REPORT OF GEOTECHNICAL ENGINEERING SERVICES

Tillamook Estuaries Partnership
Bay City Office Project
Bay City, Oregon

Geotech Solutions Inc.

December 12, 2024

GSI Project: tep-24-1-gi

Tillamook Estuaries Partnership
liane@tbnep.org; claudine@tbnep.org

REPORT OF GEOTECHNICAL ENGINEERING SERVICES
Tillamook Estuaries Offices
7855 Warren Street, Bay City, Oregon

As authorized, we are pleased to present this report summarizing our geotechnical engineering services for the proposed new development on roughly one acre at the subject address. Development is to include demolition of existing structures and new construction including single-story office, lobby, and laboratory space covering roughly 8,000 square feet, along with a roughly 1,200 square foot single-story duplex. Proposed improvements also include pervious and impervious pavements and utilities. The purpose of our services was to provide geotechnical engineering recommendations for design. Our specific scope of work included the following:

- Provide principal-level geotechnical project management including client communications, management of field and subcontracted services, report writing, analyses, and invoicing.
- Review previous reports, geologic maps, and vicinity geotechnical information as indicators of subsurface conditions.
- Complete a site reconnaissance to observe surface features relevant to geotechnical issues, such as topography, vegetation, presence and condition of springs, exposed soils and rock, and evidence of previous grading.
- Complete a "one call" public locate and a private utility locate for locatable utilities (limited to metallic or with tracer wire). As-built utilities are also requested from the owner. Unlocatable utilities are the responsibility of the owner, and our scope does not include any related utility repair.
- Explore subsurface conditions by advancing one CPT probe to a depth of up to 60 feet or refusal and two test pits up to 10 feet or refusal in accessible areas. Complete ppd testing in the cone and observe for seepage to evaluate ground water depths.
- Complete shallow infiltration testing in one of the test pits, and provide a pervious pavement subgrade infiltration rate for the civil engineer's use in design, if feasible. Low rates and shallow ground water are expected and significant infiltration may not be feasible.
- Classify and sample materials encountered and maintain a detailed log of the explorations.
- Determine the moisture content of selected samples obtained from the explorations and complete soil classification testing, as necessary.
- Provide recommendations for earthwork including site preparation, reuse of existing fill in place or stabilized or reinstalled, seasonal material usage, compaction criteria, utility trench backfill, and the need for subsurface drainage.
- Evaluate site liquefaction potential and estimate site deformations and provide qualitative means to address unsuitable deformations if needed.
- Provide recommendations for shallow foundations including suitable soils, stabilization, bearing pressures, sliding coefficient, and a seismic site class, as well as geotechnical parameters for deep foundation support for up to one pile type, if needed.

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- Provide recommendations for slab support, including a subgrade modulus if needed, underslab rock thickness and materials, and the need for stabilization.
- Provide recommendations for pervious and non-pervious pavements including subgrade preparation and stabilization, and base rock and asphalt concrete and portland cement concrete thicknesses, as well as subgrade infiltration rate for pervious pavements.
- Provide a written report summarizing the results of our geotechnical evaluation.
- Complete an appended seismic hazard study identifying potential for liquefaction, amplification, fault surface rupture, and seismic elements for hazard evaluation to the degree of complexity compatible with the project.

SITE CONDITIONS

Site Surface Conditions

The site includes a residence and associated driveway and covered eastern concrete strips/features near the building, as well as an abandoned slab in the north, with most of the site area covered in grass and with large trees to the east. The site is relatively flat.

Site Geological Context

We reviewed geological mapping on file with DOGAMI consisting of Bulletin 74 – Nehalem Quad, TIM Till-06, OFR O-21-08, OFR O-23-01, as well as Oregon SLIDO landslide mapping. These show the general site area mapped as Oligocene Miocene sedimentary rock of tuffaceous siltstone. No mapped slides are near the site. The site is expected to be inundated by most Cascadia Subduction Zone earthquake scenarios.

Subsurface Conditions

General – Subsurface conditions at the site were explored on December 2 and 6, 2024 by completing 2 cone penetrometer test probes (CPT's) to refusal at depths of 11 to 15 feet, and test pits (TP-1 and TP-2) to depths of up to 11 feet below the existing ground surface (bgs). In general, explorations encountered 2 feet of very soft black organic topsoil underlain by medium stiff yellowish-brown silt with some clay and cemented zones near 5 and 11 feet. Tip resistance generally ranged from 5 to 25 tsf, higher where cemented, with refusal at over 400 tsf.

Approximate exploration locations are shown on the attached ***Site Plan.*** Specific subsurface conditions observed at each exploration are described in the attached exploration logs.

Laboratory Testing – Laboratory testing resulted in moisture contents of 32 to 49%, in the silt, and 53% in the topsoil (from organic content). Results of moisture content testing are provided in the attached ***Moisture Contents***.

Infiltration testing at a depth of 2.5 feet in TP-1 indicated low infiltration rates less than 0.5 $in^3/in^2/hr$ in the medium stiff yellowish-brown silt, which is typical of these soils.

Groundwater – We observed groundwater slow seepage near depths of 5 feet in the test pits, immediately above a cemented zone, and observe soil staining indicative of higher seasonal fluctuations in the top few feet.

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CONCLUSIONS AND RECOMMENDATIONS

General

Based on the results of our explorations, laboratory testing, and engineering analyses, it is our opinion that the site can be developed as proposed following the recommendations contained herein. Key geotechnical issues include removal of topsoil and developed site features, and moisture sensitivity of site soils. Specific geotechnical recommendations are provided in the following sections.

Site Preparation

General – Prior to earthwork construction, the site must be prepared by removing any existing structures, utilities, fill, and topsoil. Deeper topsoil stripping depths may be required in areas of loose organic soil typically associated with trees and shrubs. Root balls from trees and shrubs may extend several feet and grubbing operations can cause considerable subgrade disturbance. All disturbed material must be removed to undisturbed subgrade and backfilled with structural fill. In general, roots greater than one-inch in diameter must be removed as well as areas of concentrated smaller roots where organic content exceeds 2% by dry weight.

The test pit excavations were backfilled using relatively minimal compactive effort. Therefore, soft spots can be expected at these locations. We recommend that these relatively uncompacted soils be removed from the test pits located within the proposed building and paved areas to a depth of 3.0 feet below finished subgrade. The resulting excavation must be brought back to grade with structural fill. If located beneath a footing, the uncompacted soils must be completely removed and replaced with structural fill.

Stabilization and Soft Areas - After stripping and fill removal, we must be contacted to evaluate the exposed subgrade. This evaluation can be done by proof rolling in dry conditions or probing during wet conditions. Soft areas will require over-excavation and backfilling with well graded, angular crushed rock compacted as structural fill. Geosynthetics may also be required. We recommend that geosynthetics for stabilization consist of a Propex Geotex 801 overlying a suitable punched and drawn biaxial geogrid such as a Hanes EGrid 2020 or Propex Gridpro BXP12-4 (or equivalents).

Working Blankets and Haul Roads - Construction equipment must not operate directly on the subgrade, as it is susceptible to disturbance and softening. Rock working blankets and haul roads placed over a geosynthetic in a thickened advancing pad can be used to protect subgrades. We recommend that sound, angular, pit run or crushed basalt with no more than 6 percent passing a #200 sieve be used to construct haul roads and working blankets. Working blankets must be at least 12 inches thick, and haul roads at least 18 inches thick. These can typically be reduced to 10 and 14 inches, respectively, with the use of the preceding separation geosynthetic and geogrid. Some repair of working blankets and haul roads should be expected.

The preceding rock and amendment thicknesses are the minimum recommended. Subgrade protection is the responsibility of the contractor and thicker sections may be required based on subgrade conditions during construction and type and frequency of construction equipment.

Earthwork

Fill – The site fine grained native soil beneath the topsoil can be used for structural fill if properly moisture conditioned and free of deleterious materials. Use of this material will not be feasible during wet conditions, and use of the clayey material may not be feasible or advisable in any conditions due to

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high plasticity. Given the site climate, proper drying of the soil is expected to be difficult and have a short late summer window of opportunity. The on-site soil will require drying by scarification and frequent mixing in thin lifts which again will only be feasible during hot dry summer conditions. Once moisture contents are within 3 percent of optimum, the material must be compacted to at least 92 percent relative to ASTM D1557 (modified proctor) using a tamping foot type compactor. Fill must be placed in lifts no greater than 10 inches in loose thickness. In addition to meeting density specifications, fill will also need to pass a proof roll using a loaded dump truck, water truck, or similar size equipment.

In wet conditions, fill must be imported granular soil with less than 6 percent fines, such as clean crushed or pit run rock. This material must also be compacted to 95 percent relative to ASTM D1557.

Trenches – Utility trenches may encounter ground water seepage and caving must be expected where seepage is present. Shoring of utility trenches will be required for depths greater than 4 feet and where groundwater seepage is present. We recommend that the type and design of the shoring system be the responsibility of the contractor, who is in the best position to choose a system that fits the plan of operation.

Depending on the excavation depth and amount of groundwater seepage, dewatering may be necessary for construction of underground utilities. Flow rates for dewatering are likely to vary depending on location, soil type, and the season during which the excavation occurs. The dewatering systems, if necessary, must be capable of adapting to variable flows.

Pipe bedding must be installed in accordance with the pipe manufacturers' recommendations. If groundwater is present in the base of the utility trench excavation, we recommend overexcavating the trench by 12 to 18 inches and placing trench stabilization material in the base. Trench stabilization material must consist of well-graded, crushed rock or crushed gravel with a maximum particle size of 4 inches and be free of deleterious materials. The percent passing the U.S. Standard No. 200 Sieve must be less than 5 percent by weight when tested in accordance with ASTM C 117.

Trench backfill above the pipe zone must consist of well graded, angular crushed rock or sand fill with no more than 7 percent passing a #200 sieve. Trench backfill must be compacted to 92 percent relative to ASTM D-1557, and construction of hard surfaces, such as sidewalks or pavement, must not occur within one week of backfilling.

Seismic Design

General - In accordance with the International Building Code (IBC) as adapted by State of Oregon Structural Specialty Code (SOSSC) and based on our explorations and experience in the site vicinity, the subject project must be evaluated using the parameters associated with Site Class C. The site is subject to tsunami inundation from most Cascadia Subduction Zone interface earthquake events.

Liquefaction - Liquefaction occurs in loose, saturated, granular soils. Strong shaking, such as that experienced during earthquakes, causes the densification and the subsequent settlement of these soils. Given the soil type and consistency encountered in our explorations, the risk of liquefaction related structurally damaging deformations in proposed building areas is low.

Infiltration
Infiltration into site soils will be difficult, even for pervious pavements, and is generally not recommended due to the low rates and potential for shallow seasonal ground water. If attempted, the recommendations in the pervious pavements section in this report must be followed.

Shallow Foundations
Based on the provided information regarding building type and anticipated structural loads as previously stated, the proposed structure can be supported on shallow spread foundations bearing in the native medium stiff silt or structural fill. Footings must be embedded at least 18 inches below the lowest adjacent, exterior grade. Footings can be designed for an allowable net bearing pressure of 2,500 psf when founded on medium stiff or better native silt or structural fill. The preceding bearing pressure can be increased to 5,000 psf for temporary wind and seismic loads.

Continuous footings must be no less than 18 inches wide, and pad footings must be no less than 24 inches wide. Resistance to lateral loads can be obtained by a passive equivalent fluid pressure of 400 pcf against suitable footings, ignoring the top 12 inches of embedment, and by a footing base friction coefficient of 0.38. Each of these includes a factor of safety of 1.5 to limit deformation to near one inch. Properly founded footings are expected to settle less than a total of 1 inch, with less than ½ inch differentially.

If footing construction is to occur in wet conditions, a few inches of crushed rock must be placed at the base of footings to reduce subgrade disturbance and softening during construction.

Slabs
Floor slab loads up to 250 psf are expected to induce less than one inch of settlement if based on native soils. A minimum of 12 inches of clean, angular crushed rock with no more than 5 percent passing a #200 sieve is recommended for underslab rock. If the subgrade is fully prepared in the dry season, and if the slab is to be placed prior to fall rains, it may be possible to use 6 inches of rock on the pad if all rubber-tired traffic is supported on haul roads (such as thickening a road on the pad for use then cutting it back down). Prior to slab rock placement the subgrade will need to be evaluated by our probing or observation of proof rolling using a fully loaded dump truck or equivalent wheel load equipment. Underslab rock must be compacted to 92 percent compaction relative to ASTM D1557 and must also be proof rolled or evaluated by the geotechnical engineer for suitable stiffness/relative density. In addition, any areas contaminated with fines must be removed and replaced with clean rock. If the base rock is saturated or trapping water, this water must be removed prior to slab placement.

Some flooring manufacturers require specific slab moisture levels and/or vapor barriers to validate the warranties on their products. A properly installed and protected vapor flow retardant can reduce slab moisture. If a vapor flow retardant is used, care must be taken not to trap moisture within the overlying granular fill and floor slab concrete.

Drainage
General - We recommend installing perimeter foundation drains around all exterior foundations. These drains can be eliminated if a vapor barrier is used over the underslab rock surface and poured directly on, and if slab subgrade is at or above pre-existing grades. In all cases the surface around building perimeters must be sloped to drain away from the buildings. As stated previously, our retaining

wall recommendations are based on drained conditions. All retaining walls must include a drain constructed as described in the following section.

Foundation and Wall Drains - Foundation and retaining wall drains must consist of a two-foot-wide zone of drain rock encompassing a 4-inch diameter perforated pipe, all enclosed with a non-woven filter fabric. The drain rock must have no more than 2 % passing a #200 sieve and must extend to within one foot of the ground surface. The geosynthetic must have an AOS of a #70 sieve, a minimum permittivity of 1.0 sec^{-1}, and a minimum puncture resistance of 80 pounds (such as Propex Geotex 601 or equivalent). Alternatively, a composite drain board such as an Amoco 500/520 could be used. In either case, one foot of low permeability soil (such as the on-site silt) must be placed over the fabric at the top of the drain to isolate the drain from surface runoff.

Hardscaping and Pavement

Hardscaping – These features include sidewalks and pavers subjected only to foot traffic. We must be contacted to evaluate increased thicknesses if vehicle support is planned. These features must be based on native subgrade or structural fill overlain by a Propex Geotex 801 separation geosynthetic (or equivalent), in turn overlain by at least 6 inches of well graded angular crushed rock with less than 5 percent fines compacted to 95% relative to ASTM D1557. A sand or fine gravel bedding layer may be used per manufacturers' recommendations for pavers provided the material contains less than 3% fines. This material must be compacted to 92 percent relative to ASTM D1557.

Asphalt Cement Concrete – At the time of this report we did not have specific information regarding the type and frequency of expected traffic. We therefore developed asphalt concrete pavement thicknesses for areas exposed to passenger vehicles only and areas exposed to up to one truck per day based on a 20-year design life and a truck factor of 0.6. We assumed that the average truck will consist of a panel-type delivery truck, with occasional 3- to 5-axle trucks. Traffic volumes can be revised if specific data is available.

Our pavement analyses are based on AASHTO methods and subgrade of structural fill or undisturbed medium stiff or better native silt having a resilient modulus of 6,000 psi and prepared as recommended herein. We have also assumed that roadway construction will be completed during an extended period of dry weather. The results of our analyses based on these parameters are provided in the following table.

Traffic	AC (inches)	CR (inches)
Passenger Vehicle Only	2.5	6
Up to 3 Truck Per Day	3	8

The thicknesses listed in the above table are the minimum acceptable for construction during an extended period of dry weather. Increased rock thickness will be required for construction during wet conditions. Crushed rock must conform to ODOT base rock standards and have less than 6 percent passing the #200 sieve. Asphalt concrete must be level 2 or 3, ½" dense graded HMAC compacted to a minimum of 91 percent of a Rice Density.

Portland Cement Concrete - We developed PCC pavement thicknesses at the site for the assumed one-way traffic levels as shown in the table below. Each of these sections is based on AASHTO

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methods with no reduction for wander and a composite modulus of subgrade reaction of 350 pci (AASHTO Figure 3.3 with M_r = 6,000 psi and 6 inches crushed rock base). Other parameters include 4,000 psi compressive strength portland cement concrete (PCC), and plain jointed concrete without load transfer devices or tied concrete shoulders. PCC pavements over trench backfill should not be placed within one week of fill installation unless survey data indicates that settlement of the backfill is complete.

Traffic	PCC (inches)	CRB (inches)
Up to 3, 3-axle Trucks Per Day	6	6

Subgrade Preparation - The pavement subgrade must be prepared in accordance with the ***Earthwork*** *and* ***Site Preparation*** recommendations presented in this report. All pavement subgrades must pass a proof roll prior to paving. Soft areas must be repaired by over-excavating the areas and installing a stabilization geosynthetic. Well graded, angular crushed rock backfill compacted as structural fill must be used to bring the aforementioned areas to-grade. For stabilization geosynthetics we recommend a Propex Geotex 801 for separation overlying a suitable punched and drawn biaxial geogrid such as a Propex Gridpro BXP12-4 (or equivalents).

Pervious Pavement Design Recommendations

General - We understand that pervious asphalt concrete pavement is being considered, although site infiltration rates are low. It should be understood that infiltration into pervious pavement requires frequent maintenance to remove surface clogging particles. As such, designing an overflow system with associated grading is recommended. Pervious pavement typically does not perform well in areas of turning, with pavement surface raveling and a "gravelly" appearance over time being common. Maintenance is critical to improving performance.

The pervious pavement subgrade and separation fabric should be prepared as recommended in the following sections. Specific material recommendations and specifications are presented in the following sections.

Design Infiltration Rate - Design infiltration rates are low and summarized earlier in this report.

Maintenance and Overflow - Pervious pavements will require frequent maintenance to maintain infiltration capacity and reduce clogging. Maintenance should include monthly cleaning with vacuuming-sweeping machines, and salting or sanding must be avoided. Infiltration rates should be expected to gradually decrease with time. We therefore recommend that pervious pavement surface areas include overflow drains that drain to the rock storage layer underlying the pavement or a suitable alternate discharge. We also recommend that the subgrade be gently sloped to such alternative discharge.

Subgrade Preparation - All disturbed material must be removed to expose undisturbed subgrade. The subgrade should be prepared in accordance with the ***Earthwork*** *and* ***Site Preparation*** recommendations presented herein. Prior to placement of fabric, the subgrade should be lightly raked to disturb the top ½" to improve infiltration. This can be suitably seated for pavement support with fabric confinement and rock compaction.

Subgrade Separation Geosynthetic – The geosynthetic for stabilization can also serve the purpose of separation. We recommend that a geosynthetic over the subgrade consist of a Propex Geotex 801 or equivalent.

Base Course - The base course (or storage layer) aggregate should consist of 8 inches of an open-graded, single size, angular crushed rock material with a particle size of between 1 to 2.5 inches and have less than 2 percent passing the #200 sieve (ASSHTO 1 or 2 aggregate or approved alternative). The material should be suitably compacted until dense and well-keyed. We should be contacted to evaluate compaction of the base course prior to the placement of the 'choker' course. The base course should be capped with a 'choker' course to stabilize the base course for paving.

Choker Course – The choker course should be placed directly over the base course with a minimum thickness of 2 inches. The choker course aggregate should consist of an open-graded, angular crushed rock material with a predominant particle size of approximately ½-inch and have less than 2 percent passing the #200 sieve (ASSHTO 57 aggregate or approved alternative). The material should be suitably compacted until dense and well-keyed. We should be contacted to observe the 'choker' course prior to paving.

Open Graded Asphalt Concrete - Pervious asphalt cement concrete should consist of ODOT 2015 ½" porous asphalt concrete (PAC) using an asphalt cement of 70-22ER. The pavement should be compacted until uniform and dense with the roller marks removed. Over-compaction can increase bleeding and reduce permeability.

Minimum Pavement and Base Thicknesses - At the time of this report we did not have specific information regarding the type and frequency of expected traffic. We therefore pavement thicknesses for areas exposed to occasional use by an average of three 3 to 5 axle trucks per day and an average of up to 100 autos per day (the autos only contribute about 10% to the criteria, and this traffic is accommodated by the following minimum section).

Our recommendations for minimum combined pervious asphalt concrete and base aggregate thicknesses are based on AASHTO design methods, a 20-year design life, and subgrade of medium stiff silt subgrade with a DCPI of 14.8 and correlated resilient modulus of 6000 psi. Based on the preceding assumptions, we recommend the minimum surfacing and combined base aggregate (CBA) thicknesses shown in the following table. The combined base aggregate thickness is the total thickness of the open-graded base course and the 'choker' course. The 'choker' course should have a minimum thickness of 2 inches.

Traffic	**Surfacing Thickness (inches)**	**Combined Base (inches)**
100 Autos plus three 5-axle trucks per day on ave.	Pervious Asphalt Concrete – 3"	10

The preceding thicknesses are the minimum acceptable and are suitable for fire truck support (75,000 GVW). An increased base course thickness may be required for construction during wet weather and/or to provide adequate storage for infiltration. The civil engineer must evaluate storm water volumes relative to the design subgrade infiltration rate and provide a recommended base course thickness to provide adequate storage. A porosity of 0.40 may be used for the preceding rock.

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LIMITATIONS AND OBSERVATION DURING CONSTRUCTION

We have prepared this report for use by Tillamook Estuaries Partnership and the design and construction teams for this project only. The information herein could be used for bidding or estimating purposes but must not be construed as a warranty of subsurface conditions. We have made observations only at the aforementioned locations and only to the stated depths. These observations do not reflect soil types, strata thicknesses, water levels or seepage that may exist between observations. We must be consulted to observe all foundation bearing surfaces, subgrade stabilization, proof rolling of slab and pavement subgrades, installation of structural fill, subsurface drainage, and cut and fill slopes. We must be consulted to review final design and specifications to see that our recommendations are suitably followed. If any changes are made to the anticipated locations, loads, configurations, or construction timing, our recommendations may not be applicable, and we must be consulted. The preceding recommendations must be considered preliminary, as actual soil conditions may vary. For our recommendations to be final, we must be retained to observe actual subsurface conditions encountered. Our observations will allow us to interpret actual conditions and adapt our recommendations if needed.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, is given.

We appreciate the opportunity to work with you on this project and look forward to our continued involvement. Please call if you have any questions.

Sincerely,

Don Rondema, MS, PE, GE
Principal

Attachments –
Site Plan, Soil Classification, Test Pit Logs, CPT Log, Moisture Contents

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BASE PHOTO FROM GOOGLE EARTH 2024 AERIAL

Geotech Solutions Inc.

SITE PLAN

tep-24-1-gi

GUIDELINES FOR CLASSIFICATION OF SOIL

Description of Relative Density for Granular Soil	
Relative Density	**Standard Penetration Resistance (N-values) blows per foot**
very loose	0 - 4
loose	4 - 10
medium dense	10 - 30
dense	30 - 50
very dense	over 50

Description of Consistency for Fine-Grained (Cohesive) Soils		
Consistency	**Standard Penetration Resistance (N-values) blows per foot**	**Torvane Undrained Shear Strength, tsf**
very soft	0 - 2	less than 0.125
soft	2 - 4	0.125 - 0.25
medium stiff	4 - 8	0.25 - 0.50
stiff	8 - 15	0.50 - 1.0
very stiff	15 - 30	1.0 - 2.0
hard	over 30	over 2.0

Grain-Size Classification	
Description	**Size**
Boulders	12 - 36 in.
Cobbles	3 - 12 in.
Gravel	¼ - ¾ in. (fine)
	¾ - 3 in. (coarse)
Sand	No. 200 - No. 40 Sieve (fine)
	No. 40 - No. 10 sieve (medium)
	No. 10 - No. 4 sieve (coarse)
Silt/Clay	Pass No. 200 sieve

Modifier for Subclassification	
Adjective	**Percentage of Other Material In Total Sample**
Clean/Occasional	0 - 2
Trace	2 - 10
Some	10 - 30
Sandy, Silty, Clayey, etc.	30 - 50

Test Pit #	Depth (ft)	Soil Description

Explorations completed on December 6, 2024 with a rubber tracked excavator.

TP-1	surface	grass in N side parking area. relatively flat
	0 - 1.9	Soft, dark brown to black, rooty, organic SILT; moist. (topsoil)
	1.9 - 5.0	Medium stiff, orange mottled yellowish-brown, SILT with trace to some clay; moist. 5 ft becomes wet.
	5.0 - 6.5	Very stiff, orange stained, yellowish brown CEMENTED SILT with trace clay and trace sand; wet.
	6.5 - 10	Soft, mottled orange, light gray clayey SILT; wet.
	10 - 11	Very stiff, mottled orange, light gray cemented clayey SILT; wet.

Slow seepage below 5 feet. Moderate caving above 5 feet. Backfilled and tamped every 2-3 ft.

TP-2	surface	grass near S side of proposed building. relatively flat
	0 – 2.3	Very soft, dark brown to black, rooty, organic SILT; moist. (topsoil)
	2.3 - 5.5	Medium stiff, orange mottled yellowish-brown, SILT with trace to some clay; moist. 5 ft becomes wet.
	5.5 - 6.0	Very stiff, orange stained, yellowish brown CEMENTED SILT with trace clay and trace sand; wet.
	6 - 10.5	Soft, mottled orange, light gray clayey SILT; wet.
	10.5 - 11	Very stiff, mottled orange, light gray cemented clayey SILT; wet.

Slow seepage below 5 feet. Moderate caving above 5 feet. Backfilled and tamped every 2-3 ft.

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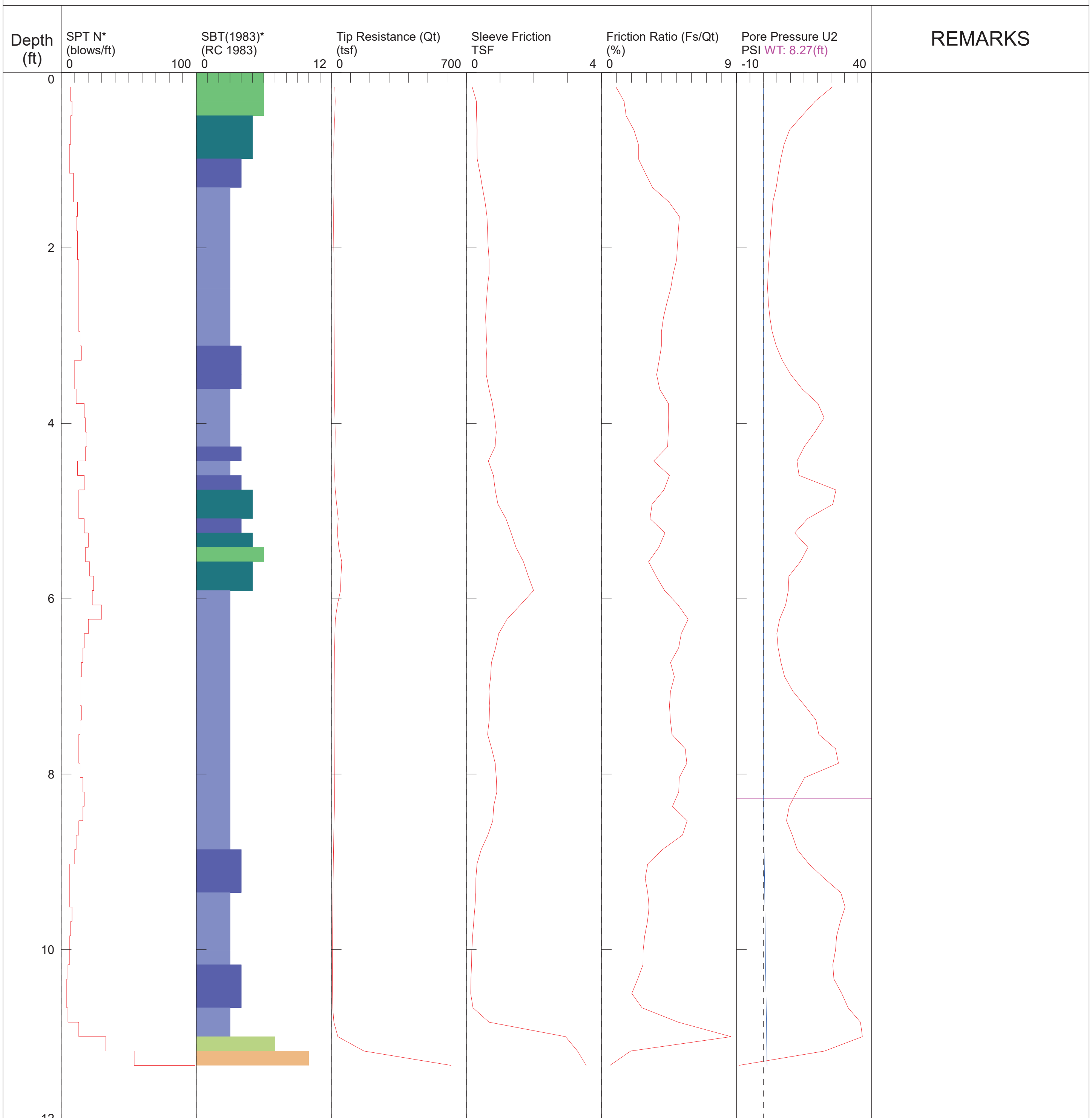
OPERATOR: OGE DMM
TEST DATE: 12/2/2024 8:28:06 AM
CONE ID: DDG1296
TOTAL DEPTH: 11.319 ft
HOLE NUMBER: CPT-1



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

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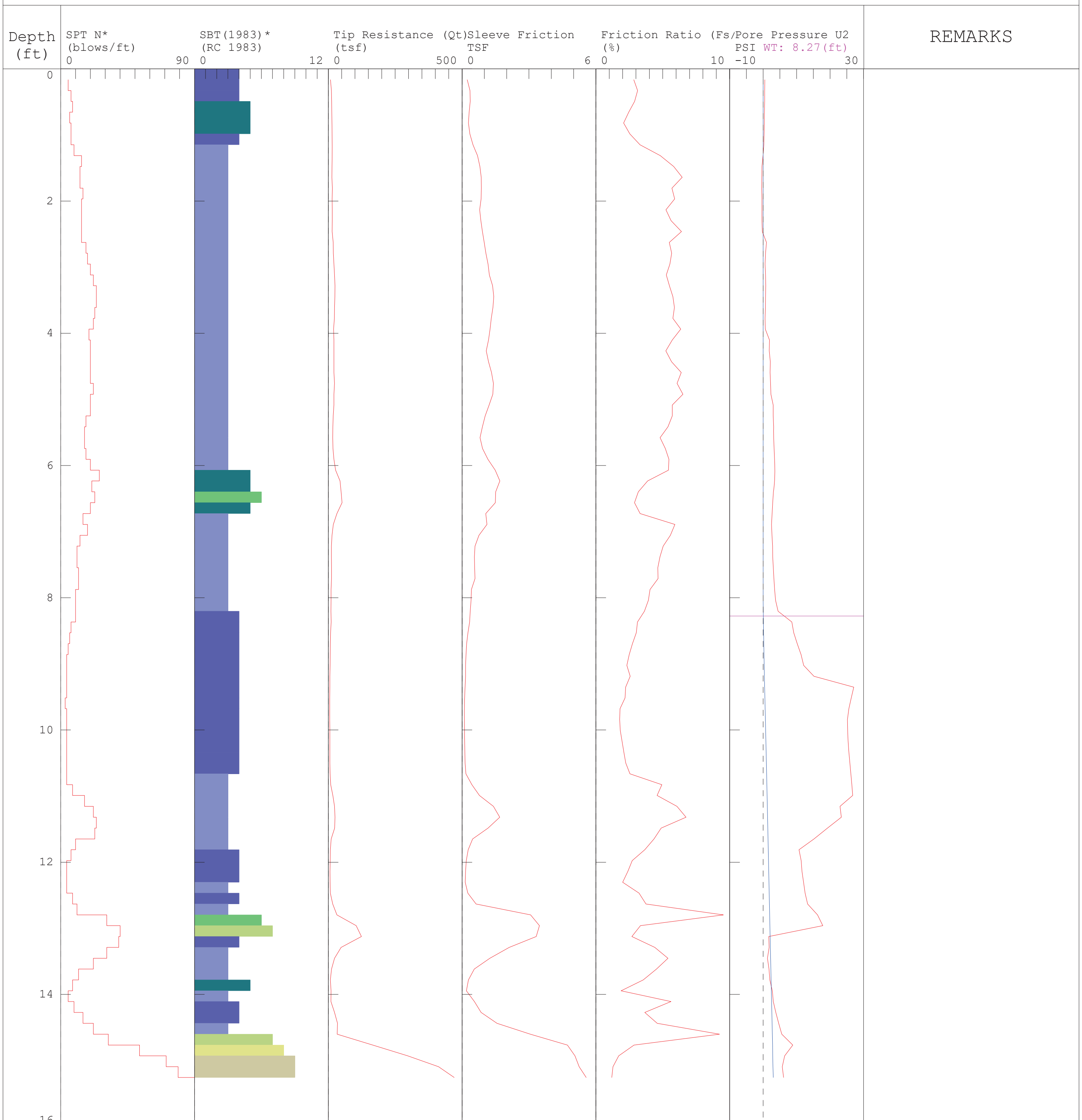
OPERATOR: OGE DMM
TEST DATE: 12/2/2024 8:56:14 AM
CONE ID: DDG1296
TOTAL DEPTH: 15.256 ft
HOLE NUMBER: CPT-2



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

Exploration	Depth, ft	Moisture Content
TP-1	1.0	53%
TP-1	3.0	32%
TP-1	7.0	33%
TP-1	11.0	49%
TP-2	5.5	47%