Geotechnical Investigation
Proposed Residential Development
1927 Maple Grove Road
Ottawa, Ontario

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Executive Summary

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the proposed residential development to be located at the property registered by the street address of 1927 Maple Grove Road, Ottawa, Ontario (Figure 1). Terms and conditions of this assignment were outlined in EXP Services Inc. (EXP) proposal number P92046GM dated November 27, 2020 and authorized by Latitude Homes Inc. (the client) on November 27, 2020.

It is our understanding that the proposed residential development will comprise of six (6) new townhome blocks each with one basement level with associated underground services and access road. Information regarding the elevation designed finished floors, exterior grades, sewer inverts were not available at the time of preparation of this report.

The site is currently occupied with a residential dwelling with associated amenities and septic bed/tank which will demolished/decommissioned to permit the construction of the proposed development.

The fieldwork for the geotechnical investigation was completed on December 22, 2020 and comprised of seven (7) boreholes (Borehole Nos. 1 to 7) advanced to refusal or termination depths ranging between 1.7 m and 6.2 m below the existing ground surface (Figure 2). Wash boring and core drilling techniques were used to advance Borehole Nos. 2 and 4 beyond the auger refusal depth into the bedrock.

The subsurface condition at the site generally comprises of topsoil, fill, and silty sand to silt with sand extending to depths of 0.8 m to 1.5 m below existing grade (Elevation 106.5 m to Elevation 105.0 m). The silty sand/sand silt is underlain by silty sand glacial till extending to depths of 1.7 m to 2.7 m (Elevation 105.4 m to Elevation 104.3 m). Refusal to augers at inferred bedrock was contacted at depths ranging between to 2.7 below the existing ground surface (Elevation 105.5 m to Elevation 104.3 m). The groundwater level was established at depths of 2.0 m to 2.3 m below the existing ground surface (Elevation 105.2 m to Elevation 104.5 m) 14 days following the completion of the fieldwork.

Based on the borehole information and Table 4.1.8.4.A in the 2012 Ontario Building Code (as amended May 2, 2019), the site classification for seismic site response is **Class C** and the subsurface soils are not susceptible to liquefaction during a seismic event.

Design grades were not available at the time of preparation of this report. However, compressible clay soils were not encountered at the site. Therefore, for preliminary design purposes, a grade raise of up to 1 m is considered feasible at the site from a geotechnical perspective.

Since design grades are not available at this time, it is not known whether the footings will be founded in the native soils, engineered fill or bedrock. Therefore, the report must be updated once this information becomes available.

The proposed new townhome blocks may be supported by strip and spread footings founded on the compact to very dense glacial till or on well compacted engineered fill (as required) and designed for a bearing pressure at serviceability limit state (SLS) of 150 kPa and factored geotechnical resistance at ultimate limit state (ULS) of 200 kPa. Settlement of footings designed for the above SLS bearing pressure is expected to be within the tolerable limits of 25 mm total and 19 mm differential. Engineered fill will be required in area of previous residence, septic bed and tank, in areas of loose soils (Borehole Nos 4 and

11), and in the event that the grades are raised at the site. The existing fill and silty sand to silt with sand are not suitable for founding purposes and must be removed and replaced with engineered fill.

Footings founded on the surface of the bedrock be designed for a factored geotechnical resistance at ULS of 1000 kPa. Settlement for footings founded on sound bedrock is expected to be minimal. The factored geotechnical resistance at ULS includes a geotechnical resistance factor of 0.5.

Footings for a single building must not bear partly on bedrock and partly on the glacial till/engineered fill. If this is the case, transition zone or construction joints must be provided to reduce the potential of differential settlement between the two founding mediums or the footings must be stepped down to be founded on the bedrock.

A minimum of 1.5 m of earth cover should be provided to the exterior foundations of heated structures to protect them from damage due to frost penetration. The frost cover should be increased to 2.1 m for unheated structures if snow will not be removed from their vicinity and to 2.4 m if snow will be removed from the vicinity of the structure. When earth cover is less than the minimum required, an equivalent thermal combination of earth cover and rigid insulation or rigid insulation alone should be provided.

The basement floors of the new buildings may be designed as a slab-on-grade set on a bed of clear stone placed on the glacial till or on well compacted engineered fill set on the glacial till. Perimeter and underfloor drainage systems are recommended for the proposed buildings. However, their requirements will be best established once the design grades are set for the site.

All excavation work should be completed in accordance with the Occupational Health and Safety Act (OHSA), Ontario, Reg. 213/91. Based on the definitions provided in OHSA, the subsurface soils at the site are considered to be Type 3 soil and therefore any open cut excavations undertaken within Type 3 soil, must be sloped back at 1H:1V from the bottom of the excavation. Bedrock excavation and removal will require line drilling and blasting and must be completed by a specialized contractor.

The existing septic bed, and tank must be decommissioned as per the MECP guideline and by a licensed contractor.

Vibrations monitoring during construction as well as well as pre-condition survey of all the structures and services situated within the proximity of the site should be completed.

Seepage of the surface and subsurface water into these excavations is anticipated. However, it should be possible to collect water entering the excavations at low points and to remove it by conventional pumping techniques. In areas of high infiltration or in areas where more permeable soil layers may occur, a higher seepage rate should be anticipated. Therefore, the need of high capacity pumps to keep the excavation dry should not be ignored.

It is anticipated that the majority of the material required for underfloor fill and backfilling purposes would have to be imported and should preferably conform to the specifications provided in the body of the report.

Pavement structure thicknesses required for the new access roads were computed and are provided in the body of the report.

It should be noted that parts of the site were not accessible due to trees, therefore, consideration should be given to conduct additional test pit investigation in this area once the trees are cleared and prior to tendering.

The above and other related considerations are discussed in greater detail in the attached report.

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1. Introduction

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the proposed residential development to be situated at the property registered by the street address of 1927 Maple Grove Road, Ottawa, Ontario (Figure 1). Terms and conditions of this assignment were outlined in EXP Services Inc. (EXP) proposal number: P92046GM dated November 27, 2020 and authorized by Latitude Homes Inc. (the client) on November 27, 2020.

It is our understanding that the proposed residential development will comprise of six (6) new townhome blocks each with one basement level with associated underground services and access roads. Information regarding the design finished floor elevations, exterior grades, sewer inverts were not available at the time of preparation of this report.

The site is currently occupied by a residential dwelling with associated amenities and a septic bed/tank which will demolished/decommissioned to permit the construction of the proposed development.

This geotechnical investigation was undertaken to:

a) Establish the subsurface soil and groundwater conditions at the locations of boreholes drilled throughout the site;

b) Provide classification of the site for seismic design in accordance with requirements of the 2012 Ontario Building Code (OBC) as amended May 2, 2019 and assess the liquefication potential of the subsurface soils in a seismic event;

c) Discuss grade raise restrictions;

d) Provide the bearing pressure at Serviceability Limit State (SLS) and factored geotechnical resistance at Ultimate Limit State (ULS) of the most suitable type of foundation for the new buildings, as well as anticipated total and differential settlements;

e) Comment on slab-on-grade construction and permanent drainage requirements;

f) Discuss lateral earth pressure against subsurface walls;

g) Discuss excavation conditions and dewatering requirements during construction of the foundations for the new buildings;

h) Provide pipe bedding requirements for the new underground services;

i) Comment on backfilling requirements and suitability of the on-site soils for backfilling purposes;

j) Comment on subsurface concrete requirements and the corrosion potential of subsurface soils to buried metal structures/members; and,

k) Recommend pavement structure thickness for the proposed subdivision roads.

The comments and recommendations given in this report assume that the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or it may require additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

2. Site Description

The site is located on the north side of Maple Grove Road and it is bounded by residential properties to the east and west sides and undeveloped green land on the north side (Figure 1). The site is currently occupied by a residential dwelling with amenities (swimming pool and a shed), septic tank and bed which will be demolished/decommissioned for the construction of the proposed development. Parts of the site are occupied by large trees.

The site is relatively flat to gently undulating downwards towards the north with ground surface elevations at the location of boreholes ranging between Elevation 106.51 m and Elevation 107.27 m.

3. Procedure

The fieldwork for the geotechnical investigation was completed on December 22, 2020 and consists of seven (7) boreholes (Borehole Nos. 1 to 7) advanced to refusal or termination depths ranging between 1.7 m and 6.2 m below the existing ground surface. Wash boring and core drilling techniques were used to advance Borehole Nos. 2 and 4 beyond the auger refusal depth. The boreholes were drilled using a track-mounted drill rig operated by a drilling specialist subcontracted to EXP and the fieldwork was supervised on a full-time basis by a representative from EXP.

The borehole locations were staked on site by EXP and their geodetic elevations established by EXP and Annis, O'Sullivan, Vollebekk Ltd. (Figure 2)

Prior to the fieldwork, the locations of the boreholes were cleared of any public and private underground services. Standard penetration tests (SPTs) were performed in the boreholes at 0.75 m depth intervals and the soil samples were retrieved by the split-barrel sampler. The bedrock was cored in two boreholes using conventional wash-boring and core-drilling techniques using an NQ-size core barrel. A careful record of any sudden drops of the drill rods, colour of wash water, and wash water return were kept during rock coring operation.

A 19 mm diameter standpipe with slotted section was installed in Borehole Nos. 2, 4, and 7 for long-term monitoring of the groundwater level. The standpipes were installed in accordance with EXP standard practice and the installation configuration is documented on the respective borehole logs. The boreholes were backfilled upon completion of the drilling and the installation of the standpipes.

All soil samples were visually examined in the field for textural classification, logged, preserved in plastic bags and identified. Similarly, all the rock cores were visually examined, placed in core boxes, identified and logged. On completion of the fieldwork, all the soil and rock samples were transported to the EXP laboratory in the City of Ottawa, Ontario, where they were visually examined by a geotechnical engineer, and borehole logs were prepared. The engineer also assigned the laboratory testing which consisted of performing the following tests on soil and rock samples:

Natural Moisture Content.....23 Tests
Unit Weight.....4 Tests
Grain Size Analysis.....3 Tests
Atterberg Limits.....1 Test
Chemical Analysis (pH, sulphate, chloride, and resistivity).....1 Test
Unit Weight and Unconfined Compressive Strength Tests on Rock Cores.....5 Tests

4. Subsurface Soil and Groundwater Conditions

A detailed description of the geotechnical conditions encountered in the boreholes is given on the borehole logs, Figures 3 to 9. The borehole logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time may also result in changes in the conditions interpreted to exist at the locations where sampling was conducted.

The boreholes were drilled to provide representation of subsurface conditions as part of a geotechnical exploration program and are not intended to provide evidence of environmental conditions.

It should be noted that the soil boundaries indicated on the borehole logs are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Descriptions" preceding the borehole logs forms an integral part of this report and should be read in conjunction with this report.

A review of the borehole logs indicates the following subsurface soil conditions with depth and groundwater level measurements.

4.1 Topsoil

A 150 mm to 360 mm thick topsoil was contacted at ground surface in all boreholes.

4.2 Fill

The topsoil in Borehole Nos. 4 and 7 is underlain by silty sand and sand fill that extends to depths ranging from 0.8 m and 1.5 m below existing grade (Elevation 106.2 m to Elevation 105.0 m). The fill material contains organic in Borehole Nos. 4. It is in a loose state as indicated by the SPT N-values of 4 to 9 and has a natural moisture content of 14.6 and 41.0 percent.

4.3 Silty Sand to Silt with Sand (SM to ML)

The topsoil in Borehole Nos. 1 to 3 and 5 to 6 and the fill in Borehole No. 7 are underlain by silty sand to silt with sand which extends to depths ranging from 0.8 m to 1.5 m below existing grade (Elevation 106.5 m to Elevation 105.5 m). This deposit contains organics, rootlets, cobbles and boulders in some of the boreholes. It is loose to dense as indicated by the SPT N-values of 4 to 38 and has a natural moisture content ranging from 12.4 percent to 29.5 percent.

Grain size analysis was conducted on two (2) samples from this deposit and the grain size distribution curves are shown in Figure Nos. 10 and 11 and the test results summarized in Table I.

Table I: Summary of Grain-size Analysis Results – Fill Sample						
Borehole No. – Sample No.	Depth (m)	Grain-size Analysis (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	
BH-1 – SS2	0.8 – 1.1	12	43	35	10	Silty SAND (SM)
BH-6 – SS2	0.8 – 1.4	11	18	58	13	SILT with Sand (ML)

Based on the results of the grain size analysis, the soil may be classified as a silty sand to silt with sand in accordance with the Unified Soil Classification System (USCS).

4.4 Glacial Till

The fill in Borehole Nos. 4 and the silty sand to silt with sand in all other boreholes are underlain by glacial till that extends surface of bedrock/inferred bedrock contacted at depths ranging from 1.6 m to 2.7 m (Elevation 105.5 m to Elevation 104.3 m) in all the boreholes. The glacial till consists of a silty sand with some gravel and contains cobbles and boulders. It is in a loose to very dense state as indicated by the SPT N-values ranging from 9 to over 50 per 300 mm of the sampler length and has a natural moisture content ranging from 6.2 to 31.5 percent.

Grain size analysis and Atterberg Limits were conducted on one (1) sample of the glacial till and the grain size distribution curve is shown in Figure 12 and the test results are summarized in Tables II and III.

Table II: Summary of Grain-size Analysis Results – Glacial Till Sample						
Borehole No. – Sample No.	Depth (m)	Grain-size Analysis (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	
BH-7 – SS3	1.5 – 2.1	11	43	33	13	Silty SAND (SM)

Table III: Summary of Atterberg Limits Results – Glacial Till Sample							
Borehole No. – Sample No.	Depth (m)	Atterberg Limits Results					Soil Classification (USCS)
		W_c (%)	LL (%)	PL (%)	PI (%)	LI	
BH-7 – SS3	1.5 – 2.1	9.0	Non-Plastic				Silty SAND (SM)
w_c: Moisture Content, **LL**: Limit Liquid; **PL:** Plastic Limit; **PI**: Plasticity Index; **LI**: Liquidity Index; (1): Refer to Casagrande Plasticity Chart (1932)							

Based on the results of the grain size analysis and Atterberg Limits, the glacial till may be classified as non-plastic silty sand in accordance with the Unified Soil Classification System (USCS).

4.5 Limestone Bedrock

Refusal to auger was met in all boreholes at depths ranging between 1.7 m and 2.7 m. In some of the boreholes, the spoon sampler penetrated the upper layers of the bedrock. It was also possible to auger through the upper 0.1 m to 0.5 m layer of the weathered bedrock in some of the boreholes. Wash-boring and core drilling techniques used to advance below the refusal depths in Borehole Nos. 2 and 4 revealed that refusal was met on bedrock. A review of the recovered bedrock cores and the bedrock geology map (Map 1508A – Generalized Bedrock geology, Ottawa-Hull, Ontario and Quebec, Geological Survey of Canada, printed by the Surveys and Mapping Branch, 1979) indicates that the site is underlain by limestone bedrock (with some shaley partings) of the Ottawa formation. A summary of the inferred bedrock depths and elevations is shown in Table IV.

Table IV: Summary of Inferred Bedrock Depths (Elevations) at Boreholes Locations

Borehole No.	Ground Surface Elevation (m)	Depth (Elevation) of Inferred Bedrock (m)	Bedrock Proven by Coring
BH-1	107.12	1.6 (105.5)	No
BH-2	107.27	2.4 (104.9)	Yes
BH-3	107.09	1.6 (105.5)	No
BH-4	106.51	2.0 (104.5)	Yes
BH-5	107.00	2.2 (104.8)	No
BH-6	106.96	2.6 (104.4)	No
BH-7	106.98	2.7 (104.3)	No

A Total Core Recovery (TCR) and Rock Quality Designation (RQD) of 94 to 100 percent and 74 to 98 percent respectively were obtained from the recovered bedrock cores. On this basis, the bedrock quality within the depth investigated may be classified as fair to excellent quality.

A total of five (5) rock core samples were selected for unconfined compressive strength testing and the test results are presented in Table V. A review of the test results indicates a bedrock with compressive strength of 82.0 MPa to 112.9 MPa. Based on these values, the rock can be classified with respect to intact strength as “strong to very strong”, (Canadian Foundation Engineering Manual, 4th Edition, 2006). The unit weight of the bedrock is 25.9 kN/m^3 to 26.2 kN/m^3. Photographs of the bedrock core recovered are presented in Figure Nos. 13 and 14.

Table V: Results of Unconfined Compressive Tests on Rock Core Samples			
Borehole No. – Run No.	**Depth (m)**	**Compressive Strength (MPa)**	**Unit Weight (kN/m³)**
BH-2 – Run 1	2.9 – 3.1	88.8	25.9
BH-2 – Run 2	4.3 – 4.5	82.0	26.1
BH-2 – Run 3	5.6 – 5.8	102.3	26.0
BH-4 – Run 1	2.1 – 2.3	112.9	26.2
BH-4 – Run 2	3.5 – 3.7	92.8	25.9

4.6 Groundwater Level

A summary of the groundwater depths and elevations measurements is shown in Table VI.

Table VI: Summary of Groundwater Depths and Elevations Measurements			
Borehole No.	**Ground Surface Elevation (m)**	**Depth (Elevation) of Groundwater Level (m)**	**Days After Installation**
BH-2	107.27	2.1 (105.2)	14
BH-4	106.51	2.0 (104.5)	14
BH-7	106.98	2.3 (104.7)	14

Groundwater levels were determined in the boreholes at the times and under the conditions stated in the scope of services. Note that fluctuations in the level of groundwater may occur due to a seasonal variation such as precipitation, snowmelt, rainfall activities, and other factors not evident at the time of measurement and therefore may be at a higher level during wet weather periods.

5. Seismic Site Classification and Liquefaction Potential of Soils

5.1 Site Classification for Seismic Site Response

Based on the borehole information and Table 4.1.8.4.A in the 2012 Ontario Building Code (as amended May 2, 2019), the site classification for seismic site response is **Class C.**

A higher site class will likely be obtained if a shear-wave velocity testing is completed at the site and provided that the maximum depth of overburden between the underside of footing and bedrock is less than 3 m which is likely the case for this site. However, this will be depended on the final design grades.

5.2 Liquefaction Potential of Soils

The subsurface soils are not susceptible to liquefaction during a seismic event.

6. Grade Raise Restrictions

The investigation has revealed the site is underlain by silty sand and sand fill, silty sand to silt with sand, and silty sand glacial till underlain by bedrock.

Design grades were not available at the time of preparation of this report. However, compressible clay soils were not encountered at the site. Therefore, for preliminary design purposes, a grade raise of up to 1 m is considered feasible at the site from a geotechnical perspective.

Should this assumption be incorrect, EXP should be contacted to review the acceptability of the proposed grade raise from a geotechnical point of view and provide updated bearing pressure value at serviceability limit state (SLS) and factored geotechnical resistance value at ultimate limit state (ULS) for the footings of the new buildings in view of the required grade raise.

7. Foundation Considerations

Design grades for the finished floors, basement floors, and invert of the sewers were not available at the time of preparation of this report. Therefore, this section should be updated once this information become available.

The investigation has revealed the subsurface condition to comprise of fill, silty sand to silt with sand, glacial till, and limestone bedrock. The fill, silty sand to silt with sand, and some loose pockets of the glacial till are not suitable founding material and must be removed if encountered at founding levels and replaced with engineered fill. In addition, following demolishing of the existing residence dwellings and amenities and the decommissioning of the septic bed/tank, removal of all fill/construction debris down to the surface of the undisturbed native soils, these excavations must be backfilled with engineered fill prepared as described below.

In areas where engineered fill will be required, it should comprise of OPSS 1010 Granular B Type II placed in 300 mm lifts and each lift compacted to 100 percent of the standard Proctor maximum dry density (SPMDD) in accordance with ASTM D-698-12e2. The engineered fill pad must extend at least 0.6 m from the exterior edge of the footing and then slope down at a gradient of 1H:1V.

Footings designed to bear on the compact to very dense glacial till or on well prepared engineered fill pad founded on the glacial till may be designed for a bearing pressure at Serviceability Limit State (SLS) of 150 kPa and a factored geotechnical resistance at ultimate limit state (ULS) of 200 kPa. The factored geotechnical resistance at ULS includes a geotechnical resistance factor of 0.5. Settlements of footings designed for the above SLS bearing pressure are expected to be within the tolerable limits of 25 mm total and 19 mm differential.

Footings founded on the sound bedrock (if the case) below any weathered or fractured zone may be designed for a factored geotechnical resistance at ULS of 1000 kPa. For footings founded on sound bedrock, factored geotechnical resistance at ULS will govern the design. Settlement of footings founded on sound bedrock is expected to be minimal.

Footings for a single building must not bear partly on bedrock and partly on the glacial till/ engineered fill. If this is the case, transition zone or construction joints must be provided to reduce the potential of differential settlement between the two founding mediums or the footings must be stepped down to be founded on the bedrock.

A minimum of 1.5 m of earth cover should be provided to the exterior foundations of heated structures to protect them from damage due to frost penetration. The frost cover should be increased to 2.1 m for unheated structures if snow will not be removed from their vicinity and to 2.4 m if snow will be removed from the vicinity of the structure. When earth cover is less than the minimum required, an equivalent thermal combination of earth cover and rigid insulation or rigid insulation alone should be provided. EXP can provide additional comments in this regard, if required.

The founding surfaces should be reviewed and approved by a geotechnician prior to placement of concrete and or placement and compaction of the engineered fill.

The recommended bearing pressure at SLS and factored geotechnical resistances at ULS have been calculated by EXP from the borehole information for the design stage only. The investigation and

comments are necessarily on-going as new information of underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field monitoring provided by an experienced geotechnical engineer to validate the information for use during the construction stage.

8. Slab-on-Grade Construction

The basement floors of the new buildings may be designed as a slab-on-grade set on a bed of clear stone placed on the glacial till or on well compacted engineered fill set on the glacial till prepared as described in Section 7.

Perimeter and underfloor drainage systems are recommended for the proposed buildings. However, their requirements will be best established once the design grades are set for the site. For general guidance, the drainage systems may consist of a 100 mm perforated pipes wrapped with filter cloth (sock) and set on the foundations or under the slab-on-grade and surrounded with 150 mm of 19 mm clear stone and properly connected to an outflow. It is recommended that the perimeter and underfloor drainage systems be connected to separate outflows.

The ground floor of the new buildings should be at least 150 mm above the finished exterior grade. The finished exterior grade should be sloped away from the buildings to prevent ponding of surface water close to the exterior walls.

9. Lateral Earth Pressure to Subsurface Walls

The subsurface basement walls of the new buildings should be backfilled with free draining material, such as OPSS 1010 Granular B Type II and equipped with a perimeter drainage system to prevent the buildup of hydrostatic pressure behind the walls. The walls will be subjected to lateral static and dynamic (seismic) earth forces. The expressions below assume free draining backfill material, a perimeter drainage system, level backfill surface behind the wall and vertical face on the back side of the wall.

For design purposes, the lateral static earth thrust against the subsurface walls may be computed from the following equation:

$$P = K_0\, h\, (½\, \gamma h + q)$$

where P = lateral earth thrust acting on the subsurface wall; kN/m

K_0 = lateral earth pressure coefficient for 'at rest' condition for Granular B Type II backfill material = 0.50

γ = unit weight of free draining granular backfill; Granular B Type II = 22 kN/m^3

h = depth of point of interest below top of backfill, m

q = surcharge load stress, kPa

The lateral seismic thrust may be computed from the equation given below:

$$\Delta_{Pe} = \gamma H^2 \frac{a_h}{g} F_b$$

where Δ_{Pe} = dynamic thrust in kN/m of wall

H = height of wall, m

γ = unit weight of backfill material = 22 kN/m^3

$\frac{a_h}{g}$ = seismic coefficient = 0.32

F_b = thrust factor = 1.0

The dynamic thrust does not take into account the surcharge load. The resultant force acts approximately at 0.63H above the base of the wall.

All subsurface walls should be properly waterproofed.

10. Excavation and De-Watering Requirements

10.1 Excess Soil Management

A new Ontario Regulation 406/19 made under the Environmental Protection Act (November 28, 2019) has been implemented as of January 1, 2021. The new regulation dictates the testing protocol that is required for the management and disposal of excess soils. As set forth in the regulation, specific analytical testing protocols need to be implemented and followed based on the volume of soil to be managed. The testing protocols are specific as to whether the soils are stockpiled or in situ. In either scenario, the testing protocols are far more onerous than have been historically carried out as part of standard industry practices. These decisions should be factored in and accounted for prior to the initiation of the project-defined scope of work. EXP would be pleased to assist with the implementation of a soil management and testing program that would satisfy the requirements of Ontario Regulation 406/19.

10.2 Excavations

Excavations for the construction of the townhome building blocks and underground services are expected to extend to a maximum depth of 2.0 to 3.0 m below the existing ground surface. These excavations will extend through the fill, silty sand to silt with sand, glacial till, and into the bedrock depending on the final design grades.

The overburden soils have been classified as Type 3 soils in accordance with the Occupational Health and Safety Act (OHSA), Ontario, Reg. 213/91 and therefore any open excavation must be sloped back at 1H:1V from the bottom of the excavation. Within zones of persistent seepage or below the groundwater level, the excavation side slopes are expected to slough and eventually stabilize at 2H:1V from the bottom of the excavation.

Excavations into the overburden soils may be undertaken using conventional equipment capable of removing cobbles and boulders and large tree roots within the overburden soils. Excavation of the bedrock would require the use of hoe-ramming and/or line drilling and may be undertaken with near vertical sides. Contractor bidding on this project must review the available data and decide on their own the most suitable method to excavate the bedrock, i.e. line drilling, blasting, etc. It should be noted that lab testing has revealed the bedrock underlaying the site to be strong to very strong.

Vibrations should be monitored during construction to prevent damage to adjacent structures and services. A pre-condition survey of all the structures and services situated within the proximity of the site will be required prior to the commencement of construction and during the excavation of the bedrock. Care must be undertaken to ensure that the footings of the neighboring properties are not undermined or damaged during construction.

The existing septic bed, and tank must be decommissioned as per the MECP guideline and by a licensed contractor.

Many geologic materials deteriorate rapidly upon exposure to meteorological elements. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from moisture, desiccation, and frost action throughout the course of construction.

10.3 De-Watering Requirements and Impact on Surrounding Structures and Infrastructure

For excavations extending to 2.0 to 3.0 m below the existing grade, the excavations are anticipated to be below groundwater level. Therefore, the removal of groundwater from the excavation will be required.

Seepage of the surface and subsurface water into these excavations is anticipated. However, it should be possible to collect water entering the excavations at low points and to remove it by conventional pumping techniques. In areas of high infiltration or in areas where more permeable soil layers may exist, a higher seepage rate should be anticipated. Therefore, the need of high capacity pumps to keep the excavation dry should not be ignored.

It has been assumed that the maximum excavation depth at the site will be approximately 2.0 to 3.0 m and groundwater removal is anticipated to be required. Therefore, it is noteworthy to mention that new legislation came into force in Ontario on March 29, 2016 to regulate groundwater takings for construction dewatering purposes. Prior to March 29, 2016, a Category 2 Permit to Take Water (PTTW) was required from the Ontario Ministry of the Environment and Climate Change (MOECC) for groundwater takings related to construction dewatering, where taking volumes in excess of 50 m3/day, but less than 400 m3/day, and the taking duration was no more than 30 consecutive days. The new legislation replaces the Category 2 PTTW for construction dewatering with a new process under the Environmental Activity and Sector Registry (EASR). The EASR is an on-line registry, which allows persons engaged in prescribed activities, such as water takings, to register with the MOECC instead of applying for a PTTW.

To be eligible for the new EASR process, the construction dewatering taking must be less than 400 m3/day under normal conditions. The water taking can be groundwater, storm water, or a combination of both. It should be noted that the 30-consecutive day limit on the water taking under the old Category 2 PTTW process has been removed in the new EASR process. Also, it should be noted that the EASR process requires two technical studies be prepared by a Qualified Person, prior to any water taking. These studies include a Water Taking Report, which provides assurance that the taking will not cause any unacceptable impacts, and a Discharge Plan, which provides assurance that the discharge will not result in any adverse impacts to the environment. EXP has qualified persons who can prepare these types of reports, if required. A significant advantage of the new EASR process over the former Category 2 PTTW process, is that the groundwater taking may begin immediately after completing the on-line registration of the taking and paying the applicable fee, assuming the accompanying technical studies have been completed. The former PTTW process typically took more than 90 days, which had the potential to impact construction schedules.

Although this investigation has estimated the groundwater levels at the time of the fieldwork, and commented on dewatering and general construction problems, conditions may be present which are difficult to establish from standard boring and excavating techniques and which may affect the type and nature of dewatering procedures used by the contractor in practice. These conditions include local and seasonal fluctuations in the groundwater table, erratic changes in the soil profile, thin layers of soil with large or small permeabilities compared with the soil mass, etc. Only carefully controlled tests using pumped wells and observation wells will yield the quantitative data on groundwater volumes and pressures that are necessary to adequately engineer construction dewatering systems.

11. Pipe Bedding Requirements

It is recommended that the bedding for the underground services including material specifications, thickness of cover material and compaction requirements conform to City of Ottawa requirements and/or Ontario Provincial Standard Specification and Drawings (OPSS and OPSD).

The pipe subgrade material is anticipated to be glacial till or bedrock. In this case, it is recommended the pipe bedding consist of 300 mm thick OPSS 1010 Granular A bedding material for the glacial till subgrade and consist of 150 mm thick OPSS 1010 Granular A bedding material for the bedrock subgrade. The bedding materials should be compacted to at least 98 percent SPMDD. A transition zone in the pipe bedding must be provided when the founding material changes from overburden soils to bedrock and vice versa. In the areas where the bedrock slopes at a steeper gradient than 3H:1V, the bedrock should be excavated and additional bedding material placed to create a 3H:1V transition zone. The bedding material should be also placed along the sides and on top of the pipes to provide a minimum cover of 300 mm and should be compacted to at least 98 percent SPMDD.

12. Backfilling Requirements and Suitability of On-Site Soils for Backfilling Purposes

The material to be excavated from the site will consist of fill, silty sand to silt with sand, silty sand glacial till with boulders and cobbles, and bedrock. These soils are not considered suitable for use under structural elements and for backfilling purposes or against foundation walls.

Portion of the on-site excavated material fill and glacial till from above the groundwater level and free of debris, cobbles, boulders, and organic material may be used as backfill of services trenches situated in the exterior of the buildings following further sampling and testing during construction. However, these soils are susceptible to moisture absorption due to precipitation and must be protected if stockpiled on-site for re-use. The excavated material may be used also for general grading purposes in landscaped areas.

It is anticipated that the majority of the material required for underfloor fill and backfilling purposes would have to be imported and should preferably conform to the following specification:

- Engineered fill under the slab-on-grade area and footings - OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 98 and 100 percent SPMDD respectively.
- Backfill in footing trenches and against foundation walls – OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 98 percent of the SPMDD inside the building and 95 percent SPMDD outside the building respectively.
- Backfill in services trenches inside building – OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 98 percent of the SPMDD.
- Backfill in exterior services trenches or subgrade fill– OPSS 1010 Select Subgrade Material (SSM) placed in 300 mm thick lifts and each lift compacted to 95 percent of the SPMDD or on-site approved excavated material as noted above. Trench backfill and subgrade fill, select on-site material free if organics, boulders and cobbles and following further sampling and testing during construction.

13. Subsurface Concrete and Steel Requirements

Chemical tests limited to pH, chloride, sulphate and resistivity were performed on one (1) selected soil sample. The certificate of the laboratory analysis is attached in Appendix A and the results are summarized in Table VII.

Table VII: Chemical Test Results on Soil Sample

Borehole No. (Sample No.)	Soil Type	Depth (m)	pH	Sulphate (%)	Chloride (%)	Resistivity (ohm-cm)
BH-6 (SS3)	Glacial Till	1.5 – 2.0	8.18	0.0016	0.0006	6850

The test results indicate the sulphate content in the glacial till is 0.0016 percent. The sulphate content is less than 0.1 percent. This concentration in the glacial till would have a negligible potential of sulphate attack on subsurface concrete. The concrete should be designed in accordance with Table Nos. 3 and 6 of CSA A.23.1-14. However, the concrete should be dense, well compacted and cured.

Based on a review of the resistivity test result, the glacial till sample is considered mildly corrosive to bare steel as per the National Association of Corrosion Engineers (NACE). Appropriate measures should be undertaken to protect buried steel elements from corrosion.

14. Pavement Structure

Pavement structure thicknesses required for the new access road and parking areas were computed and are shown on Table VIII. The thicknesses are based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples and pavement functional design life of ten to fifteen (10 to 15) years. The proposed functional design life represents the number of years to the first rehabilitation, assuming regular maintenance is carried out. The subgrade is anticipated to consist of the native compact silty sand to silt with sand, compact to very dense glacial till, or select subgrade material (SSM).

Table VIII: Recommended Pavement Structure Thicknesses for Overburden Soil Subgrade

Pavement Layer	Compaction Requirements	Light Duty Traffic (vehicles only)	Heavy Duty Traffic (trucks)
Asphaltic Concrete (PG 58-34)	92 - 97 percent MRD*	65 mm HL3 or SP12.5 Cat B	40 mm HL3/SP12.5 Cat B 50 mm HL8 or SP 19 Cat B
OPSS 1010 Granular A Base	100 percent SPMDD**	150 mm	150 mm
OPSS 1010 Granular B Type II Sub-Base	100 percent SPMDD**	300 mm	450 mm

**Denotes maximum relative density.*

*** Denotes standard Proctor maximum dry density, ASTM-D698-12e2.*

Construction procedures for the pavement structure are discussed below.

The foregoing design assumes that construction is carried out during dry periods and that the subgrade is undisturbed under the load of construction equipment. If construction is carried out during wet weather, and heaving or rolling of the subgrade is experienced, additional thickness of granular material and/or geotextile may be required.

Additional comments on the construction of the new access roads are as follows:

- As part of the subgrade preparation for the new pavement, the pavement area should be stripped of existing fill materials, asphalt, topsoil and organic soils, and other obviously unsuitable material down to subgrade level. The subgrade should be properly shaped, crowned, then proofrolled using a ten (10) vibratory roller in the full-time presence of a representative of this office. Any loose, soft, or spongy subgrade areas detected should be sub-excavated and replaced OPSS 1010 Granular B Type II material placed in 300 mm lifts and each lift compacted to 95% of the SPMDD in accordance with ASTM D698-12e2.

- It is noted that the long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure that uniform subgrade moisture and density conditions are achieved. Therefore, it is recommended that as a minimum precautionary measure, sub-drains stubs be installed at all

catchbasins and extend a distance of 3 m in all directions. This will ensure no water collects in the granular course, which could result in pavement distress during the spring thaw. If this assumption is not correct, this office must be contacted to revise the drainage requirements. This is will be best established once the design grades are set.

- To minimize the problems of differential movement between the pavement and catchbasins/manhole due to frost action, the backfill around the structures should consist of free-draining granular preferably conforming to OPSS Granular B Type II material. Care should be taken to ensure that the fill around the services installation (catchbasins and manholes) is properly compacted using smaller compaction equipment's. Weep holes should be provided in the catchbasins/manholes to facilitate drainage of any water that may accumulate in the granular fill.

- The most severe loading conditions on pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted lanes, half-loads during paving, temporary construction roadways, etc., may be required, especially if construction is carried out during unfavorable weather.

- The finished pavement surface should be free of depressions and should be sloped (preferably at a minimum cross fall of 2 percent) to provide effective surface drainage towards catch basins. Surface water should not be allowed to pond adjacent to the outside edges of paved areas.

- Relatively weaker subgrade may develop over service trenches at subgrade level. Therefore, only compactible and dry soil should be used as backfill in the services trenches. The use of a geotextile may be required at subgrade level and should be allowed for as a provisional item in the contract.

- The granular materials used for pavement construction should conform to Ontario Provincial Standard Specifications (OPSS 1010) for Granular A and Granular B Type II and should be compacted to 100 percent of the SPMDD. The asphaltic concrete used and its placement should meet OPSS 1150 or 1151 requirements. It should be compacted from 92 percent to 97 percent of the MRD (ASTM D2041). Asphalt placement should be in accordance with OPSS 310 and OPSS 313.

- It is recommended that EXP be retained to review the final pavement structure design and drainage plans prior to construction to ensure they are consistent with the recommendations of this report.

15. General Comments

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions, between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much 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.

It should be noted that parts of the site were not accessible due to trees, therefore, consideration should be given to conduct additional test pit investigation in this area once the trees are cleared and prior to tendering.

The information contained in this report is not intended to reflect on environmental aspects of the soils and groundwater. Should specific information be required, including for example the presence of pollutants, contaminants or other hazards in the soil, additional testing may be required.

We trust that the information contained in this report is satisfactory for your purposes. Should you have any questions, please contact this office.

Sincerely.

DRAFT

Athir Nader, M.A.Sc., P.Eng.
Senior Project Manager, Geotechnical Services
Earth and Environment

DRAFT

Ismail Taki, M.Eng, P.Eng.
Manager, Geotechnical Services
Earth and Environment

Figures

0 50m 100m 200m

HORIZONTAL 1:5,000

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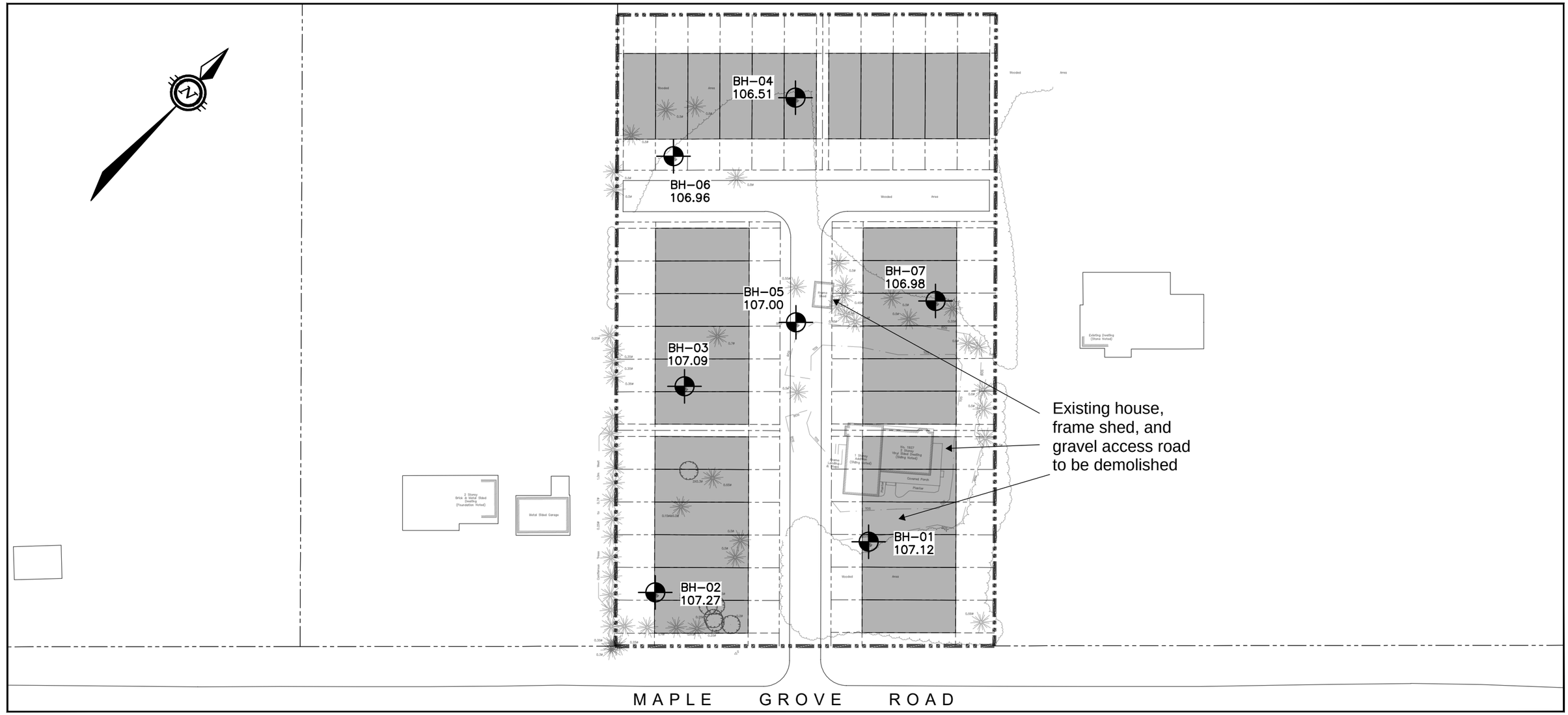
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: JANUARY 2021	CLIENT: LATITUDE HOMES INC.	project no. OTT-00263193-A0
DESIGN: A.N. / CHECKED: I.T.	TITLE: PROPOSED RESIDENTIAL DEVELOPMENT SITE LOCATION PLAN 1927 MAPLE GROVE ROAD, OTTAWA, ONTARIO	scale 1:5,000
DRAWN BY: G.C.		FIG 1

FILENAME Last Saved: LASTSAVED Last Plotted: LASTPLOTTED Plotted by: PLOTTEDBY



LEGEND

BH–01
107.12 — BOREHOLE LOCATION, NUMBER AND GROUND SURFACE ELEVATION

0 5m 10m 30m
HORIZONTAL 1:750

NOTES:

1. THE BOUNDARIES, SOIL AND ROCK TYPES HAVE BEEN ESTABLISHED ONLY AT BOREHOLE AND TEST PIT LOCATIONS. BETWEEN BOREHOLES AND TEST PITS THEY ARE ASSUMED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.
2. SOIL AND ROCK SAMPLES WILL BE RETAINED IN STORAGE FOR THREE MONTHS AND THEN DESTROYED UNLESS THE CLIENT ADVISES THAT AN EXTENDED TIME PERIOD IS REQUIRED.
3. TOPSOIL QUANTITIES SHOULD NOT BE ESTABLISHED FROM THE INFORMATION PROVIDED AT THE BOREHOLE LOCATIONS.
4. BOREHOLE ELEVATIONS SHOULD NOT BE USED TO DESIGN BUILDING(S) OR FLOOR SLABS OR PARKING LOT(S) GRADES.
5. THIS DRAWING FORMS PART OF THE REPORT PROJECT NUMBER AS REFERENCED AND SHOULD BE USED ONLY IN CONJUNCTION WITH THIS REPORT.
6. BASE PLAN INFORMATION OBTAINED FROM ANNIS, O'SULLIVAN, VOLLEBEEK LTD. JOB NO. 21020–20 DATED DECEMBER 21, 2020.

EXP Services Inc. www.exp.com
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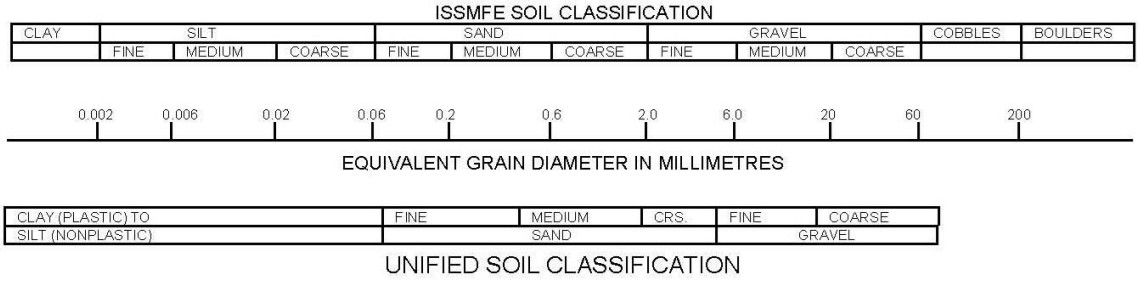
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: JANUARY 2021	CLIENT: LATITUDE HOMES INC.	project no. OTT-00263193-A0
DESIGN: A.N. / CHECKED: I.T.	TITLE: PROPOSED RESIDENTIAL DEVELOPMENT BOREHOLE LOCATION PLAN 1927 MAPLE GROVE ROAD, OTTAWA, ONTARIO	scale 1:750
DRAWN BY: G.C.		FIG 2

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Societv for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by **exp** Services Inc. also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.



2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Log of Borehole BH-1

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 3

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)
Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~310 mm thick	107.12	0				
		SILTY SAND (SM) Trace to some gravel, some rootlets and organics, brown to grey, moist (loose)	106.8		8		SS1	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, brownish grey, moist (compact)	106.0	1	12		SS2	
			105.5		50 for 125 mm		SS3	
		POSSIBLE WEATHERED BEDROCK Limestone bedrock pieces	105.4					
		Auger Refusal at 1.7 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS		
Date	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.7

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

Log of Borehole BH-2

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 4

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —○—
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		TOPSOIL ~310 mm thick	107.27	0
		SILTY SAND (SM) Trace to some gravel, brown to grey, moist (loose)	107.0	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, brownish grey to grey, moist (compact)	106.5	1
▽			105.17	2
		LIMESTONE BEDROCK With shale partings, light grey with black partings, fine to medium grained, fresh to moderately weathered, highly weathered at the upper 0.4 m, strong to very strong, (fair to excellent quality)	104.9	
			101.1	6
		Borehole Terminated at 6.2 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

8 (SS1)
18 (SS2)
28 (SS3)
85 for 175 mm (SS4)

SAMPLES	Natural Unit Wt. kN/m³
SS1	
SS2	
SS3	
SS4	
RUN1	
RUN2	
RUN3	

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. 19 mm diameter standpipe installed upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
On Completion	NA	6.2
14 Days	2.1	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	2.7 - 3.2	94	75
2	3.2 - 4.7	100	90
3	4.7 - 6.2	100	98

Log of Borehole BH-3

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 5

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~310 mm thick	107.09	0	4		SS1	
		SILTY SAND (SM) Trace to some gravel, brown to grey, moist (loose)	106.8					
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, brownish grey, moist (dense)	106.3	1	33		SS2	22.4
		POSSIBLE WEATHERED BEDROCK Limestone bedrock pieces	105.5		99 for 230 mm		SS3	
		Auger Refusal at 2.1 m Depth	105.0	2				

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
On Completion	Dry	2.1

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

Log of Borehole BH-4

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 6

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○⊣
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~310 mm thick	106.51	0				
		FILL Silty sand, trace to some gravel, organic, brown to grey, moist to wet (loose)	106.2		5	×	SS1	
				1	4	×	SS2	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, grey, wet (loose)	105.0		9	×	SS3	
		LIMESTONE BEDROCK With shale partings, light grey with black partings, fine to medium grained, fresh to moderately weathered, highly weathered at the upper 0.3 m, strong to very strong, (fair to excellent quality)	104.5 104.51	2			RUN1	
				3			RUN2	
				4				
				5			RUN3	
		Borehole Terminated at 5.5 m Depth	101.0					

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. 19 mm diameter standpipe installed upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
On Completion	NA	5.5
14 Days	2.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	2.1 - 3	100	74
2	3 - 4.5	100	98
3	4.5 - 5.5	100	84

Log of Borehole BH-5

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 7

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~360 mm thick	107	0				
		SILTY SAND (SM) Trace to some gravel, brown to grey, moist (loose)	106.6		6	×	SS1	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, brownish grey to grey, moist (compact to very dense)	106.0	1	11	×	SS2	23.7
					51	×	SS3	23.2
			104.8	2				
		Auger Refusal at 2.2 m Depth						

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS		
Date	Water Level (m)	Hole Open To (m)
On Completion		

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

Log of Borehole BH-6

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 8

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~260 mm thick	106.96	0				
		SILTY SAND TO SILT WITH SAND (SM TO ML) Trace to some gravel, possible cobbles and boulders, brown to grey, moist to wet (loose to dense)	106.7		5		SS1	
				1	38		SS2	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, grey, moist (very dense)	105.5		75		SS3	
				2	80 for 230 mm		SS4	
			104.4					
		Auger Refusal at 2.6 m Depth						

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

WATER LEVEL RECORDS		
Date	Water Level (m)	Hole Open To (m)
On Completion		

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

Log of Borehole BH-7

Project No: OTT-00263193-A0

Project: Proposed Residential Development

Location: 1927 Maple Grove Road, Ottawa, Ontario

Figure No. 9

Page. 1 of 1

Date Drilled: 'December 22, 2020

Drill Type: Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A. Neguss Checked by: A. Nader

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~150 mm thick	106.98	0				
		FILL Sand, brown, moist (loose)	106.8		9	×	SS1	
		SILTY SAND (SM) Trace to some gravel, brown to grey, moist (compact)	106.2	1	11	×	SS2	
		GLACIAL TILL Silty sand (SM), some gravel, cobbles and boulders, grey, moist (dense to very dense)	105.5	2	37	×	SS3	22.4
▼			104.68		53 for 175 mm		SS4	
		Auger Refusal at 2.7 m Depth	104.3					

LOG OF BOREHOLE LOGS OF BOREHOLES - PROPOSED RESIDENTIAL DEVELOPMENT - 1927 MAPLE GROVE RD.GPJ TROW OTTAWA.GDT 1/28/21

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. 19 mm diameter standpipe installed upon completion of the drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00263193-A0

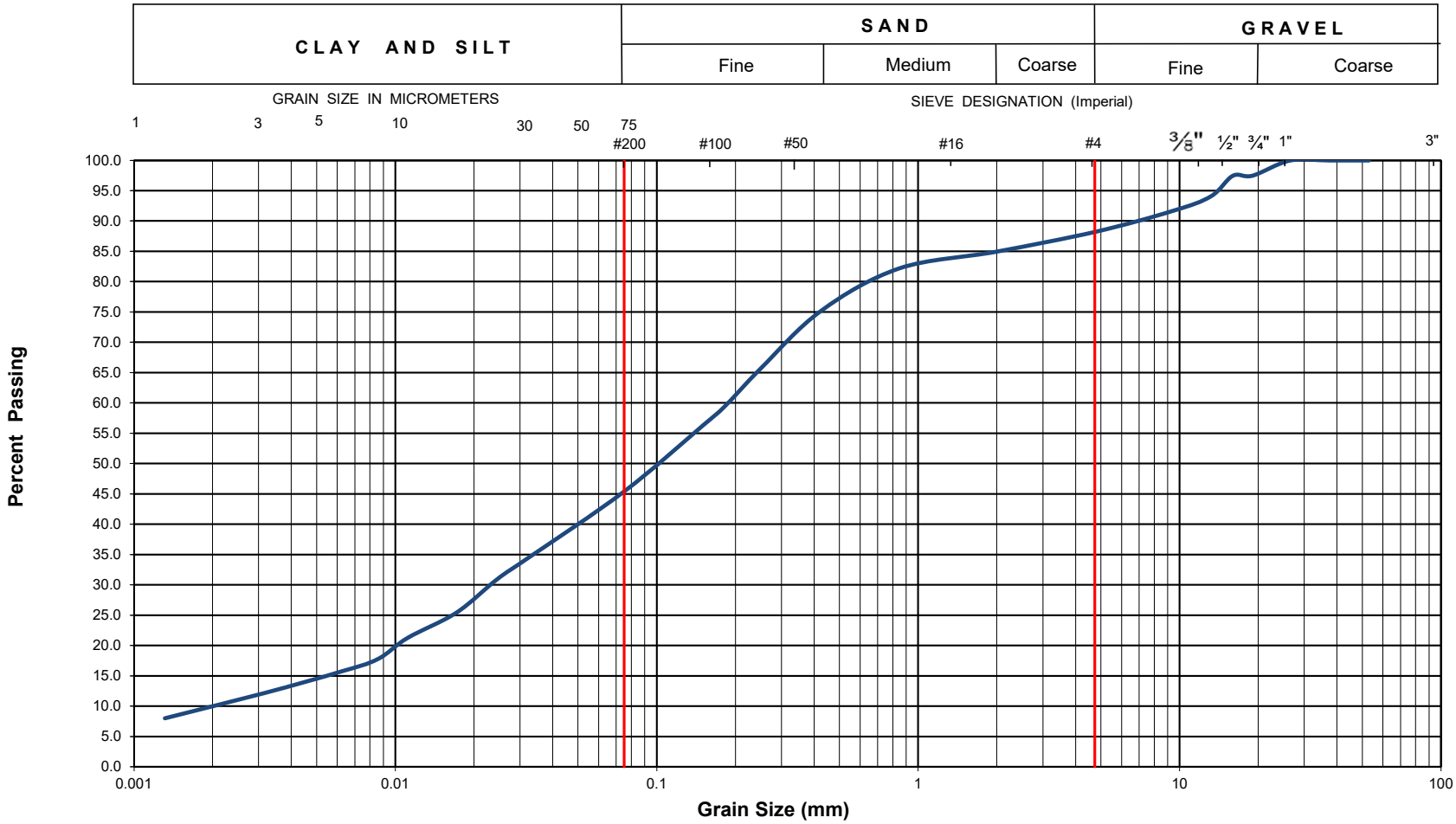
WATER LEVEL RECORDS		
Date	Water Level (m)	Hole Open To (m)
On Completion	Dry	
14 Days	2.3	

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System

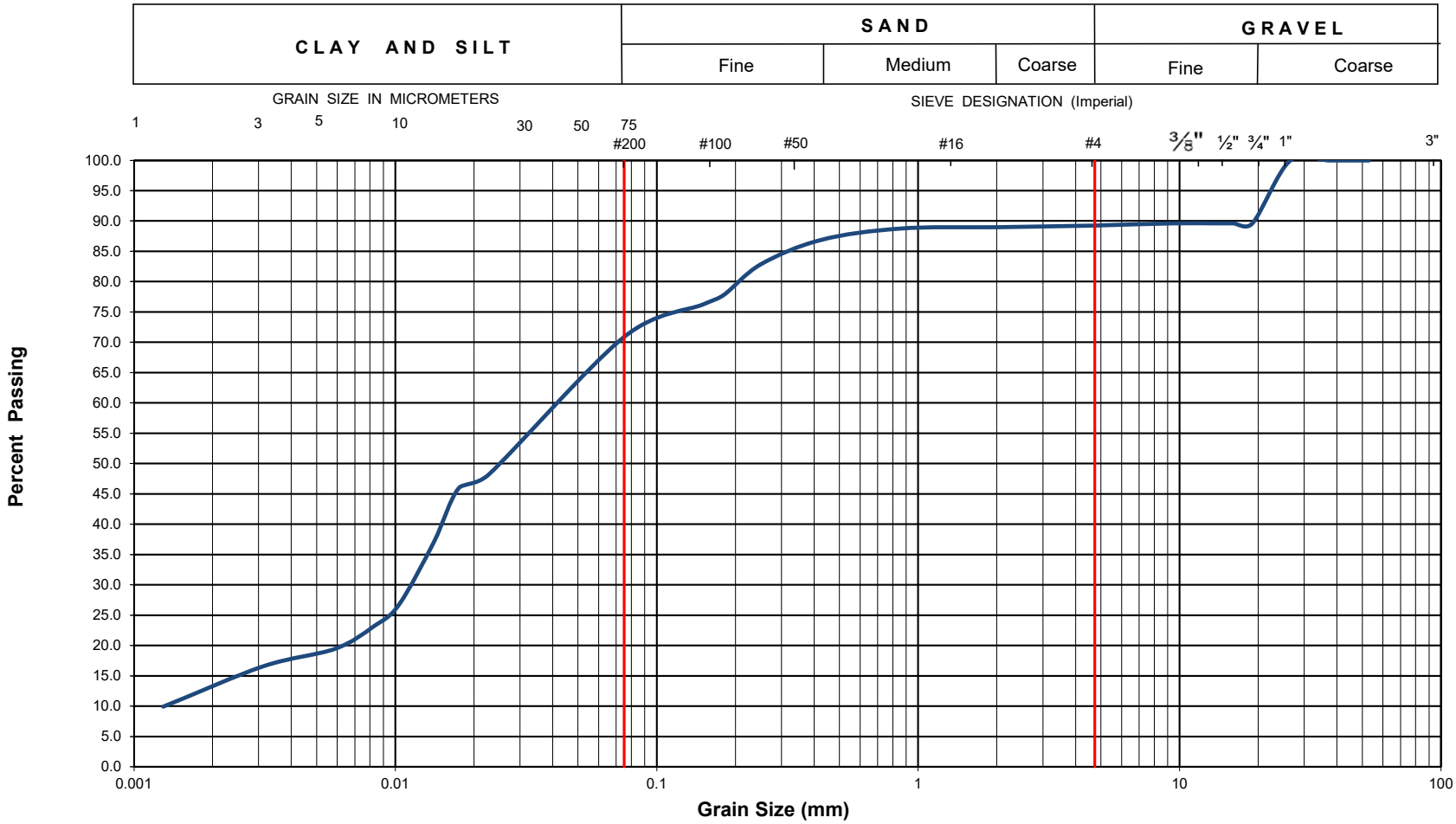


EXP Project No.:	**OTT-00263193-A0**	**Project Name :**	**Proposed Residential Development**						
Client :	**Latitude Homes Inc.**	**Project Location :**	**1927 Maple Grove Road, Ottawa, Ontario**						
Date Sampled :	**December 22, 2020**	**Borehole No:**	**BH-1**		**Sample No.:**	**SS2**		**Depth (m) :**	**0.8-1.1**
Sample Description :		**% Silt and Clay**	**45**	**% Sand**	**43**	**% Gravel**	**12**	**Figure :**	**10**
Sample Description :		**Silty SAND (SM)**							

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-00263193-A0**	**Project Name :**	**Proposed Residential Development**						
Client :	**Latitude Homes Inc.**	**Project Location :**	**1927 Maple Grove Road, Ottawa, Ontario**						
Date Sampled :	**December 22, 2020**	**Borehole No:**	**BH-6**		**Sample No.:**	**SS2**		**Depth (m) :**	**0.8-1.4**
Sample Description :		**% Silt and Clay**	**71**	**% Sand**	**18**	**% Gravel**	**11**	**Figure :**	**11**
Sample Description :		**SILT with Sand (ML)**							

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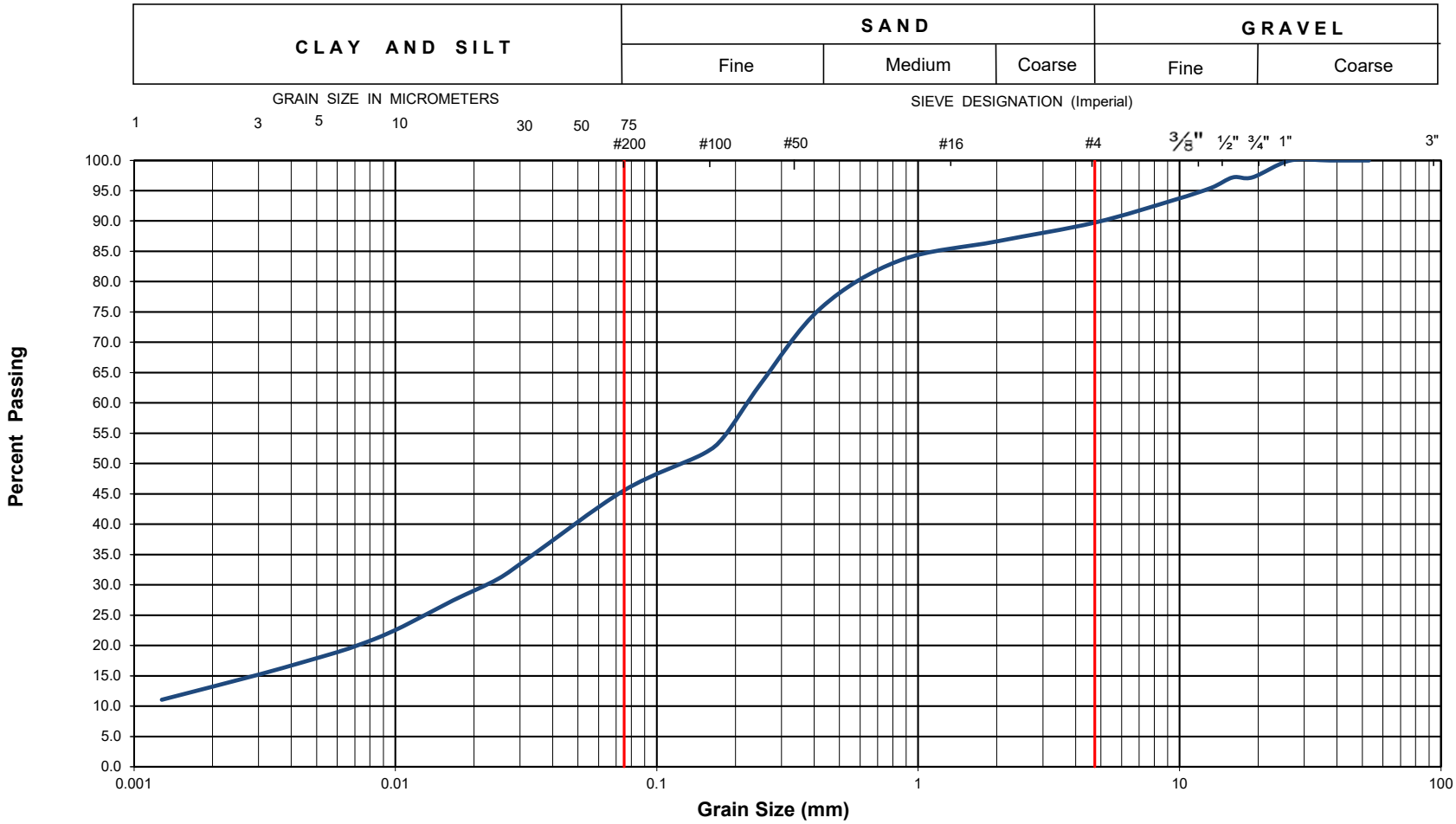
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

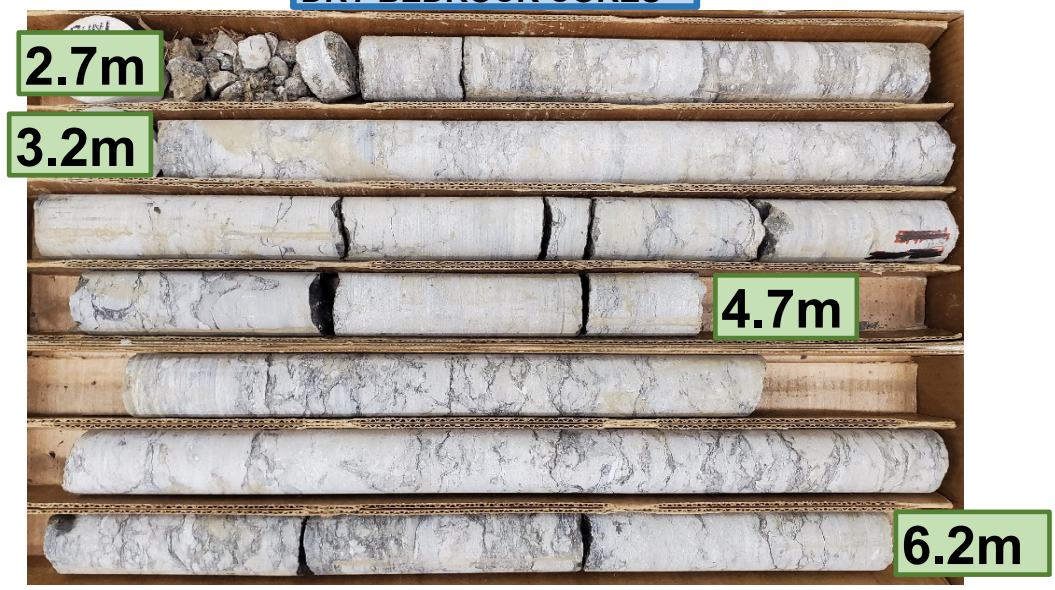
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System

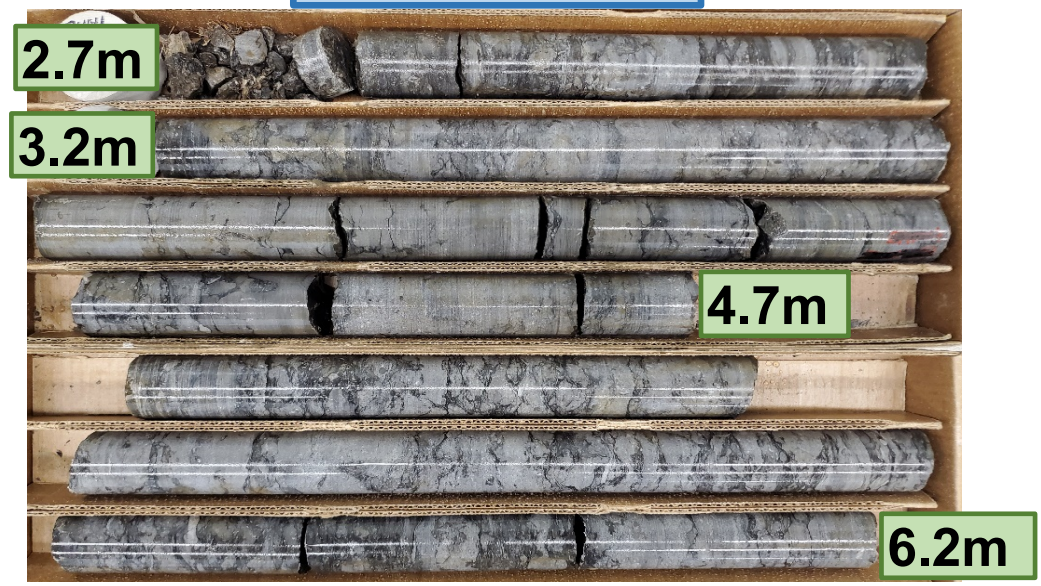


EXP Project No.:	**OTT-00263193-A0**	**Project Name :**	**Proposed Residential Development**						
Client :	**Latitude Homes Inc.**	**Project Location :**	**1927 Maple Grove Road, Ottawa, Ontario**						
Date Sampled :	**December 22, 2020**	**Borehole No:**	**BH-7**		**Sample No.:**	**SS3**		**Depth (m) :**	**1.5-2.1**
Sample Description :		**% Silt and Clay**	**46**	**% Sand**	**43**	**% Gravel**	**11**	**Figure :**	**12**
Sample Description :		**GLACIAL TILL: non-plastic silty sand (SM)**							

DRY BEDROCK CORES



WET BEDROCK CORES



exp Services Inc.
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2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6
Canada
www.exp.com

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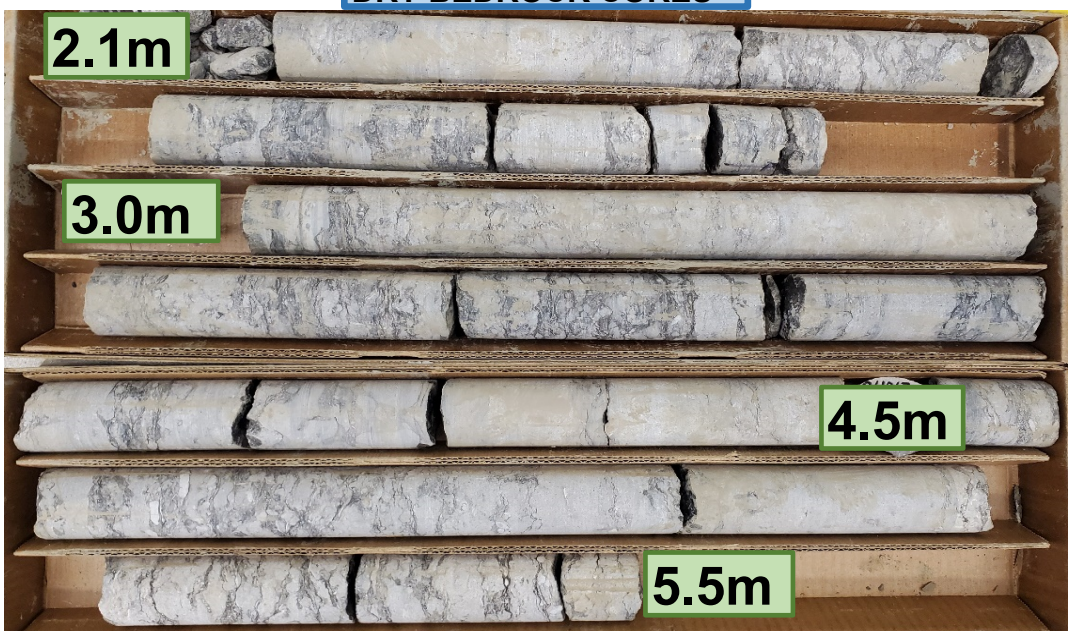
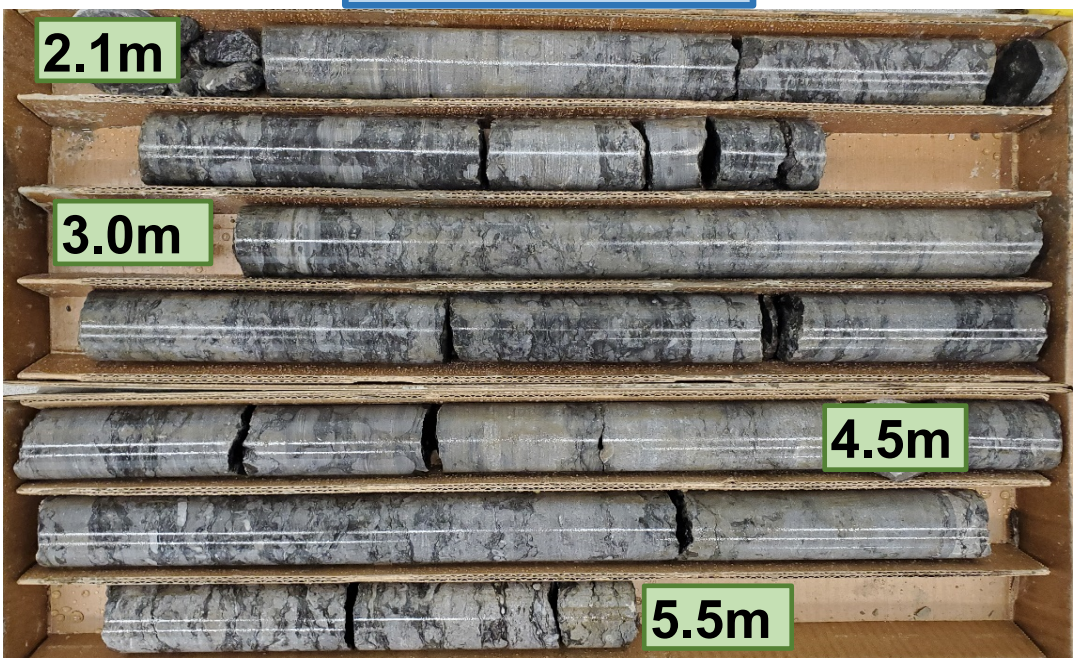
borehole no.	core runs	PROJECT	project no.
BH-2	Run 1: 2.7m - 3.2m Run 2: 3.2m - 4.7m Run 3: 4.7m - 6.2m	Proposed Residential Development 1927 Maple Grove Road, Ottawa, Ontario	OTT-00263193-A0
date cored Dec 22, 2020		Rock Core Photographs	FIG 13

DRY BEDROCK CORES



WET BEDROCK CORES



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borehole no.	core runs	PROJECT	project no.
BH-4	Run 1: 2.1m - 3.0m Run 2: 3.0m - 4.5m Run 3: 4.5m - 5.5m	Proposed Residential Development 1927 Maple Grove Road, Ottawa, Ontario	OTT-00263193-A0
date cored Dec 22, 2020		Rock Core Photographs	FIG 14

Appendix A:
Laboratory Certificate of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: EXP SERVICES INC
2650 QUEENSVIEW DRIVE, UNIT 100
OTTAWA, ON K2B8H6
(613) 688-1899
ATTENTION TO: Ismail M. Taki
PROJECT: OTT-263193
AGAT WORK ORDER: 21Z696403
SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager
DATE REPORTED: Jan 13, 2021
PAGES (INCLUDING COVER): 6
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21Z696403

PROJECT: OTT-263193

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Ismail M. Taki

SAMPLING SITE:1927 Maple Grove Road

SAMPLED BY:EXP

Inorganic Chemistry (Soil)

DATE RECEIVED: 2021-01-05 **DATE REPORTED: 2021-01-13**

		SAMPLE DESCRIPTION:		BH6 SS3 5'-7'
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2020-12-22
Parameter	**Unit**	**G / S**	**RDL**	**1917753**
Chloride (2:1)	µg/g		2	6
Sulphate (2:1)	µg/g		2	16
pH (2:1)	pH Units		NA	8.18
Resistivity (2:1) (Calculated)	ohm.cm		1	6850

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1917753 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21Z696403

PROJECT: OTT-263193

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Ismail M. Taki

SAMPLING SITE:1927 Maple Grove Road

SAMPLED BY:EXP

Inorganic Chemistry (Soil) (%)

DATE RECEIVED: 2021-01-05 **DATE REPORTED: 2021-01-13**

		SAMPLE DESCRIPTION:		BH6 SS3 5'-7'
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2020-12-22
Parameter	**Unit**	**G / S**	**RDL**	**1917753**
Chloride (2:1)	%		0.0002	0.0006
Sulphate (2:1)	%		0.0002	0.0016

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1917753 Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 21Z696403

PROJECT: OTT-263193

ATTENTION TO: Ismail M. Taki

SAMPLING SITE:1927 Maple Grove Road

SAMPLED BY:EXP

Soil Analysis

RPT Date: Jan 13, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (Soil)															
Chloride (2:1)	1917769		7	7	NA	< 2	101%	70%	130%	106%	80%	120%	107%	70%	130%
Sulphate (2:1)	1917769		57	56	1.8%	< 2	102%	70%	130%	103%	80%	120%	103%	70%	130%
pH (2:1)	1917744		7.81	7.84	0.4%	NA	99%	90%	110%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Inorganic Chemistry (Soil) (%)															
Chloride (2:1)	1917769		0.0007	0.0007	NA	< 0.0002	101%	70%	130%	106%	80%	120%	107%	70%	130%
Sulphate (2:1)	1917769		0.0057	0.0056	1.8%	< 0.0002	102%	70%	130%	103%	80%	120%	103%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 21Z696403

PROJECT: OTT-263193

ATTENTION TO: Ismail M. Taki

SAMPLING SITE:1927 Maple Grove Road

SAMPLED BY:EXP

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION

L-L → 8-2/8-3/8-4

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 21Z696403

Cooler Quantity: 1

Arrival Temperatures: 20.4, 20.5, 20.5

Custody Seal Intact: ☐ Yes ☐ No ☒ N/A

Notes:

Report Information:

Company: EXP Services
Contact: Ismail Tak
Address: 2650 Queensview Drive Suite 100
Ottawa ON K2B 8H6
Phone: 613-688-1899 Fax:
Reports to be sent to:
1. Email: Ismail.Tak@exp.com
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table _____ *Indicate One*
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: OTT-263193
Site Location: 1927 Maple Grove Road
Sampled By: EXP
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	pH	Sulphate	Electrical Conductivity					Potentially Hazardous or High Concentration (Y/N)
BH 1 SS2 2.5'-4.5'	Dec 22/20	AM PM	1														✓	✓	✓					
BH 3 SS2 2.5'-4.5'	Dec 22/20	AM PM	1														✓	✓	✓					
BH 6 SS3 5'-7'	Dec 22/20	AM PM	1														✓	✓	✓					
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Ryan Dickson Ryan Dickson	Jan 5/21	5:00pm	JEM Jais	5 Jan 21	1720
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
[illegible]	2021-01-06	16h00	[illegible] Jan 7	8:50	
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

N°: T 111709

Document ID: DIV-78-1511.015

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Appendix B: Legal Notification

Legal Notification

This report was prepared by EXP Services Inc. (EXP) for the account of Latitude Homes Inc..

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. EXP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Report Distribution

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Carmine Zayoun, Latitude Homes Inc.; carmine@zayoungroup.com