



CHUNG & VANDER DOELEN
ENGINEERING LTD.

**GEOTECHNICAL INVESTIGATION
PROPOSED MIXED RESIDENTIAL COMPLEX
WHITELAW ROAD
GUELPH, ONTARIO**

Submitted to:

Armel Corporation
199 Bay Street, Suite 2900
P O Box 459
Toronto, Ontario
M5L 1G4

Attention:

Mr. Chris Corosky

FILE NO / G18570 / April 27, 2018



**CHUNG & VANDER DOELEN
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April 27, 2018
File No.: G18570

Armel Corporation
199 Bay Street, Suite 2900
P O Box 459
Toronto, Ontario
M5L 1G4

Attention: Mr. Chris Corosky

**Re: GEOTECHNICAL INVESTIGATION
PROPOSED MIXED RESIDENTIAL COMPLEX
WHITELAW ROAD, GUELPH, ONTARIO**

We take pleasure in enclosing one (1) copy of our Geotechnical Investigation Report carried out at the above-mentioned location and we will be glad to discuss any questions arising from this work.

Soil samples will be retained for a period of three (3) months and will thereafter be disposed of unless we are otherwise instructed.

We thank you for giving us this opportunity to be of service to you.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Robert Vander Doelen, P. Eng.
Senior Engineer

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1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by Armel Corporation to conduct a geotechnical investigation for a proposed mixed residential condominium development to be constructed at the southeast corner of Whitelaw Road and Paisley Road in Kitchener, Ontario.

It is proposed to develop the 7± hectare site with six (6) 6-storey apartment buildings (with underground parking) and twelve multi-unit townhouse blocks. Paved driveways and parking, stormwater management features and landscaping will generally comprise the remaining areas. It is understood that significant cut and fill grading operations in the order of 6± m are expected for the site.

The purpose of this current investigation has been to determine the subsurface conditions and relevant soil properties at the subject site in order to provide geotechnical recommendations for the design and construction of site grading operations, municipal site servicing and pavement areas. Estimates of hydraulic conductivity and infiltration rates of the insitu soil deposits will be provided.

2.0 FIELD WORK

Eleven (11) boreholes were drilled and sampled to depths between 3.5 and 12.35 m below existing grades across the site in order to investigate the subsurface conditions. The locations of the boreholes are shown on Drawing No. 1, Borehole Location Plan. The borehole locations were laid out in the field by GMBBluePlan Engineering Limited (GMBP) who surveyed their associated ground surface elevations and provided this information back to CVD.

The field work for this project was conducted during the period between March 21 and March 23, 2018 under the supervision of members of our engineering team, who logged the boreholes in the field, effected the subsurface sampling and monitored the groundwater conditions. Underground utility locates were completed prior to the commencement of borehole drilling.

The boreholes were advanced to the sampling depths using a power auger drilling rig equipped with continuous flight hollow stem augers and standard soil sampling equipment. Standard penetration tests (STPs) were carried out at frequent intervals of depth, and the results are shown on the Borehole Logs as Penetration Resistance or "N"-values. The compactness condition or consistency of the soil strata has been inferred from the test results.

Groundwater conditions were monitored in the boreholes during and following withdrawal of the drilling augers at each borehole location. 50 mm diameter monitoring wells with above-grade protective covers were installed under the direction of GMBP to specified depths in each of Boreholes



MW-01 to MW-08, NW-01D, NW-01S, NW-02D and NW-02S to enable long term measurement of the groundwater. Initial groundwater levels were measured by CVD on March 26, 2018.

Samples obtained from the in situ tests were examined in the field and subsequently taken to our laboratory for further examination and testing.

3.0 LABORATORY TESTING

Geotechnical testing performed at CVD's laboratory included moisture content determination of all retrieved soil samples. Six (6) grain size distribution analyses and two Standard Proctor Maximum Dry Density (SPMDD) relationship tests which were conducted on representative soil samples collected during the field work program.

Eighteen (18) soil samples from nine of the eleven borehole locations were tested for metals and inorganic parameters, including sodium adsorption ratio (SAR) and electrical conductivity (EC). Analytical testing of soil samples was performed by ALS Laboratory Group of Waterloo, Ontario, a CAEAL accredited laboratory, using MOECC approved test methods. Chemical testing conducted on the soil samples was to assess the environmental quality of excess soil which may potentially be removed off-site during construction.

4.0 SITE CONDITION

The site is currently undeveloped and generally exists as a corn field.

The site generally exists as an elevated ridge (near Elevation 345 m) with an east-west trend which falls to both the north and south directions to near Elevations 334 and 333 m. A previously excavated area exists along the elevated ridge towards Paisley Road.



5.0 SUBSURFACE CONDITION

The subsurface conditions encountered at the boreholes are detailed on the Borehole Log Sheets, Enclosures 1 to 13, inclusive. The following notes are intended to amplify and comment on the subsurface data obtained.

The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling conducted during advancement of the borehole drilling procedures and, therefore, represent transitions between soil types rather than exact planes of geologic change. The subsurface conditions will vary between and beyond the borehole locations.

5.1 Topsoil

Topsoil was encountered at the ground surface of the borehole locations (except Borehole MW-02) with measured thicknesses between 150 and 425 mm.

5.2 Upper Sand and Silt

The topsoil at Borehole 1 was underlain by dark brown to orangy brown sand and silt with a trace of gravel and organics which extended to a depth of 1.6 m below existing grade.

Standard Penetration testing within the sand and silt deposit yielded "N"-values of 3 and 10 blows per 300 mm, indicating a very loose to compact compactness condition. A natural moisture content of 12% was measured, indicating a moist moisture condition.

5.3 Sand and Silt Till

The ground surface at Borehole MW-02, the sand and silt at Borehole 1 and the topsoil at the remaining nine boreholes were underlain by brown to grey sand and silt till with trace to some gravel and clay and occasional to frequent cobbles. The till deposit extended to depths of 1.6 and 3.9 m below existing grades at Boreholes MW-05 and MW-06, respectively. The remaining nine (9) boreholes were terminated within the till deposit at depths between 3.5 and 12.35 m below existing grades.



Standard Penetration testing within the sand and silt till deposit yielded "N"-values between 5 and greater than 100 blows per 300 mm, indicating a variable very loose to very dense compactness condition. Natural moisture contents were measured between 7 and 16%, indicating a variable damp to wet moisture condition.

Four (4) grain size distribution analyses were conducted on representative samples of the sand and silt till collected from Boreholes MW-01, MW-03, MW-06, and NW-01D and the results are graphically presented on Enclosures 14 to 17.

Two (2) laboratory Standard Proctor tests were conducted on bulk samples of the native deposits collected at Boreholes NW-01D and NW-02D and the results are presented on Enclosures 20 to 21. The density-moisture relationship test derived maximum dry densities of 2119 and 2125 kg/m³ with corresponding optimum moisture contents of 8.4 and 8.3%.

5.4 Lower Sand and Silt and Silt

The sand and silt till at Boreholes MW-05 and MW-06 was underlain by brown sand and silt with a trace of gravel or brown silt with a trace of sand which extended to at least 3.5 and 6.55 m below existing grade, respectively.

Two (2) grain size distribution analyses were conducted on representative samples of these deposits and the results are graphically presented on Enclosures 18 and 19.

Standard Penetration testing within the lower sand and silt and silt deposits yielded "N"-values between 17 and 93 blows per 300 mm, indicating compact to very dense compactness conditions. Natural moisture contents were measured between 12 and 20%, indicating wet to saturated moisture conditions.



5.5 Groundwater Condition

50 mm diameter monitoring wells with screen lengths between 0.5 and 1.5 m were installed to specified depths between depths of 3.0 and 12.2 m below existing grades at Boreholes MW01 to MW08, NW-01D, NW-01S, NW-02D and NW-02S to enable measurement of groundwater levels over the long term. The following table provides the water levels measured on March 26, 2018.

Borehole Location	Ground Surface Elevation (m)	Water Depth (m)	Water Elevation (m)
MW-01	335.32	dry	-
MW-02	339.60	4.72	334.88
MW-03	338.01	dry	-
MW-04	343.25	2.33	340.92
MW-05	338.26	0.92	337.34
MW-06	345.87	3.84	342.03
MW-07	342.36	1.66	340.70
MW-08	334.12	1.18	332.94
NW-01D	345.19	10.15	335.04
NW-01S	345.05	4.05	341.00
NW-02D	339.15	4.55	334.60
NW-02S	339.03	1.57	337.46

Borehole 1 experienced dry cave-in at 5.5 m depth at the time of auger withdrawal.

It should be cautioned that the groundwater table will fluctuate in response to major weather events. Seasonal fluctuations of the groundwater table are to be expected.



5.6 Soil Chemistry

Eighteen (18) soil samples were submitted to ALS Laboratory Group of Waterloo, Ontario for analysis of metals and inorganics, including SAR and EC. The chemical testing was conducted to assess the environmental quality of excess soil which may potentially be removed off-site during construction. The following table presents the location, depth, and parameters analyzed for each soil sample collected and submitted.

Sample ID	Sample Depth	Parameters Analysed
MW01-SA1	0.6 to 1.2 mbeg	metals, inorganics
MW01-SA4	3.05 to 3.5 mbeg	metals, inorganics
MW02-SA1	0.6 to 1.2 mbeg	metals, inorganics
MW02-SA3	3.05 to 3.5 mbeg	metals, inorganics
MW03-SA1	0.75 to 1.2 mbeg	metals, inorganics
MW03-SA4	3.05 to 3.5 mbeg	metals, inorganics
MW04-SA1	0.6 to 1.2 mbeg	metals, inorganics
MW04-SA3	3.05 to 3.5 mbeg	metals, inorganics
MW05-SA1	0.75 to 1.2 mbeg	metals, inorganics
MW05-SA4	3.05 to 3.5 mbeg	metals, inorganics
MW06-SA1	0.75 to 1.2 mbeg	metals, inorganics
MW06-SA4	3.05 to 3.5 mbeg	metals, inorganics
MW07-SA2	0.75 to 1.2 mbeg	metals, inorganics
MW07-SA5	3.05 to 3.5 mbeg	metals, inorganics
NW01D-SA1	0.6 to 1.2 mbeg	metals, inorganics
NW01D-SA3	3.05 to 3.5 mbeg	metals, inorganics
NW02D-SA2	0.75 to 1.2 mbeg	metals, inorganics
NW02D-SA5	3.05 to 3.5 mbeg	metals, inorganics

Note: mbeg denotes metres below existing grade

The laboratory certificates of chemical analysis and results of the soil samples submitted to ALS Laboratory Group of Waterloo are enclosed in Appendix B.



6.0 DISCUSSION AND RECOMMENDATIONS

It is proposed to develop the 7± hectare site with six (6) 6-storey apartment buildings (with underground parking) and twelve multi-unit townhouse blocks. Paved driveways and parking, stormwater management features and landscaping will generally comprise the remaining areas. It is understood that significant cut and fill grading operations in the order of 6± m are expected for the site.

6.1 Site Grading and Engineered Fill Construction

Site grading operations involving “cut and fill” procedures in the order of 6± m are expected throughout the site. It is recommended to construct engineered fill in areas to be raised in order to suitably support the future roadway, infrastructure servicing and lightly loaded building structures.

The surficial topsoil layer varied in thickness between 150 and 425 mm at the borehole locations. It should be noted that the thickness of the organic soil layer could vary drastically across the site from those reported at the borehole locations.

It is noted that topsoil stripping operations should be conducted when the ground is not wet and will support large scale construction equipment. Over-stripping can result when the ground conditions are wet and unstable.

Inorganic onsite native soil deposits from potential “cut” areas may potentially be reused to construct engineered fill capable of supporting building structures, infrastructure servicing and future roadways. The natural moisture content of the “cut” soils to be used as engineered fill should be within 3% below their optimum moisture contents to achieve the specified degree of compaction.

Any shortfall of fill material required for site grading operations may be made with similarly graded imported soils for the various purposes described above. It is recommended that any proposed borrow source materials be tested prior to importing, in order to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction.

It is recommended that engineered fill construction be conducted during the summer and early fall months when drier warmer weather conditions typically exist as the onsite soils are sensitive to moisture and will become difficult to handle and compact to the specified degree of compaction when wet.



The onsite deposits are frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls and service trenches using these finer grained soils during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The onsite soils are susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as wet Spring or Fall.

Engineered fill should be constructed in accordance with the following procedures in order to support infrastructure servicing, roadway pavements and lightly loaded building structures.

1. All existing fill, topsoil, organic and deleterious materials should be stripped from building and roadway areas. These excavated materials should be placed in non-structural areas;
2. The exposed inorganic subgrade surface is to be thoroughly recompact by large heavy compaction equipment (10 tonne compactor is recommended) and inspected by qualified geotechnical personnel. Any loose or soft areas identified should be excavated to the level of competent soil;
3. The required grades can then be achieved by placing approved inorganic onsite fill in maximum 200 to 300 mm thick lifts which are to be thoroughly compacted to at least 98% Standard Proctor maximum dry density (SPMDD). The moisture content of the fill materials should be within 3% below their optimum moisture contents in order to achieve the specified degree of compaction;
4. Engineered fill used to support future roadway, infrastructure servicing and lightly loaded building structures must be placed such that the fill pad extends horizontally outwards at least a distance equal to the depth of fill to be placed;
5. Overly wet and organic materials should be placed in non-structural areas and outside of SWM feature areas where 90% SPMDD is adequate. Alternatively, wet inorganic soils can be mixed with drier soils to produce a suitable moisture content to allow appropriate compaction to occur if conditions dictate;



6. All fill placement and compaction operations must be supervised on a full-time basis by qualified geotechnical personnel to approve fill material and ensure the specified degrees of compaction have been achieved.

Vibration could be generated from various construction equipment (compactors and rollers) during construction which could be harmful to surrounding structures and buildings. Peak particle velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration damage to structures. The safe vibration limit can be set to 10 to 20 mm/s PPV, depending on the sensitive of surrounding structures to vibration.

Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in the potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. It is also recommended that a pre-construction condition survey be conducted to document the condition of the existing structures within the possible zone of influence.

6.2 Underground Site Servicing

It is anticipated that municipal watermain and sewer servicing will generally be in the range of 2 to 4 m below final design grades.

6.2.1 Excavation Conditions

Trenching can be carried out using conventional open cut procedures. The excavations will generally intersect native and/or re-compacted fill soils. The native and re-compacted fill soil will generally provide suitable subgrade support to sewer and watermain serving. Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" which should be placed in 150 mm thick layers and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in these areas can also be achieved with non-shrinkable fill, if poor soil is encountered at the subgrade level and fully removed.

Excavation side slopes should comply with the current "Regulations for Construction Projects Under The Ontario Occupational Health and Safety Act". The native or re-compacted fill soils can be generally classified as Type 3 soils. Excavation in the Type 3 soils should be cut to side slopes of 1H : 1V throughout. The excavation side slopes should be suitably protected from erosion processes. Should unstable and/or wet conditions be encountered, side slopes are to be flattened to a stable



configuration. The geotechnical engineer should be retained to examine and inspect cut slopes to ensure construction safety.

6.2.2 Pipe Bedding

As noted in Section 6.2.1, any unsuitable soils exposed at the pipe subgrade should be sub-excavated and replaced with imported Granular "A", placed in thin layers and compacted to at least 95% SPMDD, or can be removed and supported on non-shrinkable fill.

The bedding requirements for the services should be in accordance with Ontario Provincial Standard Drawings OPSD - 802 for flexible and rigid pipes. The bedding shall be a Class "B" and consist of at least 150 mm thick Granular "A" compacted to at least 95% SPMDD. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe.

Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted. Recycled asphalt will not be allowed to be used in Granular "A" bedding material.

6.2.3 Trench Backfill

Excavated inorganic materials are considered suitable for reuse as trench backfill. If necessary, potential mixing of drier and wetter excavated soils in proper ratios can be done to produce a suitable mixture near the materials optimum moisture content in order to achieve the required compaction specification. Conversely, judicious addition of water may be required if the soils are significantly drier than their optimum moisture content in order to facilitate suitable compaction.

The backfill should be placed in thin layers, 300 mm thick (or less dependant on the demonstrated success of compaction based on in-situ density test results) and compacted to no less than 95% SPMDD. Other types of materials such as organic soils, overly wet soils, boulders and frozen materials (if work is carried out in the winter months) should not be used for backfilling.

Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time so as to minimize potential problems. This will potentially minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.



It has been our experience that excavated cohesive soils should be broken into smaller pieces (less than 150 mm diameter) before returning into the trench as backfill. This will eliminate “wedging” problems and reduce long term settlement. Particular attention must be made to backfilling the laterals where the trenches are narrow and against the manholes and catch-basins. Thinner lifts and additional compaction must be applied.

Frequent inspection by experienced geotechnical personnel should be carried out to examine and approve backfill material, to carefully inspect placement, and to verify that the specified degree of compaction has been obtained by in situ density testing.

6.2.4 Groundwater Control

No major problems due to groundwater are expected within the anticipated servicing excavations. Perched water and surface runoff may be controlled by filtered sump pits and pumping when and where necessary.

It should be noted that the groundwater table can be expected to fluctuate seasonally and with major weather events.

6.3 Pavement Design and Construction

The earth subgrade soil is generally expected to consist of sand and silt soil. The following flexible roadway pavement structure is recommended based on the results of the gradational analyses, assumed CBR values, groundwater table, frost susceptibility of subgrade soils and anticipated traffic volume.

Pavement Component	Component Thickness
HL3 Surface Asphaltic Concrete	40 mm
HL8 Binder Asphaltic Concrete	60 mm
Granular "A" Base Course	150 mm
Granular "B" Type II Sub-base Course	400 mm
Granular Base Equivalency (GBE)	615 mm

Note: GBE denotes Granular Base Equivalency which is calculated using factors of 2 for asphaltic concrete, 1 for Granular “A” base and 0.67 for Granular “B” sub-base.



The pavement design considers that road construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

The subgrade should be prepared in accordance with the recommendations provided in Section 6.1 and Section 6.2.3 prior to placement of the granular base layers.

The base and sub-base materials should be produced in accordance with the current OPSS specifications, and placed and uniformly compacted to at least 100% SPMDD. The asphaltic concrete should be placed and compacted in accordance with OPSS Form 310 and to a minimum of 92% of the Marshall Density (MRD). Frequent in situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.

It should be noted that even well-compacted trench backfill could settle for a period of time after construction. In this regard, the surface course of the asphaltic concrete should be placed at least one (1) year after trench backfill is completed so as to allow any minor settlements to occur within the trench backfill. The incomplete pavement structure may not be capable of supporting construction traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving with the base course and/or the surface course asphaltic concrete.

Longitudinal sub-drains with positive drainage outlets are recommended to be installed at the subgrade level along the edges of the roadway construction to enhance the performance of the pavement. Systematic drainage of the granular base materials will promote the longevity of the pavement structure.



6.4 Hydraulic Conductivity and Infiltration Rates

Grain size distribution analyses were conducted on samples of the native sand and silt till, lower sand and silt and lower silt deposits. The results are graphically presented on Enclosures 14 to 19.

Based on our past experience and the results of grain size analyses, the coefficient of permeability and infiltration rate of the encountered inorganic native soil deposits are estimated and provided in the following table:

MATERIAL	PERMEABILITY (K) (cm/sec)	INFILTRATION RATE (mm/hr)
compact to very dense Sand and Silt Till	1×10^{-6} to 5×10^{-6}	1 to 5
Lower Sand and Silt (MW-05)	1×10^{-5}	10
Lower Silt (MW-06)	5×10^{-6}	5



7.0 ENVIRONMENTAL CONSIDERATIONS

It is our understanding that excess soils may potentially be removed off-site during construction. CVD recommends that a soil management plan be established to manage the quantity, as well as where and how the excess soils can be disposed of off-site.

The analytical results and environmental assessment findings must be disclosed to the receiving site owner(s) and approval by the receiving site owner(s) be obtained prior to exporting/transferring the materials. It is noted that the soils condition may differ between and beyond the sampled locations. If any impacted soils are discovered during construction, CVD should be contacted for further sampling and testing to determine the limit of the impacted soils.

Transportation of excess soils from the source site to the receiving site(s) should be carried out in accordance with the MOECC document entitled "Management of Excess Soil - A Guide for Best Management Practices" dated January 2014. Additional soil sampling and analysis may be required as per the above-noted MOECC document and/or as per the requirement of the receiving site owner(s), depending on the volume of excess soil generated during construction.

Any soils identified during construction to have been environmentally impacted are to be separately stockpiled and analysed to determine the appropriate measures for handling and disposal. Waste characterization testing (TCLP) to classify the material for disposal as prescribed in Ontario Regulation 558 is required.

Similarly, groundwater encountered during construction works must also be suitably assessed and handled.

7.1 Applicable Regulatory Standards

The Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act established in accordance with the amended Ontario Regulation 153/04 (April 15, 2011) was consulted in the assessment of the soil at the project site. The analytical results were compared to the following "applicable regulatory standards":

- Table 1 (Full Depth Background Site Condition Standards) for Agricultural or Other Property Use
- Table 1 (Full Depth Background Site Condition Standards) for Residential/Institutional/Parkland/Industrial/Commercial/Community Property Use



- Table 2 (Full Depth Generic Site Condition Standards in a Potable Ground Water Condition) for Residential/Parkland/Institutional Property Use for coarse textured soil

The project site exists as an undeveloped natural site which will be developed into a residential setting. The City of Guelph relies on groundwater as a source of potable water. The site is not located within 30 m of an area of natural significance and is not a shallow soil property. The soil results were therefore compared to the Ministry of the Environment & Climate Change (MOECC) Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Residential/Parkland/Institutional Property Use for coarse textured soil.

Table 1 for Full Depth Background Standards for Agricultural or Other Property Use and Residential/Institutional/Parkland/Industrial/Commercial/Community Use would apply for off site disposal of soil and reuse with no environmental restrictions.

7.2 Analytical Results and Considerations

Eighteen (18) soil samples were submitted to ALS Laboratory Group of Waterloo, Ontario for analysis of metals and inorganic parameters, including Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC). The laboratory certificates of chemical analysis and results provided by ALS Laboratory Group of Waterloo are enclosed in Appendix B. A comparison of the soil chemistry results to the applicable regulatory standards is enclosed in Appendix C.

The analytical results from the soil samples submitted for metals analysis indicate all the samples were below the applicable regulatory standards.

The SAR parameter value from MW07-Sa5 has a concentration above Table 1 standards for Residential/Institutional/Parkland/Industrial/Commercial/Community Property Use. Excavated excess soil may be received by an accepting Table 2 site or a holder of an appropriate certificate of approval.



8.0 CLOSURE

The Limitations of Report, as quoted in Appendix "A", is an integral part of this report.

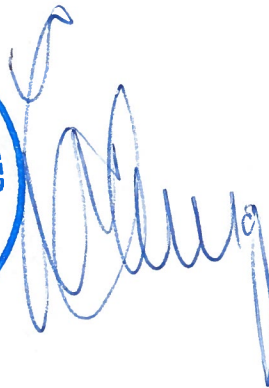
We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,

CHUNG & VANDER DOELEN ENGINEERING LTD.



Robert Vander Doelen, P. Eng.
Senior Engineer



Eric Y. Chung, M. Eng., P. Eng.
Principal Engineer



APPENDIX “A”

Limitations of Report



APPENDIX “A”

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report. The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.



APPENDIX “B”

Soil Chemistry Results





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Date Received: 05-APR-18
Report Date: 16-APR-18 12:35 (MT)
Version: FINAL REV. 4

Client Phone: 519-742-8979

Certificate of Analysis

Lab Work Order #: L2076359

Project P.O. #: G18570

Job Reference: G18570

C of C Numbers: 17-626460

Legal Site Desc:

Mary-Lynn Pike
Client Services Supervisor

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ANALYTICAL GUIDELINE REPORT

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
L2076359-1		MW01-SA1						#1	#2	#3
Sampled By:		CLIENT on 22-MAR-18								
Matrix:		SOIL								
Physical Tests										
Conductivity			0.122		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
% Moisture			12.9		0.10	%	06-APR-18			
pH			7.55		0.10	pH units	07-APR-18			
Cyanides										
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables										
SAR			0.15	SAR:M	0.10	SAR	10-APR-18	1	2.4	5
Calcium (Ca)			4.6		1.0	mg/L	10-APR-18			
Magnesium (Mg)			<1.0		1.0	mg/L	10-APR-18			
Sodium (Na)			1.2		1.0	mg/L	10-APR-18			
Metals										
Antimony (Sb)			<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5
Arsenic (As)			3.1		1.0	ug/g	12-APR-18	11	18	18
Barium (Ba)			34.3		1.0	ug/g	12-APR-18	210	220	390
Beryllium (Be)			<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4
Boron (B)			7.7		5.0	ug/g	12-APR-18	36	36	120
Boron (B), Hot Water Ext.			<0.10		0.10	ug/g	10-APR-18	36	36	1.5
Cadmium (Cd)			<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2
Chromium (Cr)			11.6		1.0	ug/g	12-APR-18	67	70	160
Cobalt (Co)			4.3		1.0	ug/g	12-APR-18	19	21	22
Copper (Cu)			11.7		1.0	ug/g	12-APR-18	62	92	140
Lead (Pb)			7.9		1.0	ug/g	12-APR-18	45	120	120
Mercury (Hg)			0.0180		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
Molybdenum (Mo)			<1.0		1.0	ug/g	12-APR-18	2	2	6.9
Nickel (Ni)			9.3		1.0	ug/g	12-APR-18	37	82	100
Selenium (Se)			<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4
Silver (Ag)			<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20
Thallium (Tl)			<0.50		0.50	ug/g	12-APR-18	1	1	1
Uranium (U)			<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23
Vanadium (V)			19.7		1.0	ug/g	12-APR-18	86	86	86
Zinc (Zn)			36.1		5.0	ug/g	12-APR-18	290	290	340
Speciated Metals										
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-2		MW01-SA4						#1	#2	#3
Sampled By:		CLIENT on 22-MAR-18								
Matrix:		SOIL								
Physical Tests										
Conductivity			0.142		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7
% Moisture			7.83		0.10	%	06-APR-18			
pH			7.91		0.10	pH units	07-APR-18			
Cyanides										
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables										
SAR			0.25	SAR:M	0.10	SAR	11-APR-18	1	2.4	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
Grouping	Analyte						#1	#2	#3	
L2076359-2 MW01-SA4										
Sampled By: CLIENT on 22-MAR-18										
Matrix: SOIL										
Saturated Paste Extractables										
	Calcium (Ca)	3.9		1.0	mg/L	11-APR-18				
	Magnesium (Mg)	<1.0		1.0	mg/L	11-APR-18				
	Sodium (Na)	1.8		1.0	mg/L	11-APR-18				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
	Arsenic (As)	2.7		1.0	ug/g	10-APR-18	11	18	18	
	Barium (Ba)	29.5		1.0	ug/g	10-APR-18	210	220	390	
	Beryllium (Be)	<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4	
	Boron (B)	7.6		5.0	ug/g	10-APR-18	36	36	120	
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	11-APR-18	36	36	1.5	
	Cadmium (Cd)	<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2	
	Chromium (Cr)	11.3		1.0	ug/g	10-APR-18	67	70	160	
	Cobalt (Co)	4.1		1.0	ug/g	10-APR-18	19	21	22	
	Copper (Cu)	11.3		1.0	ug/g	10-APR-18	62	92	140	
	Lead (Pb)	6.4		1.0	ug/g	10-APR-18	45	120	120	
	Mercury (Hg)	0.0094		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
	Molybdenum (Mo)	<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
	Nickel (Ni)	7.3		1.0	ug/g	10-APR-18	37	82	100	
	Selenium (Se)	<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
	Silver (Ag)	<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
	Thallium (Tl)	<0.50		0.50	ug/g	10-APR-18	1	1	1	
	Uranium (U)	<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23	
	Vanadium (V)	19.3		1.0	ug/g	10-APR-18	86	86	86	
	Zinc (Zn)	35.0		5.0	ug/g	10-APR-18	290	290	340	
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-3 MW02-SA1										
Sampled By: CLIENT on 21-MAR-18										
Matrix: SOIL										
Physical Tests										
	Conductivity	0.194		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7	
	% Moisture	6.29		0.10	%	06-APR-18				
	pH	8.04		0.10	pH units	07-APR-18				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables										
	SAR	0.38		0.10	SAR	11-APR-18	1	2.4	5	
	Calcium (Ca)	4.2		1.0	mg/L	11-APR-18				
	Magnesium (Mg)	2.1		1.0	mg/L	11-APR-18				
	Sodium (Na)	3.8		1.0	mg/L	11-APR-18				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
	Arsenic (As)	2.3		1.0	ug/g	10-APR-18	11	18	18	
	Barium (Ba)	27.1		1.0	ug/g	10-APR-18	210	220	390	

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
L2076359-3		MW02-SA1						#1	#2	#3
Sampled By:		CLIENT on 21-MAR-18								
Matrix:		SOIL								
Metals										
	Beryllium (Be)	<0.50			0.50	ug/g	10-APR-18	2.5	2.5	4
	Boron (B)	6.7			5.0	ug/g	10-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10			0.10	ug/g	11-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50			0.50	ug/g	10-APR-18	1	1.2	1.2
	Chromium (Cr)	10.8			1.0	ug/g	10-APR-18	67	70	160
	Cobalt (Co)	3.5			1.0	ug/g	10-APR-18	19	21	22
	Copper (Cu)	10.2			1.0	ug/g	10-APR-18	62	92	140
	Lead (Pb)	5.9			1.0	ug/g	10-APR-18	45	120	120
	Mercury (Hg)	0.0060			0.0050	ug/g	10-APR-18	0.16	0.27	0.27
	Molybdenum (Mo)	<1.0			1.0	ug/g	10-APR-18	2	2	6.9
	Nickel (Ni)	6.4			1.0	ug/g	10-APR-18	37	82	100
	Selenium (Se)	<1.0			1.0	ug/g	10-APR-18	1.2	1.5	2.4
	Silver (Ag)	<0.20			0.20	ug/g	10-APR-18	0.5	0.5	20
	Thallium (Tl)	<0.50			0.50	ug/g	10-APR-18	1	1	1
	Uranium (U)	<1.0			1.0	ug/g	10-APR-18	1.9	2.5	23
	Vanadium (V)	15.7			1.0	ug/g	10-APR-18	86	86	86
	Zinc (Zn)	32.3			5.0	ug/g	10-APR-18	290	290	340
Speciated Metals										
	Chromium, Hexavalent	<0.20			0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-4		MW02-SA3						#1	#2	#3
Sampled By:		CLIENT on 21-MAR-18								
Matrix:		SOIL								
Physical Tests										
	Conductivity	0.230			0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
	% Moisture	6.58			0.10	%	06-APR-18			
	pH	8.01			0.10	pH units	07-APR-18			
Cyanides										
	Cyanide, Weak Acid Diss	<0.050			0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.37			0.10	SAR	10-APR-18	1	2.4	5
	Calcium (Ca)	6.4			1.0	mg/L	10-APR-18			
	Magnesium (Mg)	4.0			1.0	mg/L	10-APR-18			
	Sodium (Na)	4.9			1.0	mg/L	10-APR-18			
Metals										
	Antimony (Sb)	<1.0			1.0	ug/g	12-APR-18	1	1.3	7.5
	Arsenic (As)	1.3			1.0	ug/g	12-APR-18	11	18	18
	Barium (Ba)	13.8			1.0	ug/g	12-APR-18	210	220	390
	Beryllium (Be)	<0.50			0.50	ug/g	12-APR-18	2.5	2.5	4
	Boron (B)	<5.0			5.0	ug/g	12-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10			0.10	ug/g	10-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50			0.50	ug/g	12-APR-18	1	1.2	1.2
	Chromium (Cr)	6.3			1.0	ug/g	12-APR-18	67	70	160
	Cobalt (Co)	1.8			1.0	ug/g	12-APR-18	19	21	22
	Copper (Cu)	5.3			1.0	ug/g	12-APR-18	62	92	140

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#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2076359-4		MW02-SA3									
Sampled By:		CLIENT on 21-MAR-18									
Matrix:		SOIL									
Metals								#1	#2	#3	
Lead (Pb)			3.3		1.0	ug/g	12-APR-18	45	120	120	
Mercury (Hg)			<0.0050		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	12-APR-18	2	2	6.9	
Nickel (Ni)			4.0		1.0	ug/g	12-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	12-APR-18	1	1	1	
Uranium (U)			<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23	
Vanadium (V)			10.8		1.0	ug/g	12-APR-18	86	86	86	
Zinc (Zn)			14.1		5.0	ug/g	12-APR-18	290	290	340	
Speciated Metals											
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-5		MW03-SA1									
Sampled By:		CLIENT on 21-MAR-18									
Matrix:		SOIL									
Physical Tests								#1	#2	#3	
Conductivity			0.138		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7	
% Moisture			8.61		0.10	%	07-APR-18				
pH			7.74		0.10	pH units	07-APR-18				
Cyanides											
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables											
SAR			0.16	SAR:M	0.10	SAR	11-APR-18	1	2.4	5	
Calcium (Ca)			4.4		1.0	mg/L	11-APR-18				
Magnesium (Mg)			<1.0		1.0	mg/L	11-APR-18				
Sodium (Na)			1.2		1.0	mg/L	11-APR-18				
Metals											
Antimony (Sb)			<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
Arsenic (As)			2.3		1.0	ug/g	10-APR-18	11	18	18	
Barium (Ba)			22.9		1.0	ug/g	10-APR-18	210	220	390	
Beryllium (Be)			<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4	
Boron (B)			6.1		5.0	ug/g	10-APR-18	36	36	120	
Boron (B), Hot Water Ext.			<0.10		0.10	ug/g	11-APR-18	36	36	1.5	
Cadmium (Cd)			<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2	
Chromium (Cr)			8.6		1.0	ug/g	10-APR-18	67	70	160	
Cobalt (Co)			3.2		1.0	ug/g	10-APR-18	19	21	22	
Copper (Cu)			11.0		1.0	ug/g	10-APR-18	62	92	140	
Lead (Pb)			7.0		1.0	ug/g	10-APR-18	45	120	120	
Mercury (Hg)			0.0098		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
Nickel (Ni)			5.5		1.0	ug/g	10-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	10-APR-18	1	1	1	

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2076359-5		MW03-SA1						#1	#2	#3	
Sampled By:		CLIENT on 21-MAR-18									
Matrix:		SOIL									
Metals											
Uranium (U)			<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23	
Vanadium (V)			15.4		1.0	ug/g	10-APR-18	86	86	86	
Zinc (Zn)			34.5		5.0	ug/g	10-APR-18	290	290	340	
Speciated Metals											
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-6		MW03-SA4						#1	#2	#3	
Sampled By:		CLIENT on 21-MAR-18									
Matrix:		SOIL									
Physical Tests											
Conductivity			0.114		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7	
% Moisture			4.91		0.10	%	07-APR-18				
pH			7.99		0.10	pH units	07-APR-18				
Cyanides											
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables											
SAR			<0.16	SAR:DL	0.16	SAR	11-APR-18	1	2.4	5	
Calcium (Ca)			3.0		1.0	mg/L	11-APR-18				
Magnesium (Mg)			<1.0		1.0	mg/L	11-APR-18				
Sodium (Na)			<1.0		1.0	mg/L	11-APR-18				
Metals											
Antimony (Sb)			<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
Arsenic (As)			2.3		1.0	ug/g	10-APR-18	11	18	18	
Barium (Ba)			26.4		1.0	ug/g	10-APR-18	210	220	390	
Beryllium (Be)			<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4	
Boron (B)			6.4		5.0	ug/g	10-APR-18	36	36	120	
Boron (B), Hot Water Ext.			<0.10		0.10	ug/g	11-APR-18	36	36	1.5	
Cadmium (Cd)			<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2	
Chromium (Cr)			9.4		1.0	ug/g	10-APR-18	67	70	160	
Cobalt (Co)			3.5		1.0	ug/g	10-APR-18	19	21	22	
Copper (Cu)			9.4		1.0	ug/g	10-APR-18	62	92	140	
Lead (Pb)			6.3		1.0	ug/g	10-APR-18	45	120	120	
Mercury (Hg)			0.0057		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
Nickel (Ni)			5.8		1.0	ug/g	10-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	10-APR-18	1	1	1	
Uranium (U)			<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23	
Vanadium (V)			15.9		1.0	ug/g	10-APR-18	86	86	86	
Zinc (Zn)			34.8		5.0	ug/g	10-APR-18	290	290	340	
Speciated Metals											
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-7 MW04-SA1									
Sampled By: CLIENT on 22-MAR-18									
Matrix: SOIL									
Physical Tests									
Conductivity		0.134		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
% Moisture		9.11		0.10	%	07-APR-18			
pH		7.88		0.10	pH units	07-APR-18			
Cyanides									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
SAR		<0.11	SAR:DL	0.11	SAR	10-APR-18	1	2.4	5
Calcium (Ca)		6.2		1.0	mg/L	10-APR-18			
Magnesium (Mg)		<1.0		1.0	mg/L	10-APR-18			
Sodium (Na)		<1.0		1.0	mg/L	10-APR-18			
Metals									
Antimony (Sb)		<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5
Arsenic (As)		2.8		1.0	ug/g	12-APR-18	11	18	18
Barium (Ba)		26.9		1.0	ug/g	12-APR-18	210	220	390
Beryllium (Be)		<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4
Boron (B)		6.7		5.0	ug/g	12-APR-18	36	36	120
Boron (B), Hot Water Ext.		<0.10		0.10	ug/g	10-APR-18	36	36	1.5
Cadmium (Cd)		<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2
Chromium (Cr)		10.9		1.0	ug/g	12-APR-18	67	70	160
Cobalt (Co)		3.8		1.0	ug/g	12-APR-18	19	21	22
Copper (Cu)		11.0		1.0	ug/g	12-APR-18	62	92	140
Lead (Pb)		6.3		1.0	ug/g	12-APR-18	45	120	120
Mercury (Hg)		0.0090		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
Molybdenum (Mo)		<1.0		1.0	ug/g	12-APR-18	2	2	6.9
Nickel (Ni)		7.8		1.0	ug/g	12-APR-18	37	82	100
Selenium (Se)		<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4
Silver (Ag)		<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20
Thallium (Tl)		<0.50		0.50	ug/g	12-APR-18	1	1	1
Uranium (U)		<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23
Vanadium (V)		17.0		1.0	ug/g	12-APR-18	86	86	86
Zinc (Zn)		28.3		5.0	ug/g	12-APR-18	290	290	340
Speciated Metals									
Chromium, Hexavalent		<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-8 MW04-SA3									
Sampled By: CLIENT on 22-MAR-18									
Matrix: SOIL									
Physical Tests									
Conductivity		0.118		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
% Moisture		15.3		0.10	%	07-APR-18			
pH		7.91		0.10	pH units	07-APR-18			
Cyanides									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
SAR		0.12		0.10	SAR	10-APR-18	1	2.4	5

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-8 MW04-SA3									
Sampled By: CLIENT on 22-MAR-18									
Matrix: SOIL									
Saturated Paste Extractables									
	Calcium (Ca)	4.5		1.0	mg/L	10-APR-18			
	Magnesium (Mg)	1.2		1.0	mg/L	10-APR-18			
	Sodium (Na)	1.1		1.0	mg/L	10-APR-18			
Metals									
	Antimony (Sb)	<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5
	Arsenic (As)	2.0		1.0	ug/g	12-APR-18	11	18	18
	Barium (Ba)	22.8		1.0	ug/g	12-APR-18	210	220	390
	Beryllium (Be)	<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4
	Boron (B)	5.2		5.0	ug/g	12-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	10-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2
	Chromium (Cr)	8.6		1.0	ug/g	12-APR-18	67	70	160
	Cobalt (Co)	3.1		1.0	ug/g	12-APR-18	19	21	22
	Copper (Cu)	7.7		1.0	ug/g	12-APR-18	62	92	140
	Lead (Pb)	4.7		1.0	ug/g	12-APR-18	45	120	120
	Mercury (Hg)	0.0080		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
	Molybdenum (Mo)	<1.0		1.0	ug/g	12-APR-18	2	2	6.9
	Nickel (Ni)	6.3		1.0	ug/g	12-APR-18	37	82	100
	Selenium (Se)	<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4
	Silver (Ag)	<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20
	Thallium (Tl)	<0.50		0.50	ug/g	12-APR-18	1	1	1
	Uranium (U)	<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23
	Vanadium (V)	14.5		1.0	ug/g	12-APR-18	86	86	86
	Zinc (Zn)	25.7		5.0	ug/g	12-APR-18	290	290	340
Speciated Metals									
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-9 MW05-SA1									
Sampled By: CLIENT on 21-MAR-18									
Matrix: SOIL									
Physical Tests									
	Conductivity	0.102		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
	% Moisture	9.75		0.10	%	07-APR-18			
	pH	7.91		0.10	pH units	07-APR-18			
Cyanides									
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
	SAR	<0.14	SAR:DL	0.14	SAR	10-APR-18	1	2.4	5
	Calcium (Ca)	3.7		1.0	mg/L	10-APR-18			
	Magnesium (Mg)	<1.0		1.0	mg/L	10-APR-18			
	Sodium (Na)	<1.0		1.0	mg/L	10-APR-18			
Metals									
	Antimony (Sb)	<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5
	Arsenic (As)	2.3		1.0	ug/g	12-APR-18	11	18	18
	Barium (Ba)	23.2		1.0	ug/g	12-APR-18	210	220	390

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#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-9 MW05-SA1									
Sampled By: CLIENT on 21-MAR-18									
Matrix: SOIL									
Metals									
	Beryllium (Be)	<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4
	Boron (B)	6.0		5.0	ug/g	12-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	10-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2
	Chromium (Cr)	8.7		1.0	ug/g	12-APR-18	67	70	160
	Cobalt (Co)	3.5		1.0	ug/g	12-APR-18	19	21	22
	Copper (Cu)	9.8		1.0	ug/g	12-APR-18	62	92	140
	Lead (Pb)	7.5		1.0	ug/g	12-APR-18	45	120	120
	Mercury (Hg)	0.0060		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
	Molybdenum (Mo)	<1.0		1.0	ug/g	12-APR-18	2	2	6.9
	Nickel (Ni)	6.3		1.0	ug/g	12-APR-18	37	82	100
	Selenium (Se)	<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4
	Silver (Ag)	<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20
	Thallium (Tl)	<0.50		0.50	ug/g	12-APR-18	1	1	1
	Uranium (U)	<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23
	Vanadium (V)	15.7		1.0	ug/g	12-APR-18	86	86	86
	Zinc (Zn)	32.9		5.0	ug/g	12-APR-18	290	290	340
Speciated Metals									
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-10 MW05-SA4									
Sampled By: CLIENT on 21-MAR-18									
Matrix: SOIL									
Physical Tests									
	Conductivity	0.109		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
	% Moisture	9.23		0.10	%	07-APR-18			
	pH	7.98		0.10	pH units	07-APR-18			
Cyanides									
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
	SAR	0.23	SAR:M	0.10	SAR	10-APR-18	1	2.4	5
	Calcium (Ca)	3.5		1.0	mg/L	10-APR-18			
	Magnesium (Mg)	<1.0		1.0	mg/L	10-APR-18			
	Sodium (Na)	1.6		1.0	mg/L	10-APR-18			
Metals									
	Antimony (Sb)	<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5
	Arsenic (As)	1.5		1.0	ug/g	12-APR-18	11	18	18
	Barium (Ba)	10.9		1.0	ug/g	12-APR-18	210	220	390
	Beryllium (Be)	<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4
	Boron (B)	6.2		5.0	ug/g	12-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	10-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2
	Chromium (Cr)	5.6		1.0	ug/g	12-APR-18	67	70	160
	Cobalt (Co)	1.7		1.0	ug/g	12-APR-18	19	21	22
	Copper (Cu)	5.3		1.0	ug/g	12-APR-18	62	92	140

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#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2076359-10 MW05-SA4		Sampled By: CLIENT on 21-MAR-18						#1	#2	#3	
Matrix: SOIL											
Metals											
Lead (Pb)			3.3		1.0	ug/g	12-APR-18	45	120	120	
Mercury (Hg)			<0.0050		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	12-APR-18	2	2	6.9	
Nickel (Ni)			3.4		1.0	ug/g	12-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	12-APR-18	1	1	1	
Uranium (U)			<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23	
Vanadium (V)			11.1		1.0	ug/g	12-APR-18	86	86	86	
Zinc (Zn)			16.4		5.0	ug/g	12-APR-18	290	290	340	
Speciated Metals											
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-11 MW06-SA1		Sampled By: CLIENT on 22-MAR-18						#1	#2	#3	
Matrix: SOIL											
Physical Tests											
Conductivity			0.132		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7	
% Moisture			8.91		0.10	%	07-APR-18				
pH			7.99		0.10	pH units	07-APR-18				
Cyanides											
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables											
SAR			0.16	SAR:M	0.10	SAR	10-APR-18	1	2.4	5	
Calcium (Ca)			5.4		1.0	mg/L	10-APR-18				
Magnesium (Mg)			<1.0		1.0	mg/L	10-APR-18				
Sodium (Na)			1.4		1.0	mg/L	10-APR-18				
Metals											
Antimony (Sb)			<1.0		1.0	ug/g	12-APR-18	1	1.3	7.5	
Arsenic (As)			2.0		1.0	ug/g	12-APR-18	11	18	18	
Barium (Ba)			19.0		1.0	ug/g	12-APR-18	210	220	390	
Beryllium (Be)			<0.50		0.50	ug/g	12-APR-18	2.5	2.5	4	
Boron (B)			6.7		5.0	ug/g	12-APR-18	36	36	120	
Boron (B), Hot Water Ext.			<0.10		0.10	ug/g	10-APR-18	36	36	1.5	
Cadmium (Cd)			<0.50		0.50	ug/g	12-APR-18	1	1.2	1.2	
Chromium (Cr)			7.9		1.0	ug/g	12-APR-18	67	70	160	
Cobalt (Co)			2.8		1.0	ug/g	12-APR-18	19	21	22	
Copper (Cu)			10.0		1.0	ug/g	12-APR-18	62	92	140	
Lead (Pb)			5.0		1.0	ug/g	12-APR-18	45	120	120	
Mercury (Hg)			0.0082		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	12-APR-18	2	2	6.9	
Nickel (Ni)			5.7		1.0	ug/g	12-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	12-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	12-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	12-APR-18	1	1	1	

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Environmental

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-11 MW06-SA1									
Sampled By: CLIENT on 22-MAR-18									
Matrix: SOIL									
Metals									
	Uranium (U)	<1.0		1.0	ug/g	12-APR-18	1.9	2.5	23
	Vanadium (V)	13.6		1.0	ug/g	12-APR-18	86	86	86
	Zinc (Zn)	24.4		5.0	ug/g	12-APR-18	290	290	340
Speciated Metals									
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-12 MW06-SA4									
Sampled By: CLIENT on 22-MAR-18									
Matrix: SOIL									
Physical Tests									
	Conductivity	0.0976		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
	% Moisture	8.12		0.10	%	07-APR-18			
	pH	7.97		0.10	pH units	07-APR-18			
Cyanides									
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
	SAR	0.16	SAR:M	0.10	SAR	10-APR-18	1	2.4	5
	Calcium (Ca)	4.0		1.0	mg/L	10-APR-18			
	Magnesium (Mg)	<1.0		1.0	mg/L	10-APR-18			
	Sodium (Na)	1.2		1.0	mg/L	10-APR-18			
Metals									
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5
	Arsenic (As)	2.1		1.0	ug/g	10-APR-18	11	18	18
	Barium (Ba)	15.4		1.0	ug/g	10-APR-18	210	220	390
	Beryllium (Be)	<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4
	Boron (B)	5.7		5.0	ug/g	10-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	10-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2
	Chromium (Cr)	7.4		1.0	ug/g	10-APR-18	67	70	160
	Cobalt (Co)	2.6		1.0	ug/g	10-APR-18	19	21	22
	Copper (Cu)	7.6		1.0	ug/g	10-APR-18	62	92	140
	Lead (Pb)	34.6		1.0	ug/g	10-APR-18	45	120	120
	Mercury (Hg)	<0.0050		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
	Molybdenum (Mo)	<1.0		1.0	ug/g	10-APR-18	2	2	6.9
	Nickel (Ni)	5.6		1.0	ug/g	10-APR-18	37	82	100
	Selenium (Se)	<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4
	Silver (Ag)	<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20
	Thallium (Tl)	<0.50		0.50	ug/g	10-APR-18	1	1	1
	Uranium (U)	<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23
	Vanadium (V)	13.9		1.0	ug/g	10-APR-18	86	86	86
	Zinc (Zn)	30.7		5.0	ug/g	10-APR-18	290	290	340
Speciated Metals									
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-13 MW07-SA2									
Sampled By: CLIENT on 23-MAR-18									
Matrix: SOIL									
Physical Tests									
Conductivity		0.130		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
% Moisture		9.71		0.10	%	05-APR-18			
pH		7.88		0.10	pH units	07-APR-18			
Cyanides									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	06-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
SAR		0.27	SAR:M	0.10	SAR	10-APR-18	1	2.4	5
Calcium (Ca)		5.1		1.0	mg/L	10-APR-18			
Magnesium (Mg)		<1.0		1.0	mg/L	10-APR-18			
Sodium (Na)		2.2		1.0	mg/L	10-APR-18			
Metals									
Antimony (Sb)		<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5
Arsenic (As)		2.5		1.0	ug/g	10-APR-18	11	18	18
Barium (Ba)		23.3		1.0	ug/g	10-APR-18	210	220	390
Beryllium (Be)		<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4
Boron (B)		6.9		5.0	ug/g	10-APR-18	36	36	120
Boron (B), Hot Water Ext.		<0.10		0.10	ug/g	10-APR-18	36	36	1.5
Cadmium (Cd)		<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2
Chromium (Cr)		9.6		1.0	ug/g	10-APR-18	67	70	160
Cobalt (Co)		3.6		1.0	ug/g	10-APR-18	19	21	22
Copper (Cu)		10.6		1.0	ug/g	10-APR-18	62	92	140
Lead (Pb)		5.5		1.0	ug/g	10-APR-18	45	120	120
Mercury (Hg)		0.0082		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
Molybdenum (Mo)		<1.0		1.0	ug/g	10-APR-18	2	2	6.9
Nickel (Ni)		7.6		1.0	ug/g	10-APR-18	37	82	100
Selenium (Se)		<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4
Silver (Ag)		<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20
Thallium (Tl)		<0.50		0.50	ug/g	10-APR-18	1	1	1
Uranium (U)		<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23
Vanadium (V)		16.7		1.0	ug/g	10-APR-18	86	86	86
Zinc (Zn)		29.6		5.0	ug/g	10-APR-18	290	290	340
Speciated Metals									
Chromium, Hexavalent		<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-14 MW07-SA5									
Sampled By: CLIENT on 23-MAR-18									
Matrix: SOIL									
Physical Tests									
Conductivity		0.244		0.0040	mS/cm	10-APR-18	0.47	0.57	0.7
% Moisture		6.33		0.10	%	05-APR-18			
pH		8.01		0.10	pH units	07-APR-18			
Cyanides									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	06-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
SAR		2.65		0.10	SAR	10-APR-18	*1	*2.4	5

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#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)



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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
Grouping	Analyte									
L2076359-14 MW07-SA5							#1	#2	#3	
Sampled By: CLIENT on 23-MAR-18										
Matrix: SOIL										
Saturated Paste Extractables										
	Calcium (Ca)	3.5		1.0	mg/L	10-APR-18				
	Magnesium (Mg)	1.1		1.0	mg/L	10-APR-18				
	Sodium (Na)	22.1		1.0	mg/L	10-APR-18				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
	Arsenic (As)	1.8		1.0	ug/g	10-APR-18	11	18	18	
	Barium (Ba)	32.1		1.0	ug/g	10-APR-18	210	220	390	
	Beryllium (Be)	<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4	
	Boron (B)	6.4		5.0	ug/g	10-APR-18	36	36	120	
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	10-APR-18	36	36	1.5	
	Cadmium (Cd)	<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2	
	Chromium (Cr)	8.5		1.0	ug/g	10-APR-18	67	70	160	
	Cobalt (Co)	4.9		1.0	ug/g	10-APR-18	19	21	22	
	Copper (Cu)	9.3		1.0	ug/g	10-APR-18	62	92	140	
	Lead (Pb)	4.4		1.0	ug/g	10-APR-18	45	120	120	
	Mercury (Hg)	<0.0050		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
	Molybdenum (Mo)	<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
	Nickel (Ni)	5.8		1.0	ug/g	10-APR-18	37	82	100	
	Selenium (Se)	<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
	Silver (Ag)	<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
	Thallium (Tl)	<0.50		0.50	ug/g	10-APR-18	1	1	1	
	Uranium (U)	<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23	
	Vanadium (V)	14.4		1.0	ug/g	10-APR-18	86	86	86	
	Zinc (Zn)	25.9		5.0	ug/g	10-APR-18	290	290	340	
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-15 NW01D-SA1							#1	#2	#3	
Sampled By: CLIENT on 20-MAR-18										
Matrix: SOIL										
Physical Tests										
	Conductivity	0.149		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7	
	% Moisture	10.5		0.10	%	07-APR-18				
	pH	7.80		0.10	pH units	07-APR-18				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables										
	SAR	0.15	SAR:M	0.10	SAR	11-APR-18	1	2.4	5	
	Calcium (Ca)	5.1		1.0	mg/L	11-APR-18				
	Magnesium (Mg)	<1.0		1.0	mg/L	11-APR-18				
	Sodium (Na)	1.2		1.0	mg/L	11-APR-18				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
	Arsenic (As)	3.0		1.0	ug/g	10-APR-18	11	18	18	
	Barium (Ba)	34.2		1.0	ug/g	10-APR-18	210	220	390	

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#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2076359-15 NW01D-SA1									
Sampled By: CLIENT on 20-MAR-18									
Matrix: SOIL									
Metals									
	Beryllium (Be)	<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4
	Boron (B)	7.8		5.0	ug/g	10-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	11-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2
	Chromium (Cr)	12.9		1.0	ug/g	10-APR-18	67	70	160
	Cobalt (Co)	4.6		1.0	ug/g	10-APR-18	19	21	22
	Copper (Cu)	12.8		1.0	ug/g	10-APR-18	62	92	140
	Lead (Pb)	11.2		1.0	ug/g	10-APR-18	45	120	120
	Mercury (Hg)	0.0205		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
	Molybdenum (Mo)	<1.0		1.0	ug/g	10-APR-18	2	2	6.9
	Nickel (Ni)	9.8		1.0	ug/g	10-APR-18	37	82	100
	Selenium (Se)	<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4
	Silver (Ag)	<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20
	Thallium (Tl)	<0.50		0.50	ug/g	10-APR-18	1	1	1
	Uranium (U)	<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23
	Vanadium (V)	22.2		1.0	ug/g	10-APR-18	86	86	86
	Zinc (Zn)	47.0		5.0	ug/g	10-APR-18	290	290	340
Speciated Metals									
	Chromium, Hexavalent	<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-16 NW01D-SA3									
Sampled By: CLIENT on 20-MAR-18									
Matrix: SOIL									
Physical Tests									
	Conductivity	0.157		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7
	% Moisture	4.41		0.10	%	07-APR-18			
	pH	7.94		0.10	pH units	07-APR-18			
Cyanides									
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
	SAR	0.44		0.10	SAR	11-APR-18	1	2.4	5
	Calcium (Ca)	4.2		1.0	mg/L	11-APR-18			
	Magnesium (Mg)	1.5		1.0	mg/L	11-APR-18			
	Sodium (Na)	4.1		1.0	mg/L	11-APR-18			
Metals									
	Antimony (Sb)	<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5
	Arsenic (As)	2.5		1.0	ug/g	10-APR-18	11	18	18
	Barium (Ba)	32.4		1.0	ug/g	10-APR-18	210	220	390
	Beryllium (Be)	<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4
	Boron (B)	9.5		5.0	ug/g	10-APR-18	36	36	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	11-APR-18	36	36	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2
	Chromium (Cr)	11.7		1.0	ug/g	10-APR-18	67	70	160
	Cobalt (Co)	4.0		1.0	ug/g	10-APR-18	19	21	22
	Copper (Cu)	10.9		1.0	ug/g	10-APR-18	62	92	140

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#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2076359-16 NW01D-SA3		Sampled By: CLIENT on 20-MAR-18						#1	#2	#3	
Matrix: SOIL											
Metals											
Lead (Pb)			6.6		1.0	ug/g	10-APR-18	45	120	120	
Mercury (Hg)			0.0067		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
Nickel (Ni)			8.5		1.0	ug/g	10-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	10-APR-18	1	1	1	
Uranium (U)			<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23	
Vanadium (V)			18.0		1.0	ug/g	10-APR-18	86	86	86	
Zinc (Zn)			39.6		5.0	ug/g	10-APR-18	290	290	340	
Speciated Metals											
Chromium, Hexavalent			<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8	
L2076359-17 NW02D-SA2		Sampled By: CLIENT on 20-MAR-18						#1	#2	#3	
Matrix: SOIL											
Physical Tests											
Conductivity			0.108		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7	
% Moisture			10.8		0.10	%	07-APR-18				
pH			7.81		0.10	pH units	07-APR-18				
Cyanides											
Cyanide, Weak Acid Diss			<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051	
Saturated Paste Extractables											
SAR			<0.14	SAR:DL	0.14	SAR	11-APR-18	1	2.4	5	
Calcium (Ca)			3.7		1.0	mg/L	11-APR-18				
Magnesium (Mg)			<1.0		1.0	mg/L	11-APR-18				
Sodium (Na)			<1.0		1.0	mg/L	11-APR-18				
Metals											
Antimony (Sb)			<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5	
Arsenic (As)			2.3		1.0	ug/g	10-APR-18	11	18	18	
Barium (Ba)			19.0		1.0	ug/g	10-APR-18	210	220	390	
Beryllium (Be)			<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4	
Boron (B)			6.0		5.0	ug/g	10-APR-18	36	36	120	
Boron (B), Hot Water Ext.			<0.10		0.10	ug/g	11-APR-18	36	36	1.5	
Cadmium (Cd)			<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2	
Chromium (Cr)			8.0		1.0	ug/g	10-APR-18	67	70	160	
Cobalt (Co)			3.0		1.0	ug/g	10-APR-18	19	21	22	
Copper (Cu)			8.8		1.0	ug/g	10-APR-18	62	92	140	
Lead (Pb)			5.6		1.0	ug/g	10-APR-18	45	120	120	
Mercury (Hg)			0.0068		0.0050	ug/g	10-APR-18	0.16	0.27	0.27	
Molybdenum (Mo)			<1.0		1.0	ug/g	10-APR-18	2	2	6.9	
Nickel (Ni)			6.3		1.0	ug/g	10-APR-18	37	82	100	
Selenium (Se)			<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4	
Silver (Ag)			<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20	
Thallium (Tl)			<0.50		0.50	ug/g	10-APR-18	1	1	1	

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
L2076359-17 NW02D-SA2							#1	#2	#3
Sampled By: CLIENT on 20-MAR-18									
Matrix: SOIL									
Metals									
Uranium (U)		<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23
Vanadium (V)		15.2		1.0	ug/g	10-APR-18	86	86	86
Zinc (Zn)		31.7		5.0	ug/g	10-APR-18	290	290	340
Speciated Metals									
Chromium, Hexavalent		<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8
L2076359-18 NW02D-SA5							#1	#2	#3
Sampled By: CLIENT on 20-MAR-18									
Matrix: SOIL									
Physical Tests									
Conductivity		0.134		0.0040	mS/cm	11-APR-18	0.47	0.57	0.7
% Moisture		9.50		0.10	%	07-APR-18			
pH		8.00		0.10	pH units	07-APR-18			
Cyanides									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	10-APR-18	0.051	0.051	0.051
Saturated Paste Extractables									
SAR		0.20		0.10	SAR	11-APR-18	1	2.4	5
Calcium (Ca)		3.4		1.0	mg/L	11-APR-18			
Magnesium (Mg)		1.4		1.0	mg/L	11-APR-18			
Sodium (Na)		1.7		1.0	mg/L	11-APR-18			
Metals									
Antimony (Sb)		<1.0		1.0	ug/g	10-APR-18	1	1.3	7.5
Arsenic (As)		2.1		1.0	ug/g	10-APR-18	11	18	18
Barium (Ba)		15.8		1.0	ug/g	10-APR-18	210	220	390
Beryllium (Be)		<0.50		0.50	ug/g	10-APR-18	2.5	2.5	4
Boron (B)		6.3		5.0	ug/g	10-APR-18	36	36	120
Boron (B), Hot Water Ext.		<0.10		0.10	ug/g	11-APR-18	36	36	1.5
Cadmium (Cd)		<0.50		0.50	ug/g	10-APR-18	1	1.2	1.2
Chromium (Cr)		7.0		1.0	ug/g	10-APR-18	67	70	160
Cobalt (Co)		2.2		1.0	ug/g	10-APR-18	19	21	22
Copper (Cu)		6.7		1.0	ug/g	10-APR-18	62	92	140
Lead (Pb)		5.1		1.0	ug/g	10-APR-18	45	120	120
Mercury (Hg)		<0.0050		0.0050	ug/g	10-APR-18	0.16	0.27	0.27
Molybdenum (Mo)		<1.0		1.0	ug/g	10-APR-18	2	2	6.9
Nickel (Ni)		4.5		1.0	ug/g	10-APR-18	37	82	100
Selenium (Se)		<1.0		1.0	ug/g	10-APR-18	1.2	1.5	2.4
Silver (Ag)		<0.20		0.20	ug/g	10-APR-18	0.5	0.5	20
Thallium (Tl)		<0.50		0.50	ug/g	10-APR-18	1	1	1
Uranium (U)		<1.0		1.0	ug/g	10-APR-18	1.9	2.5	23
Vanadium (V)		12.4		1.0	ug/g	10-APR-18	86	86	86
Zinc (Zn)		23.6		5.0	ug/g	10-APR-18	290	290	340
Speciated Metals									
Chromium, Hexavalent		<0.20		0.20	ug/g	10-APR-18	0.66	0.66	8

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Res/Park/Inst. Property Use (Coarse)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD
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The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199
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This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138
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A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
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Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
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This method uses a heated strong acid digestion with HNO₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

SAR-R511-WT Soil SAR-O.Reg 153/04 (July 2011) SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-626460

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.



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311 VICTORIA ST. N.
KITCHENER ON N2H 5E1
Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT Soil								
Batch	R4008368							
WG2747853-4	DUP	L2075890-3						
Boron (B), Hot Water Ext.		0.26	0.28		ug/g	8.0	30	10-APR-18
WG2747853-2	IRM	HOTB-SAL_SOIL5						
Boron (B), Hot Water Ext.			101.2		%		70-130	10-APR-18
WG2747853-3	LCS							
Boron (B), Hot Water Ext.			111.1		%		70-130	10-APR-18
WG2747853-1	MB							
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	10-APR-18
Batch R4009034								
WG2748320-4	DUP	L2076559-5						
Boron (B), Hot Water Ext.		0.29	0.26		ug/g	8.2	30	11-APR-18
WG2748320-2	IRM	HOTB-SAL_SOIL5						
Boron (B), Hot Water Ext.			96.7		%		70-130	11-APR-18
WG2748320-3	LCS							
Boron (B), Hot Water Ext.			103.6		%		70-130	11-APR-18
WG2748320-1	MB							
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	11-APR-18
CN-WAD-R511-WT Soil								
Batch	R4006731							
WG2745756-3	DUP	L2076359-14						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	06-APR-18
WG2745756-2	LCS							
Cyanide, Weak Acid Diss			98.4		%		80-120	06-APR-18
WG2745756-1	MB							
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	06-APR-18
WG2745756-4	MS	L2076359-14						
Cyanide, Weak Acid Diss			103.8		%		70-130	06-APR-18
Batch R4008035								
WG2746517-3	DUP	L2075970-1						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	10-APR-18
WG2746517-2	LCS							
Cyanide, Weak Acid Diss			98.2		%		80-120	10-APR-18
WG2746517-1	MB							
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	10-APR-18
WG2746517-4	MS	L2075970-1						
Cyanide, Weak Acid Diss			105.1		%		70-130	10-APR-18



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311 VICTORIA ST. N.

KITCHENER ON N2H 5E1

Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-WAD-R511-WT Soil								
Batch R4008167								
WG2746658-3	DUP	L2076359-18						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	10-APR-18
WG2746658-2	LCS							
Cyanide, Weak Acid Diss			95.2		%		80-120	10-APR-18
WG2746658-1	MB							
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	10-APR-18
WG2746658-4	MS	L2076359-18						
Cyanide, Weak Acid Diss			96.7		%		70-130	10-APR-18
CR-CR6-IC-WT Soil								
Batch R4007390								
WG2746629-4	CRM	WT-SQC012						
Chromium, Hexavalent			86.8		%		70-130	10-APR-18
WG2746660-4	CRM	WT-SQC012						
Chromium, Hexavalent			90.4		%		70-130	10-APR-18
WG2746629-3	DUP	L2076359-11						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	10-APR-18
WG2746660-3	DUP	L2076516-1						
Chromium, Hexavalent		0.26	0.30		ug/g	15	35	10-APR-18
WG2746629-2	LCS							
Chromium, Hexavalent			96.5		%		80-120	10-APR-18
WG2746660-2	LCS							
Chromium, Hexavalent			94.6		%		80-120	10-APR-18
WG2746629-1	MB							
Chromium, Hexavalent			<0.20		ug/g		0.2	10-APR-18
WG2746660-1	MB							
Chromium, Hexavalent			<0.20		ug/g		0.2	10-APR-18
EC-WT Soil								
Batch R4007538								
WG2747855-4	DUP	WG2747855-3						
Conductivity		0.149	0.145		mS/cm	3.0	20	10-APR-18
WG2748080-1	LCS							
Conductivity			100.0		%		90-110	10-APR-18
WG2747855-1	MB							
Conductivity			<0.0040		mS/cm		0.004	10-APR-18
Batch R4008627								
WG2748220-4	DUP	WG2748220-3						
Conductivity		0.108	0.111		mS/cm	2.6	20	11-APR-18
WG2748952-1	LCS							



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KITCHENER ON N2H 5E1
Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	Soil							
Batch	R4008627							
WG2748952-1	LCS							
Conductivity			99.1		%		90-110	11-APR-18
WG2748220-1	MB							
Conductivity			<0.0040		mS/cm		0.004	11-APR-18
HG-200.2-CVAA-WT	Soil							
Batch	R4007521							
WG2747832-2	CRM	WT-CANMET-TILL1						
Mercury (Hg)			116.8		%		70-130	10-APR-18
WG2747832-6	DUP	WG2747832-5						
Mercury (Hg)		0.0082	0.0073		ug/g	11	40	10-APR-18
WG2747832-3	LCS							
Mercury (Hg)			114.5		%		80-120	10-APR-18
WG2747832-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	10-APR-18
Batch	R4007522							
WG2747564-2	CRM	WT-CANMET-TILL1						
Mercury (Hg)			113.1		%		70-130	10-APR-18
WG2747564-6	DUP	WG2747564-5						
Mercury (Hg)		0.0057	<0.0050	RPD-NA	ug/g	N/A	40	10-APR-18
WG2747564-3	LCS							
Mercury (Hg)			116.5		%		80-120	10-APR-18
WG2747564-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	10-APR-18
Batch	R4007528							
WG2747834-2	CRM	WT-CANMET-TILL1						
Mercury (Hg)			112.6		%		70-130	10-APR-18
WG2747834-6	DUP	WG2747834-5						
Mercury (Hg)		<0.0050	0.0050	RPD-NA	ug/g	N/A	40	10-APR-18
WG2747834-3	LCS							
Mercury (Hg)			111.0		%		80-120	10-APR-18
WG2747834-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	10-APR-18
MET-200.2-CCMS-WT	Soil							
Batch	R4007656							
WG2747564-2	CRM	WT-CANMET-TILL1						
Antimony (Sb)			118.0		%		70-130	10-APR-18
Arsenic (As)			112.7		%		70-130	10-APR-18



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311 VICTORIA ST. N.
KITCHENER ON N2H 5E1
Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch	R4007656							
WG2747564-2	CRM	WT-CANMET-TILL1						
Barium (Ba)			122.9		%		70-130	10-APR-18
Beryllium (Be)			110.9		%		70-130	10-APR-18
Boron (B)			4.3		mg/kg		0-8.2	10-APR-18
Cadmium (Cd)			117.6		%		70-130	10-APR-18
Chromium (Cr)			114.9		%		70-130	10-APR-18
Cobalt (Co)			112.8		%		70-130	10-APR-18
Copper (Cu)			114.9		%		70-130	10-APR-18
Lead (Pb)			104.6		%		70-130	10-APR-18
Molybdenum (Mo)			113.7		%		70-130	10-APR-18
Nickel (Ni)			108.8		%		70-130	10-APR-18
Selenium (Se)			0.35		mg/kg		0.11-0.51	10-APR-18
Silver (Ag)			0.27		mg/kg		0.13-0.33	10-APR-18
Thallium (Tl)			0.137		mg/kg		0.077-0.18	10-APR-18
Uranium (U)			103.4		%		70-130	10-APR-18
Vanadium (V)			118.9		%		70-130	10-APR-18
Zinc (Zn)			115.5		%		70-130	10-APR-18
WG2747564-6	DUP	WG2747564-5						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	10-APR-18
Arsenic (As)		2.27	2.32		ug/g	2.3	30	10-APR-18
Barium (Ba)		26.4	28.3		ug/g	6.9	40	10-APR-18
Beryllium (Be)		0.24	0.24		ug/g	0.4	30	10-APR-18
Boron (B)		6.4	6.7		ug/g	3.7	30	10-APR-18
Cadmium (Cd)		0.096	0.108		ug/g	11	30	10-APR-18
Chromium (Cr)		9.39	9.75		ug/g	3.8	30	10-APR-18
Cobalt (Co)		3.52	3.70		ug/g	4.8	30	10-APR-18
Copper (Cu)		9.42	10.9		ug/g	15	30	10-APR-18
Lead (Pb)		6.31	6.34		ug/g	0.6	40	10-APR-18
Molybdenum (Mo)		0.22	0.26		ug/g	16	40	10-APR-18
Nickel (Ni)		5.82	6.65		ug/g	13	30	10-APR-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	10-APR-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	10-APR-18
Thallium (Tl)		0.056	0.054		ug/g	5.3	30	10-APR-18
Uranium (U)		0.373	0.358		ug/g	3.9	30	10-APR-18



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Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch	R4007656							
WG2747564-6	DUP	WG2747564-5						
Vanadium (V)		15.9	17.2		ug/g	7.9	30	10-APR-18
Zinc (Zn)		34.8	37.2		ug/g	6.7	30	10-APR-18
WG2747564-4	LCS							
Antimony (Sb)			110.8		%		80-120	10-APR-18
Arsenic (As)			100.5		%		80-120	10-APR-18
Barium (Ba)			102.4		%		80-120	10-APR-18
Beryllium (Be)			102.4		%		80-120	10-APR-18
Boron (B)			100.2		%		80-120	10-APR-18
Cadmium (Cd)			99.3		%		80-120	10-APR-18
Chromium (Cr)			101.7		%		80-120	10-APR-18
Cobalt (Co)			98.4		%		80-120	10-APR-18
Copper (Cu)			98.7		%		80-120	10-APR-18
Lead (Pb)			97.6		%		80-120	10-APR-18
Molybdenum (Mo)			105.9		%		80-120	10-APR-18
Nickel (Ni)			96.6		%		80-120	10-APR-18
Selenium (Se)			102.2		%		80-120	10-APR-18
Silver (Ag)			103.1		%		80-120	10-APR-18
Thallium (Tl)			93.8		%		80-120	10-APR-18
Uranium (U)			93.3		%		80-120	10-APR-18
Vanadium (V)			102.2		%		80-120	10-APR-18
Zinc (Zn)			93.9		%		80-120	10-APR-18
WG2747564-1	MB							
Antimony (Sb)			<0.10		mg/kg		0.1	10-APR-18
Arsenic (As)			<0.10		mg/kg		0.1	10-APR-18
Barium (Ba)			<0.50		mg/kg		0.5	10-APR-18
Beryllium (Be)			<0.10		mg/kg		0.1	10-APR-18
Boron (B)			<5.0		mg/kg		5	10-APR-18
Cadmium (Cd)			<0.020		mg/kg		0.02	10-APR-18
Chromium (Cr)			<0.50		mg/kg		0.5	10-APR-18
Cobalt (Co)			<0.10		mg/kg		0.1	10-APR-18
Copper (Cu)			<0.50		mg/kg		0.5	10-APR-18
Lead (Pb)			<0.50		mg/kg		0.5	10-APR-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	10-APR-18
Nickel (Ni)			<0.50		mg/kg		0.5	10-APR-18



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311 VICTORIA ST. N.
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Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch R4007656								
WG2747564-1 MB								
Selenium (Se)			<0.20		mg/kg		0.2	10-APR-18
Silver (Ag)			<0.10		mg/kg		0.1	10-APR-18
Thallium (Tl)			<0.050		mg/kg		0.05	10-APR-18
Uranium (U)			<0.050		mg/kg		0.05	10-APR-18
Vanadium (V)			<0.20		mg/kg		0.2	10-APR-18
Zinc (Zn)			<2.0		mg/kg		2	10-APR-18
Batch R4008309								
WG2747834-2 CRM WT-CANMET-TILL1								
Antimony (Sb)			107.1		%		70-130	10-APR-18
Arsenic (As)			103.8		%		70-130	10-APR-18
Barium (Ba)			111.8		%		70-130	10-APR-18
Beryllium (Be)			110.4		%		70-130	10-APR-18
Boron (B)			3.6		mg/kg		0-8.2	10-APR-18
Cadmium (Cd)			112.2		%		70-130	10-APR-18
Chromium (Cr)			105.8		%		70-130	10-APR-18
Cobalt (Co)			106.7		%		70-130	10-APR-18
Copper (Cu)			105.0		%		70-130	10-APR-18
Lead (Pb)			104.6		%		70-130	10-APR-18
Molybdenum (Mo)			103.5		%		70-130	10-APR-18
Nickel (Ni)			105.5		%		70-130	10-APR-18
Selenium (Se)			0.34		mg/kg		0.11-0.51	10-APR-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	10-APR-18
Thallium (Tl)			0.124		mg/kg		0.077-0.18	10-APR-18
Uranium (U)			108.0		%		70-130	10-APR-18
Vanadium (V)			105.9		%		70-130	10-APR-18
Zinc (Zn)			105.2		%		70-130	10-APR-18
WG2747834-6 DUP WG2747834-5								
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	10-APR-18
Arsenic (As)		2.13	2.21		ug/g	3.8	30	10-APR-18
Barium (Ba)		15.4	15.3		ug/g	0.3	40	10-APR-18
Beryllium (Be)		0.19	0.18		ug/g	4.1	30	10-APR-18
Boron (B)		5.7	6.1		ug/g	6.7	30	10-APR-18
Cadmium (Cd)		0.122	0.111		ug/g	10	30	10-APR-18
Chromium (Cr)		7.41	7.03		ug/g	5.3	30	10-APR-18



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KITCHENER ON N2H 5E1
Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch	R4008309							
WG2747834-6 DUP		WG2747834-5						
Cobalt (Co)		2.64	2.55		ug/g	3.4	30	10-APR-18
Copper (Cu)		7.61	7.38		ug/g	3.2	30	10-APR-18
Lead (Pb)		34.6	37.4		ug/g	7.9	40	10-APR-18
Molybdenum (Mo)		0.25	0.24		ug/g	4.5	40	10-APR-18
Nickel (Ni)		5.63	5.31		ug/g	5.8	30	10-APR-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	10-APR-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	10-APR-18
Thallium (Tl)		<0.050	<0.050	RPD-NA	ug/g	N/A	30	10-APR-18
Uranium (U)		0.376	0.380		ug/g	1.1	30	10-APR-18
Vanadium (V)		13.9	13.1		ug/g	5.9	30	10-APR-18
Zinc (Zn)		30.7	28.7		ug/g	6.5	30	10-APR-18
WG2747834-4 LCS								
Antimony (Sb)			103.5		%		80-120	10-APR-18
Arsenic (As)			100.3		%		80-120	10-APR-18
Barium (Ba)			99.3		%		80-120	10-APR-18
Beryllium (Be)			101.5		%		80-120	10-APR-18
Boron (B)			97.0		%		80-120	10-APR-18
Cadmium (Cd)			100.8		%		80-120	10-APR-18
Chromium (Cr)			100.1		%		80-120	10-APR-18
Cobalt (Co)			98.5		%		80-120	10-APR-18
Copper (Cu)			96.3		%		80-120	10-APR-18
Lead (Pb)			96.5		%		80-120	10-APR-18
Molybdenum (Mo)			99.9		%		80-120	10-APR-18
Nickel (Ni)			96.6		%		80-120	10-APR-18
Selenium (Se)			97.9		%		80-120	10-APR-18
Silver (Ag)			94.1		%		80-120	10-APR-18
Thallium (Tl)			94.4		%		80-120	10-APR-18
Uranium (U)			95.0		%		80-120	10-APR-18
Vanadium (V)			99.1		%		80-120	10-APR-18
Zinc (Zn)			96.9		%		80-120	10-APR-18
WG2747834-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	10-APR-18
Arsenic (As)			<0.10		mg/kg		0.1	10-APR-18
Barium (Ba)			<0.50		mg/kg		0.5	

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311 VICTORIA ST. N.
KITCHENER ON N2H 5E1
Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch R4008309								
WG2747834-1 MB								
Barium (Ba)			<0.50		mg/kg		0.5	10-APR-18
Beryllium (Be)			<0.10		mg/kg		0.1	10-APR-18
Boron (B)			<5.0		mg/kg		5	10-APR-18
Cadmium (Cd)			<0.020		mg/kg		0.02	10-APR-18
Chromium (Cr)			<0.50		mg/kg		0.5	10-APR-18
Cobalt (Co)			<0.10		mg/kg		0.1	10-APR-18
Copper (Cu)			<0.50		mg/kg		0.5	10-APR-18
Lead (Pb)			<0.50		mg/kg		0.5	10-APR-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	10-APR-18
Nickel (Ni)			<0.50		mg/kg		0.5	10-APR-18
Selenium (Se)			<0.20		mg/kg		0.2	10-APR-18
Silver (Ag)			<0.10		mg/kg		0.1	10-APR-18
Thallium (Tl)			<0.050		mg/kg		0.05	10-APR-18
Uranium (U)			<0.050		mg/kg		0.05	10-APR-18
Vanadium (V)			<0.20		mg/kg		0.2	10-APR-18
Zinc (Zn)			<2.0		mg/kg		2	10-APR-18
Batch R4009140								
WG2749568-2 CRM WT-CANMET-TILL1								
Antimony (Sb)			97.5		%		70-130	12-APR-18
Arsenic (As)			100.1		%		70-130	12-APR-18
Barium (Ba)			111.4		%		70-130	12-APR-18
Beryllium (Be)			107.1		%		70-130	12-APR-18
Boron (B)			3.7		mg/kg		0-8.2	12-APR-18
Cadmium (Cd)			100.7		%		70-130	12-APR-18
Chromium (Cr)			99.4		%		70-130	12-APR-18
Cobalt (Co)			97.9		%		70-130	12-APR-18
Copper (Cu)			99.3		%		70-130	12-APR-18
Lead (Pb)			101.7		%		70-130	12-APR-18
Molybdenum (Mo)			99.9		%		70-130	12-APR-18
Nickel (Ni)			97.9		%		70-130	12-APR-18
Selenium (Se)			0.29		mg/kg		0.11-0.51	12-APR-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	12-APR-18
Thallium (Tl)			0.123		mg/kg		0.077-0.18	12-APR-18
Uranium (U)			96.1		%		70-130	12-APR-18

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311 VICTORIA ST. N.

KITCHENER ON N2H 5E1

Contact: Rob Vander Doelen

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch	R4009140							
WG2749568-2	CRM	WT-CANMET-TILL1						
Vanadium (V)			97.8		%		70-130	12-APR-18
Zinc (Zn)			98.3		%		70-130	12-APR-18
WG2749568-4	DUP	L2076359-11						
Antimony (Sb)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	12-APR-18
Arsenic (As)		2.0	2.3		ug/g	14	30	12-APR-18
Barium (Ba)		19.0	21.2		ug/g	11	40	12-APR-18
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	12-APR-18
Boron (B)		6.7	6.0		ug/g	10	30	12-APR-18
Cadmium (Cd)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	12-APR-18
Chromium (Cr)		7.9	8.9		ug/g	12	30	12-APR-18
Cobalt (Co)		2.8	3.8		ug/g	28	30	12-APR-18
Copper (Cu)		10.0	9.9		ug/g	1.1	30	12-APR-18
Lead (Pb)		5.0	5.6		ug/g	10	40	12-APR-18
Molybdenum (Mo)		<1.0	<1.0	RPD-NA	ug/g	N/A	40	12-APR-18
Nickel (Ni)		5.7	6.5		ug/g	12	30	12-APR-18
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	12-APR-18
Silver (Ag)		<0.20	<0.20	RPD-NA	ug/g	N/A	40	12-APR-18
Thallium (Tl)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	12-APR-18
Uranium (U)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	12-APR-18
Vanadium (V)		13.6	16.3		ug/g	18	30	12-APR-18
Zinc (Zn)		24.4	28.2		ug/g	15	30	12-APR-18
WG2749568-3	LCS							
Antimony (Sb)			103.0		%		80-120	12-APR-18
Arsenic (As)			95.4		%		80-120	12-APR-18
Barium (Ba)			101.0		%		80-120	12-APR-18
Beryllium (Be)			89.3		%		80-120	12-APR-18
Boron (B)			89.2		%		80-120	12-APR-18
Cadmium (Cd)			99.0		%		80-120	12-APR-18
Chromium (Cr)			97.5		%		80-120	12-APR-18
Cobalt (Co)			90.5		%		80-120	12-APR-18
Copper (Cu)			92.3		%		80-120	12-APR-18
Lead (Pb)			95.8		%		80-120	12-APR-18
Molybdenum (Mo)			90.6		%		80-120	12-APR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT Soil								
Batch	R4009140							
WG2749568-3	LCS							
Nickel (Ni)			93.6		%		80-120	12-APR-18
Selenium (Se)			92.4		%		80-120	12-APR-18
Silver (Ag)			94.1		%		80-120	12-APR-18
Thallium (Tl)			90.3		%		80-120	12-APR-18
Uranium (U)			94.3		%		80-120	12-APR-18
Vanadium (V)			97.5		%		80-120	12-APR-18
Zinc (Zn)			85.4		%		80-120	12-APR-18
WG2749568-1	MB							
Antimony (Sb)			<0.10		mg/kg		0.1	12-APR-18
Arsenic (As)			<0.10		mg/kg		0.1	12-APR-18
Barium (Ba)			<0.50		mg/kg		0.5	12-APR-18
Beryllium (Be)			<0.10		mg/kg		0.1	12-APR-18
Boron (B)			<5.0		mg/kg		5	12-APR-18
Cadmium (Cd)			<0.020		mg/kg		0.02	12-APR-18
Chromium (Cr)			<0.50		mg/kg		0.5	12-APR-18
Cobalt (Co)			<0.10		mg/kg		0.1	12-APR-18
Copper (Cu)			<0.50		mg/kg		0.5	12-APR-18
Lead (Pb)			<0.50		mg/kg		0.5	12-APR-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	12-APR-18
Nickel (Ni)			<0.50		mg/kg		0.5	12-APR-18
Selenium (Se)			<0.20		mg/kg		0.2	12-APR-18
Silver (Ag)			<0.10		mg/kg		0.1	12-APR-18
Thallium (Tl)			<0.050		mg/kg		0.05	12-APR-18
Uranium (U)			<0.050		mg/kg		0.05	12-APR-18
Vanadium (V)			<0.20		mg/kg		0.2	12-APR-18
Zinc (Zn)			<2.0		mg/kg		2	12-APR-18
MOISTURE-WT Soil								
Batch	R4005705							
WG2745948-3	DUP	L2075930-1						
% Moisture		3.95	4.45		%	12	20	05-APR-18
WG2745948-2	LCS							
% Moisture			100.1		%		90-110	05-APR-18
WG2745948-1	MB							
% Moisture			<0.10		%		0.1	05-APR-18

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KITCHENER ON N2H 5E1

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT Soil								
Batch	R4005706							
WG2745650-3	DUP	L2075529-1						
% Moisture		7.08	8.12		%	14	20	05-APR-18
WG2745650-5	LCS							
% Moisture			100.3		%		90-110	05-APR-18
WG2745650-4	MB							
% Moisture			<0.10		%		0.1	05-APR-18
Batch	R4006735							
WG2746447-3	DUP	L2076359-3						
% Moisture		6.29	6.23		%	1.0	20	06-APR-18
WG2746447-2	LCS							
% Moisture			99.6		%		90-110	06-APR-18
WG2746447-1	MB							
% Moisture			<0.10		%		0.1	06-APR-18
Batch	R4006736							
WG2746555-3	DUP	L2076429-1						
% Moisture		68.8	69.2		%	0.5	20	07-APR-18
WG2746555-2	LCS							
% Moisture			100.3		%		90-110	07-APR-18
WG2746555-1	MB							
% Moisture			<0.10		%		0.1	07-APR-18
PH-WT Soil								
Batch	R4006546							
WG2746325-1	DUP	L2076359-5						
pH		7.74	7.87	J	pH units	0.13	0.3	07-APR-18
WG2746395-1	LCS							
pH			6.97		pH units		6.9-7.1	07-APR-18
Batch	R4006549							
WG2746117-1	DUP	L2076359-1						
pH		7.55	7.56	J	pH units	0.01	0.3	07-APR-18
WG2746906-1	LCS							
pH			6.97		pH units		6.9-7.1	07-APR-18
SAR-R511-WT Soil								
Batch	R4007639							
WG2747855-4	DUP	WG2747855-3						
Calcium (Ca)		3.8	3.8		mg/L	1.1	30	10-APR-18
Sodium (Na)		13.8	14.7		mg/L	6.5	30	10-APR-18
Magnesium (Mg)		3.1	2.9		mg/L	5.2	30	10-APR-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT Soil								
Batch	R4007639							
WG2747855-2	IRM	WT SAR1						
Calcium (Ca)			98.9		%		70-130	10-APR-18
Sodium (Na)			106.6		%		70-130	10-APR-18
Magnesium (Mg)			105.2		%		70-130	10-APR-18
WG2747855-1	MB							
Calcium (Ca)			<1.0		mg/L		1	10-APR-18
Sodium (Na)			<1.0		mg/L		1	10-APR-18
Magnesium (Mg)			<1.0		mg/L		1	10-APR-18
Batch	R4009030							
WG2748220-4	DUP	WG2748220-3						
Calcium (Ca)		3.7	3.3		mg/L	11	30	11-APR-18
Sodium (Na)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	11-APR-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	11-APR-18
WG2748220-2	IRM	WT SAR1						
Calcium (Ca)			85.6		%		70-130	11-APR-18
Sodium (Na)			102.8		%		70-130	11-APR-18
Magnesium (Mg)			94.7		%		70-130	11-APR-18
WG2748220-1	MB							
Calcium (Ca)			<1.0		mg/L		1	11-APR-18
Sodium (Na)			<1.0		mg/L		1	11-APR-18
Magnesium (Mg)			<1.0		mg/L		1	11-APR-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
% Moisture							
	1	22-MAR-18	06-APR-18 14:27	14	15	days	EHTR
	2	22-MAR-18	06-APR-18 14:28	14	15	days	EHTR
	3	21-MAR-18	06-APR-18 14:29	14	16	days	EHTR
	4	21-MAR-18	06-APR-18 14:31	14	16	days	EHTR
	5	21-MAR-18	07-APR-18 15:53	14	17	days	EHTR
	6	21-MAR-18	07-APR-18 15:54	14	17	days	EHTR
	7	22-MAR-18	07-APR-18 15:55	14	16	days	EHTR
	8	22-MAR-18	07-APR-18 15:56	14	16	days	EHTR
	9	21-MAR-18	07-APR-18 15:57	14	17	days	EHTR
	10	21-MAR-18	07-APR-18 15:58	14	17	days	EHTR
	11	22-MAR-18	07-APR-18 15:59	14	16	days	EHTR
	12	22-MAR-18	07-APR-18 16:00	14	16	days	EHTR
	15	20-MAR-18	07-APR-18 16:01	14	18	days	EHTR
	16	20-MAR-18	07-APR-18 16:02	14	18	days	EHTR
	17	20-MAR-18	07-APR-18 16:03	14	18	days	EHTR
	18	20-MAR-18	07-APR-18 16:04	14	18	days	EHTR

Cyanides

Cyanide (WAD)-O.Reg 153/04 (July 2011)

	1	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	2	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	3	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	4	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	5	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	6	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	7	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	8	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	9	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	10	21-MAR-18	06-APR-18 15:00	14	16	days	EHTR
	11	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	12	22-MAR-18	06-APR-18 15:00	14	15	days	EHTR
	15	20-MAR-18	06-APR-18 15:00	14	17	days	EHTR
	16	20-MAR-18	06-APR-18 15:00	14	17	days	EHTR
	17	20-MAR-18	06-APR-18 17:00	14	17	days	EHTR
	18	20-MAR-18	06-APR-18 17:00	14	17	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
 EHTR: Exceeded ALS recommended hold time prior to sample receipt.
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
 EHT: Exceeded ALS recommended hold time prior to analysis.
 Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
 Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2076359 were received on 05-APR-18 14:14.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Chain of Custody (COC) / Analytical
Request Form

Canada Toll Free: 1 800 668 9878



L2076359-COFC

COC Number: 17 - 626460

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Report To Contact and company name below will appear on the final report		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Company: CHUNG & VANDER DOELEN		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply	
Contact: ROB VANDER DOELEN		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		4 day [P4-20%] <input type="checkbox"/>	
Phone: 519-742-8939		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] <input type="checkbox"/>	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		2 day [P2-50%] <input type="checkbox"/>	
Street: 311 Victoria St. N		Email 1 or Fax		1 Business day [E-100%] <input type="checkbox"/>	
City/Province: Kitchener, ON		Email 2 Rob Vander Doelen +		Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply) <input type="checkbox"/>	
Postal Code: N2H 5E1		Email 3 Env. Dist. list.		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm	
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		For tests that can not be performed according to the service level selected, you will be contacted.	
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Analysis Request	
Company: CHUNG & VANDER DOELEN		Email 1 or Fax Rob VD & accounting		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	
Contact: CHUNG & VANDER DOELEN		Email 2		SAMPLES ON HOLD	
Project Information		Oil and Gas Required Fields (client use)		NUMBER OF CONTAINERS	
ALS Account # / Quote #: 618570		AFE/Cost Center: PO#		Sample is hazardous (please provide further details)	
Job #: 618570		Major/Minor Code: Routing Code:			
PO / AFE: 618570		Requisitioner:			
LSD:		Location:			
ALS Lab Work Order # (lab use only): L2076359		ALS Contact: ML		Sampler: NANDO	
Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mm-yy)		Time (hh:mm)	
Sample Type		Date		Time	
1 MW01-Sa1		22-03-18		Soil	
2 MW01-Sa4		22-03-18		Soil	
3 MW02-Sa1		21-03-18		Soil	
4 MW02-Sa3		21-03-18		Soil	
5 MW03-Sa1		21-03-18		Soil	
6 MW03-Sa4		21-03-18		Soil	
7 MW04-Sa1		22-03-18		Soil	
8 MW04-Sa3		22-03-18		Soil	
9 MW05-Sa1		21-03-18		Soil	
10 MW05-Sa4		21-03-18		Soil	
11 MW06-Sa1		22-03-18		Soil	
12 MW06-Sa4		22-03-18		Soil	
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)	
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Please compare/report results to DOH MOECC TABLE 15, & MOECC TABLE 2 RPI		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are samples for human consumption/use? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
				Cooling Initiated <input type="checkbox"/>	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)	
Released by: JEFF CULL		Received by: 691		Received by: 691	
Date: 05-APR-18		Date: 5-Apr-18		Date: 5-Apr-18	
Time: 14:15		Time: 14:15		Time: 14:15	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

JULY 2017 FORM



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2076359-COFC

COC Number 17-625907

Page 2 of 2

Report To Contact and company name below will appear on the final report		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Company: CHUNG & Vander Doelen		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply	
Contact: Rob Vander Doelen		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		4 day [P4-20%] <input type="checkbox"/> 1 Business day [E-100%] <input type="checkbox"/>	
Phone: 519.742.0779		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2-200%] <input type="checkbox"/>	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		2 day [P2-50%] <input type="checkbox"/> (Laboratory opening fees may apply)	
Street: 311 Victoria St. N		Email 1 or Fax: Rob V. & ENV. DIST.		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm	
City/Province: Kitchener, ON		Email 2: List.		For tests that can not be performed according to the service level selected, you will be contacted.	
Postal Code: N2H 5E1		Email 3: List.		Analysis Request	
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below	
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		SAMPLES ON HOLD	
Company: CHUNG & Vander Doelen		Email 1 or Fax: Rob V. & acc. - M.T.A.		Sample is hazardous (please provide further details)	
Contact: CHUNG & Vander Doelen		Email 2: List.		NUMBER OF CONTAINERS	
Project Information		Oil and Gas Required Fields (client use)			
ALS Account # / Quote #: 618570		AFE/Cost Center: PO#			
Job #: 618570		Major/Minor Code: Routing Code:			
PO / AFE: 618570		Requisitioner:			
LSD:		Location:			
ALS Lab Work Order # (lab use only): L2076359 VL OSB		ALS Contact: M. L.		Sampler: NANDO	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	
13	MW07-Sa2	23-03-18		Soil	X
14	MW07-Sa5	23-03-18		Soil	X
15	NW01D-Sa1	20-03-18		Soil	X
16	NW01D-Sa3	20-03-18		Soil	X
17	NW02D-Sa2	20-03-18		Soil	X
18	NW02D-Sa5	20-03-18		Soil	X
Drinking Water (DW) Samples* (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)	
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Compare/report to MOEC TABLE 1 (both standards) & MOEC TABLE 2 RPI		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
				Cooling Initiated <input type="checkbox"/>	
				INITIAL COOLER TEMPERATURES °C	
				8.3	
				FINAL COOLER TEMPERATURES °C	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)	
Released by: JEFFREY		Received by: COE		Received by: COE	
Date: 05-APR-18		Date: 05-APR-18		Date: 05-APR-18	
Time: 14:15		Time: 14:15		Time: 14:15	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS 2017 FORM

APPENDIX "C"

Comparison of the Soil Chemistry Results to the Applicable Regulatory Criteria



ANALYTICAL RESULTS FOR SOIL
MOE Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act, April 15, 2011

	Table 1 Agricultural or Other Property Use Standard	Table 1 Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use Standard	Table 2 Residential/Parkland/ Institutional Property Use Standard	MW01-SA1	MW01-SA4	MW02-SA1	MW02-SA3	MW03-SA1	MW03-SA4	MW04-SA1	MW04-SA3	MW05-SA1
Conductivity	0.47	0.57	0.7	0.122	0.142	0.194	0.23	0.138	0.114	0.134	0.118	0.102
pH	-	-	-	7.55	7.91	8.04	8.01	7.74	7.99	7.91	7.91	0.102
Cyanide, Weak Acid Diss	0.051	0.051	0.051	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
SAR	1	2.4	5	0.15	0.25	0.38	0.37	0.16	<0.16	<0.11	0.12	<0.14
Calcium (Ca)	-	-	-	4.6	3.9	4.2	6.4	4.4	3	6.2	4.5	3.7
Magnesium (Mg)	-	-	-	<1.0	<1.0	2.1	4	<1.0	<1.0	<1.0	1.2	<1.0
Sodium (Na)	-	-	-	1.2	1.8	3.8	4.9	1.2	<1.0	<1.0	1.1	<1.0
Antimony (Sb)	1	1.3	7.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	11	18	18	3.1	2.7	2.3	1.3	2.3	2.3	2.8	2	2.3
Barium (Ba)	210	220	390	34.3	29.5	27.1	13.8	22.9	26.4	26.9	22.8	23.2
Beryllium (Be)	2.5	2.5	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Boron (B)	36	36	120	7.7	7.6	6.7	<5.0	6.1	6.4	6.7	5.2	6
Boron (B), Hot Water Ext. Available	36	36	1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)	1	1.2	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	67	70	160	11.6	11.3	10.8	6.3	8.6	9.4	10.9	8.6	8.7
Cobalt (Co)	19	21	22	4.3	4.1	3.5	1.8	3.2	3.5	3.8	3.1	3.5
Copper (Cu)	62	92	140	11.7	11.3	10.2	5.3	11	9.4	11	7.7	9.8
Lead (Pb)	45	120	120	7.9	6.4	5.9	3.3	7	6.3	6.3	4.7	7.5
Mercury (Hg)	0.16	0.27	0.27	0.018	0.0094	0.006	<0.0050	0.0098	0.0057	0.009	0.008	0.006
Molybdenum (Mo)	2	2	6.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	37	82	100	9.3	7.3	6.4	4	5.5	5.8	7.8	6.3	6.3
Selenium (Se)	1.2	1.5	2.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	0.5	0.5	20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	1	1	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	1.9	2.5	23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	86	86	86	19.7	19.3	15.7	10.8	15.4	15.9	17	14.5	15.7
Zinc (Zn)	290	290	340	36.1	35	32.3	14.1	34.5	34.8	28.3	25.7	32.9
Chromium, Hexavalent	0.66	0.66	8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

NOTES:

1. Units = ug/g
2. "n" - Parameter not included in chemical analysis
3. "nv" - no value
4. Test results shown in bold and highlighted text exceed the Table 1 Standards for Agricultural Other Property Use and the Table 1 Standards for Residential/Institutional/Parkland/Industrial/Commercial/Community Property Use
5. Test results shown in bold and highlighted text exceed the Table 2 Standards for Residential/Parkland/Institutional Property Use

ANALYTICAL RESULTS FOR SOIL
MOE Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act, April 15, 2011

	Table 1 Agricultural/ or Other Property Use Standard		Table 1 Residential/ Parkland/Institutional/ Community Property Use Standard		Table 2 Residential/Parkland/ Institutional Property Use Standard		MW05-SA4	MW06-SA1	MW06-SA4	MW07-SA2	MW07-SA5	NW01D-SA1	NW01D-SA3	NW02D-SA2	NW02D-SA5
	0.47	0.57	-	-	0.7	0.109	0.132	0.0976	0.13	0.244	0.149	0.157	0.108	0.134	
Conductivity	-	-	-	-	-	7.98	7.99	7.97	7.88	8.01	7.8	7.94	7.81	8	
pH	0.051	0.051	0.051	0.051	0.051	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Cyanide, Weak Acid Diss	1	2.4	2.4	2.4	5	0.23	0.16	0.16	0.27	2.65	0.15	0.44	<0.14	0.2	
SAR	-	-	-	-	-	3.5	5.4	4	5.1	3.5	5.1	4.2	3.7	3.4	
Calcium (Ca)	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	
Magnesium (Mg)	-	-	-	-	-	1.6	1.4	1.2	2.2	2.2	1.2	4.1	<1.0	1.7	
Sodium (Na)	1	1.3	1.3	1.3	7.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Antimony (Sb)	11	18	18	18	18	1.5	2	2.1	2.5	1.8	3	2.5	2.3	2.1	
Arsenic (As)	210	220	220	220	390	10.9	19	15.4	23.3	32.1	34.2	32.4	19	15.8	
Barium (Ba)	2.5	2.5	2.5	2.5	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Beryllium (Be)	36	36	36	36	120	6.2	6.7	5.7	6.9	6.4	7.8	9.5	6	6.3	
Boron (B)	36	36	36	36	1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Boron (B), Hot Water Ext. Available	1	1.2	1.2	1.2	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Cadmium (Cd)	67	70	70	70	160	5.6	7.9	7.4	9.6	8.5	12.9	11.7	8	7	
Chromium (Cr)	19	21	21	21	22	1.7	2.8	2.6	3.6	4.9	4.6	4	3	2.2	
Cobalt (Co)	62	92	92	92	140	5.3	10	7.6	10.6	9.3	12.8	10.9	8.8	6.7	
Copper (Cu)	45	120	120	120	120	3.3	5	34.6	5.5	4.4	11.2	6.6	5.6	5.1	
Lead (Pb)	0.16	0.27	0.27	0.27	0.27	<0.0050	0.0082	<0.0050	0.0082	<0.0050	0.0205	0.0067	0.0068	<0.0050	
Mercury (Hg)	2	2	2	2	6.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Molybdenum (Mo)	37	82	82	82	100	3.4	5.7	5.6	7.6	5.8	9.8	8.5	6.3	4.5	
Nickel (Ni)	1.2	1.5	1.5	1.5	2.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Selenium (Se)	0.5	0.5	0.5	0.5	20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Silver (Ag)	1	1	1	1	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Thallium (Tl)	1.9	2.5	2.5	2.5	23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Uranium (U)	86	86	86	86	86	11.1	13.6	13.9	16.7	14.4	22.2	18	15.2	12.4	
Vanadium (V)	290	290	290	290	340	16.4	24.4	30.7	29.6	25.9	47	39.6	31.7	23.6	
Zinc (Zn)	0.66	0.66	0.66	0.66	8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Chromium, Hexavalent															

NOTES:

1. Units = ug/g
2. "-" - Parameter not included in chemical analysis
3. "nv" - no value

4. Test results shown in **bold and highlighted text** exceed the Table 1 Standards for Agricultural Other Property Use and the Table 1 Standards for Residential/Industrial/Parkland/Institutional Property Use

5. Test results shown in **bold and highlighted text** exceed the Table 2 Standards for Residential/Parkland/Institutional Property Use

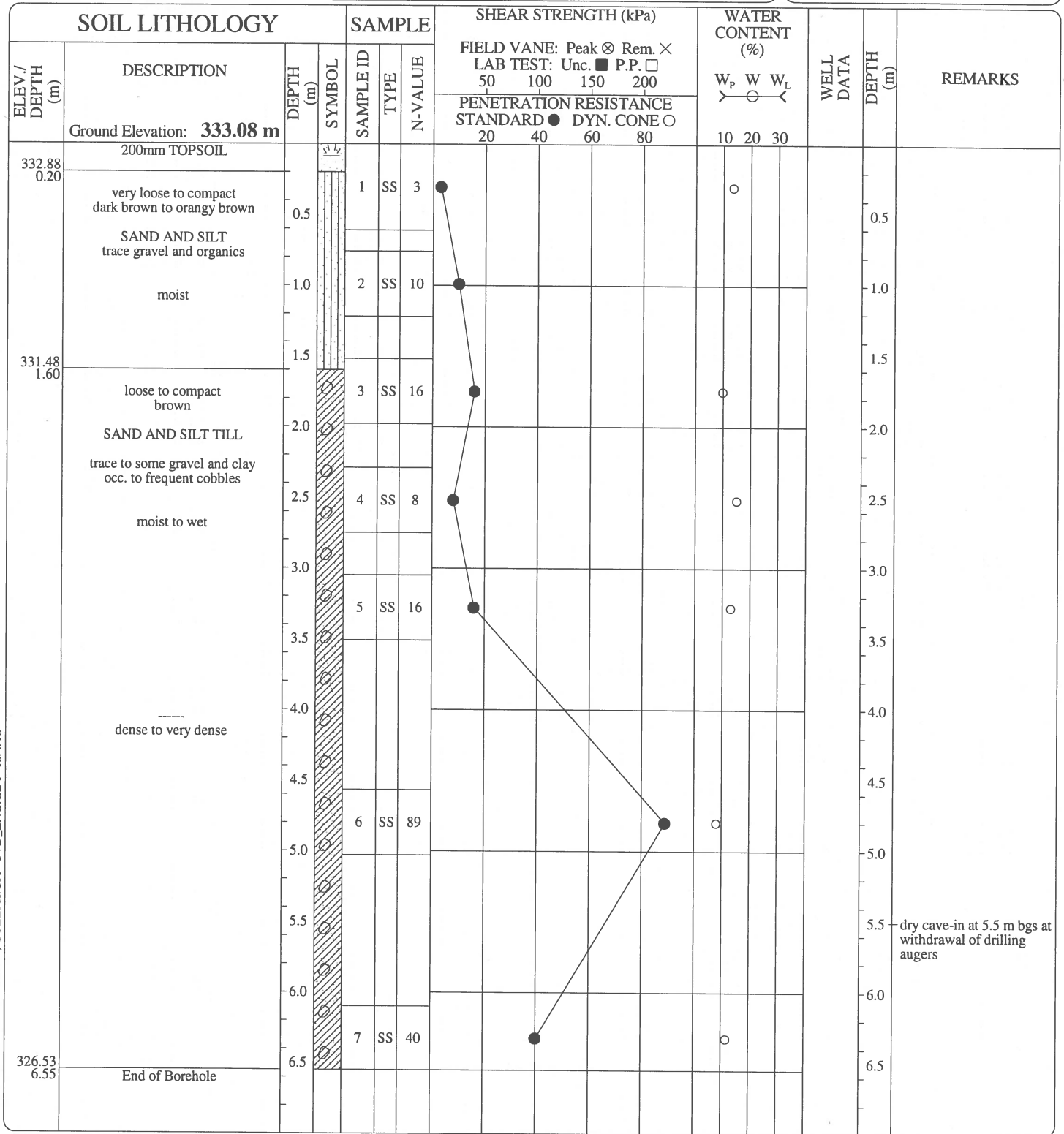
ENCLOSURES



Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
 Method: **Hollow Stem Auger**
 Size: **108 mm I.D.**
 Date: **Mar 23 / 18** TO **Mar 23 / 18**

PROJECT MANAGER: **RVD**
**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

311 Victoria Street North
 Kitchener, Ontario N2H 5E1
 ph. (519) 742-8979, fx. (519) 742-7739

FILE No: G18570

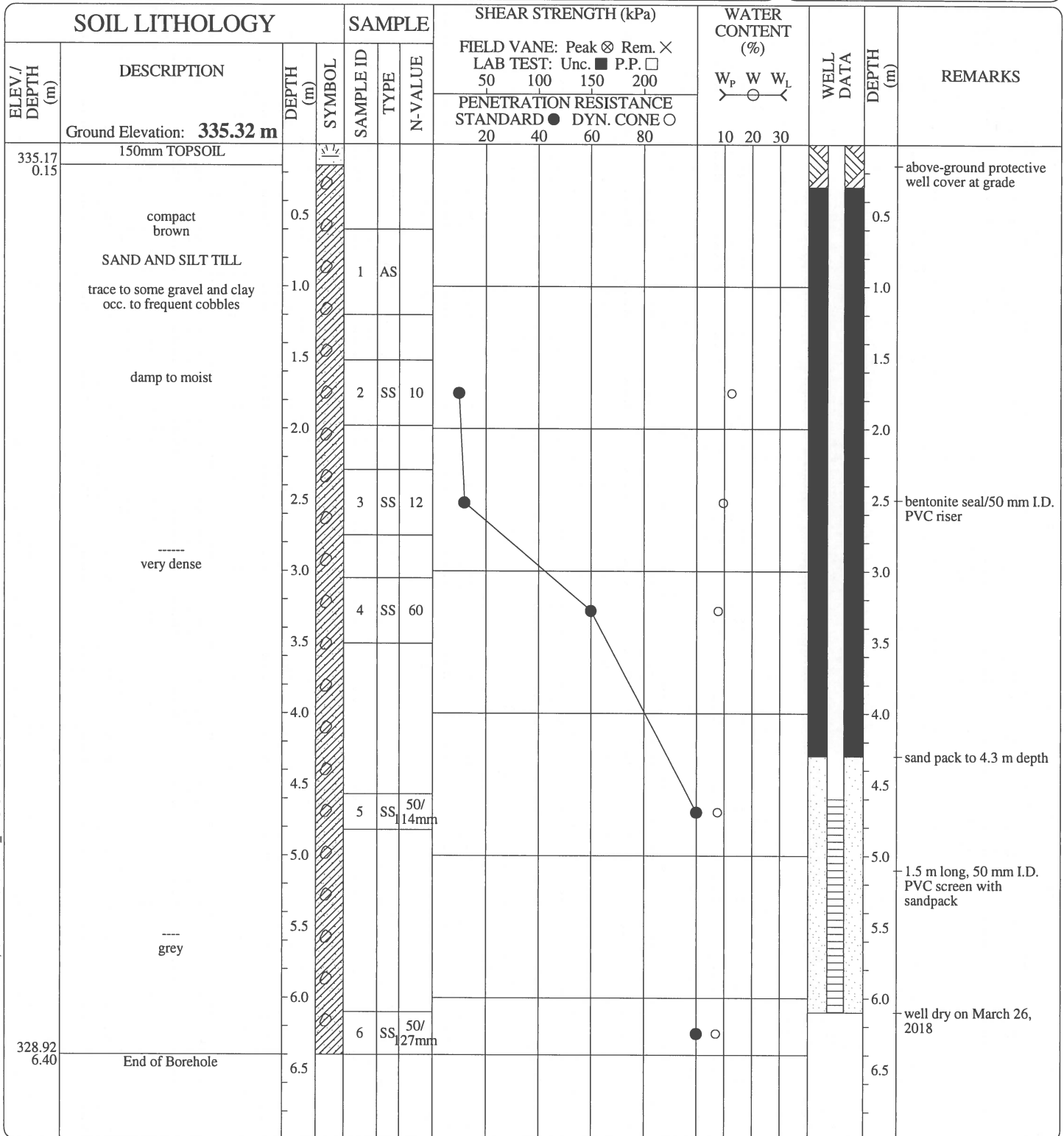
BOREHOLE No. MW-01

Enclosure No.: 2

Sheet 1 of 1

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 22 / 18 TO Mar 22 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPI CVD_ENG.GDT 13/4/18

FILE No: G18570

BOREHOLE No. MW-02

Enclosure No.: 3

Sheet 1 of 2

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 21 / 18 TO Mar 21 / 18**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV. / DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30					
Ground Elevation: 339.60 m																
	very dense brown	0.5													above-ground protective well cover at grade	
	SAND AND SILT TILL			1	AS											
	trace to some gravel and clay occ. to frequent cobbles	1.0														
	damp to moist	1.5		2	SS	71/50mm										
		2.0														
		2.5														
		3.0														
		3.5		3	SS	140									bentonite seal/50 mm I.D. PVC riser	
		4.0														
		4.5													bulk auger sample collected from 3.5 to 4.5 m depth	
	grey	5.0		4	SS	76/50mm									water level at 4.72 m depth on March 26, 2018	
		5.5														
		6.0		5	SS	100/50mm										
		6.5														

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: G18570

BOREHOLE No. MW-02

Enclosure No.: 3

Sheet 2 of 2



Client: **Armel Corporation**

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**

Method: **Hollow Stem Auger**

Size: **108 mm I.D.**

Date: **Mar 21 / 18 TO Mar 21 / 18**

SOIL LITHOLOGY			SAMPLE		SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200	PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	W _p	W	W _L			
	(continued)													
	very dense grey	7.5												
	SAND AND SILT TILL			6	SS	63/50mm								
	trace to some gravel and clay occ. to frequent cobbles	8.0												
	damp to moist	8.5												
		9.0		7	SS	79/50mm								
		9.5												
		10.0												
		10.5		8	SS	135/50mm								
		11.0												
		11.5												
		12.0												
327.40 12.20	End of Borehole													
		12.5												
		13.0												
		13.5												

sand pack to 8.2 m depth

1.5 m long, 50 mm I.D. PVC screen with sandpack

sand backfill to 10.3 m beneath well underlain by bentonite backfill

PROJECT MANAGER: **RVD**

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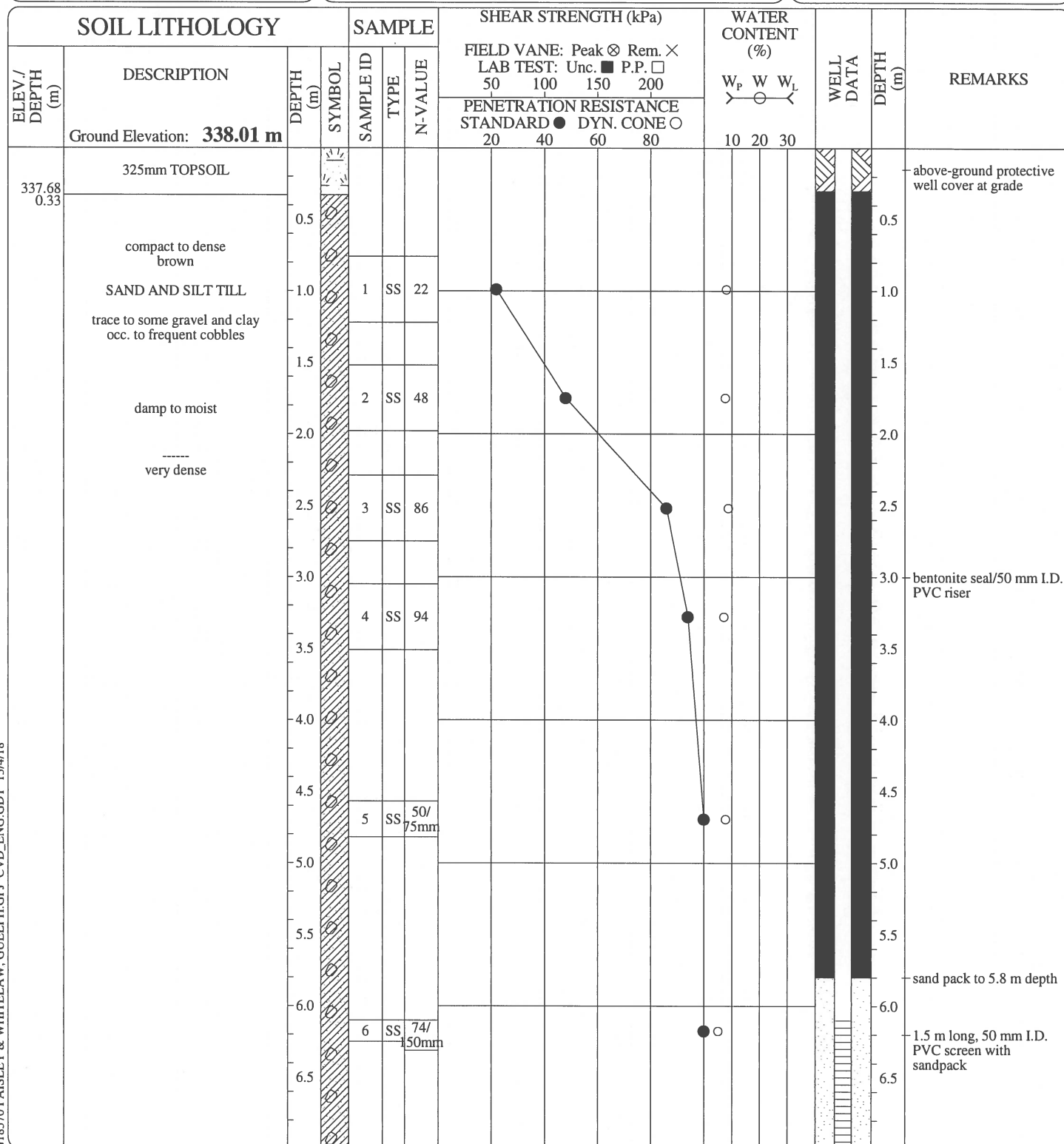
CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPI CVD_ENG.GDT 13/4/18

FILE No: G18570

BOREHOLE No. MW-03

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 21 / 18 TO Mar 21 / 18**PROJECT MANAGER: **RVD**
**CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. MW-03

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 21 / 18 TO Mar 21 / 18**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS		
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
330.26 7.75	very dense brown SAND AND SILT TILL	7.5													7.5	well dry on March 26, 2018	
	damp to moist																
	End of Borehole		7	SS	83/150mm												
			8.0													8.0	
			8.5													8.5	
			9.0													9.0	
			9.5													9.5	
			10.0													10.0	
			10.5													10.5	
			11.0													11.0	
			11.5													11.5	
			12.0													12.0	
			12.5													12.5	
			13.0													13.0	
			13.5													13.5	

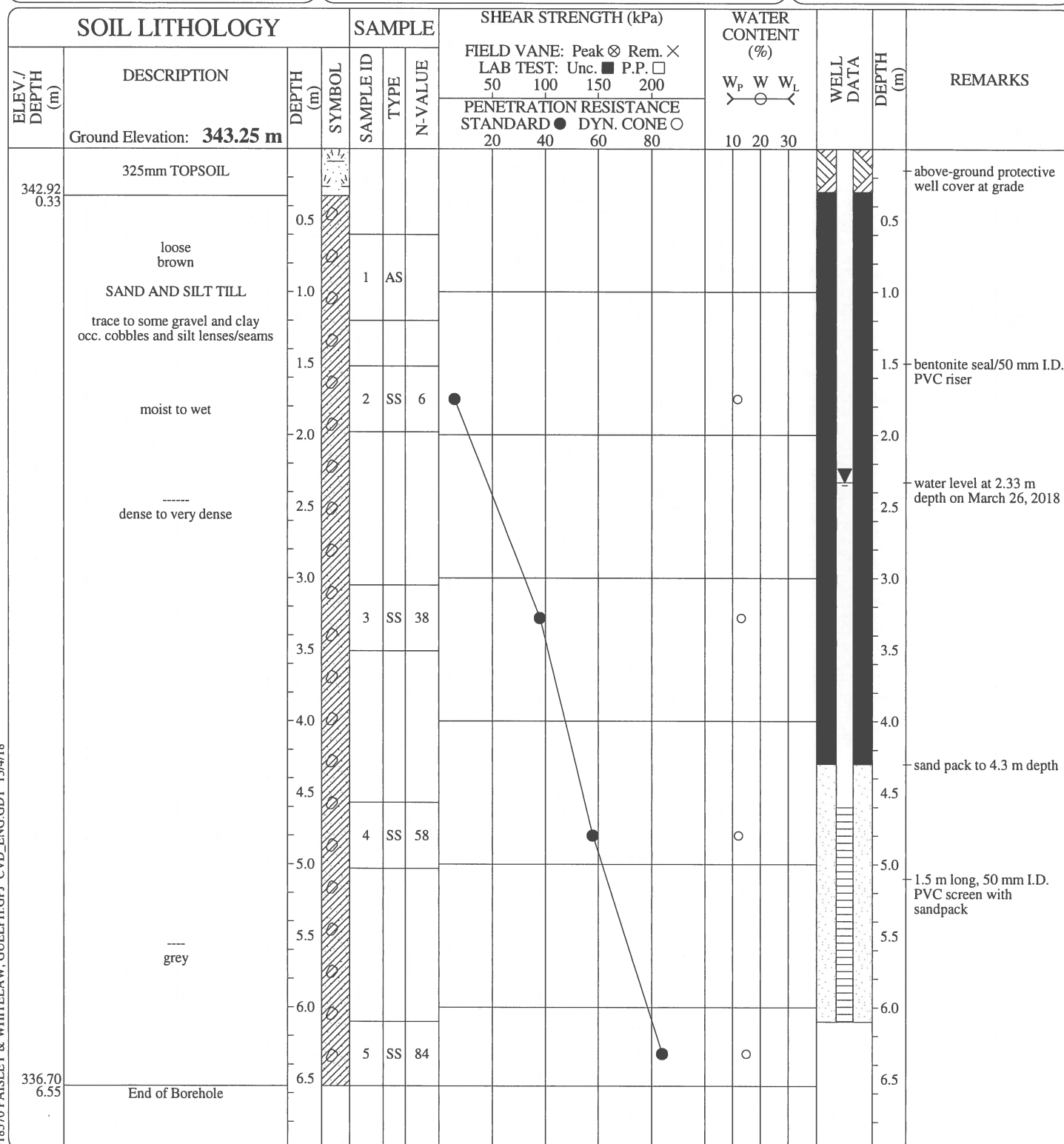
PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. MW-04

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 22 / 18 TO Mar 22 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. MW-05

Enclosure No.: 6

Sheet 1 of 1



Client: **Armel Corporation**

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

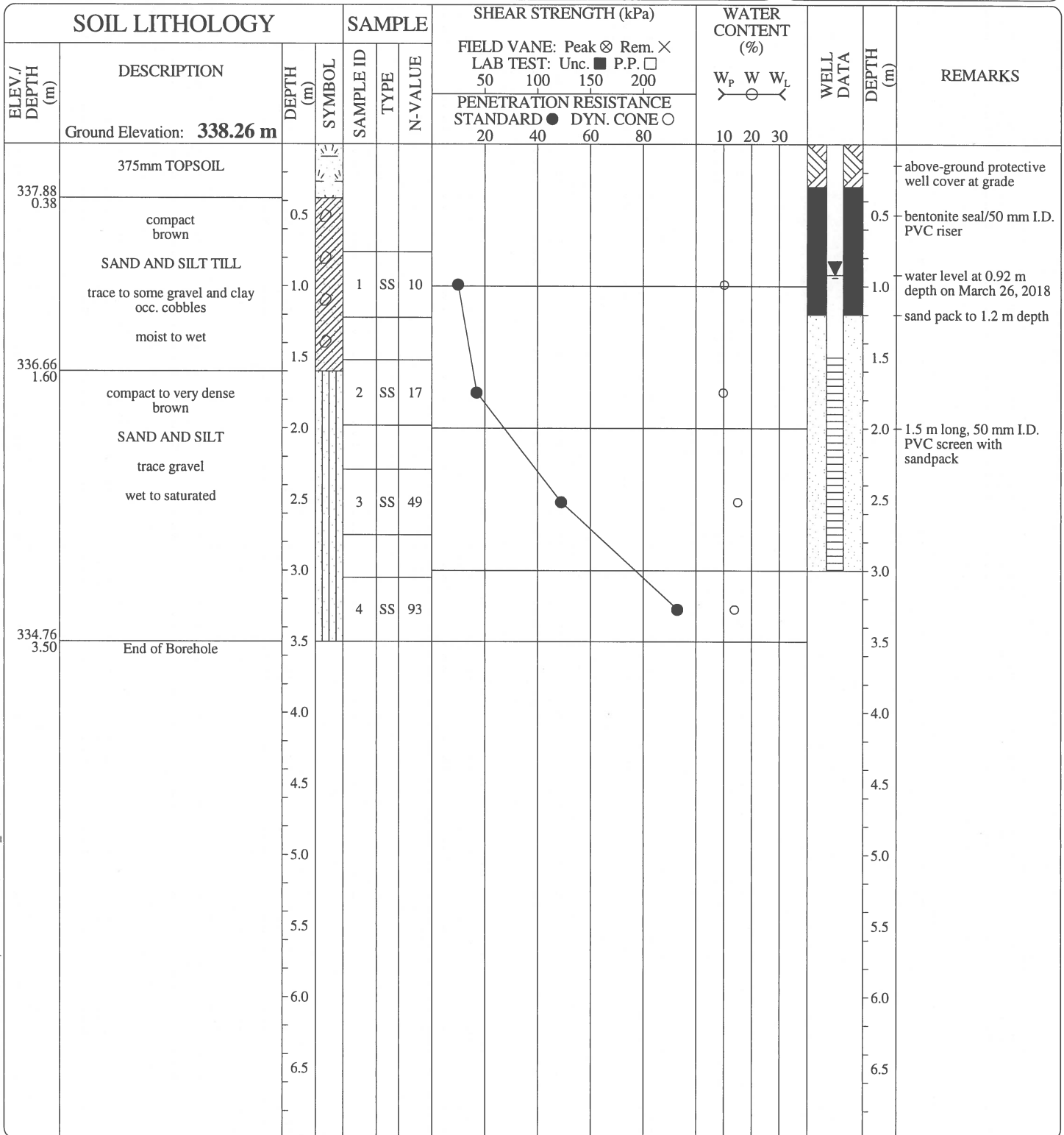
EQUIPMENT DATA

Machine: **Diedrich D-50T**

Method: **Hollow Stem Auger**

Size: **108 mm I.D.**

Date: **Mar 21 / 18 TO Mar 21 / 18**



PROJECT MANAGER: **RVD**

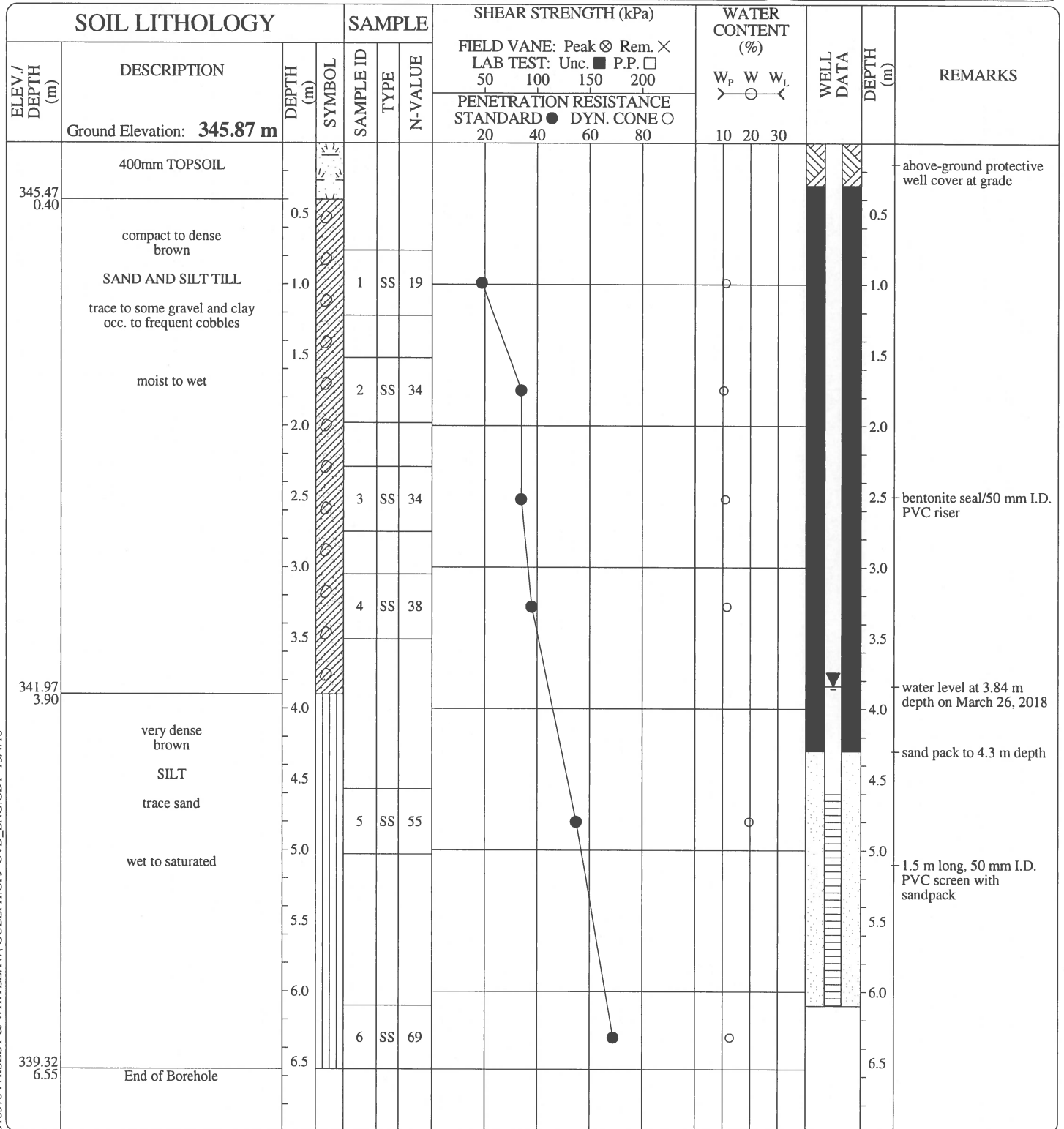
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CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPJ CVD_ENG.GDT 13/4/18

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 22 / 18 TO Mar 22 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

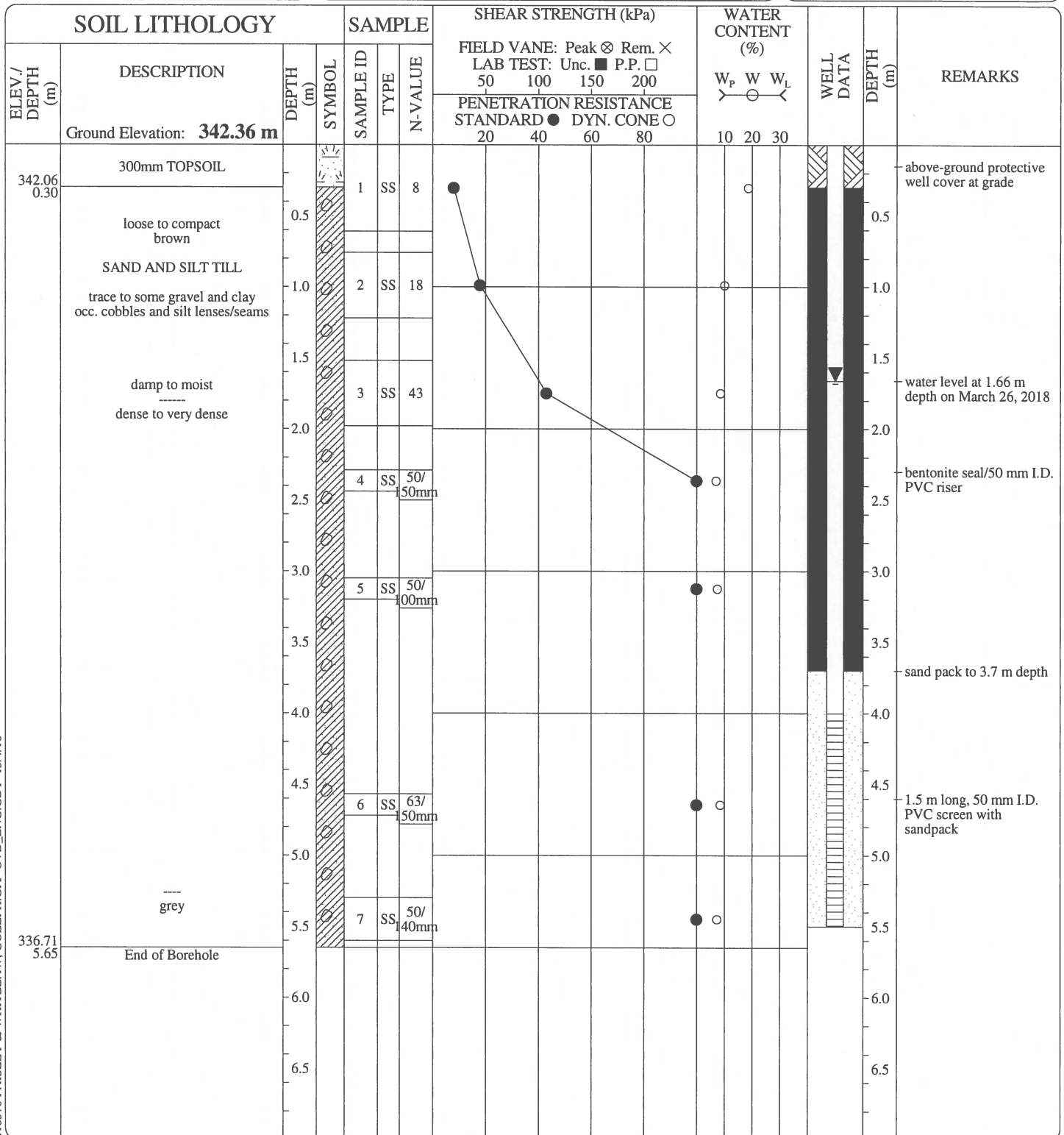
BOREHOLE No. MW-07

Enclosure No.: 8

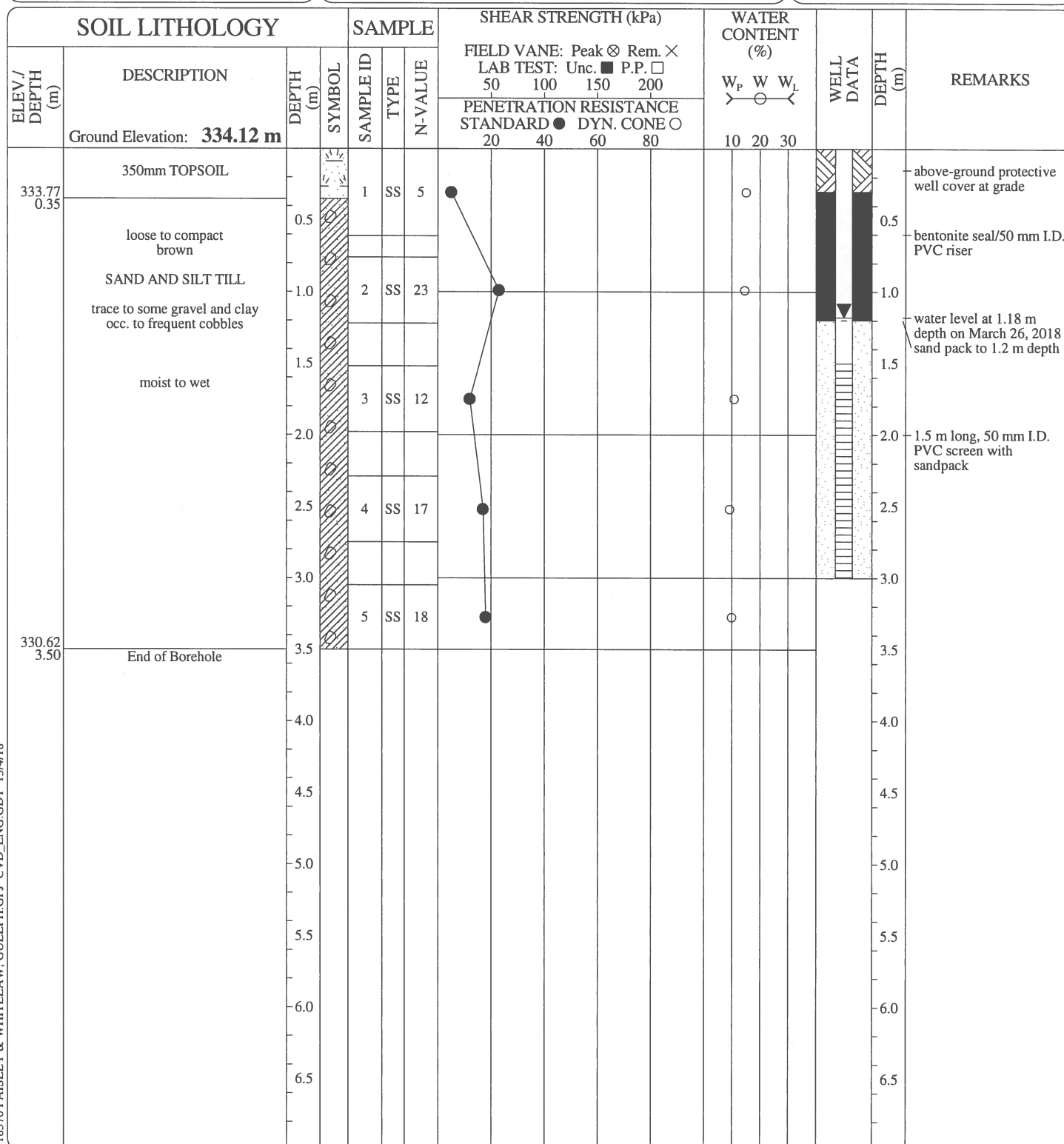
Sheet 1 of 1

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 23 / 18 TO Mar 23 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPI CVD_ENG.GDT 13/4/18

FILE No: G18570**BOREHOLE No. MW-08**Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph****EQUIPMENT DATA**Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 23 / 18 TO Mar 23 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. NW-01D



Client: **Armel Corporation**

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Mar 20 / 18 TO Mar 20 / 18**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _P W W _L					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30					
Ground Elevation: 345.19 m																
344.79 0.40	400mm TOPSOIL														above-ground protective well cover at grade	
	very dense brown SAND AND SILT TILL trace to some gravel and clay occ. to frequent cobbles damp to moist	0.5													0.5	
		1.0		1	AS										1.0	
		1.5		2	SS	52									1.5	
		2.0													2.0	
		2.5													2.5	bulk auger sample collected from 1.5 to 3 m depth
		3.0		3	SS	50/ 90mm									3.0	
		3.5													3.5	
		4.0													4.0	bentonite seal/50 mm I.D. PVC riser
		4.5		4	SS	50/ 75mm									4.5	
		5.0													5.0	
		5.5													5.5	
		6.0		5	SS	50/ 125mm									6.0	
		6.5													6.5	

PROJECT MANAGER: **RVD**

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FILE No: G18570

BOREHOLE No. NW-01D

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 20 / 18 TO Mar 20 / 18**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS						
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				WATER CONTENT (%) W _p W W _L ↗ ○ ↖ 10 20 30										
(continued)							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80														
332.84 12.35	very dense grey SAND AND SILT TILL trace to some gravel and clay occ. to frequent cobbles damp to moist	7.5		6	SS	50/ 90mm											7.5	auger cuttings wet from below 9.1 m depth water level at 10.15 m depth on March 26, 2018 sand pack to 11.4 m depth 0.5 m long, 50 mm I.D. PVC screen with sandpack			
		8.0																			
		8.5																			
		9.0																			
		9.5																			
		10.0																			
		10.5																			
		11.0																			
		11.5																			
		12.0																			
		12.5		9	SS	193/ 150mm															
	End of Borehole	12.5																			
		13.0																			
		13.5																			

auger cuttings wet from below 9.1 m depth

water level at 10.15 m depth on March 26, 2018

sand pack to 11.4 m depth

0.5 m long, 50 mm I.D. PVC screen with sandpack

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. NW-01S

Enclosure No.: 11

Sheet 1 of 2



Client: **Armel Corporation**

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**

Method: **Hollow Stem Auger**

Size: **108 mm I.D.**

Date: **Mar 20 / 18 TO Mar 20 / 18**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS			
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. ×				LAB TEST: Unc. ■ P.P. □						W _p	W	W _L
							PENETRATION RESISTANCE												
							STANDARD ● DYN. CONE ○												
Ground Elevation: 345.05 m							20	40	60	80	10	20	30						
	Borehole drilled adjacent to NW-01D	0.5														above-ground protective well cover at grade			
	-auger cuttings indicate SAND AND SILT TILL	1.0																	
		1.5																	
		2.0																	
		2.5																	
		3.0														bentonite seal/50 mm I.D. PVC riser			
		3.5																	
		4.0														water level at 4.05 m depth on March 26, 2018			
		4.5																	
		5.0																	
		5.5																	
		6.0																	
		6.5																	

PROJECT MANAGER: **RVD**

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CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPJ CVD_ENG.GDT 13/4/18

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 20 / 18 TO Mar 20 / 18**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS				
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. ×				LAB TEST: Unc. ■ P.P. □						W _p	W	W _L	
							50	100	150	200	50	100	150							200
							PENETRATION RESISTANCE													STANDARD ● DYN. CONE ○
(continued)								20	40	60	80	10	20	30						
		7.5																		
		8.0																		
		8.5																		
		9.0																		
		9.5																		
		10.0																		
		10.5																		
		11.0																		
		11.5																		
		12.0																		
		12.5																		
		13.0																		
		13.5																		

sand pack to 8.25 m depth

0.5 m long, 50 mm I.D.
PVC screen with
sandpackPROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

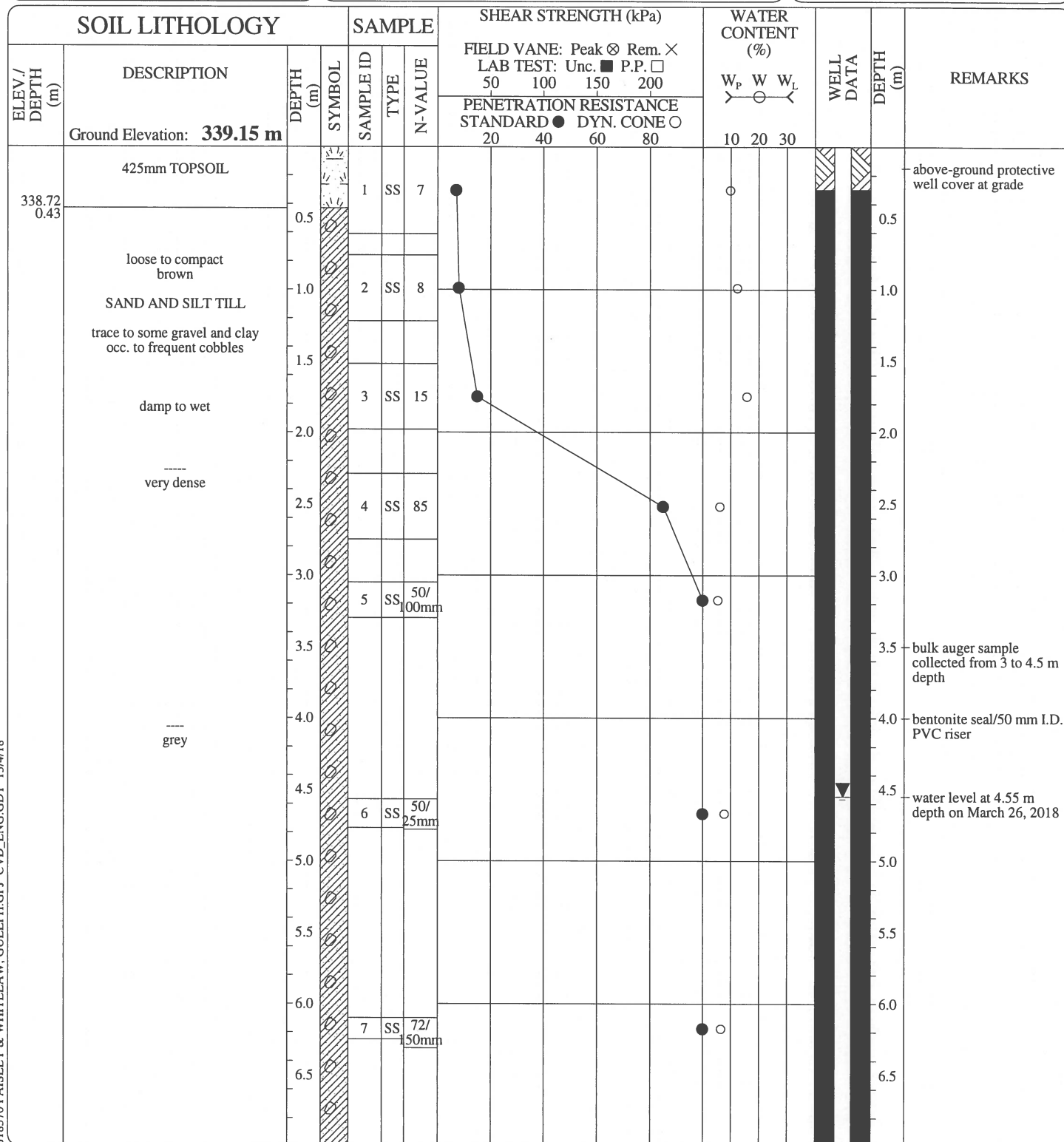
BOREHOLE No. NW-02D

Enclosure No.: 12

Sheet 1 of 2

Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**


EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 22 / 18 TO Mar 22 / 18**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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Client: **Armel Corporation**Project: **Proposed Mixed Residential Complex**Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Mar 22 / 18 TO Mar 22 / 18**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _P W W _L —○—						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
	(continued)																
329.85 9.30	very dense grey	7.5															
	SAND AND SILT TILL																
	trace to some gravel and clay occ. to frequent cobbles	8.0		8	SS	50/ 25mm											auger cuttings wet from below 7.6 m depth
	damp to wet	8.5															sand pack to 8.25 m depth
		9.0															0.5 m long, 50 mm I.D. PVC screen with sandpack
	End of Borehole	9.30	9	SS	58/ 150mm												
			9.5														
			10.0														
			10.5														
			11.0														
		11.5															
		12.0															
		12.5															
		13.0															
		13.5															

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G18570

BOREHOLE No. NW-02S

Enclosure No.: 13

Sheet 1 of 1



Client: **Armel Corporation**

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

EQUIPMENT DATA

Machine: **Diedrich D-50T**

Method: **Hollow Stem Auger**

Size: **108 mm I.D.**

Date: **Mar 22 / 18 TO Mar 22 / 18**

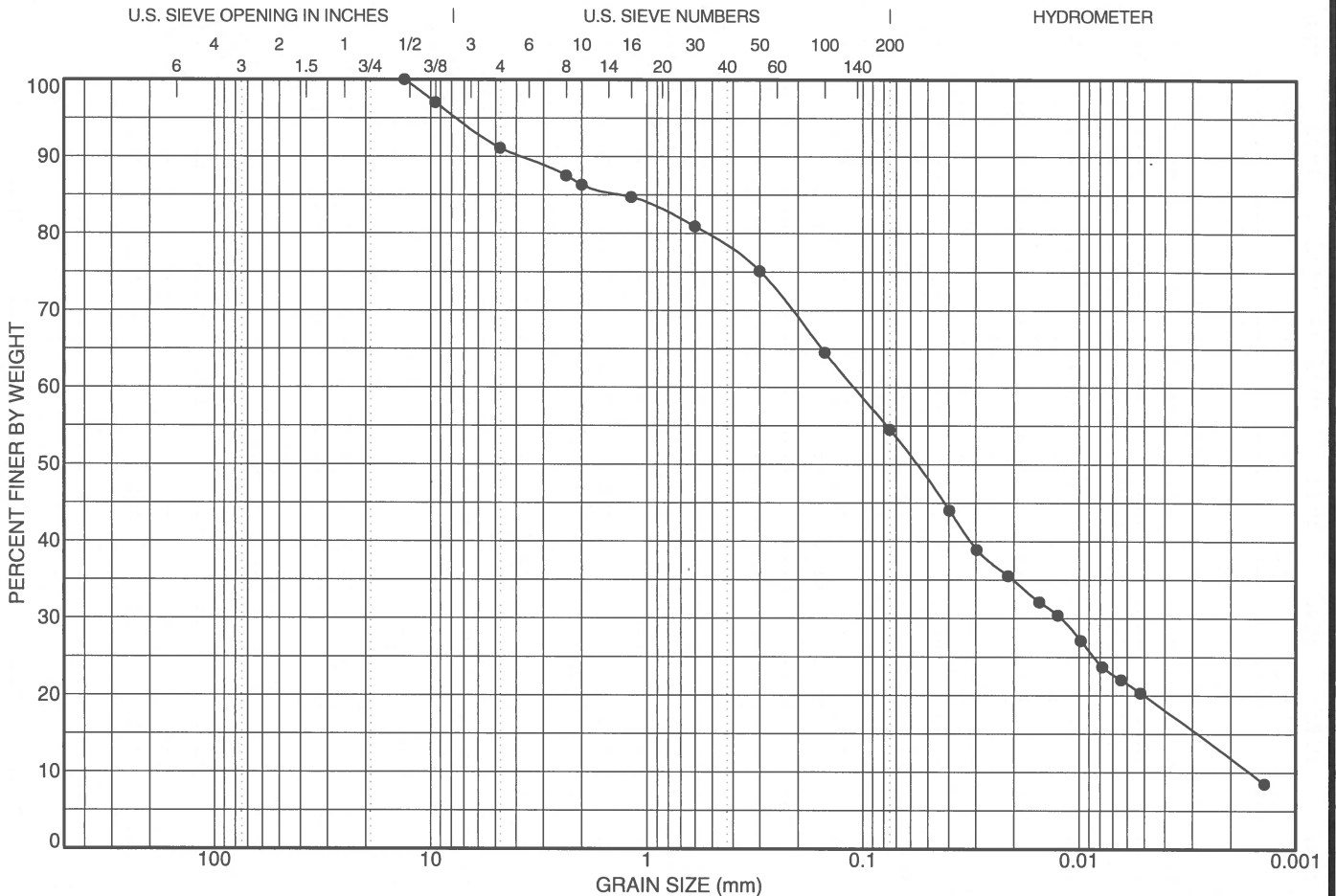
SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □				W _p W W _L					
							50 100 150 200				—○—					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○				20 40 60 80					
Ground Elevation: 339.03 m																
	Borehole drilled adjacent to NW-02D -auger cuttings indicate SAND AND SILT TILL	0.5													above-ground protective well cover at grade	
		1.0														
		1.5														water level at 1.57 m depth on March 26, 2018
		2.0														
		2.5														bentonite seal/50 mm I.D. PVC riser
		3.0														
		3.5														
		4.0														sand pack to 3.7 m depth
		4.5														0.5 m long, 50 mm I.D. PVC screen with sandpack
		5.0														
	5.5															
	6.0															
	6.5															

PROJECT MANAGER: **RVD**

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CVD BOREHOLE (2017) G18570 PAISLEY & WHITELAW, GUELPH.GPJ CVD_ENG.GDT 13/4/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.81	66.38	13.2	0.11	0.012	0.002	8.9	36.6	54.5	

Date: Apr. 11 / 2018
Client: Armel Corporation
Contractor:
Source:
Sampled From: MW 01 - SA 4, 3.05 to 3.51 m depth
Sample No.: 4
Date Sampled: Mar. 29 / 2018
Sampled By: NZ
Lab No.: 2872
Date Tested: Apr. 02 / 2018
Type of Material: Sand and Silt Till, some clay, trace gravel

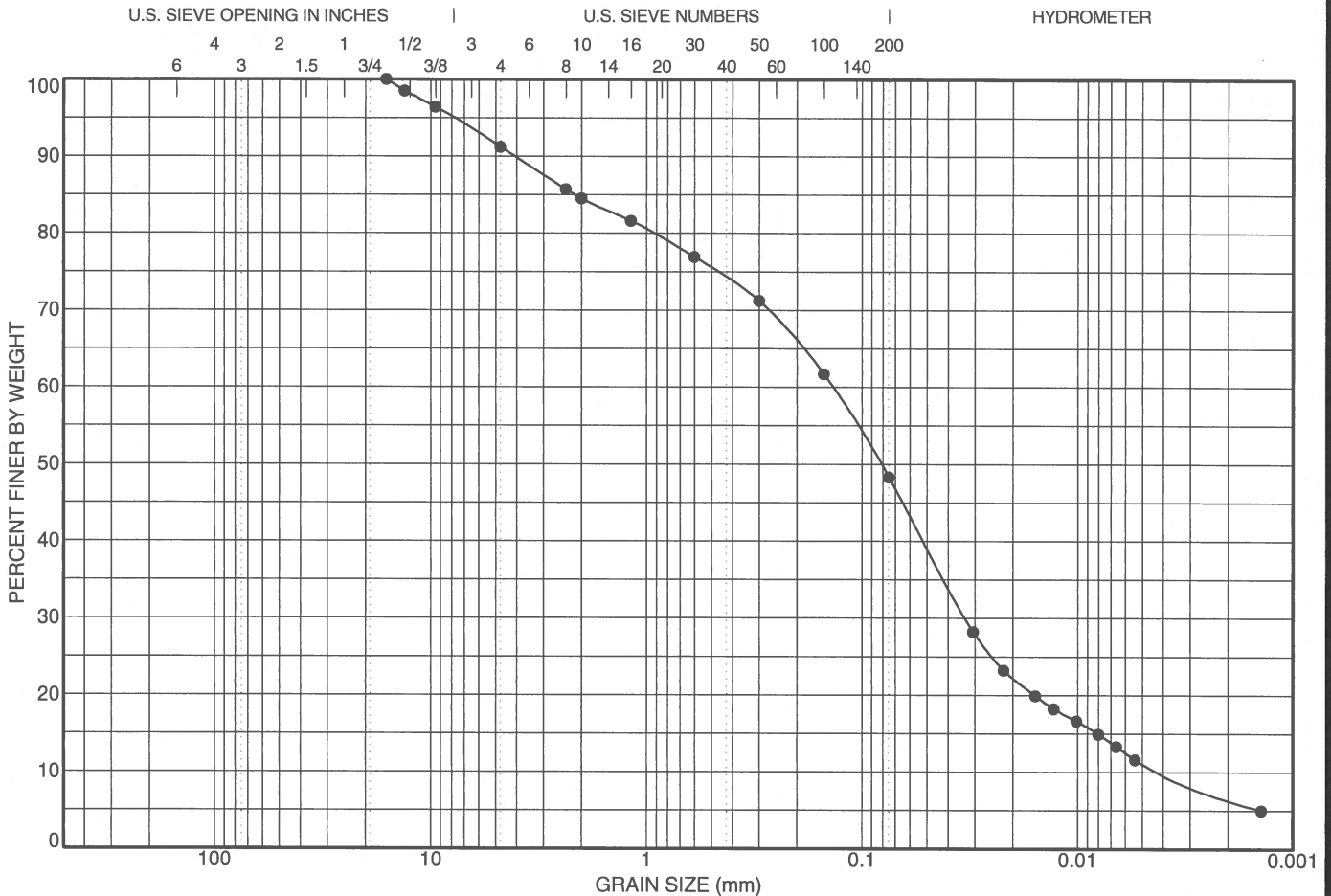
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Proposed Mixed Residential Complex
Location: SW Corner of Paisley Road & Whitelaw Road, Guelph
File No.: G18570
Enclosure No.: 14



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			2.04	35.29	16	0.137	0.033	0.004	8.8	42.9	48.3	

Date: Apr. 11 / 2018
Client: Armel Corporation
Contractor:
Source:
Sampled From: MW 03 - SA 2, 1.52 to 1.98 m depth
Sample No.: 2
Date Sampled: Mar. 29 / 2018
Sampled By: NZ
Lab No.: 2873
Date Tested: Apr. 02 / 2018
Type of Material: Sand and Silt Till, trace gravel and clay

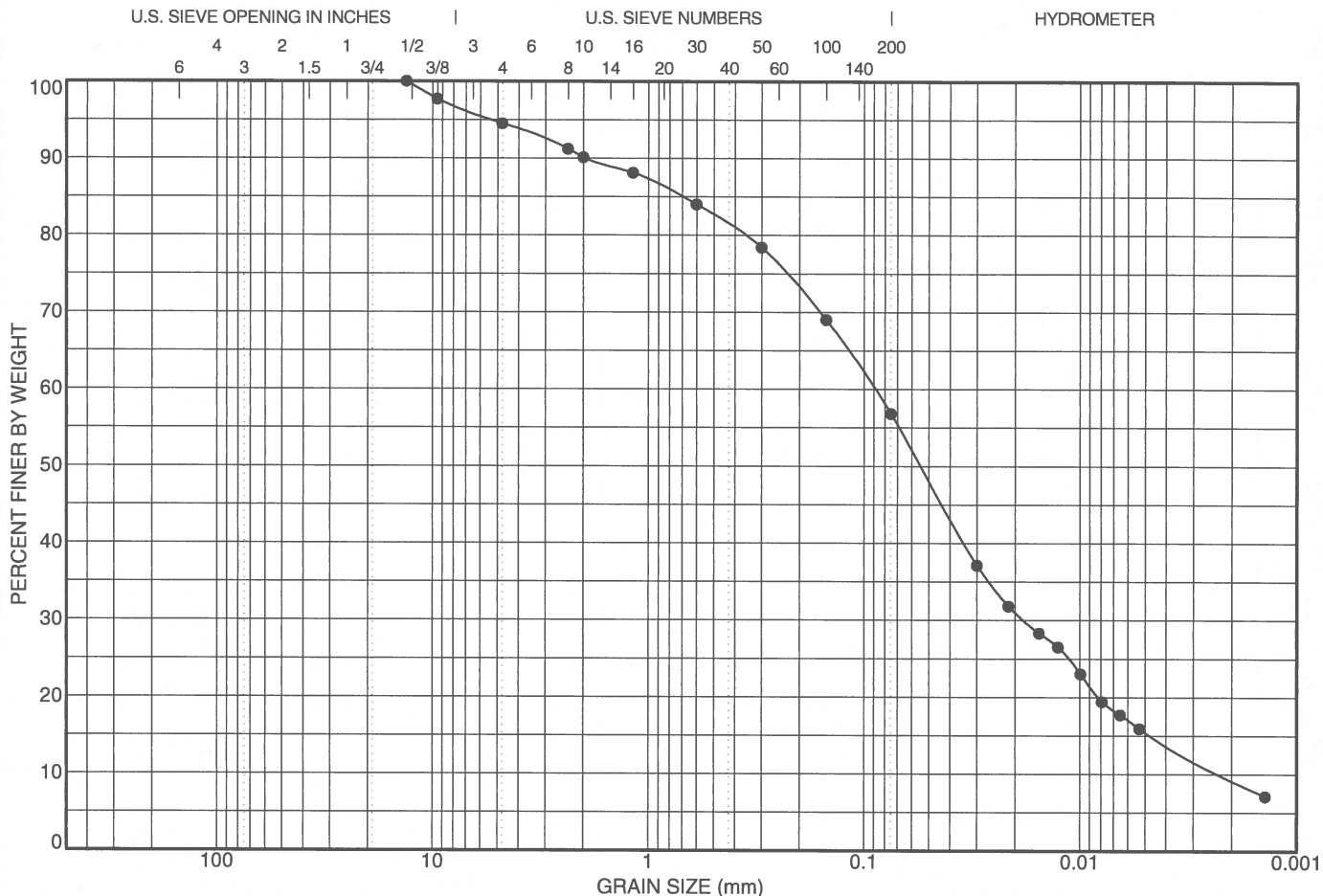
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Proposed Mixed Residential Complex
Location: SW Corner of Paisley Road & Whitelaw Road, Guelph
File No.: G18570
Enclosure No.: 15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.67	41.43	13.2	0.09	0.018	0.002	5.5	37.7	56.8	

Date: Apr. 11 / 2018
Client: Armel Corporation
Contractor:
Source:
Sampled From: MW 06 - SA 3, 2.29 to 2.75 m depth
Sample No.: 3
Date Sampled: Mar. 29 / 2018
Sampled By: NZ
Lab No.: 2875
Date Tested: Apr. 02 / 2018
Type of Material: Sand and Silt Till, trace gravel and clay

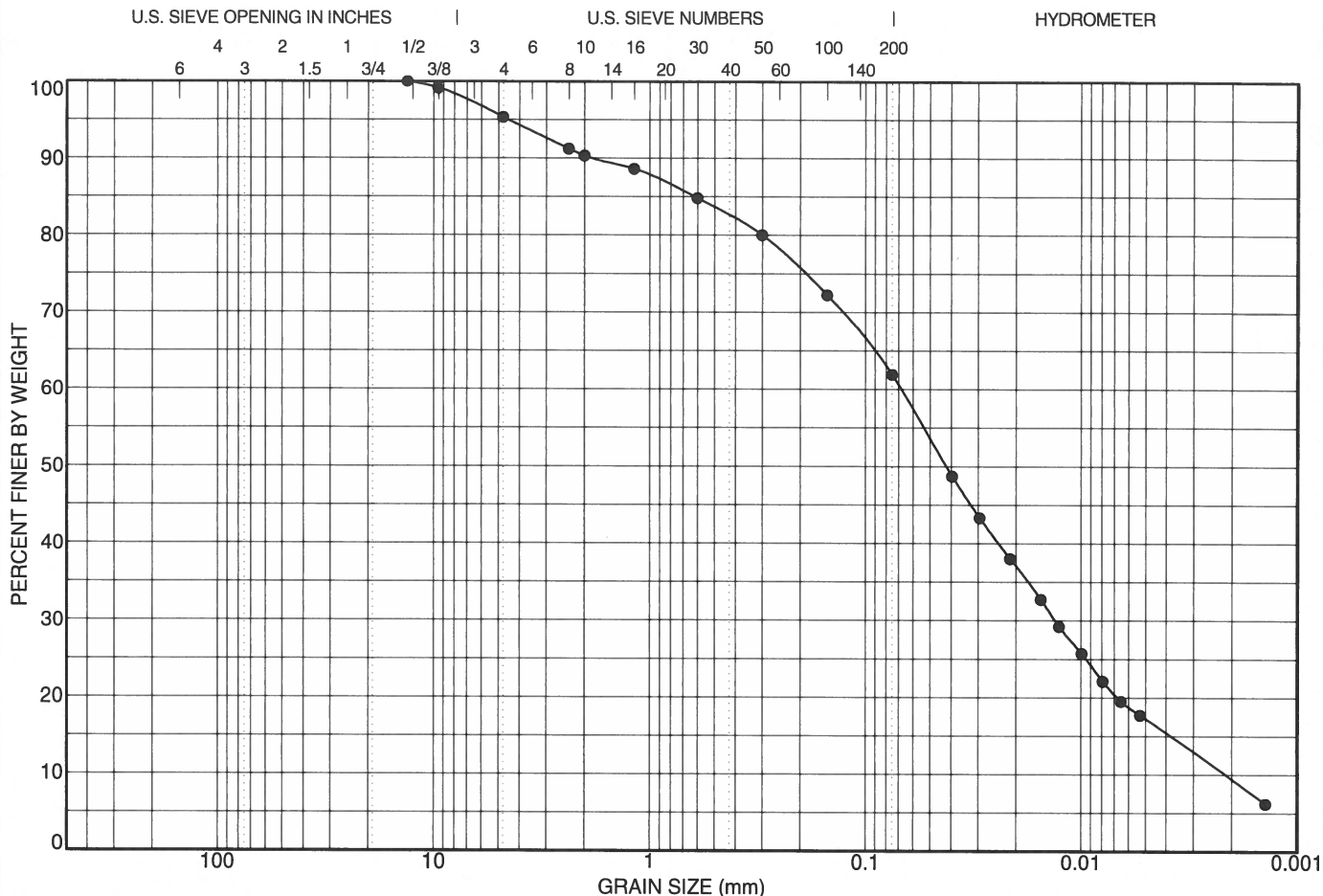
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Proposed Mixed Residential Complex
Location: SW Corner of Paisley Road & Whitelaw Road, Guelph
File No.: G18570
Enclosure No.: 16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.17	31.46	13.2	0.068	0.013	0.002	4.7	33.4	61.9	

Date: Apr. 11 / 2018
Client: Armel Corporation
Contractor:
Source:
Sampled From: NW 01D - SA 5, 6.1 to 6.25 m depth
Sample No.: 5
Date Sampled: Mar. 29 / 2018
Sampled By: NZ
Lab No.: 2877
Date Tested: Apr. 02 / 2018
Type of Material: Sand and Silt Till, trace gravel and clay

Sieve Size (mm)	Percent Passing	No Specifications



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 e-mail: info@cvdengineering.com

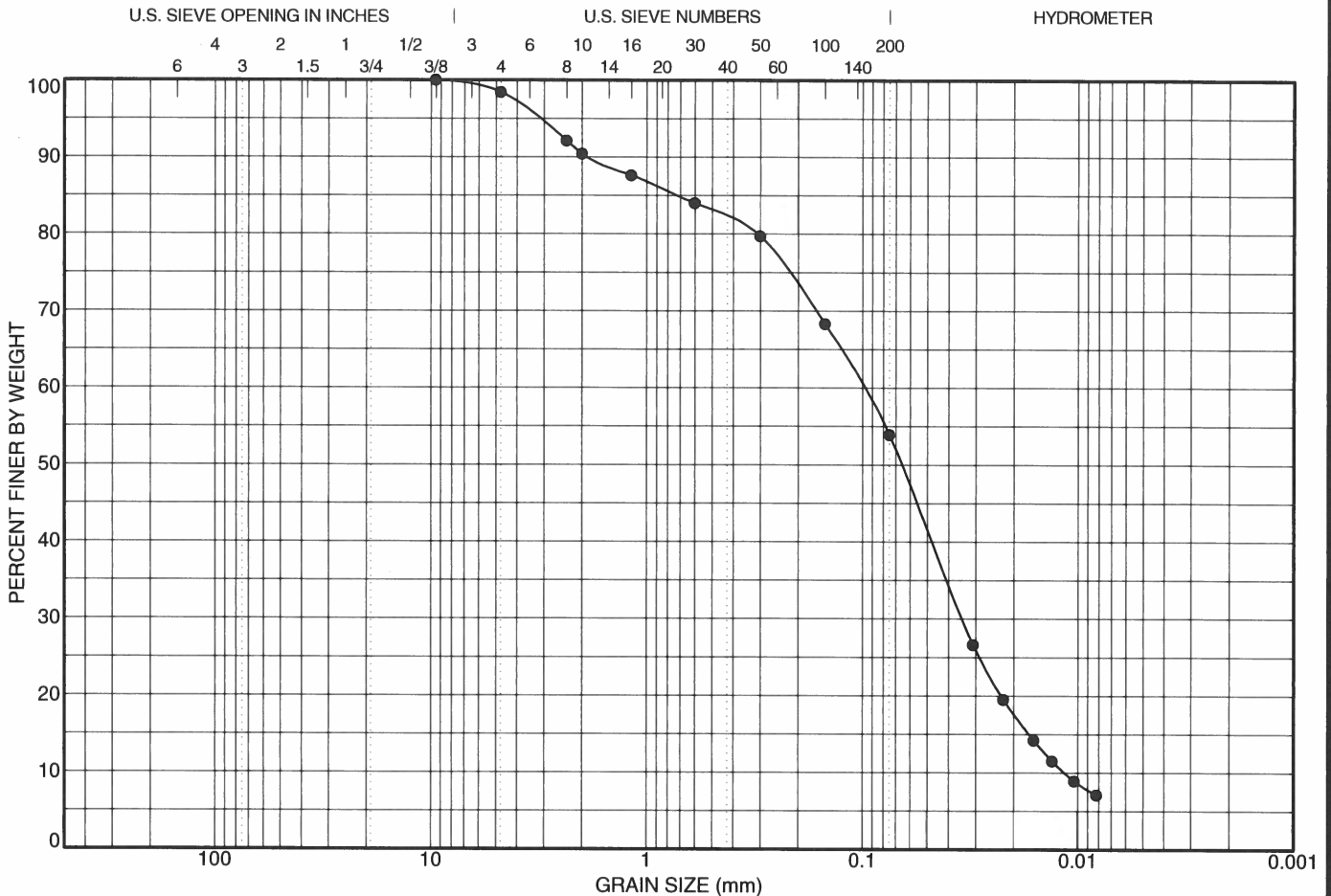
GRAIN SIZE DISTRIBUTION

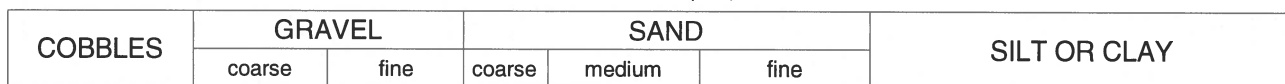
Project: Proposed Mixed Residential Complex

Location: SW Corner of Paisley Road & Whitelaw Road, Guelph

File No.: G18570

Enclosure No.: 17





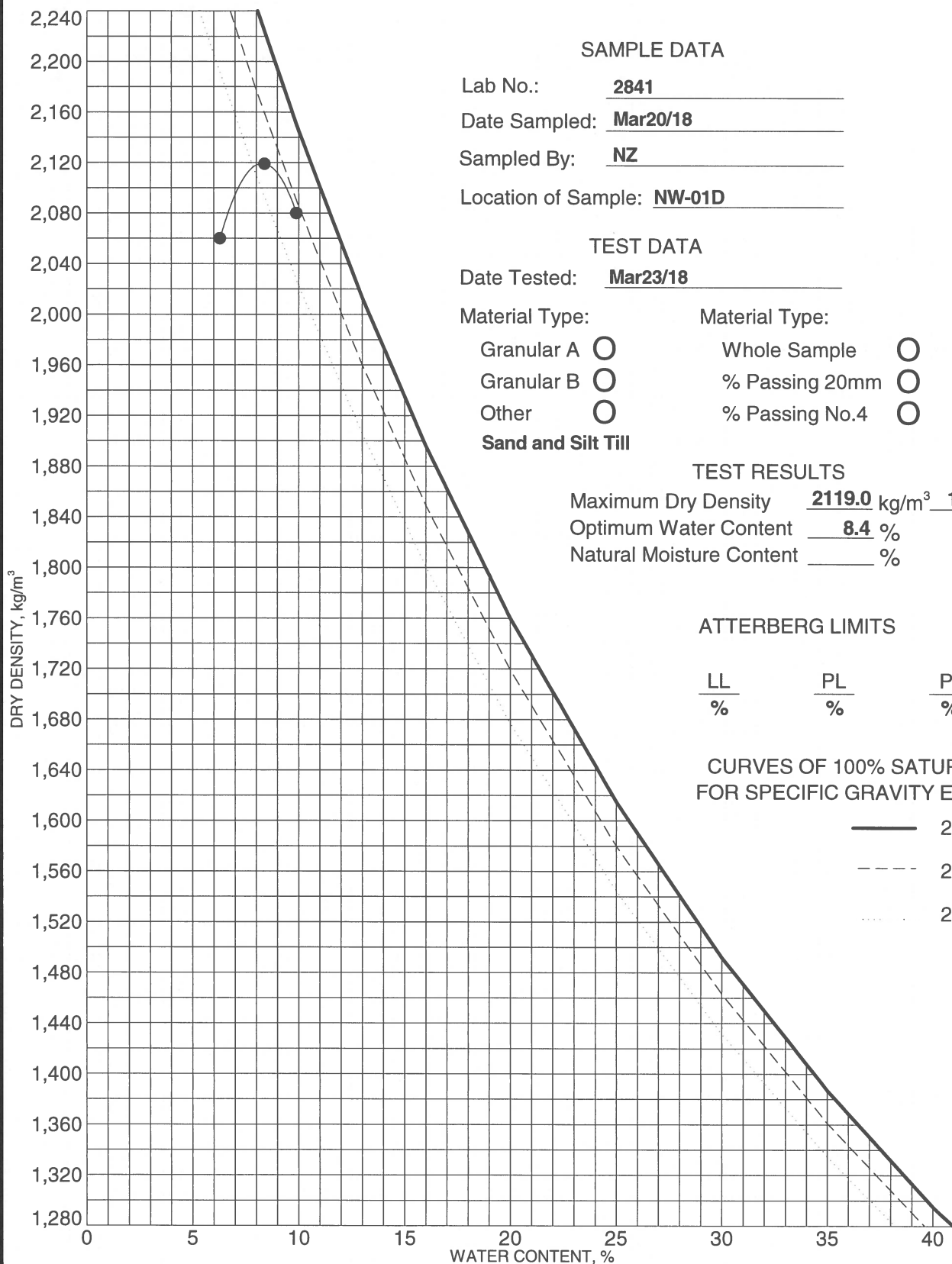
Date:	Apr. 11 / 2018
Client:	Armel Corporation
Contractor:	
Source:	
Sampled From:	MW 06 - SA 5, 4.57 to 5.03 m depth
Sample No.:	5
Date Sampled:	Mar. 29 / 2018
Sampled By:	NZ
Lab No.:	2876
Date Tested:	Apr. 02 / 2018
Type of Material:	Silt, trace sand

Sieve Size (mm)	Percent Passing	No Specifications



GRAIN SIZE DISTRIBUTION

Enclosure No.: 19

**SAMPLE DATA**

Lab No.: 2841

Date Sampled: Mar20/18

Sampled By: NZ

Location of Sample: NW-01D

TEST DATA

Date Tested: Mar23/18

Material Type:

Granular A ☐

Granular B ☐

Other ☐

Sand and Silt Till

Material Type:

Whole Sample ☐

% Passing 20mm ☐

% Passing No.4 ☐

TEST RESULTS

Maximum Dry Density 2119.0 kg/m³ 132.3 PCF

Optimum Water Content 8.4 %

Natural Moisture Content _____ %

ATTERBERG LIMITS

LL	PL	PI
%	%	%

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

— 2.80

- - - 2.70

... 2.60



**CHUNG & VANDER DOELEN
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e-mail: info@cvdengineering.com

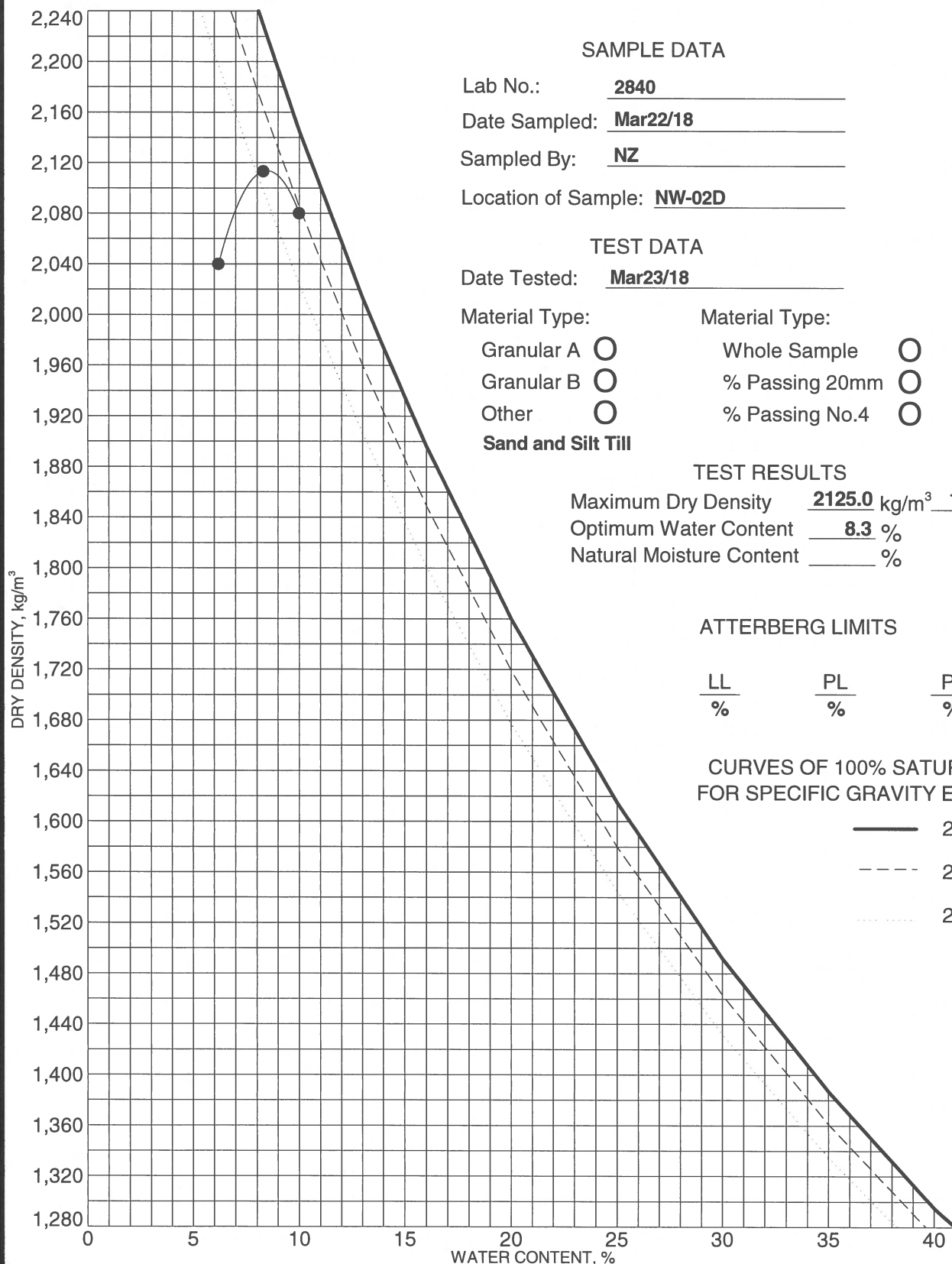
STANDARD PROCTOR TEST RESULTS

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

File No.: **G18570**

Enclosure No.: **20**

**SAMPLE DATA**

Lab No.: 2840
 Date Sampled: Mar22/18
 Sampled By: NZ
 Location of Sample: NW-02D

TEST DATA

Date Tested: Mar23/18

Material Type:

Granular A ☐

Granular B ☐

Other ☐

Sand and Silt Till

Material Type:

Whole Sample ☐

% Passing 20mm ☐

% Passing No.4 ☐

TEST RESULTS

Maximum Dry Density 2125.0 kg/m³ 132.7 PCF

Optimum Water Content 8.3 %

Natural Moisture Content _____ %

ATTERBERG LIMITS

LL	PL	PI
%	%	%

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

— 2.80
 - - - 2.70
 ... 2.60



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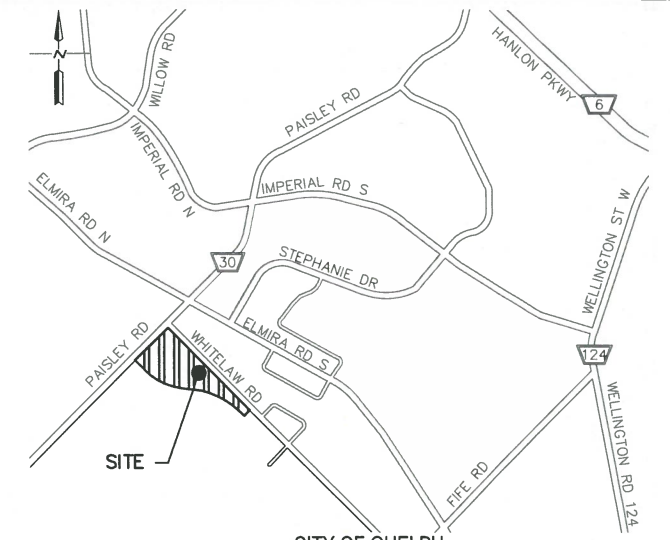
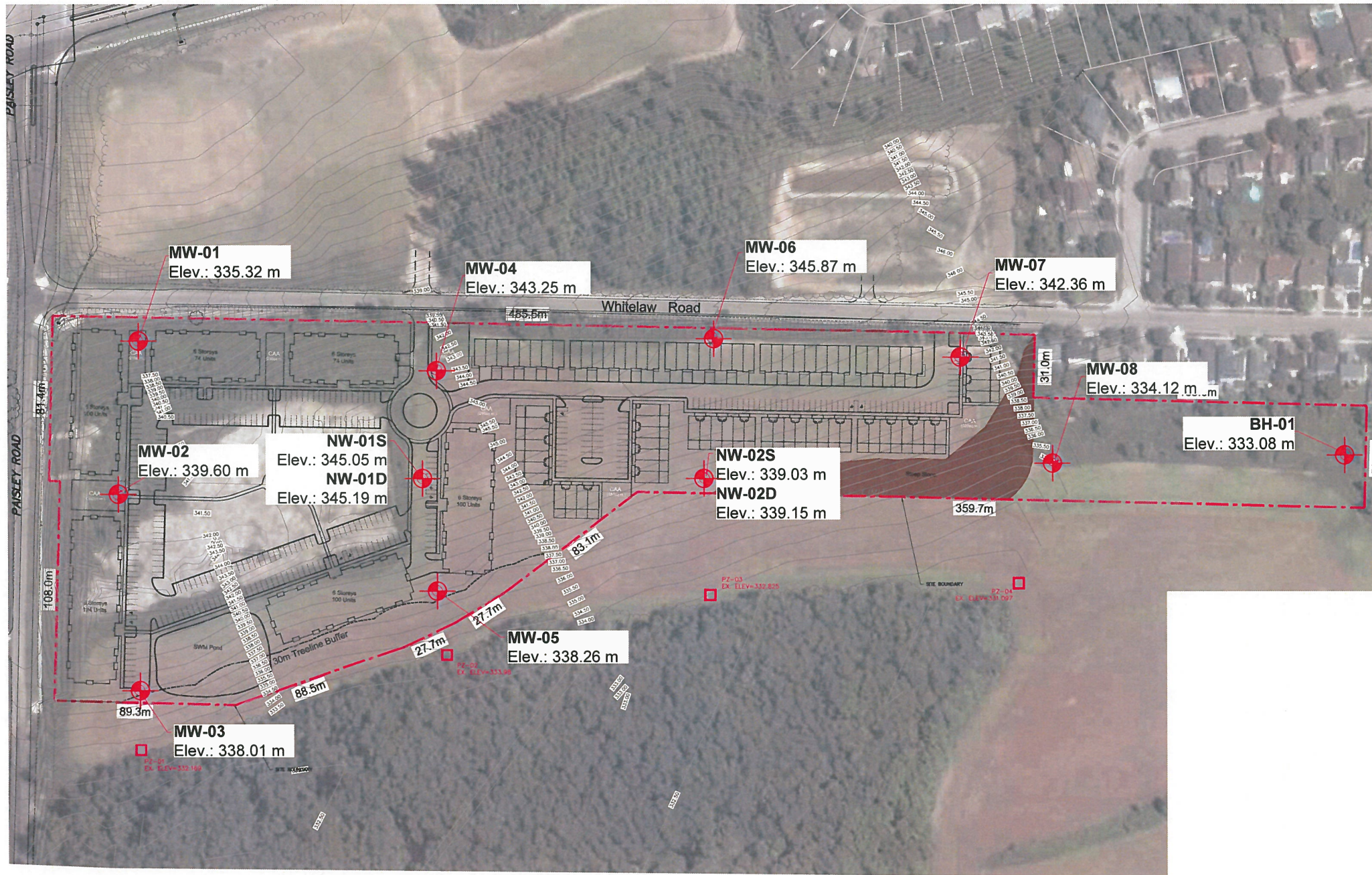
STANDARD PROCTOR TEST RESULTS

Project: **Proposed Mixed Residential Complex**

Location: **SW Corner of Paisley Road & Whitelaw Road, Guelph**

File No.: **G18570**

Enclosure No.: 21



KEY PLAN SOURCE: GM Blueplan

LEGEND



Note: Base Drawing and Elevations Ref.:
Drawing No.: 1, Borehole and Monitoring Well
Location Map, By GM Blueplan Engineering Ltd.,
Dated March, 2018.

BOREHOLE LOCATION PLAN

Proposed Mixed Residential Complex
SW Corner of Paisley Road & Whitelaw Road
Guelph, Ontario



311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn By: AB	Date: April, 2018	File No.: G18570
Checked By: RVD	Scale: 1:2500	Drawing No.: 1