

Geotechnical Investigation

Proposed Addition to Notre Dame Catholic School

140 Atlantis Drive, Orillia, ON

Submitted to:
Simcoe Muskoka Catholic District School Board
46 Alliance Boulevard
Barrie, ON L4M 5K3

Submitted by:
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GW/AW:tw

Certification

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Record of Revisions

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First Submission	Sept 30, 2025, (Original Report)	Draft Report
Second Submission	November 21, 2025, (Final Report)	Final Report

Acronyms and Abbreviations

%	Percent (per 100 units)
ASTM	American Society for Testing and Materials
Elev.	Elevation
EASR	Environmental Activity and Sector Registry
ERO	Environmental Registry of Ontario
GEI	GEI Consultants Canada Ltd.
GPS	Global Positioning System
kg	Kilogram
kPa	Kilopascal
L	Litres
m	Metres
m^2	Square metres
MECP	Ministry of the Environment, Conservation and Parks
mm	Millimetres
MRD	Maximum Relative Density
N/A	Not applicable
N values	Standard Penetration resistance “N” values
NAD 83	North American Datum 1983
OD	Outside Diameter
O.Reg.	Ontario Regulation
OBC	Ontario Building Code
OHSA	Occupational Health and Safety Act
OPSD	Ontario Provincial Standard Drawings
OPSS.MUNI	Ontario Provincial Standard Specifications (Municipal)
PG	Performance Grade (asphalt binder)
PVC	Polyvinyl Chloride
PTTW	Permit to Take Water
SPmdd	Standard Proctor maximum dry density
SLS	Serviceability Limit State
SPT	Standard Penetration Test
SS	Split Spoon
Su	Undrained shear strength
ULS	Ultimate Limit State
Vs30	Time-averaged shear-wave velocity in top 30 m

It is noted that all elevations in this report are metric and expressed in metres (m). All measurements are also in metric and expressed in millimetres (mm), metres (m) or kilometers (km), unless otherwise specified.

1. Introduction

GEI was retained by the Simcoe Muskoka Catholic District School Board (SMCDSB) to complete a geotechnical investigation and report for the proposed addition to Notre Dame Catholic School located at 140 Atlantis Drive, Orillia, Ontario. A site location plan is enclosed as Figure 1.

The proposed single storey addition will match the existing ground floor slab elevation, will have a rectangular shape, and will be about 800 m^2 in size. The addition is located at the north end of the existing school. The following is also proposed as part of the work:

- A reconfigured paved play area will surround the addition, to the north and west.
- Some of the underground utilities currently in the addition footprint will be re-routed around the addition.
- An expanded “kiss and ride” lane is proposed along the north edge of the north entrance with an accompanying concrete sidewalk area paralleling the lane.
- A garbage enclosure will be constructed at the end of the concrete sidewalk adjacent to the “kiss and ride” lane.
- Three additional parking spaces are proposed to the east of the addition just off the main parking lot and six additional parking spaces are proposed to the south of the new reconfigured bus lanes.
- A new outdoor classroom area will be established to the northwest of the addition.
- The paved access for the buses will be reconfigured to allow for a second access lane and accompanying concrete sidewalk.

An aerial photograph of the existing site is shown in Figure 2A and a site plan for the proposed works is shown in Figure 2B.

The purpose of the geotechnical investigation was to assess the subsurface soil conditions at the site in the proposed addition area, new outdoor classroom area and reconfigured pavement areas, and based on this information, provide geotechnical engineering recommendations in support of the proposed addition, other structure areas and reconfigured pavement areas. This report summarizes the borehole findings, provides geotechnical engineering recommendations regarding engineered fill, available bearing capacities for building addition foundations and other structures, slabs-on-grade, underground utility relocation and pavement design. Considerations for constructability such as soil excavation, compaction, on-site backfill suitability and temporary groundwater control are also provided.

Excess Soil Management and Hydrogeological reports were also part of the scope of work. These reports are provided under separate covers and must be read in conjunction with this geotechnical report for context.

2. Procedures and Methodology

Prior to the commencement of drilling activities, the borehole locations were staked in the field by GEI. Ground surface elevations of the boreholes and horizontal coordinates (referencing NAD 83 geodetic datum) were surveyed by GEI with a Topcon FC – 5000 GPS Survey unit.

Underground utilities including natural gas, electrical, telephone, water, etc. were marked out by public and private utility locating companies, prior to the boreholes.

The fieldwork for the drilling program was carried out between July 28 and August 5, 2025, and described below. Borehole logs are provided in Appendix A and the borehole locations are shown on Figures 2A and 2B:

- Boreholes 1 to 12 were advanced to 9.8 m depth below existing grade (Elev. 273.6 to 274.2), locally 7.5 m depth (Elev. 276.2) in Borehole 11 due to refusal to auger, all in the proposed addition area.
- Boreholes 13 and 16 were drilled to 6.7 m depth (Elev. 276.6 to 277.0) in the proposed reconfigured play area pavement surrounding the addition.
- Boreholes 14 and 15 were drilled to 6.7 m depth (Elev. 276.1 to 277.4) in the proposed new outdoor classroom area.
- Borehole 17 was drilled to 6.6 m depth (Elev. 277.1) in the garbage enclosure area/end of the “kiss and ride” lane/concrete sidewalk area.
- Boreholes 18, 19 and 20 were drilled to 6.7 m depth (Elev. 276.5 to 276.6) in the “kiss and ride” lane/sidewalk area;
- Boreholes 21 to 26 were drilled to 6.7 m depth (Elev. 276.8 to 277.4) in the reconfigured bus pavement access area and new parking spaces at the front of the school.

The boreholes were advanced by a drilling subcontractor retained and supervised by GEI using a rubber tire mounted drill rig, solid stem augers, and standard soil sampling equipment. Sampling was conducted using a 51 mm OD SS sampler. N values were recorded for the sampled intervals as the number of blows required to drive an SS sampler 305 mm into the soil using a 63.5 kg drop hammer falling 750 mm, in accordance with ASTM D1586. In each borehole soil sampling was conducted at 0.75 m intervals to 3.0 m depth then at 1.5 m intervals thereafter.

Monitoring wells were installed in three (3) boreholes (Boreholes 9, 16 and 17) by GEI to facilitate long-term groundwater monitoring, each consisting of 50 mm diameter PVC pipe with a 3.0 m long screen and protective casing. Monitoring well construction is shown on the borehole logs in Appendix A. Boreholes without wells were backfilled in accordance with O.Reg. 903, and patched with cold mix asphalt as required.

The GEI field staff examined, and classified characteristics of the soils encountered in the boreholes, including the presence of fill materials, groundwater observations during and upon completion of the drilling, recorded observations of borehole construction, and processed the recovered samples. All recovered soil samples were logged in the field, carefully packaged, and transported to GEI’s laboratory for more detailed examination and classification.

In addition to the borehole drilling, on August 14, 2025, Test Pits 1 and 2 were advanced to 2.2 to 2.3 m depth (Elev. 281.6 to 281.5) adjacent to the existing building to examine the existing footing characteristics where the addition will be located. In the test pits, the footing dimensions and stratigraphic profile were documented, and soil descriptions were based on visual and tactile methods. Inferred consistency or relative density of the soil strata was determined based on tactile probing of the material. The exposed conditions in the test pits were also assessed visually. The test pits were backfilled upon completion and covered with cold patch asphalt, as required. Test pit logs are provided in Appendix A.

In GEI's laboratory, the samples were classified as to their visual and textural characteristics. All samples were submitted for moisture content determination in accordance with ASTM D2216. Five (5) representative samples of the subgrade soils were selected and submitted to our laboratory for grain size analysis. Grain size results are provided in Figures B1 and B2 in Appendix B.

3. Subsurface Conditions

3.1. General Overview

The detailed soil profiles encountered in the boreholes are indicated on the attached borehole logs in Appendix A, and the geotechnical laboratory results are included in Appendix B. The borehole locations are shown on Figures 2A and 2B.

It should be noted that the conditions indicated on the borehole logs are for specific locations only and can vary between and beyond the locations. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. When excavation extends laterally beyond the available boreholes, the contractor shall assume that the existing soil characterization/fill/disturbed soil depth is similar to the closest relevant borehole(s).

In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including visual observations of the soil samples retrieved, measurements prior to and after drilling, the drilling process itself (speed of drilling, shaking/grinding of the augers, etc.) and the results of the laboratory testing. The passage of time also may result in changes in conditions interpreted to exist at locations where sampling was conducted.

3.2. Stratigraphy

3.2.1. Topsoil

A topsoil layer was present at the surface of most boreholes, in landscaped areas around the paved areas. The topsoil layer was 40 to 180 mm thick at the borehole locations.

3.2.2. Pavement

Some of the boreholes were advanced through the existing playfield pavement and parking areas. The following asphalt and granular thickness were recorded.

Borehole	Asphalt Thickness (mm)	Granular Thickness (mm)	Total Thickness (mm)
1	50	700	750
5	100	510	610
6	100	660	760
11	100	-	100
21	115	455	670
22	125	305	430

3.2.3. Fill

Below the pavement and topsoil, fill was revealed in all boreholes advanced on site and extended to 0.8 to 2.3 m depth (Elev. 181.0 to 182.9). The fill soil was comprised of silty sand to sand, typically with trace

gravel. Trace organics were noted in some samples. The material was moist with moisture contents of 2 to 16%, typically less than 10%. N values in the fill soil ranged from 2 to 83, showing the material was very loose to very dense, typically loose to compact.

3.2.4. Silty Sand & Sand

A discontinuous native silty sand deposit was below the fill in Borehole 5 to 3.0 m depth (Elev. 280.7) and in Borehole 19 to 2.3 m depth (Elev. 281.1). The local layer had trace gravel. The material was moist, and moisture contents were 6 to 9%. The soil was compact in Borehole 19 with N values of 20 and 26 and dense to very dense in Borehole 5 with N values of 32 and 84.

A local basal silty sand was also noted in Borehole 9 below the other soil layers from 9.1 to the 9.8 m depth of the borehole (Elev. 274.2 to 274.8). One (1) sample was submitted to our laboratory for grain size analysis, and the results are provided on Figure B1 in Appendix B. The soil was very dense and the N value was greater than 100. The moisture content was 13% (wet).

Distinct local sand layers interrupted the till from 4.6 to 6.1 m depth (Elev. 277.5 to 279.0) in Boreholes 2 and 3. The layers had some silt and trace gravel. The soil was very dense with N values greater than 50. The sand layers were moist to very moist with moisture contents of 6 to 11%.

3.2.5. Glacial Till

A major glacial till deposit was revealed in all boreholes below the topsoil/pavement and fill, locally the silty sand, and continued to the 6.7 to 9.8 m depth of the boreholes (Elev. 273.6 to 277.4), locally being penetrated at 9.1 m depth (Elev. 274.8) in Borehole 9. The till matrix consisted of silty sand, with some clay and trace gravel. Cobbles and boulders were noted based on augers grinding during drilling. Four (4) samples of the soil were submitted to our laboratory for grain size analysis, and the results are provided on Figure B2 in Appendix B. The native soil was compact to very dense, typically dense to very dense and N values ranged from 15 to greater than 100. The till material was moist, and moisture contents were typically less than 10%.

3.3. Groundwater

Unstabilized groundwater level measurements and cave measurements were taken upon the completion of drilling of each borehole as shown on the borehole logs in Appendix A. These measurements were taken to provide a rough estimate of the possible excavation and temporary groundwater control constructability considerations that may arise. Three (3) boreholes were outfitted with a monitoring well with 50 mm diameter pipe and 3.0 m long screen. Monitoring well configuration and groundwater observations are noted on the borehole logs in Appendix A and summarized in the table below.

Borehole	Depth of Cave / Elev.	Unstabilized Groundwater Level Depth / Elev.	Depth / Elev. of Groundwater Table, Aug 14, 2025
1	No Water	Dry	N/A
2	No Water	Dry	N/A
3	No Water	Dry	N/A
4	No Water	Dry	N/A
6	No Water	Dry	N/A
7	No Water	Dry	N/A
9	No Water	Dry	Dry
10	No Water	Dry	N/A
11	No Water	Dry	N/A
12	No Water	Dry	N/A
13	No Water	Dry	N/A
14	No Water	Dry	N/A
15	5.5/277.3	5.2/277.6	N/A
16	No Water	Dry	Dry
17	No Water	Dry	Dry
18	No Water	Dry	N/A
19	No Water	Dry	N/A
20	No Water	Dry	N/A
21	No Water	Dry	N/A
23	No Water	Dry	N/A
24	No Water	Dry	N/A
25	No Water	Dry	N/A
26	No Water	Dry	N/A

Note - N/A indicates that no monitoring well was installed.

Groundwater was not encountered during drilling or upon completion, except in Borehole 15 at 5.2 m depth (Elev. 277.6). Upon returning to the site in August 2024 to measure the stabilized groundwater levels, all the wells were dry.

GEI is currently conducting a monthly groundwater level program and results will be provided when complete.

The fill, local silty sand and sand layers are permeable and allow the free flow of water when saturated. The till is semi permeable and will allow for some free flow of water when wet.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions.

3.4. Test Pits

Test Pit 1 was located at the southeast corner of the addition. Below the 100 mm of topsoil, sand fill was encountered to 1.4 m depth (Elev. 282.5). An 800 mm thick layer of clearstone was revealed below the fill to Elev. 281.7. A drainage pipe was noted at 1.6 m depth (Elev. 282.3) within the clearstone layer. Compact glacial till was below the clearstone to 2.3 m depth (Elev. 281.6). The test pit was dry upon completion.

Test Pit 2 was located along the north edge of the existing building/south edge of the addition. Below the play area pavement (100 m of asphalt over 200 mm of granular), sand fill was encountered to 1.3 m depth (Elev. 282.4). Clearstone was revealed below the fill to Elev. 281.7 (700 mm thick). A drainage pipe was noted at 1.5 m depth (Elev. 282.2) within the clearstone layer. Compact glacial till was below the clearstone to 2.2 m depth (Elev. 281.5). The test pit was dry upon completion.

The existing footing dimensions revealed in the test pits are summarized below. Test pit photographs are provided in Appendix C.

Test Pit	Footing Thickness (mm)	Footing Projection (mm)	Depth / Elev. of bottom of footing
1	150	270	2.2 / 281.7
2	180	100	2.0 / 281.7

4. Engineering Design Parameters & Analysis

The proposed single storey addition will match the existing ground floor slab elevation, will have a rectangular shape, and will be about 800 m^2 in size. The addition is located at the north end of the existing school. The following is also proposed as part of the work:

- A reconfigured paved play area will surround the addition, to the north and west.
- Some of the underground utilities currently in the addition footprint will be re-routed around the addition.
- An expanded “kiss and ride” lane is proposed along the north edge of the north entrance with an accompanying concrete sidewalk area paralleling the lane.
- A garbage enclosure will be constructed at the end of the concrete sidewalk adjacent to the “kiss and ride” lane.
- Three additional parking spaces are proposed to the east of the addition just off the main parking lot and six additional parking spaces are proposed to the south of the new reconfigured bus lanes.
- A new outdoor classroom area will be established to the northwest of the addition.
- The paved access for the buses will be reconfigured to allow for a second access lane and accompanying concrete sidewalk.

An aerial photograph of the existing site is shown in Figure 2A and a site plan for the proposed works is shown in Figure 2B.

4.1. Site Grading and Engineered Fill

The ground floor slab of the addition will match the existing building floor slab, with foundations for the addition set a minimum of 1.2 m below the proposed grade. The site grades are not expected to change much except for minor regrading of the final site grade to accommodate the addition and pavement revisions.

The existing pavement/topsoil, and fill are not suitable to support building foundations and slabs. The full depth of existing pavement/topsoil and fill soil will need to be removed down to competent native soil under the building addition footprint (slab and foundations) and grades raised with engineered fill to the design grades. In addition, where services currently are within the addition footprint and are programmed to be re-routed, the backfill within the existing service trenches will need to be excavated vertically and laterally to competent native soil and replaced with engineered fill.

The depths of sub-excavation for removal of existing pavement/topsoil fill/ disturbed soil and loose native soil, based on the boreholes in the building addition area (Boreholes 1 to 12), are below.

Borehole	Depth / Elev.	Borehole	Depth / Elev.
1	2.3 / 281.5	2	2.3 / 281.3
3	2.3 / 281.3	4	2.3 / 281.0
5	1.5 / 282.2	6	1.5 / 282.1
7	1.5 / 182.2	8	1.5 / 282.0
9	1.5 / 282.5	10	0.8 / 283.2
11	1.5 / 282.1	12	1.5 / 282.1

The existing pavement/topsoil, fill or soil containing organics are also not suitable to support other structures that require a bearing capacity such as retaining walls, garbage enclosures, sheds and exterior slabs etc., This report may not have the details of these structures, however it is intended for these structures requiring bearing capacity to have unsuitable soils removed down to competent native soil and engineered fill placed under these structures (constructed as described in this section) to provide the required support.

Underpinning is not considered necessary and that it is unlikely that significant excavation immediately adjacent to the foundations to get to competent subgrade will be required that could undermine the existing foundations. As the test pits only show conditions in an isolated area, once construction proceeds, the Inspection and Testing Consultant should review the subsurface conditions along the entire edge of the existing school building once exposed.

In proposed pavement and concrete sidewalk areas only removal of the existing pavement / topsoil and any fill/other soil with excessive organic material (more than trace amounts) will be required, prior to raising grades to the required levels with engineered fill, if required.

For purposes of this report, “engineered fill” is soil that will support foundations (any structures that require a bearing capacity) and floor slabs, sidewalks, garbage enclosures, retaining walls, sheds and exterior slabs and pavement and which is placed and compacted in a specified and controlled manner under full-time supervision of geotechnical engineering staff.

Key considerations for the site grading/engineered fill process for the site are detailed below:

1. Excavate and remove existing pavement/topsoil, fill soil and other deleterious soil as follows:
    a. Building Addition and Other Structures: Excavate the full depth of existing topsoil/pavement, fill soil, and any loose native soil, down to competent native soil as shown on the borehole logs and table above.
    b. Pavement & Concrete Sidewalk Areas and Grassed Playing Field Areas: Excavate topsoil/pavement and other soil mixed with excessive organics (more than trace/negligible amounts) down to inorganic soil.
2. The exposed subgrade surface (whether native soil for the building addition and/or structures or inorganic fill in the other areas) shall be proofrolled and reviewed by the Inspection and Testing Consultant prior to placement of engineered fill to ensure 100% SPmdd is achieved in building

addition and structure areas and 95% SPmdd is achieved in pavement areas, sidewalk areas and for site servicing. If additional excavation is required to achieve suitable subgrade soil (beyond the depths provided in the table noted above – such as existing service trenches), the contractor will record the depths of excavation, which will be verified on site by the Inspection and Testing Consultant the same day to resolve any discrepancies.

3. Engineered fill material must be placed in maximum 200 mm thick loose lifts, within 2% of optimum moisture content, and under the full-time inspection of the Inspection and Testing Consultant to ensure compaction specifications are achieved. The excavated inorganic site soil is not considered suitable for reuse as engineered fill in building areas. For this project considering the small amount of engineered fill anticipated in pavement areas, inorganics site soil can be reused in pavement areas, provided it is moisture conditioned to with 2% of optimum moisture content, does not contain organics / deleterious materials, and is approved by the Inspection and Testing Consultant. The following details the recommendations for various areas of the proposed works:

    a. Buildings: Engineered fill within the proposed building footprint below foundations and floor slabs-on-grade must be compacted to a minimum 100% SPmdd and consist of Granular B Type I (OPSS.MUNI 1010).

    b. Pavement & Concrete Sidewalk Areas: Engineered fill below pavement and concrete sidewalks must be compacted to a minimum 95% SPmdd and consist of inorganic site soil or imported SSM (OPSS.MUNI 1010).

4. Depending on the prevailing weather conditions and construction staging, consideration for the following shall be accounted for:

    a. It may be necessary to conduct the sub-excavation, subgrade approval and the initial lift of engineered fill in small manageable sections that can be completed in one day such that approved subgrade is not allowed to deteriorate from weathering or construction traffic, requiring further excavation at a later time.

    b. The exposed competent subgrade surface might be wet due to perched water in localized areas, though considered unlikely at this site. In this scenario, the first lift of engineered fill shall comprise a 400 mm thick layer of OPSS.MUNI 1010 Granular B Type II. Subject to review of the Testing and Inspection Company.

5. The engineered fill for the building must extend a minimum of 1 m beyond the outside edge of the foundations supporting the building then outwards and downwards at a 1 horizontal to 1 vertical slope (1H:1V) to the exposed competent native subgrade. A typical detail for engineered fill pad dimensioning is included in Appendix D.

6. Engineered fill must be placed under the full-time supervision of the Inspection and Testing Consultant as required in the Ontario Building Code.

4.2. Foundation Design

Based on the grading discussion above and the existing fill thickness, all building addition footings will be supported predominately if not entirely on engineered fill, with some local area possibly supported by native soil.

For the building addition and/or other structures set on either engineered fill or native soil, the spread or strip footings can be uniformly designed for a geotechnical reaction at SLS of 150 kPa (for 25 mm or less of total settlement and differential settlement not exceeding 75% of this value) and a factored geotechnical resistance at ULS of 225 kPa.

For cast-in-place concrete footings bearing on the dense sand encountered at this site, a coefficient of sliding friction, $\mu = 0.55$ is appropriate for serviceability-level checks. At the ultimate limit state, apply a geotechnical resistance factor, $\phi_s = 0.8$ to sliding-friction resistance developed at a soil–concrete interface. The factored sliding capacity is therefore calculated from:

$$R_d = \varphi_s \mu N_v$$

where, R_d = factored sliding resistance (kN)

ϕ_s = 0.8 (resistance factor for sliding on soil)

μ = 0.55 (soil–concrete friction coefficient)

N_v = factored vertical load acting on the footing (kN)

All footings exposed to freezing weather must be provided with a minimum of 1.2 m of earth cover or equivalent insulation for frost protection (25 mm of polystyrene insulation is equivalent to 300 mm of soil cover). The minimum strip and spread footing widths to be used shall be dictated as stated in the Ontario Building Code, regardless of loading considerations. Footings stepped from one level to another must be at a slope not exceeding 7V:10H.

The foundation subgrade must be reviewed by the Inspection and Testing Consultant prior to concrete placement to ensure the foundation design parameters provided are applicable, and to provide remedial recommendations if necessary. If the foundation excavation will be open for a prolonged period of time, the foundation subgrade shall be protected with a skim coat of lean mix concrete (applied immediately after inspection by the geotechnical engineer), to ensure that no deterioration will occur due to weather effects.

Vibrations from standard construction activities such as excavation, forming and concrete placement are generally low and are not expected to produce PPV levels that exceed commonly accepted limits for existing foundations. To reduce the potential for vibration-related issues, any compaction of engineered fill within about 5 m of the existing foundations should be carried out using smaller equipment (for example, diesel plate tampers) to limit vibration transmission to the structure.

4.2.1. Seismic

The 2024 Building Code items pertaining to the seismic site classification are listed below:

- As per Clause 4.1.8.4.(2) in the OBC, the site designation shall be calculated from in situ measurements of shear wave velocity as X_V (except for the exceptions as listed in Table 4.1.8.4.-A) where V is the value of the average shear wave velocity V_{s30}.
- Where V_{s30} calculated from in situ shear wave velocity measurements is not available, the site designation shall be X_S, where S is the Site Class determined using the energy-corrected average standard penetration resistance, N_{60}, or the average undrained shear strength, S_u, in accordance with Table 4.1.8.4.-B, N_{60} and S_u being calculated based on rational analysis.

These Site Classes are based on the upper 30 m of soil underlying the grade beams or foundations of the proposed structure. As the boreholes and testing at this site were advanced as deep as 9 m at the site, a Multi-Channel Analysis of Surface Waves (MASW) testing was completed at the site, which is a non-invasive geophysical technique commonly used to evaluate subsurface shear wave velocity profiles for seismic site classification purposes to 30 m depth. The results of this testing are provided in Appendix E. As such, Clause 4.1.8.4.(2) was used to determine the site classification, and the site designation for structural design is X_{593}.

4.3. Floor Slabs

Engineered fill constructed as described in Section 4.1 is suitable to support the school floor slabs or other structure slabs.

A modulus of subgrade reaction of 45,000 kPa/m can be used for the design of the addition slab on the Granular B engineered fill.

Prior to granular placement, the subgrade must be inspected and approved by the geotechnical engineer at the time of the floor slab construction as the construction activity may have weakened/disturbed the engineered fill. If any loose or weak subgrade areas are identified, or if there are areas containing excessive amounts of deleterious material, they must be locally sub-excavated and backfilled with OPSS.MUNI 1010 Granular B Type I and compacted to a minimum of 100% SPmdd.

All building floor slabs must be provided with a capillary moisture barrier and drainage layer. This is made by placing the concrete slab on a minimum 200 mm layer of 19 mm clear stone (OPSS.MUNI 1004) compacted by vibration to a dense state. Alternatively, OPSS.MUNI 1010 Granular A compacted to 100% SPmdd can be utilized. As a minimum polyethylene sheeting should be installed to provide a vapour transmission barrier, however, the building designer may specify a proprietary system.

For the proposed slab-on-grade structure (with no basement levels), under-slab drainage at the foundation level is not necessarily required where the slab is 200 mm above prevailing grade. However, since existing footing perimeter drains are present, it is recommended that the subdrains be continued around the addition. The prevailing grade of the site and the surrounding surfaces shall be sloped away from the building addition to promote surface water run-off and to reduce groundwater infiltration adjacent to foundations

4.4. Site Servicing

Inverts for relocated underground utilities are noted to be about 3.0 to 4.0 m below existing grade based on the Nov 14, 2025 grading plans provided for GEI review.

4.4.1. Pipe Bedding

The type of material and depth of granular bedding below the pipe will, to some extent, depend on the method of construction used by the contractor. Pipe bedding for flexible pipes shall follow the requirements in OPSD 802.010 or applicable municipal standards. Pipe bedding for rigid pipes shall follow the requirements in OPSD 802.030 to 802.032 or applicable municipal standards.

A subgrade consisting of the native soil or engineered fill will provide adequate support for pipes with the bedding requirements as laid out in the above referenced OPS drawings. Where disturbance of the trench base has occurred from groundwater seepage or construction traffic, the material shall be sub-excavated and replaced with suitably compacted granular fill.

Regardless of whether flexible or rigid pipes are implemented, granular bedding and cover material shall consist of a well graded, free draining material, such as Granular “A” (OPSS.MUNI 1010). All granular bedding must be compacted to a minimum of 95% SPmdd. Clear stone or other open graded stone products a not recommended for use as pipe embedment.

4.4.2. Backfill

The soil used as backfill shall match the surrounding conditions in terms of both composition and compaction specification. In building areas backfill shall be Granular B Type I compacted to 100% SPmdd. In pavement areas it shall be inorganic site soil compacted to 95% SPmdd, subject to Inspection and testing consultant approval. Regardless of backfill composition, it must have a moisture content that is within 2% of optimum moisture content.

In confined areas such service trenches, the layer thickness will have to be reduced to utilize smaller compaction equipment efficiently or by using granular material instead of locally sourced fill. Any backfill that is frozen, contains more than a trace amount of organic material (topsoil, peat, etc.), has high moisture content, or has otherwise unsuitable deleterious inclusion shall not be used as backfill. The maximum cobble or boulder size shall not exceed half of the loose lift thickness (i.e., all particles with a diameter greater than 100 mm shall be removed).

Where trenches are within the traveled portions of a roadway/parking area, backfill within the frost penetration depth of 1.2 m shall consist of excavated material consistent with the soils surrounding the trench. If this technique is not undertaken, then frequently problems arise with yearly differential frost heave movements between the trench backfill and the adjacent native soil. Alternatively, if different soil is used as the backfill due to issues with achieving compaction, a frost taper of 10H:1V shall be implemented to help mitigate the potential for differential settlement and frost heave.

4.5. Pavement Design

4.5.1. Subgrade Preparation

Based on discussion earlier in the report, the pavement subgrade typically will comprise inorganic fill, native soil or locally engineered fill (consisting of inorganic site soil) and compacted to a minimum 95% SPmdd.

Prior to pavement placement, the subgrade must be inspected and approved by the Inspection and Testing Consultant at the time of the pavement construction as the construction activity may have weakened/ disturbed the engineered fill. The exposed pavement subgrade must be recompacted/proofrolled to a minimum 95% SPmdd. If any soft or weak subgrade areas are identified, or if there are areas containing excessive amounts of moisture or deleterious material, they must be locally sub-excavated and backfilled with inorganic site soil and compacted to a minimum of 95% SPmdd.

4.5.2. Drainage

Control of surface water is an important factor in achieving a good pavement life. The need for adequate subgrade drainage cannot be over-emphasized. The subgrade must be free of depressions and sloped (at a minimum grade of 2 percent) to provide effective drainage toward subgrade drains. Grading adjacent to pavement areas shall be designed to ensure that water is not allowed to pond adjacent to the outside edges of the pavement.

Continuous pavement subdrains shall be provided along all sides of the paved areas and drained into respective catchbasins to facilitate drainage of the subgrade and the granular materials. The subdrain invert shall be maintained at least 0.3 m below subgrade level. The play area and parking lot pavement shall be graded towards the centralized catchbasins. To minimize the problems of differential movement between the pavement and catchbasins/manholes due to frost action, the backfill around the structures shall consist of free-draining OPSS.MUNI Granular B with stubdrains extending out about 2 m from the structure. Typical pavement drainage details are provided in Appendix D.

4.5.3. Pavement Structure

There are three (3) different types of pavements that need to be designed for:

- Play Area: Pavement that will only receive pedestrian traffic, with occasional maintenance vehicles.
- Light Duty: Includes driveways and parking lots which will not be subject to frequent heavy traffic loads such as buses, delivery or fire trucks, etc., and will mostly service small vehicles such as cars or pickup trucks.
- Heavy Duty: Includes driveways and parking lots which are designated for busses and fire truck routes, or will see frequent heavy traffic loads such as delivery or garbage trucks, etc.

The industry pavement design methods are based on a design life of 15 to 20 years for typical weather conditions depending on actual traffic volumes. The following pavement thickness design is provided on

the above noted considerations and anticipated subgrade soil typically comprising inorganics silty sand soil from the site:

Pavement Layer	Compaction Requirements	Minimum Component Thickness		
		Play Area	Light-Duty	Heavy-Duty
Surface Course Asphaltic Concrete: HL3 (OPSS.MUNI 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)	92% MRD (OPSS.MUNI 310)	60 mm	40 mm	40 mm
Binder Course Asphaltic Concrete: HL8 (OPSS.MUNI 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)		-	50 mm	80 mm
Base Course: Granular A (OPSS.MUNI 1010)	100% SPmdd (OPSS.MUNI 501)	150 mm	150 mm	150 mm
Subbase Course: Granular B Type I (OPSS.MUNI 1010)		250 mm	300 mm	450 mm

The granular materials shall be placed in lifts 200 mm thick or less and be compacted to a minimum of 100% SPmdd for both granular base and subbase. The granular and asphalt pavement materials and their placement shall conform to OPSS.MUNI 310, 501, 1010 and 1150.

All longitudinal joints shall be staggered between the asphalt lifts. The staggering of the longitudinal joints shall be accomplished by offsetting the paving edge in the upper asphalt course by a minimum of 150 mm. Frost tapers of 10H:1V shall be incorporated at the transition areas between pavement of differing thickness.

Smooth transitions are required in all areas where the new pavement meets the existing asphalt surface. All longitudinal and transverse joints shall meet the requirements of OPSS.MUNI 310.

If the pavement construction occurs in wet, winter or inclement weather, it may be necessary to provide additional subgrade support for heavy construction traffic by increasing the thickness of the granular subbase, base or both subject to review by the Inspection and Testing Consultant. Further, traffic areas for construction equipment may experience unstable subgrade conditions. These areas may be stabilized utilizing additional thickness of granular materials or geogrid.

It must be noted that in addition to adherence of the above pavement design recommendations, a close control on the pavement construction process will also be required to obtain the desired pavement life. Therefore, regular inspection and testing shall be conducted by The Inspection and Testing Consultant during the pavement construction to confirm material quality, thickness, and to ensure adequate compaction.

For concrete sidewalks the light duty pavement structure granular thicknesses shall be utilized below the concrete. Where concrete sidewalks are adjacent to heavy duty pavement the pavement granular thickness shall be continued under the sidewalk to 1 m past the edge of the pavement and the transition at 10H:1V to the light duty thicknesses.

5. Constructability Considerations

5.1. Excavations

Excavation is envisioned to extend to about 0.8 to 2.3 m depth (Elev. 281.0 to 283.2) for removal of soil as described in Section 4.1, within the building addition area. Excavation in pavement areas to remove topsoil and other organics for engineered fill purposes is expected to extend to 50 to 500 mm below existing grade. For service relocation excavation is expected to extend 3.0 to 4.0 m depth. Excavation will encounter pavement, topsoil, fill, and the native soil (silty sand or glacial till deposit). Harder digging and the presence of cobbles and boulders shall be expected in the dense to very dense till soil.

Excavations must be carried out in accordance with the Occupational Health and Safety Act, Ontario Regulation 213/91 (as amended), Construction Projects, Part III - Excavations, Section 222 through 242. Where workers must enter a trench or excavation the soil must be suitably sloped and/or braced in accordance with the OHSA. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety. If more than one soil type is encountered in an excavation, the most conservative soil type must be followed for sloping the sidewalls of the excavation. It is expected that all excavations shall be completed considering a Type 3 soil geometry, 1H:1V from the base of the excavation, assuming that groundwater control is provided prior to excavation.

Excavation sidewalls will need to be continuously reviewed for evidence of instability and ground water seepage, particularly following periods of heavy rain or thawing. When required, remedial action must be taken to ensure the continued stability of excavation slopes and the safety of the workers.

Minimum support system requirements for steeper excavations are stipulated in Sections 235 through 238 and 241 of the OHSA and include provisions for timbering, shoring and moveable trench boxes. To reduce the potential for instability of the trench excavations, materials excavated from the service trenches and/or other fill materials or heavy equipment shall not be placed near the crest of the trench excavations.

It is important to note that soils encountered in the construction excavations may vary significantly across the site. Our soil classifications are based solely on the materials encountered in the test pits advanced on site. The contractor shall verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, the contactor shall contact the Inspection and Testing Consultant immediately to evaluate the conditions encountered.

5.2. Temporary Construction Groundwater Control

As noted in the previous section, excavation is envisioned to extend to about 0.8 to 2.3 m depth (Elev. 281.0 to 283.2) for removal of soil as described in Section 4.1, within the building addition area. Excavation in pavement areas to remove topsoil and other organics for engineered fill purposes is

expected to extend to 50 to 500 mm below existing grade. For service relocation excavation is expected to extend 3.0 to 4.0 m depth.

Groundwater was not encountered during drilling or upon completion, except in Borehole 15 at 5.2 m depth (Elev. 277.6). Upon return to the site in August 2024 to measure the stabilized groundwater levels, all the wells were dry.

Based on the groundwater levels/elevations and anticipated excavation depths/elevations against the borehole logs, excavation for the project is generally expected to be above the groundwater table. Local perched water can be expected.

The exact scenario where certain groundwater control techniques will work are directly correlated to how coarse/fine the native soils are in an excavation. If the groundwater table is not controlled during construction, the base of the excavations will be unstable, leading to difficulties in excavating and placement of engineered fill, pipes or footings, and providing safety for the workers.

Conventional sump pumping should suffice to control local perched groundwater seepage from the excavation walls for excavation above the groundwater table, anticipated to be for the majority of the site.

Multiple pumps or sumps created with a corrugated steel pipe filled with gravel, may be required in excavations that extend to or slightly below the groundwater table or localized perched water areas where greater seepage is encountered, though this is not expected at this site.

It is recommended to carry out the work during the dry time of the year when the ground water table is lowest, to mitigate groundwater control measures. Also reducing the size of the excavation that is open at any one time will aid in reducing groundwater control requirements.

Due to new guidance recently provided by the MECP (ERO number 019-6853, last updated May 27, 2025), water taking for construction purposes are only required to be registered on the EASR system, even if water taking rates are expected to exceed 400,000 L/day (per previous MECP guidance). If water taking for any purpose other than or in addition to construction dewatering occurs, a PTTW from the MECP may be necessary. Registry on the EASR system is likely not required. Refer to GEI's hydrogeological report for further details.

5.3. Quality Verification Services

On-site quality verification services are an integral part of the geotechnical design function, and for foundations and engineered fill, are required under the Ontario Building Code. Quality verification services are used to confirm that construction is being conducted in general conformance with the requirements as outlined in the drawings, reports and specifications prepared for the proposed development.

The Inspection and Testing Consultant will conduct all the on-site quality verification services outlined below:

- Full-time monitoring, testing and inspection of engineered fill placement in accordance with the OBC.
- The subgrade for shallow foundations must be field reviewed in accordance with the OBC.
- Full-time monitoring of the subgrade support capabilities, material quality, lift thickness, moisture content, degree of compaction, etc. for the following areas to ensure the recommendations within this report are followed and they perform adequately in the long-term;
    - Slab-on-grade;
    - Pavement structure (granular and asphalt); and
    - Bedding/backfilling of site servicing.
- Testing of the concrete (slump, air content, compressive strength etc.) and testing of the asphalt (Marshal properties, asphalt content and gradation) to ensure that the quality of the materials being brought to site meet the requirements of the project.

5.4. Site Work

The soils found at this site may become weakened/disturbed when subjected to traffic, particularly when wet. If there is site work carried out during periods of wet weather, then it can be expected that the subgrade will be disturbed unless an adequate granular working surface is provided to protect the integrity of the subgrade soils from construction traffic. Subgrade preparation works cannot be adequately accomplished during wet weather and the project must be scheduled accordingly. The disturbance caused by the traffic can result in the removal of disturbed soil and use of granular fill material for site restoration or underfloor fill that is not intrinsic to the project requirements.

The most severe loading conditions on the subgrade may occur during construction. Consequently, special provisions such as end dumping and forward spreading of earth and aggregate fills, restricted construction lanes, and half-loads during paving and other work may be required, especially if construction is carried out during unfavourable weather.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the founding subgrade and concrete must be provided. The soil at this site is susceptible to frost damage. Consideration must be given to frost effects, such as heave or softening, on exposed soil surfaces in the context of this particular project development.

6. Limitations and Conclusions

6.1. Limitations

If conditions not observed during this investigation become apparent, GEI should be contacted to assess the situation and provide recommendations.

GEI shall be retained for a general review of the final design drawings and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, GEI will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of the design engineers. The level of investigation required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

This report was authorized by, and prepared by GEI for, the account of the SMCDSB (as provided in the PO for the project). 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. GEI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

6.2. Conclusion

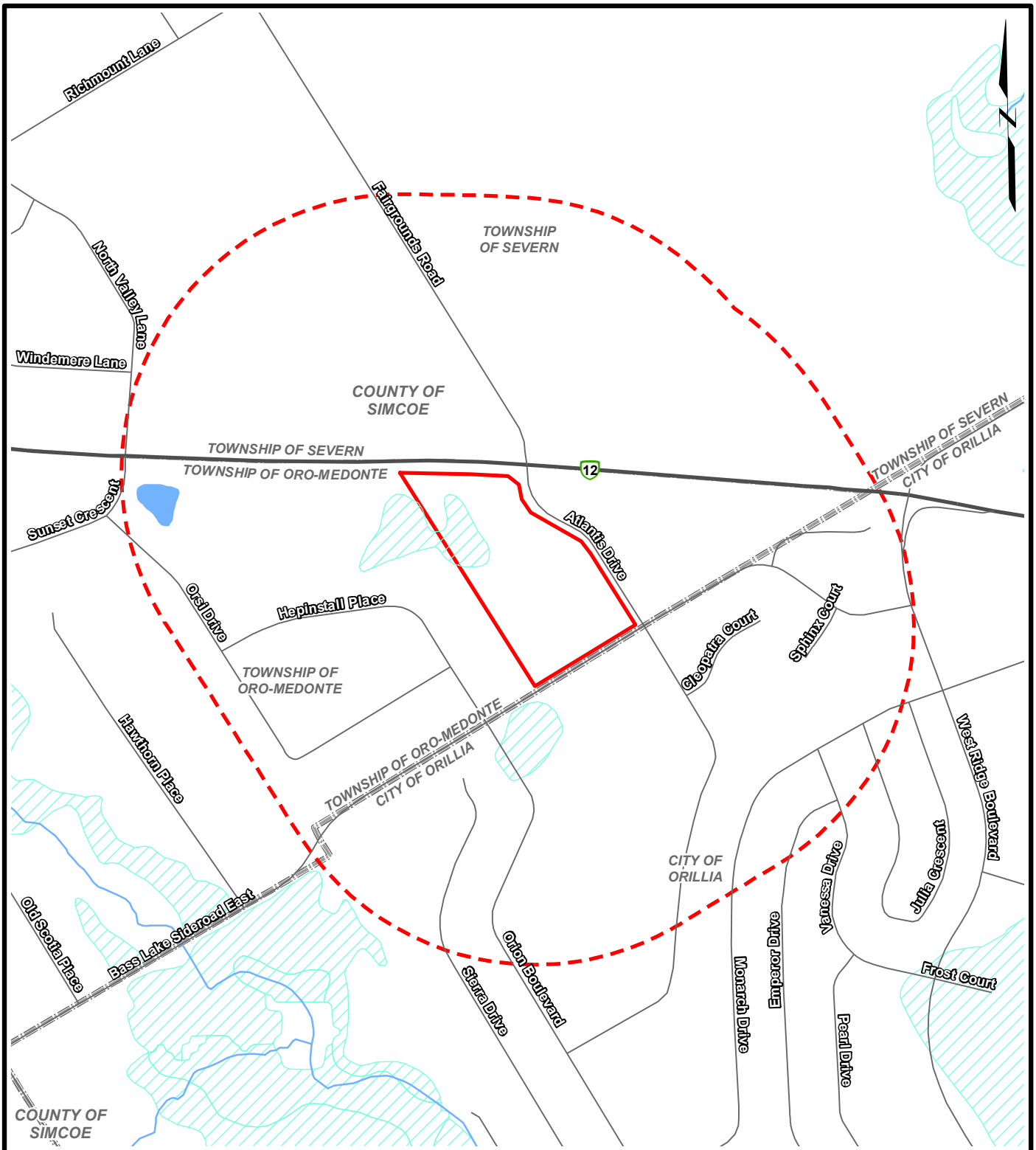
It is recognized that municipal/regional governing bodies, in their capacity as the planning and building authority under Provincial statues, will make use of and rely upon this report, cognizant of the limitations thereof, both as are expressed and implied.

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to contact our office.

Figures

Site Location Plan

Borehole Location Plans



Geotechnical Investigation
Proposed Addition to the Notre Dame Catholic School
140 Atlantis Dr, Orillia, ON

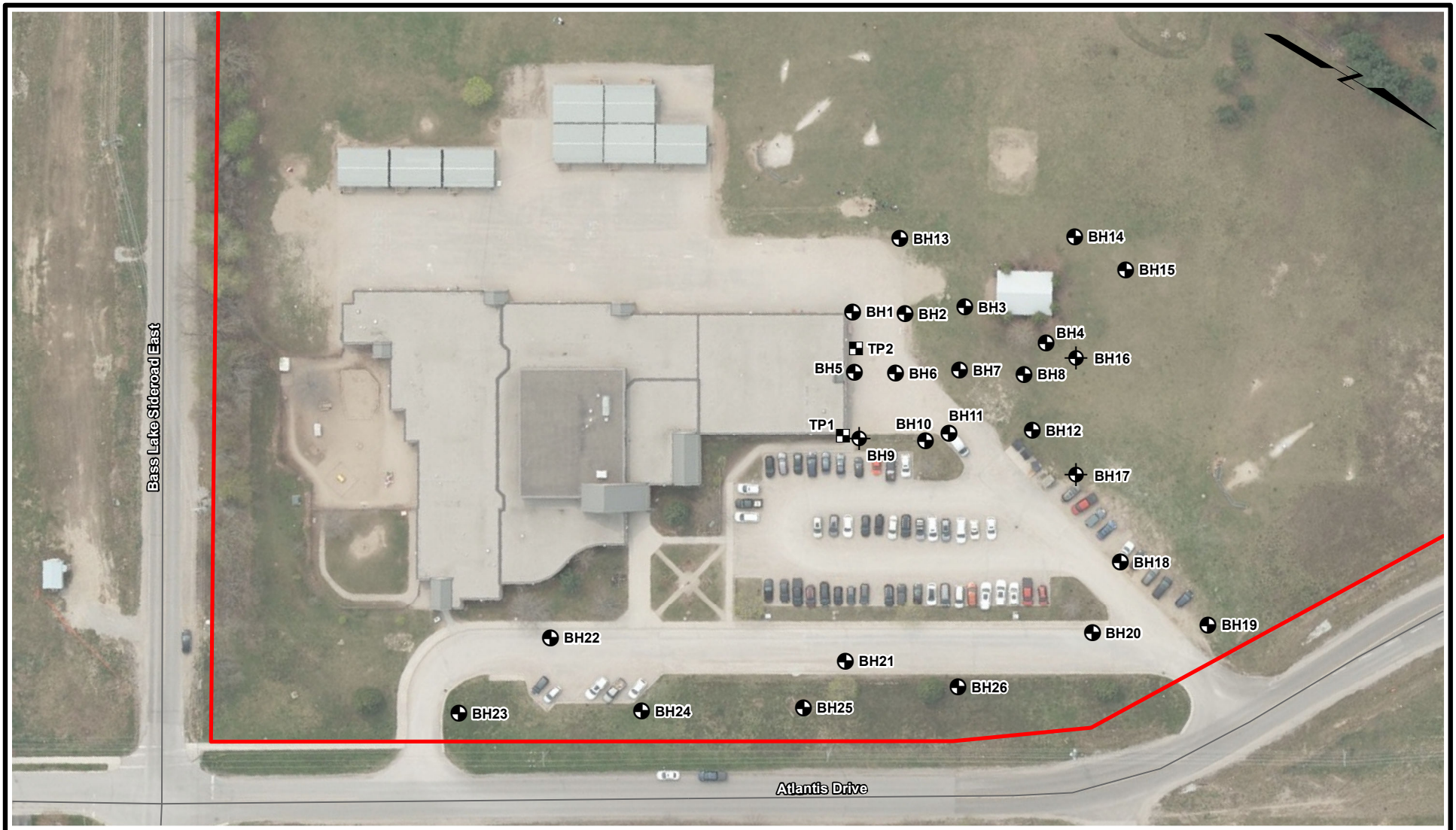
Simcoe Muskoka Catholic District School Board

GEI Consultants Canada

SITE LOCATION PLAN

Project 2503918 | Nov 2025 | Fig. 1

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Site
Road
Approximate Borehole Location
Approximate Borehole/Monitoring Well Location
Approximate Test Pit Location

Reference(s):
1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2025.
3. Orthoimagery © First Base Solutions, 2025. Imagery taken in 2023.

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Geotechnical Investigation
Proposed Addition to the Notre Dame Catholic School
140 Atlantis Dr, Orillia, ON

Simcoe Muskoka Catholic District School Board

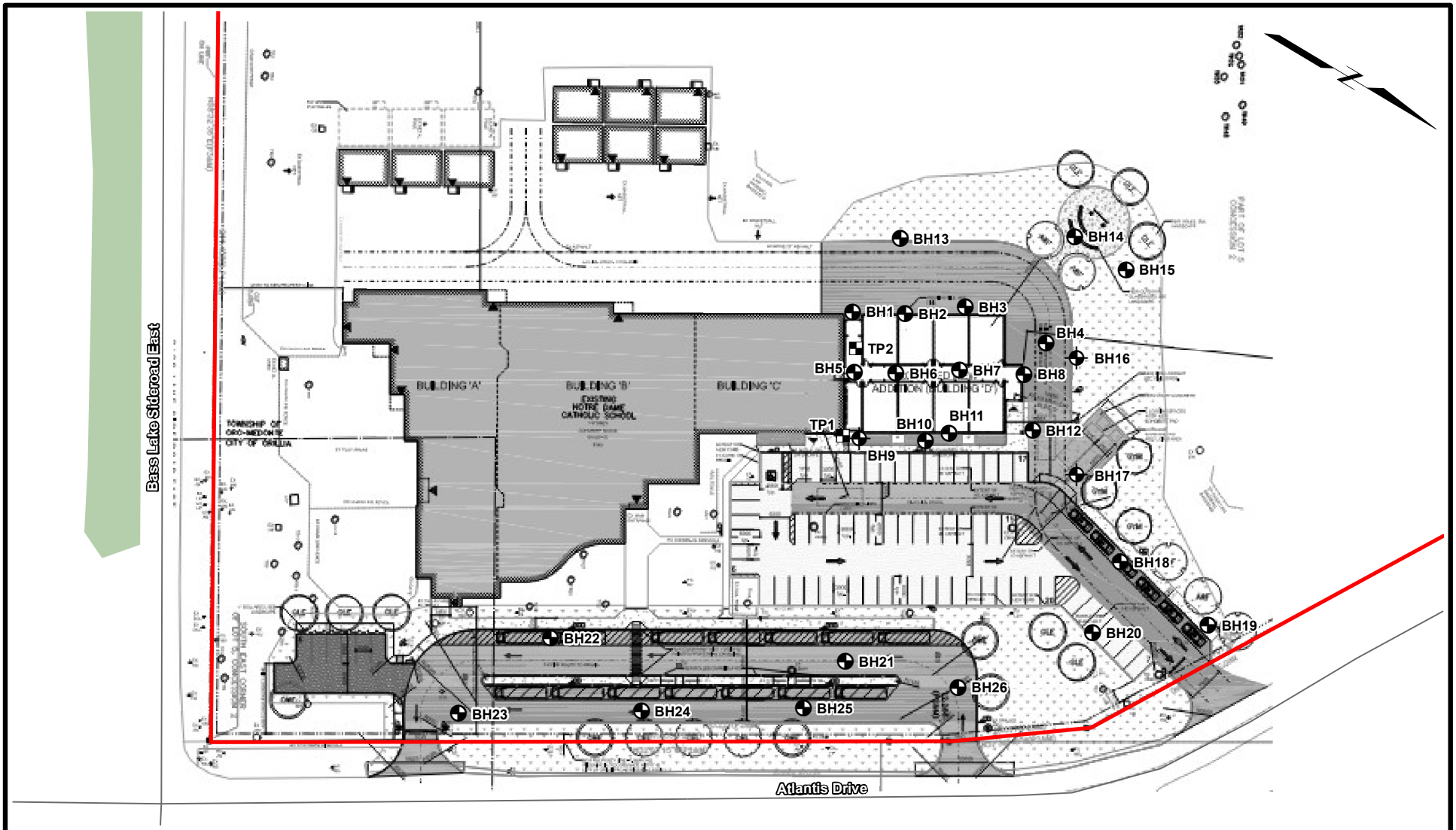
GEI Consultants Canada

Project 2503918

BOREHOLE/MONITORING WELL LOCATION PLAN (AERIAL)

November 2025 Fig. 2A

\\bos-pzcc-1\Data_Storage\Working\SIMCOE MUSKOKA CATHOLIC DISTRICT SCHOOL BOARD\2503918 Proposed Addition to Notre Dame Catholic School Orillia ON\05_GIS\MXD\2025-11_Geotech_update\2503918_rpt_fig02A_BH_location_plan.mxd



Reference(s):
1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2025.

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Metres

Geotechnical Investigation Proposed Addition to the Notre Dame Catholic School 140 Atlantis Dr, Orillia, ON	GEI Consultants Canada	BOREHOLE/MONITORING WELL LOCATION PLAN (SITE PLAN)
Simcoe Muskoka Catholic District School Board	Project 2503918	November 2025 Fig. 2B

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Appendix A Borehole and Test Pit Logs

RECORD OF BOREHOLE No. 01

GEI Consultants

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940841** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621971** Date Completed: **Jul 29/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing SPT/DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL–LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 283.8										
	ASPHALT: 50 mm GRANULAR: 700 mm 0.8 283.0	AS	1			0					
	FILL: Silty sand, trace gravel, compact, brown, moist	SS	2	10	16			16	8		Sample SS2
		SS	3	100	17	2	282	17	9		Sample SS3
	2.3 281.5										
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	4	80	46			46	7		Sample SS4
		SS	5	85	100+			100+ →	6		
						4	280				
		SS	6	100	100+			100+ →	7		
						6	278				
		SS	7	100	100+			100+ →	8		
		SS	8	85	100+	8	276	100+ →	7		
	9.8 274.0	SS	9	50	100+			100+ →	6		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: **1 :100**
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RECORD OF BOREHOLE No. 02

GEI Consultants

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940850** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621966** Date Completed: **Jul 29/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 / 283.6							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded) — 50 100 150 200. Penetration Testing: ○ SPT ● DCPT — 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm) — 100 200 300 400. Atterberg Limits: PL — LL. ○ Water Content (%) — 10 20 30 40		GR SA SI CL
	TOPSOIL: 50 mm FILL: Silty sand, compact to very loose, brown, moist	SS	1	35	11	0		11	8		
		SS	2	10	11			11	8		Sample SS2 SPLP1
	2.3 / 281.3	SS	3	75	2	2	282	2	11		
	SILTY SAND GLACIAL TILL: Trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	4	80	40			40	8		Sample SS4
		SS	5	85	100+	4	280	100+ →	6		
	4.6 / 279.0										
	SAND: Some silt, trace gravel, very dense, brown, very moist	SS	6	100	80		278	80 →	11		
	6.1 / 277.5					6					
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, very dense, brown, moist	SS	7	100	100+			100+ →	8		
		SS	8	100	100+	8	276	100+ →	7		
	9.8 / 273.9	SS	9	50	100+		274	100+ →	7		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: **1 :100**
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RECORD OF BOREHOLE No. 03

GEI Consultants

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940860** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621958** Date Completed: **Jul 29/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa) / Penetration Testing: SPT, DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL–LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 / 283.6					0					
	TOPSOIL: 40 mm FILL: Silty sand, compact to dense, brown, moist	SS	1	25	40			40	2		
		SS	2	100	14			14	8		Sample SS2
	2.3 / 281.3	SS	3	80	18	2	282	18	10		
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	4	100	46			46	7		Sample SS4
		SS	5	100	100+			100+ →	7		7 51 30 12
	4.6 / 279.0					4	280				
	SAND: Some silt, trace gravel, very dense, brown, moist	SS	6	25	100+			100+ →	6		
	6.1 / 277.5					6	278				
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	7	100	82			82 →	7		
		SS	8	100	37	8	276	37	8		
	9.8 / 273.8	SS	9	50	100+		274	100+ →	6		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

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RECORD OF BOREHOLE No. 04

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940878** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621955** Date Completed: **Jul 28/25**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa); Penetration Testing (SPT, DCPT)	Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits; Water Content (%)	Instrumentation Installation		GR	SA	SI	CL
0.0 / 283.3	TOPSOIL: 50 mm FILL: Silty sand, trace gravel, trace organics, loose to compact, brown, moist	SS	1	75	21	0		21	10		Sample SS2				
		SS	2	75	6		282	6	9						
		SS	3	100	17	2		17	10						
2.3 / 281.0	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	4	80	46			46	7		Sample SS4				
		SS	5	100	84		280	84 →	7						
		SS	6	100	100+	4	278	100+ →	7						
		SS	7	100	100+	6	276	100+ →	6						
	- - - Sand layers, greyish brown to brown - - -	SS	8	65	100+	8		100+ →	4						
9.8 / 273.6		SS	9	75	100+		274	100+ →	7						
	Borehole Terminated at 9.8 m														

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

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RECORD OF BOREHOLE No. 05

GEI Consultants

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940848** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **621981** Date Completed: **Jul 30/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 283.7							Shear Strength Testing (kPa): Other Test; Pocket Penetrometer; Field Vane (Intact); Field Vane (Remolded) 50 100 150 200. Penetration Testing: SPT, DCPT 10 20 30 40	Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm) 100 200 300 400. Atterberg Limits PL LL. Water Content (%) 10 20 30 40		
	ASPHALT: 100 mm GRANULAR: 510 mm 0.6 283.1	AS	1			0					
	FILL: Silty sand, trace gravel, compact, brown, moist 1.5 282.2	SS	2	25	19		282	19	8		Sample SS2
	SILTY SAND: Trace gravel, dense to very dense, brown, moist	SS	3	35	32	2		32	7		Sample SS3 DUP1
	3.0 280.7	SS	4	80	84			84 →	6		Sample SS4 SPLP2
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, very dense, brown, moist	SS	5	100	100+			100+ →	7		
						4	280				
		SS	6	100	100+			100+ →	10		
							278				
		SS	7	65	100+	6		100+ →	7		
		SS	8	100	100+		276	100+ →	8		
	9.8 274.0	SS	9	75	100+	8	274	100+ →	8		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 06

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940855** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621977** Date Completed: **Jul 29/25**

Depth	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Elevation (m)	Comments
0.0						283.7	
0.8	ASPHALT: 100 mm GRANULAR: 660 mm	AS	1			282.9	
1.5	FILL: Sand, trace silt, trace gravel, compact, brown, moist	SS	2	50	18	282.1	Sample SS2 SPLP3
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	50	18	282	Sample SS3
		SS	4	80	58		Sample SS4
		SS	5	100	84	280	
		SS	6	100	100+	278	
	- - - Greyish brown, very moist - - -	SS	7	20	100+	276	
		SS	8	65	100+		
9.8		SS	9	100	100+	273.9	
	Borehole Terminated at 9.8 m						

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Scale: **1 :100**

RECORD OF BOREHOLE No. 07

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940866** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621969** Date Completed: **Jul 29/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 / 283.7							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 50 100 150 200. Penetration Testing: ○ SPT ● DCPT; 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits: PL — LL; ○ Water Content (%); 10 20 30 40		GR SA SI CL
	TOPSOIL: 50 mm FILL: Silty sand, trace gravel, trace organics, compact, brown, moist	AS	1			0			5		
	1.5 / 282.2	SS	2	80	18			18 18	6		Sample SS2
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	80	18	2	282		7		Sample SS3
		SS	4	80	58			58 →	8		Sample SS4
		SS	5	65	84			84 →	8		
						4	280				
		SS	6	100	100+			100+ →	7		
						6	278				
		SS	7	100	100+			100+ →	7		
		SS	8	55	100+	8	276	100+ →	7		
	9.8 / 274.0	SS	9	50	100+		274	100+ →	6		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 08

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940877** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621963** Date Completed: **Jul 28/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 / 283.5							Shear Strength Testing (kPa): Other Test; Pocket Penetrometer; Field Vane (Intact); Field Vane (Remolded) 50 100 150 200	Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm) 100 200 300 400		
	TOPSOIL: 40 mm FILL: Silty sand, trace gravel, trace organics, compact to loose, brown, moist	SS	1	75	21	0		Penetration Testing: SPT ○ DCPT ● 10 20 30 40	Atterberg Limits: PL ○ Water Content (%) LL 10 20 30 40		
	1.5 / 282.0	SS	2	80	6		282				Sample SS2
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	80	17	2					Sample SS3
		SS	4	100	46						Sample SS4
		SS	5	100	84		280				
		SS	6	100	100+	4					
							278				
		SS	7	100	100+	6					
							276				
		SS	8	65	100+	8					
	9.8 / 273.8	SS	9	60	100+		274				
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 09

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940856** Date Started: **Jul 31/25**
Reviewed By: **GW** Easting: **621992** Date Completed: **Jul 31/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing SPT/DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL/LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL
	0.0 284.0													
	0.2 283.8 TOPSOIL: 180 mm													
	FILL: Silty sand, trace gravel, trace organics, dense to compact, brown, moist	SS	1	75	36	0		36	2					
		SS	2	75	25			25	7		Sample SS2			
	1.5 282.5													
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	80	27	2	282	27	8		Sample SS3			
		SS	4	80	55			55 →	7		Sample SS4			
		SS	5	55	100+			100+ →	6					
						4	280							
		SS	6	85	100+			100+ →	6					
						6	278							
		SS	7	85	100+			100+ →	8		1	58	32	9
		SS	8	65	100+	8	276	100+ →	7					
	9.1 274.8													
	SILTY SAND: Some clay, trace gravel very dense, greyish brown, wet 9.8 274.2	SS	9	100	100+			100+ →	13		6	50	31	13
	Borehole Terminated at 9.8 m													

Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on: Aug 14/25 at depth of: Dry
Cave depth after auger removal: Open
Groundwater Elevation:

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RECORD OF BOREHOLE No. 10

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940867** Date Started: **Jul 31/25**
Reviewed By: **GW** Easting: **621985** Date Completed: **Jul 31/25**

Depth	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Elevation (m)	Comments
0.0 / 284.0							
0.2 / 283.8	TOPSOIL: 180 mm						
	FILL: Silty sand, trace gravel, trace organics, trace cobbles, dense, brown, moist	SS	1	80	31		Sample SS2
		SS	2	65	43		
1.5 / 282.5	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	3	100	32		
		SS	4	80	87		Sample SS4 DUP2
		SS	5	85	100+		
		SS	6	100	90		
		SS	7	100	100+		
	- - - Greyish brown - - -	SS	8	100	100+		
9.8 / 274.3		SS	9	100	100+		
	Borehole Terminated at 9.8 m						

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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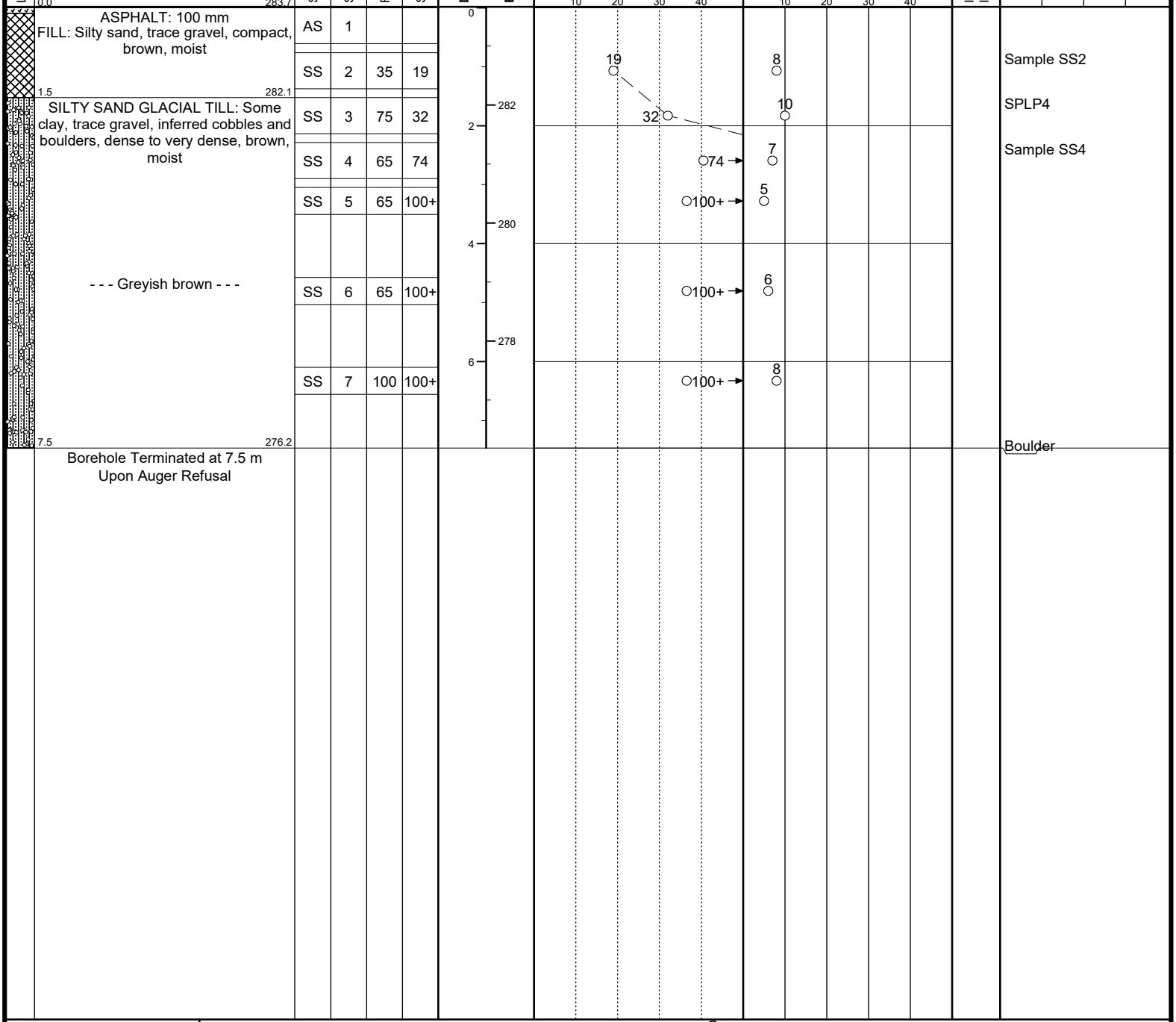
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RECORD OF BOREHOLE No. 11

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940871** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **621981** Date Completed: **Jul 30/25**

Depth (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Elevation (m)	Comments
0.0						283.7	
	ASPHALT: 100 mm FILL: Silty sand, trace gravel, compact, brown, moist	AS	1				
		SS	2	35	19		Sample SS2
1.5						282.1	
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	3	75	32		SPLP4
		SS	4	65	74		Sample SS4
		SS	5	65	100+		
	- - - Greyish brown - - -	SS	6	65	100+		
		SS	7	100	100+		
7.5						276.2	Boulder
	Borehole Terminated at 7.5 m Upon Auger Refusal						



Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 12

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940885** Date Started: **Jul 29/25**
Reviewed By: **GW** Easting: **621972** Date Completed: **Jul 29/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing SPT/DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL/LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 / 283.6										
	TOPSOIL: 75 mm FILL: Silty sand, trace gravel, trace organics, dense to compact, brown, moist	SS	1	75	42	0		42	4		
		SS	2	75	24			24	7		Sample SS2
	1.5 / 282.1						282				
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	75	19	2		19	8		
		SS	4	75	56			56	7		Sample SS4
		SS	5	100	100+		280	100+	6		6 50 33 11
		SS	6	100	100+	4		100+	6		
							278				
		SS	7	100	100+	6		100+	6		
		SS	8	55	100+		276	100+	6		
	9.8 / 273.9	SS	9	50	100+	8	274	100+	13		
	Borehole Terminated at 9.8 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 13

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940841** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621953** Date Completed: **Jul 28/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0 / 283.8	TOPSOIL: 40 mm FILL: Silty sand, trace gravel, trace organics, very dense, brown, moist	SS	1	65	83	0	
		SS	2	65	57		
1.5 / 282.2	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	100	17	2	282
		SS	4	80	52		
		SS	5	100	64	4	280
		SS	6	100	100+		
6.7 / 277.0		SS	7	75	100+	6	278
	Borehole Terminated at 6.7 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
50 100 150 200
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Sample SS2
SPLP5

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 14

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940871** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621934** Date Completed: **Jul 28/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 283.0							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 50 100 150 200. Penetration Testing: ○ SPT ● DCPT; 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits: PL LL. ○ Water Content (%); 10 20 30 40		GR SA SI CL
	TOPSOIL: 40 mm FILL: Silty sand, trace gravel, trace organics, compact to loose, brown, moist	SS	1	100	14	0	282	14	15		Sample SS2 SPLP6
	1.5 281.4	SS	2	75	5			5	9		
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	100	23	2	280	23	10		
		SS	4	100	27			27	7		
		SS	5	100	100+	4	278	100+ →	6		
		SS	6	100	100+			100+ →	7		
	6.7 276.3	SS	7	100	100+	6		100+ →	6		
	Borehole Terminated at 6.7 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 15

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940884** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621934** Date Completed: **Jul 28/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa) / Penetration Testing: SPT, DCPT)	LAB TESTING (Combustible Organic Vapour (ppm), Combustible Organic Vapour (%LEL), Total Organic Vapour (ppm), Atterberg Limits PL–LL, Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 / 282.8										
	TOPSOIL: 50 mm FILL: Silty sand, trace gravel, trace organics, compact to very loose, brown, moist	SS	1	50	12	0	282	12	3		Sample SS2 SPLP7
	1.5 / 281.3	SS	2	75	3			3	8		
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	100	28	2	280	28	7		
		SS	4	100	46			46	6		
		SS	5	100	80	4	278	80 →	8		
		SS	6	65	100+			100+ →	12		
	6.7 / 276.1	SS	7	80	100+	6		100+ →	10		
	Borehole Terminated at 6.7 m										

Groundwater depth encountered on completion of drilling: 5.2 m. Cave depth after auger removal: 5.5 m.
Groundwater depth observed on: Groundwater Elevation:

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RECORD OF BOREHOLE No. 16

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940885** Date Started: **Jul 28/25**
Reviewed By: **GW** Easting: **621955** Date Completed: **Jul 28/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0						0	283.3
	TOPSOIL: 40 mm FILL: Silty sand, trace gravel, trace organics, compact, brown, moist	SS	1	75	30		
		SS	2	60	16		282
1.5							281.8
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	3	35	32	2	
		SS	4	70	60		280
		SS	5	65	100+	4	
		SS	6	65	100+		278
		SS	7	40	100+	6	
6.7							276.6
	Borehole Terminated at 6.7 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
50 100 150 200
Penetration Testing
○ SPT ● DCPT
10 20 30 40
30
16
32
60
100+
100+
100+

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40
6
4
9
8
5
6
7

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
3	49	34	14

Sample SS2

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 14/25 at depth of: Dry
Groundwater Elevation:

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RECORD OF BOREHOLE No. 17

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940897** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **621975** Date Completed: **Jul 30/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 / 283.6							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded) — 50 100 150 200. Penetration Testing: ○ SPT ● DCPT — 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm) — 100 200 300 400. Atterberg Limits: PL — LL. ○ Water Content (%) — 10 20 30 40		GR SA SI CL
	TOPSOIL: 75 mm FILL: Silty sand, trace gravel, trace organics, very dense to compact, brown, moist	SS	1	75	57	0		57	4		
		SS	2	80	18			18	8		Sample SS2
	1.5 / 282.1						282				
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	75	24	2		24	7		Sample SS3
		SS	4	75	76			76	7		
		SS	5	100	100+		280	100+	7		
		SS	6	100	100+	4		100+	6		
							278				
	6.6 / 277.1	SS	7	50	100+	6		100+	6		
	Borehole Terminated at 6.6 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 14/25 at depth of: Dry
Groundwater Elevation:

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RECORD OF BOREHOLE No. 18

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940914** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **621985** Date Completed: **Jul 30/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa) / Penetration Testing: SPT, DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL–LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 / 283.2										
	TOPSOIL: 75 mm FILL: Silty sand, trace gravel, trace organics, compact, brown, moist	SS	1	50	12	0		12	8		Sample SS2
		SS	2	75	20		282	20	7		
	1.5 / 281.7										
	SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	3	100	40	2		40	7		
		SS	4	65	100+			100+ →	7		
		SS	5	100	66		280	66 →	7		
		SS	6	65	100+	4		100+ →	7		
							278				
		SS	7	50	100+	6		100+ →	5		
	6.7 / 276.5										
	Borehole Terminated at 6.7 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 19

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940936** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **621987** Date Completed: **Jul 30/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 283.4							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded) 50 100 150 200. Penetration Testing: ○ SPT ● DCPT 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm) 100 200 300 400. Atterberg Limits PL LL. Water Content (%) 10 20 30 40		GR SA SI CL
	TOPSOIL: 100 mm FILL: Silty sand, trace gravel, trace organics, dense, brown, moist 0.8 282.6	SS	1	80	31	0	282	31	5		
	SILTY SAND: Trace gravel, compact, brown, moist 2.3 281.1	SS	2	75	26			26	7		Sample SS2
		SS	3	100	20	2		20	9		
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, very dense, brown, moist	SS	4	100	56		280	56 →	7		
		SS	5	65	63	4		63 →	7		
		SS	6	65	100+		278	100+ →	5		
	6.7 276.6	SS	7	65	100+	6		100+ →	7		
	Borehole Terminated at 6.7 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 20

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **AG** Northing: **4940917** Date Started: **Jul 30/25**
Reviewed By: **GW** Easting: **622000** Date Completed: **Jul 30/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing: SPT ○, DCPT ●)	LAB TESTING (Combustible Organic Vapour (ppm) △; Combustible Organic Vapour (%LEL) ▲; Total Organic Vapour (ppm) ◇; Atterberg Limits PL–LL; Water Content (%) ○)	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL
	0.0 / 283.2													
	TOPSOIL: 100 mm FILL: Silty sand, trace gravel, trace organics, loose, brown, moist	AS	1			0								
	1.5 / 281.7	SS	2	75	7		282	7	7		Sample SS2 DUP4			
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	3	100	39	2		39	7					
		SS	4	100	86		280	86 →	7					
		SS	5	100	79	4		79 →	7					
		SS	6	100	62		278	62 →	7					
	6.7 / 276.5	SS	7	75	100+	6		100+ →	7					
	Borehole Terminated at 6.7 m													

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Scale: **1 :100**

RECORD OF BOREHOLE No. 21

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940877** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622032** Date Completed: **Aug 05/25**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa): Other Test, Pocket Penetrometer, Field Vane (Intact), Field Vane (Remolded); Penetration Testing: SPT, DCPT	Combustible Organic Vapour (ppm), Combustible Organic Vapour (%LEL), Total Organic Vapour (ppm); Atterberg Limits; Water Content (%)	Instrumentation Installation		GR	SA	SI	CL
	0.0 283.3														
	ASPHALT: 115 mm GRANULAR: 455 mm 0.6 282.8	AS	1			0			7						
	0.8 FILL: Sand, trace silt, trace gravel, brown, moist 282.6	SS	2	100	24		282	24	8		Sample SS2				
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	100	67	2		67 →	6						
		SS	4	65	100+			100+ →	7						
		SS	5	65	100+		280	100+ →	8						
		SS	6	100	63	4		63 →	8						
							278								
	6.6 276.8	SS	7	95	80	6		80 →	8						
	Borehole Terminated at 6.6 m														

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Scale: **1 :100**

RECORD OF BOREHOLE No. 22

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940824** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622059** Date Completed: **Aug 05/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	0.0 283.7							Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded) 50 100 150 200. Penetration Testing: ○ SPT ● DCPT 10 20 30 40	△ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm) 100 200 300 400. Atterberg Limits: PL — LL. ○ Water Content (%) 10 20 30 40		GR SA SI CL
	0.4 283.3 ASPHALT: 125 mm GRANULAR: 305 mm	AS	1			0					
	FILL: Sand, some to silt, some gravel, trace organics, loose to very loose, brown, moist	SS	2	100	8			8	6, 13		Sample SS2
		SS	3	100	2	2	282	2	11		
	2.3 281.4 SILTY SAND GLACIAL TILL: Some clay, trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	4	100	15			15	8		
		SS	5	65	100+			100+ →	8		
						4	280				
		SS	6	65	100+			100+ →	8		
						6	278				
	6.6 277.2	SS	7	35	100+			100+ →	8		
	Borehole Terminated at 6.6 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 23

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940817** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622082** Date Completed: **Aug 05/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing SPT/DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 283.9										
	TOPSOIL: 75 mm FILL: Sand, some silt, trace organics, compact, brown, moist	SS	1	100	12	0		12	5		Sample SS2
		SS	2	100	13			13	16		
	1.5 282.4										
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	3	100	19	2	282	19	15		
		SS	4	100	41			41	10		
		SS	5	100	71			71 →	7		
						4	280				
		SS	6	100	64			64 →	7		
						6	278				
	6.6 277.4	SS	7	35	100+			100+ →	6		
	Borehole Terminated at 6.6 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 24

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Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940848** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622062** Date Completed: **Aug 05/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0 / 283.9	TOPSOIL: 75 mm FILL: Silty sand, trace gravel, trace organics, compact, brown, moist	SS	1	100	18	0	
		SS	2	100	12		
		SS	3	100	13	2	282
2.3 / 281.6	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	4	100	23		
		SS	5	100	48	4	280
		SS	6	100	49		
6.6 / 277.3		SS	7	35	100+	6	278
	Borehole Terminated at 6.6 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
50 100 150 200
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL ○ Water Content (%) LL
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Sample SS2

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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Scale: **1 :100**

RECORD OF BOREHOLE No. 25

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940875** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622044** Date Completed: **Aug 05/25**

Depth (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Elevation (m)	Field Testing (Shear Strength Testing (kPa) / Penetration Testing)	Lab Testing (Combustible Organic Vapour (ppm) / Combustible Organic Vapour (%LEL) / Total Organic Vapour (ppm) / Atterberg Limits / Water Content (%))	Instrumentation Installation	Comments & Grain Size Distribution (%)
0.0						283.7				
0.8	TOPSOIL: 75 mm FILL: Sand, some silt, trace gravel, dense, brown, moist	SS	1	100	34	282.9				Sample SS2 DUP5 SPLP8
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, compact to very dense, brown, moist	SS	2	100	24					
		SS	3	100	34					
		SS	4	35	100+					
		SS	5	30	100+					
		SS	6	35	100+					
6.6		SS	7	65	100+	277.1				
	Borehole Terminated at 6.6 m									

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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RECORD OF BOREHOLE No. 26

Project Number: **2503918**
Project Client: **Simcoe Muskoka Catholic District School**
Project Name: **Addition to Notre Dame Catholic School**
Project Location: **140 Atlantis Dr., Orillia, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark:

Drilling Method: **Solid Stem Augers** Drilling Machine: **Rubber Tire**
Logged By: **BH** Northing: **4940900** Date Started: **Aug 05/25**
Reviewed By: **GW** Easting: **622024** Date Completed: **Aug 05/25**

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing SPT/DCPT)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL–LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	0.0 283.3					0					
	TOPSOIL: 125 mm FILL: Sand, some silt, trace gravel, compact, brown, moist 0.8 282.6	SS	1	100	21			21	1		
	SILTY SAND GLACIAL TILL: Some clay trace gravel, inferred cobbles and boulders, dense to very dense, brown, moist	SS	2	100	40		282	40	7		Sample SS2
		SS	3	100	90	2		90 →	5		
		SS	4	100	79			79 →	6		
		SS	5	100	69		280	69 →	7		
		SS	6	35	100+	4	278	100+ →	8		
	6.6 276.8	SS	7	35	100+	6		100+ →	8		
	Borehole Terminated at 6.6 m										

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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TEST PIT LOG

Project Name:	Proposed Addition – Notre Dame Catholic School	Test Pit #:	**1**
Project #:	2503918	Date/Time:	August 14, 2025
Project Loc.:	Orillia, ON	Inspector:	MH
Client:	Simcoe Muskoka Catholic District School Board	Elevation:	283.9
Contractor:	--	Equipment:	--
Northing:	4940853	Easting:	621993

Depth (m)		Stratigraphy	Samples	Notes
Top	Bottom			
0.0	**0.1**	TOPSOIL		
0.1	**1.4**	FILL: Sand, trace silt, trace gravel, trace cobbles, loose, brown, moist		
1.4	**2.2**	CLEARSTONE GRAVEL		
2.2	**2.3**	SILTY SAND GLACIAL TILL: Trace gravel, trace cobbles, compact, brown, moist		
	2.3			**TEST PIT TERMINATED**

Additional Notes

Seepage:	**Dry**
Caving:	**No Cave**
Other:	**Footing Thickness: 150 mm, Projection: 270 mm, Depth to bottom of footing: 2.2 m. Drainpipe noted at 1.6 m.**

TEST PIT LOG

Project Name:	Proposed Addition – Notre Dame Catholic School	Test Pit #:	**2**
Project #:	2503918	Date/Time:	August 14, 2025
Project Loc.:	Orillia, ON	Inspector:	MH
Client:	Simcoe Muskoka Catholic District School Board	Elevation:	283.7
Contractor:	--	Equipment:	--
Northing:	4940846	Easting:	621977

Depth (m)		Stratigraphy	Samples	Notes
Top	Bottom			
0.0	**0.1**	ASPHALT		
0.1	**0.3**	GRANULAR FILL		
0.3	**1.3**	FILL: Sand, trace silt, trace gravel, trace cobbles, loose, brown, moist		
1.3	**2.0**	CLEARSTONE GRAVEL		
2.0	**2.2**	SILTY SAND TILL: Trace gravel, trace cobbles, compact, brown, moist		
	2.2			**TEST PIT TERMINATED**

Additional Notes

Seepage:	**Dry**
Caving:	**No Cave**
Other:	**Footing Thickness: 180 mm, Projection: 100 mm, Depth to bottom of footing: 2.0 m. Drainpipe noted at 1.5 m.**

Appendix B Geotechnical Laboratory Testing

Appendix C Test Pit Photographs



PHOTOGRAPH 1

(GEI 2025)

Description:
General View of Work Area for Test Pit #1 before starting.



PHOTOGRAPH 2

(GEI 2025)

Description:
General View of Test Pit #1.



PHOTOGRAPH 3

(GEI 2025)

Description:
View of perimeter drain and footing from Test Pit #1.



PHOTOGRAPH 4

(GEI 2025)

Description:
General View of Test Pit #1 after completion of investigation.



PHOTOGRAPH 5

(GEI 2025)

Description:
General View of Work Area for Test Pit #2 before starting.



PHOTOGRAPH 6

(GEI 2025)

Description:
General View of Test Pit #2.



PHOTOGRAPH 7

(GEI 2025)

Description:
View of perimeter drain and footing from Test Pit #2.



PHOTOGRAPH 8

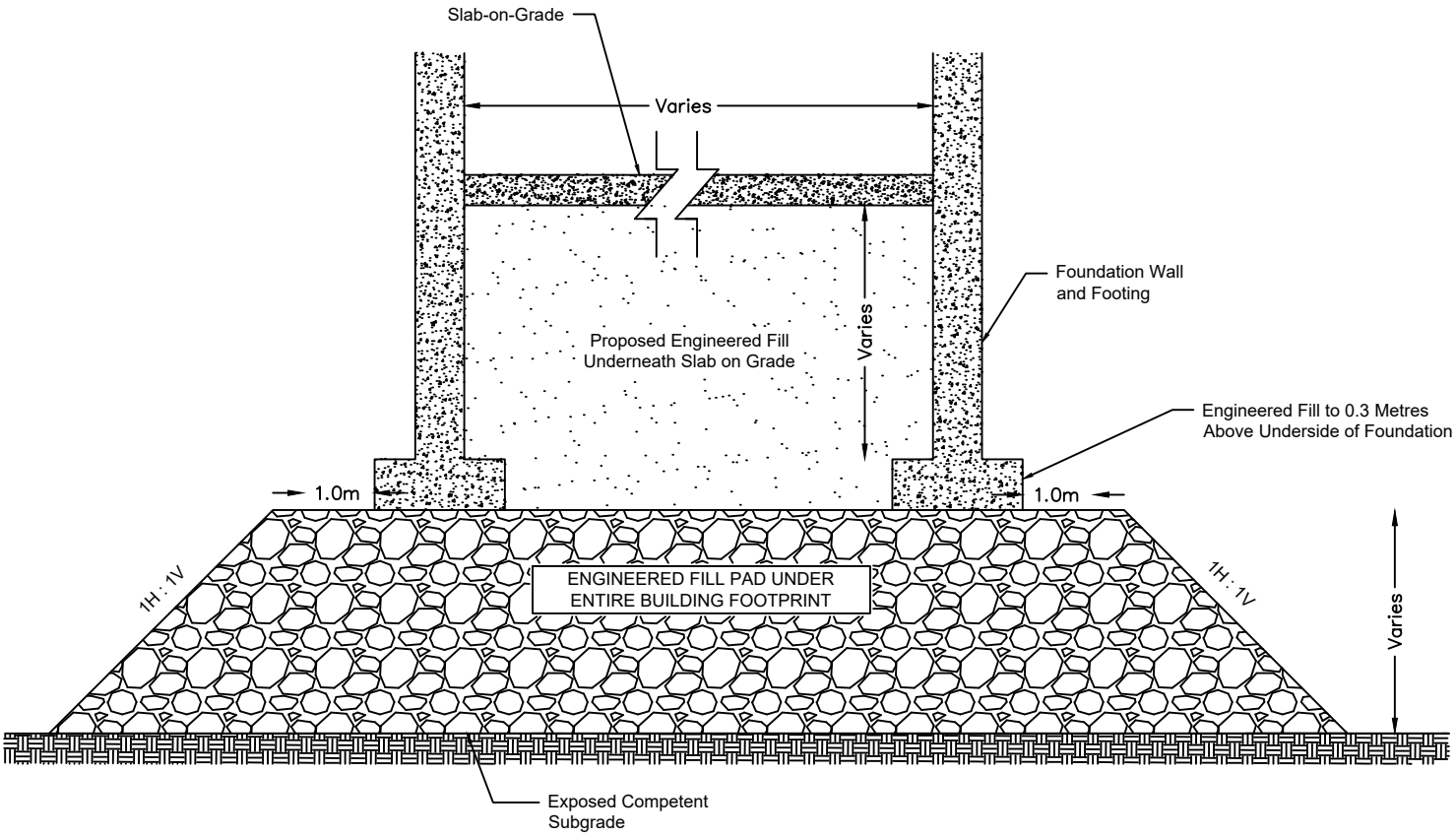
(GEI 2025)

Description:
General View of Test Pit #2 after completion of investigation.

Appendix D Typical Details

Notes:

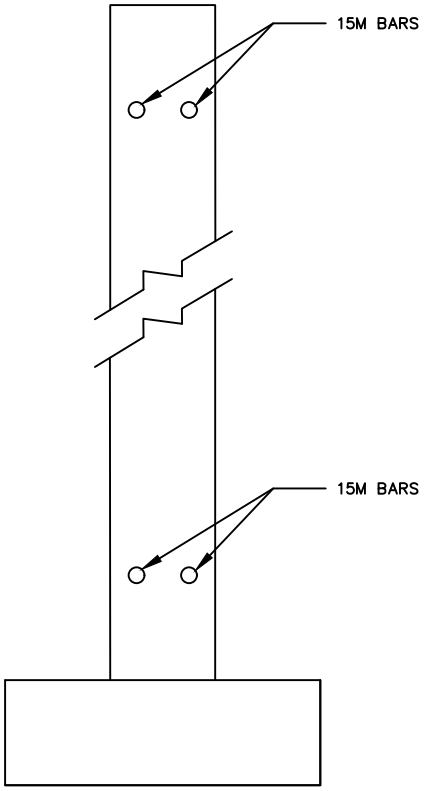
1. Engineered Fill compacted to 100% Standard Proctor Maximum Dry Density (SPMDD) and inspected under the full time supervision of GEI.
2. Engineered fill must be placed in loose lifts of 200 mm or less and then compacted as noted above.



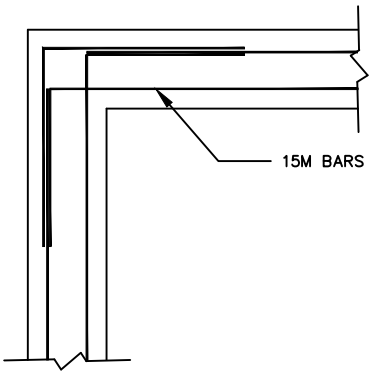
GEI Consultants

647 Welham Rd, Unit 14, Barrie, ON, L4N 0B7

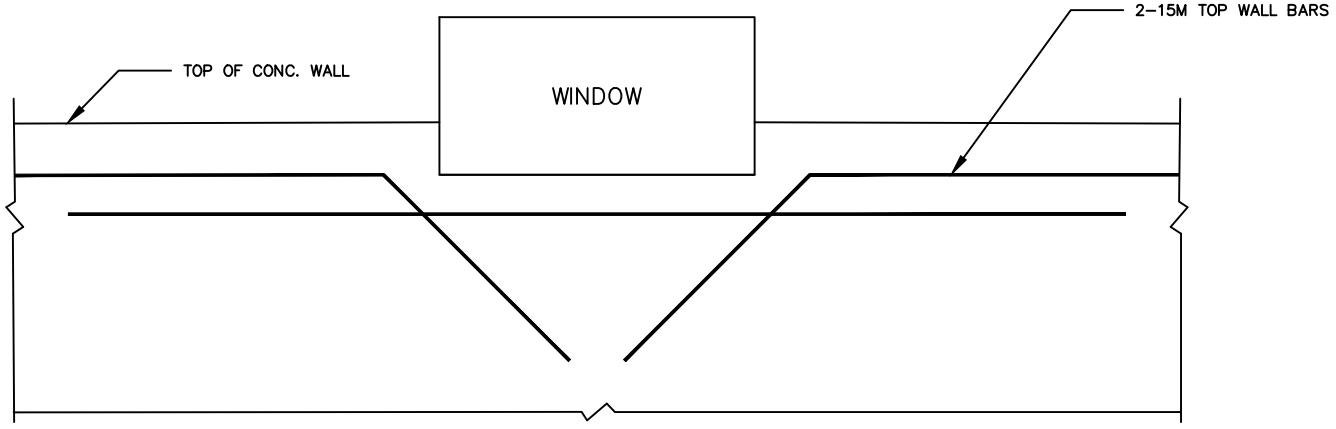
ENGINEERED FILL PAD DIMENSIONING TYPICAL DETAIL



TYPICAL REINFORCED WALL



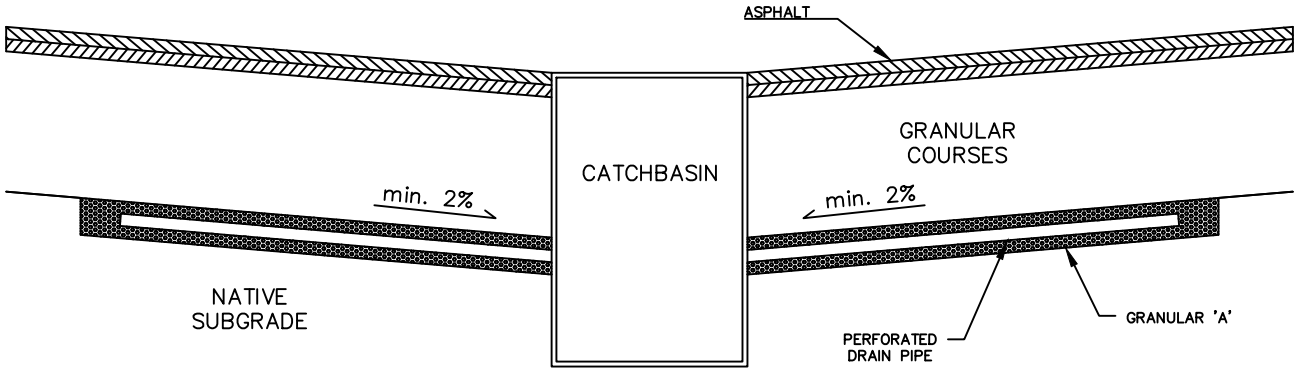
TYPICAL SPLICING AT CORNERS

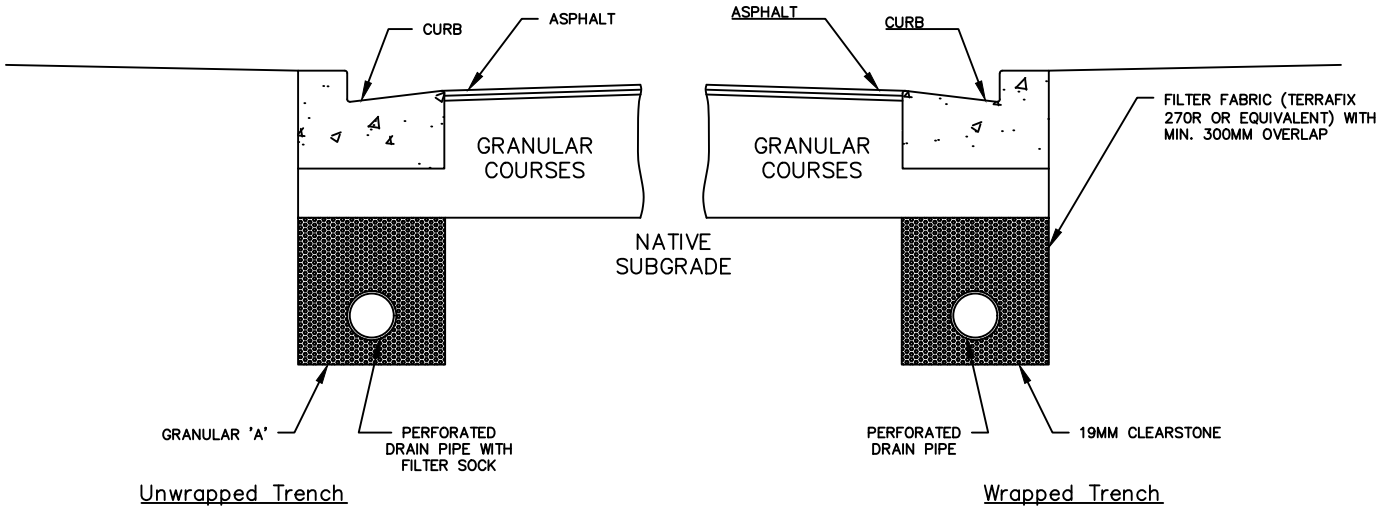


TYPICAL WINDOW REINFORCING

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FOUNDATION WALL REINFORCING ON ENGINEERED FILL TYPICAL DETAIL

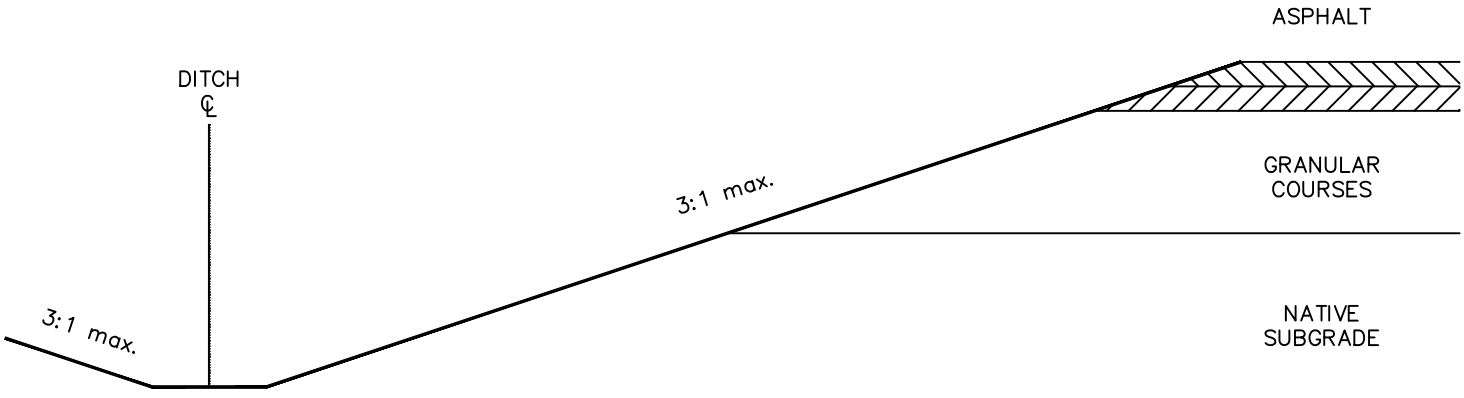




Unwrapped Trench

Wrapped Trench

Urban Cross Sections



Rural Cross Section

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647 Welham Rd, Unit 14, Barrie, ON, L4N 0B7

PAVEMENT DRAINAGE ALTERNATIVES TYPICAL DETAILS

Appendix E MASW Testing

SHEAR WAVE VELOCITY TESTING
FOR SEISMIC SITE CLASSIFICATION
NOTRE DAME CATHOLIC SCHOOL
140 ATLANTIS DRIVE, ORILLIA, ONTARIO

Submitted to:

GEI Consultants
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7

Attention:

Mr. Matthew Hobson, Geotechnical EIT Email: mhobson@geiconsultants.com

File No. F-25424

November 4, 2025

Frontwave Geophysics Inc.
Brampton, ON
(647) 514-4724
www.frontwave.ca

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1 INTRODUCTION

Frontwave Geophysics Inc. was retained by GEI Consultants to carry out a geophysical investigation for the proposed addition to Notre Dame Catholic School located at 140 Atlantis Drive in Orillia, Ontario.

The objective of the survey was to determine site designation for seismic site response based on average shear wave velocity value measured in the upper 30 m (V_S30). The multi-channel analysis of surface waves (MASW) method was used to obtain shear wave velocity profile.

The fieldwork was conducted on October 31, 2025. The location of the MASW survey line is shown in Figure 1.

This report describes the basic principles of MASW, survey design, interpretation method, and presents the results of the investigation in the chart and table format.

2 INVESTIGATION METHODOLOGY

Overview

The Multi-channel Analysis of Surface Waves (MASW) is a seismic method widely applied to produce shear wave velocity (V_S) profiles. It is based on the dispersive nature of Rayleigh or Love surface waves in layered media. Surface waves with longer wavelengths propagate deeper in the subsurface, hence, their phase velocity is more influenced by the elastic properties of deeper layers. The velocity of surface waves depends mainly on the shear wave velocity of the medium. The distribution of surface waves phase velocities as a function of wavelength (or frequency) can be visualized as a dispersion curve. The inverse problem is then solved by modelling the experimental data with a theoretical dispersion curve; the model parameters are typically limited to layer thickness and shear wave velocity with an assumption of horizontally layered strata. As a result of the inversion, a shear wave velocity depth profile is obtained. Figure 2 illustrates the overall procedure of the MASW method.

Two approaches different in data acquisition and processing can be implemented. The active method involves using artificial sources (e.g., sledgehammer, drop weight) to generate seismic energy, whereas the passive method utilizes energy generated by natural sources (wind, waves, microseismicity) and human activities (mostly vehicle traffic). The energy that can be generated with easily accessible active sources such as sledgehammers is typically concentrated within a relatively high frequency range, and the maximum depth of penetration for active surveys is limited to approximately 15-30 m, depending on the mass of the source and geology of the site. Ambient vibrations registered with the passive acquisition are usually of lower frequency and provide better resolution at greater depths. When survey logistics allow, the active and passive source methods are combined for obtaining well-resolved dispersion images over a wide frequency range, thus increasing the depth of investigation while retaining high resolution at shallow depths.



Legend

MASW Location of MASW survey line (69 m geophone spread)

Image: Google Earth 2022

Date:	2025-11-04
File No:	F-25424
Title:	Survey location plan
Location:	140 Atlantis Dr Orillia, ON

FRONTWAVE GEOPHYSICS

Figure: **1**

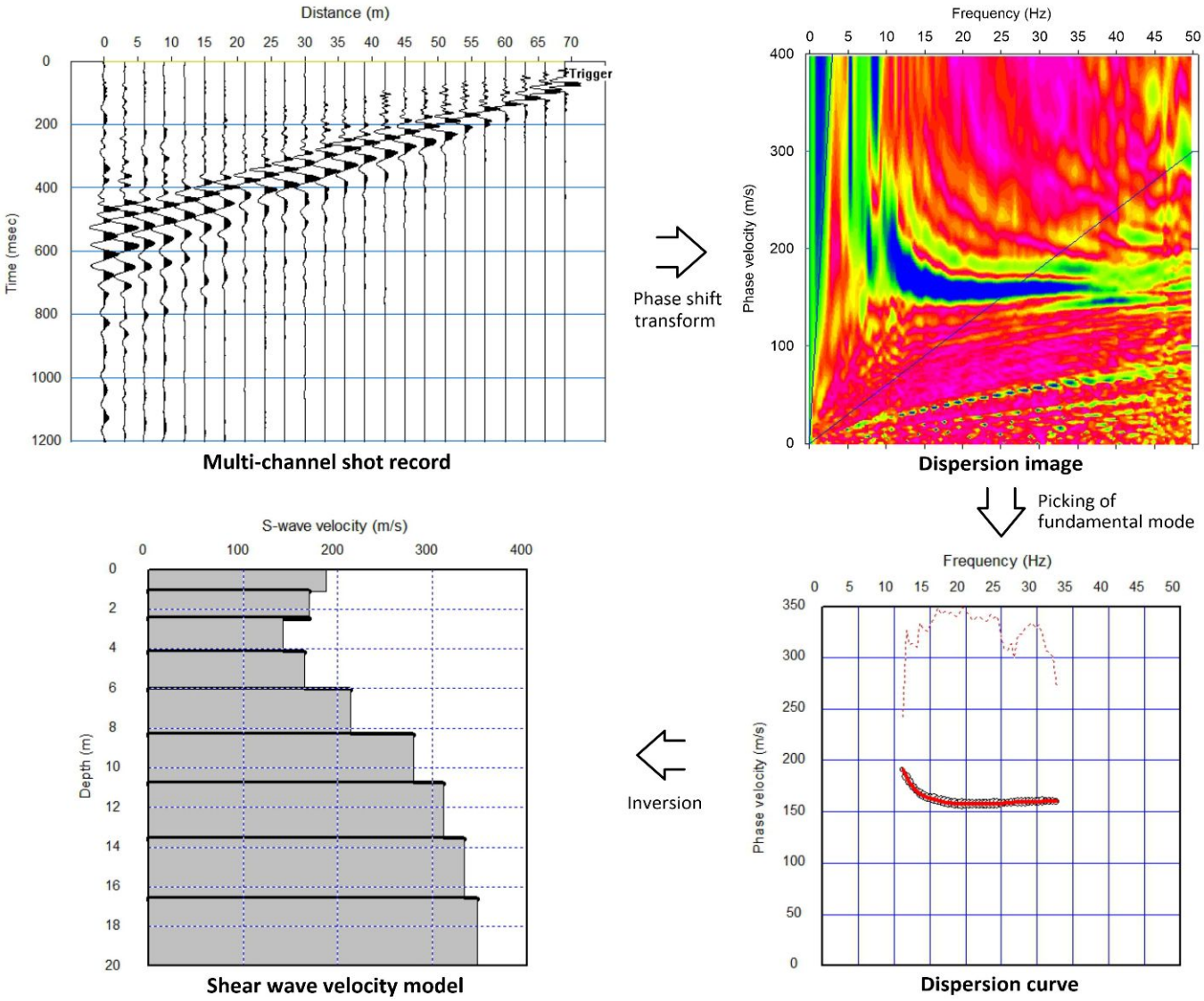


Figure 2 *The procedure of MASW data processing using the SeisImager SW software package.*

Survey Design

The acquisition layout consisted of 24 receivers in a linear array (spread), connected with a multicore cable to a DAQLink 4 seismograph. 4.5 Hz natural frequency vertical geophones were used for this survey. To optimize sampling of different wavelengths, two sets of measurements were conducted with spread lengths of 23 m and 69 m (1 m and 3 m spacing between geophones, respectively). Data collected with longer spreads provide a greater depth of investigation, whereas data collected with shorter geophone spacings ensure better resolution in the uppermost few meters of the subsurface.

An 8-kg sledgehammer was used as an energy source for active acquisition. Shots were executed at three to five locations per spread: two shots close to the ends of the spread and one to three

shots within the spread. A total of 8 shot records was collected. The record length was set to 1500 ms with a 0.05 ms sampling interval.

For passive acquisition, a linear 24-channel array with 3 m spacing between geophones was used. Ambient wavefield was recorded for 10 minutes with a sampling interval of 2 ms.

Interpretation

A dispersion curve is obtained from each field record by converting the shot gather into a dispersion image and then identifying and picking the fundamental mode. A shear wave velocity profile is obtained through inversion of the dispersion curve by modelling the subsurface as a horizontally layered medium with the model parameters limited to the number of layers, their thickness and shear-wave velocity.

SeisImager SW software package was used for processing, picking and inversion of the MASW data.

Some variability among the dispersion curves and resulting models obtained from different shot records is always observed due to lateral velocity variations, near and far field effects, different signal-to-noise ratio, etc. Combining independent inversion results from multiple shot records improves the estimation of the actual shear wave velocity and provides an assessment of uncertainty. The results of the interpretation are presented in the form of the average shear wave velocity profile; the observed variability of the MASW data is reported as upper and lower bound velocity profiles.

Accuracy of the results

The accuracy of MASW generally depends on the complexity of the subsurface and specific site conditions (noise levels, topography, etc.). Lateral velocity variations and steeper bedrock topography increase the dispersion uncertainty. The presence of high velocity contrast layers such as bedrock will require the use of a-priory information to optimize model parameters for more accurate results. Hence, if the a-priory information is not available (e.g. when the data are overly noisy to carry out refraction analysis), the accuracy decreases.

The uncertainty of the resulting S-wave velocity depth profile is evaluated using the upper and lower bound velocity profiles. Typically, the error margin of average V_S30 value determined from MASW is within ±10%.

3 RESULTS

The collected surface wave data were of fair quality; overall, the dispersion images of active and passive data covered a frequency range of approximately 5 to 60 Hz. Example shot record and MASW dispersion images obtained at this site are presented in Figure 3.

Seismic refraction analysis indicated that the depth to bedrock at this site was beyond the investigation depth of the refraction method (which was estimated to be approximately 21 m below the ground surface). Compressional (P) wave velocities in the overburden ranged from 250-500 m/s above the water table to approximately 2000 m/s below the water table.

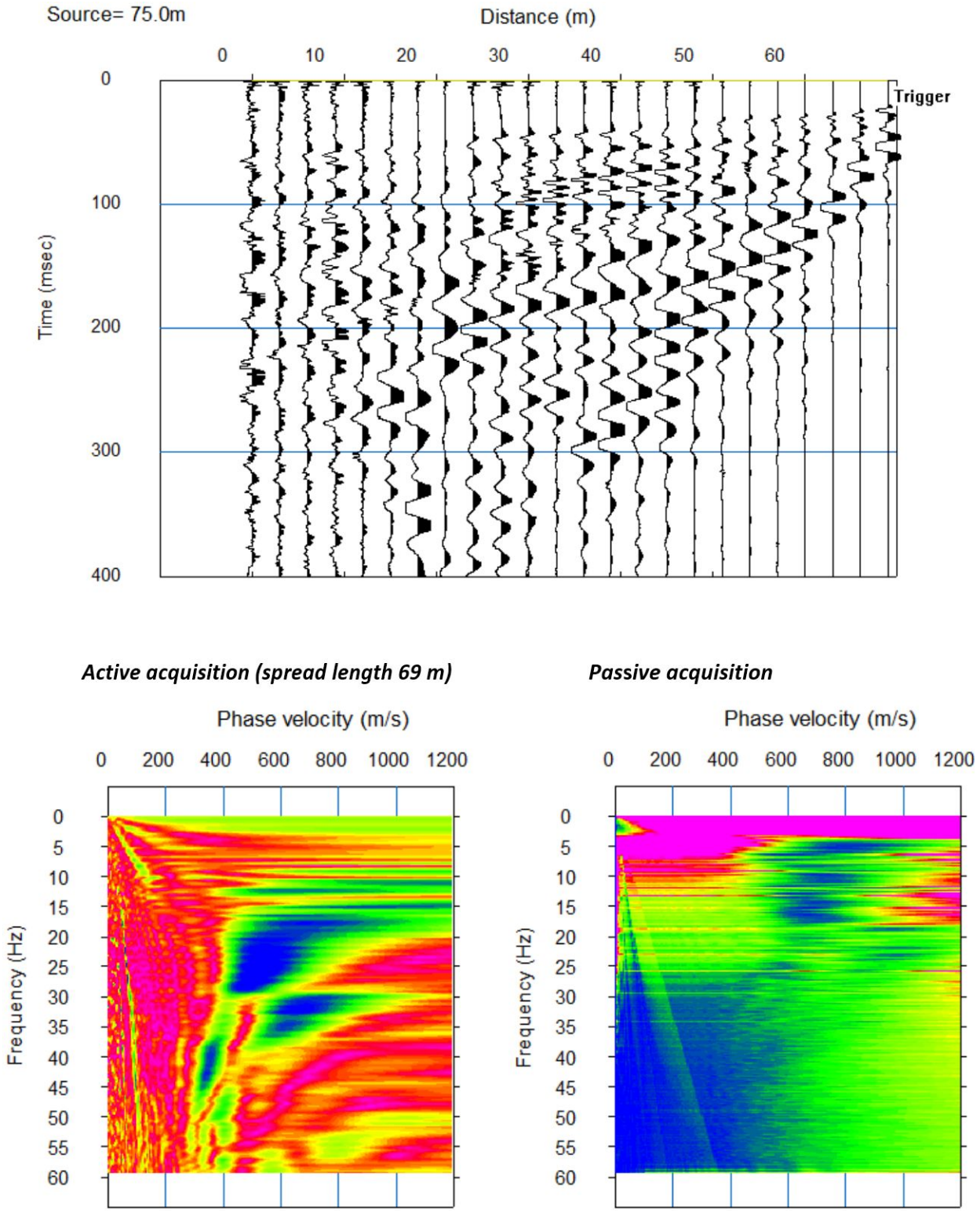


Figure 3 *Example shot record (top) and MASW dispersion images (bottom).*

The results of the MASW sounding are presented in Figure 4. The average shear wave velocity profile from the active shot records and passive data is plotted in the chart as a solid line. The dashed lines represent the upper and lower bound S-wave velocity profiles.

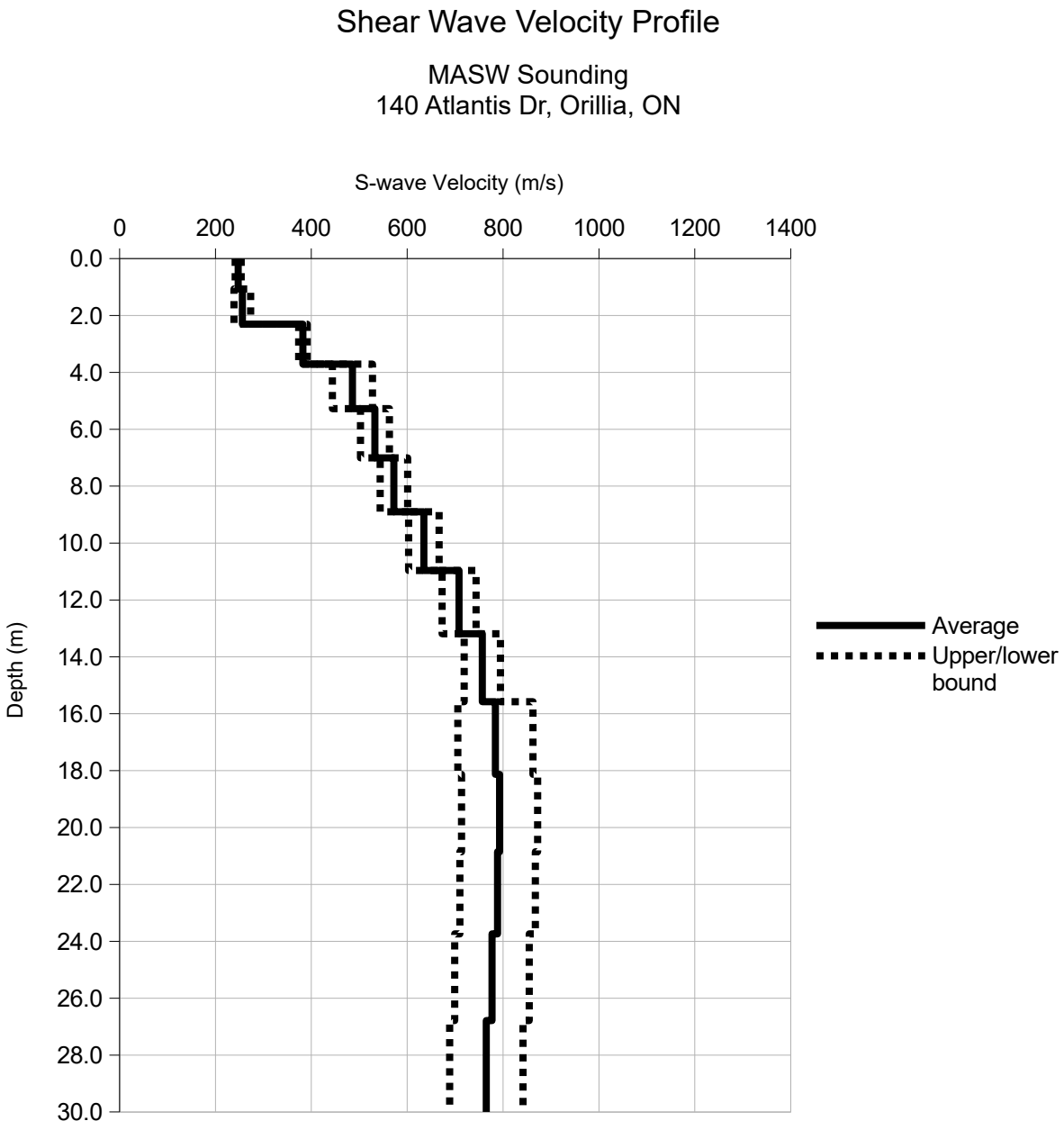


Figure 4 *Shear wave velocity profile from MASW sounding.*

The tabulated shear wave velocity model is presented in Table 1.

Table 1 *Shear wave velocities from MASW sounding.*

Depth Interval (m)		S-wave Velocity (m/s)
From	To	
0.0	1.1	248
1.1	2.3	256
2.3	3.7	382
3.7	5.3	486
5.3	7.0	533
7.0	8.9	572
8.9	11.0	635
11.0	13.2	708
13.2	15.6	757
15.6	18.1	784
18.1	20.9	793
20.9	23.7	789
23.7	26.8	777
26.8	30.0	765

The average shear wave velocity within the upper 30 meters (V_S30) is defined as the travel-time weighted average velocity from surface to a depth of 30 m and calculated using the following formula:

$$V_S30 = 30 / \Sigma (d/V_S),$$

where d is the thickness of any layer and V_S is the layer S-wave velocity. In other words, V_S30 is calculated as 30 m divided by the sum of the S-wave travel times for each layer within the topmost 30 m.

The calculated V_S30 values are presented in Table 2.

Table 2 *V_S30 values from MASW sounding.*

Depth Range (m)	Minimum V_S30 (m/s)	Average V_S30 (m/s)	Maximum V_S30 (m/s)	NBC 2020 Site Designation
0 to 30	551	**593**	633	**X_{593}**

The V_S30 values obtained from the MASW sounding varied from 551 m/s to 633 m/s with an average of 593 m/s.

Based on Sentence 4.1.8.4.(2b) of the National Building Code of Canada 2020 (NBC 2020), the **Site Designation** is **X_{593}**.

4 CLOSURE

Shear wave velocity testing involving the multi-channel analysis of surface waves (MASW) method was carried out for the proposed addition to Notre Dame Catholic School located at 140 Atlantis Drive in Orillia, Ontario.

The average shear wave velocity (V_S30) value calculated from in situ shear wave velocity measurements was **593 m/s**. Based on Sentence 4.1.8.4.(2b) of the National Building Code of Canada 2020 (NBC 2020), the applicable **Site Designation** is **X_{593}**.

We hope you find this report satisfactory. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Frontwave Geophysics Inc.



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