DUE DILIGENCE RISK ASSESSMENT OF BIRCH DOG PARK, 235 BIRCH AVENUE, HAMILTON, ONTARIO

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DUE DILIGENCE RISK ASSESSMENT OF BIRCH DOG PARK
235 BIRCH AVENUE, HAMILTON, ONTARIO

EXECUTIVE SUMMARY

Intrinsik Corp. (Intrinsik) was retained by G2S Consulting Inc. (G2S) on behalf of the City of Hamilton (the City) to assess potential risks to humans, dogs, and ecological receptors associated with contaminants identified in on-site soil at the parkland property located at 235 Birch Avenue, Hamilton, Ontario (hereafter referred to as the 'Site'). The irregularly shaped Site is located on the west side of Birch Avenue, approximately 110 m north of the intersection with Princess Street and covers an approximate plan area of 0.69 hectares (1.7 acres). The Site was first developed as an oil works (refinery) pre-1875. The Site occupants historically consisted of various oil companies from 1875 into the 1940s, and as a scrap yard in the 1960s until the on-site buildings were demolished between 1964 and 1978. The Site was redeveloped and used as a parking lot until the late 1980s. Large amounts of fill were imported to the Site in the late 1980s and the Site was developed as a park. The Site is currently developed for use as a dog park, which has been temporarily closed since June 2025 (G2S, 2025a,b).

To evaluate potential risks to human health and ecological receptors, a due diligence risk assessment (DDRA) was conducted which involved a comparison of concentrations of contaminants in soil to the Ministry of the Environment, Conservation and Parks (MECP) generic Site Condition Standards (SCS) and the associated component values derived to be protective of human health and the environment. Given that the MECP does not provide component values protective of dogs, the assessment of potential risks to dogs involved estimating exposure to copper and lead *via* soil ingestion and the derivation of Hazard Quotients (HQs) and Effects-Based Concentrations (EBCs) protective of acute and chronic effects.

This assessment was conducted using scientific approaches that are generally consistent with Ontario Regulation 153/04 (O. Reg. 153/04), as amended, and in accordance with accepted practices and usual standards of thoroughness and competence for the profession of toxicology and environmental risk assessment.

Based on the available data, the results of the assessment of potential risks to humans, dogs, ecological receptors related to concentrations of contaminants of concern (COCs) in on-site soil indicated the following:

Human Health Risk Assessment

- Concentrations of polycyclic aromatic hydrocarbons (PAHs), cadmium, copper, lead, and Polychlorinated Biphenyls (PCBs) exceeded modified MECP S1 component values derived to be protective of recreational users *via* direct contact and incidental ingestion of impacted soils. Concentrations of PAHs and lead also exceeded the MECP S2 component values protective of long-term outdoor maintenance workers *via* direct contact and incidental ingestion of impacted soils.
    - Given that concentrations of one or more COCs exceeded the S2 and/or modified S1 component values in surface soils collected at depths of 0.50 metres below ground surface (mbgs) or shallower at 12 of 13 sample locations, the majority of the Site has been shown to contain impacted soils that represent a potential concern to human health for receptors that may have opportunities frequent exposure. As such, it is recommended that measures are taken to ensure that soils are not exposed at ground surface and available for direct exposure to park users and outdoor maintenance workers.

  - As described by G2S (2025c), the Site is generally grass covered with some worn footpath areas leading from the Site entrance at the northeast corner of the Site to the top of the fill mound. The areas surrounding shelters that are present in the northeast and central portions of the Site were significantly worn with no grass/root mat, with red brick and construction debris observed at the ground surface. Overall, G2S reported that the soft cap barrier varied from 6 to 9 cm in thickness and was not present in two (2) locations. Based on these observations, it may be difficult to consistently prevent contaminated soils from becoming exposed, particularly in high traffic areas of the park. It is recommended that the City evaluate whether targeted capping measures can be implemented in areas with exposed soils, and whether monitoring and repairs can occur on a sufficiently frequent basis to prevent exposure given the limited thickness of the existing soft cap barrier across the Site.
  - Alternatively, widespread soil excavation and/or the addition of capping measures across the Site is recommended. Capping measures may include hard caps (*e.g.*, asphalt, concrete, or paving stones) or soft caps consisting of a minimum of 30-50 cm of clean topsoil or soils meeting the appropriate MECP soil quality standards. Consideration should also be given to the inclusion of landscaping fabric to demarcate the clean soil cap from underlying contamination.

- Concentrations of lead exceeded the MECP S3 component value protective of short-term construction workers that may be exposed to soils with elevated concentrations of lead during construction activities or underground utility maintenance in the areas surrounding Birch 1, BH101, BH102, BH104, BH105, BH106, BH108 and BH109. It is recommended that workers follow appropriate occupational health and safety precautions. Under the Ontario Occupational Health and Safety Act and Regulations for Construction Projects (OHSA), all construction workers "shall wear such protective clothing and use such personal protective equipment (PPE) or devices as necessary to protect the worker against the hazards to which the worker may be exposed" (O. Reg. 213/91, s. 21(2)). It is anticipated that the use of appropriate PPE, such as gloves and long-sleeved shirts, as well appropriate hygiene, will prevent the occurrence of unacceptable risks under this scenario.

- No unacceptable health risks to recreational users and outdoor workers are anticipated from exposure to COCs in on-site soil through the inhalation of vapours in outdoor air.
- No unacceptable health risks to recreational users and indoor workers are anticipated from exposure to COCs in on-site soil through the inhalation of vapours in indoor air for future on-site buildings.

Ecological Risk Assessment:

- Concentrations of barium, benz(a)anthracene, copper, lead, and zinc exceeded the MECP modified component values protective of plants and soil organisms in surface soils samples collected at boreholes Birch 1, BH101, BH102, BH104 and BH109. Concentrations of barium, benz(a)anthracene, copper, lead, and zinc exceeded modified component values protective of plants/soil organisms in surface soils collected at depths shallower than 0.30 mbgs at boreholes Birch 1, BH101, BH102, BH104 and BH109. As a result, adverse effects may occur to plants and soil organisms in these areas.
- Maximum concentrations of all COCs were below generic MECP component values or modified component values protective of mammals and birds. Therefore, concentrations of COCs in soil are not anticipated to pose a significant risk to populations of most mammals/birds; however, risks may occur to sensitive species.

- Concentrations of COCs in on-site soil are not anticipated to represent an unacceptable risk to aquatic receptors in off-site bodies of surface water *via* leaching to groundwater and the subsequent migration of groundwater to surface water.

Risk Assessment for Dogs:

- Predicted exposure to dogs *via* incidental ingestion of copper and lead in on-site soil are below levels protective of acute or chronic adverse effects. Given that the exposure and risk estimates are based on the assumption that dogs would be exposed to the maximum concentration each day spent at the park, this assessment is considered to be conservative for a mobile receptor such as a dog that is likely to move randomly throughout the park.
- It is noted that risk estimates were only calculated for copper and lead as a 'worst case' scenario to assess potential risks to dogs *via* the ingestion of on-site soils. While it is anticipated that risks based on exposure to other COCs would be lower, there is the potential that higher risks to dogs *via* this pathway may exist for other COCs; however, RMMs have been recommended to mitigate risks to human health based on the findings of the HHRA. As such, any potential risks to dogs would also be addressed through the implementation of these RMMs.

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1.0 INTRODUCTION

Intrinsik Corp. (Intrinsik) was retained by G2S Consulting Inc. (G2S) on behalf of the City of Hamilton (the City) to assess potential risks to humans, dogs, and ecological receptors associated with contaminants identified in on-site soil at the parkland property located at 235 Birch Avenue, Hamilton, Ontario (hereafter referred to as the 'Site'). The irregularly shaped Site is located on the west side of Birch Avenue, approximately 110 m north of the intersection with Princess Street and covers an approximate plan area of 0.69 hectares (1.7 acres). The Site was first developed as an oil works (refinery) pre-1875. The Site occupants historically consisted of various oil companies from 1875 into the 1940s, and as a scrap yard in the 1960s until the on-site buildings were demolished between 1964 and 1978. The Site was redeveloped and used as a parking lot until the late 1980s. Large amounts of fill were imported to the Site in the late 1980s and the Site was developed as a park. The Site is currently developed for use as a dog park, which has been temporarily closed since June 2025 (G2S, 2025a,b).

Environmental investigations conducted at the Site between 2024 and 2025 identified concentrations of polycyclic aromatic hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and metals in soil in excess of the applicable Ministry of the Environment, Conservation and Parks (MECP) (formerly the Ministry of the Environment and Climate Change (MOECC)) Site Condition Standards (SCS). Groundwater was not collected as part of the site investigations and was not considered in the current assessment.

A due diligence risk assessment (DDRA) was conducted to evaluate potential risks to human health and ecological receptors. Given the current use of the Site as a dog park, the DDRA also evaluated potential risks to dogs. The assessment of potential risks to human health and ecological receptors involved a comparison of concentrations of chemicals in soil to the SCS and the associated component values derived to be protective of these receptors. Given that the MECP does not provide component values protective of dogs, the assessment of potential risks involved the derivation of hazard quotients (HQs), and Effects-Based Concentrations (EBCs) protective of dogs. The results of these comparisons were used to determine if risk management measures (RMMs) may be required to mitigate any potential unacceptable risks. It is Intrinsik's understanding that the Site will continue to be used for parkland purposes and that the DDRA is for internal due diligence.

This assessment was conducted using scientific approaches that are generally consistent with Ontario Regulation 153/04 (O. Reg. 153/04), as amended, and in accordance with accepted practices and usual standards of thoroughness and competence for the profession of toxicology and environmental risk assessment. The assessment was prepared for internal due diligence purposes and was not prepared for submission to the MECP to support the filing of a Record of Site Condition (RSC) under O. Reg. 153/04. The conclusions and recommendations provided within this report are based exclusively on the site characterization information provided within the G2S (2025a) Phase One ESA, the G2S (2025b) Phase Two ESA, and the G2S (2025c) Cap Inspection Report.

2.0 SITE DESCRIPTION AND HISTORY

The irregularly shaped Site is located on the west side of Birch Avenue, approximately 110 m north of the intersection with Princess Street and covers an approximate plan area of 0.69 hectares (1.7 acres). The surrounding properties consist of residential, commercial, industrial, and parkland land use. The Canadian National Railway is located south adjacent to the Site (G2S, 2025a,b).

The current owner of the Site is the Regional Municipality of Hamilton-Wentworth. The Site was first developed as an oil works (refinery) pre-1875. The Site occupants historically consisted of various oil companies from 1875 into the 1940s, and as a scrap yard in the 1960s until the on-site buildings were demolished between 1964 and 1978. The Site was redeveloped and used as a parking lot until the late 1980s. Large amounts of fill were imported to the Site in the late 1980s and the Site was developed as a park. The Site is currently developed for use as a dog park, which has been temporarily closed since June 2025 (G2S, 2025a,b). As such, the current and anticipated ongoing land use of the Site is parkland.

G2S (2025a) conducted a Phase One ESA for the Site in September 2025. The Phase One ESA identified four (4) on-site Potentially Contaminating Activities (PCAs) and several off-Site PCAs, as defined in O. Reg. 153/04 (as amended). The PCAs were assessed based on observations of the operations, their tenure, the expected chemical storage amounts, etc. Based on a review and evaluation of the information gathered, G2S (2025a) identified the following nine (9) Areas of Potential Environmental Concern (APECs) on-Site:

APEC 1: Entire Site – Significant mound of fill material imported to the Site in the late 1980s from an unknown source(s) (approximately 8 m high with known metals impacts).

APEC 2: Entire Site – Historical presence of a salvage/scrap iron yard on-site (1962).

APEC 3: Entire Site – Historical presence of an oils works with underground storage tanks (USTs) and above ground storage tanks (ASTs) on-site (late 1800s to 1950s).

APEC 4: South portion of the Site – Historical presence of a rail spur on-site (~1950s).

APEC 5: South portion of the Site – Current and historical presence of rail tracks south adjacent to the Site.

APEC 6: West portion of the Site – Current and historical use of the west adjacent property for industrial activities (late 1800s to present).

APEC 7: North portion of the Site – Historical use of the north adjacent property for industrial activities (late 1800s to present).

APEC 8: East portion of the Site – Historical use of properties to the east/northeast for industrial activities (late 1800s to present).

APEC 9: South portion of the Site – Historical use of properties to the south for industrial activities (late 1800s to present) (G2S, 2025a).

As noted above, the G2S (2025a) Phase One ESA identified several APECs on-Site, including the presence of imported fill material of unknown origin with metals impacts, forming a significant mound on the Site, approximately 8 m above grade at the highest point in the centre of the Site. G2S (2025b) completed a Scoped Phase Two ESA in September of 2025 to investigate the environmental condition of the dog park that currently occupies the Site in relation to the fill mound identified in the Phase One ESA. The sampling and testing conducted during the investigation was limited to the shallow fill material (up to 0.6 to 1.8 meters below ground surface (mbgs)) within the mound of fill material to assess the risk of the fill materials to park users. The remaining APECs identified in the G2S (2025a) Phase One ESA were not investigated as part of the G2S (2025b) Scoped Phase Two ESA.

The Scoped Phase Two ESA included the advancement of nine (9) boreholes (BH101 to BH109) to a maximum depth of approximately 1.8 mbgs. In general, the subsurface conditions at the Site consisted of approximately 50 to 100 mm of topsoil and grass/root mat underlain by silty sand/sandy silt and gravel fill material extending to borehole termination depths of up to approximately 1.8 mbgs. The fill contained debris such as red brick, yellow brick, slag and concrete and the grass/root mat was worn from foot traffic in two borehole locations (G2S, 2025b).

As part of the Scoped Phase Two ESA, a total of eighteen (18) soil samples were collected and submitted for analysis of Petroleum Hydrocarbons Fractions F1 to F4 (PHCs F1 to F4), including Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), metals, Other Regulated Parameters (ORPs), PAHs, PCBs, Organochlorine Pesticides (OCPs) and/or Volatile Organic Compounds (VOCs). The analytical results were compared to the Table 3 SCS for residential/parkland/institutional property use with coarse textured soils. All soil samples submitted for laboratory analysis met the applicable Table 3 SCS for PHCs, BTEX, ORPs, OCPs, and VOCs. PCBs and several PAHs and metals in soil samples collected from boreholes BH101 to BH109 exceeded the Table 3 SCS (G2S, 2025b).

As part of the investigation, G2S also reviewed the previous data collected in the Parks Soil Test completed in November of 2024 by the City of Hamilton. As part of the investigation, four (4) soil samples and one (1) field duplicate sample were collected from the ‘four corners’ of the Site. The submitted soil samples exhibited exceedances of the Table 3 SCS for several metal parameters, including cadmium, copper, lead, mercury, and zinc (G2S, 2025b).

Based on the findings of the Scoped Phase Two ESA, G2S concluded that the shallow soil on-site does not meet the applicable Table 3 SCS. Elevated levels of PAHs (0.1 to 1.0 mbgs) and metals (0.1 to 1.8 mbgs) were found in the subsurface layer of the fill material across the Site (G2S, 2025b).

In November 2025, G2S was retained by the City to conduct an assessment of the grass/root mat and topsoil thickness (referred to as the ‘soft cap barrier’) at the Site (G2S, 2025c). As part of this investigation, G2S prepared a grid for inspection and advanced test pits at nine (9) locations across the Site using hand sampling equipment to approximate depths of 30 to 50 cm bgs. The soft cap barrier thickness was measured and described. G2S (2025c) noted that the Site is generally grass covered with some worn footpath areas leading from the Site entrance at the northeast corner of the Site to the top of the fill mound. The areas surrounding shelters that are present in the northeast and central portions of the Site were significantly worn with no grass/root mat, with red brick and construction debris observed at the ground surface. Overall, G2S reported that the soft cap barrier varied from 6 to 9 cm in thickness and was not present in two (2) locations (Cap C and Cap E) (refer to the Test Pit Location Plan in Appendix A).

3.0 IDENTIFICATION OF CONTAMINANTS OF CONCERN

The current and continued land use of the Site is parkland. The Site is not within an area of natural significance and does not include and is not adjacent to such an area or part of such an area. Twenty-two (22) soil samples and one (1) field duplicate sample were submitted for analysis of soil pH. The pH for all soil samples fell within the acceptable MECP range of 5 to 9 for surface soil and 5 to 11 for sub-surface soils, with the exception of a single soil sample [BH102 S1 (0.6-0.9 mbgs)] which had a pH level of 11. The elevated pH level was likely attributed to the fill material and associated debris (red brick, slag and concrete) on-Site, and was not considered to be representative of the native soil conditions or overall conditions across the Site. As such, the Site is not considered to be a sensitive site as defined in Section 41 of O.Reg. 153/04 (G2S, 2025b).

Based on field observations and grain size analysis, on-site soils were classified as coarse textured as defined in O. Reg.153/04 (as amended). The Site has not been classified as a shallow soil property (*i.e.*, there is >2 m of overburden over more than two-thirds of the Site). The Site is not located within 30 m of a waterbody. The nearest water body is the Sherman Inlet located approximately 650 m northeast of the Site. The Site, and/or properties, in whole or in part, within 250 metres of the boundaries of the Site, are located within the City of Hamilton which obtains potable water from surface water sources (Lake Ontario). As such, non-potable conditions apply to the Site (G2S, 2025b). Therefore, the selection of contaminants of concern (COCs) in on-site soil was based on a comparison of the maximum concentrations or highest detection limits to the Table 3 SCS for residential/parkland/institutional property use with coarse textured soils.

Chemicals with concentrations in excess of the SCS were retained as COCs for further evaluation. For those chemicals that were not found above the laboratory detection limit in any sample, the highest detection limit was selected to represent the maximum concentration. For those chemicals for which the highest detection limit exceeded the highest measured concentration, the highest detection limit was used to represent the maximum concentration.

3.1 Contaminants of Concern in Soil

The selection of COCs in soil was based on a comparison of the maximum concentrations or highest detection limits of chemicals measured in soil samples collected as part of the G2S (2025b) Scoped Phase Two ESA to the Table 3 SCS for residential/parkland/institutional property use with coarse textured soils (Table 3-1). Chemicals with concentrations in excess of the Table 3 SCS were retained as COCs for further evaluation.

Table 3-1 Screening of Maximum Concentrations of Chemicals in Soil Against the Table 3 Site Condition Standards

Chemical Parameter	*Location of Maximum Concentration*	*Sample Depth (mbgs)*	*Maximum Soil Concentration (µg/g)*	*Table 3 Site Condition Standard[a] (µg/g)*
Acenaphthene	BH109 S1C	0.2 - 0.9	2.62	7.9
Acenaphthylene	BH103 S1B	0.1 - 0.3	0.11	0.15
Acetone	Multiple Locations	Multiple Depths	<0.5	16
Aldrin	Multiple Locations	Multiple Depths	<0.005	0.05
Anthracene	**BH109 S1C**	**0.2 - 0.9**	**4.66**	**0.67**
Antimony	BH109 S1C	0.2 - 0.9	3.1	7.5
Arsenic	Birch 1 DUP	0.05 - 0.15	14	18
Barium	**BH104 S1B**	**0.1 - 0.3**	**5,860**	**390**

Table 3-1 Screening of Maximum Concentrations of Chemicals in Soil Against the Table 3 Site Condition Standards

Chemical Parameter	*Location of Maximum Concentration*	*Sample Depth (mbgs)*	*Maximum Soil Concentration (µg/g)*	*Table 3 Site Condition Standard[a] (µg/g)*
Benz(a)anthracene	**BH109 S1C**	**0.2 - 0.9**	**2.53**	**0.5**
Benzene	Multiple Locations	Multiple Depths	<0.02	0.21
Benzo(a)pyrene	**BH109 S1C**	**0.2 - 0.9**	**1.77**	**0.3**
Benzo(b)fluoranthene	**BH109 S1C**	**0.2 - 0.9**	**3.74**	**0.78**
Benzo(g,h,i)perylene	BH109 S1C	0.2 - 0.9	1.15	6.6
Benzo(k)fluoranthene	**BH109 S1C**	**0.2 - 0.9**	**1.74**	**0.78**
Beryllium	Multiple Locations	Multiple Depths	0.9	4
Boron (Hot Water Extractable)	BH109 S1C	0.2 - 0.9	1.4	1.5
Boron (Total)	BH104 S1C	0.3 - 0.6	38	120
Bromodichloromethane	Multiple Locations	Multiple Depths	<0.05	13
Bromoform	Multiple Locations	Multiple Depths	<0.05	0.27
Bromomethane	Multiple Locations	Multiple Depths	<0.05	0.05
Cadmium	**Birch 1 DUP**	**0.05 - 0.15**	**3.4**	**1.2**
Carbon Tetrachloride	Multiple Locations	Multiple Depths	<0.05	0.05
Chlordane	Multiple Locations	Multiple Depths	<0.007	0.05
Chlorobenzene	Multiple Locations	Multiple Depths	<0.05	2.4
Chloroform	Multiple Locations	Multiple Depths	<0.04	0.05
Chromium (Total)	Birch 1	0.05 - 0.15	66	160
Chromium VI	Multiple Locations	Multiple Depths	<0.2	8
Chrysene	BH109 S1C	0.2 - 0.9	5.21	7
Cobalt	BH101 S1B	0.1 - 0.2	11.6	22
Copper	**BH101 S1C**	**0.2 - 0.6**	**433**	**140**
Cyanide	Multiple Locations	Multiple Depths	<0.04	0.051
DDD	Multiple Locations	Multiple Depths	<0.007	3.3
DDE	Multiple Locations	Multiple Depths	<0.007	0.26
DDT	Multiple Locations	Multiple Depths	<0.007	1.4
Dibenz(a,h)anthracene	**BH109 S1C**	**0.2 - 0.9**	**0.15**	**0.1**
Dibromochloromethane	Multiple Locations	Multiple Depths	<0.05	9.4
Dichlorobenzene, 1,2-	Multiple Locations	Multiple Depths	<0.05	3.4
Dichlorobenzene, 1,3-	Multiple Locations	Multiple Depths	<0.05	4.8
Dichlorobenzene, 1,4-	Multiple Locations	Multiple Depths	<0.05	0.083
Dichlorodifluoromethane	Multiple Locations	Multiple Depths	<0.05	16
Dichloroethane, 1,1-	Multiple Locations	Multiple Depths	<0.02	3.5
Dichloroethane, 1,2-	Multiple Locations	Multiple Depths	<0.03	0.05
Dichloroethylene, 1,1-	Multiple Locations	Multiple Depths	<0.05	0.05
Dichloroethylene, 1,2-cis-	Multiple Locations	Multiple Depths	<0.02	3.4
Dichloroethylene, 1,2-trans-	Multiple Locations	Multiple Depths	<0.05	0.084
Dichloropropane, 1,2-	Multiple Locations	Multiple Depths	<0.03	0.05
Dichloropropene, 1,3-	Multiple Locations	Multiple Depths	<0.05	0.05
Dieldrin	Multiple Locations	Multiple Depths	<0.005	0.05
Electrical Conductivity (EC)	BH109 S1C	0.2 - 0.9	0.64	0.7
Endosulfan	Multiple Locations	Multiple Depths	<0.005	0.04
Endrin	Multiple Locations	Multiple Depths	<0.005	0.04
Ethylbenzene	Multiple Locations	Multiple Depths	<0.05	2
Ethylene Dibromide	Multiple Locations	Multiple Depths	<0.04	0.05
Fluoranthene	**BH109 S1C**	**0.2 - 0.9**	**23.6**	**0.69**

Table 3-1 Screening of Maximum Concentrations of Chemicals in Soil Against the Table 3 Site Condition Standards

Chemical Parameter	*Location of Maximum Concentration*	*Sample Depth (mbgs)*	*Maximum Soil Concentration (µg/g)*	*Table 3 Site Condition Standard[a] (µg/g)*
Fluorene	BH109 S1C	0.2 - 0.9	2.66	62
Gamma-Hexachlorocyclohexane	Multiple Locations	Multiple Depths	<0.005	0.056
Heptachlor	Multiple Locations	Multiple Depths	<0.005	0.15
Heptachlor Epoxide	Multiple Locations	Multiple Depths	<0.005	0.05
Hexachlorobenzene	Multiple Locations	Multiple Depths	<0.005	0.52
Hexachlorobutadiene	Multiple Locations	Multiple Depths	<0.01	0.012
Hexachloroethane	Multiple Locations	Multiple Depths	<0.005	0.089
Hexane (n)	Multiple Locations	Multiple Depths	<0.05	2.8
Indeno(1,2,3-cd)pyrene	**BH102 S1B**	**0.1 - 0.6**	**0.97**	**0.38**
Lead	**BH109 S1C**	**0.2 - 0.9**	**2,840**	**120**
Mercury	**BH109 S1B**	**0.1 - 0.2**	**2.81**	**0.27**
Methoxychlor	Multiple Locations	Multiple Depths	<0.005	0.13
Methyl Ethyl Ketone (MEK)	Multiple Locations	Multiple Depths	<0.5	16
Methyl Isobutyl Ketone	Multiple Locations	Multiple Depths	<0.5	1.7
Methyl tert-butyl ether (MTBE)	Multiple Locations	Multiple Depths	<0.05	0.75
Methylene Chloride	Multiple Locations	Multiple Depths	<0.05	0.1
Methylnaphthalene (1&2)	BH109 S1C	0.2 - 0.9	0.78	0.99
Molybdenum	**BH103 S1C**	**0.3 - 0.6**	**7.8**	**6.9**
Naphthalene	**BH109 S1C**	**0.2 - 0.9**	**2.6**	**0.6**
Nickel	Birch 1 DUP	0.05 - 0.15	52	100
Petroleum Hydrocarbons F1	Multiple Locations	Multiple Depths	<5	55
Petroleum Hydrocarbons F2	BH109 S1C	0.2 - 0.9	33	98
Petroleum Hydrocarbons F3	BH109 S1C	0.2 - 0.9	279	300
Petroleum Hydrocarbons F4	Multiple Locations	Multiple Depths	<50	2,800
Phenanthrene	**BH109 S1C**	**0.2 - 0.9**	**15.3**	**6.2**
Polychlorinated Biphenyls (PCBs)	**BH101 S1C**	**0.2 - 0.6**	**1.37**	**0.35**
Pyrene	BH109 S1C	0.2 - 0.9	15.5	78
Selenium	BH109 S1B	0.1 - 0.2	0.9	2.4
Silver	BH109 S1B	0.1 - 0.2	2.1	20
Sodium Adsorption Ratio (SAR)	BH109 S1C	0.2 - 0.9	1.38	5
Styrene	Multiple Locations	Multiple Depths	<0.05	0.7
Tetrachloroethane, 1,1,1,2-	Multiple Locations	Multiple Depths	<0.04	0.058
Tetrachloroethane, 1,1,2,2-	Multiple Locations	Multiple Depths	<0.05	0.05
Tetrachloroethylene	Multiple Locations	Multiple Depths	<0.05	0.28
Thallium	Multiple Locations	Multiple Depths	<0.5	1
Toluene	BH101 S1C	0.2 - 0.6	0.32	2.3
Trichloroethane, 1,1,1-	Multiple Locations	Multiple Depths	<0.05	0.38
Trichloroethane, 1,1,2-	Multiple Locations	Multiple Depths	<0.04	0.05
Trichloroethylene	Multiple Locations	Multiple Depths	<0.03	0.061
Trichlorofluoromethane	Multiple Locations	Multiple Depths	<0.05	4
Uranium	BH105 S1C	0.5 - 0.6	0.84	23
Vanadium	BH107 S1C	0.4 - 1.0	38.4	86
Vinyl Chloride	Multiple Locations	Multiple Depths	<0.02	0.02
Xylene Mixture (Total)	BH109 S1B	0.1 - 0.2	0.3	3.1
Zinc	**Birch 1 DUP**	**0.05 - 0.15**	**2,010**	**340**

Table 3-1 Screening of Maximum Concentrations of Chemicals in Soil Against the Table 3 Site Condition Standards				
Chemical Parameter	***Location of Maximum Concentration***	***Sample Depth (mbgs)***	***Maximum Soil Concentration (µg/g)***	***Table 3 Site Condition Standard[a] (µg/g)***

BOLDED values in greyscale indicate that maximum measured concentration was greater than the Table 3 Site Condition Standard for residential/parkland/institutional property use with coarse textured soils.
< Concentration is below the value presented but cannot be more accurately quantified due to analytical uncertainty.

As presented in Table 3-1, the maximum concentrations of eighteen (18) chemicals in on-site soil exceeded the Table 3 SCS. Therefore, the following eighteen (18) chemicals were retained as COCs in soil for further evaluation in the Human Health Risk Assessment (HHRA), the Ecological Risk Assessment (ERA), and the assessment of risks to dogs:

- Anthracene
- Barium
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Cadmium
- Copper
- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- Lead
- Mercury
- Molybdenum
- Naphthalene
- Phenanthrene
- PCBs
- Zinc

4.0 HUMAN HEALTH RISK ASSESSMENT

The HHRA was conducted using scientific approaches that are generally consistent with Ontario Regulation 153/04 (O. Reg. 153/04) and in accordance with accepted practices and usual standards of thoroughness and competence for the profession of toxicology and environmental risk assessment. The HHRA was conducted using the fundamental risk assessment framework that is recognized in Canada and worldwide (Figure 4-1).

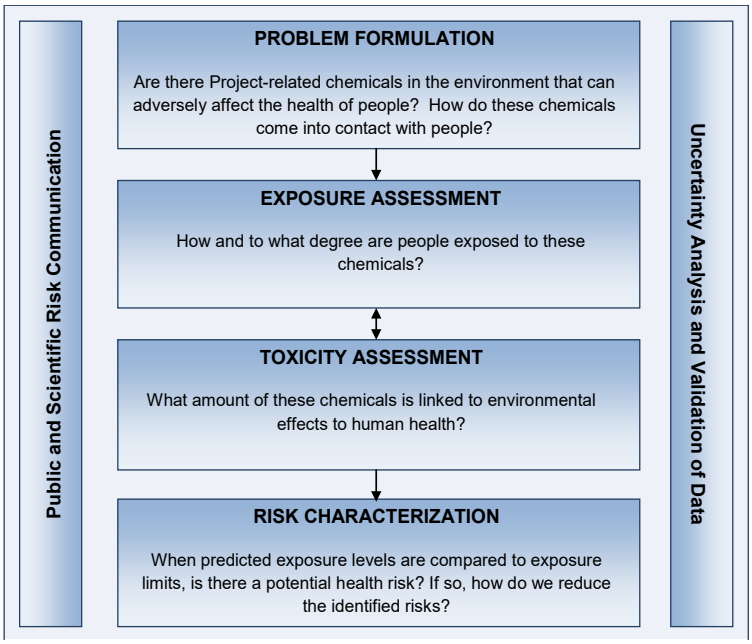

Figure 4-1 Standard Risk Assessment Framework

4.1 Problem Formulation

Typically, the development of a Conceptual Model is the result of completing the problem formulation phase of an RA (Figure 4-2). The key tasks requiring evaluation when developing a Conceptual Model include identifying human receptors of interest, developing an initial list of COCs, and identifying exposure pathways (*i.e.,* ways in which individuals may be exposed to compounds in the environment).

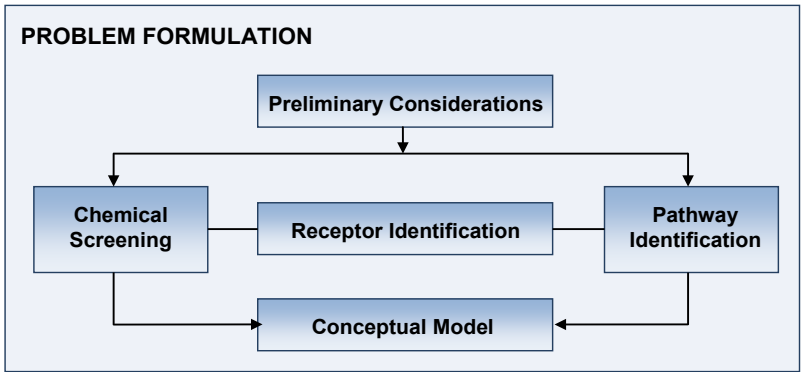

Figure 4-2 Components of the Conceptual Model

4.1.1 Identification of Potential Human Receptors

A human receptor is a hypothetical person (*e.g.,* infant, toddler, child, adolescent, adult) who may reside or work in the area being investigated and is, or could potentially be, exposed to the COCs. General physical and behavioural characteristics specific to the receptor type (*e.g.,* body weight, breathing rate, soil ingestion rate, *etc.*) are often used to determine the amount of chemical exposure received by each receptor. Due to differences in these characteristics between receptors of different age classes, predicted exposure will vary on a receptor-by-receptor basis. Consequently, the potential risks associated with exposure to COCs may differ depending on the receptor chosen for evaluation.

It is critical that the assessment is sufficiently comprehensive to ensure that overall risks have been adequately addressed. However, it is not feasible to consider all humans that may potentially be exposed to contaminants from the Site. As a result, it is important to select those human receptors that may be subject to the greatest potential risk. These will be people with the greatest probability of exposure to the contaminants detected on-site and those that have the greatest sensitivity to these contaminants.

Given the parkland land use of the Site, it was considered most appropriate to consider different types of receptors that may spend a significant amount of time on-site. As such, four (4) general receptor types of interest were identified, including:

1. A recreational receptor – a toddler and a lifetime composite receptor who regularly visits the Site within the context of a parkland;
2. An outdoor maintenance worker – an adult who may be involved with on-going Site maintenance, repairs, landscaping, *etc.*;
3. A construction worker – an adult who may (from time to time) be involved in sub-surface investigations and/or construction related matters which may provide the opportunity to come into direct contact with on-site soil; and,
4. An indoor worker – an adult who may work inside any future on-site building or structure.

4.1.2 Identification of Exposure Scenarios and Operable Exposure Pathways

Receptors may come into contact with contaminants in their environment in a variety of ways, depending on their daily activities and land use patterns. The means by which a person comes into contact with a contaminant in an environmental medium are referred to as exposure pathways. The means by which a contaminant enters the body from the environmental medium are referred to as exposure routes. There are three (3) major exposure routes through which contaminants can enter the body: inhalation; ingestion; and dermal absorption (*i.e.,* uptake through the skin).

Exposure pathways may require direct contact between receptors and the environmental media of concern (*e.g.,* incidental ingestion of soil or groundwater, dermal contact, *etc.*), or may be indirect requiring the movement of the contaminant from one environmental medium to another (*e.g.,* the migration of vapours from soil or groundwater to indoor or outdoor air).

Due to the volatility of certain contaminants, their vapours have a tendency to migrate from subsurface soil and/or groundwater into the enclosed space of an indoor environment. Depending on site-specific soil characteristics, building parameters and levels of contamination, the inhalation of impacted indoor air can be a significant health concern to occupants.

Exposures *via* the inhalation of impacted indoor air was considered to be a viable exposure pathway by which occupants (*e.g.,* recreational user and indoor worker) of any future on-site building could be exposed to impacted soil (Figure 4-3).

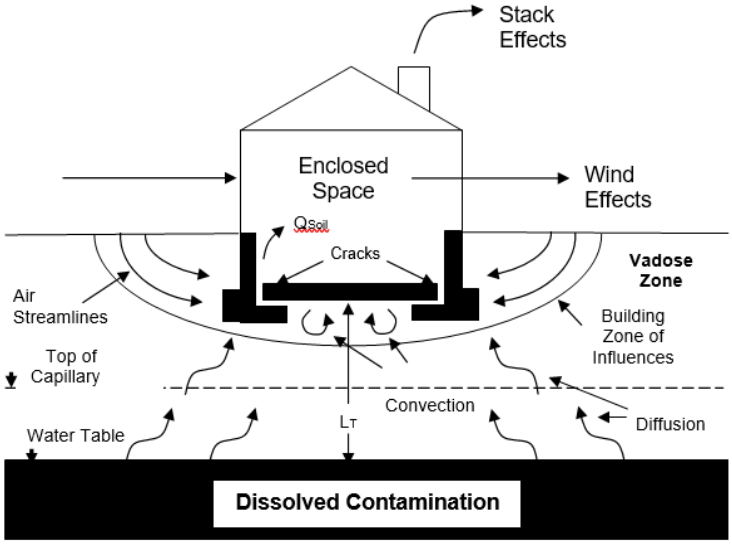

Figure 4-3 The Vapour Infiltration Pathway (US EPA, 2004)

The MECP has derived health-based component values to protect human health *via* the indoor vapour infiltration exposure pathway. As with any predictive modelling exercise, the degree of uncertainty associated with predictive outcomes is, in part, a function of both the quantity and quality of site-specific data available. When predicting exposures resulting from the vapour infiltration pathway, two (2) general areas of uncertainty exist, including (1) the prediction of soil-vapour concentrations based on measurements in soil (µg/g) and/or groundwater (µg/L), and (2) the degree of attenuation between underlying soil-vapour concentrations and the indoor environment.

The degree of attenuation as vapours migrate both laterally and vertically through soils is dependent on many site-specific factors such as soil characteristics, building-associated pressure differentials, and the existence of preferential conduits such as underground utilities. The assessment of risks to building occupants based on a comparison of maximum concentrations to generic MECP component values is generally considered to be highly conservative and intended to ensure that unacceptable risks do not occur rather than identifying conditions in which risks will occur.

The primary exposure pathways of concern for individuals utilizing the Site or working in various on-site capacities include:

Recreational User:

- Ingestion of soil/dust;
- Dermal contact with soil/dust;
- Inhalation of vapours *via* migration from soil to outdoor ambient air; and,
- Inhalation of vapours *via* migration from soil to indoor air.

Outdoor Maintenance Workers:

- Incidental ingestion of surface soil and dust;

- Dermal contact with surface soil; and,
- Inhalation of vapours *via* migration from soil to outdoor ambient air.

Construction Workers:

- Incidental ingestion of soil/dust;
- Inhalation of soil/dust;
- Dermal contact with soil/dust; and,
- Inhalation of vapours *via* migration from soil to outdoor ambient air.

Indoor Worker:

- Inhalation of vapours *via* migration from soil to indoor air.

4.1.3 Characterizing Exposure Point Concentrations

The derivation of an appropriate exposure point concentration or EPC (*i.e.,* the concentration of a contaminant in any environmental medium to which a receptor could reasonably be expected to be exposed over an extended period of time) is critical to the overall exposure assessment. The U.S. EPA Risk Assessment Guidance for Superfund (U.S. EPA, 1989) recommends that the upper 95% confidence interval on the arithmetic mean of the dataset (*i.e.,* the 95% UCLM) be used to represent the EPC. The rationale for the use of the 95% UCLM is that individuals, over a prolonged period of time, are assumed to move in a somewhat random fashion over the site in question and, therefore, may over time come into contact with an upper estimate of the average on-site soil concentration (*i.e.,* the 95% UCLM). Health Canada (2024) recommends that Preliminary Quantitative Risk Assessments (PQRAs) use the maximum on-site concentration to represent the EPC. An RA conducted under Ontario Regulation 153/04 must also employ the maximum on-site soil and/or groundwater concentration as the EPC. This recommendation inherently assumes that an individual is continuously in contact with the maximum on-site concentration for the entire exposure duration. Although considered a highly conservative measure, the current DDRA has utilized the maximum measured concentrations as the EPCs as required under Ontario Regulation 153/04 and as recommended by Health Canada (2024) when conducting PQRAs.

4.1.4 Identification of Contaminants of Concern to Human Health

As described in Section 3.1, the initial selection of COCs in soil included a comparison of the maximum measured concentrations or highest detection limits to the Table 3 SCS. Based on these comparisons, eighteen (18) chemicals in soil were retained as COCs for further evaluation in the RA.

The MECP SCS for use at contaminated sites in Ontario were developed considering various receptors (*e.g.,* human and ecological), exposure pathways (*e.g.,* inhalation of vapours, leaching of contaminants into groundwater), exposure scenarios (*e.g.,* maintenance worker, shorter-term construction worker scenarios) and other factors (*e.g.,* background levels in soil). The final SCS typically represents the lowest of the individual component values. Therefore, an exceedance of the SCS does not necessarily indicate that concentrations are above levels considered to be protective of human health.

4.1.5 Contaminants of Concern in Soil

Concentrations of multiple carcinogenic PAHs were in excess of the Table 3 SCS in nine (9) soil samples [BH101 S1C (0.2-0.6 mbgs), BH102 S1B (0.1-0.6 mbgs), BH103 S1B (0.1-0.3 mbgs), BH104 S1B (0.1-0.3 mbgs), BH105 S1C (0.5-0.6 mbgs), BH106 S1B (0.1-0.7 mbgs), BH107 S1C (0.4-1.0 mbgs), BH108 S1C (0.5-0.9 mbgs), and BH109 S1C (0.2-0.9 mbgs)] collected by G2S (2025b). The hazard to human health from the carcinogenic effects of PAHs is evaluated on the basis of benzo[a]pyrene total potency equivalents (TPE), which is the sum of the estimated cancer potency relative to benzo[a]pyrene for all potentially carcinogenic PAHs. The benzo[a]pyrene TPE for a soil sample is calculated by multiplying the concentration of each individual PAH in the sample by its benzo[a]pyrene Toxic Equivalence Factor (TEF) and summing the products. Therefore, the concentrations of carcinogenic PAHs found in these nine (9) soil samples were used to calculate the benzo[a]pyrene TPE (Table 4-1). As shown in Table 4-1, the calculated benzo[a]pyrene TPE in eight (8) of the nine (9) soil samples exceeded the benzo[a]pyrene Table 3 SCS (0.3 µg/g). As such, benzo[a]pyrene TPE was retained for further evaluation in the HHRA.

Table 4-1 Benzo(a)pyrene Total Potency Equivalent for Carcinogenic PAHs in Soil

COC	*B(a)P Toxic Equivalence Factors (TEF)*[a]	*Concentration (µg/g)*									*B(a)P TPE (µg/g)*								
		BH101 S1C	**BH102 S1B**	**BH103 S1B**	**BH104 S1B**	**BH105 S1C**	**BH106 S1B**	**BH107 S1C**	**BH108 S1C**	**BH109 S1C**	**BH101 S1C**	**BH102 S1B**	**BH103 S1B**	**BH104 S1B**	**BH105 S1C**	**BH106 S1B**	**BH107 S1C**	**BH108 S1C**	**BH109 S1C**
Acenaphthene	**0.001**	0.18	0.25	0.23	<0.05	0.16	0.19	0.16	0.13	2.62	0.00018	0.00025	0.00023	0.00005	0.00016	0.00019	0.00016	0.00013	0.00262
Acenaphthylene	**0.01**	0.09	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.0009	0.0005	0.0011	0.0005	0.0005	0.0005	0.0005	0.0005	0.0006
Anthracene	**0.01**	0.8	1.81	0.83	0.17	0.55	1.27	0.9	0.65	4.66	0.008	0.0181	0.0083	0.0017	0.0055	0.0127	0.009	0.0065	0.0466
Benzo[a]anthracene	**0.1**	0.94	2.13	1.29	0.21	0.37	0.68	0.54	0.5	2.53	0.094	0.213	0.129	0.021	0.037	0.068	0.054	0.05	0.253
Benzo[a]pyrene	**1.0**	0.53	1.53	0.84	0.15	0.14	0.29	0.18	0.12	1.77	0.53	1.53	0.84	0.15	0.14	0.29	0.18	0.12	1.77
Benzo[b]fluoranthene	**0.1**	0.82	3.15	1.32	0.22	0.43	0.81	0.77	0.47	3.74	0.082	0.315	0.132	0.022	0.043	0.081	0.077	0.047	0.374
Benzo[g,h,i]perylene	**0.01**	0.42	0.95	0.51	0.12	0.12	0.24	0.13	0.11	1.15	0.0042	0.0095	0.0051	0.0012	0.0012	0.0024	0.0013	0.0011	0.0115
Benzo[k]fluoranthene	**0.1**	0.5	1.23	0.73	0.14	0.22	0.38	0.49	0.43	1.74	0.05	0.123	0.073	0.014	0.022	0.038	0.049	0.043	0.174
Chrysene	**0.01**	1.3	3.06	1.8	0.38	0.6	0.86	0.82	0.92	5.21	0.013	0.0306	0.018	0.0038	0.006	0.0086	0.0082	0.0092	0.0521
Dibenzo[a,h]anthracene	**1.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.15	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.15
Fluoranthene	**0.01**	3.12	9.18	4.09	0.86	1.95	3.87	3.27	2.23	23.6	0.0312	0.0918	0.0409	0.0086	0.0195	0.0387	0.0327	0.0223	0.236
Indeno[1,2,3-cd]pyrene	**0.1**	0.29	0.97	0.43	0.08	0.11	0.24	0.13	0.08	0.87	0.029	0.097	0.043	0.008	0.011	0.024	0.013	0.008	0.087
Pyrene	**0.001**	2.56	7.98	3.56	0.72	1.59	2.9	2.6	1.65	15.5	0.00256	0.00798	0.00356	0.00072	0.00159	0.0029	0.0026	0.00165	0.0155
Benzo(a)pyrene Total Potency Equivalents (B(a)P TPE)		-	-	-	-	-	-	-	-	-	0.89	2.49	1.34	0.28	0.34	0.62	0.48	0.36	3.2

[a] TEF values were taken from MECP (2024).

< Indicates that the concentration is lower than the value presented but cannot be more accurately quantified due to analytical uncertainty.

To determine which COCs in soil are in excess of values protective of human health, the maximum concentrations of those chemicals retained as COCs in soil (as well as the benzo(a)pyrene TPE) were compared to the MECP human health component values for residential/parkland/institutional properties with coarse textured soil under a non-potable groundwater condition (Table 4-2).

Given that the Site's use as parkland falls within the broader MECP category of residential/parkland/institutional land use, the S1 component value protective of direct exposure to soil *via* incidental ingestion and dermal contact would generally be used to identify potential risks to recreational users. The S1 component values were derived to be protective of a residential scenario in which it is assumed that receptors of all ages would be directly exposed to soil 7 days/week for 39 weeks/year (which represents the number of weeks per year when exposure to soil is not prevented by snow or frozen ground conditions). An exposure frequency of 7 days/week may be an overly conservative assumption for most park users; therefore, for the assessment of risks to recreational users in the current assessment, the Site was considered to fall under the local urban park category (*i.e.*, a common neighbourhood park in an urban area) as described in the MECP (2024a) *Technical Memorandum: General Guidance on Determining Exposure Frequency (Days/Week) when Assessing Parkland Sites in Tier 3 Risk Assessments Under Ontario Regulation 153/04*. For a local urban park, the MECP (2024a) recommends an exposure frequency (EF) of 4 days/week. As such, for the assessment of risks from incidental ingestion and dermal contact with soil/dust, recreational users were assumed to spend 4 days/week for 39 weeks/year exposed to COCs outdoors (MOE, 2011; MECP, 2024a). Modified S1 component values protective of these pathways for recreational users were derived by multiplying the generic S1 component values by a factor of 7/4.

The human health component values for industrial/commercial/community land use protective of direct contact by the outdoor maintenance worker (S2) and construction/trench worker (S3) and the inhalation of vapours in indoor air by indoor workers (S-IA) were also compared to the maximum concentrations to provide an indication of potential unacceptable risks for these exposure scenarios.

To reflect the most current scientific methodologies of the MECP, the MECP (2016) human health component values provided in the Modified Generic Risk Assessment (MGRA) model were revised using the most recently recommended MECP (2024b) TRVs. The human health component values presented in Table 4-2 are protective of the following scenarios:

S1 Soil Contact	Protective of soil ingestion and direct dermal contact within a residential/parkland/institutional setting assuming all age categories (*e.g.*, infant through to adult) are present
Modified S1 Soil Contact	Modified S1 component value assuming an exposure frequency of 4 days/week for 39 weeks/year (MECP, 2024a). Protective of direct contact within a parkland setting assuming all age categories (*e.g.,* infant through to adult) are present
S2 Soil Contact	Low-intensity, moderate-frequency soil ingestion and direct dermal contact for adults on a commercial/industrial property (adult outdoor worker)
S3 Soil Contact	High-intensity, low-frequency soil ingestion, direct dermal contact, and inhalation of soil particulate protective of an adult worker digging in the soil (adult subsurface worker)
Commercial Soil to Indoor Air (commercial S-IA)	Migration of chemical vapours from soil to indoor air under an industrial/commercial/community land use
Soil to Outdoor Air (S-OA)	Migration of chemical vapours from soil to outdoor air
Indoor Air Odour (IA-Odour)	Unacceptable odours in indoor air

Table 4-2 Comparison of Maximum Concentrations of COCs in Soil to Component Values Protective of Human Health (µg/g)

COC	Max Concentration	Soil Contact				Soil to Indoor Air (S-IA)[c]	IA-Odour[a]	S-OA[a]
		S1[a]	Modified S1[b]	S2[c]	S3[c]			
Anthracene	4.66	57	100	70	2,600	270	NV	950
Barium	5,860	**3,800**	6,650	32,000	8,600	NA/NV	NA/NV	NA/NV
Benz(a)anthracene	2.53	5.7	10	7	260	1,800	NV	600
Benzo(a)pyrene	1.77	**0.57**	**1.0**	**0.7**	17	5,400	NV	68
Benzo(a)pyrene TPE	3.2	**0.57**	**1.0**	**0.7**	17	5,400	NV	68
Benzo(b)fluoranthene	3.74	5.7	10	7	260	150,000	NV	3,800
Benzo(k)fluoranthene	1.74	5.7	10	7	260	180,000	NV	3,800
Cadmium	3.4	**0.69**	**1.2**	7.9	7.9	NA/NV	NA/NV	NA/NV
Copper	433	**200**	**350**	1,900	1,900	NA/NV	NA/NV	NA/NV
Dibenz(a,h)anthracene	0.15	0.57	1.0	0.7	26	880,000	NV	790
Fluoranthene	23.6	57	100	70	2,600	6,700	NV	4,500
Indeno(1,2,3-cd)pyrene	0.97	5.7	10	7	260	1,200,000	NV	7,300
Lead	2,840	**120[d] (45[e])**	**120[d] (79)**	**420[e]**	**420[e]**	NA/NV	NA/NV	NA/NV
Mercury	2.81	9.8	17	67	670	3.9	NV	36
Molybdenum	7.8	110	193	1,200	1,200	NA/NV	NA/NV	NA/NV
Naphthalene	2.6	360	630	2,800	28,000	9.6	150	270
Phenanthrene	15.3	NV	NV	NV	NV	NV	NV	NV
PCBs	1.37	**0.35**	**0.61**	2.7	4.1	45	NV	120
Zinc	2,010	6,800	11,900	57,000	57,000	NA/NV	NA/NV	NA/NV

BOLDED values highlighted in grey are exceeded by the maximum concentrations.

NA Not applicable. This chemical is insufficiently volatile to warrant assessment *via* this pathway (MOECC, 2016).

NV No value. Indicates that an applicable human health component value and/or an appropriate TRV was not available.

[a] Component values are the Table 3 component values for residential/parkland/institutional property use with coarse textured soil (revised using the MECP (2024b) TRVs).

[b] Component values are the Table 3 component values for residential/parkland/institutional property use with coarse textured soil (revised using the MECP (2024b) TRVs), adjusted for an exposure frequency of 4 days/week for 39 weeks/year for recreational users under a parkland scenario (MECP, 2024a).

[c] Component values are the Table 3 human health component values for industrial/commercial/community property use with coarse textured soil (revised using the MECP (2024b) TRVs).

[d] Value represents the Ontario background concentration when the MECP component value (in brackets) is lower than the background concentration.

[e] Component values are those provided in the MECP (2024c) Technical Update: Dealing with Lead in Soil in Human Health Risk Assessments under O. Reg. 153/04.

Exposure to COCs in Soil for Recreational Users and Outdoor Workers

The maximum measured concentrations of benzo[a]pyrene, benzo[a]pyrene TPE, cadmium, copper, lead, and PCBs exceeded their modified S1 component values derived to be protective of recreational users that may have direct contact with impacted soils (Table 4-2). Benzo[a]pyrene, benzo[a]pyrene TPE, and lead also exceeded their S2 component values protective of long-term outdoor maintenance workers that may have direct contact with impacted soils. Additionally, the maximum concentration of lead exceeded the S3 component value protective of construction workers that may have direct contact with impacted soils.

Concentrations of COCs exceeded their S2, S3, and/or their modified S1 component values in multiple soil samples collected from landscaped areas across the Site. Table 4-3 presents a summary of the soil samples with concentrations of COCs exceeding values protective of recreational users and outdoor workers.

Table 4-3 Summary of Soil Samples with Concentrations of COCs Exceeding Values Protective of Recreational Users and Outdoor Workers		
COC	***Component Value Exceeded***	***Soil Samples with Exceedances***
Benzo(a)pyrene	Modified S1	BH102 S1B (0.1-0.6 mbgs) BH109 S1C (0.2-0.9 mbgs)
	S2	BH102 S1B (0.1-0.6 mbgs) BH103 S1B (0.1-0.3 mbgs) BH109 S1C (0.2-0.9 mbgs)
Benzo(a)pyrene TPE	Modified S1	BH102 S1B (0.1-0.6 mbgs) BH103 S1B (0.1-0.3 mbgs) BH109 S1C (0.2-0.9 mbgs)
	S2	BH101 S1C (0.2-0.6 mbgs) BH102 S1B (0.1-0.6 mbgs) BH103 S1B (0.1-0.3 mbgs) BH109 S1C (0.2-0.9 mbgs)
Cadmium	Modified S1	Birch 1 (0.05-0.15 mbgs) Birch 1 DUP (0.05-0.15 mbgs) Birch 2 (0.05-0.15 mbgs) BH101 S1C (0.2-0.6 mbgs) BH102 S1B (0.1-0.6 mbgs) BH105 S1C (0.5-0.6 mbgs) BH109 S1C (0.2-0.9 mbgs)
Copper	Modified S1	BH101 S1C (0.2-0.6 mbgs)
Lead	Modified S1	Birch 1 (0.05-0.15 mbgs) Birch 1 DUP (0.05-0.15 mbgs) Birch 2 (0.05-0.15 mbgs) Birch 3 (0.05-0.15 mbgs) BH101 S1C (0.2-0.6 mbgs) BH102 S1B (0.1-0.6 mbgs) BH102 S1C (0.6-0.9 mbgs) BH103 S1B (0.1-0.3 mbgs) BH103 S1C (0.3-0.6 mbgs) BH104 S1B (0.1-0.3 mbgs) BH104 S1C (0.3-0.6 mbgs) BH105 S1C (0.5-0.6 mbgs) BH106 S1B (0.1-0.7 mbgs) BH106 S2 (1.5-1.8 mbgs) BH107 S1B (0.1-0.4 mbgs) BH107 S1C (0.4-1.0 mbgs) BH108 S1B (0.1-0.5 mbgs) BH108 S1C (0.5-0.9 mbgs) BH109 S1B (0.1-0.2 mbgs) BH109 S1C (0.2-0.9 mbgs)
	S2 and S3	Birch 1 (0.05-0.15 mbgs) Birch 1 DUP (0.05-0.15 mbgs) BH101 S1C (0.2-0.6 mbgs) BH102 S1B (0.1-0.6 mbgs) BH102 S1C (0.6-0.9 mbgs) BH104 S1B (0.1-0.3 mbgs) BH104 S1C (0.3-0.6 mbgs) BH105 S1C (0.5-0.6 mbgs) BH106 S1B (0.1-0.7 mbgs) BH108 S1C (0.5-0.9 mbgs) BH109 S1B (0.1-0.2 mbgs) BH109 S1C (0.2-0.9 mbgs)
PCBs	Modified S1	BH101 S1C (0.2-0.6 mbgs)

The frequency of exceedances was the highest for lead, with 19 of 22 soil samples containing concentrations exceeding the modified S1 component value (79 µg/g), and the maximum concentration of 2,840 µg/g exceeding this value by a factor of 36x. It is recognized that mobile receptors are unlikely to spend all of their time in a given area where they may continually be

exposed to the maximum concentration; however, a 95% UCLM concentration (which is often used as an upper estimate of the average concentration to which a receptor may be exposed across the Site) of 1,000 µg/g calculated for lead using all soil data indicates that even average exposure estimates notably exceed the health-based value. It should also be noted that while it was assumed that recreational users would only be exposed while visiting the park 4 days/week, there may be additional opportunities for exposure to lead and other COCs at home following visits to the park, as impacted soils may be tracked into homes on shoes and dog fur. In these situations, comparison to the generic S1 component value of 45 µg/g (which assumes that exposure occurs 7 days/week) may be more appropriate.

Given that concentrations of one or more COCs exceeded the S2 and/or modified S1 component values in surface soils collected at depths of 0.50 mbgs or shallower at 12 of 13 sample locations (*i.e.*, Birch 1, Birch 2, Birch 3, BH101, BH102, BH103, BH104, BH105, BH106, BH107, BH108, and BH109), the majority of the Site has been shown to contain impacted soils that represent a potential concern to human health for receptors that may have opportunities frequent exposure. As such, it is recommended that measures are taken to ensure that soils are not exposed at ground surface and available for direct exposure to park users and outdoor maintenance workers. As described by G2S (2025c), the Site is generally grass covered with some worn footpath areas leading from the Site entrance at the northeast corner of the Site to the top of the fill mound. The areas surrounding shelters that are present in the northeast and central portions of the Site were significantly worn with no grass/root mat, with red brick and construction debris observed at the ground surface. Overall, G2S reported that the soft cap barrier varied from 6 to 9 cm in thickness and was not present in two (2) locations (Cap C and Cap E) (refer to the Test Pit Location Plan in Appendix A). Based on these observations, it may be difficult to consistently prevent contaminated soils from becoming exposed, particularly in high traffic areas of the park. It is recommended that the City evaluate whether targeted capping measures can be implemented in areas with exposed soils, and whether monitoring and repairs can occur on a sufficiently frequent basis to prevent exposure given the limited thickness of the existing soft cap barrier across the Site.

Alternatively, widespread soil excavation and/or the addition of capping measures across the Site is recommended. Capping measures may include hard caps (*e.g.*, asphalt, concrete, or paving stones) or soft caps consisting of a minimum of 30-50 cm of clean topsoil or soils meeting the appropriate MECP soil quality standards. Consideration should also be given to the inclusion of landscaping fabric to demarcate the clean soil cap from underlying contamination.

For construction workers, use of personal protective equipment (PPE) is recommended to mitigate exposure to impacted soils during sub-surface construction activities to prevent exposure to lead.

Maximum concentrations of COCs were below the S-OA component values protective of outdoor air exposure. Therefore, it is not anticipated that COCs in on-site soil will result in unacceptable risks to recreational users and outdoor workers *via* the outdoor air exposure pathway.

Exposure to COCs in Soil *via* the Inhalation of Vapours in Indoor Air

Although the Site falls within the MECP residential/parkland/institutional land use category, the residential S-IA component values were derived by the MECP to be protective of residents *via* the inhalation of vapours migrating from impacted soil to indoor air, assuming toddlers and composite receptors are exposed to impacted indoor air for 22.5 to 24 hours/day, 7 days/week, 50 weeks/year (MECP, 2011). These values are considered to be overly conservative for the

current Site use as a dog park, even if future buildings (*e.g.*, washrooms) are constructed on-site. As previously described, for the assessment of risks to recreational users, the Site was considered to fall under the local urban park category (*i.e.*, a common neighbourhood park in an urban area) as described in the MECP (2024a) *Technical Memorandum: General Guidance on Determining Exposure Frequency (Days/Week) when Assessing Parkland Sites in Tier 3 Risk Assessments Under Ontario Regulation 153/04*. For a local urban park, the recommended exposure frequency is 4 days/week (MECP, 2024a). The commercial S-IA component values were derived by the MECP to be protective of indoor workers *via* the inhalation of vapours migrating from impacted soil to indoor air, assuming an indoor worker is exposed to impacted indoor air for 9.8 hours/day, 5 days/week, 50 weeks/year (MECP, 2011). Based on the MECP (2024a) guidance, the exposure frequency of recreational users under a parkland setting is lower than the exposure frequency utilized to derive the commercial S-IA component values, and as such, the commercial S-IA component values are considered to be adequately protective of recreational users that may utilize any on-site parkland buildings in the future. Maximum concentrations of all COCs were below the commercial S-IA component values. Therefore, it is not anticipated that COCs in on-site soil will result in unacceptable risks to recreational users and indoor workers *via* the migration of vapours from soil to indoor air for any future on-site building(s).

5.0 ECOLOGICAL RISK ASSESSMENT

The initial selection of COCs in soil included a comparison of the maximum measured concentrations or highest detection limits to the Table 3 SCS. Based on these comparisons, eighteen (18) chemicals in soil were retained as COCs for further evaluation in the RA.

As described previously, the SCS represent the lowest of a series of component values designed to be protective of a number of human and ecological receptors. Therefore, an exceedance of the Standard does not necessarily indicate that concentrations are above those levels that are considered to be protective of ecological receptors. The purpose of an ERA is to determine whether COCs in on-site soil have the potential to result in unacceptable risks to ecological receptors. Therefore, the maximum concentrations or highest detection limits of COCs in on-site soil that were in excess of the SCS were compared to the MECP component values protective of ecological receptors.

The following section provides a qualitative evaluation of potential risks to on-site receptors terrestrial receptors and off-site aquatic receptors as a result of exposure to COCs in soil.

5.1 Contaminants of Concern in Soil

To further address the potential risks of COCs in soil to ecological receptors, the maximum concentration of COCs in soil were compared to the MECP component values derived to be protective of birds/mammals, plants/soil organisms, and the leaching of chemicals from soil to groundwater and the subsequent movement to nearby surface water bodies (*i.e.*, the S-GW3 component values) (Table 5-1). The S-GW3 component values are based on a number of generic input parameters, including the distance to the nearest surface water body which is assumed to be 36.5 m (MECP, 2011). Given that the nearest body of surface water is the Sherman Inlet, located approximately 650 m northeast of the Site, site-specific S-GW3 values were also derived using the MECP (2016) MGRA model.

Table 5-1 Comparison of COC Concentrations in Soil to Ecological Component Values (µg/g)

COC	*Maximum Concentration*	*MECP Component Values Protective of Ecological Receptors*			
		Plants and Soil Organisms[a]	*Birds and Mammals*[a]	*Generic S-GW3*[a]	*Site Specific S-GW3*[b]
Anthracene	4.66	**2.5**	38,000	**0.67**	7.2
Barium	5,860	**750**	**390**	NV	NV
Benz(a)anthracene	2.53	**0.5**	NV	5.1E+11	6.9E+10
Benzo(a)pyrene	1.77	20	1,600	3.8E+13	5.3E+14
Benzo(b)fluoranthene	3.74	20[c]	1,600[c]	7.7E+13	1.1E+15
Benzo(k)fluoranthene	1.74	7.6	NV	2.5E+13	3.6E+14
Cadmium	3.4	12	**1.9**	NV	NV
Copper	433	**140**	770	NV	NV
Dibenz(a,h)anthracene	0.15	NV	NV	2.4E+13	3.4E+14
Fluoranthene	23.6	50	**0.69**	40,000	140,000
Indeno(1,2,3-cd)pyrene	0.97	**0.38**	NV	8.6E+13	1.2E+15
Lead	2,840	**250**	**120[d] (32)**	NV	NV
Mercury	2.81	10	20	1.2E+14	1.6E+15
Molybdenum	7.8	40	**6.9**	NV	NV
Naphthalene	2.6	**0.6**	380	200	2,800
Phenanthrene	15.3	**6.2**	2,700	270	2,900
PCBs	1.37	33	**1.1**	9.9E+11	1.4E+13

Table 5-1 Comparison of COC Concentrations in Soil to Ecological Component Values (µg/g)					
COC	***Maximum Concentration***	***MECP Component Values Protective of Ecological Receptors***			
		Plants and Soil Organisms[a]	***Birds and Mammals[a]***	***Generic S-GW3[a]***	***Site Specific S-GW3[b]***
Zinc	2,010	**400**	**340**	NV	NV

BOLDED values highlighted in grey are exceeded by the maximum concentrations.
NV No value provided by the MECP.
[a] Component values are the MECP Table 3 ecological component values for residential/parkland/institutional property use with coarse textured soil.
[b] Site-specific S-GW3 values were calculated using the MECP (2016) MGRA model and a distance of 650 m to the nearest body of surface water.
[c] The MECP component value for benzo(a)pyrene was selected as a surrogate in the absence of a component value for benzo(b)fluoranthene.
[d] Value represents the Ontario background concentration when the MECP component value (in brackets) is lower than the background concentration.

Risks to Plants/Soil Organisms and Birds/Mammals

Based on the comparison provided in Table 5-1, maximum concentrations of anthracene, barium, benz(a)anthracene, copper, indeno[1,2,3-cd]pyrene, lead, naphthalene, phenanthrene, and zinc exceeded component values protective of plants/soil organisms. In addition, maximum concentrations of barium, cadmium, fluoranthene, lead, molybdenum, PCBs, and zinc exceeded component values protective of birds/mammals.

The MECP has developed a "modified ecological protection (MEP)" option within the MGRA Model, which is intended to both promote land redevelopment and preserve existing and potential future ecological habitat. This method provides property owners with a greener alternative to capping over ecological habitat. Using the MECP (2016) MGRA model and MEP, modified ecological component values were derived for soil COCs that exceeded the Table 3 ecological component values for residential/parkland/institutional property use with coarse textured soil (Table 5-2).

Table 5-2 Comparison of COC Concentrations in Soil to Ecological Component Values with Modified Ecological Protection (µg/g)			
COC	***Maximum Concentration***	***MECP Component Values[a]***	
		Plants and Soil Organisms	***Birds/Mammals***
Anthracene	4.66	61	38,000,000
Barium	5,860	**2,900**	390,000
Benz(a)anthracene	2.53	**1.9**	NV
Cadmium	3.4	46	1,900
Copper	433	**430**	770,000
Fluoranthene	23.6	340	690
Indeno(1,2,3-cd)pyrene	0.97	1.4	NV
Lead	2,840	**2,100**	32,000
Molybdenum	7.8	76	6,900
Naphthalene	2.6	42	380,000
Phenanthrene	15.3	24	2,700,000
PCBs	1.37	63	1,100
Zinc	2,010	**1,100**	340,000

BOLDED values highlighted in grey scale are exceeded by the maximum on-site concentration.
NV No value provided by the MECP
[a] Component values were derived using the MGRA model and modified ecological protection.

Based on the comparison provided in Table 5-2, the maximum concentrations of barium, benz(a)anthracene, copper, lead, and zinc exceeded the modified component values protective of plants and soil organisms. Concentrations of COCs exceeded their modified component values protective of plants/soil organisms as follows:

- Barium in soil sample BH104 S1B (0.1-0.3 mbgs);
- Benz(a)anthracene in soil samples BH102 S1B (0.1-0.6 mbgs) and BH109 S1C (0.2-0.9 mbgs);
- Copper in soil sample BH101 S1C (0.2-0.6 mbgs);
- Lead in soil samples Birch 1 DUP (0.05-0.15 mbgs) and BH109 S1C (0.2-0.9 mbgs); and,
- Zinc in soil samples Birch 1 (0.05-0.15 mbgs) and Birch 1 DUP (0.05-0.15 mbgs).

Given that concentrations of COCs exceeded their modified component values protective of plants/soil organisms in surface soils collected at depths shallower than 0.30 mbgs at boreholes Birch 1, BH101, BH102, BH104 and BH109, adverse effects may occur to plants and soil organisms in these areas.

Maximum concentrations of all COCs were below generic component values or modified component values protective of mammals/birds (Tables 5-1 and 5-2). Therefore, concentrations of COCs in soil are not anticipated to pose a significant risk to populations of most mammals/birds; however, risks may occur to sensitive species.

Risks to Aquatic Life

As shown in Table 5-1, the maximum concentration of anthracene exceeded the generic S-GW3 component value; however, the maximum concentration was below the site-specific S-GW3 component value protective of aquatic life in nearby surface water bodies that may be impacted by the leaching of COCs from soil to groundwater and the subsequent migration of groundwater to surface water. Concentrations of all other COCs in soil were below their generic and site-specific S-GW3 component values. Based on the available data, concentrations of COCs in soil are not anticipated to represent a risk to aquatic receptors in the nearest off-site surface water body (*i.e.*, Sherman Inlet).

6.0 RISK ASSESSMENT FOR DOGS

Given that the Site is currently used as a dog park, the DDRA included an assessment of potential risks to dogs from exposure to contaminants in on-site soil. As described in Section 3.1, the initial selection of COCs in soil included a comparison of the maximum measured concentrations or highest detection limits to the Table 3 SCS. Based on these comparisons, eighteen (18) chemicals in soil were retained as COCs for further evaluation in the DDRA.

Although the MECP does not provide component values protective of dogs, the S1 component values are protective of human health and consider the elevated soil ingestion rates commonly assumed for the toddler age group which may also be relevant for dogs while playing outdoors and grooming themselves after outdoor activities. Many of these S1 component values were derived using mammalian toxicity data with the application of uncertainty factors to account for species-to-species extrapolation. The MECP also provides component values protective of mammalian wildlife, including meadow vole, sheep, red fox, and short-tailed shrew; however, the assessment of risks to wildlife is generally based on population-level effects rather than the occurrence of adverse effects in individuals. As a result, the MECP component values for mammals were derived to ensure that receptors are able to successfully survive and reproduce at a rate that is sufficient to maintain the overall population, despite the potential for risks to the health of individuals. Although these component values are only protective of population-level effects, some are lower than the S1 component values due to species-specific sensitivities to certain COCs, or significantly higher soil ingestion rate to body weight ratios for receptors such as the short-tailed shrew. Overall, given that dogs are commonly considered to be 'part of the family', they should be afforded a level of protection that is similar to what is provided to humans in an HHRA.

As a secondary screening step, the maximum concentrations of COCs in soil were compared to the modified S1 component values (as presented in the HHRA to account for a 4 day/week assumed exposure frequency) and component values protective of the meadow vole, sheep, red fox and short-tailed shrew (Table 6-1). The COC with the highest margin of exceedance was conservatively retained for further evaluation in the dog RA as a 'worst case' scenario.

Table 6-1 Comparison of COC Concentrations in Soil to Modified S1 and Mammalian Component Values (µg/g)

COC	*Maximum Concentration*	*Modified S1[a]*	*Meadow Vole[b]*	*Sheep[b]*	*Red Fox[b]*	*Short-Tailed Shrew[b]*	*Maximum Margin of Exceedance[c]*
Anthracene	4.66	100	473,000	237,000	1,000,000	37,900	-
Barium	5,860	6,650	**4,950**	**2,640**	6,750	**394**	15
Benz(a)anthracene	2.53	10	NV	NV	NV	NV	-
Benzo(a)pyrene	1.77	**1.0**	69,000	25,800	46,300	1,620	1.8
Benzo(b)fluoranthene	3.74	10	NV	NV	NV	NV	-
Benzo(k)fluoranthene	1.74	10	NV	NV	NV	NV	-
Cadmium	3.4	**1.2**	4,520	2,600	2,390	**2.4**	2.8
Copper	433	**350**	31,900	**283**	16,600	772	1.5
Dibenz(a,h)anthracene	0.15	1.0	NV	NV	NV	NV	-
Fluoranthene	23.6	100	115,000	51,200	147,000	**0.69**	34
Indeno(1,2,3-cd)pyrene	0.97	10	NV	NV	NV	NV	-
Lead	2,840	**79**	185,000	5,380	88,200	**1,760**	36
Mercury	2.81	17	1,590	532	216	32	-
Molybdenum	7.8	193	557	299	3,050	**6.9**	1.1
Naphthalene	2.6	630	1,260	697	11,800	379	-

Table 6-1 Comparison of COC Concentrations in Soil to Modified S1 and Mammalian Component Values (µg/g)

COC	Maximum Concentration	Modified S1[a]	Meadow Vole[b]	Sheep[b]	Red Fox[b]	Short-Tailed Shrew[b]	Maximum Margin of Exceedance[c]
Phenanthrene	15.3	NV	36,000	17,800	82,400	2,650	-
PCBs	1.37	**0.61**	1,700	617	1,040	**1.2**	2.2
Zinc	2,010	11,900	492,000	4,200	36,900	5,520	-

BOLDED values highlighted in grey are exceeded by the maximum concentrations.
NV No value provided by the MECP.
- Indicates that the maximum concentration did not exceed an applicable component value.
[a] Component values are the Table 3 component values for residential/parkland/institutional property use with coarse textured soil (revised using the MECP (2024b) TRVs), adjusted for an exposure frequency of 4 days/week for 39 weeks/year for recreational users under a parkland scenario (MECP, 2024a).
[b] Component values are the ecological component values from the Ecological tab of the MECP (2016) MGRA model.
[c] Value represents the maximum concentration divided by the lowest component value.

Based on the comparisons in Table 6-1, the maximum concentration of lead had the greatest margin of exceedance over the modified S1 component value or mammalian component values. As such, lead was retained for further assessment in the assessment of risks to dogs. Although the margin of exceedance for copper was low, various breeds of dogs (*e.g.*, Bedlington Terriers, Labrador Retrievers, West Highland White Terriers, Skye Terriers, Keeshonds, American Cocker Spaniels, and Doberman Pinschers) are known to have an inherited sensitivity that may result in chronic copper poisoning (Blakley, 2024). Therefore, copper was also retained for further assessment.

6.1.1 Identification of Exposure Scenarios and Operable Exposure Pathways

Under a dog park scenario, dogs may be exposed to contaminants in on-site soil *via* three (3) distinct pathways: ingestion, inhalation, and dermal contact. The primary pathway of concern is incidental ingestion of soil while playing fetch with items landing on or rolling across the ground surface, digging in soil, and during grooming. Dermal exposure can occur when contaminants are absorbed through the skin as a result of direct contact with impacted soil. Dermal exposure is generally assumed to be negligible for animals. This is because fur on animals, such as dogs, reduce dermal exposure by limiting the contact of skin with chemicals in soil (Sample *et al.*, 1997). Exposure may also occur *via* inhalation if chemicals are volatile, or if they are components of fine particulate matter which may be re-suspended in ambient air. However, given that the identified COCs in soil have limited volatility, the inhalation of vapours does not represent a potential concern. In addition, since the Site is primarily cover by grass, the inhalation of particulates is considered to represent a relatively minor route of exposure. As such, soil ingestion tends to be the most significant route of exposure, contributing the greatest to overall risk.

To calculate exposure to a dog *via* ingestion of soil, assumptions need to be made regarding the rate of soil ingestion and the body weight. Given that each of these characteristics will be highly variable across different breeds and ages of dogs, average or central tendency estimates were selected. A study conducted by Calabrese and Stanek (1995) used a soil tracer-based mass-balance approach to estimate soil ingestion in a 2-year old female Irish Setter pet dog over a three-day period. The dog spent approximately 8-hours per day outside of the house in a fenced yard which was primarily covered with grass (>90%). The study reported an ingestion rate of approximately 10-20 g/day. For comparison, the MECP assumes a daily incidental soil ingestion rate of 0.05 g/day for a human adult and 0.2 g/day for a toddler.

The ingestion rate of 10-20 g/day reported by Calabrese and Stanek (1995) represented approximately 2-4% of the dog's daily dietary consumption of food. This is similar to the rate of 2.8% reported by Sample and Suter (1997) for the red fox. The dog's body weight was not reported by Calabrese and Stanek (1995); however, female Irish Setters are reported to have an average weight of 60 pounds (27kg) (American Kennel Club, 2026). For the current assessment, the average soil ingestion rate (15 g/day) and the average body weight for a female Irish Setter (27 kg) were used to represent a dog that may be exposed to copper and lead in on-site soil. Given that the soil ingestion rate is assumed to be proportional to a dog's body weight, a similar ingestion rate per body weight would likely occur for other dog breeds of varying sizes.

Dogs were assumed to be exposed 4 days/week (reflective of typical urban park use as reported by MECP (2024a)) for 39 weeks/year (the assumed number of weeks when exposure to soil is not restricted by snow or frozen ground conditions).

6.1.2 Exposure Assessment

Contaminant exposure for dogs *via* soil ingestion was calculated as a daily dose (mg/kg/day) using the following equation as shown for lead:

$$\text{Dose (mg/kg}_{BW}\text{-day)} = \frac{(C_S \times IR_S \times RAF_{Oral} \times D_2 \times D_3)}{BW}$$

where:

C_S =	maximum concentration of contaminant in soil (2,840 mg/kg)
IR_S =	soil ingestion rate for dogs (0.015 kg/d) (average reported by Calabrese & Stanek, 1995)
RAF_{Oral} =	relative absorption factor from the gastrointestinal tract (1.0) (assumed)
D2 =	days per week exposed (4 days/7 days) (MECP, 2024a)
D3 =	weeks per year exposed (39 weeks/52 weeks) (MECP, 2024a)
BW =	body weight (27 kg) (average body weight for a female Irish Setter as reported by the American Kennel Club (2026))

As such, the predicted daily exposure to lead for dogs *via* incidental ingestion of soil was calculated as follows:

Dose = (2,840 mg/kg * 0.015 kg/day * 1 * 4d/7d * 39w/52w) / 27 kg

Dose = 0.68 mg/kg/day

Using a maximum concentration of 433 mg/kg, the predicted daily exposure for copper was calculated to be 0.10 mg/kg/day.

6.1.3 Hazard Assessment

Exposure limits are concentrations or doses that are considered to provide protection to receptors of interest. For ERAs, exposure limits are typically protective of population-level effects such as survival, growth, and reproduction. However, given that dogs are considered to be 'part of the family', potential risks were assessed on an individual basis, similar to the level of

protection afforded to human health. A literature review was completed to identify exposure limits protective of adverse effects in dogs.

A No-Observed-Adverse-Effect-Level (NOAEL) of 0.8 mg/kg/day was identified for changes in body weight in a 2-year dog-study (Azar *et al*., 1973). This exposure limit is considered to be protective of the occurrence of adverse effects in dogs. To provide an indication of exposure levels at which adverse effects are more likely to occur, exposure limits for acute toxicity and low-level chronic poisoning were also identified (Table 6-2).

Chronic copper toxicosis most commonly occurs in sheep as a result of the ingestion of excessive copper over a prolonged duration. Adverse effects occur when copper that has accumulated within the liver is released to the blood in large amounts (Blakley, 2024). Acute effects in sheep and other animals with copper sensitivities may include gastrointestinal issues, including anorexia, abdominal pain, diarrhea, and dehydration. Chronic effects may also include depression, lethargy, weakness, thirst, and jaundice (Blakley, 2024). MECP (2011) has recommended an exposure limit of 0.89 mg/kg/day for copper based on a Lowest Observed Effect Level (LOEL) in sheep for haemolytic crisis and jaundice. Given that sheep share a similar sensitivity to copper as several dog breeds, this value was selected for the current assessment.

Table 6-2 Exposure Limits for Dogs

COC	*Exposure Limit (mg/kg/day)*	*Basis of Exposure Limit*	*Reference*
Lead	0.8	No effect on beagle body weight over 2 years	Azar *et al*., 1973
	5	Low level chronic poisoning	Veterinary Information Network, 2026
	10-15	Acute toxicity	Veterinary Information Network, 2026
Copper	0.89	Haemolytic crisis and jaundice	MECP, 2011

6.1.4 Risk Characterization

The method used to assess potential risks to dogs was the calculation of a “hazard quotient” (HQ), which is a unitless value defined as:

$$HQ = Dose / Exposure\ Limit$$

where:

HQ = Hazard Quotient (unitless)
Dose = Contaminant Daily Dose (mg/kg/day)
Exposure Limit = Contaminant Exposure Limit (mg/kg/day)

If the HQ is less than or equal to 1, no unacceptable risks to dogs would be expected. If the HQ exceeds 1, the implication is that adverse risks may occur, and RMMs should be considered.

A worked example of the HQ for lead in soil using the Azar *et al.* (1973) exposure limit is provided below.

$$HQ = 0.68\ mg/kg/day / 0.8\ mg/kg/day$$

$$HQ = 0.85$$

As an additional step, effects-based concentrations (EBCs) were derived for soil that would be protective of dogs. The derivation of the EBC is shown below.

$$EBC = C_S \times 1.0 / HQ$$

where:

EBC = Effects-Based Concentration (mg/kg)
C_S = Concentration of lead in soil used to calculate exposure and risk (mg/kg)
1.0 = Acceptable HQ
HQ = Hazard Quotient associated with the soil concentration used to calculate risk (unitless)

A worked example of the EBC for lead in soil using the Azar *et al.* (1973) exposure limit is provided below.

$$EBC = 2{,}840 \text{ mg/kg} * 1.0 / 0.85$$

$$EBC = 3{,}300 \text{ mg/kg}$$

Table 6-3 summarizes the calculated HQs and EBCs using the three identified exposure limits for dogs.

Table 6-3 Hazard Quotients for Dogs

COC	*Maximum Soil Concentration (mg/kg)*	*Dose (mg/kg/day)*	*Exposure Limit (mg/kg/day)*	*Hazard Quotient*	*Effects-Based Concentration (mg/kg)*
Lead	2,840	0.68	0.8 (No effect on body weight)	0.85	3,300
			5 (Low level chronic poisoning)	0.14	20,000
			10-15 (Acute toxicity)	0.068-0.045	42,000-63,000
Copper	433	0.10	0.89 (Haemolytic crisis and jaundice)	0.11	3,900

Based on the comparisons provided in Table 6-3, predicted exposures to dogs *via* incidental ingestion of copper and lead in on-site soil are below levels derived to be protective of acute or chronic adverse effects. Given that the exposure and risk estimates are based on the assumption that dogs would be exposed to the maximum concentrations of copper and lead in soil during each day spent at the park, this assessment is considered to be conservative for a mobile receptor such as a dog that is likely to move randomly throughout the park.

EBCs were back-calculated to be protective of exposure limits for copper and lead. These EBCs can be used to help interpret risks based on current soil data or any future sampling.

It is noted that HQs and EBCs were only calculated for copper and lead as a 'worst case' scenario to assess potential risks to dogs *via* the ingestion of on-site soils. While it is anticipated that risks based on exposure to other COCs would be lower, there is the potential that higher risks to dogs *via* this pathway may exist for other COCs; however, RMMs have been recommended to mitigate risks to human health based on the findings of the HHRA. As such, any potential risks to dogs would also be addressed through the implementation of these RMMs.

7.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

Intrinsik was retained by G2S on behalf of the City to assess potential risks to humans, dogs, and ecological receptors associated with contaminants identified in on-site soil at the parkland property located at 235 Birch Avenue, Hamilton, Ontario. This was determined by conducting a screening-level evaluation as part of a DDRA, where concentrations of chemicals present in soil were compared to the MECP SCS and the associated component values derived to be protective of human health and the environment. Given that the MECP does not provide component values protective of dogs, the assessment of potential risks to dogs involved estimating exposure to copper and lead *via* soil ingestion and the derivation of HQs and EBCs protective of acute and chronic effects.

This assessment was conducted using scientific approaches that are generally consistent with O. Reg.153/04 and in accordance with accepted practices and usual standards of thoroughness and competence for the profession of toxicology and environmental risk assessment. The assessment was prepared for internal due diligence purposes and not for submission to the MECP for the purpose of obtaining an RSC. This assessment was based exclusively on the site characterization information provided within the G2S (2025a) Phase One ESA, the G2S (2025b) Phase Two ESA, and the G2S (2025c) Cap Inspection Report.

Based on the available data, the results of the assessment of potential risks to humans, dogs, ecological receptors related to concentrations of COCs in on-site soil indicated the following:

Human Health Risk Assessment

- Concentrations of PAHs, cadmium, copper, lead, and PCBs exceeded modified MECP S1 component values derived to be protective of recreational users *via* direct contact and incidental ingestion of impacted soils. Concentrations of PAHs and lead also exceeded the MECP S2 component values protective of long-term outdoor maintenance workers *via* direct contact and incidental ingestion of impacted soils.
    - Given that concentrations of one or more COCs exceeded the S2 and/or modified S1 component values in surface soils collected at depths of 0.50 mbgs or shallower at 12 of 13 sample locations, the majority of the Site has been shown to contain impacted soils that represent a potential concern to human health for receptors that may have opportunities frequent exposure. As such, it is recommended that measures are taken to ensure that soils are not exposed at ground surface and available for direct exposure to park users and outdoor maintenance workers.
    - As described by G2S (2025c), the Site is generally grass covered with some worn footpath areas leading from the Site entrance at the northeast corner of the Site to the top of the fill mound. The areas surrounding shelters that are present in the northeast and central portions of the Site were significantly worn with no grass/root mat, with red brick and construction debris observed at the ground surface. Overall, G2S reported that the soft cap barrier varied from 6 to 9 cm in thickness and was not present in two (2) locations. Based on these observations, it may be difficult to consistently prevent contaminated soils from becoming exposed, particularly in high traffic areas of the park. It is recommended that the City evaluate whether targeted capping measures can be implemented in areas with exposed soils, and whether monitoring and repairs can occur on a sufficiently frequent basis to prevent exposure given the limited thickness of the existing soft cap barrier across the Site.

  - Alternatively, widespread soil excavation and/or the addition of capping measures across the Site is recommended. Capping measures may include hard caps (*e.g.*, asphalt, concrete, or paving stones) or soft caps consisting of a minimum of 30-50 cm of clean topsoil or soils meeting the appropriate MECP soil quality standards. Consideration should also be given to the inclusion of landscaping fabric to demarcate the clean soil cap from underlying contamination.

- Concentrations of lead exceeded the MECP S3 component value protective of short-term construction workers that may be exposed to soils with elevated concentrations of lead during construction activities or underground utility maintenance in the areas surrounding Birch 1, BH101, BH102, BH104, BH105, BH106, BH108 and BH109. It is recommended that workers follow appropriate occupational health and safety precautions. Under the Ontario Occupational Health and Safety Act and Regulations for Construction Projects (OHSA), all construction workers "shall wear such protective clothing and use such PPE or devices as necessary to protect the worker against the hazards to which the worker may be exposed" (O. Reg. 213/91, s. 21(2)). It is anticipated that the use of appropriate PPE, such as gloves and long-sleeved shirts, as well appropriate hygiene, will prevent the occurrence of unacceptable risks under this scenario.

- No unacceptable health risks to recreational users and outdoor workers are anticipated from exposure to COCs in on-site soil through the inhalation of vapours in outdoor air.
- No unacceptable health risks to recreational users and indoor workers are anticipated from exposure to COCs in on-site soil through the inhalation of vapours in indoor air for future on-site buildings.

Ecological Risk Assessment:

- Concentrations of barium, benz(a)anthracene, copper, lead, and zinc exceeded the MECP modified component values protective of plants and soil organisms in surface soils samples collected at boreholes Birch 1, BH101, BH102, BH104 and BH109. Concentrations of barium, benz(a)anthracene, copper, lead, and zinc exceeded modified component values protective of plants/soil organisms in surface soils collected at depths shallower than 0.30 mbgs at boreholes Birch 1, BH101, BH102, BH104 and BH109. As a result, adverse effects may occur to plants and soil organisms in these areas.
- Maximum concentrations of all COCs were below generic MECP component values or modified component values protective of mammals and birds. Therefore, concentrations of COCs in soil are not anticipated to pose a significant risk to populations of most mammals/birds; however, risks may occur to sensitive species.
- Concentrations of COCs in on-site soil are not anticipated to represent an unacceptable risk to aquatic receptors in off-site bodies of surface water *via* leaching to groundwater and the subsequent migration of groundwater to surface water.

Risk Assessment for Dogs:

- Predicted exposures to dogs *via* incidental ingestion of copper and lead in on-site soil are below levels protective of acute or chronic adverse effects. Given that the exposure and risk estimates are based on the assumption that dogs would be exposed to the maximum

concentration each day spent at the park, this assessment is considered to be conservative for a mobile receptor such as a dog that is likely to move randomly throughout the park.

- It is noted that risk estimates were only calculated for copper and lead as a 'worst case' scenario to assess potential risks to dogs *via* the ingestion of on-site soils. While it is anticipated that risks based on exposure to other COCs would be lower, there is the potential that higher risks to dogs *via* this pathway may exist for other COCs; however, RMMs have been recommended to mitigate risks to human health based on the findings of the HHRA. As such, any potential risks to dogs would also be addressed through the implementation of these RMMs.

8.0 DOCUMENT SIGN-OFF

LIMITATIONS AND DISCLAIMER

Intrinsik has been retained by G2S on behalf of the City of Hamilton (the City) to conduct a DDRA for the parkland property located at 235 Birch Avenue, Hamilton, Ontario. The conclusions and recommendations provided within this report are based exclusively on the site characterization information provided within the G2S (2025a) Phase One ESA, the G2S (2025b) Phase Two ESA, and the G2S (2025c) Cap Inspection Report. It is assumed that the soil data summarized in the Phase Two ESA provides an accurate representation of on-site conditions. It is noted that groundwater data was not collected at the Site. Additional investigations may be required to provide complete horizontal and vertical delineation of contaminants in soil, and to identify any potential contaminants in groundwater. Concentrations in excess of those reported may exist in areas of the Site, therefore, the accuracy of the risk estimates provided in this report are limited by the available site characterization data.

Intrinsik provided this report for the City and G2S solely for the purpose stated in the report. Intrinsik does not have, and does not accept, any responsibility or duty of care whether based in negligence or otherwise, in relation to the use of this report in whole or in part by any third party. Any alternate use, including that by a third party, or any reliance on or decision made based on this report, are the sole responsibility of the alternative user or third party. Intrinsik does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Intrinsik makes no representation, warranty, or condition with respect to this report or the information contained herein other than that it has exercised reasonable skill, care, and diligence in accordance with accepted practice and usual standards of thoroughness and competence for the profession of toxicology and environmental assessment to assess and evaluate information acquired during the preparation of this report. Any information or facts provided by others and referred to or utilized in the preparation of this report, is believed to be accurate without any independent verification or confirmation by Intrinsik. This report is based upon and limited by circumstances and conditions stated herein, and upon information available at the time of the preparation of the report.

Intrinsik has reserved all rights in this report, unless specifically agreed to otherwise in writing with the City and G2S.

Yours sincerely,
INTRINSIK CORP.

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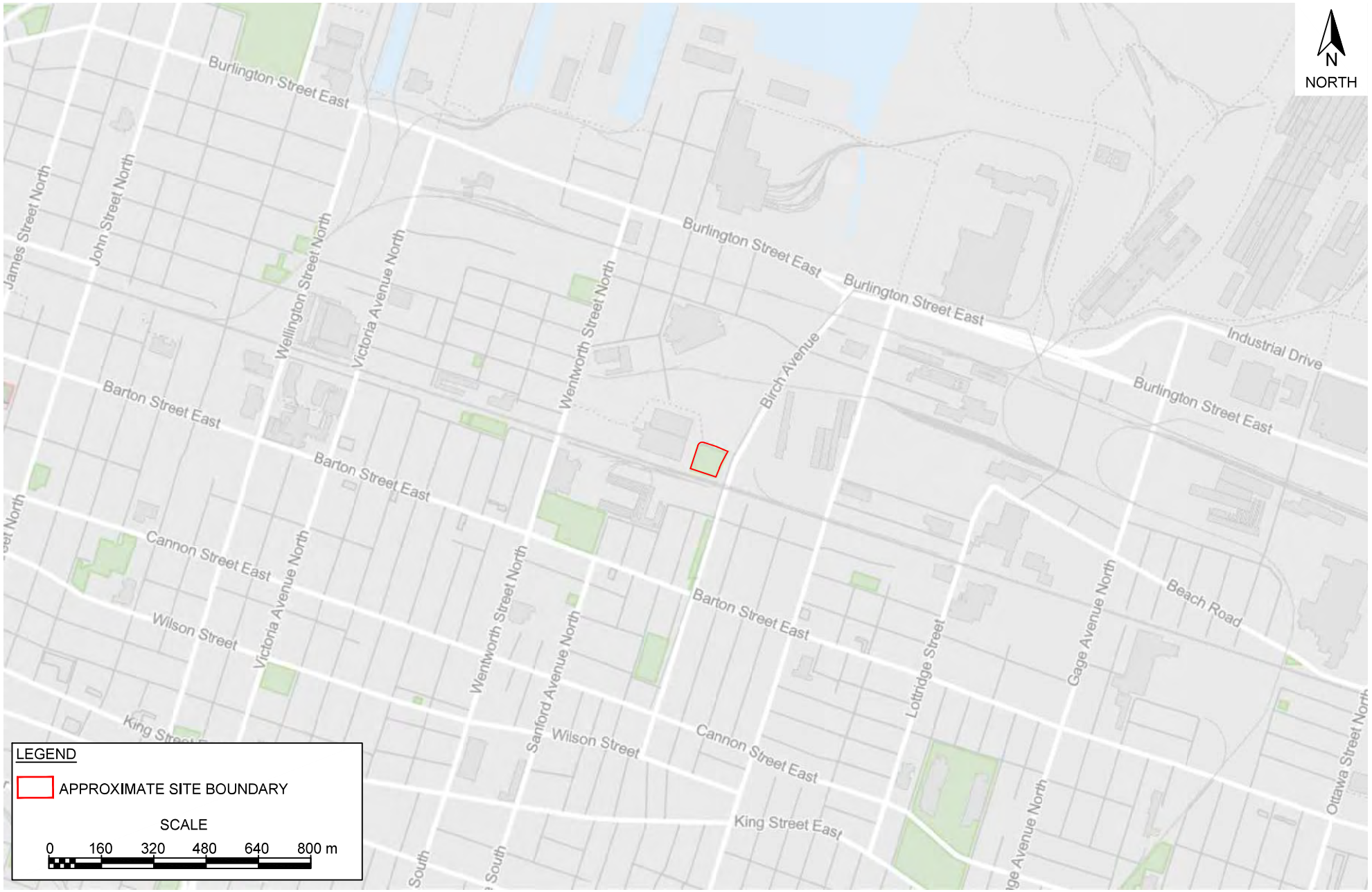
APPENDIX A

SITE CHARACTERIZATION FIGURES



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SITE LOCATION PLAN
235 BIRCH AVENUE

HAMILTON ONTARIO

Drawing No.

1

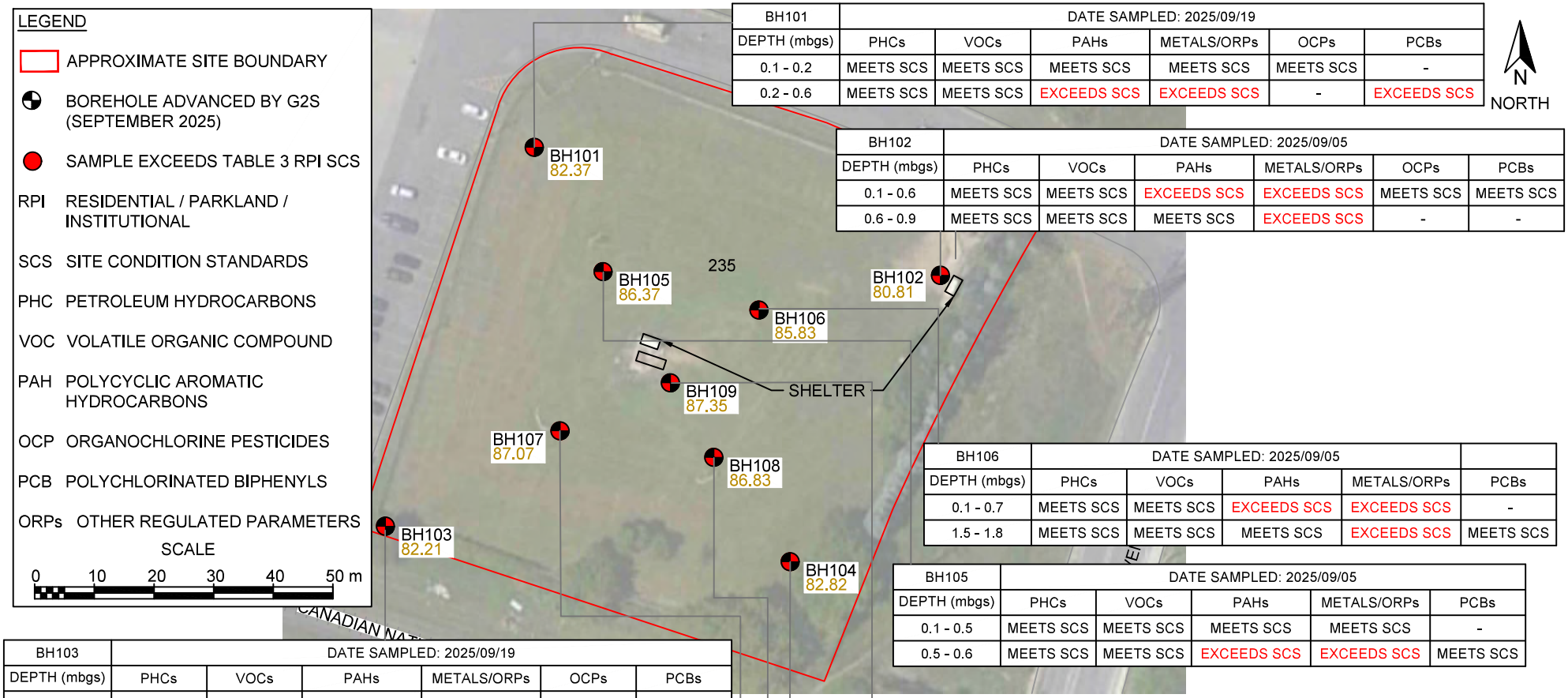
Scale:	AS SHOWN
Project No.:	G2S25144A
Date:	NOVEMBER 2025
Drawn by:	SH/SP
File name:	G2S25144A.dwg

BOREHOLE LOCATION PLAN
235 BIRCH AVENUE

HAMILTON ONTARIO

Drawing No.

2



BH101	DATE SAMPLED: 2025/09/19					
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	OCPs	PCBs
0.1 - 0.2	MEETS SCS	MEETS SCS	MEETS SCS	MEETS SCS	MEETS SCS	-
0.2 - 0.6	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	-	EXCEEDS SCS

BH102	DATE SAMPLED: 2025/09/05					
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	OCPs	PCBs
0.1 - 0.6	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	MEETS SCS	MEETS SCS
0.6 - 0.9	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	-	-

BH103	DATE SAMPLED: 2025/09/19					
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	OCPs	PCBs
0.1 - 0.3	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	-	MEETS SCS
0.3 - 0.6	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	MEETS SCS	-

BH104	DATE SAMPLED: 2025/09/19					
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	OCPs	PCBs
0.1 - 0.3	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	MEETS SCS	-
0.3 - 0.6	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	-	MEETS SCS

BH105	DATE SAMPLED: 2025/09/05				
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	PCBs
0.1 - 0.5	MEETS SCS	MEETS SCS	MEETS SCS	MEETS SCS	-
0.5 - 0.6	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	MEETS SCS

BH106	DATE SAMPLED: 2025/09/05				
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	PCBs
0.1 - 0.7	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	-
1.5 - 1.8	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	MEETS SCS

BH107	DATE SAMPLED: 2025/09/05				
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	PCBs
0.1 - 0.4	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	-
0.4 - 1.0	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	MEETS SCS

BH108	DATE SAMPLED: 2025/09/05				
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	PCBs
0.1 - 0.5	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	MEETS SCS
0.5 - 0.9	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	-

BH109	DATE SAMPLED: 2025/09/05[2] AND 2025/09/19[1]					
DEPTH (mbgs)	PHCs	VOCs	PAHs	METALS/ORPs	OCPs	PCBs
0.1 - 0.2[1]	MEETS SCS	MEETS SCS	MEETS SCS	EXCEEDS SCS	-	-
0.2 - 0.9[2]	MEETS SCS	MEETS SCS	EXCEEDS SCS	EXCEEDS SCS	MEETS SCS	MEETS SCS

NOTE: REFER TO TABLES IN APPENDIX C FOR FULL ANALYTICAL RESULTS

Scale:	AS SHOWN	SOIL ANALYTICAL RESULTS 235 BIRCH AVENUE	Drawing No.
Project No.:	G2S25144A		3
Date:	NOVEMBER 2025		
Drawn by:	SH/SP		
File name:	G2S25144A.dwg	HAMILTON ONTARIO	

Scale:	AS SHOWN
Project No.:	G2S25144A3
Date:	NOVEMBER 2025
Drawn by:	SH
File name:	G2S25144A3.dwg

TEST PIT LOCATION PLAN
235 BIRCH AVENUE

HAMILTON ONTARIO

Drawing No.

2

APPENDIX B

DATA SUMMARY TABLES

Table 1: Soil Quality Results
Petroleum Hydrocarbons (F1-F4) and BTEX

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			Birch 1	Birch 1 DUP	Birch 2	Birch 3	Birch 4	BH101 S1B	BH101 S1C	BH102 S1B	BH102 S1C	BH103 S1B
Date Sampled			**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-19**
Depth	**mbgs**		**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.1 - 0.2**	**0.2 - 0.6**	**0.1 - 0.6**	**0.6 - 0.9**	**0.1 - 0.3**
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.32	<0.05	<0.05	0.18
Xylenes	µg/g	3.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	<0.05	0.21
Petroleum Hydrocarbons F1	µg/g	55	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Petroleum Hydrocarbons F2	µg/g	98	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F3	µg/g	300	167	231	62	65	<50	<50	87	86	<50	<50
Petroleum Hydrocarbons F4	µg/g	2800	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Table 1: Soil Quality Results
Petroleum Hydrocarbons (F1-F4) and BTEX

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			BH103 S1C	BH104 S1B	BH104 S1C	BH105 S1B	BH105 S1C	BH106 S1B	BH106 S2	BH107 S1B	BH107 S1C	BH108 S1B
Date Sampled			**2025-09-19**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**
Depth	**mbgs**		**0.3 - 0.6**	**0.1 - 0.3**	**0.3 - 0.6**	**0.1 - 0.5**	**0.5 - 0.6**	**0.1 - 0.7**	**1.5 - 1.8**	**0.1 - 0.4**	**0.4 - 1.0**	**0.1 - 0.5**
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	0.13	0.2	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	µg/g	3.1	0.11	0.19	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons F1	µg/g	55	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Petroleum Hydrocarbons F2	µg/g	98	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F3	µg/g	300	<50	<50	<50	<50	84	<50	<50	<50	<50	<50
Petroleum Hydrocarbons F4	µg/g	2800	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Table 1: Soil Quality Results
Petroleum Hydrocarbons (F1-F4) and BTEX

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification		
			BH108 S1C	BH109 S1B	BH109 S1C
Date Sampled			**2025-09-05**	**2025-09-19[1]**	**2025-09-05**
Depth	**mbgs**		**0.5 - 0.9**	**0.1 - 0.2**	**0.2 - 0.9**
Benzene	µg/g	0.21	<0.02	<0.02	<0.02
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	<0.05	0.29	<0.05
Xylenes	µg/g	3.1	<0.05	0.3	<0.05
Petroleum Hydrocarbons F1	µg/g	55	<5	<5	<5
Petroleum Hydrocarbons F2	µg/g	98	<10	<10	33
Petroleum Hydrocarbons F3	µg/g	300	<50	<50	279
Petroleum Hydrocarbons F4	µg/g	2800	<50	<50	<50

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

[1] Sample BH109 S1B was resampled on September 19, 2025 due to insufficient sample originally obtained

Table 2: Soil Quality Results
Volatile Organic Compounds (VOCs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			Birch 1	Birch 1 DUP	Birch 2	Birch 3	Birch 4	BH101 S1B	BH101 S1C	BH102 S1B	BH102 S1C	BH103 S1B
Date Sampled			**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-19**
Depth	**mbgs**		**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.1 - 0.2**	**0.2 - 0.6**	**0.1 - 0.6**	**0.6 - 0.9**	**0.1 - 0.3**
Acetone	µg/g	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	µg/g	13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	µg/g	2.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloroform	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dibromochloromethane	µg/g	9.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	µg/g	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,2-	µg/g	3.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,3-	µg/g	4.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,4-	µg/g	0.083	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloroethane, 1,1-	µg/g	3.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dichloroethane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Dichloroethylene, 1,1-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloroethylene, 1,2-cis-	µg/g	3.4	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dichloroethylene, 1,2-trans-	µg/g	0.084	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloropropane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Dichloropropene, 1,3-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Hexane (n)	µg/g	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (MEK)	µg/g	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	µg/g	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	µg/g	0.75	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethane, 1,1,1,2-	µg/g	0.058	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethane, 1,1,2,2-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	µg/g	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.32	<0.05	<0.05	0.18
Trichloroethane, 1,1,1-	µg/g	0.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethane, 1,1,2-	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Trichloroethylene	µg/g	0.061	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichlorofluoromethane	µg/g	4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Xylene Mixture (Total)	µg/g	3.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	<0.05	0.21

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Table 2: Soil Quality Results
Volatile Organic Compounds (VOCs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			BH103 S1C	BH104 S1B	BH104 S1C	BH105 S1B	BH105 S1C	BH106 S1B	BH106 S2	BH107 S1B	BH107 S1C	BH108 S1B
Date Sampled			2025-09-19	2025-09-19	2025-09-19	2025-09-05	2025-09-05	2025-09-05	2025-09-05	2025-09-05	2025-09-05	2025-09-05
Depth	**mbgs**		0.3 - 0.6	0.1 - 0.3	0.3 - 0.6	0.1 - 0.5	0.5 - 0.6	0.1 - 0.7	1.5 - 1.8	0.1 - 0.4	0.4 - 1.0	0.1 - 0.5
Acetone	µg/g	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	µg/g	13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	µg/g	2.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloroform	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dibromochloromethane	µg/g	9.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	µg/g	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,2-	µg/g	3.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,3-	µg/g	4.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorobenzene, 1,4-	µg/g	0.083	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloroethane, 1,1-	µg/g	3.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dichloroethane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Dichloroethylene, 1,1-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloroethylene, 1,2-cis-	µg/g	3.4	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dichloroethylene, 1,2-trans-	µg/g	0.084	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloropropane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Dichloropropene, 1,3-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Hexane (n)	µg/g	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (MEK)	µg/g	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	µg/g	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	µg/g	0.75	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethane, 1,1,1,2-	µg/g	0.058	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethane, 1,1,2,2-	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	µg/g	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	0.13	0.2	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethane, 1,1,1-	µg/g	0.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethane, 1,1,2-	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Trichloroethylene	µg/g	0.061	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichlorofluoromethane	µg/g	4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Xylene Mixture (Total)	µg/g	3.1	0.11	0.19	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Table 2: Soil Quality Results
Volatile Organic Compounds (VOCs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification		
			BH108 S1C	BH109 S1B	BH109 S1C
Date Sampled			**2025-09-05**	**2025-09-19[1]**	**2025-09-05**
Depth	**mbgs**		**0.5 - 0.9**	**0.1 - 0.2**	**0.2 - 0.9**
Acetone	µg/g	16	<0.50	<0.50	<0.50
Benzene	µg/g	0.21	<0.02	<0.02	<0.02
Bromodichloromethane	µg/g	13	<0.05	<0.05	<0.05
Bromoform	µg/g	0.27	<0.05	<0.05	<0.05
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05
Chlorobenzene	µg/g	2.4	<0.05	<0.05	<0.05
Chloroform	µg/g	0.05	<0.04	<0.04	<0.04
Dibromochloromethane	µg/g	9.4	<0.05	<0.05	<0.05
Dichlorodifluoromethane	µg/g	16	<0.05	<0.05	<0.05
Dichlorobenzene, 1,2-	µg/g	3.4	<0.05	<0.05	<0.05
Dichlorobenzene, 1,3-	µg/g	4.8	<0.05	<0.05	<0.05
Dichlorobenzene, 1,4-	µg/g	0.083	<0.05	<0.05	<0.05
Dichloroethane, 1,1-	µg/g	3.5	<0.02	<0.02	<0.02
Dichloroethane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03
Dichloroethylene, 1,1-	µg/g	0.05	<0.05	<0.05	<0.05
Dichloroethylene, 1,2-cis-	µg/g	3.4	<0.02	<0.02	<0.02
Dichloroethylene, 1,2-trans-	µg/g	0.084	<0.05	<0.05	<0.05
Dichloropropane, 1,2-	µg/g	0.05	<0.03	<0.03	<0.03
Dichloropropene, 1,3-	µg/g	0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.05	<0.04	<0.04	<0.04
Hexane (n)	µg/g	2.8	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (MEK)	µg/g	16	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	µg/g	1.7	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	µg/g	0.75	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.1	<0.05	<0.05	<0.05
Styrene	µg/g	0.7	<0.05	<0.05	<0.05
Tetrachloroethane, 1,1,1,2-	µg/g	0.058	<0.04	<0.04	<0.04
Tetrachloroethane, 1,1,2,2-	µg/g	0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	µg/g	0.28	<0.05	<0.05	<0.05
Toluene	µg/g	2.3	<0.05	0.29	<0.05
Trichloroethane, 1,1,1-	µg/g	0.38	<0.05	<0.05	<0.05
Trichloroethane, 1,1,2-	µg/g	0.05	<0.04	<0.04	<0.04
Trichloroethylene	µg/g	0.061	<0.03	<0.03	<0.03
Trichlorofluoromethane	µg/g	4	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02
Xylene Mixture (Total)	µg/g	3.1	<0.05	0.3	<0.05

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

[1] Sample BH109 S1B was resampled on September 19, 2025 due to insufficient sample originally obtained

Table 3: Soil Quality Results
Polycyclic Aromatic Hydrocarbons (PAHs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			Birch 1	Birch 1 DUP	Birch 2	Birch 3	Birch 4	BH101 S1B	BH101 S1C	BH102 S1B	BH102 S1C	BH103 S1B
Date Sampled			**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-19**
Depth	**mbgs**		**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.1 - 0.2**	**0.2 - 0.6**	**0.1 - 0.6**	**0.6 - 0.9**	**0.1 - 0.3**
Acenaphthene	µg/g	7.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	0.25	<0.05	0.23
Acenaphthylene	µg/g	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	0.11
Anthracene	µg/g	0.67	<0.05	<0.05	0.07	0.07	<0.05	<0.05	**0.80**	**1.81**	<0.05	**0.83**
Benz(a)anthracene	µg/g	0.5	0.1	0.11	0.14	0.17	0.06	<0.05	**0.94**	**2.13**	<0.05	**1.29**
Benzo(a)pyrene	µg/g	0.3	0.08	0.09	0.14	0.16	<0.05	<0.05	**0.53**	**1.53**	<0.05	**0.84**
Benzo(b)fluoranthene	µg/g	0.78	0.2	0.23	0.34	0.36	0.14	<0.05	**0.82**	**3.15**	<0.05	**1.32**
Benzo(g,h,i)perylene	µg/g	6.6	0.09	0.1	0.14	0.11	<0.05	<0.05	0.42	0.95	<0.05	0.51
Benzo(k)fluoranthene	µg/g	0.78	0.1	0.11	0.13	0.12	0.08	<0.05	0.5	**1.23**	<0.05	0.73
Chrysene	µg/g	7	0.25	0.32	0.3	0.3	0.13	<0.05	1.30	3.06	<0.05	1.80
Dibenz(a,h)anthracene	µg/g	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.4	0.41	0.58	0.61	0.25	<0.05	**3.12**	**9.18**	0.11	**4.09**
Fluorene	µg/g	62	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	0.28	<0.05	0.25
Indeno(1,2,3-cd)pyrene	µg/g	0.38	<0.05	0.06	0.09	0.07	<0.05	<0.05	0.29	**0.97**	<0.05	**0.43**
Methylnaphthalene (1&2)	µg/g	0.99	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	<0.05	<0.05	0.17
Naphthalene	µg/g	0.6	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.21	<0.05	<0.05	0.10
Phenanthrene	µg/g	6.2	0.21	0.27	0.33	0.3	0.13	<0.05	2.18	4.22	<0.05	2.42
Pyrene	µg/g	78	0.34	0.35	0.47	0.5	0.2	<0.05	2.56	7.98	0.09	3.56

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards
RPI - Residential/Parkland/Institutional
Values shaded and in bold exceed the Table 3 SCS

Table 3: Soil Quality Results
Polycyclic Aromatic Hydrocarbons (PAHs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			BH103 S1C	BH104 S1B	BH104 S1C	BH105 S1B	BH105 S1C	BH106 S1B	BH106 S2	BH107 S1B	BH107 S1C	BH108 S1B
Date Sampled			**2025-09-19**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**
Depth	**mbgs**		**0.3 - 0.6**	**0.1 - 0.3**	**0.3 - 0.6**	**0.1 - 0.5**	**0.5 - 0.6**	**0.1 - 0.7**	**1.5 - 1.8**	**0.1 - 0.4**	**0.4 - 1.0**	**0.1 - 0.5**
Acenaphthene	µg/g	7.9	<0.05	<0.05	<0.05	<0.05	0.16	0.19	<0.05	<0.05	0.16	<0.05
Acenaphthylene	µg/g	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.67	0.10	0.17	0.11	<0.05	0.55	**1.27**	<0.05	<0.05	**0.90**	<0.05
Benz(a)anthracene	µg/g	0.5	0.16	0.21	0.16	<0.05	0.37	**0.68**	<0.05	<0.05	**0.54**	<0.05
Benzo(a)pyrene	µg/g	0.3	0.10	0.15	0.08	<0.05	0.14	0.29	<0.05	<0.05	0.18	<0.05
Benzo(b)fluoranthene	µg/g	0.78	0.18	0.22	0.12	<0.05	0.43	**0.81**	<0.05	<0.05	0.77	<0.05
Benzo(g,h,i)perylene	µg/g	6.6	0.09	0.12	0.06	<0.05	0.12	0.24	<0.05	<0.05	0.13	<0.05
Benzo(k)fluoranthene	µg/g	0.78	0.11	0.14	0.08	<0.05	0.22	0.38	<0.05	<0.05	0.49	<0.05
Chrysene	µg/g	7	0.30	0.38	0.24	<0.05	0.6	0.86	<0.05	<0.05	0.82	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.66	**0.86**	0.60	<0.05	**1.95**	**3.87**	<0.05	0.11	**3.27**	<0.05
Fluorene	µg/g	62	<0.05	<0.05	<0.05	<0.05	0.17	0.28	<0.05	<0.05	0.12	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.38	0.07	0.08	<0.05	<0.05	0.11	0.24	<0.05	<0.05	0.13	<0.05
Methylnaphthalene (1&2)	µg/g	0.99	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/g	0.6	<0.05	0.05	<0.05	<0.05	0.05	0.1	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	6.2	0.31	0.48	0.29	<0.05	1.21	2.47	<0.05	<0.05	1.45	<0.05
Pyrene	µg/g	78	0.54	0.72	0.51	<0.05	1.59	2.9	<0.05	0.09	2.6	<0.05

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards
RPI - Residential/Parkland/Institutional
Values shaded and in bold exceed the Table 3 SCS

Table 3: Soil Quality Results
Polycyclic Aromatic Hydrocarbons (PAHs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification		
			BH108 S1C	BH109 S1B	BH109 S1C
Date Sampled			**2025-09-05**	**2025-09-19[1]**	**2025-09-05**
Depth	**mbgs**		**0.5 - 0.9**	**0.1 - 0.2**	**0.2 - 0.9**
Acenaphthene	µg/g	7.9	0.13	<0.05	2.62
Acenaphthylene	µg/g	0.15	<0.05	<0.05	0.06
Anthracene	µg/g	0.67	0.65	0.09	**4.66**
Benz(a)anthracene	µg/g	0.5	0.5	0.14	**2.53**
Benzo(a)pyrene	µg/g	0.3	0.12	0.15	**1.77**
Benzo(b)fluoranthene	µg/g	0.78	0.47	0.12	**3.74**
Benzo(g,h,i)perylene	µg/g	6.6	0.11	0.10	1.15
Benzo(k)fluoranthene	µg/g	0.78	0.43	0.06	**1.74**
Chrysene	µg/g	7	0.92	0.22	5.21
Dibenz(a,h)anthracene	µg/g	0.1	<0.05	<0.05	**0.15**
Fluoranthene	µg/g	0.69	**2.23**	0.52	**23.6**
Fluorene	µg/g	62	0.12	<0.05	2.66
Indeno(1,2,3-cd)pyrene	µg/g	0.38	0.08	<0.05	**0.87**
Methylnaphthalene (1&2)	µg/g	0.99	0.1	0.06	0.78
Naphthalene	µg/g	0.6	0.07	<0.05	**2.60**
Phenanthrene	µg/g	6.2	1.12	0.32	**15.3**
Pyrene	µg/g	78	1.65	0.44	15.5

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

[1] Sample BH109 S1B was resampled on September 19, 2025 due to insufficient sample originally obtained

SCS - Site Condition Standards
RPI - Residential/Parkland/Institutional
Values shaded and in bold exceed the Table 3 SCS

Table 4: Soil Quality Results
Metals and ORPs

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			Birch 1	Birch 1 DUP	Birch 2	Birch 3	Birch 4	BH101 S1B	BH101 S1C	BH102 S1B	BH102 S1C	BH103 S1B
Date Sampled			**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-19**
Depth	**mbgs**		**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.1 - 0.2**	**0.2 - 0.6**	**0.1 - 0.6**	**0.6 - 0.9**	**0.1 - 0.3**
Antimony	µg/g	7.5	2.5	2.9	<0.8	<0.8	<0.8	<0.8	2.8	1.3	1.4	1.4
Arsenic	µg/g	18	12	14	9	8	7	6	12	7	4	8
Barium	µg/g	390	151	205	100	117	95.1	94.2	162	141	108	149
Beryllium	µg/g	4	0.9	0.9	0.8	0.9	0.9	0.7	0.6	0.9	<0.5	0.7
Boron (Total)	µg/g	120	13	14	17	16	9	9	17	18	16	29
Boron (Hot Water Extractable)	µg/g	1.5	0.43	0.4	0.58	0.38	0.36	0.26	0.65	1.19	0.28	0.53
Cadmium	µg/g	1.2	**2**	**3.4**	**1.7**	0.6	<0.5	<0.5	**1.4**	**1.70**	0.7	0.9
Chromium VI	µg/g	8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (Total)	µg/g	160	66	58	61	33	30	27	37	29	14	32
Cobalt	µg/g	22	9.3	10.4	7.9	9.5	10.4	11.6	9.1	9.3	4.1	8.7
Copper	µg/g	140	**168**	**282**	74.1	68.4	50.1	35.3	**433**	132	48	131
Cyanide	µg/g	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Lead	µg/g	120	**1680**	**2650**	**300**	**230**	67	22	**950**	**903**	**840**	**384**
Mercury	µg/g	0.27	**0.75**	**1.29**	0.12	<0.10	<0.10	<0.10	**0.55**	0.24	<0.10	0.26
Molybdenum	µg/g	6.9	2.4	2.6	2.2	1.2	1	0.6	2.9	1.2	1	1.7
Nickel	µg/g	100	48	52	31	28	27	25	33	32	13	32
Selenium	µg/g	2.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	20	0.6	0.8	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5
Thallium	µg/g	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	23	0.54	0.58	0.54	0.57	0.65	0.72	0.67	0.74	0.67	0.67
Vanadium	µg/g	86	36.7	36.6	35.0	30.8	30.9	37.1	30.7	34.5	17.9	33.0
Zinc	µg/g	340	**1370**	**2010**	**887**	301	178	73	**511**	**457**	281	**421**
Electrical Conductivity (EC)	mS/cm	0.7	0.243	0.267	0.260	0.3	0.25	0.132	0.530	0.401	0.612	0.139
Sodium Adsorption Ratio (SAR)	-	5	0.12	0.11	0.082	0.065	0.069	0.437	0.257	0.433	0.579	0.172
pH	**see note	-	6.95	7.11	7.03	7.01	7.16	7.19	7.03	6.98	**11**	7.03

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

**pH 5 to 9 for surface soils; pH 5 to 11 for subsurface soil
ORPs include Mercury, Chromium (VI), Boron (Hot water soluble)
SCS - Site Condition Standards
RPI - Residential/Parkland/Institutional
Bolded value - pH is outside of the recommended range
Values shaded and in bold exceed the Table 3 SCS

Table 4: Soil Quality Results
Metals and ORPs

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			BH103 S1C	BH104 S1B	BH104 S1C	BH105 S1B	BH105 S1C	BH106 S1B	BH106 S2	BH107 S1B	BH107 S1C	BH108 S1B
Date Sampled			**2025-09-19**	**2025-09-19**	**2025-09-19**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**
Depth	**mbgs**		**0.3 - 0.6**	**0.1 - 0.3**	**0.3 - 0.6**	**0.1 - 0.5**	**0.5 - 0.6**	**0.1 - 0.7**	**1.5 - 1.8**	**0.1 - 0.4**	**0.4 - 1.0**	**0.1 - 0.5**
Antimony	µg/g	7.5	<0.8	0.9	<0.8	<0.8	1.7	1.6	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	8	10	8	5	8	9	5	6	5	6
Barium	µg/g	390	169	**5860**	235	89.9	145	153	126	104	157	134
Beryllium	µg/g	4	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.6	0.9	0.7
Boron (Total)	µg/g	120	19	16	38	8	18	16	19	10	19	11
Boron (Hot Water Extractable)	µg/g	1.5	0.78	0.85	0.68	0.38	0.78	0.8	0.87	0.47	0.76	0.59
Cadmium	µg/g	1.2	0.5	1.1	0.6	<0.5	**1.50**	0.7	0.5	0.5	<0.5	0.5
Chromium VI	µg/g	8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (Total)	µg/g	160	33	34	32	25	43	27	25	26	29	26
Cobalt	µg/g	22	10.7	9.2	9.6	9.3	8.4	9.5	9.7	7.9	10.7	9
Copper	µg/g	140	91.7	120	87.7	30.7	**211**	**191**	24.9	45.4	42.3	62.3
Cyanide	µg/g	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Lead	µg/g	120	**165**	**1250**	**872**	52	**438**	**558**	**196**	98	**147**	**362**
Mercury	µg/g	0.27	0.20	0.21	0.18	0.12	0.17	0.12	<0.10	**0.44**	<0.10	**1.10**
Molybdenum	µg/g	6.9	**7.80**	1.5	1.3	0.8	1.8	1.2	0.7	0.9	0.8	0.8
Nickel	µg/g	100	35	30	26	19	50	25	22	18	27	21
Selenium	µg/g	2.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
Thallium	µg/g	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	23	0.73	0.75	0.75	0.64	0.84	0.69	0.67	0.64	0.68	0.69
Vanadium	µg/g	86	38.3	36.0	35.4	30.5	32.2	33.5	35.8	28.7	38.4	32.2
Zinc	µg/g	340	276	**563**	**429**	104	**621**	**383**	253	190	158	251
Electrical Conductivity (EC)	mS/cm	0.7	0.176	0.151	0.165	0.157	0.197	0.1	0.471	0.153	0.206	0.14
Sodium Adsorption Ratio (SAR)	-	5	0.153	0.139	0.145	0.4	0.474	0.296	1.03	0.406	0.526	0.299
pH	**see note	-	6.89	6.83	6.88	6.84	6.88	6.91	6.99	6.82	6.89	7.09

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

**pH 5 to 9 for surface soils; pH 5 to 11 for subsurface soil
ORPs include Mercury, Chromium (VI), Boron (Hot water soluble)
SCS - Site Condition Standards
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Bolded value - pH is outside of the recommended range
Values shaded and in bold exceed the Table 3 SCS

Table 4: Soil Quality Results
Metals and ORPs

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification		
			BH108 S1C	BH109 S1B	BH109 S1C
Date Sampled			**2025-09-05**	**2025-09-19[1]**	**2025-09-05**
Depth	**mbgs**		**0.5 - 0.9**	**0.1 - 0.2**	**0.2 - 0.9**
Antimony	µg/g	7.5	0.9	2.2	3.1
Arsenic	µg/g	18	8	10	9
Barium	µg/g	390	167	219	149
Beryllium	µg/g	4	0.8	0.6	0.8
Boron (Total)	µg/g	120	22	14	30
Boron (Hot Water Extractable)	µg/g	1.5	0.99	0.51	1.4
Cadmium	µg/g	1.2	0.7	1.2	**1.40**
Chromium VI	µg/g	8	<0.2	<0.2	<0.2
Chromium (Total)	µg/g	160	27	33	27
Cobalt	µg/g	22	8.7	7.3	8.6
Copper	µg/g	140	87.8	137	115
Cyanide	µg/g	0.051	<0.040	<0.040	<0.040
Lead	µg/g	120	**429**	**1140**	**2840**
Mercury	µg/g	0.27	0.13	**2.81**	**0.71**
Molybdenum	µg/g	6.9	1.1	1.3	1.5
Nickel	µg/g	100	26	24	26
Selenium	µg/g	2.4	<0.8	0.9	<0.8
Silver	µg/g	20	<0.5	2.1	0
Thallium	µg/g	1	<0.5	<0.5	<0.5
Uranium	µg/g	23	0.76	0.77	0.65
Vanadium	µg/g	86	33.2	29.4	30.1
Zinc	µg/g	340	332	**708**	**400**
Electrical Conductivity (EC)	mS/cm	0.7	0.187	0.204	0.641
Sodium Adsorption Ratio (SAR)	-	5	0.409	0.439	1.38
pH	**see note	-	6.92	8.11	6.92

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

**pH 5 to 9 for surface soils; pH 5 to 11 for subsurface soil
ORPs include Mercury, Chromium (VI), Boron (Hot water soluble)
SCS - Site Condition Standards
RPI - Residential/Parkland/Institutional
Bolded value - pH is outside of the recommended range
Values shaded and in bold exceed the Table 3 SCS

[1] Sample BH109 S1B was resampled on September 19, 2025 due to insufficient sample originally obtained

Table 5: Soil Quality Results
Organochlorine Pesticides (OCPs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification				
			BH101 S1B	BH102 S1B	BH103 S1C	BH104 S1B	BH109 S1C
Date Sampled			**2025-09-19**	**2025-09-05**	**2025-09-19**	**2025-09-19**	**2025-09-05**
Depth	**mbgs**		**0.1 - 0.2**	**0.1 - 0.6**	**0.3 - 0.6**	**0.1 - 0.3**	**0.2 - 0.9**
Aldrin	µg/g	0.05	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	<0.007	<0.007	<0.007	<0.007	<0.007
DDD	µg/g	3.3	<0.007	<0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.26	<0.007	<0.007	<0.007	<0.007	<0.007
DDT	µg/g	1.4	<0.007	<0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	<0.005	<0.005	<0.005	<0.005	<0.005
Gamma-Hexachlorocyclohexane	µg/g	0.056	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.15	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.52	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.012	<0.01	<0.01	<0.01	<0.01	<0.01
Hexachloroethane	µg/g	0.089	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.13	<0.005	<0.005	<0.005	<0.005	<0.005

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Table 6: Soil Quality Results
Polychlorinated Biphenyls (PCBs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification									
			Birch 1	Birch 1 DUP	Birch 2	Birch 3	Birch 4	BH101 S1C	BH102 S1B	BH103 S1B	BH104 S1C	BH105 S1C
Date Sampled			**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2024-11-20**	**2025-09-19**	**2025-09-05**	**2025-09-19**	**2025-09-19**	**2025-09-05**
Depth	**mbgs**		**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.05 - 0.15**	**0.2 - 0.6**	**0.1 - 0.6**	**0.1 - 0.3**	**0.3 - 0.6**	**0.5 - 0.6**
Polychlorinated Biphenyls	µg/g	0.35	0.28	0.28	0.31	<0.1	<0.1	**1.37**	<0.10	<0.1	0.1	0.1

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Values shaded and in bold exceed the Table 3 SCS

Table 6: Soil Quality Results
Polychlorinated Biphenyls (PCBs)

Parameter	Unit	*Table 3 RPI SCS - Coarse texture	Sample Identification			
			BH106 S2	BH107 S1C	BH108 S1B	BH109 S1C
Date Sampled			**2025-09-05**	**2025-09-05**	**2025-09-05**	**2025-09-05**
Depth	**mbgs**		**1.5 - 1.8**	**0.4 - 1.0**	**0.1 - 0.5**	**0.2 - 0.9**
Polychlorinated Biphenyls	µg/g	0.35	<0.1	<0.1	<0.1	<0.10

*MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, dated April 2011.

SCS - Site Condition Standards

RPI - Residential/Parkland/Institutional

Values shaded and in bold exceed the Table 3 SCS