July 16, 2025

THE TOWNSHIP OF MINDEN HILLS
IN SEASON, EVERY SEASON

Addendum #2

for RFT ENV 25-002

Construction of Scotch Line Transfer Station

This addendum shall be incorporated into and form part of RFT ENV 25-002 for the construction of the Scotch Line Transfer Station.

Receipt of the Addendum shall be acknowledged as part of your submission as per Section 2.14 – Addenda of the RFT document and **must be included** in the submission package before the closing date of **Friday August 15, 2025 at 12:00 noon.**

The Township of Minden Hills reserves the right to reject any or all Tenders or accept any Proposal, should it deem such actions to be in the best interest of the Township.

This addendum consists of five pages in addition to the Geotechnical Report.

1. The deadline for inquiries has been extended to **July 28, 2025 at 4:00 p.m.**

2. Question: Can the township please confirm the Granular design as Granular B only? Also, please confirm which types of Granular B will be accepted (Granular B Type 1 or Granular B Type 2). Both types appear in the contract documents for the same purposes.

   Answer: While the majority of the scope will utilize Granular B Type 2 compacted to 100% SPMDD, Granular A may be used in some local areas as per the Drawings and Specifications.

3. Question: Disposal of excess materials - Can the township please confirm all excavated materials are able to remain at a designated stockpile location on site for future use within the landfill?

   Answer: The Township confirms that material can stay on site, to be used as interim cover at the landfill.

4. Question: In the absence of a soils report/test holes, can the township please specify a maximum depth bedrock will be encountered for the purpose of calculating Rod-Lock materials and labour required?

   Answer: Please see the attached Geotechnical Report.

5. Question: Will the township entertain locally (Canada) sourced scale systems and foundations products in this tender provided they meet the weight and size requirements in this tender?

   Answer: Approved equivalents are acceptable for the scale. However, any alternative product that also requires a change to the foundation design may not necessarily be accepted. The Township reserves the right to reject the alternative proposal.

6. Question: Is silt fence and site security fencing required around the perimeter of this entire work site? Or, could this be reduced to the road frontage to consider the use of the rest of the property.

   Answer: For bidding purposes, please consider that silt fencing is required for the entire perimeter of the work area. A separate security fencing shall be up to the discretion of the proponent in what is necessary to protect the future construction site.

7. Question: Would the township consider or give preference to a custom-built kiosk on site over the specified pre-engineered structure? If not, will the township entertain other locally (Canada) sourced pre-engineered buildings?

   Answer: Approved equivalents are acceptable for the kiosk. However, any alternative product or method that also requires a change to the foundation or layout may not necessarily be accepted. The Township reserves the right to reject the alternative proposal.

8. Question: Will the township consider removing the requirement for a Pre-Construction Survey from this contract given the nature/location of this contract?

   Answer: No, the pre-construction survey is required to confirm existing conditions. This survey will be the benchmark for payment of earthwork and granular B.

9. Question: Performance Testing – Is it expected that the contractor will run this site for 2 weeks to satisfy this requirement?

   Answer: No, the Township will run the site. To satisfy this requirement, the successful proponent shall assist the Township in troubleshooting any in scope issues during its normal operational hours, for a period of 2 weeks.

10. Question: Training- Documents require the contractor to supply a training facility for up to 12 people to receive training. It is my opinion that training should happen inside the kiosk, which cannot house 12 people. Please confirm.

    Answer: The Township will provide the necessary training facility.

11. Question: In sub-grade preparation, direction is provided to backfill with Granular “A”. Can an item be added to cover payment for this work?

    Answer: Replace Granular A with Granular B Type 2.

12. Question: Documents specify concrete blocks 0.6m x 1m x 1m. The drawings indicate 0.75m x 0.75m x 1.5m. Please confirm which block size will be accepted.

    Answer: Please follow the Drawings for the block sizing.

13. Question: The project specifies that Rod-Lock system is to be used, anchoring the wall permanently to bedrock. I have called the supplier, and they are unfamiliar with this requirement and not done this in the past. There is technical information available to accomplish this and it may even go against the Rod-Lock system engineering spec's. Can you please request more information from the engineer as to why this is specified and how it is to work in conjunction with the Rod-Lock function of locking the blocks together? (opposed to pulling them directly into the granular material below).

    Answer: For bidding purposes, please only consider anchorage to the subgrade, but not the bedrock. The successful proponent shall provide a formal submittal prior to procurement of the blocks, upon which a final solution will be agreed upon. Any appropriate extras or credits to the Contract will be discussed accordingly at that time.

14. Question: The specifications call for the contractor to Supply and Install Geoware waste management software. There is no information available regarding office furniture, computer hardware or other furnishings that are required/shown inside the Kiosk, but they are listed on the tender form. Can you please provide a list of furniture and computer hardware required and accepted suppliers? I don't see reference in the specifications pertaining to office furniture etc. There is reference to a waste management software and perhaps this wording has created some confusion:

    Answer: For bidding purposes, please follow specifications and supply and install GEOWARE or Equal Approved software system. Supply and install all the required conduits, cable, and wiring to provide make connection and complete instrumentation between the scale house workstation, new 80-feet scales, CCTV camera, new traffic control, and other peripherals. No other Kiosk furnishings shall be included.

15. Question: It has been asked that wiring diagrams be provided to the township in Auto-Cad or MicroStation format. Can this requirement be removed from the contract?

    Answer: Yes, the wiring diagrams will still be required as part of the O&M but may be exempt from being in an AutoCAD or MicroStation format.

16. Question: I have not seen any considerations for external phonelines/internet. I'm not sure if I have missed this, but please advise.

    Answer: Internet would be arranged through the County IT department and there are no current plans to have a phone line.

17. Question: Scale type in drawings is not appropriate for the application. Shown is a Multi deck scale that requires extra loadcells at each joint

    Answer: Please refer to Answer #4 above.

18. Question: Recommend steel deck truck scale with 3/8" deck plate with factory guide rails vs Concrete deck.

    Answer: Please refer to Answer #4 above.

19. Question: Design does not have provision for mirror clearance from building, 18" recommended from scale to building

    Answer: For bidding purposes, no changes to the drawings will be included at this time.

20. Question: Scale and foundation to be supplied and recommended by the Scale supplier. Current drawing is over specified.

    Answer: Please refer to Answer #4 above.

21. Question: No provisions for loadcell service after installation

    Answer: Aside from warranty obligations in the contract, post-installation services are not to be included in the bid.

22. Question: Recommend Wireless Communication to remote displays. Remote displays should have integrated red green traffic lights.

    Answer: For bidding purposes, changes to the remote displays will not be included.

23. Question: Recommend Hanging walkways with handrails to guard patrons from stepping out off the scale and causing injury, especially on the passenger side.

    Answer: For bidding purposes, additional handrails will not be included.

24. Question: Recommend use of scale with no proprietary parts and components

    Answer: Please refer to Answer #4 above.

If you have questions regarding this RFT or its addenda's, please contact the Township as outlined in Section 2.13 – Inquiries of the RFT document.

Sincerely,

Mike Timmins
Director of Public Works

Acknowledgement of Receipt

Bidders are required to acknowledge receipt of all addenda by signing the Acknowledgement of Receipt below. Failure to submit all addenda will constitute an automatic rejection.

I/we hereby acknowledge receipt of this addendum and make allowances in my bid.

_____ _____

Signature of Bidder Date

_____

Name of Company

TECHNICAL MEMORANDUM

DATE June 15, 2023 **Project No.** 221-10889-00

TO Andrew Boyd, Construction Manager
WSP Canada Inc. - 6925 Century Avenue, Mississauga, ON L5N 7K2

FROM WSP Canada Inc. **EMAIL trent.larock@wsp.com; michael.nieukirk@wsp.com**

GEOTECHNICAL CONSULTING SERVICES – SCOTCH LINE TRANSFER STATION

1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained internally by Legacy Golder to complete a limited geotechnical site investigation to support the design and construction of the proposed Scotch Line Transfer Station (Site) located at 2038 Scotch Line Road East, approximately one kilometer west of Highway 35 and three kilometers north of the town of Minden, ON. It is understood that the existing landfill site is nearing its approved waste disposal capacity and so the Township of Minden Hills (Client) retained WSP to design and build the Scotch Line Transfer Station to continue to service the Township's residents.

This geotechnical memo provides information on subsurface conditions at the Site, including a description of the existing soil profile, groundwater conditions, and bedrock conditions. Based on the investigation findings, WSP has provided select geotechnical recommendations for consideration in the design and construction of the proposed transfer station and associated components. Details are as follows.

2.0 INVESTIGATION METHODOLOGY

WSP completed a test pit investigation program for the Site on October 28, 2022. Buried utility clearances were completed prior to equipment mobilization. A total of eighteen (18) test pits, designated as TP22-01 to TP22-18, were advanced to practical refusal on inferred bedrock, with depths ranging from approximately 0.2 to 2.7 meters below ground surface (mbgs). All test pits were located east of the existing landfill.

WSP field staff supervised the test pitting operations and recorded the subsurface conditions encountered at the test pit locations. Test pits were advanced using an excavator until practical refusal was encountered and inferred bedrock was scraped with the excavator bucket. Soil samples were recovered from select test pits from the excavation wall, remaining relatively undisturbed. Test pits were checked for groundwater seepage and general stability upon completion. Open pits were backfilled with excavated materials.

The location of each test pit was obtained using a handheld GPS unit and approximate test pit locations are illustrated in Figure 1.

3.0 SUBSURFACE CONDITIONS

Surficial topsoil/organic-rich material was encountered in all 18 test pits. The Site's vegetation had been previously clear cut and as such, there was a presence of wood chips and processed trees mixed with the surficial soil materials across the Site. The surficial material had a thickness ranging from approximately 0.1 m to 0.6 m consisting of dark brown to black soil with a sandy silt texture. The material contained heavy roots & rootlets, major tree debris. At test pits, TP 22-02, TP 22-03, TP 22-04, and TP 22-05 the surficial material contained wood chips. Test pit TP 22-12 was terminated in the surficial material after encountering inferred bedrock at 0.2 mbgs.

Immediately beneath the surficial material, layers of orangish brown to dark brown sandy silt/silty sand were encountered and extended to depths ranging between 0.5 to 1.1 mbgs. The sandy silt/silty sand contained some gravel, cobbles, boulders, and inferred weathered bedrock fragments. At test pits TP22-01 to TP 22-05, TP 22-08, TP 22-13, and TP 22-17 the sandy silt/silty sand material extended to termination depths (ranging from approximately 0.5 to 1.8 mbgs).

Underlying the sandy silt/silty sand was a brown to grey sand and gravel layer that was either silty or contained some silt with the presence of cobbles, boulders, and inferred weathered bedrock. The sand and gravel layer extended to depths ranging between 0.6 to 2.7 mbgs. The sand and gravel layer in test pits TP 22-06, TP 22-07, TP 22-09 to TP 22-11, TP 22-14 to TP 22-16, and TP 22-18 extended to termination. Based on field observations, all materials were generally compact and moist except for materials from test pits TP 22-04, TP 22-05, and TP 22-06 which were loose to very loose and wet to saturated from groundwater conditions. All test pit logs are included in Appendix A.

3.1 Bedrock

All test pits were terminated on inferred bedrock upon practical refusal of the excavator bucket. The depth at which refusal was encountered was interpreted by WSP as being the depth of competent bedrock for the purpose of logging the test pits. It is noted that bedrock typically exhibits a certain degree of weathering and fracturing in its upper zone. The inferred bedrock surface was scraped with the bucket teeth, occasionally causing the weathered rock to be uplifted. Bedrock coring was not part of the project scope; therefore, confirmation of the bedrock was not completed during this investigation. A summary of the test pit termination depths on inferred bedrock is shown below in Table 1.

Table 1: Test Pit Termination Depths on Inferred Bedrock

Test Pit	Termination Depth (mbgs)
TP 22-01	0.9
TP 22-02	0.7
TP 22-03	0.5
TP 22-04	1.0
TP 22-05	1.8
TP 22-06	1.6
TP 22-07	1.0

Test Pit	Termination Depth (mbgs)
TP 22-08	0.7
TP 22-09	0.9
TP 22-10	1.2
TP 22-11	1.5
TP 22-12	0.2
TP 22-13	0.5
TP 22-14	1.3
TP 22-15	1.6
TP 22-16	0.6
TP 22-17	0.5
TP 22-18	2.7

The varying depths of inferred bedrock may impact the design and constructability for the site features and is further discussed in Section 4.

3.2 Groundwater

Water seepage and accumulation was encountered at test pits TP 22-04, TP 22-05, and TP 22-06 likely due to their proximity to a natural pond/wetland of standing water. No water seepage was encountered at other test pit locations and so we can interpret the "groundwater" presence noted on the test pit logs as actually ponded surface water that has migrated into the excavations. "Groundwater" seepage comments are included in the test pit logs in Appendix A.

3.3 Subsurface Waste

During the investigation, test pits TP 22-16, TP 22-17, and TP 22-18 were advanced along a natural bedrock channel that delineates the existing landfill site from the new proposed transfer station Site. This channel (ditch) contained garbage waste and there were concerns that the subsurface materials would contain buried garbage waste. Test pits along this ditch did not encounter any subsurface garbage waste on the east slope. It appears that at the test pit locations, the garbage waste was only surficial deposited by wind or falling debris from the nearby garbage waste mounds. A cross-sectional sketch of test pit TP 22-17 showing the approximate depths and location of the bedrock face is included in Appendix B.

4.0 RECOMMENDATIONS

It is understood that the proposed Site development will include the design and construction of a waste transfer station and all associated components. Associated components include a sawtooth design retaining wall and shed for the public drop-off area, a leaf and yard compost pad, weigh scales and a scale-house with fully plumbed water (well) and sanitary services (septic), a hazardous waste storage building, reusable items building and equipment storage building.

The subsurface material is relatively consistent within the test pits and typically has a compact relative consistency based on field observations. The subsoil generally consists of fine-grained sandy silt/silty sand with some gravel and the presence of cobbles and boulders. Water did accumulate in select test pits near an existing wetland/pond.

While we believe our findings are representative, conditions may differ beyond the investigated location. If significant differences in subsurface conditions are found at a later time, particularly during construction or as more information becomes available, WSP should be contacted immediately to revise our findings and recommendations, if necessary.

Recommendations are intended for Designers and are not intended as instructions to Contractors, who should perform their own investigations to confirm any conditions that may affect them. Recommendations in this Technical Memo must not be used by third parties without the express written consent of WSP.

4.1 Site Preparation

The existing organic topsoil and otherwise deleterious surficial material should be stripped from below the footprint of the proposed structures and pavement areas. With shallow inferred bedrock present on the Site it is recommended that all subsoils and loose/weathered rock be removed to expose the competent bedrock face below the footprint of proposed structures and pavement areas before construction. An inspection of the exposed bedrock face should be completed by a qualified Geotechnical Engineer or qualified personnel working under the direct supervision of a geotechnical engineer prior to the placement of any engineered fill.

If it is decided that the structures will be built within the subsoil layers instead of on competent bedrock, the prepared structural and pavement subgrade areas should be proof rolled using a self-propelled vibratory compactor or smooth drum roller with a minimum static weight of 8 tonnes or approved equivalent. Proof-rolling should be completed in the presence of a qualified Geotechnical Engineer or qualified personnel working under the direct supervision of a Geotechnical Engineer. Loose or soft subsoils, if any, should be subexcavated and replaced with approved fill that is texturally consistent with the native material.

Any new fill from onsite cuts or offsite borrow sources, should be approved by the Engineer, and placed in 200 mm maximum loose lifts, subsequently compacted to the following Standard Proctor Maximum Dry Density (SPMDD) standards (ASTM D698) based on the presumptive loading conditions:

- Material placed below structurally loaded areas: 100 % SPMDD
- Material placed below parking areas/roadways: 98 % SPMDD
- Materials placed below general fill areas: 95 % SPMDD

4.2 Excavations and Dewatering

Excavations should be constructed in accordance with the most recent version (O. Reg. 123/08) of the Occupational Health and Safety Act (OHSA). In general, the site soils consist predominantly of sandy silt/silty sand. Based on OHSA criteria, the Site soils may be classified, and the excavation sidewall should be sloped, as follows:

- The native site soils, above the groundwater table, may be considered Type 2 soil, and excavation sidewalls should be sloped at a maximum of 1H:1V to within 1.2 m of the base of the excavation.

- Any soils below the groundwater tables should be considered Type 4 soil, and excavation sidewalls should be sloped at a maximum of 3H:1V to the base of the excavation. WSP interprets the investigation findings to be that "groundwater" was not present within the test pits, but water accumulation was the result of existing wetland/pond surface waters near the test pit locations.

Excavations should be protected from exposure to precipitation and associated ground surface runoff and should be inspected regularly for signs of instability. If localized instability is noted during excavation, or if wet conditions are encountered, side slopes should be flattened as required to maintain safe working conditions. If excavation side slopes cannot be achieved due to site confinement, shoring should be designed and installed.

Relatively minor seepage into open-cut excavations above the groundwater table may be controlled using filtered sumps and pumps. Surface water inflow can also be controlled in this manner, but preferably it should be directed away from the excavations. For service trenches, to minimize potential problems, backfilling operations should follow closely after excavation and pipe installation so that only minimal lengths of the trench are exposed at any given time.

It is expected that the majority of dewatering activities can be completed using filtered sumps, however depending on the final installation depth, advanced dewatering systems may be required when excavations extend below the groundwater table. All dewatering shall be completed according to OPSS 518 and shall be completed using submersible pumps and sumps, well points, or diversions as required.

If dewatering activities exceed 50,000 L/day, the project would either need to be registered under the Environmental Sector and Registry (ESAR) program by the MOECC for up to 400,000 L/day or require a permit to take water (PTTW) if anticipated volume exceeds 400,000 L/day. Both an EASR or a PTTW application should be done in advance of construction, by a Qualified Person, and consider the pumping rates, drawdown, water quality for discharge, ground effects, and monitoring requirements.

4.3 Service Trenches

Buried infrastructure pipes and conduit may be installed using a Class B bedding design, in accordance with the OPSD 802.010. Water and sewer lines installed outside of heated areas should be provided with a minimum of 1.8 m soil cover or equivalent for frost protection. Pipe bedding and cover should be compacted to at least 98 percent of SPMDD as per ASTM D698.

4.4 Material Reuse, Backfill and Compaction

The native soils may be reused as trench backfill, however, the native soils contained significant amounts of fine-grained material which can be difficult to reuse. Aeration of the native soil may be required to ensure that the native soil is a suitable moisture content to be reused.

The material used as trench backfill should be free of all deleterious matter (e.g., topsoil, organic matter, etc.). Materials used for trench backfill should be placed in 200 mm maximum loose lifts and compacted to 98 percent of the Standard Proctor Maximum Dry Density (SPMDD) beneath roadways and structural components, and 95 percent of the SPMDD in general fill areas. Compaction operations should be completed using a self-propelled vibratory compactor or jumping-jack plate tamper where access is limited. Backfill loose lift thicknesses may need to be reduced to achieve the above-noted compaction values based on the compaction equipment utilized.

Special considerations should be made for backfill and compaction operations during cold weather conditions. Reused native soils and granular soils (Granular A and B) tend not to achieve adequate compaction in below-freezing temperatures and thus other backfill materials such as 19 mm Clear Stone Bedding or High-Performance Bedding Stone (HPBS) wrapped in a geotextile (Terrafix 270R or approved equivalent) may need to be utilized.

If soils are to be exported from the site, confirmatory field screening and chemical soil analyses should be completed at the time of export to verify acceptance for the receiving Site.

4.5 Frost Penetration Depths

Based on professional experience, soil types, and proposed structures, the proposed services should be provided with at least 1.8 m of earth cover for frost protection or an equivalent thickness of insulation installed according to the manufacturer's specifications. However, provided all foundations extend to bedrock, and assuming there is no evidence of frost susceptible layers or lenses in the bedrock, no frost protection is required.

4.6 Building Foundations

Based on the subsurface conditions encountered during the investigation and in conversations with the Client, the buildings will be founded on bedrock.

It is recommended that structural loading for these buildings be supported using conventional spread footings. To achieve consistency in the overall foundation bearing and thereby minimize the potential for differential settlements as a result of bearing on different materials (i.e., soil and bedrock), the footings should be founded on a uniform material consisting of the sound, approved bedrock surface.

Based on the results of the test pit investigation, it is expected that the bedrock depths across the site is variable. Bedrock shelves were observed during the investigation at surface and below grade, illustrated in TP 22-17 Sketch in Appendix B.

The bedrock was encountered within the test pits ranging from approximately 0.2 to 2.7 mbgs (see Table 1). There may be zones and pockets where more weathered and fractured bedrock exists, requiring subexcavation of such material to competent bedrock. The quality of the bedrock surface for foundation bearing will become more evident once construction excavations expose wider areas of bedrock.

Footings constructed on sound, approved bedrock at this site could be designed based on a bearing resistance of 750 kPa under factored Ultimate Limit States conditions (ULS) (resistance factor of 0.5 applied). There would be no corresponding SLS bearing resistance, as settlements for foundations constructed on sound bedrock would be considered to be negligible.

To place strip or spread footings directly on bedrock, all overburden material along with any loose debris, weathered bedrock and rock shatter must be removed and the surface cleaned using air hose or water jetting procedures, exposing sound bedrock. Geotechnical inspection of the rock surface is required during construction to verify conditions and estimated rock strength. The foundations should be constructed such that they do not exceed a slope of 2 horizontal in 1 vertical over their length. For bedrock subgrades, if uneven surfaces are encountered, lean concrete mix (minimum compressive strength of 4 MPa) may be used in order to provide a level working surface (or alternatively to raise the subgrade elevation).

Excavations for sump pits, utility trenches or similar should not intersect a zone that would extend downward at an angle of 10 horizontal to 7 vertical from the bottom outside edges of foundations on a soil subgrade, and 1 horizontal to 1 vertical on a bedrock subgrade.

Insulation should be used where earth cover for frost protection is less than 1.8 m. However, provided all foundations extend to competent bedrock, and assuming there is no evidence of frost susceptible layers or lenses in the bedrock, no frost protection is required.

A filtered, perforated perimeter drain should be installed around the exterior perimeter of the footings. The perimeter drain should outlet to an acceptable frost-free outlet.

Foundations designed and constructed in accordance with this report are anticipated to remain within a total allowable settlement of 25 mm and a maximum differential settlement of 19 mm.

4.7 Retaining Walls

It is understood that retaining walls will be constructed at select bin storage locations. The proposed retaining walls will be subject to lateral earth pressures from the earth backfill behind the wall. Granular fill consisting of either, Select Subgrade Material (SSM), or Granular "A" or "B" conforming to OPSS.MUNI 1010 should be placed behind the wall. The following geotechnical parameters can be used for below grade walls that are backfilled with granular materials.

Table 2: Lateral Earth Pressure Parameters (Granular Fills)

Parameter	OPSS Select Subgrade Material (SSM)	OPSS Granular A or Granular B, Type II
Unit Weight, γ_{moist}	20.0 kN/m^3	22.0 kN/m^3
Unit Weight, $\gamma_{submerged}$	10.0 kN/m^3	12.0 kN/m^3
Angle of Internal Friction (compacted), ϕ	32 degrees	35 degrees
Coefficient of Passive Earth Pressure, K_p	3.25	3.69
Coefficient of Active Earth Pressure, K_a	0.31	0.27
Coefficient of at-Rest Earth Pressure, K_o	0.47	0.43
Combined Active and Seismic Earth Pressure Coefficient, K_{AE}	0.61	0.55

4.7.1 Static Lateral Earth Pressure

The lateral static earth forces acting on permanent retaining walls and temporary shoring, etc. may be calculated using the following expressions:

$$P = \frac{1}{2} K\gamma H^2 \text{ and } P_{surcharge} = KqH$$

Where:

P = lateral earth pressure forces (kN): earth force acts at $\frac{1}{3}$H and surcharge force acts at $\frac{1}{2}$H above the bottom of wall

K = earth pressure coefficient; for unrestrained walls and structures where some movement is acceptable (such as retaining walls) use a coefficient of active earth pressure (Ka) and for restrained walls (such as basement walls) use the coefficient of earth pressure at rest (Ko)

γ = the moist unit weight of retained fill

H = the wall height (m)

q = the magnitude of any design surcharge at the ground surface, typically 12 kPa for standard vehicles.

Hydrostatic pressure should also be applied to the wall if submerged conditions are to be expected (e.g., 100-year flood level). Hydrostatic force should be applied at $\frac{1}{3}$H above bottom of the wall.

4.8 Rock Anchors

If required for uplift resistance, bedrock anchors are recommended to provide foundation uplift resistance for the proposed structures. It is recommended that a tensioned anchor or group of anchors be used. Anchor types and diameters will depend on applied stress factors. It is important to verify manufacturer's design recommendations. The components of anchorages should be capable of developing at least 100% of the guaranteed minimum ultimate capacity of the tendon or bar from the manufacturer. Sealed anchors should be used for corrosion protection.

The design of the grouted anchors is based on multiple failure modes, including frictional stress between grout and anchor interface, frictional stress between the grout and rock interface, and the total mass of rock mobilized. For anchors installed without a performance test specification requirement, then it is recommended that designers use a rock/grout safe allowable bond stress or serviceability limit states value of 690 kPa (100 psi). Allowable bond stress is based on a Factor of Safety of 3. If pre-production design tests are carried out using the recommended procedures in the Canadian Foundation Engineering Manual (CFEM), higher bond stresses may be proven and possibly achieve in the order of 1000 kPa. The CFEM recommends that allowable bond stress for anchors not exceed 1300 kPa.

Anchor capacity should be further assessed using an inferred 60-degree apex tear out cone, recommended to start at the lower third point of the anchor bond zone. Grouted anchors should be spaced such that theoretical cones do not overlap. The submerged unit weight of rock (assume 17 kN/m3) should be used for design. Stresses along "grout-to-rock" and "grout-to-steel" interface bonds should be checked to ensure that failures will not occur.

When drilling for anchor installation, the sides and end of the completed anchor holes shall be maintained in a stable condition. The anchor hole entry shall be located within 25 mm (1 in) of its plan location, or over-riding design specifications. It is recommended that the deviation of the anchor hole entry angle from its specified inclination should be no greater than 2 degrees. Open anchor holes and drilled casings shall be cleaned upon completion of drilling. Anchor holes open for longer than eight hours shall be re-cleaned prior to insertion of the tendon and primary grouting. A slip-sheathing may be required in the anchor design to allow proper stress transfer. This aspect may be subject to further geotechnical review when more information is available.

During construction, monitoring of anchor installations by trained geotechnical personnel should be carried out to verify the quality of the installation, grout material strengths and contractors work methods. Once performance tests and/or design tests are complete, and following construction installation and adequate setting of the grout, all anchors should be subjected to proof testing to verify the anchor installation. Proof testing is typically a short

duration test (about 5 min) to 125% of the design load, and results are checked to confirm that elongation movements are within tolerable limits.

4.9 Design Review, Testing, and Inspections

WSP shall be afforded the opportunity to complete a thorough review of final services to verify that assumptions and geotechnical recommendations discussed in this Report are appropriate. If not given this opportunity, WSP cannot assume liability for omissions, misinterpretations or deficiencies in our recommendations.

WSP should be contacted to provide geotechnical material testing and inspections during construction operations. Exposed subgrade soils are to be inspected to confirm the materials are stable and competent as described in this report and related recommendations. Testing and inspections for general QA/QC should include sampling and laboratory testing of fill materials, field and laboratory testing of concrete and in-situ densometer testing of compacted soils and granular fill, as appropriate.

5.0 LIMITATIONS OF REPORT

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to WSP Canada Inc. at the time of preparation. Unless otherwise agreed in writing by WSP Canada Inc., it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

By issuing this report, WSP is the Geotechnical Engineer of record. It is recommended that WSP be retained during construction of all foundations and during earthwork operations to confirm the conditions of the subsoil are actually similar to those observed during our study. The intent of this requirement is to verify that conditions encountered during construction are consistent with the findings in the report and that inherent knowledge developed as part of our study is correctly carried forward to the construction phases.

WSP Canada Inc.

Trent Larock, E.I.T.
Geotechnical Engineer in Training

Michael Nieukirk, P.Eng.
Geotechnical Engineer

TL/MSN/kj

Attachments: Figures – Figure 1 - Test Pit Location Plan
Appendix A – Test Pit Logs
Appendix B – TP22-17 Cross Section Sketch

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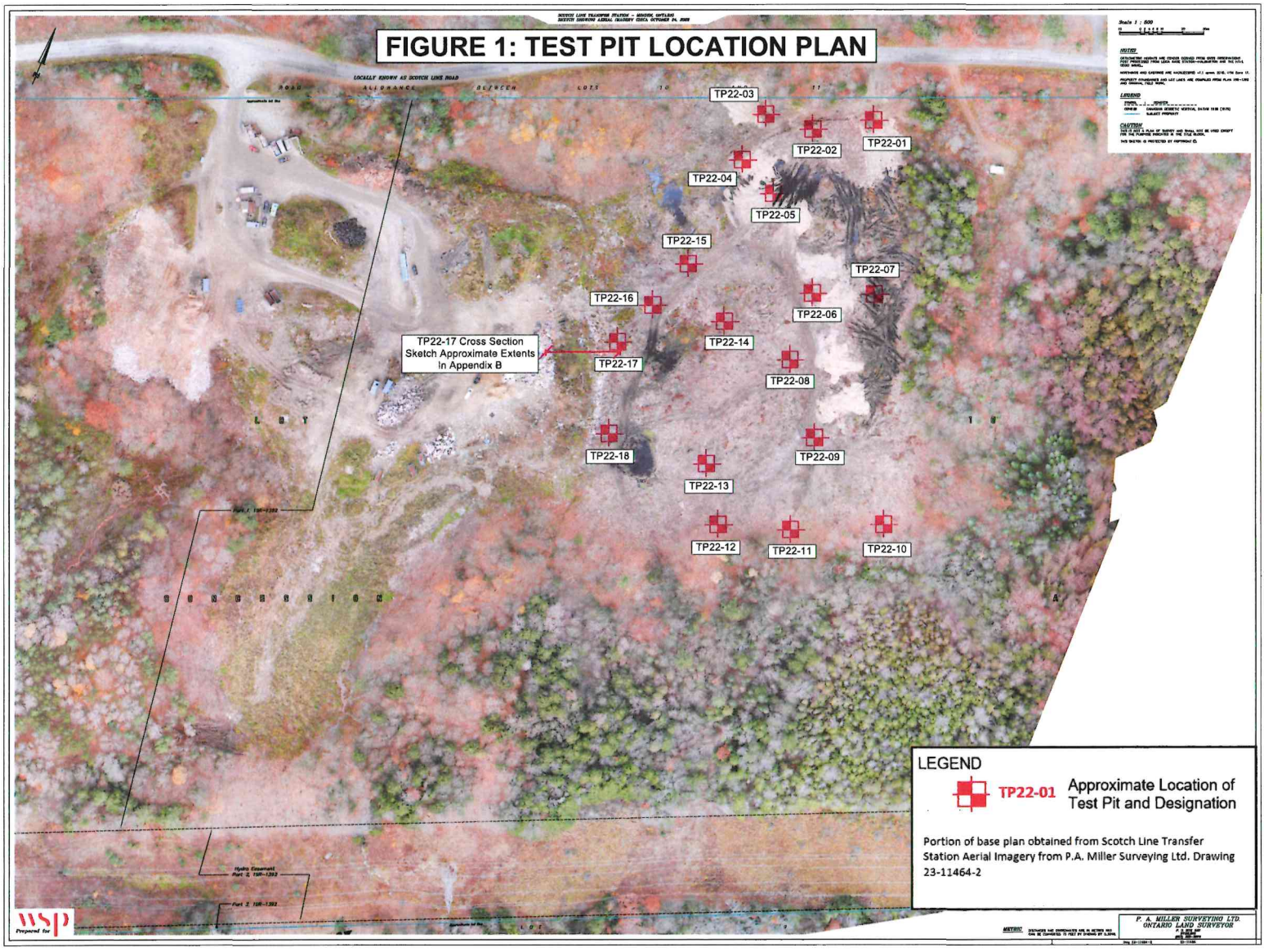
FIGURES

Figure 1 - Test Pit Location Plan

FIGURE 1: TEST PIT LOCATION PLAN



APPENDIX A

Test Pit Logs

TEST PIT LOGS
Scotch Line Landfill - Geotechnical Investigation
October 28, 2022
PROJECT NO. 211-10889-00

Test Pit No.		TP 22-01
Location		44°57'11"N 78°43'49"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.9	Sandy Silt - orangish brown, some gravel, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.9 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-02
Location		44°57'09"N 78°43'46"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest and woodchips)
0.3	0.7	Sandy Silt - orangish brown, some gravel, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed.Test pit terminated at 0.7 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-03
Location		44°57'10"N 78°43'48"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.4	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest and woodchips)
0.4	0.5	Sandy Silt - orangish brown, some gravel, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.5 mbgs. Refusal on presumed bedrock.	

TEST PIT LOGS
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Test Pit No.		TP 22-04
Location		44°57'09"N 78°43'47"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.4	Wood chips and organic matter
0.4	1.0	Silty Sand - dark brown, some gravel, occasional cobbles, boulders, possible weathered bedrock, wet / saturated
Notes:	Groundwater seepage observed immediately to surface. Test pit terminated at 1.0 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-05
Location		44°57'09"N 78°43'46"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.6	Wood chips and organic matter
0.6	1.8	Silty Sand - dark brown, some gravel, occasional cobbles, boulders, possible weathered bedrock, wet / saturated
Notes:	Groundwater seepage observed immediately to 0.5 mbgs. Test pit terminated at 1.8 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-06
Location		44°57'08"N 78°43'45"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.2	0.7	Sandy Silt - orangish brown, some gravel, frequent cobbles, boulders, possible weathered bedrock, moist
0.7	1.6	Sand and Gravel - greyish brown with orange staining, some silt, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	Groundwater seepage observed at approximately 1.6 mbgs. Test pit terminated at 1.6 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-07
Location		44°57'08"N 78°43'44"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.2	0.3	Silty Sand - orangish brown, some gravel, moist
0.3	1.0	Sand and Gravel - greyish brown with orange staining, some silt, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 1.0 mbgs. Refusal on presumed bedrock.	

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Test Pit No.		TP 22-08
Location		44°57'07"N 78°43'45"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.1	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.1	0.7	Sandy Silt - orangish brown, some gravel, frequent cobbles, boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.7 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-09
Location		44°57'06"N 78°43'44"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.6	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, possible weathered bedrock, moist
0.6	0.9	Sand and Gravel - brown, some silt, frequent cobbles and boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.9 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-10
Location		44°57'05"N 78°43'42"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.5	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, possible weathered bedrock, moist
0.5	1.2	Sand and Gravel - brown, some silt, frequent cobbles and boulders, possible weathered bedrock, moist
Notes:	No groundwater seepage observed. Test pit terminated at 1.2 mbgs. Refusal on presumed bedrock.	

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Test Pit No.		TP 22-11
Location		44°57'04"N 78°43'44"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	1.1	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
1.1	1.5	Silty Sand and Gravel - grey, frequent cobbles and boulders, possible weathered bedrock
Notes:	No groundwater seepage observed. Test pit terminated at 1.5 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-12
Location		44°57'04"N 78°43'45"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
Notes:	No groundwater seepage observed. Test pit terminated at 0.2 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-13
Location		44°57'05"N 78°43'46"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.5	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.5 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-14
Location		44°57'07"N 78°43'47"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.8	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
0.8	1.3	Silty Sand and Gravel - grey, frequent cobbles and boulders, possible weathered bedrock
Notes:	No groundwater seepage observed. Test pit terminated at 1.3 mbgs. Refusal on presumed bedrock.	

TEST PIT LOGS
Scotch Line Landfill - Geotechnical Investigation
October 28, 2022
PROJECT NO. 211-10889-00

Test Pit No.		TP 22-15
Location		44°57'07"N 78°43'47"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.2	0.6	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
0.6	1.6	Silty Sand and Gravel - grey, frequent cobbles and boulders, possible weathered bedrock
Notes:	No groundwater seepage observed. Test pit terminated at 1.6 mbgs. Refusal on presumed bedrock.	

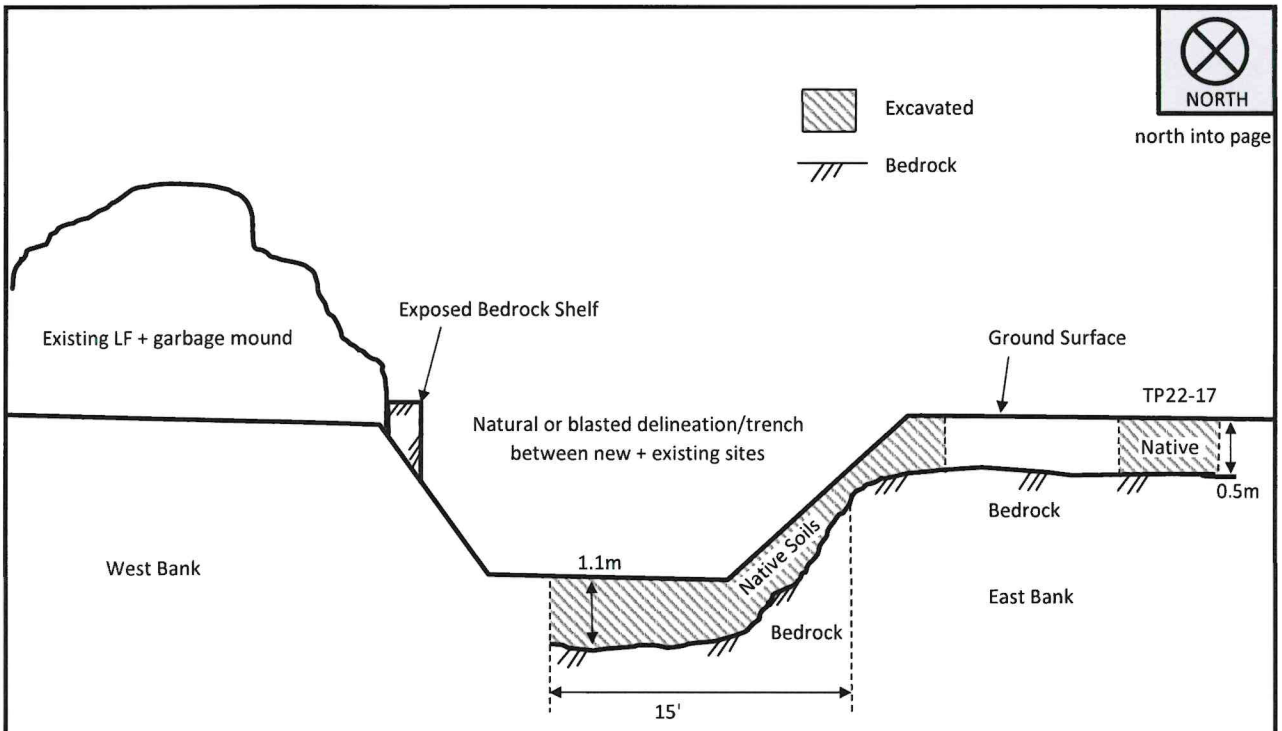
Test Pit No.		TP 22-16
Location		44°57'07"N 78°43'48"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.2	0.3	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
0.3	0.6	Silty Sand and Gravel - grey, frequent cobbles and boulders, possible weathered bedrock
Notes:	No groundwater seepage observed. Test pit terminated at 0.6 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-17
Location		44°57'6.5"N 78°43'48.5"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.2	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.2	0.5	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
Notes:	No groundwater seepage observed. Test pit terminated at 0.5 mbgs. Refusal on presumed bedrock.	

Test Pit No.		TP 22-18
Location		44°57'05"N 78°43'48"W
Surface Elevation		Not Surveyed
Depth		Soil Description
From (m)	To (m)	
0.0	0.3	Topsoil - dark brown to black, sandy silt, heavy rootlets and organic matter, (clear cut forest)
0.3	0.7	Sandy Silt - orangish brown, some gravel, occasional cobbles and boulders, moist
0.7	2.7	Silty Sand and Gravel - grey, frequent cobbles and boulders, possible weathered bedrock
Notes:	No groundwater seepage observed. Test pit terminated at 2.7 mbgs. Refusal on presumed bedrock.	

APPENDIX B

TP22-17 Cross Section Sketch



TP22-17 along top of slope and extended down the slope to identify any buried garbage, bedrock, and soils.
Trench has blown garbage but none buried. Similar procedure for TP22-18 at southern extents.
Warren Willis captured photos. The trench runs North-South.

N.T.S.

Project Name: Scotch Line LF
Project #: 221-10889-00

Date: 27-Oct-22
Tech: TL