PINCHIN

Phase Two Environmental Site Assessment

85 Gemini Way
Ottawa, Ontario

Prepared for:

Centurion Appelt (1 Centrepoint) LP
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TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

1.0 EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained by Centurion Appelt (1 Centrepoint) LP (Client) to complete a Phase Two Environmental Site Assessment (Phase Two ESA) of the property located at 85 Gemini Way in Ottawa, Ontario (hereafter referred to as the Site or Phase Two Property). The Phase Two Property is approximately 0.28 hectares in size and exists as vacant land partially utilized as an asphalt paved parking lot.

The Phase Two ESA was conducted at the request of the Client as a condition for the future redevelopment of the Phase Two Property. It is Pinchin's understanding that the Phase Two Property will be redeveloped from its current commercial land use to residential land use. A Record of Site Condition (RSC) submittal to the Ontario Ministry of Environment, Conservation and Parks (MECP) is a mandatory requirement when a land use changes to a more sensitive land use and as such, to support the RSC submission, the Phase Two ESA was conducted in accordance with the Province of Ontario's Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act, and last amended by Ontario Regulation 362/23 on November 29, 2023 (O. Reg. 153/04).

The objectives of this Phase Two ESA were to assess the soil quality in relation to an area of potential environmental concern (APEC) and related potentially contaminating activities (PCAs) and contaminants of potential concern (COPCs) identified in a Phase One ESA completed by Pinchin in accordance with O. Reg. 153/04. The identified APEC, PCA and COPCs are summarized in Tables 1 and 2 (all Tables are provided within Section 9.0).

The Phase Two ESA was completed by Pinchin on January 24, 2025 and included the advancement of five boreholes at the Phase Two Property. The boreholes were advanced to a maximum depth of 3.05 metres below ground surface (mbgs). Select soil samples collected from each of the borehole locations were submitted for laboratory analysis of volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs) fractions 1 through 4 (F1-F4), polycyclic aromatic hydrocarbons (PAHs), metals and/or inorganic parameters.

Based on Site-specific information, the applicable regulatory standards for the Phase Two Property were determined to be the *"Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition",* provided in the MECP document entitled, *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"* dated April 15, 2011 *(Table 3 Standards)* for coarse-textured soils and residential/parkland/institutional property use.

The laboratory results for the submitted soil samples indicated that all reported concentrations for the parameters analyzed met the corresponding *Table 3 Standards*.

It is the opinion of the Qualified Person (QP) who supervised the Phase Two ESA that the applicable *Table 3 Standards* for soil and groundwater at the Phase Two Property have been met as of the Certification Date of January 24, 2025 and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and groundwater at the Phase Two Property.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

2.0 INTRODUCTION

A Phase Two ESA is defined as an "assessment of property conducted in accordance with the regulations by or under the supervision of a QP to determine the location and concentration of one or more contaminants in the land or water on, in or under the property". Under O. Reg. 153/04, the purpose of a Phase Two ESA is as follows:

- To determine the location and concentration of contaminants in the land or water on, in or under the Phase Two Property;
- To obtain information about environmental conditions in the land or water on, in or under the Phase Two Property necessary to undertake a Risk Assessment, in accordance with O. Reg. 153/04, with respect to one or more contaminants of concern; and
- To determine if applicable Site Condition Standards and standards specified in a Risk Assessment for contaminants on, in or under the Phase Two Property were met as of the certification date by developing an understanding of the geological and hydrogeological conditions at the Phase Two Property and conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the Phase Two ESA sampling and analysis plan (SAP) and for any such contaminants identified during subsequent Phase Two ESA activities and analyses of environmental conditions at the Phase Two Property.

This Phase Two ESA was conducted at the request of the Client in relation to the future redevelopment of the Phase Two Property from commercial to residential land use. An RSC submittal to the MECP is a mandatory requirement when a land use changes to a more sensitive land use and as such, to support the RSC submission, the Phase Two ESA was conducted in accordance with O. Reg. 153/04.

The overall objectives of this Phase Two ESA were to assess the soil quality in relation to APECs and related COPCs identified in a Phase One ESA completed by Pinchin, the findings of which were summarized in the report entitled "*Phase One Environmental Site Assessment*, *85 Gemini Way, Ottawa, Ontario*", completed by Pinchin for the Client and dated February 5, 2025. The property assessed by the Pinchin Phase One ESA is referred to herein as the Phase One Property. The Phase Two ESA was conducted on the whole Phase One Property, at specific APECs identified during the Phase One ESA, and the Phase One Property and Phase Two Property have the same boundaries.

2.1 Site Description

The Phase One Property consists of one legal lot situated at the municipal address of 85 Gemini Way, Ottawa, Ontario and is currently owned by Centurion Appelt (1 Centrepoint) LP. The Phase One Property is located on the northwest side of Gemini Way, approximately 180 metres (m) northeast of the intersection between Gemini Way and Centrepoint Drive, as shown on Figure 1 (all Figures are provided in Appendix A and all appendices are provided in Section 10.0). A plan showing the Phase One Property is provided as Figure 2.

A summary of the pertinent details of the Phase Two Property is provided in the following table:

Detail	Source / Reference	Information
Legal Description	Legal Survey Drawing provided by the Client, Service Ontario Parcel Register	Part of Lot 35, Concession 2 of Registered Plan No. 4R-7298, City of Ottawa
Municipal Address	Client	85 Gemini Way Ottawa, ON K2G 5L4
Parcel Identification Number (PIN)	Client	Part of PINs 04692-0024 (LT), 04692-0455 (LT), 04692-47 (LT), 04692-1250 (LT) and 04692-1319 (LT)
Current Owner	Client	Centurion Appelt (1 Centrepoint) LP
Owner Contact Information	Client	Centurion Appelt (1 Centrepoint) LP 3975 Lakeshore Road, Suite 320 Kelowna, BC V1W 1V3
Current Occupants	Client	Commercial use – the southwest portion is used for vehicular parking; and the northeast portion is being developed as a multi-tenant residential building
Client	Authorization to Proceed Form for Pinchin Proposal	Centurion Appelt (1 Centrepoint) LP
Client Contact Information	Authorization to Proceed Form for Pinchin Proposal	Joshua Saltzman c/o Centurion Appelt (1 Centrepoint) LP 3975 Lakeshore Road, Suite 320 Kelowna, BC V1W 1V3
Site Area	Client	0.28 hectares (0.68 acres)
Current Zoning	GeoOttawa https://maps.ottawa.ca/geoottawa/	MC F(2.0) H(34) - Mixed-Use Centre Zone
Centroid UTM Co-ordinates	Google Earth	439955 Easting
		5022049 Northing
		Zone 18T

2.2 Property Ownership

The entirety of the Phase Two Property is currently owned by Centurion Appelt (1 Centrepoint) LP. Pinchin was retained by Joshua Saltzman of the Client (Centurion Appelt (1 Centrepoint) LP) to conduct the Phase Two ESA of the Site. Contact information for Joshua Saltzman is provided in the preceding section.

2.3 Current and Proposed Future Uses

The Phase Two Property is presently not utilized and exists as vacant, undeveloped land partially utilized as an asphalt paved parking lot. It is Pinchin's understanding that the Client intends to develop the Phase Two Property for residential land use.

Given that the future land use is changing to a more sensitive land use, there is a mandatory requirement that an RSC be filed as per Section 168.3.1 of the Province of Ontario's *Environmental Protection Act.*

2.4 Applicable Site Condition Standards

The Phase Two Property is currently vacant, undeveloped land partially utilized as an asphalt paved parking lot located within the City of Ottawa and the proposed future land use is residential. It is Pinchin's understanding that drinking water for the Phase Two Property and surrounding properties within 250 metres of the Phase Two Property is supplied by the City of Ottawa, and there are no known drinking water supply wells within 250 metres of the Phase Two Property.

Bedrock was not encountered at any of the boreholes completed at the Phase Two Property during the Phase Two ESA, which were advanced to a maximum depth of approximately 3.05 mbgs and, as such, the Phase Two Property is not a shallow soil property as defined in Section 43.1 of O. Reg. 153/04.

The Phase Two Property does not contain a water body nor is it located within 30 metres of a water body and the use of standards for properties situated within 30 metres of a water body is not required.

Section 41 of O. Reg. 153/04 states that a property is classified as an "environmentally sensitive area" if the pH of the surface soil (less than or equal to 1.5 mbgs) is less than 5 or greater than 9, if the pH of the subsurface soil (greater than 1.5 mbgs) is less than 5 or greater than 11, or if the property is an area of natural significance or is adjacent to or contains land within 30 metres of an area of natural significance. A total of two representative soil samples collected from the boreholes advanced at the Phase Two Property were submitted for pH analysis. The pH analytical results are summarized in Table 3. The pH values measured in the submitted soil samples were within the limits for non-sensitive sites. The Phase Two Property is also not an area of natural significance, and it is not adjacent to, nor does it contain land within 30 metres of, an area of natural significance. As such, the Phase Two Property is not an environmentally sensitive area.

As discussed further in Section 6.4, based on the results of grain size analysis completed on representative soil samples collected during the Phase Two ESA and the observed stratigraphy at the borehole locations at the Phase Two Property, it is the QP's opinion that over two-thirds of the overburden at the Phase Two Property is coarse-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property has been considered coarse-textured for the purpose of establishing the applicable MECP Site Condition Standards.

Based on the above, the appropriate Site Condition Standards for the Phase Two Property are the Table 3 Standards for:

- Coarse-textured soils; and
- Residential/parkland/institutional property use.

As such, all analytical results have been compared to these *Table 3 Standards*.

3.0 BACKGROUND INFORMATION

3.1 Physical Setting

The Phase One Property consists of one legal lot situated at the municipal address of 85 Gemini Way, Ottawa, Ontario and is currently owned by Centurion Appelt (1 Centrepoint) LP. The Phase One Property is located on the northwest side of Gemini Way, approximately 180 metres (m) northeast of the intersection between Gemini Way and Centrepoint Drive. The Site is situated in an area that predominantly consists of commercial and residential land The general topography in the local and surrounding area is generally flat and the Phase Two Property is at a similar elevation to the adjacent/surrounding properties. Surface water (e.g., storm runoff) is inferred to run overland and drain into the roadside ditch.

There are no open water bodies or areas of natural significance located on-Site or within the area assessed by the Pinchin Phase One ESA (the Phase One Study Area). A plan showing the Phase One Study Area is presented on Figure 3. The nearest surface water body is Pinecrest Creek located approximately 245 m north of the Phase One Property at an elevation of approximately 80 mamsl.

A review of the Area of Natural & Scientific Interest map prepared by ERIS and information provided on the MNRF's NHIC website did not identify any provincial parks, wetlands, conservation areas, or other areas of natural significance, within the Phase One Study Area.

A review of the municipal plan for the City of Ottawa indicated that the Phase One Study Area is not located in whole or in part within a well head protection area or other designation identified by the City of Ottawa for the protection of groundwater, with the exception of the Phase One Property being located within an intake protection zone (IPZ-2). However, the City of Ottawa has consented in writing to the use of non-potable Site Condition Standards (refer to Section 6.6.4).

The records review did not identify the presence of wells within the Phase One Study Area that supply water for human consumption or for agricultural purposes.

3.2 Past Investigations

The Client informed Pinchin that no previous environmental reports were available for the Phase Two Property or for adjacent properties within the Phase One Study Area. None of the other information sources accessed by Pinchin had previous environmental reports for the Phase Two Property or adjacent properties within the Phase One Study Area available for review.

However, the ERIS database search of the Environmental Registry and Record of Site Condition database indicated the following for the Phase One Study Area:

- An RSC was filed for the property located at 2140 Baseline Road, which is located adjacent to the northeast elevation of the Phase One Property. The RSC provided a Phase One Conceptual Site Model (CSM), which Pinchin reviewed for potential PCAs. The CSM identified the possible presence of fill throughout 2140 Baseline Road as well as the Phase One Property due to former roadways in several configurations in 1985 and 1991 aerial photographs. Previous subsurface investigation work at 2140 Baseline Road identified the presence of fill including coarse sand, concrete debris, gravel and cobbles to a depth of 3.0 m below ground surface (mbgs). Based on the above-noted information, the potential on-Site fill materials are considered a PCA that represents an APEC at the Phase One Property; however, based on Pinchin's review of the CSM which indicated that soil samples collected from 2140 Baseline Road met the applicable site condition standards, the PCA at the northeast adjacent property (i.e., importation of fill material of unknown quality) has not resulted in an APEC at the Phase One Property.

4.0 SCOPE OF INVESTIGATION

4.1 Overview of Site Investigation

The scope of work for this Phase Two ESA was prepared to address the APEC identified at the Phase Two Property and consisted of the following:

- Prepared a health and safety plan and arranged for the completion of underground utility locates prior to the commencement of drilling activities.
- Developed a detailed SAP prior to the advancement of the boreholes. The SAP was outlined in the document entitled "Sampling and Analysis Plan for Phase Two Environmental Site Assessment, 85 Gemini Way, Ottawa, Ontario", dated February 2025,

which is provided in Appendix B. Based on Pinchin's knowledge of the surrounding properties and known hydrogeological conditions, boreholes were advanced at the Phase Two Property to a maximum depth of 3.05 mbgs.

- Retained Strata Drilling Group Inc. (Strata) to advance boreholes using a Geoprobe 6620DT™ drill rig. Strata is licensed by the MECP in accordance with Ontario Regulation 903 (as amended) (O. Reg. 903) to undertake borehole drilling/well installation activities. Strata advanced eight boreholes at the Phase Two Property to investigate the potential for soil contaminants associated with the APECs identified in the Phase One ESA.
- Collected soil samples at regular intervals within each borehole.
- Field-screened soil samples for visual/olfactory evidence of impacts as well as for petroleum-derived vapours in soil headspace using a combustible gas indicator (CGI) calibrated to hexane and VOC-derived vapours in soil headspace using a photoionization detector (PID).
- Submitted a minimum of one "worst case" soil sample from each borehole for chemical analysis of VOCs, PHCs F1-F4, PAHs, and/or metals.
- Submitted one duplicate soil sample for chemical analysis of VOCs, PHCs F1-F4, and PAHs for quality assurance/quality control (QA/QC) purposes.
- Submitted one representative soil sample for the laboratory analysis of grain size and two representative soil samples for the laboratory analysis of pH in order to confirm the appropriate MECP Site Condition Standards.
- Compared the soil analytical results to the applicable criteria stipulated in the Table 3 Standards.
- Prepared a report (this report) documenting the findings of the Phase Two ESA which meets the reporting requirements listed in Schedule E and Table 1 – Mandatory Requirements for Phase Two Environmental Site Assessment Reports of O. Reg. 153/04.

4.2 Media Investigated

The scope of work for this Phase Two ESA was prepared to address the APEC and corresponding media at the Phase Two Property as identified through the completion of the Phase One ESA.

The media of concern for the Phase Two ESA was soil. The assessment of groundwater quality was not included in the Phase Two ESA because the APECs were related to PCAs located at the ground surface (i.e., importation of fill material of unknown quality (APEC-1 and APEC-3) and the results of soil samples collected and analyzed from these APECs showed no evidence of soil impacts and groundwater impacts were considered unlikely. For assessing the soil at the Phase Two Property for the presence of COPCs, a total of five boreholes were advanced at the Phase Two Property for the purpose of collecting soil samples. Select “worst case” samples collected from each of the boreholes, were submitted for laboratory analysis of the COPCs.

4.3 Phase One Conceptual Site Model

A conceptual site model (CSM) has been created to provide a summary of the findings of the Phase One ESA. The Phase One CSM is summarized in Figures 1 through Figure 4, which illustrate the following features within the Phase One Study Area, where present:

- Existing buildings and structures.
- Water bodies located in whole or in part within the Phase One Study Area.
- Areas of natural significance located in whole or in part within the Phase One Study Area.
- Groundwater monitoring wells located at the Phase One Property.
- Land use of adjacent properties.
- Roads within the Phase One Study Area.
- PCAs and APECs on the Phase One Property.
- PCAs within the Phase One Study Area, including the locations of tanks.

The following provides a narrative summary of the Phase One CSM:

- The Phase One Property possesses the municipal address of 85 Gemini Way, Ottawa, Ontario and is currently owned by Centurion Appelt (1 Centrepoint) LP. The Phase One Property is located immediately northwest of Gemini Way, approximately 185 m northeast of the intersection between Gemini Way and Centrepointe Drive. The Phase One Property is approximately 0.28 hectares in size and presently consists of vacant undeveloped land utilized as a parking lot;
- The nearest surface water body is Pinecrest Creek located approximately 245 m north of the Phase One Property at an elevation of approximately 80 mamsl;
- No areas of natural significance were identified within the Phase One Study Area;
- No drinking water wells were located on the Phase One Property;
- The adjacent and surrounding properties in the vicinity of the Site consist of commercial, residential, institutional and vacant land uses. The properties located northwest of the Phase One Property consist of residential developments, institutional developments and associated roadways to beyond 200 m from the Phase One Property; the properties

located northeast of the Phase One Property consist of residential developments, commercial developments, vacant undeveloped land and associated roadways to beyond 200 m from the Phase One Property; the properties located southeast of the Phase One Property consist of vacant undeveloped land, institutional developments and associated roadways to beyond 200 m from the Phase One Property; and the properties located southwest of the Phase One Property consist of commercial developments, residential developments and associated roadways to beyond 200 m from the Phase One Property;

- A total of 11 PCAs were identified within the Phase One Study Area, consisting of three PCAs on the Phase One Property and eight off-Site PCAs within the Phase One Study Area. As shown on Figure 2 – Potentially Contaminating Activities, the three on-Site PCAs resulted in APECs;
- The Phase One Property and the surrounding properties located within the Phase One Study Area are located within alluvial deposits consisting of stratified gravel, sand, silt and clay with an overburden thickness ranging from approximately 2 to 5 mbgs. Bedrock is expected to consist of sedimentary rocks consisting of limestone, dolomite, shale, argillite, sandstone, quartzite, and/or grit; and
- The Phase One Property is relatively flat. Local groundwater flow is inferred to be to the north, based on the topographic map and nearest surface water body.

The Phase One Property consists of a paved parking lot. According to the Site Representative, salt has historically been applied to the parking area for safety reasons during winter conditions to remove snow and ice, which represents a PCA at the Phase One Property. However, it is the opinion of the QP_{ESA} supervising the Phase One ESA that, although salt-related parameters such as sodium adsorption ratio and electrical conductivity in soil and sodium and chloride in groundwater may be present at concentrations exceeding the applicable *Table 3 Standards*, the exemption provided in Section 49.1 of O. Reg. 153/04 can been applied and as such, although this PCA results in an APEC at the Phase One Property, these parameters would be deemed to meet the *Table 3 Standards* and do not need to be further assessed as part of a Phase Two ESA.

There were no deviations from the Phase One ESA requirements specified in O. Reg. 153/04 or absence of information that have resulted in uncertainty that would affect the validity of the Phase One CSM.

4.4 Deviations from Sampling and Analysis Plan

No notable constraints and limitations with respect to the SAP were documented during the field activities, and as such Pinchin has conducted the Phase Two ESA in a manner generally consistent with the SAP provided in Appendix B.

No additional scope of work items was added to the Phase Two ESA or other notable constraints and limitations with respect to the SAP were documented during the field activities, and as such Pinchin has conducted the Phase Two ESA in a manner generally consistent with the SAP provided in Appendix B.

There were no deviations from the SAP that affect the investigation of the APEC or their respective COPCs and as such, no impact on the overall findings and conclusions of the Phase Two ESA.

4.5 Impediments

Pinchin had full access to the Phase Two Property throughout the completion of the Phase Two ESA.

5.0 INVESTIGATION METHOD

5.1 General

The Phase Two ESA field work was conducted in accordance with Pinchin's standard operating procedures (SOPs) as provided in the SAP, which have been developed in accordance with the procedures and protocols provided in the MECP document entitled "*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*", dated December 1996, in the Association of Professional Geoscientists of Ontario document entitled *"Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)"*, dated April 2011, and in O. Reg. 153/04.

No deviations from Pinchin's SOPs occurred during the Phase Two ESA.

5.2 Drilling

Pinchin retained Strata to advance a total of five boreholes (BH1 through BH5) at the Phase Two Property on January 24, 2025 to investigate the potential presence of COPCs associated with the APEC identified in the Phase One ESA. The boreholes were drilled to a maximum depth of 3.05 mbgs using a Geoprobe 6620™ drill rig.

The locations of the boreholes are provided on Figure 6 in Section Appendix A. The rationale and placement of the boreholes completed to investigate the APEC is summarized in Table 3 of Appendix B. A description of the subsurface stratigraphy encountered during the drilling program is documented in the borehole logs included in Appendix C.

Measures taken to minimize the potential for cross-contamination during the borehole drilling included:

- The use of dedicated, disposable PVC soil sample liners for soil sample collection during direct-push drilling.
- The use of dedicated, pre-cleaned augers for each borehole location.
- The extraction of soil samples from the interior of the sampling device (where possible), rather than from areas in contact with the sampler walls.
- The cleaning of all non-dedicated drilling and soil sampling equipment (i.e., spatulas used for sample collection) before initial use and between sample and borehole locations.
- The use of dedicated and disposable nitrile gloves for all soil sample handling.

No excavating activities (e.g., test pitting) were completed as part of the Phase Two ESA.

5.3 Soil Sampling

Soil samples were collected in the boreholes at continuous intervals using 5.08 centimetre (cm) outer diameter (OD) direct push macro core soil samplers with dedicated single-use sample liners.

Discrete soil samples were collected from the dedicated sample liners by Pinchin personnel. Dedicated and disposable nitrile gloves were worn during the collection of each soil sample. A portion of each sample was placed in a resealable plastic bag for field screening and a portion was containerized in laboratory-supplied glass sampling jars. Following sample collection, the sample jars were placed into dedicated coolers with ice for storage pending transport to AGAT Laboratories (AGAT Labs) in Mississauga, Ontario. Formal chain of custody records was maintained between Pinchin and the staff at AGAT Labs.

Subsurface soil conditions were logged on-Site by Pinchin personnel at the time of borehole drilling. Based on the soil samples recovered during the borehole drilling program, the soil stratigraphy at the drilling locations generally consists of grey gravelly sand, trace silt to grey sandy silt, and some clay that extended to the maximum investigation depth of 3.05 mbgs. Moist soil conditions were generally observed at depths between 0.76 to 1.22 mbgs. Groundwater was not encountered during the drilling program.

No odours or staining were observed in the soil samples collected during the borehole drilling program.

A detailed description of the subsurface stratigraphy encountered during the borehole program is documented in the borehole logs included in Appendix C.

5.4 Field Screening Measurements

Soil samples were collected at each of the sampling intervals during the drilling activities and analyzed in the field for VOC-derived and petroleum-derived vapour concentrations in soil headspace with an RKI Eagle 2™ equipped with a PID. The soil samples collected for field-screening purposes were placed in resealable plastic bags. The plastic bags were stored out of direct sunlight for a minimum of five minutes and agitated in order to release organic vapours within the soil pore space prior to analysis with the PID.

Based on a review of the operator's manual, the RKI Eagle 2™ PID has an accuracy/precision of up to 0.1 parts per million (ppm). The PID was calibrated prior to field use by the equipment supplier, Maxim Environmental (Maxim) according to Maxim's standard operating procedures.

Based on a review of the operator's manual, the RKI Eagle 2™ has an accuracy/precision of up to +/- 25 ppm, or +/- 5% of the reading (whichever is greater).

In general, the soil samples with the highest measured vapour concentrations (i.e., "worst case") from a given borehole were submitted for laboratory analysis. Sample depth and visual and olfactory observations of potential contaminants were also used in conjunction with the vapour concentrations in making the final selection of "worst case" soil samples for laboratory analysis.

5.5 Analytical Testing

All collected soil samples were delivered to AGAT Labs for analysis. AGAT Labs is an independent laboratory accredited by the Canadian Association for Laboratory Accreditation. Formal chain of custody records of the sample submissions was maintained between Pinchin and the staff at AGAT Labs. AGAT Labs conducted the laboratory analysis in accordance with the MECP document entitled *"Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act"* dated March 9, 2004 and revised on July 1, 2011 (*Analytical Protocol*).

5.6 Quality Assurance and Quality Control Measures

The QA/QC protocols that were followed during borehole drilling and soil sampling so that representative samples were obtained are described in the following subsections.

5.6.1 Sample Containers, Preservation, Labelling, Handling and Custody of Samples

Soil samples were containerized within laboratory-prepared sample containers in accordance with the *Analytical Protocol*.

The following soil sample containers and preservatives were used:

- VOCs and PHCs F1: 40 millilitre (mL) glass vials with septum-lids, pre-charged with methanol preservative.

- PHCs F2-F4, PAHs, metals, inorganics, pH and grain size: 120 or 250 mL unpreserved clear glass wide-mouth jars with a Teflon™–lined lid.

Each soil and QA/QC sample was labeled with a unique sample identifier along with the company name, sampling date, Pinchin project number and analysis required.

Each sample was placed in a cooler on ice immediately upon collection and prior to submission to AGAT Labs for analysis. Formal chain of custody records of the sample submissions was maintained between Pinchin and the staff at AGAT Labs.

5.6.2 Equipment Cleaning Procedures

Dedicated, single-use PVC sample liners were used for each soil sample collected, which precluded the need for drilling equipment cleaning during soil sample collection. Equipment utilized in soil sample collection and handling (i.e., spatulas used to remove soil from the sample liners) was cleaned with a solution of Alconox™ detergent and potable water followed by a distilled water rinse prior to initial use and between samples.

5.6.3 Field Quality Control Measures

A total of one field duplicate soil sample was collected by Pinchin during the Phase Two ESA for analysis of one or more of the COPCs. The frequency of field duplicate soil sample analysis complied with the requirement that one field duplicate soil sample is analyzed for every ten regular soil samples submitted for analysis of the COPCs. The soil sample field duplicate pairings and corresponding analytical schedules are summarized as follows:

- Soil sample “BH5-S3” and its corresponding field duplicate “DUP” were submitted for laboratory analysis of VOCs, PHCs, PAHs, and/or metals.

The calibrations of the RKI Eagle™ CGI used for field screening were checked by the equipment supplier (Maxim) prior to use in the field by Pinchin.

Maxim completed the calibration checks in accordance with the equipment manufacturers’ specifications and/or Maxim’s SOPs. As described in Section 5.4, calibration checks and recalibration (if required) were completed daily for the and RKI Eagle™ CGI during the drilling program.

5.6.4 QA/QC Sampling Program Deviations

There were no deviations from the QA/QC sampling program outlined in the SAP.

6.0 REVIEW AND EVALUATION

6.1 Geology

Based on the stratigraphic information obtained from the soil samples recovered during the drilling activities completed as part of the Phase Two ESA, the asphaltic concrete ground surface at the Phase Two Property is underlain by grey gravelly sand, trace silt; followed by grey sandy silt, some clay, to a maximum depth of approximately 3.05 mbgs.

Bedrock was not encountered at any of the boreholes completed at the Phase Two Property during the Phase Two ESA, which were advanced to a maximum depth of approximately 3.05 mbgs.

6.2 Coarse Soil Texture

One soil sample collected from the boreholes advanced at the Phase Two Property was submitted for 75 micron single-sieve grain size analysis. The soil sample selected for analysis was considered to be representative of the primary stratigraphic unit observed at the borehole locations, which was sand and gravel and sand and clayey silt. One representative sample (BH2-S2) of the Phase Two Property was classified as coarse-textured (56.8% coarse-grained soil of samples BH2-S2).

Based on the grain size analysis results and the observed stratigraphy at the borehole locations at the Phase Two Property, it is the QP's opinion that over one-third of the overburden at the Phase Two Property is coarse-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property was interpreted to be coarse textured for the purpose of determining the MECP Site Condition Standards applicable to the Phase Two Property.

6.3 Soil Field Screening

Soil vapour headspace concentrations measured in the soil samples collected as part of this Phase Two ESA are presented in the borehole logs. Soil vapour headspace values measured with the PID were 0 part per million (ppm) in all soil samples collected during the borehole drilling program.

One most apparent "worst case" soil sample, based on visual and/or olfactory considerations, recovered from each borehole was submitted for laboratory analysis of VOCs, PHCs (F1-F4), PAHs and metals.

6.4 Soil Quality

A total of five boreholes were advanced at the Phase Two Property at the locations shown on Figure 6 in order to assess for the presence of subsurface impacts resulting from the APEC identified in the Pinchin Phase One ESA. Select soil samples were collected from each of the advanced boreholes and submitted for laboratory analysis of the COPCs. The soil sample locations, depths and laboratory analyses are summarized in Table 3 and in the borehole logs.

The soil sample analytical results were compared to the *Table 3 Standards* and the following subsections provide a discussion of the findings. A summary of the analytical results is provided in Appendix D.

6.4.1 PHCs F1-F4

The soil sample analytical results for PHCs F1-F4, along with the corresponding *Table 3 Standards*, are presented in Table 3 and indicated that all reported concentrations of VOCs and PHCs F1- F4 in the soil samples submitted for analysis satisfied the *Table 3 Standards*.

6.4.2 VOCs

The soil sample analytical results for VOCs, along with the corresponding *Table 3 Standards*, are presented in Table 3 and indicated that all reported concentrations of VOCs and PHCs F1- F4 in the soil samples submitted for analysis satisfied the *Table 3 Standards*.

6.4.3 PAHs

The soil sample analytical results for PAHs, along with the corresponding *Table 3 Standards*, are presented in Table 3 and indicated that all reported concentrations of PAHs in the soil samples submitted for analysis satisfied the *Table3 Standards*.

6.4.4 Metals

The soil sample analytical results for metals parameters, along with the corresponding *Table 3 Standards*, are presented in Table 8 and indicated that all reported concentrations of metals in the soil samples submitted for analysis satisfied the *Table 3 Standards*.

6.4.5 General Comments on Soil Quality

The soil sample results show no evidence of chemical or biological transformations of chemical parameters in the subsurface.

The soil sample analytical results show no evidence of NAPL in the subsurface at the Site. All reported soil sample concentrations either meet the *Table 3 Standards* or are above the *Table 3 Standards* but well below their corresponding free-product thresholds, where applicable. In addition, no evidence of NAPL was observed during borehole drilling.

6.5 Quality Assurance and Quality Control Results

QA/QC comprises technical activities that are used to measure or assess the effect of errors or variability in sampling and analysis. It may also include specification of acceptance criteria for the data and corrective actions to be taken when they are exceeded. QA/QC also includes checks performed to evaluate laboratory analytical quality, checks designed to assess the combined influence of field sampling and laboratory analysis and checks to specifically evaluate the potential for cross contamination during sampling and sample handling.

The QA/QC samples collected and submitted for analysis by Pinchin during the Phase Two ESA consisted of the following:

- Field duplicate soil samples to assess the suitability of field sampling methods and laboratory performance.

In addition to the above, laboratory quality control activities and sample checks employed by AGAT Labs included:

- Method blanks - where a clean sample is processed simultaneously with and under the same conditions (i.e., using the same reagents and solvents) as the samples being analyzed. These are used to confirm whether the instrument, reagents and solvents used are contaminant free.
- Laboratory duplicates - where two samples obtained from the sample container are analyzed. These are used to evaluate laboratory precision.
- Surrogate spike samples - where a known mass of compound not found in nature (e.g., deuterated compounds such as toluene-d8) but that has similar characteristics to the analyzed compounds is added to a sample at a known concentration. These are used to assess the recovery efficiency.
- Matrix spike samples - where a known mass of target analyte is added to a matrix sample with known concentrations. These are used to evaluate the influence of the matrix on a method’s recovery efficiency.
- Use of standard or certified reference materials - a reference material where the content or concentration has been established to a very high level of certainty (usually by a national regulatory agency). These are used to assess accuracy.

The results of the QA/QC samples are discussed in the following subsections.

6.5.1 Soil Duplicate Results

During borehole soil sampling activities, one soil duplicate sample pair, consisting of soil sample “BH1-S4” and its corresponding field duplicate “DUP”, were submitted for laboratory analysis of VOCs, PHCs (F1-F4), PAHs, and metals.

The quality of the analytical results was evaluated by calculating relative percent differences (RPDs) for the parameters analyzed for the original and field duplicate samples. The RPD for each parameter was calculated using the following equation:

$$\text{RPD} = \frac{(\text{Original Concentration} - \text{Duplicate Concentration}) \times 100}{(\text{Original Concentration} + \text{Duplicate Concentration})/2}$$

An RPD was not calculated unless the parameter concentration in both the original and duplicate sample had detectable concentrations above the corresponding practical quantitation limit for the parameter, which is equal to five times the lowest laboratory reportable detection limit (RDL).

The calculated RPDs for the original and field duplicate soil samples have been compared to performance standards provided in the *Analytical Protocol.* Pinchin notes that although these performance standards only strictly apply to laboratory duplicate samples, they have been considered suitable for comparison to the field duplicate soil sample results as well.

Each of the calculated RPDs met the corresponding performance standards.

Based on Pinchin’s review of the calculated RPD values for the submitted soil sample duplicate pairings, the level of observed variance in the reported analytical results is considered acceptable for the purpose of meeting the data quality objectives of this Phase Two ESA.

6.5.2 Deviations from Analytical Protocol

There were no deviations from the holding times, preservation methods, storage requirements and container types specified in the *Analytical Protocol* during the completion of the Phase Two ESA.

6.5.3 Laboratory Certificates of Analysis

Pinchin has reviewed the laboratory Certificates of Analysis provided by AGAT Labs for the samples submitted during the Phase Two ESA and confirms the following:

- All laboratory Certificates of Analysis contain a complete record of the sample submission and analysis and meet the requirements of Section 47(3) of O. Reg. 153/04.
- A laboratory Certificate of Analysis has been received for each sample submitted for analysis during the Phase Two ESA.
- All laboratory Certificates of Analysis have been included in full in Appendix E.

- All of the analytical results reported in the Certificates of Analysis have been summarized, in full, in Table 3.

6.5.4 Laboratory Comments Regarding Sample Analysis

AGAT Labs routinely conducts internal QA/QC analyses in order to satisfy regulatory QA/QC requirements. The results of the AGAT Labs QA/QC analyses for the submitted soil samples are summarized in the laboratory Certificates of Analyses provided in Appendix E. Also included in Appendix H are all correspondences between the laboratory and staff at Pinchin.

6.5.5 QA/QC Sample Summary

The overall evaluation of the QA/QC sample results indicates no issues with respect to field collection methods and laboratory performance, and no apparent bias due to ambient conditions at the Phase Two Property and during transportation of the sample containers/samples to and from the analytical laboratory.

As such, it is the QP’s opinion that the soil analytical data obtained during the Phase Two ESA are representative of actual Site conditions and are appropriate for meeting the objective of assessing whether the soil at the Phase Two Property meets the applicable MECP Site Condition Standards.

6.6 Phase Two Conceptual Site Model

This Phase Two ESA was completed for the property located immediately northwest of Gemini Way, approximately 185 metres northeast of the intersection between Gemini Way and Centrepointe Drive. The Phase One Property is approximately 0.28 hectares in size and presently consists of vacant undeveloped land utilized as a parking lot. There is no record of industrial use or of a commercial use (e.g., garage, bulk liquid dispensing facility or dry cleaner) that would require classifying the Phase One Property as an enhanced investigation property. Key Map showing the Phase Two Property location is provided on Figure 1.

A Phase One CSM was created during the Pinchin Phase One ESA in order to provide a detailed visualization of the APECs which could occur on, in, under, or affecting the Phase Two Property. The Phase One CSM is summarized in Figures 1 through 4, which illustrate the following features within the Phase One Study Area, where present:

- Existing buildings and structures.
- Water bodies located in whole or in part within the Phase One Study Area.
- Areas of natural significance located in whole or in part within the Phase One Study Area.
- Drinking water wells located at the Phase One Property.

- Land use of adjacent properties.
- Roads within the Phase One Study Area.
- PCAs within the Phase One Study Area, including the locations of tanks.
- APECs at the Phase One Property.

The following subsections expand on the Phase One CSM with the information collected during the completion of the Phase Two ESA.

6.6.1 Potentially Contaminating Activities

Table 2 summarizes the descriptions and locations of all PCAs as defined by O. Reg. 153/04 that were identified by Pinchin within the Phase One Study Area. The following presents a summary of these PCAs:

- A total of three PCAs were documented to have occurred at the Phase One Property.
- A total of eight PCAs were documented to have occurred within the Phase One Study Area outside of the Phase One Property. Based on the time elapsed, distances between these off-Site PCAs and the Phase One Property and/or their downgradient or transgradient location with respect to the inferred groundwater flow direction at the Phase One Property, it is Pinchin's opinion that the PCAs identified on these properties do not represent APECs at the Phase One Property.

6.6.2 Areas of Potential Environmental Concern

Table 1 summarizes the APECs identified at the Phase Two Property, as well as their respective PCAs, COPCs and the media that could potentially be impacted. The APECs at the Phase Two Property are illustrated on Figure 5. The Phase Two ESA included an assessment of soil quality within the APECs.

The following table summarizes the boreholes completed to investigate each of the APECs:

APEC	Investigation Location
APEC-1	BH1, BH2, BH3, BH4, BH5
APEC-2	Not applicable – See below.
APEC-3	BH1, BH2, BH3, BH4, BH5

A summary of the findings for the APECs are provided below.

<u>APEC-1</u>

- The potential presence of fill material was identified throughout the Phase Two Property through a review of the 1990 aerial photograph, at first developed use of the Phase Two Property. The potential presence of fill material represented a PCA that required investigation as part of the Phase Two ESA. The subsurface investigation of APEC-1 completed by Pinchin as part of the Phase Two ESA included five new boreholes. The soil samples submitted from the boreholes completed within APEC-1 met the *Table 3 Standards* for VOCs, PHCs F1-F4, PAHs, and/or metals.

APEC-2

- The Phase Two Property partially consists of a paved parking lot. According to the Site Representative, salt has historically been applied to the parking area for safety purposes during winter conditions to remove snow and ice. The application of salt represents a PCA at the Phase Two Property. However, it is the opinion of the QP_{ESA} supervising the Phase One ESA that, although salt-related parameters such as sodium adsorption ratio and electrical conductivity in soil and sodium and chloride in groundwater may be present at concentrations exceeding the applicable Site Condition Standards, the exemption provided in Section 49.1 of O. Reg. 153/04 applies. Accordingly, although this PCA results in an APEC at the Phase One Property, these parameters would be deemed to meet the Site Condition Standards and do not need to be further assessed as part of a Phase Two ESA.

APEC-3

- The Phase Two Property was developed with a roadway between 1977 and 1982. Fill material of unknown quality may have been imported to the Site in preparation for the road construction, which represents a PCA on-Site; resulting in an APEC on the Phase Two Property. The potential presence of fill material represented a PCA that required investigation as part of the Phase Two ESA. The subsurface investigation of APEC-1 completed by Pinchin as part of the Phase Two ESA included five new boreholes. The soil samples submitted from the boreholes completed within APEC-3 met the *Table 3 Standards* for VOCs, PHCs F1-F4, PAHs, and/or metals.

6.6.3 Subsurface Structures and Utilities

Interaction of the groundwater at the Phase Two Property with buried utilities is not a concern nor likely given that the Phase Two Property is an undeveloped, and vacant area with few public utilities in the area.

6.6.4 Physical Setting

Based on the work completed as part of this Phase Two ESA, the following subsections provide a summary of the physical setting of the Phase Two Property.

Stratigraphy

Subsurface soil conditions were logged on-Site by Pinchin personnel at the time of borehole drilling. Based on the soil samples recovered during the borehole drilling program, the soil stratigraphy at the drilling locations generally consists of surficial granular road base material comprised of grey sand and gravel, trace silt to a depth of approximately 0.61 mbgs, followed by grey sandy silt, some clay, that extended to the maximum investigation depth of 3.05 mbgs. Wet soil conditions were not observed.

No odours or staining were observed in the soil samples collected during the borehole drilling program.

A detailed description of the subsurface stratigraphy encountered during the borehole program is documented in the borehole logs included in Appendix C.

Depth to Bedrock

Bedrock was not encountered at any of the boreholes completed at the Phase Two Property during the Phase Two ESA drilling program, which were advanced to a maximum depth of approximately 3.05 mbgs.

Depth to Water Table

Groundwater was not encountered during the Phase Two ESA drilling program.

Applicability of Section 35 of O. Reg 153/04 – Non-Potable Site Condition Standards

Site Condition Standards for non-potable groundwater use have been applied to the Phase Two Property given that the following conditions specified in Section 35 of O. Reg. 153/04 have been met:

- The Phase Two Property and all properties within 250 metres of the Phase Two Property are supplied by a municipal drinking water system.
- The Phase Two Property is located within an intake protection zone (IPZ-2) by the City of Ottawa but the City of Ottawa has consented in writing to the use of non-potable Site Condition Standards.
- There are no wells located at the Phase Two Property or within the Phase One Study Area that are used or intended for use as a water source for human consumption or agriculture.
- The City of Ottawa has provided written notice that they do not object to the use of non-potable Site Condition Standards at the Phase Two Property.

Applicability of Section 41 of O. Reg 153/04 – Environmentally Sensitive Area

Section 41 of O. Reg. 153/04 states that a property is classified as an “environmentally sensitive area” if the property is within an area of natural significance, the property includes or is adjacent to an area of natural significance or part of such an area, the property includes land that is within 30 m of an area of natural significance or part of such an area, the soil at the property has a pH value for surface soil less than 5 or greater than 9 or the soil at the property has a pH value for subsurface soil less than 5 or greater than 11.

The Phase Two Property is not located in or adjacent to, nor does it contain land within 30 m of, an area of natural significance. Furthermore, the pH values measured in the submitted soil samples were within the limits for non-sensitive sites. As such, the Phase Two Property is not an environmentally sensitive area as defined by Section 41 of O. Reg. 153/04.

Applicability of Section 43.1 of O. Reg 153/04 – Shallow Soil Property and Proximity to a Water Body

Section 43.1 of O. Reg. 153/04 states that a property is classified as a "shallow soil property" if one-third or more of the area consists of soil less than 2 m in depth.

Bedrock was not encountered at any of the borehole locations, all of which were extended to depths below 2.0 mbgs. As such, the Phase Two Property is not a shallow soil property as defined by Section 43.1 of O. Reg. 153/04.

As per Section 43.1 of O. Reg. 153/04, the proximity of the Phase Two Property to a water body must be considered when selecting the appropriate Site Condition Standards.

The Phase Two Property does not include all or part of a water body, it is not adjacent to a water body and it does not include land within 30 m of a water body. As such, Site Condition Standards for use within 30 m of a water body were not applied.

Soil Imported to Phase Two Property

No soil was imported to the Phase Two Property during completion of the Phase Two ESA.

Proposed Buildings and Other Structures

The Phase Two Property is currently vacant, undeveloped land; as such, there are no buildings currently on the Phase Two Property. The future use of the Phase Two Property is understood by Pinchin to be the operation of a warehouse facility.

6.6.5 Applicable Site Condition Standards

Based on the grain size analysis of representative soil samples collected during the Phase Two ESA and the observed stratigraphy at the borehole locations, Pinchin concluded that over two-thirds of the overburden at the Phase Two Property is coarse-textured as defined by O. Reg. 153/04 and Site Condition Standards for coarse-textured soil were not applied.

Based on the above, the appropriate Site Condition Standards for the Phase Two Property are the *Table 3 Standards* for:

- Coarse-textured soils; and
- Residential/parkland/institutional property use.

As such, all analytical results have been compared to these *Table 3 Standards*.

7.0 CONCLUSIONS

Pinchin completed a Phase Two ESA at the Phase Two Property in relation to the future development of the Phase Two Property. The Phase Two ESA was conducted in general accordance with O. Reg. 153/04 as a conditional requirement for a Site Plan Approval to the City of Ottawa.

The Phase Two ESA completed by Pinchin included the advancement of five boreholes at the Phase Two Property.

Based on Site-specific information, the applicable regulatory standards for the Phase Two Property were determined to be the *Table 3 Standards* for residential/parkland/institutional property use and coarse-textured soils. Soil samples were collected from each of the borehole locations and submitted for laboratory analysis of VOCs, PHCs F1-F4, PAHs, and/or metals.

The laboratory results for the soil samples submitted during the Phase Two ESA indicated that all reported concentrations for the parameters analyzed met the corresponding *Table 3 Standards*.

7.1 Signatures

This Phase Two ESA was undertaken under the supervision of Scott Mather, P.Eng., QP_{ESA} in accordance with the requirements of O. Reg. 153/04 as a conditional requirement for a Site Plan Approval for the Phase Two Property.

7.2 Terms and Limitations

This Phase Two ESA was performed for Centurion Appelt (1 Centrepoint) LP (Client) in order to investigate potential environmental impacts at 85 Gemini Way in Ottawa, Ontario (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This Phase Two ESA does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Phase Two ESA to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site and recognizes reasonable limits on time and cost.

This Phase Two ESA was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This report was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

8.0 REFERENCES

The following documents provided information used in this report:

- Association of Professional Geoscientists of Ontario. Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended). April 2011.
- Ontario Ministry of the Environment. Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. December 1996.
- Ontario Ministry of the Environment. Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. March 9, 2004 amended July 1, 2011.
- Ontario Ministry of the Environment. Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15, 2011.
- Pinchin Ltd. Phase One Environmental Site Assessment, 85 Gemini Way in Ottawa, Ontario", Prepared for Centurion Appelt (1 Centrepoint) LP ., February 5, 2025.
- Province of Ontario. Environmental Protection Act, R.S.O 1990, Chapter E.19.
- Province of Ontario. R.R.O. 1990, Regulation 347, General – Waste Management, as amended by Ontario Regulation 234/11.
- Province of Ontario. Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act. Last amended by Ontario Regulation 407/19 on November 29, 2023 .

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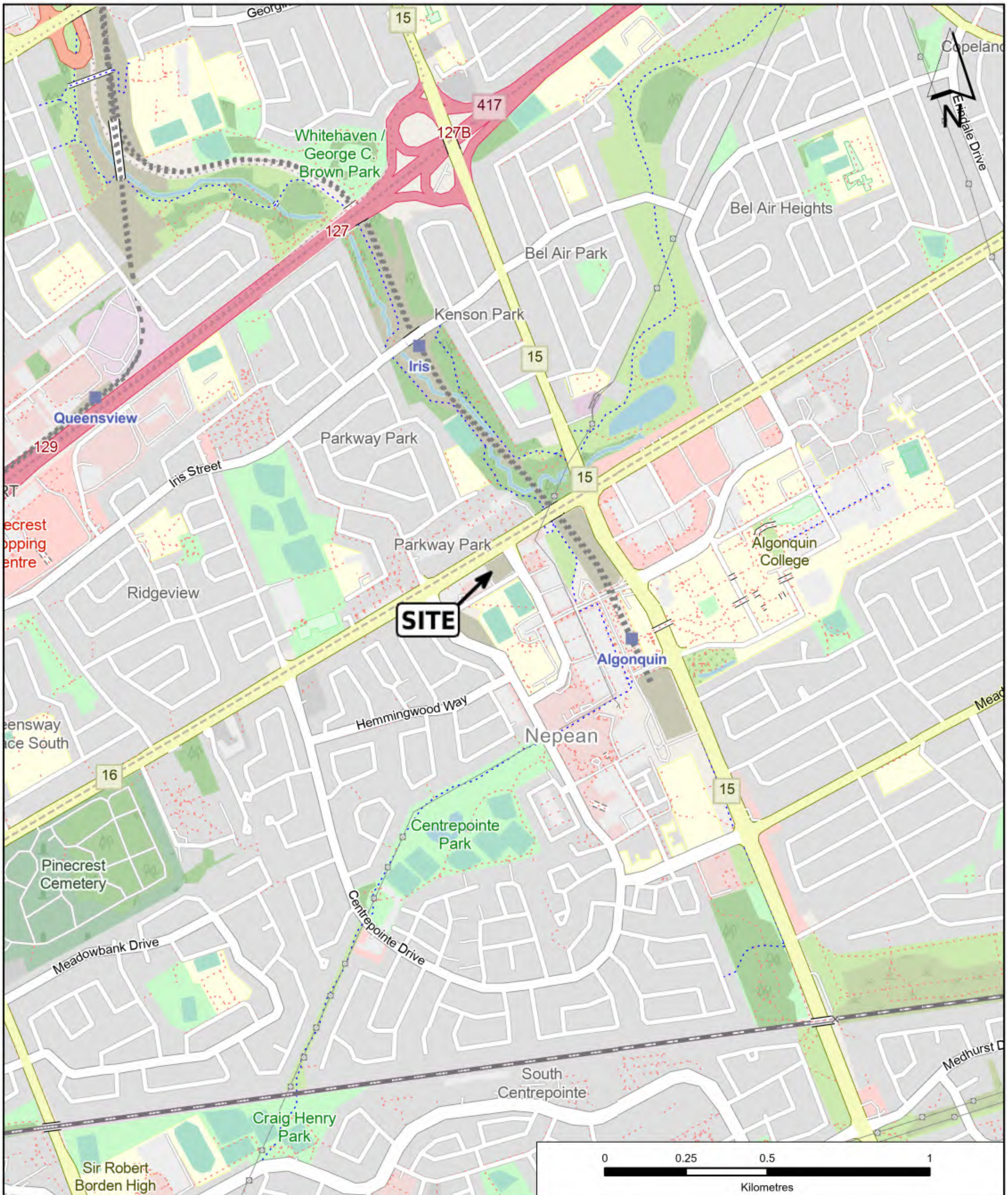
Template: Master Report for RSC Phase Two ESA Report – Unimpacted Site, EDR, July 18, 2024

9.0 APPENDICES

APPENDIX A
Figures



PINCHIN

PROJECT NAME:	PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME:	CENTURION APPELT (1 CENTREPOINT) LP
PROJECT LOCATION:	85 GEMINI WAY, OTTAWA, ONTARIO
FIGURE NAME:	KEY MAP
FIGURE NUMBER	1

PROJECT NUMBER:	SCALE:	DRAWN BY:	REVIEWED BY:	DATE:
350868	AS SHOWN	CF	MR	DECEMBER 2024

N

LEGEND

- MTC - MULTI TENANT COMMERCIAL
- MTR - MULTI TENANT RESIDENTIAL
- PHASE ONE PROPERTY

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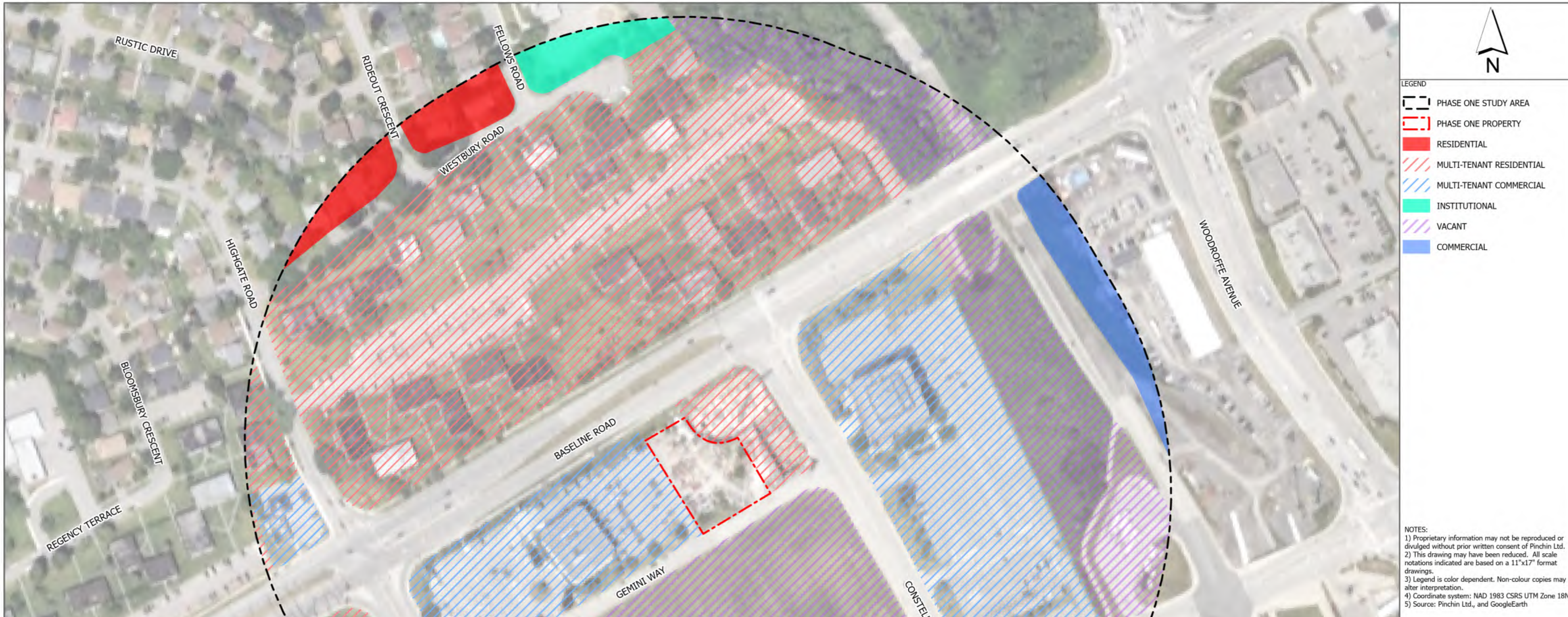
3) Legend is color dependent. Non-colour copies may alter interpretation.
4) Coordinate system: NAD 1983 CSRS UTM Zone 18N.
5) Source: Pinchin Ltd., and GoogleEarth

PINCHIN

PROJECT NAME	PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME	CENTURION APPELT (1 CENTREPOINT) LP
PROJECT LOCATION	85 GEMINI WAY, OTTAWA, ONTARIO
FIGURE NAME	PHASE ONE PROPERTY
PROJECT NUMBER: 350868	SCALE AS SHOWN
DRAWN BY CF	REVIEWED BY MR
DATE DECEMBER 2024	FIGURE NUMBER 2



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PINCHIN

PROJECT NAME: PHASE ONE ENVIRONMENTAL SITE ASSESSMENT	
CLIENT NAME: CENTURION APPELT (1 CENTREPOINT) LP	
PROJECT LOCATION: 85 GEMINI WAY, OTTAWA, ONTARIO	
FIGURE NAME: PHASE ONE STUDY AREA	
PROJECT NUMBER: 350868	SCALE: AS SHOWN
DRAWN BY: CF	REVIEWED BY: MR
DATE: DECEMBER 2024	FIGURE NUMBER: 3

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PINCHIN

PROJECT NAME	PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME	CENTURION APPELT (1 CENTREPOINT) LP
PROJECT LOCATION	85 GEMINI WAY, OTTAWA, ONTARIO
FIGURE NAME	POTENTIALLY CONTAMINATING ACTIVITIES – ON-SITE
PROJECT NUMBER: 350868	SCALE AS SHOWN
DRAWN BY CF	REVIEWED BY MR
DATE DECEMBER 2024	FIGURE NUMBER 4

N

LEGEND

PCA DOES NOT CONTRIBUTE TO AN APEC

SITE BOUNDARY

PHASE ONE STUDY AREA

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PROJECT NAME
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
CENTURION APPELT (1 CENTREPOINT) LP

PROJECT LOCATION
85 GEMINI WAY, OTTAWA, ONTARIO

FIGURE NAME
POTENTIALLY CONTAMINATING ACTIVITIES - OFF-SITE

PROJECT NUMBER:	SCALE
350868	AS SHOWN
DRAWN BY	REVIEWED BY
CF	MR
DATE	FIGURE NUMBER
DECEMBER 2024	5

N

LEGEND

APEC 1

PHASE ONE PROPERTY

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PROJECT NAME	PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME	CENTURION APPELT (1 CENTREPOINT) LP
PROJECT LOCATION	85 GEMINI WAY, OTTAWA, ONTARIO
FIGURE NAME	AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
PROJECT NUMBER: 350868	SCALE AS SHOWN
DRAWN BY CF	REVIEWED BY MR
DATE DECEMBER 2024	FIGURE NUMBER 6

APPENDIX B

Sampling and Analysis Plan

Table 3 - Table of Areas of Potential Environmental Concern

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase Two Property	Potentially Contaminating Activity[2]	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
APEC-1 Potential presence of fill throughout the Phase Two Property at first developed use in the 1990 aerial photograph.	Located throughout the Phase Two Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	PHCs BTEX PAHs Metals As, Sb, Se B-HWS Cr (VI) Hg	Soil
APEC-2 Road salt application to parking areas on-Site.	Located throughout the Phase Two Property.	Other - Road Salting Activities	On-Site	Na Cl- Electrical conductivity SAR	Soil and Groundwater
APEC-3 Potential presence of fill throughout the Phase Two Property die to roadway transecting the Phase Two Property between 1977 and 1982.	Located throughout the Phase Two Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	PHCs BTEX PAHs Metals As, Sb, Se B-HWS Cr (VI) Hg	Soil

Notes:

1 - Areas of potential environmental concern means the area on, in or under a Phase Two property where one or more contaminants are potentially present, as determined through the Phase Two environmental site assessment, including through,
(a) identification of past or present uses on, in or under the Phase Two property, and
(b) identification of potentially contaminating activity.

2 - Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a Phase Two study area

3 - When completing this column, identify all contaminants of potential concern using the Method Groups as identified in the Protocol for in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004, amended as of July 1, 2011, as specified below:

List of Method Groups:

ABNs	PCBs	Metals	Electrical Conductivity
CPs	PAHs	As, Sb, Se	Cr (VI)
1,4-Dioxane	THMs	Na	Hg
Dioxins/Furans, PCDDs/PCDFs	VOCs	B-HWS	Methyl Mercury
OCs	BTEX	Cl-	Low or high pH,
PHCs	Ca, Mg	CN-	SAR

4 - When submitting a record of site condition for filing, a copy of this table must be attached

Table 1
SAMPLES SUBMITTED FOR LABORATORY ANALYSIS
Centurion Appelt (1 Centrepoint) LP
85 Gemini Way, Ottawa, Ontario

Samples			*Parameters*							
Borehole ID	*Sample ID*	*Sample Depth Range (mbgs)*		*PHCs (F1-F4)*	*VOCs*	*PAHs*	*Metals*	*pH*	*Grain Size Analysis*	*Rationale/Notes*
BH1	BH1-S1	0.00-0.76	*SOIL SAMPLES*	●	●	●	●	●		Assess soil quality on-Site due to the imporation of fill material of unknown quality across the Site.
BH2	BH2-S2	0.76-1.52		●	●	●	●		●	
BH3	BH3-S2	0.76-1.52		●	●	●	●			
BH4	BH4-S2	0.76-1.52		●	●	●	●			
BH5	BH5-S3	1.52-2.29		●	●	●	●	●		
	DUP	1.52-2.29		●	●	●	●			

Notes:

PHCs (F1-F4) Petroleum Hydrocarbons (Fraction 1 to Fraction 4)
VOCs Volatile Organic Compounds
PAHs Polycyclic Aromatic Hydrocarbons
mbgs Metres Below Ground Surface
MECP Ontario Ministry of the Environment, Conservation and Parks

SOP – EDR003 – REV005 – FIELD SCREENING OF SOIL SAMPLES

Title:	Field Screening of Soil Samples
Practice:	EDR
First Effective Date:	June 16, 2009
Version:	005
Version Date:	May 6, 2022
Author:	Robert MacKenzie
Authorized by:	Terry Duffy

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	June 16, 2009	N/A	MEM
001	November 26, 2010	Update approval signature	FG
002	September 25, 2013	Revised SOP to reflect current practices/Added section on O.Reg. 153/04 compliance	RLM
003	April 29, 2016	Updated Section 4.0/Modified time between readings to 1 hour	RLM
004	April 28, 2017	Removed reference to Pinchin West/In Section 5.2, clarified that soil vapour measurements do not need to be made within one hour of sampling during winter conditions	RLM
005	May 6, 2022	Annual update Update Corp Health & Safety wording and links, update formatting as required	Terry Duffy Abby Mitchell

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the quantitative and qualitative methods to be used by Pinchin field personnel for field screening soil samples for potential impacts during field investigations.

The quantitative part of field screening consists of the measurement of vapour concentrations in soil sample headspace in order to assess the potential for volatile constituents to be present in the soil. The soil vapour readings obtained from these measurements are then used to assist in selecting potential “worst case” soil samples for submission to the laboratory for analysis. There are no regulatory standards for comparison with soil headspace vapour readings and we are using the general principle that the sample with the highest soil headspace vapour concentration from a group of samples is often the most likely to be impacted by volatile constituents.

The qualitative part of field screening includes assessing the soil for visual or olfactory indicators of potential contamination and is used in conjunction with the soil headspace vapour readings to select “worst case” soil samples to be submitted for laboratory analysis.

Note that soil vapour measurements have limited value when selecting “worst case” soil samples for laboratory analysis of non-volatile parameters such as metals. Visual observations of the presence of staining and debris (e.g., brick fragments and other building materials, coal ash, etc.), along with sample depth and likely migration pathways are to be factored into selecting the samples. The sample with the highest soil headspace vapour reading is not automatically selected under these circumstances.

Soil samples collected for soil vapour measurement must not be submitted for laboratory analysis except for analysis of non-volatile parameters (i.e., metals and inorganics) or grain size analysis.

This SOP also applies to the field screening of sediment samples but for simplicity, only soil samples are referred to below.

3.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

1. Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
2. Distributed to senior staff at Le Groupe Gesfor Poirier for distribution as appropriate.

4.0 PROCEDURE

4.1 Equipment and Supplies

1. Resealable plastic bags (e.g., Ziploc®);

   Note: that small capacity bags (e.g., 500 millilitre capacity) are preferred over larger sized bags. When conducting headspace screening of a set of soil samples, the size of bag used should be consistent throughout in order to maintain the same approximate headspace volume in each bag;

2. Combustible gas indicator (CGI) capable of operating in methane-elimination and/or photo-ionization detector (PID);
3. (The Project Manager will be responsible for selecting the appropriate instrument(s) for each project. CGIs (e.g., RKI Eagle or Gastechtor) are acceptable for screening of petroleum hydrocarbons (PHCs) and related compounds, whereas PIDs (e.g., MiniRAE) are acceptable for screening for volatile organic compounds (VOCs), including chlorinated solvents, but can also be used when screening for PHCs. For many projects, it will be appropriate to employ both a CGI and a PID); and
4. Calibration equipment (e.g., calibration gas, regulators, tubing, calibration bags, etc. as provided by the equipment supplier).

4.1.1 PPE Requirements

Known PPE that will be required when completing the work of this SOP include:

1. Standard field PPE (hard hat, hi-vis vest/clothing, safety glasses and boots, nitrile gloves);

2. If handling samples containing sharp debris (glass, metal), leather gloves should be worn over the nitrile gloves;
3. In dusty Site conditions, and/or where strong vapours occur or are anticipated, a respirator with appropriate filter cartridges should be used.

4.2 Documentation

4.2.1 Project Hazard Assessment (PHA)

Project Supervisor(s) and field staff must complete a Project Hazard Assessment (PHA) prior to conducting field work in accordance with the Pinchin Health and Safety Program Section 3.2 Project Hazard Assessments.

4.3 Soil Headspace Vapour Measurement Procedure

The procedure for conducting soil headspace vapour measurements for soil sample headspace is as follows:

1. Unless pre-calibrated by the equipment supplier, calibrate the CGI/PID as per the instrument manufacturer's instructions before commencing soil vapour measurements. Record the date and time of calibration, and type and concentration of the calibration gas used in the field logbook or field forms;
2. Label the plastic bag with the sample number;
3. Create a split soil sample by splitting the sample core vertically (i.e., along the longitudinal axis) with one half used for soil headspace vapour measurement and the other half used to fill sample jars for laboratory analysis of volatile parameters (e.g., VOCs and PHCs (F1 fraction)). In other words, the depth interval of the soil subjected to soil headspace vapour measurements should be the same as the depth interval from which samples for volatile parameters are collected. This procedure doesn't apply to grab samples but is to be completed when soil cores are obtained, such as sampling with dual tube samplers, split-spoon samplers and hand augers. For grab samples, soil used for laboratory analysis and soil headspace vapour measurements should be collected from proximal locations;
4. Place the soil into the plastic bag until the bag is approximately one-quarter full as soon as possible after the sampling device is retrieved/opened;
5. Seal the bag and break apart the soil by manually kneading the soil in the sealed bag;
6. Allow the soil sample to equilibrate at ambient temperature for a minimum of 5 minutes but no longer than one hour before taking a soil headspace vapour measurement. The exception to this is that during winter conditions, the soil samples should be placed in a heated environment (e.g., building interior) to warm up for a minimum of 15 minutes

before taking soil vapour measurements (do not place directly under/over heater vent). In this case, the soil vapour measurements do not need to be completed within one hour of sample collection;

7. Do not store the bagged soil samples in direct sunlight prior to taking soil headspace vapour measurements;
8. When conducting soil headspace vapour measurements with a CGI, make sure it is switched to methane elimination mode;
9. When completing soil headspace vapour measurements of a soil sample using both a PID and CGI, the vapour measurement using the PID should be made first;
10. Immediately before taking a soil headspace vapour measurement, gently agitate the bag and then create a small opening in the top of the bag. Insert the tip of the CGI/PID into the headspace of the bag and quickly reseal the bag around the tip to minimize leakage. If there is any water inside the bag, ensure that the tip does not contact the water;
11. Record the maximum vapour concentration measured within the first 10 seconds after inserting the tip of the CGI/PID into the bag. Note any anomalies that occur during the taking of the measurement (e.g., if the readings displayed by the instrument progressively increase and do not reach an obvious peak);
12. Remove the tip of the CGI/PID from the bag and reseal the bag immediately in case additional soil headspace vapour measurements are needed. If the soil headspace vapour is measured for a sample using a PID and an additional measurement with a CGI is required, wait a minimum of five minutes after the bag is resealed before taking the measurement with the CGI;
13. Before completing the next soil headspace vapour measurement, allow the CGI/PID to reach “zero” or “baseline”. If the CGI/PID does not return to “zero” or “baseline” it should be recalibrated before further soil headspace vapour measurements are made;
14. At the discretion of the Project Manager, a calibration check of the CGI/PID should be completed at least once per day or at a frequency of once per 100 soil headspace vapour measurements (for projects where numerous soil headspace vapour measurements are made on a daily basis such as a large remediation project); and
15. A calibration check is made by measuring the concentration of a sample of the calibration gas with the CGI/PID without making any adjustments to the instrument beforehand and comparing the measured concentration with the known concentration. The comparison of the measured concentration versus the actual concentration of the calibration gas indicates how much the instrument’s calibration may have been altered during soil headspace vapour measurements, which is known as “instrument drift”. Should the calibration check show instrument drift of more than 10%, the CGI/PID needs to be

recalibrated before completing further soil headspace vapour measurements. Record all pertinent information for the calibration check (e.g., date and time, initial measured concentration, calibration gas type and concentration) in the field logbook or field forms.

4.4 Visual Screening

Visual screening consists of examining the soil sample for potential indicators of contamination as per the following:

1. Visually examine the soil sample, including breaking apart a portion of the sample;
2. Note any indications of a mottled appearance, dark discolouration or staining, free-phase product, or unusual colour;
3. Note any indications of non-soil constituents, such as brick, asphalt, wood or concrete fragments, coal fragments, coal ash, etc.; and
4. Record the findings of the visual screening in the field logbook or field forms. If there is no visual evidence of impacts this should be noted.

4.5 Olfactory Screening

Record in the field logbook or field forms the presence of any odours noted during sample collection and visual screening. Field staff are not expected to directly smell soil samples to assess the presence/absence of odours.

If it is possible to identify the likely type of odour (e.g., PHC-like, solvent-like, etc.) then this information should be recorded along with a comment on the severity of the odour (e.g., slight, strong, etc.). If the odour cannot be readily identified, it should be described in the field notes as “unidentified odour”.

If no odours are observed, this information should also be recorded in the field logbook or field forms.

4.6 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following additional procedures must be undertaken:

1. Calibration of the CGI/PID must be completed at the beginning of each field day and calibration checks must be made either at the end of each field day or after every 100 soil vapour readings (whichever occurs first); and
2. Thorough records of the CGI/PID calibration and calibration checks must be kept, including any calibration sheets provided by the equipment supplier. The Quality Assurance/Quality Control section of the Phase Two ESA report requires a discussion of field screening instrument calibration, and equipment calibration records must be appended to the Phase Two ESA report.

4.7 Health and Safety

4.7.1 Pinchin's Corporate Health and Safety Program

1. All work activities under this SOP will be completed in a safe manner following the requirements of Pinchin's Corporate Health and Safety Program, client site requirements and current legislation.
2. Pinchin Employees conducting work under this SOP must meet the job competency requirements as outlined in Section 2.03 Job Competency of the Pinchin's Corporate Health and Safety Program.

4.7.2 Training Requirements

Training requirements for this SOP include, but may not be limited to, the following:

1. Site Orientation as required by client.
2. Specific training as outlined in Pinchin's Corporate Health and Safety Program Section 2.04 Health and Safety Training.

4.7.3 Qualified Person

Where technical occupational health and safety assistance is required in evaluating hazards and determining controls, a Qualified Person should be engaged following Pinchin's Corporate Health and Safety Program Section 3.2 Project Hazard Assessments.

4.7.4 INMIR – Incident/Near Miss Reporting and Investigation – Resulting in No Injury

If, while working on-Site and following this SOP, an event or hazard that did not result in injury, illness or damage is encountered **it is expected** that the NEAR MISS is reported by filling in the appropriate information using INMIR – Incident/Near Miss Reporting and Investigation form on Survey123 platform

4.7.5 INMIR – Incident/Near Miss Reporting and Investigation – Resulting in Injury and or Loss

If, while working on a site and following this SOP, there is an incident resulting in loss (personal injury, property damage) fill in the appropriate information using INMIR – Incident/Near Miss Reporting and Investigation form on Survey123 platform.

5.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

6.0 MAINTENANCE OF SOP

This SOP will be reviewed annually by the National Practice Leader**.**

7.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

Ontario Ministry of the Environment, *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996.

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Template: Master SOP Template – November 11, 2021

SOP – EDR006 – REV005 – BOREHOLE DRILLING

Title:	Borehole Drilling
Practice:	EDR
First Effective Date:	November 25, 2010
Version:	004
Version Date:	November 19, 2020
Author:	Francesco Gagliardi and Robert MacKenzie
Authorized by:	Terry Duffy

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 25, 2010	N/A	FG
001	November 22, 2013	Streamlined text to reflect most common current practices/Removed sections covered by other SOPs	RM
002	April 29, 2016	Updated Section 4.0	RM
003	April 28, 2017	Removed reference to Pinchin West	RM
004	January 30, 2020	Annual Review	TJD
005	November 19, 2020	Formatting updates	RM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents a description of the methods employed for the completion of boreholes and the collection of subsurface soil samples.

Boreholes are typically completed to determine geologic conditions for hydrogeological evaluation, to allow the installation of monitoring wells, and to allow for the collection of subsurface soil samples for laboratory analysis.

Several methods are available for the collection of shallow subsurface soil samples using hand-held equipment (e.g., hand augers, post-hole augers). However, the use of a drill rig, equipped with direct-push tooling, solid-stem augers and/or hollow-stem augers, is the most common method used by Pinchin to advance boreholes and will be the focus of this SOP.

A detailed discussion of all the various drilling rigs and drilling methods (e.g., direct push, augering, sonic drilling, air/water/mud rotary drilling, etc.) is beyond the scope of this SOP. The Project Manager will be responsible for determining the appropriate drill rig and drilling method for the site investigation.

The majority of the site investigations completed by Pinchin involve relatively straightforward drilling within the overburden within a one aquifer system. In some situations, such as when multiple aquifers are spanned by a borehole, when drilling into bedrock or when there are known impacts in the shallow subsurface, drilling using telescoped casing methods may be appropriate. Telescoped casing and bedrock drilling methods are beyond the scope of this SOP. In these situations, the Project Manager, in consultation with the drilling contractor, will be required to confirm the drilling requirements and procedures.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

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5.0 PROCEDURE

5.1 General

The overall borehole drilling program is to be managed in accordance with SOP-EDR005. In particular, utility locates must be completed in accordance with SOP-EDR021 before any drilling activities commence.

All non-dedicated drilling and sample collection equipment must be decontaminated in accordance with SOP-EDR009.

5.2 Prior Planning and Preparation

The planning requirements for borehole drilling programs are covered in detail in SOP-EDR005.

As noted above, the type of drilling rig and drilling method will be determined by the Project Manager when scoping out the site investigation. In some cases, a switch in drilling rig and/or drilling method may be required depending on site conditions. For example, if competent bedrock is encountered in the subsurface at a depth above the water table, bedrock coring would be required to advance the borehole deep enough to install a monitoring well.

5.3 Borehole Drilling Procedures

Once the final location for a proposed boring has been selected and utility clearances are complete, one last visual check of the immediate area should be performed before drilling proceeds. This last visual check should confirm the locations of any adjacent utilities (subsurface or overhead) and verification of adequate clearance.

In some instances, in particular where there is uncertainty regarding the location of buried utilities or the borehole is being completed near a buried utility, the use of a hydro-excavating (hydro-vac) unit will be required to advance the borehole to a depth below the bottom of the utility. The hydro-vac uses a combination of high-pressure water and high-suction vacuum (in the form of a vacuum truck) to excavate soil. This is also known as “daylighting”. The need to use a hydro-vac will be determined by the Project Manager.

If it is necessary to relocate any proposed borehole due to terrain, utilities, access, etc., the Project Manager must be notified, and an alternate location will be selected.

5.4 Borehole Nomenclature

If a borehole is advanced strictly for the purpose of soil sampling and no monitoring well is installed, the borehole should be identified as “BHxx”. If a monitoring well is installed in a borehole, the borehole should be identified as “MWxx”.

To avoid confusion, for site investigations involving both boreholes and monitoring wells, the numerical identifiers are to be sequential (e.g., there should not be a BH01 and MW01 for the same project).

When completing supplemental drilling programs, the borehole number should start at either the next sequential number after the last borehole number used in the first stage, or label them as ‘100 series’, ‘200 series’, etc. as appropriate (e.g., BH101, MW102, etc. for the first series of additional boreholes).

It is also acceptable to add the 2 digit year either before or after the borehole or monitoring well name (e.g., 17-MW101 or MW101-17).

5.5 Borehole Advancement

Each borehole will be advanced incrementally to permit intermittent or continuous sampling as specified by the Project Manager. Typically, the sampling frequency is one sample for every 2.5 or 5 feet (0.75 or 1.5 metres) the borehole is advanced. At the discretion of the Project Manager, soil samples may be collected at a lower frequency in homogeneous soil or at a higher frequency if changes in stratigraphy or other visual observations warrant it.

5.6 Direct-Push Drilling

This method is most commonly used at Pinchin to obtain representative samples of the subsurface soil material at a site. Direct-push drilling is achieved by driving a steel sampler into the subsurface at 1.5 metre intervals until the desired depth is achieved. The samplers are advanced by the drilling rig by means of a hydraulic hammer. For each soil sample run, a dedicated PVC sample liner is placed within the steel sampler which collects the soil as the sampler is advanced. After each sample run, a new sampler is assembled, and it is advanced deeper down the open borehole.

There are generally two methods of direct-push drilling which are used:

- Dual-tube sampling; and
- Macro-core sampling.

A dual-tube sampler consists of an 8.25 centimetre (cm) inner diameter steel tooling (outer tube), equipped with a steel cutting-shoe affixed to the advancing end. A smaller diameter steel tooling, consisting of a 5.75 cm inner diameter (inner tube), fits within the outer tube and contains a PVC sample liner within. These two tubes form the completed dual-tube sampler. The completed dual-tube sampler has a length of 1.5 metres.

A macro-core sampler consists of the smaller inner tube (mentioned above) used independently. The macro-core sampler measures approximately 1.5 metres in length.

The difference in drilling methods used is typically determined by soil conditions. Where soil conditions consist of tight or dense soil types (e.g., silts or clays), the macro-core sampling method may be used as this method provides less resistance to advancing the sampler. In soil types that are less resistive (e.g., loose sands), the dual-tube sampler may be used.

5.7 Auger Drilling (Split-Spoon)

The auger drilling method for borehole advancement and sampling involves using an auger drill rig to advance the borehole to the desired sampling depth and sampling with a split-spoon sampler. Borehole advancement with hollow stem augers is the preferred drilling method when sampling with split-spoon samplers as it minimizes the potential from sloughed material to reach the bottom of a borehole and possibly cross-contaminate samples when the split-spoon is driven beyond the bottom of the borehole. Solid stem augers can be used when drilling at sites with cohesive soils (e.g., silty clay), provided that the borehole remains open after the augers are removed from the ground prior to driving the split-spoon sampler.

The split-spoon sampler consists of an 18- or 24-inch (0.45 or 0.60 metres) long, 2-inch (5.1 cm) outside diameter tube, which comes apart lengthwise into two halves.

Once the borehole is advanced to the target depth, the sampler is driven continuously for either 18 or 24 inches (0.45 or 0.60 metres) by a 140-pound (63.5 kilogram) hammer. The hammer may be lifted and dropped by either the cathead and rope method, or by using an automatic or semi-automatic drop system.

The number of blows applied in each 6-inch (0.15 metre) increment is counted until one of the following occurs:

- A total of 50 blows have been applied during any one of the 6-inch (0.15 metre) increments described above;
- A total of 100 blows have been applied;

- There is no advancement of the sampler during the application of ten successive blows of the hammer (i.e., the spoon is "bouncing" on a cobble or bedrock); or
- The sampler has advanced the complete 18 or 24 inches (0.45 or 0.60 metre) without the limiting blow counts occurring as described above.

On the field form, record the number of blows required to drive each 6-inch (0.15 metre) increment of penetration. The first 6 inches is considered to be a seating drive.

The sum of the number of blows required for the second and third 6 inches (0.15 metres) of penetration is termed the "standard penetration resistance" or the "N-value". This information is typically provided on the borehole logs included in our site investigation reports.

The drill rods are then removed from the borehole and the split-spoon sampler unthreaded from the drill rods.

Caution must be used when drilling with augers below the groundwater table, particularly in sandy or silty soils. These soils tend to heave or "blow back" up the borehole due to the difference in hydraulic pressure between the inside of the borehole and the undisturbed formation soil. If blowback occurs, the drilling contractor will introduce water or drilling mud into the borehole or inside of the hollow-stem augers (if used) to equalize the hydraulic pressure and permit drilling deeper to proceed.

Heaving conditions and the use of water or drilling mud must be noted on the field logs, including the approximate volume of water or drilling mud used.

5.8 Auger Drilling (Direct Sampling)

In some jurisdictions (e.g., BC, Manitoba) it may be acceptable to collect soil samples directly from auger flights when using solid stem augers.

When sampling directly from auger flights, care must be exercised not to collect soils that were in direct contact with the auger or that were smeared along the edge of the borehole.

5.9 Borehole Advancement in Bedrock

It is sometimes possible to advance augers through weathered bedrock but borehole advancement through competent bedrock requires alternate drilling procedures. Bedrock drilling can be accomplished by advancing core barrels or tri-cone bits using air rotary or water rotary drilling methods. A description of the various bedrock drilling procedures is beyond the scope of this SOP.

The bedrock drilling method selected will depend in part on the type of bedrock, the borehole depth required, whether bedrock core logging is required, whether telescoped casing is required, etc. The Project Manager, in consultation with the drilling contractor, will determine the best method for advancing boreholes in competent bedrock.

5.10 Borehole Soil Sample Logging and Collection

The following describes the methods for logging and collection of samples from a split-spoon or direct-push sampler but can be adapted for sample collection from augers:

1. After the driller opens the split-spoon sampler or PVC liner, measure the length of the soil core retained in the sampler in inches or centimetres. Be sure to be consistent in the use of metric or imperial units, and that the units used are clearly noted in the field notes. The percentage of soil retained versus the length of the sampler is known as “sample recovery” and this information is presented on the borehole logs within our Phase II ESA reports;
2. Dedicated, disposable nitrile gloves are to be worn during soil logging and sampling;
3. When using a dual-tube or macro-core sampler with direct-push drilling, there is usually sufficient sample recovery to permit the collection of two soil samples from each sample run. In this case, if the sample recovery is greater than 2.5 feet (0.75 metres), divide the recovered soil into two depth intervals and log/collect a sample from each interval. Split-spoon samplers typically are not long enough nor provide enough sample to divide a sample run into two. However, if a recovered sample contains distinct stratigraphic units (e.g., fill material and native material, obviously impacted soil and non-impacted soil), the distinct units are to be sampled separately. It is especially important that potentially impacted soil (e.g., fill material, obviously impacted soil) is not mixed with potentially unimpacted soil (e.g., native soil, soil without obvious impacts) to form one sample;
4. Discard the top several centimetres in each core as this material is the most likely to have sloughed off the borehole wall and may not be representative of the soil from the intended depth interval;
5. To minimize the potential for cross-contamination, scrape the exterior of the soil core with a clean, stainless-steel putty knife, trowel or similar device to remove any smeared soil. Note that is not practical and can be skipped if the soil is non-cohesive (e.g., loose sand);
6. Split the soil core longitudinally along the length of the sampler and to the extent practical, collect the soil samples for laboratory analysis from the centre of the core (i.e., soil that has not contacted the sampler walls). When sampling directly from augers, soils in direct contact with the auger or soils retained on the augers that may have been in contact with the edge of the borehole should not be collected;

   Collect soil samples for potential volatile parameter analysis and field screening (in that order) as soon as possible after the core is opened. The length of time between opening the sampler and sample collection for these parameters should not exceed 2 minutes. It is important to follow this as it minimizes the potential for volatile constituents in the soil to

SOP – EDR009 – REV004 – FIELD DECONTAMINATION OF NON-DEDICATED MONITORING AND SAMPLING EQUIPMENT

Title:	Field Decontamination of Non-Dedicated Monitoring and Sampling Equipment
Practice:	EDR
First Effective Date:	August 03, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	August 02, 2009	N/A	MEM
001	November 26, 2010	Updated Approval Signature/Added reference to Ontario Regulation 511/09	FG
002	September 20, 2013	Revised majority of text to reflect current practices/Focused on equipment cleaning and removed reference to personnel decontamination/Added section on O. Reg. 153/04 requirements/Revised reference list	RLM
003	April 29, 2016	Updated Section 4.0/Removed methanol as optional cleaning reagent	RLM
004	April 28, 2017	Removed reference to Pinchin West/In Section 5.2.2, modified requirements for cleaning water level tapes and interface probes/In Section 5.2.3, modified requirements for cleaning electrical or retrieval cables for pumps	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the general requirements for field decontamination of non-dedicated equipment used for monitoring of environmental media and the collection of environmental samples (i.e., equipment that is re-used between monitoring and sampling locations). Note that the procedures described in this SOP also apply to pumps used for well development.

3.0 OVERVIEW

The main purpose of non-dedicated monitoring and sampling equipment decontamination is to minimize the potential for cross-contamination during monitoring/sampling activities completed for site investigations. Cross-contamination can occur when equipment used to monitor/sample contaminated soil, groundwater or sediment is reused at another monitoring/sampling location without cleaning. This can result in the transfer of contaminants from a “dirty” monitoring/sampling location to a “clean” monitoring/sampling location, causing possible positive bias of subsequent samples. Positive sample bias can result in reported analytical results that are not representative of actual site conditions and, if significant cross-contamination occurs, can result in reported exceedances of the applicable regulatory standards for samples that would have met the standards had cross-contamination not occurred.

Site investigations completed by Pinchin typically use the following non-dedicated monitoring/sampling equipment:

- Manually operated equipment (e.g., water level tapes/interface probes using during groundwater monitoring and sampling, knifes/spatulas used for soil sampling, hand augers);
- Pumps for groundwater monitoring well development, purging and/or sampling (e.g., bladder pumps, submersible pumps); and
- Downhole drilling/sampling equipment (e.g., split-spoon samplers, augers).

The above list is not all inclusive and other non-dedicated monitoring/sampling equipment may be employed during a site investigation that requires decontamination. For example, it may be appropriate to decontaminate the bucket of a backhoe used for test pitting between test pit locations. The Project Manager will be responsible for identifying the additional monitoring/sampling equipment that requires decontamination and instructing field staff regarding the procedure to be followed for cleaning this equipment.

When conducting field monitoring and sampling work in the field, it is not always possible to judge whether a monitoring/sampling location is uncontaminated. Because of this, it is important that all non-dedicated monitoring/sampling equipment be properly cleaned before initial use and between uses to minimize the potential for cross-contamination to occur.

4.0 DISTRIBUTION

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5.0 PROCEDURE

5.1 Equipment and Supplies

The following is a list of equipment needed to perform the decontamination of non-dedicated monitoring and sampling equipment in accordance with this SOP:

- Personal Protective Equipment (PPE);
- Potable tap water;
- Distilled water (store bought);

- Volatile organic compound (VOC)-free deionized distilled water (supplied by the analytical laboratory);
- Laboratory grade, phosphate-free soap;
- Wash buckets (minimum of three);
- Scrub brushes;
- Paper towels; and
- Buckets or drums with resealable lids for containing liquids generated by equipment cleaning.

Other equipment required to clean drilling equipment (e.g., steam cleaner, power washer, tub for containing wash water, etc.) is typically provided by the drilling subcontractor. The Project Manager is responsible for ensuring that the drilling subcontractor brings the required cleaning equipment to the project site. Prior to mobilization, the Project Manager should also assess the availability of a potable water supply for drilling equipment cleaning at the project site. When no accessible potable water supply is available at a project site, the drilling subcontractor will need to bring a potable water supply to the site in the drill rig water supply tank or separate support vehicle, or arrange to have a third-party supplier deliver potable water to the site.

5.2 Procedure

5.2.1 General Procedures and Considerations

The following general procedures and considerations apply to all decontamination of non-dedicated monitoring/sampling equipment activities:

- Personnel will dress in suitable PPE to reduce personal exposure during equipment decontamination activities;
- In addition to cleaning between monitoring/sampling locations, all non-dedicated monitoring/sampling equipment must be cleaned before initial use. Field staff should not assume that the equipment was properly cleaned by the last person to use it;
- Prior to starting a drilling program, the downhole drilling equipment (e.g., augers) must be inspected and any “dirty” equipment must not be used in the drilling program or it must be cleaned prior to use; and
- All liquids and solids generated by the cleaning of non-dedicated monitoring/sampling equipment are to be containerized and managed in accordance with the procedures outlined in SOP-EDR020 – Investigation Derived Wastes.

5.2.2 Decontamination of Manually Operated Monitoring/Sampling Equipment

The procedure for decontaminating manually operated monitoring/sampling equipment is as follows:

- Wash the equipment in a bucket filled with a mixture of phosphate-free soap/potable water, while using a brush to remove any obvious contamination and/or adhered soil;
- Rinse the equipment thoroughly in a bucket filled with potable water;
- Rinse the equipment thoroughly using a spray bottle filled with distilled water, capturing the rinsate in a bucket; and
- Allow the equipment to air dry. If there is insufficient time to allow the equipment to air dry before reusing, or the equipment cleaning is occurring during winter conditions, the equipment should be dried after the final rinse with a clean paper towel.

At the discretion of the Project Manager, it may be acceptable to use spray bottles, rather than buckets, for lightly contaminated equipment or if no obvious contaminants are present.

Should soil or obvious contaminants remain on the equipment after cleaning, the above procedure must be repeated until the soil or contaminants have been removed. The equipment should not be reused if repeated cleanings do not remove the soil or contaminants.

The above equipment cleaning procedure applies to, but is not limited to, the following non-dedicated monitoring/sampling equipment:

- Knives/spatulas used for soil sampling;
- Hand augers;
- Water level tapes and interface probes (both the end probe and portion of the tape that entered the well);
- The exterior of submersible pumps and interior/exterior of bladder pumps (including the portion of the electrical or retrieval cables that contact groundwater in a well); and
- Various pieces of drilling equipment, including split-spoon samplers, hollow stem auger centre plugs, continuous sampling tubes, and the reusable portions of dual-tube samplers.

At the discretion of the Project Manager, the distilled water used for the final equipment rinse will be VOC-free deionized distilled water supplied by the analytical laboratory. For example, the use of VOC-free distilled water would be appropriate for a project where trace VOCs are being investigated and it is important to minimize the potential for cross-contamination and positive bias of VOC sample results.

For tapes associated with water level tapes and interface probes, if they were submerged in a monitoring well water free of non-aqueous phase liquids or obvious contamination, the tape can be cleaned at the discretion of the Project Manager by pulling the tape through a towel dampened with phosphate-free soap/potable water as the tape is retrieved. The end probe should then be cleaned as described above.

5.2.3 Decontamination of Groundwater Sampling Pumps

The exterior of each bladder or submersible pump that is used for well development, well purging and/or groundwater sampling, and the portion of any electrical or retrieval cables that entered the well, are to be cleaned following the procedure described above for decontaminating manually operated monitoring/sampling equipment.

Submersible pumps are not designed to be disassembled in the field and cleaning of the interior of this type of pump requires flushing of cleaning solutions through the pump. After cleaning the exterior of the pump, the minimum decontamination requirement for a submersible pump is the flushing of a phosphate-free soap/potable water mixture contained in a bucket through the pump (i.e., pumping the mixture through the pump and capturing the pump outflow in the same bucket or a separate bucket), followed by flushing distilled water contained in a separate bucket through the pump and capturing the pump outflow in the same bucket or separate bucket. Note that store bought distilled water is acceptable for this purpose.

At the discretion of the Project Manager and depending on the requirements of the project, the final step in the process is a final flush with laboratory-supplied VOC-free distilled water.

The following summarizes the flushing sequence for decontaminating the interior of a submersible pump:

- Soap/water mixture*;
- Distilled water (store bought)*; and
- Distilled water (laboratory supplied VOC-free distilled water - to be confirmed by the Project Manager).

* Minimum requirement.

Bladder pumps are designed for disassembly in the field to facilitate the replacement of the bladders. The internal parts of a bladder pump are to be cleaned in accordance with the procedure described above for decontaminating manually operated monitoring/sampling equipment. Whenever possible, bladders are to be disposed of between well locations. However, if it is necessary to reuse a bladder, it must be cleaned in accordance with the procedure for cleaning manually operated monitoring/sampling equipment. It should be noted that bladders are difficult to clean and the decontamination procedure needs to be thorough.

Flushing of a bladder pump with distilled water after cleaning and reassembly is not required unless specified by the Project Manager.

5.2.4 Decontamination of Downhole Drilling Equipment

Hollow stem and solid stem augers used for borehole advancement are to be decontaminated by the drilling contractor using the following procedure:

- Wherever possible, all augers used for borehole drilling should be cleaned before initial use and between borehole locations by steam cleaning or power washing with potable water. However, the minimum requirements for auger cleaning are as follows:
  - Use a brush or shovel to remove excess soil from <u>all</u> used augers; and
  - Any augers that <u>may come into contact with groundwater</u> are to be decontaminated by steam cleaning or power washing with potable water. An auger must not be used for the balance of the drilling program if obvious contaminants or residual soil remain on the auger following decontamination, unless subsequent cleaning efforts remove these materials.

As noted previously, downhole drilling equipment used for soil sample retrieval (e.g., split-spoon samplers, continuous sampling tubes and the reusable portions of dual-tube samplers used with direct push rigs) and the hollow stem auger centre plug are to be decontaminated following the procedure outlined above for cleaning manually operated monitoring/sampling equipment.

5.3 Decontamination Records

Field personnel will be responsible for documenting the decontamination of non-dedicated monitoring/sampling equipment and drilling equipment in their field log book or field forms. The documentation should include the type of equipment cleaned and the frequency of cleaning, the methods and reagents used for equipment cleaning, and how fluids generated by the equipment cleaning were stored.

5.4 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following additional procedures must be undertaken:

- All augers must have excess soil removed by a brush or shovel and be steam cleaned or power washed before initial use and between borehole locations regardless of whether they contact the groundwater or not (i.e., the minimum requirements listed above for auger cleaning are not sufficient); and

- Thorough records of the frequency and cleaning materials used for the decontamination of non-dedicated monitoring/sampling equipment and downhole drilling equipment must be kept. The Quality Assurance/Quality Control section of the Phase Two ESA report requires a summary of what steps were taken to minimize the potential for cross-contamination during the Phase Two ESA. The handling and disposal of fluids generated by equipment decontamination must also be well documented in the field for inclusion in the Phase Two ESA report.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

SOP – EDR013 – REV004 – SAMPLE HANDLING DOCUMENTATION

Title:	Sample Handling Documentation
Practice:	EDR
First Effective Date:	August 03, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Mark McCormack and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	August 03, 2009	N/A	MEM
001	November 26, 2010	Updated Approval Signature/Added reference to Ontario Regulation 511/09	FG
002	September 12, 2013	Updated text/Added tables from MOE lab protocol/Streamlined reference section/Added O. Reg. 153/04 compliance section	RLM
003	April 29, 2016	Updated Section 4.0/Aligned document retention with PEP	RLM
004	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the general requirements for sample handling and documentation practices.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment Required

- Laboratory-supplied sample containers;
- Field log book or field forms; and
- Laboratory-supplied Chain-of-Custody forms.

5.2 Procedures

5.2.1 Sample Labelling

Sample labels are to be filled out in the field at the time of sampling as completely as possible by field personnel. All sample labels shall be filled out using waterproof ink. At a minimum, each label shall contain the following information:

- Sample identifier, consisting of sample location (borehole number, monitoring well number, surface sample location, etc.) and sample number (if appropriate). For example, the second soil sample collected during borehole advancement at borehole BH3 would be labelled “BH3-2”;
- Pinchin project number;
- Date and time of sample collection;
- Company name (i.e., Pinchin); and
- Type of analysis.

5.2.2 Sample Containers, Preservation and Holding Times

The sample containers, sample preservation and holding times for projects in Ontario are to be those specified in Table A (for soil and sediment) and Table B (groundwater) from the Ontario Ministry of the Environment Climate Change (MOECC, formerly the Ontario Ministry of the Environment) document entitled *“Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act”,* dated March 9, 2004, amended as of July 1, 2011. These tables are attached and form part of this SOP.

With reference to the attached Tables A and B, field personnel must use the sample containers appropriate for the parameters being sampled for, undertake any required field preservation or filtration and observe the sample holding times.

Each province has its own preservation and holding time regulations or guidance, which are generally similar. It is the Project Manager’s responsibility to ensure that field staff are aware of, and can meet, the requirements in the province they are working in.

5.2.3 Sample Documentation

The following sections describe documentation required in the field notes and on the Chain-of-Custody forms.

Field Notes

Documentation of observations and data from the field will provide information on sample collection and also provide a permanent record of field activities. The observations and data will be recorded using a pen with permanent ink in the field log book or on field forms.

The information in the field book or field forms will, at a minimum, include the following:

- Site name;
- Name of field personnel;
- Sample location (borehole number, monitoring well number, surface sample location, etc.);
- Sample number;
- Date and time of sample collection;
- Description of sample;
- Matrix sampled;
- Sample depth (if applicable);
- Method of field preservation (if applicable);
- Whether filtration was completed for water samples;
- Analysis requested;
- Field observations;
- Results of any field measurements (e.g., field screening measurements, depth to water, etc.); and
- Volumes purged (if applicable).

In addition to the above, other pertinent information is to be recorded in the field log book or field forms depending on the type of sampling being completed (e.g., field parameter measurements and pumping rates for low flow sampling) as required by the SOP for the particular sampling activity.

Sufficient information should be recorded to allow the sampling event to be reconstructed without relying on the sampler’s memory.

All field notes are to be scanned and saved to the project folder on the server immediately upon returning from the field.

Sample Chain-of-Custody

Sample Chain-of-Custody maintains the traceability of the samples from the time they are collected until the analytical data are issued by the laboratory. Initial information concerning collection of the samples will be recorded in the field log book or field forms as described above. Information on the custody, transfer, handling and shipping of samples will be recorded on a Chain-of-Custody for each sample submission.

All signed Chain-of-Custody forms will be photocopied or duplicate copies retained prior to sample shipment. A Chain-of-Custody should be laboratory-specific and will typically be supplied by the laboratory with the sample containers requested for the project. The sampler will be responsible for fully filling out the Chain-of-Custody for each sample submission.

The Chain-of-Custody will be signed by the sampler when the sampler relinquishes the samples to anyone else (i.e., courier or laboratory). Until samples are picked up by the courier or delivered to the laboratory, they must be stored in a secure area. The following information needs to be provided on the Chain-of-Custody at a minimum:

- Company name;
- Name, address, phone number, fax number and e-mail address of the main contact for the submission (typically the Project Manager);
- Project information (project number, site address, quotation number, rush turnaround number, etc.);
- Regulatory standards or criteria applicable to the samples (including whether the samples are for regulated drinking water or whether the samples are for a Record of Site Condition);
- Sample identifiers;
- Date and time of sample collection;
- Matrix (e.g., soil, groundwater, sediment, etc.);
- Field preservation information (e.g., whether groundwater samples for metals analysis were field filtered);
- Analyses required;
- Number of sample containers per sample;
- Analytical turnaround required (i.e., standard or rush turnaround);
- Sampler’s name and signature;
- Date and time that custody of the samples was transferred;

- Name and signature of person accepting custody of the samples from Pinchin, and date and time of custody transfer; and
- Method of shipment (if applicable).

The person responsible for delivery of the samples to the laboratory or transfer to a courier will sign the Chain-of-Custody, retain a duplicate copy or photocopy of the Chain-of-Custody so it can be scanned and saved to the project file, document the method of shipment, and send the original copy of the Chain-of Custody with the samples.

5.3 Additional Considerations for Ontario Regulation. 153/04 Phase Two ESA Compliance

Custody seals must be placed on all coolers containing samples prior to transfer to a courier or delivery to the laboratory. The laboratory will comment on the presence/absence of custody seals in the Certificate-of-Analysis for each submission and this information must be discussed in the Quality Assurance/Quality Control section of the Phase Two Environmental Site Assessment report.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Ontario Ministry of the Environment and Climate Change, *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, March 9, 2004, as amended as of July 1, 2011.

9.0 APPENDICES

Appendix I Tables A and B From Ontario MOECC Laboratory Protocol

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Template: Master SOP Template – February 2014

APPENDIX I

Tables A and B From Ontario MOECC Laboratory Protocol

TABLE A: SOIL AND SEDIMENT Sample Handling and Storage Requirements

SOIL Inorganic Parameters	Container[1]	Field Preservation	Storage Temp.[2]	Preserved Holding Time[3]	Unpreserved Holding Time[3]
Chloride, electrical conductivity	glass, HDPE or PET	none	5 ± 3 °C		30 days as received (without lab drying); indefinite when dried at the lab
Cyanide (CN^-)	glass wide-mouth jar, Teflon™ lined lid	protect from light	5 ± 3 °C		14 days
Fraction organic carbon (FOC)	glass jar, Teflon™ lined lid	none	5 ± 3 °C		28 days as received(without lab drying); indefinite storage time when dried
Hexavalent chromium	glass, HDPE	none	5 ± 3 °C		30 days as received
Metals (includes hydride-forming metals, SAR, HWS boron, calcium, magnesium, sodium)	glass, HDPE	none	5 ± 3 °C		180 days as received (without lab drying); indefinite when dried at the lab
Mercury, methyl mercury	glass, HDPE or PET	none	5 ± 3 °C		28 days
pH	glass, HDPE or PET	none	5 ± 3 °C		30 days as received
SOIL Organic Parameters	**Container [1,5,6,7,20]**	**Field Preservation**	**Storage Temp.[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time[3]**
BTEX [8], PHCs (F1)[8], THMs, VOCs[7] **NB: SEE FOOTNOTE #20**	40–60 mL glass vial (charged with methanol preservative, pre-weighed)[6]AND glass jar (for moisture content) [hermetic samplers are an acceptable alternative [5, 18]]	methanol (aqueous $NaHSO_4$ is an acceptable alternative for bromomethane)[6, 7, 18,20]	5 ± 3 °C	14 days	hermetic samples: stabilize with methanol preservative within 48 hours of sampling[18]
1,4-Dioxane[9, 15]	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[9,15,18]		5 ± 3 °C	14 days	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[18]
PHCs (F2–F4)	glass wide-mouth jar, Teflon™ lined lid	none	5 ± 3 °C		14 days
ABNs, CPs, OCs, PAHs	glass wide-mouth jar, Teflon™ lined lid	none	5 ± 3 °C		60 days
Dioxins and furans, PCBs	glass wide-mouth jar Teflon™ lined lid	none	5 ± 3 °C		indefinite storage time

HDPE = high density polyethylene; PET = polyethylene terephthalate; HWS = hot water soluble boron; THM = trihalomethanes; VOC = volatile organic compounds; BTEX = benzene, toluene, ethylbenzene, xylenes; PHCs = petroleum hydrocarbons; CPs = chlorophenols; PCBs = polychlorinated biphenyls; OCs = organochlorine pesticides

[1–20]footnotes immediately follow Table B

TABLE B: GROUND WATER Sample Handling and Storage Requirement

GROUND WATER Inorganic Parameters	Container[10]	Field Preservation	Storage Temperature[2]	Preserved Holding Time[3]	Unpreserved Holding Time[3]
Chloride, electrical conductivity, pH	HDPE or glass	none	5 ± 3 °C		28 days
Cyanide (CN^-)	HDPE or glass	NaOH to a pH > 12	5 ± 3 °C	14 days	must be field preserved
Hexavalent chromium	HDPE or glass	field filter followed by buffer solution to a pH 9.3–9.7 [17]	5 ± 3 °C	28 days[17]	24 hours[17]
Metals (includes hydride-forming metals, calcium, magnesium, sodium)	HDPE or Teflon™ [10]	field filter followed by HNO_3 to pH < 2[11]	room temperature when preserved	60 days	must be field preserved
Mercury	glass or Teflon™ [10]	field filter followed by HCl to pH < 2[11]	room temperature when preserved	28 days	must be field preserved
Methyl mercury	glass or Teflon™	DO NOT FILTER HCl or H_2SO_4 to pH <2[12]	5 ± 3 °C	28 days	DO NOT FILTER must be field preserved[12]
GROUND WATER Organic Parameters[10, 13, 14]	**Container[10, 13, 14]**	**Field Preservation**	**Storage Temperature[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time[3]**
BTEX, PHCs (F1),THMs, VOCs;	40–60 mL glass vials (minimum of 2)[14] (no headspace)	$NaHSO_4$ or HCl to a pH < 2[16]	5 ± 3 °C	14 days	7 days
1,4-Dioxane[9, 15]	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[9, 15]		5 ± 3 °C	14 days	14 days
PHCs (F2–F4)	1L amber glass bottle, Teflon™ lined lid	$NaHSO_4$ or HCl to a pH < 2[16]	5 ± 3 °C	40 days	7 days
ABNs, CP, OCs, PAHs[19], PCBs	1L amber glass bottle, Teflon™ lined lid	none	5 ± 3 °C		14 days
Dioxins and furans	1L amber glass bottle, Teflon™ lined lid	None	5 ± 3 °C		indefinite storage time

HDPE = high density polyethylene;THM = trihalomethanes; VOC = volatile organic compounds; BTEX = benzene, toluene, ethylbenzene, xylenes; PHCs = petroleum hydrocarbons; CPs = chlorophenols; PCBs = polychlorinated biphenyls; OCs = organochlorine pesticides

1 One soil container is generally sufficient for inorganic analysis and another for extractable organics. A separate container is required for BTEX, THM, VOC and PHC (F1) moisture analysis.

2 Storage temperature refers to storage at the laboratory. Samples should be cooled and transported as soon as possible after collection.

3 Holding time refers to the time delay between time of sample collection and time stabilization/analysis is initiated. For samples stabilized with methanol, the hold time for the recovered methanol extract is up to 40 days.

4 PET can not be used for samples requiring antimony analysis.

5 As an alternative, the USEPA has investigated hermetic sample devices that take and seal a single core sample. The sample is submitted as is to the laboratory where it is extruded into an extracting solvent. Samples must be received at the laboratory within 48 hours of sampling. (Note that replicate samples are necessary for bisulphate and methanol extraction for all samples plus laboratory duplicates and spikes.) Consult the laboratory for the number of samples required.

6 The USEPA has approved field preservation. Pre-weighed vials containing known weights of methanol preservative (or aqueous sodium bisulphate if used for bromomethane) are sent to the field. Sample cores (approximately 5 g) are extruded directly into the vial. The vials are sealed, and submitted directly to the laboratory. In practice, this technique requires great care to prevent losses of methanol due to leaking vials or through splashing. Consult the laboratory for the number of containers required.

7 Methanol-preserved samples may elevate the detection limit for bromomethane (VOC); a separate bisulphate-preserved sample or hermetically sealed sample may be submitted at the time of sampling if bromomethane is a chemical of concern – contact the laboratory to determine if a separate sample should be collected.

8 For BTEX and PHC (F1) pre-charging the soil sampling container with methanol preservative is an accepted deviation from the CCME method.

9 1,4-Dioxane may be analyzed with the ABNs or VOCs; sample container requirements used for ABNs or VOCs are both acceptable. If 1,4-dioxane is to be analyzed with ABNs, follow the ABN sample container requirements; similarly if it is to be analyzed with VOCs, follow VOC sample container requirements. Consult the laboratory for the container type and the total number required (see also footnote #15).

10 Samples containing visual sediment at the time of analysis should be documented and noted on the Certificate of Analysis or written report as results may be biased high due to the inclusion of sediment in the extraction.

11 Field filter with 0.45µm immediately prior to adding preservative or filling pre-charged container.

12 Sample directly into a HCl or H_2SO_4 preserved container, or add acid to an unfiltered sample immediately after sample collection in the field.

13 Aqueous organic samples should be protected from light. If amber bottles are not available, glass should be wrapped in foil.

14 Separate containers are required for each organic water analysis. Consult the laboratory for required volumes. Chloride and electrical conductivity can be taken from the same container.

15 For 1,4-dioxane in soil and sediment, no preservative is required if processed as an ABN, however. Methanol is an acceptable alternative if processed as a VOC. For 1,4-dioxane in groundwater, no preservative is required, however, $NaHSO_4$ or HCl are acceptable alternatives.

16 Preserved to reduce biodegradation, however effervescence/degassing may occur in some ground water samples. In this case, rinse preservative out three times with sample and submit to the laboratory as unpreserved.

17 To achieve the 28-day holding time, use the ammonium sulfate buffer solution [i.e., $(NH_4)_2SO_4/NH_4OH$] or $(NH_4)_2SO_4/NH_4OH/NaOH$ + NaOH] as specified in EPA Method 218.6 (revision 3.3, 1994) or Standard Methods 3500-Cr Chromium (2009).Using only NaOH without the ammonium sulfate buffer to adjust the pH would require analysis within 24 hours of sampling.

18 Alternatively, to achieve a longer hold time, hermetic samples may be frozen within 48 hours of sampling as per ASTM method D6418 – 09; however, storage stability must be validated by the laboratory with no more than 10% losses.

19 For benzo(a)pyrene in ground water samples filtration prior to analysis on a duplicate sample is permitted.

20 For VOC, BTEX, F1 PHCs, 1,4 dioxane soil samples collected before July 1, 2011, the following sampling and handling requirements are also permitted.

SOIL Organic Parameters	**Container**	**Preservative**	**Storage Temperature**	**Preserved Holding Time**	**Unpreserved Holding Time**
VOC, BTEX, F1 PHCs, 1,4-dioxane*	glass jar, Teflon lined lid, no headspace, separate container required Hermetic samplers are an acceptable alternative	none field preservation with aqueous sodium bisulphate and methanol is an acceptable alternative	5 ± 3C	See notations 1-3 below	Stabilize by extraction or freezing within 48 hrs of receipt at the laboratory (7days from sampling). Frozen or field preserved samples must be extracted within 14 days of sampling.

*Special care must be used when sampling for VOC, BTEX and F1 in soil and sediment. Studies have shown that substantial losses can occur through volatilization and bacterial degradation. There are several allowable options for field collection of samples. Each is discussed below. Consult SW846, Method 5035A for additional detail. The laboratory is required to stabilize the sample on the day of receipt, either by extraction or freezing.

1. Collection in soil containers: To minimize volatilization losses, minimize sample handling and mixing during the process of filling the sample container. The bottle should be filled with headspace and voids minimized. Care is required to ensure that no soil remains on the threads of the jar, preventing a tight seal and allowing volatilization losses. To minimize losses through bacterial degradation, commence cooling of the samples immediately and transport the samples to the lab as soon as possible, ideally on the day of sampling. Samples must be received at the laboratory within 48 hours of sampling. Freezing can be used to extend the hold time to 14 days, however the practice is difficult to implement in the field and can cause sample breakage.
2. As an alternative, the USEPA has investigated hermetic sample devices that take and seal a single core sample. The sampler is submitted as is to the laboratory where it is extruded into the extracting solvent. Samples must be received at the laboratory within 48 hours of sampling. This technique minimizes volatilization losses and is worth consideration for critical sites. (Note that replicate samplers are necessary for bisulphate and methanol extraction for all samples plus lab duplicates and spikes). Consult the laboratory for the number of samplers required.
3 The USEPA has also approved field preservation. Pre-weighed vials containing known weights of methanol and aqueous sodium bisulphate preservative are sent to the field. Sample cores ($\approx$5 g) are extruded directly into the vial. The vials are sealed, and submitted directly to the laboratory. In practice, this technique requires great care to implement successfully. Losses due to leaking vials, through splashing and effervescence (aqueous bisulphate) can easily occur and make the sample unusable. Consult the laboratory for the number of containers required.

SOP – EDR019 – REV004 – SOIL SAMPLE LOGGING

Title:	Soil Sample Logging
Practice:	EDR
First Effective Date:	August 03, 2013
Version:	004
Version Date:	January 3, 2018
Author:	Francesco Gagliardi and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 26, 2010	N/A	FG
001	October 31, 2013	Streamlined SOP to focus only on soil sample logging/Added O. Reg. 153/04 compliance section	RLM
002	April 29, 2016	Updated Section 4.0	RLM
003	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	Modified percentages of minor constituents in Section 5.1.3/Clarified when geotechnical terms can be used for soil logging in Section 5.2	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the methods used to describe the physical characteristics of soil samples collected during site investigations.

The methods and equipment used for retrieving soil samples are provided in other SOPs (e.g., SOP-EDR007 – Borehole Drilling) and will not be repeated herein.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

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- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 General Procedures

For each soil sample collected during a site investigation, the following information is to be recorded in the field log book or field forms in the order presented below:

- Depth;
- Primary soil texture;
- Colour;
- Minor constituents*;
- Noticeable odours;
- Noticeable staining;
- Noticeable free-phase product/sheen*; and
- Moisture content.

*These constituents only need to be noted if they are actually present in the sample.

5.1.1 Primary Soil Texture

The primary soil texture should be determined using the attached flow chart as a guide to help classify the soil.

5.1.2 Colour

Describe the primary colour of the soil sample (e.g., brown, grey, black, green, white, yellow, red). The relative lightness or darkness of the primary colour can be described using the adjectives "light" or "dark" as appropriate. Soil that exhibits different shades or tints is to be described by using two colours (e.g., brown-grey). If the soil sample contains spots of a different colour, this is to be described as "mottling" (e.g., grey with green mottling).

5.1.3 Minor Constituents

Note the presence of minor constituents in the soil that are "natural" materials (e.g., gravel, cobbles, sand, oxidation, etc.) or "man-made" materials (e.g., asphalt, brick, concrete, coal or glass fragments, coal ash, etc.). Gravel comprises particles between 5 millimetres (mm) and 75 mm in diameter. Cobbles comprise particles greater than 75 mm in diameter (approximately the size of a man's fist) and boulders are particles greater than 150 mm in diameter (approximately the size of man's head).

When the percentage of the minor constituents in the soil is between approximately 1 and 10%, the adjective used to describe the relative amount of the minor constituent is "trace" (e.g., silty sand with trace brick fragments).

When the percentage of minor constituents of soil is between approximately 10 and 20%, the adjective used to describe the relative amount of the minor constituent is “some” (e.g., silty sand with some concrete fragments).

When the percentage of the “natural” minor soil constituents is between approximately 20 and 35%, the minor soil type is described by adding a ‘y’ or ‘ey’ to the soil type (e.g., silty, sandy, clayey).

When the percentage of the “natural” minor soil constituents is also greater than 35%, the minor soil type is described by using “and” the soil type (e.g., sand and gravel, sand and silt).

When the percentage of the “man-made” minor soil constituents is between approximately 30 and 50%, describe the soil as per the normal procedure and add “with” the minor constituent type(s) (e.g., silty sand with coal ash and brick fragments).

5.1.4 Noticeable Odours

Field staff are not expected to directly smell soil samples to assess the presence/absence of odours.

If it is possible to identify the likely type of odour then this information should be recorded along with a comment on the severity of the odour (e.g., slight, strong, etc.). Identification of specific chemical compounds, such as petroleum hydrocarbons (PHCs) or solvents is acceptable; however, this identification should be referenced as “xxxx-like” (e.g., PHC-like, solvent-like, etc.). This principle also applies when describing staining and free-phase product.

If the odour cannot be readily identified, it should be described in the field notes as “unidentified odour”. If no noticeable odours are observed, this needs to be recorded in the field notes as “no odour”.

5.1.5 Noticeable Staining

Describe the colour and possible source of the staining (e.g., black PHC-like staining).

If no noticeable staining is observed, this needs to be recorded in the field notes as “no staining”.

5.1.6 Noticeable Free-Phase Product/Sheen

Describe the colour, odour, possible composition and relative viscosity (if sufficient product is present to assess) of the product (e.g., dark brown, viscous, motor oil-like product). Identification of the composition of the product is acceptable but needs to be described as PHC-like, motor oil-like. Alternatively, the product can be described as “resembling” a substance (e.g., “resembling motor oil”).

The presence of any observed iridescent sheen is to be recorded in the field notes. Note that the presence of an iridescent sheen by itself in the soil does not constitute the presence of free-phase product but may be an indicator that free-phase product is present within the vicinity of the borehole.

5.1.7 Moisture Content

Describe the moisture content of the soil sample using one of the following three terms:

- Dry – no visible evidence of water and the soil is dry to the touch;
- Moist – visible evidence of water but the soil is relatively dry to the touch. Do not use the term “damp” to describe this type of soil; and
- Wet – visible evidence of water and the soil is wet to the touch. Free water is evident when sandy soil is squeezed. Do not use the term “saturated” to describe this type of soil.

5.1.8 Recording Soil Sample Descriptions in Field Notes

Recording the information in the field notes consistently in the above order will make it easier to prepare the borehole logs for the site investigation report.

Example soil sample descriptions are as follows:

- Sand, grey, trace gravel, PHC-like odours, free-phase PHC-like product, wet;
- Silty sand, brownish-grey, some gravel, trace asphalt and brick fragments, no odours or staining, moist; and
- Silty clay, brown, trace gravel, no odours or staining, moist to wet at 2.4 mbgs.

5.2 General Considerations

Where any physical properties change within a soil sample, the depth at which this transition takes place needs to be recorded. For example, for a soil sample collected from 1.8 to 2.4 metres below ground surface (mbgs), if the upper 0.3 metres has no odours but PHC-like odours are present below this depth then the field notes need to state “no odours from 1.8 to 2.1 mbgs, PHC-like odours from 2.1 to 2.4 mbgs”.

Some soil samples will contain a thin seam of a different soil type, such as a sand seam within a silty clay. The depth interval of any such seam is to be recorded in the field notes, and the material comprising the seam should be described separately using the logging procedure outlined above.

Unless soil sampling is being completed as part of a combined environmental/geotechnical investigation and EDR staff logging the soil samples have the appropriate geotechnical training, avoid the use of geotechnical terms (e.g., stiff, dense, high plasticity, etc.) when logging soil samples. If any geotechnical terms are inadvertently included in the field notes by staff who have not had geotechnical training, they must not be included in the borehole logs provided in our report.

5.3 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

None. Following this SOP will be sufficient to comply with the Ontario Regulation 153/04 requirements for Phase Two ESAs with respect to field logging. Risk assessments completed in accordance with Ontario Regulation 153/04 will typically require soil samples to be submitted to a laboratory for full soil texture analysis, but this is beyond the scope of field logging.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

American Society for Testing and Materials, *ASTM D2487-11 - Standard Practice for Classification of Soils for Engineering Purposes (United Soil Classification System)*, 2011.

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)*, April 2011.

9.0 APPENDICES

Appendix 1 Soil Texture by Feel Chart

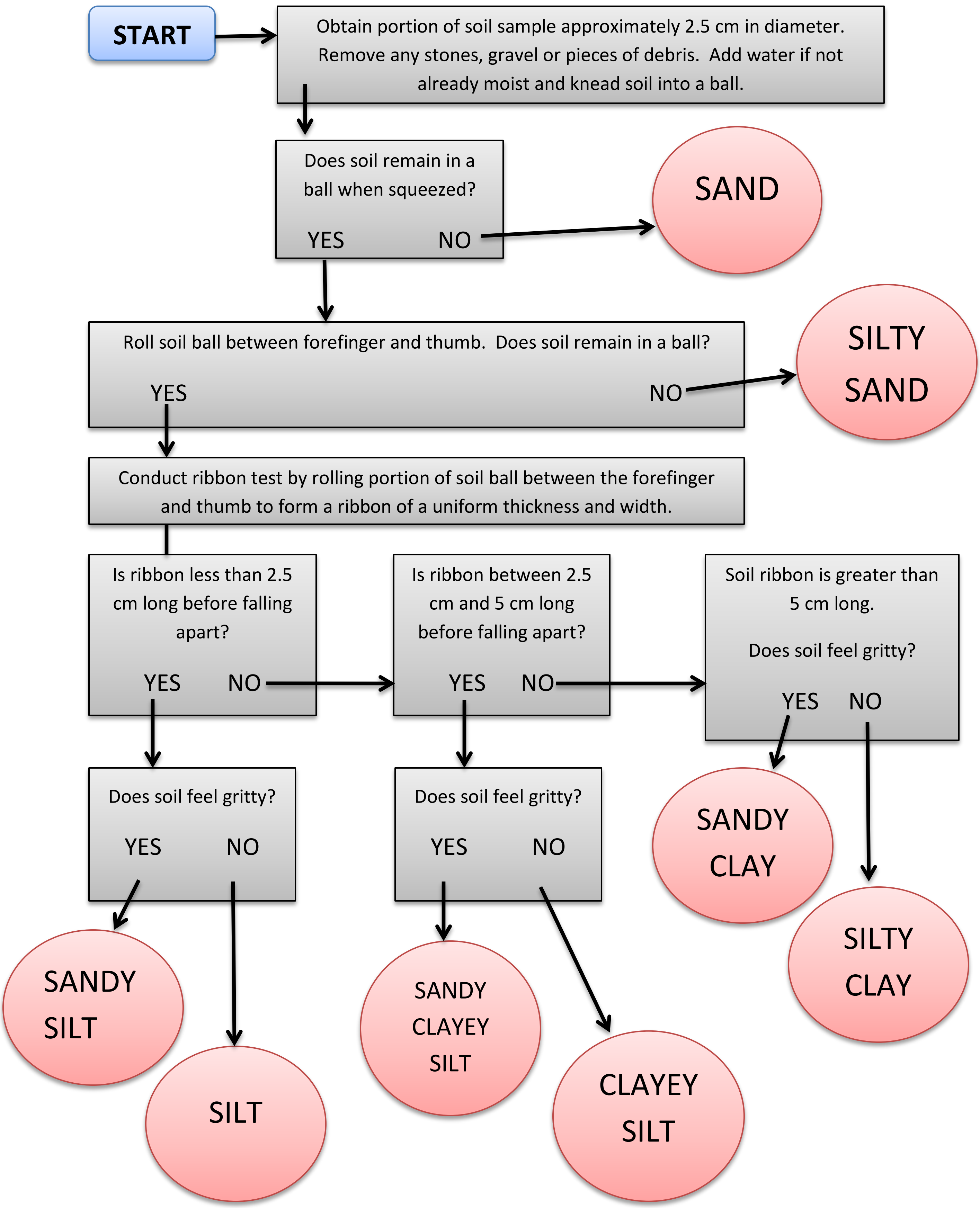
I:\2018 SOP Updates\SOP - EDR019 - REV004 - Soil Sampling Logging.docx

Template: Master SOP Template – February 2014

APPENDIX I

Soil Texture by Feel Chart

Key to Soil Texture by Feel



SOP – EDR025 – REV004 – QA/QC SAMPLING

Title:	QA/QC Sampling
Practice:	EDR
First Effective Date:	January 17, 2014
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	Rob MacKenzie

TABLE OF CONTENTS

MEMBER OF THE PINCHIN GROUP

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	January 17, 2014	N/A	RLM
001	June 26, 2014	Amended blind duplicate sampling requirements	RLM
002	April 29, 2016	Updated Section 4.0/Amended O.Reg. 153/04 trip blank requirements	RLM
003	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	In Section 5.2.6, clarified order of regular investigative sample and duplicate sample collection	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for collecting soil, water and sediment samples for quality assurance/quality control (QA/QC) purposes.

A QA/QC program is essentially a management system that ensures that quality standards are met within a stated level of confidence. The QC component of the program comprises daily activities in the field and laboratory that are used to control the quality of both the samples collected and the sample analytical data. The QA component of the program is made up of measures used to determine whether the QC activities are effective.

When completing a site investigation, one of our primary goals is to obtain analytical data that are representative of actual soil, water and/or sediment conditions at the site. The completion of a QA/QC program, consisting of the collection and analysis of various QA/QC samples, provides information for use in evaluating the accuracy of the analytical data used to assess the environmental quality of the site.

The type and number of samples comprising the QA/QC program will be determined by the Project Manager on a site-by-site basis, but will typically include at a minimum a trip blank when collecting water samples for volatile parameter analysis and duplicate soil, water or sediment samples. Other types of QA/QC samples may be collected (e.g., equipment or field blanks) to meet project-specific requirements at the discretion of the Project Manager or to meet regulatory requirements.

The QA/QC sampling requirements and procedures for indoor air, soil vapour and sorbent tube samples are described in SOP-EDR012, SOP-EDR018 and SOP-EDR027, respectively.

3.0 OVERVIEW

The types of samples collected for the QA/QC program during site investigations may include the following:

- Trip blanks;
- Field blanks;
- Equipment blanks; and
- Field duplicates.

Trip blanks are used to assess whether ambient air conditions may have resulted in positive bias of water samples collected for volatile parameter analysis during transportation of the sample containers to and from a project site. Note that the term “positive bias” means that reported sample concentrations are greater than actual in situ sample concentrations due to some form of “cross-contamination”.

Field blanks are collected to assess whether ambient air conditions may have resulted in positive bias of samples collected at a project site for volatile parameter analysis at the time of sampling.

Equipment blanks are collected to assess the efficiency of non-dedicated monitoring/sampling equipment cleaning procedures.

Duplicate samples are collected to assess whether field sampling and laboratory analytical methods are suitable and reproducible.

The analytical results of the QA/QC samples are reviewed by the Project Manager to assess whether any data quality issues are evident which may affect the interpretation of the soil, water and/or sediment sample analytical data.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment and Supplies

The equipment/supplies required for QA/QC sample collection are the same as that used for regular investigative sampling, except for the following:

- Volatile organic compound (VOC)-free distilled water supplied by the analytical laboratory for use in the collection of field blanks and/or equipment blanks;
- Additional sample jars supplied by the analytical laboratory for the collection of field blanks, equipment blanks and field duplicates; and
- Trip blanks supplied by the analytical laboratory.

5.2 QA/QC Sampling Procedures

5.2.1 General Procedures for QA/QC Blank Sampling

The analytical laboratory that will be completing the analysis of the regular investigative samples and QA/QC samples for a project must supply the water used to collect field blanks and equipment blanks. Water provided by another analytical laboratory or store-bought distilled water must not be used.

5.2.2 Trip Blanks

A trip blank is a set of VOC sample vials filled by the analytical laboratory with VOC-free distilled water and shipped with the sample containers. A trip blank is to be stored with the sample containers provided by the analytical laboratory during travel to the project site, while on the project site, and during travel from the project site back to the analytical laboratory. The sample containers comprising a trip blank are not to be opened in the field.

For some projects, submissions of volatile parameter samples to the analytical laboratory over several days will be required. In this case, a trip blank sample should accompany each submission to the laboratory. If this situation is anticipated, the Project Manager must request that the analytical laboratory provide sufficient trip blanks so that a trip blank can accompany the submission of each set of samples to the laboratory.

Trip blanks are to be analyzed for the same volatile parameters (i.e., VOCs and/or petroleum hydrocarbons (PHCs) (F1 fraction)) as the regular investigative samples. For example, if the groundwater sampling program includes analysis of VOCs and PHCs (F1-F4 fractions), then the trip blank(s) require analysis of VOCs and PHCs (F1 fraction). If the groundwater sampling program only includes VOC analysis, then the trip blank(s) require analysis of VOCs only.

Unless specified by the Project Manager, trip blanks are not required for soil and sediment sampling, or for water sampling involving only non-volatile parameters. At the discretion of the Project Manager and to meet project-specific requirements, trip blanks for non-volatile parameters can be prepared and analyzed using the same principles as for volatile parameter trip blanks.

5.2.3 Field Blanks

A field blank is a set of VOC sample vials filled during a sampling event at a project site with VOC-free distilled water supplied by the analytical laboratory and submitted for analysis of volatile parameters (i.e., VOCs and/or PHCs (F1 fraction)).

Field blanks are to be collected at a sample location considered "worst case" with respect to ambient air conditions (e.g., adjacent to and downwind of the pump island of an active retail fuel outlet, inside an active on-the-premises dry cleaner, etc.). At project sites where there is no obvious "worst case" ambient air location, the field blank can be collected at a sampling location picked randomly. The field blank collection location and rationale for selecting it must be documented in the field notes.

If a groundwater sampling event at a project site occurs over more than one day, a field blank is to be collected for each day of sampling.

Some project sites may have an isolated area where the ambient air conditions are significantly poorer than the remainder of the site and a field blank collected from this area may not be representative of conditions elsewhere on the site. In this case, at the discretion of the Project Manager, the collection of two field blanks may be appropriate, with one field blank collected from the poor ambient air area and one field blank collected from a location outside of this area.

Unless specified by the Project Manager, field blanks are not required for soil and sediment sampling, or for water sampling involving only non-volatile parameters. At the discretion of the Project Manager and to meet project-specific requirements, field blanks for non-volatile parameters can be collected and analyzed using the same principles as for volatile parameter field blanks.

5.2.4 Equipment Blanks

An equipment blank is collected by pouring VOC-free distilled water supplied by the analytical laboratory either over or through non-dedicated sampling/monitoring equipment that has been cleaned following sampling/monitoring using the procedures outlined in SOP-EDR009. The resulting rinsate is then captured in sample containers appropriate for the intended analysis. Note that the surface over which the distilled water is poured must be the surface from which samples are collected from or that is in contact with the medium being monitored. For example, if an equipment blank is being collected from a split-spoon sampler, the distilled water must be poured through the interior of the sampler, and not the exterior of the sampler.

The Project Manager will be responsible for determining the sampling/monitoring equipment from which equipment blanks will be obtained, the number of equipment blanks and the parameters to be analyzed. Regarding the latter, the parameters analyzed for equipment blanks are typically the parameters of concern for a given project site.

5.2.5 Evaluation of Blank Sample Results

The Project Manager will evaluate the results of the blank sample analysis to assess whether these results show that bias may have been introduced to investigative samples collected during the field sampling activities. Judgement by the Project Manager will be required to assess whether the blank sample results have any effect on the interpretation of the investigative sample results. This is assessed on a case-by-case basis, but the following general principles can be applied:

- If all soil, groundwater and/or sediment samples collected for a site investigation meet the applicable environmental standards/criteria, the presence of detectable or elevated parameter concentrations in the blanks has no effect on the interpretation of the investigative sample results;
- If parameters have detectable or elevated concentrations in the blank samples but none of these parameters are present in the regular investigative samples at concentrations exceeding the applicable environmental standards/criteria, the blank sample results have no effect on the interpretation of the investigative sample results;
- If parameters have detectable or elevated parameter concentrations in the blank samples and one or more of these parameters are present in the regular investigative samples at concentrations exceeding the applicable environmental standards/criteria, then positive bias of the regular investigative samples may have occurred. The Project Manager will need to assess a number of variables, including the relative parameter concentrations in the blank and regular investigative samples, to determine whether the regular investigative sample data are considered representative and usable for assessing the environmental quality of the site. If the regular investigative sample data are questionable, then resampling may be required; and
- If the regular investigative samples have exceedances of the applicable environmental standards/criteria and the blank samples have non-detectable parameter concentrations, the blank sample results have no effect on the interpretation of the investigative sample results.

5.2.6 General Procedures for QA/QC Duplicate Sampling

Whenever possible, duplicate samples are to be collected from "worst case" sample locations. The reason for this is that Relative Percent Differences (RPDs) are calculated using the analytical results of the duplicate and regular investigative samples to evaluate the suitability and reproducibility of field sampling and laboratory analytical methods. However, RPDs for a given parameter can only be calculated if there are detectable concentrations in both samples, and "worst case" sample locations are the most likely to have detectable levels of parameters of concern. The calculation and evaluation of RPDs is discussed at the end of this section.

When filling sample containers, the order of collection is to fill the sample container for a particular parameter or parameters for the regular investigative sample first and then fill the sample container for the same parameter or parameters for the duplicate sample second. For example, if groundwater was being sampled for PAHs and metals and a duplicate sample was required, the order of filling the sample containers would regular investigative sample for PAHs, duplicate sample for PAHs, regular investigative sample for metals and duplicate sample for metals.

5.2.7 Field Duplicate Samples – Soil/Sediment

Soils/sediments are frequently heterogeneous because they are typically deposited in horizontal layers over time, causing both small scale and large scale grain size variations that can often result in significant variations in contaminant concentrations between layers. Because of this, it is important that duplicate soil/sediment samples be collected from the same vertical depths as the regular investigative samples in sample cores or at discrete sampling locations (e.g., grab samples).

When collecting a duplicate soil/sediment sample from a sampling device that provides a soil core (e.g., dual-tube sampler, split-spoon sampler), the soil core is to be split in half vertically (i.e., longitudinally). A portion of one half of the core is used for the regular investigative sample and a portion of the other half of the core is used for the duplicate sample. The portion of each core placed in sample jars for analysis must be obtained from the same depth interval within the cores.

When collecting a duplicate soil/sediment sample from a grab sample (e.g., excavation floor or sidewall), the field duplicate sample must be collected as close as possible to the regular investigative sample location at the sample depth and within the same soil layer.

There are no special procedures for collecting field duplicates of composite soil/sediment samples given that the soil/sediment is homogenized during the composite sample collection procedure.

A field duplicate soil/sediment sample must be collected at the same time as the regular investigative sample. Retroactively splitting a soil/sediment sample to obtain a field duplicate sample is not permitted.

APPENDIX C
Borehole Logs

Log of Borehole: BH1

Project #: 350868.001 **Logged By:** EW

Project: Phase Two Environmental Site Assessment

Client: Centurion Appelt (1 Centrepoint) LP

Location: 85 Gemini Way, Ottawa, Ontario

Drill Date: January 24, 2025

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00	No Monitoring Well Installed				
		Asphalt, Concrete and sand	0.00		100	S1	20/0	PHCs (F1-F4), VOCs, PAHs, Metals, pH
		Gravel and Sand Grey, moist, dense, trace silt, no odour or staining	-0.61					
2		***Sandy Silt*** Grey, moist, dense, some clay, no odour or staining	0.61		100	S2	25/0	
					60	S3	50/0	
			-3.05		60	S4	0/0	
10 / 3		End of Borehole	3.05					

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size:

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: N/A

Top of Casing Elevation: N/A

Sheet: 1 of 1

Log of Borehole: BH2

Project #: 350868.001 **Logged By:** EW

Project: Phase Two Environmental Site Assessment

Client: Centurion Appelt (1 Centrepoint) LP

Location: 85 Gemini Way, Ottawa, Ontario

Drill Date: January 24, 2025

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00	No Monitoring Well Installed				
		Asphalt, Concrete and sand	0.00					
		Gravel and Sand Grey, moist, dense, trace silt, no odour or staining	-0.76		100	S1	15/2	
		Sandy Silt Dark grey, moist, dense, trace clay, no odour or staining	0.76 / -1.37		100	S2	30/0	PHCs (F1-F4), VOCs, PAHs, Metals, Grain Size
		Grey, moist, dense, some clay, no odour or staining	1.37 / -3.05		100	S3	15/0	
					100	S4	15/0	
10 / 3		End of Borehole	3.05					

Depth scale: 0–12 ft; 0–3 m.

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size:

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: N/A

Top of Casing Elevation: N/A

Sheet: 1 of 1

PINCHIN

Log of Borehole: BH3

Project #: 350868.001 ***Logged By:*** EW

Project: Phase Two Environmental Site Assessment

Client: Centurion Appelt (1 Centrepoint) LP

Location: 85 Gemini Way, Ottawa, Ontario

Drill Date: January 24, 2025

SUBSURFACE PROFILE / SAMPLE

Depth (ft / m)	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 ft / 0 m	Ground Surface	0.00	No Monitoring Well Installed				
0	***Asphalt, Concrete and sand***	0.00					
0–2 ft	***Gravel and Sand*** Grey, dense, trace silt, no odour or staining	-0.61		80	S1	5/1	
2–10 ft	***Sandy Silt*** Grey, dense, some clay, trace gravel, no odour or staining	0.61 / -3.05		80	S2	5/0	PHCs (F1-F4), VOCs, PAHs, Metals
				80	S3	10/0	
				80	S4	20/0	
10 ft	End of Borehole	3.05					

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size:

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: N/A

Top of Casing Elevation: N/A

Sheet: 1 of 1

Log of Borehole: BH4

Project #: 350868.001 **Logged By:** EW

Project: Phase Two Environmental Site Assessment

Client: Centurion Appelt (1 Centrepoint) LP

Location: 85 Gemini Way, Ottawa, Ontario

Drill Date: January 24, 2025

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 ft / 0 m		Ground Surface	0.00	No Monitoring Well Installed				
0 ft / 0 m		**Asphalt, Concrete and sand**	0.00		20	S1	0/1	
		Gravel and Sand Grey, dry, trace silt, no odour or staining	-0.61					
2 ft		**Sandy Silt** Grey, dense, moist, some clay, no odour or staining	0.61		30	S2	35/0	PHCs (F1-F4), VOCs, PAHs, Metals
					100	S3	20/0	
			-3.05		100	S4	25/0	
10 ft		End of Borehole	3.05					

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size:

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 0

Top of Casing Elevation: N/A

Sheet: 1 of 1

Log of Borehole: BH5

Project #: 350868.001 **Logged By:** EW

Project: Phase Two Environmental Site Assessment

Client: Centurion Appelt (1 Centrepoint) LP

Location: 85 Gemini Way, Ottawa, Ontario

Drill Date: January 24, 2025

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 ft / 0 m		Ground Surface	0.00	No Monitoring Well Installed				
		Asphalt, Concrete and sand	0.00		100	S1	40/1	
		Gravel and Sand Grey, asphalt fragments, no odour or staining			100	S2	50/1	
			-1.83					
		Sandy Silt Grey to brown, some clay, trace gravel, trace white shell fragments, no odour or staining	1.83		100	S3	25/1	PHCs (F1-F4), VOCs, PAHs, Metals, pH
					100	S4	55/0	
			-3.05					
			3.05					

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size:

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: N/A

Top of Casing Elevation: N/A

Sheet: 1 of 1

APPENDIX D

Summary of Analytical Results

Table 3
SAMPLES SUBMITTED FOR LABORATORY ANALYSIS
Centurion Appelt (1 Centrepoint) LP
85 Gemini Way, Ottawa, Ontario

Samples			Parameters							
Borehole ID	Sample ID	Sample Depth Range (mbgs)		PHCs (F1-F4)	VOCs	PAHs	Metals	pH	Grain Size Analysis	Rationale/Notes
BH1	BH1-S1	0.00-0.76	SOIL SAMPLES	●	●	●	●	●		Assess soil quality on-Site due to the imporation of fill material of unknown quality across the Site.
BH2	BH2-S2	0.76-1.52		●	●	●	●		●	
BH3	BH3-S2	0.76-1.52		●	●	●	●			
BH4	BH4-S2	0.76-1.52		●	●	●	●			
BH5	BH5-S3	1.52-2.29		●	●	●	●	●		
	DUP	1.52-2.29		●	●	●	●			

Notes:

PHCs (F1-F4)	Petroleum Hydrocarbons (Fraction 1 to Fraction 4)
VOCs	Volatile Organic Compounds
PAHs	Polycyclic Aromatic Hydrocarbons
mbgs	Metres Below Ground Surface
MECP	Ontario Ministry of the Environment, Conservation and Parks

Table 4

pH AND GRAIN SIZE ANALYSIS FOR SOIL

Centurion Appelt (1 Centrepoint) LP

85 Gemini Way, Ottawa, Ontario

Parameter	***Units***	***MECP Site Condition Standard Selection Criteria***	***Sample Designation***		
			Sample Collection Date (dd/mm/yyyy)		
			Sample Depth (mbgs)		
			BH1-S1	BH2-S2	BH5-S3
			01/24/2025	01/24/2025	01/24/2025
			0.00-0.76	0.76-1.52	1.52-2.29
pH		Surface: 5 < pH < 9 Subsurface: 5 < pH < 11	7.83	NA	7.48
Sieve #200 <0.075 mm	%	50%	NA	56.8	NA
Sieve #200 >0.075 mm	%	50%	NA	43.2	NA
		Grain Size Classification	NA	Coarse	NA

Notes:

BOLD	Environmentally Sensitive Area (Based Upon pH of Surface Soil)
BOLD	Environmentally Sensitive Area (Based Upon pH of Sub-Surface Soil)
NA	Not Analysed
mbgs	Metres Below Ground Surface

Table 5

PETROLEUM HYDROCARBON AND BTEX ANALYSIS FOR SOIL

Centurion Appelt (1 Centrepoint) LP

85 Gemini Way, Ottawa, Ontario

Parameter	*MECP Table 3 Standards**	*Sample Designation*					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1-S1	BH2-S2	BH3-S2	BH4-S2	BH5-S3	DUP
		01/24/2025	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*
		0.00-0.76	*0.76-1.52*	*0.76-1.52*	*0.76-1.52*	*1.52-2.29*	*1.52-2.29*
Benzene	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	2.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	3.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons F1 (C_6 - C_{10})	55	<7	<7	<7	<7	<7	<7
Petroleum Hydrocarbons F2 (>C_{10} - C_{16})	98	<4	<4	<4	<4	<4	<4
Petroleum Hydrocarbons F3 (>C_{16} - C_{34})	300	23	39	<8	<8	33	34
Petroleum Hydrocarbons F4 (>C_{34} - C_{50})	2800	55	41	<6	<6	69	61

Notes:

MECP Table 3 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 3 Standards, Coarse-Textured Soils, Non-Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units in µg/g
mbgs	Metres Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes

Table 6
VOLATILE ORGANIC COMPOUND ANALYSIS FOR SOIL
Centurion Appelt (1 Centrepoint) LP
85 Gemini Way, Ottawa, Ontario

Parameter	*MECP Table 3 Standards**	*Sample Designation*					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1-S1	*BH2-S2*	*BH3-S2*	*BH4-S2*	*BH5-S3*	*DUP*
		01/24/2025	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*
		0.00-0.76	*0.76-1.52*	*0.76-1.52*	*0.76-1.52*	*1.52-2.29*	*1.52-2.29*
Acetone	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	2.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dibromochloromethane	9.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	3.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	4.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.083	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	3.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloroethane	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1-Dichloroethylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	3.4	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
trans-1,2-Dichloroethylene	0.084	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,3-Dichloropropene (Total)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Hexane	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl t-Butyl Ether (MTBE)	0.75	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.058	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,1,2,2-Tetrachloroethane	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	2.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	0.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Trichloroethylene	0.061	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichlorofluoromethane	4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Xylenes (Total)	3.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:

MECP Table 3 Standards* — Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 3 Standards, Coarse-Textured Soils, Non-Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.

BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units in µg/g
mbgs	Metres Below Ground Surface

Table 7

POLYCYCLIC AROMATIC HYDROCARBON ANALYSIS FOR SOIL

Centurion Appelt (1 Centrepoint) LP

85 Gemini Way, Ottawa, Ontario

Parameter	*MECP Table 3 Standards**	*Sample Designation*					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1-S1	*BH2-S2*	*BH3-S2*	*BH4-S2*	*BH5-S3*	*DUP*
		01/24/2025	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*
		0.00-0.76	*0.76-1.52*	*0.76-1.52*	*0.76-1.52*	*1.52-2.29*	*1.52-2.29*
Acenaphthene	7.9	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anthracene	0.67	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.5	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Benzo(a)pyrene	0.3	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Benzo(b)fluoranthene	0.78	<0.02	<0.02	<0.02	<0.02	0.04	<0.02
Benzo(ghi)perylene	6.6	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Benzo(k)fluoranthene	0.78	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chrysene	7	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Dibenzo(a,h)anthracene	0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.69	<0.02	<0.02	<0.02	<0.02	0.08	<0.02
Fluorene	62	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(1,2,3-cd)pyrene	0.38	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene 2-(1-)	0.99	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	6.2	<0.02	<0.02	<0.02	<0.02	0.04	0.04
Pyrene	78	<0.02	<0.02	<0.02	<0.02	0.06	<0.02

Notes:

MECP Table 3 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 3 Standards, Coarse-Textured Soils, Non-Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units in µg/g
mbgs	Metres Below Ground Surface

TABLE 8

METALS ANALYSIS FOR SOIL

Centurion Appelt (1 Centrepoint) LP

85 Gemini Way, Ottawa, Ontario

Parameter	***MECP Table 2 Standards****	***Sample Designation***					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1-S1	*BH2-S2*	*BH3-S2*	*BH4-S2*	*BH5-S3*	*DUP*
		01/24/2025	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*	*01/24/2025*
		0.00-0.76	*0.76-1.52*	*0.76-1.52*	*0.76-1.52*	*1.52-2.29*	*1.52-2.29*
Antimony	7.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic	18	2.1	2.7	4.3	3.8	4.1	3.9
Barium	390	181	62.3	241	225	202	196
Beryllium	4	<0.5	<0.5	0.7	0.7	0.7	0.6
Boron (Total)	120	15.8	<5.0	5	5.4	<5.0	<5.0
Cadmium	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Total)	160	11.1	30.1	80.4	67.3	74.4	65.8
Cobalt	22	5	5.2	16.3	14.5	15.6	13.9
Copper	140	8.7	11.3	34.6	25.1	30.1	28.9
Lead	120	8	54.5	16.1	38.4	30	46.2
Molybdenum	6.9	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
Nickel	100	10.7	13.2	42.7	34	37.9	33.9
Selenium	2.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	20	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Thallium	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium	23	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
Vanadium	86	10.3	39.9	84.4	76	77.4	71.9
Zinc	340	<20.0	59.4	97.9	104	97.9	97

Notes:

MECP Table 3 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 3 Standards, Coarse-Textured Soils, Non-Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units in µg/g
mbgs	Metres Below Ground Surface

APPENDIX E

Laboratory Certificates of Analysis

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Pinchin Ltd. (Ottawa)
1 Hines Road, Suite 200
Kanata, ON K2K 3C7
Attn: Ester Wilson

Report Date: 30-Jan-2025
Order Date: 24-Jan-2025

Client PO:
Project: 350868.001
Custody: 146930

Order #: 2504463

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2504463-01	BH1-S1
2504463-02	BH2-S2
2504463-03	BH3-S2
2504463-04	BH4-S2
2504463-05	BH5-S3
2504463-06	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	24-Jan-25	24-Jan-25
PHC F1	CWS Tier 1 - P&T GC-FID	27-Jan-25	28-Jan-25
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	25-Jan-25	27-Jan-25
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	27-Jan-25	27-Jan-25
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	25-Jan-25	26-Jan-25
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	27-Jan-25	28-Jan-25
Solids, %	CWS Tier 1 - Gravimetric	24-Jan-25	27-Jan-25
Texture - Coarse Med/Fine	Based on ASTM D2487	28-Jan-25	29-Jan-25

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH1-S1	BH2-S2	BH3-S2	BH4-S2	-	-
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00		
	Sample ID:	2504463-01	2504463-02	2504463-03	2504463-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	93.5	83.1	80.3	82.5	-	-
>75 um	0.1 %	-	56.8	-	-	-	-
<75 um	0.1 %	-	43.2	-	-	-	-
Texture	0.1 %	-	Coarse	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.83	-	-	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1.0 ug/g	2.1	2.7	4.3	3.8	-	-
Barium	1.0 ug/g	181	62.3	241	225	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	0.7	0.7	-	-
Boron	5.0 ug/g	15.8	<5.0	5.0	5.4	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Chromium	5.0 ug/g	11.1	30.1	80.4	67.3	-	-
Cobalt	1.0 ug/g	5.0	5.2	16.3	14.5	-	-
Copper	5.0 ug/g	8.7	11.3	34.6	25.1	-	-
Lead	1.0 ug/g	8.0	54.5	16.1	38.4	-	-
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Nickel	5.0 ug/g	10.7	13.2	42.7	34.0	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	10.3	39.9	84.4	76.0	-	-
Zinc	20.0 ug/g	<20.0	59.4	97.9	104	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: Pinchin Ltd. (Ottawa)

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	MDL/Units						
Client ID:		BH1-S1	BH2-S2	BH3-S2	BH4-S2	-	-
Sample Date:		24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00		
Sample ID:		2504463-01	2504463-02	2504463-03	2504463-04		
Matrix:		Soil	Soil	Soil	Soil		
Volatiles							
Acetone	0.50 ug/g	<0.50	<0.50	<0.50	<0.50	-	-
Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Bromodichloromethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Bromoform	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Bromomethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Chlorobenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Chloroform	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Dibromochloromethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Ethylene dibromide (dibromoethane,	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Hexane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-

PARACEL LABORATORIES LTD.

Order #: 2504463

Certificate of Analysis

Report Date: 30-Jan-2025

Client: Pinchin Ltd. (Ottawa)

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH1-S1	BH2-S2	BH3-S2	BH4-S2	-	-
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00		
	Sample ID:	2504463-01	2504463-02	2504463-03	2504463-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Volatiles							
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g	<0.50	<0.50	<0.50	<0.50	-	-
Methyl Isobutyl Ketone	0.50 ug/g	<0.50	<0.50	<0.50	<0.50	-	-
Methyl tert-butyl ether	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Methylene Chloride	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Styrene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Tetrachloroethylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Trichloroethylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Vinyl chloride	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
4-Bromofluorobenzene	Surrogate	106%	110%	56.5%	55.6%	-	-
Dibromofluoromethane	Surrogate	105%	108%	54.8%	55.3%	-	-
Toluene-d8	Surrogate	106%	110%	56.4%	56.3%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g	23	39	<8	<8	-	-
F4 PHCs (C34-C50)	6 ug/g	55	41	<6	<6	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH1-S1	BH2-S2	BH3-S2	BH4-S2	-	-
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00	24-Jan-25 09:00		
	Sample ID:	2504463-01	2504463-02	2504463-03	2504463-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Chrysene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	<0.01	<0.01	-	-
Phenanthrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
2-Fluorobiphenyl	Surrogate	77.8%	83.5%	73.0%	71.3%	-	-
Terphenyl-d14	Surrogate	73.5%	81.6%	71.2%	66.7%	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	MDL/Units						
Client ID:		BH5-S3	DUP			-	-
Sample Date:		24-Jan-25 09:00	24-Jan-25 09:00				
Sample ID:		2504463-05	2504463-06				
Matrix:		Soil	Soil				
Physical Characteristics							
% Solids	0.1 % by Wt.	79.5	82.0	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.48	-	-	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	-	-	-	-
Arsenic	1.0 ug/g	4.1	3.9	-	-	-	-
Barium	1.0 ug/g	202	196	-	-	-	-
Beryllium	0.5 ug/g	0.7	0.6	-	-	-	-
Boron	5.0 ug/g	<5.0	<5.0	-	-	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Chromium	5.0 ug/g	74.4	65.8	-	-	-	-
Cobalt	1.0 ug/g	15.6	13.9	-	-	-	-
Copper	5.0 ug/g	30.1	28.9	-	-	-	-
Lead	1.0 ug/g	30.0	46.2	-	-	-	-
Molybdenum	1.0 ug/g	<1.0	1.1	-	-	-	-
Nickel	5.0 ug/g	37.9	33.9	-	-	-	-
Selenium	1.0 ug/g	<1.0	<1.0	-	-	-	-
Silver	0.3 ug/g	<0.3	<0.3	-	-	-	-
Thallium	1.0 ug/g	<1.0	<1.0	-	-	-	-
Uranium	1.0 ug/g	<1.0	1.1	-	-	-	-
Vanadium	10.0 ug/g	77.4	71.9	-	-	-	-
Zinc	20.0 ug/g	97.9	97.0	-	-	-	-
Volatiles							
Acetone	0.50 ug/g	<0.50	<0.50	-	-	-	-
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH5-S3	DUP				
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00			-	-
	Sample ID:	2504463-05	2504463-06				
	Matrix:	Soil	Soil				
	MDL/Units						
Volatiles							
Bromodichloromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Bromoform	0.05 ug/g	<0.05	<0.05	-	-	-	-
Bromomethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Carbon Tetrachloride	0.05 ug/g	<0.05	<0.05	-	-	-	-
Chlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Chloroform	0.05 ug/g	<0.05	<0.05	-	-	-	-
Dibromochloromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Dichlorodifluoromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,3-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,4-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1-Dichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichloropropane	0.05 ug/g	<0.05	<0.05	-	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,3-Dichloropropene, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Ethylene dibromide (dibromoethane,	0.05 ug/g	<0.05	<0.05	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Hexane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g	<0.50	<0.50	-	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g	<0.50	<0.50	-	-	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH5-S3	DUP			-	-
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00				
	Sample ID:	2504463-05	2504463-06				
	Matrix:	Soil	Soil				
	MDL/Units						
Volatiles							
Methyl tert-butyl ether	0.05 ug/g	<0.05	<0.05	-	-	-	-
Methylene Chloride	0.05 ug/g	<0.05	<0.05	-	-	-	-
Styrene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Tetrachloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,1-Trichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,2-Trichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Trichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Trichlorofluoromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Vinyl chloride	0.02 ug/g	<0.02	<0.02	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene-d8	Surrogate	56.2%	55.8%	-	-	-	-
4-Bromofluorobenzene	Surrogate	56.4%	55.4%	-	-	-	-
Dibromofluoromethane	Surrogate	56.0%	54.7%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	33	34	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	69	61	-	-	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	-	-	-	-

Certificate of Analysis

Report Date: 30-Jan-2025

Client: **Pinchin Ltd. (Ottawa)**

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

	Client ID:	BH5-S3	DUP				
	Sample Date:	24-Jan-25 09:00	24-Jan-25 09:00			-	-
	Sample ID:	2504463-05	2504463-06				
	Matrix:	Soil	Soil				
	MDL/Units						
Semi-Volatiles							
Acenaphthylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	0.03	<0.02	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	0.03	<0.02	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	0.04	<0.02	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	0.03	<0.02	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Chrysene	0.02 ug/g	0.03	<0.02	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluoranthene	0.02 ug/g	0.08	<0.02	-	-	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	-	-	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	-	-	-	-
Phenanthrene	0.02 ug/g	0.04	0.04	-	-	-	-
Pyrene	0.02 ug/g	0.06	<0.02	-	-	-	-
2-Fluorobiphenyl	Surrogate	65.4%	71.7%	-	-	-	-
Terphenyl-d14	Surrogate	61.5%	69.0%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					
Benzo [g,h,i] perylene	ND	0.02	ug/g					
Benzo [k] fluoranthene	ND	0.02	ug/g					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Chrysene	ND	0.02	ug/g					
Dibenzo [a,h] anthracene	ND	0.02	ug/g					
Fluoranthene	ND	0.02	ug/g					
Fluorene	ND	0.02	ug/g					
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g					
1-Methylnaphthalene	ND	0.02	ug/g					
2-Methylnaphthalene	ND	0.02	ug/g					
Methylnaphthalene (1&2)	ND	0.04	ug/g					
Naphthalene	ND	0.01	ug/g					
Phenanthrene	ND	0.02	ug/g					
Pyrene	ND	0.02	ug/g					
Surrogate: 2-Fluorobiphenyl	*0.925*		*%*	*69.4*	*50-140*			
Surrogate: Terphenyl-d14	*0.898*		*%*	*67.4*	*50-140*			
Volatiles								
Acetone	ND	0.50	ug/g					
Benzene	ND	0.02	ug/g					
Bromodichloromethane	ND	0.05	ug/g					
Bromoform	ND	0.05	ug/g					
Bromomethane	ND	0.05	ug/g					
Carbon Tetrachloride	ND	0.05	ug/g					
Chlorobenzene	ND	0.05	ug/g					
Chloroform	ND	0.05	ug/g					
Dibromochloromethane	ND	0.05	ug/g					
Dichlorodifluoromethane	ND	0.05	ug/g					
1,2-Dichlorobenzene	ND	0.05	ug/g					
1,3-Dichlorobenzene	ND	0.05	ug/g					
1,4-Dichlorobenzene	ND	0.05	ug/g					
1,1-Dichloroethane	ND	0.05	ug/g					
1,2-Dichloroethane	ND	0.05	ug/g					
1,1-Dichloroethylene	ND	0.05	ug/g					
cis-1,2-Dichloroethylene	ND	0.05	ug/g					
trans-1,2-Dichloroethylene	ND	0.05	ug/g					

PARACEL LABORATORIES LTD.

Order #: 2504463

Certificate of Analysis

Report Date: 30-Jan-2025

Client: Pinchin Ltd. (Ottawa)

Order Date: 24-Jan-2025

Client PO:

Project Description: 350868.001

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichloropropane	ND	0.05	ug/g					
cis-1,3-Dichloropropylene	ND	0.05	ug/g					
trans-1,3-Dichloropropylene	ND	0.05	ug/g					
1,3-Dichloropropene, total	ND	0.05	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.05	ug/g					
Hexane	ND	0.05	ug/g					
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g					
Methyl Isobutyl Ketone	ND	0.50	ug/g					
Methyl tert-butyl ether	ND	0.05	ug/g					
Methylene Chloride	ND	0.05	ug/g					
Styrene	ND	0.05	ug/g					
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g					
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g					
Tetrachloroethylene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
1,1,1-Trichloroethane	ND	0.05	ug/g					
1,1,2-Trichloroethane	ND	0.05	ug/g					
Trichloroethylene	ND	0.05	ug/g					
Trichlorofluoromethane	ND	0.05	ug/g					
Vinyl chloride	ND	0.02	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: 4-Bromofluorobenzene	*8.16*		*%*	*102*	*50-140*			
Surrogate: Dibromofluoromethane	*7.29*		*%*	*91.1*	*50-140*			
Surrogate: Toluene-d8	*8.52*		*%*	*107*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	9.64	0.05	pH Units	9.59			0.5	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	27	8	ug/g	23			16.3	30	
F4 PHCs (C34-C50)	58	6	ug/g	55			4.6	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	6.5	1.0	ug/g	6.7			2.5	30	
Barium	203	1.0	ug/g	196			3.6	30	
Beryllium	0.9	0.5	ug/g	1.1			12.0	30	
Boron	7.9	5.0	ug/g	8.2			3.7	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	50.9	5.0	ug/g	51.7			1.6	30	
Cobalt	15.1	1.0	ug/g	15.6			3.2	30	
Copper	23.3	5.0	ug/g	23.8			2.3	30	
Lead	8.2	1.0	ug/g	8.6			5.2	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	28.6	5.0	ug/g	29.5			3.2	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	69.1	10.0	ug/g	70.5			2.1	30	
Zinc	72.6	20.0	ug/g	75.1			3.4	30	
Physical Characteristics									
% Solids	85.7	0.1	% by Wt.	85.9			0.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	0.036	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	0.022	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	0.026	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	0.025	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.15*		*%*		*80.5*	*50-140*			
Surrogate: Terphenyl-d14	*0.933*		*%*		*65.3*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*9.74*		*%*		*106*	*50-140*			
Surrogate: Dibromofluoromethane	*9.49*		*%*		*104*	*50-140*			
Surrogate: Toluene-d8	*9.92*		*%*		*108*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	185	7	ug/g	ND	92.6	85-115			
F2 PHCs (C10-C16)	80	4	ug/g	ND	93.8	60-140			
F3 PHCs (C16-C34)	249	8	ug/g	23	108	60-140			
F4 PHCs (C34-C50)	215	6	ug/g	55	120	60-140			
Metals									
Arsenic	49.6	1.0	ug/g	2.7	93.8	70-130			
Barium	125	1.0	ug/g	78.4	93.5	70-130			
Beryllium	49.2	0.5	ug/g	ND	97.6	70-130			
Boron	46.8	5.0	ug/g	ND	86.9	70-130			
Cadmium	47.3	0.5	ug/g	ND	94.7	70-130			
Chromium	70.9	5.0	ug/g	20.7	101	70-130			
Cobalt	54.7	1.0	ug/g	6.3	96.9	70-130			
Copper	55.8	5.0	ug/g	9.5	92.5	70-130			
Lead	47.3	1.0	ug/g	3.5	87.6	70-130			
Molybdenum	47.4	1.0	ug/g	ND	94.3	70-130			
Nickel	59.4	5.0	ug/g	11.8	95.2	70-130			
Selenium	48.2	1.0	ug/g	ND	95.7	70-130			
Silver	39.3	0.3	ug/g	ND	78.6	70-130			
Thallium	43.4	1.0	ug/g	ND	86.5	70-130			
Uranium	44.1	1.0	ug/g	ND	87.7	70-130			
Vanadium	77.0	10.0	ug/g	28.2	97.6	70-130			
Zinc	78.1	20.0	ug/g	30.0	96.1	70-130			
Semi-Volatiles									
Acenaphthene	0.179	0.02	ug/g	ND	100	50-140			
Acenaphthylene	0.181	0.02	ug/g	ND	102	50-140			
Anthracene	0.159	0.02	ug/g	ND	88.9	50-140			
Benzo [a] anthracene	0.182	0.02	ug/g	ND	102	50-140			
Benzo [a] pyrene	0.161	0.02	ug/g	ND	90.2	50-140			
Benzo [b] fluoranthene	0.201	0.02	ug/g	ND	112	50-140			
Benzo [g,h,i] perylene	0.145	0.02	ug/g	ND	81.4	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	0.171	0.02	ug/g	ND	95.9	50-140			
Chrysene	0.191	0.02	ug/g	ND	107	50-140			
Dibenzo [a,h] anthracene	0.117	0.02	ug/g	ND	65.4	50-140			
Fluoranthene	0.191	0.02	ug/g	ND	107	50-140			
Fluorene	0.180	0.02	ug/g	ND	101	50-140			
Indeno [1,2,3-cd] pyrene	0.128	0.02	ug/g	ND	71.6	50-140			
1-Methylnaphthalene	0.181	0.02	ug/g	ND	101	50-140			
2-Methylnaphthalene	0.194	0.02	ug/g	ND	108	50-140			
Naphthalene	0.189	0.01	ug/g	ND	106	50-140			
Phenanthrene	0.203	0.02	ug/g	ND	114	50-140			
Pyrene	0.191	0.02	ug/g	ND	107	50-140			
Surrogate: 2-Fluorobiphenyl	*1.18*		*%*		*82.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.08*		*%*		*75.3*	*50-140*			
Volatiles									
Acetone	11.3	0.50	ug/g	ND	113	50-140			
Benzene	5.14	0.02	ug/g	ND	129	60-130			
Bromodichloromethane	4.72	0.05	ug/g	ND	118	60-130			
Bromoform	4.57	0.05	ug/g	ND	114	60-130			
Bromomethane	5.35	0.05	ug/g	ND	134	50-140			
Carbon Tetrachloride	4.47	0.05	ug/g	ND	112	60-130			
Chlorobenzene	4.89	0.05	ug/g	ND	122	60-130			
Chloroform	4.52	0.05	ug/g	ND	113	60-130			
Dibromochloromethane	4.93	0.05	ug/g	ND	123	60-130			
Dichlorodifluoromethane	4.09	0.05	ug/g	ND	102	50-140			
1,2-Dichlorobenzene	5.13	0.05	ug/g	ND	128	60-130			
1,3-Dichlorobenzene	5.16	0.05	ug/g	ND	129	60-130			
1,4-Dichlorobenzene	5.12	0.05	ug/g	ND	128	60-130			
1,1-Dichloroethane	4.93	0.05	ug/g	ND	123	60-130			
1,2-Dichloroethane	4.43	0.05	ug/g	ND	111	60-130			
1,1-Dichloroethylene	4.89	0.05	ug/g	ND	122	60-130			
cis-1,2-Dichloroethylene	4.59	0.05	ug/g	ND	115	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
trans-1,2-Dichloroethylene	4.61	0.05	ug/g	ND	115	60-130			
1,2-Dichloropropane	4.69	0.05	ug/g	ND	117	60-130			
cis-1,3-Dichloropropylene	4.49	0.05	ug/g	ND	112	60-130			
trans-1,3-Dichloropropylene	4.64	0.05	ug/g	ND	116	60-130			
Ethylbenzene	5.18	0.05	ug/g	ND	129	60-130			
Ethylene dibromide (dibromoethane, 1,2-)	3.89	0.05	ug/g	ND	97.2	60-130			
Hexane	5.07	0.05	ug/g	ND	127	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.5	0.50	ug/g	ND	105	50-140			
Methyl Isobutyl Ketone	12.4	0.50	ug/g	ND	124	50-140			
Methyl tert-butyl ether	11.7	0.05	ug/g	ND	117	50-140			
Methylene Chloride	5.09	0.05	ug/g	ND	127	60-130			
Styrene	4.74	0.05	ug/g	ND	119	60-130			
1,1,1,2-Tetrachloroethane	4.30	0.05	ug/g	ND	108	60-130			
1,1,2,2-Tetrachloroethane	3.66	0.05	ug/g	ND	91.6	60-130			
Tetrachloroethylene	4.62	0.05	ug/g	ND	115	60-130			
Toluene	5.09	0.05	ug/g	ND	127	60-130			
1,1,1-Trichloroethane	3.91	0.05	ug/g	ND	97.7	60-130			
1,1,2-Trichloroethane	4.54	0.05	ug/g	ND	113	60-130			
Trichloroethylene	4.40	0.05	ug/g	ND	110	60-130			
Trichlorofluoromethane	5.13	0.05	ug/g	ND	128	50-140			
Vinyl chloride	4.30	0.02	ug/g	ND	107	50-140			
m,p-Xylenes	10.1	0.05	ug/g	ND	126	60-130			
o-Xylene	5.08	0.05	ug/g	ND	127	60-130			
Surrogate: 4-Bromofluorobenzene	*7.95*		*%*		*99.3*	*50-140*			
Surrogate: Dibromofluoromethane	*6.90*		*%*		*86.3*	*50-140*			
Surrogate: Toluene-d8	*8.01*		*%*		*100*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES L

Paracel ID: 2504463

Paracel Order Number (Lab Use Only): 2504463

Chain of Custody (Lab Use Only) № 146930

Client Name: PINCHIN

Contact Name: E. Wilson

Address: 1 Hines Rd. Kanata, ON

Telephone:

Project Ref: 350868.001

Quote #

PO #

E-mail: ewilson, amcdonald @pinchin.com

Page 1 of 1

Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 day ☑ Regular

Date Required:

☑ REG 153/04 ☐ REG 406/19

☑ Table 1 ☑ Agri/other ☐ Med/Fine

☐ Table 2 ☐ Res/Park ☑ Coarse

☑ Table 3 ☐ Ind/Comm

Table ___

For RSC: ☑ Yes ☐ No

Other Regulation

☐ REG 558 ☐ PWQO

☐ CCME ☐ MISA

☐ SU - Sani ☐ SU - Storm

Mun:

☐ other:

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Field Filtered	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	grain Size		
1	BH1-S1	S	/	2	N/A	Jan.24/25	AM	✓	✓	✓	✓				✓			
2	BH2-S2	S	/	2	↓	↓	↓	✓	✓	✓	✓					✓		
3	BH3-S2	S	/	2				✓	✓	✓	✓							
4	BH4-S2	S	/	2				✓	✓	✓	✓							
5	BH5-S3	S	/	2				✓	✓	✓	✓				✓			
6	DUP	S	/	2				✓	✓	✓	✓							
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Walk-in

Relinquished By (Sign): Ester Wilson

Relinquished By (Print): Ester Wilson

Date/Time: 2025-Jan-24 @ 2:05.

Received at Depot:

Date/Time:

Temperature °C

Received at Lab: [illegible] 15. Urban

Date/Time: 2025/01/24 2:07pm

Temperature 2.3 °C

Verified By: [illegible]

Date/Time: Jan 24 1454

pH Verified: ☐ By: NA