Phase Two Environmental Site Assessment

900 Mulock Drive

Newmarket, Ontario

Prepared For:

Denison Child Care Services – York Region District School Board

135 Bristol Road

Newmarket, Ontario

L3Y 8J7

DS Project No: 19-190-100

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Executive Summary

DS Consultants Ltd. (DS) was retained by Denison Child Care Services – York Region District School Board (the "Client") to conduct a Phase Two Environmental Site Assessment (ESA) of the Property located at 900 Mulock Drive, Newmarket, Ontario, herein referred to as the "Phase Two Property" or "Site". It is DS's understanding that this Phase Two ESA has been requested for due diligence purposes in association with the proposed redevelopment of the Property. It is further understood that the proposed development will consist of a single-story slab on grade daycare building and associated play and parking areas.

It is understood that the intended future property use (institutional) is not considered to be a more sensitive property use as defined under O.Reg. 153/04 (as amended); therefore, the filing of a Record of Site Condition (RSC) with the Ontario Ministry of Environment, Conservation and Parks (MECP) is not mandated under O.Reg. 153/04. However, it is DS's understanding that the Town of Newmarket requires the filing of a RSC as part of the development approvals process.

The Phase Two ESA was completed to satisfy the intent of the requirements, methodology and practices for a Phase Two ESA as described in Ontario Regulation 153/04 (as amended). The objective of this Phase Two ESA is to confirm whether contaminants are present, and at what concentration are they present on the Phase Two Property, as related to the Areas of Potential Environmental Concern (APEC) identified in the Phase One ESA.

The Phase Two Property is a 0.86-hectare (2.12 acres) parcel of land situated within a mixed residential, institutional, and commercial neighbourhood in the Town of Newmarket, Ontario. The Phase Two Property is located approximately 370 m northeast of the intersection of Mulock Drive and Fernbank Road and it has a two-storey stone residential building constructed in the late 1800s, a one-storey stucco building, a one-storey shed, a one-storey barn, and a one-storey corrugated metal garage. All buildings on the Phase Two Property were vacant at the time of this investigation.

The Phase One ESA completed in October 2019 indicated that the Phase Two Property was first developed for residential and agricultural purposes around mid-1800s. One (1) Potentially Contaminating Activity (PCA) was identified in the Phase One ESA, which is considered to be contributing to one (1) APEC on the Phase Two Property. A summary of the APECs, associated with PCAs, and contaminants of potential concern (copc) identified is presented in the table below:

Table 1-1: Summary of APECs

Area of Potential Environmental Concern	Location of APECs on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-1	Eastern Portion of Property	PCA-7: #40 - Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications - An orchard was visible on the eastern portion of the Phase One Property is the 1927 aerial photograph.	On-Site	Metals, Hydrides, Cyanide, OCPs	Soil

Based on the findings of the Phase One ESA it was concluded that a Phase Two ESA is warranted in order to assess the soil conditions on the Phase Two Property.

The Phase Two ESA involved the advancement of four (4) shallow hand auger boreholes (up to 0.6 mbgs), which were completed on November 22, 2019. Additionally, Geotechnical and Hydrogeological investigations were conducted on October 17, 2019, involving the completion of three (3) boreholes with one (1) monitoring well installation. The boreholes were advanced to a maximum depth of 8.1 metres below ground surface (mbgs) under the supervision of DS personnel. The hand auger borehole locations were determined based on the findings of the Phase One ESA. Soil samples were collected and submitted for analysis of all PCOCs, including: Metals, Hydrides, Cyanide, and OCPs.

The soil and groundwater analytical results were compared to the "Table 2 SCS: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Residential/Parkland/Institutional Use" 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 2 Standards*)* for medium-fine texture soils.

Based on the findings of the Phase Two ESA, DS presents the following findings:

- A topsoil layer has a thickness of 100 to 125 mm. Below the topsoil, reworked native consisting of silt, sandy silt and clayey silt to silt, extending to depths of 0.5 to 1.5 m. Fill material contained topsoil/organics. The native overburden consisted of upper native cohesive soils consisting of silt to clayey silt (till) were encountered in all

boreholes, extending to depth varying from 1.5 to 4.6 m. Below the silt to clayey silt or till deposits, sandy silt till was encountered, extending to depths of 2.6 to 6.1m. Below the clayey silt till or sandy silt till deposits, cohesionless deposits of silty sand and sand & gravel were encountered in boreholes, at depths varying from 4.6 to 6.1 m below the existing grade. A lower clayey silt till deposit was encountered in borehole BH19-2 below the cohesionless deposits

- The depth to groundwater was measured in one (1) monitoring well installed during the course of this investigation. The monitoring well was screened to intercept the groundwater water table. The groundwater levels were found to range between 2.77 to 2.46 mbgs, with corresponding elevations of 262.5 to 262.54 metres above sea level (masl). Based on the topographic mapping of the area, the groundwater flow direction is inferred to be north and southwesterly towards a tributary of Bogart Creek and the west branch of the Holland River respectively. It is possible that the groundwater levels may vary seasonally.
- Soil samples were collected from four (4) hand auger boreholes advanced on the Phase Two Property and submitted for analysis of metals, hydride forming metals, cyanide and OCPs. The results of the chemical analyses conducted indicated that all samples analyzed met the applicable Site Condition Standards.

Based on a review of the findings of this Phase Two ESA, DS presents the following conclusions and recommendations:

- The results of the chemical analyses conducted on soil samples indicate that the applicable Site Condition Standards have been met;
- Based on the findings of this Phase Two ESA, a Record of Site Condition may be filed for the Phase Two Property;
- All monitoring wells should be decommissioned in accordance with O.Reg. 903 when no longer required.

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APPENDICES

1.0 Introduction

DS Consultants Ltd. (DS) was retained by Denison Child Care Services – York Region District School Board to complete a Phase Two Environmental Site Assessment (ESA) of the Property located at 900 Mulock Drive, Newmarket, Ontario, herein referred to as the "Phase Two Property" or "Site". It is DS's understanding that this Phase Two ESA has been requested for due diligence purposes in association with the proposed redevelopment of the Property. It is further understood that the proposed development will consist of a single-story slab on grade daycare building and associated play and parking areas.

It is understood that the intended future property use (institutional) is not considered to be a more sensitive property use as defined under O.Reg. 153/04 (as amended); therefore, the filing of a Record of Site Condition (RSC) with the Ontario Ministry of Environment, Conservation and Parks (MECP) is not mandated under O.Reg. 153/04. However, it is DS's understanding that the Town of Newmarket may require the filing of a RSC as part of the development approval process.

The Phase Two ESA was completed to satisfy the intent of the requirements, methodology and practices for a Phase One ESA as described in Ontario Regulation 153/04 (as amended). The objective of this Phase Two ESA is to confirm whether contaminants are present, and at what concentration are they present on the Phase Two Property, as related to the Areas of Potential Environmental Concern (APEC) identified in the Phase One ESA.

1.1 Site Description

The Phase Two Property is a 0.86-hectare (2.12 acres) parcel of land situated within a residential, institutional, and commercial neighbourhood in the Town of Newmarket, Ontario. The Phase Two Property is located approximately 370 m northeast of the intersection of Mulock Drive and Fernbank Road and it has a two-storey stone residential building constructed in the late 1800s, a one-storey shed, a one-storey barn, and a one-storey corrugated metal garage. All buildings on the Phase Two Property were vacant at the time of this investigation. A Site Location Plan is provided in Figure 1.

For the purposes of this report, Mulock Drive is assumed to be aligned in an east-west orientation, and Fernbank Road in a north-south orientation. A Plan of Survey for the Phase Two Property prepared by Lloyd & Purcell, an Ontario Land Surveyor, has been provided under Appendix A.

The Phase Two Property was occupied by five buildings at the time of the investigation. Site Building A is a two-storey stone residential building constructed in the late 1800s. Site Building B is a one-storey stucco building constructed between 2013 and 2015. Site Building C is a one-storey wooden shed, Site Building D is a one-storey wooden barn and Site Building E is a one-storey corrugated metal garage. A Site Plan depicting the orientation of the buildings on-site is provided in Figure 2.

Additional details regarding the Phase Two Property are provided in the table below.

Table 1-1: Phase Two Property Information

Criteria	Information	Source
Legal Description	Part of Block 38, Registered Plan 65M-4022, Town of Newmarket, Regional Municipality of York	Legal Survey
Property Identification Number (PIN)	03623-2087	Legal Survey
Site Area	0.86-hectare (2.12 acres)	Client

1.2 Property Ownership

The ownership details for the Phase Two Property are provided in the table below.

Table 1-2: Phase Two Property Ownership

Property Owner	Address	Contact
The Town of Newmarket	395 Mulock Drive P.O. Box 328 STN Main, Newmarket, Ontario	Client

1.3 Current and Proposed Future Use

The Phase Two Property is currently occupied by five vacant structures, for which the biggest is a vacant residential building. Thus, the Phase Two Property is considered to be of residential Property Use under O.Reg. 153/04 (as amended). It is DS's understanding that the Client intends to redevelop the Site for institutional use.

1.4 Applicable Site Condition Standards

The applicable Site Condition Standards (SCS) for the Phase Two Property are considered by the Qualified Person (QP) to be the Table 2 SCS: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Residential/Parkland/Institutional Use with medium-fine textured soils as contained in the April 15, 2011 Ontario Ministry of Environment, Conservation and Parks (MECP) document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", herein referred to as the "Table 2 SCS".

The selection of the Table 2 SCS is considered appropriate based on the following rationale:

- There are potable wells located within the Phase One Study Area;
- The Site is not considered to be environmentally sensitive, as defined under O.Reg. 153/04 (as amended);
- The proposed future use of the Phase Two Property will be institutional;
- The Site is not located within 30 m of a water body; and
- Bedrock was not encountered within 2 metres of the ground surface

2.0 Background Information

2.1 Physical Setting

2.1.1 Water Bodies and Areas of Natural Significance

The Bogart Creek is the closest body of water to the Phase Two Property, located approximately 550 m to the northeast of the Phase Two Property.

The Natural Heritage Areas database published by the Ministry of Natural Resources (MNR) was reviewed in order to identify the presence/absence of areas of natural significance including provincial parks, conservation reserves, areas of natural and scientific interest, wetlands, environmentally significant areas, habitats of threatened or endangered species, and wilderness areas. The Town of Newmarket and York Region Official Plans were also reviewed as part of this assessment.

No areas of natural or scientific interest were identified within the Phase Two Study Area.

2.1.2 Topography and Surface Water Draining Features

The Phase Two Property is located in an urban setting, at an elevation of 260 metres above sea level (masl). The topography of the Phase Two Property is generally sloped to the west, while the topography within the Phase Two Study Area generally slopes to the southwest. There are no drainage features (e.g. ditches, swales, etc.) present on-Site. Surface water flow associated with precipitation events is anticipated to run overland and drain into the municipal storm sewer catch basins.

2.2 Past Investigations

No environmental reports were provided to DS to review.

3.0 Scope of the Investigation

The scope of the Phase Two ESA was designed to investigate the portions of the Site determined in the Phase One ESA to be Areas of Potential Environmental Concern. This Phase Two ESA was conducted in general accordance with O.Reg. 153/04 (as amended). The scope of the investigation including the subsurface investigation, sampling, and laboratory analysis was based on the findings of the Phase One ESA and was limited to the portions of the site which were accessible.

3.1 Overview of Site Investigation

The following tasks were completed as part of the Phase Two ESA:

- Preparation of a Health and Safety Plan to ensure that all work was executed safely;
- Clearance of public private underground utility services prior to commencement of subsurface investigative operations;
- Preparation of a Sampling and Analysis Plan (SAP);
- Retained a MECP licensed driller to advance a total of three (3) boreholes as part of the Geotechnical and Hydrogeological investigations, to depths ranging between 1.0 to 8.1 mbgs. One (1) of the boreholes was instrumented with a groundwater monitoring well upon completion. The soil lithology was logged during drilling, and representative soil samples were collected at regular intervals. The soil samples were screened for organic vapours using an RKI Eagle 2 MultiGas Detector, and examined for visual and olfactory indications of soil impacts;
- The advancement of four (4) hand-auger boreholes to a maximum depth of 0.6 mbgs.
- Submitted "worst case" soil samples collected from the boreholes for laboratory analysis of relevant contaminants of potential concern (COPCs) as identified in the Phase One ESA;
- Conducted groundwater level measurements in the monitoring wells in order to determine the groundwater elevation;
- Surveyed all boreholes to a geodetic benchmark;
- Developed and purged the monitoring well prior to sampling;
- Compared soil analytical data to the applicable MECP SCS; and
- Prepared a Phase Two ESA Report in general accordance with O.Reg. 153/04 (as amended).

3.2 Media Investigated

3.2.1 Rationale for Inclusion or Exclusion of Media

Table 3-1: Rationale of Sampling Media

Media	Included or Excluded	Rationale
Soil	Included	Soil was identified as a media of potential impact in the Phase One ESA, based on the historical operations conducted on-Site.
Groundwater	Excluded	Groundwater was not identified as a media of potential impact in the Phase One ESA, based on the historical operations conducted on-Site.
Sediment	Excluded	Sediment is not present on the Phase Two Property.
Surface Water	Excluded	Surface water is not present on the Phase Two Property.

3.2.2 Overview of Field Investigation of Media

Table 3-2: Field Investigation of Media

Media	Methodology of Investigation
Soil	A total of four (4) hand auger boreholes were advanced on the Phase Two Property, to a maximum depth of 0.6 mbgs. Soil samples were collected and submitted for analysis of all relevant PCOCs.

3.3 Phase One Conceptual Site Model

A Conceptual Site Model was developed for the Phase One Property, located at 900 Mulock Drive, Newmarket, Ontario. The Phase One Conceptual Site Model is presented in Drawings 3, 4, and 5 and visually depict the following:

- Any existing buildings and structures
- Water bodies located in whole, or in part, on the Phase One Study Area
- Areas of natural significance located in whole, or in part, on the Phase One Study Area
- Water wells at the Phase One Property or within the Phase One Study Area
- Roads, including names, within the Phase One Study Area
- Uses of properties adjacent to the Phase One Property
- Areas where any PCAs have occurred, including location of any tanks
- Areas of Potential Environmental Concern

3.3.1 Potentially Contaminating Activity Affecting the Phase One Property

All PCAs identified within the Phase One Study Area are presented on Figure 4. The PCAs which are considered to contribute to APECs on, in or under the Phase One Property are summarized in the table below:

Table 3-3: Summary of PCAs Contributing to APECs

PCA Item.	PCA Description (Per. Table 2, Schedule D of O.Reg. 153/04)	Description	Rationale
PCA-7	#40 - Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	An orchard was visible on the eastern portion of the Phase One Property is the 1927 aerial photograph.	PCA is located on the Property.

N/S - not specified in Table 2, Schedule D, of O.Reg. 153/04

3.3.2 Contaminants of Potential Concern

A summary of the contaminants of potential concern identified for each respective APEC is presented in Table 3-3 above. The following contaminants of potential concern were identified for the Phase One Property: Metals, Hydrides, Cyanide and OCPs.

3.3.3 Underground Utilities and Contaminant Distribution and Transport

Underground utilities can affect contaminant distribution and transport. Trenches excavated to install utility services, and the associated granular backfill may provide preferential pathways for horizontal contaminant migration in the shallow subsurface.

Underground utilities were identified at the Phase One Property, including water, natural gas, electrical, and sewer services to the existing Site Building. Plans were not available to confirm the depths of these utilities; however, they are estimated to be installed at depths ranging from 2 to 3 metres below ground surface.

The depth to groundwater at the Phase One Property is inferred to be approximately 3.3 metres below ground surface, therefore it is possible that the utility corridors may act as preferential pathways for contaminant distribution and transport in the event that shallow subsurface contaminants exist at the Phase One Property.

3.3.4 Geological and Hydrogeological Information

The topography of the Phase One Property is generally flat with a surface elevation of 260 metres above sea level (masl). The topography within the Phase One Study Area generally slopes to the southwest. Based on a review of the MECP well records, the depth to groundwater in the vicinity of the Phase One Property is approximately 3.3 mbgs. The shallow groundwater flow direction within the Phase One Study Area is inferred to be northeast towards Bogart Creek, located approximately 550 m northeast of the Phase One Property

The Site is situated within a clay plains physiographic region. The surficial geology within the Phase One Study area is described as “fine-textured glaciolacustrine deposits consisting

of silt and clay with minor sand and gravel", and the bedrock is described as "shale with minor limestone deposits of the Blue Mountain Formation". Based on a review of MECP well records, the bedrock in the Phase One Study Area is anticipated to be encountered at depths greater than 30 metres below ground surface (mbgs).

3.3.5 Uncertainty and Absence of Information

DS has relied upon information obtained from federal, provincial, municipal, and private databases, in addition to records and summaries provided by EcoLog ERIS. All information obtained was reviewed and assessed for consistency, however the conclusions drawn by DS are subject to the nature and accuracy of the records reviewed.

All reasonable inquiries were made to obtain reasonably accessible information, as mandated by O.Reg.153/04 (as amended). All responses to database requests were received prior to completion of this report, with the exception of the MECP FOI request. If the MECP FOI request produces information which may alter the conclusions of this report, an addendum will be provided to the Client. This report reflects the best judgement of DS based on the information available at the time of the investigation.

Information used in this report was evaluated based on proximity to the Phase One Property, anticipated direction of local groundwater flow, and the potential environmental impact on the Phase One Property as a result of potentially contaminating activities.

The QP has determined that the uncertainty dose not affect the validity of the Phase One ESA Conceptual Site Model or the conclusions of this report.

3.4 Deviations from Sampling and Analysis Plan

The Phase Two ESA was completed in accordance with the SAP.

3.5 Impediments

DS was granted complete access to the Phase Two Property throughout the course of the investigation. No impediments were encountered.

4.0 Investigation Method

4.1 General

The Phase Two ESA followed the methodology outlined in the following documents:

- 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 "Guide for Completing Phase Two Environmental Site Assessments under Ontario regulation 153/04" (June 2011);
- Ontario Ministry of the Environment "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" (July 2011) (Analytical Protocol);

The methods used in the Phase Two ESA investigation did not differ from the associated standard operating procedures.

4.2 Drilling and Excavating

A site visit was conducted prior to drilling in order to identify the borehole locations advanced for the completion of the Preliminary Hydrogeological Investigation and Geotechnical Investigation of the Phase Two Property. The selected borehole locations are presented on Figure 5. The borehole locations were cleared of underground public and private utility services prior to commencement of drilling. A summary of the drilling activities is provided in the table below.

Table 4-1: Summary of Drilling Activities

Parameter	Details
Drilling Contractor	Davis Drilling
Drilling Dates	October 17, 2019
Drilling Equipment Used	Truck-mounted CME 55
Measures taken to minimize the potential for cross contamination	◆ Soil sampling was conducted using a 50 mm stainless steel split spoon sampler. The split spoon sampler was brushed clean of soil, washed in municipal water containing phosphate free detergent, rinsed in municipal water, and then rinsed with distilled water for each sampling interval in order to reduce the potential for cross contamination; ◆ Soil samples were extracted from the interior of the sampler rather than from areas in contact with the sampler sidewalls; ◆ Use of dedicated and disposable nitrile gloves for the handling of soil samples. A new set of gloves was used for each sample.

Parameter	Details
Sample collection frequency	Samples were collected at a frequency of every 0.6 m per 0.8 m from the ground surface to 3.1 mbgs, followed by one sample per 1.5 m to borehole termination depth.

4.3 Soil Sampling

Soil samples were collected using (insert method as described in section above). Discrete soil samples were collected from the split-spoon samplers by DS personnel using dedicated nitrile gloves. Additional surface soil samples were collected by a DS technician using hand auger equipment to investigation the soils associated with the identified APEC area.

A portion of each sample was placed in a resealable plastic bag for field screening, and the remaining portion was placed into laboratory supplied glass sampling jars. All sample jars were stored in dedicated coolers with ice for storage, pending transport to the analytical laboratory. A formal chain of custody was maintained for all samples submitted to the laboratory.

The subsurface soil conditions were logged by DS personnel at the time of drilling and recorded on field borehole logs. The borehole logs are presented under Appendix B.

4.4 Field Screening Measurements

Retrieved soil samples were screened in the field for visual and olfactory observations. No obvious visual or olfactory evidence of potential contamination were noted. No aesthetic impacts (e.g. cinders, slag, hydrocarbon odours) were encountered during this investigation. The soil sample headspace vapour concentrations for all soil samples recovered during the investigation were screened using portable organic vapour testing equipment in accordance with the procedure outlined in the MECP's '*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario'.*

The soil samples were inspected and examined to assess soil type, ground water conditions, and possible chemical contamination by visual and olfactory observations or by organic vapour screening. Samples submitted for chemical analysis were collected from locations judged by the assessor to be most likely to exhibit the highest concentrations of contaminants based on several factors including (i) visual or olfactory observations, (ii) sample location, depth, and soil type (iii) ground water conditions and headspace reading. A summary of the equipment used for field screening is provided below:

Table 4-2: Field Screening Equipment

Parameter	Details
Make and Model of Field Screening Instrument	RKI Eagle 2, Model 5101-P2 Serial Number: E2G721
Chemicals the equipment can detect and associated detection limits	VOCs with dynamic range of 0 parts per million (ppm) to 2,000 ppm PHCs with range of 0 to 50, 000 ppm
Precision of the measurements	3 significant figures
Accuracy of the measurements	VOCs: ± 10% display reading + one digit Hydrocarbons: ± 5% display reading + one digit
Calibration reference standards	PID: Isobutylene CGD: Hexane
Procedures for checking calibration of equipment	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 calibration had drifted by more than +/- 10%.

A summary of the soil headspace measurements are presented in the borehole logs, provided under Appendix B.

4.5 Groundwater Monitoring Well Installation

Groundwater was not identified as a media of potential impact; thus, groundwater sampling was not conducted. However, one (1) monitoring well was installed upon completion of one (1) of the boreholes advanced on the Phase Two Property for the purpose of completing a Preliminary Hydrogeological Investigation. The monitoring well was constructed of 51-millimetre (2-inch) inner diameter (ID) flush-threaded schedule 40 polyvinyl chloride (PVC) risers, equipped with a 3.1 m length of No. 10 slot PVC screen. The well screen was sealed at the bottom using a threaded cap and at the top with a lockable J-plug.

Silica sand was placed around and up to 0.6m above the well screen to act as a filter pack. Bentonite was placed from the ground surface to the top of the sand pack. The well was completed with protective flush mount casings.

4.6 Groundwater Field Measurement of Water Quality Parameters

Groundwater was not identified as a media of potential impact.

4.7 Groundwater Sampling

Groundwater was not identified as a media potentially impacted on the APEC recognized for this Phase Two investigation. Thus, no groundwater samples were collected during this investigation.

4.8 Sediment Sampling

No sediment as defined under O.Reg. 153/04 (as amended) was present on the Phase Two Property at the time of this investigation. Sediment sampling was not conducted as a result.

4.9 Analytical Testing

The soil samples collected were submitted to SGS Canada Inc. under chain of custody protocols. SGS is an independent laboratory accredited by the Canadian Association for Laboratory Accreditation. SGS conducted the analyses in accordance with the MECP document "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" dated March 9, 2004 (revised on July 1, 2011).

4.10 Residue Management Procedures

4.10.1 Soil Cuttings From Drilling and Excavations

The soil cuttings generated by the borehole drilling program were stored in 205 L drums and left on-site for disposal by a MECP approved waste-hauler for disposal at a MECP-approved waste management facility.

4.10.2 Fluids from Equipment Cleaning

Excess equipment cleaning fluids were stored in 20-L sealed plastic pails and temporarily stored on site for disposal by a MECP approved waste-hauler for disposal at a MECP-approved waste management facility.

4.11 Elevation Surveying

The ground surface elevations of the boreholes were surveyed using a Sokkia GCX-2 GNSS RTK receiver, based on global positioning system satellites.

The ground surface elevation can be found on the borehole logs presented in Appendix B.

4.12 Quality Assurance and Quality Control Measures

4.12.1 Sample containers, preservation, labelling, handling and custody for samples submitted for laboratory analysis, including any deviations from the SAP

All soil samples were stored in laboratory-supplied sample containers in accordance with the MECP Analytical Protocol. A summary of the preservatives supplied by the laboratory is provided in the table below.

Table 4-3: Summary of Sample Bottle Preservatives

Media	Parameter	Sample Container
Soil	Metals, Hydrides, Cyanide and OCPs	120 mL or 250 mL unpreserved glass jar with Teflon™-lined lid.

Each sample container was labelled with a unique sample identification, the project number, and the sampling date. All samples were placed in an ice-filled cooler upon completion of sampling and kept under refrigerated conditions until the time of delivery to the analytical laboratory. A formal chain of custody was maintained for all samples submitted to the laboratory.

4.12.2 Description of equipment cleaning procedures followed during all sampling

Dedicated, disposable nitrile gloves were used for each sampling event to reduce the potential for cross-contamination.

The hand auger was brushed clean of soil, washed in municipal water containing phosphate free detergent, rinsed in municipal water, and then rinsed with distilled water for each sampling interval in order to reduce the potential for cross contamination. Non-dedicated equipment (i.e. interface probe) was cleaned before initial use and between all measurement points with a solution of Alconox™ and distilled water. The Alconox™ solution was rinsed off using distilled water.

4.12.3 Description of how the field quality control measures referred to in subsection 3 (3) were carried out

Field duplicate samples were collected at the time of sampling. In accordance with O.Reg. 153/04, one duplicate sample was analyzed per ten samples submitted for analysis.

All field screening devices (i.e. RKI Eagle 2) were calibrated prior to use by the supplier. Calibration checks were completed, and re-calibrations were conducted as required.

4.12.4 Description of, and rational for, any deviations from the procedures set out in the quality assurance and quality control program set out in the SAP

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

5.0 Review and Evaluation

5.1 Geology

A summary of the subsurface conditions is presented below. Additional details may be found in the borehole logs appended in Appendix B.

Topsoil/Reworked Native:

A surficial topsoil layer of thickness varying from 100 to 125 mm was encountered in BH19-2 and BH19-3. BH19-1 encountered granular fill layer (125 mm of sand and gravel) at surface. Below the topsoil or granular, reworked native consisting of silt, sandy silt and clayey silt to silt, extending to depths of 0.5 to 1.5 m. Fill material contained topsoil/organics and was in a very loose to compact state.

Upper Silt to Clayey Silt (Till-like):

Below the reworked native, upper native cohesive soils consisting of silt to clayey silt (till) were encountered in all boreholes, extending to depth varying from 1.5 to 4.6 m. The consistency of the silt to clayey silt was firm to stiff.

Sandy Silt Till:

Below the silt to clayey silt or till deposits, sandy silt till was encountered in borehole BH19-1 and BH19-2, extending to depths of 2.6 to 6.1m, it was compact to very dense state.

Cohesionless Soils (Silty Sand, Sand & Gravel) Deposits:

Below the clayey silt till or sandy silt till deposits, cohesionless deposits of silty sand and sand & gravel were encountered in boreholes, at depths varying from 4.6 to 6.1 m below the existing grade. The cohesionless soils were water bearing and present in a dense to very dense state.

Lower Clayey Silt Till:

A lower clayey silt till deposit was encountered in borehole BH19-2 below the cohesionless deposits. This deposit was present in hard consistency.

Bedrock was not encountered during this investigation.

Table 5-1: Summary of Geologic Units Investigated

Geologic Unit	Inferred Thickness (m)	Top Elevation (masl)	Bottom Elevation (masl)	Properties
Granular/Topsoil	0.1	265.7	265.6	Sand and gravel
Topsoil	~1.2	266.1	264.9	-
Reworked Native	~1.5	266	264.5	Clayey silt to silt, trace to some topsoil/rootlets, dark brown to brown, mixed with organics, moist, loose
Upper Silt to Clayey Silt	~3.1	264.5	261.5	Silt to Clayey Silt Till, some sand, trace gravel, brown, very moist, firm to stiff/compact to very dense. Some gravel below 4.6 mbgs.
Sandy Silt Till	~3.5	263.5	260	
Cohesionless Soils	~2.6	261.1	258.5	Silty sand, trace clay, trace gravel, brown, wet, dense to very dense
Lower Clayey Silt Till	>0.5	258.5	-	Clayey Silt Till, some sand to sandy silt, trace gravel, grey, moist

5.2 Ground Water Elevations and Flow Direction

5.2.1 Rationale for Monitoring Well Location and Well Screen Intervals

Groundwater was not identified as a media of potential impact, but one (1) monitoring well was installed on the Phase Two Property in order to complete a Preliminary Hydrogeological Investigation. The monitoring well was screened within the clayey silt till and silty sand units at an approximate depths of 3.0 to 6.1 mbgs. This unit is inferred to be an unconfined aquifer.

5.2.2 Results of Interface Probe Measurements

The groundwater level measurements were collected using a Solinst interface probe (Model 122. The groundwater levels were measured on October 25 and October 28, 2019; the depth to groundwater was found to range between 2.46 to 2.77 mbgs. There was no indication of DNAPL or LNAPL in the monitoring wells at this time.

5.2.3 Product Thickness and Free Flowing Product

No evidence of product was observed in the monitoring well at the time of the investigation.

5.2.4 Groundwater Elevation

The groundwater elevation was calculated by subtracting the depth to groundwater from the surface elevation determined by the surface elevation survey conducted as part of this investigation. Generally, the groundwater elevation was found to be from 261.93 to 262.54 masl in the upper aquifer.

5.2.5 Groundwater Flow Direction

Based on the Phase One ESA, and the Preliminary Hydrogeological Investigation completed on the Phase Two Property, the groundwater flow direction is inferred to be north and southwesterly towards a tributary of Bogart Creek and the west branch of the Holland River respectively.

5.2.6 Assessment of Potential for Temporal Variability in Groundwater Flow Direction

The shallow aquifer investigated is inferred to be an unconfined aquifer, based on the soil stratigraphy observed in the boreholes advanced on the Phase Two Property. It is possible that temporal variations in groundwater elevations may occur on the Phase Two Property in response to seasonal weather patterns.

Temporal variability in groundwater level has the ability to influence the groundwater flow direction. The degree of variation in groundwater levels on the Phase Two Property can only be confirmed with long-term monitoring.

5.2.7 Evaluation of Potential Interaction Between Buried Utilities and the Water Table

The groundwater table was encountered at a depth of 2.46 to 2.77 mbgs on the Phase Two Property. Buried utility services are present on the Phase Two Property and are inferred to be situated at depths ranging between 2 and 3 mbgs. Based on this there is the potential for the utility trenches to act as preferential pathways. However, no groundwater impacts were identified, therefore the potential for preferential migration of contaminants is not of concern at this time.

5.3 Ground Water Hydraulic Gradients

5.3.1 Horizontal Hydraulic Gradient

The horizontal hydraulic gradient was not calculated.

5.3.2 Vertical Hydraulic Gradient

The vertical hydraulic gradient was not calculated.

5.4 Fine-Medium Soil Texture

5.4.1 Rational for use of Fine-Medium Soil Texture Category

A total of three (3) grain size analyses were conducted as part of this investigation. The results of the grain size analyses indicate that more than two-thirds of the soils encountered are medium to fine textured.

5.4.2 Results of Grain Size Analysis

A summary of the soil samples analyzed, and the corresponding grain size results is presented in the table below:

Table 5-2: Summary of Grain Size Analyses

Sample	% Gravel	% Sand	% Silt	% Clay	Classification
BH19-1 SS3	1%	11%	74%	14%	Medium-fine textured
BH19-3 SS4	2%	11%	66%	21%	Medium-fine textured
BH19-3 SS6	1%	54%	41%	4%	Coarse-textured

5.4.3 Rational for the Number of Samples Collected and Analyzed

The grain size analyses were conducted for the purposes of this Phase Two ESA, in addition to a geotechnical investigation which was conducted concurrently. At least one sample was analyzed per stratigraphic unit encountered in order to characterize the various strata encountered.

5.5 Soil Field Screening

Soil vapour headspace readings were collected at the time of sample collection, the results of which are presented on the borehole logs (Appendix D). The soil vapour headspace readings were collected using a CGD in methane elimination mode. The CGD readings were non-detect (0 ppm).

The soil samples were also screened for visual and olfactory indicators of impacts (e.g. staining, odours). No visual or olfactory observations were made for any of the soil samples collected.

5.6 Soil Quality

The results of the chemical analyses conducted are presented in Tables 4 and 5. A visual summary of the location of the sample locations is provided in Figures 6A, and 6B. The laboratory certificates of analysis have been provided under Appendix C.

5.6.1 Metals, Hydrides, Cyanide

A total of four (4) samples, including one (1) field duplicate for QA/QC purposes were submitted for analysis of metals, hydrides, and cyanide. The results of the analyses are tabulated in Table 4 and presented on Figure 6A. The results of the analyses indicated that all soil samples analyzed met the applicable Table 2 RPI SCS.

5.6.2 Organochloride Pesticides

A total of four (4) samples, including one (1) field duplicate for QA/QC purposes were submitted for analysis of organochloride pesticides. The results of the analyses are tabulated in Table 5 and presented on Figure 6B. The results of the analyses indicated that all soil samples analyzed met the applicable Table 2 RPI SCS.

5.6.3 Commentary on Soil Quality

No evidence of chemical or biological transformations of the parameters analyzed was observed.

5.7 Ground Water Quality

No groundwater chemical analyses were conducted on the Phase Two Property, since groundwater was not identified as a media of potential impact from the PCAs identified on the Phase One ESA performed by DS.

5.8 Sediment Quality

No sediment was present on the Phase Two Property at the time of the investigation.

5.9 Quality Assurance and Quality Control Results

Collection of soil samples were conducted in general accordance with the MECP *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*. As described in Section 5.12, dedicated equipment was used where possible, and all non-dedicated equipment was decontaminated before and between sampling events. All soil and groundwater samples were transferred directly into laboratory-supplied containers. The laboratory containers were prepared by the laboratory with suitable preservative, as required. All samples were stored and transported under refrigerated conditions. Chain of custody protocols were maintained from the time of sampling to delivery to the analytical laboratory.

The field QA/QC program involved the collection of field duplicate soil and groundwater samples, and the use of a trip blank for each groundwater sampling event (when suitable).

In addition to the controls listed above, the analytical laboratory employed method blanks, internal laboratory duplicates, surrogate spike samples, matrix spike samples, and standard reference materials.

A summary of the field duplicate samples analyzed and an interpretation of the efficacy of the QA/QC program is provided in the table below.

Table 5-3: Summary of QA/QC Results

Sample ID	QA/QC duplicate	Medium	Parameter Analyzed	QA/QC Result
DUP-1	S3	Soil	Metals, OCPs, Hydrides, Cyanide	All results were within the analytical protocol criteria for RPD, except for the parameters listed below.

The following exceptions in the RPD protocols were identified:

- The RPD value for S3 (DUP-1) of 46% exceeded the recommended 30% RPD limit for Barium. The variance in the analytical result between the parent and duplicate sample are attributed to the heterogeneity of the soil matrix analyzed.

Based on the interpretation of the laboratory results and the QA/QC program, it is the opinion of the QP that the laboratory analytical data can be relied upon.

All samples were handled in accordance with the MECP Analytical Protocol regarding sample holding time, preservation methods, storage requirements, and type of container.

SGS routinely conducts internal QA/QC analyses in order to satisfy regulatory QA/QC requirements. The results of the SGS QA/QC analyses for the submitted soil samples are summarized in the laboratory Certificates of Analyses provided in Appendix C.

With respect to subsection 47(3) of O.Reg 153/04 (as amended), all certificates of analysis or analytical reports pursuant to clause 47(2) (b) of the regulation comply with subsection 47(3). A certificate of analysis has been received for each sample submitted for analysis and have been provided (in full) in Appendix C.

A review of the QA/QC sample results indicated that no issues were identified with respect to both the field collection methodology and the laboratory reporting. It is the opinion of the QP that the analytical data obtained are representative of the soil conditions at the Phase Two Property for the purpose of assessing whether the soil at the Phase Property meets the applicable MECP SCS.

5.10 Phase Two Conceptual Site Model

This Phase Two Conceptual Site Model was developed through a synthesis of the information obtained through the completion of the Phase One ESA, and the data collected as part of the Phase Two ESA.

I. Description and Assessment of:

A. Areas where potentially contaminating activity has occurred

A total of seven (7) PCAs were identified in the Phase One ESA. A summary of the PCAs considered to be contributing to APECs on the Phase Two Property is provided in the table below.

PCA Item.	PCA Description (Per. Table 2, Schedule D of O.Reg. 153/04)	Description	Contributing to APEC (Y/N)
PCA-7 (On-Site)	#40 - Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	An orchard was visible on the eastern portion of the Phase One Property is the 1927 aerial photograph.	Yes – APEC-1

B. Areas of potential environmental concern

One (1) APEC was identified to be present on the Phase Two Property through the completion of the Phase One ESA. The APEC identified, and the associated PCOCs is provided in the table below.

Area of Potential Environmental Concern	Location of APECs on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-1	Eastern Portion of Property	PCA-7: #40 - Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications - An orchard was visible on the eastern portion of the Phase One Property is the 1927 aerial photograph.	On-Site	Metals, Hydrides, Cyanide, OCPs	Soil

C. Any subsurface structures and utilities on, in or under the Phase Two Property that may affect contaminant distribution and transport

The groundwater table was encountered ranging depths of 2.46 to 2.77 mbgs on the Phase Two Property. Buried utility services are present on the Phase Two Property and are inferred to be situated at depths ranging between 2 and 3 mbgs. Based on this, there is the potential for the utility trenches to act as preferential pathways. However, since groundwater impacts were not identified, the potential for preferential migration of contaminants is not of concern at this time.

II. Description of, and as appropriate, figures illustrating, the physical setting of the Phase Two Property and any areas under it including:

A. Stratigraphy from ground surface to the deepest aquifer or aquitard investigated

A topsoil layer has a thickness of 100 to 125 mm. Below the topsoil, reworked native consisting of silt, sandy silt and clayey silt to silt, extending to depths of 0.5 to 1.5 m. The native overburden consisted of upper native cohesive soils consisting of silt to clayey silt (till) were encountered in all boreholes, extending to depth varying from 1.5 to 4.6 m. Below the silt to clayey silt or till deposits, sandy silt till was encountered in borehole BH19-1 and BH19-2, extending to depths of 2.6 to 6.1m. Below the clayey silt till or sandy silt till deposits, cohesionless deposits of silty sand and sand & gravel were encountered in boreholes, at depths varying from 4.6 to 6.1 m below the existing grade. A lower clayey silt till deposit was encountered in borehole BH19-2 below the cohesionless deposits

The borehole locations are depicted on Figure 5.

B. Hydrogeological Characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants is present at concentrations above the applicable site condition standards, lateral and vertical gradients

The groundwater table was encountered in a clayey silt till and silty sand units, which is considered to be an unconfined aquifer.

Based on the groundwater elevations, the groundwater flow direction is interpreted to be northeast towards Bogart Creek, located approximately 550 m northeast of the Phase Two Property. The vertical and horizontal gradients were not calculated.

C. Depth to bedrock

Bedrock was not encountered as part of this investigation. Based on well records, the bedrock in the Phase Two Study Area is anticipated to be encountered at depths greater than 30 mbgs.

D. Approximate depth to water table

The depth to groundwater was found to range between 2.46 to 2.77 mbgs on October 25 and October 28, 2019.

E. Any respect in which section 41 or 43.1 of the regulation applies to the property

There are no areas of natural significance on the Phase Two Property, or within 30 m of the Phase Two Property. As such the Phase Two Property is not considered to be environmentally sensitive as defined by Section 41.

F. Areas where soil has been brought from another property and placed on, in or under the Phase Two Property

Soil has not been imported from another property and placed on, in, or under the Site.

G. Approximate locations, if known, of any proposed buildings and other structures

It is our understanding that redevelopment of the Site for institutional purposes has been proposed, and that the development will feature a single-story slab on grade building and associated play and parking areas.

III. Where a contaminant is present on, in or under the Phase Two Property at a concentration greater than the applicable site condition standard, identification of

A. Each area where a contaminant is present on, in or under the Phase Two Property at a concentration greater than the applicable SCS

Based on the analytical results obtained from the investigation, there were no contaminants that exceeded the site condition standards on, in or under the Phase Two Property.

B. The contaminants associated with each of the areas

Based on the analytical results, metals, hydrides, cyanide, and OCPs do not impact the areas of potential environmental concern on the Phase Two Property.

C. Medium that contaminants were identified in

No soil impacts were identified. All samples analysed met the applicable Table 2 RPI SCS.

D. Description and assessment of what is know about each of the areas

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

E. Distribution in which the areas of each contaminant is present in the area at a concentration greater than the applicable SCS, for each medium in which the contaminant is present, together with figures showing the distribution

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

F. Anything know about the reason for the discharge of the contaminants present on, in or under the Phase Two Property at a concentrations greater than the applicable SCS

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

G. Anything known about migration of the contaminants present on, in or under the phase two property at a concentration greater than the applicable SCS away from any area of potential environmental concern, including the identification of any preferential pathways

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

H. Climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in groundwater levels

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

I. Information concerning soil vapour intrusion of the contaminants into buildings

Volatile parameters where not identified to be contaminants of potential concern,; therefore, vapour intrusion is not considered to be an exposure pathway at this time.

IV. Where contaminants on, in or under the Phase Two Property are present at concentrations greater than the applicable SCS, one or more cross-sections showing

A. <u>The lateral and vertical distribution of a contaminant in each area where the contaminants are present at concentrations greater than the applicable SCS in soil, groundwater and sediment</u>

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

B. <u>Approximate depth to water table</u>

The depth to groundwater was recorded in one (1) monitoring well installed during the current investigation (BH19-3). The groundwater was found to be 262.54 masl on the most recent observation date, October 28, 2019 in the upper aquifer investigated.

C. <u>Stratigraphy from ground surface to the deepest aquifer or aquitard investigated</u>

Stratigraphy from ground surface to the deepest strata investigated is further described in Section 5.1 above.

D. <u>Any subsurface structures and utilities that may affect contaminants distribution and transport</u>

Underground utilities were identified on the property and can affect contaminant distribution and transport. However, no contaminants were identified on the Phase Two Property.

V. For each area where a contaminant is present on, in or under the property at a concentration greater than the applicable SCS for the contaminant, a diagram identifying, with narrative explanatory notes

A. The release mechanisms
B. Contaminant transport pathway
C. The human and ecological receptors located on, in or under the phase two property
D. Receptor exposure points
E. Routes of exposure

Not applicable – all samples analysed met the applicable Table 2 RPI SCS.

6.0 Conclusions

This Phase Two ESA involved that advancement of three (3) boreholes, the installation of one (1) monitoring well in one (1) selected borehole, the advancement of four (4) shallow hand auger boreholes (up to 0.6 mbgs), and the collection of soil samples for analysis of the potential contaminants of concern, including: metals, hydrides, cyanide and OCPs.

Based on the results of the information gathered through the course of the investigation, DS presents the following conclusions:

- The results of this Phase Two ESA indicate that the applicable Table 2 RPI Site Conditions Standards have been met; and
- Based on the findings of this Phase Two ESA no further environmental investigations are required, and a Record of Site Condition may be filed for the Phase Two Property;
- The monitoring well should be decommissioned in accordance with O.Reg. 903 when no longer required.

It is the opinion of the QP_{ESA} that the applicable SCS for the soil and groundwater at the Phase Two Property have been met as of the Certification Date of this report. No further sub-surface investigation is required regarding the environmental quality of the soil and groundwater at the Phase Two Property.

6.1 Qualifications of the Assessors

John Gaviria-Ballen, B. Eng., EIT

Mr. Gaviria-Ballen is an environmental technician with DS Consultants Ltd. John holds a bachelor's degree in Environmental Engineering from Carleton University, and a post graduate certificate diploma from Conestoga College in Environmental Engineering Applications. John has experience in conducting Phase One and Two Environmental Site Assessments.

Mr. Drew Doak, B.Sc.E., P.Eng., QP_{ESA}

Mr. Doak is an Environmental Project Manager with DS Consultants Limited. Drew holds a Bachelor of Science in Engineering from Queen's University, and is a practicing member of the Professional Engineers of Ontario (PEO). Drew has five years of environmental consulting experience and has conducted and/or managed a multitude of projects in his professional experience. Drew has extensive experience conducting Phase One and Phase

Two Environmental Site Assessments in support of brownfields redevelopment in urban settings, and been involved in numerous remediation projects, and supported many risk assessments and Records of Site Conditions with the Ministry of Environment, Conservation and Parks. He has also conducted a variety of Hydrogeological investigations within the GTA. Drew is considered a Qualified Person to conduct Environmental Site Assessments as defined by Ontario Regulation 153/04 (as amended).

Mr. Patrick (Rick) Fioravanti, B.Sc., P.Geo., QP_{ESA}

Mr. Fioravanti is the Manager of Environmental Services with DS Consultants Ltd. Patrick holds a Honours Bachelor of Science with distinction in Toxicology from the University of Guelph and is a practicing member of the Association of Professional Geoscientists of Ontario (APGO). Patrick has over eight years of environmental consulting experience and has conducted and/or managed over 100 projects in his professional experience. Patrick has extensive experience conducting Phase One and Phase Two Environmental Site Assessments in support of brownfields redevelopment in urban settings, and been involved in numerous remediation projects, supported many risk assessments, and successfully filed Records of Site Condition with the Ministry of Environment and Climate Change. He has conducted work across southern and eastern Ontario, and Quebec in his professional experience. Patrick is considered a Qualified Person to conduct Environmental Site Assessments as defined by Ontario Regulation 153/04 (as amended).

6.2 Signatures

This Phase Two ESA was conducted under the supervision of Drew Doak B.Sc.E., P.Eng., QPESA in accordance with the requirements of O.Reg. 153/04 (as amended). The findings and conclusions presented have been determined based on the information obtained at the time of the investigation, and on an assessment of the conditions of the Site at this time.

We trust this report meets with your requirements. Should you have any questions regarding the information presented, please do not hesitate to contact our office.

Yours truly,

DS Consultants Ltd

John Gaviria-Ballen, EIT
Environmental Technician

Drew Doak, B.Sc.E., P.Eng., QPESA
Environmental Project Manager

Rick Fioravanti, B.Sc., P.Geo., QPESA
Manager – Environmental Services

6.3 Limitations

This report was prepared for the sole use of Denison Child Care Services – York Region District School Board and is intended to provide an assessment of the environmental condition on the property located at 900 Mulock Drive, Newmarket, Ontario. The information presented in this report is based on information collected during the completion of the Phase Two Environmental Site Assessment by DS Consultants Ltd. The material in this report reflects DS' judgment in light of the information available at the time of report preparation. This report may not be relied upon by any other person or entity without the written authorization of DS Consultants Ltd. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this documents or findings, conclusions and recommendations represented herein, is at the sole risk of said users.

The conclusions drawn from the Phase Two ESA were based on information at selected observation and sampling locations. Conditions between and beyond these locations may become apparent during future investigations or on-site work, which could not be detected or anticipated at the time of this investigation. The sampling locations were chosen based upon a cursory historical search, visual observations and limited information provided by persons knowledgeable about past and current activities on this site during the Phase Two ESA activities. As such, DS Consultants Ltd. cannot be held responsible for environmental conditions at the site that was not apparent from the available information.

7.0 References

- Armstrong, D.K. and Dodge, J.E.P. *Paleozoic Geology Map of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 219.
- Chapman, L.J. and Putnam, D.F. 2007. *The Physiography of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 228.
- Freeze, R. Allen and Cherry, John A., 1979. *Ground water*. Page 29.
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- Ontario Ministry of Environment, 15 April 2011. *Soil, Ground Water and Sediment Standards for use under part XV.1of the Environmental Protection Act.*
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- Ontario Ministry of the Environment, July 2011. *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.*
- The Ontario Geological Survey. 2003. *Surficial Geology of Southern Ontario*.

Figures

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 1 - Site Location Plan.qgs

Legend

Approx Property Boundary

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
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Telephone: (905) 264-9393
www.dsconsultants.ca

Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

Title: **SITE LOCATION PLAN**

N

Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: 1

Image/Map Source: *Google Street Map*

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 2 – Phase Two Property Site Plan.qgs

Legend

Approx Property Boundary

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900 Mulock Drive, Newmarket, ON

Title: **PHASE TWO PROPERTY SITE PLAN**

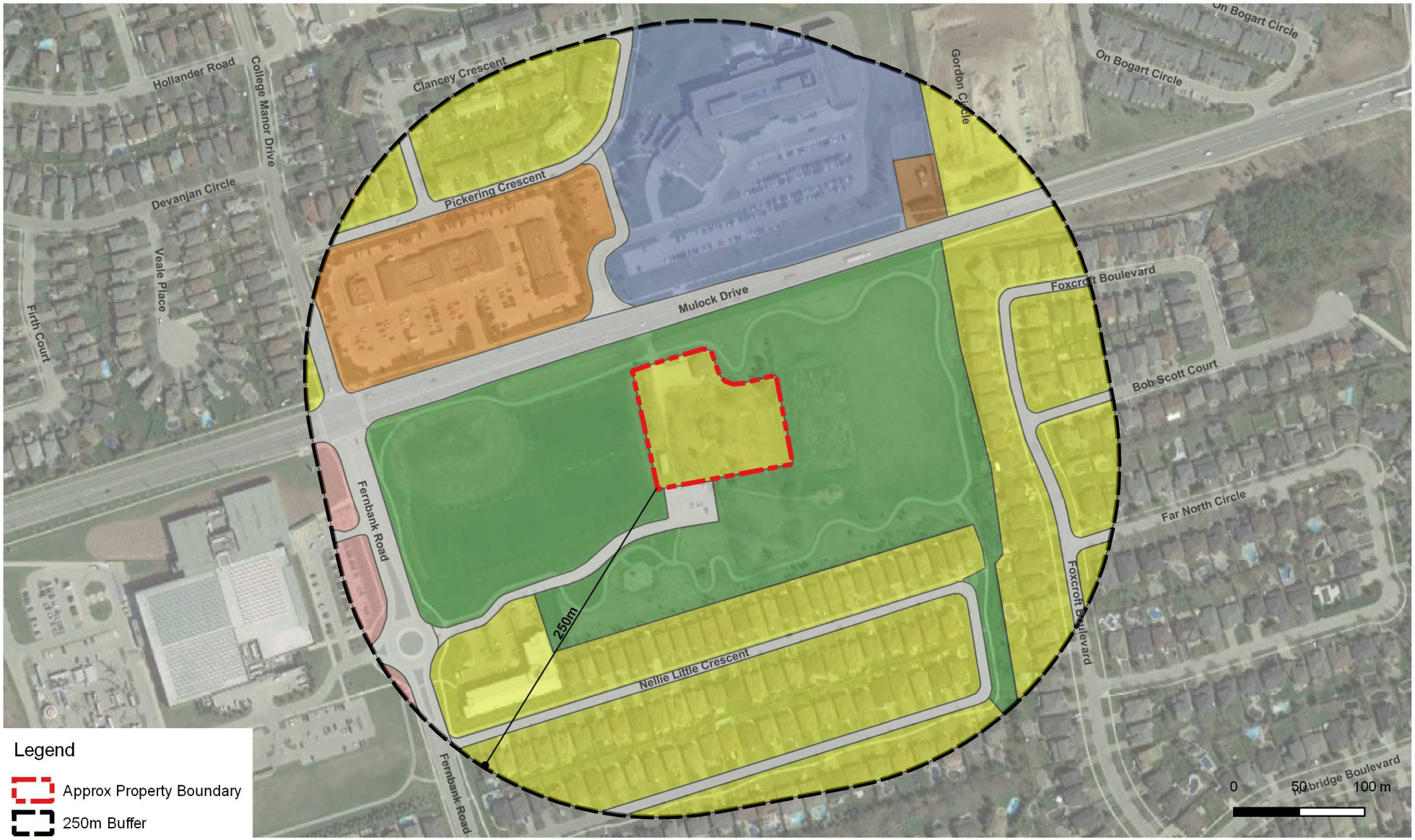
N

Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: 2

Image/Map Source: *Google Satellite Image*

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 3 - Phase Two Study Area.qgs



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Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

Title: **PHASE TWO STUDY AREA**

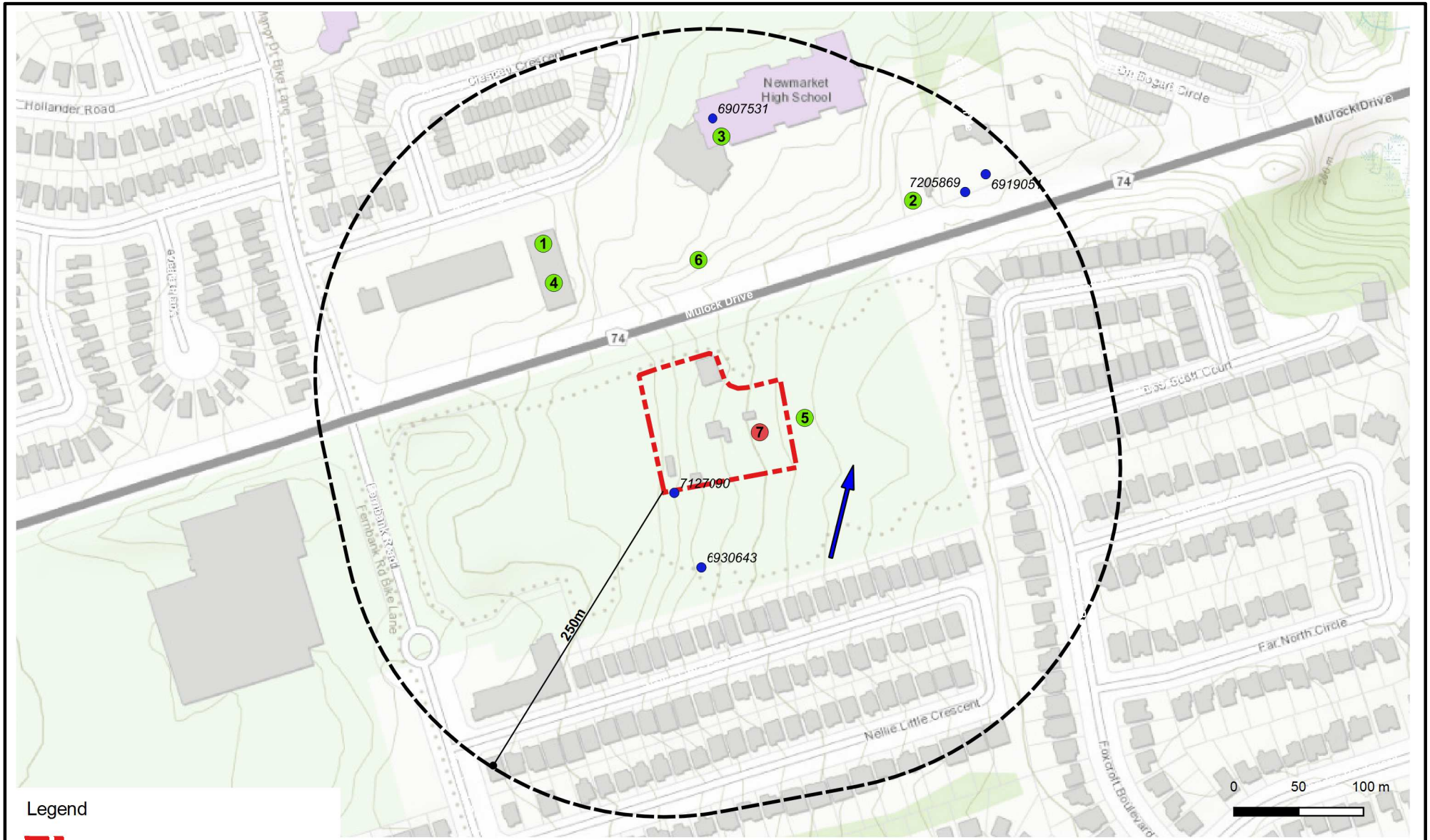
N

Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: 3

Image/Map Source: *Google Satellite Image*

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 4 – PCA within Phase Two Study Area.qgs



Legend

- Approx Property Boundary
- 250m Buffer
- Inferred Groundwater Flow Direction
- Registered Water Well (MECP WWR)
- PCA not Contributing to APEC
- PCA Contributing to APEC

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Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

Title: **PCA WITHIN PHASE TWO STUDY AREA**

N

Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: 4
	Image/Map Source: *Esri Topo Map*		

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 5 – Borehole Location Plan with APECs.qgs

Legend

- Approx Property Boundary
- Hand Augered Borehole
- Borehole
- Monitoring Well
- APEC 1

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Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

Title: **BOREHOLE LOCATION PLAN WITH APECs**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: 5

Image/Map Source: *Google Satellite Image*

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 6A – Summary of Metals-Hyd-Cyanide in Soil.qgs

Legend

- Approx Property Boundary
- Hand Augered Borehole
- Borehole
- Monitoring Well
- Sample Met Applicable Standards

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Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

Title: **SUMMARY OF METALS, HYDRIDES AND CYANIDE IN SOIL**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: **6A**

Image/Map Source: *Google Satellite Image*

J:\-GIS\19-190-100 Proposed Daycare Building\1-QGIS\Phase Two\Figure 6B – Summary of ORPs in Soil.qgs

Legend

- Approx Property Boundary
- Hand Augered Borehole
- Borehole
- Monitoring Well
- Sample Met Applicable Standards

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Client: COUNTERPOINT ENGINEERING
c/o DENISON CHILD CARE SERVICES – YRDSB

Project: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
900 Mulock Drive, Newmarket, ON

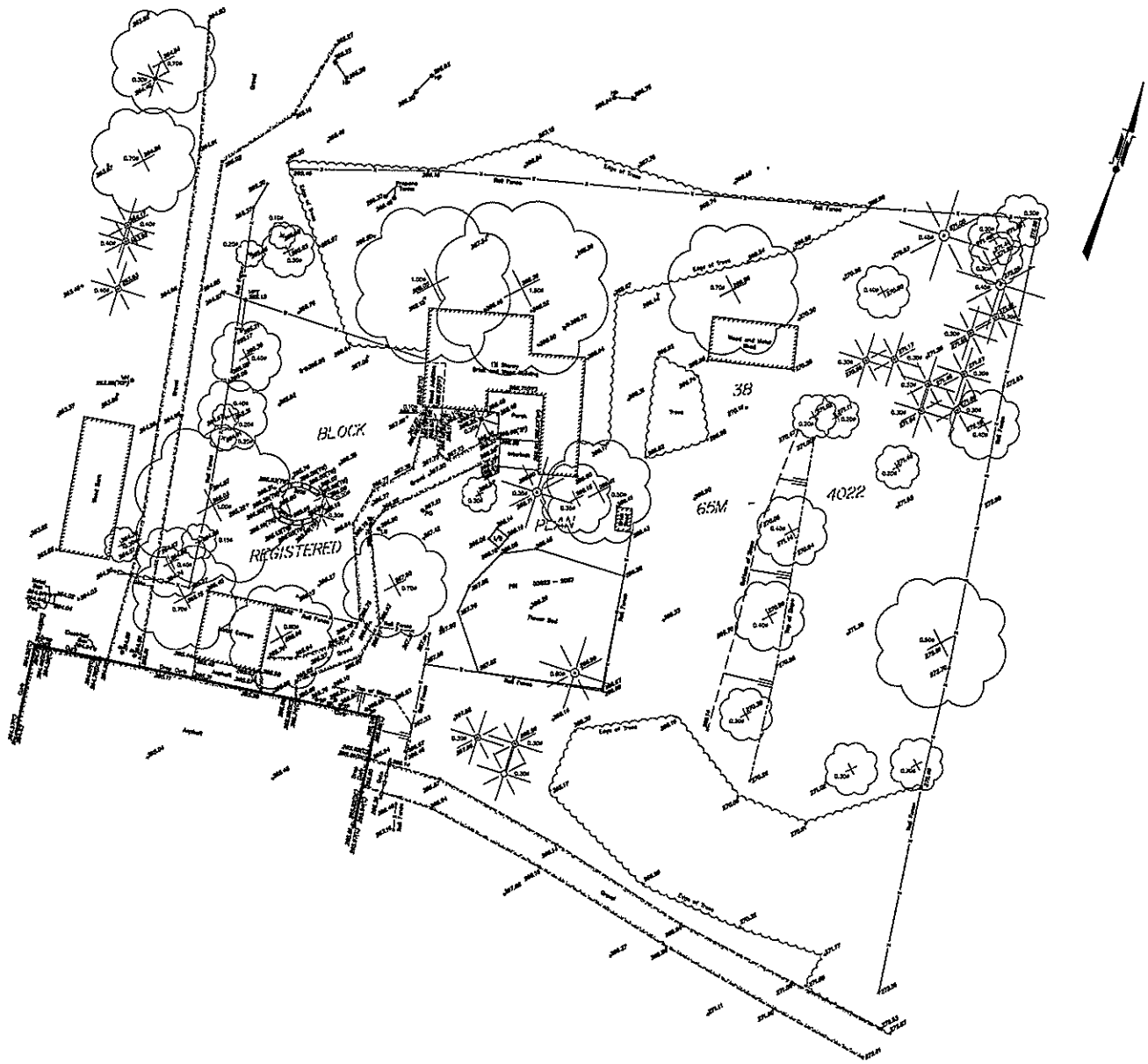
Title: **SUMMARY OF OCPs IN SOIL**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.D	S.Y	December 2019
Rev: 0	Scale: As Shown	Project No.: 19-190-100	Figure No.: **6B**

Image/Map Source: *Google Satellite Image*

Appendix A



PART OF BLOCK 38
REGISTERED PLAN 65M-4022
TOWN OF NEWMARKET
REGIONAL MUNICIPALITY OF YORK

LLOYD & PURCELL LTD., SCALE 1:250

0 2.5 0 5 10 15 Metres

BENCH MARK

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE REFERRED TO THE D.H.O. BENCHMARK N° 467-99 HAVING A PUBLISHED ELEVATION OF 254.573 METRES.

TEMPORARY BENCH MARK

SOUTHWEST ANCHOR BOLT ON THE TIM HORTON'S SIGN LOCATED AT 898 MULOCK DRIVE SET BY LLOYD & PURCELL LTD. JULY 4, 2003 AND FILED AS N1-6-30-15-1, HAVING AN ELEVATION OF 257.66 METRES.

METRIC

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

LEGEND

BS	-	BOTTOM STEP
BOBC	-	TOP OF BACK OF CURB
DC	-	DROP CURB
TOP	-	TOP OF PORCH
TOS	-	TOP OF STEP
TOW	-	TOP OF WALL
ø	-	DIAMETER
BOL/GP	-	BOLLARD/GUARD POST
BRW	-	BLOCK RETAINING WALL
CONC.	-	CONCRETE
FF	-	FINISHED FLOOR
HP	-	HYDRO POLE
HP/T	-	HYDRO POLE & TRANSFORMER
HR	-	HANDRAIL
IBS	-	INTERLOCKING BRICK
LS	-	LIGHT STANDARD
MH	-	MAN HOLE
MP	-	MISC. POST
SP	-	SIGN POST
W	-	WELL
WK	-	WATER KEY
	-	ANCHOR/GUY WIRE
	-	CONIFEROUS TREE (SPREAD)
	-	DECIDUOUS TREE (SPREAD)
	-	TOP OF SLOPE
	-	TOE OF SLOPE
	-	EDGE OF ASPHALT/GRAVEL
	-	EDGE OF TREES

CAUTION

THIS IS NOT A PLAN OF SURVEY. BOUNDARY INFORMATION HAS NOT BEEN CONFIRMED IN THE FIELD.

NOTE

UNDERGROUND SERVICE/UTILITY LOCATIONS WERE NOT DETERMINED AND SHOULD BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION.

TOPOGRAPHIC OBSERVATIONS SHOWN HEREON COMPLETED ON JUNE 19, 2014.

TOPOGRAPHY

(PREPARED FOR THE TOWN OF NEWMARKET)

LLOYD & PURCELL LTD.
ONTARIO LAND SURVEYORS
1238 GORHAM STREET, UNIT 28, NEWMARKET, ONTARIO, L3Y 8Z1
(905) 895-5115 Fax (905) 853-3557 E-MAIL: l_p.newmarket@surveyors.ca
TORONTO LINE (905) 479-4500 Fax (905) 479-4575
WWW.NEWMARKETLANDSURVEYORS.CA

CAD: CF 24/06/14	PC: BR 19/08/14	JOB: 14-333
CALC: CF	CHK'D: TMP	FILE: N1-M4022-38

LLOYD & PURCELL Ltd.

Appendix B

DS CONSULTANTS LTD.
Geotechnical ❖ Environmental ❖ Materials ❖ Hydrogeology

LOG OF BOREHOLE BH19-1

PROJECT: Phase Two ESA - Proposed Daycare Building
CLIENT: Denison Child Care Services C/O YRDSB
PROJECT LOCATION: 900 Mulock Drive, Newmarket, ON
DATUM: Geodetic
DRILLING COMPANY: See Drawing 5

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct/17/2019

REF. NO.: 19-190-100
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors PID (ppm) 10 20 30 40	Soil Head Space Vapors CGD (ppm) 10 20 30 40	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.7													
265.6	**GRANULAR:** sand and gravel, 125mm		1	SS	16		265						
265.3 0.4	**FILL(Re-worked Native):** clayey silt to silt, trace to some topsoil, dark brown to brown, moist, very stiff												
1	**FILL (Re-worked Native):** clayey silt, mixed with organics, grey, moist, soft		2	SS	3								
264.2 1.5	**SILT TO CLAYEY SILT TILL:** some sand, trace gravel, brown, very moist to wet, compact		3	SS	11		264						1 11 74 14
2													
263.1 2.6	**SANDY SILT TILL:** trace to some clay, trace gravel, brown, moist, dense		4	SS	14		263						
3			5	SS	33								
4							262						
261.1 4.6	**SILTY SAND:** trace clay, trace gravel, brown, wet, very dense		6	SS	88		261						
5													
6							260						
259.6													
~~259.5~~ 6.2	~~**SAND AND GRAVEL:** trace silt,~~ grey, wet, very dense		7	SS	50/125mm								
	END OF BOREHOLE:												
	Notes: 1) Water level at depth of 4.6 mbgl during drilling												

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 19-190-100.GPJ DS.GDT 12/23/19

DS CONSULTANTS LTD.
Geotechnical ❖ Environmental ❖ Materials ❖ Hydrogeology

LOG OF BOREHOLE BH19-2

PROJECT: Phase Two ESA - Proposed Daycare Building
CLIENT: Denison Child Care Services C/O YRDSB
PROJECT LOCATION: 900 Mulock Drive, Newmarket, ON
DATUM: Geodetic
DRILLING COMPANY: See Drawing 5

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct/17/2019

REF. NO.: 19-190-100
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors PID (ppm) 10 20 30 40	Soil Head Space Vapors CGD (ppm) 10 20 30 40	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
266.1													
266.0 / 0.1	**TOPSOIL:** 100mm						266						
	FILL (Re-worked Native): sandy silt, trace topsoil/ rootlets, brown, moist, loose		1	SS	9								
265.3 / 0.8	**SILT TO CLAYEY SILT:** trace sand, brown, very moist to wet, stiff		2	SS	11		265						
264.6 / 1.5	**SANDY SILT TILL:** trace gravel, trace to some clay, brown, wet, compact to very dense		3	SS	19								
			4	SS	38		264						
			5	SS	49		263						
	some gravel, moist below 4.6m		6	SS	50/ 125mm		262						
260.0 / 6.1	**SILTY SAND:** trace clay, trace gravel, brown, wet, very dense		7	SS	50/ 125mm		261						
258.5 / 7.6	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, grey, moist, hard		8	SS	88/ 250mm		260						
258.0 / 8.1	**END OF BOREHOLE:**						259						
	Notes: 1) Water level at depth of 6.1 mbgl during drilling						258						

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS CONSULTANTS LTD.
Geotechnical ❖ Environmental ❖ Materials ❖ Hydrogeology

LOG OF BOREHOLE BH19-3

PROJECT: Phase Two ESA - Proposed Daycare Building
CLIENT: Denison Child Care Services C/O YRDSB
PROJECT LOCATION: 900 Mulock Drive, Newmarket, ON
DATUM: Geodetic
DRILLING COMPANY: See Drawing 5

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct/17/2019

REF. NO.: 19-190-100
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	PID (ppm) 10 20 30 40	CGD (ppm) 10 20 30 40	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.0													
264.9 0.1	**TOPSOIL:** 125mm												
264.5 0.5	**FILL (Re-worked Native):** silt, trace topsoil, trace organics, brown, moist, loose		1	SS	5								
1	**CLAYEY SILT TILL:** some sand, trace gravel, brown, very moist, firm to stiff		2	SS	8		264						
							Bentonite						
2			3	SS	14		263						
			4	SS	11								2 11 66 21
3							W. L. 262.2 m Oct 25, 2019						
			5	SS	14		261						
260.7 4							Filter Pack Slotted Pipe						
4.3	**SILTY SAND:** trace clay, trace gravel, brown, wet, dense to very dense		6	SS	34		260						1 54 41 4
6							259						
258.6 6.4	trace to some gravel below 6.1m		7	SS	50/ 100mm								
	END OF BOREHOLE:												

Notes:
1) Water level at 4.6 mbgl during drilling.
2) 50mm dia. monitoring well installed upon completion.
3) Water level Reading:

Date:	Water Level (mbgl):
Oct 25, 2019	2.82

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +³, ×³: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 19-190-100.GPJ DS.GDT 12/23/19

Appendix C

FINAL REPORT

CA14919-NOV19 R

19-190-100

Prepared for

DS Consultants

FINAL REPORT

CA14919-NOV19 R

First Page

CLIENT DETAILS

Client	DS Consultants
Address	6221 Highway 7 Vaughan, Ontario L4H 0K8. Canada
Contact	Drew Doak
Telephone	905-264-9393
Facsimile	905-264-2685
Email	drew.doak@dsconsultants.ca
Project	19-190-100
Order Number	
Samples	Soil (5)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14919-NOV19
Received	11/25/2019
Approved	12/02/2019
Report Number	CA14919-NOV19 R
Date Reported	12/02/2019

COMMENTS

Temperature of Sample upon Receipt: 2 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:012193

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: DS Consultants
Project: 19-190-100
Project Manager: Drew Doak
Samplers: John Gaviria-Ballen

PACKAGE: **REG153 - Hydrides** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Hydrides								
Antimony	µg/g	0.8	1.3	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	3.5	1.4	1.4	2.6	1.0
Selenium	µg/g	0.7	1.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics								
Moisture Content	%	-		9.0	14.4	19.8	16.1	17.8
Barium	µg/g	0.1	220	48	44	27	57	43
Beryllium	µg/g	0.02	2.5	0.50	0.19	0.20	0.43	0.29
Boron	µg/g	1	36	3	3	2	3	1
Cadmium	µg/g	0.02	1.2	0.09	0.05	0.07	0.14	0.11
Chromium	µg/g	0.5	70	17	8.8	8.5	17	12
Cobalt	µg/g	0.01	21	5.6	3.4	3.4	6.3	3.7
Copper	µg/g	0.1	92	15	7.0	6.6	12	4.5
Lead	µg/g	0.1	120	7.1	3.2	3.3	16	5.8
Molybdenum	µg/g	0.1	2	0.4	0.1	0.2	0.3	0.3
Nickel	µg/g	0.5	82	12	6.8	6.5	12	6.1
Silver	µg/g	0.05	0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thallium	µg/g	0.02	1	0.11	0.05	0.06	0.11	0.06

Client: DS Consultants
Project: 19-190-100
Project Manager: Drew Doak
Samplers: John Gaviria-Ballen

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

Parameter	Units	RL	L1	Sample Number 11	12	13	14	15
				Sample Name S1	S2	S3	S4	DUP-1
				Sample Matrix Soil	Soil	Soil	Soil	Soil
				Sample Date 22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
				Result	Result	Result	Result	Result
Metals and Inorganics (continued)								
Uranium	µg/g	0.002	2.5	0.46	0.34	0.32	0.45	0.38
Vanadium	µg/g	3	86	30	16	17	28	21
Zinc	µg/g	0.7	290	27	17	17	35	31

PACKAGE: **REG153 - Organochlorine Pests (OCs)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

Parameter	Units	RL	L1	Sample Number 11	12	13	14	15
				Sample Name S1	S2	S3	S4	DUP-1
				Sample Matrix Soil	Soil	Soil	Soil	Soil
				Sample Date 22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
				Result	Result	Result	Result	Result
Organochlorine Pests (OCs)								
Aldrin	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
alpha-Chlordane	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
gamma-Chlordane	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Chlordane (total)	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
o,p-DDD	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
pp-DDD	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
DDD (total)	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
o,p-DDE	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
pp-DDE	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
DDE (total)	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
op-DDT	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
pp-DDT	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02

Client: DS Consultants
Project: 19-190-100
Project Manager: Drew Doak
Samplers: John Gaviria-Ballen

PACKAGE: **REG153 - Organochlorine Pests (OCs)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

Sample Number				11	12	13	14	15
Sample Name				S1	S2	S3	S4	DUP-1
Sample Matrix				Soil	Soil	Soil	Soil	Soil
Sample Date				22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Organochlorine Pests (OCs) (continued)								
DDT (total)	µg/g	0.05	1.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
gamma-BHC	µg/g	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan II	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Endrin	µg/g	0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Heptachlor	µg/g	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	µg/g	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	µg/g	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	µg/g	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachloroethane	µg/g	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

PACKAGE: **REG153 - Other (ORP)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Other (ORP)								
Free Cyanide	µg/g	0.05	0.051	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

PACKAGE: **REG153 - Pesticides** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Pesticides								
Endosulfan (total)	µg/g	0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04

PACKAGE: **REG153 - Pesticides Surrogate** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Pesticides Surrogate								
Surr Decachlorobiphenyl	Surr Rec %	-		99	71	107	98	93

PACKAGE: **REG153 - VOC Surrogates** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

			Sample Number	11	12	13	14	15
			Sample Name	S1	S2	S3	S4	DUP-1
			Sample Matrix	Soil	Soil	Soil	Soil	Soil
			Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
VOC Surrogates								

Client: DS Consultants
Project: 19-190-100
Project Manager: Drew Doak
Samplers: John Gaviria-Ballen

PACKAGE: **REG153 - VOC Surrogates** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

	Sample Number	11	12	13	14	15		
	Sample Name	S1	S2	S3	S4	DUP-1		
	Sample Matrix	Soil	Soil	Soil	Soil	Soil		
	Sample Date	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019		
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
VOC Surrogates (continued)								
Surr TCMX	Surr Rec %	-		87	65	88	86	91

EXCEEDANCE SUMMARY

No exceedances are present above the regulatory limit(s) indicated

QC SUMMARY

Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Free Cyanide	SKA5112-NOV19	µg/g	0.05	<0.05	ND	20	94	80	120	91	75	125

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 I Internal ref.: ME-CA-[ENVISPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver	EMS0186-NOV19	ug/g	0.05	<0.05	ND	20	97	70	130	96	70	130
Arsenic	EMS0186-NOV19	µg/g	0.5	<0.5	10	20	100	70	130	96	70	130
Barium	EMS0186-NOV19	ug/g	0.1	<0.1	20	20	105	70	130	93	70	130
Beryllium	EMS0186-NOV19	µg/g	0.02	<0.02	11	20	92	70	130	88	70	130
Boron	EMS0186-NOV19	µg/g	1	<1	9	20	97	70	130	82	70	130
Cadmium	EMS0186-NOV19	µg/g	0.02	<0.02	17	20	98	70	130	102	70	130
Cobalt	EMS0186-NOV19	µg/g	0.01	<0.01	13	20	100	70	130	110	70	130
Chromium	EMS0186-NOV19	µg/g	0.5	<0.5	19	20	102	70	130	114	70	130
Copper	EMS0186-NOV19	µg/g	0.1	<0.1	5	20	103	70	130	108	70	130
Molybdenum	EMS0186-NOV19	µg/g	0.1	<0.1	11	20	103	70	130	118	70	130
Nickel	EMS0186-NOV19	ug/g	0.5	<0.5	10	20	102	70	130	111	70	130
Lead	EMS0186-NOV19	ug/g	0.1	<0.1	12	20	101	70	130	97	70	130

QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS (continued)

Method: EPA 3050/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Antimony	EMS0186-NOV19	µg/g	0.8	<0.8	ND	20	109	70	130	97	70	130
Selenium	EMS0186-NOV19	µg/g	0.7	<0.7	ND	20	101	70	130	97	70	130
Thallium	EMS0186-NOV19	µg/g	0.02	<0.02	9	20	102	70	130	95	70	130
Uranium	EMS0186-NOV19	µg/g	0.002	<0.002	20	20	98	70	130	92	70	130
Vanadium	EMS0186-NOV19	µg/g	3	<3	14	20	102	70	130	107	70	130
Zinc	EMS0186-NOV19	µg/g	0.7	<0.7	7	20	95	70	130	99	70	130

QC SUMMARY

Pesticides

Method: EPA 3541/8270D | Internal ref.: ME-CA-[ENVIGC-LAK-AN-018

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Aldrin	GCM0416-NOV19	µg/g	0.05	< 0.05	ND	40	94	50	140	85	50	140
alpha-Chlordane	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	94	50	140	87	50	140
Dieldrin	GCM0416-NOV19	µg/g	0.05	< 0.05	ND	40	94	50	140	84	50	140
Endosulfan I	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	91	50	140	83	50	140
Endosulfan II	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	88	50	140	83	50	140
Endrin	GCM0416-NOV19	µg/g	0.04	< 0.04	ND	40	95	50	140	92	50	140
gamma-BHC	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	93	50	140	85	50	140
gamma-Chlordane	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	94	50	140	86	50	140
Heptachlor epoxide	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	94	50	140	87	50	140
Heptachlor	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	92	50	140	84	50	140
Hexachlorobenzene	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	96	50	140	87	50	140
Hexachlorobutadiene	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	93	50	140	87	50	140
Hexachloroethane	GCM0416-NOV19	µg/g	0.01	< 0.01	ND	40	90	50	140	86	50	140
Methoxychlor	GCM0416-NOV19	µg/g	0.05	< 0.05	ND	40	93	50	140	87	50	140
o,p-DDD	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	89	50	140	85	50	140
o,p-DDE	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	95	50	140	86	50	140
op-DDT	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	90	50	140	80	50	140
pp-DDD	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	85	50	140	81	50	140
pp-DDE	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	95	50	140	87	50	140
pp-DDT	GCM0416-NOV19	µg/g	0.02	< 0.02	ND	40	92	50	140	84	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.
Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.
LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.
Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.
RL: Reporting limit
RPD: Relative percent difference
AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.
Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.
Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 012193 Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Oleg Mozhin
Received Date: 11/25/19 (mm/dd/yy)
Received Time: 10:15 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C): 2.2.2
LAB LIMS #: CA14919-NOV19

REPORT INFORMATION	INVOICE INFORMATION
Company: DS Consultants	☐ (same as Report Information)
Contact: Drew Doak	Company: DS Consultants
Address: 6221 Hwy 7 Unit 16	Contact:
Phone: 905-715-4182	Address:
Fax:	Phone:
Email: drew.doak@dsconsultants.ca	Email: Accounting

Quotation #: P.O. #:
Project #: 19-190-100 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04: ☒ Table 1 ☒ Table 2 ☐ Table 3 ☐ Table ____ | ☐ Res/Park ☒ Ind/Com ☐ Agri/Other | Soil Texture: ☐ Coarse ☐ Medium ☐ Fine

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☒ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water))	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI)	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni, Se,Ag,Tl,U,V,Zn)	SVOC: PAHs only	SVOC: SVOCs (all incl PAHs, ABNs, CPs)	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only (no BTEX)	VOC: VOCs (all incl BTEX)	VOC: BTEX only	Pest: Pesticides (Organochlorine or specify other)	Other: Hydride forming Metals	Other: CN	Other	Other	Other	Other	Other: Sewer Use: (Specify pkg:)	Other: Water Characterization Pkg (General ☐ Extended ☐)	TCLP (Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.)	COMMENTS:
1	S1	11/22/19	10:45	2	soil				X								X	X	X							
2	S2		9:15	2					X								X	X	X							
3	S3		9:45	2					X								X	X	X							
4	S1		10:20	2					X								X	X	X							
5	DUP-1		11:00	2					X								X	X	X							
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): John Gaviria-Ballen Signature: Date: 11/22/19 (mm/dd/yy)
Relinquished by (NAME): Tanner Leonhardt Signature: Date: 11/25/19 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.2
Date of Issue: 09 Sept, 2019

Appendix D

Project Number: Insert Project # 19-190-100 2019-11-15

[Comments]
135 Bristol Road
Newmarket, Ontario
L3Y 8J7

Attention: Ms. Nancy Mosey

RE: Sampling and Analysis Plan
Phase Two Environmental Site Assessment
900 Mulock Drive, Newmarket, Ontario

Dear: Ms. Nancy Mosey

1. Introduction

DS Consultants Limited (DS) is pleased to present the Sampling and Analysis Plan (SAP) for the proposed Phase Two Environmental Site Assessment of 900 Mulock Drive, Newmarket, Ontario , (the Site). The purpose of the proposed Phase Two ESA program is to assess the current subsurface environmental conditions in support of the proposed redevelopment of the Site.

The Phase Two ESA will involve intrusive investigation in the areas determined in the Site to be Areas of issues of potential Environmental concern, and will be completed in general accordance with O.Reg 153/04. Based on the findings of the field and laboratory analyses, a Phase Two ESA report will be prepared.

2. Background

Base on The Phase One ESA completed in October 2019 by DS, it is DS's understanding that the Site a 0.86-hectare (2.12 acres) parcel of land situated within a mixed residential and commercial neighbourhood in the City of Newmarket, Ontario. The Site was first developed for residential and agricultural purposes, based on the findings of the Phase One ESA, and has been used for that use since. A total of one (1) potentially contaminating activity was identified on the Phase One Property which is considered to be contributing to Areas of Potential Environmental Concern (APECs) on the Phase Two Property. A summary of the APECs identified, the potential contaminants of concern, and the media potentially impacted is presented in Table 1 below:

Table 1: Location of potential contamination

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-1	Eastern Portion of Property	PCA-7: #40 - Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications - An orchard was visible on the eastern portion of the Phase One Property is the 1927 aerial photograph.	On-Site	Metals, Hydrides, Cyanide, OCPs	Soil

Notes:

1. OCP= Organochloride Pesticides

The PCAs identified in Table 1-1 above are considered by the Qualified Person (QP) to be contributing to Areas of Potential Environmental Concern on the Phase One Property. The Potential Contaminants of Concern (PCOCs) identified by the QP include Metals, Hydrides, Cyanide and OCPs. Based on the findings of this Phase One ESA, it is concluded that a Phase Two ESA would be required in order to investigate the aforementioned APECs and to assess the environmental soil and groundwater conditions on the Phase One Property.

3. Site Investigation Program

The Site Investigation Program will be completed as follows:

- Public and private underground utilities and services will be cleared prior to commencement of intrusive investigation activities;
- Four (4) hand auger boreholes will be advanced to a maximum depth of 0.6 mbgs. The location of the boreholes will be selected to investigate any APECs identified during the Phase One ESA, to delineate the extents of relevant parameters of concern.
- Soil samples will be submitted for chemical analysis by a CALA laboratory in accordance with the Ontario MECP standards and requirements of O.Reg. 153/04 under the Environmental Protection Act.

All field equipment is to be calibrated at the start of each field day, in accordance with DS's Standard Operating Procedures (SOPs). Clean, disposable Nitrile™ gloves will be used at each sampling interval to reduce the risk of cross contamination. All non-dedicated equipment (e.g. split spoon sampler, interface probe, etc.) will be decontaminated between each borehole. The equipment will be brushed free of debris, washed with phosphate-free detergent, and then rinsed with analyte free

water.

The proposed analytical program is outlined below (proposed program subject to change as a result of site observations/findings). All soil sampling will be carried out in accordance with DS's SOPs.

Soils:

- Four (4) soil sample for analysis of Metals, Hydrides, Cyanide, and OCPs.

One quality control/quality assurance (QAQC) sample will be submitted for analysis per ten (10) samples analyzed in accordance with O.Reg. 153/04.

Following receipt of all of the results, a report in accordance with O.Reg. 153/04 will be prepared.

It is noted that if the Phase Two ESA reveals parameter concentrations greater than the applicable standards set out in *Ontario Regulation 153/04,* then additional work (i.e., supplemental delineation, additional drilling, sampling, analysis, and/or site remediation activities) will be deemed necessary prior to RSC filing, should an RSC be required. The costs for any additional work, if necessary, are beyond the current scope of work.

The SAP was created based on the request to complete a Phase Two ESA in support of the proposed redevelopment of the Site. The SAP was compiled to collect data to provide information on soil and/or groundwater quality in each APEC.

Additional delineation may be required following the implementation of this SAP to meet the requirements of O.Reg. 153/04 which requires delineation of all areas where concentrations are above the applicable SCS such as in the following conditions:

- Unexpected contamination not previously discovered, or not related to identified APECs, is discovered which will require further delineation to identify source(s); and
- If the sampling results indicate that the soil and/or groundwater impacts are deeper than initially expected.

We trust that this Sampling and Analysis Plan meets the objectives of the Client. If further assistance is required on this matter, please do not hesitate to contact the undersigned.

Yours Very Truly,

DS Consultants Ltd.

Drew Doak, B.Sc.E., P.Eng., QP_{ESA}
Environmental Project Manager