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AECOM

Equipment Garage – Iqaluit, NU
Geotechnical Investigation Report

Prepared for:
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R3P 0Y7

Project Number: 0013-060-00

Date: July 7, 2026

TREK ENGINEERING
We engineer for what's ahead.

July 7, 2026 Our File No. 0013-060-00

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99 Commerce Drive
Winnipeg, MB, Canada
R3P 0Y7

RE: Equipment Garage – Iqaluit, NU
Geotechnical Investigation Report

TREK Engineering Inc. is pleased to submit our final geotechnical investigation report for the above noted project.

Please contact the undersigned should you have any questions.

Sincerely,

TREK Engineering Inc.
Per:

Brent Hay, M.Sc., P.Eng.
Senior Geotechnical Engineer

Encl.

Revision History

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PERMIT NUMBER: P 1028
NT/NU Association of Professional
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Senior Geotechnical Engineer

Table of Contents

List of Figures

List of Tables

List of Drawings

List of Appendices

1.0 Introduction

This report summarizes the results of the geotechnical investigation completed by TREK Engineering Inc. (TREK) for AECOM (the Client) at the proposed equipment storage garage in Iqaluit, Nunavut (NU). Terms of reference for this work are included in TREK's proposal to the Client (dated March 11, 2026). The scope of work includes a sub-surface investigation, laboratory testing, and provision of geotechnical design & construction recommendations for suitable foundations. Recommendations for concrete slabs (on grade or structural), site drainage, foundation concrete, excavation & backfill, seismic classification, permafrost considerations, climate change, quality control materials testing and inspection services will also be provided.

2.0 Background

The proposed garage is located at the northeast corner of Niaqunngusiariaq and Tasilik Street (adjacent to Toonik Pond) as shown in Figure 1. This single-storey structure will have a footprint of 8,000 to 10,000 ft^2 (740 to 930 m^2), with a grade-supported slab that is required to support the loading of large vehicles used for sewer & water services. The building will be heated year-round and contain staff facilities (a small office, lunchroom, washrooms, etc.). The distance between the road and Toonik Pond is approximately 50 m, while the length of the proposed property is 200 m, indicating there is sufficient space to construct the garage while maintaining adequate setback from Toonik Pond and the front road.

2.1 Geological Setting

The surficial geology in the area consists mainly of a glaciofluvial subaerial outwash plain comprised of stratified gravel and sand anywhere from 1.0 to 30 m thick [Ref 1]. The site is located within Canada's zone of continuous permafrost (90-100% by ground cover), generally having low ice content (<10%). However, localized zones with more ice are present in some areas [Ref 2 & 3]. Geographically, the active layer is in the order of 2.0 to 3.0 m thick depending on location, ground cover, aspect, soil type, local drainage, and anthropogenic activities. Undifferentiated Geological maps of the area indicate the underlying bedrock is of Precambrian origin.

2.2 Climate

Iqaluit has a mean annual air temperature (MAAT) of -8.6 ^{o} C, with the coldest months being January & February. Average temperatures above zero are experienced from June to September, and the area has thawing & freezing indices of 738 and 3,804-degree (^{o}C) days [Ref 4]. Average yearly precipitation is 361.2 mm, with the wettest months being August and September due to rainfall. Mean annual ground temperatures (MAGT) for Iqaluit have been reported at -7.0^{o} C at 5 m depth [Ref 5].

3.0 Field Program

3.1 Site Conditions

The site is undeveloped and was partially snow covered during the time of the geotechnical investigation. Snow piles were present west of the proposed garage footprint from previous snow clearing. Fill material was present from Niaqunngusiariaq Road to approximately 5 m offset from Toonik Pond, which appeared to be loosely placed based on rutting caused by truck traffic. The fill material is suspected to be placed on natural ground without prior clearing and grubbing based on the north edge of the fill transitioning to natural vegetated ground near Toonik Pond. Shallow standing water from snow melt had accumulated throughout the site. Rip rap armouring comprising blast rock was located along the northwest corner of the proposed building location and along the east side of Toonik Pond. A riprap armoured drainage channel was observed from Niaqunngusiariaq Road to Toonik Pond along the east end of the site. A rounded hill located along the west end of the lot is suspected to be a bedrock outcrop.

3.2 Sub-surface Investigation

A sub-surface investigation was performed on May 23rd, 2026, under the supervision of TREK personnel to assess the soil stratigraphy and groundwater conditions at the site. Six test holes (TH26-01 to 06) were drilled approximately 2 m in bedrock at depths varying from 3.9 to 8.5 m below ground surface. The test hole locations and overall site plan are shown on Figure 01.

The test holes were drilled by Canadrill Inc. using a Joy air hammer crawler rig, equipped with a 165 mm diameter bit. Two thermistors were installed within 38 mm diameter PVC pipe in test holes TH26-01 and TH26-05 to depths of 4.9 m and 4.8 m below ground surface, respectively. TSR16 data loggers were connected to the thermistors and programmed for 4-hour interval readings. The test holes were backfilled with auger cuttings to the ground surface. Excess auger cuttings were mounted over the test hole locations. Above ground covers constructed from 200 mm diameter PVC pipe were installed in TH26-01 and TH26-05 to protect the thermistors and dataloggers.

Sub-surface soils encountered during drilling were visually classified based on the ASTM standard practice for “Description and Identification of Soils (Visual-Manual Procedures)” (ASTM D2488) supplemented by laboratory testing and classification based on the ASTM standard practice for “Classification of Soils for Engineering Purposes (Unified Soil Classification System)” (ASTM D2487). TREK’s classification system includes some modifications from USCS based on local practice, as summarized on the explanatory pages attached to the sub-surface logs. Samples retrieved from the air hammer drill were highly disturbed and therefore were limited to general soil descriptions. Disturbed auger cuttings were retrieved at regular intervals or noted changes in the soil stratigraphy and visually analyzed for the presence of ice.

All samples retrieved during drilling were transported to TREK's material testing laboratory in Winnipeg, Manitoba. Laboratory testing consisted of moisture content determination on all samples and grain size analysis (hydrometer method) on select samples. Two samples were sent to ALS Environmental for water soluble sulphate and chloride content testing. Laboratory testing results are included in Appendix A.

Test hole locations were recorded by TREK using a handheld GPS. Test hole elevations were surveyed using a rod and level relative to a local temporary benchmark (TBM) established on top of a fire hydrant at the location illustrated on Figure 01. The TBM was assigned an elevation of 100.0 m (local).

The test hole logs are attached and include a description of the soil units encountered and other pertinent information such as groundwater and sloughing conditions, UTM coordinates, elevation (local), and a summary of the laboratory testing results.

3.3 Sub-surface Conditions

A brief description of the soil units encountered during drilling is provided below. All interpretations of soil stratigraphy for the purposes of design should refer to the detailed information provided on the attached test hole logs. The soil classifications and descriptions of permafrost are based on cuttings from the air hammer. The recovered samples should be considered highly disturbed but sufficient for providing a general indication of sub-surface stratigraphy; however, moisture content and visible ice may not be representative of actual ground conditions. If the ground ice conditions are more severe at the site than represented in the retrieved samples, increased movements associated with thaw settlement from permafrost degradation are anticipated for grade supported features of the structure.

3.3.1 Stratigraphic Profile

Beginning at ground surface, the general stratigraphic profile to the depth of exploration consists of a surficial layer of peat or sand (fill), followed by poorly graded sand and bedrock. The surficial peat layer is 0.1 m thick in test holes TH26-03 & 04, was black, and wet. The sand (fill) layer was encountered in test holes TH26-01, 02, 05, 06 and extended to depths of 0.6 m to 1.5 m below ground surface. The sand (fill) contained varying amounts of silt, gravel, and cobbles, and was frozen below 0.3 m depth. It is brown, moist to wet, loose when thawed (based on rutting from foot traffic and equipment) and poorly graded. Brown sand encountered below the sand (fill) extends to depths ranging from 1.9 m to 6.4 m. It contains silt, gravel, cobbles & suspected boulders, and is moist to wet when thawed. A silt layer was observed in TH26-04 from a depth of 0.9 m to 1.8 m below ground surface. The silt is black and grey, frozen, moist and soft when thawed, and non-plastic. The identification of cobbles and boulders during the investigation was difficult due to the selected drilling method.

Bedrock was encountered at depths ranging from 1.8 to 6.4 m, and was classified based on an abrupt change in the colour of drill cuttings (e.g. brown to grey) and air hammer resistance. The rock can be classified as a grey and black Monzogranite Gneiss; however, no other classification was possible due to the drilling method. Changes in drill conditions indicative of fractured or unsound rock were noted when advancing through the bedrock in TH26 03 in the upper 0.3 m of bedrock. Based on table 4.21 in the Canadian Foundation Engineering Manual 5th Edition (2023), Un-weathered and intact gneiss and granite can have an unconfined compressive strength (UCS) between 100 to >250 MPa. No UCS laboratory testing was completed on the rock as no core samples were retrieved with the drilling method used.

3.3.2 Groundwater and Sloughing Conditions

Groundwater seepage and sloughing were not observed at the time of the sub-surface investigation, as the ground was frozen. It is expected, however, that such conditions are likely to be encountered within the active layer (2.0 to 3.0 m depth) during the summer.

3.3.3 Ground Temperatures and Permafrost

Thermistor strings were installed in TH26-01 and 05 on May 25th, 2026, to assess the ground temperature profile. Ground temperature monitoring was carried out between May 25th to June 16 2026 and are attached in Appendix B. The seasonal thaw was approximately 0.8 to 1 m by the end of the monitoring period with average ground temperatures around -4 to -7°C below 2 m, with a trend of decreasing temperature with depth.

The classification of ice content within frozen ground was limited as the air hammer cuttings are highly disturbed and any ice content within the soil may have been lost or melted during the drilling/sampling process. Most samples were classified as Nbn (non-visible, no excess ice). Visible ice fragments (Vx) were not observed in the drill cuttings and moisture contents of the soil below the expected active layer were generally low, ranging from 2.6 to 10.8%. Free water was observed in two soil samples when thawed (TH26-04, G4 and TH26-06, G4). These results, however, may be misleading (artificially low) based on the drilling and sampling techniques used. It is expected that zones of ice rich permafrost exist, given the above discussion.

3.4 Frost Susceptibility

Various methods are available to determine the frost susceptibility of a soil based on gradation and plasticity. These methods typically rank the severity of frost susceptibility based on these index properties. Based on the US Corps of Engineers Frost Design Soil Classification, the sand and sand (fill) may be considered possibly frost-susceptible based on the grain size analysis (hydrometer method). Figure 01 below shows the gradation curve in comparison to Frost susceptible soils from Figure 5 of the Frost Design Practice in Canada [Ref 6]. The grains size distribution generally resides in the non-frost susceptibility portion. However, some frost susceptibility soils are noted in the fine sand and silt gradation and given the nature of the drilling it is expected that a portion of the fines were blown out of the sample for G04. In this regard, seasonal movements (frost heave and settlement) and strength loss of the sub-grade soils during freeze-thaw cycles may be expected within the active layer.

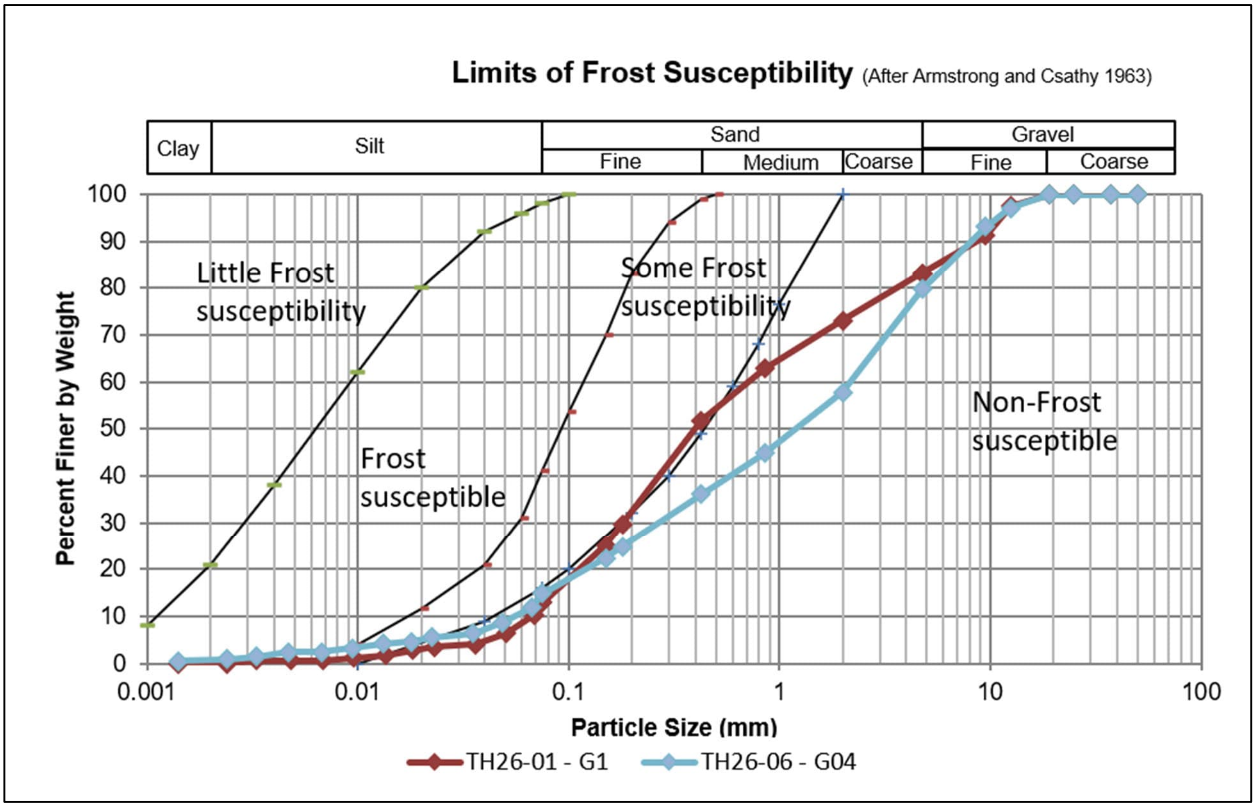


Figure 01: Limits of Frost Susceptibility

4.0 Foundation Considerations

4.1 Considerations for Climate Change

Foundations in the Arctic are especially vulnerable to the effects of climate change (warming). The Canadian Standards Association (CSA) provides a framework for incorporating climate change into foundation design within the CSA Plus 4011:19 Technical Guide Ref 7 (the Guide). The Guide provides projections based on various Greenhouse Gas (GHG) scenarios, referred to as Representative Concentration Pathways (RCPs) for several regions in the Canadian Arctic. The Guide uses RCPs 4.5 and 8.5 which indicate potential MAAT increases for their respective GHG emissions, with an RCP 4.5 corresponding to a moderately reduced greenhouse gas emissions scenario and RCP of 8.5 being a more severe high emissions scenario. Based on Figure 4.5 of the Guide, the site is located in Climatic Zone E1. Table 4.2 and 4.3 in the Guide provide the estimated air temperature increase from 2041 to 2070 for the RCP 4.5 and 8.5 Scenarios which is anticipated to fall within the buildings' service life. A MAAT increase of 2.6 to 3.9° C is anticipated under the RCP 4.5 and 8.5 Scenarios, respectively. Ground temperatures are assumed to increase in step with the increasing air temperatures, and will attenuate with depth, albeit there will be a lag as energy is required to convert ice into liquid water. Please refer to the guide for further clarification of descriptions for climatic zones and RCPs.

There are several factors which add uncertainty to the change in MAGT and active layer thickness such as the accuracy of the climate change models used in predictions, site specific conditions, and site development over the service life of the structure. In this regard, a MAGT of -4.0^{o} C and an active layer thickness of 3.0 m is recommended for design to account for climate change throughout the design life of the structure.

4.2 Considerations for Permafrost Conditions

A method to evaluate the risk to buildings and their foundations relative to permafrost conditions is also provided in the Guide based on sensitivity and consequence. The sensitivity is evaluated on ground temperature and soil type. The sensitivity and consequence are then used to define a risk level (A to D with D being the lowest risk) which defines the subsequent level of analysis prescribed (no analysis to detailed quantitative analysis). Based on the estimated MAAT and MAGT and the soils encountered, the site sensitivity is considered to be Medium (M). A 'Major' consequence is appropriate for a structure that cannot tolerate any significant differential movement associated with thaw-settlement. It should also be noted that the risk of movements associated with thaw settlements for the proposed pile type is not considered likely. Movement of the grade-supported slab is possible, and the owner needs to accept this risk along with potential maintenance activities. In this regard, a 'Minor' consequence is considered appropriate. In accordance with Table 5.1 in the Guide, a Risk Factor of 'C' has been applied to the site. In this regard, a qualitative level of analysis with respect to permafrost is considered appropriate, although we have undertaken a semi-quantitative analysis which is required for a Risk Factor of B.

5.0 Foundation Recommendations

Based on the anticipated foundation loads, the presence of frozen and locally ice-rich soils at the site, the potential for differential thaw settlement, and uncertainty regarding the long-term thermal regime, grade-supported foundations (thickened-edge slab) are not recommended for support of the primary structure. In this regard, rock socketed pipe piles are suitable foundation types to support the superstructure of the garage.

TREK understands that locally available construction equipment is capable of installing rock socketed pipe piles to a depth of about 12 to 14 m, which is much greater than the depth of bedrock encountered at the site. Limit state design and construction recommendations in accordance with the National Building Code of Canada (NBCC 2015) as per the current adoption codes for Nunavut, and in general accordance with the Nunavut Good Building Practices Guidelines are provided in the following sections.

5.1 Limit States Design (NBCC, 2015)

The foundation recommendations provided in this report are based on limit state design. The National Building Code of Canada (NBCC, 2015), the Canadian Highway Bridge Design Code (CHBDC, 2019), and the American Association of State Highway and Transportation Officials (AASHTO, 2024) require the use of limit state design that utilize load and resistance factor design (LRFD) methodology. CHBDC (2019) also incorporates a consequence factor for geotechnical systems, while NBCC (2015) does not.

Table 1. Ultimate Geotechnical Resistance Factors for Deep Foundations summarizes the recommended ULS geotechnical resistance factors that can be used for the design of foundations based on the degree of understanding (low, typical and high) of the site's sub-surface conditions and models used to predict geotechnical resistance. Depending on the relevant Code, resistance factors may depend upon the degree of understanding & verification testing completed during construction.

The following definitions from the 5th Ed. of the Canadian Foundation Engineering Manual (CFEM, 2023) are provided with additional notes to assist the reader with the limit state design terminology used in the building foundation recommendations.

Limit state: conditions beyond which a geotechnical system or component ceases to meet the criteria for which it was designed. The main ones are:

Serviceability limit state (SLS) – state corresponding to behaviour of the ground that causes unacceptable serviceability performance conditions, such as deformations, that restrict the intended use of the supported structure and (or) geotechnical system. Recommendations in this report are provided for evaluating the SLS that are developed based on limiting settlement to 25 mm or less. If a more stringent settlement tolerance is required, detailed settlement analysis should be conducted to refine the estimated settlement and/or adjust our recommendations.

Ultimate limit state (ULS) – state corresponding to a loss of stability of the geotechnical system and (or) failure of the supported structure.

Load factor – factor used to modify (usually increase) the characteristic load acting on and from a structure, for the limit state being considered.

Geotechnical resistance factor (ϕ) – multiplicative value that accounts for uncertainty in the geotechnical resistance to produce an acceptable and reliable geotechnical system.

Ultimate geotechnical resistance factor – resistance factor to be used at the ULS.

Characteristic (Nominal) geotechnical parameter – an appropriately conservative estimate of the mean value of a geotechnical parameter for individual strata within the zones of influence of applied loads.

Consequence factor (Ψ) - multiplicative factor applied to ultimate and serviceability geotechnical resistances, which accounts for consequences of exceeding the limit state under consideration.

Geotechnical resistance – load that the ground can support at a limit state. Different resistances can be defined, including:

Characteristic (nominal) ultimate geotechnical resistance – maximum load that the ground can support at the ULS, estimated using characteristic (nominal) geotechnical parameters.

Factored ultimate (ULS) geotechnical resistance – product of the consequence factor, the ultimate geotechnical resistance factor, and the characteristic (nominal) ultimate geotechnical resistance.

Table 1. Ultimate Geotechnical Resistance Factors for Deep Foundations

Deep Foundations	**Resistance Factors (ϕ)** (Note 1)	
Limit State: Test Method / Model	**Degree of Understanding**	
	Typical	High
Compression: Static Analysis	0.4	N/A
Uplift Resistance – Static Analysis	0.3	N/A
Analysis using static loading test results (Note 2)	0.6	N/A
Uplift resistance using loading test results (Note 2)	0.4	N/A

1. *Based on a consequence factor of 1.0*
2. *TREK should be contacted to determine the number of tests required for usage of the associated resistance factor.*

5.2 Rock Socketed Steel Pipe Piles

Steel pipe piles socketed into bedrock are a suitable foundation alternative. Bedrock is expected to be encountered in depths ranging from 1.8 (TH26-03) to 6.4 m (TH26-02), although the contractor should be prepared to accommodate longer piles.

The piles can be installed by lowering the pipe into the bottom of a pre-drilled and grout-filled hole and by using a rotary/percussion hammer to “seat” the pile into the bottom of the grouted socket.

Compressive Capacity

Grouted steel pipe piles in bedrock will derive their axial compressive capacity in shaft adhesion between the pile-grout interface, along with a contribution from end bearing from the area of the steel for the pipe pile. The mobilization of shaft adhesion and end bearing resistance depends on several factors such as the socket length of pile, pile diameter vs core hole diameter, installation methods and quality of installation. In this regard, it is recommended for design, that the pile capacity be checked assuming shaft adhesion only. If additional capacity is required, the contribution from end bearing can be reassessed by TREK.

The shaft adhesion of pipe piles socketed and grouted into bedrock will depend on the bond strength between the grout and steel surface of the pile or the grout and bedrock surface, whichever is lower. The bond of the grout-rock interface will be controlled by the grout strength (f'_c), based on the anticipated high strength that is typical for Precambrian bedrock. The axial compressive capacity of the grout and bedrock can be calculated based on a nominal bond strength of $0.05f'_c$ (f'_c= compressive strength of the grout) applied to the surface area of the socket embedded into intact (i.e. sound) bedrock. A minimum compressive strength of 30 MPa is recommended for the grout, and in this regard, a factored ULS axial compressive capacity of 600 kPa can be used. The bond strength between the grout and the pile should be determined by a structural engineer and is to be applied only to the surface of the pipe embedded within the bedrock.

The pile head settlement under unfactored service loads can be calculated based on 6 mm or less of pile displacement, plus elastic shortening of the pile.

Recommendations for the design and construction of rock socketed steel pipe piles are provided below:

1. Piles should be advanced into sound, intact, un-weathered bedrock a minimum of 1 m, or as required to resist frost jacking, whichever is greater. Intact, un-weathered bedrock is the responsibility of the pile installer to identify and to be documented with the retained on-site monitoring personnel. Un-weathered bedrock may be identified by a sudden change in air rotary advancement (slower advancement) and observing the pulverized bedrock during drilling of the pile hole.
2. Shaft adhesion for axial compressive capacity within fill soils, overburden soils, and weathered bedrock should not be included in design calculations.
3. Seepage and sloughing of the pile hole may occur during construction, and the contractor should be prepared to sleeve the holes to facilitate grout and pile placement. This condition may be rectified by undertaking pile construction in frozen ground conditions.
4. The contractor should be prepared to remove or advance through cobbles and boulders in over-burden soils.
5. Care must be taken to ensure that the piles are clean before grouting, free of dirt, grease, paint, oil, or other debris.
6. Piles are to be seated securely on the base of the socket and the pile is to be centered in the socket. The annulus between the pile and rock should be a minimum width to allow for the grout to be placed around the pile, and cover the pile and bedrock interface properly, typically a minimum of 50 mm greater than the pile diameter.
7. Where lateral resistance is required, piles should be grouted to ground surface prior to removing casing to ensure compliance with surrounding soils or rock along the entire pile length. TREK can provide additional recommendations to address lateral loads if needed. Drill cuttings from pre-boring pile holes can be used to backfill the pile hole above the grout.
8. The grout should be a quick set, non-shrink grout, with a minimum specified 28-day unconfined compressive strength of 30 MPa and be suitable for curing in cold weather, ambient air, and sub-strate. SikaGrout® Artic 100 or approved alternate would be appropriate for use.
9. Pile verticality (plumbness) should be measured on all piles to check if verticality is within the limits of the structural design. It is common practice to specify a maximum acceptable percentage that the pile can be out of vertical plumbness (e.g. 2% out of plumb).
10. Variability in the depth to bedrock should be considered when estimating quantities and lengths of sections required.
11. TREK should be retained by the Owner to perform full-time monitoring during installation of all rock-socketed piles as per the NBCC (2015), to observe the drilling conditions, and confirm that the pile installation has been completed according to the design.

5.2.1 Pile Resistance to Uplift and Ad-Freeze

The steel pipe pile uplift resistance can be calculated based on the bond strength between the grout and steel surface of the pile or the grout and bedrock surface, whichever is lower. Ad-freeze loads should be added to any uplift loads. Consideration may be given to adding equally staggered slots within the pipe for the rock-socketed portion to improve mechanical interlock between the pipe and grout.

Steel piles and pile caps should be designed to resist ad-freeze & uplift forces related to frost action acting along the vertical face of the member. The depth of ad-freeze forces will depend on the final grading of the site, however, will be limited by the depth of intact bedrock. Furthermore, site development and global warming will affect the freeze-thaw regime and overall active layer. In this regard, the depth of the active layer should be taken as 3.0 m. A nominal ad-freeze bond stress of 150 kPa should be used.

Ad-freeze forces will be resisted by structural dead loads and uplift resistance, provided by the length of the pile within intact (i.e. sound) bedrock.

The following design recommendations apply to ad-freeze forces:

1. A load factor (α) of 1.2 may be used in the calculation of ad-freezing forces.
2. A reduction factor of 0.8 may be used in calculation of geotechnical resistance for the ULS condition. It is recommended that structural dead loads be added to the resistance.
3. The calculated geotechnical resistance plus the structural dead loads must be greater than the factored ad-freezing forces.
4. Piles should have a minimum socket length of 1.0 m into sound, intact bedrock or as required to resist ad-freeze & uplift forces, whichever is greater.
5. Pile caps should be designed above grade to avoid uplift pressures from developing on the underside of the pile cap due to frost action.

5.3 Foundation Insulation

In areas where ad-freeze forces need to be reduced, the following recommendations may be considered:

1. Rigid extruded polystyrene insulation (e.g. Styrofoam Highload^{TM}) should be placed at a minimum depth of 0.3 m below finished grade and extended 2.7 m horizontally in all directions from the building foundation according to manufacturer's specifications.
2. Insulation should be a minimum of 100 mm thick. Joints between insulation layers should be staggered.
3. For heated structures, insulation should be fastened to exterior walls up from the horizontal insulation to a level coincident with the base of insulated walls.
4. Insulation should be sloped away from the structure to promote runoff.

5.4 Lateral Pile Capacity

The soil response (sub-grade reaction) to lateral loads can be modeled in a simplified manner that assumes the soil around a pile can be simulated by a series of horizontal springs for preliminary design of pile foundations. The soil behaviour can be estimated using an equivalent spring constant referred to as the lateral sub-grade reaction modulus (K_s) as provided in Table 2. The majority of lateral resistance will be offered by the upper 5 to 10 m of soil, depending on the relative stiffness of the pile and soil units.

Table 2. Recommended Values for Lateral Sub-grade Reaction Modulus (Ks)

Approximate Elevation (m)	Soil Type	K_s (kPa/m) (Notes 1, 2)
0 to 3	Sand (thawed)	2,200z/d
3 to 6.5	Sand (permafrost)	14,000z/d

1. *d = pile diameter*
2. *z = depth below grade*

For the portion of the pile in bedrock, the designer can assume the pile is in a fixed position. It is worth noting that using the lateral sub-grade reaction modulus assumes a linear response to lateral loading, and therefore is only appropriate under the following conditions:

1. Maximum pile deflections are small (less than 1% of the pile diameter).
2. Loading is static (no cycling).
3. Pile material behaves linear elastically (does not reach yield conditions).

If one or more of these conditions are not met; a more rigorous analysis that includes non-linear behavior of the piles and surrounding soil is required (e.g. p-y curve method). In this regard, a lateral pile analysis that incorporates the material and section properties of the piles, lateral pile deflection criteria, and a more realistic elastic-plastic model of the soil response to loading should be carried out to confirm the lateral load capacity of the piles.

5.5 Foundation Concrete

All foundation concrete should be designed to resist the anticipated loads from the structures and seasonal movements. Furthermore, all concrete should be designed in accordance with CSA A23.1-24 (Concrete Materials and Methods of Construction). Two samples were sent to ALS Environmental for soil chemistry testing, the results of the soil chemistry testing are provided in Table 3. Full testing results are included in Appendix A.

Table 3. Soil Chemistry

Test Hole ID	Sample Depth	Sample ID	Total Sulphate Ion Content (%)	Soluble Sulphate Ion Content (%)	Soluble Chloride Ion Content (%)
TH26-01	1.5 – 1.8 m	G3	<0.050	NR	0.0036
TH26-02	0.0 – 0.3 m	G1	<0.050	NR	0.0031

The samples had a total sulphate ion content of less than 0.05%, indicating a negligible water-soluble content. In this regard, the degree of exposure for concrete subjected to sulphate attack is considered negligible, according to CSA A23.1-24. High sulphate- or chloride- resistant cement is not required. Concrete that may be exposed to freezing and thawing should be adequately air-entrained to improve freeze-thaw durability in accordance with Table 4, CSA A23.1-24.

5.6 Seismic Site Classification

The NBCC (2015) requires soil be characterized to a depth of 30 m for seismic site classification but does not specifically address permafrost in the classification. Frozen soils have a much higher shear wave velocity than unfrozen soils, typically on the order of 900 to 1500 m/s, which would suggest a site classification of B, or higher [Ref 8]. Based on piles being socketed into rock, a site classification of B is considered appropriate.

Foundation Inspection Requirements

In accordance with Section *4.2.2.3 Field Review* of the NBCC (2015), the designer (or other suitably qualified persons) shall carry out a field review on:

a) continuous basis during:
   i. the construction of all deep foundation units with all pertinent information (e.g. grout strength, bedrock socket length, pile depth, etc.) recorded for each *foundation unit*,
   ii. during the installation and removal of retaining structures and related backfilling operations.
   iii. during the placement of engineered fills that are to be used to support the *foundation units.*

b) as required, unless otherwise directed by the *authority having jurisdiction*,
   i. in the construction of all *shallow foundation units,* and
   ii. in excavating, dewatering, and other related works

For conformance with the NBCC, we recommend that TREK, as the geotechnical engineer of record, should be retained to inspect the installation of any foundation elements. TREK is familiar with the geotechnical conditions present and the underlying design assumptions of our foundation recommendations. TREK is therefore solely qualified to evaluate any design modifications deemed to be necessary should altered sub-surface conditions be encountered.

6.0 Concrete Slabs

6.1 Structural Slabs

In areas where movement of floor slabs is not tolerable, a structural floor slab supported on rock socketed pipe piles over a void should be used. A minimum void of 150 mm beneath structural floor slabs is recommended to accommodate volumetric changes in the underlying sub-grade soils (i.e. swelling, shrinkage, and thermal expansion and contraction in unheated areas). The void can consist of a compressible layer (e.g. void form), or alternatively; a crawl space. Void forms should be selected such that they can deform a minimum of 150 mm without transferring excessive stresses to the structure. A vapour barrier should be placed between the floor slab and the void form (if present).

6.2 Grade-Supported Slabs

If some movement can be tolerated, grade-supported concrete floor slabs can be used for the interior portion of the garage, provided all fill materials are removed. Vertical movements (potentially differential) of grade-supported slabs should be expected due to the potential thaw of ice rich soils. Slabs in unheated areas or near the perimeter of the structure may be subject to additional movements from freeze/thaw of the sub-grade soils, unless insulation is incorporated into the design.

Where the performance risks and potential slab movement discussed in this section are not tolerable, or where maintenance and/or repair of their occurrence is not feasible, TREK recommends a structural floor supported on piles be designed using the foundation design recommendations presented in this report. Granular materials should be in accordance with the City of Iqaluit *Municipal Design Guidelines (2005)* Ref 9. Based on the grain size result of sample G01 from the sand (fill), the material is slightly outside the City of Iqaluit specification for Granular C & Modified Granular C and is suitable for reuse for those purposes however may require removal (hand picking) of some cobbles and boulders or additional compactive efforts to meet specifications.

Additional Recommendations:

1. Existing fill materials, organics, silt, and any other deleterious material should be removed such that the sub-grade consists of poorly graded sand with silt. It is anticipated that some fill materials may be encountered and may not be practical to fully remove from a cost or constructability perspective. In this regard and provided the potential for an increase in risk of settlement or seasonal movements is recognized, the sub-grade may consist of the existing fill soils provided the upper 150 mm is scarified, moisture conditioned as appropriate, and re-compacted to 95% of the Standard Proctor Maximum Dry Density (SPMDD). Organics must be removed in their entirety.
2. Excavation should be completed with an excavator equipped with a smooth bucket and operating from the edge of the excavation in order to minimize disturbance to the exposed sub-grade at all times.
3. After excavation, the sub-grade should be inspected by TREK prior to placement of new granular materials to identify soft areas, silt, or organics. The sub-grade should be proof rolled with a fully loaded tandem axle truck to identify soft areas or organics. Soft and silt areas should be repaired as per recommendations provided by TREK. This may consist of excavating an additional 150 to 300 mm of granular sub-base and placing a non-woven geotextile on the sub-grade and backfilling with the 50 mm down granular sub-base material. However, this will also be dependent on the fill thickness to be placed on top of the sub-grade. The additional sub-base material should be placed in lifts no greater than 150 mm and compacted to a minimum of 98% of the SPMDD. Organics should be removed in their entirety.
4. The sub-grade should be protected from freezing, drying, inundation, or disturbance. If any of these conditions occur, the sub-grade should be scarified, moisture conditioned as appropriate, and re-compacted to a minimum of 95% of the SPMDD.
5. A vapour barrier should be placed between the floor slab and the granular base.

6. In heated areas, the floor slab should be placed on a 150 mm thick layer of Granular B sub-base underlying a 150 mm thick base consisting of Granular A. In unheated areas (e.g. exterior slabs) the thickness of the sub-base should be increased to 250 mm. The granular material should be placed in lifts no greater than 150 mm and compacted to 98% of the SPMDD.
7. The granular base and sub-base materials should consist of a well graded, durable, crushed rock, in accordance with the most recent City of Iqaluit Municipal Design Guidelines G-2 Granular Classifications, or equivalent as approved by TREK.
8. Floor slabs should be designed to resist all structural loads and to minimize slab cracking associated with movements due to swelling, shrinkage, and thermal expansion and contraction of the sub-grade soils.
9. To accommodate slab movements, it may be recommended to provide control joints to reduce random cracking and isolation joints to separate the slab from other structural elements. Allowances should be made to accommodate vertical movements of light-weight structures (e.g., partitions) bearing on the slab.

6.2.1 Modulus of Sub-Grade Reaction

The soil response (sub-grade reaction) to vertical loads can be modeled in a manner that assumes the soil beneath a grade-supported slab can be simulated by a series of vertical springs. The soil behaviour can be estimated using an equivalent spring constant referred to as the modulus of sub-grade reaction (k_s), which is often defined as the contact bearing pressure of a foundation against the soil that will produce a unit of deflection of the foundation. The modulus of sub-grade reaction is not a fundamental soil property, but a function of following combined soil and structural components:

1. Elastic soil properties
2. Soil layer thickness and compressibility
3. Soil layer temperature, ice content and salinity (in permafrost areas)
4. Foundation size and depth
5. Foundation stiffness (moment of inertia and modulus of elasticity)

TREK understands that k_s values for the sub-grade materials are required to perform analyze the force effects in the new slab. The k_s values provided are only to serve as a boundary condition for the analyses and should not be used to determine or predict settlements beneath the slab. Values of k_s are provided in Table 4 below.

Table 4: Values of Modulus of Sub-Grade Reaction (ks)

Soil Type	Modulus of Sub-Grade Reaction, k_s (MPa/m)
Sand	*10 -25*

1. *Assumes the granular fill is compacted to 98% of the SPMDD.*

The k_s values have been provided for thawed soil conditions as frozen soils will have a higher modulus which are not expected to represent the long-term conditions of the grade supported slab.

7.0 Temporary Excavations

Excavations must be carried out in compliance with the appropriate regulations under the Government of Nunavut's Occupational Health and Safety Regulations. The soils observed during the excavation soils can be classified as Type 3. In this regard, excavations should have a minimum side slope of 1H:1V. Based on the recommendations, deep excavations will not likely be required. Although not anticipated, excavations deeper than 1.2 m should be reviewed by TREK.

The base excavation should be kept free of water at all times and surface water should be diverted away from the excavation. Stockpiles of excavated material should not be permitted near the edge of an open excavation. If heavy equipment is required to operate at the edge of an excavation, personnel should not be allowed to enter. Loose material should be scaled or trimmed from the sides of excavations if personnel are required to enter.

Maintaining the stability of the excavation slopes for the duration of construction should be the responsibility of the Contractor. It is recommended that all temporary slopes and shoring proposed by the contractor be reviewed by TREK.

8.0 Site Drainage

Site drainage is critical to prevent water ponding around the foundations. Following recommendations apply:

1. The finished grade and site should be graded with a minimum 5% crossfall to direct water away from the foundation structures, and to prevent ponding.
2. Drainage ditches & paths should facilitate water removal and not divert water towards any sensitive permafrost terrain. It is recommended that local drainage plans be assessed to confirm that site grading does not negatively affect drainage in neighbouring lots.
3. Roof leaders should be extended sufficiently away from the structure.
4. Drainage must be maintained throughout the lifespan of the structure.

9.0 Closure

The geotechnical information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation and laboratory testing). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work or standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

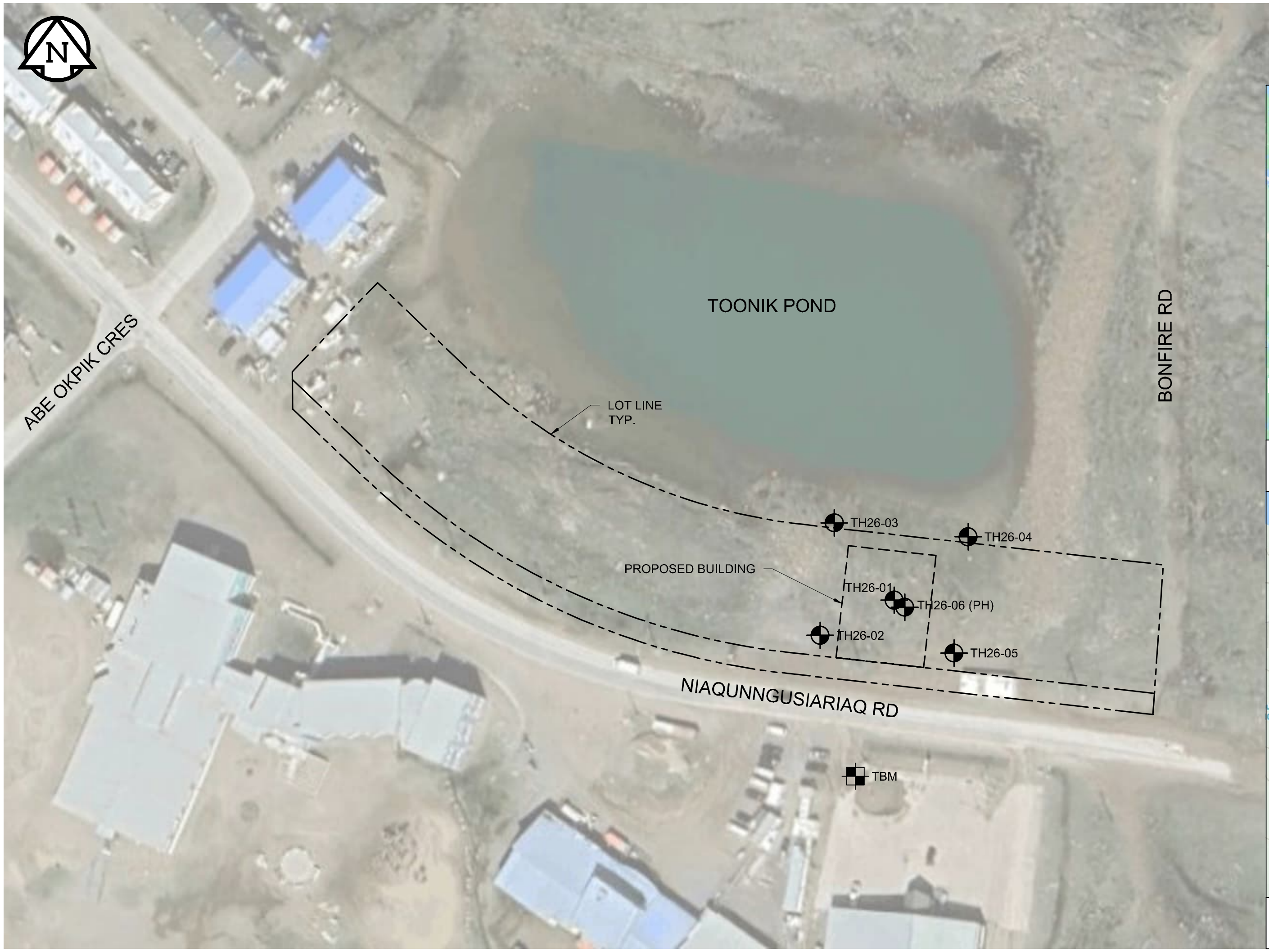
This report has been prepared by TREK Engineering Inc. (the Consultant) for the exclusive use of AECOM (the Client) and their agents for the work product presented in this report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

References

1) Allard M., Doyon, J., Mathon-Dufour, V., LeBlanc, A-M., L'Herault, E., Mate, D., Oldenborger, G.A., and Sladen, W.E., 2012. Surficial Geology, Iqaluit, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 64 (Preliminary Version), Scale 1:15 000, doi: 10.4095/289503.
2) CSA Group; CSA Plus 4011.1:19. Technical Guide: Design and Construction Considerations for Foundations in Permafrost Regions. CSA Group. November 2019.
3) O'Neill, H.B., Wolfe, S.A., and Duchesne, C., 2020. Ground Ice Map of Canada; Geological Survey of Canada, Open File 8713 (version 1).
4) Environment Canada. https://climate.weather.gc.ca/climate_normals. Accessed June 1, 2026.
5) Throop, J., Lewkowicz, A.G. and Smith, S.L. 2012. Climate and ground temperature relations at sites across the continuous and discontinuous permafrost zones, northern Canada.
6) Armstrong, M. D. and Csathy, T. I., 1963. Frost Design Practice in Canada. Highway Research Record, No. 33, pp. 170–201.
7) CSA Group; CSA Plus 4011:19. Technical Guide: Infrastructure in Permafrost: A Guideline for Climate Change Adaptation. CSA Group. May 2019.
8) LeBlanc AM, Fortier R, Allard M, Cosma C, Buteau S. Seismic cone penetration test and seismic tomography in permafrost. Canadian Geotechnical Journal 2004; 41 (5) 796-813. https://doi.org/10.1139/T04-026
9) City of Iqaluit, 2005. *Municipal Design Guidelines*. Iqaluit, NU: City of Iqaluit.

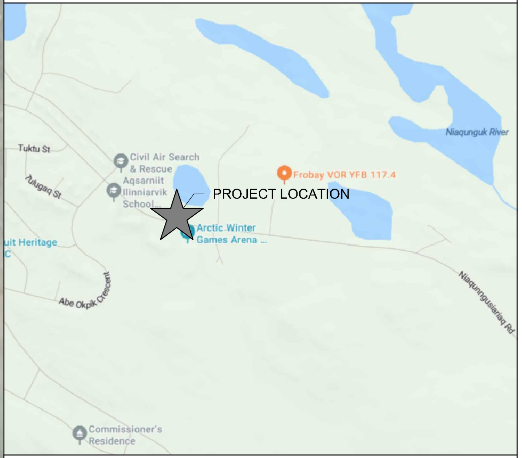
Drawings

0013 060 00
AECOM
Equipment Storage Garage - Iqaluit, NU



KEY PLAN

SCALE: N.T.S.



LOCATION PLAN

SCALE: N.T.S.

0 10 20 30 40 50 m
SCALE = 1 : 1 250 (279 mm x 432 mm)

LEGEND:

⊕	TEST HOLE (TREK, 2026)
▚	TEMPORARY BENCHMARK

NOTES:

1. AERIAL IMAGERY FROM GOOGLE EARTH (2023).
2. TEST HOLE LOCATIONS WERE SURVEYED BY TREK (MAY 24, 2025).
3. TEST HOLE ELEVATIONS WERE SURVEYED RELATIVE TO A TBM (ASSIGNED LOCAL ELEVATION 100.0 m) LOCATED ON THE TOP NUT OF THE FIRE HYDRANT SOUTH OF NIAQUNNGUSIARIAQ RD (UTM 19U, 7068231 m N, 525720 m E).

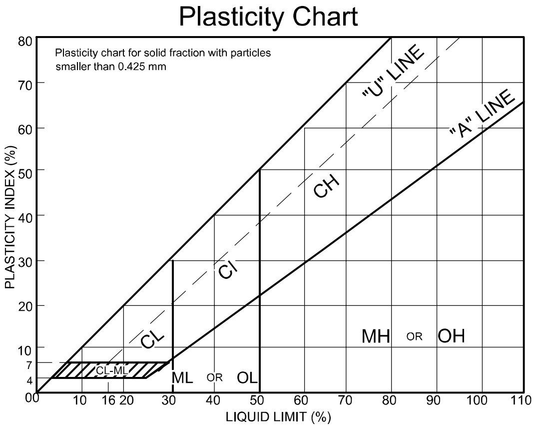
Drawing 01
Test Hole Location Plan

Test Hole Logs

EXPLANATION OF FIELD AND LABORATORY TESTING

GENERAL NOTES

1. Classifications are based on the Unified Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
2. Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
3. When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions			USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria			
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	Clean gravel (Little or no fines)	GW	●	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:	Less than 5 percent...... GW, GP, SW, SP More than 12 percent...... GM, GC, SM, SC 6 to 12 percent...... Borderline case4s requiring dual symbols*	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	○	Poorly-graded gravels, gravel-sand mixtures, little or no fines			Not meeting all gradation requirements for GW	
		Gravel with fines (Appreciable amount of fines)	GM	○	Silty gravels, gravel-sand-silt mixtures			Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-line cases requiring use of dual symbols
			GC	▨	Clayey gravels, gravel-sand-silt mixtures			Atterberg limits above "A" line or P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SW	⁘	Well-graded sands, gravelly sands, little or no fines			$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	░	Poorly-graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM	▥	Silty sands, sand-silt mixtures			Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-line cases requiring use of dual symbols
			SC	▨	Clayey sands, sand-clay mixtures			Atterberg limits above "A" line or P.I. greater than 7	
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 50)		ML	▥	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	Plasticity Chart 			
			CL	▨	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays				
			OL	▤	Organic silts and organic silty clays of low plasticity				
	Silts and Clays (Liquid limit greater than 50)		MH	▮	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts				
			CH	▨	Inorganic clays of high plasticity, fat clays				
			OH	≋	Organic clays of medium to high plasticity, organic silts				
	Highly Organic Soils		Pt	⩩	Peat and other highly organic soils	Von Post Classification Limit		Strong colour or odour, and often fibrous texture	

Material		Particle Size	
		mm	ASTM Sieve sizes
Sand	Coarse	2.00 to 4.75	#10 to #4
	Medium	0.425 to 2.00	#40 to #10
	Fine	0.075 to 0.425	#200 to #40
Silt or Clay		< 0.075	< #200

Material		Particle Size	
		mm	ASTM Sieve Sizes
Boulders		> 300	> 12 in.
Cobbles		75 to 300	3 in. to 12 in.
Gravel	Coarse	19 to 75	3/4 in. to 3 in.
	Fine	4.75 to 19	#4 to 3/4 in.

* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols.
For example; GW-GC, well-graded gravel-sand mixture with clay binder.

Other Symbol Types

■	Asphalt	▧	Bedrock (undifferentiated)	○	Cobbles
⁘	Concrete	⊞	Limestone Bedrock	●	Boulders and Cobbles
▩	Fill	▤	Cemented Shale	▥	Silt Till
		▨	Non-Cemented Shale	▨	Clay Till

EXPLANATION OF FIELD AND LABORATORY TESTING

LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)
PL - Plastic Limit (%)
PI - Plasticity Index (%)
MC - Moisture Content (%)
SPT - Standard Penetration Test
RQD - Rock Quality Designation
Qu - Unconfined Compression
Su - Undrained Shear Strength

VW - Vibrating Wire Piezometer
SI - Slope Inclinometer

▽ Water Level at Time of Drilling

▼ Water Level at End of Drilling

▼ Water Level After Drilling as Indicated on Test Hole Logs

FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent
with *	with silt, with sand	> 35 percent

* Used when the material is classified based on behaviour as a cohesive material

TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

Descriptive Terms	SPT (N) (Blows/300 mm)
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

Descriptive Terms	SPT (N) (Blows/300 mm)
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

Descriptive Terms	Undrained Shear Strength (kPa)
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200

PERMAFROST CLASSIFICATION

General Notes:

1. Permafrost is frozen ground that remains at or below 0°C (32°F) for at least two consecutive years.
2. Classifications are based on the Guide to a Field Description of Permafrost for Engineering Purposes by National Research council of Canada (Ref 1).
3. For descriptive purposes frozen materials are divided into three major groups in which the ice is:
    - Not visible (Follow Section A)
    - Visible by eye with individual ice layers less than 25 mm in thickness (Follow Section B)
    - Visible by eye with individual ice layers greater than 25 mm in thickness (Follow Section C)

Group Symbol	Subgroup Symbol	Description
A. ICE NOT VISIBLE		
N	Nf	When ice bonds or cements the sub-surface materials into a weak or friable mass (material can be broken up easily)
	Nb	When ice bonds or cements the sub-surface materials into a hard, solid mass. Further subgroups based on the ice content present in the soil mass are: 1. Nbn - No excess ice in the well bonded soil mass 2. Nbe - Excess ice present in the well bonded soil mass
B. VISIBLE ICE - LESS THAN 25 mm THICK		
V	Vx	Individual ice crystals or inclusions in the soil mass
	Vc	Visible ice coating coarse soil particles
	Vr	Random or irregularly oriented ice formations in the soil mass
	Vs	Stratified or distinctly oriented ice formation in the soil mass
C. VISIBLE ICE - GREATER THAN 25 mm THICK (Ice greater than 50% by volume)		
ICE	ICE + soil type	When soil inclusions are present in the ice mass
	ICE	When no soil inclusions are present in the ice mass

Additional Notes (Ref 2):

1. Warm permafrost - permafrost with temperatures warmer than -2°C
2. Cold permafrost - permafrost with temperatures colder than -4°C
3. Permafrost between -2°C and -4°C can behave as either warm or cold permafrost depending on ice content and soil type.

References:

1. Pihlainen, J.A.; Johnston, G.H.; (1979). Guide to a field description of permafrost for engineering purposes. NRC Publications Archive. HTTPs://nrc-publications.canada.ca/eng/view/ft/?id=5896e329-db6d-452f-bdfd-420b23a8fa04.
2. Roghani. A.; (March 18, 2021). Review of current state of knowledge regarding the design, construction and maintenance of railway lines over permafrost. NRC publications.

DEGREE OF DECOMPOSITION

VON POST'S SCALE	DECOMPOSED	DESCRIPTION
H1	Undecomposed	Completely unconverted and mud-free peat which, when pressed in the hand, only gives off clear water.
H2	Almost undecomposed	Practically completely unconverted and mud-free peat which, when pressed in the hand, gives off almost clear colourless water.
H3	Very slightly	Little converted or very slightly muddy peat which, when pressed in the hand, gives off marked muddy water, but no peat substance passes through the fingers. The pressed residue is not thick.
H4	Slightly	Badly converted or somewhat muddy peat which, when pressed in the hand, gives off marked muddy water. The pressed residue is somewhat thick.
H5	Slightly to moderately	Fairly converted or rather muddy peat. Growth structure quite evident but somewhat obliterated. Some peat substance passes through the fingers when press mostly muddy water. The pressed residue is very thick.
H6	Moderately	Fairly converted or rather muddy peat with indistinct growth structure. When pressed at most 1/3 of the peat substance passes through the fingers. The rema extremely thick but with more obvious growth structure than in the case of unpressed peat.
H7	Strongly	Fairly well converted or marked muddy peat but the growth structure can still be seen. When pressed, about half the peat substance passes through the fingers. If water is also given off, this has the nature of porridge.
H8	Very strongly	Well converted or very muddy peat with very indistinct growth structure. When pressed, about 2/3 of the peat substance passes through the fingers and at tim somewhat porridgy liquid. The remainder consists mainly of more resistant fibers and roots.
H9	Almost completely	Practically completely converted or almost mudlike peat in which almost no growth structure is evident. Almost all the peat substance passes through the fing a homogenous porridge when pressed.
H10	Completely	Completely converted or absolutely muddy peat where no growth structure can be seen. The entire peat substance passes through the fingers when pressed.

Sub-Surface Log

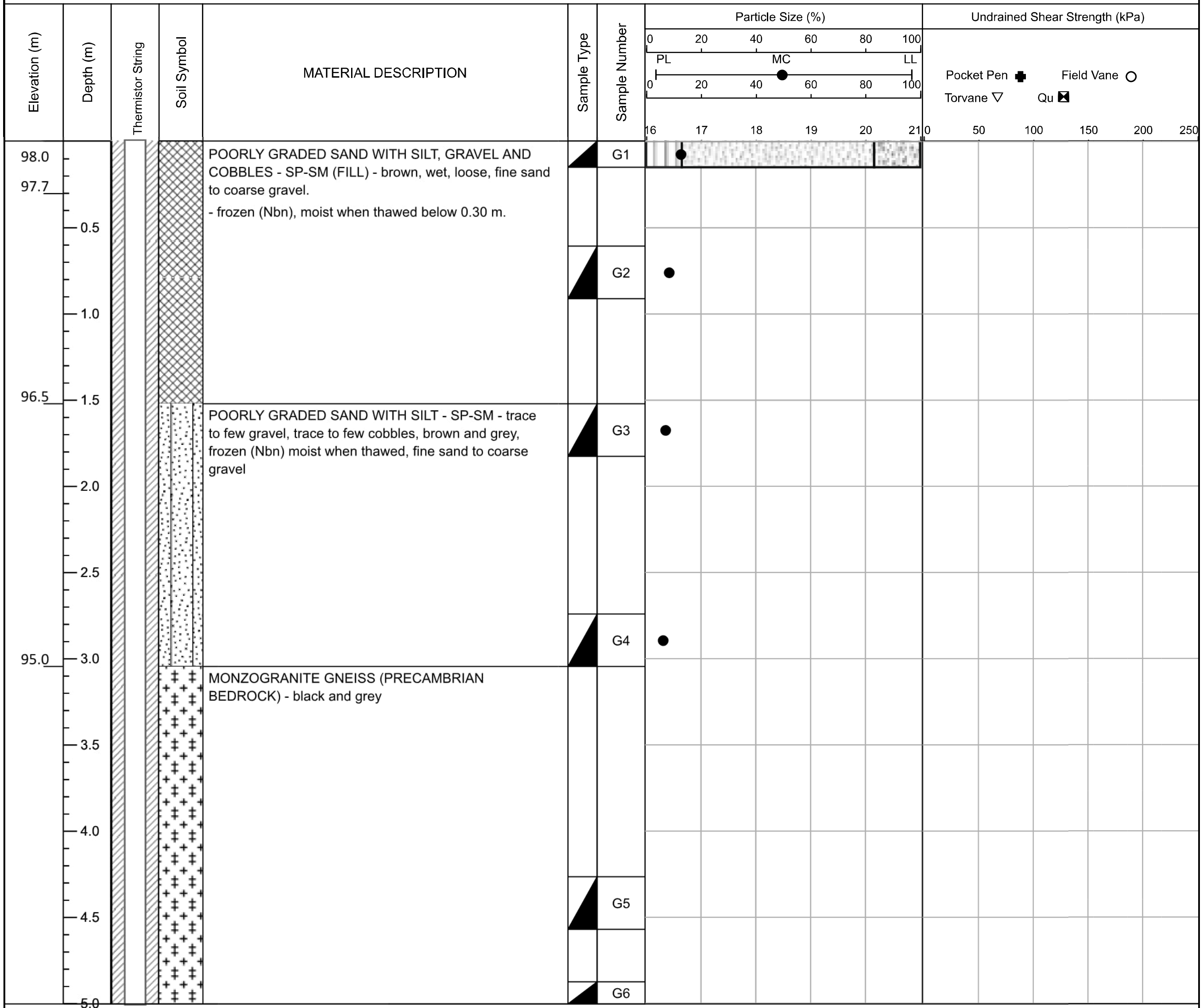
Test Hole TH26-01

1 OF 1

Client: AECOM
Project Name: Equipment Storage Garage, Iqaluit, NU
Project Number: 0013-060-00
Contractor: Canadrill Ltd.
Equipment: Joy Air Hammer
Method: 165.1mm Air Hammer

Date Drilled: 2026-05-23
Location: Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada
Description: Niaqunngusiariaq Road, Iqaluit, NU
UTM: 19V: 525730.9 E, 7068286.0 N
Ground Elevation: 98.05 m **Total Depth:** 5.01 m

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) / SPT Split Barrel (SB) / LPT Core (C) Sidewall (SW)



POORLY GRADED SAND WITH SILT, GRAVEL AND COBBLES - SP-SM (FILL) - brown, wet, loose, fine sand to coarse gravel.

- frozen (Nbn), moist when thawed below 0.30 m.

POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, trace to few cobbles, brown and grey, frozen (Nbn) moist when thawed, fine sand to coarse gravel

MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK) - black and grey

END OF HOLE AT 5.0 m

Notes:

1. **No seepage or sloughing observed.**
2. **Test hole open to 5.0 m and dry immediately after drilling.**
3. **Thermistor installed in test hole to 5.0 m depth.**
4. **Test hole backfilled with air hammer cuttings to surface.**
5. **Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).**
6. **Temperature readings recorded on May 25, 2026.**

Logged By: Paul Hiller
Reviewed By: Matt Klymochko
Project Engineer: Brent Hay

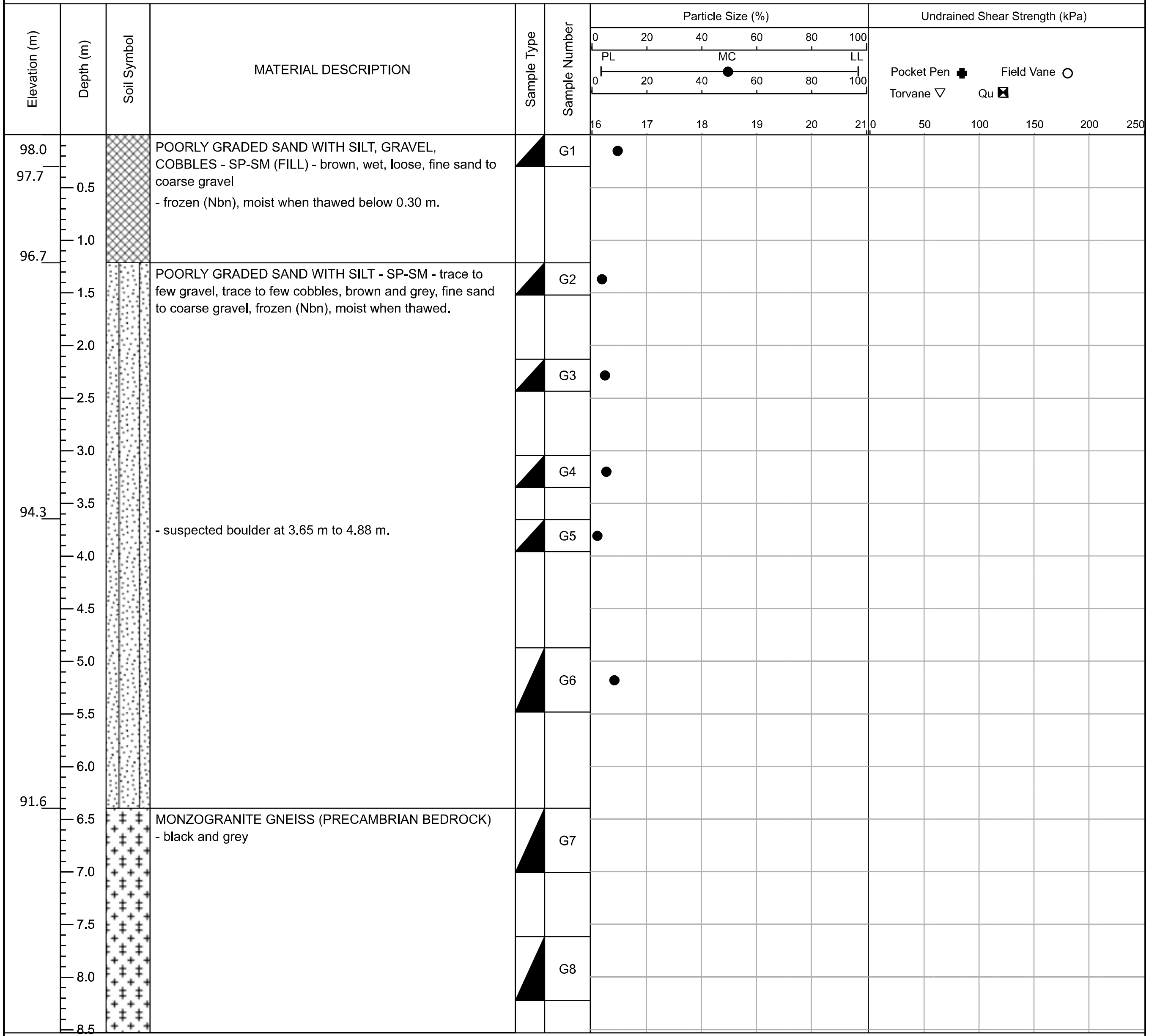
Sub-Surface Log

Test Hole TH26-02

1 OF 1

Client:	AECOM	**Date Drilled:**	2026-05-23
Project Name:	Equipment Storage Garage, Iqaluit, NU	**Location:**	Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada
Project Number:	0013-060-00	**Description:**	Niaqunngusiariaq Road, Iqaluit, NU
Contractor:	Canadrill Ltd.	**UTM:**	19V: 525714.0 E, 7068271.0 N
Equipment:	Joy Air Hammer	**Ground Elevation:**	97.96 m
Method:	165.1mm Air Hammer	**Total Depth:**	8.53 m

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) / SPT Split Barrel (SB) / LPT Core (C) Sidewall (SW)



POORLY GRADED SAND WITH SILT, GRAVEL, COBBLES - SP-SM (FILL) - brown, wet, loose, fine sand to coarse gravel

- frozen (Nbn), moist when thawed below 0.30 m.

POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, trace to few cobbles, brown and grey, fine sand to coarse gravel, frozen (Nbn), moist when thawed.

- suspected boulder at 3.65 m to 4.88 m.

MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK)
- black and grey

END OF HOLE AT 8.5 m
Notes:
1. No seepage or sloughing observed.
2. Test hole open to 8.5 m and dry immediately after drilling.
3. Test hole backfilled with air hammer cuttings to surface.
4. Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).

Logged By: Paul Hiller Reviewed By: Matt Klymochko Project Engineer: Brent Hay

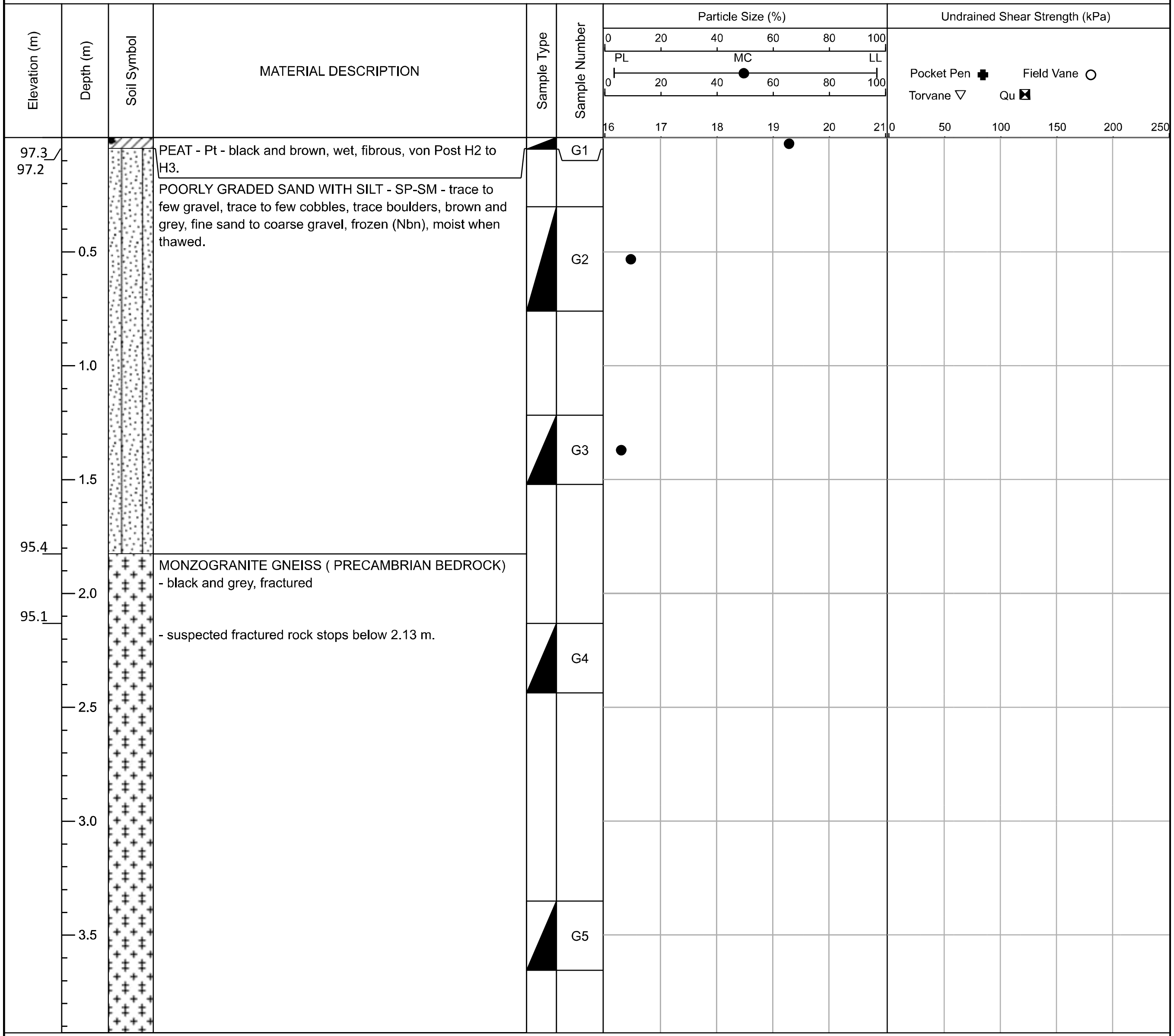
Sub-Surface Log

Test Hole TH26-03

1 OF 1

Client: AECOM
Project Name: Equipment Storage Garage, Iqaluit, NU
Project Number: 0013-060-00
Contractor: Canadrill Ltd.
Equipment: Joy Air Hammer
Method: 165.1mm Air Hammer
Date Drilled: 2026-05-23
Location: Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada
Description: Niaqunngusiariaq Road, Iqaluit, NU
UTM: 19V: 525714.0 E, 7068303.0 N
Ground Elevation: 97.25 m **Total Depth:** 3.93 m

Sample Type: ◩ Grab (G) ▮ Shelby Tube (T) ☒ Split Spoon (SS) / SPT ☒ Split Barrel (SB) / LPT ▯ Core (C) ▲ Sidewall (SW)



PEAT - Pt - black and brown, wet, fibrous, von Post H2 to H3.

POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, trace to few cobbles, trace boulders, brown and grey, fine sand to coarse gravel, frozen (Nbn), moist when thawed.

MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK) - black and grey, fractured

- suspected fractured rock stops below 2.13 m.

END OF HOLE AT 3.9 m
Notes:
1. No seepage or sloughing observed.
2. Test hole open to 3.9 m and dry immediately after drilling.
3. Test hole backfilled with air hammer cuttings to surface.
4. Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).

Logged By: Paul Hiller
Reviewed By: Matt Klymochko
Project Engineer: Brent Hay

TREK ENGINEERING

Sub-Surface Log

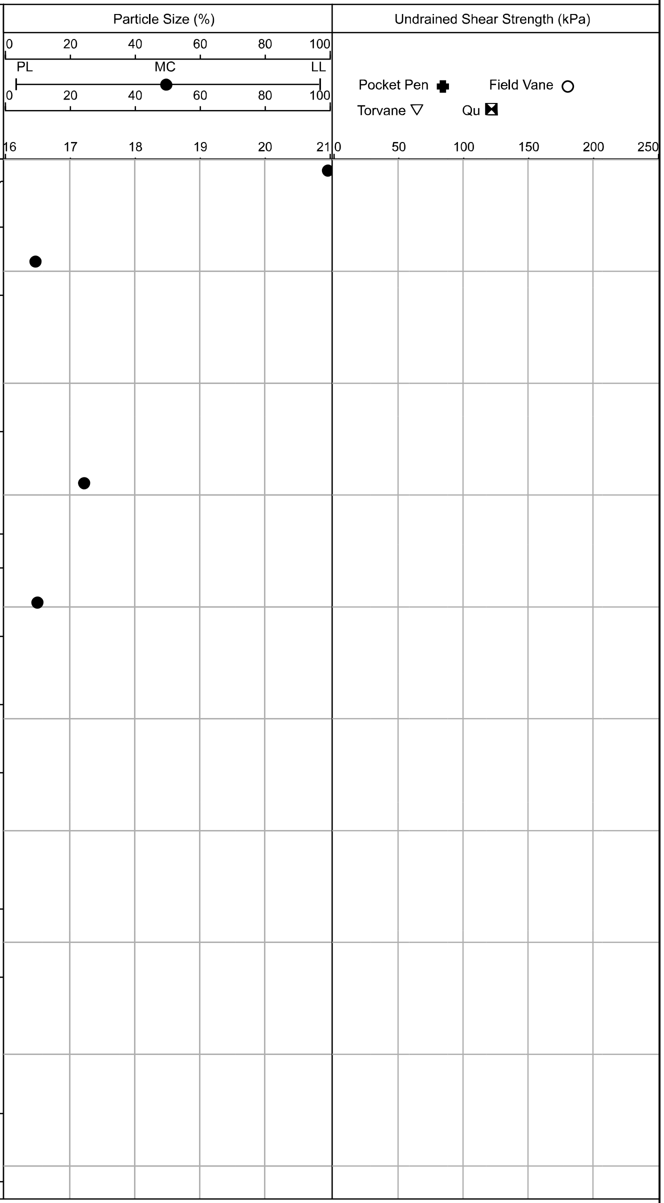
Test Hole TH26-04

1 OF 1

Client: AECOM
Project Name: Equipment Storage Garage, Iqaluit, NU
Project Number: 0013-060-00
Contractor: Canadrill Ltd.
Equipment: Joy Air Hammer
Method: 165.1mm Air Hammer
Date Drilled: 2026-05-23
Location: Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada
Description: Niaqunngusiariaq Road, Iqaluit, NU
UTM: 19V: 525752.0 E, 7068299.0 N
Ground Elevation: 97.12 m **Total Depth:** 4.65 m

Sample Type: ◪ Grab (G) ▮ Shelby Tube (T) ☒ Split Spoon (SS) / SPT ⧗ Split Barrel (SB) / LPT ◫ Core (C) ▲ Sidewall (SW)

Elevation (m)	Depth (m)	MATERIAL DESCRIPTION	Sample Type	Sample Number
97.1		PEAT - Pt (SOIL (GENERAL)) - black and brown, wet, fibrous, von Post H2 to H3.	◪	G1
97.0 96.8	0.5	POORLY GRADED SAND WITH GRAVEL, COBBLES AND BOULDERS - SP - brown, moist, compact, fine sand to coarse gravel. - grey to light brown , frozen (Nbn), moist when thawed below 0.30 m.	◪	G2
96.2	1.0 1.5	SILT - ML - trace gravel, trace to few sand, black and grey, frozen, moist when thawed, non-plastic.	◪	G3
95.3	2.0	POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, trace to few cobbles, brown, fine sand to fine gravel, frozen (Nbe), wet when thawed.	◪	G4
94.7	2.5 3.0 3.5 4.0 4.5	MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK) - black and grey	◪ ◪ ◪	G5 G6 G7



END OF HOLE AT 4.6 m
Notes:
1. No seepage or sloughing observed.
2. Test hole open to 4.6 m and dry immediately after drilling.
3. Test hole backfilled with air hammer cuttings to surface.
4. Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).

Logged By: Paul Hiller
Reviewed By: Matt Klymochko
Project Engineer: Brent Hay

Sub-Surface Log

Test Hole TH26-05

1 OF 1

Client: AECOM

Project Name: Equipment Storage Garage, Iqaluit, NU

Project Number: 0013-060-00

Contractor: Canadrill Ltd.

Equipment: Joy Air Hammer

Method: 165.1mm Air Hammer

Date Drilled: 2026-05-23

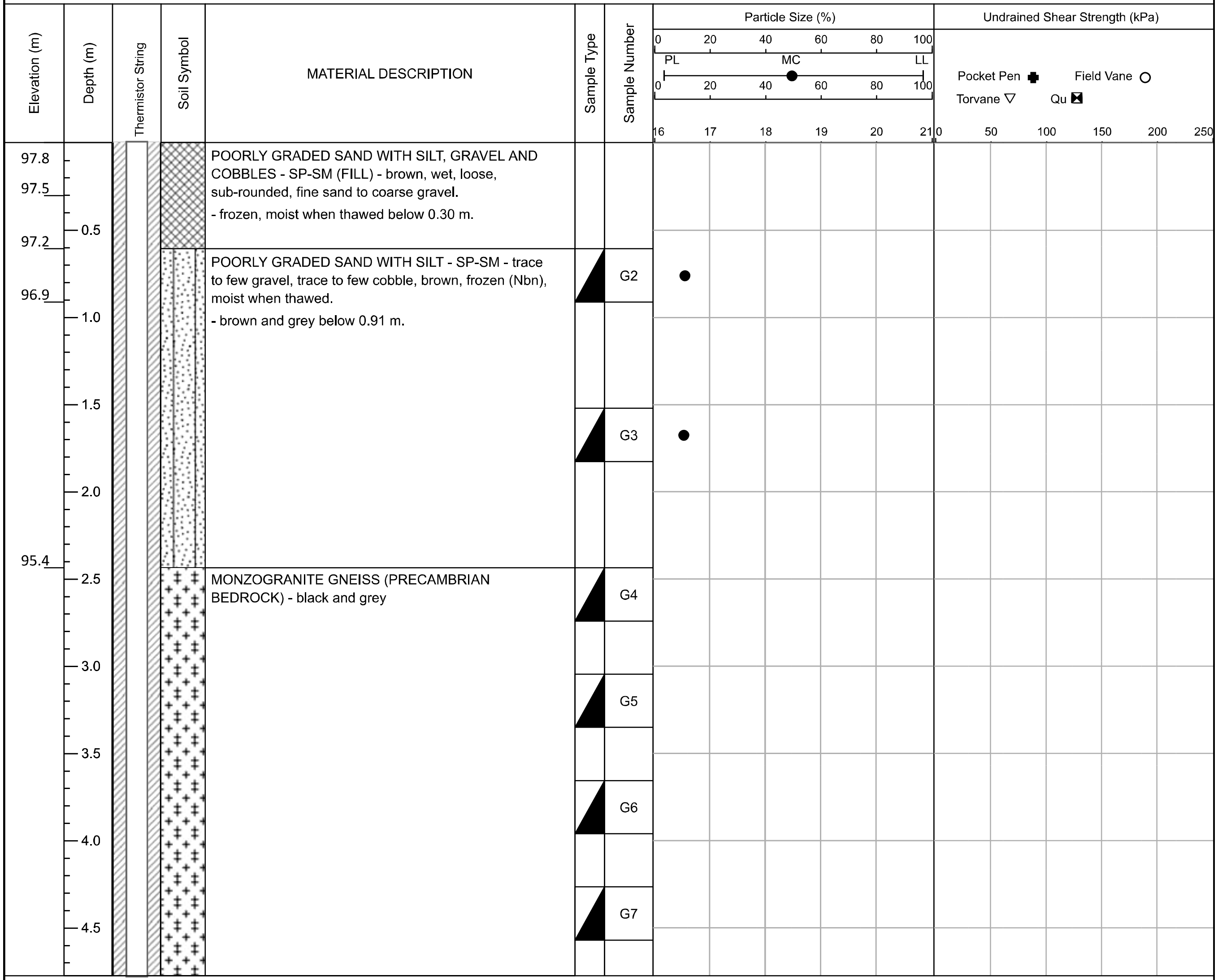
Location: Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada

Description: Niaqunngusiariaq Road, Iqaluit, NU

UTM: 19V: 525748.0 E, 7068266.0 N

Ground Elevation: 97.82 m **Total Depth:** 4.78 m

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) / SPT | Split Barrel (SB) / LPT | Core (C) | Sidewall (SW)



POORLY GRADED SAND WITH SILT, GRAVEL AND COBBLES - SP-SM (FILL) - brown, wet, loose, sub-rounded, fine sand to coarse gravel.

- frozen, moist when thawed below 0.30 m.

POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, trace to few cobble, brown, frozen (Nbn), moist when thawed.

- brown and grey below 0.91 m.

MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK) - black and grey

END OF HOLE AT 4.8 m

Notes:

1. No seepage or sloughing observed.

2. Test hole open to 4.8 m and dry immediately after drilling.

3. Thermistor installed in test hole to 4.8 m depth.

4. Test hole backfilled with air hammer cuttings to surface.

5. Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).

6. Temperature readings recorded on May 25, 2026.

Logged By: Paul Hiller Reviewed By: Matt Klymochko Project Engineer: Brent Hay

Sub-Surface Log

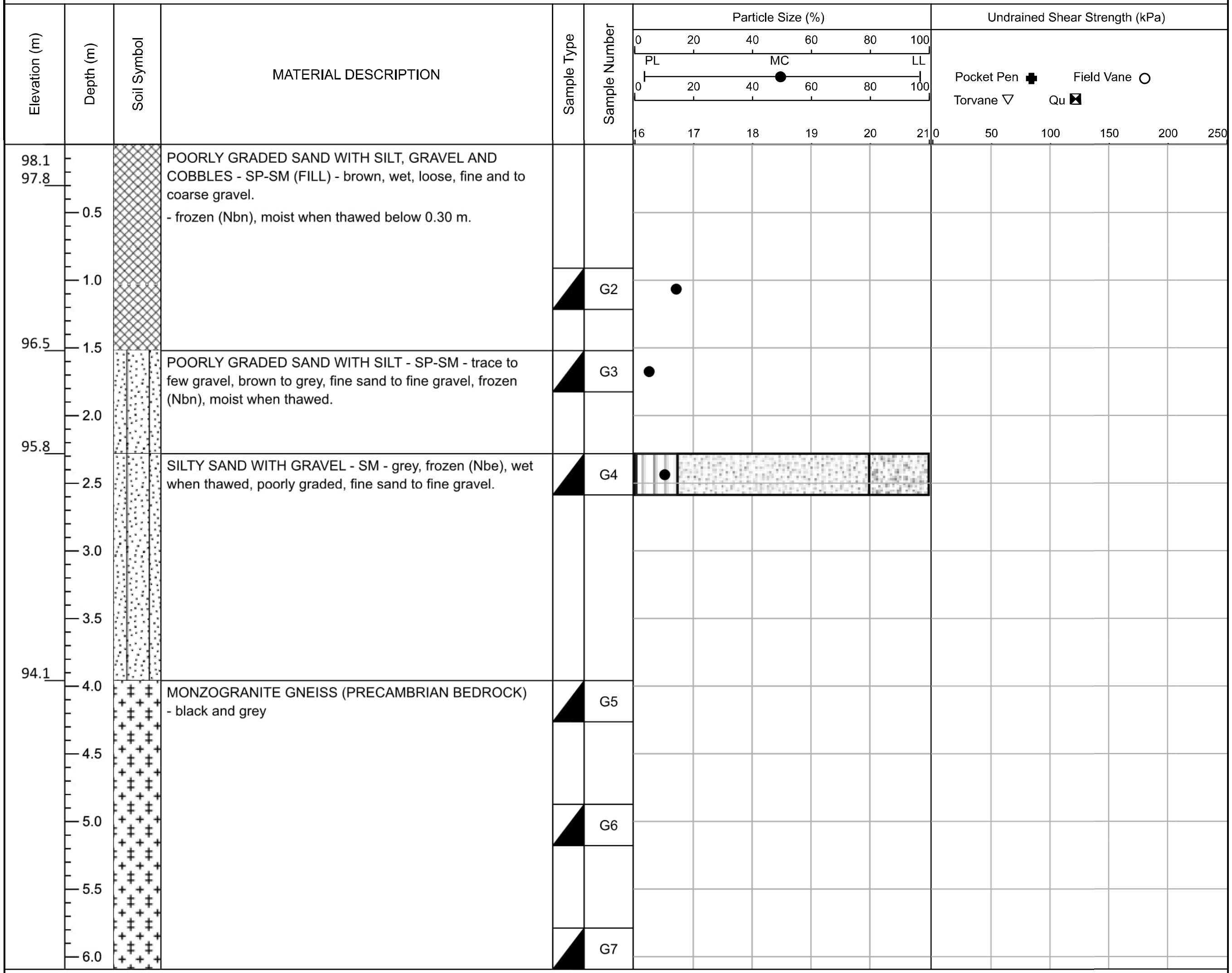
Test Hole TH26-06

1 OF 1

Client: AECOM
Project Name: Equipment Storage Garage, Iqaluit, NU
Project Number: 0013-060-00
Contractor: Canadrill Ltd.
Equipment: Joy Air Hammer
Method: 165.1mm Air Hammer

Date Drilled: 2026-05-23
Location: Niaqunngusiariaq, Iqaluit, NU X0A 0H0, Canada
Description: Niaqunngusiariaq Road, Iqaluit, NU
UTM: 19V: 525734.0 E, 7068282.0 N
Ground Elevation: 98.07 m **Total Depth:** 6.10 m

Sample Type: ◣ Grab (G) ▮ Shelby Tube (T) ☒ Split Spoon (SS) / SPT ⧗ Split Barrel (SB) / LPT ▯ Core (C) ▲ Sidewall (SW)



POORLY GRADED SAND WITH SILT, GRAVEL AND COBBLES - SP-SM (FILL) - brown, wet, loose, fine and to coarse gravel.

- frozen (Nbn), moist when thawed below 0.30 m.

POORLY GRADED SAND WITH SILT - SP-SM - trace to few gravel, brown to grey, fine sand to fine gravel, frozen (Nbn), moist when thawed.

SILTY SAND WITH GRAVEL - SM - grey, frozen (Nbe), wet when thawed, poorly graded, fine sand to fine gravel.

MONZOGRANITE GNEISS (PRECAMBRIAN BEDROCK)

- black and grey

END OF HOLE AT 6.1 m
Notes:
1. No seepage or sloughing observed.
2. Test hole open to 6.1 m and dry immediately after drilling.
3. Test hole backfilled with air hammer cuttings to surface.
4. Test hole elevation surveyed relative to a Temporary Benchmark (TBM) with an assigned elevation of 100.00 m. TBM is on top of the fire hydrant. (UTM 19U 525720 m E, 7068231 m N).

Logged By: Paul Hiller
Reviewed By: Matt Klymochko
Project Engineer: Brent Hay

Appendix A – Lab Testing

MEMORANDUM

Date	June 12, 2026
To	Paul Hiller, TREK Engineering
From	Angela Fidler-Kliewer, TREK Engineering
Project No.	0013-060-00
Project	Equipment Storage Garage – Iqaluit, NU
Subject	Laboratory Testing Results – Lab Req. R26-156
Distribution	Tyler Chapko, Brent Hay

Attached are the laboratory testing results for the above noted project. The testing included moisture content determinations and particle size distribution (Hydrometer method).

Two samples (TH26-01 G03 and TH26-02 G01) were sent to ALS Environmental for sulphate and chloride tests. The results will be issued in a separate report upon completion by ALS.

Regards,

Angela Fidler-Kliewer, C.Tech.

Attach.

Review Control:

Prepared By: SCH	*Reviewed By:* AFK	*Checked By:* NJF

TREK ENGINEERING

Lab Requisition

www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

PROJECT: Equipment Storage Garage - Iqaluit, NU
PROJECT NO: 0013-060-00
CLIENT: AECOM
FIELD TECHNICIAN: Paul Hiller

TEST HOLE NUMBER	SAMPLE NUMBER	Sample Start Depth (ft)	Sample End Depth (ft)	Sample Date	MOISTURE	ATTERBERG LIMITS	HYDROMETER	GRADATION	STD. PROCTOR	UNCONFINED AND AUXILLARY TESTS	VISUAL CLASS.	Soluble Sulfate/ Chloride Content (500g).			Soil Description/ Comments
TH26-01	G01	0.0	0.5	23-May	X		X					✓			Sand W/Gravelly (Fill)
TH26-01	G02	2.0	3.0	23-May	X										Sand-with (fill)
TH26-01	G03	5.0	6.0	23-May	X							X			Sand, gravelly
TH26-01	G04	9.0	10.0	23-May	X										Sand, gravelly
TH26-01	G05	14.0	15.0	23-May	X										Bedrock
TH26-01	G06	16.0	17.0	23-May	X										Bedrock
TH26-02	G01	0.0	1.0	23-May	X							X			Sand W/gravel (fill) ✓
TH26-02	G02	4.0	5.0	23-May	X					CHECK					Sand W/gravel
TH26-02	G03	7.0	8.0	23-May	X					COMMENTS					Sand W/gravel
TH26-02	G04	10.0	11.0	23-May	X										Sand W/gravel
TH26-02	G05	12.0	13.0	23-May	X										Boulder - fragments
TH26-02	G06	16.0	18.0	23-May	X										-Sand-with gravel
TH26-02	G07	21.0	23.0	23-May	X										Bedrock-
TH26-02	G08	25.0	27.0	23-May	X										Bedrock
TH26-03	G01	0.0	0.2	23-May	X										Peat
TH26-03	G02	1.0	2.5	23-May	X										Sand - gravelly
TH26-03	G03	4.0	5.0	23-May	X										Sand - gravelly
TH26-03	G04	7.0	8.0	23-May	X										Bedrock
TH26-03	G05	11.0	12.0	23-May	X										Bedrock
										CHECK					
TH26-04	G01	0.0	0.3	23-May	X					COMMENTS					Peat
TH26-04	G02	1.0	2.0	23-May	X										Sand W/gravel
TH26-04	G03	4.0	5.5	23-May	X							~~✓~~			Silt - Sandy * watch Amount
TH26-04	G04	6.0	7.0	23-May	X										Sand W/gravel
TH26-04	G05	8.0	9.0	23-May	X										Bedrock
TH26-04	G06	11.0	12.0	23-May	X										Bedrock
TH26-04	G07	14.0	15.0	23-May	X										Bedrock

REQUESTED BY: PH
REPORT TO: PH ,TC ,BH
REQUISTION DATE: 2026-06-0~~2~~3
DATE REQUIRED: 2026-06-1~~6~~7
COMMENTS: TH26-04. G03 NOT ENOUGH MATERIAL FOR ALS; TECH "PH" REQUESTED TH26-02. G01 FOR ALS INSTEAD.

REQUISITION NO. R26-156

SHEET 1 OF 2

TREK ENGINEERING

Lab Requisition

www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

PROJECT: Equipment Storage Garage - Iqaluit, NU
PROJECT NO: 0013-060-00
CLIENT: AECOM
FIELD TECHNICIAN: Paul Hiller

TEST HOLE NUMBER	SAMPLE NUMBER	Sample Start Depth (ft)	Sample End Depth (ft)	Sample Date	MOISTURE	ATTERBERG LIMITS	HYDROMETER	GRADATION	STD. PROCTOR	UNCONFINED AND AUXILLARY TESTS	VISUAL CLASS.				Soil Description/ Comments
TH26-05	G02	2.0	3.0	23-May	X										Sand - gravelly
TH26-05	G03	5.0	6.0	23-May	X										Sand - gravelly
TH26-05	G04	8.0	9.0	23-May	X										Bedrock
TH26-05	G05	10.0	11.0	23-May	X										Bedrock
TH26-05	G06	12.0	13.0	23-May	X										Bedrock
TH26-05	G07	14.0	15.0	23-May	X										Bedrock
TH26-06	G02	3.0	4.0	23-May	X										Sand - gravelly (fill)
TH26-06	G03	5.0	6.0	23-May	X										Sand - Gravelly
TH26-06	G04	7.5	8.5	23-May	X		X ✓								Sand - some silt
TH26-06	G05	13.0	14.0	23-May	X										Bedrock
TH26-06	G06	16.0	17.0	23-May	X										Bedrock
TH26-06	G07	19.0	20.0	23-May	X										Bedrock

REQUESTED BY: PH
REPORT TO: PH ,TC ,BH
REQUISTION DATE: 2026-06-02
DATE REQUIRED: 2026-06-16
COMMENTS:

REQUISITION NO. R26-156

SHEET 2 OF 2

TREK ENGINEERING
www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

Moisture Content Report
ASTM D2216-98

Project No. 0013-060-00
Client AECOM
Project Equipment Storage Garage - Iqaluit, NU

Sample Date 23-May-26
Test Date 03-Jun-26
Technician J. Chau

Test Hole	TH26-01	TH26-01	TH26-01	TH26-01	TH26-01	TH26-01
Depth (m)	0.0 - 0.2	0.6 - 0.9	1.5 - 1.8	2.7 - 3.0	4.3 - 4.6	4.9 - 5.2
Sample #	G01	G02	G03	G04	G05	G06
Tare ID	N21	N99	Z82	J77	B2	M40
Mass of tare	8.8	8.6	8.6	7.0	6.8	7.4
Mass wet + tare	450.6	207.6	195.4	198.6	204.6	200.2
Mass dry + tare	399.0	191.3	182.2	186.5	200.3	193.9
Mass water	51.6	16.3	13.2	12.1	4.3	6.3
Mass dry soil	390.2	182.7	173.6	179.5	193.5	186.5
Moisture %	13.2%	8.9%	7.6%	6.7%	2.2%	3.4%

Test Hole	TH26-02	TH26-02	TH26-02	TH26-02	TH26-02	TH26-02
Depth (m)	0.0 - 0.3	1.2 - 1.5	2.1 - 2.4	3.0 - 3.4	3.7 - 4.0	4.9 - 5.5
Sample #	G01	G02	G03	G04	G05	G06
Tare ID	QW20	QT55	P14	F130	D20	F59
Mass of tare	6.8	8.2	8.6	8.8	8.6	8.8
Mass wet + tare	199.0	110.4	190.0	170.2	205.4	169.4
Mass dry + tare	181.6	106.2	180.7	161.2	200.5	156.4
Mass water	17.4	4.2	9.3	9.0	4.9	13.0
Mass dry soil	174.8	98.0	172.1	152.4	191.9	147.6
Moisture %	10.0%	4.3%	5.4%	5.9%	2.6%	8.8%

Test Hole	TH26-02	TH26-02	TH26-03	TH26-03	TH26-03	TH26-03
Depth (m)	6.4 - 7.0	7.6 - 8.2	0.0 - 0.1	0.3 - 0.8	1.2 - 1.5	2.1 - 2.4
Sample #	G07	G08	G01	G02	G03	G04
Tare ID	E73	D224	M02	M24	QT45	M37
Mass of tare	7.2	7.0	6.9	7.1	8.3	6.9
Mass wet + tare	169.6	183.4	198.5	188.9	184.6	148.7
Mass dry + tare	165.5	180.7	122.1	172.5	173.9	147.1
Mass water	4.1	2.7	76.4	16.4	10.7	1.6
Mass dry soil	158.3	173.7	115.2	165.4	165.6	140.2
Moisture %	2.6%	1.6%	66.3%	9.9%	6.5%	1.1%

Moisture Content Report
ASTM D2216-98

Project No. 0013-060-00
Client AECOM
Project Equipment Storage Garage - Iqaluit, NU

Sample Date 23-May-26
Test Date 03-Jun-26
Technician J. Chau

Test Hole	TH26-03	TH26-04	TH26-04	TH26-04	TH26-04	TH26-04
Depth (m)	3.4 - 3.7	0.0 - 0.1	0.3 - 0.6	1.2 - 1.7	1.8 - 2.1	2.4 - 2.7
Sample #	G05	G01	G02	G03	G04	G05
Tare ID	E49	K10	W98	E14	QW5	EX01
Mass of tare	7.0	8.5	8.6	7.1	6.9	6.9
Mass wet + tare	173.4	187.5	182.9	182.3	198.0	142.6
Mass dry + tare	171.0	91.0	167.2	147.4	179.9	140.5
Mass water	2.4	96.5	15.7	34.9	18.1	2.1
Mass dry soil	164.0	82.5	158.6	140.3	173.0	133.6
Moisture %	1.5%	117.0%	9.9%	24.9%	10.5%	1.6%

Test Hole	TH26-04	TH26-04	TH26-05	TH26-05	TH26-05	TH26-05
Depth (m)	3.4 - 3.7	4.3 - 4.6	0.6 - 0.9	1.5 - 1.8	2.4 - 2.7	3.0 - 3.4
Sample #	G06	G07	G02	G03	G04	G05
Tare ID	B14	H1	H46	D200	D231	W105
Mass of tare	6.9	8.5	7.0	6.9	6.8	8.5
Mass wet + tare	177.1	172.4	180.6	139.3	80.6	185.7
Mass dry + tare	176.1	171.3	162.5	126.0	76.7	179.8
Mass water	1.0	1.1	18.1	13.3	3.9	5.9
Mass dry soil	169.2	162.8	155.5	119.1	69.9	171.3
Moisture %	0.6%	0.7%	11.6%	11.2%	5.6%	3.4%

Test Hole	TH26-05	TH26-05	TH26-06	TH26-06	TH26-06	TH26-06
Depth (m)	3.7 - 4.0	4.3 - 4.6	0.9 - 1.2	1.5 - 1.8	2.3 - 2.6	4.0 - 4.3
Sample #	G06	G07	G02	G03	G04	G05
Tare ID	I75	F125	QT40	H41	Z123	K11
Mass of tare	7.0	8.7	8.5	8.5	8.6	8.9
Mass wet + tare	180.4	181.2	168.2	173.8	321.5	126.3
Mass dry + tare	174.8	179.6	147.7	165.2	290.9	124.4
Mass water	5.6	1.6	20.5	8.6	30.6	1.9
Mass dry soil	167.8	170.9	139.2	156.7	282.3	115.5
Moisture %	3.3%	0.9%	14.7%	5.5%	10.8%	1.6%

TREK ENGINEERING
www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

Moisture Content Report
ASTM D2216-98

Project No. 0013-060-00
Client AECOM
Project Equipment Storage Garage - Iqaluit, NU

Sample Date 23-May-26
Test Date 03-Jun-26
Technician J. Chau

Test Hole	TH26-06	TH26-06				
Depth (m)	4.9 - 5.2	5.8 - 6.1				
Sample #	G06	G07				
Tare ID	E06	QT59				
Mass of tare	7.1	8.1				
Mass wet + tare	173.6	125.4				
Mass dry + tare	171.2	123.3				
Mass water	2.4	2.1				
Mass dry soil	164.1	115.2				
Moisture %	1.5%	1.8%				

TREK ENGINEERING

www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

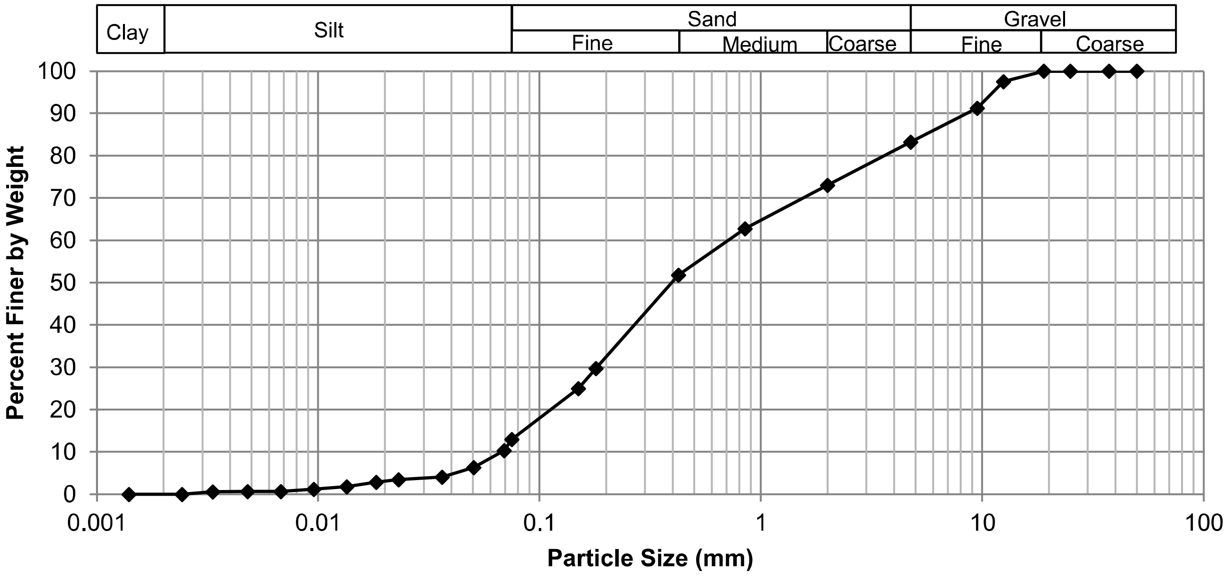
Grain Size Analysis (Hydrometer Method)
AASHTO T 88

CERTIFIED BY CCIL Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

Project No.	0013-060-00
Client	AECOM
Project	Equipment Storage Garage - Iqaluit, NU
Sample #	G01
Test Hole	TH26-01
Depth (m)	0.0 - 0.2
Sample Date	23-May-26
Test Date	08-Jun-26
Technician	P. Kaur

Gravel	16.8%
Sand	70.2%
Silt	13.0%
Clay	0.0%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**
50.0	100.00	4.75	83.20	0.0750	12.97
37.5	100.00	2.00	73.04	0.0692	10.30
25.0	100.00	0.850	62.78	0.0505	6.30
19.0	100.00	0.425	51.81	0.0363	4.02
12.5	97.48	0.180	29.71	0.0231	3.45
9.50	91.26	0.150	25.02	0.0183	2.87
4.75	83.20	0.075	12.97	0.0135	1.75
				0.0096	1.18
				0.0068	0.61
				0.0048	0.61
				0.0033	0.57
				0.0024	0.00
				0.0014	0.00

TREK ENGINEERING

www.trekengineering.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433

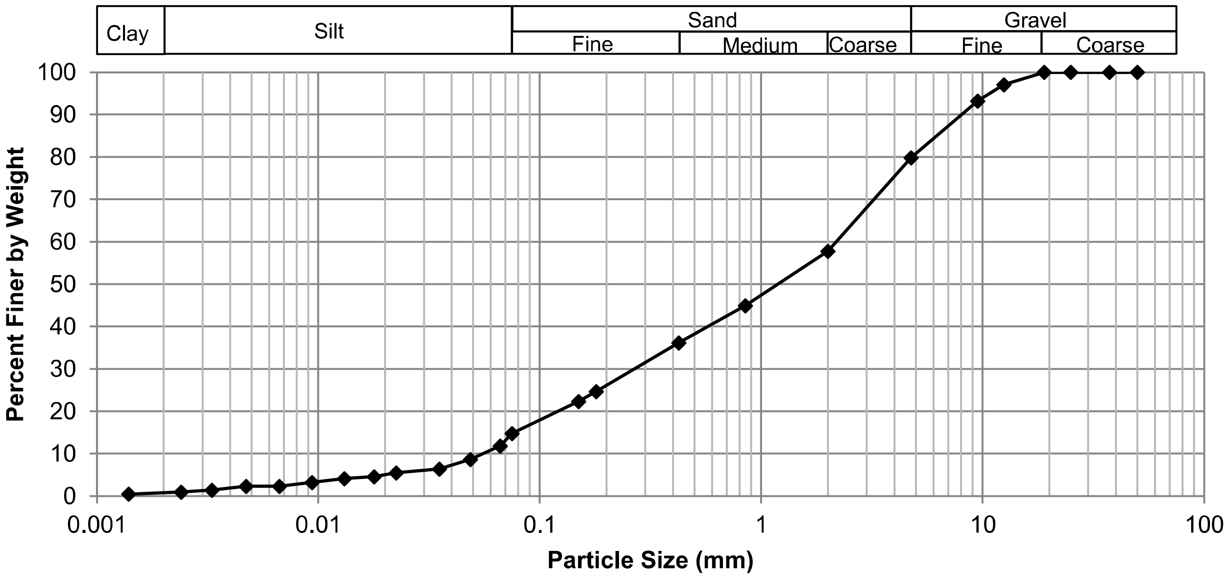
Grain Size Analysis (Hydrometer Method)
AASHTO T 88

CERTIFIED BY CCIL
Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

Project No.	0013-060-00
Client	AECOM
Project	Equipment Storage Garage - Iqaluit, NU
Sample #	G04
Test Hole	TH26-06
Depth (m)	2.3 - 2.6
Sample Date	23-May-26
Test Date	08-Jun-26
Technician	P. Kaur

Gravel	20.2%
Sand	65.1%
Silt	14.0%
Clay	0.7%

Particle Size Distribution Curve



Gravel		**Sand**		**Silt and Clay**	
Particle Size (mm)	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**
50.0	100.00	4.75	79.80	0.0750	14.75
37.5	100.00	2.00	57.75	0.0664	11.80
25.0	100.00	0.850	44.89	0.0486	8.64
19.0	100.00	0.425	36.15	0.0352	6.38
12.5	97.06	0.180	24.71	0.0225	5.48
9.50	93.19	0.150	22.30	0.0179	4.59
4.75	79.80	0.075	14.75	0.0131	4.14
				0.0094	3.24
				0.0067	2.34
				0.0047	2.34
				0.0033	1.40
				0.0024	0.92
				0.0014	0.48

CERTIFICATE OF ANALYSIS

Work Order : **WP2608513**
Client : **TREK Geotechnical Inc.**
Contact : Paul Hiller
Address : 1712 St. James Street
Winnipeg Manitoba Canada R3H 0L3
Telephone : ----
Project : 0013-060-00
PO : ----
C-O-C number : ----
Sampler : ----
Site : TREK Geotechnical - Analytical
Quote number : 2025 Analytical Testing
No. of samples received : 2
No. of samples analysed : 2

Laboratory : ALS Environmental - Winnipeg
Account Manager : Riya Gill
Address : 1329 Niakwa Road East, Unit 12
Winnipeg MB Canada R2J 3T4
E-mail : riya.gill@alsglobal.com
Telephone : +1 204 255 9720
Date Samples Received : 04-Jun-2026 14:19
Date Analysis Commenced : 10-Jun-2026
Issue Date : 19-Jun-2026 16:38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key:

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

				Client sample ID	TH26-01 G03 (5.0'-6.0') ----	TH26-02 G01 (0.0'-1.0) ----	----	----	----
				Client sampling date / time	23-May-2026 00:00	23-May-2026 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2608513-001	WP2608513-002	----	----	----
					Result	Result	----	----	----
Inorganics									
Chloride, soluble ion content	16887-00-6	E246.CL/CG	0.0025	%	0.0036	0.0031	----	----	----
Sulfate, total, ion content	14808-79-8	E246.SO4/CG	0.050	%	<0.050	<0.050	----	----	----
Sulfate, soluble ion content	14808-79-8	E246A.SO4/CG	0.05	%	NR	NR	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

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Quality Control Interpretive Report

Work Order : **WP2608513**

Client : TREK Geotechnical Inc.
Contact : Paul Hiller
Address : 1712 St. James Street
Winnipeg MB Canada R3H 0L3
Telephone : ----
Project : 0013-060-00
PO : ----
C-O-C number : ----
Sampler : ----
Site : TREK Geotechnical - Analytical
Quote number : 2025 Analytical Testing
No. of samples received : 2
No. of samples analysed : 2

Laboratory : ALS Environmental - Winnipeg
Account Manager : Riya Gill
Address : 1329 Niakwa Road East, Unit 12
Winnipeg MB Canada R2J 3T4
Telephone : +1 204 255 9720
Date Samples Received : 04-Jun-2026 14:19
Issue Date : 19-Jun-2026 16:38

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Laboratory Control Sample Duplicate (LCSD) outliers occur
- No Matrix Spike outliers occur.
- No Matrix Spike Duplicate (MSD) outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and/or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance; ✓ = Within Holding Time

Analyte Group : Analytical Method					Extraction / Preparation				Analysis			
Container						Holding Times				Holding Times		
Client sample ID	ALS Sample ID	QC Lot	Method	Sampling Date	Preparation Date	Rec	Actual	Eval	Analysis Date	Rec	Actual	Eval
Inorganics : Chloride in soil by boiling water extraction, DA												
LDPE bag												
TH26-01 G03 (5.0'-6.0')	001	2643797	E246.CL	23-May-2026	10-Jun-2026	180 days	19 days	✓	12-Jun-2026	28 days	1 days	✓
TH26-02 G01 (0.0'-1.0)	002	2643797	E246.CL	23-May-2026	10-Jun-2026	180 days	19 days	✓	12-Jun-2026	28 days	1 days	✓
Inorganics : Soluble Sulfate ion in soil by boiling water extraction, IC.												
LDPE bag												
TH26-01 G03 (5.0'-6.0')	001	2655510	E246A.SO4	23-May-2026	16-Jun-2026	180 days	25 days	✓	16-Jun-2026	28 days	0 days	✓
TH26-02 G01 (0.0'-1.0)	002	2655510	E246A.SO4	23-May-2026	16-Jun-2026	180 days	25 days	✓	16-Jun-2026	28 days	0 days	✓
Inorganics : Total Sulfate ion in soil by acidic boiling water extraction, IC												
LDPE bag												
TH26-01 G03 (5.0'-6.0')	001	2644846	E246.SO4	23-May-2026	11-Jun-2026	180 days	19 days	✓	11-Jun-2026	28 days	0 days	✓
TH26-02 G01 (0.0'-1.0)	002	2644846	E246.SO4	23-May-2026	11-Jun-2026	180 days	19 days	✓	11-Jun-2026	28 days	0 days	✓

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification;* ✓ = *QC frequency within specification*

Quality Control Sample Type			*Count*		*Frequency (%)*		
Analytical Methods	*Method / Lab*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Chloride in soil by boiling water extraction, DA	E246.CL / CG	2643797	1	3	33.3	5.0	✓
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4 / CG	2644846	1	19	5.3	5.0	✓
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4 / CG	2655510	0	13	0.0	5.0	×
Laboratory Control Samples (LCS)							
Chloride in soil by boiling water extraction, DA	E246.CL / CG	2643797	2	3	66.7	10.0	✓
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4 / CG	2644846	2	19	10.5	10.0	✓
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4 / CG	2655510	2	13	15.4	10.0	✓
Method Blanks (MB)							
Chloride in soil by boiling water extraction, DA	E246.CL / CG	2643797	1	3	33.3	5.0	✓
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4 / CG	2644846	1	19	5.3	5.0	✓
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4 / CG	2655510	1	13	7.7	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	***Method / Lab***	***Matrix***	***Method Reference***	***Method Descriptions***
Chloride in soil by boiling water extraction, DA	E246.CL ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-4B (mod)	Hot water soluble chloride is determined in soil by combining a fixed ratio of soil and water, boiling the mixture for a period of time, cooling, filtration, and analysis by Discrete Analyzer
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4 ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B (Mod)	The dried solid is mixed with water at a specified ratio then heated. After filtration the liquid is ready for analysis by IC with conductivity detector. A result of "NR" indicates that the total sulfate analysis was <0.2% and based on CSA-A23.2-3B no analysis for soluble sulfate is required.
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4 ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B (Mod)	The dried solid is mixed with water and acid then heated. After filtration the liquid is ready for analysis by IC with conductivity detector.
Preparation Methods	***Method / Lab***	***Matrix***	***Method Reference***	***Method Descriptions***
Chloride in soil by boiling water extraction	EP246.CL ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B mod	Hot water soluble chloride is determined in soil by combining a fixed ratio of soil and water, boiling the mixture for a period of time, cooling, then filtration prior to analysis
Soluble ion Sulfate in soil or concrete preparation.	EP246.S ALS Environmental - Calgary	Soil/Solid	CSA-A23.2B	The dried solid is mixed with water then heated. After filtration the liquid is ready for analysis.
Total ion Sulfate in soil or concrete preparation	EP246.T ALS Environmental - Calgary	Soil/Solid	CSA-A23.2B	The dried solid is mixed with water and acid then heated. After filtration the liquid is ready for analysis.

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QUALITY CONTROL REPORT

Work Order : **WP2608513**

Client : TREK Geotechnical Inc.
Contact : Paul Hiller
Address : 1712 St. James Street
Winnipeg MB Canada R3H 0L3
Telephone : ----
Project : 0013-060-00
PO : ----
C-O-C number : ----
Sampler : ----
Site : TREK Geotechnical - Analytical
Quote number : 2025 Analytical Testing
No. of samples received : 2
No. of samples analysed : 2

Laboratory : ALS Environmental - Winnipeg
Account Manager : Riya Gill
Address : 1329 Niakwa Road East, Unit 12
Winnipeg MB Canada R2J 3T4
Telephone : +1 204 255 9720
Date Samples Received : 04-Jun-2026 14:19
Date Analysis Commenced : 11-Jun-2026
Issue Date : 19-Jun-2026 16:38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key:
Anonymous=Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number=Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO=Data Quality Objective.
LOR=Limit of Reporting (detection limit).
RPD=Relative Percent Difference
# =Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Inorganics(QC Lot: 2643797)											
EO2604214-001	Anonymous	Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	0.0187 %	184	1.64 %	30%	---
Inorganics(QC Lot: 2644846)											
CG2607385-001	Anonymous	Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	0.164 %	1640	7	Diff <2x LOR	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Inorganics(QC Lot: 2643797)						
Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	<25	----
Inorganics(QC Lot: 2644846)						
Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	<500	----
Inorganics(QC Lot: 2655510)						
Sulfate, soluble ion content	14808-79-8	E246A.SO4	500	mg/kg	NR	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Inorganics(QC Lot: 2643797)									
Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	100 mg/kg	101	70.0	130	----
Inorganics(QC Lot: 2644846)									
Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	10000 mg/kg	101	90.0	110	----
Inorganics(QC Lot: 2655510)									
Sulfate, soluble ion content	14808-79-8	E246A.SO4	500	mg/kg	Incalculable	Incalculable	60.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: Soil

					Reference Material (RM) Report				
					RM	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Target Concentration	RM	Low	High	Qualifier
Inorganics(QC Lot: 2643797)									
QC-2643797-001		Chloride, soluble ion content	16887-00-6	E246.CL	1407 mg/kg	# 105	70.0	130	----
Inorganics(QC Lot: 2644846)									
QC-2644846-001		Sulfate, total, ion content	14808-79-8	E246.SO4	33400 mg/kg	# 91.1	80.0	120	----
Inorganics(QC Lot: 2655510)									
QC-2655510-001		Sulfate, soluble ion content	14808-79-8	E246A.SO4	mg/kg	----	80.0	120	----

Chain of Custody (COC) / Analytical Request Form

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: **22 -**

Page of

Environmental Division
Winnipeg
Work Order Reference
WP2608513
Telephone : 204 255 9720

L HERE

Report To Contact and company name below will appear on the final report

Company: TREK Engineering Inc.
Contact: Paul Hiller
Phone: 204-212-0696

Company address below will appear on the final report

Street: 1712 St James Street
City/Province: Winnipeg, MB
Postal Code: R3H 0L3

Invoice To Same as Report To ☑ YES ☐ NO
Copy of Invoice with Report ☑ YES ☐ NO
Company: TREK Engineering Inc.
Contact:

Project Information

ALS Account # / Quote #: W10728
Job #: 0013-060-00
PO / AFE:
LSD:

ALS Lab Work Order # (ALS use only):

Reports / Recipients

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☐ YES ☑ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax philler@trekeng.ca
Email 2 tchapko@trekeng.ca
Email 3 bhay@trekeng.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@trekeng.ca
Email 2

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Contact: **Sampler:**

Turnaround Time (TAT) Requ

☑ Routine [R] if received by 3pm M-F - no surchar
☐ 4 day [P4] if received by 3pm M-F - 20% rush su
☐ 3 day [P3] if received by 3pm M-F - 25% rush s
☐ 2 day [P2] if received by 3pm M-F - 50% rush su
☐ 1 day [E] if received by 3pm M-F - 100% rush su
☐ Same day [E2] if received by 10am M-S - 200%

Additional fees may apply to rush requests

Date and Time Required for all E&P TATs:

For all tests with rush TATs reques

An

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	SO4-Water-Soluble (CSA-A23.2-3B)	PH-WT	RESISTIVITY-CALC-WT	CONDUCTIVITY-EC-WT	CHLORIDE										SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	TH26-01 G03 (5.0' - 6.0')	23-May-26		Grab		R				R												
	TH26-02 G01 (0.0' - 1.0')	23-May-26		Grab		R				R												

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human consumption/ use?
☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C: 22
FINAL COOLER TEMPERATURES °C:

SHIPMENT RELEASE (client use)

Released by: Samantha Huyghe Date: 2026-06-04 Time: 10:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: DG Date: 06/04 Time: 214

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

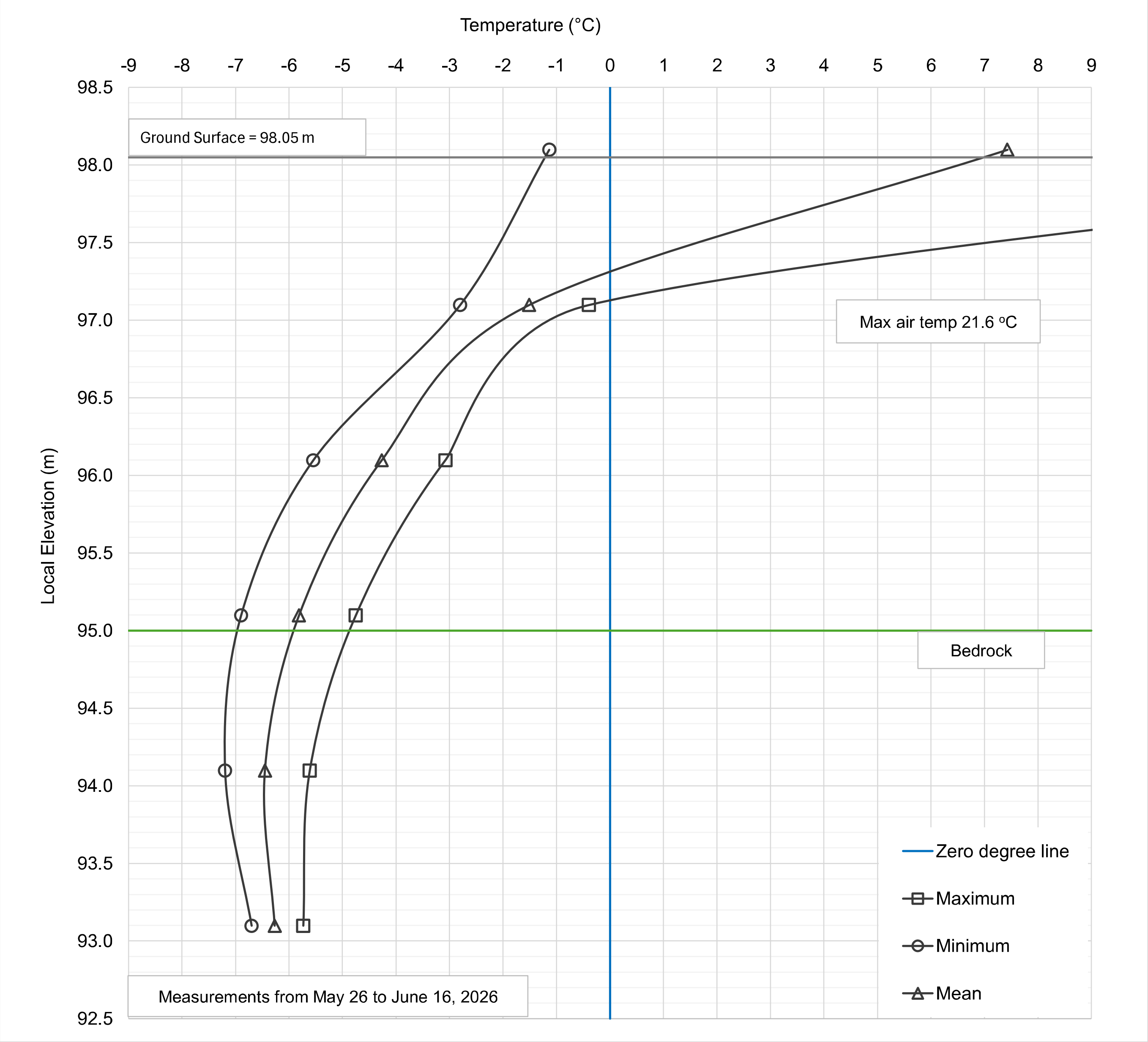
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

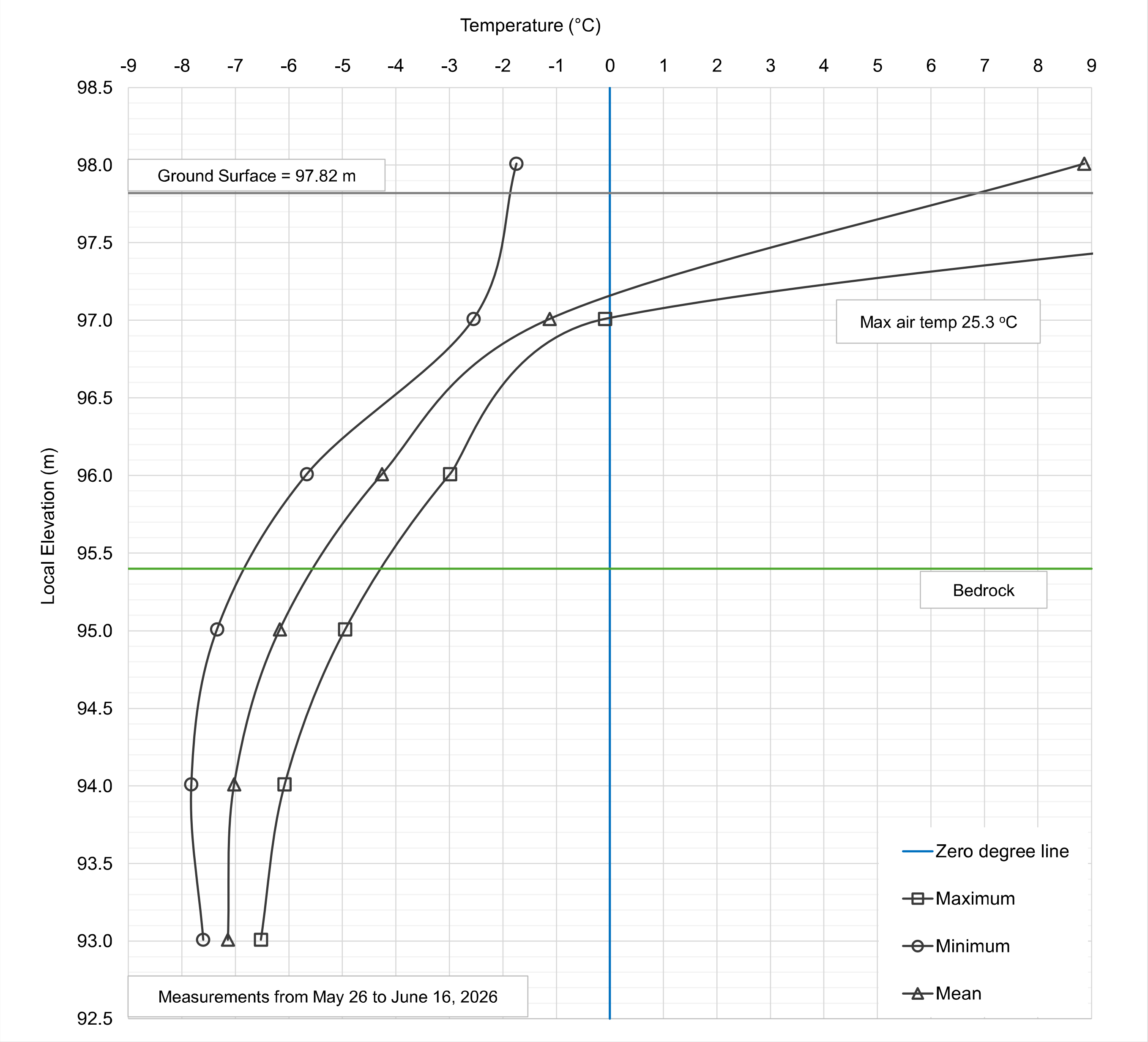
FEB 2022 FRONT

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

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

Appendix B – Thermistor Plots


Temperature (°C)
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
Local Elevation (m)
98.5
98.0
97.5
97.0
96.5
96.0
95.5
95.0
94.5
94.0
93.5
93.0
92.5
Ground Surface = 98.05 m
Max air temp 21.6 ºC
Bedrock
Zero degree line
Maximum
Minimum
Mean
Measurements from May 26 to June 16, 2026



Appendix B: Thermistor Plots
Test Hole: TH26-05
Thermistor ID: T6-22B