Geotechnical Assessment and Construction Field Review

351 Kootenay Avenue, Trail, BC

Prepared for:

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VAST Project: 26.0248.00

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1 Introduction

At the request of Anthony Boni, the owner of Boni-Maddison Architects (the Client), VAST Resource Solutions Inc. (VAST) completed an updated geotechnical report from the original assessment completed by SNT Geotechnical Ltd. in 2021 for a proposed childcare centre at 351 Kootenay Avenue, Trail, British Columbia (BC) (The Subject Property). The Engineer of Record for the initial stage of the project is now with VAST and continues to manage the project. As such, VAST relied on the initial investigation findings from the SNTG assessment, with relevant sections such as the test pit logs and site plan provided in Appendix A.

In addition to updating the original geological assessment, VAST will be completing a percolation assessment for the associated proposed infiltration pit and will also conduct construction-phase field reviews for the foundation subgrade, infiltration pit, and foundation drainage, as the project proceeds.

The geotechnical assessment was completed in accordance with the requirements of the City of Trail and the BC Building Code Letters of Professional Assurance (Schedule B and CB).

This report summarizes and updates the findings of the original SNT report and provides additional design recommendations for the infiltration pit for the proposed childcare centre. VAST will complete a supplementary field report with recommendations for the infiltration pit once the investigation is completed.

2 Study Area

The Subject Property is located in the Rossland Range of the Monashee Mountains in Tadanac, a neighbourhood upstream and northwest of the City of Trail, BC. It is situated adjacent to and northwest of Teck Metals Ltd, and approximately 275 m (horizontal distance) and 50 m (vertical distance) from the west bank of the Columbia River. The legal description of the property is Lot 1, District Lot 367, Kootenay District Plan EPP112961.

The Subject Property is bounded by Stoney Creek Road to the northwest, Kootenay Avenue to the northwest, Cominco Road to the southwest and private property to the southeast.

The development comprises a 6499.25 m2 lot to be improved with a single-storey childcare centre to be supported by a slab-on-grade pad underlain by concrete pad and strip footings, as illustrated on the structural drawings titled "*Unicorn Daycare, Trail, BC"* prepared by Juniper Structural Engineers, and dated July 03, 2026. The infiltration pit will be located near the south east corner of the proposed structure. The site location is shown in Figure 1 of Appendix B.

3 Scope of Work

The scope of work for this project includes:

- A preliminary site assessment to review the current site conditions on The Subject Property, and complete a percolation test at the proposed infiltration pit location;
- An updated geotechnical report detailing the site conditions and providing recommendations for, but not limited to, bearing capacity, frost depth, foundation drainage, the placement of Engineered Structural Fill (ESF), construction of an infiltration pit, and geotechnical construction field reviews; and,
- To provide the British Columbia Building Code (BCBC 2024) letter of assurance (Schedules B and C-B).

4 Methodology

4.1 References and Office Assessments

Reference was made to soil maps and reports, bedrock and geologic maps, updated building design drawings, professional practice guidelines, and geotechnical design manuals, including the Canadian Foundation Engineering Manual (CFEM) 5th Edition (2023). Aerial images from Google Earth©™ were used for reconnaissance-level evaluation of the Subject Property.

The following additional documents were referenced for this project:

- Original Geotechnical Assessment titled "*Geotechnical assessment for proposed unicorn childcare centre in Trail, BC*" by SNT Geotechnical Ltd. dated December 14, 2021;
- Structural drawings titled "*Unicorn Daycare Trail, BC*" by Juniper Structural Engineers dated July 03, 2026;
- Architectural Drawings titled "*Unicorn Daycare, City of Trail, Kootenay Family Place, 44 Child Daycare, 351 Kootenay Ave, Trail, BC*" by Boni-Maddison Architects dated July 15, 2026.

The soil was classified using the methods described in the CFEM and Unified Soil Classification System (USCS).

4.2 Field Assessments

4.2.1 Foundation Test Pit Investigation SNTG (2021)

A detailed test pit investigation was completed by the undersigned on December 05, 2021, as part of the 2021 SNTG geotechnical assessment for the Subject Property (Appendix A). VAST has reviewed the SNTG findings, including test pit logs, laboratory results, and recommendations, in consideration of the identified bearing material (Section 5.6) and our foundation recommendations are presented in Section 7 below.

5 Physiography

5.1 Bedrock Geology

Surficial soils within the Subject property are underlain by Quaternary-aged sediments, likely underlain by porphyritic Granite, granodiorite, or quartz monzonite (Hoy et al., 1998)

Bedrock was not observed during the 2021 test pit investigation or observed in the test pit excavation for the proposed infiltration pit.

5.2 Surficial Geology

The project area is mapped by the Geological Survey of Ottawa as "Post-Glacial and Late Glacial Terrace Deposits: Dominantly sand, some gravel." (Fulton, 1970).

5.3 Geomorphic Processes

No active geomorphic processes (i.e., landslides, soil creep, fluvial, or rockfall) were observed in and adjacent to the Subject Property that could adversely affect the proposed childcare centre.

5.3.1 Fluvial – Columbia River

The Project Site and surrounding area are located on a former post-glacial Columbia River Valley floor. During glaciated periods and subsequent warming, large deposits of sand and gravel defined the valley floor, which was carved through as the Columbia River resumed its flow. The Subject property is located approximately 45 m above the flood construction level and more than 30 m from the Columbia River, as noted in the Regional District of Kootenay Boundary Floodplain Management Bylaw No. 1844. Flooding from the Columbia River will not adversely affect the proposed development.

5.4 Topography

The Subject Property is situated on a relatively flat area situated approximately 50 m (vertical distance) above the Columbia River. Pre-Construction, the lot is tiered, with an approximate elevation of 461 m on the northwest side and 460 m on the southwest side.

5.5 Soil Stratigraphy

The bearing material, as described in Section 6.4 of the SNTG 2021 report, comprises native compact gravelly sand and sand-and-gravel beneath the proposed childcare centre.

This material is considered the design bearing surface and can support design bearing pressures exceeding the design allowable bearing capacity of 150 ULS (Juniper, 2026).

Table 5-1. Summary of Estimated Native Soil Properties

Foundation Subgrade/Design Bearing Soil	Friction Angle (Degrees)	Cohesion (kPa)	Unit Weight (kN/m^3)
Gravelly SAND or SAND and GRAVEL	37	0	19

5.6 Groundwater

No groundwater was noted within the excavated test pits, and is not anticipated based on the nearby well logs outlined in Section 5.6.1 below.

5.6.1 Water Wells

A nearby water well (Tag No. 5055) at a lower elevation indicates groundwater levels at or near the Columbia River, located approximately 230 m northeast of the Subject Property and 30 m below it. The well log is summarized in Table 5-2.

Based on on-site observations and the reviewed well logs, groundwater is not considered to be present in the surrounding area. Accordingly, groundwater levels are assumed to be located more than 3 m below ground surface.

Table 5-2. Nearby Well Logs

Well Tag Number	Location	Depth Range (m)	Lithology	Depth to Water (m)
5055	230 m North by Northwest	0 – 55.4	Sand and Gravel	14.6

6 Discussion

6.1 Foundation Bearing Resistance

The native compact gravelly sand and sand and gravel, described in Section 5.5, is considered the foundation design bearing material.

6.1.1 Design Method

The bearing resistance was calculated using Ultimate Limit States (ULS) Design in accordance with the Canadian Foundation Engineering Manual (CFEM, 2023) and generally accepted geotechnical engineering practice.

6.1.2 Design Basis

Based on the native bearing surface observed by the undersigned in the SNTG 2021 report, the proposed building can be supported on native Gravelly Sand or Sand and Gravel (per the recommendations below) using conventional shallow strip and spread-type footings. Table 7-1 below describes the estimated bearing capacity at the Subject Property. The design bearing resistance for soil subgrade assumes the following:

- Spread-type footings will be square and have widths of 0.91 or 1.37 m;
- Strip footings will have a width of 0.61 m;
- The Geotechnical Engineer reviews and approves the bearing surface material before placement of ESF, footing forms, and reinforcing steel, anchor bolts, or pouring of concrete;
- Foundation-bearing surfaces are no higher than a line projecting at 2H:1V from the base or toe of adjacent walls, sumps, or buried structures such as utility lines, etc;
- Site preparation and water management on bearing surfaces are completed as recommended below;
- Unconsolidated fill and organic material have been removed from beneath all bearing surfaces extending downward at a minimum of 1 H:1 V and replaced with approved ESF material (Section 7.3);
- Footings are placed below a 2H:1V line projected up from lower footings;
- A minimum exterior footing backfill depth of 800 mm or protected using an approved alternate such as insulating foam for frost protection;
- Internal footings are founded a minimum of 0.15 m below the underside of the concrete slab for confinement;
- Foundation drains are constructed per the recommendations below in Section 7.5;
- The vertical effective stress was calculated in accordance with Table 10.3 of the Canadian Foundation Engineering Manual (CFEM), where the assumed depth of groundwater is at the underside of the foundation; and,
- A geotechnical resistance factor Phi (Φ) of 0.5 and consequence factor Psi (Ψ) of 1.0 were applied to the ultimate geotechnical capacity (Rn) to determine the factored bearing resistance at ULS.

6.1.3 Settlement Analysis

Settlement calculation is completed using the Elastic Displacement method described in the 2023 Canadian Foundation Engineering Manual.

Settlement for the assumed foundation configuration under the allowable bearing capacity is estimated to be less than 25 mm and is not considered a limiting factor. Note that actual settlement can vary from 50% to 200% of the calculated estimates.

7 Recommendations

The following recommendations are intended to guide foundation and infiltration pit preparation and are based on the limited subsurface assessments and assumed foundation configurations and could change during foundation construction based on actual subsurface conditions (i.e., bearing material, depth to groundwater, depth of fill, etc.) or if foundation types/configurations are different than what is assumed within Section 6.1.2 above.

It is recommended that the Geotechnical Engineer review and approve foundation plans when they are completed and before construction to confirm the bearing capacity and settlement based on the actual (vs assumed in this report) foundation configuration.

7.1 Bearing Capacity

Table 7-1 below describes the recommended bearing soil resistances.

Table 7-1. Limit States Design and Working Stress Design for Gravelly Sand or Sand-and-Gravel Footings.

Foundation Subgrade/Design Bearing Soil	Limit States Design		Working Stress Design
	Ultimate Limit State Bearing Resistance	Serviceability Limit State Bearing Resistance	Allowable Bearing Pressure DL + LL
Gravelly Sand and Sand and Gravel	150 kPa	100 kPa	100 kPa

If the design foundation configuration differs from what is assumed in this report and described within Section 6.1.2 (i.e., foundation depth and dimensions), it is recommended that the designer contact the undersigned to reassess the bearing resistance and settlement.

7.2 Site Preparation

7.2.1 Foundations

Foundation excavation is to be completed to expose undisturbed inorganic native soils. All unconsolidated/uncompacted fill materials or unsuitable subgrade soil identified by the Geotechnical Engineer are to be removed beneath the building footprint extending down and outwards from the footing toes at 1 H:1 V. Soft materials, fill materials, and/or organics, if encountered at or below the final excavation depth are to be excavated, replaced with imported granular material as described below (Section 7.3), and compacted to 100% of the Standard Proctor Maximum Dry Density (SPMDD).

The foundation soil should be protected at all times from rain, snow, freezing temperatures, excessive drying, and water ingress.

Excavation surfaces should be proof-compacted and reviewed by the Geotechnical Engineer before the placement of structural fill materials, forms, and reinforcing steel.

It is recommended that excavations be conducted with an excavator equipped with a cleanup bucket to minimize disturbance below the final grade. Bulk excavations near the ground surface can utilize a toothed digging bucket.

7.2.2 Temporary Cut Slopes and Excavations

Excavations should be conducted and maintained in accordance with WorkSafe Regulation Part 20, and/or under field review by a qualified Geotechnical Engineer to provide written safe excavation instructions.

7.2.3 Interior Concrete Slabs on Grade

Floor slabs should be structurally independent of walls and columns that are supported on footings, unless this is accounted for in the structural design. This is to reduce any structural distress that may result from differential soil movement.

The subgrade beneath the slab-on-grade should be free from fill, organics, and other deleterious material. The subgrade should be protected at all times from rain, snow, freezing temperatures, excessive drying, and water ingress. Some relative movement between the floor slab-on-grade and adjacent walls or foundation, and differential movement within the slab should be anticipated.

7.3 Engineered Structural Fill

In the event Engineered Structural Fill is required, the recommended ESF comprises imported well-graded pit run gravel (75 mm minus) with less than 5% fines passing the No. 200 sieve or a 19 to 25 mm minus crushed gravel meeting BC Ministry of Transportation and Transport(MoTT) WGB specifications (BC MoTT, 2025).

The ESF shall be compacted to 100% Standard Proctor Maximum Dry Density (ASTM D698) using a plate compactor with a minimum weight of 454 kg (1000 lbs.) or a vibratory drum roller, and placed in lifts not exceeding 300 mm loose thickness. Moisture content should be within +/- 2% of the optimum moisture content. Gradation analysis (ASTM D6913) and Proctor laboratory test data for the ESF material are to be provided to the Geotechnical Engineer before placement and compaction of ESF. Field density testing reports are to be submitted to the Geotechnical Engineer for review and approval.

To ensure the maximized density of the ESF is achieved, all ESFs will require nuclear densometer testing (ASTM D2922) for every 100 m² area of material placed and compacted on the first and second lifts and every subsequent lift (i.e. lifts tested: 1, 2, 4, 6, 8, etc.). Depending on material and contractor performance, the frequency of the density testing may be increased or decreased at the discretion of the Geotechnical Engineer.

No organic soil, frozen material, or other deleterious material should be placed in any fill employed to support the footings. If the ESF material becomes excessively wet, it should be allowed to dry before use. Depending on the material's natural moisture content and the applied compaction energy, adding water to the fill may be required to achieve the specified compaction. If water is required, it should be applied to the fill during the spreading of lifts before compaction. ESF materials, compaction process, and frequency of and location of compaction testing should be approved by the Geotechnical Engineer before placement and compaction commence.

7.4 Frost Protection

Frost susceptibility of soil and rock refers to the propensity of the soil to grow ice lenses and heave during freeze and thaw cycles or the tendency for frost jacking and fracturing in rock. Based on the US Corps of Engineers Frost Design Soil Classification (USACE, 1984), the native gravelly Sand or Sand and Gravel are considered to have low frost susceptibility.

Based on the mean freezing index of 241 degree-days Celsius (Climate Map BC) for The Subject Property, footings, slabs and the top of the infiltration pit should be protected by a minimum of 800 mm of soil cover to the underside of the footings for frost protection purposes.

Where the underside of the footing cannot be constructed at the minimum depth (i.e. 0.8 m below final grade elevation), thermal insulation in accordance with the recommendations of "Design and Construction

of Frost-Protected Shallow Foundations", ASCE 32-01 (ASCE, 2001) shall be incorporated into the foundation design.

7.5 Foundation Drainage

A foundation drain should be installed in accordance with Best Practices around the foundation perimeter and at steps in the foundation for partial basement foundations. The foundation drain should comprise a non-woven geotextile wrap (note that "Landscape" fabrics are **not acceptable**) surrounding 19-25 mm washed drain rock and a minimum 100 mm diameter perforated PVC drain pipe (CSA B-182.1). Perforations on the pipe shall be placed facing down. The recommended geotextiles are Nilex NW 67, Armtec 180, TC Mirafi 160N, Layfield LP6, or a pre-approved equivalent. The perforated drain pipe (CSA Approved) should be set with a minimum 1% drainage gradient sloping to a storm drain, daylight, or a gravel-filled soak-away pit wrapped with non-woven geotextile located more than 5.0 m away from the foundation. Cleanouts for future inspection and maintenance should be installed.

Foundation drains should be extended to include all exterior footing elements, including spread footings for deck construction.

PVC drain pipe should be set so that 100 mm of drain rock is placed beneath the pipe, and a minimum of 100 mm of drain rock exists on all other sides. Using 90˚fittings is **not** recommended, and a series of 45˚ fittings should be utilized where necessary (i.e. corners, cleanout junctions).

Flexible corrugated drain pipe (i.e., Big-O type) is not permitted due to its potential for collapse, clogging, and difficulty mechanically reaming out obstructions over the long term.

Foundation drains **must not** be connected to the storm/roof drainage system.

7.6 Backfill

7.6.1 Exterior Backfill

Native soils, excluding organic materials and gravel greater than 75 mm in diameter, are considered suitable for general site backfill and grading purposes. Recommended backfill if imported material is required comprises imported granular material, such as 25 - 75 mm minus well-graded crushed gravel with less than 5% fines, 25 - 75 mm clear crushed gravel, Select Granular Subbase material (MMCD-SGSB). If clear crushed gravel is used, place a non-woven geotextile between the backfill material and the native soils to prevent fines from migrating into the backfill material.

The depth of backfill from the underside of the footings to the finished exterior surface grade should be at least 0.8 m for frost protection.

Native backfill material must not be used if concrete sidewalks, concrete slabs, or asphalt-covered areas are to be constructed above the backfill material. ESF (Section 7.3) is recommended under all concrete or asphalt-covered surfaces and is to be compacted to 100% SPMDD.

Field density testing should confirm the compaction of backfill materials exceeding 0.4 m in total thickness.

7.6.2 Interior Backfill

The use of native soils as interior backfill material under concrete slabs-on-grade must be reviewed and approved by the Geotechnical Engineer before use.

If native interior backfill material is not approved for use, the recommended material comprises imported coarse-grained ESF (Section 7.3). Compaction testing should be carried out on under-slab fills greater than

0.3 m depth to confirm that fill placed below the Building has been compacted to 100% SPMDD. Before placement of any grade restoration fills, the subgrade should be reviewed by the Geotechnical Engineer.

Slabs-on-grade should be underlain by a drainage layer comprising a minimum 100 mm thick layer of well-compacted clean sand (less than 5% passing No. 200 sieve), 19 mm minus crushed gravel with less than 5% fines, radon mitigation specified material, or as approved by the Geotechnical Engineer. This drainage layer should be hydraulically connected to the foundation drain. Polyethylene sheeting should be provided beneath finished interior floor slabs to reduce potential slab dampness.

7.7 Runoff Management and Surface Drainage

7.7.1 Foundation Excavations

If construction occurs during wet weather, ditching, sandbags, ditches/swales, and/or soil berms are recommended to prevent surface water from entering the excavation. Runoff management is to be maintained until backfill and grading are complete. This includes overnight and on weekends.

7.7.2 Storm and Roof Drainage

Water from drainage gutters/roof leaders should be directed away from the foundation and towards the infiltration pit

7.7.3 Road and Parking Drainage

Care is warranted in managing surface runoff from paved or compacted surfaces. Roads and parking areas are to be graded, ditched, curbed, or otherwise sloped to prevent surface runoff from moving toward the building foundations.

To minimize ingress of surface runoff from natural and paved areas of the Property, it is recommended that finished ground surfaces, including landscaping, paved areas, and roadways, be graded to slope away from the building foundations at a minimum gradient of 2% for a distance of at least 2.0 m or in accordance with the site grading plan if one exists.

7.8 Finished Grading and Final Sloping

Permanent cut and fill slopes required for slope grading shall be constructed at a maximum gradient of 2H:1V. The crest of slopes shall be a minimum of 2 m horizontal distance from the nearest footings. Slopes should be vegetated (i.e. grass seed) or other suitable erosion mitigation measures as soon as practicable following construction.

7.9 Freezing Conditions

If late-season construction is anticipated under freezing or potentially freezing conditions, the following recommendations apply. Note that these requirements may significantly increase costs and efforts for construction:

1. Foundation excavation, construction, and backfill are <u>not</u> recommended during freezing conditions;
2. Placement of frozen fill materials or placement of fill onto frozen ground surfaces should be avoided;
3. If freezing conditions occur during foundation construction (overnight, on weekends and between lifts of fill, all frozen soils should be removed and replaced with non-frozen granular soil (Section 5.3) and compacted to 100% of the SPMDD;

4. The use of insulating tarpaulins can be used to minimize the freezing of bearing surface soils. Frozen soil and snow should be removed from the backfill prior to compacting;
5. Concrete should not be poured on frozen soil; and,
6. Concrete foundations should not be left over the winter without adequate frost protection.

7.10 Pavement Design

If concrete or asphalt-covered surfaces (i.e., parking areas, exterior concrete slabs, concrete curbs, etc.) are required, it is recommended to contact a suitably qualified Professional Engineer to assess and provide pavement design details.

7.11 Site Classification for Seismic Response

The proposed building structure should be designed assuming Site Class **D** (Soft Soil) per Table 4.1.8.4-A, BCBC 2024, reproduced as Table 7-2 below.

A detailed drilling investigation was not completed for this project, therefore the site classification was based on the SNT test pit logs, VAST's experience in the project area, and nearby well logs.

The Peak Ground Acceleration (PGA) for a 2% probability of exceedance in 50 years (0.000404 per annum) at this site is 0.058g (NRCAN, 2020) calculated for soft Rock ground conditions (Site Class C). Seismic design inputs based on Site Class D for all standard spectrums and return periods are provided in Table 7-3 below.

The subgrade soil conditions are not considered susceptible to seismically induced liquefaction in the design earthquake (NBCC 2020 Design Spectra) based on current industry understanding of soil response to strong earthquake shaking.

Table 7-2. Site Classification for Seismic Response Based on Soil Compactness/Consistency (BCBC, 2024)

Site Class	Soil profile Name	Average Properties in Top 30 m as per BCBC 2024		
		Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)	**Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)**	**Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)**
A	Hard Rock	$\overline{V}_{S30}$ > 1500	Not Applicable	Not Applicable
B	Rock	760 < $\overline{V}_{S30}$ < 1500	Not Applicable	Not Applicable
C	Very Dense Soil and Soft Rock	360 < $\overline{V}_{S30}$ < 760	50 < $\overline{N}_{60}$	100 < S_u
D	Soft Soil	180 < $\overline{V}_{S30}$ < 360	15 ≤ $\overline{N}_{60}$ ≤ 50	50 < $S_{u\ <\ 100}$
E	Other Soils	$\overline{V}_{S30}$ < 180	$\overline{N}_{60}$ ≤ 15	S_u < 50
E		Any profile with more than 3 m of soil with the following characteristics: Plasticity Index, Ip > 20; Moisture Content, w ≥ 40%; and Undrained Shear Strength, su < 25 kPa		

Site Class	Soil profile Name	Average Properties in Top 30 m as per BCBC 2024		
		Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)	Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)	Soil Shear Wave Velocity $\overline{V}_{S30}$(m/s)
F	Other Soils	Site Specific Evaluation Required		

The Geological of Canada (GSC) seismic hazard model (2020) forms the basis of the seismic design provisions of the BCBC 2024. Peak Ground Accelerations (PGA) and Spectral Accelerations (Sa(T)) can be obtained from the earthquakes Canada website (https://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/nbc2020-cnb2020-en.php) for various return periods. The values for the project area are summarized in Table 7-3 below.

Table 7-3. Design PGA and Sa(T) for the Unicorn Daycare with Assumed Site Class D

Annual Exceedance Probability	$Sa_{(0.2)}$	$Sa_{(0.5)}$	$Sa_{(1.0)}$	$Sa_{(2.0)}$	$Sa_{(max)}$	PGA	PGV
1:2475 (0.000404)	0.237	0.210	0.154	0.107	0.210	0.0965	0.172

8 Geotechnical Construction Field Reviews

Field Review by the Geotechnical Engineer of Record is required under BCBC 2024 Letters of Professional Assurance (Schedule B). Anticipated remaining Field Reviews and QA/QC reviews to be completed during construction include, but may not be limited to the following:

1. To review final structural and architectural drawings;
2. To examine the bearing surface material and foundation subgrades and proof compaction before the placement of ESF, forms and reinforcing steel;
3. Review infiltration pit subgrades to confirm subsurface conditions;
4. Verification of footing positioning;
5. Confirmation that materials and methods meet project requirements;
6. To review quality assurance engineered fill material and review compaction testing records (if utilized);
7. To examine the perimeter drains before backfill; and
8. To approve the interior and exterior backfill material and compaction program;
9. An inspection report/synopsis, including Schedule C-B of the BC Building Code, is to be completed by the Geotechnical Engineer after the construction field reviews.

Note that a minimum of 72 hours' notice before the above-mentioned field review items is typically required to avoid scheduling delays.

9 Closure

This report is prepared for the exclusive use of Anthony Boni of Boni-Maddison Architects and their designated representatives and may not be used by other parties without the written permission of VAST Resource Solutions. The City of Trail may also rely on the findings of this report.

The use of this assessment report is subject to the conditions on the attached Report Interpretation and Limitations sheet. The reader's attention is drawn specifically to those conditions, as it is considered essential that they be followed for proper use and interpretation of this report.

We hope the above meets your requirements. Should any questions arise, please do not hesitate to contact the undersigned.

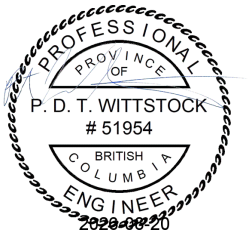
This document has been digitally signed, sealed and certified by the author. Hard copies of the report can be produced upon request.

Yours truly,

Prepared By:

Koreena McCulloch, E.I.T.,
Junior Resource Engineer

Review By:



Pete Wittstock, P.Eng.
Geotechnical Engineer (Senior)

Engineers and Geoscientists of British Columbia Permit to Practice Number: 1000121

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Appendix A SNTG 2021 Testpit Logs and Site Plan

Figure 1. Proposed Building Location

SNT Geotechnical Ltd
#4, 385 Baker Street
Nelson BC
pete@SNTG.ca
250-3300-9324

Project:	Unicorn Childcare Centre	Ground Elevation:	461
Date:	05-Nov-21	Hole Location :	See Figure 1
Excavation Company:	Hiltech	Hole Number :	TP-1
Hole Logged by:	PW		

Depth		RDS							Grain size analyses					WC	Atterberg lim.		
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI
0.0	0.00				Sandy TOPSOIL, rooty, grassy.													
0.5	0.15				Compact SAND FILL, silty, trace grass, moist, brown.													
1.0	0.30																	
1.5	0.46				Compact SAND FILL, trace silt and gravel, moist, light brown.													
2.0	0.61																	
2.5	0.76																	
3.0	0.91				Loose Sandy Silty TOPSOIL, rooty, moist, black to dark brown.													
3.5	1.07																	
4.0	1.22																	
4.5	1.37				Compact SAND, Cobbly, some Gravel and Silt, moist, brown.													
5.0	1.52																	
5.5	1.68																	
6.0	1.83																	
					Bottom of Test Pit at 1.8 m													

Photo 1: TP-1 Location

SNT Geotechnical Ltd
#4, 385 Baker Street
Nelson BC
pete@SNTG.ca
250-3300-9324

Project:	Unicorn Childcare Centre	Ground Elevation:	461
Date:	05-Nov-21	Hole Location :	See Figure 1
Excavation Company:	Hiltech	Hole Number :	TP-2
Hole Logged by:	PW		

Depth		RDS							Grain size analyses						WC	Atterberg lim.		
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI
0.0	0.00				Sandy TOPSOIL, some Silt, rooty, grassy.						0	80.9	13.1	6	9.4			
0.5	0.15				Compact gravelly SAND, some silt, moist, grey to brown.													
1.0	0.30																	
1.5	0.46				Compact Silty SAND, some Cobbles and Gravel, moist, grey.													
2.0	0.61																	
2.5	0.76																	
3.0	0.91																	
3.5	1.07																	
4.0	1.22																	
4.5	1.37																	
5.0	1.52				Compact SAND FILL, cobbly, Silty, some gravel, moist, brown.													
5.5	1.68																	
6.0	1.83																	
6.5	1.98																	
7.0	2.13																	
7.5	2.29																	
8.0	2.44				Compact SAND, Silty, some Gravel, moist, brown.													
Bottom of Test Pit at 2.5 m																		

Photo 2: TP-2 Location

SNT Geotechnical Ltd
#4, 385 Baker Street
Nelson BC
pete@SNTG.ca
250-3300-9324

Project:	Unicorn Childcare Centre	Ground Elevation:	461
Date:	05-Nov-21	Hole Location :	See Figure 1
Excavation Company:	Hiltech	Hole Number :	TP-3
Hole Logged by:	PW		

Depth		RDS									Grain size analyses				WC	Atterberg lim.		
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI
0.0	0.00				Sandy TOPSOIL, rooty, grassy.													
0.5	0.15				Compact gravelly SAND, some silt, moist, grey to brown.													
1.0	0.30																	
1.5	0.46				Compact SAND FILL, some Silt, trace Clay, moist, light brown.						0	75.1	15.6	9.3	10			
2.0	0.61																	
2.5	0.76				Compact COBBLE FILL, Silty, Sandy, some concrete debris, moist, grey to brown.													
3.0	0.91																	
3.5	1.07				Compact SAND, Cobbly, some Gravel and Silt, moist, brown.													
4.0	1.22																	
4.5	1.37																	
					Bottom of Test Pit at 1.4 m													

Photo 3: TP-3 Location

SNT Geotechnical Ltd				Project:	Unicorn Childcare Centre								Ground Elevation:	460						
				Date:	05-Nov-21								Hole Location :	See Figure 1						
#4, 385 Baker Street				Excavation Company:	Hiltech								Hole Number :	TP-4						
Nelson BC				Hole Logged by:	PW															
pete@SNTG.ca																				
250-3300-9324																				
Depth		RDS									Grain size analyses				WC	Atterberg lim.				
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI		
0.0	0.00				Sandy TOPSOIL, rooty, grassy.															
0.5	0.15				Compact SAND FILL, silty, some Gravel, trace grass,															
1.0	0.30				Compact Gravelly SAND FILL, some Silt, some Cobbles, moist, orange to brown.															
1.5	0.46																			
2.0	0.61				Compact SAND, some gravel, trace Silt, moist, brown, well graded.															
2.5	0.76																			
3.0	0.91																			
3.5	1.07																			
4.0	1.22																			
4.5	1.37																			
5.0	1.52				Compact SAND, some Gravel and Cobbles, trace Silt, moist, brown, well graded.															
5.5	1.68																			
6.0	1.83																			
					Bottom of Test Pit at 1.8 m															

Photo 4: TP-4 Location

SNT Geotechnical Ltd
#4, 385 Baker Street
Nelson BC
pete@SNTG.ca
250-3300-9324

Project:	Unicorn Childcare Centre	Ground Elevation:	460
Date:	05-Nov-21	Hole Location :	See Figure 1
Excavation Company:	Hiltech	Hole Number :	TP-5
Hole Logged by:	PW		

Depth		RDS						Grain size analyses							WC	Atterberg lim.		
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI
0.0	0.00				Sandy TOPSOIL, rooty, grassy.													
0.5	0.15				Compact SAND FILL, silty, some Gravel, moist, brown.													
1.0	0.30																	
1.5	0.46				Compact Gravelly SAND FILL, some Silt, some Cobbles, moist, brown.													
2.0	0.61				Compact SAND, some Gravel and Cobbles, trace Silt, moist, brown, well graded.													
2.5	0.76																	
3.0	0.91																	
3.5	1.07																	
4.0	1.22																	
4.5	1.37																	
5.0	1.52																	
					Bottom of Test Pit at 1.6m													

Photo 5: TP-5 Location

SNT Geotechnical Ltd				Project:	Unicorn Childcare Centre							Ground Elevation:		460					
				Date:	05-Nov-21							Hole Location :		See Figure 1					
#4, 385 Baker Street				Excavation Company:	Hiltech							Hole Number :		TP-6					
Nelson BC				Hole Logged by:	PW														
pete@SNTG.ca																			
250-3300-9324																			
Depth		RDS									Grain size analyses				WC	Atterberg lim.			
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay	%	LL	PL	PI	
0.0	0.00				Sandy TOPSOIL, rooty, grassy.														
0.5	0.15				Compact SAND FILL, silty, some Gravel, moist, brown.														
1.0	0.30																		
1.5	0.46				Compact Gravelly SAND FILL, some Silt, some Cobbles, moist, brown.														
2.0	0.61																		
2.5	0.76																		
3.0	0.91				Compact SAND, some Gravel and Cobbles, trace Silt, moist, brown, well graded.														
3.5	1.07																		
4.0	1.22																		
4.5	1.37																		
					Bottom of Test Pit at 1.3m														

Photo 6: TP-6 Location

SNT Geotechnical Ltd				Project:	Unicorn Childcare Centre							Ground Elevation:		460						
				Date:	05-Nov-21							Hole Location :		See Figure 1						
#4, 385 Baker Street				Excavation Company:	Hiltech							Hole Number :		TP-7						
Nelson BC				Hole Logged by:	PW															
pete@SNTG.ca																				
250-3300-9324																				
Depth		RDS									Grain size analyses					WC	Atterberg lim.			
Feet	Metres		Stratigraphy	Water Table	Soil Description	Soil Classification	Sample	RAW SPT	N60	N160	% Gravel	% Sand	% Silt	% Clay		%	LL	PL	PI	
0.0	0.00				Sandy TOPSOIL, rooty, grassy.															
0.5	0.15				Compact SAND FILL, some silt, fine to medium grained, moist, light brown.															
1.0	0.30				Compact SAND FILL, silty, some Gravel, moist, brown.															
1.5	0.46																			
2.0	0.61																			
2.5	0.76				Compact Gravelly SAND FILL, some Silt, some Cobbles,															
3.0	0.91				Compact SAND, some Gravel and Cobbles, trace Silt, moist, brown, well graded.															
3.5	1.07																			
4.0	1.22																			
4.5	1.37																			
5.0	1.52																			
5.5	1.68																			
					Bottom of Test Pit at 1.7m															

Photo 7: TP-7 Location

Appendix B Site Location Map

PROJECT

Unicorn Day Care

TITLE

Site Plan

LEGEND

Parcel Fabric

Approximate Building Location

MAP INFORMATION

1. MAP DATUM/PROJECTION: UTM ZONE 11N
2. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE FOR 11X17 PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
3. ALL DIGITIZED LINEWORK IS APPROXIMATE.

DESIGN	KM	DATE	2026-07-27
DRAWING	KM	DATE	2026-07-27
REVIEW	PW	DATE	2026-07-29
ID			

1:600

0 6 12 18 24 30

Meters

DATA SOURCES

Imagery via Google Maps Property Boundary via PMBC Parcel Fabric

OVERVIEW MAP

Appendix C Report Limitations and Interpretations

REPORT INTERPRETATION AND LIMITATIONS

1. Standard of Care

VAST Resource Solutions Inc (VAST) has prepared this report in a manner consistent with generally accepted engineering consulting practices in this area, subject to the time and physical constraints applicable. Professional judgment has been applied in developing any conclusions and/or recommendations in this report. No other warranty, expressed or implied, is made.

The author reserves the right to amend this report if additional information becomes available.

The work performed in this report was carried out in accordance with the terms and conditions specified in VAST's Project Work Agreement (PWA) with the client. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations approved by the client and described in the PWA. Since site conditions may change over time, the report is intended for immediate use only.

The conclusions and/or recommendations provided in this report do not relieve the client or their agents or representatives of the responsibility to comply with applicable Acts, regulations, bylaws and/or decisions of any authorities that have jurisdiction under an enactment.

2. Completeness of this Report

This Report represents a summary of paper, electronic and other documents, records, data and files and is not intended to stand alone without reference to the instructions given to VAST by the Client, communications between VAST and the Client, and/or to any other reports, writings, proposals or documents prepared by VAST for the Client relating to the specific site described herein.

This report is intended to be used and quoted in its entirety. Any references to this report must include the whole of the report and any appendices or supporting material. VAST cannot be responsible for use by any party of portions of this report without reference to the entire report.

3. Basis of this Report

This report has been prepared for the specific site, development, design objective, and purpose described to VAST by the Client or the Client's Representatives or Consultants. The applicability and reliability of any of the factual data, findings, recommendations or opinions expressed in this document pertain to a specific project as described in this report and are not applicable to any other project or site, and are valid only to the extent that there has been no material alteration to or variation from any of the descriptions provided to VAST. VAST cannot be responsible for use of this report, or portions thereof, unless we were specifically requested by the Client to review and revise the Report in light of any alterations or variations to the project description provided by the Client.

If the project does not commence within 18 months of the report date, the report may become invalid and further review may be required.

The recommendations of this report should only be used for design. The extent of exploration including number of test pits or test holes necessary to thoroughly investigate the site for conditions that may affect construction costs will generally be greater than that required for design purposes. Contractors should rely upon their own explorations and interpretation of the factual data provided for costing purposes, equipment requirements, construction techniques, or to establish project schedule.

The information provided in this report is based on limited exploration, for a specific project scope. VAST cannot accept responsibility for independent conclusions, interpretations, interpolations or decisions by the Client or others based on information contained in this Report. This restriction of liability includes decisions made to purchase or sell land.

4. Use of this Report

The contents of this report, including plans, data, drawings and all other documents including electronic and hard copies remain the copyright property of VAST. However, VAST will consider any reasonable request by the Client to approve the use of this report by other parties as "Approved Users". With regard to the duplication and distribution of this Report or its contents, VAST authorizes only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of this Report by those parties. The Client and "Approved Users" may not give, lend, sell or otherwise make this Report or any portion thereof available to any other party without express written permission from VAST. Any use which a third party makes of this Report - in its entirety or portions thereof - is the sole responsibility of such third parties. VAST ACCEPTS NO RESPONSIBILITY FOR DAMAGES SUFFERED BY ANY PARTY RESULTING FROM THE UNAUTHORIZED USE OF THIS REPORT.

Electronic media is susceptible to unauthorized modification or unintended alteration, and the Client should not rely on electronic versions of reports or other documents. All documents should be obtained directly from VAST.

5. Interpretation of this Report

Classification and identification of soils and rock and other geological units, including groundwater conditions have been based on exploration(s) performed in accordance with the standards set out in Paragraph 1. These tasks are judgemental in nature; despite comprehensive sampling and testing programs properly performed by experienced personnel with the appropriate equipment, some conditions may elude detection. As such, all explorations involve an inherent risk that some conditions will not be detected.

Further, all documents or records summarizing such exploration will be based on assumptions of what exists between the actual points sampled at the time of the site exploration. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of and accept this risk.

The Client and "Approved Users" accept that subsurface conditions may change with time and this report only represents the soil conditions encountered at the time of exploration and/or review. Soil and ground water conditions may change due to construction activity on the site or on adjacent sites, and also from other causes, including climactic conditions.

The exploration and review provided in this report were for geotechnical purposes only. Environmental aspects of soil and groundwater have not been included in the exploration or review, or addressed in any other way.

The exploration and Report is based on information provided by the Client or the Client's Consultants, and conditions observed at the time of our site reconnaissance or exploration. VAST has relied in good faith upon all information provided. Accordingly, VAST cannot accept responsibility for inaccuracies, misstatements, omissions, or deficiencies in this Report resulting from misstatements, omissions, misrepresentations or fraudulent acts of persons or sources providing this information.

6. Design and Construction Review

This report assumes that VAST will be retained to work and coordinate design and construction with other Design Professionals and the Contractor. Further, it is assumed that VAST will be retained to provide field reviews during construction to confirm adherence to building code guidelines and generally accepted engineering practices, and the recommendations provided in this report. Field services recommended for the project represent the minimum necessary to confirm that the work is being carried out in general conformance with VAST's recommendations and generally accepted engineering standards. It is the Client's or the Client's Contractor's responsibility to provide timely notice to VAST to carry out site reviews. The Client acknowledges that unsatisfactory or unsafe conditions may be missed by intermittent site reviews by VAST. Accordingly, it is the Client's or Client's Contractor's responsibility to inform VAST of any such conditions.

Work that is covered prior to review by VAST may have to be re-exposed at considerable cost to the Client. Review of all Geotechnical aspects of the project are required for submittal of unconditional Letters of Assurance to regulatory authorities. The site reviews are not carried out for the benefit of the Contractor(s) and therefore do not in any way effect the Contractor(s) obligations to perform under the terms of his/her Contract.

7. Sample Disposal

VAST will dispose of all samples 3 months after issuance of this report, or after a longer period of time at the Client's expense if requested by the Client. All contaminated samples remain the property of the Client and it will be the Client's responsibility to dispose of them properly.

8. Subconsultants and Contractors

Engineering studies frequently requires hiring the services of individuals and companies with special expertise and/or services which VAST does not provide. These services are arranged as a convenience to our Client's, for the Client's benefit. Accordingly, the Client agrees to hold VAST harmless and to indemnify and defend VAST from and against all claims arising through such Subconsultants or Contractors as though the Client had retained those services directly. This includes responsibility for payment of services rendered and the pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. These conditions apply to specialized subconsultants and the use of drilling, excavation and laboratory testing services, and any other Subconsultant or Contractor.

9. Site Safety

VAST assumes responsibility for site safety solely for the activities of our employees on the jobsite. The Client or any Contractors on the site will be responsible for their own personnel. The Client or his representatives, Contractors or others retain control of the site. It is the Client's or the Client's Contractors responsibility to inform VAST of conditions pertaining to the safety and security of the site – hazardous or otherwise – of which the Client or Contractor is aware.

Exploration or construction activities could uncover previously unknown hazardous conditions, materials, or substances that may result in the necessity to undertake emergency procedures to protect workers, the public or the environment. Additional work may be required that is outside of any previously established budget(s). The Client agrees to reimburse VAST for fees and expenses resulting from such discoveries. The Client acknowledges that some discoveries require that certain regulatory bodies be informed. The Client agrees that notification to such bodies by VAST will not be a cause for either action or dispute.