REVISED

Phase Two Environmental Site Assessment

North Part of 541 Somme Street
Ottawa, Ontario

Prepared for:

Tres Comas Ltd.
777 Quest Boulevard
Ile-des-Chenes, MB R0A 0T1

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1.0 EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained by Tres Comas Ltd. (Client), to complete a Phase Two Environmental Site Assessment (Phase Two ESA) of the property located at North Part of 541 Somme Street in Ottawa, Ontario (hereafter referred to as the Site or Phase Two Property). The Phase Two Property is approximately 1.98 acres in size and exists as vacant, undeveloped land, with thick vegetation cover consisting of grasses and shrubs.

The Phase Two ESA was conducted at the request of the Client to support a Site Plan Control Application (SPCA) to the City of Ottawa as a condition for the future development of the Phase Two Property. It is Pinchin's understanding that the Phase Two Property will be developed from its current vacant undeveloped land use to industrial/commercial land use. Given that this proposed development does not constitute a change to a more sensitive land use, a Record of Site Condition (RSC) for the Site is not required at this time; nonetheless, the City of Ottawa Site Plan Approval process dictates that assessments be conducted in accordance with the Province of Ontario's *Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act*, which was last amended by Ontario Regulation 362/23 on January 1, 2024 (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 activity (PCA) 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 between June 2024 and September 2024, and consisted of the following:

- Initial investigation of the APEC.

The initial APEC investigation included the advancement of five boreholes at the Phase Two Property. The boreholes were advanced to depths ranging from approximately 0.91 to 2.13 metres below ground surface (mbgs). Select soil samples collected from each of the borehole locations were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes, collectively referred to as BTEX, petroleum hydrocarbons (PHCs) fractions 1 through 4 (F1-F4), polycyclic aromatic hydrocarbons (PAHs), and 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 6: Generic Site Condition Standards for Shallow Soils in a 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 6 Standards)* for medium to fine-textured soils for industrial/commercial/community property use.

The laboratory results for the submitted soil samples indicated that all reported concentrations for the parameters analyzed met the corresponding *Table 6 Standards*, except for the following:

Electrical conductivity (EC) concentration in three soil samples (BH2-S1, BH3-S1 and BH4-S2) marginally exceeded the *Table 6 Standards*. These EC exceedances are considered to be a result of the handling of imported fill material from the adjacent properties to grade the Site. Given that the proposed development for the Phase Two Property remains unchanged from its current vacant land use (i.e., industrial/commercial), the marginal EC exceedances identified at the Phase Two Property pose no risk to the current land use or the proposed development. As such, it is the opinion of the Qualified Person (QP) who supervised the Phase Two ESA that the applicable *Table 6 Standards* for soil at the Phase Two Property has been met, and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and/or 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 development of the Phase Two Property in general accordance with O. Reg. 153/04 as a conditional requirement for a Site Plan Control Application (SPCA) to the City of Ottawa. It is Pinchin's understanding that the Phase Two Property will be developed from its current undeveloped vacant land use to industrial/commercial land use. Given that this does not constitute a change to a more sensitive land use, a Record of Site Condition (RSC) for the Phase One Property is not required at this time.

The overall objectives of this Phase Two ESA were to assess the soil quality in relation to an APEC 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*, *North Part of 541 Somme Street, Ottawa, Ontario*", completed by Pinchin for the Client and dated August 30, 2024. 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, and the Phase One Property and Phase Two Property have the same boundaries.

2.1 Site Description

This Phase Two ESA was completed for the property located at the municipal address of North Part of 541 Somme Street in Ottawa, Ontario. The Phase Two Property is approximately 1.98 acres in size and exists as vacant land with thick vegetation cover consisting of grasses and shrubs. The Phase Two Property is bounded by vacant undeveloped land to the north, vacant undeveloped land to the south, forested undeveloped land to the east, and Somme Street followed by vacant land to the west. A Key Map showing the Phase Two Property location is provided on Figure 1 (all Figures are provided within Section 9.0).

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

Detail	Source / Reference	Information
Legal Description	Preliminary Survey Plan Drawing provided by the Client, Service Ontario Parcel Register	The most north-western part of PIN 04326-0670, legally described as part BLOCK 2 PLAN 4M1388, save and except parts 1,2,3 & 4 4R32280
Municipal Address	Client	541 Somme St. Ottawa, ON K1G 3N4
Parcel Identification Number (PIN)	Client	04326-0670 (LT)
Current Owner	Client	Titan Environmental Containment c/o Tres Comas Ltd.
Owner Contact Information	Client	Derek Bishop, c/o Tres Comas Ltd. 777 Quest Boulevard Ile-des-Chenes, MB R0A 0T1
Current Occupants	Client	Unoccupied, vacant land
Client	Authorization to Proceed Form for Pinchin Proposal	Titan Environmental Containment c/o Tres Comas Ltd.
Client Contact Information	Authorization to Proceed Form for Pinchin Proposal	Derek Bishop, c/o Tres Comas Ltd. 777 Quest Boulevard Ile-des-Chenes, MB R0A 0T1
Site Area	Client	0.80 hectares (1.98 acres)
Current Zoning	GeoOttawa https://maps.ottawa.ca/geoottawa/	RH Zoning – Rural Heavy Industrial Zone
Centroid UTM Co-ordinates	Google Earth	457230 Easting
		5017040 Northing
		Zone 18T

A Preliminary Survey Plan showing the Phase Two Property is provided in Appendix A (all Appendices are provided in Section 10.0).

2.2 Property Ownership

The entirety of the Phase Two Property is currently owned by the Client (Titan Environmental Containment Ltd.) located at 777 Quest Boulevard, Ile-des-Chenes, MB R0A 0T1. Contact information for the Phase Two Property owner is provided in the preceding section.

Pinchin was retained by Mr. Derek Bishop of the Client to conduct the Phase Two ESA of the Site. Contact information for Mr. Bishop 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. It is Pinchin's understanding that the Client intends to develop the Phase Two Property for commercial/light industrial land use.

Given that the future land use is not changing to a more sensitive land use, the proposed change of land use does not require 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 undeveloped vacant land located within the City of Ottawa. It is Pinchin's understanding that the Phase Two Property will be developed for industrial/commercial land use where water for the Phase Two Property and surrounding area is not supplied by municipal water services. Potable groundwater supply is assumed to be sourced by privately-owned supply wells.

The results of the borehole drilling program indicated that the overburden was less than two metres thick over more than one-third of the Phase Two Property, classifying the Phase Two Property as 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 4. 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 6.6.4, 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 fine-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property has been considered medium and fine-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 6 Standards for:

- Medium and fine-textured soils; and
- Industrial/commercial/community property use.

As such, all analytical results have been compared to these *Table 6 Standards*.

3.0 BACKGROUND INFORMATION

3.1 Physical Setting

The Phase Two Property is located on the east side of Somme Street, approximately 615 metres (m) northeast of Sappers Ridge, at an elevation of approximately 88 metres above mean sea level (mamsl) in Ottawa, Ontario. The Site is situated in an area that predominantly consists of vacant, undeveloped 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. A ditch is present on the western boundary of the Phase Two Property that flows northwest adjacent to Somme Street. 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 Findlay Creek Municipal Drain is located approximately 160 m north of the Site, which flows east and discharges into a tributary of the Castor River, located approximately 1.90 kilometres (km) southeast of the Site.

A review of the Area of Natural & Scientific Interest map and information provided on the Ministry of Natural Resources and Forestry (MNRF)'s Natural Heritage Information Center (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.

The records review indicated that the Phase One Property and all other properties within the Phase One Study Area are not serviced by a municipal drinking water system.

3.2 Past Investigations

3.2.1 Summary of Previous Environmental Investigations by Others

Reports summarizing the following environmental investigations completed by others and pertaining to the Phase Two Property were reviewed as part of the Pinchin Phase One ESA:

- Report entitled “Phase II Environmental Site Assessment, 5213 Hawthorne Road, Part 4, Ottawa, Ontario”,” prepared by Paterson Group for R. W. Tomlinson Limited and, dated January 9, 2020 (2020 Paterson Phase II ESA Report).

A summary of the salient information identified in the above-referenced reports prepared by others is provided below.

<u>2020 Paterson Phase II ESA Report</u>

Paterson completed a Phase II ESA in January 2020 for Part 4 of 5123 Hawthorne Road in the City of Ottawa, Ontario in order to assess the quality of the fill material that had been placed on the adjacent south-southwest properties and on-Site (i.e., collectively now referred to as 631, 581, 561 and 541 Somme Street) in light of the proposed development of the property.

The field work consisted of placing four boreholes (BH1 to BH4) on the entire property, which included a borehole (BH4) on the Phase One Property. The boreholes were placed to obtain a general coverage of the area to address environmental concerns relating to the potential former use of the property for fill disposal/storage. Based on the borehole log at the Phase One Property, the general soil profile consisted of fill material (crushed stone), underlain by dolostone and sandstone bedrock. Bedrock was encountered at 0.6 mbgs and terminated in this unit at a depth of approximately 4.72 mbgs.

Five soil samples were collected and analyzed for petroleum hydrocarbons (PHCs) fraction F2 to F4 (F2 to F4), polycyclic aromatic hydrocarbons (PAHs), metals, electrical conductivity, SAR and pH.

BH1 and BH4 were instrumented with monitoring wells. Two groundwater samples were collected and analysed for PHCs (F1-F4), PAHs, volatile organic compounds (VOCs), sodium and chloride.

Criteria used were full depth *Table 2 Standards* (coarse-grained soil, industrial land use, potable groundwater environment) of the Ministry of the Environment, Conservation and Parks (MECP) document entitled "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*" dated April 15, 2011 (*MECP Table 2 Standards*).

The soil sample collected from the BH4 on the Phase One Property satisfied the *MECP Table 2 Standards*. The parameters concentrations in the groundwater sample collected from BH4 respected the 2011 *MECP Table 2 Standards*; with exception of chloroform, which was noted at that time to be 8 µg/L vs. 2.4 µg/L of *Table 2 Standards*. Paterson noted that the chloroform concentrations are considered to be a result of the use of municipal water used during bedrock coring and would be expected to dissipate over time.

3.2.2 Pinchin Phase One ESA Summary

From May 2024 through August 2024, Pinchin conducted a Phase One ESA in support of a SPCA submission to the City of Ottawa for the Phase Two Property. The Phase One ESA consisted of a Site visit, interviews with Site personnel, records review, evaluation of information, and preparation of a written report which was completed under the supervision of a QP. A plan showing the Phase One Study Area is attached as Figure 3.

The Phase One ESA was completed recently (i.e., within one month of the start of the Phase Two ESA) and in accordance with the requirements of O. Reg. 153/04. Therefore, the information provided within the Phase One ESA Report is considered adequate such that it can be relied upon for the purpose of this Phase Two ESA.

Based on information obtained during the Phase One ESA, a total of one APEC and corresponding potentially contaminating activity (PCA) and COPCs were identified that could potentially affect the environmental condition of the subsurface media on, in or under the Phase Two Property. The COPCs associated with the APEC were determined based on a review of the PCAs and substances associated with the related activities, and on several sources of information, including but not limited to, Pinchin's experience with environmental contamination and hazardous substances, common industry practices for analysis of such contaminants and point sources, literature reviews of COPCs and associated hazardous substances, and evaluations of contaminant mobility and susceptibility for migration in the subsurface.

Table 1 presents the APEC and the associated PCA and COPCs. Identified on-Site and off-Site PCAs are summarized in Table 2 and their locations are shown on Figure 4. The APEC at the Phase Two Property is illustrated on Figure 5.

3.2.3 Use of Previous Analytical Data

Pinchin notes that the information provided in the previously completed environmental report was reviewed for the purpose of identifying an APEC pertaining to the Phase Two Property during the Phase One ESA. The analytical data provided in this report was considered sufficient for the purpose of the 2020 Paterson Phase II ESA; however, for the purpose of this Phase Two ESA, the former environmental investigation does not meet the general requirements of O.Reg. 153/04. As such, Pinchin recommended additional soil tests to be completed to investigate the quality of the fill material across the Phase Two 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, North Part of 541 Somme Street Ottawa, Ontario*", dated July 2024, 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 maximum depths ranging between approximately 0.91 and 2.13 mbgs.
- Retained Strata Drilling Group Inc. (Strata) to advance boreholes and complete monitoring well installations 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 5 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 BTEX, PHCs F1-F4, PAHs, Metals, and/or Inorganics.
- Submitted one duplicate soil sample for chemical analysis of BTEX, PHCs F1-F4, and PAHs for quality assurance/quality control (QA/QC) purposes.
- Submitted two representative soil samples 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 6 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 APEC was related to a PCA located at the ground surface (i.e., fill material of unknown quality (APEC-1)) and groundwater impacts were considered unlikely, based on Pinchin’s review of Site records in combination of the 2020 Paterson Phase II ESA. Pinchin did not conduct sediment sampling as part of this Phase Two ESA as there are no surface water bodies and, therefore no sources of sediment, present on Site.

For assessing the soil at the Phase Two Property for the presence of COPCs, a total of 5 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 summarize 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.
- PCA and APEC on the Phase One Property.
- PCA within the Phase One Study Area.

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

- The Site is vacant and undeveloped, free of any permanent structures and/or buildings with the legal description of the most north-western part of PIN 04326-0670, legally described as part BLOCK 2 PLAN 4M1388, save and except parts 1,2,3 & 4 4R32280. Subject to an easement over parts 34, 35, 36, 37 AND 38 4R23865 as in OC1253757; subject to an easement in gross over parts 34, 35, 36, 37 AND 38 4R23865 as in OC1253753; together with an easement over PART BLOCK 7 PLAN 4M1388, PART 5 4R25123 AS IN OC1277606; together with an easement over PART BLOCK 7 PLAN 4M1388, PARTS 6 AND 7 4R25123 AS IN OC1277598; together with an easement over PART BLOCK 7 PLAN 4M1388, PART 4 4R25123 AS IN OC1277614; City of Ottawa. It should be noted that the Phase One Property is considered the north part of the larger tract of land with the municipal address, 541 Somme Street in the City of Ottawa;
- The Findlay Creek Municipal Drain is located approximately 160 m north of the Site, which flows east and discharges into a tributary of the Castor River, located approximately 1.90 kilometres (km) southeast of the Site;
- No areas of natural significance were identified within the Phase One Study Area;
- No potable water supply wells were located on the Phase One Property;
- The elevation of the Phase One Property, based on information obtained from the Ontario Base Map series, is approximately 88 m above sea level (masl). The general topography in the local and surrounding area is generally flat and the Phase One Property is at a similar elevation to the adjacent/surrounding properties. A ditch is present on the western boundary of the Phase One Property that flows northwest adjacent to Somme Street;
- A review of the available physiographical data indicates that the Phase One Property and the surrounding properties located within the Phase One Study Area are located within the Russell and Prescott sand plains with shallow bedrock and little to no overburden (Paleozoic bedrock). Bedrock is mapped as consisting of dolostone and sandstone of the Beekmantown Group;

- The properties in the Phase One Study Area have various land uses, including commercial, light industrial and vacant. Land use types within the Phase One Study Area are presented on Figure 3 – Phase One Study Area;
- A total of two PCAs were identified within the Phase One Study Area, consisting of one PCA on the Phase One Property and one off-Site PCA within the Phase One Study Area. As shown on Figure 4 – Potentially Contaminating Activities, the on-Site PCA resulted in an APEC, while the off-Site PCA was not considered to generate an APEC on the Phase One Property; and
- Groundwater flow beneath the Phase One Property and properties within a 250 m search radius, is considered to flow in a northeasterly direction towards the Findlay Creek Municipal Drain and into the Castor River. Any off-Site PCAs inferred to be upgradient or transgradient with respect to the Site are not considered to represent APECs on the Phase One Property. Figure 5 – Areas of Potential Environmental Concern, provides a summary of the APEC and associated PCA and COPCs.

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 were 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 July 17, 2024 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 2.13 mbgs using a Geoprobe 6622DT™ drill rig.

The locations of the boreholes are provided on Figure 6 in Section 9.0. The rationale and placement of the boreholes completed to investigate the APEC is summarized in Table 2 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 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) in Mississauga, Ontario. Formal chain of custody records were 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 fill material comprised of brown silty sand and gravel, trace clay that extended to the maximum investigation depth of 2.13 mbgs. Moist to wet soil conditions were generally observed at depths between 0.61 and 0.91 mbgs.

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 and a CGI operated in methane elimination mode. 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 and CGI.

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). The CGI was calibrated prior to field use by Maxim according to Maxim's standard operating procedures. In addition, the CGI calibration was tested at the beginning of each day of drilling against a Maxim-provided hexane gas standard with a concentration of 400 ppm. The gas standard was stored in a gas cylinder and delivered to the CGI via a regulator valve.

An in-field re-calibration of the CGI was conducted (using the gas standard in accordance with the operator's manual instructions) if the calibration check indicated that the CGI's calibration had drifted by more than +/- 10%.

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 Laboratories (AGAT) for analysis. AGAT is an independent laboratory accredited by the Canadian Association for Laboratory Accreditation. Formal chain of custody records of the sample submissions were 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:

- BTEX 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 were 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 “BH4-S2” and its corresponding field duplicate “DUP” were submitted for laboratory analysis of BTEX, PHCs, PAHs, metals and/or inorganics.

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 grass-covered ground surface at the Phase Two Property is underlain by granular soil fill materials to a maximum depth of approximately 2.13 mbgs.

Bedrock refusal was encountered during the drilling activities at a minimum depth of 0.91 mbgs and a maximum depth of 2.13 mbgs. Based on geological data published by the Ontario Geological Survey, the Phase Two Property and the surrounding properties located within the Phase One Study Area are located within the Russell and Prescott sand plains with shallow bedrock and little to no overburden (Paleozoic bedrock). Bedrock is mapped as consisting of dolostone and sandstone of the Beekmantown Group.

6.2 Fine-Medium Soil Texture

Two soil samples collected from the boreholes advanced at the Phase Two Property were submitted for 75 micron single-sieve grain size analysis. The soil samples selected for analysis were considered to be representative of the primary stratigraphic unit observed at the borehole locations, which was a sand and gravel and sand and clayey silt fill unit. The two representative samples (BH2-S1 and BH5-S2) of the at the Phase Two Property were classified as fine-textured (46.6% and 22.9% coarse-grained soil of samples Bh2-S1 and BH5-S2, respectively).

Based on these 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 two-thirds of the overburden at the Phase Two Property is fine-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property was interpreted to be fine-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 ranged from 45 ppm_v in soil sample BH1-S1 collected from borehole BH1 at a depth of approximately 0.00 to 0.76 mbgs.

One most apparent "worst case" soil sample, based on vapour concentrations as well as visual and/or olfactory considerations, recovered from each borehole was submitted for laboratory analysis of BTEX, PHCs (F1-F4), PAHs and/or 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 6 Standards* and the following subsections provide a discussion of the findings.

6.4.1 BTEX and PHCs F1-F4

The soil sample analytical results for BTEX and PHCs F1-F4, along with the corresponding *Table 6 Standards*, are presented in Table 5 and indicated that all reported concentrations of BTEX and PHCs F1- F4 in the soil samples submitted for analysis satisfied the *Table 6 Standards*.

6.4.2 PAHs

The soil sample analytical results for PAHs, along with the corresponding *Table 6 Standards*, are presented in Table 6 and indicated that all reported concentrations of PAHs in the soil samples submitted for analysis satisfied the *Table 6 Standards*.

6.4.3 Metals and Inorganics

The soil sample analytical results for metals and inorganics parameters, along with the corresponding *Table 6 Standards*, are presented in Table 7 and indicated that all reported concentrations of metals and pH in the soil samples submitted for analysis satisfied the *Table 6 Standards*, except for the following:

- The electrical conductivity (EC) values (1.43, 2.06 and 1.45 milliSiemens per centimetre [mS/cm] vs. the *Table 6 Standard* of 1.4 mS/cm) reported for soil samples BH2 - S1, BH3 - S1, and BH4 - S2, respectively collected from depths of 0.00-0.91, 0.00-0.91 and 0.61-1.37mbgs, respectively, marginally exceeded the *Table 6 Standards*.

6.4.4 General Comments on Soil Quality

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

Elevated levels of EC in soil exceeding the *Table 6 Standards* have been identified at BH2 - S1, BH3 - S1, and BH4 - S2, collected from depths of 0.00-0.91, 0.00-0.91 and 0.61-1.37mbgs, respectively. It is Pinchin's opinion that the elevated EC values in the soil samples are related to the handling of imported fill material from the adjacent properties to grade the Site.

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 6 Standards* or are above the *Table 6 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 "BH4-S2" and its corresponding field duplicate "DUP", were submitted for laboratory analysis of BTEX, PHCs (F1-F), and PAHs.

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:

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

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 D.
- All of the analytical results reported in the Certificates of Analysis have been summarized, in full, in Tables 4 through 7.

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 D. 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 at the municipal address of North Part of 541 Somme Street in Ottawa, Ontario. The Phase Two Property is approximately 1.98 acres in size and exists as vacant land with thick vegetation cover consisting of grasses and shrubs. The Phase Two Property is bounded by vacant undeveloped land to the north, vacant undeveloped land to the south, forested undeveloped land to the east, and Somme Street followed by vacant land to the west. A Key Map showing the Phase Two Property location is provided on Figure 1 (all Figures are provided within Section 9.0).

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

The Phase One ESA identified a total of two PCAs within the Phase One Study Area. These PCAs consisted of one PCA at the Phase Two Property and one PCA within the Phase One Study Area, outside of the Phase Two Property. The on-Site PCA was interpreted as potentially affecting the environmental condition of the subsurface media on, in or under the Phase Two Property and was considered to result in an APEC. Identified on-Site and off-Site PCAs are summarized in Table 2 and their locations are shown on Figure 4.

6.6.2 Areas of Potential Environmental Concern

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

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

APEC	Investigation Location
APEC-1	BH1, BH2, BH3, BH4, BH5

A summary of the findings for the APEC is provided below.

APEC-1

Based on the findings of this Phase One ESA, Pinchin identified one PCA at the Phase One Property (i.e., on-Site). One PCA was identified within the Phase One Study Area outside of the Phase One Property (i.e., off-Site). The off-Site PCA is not considered to result in an area of potential environmental concern (APEC) at the Phase One Property, based on the nature of the activity and potential contaminants related to the activity and/or their downgradient or transgradient location with respect to the inferred groundwater flow direction within the Phase One Study Area. Therefore, it is Pinchin's opinion that the off-Site PCA identified on properties within the Phase One Study Area does not represent an APEC at the Phase One Property.

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 located in a remote, undeveloped, and vacant area with no public utilities.

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 fill material comprised of brown silty sand and gravel, trace clay that extended to the maximum investigation depth of 2.13 mbgs. Moist to wet soil conditions were generally observed at depths between 0.61 and 0.91 mbgs.

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 encountered at each of the borehole locations at depths ranging from 0.91 mbgs at borehole BH2 and BH3 to 2.13 mbgs at borehole BH1.

Depth to Water Table

Groundwater was not encountered during the Phase Two ESA drilling program. The depth to the water table across the Phase Two Property is anticipated to range from approximately 1.10 to 1.32 mbgs, based on previous investigations in the area.

Applicability of Section 35, 41 or 43.1 of O. Reg 153/04

Site Condition Standards for potable groundwater use have been applied to the Phase Two Property and non-potable Site Condition Standards as per Section 35 of O. Reg. 153/04 are not applicable.

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.

Based on a review of the depths to bedrock and the spatial distribution of the borehole locations, the depth to bedrock is interpreted to be less than 2.0 mbgs over more than one-third of the Phase Two Property. As such, the Phase Two Property is a shallow soil property as defined by Section 43.1 of O. Reg. 153/04.

The Phase Two Property does not include all or part of a water body, it is not adjacent to a water body nor 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, which will include the construction of a slab-on-grade storage building across the majority of the Phase Two Property.

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 medium and fine-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 6 Standards for:

- Medium and fine-textured soils; and
- Industrial/commercial/community property use.

As such, all analytical results have been compared to these *Table 6 Standards*.

6.6.6 Contaminants Exceeding Applicable Site Condition Standards in Soil

Electrical Conductivity (EC)

Elevated levels of EC in soil exceeding the *Table 6 Standards* have been identified at BH2 - S1, BH3 - S1, and BH4 - S2, collected from depths of 0.00-0.91, 0.00-0.91 and 0.61-1.37mbgs, respectively. These marginal exceedances are considered to be a result of the handling of imported fill material from the adjacent properties to grade the Site. Given that the proposed development for the Phase Two Property remains unchanged from its current vacant land use (i.e., industrial/commercial), it is Pinchin's opinion that the elevated EC identified at the Phase Two Property poses no risk to the current or future land. As such,

it is Pinchin's opinion that the applicable *Table 6 Standards* for soil at the Phase Two Property has been met, and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and/or groundwater at the Phase Two Property.

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 Control Application 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 6 Standards* for industrial/commercial/community land use and medium and fine-textured soils. Soil samples were collected from each of the borehole locations and submitted for laboratory analysis of BTEX, PHCs F1-F4, PAHs, metals and/or inorganic parameters.

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 6 Standards*, with the exception of the following:

- Elevated levels of EC in soil exceeding the *Table 6 Standards* have been identified at BH2 - S1, BH3 - S1, and BH4 - S2, collected from depths of 0.00-0.91, 0.00-0.91 and 0.61-1.37 mbgs.

These EC exceedances are considered to be a result of the handling of imported fill material from the adjacent properties to grade the Site. Given that the proposed development for the Phase Two Property remains unchanged from its current vacant land use (i.e., industrial/commercial), the marginal EC exceedances identified at the Phase Two Property pose no risk to the current or future land. As such, it is the opinion of the Qualified Person (QP) who supervised the Phase Two ESA that the applicable *Table 6 Standards* for soil at the Phase Two Property has been met, and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and/or groundwater at the Phase Two Property.

7.1 Signatures

This Phase Two ESA was undertaken under the supervision of a QP_{ESA} in accordance with the requirements of O. Reg. 153/04 as a conditional requirement for a Site Plan Control Application for the Phase Two Property.

7.2 Terms and Limitations

This Phase Two ESA was performed for Tres Comas Ltd. (Client) in order to investigate potential environmental impacts at North Part of 541 Somme Street, 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, North Part of 541 Somme Street, Ottawa, Ontario", Prepared for Tres Comas Ltd. Farms Ltd., August 30, 2024.
- "Phase II Environmental Site Assessment, 5213 Hawthorne Road, Part 4, Ottawa, Ontario", prepared by Paterson Group for R. W. Tomlinson Limited and, dated January 9, 2020.
- 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 December 4, 2019.
- U.S. Environmental Protection Agency - Region 1. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. Revised January 19, 2010.

9.0 FIGURES AND TABLES

PINCHIN

PROJECT NAME:	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT				
CLIENT NAME:	TRES COMAS LTD				
PROJECT LOCATION:	NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO				
FIGURE NAME:	KEY MAP				FIGURE NUMBER: 1
PROJECT NUMBER: 342746.001	SCALE: 1:25,000	DRAWN BY: KP	REVIEWED BY: EW	DATE: SEPT. 2024	

N

LEGEND

PHASE TWO PROPERTY BOUNDARY

MONITORING WELL (PATERSON, 2019)

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

0m 50m

SCALE

INFERRED GROUNDWATER FLOW DIRECTION

PINCHIN

PROJECT NAME:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME:
TRES COMAS LTD

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
PHASE TWO PROPERTY

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: SEPT. 2024	FIGURE NUMBER: 2

N

LEGEND

- PHASE TWO PROPERTY BOUNDARY
- PHASE ONE STUDY AREA BOUNDARY
- (P) PARKING
- IND INDUSTRIAL
- INDUSTRIAL/COMMERCIAL/ COMMUNITY LAND USE
- RESIDENTIAL/PARKLAND/ INSTITUTIONAL LAND USE
- AGRICULTURAL OR OTHER LAND USE

0m 125m
SCALE

INFERRED GROUNDWATER FLOW DIRECTION

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

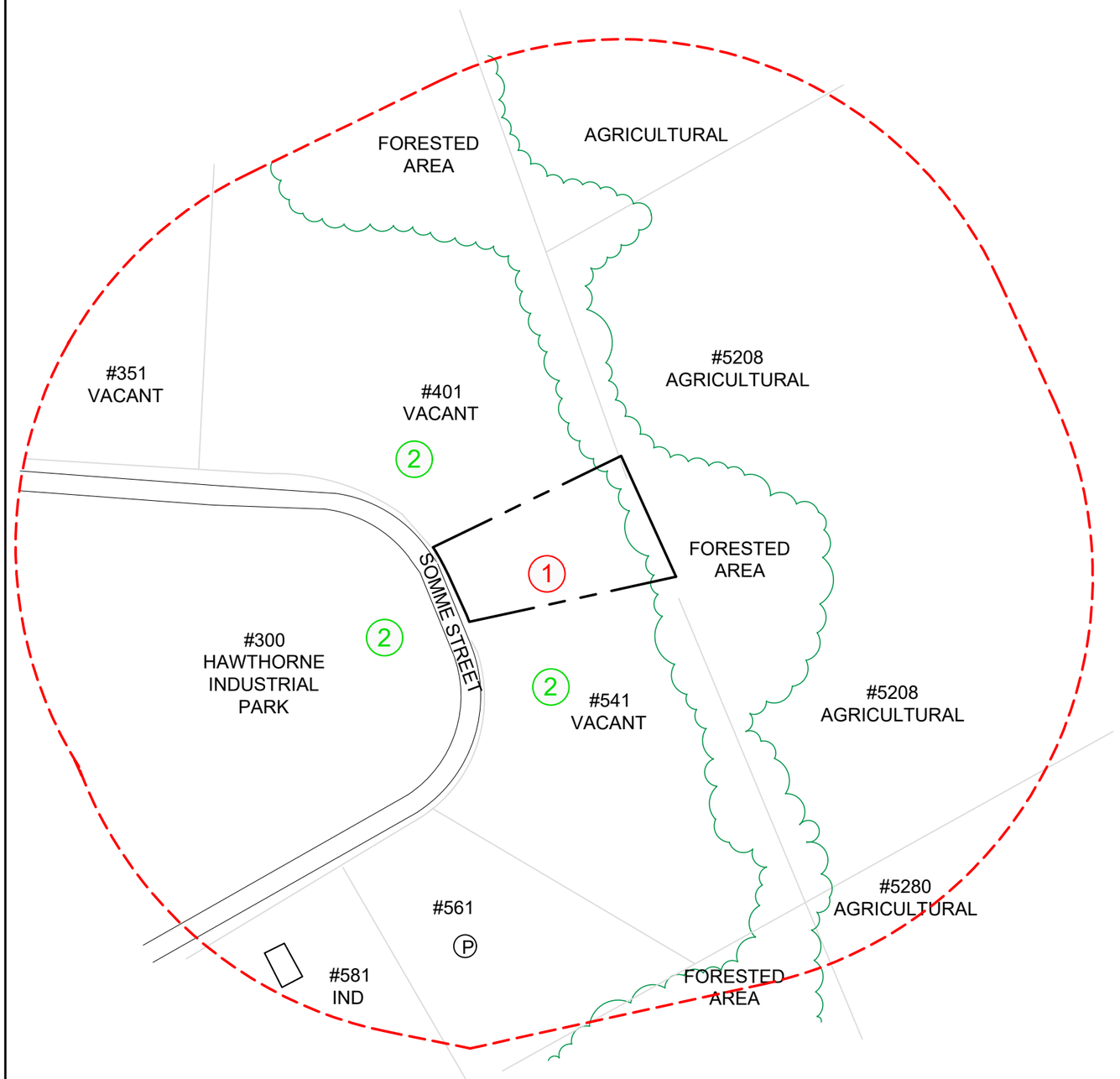
PROJECT NAME:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME:
TRES COMAS LTD

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
PHASE ONE STUDY AREA

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: SEPT. 2024	FIGURE NUMBER: 3



PCA Designation	Location of Potentially Contaminating Activity	Potentially Contaminating Activity	Location of PCA (On-Site or Off-Site)	Distance from Phase One Property (meters)	Location Relative to Inferred Groundwater Flow Direction[1]	Contributing to an APEC at the Site (Yes/No)	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
PCA-1	Throughout the entire Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	NA – On-Site PCA	NA - On-Site PCA	Yes	Soil
PCA-2	Northwest, south and west of the Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	Off-Site	Neighbouring properties	Upgradient/Transgradient	No	Not Applicable

N

LEGEND

- PHASE TWO PROPERTY BOUNDARY
- PHASE ONE STUDY AREA BOUNDARY
- (P) PARKING
- IND INDUSTRIAL
- APEC AREA OF POTENTIAL ENVIRONMENTAL CONCERN
- PCA POTENTIALLY CONTAMINATING ACTIVITY
- (#) PCA CONTRIBUTES TO AN APEC
- (#) PCA DOES NOT CONTRIBUTE TO AN APEC

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PINCHIN

PROJECT NAME:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME:
TRES COMAS LTD

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
POTENTIALLY CONTAMINATING ACTIVITIES

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: SEPT. 2024	FIGURE NUMBER: 4

Area of Potential Environmental Concern1	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity2	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern3	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
APEC-1 (Importation of fill material on-Site)	Across the entirety of the Phase One Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	BTEX PHCs (F1-F4) PAHs EC/SAR	Soil

N

LEGEND

- PHASE TWO PROPERTY BOUNDARY
- APEC AREA OF POTENTIAL ENVIRONMENTAL CONCERN
- APEC-1
- MONITORING WELL (PATERSON, 2019)

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PINCHIN

PROJECT NAME:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME:
TRES COMAS LTD

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
AREA OF POTENTIAL ENVIRONMENTAL CONCERN

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: SEPT. 2024	FIGURE NUMBER: 5

N

LEGEND

PHASE TWO PROPERTY BOUNDARY

MONITORING WELL (PATERSON, 2019)

BOREHOLE

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PINCHIN

PROJECT NAME:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME:
TRES COMAS LTD

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
BOREHOLE LOCATION PLAN

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: NJ	REVIEWED BY: EW
DATE: SEPT. 2024	FIGURE NUMBER: 6

Table 1 - Table of Areas of Potential Environmental Concern

Area of Potential Environmental Concern1	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity2	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
APEC-1 (Importation of fill material on-Site)	Across the entirety of the Phase One Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	BTEX PHCs (F1-F4) PAHs EC/SAR	Soil

Notes:

1 - Areas of potential environmental concern means the area on, in or under a phase one property where one or more contaminants are potentially present, as determined through the phase one environmental site assessment, including through,
(a) identification of past or present uses on, in or under the phase one 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 one 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 2 - Table of Potentially Contaminating Activities

PCA Designation	Location of Potentially Contaminating Activity	Potentially Contaminating Activity	Location of PCA (On-Site or Off-Site)	Distance from Phase One Property (meters)	Location Relative to Inferred Groundwater Flow Direction[1]	Contributing to an APEC at the Site (Yes/No)	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
PCA-1	Throughout the entire Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	NA – On-Site PCA	NA - On-Site PCA	Yes	Soil
PCA-2	Northwest, south and west of the Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	Off-Site	Neighbouring properties	Upgradient/Transgradient	No	Not Applicable

Notes:

APEC – Area of Potential Environmental Concern

PCA – Potentially Contaminating Activity

1 – Location of PCA relative to the Phase One Property in relation to the inferred groundwater flow direction in the Phase One Study Area

TABLE 3
SAMPLES SUBMITTED FOR LABORATORY ANALYSIS
Tres Comas Ltd.
North Part of 541 Somme Street , Ottawa, Ontario

Samples				Parameters						
Borehole / Monitoring Well ID	Sample ID	Sample Depth Range (mbgs)		PHCs (F1-F4) & BTEX	PAHs	Metals ICP	pH	Grain Size Analysis	Rationale/Notes
BH1	BH1 - S3	1.52-1.83	SOIL SAMPLES	●	●	●	●		Assess soil quality due to importation of fill material of unknown quality
BH2	BH2 - S1	0.00-0.91		●	●	●	●	●	
BH3	BH3 - S1	0.00-0.91		●	●	●			
BH4	BH4 - S2	0.61-1.37		●	●	●			
	DUP	0.61-1.37		●	●				
BH5	BH5 - S2	0.76-1.37		●	●	●		●	

Notes:

PHCs (F1-F4)	Petroleum Hydrocarbons (Fraction 1 to Fraction 4)
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
PAHs	Polycyclic Aromatic Hydrocarbons
mbgs	Metres Below Ground Surface
MECP	Ontario Ministry of the Environment, Conservation and Parks

Pinchin File: 90000

TABLE 4
pH AND GRAIN SIZE ANALYSIS FOR SOIL
Tres Comas Ltd.
North Part of 541 Somme Street , Ottawa, Ontario

Parameter	*Units*	*MECP Site Condition Standard Selection Criteria*	*Sample Designation*		
			Sample Collection Date (dd/mm/yyyy)		
			Sample Depth (mbgs)		
			BH1 - S3	*BH2 - S1*	*BH5 - S2*
			17/07/2024	*17/07/2024*	*17/07/2024*
			1.52-1.83	*0.00-0.91*	*0.76-1.37*
pH		Surface: 5 < pH < 9 Subsurface: 5 < pH < 11	6.74	6.71	NA
Sieve #200 <0.075 mm	%	50%	NA	53.38	77.1
Sieve #200 >0.075 mm	%	50%	NA	46.62	22.9
		Grain Size Classification	NA	Fine	Fine

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
Tres Comas Ltd.
North Part of 541 Somme Street , Ottawa, Ontario

Parameter	*MECP Table 6 Standards**	*Sample Designation*					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1 - S3	*BH2 - S1*	*BH3 - S1*	*BH4 - S2*	*BH5 - S2*	*DUP*
		17/07/2024	*17/07/2024*	*17/07/2024*	*17/07/2024*	*17/07/2024*	*17/07/2024*
		1.52-1.83	*0.00-0.91*	*0.00-0.91*	*0.61-1.37*	*0.76-1.37*	*0.61-1.37*
Benzene	0.4	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	1.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	30	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons F1 (C_6 - C_{10})	65	<5	<5	<5	<5	<5	<5
Petroleum Hydrocarbons F2 (>C_{10} - C_{16})	250	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F3 (>C_{16} - C_{34})	2500	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons F4 (>C_{34} - C_{50})	6600	<50	<50	<50	<50	<50	<50

Notes:

MECP Table 6 Standards* — Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 6 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Industrial/Commercial/Community 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

Pinchin File: 342746.001

TABLE 6
POLYCYCLIC AROMATIC HYDROCARBON ANALYSIS FOR SOIL
Tres Comas Ltd.
North Part of 541 Somme Street , Ottawa, Ontario

Parameter	*MECP Table 6 Standards**	*Sample Designation*					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		BH1 - S3	*BH2 - S1*	*BH3 - S1*	*BH4 - S2*	*BH5 - S2*	*DUP*
		17/07/2024	*17/07/2024*	*17/07/2024*	*17/07/2024*	*17/07/2024*	*17/07/2024*
		1.52-1.83	*0.00-0.91*	*0.00-0.91*	*0.61-1.37*	*0.76-1.37*	*0.61-1.37*
Acenaphthene	29	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	0.74	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	0.96	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.3	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	0.96	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	9.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	0.96	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	9.6	0.13	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	9.6	0.18	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	0.95	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene 2-(1-)	42	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	16	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	96	0.16	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:

MECP Table 6 Standards* — Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 6 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Industrial/Commercial/Community 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

Pinchin File: 342746.001

TABLE 7

METALS & INORGANICS ANALYSIS FOR SOIL

Tres Comas Ltd.

North Part of 541 Somme Street , Ottawa, Ontario

Parameter	*MECP Table 6 Standards**	*Sample Designation*				
		Sample Collection Date (dd/mm/yyyy)				
		Sample Depth (mbgs)				
		BH1 - S3	*BH2 - S1*	*BH3 - S1*	*BH4 - S2*	*BH5 - S2*
		17/07/2024	*17/07/2024*	*17/07/2024*	*17/07/2024*	*17/07/2024*
		1.52-1.83	*0.00-0.91*	*0.00-0.91*	*0.61-1.37*	*0.76-1.37*
Electrical Conductivity (2:1) [1]	1.4	0.178	**1.43**	**2.06**	**1.45**	0.235
Sodium Adsorption Ratio (2:1) (	12	0.837	0.339	0.118	0.07	0.171
Antimony	50	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	18	3	6	7	6	3
Barium	670	166	68.6	69	94.6	162
Beryllium	10	<0.5	<0.5	<0.5	<0.5	0.6
Boron (Total)	120	8	<5	<5	<5	9
Cadmium	2	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Total)	1.9	35	8	7	7	57
Cobalt	160	9.2	5.3	5.7	5.5	12.3
Copper	10	23.4	4.3	5.2	4.4	29
Lead	100	17	10	12	11	17
Molybdenum	300	1.1	4.2	6	5.4	1
Nickel	120	23	9	10	9	33
Selenium	20	1.9	0.9	1	1.2	1.8
Silver	40	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	340	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	5.5	0.76	<0.50	<0.50	<0.50	0.9
Vanadium	50	39.3	6.5	6.1	5.8	51.5
Zinc	340	59	<5	<5	<5	73

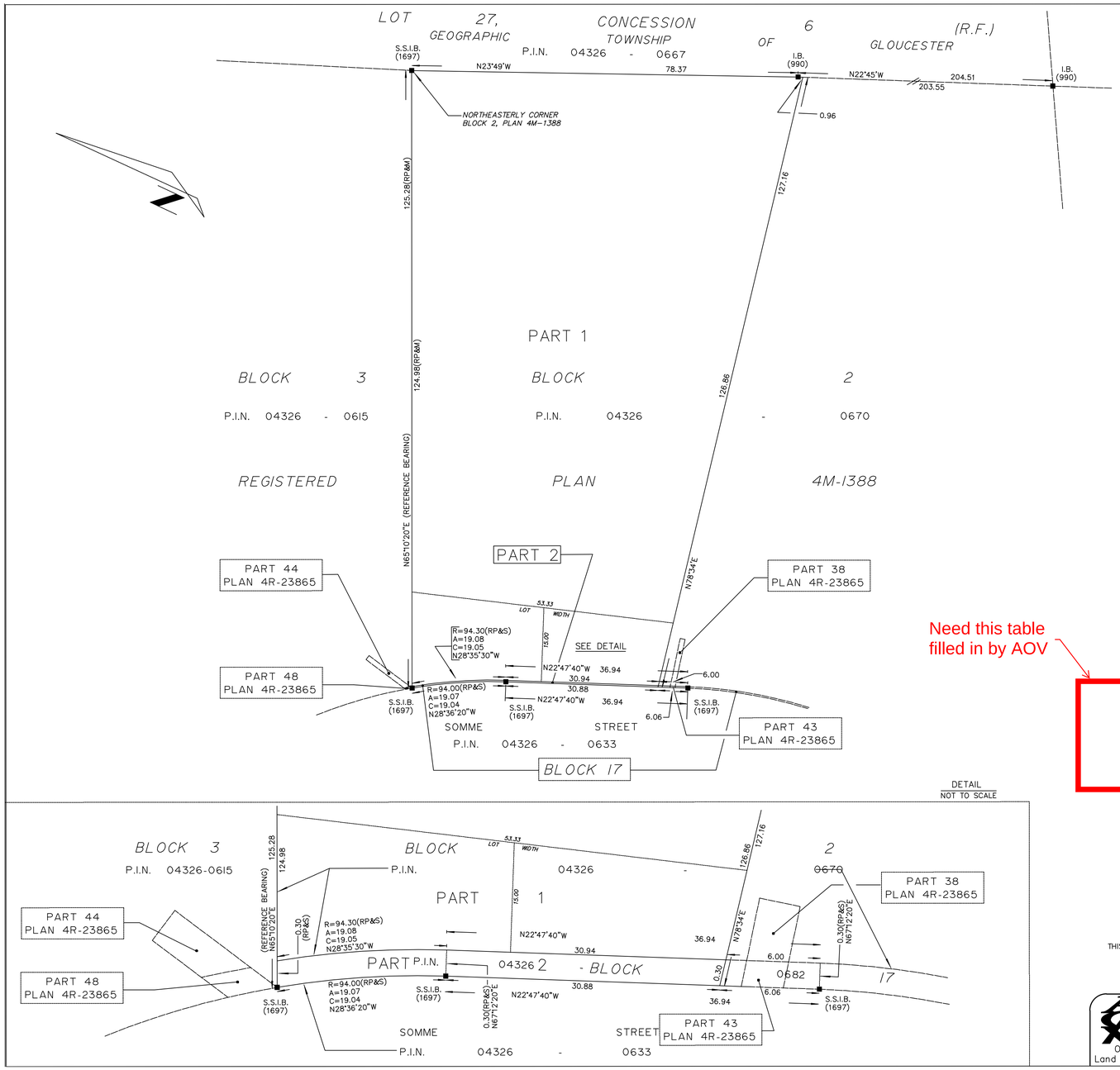
Notes:

MECP Table 6 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 6 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Industrial/Commercial/Community Property Use.
1	units of mS/cm
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units in µg/g unless otherwise noted
mbgs	Metres Below Ground Surface

10.0 APPENDICES

APPENDIX A

Preliminary Survey Plan



DETAIL
NOT TO SCALE

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE _____

_____
J.P. SHIPMAN

PLAN 4R-_____

RECEIVED AND DEPOSITED

DATE _____

_____

REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON (No.4)

PLAN OF SURVEY OF
PART OF BLOCKS 2 AND 17 REGISTERED PLAN 4M-1388
CITY OF OTTAWA
SCALE 1:500

0 5 10 15 20 30 40 50
METRES

SCHEDULE				
PART	BLOCK	PLAN	P.I.N.	AREA
1	PART OF 2	4M-1388	PART OF 04326-0670	0.80 ha.
2	PART OF 17		PART OF 04326-0682	14.7 sq. m.

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

NOTES

BEARINGS SHOWN ON THIS PLAN ARE GRID BEARINGS, AND ARE DERIVED THE NORTHERLY LIMIT OF BLOCK 2 ON REGISTERED PLAN 4M-1388, HAVING A BEARING OF N65°10'20"E.

DISTANCES SHOWN ON THIS PLAN ARE HORIZONTAL GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999954.

S.I.B.	DENOTES 0.025 SQ., 1.2 LONG, STANDARD IRON BAR
S.S.I.B.	DENOTES 0.025 SQ., 0.6 LONG, SHORT STANDARD IRON BAR
I.B.	DENOTES 0.016 SQ., 0.6 LONG, IRON BAR
R.I.B.	DENOTES ROUND IRON BAR
■	DENOTES SURVEY MONUMENT FOUND
□	DENOTES SURVEY MONUMENT PLANTED
WIT.	DENOTES WITNESS
S.U.	DENOTES SOURCE UNKNOWN
990	DENOTES J.G. PAYETTE, O.L.S.
1697	DENOTES J.P. SHIPMAN, O.L.S.
RP	DENOTES REGISTERED PLAN 4M-1388
M	DENOTES MEASURED
S	DENOTES SET

Need this table filled in by AOV

OBSERVED REFERENCE POINTS (ORP): MTM ZONE 9, NAD 83 (ORIGINAL)		
POINT IDENTIFICATION	NORTHING	EASTING
ORP A		
ORP B		

COORDINATES SHOWN TO RURAL ACCURACY IN ACCORDANCE WITH O.REG 216/10, SECTIONS 14, AND 31 TO 35 (BOTH INCLUSIVE).

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

(1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM;

(2) THE SURVEY WAS COMPLETED ON THE DAY OF , 2024.

_____ _____
DATE J.P. SHIPMAN
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER XXXXXXX

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
113 Prescott Street, Box 1340
Kemptville, Ontario K0G 1J0
Phone: (613) 258-1717
Email: Kemptville@aovltd.com
Ontario Land Surveyors

FILE No. : K-13653-24

APPENDIX B
Sampling and Analysis Plan

Sampling and Analysis Plan for Phase Two Environmental Site Assessment

North Part of 541 Somme Street
Ottawa, Ontario

Prepared for:

Tres Comas Ltd.
777 Quest Boulevard
Ile-des-Chenes, MB R0A 0T1

July 15, 2024

Pinchin File: 342746.001

Issued To:	**Tres Comas Ltd.**
Issued On:	**July 15, 2024**
Pinchin File:	**342746.001**
Issuing Office:	**Kanata, ON**

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Figure 2 - Potentially Contaminating Activities – On-Site
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TABLES

Table 1 - Table of Areas of Potential Environmental Concern
Table 2 - Phase Two ESA Scope of Work Summary

1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) has prepared this Sampling and Analysis Plan (SAP) for the Phase Two Environmental Site Assessment (ESA) to be performed at the property on the North Part of 541 Somme Street in Ottawa, Ontario (hereafter referred to as the Site or Phase Two Property). The Phase Two Property is approximately 1.98 acres in size and exists as vacant, undeveloped land, with thick vegetation cover consisting of grasses and shrubs. A Key Map showing the Phase Two Property location is provided on Figure 1 (all Figures are located in Appendix I).

The Phase Two ESA was conducted at the request of the Client to support a Site Plan Control Application (SPCA) to the City of Ottawa as a conditional requirement for the future development of the Phase Two Property. It is Pinchin's understanding that the Phase Two Property will be developed from its current vacant undeveloped land use to industrial/commercial land use. Given that this does not constitute a change to a more sensitive land use, a Record of Site Condition (RSC) for the Phase One Property is not required at this time, as per the Ontario Ministry of the Environment, Conservation and Parks (MECP) O. Reg. 153/04.

This SAP provides the scope of work and procedures for completing the field investigation for the Phase Two ESA. The Phase Two ESA will be performed in accordance with the scope of work, and terms and conditions described in the proposal entitled *"Phase Two Environmental Site Assessment, 541 Somme Street, Ottawa, Ontario"*, prepared for the Client, dated June 28, 2024.

2.0 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

The objectives of the Phase Two ESA will be to assess soil quality at the Phase Two Property in relation to one area of potential environmental concern (APEC) and related potentially contaminating activity (PCA) and contaminants of potential concern (COPCs) identified in a Phase One ESA completed by Pinchin in accordance with O. Reg. 153/04, the findings of which are provided in the draft report entitled "*Phase One Environmental Site Assessment, North Part of 541 Somme Street, Ottawa, Ontario",* prepared for the Client. The APEC and corresponding PCA and COPCs are summarized in Table 1 (all Tables are located in Appendix II) and shown on Figures 2 to 4.

3.0 SCOPE OF WORK

The information obtained from the Phase One ESA, in particular the Phase One Conceptual Site Model, was used to determine the environmental media requiring investigation during the Phase Two ESA (i.e., soil), the locations and depths for sample collection, and the parameters to be analyzed for the samples submitted for the APEC. The Phase Two ESA scope of work will include the advancement of five boreholes. The proposed borehole locations are provided on Figure 5.

Table 2 in Appendix II provides a detailed summary of the proposed Phase Two ESA scope of work, including:

- Boreholes to be completed within the APEC and the COPCs to be analyzed for samples collected in relation to the APEC.
- Media to be sampled at each sampling location, the sampling system (see Section 7.0), the soil sampling depth intervals and the sampling frequency.
- Number of samples per borehole to be collected and submitted for laboratory analysis.

Note that the soil sampling depth intervals (i.e., borehole depths), and sampling frequency are based on Pinchin's current knowledge of subsurface conditions and may be revised based on the actual subsurface conditions encountered.

Additional scope of work items includes the following:

- Submission of a minimum of one "worst case" soil sample from each borehole for chemical analysis of: BTEX, PHCs F1-F4, PAHs, Metals and/or Inorganics.
- Submission of one duplicate soil sample for chemical analysis of BTEX, PHCs F1-F4, and PAHs for quality assurance/quality control (QA/QC) purposes.
- Submission of two representative soil samples 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.

4.0 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) for the Phase Two ESA will be to obtain unbiased analytical data that are representative of actual soil conditions at the Phase Two Property. This will be accomplished by implementing a quality assurance/quality control (QA/QC) program, as described in Section 5.0, and by completing the fieldwork in accordance with Pinchin's standard operating procedures (SOPs), as described in Section 6.0. Pinchin's SOPs are based in part on the MECP's *"Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario"*, dated December 1996 and the Association of Professional Geoscientists of Ontario document entitled *"Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)"*, dated April 2011.

The DQOs are intended to minimize uncertainty in the analytical data set such that the data are considered reliable enough to not affect the conclusions and recommendations of the Phase Two ESA and to meet the overall objective of the Phase Two ESA, which is to assess the environmental quality of the Phase Two Property in relation to the identified APEC.

5.0 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

5.1 Non-Dedicated Sampling and Monitoring Equipment Cleaning

Based on the proposed scope of work, the following non-dedicated sampling and monitoring equipment will be used during completion of the Phase Two ESA:

- Spatula for soil sampling.
- Hollow-stem augers.

All of the above-listed equipment will be cleaned prior to initial use and between samples or sampling locations, as appropriate, following the equipment cleaning procedures described in SOP-EDR009. Any non-dedicated sampling or monitoring equipment not listed above that is used during the Phase Two ESA will also be cleaned in accordance with SOP-EDR009.

5.2 Field Duplicate Samples

Field duplicate soil and groundwater samples will be collected for laboratory analysis in accordance with SOP-EDR025 at a frequency of one sample for every ten samples submitted for laboratory analysis, with a minimum of one sample per media sampled per COPC.

5.3 Calibration Checks on Field Instruments

5.3.1 Field Screening Instruments

The photoionization detector (PID) and combustible gas indicator (CGI) used for the field screening of soil samples will be calibrated in accordance with the procedures described in SOP-EDR003. Calibration checks will also be made at the frequency specified in SOP-EDR003.

Records of the calibration and calibration checks of the PID and CGI, including any calibration sheets provided by the equipment supplier, will be retained in Pinchin's project file.

6.0 STANDARD OPERATING PROCEDURES

The proposed field investigation for the Phase Two ESA will require the following SOPs to be followed:

- Borehole drilling (SOP-EDR006).
- Soil sampling (SOP-EDR013 and SOP-EDR019).
- Field screening (SOP-EDR003).
- QA/QC sampling (SOP-EDR025).
- Non-dedicated field equipment decontamination (SOP-EDR009).

The above-referenced SOPs are provided in Appendix III. Each SOP includes a section describing the specific requirements for Phase Two ESAs completed in accordance with O. Reg. 153/04.

Any deviations from the SOPs will be summarized in the Phase Two ESA report.

7.0 SAMPLING SYSTEM

The borehole locations for the APEC will be selected following a judgemental sampling system. Boreholes will be placed at locations where the potential for COPCs to be present is considered the highest (i.e., “worst case”).

The sampling system that will be used for the APEC is summarized in Table 2.

8.0 PHYSICAL IMPEDIMENTS

Pinchin does not anticipate any physical impediments that will limit access to the Phase Two Property during completion of the Phase Two ESA.

9.0 TERMS AND LIMITATIONS

This Sampling and Analysis Plan (SAP) has been prepared to summarize the general scope of work and field procedures to be followed for the Phase Two ESA that will be performed for Tres Comas Ltd. (Client) in order to investigate potential environmental impacts on the North Part of 541 Somme Street, 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. The Phase Two ESA will not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived from the Phase Two ESA will be specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples will be 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 the 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.

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

This SAP 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 SAP, 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 SAP, 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 SAP 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 SAP, 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.

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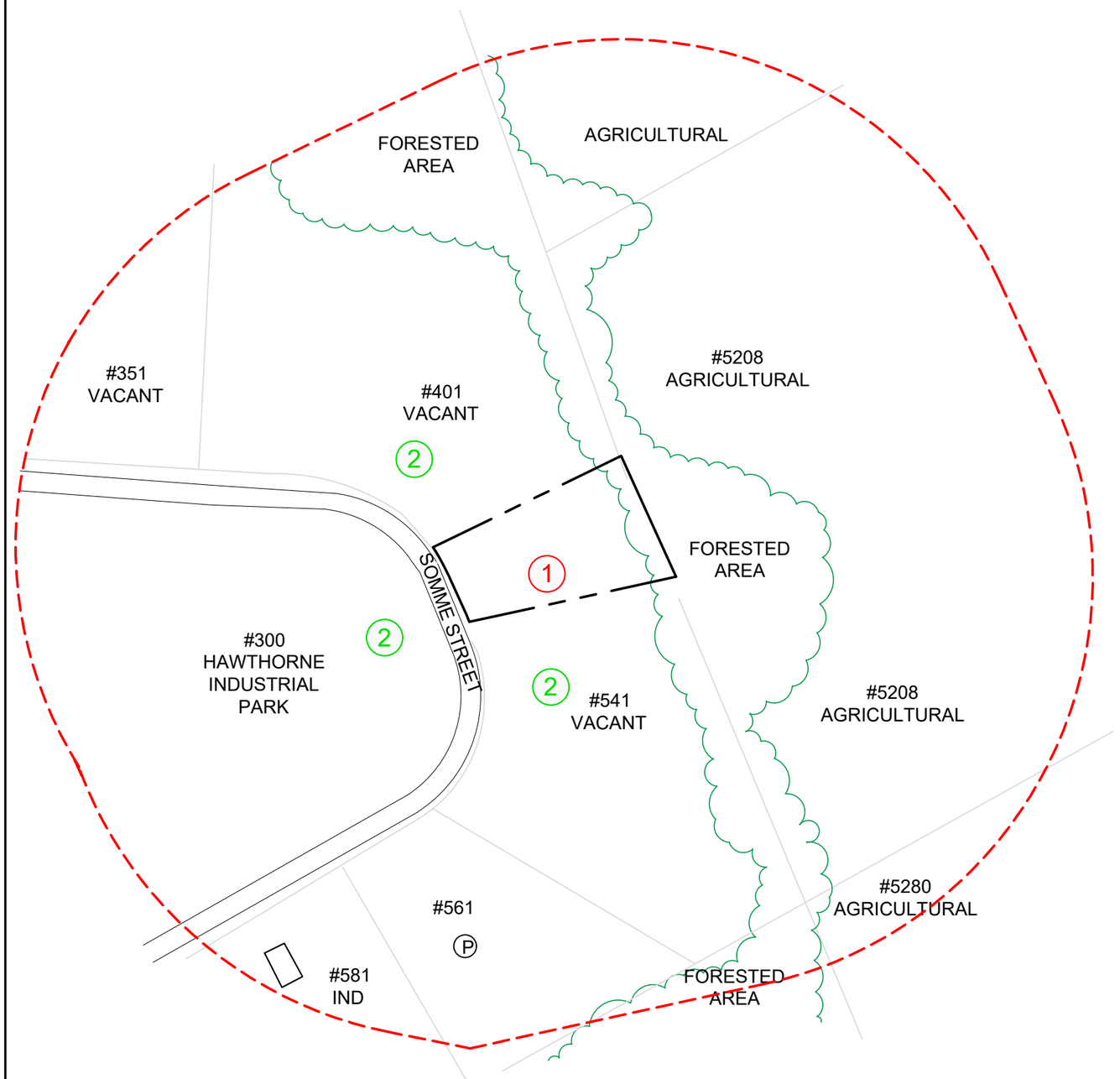
Template: RSC Sampling and Analysis Plan, EDR, July 18, 2024

APPENDIX I
Figures

PINCHIN

PROJECT NAME:	SAMPLING AND ANALYSIS PLAN				
CLIENT NAME:	TRES COMAS LTD.				
PROJECT LOCATION:	NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO				
FIGURE NAME:	KEY MAP				FIGURE NUMBER: 1
PROJECT NUMBER: 342746.001	SCALE: 1:25,000	DRAWN BY: KP	REVIEWED BY: EW	DATE: JULY 2024	



PCA Designation	Location of Potentially Contaminating Activity	Potentially Contaminating Activity	Location of PCA (On-Site or Off-Site)	Distance from Phase One Property (meters)	Location Relative to Inferred Groundwater Flow Direction[1]	Contributing to an APEC at the Site (Yes/No)	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
PCA-1	Throughout the entire Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	NA – On-Site PCA	NA - On-Site PCA	Yes	Soil
PCA-2	Northwest, south and west of the Phase One Property	Item 30 - Importation of Fill Material of Unknown Quality	Off-Site	Neighbouring properties	Upgradient/Transgradient	No	Not Applicable

N

LEGEND

- PHASE TWO PROPERTY BOUNDARY
- PHASE ONE STUDY AREA BOUNDARY
- (P) PARKING
- IND INDUSTRIAL
- APEC AREA OF POTENTIAL ENVIRONMENTAL CONCERN
- PCA POTENTIALLY CONTAMINATING ACTIVITY
- (#) PCA CONTRIBUTES TO AN APEC
- (#) PCA DOES NOT CONTRIBUTE TO AN APEC

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PINCHIN

PROJECT NAME:
SAMPLING AND ANALYSIS PLAN

CLIENT NAME:
TRES COMAS LTD.

PROJECT LOCATION:
NORTH PART OF 541 SOMME STREET, OTTAWA, ONTARIO

FIGURE NAME:
POTENTIALLY CONTAMINATING ACTIVITIES

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: JULY 2024	FIGURE NUMBER: 2

Area of Potential Environmental Concern1	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity2	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern3	Media Potentially Impacted (Ground Water, Soil and/or Sediment)
APEC-1 (Importation of fill material on-Site)	Across the entirety of the Phase One Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	BTEX PHCs (F1-F4) PAHs EC/SAR	Soil

N

LEGEND

- PHASE TWO PROPERTY BOUNDARY
- APEC — AREA OF POTENTIAL ENVIRONMENTAL CONCERN
- APEC-1
- MONITORING WELL (PATERSON, 2019)

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PINCHIN

PROJECT NAME:
SAMPLING AND ANALYSIS PLAN

CLIENT NAME:
TRES COMAS LTD.

PROJECT LOCATION:
NORTH PART OF
541 SOMME STREET,
OTTAWA, ONTARIO

FIGURE NAME:
AREA OF POTENTIAL
ENVIRONMENTAL CONCERN

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY: KP	REVIEWED BY: EW
DATE: JULY 2024	FIGURE NUMBER: 3

N

LEGEND

PHASE TWO PROPERTY BOUNDARY

MONITORING WELL (PATERSON, 2019)

PROPOSED BOREHOLE

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PINCHIN

PROJECT NAME:
SAMPLING AND ANALYSIS PLAN

CLIENT NAME:
TRES COMAS LTD.

PROJECT LOCATION:
NORTH PART OF
541 SOMME STREET,
OTTAWA, ONTARIO

FIGURE NAME:
PROPOSED BOREHOLE
LOCATION PLAN

PROJECT NUMBER:	SCALE:
342746.001	AS SHOWN
DRAWN BY:	REVIEWED BY:
NJ	EW
DATE:	FIGURE NUMBER:
JULY 2024	4

APPENDIX II

Tables

Table 1 - Table of Areas of Potential Environmental Concern

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase One 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 (Importation of fill material on-Site)	Across the entirety of the Phase One Property.	Item 30 - Importation of Fill Material of Unknown Quality	On-Site	BTEX PHCs (F1-F4) PAHs EC/SAR	Soil

Notes:

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

Table 2
SAMPLES SUBMITTED FOR LABORATORY ANALYSIS
Tres Comas Ltd.
North Part of 541 Somme Street , Ottawa, Ontario

Samples				Parameters						
Borehole / Monitoring Well ID	Sample ID	Sample Depth Range (mbgs)		PHCs (F1-F4) & BTEX	PAHs	Metals ICP	pH	Grain Size Analysis	Rationale/Notes
BH1	BH1 - S3	1.52-1.83	SOIL SAMPLES	●	●	●	●		Assess soil quality due to importation of fill material of unknown quality
BH2	BH2 - S1	0.00-0.91		●	●	●	●	●	
BH3	BH3 - S1	0.00-0.91		●	●	●			
BH4	BH4 - S2	0.61-1.37		●	●	●			
	DUP	0.61-1.37		●	●				
BH5	BH5 - S2	0.76-1.37		●	●	●		●	

Notes:

PHCs (F1-F4)	Petroleum Hydrocarbons (Fraction 1 to Fraction 4)
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
PAHs	Polycyclic Aromatic Hydrocarbons
mbgs	Metres Below Ground Surface
MECP	Ontario Ministry of the Environment, Conservation and Parks

Pinchin File: 90000

Table 2 - Phase Two Scope of Work Summary

Sampling Location	APEC	Media Sampled	COPCs						Number of Samples Submitted for Analysis	Soil Sampling Depth Interval (mbgs)	Sampling Frequency	Sampling System	Rationale/Notes
			PHCs	BTEX	PAHs	Metals	EC	SAR					
BH1	1	Soil	●	●	●				1		Continous/Soil cores every 1.5 m	Judgemental	
BH2		Soil	●	●	●				1		Continous/Soil cores every 1.5 m	Judgemental	
BH3		Soil	●	●	●	●			1		Continous/Soil cores every 1.5 m	Judgemental	
BH4		Soil	●	●	●				1		Continous/Soil cores every 1.5 m	Judgemental	

PHCs	Petroleum Hydrocarbons (Fraction 1 to Fra
BTEX	Benzene, Toluene, Ethylbenzene and Xyle
VOCs	Volatile Organic Compounds
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
As, Sb, Se	Arsenic, Antimony, Selenium
Boron (HWS)	Hot Water Soluble Boron
Chromium VI	Hexavalent Chromium
ABNs	Acid/Base/Neutral Compounds
OCPs	Organochlorine Pesticides
EC	Electrical Conductivity
SAR	Sodium Adsorption Ratio

APEC	
COPCs	
m	
mbgs	
NA	
PCA	
SOP	
UST	
mbfs	

Table 2 - Phase Two Scope of Work Summary

Sampling Location	APEC	Media Sampled	COPCs															Number of Samples Submitted for Analysis	Rationale/Notes
			PHCs	BTEX	VOCs	PAHs	PCBs	Metals	Hydrides (As, Sb, Se)	Boron (HWS)	CrVI	Mercury	Sodium	Chloride	Cyanide	EC	SAR		
MW16	11	Soil														●	●		Assess soil and groundwater quality due to the bulk stroage of road salt (PCA-11)
		Groundwater											●	●					
MW17	11	Soil														●	●		Assess soil and groundwater quality due to the bulk stroage of road salt (PCA-11)
		Groundwater											●	●					
MW18	11	Soil														●	●		Assess soil and groundwater quality due to the bulk stroage of road salt (PCA-11)
		Groundwater											●	●					
	12	Soil	●	●	●	●	●	●	●	●	●	●							Assess soil and groundwater quality due to the historial operations, storage of suppliesd/chemicals and waste assocaited with an Industrial
		Groundwater	●	●	●	●	●	●	●	●	●	●							
MW19	11	Soil														●	●		Assess soil and groundwater quality due to the bulk stroage of road salt (PCA-11)
		Groundwater											●	●					
MW20	12	Soil	●	●	●	●	●	●	●	●	●	●							Assess soil and groundwater quality due to the historial operations, storage of suppliesd/chemicals and waste assocaited with an Industrial
		Groundwater	●	●	●	●	●	●	●	●	●	●							
MW21	12	Soil	●	●	●	●	●	●	●	●	●	●							Assess soil and groundwater quality due to the historial operations, storage of suppliesd/chemicals and waste assocaited with an Industrial
		Groundwater	●	●	●	●	●	●	●	●	●	●							
MW22	12	Soil	●	●	●	●	●	●	●	●	●	●							Assess soil and groundwater quality due to the historial operations, storage of suppliesd/chemicals and waste assocaited with an Industrial
		Groundwater	●	●	●	●	●	●	●	●	●	●							
BH23	13	Soil	●	●		●													Assess soil quality due to the exisiting on-Site diesel fuel AST (PCA-13)
	13	Groundwater	●	●		●													
MW24	11	Soil														●	●		Assess soil and groundwater quality due to the bulk stroage of road salt (PCA-11)
		Groundwater											●	●					

APPENDIX III

Pinchin Standard Operating Procedures

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

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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.

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

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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

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 for distribution as appropriate.

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

be lost. See SOP-EDR003 for additional details regarding the collection of soil samples for field screening;

7. Drillers are not to open the split-spoon sampler or PVC liner until instructed to do so. If drilling and sample retrieval is occurring at a rate faster than Pinchin staff are able to sample and log the soil cores, the drillers are to be instructed to slow down or stop until further notice. This will prevent a back log of soil cores from accumulating and minimize the exposure of the soil cores to ambient conditions. This is particularly important when sampling for VOCs;
8. Collect soil samples for the remaining parameters to be analyzed;
9. Soil samples are to be labelled and handled in accordance with SOP-EDR013;
10. Record the parameters sampled for, the type(s) and number of sample containers, and the time and date of sample collection in the field notes;
11. Determine the soil texture in accordance with SOP-EDR019 and record this information in the field notes;
12. Soil samples collected for soil headspace 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;
13. Immediately following collection, place each sample container in a cooler containing ice bags or ice packs; and
14. After the maximum borehole drilling depth is reached, measure the borehole depth with a weighted measuring tape and record the total depth in the field notes if the borehole diameter is large enough to permit measurement.

5.11 Borehole Backfilling.

Following completion of each borehole in which a well is not installed, it must be properly backfilled with bentonite and/or bentonite grout by the drilling contractor. The drilling contractor is to be consulted to confirm the proper borehole abandonment procedures required by the local regulations (e.g., Ontario Regulation 903 (as amended) for Ontario sites).

Drill cuttings are not be used to backfill boreholes.

Record the borehole backfilling method and materials used in the field notes.

5.12 Borehole Location Documentation

For each borehole, complete the following to document its location:

1. Photograph the completed borehole location. Close up photographs of the borehole are to be taken as well as more distant photographs that show the location of site landmarks relative to the borehole so that the photograph can be used to locate the borehole in the future; and
2. Using a measuring tape or measuring wheel, measure the distance between the borehole and a nearby landmark (e.g., corner of the nearest building) and provide a borehole location sketch in the field notes. Measurements are to be made at right angles relative to the orientation of the landmark or to a fixed axis (e.g., relative to true north). If required by the Project Manager, measure the UTM coordinates of the borehole with a hand-held GPS device.

5.13 Field Notes

The field notes must document all drilling equipment used, sample depths and measurements collected during the borehole drilling activities. The field notes must be legible and concise such that the entire borehole drilling and soil sampling event can be reconstructed later for future reference. The field notes are to be recorded on the field forms or in a field book.

5.14 Additional Considerations for O. Reg. 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 Environmental Site Assessments.

5.15 Health and Safety

All work activities under this SOP will be completed in a safe manner following the requirements of Pinchin's Occupational Health and Safety Program, client site requirements and current legislation.

Pinchin Employees conducting work under this SOP must meet the job competency requirements as outlined in Section 2.3 Job Competency of the Pinchin Health and Safety Program.

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

If, while working on a site and following this SOP, there is an incident resulting in loss (personal injury, property damage) or a near miss (potential loss), fill in and submit the appropriate incident form (3.3.1.) or near miss form (3.3.2).

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

Canadian Standards Association, *Phase II Environmental Site Assessment, CSA Standard Z769-00 (R2018)*, dated 2000 and reaffirmed in 2018.

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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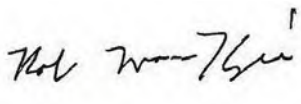
Template: Master SOP Template – February 2014

SOP – 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:	

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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

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 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 all used augers; and
  - Any augers that may come into contact with groundwater 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.

I:\2018 SOP Updates\SOP - EDR009 - REV004 - Field Decontamination.docx

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:	

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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

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.

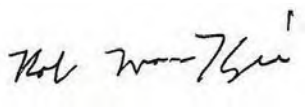
[20] For VOC, BTEX, F1 PHCs, 1,4 dioxane soil samples collected before July 1, 2011, the following sampling and handling requirements are also permitted.

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 (≈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:	

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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

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 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

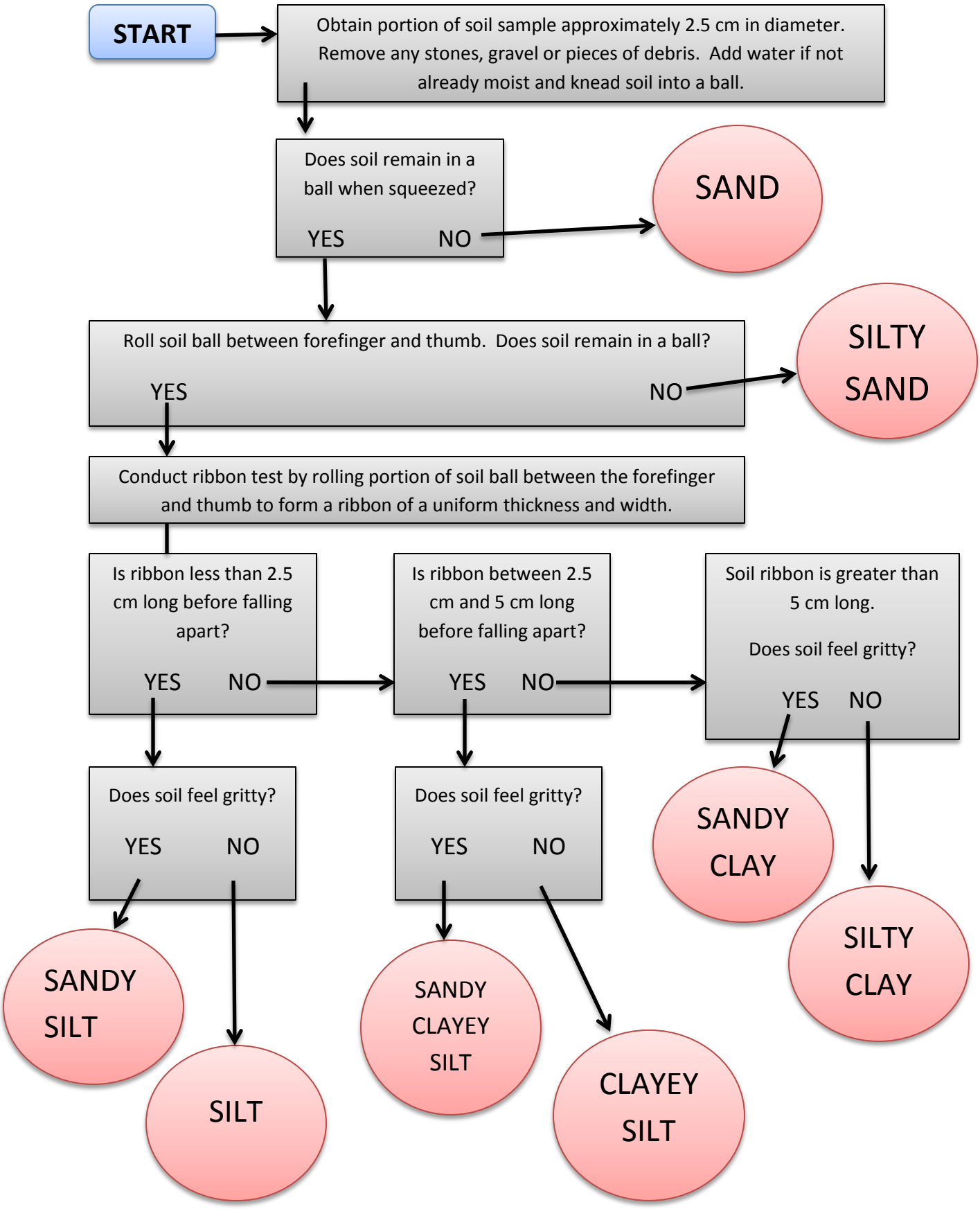
I:\2018 SOP Updates\SOP - EDR019 - REV004 - Soil Sampling Logging.docx

Template: Master SOP Template – February 2014

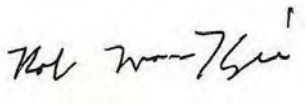
APPENDIX I

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:	

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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.

5.2.8 Field Duplicate Samples – Surface Water/Potable Water/Groundwater

There are no special procedures for collecting surface water/potable water/groundwater field duplicate samples with the following exceptions:

- When collecting a duplicate water sample for metals analysis and field filtering is required, a new filter is to be used to collect the duplicate sample unless the groundwater has a low sediment content; and
- When collecting a duplicate surface water sample, the sample containers for the same parameter(s) should be immersed in the surface water body at the same location and at the same time whenever possible.

5.2.9 Duplicate Sample Labelling

The duplicate sample should have the term “DUP” in the sample identifier to distinguish it as a duplicate sample.

5.2.10 Evaluation of Duplicate Sample Results

Duplicate sample results are evaluated by calculating RPDs using the following equation:

$$RPD = \frac{\text{Absolute Value (Original Concentration – Duplicate Concentration)}}{\text{(Original Concentration + Duplicate Concentration)/2}} \times 100\%$$

RPDs are not calculated unless the parameter concentrations in both the regular investigative sample and duplicate sample are detectable concentrations above the corresponding practical quantitation limit (PQL) for the parameter, which is equal to five times the lowest laboratory reportable detection limit (RDL).

For example, if the RDL for a parameter is 0.1 parts per million (ppm), and the concentration in the regular investigative sample is 0.4 ppm and the concentration in the duplicate sample is 0.6 ppm, the RPD cannot be calculated because the concentration in the regular investigative sample (0.4 ppm) is less than the PQL of 0.5 ppm (5 times the RDL of 0.1 ppm).

Also, if the regular investigative sample concentration is 2 ppm and the duplicate sample concentration is <1 ppm, then the RPD cannot be calculated regardless of the PQL since detectable concentrations were not reported for both samples.

Calculated RPDs for the regular investigative and field duplicate samples are compared to established performance standards to evaluate the suitability and reproducibility of field sampling and laboratory analytical methods. In Ontario, the Ontario Ministry of the Environment and Climate Change (formerly the Ontario Ministry of the Environment) provides duplicate sample performance standards in the document *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. Although these performance standards only strictly apply to laboratory duplicate samples, they are considered suitable for comparison to field duplicate samples. Other provinces provide their own similar guidance.

When calculated RPDs exceed the performance standards, the Project Manager will evaluate whether these results have any effect on the interpretation of the investigative sample results. This is judged on a case-by-case basis, but in many situations RPD values above the performance standards can be attributed to small scale heterogeneity inherent in soil samples or variations in the quantity of sediment in groundwater or surface water samples, and are not indicative of poor field sampling or laboratory procedures. The results of internal laboratory QA/QC sampling may provide additional information as to the precision of the data. Furthermore, if all soil, water and/or sediment samples collected for a site investigation meet the applicable environmental standards/criteria, the apparent lack of precision shown by elevated RPD values should not affect the interpretation of the investigative sample results.

Sometimes a regular investigative sample will meet the applicable environmental standards/criteria and its corresponding duplicate sample will fail the applicable environmental standards/criteria (or vice versa). In Ontario, it is permitted to average the parameter concentrations of two samples provided they are collected at the same time and from the same sample location and depth. The resulting average parameter concentrations are then compared with the applicable standards to determine whether the sample meets or fails the standards. This approach is not acceptable in all jurisdictions. In situations where averaging is not acceptable to the regulatory agency, the “worst case” sample result is to be used in assessing the environmental condition of the project site.

5.3 Fieldwork Records

The field notes must include the following information with respect to QA/QC samples:

- The date and time of sampling for all blank/duplicate samples;
- The sample location for field blanks and the rationale for selecting the field blank locations;
- The type of equipment from which a rinsate was collected for equipment blanks and the parameters to be analyzed; and
- The corresponding regular investigative sample location/sample interval for duplicate samples and the parameters to be analyzed.

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

When completing a Phase Two ESA in accordance with Ontario Regulation 153/04, the QA/QC sampling program must consist of the following as a minimum:

- At least one field duplicate soil, sediment or groundwater sample must be collected for every ten samples submitted for analysis. The frequency is one duplicate sample for one to 10 regular investigative samples, two duplicate samples for 11 to 20 samples, etc. for all parameters analyzed. For example, even if only one groundwater sample is collected for PAHs analysis, a duplicate of this sample must be collected.

When sampling for VOCs, one trip blank sample must be submitted to the laboratory for VOCs analysis for each submission to the laboratory. In other words, if a groundwater sampling program lasts three days and samples are submitted to the laboratory at the end of each day, there must be a total of three trip blanks submitted with the samples (i.e., one per day of sampling). Note that analysis of trip blank samples for other volatile parameters (e.g., PHCs (F1 Fraction)) is not mandatory but can be completed at the discretion of the Qualified Person.

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.

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.

Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Province of British Columbia, *British Columbia Field Sampling Manual*, 2003.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

APPENDIX C
Borehole Logs

Log of Borehole: BH1

Project #: 342746.001 ***Logged By:*** EW

Project: Phase II Environmental Site Assessment

Client: Titan Environmental Containment LTD.

Location: North Part of 541 Somme Street, Ottawa, Ontario

Drill Date: July 17, 2024

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					
		Sandy Silt and Gravel Thick vegetation cover, brown silty sand and gravel.	0.00		30	S1	45/2	
			-0.91					
1		***Sand and Gravel Fill*** Brown clayey coarse sand, some silt and gravel.	0.91		30	S2	30/2	
					100	S3	35/2	BTEX, PHCs (F1-F4), PAHs, Metals ICP, EC/SAR, pH
			-1.98		100	S4	20/1	
2		***Sandy Silt*** Dark brown sandy silt.	1.98					
			-2.13					
		End of Borehole	2.13					

Contractor: Strata Drilling

Drilling Method: Direct Push

Well Casing Size: N/A

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 #: 342746.001 **Logged By:** EW

Project: Phase II Environmental Site Assessment

Client: Titan Environmental Containment LTD.

Location: North Part of 541 Somme Street, Ottawa, Ontario

Drill Date: July 17, 2024

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					
		Sandy Silt and Gravel Coarse gravel. Grey silty fine sand, (fill) wet.	0.00		100	S1	30/1	BTEX, PHCs (F1-F4), PAHs, Metals ICP, EC/SAR, pH, grain size
1								
2								
3			-0.91					
		End of Borehole	0.91					
1								
4								

Contractor: Strata Drilling

Drilling Method: Direct Push

Well Casing Size: N/A

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: BH3

Project #: 342746.001 ***Logged By:*** EW

Project: Phase II Environmental Site Assessment

Client: Titan Environmental Containment LTD.

Location: North Part of 541 Somme Street, Ottawa, Ontario

Drill Date: July 17, 2024

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					
		Sandy Clayey Silt Top soil, dark brown sand and silt, trace clay.	0.00		100	S1	35/1	BTEX, PHCs (F1-F4), PAHs, Metals ICP, EC/SAR
			-0.61					
		Silty Sand Fill, grey silty fine sand, wet.	0.61		100	S2	30/1	
			-1.37					
		End of Borehole	1.37					
1 / 1								
2								
3								
4								
5								
6								

Contractor: Strata Drilling

Drilling Method: Direct Push

Well Casing Size: N/A

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 #: 342746.001 **Logged By:** EW

Project: Phase II Environmental Site Assessment

Client: Titan Environmental Containment LTD.

Location: North Part of 541 Somme Street, Ottawa, Ontario

Drill Date: July 17, 2024

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					
		Sandy Clayey Silt Top soil, dark brown sand and silt, trace clay.	0.00		100	S1	35/1	
			-0.61					
		Silty Sand Fill, grey silty fine sand, wet.	0.61		100	S2	30/1	BTEX, PHCs (F1-F4), PAHs, Metals ICP, EC/SAR, DUP-BTEX, PHCs (F1-F4) PAHs
1 / 1			-1.37					
		End of Borehole	1.37					
2								
3								
4								
5								
6								

Contractor: Strata Drilling

Drilling Method: Direct Push

Well Casing Size: N/A

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: BH5

Project #: 342746.001 ***Logged By:*** EW

Project: Phase II Environmental Site Assessment

Client: Titan Environmental Containment LTD.

Location: North Part of 541 Somme Street, Ottawa, Ontario

Drill Date: July 17, 2024

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					
		Sandy Silt and Gravel Brown silty sand and gravel, trace clay, moist.	0.00		75	S1	30/1	
			-0.76					
		Sandy Clayey Silt Brown clayey silt and sand, compact, moist.	0.76		75	S2	10/1	BTEX, PHCs (F1-F4), PAHs, Metals ICP, EC/SAR, grain size
1 / 1			-1.37					
		End of Borehole	1.37					

Contractor: Strata Drilling

Drilling Method: Direct Push

Well Casing Size: N/A

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

Laboratory Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
1 HINES ROAD SUITE 200
KANATA, ON K2K 3C7
(613) 592-3387

ATTENTION TO: Mandy Witteman

PROJECT: 342746.001

AGAT WORK ORDER: 24Z175305

SOIL ANALYSIS REVIEWED BY: Chuandi Zhang, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jul 24, 2024

PAGES (INCLUDING COVER): 24

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.*
- *This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

				SAMPLE DESCRIPTION:	BH1 - S3	BH2 - S1	BH3 - S1	BH4 - S2	BH5 - S2
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00
Parameter	Unit	G / S	RDL		6014989	6015012	6015013	6015015	6015017
Antimony	µg/g		0.8		<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g		1		3	6	7	6	3
Barium	µg/g		2.0		166	68.6	69.0	94.6	162
Beryllium	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	0.6
Boron	µg/g		5		8	<5	<5	<5	9
Cadmium	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g		5		35	8	7	7	57
Cobalt	µg/g		0.8		9.2	5.3	5.7	5.5	12.3
Copper	µg/g		1.0		23.4	4.3	5.2	4.4	29.0
Lead	µg/g		1		17	10	12	11	17
Molybdenum	µg/g		0.5		1.1	4.2	6.0	5.4	1.0
Nickel	µg/g		1		23	9	10	9	33
Selenium	µg/g		0.8		1.9	0.9	1.0	1.2	1.8
Silver	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g		0.50		0.76	<0.50	<0.50	<0.50	0.90
Vanadium	µg/g		2.0		39.3	6.5	6.1	5.8	51.5
Zinc	µg/g		5		59	<5	<5	<5	73

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

				SAMPLE DESCRIPTION:	BH1 - S3	BH2 - S1	BH3 - S1	BH4 - S2	BH5 - S2
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00
Parameter	**Unit**	**G / S**	**RDL**		**6014989**	**6015012**	**6015013**	**6015015**	**6015017**
Electrical Conductivity (2:1)	mS/cm		0.005		0.178	1.43	2.06	1.45	0.235
pH, 2:1 CaCl2 Extraction	pH Units		NA		6.74	6.71			
Sodium Adsorption Ratio (2:1) (Calc.)	N/A		N/A		0.837	0.339	0.118	0.070	0.171

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6014989-6015017 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil). SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

Particle Size by Sieve (Wet)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

				SAMPLE DESCRIPTION:	BH2 - S1	BH5 - S2
				SAMPLE TYPE:	Soil	Soil
				DATE SAMPLED:	2024-07-17 12:00	2024-07-17 12:00
Parameter	**Unit**	**G / S**	**RDL**		**6015012**	**6015017**
Sieve Analysis - 75 µm (retained)	%		NA		46.62	22.90
Sieve Analysis - 75 µm (passing)	%		NA		53.38	77.10
Soil Texture (Toronto)					Fine	Fine

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6015012-6015017 Value reported is the amount of sample passing through or retained on sieve after wash with water and represents proportion by weight particles smaller or larger than indicated sieve size.
Analysis performed at AGAT Toronto (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

		SAMPLE DESCRIPTION:		BH1 - S3	BH2 - S1	BH3 - S1	BH4 - S2	BH5 - S2	DUP
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00
Parameter	**Unit**	**G / S**	**RDL**	**6014989**	**6015012**	**6015013**	**6015015**	**6015017**	**6015041**
Naphthalene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g		0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g		0.05	0.18	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g		0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g		0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g		0.05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	35.4	11.9	13.8	15.9	20.1	19.6
Surrogate	**Unit**	**Acceptable Limits**							
Naphthalene-d8	%	50-140		75	70	70	75	90	70
Acridine-d9	%	50-140		75	70	75	90	85	70
Terphenyl-d14	%	50-140		80	100	95	95	85	75

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6014989-6015041 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopowich

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

				SAMPLE DESCRIPTION:	BH1 - S3	BH2 - S1	BH3 - S1	BH4 - S2	BH5 - S2	DUP
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00	2024-07-17 12:00
Parameter	**Unit**	**G / S**	**RDL**		**6014989**	**6015012**	**6015013**	**6015015**	**6015017**	**6015041**
Benzene	µg/g		0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5		<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5		<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g		10		<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10		<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g		50		<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g		50		<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g		50		<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50		NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1		35.4	11.9	13.8	15.9	20.1	19.6
Surrogate	**Unit**	**Acceptable Limits**								
Toluene-d8	% Recovery	60-140			104	74	67	68	68	69
Terphenyl	%	60-140			91	99	95	99	93	96

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2024-07-18

DATE REPORTED: 2024-07-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6014989-6015041 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

Soil Analysis

RPT Date: Jul 24, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals (Including Hydrides) (Soil)															
Antimony	6014700		<0.8	<0.8	NA	< 0.8	106%	70%	130%	115%	80%	120%	95%	70%	130%
Arsenic	6014700		2	2	NA	< 1	118%	70%	130%	112%	80%	120%	110%	70%	130%
Barium	6014700		49.0	50.8	3.6%	< 2.0	116%	70%	130%	116%	80%	120%	118%	70%	130%
Beryllium	6014700		<0.5	<0.5	NA	< 0.5	108%	70%	130%	112%	80%	120%	108%	70%	130%
Boron	6014700		<5	<5	NA	< 5	90%	70%	130%	102%	80%	120%	90%	70%	130%
Cadmium	6014700		<0.5	<0.5	NA	< 0.5	121%	70%	130%	104%	80%	120%	107%	70%	130%
Chromium	6014700		28	30	6.9%	< 5	108%	70%	130%	106%	80%	120%	NA	70%	130%
Cobalt	6014700		6.4	6.5	1.6%	< 0.8	102%	70%	130%	102%	80%	120%	96%	70%	130%
Copper	6014700		23.3	25.1	7.4%	< 1.0	100%	70%	130%	106%	80%	120%	104%	70%	130%
Lead	6014700		6	6	0.0%	< 1	106%	70%	130%	108%	80%	120%	103%	70%	130%
Molybdenum	6014700		<0.5	<0.5	NA	< 0.5	106%	70%	130%	106%	80%	120%	103%	70%	130%
Nickel	6014700		15	16	6.5%	< 1	109%	70%	130%	106%	80%	120%	101%	70%	130%
Selenium	6014700		1.0	1.1	NA	< 0.8	106%	70%	130%	105%	80%	120%	103%	70%	130%
Silver	6014700		<0.5	<0.5	NA	< 0.5	112%	70%	130%	104%	80%	120%	102%	70%	130%
Thallium	6014700		<0.5	<0.5	NA	< 0.5	102%	70%	130%	100%	80%	120%	101%	70%	130%
Uranium	6014700		1.02	1.03	NA	< 0.50	97%	70%	130%	99%	80%	120%	103%	70%	130%
Vanadium	6014700		33.7	36.0	6.6%	< 2.0	116%	70%	130%	105%	80%	120%	103%	70%	130%
Zinc	6014700		30	30	0.0%	< 5	112%	70%	130%	106%	80%	120%	98%	70%	130%

Comments: NA Signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

O. Reg. 153(511) - ORPs (Soil)									
Electrical Conductivity (2:1)	6013722	0.624	0.637	2.1%	< 0.005	101%	80%	120%	
pH, 2:1 CaCl2 Extraction	6013744	5.39	5.59	3.6%		103%	80%	120%	
Sodium Adsorption Ratio (2:1) (Calc.)	6013722	9.39	9.95	5.8%	NA	NA			

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Particle Size by Sieve (Wet)											
Sieve Analysis - 75 µm (retained)	6015012	6015012	46.62	45.82	1.7%		100%	75%	125%	NA	NA
Sieve Analysis - 75 µm (passing)	6015012	6015012	53.38	54.18	1.5%		NA			NA	NA

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 24, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)															
Benzene	6015041	6015041	<0.02	<0.02	NA	< 0.02	91%	60%	140%	96%	60%	140%	85%	60%	140%
Toluene	6015041	6015041	<0.05	<0.05	NA	< 0.05	105%	60%	140%	112%	60%	140%	105%	60%	140%
Ethylbenzene	6015041	6015041	<0.05	<0.05	NA	< 0.05	101%	60%	140%	108%	60%	140%	91%	60%	140%
m & p-Xylene	6015041	6015041	<0.05	<0.05	NA	< 0.05	114%	60%	140%	101%	60%	140%	103%	60%	140%
o-Xylene	6015041	6015041	<0.05	<0.05	NA	< 0.05	115%	60%	140%	97%	60%	140%	107%	60%	140%
F1 (C6 to C10)	6015041	6015041	<5	<5	NA	< 5	103%	60%	140%	110%	60%	140%	95%	60%	140%
F2 (C10 to C16)	6013649		< 10	< 10	NA	< 10	103%	60%	140%	99%	60%	140%	104%	60%	140%
F3 (C16 to C34)	6013649		< 50	< 50	NA	< 50	106%	60%	140%	126%	60%	140%	127%	60%	140%
F4 (C34 to C50)	6013649		< 50	< 50	NA	< 50	66%	60%	140%	119%	60%	140%	101%	60%	140%
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6014989	6014989	<0.05	<0.05	NA	< 0.05	82%	50%	140%	73%	50%	140%	78%	50%	140%
Acenaphthylene	6014989	6014989	<0.05	<0.05	NA	< 0.05	85%	50%	140%	85%	50%	140%	75%	50%	140%
Acenaphthene	6014989	6014989	<0.05	<0.05	NA	< 0.05	84%	50%	140%	88%	50%	140%	80%	50%	140%
Fluorene	6014989	6014989	<0.05	<0.05	NA	< 0.05	84%	50%	140%	78%	50%	140%	75%	50%	140%
Phenanthrene	6014989	6014989	0.06	0.09	NA	< 0.05	82%	50%	140%	80%	50%	140%	88%	50%	140%
Anthracene	6014989	6014989	<0.05	<0.05	NA	< 0.05	74%	50%	140%	80%	50%	140%	75%	50%	140%
Fluoranthene	6014989	6014989	0.18	0.17	NA	< 0.05	82%	50%	140%	75%	50%	140%	118%	50%	140%
Pyrene	6014989	6014989	0.16	0.14	NA	< 0.05	81%	50%	140%	75%	50%	140%	118%	50%	140%
Benzo(a)anthracene	6014989	6014989	0.06	<0.05	NA	< 0.05	74%	50%	140%	83%	50%	140%	73%	50%	140%
Chrysene	6014989	6014989	0.13	0.14	NA	< 0.05	108%	50%	140%	75%	50%	140%	63%	50%	140%
Benzo(b)fluoranthene	6014989	6014989	0.07	0.08	NA	< 0.05	72%	50%	140%	75%	50%	140%	65%	50%	140%
Benzo(k)fluoranthene	6014989	6014989	0.07	0.09	NA	< 0.05	112%	50%	140%	103%	50%	140%	85%	50%	140%
Benzo(a)pyrene	6014989	6014989	0.07	0.08	NA	< 0.05	73%	50%	140%	85%	50%	140%	60%	50%	140%
Indeno(1,2,3-cd)pyrene	6014989	6014989	<0.05	<0.05	NA	< 0.05	92%	50%	140%	85%	50%	140%	88%	50%	140%
Dibenz(a,h)anthracene	6014989	6014989	<0.05	<0.05	NA	< 0.05	78%	50%	140%	93%	50%	140%	85%	50%	140%
Benzo(g,h,i)perylene	6014989	6014989	<0.05	<0.05	NA	< 0.05	99%	50%	140%	105%	50%	140%	100%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6014989	BH1 - S3	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	23-JUL-2024	23-JUL-2024	SE
Arsenic	23-JUL-2024	23-JUL-2024	SE
Barium	23-JUL-2024	23-JUL-2024	SE
Beryllium	23-JUL-2024	23-JUL-2024	SE
Boron	23-JUL-2024	23-JUL-2024	SE
Cadmium	23-JUL-2024	23-JUL-2024	SE
Chromium	23-JUL-2024	23-JUL-2024	SE
Cobalt	23-JUL-2024	23-JUL-2024	SE
Copper	23-JUL-2024	23-JUL-2024	SE
Lead	23-JUL-2024	23-JUL-2024	SE
Molybdenum	23-JUL-2024	23-JUL-2024	SE
Nickel	23-JUL-2024	23-JUL-2024	SE
Selenium	23-JUL-2024	23-JUL-2024	SE
Silver	23-JUL-2024	23-JUL-2024	SE
Thallium	23-JUL-2024	23-JUL-2024	SE
Uranium	23-JUL-2024	23-JUL-2024	SE
Vanadium	23-JUL-2024	23-JUL-2024	SE
Zinc	23-JUL-2024	23-JUL-2024	SE

O. Reg. 153(511) - ORPs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Electrical Conductivity (2:1)	22-JUL-2024	22-JUL-2024	SB
pH, 2:1 CaCl2 Extraction	24-JUL-2024	24-JUL-2024	SB
Sodium Adsorption Ratio (2:1) (Calc.)	23-JUL-2024	23-JUL-2024	XH

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP

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CLIENT NAME: PINCHIN LTD.

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6014989	BH1 - S3	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015012	BH2 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	23-JUL-2024	23-JUL-2024	SE
Arsenic	23-JUL-2024	23-JUL-2024	SE
Barium	23-JUL-2024	23-JUL-2024	SE
Beryllium	23-JUL-2024	23-JUL-2024	SE
Boron	23-JUL-2024	23-JUL-2024	SE

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015012	BH2 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Cadmium	23-JUL-2024	23-JUL-2024	SE
Chromium	23-JUL-2024	23-JUL-2024	SE
Cobalt	23-JUL-2024	23-JUL-2024	SE
Copper	23-JUL-2024	23-JUL-2024	SE
Lead	23-JUL-2024	23-JUL-2024	SE
Molybdenum	23-JUL-2024	23-JUL-2024	SE
Nickel	23-JUL-2024	23-JUL-2024	SE
Selenium	23-JUL-2024	23-JUL-2024	SE
Silver	23-JUL-2024	23-JUL-2024	SE
Thallium	23-JUL-2024	23-JUL-2024	SE
Uranium	23-JUL-2024	23-JUL-2024	SE
Vanadium	23-JUL-2024	23-JUL-2024	SE
Zinc	23-JUL-2024	23-JUL-2024	SE

O. Reg. 153(511) - ORPs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Electrical Conductivity (2:1)	22-JUL-2024	22-JUL-2024	SB
pH, 2:1 CaCl2 Extraction	24-JUL-2024	24-JUL-2024	SB
Sodium Adsorption Ratio (2:1) (Calc.)	23-JUL-2024	23-JUL-2024	XH

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015012	BH2 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

Particle Size by Sieve (Wet)

Parameter	Date Prepared	Date Analyzed	Initials
Sieve Analysis - 75 µm (retained)	19-JUL-2024	23-JUL-2024	PC
Sieve Analysis - 75 µm (passing)	19-JUL-2024	23-JUL-2024	PC

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015013	BH3 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	23-JUL-2024	23-JUL-2024	SE
Arsenic	23-JUL-2024	23-JUL-2024	SE
Barium	23-JUL-2024	23-JUL-2024	SE
Beryllium	23-JUL-2024	23-JUL-2024	SE
Boron	23-JUL-2024	23-JUL-2024	SE

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015013	BH3 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Cadmium	23-JUL-2024	23-JUL-2024	SE
Chromium	23-JUL-2024	23-JUL-2024	SE
Cobalt	23-JUL-2024	23-JUL-2024	SE
Copper	23-JUL-2024	23-JUL-2024	SE
Lead	23-JUL-2024	23-JUL-2024	SE
Molybdenum	23-JUL-2024	23-JUL-2024	SE
Nickel	23-JUL-2024	23-JUL-2024	SE
Selenium	23-JUL-2024	23-JUL-2024	SE
Silver	23-JUL-2024	23-JUL-2024	SE
Thallium	23-JUL-2024	23-JUL-2024	SE
Uranium	23-JUL-2024	23-JUL-2024	SE
Vanadium	23-JUL-2024	23-JUL-2024	SE
Zinc	23-JUL-2024	23-JUL-2024	SE

O. Reg. 153(511) - ORPs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Electrical Conductivity (2:1)	22-JUL-2024	22-JUL-2024	SB
Sodium Adsorption Ratio (2:1) (Calc.)	23-JUL-2024	23-JUL-2024	XH

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP

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Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015013	BH3 - S1	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015015	BH4 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	12-JUL-2024	23-JUL-2024	SE
Arsenic	12-JUL-2024	23-JUL-2024	SE
Barium	12-JUL-2024	23-JUL-2024	SE
Beryllium	12-JUL-2024	23-JUL-2024	SE
Boron	12-JUL-2024	23-JUL-2024	SE
Cadmium	12-JUL-2024	23-JUL-2024	SE
Chromium	12-JUL-2024	23-JUL-2024	SE
Cobalt	12-JUL-2024	23-JUL-2024	SE
Copper	12-JUL-2024	23-JUL-2024	SE
Lead	12-JUL-2024	23-JUL-2024	SE
Molybdenum	12-JUL-2024	23-JUL-2024	SE

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015015	BH4 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Nickel	12-JUL-2024	23-JUL-2024	SE
Selenium	12-JUL-2024	23-JUL-2024	SE
Silver	12-JUL-2024	23-JUL-2024	SE
Thallium	12-JUL-2024	23-JUL-2024	SE
Uranium	12-JUL-2024	23-JUL-2024	SE
Vanadium	12-JUL-2024	23-JUL-2024	SE
Zinc	12-JUL-2024	23-JUL-2024	SE

O. Reg. 153(511) - ORPs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Electrical Conductivity (2:1)	22-JUL-2024	22-JUL-2024	SB
Sodium Adsorption Ratio (2:1) (Calc.)	23-JUL-2024	23-JUL-2024	XH

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015015	BH4 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015017	BH5 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	22-JUL-2024	23-JUL-2024	SE
Arsenic	22-JUL-2024	23-JUL-2024	SE
Barium	22-JUL-2024	23-JUL-2024	SE
Beryllium	22-JUL-2024	23-JUL-2024	SE
Boron	22-JUL-2024	23-JUL-2024	SE
Cadmium	22-JUL-2024	23-JUL-2024	SE
Chromium	22-JUL-2024	23-JUL-2024	SE
Cobalt	22-JUL-2024	23-JUL-2024	SE
Copper	22-JUL-2024	23-JUL-2024	SE
Lead	22-JUL-2024	23-JUL-2024	SE
Molybdenum	22-JUL-2024	23-JUL-2024	SE
Nickel	22-JUL-2024	23-JUL-2024	SE
Selenium	22-JUL-2024	23-JUL-2024	SE
Silver	22-JUL-2024	23-JUL-2024	SE
Thallium	22-JUL-2024	23-JUL-2024	SE
Uranium	22-JUL-2024	23-JUL-2024	SE
Vanadium	22-JUL-2024	23-JUL-2024	SE

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015017	BH5 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Zinc	22-JUL-2024	23-JUL-2024	SE

O. Reg. 153(511) - ORPs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Electrical Conductivity (2:1)	22-JUL-2024	22-JUL-2024	SB
Sodium Adsorption Ratio (2:1) (Calc.)	23-JUL-2024	23-JUL-2024	XH

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015017	BH5 - S2	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

Particle Size by Sieve (Wet)

Parameter	Date Prepared	Date Analyzed	Initials
Sieve Analysis - 75 µm (retained)	19-JUL-2024	23-JUL-2024	PC
Sieve Analysis - 75 µm (passing)	19-JUL-2024	23-JUL-2024	PC

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015041	DUP	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	24-JUL-2024	24-JUL-2024	NP
Acenaphthylene	24-JUL-2024	24-JUL-2024	NP
Acenaphthene	24-JUL-2024	24-JUL-2024	NP
Fluorene	24-JUL-2024	24-JUL-2024	NP
Phenanthrene	24-JUL-2024	24-JUL-2024	NP
Anthracene	24-JUL-2024	24-JUL-2024	NP
Fluoranthene	24-JUL-2024	24-JUL-2024	NP
Pyrene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)anthracene	24-JUL-2024	24-JUL-2024	NP
Chrysene	24-JUL-2024	24-JUL-2024	NP
Benzo(b)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(k)fluoranthene	24-JUL-2024	24-JUL-2024	NP
Benzo(a)pyrene	24-JUL-2024	24-JUL-2024	NP
Indeno(1,2,3-cd)pyrene	24-JUL-2024	24-JUL-2024	NP
Dibenz(a,h)anthracene	24-JUL-2024	24-JUL-2024	NP
Benzo(g,h,i)perylene	24-JUL-2024	24-JUL-2024	NP
2-and 1-methyl Naphthalene	24-JUL-2024	24-JUL-2024	SYS
Naphthalene-d8	24-JUL-2024	24-JUL-2024	NP

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AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Mandy Witteman

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
6015041	DUP	Soil	17-JUL-2024	18-JUL-2024

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Acridine-d9	24-JUL-2024	24-JUL-2024	NP
Terphenyl-d14	24-JUL-2024	24-JUL-2024	NP
Moisture Content	22-JUL-2024	22-JUL-2024	SD

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	23-JUL-2024	23-JUL-2024	CB
Toluene	23-JUL-2024	23-JUL-2024	CB
Ethylbenzene	23-JUL-2024	23-JUL-2024	CB
m & p-Xylene	23-JUL-2024	23-JUL-2024	CB
o-Xylene	23-JUL-2024	23-JUL-2024	CB
Xylenes (Total)	23-JUL-2024	23-JUL-2024	SYS
F1 (C6 to C10)	23-JUL-2024	23-JUL-2024	CB
F1 (C6 to C10) minus BTEX	23-JUL-2024	23-JUL-2024	SYS
Toluene-d8	23-JUL-2024	23-JUL-2024	CB
F2 (C10 to C16)	23-JUL-2024	23-JUL-2024	SS
F2 (C10 to C16) minus Naphthalene	24-JUL-2024	24-JUL-2024	SYS
F3 (C16 to C34)	23-JUL-2024	23-JUL-2024	SS
F3 (C16 to C34) minus PAHs	24-JUL-2024	24-JUL-2024	SYS
F4 (C34 to C50)	23-JUL-2024	23-JUL-2024	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content	22-JUL-2024	22-JUL-2024	SD
Terphenyl	23-JUL-2024	23-JUL-2024	SS

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
Sieve Analysis - 75 µm (retained)	INOR-93-6065	Modified from ASTM D1140-17	SIEVE
Sieve Analysis - 75 µm (passing)	INOR-93-6065	Modified from ASTM D1140-17	SIEVE

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Benzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Toluene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24Z175305

PROJECT: 342746.001

ATTENTION TO: Mandy Witteman

SAMPLING SITE:Somme St.

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: Pinchin
Contact: MWitteman@pinchin.com
Address: 200 - 1 Hines Rd, Ottawa
Phone: (613) 617-5936 Fax:
Reports to be sent to:
1. Email: mwitteman@pinchin.com
2. Email: ewilson@pinchin.com

Project Information:

Project: 342746.001
Site Location: Somme St.
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐
Company: Accounts payable
Contact:
Address:
Email: ap@pinchin.com

Regulatory Requirements:

(Please check all applicable boxes)

☒ Regulation 153/04 — Table 1 (Indicate One) — ☐ Ind/Com ☐ Res/Park ☐ Agriculture — Soil Texture (Check One) ☐ Coarse ☐ Fine
☐ Regulation 406 — Table (Indicate One)
☐ Regulation 558
☐ CCME
☐ Sewer Use ☐ Sanitary ☐ Storm — Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other — Indicate One

Is this submission for a Record of Site Condition? ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 24717530S
Cooler Quantity: one - ice packs
Arrival Temperatures: 18.5 | 18.6 | 18.5
5.1 | 4.7 | 4.2
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: F/I

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply) ☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	EC/SAR	pH	grain-size	PHCs (F2-F4)		Potentially Hazardous or High Concentration (Y/N)
1. BH1 - S3	July 17	PM AM PM	3	S	* Use CoC info (ICP Metals)			X	X		X							X	X				
2. BH2 - S1			3		ICP Metals			X	X		X							X	X	X			
3. BH3 - S1								X	X		X							X					
4. BH4 - S2								X	X		X							X					
5. BH5 - S2								X	X		X							X		X			
6. DUP			2		* Pls use date as per CoC for all samples.				X		X										X		
7.																							
8.																							
9.																							
10.																							
11.																							

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Maddy Maddy Witteman	July 17/24		C. Gutheth	07/18/24	12h30
CC to Dino	07/18/24	15h00	Anna Li-Ts	19/7/24	8:30
	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page _____ of _____
N°: T - 148137

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT