	180		X		X
7439921	Lead	430	ug/g	1	120		X	X	
7439976	Mercury	0.11	ug/g	0.05	1.8		X		X
7439987	Molybdenum	<1	ug/g	0.5	6.9		X		X
7440020	Nickel	17	ug/g	0.5	130		X		X
7782492	Selenium	<1	ug/g	0.50	2.4		X		X
7440224	Silver	0.21	ug/g	0.2	25		X		X
7440280	Thallium	<0.5	ug/g	0.05	1		X		X
7440611	Uranium	<1	ug/g	0.05	23		X		X
7440622	Vanadium	29	ug/g	5	86		X		X
7440666	Zinc	140	ug/g	5	340		X		X
EC	Electrical Conductivity (mS/cm)	5.5	mS/cm	0.002	0.7		X		X
SAR	Sodium Adsorption Ratio (unitless)	72.7	unitless	-	5		X		X
57125	Free Cyanide	<0.05	ug/g	0.01	0.051		X		X
NV	pH (pH units)	7.41 - 8.12	pH units	NA	5-9 (surface soil); 5-11 (subsurface soil)		X		X

Parameter within current applicable MECP Standards.
Parameter to be retained as a COC in the RA.
Non-detect but detection limit exceeds the applicable MECP (2011) SCS. However, this parameter is not considered a COC at the Site. Refer to Phase Two CSM in Appendix A for further details.
Concentration exceeds MECP (2011) SCS, however, not considered a COC due to the most recent amendments to the regulation (O. Reg. 407/19 - December 4, 2019)
(salt exemption from application of road salt for the purpose of de-icing). See Phase Two CSM for a rationale.

TABLE 2: CONTAMINANT INVENTORY FOR GROUNDWATER
1337 Queen Street West, Toronto, ON
GTR-21003722-B0

Contaminant Identifier	Contaminant	Maximum Measured Concentration	Units	Reported Detection Limit	MECP Table 3 SCS All Property Uses and Medium/Fine Textured Soil	MECP Table 7 SCS All Property Uses and Medium/Fine Textured Soil	Potential for Exceedence of Applicable SCSs at nearest off-Site receptors?		Retained as a contaminant for RA?	
							Yes	No	Yes	No
PHCF1	PHC F1 (C6-C10)	470	ug/L	25	750	420		X	X	X
PHCF2	PHC F2 (C10-C16)	110	ug/L	100	150	150		X		X
PHCF3	PHC F3 (C16-C34)	280	ug/L	200	500	500		X		X
PHCF4	PHC F4 (C34-C50)	<250	ug/L	200	500	500		X		X
67641	Acetone	3700	ug/L	10	130000	100000		X		X
71432	Benzene	<0.50	ug/L	0.17	430	0.5		X		X
75274	Bromodichloromethane	<2.0	ug/L	0.50	85000	67000		X		X
75252	Bromoform	<5.0	ug/L	1.0	770	5		X		X
74839	Bromomethane	<0.50	ug/L	0.50	56	0.89		X		X
56235	Carbon Tetrachloride	<0.20	ug/L	0.19	8.4	0.2		X		X
108907	Chlorobenzene	<0.50	ug/L	0.20	630	140		X		X
67663	Chloroform	<1.0	ug/L	0.20	22	2		X		X
124481	Dibromochloromethane	<2.0	ug/L	0.50	82000	65000		X		X
95501	1,2-Dichlorobenzene	<0.50	ug/L	0.40	9600	150		X		X
541731	1,3-Dichlorobenzene	<0.50	ug/L	0.40	9600	7600		X		X
106467	1,4-Dichlorobenzene	<0.50	ug/L	0.40	67	0.5		X		X
75718	Dichlorodifluoromethane	<2.0	ug/L	1	4400	3500		X		X
75343	1,1-Dichloroethane	1.4	ug/L	0.2	3100	11		X		X
107062	1,2-Dichloroethane	<0.50	ug/L	0.49	12	0.5		X		X
75354	1,1-Dichloroethylene	<0.50	ug/L	0.2	17	0.5		X		X
156592	cis-1,2-Dichloroethylene	150	ug/L	0.5	17	1.6	X		X	
156605	trans-1,2-Dichloroethylene	54.8	ug/L	0.5	17	1.6	X		X	
78875	1,2-Dichloropropane	<0.50	ug/L	0.2	140	0.58		X		X
542756	1,3-Dichloropropene	<0.50	ug/L	0.50	45	0.5		X		X
100414	Ethylbenzene	<0.50	ug/L	0.20	2300	54		X		X
106934	Ethylene Dibromide (1,2-Dibromoethane)	<0.20	ug/L	0.19	0.83	0.2		X		X
11053	Hexane (n)	<1.0	ug/L	1	520	5		X		X
75092	Methylene chloride (Dichloromethane)	<5.0	ug/L	2.0	5500	26		X		X
78933	Methyl ethyl ketone (2-Butanone)	660	ug/L	10	1500000	21000		X		X
108101	Methyl Isobutyl Ketone	<20	ug/L	5.0	580000	5200		X		X
1634044	Methyl t-butyl ether (MTBE)	<5.0	ug/L	0.50	1400	15		X		X
100425	Styrene	<0.50	ug/L	0.4	9100	43		X		X
630206	1,1,1,2-Tetrachloroethane	<0.50	ug/L	0.5	28	1.1		X		X
79345	1,1,2,2-Tetrachloroethane	<0.50	ug/L	0.4	15	0.5		X		X
127184	Tetrachloroethylene	4100	ug/L	0.2	17	0.5	X		X	
108883	Toluene	0.71	ug/L	0.2	18000	320		X		X
71556	1,1,1-Trichloroethane	0.52	ug/L	0.2	6700	23		X		X
79005	1,1,2-Trichloroethane	<0.50	ug/L	0.4	30	0.5		X		X
79016	Trichloroethylene	270	ug/L	0.20	17	0.5	X		X	
75694	Trichlorofluoromethane	<5.0	ug/L	0.50	2500	2000		X		X
75014	Vinyl Chloride	5.4 (555.5*)	ug/L	0.20	1.7	0.5	X		X	
1330207	Xylenes (total)	1.4	ug/L	0.20	4200	72		X		X
83329	Acenaphthene	1.54	ug/L	0.05	1700	17		X		X
208968	Acenaphthylene	<0.050	ug/L	0.050	1.8	1		X		X
120127	Anthracene	0.632	ug/L	0.05	2.4	1		X		X
56553	Benzo(a)anthracene	0.224	ug/L	0.050	4.7	-		X		X
50328	Benzo(a)pyrene	0.172	ug/L	0.009	0.81	-		X		X
205992	Benzo(b)fluoranthene	0.177	ug/L	0.05	0.75	-		X		X
191242	Benzo(ghi)perylene	0.094	ug/L	0.05	0.2	-		X		X
207089	Benzo(k)fluoranthene	0.08	ug/L	0.05	0.4	-		X		X
218019	Chrysene	0.195	ug/L	0.05	1	-		X		X
53703	Dibenz(a,h)anthracene	<0.050	ug/L	0.05	0.52	-		X		X
206440	Fluoranthene	0.835	ug/L	0.05	130	-		X		X
86737	Fluorene	1.04	ug/L	0.05	400	290		X		X
193395	Indeno(1,2,3-cd)pyrene	0.104	ug/L	0.05	0.2	-		X		X
91576	1&2-Methylnaphthalene	1.225	ug/L	0.071	1800	1500		X		X
91203	Naphthalene	4.7	ug/L	0.05	6400	7		X		X
85018	Phenanthrene	2.64	ug/L	0.03	580	380		X		X
129000	Pyrene	0.666	ug/L	0.05	68	-		X		X
7440360	Antimony	1.8	ug/L	0.50	20000	-		X		X
7440382	Arsenic	2.8	ug/L	1.0	1900	-		X		X
7440393	Barium	310	ug/L	2.0	29000	-		X		X
7440417	Beryllium	<0.40	ug/L	0.40	67	-		X		X
7440428	Boron (Total)	190	ug/L	10	45000	-		X		X
7440439	Cadmium	0.16	ug/L	0.09	2.7	-		X		X
16065831	Chromium (total)	<5.0	ug/L	5	810	-		X		X
18540299	Chromium VI	<0.50	ug/L	0.50	140	-		X		X
7440484	Cobalt	5.6	ug/L	0.50	66	-		X		X
7440508	Copper	3.5	ug/L	0.90	87	-		X		X
7439921	Lead	<0.50	ug/L	0.50	25	-		X		X
7439976	Mercury	<0.10	ug/L	0.10	2.8	0.1		X		X
7439987	Molybdenum	25	ug/L	0.50	9200	-		X		X
7440020	Nickel	32	ug/L	1.0	490	-		X		X
7782492	Selenium	<2.0	ug/L	2.0	63	-		X		X
7440224	Silver	<0.090	ug/L	0.09	1.5	-		X		X
7440280	Thallium	<0.050	ug/L	0.05	510	-		X		X
7440611	Uranium	8.3	ug/L	0.1	420	-		X		X
7440622	Vanadium	1	ug/L	0.5	250	-		X		X
7440666	Zinc	34	ug/L	5	1100	-		X		X
7440235	Sodium	980,000	ug/L	100	2300000	-		X		X
1336363	Total Polychlorinated Biphenyls	<0.05	ug/L	0.05	15	-		X		X

Parameter within current applicable MECP Standards.
Parameter exceeds Table 3 and 7 SCS and will be retained as a COC in the RA.
Parameter exceeds only Table 7 SCS and will be retained for risk evaluation in the RA.
* Concentration in brackets is the theoretical maximum concentration of vinyl chloride (maximum concentration + 10% of parent compounds [PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE]) + 20% for variability.
Concentration exceeds MECP (2011) SCS, however, not considered a COC due to the most recent amendments to the regulation (O. Reg. 407/19 - December 4, 2019)
(salt exemption from application of road salt for the purpose of de-icing). See Phase Two CSM for a rationale.

SOIL ANALYTICAL RESULTS:

Table 3 - Petroleum Hydrocarbons (PHCs) including Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	**Borehole 1**		**Borehole 2**		**BH/MW1-D**		**BH/MW2-D**		
Sample ID				**1 0-5**	**1 13-15**	**2 0-5**	**2 20-25**	**BH1 SS1**	**BH1 SS7**	**BH2 SS1**	**BH2 SS7**	**BH2 SS7 DUP**
Lab ID				L2704961-1	L2704961-2	L2704961-3	L2704961-4	UBT888	UBT889	UBT890	UBT891	UBT896
Sampling Date				May 09, 2022	May 09, 2022	May 09, 2022	May 09, 2022	Oct 18, 2022	Oct 18, 2022	Oct 19, 2022	Oct 19, 2022	Oct 19, 2022
Sampling Depth (m)				0 - 1.52	3.96 - 4.57	0 - 1.52	6.10 - 7.62	0 - 0.61	6.10 - 6.71	0 - 0.61	6.10 - 6.71	Field Duplicate of BH2 SS7
Consultant				TEC	TEC	TEC	TEC	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				L2704961	L2704961	L2704961	L2704961	C2U8186	C2U8186	C2U8186	C2U8186	C2U8186
Petroleum Hydrocarbons												
F1 (C6-C10)	65	ug/g	5	<5.0	<5.0	<5.0	<5.0	<10	<10	10	<10	<10
F1 (C6-C10) - BTEX	65	ug/g	5	<5.0	<5.0	<5.0	<5.0	<10	<10	10	<10	<10
F2 (C10-C16)	150	ug/g	10	<10	<10	<10	<10	<10	<10	<10	12	<10
F3 (C16-C34)	1300	ug/g	50	69	51	<50	<50	250	<50	<50	<50	<50
F4 (C34-C50)	5600	ug/g	50	<50	51	<50	<50	510	<50	<50	<50	<50
Reached Baseline at C50	NV	ug/g	-	Yes	Yes	Yes	Yes	NO	YES	YES	YES	YES
F4G (Gravimetric)	5600	ug/g	100	-	-	-	-	3800	-	-	-	-
BTEX												
Benzene	0.17	ug/g	0.006	<0.0068	<0.0068	<0.0068	<0.0068	<0.020	<0.0060	<0.020	<0.0060	<0.020
Toluene	6	ug/g	0.020	<0.080	<0.080	<0.080	<0.080	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	15	ug/g	0.010	0.019	<0.018	<0.018	<0.018	<0.020	<0.010	<0.020	<0.010	<0.020
m+p-Xylene	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040
o-Xylene	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	25	ug/g	0.020	<0.050	<0.050	<0.050	<0.050	<0.040	<0.020	<0.040	<0.020	<0.040

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 3 - Petroleum Hydrocarbons (PHCs) including Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	BH/MW3-D		BH111	BH 113		BH 114		
Sample ID				**BH3 SS1**	**BH3 SS7**	**BH111 SS9**	**BH113 SS1**	**BH113 SS10**	**BH114 SS1**	**BH114 SS9**	**BH114 SS12**
Lab ID				UBT893	UBT894	YJY633	YKF629	YKF639	YKF649	YKF650	YKF651
Sampling Date				Oct 20, 2022	Oct 20, 2022	Feb 13, 2024	Feb 13, 2024	Feb 13, 2024	Feb 14, 2024	Feb 14, 2024	Feb 14, 2024
Sampling Depth (m)				0 - 0.61	6.10 - 6.71	6.10 - 6.71	0 - 0.61	6.10 - 6.71	0 - 0.61	6.10 - 6.71	8.38 - 8.99
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV
Certificate of Analysis Number				C2U8186	C2U8186	C447629	C449019	C449019	C449019	C449019	C449019
Petroleum Hydrocarbons											
F1 (C6-C10)	65	ug/g	5	<10	<10	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	65	ug/g	5	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16)	150	ug/g	10	<10	<10	<10	<10	<10	<10	21	<10
F3 (C16-C34)	1300	ug/g	50	<50	<50	<50	<90	<50	<50	<50	<50
F4 (C34-C50)	5600	ug/g	50	91	<50	<50	<50	<50	<50	<50	<50
Reached Baseline at C50	NV	ug/g	-	YES	YES	YES	YES	YES	YES	YES	YES
F4G (Gravimetric)	5600	ug/g	100	-	-	-	-	-	-	-	-
BTEX											
Benzene	0.17	ug/g	0.006	<0.020	<0.0060	<0.0060	<0.020	<0.020	<0.020	<0.020	<0.020
Toluene	6	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	15	ug/g	0.010	<0.020	<0.010	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020
m+p-Xylene	NV	ug/g	0.020	<0.040	<0.020	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040
o-Xylene	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	25	ug/g	0.020	<0.040	<0.020	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 4 - Volatile Organic Compounds (VOCs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**BH 1**		**BH 2**		**BH/MW1-D**	**BH/MW2-D**		**BH/MW3-D**		**BH103**		
Sample ID				**1 0-5**	**1 13-15**	**2 0-5**	**2 20-25**	**BH1 SS7**	**BH2 SS7**	**BH2 SS8**	**BH3 SS7**	**BH3 SS8**	**BH103 SS1**	**BH103 SS1-0**	**BH103 SS2**
Lab ID				L2704961-1	L2704961-2	L2704961-3	L2704961-4	UBT889	UBT891	UBT892	UBT894	UBT895	YLK240	YLK241	YLK242
Sampling Date				May 09, 2022	May 09, 2022	May 09, 2022	May 09, 2022	Oct 18, 2022	Oct 19, 2022	Oct 19, 2022	Oct 20, 2022	Oct 20, 2022	Feb 21, 2024	Feb 21, 2024	Feb 21, 2024
Sampling Depth (m)				0 - 1.52	3.96 - 4.57	0 - 1.52	6.10 - 7.62	6.10 - 6.71	6.10 - 6.71	7.62 - 8.23	6.10 - 6.71	7.62 - 8.23	7.62 - 8.23	Field Duplicate of BH103 SS1	8.38 - 8.99
Consultant				TEC	TEC	TEC	TEC	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				L2704961	L2704961	L2704961	L2704961	C2U8186	C2U8186	C2U8186	C2U8186	C2U8186	C454454	C454454	C454454
Volatile Organic Compounds															
Benzene	0.17	ug/g	0.006	<0.0068	<0.0068	<0.0068	<0.0068	<0.0060	<0.0060	<0.0060	<0.0060	<0.024	<0.0060	<0.0060	<0.0060
Toluene	6	ug/g	0.02	<0.080	<0.080	<0.080	<0.080	<0.020	<0.020	<0.020	<0.020	<0.080	<0.020	<0.020	<0.020
Ethylbenzene	15	ug/g	0.01	0.019	<0.018	<0.018	<0.018	<0.010	<0.010	<0.010	<0.010	<0.040	<0.010	<0.010	<0.010
m+p-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.080	<0.020	<0.020	<0.020
o-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.080	<0.020	<0.020	<0.020
Xylenes, Total	25	ug/g	0.02	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.080	<0.020	<0.020	<0.020
Acetone	28	ug/g	0.49	<0.50	<0.50	<0.50	<0.50	<0.49	<0.49	<0.49	<0.49	<2.0	<0.49	<0.49	<0.49
Bromodichloromethane	13	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Bromoform	0.26	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Bromomethane	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Carbon Tetrachloride	0.12	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Chlorobenzene	2.7	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Chloroform	0.17	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Dibromochloromethane	9.4	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,2-Dichlorobenzene	4.3	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,3-Dichlorobenzene	6	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,4-Dichlorobenzene	0.097	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Dichlorodifluoromethane	25	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,1-Dichloroethane	11	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,2-Dichloroethane	0.05	ug/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.049	<0.049	<0.049	<0.049	<0.20	<0.049	<0.049	<0.049
1,1-Dichloroethylene	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
cis-1,2-Dichloroethylene	30	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
trans-1,2-Dichloroethylene	0.75	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,2-Dichloropropane	0.085	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
cis-1,3-Dichloropropene	0.083	ug/g	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.12	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	0.083	ug/g	0.04	<0.030	<0.030	<0.030	<0.030	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,3-Dichloropropene (cis+trans)	0.083	ug/g	0.05	<0.042	<0.042	<0.042	<0.042	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050
Ethylene Dibromide	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Hexane (n-Hexane)	34	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Methyl Ethyl Ketone (MEK)	44	ug/g	0.40	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.40	<0.40	<1.6	<0.40	<0.40	<0.40
Methyl Isobutyl Ketone (MIBK)	4.3	ug/g	0.40	<0.50	<0.50	<0.50	<0.50	<0.40	<0.40	<0.40	<0.40	<1.6	<0.049	<0.049	<0.049
Methyl tert-butyl ether (MTBE)	1.4	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.40	<0.40	<0.40
Methylene Chloride (Dichloromethane)	0.96	ug/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.049	<0.049	<0.049	<0.049	<0.20	<0.040	<0.040	<0.040
Styrene	2.2	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,1,1,2-Tetrachloroethane	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,1,2,2-Tetrachloroethane	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Tetrachloroethylene	2.3	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	0.35	0.42	0.45	<0.040	**7.9**	0.41	0.38	0.16
1,1,1-Trichloroethane	3.4	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
1,1,2-Trichloroethane	0.05	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Trichloroethylene	0.52	ug/g	0.01	<0.010	<0.010	<0.010	0.107	<0.010	0.026	<0.010	<0.010	0.054	<0.010	<0.010	<0.010
Trichlorofluoromethane	5.8	ug/g	0.04	<0.050	<0.050	<0.050	<0.050	<0.040	<0.040	<0.040	<0.040	<0.16	<0.040	<0.040	<0.040
Vinyl Chloride	0.022	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.019	<0.019	<0.019	<0.019	<0.076	<0.019	<0.019	<0.019

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold	Concentration exceeds MECP (2011) SCS.
	Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 4 - Volatile Organic Compounds (VOCs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)	Units	RDL	BH104	BH105	BH105A		BH106		BH107	BH109		BH110			BH111	
Sample ID				**BH104 SS9**	**BH105 SS9**	**BH105A SS6A**	**BH105A SS0**	**BH106 SS11**	**BH106 SS12**	**BH107 SS9**	**BH109 SS11**	**BH109 SS12**	**BH110 SS11**	**BH10 SS11-0**	**BH10 SS12**	**BH111 SS11**	**BH111 SS12**
Lab ID				YLK237	YLK235	AKUU70	AKUU72	YJJ200	YJJ201	YJY632	YLK246	YLK247	YLK243	YLK244	YLK245	YJY634	YJY635
Sampling Date				Feb 20, 2024	Feb 20, 2024	Dec 03, 2024	Dec 03, 2024	Feb 12, 2024	Feb 12, 2024	Feb 13, 2024	Feb 22, 2024	Feb 22, 2024	Feb 22, 2024	Feb 22, 2024	Feb 22, 2024	Feb 13, 2024	Feb 13, 2024
Sampling Depth (m)				6.10 - 6.71	6.10 - 6.71	7.62 - 8.53	Field Duplicate of BH105A SS 6A	7.62 - 8.23	8.38 - 8.99	6.10 - 6.71	7.62 - 8.23	8.38 - 8.99	7.62 - 8.23	Field Duplicate of BH110 SS11	8.38 - 8.99	7.62 - 8.23	8.38 - 8.99
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV	BV	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C454454	C454454	C4AW072	C4AW072	C444699	C444699	C447629	C454454	C454454	C454454	C454454	C454454	C447629	C447629
Volatile Organic Compounds																	
Benzene	0.17	ug/g	0.006	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	6	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	15	ug/g	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
m+p-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	25	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Acetone	28	ug/g	0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
Bromodichloromethane	13	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromoform	0.26	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromomethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Carbon Tetrachloride	0.12	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chlorobenzene	2.7	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chloroform	0.17	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Dibromochloromethane	9.4	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichlorobenzene	4.3	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichlorobenzene	6	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,4-Dichlorobenzene	0.097	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Dichlorodifluoromethane	25	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1-Dichloroethane	11	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloroethane	0.05	ug/g	0.05	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
1,1-Dichloroethylene	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
cis-1,2-Dichloroethylene	30	ug/g	0.04	<0.040	0.11	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
trans-1,2-Dichloroethylene	0.75	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloropropane	0.085	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
cis-1,3-Dichloropropene	0.083	ug/g	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	0.083	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichloropropene (cis+trans)	0.083	ug/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylene Dibromide	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Hexane (n-Hexane)	34	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Methyl Ethyl Ketone (MEK)	44	ug/g	0.40	<0.40	<0.40	<0.040	<0.040	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl Isobutyl Ketone (MIBK)	4.3	ug/g	0.40	<0.049	<0.049	<0.40	<0.40	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Methyl tert-butyl ether (MTBE)	1.4	ug/g	0.04	<0.40	<0.40	<0.049	<0.049	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methylene Chloride (Dichloromethane)	0.96	ug/g	0.05	<0.040	<0.040	<0.40	<0.40	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Styrene	2.2	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,1,2-Tetrachloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2,2-Tetrachloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Tetrachloroethylene	2.3	ug/g	0.04	1.2	**17**	**2.4**	2	1.3	1.5	<0.040	<0.040	<0.040	0.37	0.33	0.16	0.083	0.082
1,1,1-Trichloroethane	3.4	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2-Trichloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Trichloroethylene	0.52	ug/g	0.01	0.03	0.25	0.011	<0.010	<0.010	<0.010	0.018	<0.010	<0.010	0.049	0.022	<0.010	<0.010	<0.010
Trichlorofluoromethane	5.8	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Vinyl Chloride	0.022	ug/g	0.02	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 4 - Volatile Organic Compounds (VOCs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	**BH112**				**BH113**	**BH114**		**BH115**		
Sample ID				**BH112 SS9**	**BH112 SS11**	**BH112 SS111**	**BH112 SS12**	**BH113 SS10**	**BH114 SS9**	**BH114 SS12**	**BH115 SS9**	**BH115 SS10**	**BH115 SS11**
Lab ID				YJJ202	YJJ193	YJJ194	YJJ195	YKF639	YKF650	YKF651	YJJ199	YJJ198	YJJ196
Sampling Date				Feb 12, 2024	Feb 12, 2024	Feb 12, 2024	Feb 12, 2024	Feb 13, 2024	Feb 14, 2024	Feb 14, 2024	Feb 12, 2024	Feb 12, 2024	Feb 12, 2024
Sampling Depth (m)				6.10 - 6.71	7.62 - 8.23	Field Duplicate of BH112 SS11	8.38 - 8.99	5.49 - 6.10	6.10 - 6.71	8.38 - 8.99	6.10 - 6.71	6.86 - 7.47	7.62 - 8.23
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C444699	C444699	C444699	C444699	C449019	C449019	C449019	C444699	C444699	C444699
Volatile Organic Compounds													
Benzene	0.17	ug/g	0.006	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	6	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	15	ug/g	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	<0.010	<0.010	<0.010	<0.010
m+p-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	NV	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	25	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Acetone	28	ug/g	0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
Bromodichloromethane	13	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromoform	0.26	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Bromomethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Carbon Tetrachloride	0.12	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chlorobenzene	2.7	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Chloroform	0.17	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Dibromochloromethane	9.4	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichlorobenzene	4.3	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichlorobenzene	6	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,4-Dichlorobenzene	0.097	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Dichlorodifluoromethane	25	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1-Dichloroethane	11	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloroethane	0.05	ug/g	0.05	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
1,1-Dichloroethylene	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
cis-1,2-Dichloroethylene	30	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
trans-1,2-Dichloroethylene	0.75	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,2-Dichloropropane	0.085	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
cis-1,3-Dichloropropene	0.083	ug/g	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	0.083	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,3-Dichloropropene (cis+trans)	0.083	ug/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylene Dibromide	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Hexane (n-Hexane)	34	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Methyl Ethyl Ketone (MEK)	44	ug/g	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl Isobutyl Ketone (MIBK)	4.3	ug/g	0.40	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Methyl tert-butyl ether (MTBE)	1.4	ug/g	0.04	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methylene Chloride (Dichloromethane)	0.96	ug/g	0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Styrene	2.2	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,1,2-Tetrachloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2,2-Tetrachloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Tetrachloroethylene	2.3	ug/g	0.04	<0.040	0.17	0.19	0.042	<0.040	<0.040	<0.040	0.07	1.4	1.1
1,1,1-Trichloroethane	3.4	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1,1,2-Trichloroethane	0.05	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Trichloroethylene	0.52	ug/g	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.04	0.01	<0.010
Trichlorofluoromethane	5.8	ug/g	0.04	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Vinyl Chloride	0.022	ug/g	0.02	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019

All soil concentrations reported in µg/g.
'<' = Parameter below detection limit, as indicated
'NV'= No value
Bold Concentration exceeds MECP (2011) SCS.
Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 5 - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**BH1**	**BH2**	**BH/MW1-D**	**BH/MW2-D**	**BH/MW3-D**	**BH102**	
Sample ID				**1 0-5**	**2 0-5**	**BH1 SS1**	**BH2 SS1**	**BH3 SS1**	**BH102 SS2**	**BH102 SS3**
Lab ID				L2704961-1	L2704961-3	UBT888	UBT890	UBT893	YKQ037	YKQ038
Sampling Date				May 09, 2022	May 09, 2022	Oct 18, 2022	Oct 19, 2022	Oct 20, 2022	Feb 15, 2024	Feb 15, 2024
Sampling Depth (m)				0 - 1.52	0 - 1.52	0 - 0.61	0 - 0.61	0 - 0.61	0.76 - 1.37	1.52 - 2.13
Consultant				TEC	TEC	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				L2704961	L2704961	C2U8186	C2U8186	C2U8186	C450721	C450721
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene	58	ug/g	0.0050	44.2	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.17	ug/g	0.0050	**0.301**	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.74	ug/g	0.0050	**82**	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.63	ug/g	0.0050	**74.1**	<0.050	0.14	0.011	0.024	<0.0050	<0.0050
Benzo(a)pyrene	0.3	ug/g	0.0050	**71.9**	<0.050	0.15	0.011	0.024	<0.0050	<0.0050
Benzo(b/j)fluoranthene	0.78	ug/g	0.0050	**72.3**	<0.050	0.18	0.018	0.035	<0.0050	<0.0050
Benzo(g,h,i)perylene	7.8	ug/g	0.0050	**37.3**	<0.050	0.11	0.011	0.024	<0.0050	<0.0050
Benzo(k)fluoranthene	0.78	ug/g	0.0050	**27.8**	<0.050	0.066	0.0056	0.012	<0.0050	<0.0050
Chrysene	7.8	ug/g	0.0050	**66.2**	<0.050	0.12	0.011	0.024	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.1	ug/g	0.0050	**9.1**	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.69	ug/g	0.0050	**183**	<0.050	0.32	0.025	0.066	<0.0050	<0.0050
Fluorene	69	ug/g	0.0050	43.2	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.48	ug/g	0.0050	**38.1**	<0.050	0.091	0.0095	0.019	<0.0050	<0.0050
1-Methylnaphthalene	3.4	ug/g	0.0050	**7.11**	<0.030	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	3.4	ug/g	0.0050	**11.7**	<0.030	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
1+2-Methylnaphthalene	3.4	ug/g	0.0071	**18.81**	<0.42	<0.071	<0.0071	<0.0071	<0.0071	<0.0071
Naphthalene	0.75	ug/g	0.0050	**32**	<0.013	<0.050	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene	7.8	ug/g	0.0050	**241**	<0.046	0.16	0.017	0.023	<0.0050	<0.0050
Pyrene	78	ug/g	0.0050	**153**	<0.050	0.3	0.026	0.053	<0.0050	<0.0050

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 5 - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**BH105A**	**BH106**		**BH107**		**BH108**		**BH113**	
Sample ID				**BH105A SS1B**	**BH106 SS1**	**BH106 SS2**	**BH107 SS2**	**BH107 SS3**	**BH108 SS2**	**BH108 SS3**	**BH113 SS1**	**BH113 SS10**
Lab ID				AKUU68	YJJ190	YJJ191	YJY630	YJY631	YLK238	YLK239	YKF629	YKF639
Sampling Date				Dec 03, 2024	Feb 12, 2024	Feb 12, 2024	Feb 13, 2024	Feb 13, 2024	Feb 20, 2024	Feb 20, 2024	Feb 20, 2024	Feb 13, 2024
Sampling Depth (m)				0.43 - 0.56	0.0 - 0.61	0.76 -1 .37	0.76 - 1.37	1.52 - 2.13	0.76 - 1.37	1.52 - 2.13	0 - 0.61	6.86 - 7.47
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV
Certificate of Analysis Number				C4AW072	C444699	C444699	C447629	C447629	C454454	C454454	C449019	C449019
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	58	ug/g	0.0050	0.096	<0.0050	<0.0050	<0.0050	<0.0050	0.11	<0.0050	0.013	<0.0050
Acenaphthylene	0.17	ug/g	0.0050	0.056	<0.0050	<0.0050	<0.0050	<0.0050	0.0085	<0.0050	0.11	0.0091
Anthracene	0.74	ug/g	0.0050	0.22	<0.0050	<0.0050	<0.0050	<0.0050	0.13	<0.0050	0.18	0.015
Benzo(a)anthracene	0.63	ug/g	0.0050	**0.65**	<0.0050	<0.0050	<0.0050	<0.0050	0.23	<0.0050	**0.99**	0.069
Benzo(a)pyrene	0.3	ug/g	0.0050	**0.67**	<0.0050	<0.0050	<0.0050	<0.0050	0.22	<0.0050	**0.87**	0.069
Benzo(b/j)fluoranthene	0.78	ug/g	0.0050	0.76	<0.0050	<0.0050	<0.0050	<0.0050	0.21	<0.0050	**0.88**	0.082
Benzo(g,h,i)perylene	7.8	ug/g	0.0050	0.39	<0.0050	<0.0050	<0.0050	<0.0050	0.13	<0.0050	0.36	0.04
Benzo(k)fluoranthene	0.78	ug/g	0.0050	0.3	<0.0050	<0.0050	<0.0050	<0.0050	0.081	<0.0050	0.38	0.028
Chrysene	7.8	ug/g	0.0050	0.58	<0.0050	<0.0050	<0.0050	<0.0050	0.19	<0.0050	0.77	0.058
Dibenzo(a,h)anthracene	0.1	ug/g	0.0050	**0.11**	<0.0050	<0.0050	<0.0050	<0.0050	0.033	<0.0050	**0.13**	0.0087
Fluoranthene	0.69	ug/g	0.0050	**1.5**	<0.0050	<0.0050	<0.0050	<0.0050	0.4	<0.0050	**1.8**	0.14
Fluorene	69	ug/g	0.0050	0.088	<0.0050	<0.0050	<0.0050	<0.0050	0.067	<0.0050	0.018	<0.0050
Indeno(1,2,3-cd)pyrene	0.48	ug/g	0.0050	0.41	<0.0050	<0.0050	<0.0050	<0.0050	0.12	<0.0050	0.43	0.044
1-Methylnaphthalene	3.4	ug/g	0.0050	0.038	<0.0050	<0.0050	<0.0050	<0.0050	0.02	<0.0050	0.013	<0.0050
2-Methylnaphthalene	3.4	ug/g	0.0050	0.037	<0.0050	<0.0050	<0.0050	<0.0050	0.011	<0.0050	0.013	<0.0050
1+2-Methylnaphthalene	3.4	ug/g	0.0071	0.075	<0.0071	<0.0071	<0.0071	<0.0071	0.032	<0.0071	0.027	<0.0071
Naphthalene	0.75	ug/g	0.0050	0.042	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	<0.0050	0.013	<0.0050
Phenanthrene	7.8	ug/g	0.0050	1.1	<0.0050	<0.0050	<0.0050	<0.0050	0.44	<0.0050	0.52	0.063
Pyrene	78	ug/g	0.0050	1.4	<0.0050	<0.0050	<0.0050	<0.0050	0.4	<0.0050	1.6	0.12

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 6 - Metals (including Hydride-Forming Metals) in Soil

GTR-21003722-B0,

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	**BH1**	**BH2**	**BH/MW1-D**	**BH/MW2-D**	**BH/MW3-D**	**BH101**	**BH104**	**BH105**	**BH/MW105A**		**BH106**		**BH113**	**BH114**
Sample ID				**1 0-5**	**2 0-5**	**BH1 SS1**	**BH2 SS1**	**BH3 SS1**	**BH101 SS2**	**BH104 SS1**	**BH105 SS1**	**BH105A SSIC**	**BH105A SS6A**	**BH106 SS1**	**BH106 SS2**	**BH113 SS1**	**BH114 SS1**
Lab ID				L2704961-1	L2704961-3	UBT888	UBT890	UBT893	YJY629	YLK236	YLK234	AOAO25	AKUU70	YJJ190	YJJ191	YKF629	YKF649
Sampling Date				May 09, 2022	May 09, 2022	Oct 18, 2022	Oct 19, 2022	Oct 20, 2022	Feb 13, 2024	Feb 20, 2024	Feb 20, 2024	Dec 03, 2024	Dec 03, 2024	Feb 12, 2024	Feb 12, 2024	Feb 13, 2024	Feb 13, 2024
Sampling Depth (m)				0 - 1.52	0 - 1.52	0 - 0.61	0 - 0.61	0 - 0.61	0.76 - 1.37	0 - 0.61	0 - 0.61	0.53 - 1.52	7.62 - 8.53	0 - 0.61	0.76 - 1.37	0 - 0.61	0 - 0.61
Consultant				TEC	TEC	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV	BV	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				L2704961	L2704961	C2U8186	C2U8186	C2U8186	C447629	C454454	C454454	C515602	C4AW072	C444699	C444699	C449019	C449019
Metals (including Hydride-Forming Metals)																	
Acid Extractable Antimony (Sb)	7.5	ug/g	0.20	<1.0	<1.0	3.2	<0.20	<0.20	-	-	-	-	<0.20	-	-	0.37	0.3
Acid Extractable Arsenic (As)	18	ug/g	1	1.8	1.5	4.5	1.7	2.7	-	-	-	-	<1.0	-	-	3.2	2.9
Acid Extractable Barium (Ba)	390	ug/g	0.5	92.7	55	61	88	44	-	-	-	-	7.7	-	-	87	66
Acid Extractable Beryllium (Be)	5	ug/g	0.20	<0.50	<0.50	0.36	0.46	0.35	-	-	-	-	<0.20	-	-	0.42	0.42
Acid Extractable Boron (B)	120	ug/g	5.0	<5.0	<5.0	5.6	<5.0	<5.0	-	-	-	-	<5.0	-	-	<5.0	5
Acid Extractable Cadmium (Cd)	1.2	ug/g	0.10	<0.50	<0.50	0.42	0.14	0.11	-	-	-	-	<0.10	-	-	0.15	0.15
Acid Extractable Chromium (Cr)	160	ug/g	1	21.5	14.7	15	20	16	-	-	-	-	5.1	-	-	17	18
Acid Extractable Cobalt (Co)	22	ug/g	0.1	6.3	4.6	5.6	9	5.5	-	-	-	-	1.6	-	-	6.1	7.3
Acid Extractable Copper (Cu)	180	ug/g	0.5	5.7	6.6	44	10	14	-	-	-	-	2	-	-	26	19
Acid Extractable Lead (Pb)	120	ug/g	1	7.4	7.4	**230**	24	45	9.8	30	**430**	13	1.2	**340**	7.3	100	45
Acid Extractable Molybdenum (Mo)	6.9	ug/g	0.50	<1.0	<1.0	0.87	<0.50	<0.50	-	-	-	-	0.54	-	-	0.96	<0.50
Acid Extractable Nickel (Ni)	130	ug/g	0.5	11.6	9.8	12	12	12	-	-	-	-	2.7	-	-	12	17
Acid Extractable Selenium (Se)	2.4	ug/g	0.50	<1.0	<1.0	<0.50	<0.50	<0.50	-	-	-	-	<0.50	-	-	<0.50	<0.50
Acid Extractable Silver (Ag)	25	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	-	<0.20	-	-	0.21	<0.20
Acid Extractable Thallium (Tl)	1	ug/g	0.05	<0.50	<0.50	0.13	0.15	0.096	-	-	-	-	<0.050	-	-	0.098	0.12
Acid Extractable Uranium (U)	23	ug/g	0.05	<1.0	<1.0	0.37	0.43	0.37	-	-	-	-	0.19	-	-	0.39	0.4
Acid Extractable Vanadium (V)	86	ug/g	5	26.8	23.1	22	29	24	-	-	-	-	8.3	-	-	24	25
Acid Extractable Zinc (Zn)	340	ug/g	5	63.3	26.9	140	60	43	-	-	-	-	5.2	-	-	68	95

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

SOIL ANALYTICAL RESULTS:

Table 7 - Other Regulated Parameters (ORPs) in Soil

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**BH1**	**BH2**	**BH/MW1-D**	**BH/MW2-D**	**BH/MW3-D**		**BH/MW105A**	
Sample ID				**1 0-5**	**2 0-5**	**BH1 SS1**	**BH2 SS1**	**BH3 SS1**	**BH3 SS7**	**BH105A SS1A**	**BH105A SS6A**
Lab ID				L2704961-1	L2704961-3	UBT888	UBT890	UBT893	UBT894	AKUU67	AKUU70
Sampling Date				May 09, 2022	May 09, 2022	Oct 18, 2022	Oct 19, 2022	Oct 20, 2022	Oct 20, 2022	Dec 03, 2024	Dec 03, 2024
Sampling Depth (m)				0 - 1.52	0 - 1.52	0 - 0.61	0 - 0.61	0 - 0.61	6.10 - 6.71	0.20 - 0.43	7.62 - 8.53
Consultant				TEC	TEC	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV	BV
Certificate of Analysis Number				L2704961	L2704961	C2U8186	C2U8186	C2U8186	C2U8186	C4AW072	C4AW072
Other Regulated Parameters											
Hot Water Extractable Boron	1.5	ug/g	0.050	1.09	0.38	0.77	1	0.31	-	-	-
Hexavalent Chromium (CrVI)	10	ug/g	0.05	<0.050	<0.050	<0.18	<0.18	<0.18	-	-	-
WAD Cyanide (Free)	0.051	ug/g	0.01	<0.050	<0.050	<0.01	<0.01	<0.01	-	-	-
Acid Extractable Mercury (Hg)	1.8	ug/g	0.050	0.0169	0.0248	0.11	<0.050	<0.050	-	<0.050	-
Electrical Conductivity	0.7	mS/cm	0.002	**4.28**	**0.835**	**1.9**	**5.5**	**1.4**	-	-	-
Sodium Adsorption Ratio	5	N/A	-	**72.7**	**24**	**24**	**34**	**17**	-	-	-
Available (CaCl2) pH	5-9 (surface soil); 5-11 (subsurface soil)	pH	-	8.12	8.02	7.53	7.41	7.78	7.77	-	7.99

All soil concentrations reported in µg/g.

'<' = Parameter below detection limit, as indicated

'NV'= No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 8 - Petroleum Hydrocarbons (PHCs) including Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)	Units	RDL	MW1	MW2	MW1-D	MW2-S	MW3-D	MW104	MW105	MW113	MW114	
Sample ID				MW1	MW2	MW1-D	MW2-S	MW3-D	MW104	MW105	MW113	MW114	MW1144
Lab ID				L2704960-1	L2704960-2	UEF209	UEF211	UEF212	YPV871	YPV872	UEF212	UEF212	UEF212
Sampling Date				May 10, 2022	May 10, 2022	Nov 01, 2022	Nov 01, 2022	Nov 01, 2022	Mar 12, 2024	Mar 12, 2024	Mar 12, 2024	Mar 13, 2024	Mar 13, 2024
Screen Depth (m)				3.05 - 6.10	3.05 - 6.10	4.57 - 7.62	3.05 - 6.10	4.57 - 7.62	6.27 - 7.79	7.02 - 8.54	4.43 - 7.48	4.59 - 7.64	Field Duplicate of MW114
Consultant				TEC	TEC	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				L2704960	L2704960	C2V9321	C2V9321	C2V9321	C476120	C476120	C476120	C476120	C476120
Petroleum Hydrocarbons (PHCs)													
F1 (C6-C10)	750	ug/L	25	220	79	45	36	39	150	480	<25	<25	<25
F1 (C6-C10) - BTEX	750	ug/L	25	220	79	45	36	39	150	470	<25	<25	<25
F2 (C10-C16)	150	ug/L	100	<100	<100	<100	<100	110	<100	<100	<100	<100	<100
F3 (C16-C34)	500	ug/L	200	<250	<250	<200	<200	280	<200	<200	<200	<200	<200
F4 (C34-C50)	500	ug/L	200	<250	<250	<200	<200	<200	<200	<200	<200	<200	<200
Reached Baseline at C50	NV	ug/L	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F4G (Gravimetric)	NV	ug/L	-	-	-	-	-	-	-	-	-	-	-
BTEX													
Benzene	430	ug/L	0.17	<0.50	<0.50	<0.17	0.2	<0.17	<0.17	<0.17	<0.17	<0.17	<0.20
Toluene	18000	ug/L	0.20	0.71	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	ug/L	0.20	<0.50	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	NV	ug/L	0.20	<0.30	<0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40
o-Xylene	NV	ug/L	0.20	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes, Total	4200	ug/L	0.20	<0.50	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 9 - Volatile Organic Compounds (VOCs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)	Units	RDL	MW1				BH/MW1-D			
Sample ID				**MW1**	**MW1**	**MW1**	**MW1**	**MW1-D**	**MW11-D**	**MW1D**	**MW11D**
Lab ID				L2704960-1	YHR310	AMJS92	ANHF72	UEF209	UEF210	YHR312	YHR316
Sampling Date				May 10, 2022	Feb 06, 2024	Dec 19, 2024	Jan 16, 2025	Nov 01, 2022	Nov 01, 2022	Feb 06, 2024	Feb 06, 2024
Screen Depth (m)				3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	4.57 - 7.62	Field Duplicate of MW1-D	4.57 - 7.62	Field Duplicate of MW1D
Consultant				TEC	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	BV Labs	BV	BV	BV	BV	BV	BV
Certificate of Analysis Number				L2704960	C436494	C4BO928	C505563	C2V9321	C2V9321	C436494	C436494
Volatile Organic Compounds (VOCs)											
Benzene	430	ug/L	0.17	<0.50	0.2	<0.20	<0.20	<0.17	<0.20	<0.20	<0.20
Toluene	18000	ug/L	0.20	0.71	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	ug/L	0.20	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	NV	ug/L	0.20	<0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	NV	ug/L	0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes, Total	4200	ug/L	0.20	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acetone	130000	ug/L	10	<30	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	85000	ug/L	0.5	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	770	ug/L	1	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	56	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	8.4	ug/L	0.19	<0.20	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.19
Chlorobenzene	630	ug/L	0.2	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	22	ug/L	0.2	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	82000	ug/L	0.5	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	9600	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
1,3-Dichlorobenzene	9600	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
1,4-Dichlorobenzene	67	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
Dichlorodifluoromethane	4400	ug/L	1	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	3100	ug/L	0.2	<0.50	<0.20	<0.20	<0.20	0.2	<0.20	0.52	0.52
1,2-Dichloroethane	12	ug/L	0.49	<0.50	<0.49	<0.49	<0.49	<0.50	<0.49	<0.49	<0.49
1,1-Dichloroethylene	17	ug/L	0.2	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	17	ug/L	0.5	**65.3**	**36**	**38**	**48**	1.9	1.4	**34**	**33**
trans-1,2-Dichloroethylene	17	ug/L	0.5	5.1	1.9	1.5	1.5	<0.50	<0.50	1.1	1.1
1,2-Dichloropropane	140	ug/L	0.2	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	45	ug/L	0.3	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	45	ug/L	0.4	<0.30	<0.40	-	-	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene (cis+trans)	45	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	0.83	ug/L	0.19	<0.20	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.19
Hexane	520	ug/L	1	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (MEK)	1500000	ug/L	10	<20	<10	<10	<10	<10	<10	<10	<10
Methyl Isobutyl Ketone (MIBK)	580000	ug/L	5	<20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether (MTBE)	1400	ug/L	0.5	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride (Dichloromethane)	5500	ug/L	2	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Styrene	9100	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
1,1,1,2-Tetrachloroethane	28	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
Tetrachloroethylene	17	ug/L	0.2	**838**	**1600**	**3900**	**4100**	**110**	**72**	**480**	**480**
1,1,1-Trichloroethane	6700	ug/L	0.2	<0.50	0.39	0.33	0.36	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	30	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40
Trichloroethylene	17	ug/L	0.2	**59.2**	**48**	**70**	**76**	7.3	6.1	**21**	**21**
Trichlorofluoromethane	2500	ug/L	0.5	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	1.7	ug/L	0.2	**4.36**	1.5	**2.1**	**4.2**	0.24	<0.20	**5.4**	**5.4**

Location ID	MW2						MW2-S		BH/MW107	MW2D	MW3-D		
Sample ID	**MW2**	**MW2**	**MW2**	**MWD**	**MW2**	**MW2**	**MW2-S**	**BH/MW2-S**	**MW107**	**MW2D**	**MW3-D**	**MW3D**	**BH/MW 3-D**
Lab ID	L2704960-2	YHR311	AJAV19	AJAV24	AMJS93	ANHF74	UEF211	AMJS91	ANHF70	YHR313	UEF212	YHR314	AJAV21
Sampling Date	May 10, 2022	Feb 05, 2024	Nov 15, 2024	Nov 15, 2024	Dec 19, 2024	Jan 16, 2025	Nov 01, 2022	Dec 19, 2024	Jan 16, 2025	Feb 06, 2024	Nov 01, 2022	Feb 05, 2024	Nov 15, 2024
Screen Depth (m)	3.05 - 6.10	3.05 - 6.10	3.05 - 6.10	Field Duplicate of MW 2	4.57 - 7.62	4.57 - 7.62	3.05 - 6.10	3.05 - 6.10	7.53 - 9.03	9.03 - 12.07	4.57 - 7.62	4.57 - 7.62	4.57 - 7.62
Consultant	TEC	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory	ALS	BV Labs	BV Labs	BV Labs	BV	BV	BV Labs	BV	BV	BV Labs	BV Labs	BV Labs	BV
Certificate of Analysis Number	L2704960	C436494	C4AB156	C4AB156	C4BO928	C505563	C2V9321	C4BO928	C505563	C436494	C2V9321	C436494	C4AB156
Volatile Organic Compounds (VOCs)													
Benzene	<0.50	0.2	<0.20	<0.20	<0.20	0.39	<0.17	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20
Toluene	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	<0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.55
m+p-Xylene	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.84
Xylenes, Total	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.4
Acetone	<30	<10	<10	<10	110	3700	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.20	<0.19	<0.19	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.20	<0.20	<0.20	<0.19
Chlorobenzene	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.7	<0.20	<0.20
Dibromochloromethane	<2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
1,3-Dichlorobenzene	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
1,4-Dichlorobenzene	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
Dichlorodifluoromethane	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	<0.50	0.31	0.37	0.39	0.35	0.21	<0.20	<0.20	<0.20	<0.20	0.61	0.67	0.65
1,2-Dichloroethane	<0.50	<0.49	<0.49	<0.49	<0.49	<0.49	<0.50	<0.49	<0.49	<0.50	<0.50	<0.50	<0.49
1,1-Dichloroethylene	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.34	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	**50.4**	**44**	7.5	7.6	**27**	**55**	**37**	**150**	0.81	2.2	6.4	8	4.3
trans-1,2-Dichloroethylene	**54.8**	12	2.8	2.7	2.6	5.4	2.4	2.6	<0.50	1.6	0.65	5	1.4
1,2-Dichloropropane	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	<0.30	<0.30	<0.30	<0.30	-	-	<0.30	-	-	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	<0.40	<0.40	<0.40	<0.40	-	-	<0.40	-	-	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene (cis+trans)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	<0.20	<0.19	<0.19	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.20	<0.20	<0.20	<0.19
Hexane	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (MEK)	<20	<10	<2.0	<2.0	<46	660	<10	<10	<10	<10	<10	<10	<2.0
Methyl Isobutyl Ketone (MIBK)	<20	<5.0	<10	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
Methyl tert-butyl ether (MTBE)	<2.0	<0.50	<5.0	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0
Methylene Chloride (Dichloromethane)	<5.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50
Styrene	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
1,1,1,2-Tetrachloroethane	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
Tetrachloroethylene	**145**	**140**	**140**	**150**	**92**	**67**	**57**	**290**	1.9	1.3	**69**	**430**	**470**
1,1,1-Trichloroethane	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.24
1,1,2-Trichloroethane	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.50	<0.50	<0.50	<0.40
Trichloroethylene	**191**	**62**	**40**	**39**	**41**	**39**	**28**	**270**	1.5	5.2	**19**	**110**	9.9
Trichlorofluoromethane	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	<0.50	<0.20	<0.20	<0.20	0.38	0.48	**2**	1.4	<0.20	<0.20	0.53	<0.20	<0.20

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 9 - Volatile Organic Compounds (VOCs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	**MW101**	**MW102**	**MW103**		**MW104**	**MW105**	**MW107**	**MW109**		**MW110**		**MW111**		**MW113**		**MW114**
Sample ID				**MW101**	**MW102**	**MW103**	**MW1033**	**MW104**	**MW105**	**MW107**	**MW109**	**BH/MW 109**	**MW110**	**BH/MW110**	**MW111**	**BH/MW 111**	**MW113**	**BH/MW113**	**MW114**
Lab ID				YPV875	YPV866	YPV864	YPV865	YPV871	YPV872	YPV874	YPV869	AJAV22	YPV868	AJAV20	YPV867	AJAV23	YPV870	AKIY41	YPV873
Sampling Date				Mar 12, 2024	Mar 11, 2024	Mar 11, 2024	Mar 11, 2024	Mar 12, 2024	Mar 12, 2024	Mar 13, 2024	Mar 12, 2024	Nov 15, 2024	Mar 12, 2024	Nov 15, 2024	Mar 12, 2024	Nov 15, 2024	Mar 12, 2024	Nov 29, 2024	Mar 13, 2024
Screen Depth (m)				17.25 - 18.77	17.22 - 18.74	16.88 - 18.40	Field Duplicate of MW103	6.27 - 7.79	7.02 - 8.54	7.51 - 9.03	6.20 - 9.25	6.20 - 9.25	5.81 - 8.86	5.81 - 8.86	5.87 - 8.92	5.87 - 8.92	4.43 - 7.48	4.43 - 7.48	4.59 - 7.64
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV	BV Labs	BV	BV Labs	BV	BV Labs	BV	BV Labs
Certificate of Analysis Number				C476120	C476120	C476120	C476120	C476120	C476120	C476120	C476120	C4AB156	C476120	C4AB156	C476120	C4AB156	C476120	C4AQ709	C476120
Volatile Organic Compounds (VOCs)																			
Benzene	430	ug/L	0.17	<0.17	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.26	0.33	<0.17	<0.20	<0.20
Toluene	18000	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes, Total	4200	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acetone	130000	ug/L	10	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	85000	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	770	ug/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	56	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	8.4	ug/L	0.19	<0.20	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.20	<0.20	<0.19
Chlorobenzene	630	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	22	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	82000	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	9600	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
1,3-Dichlorobenzene	9600	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
1,4-Dichlorobenzene	67	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
Dichlorodifluoromethane	4400	ug/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	3100	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	1.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.27	<0.20
1,2-Dichloroethane	12	ug/L	0.49	<0.50	<0.49	<0.49	<0.49	<0.50	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.50	<0.50	<0.49
1,1-Dichloroethylene	17	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	0.23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	17	ug/L	0.5	<0.50	<0.50	1.9	1.9	13	**30**	1.2	<0.50	<0.50	17	**23**	15	5.7	6.3	**120**	<0.50
trans-1,2-Dichloroethylene	17	ug/L	0.5	<0.50	<0.50	0.7	0.7	0.58	2.5	<0.50	<0.50	<0.50	6.5	8.3	0.68	0.75	1.3	4.2	<0.50
1,2-Dichloropropane	140	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	45	ug/L	0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	45	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene (cis+trans)	45	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	0.83	ug/L	0.19	<0.20	<0.19	<0.19	<0.19	<0.20	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.20	<0.20	<0.19
Hexane	520	ug/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (MEK)	1500000	ug/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<2.0	<10	<10	<10	<2.0	<10
Methyl Isobutyl Ketone (MIBK)	580000	ug/L	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0
Methyl tert-butyl ether (MTBE)	1400	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50
Methylene Chloride (Dichloromethane)	5500	ug/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0	<0.50	<2.0
Styrene	9100	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
1,1,1,2-Tetrachloroethane	28	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
Tetrachloroethylene	17	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	**530**	**1800**	4.7	1.8	6.7	**44**	**24**	1.1	0.31	4.6	2.1	2.1
1,1,1-Trichloroethane	6700	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	0.52	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	30	ug/L	0.4	<0.50	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.50	<0.50	<0.40
Trichloroethylene	17	ug/L	0.2	<0.20	<0.20	0.71	0.68	**55**	**30**	1.3	0.5	1.2	**48**	**54**	0.53	0.43	2.5	0.9	<0.20
Trichlorofluoromethane	2500	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.46	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	1.7	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	1.6	1.3	<0.20	<0.20	<0.20	0.35	0.35	<0.20	<0.20	<0.20	<0.20	<0.20

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 9 - Volatile Organic Compounds (VOCs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	*MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)*	*Units*	*RDL*	MW201			MW202		MW203			TRIP BLANK					
Sample ID				**BH/MW201**	**BH/MW0**	**MW201**	**BH/MW202**	**MW202**	**BH/MW203**	**MW203**	**MW0**	**TRIP BLANK**	**TRIP BLANK**	**TRIP BLANK**	**TRIP BLANK**	**TRIP BLANK**	**TRIP BLANK**
Lab ID				AMJS94	AMJS97	ANHF75	AMJS95	ANHF71	AMJS96	ANHF73	ANHF76	UEF213	YHR315	AJAV25	AKIY43	AMJS98	ANHF77
Sampling Date				Dec 19, 2024	Dec 19, 2024	Jan 16, 2025	Dec 19, 2024	Jan 16, 2025	Dec 19, 2024	Jan 16, 2025	Jan 16, 2025	Nov 01, 2022	Feb 06, 2024	Nov 15, 2024	Nov 29, 2024	Dec 19, 2024	Jan 16, 2025
Screen Depth (m)				6.19 - 9.24	Field Duplicate of BH/MW201	6.19 - 9.24	6.28 - 9.33	6.28 - 9.33	6.28 - 9.33	6.28 - 9.33	6.28 - 9.33	-	-	-	NA	-	-
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV	BV	BV	BV	BV	BV	BV	BV	BV Labs	BV Labs	BV	BV	BV	BV
Certificate of Analysis Number				C4BO928	C4BO928	C505563	C4BO928	C505563	C4BO928	C505563	C505563	C2V9321	C436494	C4AB156	C4AQ709	C4BO928	C505563
Volatile Organic Compounds (VOCs)																	
Benzene	430	ug/L	0.17	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	18000	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes, Total	4200	ug/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acetone	130000	ug/L	10	<10	<10	3600	15	190	<10	490	530	<10	<10	<10	<10	<10	<10
Bromodichloromethane	85000	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	770	ug/L	1	<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
Bromomethane	56	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	8.4	ug/L	0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Chlorobenzene	630	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	22	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	82000	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	9600	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,3-Dichlorobenzene	9600	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,4-Dichlorobenzene	67	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Dichlorodifluoromethane	4400	ug/L	1	<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
1,1-Dichloroethane	3100	ug/L	0.2	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	12	ug/L	0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
1,1-Dichloroethylene	17	ug/L	0.2	<0.20	<0.20	<0.20	0.24	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	17	ug/L	0.5	<0.50	<0.50	<0.50	**48**	13	**36**	9.3	8.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	ug/L	0.5	<0.50	<0.50	<0.50	2.7	4.5	1.7	1.1	0.95	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	140	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	45	ug/L	0.3	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	-	-
trans-1,3-Dichloropropene	45	ug/L	0.4	-	-	-	-	-	-	-	-	<0.40	<0.40	<0.40	<0.40	-	-
1,3-Dichloropropene (cis+trans)	45	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	0.83	ug/L	0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Hexane	520	ug/L	1	<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
Methyl Ethyl Ketone (MEK)	1500000	ug/L	10	<10	<19	100	<15	15	<10	230	270	<10	<10	<2.0	<2.0	<10	<10
Methyl Isobutyl Ketone (MIBK)	580000	ug/L	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<10	<5.0	<5.0
Methyl tert-butyl ether (MTBE)	1400	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<0.50
Methylene Chloride (Dichloromethane)	5500	ug/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0
Styrene	9100	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1,1,2-Tetrachloroethane	28	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Tetrachloroethylene	17	ug/L	0.2	8.1	8.8	6.4	**640**	**21**	**49**	**35**	**33**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	6700	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	30	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Trichloroethylene	17	ug/L	0.2	0.37	0.39	1.6	**180**	**36**	10	4.7	4.3	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	2500	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	1.7	ug/L	0.2	<0.20	<0.20	<0.20	1.7	0.38	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 10 - Polycyclic Aromatic Hydrocarbons (PAHs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**MW1**	**MW2**	**BH/MW104**		**BH/MW105**	**BH/MW107**	**BH/MW 109**	**BH/MW113**
Sample ID				MW1	MW2	BH/MW104	BH/MW0	BH/MW105	BH/MW107	BH/MW 109	BH/MW113
Lab ID				L2704960-1	L2704960-2	AKIY38	AKIY42	AKIY39	AKIY40	AJAV22	AKIY41
Sampling Date				May 10, 2022	May 10, 2022	Nov 29, 2024	Nov 29, 2024	Nov 29, 2024	Nov 29, 2024	Nov 15, 2024	Nov 29, 2024
Screen Depth (m)				3.05 - 6.10	3.05 - 6.10	6.27 - 7.79	Field Duplicate of BH/MW104	7.02 - 8.54	7.51 - 9.03	6.20 - 9.25	4.43 - 7.48
Consultant				TEC	TEC	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				ALS	ALS	BV	BV	BV	BV	BV	BV
Certificate of Analysis Number				L2704960	L2704960	C4AQ709	C4AQ709	C4AQ709	C4AQ709	C4AB156	C4AQ709
Polycyclic Aromatic Hydrocarbons (PAHs)											
Acenaphthene	1700	ug/L	0.050	1.54	0.315	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	1.8	ug/L	0.020	<0.020	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	2.4	ug/L	0.050	0.632	0.078	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene	4.7	ug/L	0.050	0.224	<0.020	0.062	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	0.81	ug/L	0.009	0.172	<0.020	0.06	0.028	<0.0090	<0.0090	<0.0090	<0.0090
Benzo(b/j)fluoranthene	0.75	ug/L	0.050	0.177	<0.020	0.084	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	0.2	ug/L	0.050	0.094	<0.020	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	0.4	ug/L	0.050	0.08	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	1	ug/L	0.050	0.195	<0.020	0.062	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenzo(a,h)anthracene	0.52	ug/L	0.050	0.021	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	130	ug/L	0.050	0.835	0.071	0.17	0.072	<0.050	<0.050	<0.050	<0.050
Fluorene	400	ug/L	0.050	1.04	0.195	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	0.2	ug/L	0.050	0.104	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1-Methylnaphthalene	1800	ug/L	0.050	0.525	0.107	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	1800	ug/L	0.050	0.7	0.125	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1+2-Methylnaphthalene	1800	ug/L	0.071	1.225	0.232	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071
Naphthalene	6400	ug/L	0.050	4.7	0.68	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	580	ug/L	0.030	2.64	0.448	0.11	0.051	<0.030	<0.030	<0.030	0.054
Pyrene	68	ug/L	0.050	0.666	0.053	0.15	0.061	<0.050	<0.050	<0.050	<0.050

All groundwater concentrations reported in μg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold — Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 11 - Metals (including Hydride-Forming Metals) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**BH/MW1-D**	**BH/MW2-S**	**BH/MW3-D**	**MW104**	**MW105**	**MW113**	**MW114**
Sample ID				**MW1-D**	**MW2-S**	**MW3-D**	**MW104**	**MW105**	**MW113**	**MW114**
Lab ID				UEF209	UEF211	UEF212	YPV871	YPV872	YPV870	YPV873
Sampling Date				Nov 01, 2022	Nov 01, 2022	Nov 01, 2022	Mar 12, 2024	Mar 12, 2024	Mar 12, 2024	Mar 13, 2024
Screen Depth (m)				4.57 - 7.62	3.05 - 6.10	4.57 - 7.62	6.27 - 7.79	7.02 - 8.54	4.43 - 7.48	4.59 - 7.64
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C2V9321	C2V9321	C2V9321	C476120	C476120	C476120	C476120
Metals (Including Hydride-Forming Metals)										
Dissolved Antimony (Sb)	20000	ug/L	0.50	<0.50	0.86	1.8	<0.50	<0.50	0.57	<0.50
Dissolved Arsenic (As)	1900	ug/L	1.0	<1.0	<1.0	2.4	<1.0	<1.0	2.8	<1.0
Dissolved Barium (Ba)	29000	ug/L	2.0	130	170	310	88	190	190	310
Dissolved Beryllium (Be)	67	ug/L	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Dissolved Boron (B)	45000	ug/L	10	180	130	190	140	100	120	110
Dissolved Cadmium (Cd)	2.7	ug/L	0.090	<0.090	<0.090	<0.090	<0.090	0.16	<0.090	0.11
Dissolved Chromium (Cr)	810	ug/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	66	ug/L	0.5	1.7	1.4	2.9	3.3	5.6	1.4	4.1
Dissolved Copper (Cu)	87	ug/L	0.9	2.9	3.5	1.9	2	1.7	1.4	1.6
Dissolved Lead (Pb)	25	ug/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Molybdenum (Mo)	9200	ug/L	0.5	3.3	2.9	14	2.6	3.2	25	2.2
Dissolved Nickel (Ni)	490	ug/L	1.0	4.3	5.3	32	3.4	7.1	4.3	7.2
Dissolved Selenium (Se)	63	ug/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dissolved Silver (Ag)	1.5	ug/L	0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Dissolved Thallium (Tl)	510	ug/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Uranium (U)	420	ug/L	0.10	7.5	4.5	5.9	8.3	6	8	6.3
Dissolved Vanadium (V)	250	ug/L	0.50	0.65	0.5	<0.50	0.82	<0.50	1	0.71
Dissolved Zinc (Zn)	1100	ug/L	5.0	<5.0	34	<5.0	8.1	<5.0	<5.0	<5.0

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 12 - Polychlorinated Biphenyls (PCBs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID				**BH/MW1-D**	**BH/MW2-S**	**BH/MW3-D**	**BH/MW104**	**BH/MW105**	**MW113**	**MW114**
Sample ID	***MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)***	***Units***	***RDL***	**MW1-D**	**MW2-S**	**MW3-D**	**MW104**	**MW105**	**MW113**	**MW114**
Lab ID				UEF209	UEF211	UEF212	YPV871	YPV872	YPV870	YPV873
Sampling Date				Nov 01, 2022	Nov 01, 2022	Nov 01, 2022	Mar 12, 2024	Mar 12, 2024	Mar 12, 2024	Mar 13, 2024
Screen Depth (m)				4.57 - 7.62	3.05 - 6.10	4.57 - 7.62	6.27 - 7.79	7.02 - 8.54	4.43 - 7.48	4.59 - 7.64
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV	BV	BV Labs	BV Labs
Certificate of Analysis Number				C2V9321	C2V9321	C2V9321	C476120	C476120	C476120	C476120
Polychlorinated Biphenyls (PCBs)										
Aroclor 1242	NV	ug/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	NV	ug/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	NV	ug/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	NV	ug/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls (PCBs)	15	ug/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold — Concentration exceeds MECP (2011) SCS.

(yellow) — Non-detect but detection limit exceeds the MECP (2011) SCS.

GROUNDWATER ANALYTICAL RESULTS:

Table 13 - Sodium and Other Regulated Parameters (ORPs) in Groundwater

GTR-21003722-B0

1337 Queen Street West, Toronto, Ontario

Location ID	MECP (2011) Table 3: Full Depth Background SCS in a Non-Potable Groundwater Condition RPI Land Use (fine textured soil)	Units	RDL	BH/MW1-D	BH/MW2-S	BH/MW3-D	MW104	MW105	MW113	MW114
Sample ID				**MW1-D**	**MW2-S**	**MW3-D**	**MW104**	**MW105**	**MW113**	**MW114**
Lab ID				UEF209	UEF211	UEF212	YPV871	YPV872	YPV870	YPV873
Sampling Date				Nov 01, 2022	Nov 01, 2022	Nov 01, 2022	Mar 12, 2024	Mar 12, 2024	Mar 12, 2024	Mar 13, 2024
Screen Depth (m)				4.57 - 7.62	3.05 - 6.10	4.57 - 7.62	6.27 - 7.79	7.02 - 8.54	4.43 - 7.48	4.59 - 7.64
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C2V9321	C2V9321	C2V9321	C476120	C476120	C476120	C476120
Sodium										
Dissolved Sodium (Na)	2,300,000	ug/L	100	250,000	570,000	420,000	300,000	980,000	470,000	820,000
Other Regulated Parameters										
Hexavalent Chromium (CrVI)	140	ug/L	0.50	<0.50	<0.50	<0.50	-	-	-	-
Mercury (Hg)	2.8	ug/L	0.10	<0.10	<0.10	<0.10	-	-	-	-

All groundwater concentrations reported in µg/L.

'<' = Parameter below detection limit, as indicated

'NV' = No value

Bold Concentration exceeds MECP (2011) SCS.

Non-detect but detection limit exceeds the MECP (2011) SCS.

Appendix D: MECP Comments and EXP Responses

Ministry of the Environment, Conservation and Parks

Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto, ON M4V 1M2

October 16, 2024

City of Toronto
61 Front Street West
Toronto, ON
M5J 1E5

Attention: Vic Gupta – Chief Executive Officer

RE: **Ministry comments for the PSF for 1337 Queen Street West, Toronto, ON, report prepared by Exp Services Inc., dated July 4, 2024 [PSF2251-24, IDS No. 8055-D6VKUD].**

This letter will acknowledge receipt of the Pre-Submission Form (PSF) submitted for the following Property under the Records of Site Condition Regulation (O. Reg. 153/04).

- **Pre-Submission Form for 1337 Queen Street West, Toronto, ON, report prepared by Exp Services Inc., dated July 4, 2024**

The Ministry has reviewed the PSF submitted for the Property. Our reviewers offer comments, and questions in the attached Schedule A for the proponent's consideration in preparing a risk assessment for submission under the *Environmental Protection Act* (Act), Ontario Regulation 153/04 (Regulation), and associated guidance documents.

The outcome of this preliminary consultation is not binding on the risk assessment property owner or the Ministry, as the understanding of site conditions may develop and/or change during the course of the risk assessment. For this reason, the Ministry has the right to change its position. Ministry comments on the PSF do not in any way indicate acceptance of the final risk assessment approach or other conclusions of the risk assessment report and it does not indicate acceptance of the risk assessment report by the Director pursuant to s.168.5 of the Act.

If, at any time after submitting the PSF, the qualified person responsible for the preparation of the risk assessment changes or the property owner changes, the property owner shall give notice to the Director of the change in circumstance.

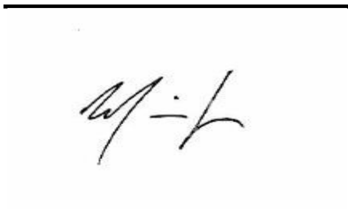
Four hard copies of the risk assessment, one marked original (along with a stand-alone electronic copy of the risk assessment [USB format]) are to be submitted to the Director of Client Services and Permissions Branch for review under the Regulation and must include a copy of the PSF as well as a response in the risk assessment report outlining how the Ministry's concerns in Schedule A to this letter were addressed in the risk assessment. However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

Please note that a risk assessment under the Regulation does not deal with all potential approvals and issues associated with other Ministry legislation. Other regulatory and compliance tools are required to address other aspects of redevelopment of this property including:

- disposal of excess soil,
- potential for release of contaminants to the environment during remediation and construction activities,
- remedial activities which require Certificates of Approvals, and
- off-site impacts.

Off-site impacts, actual or likely, must be reported to the Ministry District Office forthwith. For your information the Act, Regulation, guidance documents and associated fact sheets have been posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment



Michelle Zehr
Director, Environmental Protection Act s. 168.5

Attach:

SCHEDULE A

To Director's Notice dated October 16, 2024

Comments by Ministry of Environment, Conservation and Parks On Pre-Submission Form

1337 Queen Street West Toronto, ON PSF2251-24

(IDS Ref No. 8055-D6VKUD)

The following are Ministry comments on the following Pre-Submission Form (PSF):

- **Pre-Submission Form for 1337 Queen Street West, Toronto, ON, report prepared by Exp Services Inc., dated July 4, 2024**

Ministry reviewers offer comments, observations and questions, as follow, for the proponent's consideration in preparing a risk assessment for submission under the Records of Site Condition Regulation, O. Reg. 153/04 (Regulation).

Comments provided by the Ministry on the content of this Pre-Submission Form are not in any way a Director's response to a risk assessment referred to in subsection 168.5 of the EPA.

It also should be noted that a risk assessment submitted to the Ministry under the Regulation must include all mandatory requirements for risk assessments as listed in Table 1 of Schedule C of the Regulation. These requirements must be met or the risk assessment will be deemed incomplete and may be returned without further review.

It should also be noted that a risk assessment submitted to the Ministry under the Regulation must include a copy of the PSF as well as a response outlining how the comments in this Ministry review have been considered in the risk assessment.

The Regulation, guidance documents and associated fact sheets have been prepared to assist proponents. They can be found posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment

Timeline for Review of Risk Assessment

The proposed Risk Assessment (RA) will be a RA other than those identified in O. Reg. 153/04, Schedule C, Part II. Therefore, the review timeline for the RA will be set at 16 weeks. Section 46 of the Regulation provides specified maximum timelines for review of a RA by the Ministry. The Ministry's timeline for review of the RA under Section 46 of the Regulation will commence on receipt by the Ministry of a risk assessment in accordance with Section 2 of Schedule C of the Regulation.

COMMENTS ON PRE-SUBMISSION FORM

The following comments pertain to the Pre-Submission Form (PSF) for **1337 Queen Street West, Toronto, ON, report prepared by Exp Services Inc., dated July 4, 2024**

General Comments

The RA property is an irregularly shaped parcel of land currently comprised of a commercial building with asphalt parking spaces in a mixed used residential, community and commercial area of downtown Toronto. The land occupies an area of approximately 0.20 hectares. A sixteen storey residential condominium building with a basement level is intended to be redeveloped on the RA property. The basement level and ground floor are proposed to be occupied by community space.

Table 3: Full Depth Generic Site Condition Standards (SCS) in a Non-Potable Ground Water Condition for Residential / Parkland / Institutional Property Use and medium and fine soil texture has been identified as the applicable SCS for the RA property. Volatile groundwater parameters were compared to the Table 7 Generic SCS for Shallow Soils in a Non-Potable Ground Water Condition due to the future basement level being within 3.0 m of the groundwater table measured at the RA property. Tetrachloroethylene (PCE), lead and PAHs were identified as contaminants of concern (COC) in soil. PHC F1, cis-1,2-dichloroethylene, trans-1,2-dicholoethylene, tetrachloroethylene (PCE), trichloroethylene (TCE) and vinyl chloride were identified as COCs in groundwater.

Residents, visitors and trespassers, long-term indoor and outdoor workers, and subsurface workers have been identified as the human receptors on and off the RA property. Terrestrial plants, soil organisms, mammals and birds have been identified as ecological receptors on and off the RA property. Aquatic biota have also been identified as ecological receptors off-site.

The anticipated risk management measures for the RA property include a cap, engineered measures for vapour intrusion, a health and safety plan and a soil and groundwater management plan.

Some issues and/or inconsistencies have been identified as described below that must be addressed in the risk assessment (RA) submission.

Specific Review Comments

1. Introduction and General Approach, Risk Assessment Approach. The following comments are provided:

   a. It is noted that new toxicity information provided by MECP (2022) will be used for the RA. The Ministry has recently released updated TRVs for lead, acenaphthylene and anthracene, identified as soil COCs for the RA property. The QP_{RA} should consider use of these TRVs in the RA.

b. The QP provided a rationale for not retaining VOCs as soil COCs based on data from BH3 SS8 with elevated RDLs is reasonable (i.e., due to high moisture content and or low weight of soil sampled provided). The same rationale was again provided in Section 3.1.1 of the P2CSM. However, given that VOCs were identified as CPOCs in soil for several APECs and vinyl chloride was a COC in groundwater, further information is required. Note that the QP_{ESA} submitting the record of site condition (RSC) for the RA property will need to ensure that these PSS are met. If the QP_{ESA} finds that the RA does not support filing of the RSC (for example: the RA established PSS that are lower than concentrations found on-site; remediation has failed to reduce concentrations to below the PSS or applicable SCS), a new Pre-Submission Form (PSF) and RA must be submitted to the Ministry for review under the Regulation. RAs, once accepted under the Regulation, cannot be ‘reopened’ or revised.

2. PSF, Section 2, Planned Risk Assessment Approach. The QP is reminded that while the MECP (2016) Modified Generic Risk Assessment Approved Model may be used as a tool in the conduct of the Tier 3 RA, it will not satisfy all of the mandatory requirements of a Tier 3 RA and not all of the assumptions of the Approved Model will necessarily be appropriate in the context of a Tier 3 RA. The limitations of the model (as described in Section 12 of the MGRA User Guide (November 2016)) should be explicitly addressed in the context of the RA property.

3. Related to the above comment, the QP indicated in Section 2 of the PSF that the MGRA approved model will be used as part of the RA, please note that either a printout of the Tier 2 input tab sheet or the actual model run be included with the RA for clarity and transparency.

4. PSF, Section 3.5.7, Contaminant Inventory for Media, Full Depth Soil, and Appendix G. While three (3) soil samples were collected for grain size analysis and the QP provided a rationale as per s. 42 of the regulation, it would appear that all of the soil samples collected were from the native silty sand layer and not where contaminant transport is likely occurring. A Figure showing the grain size sampling locations together with rationale for the sampling locations should be provided for the RA submission. Please also refer to general comment 2, P2CSM comments from Environmental Permissions Branch below.

5. PSF, Section 3.6, Contaminant Inventory for Media, Groundwater. The reported aquifer horizontal gradient reported in this section does not match the values reported in Appendix A- Phase Two Conceptual Site Model. This discrepancy will need to be addressed in the RA. Additionally, the Phase Two CSM did not report the aquifer hydraulic conductivity reported in the PSF, and this should be clarified in the RA submission.

6. PSF, Section 6, Ecological Conceptual Site Model, Habitat. It is noted that there is undisturbed natural habitat present off the property. It is unclear if this is a typo. For transparency, the RA should comment if this habitat is within 30 m of the RA property, if not a typo.

7. Appendix A – Phase Two Conceptual Site Model, Figure 24A and Figure 24B, the following comments are made:

   a. For the aquatic receptors, the title suggests that aquatic receptors are present on-site. This appears to be a typo, and "On-Site" for Aquatic should be removed.

   b. Section 4.2 Release Mechanisms, Contaminant Transport Pathways, Human and Ecological Receptors. The title for this section appears to be incorrect as human receptors are not discussed in this section, The title should perhaps be revised to "Ecological Receptors and Exposure Pathways", to match Section 4.1.

   c. Section 4.2 indicates that the soil particulate inhalation is an exposure route for soil invertebrates, but Figure 24A does not show this exposure pathway as complete for soil invertebrates. This appears to be a typo in Section 4.2. This discrepancy will need to be addressed for the RA.

   d. It is also noted that the resolution of Figures 23A to 24B is poor, and this ideally could be improved for the RA submission.

Environmental Permissions Branch Comments on Phase Two CSM

These comments are based on the information provided in the phase two conceptual site model (CSM) submitted with the Risk Assessment Pre-Submission Form (PSF) for 1337 Queen Street West, Toronto dated July 4, 2024.

General Comments:

1. The qualified person (QP) notes in Table 10 of the phase two CSM that a monitoring well will be resampled twice to confirm concentrations. This to be related to completion of the phase two environmental site assessment (ESA). Please note that, as per the Regulation (as amended December 4, 2019), the PSF (and phase two CSM as a result) must be complete upon submittal to the Ministry.

2. According to Table 6 in the phase two CSM, the QP determined coarse-textured soil to be the predominant texture at the site and notes that the SCS for coarse textured soil are applicable. However, according to the SCS shown in Table 7 and 8 and CSM figures (e.g. Figure 9, 16A, etc.), the QP appears to be comparing soil and ground water contaminant concentrations to the Table 3 SCS for <u>medium-fine textured</u> soil. It is unclear if all COCs have been identified and discussed and depicted as required in the phase two CSM. Please also refer to comment 4 above regarding soil texture.

a. Based on information presented in the phase two CSM there appears to be a variety of soil types under the phase two property, including some soils that appear to be coarse textured. Where the QP intends to apply the medium-fine textured SCS, the phase two CSM should include a brief description of the results of the required grain size analyses and how the rules set in Section 42 of the Regulation apply to the property. Further note that soil samples for grain size analysis should be collected at depths and locations where the contaminant movement is likely to occur.

Specific Comments on the Phase Two CSM:

3. Section 24, paragraph 1 of the Regulation – This section specifies the general objectives of the phase one ESA, one of which is to develop a preliminary determination of the likelihood that one or more contaminants have affected any land or water on, in or under the phase one property. The following issues were identified:

    a. Based on the associated PCA, it is unclear how the QP determined the COPCs for APEC 1B to be limited to volatile organic compounds, benzene, toluene, ethylbenzene and xylenes (BTEX) and petroleum hydrocarbons (PHCs) and did not consider other parameters to be COPCs (e.g. metals, hydride-forming metals, mercury, low/high pH, etc.).

    b. APEC 1C appears to be resultant from a historical industrial operation. However, soil was the only potentially impacted media identified for this APEC. The Ministry expects ground water (in addition to soil) be identified as a potentially impacted media for activities driving an enhanced investigation property designation (i.e. industrial activities).

4. Clause 33.1(2)(b) of the Regulation – The general objectives of the phase two ESA are to be achieved by conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the phase two sampling and analysis plan and for any such contaminants identified during subsequent phase two activities and analyses of environmental conditions at the phase two property. The following issues were identified:

    a. Based on the information provided in the phase two CSM, it is unclear if all APECs associated with the identified PCAs and/or potential sources of contamination have been adequately investigated. Some examples are provided below.

        i. The limits of each APEC must be clearly presented in relation to the PCAs and sampling locations to demonstrate the assessment of each APEC. On-site PCAs are not shown on Figure 5B.

ii. Further, limited information is provided regarding the historical on-site industrial activities, if known. It is unclear if any details regarding infrastructure within the building, waste storage areas, etc. were available. *Note that identifying and locating where any PCA and/or potential sources of contamination have occurred (e.g., aboveground and/or underground storage tanks (ASTs/USTs), fuel dispensing area(s), fuel distribution lines, coal storage areas, hoists, trenches, pits, drains, oil-water separator, oil, solvent, paint, chemical, etc. storage areas, paint spray booth, waste storage areas, etc.) and showing tanks in such areas is required in the phase one CSM and on figures showing the property before actions taken to reduce the concentration of contaminants in the phase two ESA.*

If specific locations of PCAs/potential sources of contamination are confirmed to be unavailable and unknown for one or more APECs, then this should be documented in the phase two CSM together with a brief description of efforts made to obtain historical information concerning PCAs and/or any other potential contaminant sources and a brief explanation of how the sampling that was done has addressed any uncertainty in PCA location and has captured worst-case conditions for each of the affected APECs.

Please note, it must be clearly demonstrated in the phase two CSM that sampling for the identified COPCs in each APEC has been conducted at locations and depths where maximum concentrations associated with each PCA/APEC are likely to be expected and that the sampling in each APEC is representative of the full extent of each APEC.

5. Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing or incomplete in the phase two CSM:

   a. A narrative description and assessment of: any subsurface structures and utilities on, in or under the phase two property that may affect contaminant distribution and transport.

      - The QP describes that utilities and subsurface structures may affect contaminant distribution and transport. Limited discussion was provided, including depth of utilities/subsurface structures relative to ground water depth, where known. It is unclear if they were considered to play a role in the contaminant distribution and transport at the time the site became impacted and if this was taken into account in the sampling plan.

b. A description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including: hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable site condition standards (SCSs), lateral and vertical hydraulic gradients,

- Vertical hydraulic gradient was not provided.

c. Where contaminants on, in or under the phase two property are present at concentrations greater than the applicable site condition standard (SCS), **two or more cross-sections** showing, by parameter group as defined in the Analytical Protocol for which a contaminant has been analysed:

ii. the lateral and vertical distribution of each contaminant in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment,

- The lateral and vertical distribution of contaminants in figures (e.g. Figure 9A, Figure 16A) did not follow the requirements of clause 7(4)(c), Schedule E, which states the following: “the delineation is conducted by assuming the lateral and vertical extent of the area in which a contaminant is present at a concentration greater than the applicable site condition standard (SCS) for that contaminant extends laterally or vertically, as the case may be, from a sampling location at which the contaminant is present at a concentration greater than the applicable SCS for the contaminant to the next sampling location at which the concentration of the contaminant is equal to or below the applicable SCS for the contaminant.”

- Lateral and vertical delineation of VOC contamination in soil is only illustrated in one cross-section.

- It does not appear vertical delineation of VOCs at BH/MW105 was adequately demonstrated. The QP appears to be relying on a deeper soil sample at BH/MW106, approximately 12 metres away and where no shallow soil impacts were identified.

- Lateral delineation of VOCs in ground water is inconsistent between plan view and cross-section figures (e.g. at MW114 in Figure 16 vs. 16B).

iii. approximate depth to water table in each area referred to in subparagraph i,

- This information is missing on cross-section figures depicting soil contaminants.

iv. any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subparagraph i.

- ➢ The QP acknowledges that utilities/building footprints may affect contaminant migration. These were not illustrated on any cross-sections.

d. Figure 5A indicates borehole/monitoring well by "TEC, 2022". It is unclear if there were previous environmental investigations completed by others. The phase two CSM should include a brief summary of the purpose of previous investigations, their findings / conclusions and comparison of any previous sampling results, if any, to the current applicable SCS. *Note that if previous impacts were reported at the property, the locations and depths of any known historically impacted areas and concentrations where contaminants previously exceeded the applicable SCS would need to be identified and shown in figures to demonstrate that areas where historical exceedances were present have been assessed in accordance with the regulatory requirements.*

e. Table 6 appears to indicate Section 35 is not applicable. However, non-potable standards are being used, therefore Section 35 does apply.

f. Given VOCs impact observed, QP has not discussed in the phase two CSM whether sampling results/concentrations indicate potential for NAPL. Assessment requirements for NAPL are covered in Section 8, Paragraph 2 of Schedule E and Subsection 23(2) of Schedule E.

Summary and Conclusions

Some issues and/or inconsistencies have been identified as described above that must be addressed in the risk assessment submission. The probable timeline for review of the risk assessment is sixteen (16) weeks.

Risk Management Measures (RMMs)

- The QP would need to provide details of the RMMs in the RA in accordance to O.Reg. 153/04 (Schedule C, Table 1) and if any RMMs include engineering designs and controls (barriers to site soils, etc.), a Professional Engineer licensed to practice in Ontario should sign and seal a design report that details these designs and specifications along with any design drawing/figures. Please do not copy out the generic MGRA RMMs legal wording as part of the RMP because it is expected that a licensed Professional Engineer with the appropriate RMM experience will be developing and designing site specific RMMs.

- It is also expected that a QP provide details of a soil and groundwater management that includes soil sampling details for any soils excavated on the property and for reuse or for any soils being imported to the RA property and groundwater management plan for any collection and pumping of groundwater related to excavations or foundation drains. A CPU is exempted from parts of O.Reg.406/19 because a CPU is considered a legal instrument issued by this Ministry.

- If there are potential risks to off-site receptors from the RA property, then the QP would need to “propose risk management measures on the RA property that are designed to prevent, eliminate or ameliorate any adverse effects on or off the RA property” as per O.Reg. 153/04 (Schedule C, Table 1, section 7) which appears to apply to this RA property since there are clearly off site issues with high concentrations of VOCs in groundwater near RA property boundaries adjacent to residential properties.

- The Risk Management Plan should follow the requirements and headings outlined in Schedule C, Table 1, section 7 of O.Reg. 153/04.

- The RA should contain a separate appendix that includes all the legal information in one place (i.e., the updated lawyer’s letter, a copy of the updated PIN abstracts, copy of the legal transfer and nominee agreements etc.).

- Mentioned in the phase two CSM that a community use would be located in the basement of a condo building. Please clarify what type of community use would be in the basement.

Phase Two CSM comments from District

Comments on Table 3: Areas of Potential Environmental Concern

It does not appear that APEC 2 (off site PCAs to the west of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.

It does not appear that APEC 3 (off site PCAs to the east of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.

It does not appear that APEC 4 (off site PCAs to the north of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.

It also does not appear that APEC 4 (off site PCAs to the north of the site) associated with PCA identifier #17 (Dye manufacturing, processing and use) have been adequately assessed since COPCs did not include anilines, amines, quinolines and pH changes and PCA identifier #59 (wood treating and preservation facility and bulk storage of treated and preserved wood products) since the COPC did not include PAHs. Please provide clarification as to why anilines, amines, quinolines, pH changes and PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.

Location of APECs 1B and 1C indicate the entire site on table 3, but figure 4 for APECs 1B and 1C (orange cross hatch) seem to indicate only half the site (northern part of phase two property). Please clarify.

Section 41 – Site Sensitivity
The QP indicated that the pH of the Phase Two property soils has been tested and was found to be within the acceptable range of 5-9 for surface soils and 5-11 for subsurface soils. The QP should provide more details as to how many surface and sub-surface soil samples were obtained on the phase two property and the approximate location and depths of these samples.

The QP indicated that monitoring well BH/MW113 would be resampled twice to confirm concentrations. The QP may want to consider resampling other monitoring wells because it appears the highest concentrations of PCE has not been found yet along with some of the downgradient wells near the property boundary to confirm those VOC concentrations that have potential off site issues.

Please provide a copy of the borehole logs indicating the well construction details along with a copy of the laboratory’s certificate of analyses and chain of custody.

<u>Environmental Bill of Rights Requirements</u>

For any Property Owner or their Agent with an interest in submitting a Risk Assessment to the Ministry for acceptance under the Environmental Protection Act s. 168.5 we want to bring to your attention important amendments under the Environmental Bill of Rights Act.

Ontario Regulation 681/94, Classification of Proposals for Instruments, under the Environmental Bill of Rights (EBR) has been amended to classify certificates of property use (CPUs) as a class II instrument under the EBR if the certificate of property use relates to a risk assessment submitted to the Ministry on or after October 1, 2005. This amendment was made through O. Reg. 505/05. This classification requires a minimum level of public notification (by the Ministry) prior to issuance of the CPU, including a posting on the EBR, of certificate of property use proposals, and provides third party leave to appeal a decision on a certificate of property use.

All decisions regarding a CPU are subject to the Environmental Bill of Rights (EBR). One purpose of the summary of the Risk Management Plan which must be provided in the Risk Assessment Report under the heading "Risk Management Requirements" is to support these requirements. This summary will allow the Ministry to prepare a notice for the EBR in a timely fashion so as not to delay the processing of the submission. The EBR posting allows public input regarding the pending decision of the Director to issue the CPU under Section 168.6 of the EPA.

The summary provided by the Qualified Person under the heading "Risk Management Requirements" will be posted. The Ministry reserves the right to change the wording of the description, as required, to ensure that the public is correctly notified of the subject of the application. The description should be simple and concise (typically under 100 words) and should include the following information:

- State the risk management measures (indicating the principle equipment and any proposed building or land use restrictions) and on-going monitoring, maintenance and contingency plan requirements.

The Regulation has been filed and can be viewed at e-laws:
https://www.ontario.ca/laws

SUBMISSION OF RISK ASSESSMENT

Submission of Risk Assessment

Four hard copies of the risk assessment (including a stand-alone electronic copy of the risk assessment [USB format]) should be delivered to:

The Director
Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, ON, M4V 1P5
Telephone 416-314-8001

Of the four copies, at least one copy must contain the original signature of the QP_{RA} in the section on "mandatory certifications" as required by Section 5 of Schedule C of the Regulation. This original or master copy should be clearly labelled. However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

Change of Owner or QP_{RA}

Note that Section 3 (13) of Schedule C of the Regulation requires that the Director be notified in writing of a change of Property Owner, or change of QP_{RA}. It is requested that written notification of such a change be submitted to the Director at the above address and by email to the Risk Assessment Coordinator (address below). It is also requested that the notification include a copy of completed sections A, B, 1 and 10 of the Pre-Submission Form, completed and signed by all parties.

Risk Assessment

Many risk assessments fail because they do not satisfy basic requirements of the Regulation and/or because of misunderstandings about risk assessment processes under the Regulation. Before submitting a Risk Assessment to the Ministry, it is strongly recommended that the QP_{RA} review the mandatory requirements for risk assessments submitted under the Regulation, as outlined in **Sections 2, 4 and 5, and Table 1 of Schedule C of the Regulation**. As well, the QP_{RA} should refer to the Ministry's *Procedures for Use of Risk Assessment Under Part XV.1 of the Environmental Protection Act* for guidance in how to satisfy the requirements of the Regulation.

Use of Non-Standard Models

Please be advised that if the risk assessment submission uses a computer model as referred to in Schedule C, Section 9(4) and 9(5) of the Regulation, the Risk Assessment will be deemed a 'new science' risk assessment and the review timeline will be set at 22 weeks. Please note that the Qualified Person shall, upon request of the Director, include an electronic copy of the computer model in the risk assessment report in a manner that does not violate any person's copyright or other intellectual property rights.

Property Specific Standards

It is the responsibility of the QP_{RA} to ensure that the property specific standards (PSS) that are developed in the risk assessment (RA) will support filing of a Record of Site Condition (RSC) by the QP_{ESA}. This means that:

1) The correct table of site condition standards (SCS) must be used for selecting contaminants of concern (COC) in the risk assessment, and
2) PSS must be proposed for all COCs.
3) The QP_{RA} and QP_{ESA} must be able to make the requisite certifications in the RA/RSC.
4) Any parameters that do not have a PSS established in the RA must meet the applicable SCS.
5) If the QP_{ESA} finds that the RA does not support filing of the RSC (for example: the RA established PSS that are lower than concentrations found on-site; remediation has failed to reduce concentrations to below the PSS or applicable SCS), a new Pre-Submission Form (PSF) and RA must be submitted to the Ministry for review under the Regulation.

RAs, once approved under the Regulation, cannot be 'reopened' or revised.

ESA Requirements and RSC Filing

Some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the risk assessment (RA). Note that acceptance of the qualified person (QP's) responses on these ESA-related matters will be for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs will not be conducted as part of any future RA review. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that may be amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. In addition, if the work on the phase one and two ESA exceeds 18 months prior to the submission date of the RSC, the phase one and two ESA reports will need to be updated prior to submitting RSCs for filing.

If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Sri Sangaraju of Environmental Permissions Branch; email Sridhar.Sangaraju@ontario.ca.

Questions

If the $QP_{(RA)}$ has questions regarding the application of the Regulation or the above comments, they should be forwarded by email to:

Alexina Mo
Technical Assessment and Standards Development Branch
alexina.mo@ontario.ca

and

Ann Marie Deonarine
Risk Assessment Coordinator
Technical Assessment and Standards Development Branch
ann-marie.deonarine@ontario.ca

Schedule A
Comments by the MECP on Pre-Submission Form for 1337 Queen Street West, Toronto
PSF2251-24
IDS Ref No. 8055-D6VKUD

	MECP Comments (October 16, 2024) PSF2251-24 IDS Ref No. 8055-D6VKUD	EXP Responses (June 2025)
Specific Review Comments		
1	Introduction and General Approach, Risk Assessment Approach. The following comments are provided:	
a	It is noted that new toxicity information provided by MECP (2022) will be used for the RA. The Ministry has recently released updated TRVs for lead, acenaphthylene and anthracene, identified as soil COCs for the RA property. The QPRA should consider use of these TRVs in the RA.	Acknowledged. The TRVs provided by the MECP in 2024 have been utilized in the RA.
b	The QP provided a rationale for not retaining VOCs as soil COCs based on data from BH3 SS8 with elevated RDLs is reasonable (i.e., due to high moisture content and or low weight of soil sampled provided). The same rationale was again provided in Section 3.1.1 of the P2CSM. However, given that VOCs were identified as CPOCs in soil for several APECs and vinyl chloride was a COC in groundwater, further information is required. Note that the QPESA submitting the record of site condition (RSC) for the RA property will need to ensure that these PSS are met. If the QPESA finds that the RA does not support filing of the RSC (for example: the RA established PSS that are lower than concentrations found on-site; remediation has failed to reduce concentrations to below the PSS or applicable SCS), a new Pre-Submission Form (PSF) and RA must be submitted to the Ministry for review under the Regulation. RAs, once accepted under the Regulation, cannot be 'reopened' or revised.	Acknowledged. Additional rationale has been added to the CSM. Refer to Section 3.1.1.2 in the CSM.
2	PSF, Section 2, Planned Risk Assessment Approach. The QP is reminded that while the MECP (2016) Modified Generic Risk Assessment Approved Model may be used as a tool in the conduct of the Tier 3 RA, it will not satisfy all of the mandatory requirements of a Tier 3 RA and not all of the assumptions of the Approved Model will necessarily be appropriate in the context of a Tier 3 RA. The limitations of the model (as described in Section 12 of the MGRA User Guide (November 2016)) should be explicitly addressed in the context of the RA property.	Acknowledged. The use of the MGRA model in the RA is limited to the derivation of screening values, and was not used for quantitative evaluation in the RA. The limitations of the use of the model (e.g., source sizes) have been discussed within the RA Report.
3	Related to the above comment, the QP indicated in Section 2 of the PSF that the MGRA approved model will be used as part of the RA, please note that either a printout of the Tier 2 input tab sheet or the actual model run be included with the RA for clarity and transparency.	The MGRA model has only been used in the RA to derive updated soil and/or groundwater component values based on updated TRVs provided by the MECP. Input and output sheets have been provided in Appendix H.
4	PSF, Section 3.5.7, Contaminant Inventory for Media, Full Depth Soil, and Appendix G. While three (3) soil samples were collected for grain size analysis and the QP provided a rationale as per s. 42 of the regulation, it would appear that all of the soil samples collected were from the native silty sand layer and not where contaminant transport is likely occurring. A Figure showing the grain size sampling locations together with rationale for the sampling locations should be provided for the RA submission. Please also refer to general comment 2, P2CSM comments from Environmental Permissions Branch below.	Acknowledged. Soil sampling was completed to address the APECs. With reference to the cross-sections (Figure 21 and 22), the statums are shown. The majority of the Site is underlain by till. A total of 5 grain-size analysis were completed to support the development of the cross-sections and the selection of the medium/fine criteria. Based on the analysis, the medium/fine grain criteria was selected.
5	PSF, Section 3.6, Contaminant Inventory for Media, Groundwater. The reported aquifer horizontal gradient reported in this section does not match the values reported in Appendix A- Phase Two Conceptual Site Model. This discrepancy will need to be addressed in the RA. Additionally, the Phase Two CSM did not report the aquifer hydraulic conductivity reported in the PSF, and this should be clarified in the RA submission.	The hydraulic conductivity utilized within the RA report is consistent with the values provided within the Phase Two CSM.

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6	PSF, Section 6, Ecological Conceptual Site Model, Habitat. It is noted that there is undisturbed natural habitat present off the property. It is unclear if this is a typo. For transparency, the RA should comment if this habitat is within 30 m of the RA property, if not a typo.	The reviewer is correct. There is no undisturbed natural habitat present within 250 m of the RA property.
7	Appendix A – Phase Two Conceptual Site Model, Figure 24A and Figure 24B, the following comments are made:	
a	For the aquatic receptors, the title suggests that aquatic receptors are present on-site. This appears to be a typo, and "On-Site" for Aquatic should be removed.	This typographical error has been corrected.
b	Section 4.2 Release Mechanisms, Contaminant Transport Pathways, Human and Ecological Receptors. The title for this section appears to be incorrect as human receptors are not discussed in this section, The title should perhaps be revised to "Ecological Receptors and Exposure Pathways", to match Section 4.1.	The title of Section 4.2 has been revised to "Ecological Receptors and Exposure Pathways".
c	Section 4.2 indicates that the soil particulate inhalation is an exposure route for soil invertebrates, but Figure 24A does not show this exposure pathway as complete for soil invertebrates. This appears to be a typo in Section 4.2. This discrepancy will need to be addressed for the RA.	The soil particulate inhalation pathway for soil invertebrates is not considered to be a complete pathway; as such, the typographical error within Section 4.2 of the Phase Two CSM has been revised.
d	It is also noted that the resolution of Figures 23A to 24B is poor, and this ideally could be improved for the RA submission.	Acknowledged. The resolution of Figures 25A to 26B (formerly Figures 23A to 24B) have been improved within the RA report.

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Environmental Permissions Branch Comments on Phase Two CSM		
General Comments		
1	The qualified person (QP) notes in Table 10 of the phase two CSM that a monitoring well will be resampled twice to confirm concentrations. This to be related to completion of the phase two environmental site assessment (ESA). Please note that, as per the Regulation (as amended December 4, 2019), the PSF (and phase two CSM as a result) must be complete upon submittal to the Ministry.	Acknowledged. MW113 was re-sampled in November 2024, however, concentrations did not meet the Table 3 SCS. Commentary regarding delineation has been added to the CSM. Refer to Section 3.2.4 and Figure 16.
2	According to Table 6 in the phase two CSM, the QP determined coarse-textured soil to be the predominant texture at the site and notes that the SCS for coarse textured soil are applicable. However, according to the SCS shown in Table 7 and 8 and CSM figures (e.g. Figure 9, 16A, etc.), the QP appears to be comparing soil and ground water contaminant concentrations to the Table 3 SCS for medium-fine textured soil. It is unclear if all COCs have been identified and discussed and depicted as required in the phase two CSM. Please also refer to comment 4 above regarding soil texture.	Acknowledged. This was a typo in Table 6 and has been corrected. The medium-fine grained criteria are being utilized.
a	Based on information presented in the phase two CSM there appears to be a variety of soil types under the phase two property, including some soils that appear to be coarse textured. Where the QP intends to apply the medium-fine textured SCS, the phase two CSM should include a brief description of the results of the required grain size analyses and how the rules set in Section 42 of the Regulation apply to the property. Further note that soil samples for grain size analysis should be collected at depths and locations where the contaminant movement is likely to occur.	Acknowledged. With reference to the cross-sections (Figure 21 and 22), the statums are shown. The majority of the Site is underlain by till. A total of 5 grain-size analysis were completed to support the development of the cross-sections and the selection of the medium/fine criteria. Based on the analysis, the medium/fine grain criteria was selected.
Specific Comments on the Phase Two CSM:		
3	Section 24, paragraph 1 of the Regulation – This section specifies the general objectives of the phase one ESA, one of which is to develop a preliminary determination of the likelihood that one or more contaminants have affected any land or water on, in or under the phase one property. The following issues were identified:	
a	Based on the associated PCA, it is unclear how the QP determined the COPCs for APEC 1B to be limited to volatile organic compounds, benzene, toluene, ethylbenzene and xylenes (BTEX) and petroleum hydrocarbons (PHCs) and did not consider other parameters to be COPCs (e.g. metals, hydride-forming metals, mercury, low/high pH, etc.).	Acknowledged. It is understood that the selection of COPCs is at the discretion of the QPESA. If COPCs have been determind by the MECP and released as information, please provide documentation. The COPCs for APEC 1B were determined during the Phase One ESA to be PHCs, BTEX, and VOCs, however it is noted that APEC 1B encompasses the entire Site. Metals, HFMs, pH were sampled throughout the Site and this information provided during the original CSM. As requested, we have added metals, HFM, pH and mercury as COPCs to the APEC. Refer to Table 2 and Figures 11, 12, 18 and 19.
b	APEC 1C appears to be resultant from a historical industrial operation. However, soil was the only potentially impacted media identified for this APEC. The Ministry expects ground water (in addition to soil) be identified as a potentially impacted media for activities driving an enhanced investigation property designation (i.e. industrial activities).	Acknowledged. APEC 1C was for coal storage and it is assumed the coal storage occurred at grade. As such, soil was considered to be the media of concern at the discretion of the QP. It is noted that APEC 1C encompasses the entire Site, and as such, the groundwater has been sampled across the APEC for the COPCs (PHCs, BTEX, PAHs, metals, HFM, Hg, pH). Refer to Figures 14-24

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4	Clause 33.1(2)(b) of the Regulation – The general objectives of the phase two ESA are to be achieved by conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the phase two sampling and analysis plan and for any such contaminants identified during subsequent phase two activities and analyses of environmental conditions at the phase two property. The following issues were identified:	
a	Based on the information provided in the phase two CSM, it is unclear if all APECs associated with the identified PCAs and/or potential sources of contamination have been adequately investigated. Some examples are provided below.	
i and ii	i. The limits of each APEC must be clearly presented in relation to the PCAs and sampling locations to demonstrate the assessment of each APEC. On-site PCAs are not shown on Figure 5B. ii. Further, limited information is provided regarding the historical on-site industrial activities, if known. It is unclear if any details regarding infrastructure within the building, waste storage areas, etc. were available. *Note that identifying and locating where any PCA and/or potential sources of contamination have occurred (e.g., aboveground and/or underground storage tanks (ASTs/USTs), fuel dispensing area(s), fuel distribution lines, coal storage areas, hoists, trenches, pits, drains, oil-water separator, oil, solvent, paint, chemical, etc. storage areas, paint spray booth, waste storage areas, etc.) and showing tanks in such areas is required in the phase one CSM and on figures showing the property before actions taken to reduce the concentration of contaminants in the phase two ESA.* *If specific locations of PCAs/potential sources of contamination are confirmed to be unavailable and unknown for one or more APECs, then this should be documented in the phase two CSM together with a brief description of efforts made to obtain historical information concerning PCAs and/or any other potential contaminant sources and a brief explanation of how the sampling that was done has addressed any uncertainty in PCA location and has captured worst-case conditions for each of the affected APECs.* *Please note, it must be clearly demonstrated in the phase two CSM that sampling for the identified COPCs in each APEC has been conducted at locations and depths where maximum concentrations associated with each PCA/APEC are likely to be expected and that the sampling in each APEC is representative of the full extent of each APEC.*	Acknowledged. Based on available information (such as FIPs), features such as tanks, oil-water seperators have not been located on the Site. Companies identified city directory search indicated the presence of coal storage, however coal piles are not depicted on FIPs or are visible on aerial photographs and as such, the location cannot be provided on figures. Additional occupants included battery service. Similar to the coal piles, battery service within building is not visible on aerial photographs and is not depicted on FIPs. These activities are not indicated on FIPs within the building. Building layouts for the commercial/industrial uses prior to the current commercial use (Dollarama) are not available. Furthermore, the buildings associated with the industrial uses were demolished and replaced with the current building footprint between 1965 and 1969 (based on aerial photographs and FIPs). Based on the lack information available, APEC 1b and APEC 1c are for the entire Site to address the historic activities. Refer to Table 7 in the CSM for a disposition table for soil and groundwater sampling in these APECs.
5	Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing or incomplete in the phase two CSM:	
a	A narrative description and assessment of: any subsurface structures and utilities on, in or under the phase two property that may affect contaminant distribution and transport. - The QP describes that utilities and subsurface structures may affect contaminant distribution and transport. Limited discussion was provided, including depth of utilities/subsurface structures relative to ground water depth, where known. It is unclear if they were considered to play a role in the contaminant distribution and transport at the time the site became impacted and if this was taken into account in the sampling plan.	Acknowledged. Information has been added to the CSM in Section 3.6 in CSM. The known utility corridors are shown on Figure 3. While the actual depth of the utility corridors are not known, as this would require a detailed SUE invesigation which is outside the scope of a Phase Two ESA, the utilities are expected to be apprxoimately 1-2 m bgs. Based on the groundwater monitoring at the Site, the minimum depth to groundwater is 4.49 mbgs, which is below the expected depth of the utility corridors.
b	A description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including: hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable site condition standards (SCSs), lateral and vertical hydraulic gradients. - Vertical hydraulic gradient was not provided.	Acknowledged. Refer to Section 2.3 for vertical gradient information.

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c	Where contaminants on, in or under the phase two property are present at concentrations greater than the applicable site condition standard (SCS), **two or more cross-sections** showing, by parameter group as defined in the Analytical Protocol for which a contaminant has been analysed:	Acknowledged. An additional 2 cross-sections have been added to the Figure set (C-C' and D-D') and are presented for each parameter group where cross-sections are required. Cross-section figures follow plan view figures (i.e. cross-sections are shown as Figure 9A-9D following Figure 9).
ii	the lateral and vertical distribution of each contaminant in each area where the contaminant is present at a concentration greater than the applicable SCS in soil, ground water and sediment, - The lateral and vertical distribution of contaminants in figures (e.g. Figure 9A, Figure 16A) did not follow the requirements of clause 7(4)(c), Schedule E, which states the following: "the delineation is conducted by assuming the lateral and vertical extent of the area in which a contaminant is present at a concentration greater than the applicable site condition standard (SCS) for that contaminant extends laterally or vertically, as the case may be, from a sampling location at which the contaminant is present at a concentration greater than the applicable SCS for the contaminant to the next sampling location at which the concentration of the contaminant is equal to or below the applicable SCS for the contaminant." - Lateral and vertical delineation of VOC contamination in soil is only illustrated in one cross-section. - It does not appear vertical delineation of VOCs at BH/MW105 was adequately demonstrated. The QP appears to be relying on a deeper soil sample at BH/MW106, approximately 12 metres away and where no shallow soil impacts were identified. - Lateral delineation of VOCs in ground water is inconsistent between plan view and cross-section figures (e.g. at MW114 in Figure 16 vs. 16B).	Acknowledged. As note above, additional cross-sections have been added (C-C' and D-D'), specifically to address horizontal and veritical delineation of VOCs in both soil and groundwater. The cross-sections are also provided, as applicable, for other COCs. With respect to BH/MW105, an additional borehole BH105A was added adjacent to BH/MW105 to address vertical delineation at this location. Vertical delineation in soil was achieved between 7.62-8.53 m bgs at BH105A. Plan views and cross-sections have been updated. Refer to Figures 9 through 9D and Figures 16 through 16 D.
iii	approximate depth to water table in each area referred to in subparagraph i, - This information is missing on cross-section figures depicting soil contaminants.	Acknowledged. This information has been updated.
iv	any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subparagraph i. - The QP acknowledges that utilities/building footprints may affect contaminant migration. These were not illustrated on any cross-sections.	Acknowledged. While the utilties were located prior to drilling activities, the depth of the utility corridors are unknown as as built drawings are not available. As such, they cannot be accurately shown on a cross-section. Figure 3 presents the location of the utilities in plan view.
d	Figure 5A indicates borehole/monitoring well by "TEC, 2022". It is unclear if there were previous environmental investigations completed by others. The phase two CSM should include a brief summary of the purpose of previous investigations, their findings / conclusions and comparison of any previous sampling results, if any, to the current applicable SCS. *Note that if previous impacts were reported at the property, the locations and depths of any known historically impacted areas and concentrations where contaminants previously exceeded the applicable SCS would need to be identified and shown in figures to demonstrate that areas where historical exceedances were present have been assessed in accordance with the regulatory requirements.*	Acknowledged. The previous reports section was inadvertently not included in the CSM and has been added as Section 1.2. Data from the previous due diligence investigations was included in the dataset during the development of the CSM.
e	Table 6 appears to indicate Section 35 is not applicable. However, non-potable standards are being used, therefore Section 35 does apply.	Acknowledged. The non-potable standards are being applied. This has been updated throughout the CSM.
f	Given VOCs impact observed, QP has not discussed in the phase two CSM whether sampling results/concentrations indicate potential for NAPL. Assessment requirements for NAPL are covered in Section 8, Paragraph 2 of Schedule E and Subsection 23(2) of Schedule E.	Acknowledged. Section 2.3 includes a statement regarding NAPL (which was not observed during the groundwater sampling activities).

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Phase Two CSM comments from District		
Comments on Table 3: Areas of Potential Environmental Concern		
-	It does not appear that APEC 2 (off site PCAs to the west of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.	Acknowledged. It is understood that the selection of COPCs is at the discretion of the QPESA. If COPCs have been determind by the MECP and released as information, please provide documentation. The COPCs for APEC 2 were determined during the Phase One ESA to be PHCs, BTEX, VOCs, metals and HFM, for off-site PCAs. As requested, we have added PAHs as a COPC to the APEC. Refer to Table 2 and Figure 20.
-	It does not appear that APEC 3 (off site PCAs to the east of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.	Acknowledged. It is understood that the selection of COPCs is at the discretion of the QPESA. If COPCs have been determind by the MECP and released as information, please provide documentation. The COPCs for APEC 3 were determined during the Phase One ESA to be PHCs, BTEX, VOCs, metals and HFM, for off-site PCAs. As requested, we have added PAHs as a COPC to the APEC. Refer to Table 2 and Figure 20.
-	It does not appear that APEC 4 (off site PCAs to the north of the site) associated with PCA identifier #28 (gasoline and associated products in fixed tanks) and PCA#52 storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain a transportation systems) have been adequately assessed since COPC did not include PAHs. Please provide clarification as to why PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.	Acknowledged. It is understood that the selection of COPCs is at the discretion of the QPESA. If COPCs have been determind by the MECP and released as information, please provide documentation. The COPCs for APEC 4 were determined during the Phase One ESA to be PHCs, BTEX, VOCs, metals and HFM, for off-site PCAs. As requested, we have added PAHs as a COPC to the APEC. Refer to Table 2 and Figure 20.
-	It also does not appear that APEC 4 (off site PCAs to the north of the site) associated with PCA identifier #17 (Dye manufacturing, processing and use) have been adequately assessed since COPCs did not include anilines, amines, quinolines and pH changes and PCA identifier #59 (wood treating and preservation facility and bulk storage of treated and preserved wood products) since the COPC did not include PAHs. Please provide clarification as to why anilines, amines, quinolines, pH changes and PAHs were not included as COPCs since these are normally associated with these potentially contaminated activities.	Acknowledged. The information regarding PCA#59 (in APEC 4) was based on a review of City Directories and FIPs and the identification of a furniture store. Based on additional review of the information, the location of the PCA was determined to be a store with no manufacturing. As such, the address is no longer considered to be a PCA. Refer to Table F1 of the CSM. The information regarding PCA#17 (in APEC 4) was based on the identification of a dry cleaner as "United Cleaners & Dyers" for 1 year in 1934. Based on review of FIPs and aerial photographs, this was a small storefront. As the PCA is meant to capture “bulk” industrial applications, the above noted store is unlikely to fit this description and result in a APEC on-site for dying. The PCA is carried forward from a dry-cleaner prespective with VOCs as the primary COC.
-	Location of APECs 1B and 1C indicate the entire site on table 3, but figure 4 for APECs 1B and 1C (orange cross hatch) seem to indicate only half the site (northern part of phase two property). Please clarify.	Acknowledged. As noted previously, APEC 1a, 1b, and 1c include entire Site. Refer to Figures 4 and 5B.

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Section 41 – Site Sensitivity		
-	The QP indicated that the pH of the Phase Two property soils has been tested and was found to be within the acceptable range of 5-9 for surface soils and 5-11 for subsurface soils. The QP should provide more details as to how many surface and sub-surface soil samples were obtained on the phase two property and the approximate location and depths of these samples.	Acknowledged. Additional informational information has been added to Table 6 in CSM regarding # of pH samples. A total of 5 samples were submitted by EXP during this Phase Two ESA with an additional 2 samples submitted during previous investigations.
-	The QP indicated that monitoring well BH/MW113 would be resampled twice to confirm concentrations. The QP may want to consider resampling other monitoring wells because it appears the highest concentrations of PCE has not been found yet along with some of the downgradient wells near the property boundary to confirm those VOC concentrations that have potential off site issues.	Acknowledged. Multiple monitoring wells have been re-sampled in 2024 and early 2025 for various COCs. The highest concentration for VOCs is found at MW1, which is in the centre of the property. Refer to Figures 14-20.
-	Please provide a copy of the borehole logs indicating the well construction details along with a copy of the laboratory's certificate of analyses and chain of custody.	It is noted that a copy of the borehole logs and certificates of analysis were provided electronically as a part of the PSF submission. Appendix G (provided electronically) of the RA submission provides copies of the borehole logs and certificates of analysis, including those previously provided in the PSF.

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RMM Comments		
-	The QP would need to provide details of the RMMs in the RA in accordance to O.Reg. 153/04 (Schedule C, Table 1) and if any RMMs include engineering designs and controls (barriers to site soils, etc.), a Professional Engineer licensed to practice in Ontario should sign and seal a design report that details these designs and specifications along with any design drawing/figures. Please do not copy out the generic MGRA RMMs legal wording as part of the RMP because it is expected that a licensed Professional Engineer with the appropriate RMM experience will be developing and designing site specific RMMs.	Acknowledged, the details of the RMMs are provided in the RMP (Appendix P).
-	It is also expected that a QP provide details of a soil and groundwater management that includes soil sampling details for any soils excavated on the property and for reuse or for any soils being imported to the RA property and groundwater management plan for any collection and pumping of groundwater related to excavations or foundation drains. A CPU is exempted from parts of O.Reg.406/19 because a CPU is considered a legal instrument issued by this Ministry.	Acknowledged. Soil and Groundwater Management Plan has been included within the RMP.
-	If there are potential risks to off-site receptors from the RA property, then the QP would need to "propose risk management measures on the RA property that are designed to prevent, eliminate or ameliorate any adverse effects on or off the RA property" as per O.Reg. 153/04 (Schedule C, Table 1, section 7) which appears to apply to this RA property since there are clearly off site issues with high concentrations of VOCs in groundwater near RA property boundaries adjacent to residential properties.	Acknowledged. Boundary control measures including a PRB. have been included as an RMM to mitigate potential for off-Site migration. See Appendix P for additional details.
-	The Risk Management Plan should follow the requirements and headings outlined in Schedule C, Table 1, section 7 of O.Reg. 153/04.	Acknowledged, please see Section 7 and Appendix P.
-	The RA should contain a separate appendix that includes all the legal information in one place (i.e., the updated lawyer's letter, a copy of the updated PIN abstracts, copy of the legal transfer and nominee agreements etc.).	Acknowledged, please see Appendix J.
-	Mentioned in the phase two CSM that a community use would be located in the basement of a condo building. Please clarify what type of community use would be in the basement.	The type of community use is unknown at this time. However, risks to occupants to the proposed building have been evaluated using residential receptors and RMM have been recommended for the indoor air inhalation pathways, which would be applicable for an indoor worker or visitor which may be present in a community space.

Appendix E: HHRA and ERA Tables

Table E4-1: Comparison of Soil COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Human Health Component Values - Residential/Parkland/Institutional Land Use and Medium/Fine Textured Soils

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/g)	REM Soil Concentration[1] (µg/g)	MECP (2011) Table 3 SCS (µg/g)	Human Health Component Values (µg/g)							
				S1[2]	S2[2]	S3[2]	S-IA (Residential)[2]	S-IA (Commercial)[3]	Indoor Air Odour (Residential)[4]	Indoor Air Odour (Commercial)[4]	S-OA[2]
VOCs											
Tetrachloroethylene	17	**<u>20</u>**	2.3	130	520	20,000	2.3	4.2	2,700	9,700	190
PAHs											
Acenaphthene[5]	44.2	53	58	360	700	9,800	110	1,200	29,000	100,000	2,400
Acenaphthylene[5]	0.301	0.36	0.17	57	70	2,600	6	71	NV	NV	180
Anthracene[5]	82	**<u>98</u>**	0.74	57	70	2,600	130	1,600	NV	NV	950
Benzo(a)anthracene	74.1	**<u>89</u>**	0.63	5.7	7	260	900	11,000	NA	NA	600
Benzo(a)pyrene	71.9	**<u>86</u>**	0.3	0.57	0.7	17	2,500	32,000	NA	NA	Non-Vol (68)
Benzo(b)fluoranthene	72.3	**<u>87</u>**	0.78	5.7	7	260	68,000	800,000	NA	NA	3,800
Benzo(g,h,i)perylene	37.3	45	7.8	57	70	2,600	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	27.8	**<u>33</u>**	0.78	5.7	7	260	83,000	970,000	NA	NA	3,800
Chrysene	66.2	**<u>79</u>**	7.8	57	70	2,600	23,000	270,000	NA	NA	12,000
Dibenz(a,h)anthracene	9.1	**<u>11</u>**	0.1	0.57	0.7	26	310,000	4,100,000	NA	NA	790
Fluoranthene	183	**<u>220</u>**	0.69	57	70	2,600	3,200	38,000	NA	NA	4,500
Indeno(1,2,3-cd)pyrene	38.1	**<u>46</u>**	0.48	5.7	7	260	550,000	6,400,000	NA	NA	7,300
1- and 2-Methylnaphthalene[5]	18.81	**<u>23</u>**	3.4	72	560	560	NV	NV	34	940	NV
Naphthalene[5]	32	**<u>38</u>**	0.75	360	2,800	28,000	4.6	57	150	4300	270
Phenanthrene[5]	241	**<u>289</u>**	7.8	NV	NV	NV	NV	NV	NV	NV	NV
Pyrene	153	184	78	540	700	26,000	24,000	280,000	NA	NA	41,000
Metals and Inorganics											
Lead	430	**<u>516</u>**	120	45	420	420	NA	NA	NA	NA	NA

[1] **<u>Bolded</u>** values are in excess of one or more component values or an applicable component value is not available.

[2] Table 3 soil components for residential/parkland/institutional land use in a non-potable ground water condition with medium/fine textured soils obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a, 2024b), where applicable.

[3] Table 3 soil components for industrial/commercial/community land use in a non-potable ground water condition with medium/fine textured soils obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a, 2024b), where applicable.

[4] According to the MECP (2011c), the indoor air inhalation component value is protective of indoor air odour. Therefore only the risk related to indoor air inhalation will be assessed further.

[5] Volatile PAH as per MECP guidance (i.e., any PAH with a Henry's Law Constant greater than 1×10^{-5} atm-m^3/mol or vapor pressure greater than 1 torr at the average soil or groundwater temperature of 15 ºC)

NA - not applicable; NV - no value derived.

S1 - High frequency and high intensity direct contact exposure adopted from the residential land use scenario for application to site residents and visitors.

S2 - Low frequency and low intensity direct contact expsoure without children present.

S3 - Low frequency and high intensity direct contact exposure for trench works.

S-IA Soil to indoor air.

S-OA - soil to outdoor air.

Non-Vol - The REM soil concentration exceeds the S-OA component value; however, this parameter is not considered volatile, and will not be retained for further evaluation of the vapour inhalation pathways.

Pathway to be risk assessed.

Component values not highlighted indicates that the REM concentration does not exceed the component value. Therefore no further quantitative evaluation of these pathways are warranted, excluding the assessment of the trench air inhalation pathway since no component values exist for this pathway.

The REM is below applicable component values; however, the parameter will be carried forward for the quantitative analysis of total carcinogenic PAHs for applicable pathways (where a component value is exceeded for any one carcinogenic PAH).

Table E4-2: Comparison of Ground Water COC Maximum Concentrations to MECP (2011) Table 3 and Table 7 Site Condition Standards and Human Health Component Values - All Types of Land Use and Medium/Fine Textured Soils

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/L)	REM Ground Water Concentration[1] (µg/L)	MECP (2011) Table 3 SCS (µg/L)	MECP (2011) Table 7 SCS (µg/L)	Human Health Component Values (µg/L)[2]					
					Modified GW1[3]	GW2 (Residential)[4]	GW2 (Commercial)[5]	GW2 Odour (Residential)[6]	GW2 Odour (Commercial)[6]	50% Solubility
VOCs										
cis-1,2-Dichloroethylene	150	180	17	1.6	2,000	0.075	1.2	NV	NV	1,800,000
trans-1,2-Dichloroethylene	54.8	66	17	1.6	2,000	0.075	1.2	2,600,000	11,000,000	1,800,000
Tetrachloroethylene	4,100	4,920	17	0.5	2,000	0.075	1.2	12,000,000	49,000,000	100,000
Trichloroethylene	270	324	17	0.5	500	0.053	0.86	24,000,000	100,000,000	640,000
Vinyl Chloride	556	667	1.7	0.5	200	0.0075	0.12	81,000,000	340,000,000	4,400,000
PHC F1	470	564	750	420	82,000	0.45	7.7	NV	NV	1900

[1] Bolded values are in excess of one or more component values or an applicable component value is not available.

[2] Component values obtained from MECP (2016). It is noted that component values have been updated based on updated TRVs provided by MECP (2024a), where applicable.

[3] Table 2 GW1 values for assessment of ingestion of groundwater used as a surrogate for construction/subsurface utility worker via direct contact with groundwater with application of a 100x multiplier.

[4] Table 7 GW2 residential values for assessment of the vapour intrusion pathways given the shallow groundwater condition on-site for the future residential land use scenario.

[5] Table 7 GW2 commercial values for assessment of vapour intrusion pathways given the shallow groundwater condition on-site for the current commercial land use scenario.

[6] According to the MECP (2011c), the indoor air inhalation component value is protective of indoor air odour. Therefore only the risk related to indoor air inhalation will be assessed further.

NV - no value derived.

GW1 - Ingestion of potable ground water.

GW2 - Ground water to indoor air.

Pathway to be risk assessed.

Component values not highlighted indicates that the REM concentration does not exceed the component value. Therefore no further quantitative evaluation of these pathways are warranted, excluding the assessment of the trench air and outdoor air inhalation pathway since no component values exist for these pathways.

Table E4-3: Soil COC Exposure Point Concentrations

Contaminant of Concern	Exposure Point Concentration (µg/g)	Basis
VOCs		
Tetrachloroethylene	20.4	REM
PAHs		
Acenaphthene	53	REM
Acenaphthylene	0.36	REM
Anthracene	98	REM
Benzo(a)anthracene	89	REM
Benzo(a)pyrene	86	REM
Benzo(b)fluoranthene	87	REM
Benzo(g,h,i)perylene	45	REM
Benzo(k)fluoranthene	33	REM
Chrysene	79	REM
Dibenz(a,h)anthracene	11	REM
Fluoranthene	220	REM
Indeno(1,2,3-cd)pyrene	46	REM
1- and 2-Methylnaphthalene	23	REM
Naphthalene	38	REM
Phenanthrene	289	REM
Pyrene	184	REM
Metals and Inorganics		
Lead	516	REM

REM - Reasonable estimate of the maximum concentration calculated as the maximum on-site concentration + 20%.

[1] Exposure point concentrations for the PHC aliphatic and aromatic subfractions were calculated from the maximum parent fraction concentration and the subfraction mass fractions present in CCME (2008) as cited in MECP (2011c).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-4: Ground Water COC Exposure Point Concentrations

Contaminant of Concern	Exposure Point Concentration (μg/L)[1]	Basis
VOCs		
cis-1,2-Dichloroethylene	180	REM
trans-1,2-Dichloroethylene	66	REM
Tetrachloroethylene	4,920	REM
Trichloroethylene	324	REM
Vinyl Chloride	667	Theoretical REM
PHC F1	564	REM
Aliphatic C6-C8	341	REM Subfraction Concentration[1]
Aliphatic C>8-C10	36	REM Subfraction Concentration[1]
Aromatic C>8-C10	187	REM Subfraction Concentration[1]

REM - Reasonable estimate of the maximum concentration calculated as the maximum on-site concentration + 20%.

[1] Exposure point concentrations for the PHC aliphatic and aromatic subfractions were calculated from the maximum parent fraction concentration and the subfraction mass fractions present in CCME (2008) as cited in MECP (2011c).

Table E4-5: Summary of Receptor Characteristics

Exposure Parameter	Infant Site Resident	Toddler Site Resident	Child Site Resident	Teen Site Resident	Adult Site Resident	Pregnant Resident	Long-term Indoor Worker	Pregnant Long-term Indoor Worker	Outdoor Maintenance Worker	Pregnant Outdoor Maintenance Worker	Pregnant Female Maintenance Worker - Lead Direct Soil Contact Exposure[4]	Construction/ Subsurface Utility Worker	Pregnant Construction/ Subsurface Utility Worker	Pregnant Female Construction Worker - Lead Direct Soil Contact Exposure[4]	Reference
Age (yr)	0 - 0.5	0.5 - 4	5 - 11	12 - 19	>20	>20	>20	>20	>20	>20	>20	>20	>20	>20	MECP (2011C)
Age Group Duration (yr)	0.5	4.5	7	8	56	56	56	56	56	56	56	56	56	56	MECP (2011C)
Body weight (kg)	8.2	16.5	32.9	59.7	70.7	63.1	70.7	63.1	70.7	63.1	63.1	70.7	63.1	63.1	MECP (2011C)
Exposed Skin Surface Area (cm^2)	1105	1745	2822	3858	4343	3988	-	-	3400	3090	3090	3400	3090	3090	MECP (2011C)
Soil Adherence Factor (kg/cm^2-d)	7.00E-08	2.00E-07	2.00E-07	7.00E-08	7.00E-08	7.00E-08	-	-	2.00E-07	2.00E-07	2.00E-07	2.00E-07	2.00E-07	2.00E-07	MECP (2011C)
Soil Ingestion Rate (mg/day)	3.00E+01	2.00E+02	5.00E+01	5.00E+01	5.00E+01	5.00E+01	-	-	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.00E+02	MECP (2011C)
Exposure Frequency Indoors (hr/day)	24	24	22.23	21.83	22.5	24	9.8	24	-	-	-	-	-	-	MECP (2011C)
Exposure Frequency Outdoors (hr/day)	4.3	4.3	4.3	4.3	4.3	24	-	-	9.8	24	9.8	9.8	24	9.8	US EPA (2011)[1] and MECP (2011C)
Exposure Frequency in Trench (hr/day)	-	-	-	-	-	-	-	-	-	-	-	9.8	24	9.8	Assumed
Exposure Frequency Indoors and Outdoors (d/wk)	7	7	7	7	7	7	5	7	5	7	5	5	7	5	MECP (2011C) and MECP (2024B)
Exposure Frequency Indoors (wk/yr)	50	50	50	50	50	52	50	52	-	-	-	-	-	-	MECP (2011C)
Exposure Frequency Outdoors (wk/yr)[2]	39	39	39	39	39	52	-	-	39	52	52	39	52	52	MECP (2011C) and MECP (2024B)
Exposure Frequency in Trench (wk/yr)	-	-	-	-	-	-	-		-	-	-	4	52	-	Assumed; Professional Judgement
Exposure Duration (yr)	0.5	4.5	7	8	56	56	56	56	56	56	56	1.5	56	56	MECP (2011C)
Ground Water Dermal Contact Event Duration (hr/event)	-	-	-	-	-	-	-	-	-	-	-	0.25	0.25	-	Assumed
Ground Water Dermal Contact Event Frequency (events/d)	-	-	-	-	-	-	-	-	-	-	-	2	2	-	Assumed
Ground Water Incidental Ingestion Rate (L/d)	-	-	-	-	-	-	-	-	-	-	-	0.005	0.005	-	US EPA (2014)[2]
Inhalation rate (m^3/hr)	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	1.5	1.5	1.5	MECP (2011C)
Concentration of PM10 in Air (ug/m^3)	100	100	100	100	100	100	-	-	100	100	100	100	100	100	MECP (2011C)
Fraction of PM10 Which is Deposited (unitless)	0.6	0.6	0.6	0.6	0.6	0.6	-	-	0.6	0.6	0.6	0.6	0.6	0.6	MECP (2011C)
Averaging Time - non-carcinogens (yr)	0.5	4.5	7	8	56	56	56	56	56	56	56	1.5	56	56	MECP (2011C)
Averaging Time - carcinogens (yr)	76	76	76	76	76	76	56	56	56	56	56	56	56	56	MECP (2011C)
Averaging Time for Vapour Flux (s)	3.21E+08	3.21E+08	3.21E+08	3.21E+08	3.21E+08	2.39E+09	-	-	3.85E+08	1.76E+09	5.14E+08	1.03E+07	1.76E+09	5.14E+08	Calculated

'-" - not applicable.

[1] Wiley et al. (1991), as cited by US EPA (2011), reports a total daily outdoor exposure duration of 4.3 hours for children under that age of 11 . This value was conservatively assumed for all age groups.

[2] Based on recommended incidental ingestion rate of 10 ml/h while wading in surface water (US EPA, 2014).

[3] For the Construction/Subsurface Utility Worker, it is assumed that of the 39 weeks/year spent outdoors at the Site (MECP, 2011C), 35 weeks/year are spent at grade and 4 weeks/year are spent in an on-site trench.

[4] For direct contact exposure to lead by the pregnant Maintenance Workers and pregnant Construction/Subsurface Utility Workers, it is assumed that of they would be on site for 5 days per week for 52 weeks/year (MECP, 2024B).

Table E4-6A: Summary of Chemical Physical Properties for Soil COCs[1]

COC	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Henry's Law Constant at 15°C (Unitless)	Pure Component Solubility in Water (mg/L)	Organic Carbon Partiton Coefficient (cm^3/g)	Molecular Weight (g/mol)	Octanol Water Partition Coefficient (Log (K_{ow}))
VOC							
Tetrachloroethylene	7.20E-02	8.20E-06	4.29E-01	2.06E+02	2.14E+02	1.66E+02	3.40E+00
PAHs							
Acenaphthene	4.21E-02	7.69E-06	3.01E-03	3.90E+00	1.22E+04	1.54E+02	3.92E+00
Acenaphthylene	4.39E-02	7.53E-06	5.29E-03	1.61E+01	1.22E+04	1.52E+02	3.94E+00
Anthracene5	3.24E-02	7.74E-06	8.05E-04	4.34E-02	4.08E+04	1.78E+02	4.45E+00
Benzo(a)anthracene	5.10E-02	9.00E-06	1.33E-04	9.40E-03	4.62E+05	2.28E+02	5.76E+00
Benzo(a)pyrene	4.30E-02	9.00E-06	3.65E-06	1.62E-03	1.57E+06	2.52E+02	6.13E+00
Benzo(b)fluoranthene	2.26E-02	5.56E-06	6.25E-06	1.50E-03	1.61E+06	2.52E+02	5.78E+00
Benzo(ghi)perylene[2]	2.26E-02	5.23E-06	1.40E-05	2.60E-04	5.36E+06	2.76E+02	6.63E+00
Benzo(k)fluoranthene	2.26E-02	5.56E-06	5.02E-06	8.00E-04	1.57E+06	2.52E+02	6.11E+00
Chrysene	2.48E-02	6.21E-06	5.31E-05	2.00E-03	4.72E+05	2.28E+02	5.81E+00
Dibenz(a,h)anthracene	2.02E-02	5.18E-06	3.51E-07	1.03E-03	5.24E+06	2.78E+02	6.54E+00
Fluoranthene	3.02E-02	6.35E-06	1.16E-04	2.60E-01	1.42E+05	2.02E+02	5.16E+00
Indeno(1,2,3-cd)pyrene	1.90E-02	5.66E-06	2.60E-06	1.90E-04	5.36E+06	2.76E+02	6.70E+00
Naphthalene	5.90E-02	7.50E-06	8.77E-03	3.10E+01	3.67E+03	1.28E+02	3.30E+00
Phenanthrene[3]	3.24E-02	6.69E-06	1.79E-03	1.15E+00	4.16E+04	1.78E+02	4.46E+00
Pyrene	2.72E-02	7.24E-06	1.51E-04	1.35E-01	1.39E+05	2.02E+02	4.88E+00
Metals and Inorganics							
Lead	NA	NA	NA	9.58E+03	NA	2.07E+02	NA

[1] Chemical Physical properties were obtained from MECP (2016).

[2] The air diffusion coefficient was not available by MECP. Benzo(b)fluoranthene used as a surrogate.

[3] The air diffusion coefficient was not available by MECP. Anthracene was used as a surrogate.

NA - not applicable.

Highlighted rows are carcinogenic PAHs not identified as COCs but were carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-6B: Summary of Chemical Physical Properties for Ground Water COCs[1]

COC	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Henry's Law Constant at 15°C (Unitless)	Pure Component Solubility in Water (mg/L)	Organic Carbon Partiton Coefficient (cm^3/g)	Molecular Weight (g/mol)	Octanol Water Partition Coefficient (Log (K_{ow}))
VOCs							
cis-1,2-Dichloroethylene	7.36E-02	1.13E-05	1.73E-01	3.50E+03	8.76E+01	9.69E+01	2.09E+00
trans-1,2-Dichloroethylene	7.07E-02	1.19E-05	3.96E-01	3.50E+03	8.76E+01	9.69E+01	2.09E+00
Tetrachloroethylene	7.20E-02	8.20E-06	4.29E-01	2.06E+02	2.14E+02	1.66E+02	3.40E+00
Trichloroethylene	7.90E-02	9.10E-06	2.54E-01	1.28E+03	1.35E+02	1.31E+02	2.42E+00
Vinyl Chloride	1.06E-01	1.23E-06	8.83E-01	8.80E+03	4.75E+01	6.25E+01	1.62E+00
PHC F1							
Aliphatic C6-C8	5.00E-02	6.00E-06	5.17E+01	5.40E+00	7.96E+03	1.00E+02	3.60E+00
Aliphatic C>8-C10	5.00E-02	6.00E-06	8.28E+01	4.30E-01	6.32E+04	1.30E+02	4.50E+00
Aromatic C>8-C10	5.00E-02	6.00E-06	4.97E-01	6.50E+01	3.17E+03	1.20E+02	3.20E+00

[1] Chemical Physical properties were obtained from MECP (2016).

Table E4-7: Summary of Soil Physical Properties

Property/Parameter	Unsaturated Zone				Capillary Fringe	
	Gravel Crush	Reference	Loam	Reference	Loam	Reference
Dry bulk density, ρb (g/cm^3)	1.60	MECP (2016)	1.59	MECP (2016)	1.59	MECP (2016)
Total porosity, θT (cm^3/cm^3)	0.4	MECP (2016)	0.399	MECP (2016)	0.399	MECP (2016)
Water filled porosity, θw (cm^3/cm^3)	0.01	MECP (2016)	0.148	MECP (2016)	0.148	MECP (2016)
Air filled porosity, θa (cm^3/cm^3)	0.39	Calculated	0.251	Calculated	0.251	Calculated
Fraction organic carbon content, foc (unitless)	0.00	MECP (2016)	0.005	MECP (2016)	0.005	MECP (2016)
Residual water content, θr (cm^3/cm^3)	-	-	-	-	0.061	US EPA (2004a)
Saturated water content, θs (cm^3/cm^3)	-	-	-	-	0.399	US EPA (2004a)
Maximum slope along water retention curve point of inflection, α1 (cm^{-1})	-	-	-	-	0.01112	US EPA (2004a)
Air entry pressure head, h (cm)	-	-	-	-	89.9	Calculated[1]
van Genuchten curve shape parameter, N (unitless)	-	-	-	-	1.472	US EPA (2004a)
M (= 1-(1/N), unitless)	-	-	-	-	0.3207	US EPA (2004a)
Mean grain diameter, D (cm)	-	-	-	-	0.02	US EPA (2004a)

[1] Calculated from the van Genuchten equation (Equation 5 of US EPA 2004) and the USSCS characteristics for a sand soil type as cited in MECP (2011c).

Table E4-8: Soil Stratigraphy Applied in Vapour Transport

Thickness of Stratigraphic Unit or Dept to Impacts (cm)	Soil to Indoor Air Building with Basement	Soil to Indoor Air Slab-on-Grade Building	Ground Water to Outdoor Air	Reference
Thickness of gravel crush layer, L_{gc}[1]	30	30	-	Assumed (MECP, 2011c)
Thickness of loam layer, $L_{loam,}$	158	11.25	-	Measured
Capillary fringe thickness, L_{Cf}	-	-	37.5	Calculated[2]
Minimum depth to ground water table, $L_{gw,shallow}$	-	-	450	Measured
Thickness of vadose zone below the bottom of trench, hv,t	-	-	212.5	Calculated
Minimum depth to ground water table below trench, L_{gwt}	-	-	10.0	Assumed
Minimum depth to soil impacts, $L_{soil,}$	188.1	41.35	-	Measured

[1] Thickness of gravel crush layer beneath basement slab.

[2] Calculated from the mean particle diamenter for a sand soil type using Equation 10 of US EPA (2004).

Table E4-9: Building Characteristics Applied in Vapour Intrusion Modeling

Parameter	Units	Value
Residential Building With Basement (MECP, 2011c)		
Enclosed space floor length	cm	1225
Enclosed space floor width	cm	1225
Enclosed space height	cm	366
Enclosed space floor thickness	cm	8
Soil-building pressure differential	$g/cm\text{-}s^2$	40
Floor Wall crack width	cm	0.1
Indoor air exchange rate	1/hr	0.3
Depth below grade to bottom of enclosed floor space	cm	158
Commercial Slab-on-Grade Building (MECP, 2011c)		
Enclosed space floor length	cm	2000
Enclosed space floor width	cm	1500
Enclosed space height	cm	300
Enclosed space floor thickness	cm	11.25
Soil-building pressure differential	$g/cm\text{-}s^2$	20
Floor Wall crack width	cm	0.1
Indoor air exchange rate	1/hr	1.0
Depth below grade to bottom of enclosed floor space	cm	11.25

Table E4-10: Air Mixing Zone Characteristics - Ground Surface Exposure Scenario

Characteristic	Value	Reference
Wind speed, $U_{a,}$ (cm/s)	410	MECP (2011)
Mixing zone height, δ_a , (cm)	200	MECP (2011)
Width of source area parallel to air flow, w, (cm)	1300	MECP (2011)

Table E4-11: Air Mixing Zone Characteristics - Trench Scenario

Characteristic	Value	Reference
Air density at 25°C ,ρ_a, (g/cm^3)	1.18E-03	Holman (1981)
Air kinematic vicosity at 25°C , μ_a, (g/cm-s)	1.98E-04	Holman (1981)
Pooled water area, A,(m^2)	13	Professional judgement
Pooled water effective diameter, D_e,(m)	4.07	Calculated, US EPA (1994)
Air Exchange Rate (s^{-1})	3.15	Calculated
Wind speed, $U_{a,}$ (cm/s)	41.0	Assumed 1/10 of ground surface wind speed (professional judgment; Meridian, 2011)
Trench depth/mixing zone height, δ_a , (cm)	200	MECP as Cited in Meridian Inc., 2011
Length of trench parallel to air flow, w, (cm)	1300	MECP as Cited in Meridian Inc., 2011
Width of trench perpendicular to air flow, w, (cm)	100	MECP as Cited in Meridian Inc., 2011

Table E4-12A: Exposure Estimates For the Toddler Resident via Soil Direct Contact Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Soil Particulate Air Exposure Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Anthracene	98	1.30E-01	1.00E+00	1.00E+00	2.02E-04	8.92E-04	7.88E-07
Benzo(a)anthracene	89	1.30E-01	1.00E+00	1.00E+00	1.83E-04	8.06E-04	7.12E-07
Benzo(a)pyrene	86	1.30E-01	1.00E+00	1.00E+00	1.77E-04	7.82E-04	6.91E-07
Benzo(b)fluoranthene	87	1.30E-01	1.00E+00	1.00E+00	1.78E-04	7.87E-04	6.95E-07
Benzo(k)fluoranthene	33	3.00E-02	1.00E+00	1.00E+00	1.58E-05	3.02E-04	2.67E-07
Chrysene	79	3.00E-02	1.00E+00	1.00E+00	3.77E-05	7.20E-04	6.36E-07
Dibenz(a,h)anthracene	11	1.30E-01	1.00E+00	1.00E+00	2.25E-05	9.90E-05	8.75E-08
Fluoranthene	220	3.00E-02	1.00E+00	1.00E+00	1.04E-04	1.99E-03	1.76E-06
Indeno(1,2,3-cd)pyrene	46	3.00E-02	1.00E+00	1.00E+00	2.17E-05	4.14E-04	3.66E-07
Phenanthrene	289	1.30E-01	1.00E+00	1.00E+00	5.95E-04	2.62E-03	2.32E-06
Metals and Inorganics							
Lead	516	4.00E-03	6.00E-01	1.00E+00	3.27E-05	2.81E-03	4.13E-06

[1] Values obtained from MECP (2016). For the lead dermal RAF, 4.00E-03 (0.4%) was selected for the toddler life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). For the lead ingestion RAF, 6.00E-01 (60%) was selected for the toddler life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

Table E4-12B: Exposure Estimates For the Composite Resident via Soil Direct Contact (Dermal Contact and Incidental Ingestion) Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Dermal Exposure (mg/kg-d)						Incidental Ingestion (mg/kg-d)					
				Dermal Contact (Infant)	Dermal Contact (Toddler)	Dermal Contact (Child)	Dermal Contact (Teen)	Dermal Contact (Adult)	Dermal Contact (Composite Adult)	Incidental Ingestion (Infant)	Incidental Ingestion (Toddler)	Incidental Ingestion (Child)	Incidental Ingestion (Teen)	Incidental Ingestion (Adult)	Incidental Ingestion (Composite Adult)
PAHs															
Acenaphthene	53	1.30E-01	1.00E+00	3.20E-07	6.46E-06	8.15E-06	2.46E-06	1.63E-05	3.37E-05	9.55E-07	2.85E-05	5.55E-06	3.50E-06	2.07E-05	5.92E-05
Acenaphthylene	0.36	1.30E-01	1.00E+00	2.18E-09	4.40E-08	5.55E-08	1.67E-08	1.11E-07	2.30E-07	6.50E-09	1.94E-07	3.78E-08	2.38E-08	1.41E-07	4.03E-07
Anthracene	98	1.30E-01	1.00E+00	5.94E-07	1.20E-05	1.51E-05	4.56E-06	3.03E-05	6.26E-05	1.77E-06	5.28E-05	1.03E-05	6.49E-06	3.84E-05	1.10E-04
Benzo(a)anthracene	89	1.30E-01	1.00E+00	5.37E-07	1.08E-05	1.37E-05	4.12E-06	2.74E-05	5.65E-05	1.60E-06	4.77E-05	9.31E-06	5.86E-06	3.47E-05	9.92E-05
Benzo(a)pyrene	86	1.30E-01	1.00E+00	5.21E-07	1.05E-05	1.33E-05	3.99E-06	2.66E-05	5.49E-05	1.55E-06	4.63E-05	9.03E-06	5.69E-06	3.36E-05	9.62E-05
Benzo(b)fluoranthene	87	1.30E-01	1.00E+00	5.24E-07	1.06E-05	1.33E-05	4.02E-06	2.67E-05	5.52E-05	1.56E-06	4.66E-05	9.08E-06	5.72E-06	3.38E-05	9.68E-05
Benzo(g,h,i)perylene	45	1.30E-01	1.00E+00	2.70E-07	5.45E-06	6.88E-06	2.07E-06	1.38E-05	2.85E-05	8.06E-07	2.40E-05	4.69E-06	2.95E-06	1.74E-05	4.99E-05
Benzo(k)fluoranthene	33	1.30E-01	1.00E+00	2.01E-07	4.06E-06	5.13E-06	1.54E-06	1.03E-05	2.12E-05	6.01E-07	1.79E-05	3.49E-06	2.20E-06	1.30E-05	3.72E-05
Chrysene	79	1.30E-01	1.00E+00	4.79E-07	9.67E-06	1.22E-05	3.68E-06	2.45E-05	5.05E-05	1.43E-06	4.26E-05	8.32E-06	5.24E-06	3.10E-05	8.86E-05
Dibenz(a,h)anthracene	11	1.30E-01	1.00E+00	6.59E-08	1.33E-06	1.68E-06	5.06E-07	3.36E-06	6.94E-06	1.97E-07	5.86E-06	1.14E-06	7.20E-07	4.26E-06	1.22E-05
Fluoranthene	220	1.30E-01	1.00E+00	1.33E-06	2.67E-05	3.37E-05	1.02E-05	6.77E-05	1.40E-04	3.95E-06	1.18E-04	2.30E-05	1.45E-05	8.56E-05	2.45E-04
Indeno(1,2,3-cd)pyrene	46	1.30E-01	1.00E+00	2.76E-07	5.57E-06	7.02E-06	2.12E-06	1.41E-05	2.91E-05	8.23E-07	2.45E-05	4.79E-06	3.01E-06	1.78E-05	5.10E-05
Phenanthrene	289	1.30E-01	1.00E+00	1.75E-06	3.52E-05	4.44E-05	1.34E-05	8.91E-05	1.84E-04	5.21E-06	1.55E-04	3.03E-05	1.91E-05	1.13E-04	3.23E-04
Pyrene	184	1.30E-01	1.00E+00	1.11E-06	2.24E-05	2.82E-05	8.50E-06	5.66E-05	1.17E-04	3.31E-06	9.86E-05	1.92E-05	1.21E-05	7.16E-05	2.05E-04
Metals and Inorganics															
Lead	516	Lifestage Dependent[1]	Lifestage Dependent[2]	9.58E-08	1.93E-06	2.44E-06	7.35E-07	1.22E-05	1.74E-05	5.57E-06	1.66E-04	1.89E-05	1.53E-05	1.21E-04	3.27E-04

[1] Values obtained from MECP (2016). For the lead dermal RAF, 4.00E-03 (0.4%) was selected for the infant to teen life stages, and 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). **F**or the lead ingestion RAF, 6.00E-01 (60%) was selected for the infant, toddler and adult life stages, 3.50E-01 (35%) was selected for the child life stage, and 4.50E-01 (45%) was selected for the teen life stage (MECP, 2024b).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-12C: Exposure Estimates For the Composite Resident via Soil Direct Contact (Soil Particulate Inhalation) Exposure Pathway

Contaminant of Concern	REM Soil Concentration (mg/kg)	Lung Relative Absorption Factor[1] (Unitless)	Soil Particulate Air Exposure Concentration (mg/m^3)					
			Soil Particulate Inhalation (Infant)	Soil Particulate Inhalation (Toddler)	Soil Particulate Inhalation (Child)	Soil Particulate Inhalation (Teen)	Soil Particulate Inhalation (Adult)	Soil Particulate Inhalation (Composite Adult)
PAHs								
Acenaphthene	53	1.00E+00	2.79E-09	2.52E-08	3.91E-08	4.47E-08	3.13E-07	4.25E-07
Acenaphthylene	0.36	1.00E+00	1.90E-11	1.71E-10	2.66E-10	3.04E-10	2.13E-09	2.89E-09
Anthracene	98	1.00E+00	5.18E-09	4.67E-08	7.26E-08	8.29E-08	5.81E-07	7.88E-07
Benzo(a)anthracene	89	1.00E+00	4.68E-09	4.22E-08	6.56E-08	7.50E-08	5.25E-07	7.12E-07
Benzo(a)pyrene	86	1.00E+00	4.55E-09	4.09E-08	6.36E-08	7.27E-08	5.09E-07	6.91E-07
Benzo(b)fluoranthene	87	1.00E+00	4.57E-09	4.11E-08	6.40E-08	7.31E-08	5.12E-07	6.95E-07
Benzo(g,h,i)perylene	45	1.00E+00	2.36E-09	2.12E-08	3.30E-08	3.77E-08	2.64E-07	3.58E-07
Benzo(k)fluoranthene	33	1.00E+00	1.76E-09	1.58E-08	2.46E-08	2.81E-08	1.97E-07	2.67E-07
Chrysene	79	1.00E+00	4.19E-09	3.77E-08	5.86E-08	6.70E-08	4.69E-07	6.36E-07
Dibenz(a,h)anthracene	11	1.00E+00	5.75E-10	5.18E-09	8.05E-09	9.21E-09	6.44E-08	8.75E-08
Fluoranthene	220	1.00E+00	1.16E-08	1.04E-07	1.62E-07	1.85E-07	1.30E-06	1.76E-06
Indeno(1,2,3-cd)pyrene	46	1.00E+00	2.41E-09	2.17E-08	3.37E-08	3.85E-08	2.70E-07	3.66E-07
Phenanthrene	289	1.00E+00	1.52E-08	1.37E-07	2.13E-07	2.44E-07	1.71E-06	2.32E-06
Pyrene	184	1.00E+00	9.67E-09	8.71E-08	1.35E-07	1.55E-07	1.08E-06	1.47E-06
Metals and Inorganics								
Lead	516	1.00E+00	2.72E-08	2.45E-07	3.81E-07	4.35E-07	3.04E-06	4.13E-06

[1] Assumed to be 1 for all COCs as per MECP (2011c).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-13: Exposure Estimates For Outdoor Maintenance Worker via the Soil Direct Contact Exposure Pathway

COC	REM Soil Concentration (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Prorated Soil Particulate Air Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Acenaphthene	53	1.30E-01	1.00E+00	1.00E+00	3.54E-05	4.01E-05	6.91E-07
Acenaphthylene	0.36	1.30E-01	1.00E+00	1.00E+00	2.41E-07	2.73E-07	4.71E-09
Anthracene	98	1.30E-01	1.00E+00	1.00E+00	6.57E-05	7.44E-05	1.28E-06
Benzo(a)anthracene	89	1.30E-01	1.00E+00	1.00E+00	5.94E-05	6.72E-05	1.16E-06
Benzo(a)pyrene	86	1.30E-01	1.00E+00	1.00E+00	5.76E-05	6.52E-05	1.12E-06
Benzo(b)fluoranthene	87	1.30E-01	1.00E+00	1.00E+00	5.80E-05	6.56E-05	1.13E-06
Benzo(g,h,i)perylene	45	1.30E-01	1.00E+00	1.00E+00	2.99E-05	3.38E-05	5.84E-07
Benzo(k)fluoranthene	33	1.30E-01	1.00E+00	1.00E+00	2.23E-05	2.52E-05	4.35E-07
Chrysene	79	1.30E-01	1.00E+00	1.00E+00	5.31E-05	6.00E-05	1.04E-06
Dibenz(a,h)anthracene	11	1.30E-01	1.00E+00	1.00E+00	7.29E-06	8.25E-06	1.42E-07
Fluoranthene	220	1.30E-01	1.00E+00	1.00E+00	1.47E-04	1.66E-04	2.86E-06
Indeno(1,2,3-cd)pyrene	46	1.30E-01	1.00E+00	1.00E+00	3.05E-05	3.45E-05	5.96E-07
Phenanthrene	289	1.30E-01	1.00E+00	1.00E+00	1.93E-04	2.19E-04	3.77E-06
Pyrene	184	1.30E-01	1.00E+00	1.00E+00	1.23E-04	1.39E-04	2.39E-06
Metals and Inorganics							
Lead[4]	516	1.00E-02	6.00E-01	1.00E+00	3.60E-05	3.50E-04	8.97E-06

[1] Values obtained from MECP (2016). For the lead dermal RAF, 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). **F**or the lead ingestion RAF, 6.00E-01 (60%) was selected for the adult life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

[4] For lead, direct contact exposure was evaluated for a pregnant Maintenance Worker (See Receptor Characteristics Table for details).

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-14: Exposure Estimates For Construction Worker via Soil Direct Contact Exposure Pathway

COC	REM Soil Concentation (mg/kg)	Dermal Relative Absorption Factor[1] (Unitless)	Ingestion Relative Absorption Factor[2] (Unitless)	Lung Relative Absorption Factor[3] (Unitless)	Exposure (mg/kg-d)		Prorated Soil Particulate Air Concentration (mg/m^3)
					Dermal Contact	Incidental Ingestion	
PAHs							
Phenanthrene	289	1.30E-01	1.00E+00	1.00E+00	1.93E-04	2.19E-04	6.81E-06
Metals and Inorganics							
Lead[4]	516	1.00E-02	6.00E-01	1.00E+00	3.60E-05	3.50E-04	1.62E-05

[1] Values obtained from MECP (2016). For the lead dermal RAF, 1.00E-02 (1%) was selected for the adult life stage (MECP, 2024b).

[2] Values obtained from MECP (2016). **F**or the lead ingestion RAF, 6.00E-01 (60%) was selected for the adult life stage (MECP, 2024b).

[3] Assumed to be 1 for all COCs as per MECP (2011c).

[4] For lead, direct contact exposure was evaluated for a pregnant Construction/Subsurface Utility Worker (See Receptor Characteristics Table for details).

Table E4-15: Exposure Estimates For the Soil to Indoor Air Pathway

COC	REM Soil Concentration (mg/kg)	Residential Building With Basement			Commercial Slab-on-grade Building		
		Predicted Soil Gas Concentration (µg/m^3)	Attenuation Factor[1] (Unitless)	Indoor Air Concentration (µg/m^3)	Predicted Soil Gas Concentration (µg/m^3)	Attenuation Factor (Unitless)	Indoor Air Concentration (µg/m^3)
VOCs							
Tetrachloroethylene	20	7.13E+06	3.60E-04	2.57E+03	7.13E+06	9.87E-05	7.04E+02
PAHs							
1- and 2-Methylnaphthalene	23	1.66E+04	3.58E-04	5.94E+00	1.66E+04	9.81E-05	1.63E+00
Naphthalene	38	1.82E+04	3.59E-04	6.55E+00	-	-	-
Phenanthrene	289	2.06E+03	3.55E-04	7.31E-01	2.06E+03	9.72E-05	2.00E-01

Table E4-16A: Exposure Estimates For the Soil to Outdoor Air Pathway

COC	REM Soil Concentation (mg/kg)	Unsaturated Zone Effective Diffusion Coefficient (cm^2/s)	Soil Vapour to Outdoor Air Volatilization Factor (mg/ m^3air /mg/kg soil)	Outdoor Air Concentration (mg/m^3)
VOCs				
Tetrachloroethylene	20	4.53E-03	2.80E-04	5.70E-03
PAHs				
Acenaphthene	53	2.68E-03	2.54E-06	1.35E-04
Acenaphthylene	0.36	2.78E-03	3.44E-06	1.24E-06
Anthracene	98	2.14E-03	6.46E-07	6.35E-05
1- and 2-Methylnaphthalene	23	3.03E-03	1.05E-05	2.36E-04
Naphthalene	38	3.72E-03	9.34E-06	3.59E-04
Phenanthrene	289	2.08E-03	9.40E-07	2.72E-04

Although, the maximum soil concentration of some soil COCs meet the S-OA component value where available, the concentrations of soil COCs in outdoor air were calculated for application under the construction worker total outdoor air (i.e. ground level and trench air) exposure scenario.

Table E4-16B: Exposure Estimates For the Soil to Trench Air Pathway

COC	REM Soil Concentation (mg/kg)	Unsaturated Zone Effective Diffusion Coefficient (cm^2 /s)	Soil Vapour to Trench Air Volatilization Factor (mg/ m^3air /mg/kg soil)	Trench Air Concentration (mg/m^3)
VOCs				
Tetrachloroethylene	20	4.53E-03	1.48E-04	3.03E-03
PAHs				
Acenaphthene	53	2.68E-03	1.35E-06	7.16E-05
Acenaphthylene	0.36	2.78E-03	1.82E-06	6.59E-07
Anthracene	98	2.14E-03	3.43E-07	3.37E-05
1- and 2-Methylnaphthalene	23	3.03E-03	5.56E-06	1.25E-04
Naphthalene	38	3.72E-03	4.96E-06	1.90E-04
Phenanthrene	289	2.08E-03	4.99E-07	1.44E-04

Table E4-17: Exposure Estimates for Construction Worker Ground Water Direct Contact Pathways (Dermal Contact and Incidental Ingestion)

COC	Exposure Point Concentration (µg/L)	Ingestion Absorption Factor[1] (Unitless)	Dermal Absorption Factor[1] (Unitless)	Dermal Permeability Coefficient[2] (cm/hr)	Lag Time per Event[3] (hr)	Dermal Absorbed Dose Per Event[4] (mg/cm^2-event)	Exposure (mg/kg-d)	
							Dermal Contact	Incidental Ingestion
VOCs								
Tetrachloroethylene	4,920	1.00E+00	1.00E+00	3.28E-02	8.91E-01	2.10E-04	1.08E-02	1.86E-04
Vinyl Chloride	667	1.00E+00	1.00E+00	8.30E-03	2.35E-01	3.71E-06	1.91E-04	2.52E-05

[1] Ingestion and Dermal absorption factors of 1.0 were applied for all groundwater COCs.

[2] Permeability coefficients for organics were calculated from the octanol/water partition coefficient using Equation 3.8 of US EPA (2004b).

[3] The lag time per event was calculated using Equation A.4 of US EPA (2004b).

[4] The dermal absorbed dose per event for organics was calculated using Equation 3.2 aof US EPA (2004b).

Table E4-18: Exposure Estimates For the Ground Water to Indoor Air Pathway

COC	REM Ground Water Concentration (µg/L)	Henry's Law Constant (Dimensionless)	Residential Building With Basement			Commercial Slab-on-grade Building		
			Predicted Soil Gas Concentration (µg/m³)	Attenuation Factor (Unitless)[1]	Indoor Air Concentration (µg/m³)	Predicted Soil Gas Concentration (µg/m³)	Attenuation Factor (Unitless)[1]	Indoor Air Concentration (µg/m³)
VOCs and PHCs								
cis-1,2-Dichloroethylene	180	1.73E-01	3.11E+04	2.00E-02	6.22E+02	3.11E+04	4.00E-03	1.24E+02
trans-1,2-Dichloroethylene	66	3.96E-01	2.61E+04	2.00E-02	5.21E+02	2.61E+04	4.00E-03	1.04E+02
Tetrachloroethylene	4,920	4.29E-01	2.11E+06	2.00E-02	4.23E+04	2.11E+06	4.00E-03	8.45E+03
Trichloroethylene	324	2.54E-01	8.22E+04	2.00E-02	1.64E+03	8.22E+04	4.00E-03	3.29E+02
Vinyl Chloride	667	8.83E-01	5.89E+05	2.00E-02	1.18E+04	5.89E+05	4.00E-03	2.36E+03
PHC F1	564							
Aliphatic C6-C8	341	5.17E+01	1.76E+07	2.00E-02	3.53E+05	4.13E+07	1.39E-04	5.76E+03
Aliphatic C>8-C10	36	8.28E+01	2.94E+06	2.00E-02	5.88E+04	6.88E+06	1.39E-04	9.59E+02
Aromatic C>8-C10	187	4.97E-01	9.30E+04	2.00E-02	1.86E+03	2.17E+05	1.40E-04	3.03E+01

[1] Default attenuation factor for a residential building of 0.02 and a commercial building of 0.004 (MECP, 2011c) was applied due to the shallow groundwater condition.

Table E4-19: Exposure Estimates for the Ground Water to Outdoor Air Pathway

COC	REM Groundwater Concentration (mg/L)	Unsaturated Zone Effective Diffusion Coefficient (cm^2/s)	Capillary Fringe Effective Diffusion Coefficient (cm^2/s)	Overall Effective Diffusion Coefficient (cm^2/s)	Groundwater to Outdoor Air Volatilization Factor (mg/ m^3air /mg/L water)	Outdoor Air Concentration (mg/m^3)
VOCs and PHCs						
cis-1,2-Dichloroethylene	1.80E-01	4.61E-03	4.61E-03	4.61E-03	2.81E-05	5.06E-06
trans-1,2-Dichloroethylene	6.58E-02	4.43E-03	4.43E-03	4.43E-03	6.19E-05	4.07E-06
Tetrachloroethylene	4.92E+00	4.51E-03	4.51E-03	4.51E-03	6.83E-05	3.36E-04
Trichloroethylene	3.24E-01	4.95E-03	4.95E-03	4.95E-03	4.42E-05	1.43E-05
Vinyl Chloride	6.67E-01	6.64E-03	6.64E-03	6.64E-03	2.07E-04	1.38E-04
PHC F1	5.64E-01					
Aliphatic C6-C8	3.41E-01	3.13E-03	3.13E-03	3.13E-03	5.71E-03	1.95E-03
Aliphatic C>8-C10	3.55E-02	3.13E-03	3.13E-03	3.13E-03	9.14E-03	3.25E-04
Aromatic C>8-C10	1.87E-01	3.13E-03	3.13E-03	3.13E-03	5.48E-05	1.03E-05

Table E4-20: Exposure Estimates for the Ground Water to Trench Air Pathway

COC	REM Groundwater Concentration (mg/L)	Unsaturated Zone Effective Diffusion Coefficient (cm^2/s)	Capillary Fringe Effective Diffusion Coefficient (cm^2/s)	Overall Effective Diffusion Coefficient (cm^2/s)	Groundwater to Trench Air Volatilization Factor (mg/ m^3air /mg/L water)	Trench Air Concentration (mg/m^3)
VOCs and PHCs						
cis-1,2-Dichloroethylene	1.80E-01	4.61E-03	4.61E-03	4.61E-03	1.26E-04	2.27E-05
trans-1,2-Dichloroethylene	6.58E-02	4.43E-03	4.43E-03	4.43E-03	6.19E-05	4.07E-06
Tetrachloroethylene	4.92E+00	4.51E-03	4.51E-03	4.51E-03	6.83E-05	3.36E-04
Trichloroethylene	3.24E-01	4.95E-03	4.95E-03	4.95E-03	1.99E-04	6.45E-05
Vinyl Chloride	6.67E-01	6.64E-03	6.64E-03	6.64E-03	9.30E-04	6.20E-04
PHC F1	5.64E-01					
Aliphatic C6-C8	3.41E-01	3.13E-03	3.13E-03	3.13E-03	5.71E-03	1.95E-03
Aliphatic C>8-C10	3.55E-02	3.13E-03	3.13E-03	3.13E-03	9.14E-03	3.25E-04
Aromatic C>8-C10	1.87E-01	3.13E-03	3.13E-03	3.13E-03	5.48E-05	1.03E-05

Table E4-21A: Summary of Toxicity Reference Values for Soil COCs[1]

COC	Mode of Toxicity	Oral Reference Dose, RfD (mg/k-d)	End point	Reference	Source	Inhalation Reference Concentration, RfC (mg/m^3)	End point	Reference	Source	Oral Cancer Slope Factor, CSF (mg/k-d)$^{-1}$	End point	Reference	Source	Inhalation Unit Risk Factor, URF (mg/m3)$^{-1}$	End point	Reference	Source
VOCs																	
Tetrachloroethylene	Carcinogen	6.00E-03	Neurotoxicity	Cavalleri et al., 1994; Echeverria et al., 1995	IRIS, 2012; MECP, 2020	4.00E-02	Neurotoxicity	Cavalleri et al., 1994; Echeverria et al., 1995	IRIS, 2012; MECP, 2020	2.10E-03	Liver cancer	JISA, 1993	IRIS, 2012; MECP, 2020	2.60E-04	Liver cancer	JISA, 1993	IRIS, 2012; MECP, 2020
PAHs																	
Acenaphthene	Non-threshold	2.00E-02	Increased relative liver weight in female mice	MDH, 2018	MECP, 2024a	NA	-	-	-	1.00E-03	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-04	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017
Acenaphthylene	Non-threshold	2.00E-02	Increased relative liver weight in female mice	MDH, 2018 (proxy)	MECP, 2024a	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Anthracene	Non-threshold	1.30E-01	NOAEL (absence of developmental & reproductive toxicity studies)	MDH, 2019	MECP, 2024a	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(a)anthracene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(a)pyrene	Carcinogen	3.00E-04	Neurodevelopmental toxicity	IRIS 2017	IRIS 2017	2.00E-06	Reduction in embryonic survival	Archibong et al. 2002	IRIS 2017	1.00E+00	Increase in alimentary tract tumours (forestomach, esophagus, tonge and larynx)	Beland and Culp 1998	US EPA IRIS 2017	6.00E-01	Upper respiratory tract and pharynx tumours	Thyssen et al. 1981	US EPA IRIS 2017
Benzo(b)fluoranthene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(ghi)perylene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Benzo(k)fluoranthene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
Chrysene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Dibenz(a,h)anthracene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E+00	TEF = 1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-01	TEF = 1	Kalberlah et al 1995	US EPA IRIS 2017
Fluoranthene	Non-threshold	4.00E-02	Nephropathy, increased liver weights, microscopic liver lesions, and hematological alterations	US EPA, 1988	IRIS 1993	NA	-	-	-	1.00E-02	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-03	TEF = 0.01	Kalberlah et al 1995	US EPA IRIS 2017
Indeno(1,2,3-cd)pyrene	Non-threshold	NA	-	-	-	NA	-	-	-	1.00E-01	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-02	TEF = 0.1	Kalberlah et al 1995	US EPA IRIS 2017
1 and 2-Methylnaphthalene	Threshold	4.00E-03	Pulmonary alveolar proteinosis	Murata et al., 1993, 1997	IRIS 2003	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017
Naphthalene	Threshold	2.00E-02	Decreased terminal body weight of male rats	Battelle's Columbus Laboratories (BCL), 1980	IRIS 1998	3.70E-03	Nasal lesions in rats and mice, nasal tumours in rats, chronic lung inflammation in mice	Several Studies	ATSDR 2005	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017
Phenanthrene	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017	NA	TEF = 0	Kalberlah et al 1995	US EPA IRIS 2017
Pyrene	Non-threshold	3.00E-02	Kidney effects (renal tubular pathology, decreased kidney weights)	US EPA, 1989	IRIS 1993	NA	-	-	-	1.00E-03	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017	6.00E-04	TEF = 0.001	Kalberlah et al 1995	US EPA IRIS 2017
Metals and Inorganics																	
Lead - for <20 years (Selected for Residents)	Non-threshold	5.00E-04	Neurotoxicity (decrease in IQ) in children	Lanphear et al., 2005; EFSA, 2013	EFSA, 2013; MECP, 2024b	NA	-	-	-	NA	-	-	-	NA	-	-	-
Lead - for > 20+ years (Selected for Workers)	Non-threshold	6.30E-04	Increase in systolic blood pressure in adults	Lanphear et al., 2005; EFSA, 2013	EFSA, 2013; MECP, 2024b	NA	-	-	-	NA	-	-	-	NA	-	-	-

[1] TRVs obtained from MECP (2011), MECP(2016), MECP (2024a) or MECP (2024b), unless otherwise noted. Rationale for TRVs obtained from sources other than MECP is provided in Appendix L.

NA - not applicable

TEF = Toxic Equivalency Factors (in comparison to benzo(a)pyrene).

Values shaded in grey were obtained from sources other than MECP (2011c), MECP (2016) or MECP (2024a).

Table E4-21B: Summary of Toxicity Reference Values for Ground Water COCs[1]

COC	Mode of Toxicity	Oral Reference Dose, RfD (mg/k-d)	End point	Reference	Source	Inhalation Reference Concentration, RfC (mg/m^3)	End point	Reference	Source	Oral Cancer Slope Factor, CSF $(mg/k\text{-}d)^{-1}$	End point	Reference	Source	Inhalation Unit Risk Factor, URF $(mg/m^3)^{-1}$	End point	Reference	Source
VOCs																	
cis-1,2-Dichloroethylene	Threshold	2.00E-03	Oral semi-chronic study in rats, decreased body weight, hematocrit and hemoglobin	McCauley et al., 1995	IRIS, 2010; MECP, 2016	6.00E-02	trans-1,2-DCE was used as a surrogate as per MECP.			NA	-	-	-	NA	-	-	-
trans-1,2-Dichloroethylene	Threshold	2.00E-02	Decrease in number of antibody forming cells (AFCs) against sheep red blood cells (sRBCs) in male mice	Shopp et al., 1985	IRIS, 2010; MECP, 2016	6.00E-02	Inhalation LOEL from semi-chronic study in rats, liver degeneration and lung effects	Freundt et al., 1977	RIVM, 2001, 2009; MECP, 2016	NA	--	--	--	NA	--	--	--
Tetrachloroethylene	Carcinogen	6.00E-03	Neurotoxicity	Cavalleri et al., 1994; Echeverria et al., 1995	IRIS, 2012; MECP, 2020	4.00E-02	Neurotoxicity	Cavalleri et al., 1994; Echeverria et al., 1995	IRIS, 2012; MECP, 2020	2.10E-03	Liver cancer	JISA, 1993	IRIS, 2012; MECP, 2020	2.60E-04	Liver cancer	JISA, 1993	IRIS, 2012; MECP, 2020
Trichloroethylene	Carcinogen	5.00E-04	Decreased thymus weight, hypersensitivity and decreased PFC response in mice, fetal heart malformations in rats	Keil et al., 2009; Johnson et al,. 2003; Peden-Adams et al., 2006	IRIS, 2011; ATSDR, 2013; MECP, 2020	2.00E-03	Decreased thymus weight in female B6C3F1 mice; Increased fetal cardiac malformations in Sprague-Dawley rats	Keil et al., 2009; Johnson et al., 2003	IRIS, 2011; ATSDR, 2013; MECP, 2020	4.60E-02	Kidney cancer in humans, liver tumors in mice (derived from inhalation unit risk)	Charbotel et al., 2006; Maltoni et al., 1986; Henschler et al., 1980	IRIS, 2011; MECP, 2014	4.10E-03	Kidney cancer in humans, liver tumors in mice	Charbotel et al., 2006; Maltoni et al., 1986; Henschler et al., 1980	IRIS, 2011; MECP, 2020
Vinyl Chloride - Continuous Adulthood Exposure (Adult Worker)	Carcinogen	3.00E-03	Liver cell polymorphism in rat feeding study	Til et al., 1983/ 1991	ATSDR, 2006; IRIS, 2000; MECP, 2011	6.00E-02	Liver cell polymorphism in rat feeding study	Til et al., 1983/ 1991	TCEQ, 2009; MECP, 2016	7.20E-01	Liver angiosarcomas and carcinomas, neoplasms in rats	Feron et al., 1981	IRIS, 2000; MECP, 2016	4.40E-03	Liver angiosarcomas, angiomas, hepatomas and neoplasms in rats	Maltoni et al., 1981/ 1984	IRIS, 2000; MECP, 2016
Vinyl Chloride - Continuous Exposure from Birth	Carcinogen	3.00E-03	Liver cell polymorphism in rat feeding study	Til et al., 1983/ 1991	ATSDR, 2006; IRIS, 2000; MECP, 2011	6.00E-02	Liver cell polymorphism in rat feeding study	Til et al., 1983/ 1991	TCEQ, 2009; MECP, 2016	1.40E+00	Liver angiosarcomas and carcinomas and neoplasms in rats (twofold increase from adulthood exposure to account for continuous lifetime exposure)	Feron et al., 1981	IRIS, 2000; MECP, 2016	8.40E-03	Liver angiosarcomas, angiomas, hepatomas and neoplasms in rats	Maltoni et al., 1981/ 1984	TCEQ, 2009; MECP, 2016
PHC F1																	
Aliphatic C6-C8	Threshold	5.00E+00	Neurotoxicity	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.80E+01	Neurotoxicity	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aliphatic C>8-C10	Threshold	1.00E-01	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	1.00E+00	Hepatic and hematological changes	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-
Aromatic C>8-C10	Threshold	4.00E-02	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	2.00E-01	Decreased body weight of rats and mice	Edwards et al., 1997	TPHCWG, 1997; CCME, 2000	NA	-	-	-	NA	-	-	-

[1] TRVs obtained from MECP (2011), MECP(2016) or MECP (2024a), unless otherwise noted. Rationale for TRVS obtained from sources other than MECP is provided in Appendix L.

Values shaded in grey were obtained from sources other than MECP (2011c), MECP (2016) or MECP (2024a).

NA - not applicable

Table E4-22: Predicted Risks for Site Resident Exposure to COCs in Soil via Direct Contact

COC	Toddler[1]				Composite Adult[1]				Risk Based Concentration (HQ Total Direct Contact, µg/g)	Risk Based Concentration (ILCR Total Direct Contact, µg/g)
	HQ Dermal Contact	HQ Incidental Ingestion	HQ Soil Particulate Inhalation	HQ Total Direct Contact	ILCR Dermal Contact	ILCR Incidental Ingestion	HQ Soil Particulate Inhalation	ILCR Total Direct Contact		
PAHs										
Acenaphthene	NA	NA	NA	NA	3.37E-08	5.92E-08	2.55E-10	9.31E-08	NA	5.70E+02
Acenaphthylene	NA	NA	NA	NA	2.30E-09	4.03E-09	1.74E-11	6.34E-09	NA	5.70E+01
Anthracene	1.56E-03	6.86E-03	NC	8.42E-03	6.26E-07	**1.10E-06**	4.73E-09	**1.73E-06**	2.34E+03	5.70E+01
Benzo(a)anthracene	NC	NC	NC	NC	**5.65E-06**	**9.92E-06**	4.27E-08	**1.56E-05**	NC	5.70E+00
Benzo(a)pyrene	**5.91E-01**	**2.61E+00**	**3.45E-01**	**3.54E+00**	**5.49E-05**	**9.62E-05**	4.15E-07	**1.51E-04**	4.87E+00	5.70E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	**5.52E-06**	**9.68E-06**	4.17E-08	**1.52E-05**	NC	5.70E+00
Benzo(g,h,i)perylene	NA	NA	NA	NA	2.85E-07	4.99E-07	2.15E-09	7.86E-07	NA	5.70E+01
Benzo(k)fluoranthene	NC	NC	NC	NC	**2.12E-06**	**3.72E-06**	1.60E-08	**5.86E-06**	NC	5.70E+00
Chrysene	NC	NC	NC	NC	5.05E-07	8.86E-07	3.82E-09	**1.39E-06**	NC	5.70E+01
Dibenz(a,h)anthracene	NC	NC	NC	NC	**6.94E-06**	**1.22E-05**	5.25E-08	**1.92E-05**	NC	5.70E-01
Fluoranthene	2.61E-03	4.98E-02	NC	5.24E-02	**1.40E-06**	**2.45E-06**	1.06E-08	**3.86E-06**	8.39E+02	5.70E+01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	**2.91E-06**	**5.10E-06**	2.20E-08	**8.03E-06**	NC	5.70E+00
Phenanthrene	1.49E-02	6.55E-02	1.16E-05	8.04E-02	NC	NC	NC	NC	7.19E+02	NC
Pyrene	NA	NA	NA	NA	1.17E-07	2.05E-07	8.82E-10	3.22E-07	NA	5.70E+02
Total Carcinogenic PAHs	NA	NA	NA	NA	**8.10E-05**	**1.42E-04**	6.12E-07	**2.24E-04**	NA	NA
Metals and Inorganics										
Lead	6.53E-02	**5.61E+00**	NC	**5.68E+00**	NC	NC	NC	NC	1.82E+01	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable. Parameter retained for evaluation of total carcinogenic exposure only.

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-23: Predicted Risks for Maintenance Worker Exposure to COCs in Soil via Direct Contact

COC	HQ[1]				ILCR[1]				Risk Based Concentration (HQ Total Direct Contact, µg/g)	Risk Based Concentration (ILCR Total Direct Contact, µg/g)
	Dermal Contact	Incidental Ingestion	Soil Particulate Inhalation	Total Direct Contact	Dermal Contact	Incidental Ingestion	Soil Particulate Inhalation	Total Direct Contact		
PAHs										
Acenaphthene	NA	NA	NA	NA	3.54E-08	4.01E-08	4.15E-10	7.59E-08	NA	6.99E+02
Acenaphthylene	NA	NA	NA	NA	2.41E-09	2.73E-09	2.83E-11	5.17E-09	NA	6.99E+01
Anthracene	5.06E-04	5.72E-04	NC	1.08E-03	6.57E-07	7.44E-07	7.70E-09	**1.41E-06**	1.83E+04	6.99E+01
Benzo(a)anthracene	NC	NC	NC	NC	**5.94E-06**	**6.72E-06**	6.96E-08	**1.27E-05**	NC	6.99E+00
Benzo(a)pyrene	1.92E-01	**2.17E-01**	**5.62E-01**	**9.72E-01**	**5.76E-05**	**6.52E-05**	6.75E-07	**1.24E-04**	1.78E+01	6.99E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	**5.80E-06**	**6.56E-06**	6.79E-08	**1.24E-05**	NC	6.99E+00
Benzo(g,h,i)perylene	NA	NA	NA	NA	2.99E-07	3.38E-07	3.50E-09	6.41E-07	NA	6.99E+01
Benzo(k)fluoranthene	NC	NC	NC	NC	**2.23E-06**	**2.52E-06**	2.61E-08	**4.78E-06**	NC	6.99E+00
Chrysene	NC	NC	NC	NC	5.31E-07	6.00E-07	6.21E-09	**1.14E-06**	NC	6.99E+01
Dibenz(a,h)anthracene	NC	NC	NC	NC	**7.29E-06**	**8.25E-06**	8.54E-08	**1.56E-05**	NC	6.99E-01
Fluoranthene	3.67E-03	4.15E-03	NC	7.82E-03	**1.47E-06**	**1.66E-06**	1.72E-08	**3.14E-06**	5.62E+03	6.99E+01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	**3.05E-06**	**3.45E-06**	3.58E-08	**6.54E-06**	NC	6.99E+00
Phenanthrene	4.83E-03	5.46E-03	1.89E-05	1.03E-02	NC	NC	NC	NC	5.61E+03	NC
Pyrene	NA	NA	NA	NA	1.23E-07	1.39E-07	1.44E-09	2.63E-07	NA	6.99E+02
Total Carcinogenic PAHs	NA	NA	NA	NA	**8.51E-05**	**9.62E-05**	9.96E-07	**1.82E-04**	NA	NA
Metals and Inorganics										
Lead	5.71E-02	5.55E-01	NC	6.12E-01	NC	NC	NC	NC	6.75E+02	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.8 for adult exposure to lead) or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable. Parameter retained for evaluation of total carcinogenic exposure only.

Highlighted rows are carcinogenic PAHs carried forward for evaluation of exposure to total carcinogenic PAHs.

Table E4-24: Predicted Risks for Construction Worker Exposure to COCs in Soil via Direct Contact

COC	HQ[1]				ILCR[1]				Risk Based Concentration (HQ Total Direct Contact, μg/g)	Risk Based Concentration (ILCR Total Direct Contact, μg/g)
	Dermal Contact	Incidental Ingestion	Inhalation of Particles	Total Direct Contact	Dermal Contact	Incidental Ingestion	Inhalation of Particles	Total Direct Contact		
PAHs										
Phenanthrene	4.83E-03	5.46E-03	3.41E-05	1.03E-02	NC	NC	NC	NC	5.60E+03	NC
Metals and Inorganics										
Lead	5.71E-02	5.55E-01	NC	6.12E-01	NC	NC	NC	NC	6.75E+02	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (or 0.8 for adult exposure to lead) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-25A: Predicted Risks for Toddler Resident Exposure to COCs in Soil via Indoor Air Inhalation

COC	Residential Building With Basement			Residential Building With Basement Risk-Based Concentration (µg/g)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	Hazard Quotient[1]	
VOCs				
Tetrachloroethylene	2.57E+00	2.46E+00	**6.15E+01**	6.63E-02
PAHs				
1- and 2-Methylnaphthalene	5.94E-03	5.69E-03	2.85E-02	1.59E+02
Naphthalene	6.55E-03	6.28E-03	**1.70E+00**	4.52E+00
Phenanthrene	7.31E-04	7.01E-04	3.51E-03	1.65E+04

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2. The target HQ for PHCs were set at 0.5.

Table E4-25B: Predicted Risks for Composite Resident Exposure to COCs in Soil via Indoor Air Inhalation

COC	Residential Building With Basement			Building With Basement Risk-Based Concentration (µg/g)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	ILCR[1]	
VOCs				
Tetrachloroethylene	2.57E+00	2.31E+00	**6.00E-04**	3.40E-02
PAHs				
1 and 2-Methylnaphthalene	5.94E-03	5.34E-03	NC	NC
Naphthalene	6.55E-03	5.89E-03	NC	NC
Phenanthrene	7.31E-04	6.57E-04	NC	NC

[1] Bolded values highlighted in gray exceed the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-26: Predicted Risks for Indoor Worker Exposure to COCs in Soil via Indoor Air Inhalation

COC	Commercial Slab-on-grade Building				Risk-Based Concentration (HQ, µg/g)	Risk-Based Concentration (ILCR, µg/g)
	Predicted Indoor Air Concentration (mg/m³)	Prorated Indoor Air Exposure Concentration (mg/m³)	HQ[1]	ILCR[1]		
VOCs and PHCs						
Tetrachloroethylene	7.04E-01	1.97E-01	**4.92E+00**	**5.12E-05**	8.29E-01	3.99E-01
PAHs						
1- and 2-Methylnaphthalene	1.63E-03	4.55E-04	2.28E-03	NC	1.98E+03	NC
Phenanthrene	2.00E-04	5.60E-05	2.80E-04	NC	2.07E+05	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-27: Predicted Risks for Site Resident Exposure to COCs in Soil via Ambient Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Toddler Site Resident		Composite Site Resident		Risk Based Concentration (HQ, µg/g)	Risk Based Concentration (ILCR, µg/g)
		Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	Prorated Outdoor Air Exposure Concentration (mg/m^3)	ILCR[1]		
PAHs							
1- and 2-Methylnaphthalene	1.25E-04	1.68E-05	8.41E-05	1.68E-05	NC	5.37E+04	NC
Phenanthrene	1.44E-04	1.93E-05	9.66E-05	1.93E-05	NC	5.99E+05	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-28: Predicted Risks for Maintenance Worker Exposure to COCs in Soil via Ambient Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	Maintenance Worker		Risk Based Concentration (HQ, µg/g)	Risk Based Concentration (ILCR, µg/g)
			HQ	ILCR		
PAHs						
1- and 2-Methylnaphthalene	2.36E-04	5.16E-05	2.58E-04	NC	1.75E+04	NC
Phenanthrene	2.72E-04	5.93E-05	2.96E-04	NC	1.95E+05	NC

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcionogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-29: Predicted Risks for Construction Worker Exposure to COCs in Soil via Outdoor and Trench Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Predicted Trench Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	Prorated Trench Air Exposure Concentration (mg/m^3)	Inhalation of Outdoor Air[1]		Inhalation of Trench Air[1]		Inhalation of Trench Air and Ambient Outdoor Air[1]		Risk Based Concentration (HQ Total, µg/g)	Risk Based Concentration (ILCR Total, µg/g)
					HQ	ILCR	HQ	ILCR	HQ	ILCR		
VOCs												
Tetrachloroethylene	5.70E-03	3.03E-03	2.01E-03	1.22E-04	5.02E-02	1.40E-08	3.05E-03	8.49E-10	5.33E-02	1.48E-08	7.66E+01	1.37E+03
PAHs												
Acenaphthene	1.35E-04	7.16E-05	4.76E-05	2.88E-06	NC	7.64E-10	NC	4.64E-11	NC	8.11E-10	NC	6.54E+04
Acenaphthylene	1.24E-06	6.59E-07	4.37E-07	2.65E-08	NC	7.03E-11	NC	4.27E-12	NC	7.46E-11	NC	4.84E+03
Anthracene	6.35E-05	3.37E-05	2.24E-05	1.36E-06	NC	3.60E-09	NC	2.18E-10	NC	3.82E-09	NC	2.58E+04
1- and 2-Methylnaphthalene	2.36E-04	1.25E-04	8.33E-05	5.05E-06	4.17E-04	NC	2.53E-05	NC	4.42E-04	NC	2.35E+04	NC
Naphthalene	3.59E-04	1.90E-04	1.26E-04	7.67E-06	3.42E-02	NC	2.07E-03	NC	3.62E-02	NC	2.12E+02	NC
Phenanthrene	2.72E-04	1.44E-04	9.58E-05	5.81E-06	4.79E-04	NC	2.90E-05	NC	5.08E-04	NC	1.14E+05	NC
Total Carcinogenic PAHs	NA	NA	NA	NA	NA	4.43E-09	NA	2.69E-10	NA	4.70E-09	NA	NA

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcionogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-30: Predicted Risks for Construction Worker Direct Contact Exposure to Ground Water (Dermal Contact and Incidental Ingestion)

COC	HQ[1]			ILCR[1]			Risk Based Concentration (HQ Total, µg/L)	Risk Based Concentration (ILCR Total, µg/L)
	Dermal Contact	Incidental Ingestion	Total	Dermal Contact	Incidental Ingestion	Total		
VOCs								
Tetrachloroethylene	**1.80E+00**	3.10E-02	**1.83E+00**	6.08E-07	1.05E-08	6.18E-07	5.37E+02	7.96E+03
Vinyl Chloride	6.35E-02	8.40E-03	7.19E-02	3.68E-06	4.86E-07	**4.16E-06**	1.85E+03	1.60E+02

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcionogens of 0.2 or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-31A: Predicted Risks for Toddler Site Resident Exposure to COCs in Ground Water via Indoor Air Inhalation

COC	Residential Building With Basement			Residential Building With Basement Risk-Based Concentration (µg/L)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	HQ[1]	
VOCs and PHCs				
cis-1,2-Dichloroethylene	6.22E-01	5.97E-01	**9.94E+00**	3.62E+00
trans-1,2-Dichloroethylene	5.21E-01	5.00E-01	**8.33E+00**	1.58E+00
Tetrachloroethylene	4.23E+01	4.05E+01	**1.01E+03**	9.71E-01
Trichloroethylene	1.64E+00	1.64E+00	**8.19E+02**	1.98E-01
Vinyl Chloride	1.18E+01	1.13E+01	**1.88E+02**	7.08E-01
PHC F1			**8.41E+01**	3.35E+00
Aliphatic C6-C8	3.53E+02	3.38E+02	**1.88E+01**	-
Aliphatic C>8-C10	5.88E+01	5.64E+01	**5.64E+01**	-
Aromatic C>8-C10	1.86E+00	1.78E+00	**8.92E+00**	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs and TCE).

Table E4-31B: Predicted Risks for Composite Resident Exposure to COCs in Ground Water via Indoor Air Inhalation

COC	Residential Building With Basement			Future Residential Building With Basement Risk-Based Concentration (µg/L)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	ILCR[1]	
VOCs and PHCs				
cis-1,2-Dichloroethylene	6.22E-01	5.59E-01	NC	NC
trans-1,2-Dichloroethylene	5.21E-01	4.69E-01	NC	NC
Tetrachloroethylene	4.23E+01	3.80E+01	**9.88E-03**	4.98E-01
Trichloroethylene	1.64E+00	1.48E+00	**6.06E-03**	5.35E-02
Vinyl Chloride	1.18E+01	1.06E+01	**8.89E-02**	7.50E-03
PHC F1			NC	NC
Aliphatic C6-C8	3.53E+02	3.17E+02	NC	-
Aliphatic C>8-C10	5.88E+01	5.29E+01	NC	-
Aromatic C>8-C10	1.86E+00	1.67E+00	NC	-

[1] Bolded values highlighted in gray exceed the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-32: Predicted Risks for Indoor Worker Exposure to COCs in Ground Water via Indoor Air Inhalation

COC	Commercial Slab-on-grade Building				Risk-Based Concentration (HQ, µg/L)	Risk-Based Concentration (ILCR, µg/L)
	Predicted Indoor Air Concentration (mg/m^3)	Prorated Indoor Air Exposure Concentration (mg/m^3)	HQ[1]	ILCR[1]		
VOCs and PHCs						
cis-1,2-Dichloroethylene	1.24E-01	3.48E-02	**5.80E-01**	NC	6.21E+01	NC
trans-1,2-Dichloroethylene	1.04E-01	2.92E-02	**4.86E-01**	NC	2.71E+01	NC
Tetrachloroethylene	8.45E+00	2.36E+00	**5.91E+01**	6.15E-04	1.67E+01	8.00E+00
Trichloroethylene	3.29E-01	3.28E-01	**1.64E+02**	1.34E-03	9.89E-01	2.41E-01
Vinyl Chloride	2.36E+00	6.59E-01	**1.10E+01**	2.90E-03	1.21E+01	2.30E-01
PHC F1			4.00E-01	NC	7.05E+02	NC
Aliphatic C6-C8	5.76E+00	1.61E+00	8.94E-02	NC	-	-
Aliphatic C>8-C10	9.59E-01	2.68E-01	2.68E-01	NC	-	-
Aromatic C>8-C10	3.03E-02	8.48E-03	4.24E-02	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs abd TCE) or the target incremental lifetime cancer risk for carcinogens of 1×10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-33: Predicted Risks for Site Resident Exposure to COCs in Ground Water via Inhalation of Ambient Outdoor Air

COC	Predicted Outdoor Air Concentration (mg/m^3)	Toddler Resident		Composite Resident		Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
		Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	Prorated Outdoor Air Exposure Concentration (mg/m^3)	ILCR[1]		
VOCs and PHCs							
cis-1,2-Dichloroethylene	5.06E-06	6.77E-07	1.13E-05	6.77E-07	NC	3.19E+06	NC
trans-1,2-Dichloroethylene	4.07E-06	5.45E-07	9.09E-06	6.99E-07	NC	1.45E+06	NC
Tetrachloroethylene	3.36E-04	4.50E-05	1.13E-03	5.77E-05	1.50E-08	8.75E+05	3.28E+05
Trichloroethylene	1.43E-05	1.43E-05	7.15E-03	1.92E-06	7.87E-09	2.27E+04	4.12E+04
Vinyl Chloride	1.38E-04	1.85E-05	3.08E-04	1.85E-05	1.55E-07	4.33E+05	4.30E+03
PHC F1			6.49E-05		NC	4.35E+06	NC
Aliphatic C6-C8	1.95E-03	2.61E-04	1.45E-05	3.35E-04	NC	-	-
Aliphatic C>8-C10	3.25E-04	4.35E-05	4.35E-05	5.58E-05	NC	-	-
Aromatic C>8-C10	1.03E-05	1.38E-06	6.88E-06	1.76E-06	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs and TCE) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-34: Predicted Risks for Maintenance Worker Exposure to COCs in Ground Water via Outdoor Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)	Prorated Outdoor Air Exposure Concentration (mg/m^3)	HQ[1]	ILCR[1]	Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
VOCs and PHCs						
cis-1,2-Dichloroethylene	5.06E-06	1.10E-06	1.84E-05	NC	1.96E+06	NC
trans-1,2-Dichloroethylene	4.07E-06	8.88E-07	1.48E-05	NC	8.89E+05	NC
Tetrachloroethylene	3.36E-04	7.33E-05	1.83E-03	1.90E-08	5.37E+05	2.58E+05
Trichloroethylene	1.43E-05	1.43E-05	7.15E-03	5.86E-08	2.27E+04	5.53E+03
Vinyl Chloride	1.38E-04	3.01E-05	5.01E-04	1.32E-07	2.66E+05	5.04E+03
PHC F1			1.06E-04	NC	2.67E+06	NC
Aliphatic C6-C8	1.95E-03	4.25E-04	2.36E-05	NC	-	-
Aliphatic C>8-C10	3.25E-04	7.08E-05	7.08E-05	NC	-	-
Aromatic C>8-C10	1.03E-05	2.24E-06	1.12E-05	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs and TCE) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-35: Predicted Risks for Construction Worker Exposure to COCs in Ground Water Via Outdoor and Trench Air Inhalation

COC	Predicted Outdoor Air Concentration (mg/m^3)		Prorated Outdoor Air Exposure Concentration (mg/m^3)		HQ[1]			ILCR[1]			Risk Based Concentration (HQ, µg/L)	Risk Based Concentration (ILCR, µg/L)
	Ground Level	Trench	Ground Level	Trench	Ground Level	Trench	Total	Ground Level	Trench	Total		
VOCs and PHCs												
cis-1,2-Dichloroethylene	5.06E-06	2.27E-05	1.78E-06	9.16E-07	2.97E-05	1.53E-05	4.50E-05	NC	NC	NC	8.01E+05	NC
trans-1,2-Dichloroethylene	4.07E-06	4.07E-06	1.43E-06	1.64E-07	2.39E-05	2.73E-06	2.66E-05	NC	NC	NC	4.94E+05	NC
Tetrachloroethylene	3.36E-04	3.36E-04	1.18E-04	1.35E-05	2.96E-03	3.38E-04	3.30E-03	8.24E-10	9.42E-11	9.18E-10	2.98E+05	5.36E+06
Trichloroethylene	1.43E-05	6.45E-05	2.57E-05	1.16E-04	1.29E-02	5.79E-02	7.07E-02	2.82E-09	1.27E-08	1.55E-08	9.16E+02	2.09E+04
Vinyl Chloride	1.38E-04	6.20E-04	4.85E-05	2.50E-05	8.09E-04	4.16E-04	1.23E-03	5.72E-09	2.94E-09	8.66E-09	1.09E+05	7.69E+04
PHC F1					1.71E-04	1.95E-05	1.90E-04	NC	NC	NC	1.48E+06	NC
Aliphatic C6-C8	1.95E-03	1.95E-03	6.86E-04	7.84E-05	3.81E-05	4.36E-06	4.25E-05	NC	NC	NC	-	-
Aliphatic C>8-C10	3.25E-04	3.25E-04	1.14E-04	1.31E-05	1.14E-04	1.31E-05	1.28E-04	NC	NC	NC	-	-
Aromatic C>8-C10	1.03E-05	1.03E-05	3.62E-06	4.14E-07	1.81E-05	2.07E-06	2.02E-05	NC	NC	NC	-	-

[1] Bolded values highlighted in gray exceed the target hazard quotient for non-carcinogens of 0.2 (0.5 for PHCs and TCE) or the target incremental lifetime cancer risk for carcinogens of 1 x 10^{-6}.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-36A: Risk-Based Soil Concentrations Protective of the Toddler Resident

COC	REM Soil Concentration (µg/g)	Pathway Specific Risk-Based Concentration[1] (µg/g) — Non-Carcinogens: Dermal Contact & Incidental Ingestion	Indoor Air Inhalation: Residential Building With Basement	Outdoor Air Inhalation	Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
VOCs					
Tetrachloroethylene	20	130	0.066	190	0.066
PAHs					
Acenaphthylene	0.36	57	6	180	6
Anthracene	98	2,338	130	950	130
Benzo(a)anthracene	89	NC	900	600	600
Benzo(a)pyrene	86	4.87	2,500	Non-Vol (68)	4.9
Benzo(b)fluoranthene	87	NC	68,000	3,800	3,800
Benzo(g,h,i)perylene	45	57	NA	NA	57
Benzo(k)fluoranthene	33	NC	83,000	3,800	3,800
Chrysene	79	NC	23,000	12,000	12,000
Dibenz(a,h)anthracene	11	NC	310,000	790	790
Fluoranthene	220	839	3,200	4,500	839
Indeno(1,2,3-cd)pyrene	46	NC	550,000	7,300	7,300
1- and 2-Methylnaphthalene	23	72	159	53,698	72
Naphthalene	38	360	4.52	270	4.52
Phenanthrene	289	719	16,498	598,512	719
Pyrene	184	540	24,000	41,000	540
Metals and Inorganics					
Lead	516	18	NA	NA	18

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Non-Vol: The REM soil concentration exceeds the S-OA component value; however, this parameter is not considered volatile, and was not retained for further evaluation of the the vapour inhalation pathways.

Table E4-36B: Risk-Based Soil Concentrations Protective of the Composite Resident

COC	REM Soil Concentration (µg/g)	Pathway Specific Risk-Based Concentration[1] (µg/g)			Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Carcinogens			
		Dermal Contact & Incidential Ingestion	Indoor Air Inhalation Residential Building With Basement	Outdoor Air Inhalation	
VOCs					
Tetrachloroethylene	20	130	0.034	190	0.034
PAHs					
Acenaphthylene	0.36	57	6	180	6
Anthracene	98	57	130	950	57
Benzo(a)anthracene	89	5.7	900	600	5.7
Benzo(a)pyrene	86	0.57	2,500	Non-Vol (68)	0.57
Benzo(b)fluoranthene	87	5.7	68,000	3,800	5.7
Benzo(g,h,i)perylene	45	57	NA	NA	57
Benzo(k)fluoranthene	33	5.7	83,000	3,800	5.7
Chrysene	79	57	23,000	12,000	57
Dibenz(a,h)anthracene	11	0.57	310,000	790	0.57
Fluoranthene	220	57	3,200	4,500	57
Indeno(1,2,3-cd)pyrene	46	5.7	550,000	7,300	5.7
1- and 2-Methylnaphthalene	23	72	NC	NC	72
Naphthalene	38	360	NC	270	270
Phenanthrene	289	NC	NC	NC	NC
Pyrene	184	540	24,000	41,000	540
Metals and Inorganics					
Lead	516	NC	NA	NA	NC

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Non-Vol: The REM soil concentration exceeds the S-OA component value; however, this parameter is not considered volatile, and was not retained for further evaluation of the the vapour inhalation pathways.

Table E4-37: Risk-Based Soil Concentrations Protective of the Indoor Worker

COC	REM Soil Concentration (µg/g)	Pathway Specific Risk-Based Concentration[1] (µg/g)		Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Non-Carcinogens	Carcinogens	
		Indoor Air Inhalation		
		Commercial Slab-on-Grade Building		
VOCs				
Tetrachloroethylene	20	0.83	0.399	0.399
PAHs				
Acenaphthylene	0.36	71	71	71
Anthracene	98	1,600	1,600	1,600
Benzo(a)anthracene	89	11,000	11,000	11,000
Benzo(a)pyrene	86	32,000	32,000	32,000
Benzo(b)fluoranthene	87	800,000	800,000	800,000
Benzo(g,h,i)perylene	45	NA	NA	NA
Benzo(k)fluoranthene	33	970,000	970,000	970,000
Chrysene	79	270,000	270,000	270,000
Dibenz(a,h)anthracene	11	4,100,000	4,100,000	4,100,000
Fluoranthene	220	38,000	38,000	38,000
Indeno(1,2,3-cd)pyrene	46	6,400,000	6,400,000	6,400,000
1- and 2-Methylnaphthalene	23	1,984	NC	1984
Naphthalene	38	57	57	57
Phenanthrene	289	206,680	NC	206,680
Pyrene	184	280,000	280,000	280,000
Metals and Inorganics				
Lead	516	NA	NA	NA

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-38: Risk-Based Soil Concentrations Protective of the Outdoor Maintenance Worker

COC	REM Soil Concentration (µg/g)[1]	Pathway Specific Risk-Based Concentration[1] (µg/g)				Candidate Risk-Based Human Health Property Specific Standard[2] (µg/g)
		Direct Contact		Inhalation of Outdoor Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs						
Tetrachloroethylene	20	520	520	190	190	190
PAHs						
Acenaphthylene	0.36	70	70	180	180	70
Anthracene	98	18,263	70	950	950	70
Benzo(a)anthracene	89	NC	7	600	600	7
Benzo(a)pyrene	86	17.8	0.7	Non-Vol (68)	Non-Vol (68)	0.7
Benzo(b)fluoranthene	87	NC	7	3,800	3,800	7
Benzo(g,h,i)perylene	45	70	70	NA	NA	70
Benzo(k)fluoranthene	33	NC	7	3,800	3,800	7
Chrysene	79	NC	70	12,000	12,000	70
Dibenz(a,h)anthracene	11	NC	0.7	790	790	0.7
Fluoranthene	220	5,619	70	4,500	4,500	70
Indeno(1,2,3-cd)pyrene	46	NC	7	7,300	7,300	7
1- and 2-Methylnaphthalene	23	5,600	5,600	17,508	NC	5,600
Naphthalene	38	2,800	2,800	270	270	270
Phenanthrene	289	5,609	NC	195,141	NC	5,609
Pyrene	184	700	700	41,000	41,000	700
Metals and Inorganics						
Lead	516	675	NC	NA	NA	675

[1]Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-39: Risk-Based Soil Concentrations Protective of the Construction/Subsurface Utility Worker

COC	REM Soil Concentration (µg/g)[1]	Pathway Specific Risk-Based Concentration[1] (µg/g)				Candidate Risk- Based Human Health Property Specific Standard[2] (µg/g)
		Direct Contact		Inhalation of Outdoor and Trench Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs						
Tetrachloroethylene	20	20,000	20,000	77	1,374	77
PAHs						
Acenaphthylene	0.36	2,600	2,600	NC	4,843	2,600
Anthracene	98	2,600	2,600	NC	25,778	2,600
Benzo(a)anthracene	89	260	260	600	600	260
Benzo(a)pyrene	86	17	17	Non-Vol (68)	Non-Vol (68)	17
Benzo(b)fluoranthene	87	260	260	3,800	3,800	260
Benzo(g,h,i)perylene	45	2,600	2,600	NA	NA	2,600
Benzo(k)fluoranthene	33	260	260	3,800	3,800	260
Chrysene	79	2,600	2,600	12,000	12,000	2,600
Dibenz(a,h)anthracene	11	26	26	790	790	26
Fluoranthene	220	2,600	2,600	4,500	4,500	2,600
Indeno(1,2,3-cd)pyrene	46	260	260	7,300	7,300	260
1- and 2-Methylnaphthalene	23	560	560	23,468	NC	560
Naphthalene	38	28,000	28,000	212	NC	212
Phenanthrene	289	5,601	NC	113,893	NC	5,601
Pyrene	184	26,000	26,000	41,000	41,000	26,000
Metals and Inorganics						
Lead	516	675	NC	NA	NA	675

[1]Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

NA: Not applicable.

Table E4-40: Summary of Human Health Risk-Based Soil Concentrations Protective of Individual Exposure Scenarios

COC	Maximum Soil Concentration (µg/g)	REM Soil Concentration (µg/g)	MECP (2011) Table 3 SCS	Individual Receptor Risk-Based Concentration (µg/g)					Minimum RBC (µg/g)	Dominant Exposure Pathway	Candidate Risk-Based Human Health PSS (µg/g)[1]	Risk Management Required?
				Toddler Resident	Composite Resident	Long-term Indoor Worker	Outdoor Maintenance Worker	Construction/subsurface Utility Worker				
VOCs												
Tetrachloroethylene	17	20	2.3	0.066	0.034	0.399	190	77	0.034	Indoor Air Inhalation	20	Yes
PAHs												
Acenaphthylene	0.301	0.36	0.17	6	6	71	70	2,600	6	Indoor Air Inhalation	6	Yes*
Anthracene	82	98	0.74	130	57	1,600	70	2,600	57	Direct Contact	98	Yes
Benzo(a)anthracene	74.1	89	0.63	600	5.7	11,000	7	260	5.7	Direct Contact	89	Yes
Benzo(a)pyrene	71.9	86	0.3	4.9	0.57	32,000	0.7	17	0.57	Direct Contact	86	Yes
Benzo(b)fluoranthene	72.3	87	0.78	3,800	5.7	800,000	7	260	5.7	Direct Contact	87	Yes
Benzo(g,h,i)perylene	37.3	45	7.8	57	57	NA	70	2,600	57	Direct Contact	57	Yes*
Benzo(k)fluoranthene	27.8	33	0.78	3,800	5.7	970,000	7	260	5.7	Direct Contact	33	Yes
Chrysene	66.2	79	7.8	12,000	57	270,000	70	2,600	57	Direct Contact	79	Yes
Dibenz(a,h)anthracene	9.1	11	0.1	790	0.57	4,100,000	0.7	26	0.57	Direct Contact	11	Yes
Fluoranthene	183	220	0.69	839	57	38,000	70	2,600	57	Direct Contact	220	Yes
Indeno(1,2,3-cd)pyrene	38.1	46	0.48	7,300	5.7	6,400,000	7	260	5.7	Direct Contact	46	Yes
1- and 2-Methylnaphthalene	18.81	23	3.4	72	72	1,984	5,600	560	72	Direct Contact	72	No
Naphthalene	32	38	0.75	4.52	270	57	270	212	4.52	Indoor Air Inhalation	38	Yes
Phenanthrene	241	289	7.8	719	NC	206,680	5,609	5,601	719	Direct Contact	719	No
Pyrene	153	184	78	540	540	280,000	700	26,000	540	Direct Contact	540	Yes*
Metals and Inorganics												
Lead	430	516	120	18	NC	NA	675	675	18	Direct Contact	516	Yes

[1]The final risk-based candidate PSS is the lower of the pathway specific PSS and/or component values. Where RMM is required, the PSS was set to the REM.

* Although no unacceptable risk was predicted for this parameter individually, RMM is required for total carcinogenic PAHs.

Table E4-41: Risk-Based Groundwater Concentrations Protective of Site Residents

COC	REM Groundwater Concentration (µg/L)	Pathway Specific Risk-Based Concentration[1] (µg/L)				Candidate Human Health Property-Specific Standard (µg/L)[2]
		Inhalation of Indoor Air Residential Building with Basement		Inhalation of Ambient Outdoor Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs and PHCs						
cis-1,2-Dichloroethylene	180	3.62	NC	3188404	NC	3.62
trans-1,2-Dichloroethylene	66	1.58	NC	1447385	NC	1.58
Tetrachloroethylene	4,920	0.97	0.50	874538	327952	0.498
Trichloroethylene	324	0.20	0.053	22673	41153	0.053
Vinyl Chloride	667	0.71	0.0075	433300	4299	0.0075
PHC F1	564	3.35	NC	4345752	NC	3.35

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-42: Risk-Based Groundwater Concentrations Protective of Indoor Workers

COC	REM Groundwater Concentration (µg/L)	Pathway Specific Risk-Based Concentration[1] (µg/L) Inhalation of Indoor Air Commercial Slab-on-Grade Building		Candidate Human Health Property-Specific Standard (µg/L)[2]
		Non-Carcinogens	Carcinogens	
VOCs and PHCs				
cis-1,2-Dichloroethylene	180	62	NC	62
trans-1,2-Dichloroethylene	66	27	NC	27
Tetrachloroethylene	4,920	17	0.50	0.50
Trichloroethylene	324	1.0	0.24	0.24
Vinyl Chloride	667	12	0.23	0.23
PHC F1	564	705	NC	705

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-43: Risk-Based Groundwater Concentrations Protective of Outdoor Maintence Workers

COC	REM Groundwater Concentration (µg/L)	Pathway Specific Risk-Based Concentration Outdoor Air Inhalation[1] (µg/L)		Candidate Human Health Property-Specific Standard (µg/L)[2]
		Non-Carcinogens	Carcinogens	
VOCs and PHCs				
cis-1,2-Dichloroethylene	180	1,958,591	NC	1,958,591
trans-1,2-Dichloroethylene	66	889,108	NC	889,108
Tetrachloroethylene	4,920	537,216	258,277	258,277
Trichloroethylene	324	22,673	5,530	5,530
Vinyl Chloride	667	266,170	5,041	5,041
PHC F1	564	2,669,533	NC	2,669,533

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-44: Risk-Based Groundwater Concentrations Protective of Construction/Subsurface Utility Workers

COC	REM Groundwater Concentration (µg/L)[1]	Pathway Specific Risk-Based Concentration[1] (µg/L)				Candidate Human Health Property-Specific Standard - Excavation (µg/L)[2]
		Dermal Contact & Incidental Ingestion		Inhalation of Outdoor and Trench Air		
		Non-Carcinogens	Carcinogens	Non-Carcinogens	Carcinogens	
VOCs and PHCs						
cis-1,2-Dichloroethylene	180	2,000	2,000	800,682	NC	2,000
trans-1,2-Dichloroethylene	66	2,000	2,000	493,949	NC	2,000
Tetrachloroethylene	4,920	537	7,957	298,453	5,356,854	537
Trichloroethylene	324	500	500	916	20,854	500
Vinyl Chloride	667	1,854	160	108,812	76,937	160
PHC F1	564	82,000	82,000	1,483,074	NC	82,000

[1] Shaded values indicate RBC is based on a component value. Values unshaded indicate the RBC was based on the quantitative assessment.

[2] The candidate human health property specific standard is the minimum of the pathway specific risk-based concentrations.

NC: Not calculated due to no applicable toxicity reference value.

Table E4-45: Summary of Human Health Risk-Based Groundwater Concentrations Protective of Individual Exposure Scenarios

COC	Maximum Concentration (µg/L)	REM Groundwater Concentration (µg/L)	MECP (2011) Table 3 SCS (µg/L)	MECP (2011) Table 7 SCS (µg/L)	Individual Receptor Risk-Based Concentration (µg/L)				Minimum RBC (µg/L)	Dominant Exposure Pathway	Candidate Human Health Risk-Based PSS (µg/L)[1]	Risk Management Required?
					Site Resident	Long-term Indoor Worker	Outdoor Maintenance Worker	Construction/ subsurface Utility Worker				
VOCs and PHCs												
cis-1,2-Dichloroethylene	150	180	17	1.6	3.62	62.1	1,958,591	2,000	3.62	Indoor Air Inhalation	180	Yes
trans-1,2-Dichloroethylene	55	66	17	1.6	1.58	27.1	889,108	2,000	1.58	Indoor Air Inhalation	66	Yes
Tetrachloroethylene	4,100	4,920	17	0.5	0.50	0.50	258,277	537	0.498	Indoor Air Inhalation	4,920	Yes
Trichloroethylene	270	324	17	0.5	0.053	0.24	5,530	500	0.053	Indoor Air Inhalation	324	Yes
Vinyl Chloride	556	667	1.7	0.5	0.0075	0.23	5,041	160	0.007	Indoor Air Inhalation	667	Yes
PHC F1	470	564	750	420	3.35	705	2,669,533	82,000	3.35	Indoor Air Inhalation	564	Yes

[1] The final risk-based candidate PSS is the lower of the pathway specific PSS and/or component values. Where RMM is required, the PSS was set to the REM.

Table E5-1: Comparison of Soil COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Ecological Component Values - Residential/Parkland/Institutional Land Use With Medium/Fine Textured Soils

Contaminant of Concern	Maximum Soil Concentration (mg/kg)	REM Soil Concentration[1] (mg/kg)	Table 3 Site Condition Standards 2011	Ecological Component Values (mg/kg)			
				Plants and Soil Invertebrates	Mammals and Birds	Soil Leaching (S-GW3)	Modified Soil Leaching (S-GW3)[2]
Acenaphthylene	0.301	**0.36**	0.17	NV	NV	0.17	3.4
Anthracene	82	**98**	0.74	3.1	38,000	0.74	12
Benz[a]anthracene	74.1	**89**	0.63	0.63	NV	5.6E+11	-
Benzo[a]pyrene	71.9	**86**	0.3	25	1,600	4.2E+13	-
Benzo[b]fluoranthene	72.3	**87**	0.78	NV	NV	8.6E+13	-
Benzo[ghi]perylene	37.3	**45**	7.8	8.3	NV	1.4E+13	
Benzo[k]fluoranthene	27.8	**33**	0.78	9.5	NV	2.8E+13	-
Chrysene	66.2	**79**	7.8	8.8	NV	4.0E+11	
Dibenz[a h]anthracene	9.1	**11**	0.1	NV	NV	2.7E+13	-
Fluoranthene	183	**220**	0.69	63	0.69	4.50E+04	-
Indeno[1 2 3-cd]pyrene	38.1	**46**	0.48	0.48	NV	9.5E+13	-
Lead	430	**516**	120	310	32	NV	-
Methlynaphthalene, 2-(1-)	18.81	**23**	3.4	NV	NV	85	-
Naphthalene	32	**38**	0.75	0.75	380	220	-
Phenanthrene	241	**289**	7.8	7.8	2,700	300	-
Pyrene	153	**184**	78	NV	4,700	2,900	-
Tetrachloroethylene	17	**20**	2.3	4.8	4.5	21	-

Bolded values are either in excess of the ecotoxicity component value or a component value is not provided.

Shaded boxes indicate where component values are exceeded by the measured concentration or no component value is available.

NV = no value.

[1]Reasonable estimate of the maximum concentration (REM) calculated as the maximum measured concentration + 20%.

[2]Modified Soil Leaching (S-GW3) component value is the S-GW3 component value from the applicable Table 3 SCS with modified distance to nearest downgradient surface water body (950 m).

Table E5-2 Comparison of Groundwater COC Maximum Concentrations to MECP (2011) Table 3 Site Condition Standards and Ecological Component Values - All Types of Land Use with Medium/Fine Textured Soils

Contaminant of Concern	Maximum Groundwater Concentration (µg/L)	REM Groundwater Concentration[1] (µg/L)	Table 3 Site Condition Standards 2011	GW3 Component Value (µg/L)
Dichloroethylene, 1,2-cis-	150	180	17	180,000
Dichloroethylene, 1,2-trans-	54.8	66	17	280,000
PHC F1	470	564	750	750
Tetrachloroethylene	4,100	4,920	17	11,000
Trichloroethylene	270	324	17	280,000
Vinyl Chloride	555.5	667	1.7	450,000

Bolded values are either in excess of the ecotoxicity component value or a component value is not provided.

Shaded boxes indicate where component values are exceeded by the measured concentration.

NV = no value

NA = not applicable

[1]Reasonable estimate of the maximum concentration (REM) calculated as the maximum measured concentration + 20%.

Table E5-3: Comparison of Maximum Groundwater Concentrations of Soil COCs Exceeding or Without a S-GW3 Component Value

Contaminant of Concern	Concentration(s) in Excess of S-GW3 (mg/kg)	Location(s) of Maximum Soil Measurement in Excess of S-GW3	Maximum Ground Water Concentration (µg/L)	Monitoring Wells Relied Upon	GW3 Component Value (µg/L)
Anthracene	82	BH1	0.632	MW1	2.4
Lead[1]	430	BH105	<0.50	MW1-D, MW2-S, MW3-D, MW104. MW105, MW113, MW114	25

Shaded boxes indicate where the GW3 component values are exceeded by the groundwater concentration.

[1] Given no S-GW3 value exists, only the maximum concentration in soil is provided.

Table E5-4: Avian and Mammalian Wildlife Receptor Parameters[1]

Parameter	Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Blackbird	Red-Tailed Hawk
Body weight (kg)	0.044	0.015	4.5	0.198	0.064	1.13
Dietary breakdown	Assumed 100% terrestrial vegetation	Assumed 100% soil invertebrates (earthworms)	100% small mammals (i.e. 50% Meadow Vole + 50% Short-Tailed Shrew)	Assumed 100% soil invertebrates (earthworms)	Assumed 100% terrestrial vegetation	100% small mammals (i.e. 50% Meadow Vole + 50% Short-Tailed Shrew)
Food consumption rate (kg wet weight/day)	0.005	0.009	0.43	0.15	0.091	0.0987
Food consumption rate of vegetation (kg dry weight/day)	0.0015	-	-	-	0.0273	-
Food consumption rate of invertebrates (kg dry weight/day)	-	0.00144	-	0.024	-	-
Food Consumtion rate of small mammals (kg dry weight/day)	-	-	0.138	-	-	0.032
Food consumtion rate of birds (kg dry weight/day)	-	-	-	-	-	-
Soil ingestion (kg dry weight/day)	0.000018	0.000187	0.00385	0.0025	0.00109	0.0018
Home range[2] (ha)	0.037	0.39	96	3.1	-	233
Fraction of time on Site (assumed)	1	1	1	1	1	1

[1]Exposure parameters were obtained from MECP (2011c), unless otherwise noted.

[2] Home range is the most conservative value (where mutilple values are listed) from Sample and Suter (1994). Home range is listed for reference only as it is assumed VECs spend the entirely of their time on-site.

Moisture content of vegetation was assumed to be 70%.

Moisture content of soil invertebrates was assumed to be 84%.

Moisture content of small mammals was assumed to be 68%.

Table E5-5: Physical/ Chemical Properties, Uptake Factors in Soil Plants and Estimated Mammal Biotransfer Factors[1]

Contaminant of Concern	Log K_{OW}	BCF Soil to Plant	Biotransfer Factor $_{Mammals}$ (d/kg ww)	Biotransfer Factor $_{Mammals}$ (d/kg dw)	F_{OC}	K_{OC} (cm^3/g)
Acenaphthylene	3.94E+00	2.04E-01	2.19E-04	1.49E-04	0.005	6.12E+03
Benz[a]anthracene	5.76E+00	1.81E-02	1.45E-02	9.83E-03	0.005	2.31E+05
Benzo[b]fluoranthene	5.78E+00	1.77E-02	1.51E-02	1.03E-02	0.005	8.03E+05
Benzo[ghi]perylene	6.63E+00	5.70E-03	1.07E-01	7.29E-02	0.005	2.68E+06
Benzo[k]fluoranthene	6.11E+00	1.14E-02	3.24E-02	2.20E-02	0.005	7.87E+05
Chrysene	5.81E+00	1.70E-02	1.62E-02	1.10E-02	0.005	2.36E+05
Dibenz[a h]anthracene	6.54E+00	6.43E-03	8.71E-02	5.92E-02	0.005	2.62E+06
Fluoranthene	5.16E+00	4.03E-02	3.63E-03	2.47E-03	0.005	7.09E+04
Indeno[1 2 3-cd]pyrene	6.70E+00	5.19E-03	1.26E-01	8.56E-02	0.005	2.68E+06
Lead	0.00E+00	3.87E+01	2.51E-08	1.71E-08	0.005	0.00E+00
Methlynaphthalene, 2-(1-)	3.86E+00	2.27E-01	1.82E-04	1.24E-04	0.005	2.98E+03
Tetrachloroethylene	3.40E+00	4.20E-01	6.31E-05	4.29E-05	0.005	1.07E+02

[1] Chemical properties (Log Kow and Koc) obtained from MECP (2016). Foc is MECP default value (MECP, 2011c).

Table E5-6: Predicted Concentration of COCs in Wildlife Food Items

Contaminant of Concern	Concentration in Plants (mg/kg dw)	Concentration in Invertebrates (mg/kg dw)	Concentration in Meadow Vole (mg/kg dw)	Concentration in Short-Tailed Shrew (mg/kg dw)
Acenaphthylene	7.39E-02	1.97E+00	2.57E-08	6.37E-07
Benz[a]anthracene	1.61E+00	4.94E+02	5.81E-05	1.05E-02
Benzo[b]fluoranthene	1.53E+00	1.44E+02	5.84E-05	3.39E-03
Benzo[ghi]perylene	2.55E-01	1.22E+02	1.27E-04	1.98E-02
Benzo[k]fluoranthene	3.80E-01	1.10E+02	3.79E-05	5.31E-03
Chrysene	1.35E+00	4.77E+02	5.60E-05	1.14E-02
Dibenz[a h]anthracene	7.02E-02	2.55E+01	2.63E-05	3.38E-03
Fluoranthene	8.85E+00	1.19E+03	6.26E-05	6.39E-03
Indeno[1 2 3-cd]pyrene	2.37E-01	1.44E+02	1.48E-04	2.72E-02
Lead	8.81E+00	1.24E+02	1.71E+01	1.71E+01
Methlynaphthalene, 2-(1-)	5.13E+00	2.16E+02	1.48E-06	5.74E-05
Tetrachloroethylene	8.56E+00	2.17E+03	8.33E-07	1.97E-04

Table E5-7: Predicted Dose of COCs to Wildlife (mg/kg-bw d)

Contaminant of Concern	Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Blackbird	Red-Tailed Hawk
Acenaphthylene	2.67E-03	1.94E-01	3.09E-04	2.44E-01	3.77E-02	5.75E-04
Benz[a]anthracene	9.14E-02	4.85E+01	7.62E-02	6.10E+01	2.20E+00	1.42E-01
Benzo[b]fluoranthene	8.77E-02	1.49E+01	7.43E-02	1.86E+01	2.13E+00	1.38E-01
Benzo[ghi]perylene	2.70E-02	1.23E+01	3.86E-02	1.54E+01	8.71E-01	7.16E-02
Benzo[k]fluoranthene	2.66E-02	1.09E+01	2.86E-02	1.37E+01	7.30E-01	5.32E-02
Chrysene	7.85E-02	4.68E+01	6.81E-02	5.89E+01	1.93E+00	1.27E-01
Dibenz[a h]anthracene	6.86E-03	2.58E+00	9.39E-03	3.23E+00	2.16E-01	1.74E-02
Fluoranthene	3.92E-01	1.17E+02	1.88E-01	1.48E+02	7.52E+00	3.50E-01
Indeno[1 2 3-cd]pyrene	2.68E-02	1.44E+01	3.95E-02	1.80E+01	8.80E-01	7.32E-02
Lead	5.11E-01	1.84E+01	9.64E-01	2.16E+01	1.25E+01	1.30E+00
Methlynaphthalene, 2-(1-)	1.84E-01	2.10E+01	1.93E-02	2.65E+01	2.57E+00	3.60E-02
Tetrachloroethylene	3.00E-01	2.08E+02	1.75E-02	2.63E+02	4.00E+00	3.25E-02

Table E5-8A: Soil Benchmark and Exposure Limits Selected for Plants and Soil Invertebrates

Contaminant of Concern	Plants Benchmark (mg/kg)	Invertebrates Benchmark (mg/kg)	Reference (Soil Benchmarks)
Acenaphthylene	23	23	Reynolds, T., 1977 (plants); Lee, S., Tsao, R. and Coats, J.R., 1999 (invertebrates)
Anthracene	3.1	3.1	MECP, 2011c
Benz[a]anthracene	0.63	0.63	MECP, 2011c
Benzo[a]pyrene	25	25	MECP, 2011c
Benzo[b]fluoranthene	1.2	360	Sims and Overcash, 1983 (plants); Sverdrup et al., 2002 (invertebrates)
Benzo[ghi]perylene	8.3	8.3	MECP, 2011c
Benzo[k]fluoranthene	9.5	9.5	MECP, 2011c
Chrysene	8.8	8.8	MECP, 2011c
Dibenz[a h]anthracene	155	780	Henner et al., 1999 (plants); Sverdrup et al., 2002 (invertebrates)
Fluoranthene	63	63	MECP, 2011c
Indeno[1 2 3-cd]pyrene	0.48	0.48	MECP, 2011c
Lead	310	310	MECP, 2011c
Methlynaphthalene, 2-(1-)	100	20	Hulzebos et al., 1993 (plants); Sverdrup et al., 2002 (invertebrates)
Naphthalene	0.75	0.75	MECP, 2011c
Phenanthrene	7.8	7.8	MECP, 2011c
Pyrene	25	10	Sverdrup et al., 2003 (plants); Sverdrup et al., 2001 (invertebrates)
Tetrachloroethylene	4.8	4.8	MECP, 2011c

Shaded value indicates benchmark obtained from source other than MECP (2011c). A rationale for the selection of the benchmark is provided in Appendix M.

Table E5-8B: Exposure Limits Selected for the Ecotoxicity Evaluation of Mammals and Birds

Contaminant of Concern	Tested Species	Endpoint	Benchmarks Applied in this ERA for Protection of Mammals				Benchmarks Applied in this ERA for Protection of Birds				Reference
			Meadow Vole	Short-Tailed Shrew	Red Fox	Units	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk	Units	
Acenaphthylene	Mouse	LOEL (liver weight)	175	175	175	mg/kg-bw d	35	35	35	mg/kg-bw d	Modified MECP, 2011c
Benz[a]anthracene	Wistar Rat	NOAEL (hepatic, renal, gastrointestinal)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Benzo[b]fluoranthene	Mouse	LOAEL (immunocompetence)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Benzo[ghi]perylene	Multiple species (mammals); European starling (birds)	Multiple (mammals); NOAEL (weight) (birds)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Benzo[k]fluoranthene	Mouse	LOAEL (immunocompetence)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Chrysene	Rat	LOAEL (immunocompetence)	10	10	10	mg/kg-bw d	2	2	2	mg/kg-bw d	Silkworth et al., 1995 (mammals); Trust et al., 1994 (birds)
Dibenz[a h]anthracene	Multiple species (mammals); European starling (birds)	Multiple (mammals); NOAEL (weight) (birds)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Fluoranthene	Mouse	LOEL (liver weight)	125	125	125	mg/kg-bw d	125	125	125	mg/kg-bw d	MECP, 2011c
Indeno[1 2 3-cd]pyrene	Multiple species (mammals); European starling (birds)	Multiple (mammals); NOAEL (weight) (birds)	0.615	0.615	0.615	mg/kg-bw d	2	2	2	mg/kg-bw d	US EPA, 2007 (mammals); Trust et al., 1994 (birds)
Lead	1) Rat (mammals); 2) Chicken (birds); 3) American kestrel (Hawk)	1) and 2) Chronic LOEL (reproduction) 3) Chronic NOEL (survival/body weight)	80	80	80	mg/kg-bw d	3.3	3.3	28	mg/kg-bw d	MECP, 2011c
Methlynaphthalene, 2-(1-)	Rat (mammals); Bobwhite (birds)	Sub-chronic NOAEL (weight)	50	50	50	mg/kg-bw d	1,653	1,653	1,653	mg/kg-bw d	Navarro et al., 1991; Germansky and Jamall, 1988 (mammals); Landis Associates Inc., 1985 (birds)
Tetrachloroethylene	Mouse	Subchronic LOEL (hepatoxicity)	7.0	7.0	7.0	mg/kg-bw d	7.0	7.0	7.0	mg/kg-bw d	MECP, 2011c

NA - not applicable. NV - no value.
Shaded value indicates benchmark obtained from source other than MECP (2011c). A rationale for the selection of
Lowest MECP (2011c) TRV derived for other VECs applied.

Table E5-9: Hazard Quotient and Property Specific Soil Standards for Plants and Soil Invertebrates

Contaminant of Concern	REM Soil Concentration (mg/kg)	HQ Plants	HQ Invertebrates	Risk-Based Concentration for Plants (mg/kg)	Risk-Based Concentration for Invertebrates (mg/kg)	Minimum Risk-Based Concentration[1] (mg/kg)
Acenaphthylene	0.361	1.57E-02	1.57E-02	23	23	23
Anthracene	98	**3.17E+01**	**3.17E+01**	3.1	3.1	3.1
Benz[a]anthracene	88.9	**1.41E+02**	**1.41E+02**	0.63	0.63	0.63
Benzo[a]pyrene	86.3	**3.45E+00**	**3.45E+00**	25	25	25
Benzo[b]fluoranthene	86.8	**7.23E+01**	2.41E-01	1.2	360	1.2
Benzo[ghi]perylene	44.8	**5.39E+00**	**5.39E+00**	8.3	8.3	8.3
Benzo[k]fluoranthene	33.4	**3.51E+00**	**3.51E+00**	9.5	9.5	9.5
Chrysene	79.4	**9.03E+00**	**9.03E+00**	8.8	8.8	8.8
Dibenz[a h]anthracene	10.9	7.05E-02	1.40E-02	155	780	155
Fluoranthene	220	**3.49E+00**	**3.49E+00**	63	63	63
Indeno[1 2 3-cd]pyrene	45.7	**9.53E+01**	**9.53E+01**	0.48	0.48	0.48
Lead	516	**1.66E+00**	**1.66E+00**	310	310	310
Methlynaphthalene, 2-(1-)	22.57	2.26E-01	**1.13E+00**	100	20	20
Naphthalene	38	**5.12E+01**	**5.12E+01**	0.75	0.75	0.75
Phenanthrene	289	**3.71E+01**	**3.71E+01**	7.8	7.8	7.8
Pyrene	184	**7.34E+00**	**1.84E+01**	25	10	10
Tetrachloroethylene	20	**4.25E+00**	**4.25E+00**	4.8	4.8	4.8

Bolded values highlighted in grey exceed the acceptable HQ of 1.

[1] Minimum risk-based back-calculated values protective of plants and soil invertebrates.
NC - not calculated.

Table E5-10A: Hazard Quotient for Mammals and Birds Exposed to Soil COCs

Contaminant of Concern	REM Soil Concentration (mg/kg)	HQ					
		Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk
Acenaphthylene	0.361	1.52E-05	1.11E-03	1.77E-06	6.97E-03	1.08E-03	1.64E-05
Benz[a]anthracene	88.9	1.49E-01	**7.89E+01**	1.24E-01	**3.05E+01**	**1.10E+00**	7.09E-02
Benzo[b]fluoranthene	86.8	1.43E-01	**2.43E+01**	1.21E-01	**9.29E+00**	**1.07E+00**	6.91E-02
Benzo[ghi]perylene	44.8	4.39E-02	**2.00E+01**	6.28E-02	**7.70E+00**	4.36E-01	3.58E-02
Benzo[k]fluoranthene	33.4	4.32E-02	**1.78E+01**	4.65E-02	**6.85E+00**	3.65E-01	2.66E-02
Chrysene	79.4	7.85E-03	**4.68E+00**	6.81E-03	**2.94E+01**	9.64E-01	6.34E-02
Dibenz[a h]anthracene	10.9	1.12E-02	**4.20E+00**	1.53E-02	**1.61E+00**	1.08E-01	8.72E-03
Fluoranthene	220	3.13E-03	9.39E-01	1.50E-03	**1.18E+00**	6.01E-02	2.80E-03
Indeno[1 2 3-cd]pyrene	45.7	4.36E-02	**2.34E+01**	6.43E-02	**9.01E+00**	4.40E-01	3.66E-02
Lead	516	6.39E-03	2.30E-01	1.20E-02	**6.54E+00**	**3.80E+00**	4.64E-02
Methlynaphthalene, 2-(1-)	22.57	3.69E-03	4.21E-01	3.86E-04	1.60E-02	1.56E-03	2.18E-05
Tetrachloroethylene	20	4.29E-02	**2.98E+01**	2.49E-03	**3.76E+01**	5.71E-01	4.64E-03

Bolded values highlighted in grey exceed the acceptable HQ of 1.

NC - not calculated.

Table E5-10B: Risk Based Soil Concentrations for Individual Mammals and Birds

Contaminant of Concern	REM Soil Concentration (mg/kg)	Risk-Based Concentration for Individual VECs (mbg/kg)						Minimum Risk-Based Concentration[1] (mg/kg)
		Meadow Vole	Short-Tailed Shrew	Red Fox	American Woodcock	Red-Winged Black Bird	Red-Tailed Hawk	
Acenaphthylene	0.361	2.37E+04	3.26E+02	2.05E+05	5.18E+01	3.36E+02	2.20E+04	52
Benz[a]anthracene	88.9	5.98E+02	1.13E+00	7.17E+02	2.92E+00	8.07E+01	1.25E+03	1.1
Benzo[b]fluoranthene	86.8	6.08E+02	3.57E+00	7.18E+02	9.34E+00	8.14E+01	1.26E+03	3.6
Benzo[ghi]perylene	44.8	1.02E+03	2.24E+00	7.13E+02	5.81E+00	1.03E+02	1.25E+03	2.2
Benzo[k]fluoranthene	33.4	7.71E+02	1.88E+00	7.17E+02	4.87E+00	9.14E+01	1.25E+03	1.9
Chrysene	79.4	1.01E+04	1.70E+01	1.17E+04	2.70E+00	8.24E+01	1.25E+03	2.7
Dibenz[a h]anthracene	10.9	9.79E+02	2.60E+00	7.15E+02	6.76E+00	1.01E+02	1.25E+03	2.6
Fluoranthene	220	7.01E+04	2.34E+02	1.46E+05	1.86E+02	3.65E+03	7.85E+04	186
Indeno[1 2 3-cd]pyrene	45.7	1.05E+03	1.96E+00	7.11E+02	5.08E+00	1.04E+02	1.25E+03	2.0
Lead	516	8.07E+04	2.25E+03	4.28E+04	7.89E+01	1.36E+02	1.11E+04	79
Methlynaphthalene, 2-(1-)	22.57	6.12E+03	5.36E+01	5.84E+04	1.41E+03	1.45E+04	1.04E+06	54
Tetrachloroethylene	20	4.76E+02	6.85E-01	8.18E+03	5.43E-01	3.57E+01	4.39E+03	0.5

[1] Minimum risk-based back-calculated value protective of mammals and birds.
NC - not calculated.

Table E5-11: Final Candidate ERA Property Specific Standards for Soil COCs

Contaminant of Concern	Maximum Soil Concentration (mg/kg)	REM Soil Concentration (mg/kg)	Risk-Based Concentration (Plants and Soil Invertebrates) (mg/kg)	Risk-Based Concentration (Mammals and Birds) (mg/kg)	Risk-Based Concentration (S-GW3) (mg/kg)	Minimum Risk-Based Concentration Protective of Ecological Receptors (mg/kg)	Final Candidate PSS Protective of Ecological Receptors[1] (mg/kg)	Dominant Pathway	Risk Management Required
Acenaphthylene	0.301	0.36	23	52	0.36	0.36	0.36	Soil Leaching	NO
Anthracene	82	98	3.1	38,000	98	3.1	98	Plants and Invertebrates	YES
Benz[a]anthracene	74.1	89	0.63	1.1	5.6E+11	0.63	89	Plants and Invertebrates	YES
Benzo[a]pyrene	71.9	86	25	1,600	4.2E+13	25	86	Plants and Invertebrates	YES
Benzo[b]fluoranthene	72.3	87	1.2	3.6	8.6E+13	1.2	87	Plants and Invertebrates	YES
Benzo[ghi]perylene	37.3	45	8.3	2.2	1.4E+13	2.2	45	Mammals and Birds	YES
Benzo[k]fluoranthene	27.8	33	9.5	1.9	2.8E+13	1.9	33	Mammals and Birds	YES
Chrysene	66.2	79	8.8	2.7	4.0E+11	2.7	79	Mammals and Birds	YES
Dibenz[a h]anthracene	9.1	11	155	2.6	2.7E+13	2.6	11	Mammals and Birds	YES
Fluoranthene	183	220	63	186	4.5E+04	63	220	Plants and Invertebrates	YES
Indeno[1 2 3-cd]pyrene	38.1	46	0.48	2.0	9.5E+13	0.48	46	Plants and Invertebrates	YES
Lead	430	516	310	79	516	79	516	Mammals and Birds	YES
Methlynaphthalene, 2-(1-)	18.81	23	20	54	85	20	23	Plants and Invertebrates	YES
Naphthalene	32	38	0.75	380	220	0.75	38	Plants and Invertebrates	YES
Phenanthrene	241	289	7.8	2,700	300	7.8	289	Plants and Invertebrates	YES
Pyrene	153	184	10	4,700.0	2900	10	184	Plants and Invertebrates	YES
Tetrachloroethylene	17	20	4.8	0.5	21	0.5	20	Mammals and Birds	YES

Shaded boxes indicate that the RBC is based on the component value. Unshaded boxes are the risk-based back-calculated value. Underlined values indicate the RBC was set to the REM based on the qualitative assessment.

[1] The final candidate ecological health risk-based concentration is the lower of the pathway specific risk-based concentrations and/or component values. Where the pathway specific risk-based concentration is lower than the REM concentration, the REM concentration is set as the candidate PSS and RMM are required.

Table E5-12: Final ERA Property Specific Standards for Groundwater COCs

Contaminant of Concern	Maximum Groundwater Concentration (µg/L)	REM Groundwater Concentration (µg/L)	Risk-Based Concentration Terrestrial Plants (µg/L)	Risk-Based Concentration Aquatic Life (µg/L)	Minimum Risk-Based Concentration Protective of Ecological Receptors (µg/L)	Final Candidate PSS[1] (µg/L)	Basis of Candidate PSS	Risk Management Required
Dichloroethylene, 1,2-cis-	150	180	180,000	180,000	180,000	180,000	GW3	NO
Dichloroethylene, 1,2-trans-	54.8	66	280,000	280,000	280,000	280,000	GW3	NO
PHC F1	470	564	750	750	750	750	GW3	NO
Tetrachloroethylene	4,100	4,920	11,000	11,000	11,000	11,000	GW3	NO
Trichloroethylene	270	324	280,000	280,000	280,000	280,000	GW3	NO
Vinyl Chloride	555.5	667	450,000	450,000	450,000	450,000	GW3	NO

Shaded boxes indicate that the RBC is based on the component value. Unshaded boxes are the risk-based back-calculated value. Underlined values indicate the RBC was set to the REM based on the qualitative assessment.

Bolded values indicate the candidate PSS was set to the REM concentration in the presence of RMM.

[1] The final candidate ecological health risk-based concentration is the lower of the pathway specific risk-based concentrations and/or component values. Where the pathway specific risk-based concentration is lower than the REM concentration, the REM concentration is set as the candidate PSS.

NA = Not applicable

Table E6-1: Final Property Specific Standards for Soil COCs

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/g)	REM Soil Concentration[1] (µg/g)	MECP (2011) Table 3 SCS (µg/g)	Candidate Human Health Risk-Based PSS (µg/L)	Candidate Ecological Risk-Based PSS (µg/L)	Dominant Exposure Pathway	Final Property Specific Standard (µg/L)	Basis of PSS	RMM Required	Likelihood to Exceed SCS Off-Site
VOCs										
Tetrachloroethylene	17	20	2.3	20	20	HH - Indoor Air Inhalation and ECO - Mammals and Birds	20	REM	YES[2,3,6]	NO
PAHs										
Acenaphthylene	0.301	0.36	0.17	6	0.36	ECO - Soil Leaching	0.36	REM	YES[1*,4*]	NO
Anthracene	82	98	0.74	98	98	HH - Direct Contact and ECO - Plants and Soil Invertebrates	98	REM	YES[1*,4*,6]	NO
Benzo(a)anthracene	74.1	89	0.63	89	89	HH - Direct Contact and ECO - Plants and Soil Invertebrates	89	REM	YES[1,4,5,6,7]	NO
Benzo(a)pyrene	71.9	86	0.3	86	86	HH - Direct Contact and ECO - Plants and Soil Invertebrates	86	REM	YES[1,4,5,6]	NO
Benzo(b)fluoranthene	72.3	87	0.78	87	87	HH - Direct Contact and ECO - Plants and Soil Invertebrates	87	REM	YES[1,4,5,6,7]	NO
Benzo(ghi)perylene	37.3	45	7.8	57	45	HH - Garden Produce Ingestion and ECO - Mammals and Birds	45	REM	YES[1*,4*,5,6,7]	NO
Benzo(k)fluoranthene	27.8	33	0.78	33	33	HH - Direct Contact and ECO - Mammals and Birds	33	REM	YES[1,4,5,6,7]	NO
Chrysene	66.2	79	7.8	79	79	HH - Direct Contact and ECO - Mammals and Birds	79	REM	YES[1,4,5,6,7]	NO
Dibenz(a,h)anthracene	9.1	11	0.1	11	11	HH - Direct Contact and ECO - Mammals and Birds	11	REM	YES[1,4,5,6,7]	NO
Fluoranthene	183	220	0.69	220	220	HH - Direct Contact and ECO - Plants and Soil Invertebrates	220	REM	YES[1,4,5,6,7]	NO
Indeno(1,2,3-cd)pyrene	38.1	46	0.48	46	46	HH - Direct Contact and ECO - Plants and Soil Invertebrates	46	REM	YES[1,4,5,6,7]	NO
1- and 2-Methylnaphthalene	18.81	23	3.4	72	23	ECO - Plants and Soil Invertebrates	23	REM	YES[6]	NO
Naphthalene	32	38	0.75	38	38	HH - Indoor Air Inhalation and ECO - Plants and Soil Invertebrates	38	REM	YES[2,6]	NO
Phenanthrene	241	289	7.8	719	289	ECO - Plants and Soil Invertebrates	289	REM	YES[6]	NO
Pyrene	153	184	78	540	184	ECO - Plants and Soil Invertebrates	184	REM	YES[1*,4*,6]	NO
Metals and Inorganics										
Lead	430	516	120	516	516	HH - Direct Contact and ECO - Mammals and Birds	516	REM	YES[1,5,6,7]	NO

HH - Human Health; ECO - Ecological Health

[1] RMM required for the protection of Site resident (also surrogate for site visitor) exposure to soil COCs via direct soil contact.

[2] RMM required for the protection of Site resident (also surrogate for site visitor) exposure to soil COCs via indoor air inhalation pathway.

[3] RMM required for protection of indoor worker exposure to soil COCs via indoor air inhalation pathway.

[4] RMM required for protection of outdoor maintenance worker exposure to soil COCs via direct contact.

[5] RMM required for the protection of site resident (also surrogate for site visitor) exposure to soil COCs via garden produce ingestion.

[6] RMM required for the protection of terrestrial plants and soil invertebrates.

[7] RMM required for the protection of mammals and birds.

*Although no unacceptable risk was predicted, unacceptable risk was predicted for total carcinogenic PAHs. Therefore RMM is required.

Table E6-2: Final Property Specific Standards for Groundwater COCs

Contaminant of Concern	Maximum Concentration / Reporting Detection Limit (µg/L)	REM Ground Water Concentration[1] (µg/L)	MECP (2011) Table 3 SCS (µg/L)	MECP (2011) Table 7 SCS (µg/L)	Candidate Human Health Risk-Based PSS (µg/g)	Candidate Ecological Risk-Based PSS (µg/g)	Dominant Exposure Pathway	Final Property Specific Standard (µg/g)	Basis of PSS	RMM Required	Likelihood to Exceed SCS Off-Site
PHCs											
PHC F1	470	564	750	420	564	750	HH - Indoor Air Inhalation	564	REM	YES[1]	YES
VOCs											
cis-1,2-Dichloroethylene	150	180	17	1.6	180	180,000	HH - Indoor Air Inhalation	180	REM	YES[1,2]	YES
trans-1,2-Dichloroethylene	54.8	66	17	1.6	66	280,000	HH - Indoor Air Inhalation	66	REM	YES[1,2]	YES
Tetrachloroethylene	4,100	4,920	17	0.5	4,920	11,000	HH - Indoor Air Inhalation	4,920	REM	YES[1,2,3]	YES
Trichloroethylene	270	324	17	0.5	324	280,000	HH - Indoor Air Inhalation	324	REM	YES[1,2]	YES
Vinyl Chloride	555.5	667	1.7	0.5	667	450,000	HH - Indoor Air Inhalation	667	REM	YES[1,2]	YES

HH - Human Health; ECO - Ecological Health

[1] RMM required for the protection of Site resident (also surrogate for site visitor) exposure to groundwater COCs via indoor air inhalation pathway.

[2] RMM required for the protection of indoor worker exposure to soil COCs via indoor air inhalation pathway.

[3] RMM required for the protection of construction worker exposure to groundwater COCs via dermal contact and incidental ingestion.

Appendix F: Qualifications of the Risk Assessment Team

Shane Ward, B.Sc., QPRA

Senior Risk Assessment Specialist

Professional Registrations

- QPRA - ON

Education + Training

- B.Sc., Environmental Toxicology Program, University of Guelph, 2009
- Soil Vapour Training, 1-day course, Maxxam Analytics Inc., 2016
- Conceptual Site Models in Environmental Site Assessments, Golder Associates Inc., 2014
- Technical Writing, Golder Associates Inc., 2013
- Quality Assurance Program for Environmental Investigations in Ontario, Golder Associates Inc., 2011

Affiliations + Memberships

- Ontario Environmental Industrial Association (ONEIA)
- Qualified Person Community of Ontario (QPCO)
- Society of Environmental Toxicology and Chemistry – Laurentian Chapter (L-SETAC)

Languages Spoken

- English

Mr. Ward has over thirteen (13) years of experience in the areas of human health and ecological risk assessment (RA), fate and transport modelling, risk assessment modeling, project management, due diligence and risk management. He is currently a Senior Risk Assessment Specialist at EXP and provides senior oversight and technical review on risk assessment projects. Mr. Ward has conducted numerous human health and ecological risk assessments for contaminated sites in Ontario (under Ontario Regulation 153/04, as amended) and across Canada (under Federal Contaminated Sites Action Plan protocols). To date, he has been involved in over twenty (20) RAs that have been successfully accepted by the Ontario Ministry of the Environment, Conservation and Parks (MECP). He has also conducted over one-hundred (100) Screening Level Risk Assessments in Ontario and across Canada to support due diligence and financing purposes. Moreover, he has conducted third-party peer review of O. Reg. 153/04 and due diligence RAs on behalf of local municipalities or clients.

Mr. Ward graduated from the University of Guelph with an Honours Bachelor of Science degree in Environmental Toxicology.

Prior to joining EXP in 2024, Mr. Ward was a Senior Environmental Risk Assessor at Pinchin Limited, a Risk Assessment Specialist at EXP, and an Environmental Risk Assessor at Golder Associates, where he specialized in environmental risk assessments.

Since joining EXP, Mr. Ward has been involved with senior technical review of RAs. The next page presents highlights of projects Mr. Ward has been involved with.

Shane Ward, B.Sc., QPRA - *continued*

Senior Risk Assessment Specialist

Project Experience

Tier 3 Risk Assessment (2022 to 2023) – Proposed Residential Development, Toronto, Ontario.

QPRA and Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a commercial property. The RA was being conducted to assess human and ecological risk and facilitate site permitting of a proposed residential development. Contaminants of concern (COCs) include polycyclic aromatic hydrocarbons (PAHs) in soil, and volatile organic compounds (VOCs) in groundwater.

Tier 3 Risk Assessment (2022 to 2023) – Commercial Property, Niagara Falls, Ontario.

QPRA and Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a commercial property. The RA was being conducted to assess human and ecological risk as a part of the lease agreement between the tenant and owner. COCs include VOCs in groundwater.

Tier 3 Risk Assessment (2019-2023) – Former Industrial Property, Kitchener, Ontario.

Human Health and Ecological Risk Assessor for multiple Tier 3 RAs being conducted at a former industrial property with a surface water body. The RAs were being conducted to assess human and ecological risk and facilitate site permitting of a mixed-use redevelopment, including commercial, residential and parkland parcels. COCs include petroleum hydrocarbons (PHCs), VOCs, PAHs, metals and inorganics in soil and groundwater. One of the RAs was accepted by MECP in 2023.

Modified Generic Risk Assessment (2021-2022) – Residential Development, Mount Forest, Ontario.

QPRA and Senior Human Health and Ecological Risk Assessor for an MGRA to support the development of a former industrial property to a residential townhome development. COC) include metals and polycyclic aromatic hydrocarbons (PAHs) in soil. The MGRA was accepted by MECP in 2022.

Tier 3 Risk Assessment (2019-2020) – Mixed-Use Development, Trenton, Ontario.

Human Health and Ecological Risk Assessor for a Tier 3 RAs being conducted at a commercial property. The RAs were being conducted to assess human and ecological risk and facilitate site permitting of a potential mixed-use redevelopment, including commercial and residential buildings. COCs include metals in soil and VOCs in groundwater. One of the RAs was accepted by MECP in 2020.

Tier 3 Risk Assessment (2019-2021) – Proposed Residential Development, Toronto Ontario.

Human Health and Ecological Risk Assessor for a Tier 3 RA being conducted at a residential property where contamination was identified related to fill materials and former underground storage tanks (USTs). The RA was being conducted to assess human and ecological risk and facilitate site permitting of a proposed residential development. COCs include PHCs, benzene and PAHs in soil and/or groundwater. The RA was accepted by MECP in 2021.

Modified Generic Risk Assessment (2019-2020) – Residential Development, Welland, Ontario.

Human Health and Ecological Risk Assessor for an MGRA to support the redevelopment of a former commercial property to a retirement home. COCs include electrical conductivity and sodium adsorption ratio in soil. The MGRA was accepted by MECP in 2020.

Preliminary Quantitative Risk Assessments and Screening Level Risk Assessments (2016-2017) – Public Works and Government Services Canada, Various Locations.

Shane Ward, B.Sc., QPRA - *continued*

Senior Risk Assessment Specialist

Human health and ecological Risk Assessor for multiple PQRAs and SLRAs for various properties in Ontario, including penitentiaries, lighthouses and remote contaminated sites. This work was completed for Public Works and Government Services Canada (PWGSC).

Risk Assessment – Former Uranium Mines (2011-2013).

Ecological Risk Assessor for two former uranium mine sites in Ontario. Previous monitoring in the surrounding watershed had noted elevated radionuclides and metals in surface water and sediment. The RAs were completed to evaluate potential risks to human and ecological receptors both on-Site and within the surrounding area. The RAs were submitted to the MECP and the Canadian Nuclear Safety Commission for review.

Risk Assessment (2011 to 2022) – Various Projects.

Significant experience with the Modified Generic Risk Assessment, former Streamlined Tier 3, and Tier 3 Risk Assessment approaches. Completed over twenty (20) O. Reg. 153/04-compliant human health and ecological RAs for sites impacted by contaminants of concern including metals and inorganic parameters, VOCs, PHCs, and PAHs in soil, groundwater, and/or sediment.

Employment History

EXP Services Inc. – Senior Risk Assessment Specialist

Employment: Jan 2024 – Present

Pinchin Ltd. – Senior Environmental Risk Assessor

Employment: 2021 – Jan 2024

Pinchin Ltd. – Environmental Risk Assessor

Employment: Apr 2018 – 2021

Golder Associates Ltd. – Environmental Risk Assessor

Employment: Oct 2017 – Apr 2018

EXP Services Inc. – Risk Assessment Specialist

Employment: Jan 2016 – Sep 2017

Golder Associates Ltd. – Environmental Risk Assessor

Employment: Jan 2011 – Nov 2015

**Work performed at previous firm.*

Nuo Heng Kong, M.Env.Sc.

Risk Assessment Specialist

Education + Training

- M.Env.Sc. Environmental Sciences, University of Toronto, 2022
- Hon.B.Sc. Environmental Chemistry, University of Toronto, 2021

Languages Spoken

- English
- Mandarin

Areas of Expertise

- Phase I and II Environmental Site Assessments
- Screening Level Risk Assessments & Tier 3 Risk Assessments

Mr. Kong is a Risk Assessment Specialist with a background in environmental science, chemistry, Phase one and Two Environmental Site Assessments (ESA), contaminated site remediation, and risk assessment (RA). Since joining EXP in 2022, Mr. Kong has been involved in preparation of over twenty Pre-submission Form submissions (PSF), Screening Level Risk Assessments (SLRA), Due Diligence Risk Assessments (DDRAs), and Tier 3 RAs, following the Ontario Regulation O.Reg 153/04.

Mr. Kong has conducted Ras involving contaminants including petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals and inorganics, other regulated parameters (ORPs), polychlorinated biphenyls (PCBs), and various pesticides in both soil and groundwater. In his proposed project role, Mr. Kong will be supporting all stages of human and ecological risk assessments including problem formulation, exposure assessment, hazard assessment, and risk management.

Project Experience

Tier 3 Risk Assessment (2022) – Residential Building Development, Toronto, Ontario

Supported a human health and ecological risk assessment (HHRA and ERA) for a Tier 3 RA conducted at a former office and factory complex in Toronto, Ontario. The property was proposed to be redeveloped for residential use. The contaminants of concern (COCs) consist of VOCs in groundwater. The results of the HHRA and ERA were used to implement risk management measures including a vapour intrusion mitigation system (VMS), a health and safety plan (HASP) for human receptors, and a groundwater management plan (GWMP).

Tier 3 Risk Assessment (2022 - 2023) – Conveyance to the City for Road Widening, Toronto, Ontario

Supported HHRA and ERA for a Tier 3 RA conducted at a commercial land use in Toronto, Ontario. The property was proposed to be redeveloped for community use (road). COCs consist of PAHs, metals, and ORPs in soil and groundwater. The results of the HHRA and ERA were used to implement risk management measures including administrative requirements, HASP, soil barrier, and soil and groundwater management plan (SGWMP).

Tier 3 Risk Assessment (2022 - 2023) – High Rise Mixed Residential and Commercial Building, Toronto, Ontario

Supported HHRA and ERA for a Tier 3 RA conducted at a former commercial land use in Toronto, Ontario. The property was proposed to be redeveloped for a high rise mixed residential and commercial building with basement. COCs consist of PHCs and VOCs in soil and/or groundwater. The results of the HHRA and ERA were used to implement risk management measures including VMS engineering measures, HASP, soil barrier, and soil and groundwater management plan (SMP and GWMP).

Tier 3 Risk Assessment (2023 - 2024) – Proposed Privately Owned Public Space, Toronto, Ontario

Supported HHRA and ERA for a Tier 3 RA conducted at a vacant parking lot in Toronto, Ontario. The property was proposed to be redeveloped for a proposed privately owned public space as a part of a larger property. COCs consist of PHCs, VOCs, and PAHs in soil and/or groundwater. The results of the HHRA and ERA were used to implement risk management measures including administrative requirements, HASP, and soil barrier.

Tier 3 Risk Assessment (2023 - 2024) – Six-Storey Mixed Residential and Community Building, Toronto, Ontario

Supported HHRA and ERA for a Tier 3 RA conducted at a former community land use in Toronto, Ontario. The property was proposed to be redeveloped as a six-storey mixed residential and community building with basement. COCs consist of PHCs and VOCs in soil. The results of the HHRA and ERA were used to implement risk management measures including VMS engineering measures, HASP, soil barrier, and SMP.

Tier 3 Risk Assessment (2023 - 2024) – High-rise Mixed Residential and Commercial Building, Toronto, Ontario

Supported HHRA and ERA for a Tier 3 RA conducted at a former commercial land use in Toronto, Ontario. The property was proposed to be redeveloped as a long-term care facility and a paramedic station. COCs consist of PHCs and VOCs in soil and various VOCs in groundwater. The results of the HHRA and ERA were used to implement risk management measures including Passive SVIMS (with the Option of Converting into an Active System), HASP, soil barrier, SGWMP, administrative restrictions.

Screening Level Risk Assessment (2022) – Commercial building, Smith Falls, Ontario

Completed a screening level risk assessment report of a commercial building for financial due diligence purpose. A human health and ecological risk assessment were conducted based on the PHCs and VOCs and PAH impacts in groundwater. The results of the HHRA and ERA were used to identify risk management measures including a soil barrier.

Screening Level Risk Assessment (2023) – Future Commercial Building, Hawkesbury, Ontario

Completed a screening level risk assessment report of the known groundwater impacts on the property. A human health and ecological risk assessment were conducted based on the VOCs impacts in groundwater. The results of the HHRA and ERA were used to identify risk management measures including an administrative requirement and GWMP.

Screening Level Risk Assessment (2023) – Industrial Buildings, Ajax, Ontario

Completed a screening level risk assessment report of the known soil and groundwater impacts on the property. A human health and ecological risk assessment were conducted based on the PHCs, VOCs, PAHs impacts in soil and/or groundwater. The results of the HHRA and ERA were used to identify risk management measures including a soil barrier, HASP, GWMP, and recommended IAQ/SSV sampling program.

Due Diligence Risk Assessment (2023) – Future Commercial Redevelopment, Toronto, Ontario

Completed a due diligence risk assessment report of the known soil and groundwater impacts on the property. A human health and ecological risk assessment were conducted based on the PHCs, PAHs, metals and inorganics, and ORPs impacts in soil and/or groundwater. The results of the HHRA and ERA were used to identify risk management measures including a hot spot remediation, soil barrier, HASP, and SGWMP.

Employment History

EXP Services Inc., Markham – Risk Assessment Specialist

Employment: May 2022 – Present

Conducting field work, including soil and groundwater sampling, bore hole drilling, and groundwater monitoring installation. Completion of Tier 3 Risk Assessment, Pre-submission Forms, and Screening Level Risk Assessment reports.

Environment and Climate Change Canada – Climate Analyst

Employment: January to August 2020

Performed and reported wind pressure analyses by collecting and inputting aerial and topography data into ECCC's wind pressure model for various client projects. Also supported the update of the rainfall intensity duration frequency (IDF) curve in PEI through data entry and data quality control and assurance.

Jennifer Hayman, B.Sc., P.Geo., QPESA

Senior Project Manager

Professional Registrations

- P.Geo. / Ontario

Education + Training

- Certificate, Environmental Management, Niagara College, 2001
- B.Sc., Environmental Science, McMaster University, 2000
- OSHA 40 hour Hazardous Waste Activities Training
- WHIMIS Training Program

Affiliations + Memberships

- Professional Geoscientists Ontario (PGO)

Languages Spoken

- English

Jennifer Hayman is a senior environmental scientist and specialist in the completion of Phase I/One and II/Two Environmental Site Assessments (ESA) and soil and rock management plans for environmental and construction projects. She has 18 years of experience in environmental consulting and is proficient in the interpretation and application of provincial and federal environmental legislation, such as Ontario Regulation (O. Reg.) 153/04 (as amended), the Record of Site Condition (RSC) filing process and working knowledge of O. Reg. 406/19 (Excess Soils).

Jennifer has personally completed over 300 Phase I/One ESAs in the private and public sectors, including commercial, agricultural, residential and industrial properties. As a QPESA, Jennifer reviews reports prepared by others including conducting peer review of other consultants reports on behalf of mutual clients.

Additionally, Jennifer has been managing projects since 2007 including client liaison, budget preparation, invoicing, project coordination and directing technical staff.

Jennifer is a Qualified Person (QPESA) as defined by O. Reg. 153/04.

Project Experience

Peer Review, City of Toronto, Multiple Projects - City of Toronto, Toronto, Ontario

As part of the Peer Review Team with EXP, Jennifer has completed several reviews on behalf of the City as part of the City's Harmonized Peer Review process.

Technical Reviewer, City of Toronto Roster – City of Toronto, Toronto, Ontario

Jennifer was the technical reviewer for several City of Toronto projects under Roster agreement between 20217 and 2021 including two properties potentially proceeding to RSC. Jennifer acted as the technical reviewer and QPESA for Phase One and Two ESAs including one property adjacent to Lake Ontario.

Technical Lead, Excess Soil, St. David's/Townline Tunnel Road West Reconstruction – Thorold, Ontario

Technical Lead and QPESA for the environmental portions of the project. Jennifer was responsible for review of the Assessment of Past Uses, Sampling and Analysis Plan and Excess Soil Characterization report to the requirements of O.Reg. 406/19. Environmental sampling was conducted during geotechnical drilling in advance of construction and soil movement.

Jennifer Hayman, B.Sc., P.Geo., QPESA - *continued*

Senior Project Manager

Technical Lead, Excess Soil, Erie Street Watermain Replacement – Port Colborne, Ontario

Technical Lead and QPESA for the environmental portions of the project. Jennifer was responsible for review of the Assessment of Past Uses, Sampling and Analysis Plan and Excess Soil Characterization report to the requirements of O.Reg. 406/19. Environmental sampling was conducted during geotechnical drilling in advance of construction and soil movement. Jennifer will be supporting the project during soil movement in 2022.

Technical Reviewer, Phase One and Two ESAs – Various, Greater Toronto Area, Ontario

Jennifer acts the QPESA for multiple Phase One and Two ESAs in addition to review of CSA reports. Projects include multi-disciplinary (combined with geotechnical and hydrogeological) and stand-alone projects. Several projects are moving towards RSC filing.

Technical Reviewer, Port Lands Flood Protection Project (PLFP) – Waterfront Toronto, Toronto, Ontario

The PLFP is the redevelopment of the Toronto Port Lands; 356 hectares of land that has ben impacted by many industrial contaminants and includes areas of known NAPL impacts. Jennifer served as senior technical reviewer and QPESA several of the parcels that will require RA and RSCs to facilitate the development of future Promontory Park South and River Park North.

Reviewer; Metrolinx CPG Program – Mextrolinx, Ontario wide

As part of the technical compliance team for Metrolinx programs, Jennifer acted as a peer reviewer for technical reports prepared by others on behalf of the Client in support of development/design activities. Peer review included Phase One/I ESA reports, Phase Two/II ESAs reports and workplans, data gap analysis reports and designated substance reports. Additionally, Jennifer provided technical guidance on various aspects including excess soils.

Project Manager and Reviewer, Phase One and Two ESA, Remediation and RSC Filling – Infrastructure Ontario, Toronto, Ontario

Jennifer was the technical reviewer and QPESA for a fast track project for RSC filing. The project was initiated in June 2018 with the RSC filed in March 2019. Jennifer supervised all aspects of the project including technical review and staff oversight. The RSC was required to facility the conversion of commercial use to residential use in order to support the use of the first floor of the building as a daycare. Based on the findings of the Phase Two ESA, a hot spot soil remedial program for PAHs was completed prior to RSC filing. In addition to acting at the technical reviewer, she was the project manager and was involved in client liaison, proposal preparation and invoicing.

Employment History

EXP Services Inc. - Senior Project Manager
Employment: February 2021 – Present
Jacobs Engineering Group Inc. (formerly CH2M Hill Canada Limited) - Project Manager
Employment: January 2016 – February 2021
MTE Consultants Inc. – Project Manager / Environmental Scientist
Employment: June 2009 – March 2015
AECOM (formerly Earth Tech Canada Inc.) – Environmental Scientist / Project Manager
Employment: March 2003 – June 2009

Eric Wong, P.Eng.

Environmental Engineer and Senior Project Manager

Professional Registrations

- P. Eng. - ON

Education + Training

- B.Sc.E, Queen's University, Chemical Engineering, 2009

Affiliations + Memberships

- Member, Professional Engineers of Ontario

Eric Wong has over ten (10) years of experience and is an Environmental Engineer and Senior Project Manager in EXP's Markham Office and started with EXP in 2021. Prior to working at EXP, Eric worked at GHD from 2018 to 2021. Eric obtained his Bachelor of Applied Science degree in Chemical Engineering from Queen's University in 2009 and is a licensed Professional Engineer (P. Eng.) within Ontario since 2014. He is an experienced environmental engineer, having worked on a variety of environmental assessment, remediation, and risk assessment projects. His current responsibilities include project management, reporting, quality assurance and quality control and client liaison with a multitude of clients (private and public sectors). Eric manages and coordinates Phase I and II/One and Two Environmental Site Assessments (ESAs), in-situ and ex-situ remediations, risk assessments, excess soil management, demolitions and hazardous materials/designated substances surveys/abatements.

Project Experience

Phase I and II Environmental Site Assessments

Excess Soil Management and Certificate of Property Use Execution, Whitby, Ontario

The property is currently being redeveloped from commercial use to residential use. Mr. Wong is the project manager and oversees the removal of excess soil generated during the excavation of below grade structures. Responsibilities include preparation of an Assessment of Past Use report (APU), a Sampling and Analysis Plan (SAP), a Soil Characterization Report (SCR) and a Soil Destinations Report (SDR). Mr. Wong is also responsible for revising the client's soil tracking system and assisting the client with registration of the soil. Additionally, Mr. Wong also oversees the execution of Risk Management Measures (RMMs) as outlined in the Certificate of Property Use (CPU).

General Environmental Support, Lakeview Village, Mississauga, Ontario

The site previously operated as Lakeview Coal Generating Station and is currently being redeveloped for residential, parkland, community, commercial and institutional use. Mr. Wong is the project coordinator and acting project manager for all environmental support. This includes filing for Records of Site Condition (RSCs) and Risk Assessments (RAs), soil and groundwater remediation programs including regular monitoring and collection of confirmatory samples, soil characterization programs, and preparation of technical reports. Mr. Wong is responsible for communicating with representatives from the City of Mississauga, general contractors, subcontractors, other consultants, regulatory agencies, and other stakeholders.

Phase I and II Environmental Site Assessment, Existing Transformer Substation, Toronto, Ontario
Provided project management for a due diligence Phase I/II ESA for a private client at a property that has been utilized as a transformer substation since the 1960s. Phase I ESA work consisted of a site inspection, surrounding area reconnaissance, historical records review (including previous reports), Federal, Provincial and Municipal record searches, interviews, review of historical aerial photographs, review of topographic and soil maps. Based on the findings from the Phase I ESA, a Phase II ESA was completed to investigate the environmental soil and groundwater quality associated with various industrial activities and spills that have previously taken place on the property.

Phase One and Two Environmental Site Assessment, Residential Highrise Development, Toronto, Ontario
Provided project management for a Phase One/Two ESA for a private client at a property that was previously utilized for commercial use since the late 1800's and was proposed for residential redevelopment with commercial properties along the ground floor. The investigations were completed to support the filing of a RSC. Phase One ESA work consisted of a site inspection, surrounding area reconnaissance, historical records review (including previous reports), Federal, Provincial and Municipal record searches, interviews, review of historical aerial photographs, review of topographic and soil maps. Based on the findings from the Phase One ESA, a Phase Two ESA was completed to investigate environmental soil and groundwater quality associated with previous on-Site fuel storage tanks as well as neighbouring dry-cleaning facilities and a gasoline service station. The Phase Two ESA identified metal soil impacts which needed to be remediated by excavation and off-Site disposal. An RSC was subsequently acknowledged by the Ministry of the Environment, Conservation and Parks (MECP).

Phase I and II Environmental Site Assessment, Paper Recycling Facilities, Various Locations Within the Greater Toronto Area (GTA), Ontario

Provided project management for a combination of due diligence Phase I and II ESAs for a private client at various paper recycling facilities across the GTA. The investigations were completed to support the potential sale of the facilities. Phase I ESA work consisted of site inspections, surrounding area reconnaissance, historical records review (including previous reports), Federal, Provincial and Municipal record searches, interviews, review of historical aerial photographs, review of topographic and soil maps. Based on the Phase I ESAs, Phase II ESAs were completed to investigate soil and groundwater qualities within the vicinity of fuel storage tanks, chemical tank farms, wastewater discharge points, etc. The Phase II ESAs identified various soil and groundwater impacts associated with previous and current on-Site operations.

Environmental Due Diligence Assessments, Existing Industrial Properties, Various Cities, Ontario

Provided project management for environmental due diligence assessments for various federal government regulated industrial properties across Ontario. Projects completed included soil and groundwater investigations, drainage studies, PCB Stability Analysis, etc. Analytical results generated were compared to both federal and provincial soil/groundwater standards. Responsibilities included project coordination and management, budgeting, reporting and client liaison.

Infrastructure Ontario (IO), Private Public Partnership (P3) Projects, Municipal Infrastructures, Various Cities, Ontario
Provided project management for numerous multi-disciplinary P3 projects across Ontario including redevelopment of Long-Term Care facilities and hospitals, development of detention facilities and investigations to support exiting strategies. The majority of the projects included Phase One and Two ESAs, a geotechnical investigation, a hydrogeological investigation and a geophysical survey. Responsibilities included acting as the main point of contact with IO, scheduling, budgeting, project management and coordination between all disciplinaries to ensure that tasks were completed efficiently and in a timely manner and completing all

environmental components of the projects. Additional tasks included preparation of detailed proposals and remedial programs, and soil risk evaluations to support future construction activities.

Free Product Delineation Investigation, Ontario
Provided project management for a free product delineation investigation along a stretch of roadway for a confidential municipality. The investigation was triggered by the observation of free product beneath a municipal roadway followed by a sheen of product that was observed at a creek adjacent to the roadway. The delineation program consisted of reviewing previous environmental investigation programs completed for the City and others as well as developing and managing a subsurface investigation program. Based on the investigation, it was identified that the free product likely originated from previous commercial operations located within upgradient properties. The investigation will be utilized by the City to identify liable party(ies) in the future.

Appendix G: Reports Relied Upon

List of Reports Relied Upon

1. Trafalgar Environmental Consultants. 2022. *Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario*, dated May 20, 2022.
2. EXP Services Inc. 2022a. *Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 7, 2022.
3. EXP Services Inc. 2022b. *Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 9, 2022.
4. EXP Services Inc. 2024. *Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated July 4, 2024.
5. EXP Services Inc. 2025a. DRAFT *Supplemental Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.
6. EXP Services Inc. 2025b. DRAFT *PRB Installation Oversight, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.

Appendix H: Additional Supporting Documents

The following information is provided in the included zip file, included in the electronic submission:

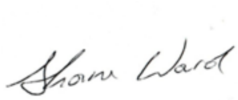
- Borehole logs
- Certificates of analysis
- J&E model inputs and outputs
- MGRA model input and outputs
- Notification of RA and use of non-potable standards
- Previous environmental reports
- Previous submission
- Plan of survey

Appendix I: Mandatory Certifications of the Qualified Person

APPENDIX I: MANDATORY CERTIFICATIONS

In accordance with O. Reg. 153/04, the following mandatory certifications are submitted with this Risk Assessment conducted for 1337 Queen Street West, Toronto, Ontario:

1. I have conducted or supervised a risk assessment report in accordance with the regulation.
2. I am a qualified person, as defined in section 168.1 of the Act, and have the qualifications required by section 6 of the regulation.
3. I have in place an insurance policy that satisfies the requirements of section 7 of the regulation.
4. The risk assessment team included members with expertise in all of the disciplines required to complete the risk assessment in accordance with the regulation.
5. The opinions expressed in the risk assessment are engineering or scientific opinions made in accordance with generally accepted principles and practices as recognized by members of the environmental engineering or science profession or discipline practicing at the same time and in the same or similar location.
6. To the best of my knowledge, the certifications and statements in this risk assessment are true as of June 5, 2025.
7. By making these certifications in this risk assessment report, I make no express or implied warranties or guarantees.



June 5, 2025

Shane Ward, B.Sc.

Date

Qualified Person Risk Assessment

1. As of June 5, 2025, it is my opinion that based on the phase one environmental site assessment and the phase two environmental site assessment and other relevant property information, the approach taken in the conduct of the risk assessment,
    a. is appropriate to evaluate human health and ecological risks from the contaminants of concern at the concentrations proposed as the standards specified in the risk assessment and assuming no measures have been taken at the RA property which have the effect of reducing the risk from the contaminants, and
    b. is consistent with the approach set out in the pre-submission form with the exception of those deviations listed in Report Section 1 (Summary of Recommendations/Findings) of the report under the heading "Deviations from Pre-Submission Form".

2. As of June 5, 2025, it is my opinion that, taking into consideration the assumptions specified in the risk assessment report, including the use of the property specified in Report Section 3 (Property Information, Site Plan and Geological Interpretation) of the risk assessment and any risk management measures recommended in the report, as long as the RA property satisfies those assumptions and meets the standards specified in the risk assessment report, the contaminants of concern are unlikely to pose a human health or ecological risk greater than the level of risk that was intended in the development of the applicable full-depth site condition standards for those contaminants.

3. As of June 5, 2025, it is my opinion that the implementation of the risk management plan described in Report Section 7 (Risk Management Plan) of the risk assessment report is necessary for a contaminant of concern addressed in the risk assessment report to prevent, eliminate or ameliorate any adverse effect from that contaminant to the human or ecological receptors addressed in the report and located on the RA property and is sufficient to address the current and potential future transport and exposure pathways.

4. As of June 5, 2025, the risk assessment report completely and accurately reflects the risk assessment assumptions and conclusions and all pertinent information has been included in the report and the appendices to the report.

Shane Ward

Shane Ward, B.Sc.	June 5, 2025 Date

Qualified Person Risk Assessment

Appendix J: Survey Plan and Legal Documents

COORDINATE TABLE

POINT	NORTHING	EASTING
1	4 833 418.92	310 156.77
2	4 833 460.71	310 136.55
3	4 833 449.17	310 096.26
4	4 833 397.54	310 110.56
5	4 833 411.34	310 158.87
6	4 833 416.65	310 148.80
7	4 833 406.91	310 114.70

SCHEDULE

PART	LOT	PLAN	PIN	AREA (m²)
1	ALL OF 5 PART OF LOTS 4,6 AND 92	REGISTERED PLAN 382	ALL OF 21302–0043 (LT)	2021.7

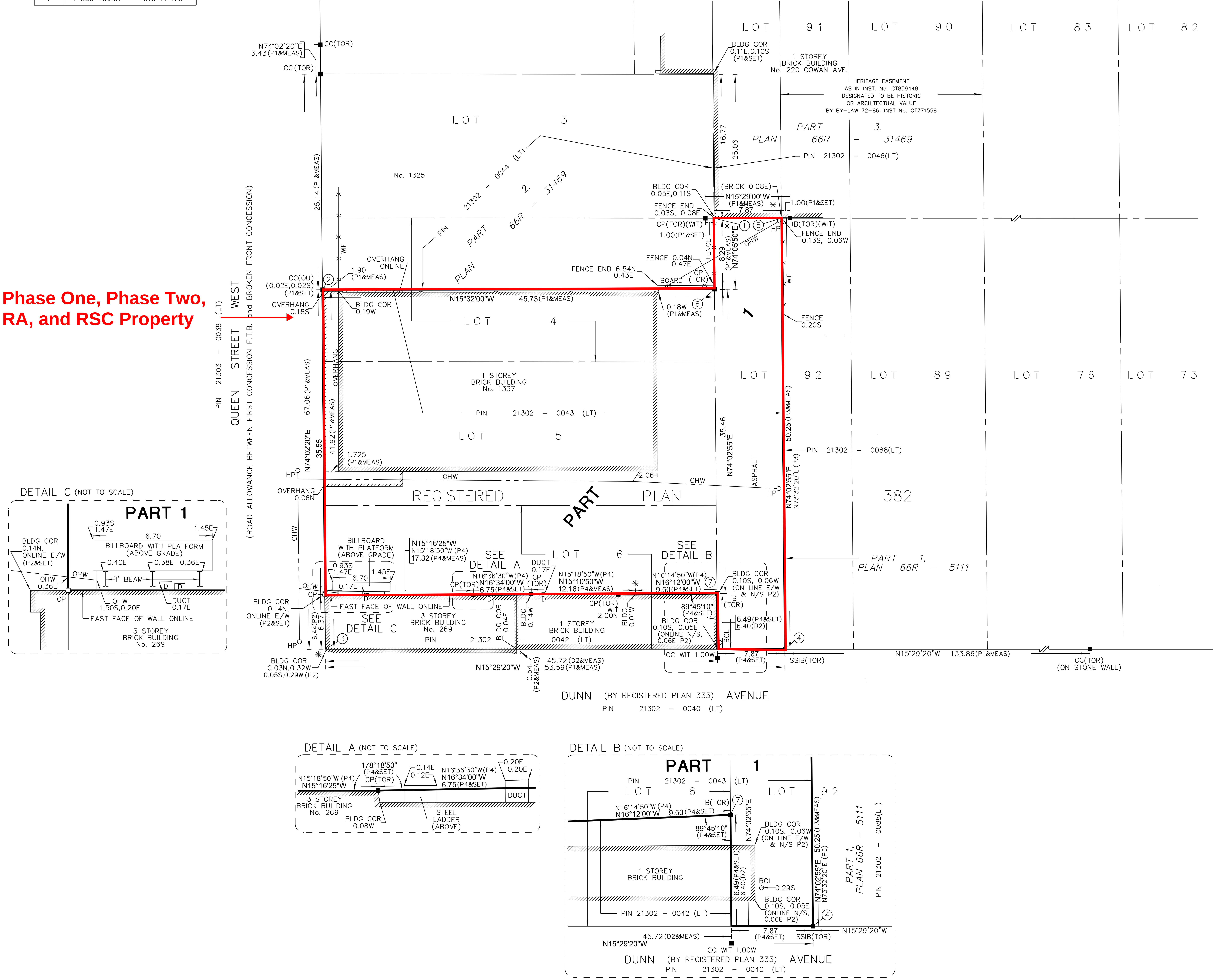
PLAN 66R-33321

Received and deposited

May 4th, 2023

Barbara Caira

Representative for the Land Registrar for the Land Titles Division of Toronto (No.80)



PLAN OF SURVEY OF
ALL OF LOT 5
PART OF LOTS 4, 6 AND 92
REGISTERED PLAN 382
CITY OF TORONTO

0 5 10 15 20m

SCALE: 1:250

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

THE INTENDED PLOT SIZE OF THIS PLAN IS 767mm IN WIDTH BY 563mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:250

BEARINGS HEREON ARE MTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS 020140658 AND 020140420, MTM ZONE 10, NAD83(CSRS)(1997.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR : 0.999886.

SPECIFIED CONTROL POINTS (SCPs) : MTM ZONE 10, NAD83(CSRS)(1997.0)
COORDINATES TO URBAN ACCURACY PER SEC. 14(2) OF O. REG. 216/10

POINT ID	NORTHING	EASTING
SCP 020140658	4 833 515.331	310 261.000
SCP 020140420	4 833 016.726	309 959.056

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
WIT	DENOTES	WITNESS
OU	DENOTES	ORIGIN UNKNOWN
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
CC	DENOTES	CUT CROSS
CP	DENOTES	CONCRETE PIN
OU	DENOTES	ORIGIN UNKNOWN
TOR	DENOTES	CITY OF TORONTO SURVEYS
P1	DENOTES	PLAN 66R–31469
P2	DENOTES	TOPOGRAPHIC SURVEY, D. HORWOOD, O.L.S., NOV. 22, 2000 (PROJECT 4461–1)
P3	DENOTES	PLAN 66R–5111
P4	DENOTES	PLAN OF SURVEY, W.N.WILDMAN, O.L.S., SEPT. 7, 1965 (JOB#3562)
D2	DENOTES	INSTRUMENT CT560773
BF	DENOTES	BOARD FENCE
CLF	DENOTES	CHAIN LINK FENCE
FP	DENOTES	FENCE POST
WIF	DENOTES	WROUGHT IRON FENCE
D	DENOTES	DUCT (ABOVE GRADE)
OHW	DENOTES	OVERHEAD WIRE
BOL	DENOTES	BOLLARD
HP	DENOTES	HYDRO POLE
N,S,E,W	DENOTES	NORTH, SOUTH, EAST AND WEST
✳	DENOTES	UNSUITABLE FOR MONUMENTATION
I	DENOTES	METAL 'I' BEAM 0.30 X 0.10 METERS (TYPICAL)

NOTE DUE TO SITE CONDITIONS, ALTERNATIVE MONUMENTS WERE PLANTED IN COMPLIANCE WITH O. REG 525/91, S.11(4).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 1ST DAY OF MAY, 2023.

DATE MAY 1, 2023

J. MERRLLES
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-29076

TORONTO
Engineering & Construction Services
Engineering Support Services

Land & Property Surveys
18 Dyas Road
2nd Floor
Toronto, Ontario
M3B 1V5

FOR CITY OF TORONTO USE ONLY

No. 1337 QUEEN STREET W.

JOB NUMBER 2017-05613

PLAN NUMBER 6

DATE	CAD/CALC	FIELD	DESIGN FILE	CHECKED BY
JANUARY 25, 2023	KEN. S/R .RASIAH	S.M	2017-05613-6.DGN	J. MERRLLES O.L.S.

STANDARD JUNE 2021

TORONTO

Wendy Walberg, LL.B., LL.M., C.S.
City Solicitor
Legal Services
Metro Hall, 26th Floor, Stn. 1260
55 John Street
Toronto, ON M5V 3C6
Tel. 416-392-8047
Fax 416-397-5624
** Certified by the Law Society as a Specialst in Municipal Law: Local Government*

Reply To: Mark Zwegers
Tel: 416-397-4055
Fax: 416-397-3848
E-Mail: Mark.zwegers@toronto.ca

File No. 2025-805-2424 2021

July 3, 2024

VIA EMAIL

Ministry of the Environment, Conservation and Parks
1st Floor, 135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Dear Sir/Madame:

RE: The property that is the subject matter of a Risk Assessment municipally known as 1337 Queen Street West, Toronto, Ontario (the "Property")

I am a solicitor for City of Toronto, the applicant herein. I confirm that the legal description of the Property identified on the Risk Assessment is as follows:

All of Lot 5 and Part of Lots 4, 6 and 92 on Plan 382 Parkdale, designated as PART 1 on Plan 66R-33321, being the whole of PIN 21302-0043(LT).

Enclosed is a copy of PIN 21302-0043(LT), Reference Plan 66R-33321 and Instrument No. AT6360787 pursuant to which the Property was conveyed to City of Toronto.

Owner
The Fee Simple (LTCQ) owner of the Property as shown on the parcel register for the Property is "City of Toronto".

There are no other registered or beneficial owners of the Property.

Assessment Roll Number
The assessment roll number is: **19 04 021 290 03700**

Municipal Address
The records of the Municipal Property Assessment Corporation show the Property as having a municipal address of 1337 Queen Street West.

Yours truly,

Mark Zwegers
Attachments

COORDINATE TABLE		
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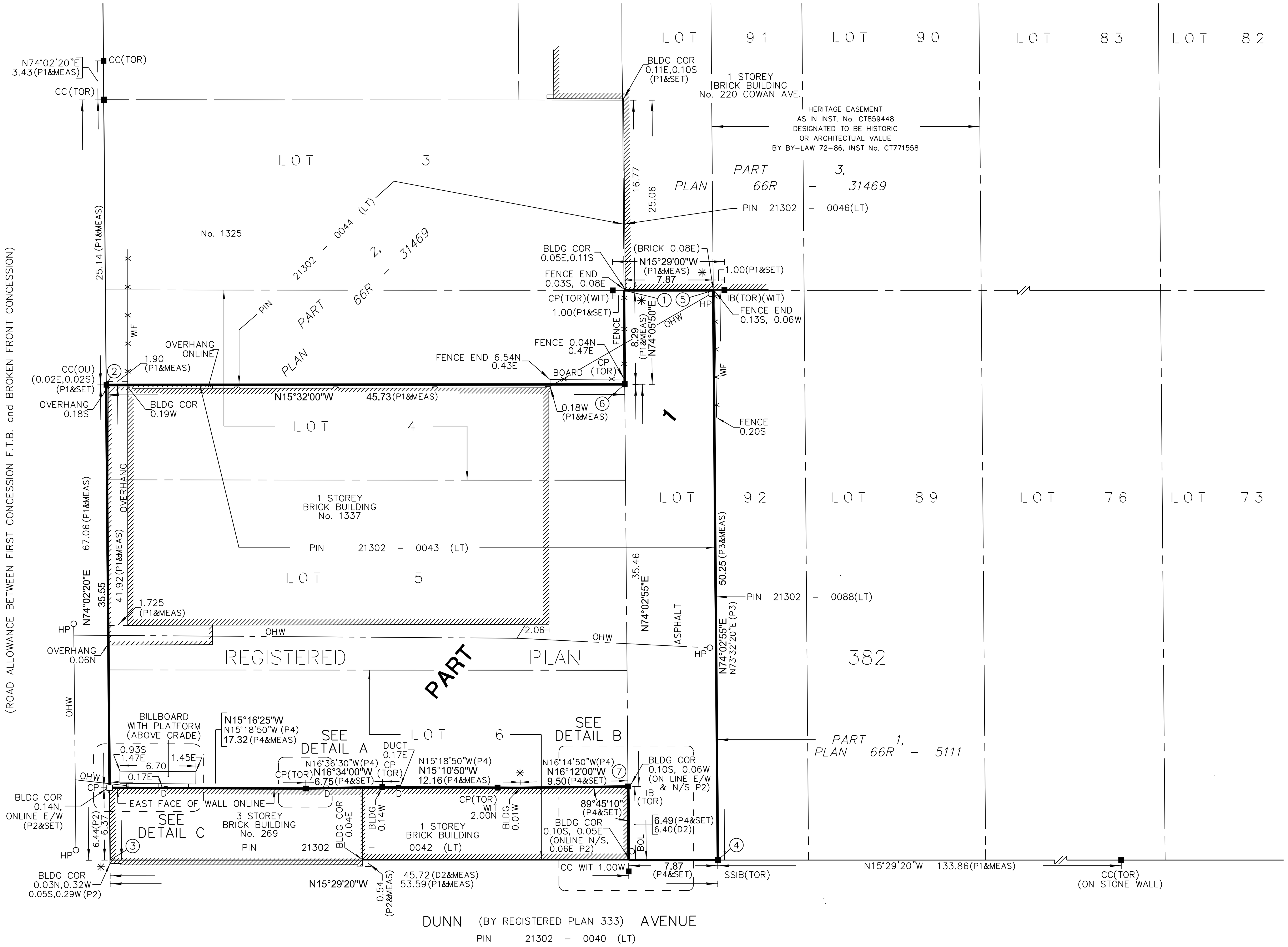

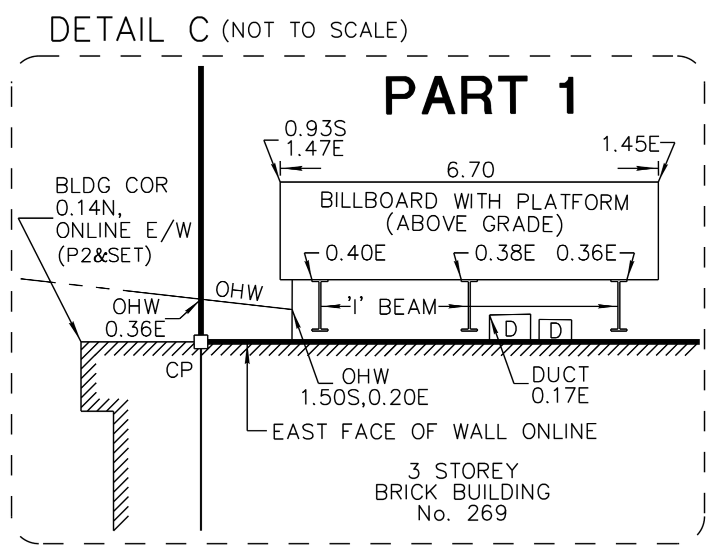

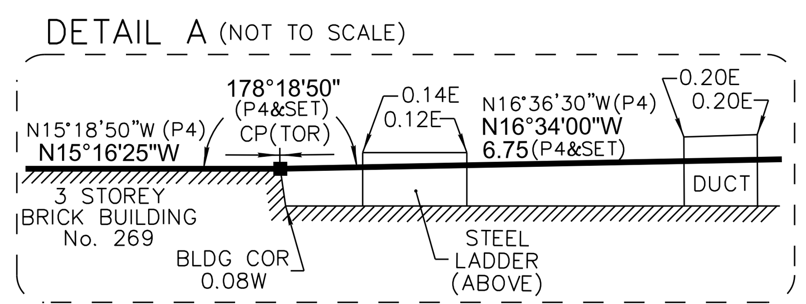

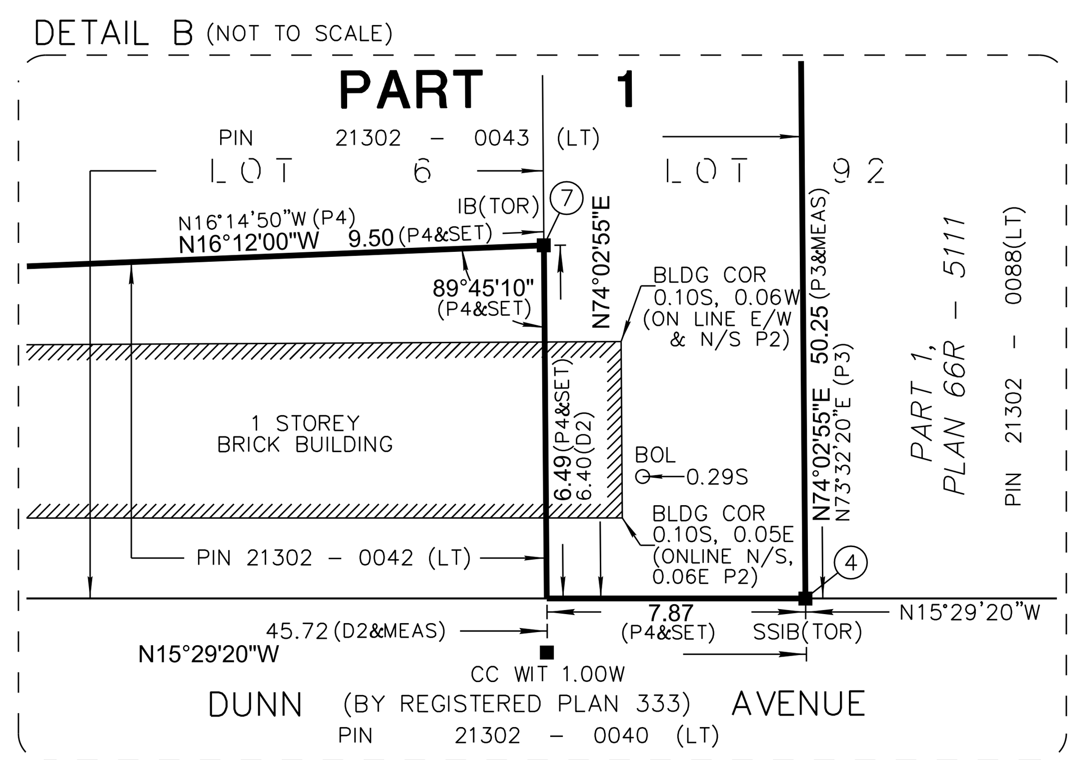

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PART OF LOTS 4, 6 AND 92
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CITY OF TORONTO

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P2	DENOTES	TOPOGRAPHIC SURVEY, D. HORWOOD, O.L.S., NOV. 22, 2000 (PROJECT 4461–1)
P3	DENOTES	PLAN 66R–5111
P4	DENOTES	PLAN OF SURVEY, W.N.WILDMAN, O.L.S., SEPT. 7, 1965 (JOB#3562)
D2	DENOTES	INSTRUMENT CT560773
BF	DENOTES	BOARD FENCE
CLF	DENOTES	CHAIN LINK FENCE
FP	DENOTES	FENCE POST
WIF	DENOTES	WROUGHT IRON FENCE
D	DENOTES	DUCT (ABOVE GRADE)
OHW	DENOTES	OVERHEAD WIRE
BOL	DENOTES	BOLLARD
HP	DENOTES	HYDRO POLE
N,S,E,W	DENOTES	NORTH, SOUTH, EAST AND WEST
✳	DENOTES	UNSUITABLE FOR MONUMENTATION
I	DENOTES	METAL 'I' BEAM 0.30 X 0.10 METERS (TYPICAL)

NOTE DUE TO SITE CONDITIONS, ALTERNATIVE MONUMENTS WERE PLANTED IN COMPLIANCE WITH O. REG 525/91, S.11(4).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 1ST DAY OF MAY, 2023.

DATE MAY 1, 2023

J. MERRLLES
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-29076

TORONTO

Engineering & Construction Services
Engineering Support Services

Land & Property Surveys
18 Dyas Road
2nd Floor
Toronto, Ontario
M3B 1V5

FOR CITY OF TORONTO USE ONLY

No. 1337 QUEEN STREET W.

JOB NUMBER	PLAN NUMBER
2017-05613	6

DATE	CAD/CALC	FIELD	DESIGN FILE	CHECKED BY
JANUARY 25, 2023	KEN. S/R .RASIAH	S.M	2017–05613–6.DGN	J. MERRLLES O.L.S.

STANDARD JUNE 2021

Properties

PIN	21302 - 0043 LT	*Interest/Estate* Fee Simple	☑ Redescription
Description	LT 5, PL 382 PARKDALE; PT LT 4, 6, 92 PL 382 PARKDALE, DESIGNATED AS PT 1, 66R33321; CITY OF TORONTO		
Address	1337 QUEEN ST W TORONTO		

Consideration

Consideration $18,309,850.00

Transferor(s)

The transferor(s) hereby transfers the land to the transferee(s).

Name GRAND BEACH HOUSING LIMITED
Address for Service c/o 2462 Yonge Street, 2nd floor
Toronto, Ontario M4P 2H5

A person or persons with authority to bind the corporation has/have consented to the registration of this document.

This document is not authorized under Power of Attorney by this party.

Name ALSHIRE LIMITED
Address for Service c/o 2462 Yonge Street, 2nd floor
Toronto, Ontario M4P 2H5

A person or persons with authority to bind the corporation has/have consented to the registration of this document.

This document is not authorized under Power of Attorney by this party.

Name HALCYON HILLS ENTERPRISES LTD.
Address for Service c/o 2462 Yonge Street, 2nd floor
Toronto, Ontario M4P 2H5

A person or persons with authority to bind the corporation has/have consented to the registration of this document.

This document is not authorized under Power of Attorney by this party.

Transferee(s) *Capacity* *Share*

Name	CITY OF TORONTO	Registered Owner	
Address for Service	Toronto City Hall 100 Queen Street West Toronto, Ontario M5H 2N2 Attention: City Clerk		

Statements

The land is being acquired or disposed of by the Crown in Right of Ontario or the Crown in Right of Canada, including any Crown corporation, or any agency, board or commission of the Crown; or a municipal corporation.

STATEMENT OF THE TRANSFEROR (S): The transferor(s) verifies that to the best of the transferor's knowledge and belief, this transfer does not contravene the Planning Act.

STATEMENT OF THE SOLICITOR FOR THE TRANSFEROR (S): I have explained the effect of the Planning Act to the transferor(s) and I have made inquiries of the transferor(s) to determine that this transfer does not contravene that Act and based on the information supplied by the transferor(s), to the best of my knowledge and belief, this transfer does not contravene that Act. I am an Ontario solicitor in good standing.

STATEMENT OF THE SOLICITOR FOR THE TRANSFEREE (S): I have investigated the title to this land and to abutting land where relevant and I am satisfied that the title records reveal no contravention as set out in the Planning Act, and to the best of my knowledge and belief this transfer does not contravene the Planning Act. I act independently of the solicitor for the transferor(s) and I am an Ontario solicitor in good standing.

Signed By

Robert Elliot Pollock	2323 Yonge St., Suite 205 Toronto M4P 2C9	acting for Transferor(s)	Signed	2023 06 23

Tel 416-488-5323

Fax 416-488-3716

I have the authority to sign and register the document on behalf of the Transferor(s).

Mark John Zwegers	55 John St., 26th Floor Toronto M5V 3C6	acting for Transferee(s)	Signed	2023 05 25

Signed By

Tel 416-392-8047
Fax 416-397-5624

I have the authority to sign and register the document on behalf of the Transferee(s).

Submitted By

CITY OF TORONTO 55 John St., 26th Floor
Toronto
M5V 3C6

2023 06 23

Tel 416-392-8047
Fax 416-397-5624

Fees/Taxes/Payment

Statutory Registration Fee	$69.00
Provincial Land Transfer Tax	$362,672.00
Municipal Land Transfer Tax	$0.00
Total Paid	$362,741.00

File Number

Transferee Client File Number : 2000-805-2424-21 (MX)

PROVINCIAL AND MUNICIPAL LAND TRANSFER TAX STATEMENTS

In the matter of the conveyance of: 21302 - 0043 LT 5, PL 382 PARKDALE; PT LT 4, 6, 92 PL 382 PARKDALE, DESIGNATED AS PT 1, 66R33321; CITY OF TORONTO

BY: GRAND BEACH HOUSING LIMITED
ALSHIRE LIMITED
HALCYON HILLS ENTERPRISES LTD.

TO: CITY OF TORONTO Registered Owner

1. MARK JOHN ZWEGERS

I am

- ☐ (a) A person in trust for whom the land conveyed in the above-described conveyance is being conveyed;
- ☐ (b) A trustee named in the above-described conveyance to whom the land is being conveyed;
- ☐ (c) A transferee named in the above-described conveyance;
- ☑ (d) The authorized agent or solicitor acting in this transaction for CITY OF TORONTO described in paragraph(s) (c) above.
- ☐ (e) The President, Vice-President, Manager, Secretary, Director, or Treasurer authorized to act for _____ described in paragraph(s) (_) above.
- ☐ (f) A transferee described in paragraph (_) and am making these statements on my own behalf and on behalf of _____ who is my spouse described in paragraph (_) and as such, I have personal knowledge of the facts herein deposed to.

2. I have read and considered the definition of "single family residence" set out in subsection 1(1) of the Act. The land being conveyed herein:
does not contain a single family residence or contains more than two single family residences.

3. **The total consideration for this transaction is allocated as follows:**

(a) Monies paid or to be paid in cash	$18,309,850.00
(b) Mortgages (i) assumed (show principal and interest to be credited against purchase price)	$0.00
(ii) Given Back to Vendor	$0.00
(c) Property transferred in exchange (detail below)	$0.00
(d) Fair market value of the land(s)	$0.00
(e) Liens, legacies, annuities and maintenance charges to which transfer is subject	$0.00
(f) Other valuable consideration subject to land transfer tax (detail below)	$0.00
(g) Value of land, building, fixtures and goodwill subject to land transfer tax (total of (a) to (f))	$18,309,850.00
(h) VALUE OF ALL CHATTELS -items of tangible personal property	$0.00
(i) Other considerations for transaction not included in (g) or (h) above	$0.00
(j) Total consideration	$18,309,850.00

6. Other remarks and explanations, if necessary.

1. The information prescribed for purposes of section 5.0.1 of the Land Transfer Tax Act is not required to be provided for this conveyance.

2. The transferee(s) has read and considered the definitions of "designated land", "foreign corporation", "foreign entity", "foreign national", "Greater Golden Horseshoe Region", "specified region", "spouse" and "taxable trustee" as set out in subsection 1(1) of the Land Transfer Tax Act and O. Reg 182/17. The transferee(s) declare that this conveyance is not subject to additional tax as set out in subsection 2(2.1) of the Act because:

3. (c) The transferee(s) is not a "foreign entity" or a "taxable trustee".

4. The transferee(s) declare that they will keep at their place of residence in Ontario (or at their principal place of business in Ontario) such documents, records and accounts in such form and containing such information as will enable an accurate determination of the taxes payable under the Land Transfer Tax Act for a period of at least seven years.

5. The transferee(s) agree that they or the designated custodian will provide such documents, records and accounts in such form and containing such information as will enable an accurate determination of the taxes payable under the Land Transfer Tax Act, to the Ministry of Finance upon request.

7. Statements pertaining only to Municipal Land Transfer Tax:

This is a conveyance to the City of Toronto.

PROPERTY Information Record

A. Nature of Instrument: Transfer
LRO 80 Registration No. AT6360787 Date: 2023/06/23

B. Property(s): PIN 21302 - 0043 Address 1337 QUEEN ST W TORONTO Assessment Roll No 1904021 - 29003700

C. Address for Service: Toronto City Hall
100 Queen Street West
Toronto, Ontario
M5H 2N2
Attention: City Clerk

D. (i) Last Conveyance(s): PIN 21302 - 0043 Registration No. CA268851

(ii) Legal Description for Property Conveyed: Same as in last conveyance? Yes ☐ No ☑ Not known ☐

E. Tax Statements Prepared By: Mark John Zwegers
55 John St., 26th Floor
Toronto M5V 3C6

PROPERTY DESCRIPTION: LOT 5 PLAN 382 PARKDALE, PART LOTS 4, 6, 92 PLAN 382 PARKDALE, PART 1 66R33321; CITY OF TORONTO

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
2003/04/28

OWNERS' NAMES
CITY OF TORONTO

CAPACITY SHARE
ROWN

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
** PRINTOUT INCLUDES ALL DOCUMENT TYPES (DELETED INSTRUMENTS NOT INCLUDED) **						
**SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:						
** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *						
** AND ESCHEATS OR FORFEITURE TO THE CROWN.						
** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF						
** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY						
** CONVENTION.						
** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.						
**DATE OF CONVERSION TO LAND TITLES: 2003/04/28 **						
CT871377	1987/05/21	NOTICE OF LEASE			BI-WAY STORES LTD.	C
CA596757	1999/04/22	NOTICE				C
REMARKS: WF53330						
AT1499262	2007/07/06	LR'S ORDER		LAND REGISTRAR		C
REMARKS: AMEND OWNERS FIELD SHARES						
66R33321	2023/05/04	PLAN REFERENCE				C
REMARKS: AT6324639.						
AT6360787	2023/06/23	TRANSFER	$18,309,850	GRAND BEACH HOUSING LIMITED ALSHIRE LIMITED HALCYON HILLS ENTERPRISES LTD.	CITY OF TORONTO	C
REMARKS: PLANNING ACT STATEMENTS.						

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

PROPERTY DESCRIPTION: LOT 5 PLAN 382 PARKDALE, PART LOTS 4, 6, 92 PLAN 382 PARKDALE, PART 1 66R33321; CITY OF TORONTO

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
2003/04/28

OWNERS' NAMES	CAPACITY	SHARE
CITY OF TORONTO	ROWN	

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES (DELETED INSTRUMENTS NOT INCLUDED) ***						
***SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:*						
*** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES **						
*** AND ESCHEATS OR FORFEITURE TO THE CROWN.*						
*** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF*						
*** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY*						
*** CONVENTION.*						
*** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.*						
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CT871377	1987/05/21	NOTICE OF LEASE			BI-WAY STORES LTD.	C
CA596757	1999/04/22	NOTICE				C
REMARKS: WF53330						
AT1499262	2007/07/06	LR'S ORDER		LAND REGISTRAR		C
REMARKS: AMEND OWNERS FIELD SHARES						
66R33321	2023/05/04	PLAN REFERENCE				C
REMARKS: AT6324639.						
AT6360787	2023/06/23	TRANSFER	$18,309,850	GRAND BEACH HOUSING LIMITED ALSHIRE LIMITED HALCYON HILLS ENTERPRISES LTD.	CITY OF TORONTO	C
REMARKS: PLANNING ACT STATEMENTS.						

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

Appendix K: Summary of Phase One and Two Environmental Assessments

APPENDIX K: SUMMARY OF PHASE ONE AND TWO ENVIRONMENTAL SITE ASSESSMENTS

K-1: Summary of Phase One Environmental Site Assessments

EXP Services Inc. (EXP) reviewed all available Phase One Environmental Site Assessment (ESA) reports that were completed for the Risk Assessment (RA) property.

The following Phase One ESAs were available for review:

- EXP. (2022a). *Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 7, 2022.
- EXP. (2024). *Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto*, *Ontario (Parkdale Hub)*, July 12, 2024.

A copy of each report is included in Appendix H. All figures referenced can be found in the Phase Two Conceptual Site Model (CSM) in Appendix B.

1. "*Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, ON*", dated December 7, 2022. The report was prepared by EXP Services Inc. for CreateTO. The following pertinent information was noted:

The Site is located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an approximate area of 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 square metres (m^2) (8,482 square feet (ft^2)) in area. The Site is bound by Queen Street West to the north, a commercial building to the west, a parking lot followed by community buildings to the east and residential land use to the south. The Site was first developed in the early 1890s for residential purposes. It was then developed with a rectangular shaped building in approximately 1910 for commercial/industrial purposes. In 1966, the Site was redeveloped for commercial use (a bank, a grocery store and then a retail store). The Site building is located on the eastern portion of the Site with asphalt paved parking spaces to west and south. Additionally, sea cans used for storage purposes, were located on the south exterior portion of the Site.

Based on the Phase One ESA findings, the following information is provided in table below in support of the Phase One Qualified Person's (QP's) conclusion:

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)[3]	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1a: Importation of Fill Material of Unknown Quality (PCA Identifier 1a)	Entire Site	PCA#30 – Importation of Fill Material of Unknown Quality.	On-Site	Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs), Benzene,	Soil

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)[3]	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
				Toluene, Ethylbenzene and Xylenes (BTEX), Metals (including hydride-forming metals)	
APEC 1b: Historic Industrial Operations (PCA identifier 1b)	Entire Site	PCA#6 – Battery Manufacturing, Recycling and Bulk Storage.	On-Site	PHCs, BTEX, Volatile Organic Compounds (VOCs), Metals, HFM, Hg, pH	Soil and Groundwater
APEC 1c: Historic Industrial Operations (PCA identifier 1c)	Entire Site	PCA "Other" – Coal Storage.	On-Site	PHCs, BTEX, PAHs	Soil and Groundwater
APEC 1d: Salt Application (PCA identifier 1d)	Western and Southern Portion	PCA 'Other' – Salt Application	On-Site	Electrical Conductivity (EC), Sodium Absorption Ratio (SAR)	Soil
APEC 2: Off-Site PCAs to the west (historic dry-cleaners, historic USTs, and vehicle maintenance) (PCA Identifier 8, 11, and 13)	West boundary of the Site	PCA#28 – Gasoline and Associated Products in Fixed Tanks. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-Site	PHCs, BTEX, Metals (including hydride-forming metals), VOCs, PAHs	Groundwater
APEC 3: Off Site PCAs to the east (historic USTs, gasoline service station, vehicle maintenance,	East boundary of the Site	PCA#28 - Gasoline and Associated Products in Fixed Tanks. PCA#37 – Operation of Dry-Cleaning	Off-Site	PHCs, BTEX, Polychlorinated Biphenyls (PCBs), VOCs, Metals (including hydride-	Groundwater

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)[3]	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
and manufacturing) (PCA Identifier 2, 6, 9, 10, and 12)		Equipment (where chemicals are used). PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.		forming metals), PAHs	
APEC 4: Off Site PCAs to the north (historic manufacturing, USTs, vehicle maintenance, dry cleaning) (PCA Identifier 3, 4, 7, 14, 15, 18, 21, 22, 43, 48, 49)	North boundary of the Site	PCA#59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products. PCA#37 – Operation of Dry-Cleaning Equipment (where chemicals are used). PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems. PCA#31 – Ink Manufacturing, Processing and Bulk Storage. PCA#43 – Plastics (including Fiberglass) Manufacturing and Processing. PCA#55 – Transformer Manufacturing, Processing and Use	Off-Site	PHCs, BTEX, VOCs, metals (including hydride forming metals), PCBs, PAHs	Groundwater

2. "*Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto, ON*", dated July 12, 2024. The report was prepared by EXP Services Inc. for CreateTO. This Phase One ESA is an update of the previous Phase One ESA completed in 2022, and no new pertinent information from this Phase One ESA report was utilized in the RA.

K-2: Summary of Phase Two Environmental Assessments

EXP reviewed all available Phase Two ESAs and other subsurface investigation reports that were completed for the RA property.

The following Phase Two ESA or other subsurface investigation reports relevant to the RA were available for review:

- Trafalgar Environmental Consultants. 2022. *Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario*, dated May 20, 2022.
- EXP Services Inc. 2022b. *Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 9, 2022.
- EXP Services Inc. 2025a. DRAFT *Supplemental Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.
- EXP Services Inc. 2025b. DRAFT *PRB Installation Oversight, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.

A copy of each report, where available, including the laboratory Certificates of Analysis (COAs), is included in Appendix H.

The following section provides a summary of the main findings of past Phase Two and related reports relevant to this RA.

3. "Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario", dated May 20, 2022. The report was prepared by Trafalgar Environmental Consultants (TEC). The following pertinent information was noted:

- The Phase II ESA was conducted according to CSA standard Z769-00 and selected portions of O.Reg. 153/04. The report was not conducted in support of a Record of Site Condition (RSC).
- As part of the Phase II ESA, two (2) boreholes were advanced on Site and equipped as monitoring wells upon completion (BH/MW1 and BH/MW2).
- The applicable Site Condition Standards (SCS) selected for Phase II ESA was the MECP (2011a) Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition for Industrial/Commercial/Community Property in coarse-textured soil (Table 3 ICC SCS). However, for the purposes of this summary, the results have been compared to the Table 3 SCS for residential/parkland/community property use in medium/fine textured soil (Table 3 SCS).
- Four (4) soil samples were collected and submitted for the laboratory analysis of Volatile Organic Compounds (VOCs), Petroleum Hydrocarbons (PHCs), Polycyclic Aromatic Hydrocarbons (PAHs), and Metals and Inorganics.
- The soil samples submitted for analysis were below the applicable Table 3 SCS, with the exception of:

    - Several PAHs in Soil Sample 1 0-5 collected at BH1;
    - EC/SAR in Soil Sample 1 0-5 collected at BH1; and
    - SAR in Soil Sample 2 0-5 collected at BH2.
- Two (2) groundwater samples were collected and submitted for the laboratory analysis of VOCs, PHCs, PAHs, and Metals and Inorganics.
- The groundwater samples submitted for analysis were below the applicable Table 3 SCS, with the exception of:
    - Several VOCs in MW1 and MW2
- Based on the results of the Phase II ESA, the Site was deemed to be impacted by the historical gasoline service station and automotive repair facility that were located east adjacent to the Site. The presence of VOCs in the groundwater at the Site was attributed to the handling/storage of solvents associated with the historical automotive repair facility that was located east adjacent to the Site.

4. "Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)", dated December 9, 2022. The report was prepared by EXP Services Inc. for CreateTO. The following pertinent information was noted:

- Based on a review of historical aerial photographs, chain of title information, and other records, the Site was historically addressed as 1331-1343 Queen Street West and was developed with two (2) residential structures since circa 1890. The Site was then developed with a rectangular shaped commercial building circa 1910, which was occupied by various tenants, including the Bank of Commerce, several coal companies, and several battery service centers between 1890 and 1965. In 1966, the Site was redeveloped for commercial use. It is currently occupied by Dollarama.
- The results and findings of the Phase Two ESA conducted at the Site are summarized as follows:

    - The Phase Two ESA drilling program was conducted between October 17th and 20th, 2022. Six (6) boreholes (BH/MW1-D, BH/MW1-S, BH/MW2-D, BH/MW2-S, BH/MW3-D, BH/MW3-S) were advanced at the Site by DrillTech to a maximum depth of 15.24 m bgs in conjunction with a geotechnical and hydrogeological investigation. Each of the six (6) boreholes were equipped with monitoring wells.

    - The stratigraphy at the Site consisted of a surficial pavement structure layer, comprised of 100 mm of asphaltic concrete over 100 mm granular base material. A fill unit was encountered below the pavement structure in each of the boreholes and extended to depths between 0.7 m to 1.5 m below grounds surface (m bgs). The fill was composed of sandy silt with some clay and gravel, to clayey silt with some sand and gravel. A trace amount of brick fragments, and wood chips, was observed in BH/MW2-D and BH/MW3-D, respectively. A silt deposit was encountered below the fill in BH/MW1-D and BH/MW2-D and extended to 6.1 m bgs. Silty clay was encountered in BH/MW3-D below the fill, extending to a depth of 6.1 m bgs. Sandy silt till was encountered below the fill in BH/MW1-D and BH/MW2-D. It extended to the termination depth in BH/MW1-D and to a depth of about 4.9 m bgs in BH/MW2-D. Bedrock was encountered at a maximum depth of 15.24 m bgs.

- The monitoring well network advanced as part of the Phase Two ESA consisted of six (6) newly installed monitoring wells screened at various depths between 3.05 and 13.72 m bgs, within the silt or silty sand.
- Groundwater levels were measured on various dates between October 26th and November 1st, 2022. The depth to groundwater ranged between 4.499 m bgs (BH/MW2-D) and 6.218 m bgs (BH/MW3-D). Groundwater elevations ranged between 90.165 meters above sea level (m asl) (BH/MW3-D) and 91.694 m asl (BH/MW2-D). Based on the groundwater contour map delineated for the Site, the measured was to the east.
- The calculated horizontal hydraulic gradient on-Site ranged from 0.067 meters/meter (m/m) (between BH/MW3-D and BH/MW2-D), and 0.040 m/m (between BH/MW2-D and BH/MW1-D).
- For assessment purposes, EXP selected the MECP Table 3 SCS.
- Soil samples were submitted for the analysis of PHCs, Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), PAHs, VOCs, Metals (including Hydride-Forming Metals), Other Regulated Parameters (ORPs [i.e., Hot Water-Soluble Boron, Hexavalent Chromium, Mercury, etc.]), pH, and 75-micron sieve (grain size analysis). All parameters were either not detected or detected below the applicable Table 3 SCS, with the exception of:
    - Tetrachloroethylene (PCE) in BH3 SS8 (7.62 – 8.23 m bgs)
        - Additionally, several VOC parameters were not detected; however, the reported detection limits (RDLs) were above the applicable Table 3 SCS. However, at the discretion of the Qualified Person, the parameters with elevated RDLs are not considered to exceed the Table 3 SCS in soil. Refer to Section 3.1.1 in Appendix B for additional information.
    - Lead in BH1 SS1 (0 – 0.61 m bgs)
    - Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR) in BH1 SS1, BH2 SS1, BH3 SS1 (0 – 0.61 m bgs)
        - The elevated levels of salt-related parameters (EC and SAR) at the indicated boreholes are likely associated with the application of de-icing materials for the purpose of snow and ice removal as the areas where the boreholes are located are utilized as a parking lot. In accordance with Ontario Regulation (O.Reg.) 153/04, s. 49.1 (1) and at the discretion of the Qualified Person, the elevated EC and SAR concentrations are deemed not to be exceeded the Table 3 SCS. Refer to Section 3.1.1 in Appendix B for additional information.
- Groundwater samples were submitted for the analysis of PHCs, BTEX, VOCs, Polychlorinated Biphenyls (PCBs), Metals (including Hydride-Forming Metals), and ORPs (i.e., Sodium, Hexavalent Chromium, Mercury, Chloride, etc.). All parameters were either not detected or detected below the applicable Table 3 SCS, with the exception of:
    - Tetrachloroethylene in BH/MW1-D (including the field and lab duplicate), BH/MW2-S, and BH/MW3-D
    - cis-1,2-Dichloroethylene in BH/MW2-S
    - Trichloroethylene in BH/MW2-S and BH/MW3-D

        - Vinyl Chloride in BH/MW2-S

    - No evidence of non-aqueous phase liquid (NAPL) was observed during groundwater monitoring, purging and sampling activities.

Based on the results of the Phase Two ESA, the PCE exceedance in soil in BH/MW3-D is likely associated with the historical dry-cleaning operations within the Phase One Study Area. The lead exceedance in soil in BH/MW1-D is likely associated with poor quality of fill material. The various VOC exceedances in groundwater in all monitoring wells are likely associated with the historical industrial operations on Site and/or the historical presence of dry-cleaning operations throughout the Phase One Study Area. As such, additional sampling program, delineation program, and remediation program is required prior to the filing of an RSC.

5. "DRAFT *Supplemental Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*", In progress. The report was prepared by EXP Services Inc. for CreateTO. The following pertinent information was noted:

The results and findings of the Phase Two ESA conducted at the Site are summarized as follows:

- The initial Phase Two ESA drilling program was conducted between October 17 and 20, 2022, as summarized previously. Six (6) boreholes (BH/MW1-D, BH/MW1-S, BH/MW2-D, BH/MW2-S, BH/MW3-D, BH/MW3-S) were advanced at the Site (by DrillTech) to a maximum depth of 15.24 m bgs in conjunction with a geotechnical and hydrogeological investigation. Each of the six (6) boreholes were equipped with monitoring wells.
- The supplemental drilling program was conducted between February 12 and 22, 2024 and on December 3, 2024. Fourteen (14) exterior boreholes (BH/MW101 to BH112, BH105A, BH115) and two (2) interior boreholes (BH/MW113, BH/MW114) were advanced at the Site (by Pontil Drilling) to a maximum depth of 18.77 m bgs, under the full-time supervision of EXP staff. Nine (9) of the thirteen (13) exterior boreholes, and both interior boreholes were equipped as monitoring wells.
- The stratigraphy at the Site consisted of a surficial pavement structure, comprising of asphalt at each of the boreholes, with the exception of BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114. At BH/MW2-S, BH/MW3-S, BH/MW113, and BH/MW114, a surficial concrete layer was encountered. A fill unit was encountered below the pavement structure in each of the boreholes and extended to depths of between 0.20 m to 2.29 m below ground surface (m bgs). Native silt was encountered below the fill material at all borehole locations with the exception of BH/MW3-S. Silty clay was encountered in BH/MW3-D below the fill. Silty sand till was encountered below the silt at all borehole locations with the exception of BH/MW104, BH/MW105, BH105A, BH/MW1-S, BH/MW2-S, BH/MW3S, BH/MW3D and BH108. Bedrock was encountered at a maximum depth of 15.24 m bgs and was tri-coned as part of the 2024 drilling event.
- The monitoring well network advanced as part of the Phase Two ESA consisted of twelve (12) monitoring wells screened in the overburden at various depths between 3.05 and 13.72 m bgs and three (3) monitoring wells installed within the shale bedrock ranging in depths between 18.40 and 18.77 m bgs.
- Groundwater levels within the overburden were measured on various dates between October 26, 2022, and November 29, 2024. The depth to groundwater within the overburden ranged between 4.501 m bgs (BH/MW2-D) and 6.88 m bgs (MW109). Groundwater elevations ranged between 89.78 meters above sea level (m asl) (MW113) and 91.694 m asl (MW2-D). Groundwater levels within the bedrock were measured on March 11 and March 13, 2024. The depth to groundwater ranged between 6.120 m bgs (MW102) and 15.080 m bgs (MW101). Groundwater elevations ranged between 81.206 m asl (MW101) and 89.995 m asl (MW102). Based on the groundwater contour maps delineated for the Site, it is expected that the

groundwater within the overburden is anticipated to flow in a southeastern direction and groundwater in the bedrock is anticipated to flow in a north to northeastern direction at the Site.

- The calculated horizontal hydraulic gradient on-Site within the overburden ranged from 0.067 meters/meter (m/m) (between BH/MW3-D and BH/MW2-D), and 0.040 m/m (between BH/MW2-D and BH/MW1-D). The horizontal hydraulic gradient on-Site within the bedrock ranged from 0.204 m/m (between BH/MW101 and BH/MW103), and 0.030 m/m (between BH/MW102 and BH/MW103).
- For assessment purposes, EXP selected the Ministry of Environment Conservation and Parks (MECP) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition Soil – Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils (Table 3 SCS).
- Soil samples were submitted for the analysis of one or more of: PHCs, BTEX, PAHs, VOCs, Metals (including Hydride-Forming Metals), Hot Water-Soluble Boron, Hexavalent Chromium, Mercury, EC, SAR, pH, and 75-micron sieve (grain size analysis). All parameters were either not detected or detected below the applicable Table 3 SCS, with the exception of:
    - PCE in BH3 SS8 (7.62-8.23 m bgs, as noted in the summary of the 2022 Phase Two ESA) and BH105 SS9 (6.10-6.71 m bgs).
        - As noted previously, several VOC parameters were non-detected at BH3 SS8, however, the (RDLs were above the applicable Table 3 SCS. However, at the discretion of the Qualified Person, the parameters with elevated RDLs are not considered to exceed the Table 3 SCS in soil. Refer to Section 3.1.1 in Appendix B for additional information
    - Lead in BH1 SS1 (0–0.61 m bgs, as noted in the summary of the 2022 Phase Two ESA), BH105 SS1 (0.0-0.61 m bgs), and BH106 SS1 (0.0-0.61 m bgs).
    - Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR) in BH1 SS1, BH2 SS1, BH3 SS1 (0-0.61 m bgs, as noted in the summary of the 2022 Phase Two ESA)
        - The elevated levels of salt-related parameters (EC and SAR) at the indicated boreholes are likely associated with the application of de-icing materials for the purpose of snow and ice removal as the areas where the boreholes are located are utilized as a parking lot. In accordance with Ontario Regulation (O.Reg.) 153/04, s. 49.1 (1) and at the discretion of the Qualified Person, the elevated EC and SAR concentrations are deemed to not exceed the Table 3 SCS. Refer to Section 3.1.1 in Appendix B for additional information.
    - Benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and fluoranthene in BH113 SS1 (0.0-0.61 m bgs)
    - Benz(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene and flouranthene in BH105A SS1B (0.22-0.33 m bgs)
- Groundwater samples were submitted for the analysis of PHCs, BTEX, VOCs, PCBs, Metals (including Hydride-Forming Metals), Sodium, Hexavalent Chromium, and Mercury. All parameters were either not detected or detected below the applicable Table 3 SCS, with the exception of:
    - PCE in MW1, BH/MW1-D (including the field duplicate), BH/MW2-S, MW2 (including field duplicate MW D) BH/MW3-D, MW104, MW105, and MW110
    - cis-1,2-Dichloroethylene (cis-1,2-DCE) in MW1, BH/MW2-S, MW2, MW11D (duplicate of MW1D) MW105, BH/MW110, and BH113
    - trans-1,2-Dichloroethylene (trans-1,2-DCE) in MW 1 and MW2,
    - Trichloroethylene (TCE) in MW1, MW2, MW11D (field duplicate of MW1D) BH/MW2-S and BH/MW3-D, MW104, MW105, and MW110
    - Vinyl Chloride in MW1, BH/MW2-S, MW11D (field duplicate of MW1D), and MW113

- No evidence of NAPL was observed during groundwater monitoring, purging and sampling activities.
- Based on the results of the Phase Two ESA, the PCE exceedance in soil in BH/MW3-D and BH105 are likely associated with the historic on-Site industrial operations and historical dry-cleaning operations within the Phase One Study Area. The lead and PAH exceedances in soil, in BH/MW1-D, BH105, BH105A, and BH106, are likely associated with poor quality of fill material. The various VOC exceedances in groundwater (in all monitoring wells) are likely associated with the historic on-Site industrial operations and historical presence of dry-cleaning operations throughout the Phase One Study Area. As such, an additional remediation program and/or a RA is required prior to the filing of an RSC.

6. "DRAFT *PRB Installation Oversight, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*", In progress. The report was prepared by EXP Services Inc. for CreateTO. The following pertinent information was noted:

- EXP was retained to oversee the installation of an injectable Permeable Reactive Barrier (PRB). Due to the presence of high concentration of chlorinated volatile organic compounds (cVOCs) in groundwater across the Site and the inferred groundwater flow direction towards the southeast, potential off-Site migration of groundwater contamination was identified to be possibly occurring for the residential properties located directly south of the Site. Given the potential for off-Site migration of impacted groundwater, EXP recommended the installation of a Permeable-Reactive Barrier (PRB) along the southern property boundary to mitigate the potential for groundwater impacts migrating off-Site and posing risk to downgradient residential receptors.
- The installation of the PRB included the following:
    - Drilling of up to forty (40) direct-push injection points to a maximum depth of approximately 9.0 m bgs using a Geoprobe 7822DT drill rig to facilitate direct-push injection of Geoform Extended Release (ER) slurry.
    - Oversight of the injection of a total of 12,000 L of an approximately 25% concentration of Geoform ER slurry into the 40 direct-push injection points (i.e., approximately 300 L per point).
    - Installation of three (3) monitoring wells (MW201 to MW203) along the southern property line to approximately 9.14 mbgs.
    - Collection of groundwater samples in December 2024 and January 2025 from the newly installed monitoring wells, as well as select existing wells (MW1, MW2, BH/MW2-S and/or BH/MW107) for VOCs.
- All parameters were either not detected or detected below the applicable Table 3 SCS, with the exception of:
    - cis-1,2-DCE and PCE in MW1, MW2, MW202 and MW203
    - TCE in MW1, MW2 and MW202
    - Vinyl chloride in MW1.
- It is noted that monthly groundwater monitoring for six (6) months is proposed; however, analytical results for December 2024 and January 2025 were the only available sampling events during the preparation of the RA.

K-3: Site-Specific Hydrogeological and Geological Interpretations

Table K-1: Comparison between Site-Specific Hydrogeological and Geological Interpretations and the Generic MECP Assumptions for Medium to Fine Textured Soil

Parameters	Site Specific Value	Rationale	Generic MECP Value
Soil Above Water Table			
Soil type	Loam	Conservative selection based on the identified soil types at the Site	Medium to fine
Total Porosity (v/v)	0.399	MECP (2016)	0.47
Moisture-filled porosity (v/v)	0.148	MECP (2016)	0.170
Fraction of organic carbon (g/g)	0.005	MECP default value	0.005
Dry bulk density (g/cm³)	1.59	MECP (2016)	1.40
Temperature (ºC)	15	MECP generic value	15
Depth to water table (m bgs)	4.50	Minimum depth measures on-Site.	3.00
Soil of Capillary Fringe			
Soil type	Loam	Field observation	Loam
A1 (1/cm)	0.01112	US EPA (2004a)	0.0111
N (unitless)	1.472	US EPA (2004a)	1.472
M (unitless)	0.3207	US EPA (2004a)	0.3207
Total porosity (v/v)	0.400	MECP (2016)	0.3990
Residual moisture content (v/v)	0.061	US EPA (2004a)	0.0610
Mean grain diameter (cm)	0.02	US EPA (2004a)	0.0200
Aquifer Soil			
Soil type	Loam	Drilling observations	Medium to fine
Hydraulic conductivity (m/s)	3.0×10^{-5}	MECP generic value	3.0×10^{-5}
Horizontal hydraulic gradient (m/m)	0.003	MECP generic value	0.003
Effective porosity (v/v)	0.25	MECP generic value	0.25
Fraction of organic carbon	0.0003	MECP generic value	0.0003

K-4: Quality Assurance, Quality Control and Uncertainty

The quality assurance and quality control (QA/QC) measures were implemented during all EXP sampling and analysis programs, to ensure the collection of high-quality data that met the objectives of the RA.

The EXP sampling programs were performed in accordance with the MECP document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996 (MOEE, 1996) and O. Reg. 153/04. Written Standard Operating Procedures for field and laboratory sampling for soil and groundwater developed by EXP were used to ensure collection of representative and unbiased samples, the collection of quality control samples to evaluate sample precision and accuracy, and the implementation of measures to preserve sample integrity and minimize the potential for cross contamination.

The staff involved in the field sampling have participated in regular, ongoing, EXP training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis. Data quality objectives for the parameters of concern were set to meet acceptable reporting detection limits (RDLs) to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic Standards, as defined in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011a). This included providing written instruction to the participating analytical laboratory describing the required analyses on a Chain of Custody prepared and delivered with the samples.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by EXP. EXP field sampling QA/QC protocols are tailored to the investigations and include, where appropriate:

- The collection of field duplicate samples for soil and groundwater;
- Instrument calibration checked on a daily basis, and re-calibrated prior to use, if required per EXP SOPs;
- Use of dedicated sampling equipment – bailer, Waterra inertial pump or LDPE tubing for low flow sampling, latex gloves, nylon string;
- Thorough cleaning of groundwater level measuring meter and hand tools using soap and water, followed by a distilled water rinse and a methanol rinse. Equipment is allowed to air dry between sampling locations; and,
- Inclusion of one trip blank for volatiles in groundwater analyses.

Further evaluation of the field duplicate samples and trip blanks collected as part of the subsurface investigations is presented below:

During EXP's Phase Two ESA (EXP, 2022b and 2025a), soil field duplicate sample was collected for PHCs, BTEX and VOCs. The groundwater field duplicate was collected for PHCs, BTEX, VOCs, and PAHs. Trip blanks for groundwater were submitted for VOCs.

Laboratory analyses for all investigative programs relied upon in the Phase Two CSM and RA were performed using generally accepted principles in accordance with the MECP document Protocol for Analytical methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (Protocol) (MECP, 2011b).

EXP has accepted the data provided by BV based on their assurance that, at minimum, the following requirements have been met and documentation to demonstrate compliance can be produced upon request:

- The method performance criteria in the Protocol were met;
- Sampling storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from EXP staff;
- The results of all laboratory QC samples were within statistically determined control limits; and,
- Certificates of Analysis with all the QA/QC sample data, has been received from the laboratory and is included within the appropriate reports in Appendix H.

Table K-2 presents the number of duplicates taken in soil while Table K-3 presents the number of duplicates taken in groundwater based on all soil and groundwater investigations.

Table K-2: Summary of QA/QC Programs – Soil

Sampling Group	Number of Original Samples[1]	Number of Field Duplicate Samples
PHCs	16	1
VOCs	32	4

Table K-3: Summary of QA/QC Programs – Groundwater

Sampling Group	Number of Original Samples[1]	Number of Field Duplicate Samples
PHCs	9	1
VOCs	40	5
PAHs	7	1

[1] The total number of original samples does not include field duplicates.

EXP met the required sampling frequency of one (1) field duplicate sample per ten (10) original samples from each media.

The RPD for each original and field duplicate sample set is provided in Tables K-A-1 through K-A-2 for soil duplicates and in Tables K-B-1 through K-B-3 for groundwater duplicates, attached at the end of this Appendix.

The following RPD exceedances were identified:

- TCE in soil between the original sample BH110 SS11 and its field duplicate BH10 SS11-0 collected on February 22, 2024;
- PCE in groundwater between the original sample MW1-D and its field duplicate MW11-D collected on November 1, 2022; and,
- Benzo(a)pyrene, fluoranthene, phenanthrene, and pyrene in groundwater between the original sample BH/MW104 and its field duplicate BH/MW0 collected on November 29, 2024.

In soil, the RPD exceedances can be attributed to soil heterogeneity. Additionally, the detected concentrations of TCE in soil were within 5x of the RDL. In groundwater, the RPD exceedances may be attributed to sediment bias in the sample. It is noted that the higher concentration between the original and duplicate sample was carried forward for consideration when determining COCs and maximum concentrations as a conservative approach. As such, these alert limits are not anticipated to alter the conclusions of the assessment.

Adequacy of Data and Justification of Sampling

Based on the completed subsurface assessments, all APECs have been sufficiently characterized, as summarized in the Phase Two CSM (Appendix B).

Overall, it is in the opinion of the QP_{ESA} and QP_{RA} that the sampling programs completed thus far are adequate for the RA objectives for the following reasons:

- APECs identified in Phase One ESA have been assessed;
- Soil and groundwater impacts have been sufficiently delineated, vertically and horizontally;
- Site geology and hydrogeology have been sufficiently characterized; and,
- QA/QC measures were in place during EXP sampling and based on the results of the QA/QC, the quality of the data was considered sufficient to meet the objectives of the RA.

A Phase Two CSM has been prepared based on the environmental assessments conducted at the site and is provided as Appendix B.

TABLE K-A-1: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES

Petroleum Hydrocarbon Parameters

1337 Queen Street West, Toronto, Ontario

19-Oct-22

Sample I.D.	RDL*	BH2 SS7	BH2 SS7 DUP	RPD*	Alert Limit
Lab ID		UBT891	UBT896		
Sampling Date		19-Oct-22	19-Oct-22		
Soil Sample Depth (m)		6.10 - 6.71	Field Duplicate of BH2 SS7		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
Benzene	0.006	<0.0060	<0.020	nc	>50%
Toluene	0.020	<0.020	<0.020	nc	>50%
Ethylbenzene	0.010	<0.010	<0.020	nc	>50%
Xylene Mixture (Total)	0.020	<0.020	<0.040	nc	>50%
PHC F1 (C6 to C10) - BTEX	5	<10	<10	nc	>30%
PHC F2 (C10 to C16)	10	12	<10	nc	>30%
PHC F3 (C16 to C34)	50	<50	<50	nc	>30%
PHC F4 (C34 to C50)	50	<50	<50	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-A-2: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

21-Feb-24

Sample I.D.	RDL*	BH103 SS1	BH103 SS1-0	RPD*	Alert Limit
Lab ID		YLK240	YLK241		
Sampling Date		21-Feb-24	21-Feb-24		
Soil Sample Depth (m)		7.62 - 8.23	Field Duplicate of BH103 SS1		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
1,1,1,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,1-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichloroethane	0.049	<0.049	<0.049	nc	>50%
1,2-Dichloropropane	0.04	<0.040	<0.040	nc	>50%
1,3-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,3-Dichloropropene (cis + trans)	0.05	<0.050	<0.050	nc	>50%
1,4-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
Acetone	0.49	<0.49	<0.49	nc	>50%
Benzene	0.006	<0.0060	<0.0060	nc	>50%
Bromodichloromethane	0.040	<0.040	<0.040	nc	>50%
Bromoform	0.040	<0.040	<0.040	nc	>50%
Bromomethane	0.04	<0.040	<0.040	nc	>50%
Carbon Tetrachloride	0.04	<0.040	<0.040	nc	>50%
Chlorobenzene	0.04	<0.040	<0.040	nc	>50%
Chloroform	0.04	<0.040	<0.040	nc	>50%
Cis-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Cis-1,3-Dichloropropylene	0.03	<0.030	<0.030	nc	>50%
Dibromochloromethane	0.04	<0.040	<0.040	nc	>50%
Dichlorodifluoromethane	0.04	<0.040	<0.040	nc	>50%
Ethylbenzene	0.01	<0.010	<0.010	nc	>50%
Ethylene Dibromide	0.04	<0.040	<0.040	nc	>50%
Hexane(n)	0.04	<0.040	<0.040	nc	>50%
m+p-Xylene	0.02	<0.020	<0.020	nc	>50%
Methyl Ethyl Ketone	0.4	<0.40	<0.40	nc	>50%
Methyl Isobutyl Ketone	0.4	<0.049	<0.049	nc	>50%
Methyl-t-Butyl Ether	0.04	<0.40	<0.40	nc	>50%
Methylene Chloride	0.049	<0.040	<0.040	nc	>50%
o-Xylene	0.02	<0.020	<0.020	nc	>50%
Styrene	0.04	<0.040	<0.040	nc	>50%
Tetrachloroethylene	0.04	0.41	0.38	8	>50%
Toluene	0.02	<0.020	<0.020	nc	>50%
Trans-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Trans-1,3-Dichloropropylene	0.04	<0.040	<0.040	nc	>50%
Trichloroethylene	0.01	<0.010	<0.010	nc	>50%
Trichlorofluoromethane	0.04	<0.040	<0.040	nc	>50%
Vinyl Chloride	0.019	<0.019	<0.019	nc	>50%
Total Xylenes	0.02	<0.020	<0.020	nc	>50%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-A-2: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

3-Dec-24

Sample I.D.	RDL*	BH105A SS6A	BH105A SS0	RPD*	Alert Limit
Lab ID		AKUU70	AKUU72		
Sampling Date		3-Dec-24	3-Dec-24		
Soil Sample Depth (m)		7.62 - 8.53	Field Duplicate of BH105A SS 6A		
Consultant		EXP	EXP		
Laboratory		BV	BV		
1,1,1,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,1-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichloroethane	0.049	<0.049	<0.049	nc	>50%
1,2-Dichloropropane	0.04	<0.040	<0.040	nc	>50%
1,3-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,3-Dichloropropene (cis + trans)	0.05	<0.050	<0.050	nc	>50%
1,4-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
Acetone	0.49	<0.49	<0.49	nc	>50%
Benzene	0.006	<0.0060	<0.0060	nc	>50%
Bromodichloromethane	0.04	<0.040	<0.040	nc	>50%
Bromoform	0.04	<0.040	<0.040	nc	>50%
Bromomethane	0.04	<0.040	<0.040	nc	>50%
Carbon Tetrachloride	0.04	<0.040	<0.040	nc	>50%
Chlorobenzene	0.04	<0.040	<0.040	nc	>50%
Chloroform	0.04	<0.040	<0.040	nc	>50%
Cis-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Cis-1,3-Dichloropropylene	0.03	<0.030	<0.030	nc	>50%
Dibromochloromethane	0.04	<0.040	<0.040	nc	>50%
Dichlorodifluoromethane	0.04	<0.040	<0.040	nc	>50%
Ethylbenzene	0.01	<0.010	<0.010	nc	>50%
Ethylene Dibromide	0.04	<0.040	<0.040	nc	>50%
Hexane(n)	0.04	<0.040	<0.040	nc	>50%
m+p-Xylene	0.02	<0.020	<0.020	nc	>50%
Methyl Ethyl Ketone	0.4	<0.040	<0.040	nc	>50%
Methyl Isobutyl Ketone	0.4	<0.40	<0.40	nc	>50%
Methyl-t-Butyl Ether	0.04	<0.049	<0.049	nc	>50%
Methylene Chloride	0.049	<0.40	<0.40	nc	>50%
o-Xylene	0.02	<0.020	<0.020	nc	>50%
Styrene	0.04	<0.040	<0.040	nc	>50%
Tetrachloroethylene	0.04	2.4	2	18	>50%
Toluene	0.02	<0.020	<0.020	nc	>50%
Trans-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Trans-1,3-Dichloropropylene	0.04	<0.040	<0.040	nc	>50%
Trichloroethylene	0.01	0.011	<0.010	nc	>50%
Trichlorofluoromethane	0.04	<0.040	<0.040	nc	>50%
Vinyl Chloride	0.019	<0.019	<0.019	nc	>50%
Total Xylenes	0.02	<0.020	<0.020	nc	>50%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

exp.

TABLE K-A-2: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

22-Feb-24

Sample I.D.	RDL*	BH110 SS11	BH10 SS11-0	RPD*	Alert Limit
Lab ID		YLK243	YLK244		
Sampling Date		22-Feb-24	22-Feb-24		
Soil Sample Depth (m)		7.62 - 8.23	Field Duplicate of BH110 SS11		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
1,1,1,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,1-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichloroethane	0.049	<0.049	<0.049	nc	>50%
1,2-Dichloropropane	0.04	<0.040	<0.040	nc	>50%
1,3-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,3-Dichloropropene (cis + trans)	0.05	<0.050	<0.050	nc	>50%
1,4-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
Acetone	0.49	<0.49	<0.49	nc	>50%
Benzene	0.006	<0.0060	<0.0060	nc	>50%
Bromodichloromethane	0.04	<0.040	<0.040	nc	>50%
Bromoform	0.04	<0.040	<0.040	nc	>50%
Bromomethane	0.04	<0.040	<0.040	nc	>50%
Carbon Tetrachloride	0.04	<0.040	<0.040	nc	>50%
Chlorobenzene	0.04	<0.040	<0.040	nc	>50%
Chloroform	0.04	<0.040	<0.040	nc	>50%
Cis-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Cis-1,3-Dichloropropylene	0.03	<0.030	<0.030	nc	>50%
Dibromochloromethane	0.04	<0.040	<0.040	nc	>50%
Dichlorodifluoromethane	0.04	<0.040	<0.040	nc	>50%
Ethylbenzene	0.01	<0.010	<0.010	nc	>50%
Ethylene Dibromide	0.04	<0.040	<0.040	nc	>50%
Hexane(n)	0.04	<0.040	<0.040	nc	>50%
m+p-Xylene	0.02	<0.020	<0.020	nc	>50%
Methyl Ethyl Ketone	0.4	<0.40	<0.40	nc	>50%
Methyl Isobutyl Ketone	0.4	<0.049	<0.049	nc	>50%
Methyl-t-Butyl Ether	0.04	<0.40	<0.40	nc	>50%
Methylene Chloride	0.049	<0.040	<0.040	nc	>50%
o-Xylene	0.02	<0.020	<0.020	nc	>50%
Styrene	0.04	<0.040	<0.040	nc	>50%
Tetrachloroethylene	0.04	0.37	0.33	11	>50%
Toluene	0.02	<0.020	<0.020	nc	>50%
Trans-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Trans-1,3-Dichloropropylene	0.04	<0.040	<0.040	nc	>50%
Trichloroethylene	0.01	0.049	0.022	**76**	>50%
Trichlorofluoromethane	0.04	<0.040	<0.040	nc	>50%
Vinyl Chloride	0.019	<0.019	<0.019	nc	>50%
Total Xylenes	0.02	<0.020	<0.020	nc	>50%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (μg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-A-2: SOIL FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

12-Feb-24

Sample I.D.	RDL*	BH112 SS11	BH112 SS111	RPD*	Alert Limit
Lab ID		YJJ193	YJJ194		
Sampling Date		12-Feb-24	12-Feb-24		
Soil Sample Depth (m)		7.62 - 8.23	Field Duplicate of BH112 SS11		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
1,1,1,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,1-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2,2-Tetrachloroethane	0.04	<0.040	<0.040	nc	>50%
1,1,2-Trichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethane	0.04	<0.040	<0.040	nc	>50%
1,1-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,2-Dichloroethane	0.049	<0.049	<0.049	nc	>50%
1,2-Dichloropropane	0.04	<0.040	<0.040	nc	>50%
1,3-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
1,3-Dichloropropene (cis + trans)	0.05	<0.050	<0.050	nc	>50%
1,4-Dichlorobenzene	0.04	<0.040	<0.040	nc	>50%
Acetone	0.49	<0.49	<0.49	nc	>50%
Benzene	0.006	<0.0060	<0.0060	nc	>50%
Bromodichloromethane	0.04	<0.040	<0.040	nc	>50%
Bromoform	0.04	<0.040	<0.040	nc	>50%
Bromomethane	0.04	<0.040	<0.040	nc	>50%
Carbon Tetrachloride	0.04	<0.040	<0.040	nc	>50%
Chlorobenzene	0.04	<0.040	<0.040	nc	>50%
Chloroform	0.04	<0.040	<0.040	nc	>50%
Cis-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Cis-1,3-Dichloropropylene	0.03	<0.030	<0.030	nc	>50%
Dibromochloromethane	0.04	<0.040	<0.040	nc	>50%
Dichlorodifluoromethane	0.04	<0.040	<0.040	nc	>50%
Ethylbenzene	0.01	<0.010	<0.010	nc	>50%
Ethylene Dibromide	0.04	<0.040	<0.040	nc	>50%
Hexane(n)	0.04	<0.040	<0.040	nc	>50%
m+p-Xylene	0.02	<0.020	<0.020	nc	>50%
Methyl Ethyl Ketone	0.4	<0.40	<0.40	nc	>50%
Methyl Isobutyl Ketone	0.4	<0.049	<0.049	nc	>50%
Methyl-t-Butyl Ether	0.04	<0.40	<0.40	nc	>50%
Methylene Chloride	0.049	<0.040	<0.040	nc	>50%
o-Xylene	0.02	<0.020	<0.020	nc	>50%
Styrene	0.04	<0.040	<0.040	nc	>50%
Tetrachloroethylene	0.04	0.17	0.19	11	>50%
Toluene	0.02	<0.020	<0.020	nc	>50%
Trans-1,2-Dichloroethylene	0.04	<0.040	<0.040	nc	>50%
Trans-1,3-Dichloropropylene	0.04	<0.040	<0.040	nc	>50%
Trichloroethylene	0.01	<0.010	<0.010	nc	>50%
Trichlorofluoromethane	0.04	<0.040	<0.040	nc	>50%
Vinyl Chloride	0.019	<0.019	<0.019	nc	>50%
Total Xylenes	0.02	<0.020	<0.020	nc	>50%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

exp.

TABLE K-B-1: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Petroleum Hydrocarbon Parameters

1337 Queen Street West, Toronto, Ontario

13-Mar-24

Sample ID	RDL*	MW114	MW1144	RPD*	Alert Limit
Lab ID		UEF212	UEF212		
Sampling Date		13-Mar-24	13-Mar-24		
Screen Depth (m)		4.59 - 7.64	Field Duplicate of MW114		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
Benzene	0.17	<0.17	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
Xylene Mixture (Total)	0.20	<0.20	<0.40	nc	>30%
PHC F1 (C6 to C10) - BTEX	25	<25	<25	nc	>30%
PHC F2 (C10 to C16)	100	<100	<100	nc	>30%
PHC F3 (C16 to C34)	200	<200	<200	nc	>30%
PHC F4 (C34 to C50)	200	<200	<200	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).
All results in ppm (µg/g) and based on dry weight basis.
* Reportable Detection Limits (RDL) is listed.
*Relative Percent Differences
'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.
Exceedences of alert limits are shown in bold.

exp.

TABLE K-B-2: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

01-Nov-22

Sample ID	RDL*	MW1-D	MW11-D	RPD*	Alert Limit
Lab ID		UEF209	UEF210		
Sampling Date		1-Nov-22	1-Nov-22		
Screen Depth (m)		4.57 - 7.62	Field Duplicate of MW1-D		
Consultant		EXP	EXP		
Laboratory		BV	BV		
Benzene	0.17	<0.17	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
o-Xylene	0.20	<0.20	<0.20	nc	>30%
m+p-Xylene	0.20	<0.20	<0.20	nc	>30%
Xylenes, Total	0.20	<0.20	<0.20	nc	>30%
Acetone	10	<10	<10	nc	>30%
Bromodichloromethane	0.5	<0.50	<0.50	nc	>30%
Bromoform	1	<1.0	<1.0	nc	>30%
Bromomethane	0.5	<0.50	<0.50	nc	>30%
Carbon Tetrachloride	0.19	<0.20	<0.19	nc	>30%
Chlorobenzene	0.2	<0.20	<0.20	nc	>30%
Chloroform	0.2	<0.20	<0.20	nc	>30%
Dibromochloromethane	0.5	<0.50	<0.50	nc	>30%
1,2-Dichlorobenzene	0.4	<0.50	<0.40	nc	>30%
1,3-Dichlorobenzene	0.4	<0.50	<0.40	nc	>30%
1,4-Dichlorobenzene	0.4	<0.50	<0.40	nc	>30%
Dichlorodifluoromethane	1	<1.0	<1.0	nc	>30%
1,1-Dichloroethane	0.2	0.2	<0.20	nc	>30%
1,2-Dichloroethane	0.49	<0.50	<0.49	nc	>30%
1,1-Dichloroethylene	0.2	<0.20	<0.20	nc	>30%
cis-1,2-Dichloroethylene	0.5	1.9	1.4	30	>30%
trans-1,2-Dichloroethylene	0.5	<0.50	<0.50	nc	>30%
1,2-Dichloropropane	0.2	<0.20	<0.20	nc	>30%
cis-1,3-Dichloropropene	0.3	<0.30	<0.30	nc	>30%
trans-1,3-Dichloropropene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichloropropene (cis+trans)	0.5	<0.50	<0.50	nc	>30%
Ethylene Dibromide	0.19	<0.20	<0.19	nc	>30%
Hexane	1	<1.0	<1.0	nc	>30%
Methyl Ethyl Ketone (MEK)	10	<10	<10	nc	>30%
Methyl Isobutyl Ketone (MIBK)	5	<5.0	<5.0	nc	>30%
Methyl tert-butyl ether (MTBE)	0.5	<0.50	<0.50	nc	>30%
Methylene Chloride (Dichloromethane)	2	<2.0	<2.0	nc	>30%
Styrene	0.4	<0.50	<0.40	nc	>30%
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	nc	>30%
1,1,2,2-Tetrachloroethane	0.4	<0.50	<0.40	nc	>30%
Tetrachloroethylene	0.2	110	72	**42**	>30%
1,1,1-Trichloroethane	0.2	<0.20	<0.20	nc	>30%
1,1,2-Trichloroethane	0.4	<0.50	<0.40	nc	>30%
Trichloroethylene	0.2	7.3	6.1	18	>30%
Trichlorofluoromethane	0.5	<0.50	<0.50	nc	>30%
Vinyl Chloride	0.2	0.24	<0.20	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

exp.

TABLE K-B-2: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

06-Feb-24

Sample ID	RDL*	MW1D	MW11D	RPD*	Alert Limit
Lab ID		YHR312	YHR316		
Sampling Date		6-Feb-24	6-Feb-24		
Screen Depth (m)		4.57 - 7.62	Field Duplicate of MW1D		
Consultant		EXP	EXP		
Laboratory		BV	BV		
Benzene	0.17	<0.20	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
o-Xylene	0.20	<0.20	<0.20	nc	>30%
m+p-Xylene	0.20	<0.20	<0.20	nc	>30%
Xylenes, Total	0.20	<0.20	<0.20	nc	>30%
Acetone	10	<10	<10	nc	>30%
Bromodichloromethane	0.5	<0.50	<0.50	nc	>30%
Bromoform	1	<1.0	<1.0	nc	>30%
Bromomethane	0.5	<0.50	<0.50	nc	>30%
Carbon Tetrachloride	0.19	<0.19	<0.19	nc	>30%
Chlorobenzene	0.2	<0.20	<0.20	nc	>30%
Chloroform	0.2	<0.20	<0.20	nc	>30%
Dibromochloromethane	0.5	<0.50	<0.50	nc	>30%
1,2-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,4-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
Dichlorodifluoromethane	1	<1.0	<1.0	nc	>30%
1,1-Dichloroethane	0.2	0.52	0.52	0	>30%
1,2-Dichloroethane	0.49	<0.49	<0.49	nc	>30%
1,1-Dichloroethylene	0.2	<0.20	<0.20	nc	>30%
cis-1,2-Dichloroethylene	0.5	34	33	3	>30%
trans-1,2-Dichloroethylene	0.5	1.1	1.1	0	>30%
1,2-Dichloropropane	0.2	<0.20	<0.20	nc	>30%
cis-1,3-Dichloropropene	0.3	<0.30	<0.30	nc	>30%
trans-1,3-Dichloropropene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichloropropene (cis+trans)	0.5	<0.50	<0.50	nc	>30%
Ethylene Dibromide	0.19	<0.19	<0.19	nc	>30%
Hexane	1	<1.0	<1.0	nc	>30%
Methyl Ethyl Ketone (MEK)	10	<10	<10	nc	>30%
Methyl Isobutyl Ketone (MIBK)	5	<5.0	<5.0	nc	>30%
Methyl tert-butyl ether (MTBE)	0.5	<0.50	<0.50	nc	>30%
Methylene Chloride (Dichloromethane)	2	<2.0	<2.0	nc	>30%
Styrene	0.4	<0.40	<0.40	nc	>30%
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	nc	>30%
1,1,2,2-Tetrachloroethane	0.4	<0.40	<0.40	nc	>30%
Tetrachloroethylene	0.2	480	480	0	>30%
1,1,1-Trichloroethane	0.2	<0.20	<0.20	nc	>30%
1,1,2-Trichloroethane	0.4	<0.40	<0.40	nc	>30%
Trichloroethylene	0.2	21	21	0	>30%
Trichlorofluoromethane	0.5	<0.50	<0.50	nc	>30%
Vinyl Chloride	0.2	5.4	5.4	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-B-2: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES

Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

15-Nov-24

Sample ID	RDL*	MW2	MWD	RPD*	Alert Limit
Lab ID		AJAV19	AJAV24		
Sampling Date		15-Nov-24	15-Nov-24		
Screen Depth (m)		3.05 - 6.10	Field Duplicate of MW 2		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
Benzene	0.17	<0.20	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
o-Xylene	0.20	<0.20	<0.20	nc	>30%
m+p-Xylene	0.20	<0.20	<0.20	nc	>30%
Xylenes, Total	0.20	<0.20	<0.20	nc	>30%
Acetone	10	<10	<10	nc	>30%
Bromodichloromethane	0.5	<0.50	<0.50	nc	>30%
Bromoform	1	<1.0	<1.0	nc	>30%
Bromomethane	0.5	<0.50	<0.50	nc	>30%
Carbon Tetrachloride	0.19	<0.19	<0.19	nc	>30%
Chlorobenzene	0.2	<0.20	<0.20	nc	>30%
Chloroform	0.2	<0.20	<0.20	nc	>30%
Dibromochloromethane	0.5	<0.50	<0.50	nc	>30%
1,2-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,4-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
Dichlorodifluoromethane	1	<1.0	<1.0	nc	>30%
1,1-Dichloroethane	0.2	0.37	0.39	5	>30%
1,2-Dichloroethane	0.49	<0.49	<0.49	nc	>30%
1,1-Dichloroethylene	0.2	<0.20	<0.20	nc	>30%
cis-1,2-Dichloroethylene	0.5	7.5	7.6	1	>30%
trans-1,2-Dichloroethylene	0.5	2.8	2.7	4	>30%
1,2-Dichloropropane	0.2	<0.20	<0.20	nc	>30%
cis-1,3-Dichloropropene	0.3	<0.30	<0.30	nc	>30%
trans-1,3-Dichloropropene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichloropropene (cis+trans)	0.5	<0.50	<0.50	nc	>30%
Ethylene Dibromide	0.19	<0.19	<0.19	nc	>30%
Hexane	1	<1.0	<1.0	nc	>30%
Methyl Ethyl Ketone (MEK)	10	<2.0	<2.0	nc	>30%
Methyl Isobutyl Ketone (MIBK)	5	<10	<10	nc	>30%
Methyl tert-butyl ether (MTBE)	0.5	<5.0	<5.0	nc	>30%
Methylene Chloride (Dichloromethane)	2	<0.50	<0.50	nc	>30%
Styrene	0.4	<0.40	<0.40	nc	>30%
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	nc	>30%
1,1,2,2-Tetrachloroethane	0.4	<0.40	<0.40	nc	>30%
Tetrachloroethylene	0.2	140	150	7	>30%
1,1,1-Trichloroethane	0.2	<0.20	<0.20	nc	>30%
1,1,2-Trichloroethane	0.4	<0.40	<0.40	nc	>30%
Trichloroethylene	0.2	40	39	3	>30%
Trichlorofluoromethane	0.5	<0.50	<0.50	nc	>30%
Vinyl Chloride	0.2	<0.20	<0.20	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-B-2: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

11-Mar-24

Sample ID	RDL*	MW103	MW1033	RPD*	Alert Limit
Lab ID		YPV864	YPV865		
Sampling Date		11-Mar-24	11-Mar-24		
Screen Depth (m)		16.88 - 18.40	Field Duplicate of MW103		
Consultant		EXP	EXP		
Laboratory		BV Labs	BV Labs		
Benzene	0.17	<0.20	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
o-Xylene	0.20	<0.20	<0.20	nc	>30%
m+p-Xylene	0.20	<0.20	<0.20	nc	>30%
Xylenes, Total	0.20	<0.20	<0.20	nc	>30%
Acetone	10	<10	<10	nc	>30%
Bromodichloromethane	0.5	<0.50	<0.50	nc	>30%
Bromoform	1	<1.0	<1.0	nc	>30%
Bromomethane	0.5	<0.50	<0.50	nc	>30%
Carbon Tetrachloride	0.19	<0.19	<0.19	nc	>30%
Chlorobenzene	0.2	<0.20	<0.20	nc	>30%
Chloroform	0.2	<0.20	<0.20	nc	>30%
Dibromochloromethane	0.5	<0.50	<0.50	nc	>30%
1,2-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,4-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
Dichlorodifluoromethane	1	<1.0	<1.0	nc	>30%
1,1-Dichloroethane	0.2	<0.20	<0.20	nc	>30%
1,2-Dichloroethane	0.49	<0.49	<0.49	nc	>30%
1,1-Dichloroethylene	0.2	<0.20	<0.20	nc	>30%
cis-1,2-Dichloroethylene	0.5	1.9	1.9	0	>30%
trans-1,2-Dichloroethylene	0.5	0.7	0.7	0	>30%
1,2-Dichloropropane	0.2	<0.20	<0.20	nc	>30%
cis-1,3-Dichloropropene	0.3	<0.30	<0.30	nc	>30%
trans-1,3-Dichloropropene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichloropropene (cis+trans)	0.5	<0.50	<0.50	nc	>30%
Ethylene Dibromide	0.19	<0.19	<0.19	nc	>30%
Hexane	1	<1.0	<1.0	nc	>30%
Methyl Ethyl Ketone (MEK)	10	<10	<10	nc	>30%
Methyl Isobutyl Ketone (MIBK)	5	<5.0	<5.0	nc	>30%
Methyl tert-butyl ether (MTBE)	0.5	<0.50	<0.50	nc	>30%
Methylene Chloride (Dichloromethane)	2	<2.0	<2.0	nc	>30%
Styrene	0.4	<0.40	<0.40	nc	>30%
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	nc	>30%
1,1,2,2-Tetrachloroethane	0.4	<0.40	<0.40	nc	>30%
Tetrachloroethylene	0.2	<0.20	<0.20	nc	>30%
1,1,1-Trichloroethane	0.2	<0.20	<0.20	nc	>30%
1,1,2-Trichloroethane	0.4	<0.40	<0.40	nc	>30%
Trichloroethylene	0.2	0.71	0.68	4	>30%
Trichlorofluoromethane	0.5	<0.50	<0.50	nc	>30%
Vinyl Chloride	0.2	<0.20	<0.20	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

exp.

TABLE K-B-2: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES
Volatile Organic Compounds

1337 Queen Street West, Toronto, Ontario

19-Dec-24

Sample ID	RDL*	BH/MW201	BH/MW0	RPD*	Alert Limit
Lab ID		AMJS94	AMJS97		
Sampling Date		19-Dec-24	19-Dec-24		
Screen Depth (m)		6.19 - 9.24	Field Duplicate of BH/MW201		
Consultant		EXP	EXP		
Laboratory		BV	BV		
Benzene	0.17	<0.20	<0.20	nc	>30%
Toluene	0.20	<0.20	<0.20	nc	>30%
Ethylbenzene	0.20	<0.20	<0.20	nc	>30%
o-Xylene	0.20	<0.20	<0.20	nc	>30%
m+p-Xylene	0.20	<0.20	<0.20	nc	>30%
Xylenes, Total	0.20	<0.20	<0.20	nc	>30%
Acetone	10	<10	<10	nc	>30%
Bromodichloromethane	0.5	<0.50	<0.50	nc	>30%
Bromoform	1	<1.0	<1.0	nc	>30%
Bromomethane	0.5	<0.50	<0.50	nc	>30%
Carbon Tetrachloride	0.19	<0.19	<0.19	nc	>30%
Chlorobenzene	0.2	<0.20	<0.20	nc	>30%
Chloroform	0.2	<0.20	<0.20	nc	>30%
Dibromochloromethane	0.5	<0.50	<0.50	nc	>30%
1,2-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,3-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
1,4-Dichlorobenzene	0.4	<0.40	<0.40	nc	>30%
Dichlorodifluoromethane	1	<1.0	<1.0	nc	>30%
1,1-Dichloroethane	0.2	<0.20	<0.20	nc	>30%
1,2-Dichloroethane	0.49	<0.49	<0.49	nc	>30%
1,1-Dichloroethylene	0.2	<0.20	<0.20	nc	>30%
cis-1,2-Dichloroethylene	0.5	<0.50	<0.50	nc	>30%
trans-1,2-Dichloroethylene	0.5	<0.50	<0.50	nc	>30%
1,2-Dichloropropane	0.2	<0.20	<0.20	nc	>30%
cis-1,3-Dichloropropene	0.3	-	-	nc	>30%
trans-1,3-Dichloropropene	0.4	-	-	nc	>30%
1,3-Dichloropropene (cis+trans)	0.5	<0.50	<0.50	nc	>30%
Ethylene Dibromide	0.19	<0.19	<0.19	nc	>30%
Hexane	1	<1.0	<1.0	nc	>30%
Methyl Ethyl Ketone (MEK)	10	<10	<19	nc	>30%
Methyl Isobutyl Ketone (MIBK)	5	<5.0	<5.0	nc	>30%
Methyl tert-butyl ether (MTBE)	0.5	<0.50	<0.50	nc	>30%
Methylene Chloride (Dichloromethane)	2	<2.0	<2.0	nc	>30%
Styrene	0.4	<0.40	<0.40	nc	>30%
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	nc	>30%
1,1,2,2-Tetrachloroethane	0.4	<0.40	<0.40	nc	>30%
Tetrachloroethylene	0.2	8.1	8.8	8	>30%
1,1,1-Trichloroethane	0.2	<0.20	<0.20	nc	>30%
1,1,2-Trichloroethane	0.4	<0.40	<0.40	nc	>30%
Trichloroethylene	0.2	0.37	0.39	5	>30%
Trichlorofluoromethane	0.5	<0.50	<0.50	nc	>30%
Vinyl Chloride	0.2	<0.20	<0.20	nc	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

TABLE K-B-3: GROUNDWATER FIELD DUPLICATES - RELATIVE PERCENT DIFFERENCES

Polycyclic Aromatic Hydrocarbons

1337 Queen Street West, Toronto, Ontario

29-Nov-24

Sample ID	RDL*	BH/MW104	BH/MW0	RPD*	Alert Limit
Lab ID		AKIY38	AKIY42		
Sampling Date		29-Nov-24	29-Nov-24		
Screen Depth (m)		6.27 - 7.79	Field Duplicate of BH/MW104		
Consultant		EXP	EXP		
Laboratory		BV	BV		
Acenaphthene	0.050	<0.050	<0.050	nc	>30%
Acenaphthylene	0.020	<0.050	<0.050	nc	>30%
Anthracene	0.050	<0.050	<0.050	nc	>30%
Benzo(a)anthracene	0.050	0.062	<0.050	nc	>30%
Benzo(a)pyrene	0.009	0.06	0.028	**73**	>30%
Benzo(b)fluoranthene	0.050	0.084	<0.050	nc	>30%
Benzo(ghi)perylene	0.050	0.05	<0.050	nc	>30%
Benzo(k)fluoranthene	0.050	<0.050	<0.050	nc	>30%
Chrysene	0.050	0.062	<0.050	nc	>30%
Dibenz(a,h)anthracene	0.050	<0.050	<0.050	nc	>30%
Fluoranthene	0.050	0.17	0.072	**81**	>30%
Fluorene	0.050	<0.050	<0.050	nc	>30%
Indeno(1,2,3-cd)pyrene	0.050	<0.050	<0.050	nc	>30%
1-Methylnaphthalene	0.050	<0.050	<0.050	nc	>30%
2-Methylnaphthalene	0.050	<0.050	<0.050	nc	>30%
1&2-Methylnaphthalene	0.071	<0.071	<0.071	nc	>30%
Naphthalene	0.050	<0.050	<0.050	nc	>30%
Phenanthrene	0.030	0.11	0.051	**73**	>30%
Pyrene	0.050	0.15	0.061	**84**	>30%

NOTES:

Analysis by Bureau Veritas Laboratories (formerly Maxxam Analytics).

All results in ppm (µg/g) and based on dry weight basis.

* Reportable Detection Limits (RDL) is listed.

*Relative Percent Differences

'nc' means "not calculable", since one (or both) of the results are less than 5x the RDL or the average of the two results is less than 5x the RDL.

Exceedences of alert limits are shown in bold.

Appendix L: Human Health Toxicity Assessment Summary and Bioavailability

APPENDIX L: Human Health Toxicity Reference Profiles

The exposure limits used in this RA were those recommended by the MECP (2011c), MECP (2016), MECP (2024a) or MECP (2024b). In these cases, no rationale was provided for the selection of the TRV. TRVs were derived for 1- and 2-methylnaphththalene and phenanthrene as oral and inhalation exposure limits were not provided by MECP. The rationale for the selection of these TRVs is provided in Section L-1. A rationale for the selection of these TRVs from MECP (2024) is also provided in L-1.

A discussion of the assumptions made in the RA, concerning contaminant bioavailability, is provided in Section L-2.

L-1 Human Health Exposure Limits

1- and 2-Methylnaphthalene

<u>Inhalation Exposure Limit</u>

MECP has not recommended a non-carcinogenic inhalation TRV for 1- and 2-methylnaphthalene. As a result, published limits from credible regulatory agencies were considered. Credible agencies including Health Canada, US EPA, Cal EPA, ATSDR, RIVM and WHO have not derived or recommended a non-carcinogenic inhalation TRV for 1- and 2-methylnaphthalene; however, CCME (2008) has derived non-carcinogenic inhalation TRVs for petroleum hydrocarbon subfraction groups.

1- and 2-methylnaphthalene is a C11 aromatic compound. CCME (2008) states that the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG; Edwards et al., 1997) identified eight (8) aromatic hydrocarbon parameters (i.e., isopropylbenzene, naphthalene, acenaphthene, biphenyl, fluorene, anthracene, fluoranthene and pyrene) within the C>8 to C16 range for which tolerable daily intakes (TDIs) and/or reference concentrations (RfCs) were published by the US EPA. Additionally, two published RfCs existed for isopropylbenzene and naphthalene. Based on the available toxicity data, TPHCWG identified an inhalation RfC of 0.2 mg/m^3 for aromatic petroleum hydrocarbons in the C>8 to C16 range. CCME (2008) re-evaluated the TPHCWG approach for aromatic petroleum hydrocarbons and considered new inhalation toxicity studies which included those developed for methylnaphthalene. The critical study selected by TPHCWG (1997) was identified to be Clark et al, 1989, which set a chronic RfC of 0.2 mg/m^3. The chronic RfC is based on a NOEL of 900,000 ug/m^3 adjusted to account for continuous exposure (rats were only exposed for 6 hours per day, 5 days per week for 1 year) and 1,000 fold uncertainty factor (including an uncertainty factor of 10 to account for sensitive subpopulations, a factor of 10 to account for animal to human extrapolation, and a factor of 10 to account for converting a sub-chronic exposure to a chronic exposure).

The CCME (2008) re-evaluated the TPHCWG approach for aromatic petroleum hydrocarbons and considered new inhalation toxicity studies which included those developed for methylnaphthalene. CCME determined that the maximum estimated vapour phase concentrations for methylnaphthalene was estimated to be relatively low (i.e., less than the corresponding screening concentration derived for the protection of indoor air quality) and concluded that from a preliminary analysis perspective that methylnaphthalene was unlikely to pose a risk to indoor air quality at petroleum-contaminated sites remediated based on the TPHCWG proposed RfC. In conclusion, CCME (2008) adopted the RfC of 0.2 mg/m^3 with the critical effect of decreased body weight in mice and rats for the petroleum hydrocarbon aromatic C>10-C16 subfraction, which includes 1- and 2-methylnaphthalene. This inhalation RfC of 0.2 mg/m^3 was used for 1- and 2-methylnaphthalene in the RA.

While it is acknowledged that a more conservative RfC for naphthalene exists (0.0037 mg/m^3), which was used to derive the S-IA and S-OA component values for naphthalene relied upon in the secondary screening in Table E4-1 of Appendix E, this RfC was not relied upon for assessment purposes within the HHRA as a surrogate RfC for 1- and 2-methylnaphthalene. The RfC for naphthalene is considered to be overly conservative for use as a surrogate value for the assessment of 1- and 2-methylnaphthalene via inhalation-based exposure pathways given the higher volatility of naphthalene in comparison to 1- and 2-methylnaphthalene. Given the use of 1,000-fold uncertainty factor in derivation of the RfC for aromatic petroleum hydrocarbons in the C>8 to C16 range, the RfC of 0.2 mg/m³ is considered to be suitably conservative for use within the Risk Assessment.

For the carcinogenic inhalation TRV, MECP (2018) has identified a Toxic Equivalency Factor of 0 for 1- and 2-methylnaphthalene, which indicates that this PAH is not considered to be carcinogenic. As a result, a carcinogenic inhalation TRV was not recommended for 1- and 2-methylnaphthalene.

References

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale Supporting Technical Document*. January 2008 PN 1399. ISBN 978-1-896997-77-3 PDF.

Clark, D.G., Butterworth, S.T., Martin, J.G., Roderick, H.R., and Bird, M.G. 1989. *Inhalation toxicity of high flash aromatic naphtha*. Toxic. Ind. Health. 5(3):415-428.

Edwards, D.A., M.D. Androit, M.A. Amoruso, A.C. Tummey, C.J. Bevan, A. Tveit, L.A. Hayes, SlH. Yongren and D.V. Nakles. 1997. *Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH).* Volume 4 of the Total Petroleum Hydrocarbon Criteria Working Group Series, Amherst Scientific Publishers, Amherst, MA. 137 p. Cited In: CCME, 2008.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2018. *Toxicity Reference Value (TRV) Selections for Benzo(a)Pyrene*. Prepared by: Human Toxicology and Air Standards Section, Technology Assessment and Standards Development Branch. October, 2018.

Phenanthrene

Inhalation Exposure Limit

MECP (2011) does not provide an inhalation exposure limit for phenanthrene, and US EPA has concluded there is insufficient information to recommend one. As cited in CCME (2008), PHC F2 contains phenanthrene along with several other aromatic hydrocarbons, with carbon chain lengths ranging from C10 to C16. The RfC value recommended by MECP for the aromatic fraction of PHC F2 is 0.2 mg/m^3 and was considered as a surrogate RfC for phenanthrene. This RfC (derived by TPHCWG, 1997) is based on a study by Clark et al. (1989). In this study, rats were exposed via inhalation to a high aromatic naphtha petroleum distillate blend (50/50 blend of SHELLSOL A* and SOLVESSO 100***) at concentrations of 0, 450, 900 or 1,800 mg/m^3 for 6 hours per day, 5 days per week for 12 months. Increased liver and kidney weights were observed in male rats exposed to 1,800 mg/m^3 petroleum distillate. A NOEL of 900 mg/m^3 was reported. TPHCWG (1997) derived an inhalation RfC of 0.2 mg/m^3 by accounting for continuous exposure and applying an uncertainty factor of 1000. This inhalation RfC of 0.2 mg/m^3 was used for phenanthrene in the RA.

For the carcinogenic inhalation TRV, MECP (2018) has identified a Toxic Equivalency Factor of 0 for phenanthrene, which indicates that this PAH is not considered to be carcinogenic. As a result, a carcinogenic inhalation TRV was not recommended for phenanthrene.

Oral Exposure Limit

MECP does not provide an oral exposure limit for phenanthrene, and US EPA has concluded there is insufficient information to recommend one. As cited in CCME (2008), PHC F2 is comprised of phenanthrene along with several other aromatic hydrocarbons with carbon chain length ranges from C10 to C16. The RfD value recommended by MECP for the aromatic fraction of PHC F2 (0.04 mg/kg/d) was considered as a surrogate RfD for phenanthrene. This value was adopted as the Tolerable Daily Intake (TDI) for phenanthrene by RIVM (2011).

This RfD is based on the lowest of several NOELs (50 mg/kg/d) reported by TPHCWG (1997) and based on an unpublished NTP (1980) report, for studies in rats and mice, using several PAHs (isopropylbenzene, naphthalene, acenaphthene, biphenyl, fluorene, anthracene, fluoranthene, pyrene and mixtures of naphthalenes and methylnaphthalenes). The lowest NOEL, upon which the RfD is based, was based on decreased body weight and exposure to naphthalene.

The Massachusetts Department of Environmental Protection (MA DEP, 2003) recommends a RfD of 0.03 mg/kg/d for phenanthrene based on a RfD for aromatic hydrocarbons with carbon chain length ranges from C9 through C32. This value is assigned to chemicals that fall into the C9 - C32 aromatic fraction and do not have an assigned US EPA IRIS value. This value is selected based on the RfD for pyrene (C16) derived by US EPA IRIS (1990). Given the selection of the RfD by MA DEP (2003) is based on a high molecular weight PAH and is applied to a larger range of carbon chain lengths, this value was not considered a suitable surrogate for phenanthrene in the RA.

While there is uncertainty associated with the application of the oral RfD for PHC F2 as a surrogate for phenanthrene, it is assumed to be sufficiently conservative for the following reasons:

- The structural similarity between phenanthrene and other PAHs evaluated/reviewed in the determination of the RfD for PHC F2 (e.g., anthracene);
- The RfD is based on the most toxic compound tested;
- The RfD was derived from a NOEL, and no LOEL was reported by the authors; and,
- The use of an RfD for a range of carbon chain lengths as surrogates for individual PAHs has been adopted by various other agencies (e.g., MA DEP and RIVM).

Based on the above, the oral RfD for PHC fraction F2, equivalent to the RfD recommended by RIVM for phenanthrene, was applied for phenanthrene in this RA.

For the carcinogenic oral TRV, MECP (2018) has identified a Toxic Equivalency Factor of 0 for phenanthrene, which indicates that this PAH is not considered to be carcinogenic. As a result, a carcinogenic oral TRV was not recommended for phenanthrene.

References

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale Supporting Technical Document*. January 2008 PN 1399. ISBN 978-1-896997-77-3 PDF.

Clark, D.G., Butterworth, S.T., Martin, J.G., Roderick, H.R., and Bird, M.G. 1989. *Inhalation Toxicity of High Flash Aromatic Naphtha*. Toxic. Ind. Health. 5(3):415-428.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2018. *Toxicity Reference Value (TRV) Selections for Benzo(a)Pyrene*. Prepared by: Human Toxicology and Air Standards Section, Technology Assessment and Standards Development Branch. October, 2018.

RIVM. 2011. *Environmental Risk Limits for Phenanthrene*. National Institute for Public Health and the Environment. RIVM Letter Report 601357007/2011.

Massachusetts Department of Environmental Protection (MA DEP). 2003. *Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology*. MDEP Bureau of Waste Site Cleanup, Boston, MA. November 2003. 65 pp.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2018. *Toxicity Reference Value (TRV) Selections for Benzo(a)Pyrene*. Prepared by: Human Toxicology and Air Standards Section, Technology Assessment and Standards Development Branch. October, 2018.

Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG). 1997 - 1999. Total Petroleum Hydrocarbon Criteria Working Group Series Vols. 1 - 5. Amherst Scientific Publishers, USA

U.S Environmental Protection Agency Integrated Risk Information System (US EPA IRIS). 1990. Chemical Assessment Summary – Pyrene; CASN 129-00-00.

L-2 Assumptions Regarding Bioavailability

During the estimation of risks, a number of assumptions are made concerning the ability of each COC to reach target tissues within the body and exert predicted toxicological effects. One of the key assumptions that is generally made is that COCs are 100% bioavailable. Bioavailability is defined by US EPA as “the amount of a contaminant that is absorbed into the body following skin contact, ingestion, or inhalation” (US EPA, 2011). Thus, bioavailability determines the amount of a substance reaching target tissues or organs, where it can produce an adverse effect. The bioavailable amount of a substance is not necessarily equal to the external dose but is otherwise known as the “effective” dose. An “administered” dose is the application of a substance to a test organism under controlled conditions, in a reproducible manner, by a defined route (IUPAC Glossary of Terms definition). During risk assessment, it is not appropriate to use toxicity values based on administered doses to predict risks from absorbed doses without some adjustment of values.

The relative bioavailability of a compound, or ratio of chemical absorbed from one medium versus another, is also an important factor in risk assessment, if the toxicity reference value assigned for one medium was derived from toxicity data using another.

If an exposure estimate is adjusted for bioavailability, then it must be compared to an equivalent exposure limit, that is, one which is based on an absorbed and not an administered dose. Failure to do so will increase the uncertainty of the risk estimate and may result in an underestimate of risks. Likewise, comparison of an exposure estimate that is not adjusted for bioavailability, to an absorbed dose may result in an overestimation of risks. Since most exposure limits are derived from studies reporting administered doses, the latter circumstance is less likely.

A comparison of relative bioavailability is often a better approach to estimating risks, if sufficient information is available. Systemic absorption of chemicals differs depending on the route of exposure, medium in which the chemical is found and/or delivery mode and medium utilized during laboratory testing. Toxicity in the target tissue also differs depending on absorption, metabolism, and distribution within the body. Route-to-route extrapolation, and Physiologically Based Pharmacokinetic (PBPK) modeling methods must take into consideration each of these factors, if an exposure limit is not available for a particular exposure route of concern, or specifically for humans. In this case, and in the absence of pharmacokinetic data, use of route-to-route extrapolation is considered acceptable. For example, dermal absorption risks are commonly estimated using exposure limits derived from oral exposures. The dermal dose absorbed systemically is adjusted accordingly, to an oral “equivalent”, for comparison to the oral exposure limit, by correcting for bioavailability.

Where available, MECP (2011) relative absorption factors were applied in this RA. As MECP (2011) does not provide RAF values for dermal contact with groundwater, the RAFs for all groundwater COCs were assumed to be equal to 1. As discussed in MECP (2011), there is insufficient quantitative data to develop inhalation RAFs. Therefore, in keeping with the MECP (2011), the inhalation RAF was assumed to be equal to 1 for all COCs.

An RAF of 1 means that it has been assumed the degree of absorption in the exposure model is equal to that of the test study upon which the TRV for that pathway is based. This is recognized as a source of uncertainty for exposure estimates, particularly when oral TRVs are used to predict dermal exposure. Assuming an RAF of 1 in any case may result in over- or under-estimations of exposure and, likewise, risk.

References

US Environmental Protection Agency (US EPA). 2011. *Assessing Relative Bioavailability in Soil at Superfund Sites*. https://www.epa.gov/superfund/soil-bioavailability-superfund-sites . Updated January 6, 2021

Ontario Ministry of the Environment, Conservation and Park (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario.* April 15, 2011.

Appendix M: Ecotoxicity Reference Profiles for Ecological Receptors

Appendix M: Ecotoxicity Reference Profiles

This appendix addresses the process of choosing TRVs for ecological receptors exposed to soil COCs where none were provided by the MECP. The selected toxicity values were considered protective of sensitive plants, invertebrates, avian, and/or mammalian species exposed to various PAHs in soil. The rationales for selection of the TRVs are provided below.

Toxicological effects data were more readily available for domestic and laboratory mammals, such as rats and mice than for any of the specific VECs included in the RA. Whenever possible, mammalian toxicity data were used for mammalian receptors and avian toxicity data for avian receptors.

The use of surrogate species introduces an additional level of uncertainty in the assessment of the potential toxicity of contaminants to wildlife species. Research has demonstrated that numerous physiological functions, such as metabolic rates and responses to toxic chemicals, are functions of body size (Sample et al., 1997). However, body weight scaling in not considered appropriate by MECP. For birds, differences in toxicological reactions appear to be more a factor of whether the species is passerine or non-passerine (Fischer and Hancock, 1997). However, Van der Wal et al. (1995) reported that the differences in toxicity among 14 species of birds did not vary by more than a factor of 100. These and other observations were considered when deriving TRVs for mammalian and avian VECs. Uncertainties associated with the toxicological assessment are discussed in the main RA report.

PAHs

Acenaphthylene

The TRV for plants and terrestrial invertebrates was obtained from the CCME (2010) document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polyaromatic Hydrocarbons (PAHs)*". The value was derived based on a study by Sverdrup et al. (2002) and Springtail reproduction. This value was used for both terrestrial plants and invertebrates in the absence of suitable plant study. It is acknowledged that this represents some uncertainty in the ERA as this may under or over-predict risks to plants if plants are more or less sensitive to acenaphthylene.

An acenaphthylene-specific TRV was not available for mammals and birds. In the Eco-SSL document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*", a benchmark value was derived for low molecular weight (LMW) compounds composed of fewer than four rings (US EPA, 2007). A literature review was undertaken which identified 46 papers with potentially acceptable toxicity data. Seventy-six endpoints were reported and used to derive a TRV of 65.6 mg/kg-bw/d. This value was based on a NOAEL for growth and reproduction of rats fed 1-naphthaleneacetic acid within their food. The TRV was the highest bounded NOAEL of the dataset and was used because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL. This value was considered as a candidate TRV for terrestrial mammals in this RA.

Acenaphthylene is insoluble in water, therefore likely to be very lipophilic, unlike naphthalene. Thus, other surrogate compounds were also considered. Acenaphthylene, naphthalene and acenaphthene have somewhat similar volatilities and structures. Acenaphthylene and acenaphthene are more structurally similar, with the only difference being a double bond in the ethylene bridge. For that reason, the TRV recommended by MECP (2011c) for acenaphthene (175 mg/kg/d), based on mouse data, was also considered as a surrogate TRV. Since the majority of toxicity tests investigated by the US EPA (2007), in deriving their TRV, were conducted using naphthalene, the latter candidate TRV (MECP 2011c value for acenaphthene) was chosen for use in this RA.

There is no Eco-SSL for birds due to the unavailability of toxicity data. However, Landis Assoc. Inc. (1985) measured food consumption, growth and mortality parameters in Bobwhite after exposure to naphthalene. In this study, the NOAEL was reported as 1653 mg/kg body weight/day. This value was considered as a surrogate value and candidate TRV for birds. However, for reasons discussed above, alternative surrogates to naphthalene were also considered.

In a study conducted by Netherland National Institute for Public Health and the Environment (RIVM) on the variation in sensitivity of birds and mammals to pesticides, it was shown that the sensitivity differences between birds and mammals are limited (for pesticides) and, for RA purposes, it was indicated that extrapolation of toxicity data would have little influence on the outcome of the RA due to other sources of uncertainty (Van der Wal et al., 1995). Also, authors reported that the differences in toxicity among 14 species of birds did not vary by more than a factor of 100. Furthermore, in a study conducted by Head et al. (2015), it was shown that the potency of PAH sensitivity between chicken, Pekin duck and greater sculp, for induction of ethoxyresorufin-Odeethylase (EROD) activity in primary hepatocyte cultures, did not vary by more than a factor of 10. Kapustka (2004) reviewed over 325 scientific papers on PAH toxicity on plants, invertebrates and wildlife and reported that, for the compounds that had toxicological results for bird species, mammals were always more sensitive. On the basis of this observation, the authors suggested that mammalian TRVs can be assumed to also be protective of avian species. These and other observations were considered when deriving TRVs for mammalian and avian VECs. If data were available only for mammals, the mammalian toxicity data were used to estimate a TRV for avian receptors. This approach was supported by CCME (2008) in deriving the daily threshold effects doses (DTEDs) for PAHs in vertebrate species including birds. CCME applied an uncertainty factor of 1-5 for deriving the DTEDs from the lowest LOAEL endpoint. Although Kapustka (2004) suggests mammalian TRVs are likely protective of avian species, to be conservative, a UF of 5 was used to derive TRVs from mammalian data here. Using the UF, the mammalian TRV of 175 mg/kg/d for acenaphthene was converted to 35 mg/kg/d and considered a surrogate candidate TRV for birds.

Of the two candidate TRVs for birds, the value for acenaphthene was selected, because it is based on a surrogate of similar structure and is more conservative than the TRV for naphthalene, derived from the avian study.

Ecotoxicity Information for Terrestrial Organisms - Acenaphthylene

Tested Species	End-point	TRV	VEC	Applied
Springtail	EC10 (reproduction)	23 mg/kg soil	Plants and Invertebrates	23 mg/kg soil
Mouse	LOEL (liver weight)	175 mg/kg-bw/day	Terrestrial Mammals	175 mg/kg-bw/day
Mouse	LOEL (liver weight)	175 mg/kg-bw/day	Birds	35 mg/kg-bw/day

<u>References</u>

CCME. 2008. *Canadian Soil Quality Guidelines: Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs), Environmental and Human Health Effects*. Scientific Supporting Document. PN 1401, ISBN 978-1-896997-79-7 PDF.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Head, J.A., Jeffery, R.W., Farmahin, R. and Kennedy, S.W. 2015. *Potency of Polycyclic Aromatic Hydrocarbons (PAHs) for Induction MOE of ethyoxyresorufin-O-deethylase (EROD) Activity in Hepatocyte Cultures from Chicken, Pekin Duck, and Greater Scaup*. Environmental Science & Technology. 49(6): 3787-3794.

Kapustka, L.A. 2004. *Establishing Eco-SSLs for PAHs: Lessons Revealed from a Review of Literature on Exposure and Effects to Terrestrial Receptors*. Human and Ecological Risk Assessment. 10: 185-205.

Landis Assoc. Inc. 1985. *A Dietary LC50 Study in the Bobwhite with Naphthalene (Final Report).* EPA/OTS; Doc #86-870000551. Ref ID: 27393.

Sverdrup, LE, Nielsen, T, and Krogh, PH. 2002. *Soil Ecotoxicity of Polycyclic Aromatic Hydrocarbons in Relation to Soil Sorption, Lipophilicity, and Water Solubility.* Environ. Sci. Technol. 36: 2429-2435.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Van der Wal, J.T., Luttik, R., Vaal, M.A. and Hoekstra, J.A. 1995. *Ordering Birds and Mammals by Their Sensitivity to Chemicals Compounds: A Principle Component Analysis of Acute Toxicity Data.* National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands, Report No. 719102036.

Benz(a)anthracene

There is limited information in the literature on the ecotoxicity of benzo(a)anthracene to terrestrial species. Two studies were cited in CCME (2010) on toxicity of benzo(a)anthracene in mammals. Silkworth et al. (1995) investigated immunosuppression in mice by administering a single oral dose of benzo(a)anthracene. The authors reported a LOAEL of 100 mg/kg/d, and a NOAEL at the next lower dose of 10 mg/kg/d, for the above endpoint. Nousiainen et al. (1984) studied the acute toxicity of benzo(a)anthracene on Wistar rats via an oral exposure pathway. The oral exposure of benzo(a)anthracene on rats during a 4-day study resulted in a NOAEL of 150 mg/kg-bw/d reported for hepatic, renal and gastrointestinal toxicity effects. Neither of the above studies is particularly suitable for deriving a chronic TRV as they are acute tests for endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benz(a)anthracene in the ERA. It is acknowledged that there is high uncertainty with applying this TRV as further discussed in Section 5.4.2 of the RA report.

Ecotoxicity Information for Terrestrial Organisms - Benz(a)anthracene

Tested Species	Endpoint	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. of Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Nousiainen, U, Torronen, R, and Hanninen, O. 1984. *Differential induction of various carboxylesterases by certain polycyclic aromatic hydrocarbons in the rat*. Toxicology 32:243-251.

Silkworth, JB, Lipinskas, T, and Stoner. CR. 1995. *Immunosuppressive Potential of Several Polycyclic Aromatic Hydrocarbons (PAHs) Found at a Superfund Site: New Model Used to Evaluate Additive Interactions Between Benzo[a]pyrene and TCDD*. Toxicology 105(2-3):375-86.

Trust, K.A., Fairbrother, A., and Hooper, M.J. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environ. Toxicol. Chem. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Benzo(b)fluoranthene

The TRV for terrestrial plants was taken from the Office of Solid Waste US EPA Region 6 Document entitled "*Screening Level Ecological Risk Assessment Protocol*" (US EPA, 1999) and was based on the work of Sims and Overcash (1983) and wheat growth.

As cited in CCME (2010), Sverdrup et al. (2002b) investigated the reproduction and survival effects of exposure to benzo(b)fluoranthene on Springtail, *Folsomia Fimetaria,* during a 21-day experiment. The EC10 and LC50 were reported to be >360 mg/kg for both endpoints. Based on the above studies, a candidate TRV for invertebrates was set to the reported EC10. As this TRV was compound-specific, it was considered the more defensible of the two candidate values thus, this was the value adopted for use in the current RA.

For mammals, as cited in CCME (2010), Silkworth et al*.* (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including benzo(b)fluoranthene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported on the immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on 50% suppression of immune responses observed in mice. This study is not particularly suitable for deriving a chronic TRV as it is an acute test and measured endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benzo(b)fluoranthene in the ERA. It is acknowledged that there is high uncertainty with applying this TRV as further discussed in Section 5.4.2 of the RA report.

Ecotoxicity Information for Terrestrial Organisms - Benzo(b)fluoranthene

Tested Species	End-point	TRV	VEC	Applied
Wheat	Chronic NOAEL (growth)	1.2 mg/kg soil	Terrestrial Plant	1.2 mg/kg soil
Springtail	LC50/EC10 (mortality and reproduction)	360 mg/kg soil	Terrestrial Invertebrate	360 mg/kg soil
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Silkworth, JB, Lipinskas, T, and Stoner. CR. 1995. *Immunosuppressive Potential of Several Polycyclic Aromatic Hydrocarbons (PAHs) Found at a Superfund Site: New Model Used to Evaluate Additive Interactions Between Benzo[a]pyrene and TCDD*. Toxicology 105(2-3):375-86.

Sims, RC, and Overcash, MR. 1983. *Fate of Polynuclear Aromatic Compounds (PNAs) in Soil-Plant Systems.* Residue Reviews. Volume 88.

Sverdrup, LE, Nielsen, T, and Krogh, PH. 2002. *Soil Ecotoxicity of Polycyclic Aromatic Hydrocarbons in Relation to Soil Sorption, Lipophilicity, and Water Solubility.* Environ. Sci. Technol. 36: 2429-2435.

Trust, K.A., Fairbrother, A., and Hooper, M.J. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environ. Toxicol. Chem. 13(5): 821-830.

US EPA, 1999. *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities: Peer Review Draft*. Office of Solid Waste (Region 6) EPA 530-D-99-001A. August 1999.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Benzo(g,h,i)perylene

A benzo(g,h,i)-specific TRV was not available for mammals and birds. In this RA, a mammalian TRV was adopted from the Eco-SSLs document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*", where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was chosen based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. As such, this value was used as the TRV for benzo(g,h,i)perylene.

Ecotoxicity Information for Terrestrial Organisms - Dibenzo(a,h)anthracene

Tested Species	End-point	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Trust, KA, Fairbrother, A, Hooper, MJ. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environmental Toxicology and Chemistry. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Benzo(k)fluoranthene

For mammals, as cited in CCME (2010), Silkworth et al. (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including benzo(k)fluoranthene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported based on an immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on 50% suppression of immune responses observed in mice. This study is not particularly suitable for deriving a chronic TRV as it is an acute test and measured endpoints other than survival, growth and reproduction. Therefore, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for benzo(k)fluoranthene in the ERA.

Ecotoxicity Information for Terrestrial Organisms - Benzo(k)fluoranthene

Tested Species	End-point	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

References

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Silkworth, JB, Lipinskas, T, and Stoner. CR. 1995. *Immunosuppressive Potential of Several Polycyclic Aromatic Hydrocarbons (PAHs) Found at a Superfund Site: New Model Used to Evaluate Additive Interactions Between Benzo[a]pyrene and TCDD*. Toxicology 105(2-3):375-86.

Trust, K.A., Fairbrother, A., and Hooper, M.J. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environ. Toxicol. Chem. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Chrysene

For mammals, as cited in CCME (2010), Silkworth et al. (1995) investigated the immunocompetence of mice exposed via a single oral dose to several PAH including chrysene, at concentrations of 0.1, 1, 10 and 100 mg/kg bw. A NOAEL of 10 mg/kg was reported based on an immunocompetence endpoint. In addition, a LOAEL of 100 mg/kg was reported based on >50% suppression of immune responses observed in mice. However, in the current RA, an uncertainty factor of 10 is applied to the LOAEL reported by Silkworth et al (1995) to account for the use of an acute study. The resulting TRV is 10 mg/kg bw/d.

Several endpoints were reported by Lambelin et al. (1967) for 6-aminochrysene, as cited in the US EPA Eco-SSLs document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" (US EPA, 2007) and summarized below. This study was used in the derivation of Eco-SSLs for HMW-PAHs. Out of the literature reviewed by the EPA, the minimum LOAEL was reported by Lambelin et al. (1967) and the LOAEL value was considered most suitable for deriving a TRV for mammals in the present RA. The study was conducted for 360 days and assessed adverse effects on physiology and growth. The authors reported a growth LOAEL of 24 mg/kg bw/d.

With the added confidence that the LOAEL reported by Silworth et al. (1995) multiplied by the uncertainty factor of 10 is below the concentration at which no effect was observed during the study conducted by Lambelin et al (1967), it was considered suitable to use 10 mg/kg/d as the TRV.

No data are available to evaluate or predict the long-term effects of chrysene to birds. Mammalian toxicity data were used to derive a TRV for birds by applying a confidence factor of five in accordance with the guidance of Van der Wal (1995) and the CCME.

Ecotoxicity Information for Terrestrial Organisms - Chrysene

Tested Species	End-point	TRV	VEC	Applied
Rat	NOAEL (reproduction, growth and survival)	13.3 mg/kg-bw/d	Mammals	10 mg/kg-bw/d
Rat	NOAEL (growth)	11.8 mg/kg-bw/d		
Rat	NOAEL (physiology)	24 mg/kg-bw/d		
Rat	NOAEL (physiology)	26.4 mg/kg-bw/d		
Rat	LOAEL (reproduction, growth and survival)	26.4 mg/kg-bw/d		
Rat	LOAEL (growth)	24 mg/kg-bw/d		

Mouse	NOAEL (immunocompetence)	10 mg/kg-bw/d		
Mouse	LOAEL (immunocompetence)	100 mg/kg/d		
Mouse	LOAEL (immunocompetence)	100 mg/kg-bw/d	Birds	2 mg/kg-bw/d

References

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Lambelin, G, Mees, G, and Buu-Hoi, NP. 1967. *Chronic Toxicity Studies of 6-Aminochrysene in the Rat*. Arzneim.-Forsch./Drug Res. 17(9): 1117-1121.

Silkworth, JB, Lipinskas, T, and Stoner. CR. 1995. *Immunosuppressive Potential of Several Polycyclic Aromatic Hydrocarbons (PAHs) Found at a Superfund Site: New Model Used to Evaluate Additive Interactions Between Benzo[a]pyrene and TCDD*. Toxicology 105(2-3):375-86.

Van der Wal, JT, Luttik, R, Vaal, MA, and Hoekstra, JA. 1995. *Ordering Birds and Mammals by Their Sensitivity to Chemical Compounds: A Principal Component Analysis of Acute Toxicity Data*. RIVM report no 719102 036. National Institute of Public Health and the Environmental, Bilthoven, Netherlands. November 1995.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Dibenz(a,h)anthracene

The TRVs for terrestrial plants and invertebrates was taken from CCME (2010) document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polyaromatic Hydrocarbons (PAHs)*". The terrestrial plant value was based on the growth and mortality of Lupin (Henner et al., 1999). The invertebrate value was derived based on a study by Sverdrup et al. (2002b) on Springtail reproduction.

A dibenzo(a,h)anthracene specific TRV was not available for mammals and birds. In this RA, a TRV was adopted from Eco-SSLs document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to there being insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for dibenz(a,h)anthracene in the ERA. It is acknowledged that there is high uncertainty with applying this TRV as further discussed in Section 5.4.2 of the RA report.

Ecotoxicity Information for Terrestrial Organisms - Dibenz(a,h)anthracene

Tested Species	End-point	TRV	VEC	Applied
Lupin	LOEC (growth and mortality)	155 mg/kg soil	Terrestrial Plants	155 mg/kg soil
Springtail	EC10 (reproduction)	780 mg/kg soil	Invertebrates	780 mg/kg soil
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

<u>References</u>

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Henner, P, Schiavon, M, Druelle, V, and Lichtfouse, E. 1999. *Phytotoxicity of Ancient Gaswork Soils. Effect of Polycyclic Aromatic Hydrocarbons (PAHs) on Plant Germination*. Organic Geochemistry 30(8b): 963-969.

Sverdrup, LE, Nielsen, T, and Krogh, PH. 2002. *Soil Ecotoxicity of Polycyclic Aromatic Hydrocarbons in Relation to Soil Sorption, Lipophilicity, and Water Solubility.* Environ. Sci. Technol. 36: 2429-2435.

Trust, KA, Fairbrother, A, Hooper, MJ. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environmental Toxicology and Chemistry. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Indeno(1,2,3-cd)pyrene

There is limited information in the literature on the ecotoxicity of indeno(1,2,3-cd)pyrene on terrestrial species. As no ecotoxicity information was available in the ECOTOX database and CCME (2010) on toxicity of this parameter in mammals and birds, a TRV was adopted from the US EPA document entitled "*Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" where a value was derived for high molecular weight (HMW) compounds composed of four or more rings (US EPA, 2007). In deriving the TRV for HMW PAH, a literature review identified 46 papers with potential toxicity data. For HMW-PAH, of the papers identified from the literature search process, 45 endpoints were reported and used to derive the TRV. A TRV of 0.615 mg/kg-bw/d was reported based on the highest bounded NOAEL of the dataset for growth and reproduction, because the geometric mean of the NOAELs was higher than the lowest bounded LOAEL.

There is no Eco-SSL for birds due to insufficient data. However, Trust et al. (1994) measured biochemical, organ and body weight parameters in European Starling after exposure to 7,12-dimethylbenzo(a)anthracene (HMW PAH). In this study, the NOAEL was reported as 2 mg/kg body weight/day. In an acute study by Brausch et al. (2010), Northern Bobwhite Quail were exposed to 2,000 mg/kg body weight benz(a)anthracene and pyrene (both HMW PAHs) via oral gavage. No difference of mean body weight was observed between the control group and test group. In addition, no mortalities were observed. It was considered appropriate to apply an uncertainty factor of 10 for adaptation of an acute TRV, resulting in a candidate TRV of 200 mg/kg bodyweight. Given that this value is based on an acute study and is higher than the NOAEL reported by Trust et al. (1994), the NOAEL of 2 mg/kg was applied as the TRV for avian VECs for indeno(1,2,3-cd)pyrene in the ERA. It is acknowledged that there is high uncertainty with applying this TRV as further discussed in Section 5.4.2 of the RA report.

Ecotoxicity Information for Terrestrial Organisms - Indeno(1,2,3-cd)pyrene

Tested Species	End-point	TRV	VEC	Applied
Multiple	Multiple	0.615 mg/kg-bw/day	Terrestrial Mammals	0.615 mg/kg-bw/day
European Starling	NOAEL (weight)	2 mg/kg/day	Birds	2 mg/kg/day

<u>References</u>

Brausch, J.M., Blackwell, B.R., Beall, B.N., Caudillo, C., Kolli, V., Godard-Codding, C., Cox, S.B., Cobb, G. and Smith, P.N. 2010. *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus)*. J. Toxicol. Environ. Health, Part A. 73: 540-551.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Trust, K.A., Fairbrother, A., and Hooper, M.J. 1994. *Effects of 7,12-Dimethylbenz[a]anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling*. Environ. Toxicol. Chem. 13(5): 821-830.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

1- and 2-Methylnaphthalene

There is limited information in the literature on the ecotoxicity of 1- and 2-methylnaphthalene and no information were found in ECOTOX database. In the present study, naphthalene is used as a surrogate for these compounds. The similar structure and physical properties of naphthalene with 1- and 2-methylnaphthalene and vast numbers of studies on ecotoxicity data, make it a suitable surrogate. The water solubility of naphthalene is 31.7 mg/l while solubility of 1-methylnaphthalene is 24.5. The log K_{OW} values are 3.29 and 3.86, for naphthalene and 1-methylnaphthalene, respectively.

The TRV for terrestrial plants was obtained for naphthalene from US EPA's ECOTOX database. Of the eight papers identified with potential toxicity data for terrestrial plants, two studies (Hulzebos et. al., 1993; Aina et. al., 2006) were selected for further assessment taking into account the screening procedure outlined in MECP Rationale document (2011). In both studies, the experiment was conducted using natural soil and the effect of exposure to naphthalene was assessed on populations and morphology by measuring biomass and weight respectively. Hulzebos et al. (1993) studied the effect of 76 priority pollutants, including naphthalene, on biomass in lettuce, and an EC50 equal to 100 mg/kg was reported for naphthalene. Aina et al. (2006) studied the effects of exposure of

Dutch clover to naphthalene for 15 days and the LOEC of 100 mg/kg was reported. In the present study, a TRV of 100 mg/kg is adopted for terrestrial plants.

The TRV for terrestrial invertebrates was extracted from the CCME document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs)*" (2010). One study cited the toxicity of naphthalene to springtails. In that study, the lethal and reproduction effects of exposure to naphthalene were investigated. The TRV was extracted from the study conducted by Sverdrup et al. (2002). In that study, the EC10 of 20 mg/kg was reported on the reproduction of tested species during 21 days of exposure. The TRV for invertebrates is set to the reported EC10.

The TRV for birds was extracted from a study cited in US EPA document entitled "*Ecological Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs)*" (2007). The value is based on a study performed by Landis Associates Inc. (1985) on the toxicity of naphthalene to birds. The lethal, growth and behavioral effects of naphthalene in birds was examined using Bobwhites in a five-day study. The NOAEL was reported to be 1653 mg/kg/d.

For mammals, chronic toxicity effects of naphthalene were assessed for various endpoints such as behaviour, physiology, reproduction, growth, and survival. The reliable studies were extracted from the list of reviewed literature by US EPA to derive the TRV for low molecular weight PAH (US EPA, 2007). A total of 31 studies reported growth, reproduction and survival effects in mouse or rats. The lowest NOAEL reported (Navarro et al., 1991; Germansky and Jamall, 1988) from those studies, was adopted as a TRV for mammals.

Ecotoxicity Information for Terrestrial Organisms - 1- and 2-Methylnaphthalene

Tested Species	End-point	TRV	VEC	Applied
Lettuce	EC50 (biomass)	100 mg/kg soil	Terrestrial Plant	100 mg/kg soil
Springtail	Chronic NOAEL (reproduction)	20 mg/kg soil	Terrestrial Invertebrate	20 mg/kg soil
Bobwhite	Chronic NOAEL (growth and mortality)	1653 mg/kgbw/d	Birds	1653 mg/kg/bw/d
Rat	Sub-chronic NOAEL (weight)	50 mg/kg-bw/d	Mammals	50 mg/kg-bw/d

References

Aina, R, Palin, L, and Citterio, S. 2006. *Molecular Evidence for Benzo(a)pyrene and Naphthalene Genotoxicity in Trifolium Repens L*. Chemosphere 65(4): 666-673.

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Germansky, M., and Jamall, I.S. 1988. *Organ-Specific Effects of Naphthalene on Tissue Peroxidation, Glutathione Peroxidases and Superoxide Dismutase in the Rat*. Arch Toxicol. 61(6): 480-483.

Hulzebos, EM, Adema, DMM, Dirven-Van Breemen, EM, Henzen, L, Van Dis, WA, Herbold, HA, Hoekstra, JA, and Baerselm, R. 1993. *Phytotoxicity Studies with Lactuca Sativa in Soil and Nutrient Solution.* Environ. Toxicol. Chem. 12(6): 1079-1094.

Landis Assoc. Inc. 1985. *A Dietary LC50 Study in the Bobwhite with Naphthalene (Final Report).* EPA/OTS; Doc #86-870000551. Ref ID: 27393.

Navarro, HA, Price, CJ, Marr, MC, Myers CB, and Heindel, JJ. 1991. *Developmental Toxicity of Naphthalene (CAS No. 91-20-3) in Sprague-Dawley (CD) Rats on Gestational Days 6 Through 15*. Final Study Report and Appendix. Report (1991).

Sverdrup, LE, Nielsen, T, and Krogh, PH. 2002. *Soil Ecotoxicity of Polycyclic Aromatic Hydrocarbons in Relation to Soil Sorption, Lipophilicity, and Water Solubility.* Environ. Sci. Technol. 36: 2429-2435.

US EPA. 2007. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*. Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-78.

Pyrene

The TRV for terrestrial plants was obtained from US EPA's ECOTOX database. Of the six papers identified with potential toxicity data for terrestrial plants, two studies were selected for further assessment taking into account the screening procedure outlined in MOE rationale document (2011). Both studies were conducted using natural soil as exposure media and the effect of exposure to pyrene was assessed on growth, morphology and mortality. Sverdrup et al. (2003) investigated the effect of pyrene on the seed emergence and early life-stage growth of three terrestrial plants (Sinapsis alba, Trifolium pratense and Lolium perenne) using a Danish agricultural soil. It was estimated that exposure concentrations resulting in a 20% reduction of seedling fresh weight (EC20-values) ranged from 49 to 1300 mg/kg dw for pyrene. It was illustrated that there is rather large difference in sensitivity between the species. The minimum observed response is selected as a TRV by applying an uncertainty factor of two.

The TRV for terrestrial invertebrates was taken from CCME (2010) document entitled "*Canadian Soil Quality Guidelines Carcinogenic and Other Polyaromatic Hydrocarbons (PAHs)*". Five studies cited the toxicity of pyrene to either earthworm or springtail. The toxicity effects of pyrene on growth, reproduction and mortality were assessed. Among cited studies, Sverdrup et al. (2002) and Sverdrup et al. (2001), reported the minimum EC10 on growth (38 mg/kg soil) and reproduction (10 mg/kg soil), for the earthworm and springtail, respectively. In addition, Jensen and Sverdrup (2001) studied the chronic effect of exposure to pyrene on reproduction in springtails for 21 days and a NOEC of 15 was reported. The TRV for invertebrates is set to the minimum reported EC10.

Ecotoxicity Information for Terrestrial Organisms - Pyrene

Tested Species	Endpoint	TRV	VEC	Applied TRV
Trifolium pretense (Red clover)	EC20 (seedling weight)	49 mg/kg soil	Terrestrial Plant	25 mg/kg soil
Springtail	EC10 (reproduction)	10 mg/kg soil	Terrestrial Invertebrate	10 mg/kg soil

References

CCME (Canada Council of Ministers of the Environment). 2010. *Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects – Scientific Criteria Document (revised).*

Sverdrup, LE, Kelley, AE, Krogh, PH, Nielsen, T, Jensen, J, Scott-Fordsmand, JJ, and Stenersen J. 2001. *Effects of Eight Polycyclic Aromatic Compounds on the Survival and Reproduction of the Springtail Folsomia Fimetaria L*. (Collembola, Isotomidea). Environmental Toxicology and Chemistry 20: 1332–1338.

Sverdrup, LE, Krogh, PH, Nielsen, T, and Stenersen, J. 2002b. *Relative Sensitivity of Three Terrestrial Invertebrate Tests to Polycyclic Aromatic Compounds*. Environmental Toxicology and Chemistry 21: 1927–1933.

Sverdrup, LE, Krogh, PH, Nielsen, T, Kjaer, C, and Stenersen, J. 2003. *Toxicity of Eight Polycyclic Aromatic Compounds to Red Clover (Trifolium pratense), Ryegrass (Lolium perenne), and Mustard (Sinapsis alba).* Chemosphere 53(8): 993-1003

Appendix N: Grain Size Analyses

APPENDIX N: RATIONALE FOR SOIL TEXTURE SELECTION

Based on previous subsurface investigations completed by Trafalgar Environmental Consultants (TEC) in 2022 and EXP Services Inc. in 2022 and 2024 (EXP, 2022b and 2025a), the Site stratigraphy beneath the surficial material (asphalt and concrete) consisted of a fill unit composed of sandy silt to silt with some clay and gravel and/or clayey silt to silty clay with some sand and gravel to depths of between 0.20 m to 2.29 m below ground surface (m bgs). Native silt was encountered below the fill material at all borehole locations with the exception of BH/MW3-S. Silty clay was encountered in BH/MW3-D below the fill. Silty sand till was encountered below the silt at all borehole locations with the exception of BH/MW104, BH/MW105, BH/MW1-S, BH/MW2-S, BH/MW3S, BH/MW3D and BH108. For specific depths and materials refer to the borehole logs in Appendix H. Bedrock was encountered at a maximum depth of 15.24 m bgs. It should be noted that the stratigraphy at the Site was only derived based on the boreholes/monitoring wells installed by EXP.

Grain size analyses were performed on a total of five (5) soil samples (EXP, 2022b, and 2025a), as follows:

- Sample BH1 SS11 collected from borehole BH/MW-1D from 12.2 to 12.8 m bgs within the native silty sand till;
- Sample BH2 SS8 collected from borehole BH/MW-2D from 7.6 to 8.2 m bgs within the native silt/sandy silt;
- Sample BH3 SS5 collected from borehole BH/MW-3D from 3.0 to 3.7 m bgs within the native silty clay;
- Sample BH105A SS4C collected from borehole BH105A from 5.1 - 6.1 m bgs within the native silty sand; and,
- Sample BH110 SS3 collected from borehole BH110 from 1.5 to 2.1 m bgs within the native silt.

As per Section 42 of O. Reg. 153/04, coarse textured soil means soil that contains more than 50 percent by mass of particles that are 75 µm or larger in mean diameter and medium and fine textured soil means soil that contains 50 percent or more by mass of particles that are smaller than 75 µm in mean diameter.

Based on the observations made during previous drilling investigations and the results of the grain size analysis, as per Section 42 of O. Reg. 153/04, the QP_{ESA} has determined that less than 1/3 of the soil at the property, measured by volume, consists of coarse textured soil and hence standards for medium and fine textured soil at the Site are applicable.

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Fax: (905) 793-0641

Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 408981-1 **Report No.:** 1 **Date Reported:** 04-Nov-22

Project No.: brm-21003722-a0 b103
Project Name: 1337 Queen Street West, Toronto, Ontario

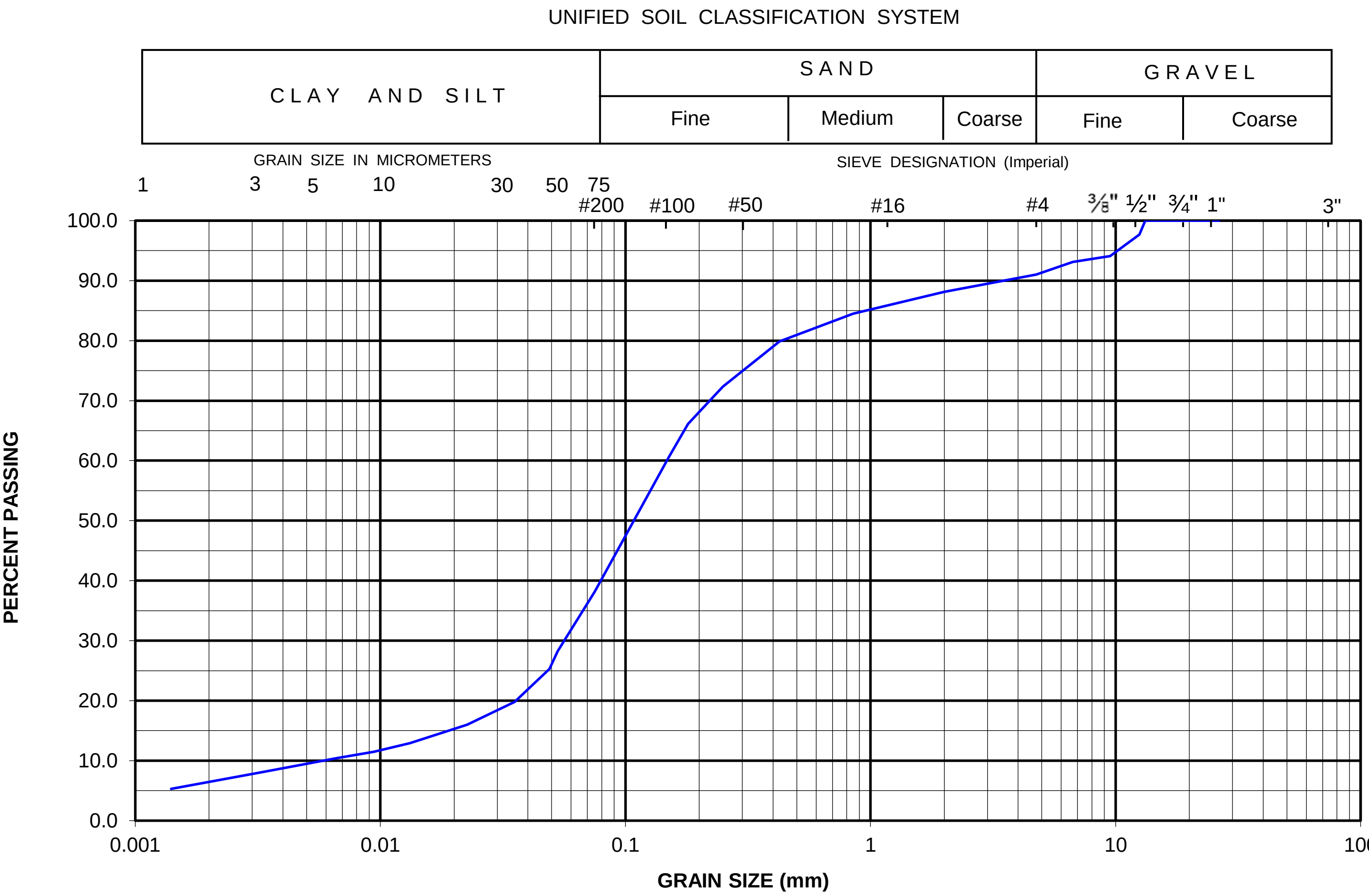
Grain Size Proportion (%)

Gravel (> 4.75mm):	**9.0**
Sand (> 75µm, < 4.75mm):	**52.8**
Silt (> 2µm), < 75µm):	**32.0**
Clay (< 2µm):	**6.2**
Total:	**100.0**

Sample Information

Location: BH 1
Sample Method: SS
Sample No.: 11
Depth: 12.2 - 12.8 m
Sample Description: Silty Sand, trace Gravel and Clay; Grey
Sampled By: exp Markham
Sampling Date: 10/28/2022
Date Received: 10/31/2022
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0490**	25.3
22.4	100.0	**0.0353**	19.8
19	100.0	**0.0226**	16.0
16	100.0	**0.0132**	12.9
13.2	100.0	**0.0094**	11.5
12.5	97.7	**0.0066**	10.4
9.5	94.1	**0.0033**	8.1
6.7	93.1	**0.0014**	5.3
4.75	91.0		
2	88.2		
0.85	84.5		
0.425	79.9		
0.25	72.4		
0.18	66.1		
0.15	60.5		
0.075	38.2		
0.053	28.3		



Project Manager: Jennifer Hayman **Approved By:** *Original Signed By* Arcadio Petrola; C.E.T. **Date Approved:** 04-Nov-22

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Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 408983-1 **Report No.:** 2 **Date Reported:** 04-Nov-22

Project No.: brm-21003722-a0 b103
Project Name: 1337 Queen Street West, Toronto, Ontario

Grain Size Proportion (%)

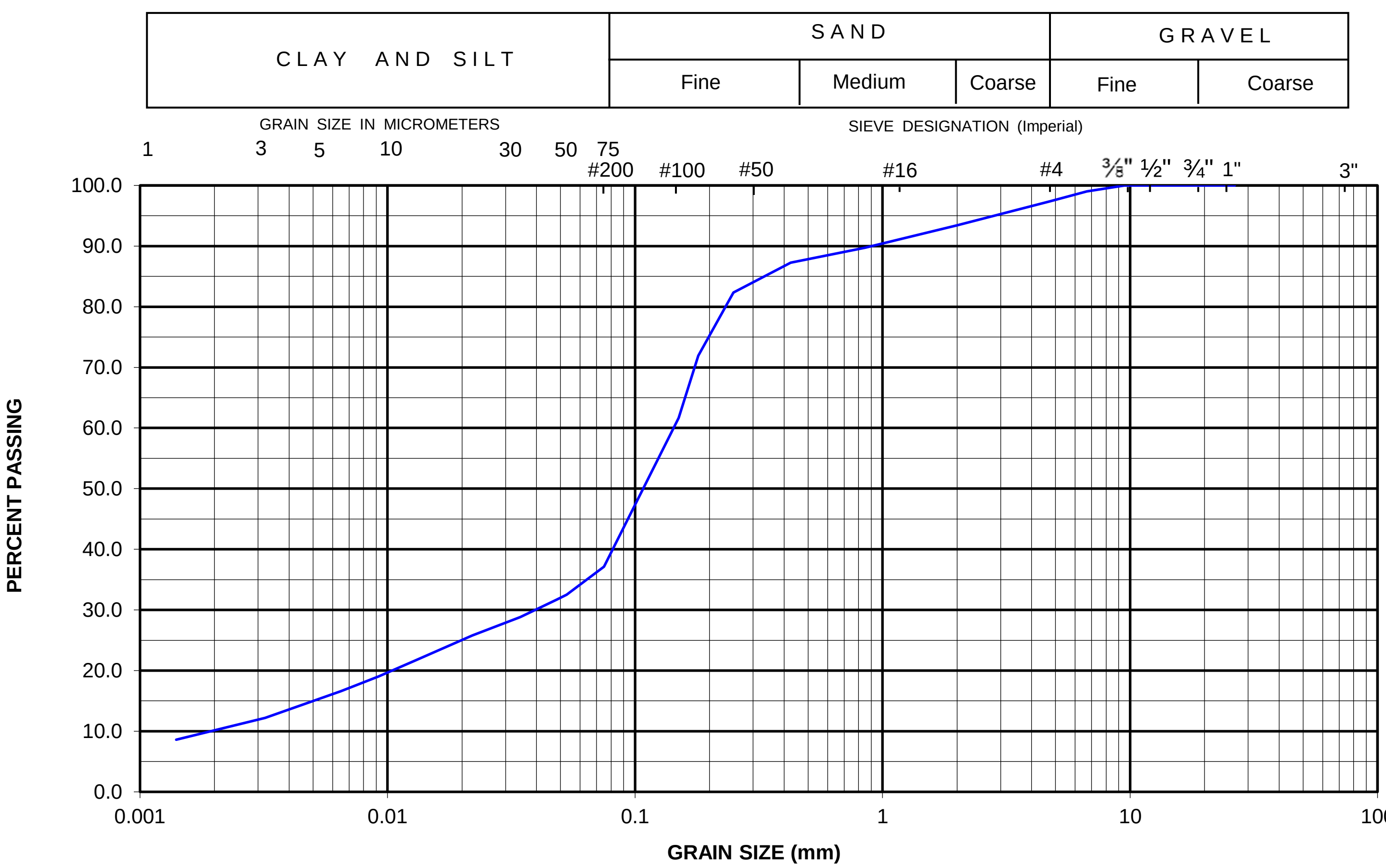
Gravel (> 4.75mm): **2.6**
Sand (> 75µm, < 4.75mm): **60.3**
Silt (> 2µm), < 75µm): **27.3**
Clay (< 2µm): **9.8**
Total: **100.0**

Sample Information

Location: BH 2
Sample Method: SS
Sample No.: 8
Depth: 7.6 - 8.2 m
Sample Description: Silty Sand, trace Clay and Gravel; Grey
Sampled By: exp Markham
Sampling Date: 10/28/2022
Date Received: 10/31/2022
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0482**	31.7
22.4	100.0	**0.0344**	28.8
19	100.0	**0.0220**	25.8
16	100.0	**0.0128**	21.6
13.2	100.0	**0.0092**	19.0
12.5	100.0	**0.0065**	16.6
9.5	100.0	**0.0032**	12.2
6.7	99.0	**0.0014**	8.6
4.75	97.4		
2	93.4		
0.85	89.7		
0.425	87.3		
0.25	82.4		
0.18	71.9		
0.15	61.7		
0.075	37.1		
0.053	32.5		

UNIFIED SOIL CLASSIFICATION SYSTEM



Project Manager: Jennifer Hayman **Approved By:** *Original Signed By* Arcadio Petrola; C.E.T. **Date Approved:** 04-Nov-22

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Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 408984-1 **Report No.:** 3 **Date Reported:** 04-Nov-22

Project No.: brm-21003722-a0 b103
Project Name: 1337 Queen Street West, Toronto, Ontario

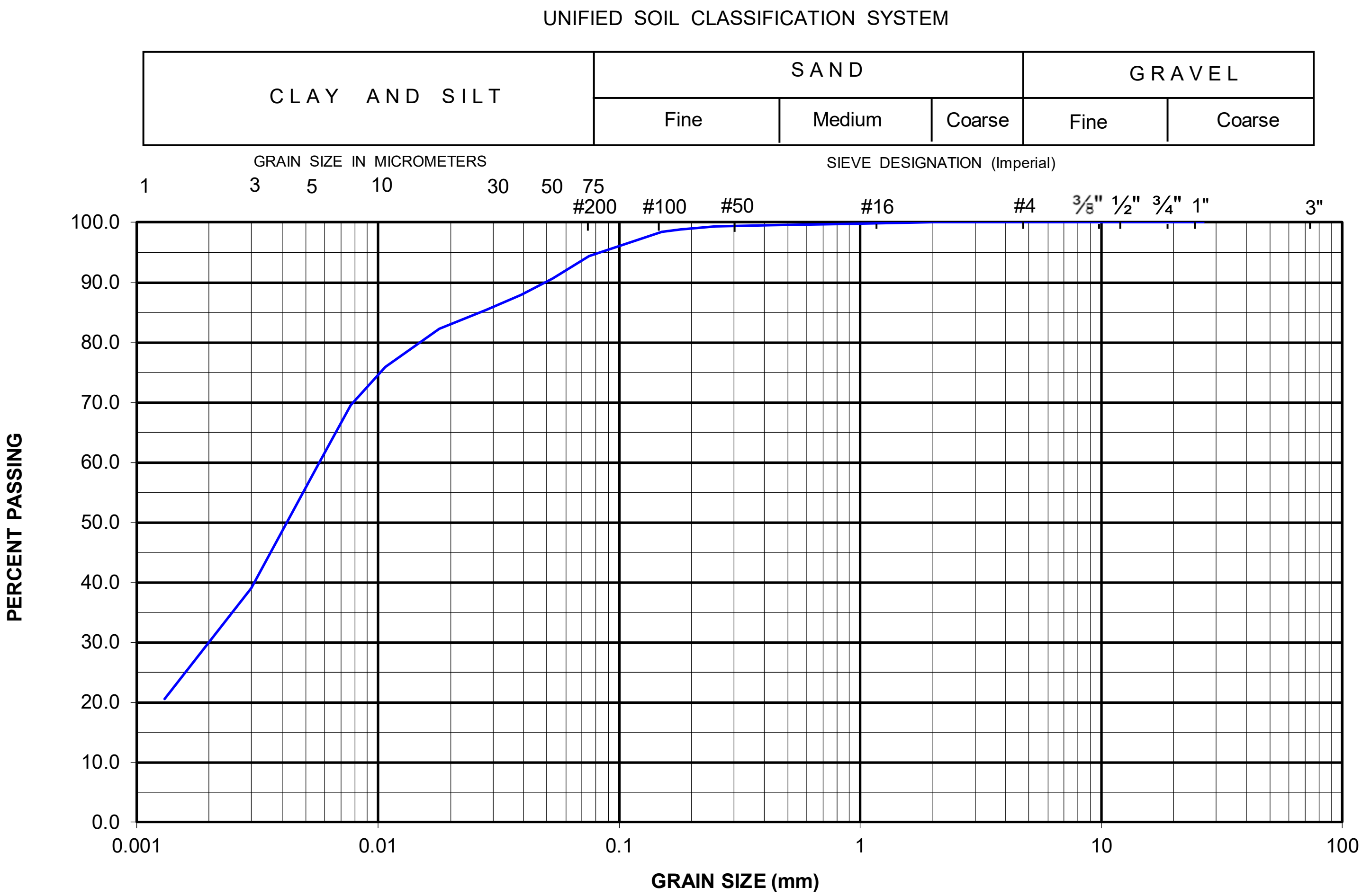
Grain Size Proportion (%)

Gravel (> 4.75mm):	
Sand (> 75µm, < 4.75mm):	**5.6**
Silt (> 2µm), < 75µm):	**66.2**
Clay (< 2µm):	**28.2**
Total:	**100.0**

Sample Information

Location: BH 3
Sample Method: SS
Sample No.: 5
Depth: 3.0 - 3.7 m
Sample Description: Clayey Silt, trace Sand; Grey
Sampled By: exp Markham
Sampling Date: 10/28/2022
Date Received: 10/31/2022
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0392**	88.0
22.4	100.0	**0.0280**	85.4
19	100.0	**0.0179**	82.3
16	100.0	**0.0107**	75.9
13.2	100.0	**0.0077**	69.6
12.5	100.0	**0.0057**	60.0
9.5	100.0	**0.0030**	39.1
6.7	100.0	**0.0013**	20.6
4.75	100.0		
2	100.0		
0.85	99.8		
0.425	99.6		
0.25	99.4		
0.18	98.9		
0.15	98.5		
0.075	94.4		
0.053	90.7		



Project Manager: Jennifer Hayman **Approved By:** *Original Signed By* Arcadio Petrola; C.E.T. **Date Approved:** 04-Nov-22

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Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 445671-3 **Report No.:** 3 **Date Reported:** 15-May-24

Project No.: gtr-21003722-c0 100
Project Name: Field Work

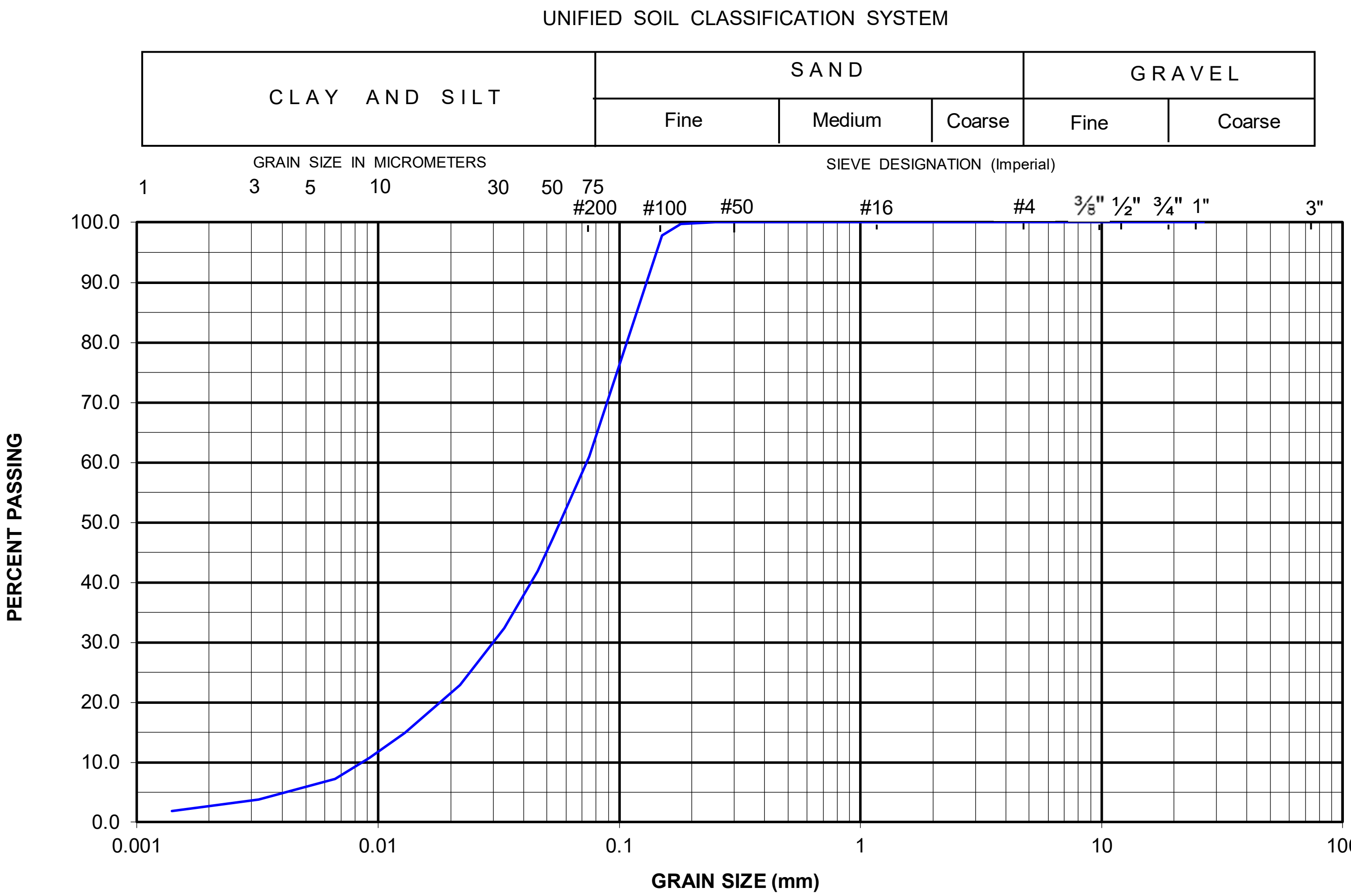
Grain Size Proportion (%)

Gravel (> 4.75mm):	
Sand (> 75µm, < 4.75mm):	39.0
Silt (> 2µm), < 75µm):	58.5
Clay (< 2µm):	2.5
Total:	100.0

Sample Information

Location: BH 110
Sample Method: SS
Sample No.: 3
Depth: 1.5 - 2.1 m
Sample Description: Silt and Sand, trace Clay; Brown
Sampled By: exp Markham
Sampling Date: 2/22/2024
Date Received: 4/30/2024
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	0.0458	41.9
22.4	100.0	0.0334	32.4
19	100.0	0.0218	22.9
16	100.0	0.0129	14.9
13.2	100.0	0.0092	10.8
12.5	100.0	0.0066	7.3
9.5	100.0	0.0032	3.8
6.7	100.0	0.0014	1.9
4.75	100.0		
2	100.0		
0.85	100.0		
0.425	100.0		
0.25	100.0		
0.18	99.8		
0.15	97.9		
0.075	61.0		
0.053	47.4		



Project Manager: Jennifer Hayman **Approved By:** *Original Signed By* **Date Approved:** 15-May-24
Arcadio Petrola, Lab Supervisor

Your Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Your C.O.C. #: 1020674-01-01

Attention: Jennifer Hayman

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Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2024/12/11
Report #: R8441030
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AW072
Received: 2024/12/04, 12:21

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	1	N/A	2024/12/10	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	2	N/A	2024/12/10		EPA 8260C m
Acid Extractable Metals by ICPMS	2	2024/12/09	2024/12/10	CAM SOP-00447	EPA 6020B m
Moisture	3	N/A	2024/12/06	CAM SOP-00445	Carter 2nd ed 70.2 m
PAH Compounds in Soil by GC/MS (SIM)	1	2024/12/09	2024/12/09	CAM SOP-00318	EPA 8270E
pH CaCl2 EXTRACT	1	2024/12/09	2024/12/09	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	1	N/A	2024/12/09	CAM SOP-00467	ASTM D1140 -17 m
Volatile Organic Compounds in Soil	2	N/A	2024/12/09	CAM SOP-00228	EPA 8260D

Remarks:

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Your Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Your C.O.C. #: 1020674-01-01

Attention: Jennifer Hayman

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CANADA L8E 5R9

Report Date: 2024/12/11
Report #: R8441030
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AW072
Received: 2024/12/04, 12:21

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
11 Dec 2024 14:44:26

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
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==
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		AKUU68			AKUU69			AKUU70		
Sampling Date		2024/12/03 12:00			2024/12/03 12:00			2024/12/03 12:00		
COC Number		1020674-01-01			1020674-01-01			1020674-01-01		
	UNITS	**BH105A SS1B**	**RDL**	**QC Batch**	**BH105A SS4C**	**RDL**	**QC Batch**	**BH105A SS6A**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	17	1.0	9810934				22	1.0	9810934
Available (CaCl2) pH	pH							7.99		9814786
Miscellaneous Parameters										
Grain Size	%				FINE	N/A	9813178			
Sieve - #200 (<0.075mm)	%				69	1	9813178			
Sieve - #200 (>0.075mm)	%				31	1	9813178			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		AKUU72		
Sampling Date		2024/12/03 12:00		
COC Number		1020674-01-01		
	UNITS	**BH105A SS0**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	15	1.0	9810934

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID			AKUU67			AKUU70		
Sampling Date			2024/12/03 12:00			2024/12/03 12:00		
COC Number			1020674-01-01			1020674-01-01		
	UNITS	**Criteria**	**BH105A SS1A**	**RDL**	**QC Batch**	**BH105A SS6A**	**RDL**	**QC Batch**
Metals								
Acid Extractable Antimony (Sb)	ug/g	7.5				<0.20	0.20	9814491
Acid Extractable Arsenic (As)	ug/g	18				<1.0	1.0	9814491
Acid Extractable Barium (Ba)	ug/g	390				7.7	0.50	9814491
Acid Extractable Beryllium (Be)	ug/g	5				<0.20	0.20	9814491
Acid Extractable Boron (B)	ug/g	120				<5.0	5.0	9814491
Acid Extractable Cadmium (Cd)	ug/g	1.2				<0.10	0.10	9814491
Acid Extractable Chromium (Cr)	ug/g	160				5.1	1.0	9814491
Acid Extractable Cobalt (Co)	ug/g	22				1.6	0.10	9814491
Acid Extractable Copper (Cu)	ug/g	180				2.0	0.50	9814491
Acid Extractable Lead (Pb)	ug/g	120				1.2	1.0	9814491
Acid Extractable Molybdenum (Mo)	ug/g	6.9				0.54	0.50	9814491
Acid Extractable Nickel (Ni)	ug/g	130				2.7	0.50	9814491
Acid Extractable Selenium (Se)	ug/g	2.4				<0.50	0.50	9814491
Acid Extractable Silver (Ag)	ug/g	25				<0.20	0.20	9814491
Acid Extractable Thallium (Tl)	ug/g	1				<0.050	0.050	9814491
Acid Extractable Uranium (U)	ug/g	23				0.19	0.050	9814491
Acid Extractable Vanadium (V)	ug/g	86				8.3	5.0	9814491
Acid Extractable Zinc (Zn)	ug/g	340				5.2	5.0	9814491
Acid Extractable Mercury (Hg)	ug/g	1.8	<0.050	0.050	9814491			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soil

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID			AKUU68		
Sampling Date			2024/12/03 12:00		
COC Number			1020674-01-01		
	UNITS	**Criteria**	**BH105A SS1B**	**RDL**	**QC Batch**
Calculated Parameters					
Methylnaphthalene, 2-(1-)	ug/g	3.4	0.075	0.0071	9807989
Polyaromatic Hydrocarbons					
Acenaphthene	ug/g	58	0.096	0.0050	9814332
Acenaphthylene	ug/g	0.17	0.056	0.0050	9814332
Anthracene	ug/g	0.74	0.22	0.0050	9814332
Benzo(a)anthracene	ug/g	0.63	**0.65**	0.0050	9814332
Benzo(a)pyrene	ug/g	0.3	**0.67**	0.0050	9814332
Benzo(b/j)fluoranthene	ug/g	0.78	0.76	0.0050	9814332
Benzo(g,h,i)perylene	ug/g	7.8	0.39	0.0050	9814332
Benzo(k)fluoranthene	ug/g	0.78	0.30	0.0050	9814332
Chrysene	ug/g	7.8	0.58	0.0050	9814332
Dibenzo(a,h)anthracene	ug/g	0.1	**0.11**	0.0050	9814332
Fluoranthene	ug/g	0.69	**1.5**	0.0050	9814332
Fluorene	ug/g	69	0.088	0.0050	9814332
Indeno(1,2,3-cd)pyrene	ug/g	0.48	0.41	0.0050	9814332
1-Methylnaphthalene	ug/g	3.4	0.038	0.0050	9814332
2-Methylnaphthalene	ug/g	3.4	0.037	0.0050	9814332
Naphthalene	ug/g	0.75	0.042	0.0050	9814332
Phenanthrene	ug/g	7.8	1.1	0.0050	9814332
Pyrene	ug/g	78	1.4	0.0050	9814332
Surrogate Recovery (%)					
D10-Anthracene	%	-	90		9814332
D14-Terphenyl (FS)	%	-	92		9814332
D8-Acenaphthylene	%	-	92		9814332

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soil

Bureau Veritas Job #: C4AW072
Report Date: 2024/12/11

exp Services Inc
Client Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Sampler Initials: GS

VOLATILE ORGANICS BY GC/MS (SOIL)

Bureau Veritas ID			AKUU70	AKUU72		
Sampling Date			2024/12/03 12:00	2024/12/03 12:00		
COC Number			1020674-01-01	1020674-01-01		
	UNITS	**Criteria**	**BH105A SS6A**	**BH105A SS0**	**RDL**	**QC Batch**
Calculated Parameters						
1,3-Dichloropropene (cis+trans)	ug/g	0.083	<0.050	<0.050	0.050	9807899
Volatile Organics						
Acetone (2-Propanone)	ug/g	28	<0.49	<0.49	0.49	9813293
Benzene	ug/g	0.17	<0.0060	<0.0060	0.0060	9813293
Bromodichloromethane	ug/g	13	<0.040	<0.040	0.040	9813293
Bromoform	ug/g	0.26	<0.040	<0.040	0.040	9813293
Bromomethane	ug/g	0.05	<0.040	<0.040	0.040	9813293
Carbon Tetrachloride	ug/g	0.12	<0.040	<0.040	0.040	9813293
Chlorobenzene	ug/g	2.7	<0.040	<0.040	0.040	9813293
Chloroform	ug/g	0.18	<0.040	<0.040	0.040	9813293
Dibromochloromethane	ug/g	9.4	<0.040	<0.040	0.040	9813293
1,2-Dichlorobenzene	ug/g	4.3	<0.040	<0.040	0.040	9813293
1,3-Dichlorobenzene	ug/g	6	<0.040	<0.040	0.040	9813293
1,4-Dichlorobenzene	ug/g	0.097	<0.040	<0.040	0.040	9813293
Dichlorodifluoromethane (FREON 12)	ug/g	25	<0.040	<0.040	0.040	9813293
1,1-Dichloroethane	ug/g	11	<0.040	<0.040	0.040	9813293
1,2-Dichloroethane	ug/g	0.05	<0.049	<0.049	0.049	9813293
1,1-Dichloroethylene	ug/g	0.05	<0.040	<0.040	0.040	9813293
cis-1,2-Dichloroethylene	ug/g	30	<0.040	<0.040	0.040	9813293
trans-1,2-Dichloroethylene	ug/g	0.75	<0.040	<0.040	0.040	9813293
1,2-Dichloropropane	ug/g	0.085	<0.040	<0.040	0.040	9813293
cis-1,3-Dichloropropene	ug/g	0.083	<0.030	<0.030	0.030	9813293
trans-1,3-Dichloropropene	ug/g	0.083	<0.040	<0.040	0.040	9813293
Ethylbenzene	ug/g	15	<0.010	<0.010	0.010	9813293
Ethylene Dibromide	ug/g	0.05	<0.040	<0.040	0.040	9813293
Hexane	ug/g	34	<0.040	<0.040	0.040	9813293
Methylene Chloride(Dichloromethane)	ug/g	0.96	<0.049	<0.049	0.049	9813293

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soil

Bureau Veritas Job #: C4AW072
Report Date: 2024/12/11

exp Services Inc
Client Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Sampler Initials: GS

VOLATILE ORGANICS BY GC/MS (SOIL)

Bureau Veritas ID			AKUU70	AKUU72		
Sampling Date			2024/12/03 12:00	2024/12/03 12:00		
COC Number			1020674-01-01	1020674-01-01		
	UNITS	**Criteria**	**BH105A SS6A**	**BH105A SS0**	**RDL**	**QC Batch**
Methyl Ethyl Ketone (2-Butanone)	ug/g	44	<0.40	<0.40	0.40	9813293
Methyl Isobutyl Ketone	ug/g	4.3	<0.40	<0.40	0.40	9813293
Methyl t-butyl ether (MTBE)	ug/g	1.4	<0.040	<0.040	0.040	9813293
Styrene	ug/g	2.2	<0.040	<0.040	0.040	9813293
1,1,1,2-Tetrachloroethane	ug/g	0.05	<0.040	<0.040	0.040	9813293
1,1,2,2-Tetrachloroethane	ug/g	0.05	<0.040	<0.040	0.040	9813293
Tetrachloroethylene	ug/g	2.3	**2.4**	2.0	0.040	9813293
Toluene	ug/g	6	<0.020	<0.020	0.020	9813293
1,1,1-Trichloroethane	ug/g	3.4	<0.040	<0.040	0.040	9813293
1,1,2-Trichloroethane	ug/g	0.05	<0.040	<0.040	0.040	9813293
Trichloroethylene	ug/g	0.52	0.011	<0.010	0.010	9813293
Trichlorofluoromethane (FREON 11)	ug/g	5.8	<0.040	<0.040	0.040	9813293
Vinyl Chloride	ug/g	0.022	<0.019	<0.019	0.019	9813293
p+m-Xylene	ug/g	-	<0.020	<0.020	0.020	9813293
o-Xylene	ug/g	-	<0.020	<0.020	0.020	9813293
Total Xylenes	ug/g	25	<0.020	<0.020	0.020	9813293
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	-	101	101		9813293
D10-o-Xylene	%	-	115	108		9813293
D4-1,2-Dichloroethane	%	-	101	101		9813293
D8-Toluene	%	-	99	99		9813293

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soil

Bureau Veritas Job #: C4AW072
Report Date: 2024/12/11

exp Services Inc
Client Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Sampler Initials: GS

TEST SUMMARY

Bureau Veritas ID: AKUU67
Sample ID: BH105A SS1A
Matrix: Soil

Collected: 2024/12/03
Shipped:
Received: 2024/12/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals by ICPMS	ICP/MS	9814491	2024/12/09	2024/12/10	Daniel Teclu

Bureau Veritas ID: AKUU68
Sample ID: BH105A SS1B
Matrix: Soil

Collected: 2024/12/03
Shipped:
Received: 2024/12/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9807989	N/A	2024/12/10	Automated Statchk
Moisture	BAL	9810934	N/A	2024/12/06	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9814332	2024/12/09	2024/12/09	Lingyun Feng

Bureau Veritas ID: AKUU69
Sample ID: BH105A SS4C
Matrix: Soil

Collected: 2024/12/03
Shipped:
Received: 2024/12/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sieve, 75um	SIEV	9813178	N/A	2024/12/09	Joe Thomas

Bureau Veritas ID: AKUU70
Sample ID: BH105A SS6A
Matrix: Soil

Collected: 2024/12/03
Shipped:
Received: 2024/12/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9807899	N/A	2024/12/10	Automated Statchk
Acid Extractable Metals by ICPMS	ICP/MS	9814491	2024/12/09	2024/12/10	Daniel Teclu
Moisture	BAL	9810934	N/A	2024/12/06	Joe Thomas
pH CaCl2 EXTRACT	AT	9814786	2024/12/09	2024/12/09	Sreena Thekkoot
Volatile Organic Compounds in Soil	GC/MS	9813293	N/A	2024/12/09	Gabriella Morrone

Bureau Veritas ID: AKUU72
Sample ID: BH105A SS0
Matrix: Soil

Collected: 2024/12/03
Shipped:
Received: 2024/12/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9807899	N/A	2024/12/10	Automated Statchk
Moisture	BAL	9810934	N/A	2024/12/06	Joe Thomas
Volatile Organic Compounds in Soil	GC/MS	9813293	N/A	2024/12/09	Gabriella Morrone

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

Results relate only to the items tested.

Bureau Veritas Job #: C4AW072
Report Date: 2024/12/11

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Sampler Initials: GS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9813293	4-Bromofluorobenzene	2024/12/09	103	60 - 140	104	60 - 140	103	%				
9813293	D10-o-Xylene	2024/12/09	118	60 - 130	99	60 - 130	103	%				
9813293	D4-1,2-Dichloroethane	2024/12/09	104	60 - 140	108	60 - 140	103	%				
9813293	D8-Toluene	2024/12/09	101	60 - 140	99	60 - 140	97	%				
9814332	D10-Anthracene	2024/12/09	87	50 - 130	93	50 - 130	98	%				
9814332	D14-Terphenyl (FS)	2024/12/09	84	50 - 130	89	50 - 130	91	%				
9814332	D8-Acenaphthylene	2024/12/09	87	50 - 130	91	50 - 130	91	%				
9810934	Moisture	2024/12/06							2.0	20		
9813178	Sieve - #200 (<0.075mm)	2024/12/09							0.12	20	55	53 - 58
9813178	Sieve - #200 (>0.075mm)	2024/12/09							0.38	20	45	42 - 47
9813293	1,1,1,2-Tetrachloroethane	2024/12/09	114	60 - 140	115	60 - 130	<0.040	ug/g	NC	50		
9813293	1,1,1-Trichloroethane	2024/12/09	114	60 - 140	111	60 - 130	<0.040	ug/g	NC	50		
9813293	1,1,2,2-Tetrachloroethane	2024/12/09	85	60 - 140	93	60 - 130	<0.040	ug/g	NC	50		
9813293	1,1,2-Trichloroethane	2024/12/09	101	60 - 140	105	60 - 130	<0.040	ug/g	NC	50		
9813293	1,1-Dichloroethane	2024/12/09	102	60 - 140	101	60 - 130	<0.040	ug/g	NC	50		
9813293	1,1-Dichloroethylene	2024/12/09	117	60 - 140	112	60 - 130	<0.040	ug/g	NC	50		
9813293	1,2-Dichlorobenzene	2024/12/09	100	60 - 140	100	60 - 130	<0.040	ug/g	NC	50		
9813293	1,2-Dichloroethane	2024/12/09	110	60 - 140	114	60 - 130	<0.049	ug/g	NC	50		
9813293	1,2-Dichloropropane	2024/12/09	100	60 - 140	102	60 - 130	<0.040	ug/g	NC	50		
9813293	1,3-Dichlorobenzene	2024/12/09	105	60 - 140	103	60 - 130	<0.040	ug/g	NC	50		
9813293	1,4-Dichlorobenzene	2024/12/09	104	60 - 140	101	60 - 130	<0.040	ug/g	NC	50		
9813293	Acetone (2-Propanone)	2024/12/09	96	60 - 140	101	60 - 140	<0.49	ug/g	NC	50		
9813293	Benzene	2024/12/09	99	60 - 140	98	60 - 130	<0.0060	ug/g	NC	50		
9813293	Bromodichloromethane	2024/12/09	99	60 - 140	104	60 - 130	<0.040	ug/g	NC	50		
9813293	Bromoform	2024/12/09	89	60 - 140	98	60 - 130	<0.040	ug/g	NC	50		
9813293	Bromomethane	2024/12/09	87	60 - 140	85	60 - 140	<0.040	ug/g	NC	50		
9813293	Carbon Tetrachloride	2024/12/09	124	60 - 140	121	60 - 130	<0.040	ug/g	NC	50		
9813293	Chlorobenzene	2024/12/09	93	60 - 140	93	60 - 130	<0.040	ug/g	NC	50		
9813293	Chloroform	2024/12/09	107	60 - 140	107	60 - 130	<0.040	ug/g	NC	50		
9813293	cis-1,2-Dichloroethylene	2024/12/09	107	60 - 140	109	60 - 130	<0.040	ug/g	NC	50		
9813293	cis-1,3-Dichloropropene	2024/12/09	95	60 - 140	102	60 - 130	<0.030	ug/g	NC	50		

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			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9813293	Dibromochloromethane	2024/12/09	96	60 - 140	102	60 - 130	<0.040	ug/g	NC	50		
9813293	Dichlorodifluoromethane (FREON 12)	2024/12/09	74	60 - 140	73	60 - 140	<0.040	ug/g	NC	50		
9813293	Ethylbenzene	2024/12/09	106	60 - 140	103	60 - 130	<0.010	ug/g	NC	50		
9813293	Ethylene Dibromide	2024/12/09	93	60 - 140	99	60 - 130	<0.040	ug/g	NC	50		
9813293	Hexane	2024/12/09	122	60 - 140	115	60 - 130	<0.040	ug/g	NC	50		
9813293	Methyl Ethyl Ketone (2-Butanone)	2024/12/09	84	60 - 140	92	60 - 140	<0.40	ug/g	NC	50		
9813293	Methyl Isobutyl Ketone	2024/12/09	90	60 - 140	102	60 - 130	<0.40	ug/g	NC	50		
9813293	Methyl t-butyl ether (MTBE)	2024/12/09	99	60 - 140	102	60 - 130	<0.040	ug/g	NC	50		
9813293	Methylene Chloride(Dichloromethane)	2024/12/09	107	60 - 140	109	60 - 130	<0.049	ug/g	NC	50		
9813293	o-Xylene	2024/12/09	110	60 - 140	108	60 - 130	<0.020	ug/g	NC	50		
9813293	p+m-Xylene	2024/12/09	102	60 - 140	100	60 - 130	<0.020	ug/g	NC	50		
9813293	Styrene	2024/12/09	95	60 - 140	96	60 - 130	<0.040	ug/g	NC	50		
9813293	Tetrachloroethylene	2024/12/09	108	60 - 140	103	60 - 130	<0.040	ug/g	NC	50		
9813293	Toluene	2024/12/09	103	60 - 140	100	60 - 130	<0.020	ug/g	NC	50		
9813293	Total Xylenes	2024/12/09					<0.020	ug/g	NC	50		
9813293	trans-1,2-Dichloroethylene	2024/12/09	112	60 - 140	111	60 - 130	<0.040	ug/g	NC	50		
9813293	trans-1,3-Dichloropropene	2024/12/09	106	60 - 140	112	60 - 130	<0.040	ug/g	NC	50		
9813293	Trichloroethylene	2024/12/09	110	60 - 140	108	60 - 130	<0.010	ug/g	NC	50		
9813293	Trichlorofluoromethane (FREON 11)	2024/12/09	116	60 - 140	111	60 - 130	<0.040	ug/g	NC	50		
9813293	Vinyl Chloride	2024/12/09	97	60 - 140	94	60 - 130	<0.019	ug/g	NC	50		
9814332	1-Methylnaphthalene	2024/12/09	90	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		
9814332	2-Methylnaphthalene	2024/12/09	92	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40		
9814332	Acenaphthene	2024/12/09	95	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
9814332	Acenaphthylene	2024/12/09	98	50 - 130	103	50 - 130	<0.0050	ug/g	NC	40		
9814332	Anthracene	2024/12/09	88	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40		
9814332	Benzo(a)anthracene	2024/12/09	79	50 - 130	83	50 - 130	<0.0050	ug/g	NC	40		
9814332	Benzo(a)pyrene	2024/12/09	83	50 - 130	85	50 - 130	<0.0050	ug/g	NC	40		
9814332	Benzo(b/j)fluoranthene	2024/12/09	83	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
9814332	Benzo(g,h,i)perylene	2024/12/09	88	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
9814332	Benzo(k)fluoranthene	2024/12/09	87	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40		
9814332	Chrysene	2024/12/09	75	50 - 130	77	50 - 130	<0.0050	ug/g	11	40		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9814332	Dibenzo(a,h)anthracene	2024/12/09	93	50 - 130	79	50 - 130	<0.0050	ug/g	NC	40		
9814332	Fluoranthene	2024/12/09	89	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
9814332	Fluorene	2024/12/09	94	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
9814332	Indeno(1,2,3-cd)pyrene	2024/12/09	90	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		
9814332	Naphthalene	2024/12/09	87	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40		
9814332	Phenanthrene	2024/12/09	85	50 - 130	90	50 - 130	<0.0050	ug/g	3.4	40		
9814332	Pyrene	2024/12/09	90	50 - 130	98	50 - 130	<0.0050	ug/g	1.2	40		
9814491	Acid Extractable Antimony (Sb)	2024/12/10	117	75 - 125	117	80 - 120	<0.20	ug/g	NC	30		
9814491	Acid Extractable Arsenic (As)	2024/12/10	102	75 - 125	102	80 - 120	<1.0	ug/g	9.1	30		
9814491	Acid Extractable Barium (Ba)	2024/12/10	100	75 - 125	100	80 - 120	<0.50	ug/g	2.5	30		
9814491	Acid Extractable Beryllium (Be)	2024/12/10	101	75 - 125	97	80 - 120	<0.20	ug/g	NC	30		
9814491	Acid Extractable Boron (B)	2024/12/10	92	75 - 125	92	80 - 120	<5.0	ug/g	NC	30		
9814491	Acid Extractable Cadmium (Cd)	2024/12/10	101	75 - 125	100	80 - 120	<0.10	ug/g	NC	30		
9814491	Acid Extractable Chromium (Cr)	2024/12/10	100	75 - 125	102	80 - 120	<1.0	ug/g	13	30		
9814491	Acid Extractable Cobalt (Co)	2024/12/10	103	75 - 125	103	80 - 120	<0.10	ug/g	7.0	30		
9814491	Acid Extractable Copper (Cu)	2024/12/10	101	75 - 125	103	80 - 120	<0.50	ug/g	9.4	30		
9814491	Acid Extractable Lead (Pb)	2024/12/10	103	75 - 125	104	80 - 120	<1.0	ug/g	9.8	30		
9814491	Acid Extractable Mercury (Hg)	2024/12/10	106	75 - 125	107	80 - 120	<0.050	ug/g	NC	30		
9814491	Acid Extractable Molybdenum (Mo)	2024/12/10	103	75 - 125	100	80 - 120	<0.50	ug/g	NC	30		
9814491	Acid Extractable Nickel (Ni)	2024/12/10	103	75 - 125	104	80 - 120	<0.50	ug/g	12	30		
9814491	Acid Extractable Selenium (Se)	2024/12/10	104	75 - 125	104	80 - 120	<0.50	ug/g	NC	30		
9814491	Acid Extractable Silver (Ag)	2024/12/10	102	75 - 125	100	80 - 120	<0.20	ug/g	NC	30		
9814491	Acid Extractable Thallium (Tl)	2024/12/10	104	75 - 125	102	80 - 120	<0.050	ug/g	NC	30		
9814491	Acid Extractable Uranium (U)	2024/12/10	108	75 - 125	105	80 - 120	<0.050	ug/g	0.11	30		
9814491	Acid Extractable Vanadium (V)	2024/12/10	93	75 - 125	104	80 - 120	<5.0	ug/g	28	30		
9814491	Acid Extractable Zinc (Zn)	2024/12/10	100	75 - 125	106	80 - 120	<5.0	ug/g	6.8	30		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9814786	Available (CaCl2) pH	2024/12/09			100	97 - 103			0.76	N/A		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

C4AW072
2024/12/04 12:21

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

C

NONT-2024-12-499

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#17488 exp Services Inc	Company Name:		Quotation #:	C20328
Attention:	Accounts Payable	Attention:	[redacted] Jennifer Hayman	P.O. #:	
Address:	1595 Clark Blvd	Address:		Project:	[redacted] GTR-21003722-[illegible] C1
	Brampton ON L6T 4V1			Project Name:	1337 Queen st W, TOR, ON
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	Fax:	Site #:	
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	[redacted]om Jennifer.Hayman@exp.com Gabriel.spizzirri@exp.com	Sampled By:	Gabriel spizzirri

Bottle Order #: 1020674

COC #: C#1020674-01-01

Project Manager: Patricia Legette

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- [ ] Table 1
- [x] Res/Park
- [ ] Medium/Fine
- [ ] Table 2
- [ ] Ind/Comm
- [ ] Coarse
- [ ] Table 3
- [ ] Agri/Other
- [x] For RSC
- [x] Table ___

Other Regulations
- [ ] CCME
- [ ] Sanitary Sewer Bylaw
- [ ] Reg 558.
- [ ] Storm Sewer Bylaw
- [ ] MISA
- Municipality ______
- [ ] PWQO
- [ ] Reg 406 Table ______
- [ ] Other ______

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? Y

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: [x]
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ______ Time Required: ______
Rush Confirmation Number: ______ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	~~O.Reg 153 VOCs by HS (water)~~	ICPMS metals	VOCs	pH	Grain size	PAHs	Hg (mercury)				# of Bottles	Comments
1		BH105A SS1A	24/12/03	12:00pm	~~GW~~ S								X				1	
2		BH105A SS1B	↓	↓	GW							X					2	
3		BH105A SS4C	↓	↓	GW						X						1	
4		BH105A SS6A	↓	↓	GW			X	X	X							5	
5		BH105A SS6B	↓	↓	GW				X								3	HOLD
6		BH105A SSØ	↓	↓	GW ↓				X								3	
7					GW													
8					GW													
9					GW													
10					GW													

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Gabriel spizzirri G.S.	24/12/03	4:30pm	[signature]	2024/12/04	12:21	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	2/0/1	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

ONUL

Bureau Veritas Job #: C4AW072
Report Date: 2024/12/11

exp Services Inc
Client Project #: GTR-21003722-C1
Site Location: 1337 QUEEN ST W, TORONTO, ON
Sampler Initials: GS

Exceedance Summary Table – Reg153/04 T3-Soil/Res-F/M

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH105A SS1B	AKUU68-01	Benzo(a)anthracene	0.63	0.65	0.0050	ug/g
BH105A SS1B	AKUU68-01	Benzo(a)pyrene	0.3	0.67	0.0050	ug/g
BH105A SS1B	AKUU68-01	Dibenzo(a,h)anthracene	0.1	0.11	0.0050	ug/g
BH105A SS1B	AKUU68-01	Fluoranthene	0.69	1.5	0.0050	ug/g
BH105A SS6A	AKUU70-04	Tetrachloroethylene	2.3	2.4	0.040	ug/g

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Appendix O: Indoor Air Quality Sampling Program Report

February 12, 2025

CreateTO
61 Front Street West Union Station, East Wing, 3rd Floor
Toronto, ON M5J 1E5

Re: GTR-21003722-C1 Indoor Air Quality Sampling Program (Winter 2025)
1337 Queen Street West, Toronto, ON

EXP Services Inc. (EXP) is pleased to present CreateTO (the 'Client') with this indoor air quality (IAQ) report for the on-going commercial use property located at 1337 Queen Street West, Toronto, Ontario (hereinafter referred to as the 'Site' or 'subject building'). This report outlines the methods and results associated with the completion of the IAQ assessment within the subject building on January 27th, 2025. It is understood that the current work program is used to assess the indoor air quality to support the continued commercial occupancy of the existing Site building. It is EXP's understanding that CreateTO intends to re-develop the Site on the behalf of the City of Toronto (the 'Owner') for residential land use, which will require a Record of Site Condition (RSC) to be filed under Ontario Regulation (O. Reg.) 153/04. This IAQ report is intended to support the on-going risk assessment (RA) being completed to support redevelopment of the Site.

1 Introduction and Background

The Site is located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an approximate area of 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 square metres (m^2) in area. The Site is bound by Queen Street West to the north, a commercial building to the west, a parking lot followed by community buildings to the east, and residential land use to the south. The Site was first developed in the early 1890s for residential purposes. It was then developed with a rectangular shaped commercial building in approximately 1910 for commercial/industrial purposes. In 1966, the Site was redeveloped for commercial use (a bank, a grocery store, and subsequently; a retail store). The Site building is located on the eastern portion of the Site with asphalt paved parking spaces to the west and south. Additionally, sea cans used for storage purposes are located on the south exterior portion of the Site.

Based on correspondence with the Client, it is EXP's understanding that the existing commercial building is expected to be occupied until redevelopment activities begin after the RSC is filed. EXP understands that an RSC is required to support the re-development. As such, the environmental work will be conducted in accordance with O.Reg. 153/04 to support the RA.

Based on the results of the ongoing Tier III RA (EXP, 2025), a potential for unacceptable risks via the inhalation of indoor air associated with select contaminants of concern (COCs) in soil and groundwater was identified, specifically for, petroleum hydrocarbons (PHC) fraction F1 (including total, aromatic and aliphatic subfractions), 1,1,-dichloroethylene (1,1,-DCE), cis-1,2-dichloroethylene (cis-1,2,-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE), tetrachloroethylene (PCE), trichloroethylene (TCE), and vinyl chloride.

The objective of the IAQ sampling program conducted at the Site is to quantify the potential of vapour intrusion for the identified COCs in ambient indoor air at the subject building, to support continued commercial land use until such a time as redevelopment occurs to the proposed future residential land use.

1595 Clark Boulevard | Brampton, ON, L6T 4V1 | Brampton
t: 905.793.9800 | f: 905.793.0641 | exp.com

It is additionally noted that vapour intrusion is highly site-specific since advection or diffusion of vapours is affected by changing source conditions, building conditions, diurnal and seasonal fluctuations, atmospheric conditions, and proximity of contaminants.

2 Scope of Work

The following scope of work was conducted:

a) A Site visit on January 27th, 2025, to conduct IAQ sampling:

   i. Collection (and subsequent submission to an accredited laboratory) of indoor air samples over an 8-hour period using a total of six (6) Summa canisters for analysis of 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, vinyl chloride, PHC F1 (total), PHC F1 (aliphatic C6-C8), PHC F1 (aliphatic C>8-C10), PHC F1 (aromatic C>8-C10) by United States Environmental Protection Agency (US EPA) method TO-15A:

      - Three (3) IAQ sampling locations and one (1) field duplicate within the subject building;
      - One (1) outdoor air reference sample; and,
      - One (1) trip blank sample for quality assurance/quality control (QA/QC) purposes.

   ii. Collation and assessment of data based on appropriate criteria MECP (2016) Modified Generic Risk Assessment (MGRA) Health-Based Indoor Air Criteria (HBIAC) protective of commercial land use.

b) Provision of a final report detailing all results, interpretation, and conclusions (this report).

At the time of the January 2025 sampling event, a Photo-Ionization Device (PID) was used across the Site building during sample setup to get an initial baseline reading on ambient Total Volatile Organic Compound (TVOC) concentrations across the structure, and the potential presence of hotspot locations. PID readings, Site observations and other pertinent information was relied upon as supporting rationale for the final selection of IAQ sampling locations used in the current IAQ investigation.

A copy of Site photographs documenting conditions at the time of sample collection are included as Appendix D, for reference purposes.

3 Site Description

The Site is municipally addressed as 1337 Queen Street West and is located on the south side of Queen Street West, east of the intersection of Queen Street West and O'Hara Avenue. The Site has an area of approximately 0.20 hectares (0.49 acres) and contains one (1) commercial use building that is currently occupied by a Dollarama. The approximate Site location is depicted in Figure 1 of Appendix A. The Site is bound by Queen Street West to the north, a municipal parking lot to the east, a multi-tenant residential use property to the south, and commercial land use to the west. The Site is in an urban area of mixed-commercial and residential land use. At the time of the Site visit, EXP understood the Site building was under normal operational conditions and was occupied for commercial land use as a retail store. The current tenant of the Site building is Dollarama, various household goods and food items were present within the store at the time of the Site visit.

4 Method

4.1 Indoor Air Sampling Method

Indoor air samples were collected over an 8-hour period starting from approximately 9:30 AM to 5:30 PM on January 27th, 2025, using 6-liter capacity evacuated Summa™ canisters prepared and certified by the contractual laboratory. Sampling was conducted based on US EPA method TO-15A. The canisters were equipped with laboratory calibrated mass flow controllers adjusted for an 8-hour sampling period. Each canister and flow controller were assigned a unique sample identification number and placed approximately 1.5 – 1.8 m above the floor level, such that the intake ports of the IAQ samples are approximately equivalent to the height of respirable air Site occupants would be exposed to.

Canister pressures were measured prior to and upon completion of the sampling period, using laboratory supplied pressure gauges to ensure that sufficient sample volumes had been collected for chemical analysis. Canister pressures were also measured by the laboratory prior to analysis as a quality assurance measure to check for potential cannister leakage during handling and transport. Furthermore, canister pressures were routinely monitored throughout the sampling period using the pressure gauges attached to the flow controllers to ensure sample collection was progressing as desired. Cannister pressures are presented in Table B.1 in Appendix B.

For the IAQ assessment on January 27th, 2025, a total of five (5) samples were collected from the Site and within the subject building. IAQ-1 was collected from the north-central portion of the Site building within proximity to the cashier's front desk. IAQ-2 was collected from the central portion of the Site building within a merchandise aisleway hosting seasonal decor items. IAQ-3 and the field duplicate, IAQ-33, were collected from the southcentral portion of the Site within the storeroom. A partition wall separates the storeroom from the main store where merchandise is sold. An outdoor air background sample (OA-1) was collected during the assessment from within the southern portion of the parking lot at the rear of the Site building. The approximate locations of the indoor and outdoor air samples are shown on Figure 2 in Appendix A.

The canisters were submitted under Chain of Custody protocol to Bureau Veritas Laboratories Canada (BV Labs) for analysis of the identified COCs. The laboratory Certificate of Analysis (CoA) with the chain of custody is provided in Appendix C.

BV Labs is accredited under the Standards Council of Canada (SCC) and/or Canadian Association for Laboratory Accreditation (CALA) for specified tests. The air quality samples were analyzed by BV Labs using US EPA method TO-15A following method-specific QA/QC protocols.

4.2 Screening for Total Volatile Organic Compounds

Field screening of the indoor air space for total organic vapours was performed using a ppbRAE 3000 PID, equipped with a 10.6 eV detector within the on-Site buildings. The instrument does not identify specific VOCs but is capable of detecting the presence of a wide range of VOCs.

5 Results and Assessment

5.1 Atmospheric Conditions

Atmospheric conditions including temperature, barometric pressure, relative humidity, wind speed, and wind direction were based on measurements provided by the Environment and Climate Change Canada, meteorological station located at Toronto City Centre, located in Toronto, Ontario.

During the sampling period on January 27th, 2025, the outdoor air temperature ranged from -2.4 °C to 2.0 °C; relative humidity ranged from 42% to 62%; barometric pressure ranged from 98.91 to 99.98 kPa; and windspeed ranged from 41 to 58 km/h from the north-northeast. The weather was generally described as partly cloudy during the sampling event starting at approximately 9:30 am on January 27th, 2025.

5.2 Site Visual Review

At the time of the January 2025 IAQ sampling event, the Site was under normal operational conditions and was the Site building was occupied by Dollarama. Retail merchandise is stored and sold within the Site building. The Site building included retail space within the majority of the Site building, with storage space and office space at the southern portion of the Site building. The Site building is heated and cooled using one (1) roof-top natural gas fired HVAC unit. Additional heating is provided to the storage area on the southern portion of the Site building through the use of suspended natural gas forced-air units and electric radiant units. At the time of the Site visit, the heating, ventilation and air conditioning (HVAC) system of the Site building was under normal operational conditions. Where feasible, the foundational slab and exterior paved portions of the Site was visually assessed for significant signs of cracking, pitting, weathering and repair marks. At the time of the Site visit, the majority of the foundational slab was covered with flooring materials (i.e., tile flooring). Chemical storage was present within the Site building but was limited to general household cleaning products and well-sealed containers of general repair and maintenance products. All chemical storage containers were well sealed and in good condition, no visual observations of leakage, staining or odours were observed where chemicals were stored on-Site. A Site photolog documenting the key aspects of the Site visit is provided as Appendix D.

5.3 Screening for Total Organic Vapours

TVOC concentrations throughout the Site building measured between 41 to 109 parts per billion (ppb) as isobutylene during the sampling period on January 27th, 2025. As background reference, the level of total organic vapours taken outdoors measured between 31 to 56 ppb, as isobutylene. Field screening of the indoor air spaces indicated low TVOC concentrations throughout the subject building and did not identify any “hot spots”, points of potential vapour intrusion, or significant occupant activities that may contribute to elevated TVOC concentrations. It is noted that based upon visual review of the Site merchandise, large quantities of plastic materials are sold at the store. Plastics may off-gas volatile constituents into ambient air within the store; however, evidence of this occurring was not identified with the PID during the Site visit.

5.4 Assessment of Air Quality Control Data

Sample identification and quality control data are summarized in Table 1.

Table 1 – Sample Identification and Quality Control Data

Location ID	Location Description	Canister Serial #	Controller Serial #	Pressure (before sampling / end of sampling / on receipt at lab) (Hg)*
Indoor Air Quality Sampling Date: January 27th, 2025				
IAQ-1	Northern Portion of Building – Cashiers Desk	SX1852	FX1852	(-27.5) / (-6.25 / (-6.5)
IAQ-2	Central Portion of Building – Seasonal Décor Aisleway	SX0099	FX0017	(-27.75) / (-6.0) / (-6.9)
IAQ-3	South-Central Portion of Site – Storage Room	SX2222	FX0133	(-27.5) / (-7.5) / (-6.9)
IAQ-33 (Duplicate)	Field Duplicate of IAQ-3	SX2434	FX0174	(-27.0) / (-6.75) / (-6.3)

Location ID	Location Description	Canister Serial #	Controller Serial #	Pressure (before sampling / end of sampling / on receipt at lab) (Hg)*
OA-1 (Outdoor Air)	Parking Lot – Southeast of Building Line	SX1819	FX1148	(-27.5) / (-6.5) / (-6.9)
Trip Blank	n.a.	SX1568	n.a.	(n.a.) / (n.a.) / (-28.9)

n.a. = not applicable
*Differences in sample pressures recorded after sampling and on receipt at laboratory may be attributed to accuracy and precision of pressure gauges and difference in temperature and atmospheric pressure between the Site and contractual laboratory.

5.5 Assessment of Analytical Results Criteria

The Summa Cannister pressure measurements are presented in Table B.1 of Appendix B and the analytical results for air samples collected on January 27th, 2025, are presented in Table B.2 of Appendix B. Figure 2 of Appendix A shows the locations of sample collection and a copy of the CoA from BV Labs is provided in Appendix C.

The IAQ sample results were compared against the MECP MGRA Version 2 – November 2016 HBIAC, protective of industrial/commercial/community occupancy and a non-potable groundwater condition. HBIAC values were calculated using the March 2024 Human Health Toxicity Reference Values (TRVs) Selected for Use at Contaminated Sites in Ontario, as recommended by the MECP.

All IAQ sample concentrations of COCs were below the applicable HBIAC. Concentrations of all investigated parameters in the reference outdoor air sample, OA-1, were below the laboratory RDL or were present at measured concentrations below applicable HBIAC. It is noted that only PHC F1 was detected at a measured concentration, above the laboratory RDL, but below the applicable HBIAC within OA-1, suggesting external air quality was also influencing indoor air conditions within the subject building. In addition, the concentrations of all analyzed parameters in the Trip Blank sample were below the laboratory RDL, indicating that no cross contamination occurred during sampling shipping and transport. All laboratory RDLs were below the applicable criteria of assessment.

6 Quality Assurance/Quality Control

6.1 Adequacy of the Indoor Air Sampling Program

The sampling event on January 27th, 2025, was conducted in the peak winter season and included one (1) outdoor air sample and one (1) field duplicate sample. Air sampling was conducted under existing normal building conditions and during regular peak occupancy hours (i.e., 8-hour sampling period). Heating and ventilation systems were observed to be operational and based on conversations with the Site representative it was confirmed that sampling conditions were in accordance with normal building operational conditions at the property.

The sampling period was eight (8) hours in duration, as per MECP recommendations for an industrial/commercial/community scenario (Draft Technical Guidance: Soil Vapour Intrusion Assessment, January 4, 2021 (Chapter 6: Indoor Air Quality Testing for Vapour Intrusion Assessment) (PIBS No. 8477)). Vacuum pressures within each Summa canister were closely monitored during the sampling period to ensure that adequate vacuum remained for laboratory analysis, as recommended by BV Labs. No issues with the sampling period or sampling flow rate were identified during the course of the IAQ sampling event. As such, no data qualifications are required.

6.2 Field – General

During the sampling event, quality assurance measures that were taken included assigning unique sample numbers, measurement of canister pressure levels, transport of an unopened Trip Blank sample, and Chain of Custody documentation when submitting samples to the laboratory.

Measured pressures at end of sampling and on receipt of samples at the laboratory indicate sample integrity was maintained during sample transport and storage. Differences in sample pressures recorded after sampling and on receipt at laboratory may be attributed to accuracy and precision of pressure gauges and difference in temperature between the Site and laboratory.

6.3 Laboratory – General

The subcontract laboratory used during this investigation, BV Labs, is accredited by the SCC, through its Program for Accreditation of Laboratories (PALCAN), New Jersey's Department of Environmental Protection (NELAP) and is recognised by the US EPA. Air sample analyses are performed in accordance with US EPA method TO-15A.

The laboratory quality assurance report indicates that reference material and method blank recoveries were within method percentage QC limits for the sampling event. Relative percent differences (RPD) for the field duplicate and original sample were not able to be calculated due to parameter concentrations being either non-detect or less than 5x the RDL, as shown in Table B.3 in Appendix B. All measured concentrations in Trip Blank samples were below the laboratory RDL.

It is noted that the concentrations of PHC F1 (total) between IAQ-3 and the associated field duplicate IAQ-33 differed marginally; however, an RPD was not able to be calculated due to concentrations being less than 5 x the RDL. All other parameters included in the program were below the method detection limit (MDL), precluding assessment of an RPD. Thus, data qualifications are not required.

The analytical results of the sample/ field duplicate pair of IAQ-3 and IAQ-33 are considered acceptable, as differences in analyte concentrations between IAQ-3 and IAQ-33 may be the result of the combined variability in laboratory supplied sampling equipment, such as flow regulator calibrations which may differ slightly between individual units, and/or laboratory variability at the time of sample analysis. As such, no data qualifications are required as part of this work program.

7 Findings

- Between approximately 9:00 AM and 5:00 PM on January 27th, 2025, a total of six (6) IAQ samples were collected from the Site. The sampling program was conducted during the peak winter season, during regular occupancy hours. No potential "hot-spots" or sources of interference were documented during the initial Site visit and sample setup.
- IAQ-1 was collected from the north-central portion of the Site building, within proximity to the cashier's front desk. IAQ-2 was collected from the central portion of the Site building within a merchandise aisleway hosting seasonal decor items. IAQ-3 and the field duplicate, IAQ-33, were collected from the southcentral portion of the Site, within the storeroom. A partition wall separates the storeroom from the main store where merchandise is sold. An outdoor air background sample (OA-1) was collected during the assessment from within the southern portion of the parking lot, at the rear of the Site building. A Trip Blank Sample was submitted alongside all IAQ samples as a QA/QC measure to evaluate the potential for cross contamination to have occurred during shipping, handling and transport to the contractual laboratory.
- Based on the results, all contaminants of concern were within the applicable MECP (2016) HBIAC, protective of the current commercial land use.
- Notably, the outdoor air reference sample was identified to have concentrations of all tested parameters below the laboratory RDL, with the exception of PHC F1 (total). This result suggests that exterior sources of PHC F1 (total) may be influencing interior air conditions within Site building. All parameters were identified to be below their respective analytical

detection limits within the Trip Blank sample, and all RDLs were identified to be below the applicable HBIAC. Based on field and laboratory quality control measures, the results are deemed acceptable, and no data qualifications are required.

8 Conclusions and Recommendations

Based on the results of the IAQ program, all contaminants of concern were within the applicable MECP (2016) HBIAC, protective of the current commercial land use. Concentrations of all COCs in the reference outdoor air sample (OA-1) were below the laboratory RDL, with the exception of PHC F1 (total) which was detected at similar concentrations to those observed in samples collected from within the Site building, suggesting external sources may be influencing air conditions within the subject building. The concentrations of all analyzed parameters in the Trip Blank sample were below the laboratory RDL indicating cross-contamination did not occur during sample handling and transport. All laboratory RDLs were below the applicable criteria of assessment.

In order to confirm the results of this sampling event and to evaluate the potential effects of seasonal and temporal variability on indoor air conditions, EXP recommends the completion of a spring sampling event.

9 References

- EXP Services Inc. (2025). Risk Assessment, 1337 Queen Street West, Toronto, Ontario. *In Progress*.
- MECP (2016) Modified Generic Risk Assessment Approved Model. Ontario Ministry of the Environment, Conservation and Parks. Updated November 1, 2016. Available online at: https://www.ontario.ca/page/brownfields-redevelopment.
- MECP (2021) Technical Guidance for Soil Vapour Intrusion Assessment, Technical Assessment and Standards Development Branch of the Ontario Ministry of Environment, Conservation and Parks, Toronto, ON, Canada.
- MECP (2024) Human Health Toxicity Reference Values (TRVs), Human Toxicology and Air Standards Section, Technical Assessment & Standards Development Branch, March 2024.

10 General Limitations

Information in this report is considered to be privileged and confidential and have been prepared exclusively for **CreateTO**. The purpose of this report is to provide **CreateTO** with an assessment of the indoor air quality at the subject property. The information presented in this report is based on visual observations and the data collected as identified herein. Achieving the objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Air quality conditions at various times may differ from those encountered. In addition, any changes to operations such as the introduction of new processes and/or alterations to air-handling equipment may render the conclusions of this report inaccurate or invalid. In the event of any such changes, EXP should be contacted to re-evaluate the conditions within the tested areas and make appropriate revisions to the original conclusions of this report.

This report was prepared for the exclusive use of **CreateTO** and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

11 Closure

We trust the aforementioned meets your immediate requirements. If you have any questions or concerns, please do not hesitate to contact the undersigned.

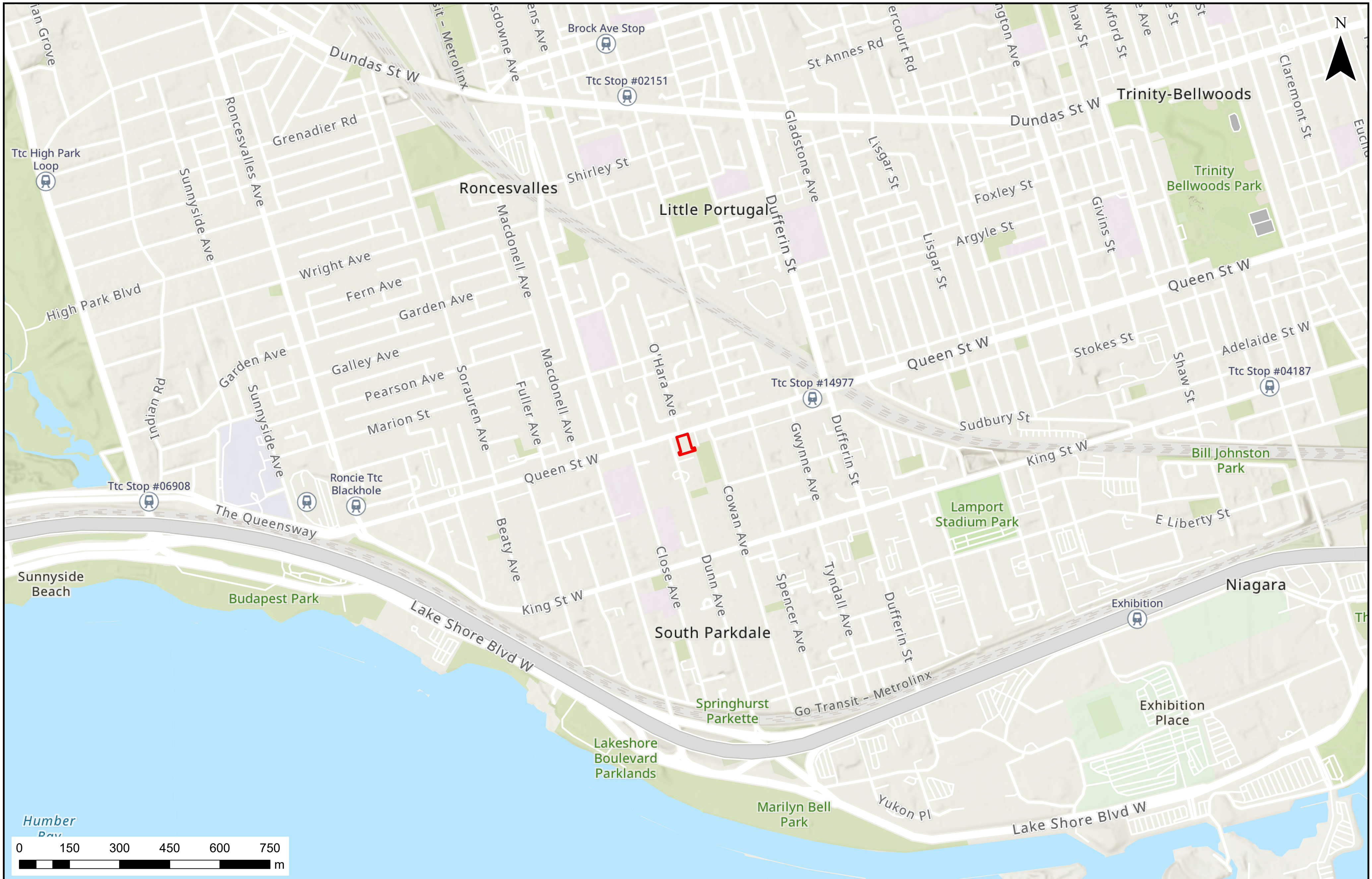
Yours truly,

EXP Services Inc.

Samuel Patterson, M.E.S.
Risk Assessment Specialist / Project Manager
Environmental Services

Shane Ward, QP_{RA}
Senior Risk Assessment Specialist
Environmental Services

Appendix A – Figures



EXP Services Inc.

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LEGEND:

APPROXIMATE SITE BOUNDARY

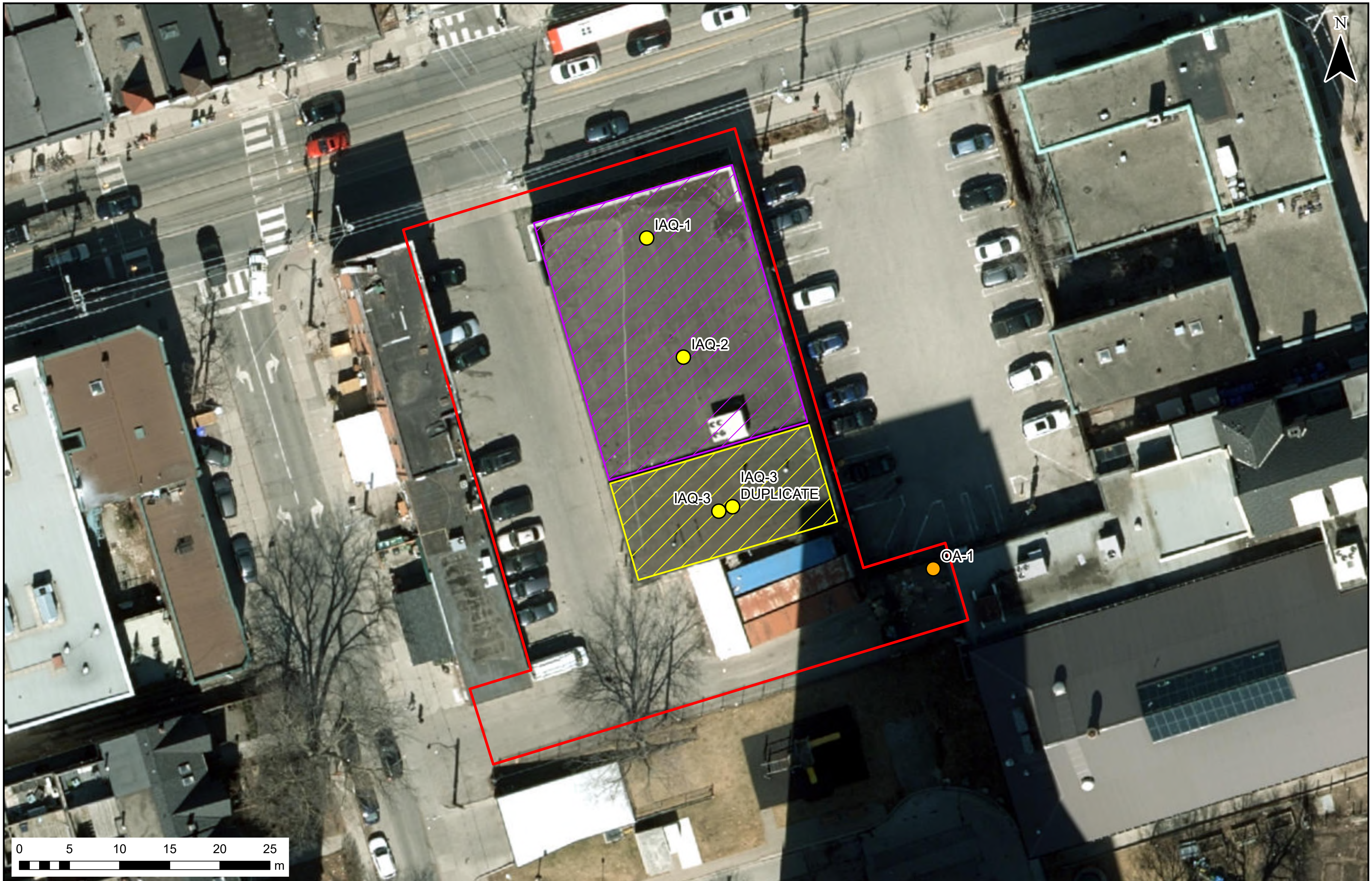
TITLE AND LOCATION:

SITE LOCATION PLAN

INDOOR AIR QUALITY SAMPLING PROGRAM
(WINTER 2025)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.: GTR-21003722-C1	DWN: MS
SCALE: AS NOTED	CHKD: SP
DATE: FEBRUARY 2025	FIG. NO.: 1

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Envi\GIS\IAQ\IAQ.aprx



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t: +1.905.695.3217 | f: +1.905.695.0169
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LEGEND:

- INDOOR AIR QUALITY SAMPLE
- OUTDOOR AIR QUALITY SAMPLE
- STORE AREA
- STORAGE AND OFFICE AREA (PARTIAL SECOND STOREY)
- APPROXIMATE SITE BOUNDARY

TITLE AND LOCATION:

IAQ SAMPLING LOCATION PLAN

INDOOR AIR QUALITY SAMPLING PROGRAM
(WINTER 2025)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN:
GTR-21003722-C1	MS
SCALE: AS NOTED	CHKD: SP
DATE: FEBRUARY 2025	FIG. NO.: 2

\\exp\data\BRM\GTR-21003722-B0\60 Execution\65 Drawings_Envi\GIS\IAQ\IAQ.aprx

Appendix B – Analytical Result Tables

Table B.1 - IAQ Canister Pressures

Sample ID	IAQ-1			IAQ-2			IAQ-3			IAQ-33			OA-1			Trip Blank		
Sampling Date	27-Jan-25			27-Jan-25			27-Jan-25			27-Jan-25			27-Jan-25			27-Jan-25		
Laboratory ID	ANOS40			ANOS41			ANOS42			ANOS43			ANOS45			ANOS44		
Canister Number	SX1852			SX0099			SX2222			SX2434			SX1819			SX1568		
Measurement	Start	Stop	Lab	Start	Stop	Lab	Start	Stop	Lab	Start	Stop	Lab	Start	Stop	Lab	Start	Stop	Lab
Pressure (psig)	-13.5	-3.1	-3.2	-13.6	-2.9	-3.4	-13.5	-3.7	-3.4	-13.3	-3.3	-3.1	-13.5	-3.2	-3.4	N/ap	N/ap	-14.2
Pressure (in Hg)	-27.5	-6.3	-6.5	-27.75	-6.0	-6.9	-27.5	-7.5	-6.9	-27.0	-6.75	-6.3	-27.5	-6.5	-6.9	N/ap	N/ap	-28.9

Table B.2 - Indoor Air Analytical Results

Sample Location	MECP (2016) Health Based Indoor Air Criteria (Commercial)(1)	IAQ-1	IAQ-2	IAQ-3	IAQ-33	OA-1	Trip Blank
Sampling Date		27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25
Laboratory ID		ANOS40	ANOS41	ANOS42	ANOS43	ANOS45	ANOS44
Canister Number		SX1852	SX0099	SX2222	SX2434	SX1819	SX1568
1,1-Dichloroethylene	143	<0.198	<0.198	<0.198	<0.198	<0.198	<0.198
Cis-1,2-Dichloroethylene	42.9	<0.198	<0.198	<0.198	<0.198	<0.198	<0.198
Trans-1,2-Dichloroethylene	42.9	<0.396	<0.396	<0.396	<0.396	<0.396	<0.396
Tetrachloroethylene	13.8	<0.339	<0.339	<0.339	<0.339	<0.339	<0.339
Trichlorethylene	0.872	<0.269	<0.269	<0.269	<0.269	<0.269	<0.269
Vinyl Chloride	0.426	<0.0511	<0.0511	<0.0511	<0.0511	<0.0511	<0.0511
PHC F1 (Total)	1,128	29	37.6	21.7	24.6	19	<5.0
PHC F1 (Aliphatic C6-C8)	1,073	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
PHC F1 (Aliphatic C>8-C10)	1,788	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
PHC F1 (Aromatic C>8-C10)	358	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Note(s):

(1) Ministry of the Environment, Conservation and Parks (MECP) "Modified Generic Risk Assessment Tier 2 Approved Model" (November 1, 2016) Health Based Indoor Air Criteria (HBIAC) for Industial land use (Non-Potable Groundwater Condition) in consideration of updated toxicity reference values selected by MECP (March, 2024).

Bold Concentration exceeds the 2016 MECP HIBAC forcommercial land use.

Analyses performed by Bureau Veritas Laboratories

All soil vapour concentrations reported in $\mu g/m^3$

Table B.3 - Relative Percent Difference (RPD)

Sample Location	IAQ-3	IAQ-33		
Sampling Date	27-Jan-25	27-Jan-25		
Laboratory ID	ANOS42	ANOS43		
Canister Number	SX2222	SX2434	RDL	RPD
1,1-Dichloroethylene	<0.198	<0.198	0.198	nc
Cis-1,2-Dichloroethylene	<0.198	<0.198	0.198	nc
Trans-1,2-Dichloroethylene	<0.396	<0.396	0.396	nc
Tetrachloroethylene	<0.339	<0.339	0.339	nc
Trichlorethylene	<0.269	<0.269	0.269	nc
Vinyl Chloride	<0.0511	<0.0511	0.051	nc
PHC F1 (Total)	21.70	24.6	5.0	nc
PHC F1 (Aliphatic C6-C8)	<5.0	<5.0	5.0	nc
PHC F1 (Aliphatic C>8-C10)	<5.0	<5.0	5.0	nc
PHC F1 (Aromatic C>8-C10)	<5.0	<5.0	5.0	nc

Note(s):

Analyses performed by Bureau Veritas Laboratories

All soil vapour concentrations reported in $\mu g/m^3$

"nc" = not calculated

Appendix C – Laboratory Certificates of Analyses

BUREAU VERITAS

6740 Campobello Rd
Mississauga Ontario, L5N 2L8
www.bvlabs.com

28-Jan-25 12:07
Cristina (Maria) Bacchus
C509247
CIV AIR-001

n of Custody Form - Summa™ Canister

CAM FCD-01302 /5

57299

Page 1 of 1

INVOICE INFORMATION			
Company Name:	EXP Services Inc.	Company Name:	EXP
Contact Name:	Accounts Payable Samuel Patterson	Project Manager:	Samuel Patterson
Address:	1595 Clark Blvd Brampton Ont.	Address:	
E-mail:	AP@exp.com	E-mail:	Samuel.patterson@exp.com
Ph:		Ph:	Shane.Ward@exp.com
Sampled by:	NB		

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A)	BTEX/Aromatic/Aliphatic Hydrocarbon Fractions	BTEX/F1 (C6-C10) and F2 (C10-C16)	1,1-DCE ~~Selected VOC's - please specify~~	~~Other~~ Cis-1,2-DCE, Trans-1,2-DCE, PCE, TCE, VC	PHC F1 (Total), PHC F1 (Aliphatic C6-C8)	PHC F1 ~~Ap~~ (Aliphatic C>8-C10)	PHC F1 (Aromatic C>8-C10)	CANISTERS NOT USED
IAQ 1	SX1852	FX1163	Jan 27/25	-27.5	-6.25		X						X	X	X	X	X	
IAQ 2	SX0099	FX0017		-27.75	-6.0		X											
IAQ 3	SX2222	FX0133		-27.5	-7.5		X											
IAQ 33	SX2434	FX0174		-27.0	-6.75		X											
Trip Blank	SX1568																	
OA-1	SX1819	FX1148		-27.5	-6.5		X											

TAT Requirement

- STD 10 Business day ☐
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Bureau Veritas

PROJECT INFORMATION

Project #: GTR-21003722-C1-(200
Name: BRM ENV
PO #: Stream 3
Bureau Veritas Quote #:
Bureau Veritas Contact: Cristina Bacchus
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes

1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

Client Signature: NBey
Date/Time: Jan 28/25 10:00 am

Received by: Sol SUGAN SALVAN
Date/Time: 2025/01/28 12:07

PLEASE RETURN ALL UNUSED EQUIPMENT

COC-1003 (06/21)

Your P.O. #: STREAM 3
Your Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your C.O.C. #: 57299

Attention: Samuel Patterson

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2025/02/10
Report #: R8485072
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C509247
Received: 2025/01/28, 12:07

Sample Matrix: Air
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	6	N/A	2025/01/30	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	6	N/A	2025/01/30	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	6	N/A	2025/01/29	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air by GC/MS/SIM (1)	6	N/A	2025/01/29	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas for a period of 5 calendar days from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your P.O. #: STREAM 3
Your Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your C.O.C. #: 57299

Attention: Samuel Patterson

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2025/02/10
Report #: R8485072
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C509247
Received: 2025/01/28, 12:07

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Cristina (Maria) Bacchus, Project Manager
Email: maria.bacchus@bureauveritas.com
Phone# (905)817-5763
==
This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

RESULTS OF ANALYSES OF AIR

Bureau Veritas ID		ANOS40	ANOS41	ANOS42	ANOS43	ANOS44	ANOS45	
Sampling Date		2025/01/27	2025/01/27	2025/01/27	2025/01/27	2025/01/27	2025/01/27	
COC Number		57299	57299	57299	57299	57299	57299	
	UNITS	**IAQ 1/SX1852**	**IAQ 2/SX0099**	**IAQ 3/SX2222**	**IAQ 33/SX2434**	**TRIP BLANK/SX1568**	**OA-1/SX1819**	**QC Batch**
Pressure on Receipt	psig	(-3.2)	(-3.4)	(-3.4)	(-3.1)	(-14.2)	(-3.4)	9867463
QC Batch = Quality Control Batch								

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Bureau Veritas ID		ANOS40	ANOS41	ANOS42	ANOS43	ANOS44		
Sampling Date		2025/01/27	2025/01/27	2025/01/27	2025/01/27	2025/01/27		
COC Number		57299	57299	57299	57299	57299		
	UNITS	**IAQ 1/SX1852**	**IAQ 2/SX0099**	**IAQ 3/SX2222**	**IAQ 33/SX2434**	**TRIP BLANK/SX1568**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	29.0	37.6	21.7	24.6	<5.0	5.0	9868391
Aliphatic >C6-C8	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9868392
Aliphatic >C8-C10	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9868392
Aromatic >C8-C10	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9868392

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		ANOS45		
Sampling Date		2025/01/27		
COC Number		57299		
	UNITS	**OA-1/SX1819**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	19.0	5.0	9868391
Aliphatic >C6-C8	ug/m3	<5.0	5.0	9868392
Aliphatic >C8-C10	ug/m3	<5.0	5.0	9868392
Aromatic >C8-C10	ug/m3	<5.0	5.0	9868392

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		ANOS40			ANOS40				
Sampling Date		2025/01/27			2025/01/27				
COC Number		57299			57299				
	UNITS	**IAQ 1/SX1852**	**ug/m3**	**DL (ug/m3)**	**IAQ 1/SX1852 Lab-Dup**	**RDL**	**ug/m3**	**DL (ug/m3)**	**QC Batch**
Vinyl Chloride	ppbv	<0.020	<0.0511	0.0511	<0.020	0.020	<0.0511	0.0511	9867461
1,1-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
cis-1,2-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	9867461
Trichloroethylene	ppbv	<0.050	<0.269	0.269	<0.050	0.050	<0.269	0.269	9867461
Tetrachloroethylene	ppbv	<0.050	<0.339	0.339	<0.050	0.050	<0.339	0.339	9867461
Surrogate Recovery (%)									
Bromochloromethane	%	92	N/A	N/A	93		N/A	N/A	9867461
D5-Chlorobenzene	%	89	N/A	N/A	90		N/A	N/A	9867461
Difluorobenzene	%	86	N/A	N/A	88		N/A	N/A	9867461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas ID		ANOS41			ANOS42				
Sampling Date		2025/01/27			2025/01/27				
COC Number		57299			57299				
	UNITS	**IAQ 2/SX0099**	**ug/m3**	**DL (ug/m3)**	**IAQ 3/SX2222**	**RDL**	**ug/m3**	**DL (ug/m3)**	**QC Batch**
Vinyl Chloride	ppbv	<0.020	<0.0511	0.0511	<0.020	0.020	<0.0511	0.0511	9867461
1,1-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
cis-1,2-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	9867461
Trichloroethylene	ppbv	<0.050	<0.269	0.269	<0.050	0.050	<0.269	0.269	9867461
Tetrachloroethylene	ppbv	<0.050	<0.339	0.339	<0.050	0.050	<0.339	0.339	9867461
Surrogate Recovery (%)									
Bromochloromethane	%	94	N/A	N/A	94		N/A	N/A	9867461
D5-Chlorobenzene	%	91	N/A	N/A	89		N/A	N/A	9867461
Difluorobenzene	%	88	N/A	N/A	88		N/A	N/A	9867461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		ANOS43			ANOS44				
Sampling Date		2025/01/27			2025/01/27				
COC Number		57299			57299				
	UNITS	**IAQ 33/SX2434**	**ug/m3**	**DL (ug/m3)**	**TRIP BLANK/SX1568**	**RDL**	**ug/m3**	**DL (ug/m3)**	**QC Batch**
Vinyl Chloride	ppbv	<0.020	<0.0511	0.0511	<0.020	0.020	<0.0511	0.0511	9867461
1,1-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
cis-1,2-Dichloroethylene	ppbv	<0.050	<0.198	0.198	<0.050	0.050	<0.198	0.198	9867461
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	9867461
Trichloroethylene	ppbv	<0.050	<0.269	0.269	<0.050	0.050	<0.269	0.269	9867461
Tetrachloroethylene	ppbv	<0.050	<0.339	0.339	<0.050	0.050	<0.339	0.339	9867461
Surrogate Recovery (%)									
Bromochloromethane	%	95	N/A	N/A	107		N/A	N/A	9867461
D5-Chlorobenzene	%	88	N/A	N/A	84		N/A	N/A	9867461
Difluorobenzene	%	87	N/A	N/A	97		N/A	N/A	9867461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		ANOS45				
Sampling Date		2025/01/27				
COC Number		57299				
	UNITS	**OA-1/SX1819**	**RDL**	**ug/m3**	**DL (ug/m3)**	**QC Batch**
Vinyl Chloride	ppbv	<0.020	0.020	<0.0511	0.0511	9867461
1,1-Dichloroethylene	ppbv	<0.050	0.050	<0.198	0.198	9867461
cis-1,2-Dichloroethylene	ppbv	<0.050	0.050	<0.198	0.198	9867461
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	9867461
Trichloroethylene	ppbv	<0.050	0.050	<0.269	0.269	9867461
Tetrachloroethylene	ppbv	<0.050	0.050	<0.339	0.339	9867461
Surrogate Recovery (%)						
Bromochloromethane	%	96		N/A	N/A	9867461
D5-Chlorobenzene	%	89		N/A	N/A	9867461
Difluorobenzene	%	87		N/A	N/A	9867461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

GENERAL COMMENTS

Results relate only to the items tested.

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Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9867461	ANE	Spiked Blank	Bromochloromethane	2025/01/29		104	%	60 - 140
			D5-Chlorobenzene	2025/01/29		106	%	60 - 140
			Difluorobenzene	2025/01/29		106	%	60 - 140
			Vinyl Chloride	2025/01/29		97	%	70 - 130
			1,1-Dichloroethylene	2025/01/29		97	%	70 - 130
			cis-1,2-Dichloroethylene	2025/01/29		99	%	70 - 130
			trans-1,2-Dichloroethylene	2025/01/29		95	%	70 - 130
			Trichloroethylene	2025/01/29		99	%	70 - 130
			Tetrachloroethylene	2025/01/29		101	%	70 - 130
9867461	ANE	Method Blank	Bromochloromethane	2025/01/29		107	%	60 - 140
			D5-Chlorobenzene	2025/01/29		81	%	60 - 140
			Difluorobenzene	2025/01/29		97	%	60 - 140
			Vinyl Chloride	2025/01/29	<0.020		ppbv	
			1,1-Dichloroethylene	2025/01/29	<0.050		ppbv	
			cis-1,2-Dichloroethylene	2025/01/29	<0.050		ppbv	
			trans-1,2-Dichloroethylene	2025/01/29	<0.10		ppbv	
			Trichloroethylene	2025/01/29	<0.050		ppbv	
			Tetrachloroethylene	2025/01/29	<0.050		ppbv	
9867461	ANE	RPD [ANOS40-01]	Vinyl Chloride	2025/01/29	NC		%	25
			1,1-Dichloroethylene	2025/01/29	NC		%	25
			cis-1,2-Dichloroethylene	2025/01/29	NC		%	25
			trans-1,2-Dichloroethylene	2025/01/29	NC		%	25
			Trichloroethylene	2025/01/29	NC		%	25
			Tetrachloroethylene	2025/01/29	NC		%	25
9868391	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2025/01/30	<5.0		ug/m3	
9868392	DM2	Method Blank	Aliphatic >C6-C8	2025/01/30	<5.0		ug/m3	
			Aliphatic >C8-C10	2025/01/30	<5.0		ug/m3	
			Aromatic >C8-C10	2025/01/30	<5.0		ug/m3	
9868392	DM2	RPD	Aliphatic >C6-C8	2025/01/30	15		%	25
			Aliphatic >C8-C10	2025/01/30	NC		%	25
			Aromatic >C8-C10	2025/01/30	NC		%	25

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas Job #: C509247
Report Date: 2025/02/10

exp Services Inc
Client Project #: GTR-21003722-C1-C200
Site Location: BRM ENV
Your P.O. #: STREAM 3
Sampler Initials: NB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Melanie Mabini, Team Leader

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Appendix D – Site Photolog

Photo 1: Exterior of Site building located at 1337 Queen Street West (Source: Google Maps, 2025).

Photo 2: IAQ-1 collected from the northern portion of the Site building within vicinity of the front desk.

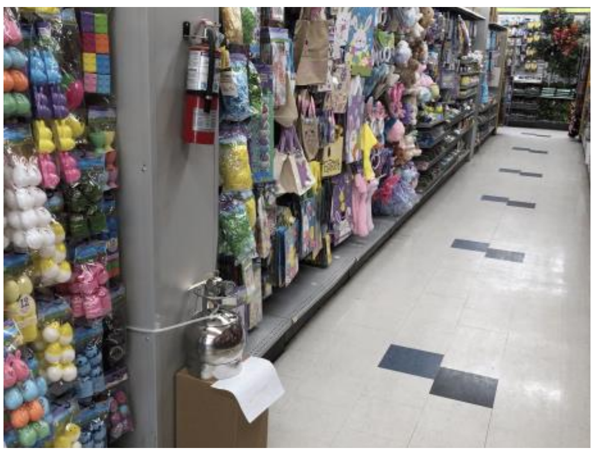

Photo 3: IAQ-2 collected from the central portion of the Site building, facing south.

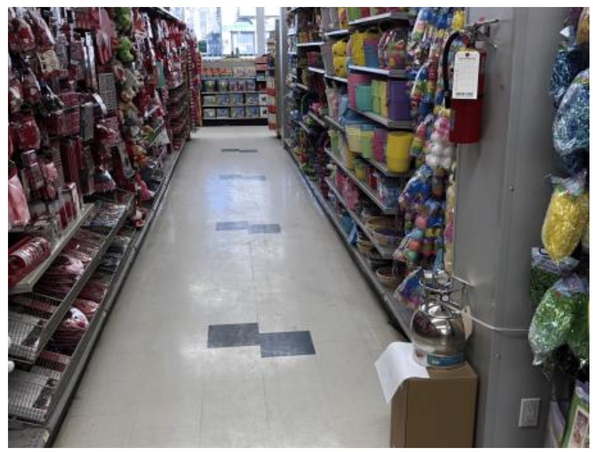

Photo 4: IAQ-2 collected from the central portion of the Site building, facing north.

Photo 5: Alternative view of IAQ-1 collected from the northern portion of the Site building within vicinity of the front desk.

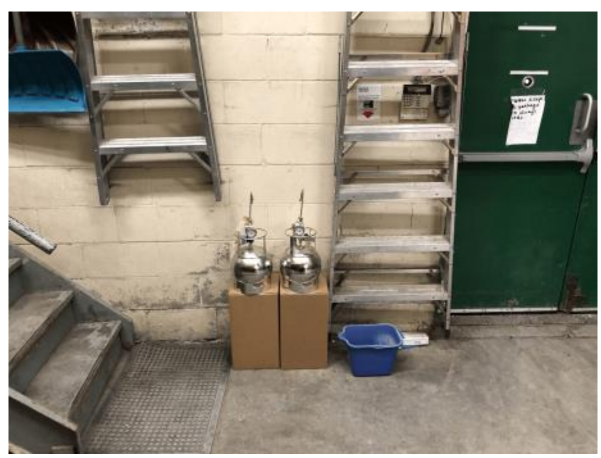

Photo 6: IAQ-3 and the field duplicate IAQ-33, collected from the southern portion of the Site building in the storage room.

exp.
EXP Services Inc.
1595 Clark Boulevard
Brampton, ON
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SITE PHOTOGRAPHS	Indoor Air Quality Sampling Program 1337 Queen Street West, Toronto, ON	SCALE: NTS	Photo Log
		DRAWN: SP	D-1
PROJ. NO: GTR-21003722-C1		CHECKED: SW	FEB 2025

Appendix P: Risk Management Plan

Appendix P: Risk Management Plan

The following risk management measures (RMM) are recommended for the risk assessment (RA) property, comprising the contiguous properties municipally addressed as 1337 Queen Street West in Toronto, Ontario

The designs, recommendations and specifications included in this Appendix are not intended to be building/structural designs or specifications for use during construction but are schematics provided for the purpose of depicting risk management measures deemed appropriate for addressing environmental issues at the RA property, as outlined in the RA and to be later included in structural designs prepared, signed and stamped by a Professional Engineer with expertise in structural design and/or plans (e.g., Soil Management Plan) prepared, signed and stamped by an appropriately qualified person. Likewise, all information provided in this Appendix is intended for the purpose of mitigating risks arising from exposure of human and/or ecological receptors on-site to the environmental contaminants identified in the RA report and is not intended for any other use. The signature and stamp of the environmental engineer thus enclosed represents approval for the suitability of the proposed measures only, and for the sole purpose of mitigating risks per the RA report.

The RA property is located on the south side of Queen Street West, south of the intersection of Queen Street West and O'Hara Avenue. The Site is irregularly shaped and has an area of approximately 0.20 hectares (0.49 acres). The Site contains one (1) commercial building that is currently occupied by a Dollarama. The Site building occupies a footprint of approximately 788 square metres (m^2) in area. The proposed redevelopment consists of a sixteen (16) storey residential condominium building with a one-level basement. The basement level and ground floor are proposed to be occupied by community space.

The results of the RA indicate that unacceptable risks may be associated with certain receptors, both human and ecological, as a result of exposure to contaminants of concern (COCs) in soil and groundwater as summarized in Table P-1. Therefore, a risk management plan (RMP) is required, describing RMMs to be noted on a Certificate of Property Use (CPU) for the property.

Table P-1: Summary of Unacceptable Risks to Human and Ecological Health

Receptor	Pathway with Risk	Media	Contaminant of Concern
Site Resident (also surrogate for Site visitor)	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, total carcinogenic polycyclic aromatic hydrocarbons (PAHs), and lead
	Indoor Air Inhalation – Residential Building with Basement	Soil	Tetrachloroethylene (PCE) and naphthalene
		Groundwater	cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE), PCE, trichloroethylene (TCE), vinyl chloride VC, and petroleum hydrocarbon fraction F1 (PHC F1)
	Ingestion of Garden Produce	Soil	Benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and lead
Long-term Indoor Worker	Indoor Air Inhalation – Future Commercial Slab-on-grade Building	Soil	PCE
		Groundwater	cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC
Outdoor Maintenance Worker	Direct Contact (dermal contact, incidental ingestion and soil particulate inhalation*)	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and total carcinogenic PAHs
Construction/ Subsurface Utility Workers	Direct Contact	Groundwater	PCE and VC
Plants and Soil Invertebrates	Direct Contact	Soil	Anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 1- and 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, PCE, and lead
Mammals and Birds	Direct Contact	Soil	Benz(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene,

Receptor	Pathway with Risk	Media	Contaminant of Concern
			dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, PCE, and lead

* No unacceptable risks were predicted for soil particulate inhalation.

P-1 Risk Management Performance Objectives

Risk reduction can be achieved by addressing any component of the exposure pathway by a) removing or treating the source, b) interrupting contaminant transport mechanisms, or c) controlling activities at the point of exposure. The RMP outlines the RMMs that may be implemented, where applicable and once the intended land use, on-site activities and/or construction plans for the property are finalized, to achieve risk reduction.

The COCs and pathways which require RMM, the proposed RMM and their performance objectives are summarized in Table P-2. The required reduction in exposure concentration to achieve acceptable target levels (HQ less than or equal to 0.2 (0.5 for PHCs or TCE [for inhalation pathways only] or 0.8 for adult exposure to lead) for human health), or 1 for ecological health and/or a cancer risk level to less than or equal to 1E-06) is provided in Tables P-3 and P-4 for soil and groundwater COCs, respectively. Details of the RMM are discussed in Section P-2.

Table P-2: Summary of RMM Performance Objectives

Proposed RMM	Pathway Mitigated	Affected Receptors	Performance Objectives
Vapour Mitigation System for Future Buildings	Indoor Air Inhalation (sourced from soil and groundwater)	Site residents, Site visitors, and long-term indoor workers	Reduction of COC concentrations in indoor air to within target levels.
Soil Barrier	Direct contact with soil	Site Resident, Site visitors, outdoor maintenance workers, terrestrial plants and soil invertebrates, mammals and birds	100% blockage of direct contact pathways through implementation of a physical barrier.
Prohibition of planting of fruit and vegetables for consumption	Garden produce ingestion	All human receptors	100% blockage of the garden produce ingestion pathway.
Health and Safety Plan (HASP)	Direct Contact with Groundwater	Construction/subsurface utility Workers	100% blockage of direct contact pathways by use of personal protective equipment (PPE).
Soil and Groundwater Management Plan (SGMP)	Direct Contact with Soil	All receptors	100% blockage of direct contact pathways by soil and groundwater management and administrative restrictions and exposure during earthworks.
Site Restriction (i.e., Maintenance of Existing Building Operating Conditions and Restriction on Building Footprint Changes)	Indoor Air Inhalation – Existing Building (sourced from soil and groundwater)	Site Visitors, Indoor Workers	Maintenance of existing building operating conditions.
Groundwater Boundary Control Measure	Direct and Indirect Contact with Groundwater	All off-Site receptors	Reduction in exposure to within acceptable levels.

Table P-3: Summary of Required Exposure Concentration Reduction Levels for Soil COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Direct Contact (Site resident and Site visitor)	Anthracene	98	0.74	57	57	41.8%
	Benz(a)anthracene	89	0.63	5.7	5.7	93.6%
	Benzo(a)pyrene	86	0.3	0.57	0.57	99.3%
	Benzo(b)fluoranthene	87	0.78	5.7	5.7	93.4%
	Benzo(k)fluoranthene	33	0.78	5.7	5.7	82.7%
	Chrysene	79	7.8	57	57	27.8%
	Dibenz(a,h)anthracene	11	0.1	0.57	0.57	94.8%
	Fluoranthene	220	0.69	57	57	74.1%
	Indeno(1,2,3-cd)pyrene	46	0.48	5.7	5.7	87.6%
	Lead	516	120	18	120	76.7%
Direct Contact (Outdoor maintenance worker)	Anthracene	98	0.74	70	70	28.6%
	Benz(a)anthracene	89	0.63	7	7	92.1%
	Benzo(a)pyrene	86	0.3	0.7	0.7	99.2%
	Benzo(b)fluoranthene	87	0.78	7	7	92.0%
	Benzo(k)fluoranthene	33	0.78	7	7	78.8%
	Chrysene	79	7.8	70	70	11.4%
	Dibenz(a,h)anthracene	11	0.1	0.7	0.7	93.6%
	Fluoranthene	220	0.69	70	70	68.2%
	Indeno(1,2,3-cd)pyrene	46	0.48	7	7	84.8%
Indoor Air Inhalation (Residential Building with Basement - Site resident and Site visitor)	PCE	20	2.3	0.034	2.3	88.5%
	Naphthalene	38	0.75	4.52	4.52	88.1%

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Minimum RBC[1]	Target Concentration[2]	Percent Concentration Reduction[3]
Indoor Air Inhalation (Future Commercial Slab-on-Grade Building - Long-term indoor worker and Site visitor)	PCE	20	2.3	0.399	2.3	88.5%
Plants and Soil Invertebrates	Anthracene	98	0.74	3.1	3.1	96.8%
	Benz(a)anthracene	89	0.63	0.63	0.63	99.3%
	Benzo(a)pyrene	86	0.3	25	25	70.9%
	Benzo(b)fluoranthene	87	0.78	1.2	1.2	98.6%
	Benzo(ghi)perylene	45	7.8	8.3	8.3	81.6%
	Benzo(k)fluoranthene	33	0.78	9.5	9.5	71.2%
	Chrysene	79	7.8	8.8	8.8	88.9%
	Fluoranthene	220	0.69	63	63	71.4%
	Indeno(1,2,3-cd)pyrene	46	0.48	0.48	0.48	99.0%
	1- and 2-Methylnaphthalene	23	3.4	20	20	13.0%
	Naphthalene	38	0.75	0.75	0.75	98.0%
	Phenanthrene	289	7.8	7.8	7.8	97.3%
	Pyrene	184	78	10	78	57.6%
	PCE	20	2.3	4.8	4.8	76.0%
	Lead	516	120	310	310	39.9%
Mammals and Birds	Benz(a)anthracene	89	0.63	1.1	1.1	98.8%
	Benzo(b)fluoranthene	87	0.78	3.6	3.6	95.9%
	Benzo(ghi)perylene	45	7.8	2.2	7.8	82.7%
	Benzo(k)fluoranthene	33	0.78	1.9	1.9	94.2%
	Chrysene	79	7.8	2.7	7.8	90.1%
	Dibenz(a,h)anthracene	11	0.1	2.6	2.6	74.6%
	Fluoranthene	220	0.69	186	186	15.5%
	Indeno(1,2,3-cd)pyrene	46	0.48	2	2	95.7%
	PCE	20	2.3	0.5	0.5	97.5%
	Lead	516	120	79	120	76.7%

All values in µg/g.
[1] Minimum risk-based concentration (RBC) for given exposure pathway for all relevant receptors from Human and Ecological Candidate Property Specific Standard (PSS) Tables (Tables E4-36A/B to E4-39 and E5-9 and E5-10B, respectively, Appendix E).
[2] Where the minimum RBC was lower than the Table 3 SCS, the target concentration was set as the SCS.
[3] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

Table P-4: Summary of Required Exposure Concentration Reduction Levels for Groundwater COCs

Exposure Pathway and Receptor	COC	Final PSS	Table 3 SCS	Table 7 SCS[1]	Minimum RBC[2]	Target Concentration[3]	Percent Concentration Reduction[4]
Indoor Air Inhalation (Residential Building with Basement - Site resident and Site visitor)	PHC F1	564	750	420	3.35	420	25.5%
	cis-1,2-DCE	180	17	1.6	3.62	3.62	98.0%
	trans-1,2-DCE	66	17	1.6	1.58	1.6	97.6%
	PCE	4,920	17	0.5	0.498	0.5	100.0%
	TCE	324	17	0.5	0.053	0.5	99.8%
	VC	667	1.7	0.5	0.0075	0.5	99.9%
Indoor Air Inhalation (Future Commercial Slab-on-Grade Building - Long-term indoor worker and Site visitor)	cis-1,2-DCE	180	17	1.6	62	62	65.6%
	trans-1,2-DCE	66	17	1.6	27	27	59.1%
	PCE	4,920	17	0.5	0.5	0.5	100.0%
	TCE	324	17	0.5	0.24	0.5	99.8%
	VC	667	1.7	0.5	0.23	0.5	99.9%
Incidental Direct Contact (Construction/ Subsurface Utility Workers)	PCE	4,920	17	0.5	537	0.5	100.0%
	VC	4,920	1.7	0.5	160	0.5	100.0%

All values in µg/L.
[1] Due to the shallow groundwater table, the Table 7 SCS have been used for the purposes of determining concentration reductions for volatile groundwater COCs.
[2] Minimum RBC for given exposure pathway for all relevant receptors from Human Candidate PSS Tables (Tables E4-41 to E4-44, Appendix E).
[3] Where the minimum RBC was lower than the Table 7 SCS, the target concentration was set as the SCS.
[4] % concentration reduction = (PSS – Target Concentration)/PSS x 100%.

P-2 Risk Management Measures

The following sub-sections describe the proposed RMMs for the Site.

P-2.1 Engineered Measures for Vapour Intrusion

Development plans have not been finalized but the current proposed re-development plan for the Site includes the construction of a sixteen (16) storey residential condominium building with community use in the basement and ground floor levels. The proposed vapour mitigation system is a sub-slab vapour membrane barrier with a passive sub-slab venting system (with the option to convert to an active system). Further details are provided below.

P-2.1.1 Passive SVIMS (with the Option of Converting into an Active System)

A combined sub-slab vapour membrane and passive sub-slab venting system (with the option of converting into an active system) may be implemented as a vapour intrusion mitigation measure for new building construction.

The venting system is to be a passive system with the option of converting to an active – mechanically/fan driven – sub-slab depressurization system. The combined system of the vapour membrane and venting system provides two complementary mechanisms for interrupting the transport of volatile COCs and operational redundancy in the event of failure in one of the component systems. In the case of a membrane barrier, the vacuum field created by a passive or active venting system limits the potential for possible preferential vapour transport along membrane seams and penetrations. Due to the varying vacuum field propagated by a passive venting system, the membrane barrier limits vapour transport along areas where the vacuum field may be weak or non-existent.

A conceptual drawing showing an overview of this system for a building with basement is presented as Figure P-1. Conceptual details for membrane vapour barriers and passive and active venting systems are presented in the following sections.

Sub-Slab Vapour Membrane

A continuous vapour membrane barrier system should be installed across the full areal extent of any foundation floor slab structure and along the vertical walls of any subsurface structures to provide a continuous barrier against the advective and diffusive transport of volatile COCs into building indoor air spaces. Where a sub-slab venting system is being installed, the vapour membrane is required below the foundation floor slab, above the soil vapour venting layer.

The membrane system may be constructed from different materials including:

1. Sheet Membranes: thermoplastic or elastomeric flexible membranes, e.g. high-density polyethylene (HDPE), polyvinylchloride, or EPDM (ethylene propylene diene monomer) rubber, polyolefin sheet membrane and fiber reinforced polyethylene materials, or a combination of multi-layer advanced membrane material technologies

2. Fluid-applied Membranes: Fluid-applied or cured-in-place membranes are rubberized asphalt emulsions spray-applied.

The membrane system should be constructed in such a fashion to provide a gas tight barrier beneath a building slab including all seams, penetrations, horizontal to vertical and vertical to horizontal transitions.

Vapour membrane barriers must be of appropriate thickness and meet the appropriate gas permeability and chemical resistance specifications to be considered substantially impermeable to soil vapour, in accordance with the appropriate ASTM standards such as D412, D543 and 1434, as applicable.

Design specifications of the vapour membrane have been provided below. Several specifications are based on ASTM E1745 (Standard Specification for Plastic Water Vapour Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs), which provides three (3) classifications for vapour barriers/retarders known as Class “A”, “B” or “C”. Class A has the highest performance objectives while Classes B and C have lower strength and puncture resistance requirements; all Classes require a permeance of 0.1 perms or less. At a minimum, vapour barriers should meet or exceed the Class “A” permeance, strength, and puncture requirements as outlined in ASTM E1745.

ASTM E1745-09 does not specify a minimum material thickness. The American Concrete Institute previously recommended a thickness of no less than 10 mils (0.25 mm) (ACI 302.1R-04); however, it is acknowledged that the updated guidance (ACI 302.1R-15) indicates that the thickness of the material be selected on the basis of protective needs and durability during and after installation. Generally, thicknesses of vapour membranes satisfying the requirements of ASTM E1745 typically vary between 10 mils (0.25 mm) and 15 mils (0.38 mm), with increased thickness providing additional durability during and after construction. Therefore, it is recommended that the minimum thickness of the vapour membrane should be 15 mils (0.38 mm).

There are no gas permeability criteria in Ontario, or Canada for the COCs identified as a potential vapour intrusion risk. As the proposed vapour barrier must also demonstrate acceptable permeability to the COCs, or suitable surrogate molecules, where information is unavailable on specific parameters, the vapour barrier manufacturer should conduct additional product testing and/or provide a letter from their technical department verifying that the barrier will be acceptable with respect to the concentrations of COCs on-site, which will be reviewed and approved by the design engineer prior to installation. Methane is provided as an example surrogate parameter in Table P-4, below, given the small size of this molecule relative to the COCs. It is noted that while gas permeability criteria for methane is also not provided for Ontario, or Canada, the City of Los Angeles criteria[1] considers an average methane gas transmission rate not exceeding 40.0 m/day.m^2.atm as acceptable and has been applied in this RMP.

For chemical resistance, manufacturers typically provide "PASS/ GOOD/ EXCELLENT/UNAFFECTED" ratings based on various testing scenarios, and no specific value/number is available in Ontario or Canada. The vapour barrier manufacturer should provide a letter from their technical department verifying that the barrier will be acceptable with respect to the actual Site conditions and concentrations of COCs on-site, which will be reviewed and approved by the design engineer prior to installation. In addition, regardless of chemical resistance ratings, it is important that the building design incorporate components to ensure that direct contact of the barrier with liquid or solid phase of the COC is mitigated. It is recommended such design components should be reviewed prior to selection of the soil gas barrier.

Table P-5: Vapour Membrane Characteristics

Property	Test Method	Value
Minimum thickness	Not Applicable	Minimum: 15 mil (0.38 mm)
Classification	ASTM E1745	Class A
Water Vapour Permeance	ASTM E96	Maximum: 0.1 perms
Tensile Strength	ASTM E154	Minimum: 7.9 kilonewton per metre (kN/m) (45 pound-force per inch [lbf/in])
Puncture Resistance	ASTM D1709	Minimum: 2,200 g
Oil and Chemical Resistance	ASTM D543	Pass/Good/Excellent/Unaffected[1]
Gas Permeability	ASTM 1434	Suitably Impermeable[1]
Methane Transmission Rate	ASTM 1434	< 40.0 ml/day.m^2.atm

[1] Suitability should be based on review of manufacture's data specific for COCs identified on-site, or suitable surrogates, to allow further assessment by the design engineer and/or a letter of reliance based on the actual Site conditions and concentrations of COCs from the manufacturer confirming their assessment for the suitability.

The construction of the membrane system should incorporate the following:

- Installation in a manner that minimizes the number of seams.
- Installation in a manner that avoids tears or punctures from building construction materials (e.g. rebar, conduits, etc). In the event of a puncture or tear, the membrane barrier must be sealed and repaired prior to pouring the concrete slab.
- Installation with underlying and overlying non-woven geotextile protective barriers to minimize the risk of puncture. However, other means of preventing damage to the vapour barrier may also be applied, as applicable and depending on the methods and type of vapour barrier implemented.
- Seams with a minimum overlap of 150 mm that are chemically or thermally welded.

[1] https://dpw.lacounty.gov/epd/swims/docs/pdf/methane/DPW%20METHANE%20BARRIER%20CERTIFICATION.pdf

- Termination on the exterior vertical surfaces of all exterior footings and installation beneath all interior footings.
- Installation around the vertical surfaces of all penetrations extending above the elevation of the membrane.
- The membrane should be overlapped at all horizontal to vertical transitions and penetrations with a minimum of 75 and 150 mm overlap on vertical and horizontal surfaces, respectively, or as per manufacturer's recommendations, and should be mechanically fastened to all vertical penetrations.
- The membrane should be chemically or thermally bonded to all vertical concrete surfaces.

In order to prevent any preferential pathways for vapour intrusion, all piping, sumps or other penetrations that are made through the membrane are to be sealed to ensure the presence of a continuous barrier against the transport of volatiles sourced from soil into a building indoor air space.

The final design specifications for construction of the vapour barrier must be reviewed and sealed by a Professional Engineer, licensed in Ontario, as part of the final building design and specification preparation process and modified as required to meet the requirements of the building. A copy of the plan shall be provided to MECP, when available.

Figure P-2 presents the specifications and details of a proposed sub-slab vapour barrier membrane system where a sub-slab venting system is installed.

Passive Venting System (with the Option of Converting into an Active System)

A membrane vapour barrier system as discussed above is to be implemented in combination with a passive venting system (with the option to convert to an active system).

As passive and active venting systems share many similarities, apart from the mechanisms by which air flow is induced, conceptual descriptions of both systems are presented together below.

The implementation of a passive or active sub-slab depressurization (SSD) system involves the creation of a weak negative pressure (i.e. vacuum) field beneath concrete floor structure to intercept and convey volatile contaminant-containing soil gas to the atmosphere. The system objective is to maintain a minimum negative pressure beneath the whole of the slab structure to control the transport of volatile contaminant-containing soil gas and prevent target contaminants from accumulating within the indoor space at concentrations that pose risks above acceptable levels. These systems implemented as a combined RMM with a membrane barrier shall be in place for as long as concentrations of target volatile COCs in soil at the Site continue to exceed the applicable MECP (2011) Table 3 SCS.

Sub-slab venting systems should consist of a gas permeable layer and a soil gas interception system installed beneath the building concrete slab/vapour membrane and either an internal or external vertical vent pipe system discharging collected soil gas to the atmosphere. Passive venting systems rely on pressure gradients and air flow induced by stack buoyancy and wind effects whereas an active venting system relies on air flow induced mechanically by blowers or fans.

The gas permeable layer should consist of a coarse textured – high permeability gravel material installed beneath the building concrete slab that provides a permeability contrast with the surrounding unsaturated zone soil material; and therefore, acts as a preferential layer for the transport of soil gas.

The gas interception/collection system may consist of a network of perforated/slotted collection pipes and solid header pipes embedded within the gas permeable layer to collect and convey soil gas to the vent pipe system. The piping network should consist of 100 or 150 mm diameter collection pipe of polyvinyl chloride (PVC) or HDPE construction connected to header pipes of similar or greater diameter.

The configuration and spacing of the collection pipe network are building specific depending on the characteristics of the gravel venting layer, the materials and diameters of the collection header and vent pipes, fitting losses, the locations of footings and penetrations and whether an active or passive mode of operation is employed. The typical collection spacing for a passive system can range from 6 to 12 m, whereas greater spacing can be realized for active systems due to more extended pressure and flow fields. Passive collection systems should be constructed with as few bends as possible to minimize pressure losses.

For any configuration, pressure losses arising from gas transport through the porous gravel venting layer and piping networks must be estimated to evaluate vent pipe locations and blower/fan requirements. General design considerations include a minimum of 3 to 6 air exchanges of the gas permeable layer void space per hour (i.e. 20 to 10 minute pore volume extraction times) and to maintain a lower air pressure differential (at least 1 Pa) below the foundation floor slab, relative to the indoor air pressure within the building (passive system) or a minimum negative pressure of 6 Pa (active system), across at least 90% of the building area during all seasons.

The vent pipe component may consist of one or more vertical vent riser pipe(s) connected to the interception system header pipes and, which, may run through the building interior or exterior to roof level. The number of vent riser pipes is building specific and would be determined by factors such as pipe size and construction, fitting losses and mode of operation (i.e., active versus passive). Due to limited and less predictable pressure fields, more vent riser pipes are required for passive systems. Vent riser pipes for passive systems must be installed within the building interior to roof level to enable air flow induced by thermal buoyancy effects as well as wind effects. The pipe spacing for any system must be evaluated iteratively by estimating pressure losses for all system components and different configurations. System performance also must be evaluated in the field by measuring gas pressures at strategically placed soil gas probes and monitoring system air flow.

Blowers/fans for active systems may be installed at the end of the vent riser pipes at roof level where the exhaust is discharge directly to the atmosphere. Alternatively, fans may be installed in line along exterior vent riser pipe sections. Fan requirements are determined by system configuration and an analysis of system pressure losses must be performed for proper fan sizing and to determine the number of units that are required. The objective in sizing fans for SSD systems is to minimize pressure losses to less than 500 Pa or 2 inches of water column, which can generally be achieved by utilizing pipes of sufficient diameter and minimizing the number of pipe bends. Fan operation must be continuous and maintained by interlocking sensors and controls with notification of system status.

A sub-slab venting system may be designed to be passive (i.e., in conjunction with a membrane barrier) with provisions for conversion to an active system, should it be warranted upon assessment of system performance. Such a conversion would generally involve the installation of a roof level fan with the necessary controls and sensors.

General Details for Passive and Active (SSD) Venting Systems

General details for passive sub-slab venting systems and active SSD systems employing roof mounted blowers/fans are presented below.

Subgrade Components

- The gas permeable venting layer should be constructed directly beneath the building slab with a maximum 200 mm thickness of 19 mm clear stone.
- Collection pipes should consist of perforated – SDR (Standard Dimensionless Ratio) 21/Schedule 40 – smooth walled -100 mm (inside) diameter rigid pipe of PVC, or HDPE construction and should be wrapped in non-woven geotextile fabric.
- Header pipes should consist of solid – SDR 21/Schedule 40 – 150 mm (inside) diameter – smooth wall - rigid pipe of PVC or HDPE construction.

Vent Riser Pipes

- Vertical vent riser pipes for passive systems must extend through the interior to the building roof.
- Riser pipes for active systems may extend through the building interior to roof level or be mounted along the building exterior.
- The vent pipe spacing should be determined from an evaluation of pressure loss estimates for the venting layer, collection and header piping and vent pipes. For passive systems, the maximum distance between vent riser pipes should be 30 m and the maximum distance between any collection pipe point and a riser pipe should be 40 m.
- Vent riser pipes should consist of solid – Schedule 40 – 150 mm (inside) diameter – smooth wall pipe of PVC (heights less than two stories), cast iron, galvanized or black steel construction with welded gas tight connections.
- Vent riser pipe outlets (fan exhaust) should be positioned a minimum of 3000 mm from the nearest operating inlet/open window and are to be terminated a minimum of 600 mm above such openings.
- Vent riser pipes should be equipped with one or more gas tight sample ports to monitor air flow and collect samples for chemical analysis.

Blowers/Fans

- Fans should be sized to provide a minimum of 3 air exchanges per hour (pore volume extraction time of 20 minutes) of the venting layer void space.
- Fans should be provided with isolation valves, manual or actuated flow control valves, pressure and electrical sensors and interlocked with a control panel with alarm and notification functions
- Fans should be installed, connected and housed in a manner to minimize vibrations and noise levels in accordance with applicable standards

As noted above, the installation of an active SSD system will require sensors interlocked with a control panel to ensure the continuous operation of the mechanically driven fan/blower. The control panel, at a minimum, should be equipped with a manual – auto fan switch and visual indicators of the fan operational status. The control panel should be equipped with visual and audible alarms and an autodial function providing notification to designated personnel in the event of a system breakdown or failure.

The operational status of the fan should be monitored by a differential pressure or flow switch positioned either in the upstream fan manifold or in the fan exhaust pipe. The inclusion of a differential pressure or flow switch/sensor will be contingent on the magnitude of the system pressure losses and the sensitivity range of the sensors. The signal from the pressure or flow switch will provide real time confirmation of system operation.

The control panel alarm and call out functions will provide immediate notification of a system breakdown or power failure. For a system breakdown lasting more than three hours, contingency measures should be in place for the system to be attended by designated service technicians to assess its status.

The overall sub-slab venting system design should include the installation of sub-slab soil gas probes to provide for the measurement of pressure differentials between soil gas and indoor air at the design and operational stages, to ensure that a minimum negative pressure of 6 Pa is maintained. The soil gas probes may be used in the design/construction stage to assist in fan sizing and confirm design calculations and at the commissioning and operational stages to evaluate system performance. The former measurements would require the use of a temporary fan (i.e. shop vac) with test sections for flow rate and applied pressure measurements.

The soil gas probes should be positioned to provide coverage of every 100 to 150 m^2 of the basement or ground level slab area. The soil gas probes should be constructed of 13 to 15 mm diameter stainless steel and extend at least 150 mm into the underlying gravel venting layer. The ends of the probes should be equipped with a gas tight fitting or valve to enable differential pressure measurements by means of a micro-monometer sensitive to a pressure of 1

Pa. The soil gas probes also may be used to sample the sub-slab soil gas for target analytes and assess requirements for continual operation of the SSD.

Details of sub-slab venting system components for active modes of operation are presented in Figures P-2 and P-3, and for above grade components in Figure P-4.

System Commissioning and Operation

Testing and monitoring would be required during system commissioning and operation. Testing during system commissioning should include measurements of system air flow and differential pressure measurements between indoor air and the soil gas within the gravel venting layer.

As described in the previous section, sub-slab pressure measurements should be made by means of sub-slab soil gas probes installed beneath the slab within the gravel venting layer. The objective of the vacuum testing is to confirm that that the system is capable to achieve and maintain a negative sub-slab (i.e. vacuum) pressure of 6 Pa below the foundation floor slab across the building area, relative to the indoor air pressure within the building across at least 90% of the building footprint during all seasons. For a passive SVIMS, vacuum testing of the soil vapour venting system must be conducted using temporary or permanently installed electrically powered fan(s). Vacuum testing of the soil vapour venting system should be conducted at least once before occupancy and as considered appropriate by a Licensed Professional Engineer after occupancy has commenced. Please refer to Section P-4.1.

In accordance with the requirements of O. Reg. 415/05 and O. Reg. 1/17, an application will have to be made to the MECP for an Environmental Compliance Approval (ECA) or registration with MECP Environmental Activity and Sector Registry (EASR) for the operation of an SSD system. An ECA (Air)/ EASR will be required to demonstrate compliance with the regulation by ensuring contaminant atmospheric concentrations at points of impingement (POI) relevant to the Site meet applicable POI standards. Compliance with the regulation will require assessing contaminant emission rates and applying recognized air dispersion models to evaluate POI concentrations. The preparation of an emission summary and dispersion modeling (ESDM) report is required.

P-2.2 Maintenance of Building Operating Conditions – Existing Building

Vapour mitigation RMMs are not recommended for the existing on-site building. One (1) round of indoor air sampling at the Site, completed in Winter of 2025, yielded COC concentrations below the applicable human health criterion (i.e., commercial/industrial HBIAC). As such, no unacceptable indoor air inhalation risk to on-Site long-term indoor workers (and property visitors) for the existing commercial building were identified. A second indoor air sampling event is planned for the Spring of 2025 to assess potential for seasonal variability. However, the maintenance of existing building operating conditions is required for the current commercial building (i.e., Dollarama). Additionally, changes to the footprint of the existing building are restricted unless it can be demonstrated that there will be no impacts in indoor air concentrations of COCs in soil and/or groundwater.

The purpose of this measure is to ensure that there are no increases in indoor air concentrations of cis-1,2-DCE, trans-1,2-DCE, PCE, TCE and VC. This measure includes the following:

- Maintenance of building floor slab integrity and the repair of any identified cracks/damage;
- Maintenance of the existing HVAC system(s) to ensure it is in good working order;
- Continued operation of HVAC system(s) to maintain existing air exchange/ventilation rate; and,
- No changes to existing building footprint unless it can be demonstrated that there will be no impacts in indoor air concentrations of COCs in soil and/or groundwater.

This RMM will have no impact on off-site human or ecological receptors.

P-2.3 Soil Barrier

The proposed soil barrier RMM serves to mitigate risks for all receptors from all direct soil contact pathways by blocking these pathways. The nature of the barrier may vary in thickness and in type across the Site. All soil imported to the Site must meet the soil importation requirements in Section P-2.6. The following barrier requirements provide minimum criteria. For the purpose of this RMP, granular material is defined as fill from a commercial sand and gravel pit or quarry licensed by the Ministry of Natural Resources pursuant to the *Aggregate Resources Act*, R.S.O. 1990, c. A .8. For the purpose of this RMP, clean soil means soil which meets the Table 3 SCS.

All soil barrier options are presented in Figure P-5.

The soil barrier may provide some level of protection to off-site human and ecological receptors by minimizing off-site migration of soil/dust and preventing exposure to soil COCs through direct contact, ingestion and dust inhalation pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-site exposure pathway, it is assumed the implications for off-site receptors are minimal.

Hard Cap

Concrete/asphalt, or equivalent material used for a hard cap, must have a minimum thickness of 7.5 cm plus 15 cm underlying fill of “Granular A” or equivalent base material for a total barrier thickness of 225 millimetres.

Fill/Soft Cap

A fill/soft cap shall consist of granular material, gravel and/or soil meeting the Table 3 SCS and/or Table 3.1 of the Excess Soil Quality Standards to a minimum depth of 1.0 m.

A fill/soft cap may consist of a minimum 1.0 m thick barrier of consist of granular material, gravel and/or soil meeting the Table 3 SCS and/or Table 3.1 of the Excess Soil Quality Standards.

Where trees or shrubs with roots that extend below 1.0 mbgs are being placed, clean fill must be present to a depth of 1.5 mbgs. In addition, the root ball must be placed entirely within clean soil. As illustrated in Figure P-5, the root ball must be placed in the subsurface such that there is a minimum of 0.5 m lateral radius of clean fill surrounding the root ball.

P-2.4 Garden Produce Restriction

An administrative control is to be implemented prohibiting the planting of any plants for human consumption, other than those planted in above ground containers with enclosed walls and bottom, such that they are isolated from the subsurface conditions. This restriction does not apply to gardening of plants not intended for human consumption.

P-2.5 Health and Safety Plan

Under the Ontario Occupational Health and Safety Act, every employer is required to provide a health and safety policy and program. The Act also provides the framework and the tools to provide a safe and healthy workplace. It sets out the rights and duties of all parties in the workplace and establishes procedures for dealing with workplace hazards. Where compliance has not been achieved voluntarily, the Act provides for enforcement of the law. The implementation of a HASP is, therefore, the duty of every employer and would not be within the scope of this RMP. However, in this RMP, recommendations for inclusion of a HASP which is specific to unacceptable risks identified for the construction worker, are discussed below. At the time of work, the HASP should be prepared by a qualified person with respect to health and safety practices in the workplace and pertaining to exposure the COCs as noted in Table P-1. The HASP is to be specific to the exposure pathways that may pose potential risks above acceptable levels and is to be developed in accordance with all Ministry of Labour (MOL) and other occupational health and safety requirements.

It is the responsibility of the RA property owner to ensure that the HASP is developed by a suitably qualified person, as appropriate, and that the HASP be reviewed by a QP_{RA} to ensure it is adequate for meeting the intent of the RMP.

Prior to initiation of any project that involves activities potentially resulting in contact with or exposing contaminated soil at the Site, where that Act requires the provision of notice, the local MOL office shall be notified of the proposed activities and that the Site contains contaminated soil. Implementation of HASP shall be overseen by persons qualified to review the provisions of the plan with respect to the proposed work and to conduct inspections.

The HASP for on-Site workers will have no impact on off-Site human or ecological receptors.

The following one or more measures (depending on the nature of the work) are recommended to be included in HASP to address predicted unacceptable risks to a construction/subsurface utility worker as a result of on-site contamination.

Personal Protective Equipment (PPE)
In the HASP prepared by a qualified person, workers should be notified that on-Site groundwater poses an unacceptable risk via the direct contact pathway.

The HASP should also include an advisory for workers to practice good hygiene by washing hands, face and any other skin exposed to soil at minimum immediately following work completion.

P-2.6 Soil and Groundwater Management Plan

P-2.6.1 Soil Management Plan

During Site construction and post-construction maintenance work, excavation of soil may take place, thus potentially exposing contaminated soil beneath the soil barrier. In the event that an excavation exposes contaminated soil, a soil management plan (SGMP), prepared by a Qualified Person, must be implemented for the protection of human and ecological receptors on-site from exposure to impacted soil. The following is an outline of recommended measures for the management of soil, to ensure the protection of human and ecological receptors. In addition, during Site development, the SMP provides the mechanism by which it will be determined whether imported soil meets the SCS for use in the fill cap.

A key aspect of the SMP is the implementation of a soil tracking control and characterization program. The SMP should be designed to fit the scope of any proposed ground intrusive work program in terms of soil movement and stockpiling, sampling and chemical analysis requirements. All activities should be implemented under the supervision of a Qualified Person for environmental site assessments (QP_{ESA}).

The SMP may provide some level of protection to off-site human and ecological receptors by minimizing off-site migration of soil/dust and preventing exposure to soil COCs through direct contact, ingestion and dust inhalation pathways. However, as migration of soil/dust is generally considered insignificant in terms of being an off-site exposure pathway, it is assumed the implications for off-site receptors are minimal.

The following soil management measures represent the highest degree of management, as would be required in the case of significant development and construction activities. These measures are not necessarily applicable to all soil excavation activities and may be adapted as required according to the scope of work.

Soil Segregation and Characterization

- Excavated impacted soil should be segregated from non-impacted material, if any, using applicable field screening practices, and stockpiled within designated bermed containment zones. The volume of impacted soil excavated and stockpiled should also be recorded.
- Visual and olfactory observations and vapour screening will be required for any excavated soil which is to be placed back beneath a soil barrier or cover system (Section P-2.2). Characterization of this soil will be completed on an as-needed basis dependent on the finding of the visual/olfactory observations and soil screening and for the purposes of verification sampling. Confirmatory/verification sampling will be completed at a frequency of 1 sample per 1,000 m^3 for all applicable potential contaminants of concern (pCOCs) and must meet PSS for the Site. A sampling frequency of 1 per 1,000 m^3 is considered appropriate by the QP as this sampling is considered an audit program given that the extensive characterization of the site completed to date is considered sufficient to identify maximum concentrations and that soils are to be placed below the soil barrier RMM to prevent exposure and therefore unlikely to affect the conclusions of the RA. It is noted that should evidence of impacts be identified (e.g., based on visual or olfactory screening), sampling of soils exhibiting evidence of impact will be sampled in accordance with O. Reg. 153/04, Schedule E, Section 36 so as to ensure that the soil can remain on-site.
- Soil intended to remain on-site as part of the soil barrier must be characterized and found to meet the Table 3 SCS. The characterization should be overseen by a QP_{ESA} and undertaken at a sampling frequency in accordance with O. Reg. 153/04, Schedule E, Sections 34.1, 35 and 36. Chemical analysis should include all potential contaminants of concern based on the Phase Two CSM for the area being excavated.
- Soil intended to be disposed off-site must be characterized and undertaken at a sampling frequency in accordance with applicable regulations (e.g., O. Reg. 153/04) and/or at a frequency deemed appropriate by the site QP_{ESA}. In the event that the excavated soil is to be sent off-site to a receiving site that is either a licensed landfill or a non-RSC property, soil characterization must be conducted in accordance with the requirements of the licensed landfill facility and/or applicable regulations. Chemical analysis should include all contaminants of concern based on the Phase Two CSM for the area being excavated. Documentation should be procured by the RA property owner from the receiving site confirming that soil to be disposed at the receiving site(s) is accepted based on the characterization prior to exporting soil.

Soil Importation

All soil to be imported to the site must meet the Table 3 SCS for residential/parkland/institutional property use with coarse textured soils and/or below PSS, depending on final placement. Soil to be imported to the Site must be sampled at a frequency and for potential COCs in accordance with O. Reg. 153/04, Schedule E Section 31 and determined to meet the appropriate standards prior to importation. Specifically, the sampling frequency required is at least one sample shall be analyzed for each 160 m^3 of soil for the first 5,000 m^3 to be assessed at each source property from which soil is being brought to the RA property, following which at least one sample shall be analyzed for each additional 300 m^3 of soil which is to remain on, in or under the RA property.

Dust Control

Dust control measures will be implemented as part of the SMP to minimize movement of via airborne dust. This will include monitoring of dust emissions generated from on-site vehicular traffic or other construction activities and implementation of dust control measures, as required which may include, but not be limited to: misting or wetting with potable water or use of an approved dust suppressant, limiting vehicular traffic and speeds within the work area, modification of work schedules in high wind (> 30 km/hr) conditions, covering of stockpiles etc.

Mitigation of Off-Site Soil Tracking

During movement of contaminated soils off-Site, if any, soil tracking and decontamination of all vehicles and equipment exiting the Site must be monitored. To ensure tracking of soil off-Site is mitigated, mud mats and aggregate roadways may be used and must be inspected and maintained as they deteriorate. Sweepers should be used during movement of contaminated soil off-Site to cleanup roadways, as needed, to remove any soil tracked off-Site as much as reasonably practicable. Inspection of vehicles by personnel designated by the Construction Manager must occur at the vehicle/equipment cleaning station at the exit of the Site, prior to exit. Record keeping of inspection procedures should be conducted by the designated personnel.

Record Keeping

Daily monitoring of earthworks must be conducted by on-Site personnel to ensure compliance with the SMP. Monitoring and record keeping, as per the future CPU, may include:

- Details on materials coming to and/or leaving the Site;
- Material volume estimates;
- Dates and duration of work;
- Weather and Site conditions at time of work;
- Location and depth of excavation activities;
- Dust control measures;
- Stockpile management and drainage;
- All material characterization results provided by a Qualified Person;
- Tracking, decontamination inspection and record keeping;
- Records related to Permits to Take Water and Discharge Agreements as well as volumes, management and characterization records for any ground water disposed outside of the bounds of the permit to take water (PTTW) and Discharge Agreement;
- Names of contractors, haulers and receiving Sites for any materials (including soil and/ or ground water) removed from the Site; and
- Any complaints received related to Site activities potentially coming in contact with or exposing Site soils and groundwater.

The property owner must retain a copy of all records relating to the SMP, including weigh bills. A copy of the SMP should be kept on-Site at all times.

P-2.6.2 Groundwater Management Plan

This Groundwater Management Plan (GWMP) is intended to be implemented for any on-site activity where groundwater is collected on-site. This measure is also intended to address rainwater and snowmelt that may accumulate in excavations.

If an excavation extends below the groundwater table and groundwater collects in the excavation, measures are to be implemented for the management of the groundwater during the dewatering of the excavation. The measures are as follows:

- Groundwater proposed for discharge to a municipal sanitary or storm sewer system is to be sampled, analyzed and assessed against applicable Sewer Use Discharge By-Law Parameter Criteria. Such waters are not to be discharged to the sanitary or storm sewer system until application has been submitted and authorization has been received from the governing municipality and/or Region and the quality of these waters meets the municipality's/Region's Sewer Use By-Law Parameter Criteria. Discharge approval from the municipality/region should be obtained prior to beginning any excavation works which may require dewatering;

- If no discharge permits are obtained, groundwater is to be containerized for off-site disposal at a licensed facility;
- Additional analysis of parameters that are COCs identified in the groundwater but do not have applicable sewer discharge criteria must also be conducted. Discharge criteria for these parameters should be proposed in the discharge permit application and be acceptable by the governing municipality;
- All equipment used to pump or transfer water collected from the excavation is to be decontaminated and wash waters collected and containerized. The wash waters are to be disposed of in a similar manner as other water collected from excavations; and,
- In the event that an exceedance of the discharge criteria is identified, contingency measures such as treatment of the water prior to discharge into the municipal sewer system, or off-site disposal at a licensed facility, should be implemented and overseen by a QP_{ESA}. Prior to ceasing the contingency measures, characterization of water should be undertaken and overseen by a QP_{ESA} to confirm that the groundwater meets the discharge criteria, and contingency measures are no longer required.

The GWMP may provide some level of protection to off-Site human and ecological receptors by minimizing off-site migration of groundwater.

P-2.7 Groundwater Boundary Control Measure

The southern groundwater boundary control measure consists of an injectable permeable reactive barrier (PRB), installed to a maximum depth of approximately nine (9) metres below ground surface (m bgs) to reduce the potential for the off-Site migration of VOC parameters in the groundwater at the Site. At the time of this RA, a PRB has been installed, and a post-installation monitoring program is currently on-going.

The PRB will also result in reduced off-Site risks for vapour intrusion given that the source of volatiles (i.e., impacted groundwater) in soil vapour will be treated at the property line. The objective of the proposed boundary control measure is to reduce the concentrations of COCs in groundwater to concentrations below the applicable SCS at the south adjacent properties. Figure P-6 depicts the location of the boundary control measure along the southern property boundary. The PRB will act to passively treat groundwater migrating south of the Site from the date of installation. The PRB is a passive treatment technology and allows for the natural migration of groundwater across the Site boundary, while simultaneously treating impacts. The PRB will not act to “push” groundwater towards the south adjacent properties as groundwater will follow natural flow pathways. The current RMP provides conceptual guiding details on the proposed installation, monitoring and maintenance of the boundary control measure as an injectable PRB.

Green Infrastructure Partners (GIP) was retained to install the PRB which spans a distance of approximately 40 m long by 3.0 m wide and extends between depths of 6 to 9 m bgs. The location of the proposed PRB is shown in Figure P-6. It was installed through the completion of approximately 40 direct-push injection points to a maximum depth of 9 m bgs. A total of 12,010 L of an approximately 25% concentration of Geoform ER slurry was injected under pressure into the injection points, at approximately 300 L per injection point. The injection of Geoform ER promotes the degradation of the VOCs via in-situ chemical reduction (ISCR) and anaerobic bioremediation. GeoForm ER can create expanded treatment areas beyond the injection area, to provide additional zones for treating VOCs in soil and groundwater. In addition to abiotic degradation, GeoForm ER can also promote biotic degradation for better performance of PRB applications. Refer to the attached Injection Summary Memo provided by GIP on December 20, 2024.

Three (3) boreholes BH/MW201 to BHMW203 were drilled up to a depth of approximately 9 m bgs and terminated within the silty sand till along the southern property line and installed as monitoring wells in December 2024 to evaluate performance of the PRB following installation. The monitoring wells are located immediately down-gradient of the PRB within the limits of the Site to confirm that the treated groundwater flowing off-Site meets site condition standards applicable to the down-gradient property. An ongoing post-installation monitoring program consisting of six (6) months of monthly groundwater monitoring from the three (3) newly installed downgradient wells after the completion of the PRB installation, including the collection of groundwater samples for the laboratory analysis of VOCs from the three (3) newly installed monitoring wells as well as three (3) existing wells is currently being carried out. At the time of each sampling event, one (1) field duplicate and one (1) trip blank sample will be collected and submitted to the laboratory as a measure of QA/QC. Currently, the program has not been completed. A PRB summary report will be completed to include the details of the supplemental drilling, PRB installation and the PRB performance monitoring program once they are completed. There is currently a contingency plan in place for additional injection events if VOC exceedances are identified during the six (6) month monitoring program.

P-3 Duration of Risk Management Measures

Indoor Air Vapour Intrusion

The proposed engineering controls protective of the indoor air vapour intrusion pathway are permanent RMM. These RMM along with the maintenance of existing building operating conditions must be maintained as long the concentrations of the applicable volatile COCs in soil and groundwater posing potential risks above acceptable levels are in excess of the MECP Table 3 or 7 SCS for soil and groundwater COCs.

Soil Barrier

The installation and maintenance of the soil barrier is required for as long as the applicable soil COC concentrations exceed the Table 3 SCS.

Prohibition of Planting of Fruit and Vegetables for Consumption

The prohibition on the planting of fruit and vegetables for consumption is required for as long as soil COC concentrations exceed the Table 3 SCS.

Health and Safety Plan

The implementation of HASP, where applicable, is required for as long as the applicable groundwater COCs exceed the Table 3 SCS.

Soil and Groundwater Management Plan

The SGMP is required for as long as soil and groundwater COC concentrations exceed the Table 3 and/or Table 7 SCS.

Groundwater Boundary Control Measure

The groundwater boundary control measure is required for as long as groundwater COC concentrations exceed the MECP Table 3 or 7 SCS.

P-4 Requirements for Maintenance and Monitoring

No maintenance is necessary for RMM pertaining to the HASP, SGMP or PRB. When work is to be undertaken which requires implementation of a HASP and SGMP, these plans must be specific to the work to be undertaken, including outlining the necessary monitoring requirements, and must be prepared prior to initiating the work. Monitoring of the proper implementation of the HASP and SGMP will be required for the duration of time that the HASP or SGMP are implemented. In addition, no maintenance or monitoring is required pertaining to the garden produce restriction.

The maintenance and monitoring requirements for other RMMs are discussed further below.

P-4.1 Vapour Intrusion Mitigation

Maintenance and monitoring requirements associated with the SVIMS RMM are outlined in the sections below.

P-4.1.1 Vapour Membrane Barrier System

For any new buildings constructed on-site, monitoring and maintenance programs are required for construction activities during installation of a membrane barrier system, and for post-construction confirmation that the controls are achieving the required performance objectives as presented in Table P-2 of this document. The monitoring programs should include appropriate quality assurance/quality control measures during and post membrane installation and may include, but are not limited to, smoke testing, membrane thickness and seam/sealing integrity inspection.

During construction, when installing a vapour barrier, it must be ensured that building construction materials (e.g. rebar, conduits) do not puncture or tear the vapour barrier. In the event that a puncture or tear occurs, the affected area is to be properly sealed and repaired prior to pouring the concrete slab. A logbook is to be kept outlining the methods used to install and seal the barrier and describing the inspection of the barrier prior to laying the building foundation. The inspections must be documented by an individual with expertise in the area of vapour barrier installation and the logbook is to be kept by the RA property owner. The name of the individual(s) overseeing installation and performing the inspections must be included in the log.

The objective of post-construction monitoring is to ensure the integrity of all barriers as applicable. The integrity of a vapour membrane barrier shall be ensured when performing any work involving excavation through the concrete floor slab. Post-construction maintenance of a membrane barrier will involve the continued repair of any damage, deterioration or breaches that may occur as a result of excavation through a building slab. A logbook will be kept outlining the activities performed on-site that resulted in a breach of the barrier, and measures taken to reseal the barrier and building foundation. These activities must be documented by an individual with expertise in the area of vapour barrier installation and the logbook must be maintained by the RA property owner. The name of the individual(s) overseeing the activities must be included in the log.

P-4.1.2 Sub-Slab Venting Systems

Monitoring and maintenance programs will be required for the implementation and operation of any sub-slab venting system beneath any new building that may be constructed at the Site. During system installation, monitoring and inspections will be required to document that the materials used and construction is in conformance with design specifications. Monitoring and inspections should be performed by a Professional Engineer with suitable experience and expertise related to sub-slab venting systems.

Upon completion of construction, monitoring and inspections will be conducted during sub-slab venting system commissioning to confirm that its operation meets the RMM performance objectives. System commissioning should be conducted by qualified individuals experienced in the testing of such systems and should be documented by an experienced Professional Engineer or Qualified Person. Commissioning testing should include the measurement of pressure differentials between indoor air and sub-slab soil gas, air flow measurements and the collection of indoor air samples for laboratory analysis of target COCs. The performance objective for the passive SSD system is to achieve a lower air pressure differential below the foundation floor slab, relative to the indoor air pressure within the building, across at least 90% of the building area during all season; for an active SSD system the objective is to achieve a sub-slab depressurization/vacuum of at least 6 Pa. Testing should be performed under normal operating conditions. An inspection should also be made of the floor slab for cracks and penetrations that may potentially result in air leakages affecting the propagation of vacuum and air flow fields beneath the slab structures. The observations made during the system construction and commissioning monitoring programs and modifications to the system or its operation should be documented in a system commissioning report prepared by a Professional Engineer or Qualified Person.

Following system commissioning, monitoring and maintenance should be undertaken to ensure continual operation within the RMM performance objectives. All visible and accessible above-grade components should be inspected for damage or other signs of deterioration and for the sub-grade components, the overlying floor slabs for cracks that may result in leakage. Where leakage is suspected, the affected portions of the concrete slab should be repaired and re-inspected accordingly. For active systems, bi-annual inspections of mechanical components (fans, motors, etc) should be undertaken.

As discussed in Section P-2.1.1, performance monitoring for the sub-slab depressurization system should include differential pressure measurements between indoor air and soil gas to confirm that an adequate vacuum field, of at least 6 Pa for an active system or a lower air pressure differential below the foundation floor slab, relative to the indoor air pressure within the building (at least 1 Pa) for a passive system, across at least 90% of the building footprint during all seasons. For a passive SVIMS, vacuum testing of the soil vapour venting system must also be conducted using temporary or permanently installed electrically powered fan(s) to ensure a 6 Pa lower air pressure differential can be met in the event conversion to an active system is required.

Post construction monitoring will also include differential pressure monitoring, to ensure that the engineering controls operate as intended. Details on post-construction pressure differential monitoring are described in Section P-4.1.3 below.

System inspections should be conducted by experienced individuals with suitable expertise in sub-slab venting systems. The observations should be documented in a logbook to be maintained by the RA property owner. Maintenance of the below grade components is not required, however, in the event of any activities, which may have caused damage and warrant repair to these components, any repairs shall be documented in the system log. The names of all individuals undertaking or overseeing these activities shall be reported in the system log.

P-4.1.3 Indoor Air or Sub-Slab Vapour Quality Monitoring Program

To verify the efficacy of the passive SVIMS, an indoor air quality (IAQ) or Sub-Slab Vapour (SSV) sampling program will be implemented.

The IAQ or SSV program is to be developed and implemented by a qualified person and is to incorporate currently accepted sampling and analytical protocols. The property owner will ensure that all sampling is executed by individuals who are properly trained for collection of samples, and that the samples are analyzed by an accredited laboratory. The program will require approval from the MECP and cannot be modified without the concurrence and approval of the MECP.

The indoor air or SSV sampling is to be conducted by experienced and trained individuals using accepted procedures, and samples are to be analyzed using accepted methodologies by an accredited laboratory. Indoor air quality sampling should be conducted following US EPA Method TO-15. The sampling program should incorporate applicable QA/QC measures including ambient outdoor air background samples (for IAQ only), field duplicates and travel blanks to ensure the collection of representative and non-biased samples. Prior to monitoring, the property owner shall retain the appropriate specialist to provide a sampling plan outlining the sampling locations and the number of samples to be collected. The RA property owner shall keep a written record of all sampling events, sample locations and analytical test results for a minimum of seven years. These records will be made available for inspection, upon request, by a Provincial Officer.

Upon completion of building construction, but prior to occupancy, one (1) round of indoor air or SSV monitoring will be completed. After occupancy, the IAQ or SSV program is proposed to take place over a minimum five (5) year period, with the recommended sampling frequency of quarterly for the first year; semi-annually for the second year, with sampling events being conducted in the summer and winter; and, on an annual basis for the third, fourth and fifth years (during the worst-case season based on previous sampling events), and thereafter, until such time as the Owner has received MECP approval to reduce the frequency or discontinue monitoring.

Any indoor air or SSV concentrations are to be compared against the criteria derived from the MECP (2011c) Tier 2 Approved Model Health Based Indoor Air Criteria (HBIAC) for residential and commercial land use. The target levels for indoor air and soil vapour are outlined in Table P-5. Indoor Air and soil vapour samples will be collected using Summa™ canisters prepared and certified by an analytical laboratory and will be analyzed using EPA Method TO-15 for all parameters.

Table P-6: Soil Vapour and Indoor Air Quality Criteria for Target COCs for Residential and Community Building

COC	Indoor Air Target Level[1] – Residential (µg/m³)	Soil Vapour Target Level[2] -Residential (µg/m³)	Indoor Air Target Level[1] – Commercial (µg/m³)	Soil Vapour Target Level[3] -Commercial (µg/m³)
PHC F1	329	16,450	1,130	282,500
cis-1,2-DCE	12.5	625	42.9	10,725
trans-1,2-DCE	12.5	625	42.9	10,725
PCE	8.34	417	28.6	7,150
TCE	0.271	13.55	0.872	218
VC	20.9	104.5	71.5	17,875

NA – not applicable. No unacceptable risks predicted for this chemical parameter for this building type

[1] Health-based indoor air criteria (HBIAC) for a residential/commercial property as provided in MECP (2016) in consideration of the updated MECP (2024) TRVs.

[2] Health-based indoor air criteria (HBIAC) for a residential property divided by 0.02 (the empirical attenuation factor for a residential building as provided in MECP [2016]).

[3] Health-based indoor air criteria (HBIAC) for a commercial property divided by 0.004 (the empirical attenuation factor for a commercial building as provided in MECP [2016]).

In the event that concentrations of one or more of the target COCs exceed the IAQ or Soil Vapour criteria, the MECP will be notified within two weeks of receiving the laboratory analysis. The notice to the MECP will include the indoor air quality or SSV sampling results and the laboratory certificates of analysis. Confirmatory sampling will be conducted at the same location with exceedance within one month of receipt of the original sample analytical results. If the results reported for the second sample meet the IAQ or Soi Vapour criteria, no additional work would be required until the next scheduled sampling round. If the second air sample exceeds the IAQ criteria, the MECP will again be notified within two weeks of receiving the laboratory analysis and a Professional Engineer will be retained by the property owner to prepare and submit a report outlining contingency RMM within one month for review by the MECP. Additional RMM will not be implemented without the concurrence of the MECP.

Contingency Measures

Possible contingency RMM would depend on the existing mitigation measures and evaluation of the risk. The proposed contingency measures comprise the development and implementation of an action plan providing mitigation measures.

Possible contingency RMM would depend on the mitigation measures already in place and may include:

- Implementation of engineering measures to increase building ventilation/pressurization (e.g., conversion to an active system);
- Additional inspection of the building concrete slab and sealing of cracks and penetrations where there may be leakage.
- Remediation of the soil and groundwater impacts. Potential remedial options may include in-situ bioremediation or remedial excavation.

All engineered contingency measures must be designed and sealed by a Professional Engineer licensed in Ontario.

P-4.2 Soil Barriers

The maintenance and monitoring of all soil barriers will be the responsibility of the RA property owner, who must keep a written record of all inspections including visual observations and, where applicable, analytical test results. The property owner will ensure that a full program of monitoring is conducted and documented for as long as COCs exceed the applicable MECP SCS, or until a new RA is performed resulting in a new RSC. An inspection and maintenance program shall be prepared and implemented to ensure the integrity of all barriers intended to prevent exposure to soil COCs. The program shall include, at a minimum, semi-annual inspections and the timely repair to any barrier deficiencies.

The following outlines situations of barrier compromise:

- Weathered/broken asphalt pavement including potholes or similar which result in exposed underlying soil.
- Damaged interlock, cracked sidewalk slabs or concrete slabs or equivalent damage to hard open space surfaces resulting in exposed underlying soil.
- Reduced thickness of soil or gravel barriers in open space caused by heavy traffic (human, ecological or other) or erosion.
- Unauthorized excavation etc.

It is the responsibility of the property owner to arrange for restoration of the barriers within a timely manner. If maintenance and restoration of any of the above involves disturbance, excavation or exposure of underlying soil exceeding the applicable MECP SCS, the property owner shall inform the contracted personnel of the exposure risk and the RMP requirements (i.e. SGMP and HASP) during maintenance and repair activities.

In the event a barrier compromise is identified and cannot be repaired in a timely manner, access should be limited to the compromised area through the use of temporary barriers such as construction fencing or pylons until the barrier can be repaired.

P-5 Reporting

Upon implementation of RMM, a site plan must be prepared showing the locations and extent of all engineering RMM protective of indoor air vapour intrusion and all barriers to Site soil installed across the RA property. As built-drawings including cross-sections should be prepared providing details on the vapour intrusion and soil barrier RMM. These drawings will be completed within 90 days of completion of development, kept on file by the property owner and made available to the MECP, upon request.

The Owner shall prepare, by March 31 each year, an annual report documenting the activities relating to the RMM undertaken during the previous calendar year. A copy of this report shall be kept by the Owner for inspection and be available upon request by the MECP.

The RA property owner will retain the following at the property, for inspection upon request by a Provincial Officer:

- A copy of all records relating to the SGMP HASP and sub-grade work on the RA property;
- A copy of all records relating to soil barriers (design specifications, construction, as-built drawings, inspections and maintenance);
- A copy of all records relating to the soil vapour mitigation measures (design specifications, construction, inspections and maintenance);
- A log of all monitoring events, and copies of air sampling data, and reports pertaining to the monitoring programs, and;
- A log of any modifications and/ or maintenance efforts carried out to mitigate concerns identified as a result of any monitoring programs and implementation of any RMM.

Records and as-built for all engineered plans for construction and RMM will be maintained by the property owner, for as long as the RMM applies. Records pertaining to monitoring, inspection and maintenance activities will be maintained by the property owner for a minimum of seven years.

P-6 Limitations and Closure

A risk assessment is a complex study that involves many areas including toxicology, geology, chemical transport and others. In completing this study, numerous conservative assumptions were made to manage scientific limitations and uncertainties. The information in this report is considered to be privileged and confidential and has been prepared exclusively for the property owner. The information presented in this report is based on Site specific information, assumptions, and conclusions reported in the risk assessment. The contents of this report should be read in conjunction with the information contained within the risk assessment. Should additional Site information or new toxicity information become available, the risk assessment should be re-evaluated to determine if the conclusions presented in the report are still valid.

Achieving the objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

The design and specifications presented in this report are limited to the functions of the engineering measures describe herein as they relate to mitigation of potential risks from exposure to contaminants of concern at the Site and not to the operations, functions or requirements of other engineering systems or components. Design and specifications for such requirements should be addressed and developed by the applicable engineering discipline.

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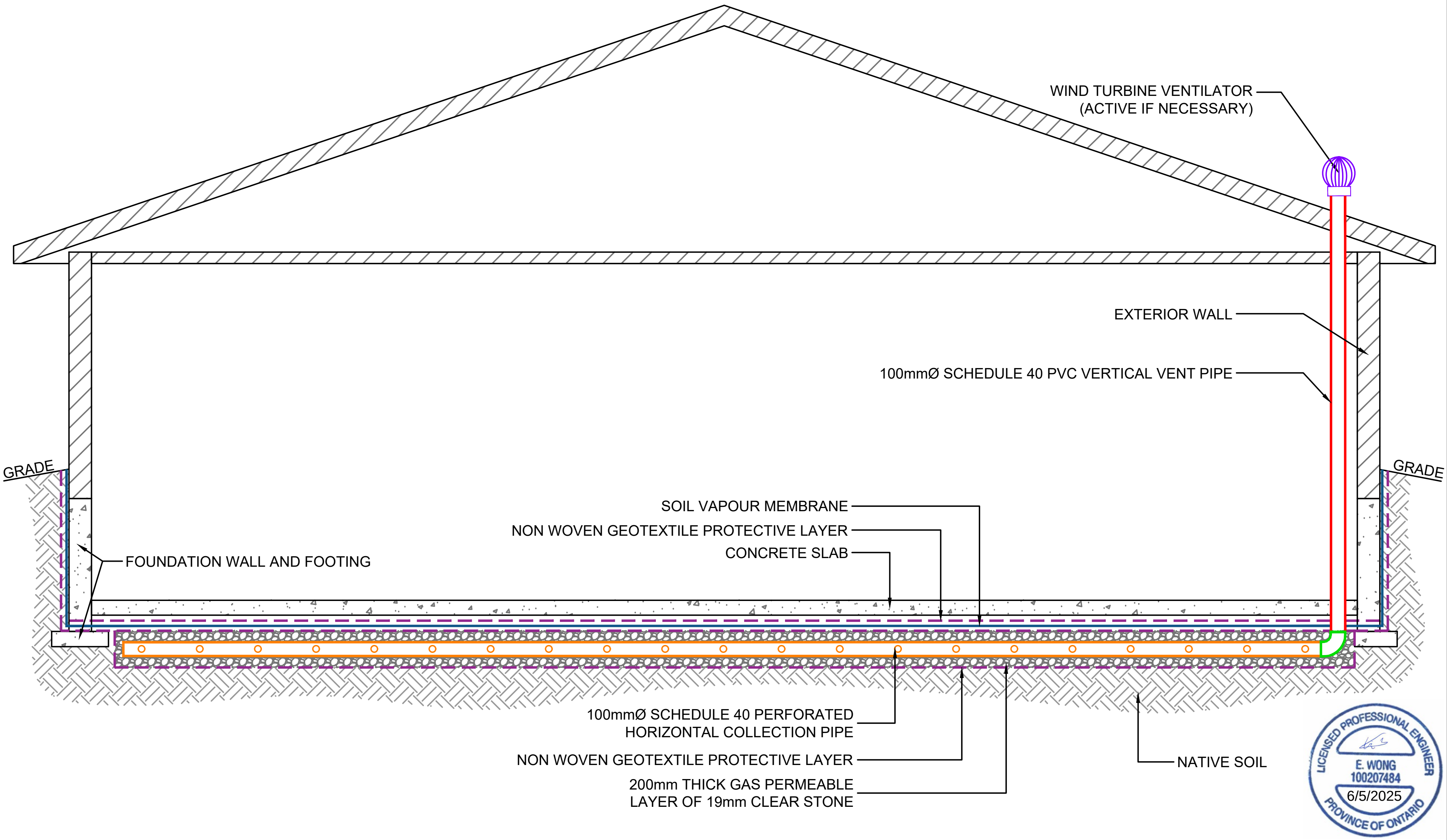
Eric Wong, P.Eng.

Senior Environmental Engineer

Figures



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LEGEND:

- COLLECTION PIPE
- SOIL VAPOUR MEMBRANE
- GEOTEXTILE PROTECTIVE LAYER
- VERTICAL RISER

TITLE AND LOCATION:

CONCEPTUAL PASSIVE SOIL VAPOUR COLLECTION SYSTEM
(FUTURE BUILDING)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	JA
SCALE: AS NOTED	CK: SW
DATE: MARCH 2025	FIG. NO.: P-1

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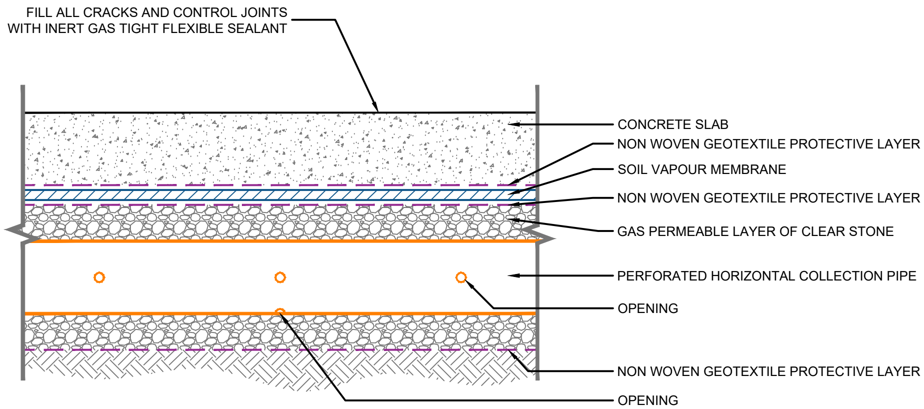
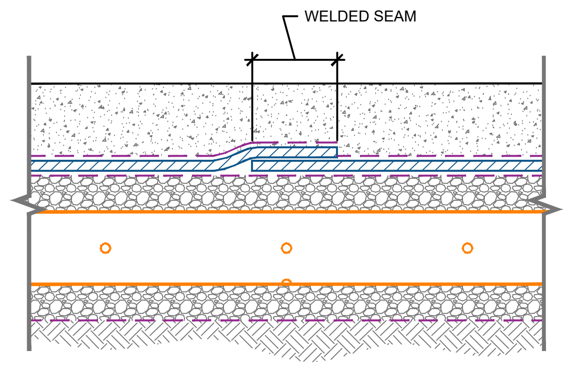
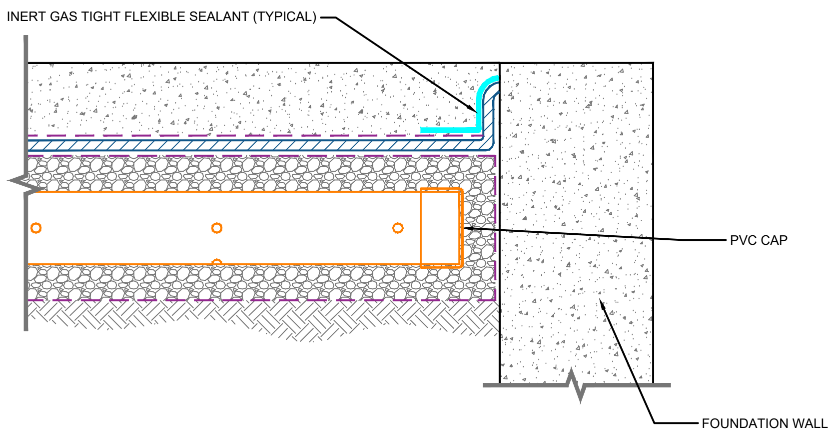


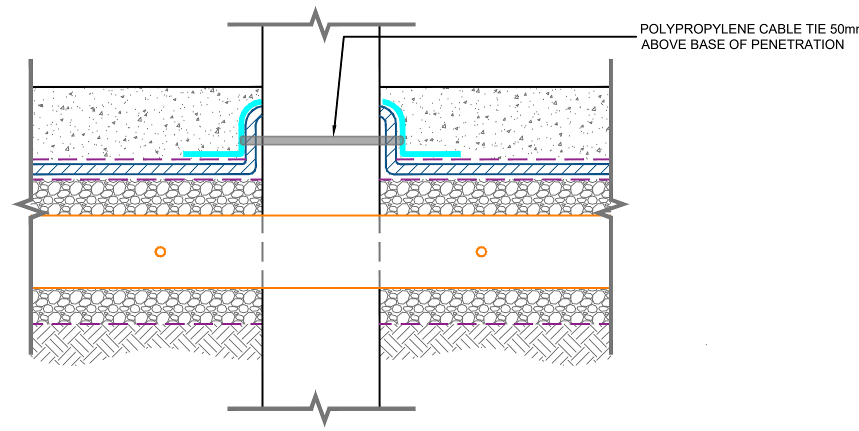
DETAIL P-2-1 SOIL VAPOUR BARRIER INSTALLATION BENEATH CONCRETE SLAB / FOUNDATION



DETAIL P-2-2 SOIL VAPOUR BARRIER OVERLAP DETAIL



DETAIL P-2-3 SOIL VAPOUR BARRIER AT FOOTING



DETAIL P-2-4 SOIL VAPOUR BARRIER INSTALLATION AT VERTICAL BARRIER

LICENSED PROFESSIONAL ENGINEER
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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - VAPOUR MEMBRANE (FUTURE BUILDING)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	JA
SCALE: AS NOTED	CK: SW
DATE: MARCH 2025	FIG. NO.: P-2

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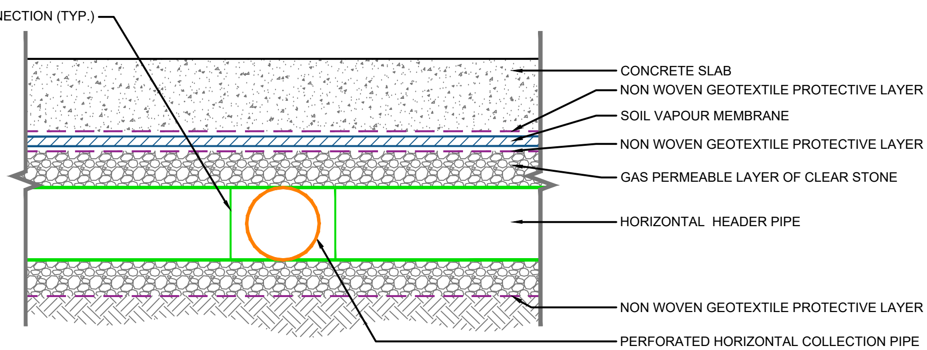
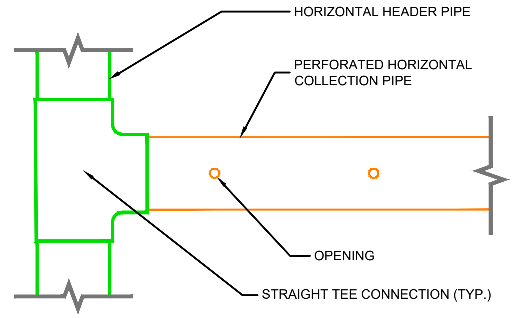
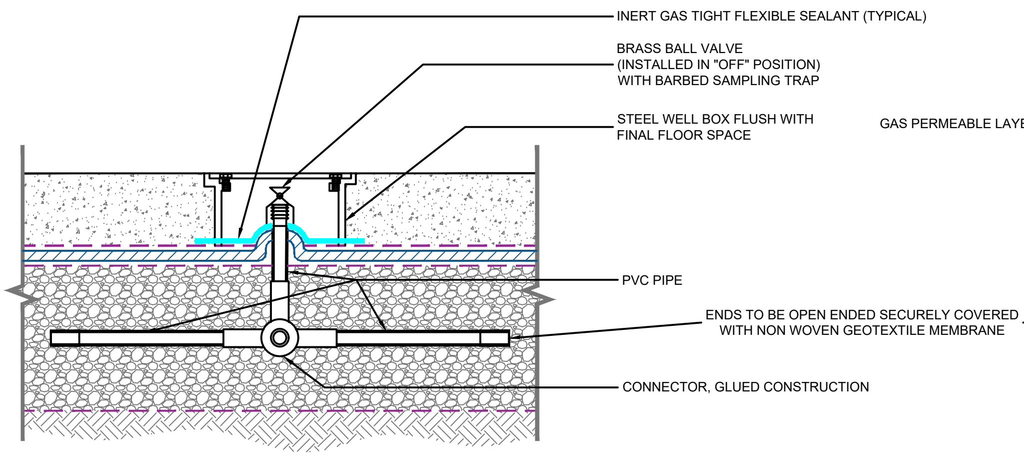


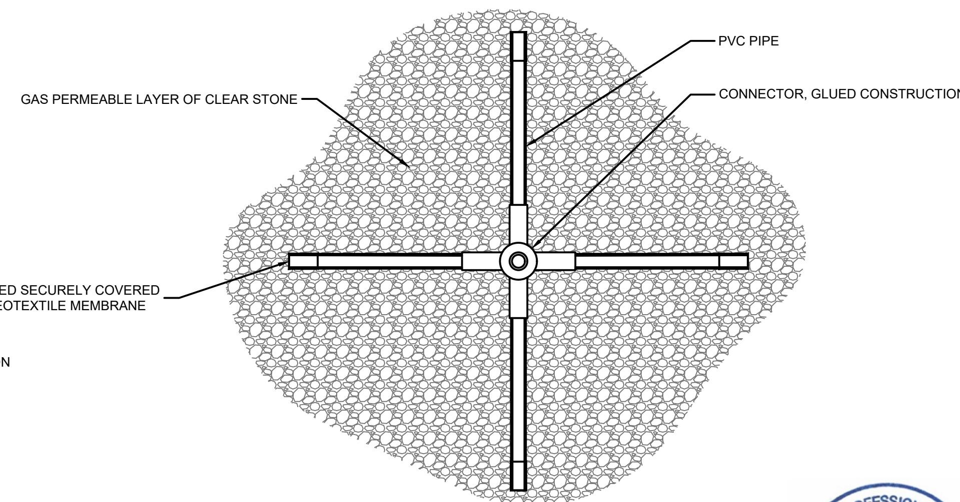
DETAIL P-3-1 HORIZONTAL COLLECTION PIPE HORIZONTAL HEADER SECTION



DETAIL P-3-2 HORIZONTAL HEADER PIPE - HORIZONTAL HEADER STRAIGHT TEE CONNECTION



DETAIL P-3-3 MONITORING PORT DETAIL



DETAIL P-3-4 MONITORING PORT PLAN VIEW

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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - SUB SLAB COMPONENTS (FUTURE BUILDING)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.: GTR-21003722-B0	DWN.: JA
SCALE: AS NOTED	CK: SW
DATE: MARCH 2025	FIG. NO.: P-3

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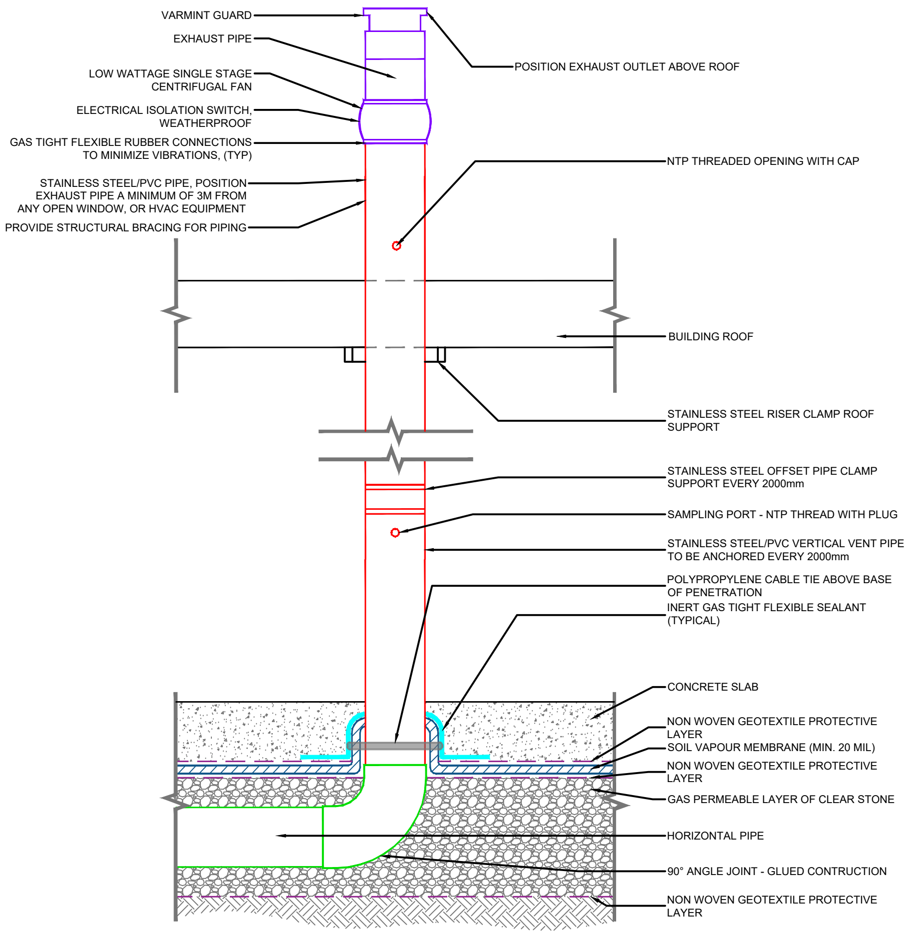
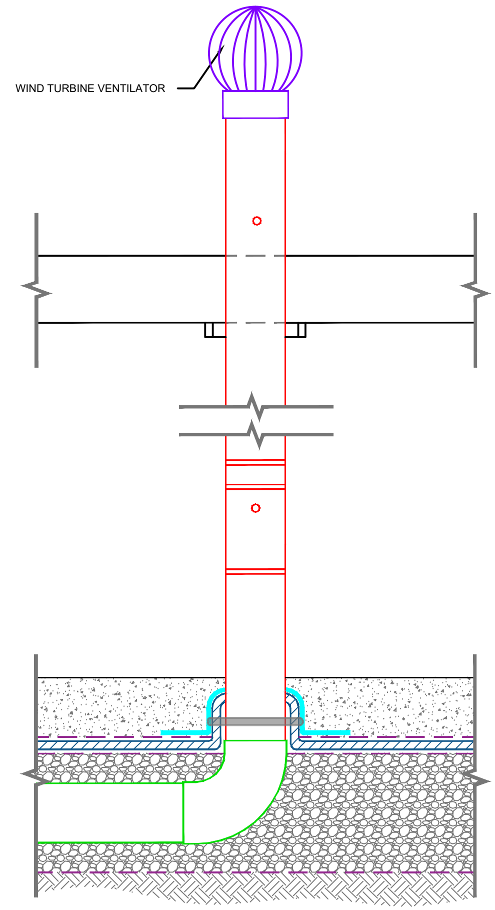
STACK SPECIFICATION TO BE DETERMINED BASED ON ECA

ACTIVE OPTION



DETAIL P-4-1 VERTICAL VENT RISER PIPE AND EXHAUST FAN

PASSIVE OPTION



DETAIL P-4-2 VERTICAL VENT RISER PIPE AND WIND TURBINE VENTILATOR

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TITLE AND LOCATION:

CONCEPTUAL VAPOUR MITIGATION SYSTEM DETAILS - ABOVE GRADE COMPONENTS (FUTURE BUILDING)
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.: GTR-21003722-B0	DWN.: JA
SCALE: AS NOTED	CK: SW
DATE: MARCH 2025	FIG. NO.: P-4

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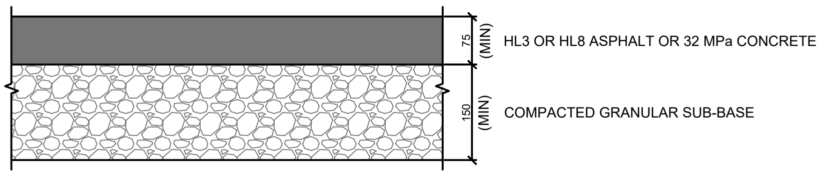
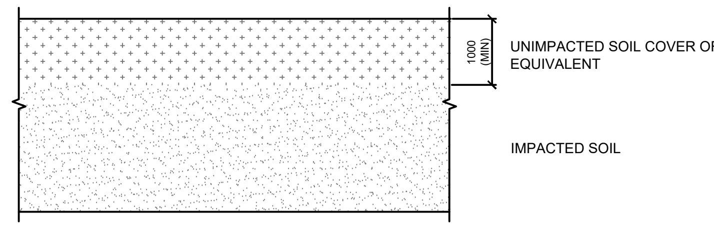


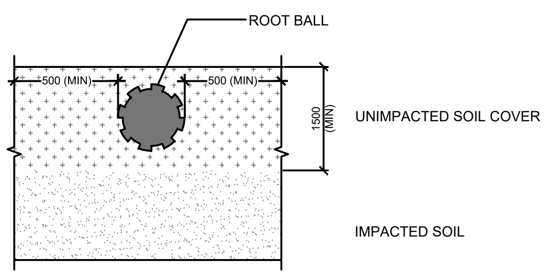
DETAIL P-5-1 HARD CAP CONSTRUCTION

NTS



DETAIL P-5-2 FILL / SOFT CAP CONSTRUCTION

NTS



DETAIL P-5-3 TREE PLANTING SPECIFICATIONS

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LEGEND:

1. ALL DIMENSIONS IN MILLIMETERS
2. THE QUALITY OF ALL UNIMPACTED SOIL COVER AND GRANULAR SUB-BASE MATERIALS ARE TO MEET THE MECP (2011) TABLE 3 SITE CONDITION STANDARDS OR MECP (2019) TABLE 3.1 EXCESS SOIL STANDARDS FOR RESIDENTIAL/PARKLAND/INSTITUTIONAL PROPERTY USE

TITLE AND LOCATION:

SOIL BARRIER DETAILS
1337 QUEEN STREET WEST
TORONTO, ONTARIO

PROJECT NO.:	DWN.:
GTR-21003722-B0	JA
SCALE: AS NOTED	CK: SW
DATE: MARCH 2025	FIG. NO.: P-5

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LEGEND:

- PRB INJECTION POINT
- BOREHOLE (EXP, DEC. 2024)
- BOREHOLE (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, DEC. 2024)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2022)
- BOREHOLE / MONITORING WELL (TEC, 2022)
- APPROXIMATE SITE BOUNDARY

TITLE AND LOCATION:

PRB LOCATION PLAN

PRB INSTALLATION OVERSIGHT
1337 QUEEN STREET WEST
TORONTO, ONTARIO

LICENSED PROFESSIONAL ENGINEER
E. WONG
100207484
6/5/2025
PROVINCE OF ONTARIO

PROJECT NO.: GTR-21003722-B0	DWN: JA
SCALE: AS NOTED	CHKD: SW
DATE: MARCH 2025	FIG. NO.: P-6

Attachment – GIP Injection Summary Memo

Green
Infrastructure
Partners

Injection Summary Memo

To: Samuel Patterson (Project Manager, EXP)

From: Zachary Smith (Project Manager, GIP)

Date: December 20th, 2024

Re: 1337 Queen St W, Toronto, ON – Dollarama PRB Injection Summary Memo

Dear Mr. Patterson,

Green Infrastructure Partners Inc. (GIP) is pleased to provide this memorandum summarizing the injection of a Permeable Reactive Barrier (PRB) that was completed at 1337 Queen St W, Toronto, ON between November 18th and December 3rd, 2024. The injection program was completed under GIP's Mobile Environmental Compliance Approval (ECA) #8071-A9SRD3. The injection program consisted of the following:

- **Number of Injection Locations:** 40 Direct-Push Injection Points along South property line
- **Injection Depths:** All injection locations received amendment between 6mbgs and 9mbgs
- **Chemical Amendment:** GeoForm Extended Release, slurry concentration of ~25%

Injection work for the permeable reactive barrier consisted of 40 direct push injection locations in one continuous, unbroken line along the southern property boundary on site. Each individual injection point received 300L of injection slurry distributed evenly across the 3m treatment zone from 6 to 9m below ground surface. Injection volumes were split into ~60L batches injected every ~0.75m across the treatment interval to evenly distribute the amendment within the PRB. A more detailed breakdown of the injection depths and volumes can be found in the attached injection summary table, Table 1. Some locations and depths, namely IP15, IP21, IP30 and IP40 could not retain the full injection volume, and as such the neighbouring locations and depths were supplemented in volume to account for these discrepancies. This is also noted in Table 1. Some daylighting of the injection slurry was noted by the injection crews, however total daylighted slurry amounted to less than 5% of the proposed injection volume and is likely much less than this in reality. As part of this work, 3 new monitoring wells were installed downgradient of the PRB installation for ongoing performance monitoring, and 1 soil sample borehole was drilled to assist with the ongoing Risk Assessment for the property. A site map is also provided (attached, Figure 1) for reference to the work area.

If you have any questions or concerns, please do not hesitate to get in touch. Thank you again for your trust in GIP, we appreciate your business!

Yours in Remediation,

Zachary Smith, B. Sc. E

		Injection Point Number (1 is easternmost point, 40 is westernmost point)																			
	m	IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	IP9	IP10	IP11	IP12	IP13	IP14	IP15	IP16	IP17	IP18	IP19	IP20
D	6.1	60	60	60	60	60	60	60	60	60	60	60	60	60	60	75	60	60	60	60	60
e	6.9	60	60	60	60	60	60	60	60	60	60	60	60	60	60	30	60	60	60	60	60
p	7.6	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
t	8.4	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
h	9.1	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	75	60
TOTAL		300	300	300	300	300	300	300	300	300	300	300	300	300	300	285	300	300	300	315	300

	m	IP21	IP22	IP23	IP24	IP25	IP26	IP27	IP28	IP29	IP30	IP31	IP32	IP33	IP34	IP35	IP36	IP37	IP38	IP39	IP40
D	6.1	~~0~~	60	60	60	60	60	60	60	60	75	60	60	60	60	60	75	60	60	90	~~0~~
e	6.9	60	60	60	60	60	60	60	60	60	75	60	60	60	60	60	60	60	60	60	100
p	7.6	60	60	60	60	60	60	60	60	60	75	60	60	60	60	60	60	60	60	60	75
t	8.4	30	60	75	60	60	60	60	60	60	75	60	60	60	60	60	60	60	60	60	75
h	9.1	60	60	60	60	60	60	60	60	90	~~0~~	90	60	60	60	60	60	60	60	90	~~0~~
TOTAL		210	300	315	300	300	300	300	300	330	300	330	300	300	300	300	315	300	300	360	250

NOTE: For individual injection intervals, proposed injection volume is ~60L. Cells will shade green at 60L and get more yellow if they are overinjected. Cells will be more red if under injected.

NOTE: For total injection volume, cells will transition from red to green as they approach total proposed injection volume of 300L per point. If overinjected, cells will begin to shade yellow.

Appendix Q: References

APPENDIX M: REFERENCES

Amdur, M.O., Doull, J. and Klassen, C.D. (Eds.). 1991. *Casarett and Doull's Toxicology: The Basic Science of Poisons*. 4th Edition. Pergamon Press Ltd., New York, NY.

ASTM. 1995. Reapproved 2010 and 2015. *Standard Guide for Risk–Based Corrective Action Applied at Petroleum Release Sites*. Standard E1739-95(2010).

CCME (Canada Council of Ministers of the Environment). 1997. A Framework for Ecological Risk Assessment: Technical Appendices. The Canadian Council of Ministers of the Environment, The National Contaminated Sites Remediation Program, Winnipeg, MB. 1997.

City of Toronto. 2024. *Official Plan*. Available online at: [Official Plan – City of Toronto]

Craul, P. 1992. *Urban Soil in Landscape Design*. Cited in: Christensen AJ. 2002. Deep Phyto. Phytoremediation at Soil Depths Beyond Those Normally Expected Targeting Contaminants at Various Depths. Contaminated Soil Sediment and Water. Aehsmag.com.

Doull, J., Klassen, C.D. and Amdur, M.O. 1980. *Casarett and Doull's Toxicology: The Basic Science of Poisons*. Second Edition. MacMillan Publishing Company, New York, NY.

Environment Canada. 1994. *A Framework for Ecological Risk Assessment at Contaminated Sites in Canada: Review and Recommendations*. Scientific Series No. 199. Environment Canada, Ecosystem Conservation Directorate, Evaluation and Interpretation Branch, Ottawa, ON. ISBN 0-662-22156-7.

EXP Services Inc. 2022a. *Phase One Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 7, 2022.

EXP Services Inc. 2022b. *Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated December 9, 2022.

EXP Services Inc. 2024. *Phase One Environmental Site Assessment Update, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, dated July 4, 2024.

EXP Services Inc. 2025a. DRAFT *Supplemental Phase Two Environmental Site Assessment, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.

EXP Services Inc. 2025b. DRAFT *PRB Installation Oversight, 1337 Queen Street West, Toronto, Ontario (Parkdale Hub)*, In progress.

FDA. 1982. *Toxicological Principles for the Safety Assessment of Direct Food Additives and Color Additives Used in Food*. (US) Food and Drug Administration, Bureau of Foods, Washington, DC.

Government of Canada. 1999. *Environmental Protection Act, 1999, Persistence and Bioaccumulation Regulation (SOR/2000-107)*.

Filov, V., Golubev, A., Liublina, E. and Tolokontsev, N. 1979. *Quantitative Toxicology: Selected Topics*. John Wiley and Sons, New York, NY.

Health Canada. 1993. *Health Risk Determination. The Challenge of Health Protection*. ISBN 0-662-20842-0.

Health Canada. 2012. *Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0*. ISBN 978-1-100-17671-0.

Himelick, E.B. 1986. *Root Development of Trees Growing in an Urban Environment*. Illinois Natural History Survey Rep. No. 262. December 1986.

Johnson, P., and Ettinger, R (J&E). 1991. *Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapours into Buildings*. Environ Sci Technol 25:1445-1452.

Little, J.C., Daisey, J.M., and Nazaroff, W.W. 1992. *Transport of Subsurface Contaminants into Buildings: An Exposure Pathway for Volatile Organics*. Environ Sci Tech 26:2058-2066.

Meridian Environmental Inc. 2011. Review of Approaches for Modelling Vapour Migration into Trenches and Excavations. Submitted to Canadian Council of Ministers of the Environment 123 Main Street, Suite 360 Winnipeg, MB, R3C 1A3. Contract 485-2010. PN 1455.

Ontario Ministry of the Environment and Energy (MOEE). 1996. *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, Ontario Ministry of the Environment, Standards Development Branch, December 1996

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*. April 15, 2011. PIBS # 7382e01

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*. Laboratory Services Branch, Ministry of the Environment, July 1, 2011.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011c. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*. April 15, 2011.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016a. *Modified Generic Risk Assessment Model*. November 1, 2016.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016b. *MGRA User Guide: A Guide to Using the "Approved Model" (November, 2016) When Submitting a Modified Generic Risk Assessment (MGRA)*. November 1, 2016.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2018. *Toxicity Reference Values (TRV) Selections for Benzo(a)pyrene*, Human Toxicology and Air Standards Section, Technical Development Branch, October 2018.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2019. Tier 2 & Tier 3 RA Email Update – Recent MECP TRV Selections, Preparing MGRAs; Defining Volatiles in RA, (e-mail correspondence from MECP, dated September 11, 2019), September 2019.

Ontario Ministry of Environment, Conservation and Parks (MECP). 2024a. *Human Health Toxicity Reference Values (TRVs)*, Human Toxicology and Air Standards Section, Technical Development Branch, March 2024.

Ontario Ministry of Environment, Conservation and Parks (MECP). 2024b. *Lead in Soil, Part I: Toxicity Reference Values Selected for Children and Adults*. Human Toxicology and Air Standards Section, Technical Assessment & Standards Development Branch, March 2024.

Ontario Ministry of Environment, Conservation and Parks (MECP). 2024c. *Technical Update: Dealing with Lead in Soil in Human Health Risk Assessments under O. Reg. 153/04*, March 2024.

Ontario Ministry of Environment, Conservation and Parks (MECP). 2025. *Species at Risk in Ontario*. Available at https://www.ontario.ca/page/species-risk-ontario#section-3.

Ontario Regulation 153/04 made under Part XV.1 of the Environmental Protection Act, July 1, 2011.

RBCA. 1995. *Guidance Manual for Risk-Based Corrective Action. Tier 2 RBCA Spreadsheet System and Modeling Guidelines*. Appendix A. Partnership in RBCA Implementation.

Sample, B.E. and Suter II, G.W. 1994. *Estimated Exposure of Terrestrial Wildlife to Contaminants.*

Sample, B.E., Aplin, M.S., Efroymson, R.A., Suter II, G.W., and Welsh, C.J.E. 1997. *Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants*. ORNL/TM-13391. Oak Ridge National Laboratory, Oak Ridge, TN.

Suter, G.W.II. 1989. *Ecological Endpoints*. In: Ecological Assessment of Hazardous Waste Sites: A field and laboratory reference document. Warren-Hicks, W, Parkhurst, B.R. and Baker, S.S. (eds.). Section 2.0. U.S. Environmental Protection Agency, EPA/600/3-89/013, Washington, DC.

Suter, G.W.II, Efroymson, R.A., Sample, B.E., and Jones, D.S. 2000. Ecological Risk Assessment for Contaminated Sites. Lewis Publishers, Boca Raton, FL. 438 p.

Stewart. J.R., Kjelgren. R., Johnson. P.G., and Kuhns, M.R. 2004. *Soil-Water-Use Characteristics of Precision-Irrigated Buffalograss and Kentucky Bluegrass*. Plant Management Network.

Timmer, SG; Eccles, J; O'Brien, K. 1985. *How Children Use Time*. In FT Juster; FP Stafford (Eds.), Time, goods, and well-being (pp. 353-382). Ann Arbor, MI: Survey Research Center, Institute for Social Research, University of Michigan.

Trafalgar Environmental Consultants. 2022. *Phase II Environmental Site Assessment of 1337 Queen Street West, Toronto, Ontario*, dated May 20, 2022.

Travis, C.C. and Arms, A.D. 1988. *Bioconcentration of Organics in Beef, Milk and Vegetation*. Environ. Sci. Technol. 22: 271-274.

US EPA. 1989. Risk Assessment Guidance for Superfund.

US EPA. 1993. *Wildlife Exposure Factors Handbook, Volume I of II.* EPA/600/R-93/187. US Environmental Protection Agency, Office of Health and Environmental Assessment, Washington, DC, December 1993.

US EPA. 1996. *Descriptive Statistics from a Detailed Analysis of the National Human Activity Pattern Survey (NHAPS) Responses*. (EPA/600/R-96/148). Washington, DC.

US EPA. 1997. *Exposure Factors Handbook*. EPA/600/P-95/002Fa. August, 1997.

US EPA. 1999a. *Derivation of a Volatilization Factor to Estimate Upper Bound Exposure Point Concentration for Workers in Trenches Flooded with Ground Water Off-Gassing Volatile Organic Chemicals*. Denver, Colorado.

US EPA. 1999b. *Screening Level Ecological Risk Assessment Protocol, Appendix D: Bioconcentration Factors (BCFs) for Wildlife Measurement Receptors.*

US EPA. 2004a. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. US Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC, February, 2004.

US EPA. 2004b. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final*. OSWER Directive 9285.7-02EP. July 2004

US EPA. 2007. *Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs): Attachment 4-1*. Eco-SSL Standard Operating Procedure (SOP) # 5: Wildlife TRV Data Evaluation, OSWER Directive 92857-55.

US EPA. 2011. *Exposure Factors Handbook: 2011 Edition*. National Center for Environmental Assessment, Washington, DC; PA/600/R-09/052F. Available from the National Technical Information Service, Springfield, VA, and online at http://www.epa.gov/ncea/efh.

US EPA OSWER. 2015. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. Office of Solid Waste and Emergency Response, OSWER Publication 9200.2-154, June 2015.

Watson G.W. and Himelick E.B. 1982. *Root Distribution of Nursery Trees and its Relationship to Transplanting Success.* Journal of Arboriculture 8(9):225-229.

Wiley, JA, Robinson, JP, Cheng, YT; Piazza, T; Stork, L; Pladsen, K. 1991. *Study of Children's Activity Patterns: Final report. (ARB-R-93/489)*. Sacramento, CA: California Air Resources Board. Available at: http://www.arb.ca.gov/research/apr/past/a73 3-149a.pdf.