DOMINION ENERGY

PERIODIC STRUCTURAL STABILITY ASSESSMENT

POSSUM POINT POWER STATION INACTIVE CCR SURFACE IMPOUNDMENT: POND ABC

APRIL 2023

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APPENDICES

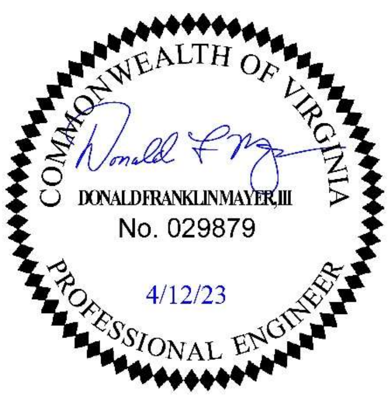
1 CERTIFICATION

This periodic Structural Stability Assessment for the Possum Point Power Station's Pond ABC was prepared by WSP USA Inc. (WSP; formerly d/b/a Golder Associates USA Inc.). The document and Certification/Statement of Professional Opinion are based on and limited to information that WSP has relied on from Dominion Energy and others, but not independently verified, as well as work products previously produced by Golder.

On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the Commonwealth of Virginia that this document has been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances, at the same time, and in the same locale. It is my professional opinion that the document was prepared consistent with the requirements in 40 CFR §257.73(d) of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015, with an effective date of October 19, 2015 [40 CFR §257.73(d)], as well as with the requirements in 40 CFR §257.100 resulting from the EPA's "Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities: Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur" published in the Federal Register on August 5, 2016, with an effective date of October 4, 2016 (40 CFR §257.100).

The use of the word "Certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty, or legal opinion.

Donald Mayer, PE	Vice President
Print Name	Title
	4/12/2023
Signature	Date



2 INTRODUCTION

This periodic Structural Stability Assessment (Assessment) was prepared for the Possum Point Power Station's (Station) Coal Combustion Residuals (CCR) inactive surface impoundment known as Pond ABC. This periodic Structural Stability Assessment was prepared in accordance with 40 CFR Part §257, Subpart D and is consistent with the requirements of 40 CFR §257.73(d).

The Station, owned and operated by Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion Energy), is located in Prince William County, Virginia, at 19000 Possum Point Road, east of I-95 and bounded to the south and east by Quantico Creek and the Potomac River. The Station includes an inactive CCR surface impoundment, Pond ABC, as defined by the Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule and Direct Final Rule (40 CFR §257; the CCR Rule). Pond ABC has historically been regulated as a dam by the Virginia Department of Conservation and Recreation (DCR) with Inventory Number 153001 (DCR Dam Permit).

Dominion Energy performed closure by removal activities in Pond ABC by removing the stored CCR and over-excavating soil pursuant to its solid waste permit closure plan (SWP 617). The Virginia Department of Environmental Quality (DEQ) verified removal activities in August 2019. The Pond remains subject to the CCR Rule requirements due to observed groundwater impacts that prevent full closure of the unit under the rule even though the Pond no longer impounds CCR materials. In addition, the Pond is no longer regulated by DCR as an impounding structure, and the impounding structure has been breached.

3 PURPOSE

This periodic Assessment is prepared pursuant to the requirements in the CCR Rule, 40 CFR §257.73(d)(1). The initial Structural Stability Assessment was completed in April 2018 and is required to be updated every five (5) years pursuant to 40 CFR §257.73(f)(3). Pond ABC remains subject to the CCR Rule requirements, including this periodic structural stability assessment update, even though all CCR materials have been removed.

4 STRUCTURAL STABILITY ASSESSMENT REQUIREMENTS

In accordance with 40 CFR §257.73(d)(1), the owner or operator of a CCR surface impoundment must conduct periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with:

- Stable foundations and abutments;
- Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown;
- Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit;
- Vegetated slopes of dikes and surrounding areas not to exceed a height of six inches above the slope of the dike, except for slopes which have an alternate form or forms of slope protection;
- A single spillway or a combination of spillways that is designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the 100-year flood;
- All spillways must be either of non-erodible construction and designed to carry sustained flows or earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected;
- Hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure; and
- For CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.

5 STRUCTURAL STABILITY ASSESSMENT

5.1 FOUNDATION AND ABUTMENTS

The Station lies in a geologically stable area with no active (Holocene) faults, karst (limestone, dolomite, or marble) potential, or other geologic conditions of concern. The pond embankments were originally constructed in 1955 as three embankments forming ponds across three natural drainageways. Prior to site improvements, parts of the site were marshy areas as indicated on historical maps from the United States Geological Service (USGS). Construction drawings for the embankments called for the removal of soft soils under the planned embankments and replacement with suitable soil materials. Previous subsurface site investigations show the site is underlain by typical alluvial fine-grained and coarse-grained Coastal Plain soils, consistent with the site's proximity to Quantico Creek and the Potomac River. Underlying the alluvial soils are Terrace Deposits and Cretaceous Sediments with a moderately high bearing capacity. The depth of these layers exceeds 75 feet below ground surface. Additional information and material properties are included in the initial Safety Factor Assessment for Ponds ABC (Golder, 2018).

WSP's assessment of embankment stability in the Periodic Safety Factor Assessment (WSP, 2023b) shows that the Pond ABC meets the minimum factor of safety requirements in the CCR Rule §257.73(e)(1) except for one section in the southeast corner of the outboard slope due to observed erosion in this area.

Additionally, Pond ABC has been routinely inspected and monitored by Station and Dominion Energy personnel in accordance with the requirements in the DCR Dam Permit. Areas of concern are evaluated by professional engineers with corrective actions implemented and documented.

5.2 SLOPE PROTECTION

The Pond ABC dike was built with interior and exterior slopes of 2 horizontal to 1 vertical (2H:1V). The exterior slope has a good stand of existing grass and woody vegetation and appears stable, except for one area of observed erosion on the southeastern edge of the outer berm as described in the Periodic Safety Factor Assessment (WSP, 2023). Interior slopes have been excavated to remove CCR materials and were backfilled with clean soil fill to reestablish a minimum 2:1 slope. The vegetation on the dike is maintained to prevent brush, trees, clumping of weeds, etc. that would concentrate flow and lead to the development of erosion rills. The interior and exterior slopes are maintained and protected against surface erosion by regular inspections and maintenance, as required, to prevent small erosion areas from developing into larger problem areas.

Dominion Energy performs annual inspections in accordance with the requirements of the DCR Dam Permit with the most recent inspections on April 27, 2021 (Virginia Electric and Power Company, 2021) and April 27, 2021 (Virginia Electric and Power Company, 2022). Dominion Energy evaluates the vegetation on the slopes of the impoundment embankment as part of the annual inspections. Current operations at Pond ABC call for grass to be mowed 2-3 times per year to control vegetation height. Additionally, in accordance with 40 CFR Section §257.83, annual inspections are performed by a qualified professional engineer with the most recent inspection on June 17, 2022 (WSP, 2022).

5.3 COMPACTION OF DIKES

In addition to a review of previous exploratory work by others, a round of Cone Penetrometer Testing (CPT) was conducted in late 2017 by Golder. A total of 6 soundings were made through and near the Pond ABC dike to assess the material strength in the dike and materials below the dike. Soundings were made to depths up to 75 feet below ground surface (bgs). The dike fill soil contains variations of fine-grained and coarse-grained soils and exhibits sufficient compaction and density to withstand the anticipated range of loading conditions. Information pertaining to the 2017 investigation, including the CPT sounding logs, are included as part of the initial Safety Factor Assessment for Ponds ABC (Golder, 2018).

No visible indications of weakened embankment (e.g., tension cracks, elevated groundwater, groundwater seeps, sinkholes, etc.) have been observed at Pond ABC over the past five years during routine and annual inspections. Slope stability analyses presented in the Safety Factor Assessment (WSP, 2023b) present the embankment to be stable. As noted above, there is an area on the outboard slope of the southeast corner of the impoundment that has observed erosion.

5.4 VEGETATED SLOPES

As required by §257.73(d)(1)(iv), vegetation on slopes and surrounding areas are not to exceed a height of six inches above the slope of the dike. Current operations at Pond ABC call for grass to be mowed 2-3 times per year to control vegetation height. The vegetated slopes are operated and maintained to be stable and to provide for visual observation of any instability. The 2021 and 2022 annual DCR inspections (Virginia Electric and Power Company, 2021; Virginia Electric and Power Company, 2022) noted that the upstream and downstream slopes of the embankment have been mowed.

5.5 SPILLWAYS

Pond ABC's principal spillway is through a discharge structure that consists of an approximately 4-foot rectangular concrete riser structure and 30-inch reinforced concrete pipe located in the eastern embankment. The pipe has an invert elevation of approximately 6 feet above mean sea level (ft-amsl).

As shown in the Periodic Inflow Design Flood Control System Plan for Pond ABC, the pond structure has adequate capacity to store the flow from the design storm event. The analysis of the spillway capacity is included in Appendix A of the Periodic Inflow Design Flood Control System Plan for Pond ABC (WSP, 2023a).

5.6 HYDRAULIC STRUCTURES

The principal spillway passes through the eastern dike of Pond ABC. There are no other known structures passing through or underlying the base of the ponds. There is no record or knowledge of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris associated with the primary spillway. In accordance with 40 CFR §257.83, the hydraulic structure is monitored and inspected periodically for clogging, leaks, erosion around the pipe, movements, and other issues.

5.7 ADJACENT WATER BODIES

Impacts of rapid drawdown of slopes as described in 40 CFR §257.73(d)(vii) of the CCR Rule were also considered as part of the stability analysis. The mapped (FIRM zone AE) 100-year flood level in the Quantico Creek is elevation 9 ft-amsl. The toe areas of the downstream slopes are generally at elevation 6 ft-amsl or higher; thus, the dikes around Ponds ABC are not expected to be significantly impacted by rapid drawdown. Therefore, additional rapid drawdown analyses are not necessary.

6 CORRECTIVE MEASURES

Results of the safety factor assessment referenced in this structural stability assessment indicate that the embankment surrounding Pond ABC meets the minimum requirements as outlined in the CCR Rule §257.73(e)(1) except for one area of observed erosion noted on the outboard slope of the southeastern portion of the impoundment. The pond remains subject to the CCR Rule requirements, even though it no longer impounds CCR materials, due to observed groundwater impacts that prevent full closure of the unit under the rule. In addition, the pond is no longer regulated by DCR as an impounding structure, and the impounding structure has been breached.

7 CONCLUSIONS

Pond ABC is subject to a periodic structural stability assessment update (due every 5 years from the original assessment performed in April 2018). The pond remains subject to the CCR Rule requirements, even though it no longer impounds CCR materials, due to observed groundwater impacts that prevent full closure of the unit under the rule. In addition, the pond is no longer regulated by DCR as an impounding structure, and the impounding structure has been breached.

Based on known site conditions, review of available information, and the current analyses performed for the Pond ABC embankment, the Pond ABC surface impoundment design, construction, operations, and maintenance procedures are consistent with good engineering practices for post-closure activity usage of the unit and meets the requirements of 40 CFR 257.73(d)(1)(ii), (iii), (iv), (v) (vi), and (vii). Due to the conditions described in previous sections of this assessment, Pond ABC meets the requirements of 40 CFR 257.73(d)(1)(i) except for one area of observed erosion noted on the outboard slope of the southeastern portion of the impoundment.

REFERENCES

- Golder Associates. Initial Safety Factor Assessment, Possum Point Power Station CCR Surface Impoundment: Ponds ABC. April 2018.
- Virginia DCR Dam Permit, Inventory No. 153001.
- Virginia Electric and Power Company. Annual Inspection Report for Virginia Regulated Impounding Structures, Possum Point Power Station Pond ABC Dam. April 2021.
- Virginia Electric and Power Company. Annual Inspection Report for Virginia Regulated Impounding Structures, Possum Point Power Station Pond ABC Dam. June 2022.
- WSP USA Inc. Annual Inspection Report for Existing CCR Surface Impoundment, Possum Point Ash Pond ABC Dam. July 2022.
- WSP USA Inc. Periodic Inflow Design Flood Control System Plan, Possum Point Power Station Inactive CCR Surface Impoundment: Pond ABC. April 2023a.
- WSP USA Inc. Periodic Safety Factor Assessment, Possum Point Power Station Inactive CCR Surface Impoundment: Pond ABC. April 2023b.

APPENDIX

A Materials Properties Package

CALCULATIONS

Date:	February 15, 2018	**Made by:**	G. Martin
Project No.:	1662150	**Checked by:**	L. Jin
Site Name:	Possum Point – Pond ABC	**Reviewed by:**	
Subject	**MATERIAL PROPERTIES PACKAGE**		

1.0 OBJECTIVE

The objective of this package is to characterize materials found at Pond ABC of Dominion Energy's Possum Point Power Station in Dumfries, VA. Specifically, Golder assessed the dike soils and foundation soils at Pond ABC to support stability and liquefaction analyses of the dikes.

2.0 METHODOLOGY

Site materials were grouped into five representative units for further analysis:

- Dike Fill
- Fine Grained Alluvium
- Coarse Grained Alluvium
- Terrace Deposits
- Cretaceous Sediments

For each unit, Golder developed material properties for use in stability and liquefaction analyses. Material properties were evaluated based on geotechnical data available from the following sources:

- Schnabel Engineering's 2014 report titled "Geotechnical Engineering Study, Possum Point Power Station Ash Pond ABC, Dominion Resources Services, Inc., Prince William County, Virginia"
- Golder's geotechnical exploration completed in December 2017.

2.1 Schnabel Engineering Report

Schnabel Engineering (Schnabel) completed a stability assessment of dikes surrounding Pond ABC in December 2014. Their report includes Standard Penetration Test (SPT) borehole data and qualitative hand auger logs in the dikes surrounding Pond ABC. Schnabel supplemented their field data with laboratory testing including two consolidated-undrained (CU) triaxial tests. One CU test was performed on the dike soils (noted as Fine-Grained Embankment Fill, Stratum A1 in the report), and the other CU test was conducted on a sample of the foundation soils (identified as Fine-Grained Alluvium, Stratum B1).

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Project No.:	1662150	Made by:	G. Martin
Site Name:	Possum Point – Pond ABC Inactive Pond Demonstration	Checked by:	L. Jin
Date:	2/15/18	Reviewed by:	

Schnabel categorized the dike and foundation soils into six groups in their report, and for each group, Schnabel determined representative total and effective strengths and unit weights. Golder used the same groupings (listed above) for analyses, except Golder modeled the dike fill soils as a single stratum. Schnabel divided the dike fill soils into a fine-grained unit and a coarse-grained unit, but this distinction was not apparent in the CPT data Golder collected in December 2017. Golder found the dike soils to be more closely represented by Schnabel's fine-grained fill.

2.2 Golder Geotechnical Explorations

Golder completed six cone penetration tests (CPTs) to characterize the dike and foundation materials. These tests were conducted by ConeTec on December 19 and 20 of 2017 under the direction and supervision of Golder engineer Sarah Fick. Table 1 lists general information for the CPTs.

Table 1: Golder CPT Locations and Testing Notes

Sounding ID	Date	Total Depth (ft)	Latitude[1] (deg)	Longitude[1] (deg)	Ground Surface Elevation[2] (ft-msl)	Testing Notes
PP-ABC-SCPT-01	12/19/17	75.0	38.54265	-77.28434	21.3	Seismic CPT
PP-ABC-CPT-02	12/19/17	35.9	38.54145	-77.28338	21.6	
PP-ABC-CPT-03	12/20/17	33.1	38.54278	-77.28463	14.8	
PP-ABC-CPT-04	12/20/17	55.8	38.54363	-77.28575	19.0	
PP-ABC-CPT-05	12/20/17	62.3	38.54405	-77.28567	21.2	
PP-ABC-CPT-06	12/20/17	32.7	38.54183	-77.28421	21.7	

Notes:

1. Latitude/Longitude - WGS 84. Coordinates were recorded with a handheld GPS unit and should be considered approximate.

CPT logs presenting raw measurements (tip, sleeve, and pore pressure) and correlated shear strengths with depth are presented in the attachment following this text. The CPT correlation to undrained strength does not properly model the strength of the cretaceous layer; thus, Golder excluded the undrained shear strength correlation in this layer from the CPT logs.

3.0 SELECTED MATERIAL PROPERTIES

Golder selected strength parameters and unit weights for use in stability analyses based on data available in Schnabel's report and CPT data collected during Golder's geotechnical exploration. Golder found the values presented in Schnabel's report to be consistent with CPT data, so Golder used a modified version of Schnabel's properties. The following modifications were made to the values presented by Schnabel:

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Date:	2/15/18	Reviewed by:	

- All dike fill was modeled as a single unit.
- Dike fill drained properties were modeled using a higher friction angle and lower cohesion than presented by Schnabel to better match conditions observed from CPT data. Dike fill undrained properties were based on Schnabel's fine-grained dike fill properties.
- The Coarse Grained Alluvium was modeled with drained strengths for all analyses. CPT data indicates this material will not behave in an undrained state during the scenarios considered in stability analyses.

The selected properties used for stability analyses are listed in Table 2. Also, the selected strengths are plotted on the attached CPT logs with the values correlated from CPT data.

Table 2: Selected Material Properties for Use in Slope Stability Analysis

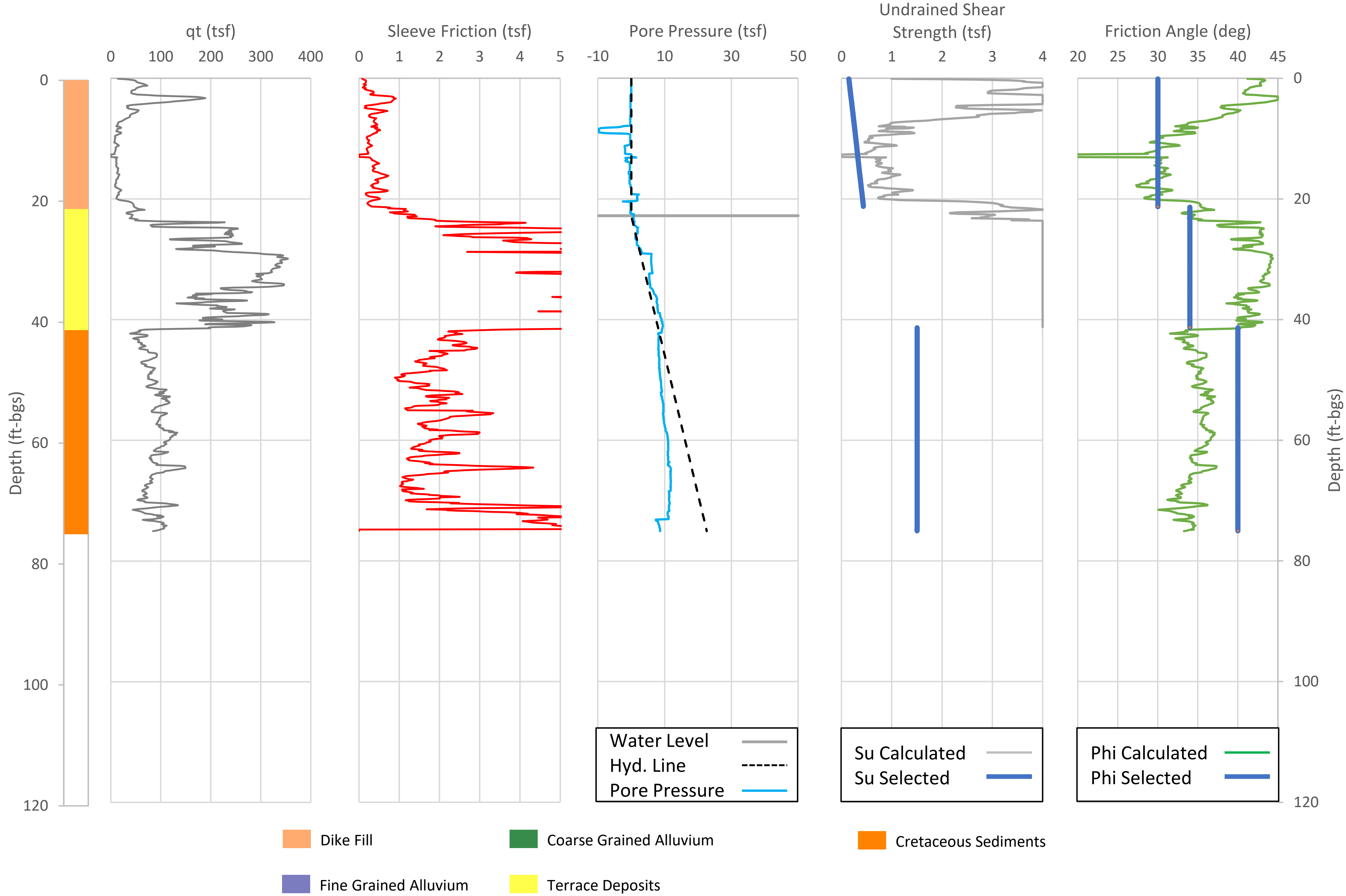
Material	Drained Strength		Undrained Strength		Unit Weight (pcf)
	ϕ' (degrees)	c' (psf)	ϕ (degrees)	c (psf)	
Dike Fill	30	100	14	290	125
Fine Grained Alluvium	28	100	14	290	120
Coarse Grained Alluvium	32	200	N/A	N/A	120
Terrace Deposits	34	0	N/A	N/A	130
Cretaceous Sediments	40	0	0	3,000	125

4.0 REFERENCES

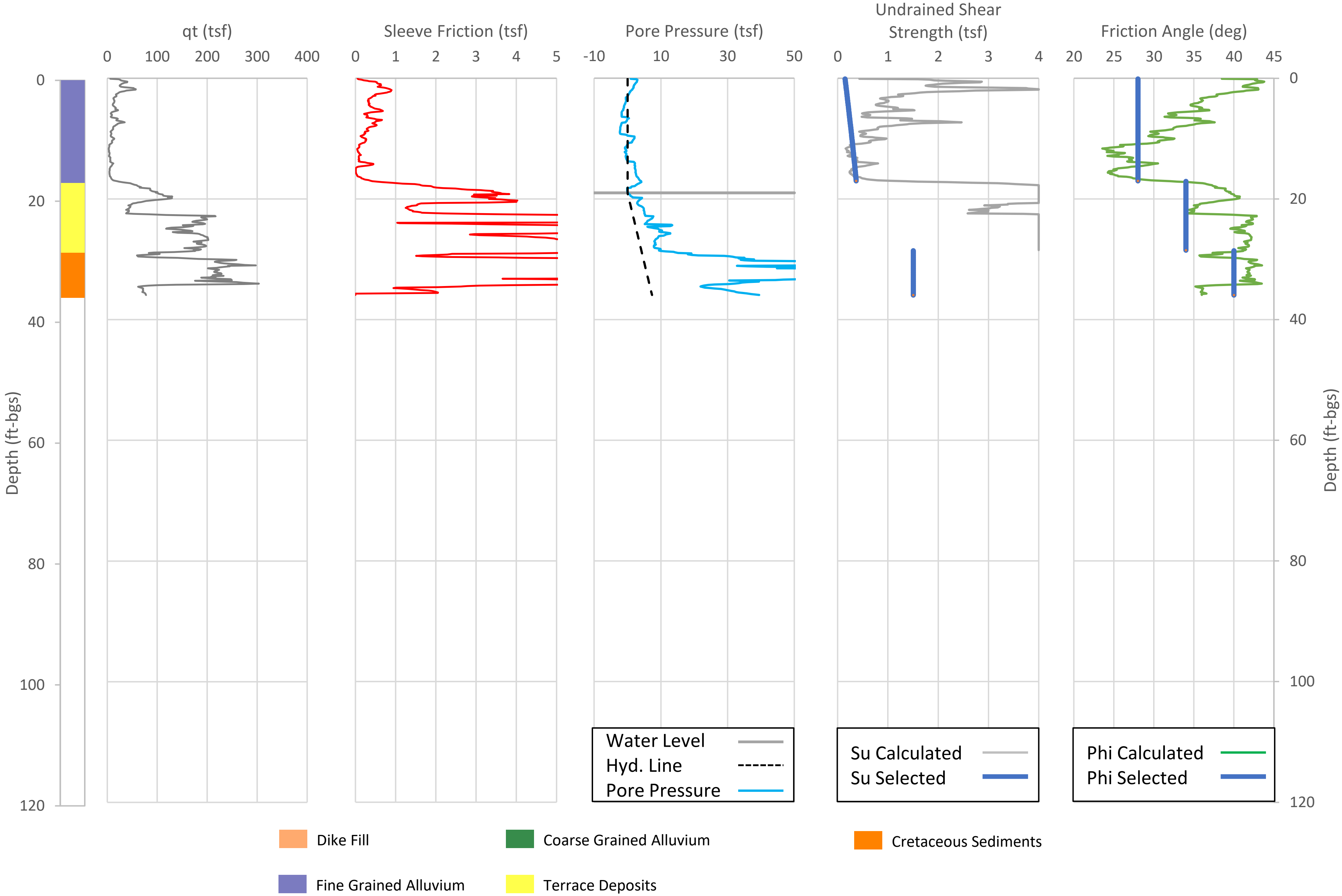
Schnabel Engineering (2014). "Geotechnical Engineering Study, Possum Point Power Station Ash Pond ABC, Dominion Resources Services, Inc., Prince William County, Virginia." December 9, 2014.

Test ID:	**CPT-ABC-01**	**CPT Rig Type:**	**Track**	**Project #:**	**1662150**
GS Elev. (ft-msl):	**21.3**	**Location:**	**Possum Point**	**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**75.0**	**Groundwater Depth (ft-bgs):**	**22.8**	**Client:**	**Dominion Energy**

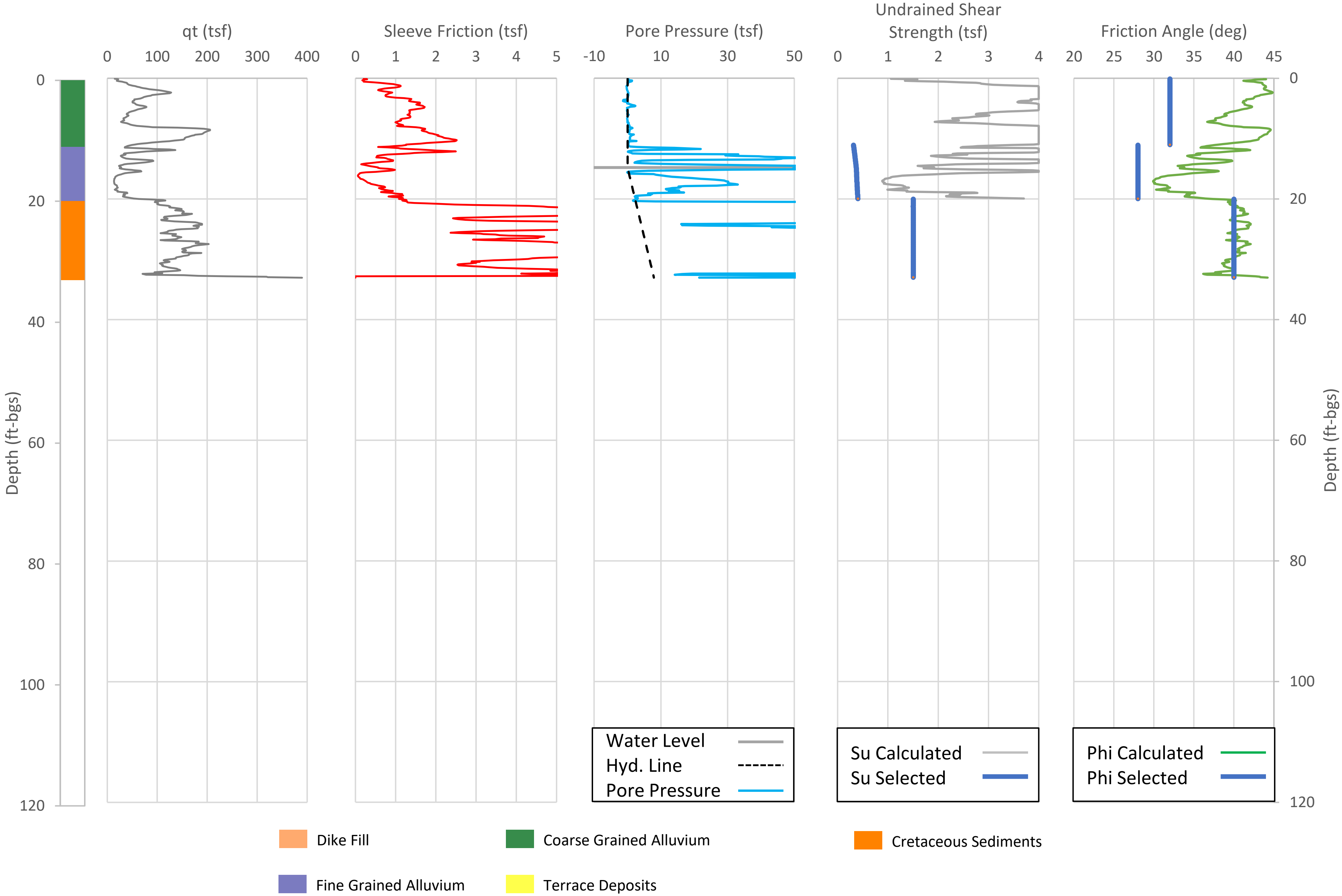
Golder Associates



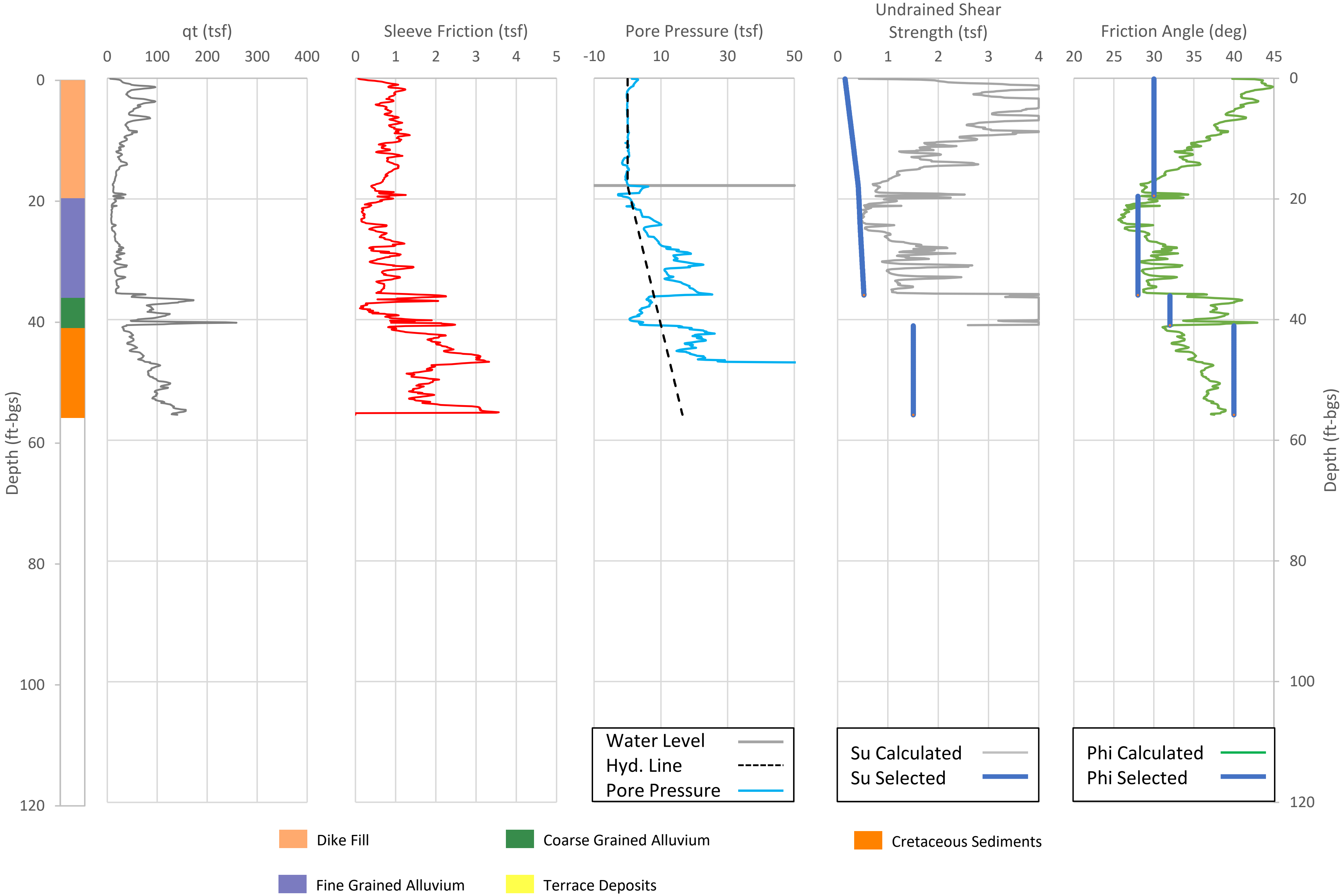
Test ID:	**CPT-ABC-02**	**CPT Rig Type:**	**Truck**		**Project #:**	**1662150**
GS Elev. (ft-msl):	**21.6**	**Location:**	**Possum Point**		**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**35.9**	**Groundwater Depth (ft-bgs):**		**19.0**	**Client:**	**Dominion Energy**



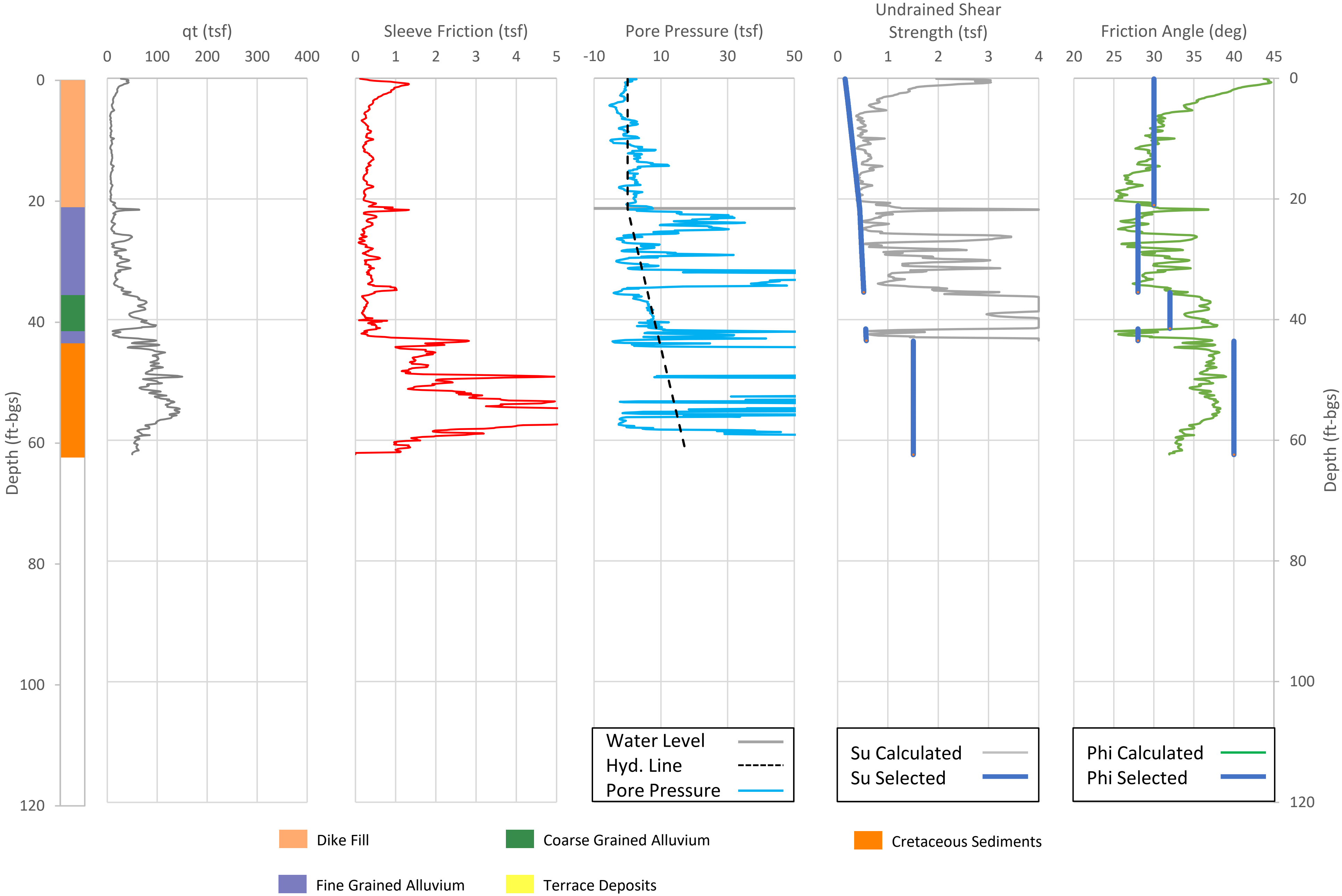
Test ID:	**CPT-ABC-03**	**CPT Rig Type:**	**Track**	**Project #:**	**1662150**
GS Elev. (ft-msl):	**14.8**	**Location:**	**Possum Point**	**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**33.1**	**Groundwater Depth (ft-bgs):**	**14.8**	**Client:**	**Dominion Energy**



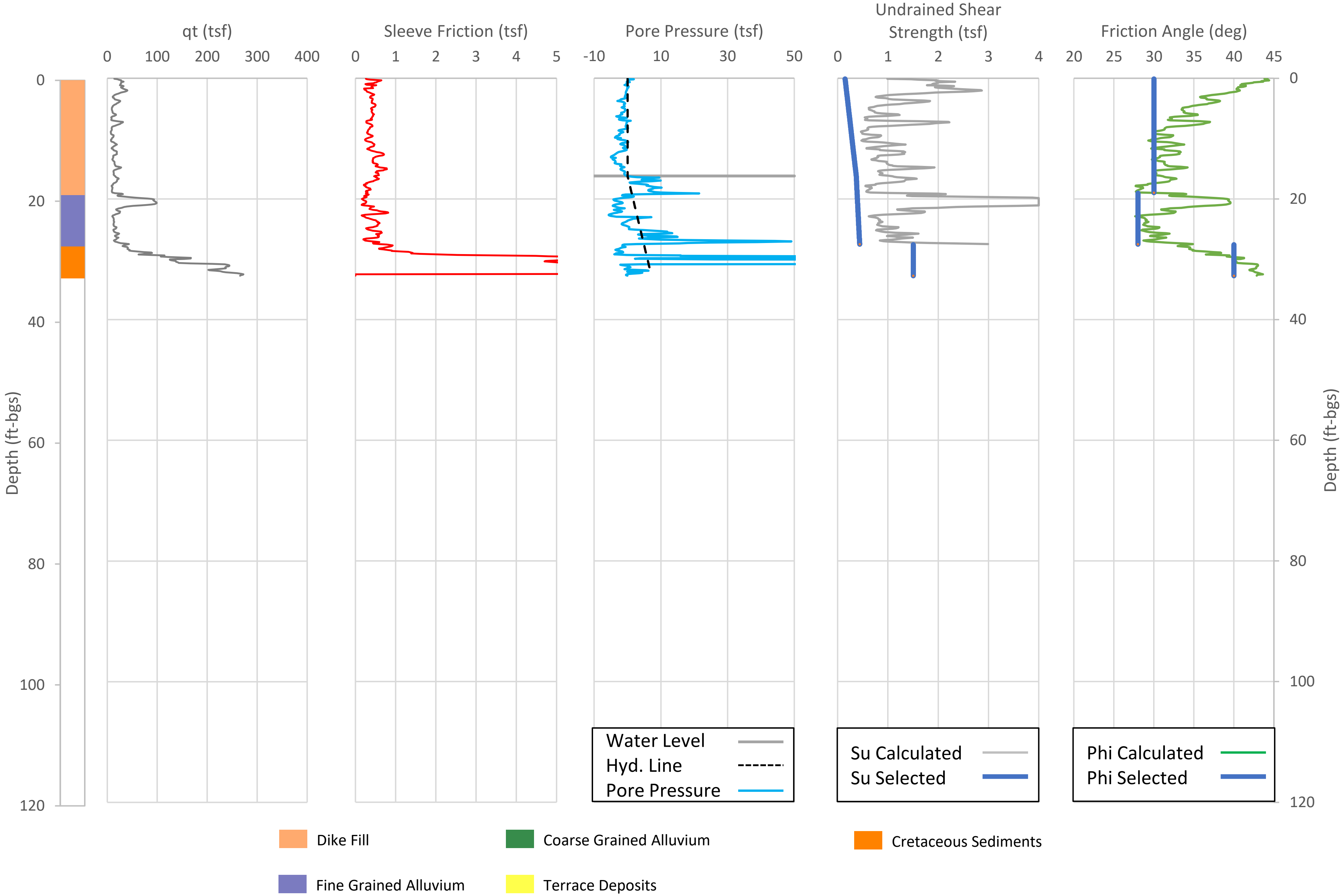
Test ID:	**CPT-ABC-04**	**CPT Rig Type:**	**Track**		**Project #:**	**1662150**
GS Elev. (ft-msl):	**19.0**	**Location:**	**Possum Point**		**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**55.8**	**Groundwater Depth (ft-bgs):**		**17.8**	**Client:**	**Dominion Energy**



Test ID:	**CPT-ABC-05**	**CPT Rig Type:**	**Track**	**Project #:**	**1662150**
GS Elev. (ft-msl):	**21.2**	**Location:**	**Possum Point**	**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**62.3**	**Groundwater Depth (ft-bgs):**	**21.6**	**Client:**	**Dominion Energy**



Test ID:	**CPT-ABC-06**	**CPT Rig Type:**	**Track**	**Project #:**	**1662150**
GS Elev. (ft-msl):	**21.7**	**Location:**	**Possum Point**	**Project Name:**	**Inactive Pond Demonstrations**
Test Depth (ft):	**32.7**	**Groundwater Depth (ft-bgs):**	**16.2**	**Client:**	**Dominion Energy**



APPENDIX

B Seismic Hazard Calculation Package

CALCULATIONS

Date:	January 9, 2018	**Made by:**	L. Jin
Project No.:	1662150	**Checked by:**	G. Martin
Subject:	Seismic Hazard Assessment	**Reviewed by:**	
Project:	**POSSUM POINT POND ABC – INACTIVE POND DEMONSTRATION**		

1.0 OBJECTIVE

This calculation package identifies and summarizes the seismic hazard at the project site located at 77.286˚W and 38.547˚N. The seismic hazard assessment is necessary for geotechnical design evaluations of stability under earthquake loading and liquefaction susceptibility.

2.0 SEISMIC HAZARD SUMMARY

For ash pond closures, the United State Environmental Protection Agency's (USEPA) CCR Rule has specified seismic analyses be completed for a seismic event with a 2% probability of exceedance in 50 years (2% / 50yr), equivalent to a return period of approximately 2,500 years. The United States Geological Survey (USGS) has provided online tools associated with this hazard for its 2014 seismic hazard model. The sections below detail the use of these tools to obtain seismic hazard data for use in analyses.

3.0 PEAK GROUND AND SPECTRAL ACCELERATION

The peak ground acceleration (PGA) and spectral ground accelerations (S_a) corresponding to a range of spectral periods are necessary for many engineering analyses including slope stability analysis and liquefaction analysis. For a 2% probability of exceedance (PE) in 50 years, The USGS provides a reference PGA and spectral accelerations corresponding to a reference site on the border between the National Earthquake Reductions Hazard Program (NEHRP) site classes B and C with an average shear wave velocity in the upper 30 m (V_{s30}) of 760 m/s. These reference accelerations are often referenced with a BC subscript (e.g. PGA_{BC}) and are scaled as appropriate to match site conditions and analysis input requirements. Figure 1 below shows the project site on the 2014 seismic hazard map for PGA_{BC}, and Figure 2 displays the uniform hazard response spectrum curve, which plots the reference spectral acceleration, or ground motion, for various spectral periods. The uniform hazard response spectrum curve is presented in tabular form in Table 1.

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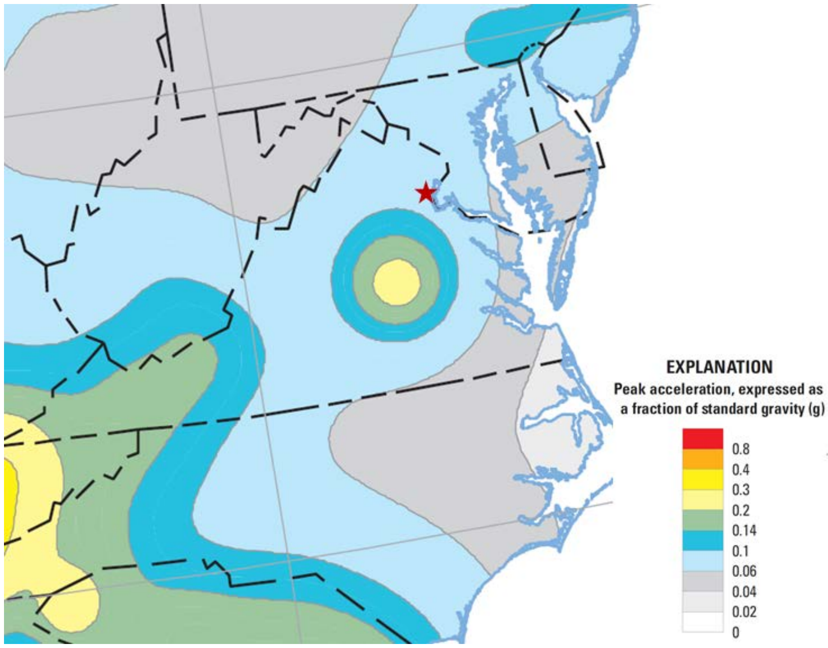


Figure 1: PGA_{BC} for the 2% PE in 50 years at the project site (red star). (USGS 2014).

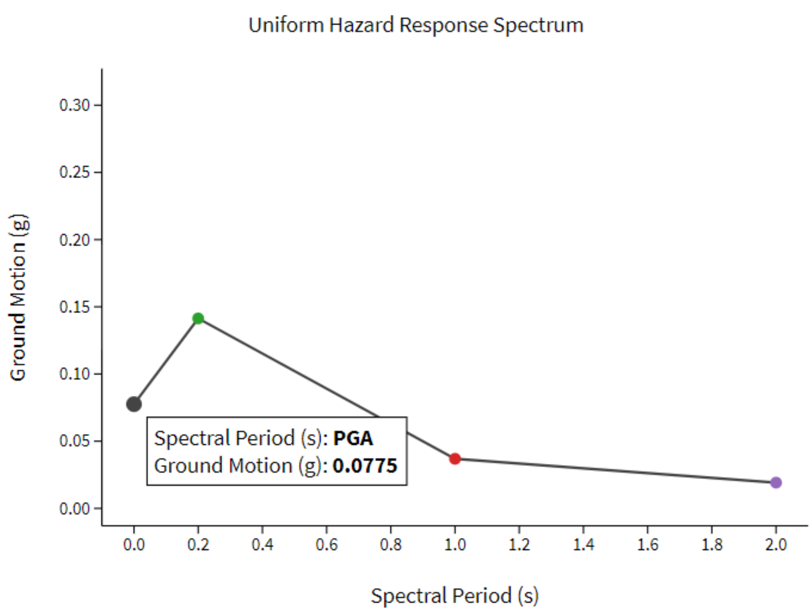


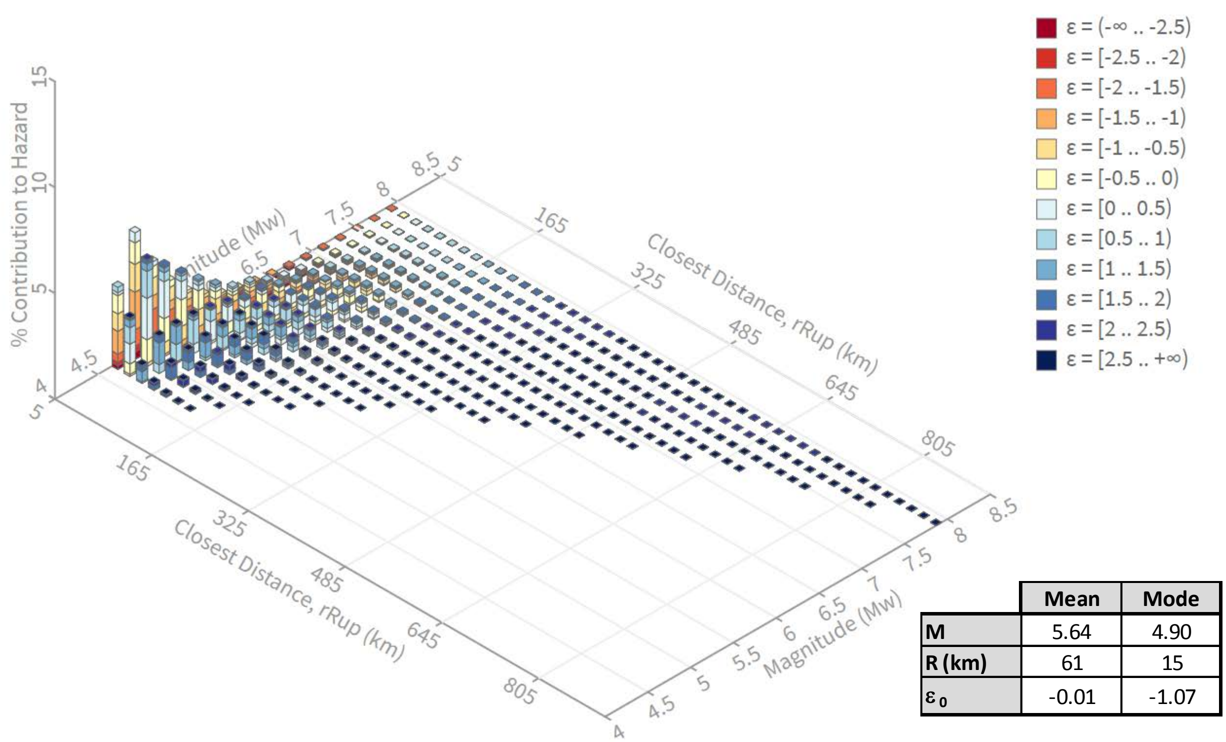
Figure 2: Uniform Hazard Response Spectrum for the 2% PE in 50 years Seismic Hazard at the Project Site (USGS 2014).

Table 1: Reference site (BC) PGA and Spectral Acceleration for the 2% PE in 50 year Seismic Hazard at the Project Site (USGS 2014).

Spectral Period (s)	Acceleration, BC (g)
0 (PGA)	0.0775
0.2	0.1414
1.0	0.0369
2.0	0.0192

3.1 Seismic Hazard Deaggregation

The seismic hazard is compiled from multiple predictive models which consider many seismic sources of varying combinations of earthquake magnitude and distance from the project site. For each magnitude and distance pair, models predict the resulting accelerations and activity rates for the project site. The results of these predictive models are aggregated to produce the seismic hazard model for specified return periods. The seismic hazard model can be deaggregated to obtain the contribution to hazard percentage of each magnitude and distance combination. This information is necessary for analyzes requiring earthquake magnitude (e.g. liquefaction susceptibility) or distance. Figure 3 below displays a deaggregation plot of the PGA_{BC} at the project site for a 2% PE in 50 years with descriptive statistics available through the USGS online tools.



	Mean	Mode
M	5.64	4.90
R (km)	61	15
ε_0	-0.01	-1.07

Figure 3: Deaggregation Plot of the PGA_{BC} at the Project Site for a 2% PE in 50 Years

3.2 Design Earthquake Magnitude

Some seismic analysis methods require a design earthquake magnitude as an input. One such analysis is the liquefaction screening method. Based on its application in the liquefaction screening, a design earthquake magnitude of 5.50 was selected. Additional details on the design earthquake magnitude are available in the Liquefaction Assessment Calculation Package. This design earthquake magnitude was used in all analyses for consistency.

4.0 DETERMINATION OF SITE-SPECIFIC PEAK GROUND ACCELERATION

For liquefaction analysis, the site-specific peak ground acceleration at the surface, a_{max}, was calculated from the site reference peak ground acceleration (PGA_{BC}). The PGA_{BC} was multiplied by an amplification factor calculated from the average shear wave velocity in the upper 30 meters (Vs30) to obtain a representative a_{max}. The shear wave velocity was directly measured every meter in one CPT (CPT-ABC-01), and a representative shear wave velocity was derived from these measurements. Figure 4 shows the measured shear wave velocities and the representative shear wave velocity profile. The Vs30 (listed in Table 2) was calculated from the representative profile to be 1164 ft/s.

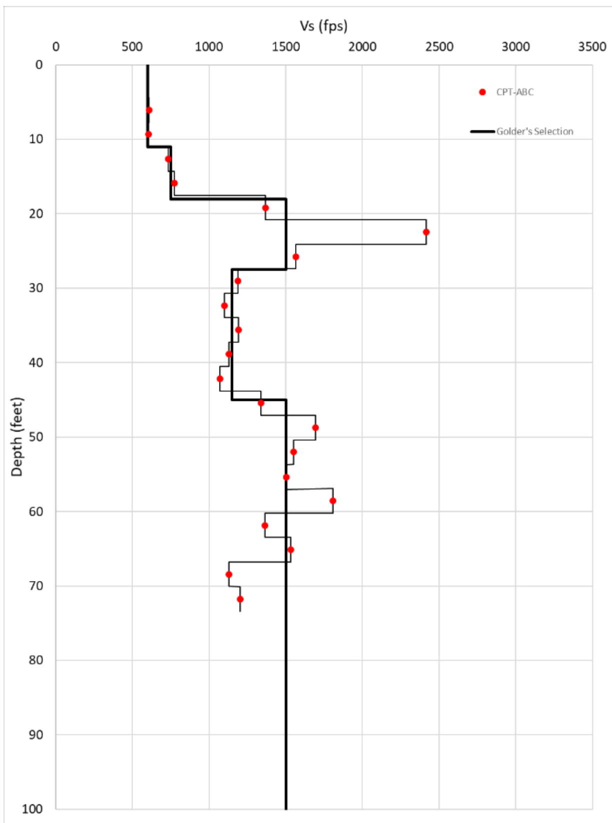


Figure 4. Shear wave velocity profile for Pond ABC

Table 2: Representative Shear Wave Velocity in the Upper 30 m (Vs30)

Pond ID	Vs30 (ft/s)	Vs30 (m/s)
ABC	1164	355

4.1 Determination of site coefficient F_a

An amplification factor was evaluated from two sources:

- Atkinson and Boore's 2006 publication on earthquake ground-motion prediction equations for Eastern North America
- the International Building Code (IBC, 2012)

Atkinson and Boore's publication provides a site response term which is used to amplify the PGA_{BC}, and the IBC provides a site coefficient F_a (amplification factor) as well. Amplification factors from these two sources were averaged to obtain a representative amplification factor.

Table 3: Site coefficient F_a

Pond ID	Atkinson and Boore (2006)	IBC (2012)	Selected for Analysis
ABC	1.36	1.41	1.39

4.2 Site-specific peak ground acceleration a_{max}

$$a_{max} = PGA_{BC} * F_a = 0.0775g * 1.39 = 0.11\ g \qquad (1)$$

With an amplification factor F_a of 1.39, Golder calculated the site-specific peak ground acceleration a_{max} to be 0.11 g for the considered seismic hazard.

Table 4: a_{max} at Pond E, Possum Point

Pond ID	a_{max}
ABC	0.11 g

5.0 PSEUDOSTATIC COEFFICIENT

For slope stability analyses, Golder used the Bray and Travasarou (2009) screening method which models the seismic loading using a pseudostatic coefficient (k). This section details the calculation of the pseudostatic coefficient for the project site. Details on the slope stability analysis are available in a separate calculation package.

Stability under seismic conditions is calculated using the pseudo-static method to model horizontal seismic forces as the product of a seismic coefficient (k) and the weight of the sliding mass. Bray and Travasarou (2009) proposed screening methodology to determine the seismic coefficient k based on the degraded period of the sliding mass and an allowable seismic displacement threshold. The screening method includes an equation to calculate the pseudostatic coefficient for periods of 0.2 and 0.5 seconds, which encompasses the range of typical slope periods. A period of 0.2 s is more conservative, so for this analysis, Golder used the equation associated with a period of 0.2 s and an allowable seismic displacement of 15 cm:

$$\boldsymbol{k_{15\,cm} = (0.036M_w - 0.004)S_a - 0.030 > 0.0,\ for\ S_a = S_a(T = 0.2\ s) < 2.0}\ \mathrm{g} \quad (2)$$

Where, k_{15cm} = pseudostatic coefficient

M_w = Design Earthquake Magnitude

S_a = Spectral acceleration at the base of the sliding mass

As noted in Section 3.0, the BC spectral acceleration at a period of 0.2 s is 0.1414 g. This value is multiplied by an amplification factor to obtain the acceleration at the base of the sliding mass. Golder used an amplification factor of 1.6 as prescribed by the international building code (IBC 2012) for a site class D. The project site was classified as D according to the representative shear wave velocity in the upper 30 meters or 100 feet (Vs30). Thus, the spectral acceleration S_a used in the equation is 0.226 g (0.1414g x 1.6). The pseudostatic coefficient was calculated to be 0.01g as shown in the table below.

Table 5: $\boldsymbol{k_{15\,cm}}$ at Pond E, Possum Point

Pond ID	$\boldsymbol{k_{15\,cm}}$
ABC	0.01 g

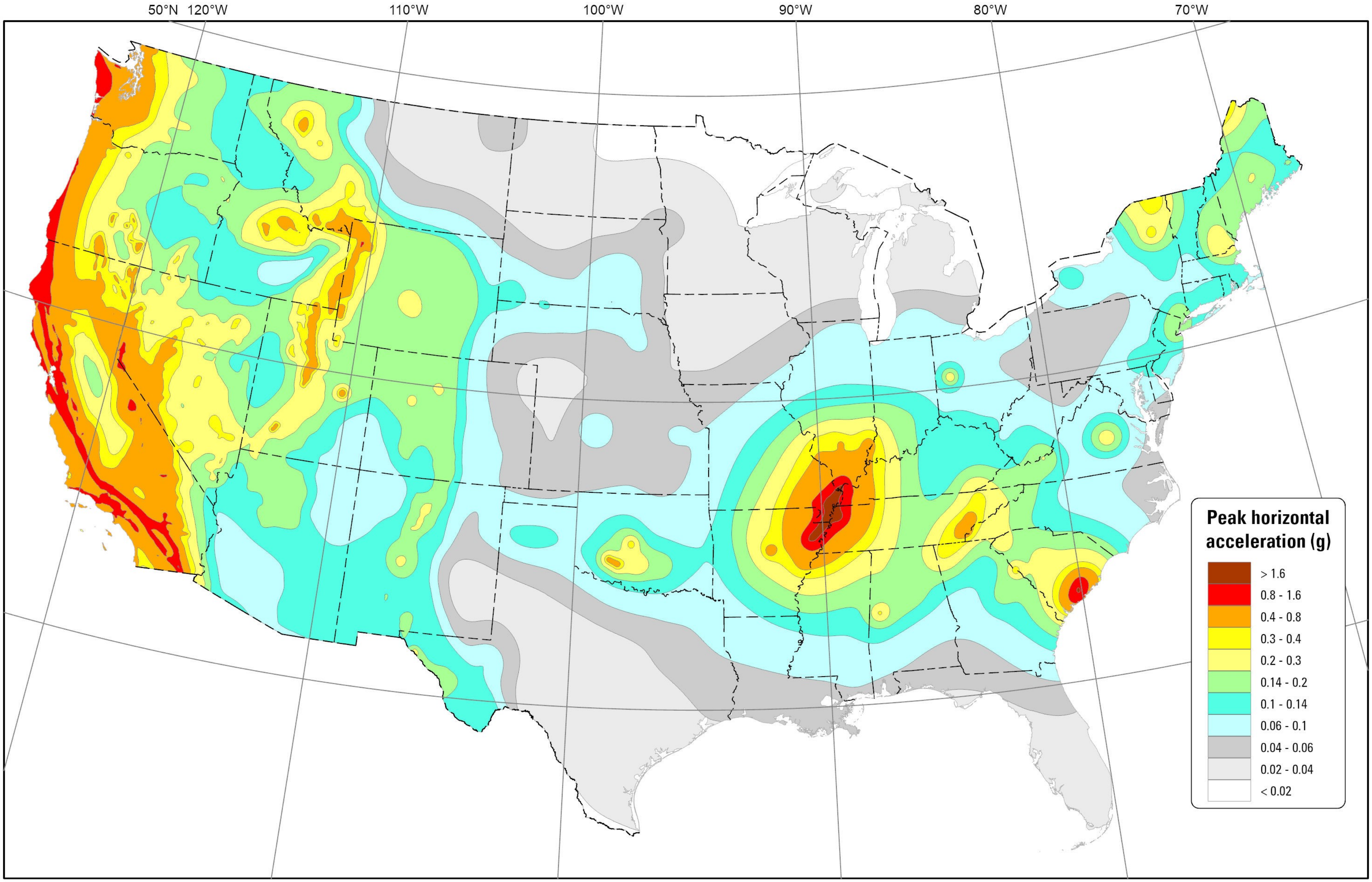
6.0 REFERENCE

Atkinson, G.M. and D.M. Boore (2006) “Earthquake Ground-Motion Prediction Equations for Eastern North America,” Bulletin of the Seismological Society of America, Vol. 96, No. 6, pp. 2181-2205.

Bray, J.D., and Travasarou, T. (2009). Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation. Journal of Geotechnical and Geoenvironmental Engineering, Vol. 135, No. 9: pp. 1336-1340.

United States Geologic Survey (2018), Unified Hazard Tool. Accessed January 9, 2018. https://earthquake.usgs.gov/hazards/interactive/.

International Code Council, Inc. (2012), “2012 Insertional Building Code”, Section 1613.3



2018 National Seismic Hazard Model for the conterminous United States

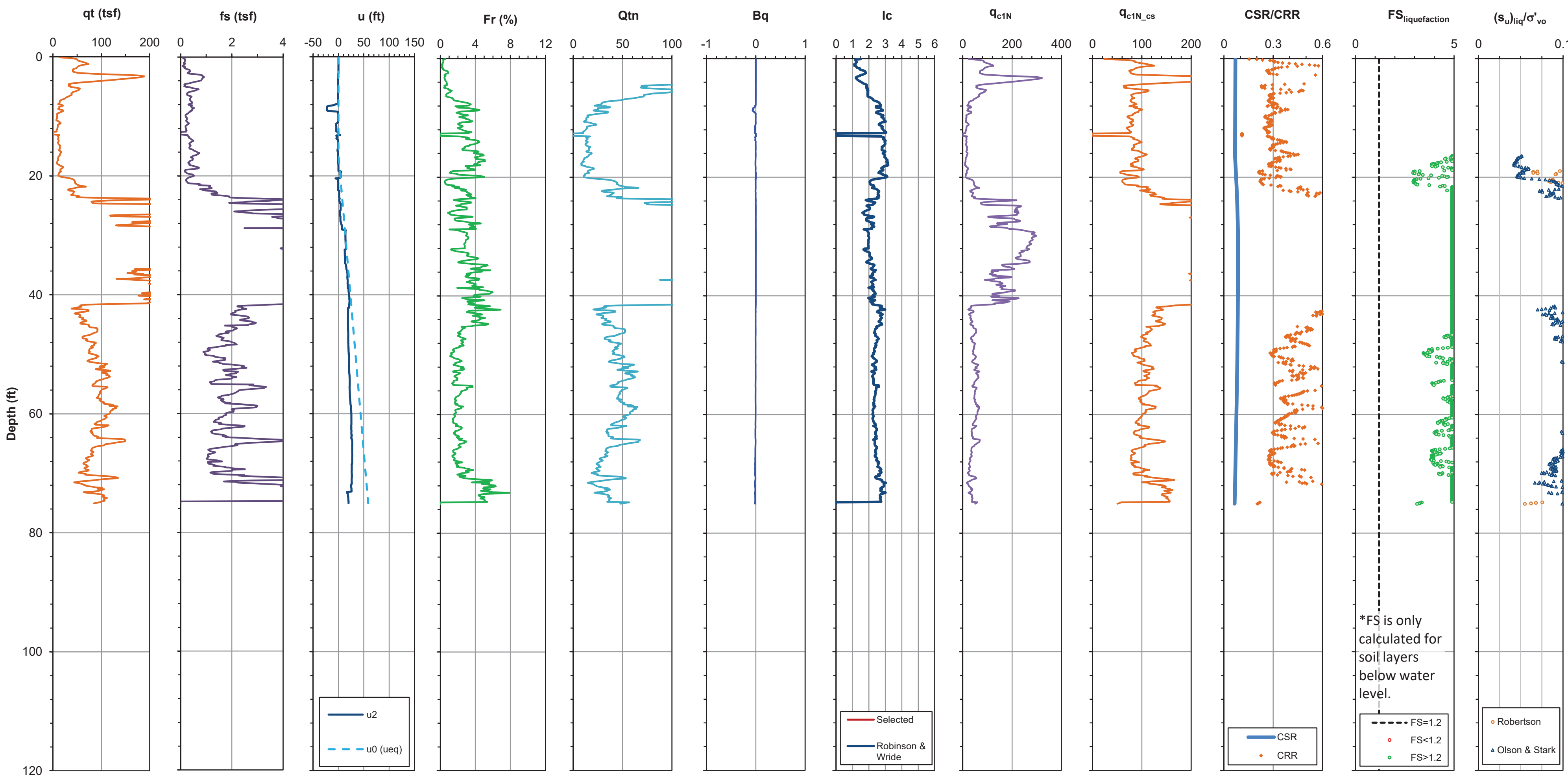
Peak horizontal acceleration
with a 2% probability of exceedance in 50 years
NEHRP site class B/C (V_{s30} = 760 m/s)

APPENDIX

C

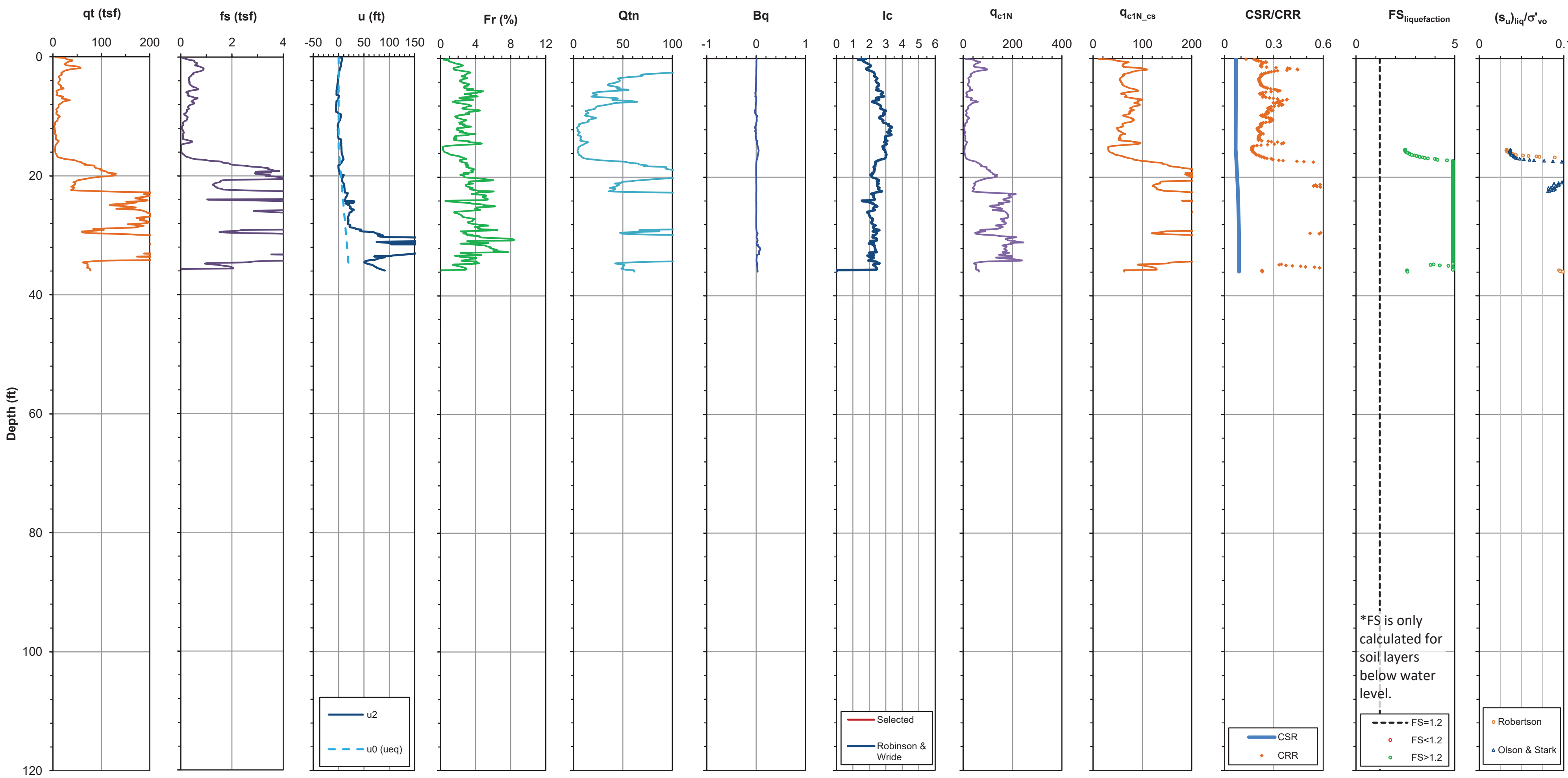
Liquefaction Assessment Calculation Package

Test Date:	12/19/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	16.4 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-01	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	**a_{max}:**	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	21.3 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				



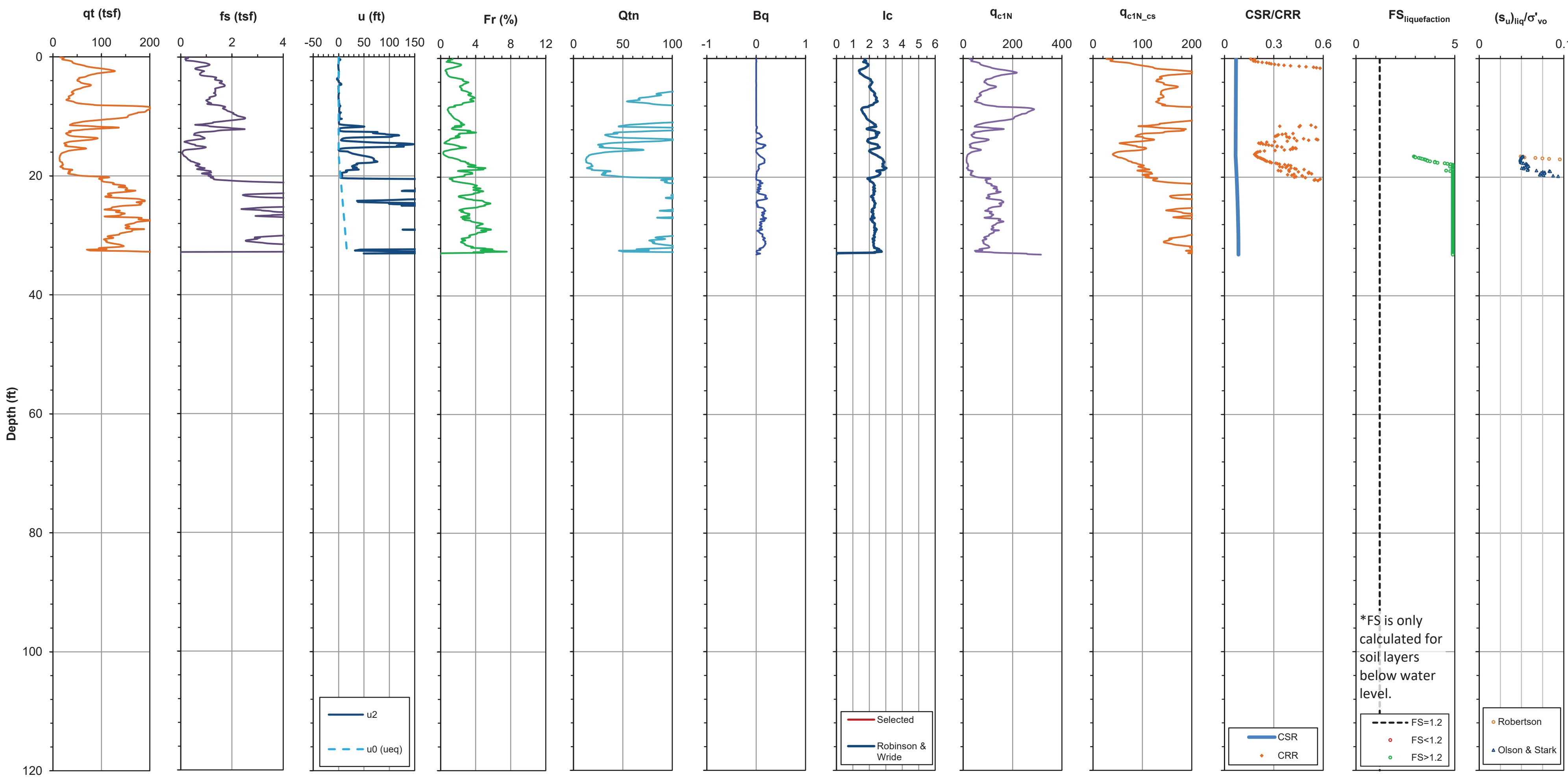
Test Date:	12/19/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	15.3 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-02	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	**a_{max}:**	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	21.6 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				

Golder Associates

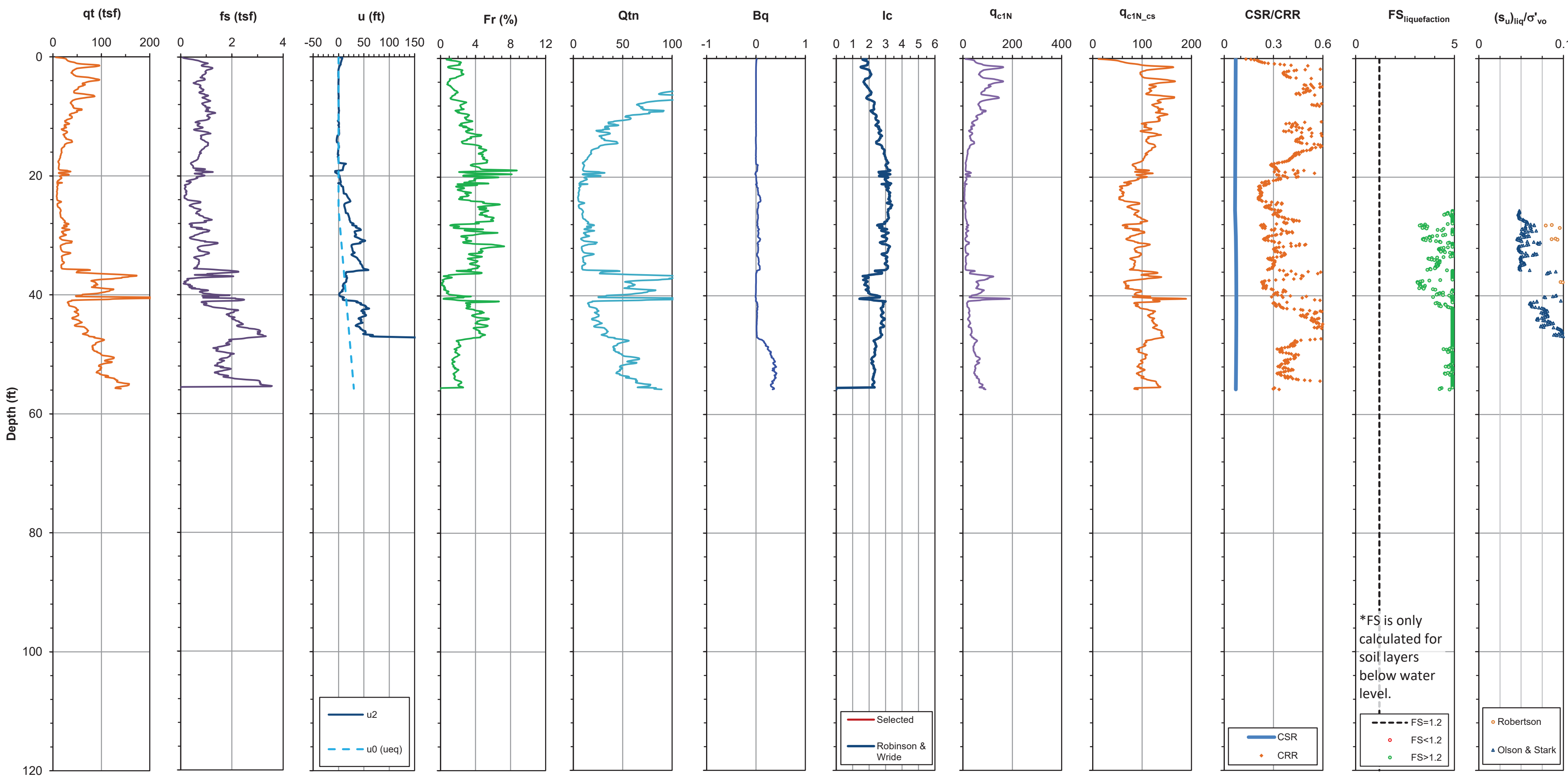


Test Date:	12/20/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	16.4 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-03	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	**a_{max}:**	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	14.8 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				

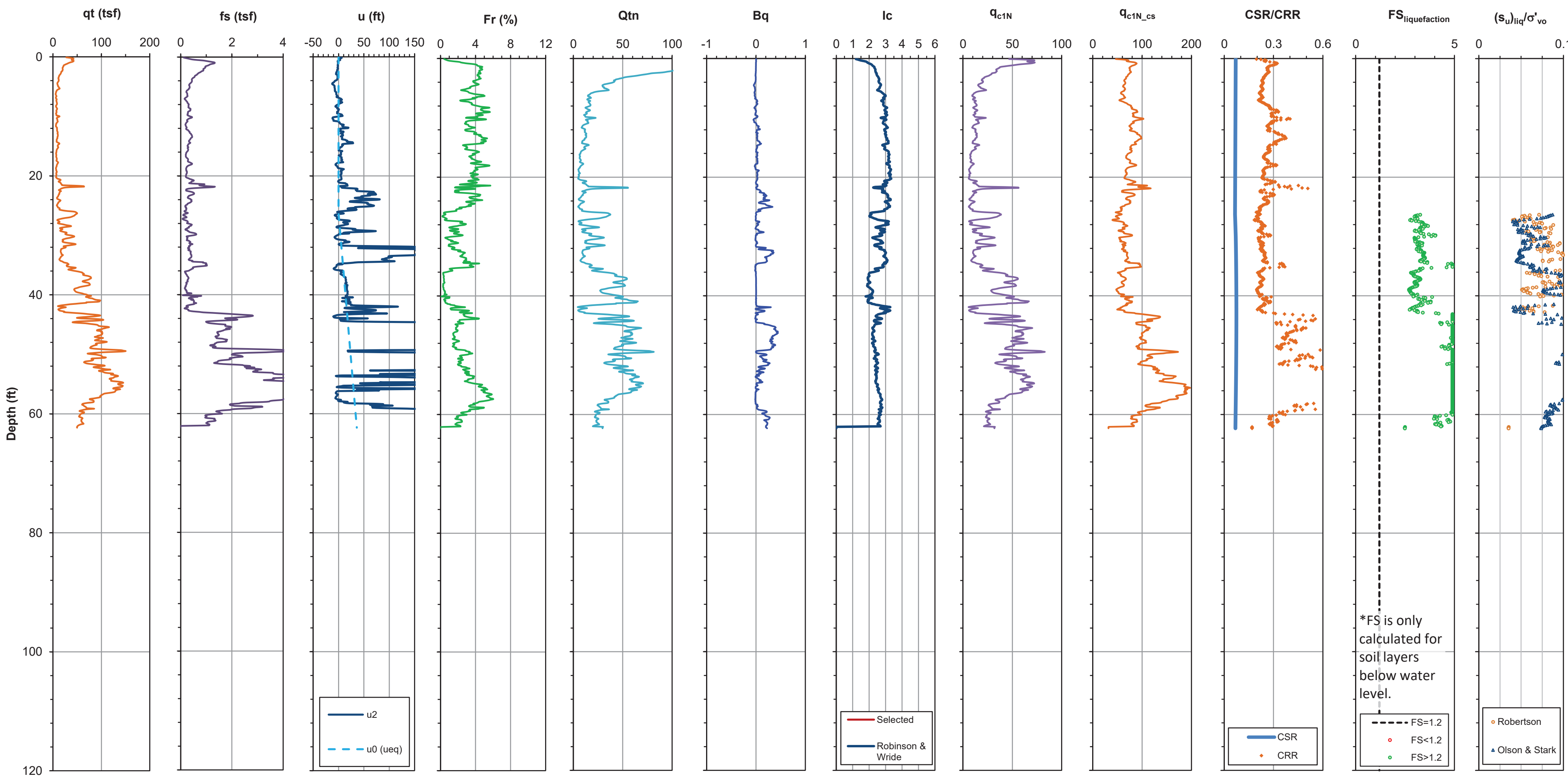
Golder Associates



Test Date:	12/20/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	25.6 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-04	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	**a_{max}:**	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	19.0 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				

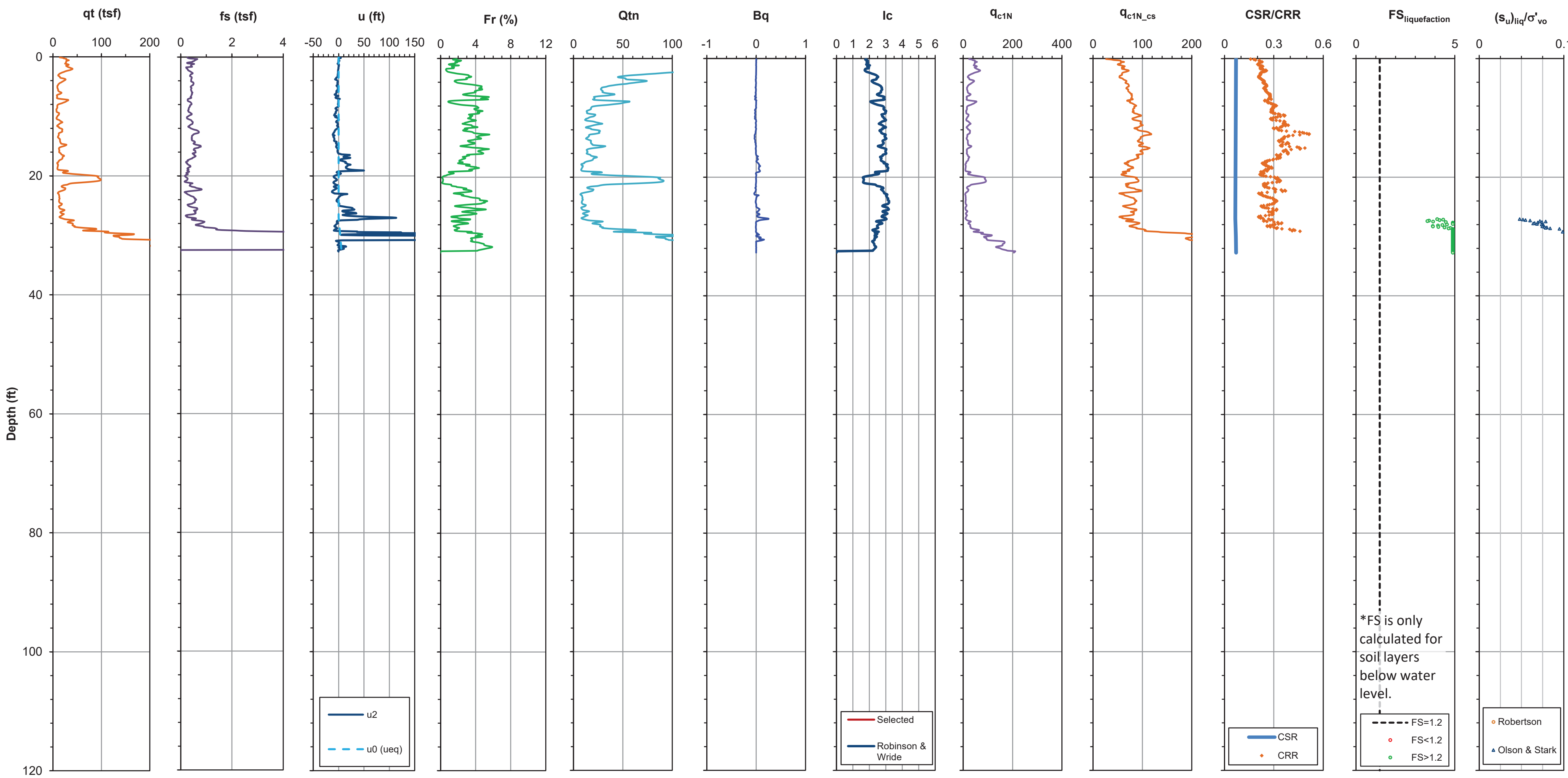


Test Date:	12/20/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	26.3 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-05	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	**a_{max}:**	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	21.2 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				



Test Date:	12/20/2017	**Project:**	Possum Point Pond ABC	**Test Type:**	CPTU	**Water Table:**	27.0 ft	**2% PE in 50 years Seismic Hazard**	
Test ID:	CPT-ABC-06	**Location:**	Dumfries, VA	**Device:**	10 cm^2, Type 2 filter	**Golder Eng:**	LJ	**Magnitude:**	5.5
Latitude	38.5	**Client:**	Dominion Energy	**Standard:**	ASTM D5778	**Check**	JGM	a_{max}:	0.11 g
Longitude	-77.3	**Proj No.:**	1662150	**Push Co.:**	ConeTec	**Review:**			
Elevation:	21.7 ft	**Termination:**	60.2 ft-bgs	**Operator:**	0				

Golder Associates



APPENDIX

D Geotechnical Stability Figures

LEGEND

EXISTING TOPOGRAPHIC CONTOURS (2' INTERVALS)

GOLDER CONE PENETRATION TEST (CPT)

A — SLOPE STABILITY SECTIONS

REFERENCE(S)

1. TOPOGRAPHY PER SURVEY TAKEN IN 2019, FILE 21 1223 - 2102019 - ... AERIAL SURVEY REV 1 AND 12016 - POSSUMPOINT -- LANDXML-0001.

0 100 200

1" = 100' FEET

wsp

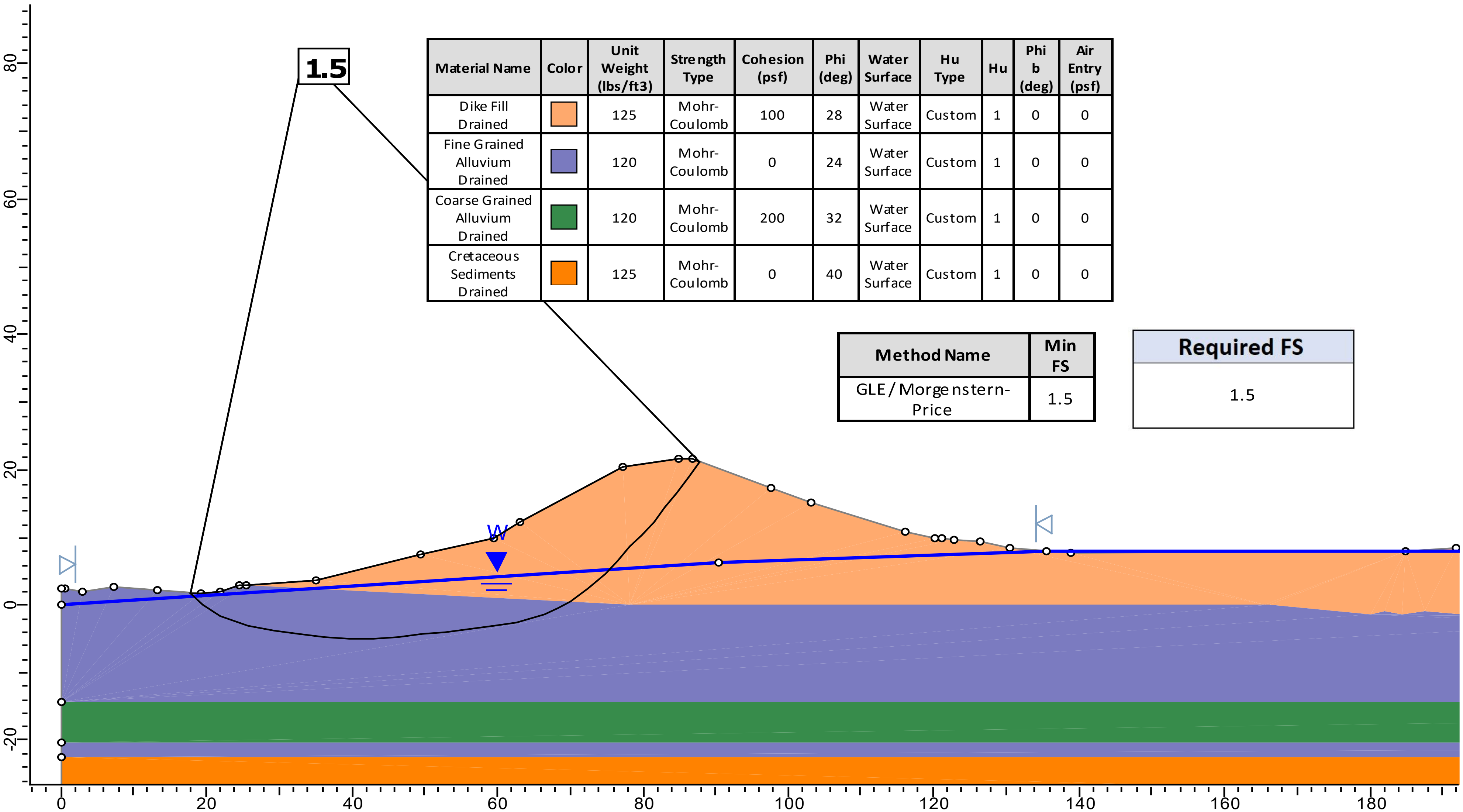
DOMINION ENERGY - POSSUM POINT

INACTIVE POND DEMONSTRATION

SAFETY FACTOR ASSESSMENT - POND ABC PLAN VIEW

FIGURE 1

Appendix D-2
2023 Safety Factor Assessment
Geotechnical Stability Figures

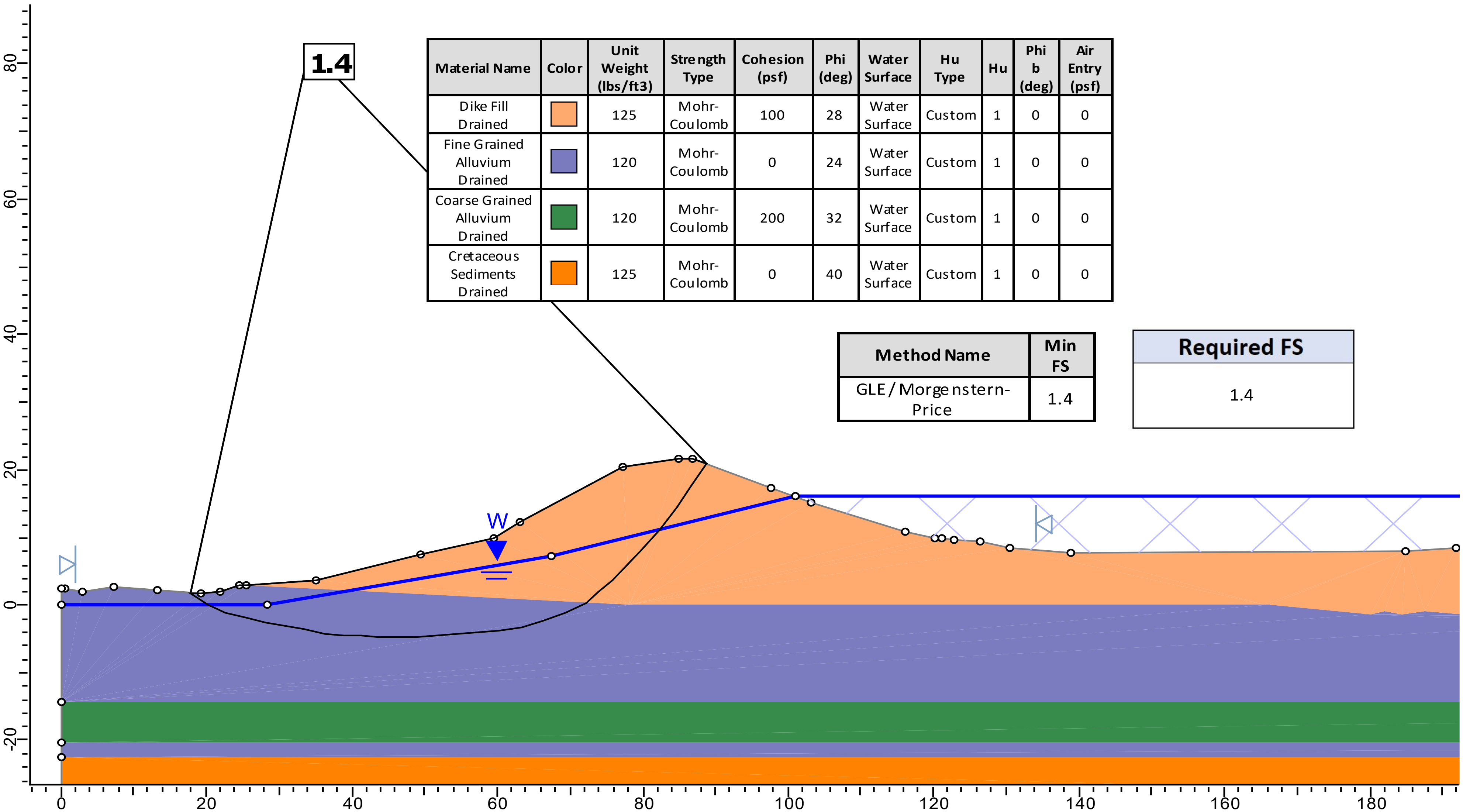


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	0	24	Water Surface	Custom	1	0	0
Coarse Grained Alluvium Drained		120	Mohr-Coulomb	200	32	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.5

Required FS
1.5

wsp	SCALE: AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
	DATE: April 2023	TITLE	Section A-A Long Term, Normal Storage Pool
	MADE BY: WJF		
	CAD: -		
FILE: STABILITY	CHECK: HJ	CLIENT	Dominion Energy
PROJECT No. GL24166315 — REV. 0	REVIEW: GLH	FIGURE	2(a)

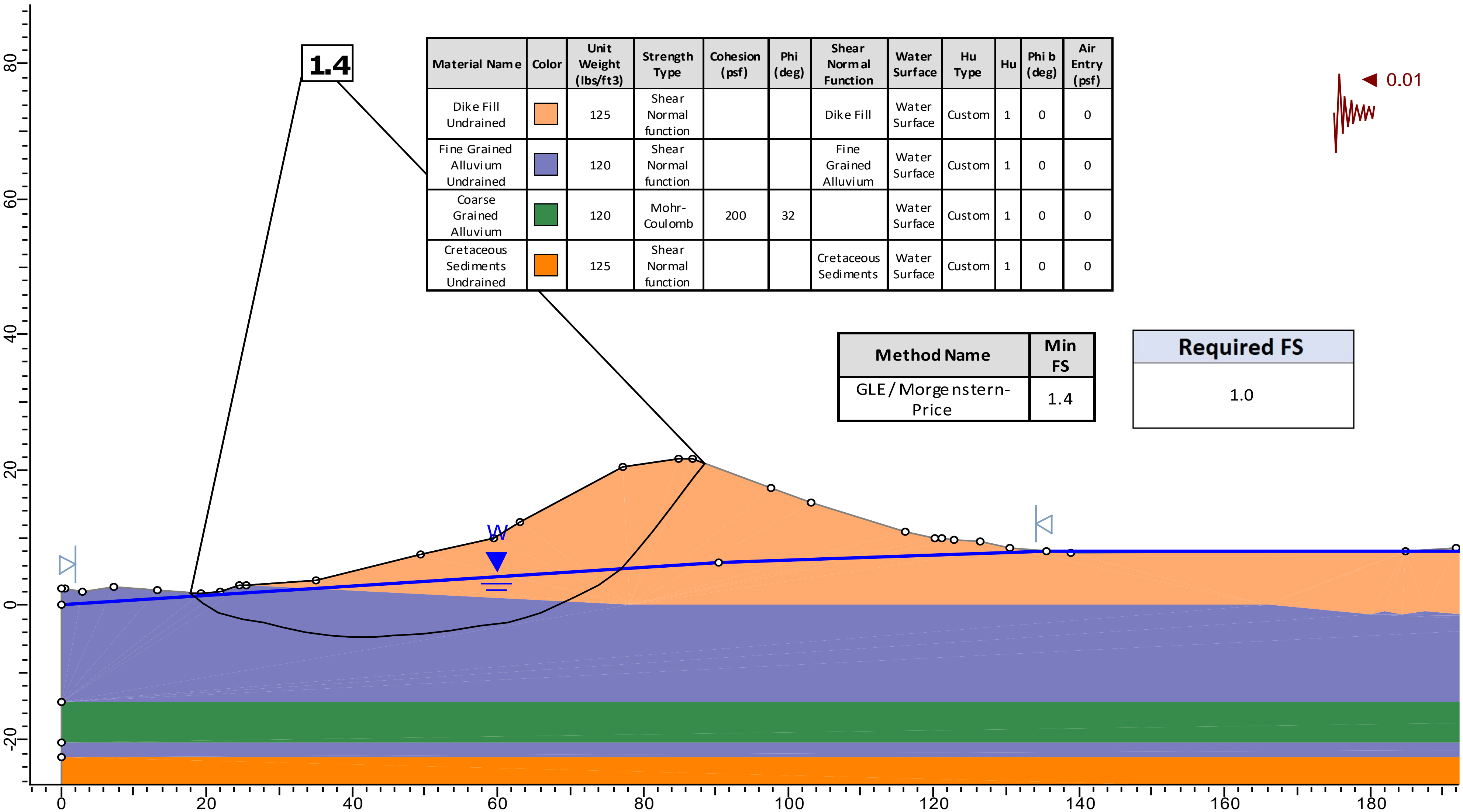


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	0	24	Water Surface	Custom	1	0	0
Coarse Grained Alluvium Drained		120	Mohr-Coulomb	200	32	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.4

Required FS
1.4

FILE	STABILITY	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
PROJECT No.	GL24166315	TITLE	Section A-A Maximum Surchage Pool
REV.	0	CLIENT	Dominion Energy
SCALE	AS SHOWN	FIGURE	2(b)
DATE	April 2023		
MADE BY	WJF		
CAD	-		
CHECK	HJ		
REVIEW	GLH		



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Undrained		125	Shear Normal function			Dike Fill	Water Surface	Custom	1	0	0
Fine Grained Alluvium Undrained		120	Shear Normal function			Fine Grained Alluvium	Water Surface	Custom	1	0	0
Coarse Grained Alluvium		120	Mohr-Coulomb	200	32		Water Surface	Custom	1	0	0
Cretaceous Sediments Undrained		125	Shear Normal function			Cretaceous Sediments	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.4

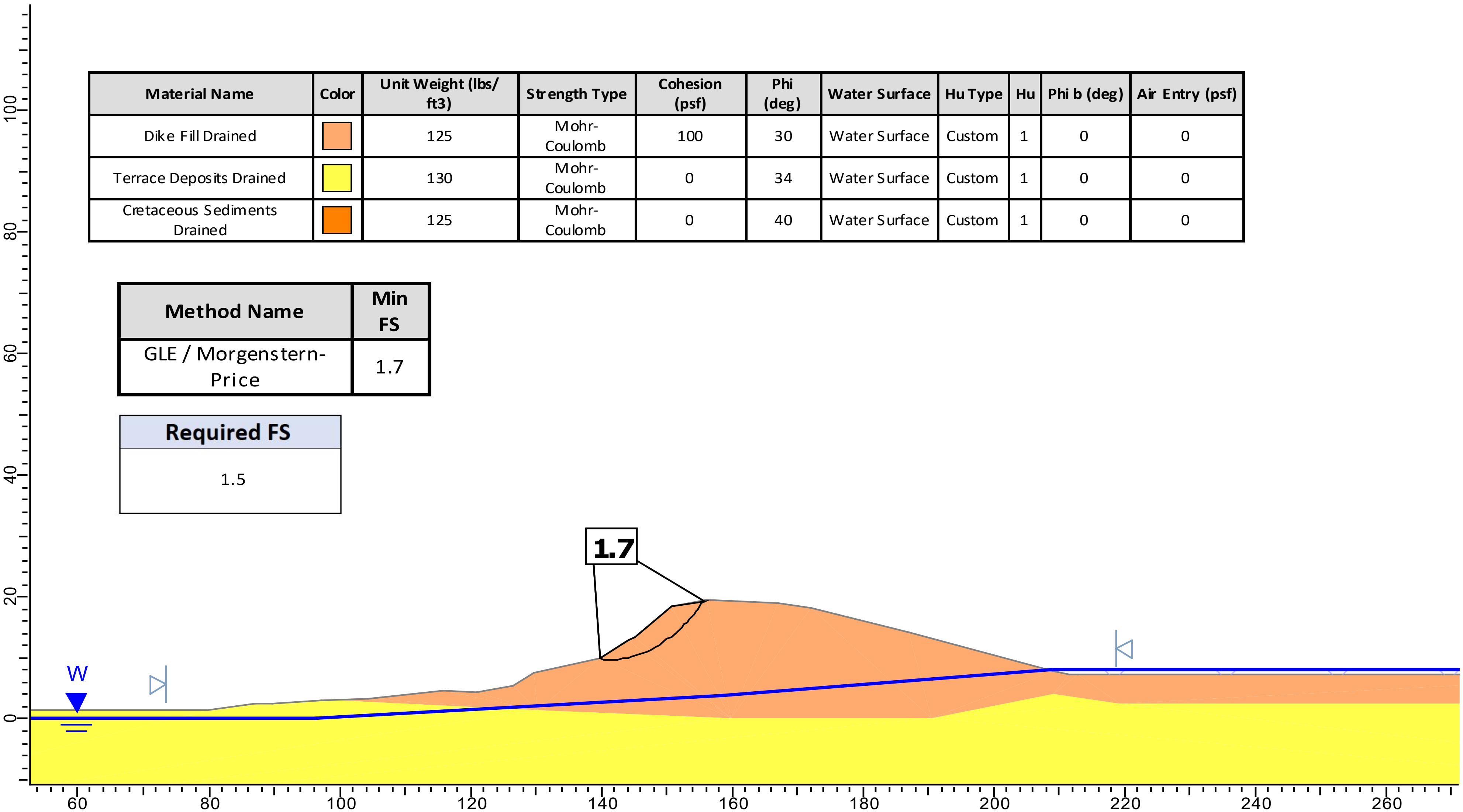
Required FS
1.0

wsp	SCALE AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment	
	DATE April 2023	TITLE	Section A-A Seismic Screening	
	MADE BY WJF			
	CAD -			
FILE STABILITY	CHECK HJ	CLIENT	Dominion Energy	FIGURE 2(c)
PROJECT No. GL24166315 REV. 0	REVIEW GLH			

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Terrace Deposits Drained		130	Mohr-Coulomb	0	34	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.7

Required FS
1.5

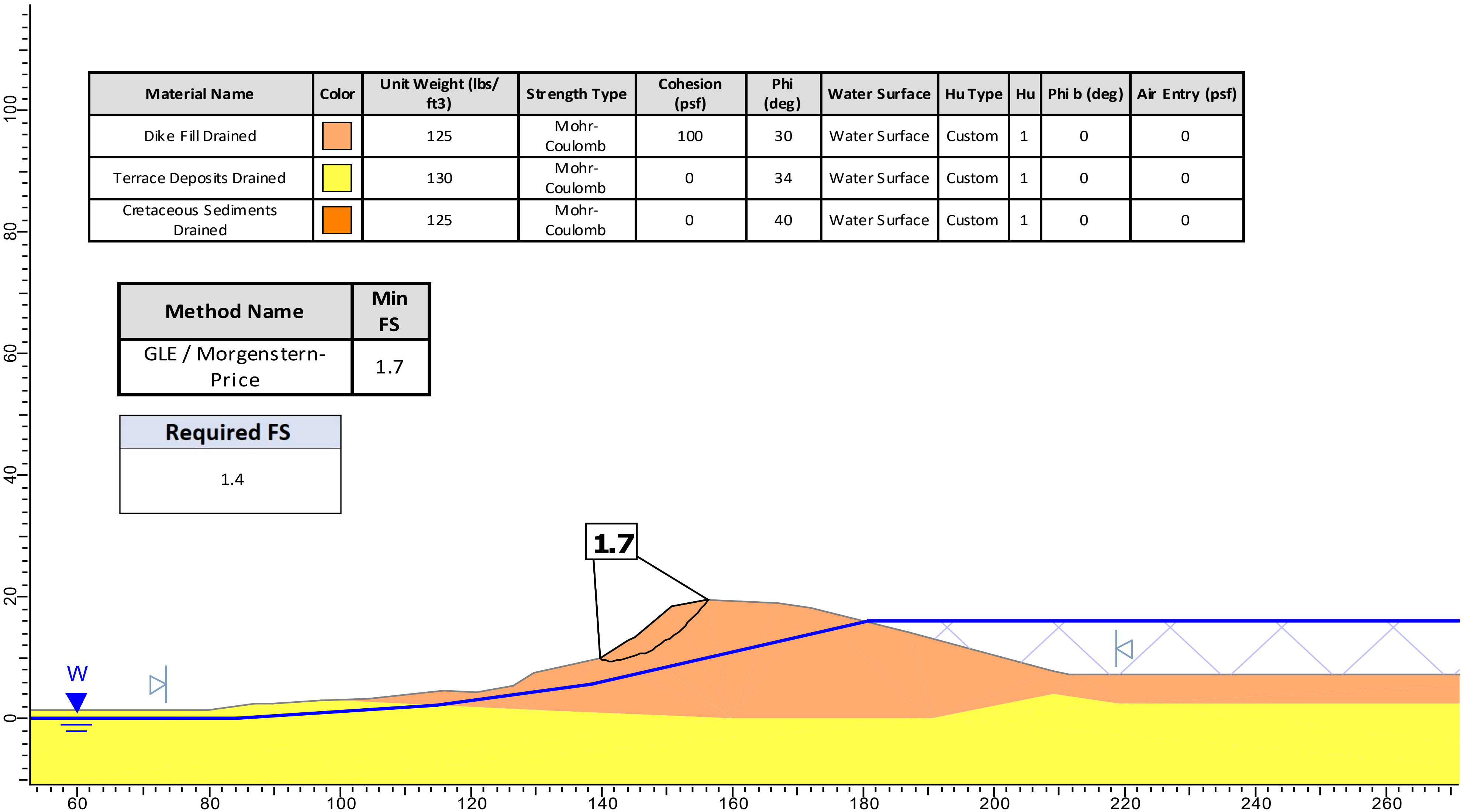


SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section B-B Long Term, Normal Storage Pool
MADE BY	WJF		
CAD	-		
FILE	STABILITY	CHECK	HJ
PROJECT No.	GL24166315	REV.	0
REVIEW	GLH	CLIENT	Dominion Energy
FIGURE	3(a)		

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Terrace Deposits Drained		130	Mohr-Coulomb	0	34	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.7

Required FS
1.4



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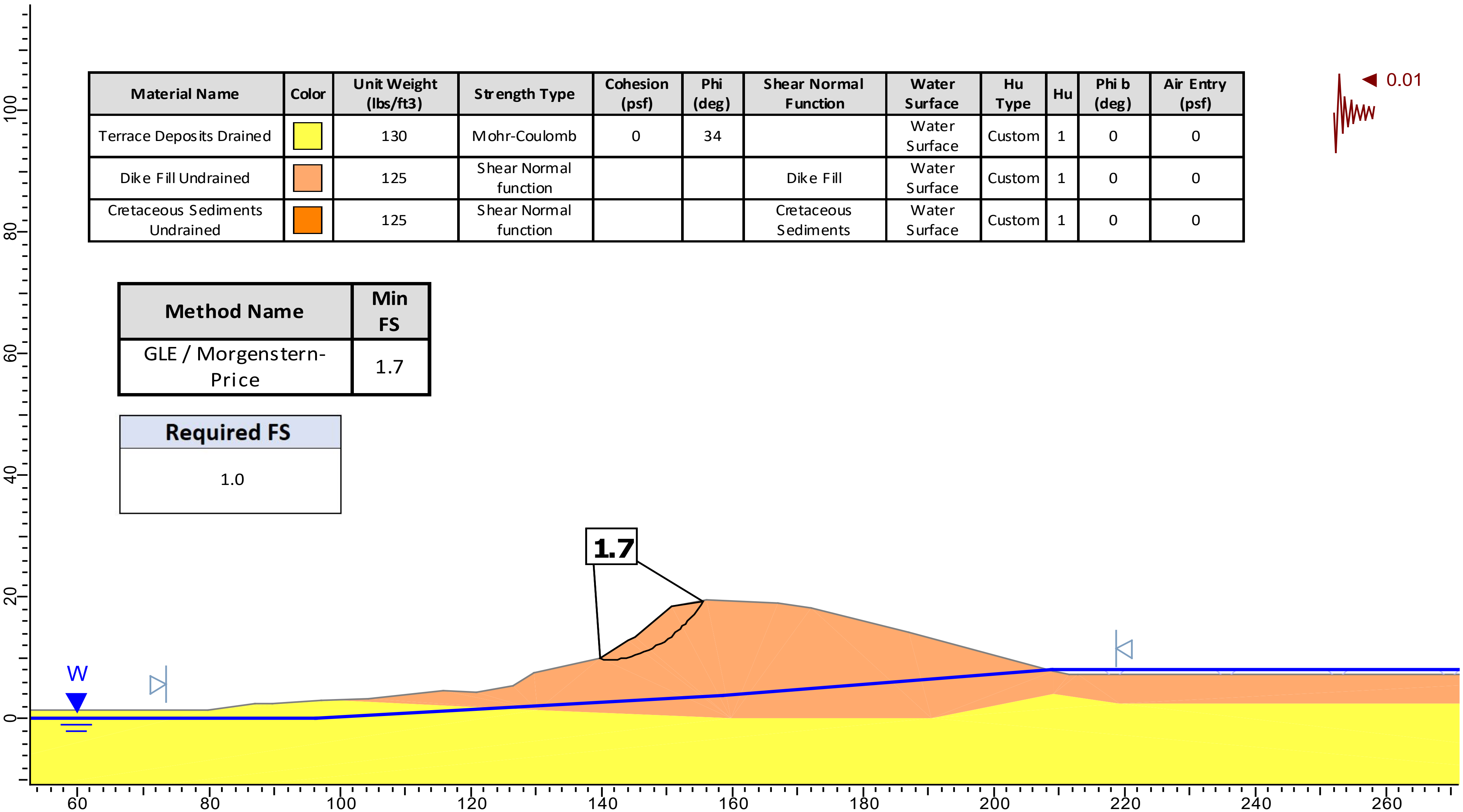
DATE	April 2023	TITLE	Section B-B Maximum Surchage Pool
MADE BY	WJF		
CAD	-		
FILE STABILITY	CHECK HJ	CLIENT	Dominion Energy
PROJECT No. GL24166315 REV. 0	REVIEW GLH	FIGURE	3(b)

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Terrace Deposits Drained		130	Mohr-Coulomb	0	34		Water Surface	Custom	1	0	0
Dike Fill Undrained		125	Shear Normal function			Dike Fill	Water Surface	Custom	1	0	0
Cretaceous Sediments Undrained		125	Shear Normal function			Cretaceous Sediments	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.7

Required FS
1.0



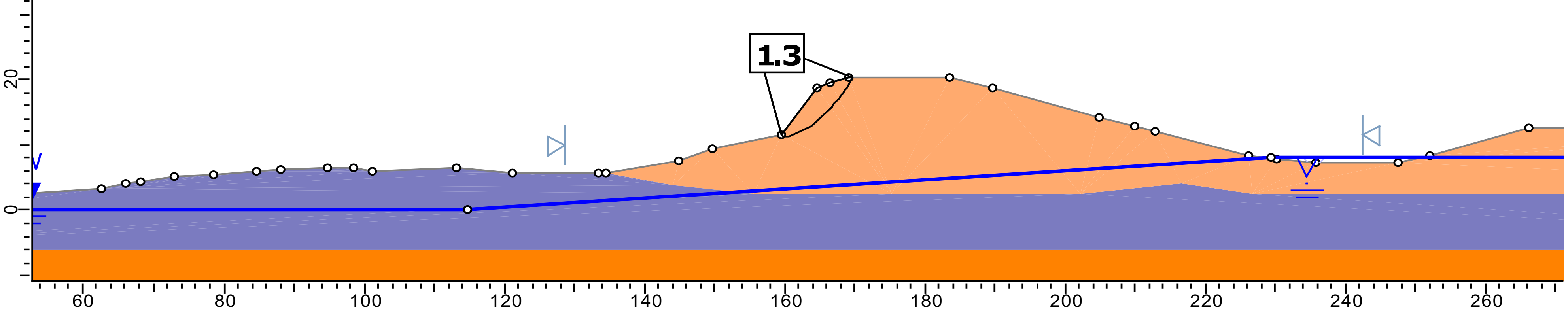
SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section B-B Seismic Screening
MADE BY	WJF		
CAD	-		
CHECK	HJ	CLIENT	Dominion Energy
REVIEW	GLH	FIGURE	3(c)

FILE: STABILITY
PROJECT No. GL24166315 REV. 0

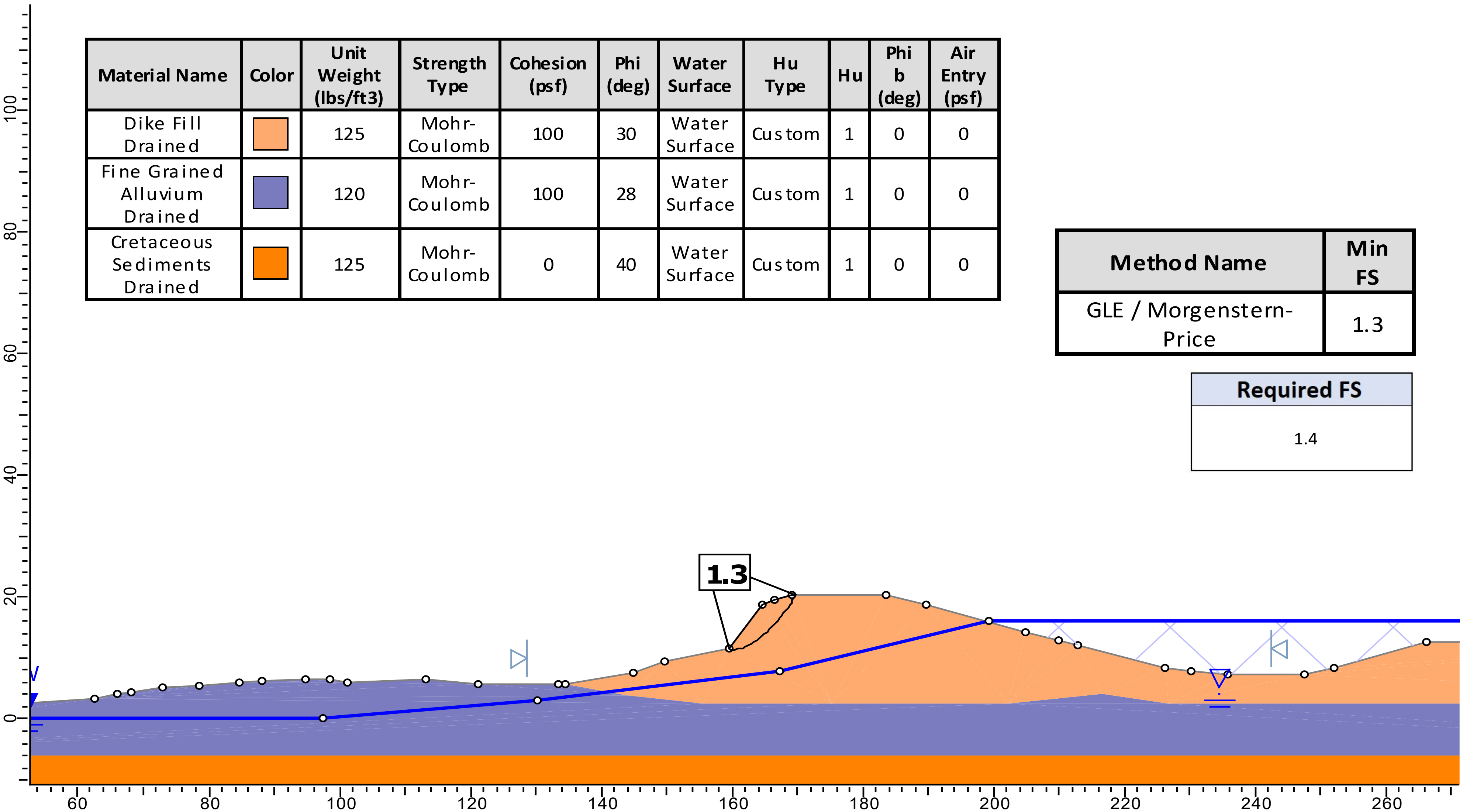
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.3

Required FS
1.5



	SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
	DATE	April 2023	TITLE	Section C-C Long Term, Normal Storage Pool
	MADE BY	WJF		
	CAD	-		
FILE STABILITY	CHECK	HJ	CLIENT	Dominion Energy
PROJECT No. GL24166315 REV. 0	REVIEW	GLH	FIGURE	4(a)



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.3

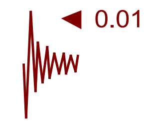
Required FS
1.4

SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Maximum Surchage Pool
MADE BY	WJF		
CAD	-		
CHECK	HJ	CLIENT	Dominion Energy
REVIEW	GLH	FIGURE	4(b)

FILE STABILITY

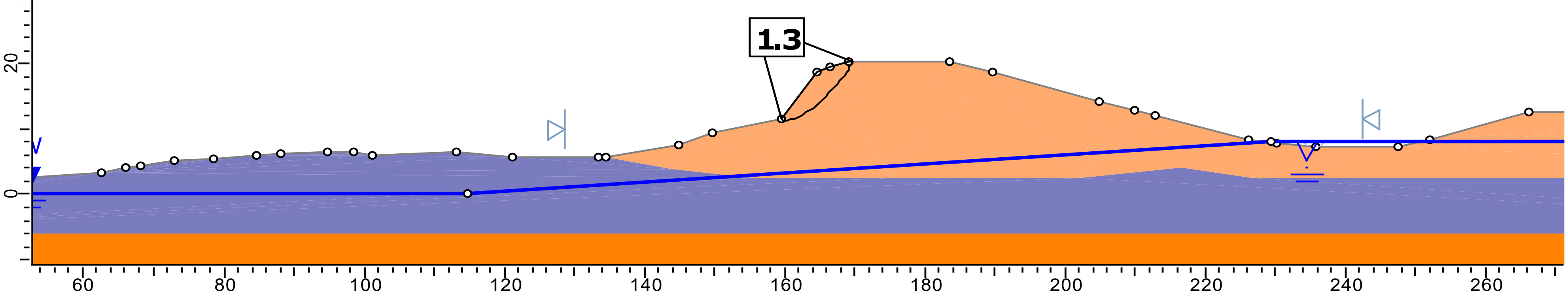
PROJECT No. GL24166315 REV. 0

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Shear Normal Function	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Undrained		125	Shear Normal function	Dike Fill	Water Surface	Custom	1	0	0
Fine Grained Alluvium Undrained		120	Shear Normal function	Fine Grained Alluvium	Water Surface	Custom	1	0	0
Cretaceous Sediments Undrained		125	Shear Normal function	Cretaceous Sediments	Water Surface	Custom	1	0	0



Method Name	Min FS
GLE / Morgenstern-Price	1.3

Required FS
1.0

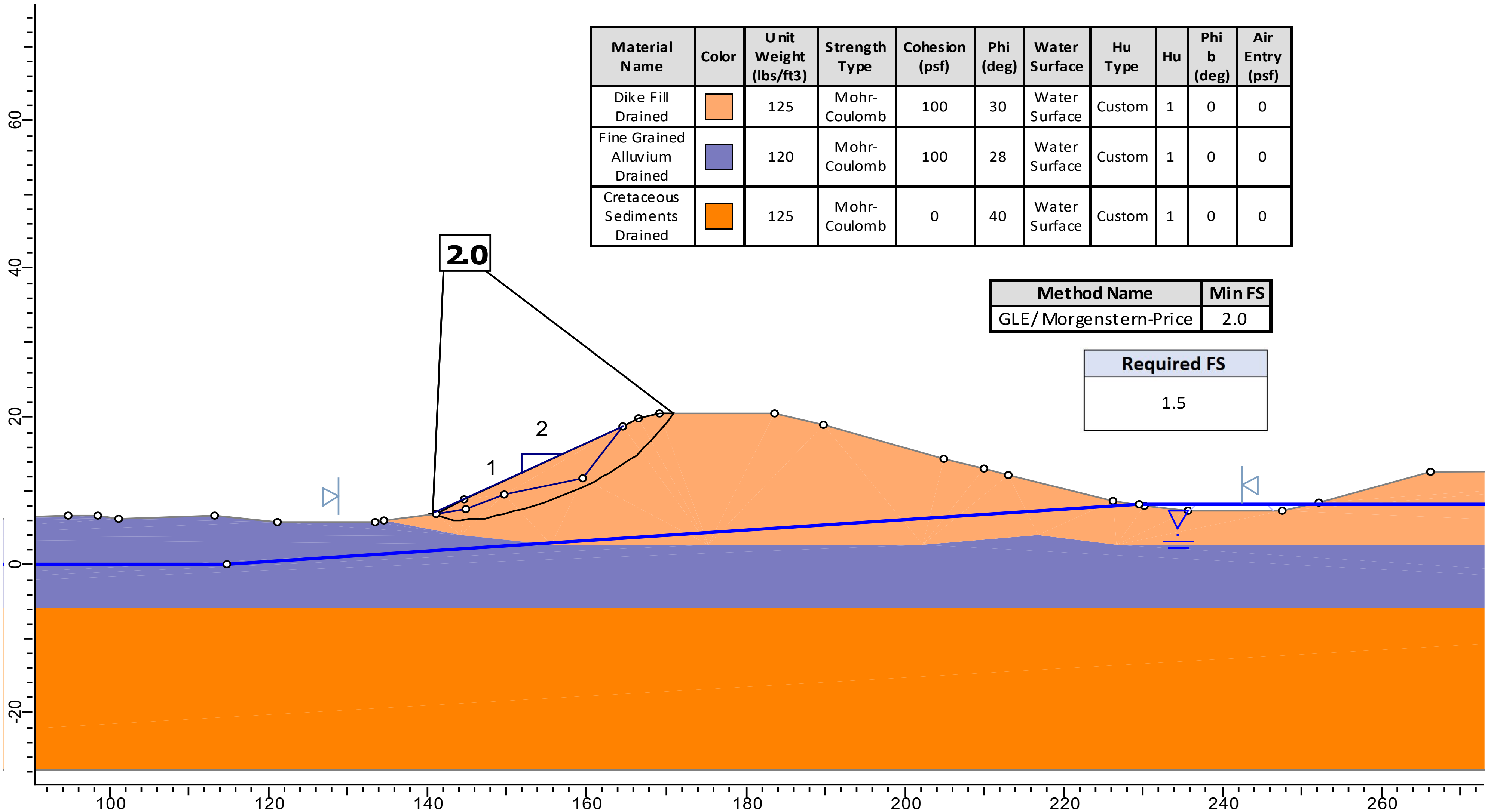


SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Seismic Screening
MADE BY	WJF		
CAD	-		
CHECK	HJ	CLIENT	Dominion Energy
REVIEW	GLH	FIGURE	4(c)

FILE STABILITY

PROJECT No. GL24166315 REV. 0

Appendix D-3
2023 Safety Factor Assessment
Geotechnical Stability Figures
Section C-C' Mitigation Options

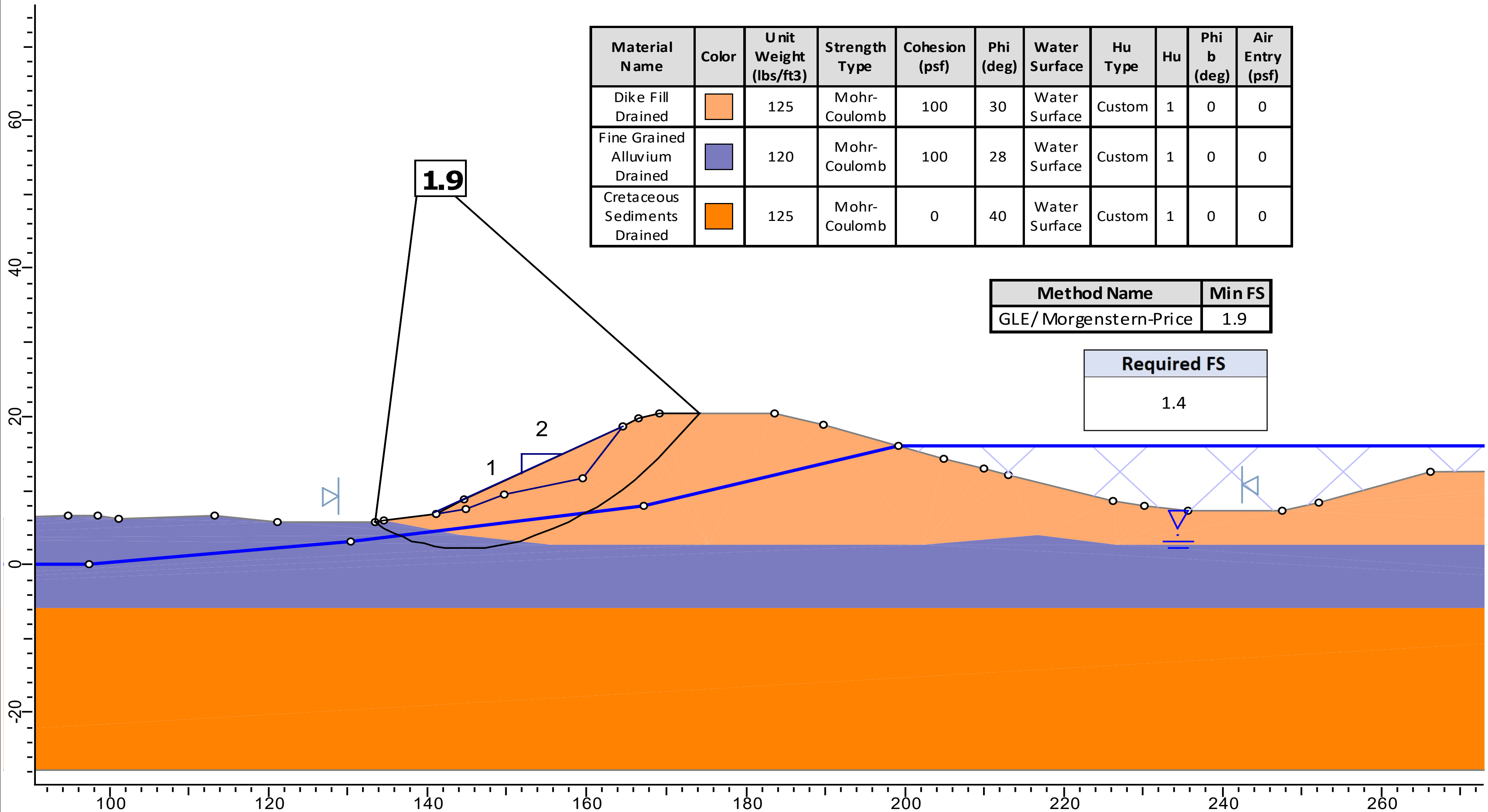


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE/Morgenstern-Price	2.0

Required FS
1.5

SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Long Term, Normal Storage Pool Mitigation Option 1
MADE BY	WJF		
CAD	-		
FILE	STABILITY	CHECK	HJ
CLIENT	Dominion Energy	FIGURE	5(a)
PROJECT No.	GL24166315	REV.	0
REVIEW	GLH		

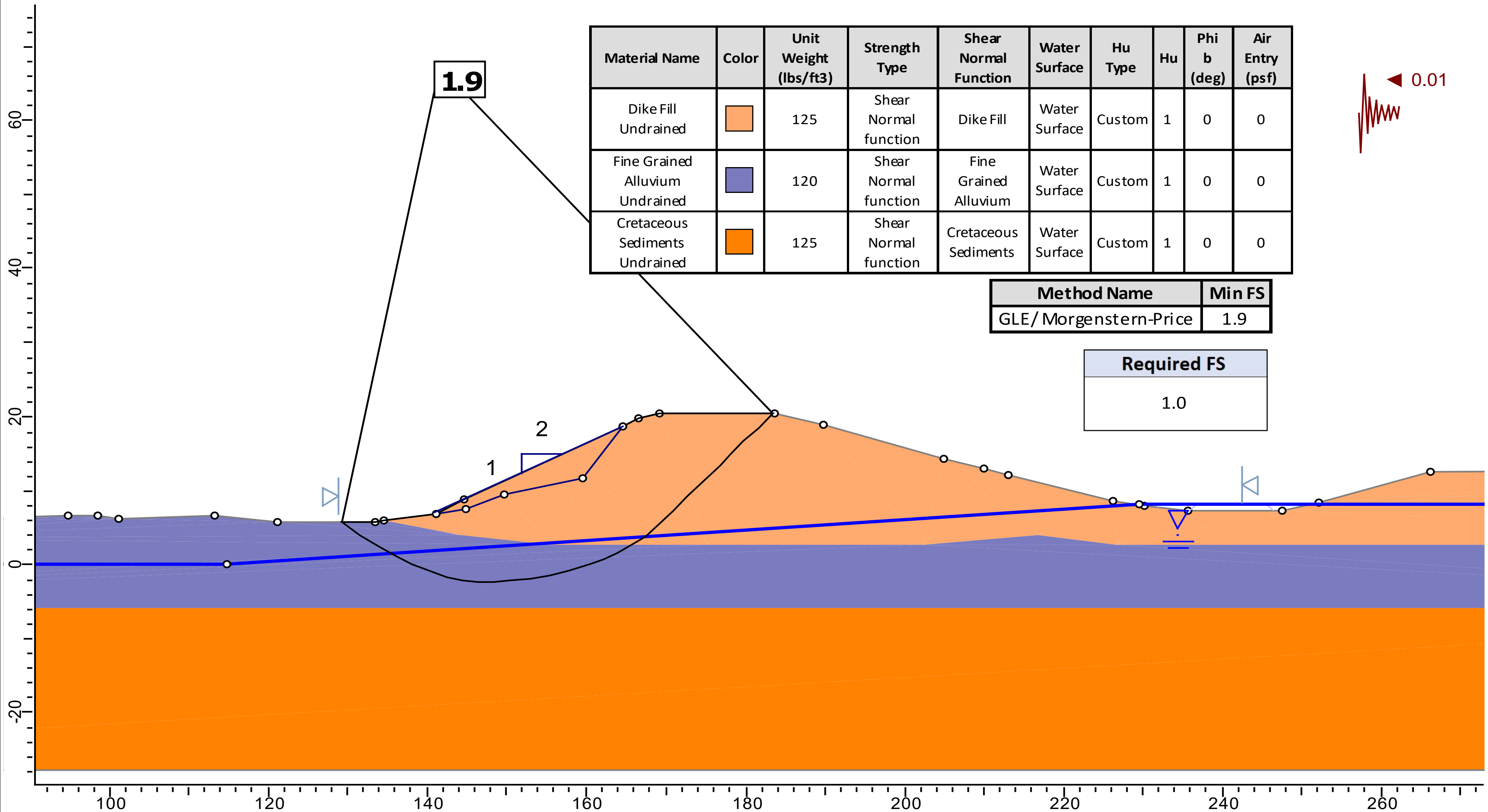


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE/Morgenstern-Price	1.9

Required FS
1.4

SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Maximum Surcharge Pool Mitigation Option 1
MADE BY	WJF		
CAD	-		
FILE	STABILITY	CHECK	HJ
PROJECT No.	GL24166315	REV.	0
REVIEW	GLH	CLIENT	Dominion Energy
FIGURE	5(b)		



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Shear Normal Function	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Undrained		125	Shear Normal function	Dike Fill	Water Surface	Custom	1	0	0
Fine Grained Alluvium Undrained		120	Shear Normal function	Fine Grained Alluvium	Water Surface	Custom	1	0	0
Cretaceous Sediments Undrained		125	Shear Normal function	Cretaceous Sediments	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE/Morgenstern-Price	1.9

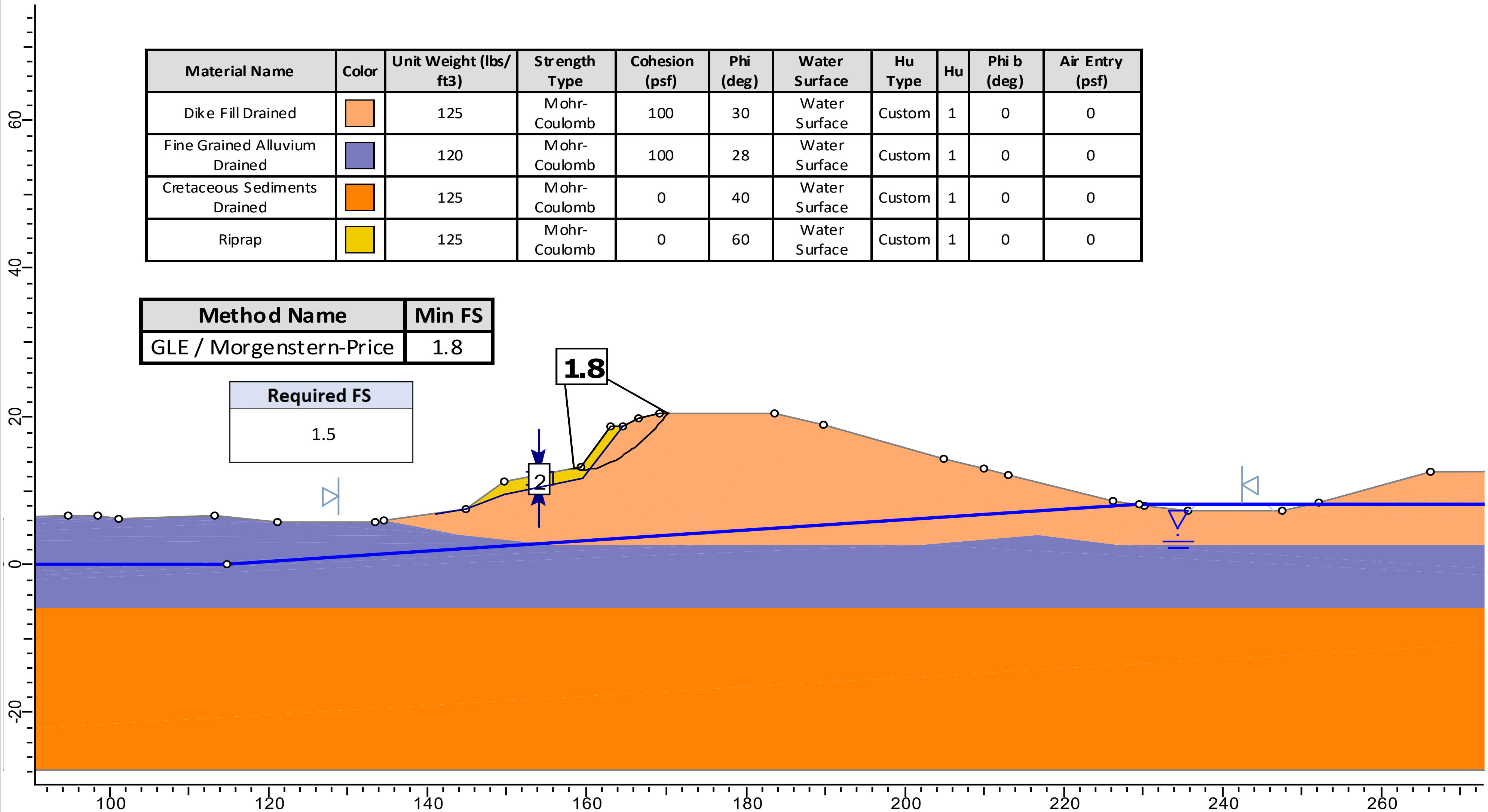
Required FS
1.0

SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Seismic Screening Mitigation Option 1
MADE BY	WJF		
CAD	-		
FILE	STABILITY	CHECK	HJ
PROJECT No.	GL24166315	REV.	0
REVIEW	GLH	CLIENT	Dominion Energy
FIGURE	5(c)		

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0
Riprap		125	Mohr-Coulomb	0	60	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.8

Required FS
1.5

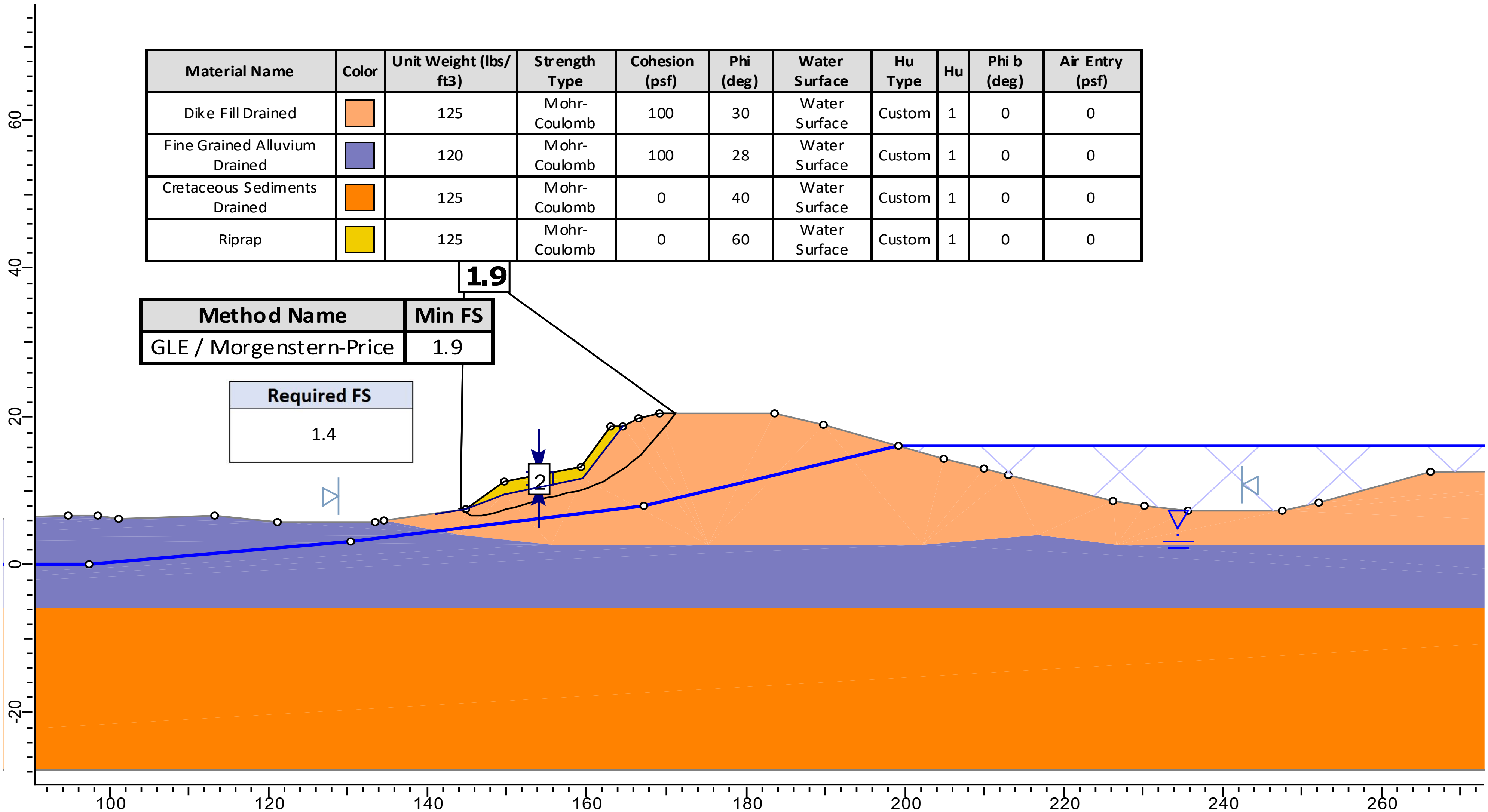


	SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
	DATE	April 2023	TITLE	Section C-C Long Term, Normal Storage Pool Mitigation Option 2
	MADE BY	WJF		
	CAD	-		
FILE: STABILITY	CHECK	HJ	CLIENT	Dominion Energy
PROJECT No. GL24166315 / REV. 0	REVIEW	GLH	FIGURE	6(a)

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Drained		125	Mohr-Coulomb	100	30	Water Surface	Custom	1	0	0
Fine Grained Alluvium Drained		120	Mohr-Coulomb	100	28	Water Surface	Custom	1	0	0
Cretaceous Sediments Drained		125	Mohr-Coulomb	0	40	Water Surface	Custom	1	0	0
Riprap		125	Mohr-Coulomb	0	60	Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.9

Required FS
1.4

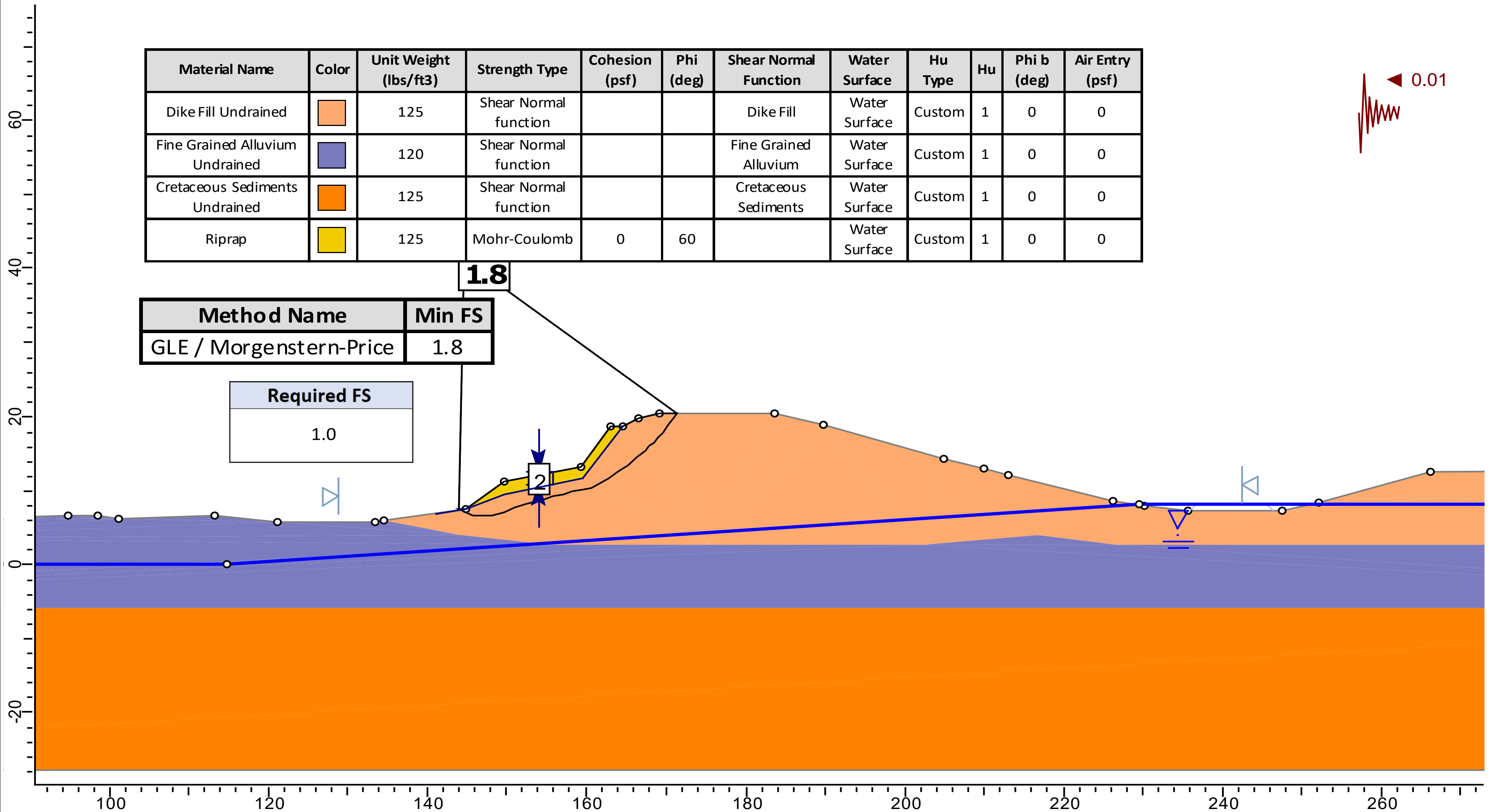


SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Maximum Surcharge Pool Mitigation Option 2
MADE BY	WJF		
CAD	-		
FILE	STABILITY	CHECK	HJ
PROJECT No.	GL24166315	REV.	0
REVIEW	GLH	CLIENT	Dominion Energy
FIGURE	6(b)		

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu	Phi b (deg)	Air Entry (psf)
Dike Fill Undrained		125	Shear Normal function			Dike Fill	Water Surface	Custom	1	0	0
Fine Grained Alluvium Undrained		120	Shear Normal function			Fine Grained Alluvium	Water Surface	Custom	1	0	0
Cretaceous Sediments Undrained		125	Shear Normal function			Cretaceous Sediments	Water Surface	Custom	1	0	0
Riprap		125	Mohr-Coulomb	0	60		Water Surface	Custom	1	0	0

Method Name	Min FS
GLE / Morgenstern-Price	1.8

Required FS
1.0



SCALE	AS SHOWN	PROJECT	Possum Point Pond ABC - 2023 Safety Factor Assessment
DATE	April 2023	TITLE	Section C-C Seismic Screening Mitigation Option 2
MADE BY	WJF		
CAD	-		
CHECK	HJ	CLIENT	Dominion Energy
REVIEW	GLH	FIGURE	6(c)

FILE: STABILITY

PROJECT No. GL24166315 | REV. 0