Prepared By:

Phase Two Environmental Site Assessment

Glen Allan Subdivision

GMBP File: 317033-1

June 2021

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PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

GLEN ALLAN SUBDIVISION

JUNE 2021

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1. INTRODUCTION & BACKGROUND

GM BluePlan Engineering Limited (GMBP) was retained by Mr. Murray Martin to complete a Phase Two Environmental Site Assessment (ESA) of the property located at the proposed residential subdivision, located west of South Mill Street, Glen Allan, in the Township of Mapleton. The subject Site is situated just south of Wellington Road 45 in the southerly portion of Glen Allan. The location of the subject Site is presented on Figure 1.

The subject Site is comprised of multiple separate lots. The legal description of each respective lot is provided as follows:

- Lot 70, 71 Donald Sutherland Survey – West of Centre Street and North of Wellesley Street; Township of (Peel) Mapleton, County of Wellington
- Lot 68, 69 Donald Sutherland Survey – West of Centre Street and South of George Street; Township of (Peel) Mapleton, County of Wellington
- Lot 62, 75, 76, 77 Donald Sutherland Survey – West of South Mill Street and North of Wellesley Street; Lot 72, 73, 74 East of Centre Street and North of Wellesley Street; Township of (Peel) Mapleton, County of Wellington
- Lot 63, 64 Donald Sutherland Survey – West of South Mill Street and Lot 65, 66, 67 East of Centre Street and South of George Street; Township of (Peel) Mapleton, County of Wellington
- Lot 34, 35, 36 West of South Mill Street and South of Hill Street; Lot 44, 45, 46 East of Centre Street and North of George Street – Donald Sutherland Survey; Township of (Peel) Mapleton, County of Wellington
- Hill Street, Donald Sutherland Survey, et al; Township of (Peel) Mapleton, County of Wellington
- George Street/Centre Street between George Street and Hill Street/Wellesley Street a.k.a. Wellesley Street; Donald Sutherland Survey, Township of Mapleton, County of Wellington
- Part Lot 5 Concession 2 as in RON75856 (third); Township of (Peel) Mapleton, County of Wellington
- Part Lot 5 Concession 2; Lots 40, 41, 42, 43 Donald Sutherland Survey; Township of (peel) Mapleton, County of Wellington

The subject property encompasses an approximate area of 4.29 hectares (10.59 acres), which consists primarily of undeveloped agricultural fields. The property is currently zoned *FD – Future Development* and *R1A – Unserviced Residential*, as designated by The Township of Mapleton comprehensive zoning by-law 2010-080.

It is our understanding that the Phase Two ESA is being completed to further assess the areas of potential environmental concern identified during completion of the previous Phase One ESA and to identify actual or potential environmental impacts or risks associated with the subject property. The Phased ESA is being completed to support the proposed development of the Site as a subdivision comprised of lots or blocks to be zoned for residential use. It is also our understanding that this Phase Two ESA is not being completed to support the filing of a Record of Site Condition (RSC) under Ontario Regulation 153/04 (as amended).

2. PREVIOUS INVESTIGATIONS

A Phase One ESA entitled *"Phase One Environmental Site Assessment, Glen Allan Subdivision"* was previously completed by GMBP for the subject property in December of 2018. The specific areas of potential environmental concern (APECs) identified in the Phase One ESA at the subject property are summarized below:

- APEC-1: The onsite fuel storage and handling operations associated with the diesel aboveground storage tank (AST) located adjacent to the exterior wall of the storage shed at the south end of South Mill Street.

- APEC-2: The potential demolition debris located at the southeast end of the site that gives evidence to a concrete cattle-feeding pad and associated structures being buried on site and may remain onsite in the subsurface.

Based on the findings of the Phase One ESA investigation, a Phase Two ESA work plan was developed in consultation with the client to assess the environmental condition of the subsurface related to the potential areas of environmental concern identified in the Phase One ESA. The Phase Two ESA investigation was undertaken to reduce the uncertainty with respect to the environmental condition of the subsurface soil at the site.

For additional information regarding the previous investigations, please refer directly to the above noted Phase One ESA.

3. PHYSIOGRAPHY & HYDROGEOLOGY

The subject property is located at the boundary line between the Physiographic Regions known as the *Dundalk Till Plain* and the *Stratford Till Plain (Chapman and Putnam 2007)*. The soils in the area primarily consist of silt till that is characterized as part of the Huron Loam Series. The Site is located primarily on undrumlinized till plains, with the north corner of the site located within the spillway of the Conestogo River.

Based on the local topography in proximity to the Site, the regional direction of shallow groundwater flow is inferred to be to the northeast toward the Conestogo River, which is located approximately 0.25 kilometers northeast of the subject Site. The pronounced topography of the area and the Site, combined with the measured water levels from each onsite monitoring well that were documented as part of the previous Hydrogeological Assessment indicate that the shallow groundwater flow at the Site is in a northeasterly direction following the topography toward the Conestogo River. The direction of shallow groundwater flow at the Site is presented on Figure 3 for reference.

4. APPLICABLE SOIL/GROUNDWATER CRITERIA – REGULATORY SETTING

For the purpose of the Phase Two ESA, impacts to the subject property are determined by comparison to the criteria identified in the Soil, Ground Water, and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act, Ministry of the Environment (MOE), April 15, 2011, under Ontario Regulation 153/04, hereafter referred to as the Standard. To determine the applicable regulatory criteria under the Standard as per O. Reg. 153/04 (as amended), the site must be characterized based on its property use, drinking water source, soil grain size, depth of overburden, and proximity to a water body, as summarized below.

Property Use

The property use for determining the applicable criteria are divided into three categories: Residential/Parkland/Institutional; Industrial/Commercial/Community; and Agricultural or Other. The subject property is being developed as a subdivision for residential purposes, and therefore, the criteria for a Residential/Parkland/Institutional property use has been selected. Based on the current use of the Site, the analytical results have also been compared to the more stringent Agricultural criteria for reference.

Drinking Water Source

There are two sets of generic criteria for a site condition, with respect to drinking water source, which includes a non-potable groundwater condition and a potable groundwater condition. The site and surrounding properties are supplied drinking water via on-site wells. Therefore, the Table 2 criteria of the Standard (i.e., for a potable groundwater condition) was selected as the regulatory criteria for the subsurface investigation.

Soil Grain Size

As part of the determination of the applicable criteria, the soil texture must be defined as “fine and medium textured” or “coarse textured” based on site conditions. By definition, coarse textured soils contain more than 50 percent by mass of particles greater than or equal to 75 µm in diameter. Based on a review of available borehole logs and geologic mapping, the native onsite soils consist primarily of native silt and clay with trace sand and gravel. Therefore, the fine and medium textured soil criteria has been selected as the applicable regulatory criteria.

Depth of Overburden

The depth of soil (overburden) must also be taken into consideration. Sites containing less than 2 m of overburden over 1/3 of the property or more are defined as being “a shallow soil property” by O. Reg. 153/04 (as amended) and as a result, are considered more environmentally sensitive and have a more stringent set of criteria.

Based on a preliminary review of available water well records in the area of the Site, the depth of overburden in the area of the site is approximately 60 to 72 metres. Based on completion of the onsite drilling program and advancement of boreholes, the onsite soils extend to a depth of at least 60 metres below ground surface (mbgs). Therefore, based on the observed subsurface conditions and the documented depth of overburden in the area, the shallow soil property criteria are not applicable.

Proximity to a Water Body

Where all or part of the subject property lies within 30 m of a surface water body, separate criteria were derived with the objective of protecting surface water body ecology. The nearest water body is the Conestogo River, which is located approximately 250 m northeast of the site. Therefore, the criteria for a water body within 30 m of the site does not apply.

In consideration of the site-specific conditions noted above, the Table 2 Residential/Parkland/Institutional Property Use criteria for fine to medium textured soils (in a potable groundwater condition) have been selected as the regulatory Standard for the subject property. As noted above, a comparison of the analytical findings to the more stringent Agricultural property use criteria has also been completed and is provided in the attached Tables.

5. METHODOLOGY

The purpose of this Phase Two ESA investigation is to determine with more certainty the nature and extent of potential impacts to the subsurface soils and groundwater in the vicinity of APECs that have been identified in the Phase One ESA investigation. The scope of work for this project was determined in consultation with the client and was developed to address the potential for impacts to the subsurface associated with the identified APECs.

Mr. A. Faarah of GMBP was onsite April 23, 2021 to complete a subsurface testhole investigation at the subject property. During the subsurface testhole investigation, a total of nine testholes were excavated to investigate the environmental condition of the subsurface soils at the subject property. Two additional soil samples were collected from a soil stockpile located onsite. Additionally, six boreholes (four equipped with monitoring wells) were advanced in 2018 as part of the previous geotechnical and hydrogeological assessments at the Site. The locations of testholes and monitoring wells are presented on Figure 2. Martin Groundworks was retained as the excavation contractor to complete the onsite testholes. During both the 2018 monitoring well installations and the 2021 testhole investigation, the nature and occurrence of the soils and groundwater was documented by GMBP personnel. Testhole and monitoring well logs are presented in Appendix “C”. Photographs of the site conditions were taken during the subsurface investigations and copies of the site photographs are presented in Appendix “A”.

To allow the collection of groundwater samples, monitoring wells were installed in four of the boreholes (i.e., MW-2, MW-3, MW-4, & MW-5). Details of the well construction are shown on the appended borehole logs (Appendix “C”). Each well was secured with a lockable expandable J-plug and a protective steel stick-up casing.

Groundwater was sampled from the monitoring wells in 2018 at the time of the initial assessments. Prior to purging and sampling, the static groundwater level and well depth were measured in each monitoring well. After purging three casing volumes of water, samples were collected from the recharged groundwater. Groundwater purging and sampling was conducted using dedicated Waterra™ tubing and inertial-type foot valves.

Soil and groundwater samples were collected using industry accepted methodology. Groundwater samples were collected for analysis of metals and inorganics, benzene, toluene, ethylbenzene and total xylenes (BTEX), and for petroleum hydrocarbons (PHCs) in the F1-F4 fractions. The samples were collected by pumping water into pre-preserved laboratory supplied containers. Sample bottles for petroleum hydrocarbons in the F1 fraction and BTEX were filled with no headspace remaining.

Soil samples were submitted for analysis of metals and inorganics, polycyclic aromatic hydrocarbons (PAHs), and the F2 to F4 fraction of PHCs. The samples were placed in laboratory supplied jars/containers. Soil samples collected for the analysis of BTEXs and the F1 fraction of PHCs were collected using laboratory supplied, sample dedicated, pre-preserved methanol vials. Collected plugs of soil (~5 grams) were deposited into the laboratory supplied sample vials.

Samples were submitted to Bureau Veritas Laboratories (BVL), formerly Maxxam Analytics (Maxxam), within the specified hold times in coolers and under standard chain of custody protocols. BVL is accredited by the Canadian Association for Laboratory Accreditation (CALA) and by the Standards Council of Canada for the analyses requested. Copies of the lab Certificates of Analyses are provided in Appendix "B" and the results are summarized in Tables 2 and 3 (i.e., Tables 2A to 2C; and 3A, 3B).

A summary of the testhole and monitoring well locations, the associated APECs, and the analytical testing conducted is provided in Table 1 below.

Table 1 - Summary of Testhole/Monitoring Well Information

Sample ID	Sample Location	Rationale	Analysis
MW-2	Near southern property boundary.	To investigate the groundwater quality for potential metals impacts.	Metals and inorganics
MW-3	Near middle of western property boundary.	To investigate the groundwater quality for potential metals impacts.	Metals and inorganics
MW-4	Near northern property boundary.	To investigate the groundwater quality for potential metals impacts.	Metals and inorganics
MW-5	Near eastern property boundary, adjacent to South Mill Street.	To investigate the groundwater quality for potential metals, PHC and BTEX impacts.	Metals, BTEX, PHC fractions F1 to F4
TP-1	Adjacent to southeastern corner of shed, near AST.	To investigate the quality of subsurface for potential PHC and BTEX impacts.	BTEX and PHC fractions F1 to F4
TP-3	Adjacent to northeastern corner of shed.	To investigate the quality of the subsurface for potential PHC and BTEX impacts.	BTEX and PHC fractions F1 to F4
TP-5	Near middle of northern side of former concrete pad and barn foundation.	To investigate the quality of the subsurface for potential metals and PAH impacts.	Metals and PAHs
TP-6	Near middle of western side of former concrete pad and barn foundation.	To investigate the quality of the subsurface for potential metals and PAH impacts.	Metals and PAHs
TP-8	Near middle of southern side of former concrete pad and barn foundation.	To investigate the quality of the subsurface for potential metals and PAH impacts.	Metals and PAHs
TP-9	Near middle of eastern side of former concrete pad and barn foundation.	To investigate the quality of the subsurface for potential metals and PAH impacts.	Metals and PAHs
SP-1	South side of soil stockpile.	To investigate the quality of piled soil materials for potential metals and PAH impacts.	Metals and PAHs

Sample ID	Sample Location	Rationale	Analysis
SP-2	North side of soil stockpile.	To investigate the quality of piled soil materials for potential metals and PAH impacts.	Metals and PAHs

6. DISCUSSION OF FINDINGS

As reported in the Phase One ESA (GMBP, 2018) one diesel fuel AST is present on the subject property, adjacent to the onsite storage shed located near the southwest end of South Mill Street. Additionally, an area of demolition debris suspected to consist of a former concrete cattle-feeding pad and barn was identified at the southeast end of the site. Based on the onsite fuel storage operations and buried debris, APECs were identified for the subject property.

To investigate the potential presence of impacts to the soil and/or groundwater due to onsite fuel storage and debris, six testholes were excavated in proximity to the debris, two samples were collected from a nearby soil stockpile, three testholes were excavated in proximity to the onsite AST, and groundwater samples were previously collected from four onsite monitoring wells.

6.1 Testhole Investigation – Findings

Three testholes (TP-1, TP-2 & TP-3) were excavated in proximity to the onsite diesel fuel AST to further investigate the presence of F1 to F4 and BTEX impacts to the subsurface related to onsite fuel storage. Additionally, six testholes (TP-4 to TP-9) were excavated in proximity to the location of the suspected barn demolition debris, and two soil samples were collected from an existing onsite soil stockpile located as shown on the attached Testhole & Monitoring Well Location Figure (Figure 2). The locations of all testholes and the boreholes/monitoring wells installed onsite are s presented on Figure 2. The soils within the boreholes were observed to generally consist of organic topsoil, native brown sandy silt with some clay, and grey silty clay. No evidence of suspicious soils or deleterious materials were identified in any of the testholes.

During the completion of TP-1, soil samples were collected from the organic topsoil observed between 0.0 and 0.46 mbgs, and from the moist sandy silt layer observed between 1.2 and 1.5 mbgs. The soil samples collected from TP-1 were submitted for F1 to F4 PHCs and BTEX analysis. The reported analytical results of the soil samples from this location indicate that the concentrations of PHCs and BTEX were not measured above the laboratory detection limits at TP-1, and therefore meet the Table 2 criteria of the Standard for these parameters.

During the completion of TP-3, a layer of wet sandy silt was encountered between 1.22 and 1.53 mbgs. A soil sample collected from this layer was submitted for F1 to F4 PHCs and BTEX analysis. The reported analytical results of the soil sample from this location indicate that the concentrations of PHCs and BTEX were not measured above the laboratory detection limits at TP-3, and therefore meet the Table 2 criteria of the Standard for these parameters.

During the completion of TP-5, a layer of hard, dry, grey silty clay was encountered between 0.9 to 2.44 mbgs. A soil sample collected from this layer was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

During the completion of TP-6, a layer of hard, dry, grey silty clay was encountered between 0.92 and 2.0 mbgs. A soil sample collected from this layer was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

During the completion of TP-8, a layer of hard, dry, grey silty clay was encountered between 1.22 and 1.7 mbgs. A soil sample collected from this layer was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

During the completion of TP-9, a layer of hard, dry, grey silty clay was encountered between 1.22 and 1.7 mbgs. A soil sample collected from this layer was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

To further investigate the existing area of stockpiled soils situated adjacent to and in close proximity to the former barn, testpits were excavated into the stockpile to assess and delineate the environmental condition of the stockpiled soils at this location. SP-1, collected from the south side of the soil stockpile, was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

SP-2, was collected from the north side of the soil stockpile and was submitted for analysis of metals and PAHs. The reported analytical results of the soil sample from this location indicate that no PAHs were measured above the laboratory detection limits, and that the reported concentrations of all metals and PAHs meet the Table 2 criteria of the Standard for these parameters.

6.2 Groundwater Investigation – Findings

As previously reported, boreholes were advanced at the time of the initial geotechnical and hydrogeological assessments that were initially completed onsite in 2018. At that time, groundwater samples were collected from MW-2, MW-3, MW-4, and MW-5following the initial drilling investigation to support the completion of those related studies. Prior to sampling, three water column volumes were purged from the monitoring wells. The groundwater sampling resulted in the following findings:

- The reported analytical parameters for MW-2, MW-3, MW-4, and MW-5 meet the Table 2 Groundwater Criteria of the Standard,
- A trace concentration of toluene was detected in the groundwater sample collected at the location of MW-5. However, the trace concentration is below the Table 2 criteria of the Standard.

7. SUMMARY OF FINDINGS

The previous Phase One ESA completed by GMBP identified the following APECs for the subject property:

- APEC-1: The onsite fuel storage and handling operations associated with the diesel AST located adjacent to the exterior wall of the storage shed at the south end of South Mill Street.

- APEC-2: The potential demolition debris located at the southeast end of the site that gives evidence to a concrete cattle-feeding pad and associated structures being buried on site and may remain onsite in the subsurface.

The Phase Two ESA was undertaken to investigate the above noted APECs associated with the subject property resulting from historical and current land use on the site. To provide more certainty regarding the subsurface conditions associated with the onsite APECs, nine testholes were completed in strategic locations across the subject site. Additionally, two soil samples were collected from an onsite soil stockpile, and four groundwater samples were collected from onsite monitoring wells. The following information was obtained through the completion of the Phase Two ESA:

- In general, the soils at the subject property consist primarily of native silt and clay till with some sand and gravel.

- No evidence of PHC impacts was identified at the surface or in the subsurface soils in proximity to the diesel fuel AST. Additionally, no PHC or BTEX impacts were measured in the soil samples collected from TP-1 and TP-3 adjacent to the AST.

- Metals and PAH impacts were not detected in the soil in the locations of TP-5, TP-6, TP-8 TP-9, SP-1, and SP-2. Further, no evidence of demolition debris or deleterious materials was identified at the location of any of the testholes excavated onsite.

- Metals and PHC impacts were not detected in the groundwater in the locations of MW-2, MW-3, MW-4, and MW-5. A trace concentration of toluene was reported to be present in the groundwater sample collected at MW-5, but remains well below the Table 2 criteria of the Standard.

8. CONCLUSIONS AND RECOMMENDATIONS

A Phase Two ESA was undertaken at the subject property to support the planned development of the proposed residential subdivision at the Site. The Phase Two ESA was completed to further investigate the APECs that were identified in the previous Phase One ESA.

To provide more certainty regarding the environmental condition of the subsurface soils and the groundwater at the subject property, nine testholes were completed for soil sampling and analysis, andtwo additional stockpile samples were collected from an onsite soil stockpile. Additionally, four monitoring wells were installed as part of the initial geotechnical and hydrogeological assessments at the Site in 2018. Groundwater samples were collected from all four monitoring wells for analysis in 2018 and included sampling and analytical testing specifically for the identified APECs (i.e., to be utilized as part of this Phase Two ESA).

The reported soil and groundwater concentrations meet the Table 2 Residential/Parkland/Institutional Criteria of the Standard at each of the sampling locations. No evidence of suspect fill, demolition debris, or impacts was noted at the locations of the advanced boreholes and/or at the excavated testpits. Based on the evidence identified in the field at the time of the subsurface investigations, combined with the analytical findings for the collected samples, no additional investigation or remediation is recommended at this time.

9. STATEMENT OF LIMITATIONS

The information in this Phase Two ESA is intended for the sole use of Mr. Murray Martin. GM BluePlan Engineering Limited accepts no liability for use of this information by third parties. Any decisions made by third parties on the basis of information provided in this report are made at the sole risk of the third parties.

GM BluePlan Engineering Limited cannot guarantee the accuracy or reliability of information provided by others. GM BluePlan Engineering Limited does not accept liability for unknown, unidentified, undisclosed or unforeseen surface or sub-surface contamination that may be later identified.

The conclusions pertaining to the environmental condition of soils identified at the site are based on the visual observations at the locations of the investigative boreholes and on the analytical data for the selected soil and groundwater samples. GM BluePlan Limited cannot guarantee the environmental condition of soil and/or groundwater that may be encountered at the site in locations that were not specifically investigated.

This report is believed to provide documentation of site conditions as of April 23, 2021.

10. QUALIFICATIONS OF ASSESSORS

Mrs. Kate Charpontier Env. Tech., has a diploma in Environmental Technology from Georgian College. Mrs. Charpontier has conducted numerous environmental investigations, including the completion of Phase One and Two Environmental Site Assessments. Mrs. Charpontier has also been involved in various investigations related to residential, commercial, and industrial properties.

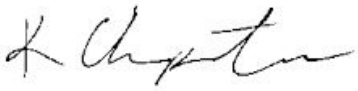
Mr. Alen Bringleson, B.E.S., C.E.T., is a Certified Engineering Technologist (Environmental Designation) with over eighteen years of experience preparing Phase One and Phase Two Environmental Site Assessments, completing site remediation, and conducting various environmental and civil investigations. Mr. Bringleson is a principal in the firm and has been involved with detailed environmental site investigations and the remediation of residential, commercial, and industrial properties. Mr. Bringleson is a member of the Ontario Association of Certified Engineering Technicians and Technologists (OACETT).

Mr. Matthew Nelson, M.Sc., P.Geo., is an Environmental Engineer/Hydrogeologist with over eighteen years of experience with environmental, hydrogeological, and remedial investigations. Mr. Nelson has experience preparing numerous Phase One and Phase Two Environmental Site Assessments, environmental investigations, and the completion of Phase Three site remediations. Mr. Nelson has been involved with detailed environmental site investigations for several large commercial and industrial properties.

GM Blue Plan Limited has completed numerous Phase One Environmental Site Assessments, which also include follow-up Phase Two ESAs. GM BluePlan Limited has also been involved with the remediation of numerous sites, and with the preparation of a Record of Site Condition in certain cases.

All of which is respectfully submitted.

GM BLUEPLAN ENGINEERING LIMITED
Per:



Kate Charpontier, Env. Tech. Dipl.

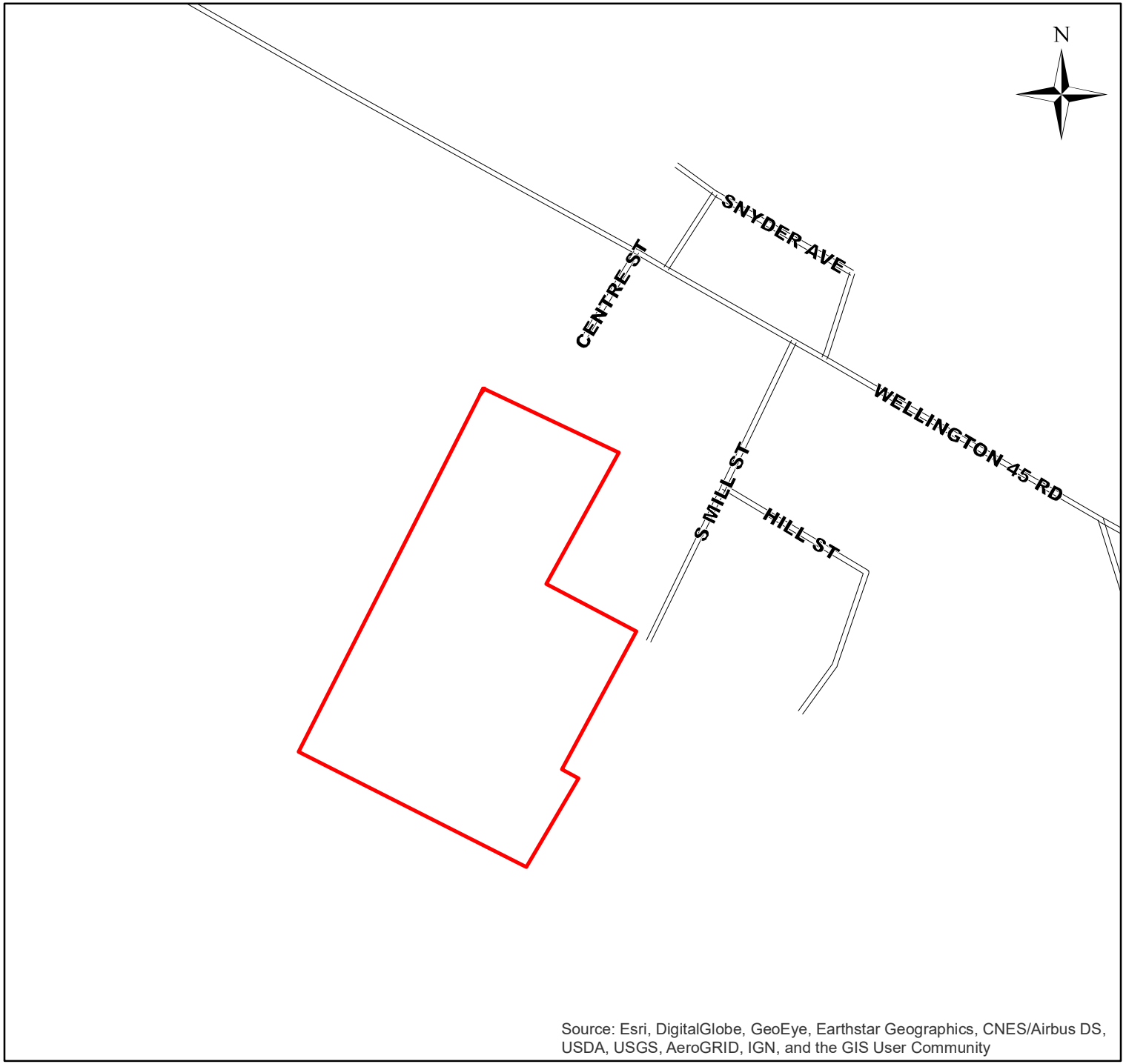
Per:

Alen Bringleson, B.E.S., C.E.T

Per:

Matthew Nelson, P.Eng, P.Geo.

FIGURES:



Project: 317033-1
Phase Two ESA
Glen Allan Subdivision
Glen Allan, Ontario

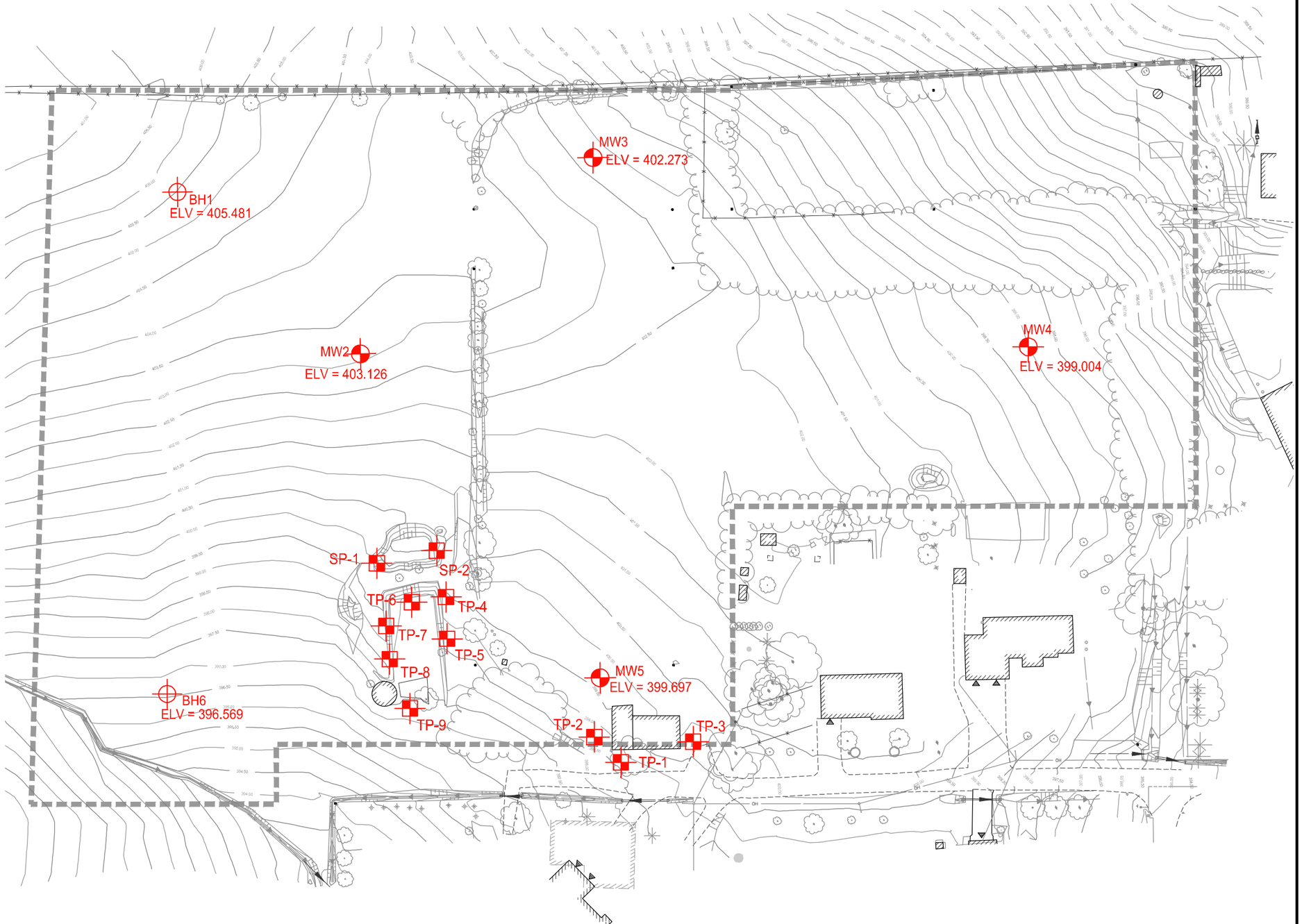
Part of Lot 5,
Concession 2,
Geo. Twp. of Peel

Roads
Site Boundary (Approx.)

Scale: 1: 4,000
April 2021

Figure 1:
Site Location

[redacted]



TOWNSHIP OF MAPLETON

N

LEGEND

- MONITORING WELL
- BOREHOLE
- TESTHOLE

TESTHOLE AND MONITORING WELL LOCATION MAP

GLEN ALLAN SUBDIVISION PHASE TWO ESA

Figure No. 2

BluePlan ENGINEERING

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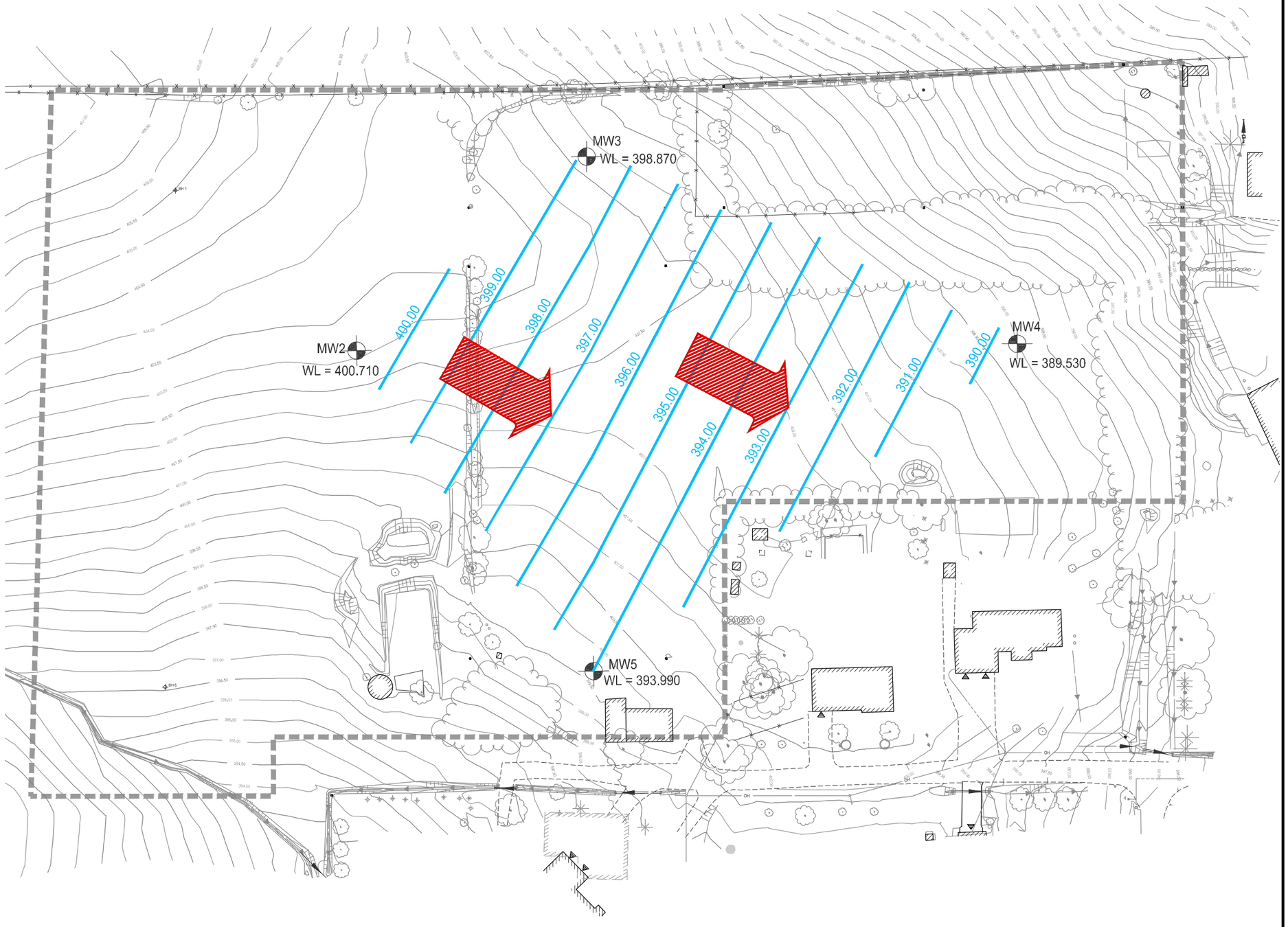

TOWNSHIP OF MAPLETON

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LEGEND

- OVERBURDEN MONITORING WELL
- GROUNDWATER CONTOURS
- INFERRED GROUNDWATER FLOW DIRECTION

OVERBURDEN GROUNDWATER FLOW MAP

GLEN ALLAN SUBDIVISION PHASE TWO ESA

Figure No. 3

BluePlan ENGINEERING

317033-1

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N.T.S.

TABLES:

Table 2a : Results of Soil Quality Analyses - Metals Parameters

	Sample ID	TP-5 (3-5)	TP-6 (3-5)	TP-8 (3-5)	TP-9 (3-5)	SP-1 COMP	SP-2 COMP
	Sample Description	Soil	Soil	Soil	Soil	Soil	Soil
	Sampling Date	2021-04-23	2021-04-23	2021-04-23	2021-04-23	2021-04-23	2021-04-23
Parameters	**Criteria 1** Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil, Agricultural Use	**Concentration**					
Antimony (Sb) (ug/g)	**7.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic (As) (ug/g)	**11**	3.3	2.7	3	3	3.8	3
Barium (Ba) (ug/g)	**390**	100	89	99	93	130	86
Beryllium (Be) (ug/g)	**5**	0.64	0.57	0.62	0.63	0.86	0.6
Cadmium (Cd) (ug/g)	**1**	0.13	0.11	<0.10	0.12	0.16	0.12
Chromium (Cr) (ug/g)	**160**	23	20	21	22	29	21
Chromium VI (Cr+6) (ug/g)	**10**	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Cobalt (Co) (ug/g)	**22**	9.9	9	8.6	9	11	8.7
Copper (Cu) (ug/g)	**180**	19	19	18	18	23	18
Lead (Pb) (ug/g)	**45**	10	9.5	9.1	9.1	11	9.2
Molybdenum (Mo) (ug/g)	**6.9**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nickel (Ni) (ug/g)	**130**	21	20	19	20	26	19
Selenium (Se) (ug/g)	**2.4**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver (Ag) (ug/g)	**25**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl) (ug/g)	**1**	0.15	0.14	0.15	0.14	0.19	0.14
Uranium (U) (ug/g)	**23**	0.54	0.51	0.49	0.48	0.54	0.47
Vanadium (V) (ug/g)	**86**	32	28	30	30	39	29
Zinc (Zn) (ug/g)	**340**	56	54	49	53	65	49
Mercury (Hg) (ug/g)	**1.8**	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

1. Criteria are from the O.Reg. 153/04 :Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil; Agricultural Use
2. Concentrations that are **Bolded** represent an exceedance of the site-specific criteria.
3. Criteria and concentrations are given in units consistent with the units listed for the associated parameter.
4. ---- represents sample parameters that were not analyzed; ~ = No value specified.
5. BV Labs Job Number: C1A9421.

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Table 2b : Results of Soil Quality Analyses - Polycyclic Aromatic Hydrocarbons

	Sample ID	TP-5 (3-5)	TP-6 (3-5)	TP-8 (3-5)	TP-9 (3-5)	SP-1 COMP	SP-2 COMP
	Sample Description	Soil	Soil	Soil	Soil	Soil	Soil
	Sampling Date	2021-04-23	2021-04-23	2021-04-23	2021-04-23	2021-04-23	2021-04-23
Parameters	**Criteria 1** Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil, Agricultural Use	**Concentration**					
Naphthalene (µg/g)	**0.75**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene (µg/g)	**0.17**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene (µg/g)	**29**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene (µg/g)	**69**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene (µg/g)	**7.8**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene (µg/g)	**0.74**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene (µg/g)	**0.69**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene (µg/g)	**78**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benz(a)anthracene (µg/g)	**0.63**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene (µg/g)	**7.8**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene (µg/g)	**0.78**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene (µg/g)	**0.78**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene (µg/g)	**0.078**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene (µg/g)	**0.48**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz(a,h)anthracene (µg/g)	**0.1**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(g,h,i)perylene (µg/g)	**7.8**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-and 1-methyl Naphthalene (µg/g)	**3.4**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

1. Criteria are from the O.Reg. 153/04 :Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil; Agricultural Use
2. Concentrations that are **Bolded** represent an exceedance of the site-specific criteria.
3. Criteria and concentrations are given in units consistent with the units listed for the associated parameter.
4. ---- represents sample parameters that were not analyzed; ~ = No value specified.
5. BV Labs Job Number: C1A9421.

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Table 2c : Results of Soil Quality Analyses - Petroleum Hydrocarbons

	Sample ID	TP-1 (0-2.5)	TP-1 (4-5)	TP-3 (4-5)
	Sample Description	Soil	Soil	Soil
	Sampling Date	2021-04-23	2021-04-23	2021-04-23
Parameters	**Criteria 1** Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil, Agricultural Use	**Concentration**		
Benzene (µg/g)	**0.17**	<0.020	<0.020	<0.020
Toluene (µg/g)	**6**	<0.020	<0.020	<0.020
Ethylbenzene (µg/g)	**1.6**	<0.020	<0.020	<0.020
Total Xylene (µg/g)	**25**	<0.040	<0.040	<0.040
F1 (C6 to C10) (µg/g)	**65**	<10	<10	<10
F1 (C6 to C10) minus BTEX (µg/g)	**65**	<10	<10	<10
F2 (C10 to C16) (µg/g)	**150**	<10	<10	<10
F3 (C16 to C34) (µg/g)	**1300**	<50	<50	<50
F4 (C34 to C50) (µg/g)	**5600**	<50	<50	<50

1. Criteria are from the O.Reg. 153/04 :Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil; Agricultural Use
2. Concentrations that are **Bolded** represent an exceedance of the site-specific criteria.
3. Criteria and concentrations are given in units consistent with the units listed for the associated parameter.
4. ---- represents sample parameters that were not analyzed; ~ = No value specified.
5. BV Labs Job Number: C1A9421

Table 3a : Results of Groundwater Quality Analyses - Metals Parameters

	Sample ID	MW2	MW3	MW4	MW5
	Sample Description	Groundwater	Groundwater	Groundwater	Groundwater
	Sampling Date	2018-12-05	2018-12-05	2018-12-05	2018-12-05
Parameters	**Criteria 1** Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil, Agricultural Use	**Concentration**			
Antimony (Sb) (ug/g)	**6**	<0.50	<0.50	<0.50	<0.50
Arsenic (As) (ug/g)	**25**	<1.0	3.8	<1.0	5.4
Barium (Ba) (ug/g)	**1000**	100	160	75	84
Beryllium (Be) (ug/g)	**4**	<0.50	<0.50	<0.50	<0.50
Cadmium (Cd) (ug/g)	**2.7**	<0.10	<0.10	<0.10	<0.10
Chromium (Cr) (ug/g)	**50**	<5.0	<5.0	<5.0	<5.0
Chromium VI (Cr+6) (ug/g)	**25**	-	-	-	-
Cobalt (Co) (ug/g)	**3.8**	<0.50	0.62	<0.50	<0.50
Copper (Cu) (ug/g)	**87**	6.6	11	1.9	10
Lead (Pb) (ug/g)	**10**	<0.50	0.51	<0.50	<0.50
Molybdenum (Mo) (ug/g)	**70**	5.9	8.9	1.1	4.4
Nickel (Ni) (ug/g)	**100**	2.7	1.4	<1.0	5.4
Selenium (Se) (ug/g)	**10**	<2.0	<2.0	<2.0	<2.0
Silver (Ag) (ug/g)	**1.5**	<0.10	<0.10	<0.10	<0.10
Thallium (Tl) (ug/g)	**2**	<0.050	<0.050	<0.050	<0.050
Uranium (U) (ug/g)	**20**	0.1	6.9	2.3	2.1
Vanadium (V) (ug/g)	**6.2**	0.5	<0.50	<0.50	0.6
Zinc (Zn) (ug/g)	**1100**	8.6	11	<5.0	12
Mercury (Hg) (ug/g)	**1**	-	-	-	-

1. Criteria are from the O.Reg. 153/04 :Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil; Agricultural Use
2. Concentrations that are **Bolded** represent an exceedance of the site-specific criteria.
3. Criteria and concentrations are given in units consistent with the units listed for the associated parameter.
4. ---- represents sample parameters that were not analyzed; ~ = No value specified.

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Table 3b : Results of Groundwater Quality Analyses - Petroleum Hydrocarbons

	Sample ID	MW5
	Sample Description	Groundwater
	Sampling Date	2018-12-05
Parameters	**Criteria 1** Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil, Agricultural Use	**Concentration**
Benzene (µg/g)	**5**	<0.20
Toluene (µg/g)	**24**	0.27
Ethylbenzene (µg/g)	**2.4**	<0.20
Total Xylene (µg/g)	**300**	<0.40
F1 (C6 to C10) (µg/g)	**750**	<25
F1 (C6 to C10) minus BTEX (µg/g)	**750**	<25
F2 (C10 to C16) (µg/g)	**150**	<100
F3 (C16 to C34) (µg/g)	**500**	<200
F4 (C34 to C50) (µg/g)	**500**	<200

1. Criteria are from the O.Reg. 153/04 :Table 2 Potable Groundwater Condition; Fine to Medium Textured Soil; Agricultural Use
2. Concentrations that are **Bolded** represent an exceedance of the site-specific criteria.
3. Criteria and concentrations are given in units consistent with the units listed for the associated parameter.
4. ---- represents sample parameters that were not analyzed; ~ = No value specified.
5. BV Labs Job Number: C1A9421

APPENDIX A:
SITE PHOTOGRAPHS

Photo 1 - View showing location of TP-1.

Photo 2 - TP-1 side wall.

Photo 3 - View showing location of TP-2.

Photo 4 - TP-2 side wall.

Photo 5 - View showing location of TP-3.

Photo 6 - TP-3 side wall.

Photo 7 - View showing location of TP-4.

Photo 8 - TP-4 side wall.

Photo 9 - View showing location of TP-5.

Photo 10 - TP-5 side wall.

Photo 11 - View showing location of TP-8.

Photo 12 - TP-8 side wall.

Photo 13 - View showing location of TP-9.

Photo 14 - TP-9 side wall.

Photo 15 - View showing location of SP-1.

Photo 16 - SP-1 side wall.

Photo 17 - View showing location of SP-2.

Photo 18 - SP-2 side wall.

APPENDIX B:
LABORATORY CERTIFICATES OF ANALYSIS

Maxxam
A Bureau Veritas Group Company

Your Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Your C.O.C. #: 695039-01-01

Attention: Kate Camlis

GM BluePlan Engineering Limited
975 Wallace Avenue North
Listowell, ON
Canada N4W 1M6

Report Date: 2018/12/14
Report #: R5525891
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8W7975
Received: 2018/12/07, 09:26

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	4	N/A	2018/12/12	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2018/12/13	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2018/12/13	CAM SOP-00463	EPA 325.2 m
Conductivity	4	N/A	2018/12/12	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	4	N/A	2018/12/12	CAM SOP-00446	SM 23 5310 B m
Petroleum Hydro. CCME F1 & BTEX in Water	1	N/A	2018/12/11	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (2)	1	2018/12/12	2018/12/13	CAM SOP-00316	CCME PHC-CWS m
Hardness (calculated as CaCO3)	4	N/A	2018/12/12	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	4	N/A	2018/12/12	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	4	N/A	2018/12/13		
Anion and Cation Sum	4	N/A	2018/12/13		
Total Ammonia-N	4	N/A	2018/12/13	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (3)	3	N/A	2018/12/12	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate (NO3) and Nitrite (NO2) in Water (3)	1	N/A	2018/12/13	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	4	N/A	2018/12/12	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	4	N/A	2018/12/13	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2018/12/13		
Sat. pH and Langelier Index (@ 4C)	4	N/A	2018/12/13		
Sulphate by Automated Colourimetry	4	N/A	2018/12/13	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	4	N/A	2018/12/13		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed

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Your Project #: 317033-2
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or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: AGibson@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

RCAP - COMPREHENSIVE (WATER)

Maxxam ID		IMM909		IMM910		IMM911	IMM912		
Sampling Date		2018/12/05		2018/12/05		2018/12/05	2018/12/05		
COC Number		695039-01-01		695039-01-01		695039-01-01	695039-01-01		
	UNITS	MW2	QC Batch	MW3	QC Batch	MW4	MW5	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	8.97	5881997	10.9	5881997	7.64	8.08	N/A	5881997
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	390	5882002	510	5882002	320	330	1.0	5882002
Calculated TDS	mg/L	450	5882000	540	5882000	390	430	1.0	5882000
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.2	5882002	5.2	5882002	2.8	2.9	1.0	5882002
Cation Sum	me/L	8.92	5881997	11.1	5881997	7.79	8.45	N/A	5881997
Hardness (CaCO3)	mg/L	400	5881953	470	5881953	360	390	1.0	5881953
Ion Balance (% Difference)	%	0.310	5881996	0.900	5881996	0.950	2.24	N/A	5881996
Langelier Index (@ 20C)	N/A	0.973	5881998	1.06	5881998	0.906	0.977		5881998
Langelier Index (@ 4C)	N/A	0.725	5881999	0.813	5881999	0.657	0.729		5881999
Saturation pH (@ 20C)	N/A	6.97	5881998	6.97	5881998	7.06	6.99		5881998
Saturation pH (@ 4C)	N/A	7.22	5881999	7.22	5881999	7.31	7.24		5881999
Inorganics									
Total Ammonia-N	mg/L	0.24	5884702	0.31	5884702	0.23	0.17	0.050	5884702
Conductivity	umho/cm	780	5884273	910	5884273	670	730	1.0	5884273
Dissolved Organic Carbon	mg/L	1.3	5883205	1.6	5883205	0.64	0.95	0.50	5883205
Orthophosphate (P)	mg/L	<0.010	5884929	<0.010	5884929	<0.010	<0.010	0.010	5884929
pH	pH	7.94	5884276	8.03	5884276	7.97	7.97		5884276
Dissolved Sulphate (SO4)	mg/L	33	5884927	22	5884927	35	44	1.0	5884927
Alkalinity (Total as CaCO3)	mg/L	390	5884270	510	5884270	330	330	1.0	5884270
Dissolved Chloride (Cl-)	mg/L	16	5884918	4.9	5884918	15	17	1.0	5884918
Nitrite (N)	mg/L	<0.010	5882903	0.017	5884293	<0.010	<0.010	0.010	5882903
Nitrate (N)	mg/L	0.24	5882903	0.25	5884293	<0.10	<0.10	0.10	5882903
Nitrate + Nitrite (N)	mg/L	0.24	5882903	0.26	5884293	<0.10	<0.10	0.10	5882903
Metals									
Dissolved Aluminum (Al)	ug/L	6.8	5883200	<5.0	5883200	48	<5.0	5.0	5883200
Dissolved Antimony (Sb)	ug/L	<0.50	5883200	<0.50	5883200	<0.50	<0.50	0.50	5883200
Dissolved Arsenic (As)	ug/L	<1.0	5883200	3.8	5883200	<1.0	5.4	1.0	5883200
Dissolved Barium (Ba)	ug/L	100	5883200	160	5883200	75	84	2.0	5883200
Dissolved Beryllium (Be)	ug/L	<0.50	5883200	<0.50	5883200	<0.50	<0.50	0.50	5883200
Dissolved Boron (B)	ug/L	28	5883200	63	5883200	14	21	10	5883200
Dissolved Cadmium (Cd)	ug/L	<0.10	5883200	<0.10	5883200	<0.10	<0.10	0.10	5883200
Dissolved Calcium (Ca)	ug/L	79000	5883200	62000	5883200	74000	86000	200	5883200
Dissolved Chromium (Cr)	ug/L	<5.0	5883200	<5.0	5883200	<5.0	<5.0	5.0	5883200
Dissolved Cobalt (Co)	ug/L	<0.50	5883200	0.62	5883200	<0.50	<0.50	0.50	5883200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

RCAP - COMPREHENSIVE (WATER)

Maxxam ID		IMM909		IMM910		IMM911	IMM912		
Sampling Date		2018/12/05		2018/12/05		2018/12/05	2018/12/05		
COC Number		695039-01-01		695039-01-01		695039-01-01	695039-01-01		
	UNITS	MW2	QC Batch	MW3	QC Batch	MW4	MW5	RDL	QC Batch
Dissolved Copper (Cu)	ug/L	6.6	5883200	11	5883200	1.9	10	1.0	5883200
Dissolved Iron (Fe)	ug/L	<100	5883200	350	5883200	<100	230	100	5883200
Dissolved Lead (Pb)	ug/L	<0.50	5883200	0.51	5883200	<0.50	<0.50	0.50	5883200
Dissolved Magnesium (Mg)	ug/L	50000	5883200	77000	5883200	43000	42000	50	5883200
Dissolved Manganese (Mn)	ug/L	95	5883200	110	5883200	22	42	2.0	5883200
Dissolved Molybdenum (Mo)	ug/L	5.9	5883200	8.9	5883200	1.1	4.4	0.50	5883200
Dissolved Nickel (Ni)	ug/L	2.7	5883200	1.4	5883200	<1.0	5.4	1.0	5883200
Dissolved Phosphorus (P)	ug/L	<100	5883200	110	5883200	<100	<100	100	5883200
Dissolved Potassium (K)	ug/L	2600	5883200	3500	5883200	1800	3800	200	5883200
Dissolved Selenium (Se)	ug/L	<2.0	5883200	<2.0	5883200	<2.0	<2.0	2.0	5883200
Dissolved Silicon (Si)	ug/L	8800	5883200	9500	5883200	7700	8900	50	5883200
Dissolved Silver (Ag)	ug/L	<0.10	5883200	<0.10	5883200	<0.10	<0.10	0.10	5883200
Dissolved Sodium (Na)	ug/L	18000	5883200	36000	5883200	11000	13000	100	5883200
Dissolved Strontium (Sr)	ug/L	620	5883200	1300	5883200	270	240	1.0	5883200
Dissolved Thallium (Tl)	ug/L	<0.050	5883200	<0.050	5883200	<0.050	<0.050	0.050	5883200
Dissolved Titanium (Ti)	ug/L	<5.0	5883200	<5.0	5883200	<5.0	<5.0	5.0	5883200
Dissolved Uranium (U)	ug/L	2.8	5883200	6.9	5883200	2.3	2.1	0.10	5883200
Dissolved Vanadium (V)	ug/L	0.50	5883200	<0.50	5883200	<0.50	0.60	0.50	5883200
Dissolved Zinc (Zn)	ug/L	8.6	5883200	11	5883200	<5.0	12	5.0	5883200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		IMM961		
Sampling Date		2018/12/05 10:30		
COC Number		695039-01-01		
	UNITS	MW5	RDL	QC Batch
BTEX & F1 Hydrocarbons				
Benzene	ug/L	<0.20	0.20	5881457
Toluene	ug/L	0.27	0.20	5881457
Ethylbenzene	ug/L	<0.20	0.20	5881457
o-Xylene	ug/L	<0.20	0.20	5881457
p+m-Xylene	ug/L	<0.40	0.40	5881457
Total Xylenes	ug/L	<0.40	0.40	5881457
F1 (C6-C10)	ug/L	<25	25	5881457
F1 (C6-C10) - BTEX	ug/L	<25	25	5881457
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5884830
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5884830
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5884830
Reached Baseline at C50	ug/L	Yes		5884830
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	99		5881457
4-Bromofluorobenzene	%	101		5881457
D10-Ethylbenzene	%	94		5881457
D4-1,2-Dichloroethane	%	98		5881457
o-Terphenyl	%	108		5884830

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

TEST SUMMARY

Maxxam ID: IMM909
Sample ID: MW2
Matrix: Water

Collected: 2018/12/05
Shipped:
Received: 2018/12/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5884270	N/A	2018/12/12	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5882002	N/A	2018/12/13	Automated Statchk
Chloride by Automated Colourimetry	KONE	5884918	N/A	2018/12/13	Alina Dobreanu
Conductivity	AT	5884273	N/A	2018/12/12	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5883205	N/A	2018/12/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5881953	N/A	2018/12/12	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5883200	N/A	2018/12/12	Prempal Bhatti
Ion Balance (% Difference)	CALC	5881996	N/A	2018/12/13	Automated Statchk
Anion and Cation Sum	CALC	5881997	N/A	2018/12/13	Automated Statchk
Total Ammonia-N	LACH/NH4	5884702	N/A	2018/12/13	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5882903	N/A	2018/12/12	Chandra Nandlal
pH	AT	5884276	N/A	2018/12/12	Surinder Rai
Orthophosphate	KONE	5884929	N/A	2018/12/13	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5881998	N/A	2018/12/13	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5881999	N/A	2018/12/13	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5884927	N/A	2018/12/13	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5882000	N/A	2018/12/13	Automated Statchk

Maxxam ID: IMM910
Sample ID: MW3
Matrix: Water

Collected: 2018/12/05
Shipped:
Received: 2018/12/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5884270	N/A	2018/12/12	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5882002	N/A	2018/12/13	Automated Statchk
Chloride by Automated Colourimetry	KONE	5884918	N/A	2018/12/13	Alina Dobreanu
Conductivity	AT	5884273	N/A	2018/12/12	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5883205	N/A	2018/12/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5881953	N/A	2018/12/12	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5883200	N/A	2018/12/12	Prempal Bhatti
Ion Balance (% Difference)	CALC	5881996	N/A	2018/12/13	Automated Statchk
Anion and Cation Sum	CALC	5881997	N/A	2018/12/13	Automated Statchk
Total Ammonia-N	LACH/NH4	5884702	N/A	2018/12/13	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5884293	N/A	2018/12/13	Chandra Nandlal
pH	AT	5884276	N/A	2018/12/12	Surinder Rai
Orthophosphate	KONE	5884929	N/A	2018/12/13	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5881998	N/A	2018/12/13	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5881999	N/A	2018/12/13	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5884927	N/A	2018/12/13	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5882000	N/A	2018/12/13	Automated Statchk

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

TEST SUMMARY

Maxxam ID: IMM911
Sample ID: MW4
Matrix: Water

Collected: 2018/12/05
Shipped:
Received: 2018/12/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5884270	N/A	2018/12/12	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5882002	N/A	2018/12/13	Automated Statchk
Chloride by Automated Colourimetry	KONE	5884918	N/A	2018/12/13	Alina Dobreanu
Conductivity	AT	5884273	N/A	2018/12/12	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5883205	N/A	2018/12/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5881953	N/A	2018/12/12	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5883200	N/A	2018/12/12	Prempal Bhatti
Ion Balance (% Difference)	CALC	5881996	N/A	2018/12/13	Automated Statchk
Anion and Cation Sum	CALC	5881997	N/A	2018/12/13	Automated Statchk
Total Ammonia-N	LACH/NH4	5884702	N/A	2018/12/13	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5882903	N/A	2018/12/12	Chandra Nandlal
pH	AT	5884276	N/A	2018/12/12	Surinder Rai
Orthophosphate	KONE	5884929	N/A	2018/12/13	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5881998	N/A	2018/12/13	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5881999	N/A	2018/12/13	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5884927	N/A	2018/12/13	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5882000	N/A	2018/12/13	Automated Statchk

Maxxam ID: IMM912
Sample ID: MW5
Matrix: Water

Collected: 2018/12/05
Shipped:
Received: 2018/12/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5884270	N/A	2018/12/12	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5882002	N/A	2018/12/13	Automated Statchk
Chloride by Automated Colourimetry	KONE	5884918	N/A	2018/12/13	Alina Dobreanu
Conductivity	AT	5884273	N/A	2018/12/12	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5883205	N/A	2018/12/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5881953	N/A	2018/12/12	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5883200	N/A	2018/12/12	Prempal Bhatti
Ion Balance (% Difference)	CALC	5881996	N/A	2018/12/13	Automated Statchk
Anion and Cation Sum	CALC	5881997	N/A	2018/12/13	Automated Statchk
Total Ammonia-N	LACH/NH4	5884702	N/A	2018/12/13	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5882903	N/A	2018/12/12	Chandra Nandlal
pH	AT	5884276	N/A	2018/12/12	Surinder Rai
Orthophosphate	KONE	5884929	N/A	2018/12/13	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5881998	N/A	2018/12/13	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5881999	N/A	2018/12/13	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5884927	N/A	2018/12/13	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5882000	N/A	2018/12/13	Automated Statchk

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

TEST SUMMARY

Maxxam ID: IMM961
Sample ID: MW5
Matrix: Water

Collected: 2018/12/05
Shipped:
Received: 2018/12/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5881457	N/A	2018/12/11	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5884830	2018/12/12	2018/12/13	Zhiyue (Frank) Zhu

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5881457	1,4-Difluorobenzene	2018/12/11	99	70 - 130	100	70 - 130	98	%		
5881457	4-Bromofluorobenzene	2018/12/11	103	70 - 130	103	70 - 130	103	%		
5881457	D10-Ethylbenzene	2018/12/11	97	70 - 130	99	70 - 130	94	%		
5881457	D4-1,2-Dichloroethane	2018/12/11	101	70 - 130	104	70 - 130	102	%		
5884830	o-Terphenyl	2018/12/13	112	60 - 130	110	60 - 130	107	%		
5881457	Benzene	2018/12/11	98	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5881457	Ethylbenzene	2018/12/11	100	70 - 130	104	70 - 130	<0.20	ug/L	NC	30
5881457	F1 (C6-C10) - BTEX	2018/12/11					<25	ug/L	NC	30
5881457	F1 (C6-C10)	2018/12/11	88	70 - 130	96	70 - 130	<25	ug/L	NC	30
5881457	o-Xylene	2018/12/11	100	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
5881457	p+m-Xylene	2018/12/11	93	70 - 130	95	70 - 130	<0.40	ug/L	NC	30
5881457	Toluene	2018/12/11	98	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5881457	Total Xylenes	2018/12/11					<0.40	ug/L	NC	30
5882903	Nitrate (N)	2018/12/12	97	80 - 120	101	80 - 120	<0.10	mg/L	NC	20
5882903	Nitrite (N)	2018/12/12	100	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
5883200	Dissolved Aluminum (Al)	2018/12/12	112	80 - 120	106	80 - 120	<5.0	ug/L	1.9	20
5883200	Dissolved Antimony (Sb)	2018/12/12	113	80 - 120	100	80 - 120	<0.50	ug/L	1.8	20
5883200	Dissolved Arsenic (As)	2018/12/12	109	80 - 120	100	80 - 120	<1.0	ug/L	6.7	20
5883200	Dissolved Barium (Ba)	2018/12/12	111	80 - 120	101	80 - 120	<2.0	ug/L	0.84	20
5883200	Dissolved Beryllium (Be)	2018/12/12	108	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
5883200	Dissolved Boron (B)	2018/12/12	102	80 - 120	98	80 - 120	<10	ug/L	4.6	20
5883200	Dissolved Cadmium (Cd)	2018/12/12	110	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
5883200	Dissolved Calcium (Ca)	2018/12/12	116	80 - 120	101	80 - 120	<200	ug/L	1.8	20
5883200	Dissolved Chromium (Cr)	2018/12/12	111	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
5883200	Dissolved Cobalt (Co)	2018/12/12	114	80 - 120	102	80 - 120	<0.50	ug/L	4.4	20
5883200	Dissolved Copper (Cu)	2018/12/12	115	80 - 120	101	80 - 120	<1.0	ug/L	3.1	20
5883200	Dissolved Iron (Fe)	2018/12/12	110	80 - 120	99	80 - 120	<100	ug/L	NC	20
5883200	Dissolved Lead (Pb)	2018/12/12	107	80 - 120	102	80 - 120	<0.50	ug/L	NC	20
5883200	Dissolved Magnesium (Mg)	2018/12/12	109	80 - 120	101	80 - 120	<50	ug/L	0.053	20
5883200	Dissolved Manganese (Mn)	2018/12/12	113	80 - 120	95	80 - 120	<2.0	ug/L	1.0	20
5883200	Dissolved Molybdenum (Mo)	2018/12/12	119	80 - 120	103	80 - 120	<0.50	ug/L	1.1	20
5883200	Dissolved Nickel (Ni)	2018/12/12	107	80 - 120	97	80 - 120	<1.0	ug/L	1.8	20

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Maxxam Job #: B8W7975
Report Date: 2018/12/14

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5883200	Dissolved Phosphorus (P)	2018/12/12	106	80 - 120	113	80 - 120	<100	ug/L	NC	20
5883200	Dissolved Potassium (K)	2018/12/12	107	80 - 120	99	80 - 120	<200	ug/L	1.3	20
5883200	Dissolved Selenium (Se)	2018/12/12	114	80 - 120	106	80 - 120	<2.0	ug/L	NC	20
5883200	Dissolved Silicon (Si)	2018/12/12	105	80 - 120	99	80 - 120	<50	ug/L	0.52	20
5883200	Dissolved Silver (Ag)	2018/12/12	109	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
5883200	Dissolved Sodium (Na)	2018/12/12	107	80 - 120	98	80 - 120	<100	ug/L	1.7	20
5883200	Dissolved Strontium (Sr)	2018/12/12	103	80 - 120	96	80 - 120	<1.0	ug/L	0.92	20
5883200	Dissolved Thallium (Tl)	2018/12/12	108	80 - 120	100	80 - 120	<0.050	ug/L	NC	20
5883200	Dissolved Titanium (Ti)	2018/12/12	107	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
5883200	Dissolved Uranium (U)	2018/12/12	109	80 - 120	100	80 - 120	<0.10	ug/L	0.74	20
5883200	Dissolved Vanadium (V)	2018/12/12	113	80 - 120	99	80 - 120	<0.50	ug/L	2.1	20
5883200	Dissolved Zinc (Zn)	2018/12/12	109	80 - 120	100	80 - 120	<5.0	ug/L	2.0	20
5883205	Dissolved Organic Carbon	2018/12/12	95	80 - 120	97	80 - 120	<0.50	mg/L	0.81	20
5884270	Alkalinity (Total as CaCO3)	2018/12/12			96	85 - 115	<1.0	mg/L	0.45	20
5884273	Conductivity	2018/12/12			101	85 - 115	<1.0	umho/cm	0	25
5884276	pH	2018/12/12			102	98 - 103			0.27	N/A
5884293	Nitrate (N)	2018/12/13	98	80 - 120	101	80 - 120	<0.10	mg/L	NC	20
5884293	Nitrite (N)	2018/12/13	101	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
5884702	Total Ammonia-N	2018/12/13	97	75 - 125	98	80 - 120	<0.050	mg/L	12 (1)	20
5884830	F2 (C10-C16 Hydrocarbons)	2018/12/13	114	50 - 130	104	60 - 130	<100	ug/L	NC	30
5884830	F3 (C16-C34 Hydrocarbons)	2018/12/13	106	50 - 130	96	60 - 130	<200	ug/L	NC	30
5884830	F4 (C34-C50 Hydrocarbons)	2018/12/13	98	50 - 130	89	60 - 130	<200	ug/L	NC	30
5884918	Dissolved Chloride (Cl-)	2018/12/13	NC	80 - 120	104	80 - 120	<1.0	mg/L	0.057	20
5884927	Dissolved Sulphate (SO4)	2018/12/13	NC	75 - 125	107	80 - 120	<1.0	mg/L	0.57	20

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QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5884929	Orthophosphate (P)	2018/12/13	98	75 - 125	99	80 - 120	<0.010	mg/L	NC	25

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

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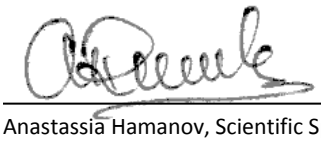
Maxxam Job #: B8W7975
Report Date: 2018/12/14

GM BluePlan Engineering Limited
Client Project #: 317033-2
Site Location: GLEN ALLAN-HYDROGEOLOGY
Sampler Initials: KC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Anastassia Hamanov, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#1067 GM BluePlan Engineering Limited	Company Name:	#22369 GM BluePlan Engineering Limited	Quotation #:	B47865	Maxxam Job #:	Bottle Order #: 695039
Attention:	Joe Rotondi	Attention:	Kate Camlis	P.O. #:			
Address:	650 Woodlawn Rd W Block C, Unit 2 Guelph ON N1K 1B8	Address:	975 Wallace Avenue North Listowell ON N4W 1M6	Project:	317033-2	COC #: C#695039-01-01	Project Manager: Ashton Gibson
Tel:	(519) 824-8150 Fax: (519) 824-8089	Tel:	(519) 291-9339 Fax:	Project Name:	Glen Allan - Hydrogeology		
Email:	jrotondi@gamsby.com	Email:	kate.nelles@gmblueplan.ca	Site #:			
				Sampled By:	KC / KA		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ___ ☐ PWQO ☑ Other ___	

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): (Metals / Hg / Cr VI)	BTEX, F1-F4	RCAP-comprehensive	# of Bottles	Comments
1		MW 2	18/12/05		GW	✓		✓	5	
2		MW 3	18/12/05		GW	✓		✓	5	
3		MW 4	18/12/05		GW	✓		✓	5	
4		MW 5	18/12/05		GW	✓		✓	5	
5										
6		MW5	18/12/05		GW		✓		4	Seperate reporting under Job # 317033-1 - Glen Allan - Phase One
7										
8										
9										
10										

07-Dec-18 09:26
Ashton Gibson
B8W7975
FCN ENV-1102

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Kate Camlis / Kate Camlis	18/12/05		Guelph GURVINDER	2018/12/07	09:26	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	5/4/4	Present	✓	
		Intact		

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM.

White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Your Project #: 317033-1
Your C.O.C. #: 158277

Attention: Abdi Faarah

GM BluePlan Engineering Limited
650 Woodlawn Rd W
Block C, Unit 2
Guelph, ON
CANADA N1K 1B8

Report Date: 2021/04/30
Report #: R6616334
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1A9421
Received: 2021/04/23, 14:26

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	6	N/A	2021/04/29	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	6	2021/04/27	2021/04/27	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	6	2021/04/28	2021/04/29	CAM SOP-00457	OMOE E3015 m
Conductivity	6	2021/04/28	2021/04/28	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	6	2021/04/28	2021/04/29	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	3	N/A	2021/04/28	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	3	2021/04/28	2021/04/29	CAM SOP-00316	CCME CWS m
Acid Extractable Metals by ICPMS	6	2021/04/27	2021/04/28	CAM SOP-00447	EPA 6020B m
Moisture	9	N/A	2021/04/24	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	6	2021/04/27	2021/04/29	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	6	2021/04/28	2021/04/28	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	6	N/A	2021/04/29	CAM SOP-00102	EPA 6010C

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Your Project #: 317033-1
Your C.O.C. #: 158277

Attention: Abdi Faarah

GM BluePlan Engineering Limited
650 Woodlawn Rd W
Block C, Unit 2
Guelph, ON
CANADA N1K 1B8

Report Date: 2021/04/30
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Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1A9421
Received: 2021/04/23, 14:26

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

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This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1A9421
Report Date: 2021/04/30

GM BluePlan Engineering Limited
Client Project #: 317033-1
Sampler Initials: AF

O.REG 153 METALS & INORGANICS PKG (SOIL)

BV Labs ID		PKC402	PKC403	PKC404	PKC405	PKC406		
Sampling Date		2021/04/23 11:00	2021/04/23 11:15	2021/04/23 11:30	2021/04/23 11:45	2021/04/23 12:00		
COC Number		158277	158277	158277	158277	158277		
	UNITS	TP-5 (3-5)	TP-6 (3-5)	TP-8 (3-5)	TP-9 (3-5)	SP-1 COMP	RDL	QC Batch
Calculated Parameters								
Sodium Adsorption Ratio	N/A	0.24 (1)	0.26 (1)	0.26 (1)	0.26 (1)	0.23 (1)		7316652
Inorganics								
Conductivity	mS/cm	0.18	0.16	0.16	0.15	0.18	0.002	7322792
Available (CaCl2) pH	pH	7.68	7.74	7.70	7.71	7.63		7322695
WAD Cyanide (Free)	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	7322431
Chromium (VI)	ug/g	<0.18	<0.18	<0.18	<0.18	<0.18	0.18	7322747
Metals								
Hot Water Ext. Boron (B)	ug/g	0.13	0.083	0.065	0.059	0.17	0.050	7320550
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7320686
Acid Extractable Arsenic (As)	ug/g	3.3	2.7	3.0	3.0	3.8	1.0	7320686
Acid Extractable Barium (Ba)	ug/g	100	89	99	93	130	0.50	7320686
Acid Extractable Beryllium (Be)	ug/g	0.64	0.57	0.62	0.63	0.86	0.20	7320686
Acid Extractable Boron (B)	ug/g	12	11	11	11	13	5.0	7320686
Acid Extractable Cadmium (Cd)	ug/g	0.13	0.11	<0.10	0.12	0.16	0.10	7320686
Acid Extractable Chromium (Cr)	ug/g	23	20	21	22	29	1.0	7320686
Acid Extractable Cobalt (Co)	ug/g	9.9	9.0	8.6	9.0	11	0.10	7320686
Acid Extractable Copper (Cu)	ug/g	19	19	18	18	23	0.50	7320686
Acid Extractable Lead (Pb)	ug/g	10	9.5	9.1	9.1	11	1.0	7320686
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7320686
Acid Extractable Nickel (Ni)	ug/g	21	20	19	20	26	0.50	7320686
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7320686
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7320686
Acid Extractable Thallium (Tl)	ug/g	0.15	0.14	0.15	0.14	0.19	0.050	7320686
Acid Extractable Uranium (U)	ug/g	0.54	0.51	0.49	0.48	0.54	0.050	7320686
Acid Extractable Vanadium (V)	ug/g	32	28	30	30	39	5.0	7320686
Acid Extractable Zinc (Zn)	ug/g	56	54	49	53	65	5.0	7320686
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7320686

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

O.REG 153 METALS & INORGANICS PKG (SOIL)

BV Labs ID		PKC406			PKC407		
Sampling Date		2021/04/23 12:00			2021/04/23 12:15		
COC Number		158277			158277		
	UNITS	SP-1 COMP Lab-Dup	RDL	QC Batch	SP-2 COMP	RDL	QC Batch
Calculated Parameters							
Sodium Adsorption Ratio	N/A				0.24 (1)		7316652
Inorganics							
Conductivity	mS/cm	0.18	0.002	7322792	0.18	0.002	7322792
Available (CaCl2) pH	pH				7.65		7322695
WAD Cyanide (Free)	ug/g				<0.01	0.01	7322431
Chromium (VI)	ug/g				<0.18	0.18	7322747
Metals							
Hot Water Ext. Boron (B)	ug/g				0.19	0.050	7320550
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	7320686	<0.20	0.20	7320686
Acid Extractable Arsenic (As)	ug/g	3.8	1.0	7320686	3.0	1.0	7320686
Acid Extractable Barium (Ba)	ug/g	130	0.50	7320686	86	0.50	7320686
Acid Extractable Beryllium (Be)	ug/g	0.87	0.20	7320686	0.60	0.20	7320686
Acid Extractable Boron (B)	ug/g	13	5.0	7320686	9.9	5.0	7320686
Acid Extractable Cadmium (Cd)	ug/g	0.17	0.10	7320686	0.12	0.10	7320686
Acid Extractable Chromium (Cr)	ug/g	29	1.0	7320686	21	1.0	7320686
Acid Extractable Cobalt (Co)	ug/g	11	0.10	7320686	8.7	0.10	7320686
Acid Extractable Copper (Cu)	ug/g	23	0.50	7320686	18	0.50	7320686
Acid Extractable Lead (Pb)	ug/g	12	1.0	7320686	9.2	1.0	7320686
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	7320686	<0.50	0.50	7320686
Acid Extractable Nickel (Ni)	ug/g	26	0.50	7320686	19	0.50	7320686
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	7320686	<0.50	0.50	7320686
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	7320686	<0.20	0.20	7320686
Acid Extractable Thallium (Tl)	ug/g	0.19	0.050	7320686	0.14	0.050	7320686
Acid Extractable Uranium (U)	ug/g	0.54	0.050	7320686	0.47	0.050	7320686
Acid Extractable Vanadium (V)	ug/g	39	5.0	7320686	29	5.0	7320686
Acid Extractable Zinc (Zn)	ug/g	64	5.0	7320686	49	5.0	7320686
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	7320686	<0.050	0.050	7320686

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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O.REG 153 PAHS (SOIL)

BV Labs ID		PKC402	PKC403	PKC404	PKC405	PKC406	PKC407		
Sampling Date		2021/04/23 11:00	2021/04/23 11:15	2021/04/23 11:30	2021/04/23 11:45	2021/04/23 12:00	2021/04/23 12:15		
COC Number		158277	158277	158277	158277	158277	158277		
	UNITS	TP-5 (3-5)	TP-6 (3-5)	TP-8 (3-5)	TP-9 (3-5)	SP-1 COMP	SP-2 COMP	RDL	QC Batch
Inorganics									
Moisture	%	17	15	13	15	19	19	1.0	7317409
Calculated Parameters									
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	7316772
Polyaromatic Hydrocarbons									
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Benzo(a)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Benzo(a)pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Benzo(b/j)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Benzo(g,h,i)perylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Benzo(k)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Chrysene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Dibenzo(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Phenanthrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7321579
Surrogate Recovery (%)									
D10-Anthracene	%	97	94	99	94	97	90		7321579
D14-Terphenyl (FS)	%	97	94	99	93	97	90		7321579
D8-Acenaphthylene	%	98	94	97	91	99	89		7321579

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

BV Labs ID		PKC399	PKC400	PKC401		
Sampling Date		2021/04/23 09:15	2021/04/23 09:30	2021/04/23 10:30		
COC Number		158277	158277	158277		
	UNITS	TP-1 (0-2.5)	TP-1 (4-5)	TP-3 (4-5)	RDL	QC Batch
Inorganics						
Moisture	%	22	15	20	1.0	7317409
BTEX & F1 Hydrocarbons						
Benzene	ug/g	<0.020	<0.020	<0.020	0.020	7323010
Toluene	ug/g	<0.020	<0.020	<0.020	0.020	7323010
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	0.020	7323010
o-Xylene	ug/g	<0.020	<0.020	<0.020	0.020	7323010
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	0.040	7323010
Total Xylenes	ug/g	<0.040	<0.040	<0.040	0.040	7323010
F1 (C6-C10)	ug/g	<10	<10	<10	10	7323010
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	7323010
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	10	7322483
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	50	7322483
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	50	7322483
Reached Baseline at C50	ug/g	Yes	Yes	Yes		7322483
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	98	98	101		7323010
4-Bromofluorobenzene	%	96	94	101		7323010
D10-o-Xylene	%	88	78	89		7323010
D4-1,2-Dichloroethane	%	103	102	104		7323010
o-Terphenyl	%	85	87	84		7322483

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

TEST SUMMARY

BV Labs ID: PKC399 **Collected:** 2021/04/23
Sample ID: TP-1 (0-2.5) **Shipped:**
Matrix: Soil **Received:** 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7323010	N/A	2021/04/28	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7322483	2021/04/28	2021/04/29	Margaret Kulczyk-Stanko
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur

BV Labs ID: PKC400 **Collected:** 2021/04/23
Sample ID: TP-1 (4-5) **Shipped:**
Matrix: Soil **Received:** 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7323010	N/A	2021/04/28	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7322483	2021/04/28	2021/04/29	Margaret Kulczyk-Stanko
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur

BV Labs ID: PKC401 **Collected:** 2021/04/23
Sample ID: TP-3 (4-5) **Shipped:**
Matrix: Soil **Received:** 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7323010	N/A	2021/04/28	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7322483	2021/04/28	2021/04/29	Margaret Kulczyk-Stanko
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur

BV Labs ID: PKC402 **Collected:** 2021/04/23
Sample ID: TP-5 (3-5) **Shipped:**
Matrix: Soil **Received:** 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

BV Labs ID: PKC403 **Collected:** 2021/04/23
Sample ID: TP-6 (3-5) **Shipped:**
Matrix: Soil **Received:** 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel

TEST SUMMARY

BV Labs ID: PKC403
Sample ID: TP-6 (3-5)
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

BV Labs ID: PKC404
Sample ID: TP-8 (3-5)
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

BV Labs ID: PKC405
Sample ID: TP-9 (3-5)
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

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TEST SUMMARY

BV Labs ID: PKC406
Sample ID: SP-1 COMP
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

BV Labs ID: PKC406 Dup
Sample ID: SP-1 COMP
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu

BV Labs ID: PKC407
Sample ID: SP-2 COMP
Matrix: Soil

Collected: 2021/04/23
Shipped:
Received: 2021/04/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7316772	N/A	2021/04/29	Automated Statchk
Hot Water Extractable Boron	ICP	7320550	2021/04/27	2021/04/27	Medhat Nasr
Free (WAD) Cyanide	TECH	7322431	2021/04/28	2021/04/29	Aditiben Patel
Conductivity	AT	7322792	2021/04/28	2021/04/28	Tarunpreet Kaur
Hexavalent Chromium in Soil by IC	IC/SPEC	7322747	2021/04/28	2021/04/29	Violeta Porcila
Acid Extractable Metals by ICPMS	ICP/MS	7320686	2021/04/27	2021/04/28	Daniel Teclu
Moisture	BAL	7317409	N/A	2021/04/24	Manpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7321579	2021/04/27	2021/04/29	Mitesh Raj
pH CaCl2 EXTRACT	AT	7322695	2021/04/28	2021/04/28	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7316652	N/A	2021/04/29	Automated Statchk

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GENERAL COMMENTS

F1/BTEX Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Results relate only to the items tested.

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BV Labs Job #: C1A9421
Report Date: 2021/04/30

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 317033-1
Sampler Initials: AF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7321579	D10-Anthracene	2021/04/28	87	50 - 130	95	50 - 130	95	%		
7321579	D14-Terphenyl (FS)	2021/04/28	89	50 - 130	96	50 - 130	93	%		
7321579	D8-Acenaphthylene	2021/04/28	86	50 - 130	97	50 - 130	93	%		
7322483	o-Terphenyl	2021/04/28	83	60 - 130	85	60 - 130	92	%		
7323010	1,4-Difluorobenzene	2021/04/28	97	60 - 140	102	60 - 140	99	%		
7323010	4-Bromofluorobenzene	2021/04/28	103	60 - 140	103	60 - 140	99	%		
7323010	D10-o-Xylene	2021/04/28	88	60 - 140	89	60 - 140	89	%		
7323010	D4-1,2-Dichloroethane	2021/04/28	99	60 - 140	95	60 - 140	101	%		
7317409	Moisture	2021/04/24							0.86	20
7320550	Hot Water Ext. Boron (B)	2021/04/27	94	75 - 125	96	75 - 125	<0.050	ug/g	8.4	40
7320686	Acid Extractable Antimony (Sb)	2021/04/28	97	75 - 125	108	80 - 120	<0.20	ug/g	NC	30
7320686	Acid Extractable Arsenic (As)	2021/04/28	104	75 - 125	105	80 - 120	<1.0	ug/g	1.5	30
7320686	Acid Extractable Barium (Ba)	2021/04/28	NC	75 - 125	109	80 - 120	<0.50	ug/g	0.91	30
7320686	Acid Extractable Beryllium (Be)	2021/04/28	102	75 - 125	101	80 - 120	<0.20	ug/g	1.1	30
7320686	Acid Extractable Boron (B)	2021/04/28	97	75 - 125	97	80 - 120	<5.0	ug/g	0.19	30
7320686	Acid Extractable Cadmium (Cd)	2021/04/28	106	75 - 125	104	80 - 120	<0.10	ug/g	3.4	30
7320686	Acid Extractable Chromium (Cr)	2021/04/28	NC	75 - 125	98	80 - 120	<1.0	ug/g	0.026	30
7320686	Acid Extractable Cobalt (Co)	2021/04/28	98	75 - 125	96	80 - 120	<0.10	ug/g	0.43	30
7320686	Acid Extractable Copper (Cu)	2021/04/28	98	75 - 125	99	80 - 120	<0.50	ug/g	1.3	30
7320686	Acid Extractable Lead (Pb)	2021/04/28	100	75 - 125	98	80 - 120	<1.0	ug/g	0.37	30
7320686	Acid Extractable Mercury (Hg)	2021/04/28	86	75 - 125	83	80 - 120	<0.050	ug/g	NC	30
7320686	Acid Extractable Molybdenum (Mo)	2021/04/28	100	75 - 125	98	80 - 120	<0.50	ug/g	NC	30
7320686	Acid Extractable Nickel (Ni)	2021/04/28	NC	75 - 125	100	80 - 120	<0.50	ug/g	1.4	30
7320686	Acid Extractable Selenium (Se)	2021/04/28	104	75 - 125	103	80 - 120	<0.50	ug/g	NC	30
7320686	Acid Extractable Silver (Ag)	2021/04/28	103	75 - 125	102	80 - 120	<0.20	ug/g	NC	30
7320686	Acid Extractable Thallium (Tl)	2021/04/28	101	75 - 125	97	80 - 120	<0.050	ug/g	0.89	30
7320686	Acid Extractable Uranium (U)	2021/04/28	98	75 - 125	93	80 - 120	<0.050	ug/g	1.2	30
7320686	Acid Extractable Vanadium (V)	2021/04/28	NC	75 - 125	99	80 - 120	<5.0	ug/g	0.45	30
7320686	Acid Extractable Zinc (Zn)	2021/04/28	NC	75 - 125	102	80 - 120	<5.0	ug/g	0.36	30
7321579	1-Methylnaphthalene	2021/04/28	83	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
7321579	2-Methylnaphthalene	2021/04/28	81	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7321579	Acenaphthene	2021/04/28	82	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
7321579	Acenaphthylene	2021/04/28	84	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40
7321579	Anthracene	2021/04/28	85	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
7321579	Benzo(a)anthracene	2021/04/28	87	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40
7321579	Benzo(a)pyrene	2021/04/28	71	50 - 130	81	50 - 130	<0.0050	ug/g	NC	40
7321579	Benzo(b/j)fluoranthene	2021/04/28	78	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
7321579	Benzo(g,h,i)perylene	2021/04/28	77	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
7321579	Benzo(k)fluoranthene	2021/04/28	63	50 - 130	82	50 - 130	<0.0050	ug/g	NC	40
7321579	Chrysene	2021/04/28	91	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
7321579	Dibenzo(a,h)anthracene	2021/04/28	78	50 - 130	85	50 - 130	<0.0050	ug/g	NC	40
7321579	Fluoranthene	2021/04/28	88	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
7321579	Fluorene	2021/04/28	86	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
7321579	Indeno(1,2,3-cd)pyrene	2021/04/28	82	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
7321579	Naphthalene	2021/04/28	72	50 - 130	81	50 - 130	<0.0050	ug/g	NC	40
7321579	Phenanthrene	2021/04/28	83	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
7321579	Pyrene	2021/04/28	88	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
7322431	WAD Cyanide (Free)	2021/04/29	82	75 - 125	89	80 - 120	<0.01	ug/g	NC	35
7322483	F2 (C10-C16 Hydrocarbons)	2021/04/29	83	50 - 130	85	80 - 120	<10	ug/g	NC	30
7322483	F3 (C16-C34 Hydrocarbons)	2021/04/29	84	50 - 130	85	80 - 120	<50	ug/g	NC	30
7322483	F4 (C34-C50 Hydrocarbons)	2021/04/29	86	50 - 130	87	80 - 120	<50	ug/g	NC	30
7322695	Available (CaCl2) pH	2021/04/28			100	97 - 103			0.79	N/A
7322747	Chromium (VI)	2021/04/29	84	70 - 130	90	80 - 120	<0.18	ug/g	NC	35
7322792	Conductivity	2021/04/28			103	90 - 110	<0.002	mS/cm	0.62	10
7323010	Benzene	2021/04/28	82	50 - 140	85	50 - 140	<0.020	ug/g	NC	50
7323010	Ethylbenzene	2021/04/28	96	50 - 140	98	50 - 140	<0.020	ug/g	NC	50
7323010	F1 (C6-C10) - BTEX	2021/04/28					<10	ug/g	NC	30
7323010	F1 (C6-C10)	2021/04/28	77	60 - 140	88	80 - 120	<10	ug/g	NC	30
7323010	o-Xylene	2021/04/28	97	50 - 140	97	50 - 140	<0.020	ug/g	NC	50
7323010	p+m-Xylene	2021/04/28	92	50 - 140	94	50 - 140	<0.040	ug/g	NC	50
7323010	Toluene	2021/04/28	85	50 - 140	88	50 - 140	<0.020	ug/g	NC	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7323010	Total Xylenes	2021/04/28					<0.040	ug/g	NC	50

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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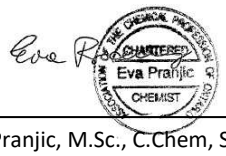
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

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CAM FCD-01191/6

CHAIN OF CUSTODY RECORD 158277

Page 1 of 1

Invoice Information
Company Name: GM Blueplan Engineering Ltd
Contact Name:
Address:
Phone: Fax:
Email: info@gmblueplan.ca

Report Information (if differs from invoice)
Company Name:
Contact Name: Abdi Faarah
Address:
Phone: Fax:
Email: abdi.faarah@gmblueplan.ca

Project Information (where applicable)
Quotation #:
P.O. #/ AFE#:
Project #: 317033-1
Site Location:
Site #:
Site Location Province:
Sampled By: Abdi Faarah

Turnaround Time (TAT) Required
[X] Regular TAT (5-7 days) Most analyses
PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Rush TAT (Surcharges will be applied)
[ ] 1 Day [ ] 2 Days [ ] 3-4 Days
Date Required:
Rush Confirmation #:

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY

Regulation 153
[ ] Table 1 [ ] Res/Park [ ] Med/ Fine
[ ] Table 2 [ ] Ind/Comm [ ] Coarse
[ ] Table 3 [ ] Agri/ Other
[ ] Table ____
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations
[ ] CCME [ ] Sanitary Sewer Bylaw
[ ] MISA [ ] Storm Sewer Bylaw
[ ] PWQO Region
[ ] Other (Specify)
[ ] REG 558 (MIN. 3 DAY TAT REQUIRED)
[ ] REG 406 Table

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Analysis Requested

LABORATORY USE ONLY
CUSTODY SEAL Y / N (N) — Present / Intact
COOLER TEMPERATURES: 8 | 8 | 9°C ; 8 | 8 | 5
COOLING MEDIA PRESENT: (Y) / N ICE

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / Cr VI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	PAHs	HOLD- DO NOT ANALYZE	COMMENTS
1	TP-1 (0-2.5)	2021/04/23	9:15	Soil	3		✓	✓							
2	TP-1 (4-5)		9:30		3		✓	✓							
3	TP-3 (4-5)		10:30		3		✓	✓							
4	TP-5 (3-5)		11:00		2					✓			✓		
5	TP-6 (3-5)		11:15		2					✓			✓		
6	TP-8 (3-5)		11:30		2					✓			✓		
7	TP-9 (3-5)		11:45		2					✓			✓		
8	SP-1 comp		12:00		2					✓			✓		
9	SP-2 comp		12:15		2					✓			✓		
10															

23-Apr-21 14:26
Ashton Gibson
C1A9421
URE ENV-1160
REC'D IN WATERLOO

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Abdi Faarah	2021/04/23	14:15	LAUREN TAMSINDAVISON	2021/04/23	14:26
			Fu/HG/HARSPR FOOK	2021/04/23	17:33

BV JOB #

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COC-1004 (06/19)

BV# 204983

White: BV Labs - Yellow: Client

APPENDIX C:
BOREHOLE & TESTPIT LOGS

BOREHOLE 1

Date Drilled: August 30, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 405.48 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation / Depth	Well Installation	Moisture Content % Wp [----X----] Wl 10 20 30 40	Pocket Penetrometer kPa 100 200 300 400 / SPT (N) Blows/0.3 m 20 40 60 80
					Ground Surface (m)	405.48			
0 ft / 0 m	SS		1		***TOPSOIL*** Loose, dark brown, silty, organic topsoil, moist (170 mm)	0.00 / 405.02 / 0.46		15.5	6, 375
1 ft / 0 m	SS		2		***CLAYEY SILT*** Firm, brown clayey silt, some sand, trace gravel, with trace organics and rootlets, drier than the plastic limit			17.4	22, 400
2 ft / 1 m	SS		3		Becoming very stiff, no organics or rootlets			12.2	29, 400
3 ft / 1 m	SS		4		Becoming hard, cobbles present	403.19 / 2.29		18.9	250 50(6")
4 ft / 1 m	SS		5		About the plastic limit Becoming very stiff	402.43 / 3.05		19.2	17, 200
5 ft / 2 m	MC5		6		***SILT AND CLAY*** Very stiff, grey silt and clay, trace sand and gravel, about the plastic limit	401.82 / 3.66		19.0	150
6 ft / 2 m	SS		7					20.2	21, 150
7 ft / 2 m	SS		9					21.2	100, 25
8 ft / 3 m					End of Borehole	399.69 / 5.79			
9 ft / 3 m									

Cave at 3.30 m below ground surface.
No accumulated groundwater encountered upon completion.

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St. Clements, Ontario N0B 2M0
phone 519-699-5775 fax 519-699-4664
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BOREHOLE 2

Date Drilled: August 29, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 403.13 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation / Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa / SPT (N) Blows/0.3 m
					Ground Surface (m)	403.13			
0	SS		1		**TOPSOIL** Loose, dark brown, silty, organic topsoil, moist (110 mm)	0.00		19.1	4, 250
1	SS		2		**CLAYEY SILT** Firm, brown clayey silt, some sand, trace gravel, with trace organics and rootlets, drier than the plastic limit	402.37 / 0.76		10.3	28, 450
2	SS		3		Becoming very stiff, no organics or rootlets			22.1	30, 450
3	SS		4					18.9	21, 350
4	SS		5		**CLAY AND SILT** Very stiff, grey clay and silt, trace sand and gravel, about the plastic limit	399.93 / 3.20		20.1	22, 200
5	MC	5	6		Becoming stiff, wetter than the plastic limit, occasional wet sand seam	399.47 / 3.66		25.6	150
6	SS		7					25.3	13, 150
7	SS		8					26.1	16, 150
					End of Borehole	397.34 / 5.79			

Well Installation: Steel Protective Cover; Bentonite; Elev. 400.71 m Oct 3/18; #3 Silca Sand; 38 mm Prepack Slot 10 Screen

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BOREHOLE 3

Date Drilled: August 29, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 402.27 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation / Depth	Well Installation	Moisture Content % Wp [----X----] Wl 10 20 30 40	Pocket Penetrometer kPa 100 200 300 400 / SPT (N) Blows/0.3 m 20 40 60 80
					Ground Surface (m)	402.27			
0 ft / 0 m	SS		1		**TOPSOIL** Very loose, dark brown, silty, organic topsoil, moist (100 mm)	0.00		19.9	3, 250
						401.92 / 0.35			
1 ft / 0 m	SS		2		**CLAYEY SILT** Soft, brown clayey silt, some sand, trace gravel, with trace organics and rootlets, drier than the plastic limit			17.8	21, 400
2 ft / 1 m	SS		3		Becoming very stiff, no organics or rootlets			17.6	30, 450
3 ft / 1 m	SS		4					17.9	28, 450
4 ft / 2 m	SS		5		**CLAY AND SILT** Very stiff, grey clay and silt, trace sand and gravel, about the plastic limit	399.07 / 3.20		17.8	28, 350
5 ft / 2 m	MC	5	6		Becoming about the plastic limit, occasional wet sand seams	398.46 / 3.81		22.3	150
6 ft / 2 m	SS		7					26.8	18, 150
7 ft / 3 m	MC	5	8		**SILT** Compact, grey silt, some sand and clay, wet	397.09 / 5.18		27.0	
8 ft / 3 m	SS		9					24.0	22, 200
					CLAY AND SILT Very stiff, grey clay and silt, some sand, trace gravel, about the plastic limit	395.82 / 6.45			
					End of Borehole	395.56 / 6.71			

Bentonite
Steel Protective Cover
Elev. 398.87 m Oct 3/18
#3 Silca Sand
38 mm Prepack Slot 10 Screen

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BOREHOLE 4

Date Drilled: August 29, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 399.00 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % Wp [----X----] Wl 10 20 30 40	Pocket Penetrometer kPa 100 200 300 400 / SPT (N) Blows/0.3 m 20 40 60 80
					Ground Surface (m)	399.00	0.00			
0	SS		1		**TOPSOIL** Very loose, dark brown, silty, organic topsoil, moist (130 mm)	398.24	0.76		25.6	3, 250
1	SS		2		**CLAYEY SILT** Soft, brown clayey silt, some sand, trace gravel, with trace organics and rootlets, drier than the plastic limit				19.0	20, 400
2	SS		3						12.8	24, 400
	SS		4			396.71	2.29		11.4	55, 450
3	SS		5		Becoming very stiff, no organics or rootlets Becoming hard				10.4	50(5"), 400
4	MC5		6			394.73	4.27		10.7	425
	SS		7		**CLAY AND SILT** Hard, grey clay and silt, trace sand and gravel, drier than the the plastic limit				11.0	59, 450
5	MC5		8			393.36	5.64		14.5	450
6	SS		9		**SILT** Very dense, grey silt, some sand and clay, moist Occasional wet sand seams				11.9	50(6")
7	MC5		10						12.9	
8	MC5		11						8.4	
9										
10	MC5		12						13.3	
11					End of Borehole	388.33	10.67			

Well Installation: Steel Protective Cover; Bentonite; #3 Silica Sand; Elev. 389.53 m Oct 3/18; 38 mm Prepack Slot 10 Screen

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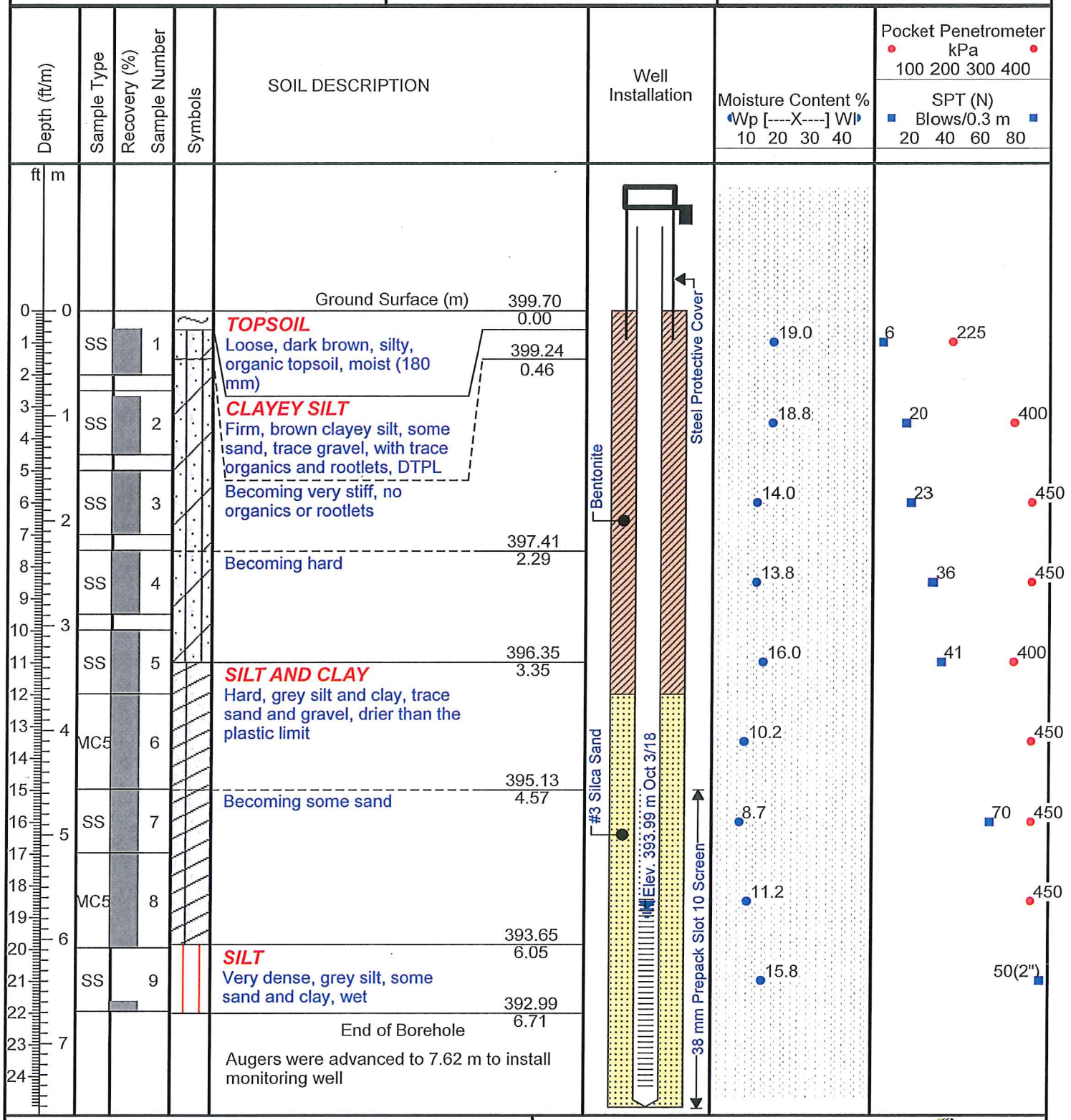
BOREHOLE 5

Date Drilled: August 29, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 399.70 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario



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BOREHOLE 6

Date Drilled: August 30, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 396.57 m
Logged by: SW

Project No.: 18-462
Project: Residential Subdivision
Location: South Mill Street, Glen Allan, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % Wp [----X----] Wl 10 20 30 40	Pocket Penetrometer kPa 100 200 300 400 / SPT (N) Blows/0.3 m 20 40 60 80
					Ground Surface (m)	396.57				
0					***TOPSOIL***		0.00			
1	SS		1		Loose, dark brown, silty, organic topsoil, moist (400 mm)	396.17	0.40		21.9	3
2						395.81	0.76			
3	SS		2		***CLAYEY SILT***				12.5	17 450
4					Soft, dark brown clayey silt, some sand, trace gravel, with trace organics and rootlets, drier than the plastic limit					
5						395.05	1.52			
6	SS		3		Becoming very stiff, no organics or rootlets				12.4	35
7										
8	SS		4		Becoming hard				10.9	36 450
9										
10						393.52	3.05			
11	SS		5		***SILT AND CLAY***				10.2	56 450
12					Hard, grey silt and clay, trace sand and gravel, drier than the plastic limit					
13	MC5		6						10.2	
14										
15										
16	SS		7						11.4	49 450
17										
18	MC5		8						9.3	350
19										
20										
21	SS		9						13.8	32
22						389.86	6.71			
23					End of Borehole					
24										
25										
26										
27										
28										
29										

Cave at 6.55 m below ground surface.
No accumulated groundwater encountered upon completion.

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TESTHOLE ID: TP-1
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
			GB 1	0.00	[TOPSOIL] Dark Brown organic TOPSOIL, moist.
	1			0.46	Brown SANDY SILT, some clay, trace gravel, Dry.
	2				Becomes moist at 0.76 m.
1	3				
	4		GB 2		
	5			1.68	Grey SILTY CLAY, hard and dry.
	6				
2	7				
	8				

Borehole Terminated at 2.44 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-2

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
				0.00	[TOPSOIL] Dark brown organic topsoil, moist.
	1			0.46	Brown SANDY SILT, some clay, trace gravel, moist.
	2			0.76	Grey SILTY CLAY, hard, moist.
1	3				Becomes wet at 1.83 m.
	4				
	5				
	6				
2	7				

Borehole Terminated at 2.14 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-3
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
				0.00	[TOPSOIL] Dark brown organic TOPSOIL, moist.
	1			0.31	Brown SANDY SILT, some clay and gravel, moist.
	2				Become wet at 1.22 m.
	3				
1					
	4		GB 3		
	5			1.53	Grey SILTY CLAY, hard, dry.
	6				
2					
	7				
	8				

Borehole Terminated at 2.44 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-4

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
				0.00	[TOPSOIL] Dark brown organic TOPSOIL, dry.
	1			0.31	Brown SANDY SILT, some gravel, minor clay, dry.
	2			0.61	Grey SILTY CLAY, hard, dry.
	3				Becomes moist at 1.98 m.
1					
	4				
	5				
	6				
2					
	7				

Borehole Terminated at 2.29 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-5
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
				0.00	[TOPSOIL] Dark brown organic TOPSOIL, moist.
	1				
				0.46	Brown SANDY SILT, some gravel, trace clay, dry.
	2				
	3			0.92	Grey SILTY CLAY, hard, dry to damp.
1			GB 4		
	4				
	5				
	6				
2					
	7				
	8				

Borehole Terminated at 2.44 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-6
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
				0.00	[TOPSOIL] Dark brown organic TOPSOIL, moist.
	1				
	2			0.61	Brown SANDY SILT, some gravel, dry.
	3			0.92	Grey SILTY CLAY, hard, dry.
1			GB 5		
	4				
	5				
	6				
2					

Borehole Terminated at 2.00 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-7
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
0.00					[TOPSOIL] Dark brown organic TOPSOIL, moist.
0.61					Brown SANDY SILT, some clay, dry.
1.53					Grey SILTY CLAY, hard, dry.
2.00					Borehole Terminated at 2.00 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-8

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
					0.00 [TOPSOIL] Dark brown organic TOPSOIL, moist.
	1				0.31 Brown SANDY SILT, some clay and gravel, dry.
	2				
	3				
1			GB 6		1.22 Grey SILTY CLAY, hard, dry.
	4				
	5				

Borehole Terminated at 1.70 m.

BluePlan ENGINEERING

TESTHOLE ID: TP-9
PAGE 1 OF 1

CLIENT Mr. Murray Martin
PROJECT NAME Glen Allan Subdivision
PROJECT NUMBER 317033-1
PROJECT LOCATION
DATE COMPLETED 04-23-2021
CONTRACTOR Martin Groundworks
LOGGED BY AF
METHOD Backhoe
WELL CONSTRUCTION N/A
NOTES

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
					Ground Surface
					0.00 [TOPSOIL] Dark brown organic TOPSOIL, moist.
					0.15 Brown SANDY SILT, some clay, trace gravel, dry.
1	1		GB 7		1.22 Grey SILTY CLAY, hard, dry.
	2				
	3				
	4				
	5				

Borehole Terminated at 1.70 m.