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Geotechnical Investigation
Proposed Development
4296 Anderson Road
Ottawa, Ontario

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Submitted to:

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Geotechnical Investigation
Proposed Development
4296 Anderson Road
Ottawa, Ontario

April 24, 2026
Project: 100011.121

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out for the proposed modifications to the existing development at 4296 Anderson Road in Ottawa, Ontario, herein further referred to as the Site.

The purpose of the investigation was to identify the general subsurface and groundwater conditions at the Site by means of a limited number of boreholes and, based on the information obtained, to provide engineering guidelines on the geotechnical design aspects of the project.

This report is subject to the Conditions and Limitations of This Report, which follows the text of the report, and which are considered an integral part of the report.

2.0 BACKGROUND

2.1 Project Description

Plans are being prepared for modifications to the existing development at the Site located at 4296 Anderson Road in Ottawa, Ontario. The Site location is shown on Figure 1 following the text of this report.

As shown on the figure, at the time of reporting the Site is occupied by two detached maintenance garages, a detached dwelling partially converted to an administrative office, and several other accessory structures for storage, and a storage area for landscape materials and construction equipment. There is also an existing septic system and a well located on the Site.

Based on the background information of the project provided to GEMTEC the following is proposed:

- Relocating the metal storage shed along the south property line; and
- Relocating the small shed along the north property line.

The above structures will likely be repositioned in the same general locations with a minimum 1-metre setback from the property lines. It is understood that no new foundation elements are proposed for the relocated structures. It is understood that all other buildings and structures will remain in place. Soft landscaping work is also anticipated within portions of the property.

2.2 Site Geology

A review of surficial geology maps of the Ottawa area and reported well records by the Ministry of the Environment, Conservation and Parks of Ontario (MECP) indicates that the Site is underlain by glaciomarine deposits of silt and clay. Bedrock geology maps indicate that the bedrock below the soil cover is comprised of shale and limestone of the Carlsbad Formation at depths ranging from about 25 to 50 metres below ground surface.

3.0 METHODOLOGY

The fieldwork for the geotechnical investigation was carried out on June 16 to 18, 2025. During those dates, seven boreholes, numbered 25-01 to 25-07 inclusive, were advanced at the locations shown on the Site Plan, Figure 1. In addition, one dynamic cone penetration test (DCPT) was performed from the base of borehole 25-02. Summary details of the boreholes are provided in Table 3.1. The subsurface conditions are discussed in greater detail in Section 4 of this report.

Table 3.1 – Borehole Details

Borehole ID	Ground Surface Elevation (metres)	Borehole Depth (metres)	Borehole Purpose
25-01	80.9	6.7	Geotechnical
25-02	80.6	Auger to 15.2 m Probe to 30.5 m	Geotechnical
25-03	80.5	4.9	Environmental
25-04	80.4	5.2	Environmental
25-05	80.7	4.9	Environmental
25-06	80.5	5.2	Environmental
25-07	80.6	4.9	Environmental

The boreholes were advanced using a Geoprobe 7822DT drill rig (direct push drill rig) supplied and operated by Strata Drilling Group of Ottawa, Ontario. The rig was also used to advance the DCPT.

Standard penetration tests (SPT) were carried out in the boreholes and samples of the soils encountered were recovered using a 50-millimetre diameter split barrel sampler. In-situ vane shear strength testing was carried out in selected boreholes, however, due to inferred soil disturbance the measures values have not been presented on the logs, as they are considered non-representative. The blow counts to advance the DCPT probe over consecutive 300-millimetre depth intervals were recorded and are presented on the logs.

A single monitoring well was installed in each of boreholes 25-01 to 25-06 inclusive, to measure the groundwater levels, conduct hydraulic testing and to allow groundwater sampling.

The fieldwork was supervised by a member of our engineering staff who directed the drilling operations, logged the boreholes, DCPT probe, and samples, carried out the in-situ testing and surveyed the locations and ground surface elevations of the boreholes using a Trimble R10 GPS

survey instrument. The elevation is referenced to geodetic datum NAD83 (CSRS) Epoch 2010, vertical network CGVD28.

Following the fieldwork, the soil samples were returned to our laboratory for examination by a geotechnical engineer. Selected samples of the soil were tested for water content, grain size distribution, and plasticity index, where applicable. In addition, one recovered soil sample from one of the boreholes was sent to Paracel Laboratories Ltd. for basic chemical testing relating to corrosion of buried concrete and steel.

4.0 SUBSURFACE CONDITIONS

4.1 General

Descriptions of the subsurface conditions logged in the boreholes and DCPT probe are provided on the Record of Borehole Sheets in Appendix A. The results of the laboratory classification testing are provided on the Record of Borehole Sheets and in Appendix B. The results of the chemical analysis are provided in Appendix C.

The following sections provide a description of the subsurface conditions encountered in the boreholes advanced as part of this investigation. In general, the subsurface conditions were similar to those anticipated from the available geological maps. It should be noted that boreholes 25-01 and 25-02 were carried out for geotechnical purposes while boreholes 25-03 to 25-07 inclusive were carried out as part of a Phase Two Environmental Site Assessment which is provided in a separate report.

4.2 Asphaltic Concrete

Asphaltic concrete was encountered at the ground surface at boreholes 25-02, 25-03, 25-06, and 25-07. The asphaltic concrete has a thickness of about 30 millimetres.

4.3 Fill Material

Fill material was encountered at the ground surface at boreholes 25-01, 25-04, and 25-05, and below the existing asphaltic concrete at boreholes 25-02, 25-03, 25-06, and 25-07. The fill extends to depths ranging from about 0.6 to 1.7 metres below the existing ground surface.

The fill generally consists of silty sand and gravel. At borehole 25-01, the fill consists of silty sand, with trace gravel. The fill also contains organic matter and pieces of asphalt, concrete, plastic, and wood.

Two standard penetration tests (SPT) carried out in the fill gave N values of 2 and 43 blows per 0.3 metres of penetration which indicates a very loose and dense relative density, respectively.

A grain size distribution test was carried out on one sample of the fill. The results are summarized in Table 4.1. The measured water content of one sample of the fill was about 4 percent.

Table 4.1 – Summary of Grain Size Distribution Test, Fill Material

Borehole ID	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
25-02	1	0.2 – 0.8	38	46	16	

4.4 Silty Sand

Native deposits of silty sand with trace gravel, or sand and silt with trace gravel, herein collectively referred to as silty sand, were encountered below the fill at all the boreholes. The silty sand also contains organic matter at borehole 25-02. The silty sand extends to depths ranging from about 2.4 to 3.2 metres.

SPT N values in the silty sand range from 3 to 30 blows per 0.3 metres of penetration which indicates a very loose to compact relative density.

Two grain size distribution tests were carried out on two samples of the silty sand. The results are summarized in Table 4.2. The measured water contents of five samples of the silty sand ranged from about 15 to 30 percent.

Table 4.2 – Summary of Grain Size Distribution Tests, Silty Sand

Borehole ID	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
25-01	3	1.5 – 2.1	0	79	21	
25-02	3	1.7 – 2.3	0	52	48	

4.5 Clay

Native deposits of clay, with trace sand, were encountered below the silty sand at all the boreholes. The clay deposit was not fully penetrated but was proven to a depth of about 15.2 metres through sample recovery. At borehole 25-02, the DCPT probe was advanced from a depth ranging from about 15.2 to 30.5 metres below the existing ground surface. The measured blow counts per 0.3 metres of penetration in the DCPT ranged from weight of hammer to 20 which suggests that the clay is likely present to this depth or greater.

SPT N values in the clay were less than 1, with 0.3 metres of penetration occurring under the weight of the hammer. The recorded DCPT blow counts are shown on the Record of Borehole Sheets. In-situ vane shear strength testing was attempted in the clay, but the undrained shear strengths values were inferred to be non-representative being likely affected by disturbance and are therefore not presented.

A grain size distribution test was carried out on one sample of the clay. The results are summarized in Table 4.3. Atterberg limits tests were carried out on two samples of the clay. The results are summarized in Table 4.4. The measured water contents of ten samples of the clay ranged from about 47 to 80 percent, which in general exceed the measured liquid limit values.

Table 4.3 – Summary of Grain Size Distribution Test, Clay

Borehole ID	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
25-02	7	6.3 – 6.9	0	1	37	62

Table 4.4 – Summary of Atterberg Limits Test Results, Clay

Borehole ID	Sample Number	Sample Depth (metres)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Water Content (%)
25-01	6	4.7 – 5.3	57	21	36	57
25-02	10	10.8 – 11.4	59	26	32	80

4.6 Groundwater Level

The groundwater level was observed within borehole 25-07 at a depth of about 2.4 metres below the existing ground surface upon completion of borehole.

The groundwater levels were measured in the monitoring wells on June 26 and August 8, 2025, and are summarized in Table 4.5. The groundwater level may be higher during wet periods of the year such as the early spring or following periods of precipitation.

Table 4.5 – Summary of Groundwater Levels

Borehole ID	Groundwater Depth (metres)	Groundwater Elevation (metres)	Date of Reading
25-01	2.1	78.8	June 26, 2025
	2.3	78.6	August 8, 2025
25-02	1.9	78.7	June 26, 2025
	3.0	77.6	August 8, 2025
25-03	1.8	78.8	June 26, 2025
	2.9	77.6	August 8, 2025

Borehole ID	Groundwater Depth (metres)	Groundwater Elevation (metres)	Date of Reading
25-04	1.7	78.7	June 26, 2025
	1.9	78.6	August 8, 2025
25-05	2.0	78.7	June 26, 2025
	2.2	78.5	August 8, 2025
25-06	1.7	78.8	June 26, 2025
	2.8	77.7	August 8, 2025

4.7 Chemistry Relating to Corrosion

The results of chemical testing on one soil sample recovered from borehole 25-02 are summarized in Table 4.6.

Table 4.6 – Summary of Corrosion Testing

Parameter	Borehole 25-02 Sample 4
Conductivity (µS/cm)	1110
Resistivity (Ohm.m)	8.98
pH	8.04
Chloride Content (µg/g)	677
Sulphate Content (µg/g)	113

5.0 GEOTECHNICAL RECOMMENDATIONS AND GUIDELINES

5.1 General

At the time of preparing this report, the final details of the works at the Site were not available to GEMTEC. The recommendations provided in the following sections may require review as the design of the project progresses and further details are made available to GEMTEC.

It is understood that the proposed works at the Site relate primarily to repositioning of existing structures and reuse of existing foundations. If the existing structures have preformed acceptably to date, and assuming that similar loading will be applied through the repositioning, in general no significant affects on the soils are anticipated (from a geotechnical perspective). The

recommendations and guidelines provided below are provided, in part, as guidance should new structures be constructed at the Site.

5.2 Grade Raise Restrictions

The subsurface conditions at the site consist of fill, with asphaltic concrete in some areas, over native deposits of silty sand, over sensitive deposits clay which have a limited capacity to support loads imposed by grade raise fill and foundations for the building.

The placement of fill at the Site must therefore be carefully planned and controlled so that the stress imposed by the fill does not result in excessive consolidation of the clay deposits. Concrete slabs, overall grade raise, and pavement structures are considered grade raise filling. Groundwater lowering also results in a stress increase on the underlying sensitive silty clay deposit.

Based on the results of the geotechnical investigation, the maximum thickness of any grade raise filling should be limited to 0.5 metres above the existing surface grade. The grade raise restriction for the Site has been evaluated based on the following assumptions:

- The groundwater lowering due to the development at this site will be at most 1.0 metres below the underside of the foundation level;
- The unit weight of the grade raise fill used in the vicinity of the structures is not greater than 20 kilonewtons per cubic metre; and,
- The grade raise fill used below the structures, where required, will be composed of compacted granular material having a unit weight of 20 kilonewtons per cubic metre.

It is our understanding that minor filling (i.e., less than 0.5 metres) is proposed at the Site. If a greater level of grade raise filling is required around / below structures, or in other areas where large settlements are to be avoided, then the use of lighter weight fills could be considered, and / or additional detailed geotechnical investigations in combination with more detailed assessment could be carried out.

5.3 Excavation

Any excavations for the proposed modifications at the Site will likely extend through the asphaltic concrete, fill, and into silty sand. Deeper excavations will encounter the clay deposit. Excavation of these materials above the water level should not present significant constraints, noting that fill can contain pockets of hard material. Below the water level sloughing of the granular soils should be anticipated, along with disturbance of the soils in the bottom of the excavation unless groundwater levels are lowered in advance of excavation.

The sides of the excavations within the overburden soils should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Occupational Health and Safety Act.

According to the Act, the dense fill at boreholes 25-02 and 25-06 can be classified as Type 2 soils, as such an allowance should be made for 1 horizontal to 1 vertical, or flatter, excavation slopes. The very loose fill at borehole 25-01 and the silty sand can be classified as Type 4 soils, as such an allowance should be made for 3 horizontal to 1 vertical, or flatter, excavation slopes. It should be noted that where multiple soil Types are encountered in an excavation the lower value is to be adopted for the full excavation. Given the variable shallow soil conditions at the Site inspection of the excavations and verification soil Type at the time of construction by a geotechnical practitioner is recommended to verify the applicable soil Type.

As an alternative or where space constraints dictate, trench excavations at the Site could be carried out within a tightly fitting, braced steel trench box, which is specifically designed for this purpose.

5.4 Groundwater Management and Permitting

The groundwater level was measured at depths ranging from about 1.7 to 2.1 metres below the existing ground surface. Perched water levels may be present in the upper sandy soils (particularly after heavy rain or other precipitation, or snow melt) due to the presence of fine-grained soil layers within these units.

Based on the results of the geotechnical investigation, it is anticipated that groundwater inflow into excavations could be handled by pumping from within the excavations, noting that fill material and more granular soils have potential to transmit large volumes of water. However, should shallow groundwater levels be present at the time of excavation groundwater lowering in advance of excavation (by well points or other means) should be considered.

Groundwater takings less than 50,000 litres per day do not need a permit. An Environmental Activity and Sector Registry (EASR), accompanied by a technical assessment prepared by a Qualified Person (QP), is required for groundwater takings above this volume.

It is not expected that short term pumping during excavation will have a significant effect on nearby structures and services. Suitable detention and filtration will be required before discharging water. The contractor should be required to submit an excavation and groundwater management plan for review.

5.5 Foundation Design

As previously indicated it is understood that no new foundations are proposed for the building repositioning works.

Should new foundations be required, based on the results of the geotechnical investigation, the native soils are considered suitable for support of spread footings, with some limitations. Any topsoil, disturbed soil, or deleterious material, if encountered, should be removed below the foundation support areas.

For exterior strip footings founded on or within native, undisturbed deposits of compact silty sand, or on a pad of compacted granular fill above native, undisturbed soil should be sized using a preliminary geotechnical reaction at Serviceability Limit State (SLS) of 75 kilopascals and a factored geotechnical resistance at Ultimate Limit State (ULS) of 150 kilopascals. These values assume that:

- The footing dimensions should be limited to about 600 to 700 millimetres width for strip footings, and maximum 700 millimetres for pad foundations;
- The underside of the foundations will be constructed at a maximum depth of about 1.5 metres below the existing ground surface (i.e. on silty sand and not on the clay); and,
- Confirmation of the preliminary values shall be made by a geotechnical practitioner prior to placement of the footings by means of hand augerhole and in-situ shear vane testing, or other suitable means.

Zones of very loose to loose silty sand may be encountered at the underside of foundation level. Where encountered at the underside of foundation level the sand should be improved by compaction of the exposed surface to at least 95 percent of the material's standard Proctor maximum dry density value (provided groundwater in sufficiently below the excavation level). Should shallow groundwater be present in areas of very loose or loose sand additional measures may be required (such as partial excavation and replacement and/or groundwater level lowering).

In areas where the underside of footing level is above the level of the native soil or where subexcavation of soil is required, the grade below the proposed structures could be raised with granular material meeting Ontario Provincial Standard Specifications (OPSS) requirements for Granular A or Granular B Type II. The granular material should be compacted in maximum 200-millimetre-thick to at least 98 percent of the material's standard Proctor maximum dry density value using suitable vibratory compaction equipment. To provide adequate spread of load below the footings, the granular material should extend at least 0.3 metres horizontally beyond the edge of the footings and down and out from this point at 1 horizontal to 1 vertical, or flatter.

Provided that the subgrade surface and engineered fill are prepared as described in this report, the post construction total and differential settlement of the footings at SLS should be less than 25 and 15 millimetres, respectively.

5.6 Frost Protection

All exterior footings, adjacent to heated areas, should be provided with at least 1.5 metres of earth cover for frost protection purposes. Isolated, unheated exterior footings should be provided with at least 1.8 metres of earth cover for frost protection purposes. The required depth of frost protection can be reduced by the thickness of any engineered fill beneath the foundations.

Alternatively, the required frost protection could be provided by means of a combination of earth cover and extruded polystyrene insulation. Further details regarding the insulation of foundations could be provided, if necessary.

5.7 Floor Slabs / Slab on Grade Structures

It is unknown whether a new interior floor slab will be required for the repositioned structures, or if new slab on grade structures will be constructed.

The existing fill is not considered suitable for support of the floor slabs / slab on grade structures. To prevent long term settlement of the floor slab, all fill and any organic material, if encountered, should be removed from below the proposed slab to expose the native overburden deposits. The subgrade surface should then be proof rolled with suitable compaction equipment under dry conditions and any noted soft or disturbed areas should be sub-excavated, subject to inspection of the geotechnical engineer.

The grade within the proposed structures could then be raised where necessary, with material meeting OPSS requirements for Granular A and Granular B Type I or II. The granular base for the proposed slab on grade should consist of at least 200 millimetres of OPSS Granular A.

OPSS documents allow recycled asphaltic concrete and concrete to be used in Granular A. Since the source of recycled material cannot be determined, it is suggested that any granular materials used beneath the floor slab be composed of virgin material only, for environmental reasons.

All imported granular materials placed below the proposed floor slab should be compacted in maximum 200-millimetre-thick lifts to at least 95 percent of the material's standard Proctor maximum dry density value using suitable vibratory compaction equipment.

Should reuse of existing slab base / subbase materials be considered further evaluation of these materials would be required.

5.8 Backfill and Drainage

The native deposits at this site are frost susceptible and should not be used as backfill against foundations. To avoid frost adhesion and possible heaving free-draining, non-frost susceptible granular material such as that meeting the requirements of OPSS Granular A, or Granular B Type I or II should be used for backfill to belowground structures.

Where the backfill will ultimately support areas of hard surfacing (pavement, sidewalks, or other similar surfaces), the backfill should be placed in maximum 200-millimetre-thick lifts to at least 95 percent of the material's standard Proctor maximum dry density value using suitable vibratory compaction equipment.

Where future landscaped areas will exist next to the proposed structures and if some settlement of the backfill is acceptable, the backfill could be compacted to at least 90 percent of the material's standard Proctor maximum dry density value.

Frost susceptible native soils could be considered for backfill purposes in soft landscaped areas provided that a suitable bond break is applied to the surface of the foundations to prevent frost jacking. A suitable bond break could consist of at least 2 layers of 6 MIL polyethylene sheeting or a proprietary plastic drainage system. It is also pointed out that the native soils at this site can be impacted by changes in moisture content and this could affect the ability to compact this material to the required density.

Perimeter foundation drainage is not considered necessary for a slab on grade structure provided that the floor slab level is above the finished exterior ground surface level.

5.9 Seismic Site Class and Liquefaction Potential

Based on the 2012 Ontario Building Code (OBC), or the 2015 National Building Code (NBC), the seismic site class can be determined based on the Average Standard Penetration Resistance or the Soil Undrained Shear Strength. Based on the results of the geotechnical investigation, it is recommended that seismic Site Class E be used for the design of structures in the proposed development.

There is no potential for liquefaction of the overburden deposits affecting structures at the Site, provided the recommendations provided in this report are followed.

5.10 Corrosion of Buried Concrete and Steel

The measured sulphate concentration in the sample of the silty sand recovered from borehole 25-02 was 113 micrograms per gram. According to the Canadian Standards Association "Concrete Materials and Methods of Concrete Construction" (CSA A23.1-14 Table 3), the degree of sulphate exposure stemming from the soils is negligible (less than 0.10 percent). Therefore, any concrete in contact with the soil at this site could be batched with General Use (GU) cement. However, the effects of freeze thaw in the presence of de-icing chemicals (sodium chloride) use on the roadway should be considered in selecting the air entrainment and the concrete mix proportions for any concrete.

Based on the resistivity and pH of the tested soil sample, the silty sand can be classified as slightly aggressive towards unprotected steel. The manufacturer of any buried steel elements that will be in contact with the soil and groundwater should be consulted to ensure that the durability of the intended product is appropriate. It is noted that the corrosivity of the soil and groundwater could vary throughout the year due to the application of sodium chloride for de-icing.

5.11 Proposed Services

It is understood that no below ground services will be installed as part of the works at the Site. Should this change as the design progresses further commentary / guidance on this aspect can be provided upon request.

6.0 ADDITIONAL CONSIDERATIONS

6.1 Effects of Construction Induced Vibration

Some of the construction operations (such as granular material compaction, excavation, etc.) will cause ground vibration on and off the site. The vibrations will attenuate with distance from the source but may be felt at nearby structures. Assuming that any excavating is carried out in accordance with the guidelines in this report, the magnitude of the vibrations will be much less than that required to cause damage to the nearby structures or services in good condition. Precondition surveys of the adjacent structures should be considered.

6.2 Winter Construction

Most of the soils at this site are highly frost susceptible and prone to significant ice lensing. In order to carry out the work during freezing temperatures, the excavation should be opened for as short a time as practicable and the excavations should be carried out only in lengths that allow all of the construction operations, including backfilling, to be fully completed in one working day. The materials on the sides of the trenches should not be allowed to freeze. In addition, the backfill should be excavated, stored, and replaced without being disturbed by frost or contaminated by snow or ice.

6.3 Abandonment of Monitoring Wells

All monitoring wells installed as part of this investigation should be decommissioned by a licensed well technician in accordance with Ontario Regulation 903, as amended by Ontario Regulation 128/03. The well abandonment could be carried out in advance of or during construction.

7.0 CLOSURE

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

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FZ/DC/BW

Enclosures
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Consulting Engineers and Scientists

CONDITIONS AND LIMITATIONS OF THIS REPORT

1. **Standard of Care:** GEMTEC has prepared this report in a manner consistent with generally accepted engineering or environmental consulting practice in the jurisdiction in which the services are provided at the time of the report. No other warranty expressed or implied is made.

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3. **Complete Report:** This report is of a summary nature and is not intended to stand alone without reference to the instructions given to GEMTEC by the Client, communications between GEMTEC and the Client and to any other reports prepared by GEMTEC for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. GEMTEC cannot be responsible for use of portions of the report without reference to the entire report.

4. **Basis of Report:** This Report has been prepared for the specific site, development, design objectives and purposes that were described to GEMTEC by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this report expressly addresses the proposed development, design objectives and purposes. Any change of site conditions, purpose or development plans may alter the validity of the report and GEMTEC cannot be responsible for use of this report, or portions thereof, unless GEMTEC is requested to review any changes and, if necessary, revise the report.

5. **Time Dependence:** If the proposed project is not undertaken by the Client within 18 months following the issuance of this report, or within the timeframe understood by GEMTEC to be contemplated by the Client, the guidance and recommendations within the report should not be considered valid unless reviewed and amended or validated by GEMTEC in writing.

6. **Use of This Report:** The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without GEMTEC's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, GEMTEC may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process.

   Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety, and equipment capabilities.

7. **No Legal Representations:** GEMTEC makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

8. **Decrease in Property Value:** GEMTEC shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.

9. **Reliance on Provided Information:** The evaluation and conclusions contained in this report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations. information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of misstatements, omissions, misrepresentations. or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information

and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

10. **Investigation Limitations:** Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions but even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. Accordingly, GEMTEC does not warrant or guarantee the exactness of the subsurface descriptions.

    Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

    In addition, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

11. **Sample Disposal:** GEMTEC will dispose of all uncontaminated soil and/or rock samples 60 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fill materials or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

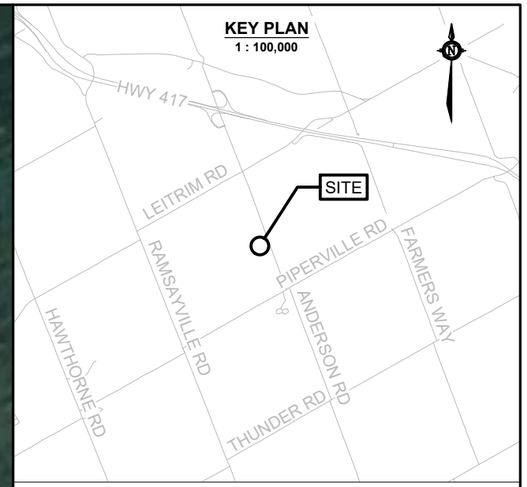
12. **Follow-Up and Construction Services:** All details of the design were not known at the time of submission of GEMTEC's report. GEMTEC should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of GEMTEC's report.

    During construction, GEMTEC should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of GEMTEC's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in GEMTEC's report. Adequate field review, observation and testing during construction are necessary for GEMTEC to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, GEMTEC's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

13. **Changed Conditions:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that GEMTEC be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that GEMTEC be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

14. **Drainage:** Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. GEMTEC takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

KEY PLAN
1 : 100,000



LEGEND

- **BH #** — BOREHOLE ID
- **XX.XX** — GROUND SURFACE ELEVATION, IN METRES GEODETIC DATUM
- BOREHOLE (CURRENT INVESTIGATION BY GEMTEC)

DATA SOURCES AND REFERENCES

1. Coordinate system: NAD83 (CSRS), UTM ZONE 18N
2. Distances, elevations, and coordinates are shown in metres unless denoted otherwise
3. This drawing is a schematic representation and should not be taken as a substitute for a legal survey.
4. Image @2025 Google Maps, CNES / Airbus, First Base Solutions, Maxar Technologies
5. Contains information licensed under the Open Government Licence – Ontario
6. Geographic dataset source: Ontario GeoHub

SCALE
1:500
0 10 20 30m

DRAWING
SITE PLAN

CLIENT
NOEL'S OTTAWA SNOW INC.

PROJECT
GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
4296 ANDERSON ROAD
OTTAWA, ONTARIO

DRAWN BY	CHECKED BY
SL	FZ
PROJECT NO. 100011.121	REVISION NO. 0
DATE SEPTEMBER 2025	FIGURE NO. **FIGURE 1**

GEMTEC
Consulting Engineers and Scientists
32 Steacie Drive
Ottawa, ON, K2K 2A9
Tel: (613) 836-1422
www.gemtec.ca
ottawa@gemtec.ca

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APPENDIX A

Record of Borehole Sheets
GEMTEC's Method of Soil Classification
List of Abbreviations and Symbols
Boreholes 25-01 to 25-07

RECORD OF BOREHOLE 25-01

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

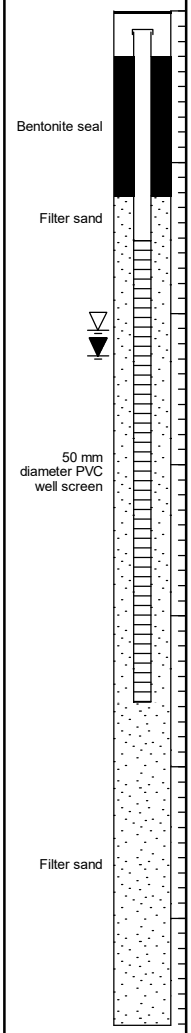
SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 18 2025

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
		Ground Surface		80.90				
0		FILL - (SM) silty sand; trace gravel, with organic matter; grey brown; non-cohesive, dry, very loose			1	SS	535	2
				80.14				
1		(SM) SILTY SAND; trace gravel; grey brown to brown; non-cohesive, dry to moist, very loose to loose		0.76	2	SS	455	3
					3	SS	560	5
2				78.61				
		(SM) SILTY SAND; trace gravel; grey; non-cohesive, wet, compact		2.29	4	SS	330	20
				78.08				
3	Direct Push	(CH) CLAY; trace sand; grey; cohesive, w>PL		2.82	5	SS	405	WH
4								
5					6	SS	560	WH
6					7	SS	560	WH
				74.19				
		End of Borehole		6.71				
7		Note: In-situ vane shear strength testing was attempted in the clay. See the report for details.						
8								
9								
10								

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING: M

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	2.11 ▽	78.8
25/08/08	2.28 ▼	78.6

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LOGGED: CD
CHECKED: FZ

RECORD OF BOREHOLE 25-02

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 4
DATUM: CGVD28
BORING DATE: Jun 16 2025

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Direct Push	Ground Surface		80.64						
		ASPHALTIC CONCRETE		0.03						
		FILL - (SM) silty sand and gravel; with pieces of asphalt; grey; non-cohesive, dry, dense			1	SS	255	43	M	
				79.73						
1		(SM) SAND and SILT; trace gravel, with organic matter; grey brown; non-cohesive, moist, loose		0.91	2	SS	305	4		
					3	SS	455	9	M	
2				78.51						
		(SM) SAND and SILT; trace gravel; grey; non-cohesive, wet, compact		2.13	4	SS	405	30		
3				77.44						
		(CH) CLAY; trace sand; grey; cohesive, w>PL		3.20	5	SS	610	WH		
4										
		- sand seam at 4.6 m depth								
5		- sand seam at 4.9 m depth			6	SS	610	WH		
6					7	SS	610	WH	MH	
7										
8					8	SS	610	WH		
9										
					9	SS	610	WH		
10				70.64						

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: NATURAL, REMOULDED
WATER CONTENT, %: W_P, W, W_L
10 20 30 40 50 60 70 80 90

Bentonite seal
Filter sand
50 mm diameter PVC well screen
Native backfill

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-02

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 2 OF 4
DATUM: CGVD28
BORING DATE: Jun 16 2025

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Direct Push	(CH) CLAY; trace sand; grey; cohesive, w>PL		10.00							
11					10	SS	610	WH			
12					11	SS	610	WH			
13											
14					12	SS	610	WH			
15				65.40 / 15.24							Native backfill
16	Direct Push										
17	Dynamic Cone Penetration										
18											
19											
20				60.64							

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL, ⊕ REMOULDED
WATER CONTENT, %: W_P, W, W_L
10 20 30 40 50 60 70 80 90

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-02

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 3 OF 4
DATUM: CGVD28
BORING DATE: Jun 16 2025

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, mm	SAMPLES: BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED); WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Direct Push Dynamic Cone Penetration			20.00					10 20 30 40 50 60 70 80 90		
21											
22											
23											
24											
25											Native backfill
26											
27											
28											
29											
30				50.64							

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

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LOGGED: CD
CHECKED: FZ

RECORD OF BOREHOLE 25-02

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 4 OF 4
DATUM: CGVD28
BORING DATE: Jun 16 2025

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30	Direct Push / Dynamic Cone Penetration			30.00							
				50.16							
		End of Borehole		30.48							
31		Note: In-situ vane shear strength testing was attempted in the clay. See the report for details.									
32											
33											
34											
35											
36											
37											
38											
39											
40											

10 20 30 40 50 60 70 80 90

Native backfill

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	1.89 ▽	78.7
25/08/08	3.00 ▼	77.6

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-03

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 18 2025

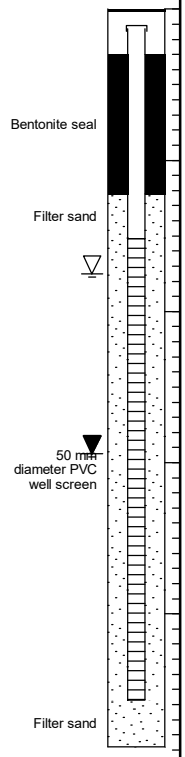
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
0	Direct Push	Ground Surface		80.51				
		ASPHALTIC CONCRETE		0.03				
		FILL - (SM) silty sand and gravel; with pieces of concrete; grey to grey brown; non-cohesive, dry			1	ST	635	
1					2	ST	510	
				78.99				
		(SM) SAND and SILT; trace gravel; grey brown; non-cohesive, moist to wet		1.52	3	ST	915	
2				78.07				
		(CH) CLAY; trace sand; grey; cohesive, w>PL		2.44	4	ST	610	
					5	ST	760	
3		- sand seam at 3.7 m depth						
					6	ST	760	
4					7	ST	305	
				75.63				
5		End of Borehole		4.88				
6								
7								
8								
9								
10								

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % — W_P W W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	1.75 ▽	78.8
25/08/08	2.94 ▼	77.6

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-04

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

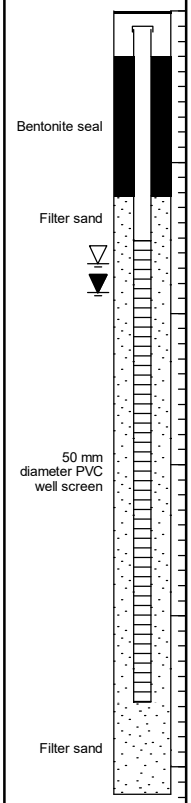
SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 17 2025

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
		Ground Surface		80.41				
0		FILL - (SM) silty sand and gravel; grey to grey brown; non-cohesive, dry, compact			1	SS	230	25
1					2	SS	75	10
				78.73				
		(SM) SILTY SAND; trace gravel; brown; non-cohesive, moist to wet, loose		1.68	3	SS	485	9
2				77.82				
	Direct Push	(CH) CLAY; trace sand; grey; cohesive, w>PL		2.59	4	SS	455	WH
3		- sand seam at 2.9 m depth			5	SS	610	WH
4					6	SS	610	WH
5				75.23				
		End of Borehole		5.18				
6		Note: In-situ vane shear strength testing was attempted in the clay. See the report for details.						
7								
8								
9								
10								

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: NATURAL, REMOULDED
WATER CONTENT, % (W_P, W, W_L)
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	1.67	78.7
25/08/08	1.86	78.6

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-05

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 18 2025

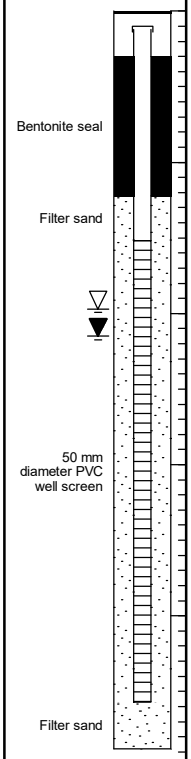
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
0		Ground Surface		80.68				
	Direct Push	FILL - (SM) silty sand and gravel; with pieces of plastic; grey; non-cohesive, dry			1	ST	330	
1				79.16				
		(SM) SAND and SILT; trace gravel; grey brown; non-cohesive, moist		1.52	2	ST	355	
2				78.70				
		(SM) SAND and SILT; trace gravel; grey; non-cohesive, wet		1.98	3	ST	455	
				78.09				
		(CH) CLAY; trace sand; grey; cohesive, w>PL		2.59	4	ST	455	
3		- sand seam at 3.1 m depth			5	ST	760	
4					6	ST	760	
					7	ST	305	
				75.80				
5		End of Borehole		4.88				
6								
7								
8								
9								
10								

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % — W_P W W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	1.97 ▽	78.7
25/08/08	2.15 ▼	78.5

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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-06

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 17 2025

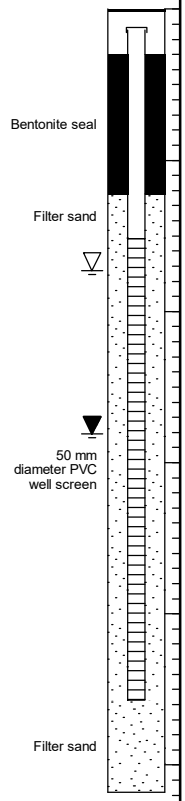
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
0		Ground Surface		80.49				
		ASPHALTIC CONCRETE		0.03				
		FILL - (SM) silty sand and gravel; with pieces of wood; grey; non-cohesive, dry, dense			1	SS	305	33
1				79.58				
		(SM) SAND and SILT; trace gravel; grey brown; non-cohesive, dry to wet, loose to compact		0.91	2	SS	230	6
2					3	SS	430	23
				78.05				
	Direct Push	(CH) CLAY; trace sand; grey; cohesive, w>PL		2.44	4	SS	560	WH
3								
4		- sand seam at 4.0 m depth			5	SS	560	WH
		- sand seam at 4.4 m depth						
5				75.31				
		End of Borehole		5.18				
6		Note: In-situ vane shear strength testing was attempted in the clay. See the report for details.						
7								
8								
9								
10								

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
25/06/26	1.73 ▽	78.8
25/08/08	2.81 ▼	77.7

GEMTEC
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LOGGED: CD
CHECKED: FZ

GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

RECORD OF BOREHOLE 25-07

CLIENT: Noel's Ottawa Snow Inc.
PROJECT: Geotechnical Investigation, 4296 Anderson Road, Ottawa, Ontario
JOB#: 100011.121
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jun 18 2025

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Direct Push	Ground Surface		80.64							
		ASPHALTIC CONCRETE		0.03							
		FILL - (SM) silty sand and gravel; grey to grey brown; non-cohesive, dry		80.03	1	ST	305				
1		(SM) SILTY SAND; trace gravel; grey brown; non-cohesive, dry to wet		0.61	2	ST	485				
2					3	ST	865				Native backfill
				78.05							
		(CH) CLAY; trace sand; grey; cohesive, w>PL		2.59	4	ST	455				
3		- sand seam at 3.0 m depth			5	ST	735				
4					6	ST	735				
					7	ST	305				Groundwater observed within open borehole at 2.4 m depth upon completion of borehole
				75.76							
5		End of Borehole		4.88							
6											
7											
8											
9											
10											

GEMTEC
Consulting Engineers and Scientists

LOGGED: CD
CHECKED: FZ

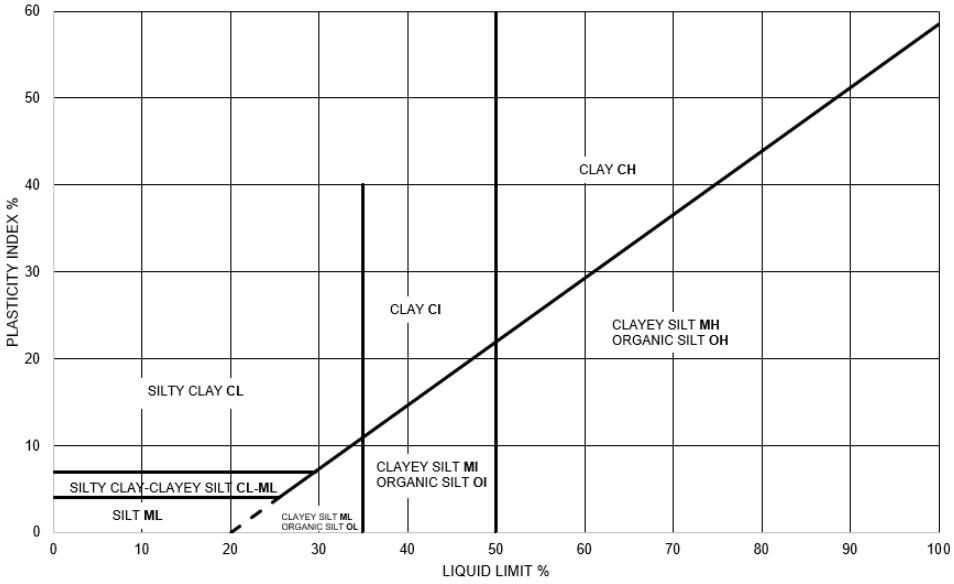
GEO - BOREHOLE LOG 100011.121_GINT_BOREHOLE LOGS.GPJ GEMTEC 2018.GDT 20/8/25

Method of Soil Classification

GEMTEC's Soil Classification is based on the MTC Soil Classification Manual (January 1980)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$	$Cc = \frac{(D_{30})^2}{D_{10} X D_{60}}$	USCS Group Symbol	Group Name
Inorganic (Organic Content less than 30%)	Coarse Grained Soils (>50% is larger than 0.075 mm)	Gravel (>50% of coarse fraction is > 4.75 mm)	Gravel with ≤12% fines	Poorly Graded	<4	≤1 or ≥3	GP	Gravel
				Well Graded	≥4	1 to 3	GW	Gravel
			Gravel with >12% fines	Below A Line	N/A		GM	Silty Gravel
				Above A Line	N/A		GC	Clayey Gravel
		Sand (≥50% coarse fraction is > 4.75 mm)	Sand with ≤12% fines	Poorly Graded	<6	≤1 or ≥3	SP	Sand
				Well Graded	≥6	1 to 3	SW	Sand
			Sand with >12% fines	Below A Line	N/A		SM	Silty Sand
				Above A Line	N/A		SC	Clayey Sand

Soil Group	Type of Soil	Liquid Limit	Field Tests			USCS Group Symbol	Group Name
			Dilatancy	Thread Diameter	Toughness		
Fine Grained Soils (≥50% is smaller than 0.075 mm)	Silts (Non-Plastic or PI and LL plot below A-Line)	<50	Rapid	>6 mm	N/A	ML	Silt
			Slow	3 to 6 mm	None to low	ML	Clayey Silt
			Slow to V. Slow	3 to 6 mm	Low	OL	Organic Silt
		≥50	Slow to V. Slow	3 to 6 mm	Low to Medium	MH	Clayey Silt
			None	1 to 3 mm	Medium to High	OH	Organic Silt
	Clays (PI and LL plot above A-Line)	Liquid Limit <35	None	~3 mm	Low to Medium	CL	Silty Clay
		Liquid Limit 35 to 50	None	1 to 3 mm	Medium	CI	Silty Clay
		Liquid Limit >50	None	<1 mm	High	CH	Clay
Highly Organic (> 30%)	Peat (Amorphous or Fibrous)					PT	Peat



Dual Symbol – Is used to indicate when soils are transitional. For coarse grained soils, it is used when the soil has between 5 and 12% fines (e.g., SP-SC, Sand to Silty Sand). For fine-grained soils it is used when the plasticity index and liquid limit values plot in the area shown in the plasticity chart on this page.

Borderline Symbol – Is used to indicate soils that are not clearly in one soil type but have similar behaviour and properties as similar materials (e.g., CL/CI or GM/SM).

ABBREVIATIONS AND TERMINOLOGY USED ON RECORDS OF BOREHOLES AND TEST PITS

SAMPLE TYPES	
AS	Auger sample
CA	Casing sample
CS	Chunk sample
BS	Borros piston sample
GS	Grab sample
MS	Manual sample
RC	Rock core
SS	Split spoon sampler
ST	Slotted tube
TO	Thin-walled open shelby tube
TP	Thin-walled piston shelby tube
WS	Wash sample

SOIL TESTS	
w	Water content
PL, w_p	Plastic limit
LL, w_L	Liquid limit
C	Consolidation (oedometer) test
D_R	Relative density
DS	Direct shear test
G_S	Specific gravity
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	Organic content test
UC	Unconfined compression test
γ	Unit weight

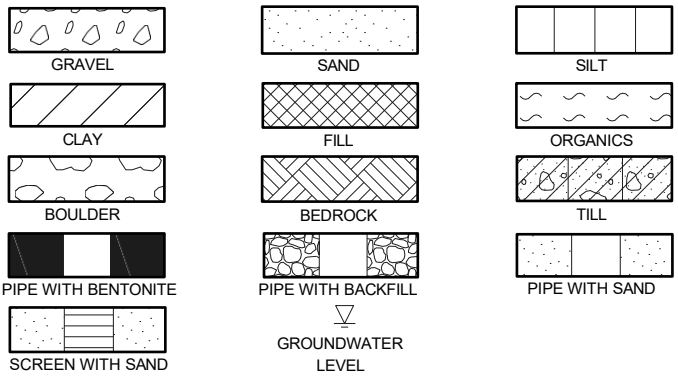
PENETRATION RESISTANCE

Standard Penetration Resistance, N
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 millimetres (30 in.) required to drive a 50 mm split spoon sampler for a distance of 300 mm (12 in.). For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

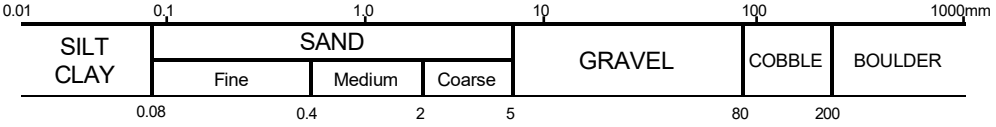
Dynamic Penetration Resistance
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive a 50 mm (2 in.) diameter 60° cone attached to 'A' size drill rods for a distance of 300 mm (12 in.).

WH	Sampler advanced by static weight of hammer and drill rods
WR	Sampler advanced by static weight of drill rods
PH	Sampler advanced by hydraulic pressure from drill rig
PM	Sampler advanced by manual pressure

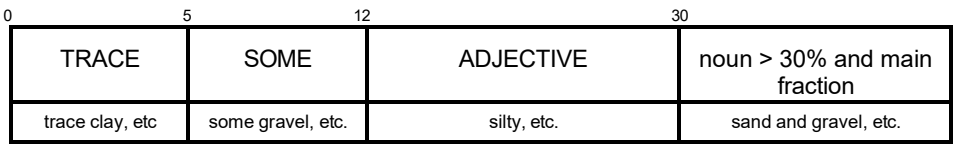
COHESIONLESS SOIL Compactness		COHESIVE SOIL Consistency	
SPT N-Values	**Description**	**Cu, kPa**	**Description**
0-4	Very Loose	0-12	Very Soft
4-10	Loose	12-25	Soft
10-30	Compact	25-50	Firm
30-50	Dense	50-100	Stiff
>50	Very Dense	100-200	Very Stiff
		>200	Hard



GRAIN SIZE



DESCRIPTIVE TERMINOLOGY



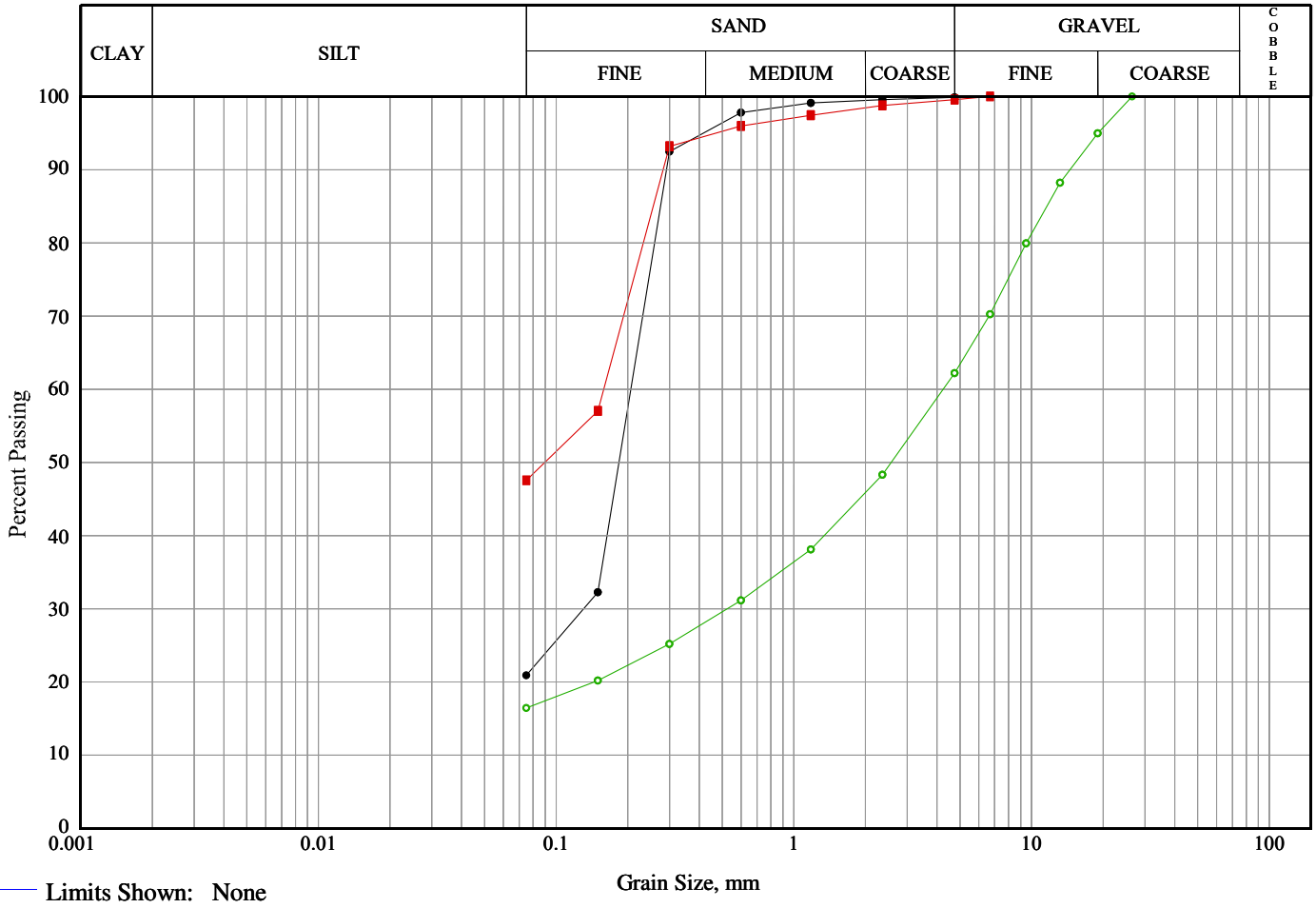
APPENDIX B

Laboratory Test Results

GEMTEC
Consulting Engineers and Scientists

Client: Novatech
Project: Novatech - 4296 Anderson Road, Ottawa
Project #: 100011121

Soils Grading Chart



Limits Shown: None

Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay
●—●	SILTY SAND	25-01	3	1.52-2.13	0.1	79.0	20.9	
■—■	SILTY SAND	25-02	3	1.68-2.29	0.4	52.0	47.5	
○—○	FILL MATERIAL	25-02	1	0.15-0.76	37.8	45.8	16.4	

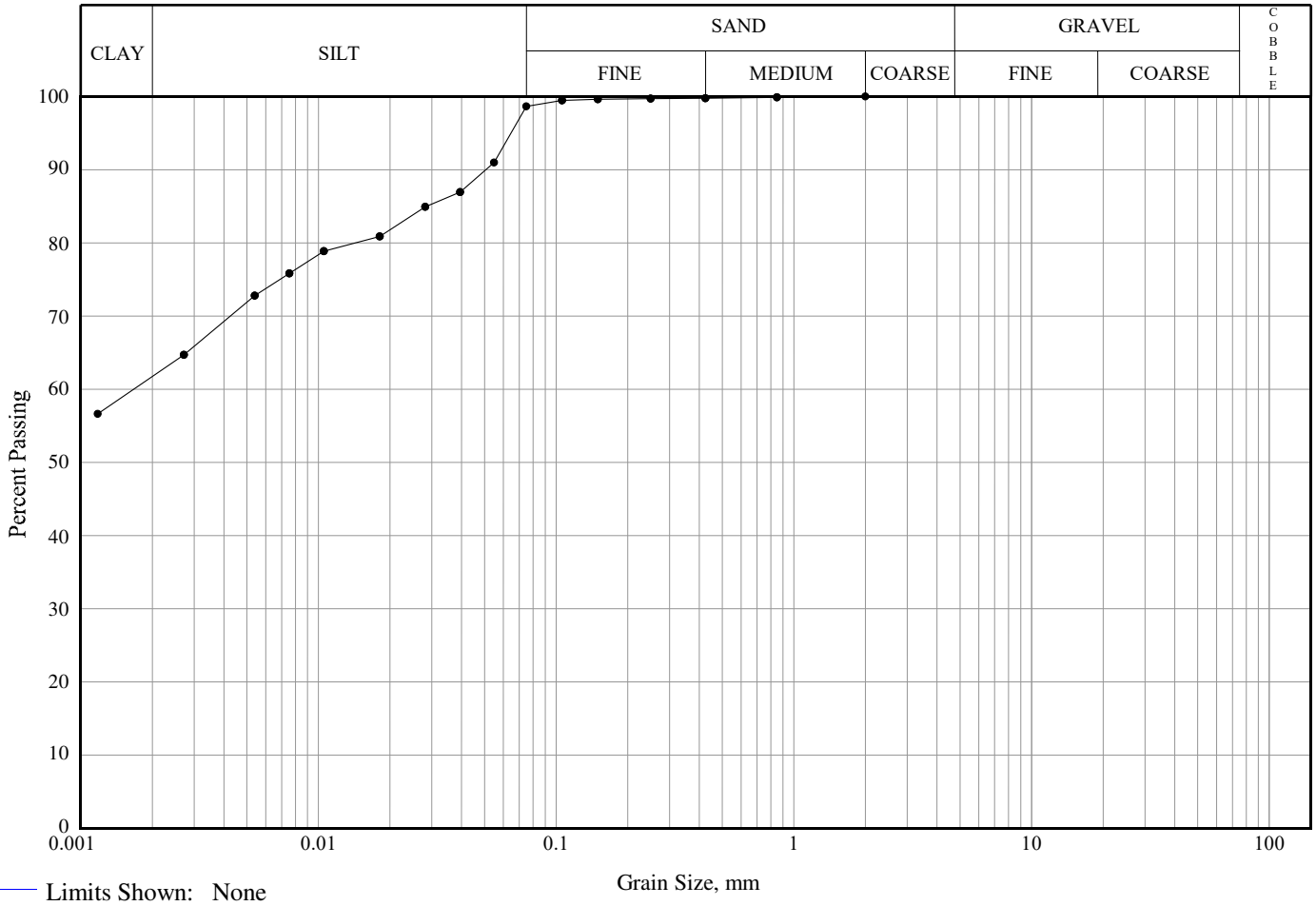
Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
●—●		N/A	---	---	0.13	0.18	0.21	0.28	---
■—■		N/A	---	---	---	0.09	0.16	0.26	---
○—○		N/A	---	---	0.53	2.57	4.25	11.62	---

Note: More information available upon request

GEMTEC
Consulting Engineers and Scientists

Client:	Novatech
Project:	Novatech - 4296 Anderson Road, Ottawa
Project #:	100011121

Soils Grading Chart (LS-702/ ASTM D-422)



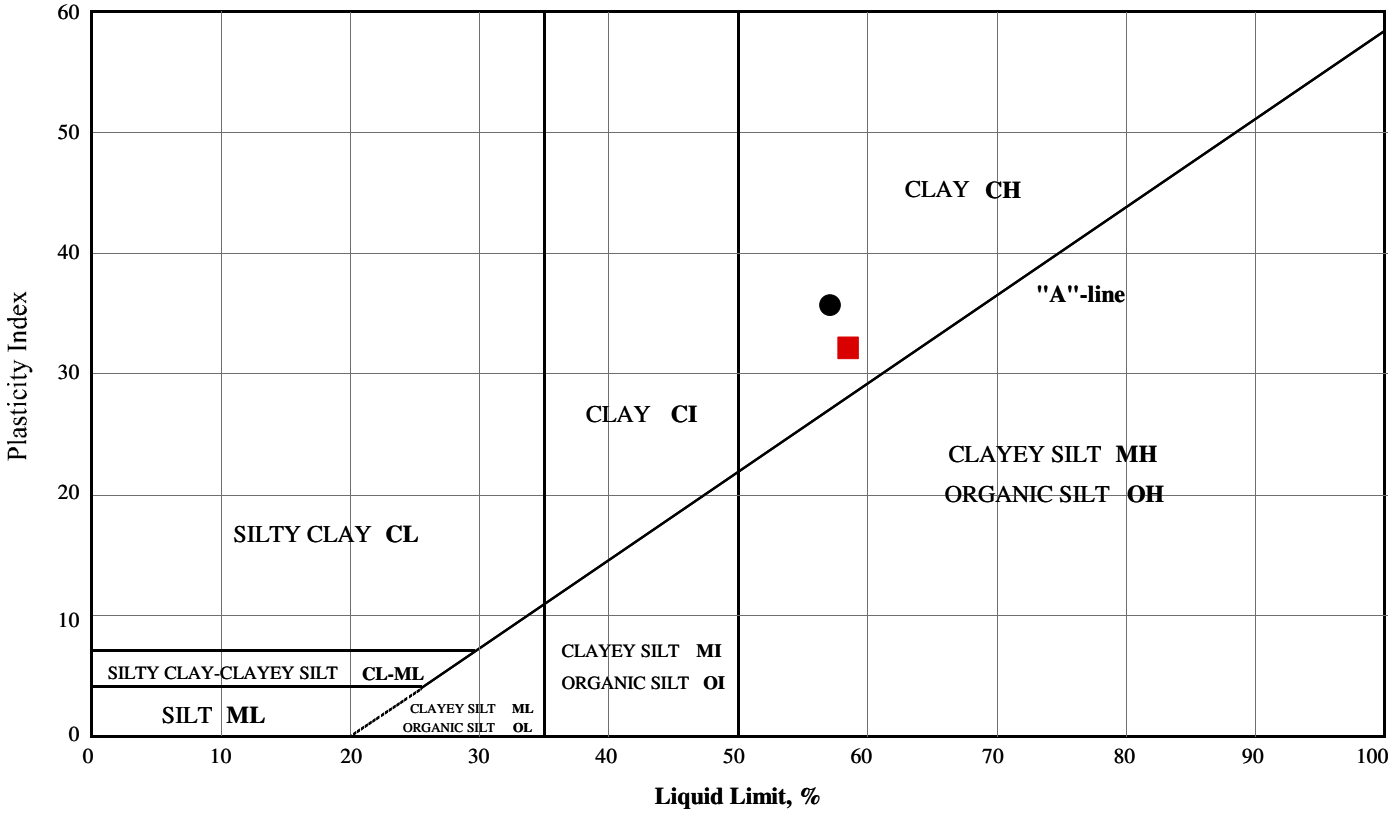
Limits Shown: None

Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay
—●—	CLAY	25-02	7	6.25-6.86	0.0	1.4	36.9	61.7

Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
—●—		N/A	---	---	---	---	0.00	0.03	36.9

Note: More information available upon request

GEMTEC Consulting Engineers and Scientists Ottawa, ON	Client: Novatech	Plasticity Chart (LS-7034/ASTM D4318)
	Project: Novatech - 4296 Anderson Road, Ottawa	
	Project #: 100011121	



Symbol	Borehole /Test Pit	Sample Number	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Non-Plastic	Moisture Content, %
●	25-01	6	4.72-5.33	57.1	21.4	36	N/A	56.7
■	25-02	10	10.82-11.43	58.5	26.4	32	N/A	80.0

Note: More information available upon request

APPENDIX C

Chemical Analysis of Soil Sample
Sample Relating to Corrosion
(Paracel Laboratories Ltd. Order No. 2526163)

Certificate of Analysis

Report Date: 27-Jun-2025

Client: **GEMTEC Consulting Engineers and Scientists Limited**

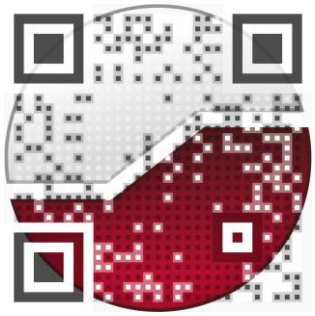
Order Date: 24-Jun-2025

Client PO:

Project Description: 100011.121

	Client ID:	BH 25-02 SA4	-	-	-		
	Sample Date:	16-Jun-25 10:00	-	-	-	-	-
	Sample ID:	2526163-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	83.9	-	-	-	-	-
General Inorganics							
Conductivity	5 uS/cm	1110	-	-	-	-	-
pH	0.05 pH Units	8.04	-	-	-	-	-
Resistivity	0.10 Ohm.m	8.98	-	-	-	-	-
Anions							
Chloride	5 ug/g	677	-	-	-	-	-
Sulphate	5 ug/g	113	-	-	-	-	-

experience • knowledge • integrity



civil	civil
geotechnical	géotechnique
environmental	environnementale
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

expérience • connaissance • intégrité