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HNTB Ohio, Inc.

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Columbus, OH 43215

Attention: Mr. Naiel Hussein, PE
Transportation Group Director – Ohio

Reference: Proposed US 33 Main Line – East Section - Final Report
ATH/MEG-033-23.23/0.00, PID No. 119142, Agreement No. 39087
Lodi and Bedford Townships, Athens & Meigs Counties, Ohio
CTL Project No. 23050059COL

Dear Mr. Hussein:

CTL Engineering, Inc. (CTL) has completed the geotechnical exploration report for the above referenced project. We are providing an electronic version (PDF file) of the Final Report via email.

Thank you for the opportunity to be of service to you on this project. If you have any questions, please contact me at our office.

Respectfully Submitted,

CTL Engineering, Inc.

A handwritten signature in black ink that reads 'Sastry M. V. S.' with a horizontal line underneath.

Sastry Malladi, P. E.
Project Engineer

ROADWAY EXPLORATION- FINAL REPORT

PROPOSED US 33 MAIN LINE – EAST SECTION- FINAL REPORT

ATH/MEG-033-23.23/0.00

PID No. 119142

AGREEMENT NO. 39087

LODI AND BEDFORD TOWNSHIPS, ATHENS & MEIGS COUNTIES, OHIO

CTL PROJECT NO. 23050059COL

PREPARED FOR:

**HNTB OHIO, INC.
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PREPARED BY:

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December 5, 2024



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I. EXECUTIVE SUMMARY

The overall ATH/MEG-033-18.70/00.00 project will convert 10.7 miles of roadway located in Athens and Meigs Counties from the existing two-lane highway configuration to a four lane, divided highway. The work will take place from just south of Athens extending down to Darwin. The overall project is divided into two sub projects, PID 119141 and PID 119142.

This report addresses the ATH/MEG-033-23.23/0.00 (PID 119142) project which involves the construction of a 6.23-mile conversion from SLM 23.23 (just west of Pratts Fork Long bridge in Athens County) to SLM 4.05 (just east of Darwin in Meigs County). The report addresses global stability, rock cut slopes and settlement considerations for PID 119142. It is understood that the pavement design for the portion of US 33 within the project limits was performed by ODOT based on the subgrade recommendations determined by the District. Therefore, no additional subgrade recommendations for the proposed roadways are included by CTL in this report.

Roadway design memos were previously submitted for this project. This Final report includes our recommendations and addresses comments received by the District on the previously submitted roadway design memos.

Four (4) new bridge structures (SFN 501191, SFN 501205, SFN 500319 and SFN 5300403) and one (1) culvert (SFN 5300586) structure are also planned within the project limits. A Final Structure Foundation exploration report was submitted separately.

A total of twenty-six (26) roadway/embankment test borings were performed for this project. From the surface or beneath the surface cover, these test borings encountered both fine-grained soils and coarse-grained soils or bedrock extending down to the boring termination depths. The fine-grained soils were described as A-4a, A-4b, A-6a, A-6b, A-7-5 or A-7-6 soils. The coarse-grained soils were described as A-1-a, A-2-4, A-3 or A-3a. Below the soil overburden, bedrock was encountered in fourteen (14) test borings. The bedrock was described as claystone, sandstone or shale.

Groundwater was encountered during or at completion of drilling in three (3) test borings (B-016-1-23, B-031-0-23 and B-040-0-23) at depths ranging from 3.0 to 23.5 feet. These depths correspond to elevations ranging from 677.9 to 816.2. No groundwater was encountered in the remaining borings, at any time during the field exploration.

Please refer to the Analyses and Recommendations section of this report for global stability, rock cut slope, catchment width and settlement considerations for this project.

II. INTRODUCTION

The overall ATH/MEG-033-18.70/00.00 project will convert 10.7 miles of roadway located in Athens and Meigs Counties from the existing two-lane highway configuration to a four lane, divided highway. The work will take place from just south of Athens



extending down to Darwin. The overall project is divided into two sub projects, PID 119141 and PID 119142.

This report addresses the ATH/MEG-033-23.23/0.00 (PID 119142) project which involves the construction of a 6.23-mile conversion from SLM 23.23 (just west of Pratts Fork Long bridge in Athens County) to SLM 4.05 (just east of Darwin in Meigs County). The project begins at Station 1227+00, and ends at Station 1556+00.

This is a Final Roadway Exploration Report.

III. GEOLOGY AND OBSERVATIONS OF THE PROJECT

The project site is located within the Marietta Plateau physiographic region. Soils in this area are described as Pleistocene (Teays) age Minford clay, red and brown silty clay loam colluvium underlain by Pennsylvanian age sedimentary bedrocks. The bedrock mainly consists of sandstone, siltstone, shale, claystone of the Conemaugh and Monongahela formations.

According to the Web Soil Survey (*United States Department of Agriculture, Natural Resources Conservation Service*), major surficial soils mapped at the subject site are described as Upshur-Gilpin complex (UgE), 25 to 50 percent slopes, Upshur- Gilpin silt loams (UgC2 or UgD), 8 to 15 percent slopes or 15 to 25 percent slopes, Guernsey-Upshur complex (GuD), 15 to 25 percent slopes, Westmoreland-Guernsey silt loams (WhD), 15 to 25 percent slopes.

According to the mapping of historic and active mines (ODNR Mines of Ohio), there are no documented mines in the immediate vicinity of the project. However, surface mining activities were performed on the hillsides south and west of US Route 33, outside the project limits.

According to the mapping of karst features (Known and Probable Karst in Ohio, *ODNR Geological Survey Map EG-1, 1999; Revised 2002, 2006*), there are no mapped karst features in the general vicinity of the project area. Additionally, karst features were not observed at the ground surface during our field exploration.

Several site visits were completed by CTL personnel between October 30, 2023, and August 2, 2024. The US 33 roadway is a two lane, bi directional road that runs generally west to east within the project limits. The topography along the roadway alignment consists of rolling hills with upward and downward slopes immediately adjacent to the roadway. The construction of the proposed US 33 is planned on the south side of the existing US 33. The original roadway plans included the conceptual layout of a future four lane highway. The right of way is wide enough to accommodate the future four lane road and interchanges.

Surface erosion, shallow sloughing and saturated areas were noted within the existing embankments. Special benching will be necessary in some areas to “tie” the



embankments together. Several existing underdrain outlets were noted within the project corridor. No significant rock falls were noted within the hills present along the south side of US 33. The talus from the rock fall was discoidal, spherical or cylindrical in shape with fallen rock size ranging from less than 0.1 foot to 5.5 feet. The talus was mainly noted on the hillside slopes or within the existing catchment area.

There are several existing culverts running beneath US 33 that were designed for future conditions. It is understood that a majority of these culverts will remain in place without any additional improvements required.

The surrounding land usage within the project limits consists of grasslands, wooded areas, with some isolated agricultural and residential areas.

Historic geotechnical records were obtained from the original geotechnical soil profile sheets prepared for ATH-033-40.981, and completed in 2001. The historic boring data was utilized while performing the design analysis. The original geotechnical soil profile sheets can be referred to for historic boring information.

IV. **EXPLORATION**

A total of twenty-six (26) roadway/embankment test borings were performed for this project. The location, depth and elevations of the borings are summarized in Table 1. The boring locations are included in the Geotechnical Profile - Roadway sheets included in Appendix A, and on the boring logs included in Appendix B.

Table 1: Boring Locations, Depths, Elevations, and Coordinates

Boring No.	Station	Offset	Boring Elevation (ft)	Depth (ft)
B-016-0-23	1252+07.01	-9.18	818.15	70.0
B-016-1-23	1252+38.95	161.90	766.34	15.0
B-017-0-23	1278+28.68	-11.88	847.27	45.0
B-017-1-23	1277+90.06	151.89	813.57	15.0
B-024-0-23	1310+28.62	81.81	867.30	20.0
B-025-0-23	1324+99.95	155.42	847.58	13.6*
B-025-1-23	1329+84.30	-11.88	881.72	72.1*
B-025-2-23	1329+64.37	137.16	808.07	19.8*
B-026-0-23**	1331+94.67	26.89	858.95	50.0
B-027-0-23	1333+78.33	156.57	800.38	10.0*
B-028-0-23	1341+17.65	167.25	816.33	33.0*
B-029-0-23	1363+10.97	203.65	807.91	15.8*
B-030-0-23	1367+17.60	215.04	742.37	22.0*
B-031-0-23**	1369+12.35	25.23	832.69	48.9*
B-032-0-23	1372+48.88	158.66	799.26	25.0
B-033-0-23	1388+87.47	142.38	805.53	8.8
B-034-0-23	1405+30.69	-9.71	796.96	68.0***



Boring No.	Station	Offset	Boring Elevation (ft)	Depth (ft)
B-040-0-23	1428+04.15	116.18	688.87	43.0*
B-041-0-23	1510+43.34	188.36	704.53	15.0
B-053-0-23	1311+16.58	-72.53	887.35	49.3*
B-054-0-23	1315+16.07	-105.34	887.37	10.0
B-055-0-23	1319+79.60	106.05	868.54	20.0
B-056-0-23	1315+97.56	112.72	890.14	19.6*
B-057-0-23	1318+15.37	352.89	834.18	13.8*
B-060-0-23	1525+80.15	-95.92	708.94	10.0
B-064-0-23	1325+74.00	-186.25	857.50	14.7*

*Boring terminated upon encountering auger refusal.

**Performed by ODOT

*** Rock coring performed in this boring to confirm bedrock

The borings were performed between November 14, 2023, and June 20, 2024. The borings were performed with track mounted drills rigs utilizing 3.25-inch inside diameter (I.D) hollow stem augers (HSA). Standard Penetration Tests (SPTs) were conducted using 140-pound automatic hammers, falling 30 inches, to drive 2-inch outside diameter (O.D) split barrel samplers. The energy transfer ratio associated with the automatic SPT hammers for CTL rigs ranged from 76.8 to 77.0 percent. These automatic hammers were calibrated between May 2023 and March 2024. The energy transfer ratio associated with the automatic SPT hammer for the ODOT rig is 91.5 percent, but was limited to 90 percent (per ODOT SGE Section 404.3). The automatic hammer for ODOT’s rig was calibrated in November 2023.

Rock coring was performed in boring B-034-0-23 using an NQ size core barrel with a diamond bit. The recovered rock from the coring operations was visually described, and the Rock Quality Designation (RQD) and core recovery values were determined.

The recovered split spoon samples obtained during the drilling operations were preserved in glass jars, visually classified in the field, and laboratory, and tested for moisture content. Representative samples were subjected to additional laboratory testing including Atterberg Limits, grain size distribution and hand penetrometer.

The survey information at the test boring locations was provided by the survey team member Buckley Group.

V. FINDINGS

Boring B-025-1-23 encountered 12 inches of concrete near the surface. No discernable surface cover was noted in boring B-025-2-23. The remaining borings exhibited 2 to 12 inches of topsoil at the surface. Beneath the surface cover, the test borings encountered both fine-grained soils and coarse-grained soils or bedrock extending down to the boring termination depths. The fine-grained soils were described as A-4a, A-4b, A-6a, A-6b, A-7-5 or A-7-6 soils. The coarse-grained soils were described as A-1-a, A-2-4, A-3 or A-3a.



These soils exhibited standard penetration N_{60} values ranging from 6 blows per foot (bpf) to 50 blows for 1 inch of penetration, with natural moisture content values ranging from 0 (due to presence of rock pieces within the fill) to 46 percent.

Beneath the soil overburden, bedrock was encountered in fourteen borings, at depths ranging from 3.5 feet to 63.0 feet below the existing grade. The bedrock was described as claystone, sandstone or shale. The top of bedrock was encountered in these borings at elevations ranging from 645.9 to 886.6. The bedrock was augered and sampled using soil sampling techniques. The augerable bedrock was described as shale or limestone. The augerable bedrock exhibited N_{60} values ranging from 27 bpf to 50 blows for 1-inch penetration. Rock coring was performed in boring B-034-0-23. The recovered bedrock exhibited RQD values ranging from 39 to 93 percent, and core recovery values ranging from 83 to 100 percent.

Groundwater was encountered during or at completion of drilling in three (3) test borings (B-016-1-23, B-031-0-23 and B-040-0-23) at depths ranging from 3.0 to 23.5 feet. The groundwater depths correspond to elevations ranging from 677.9 to 816.2. No groundwater was encountered in the remaining borings, at any time during the field exploration.

VI. ANALYSES AND RECOMMENDATIONS

Results from the global stability, rock cut slope, catchment and settlement considerations for the project are presented below.

In addition to the information obtained from test borings performed by CTL, the conditions encountered in the historic test borings designated as B-82, B-89, B-90, B-95, B-99, B-120, B-124, B-153, B-154, SB-35, SB-44, SB-49, R-47, R-63, R-64, R-74, R-94, R-95, and R-97 also utilized for the design analyses.

A. Global Stability Analyses

Global stability analyses were performed for the eastern section in areas where new fills are planned or where proposed side hill embankment slope rates are steeper than the slope rates of the existing slopes. These areas are summarized in Table 2.

The global stability models were updated based on the comments received from the District on the models presented in the previously submitted design memos.



Table 2: Areas of Global Stability Analyses

Location	Station	Boring No's	Comments
US 33/Proposed Ramps around CR 89	1252+50	B-016-0-23, B-016-1-23	2H:1V fill slope evaluation
	1269+50	B-017-0-23, SB-51	2.15H:1V fill slope evaluation
	1278+00	B-017-0-23, B-017-1-23	2.5H:1V fill slope evaluation
	1310+50	B-024-0-23, B-99	
	1320+00	B-052-0-23, B-055-0-23	2H:1V fill slope evaluation
	1329+50	B-025-1-23, B-025-2-23	Existing Landslide Area, 2.25H:1V fill slope evaluation (right side), 2H:1V fill slope evaluation (left side)
	1339+00	B-026-0-23, B-027-0-23	2. 25H:1V fill slope evaluation
	1340+50	B-028-0-23, SB-49	2. 25H:1V fill slope evaluation
	1352+00	B-033-0-23	2H:1V fill slope evaluation
	1368+00	B-030-0-23, B-031-0-23	2H:1V fill slope evaluation
	1386+00	B-033-0-23, SB-44	
	1405+50	B-034-0-23, R-63, R-64	
	1428+00	B -038-0-23, B-039-0-23, B-039-1-23, B-040-0-23	2.5H:1V fill slope evaluation
	1511+00	B-041-0-23	3H:1V fill slope evaluation
Ramp 89 L	326+50	B-025-0-23, B-025-1-23	2H:1V fill slope evaluation
Ramp 681 N	425+50	B-060-0-23, SB-35	3H:1V fill slope evaluation

The soil parameters used in the analysis were based on the subsurface conditions encountered in the current and historic test borings, laboratory test results, and ODOT's Geotechnical Design Manual (GDM). The cross sections developed by HNTB, and input from the District on Stage 2 plans regarding the proposed slope rates, were used to determine the geometry for the analyses.

The embankment inspection summary report prepared by HDR along the proposed EB lanes was also reviewed while performing the global stability analyses. HDR's inspection included identifying areas of concern such as erosion, slippage, and saturation along the proposed EB embankment areas.

In addition, findings from CTL site visits, and most recent visual inspection performed by CTL (along the westbound embankment slopes), were used while performing the global stability analyses. A summary of the areas of concern identified at the sections considered for global stability analyses is presented in Table 3.



Table 3: Areas of Concern

US 33 Station	Summary of Areas of Concern Identified During Visual Inspection by HDR	Comments*
1252+50	Depression, landslide, slope toe erosion, saturated areas	slope experiencing shallow surficial failures, several saturated areas
1278+00	Slope toe erosion, saturated areas	Erosion rills/gulley's, toe erosion
1310+50	Slope toe erosion, saturated areas	Erosion and saturated areas noted on both left and right side of US 33
1320+00	Depression, slope toe erosion, saturated areas	Erosion and saturated areas noted both on left and right side of US 33
1329+50	Existing Landslide	Landslide, creek at the bottom
1339+00	Landslide, several saturated areas	Saturated areas near the toe
1340+00	Slope toe erosion, saturated areas	Erosion and saturated areas noted on both left and right side of US 33
1368+00	Landslide, several saturated areas	slope experiencing shallow surficial failures, several saturated areas,
1386+00	Saturated areas	Saturated areas
1405+50	Landslide, several saturated areas, toe erosion	slope experiencing shallow surficial failures, several saturated areas
1428+00	None	Saturated areas near the toe
1511+00	Landslide, several saturated areas, toe erosion	slope experiencing shallow surficial failures, several saturated areas

*Comments based on the photos included in the HDR's slope inspection, CTL site visit, and CTL's most recent slope inspection performed along the east side (left side) of the existing embankments.

Per HDR's report, areas of concern, especially saturated areas/zones were also identified in other embankment sections where global stability was not performed. CTL reviewed the mainline cross sections. It is CTL's opinion that no additional analyses are needed along the mainline.

The stability analyses were performed using the *Slide* computer program. The Morgenstern-Price method was used in the analyses. To incorporate the saturated surface conditions as identified in the visual inspection performed by HDR, a piezometric surface was introduced in the global stability analysis. The piezometric surface, labelled "1" is shown on the stability models.

Results of the global stability analyses are submitted in graphical form in Appendix D, and the results are summarized in Table 4. In addition, after performing the review of the global stability analyses included in the previous reports, the District requested us to update the global stability models for Sta. 1329+50, and Sta. 1339+00. Results of the additional global stability analyses that were requested by ODOT are submitted in graphical form in Appendix D1.



Table 4: Global Stability Analyses Results

Location/Station	Case	Calculated Factor of Safety	Minimum Required Factor of Safety	Capacity to Demand Ratio
US 33/ 1252+50	Effective Stress	1.4	1.3	0.9
	Total Stress	2.2		0.6
US 33/ 1269+50	Effective Stress	1.4		0.9
	Total Stress	2.2		0.6
US 33/ 1278+00	Effective Stress	1.7		0.8
	Total Stress	2.4		0.5
US 33/ 1310+50	Effective Stress	1.8		0.7
	Total Stress	3.2		0.4
US 33/ 1320+00	Effective Stress (right side)	1.5		0.9
	Total Stress (right side)	2.7		0.5
	Effective Stress (left side)	2.0		0.7
	Total Stress (left side)	5.1		0.3
US 33/ 1329+50	Effective Stress (Existing Condition)	1.0		1.3
	Effective Stress (Proposed Condition- right side)	1.5		0.9
	Total Stress (Proposed Condition- right side)	1.6		0.8
	Effective Stress (left side)	1.3		1.0
	Total Stress (left side)	2.8		0.5
US 33/ 1339+00	Effective Stress	1.4		0.9
	Total Stress	2.0		0.7
US 33/ 1340+50	Effective Stress	1.5		0.9
	Total Stress	1.9	0.7	
US 33/ 1352+00	Effective Stress	1.6	0.8	
	Total Stress	3.5	0.4	
US 33/ 1368+00	Effective Stress (without Dumped Rock Fill)	1.1	1.2	
	Effective Stress (with Dumped Rock in Toe Key)	1.2	1.1	
	Effective Stress (with Dumped Rock Fill)	1.3	1.0	
	Total Stress (with Dumped Rock Fill)	1.3	1.0	
US 33/ 1386+00	Effective Stress	1.3	1.0	
	Total Stress	1.3	1.0	
US 33/ 1405+50	Effective Stress	1.3	1.0	
	Total Stress	1.4	0.9	
US 33/ 1428+00	Effective Stress	1.4	0.9	
	Total Stress	1.3	1.0	



Location/Station	Case	Calculated Factor of Safety	Minimum Required Factor of Safety	Capacity to Demand Ratio
US 33/ 1511+00	Effective Stress	1.6	1.3	0.8
	Total Stress	1.8		0.7
Ramp 89L/ 326+50	Effective Stress	1.7		0.8
	Total Stress	3.8		0.3
Ramp 681N/ 425+50	Effective Stress	1.4		0.9
	Total Stress	1.3		1.0

According to GDM Section 502, a factor of safety of 1.3 or greater is considered acceptable for slopes that do not support structures.

As mentioned above, several areas of concern were noted on the existing embankment slopes. CTL reviewed the areas of concern and developed a spreadsheet which shows the limits of special benching and/or standard benching along the eastern section of the project. Please refer to the *Benching and Cut Slope Summary* sheet in Appendix G for additional details.

Slope rates steeper than 3H:1V are being considered for a majority of the proposed embankments along the eastern section of the project. In most areas, the bedrock is relatively shallow at the base of the proposed embankment slopes. The residual soils near the toe are often marginally stable or unstable in their natural state. The additional weight of a sidehill embankment fill will only worsen the stability of the existing slope, and shear failures are often induced in this situation, with soils sliding on top of the bedrock surface. To avoid the potential of such a shear surface, it is necessary to install a toe-key into the shallow bedrock surface with special benching to improve the stability of the slope by intercepting the failure surface at the soil/bedrock interface. Therefore, CTL recommended a toe-key near the base of several of the proposed slopes that are steeper than 3H:1V slopes.

When performing excavation for the toe-key, no more than 50 linear feet along the road should be excavated for the embankment without replacing with the compacted embankment soils or dumped rock fill (Type C). The engineer may vary the 50 linear feet based on site conditions (Stability). No excavation shall be left open overnight. Schedule work so as to have the toe-key backfilled and stabilized prior to leaving the site.

Existing Landslide/Former Landslide Repair Area

A landslide has occurred near Sta. 1329+50. Based on the site observations and global stability analysis performed for the existing conditions, it is CTL’s opinion that the residual soils present at or slightly below the former grades may have become weak over the years. These weak layers may have initiated the shear



failure. The head scarp of the failure surface extends into the embankment fill layers placed as part of the US 33 construction.

It is understood that repairs were performed as part of the landslide which occurred in 2004, between historic stations 42+775 and 42+860 (current stationing 1332+12.16 and 1334+91.03). The repair involved over excavation and replacement of the failed embankment materials with inclusion of one-meter (approximately 3.3 feet) thick sand drain placed on top of the cut embankment slope and fill foundation. Several saturated areas and erosion rills are currently noted within the area of the former landslide. In addition, the existing landslide which occurred near Station 1329+00, extends to just west of the former landslide area.

Therefore, it is CTL's opinion that proposed embankment fills placed through these existing landslide/former landslide areas should include dump rock fill placement/special benching as provided below.

To improve the stability of the proposed embankment from Sta. 1326+50 to 1341+00, and to meet the minimum required factor of safety, an 8.0-foot-thick dumped rock fill (Item 601 Type C) layer should be placed above the bottom of the proposed embankment. Above this level, embankment construction should include special benching with drainage.

The voids at the top of the dumped rock fill should be choked off using 703.16 granular type C material. It is also recommended to place 24 inches of 703.16 granular material, type C on top of Item 601 dumped rock fill.

For further details, please refer to recommended benching detail sketches prepared for Sta. 1329+50, included in Appendix E.

Stations 1365+50 to 1371+00

Similarly, to improve the stability of the proposed embankment between Sta. 1365+50 to 1374+00, and to meet the minimum required factor of safety, dumped rock fill (Item 601 Type C) should be placed from bottom up to a constant elevation 753.5. Above this level, embankment construction should include special benching with drainage.

The voids at the top of the dumped rock fill should be choked off using 703.16 granular type C material. It is also recommended to place 24 inches of 703.16 granular material, type C on top of Item 601 dumped rock fill.

For further details, please refer to recommended benching detail sketches prepared for Sta. 1368+00, included in Appendix E.



Existing Landslide at Station 1364+00

The existing landslide near Station 1364+00 is located along a private drive beyond the limits of work for the proposed US 33 embankment. Therefore, the existing landslide will not affect the embankment design or construction.

Special Benching

The special benching should be designed per ODOT GDM Section 800, Figures 800-1 or 800-2. Due to the presence of several saturated areas on the existing embankment slopes, it is our opinion that the slope drains should be included for several areas that include special benching. The slope drains should be included as shown in Figure 800-6 of the ODOT GDM. Example benching details for these areas are provided in Appendix E. Spring drains should also be included along the slopes, as directed by the Engineer.

In addition to the suggested benching in Appendix E, temporary fill should be placed in areas where sliver fills are less than 8 feet in width (per ODOT GDM Figure 800-2), to facilitate compaction of the new fill along the slope.

Per the District's direction, the maximum bench height for special benching should be 15 feet.

For reference, sketches showing the recommended special benching and slope drains at Stations 1252+50, 1269+50, 1278+00, 1310+50, 1320+00, 1329+50 (Left and Right), 1339+00, 1340+50, 1352+00, 1368+00, 1386+00, 1405+50, 1428+00, 1511+00, 326+50 (Ramp 89L), and 425+50 (Ramp 681N) are appended to this report. These sketches can be used as a guideline while developing the special benching geometry for all other embankment slopes planned within the project limits.

B. Rock Cut Slope & Catchment Design

The eastern section of the proposed US 33 mainline will include cuts into the existing hillsides. Bedrock is primarily expected on the hillsides. However, soil should also be expected at the future crest of the cut slopes.

Rock cut slope analyses performed for this project are summarized in Table 5. Information from the historic borings performed in these areas were utilized for the rock cut slope analysis.



Table 5: Areas of Rock Cut Slope Analyses

Location	Station	Historic Boring No.	Recommended Cut slope Rate (H:V) *
US 33	1242+00	B-82	3:1 (soils) 2:1 (Incompetent Rock) 0.5:1 (Incompetent to Competent)
	1265+50	B-89 & B-90	3:1 (soils) 3:1 or 2:1 (Incompetent Rock) 2:1 (Competent Rock)
	1291+00	B-95 & R-47	3:1 (soils) 3:1 (Incompetent Rock) 3:1 (Competent Rock)
	1396+50	B-120	3:1 (soils) 3:1 or 2:1 (Incompetent Rock) 2:1 (Competent Rock)
	1409+50	B-124	3:1 (soils) 3:1 (Incompetent and Competent Rock encountered at shallow depths) 0.5:1 (Competent Rock encountered at greater depths)
	1450+50	R-74	3:1 (soils) 3:1 (Incompetent Rock) 0.5:1 or 1:1 (Competent Rock)
Ramp 681 M	323+00	B-153 & R-94	3:1 (soils) 3:1 (Incompetent Rock)
Ramp 681 N (Left and Right Side)	429+50	R-95	3:1 (soils) 3:1 (Incompetent Rock)
Ramp 681 O	135+00	R-97	3:1 (soils) 3:1, 2:1 or 1:1 (Incompetent Rock) 1:1 (Competent Rock)

* Based on the prior discussions with District personnel, if the recommended 3H:1V cut slope falls outside the eco-boundary, then 2H:1V slopes can be utilized for the overburden soil layer.

Parameters used in the rock cut slope design along with recommended slope rates are also provided in Appendix F of this report.

The Benching and Cut Slope Summary spreadsheet provided in Appendix G of this report can be used while preparing cross sections for this project.

Overburden Bench

The thickness of soil overburden in the historic test borings considered for the rock cut design analysis ranged from 3.0 and 13.1 feet. For estimating purposes, it is recommended that the top 15 feet of the cut slopes are considered as soil, and are laid back at a slope rate of 3H:1V, as recommended by the District.



Based on comments received from the District, if it is determined that a cut slope including an overburden bench will extend beyond the ecological boundary limits, the overburden soils may be laid back at a slope rate of 2H:1V, or the overburden benches may be eliminated. Otherwise, if the inclusion of an overburden bench will not extend the cut slopes beyond the ecological boundary limits, it is recommended to include a 10-foot wide overburden bench at the soil-bedrock interface.

Geotechnical (Lithologic) Bench

A geotechnical or lithologic bench is a bench placed at the top of a less durable (Incompetent) design unit, such as shale or claystone, which underlies a more durable (Competent) design unit, such as sandstone or limestone. The purpose of a geotechnical bench is to provide protection against undercutting of the more durable design unit as the less durable design unit weathers and erodes.

In addition, per District's direction, a geotechnical bench is also recommended at the top of a competent design unit which underlies an incompetent design unit.

The 10-foot wide geotechnical bench is recommended between the incompetent and competent units. Please refer to the appended Rock Cut Slope Analysis which identifies the recommended locations of the geotechnical benches.

Per ODOT GDM Section 1005.2, geotechnical benches must be field adjusted during construction to align with elevation changes in the bedding contact.

Construction Bench

Based on comments from the District, construction benches are only required when pre-splitting is performed.

Catchment Areas

Catchment areas are sections of flat or negatively sloped ground used to dissipate rockfall energy and to collect rocks and other debris that have detached from the slope. The catchment areas are required at the toe of the proposed rock cut slopes. ODOT GDM Section 1000 provides guidance on the design of the catchment for rock cut slopes. ODOT GDM Figures 1000-1 and 1000-2, provide the geometry for the design of the proposed catchment width for a given foreslope, rock cut slope angle and height of rock cut slope.

Catchment designs were performed at critical locations for this project. The analyses included the following details:

- A 10-foot-wide flat maintenance bench and angled foreslope will be for the catchment area (Similar to ODOT GDM Figure 1000-2)



- A foreslope of 8H:1V for sections 1242+00, 1396+50, 1450+50 and a foreslope of 3H:1V for section Sta. 135+00 (Ramp O).
- Rock cut slope angles as recommended in Section B above.

The catchment widths were verified using the Colorado Rockfall Simulation Program (CRSP), version 4.0. ODOT GDM requires a minimum rockfall catchment of 95 percent at the outside edge of pavement. Table 6 summarizes the input data and the results of the rockfall catchment analysis using CRSP. The CRSP input and output data files along with the figures showing the catchment geometry are contained in Appendix H.

CTL personnel performed site visits to determine the size and shape of the talus from the existing rock slopes. During the site visit, it was noted that the talus was discoidal, cylindrical, or spherical in shape with fallen rock size ranging from less than 0.1 foot to 5.5 feet. The talus was mainly noted near the toe of the slopes or within the existing catchment area. The talus sizes utilized in the catchment width design consisted of discoidal, cylindrical, or spherical shapes with the diameter and thickness shown in Table 6.

Table 6: Rockfall Catchment Options and Results

Station	Maximum Rock Size		Rock Shape	Cut Slope Height (feet)	Catchment Width (Feet)	Rockfall Catchment %
	Diameter (Feet)	Thickness (feet)				
1242+00*	3.0	1.7	Discoidal	37±	20	99
1396+50*	2.3	---	Spherical	47±	20	100
1450+50*	1.4	3.4	Cylindrical	52±	25	99
Sta. 135+00** (Ramp 681O)	5.5	4.5	Discoidal	91±	35	100

* Design includes 10-foot-wide flat maintenance bench and 8H:1V foreslope (width varies).

** Design includes 10-foot-wide flat bench and 25 foot wide, 3H:1V foreslope.

The results meet the requirements of the 95 percent rockfall catchment requirement for the given assumptions. Based on the analyses, CTL recommends the following:

- Utilize a catchment width of 20.0 feet (10-foot flat maintenance bench + 10-foot-wide 8H:1V foreslope) at the base of the rock cuts for slope heights of less than 50.0 feet,
- Utilize a catchment width of 25.0 feet (10-foot flat maintenance bench + 15-foot-wide 8H:1V foreslope) at the base of the rock cuts for slope heights between 50.0 and 90.0 feet
- Utilize a catchment width of 35.0 feet (10-foot flat maintenance bench + 25-foot-wide 3H:1V foreslope) at the base of the rock cuts for slope heights greater than 90.0 feet.



The rock cut slope height is the vertical distance from the overburden bench or lowest 2:1 or flatter slope of more than 10 feet in height, to the base of slope.

C. Settlement Analyses

Settlement analyses were performed in the following areas of the eastern section of the project. The fill heights used in the analyses are provided in Table 7 below.

Table 7: Areas of Settlement Analyses

Location	Station	Boring No.	Proposed Fill Height (feet)
US 33	1325+00	B-025-0-23	30.0
Ramp 89K	318+00	B-057-0-23	27.5
Ramp 89 L	327+00	B-064-0-23	16.3
Ramp 681N	425+50	B-060-0-23, B-154	13.5

Results of the settlement analyses are summarized in Table 8. Settlement calculations are included in Appendix I.

Table 8: Settlement Analyses

Location	Station	Estimated Settlement (inches)
US 33	1325+00	1.1
Ramp 89K	318+00	1.7
Ramp 89L	327+00	3.0
Ramp 681N	425+50	3.0

According to the GDM Section 504, where a structure, utility, or other roadway infrastructure or adjacent property is not influenced by settlement of the embankment, a predicted total settlement of 3 inches or less is considered reasonable and should not require any corrective action.

The estimated consolidation settlements for all locations indicated in Table 8 are 3.0 inches or less. Therefore, it is CTL’s opinion that no settlement monitoring is needed for the embankment fills during construction.

VII. CHANGED CONDITIONS

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, our understanding of the project and our experience with similar sites and subsurface conditions using generally accepted geotechnical engineering practices. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates drilled, they are not necessarily representative of the subsurface



conditions between boring locations or subsurface conditions during other seasons of the year.

In the event that changes in the project are proposed, additional information becomes available, or if it is apparent that subsurface conditions are different from those provided in this report, CTL should be notified so that our recommendations can be modified, if required.

VIII. TESTING AND OBSERVATION

During the design process, it is recommended that CTL work with the project designers to confirm that the geotechnical recommendations are properly incorporated into the final plans and specifications, and to assist with establishing criteria for the construction observation and testing.

CTL is not responsible for independent conclusions, opinions and recommendations made by others based on the data and recommendations provided in this report. It is recommended that CTL be retained to provide construction quality control services on this project. If CTL is not retained for these services, CTL shall assume no responsibility for compliance with the design concepts or recommendations provided.

IX. CLOSING

The report was prepared by CTL Engineering, Inc. (Consultant) solely for the use of Client in accordance with an executed contract. The Client's use of or reliance on this report is limited by the terms and conditions of the contract and by the qualifications and limitations stated in the report. It is also acknowledged that the Client's use of and reliance of this report is limited for reasons which include: actual site conditions that may change with time; hidden conditions, not discoverable within the scope of the assessment, may exist at the site; and the scope of the investigation may have been limited by time, budget and other constraints imposed by the Client.

Neither the report, nor its contents, conclusions or recommendations, are intended for the use of any party other than the Client. Consultant and the Client assume no liability for any reliance placed on this report by such party. The rights of the Client under contract may not be assigned to any person or entity, without the consent of the Consultant which consent shall not be unreasonably withheld. This geotechnical report does not address the environmental conditions of the site. The Consultant is not responsible for consequences or conditions arising from facts that were concealed, withheld, or not fully disclosed at the time the assessment was conducted.

To the fullest extent permitted by law, the Consultant and Client agree to indemnify and hold each other, and their officers and employees harmless from and against claims, damages, losses and expenses arising out of unknown or concealed conditions. Furthermore, neither the Consultant nor its employees shall be liable to the Owner in an amount in excess of the available professional liability insurance coverage of the

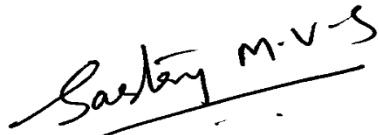


Consultant. In addition, Client and Consultant agree neither shall be liable for any special, indirect or consequential damages of any kind or nature.

The Consultant's services have been provided consistent with its professional standard of care. No other warranties are made, either expressed or implied.

Respectfully Submitted,

CTL ENGINEERING, INC.



Sastry Malladi, P.E.
Project Engineer



Joe Grani, P.E.
Project Engineer



APPENDIX A
GEO TECHNICAL PROFILE - ROADWAY



LEGEND

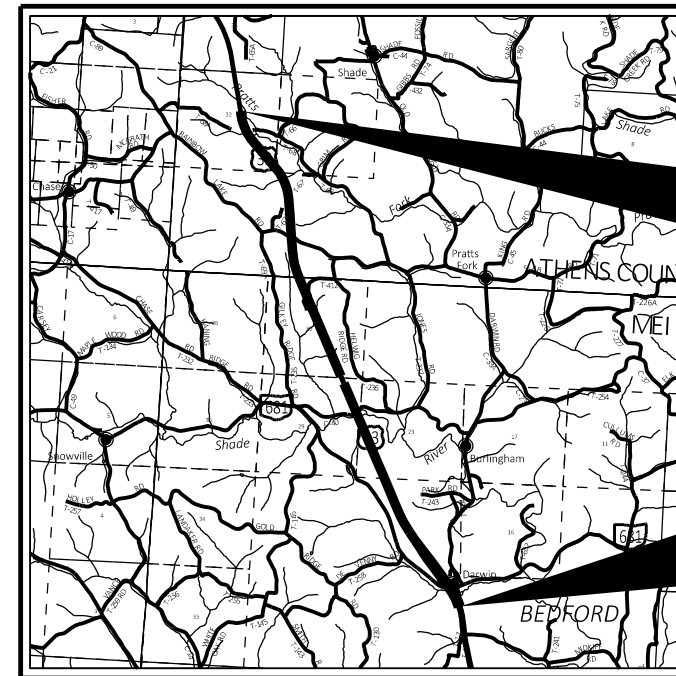
DESCRIPTION	ODOT CLASS	CLASSIFIED MECH./VISUAL	
GRAVEL AND/OR STONE FRAGMENTS	A-1-a	0	3
GRAVEL AND/OR STONE FRAGMENTS WITH SAND	A-1-b (0)	2	2
GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT	A-2-4 (0)	1	2
GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT AND CLAY	A-2-7	0	1
FINE SAND	A-3 (0)	5	9
COARSE AND FINE SAND	A-3a (0)	23	19
SANDY SILT	A-4a (3)	33	29
SILT	A-4b (7)	5	14
SILT AND CLAY	A-6a (8)	56	46
SILTY CLAY	A-6b (11)	27	26
ELASTIC CLAY	A-7-5 (17)	5	5
CLAY	A-7-6 (14)	37	53
	TOTAL	194	209
BOULDERS	VISUAL		
CLAYSTONE	VISUAL		
CONCRETE	VISUAL		
SANDSTONE	VISUAL		
SHALE	VISUAL		
ROCK OUTCROP	VISUAL		
PAVEMENT OR BASE = X = APPROXIMATE THICKNESS	VISUAL		
SOD AND TOPSOIL = X = APPROXIMATE THICKNESS	VISUAL		
EXPLORATION LOCATION - PLAN VIEW			
DRIVE SAMPLE AND/OR ROCK CORE BORING PLOTTED TO VERTICAL SCALE ONLY. HORIZONTAL BAR INDICATES A CHANGE IN STRATIGRAPHY.			
WC	INDICATES WATER CONTENT IN PERCENT.		
N ₆₀	INDICATES STANDARD PENETRATION RESISTANCE NORMALIZED TO 60% DRILL ROD ENERGY RATIO.		
X/D"	NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X/D" = NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL.		
X/Y/D"	NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X = NUMBER OF BLOWS FOR 6 INCHES (UNCORRECTED). Y/D" = NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL.		
X/Y/Z/D"	NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X = NUMBER OF BLOWS FOR FIRST INCHES (UNCORRECTED). Y = NUMBER OF BLOWS FOR SECOND 6 INCHES (UNCORRECTED). Z/D" = NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL.		
NP	INDICATES A NON-PLASTIC SAMPLE.		
NQ	"N" SERIES ROCK CORE BARREL OF "Q" IRELINE BIT SIZE.		
Qu	INDICATES UNCONFINED COMPRESSION TEST, ASTM D7012.		
SS	INDICATES A SPLIT SPOON SAMPLE.		
TR	INDICATES TOP OF ROCK ELEVATION		

RECON. - CTL 10/30/2023 -08/02/2024

DRILLING - CTL 11/14/2023-10/02/2024

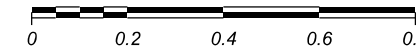
DRAWN - SACHINA 11/06/2024

REVIEWED - SM, JG 11/06/2024

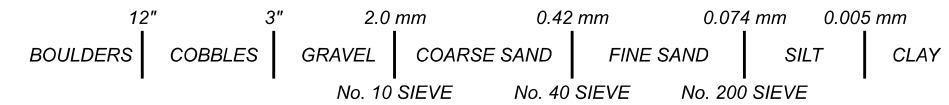


LOCATION MAP

SCALE IN MILES



PARTICLE SIZE DEFINITIONS



DCP EXPLORATION					
EXPLORATION ID	NORTHING	EASTING	ELEVATION	STATION	OFFSET
D-016-0-23	279190.871	174150.522	931.5	1247+57.36	-6.4 LT
D-017-0-23	277438.957	175326.921	947.7	1268+89.72	-11.5 LT
D-018-0-23	276687.069	175962.872	959.2	1278+74.31	-10.8 LT
D-019-0-23	274047.347	176706.348	994.5	1306+70.44	-8.2 LT
D-020-0-23	272746.653	176786.917	1001	1319+73.58	3 RT
D-021-0-23	269678.276	177604.517	977.5	1351+76.45	-3.7 LT
D-022-0-23	268847.979	177958.439	970.4	1360+79.02	-8.6 LT
D-023-0-23	267636.402	178460.005	959.2	1373+90.30	-2 LT
D-024-0-23	266819.96	178815.393	954.8	1382+80.66	-13.6 LT
D-025-0-23	266123.316	179096.456	947.5	1390+31.79	-3 LT
D-026-0-23	263858.641	180058.358	878.3	1414+92.26	-13.1 LT
D-027-0-23	261585.977	181002.004	873.9	1439+53.02	-3.3 LT
D-028-0-23	259965.178	181693.273	900.5	1457+15.05	-13.2 LT
D-029-0-23	258868.019	182149.736	903.8	1469+03.37	-9.3 LT
D-030-0-23	257360.504	182801.365	883.4	1485+46.64	-10.2 LT
D-031-0-23	256649.795	183209.42	872.5	1493+67.79	-11.6 LT
D-032-0-23	255321.326	184083.951	852.1	1509+56.97	60.1 RT
D-033-0-23	254087.976	184982.036	826.4	1524+82.62	69.8 RT

DESIGN AGENCY



DESIGNER

N.K.S

REVIEWER

SM 11-06-24

PROJECT ID

119142

SUBSET TOTAL

1 172

SHEET TOTAL

1 172

ATH/MEG-33-23.23/0.00

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PROJECT DESCRIPTION

THE PROJECT, IDENTIFIED AS ATH/MEG-033-23.23/0.00 (PID NUMBER 119142), CONSISTS OF THE CONSTRUCTION AND CONVERSION OF A 6.23 MILE SECTION OF U.S. ROUTE 33 (US 33) ROADWAY FROM A SUPER TWO-LANE HIGHWAY TO A FOUR-LANE FREEWAY ALONG WITH GRADE SEPARATED INTERCHANGES AND RAMPS. THE PROJECT IS LOCATED IN LODI TOWNSHIP, ATHENS COUNTY, OHIO AS WELL AS BEDFORD TOWNSHIP, MEIGS COUNTY, OHIO. ACCORDING TO THE STAGE 2 PLANS, THE PROJECT BEGINS AT STATION 1227+00 AND ENDS AT STATION 1556+00.00.

FOUR (4) NEW BRIDGE STRUCTURES (SFN 501191, SFN 501205, SFN 500319 AND SFN 5300403) AND ONE (1) CULVERT (SFN 5300586) STRUCTURE ARE ALSO PLANNED WITHIN THE PROJECT LIMITS.

HISTORIC RECORDS

HISTORIC GEOTECHNICAL RECORDS WERE OBTAINED FROM THE ORIGINAL GEOTECHNICAL SOIL PROFILE SHEETS PREPARED FOR ATH-033-40.981, AND COMPLETED IN 2001. PER THE DIRECTION OF THE DISTRICT, NO RE-WORK WAS DONE TO INCLUDE THE HISTORIC BORING INFORMATION ON THE CURRENT SOIL PROFILE SHEETS. THE ORIGINAL GEOTECHNICAL SOIL PROFILE SHEETS CAN BE REFERRED TO FOR HISTORIC BORING INFORMATION.

GEOLOGY

THE PROJECT SITE IS LOCATED WITHIN THE MARIETTA PLATEAU PHYSIOGRAPHIC REGION. SOILS IN THIS AREA ARE DESCRIBED AS PLEISTOCENE (TEAYS) AGE MINFORD CLAY, RED AND BROWN SILTY CLAY LOAM COLLUVIUM UNDERLAIN BY PENNSYLVANIAN AGE SEDIMENTARY BEDROCKS. THE BEDROCK MAINLY CONSISTS OF SANDSTONE, SILTSTONE, SHALE, CLAYSTONE OF THE CONEMAUGH AND MONONGAHELA FORMATIONS.

ACCORDING TO THE MAPPING OF HISTORIC AND ACTIVE MINES (ODNR MINES OF OHIO), THERE ARE NO DOCUMENTED MINES IN THE IMMEDIATE VICINITY OF THE PROJECT. HOWEVER, SURFACE MINING ACTIVITIES WERE PERFORMED ON THE HILLSIDES SOUTH AND WEST OF US ROUTE 33, OUTSIDE THE PROJECT LIMITS.

ACCORDING TO THE MAPPING OF KARST FEATURES (KNOWN AND PROBABLE KARST IN OHIO, ODNR GEOLOGICAL SURVEY MAP EG-1, 1999; REVISED 2002, 2006), THERE ARE NO MAPPED KARST FEATURES IN THE GENERAL VICINITY OF THE PROJECT AREA. ADDITIONALLY, KARST FEATURES WERE NOT OBSERVED AT THE GROUND SURFACE DURING OUR FIELD EXPLORATION.

RECONNAISSANCE

SEVERAL SITE VISITS WERE COMPLETED BY CTL PERSONNEL BETWEEN OCTOBER 30, 2023, AND AUGUST 2, 2024. THE US 33 ROADWAY IS A TWO LANE, BI DIRECTIONAL ROAD THAT RUNS GENERALLY WEST TO EAST WITHIN THE PROJECT LIMITS. THE TOPOGRAPHY ALONG THE ROADWAY ALIGNMENT CONSISTS OF ROLLING HILLS WITH UPWARD AND DOWNWARD SLOPES IMMEDIATELY ADJACENT TO THE ROADWAY. THE CONSTRUCTION OF THE PROPOSED US 33 IS PLANNED ON THE SOUTH SIDE OF THE EXISTING US 33. THE ORIGINAL ROADWAY PLANS INCLUDED THE CONCEPTUAL LAYOUT OF A FUTURE FOUR LANE HIGHWAY. THE RIGHT OF WAY IS WIDE ENOUGH TO ACCOMMODATE THE FUTURE FOUR LANE ROAD AND INTERCHANGES.

SURFACE EROSION, SHALLOW SLOUGHING AND SATURATED AREAS WERE NOTED WITHIN THE EXISTING EMBANKMENTS. NO SIGNIFICANT ROCK FALLS WERE NOTED WITHIN THE HILLS PRESENT ALONG THE SOUTH SIDE OF US 33. THE TALUS FROM THE ROCK FALL WAS DISCOIDAL, SPHERICAL OR CYLINDRICAL IN SHAPE WITH FALLEN ROCK SIZE RANGING FROM LESS THAN 0.1 FOOT TO 5.5 FEET. THE TALUS WAS MAINLY NOTED ON THE HILLSIDE SLOPES OR WITHIN THE EXISTING CATCHMENT AREA.

THERE ARE SEVERAL EXISTING CULVERTS RUNNING BENEATH US 33 THAT WERE DESIGNED FOR FUTURE CONDITIONS. IT IS UNDERSTOOD THAT A MAJORITY OF THESE CULVERTS WILL REMAIN IN PLACE WITHOUT ANY ADDITIONAL IMPROVEMENTS REQUIRED.

THE SURROUNDING LAND USAGE WITHIN THE PROJECT LIMITS CONSISTS OF GRASSLANDS AND WOODED AREAS.

SUBSURFACE EXPLORATION

A TOTAL OF TWENTY (26) ROADWAY/EMBANKMENT, AND TWENTY-SIX (26) STRUCTURE TEST BORINGS WERE COMPLETED FOR THIS SUBSURFACE EXPLORATION. THE BORINGS WERE DRILLED TO DEPTHS RANGING FROM 8.75 TO 90 FEET BELOW EXISTING GRADE. BORINGS B-026-0-23, B-031-0-23 AND B-039-2-24 WERE PERFORMED BY ODOT, THE REMAINING BORINGS WERE PERFORMED BY CTL ENGINEERING INC.

THE TEST BORINGS WERE DRILLED BETWEEN THE DATES OF NOVEMBER 7, 2023, AND OCTOBER 02, 2024, UTILIZING 3/4- INCH I.D. HOLLOW STEM AUGERS POWERED BY FOUR DIFFERENT TRACK-MOUNTED ROTARY DRILL RIGS. SPLIT-BARREL (SPOON) DISTURBED SOIL SAMPLES AND STANDARD PENETRATION TESTS WERE PERFORMED IN ACCORDANCE WITH AASHTO T206 AT 1.5- FOOT, 2.5- FOOT, AND 5- FOOT INTERVALS. THE ENERGY TRANSFER RATIO ASSOCIATED WITH THE AUTOMATIC SPT HAMMERS FOR CTL RIGS RANGED FROM 76.8 TO 79.3 PERCENT. THESE AUTOMATIC HAMMERS WERE CALIBRATED BETWEEN NOVEMBER 2022 AND MARCH 2024. THE ENERGY TRANSFER RATIO ASSOCIATED WITH THE AUTOMATIC SPT HAMMER FOR ODOT RIG WAS 90 PERCENT. THIS AUTOMATIC HAMMER WAS CALIBRATED ON NOVEMBER 2023. ROCK CORE SAMPLING WAS PERFORMED USING A WIRE-LINE SYSTEM EQUIPPED WITH A NQ-2 DOUBLE TUBE CORE BARREL AND A DIAMOND BIT.

EXPLORATION FINDINGS

ROADWAY/EMBANKMENT BORINGS

THE ROADWAY/EMBANKMENT BORINGS ENCOUNTERED TOPSOIL OR CONCRETE NEAR THE SURFACE.

BENEATH THE SURFACE COVER, THE TEST BORINGS ENCOUNTERED BOTH FINE-GRAINED SOILS AND COARSE- GRAINED SOILS OR BEDROCK EXTENDING DOWN TO THE BORING TERMINATION DEPTHS. THE FINE-GRAINED SOILS WERE DESCRIBED AS A-4a, A-4b, A-6a, A-6b, A-7-5 OR A-7-6 SOILS. THE COARSE-GRAINED SOILS WERE DESCRIBED AS A-1-a, A-2-4, A-3 OR A-3a.

BENEATH THE SOIL OVERBURDEN, BEDROCK WAS ENCOUNTERED IN FOURTEEN BORINGS, AT DEPTHS RANGING FROM 3.5 FEET TO 63.0 FEET BELOW THE EXISTING GRADE. THE BEDROCK WAS DESCRIBED AS CLAYSTONE, SANDSTONE OR SHALE. THE TOP OF BEDROCK WAS ENCOUNTERED IN THE BORINGS AT ELEVATIONS RANGING FROM 645.9 TO 886.6. THE BEDROCK WAS AUGERED AND SAMPLED USING SOIL SAMPLING TECHNIQUES. ROCK CORING WAS PERFORMED IN B-034-0-23 BETWEEN DEPTHS OF 61.5 AND 68.0 FEET BELOW GRADE.

GROUNDWATER WAS ENCOUNTERED DURING OR AT COMPLETION OF DRILLING IN THREE (3) TEST BORINGS (B-016-1-23, B-031-0-23 AND B-040-0-23) AT DEPTHS RANGING FROM 3.0 TO 23.5 FEET. THE GROUNDWATER DEPTHS CORRESPOND TO ELEVATIONS RANGING FROM 677.9 TO 816.2. NO GROUNDWATER WAS ENCOUNTERED IN THE REMAINING ROADWAY/EMBANKMENT BORINGS, AT ANY TIME DURING THE FIELD EXPLORATION.

STRUCTURE BORINGS

THE STRUCTURE BORINGS ENCOUNTERED TOPSOIL, ASPHALT, CONCRETE OR GRAVEL NEAR THE SURFACE.

BENEATH THE SURFACE COVER, THE TEST BORINGS ENCOUNTERED BOTH FINE-GRAINED SOILS AND COARSE-GRAINED SOILS EXTENDING DOWN TO DEPTHS RANGING FROM 1.0 TO 36.0 FEET BELOW EXISTING GRADE. THE FINE-GRAINED SOILS WERE DESCRIBED AS A-4a, A-6a, A-6b, A-7-5 OR A-7-6 SOILS. THE COARSE-GRAINED SOILS WERE DESCRIBED AS A-2-4, A-3 OR A-3a. BORINGS B-035-1-23 AND B-039-1-23 WERE TERMINATED WITHIN THE SOILS.

BENEATH THE SOIL OVERBURDEN, ALL STRUCTURE BORINGS EXCEPT B-035-1-23 AND B-039-1-23 EXHIBITED BEDROCK. THE TOP OF BEDROCK WAS ENCOUNTERED AT DEPTHS RANGING FROM 1.0 TO 36.0 FEET BELOW EXISTING GRADE. THE TOP OF BEDROCK WAS ENCOUNTERED IN THE BORINGS AT ELEVATIONS RANGING FROM 638.5 TO 879.8. THE BEDROCK WAS AUGERED AND SAMPLED USING SOIL SAMPLING AND ROCK CORING TECHNIQUES. THE RECOVERED BEDROCK WAS DESCRIBED AS CLAYSTONE, SANDSTONE OR SHALE.

GROUNDWATER WAS ENCOUNTERED DURING IN FIVE (5) TEST BORINGS (B-037-0-23, B-038-0-23, B-039-0-23, B-058-0-23 AND B-059-0-23) AT DEPTHS RANGING FROM 4.0 TO 8.0 FEET. THESE DEPTHS CORRESPOND TO ELEVATIONS RANGING FROM 656.7 TO 671.9.

SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 19, 2024.

AVAILABLE INFORMATION

THE SOIL AND GROUNDWATER INFORMATION COLLECTED FOR THIS SUBSURFACE EXPLORATION THAT CAN BE CONVENIENTLY DISPLAYED ON THE GEOTECHNICAL PROFILE SHEETS HAS BEEN PRESENTED. GEOTECHNICAL REPORTS, IF PREPARED, ARE AVAILABLE FOR REVIEW ON THE OFFICE OF CONTRACT SALES WEBSITE.

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LOCATION		PLAN VIEW SHEET	PROFILE SHEET	CROSS SECTION SHEET	STRUCTURE INCLUDED	
FROM STA.	TO STA.				BRIDGE NO.	SFN
US 33						
1227+00	1234+50	10	-	-	-	501191
1227+00	1234+50	-	11	-	-	-
1234+50	1247+00	12	12	-	-	501191
1247+00	1259+50	13	-	-	-	-
1247+00	1259+50	-	14	-	-	-
	1252+50	-	-	15	-	-
1272+00	1284+50	16	-	-	-	501205
1272+00	1284+50	-	17	-	-	-
	1278+00	-	-	18	-	-
1284+50	1297+00	19	-	-	-	501205
1284+50	1297+00	-	20	-	-	-
1309+50	1322+00	21	21	-	-	-
1322+00	1334+50	22	-	-	-	-
1322+00	1334+50	-	23	-	-	-
	1329+50	-	-	24	-	-
1334+50	1347+00	25	25	-	-	-
1359+50	1372+00	26	-	-	-	-
1359+50	1372+00	-	27	-	-	-
1372+00	1384+50	28	28	-	-	-
1384+50	1397+00	29	29	-	-	-
1397+00	1409+50	30	30	-	-	-
1409+50	1422+00	31	31	-	-	5300403
1422+00	1434+50	32	-	-	-	5300403
1422+00	1434+50	-	33	-	-	-
	1426+00	-	-	34	-	-
1509+50	1522+00	35	35	-	-	-
1547+00	1559+50	36	36	-	-	-
C.R. 89 (RAINBOW LAKE ROAD)						
401+75.82	414+50	37	37	-	-	-
414+50	420+57	38	38	-	-	-
RAMP 89 I						
30+00	41+50	39	39	-	-	-
41+50	46+73.91	40	40	-	-	-
RAMP 89 J						
306+11	319+07	41	41	-	-	-
RAMP 89 K						
316+55.18	327+40.95	42	42	-	-	-
RAMP 89 L						
319+09.10	332+00	43	43	-	-	-
332+00	336+24.60	44	44	-	-	-
RAMP 681 N						
420+44.63	433+85.62	45	45	-	-	-
RAMP 681 O						
126+01.32	139+87.30	46	-	-	-	-
126+01.32	139+87.30	-	47	-	-	-
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DCP TEST DATA, SHEETS 97 TO 114						
UNDISTURBED TEST RESULTS, SHEETS 115 TO 172						

GEOTECHNICAL PROFILE - ROADWAY



DESIGN AGENCY	CTL ENGINEERING
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
2	172
SHEET	TOTAL
1	1

BEDROCK TEST SUMMARY					
BORING ID	SAMPLE ELEVATION (FEET)	SAMPLE DEPTH (FEET)	QU (PSI)	SDI %	LITHOLOGY
B-007-0-23	835.0-830.0	1.0-6.0	-	83.0	SANDSTONE
	823.6-823.1	12.4-12.9	1,360	-	SANDSTONE
	820.0-819.5	16.0-16.5	2,040	-	SANDSTONE
B-008-0-23	757.5-752.5	24.3-29.3	-	3.6	CLAYSTONE
	756.1-755.6	25.7-26.2	100	-	CLAYSTONE
	750.3-749.8	31.5-32.0	880	-	CLAYSTONE
B-009-0-23	743.5-738.5	19.3-24.3	-	61.5	SHALE
	739.5-738.9	23.3-23.9	3,560	-	SANDSTONE
	736.0-735.5	26.8-27.3	2,910	-	SANDSTONE
B-010-0-23	744.6-739.6	10.7-15.7	-	18.5	SHALE
	740.1-739.6	15.2-15.7	12,850	-	SANDSTONE
	738.6-738.1	16.7-17.2	10,290	-	SANDSTONE
B-011-0-23	740.3-735.3	10.0-15.0	-	66.7	SHALE
	732.6-732.0	17.7-18.3	11,020	-	SANDSTONE
	728.3-727.8	22.0-22.5	6,790	-	SANDSTONE
B-012-0-23	837.0-832.0	15.0-20.0	-	19.9	SANDSTONE
	829.0-828.6	23.0-23.4	2,040	-	SANDSTONE
	825.6-825.0	26.4-27.0	2,710	-	SANDSTONE
	818.4-817.9	33.6-34.1	4,110	-	SANDSTONE
B-018-0-23	839.6-839.0	5.8-6.4	2,410	-	SHALE
	830.4-829.0	15.0-16.4	-	40.9	SHALE
	829.0-828.5	16.4-16.9	5,370	-	SANDSTONE
	824.4-823.9	21.0-21.5	5,030	-	SANDSTONE
B-019-0-23	748.9-743.9	15.0-20.0	-	23.0	CLAYSTONE
	745.4-745.0	18.5-18.9	50	-	CLAYSTONE
	739.4-738.9	24.5-25.0	230	-	CLAYSTONE
B-020-0-23	737.4-732.4	18.5-23.5	-	71.5	INTERBEDDED SANDSTONE AND SHALE
	734.2-733.6	21.7-22.3	10,260	-	SANDSTONE
	730.4-729.9	25.5-26.0	6,060	-	SANDSTONE
B-021-0-23	751.5-751.0	10.5-11.0	9,490	-	SANDSTONE
	750.0-745.0	12.0-17.0	-	1.2	CLAYSTONE
	747.0-746.5	15.0-15.5	80	-	CLAYSTONE
	738.5-738.0	23.5-24.0	5,720	-	SHALE
B-021-0-23	823.3-818.3	8.0-13.0	-	86.9	SANDSTONE
	823.3-822.5	8.0-8.8	11,330	-	SANDSTONE
	816.3-815.8	15.0-15.5	3,290	-	SANDSTONE
	813.3-812.7	18.0-18.6	2,900	-	SANDSTONE
B-023-0-23	841.5-841.0	22.2-22.7	740	-	CLAYSTONE
	833.7-828.7	30.0-35.0	-	85.5	INTERBEDDED SANDSTONE AND SHALE
	829.7-829.1	34.0-34.6	6,550	-	SANDSTONE
	827.7-827.2	36.0-36.5	5,510	-	SANDSTONE
	821.7-821.1	42.0-42.6	3,260	-	SANDSTONE
	817.7-816.9	46.0-46.8	9,090	-	SANDSTONE

BEDROCK TEST SUMMARY (CONT.)					
BORING ID	SAMPLE ELEVATION (FEET)	SAMPLE DEPTH (FEET)	QU (PSI)	SDI %	LITHOLOGY
B-035-0-23	713.0-712.4	17.0-17.6	180	-	SHALE
	710.0-705.0	20.0-25.0	-	4.9	SHALE
	709.8-709.3	20.2-20.7	120	-	SHALE
B-036-0-23	677.2-672.2	20.0-25.0	-	41.1	SHALE
	671.0-670.6	26.2-26.6	370	-	SHALE
B-037-0-23	634.5-629.5	40.0-45.0	-	14.5	SHALE
	632.5-631.9	42.0-42.6	110	-	SHALE
	629.0-628.5	45.5-46.0	110	-	SHALE
B-038-0-23	637.9-637.4	42.0-42.5	90	-	SHALE
	634.9-629.9	45.0-50.0	-	0.7	SHALE
	632.5-632.0	47.4-47.9	100	-	SHALE
B-039-0-23	636.8-631.8	40.0-45.0	-	5.6	SHALE
	632.4-631.8	44.4-45.0	90	-	SHALE
	630.8-630.3	46.0-46.5	140	-	SHALE
B-050-0A-23	872.0-871.6	16.1-16.5	30	-	CLAYSTONE
	863.8-863.1	24.3-25.0	6,280	-	SHALE
B-051-0-23	864.0-863.5	25.7-26.2	6,180	-	SANDSTONE
	857.4-857.0	32.3-32.7	5,370	-	SANDSTONE
B-052-0-23	867.5-866.9	22.8-23.4	8,150	-	SANDSTONE
	865.2-864.5	25.1-25.8	5,150	-	SANDSTONE
B-058-0-23	650.7-650.2	12.0-12.5	4,680	-	SANDSTONE
B-059-0-23	652.5-651.8	11.3-12.0	9,200	-	SANDSTONE

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE (614) 276-8123
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DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET	TOTAL
3	172
SHEET	TOTAL
•	•

SUMMARY OF SOIL TEST DATA

US 33

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄		
B-016-0-23 STA. 1252+07, 9' LT. LATITUDE = 39.214625 LONGITUDE = -82.063739	01.00-02.50	SS-1	14	100	2.75	0	9	13	51	27	35	21	14	17	A-6a (10)	-		
	03.50-05.00	SS-2	18	100	3.25	0	0	21	46	33	28	19	9	18	A-4a(8)	-		
	06.00-07.50	SS-3	13	100	4.0	0	0	21	46	33	28	19	9	18	A-4a(8)	-		
	08.50-10.00	SS-4	14	100	4.25	0	0	21	46	33	28	19	9	16	A-4a (VISUAL)	-		
	11.00-12.50	SS-5	12	100	3.75	1	10	47	21	21	24	16	8	27	A-4a (1)	-		
	13.50-15.00	SS-6	12	100	3.5	0	2	9	41	48	40	20	20	25	A-6b (12)	-		
	16.00-17.50	SS-7	35	100	3.0	0	0	21	46	33	28	19	9	15	A-3 (VISUAL)	-		
	18.50-20.00	SS-8	50	100	-	0	0	21	46	33	28	19	9	5	A-3 (VISUAL)	-		
	23.50-25.00	SS-9	51	100	4.0	0	0	21	46	33	28	19	9	10	A-4a (VISUAL)	-		
	28.50-30.00	SS-10	50	100	4.5	12	10	20	37	21	26	19	7	8	A-4a (5)	-		
	33.50-35.00	SS-11	77	100	4.5	0	0	21	46	33	28	19	9	12	A-6a (VISUAL)	-		
	38.50-40.00	SS-12	95	100	4.5	12	8	16	47	17	34	21	13	10	A-6a (7)	-		
	43.50-45.00	SS-13	29	100	3.75	0	0	21	46	33	28	19	9	14	A-6a (VISUAL)	-		
	48.50-50.00	SS-14	37	100	3.5	0	0	21	46	33	28	19	9	12	A-6a (VISUAL)	-		
	53.50-55.00	SS-15	81	100	2.5	0	0	21	46	33	28	19	9	16	A-7-6 (VISUAL)	-		
	58.50-60.00	SS-16	99	100	2.75	0	0	2	56	42	41	27	14	15	A-7-6 (10)	-		
	63.50-65.00	SS-17	93	100	4.5	0	0	21	46	33	28	19	9	10	A-7-6 (VISUAL)	-		
	68.50-70.00	SS-18	118	100	4.5	0	0	21	46	33	28	19	9	6	A-7-6 (VISUAL)	-		
DENSE, BROWN FINE SAND																		
B-016-1-23 STA. 1252+39, 162' RT. LATITUDE = 39.214338 LONGITUDE = -82.064231 *OFFSET BOREHOLE	01.00-02.50	SS-1	10	100	1.25	6	6	34	27	27	27	19	9	14	A-4a (4)	-		
	02.00-04.00*	ST-1	-	-	-	0	7	68	15	10	NP	NP	NP	-	A-3a	-		
	03.50-05.00	SS-2	12	100	1.5	1	10	48	23	18	NP	NP	NP	16	A-4a (1)	-		
	06.00-07.50	SS-3	13	100	0.5	0	0	21	46	33	28	19	9	24	A-4a (VISUAL)	-		
	08.50-10.00	SS-4	13	100	1.5	0	0	21	46	33	28	19	9	17	A-4a (VISUAL)	-		
	11.00-12.50	SS-5	14	100	1.0	0	0	21	46	33	28	19	9	19	A-7-6 (VISUAL)	-		
	13.50-15.00	SS-6	19	100	3.5	0	0	21	46	33	28	19	9	18	A-7-6 (VISUAL)	-		
	HARD, BROWN CLAY																	
	B-017-1-23 STA. 1277+90, 152' RT. LATITUDE = 39.208783 LONGITUDE = -82.058562 *OFFSET BOREHOLE	01.00-02.50	SS-1	17	100	4.5	5	8	21	38	28	35	22	13	13	A-6a (7)	-	
		02.00-04.00*	ST-1	-	-	-	10	16	7	43	24	35	21	14	-	A-6a (8)	-	
		03.50-05.00	SS-2	18	100	2.5	2	33	11	41	13	30	21	9	12	A-4a (4)	-	
		06.00-07.50	SS-3	19	100	4.25	0	0	21	46	33	28	19	9	14	A-4a (VISUAL)	-	
		08.50-10.00	SS-4	12	100	-	0	0	21	46	33	28	19	9	46	A-7-6 (VISUAL)	-	
		11.00-12.50	SS-5	18	100	2.5	0	0	21	46	33	28	19	9	27	A-7-6 (VISUAL)	-	
		13.50-15.00	SS-6	20	100	3.0	0	0	21	46	33	28	19	9	20	A-7-6 (VISUAL)	-	
		STIFF, RED CLAY																
		B-017-0-23 STA. 1278+29, 12' LT. LATITUDE = 39.208991 LONGITUDE = -82.058032	01.00-02.50	SS-1	17	100	2.75	0	18	8	53	21	37	23	14	20	A-6a (9)	-
			03.50-05.00	SS-2	17	100	-	0	0	21	46	33	28	19	9	9	A-4a (VISUAL)	-
06.00-07.50			SS-3	20	100	-	19	12	29	26	14	NP	NP	NP	10	A-4a (1)	-	
08.50-10.00			SS-4	22	100	4.0	0	0	21	46	33	28	19	9	11	A-3a (VISUAL)	-	
11.00-12.50			SS-5	20	100	3.0	9	8	15	38	30	43	23	20	22	A-7-6 (11)	-	
13.50-15.00			SS-6	20	100	4.5	2	3	19	34	42	36	19	17	9	A-6b (11)	-	
16.00-17.50			SS-7	27	100	4.0	0	0	21	46	33	28	19	9	9	A-4a (VISUAL)	-	
18.50-20.00			SS-8	32	100	3.5	28	10	7	42	13	31	22	9	8	A-4a (4)	-	
23.50-25.00			SS-9	24	100	3.0	0	0	21	46	33	28	19	9	9	A-4a (VISUAL)	-	
28.50-30.00			SS-10	19	100	4.0	0	0	21	46	33	28	19	9	9	A-7-6 (VISUAL)	-	
33.50-35.00	SS-11		20	100	3.75	0	0	21	46	33	28	19	9	24	A-7-6 (VISUAL)	-		
38.50-40.00	SS-12		24	100	4.0	0	0	21	46	33	28	19	9	25	A-7-6 (VISUAL)	-		
43.50-45.00	SS-13		26	100	4.25	0	1	1	27	71	55	26	29	25	A-7-6 (19)	-		
MEDIUM DENSE, BROWN AND GRAY COARSE AND FINE SAND																		
B-024-0-23 STA. 1310+29, 82' RT. LATITUDE = 39.200646 LONGITUDE = -82.055541	01.00-02.50		SS-1	35	100	4.5	0	17	8	46	29	25	17	8	11	A-4a (8)	-	
	03.50-05.00		SS-2	47	100	-	0	0	21	46	33	28	19	9	5	A-4a (VISUAL)	-	
	06.00-07.50		SS-3	20	100	3.25	3	20	8	43	26	35	20	15	19	A-6a (9)	-	
	08.50-10.00		SS-4	19	100	4.5	0	0	21	46	33	28	19	9	12	A-6a (VISUAL)	-	
	11.00-12.50	SS-5	28	100	4.5	1	19	10	49	21	31	19	12	9	A-6a (8)	-		
	13.50-15.00	SS-6	22	100	2.25	0	0	21	46	33	28	19	9	37	A-6a (VISUAL)	-		
	SAME AS SS-5																	

SUMMARY OF SOIL TEST DATA
 US 33 (CONT.)

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-024-0-23 (Cont.)	16.00-17.50	SS-7	31	100	-	0	32	9	48	11	30	21	9	4	A-4a (5)	-
	18.50-20.00	SS-8	23	100	4.5									13	A-7-6 (VISUAL)	-
B-025-0-23	01.00-02.50	SS-1	13	100	3.0	0	4	6	49	41	44	25	19	24	A-7-6 (12)	-
STA. 1325+00, 155' RT. LATITUDE = 39.196602 LONGITUDE = -82.055438 *OFFSET BOREHOLE	02.00-04.00*	ST-1	-	83	-	0	5	10	42	43	42	25	17	-	A-7-6 (11)	-
	03.50-05.00	SS-2	102	100	-									6	Rock (VISUAL)	-
	06.00-07.50	SS-3	40	100	4.5									20	Rock (VISUAL)	-
	08.50-10.00	SS-4	116	100	-									7	Rock (VISUAL)	-
	11.00-12.50	SS-5	120	100	4.5									10	Rock (VISUAL)	-
B-025-2-23	00.00-01.50	SS-1	20	100	2.5	2	7	7	46	38	45	23	22	18	A-7-6 (14)	-
STA. 1329+64, 137' RT. LATITUDE = 39.195306 LONGITUDE = -82.055188	01.50-03.00	SS-2	23	100	2.0									15	A-7-6 (VISUAL)	-
	03.00-04.50	SS-3	22	100	2.5									14	A-7-6 (VISUAL)	-
	04.50-06.00	SS-4	19	100	3.0	2	4	7	41	46	49	24	25	21	A-7-6 (16)	-
	06.00-07.50	SS-5	19	100	3.25									19	A-7-6 (VISUAL)	-
	07.50-09.00	SS-6	17	100	1.5									26	A-7-6 (VISUAL)	-
	09.00-10.50	SS-7	15	100	3.5	1	4	6	38	51	43	25	18	20	A-7-6 (12)	-
	10.50-12.00	SS-8	22	100	3.25	0	6	3	26	65	48	25	23	19	A-7-6 (15)	-
	12.00-13.50	SS-9	20	100	3.5									18	A-7-6 (VISUAL)	-
	13.50-15.00	SS-10	23	100	4.25									11	A-7-6 (VISUAL)	-
	15.00-16.50	SS-11	96	100	-									9	Rock (VISUAL)	-
	16.50-18.00	SS-12	114	100	-									9	Rock (VISUAL)	-
	18.00-19.50	SS-13	127	89	-									9	Rock (VISUAL)	-
	19.50-19.80	SS-14	50/2"	100	-									10	Rock (VISUAL)	-
B-025-1-23	01.50-03.00	SS-1	13	100	4.25	31	26	13	18	12	NP	NP	NP	6	A-2-4 (0)	-
STA. 1329+84, 12' LT. LATITUDE = 39.195316 LONGITUDE = -82.054657	03.00-04.50	SS-2	15	100	4.5									15	A-6b (VISUAL)	-
	04.50-06.00	SS-3	28	100	4.25									11	A-6b (VISUAL)	-
	06.00-07.50	SS-4	26	100	4.5									10	A-6b (VISUAL)	-
	07.50-09.00	SS-5	29	100	2.5	0	28	9	50	13	28	19	9	6	A-4b (6)	-
	09.00-10.50	SS-6	41	100	4.0									8	A-4b (VISUAL)	-
	10.50-12.00	SS-7	28	100	4.0									16	A-4b (VISUAL)	-
	12.00-13.50	SS-8	32	100	4.25									21	A-4b (VISUAL)	-
	13.50-15.00	SS-9	27	100	4.5									11	A-4b (VISUAL)	-
	15.00-16.50	SS-10	27	100	4.5	0	10	9	64	17	29	19	10	11	A-4b (8)	-
	16.50-18.00	SS-11	23	100	4.5									11	A-4b (VISUAL)	-
	18.00-19.50	SS-12	28	100	4.5									12	A-4b (VISUAL)	-
	19.50-21.00	SS-13	47	100	4.25									13	A-4b (VISUAL)	-
	21.00-22.50	SS-14	45	100	4.5									10	A-4b (VISUAL)	-
	22.50-24.00	SS-15	46	100	4.5									9	A-4b (VISUAL)	-
	24.00-25.50	SS-16	19	100	4.5	8	11	15	32	34	34	19	15	9	A-6a (8)	-
	25.50-27.00	SS-17	17	100	4.5	1	4	6	39	50	38	20	18	14	A-6b (11)	-
	27.00-28.50	SS-18	23	100	4.5									13	A-6b (VISUAL)	-
	28.50-30.00	SS-19	26	100	3.75									8	A-6b (VISUAL)	-
	30.00-31.50	SS-20	22	100	4.25									24	A-6b (VISUAL)	-
	31.50-33.00	SS-21	20	100	3.25									17	A-6b (VISUAL)	-
	33.00-34.50	SS-22	27	100	-	0	3	2	68	27	32	19	13	5	A-6a (9)	-
	34.50-36.00	SS-23	38	100	-									5	A-6a (VISUAL)	-
	36.00-37.50	SS-24	20	100	3.75									21	A-7-6 (VISUAL)	-
	37.50-39.00	SS-25	15	100	4.5									20	A-7-6 (VISUAL)	-
	39.00-40.50	SS-26	17	100	4.25									12	A-7-6 (VISUAL)	-
	40.50-42.00	SS-27	28	100	4.0									14	A-7-6 (VISUAL)	-
	42.00-43.50	SS-28	20	100	4.25									20	A-7-6 (VISUAL)	-
	43.50-45.00	SS-29	81	100	4.5									7	A-7-6 (VISUAL)	-
	45.00-46.50	SS-30	26	100	4.5	3	17	6	45	29	35	24	11	15	A-6a (8)	-



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
5	172
SHEET	TOTAL
-	-

GEOTECHNICAL PROFILE - ROADWAY
 SUMMARY OF SOIL TEST DATA

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 05-11-2024 TIME: 21:58:49 USER: ACAD
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**SUMMARY OF SOIL TEST DATA
 US 33 (CONT.)**

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-025-1-23 (Cont.)	46.50-48.00	SS-31	23	100	4.0				SAME AS SS-30					17	A-6a (VISUAL)	-
	48.00-49.50	SS-32	23	100	3.75				SAME AS SS-30					15	A-6a (VISUAL)	-
	49.50-51.00	SS-33	26	100	4.5				SAME AS SS-36					15	A-7-6 (VISUAL)	-
	51.00-52.50	SS-34	26	100	4.0				SAME AS SS-36					17	A-7-6 (VISUAL)	-
	52.50-54.00	SS-35	29	100	4.5				SAME AS SS-36					12	A-7-6 (VISUAL)	-
	54.00-55.50	SS-36	27	100	4.5	0	4	3	53	40	42	25	17	9	A-7-6 (11)	-
	55.50-57.00	SS-37	32	100	4.25				SAME AS SS-36					9	A-7-6 (VISUAL)	-
	57.00-58.50	SS-38	32	100	4.5				SAME AS SS-36					15	A-7-6 (VISUAL)	-
	58.50-60.00	SS-39	33	100	4.5				SAME AS SS-36					17	A-7-6 (VISUAL)	-
	60.00-61.50	SS-40	31	100	4.0				SAME AS SS-36					15	A-7-6 (VISUAL)	-
	61.50-63.00	SS-41	26	100	3.75				SAME AS SS-36					14	A-7-6 (VISUAL)	-
	63.00-64.50	SS-42	35	100	4.5	2	9	9	45	35	35	18	17	7	Rock (VISUAL)	-
	64.50-66.00	SS-43	105	100	4.5	CLAYSTONE, RED AND BROWN, SEVERELY WEATHERED					8	Rock (VISUAL)	-			
	66.00-66.70	SS-44	40/50/2"	100	4.0				SAME AS SS-43					9	Rock (VISUAL)	-
	67.50-69.00	SS-45	111	100	3.5				SAME AS SS-43					3	Rock (VISUAL)	-
	69.00-70.50	SS-46	116	100	4.5				SAME AS SS-43					10	Rock (VISUAL)	-
	70.50-70.70	SS-47	50/2"	100	-				SAME AS SS-43					-	Rock (VISUAL)	-
	72.00-72.20	SS-48	50/2"	100	-				SAME AS SS-43					-	Rock (VISUAL)	-
B-026-0-23 STA. 1331+95, 27' RT. LATITUDE = 39.194728 LONGITUDE = -82.054656	01.00-02.50	SS-1	14	50	4.5	3	3	7	48	39	35	20	15	13	A-6a (10)	-
	03.50-05.00	SS-2	8	22	4.5				SAME AS SS-1					14	A-6a (VISUAL)	-
	06.00-07.50	SS-3	11	67	4.5				SAME AS SS-1					17	A-6a (VISUAL)	-
	08.50-10.00	SS-4	14	39	4.5				SAME AS SS-1					15	A-6a (VISUAL)	-
	11.00-12.50	SS-5	18	72	4.5	1	9	6	41	43	35	20	15	17	A-6a (10)	-
	13.50-15.00	SS-6	9	61	4.5				SAME AS SS-5					15	A-6a (VISUAL)	-
	16.00-17.50	SS-7	11	22	4.5				SAME AS SS-5					16	A-6a (VISUAL)	-
	18.50-20.00	SS-8	14	72	4.5	1	6	3	47	43	44	23	21	19	A-7-6 (13)	-
	23.50-25.00	SS-9	20	67	4.5				SAME AS SS-8					11	A-7-6 (VISUAL)	-
	28.50-30.00	SS-10	23	61	4.5	1	6	5	45	43	33	19	14	14	A-6a (10)	-
	33.50-35.00	SS-11	20	67	4.5				SAME AS SS-10					13	A-6a (VISUAL)	-
	38.50-40.00	SS-12	27	44	4.5				SAME AS SS-13					12	A-7-6 (VISUAL)	-
	43.50-45.00	SS-13	27	72	4.5	0	2	3	37	58	45	22	23	15	A-7-6 (14)	-
	48.50-50.00	SS-14	23	72	4.5				SAME AS SS-13					16	A-7-6 (VISUAL)	-
B-027-0-23 STA. 1333+78, 157' RT. LATITUDE = 39.194149 LONGITUDE = -82.054956	01.00-02.50	SS-1	15	100	3.25	5	4	4	41	46	39	21	18	20	A-6b (11)	-
	03.50-03.70	SS-2	50/2"	100	-	SANDSTONE, BROWN, SEVERELY WEATHERED					5	Rock (VISUAL)	-			
	06.00-06.10	SS-3	50/1"	0	-				SAME AS SS-2					-	Rock (VISUAL)	-
	08.50-08.60	SS-4	50/1"	0	-				SAME AS SS-2					-	Rock (VISUAL)	-
B-028-0-23 STA. 1341+18, 167' RT. LATITUDE = 39.192149 LONGITUDE = -82.054154 *OFFSET BOREHOLE	01.00-02.50	SS-1	15	100	1.75	1	10	6	44	39	48	24	24	28	A-7-6 (15)	-
	03.00-05.00*	ST-1	-	90	-	2	7	5	48	38	38	20	18	-	A-6b (11)	-
	03.50-05.00	SS-2	26	100	4.5	1	9	5	53	32	64	21	43	16	A-7-6 (20)	-
	06.00-07.50	SS-3	17	100	2.0				SAME AS SS-2					28	A-7-6 (VISUAL)	-
	08.50-10.00	SS-4	15	100	4.25	3	7	7	42	41	40	21	19	18	A-6b (12)	-
	11.00-12.50	SS-5	20	100	2.5				SAME AS SS-4					26	A-6b (VISUAL)	-
	13.50-15.00	SS-6	27	100	4.25				SAME AS SS-4					12	A-6b (VISUAL)	-
	16.00-17.50	SS-7	23	100	4.5	0	3	4	45	48	42	21	21	20	A-7-6 (13)	-
	18.50-20.00	SS-8	28	100	4.5				SAME AS SS-7					18	A-7-6 (VISUAL)	-
	23.50-25.00	SS-9	37	100	-	MEDIUM DENSE, GRAY GRAVEL AND/OR STONE FRAGMENTS WITH SAND					5	A-1-b (VISUAL)	-			
	28.50-28.80	SS-10	50/3"	100	-				SAME AS SS-9					8	A-1-b (VISUAL)	-
B-029-0-23 STA. 1363+11, 204' RT. LATITUDE = 39.186555 LONGITUDE = -82.051279	01.00-02.50	SS-1	12	100	1.5	2	6	20	39	33	33	18	15	21	A-6a (9)	-
	03.50-05.00	SS-2	17	100	1.75	0	8	18	41	33	38	20	18	20	A-6b (11)	-
	06.00-07.50	SS-3	87	100	-	CLAYSTONE, BROWN, SEVERELY WEATHERED					7	Rock (VISUAL)	-			
	08.50-10.00	SS-4	101	100	-				SAME AS SS-3					7	Rock (VISUAL)	-

**GEOTECHNICAL PROFILE - ROADWAY
 SUMMARY OF SOIL TEST DATA**



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
6	172
SHEET	TOTAL
-	-

SUMMARY OF SOIL TEST DATA
 US 33 (CONT.)

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-029-0-23 (Cont.)	11.00-12.50	SS-5	110	100	-	-	-	-	SAME AS SS-3	-	-	-	-	10	Rock (VISUAL)	-
	13.50-15.00	SS-6	119	100	-	-	-	-	SAME AS SS-3	-	-	-	-	17	Rock (VISUAL)	-
B-030-0-23	01.00-02.50	SS-1	14	100	2.5	-	-	-	SAME AS SS-2	-	-	-	-	26	A-6a (VISUAL)	-
STA. 1367+18, 215' RT. LATITUDE = 39.185514 LONGITUDE = -82.050762	03.50-05.00	SS-2	14	100	1.25	1	4	4	46	45	37	22	15	24	A-6a (10)	-
	06.00-07.50	SS-3	15	100	2.0	0	2	6	56	36	34	20	14	21	A-6a (10)	-
	08.50-10.00	SS-4	14	100	2.5	0	3	4	46	47	39	22	17	24	A-6b (11)	-
	11.00-12.50	SS-5	15	100	3.5	-	-	-	SAME AS SS-6	-	-	-	-	21	A-6a (VISUAL)	-
	13.50-15.00	SS-6	18	100	2.0	2	22	25	23	28	30	17	13	13	A-6a (4)	-
	16.00-17.50	SS-7	14	100	2.5	-	-	-	SAME AS SS-6	-	-	-	-	23	A-6a (VISUAL)	-
	18.50-20.00	SS-8	19	100	2.0	-	-	-	SAME AS SS-6	-	-	-	-	27	A-6a (VISUAL)	-
	20.00-20.10	SS-9	50/1"	0	-	-	-	-	CLAYSTONE, BROWN, SEVERELY WEATHERED	-	-	-	-	-	Rock (VISUAL)	-
B-031-0-23	01.00-02.50	SS-1	47	72	-	3	5	64	17	11	NP	NP	NP	6	A-3a (0)	-
STA. 1369+12, 25' RT. LATITUDE = 39.185222 LONGITUDE = -82.049878	03.50-05.00	SS-2	20	83	-	-	-	-	SAME AS SS-1	-	-	-	-	7	A-3a (VISUAL)	-
	06.00-07.50	SS-3	23	56	-	-	-	-	SAME AS SS-1	-	-	-	-	8	A-3a (VISUAL)	-
	08.50-10.00	SS-4	17	67	3.5	4	8	42	25	18	23	16	7	8	A-4a (2)	-
	11.00-12.50	SS-5	20	56	-	-	-	-	MEDIUM DENSE, GRAY GRAVEL AND/OR STONE FRAGMENTS	9	-	-	-	-	A-1-a (VISUAL)	-
	13.50-15.00	SS-6	12	44	3.75	4	3	12	51	30	34	20	14	12	A-6a (10)	-
	16.00-17.50	SS-7	17	56	4.5	8	6	6	50	30	33	20	13	12	A-6a (9)	-
	18.50-20.00	SS-8	17	50	4.5	-	-	-	SAME AS SS-7	-	-	-	-	8	A-6a (VISUAL)	-
	23.50-25.00	SS-9	8	39	3.25	1	12	41	26	20	24	16	8	19	A-4a (2)	-
	28.50-30.00	SS-10	38	67	-	0	8	64	16	12	NP	NP	NP	10	A-3a (0)	-
	33.50-35.00	SS-11	41	56	4.25	1	5	36	28	30	26	16	10	15	A-4a (5)	-
	38.50-40.00	SS-12	18	39	4.5	-	-	-	SAME AS SS-11	-	-	-	-	13	A-4a (VISUAL)	-
	43.50-45.00	SS-13	26	67	4.25	-	-	-	SAME AS SS-11	-	-	-	-	19	A-4a (VISUAL)	-
	48.50-49.00	SS-14	50/5"	100	4.5	-	-	-	SAME AS SS-11	-	-	-	-	18	A-4a (VISUAL)	-
B-032-0-23	01.00-02.50	SS-1	13	56	2.75	2	14	16	30	38	39	20	19	18	A-6b (10)	-
STA. 1372+49, 159' RT. LATITUDE = 39.184229 LONGITUDE = -82.049853	03.50-05.00	SS-2	22	100	3.25	-	-	-	SAME AS SS-1	-	-	-	-	22	A-6b (VISUAL)	-
	06.00-07.50	SS-3	18	100	2.75	1	6	12	35	46	44	21	23	25	A-7-6 (14)	-
	08.50-10.00	SS-4	19	100	3.75	-	-	-	SAME AS SS-3	-	-	-	-	22	A-7-6 (VISUAL)	-
	11.00-12.50	SS-5	19	100	2.75	0	5	16	32	47	44	22	22	17	A-7-6 (14)	-
	13.50-15.00	SS-6	22	100	4.0	-	-	-	SAME AS SS-5	-	-	-	-	11	A-7-6 (VISUAL)	-
	16.00-17.50	SS-7	23	100	4.5	0	4	38	29	29	25	15	10	13	A-4a (5)	-
	18.50-20.00	SS-8	28	100	3.5	-	-	-	SAME AS SS-7	-	-	-	-	15	A-4a (VISUAL)	-
	23.50-25.00	SS-9	92	17	4.5	-	-	-	SANDSTONE, BROWN, SEVERELY WEATHERED	-	-	-	-	13	Rock (VISUAL)	-
B-033-0-23	01.00-02.50	SS-1	13	100	1.75	1	4	24	26	45	39	19	20	22	A-6b (11)	-
STA. 1388+87, 142' RT. LATITUDE = 39.180097 LONGITUDE = -82.047566	03.50-05.00	SS-2	19	100	2.25	0	1	6	39	54	57	29	28	28	A-7-6 (19)	-
	06.00-07.50	SS-3	51	100	3.5	-	-	-	SAME AS SS-2	-	-	-	-	17	A-7-6 (VISUAL)	-
	08.50-08.80	SS-4	50/3"	100	-	-	-	-	SHALE, GRAY, SEVERELY WEATHERED	-	-	-	-	6	Rock (VISUAL)	-
B-034-0-23	01.00-02.50	SS-1	14	100	4.5	0	9	17	46	28	29	17	12	9	A-6a (9)	-
STA. 1405+31, 10' LT. LATITUDE = 39.176098 LONGITUDE = -82.04483	01.00-03.00*	ST-1	-	-	-	2	2	6	56	34	38	20	18	-	A-6b (11)	-
	03.50-05.00	SS-2	17	100	3.75	-	-	-	SAME AS SS-3	-	-	-	-	11	A-6b (VISUAL)	-
	06.00-07.50	SS-3	14	100	2.25	0	5	10	43	42	38	21	17	25	A-6b (11)	-
	08.50-10.00	SS-4	14	100	2.25	-	-	-	SAME AS SS-3	-	-	-	-	18	A-6b (VISUAL)	-
	11.00-12.50	SS-5	15	100	3.25	1	4	9	46	40	38	19	19	14	A-6b (12)	-
	13.50-15.00	SS-6	15	100	4.0	-	-	-	SAME AS SS-5	-	-	-	-	13	A-6b (VISUAL)	-
	16.00-17.30	SS-7	6/7/50/3"	93	-	-	-	-	BROWN SANDSTONE BOULDERS	-	-	-	-	13	A-4a (VISUAL)	-
	18.50-18.60	SS-8	50/1"	0	-	-	-	-	SAME AS SS-7	-	-	-	-	-	A-4a (VISUAL)	-
	23.50-25.00	SS-9	51	100	-	-	-	-	SAME AS SS-7	-	-	-	-	13	A-4a (VISUAL)	-
	28.50-30.00	SS-10	100	100	-	-	-	-	SAME AS SS-7	-	-	-	-	3	A-4a (VISUAL)	-
	33.50-33.60	SS-11	50/1"	100	-	-	-	-	SAME AS SS-7	-	-	-	-	0	A-4a (VISUAL)	-



DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
7	172
SHEET	TOTAL
-	-

GEOTECHNICAL PROFILE - ROADWAY
 SUMMARY OF SOIL TEST DATA

SUMMARY OF SOIL TEST DATA
 US 33 (CONT.)

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-034-0-23 (Cont.)	38.50-38.80	SS-12	50/4"	100	-	-	-	-	SAME AS SS-7	-	-	-	-	4	A-4a (VISUAL)	-
	43.50-43.80	SS-13	50/3"	100	-	-	-	-	SAME AS SS-7	-	-	-	-	6	A-4a (VISUAL)	-
	48.50-48.80	SS-14	50/3"	100	-	-	-	-	SANDSTONE, BROWN, SEVERELY WEATHERED	-	-	-	-	7	Rock (VISUAL)	-
	53.50-53.70	SS-15	50/2"	100	-	-	-	-	SAME AS SS-14	-	-	-	-	3	Rock (VISUAL)	-
	58.50-58.80	SS-16	50/3"	100	-	-	-	-	SAME AS SS-14	-	-	-	-	5	Rock (VISUAL)	-
B-040-0-23	01.00-02.50	SS-1	10	67	4.0	2	4	56	23	15	NP	NP	NP	12	A-4a (1)	-
STA. 1428+04, 116' RT. LATITUDE = 39.170208 LONGITUDE = -82.04214	03.50-05.00	ST-2	-	100	-	2	7	34	21	36	28	17	11	17	A-6a (5)	-
	06.00-07.50	SS-3	17	100	2.75	-	-	-	SAME AS SS-2	-	-	-	-	13	A-6a (VISUAL)	-
	08.50-10.00	SS-4	10	89	-	-	-	-	SAME AS SS-7	-	-	-	-	14	A-3a (VISUAL)	-
	11.00-12.50	SS-5	14	83	-	-	-	-	SAME AS SS-7	-	-	-	-	17	A-3a (VISUAL)	-
	13.50-15.50	ST-6	-	54	-	-	-	-	SAME AS SS-7	-	-	-	-	-	A-3a (VISUAL)	-
	16.00-17.50	SS-7	10	72	-	0	6	68	14	12	NP	NP	NP	20	A-3a (0)	-
	18.50-20.00	SS-8	12	100	1.75	-	-	-	STIFF, BROWN CLAY	-	-	-	-	27	A-7-6 (VISUAL)	-
	21.00-22.50	SS-9	17	100	-	-	-	-	SAME AS SS-10	-	-	-	-	30	A-3 (VISUAL)	-
	23.50-25.00	SS-10	15	89	-	0	18	73	2	7	NP	NP	NP	25	A-3 (0)	-
B-041-0-23	01.00-02.50	SS-1	10	100	2.0	0	7	43	31	19	27	19	8	20	A-4a (3)	-
STA. 1510+43, 188' RT. LATITUDE = 39.149821 LONGITUDE = -82.029517	03.00-05.00*	ST-1	-	100	-	1	6	34	39	20	28	21	7	-	A-4a (5)	-
	03.50-05.00	SS-2	13	100	3.75	-	-	-	SAME AS SS-1	-	-	-	-	17	A-4a (VISUAL)	-
	06.00-07.50	SS-3	14	100	2.75	0	19	47	17	17	NP	NP	NP	11	A-3a (0)	-
	08.50-10.00	SS-4	15	100	2.75	-	-	-	MEDIUM DENSE, BROWN AND GRAY SANDY SILT	-	-	-	-	13	A-4a (VISUAL)	-
	11.00-12.50	SS-5	18	83	2.75	1	8	53	25	13	NP	NP	NP	10	A-4a (1)	-
	13.50-15.00	SS-6	41	89	3.75	-	-	-	SAME AS SS-5	-	-	-	-	12	A-4a (VISUAL)	-

SUMMARY OF SOIL TEST DATA
 Ramp 89 I

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-056-0-23	01.00-02.50	SS-1	33	100	4.5	11	5	4	37	43	38	21	17	15	A-6b (11)	-
STA. 45+95, 27' LT. LATITUDE = 39.199082 LONGITUDE = -82.05551	03.50-05.00	SS-2	40	100	3.5	-	-	-	CLAYSTONE, RED AND BROWN, SEVERELY WEATHERED	-	-	-	-	18	Rock (VISUAL)	-
	06.00-07.50	SS-3	27	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	17	Rock (VISUAL)	-
	08.50-10.00	SS-4	40	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	17	Rock (VISUAL)	-
	11.00-12.50	SS-5	50	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	10	Rock (VISUAL)	-
	13.50-15.00	SS-6	78	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	8	Rock (VISUAL)	-
	16.00-17.50	SS-7	90	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	13	Rock (VISUAL)	-
	18.50-19.70	SS-8	35/40/50/2"	100	4.5	-	-	-	SAME AS SS-2	-	-	-	-	10	Rock (VISUAL)	-

SUMMARY OF SOIL TEST DATA
 Ramp 89 J

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-053-0-23	03.50-05.00	SS-1	12	67	4.0	1	3	4	67	25	29	20	9	11	A-4b (8)	-
STA. 311+14, 27' RT. LATITUDE = 39.200435 LONGITUDE = -82.054977	08.50-10.00	SS-2	22	89	4.5	-	-	-	HARD, RED SILT	-	-	-	-	10	A-4b (VISUAL)	-
	13.50-15.00	SS-3	19	67	4.0	-	-	-	SAME AS SS-2	-	-	-	-	14	A-4b (VISUAL)	-
	18.50-20.00	SS-4	15	100	4.0	-	-	-	SAME AS SS-2	-	-	-	-	12	A-4b (VISUAL)	-
	23.50-25.00	SS-5	22	67	4.5	-	-	-	SAME AS SS-2	-	-	-	-	16	A-4b (VISUAL)	-
	28.50-30.00	SS-6	22	100	2.75	3	9	8	53	27	36	20	16	29	A-6b (10)	-
	31.00-32.50	SS-7	21	67	4.0	-	-	-	SAME AS SS-6	-	-	-	-	11	A-6b (VISUAL)	-
	33.50-35.00	SS-8	58	100	-	-	-	-	SAME AS SS-9	-	-	-	-	10	A-6a (VISUAL)	-
	36.00-37.50	SS-9	42	100	-	1	13	5	56	25	33	20	13	11	A-6a (9)	-
	38.50-40.00	SS-10	21	100	4.25	-	-	-	SAME AS SS-12	-	-	-	-	19	A-7-5 (VISUAL)	-
	41.00-42.50	SS-11	25	100	3.75	-	-	-	SAME AS SS-12	-	-	-	-	25	A-7-5 (VISUAL)	-
	43.50-45.00	SS-12	49	1000	4.5	0	0	1	61	38	53	31	22	21	A-7-5 (15)	-
	46.00-47.50	SS-13	45	100	4.5	-	-	-	SAME AS SS-12	-	-	-	-	15	A-7-5 (VISUAL)	-
	38.50-40.00	SS-14	47/50/3"	100	3.0	12	16	2	51	19	29	19	10	12	A-4b (7)	-



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	8
TOTAL	172
SHEET	-
TOTAL	-

SUMMARY OF SOIL TEST DATA

Ramp 89 J (CONT.)

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-054-0-23 STA. 315+14, 49' RT. LATITUDE = 39.199347 LONGITUDE = -82.054763	01.00-02.50	SS-1	33	39	4.0	1	4	7	69	19	27	19	9	11	A-4b (8)	-
	03.50-05.00	SS-2	22	78	4.5				SAME AS SS-1					12	A-4b (VISUAL)	-
	06.00-07.50	SS-3	26	56	4.0	0	1	1	56	42	34	20	14	12	A-6a (10)	-
	08.50-10.00	SS-4	77	100	4.5				SAME AS SS-3					9	A-6a (VISUAL)	-

SUMMARY OF SOIL TEST DATA

Ramp 89 K

B-055-0-23 STA. 319+80, 44' LT. LATITUDE = 39.198037 LONGITUDE = -82.055392	01.00-02.50	SS-1	24	100	2.5	6	7	24	38	25	34	20	14	20	A-6a (7)	-
	03.50-05.00	SS-2	67	100	-				CLAYSTONE, BROWN TO GRAY, SEVERELY WEATHERED					9	Rock (VISUAL)	-
	06.00-07.50	SS-3	77	100	-				SAME AS SS-2					10	Rock (VISUAL)	-
	08.50-10.00	SS-4	100	100	-				SAME AS SS-2					8	Rock (VISUAL)	-
	11.00-12.50	SS-5	73	100	-				SAME AS SS-2					4	Rock (VISUAL)	-
	13.50-15.00	SS-6	83	100	-				SAME AS SS-2					6	Rock (VISUAL)	-
	16.00-17.50	SS-7	113	100	-				SAME AS SS-2					7	Rock (VISUAL)	-
	18.50-20.00	SS-8	106	100	-				SAME AS SS-2					6	Rock (VISUAL)	-

B-057-0-23

STA. 317+91, 172' RT.
 LATITUDE = 39.198439
 LONGITUDE = -82.056302
 *OFFSET BOREHOLE

	01.00-02.50	SS-1	10	100	2.0	2	1	6	43	48	49	23	26	26	A-7-6 (16)	-
	03.00-05.00*	ST-1	-	-	-	2	1	6	38	53	53	26	27	29	A-7-6 (17)	-
	03.50-05.00	SS-2	20	100	2.25	4	8	6	38	44	47	22	25	23	A-7-6 (15)	-
	06.00-07.50	SS-3	41	100	-				CLAYSTONE, GRAY, SEVERELY WEATHERED					6	Rock (VISUAL)	-
	08.50-10.00	SS-4	32	100	-				SAME AS SS-3					10	Rock (VISUAL)	-
	11.00-11.90	SS-5	28/50/5"	100	-				SAME AS SS-3					8	Rock (VISUAL)	-
	13.50-13.80	SS-6	50/3"	100	-				SAME AS SS-3					11	Rock (VISUAL)	-

SUMMARY OF SOIL TEST DATA

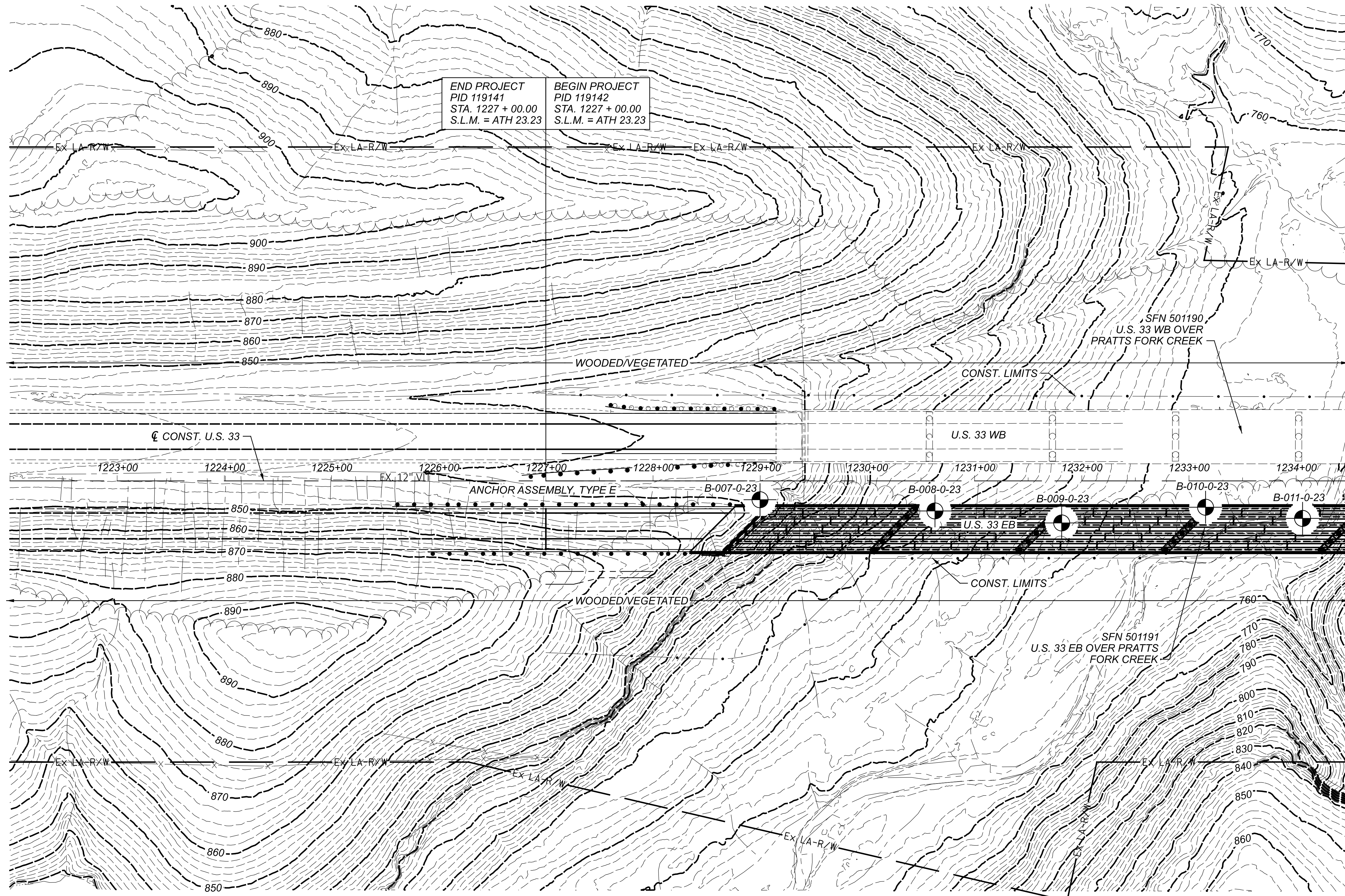
Ramp 89 L

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-064-0-23 STA. 325+84, 77' LT. LATITUDE = 39.19647 LONGITUDE = -82.054217	01.00-02.50	SS-1	18	100	4.0	1	2	2	61	34	37	20	17	11	A-6b (11)	-
	02.50-04.50	ST-2	-	100	-	6	11	3	48	32	37	21	16	-	A-6b (10)	-
	06.00-07.50	SS-3	6	100	2.50				SAME AS ST-2					14	A-6b (VISUAL)	-
	07.50-09.50	ST-4	-	83	-	10	5	5	42	38	37	20	17	-	A-6b (11)	-
	11.00-12.50	SS-5	30	100	-	13	8	4	75		34	19	15	14	Rock (VISUAL)	-
	13.50-14.20	SS-6	38/50/2"	100	3.75				CLAYSTONE, RED, SEVERELY WEATHERED					15	Rock (VISUAL)	-
	14.50-14.70	SS-7	50/2"	100	4.5				SAME AS SS-5					13	Rock (VISUAL)	-

SUMMARY OF SOIL TEST DATA

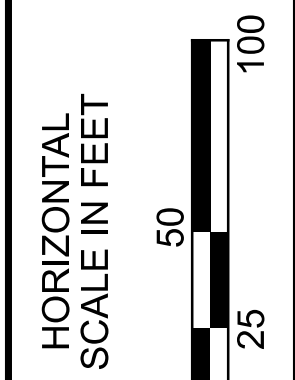
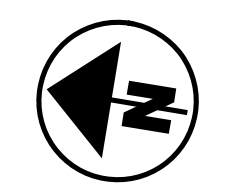
Ramp 681 N

EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N ₆₀	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO ₄
B-060-0-23 STA. 425+75, 47' RT. LATITUDE = 39.146887 LONGITUDE = -82.025496	01.00-02.50	SS-1	13	100	2.0	0	7	44	31	18	27	18	9	12	A-4a (3)	-
	03.50-05.00	ST-2	-	100	-	0	2	16	38	44	42	22	20	26	A-7-6 (12)	-
	06.00-07.50	SS-3	13	100	-	1	8	59	17	15	NP	NP	NP	11	A-3a (0)	-
	08.50-10.00	SS-4	17	100	-				SAME AS SS-3					11	A-3a (VISUAL)	-



END PROJECT PID 119141 STA. 1227 + 00.00 S.L.M. = ATH 23.23	BEGIN PROJECT PID 119142 STA. 1227 + 00.00 S.L.M. = ATH 23.23
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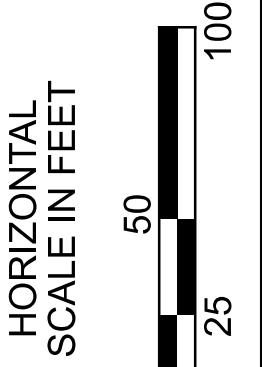
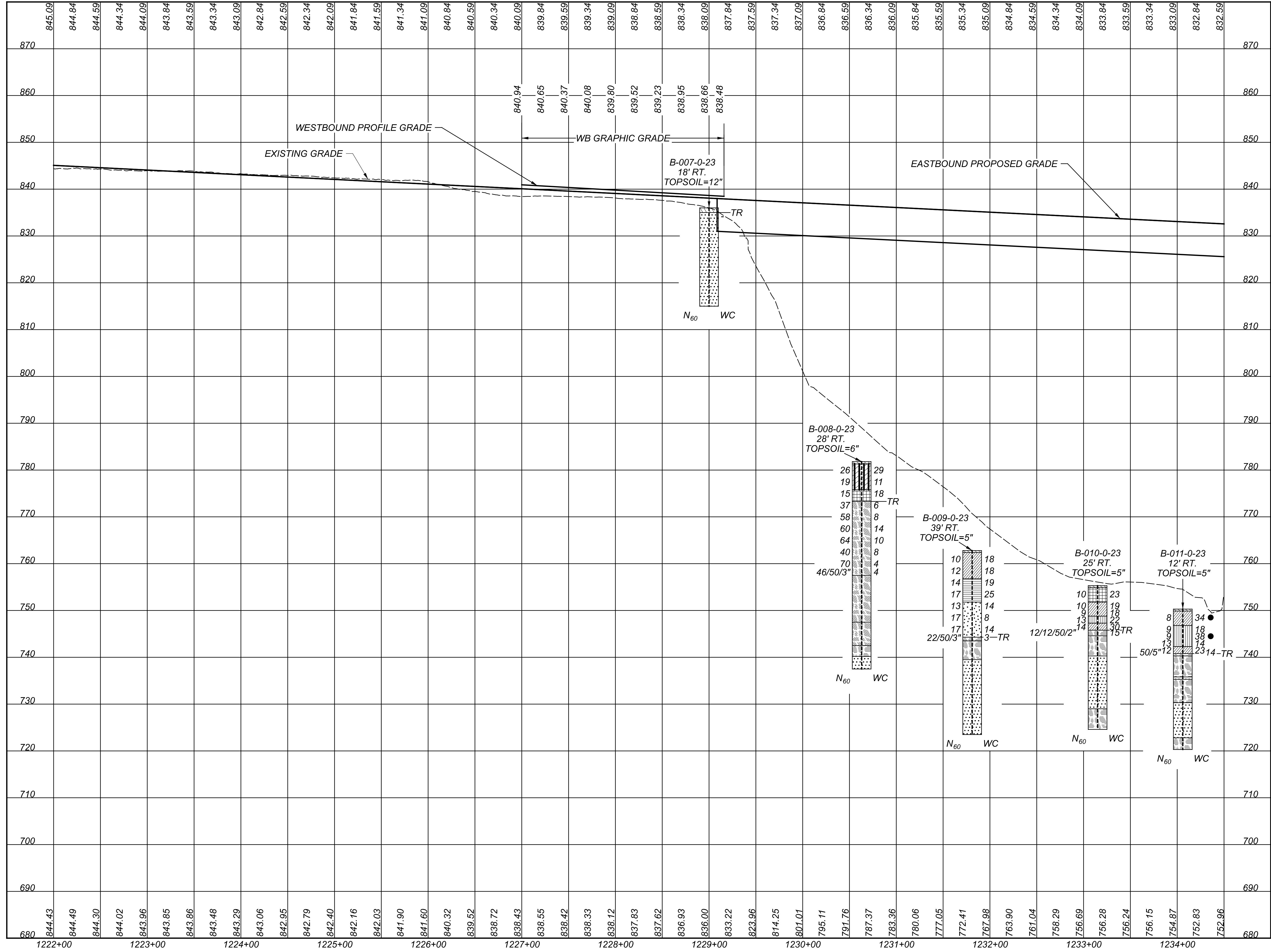
NOTE:
 SEE SHEET 11 OF 172 FOR BORINGS B-007-0-23, B-008-0-23, B-009-0-23, B-010-0-23 AND B-011-0-23 SOIL PROFILES.



GEOTECHNICAL PROFILE - ROADWAY
STA. 1227+00.00 TO STA. 1234+50.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

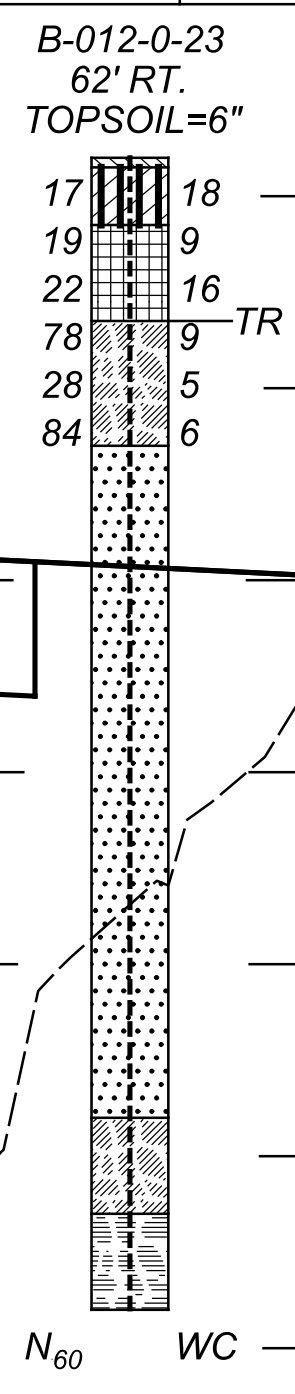
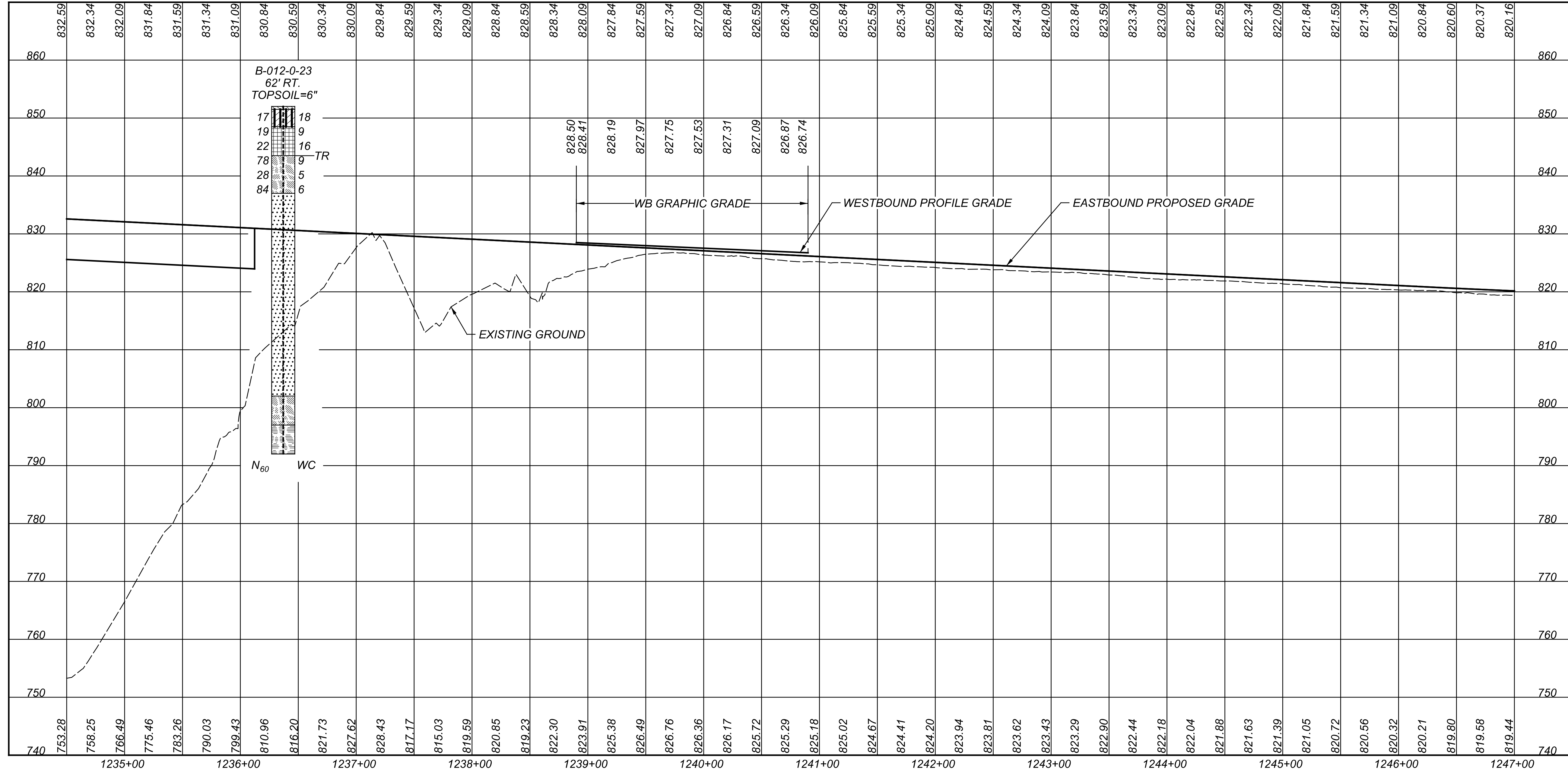
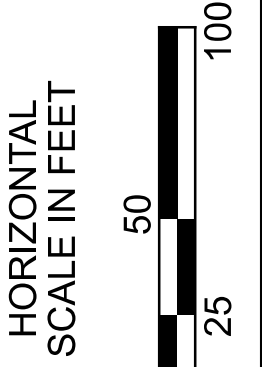
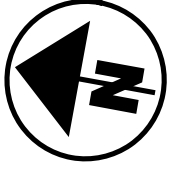
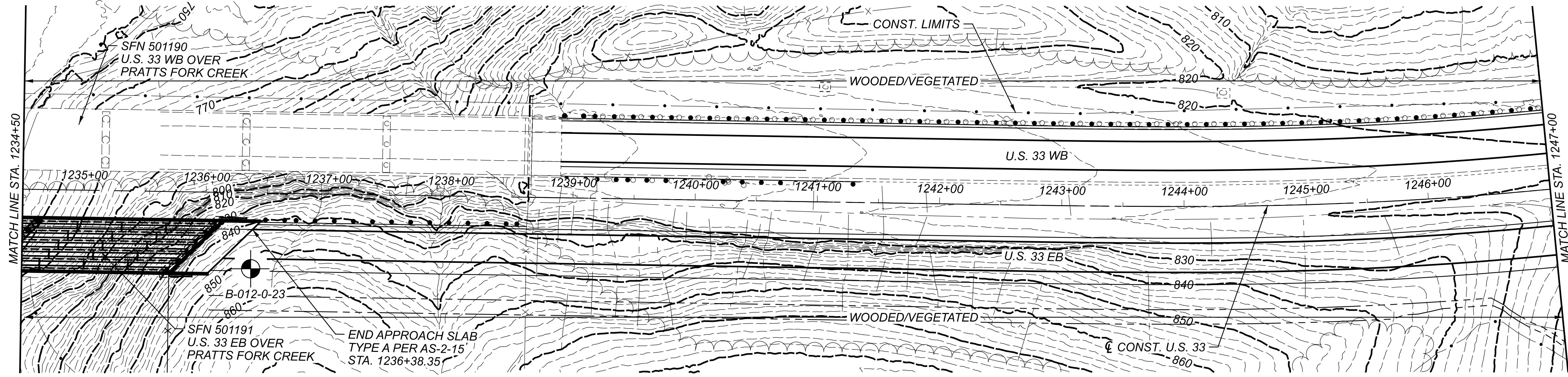
DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
10	172
SHEET	TOTAL
P.	-




GEOTECHNICAL PROFILE - ROADWAY
STA. 1227+00.00 TO STA. 1234+50.00 (US 33)

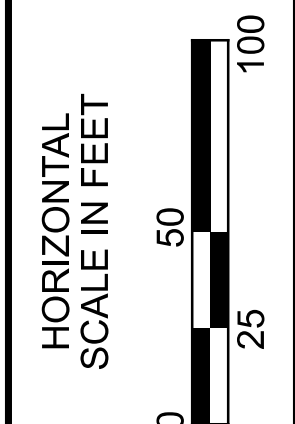
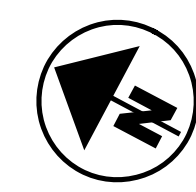
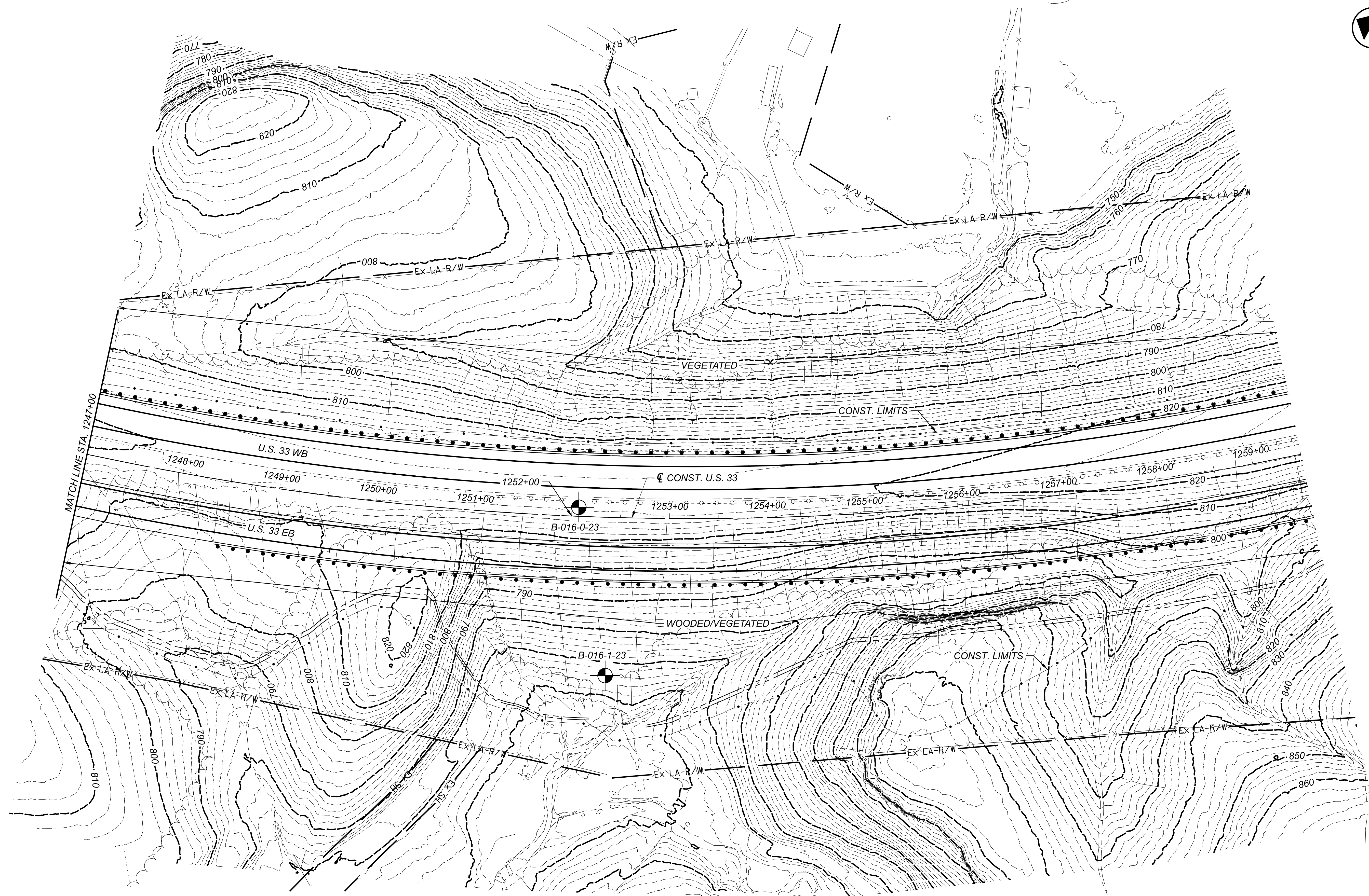


DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
11	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1234+50.00 TO STA. 1247+00.00 (US 33)

DESIGN AGENCY			
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377			
DESIGNER	N.K.S		
REVIEWER	SM		
PROJECT ID	119142		
SUBSET	12	TOTAL	172
SHEET	P.	TOTAL	-



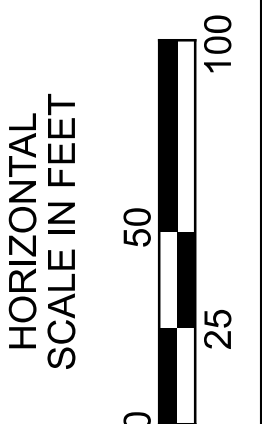
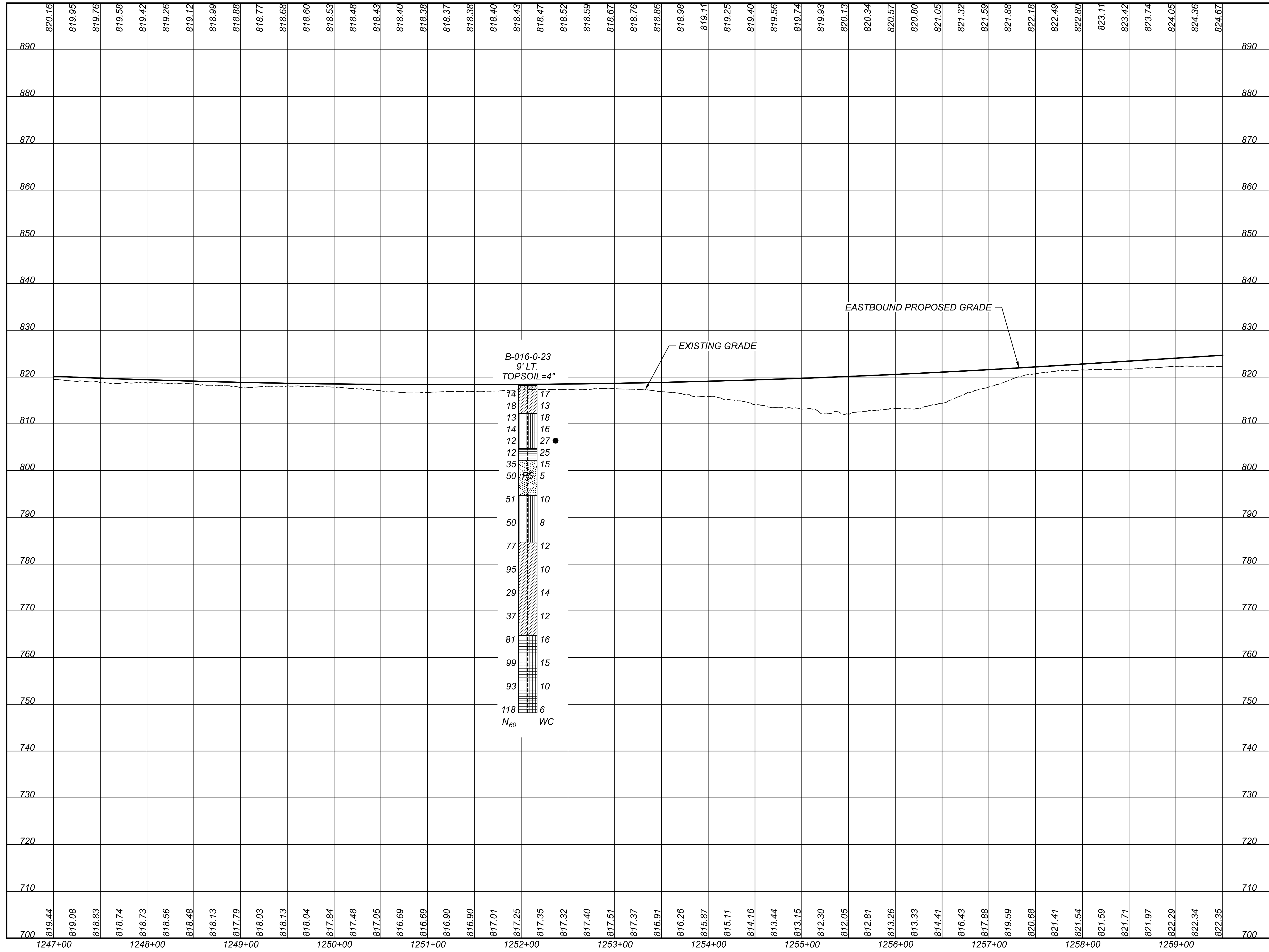
GEOTECHNICAL PROFILE - ROADWAY
STA. 1247+00.00 TO STA. 1259+50.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S	
REVIEWER	SM	
PROJECT ID	119142	
SUBSET	TOTAL	
13	172	
SHEET	TOTAL	
P.	-	

NOTE:

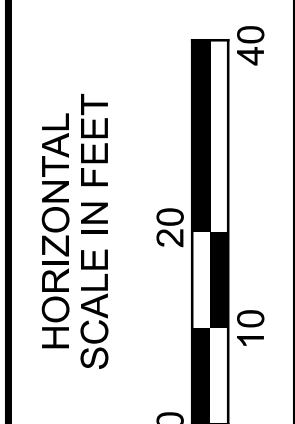
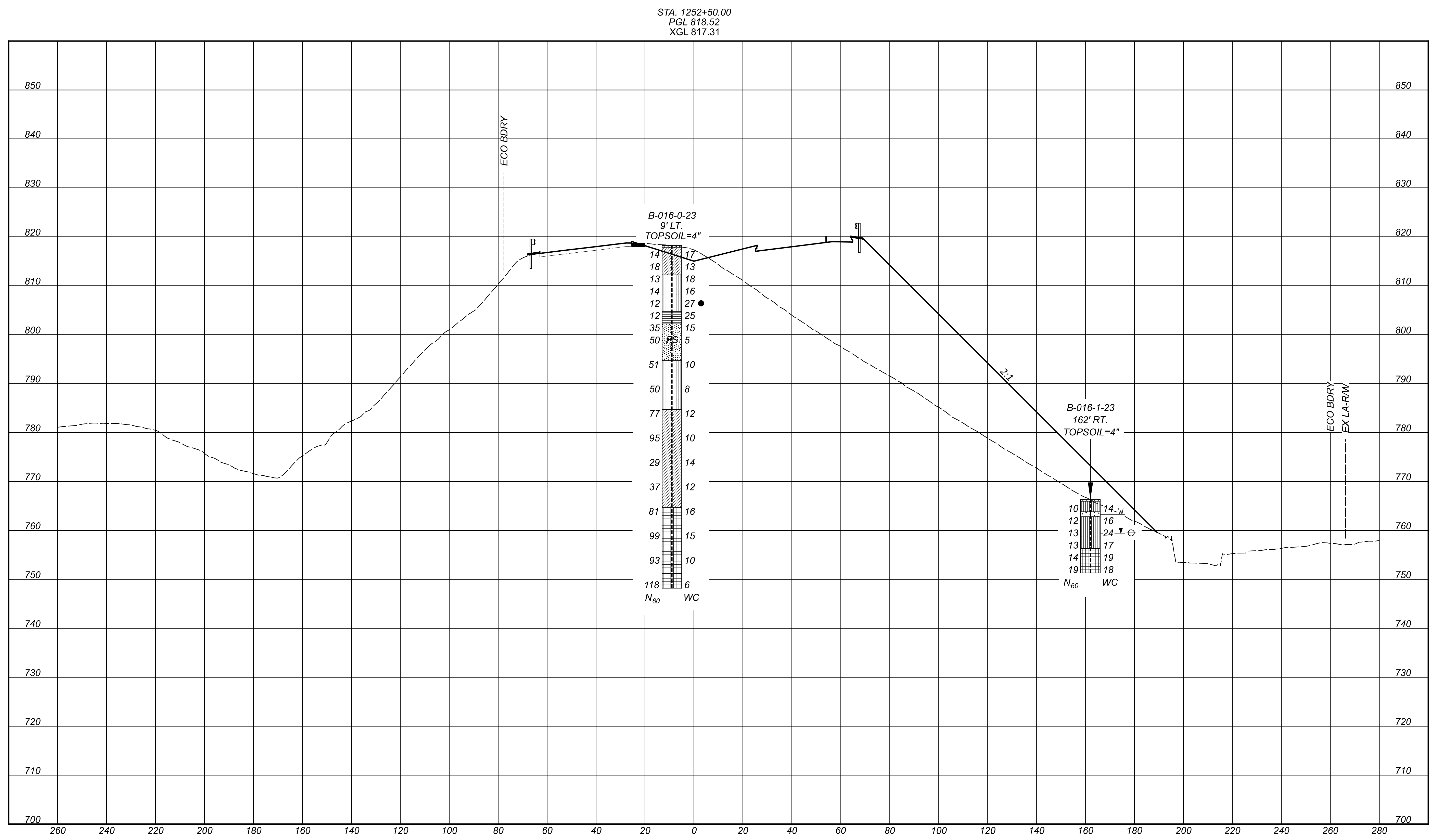
SEE SHEET 14 OF 172 FOR BORING B-016-0-23 SOIL PROFILE.
 SEE SHEET 15 OF 172 FOR BORING B-016-1-23 SOIL PROFILE.



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1247+00.00 TO STA. 1259+50.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
14	172
SHEET	TOTAL
P.	-

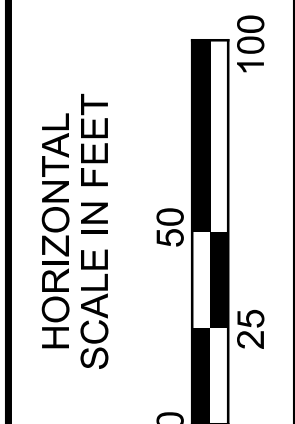
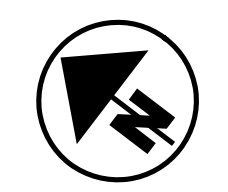
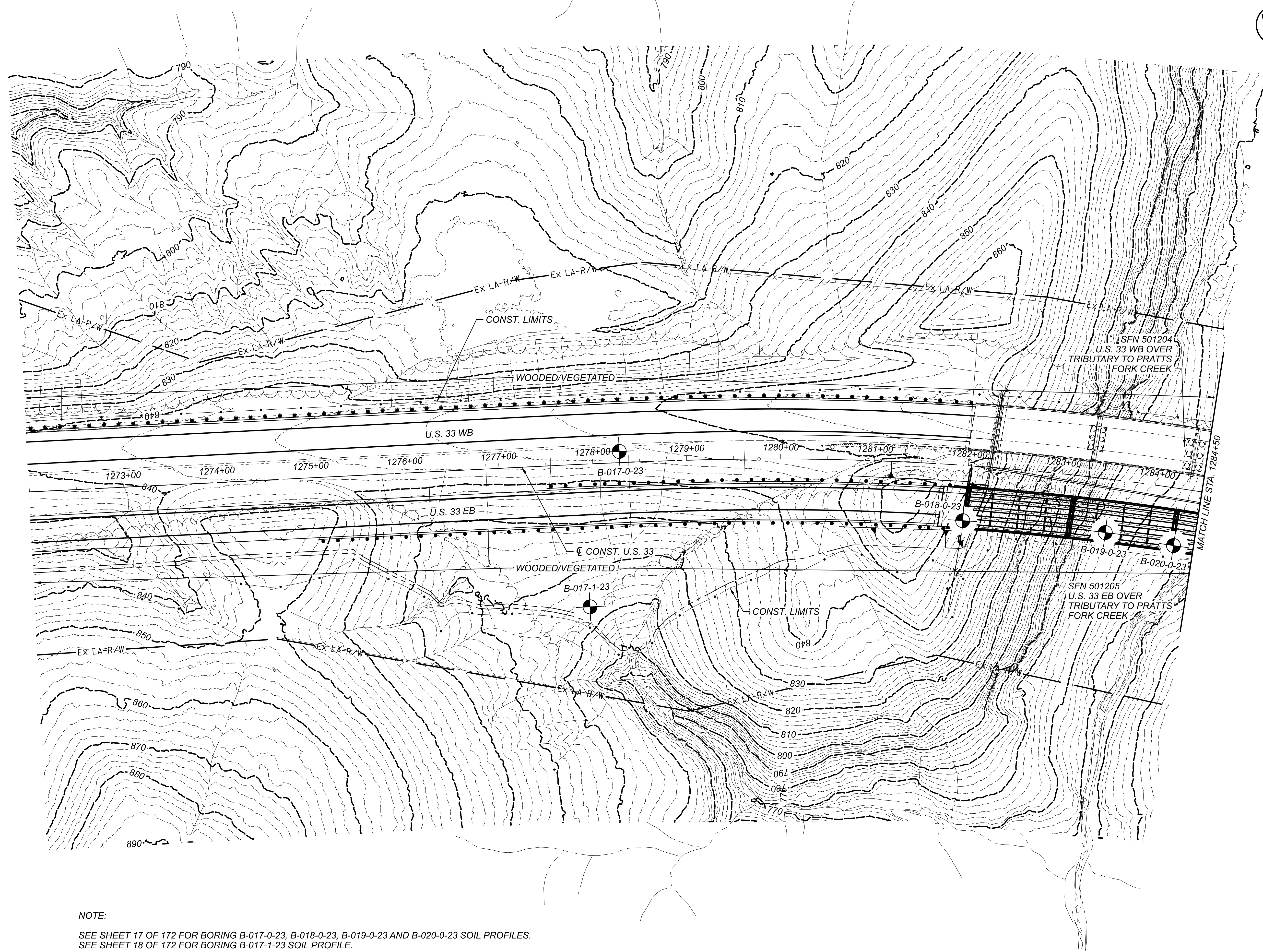


GEOTECHNICAL PROFILE - ROADWAY
 CROSS SECTION STA. 1252+50.00

DESIGN AGENCY

 2880 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614)276-8123
 FAX: (614)276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
15	172
SHEET	TOTAL
P.	-



NOTE:

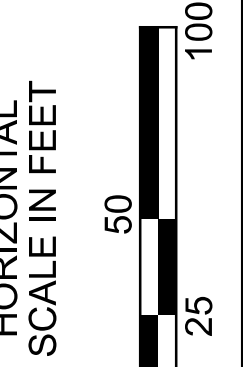
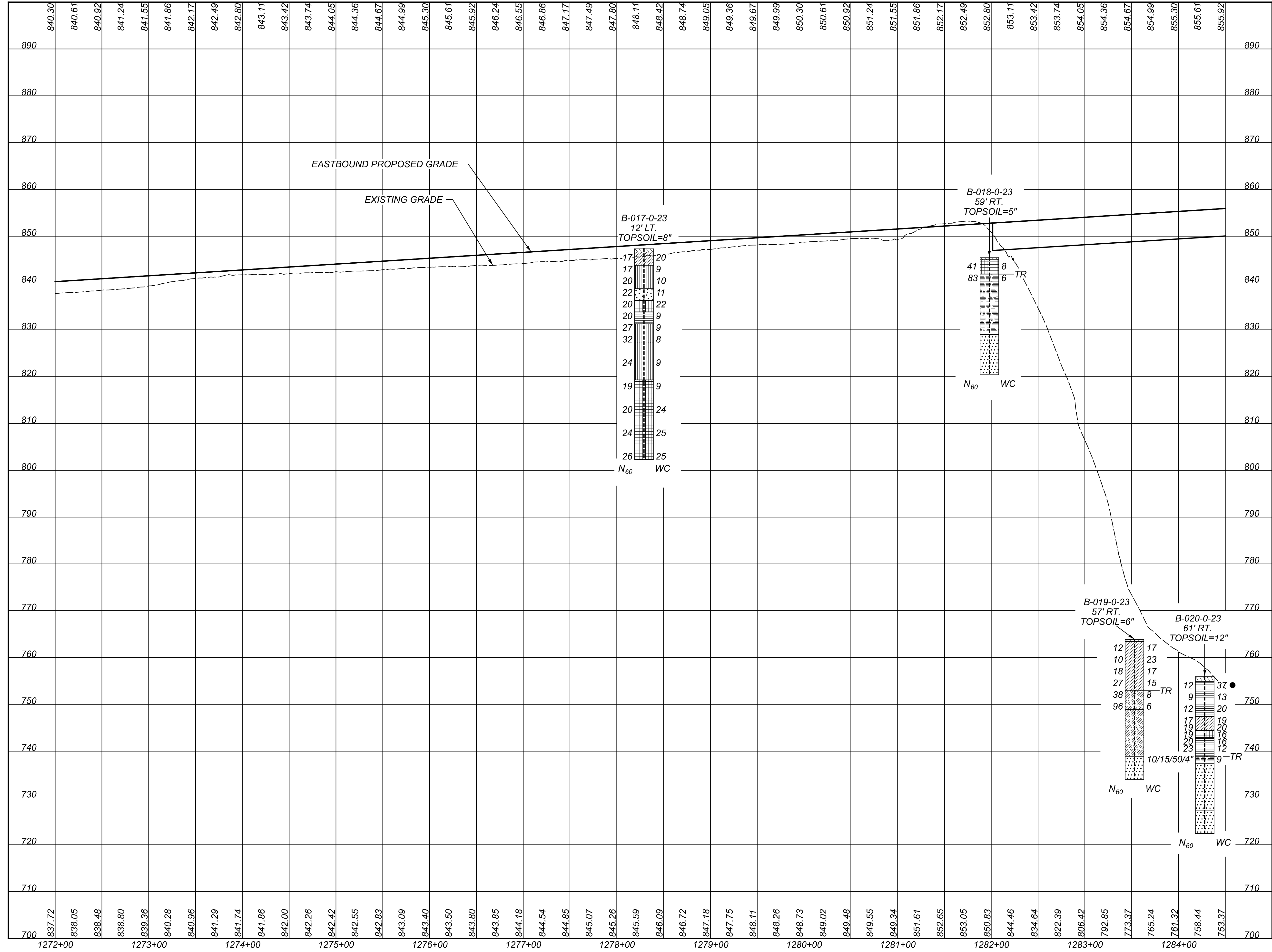
SEE SHEET 17 OF 172 FOR BORING B-017-0-23, B-018-0-23, B-019-0-23 AND B-020-0-23 SOIL PROFILES.
 SEE SHEET 18 OF 172 FOR BORING B-017-1-23 SOIL PROFILE.

GEOTECHNICAL PROFILE - ROADWAY
STA. 1272+00.00 TO STA. 1284+50.00 (US 33)

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
16	172
SHEET	TOTAL
P.	-



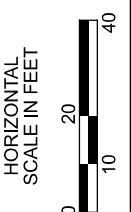
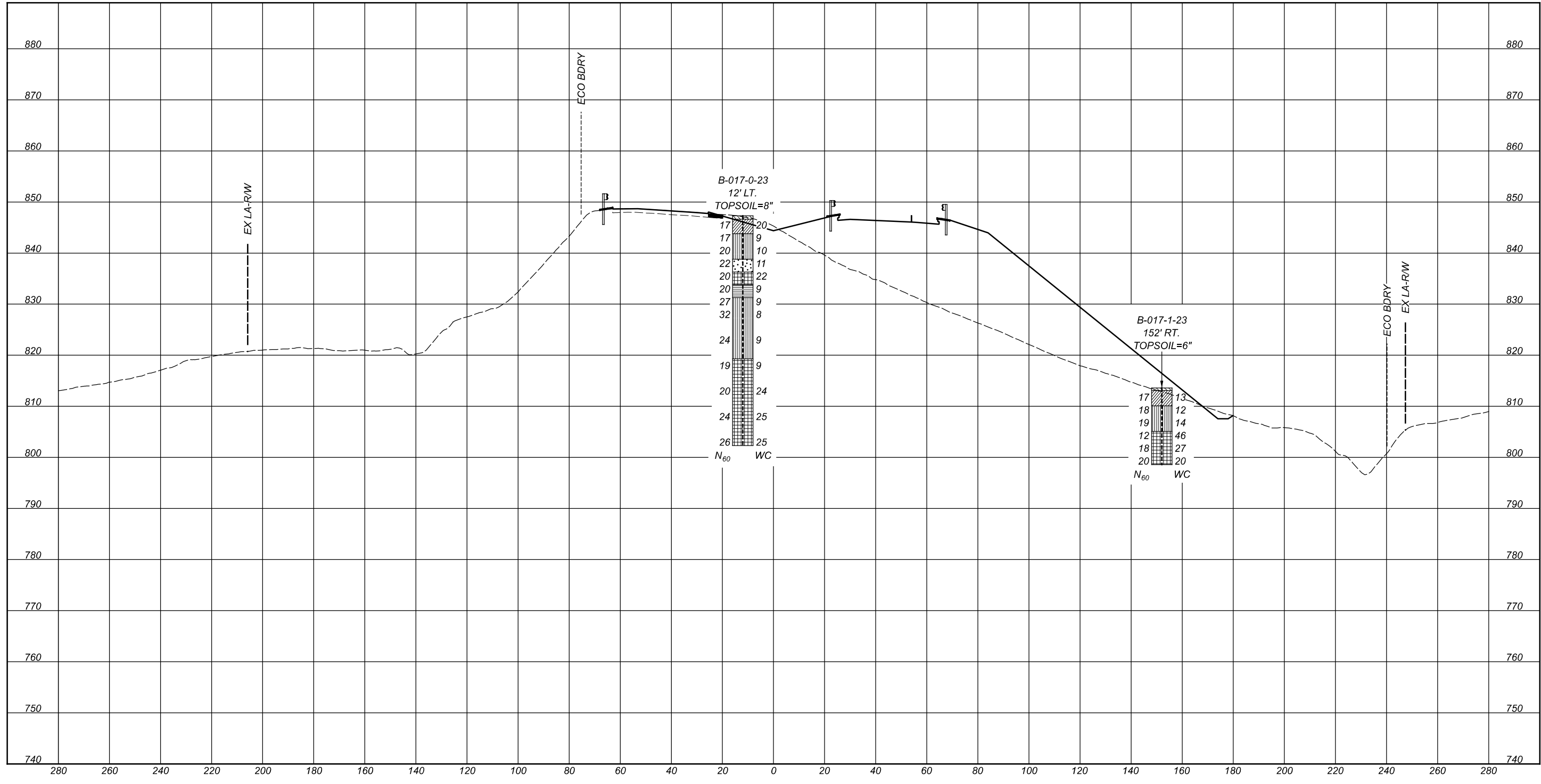
GEOTECHNICAL PROFILE - ROADWAY
 STA. 1272+00.00 TO STA. 1284+50.00 (US 33)

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	17
TOTAL	172
SHEET	P.
TOTAL	-

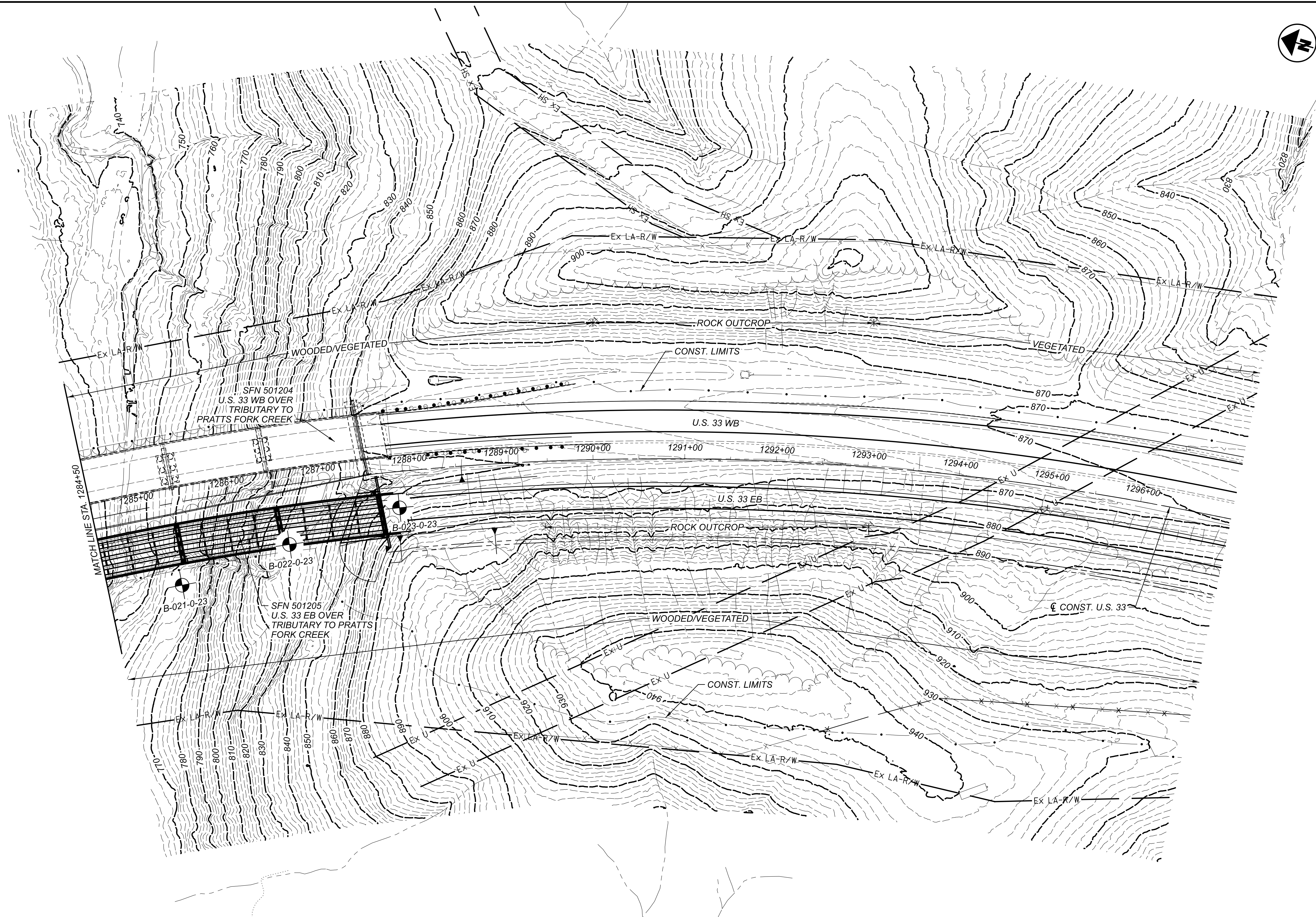
STA. 1278+00.00
 PGL 847.80
 XGL 845.27



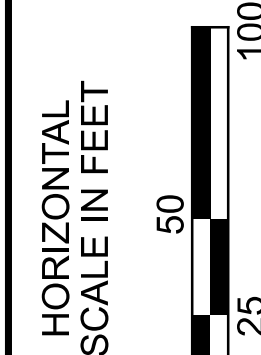
GEOTECHNICAL PROFILE - ROADWAY
 CROSS SECTION STA. 1278+00.00

DESIGN AGENCY
GTL
 ENGINEERING
 2880 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614)276-8123
 FAX: (614)276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
18	172
SHEET	TOTAL
P.	-



NOTE:
SEE SHEET 20 OF 172 FOR BORING B-021-0-23, B-022-0-23 AND B-023-0-23 SOIL PROFILES.



GEOTECHNICAL PROFILE - ROADWAY
STA. 1284+50.00 TO STA. 1297+00.00 (US 33)

DESIGN AGENCY



DESIGNER

N.K.S

REVIEWER

SM 11-06-24

PROJECT ID

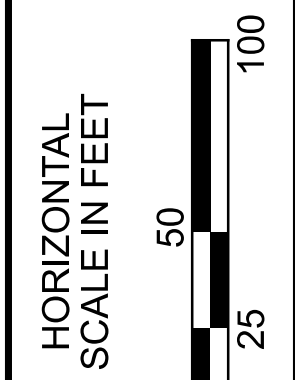
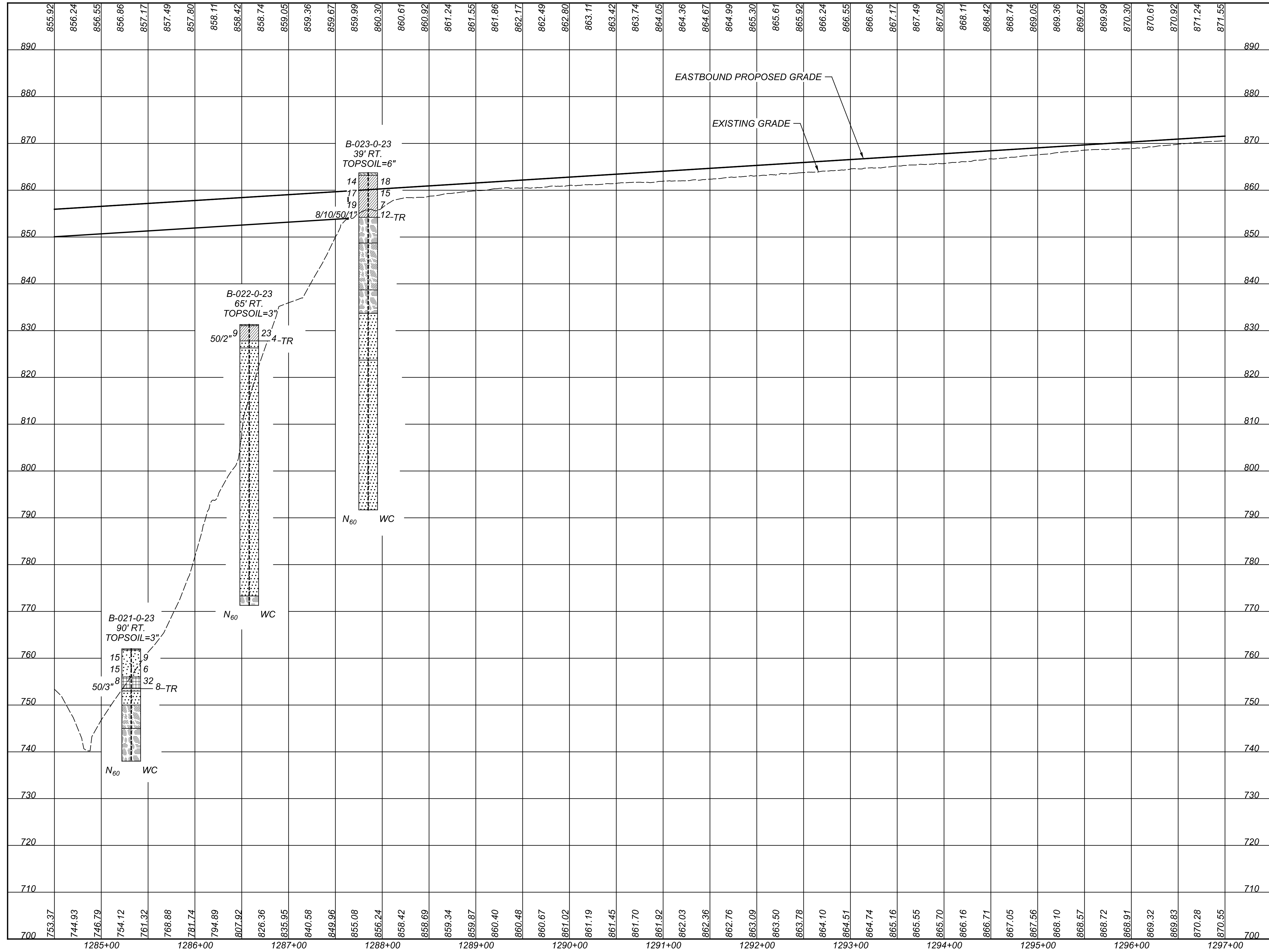
119142

SUBSET TOTAL

19 172

SHEET TOTAL

P. -

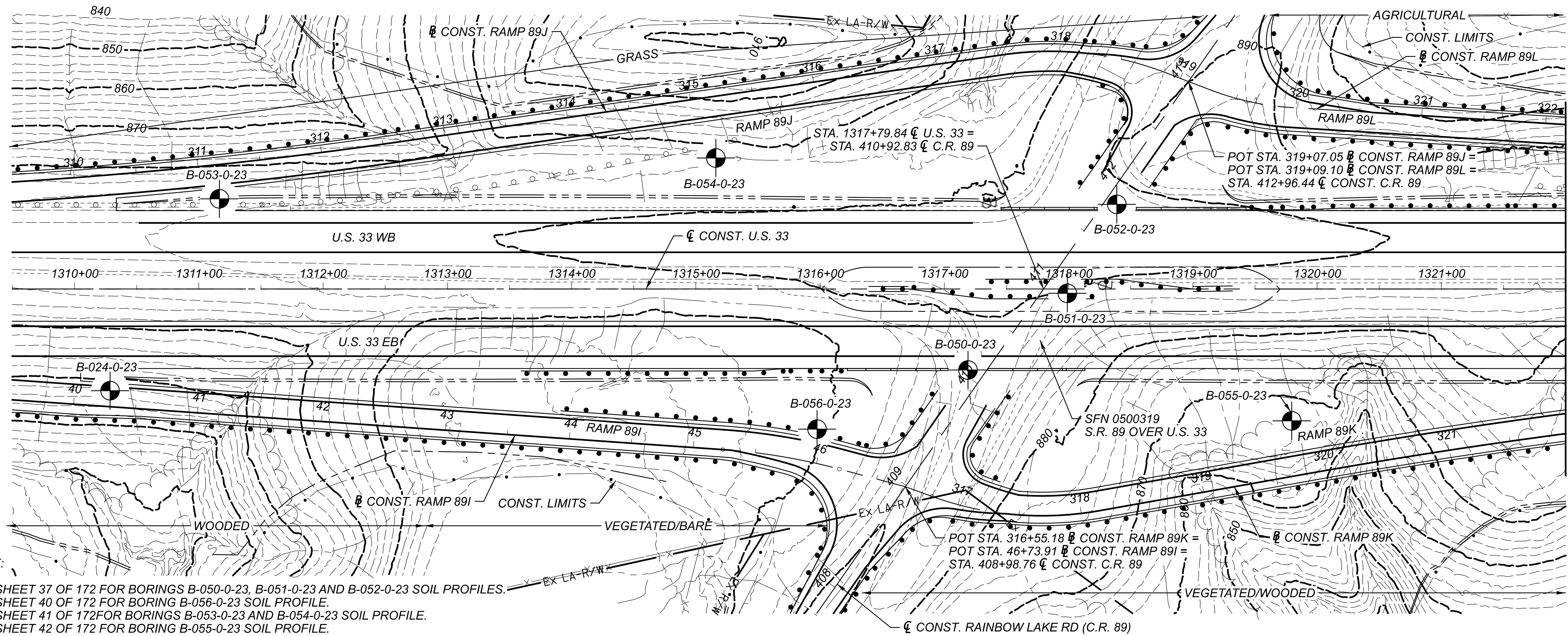


GEOTECHNICAL PROFILE - ROADWAY
 STA. 1284+50.00 TO STA. 1297+00.00 (US 33)

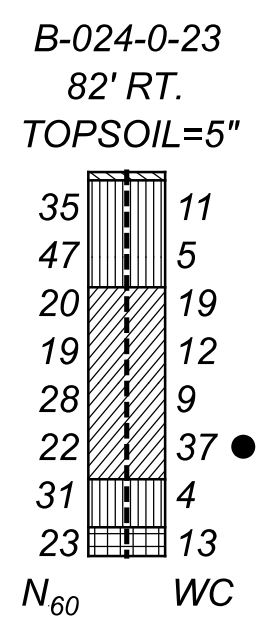
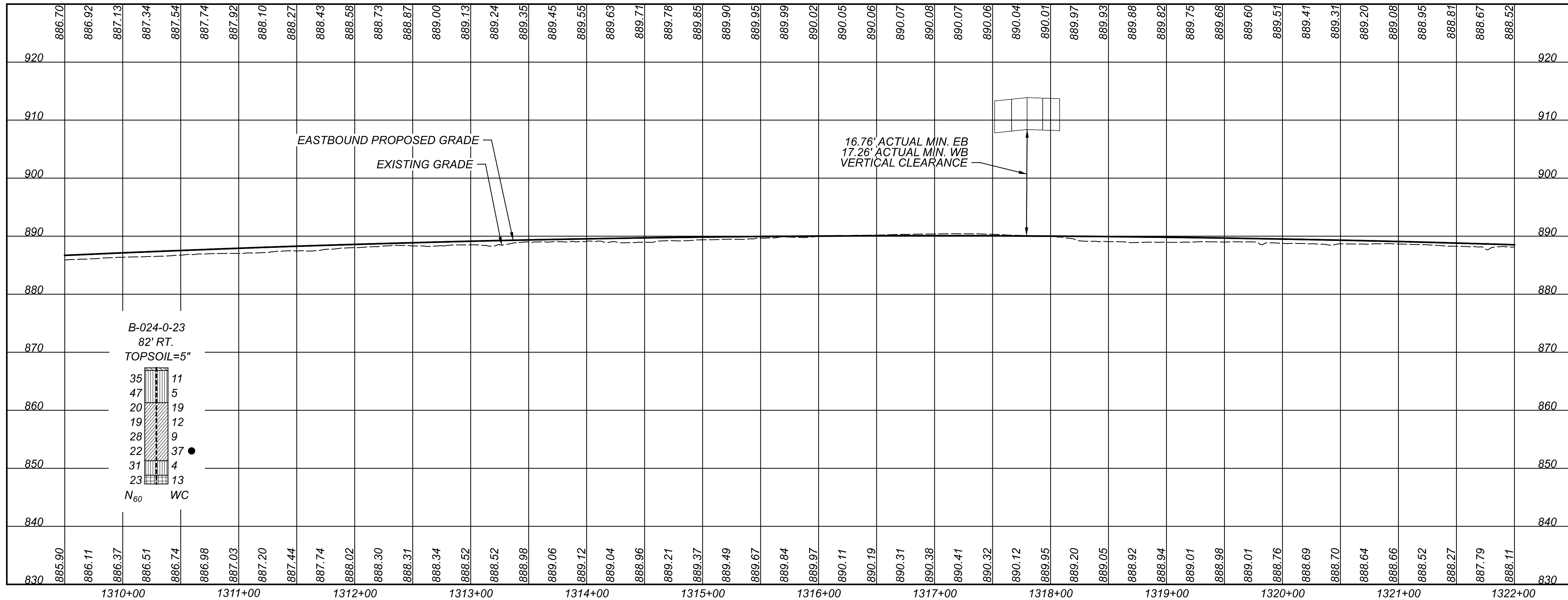
DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
20	172
SHEET	TOTAL
P.	-

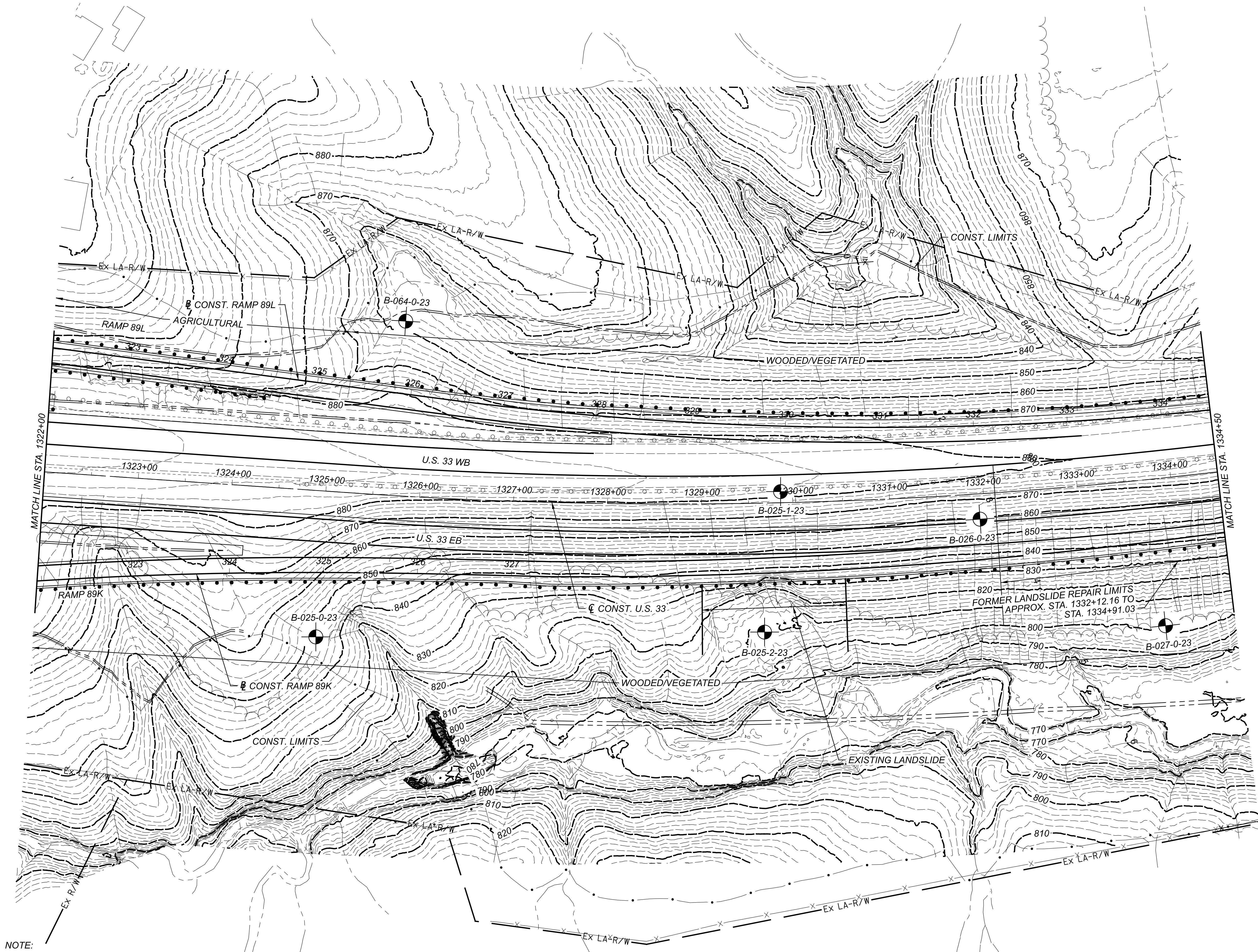


NOTE:
 SEE SHEET 37 OF 172 FOR BORINGS B-050-0-23, B-051-0-23 AND B-052-0-23 SOIL PROFILES.
 SEE SHEET 40 OF 172 FOR BORING B-056-0-23 SOIL PROFILE.
 SEE SHEET 41 OF 172 FOR BORINGS B-053-0-23 AND B-054-0-23 SOIL PROFILE.
 SEE SHEET 42 OF 172 FOR BORING B-055-0-23 SOIL PROFILE.

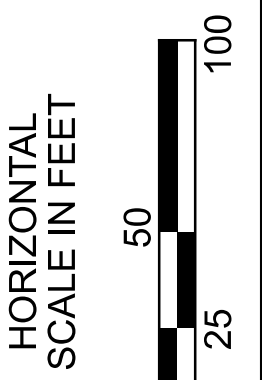
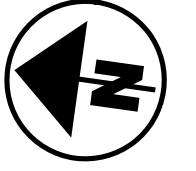


GEOTECHNICAL PROFILE - ROADWAY
 STA. 1309+50.00 TO STA. 1322+00.00 (US 33)

DESIGN AGENCY	GTL ENGINEERING	
DESIGNER	N.K.S	
REVIEWER	SM 11-06-24	
PROJECT ID	119142	
SUBSET	TOTAL	
21	172	
SHEET	TOTAL	
P.	-	



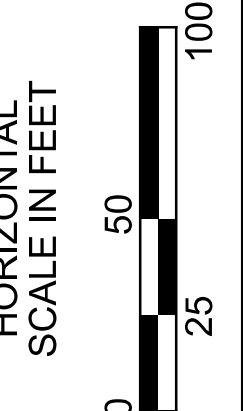
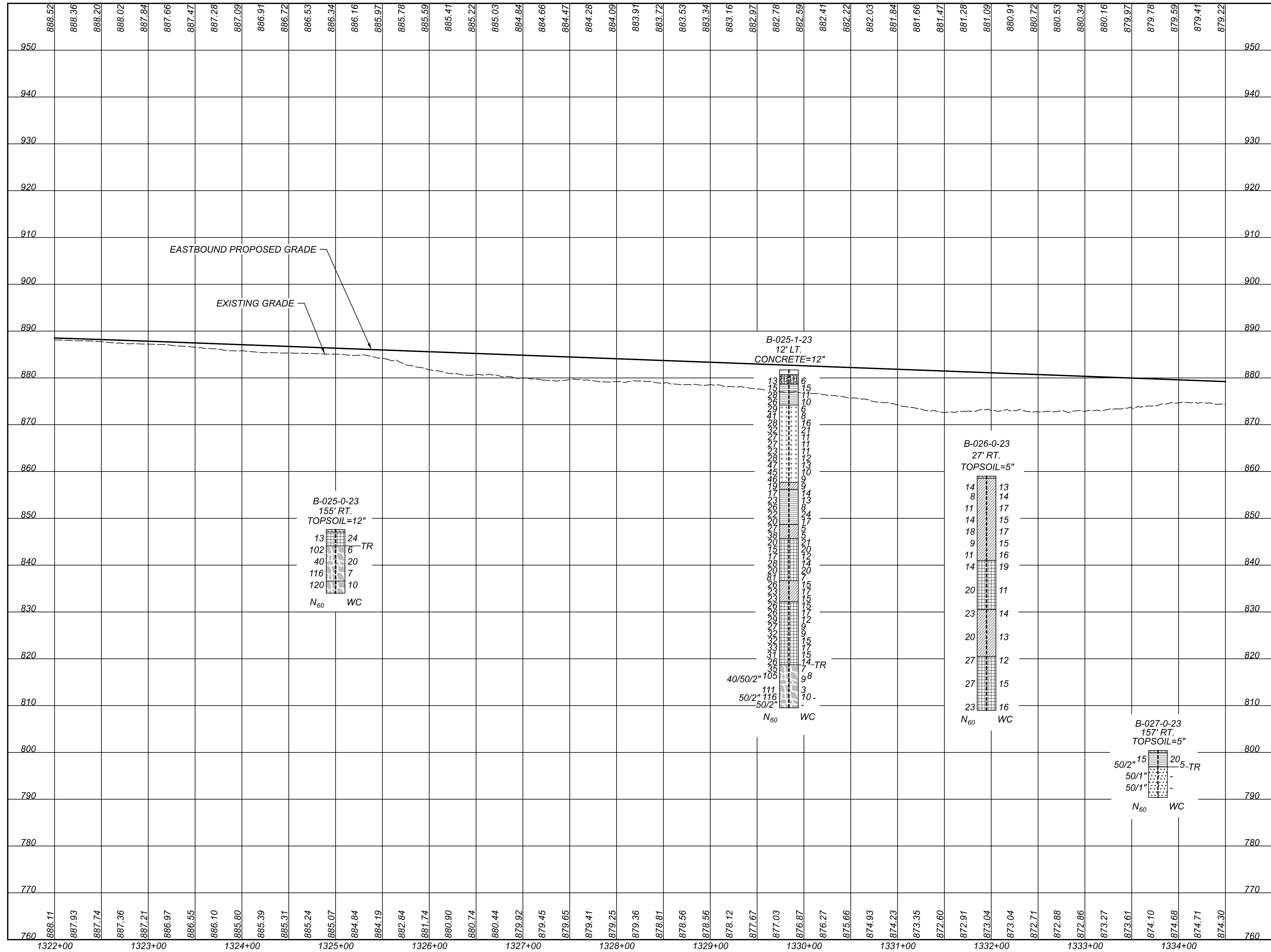
NOTE:
 SEE SHEET 23 OF 172 FOR BORINGS B-025-0-23, B-025-1-23, B-025-2-23, B-026-0-23 AND B-027-0-23 SOIL PROFILE.
 SEE SHEET 43 OF 172 FOR BORING B-064-0-23 SOIL PROFILE.



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1322+00.00 TO STA. 1334+50.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S	
REVIEWER	SM	
PROJECT ID	119142	
SUBSET	TOTAL	
22	172	
SHEET	TOTAL	
P.	-	

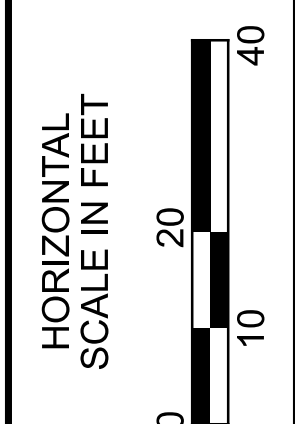
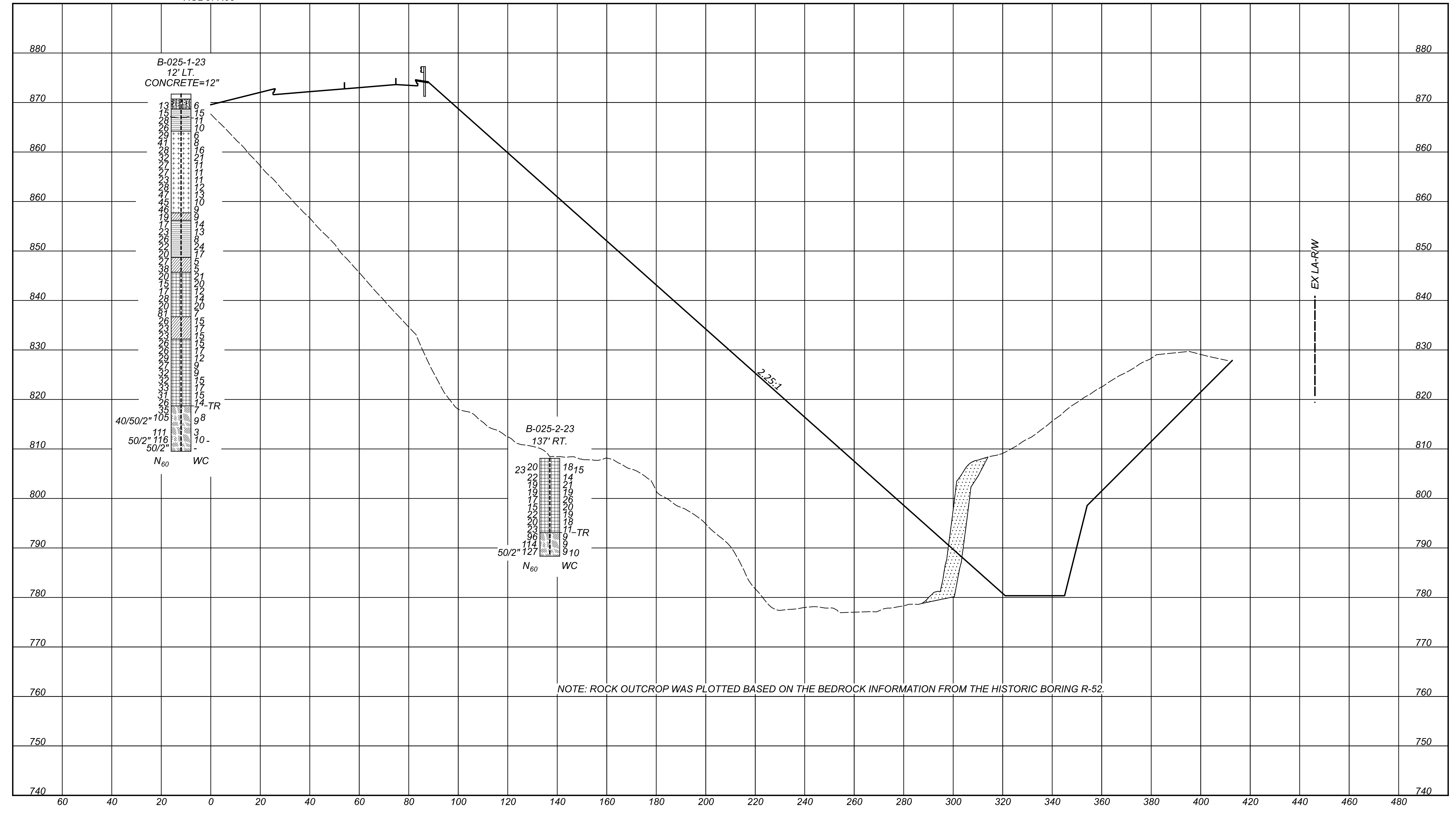


GEOTECHNICAL PROFILE - ROADWAY
 STA. 1322+00.00 TO STA. 1334+50.00 (US 33)

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S
 REVIEWER
 SM 11-06-24
 PROJECT ID
 119142
 SUBSET TOTAL
 23 172
 SHEET TOTAL
 P. -

STA. 1329+50.00
 PGL 882.97
 XGL 877.66

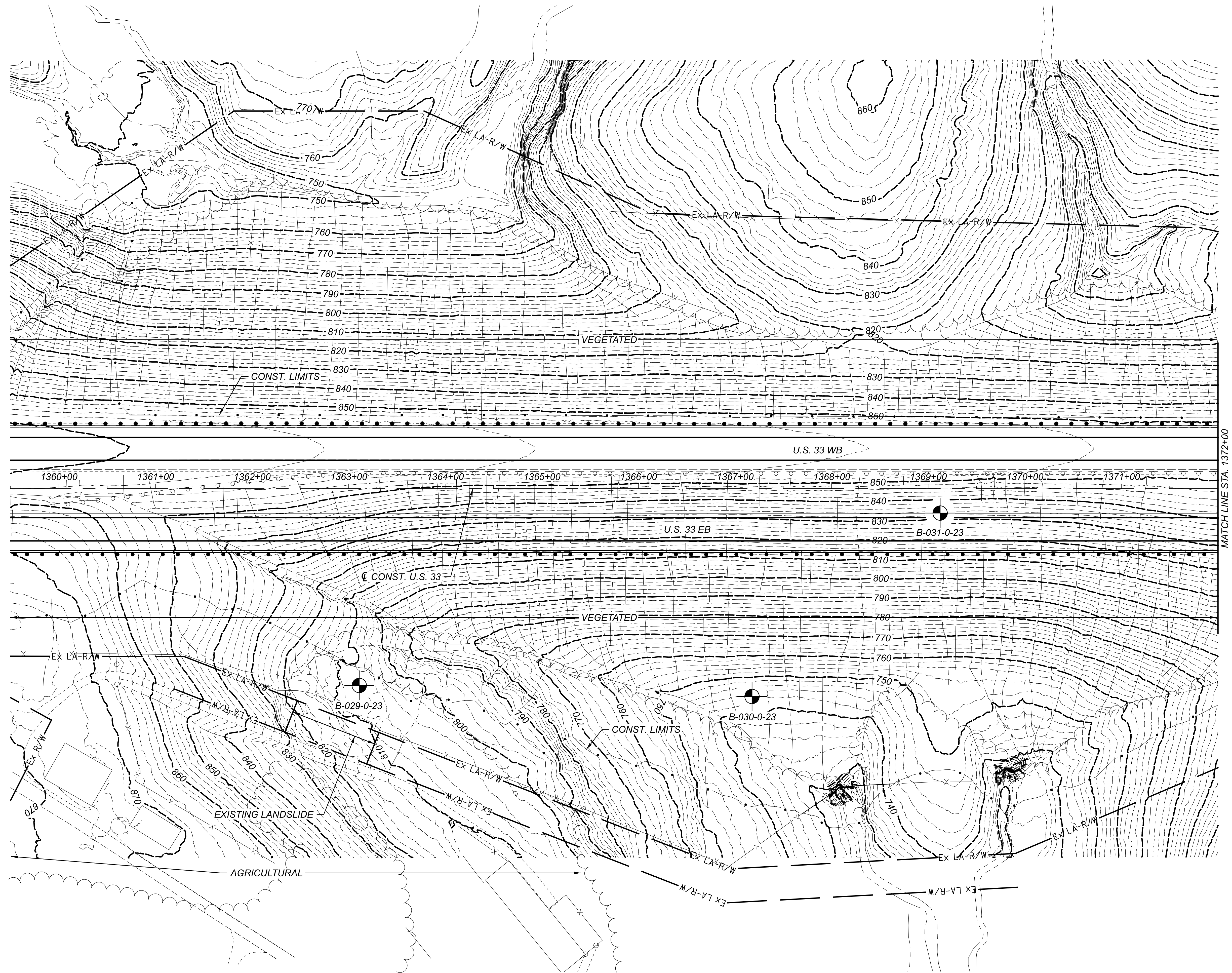


GEOTECHNICAL PROFILE - ROADWAY
 CROSS SECTION STA. 1329+50.00

DESIGN AGENCY

2880 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614)276-8123
 FAX: (614)276-8377

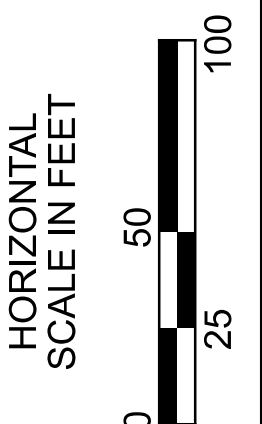
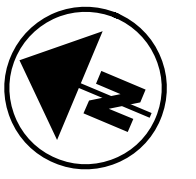
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	24
TOTAL	172
SHEET	P.
TOTAL	-



MATCH LINE STA. 1372+00

NOTE:

SEE SHEET 27 OF 172 FOR BORINGS B-029-0-23, B-030-0-23 AND B-031-0-23 SOIL PROFILES.

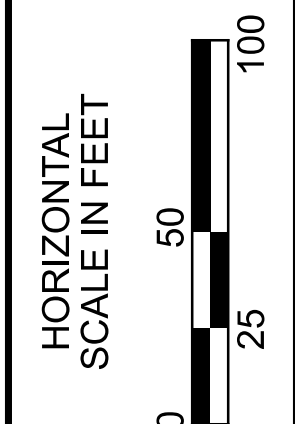
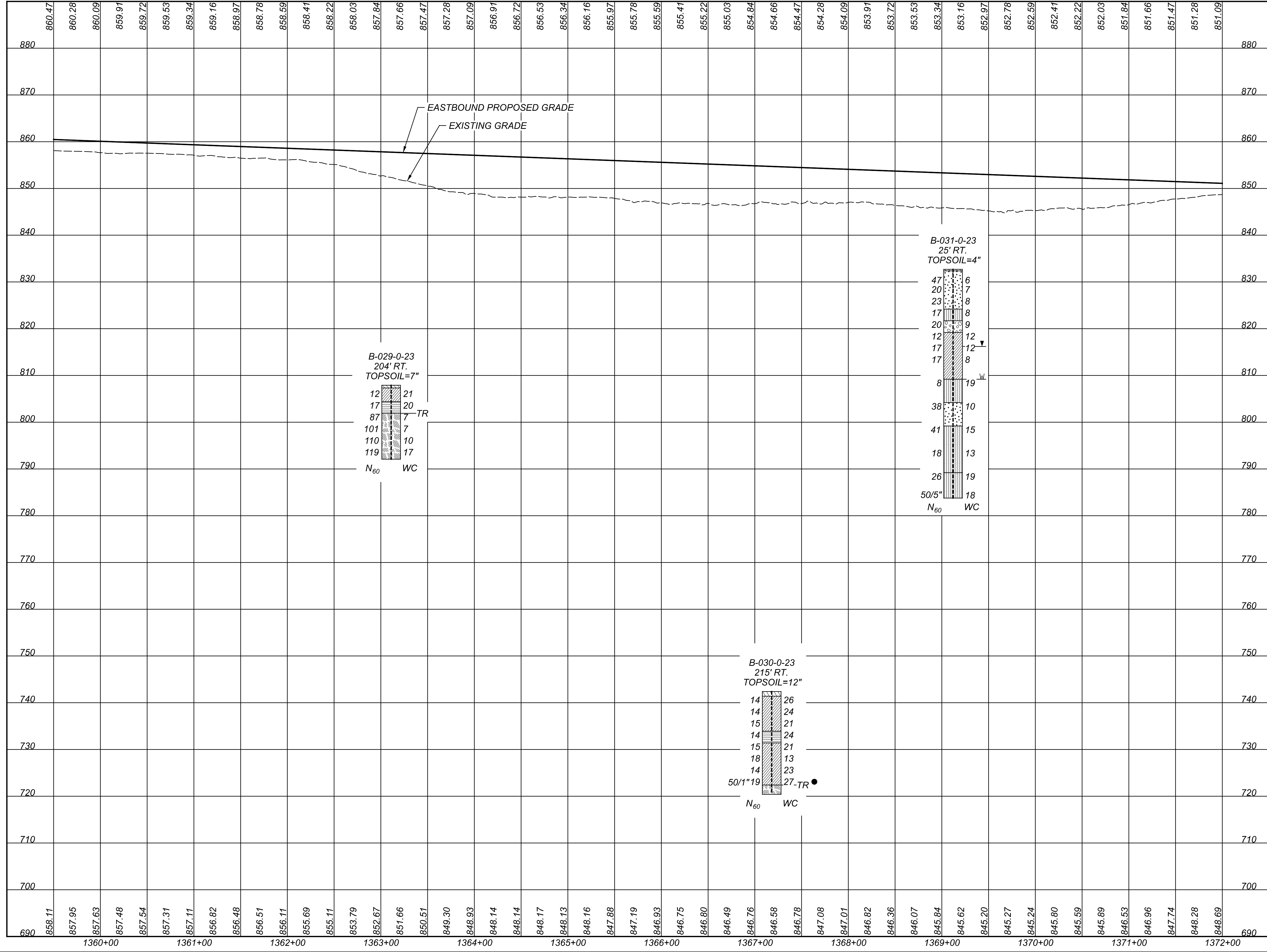


GEOTECHNICAL PROFILE - ROADWAY
STA. 1359+50.00 TO STA. 1372+00.00 (US 33)

DESIGN AGENCY

GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

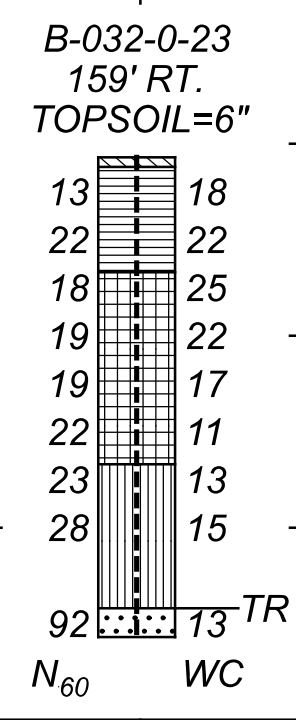
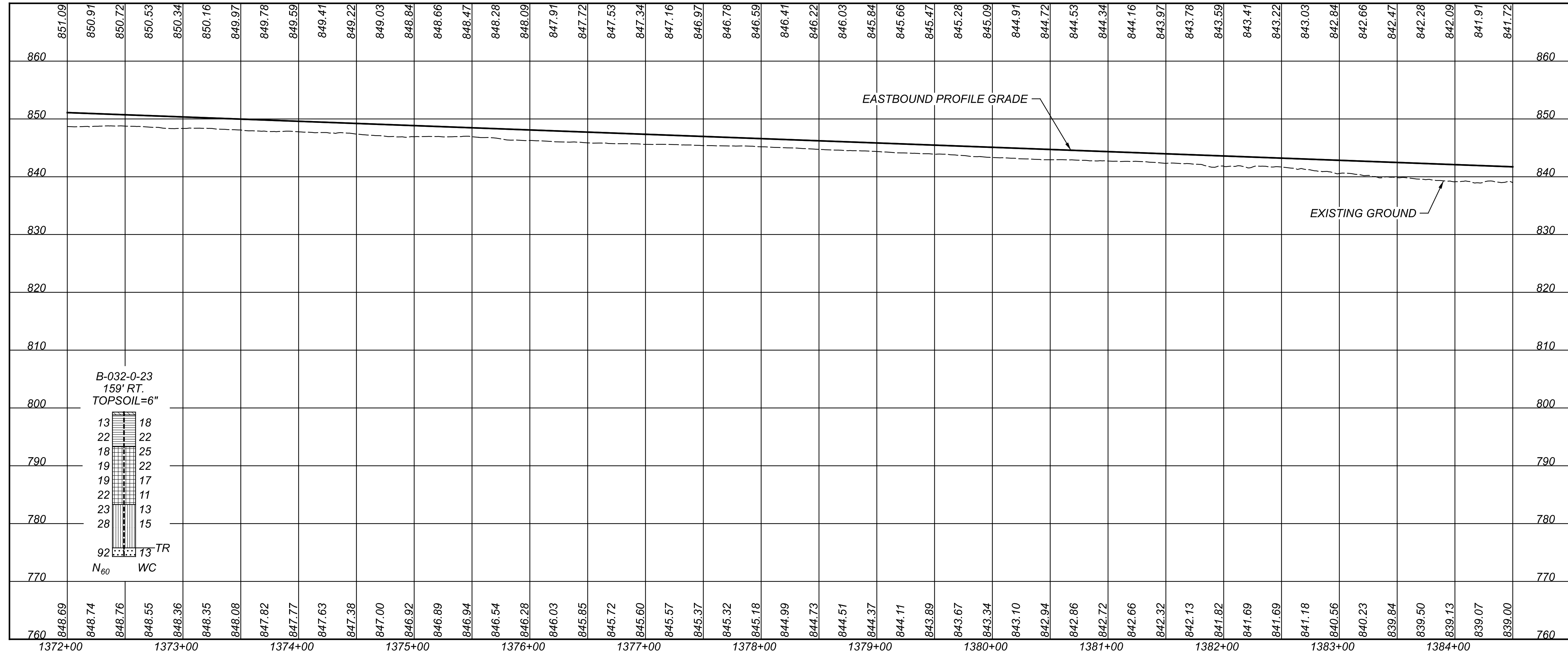
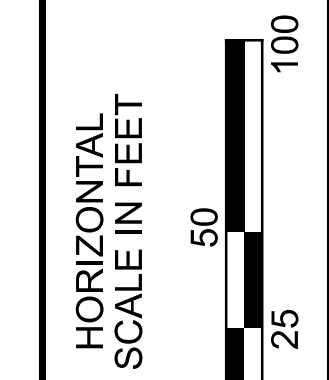
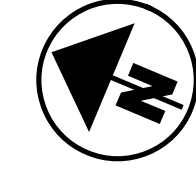
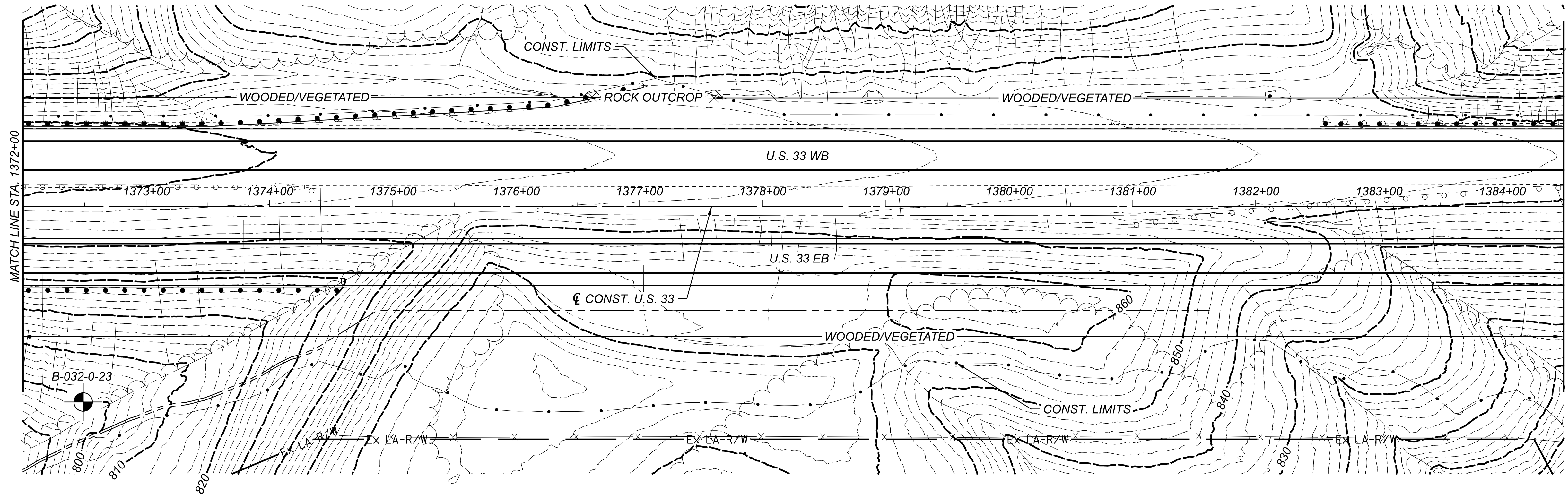
DESIGNER	N.K.S	
REVIEWER	SM	
PROJECT ID	119142	
SUBSET	TOTAL	
26	172	
SHEET	TOTAL	
P.	-	



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1359+50.00 TO STA. 1372+00.00 (US 33)

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

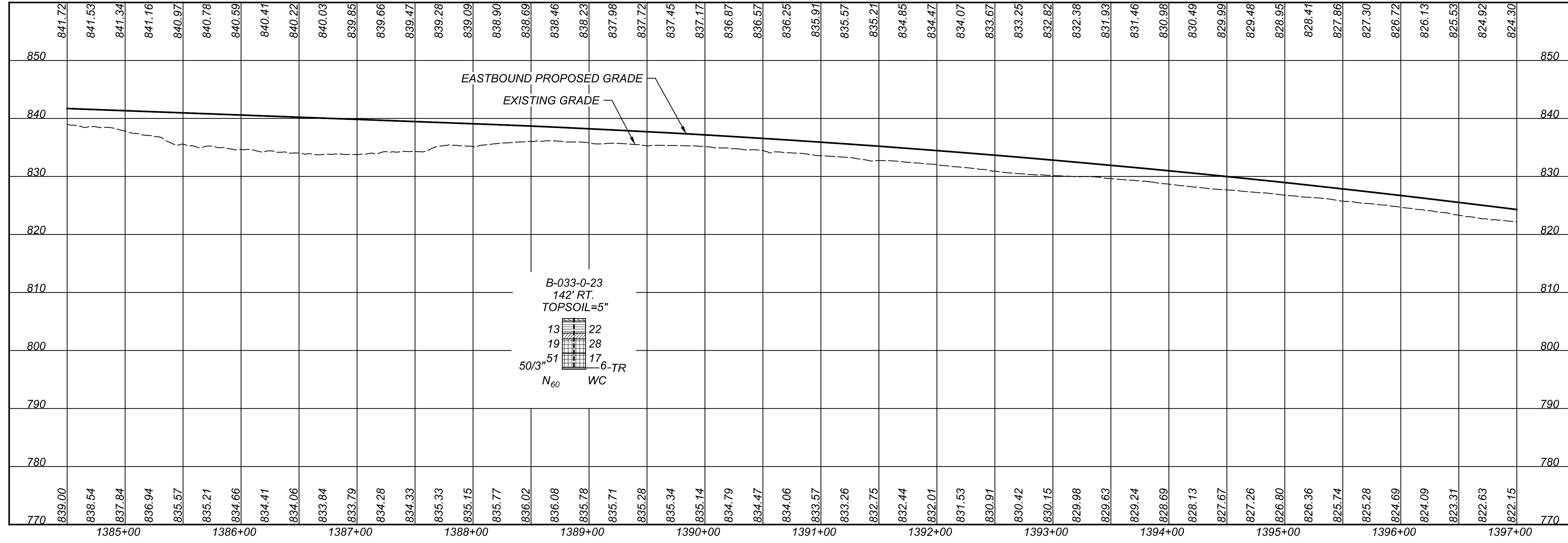
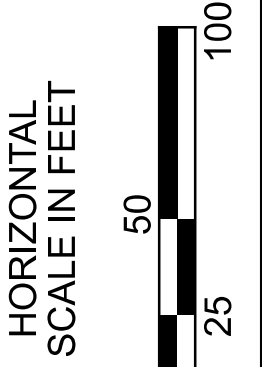
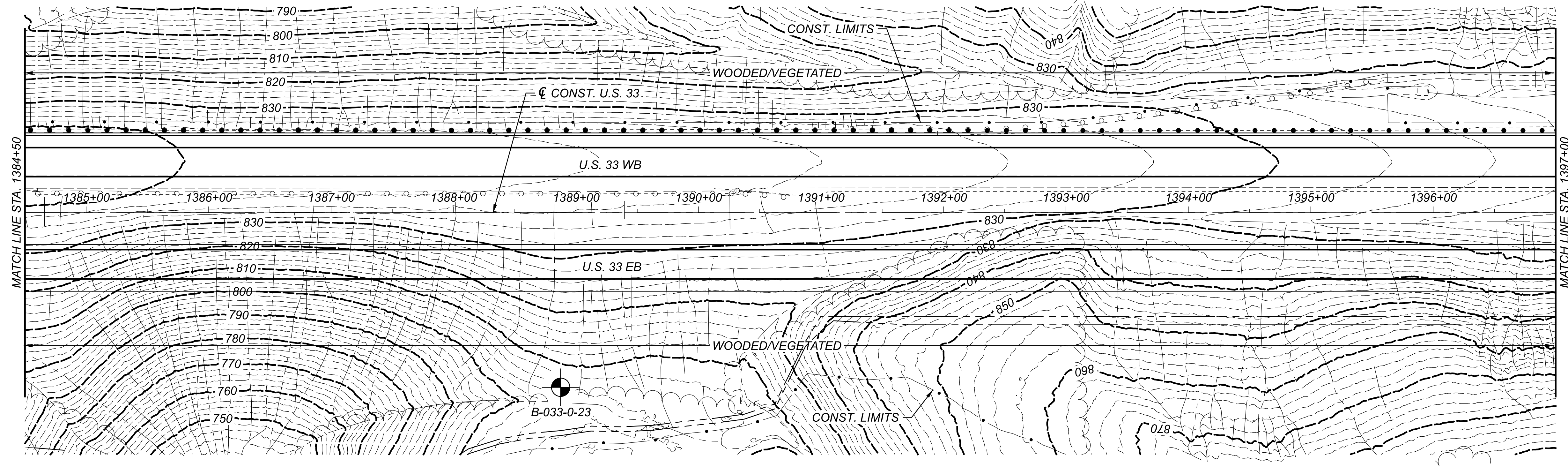
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
27	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1372+00.00 TO STA. 1384+50.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
28	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1384+50.00 TO STA. 1397+00.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

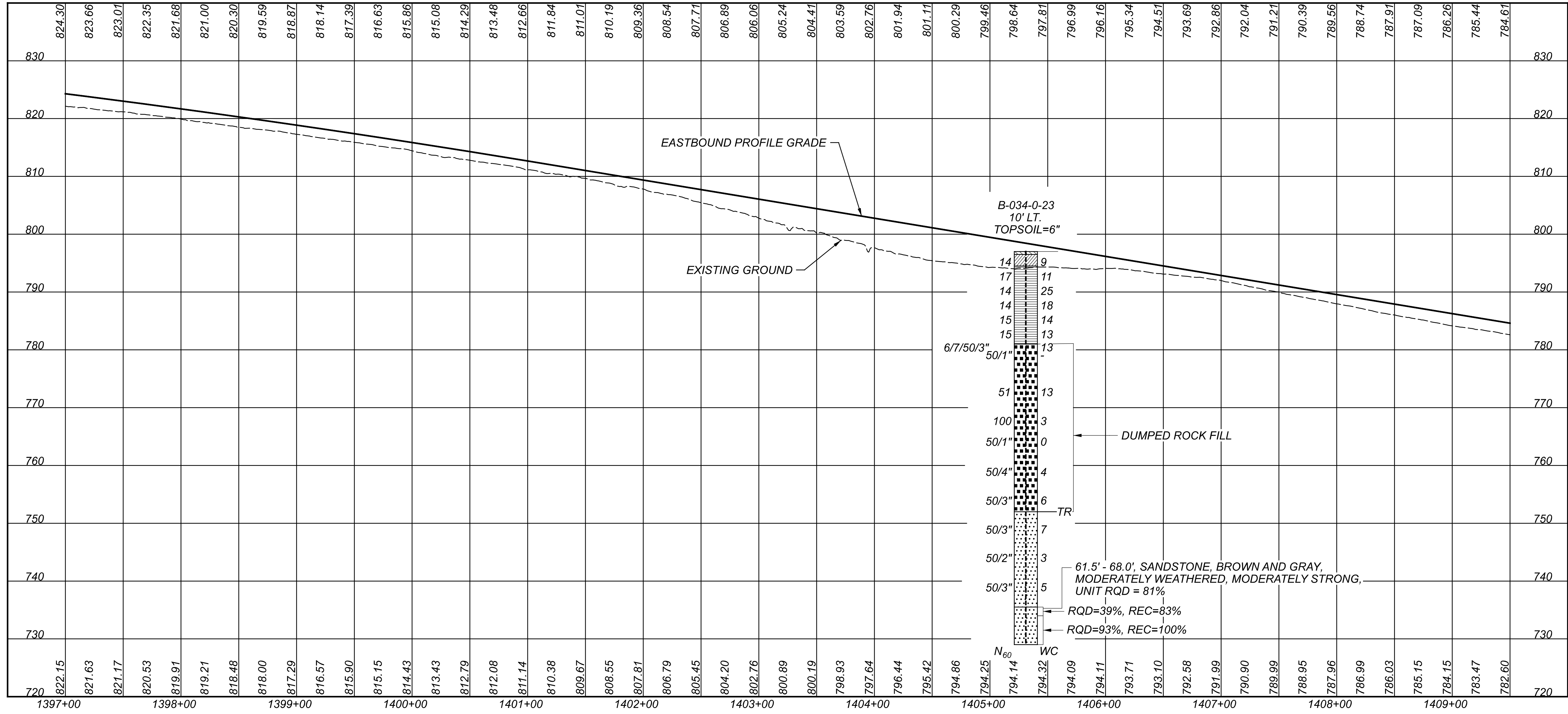
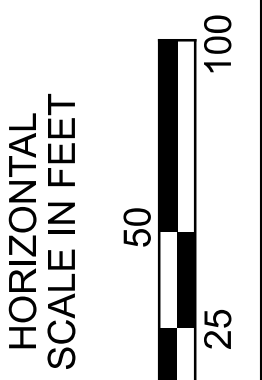
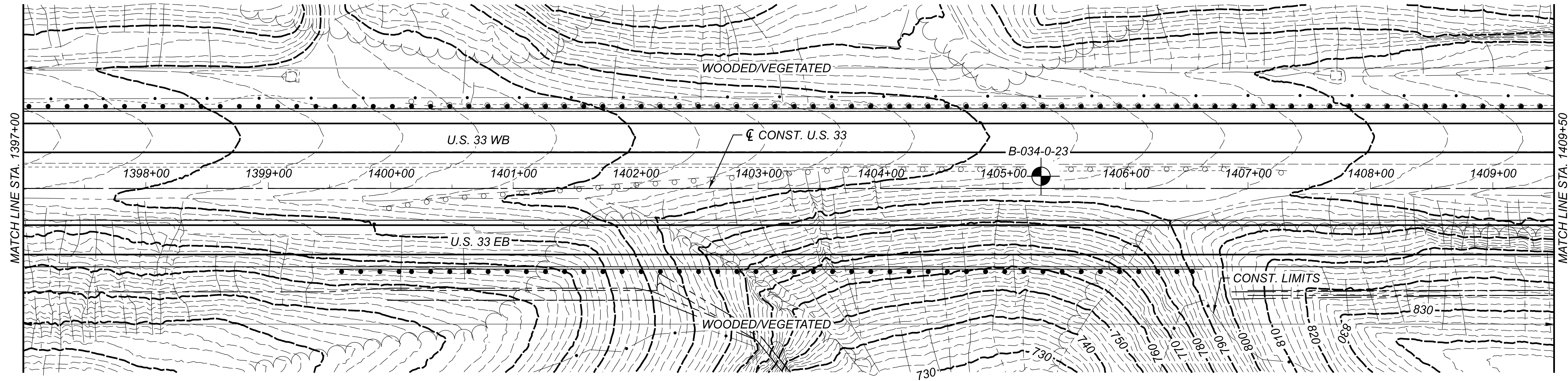
DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

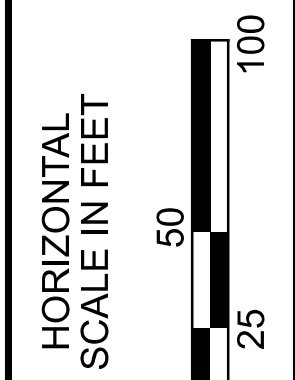
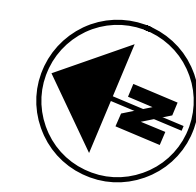
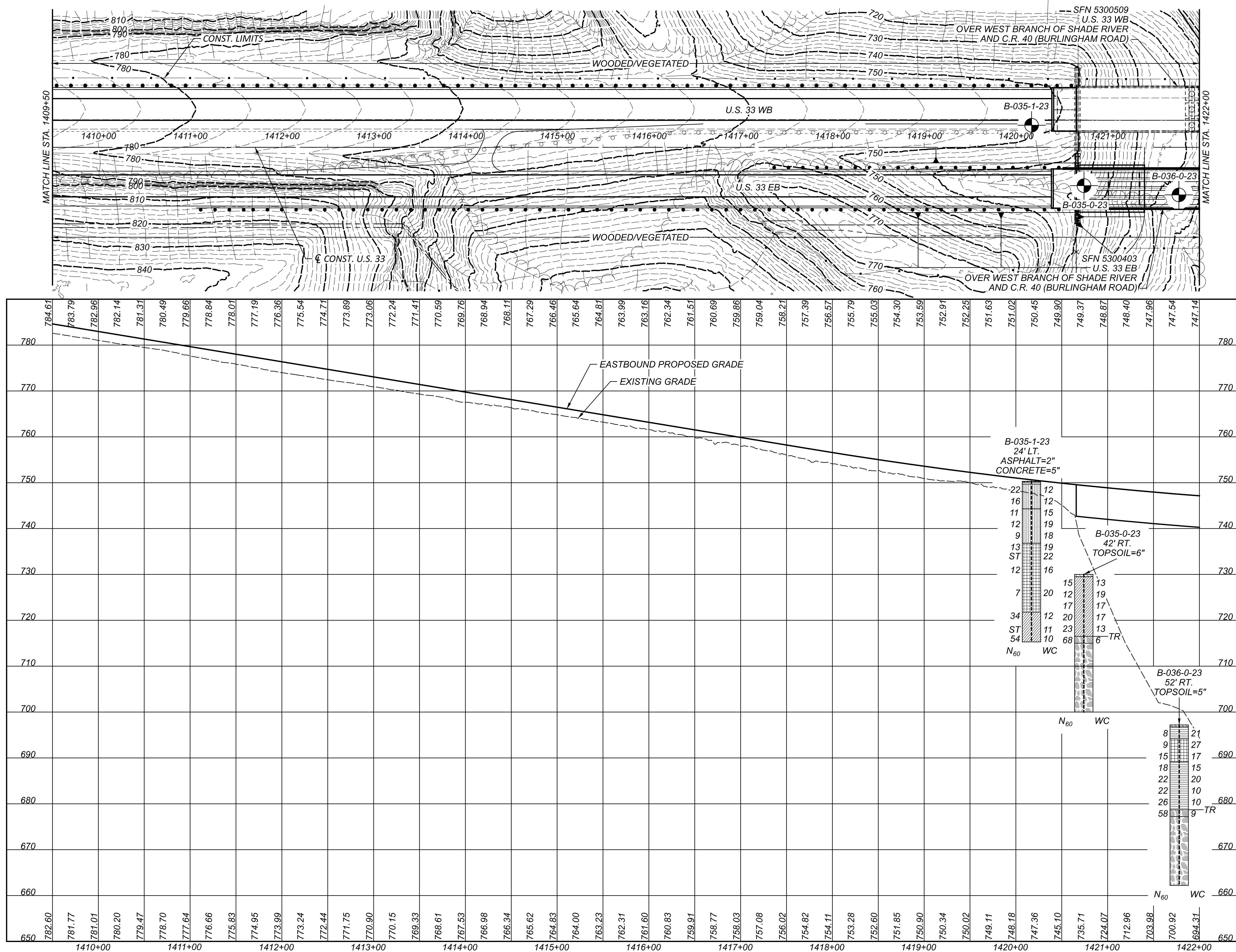
SUBSET TOTAL
 29 172

SHEET TOTAL
 P. -



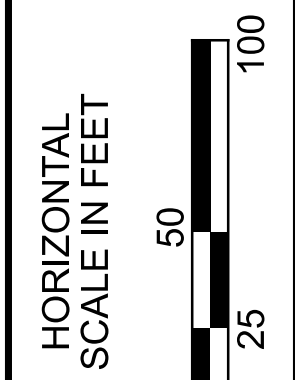
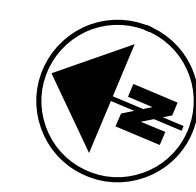
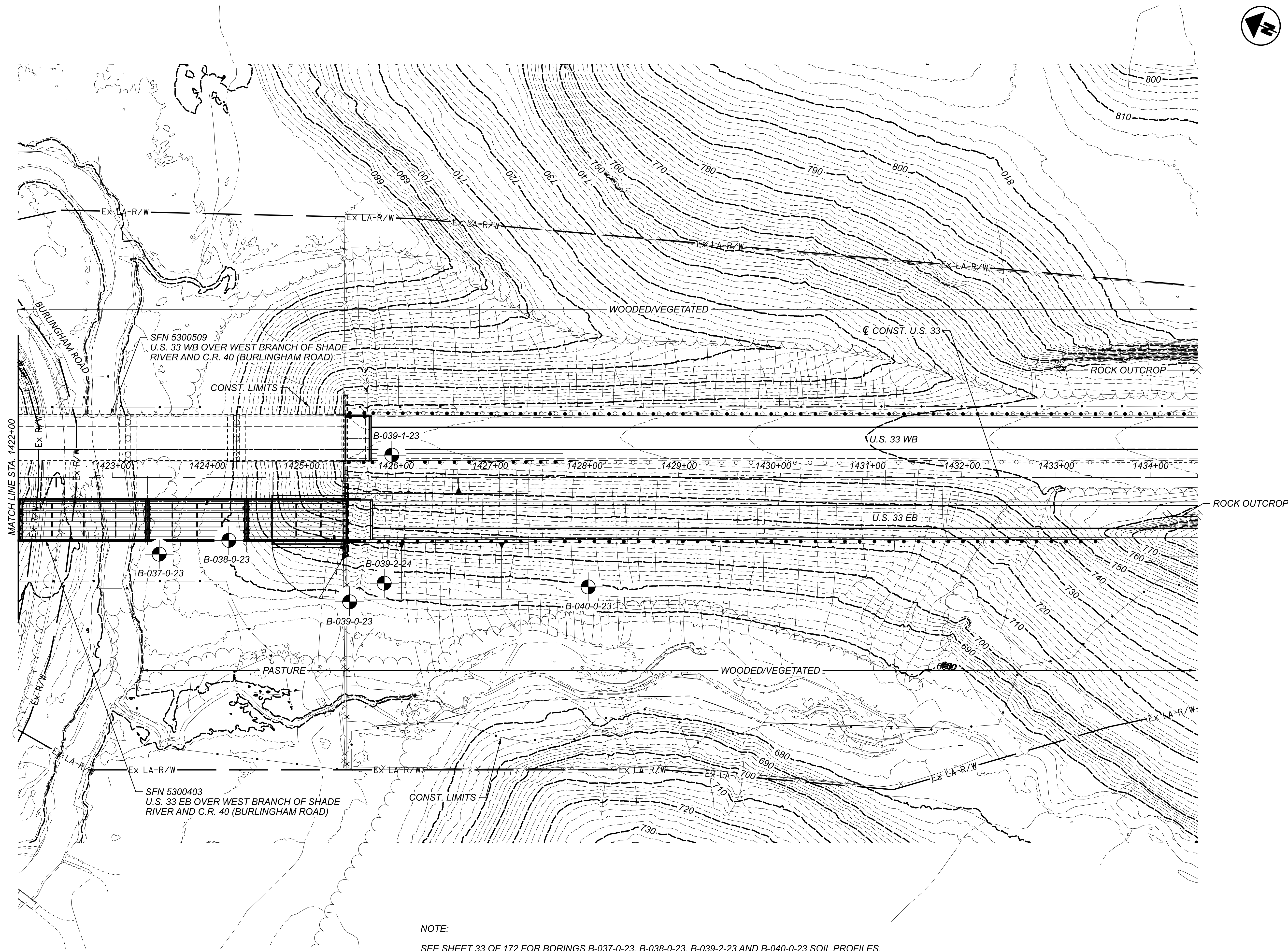
GEOTECHNICAL PROFILE - ROADWAY
 STA. 1397+00.00 TO STA. 1409+50.00 (US 33)

DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43224 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
30	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1409+50.00 TO STA. 1422+00.00 (US 33)

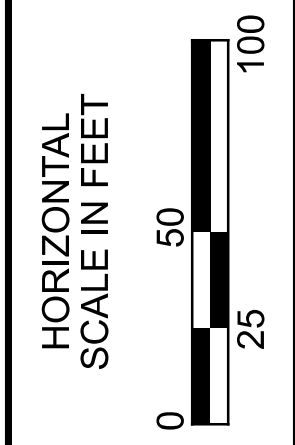
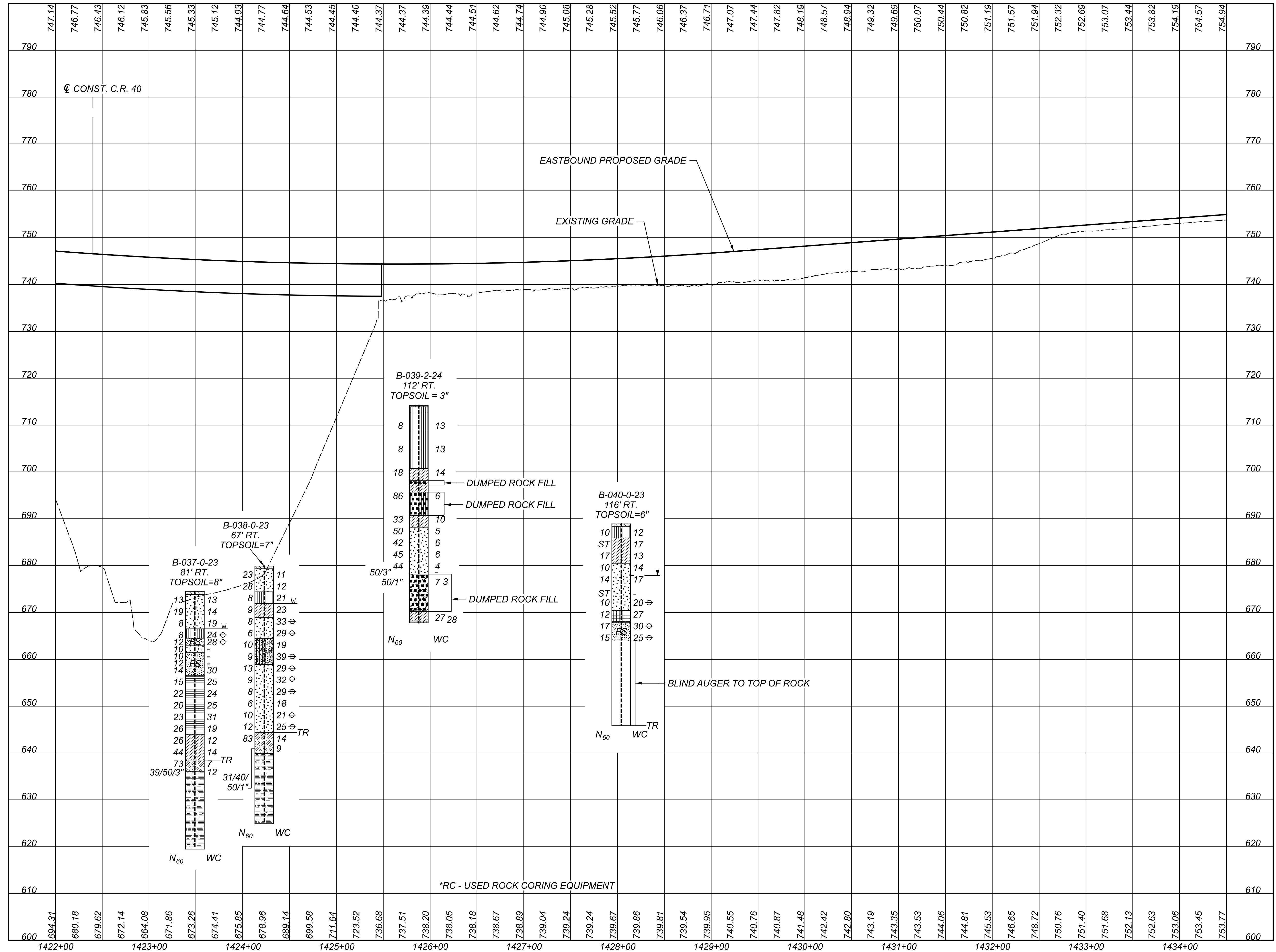
DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
31	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
STA. 1422+00.00 TO STA. 1434+50.00 (US 33)

NOTE:
 SEE SHEET 33 OF 172 FOR BORINGS B-037-0-23, B-038-0-23, B-039-2-23 AND B-040-0-23 SOIL PROFILES.
 SEE SHEET 34 OF 172 FOR BORING B-039-1-23 AND B-039-0-23 SOIL PROFILE.

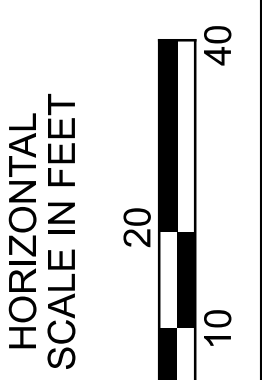
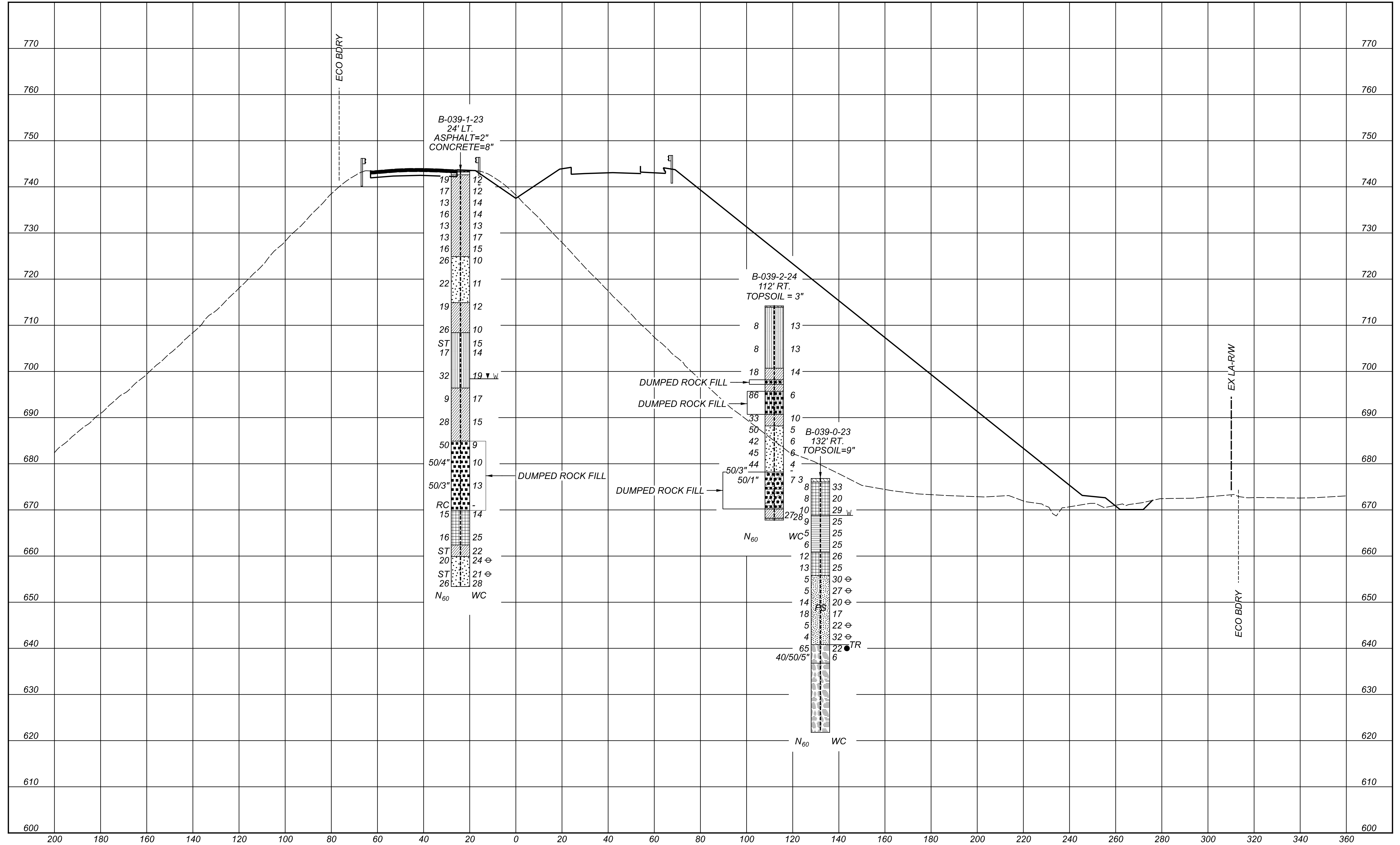
DESIGN AGENCY	
CTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43224 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
32	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
 STA. 1422+00.00 TO STA. 1434+50.00 (US 33)

DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43224 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
33	172
SHEET	TOTAL
P.	-

STA. 1426+00.00
 PGL 744.39
 XGL 738.20

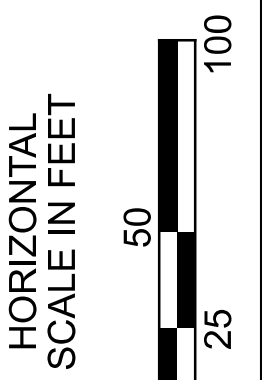
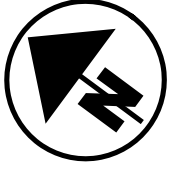
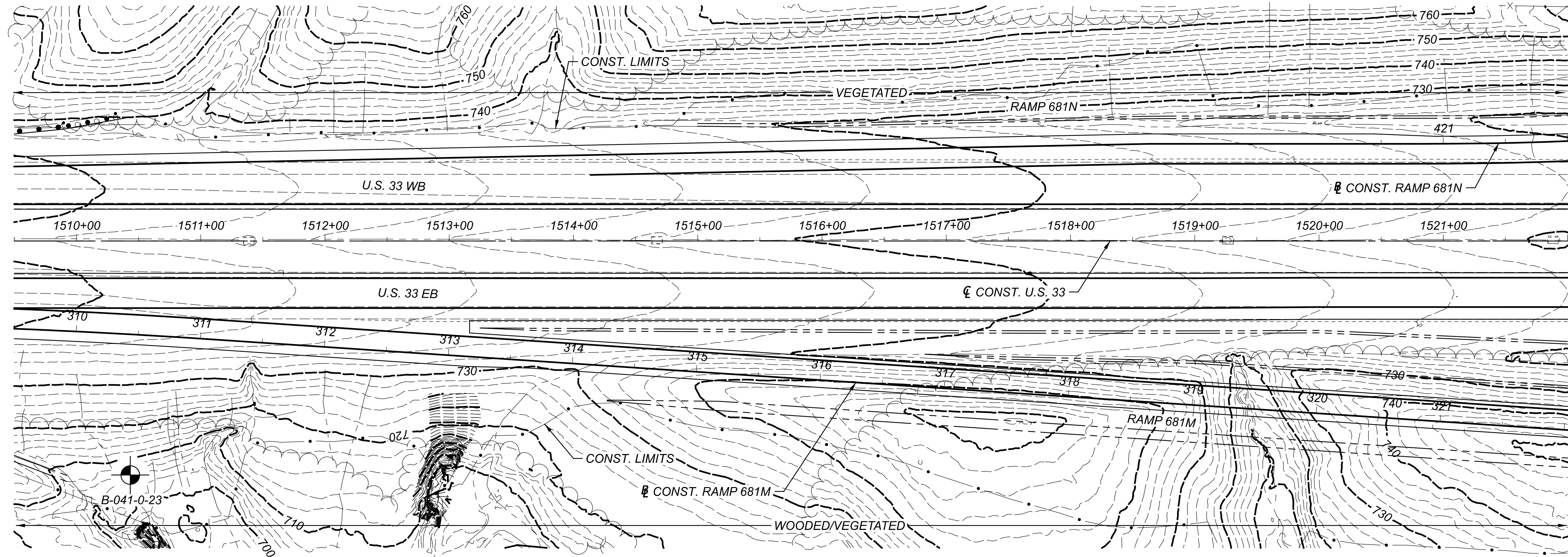
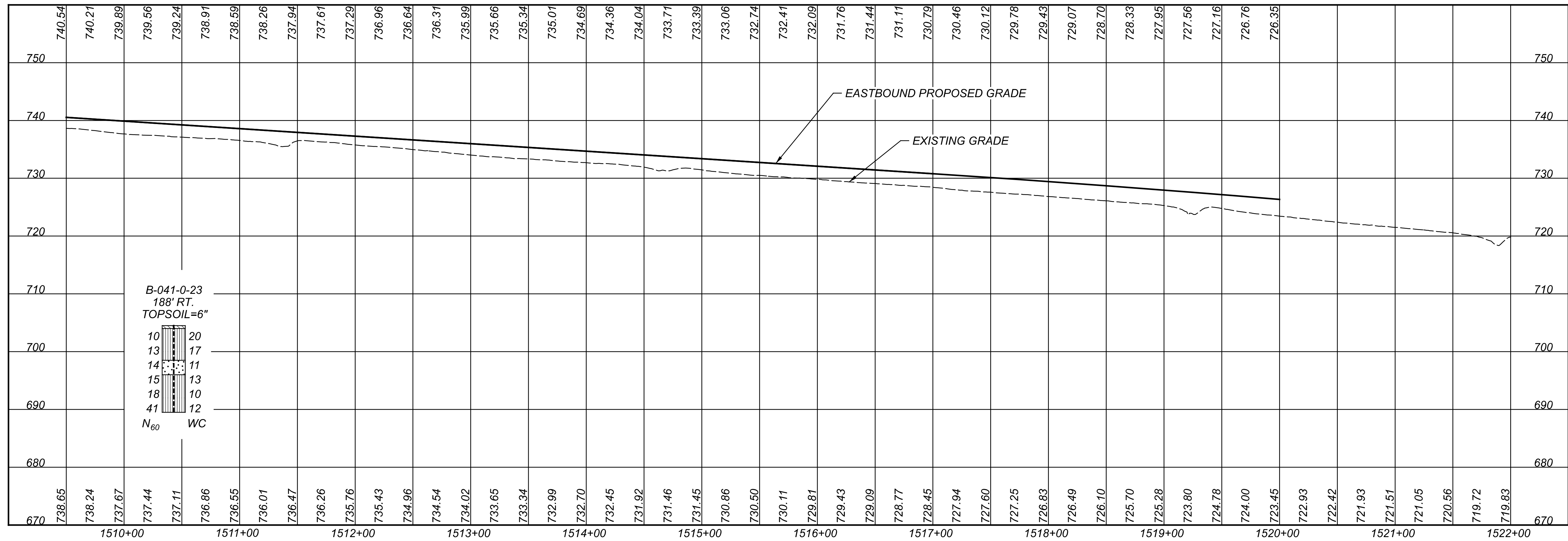


GEOTECHNICAL PROFILE - ROADWAY
 CROSS SECTION STA. 1426+00.00

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614)276-8123
 FAX: (614)276-6377

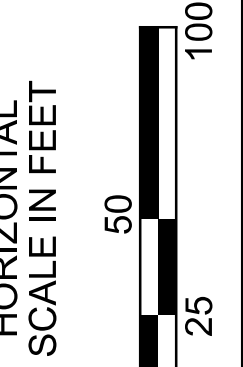
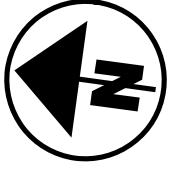
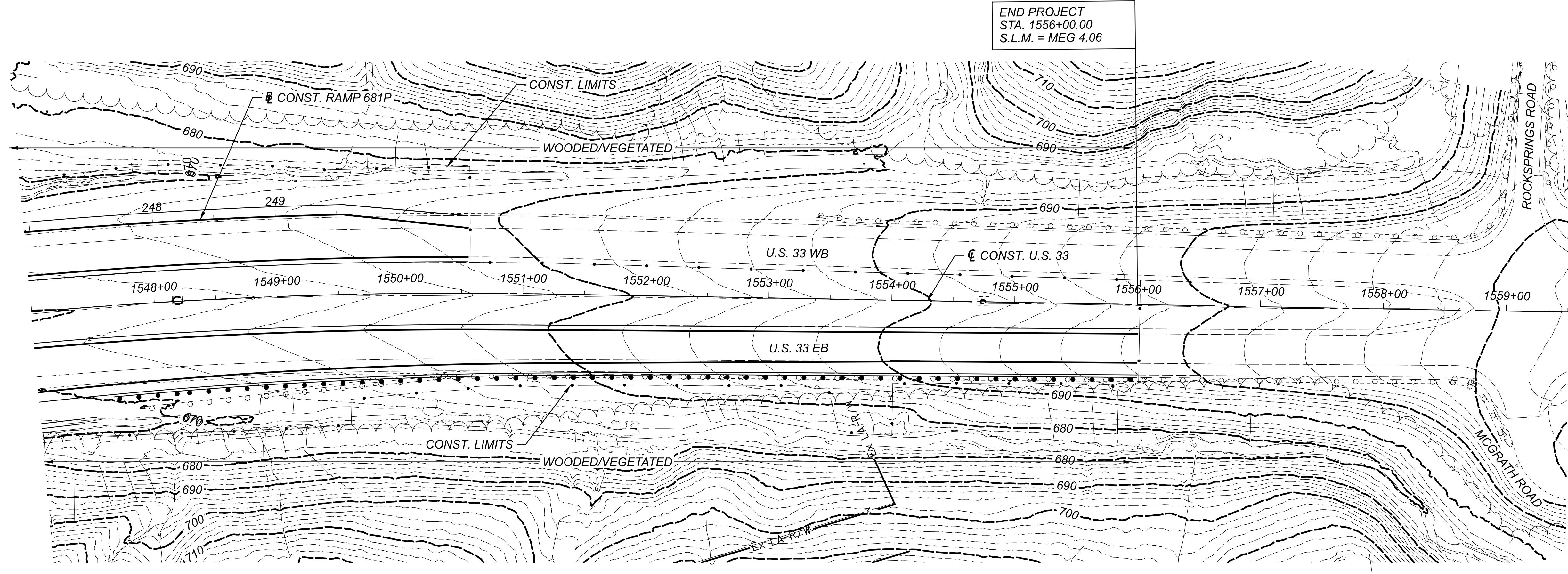
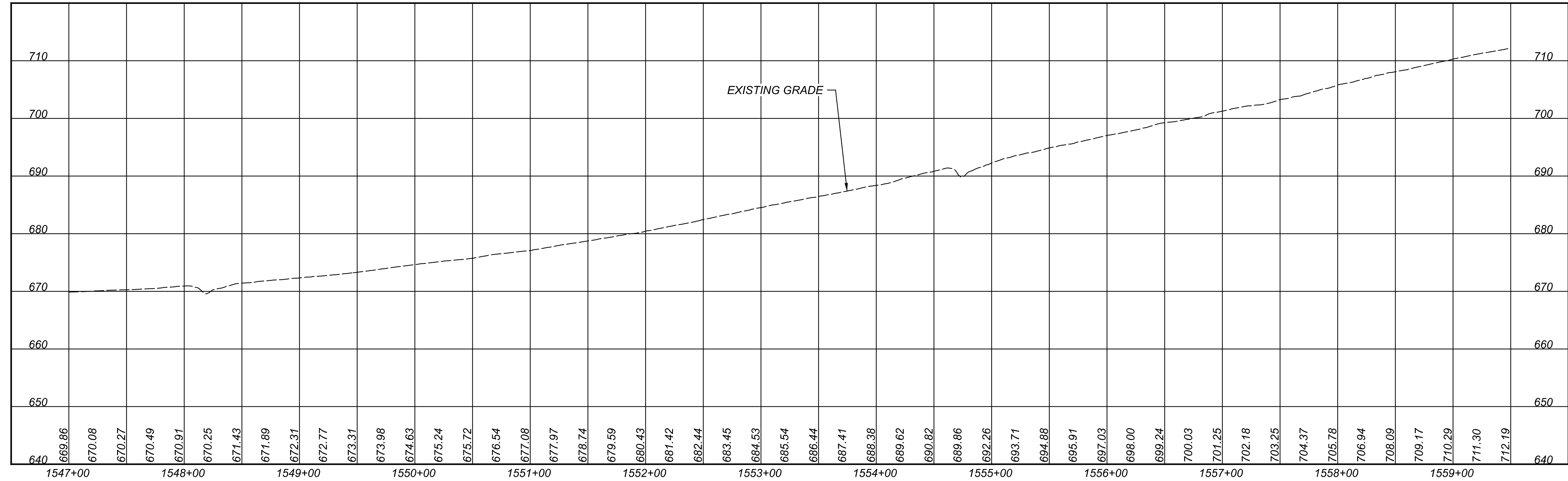
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
34	172
SHEET	TOTAL
P.	-



GEOTECHNICAL PROFILE - ROADWAY
STA. 1509+50.00 TO STA. 1522+00.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

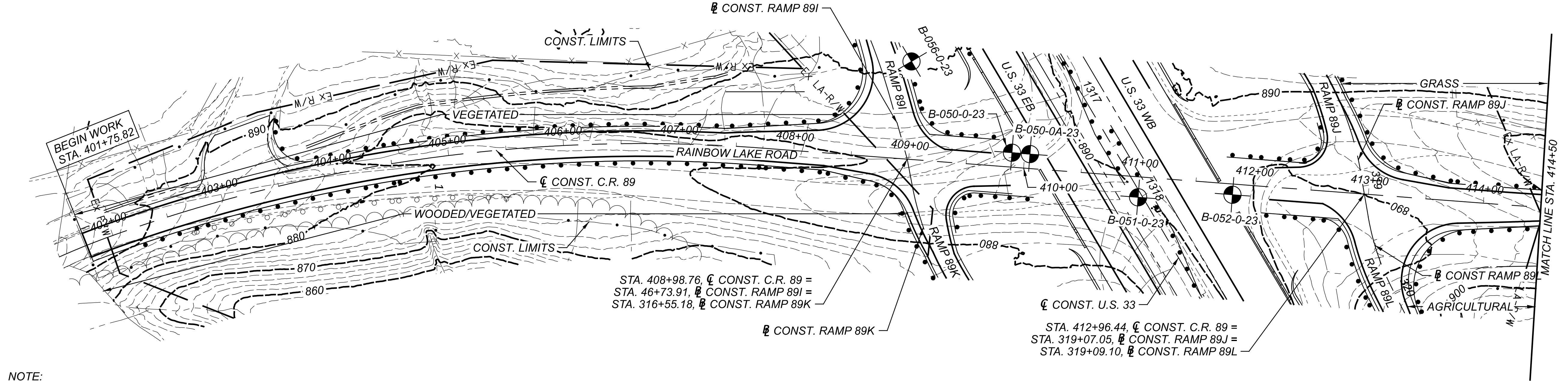
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	35
TOTAL	172
SHEET	P.
TOTAL	-



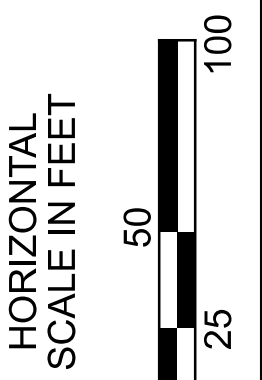
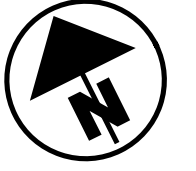
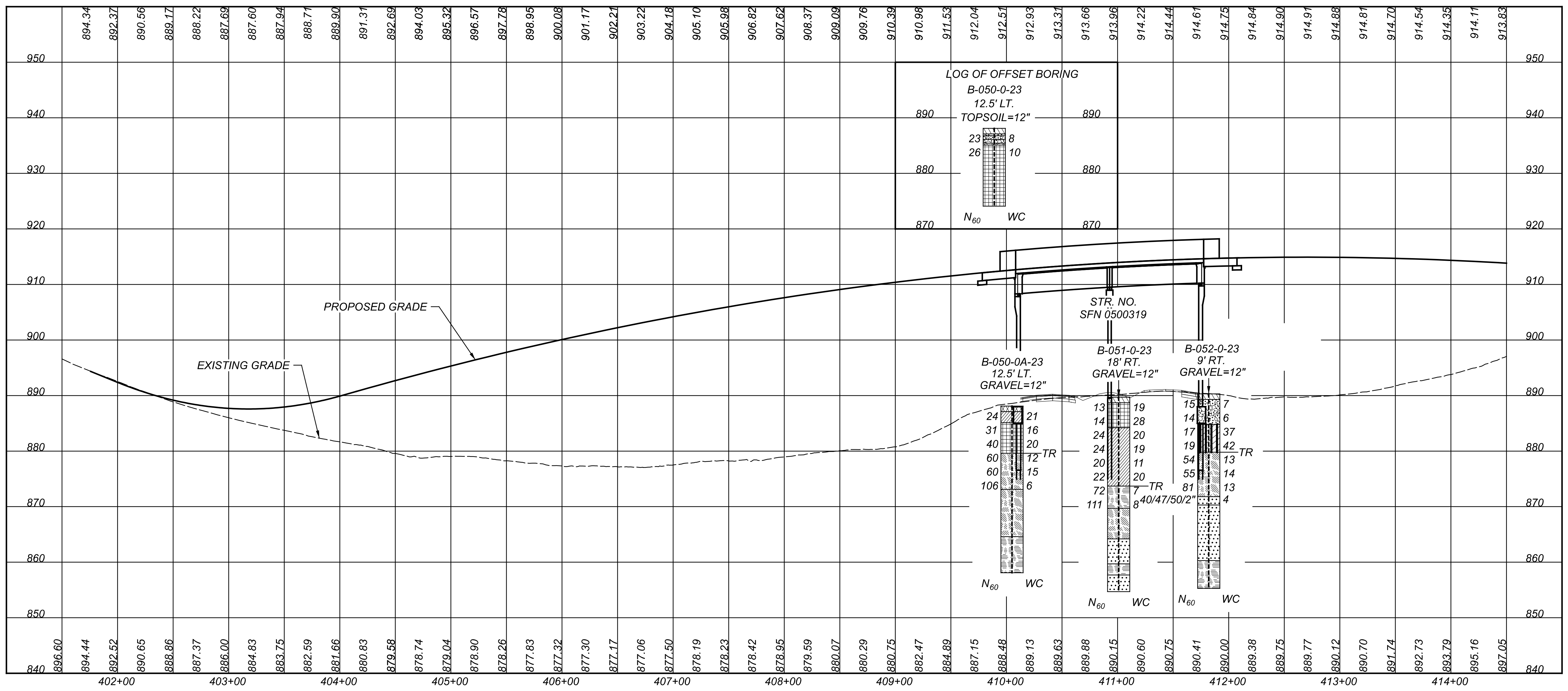
GEOTECHNICAL PROFILE - ROADWAY
 STA. 1547+00.00 TO STA. 1556+00.00 (US 33)

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S
 REVIEWER
 SM 11-06-24
 PROJECT ID
 119142
 SUBSET TOTAL
 36 172
 SHEET TOTAL
 P. -

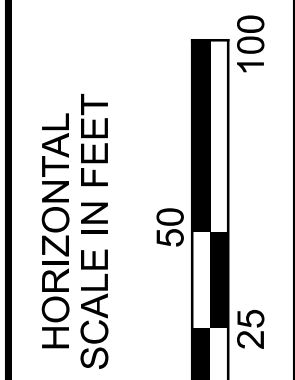
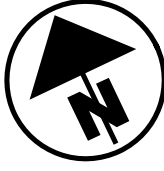
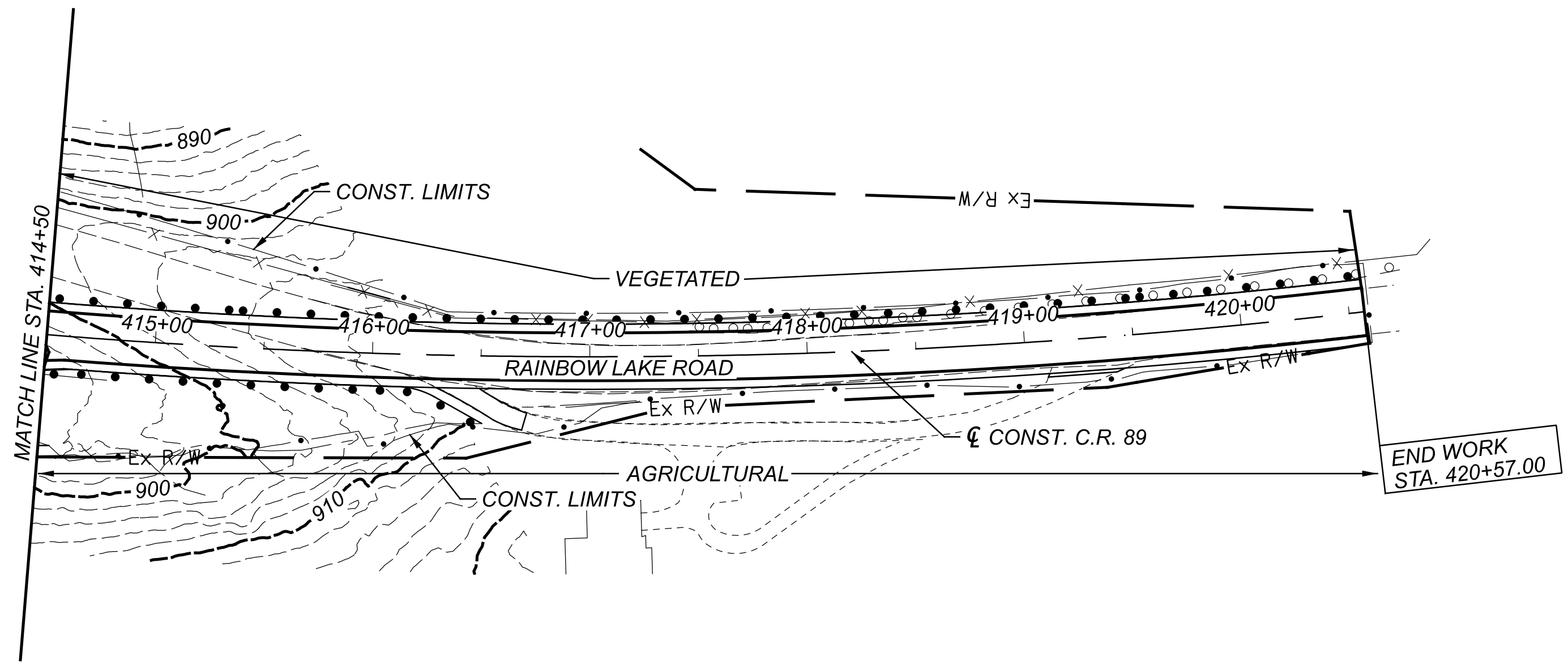
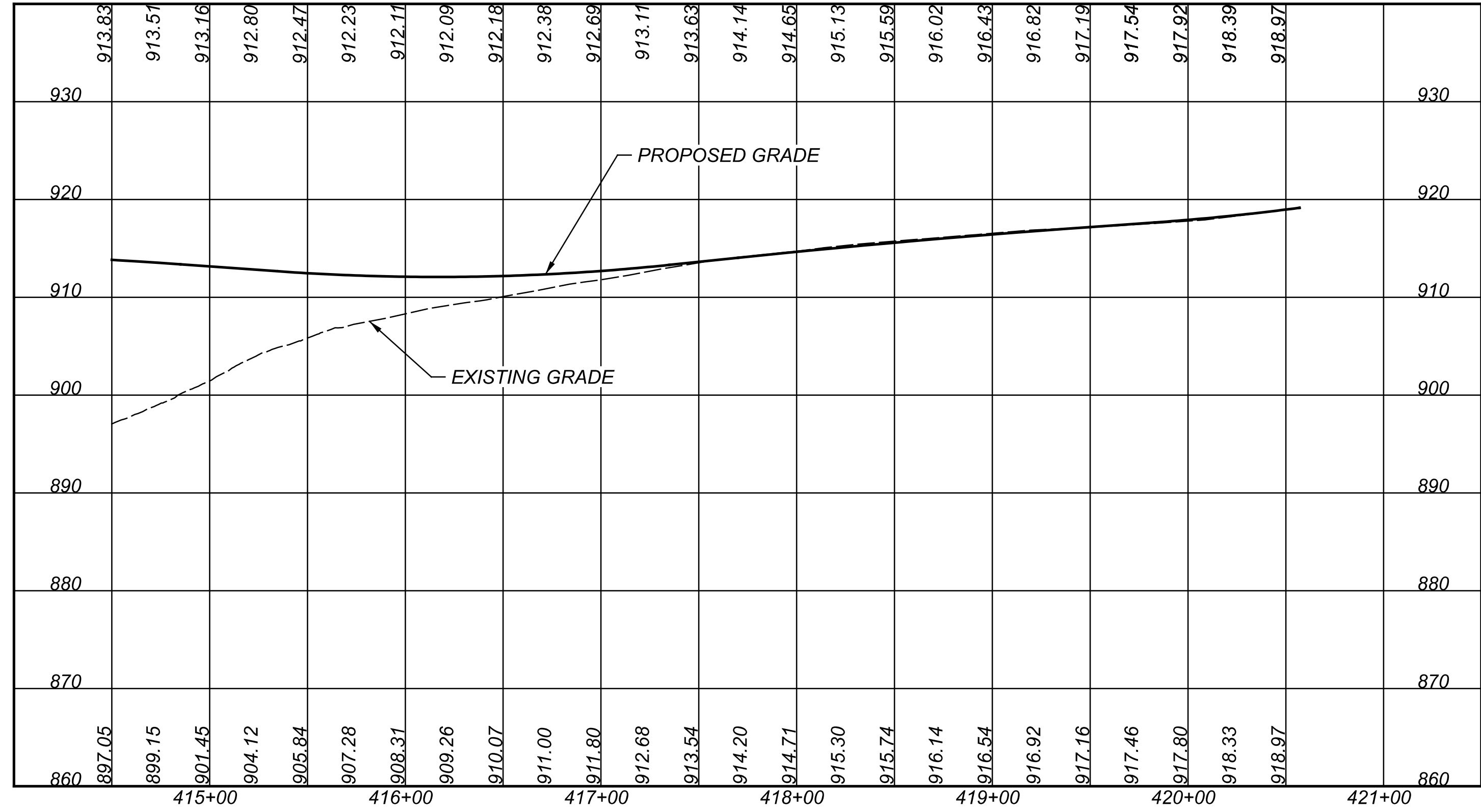


NOTE:
 SEE SHEET 40 OF 172 FOR BORING B-056-0-23 SOIL PROFILE.



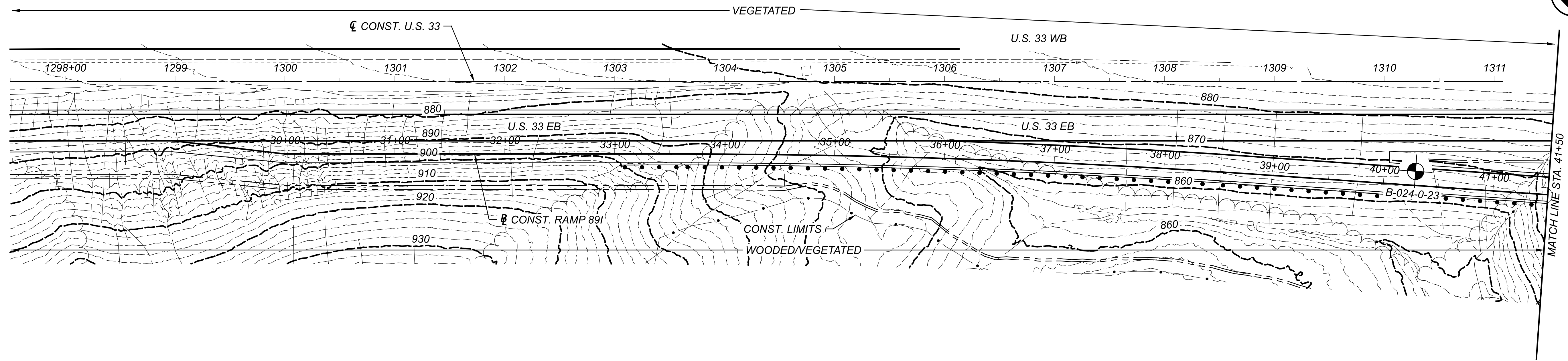
GEOTECHNICAL PROFILE - ROADWAY
 STA. 401+75.82 TO STA. 414+50.00 C.R.89 (RAINBOW LAKE ROAD)

DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	
N.K.S	
REVIEWER	
SM 11-06-24	
PROJECT ID	
119142	
SUBSET	TOTAL
37	172
SHEET	
P.	-

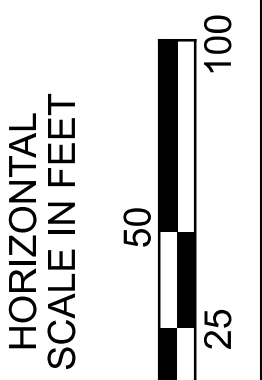
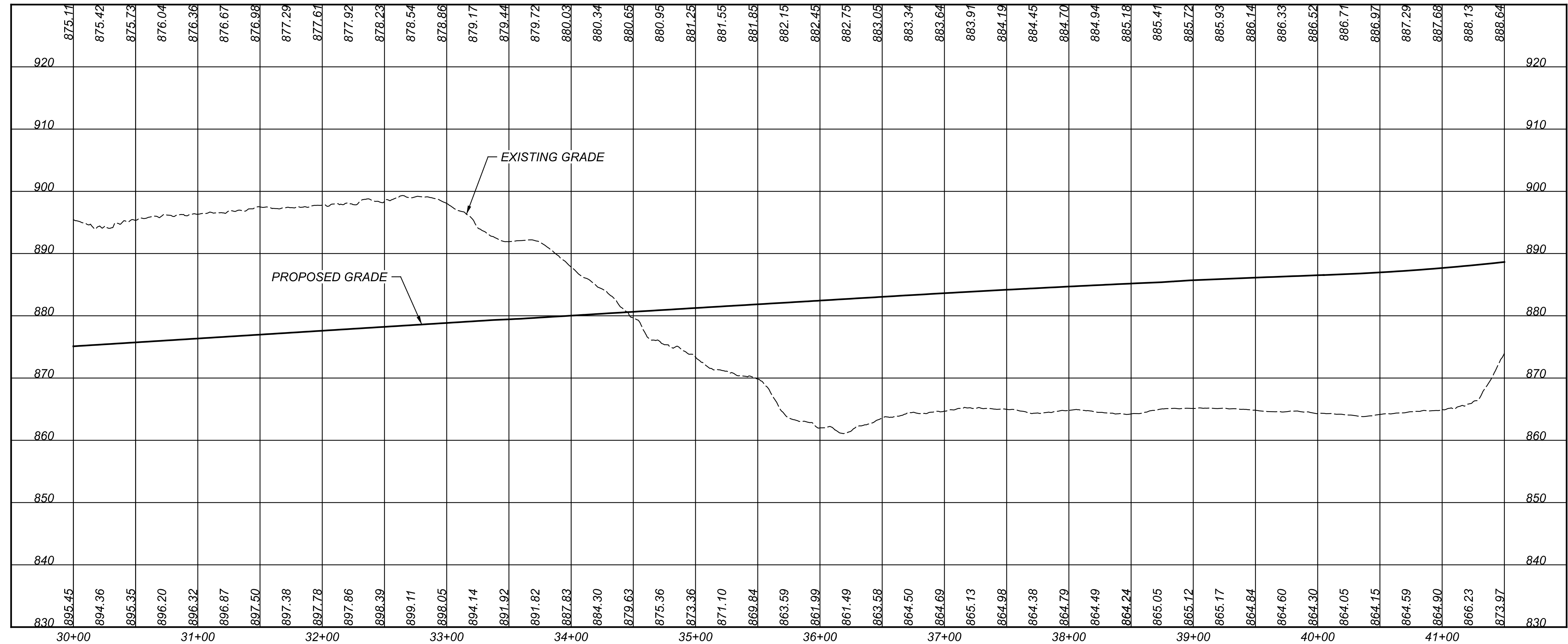


GEOTECHNICAL PROFILE - ROADWAY
STA. 414+50.00 TO STA. 420+57.00 C.R.89 (RAINBOW LAKE ROAD)

DESIGN AGENCY	
CTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43234 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
38	172
SHEET	TOTAL
P.	-



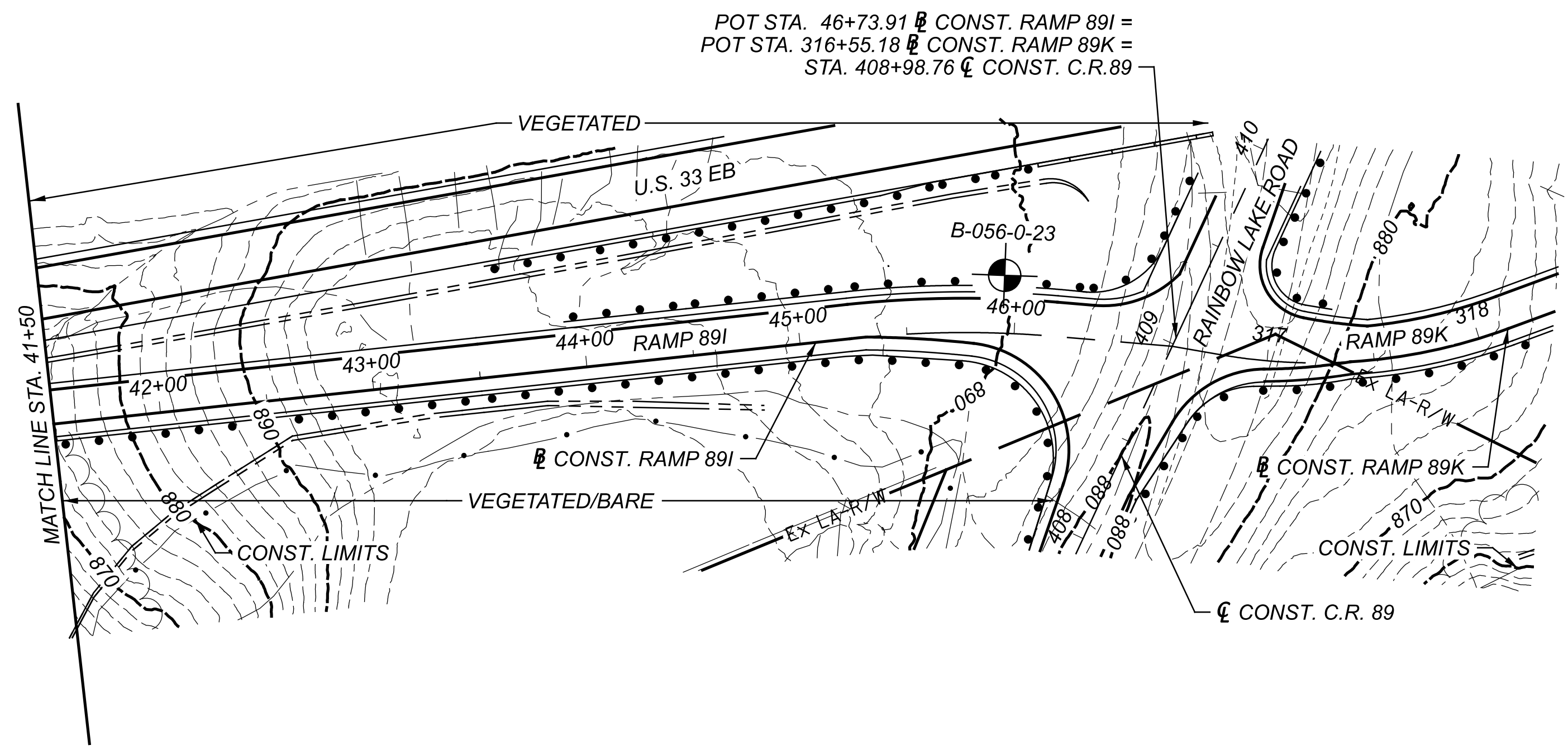
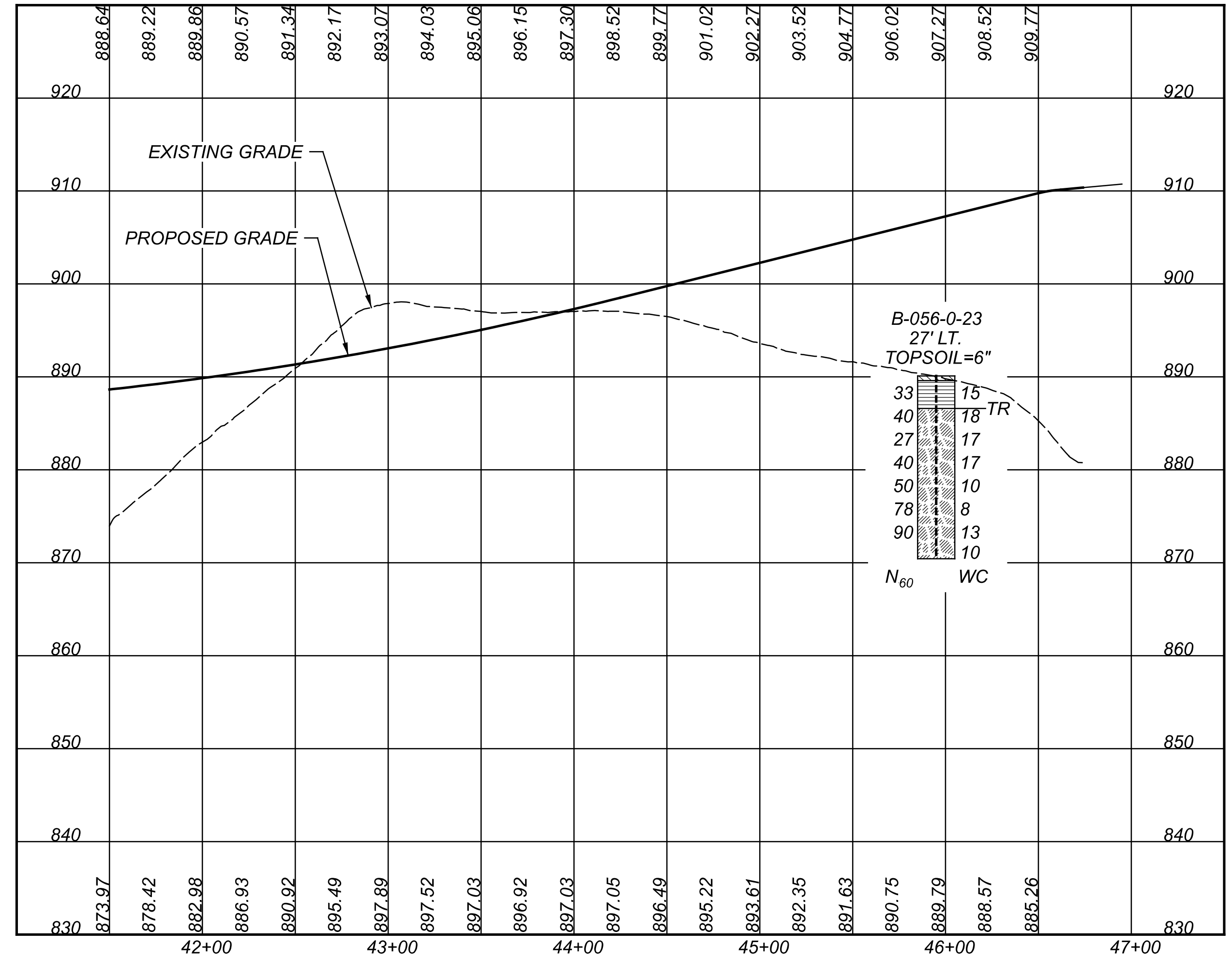
NOTE:
 SEE SHEET 21 OF 173 FOR BORING B-024-0-23 SOIL PROFILE.



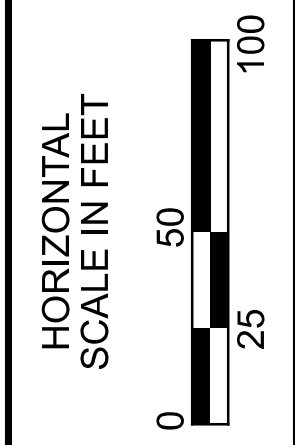
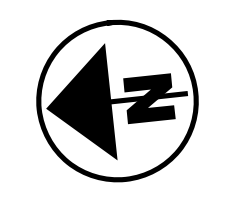
GEOTECHNICAL PROFILE - ROADWAY
 STA. 30+00.00 TO STA. 41+50.00 RAMP 891

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
39	172
SHEET	TOTAL
P.	-



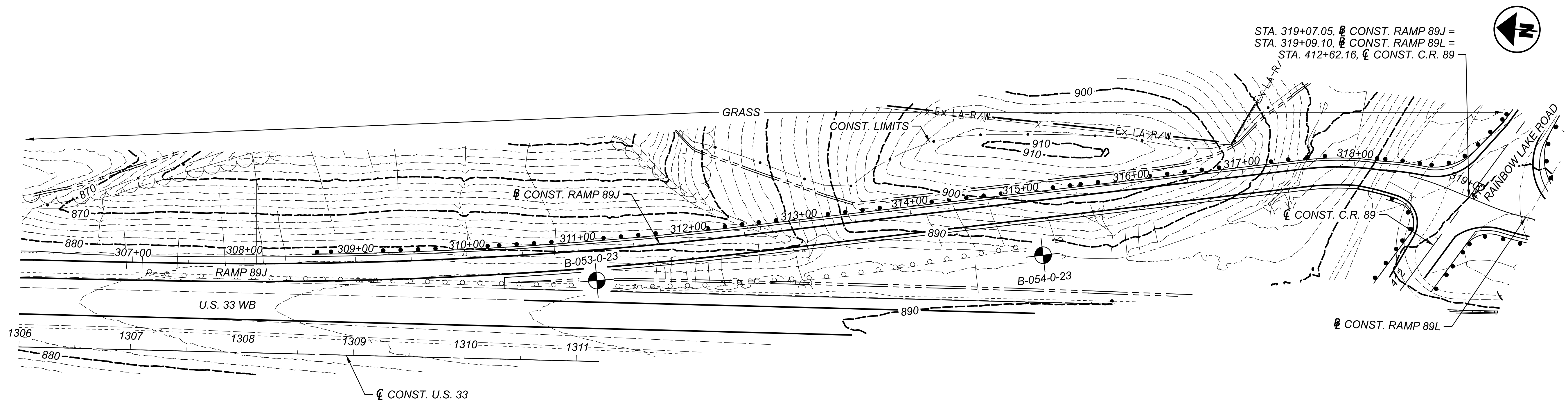
POT STA. 46+73.91 @ CONST. RAMP 89I =
 POT STA. 316+55.18 @ CONST. RAMP 89K =
 STA. 408+98.76 @ CONST. C.R. 89



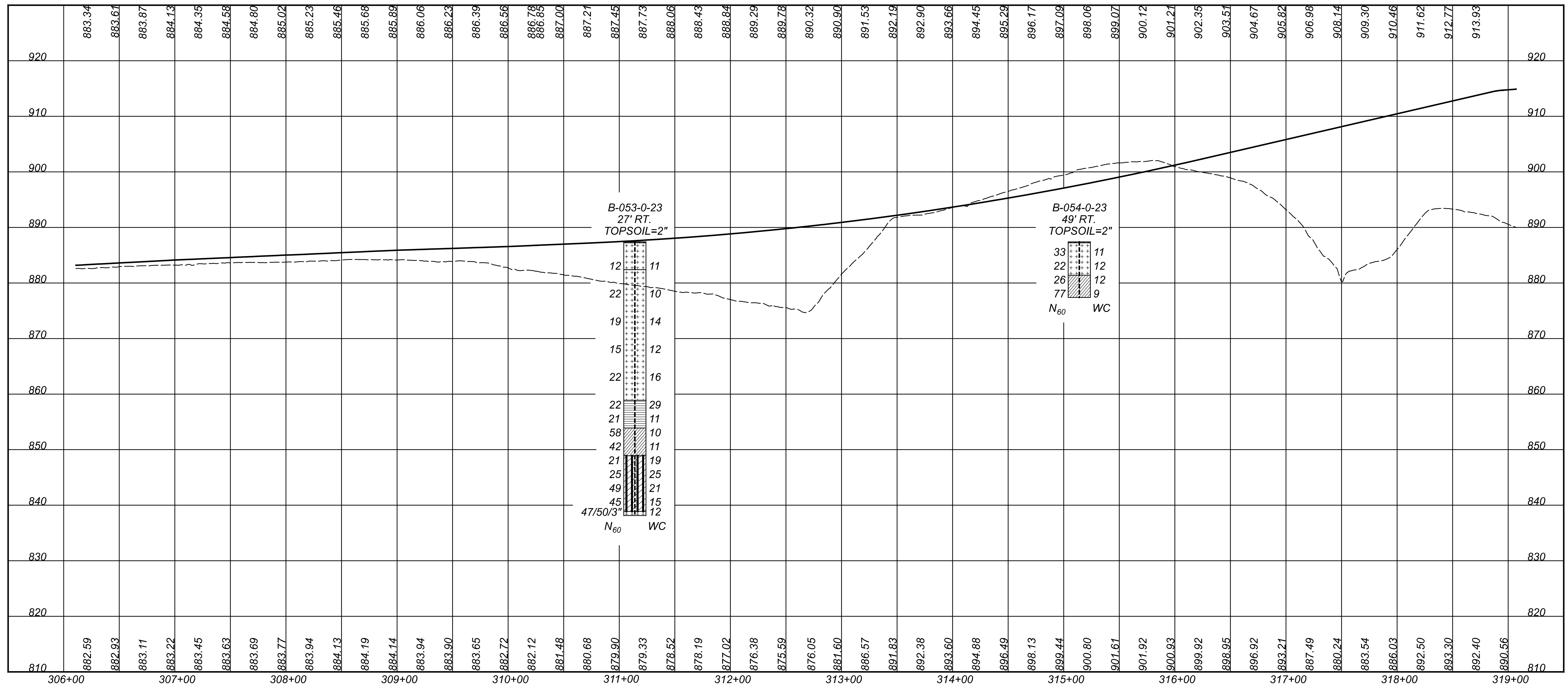
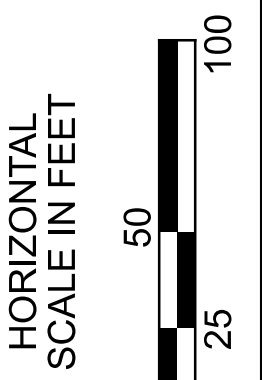
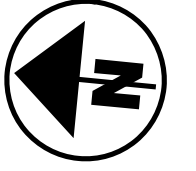
GEOTECHNICAL PROFILE - ROADWAY
STA. 41+50.00 TO STA. 46+73.91 RAMP 89 I

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
40	172
SHEET	TOTAL
P.	-



STA. 319+07.05, B CONST. RAMP 89J =
 STA. 319+09.10, B CONST. RAMP 89L =
 STA. 412+62.16, C CONST. C.R. 89

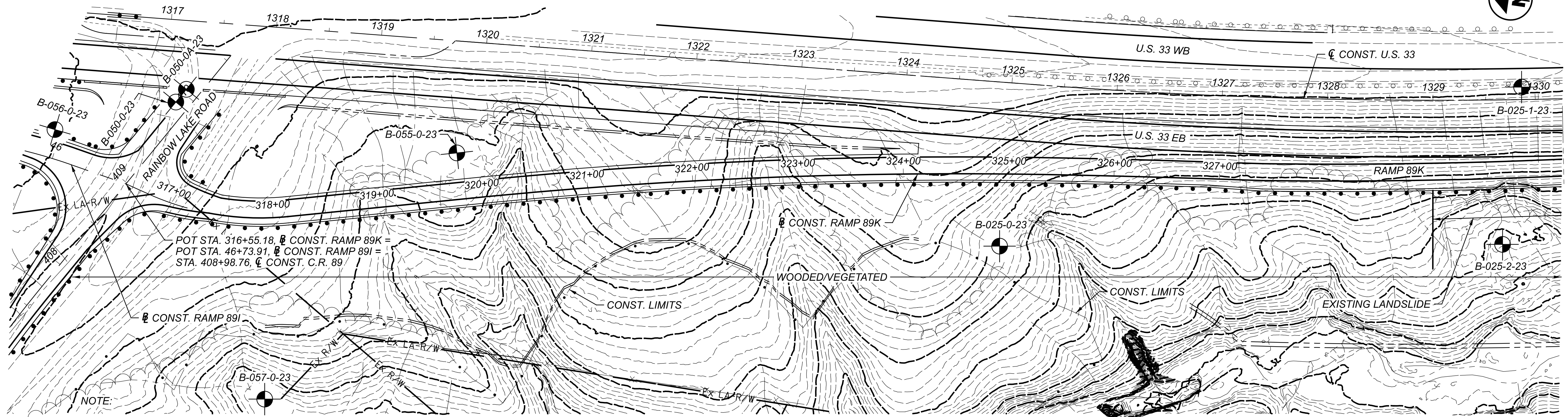


GEOTECHNICAL PROFILE - ROADWAY
 STA. 306+11.00 TO STA. 319+07.00 RAMP 89 J

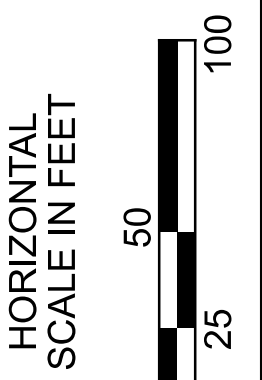
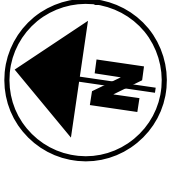
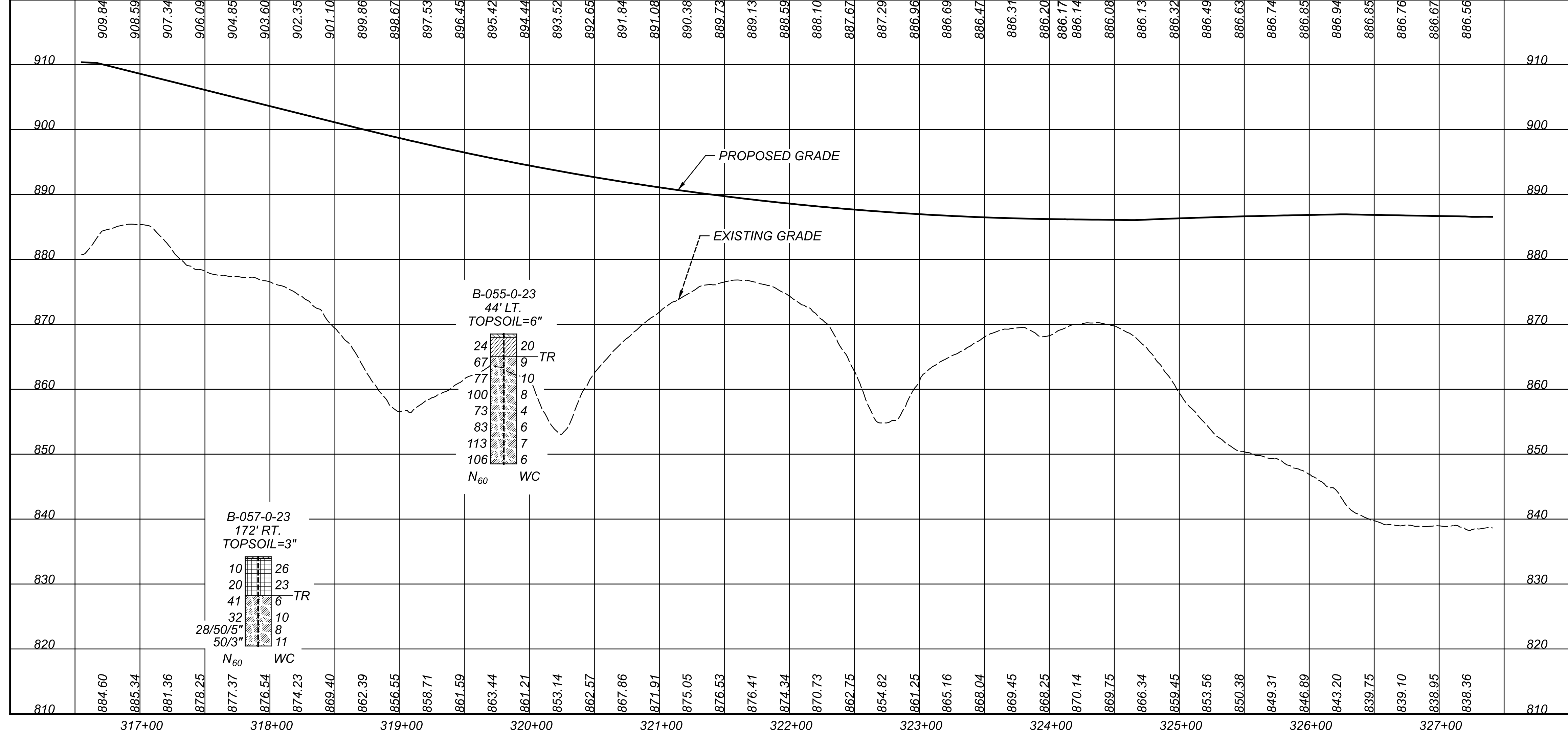
DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S
 REVIEWER
 SM 11-06-24
 PROJECT ID
 119142
 SUBSET TOTAL
 41 172
 SHEET TOTAL
 P. -



NOTE:
 SEE SHEET 23 OF 172 FOR BORING B-025-0-23, B-025-1-23 AND B-025-2-23 SOIL PROFILE.
 SEE SHEET 37 OF 172 FOR BORING B-050-0-23 AND B-050-0A-23 SOIL PROFILE.
 SEE SHEET 40 OF 172 FOR BORING B-056-0-23 SOIL PROFILE.



GEOTECHNICAL PROFILE - ROADWAY
 STA. 316+55.18 TO STA. 327+40.95 RAMP 89 K

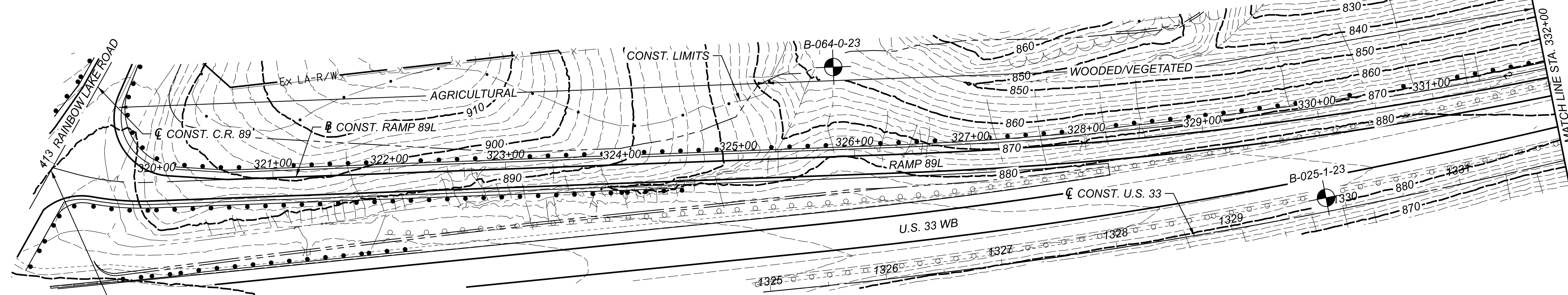
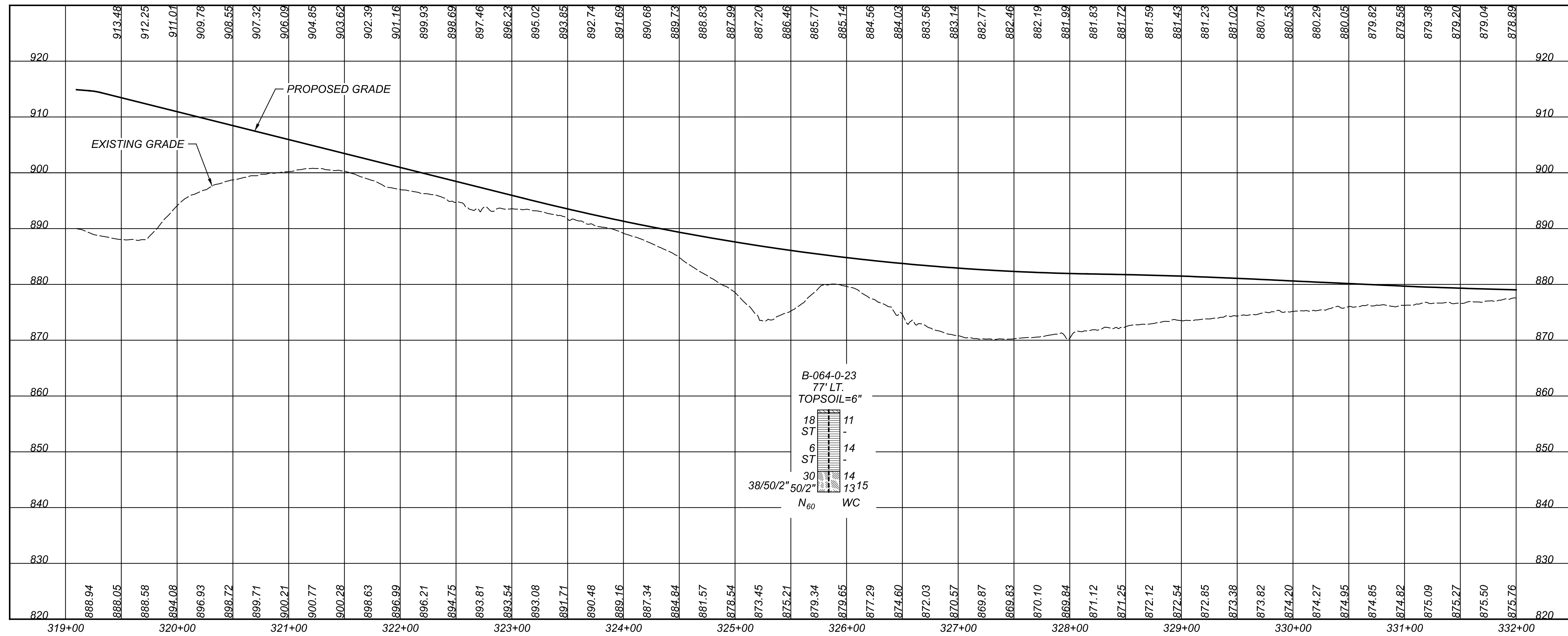
DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

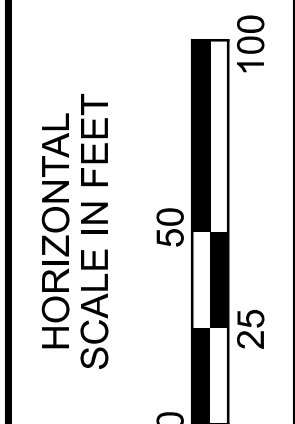
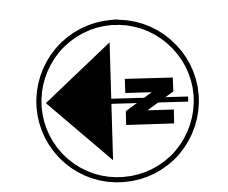
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
42	172
SHEET	TOTAL
P.	-

NOTE:

SEE SHEET 23 OF 172 FOR BORING B-025-1-23 SOIL PROFILE.

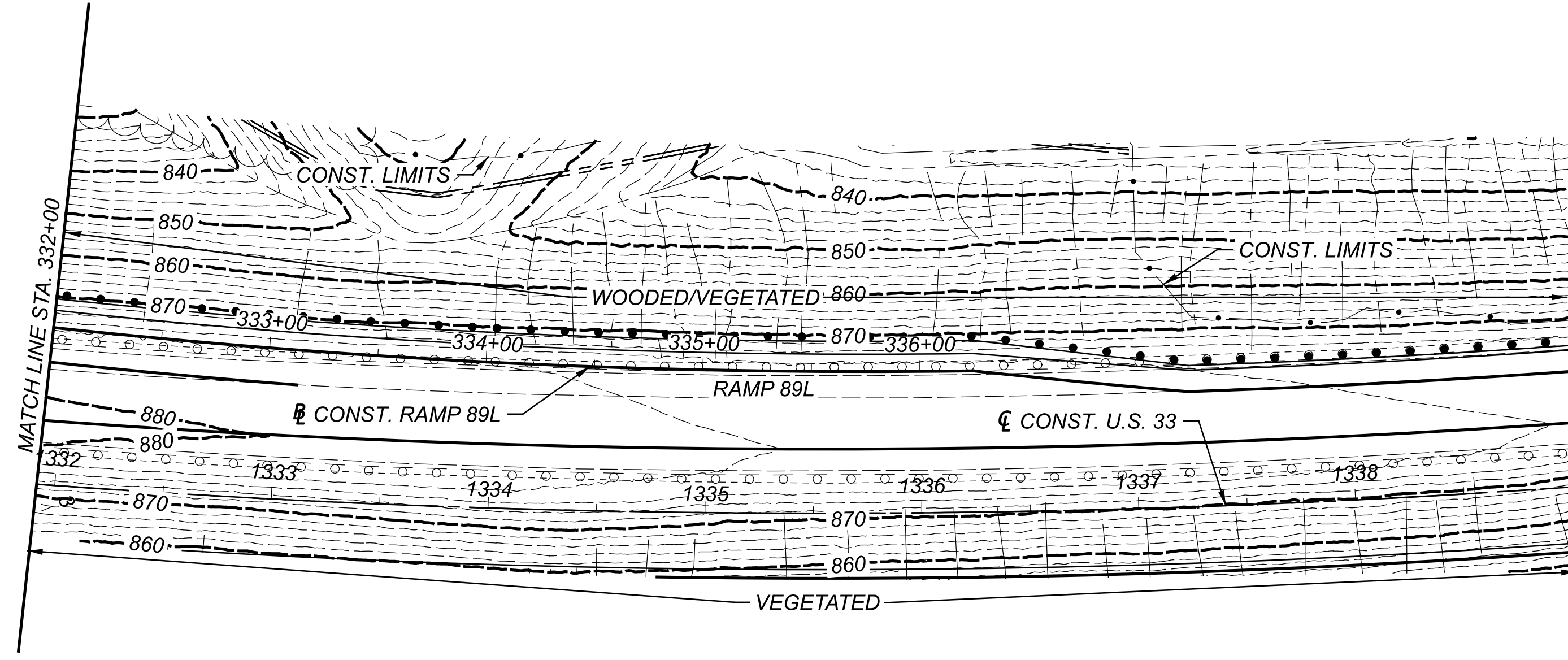
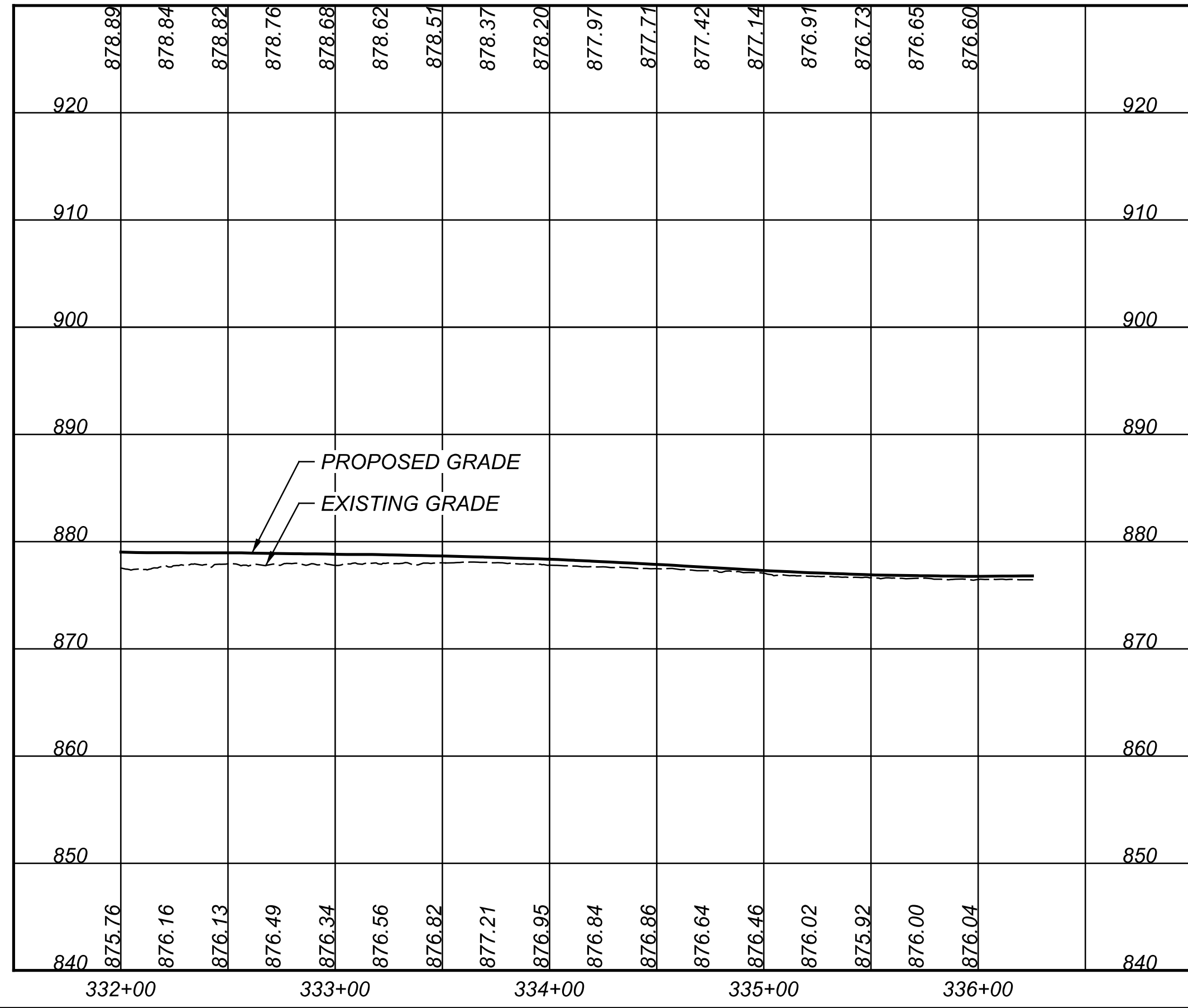


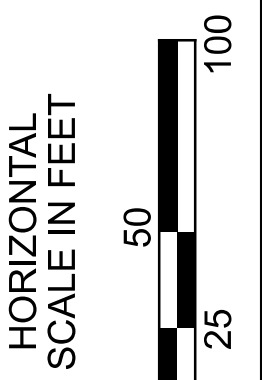
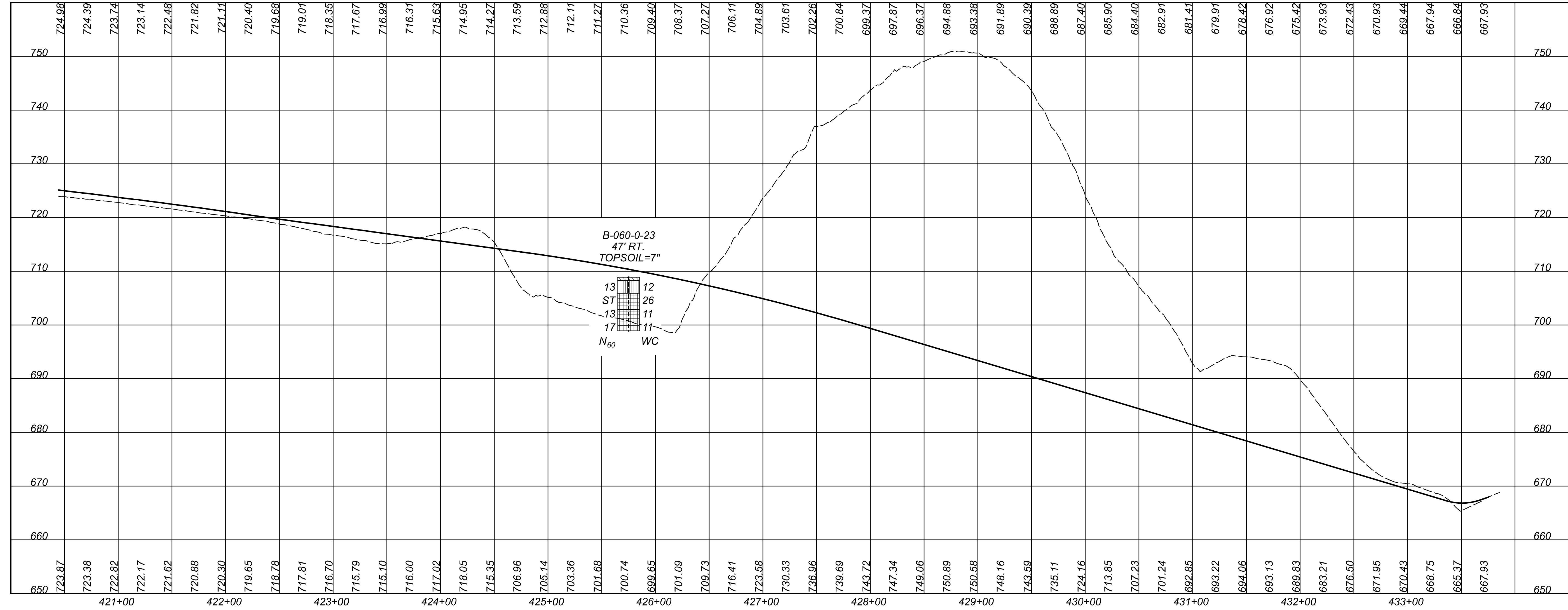
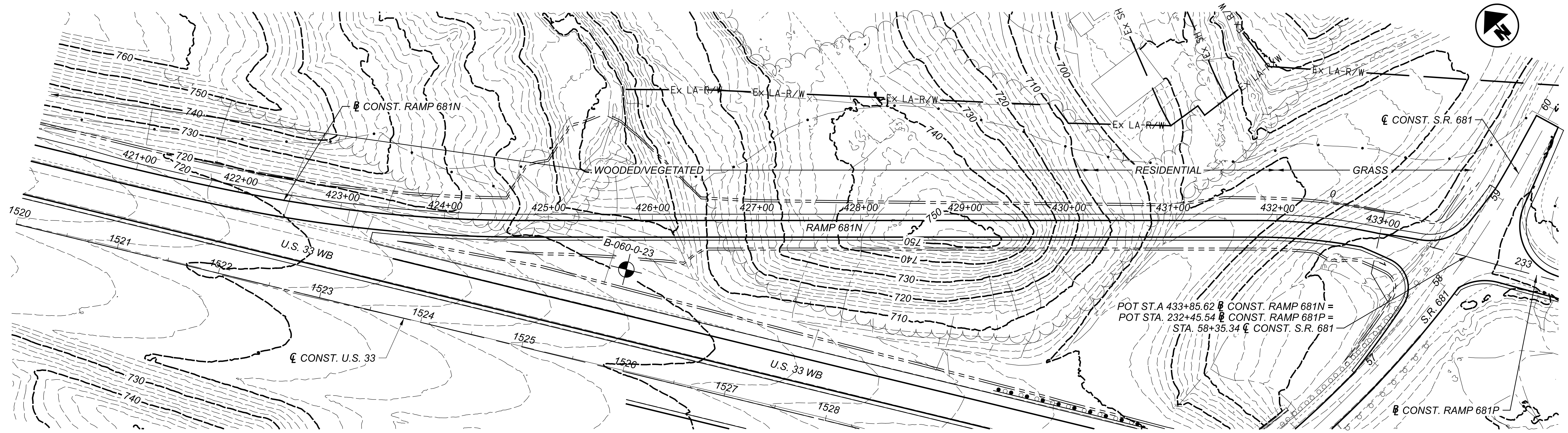
STA. 319+09.10, CONST. RAMP 89L =
 STA. 319+07.05, CONST. RAMP 89J =
 STA. 412+62.16, CONST. C.R. 89



GEOTECHNICAL PROFILE - ROADWAY
 STA. 319+09.10 TO STA. 332+00.00 RAMP 89 L

DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43224 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
43	172
SHEET	TOTAL
P.	-





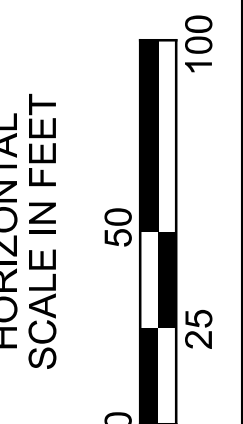
GEOTECHNICAL PROFILE - ROADWAY
STA. 420+44.63 TO STA. 433+85.62 RAMP 681 N

DESIGN AGENCY	
GTL ENGINEERING	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
45	172
SHEET	TOTAL
P.	-

STA. 49+28.36 ϕ CONST. S.R. 681 =
 POT 328+38.92 \square CONST. RAMP 681M =
 POT 126+01.32 \square CONST. RAMP 681O



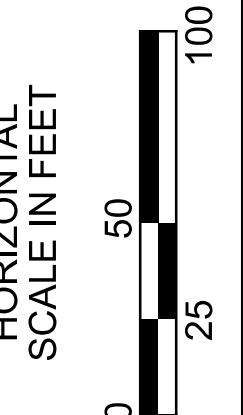
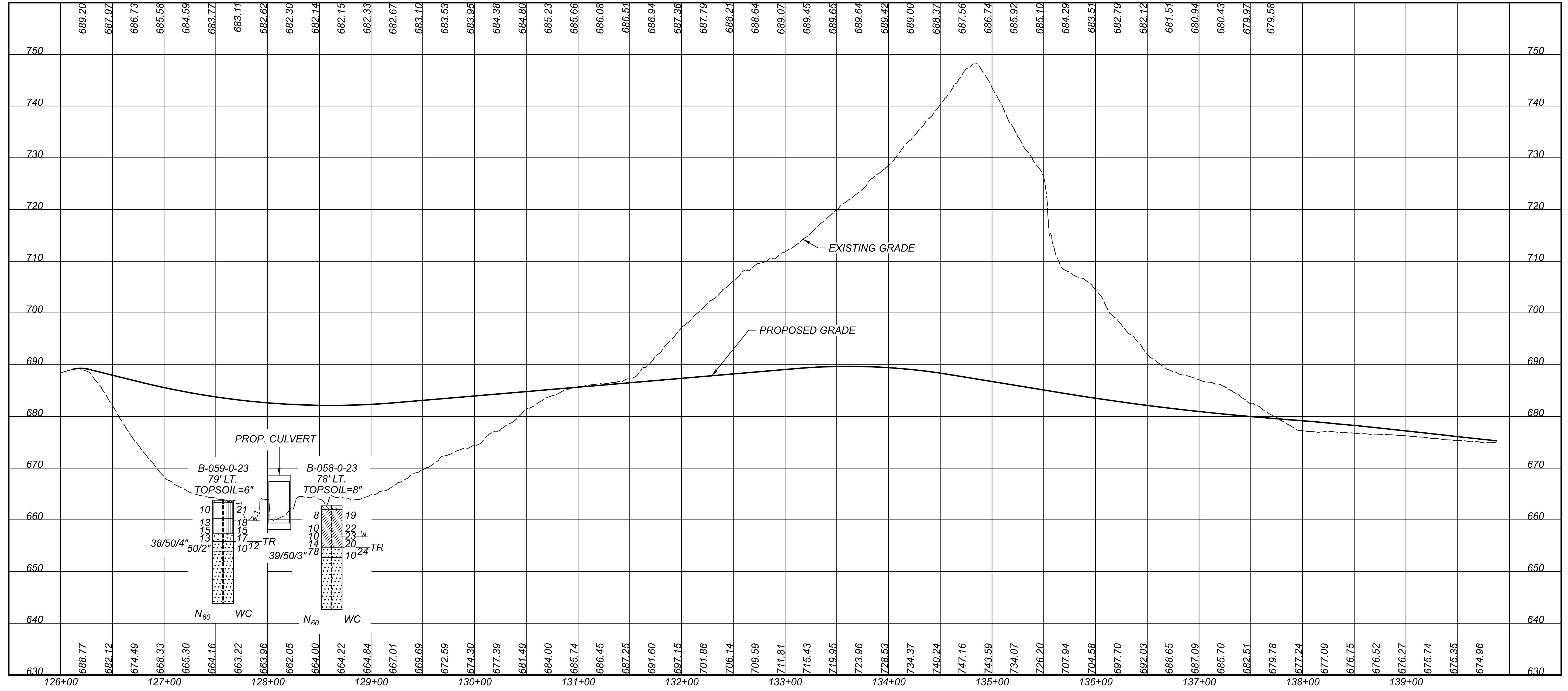
NOTE:
 SEE SHEET 47 OF 172 FOR BORINGS B-058-0-23 AND B-059-0-23 SOIL PROFILE.



GEOTECHNICAL PROFILE - ROADWAY
 STA. 126+01.32 TO STA. 139+87.30 RAMP 681 O

DESIGN AGENCY
CTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S	
REVIEWER	SM	
PROJECT ID	119142	
SUBSET	TOTAL	
46	172	
SHEET	TOTAL	
P.	-	



GEOTECHNICAL PROFILE - ROADWAY
 STA. 126+01.32 TO STA. 139+87.30 RAMP 681 O

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43224
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
47	172
SHEET	TOTAL
P.	-

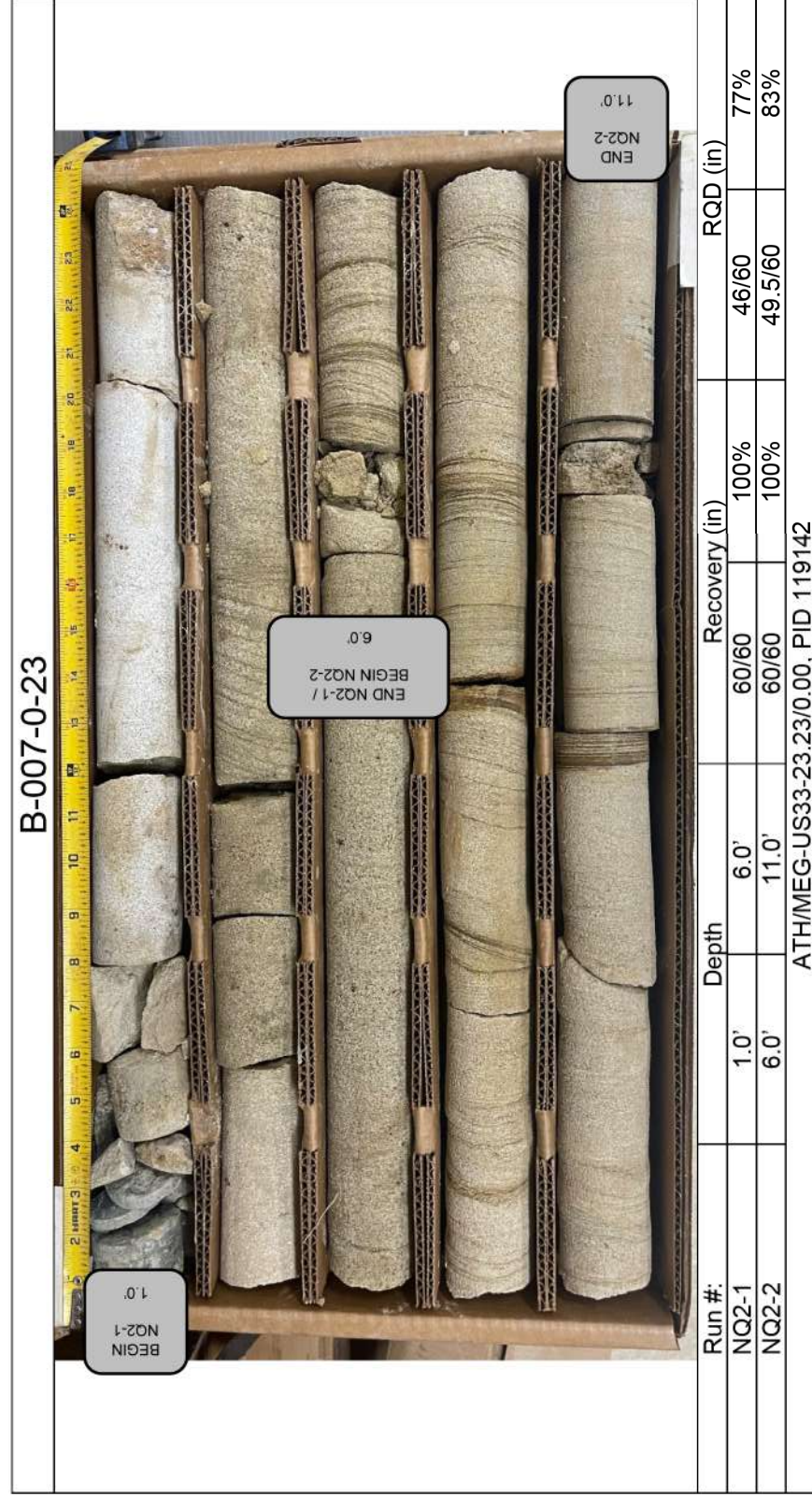
ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 13:13:51 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:58 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-33-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

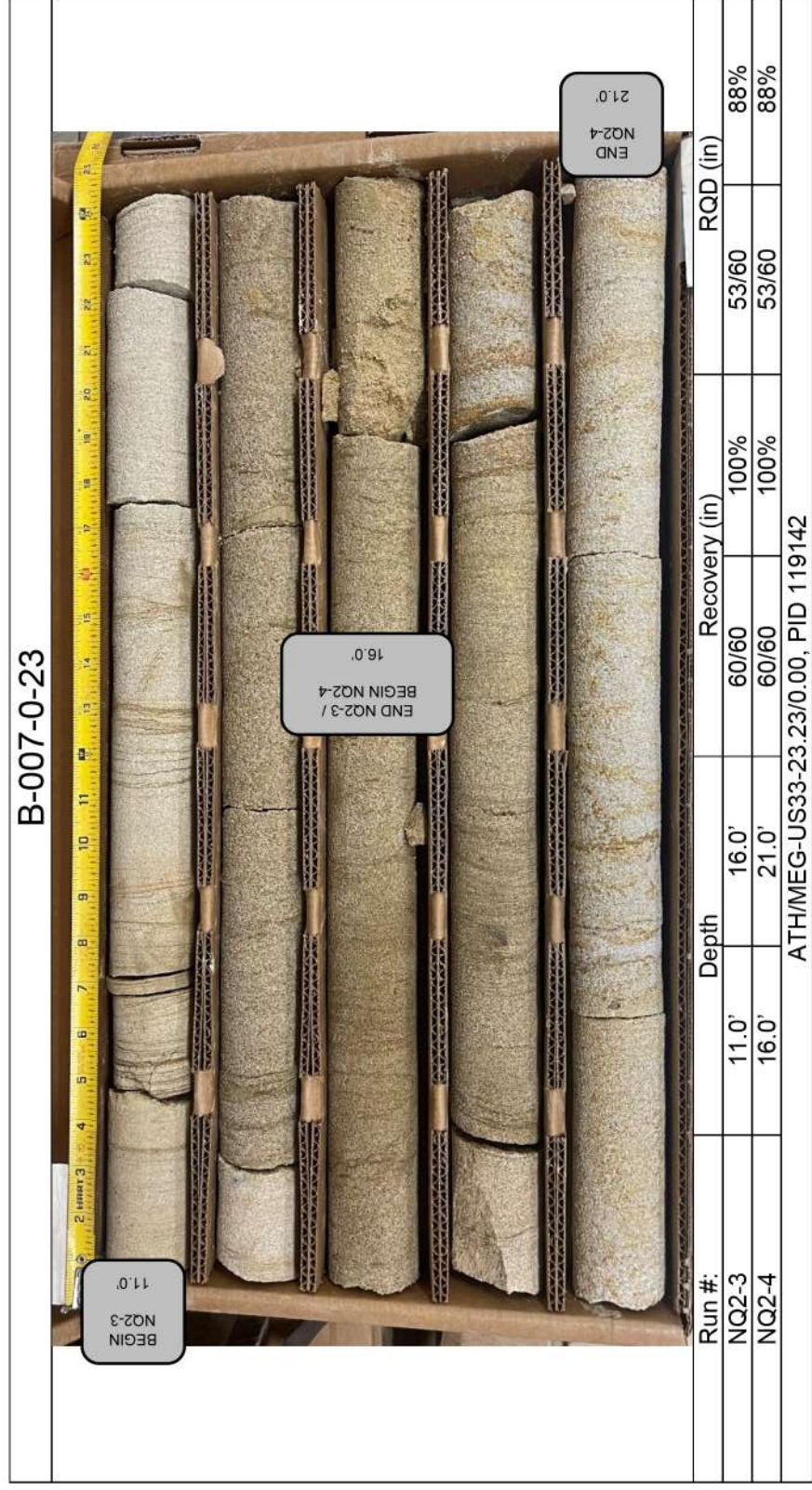
PROJECT: ATH-US 33-23.23	DRILLING FIRM / OPERATOR: CTL / H. BROWN	STATION / OFFSET: 1229+00, 18' RT.	EXPLORATION ID: B-007-0-23
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CTL / H. BROWN	ALIGNMENT: US 33	
PID: 119142 SFN: 0501190	DRILLING METHOD: 3.25" HSA / NQ2	ELEVATION: 836.0 (MSL) EOB: 21.0 ft.	PAGE 1 OF 1
START: 11/8/23 END: 11/8/23	SAMPLING METHOD: NQ2	LAT / LONG: 39.220771, -82.065568	
MATERIAL DESCRIPTION AND NOTES TOPSOIL (12") @1.0': AUGER REFUSAL ENCOUNTERED SANDSTONE, BROWN AND GRAY, SLIGHTLY WEATHERED, WEAK TO SLIGHTLY STRONG; ROD 84% REC 100%. @1.0'-6.0': SLAKE DURABILITY INDEX = 83% @12.4'-12.9': UCS = 1,360 PSI @16.0'-16.5': UCS = 2,040 PSI		DRILL RIG: MOBILE B-57 TRACK HAMMER: MOBILE AUTOMATIC CALIBRATION DATE: 5/3/23 ENERGY RATIO (%): 76.8	
	ELEV. 836.0	GRADATION (%)	
	835.0	GR CS FS SI CL LL PL PI WC	
	TR		
	1		
	2		CORE
	3		
	4		
	5		
	6		
	7		
	8		
	9		CORE
	10		
	11		
	12		
	13		CORE
	14		
	15		
	16		
	17		
	18		CORE
	19		
	20		
	21		
	EOB 815.0		

NOTES: CAVED AT 20'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT





B-007-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	11.0'	60/60	53/60
NQ2-4	16.0'	60/60	53/60
ATH/MEG-US33-23.23/0.00, PID 119142			
			88%
			88%

SPT/ RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GRADATION (%)							ODOT CLASS (G)	HOLE SEALED	
				GR	CS	FS	SI	CL	LL	PI			WC
8	26	100	4.50	0	3	15	24	58	30	25	29	A-7-5 (17)	
9	11												
7	19	100	4.50	-	-	-	-	-	-	-	11	A-7-5 (V)	
4	6	15	3.50	0	2	2	51	45	44	28	18	A-7-6 (11)	
6	6												
12	37	100	SS-4	-	-	-	-	-	-	-	6	Rock (V)	
12	17												
18	58	100	SS-5	-	-	-	-	-	-	-	8	Rock (V)	
21	24												
20	60	100	SS-6	-	-	-	-	-	-	-	14	Rock (V)	
22	25												
23	64	100	SS-7	-	-	-	-	-	-	-	10	Rock (V)	
23	27												
12	40	100	SS-8	-	-	-	-	-	-	-	8	Rock (V)	
15	16												
22	70	100	SS-9	-	-	-	-	-	-	-	4	Rock (V)	
25	30												
46	50/3"	100	SS-10	-	-	-	-	-	-	-	4	Rock (V)	
80		100	NQ2-1									CORE	

PROJECT: ATH-US 33-23.23
 TYPE: BRIDGE
 PID: 119142 SFN: 0501190
 START: 11/8/23 END: 11/8/23

DRILLING FIRM / OPERATOR: CTL / H. BROWN
 SAMPLING FIRM / LOGGER: CTL / H. BROWN
 DRILLING METHOD: 3.25" HSA / NQ2
 SAMPLING METHOD: SPT / NQ2

DRILL RIG: MOBILE B-57 TRACK
 HAMMER: MOBILE AUTOMATIC
 CALIBRATION DATE: 5/3/23
 ENERGY RATIO (%): 76.8

STATION / OFFSET: 1230+63, 28' RT.
 ALIGNMENT: US 33
 ELEVATION: 781.8 (MSL) EOB: 44.3 ft.
 LAT / LONG: 39.220324, -82.065508

MATERIAL DESCRIPTION AND NOTES

TOPSOIL (6")
 HARD, BROWN, ELASTIC CLAY, SOME SILT, LITTLE SAND, CONTAINS ROCK FRAGMENTS, DAMP

VERY STIFF, BROWN, CLAY, "ANDY" SILT, TRACE SAND, CONTAINS ROCK FRAGMENTS, DAMP

CLAYSTONE, RED AND BROWN, HIGHLY WEATHERED.

@24.3': AUGER REFUSAL ENCOUNTERED
 CLAYSTONE, GRAY, MODERATELY WEATHERED, VERY WEAK TO WEAK; RQD 76%, REC 100%.
 @24.3'-29.3': SLAKE DURABILITY INDEX = 3.6%
 @25.7'-26.2': UCS = 100 PSI

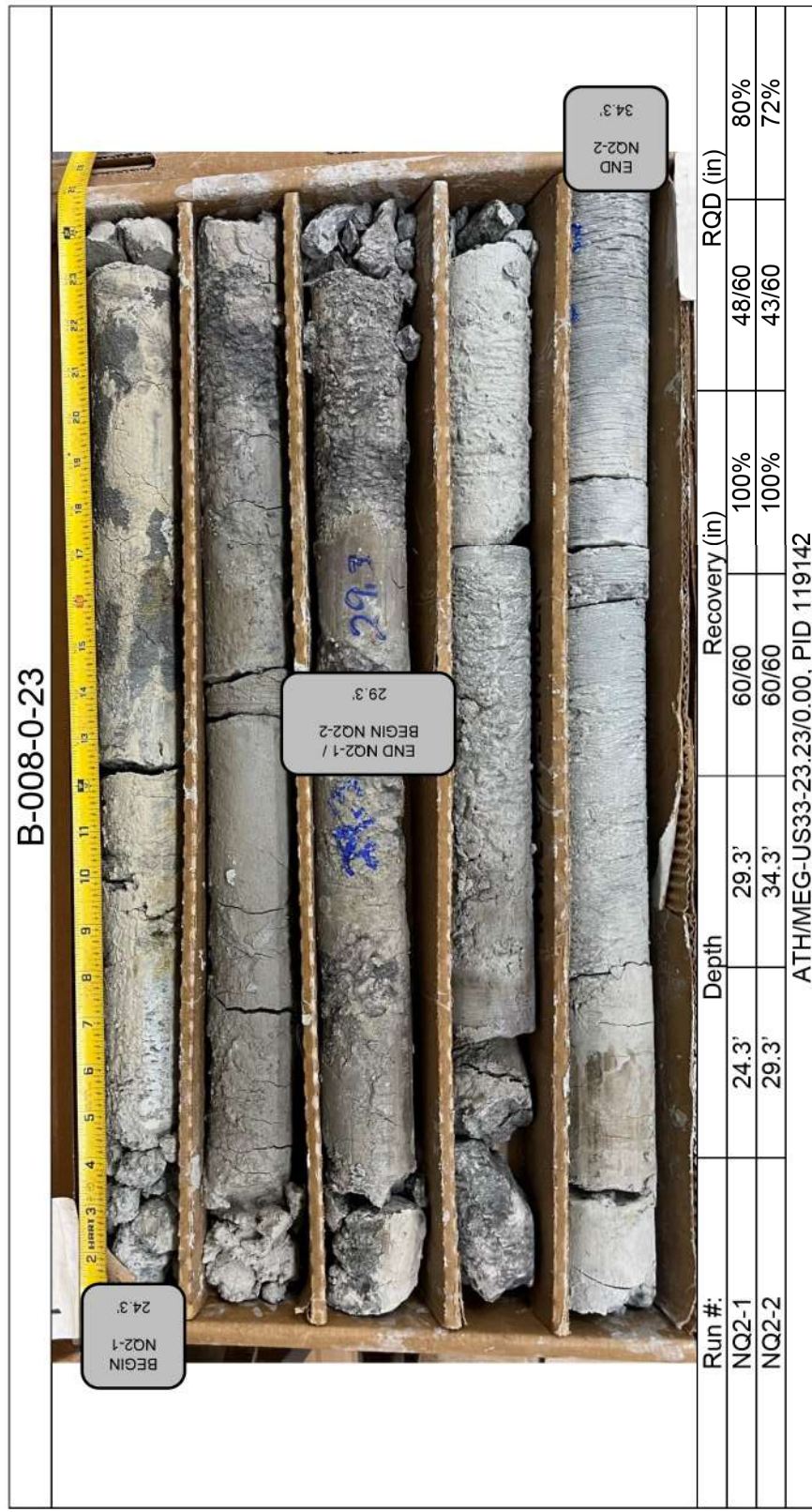
ATH/MEG-33-23-23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 13:17:00 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:58 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1230+63.28 RT.	START: 11/8/23	END: 11/8/23	PG 2 OF 2		B-008-0-23									
						ODOT CLASS (G)	SEALED										
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE ID (%)	HP (tsf)	GRADATION (%)			ATTERBERG							
							GR	CS	FS	SI	CL	LL	PL	PI	WC		
CLAYSTONE , GRAY, MODERATELY WEATHERED, VERY WEAK TO WEAK; RQD 76%, REC 100%. (continued) @31.5'-32.0'; UCS = 880 PSI		751.8	31	72	100	NQ2-2										CORE	
			32														
		747.5	33														
			34														
CLAYSTONE , GRAY, MODERATELY WEATHERED, SLIGHTLY STRONG, CONTAINS INTERBEDDED SHALE LAYERS; RQD 50%, REC 100%.			35														
			36														
		742.5	37	50	100	NQ2-3											CORE
			38														
SHALE , GRAY, MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 69%, REC 100%.			39														
			40														
		740.2	41														
			42														
SANDSTONE , GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; RQD 99%, REC 100%.			43	85	100	NQ2-4											CORE
			44														
		737.5	EOB														

NOTES: CAVED AT 8'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT





B-008-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	34.3'	60/60	30/60
NQ2-4	39.3'	60/60	51/60

ATH/MEG-US33-23.23/0.00, PID 119142

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / H. BROWN		STATION / OFFSET:	1231+81.39' RT.		EXPLORATION ID						
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / H. BROWN		ALIGNMENT:	US 33		B-009-0-23					
PID:	119142	SFN:	0501190	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	762.8 (MSL)	EOB:	39.3 ft.						
START:	11/7/23	END:	11/7/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.219999, -82.065481	PAGE	1 OF 2						
MATERIAL DESCRIPTION AND NOTES															
TOPSOIL (5')	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)						HOLE CLASS (G)	SEAL
								GR	CS	FS	SI	CL	LL		
VERY STIFF, BROWN, SILT AND CLAY, "AND" SAND, DAMP	762.8														
	762.4														
@3.5'; CONTAINS ROCK FRAGMENTS															
VERY STIFF, BROWN, SILTY CLAY, SOME SAND, CONTAINS ROCK FRAGMENTS, DAMP	756.8														
@8.5'; MOIST															
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, LITTLE SILT, LITTLE CLAY, DAMP	751.8														
@13.5'; GRAY															
@16.0'; TRACE GRAVEL															
SHALE, GRAY, HIGHLY WEATHERED.	744.3														
SHALE GRAY, SLIGHTLY WEATHERED, SLIGHTLY STRONG; RQD 83%; REC 100%. @19.3'-24.3'; SLAKE DURABILITY INDEX = 61.5%	743.5														
SANDSTONE, GRAY, SLIGHTLY WEATHERED, SLIGHTLY STRONG; RQD 92%; REC 100%. @23.3'-23.9'; UCS = 3,560 PSI	739.5														
@26.8'-27.3'; UCS = 2,910 PSI															

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:58 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1231+81.39' RT.	START: 11/7/23	END: 11/7/23	PG 2 OF 2	B-009-0-23							
MATERIAL DESCRIPTION AND NOTES		ELEV: 732.8	SPT/ RQD	GRADATION (%)	ATTERBERG	ODOT CLASS (G)	HOLE SEALED							
SANDSTONE, GRAY, SLIGHTLY WEATHERED, SLIGHTLY STRONG; RQD 92%, REC 100%. (continued)		DEPTHS	REC SAMPLE ID	GR	CS	FS	SI	CL	LL	PL	PI	WC		
		31	100 NQ2-3										CORE	
		32												
		33												
		34												
		35												
		36												
		37	100 NQ2-4	83										CORE
		38												
		39												
		ELEV: 723.5	EOB											

NOTES: CAVED AT 18'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



B-009-0-23

Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	19.3'	60/60	52/60
NQ2-2	24.3'	60/60	60/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-009-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	29.3'	60/60	55/60
NQ2-4	34.3'	60/60	50/60
ATH/MEG-US33-23.23/0.00, PID 119142			

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:		CTL / H. BROWN		STATION / OFFSET:		1233+15, 25' RT.		EXPLORATION ID								
	TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	HAMMER:	MOBILE AUTOMATIC	ALIGNMENT:	US 33	B-010-0-23										
PID:	119142	SFN:	0501190	DRILLING METHOD:	3.25" HSA / NQ2	CALIBRATION DATE:		5/3/23	ELEVATION:	755.3 (MSL)	EOB:	30.7 ft.							
START:	11/7/23	END:	11/7/23	SAMPLING METHOD:	SPT / NQ2	ENERGY RATIO (%):		76.8	LAT / LONG:	39.219642, -82.065353	PAGE								
		MATERIAL DESCRIPTION AND NOTES		SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
TOPSOIL (5')				ELEV.															
STIFF, BROWN, CLAY, "AND" SAND, SOME SILT, DAMP				755.3															
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP				751.8															
STIFF, BROWN, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, CONTAINS ROCK FRAGMENTS, MOIST				748.8															
STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, MOIST				747.3															
SHALE, BROWN, HIGHLY WEATHERED.				745.8															
@10.7' AUGER REFUSAL ENCOUNTERED				744.6															
SHALE, GRAY, MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 33%, REC 100%. @10.7-15.7'; SLAKE DURABILITY INDEX = 18.5%																			
SANDSTONE, GRAY, SLIGHTLY WEATHERED, STRONG; RQD 82%, REC 100%. @15.2-15.7'; UCS = 12,860 PSI @16.7-17.2'; UCS = 10,290 PSI				740.3															
SHALE, GRAY, MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 47%, REC 100%.				729.0															

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 13:22:16 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1233+15.25' RT.	START: 11/7/23	END: 11/7/23	PG 2 OF 2	B-010-0-23							
MATERIAL DESCRIPTION AND NOTES		ELEV: 725.3	REC SAMPLE HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
		724.6	(%)											

DEPTH	SPT/ RQD	RECOVERY (%)	RECOVERY (in)	DEPTH	RECOVERY (%)	RECOVERY (in)
10.7'		100%	60/60	15.7'	100%	21/60
15.7'		100%	60/60	20.7'	78%	47/60

NOTES: CAVED AT 16'.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



B-010-0-23

Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	10.7'	60/60	21/60
NQ2-2	15.7'	60/60	47/60

ATH/MEG-US33-23.23/0.00, PID 119142

DESIGN AGENCY	
GTL ENGINEERING INC	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
54	172
SHEET	TOTAL
-	-

GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-010-0-23 CONTINUED & ROCK CORE PHOTO FOR B-010-0-23



B-010-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	20.7'	60/60	53/60
NQ2-4	25.7'	60/60	32/60

ATH/MEG-US33-23.23/0.00, PID 119142

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / H. BROWN		STATION / OFFSET:	1234+06, 35' RT.		EXPLORATION ID									
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / H. BROWN		ALIGNMENT:	US 33		B-011-0-23								
PID:	119142	SFN:	0501190	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	750.3 (MSL)	EOB:	30.0 ft.									
START:	11/8/23	END:	11/8/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.219391, -82.065336	PAGE	1 OF 1									
MATERIAL DESCRIPTION AND NOTES		SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	HOLE CLASS (G)	SEALED	
TOPSOIL (5')																		
VERY STIFF, BROWN, SILT AND CLAY, "AND" SAND, WET		1-4	8	100	SS-1	3.00	0	8	29	33	30	34	23	11	34	A-6a (6)		
VERY STIFF, BROWN, SANDY SILT, SOME CLAY, TRACE GRAVEL, CONTAINS ORGANICS, DAMP @5.0'; STIFF, NO GRAVEL, WET @6.5'; VERY STIFF, TRACE GRAVEL, NO ORGANICS, DAMP		4-5	9	100	SS-2	2.50	1	7	35	29	28	27	19	8	18	A-4a (4)		
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, MOIST		5-7	13	100	SS-3	1.75	0	1	29	41	29	30	21	9	38	A-4a (7)		
SHALE, GRAY, HIGHLY WEATHERED. @10.0'; AUGER REFUSAL ENCOUNTERED		7-8	5	100	SS-4	2.25	2	12	35	28	23	30	21	9	14	A-4a (3)		
SHALE, GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 100%, REC 100%		8-9	12	100	SS-5	3.50	3	8	27	31	31	31	20	11	23	A-6a (6)		
INTERBEDDED SHALE (50%) AND SANDSTONE (50%), RQD 40%, REC. 100%; SHALE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG; SANDSTONE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY TO MODERATELY STRONG. @17.7'-18.3'; UCS = 11,020 PSI ON SANDSTONE		9-10	4	100	SS-6	-	-	-	-	-	-	-	-	-	-	14	Rock (V)	
SANDSTONE, GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 100%, REC 100%		11-14																
INTERBEDDED SHALE (50%) AND SANDSTONE (50%), RQD 40%, REC. 100%; SHALE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG; SANDSTONE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY TO MODERATELY STRONG. @17.7'-18.3'; UCS = 11,020 PSI ON SANDSTONE		15-17																
SANDSTONE, GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 93%, REC 100%		18-21																
@22.0'-22.5'; UCS = 6,790 PSI		22-23																
SHALE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY STRONG; ROD 70%, REC 100%		24-28																
NOTES: CAVED AT 21'. ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT		29																

NOTES: CAVED AT 21'. ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY
GTL ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43234
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 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 55 172

SHEET TOTAL
 - -



B-011-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	10.0'	15.0'	47/60
NQ2-2	15.0'	20.0'	24/60
ATH/MEG-US33-23.23/0.00, PID 119142			
			78%
			40%



B-011-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	20.0'	25.0'	57/60
NQ2-4	25.0'	30.0'	48/60
ATH/MEG-US33-23.23/0.00, PID 119142			
			95%
			80%



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
56	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 14:44:28 USER: ACAD
 D:\Dept\05\COL\23050059COL_East_Section\Mod_30_10_24\Working\19142ZLO10.dgn

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTR OHIO INC\REPORTS\LAB REPORTS\MAST


PROJECT: ATH-US 33-23.23 TYPE: BRIDGE	DRILLING FIRM / OPERATOR: CTL / H. BROWN SAMPLING FIRM / LOGGER: CTL / H. BROWN DRILLING METHOD: 3.25" HSA / NQ2 SAMPLING METHOD: SPT / NQ2	STATION / OFFSET: 1236+37.62 RT. ALIGNMENT: US 33 ELEVATION: 852.0 (MSL) EOB: 60.0 ft. LAT / LONG: 39.218754, -82.085299	EXPLORATION ID B-012-0-23			
				DRILL RIG: MOBILE B-57 TRACK HAMMER: MOBILE AUTOMATIC CALIBRATION DATE: 5/3/23 ENERGY RATIO (%): 76.8		
MATERIAL DESCRIPTION AND NOTES						
SPT/ RQD	REC SAMPLE ID (%)	HP (tsf)	GRADATION (%)	ATTERBERG	ODOT CLASS (G)	HOLE SEALED
N ₆₀			GR CS FS SI	CL LL PL PI	WC	
5	100	4.50	0 2 8 33 57 18	20 31 20	18	A-7-5 (14)
7	100	4.50	- - - - -	- - - - -	9	A-7-5 (V)
8	100	4.50	0 3 27 25 45 16	23 20	16	A-7-6 (12)
7	100	4.50	- - - - -	- - - - -	9	Rock (V)
21	78	100	- - - - -	- - - - -	9	Rock (V)
40						
9	100	4.50	- - - - -	- - - - -	5	Rock (V)
12	100	4.50	- - - - -	- - - - -		
10						
22	84	100	- - - - -	- - - - -	6	Rock (V)
25						
41						
82	100	4.50	- - - - -	- - - - -		CORE
82	100	4.50	- - - - -	- - - - -		CORE
92	100	4.50	- - - - -	- - - - -		CORE

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTR OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1236+37.62 RT.	START: 11/9/23	END: 11/9/23	PG 2 OF 2	B-012-0-23	
PID: 119142	SFN:	ATH-US 33-23.23	ATH/MEG-033-18-70-00-00	ATH/MEG-033-18-70-00-00	ATH/MEG-033-18-70-00-00	
MATERIAL DESCRIPTION AND NOTES						
SPT/ RQD	REC SAMPLE ID (%)	HP (tsf)	GRADATION (%)	ATTERBERG	ODOT CLASS (G)	HOLE SEALED
N ₆₀			GR CS FS SI	CL LL PL PI	WC	
92	100	4.50	- - - - -	- - - - -		CORE
97	100	4.50	- - - - -	- - - - -		CORE
100	100	4.50	- - - - -	- - - - -		CORE
70	80	4.50	- - - - -	- - - - -		CORE
802.0						
797.0						
792.0						

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTR OHIO INC\REPORTS\LAB REPORTS\MAST

NOTES: CAVED AT 30'.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

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 COLUMBUS, OHIO 43204
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 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

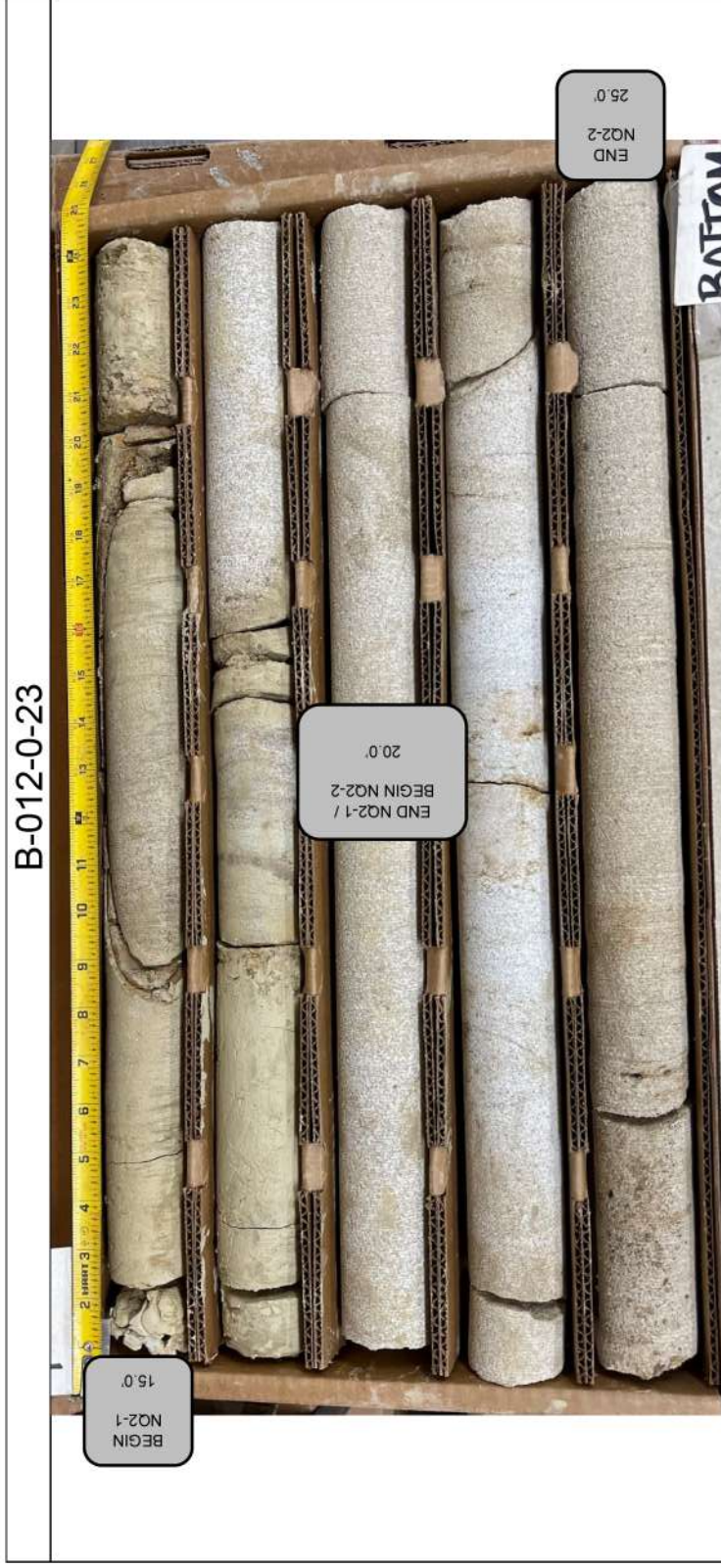
SUBSET TOTAL
 57 172

SHEET TOTAL
 - -

**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-012-0-23**



B-012-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	15.0'	60/60	49/60
NQ2-2	20.0'	60/60	49/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-012-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	25.0'	60/60	55/60
NQ2-4	30.0'	60/60	55/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-012-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-5	35.0'	60/60	58/60
NQ2-6	40.0'	60/60	60/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-012-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-7	45.0'	48/60	42/60
NQ2-8	50.0'	60/60	20/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-012-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-9	55.0'	60/60	30/60
ATH/MEG-US33-23.23/0.00, PID 119142			
		100%	50%

PROJECT:	ATH-US 33-23.23	DRILLING FIRM / OPERATOR:	CTL / H. BROWN	STATION / OFFSET:	1281+98, 59' RT.	EXPLORATION ID	B-018-0-23
TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	ALIGNMENT:	US 33		
PID:	119142 SFN: 0501204	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	845.4 (MSL) EOB: 25.0 ft.	PAGE	1 OF 1
START:	11/14/23 END: 11/14/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.208071, -82.057455		

SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)						HOLE CLASS (G)	SEAL		
					GR	CS	FS	SI	CL	LL			PL	WC
7	41	100	SS-1	4.50	1	15	8	37	39	41	25	16	8	A-7-6 (11)
21	83	100	SS-2	-	-	-	-	-	-	-	-	-	6	Rock (V)
18		100	NQ2-1											CORE
17		100	NQ2-2											CORE
57		100	NQ2-3											CORE
85		100	NQ2-4											CORE

ELEV.	DEPTHS
845.0	1
841.9	2
840.4	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
	15
	16
	17
	18
	19
	20
	21
	22
	23
	24
820.4	25

MATERIAL DESCRIPTION AND NOTES

TOPSOIL (5')
 HARD, BROWN, CLAY, SOME SILT, SOME SAND, CONTAINS ORGANICS, TRACE GRAVEL, DAMP

SHALE, BROWN, HIGHLY WEATHERED.

SHALE, BROWN, MODERATELY TO SEVERELY WEATHERED, WEAK TO SLIGHTLY STRONG, ROD 15%, REC 100%.
 @5.8'-6.4'; UCS = 2,410 PSI

@15.0'-16.4'; GRAY, SLAKE DURABILITY INDEX = 40.9%

SANDSTONE, BROWN, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 82%, REC 100%. @16.4'-16.9'; UCS = 5,370 PSI

@21.0'-21.5'; UCS = 5,030 PSI

NOTES: CAVED AT 14'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE(614)276-8123
 FAX(614)276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET	TOTAL
60	172
SHEET	TOTAL
-	-



B-018-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	5.0'	60/60	11/60
NQ2-2	10.0'	60/60	10/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-018-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	15.0'	60/60	34/60
NQ2-4	20.0'	60/60	51/60

ATH/MEG-US33-23.23/0.00, PID 119142



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
61	172
SHEET	TOTAL
-	-

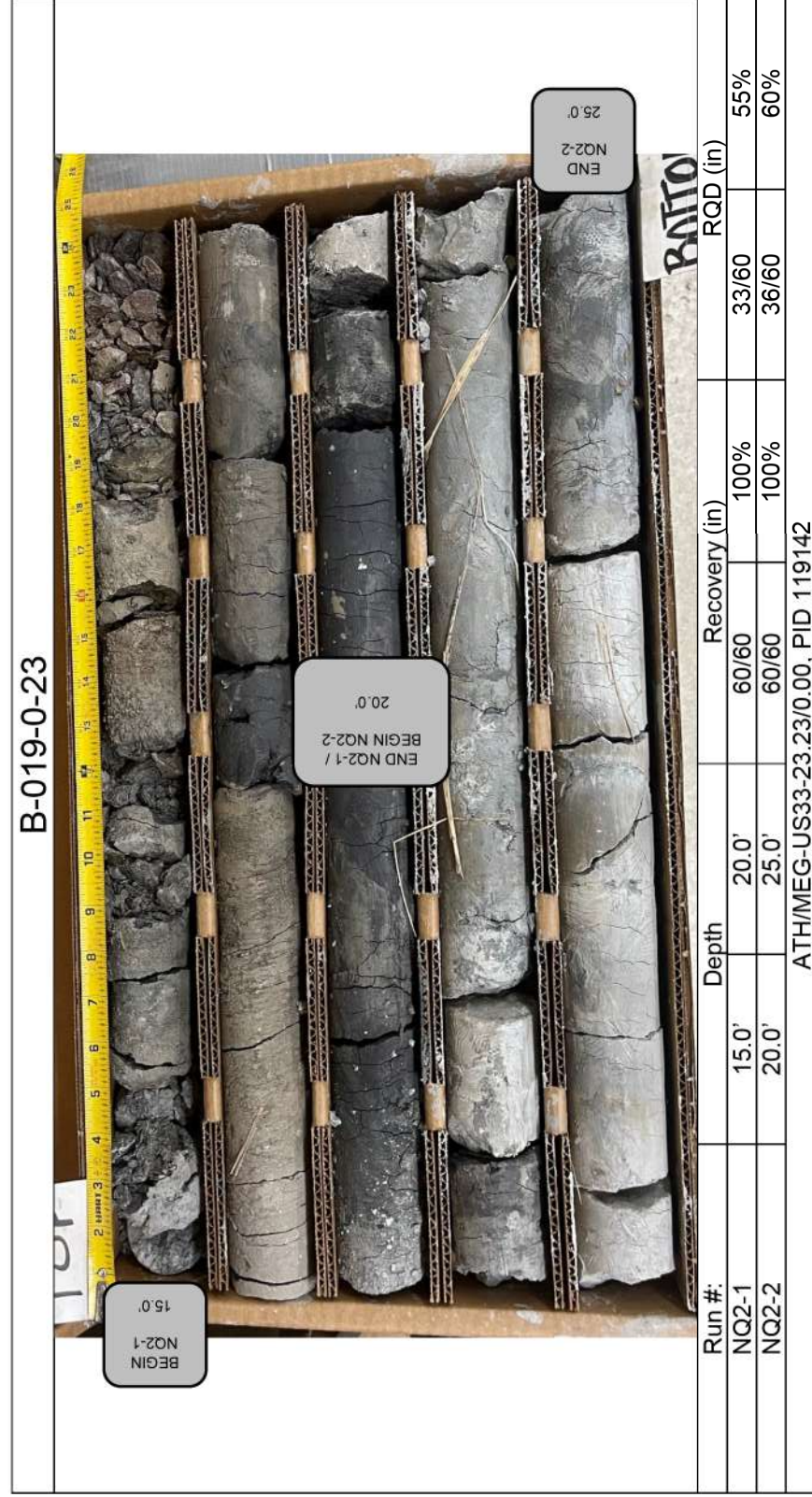
GEOTECHNICAL PROFILE - ROADWAY
 ROCK CORE PHOTO FOR B-018-0-23

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 14:48:50 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19-59 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-33-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23.23	DRILLING FIRM / OPERATOR: CTL / H. BROWN	STATION / OFFSET: 1283+53.57' RT.	EXPLORATION ID: B-019-0-23
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CTL / H. BROWN	ALIGNMENT: US 33	
PID: 119142 SFN: 0501204	DRILLING METHOD: 3.25" HSA / NQ2	ELEVATION: 763.9 (MSL) EOB: 30.0 ft.	PAGE 1 OF 1
START: 11/15/23 END: 11/15/23	SAMPLING METHOD: SPT / NQ2	LAT / LONG: 39.207719, -82.057165	
MATERIAL DESCRIPTION AND NOTES			
TOPSOIL (6")	ELEV. 763.9		
HARD, BROWN, SILT AND CLAY, SOME SAND, DAMP	763.4		
@3.5'; VERY STIFF, MOIST			
@6.0'; CONTAINS ORGANICS, DAMP			
@8.5'; HARD, NO ORGANICS			
CLAYSTONE, GRAY, HIGHLY WEATHERED.	752.9		
CLAYSTONE, GRAY, MODERATELY TO SEVERELY WEATHERED, VERY WEAK; RQD 58% REC 100% @15.0'-20.0'. SLAKE DURABILITY INDEX = 23.0%	748.9		
@18.5'-18.9'; UCS = 50 PSI			
@24.5'-25.0'; UCS = 230 PSI INTERBEDDED SANDSTONE (75%) AND SHALE (25%), RQD 72% REC 100%; SANDSTONE, GRAY, SLIGHTLY WEATHERED, SLIGHTLY TO MODERATELY STRONG; SHALE, GRAY, SLIGHTLY WEATHERED, SLIGHTLY TO MODERATELY STRONG.	738.9		
	733.9		
-EOB-			
NOTES: CAVED AT 15'			
ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT			

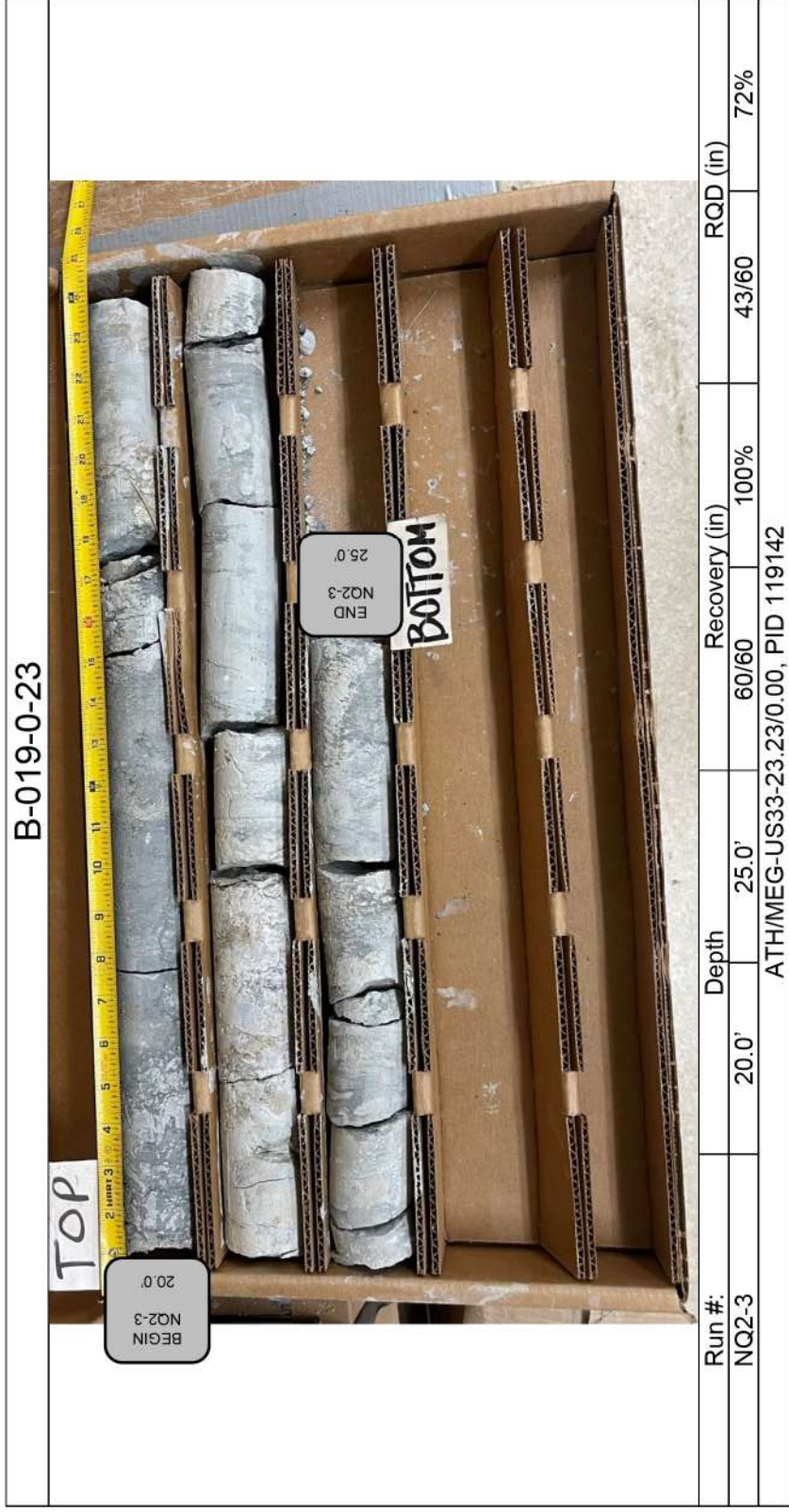


DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
62	172
SHEET	TOTAL
-	-

GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG & ROCK CORE PHOTO FOR B-019-0-23



B-019-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	20.0' - 25.0'	60/60 100%	43/60 72%
ATH/MEG-US33-23.23/0.00, PID 119142			

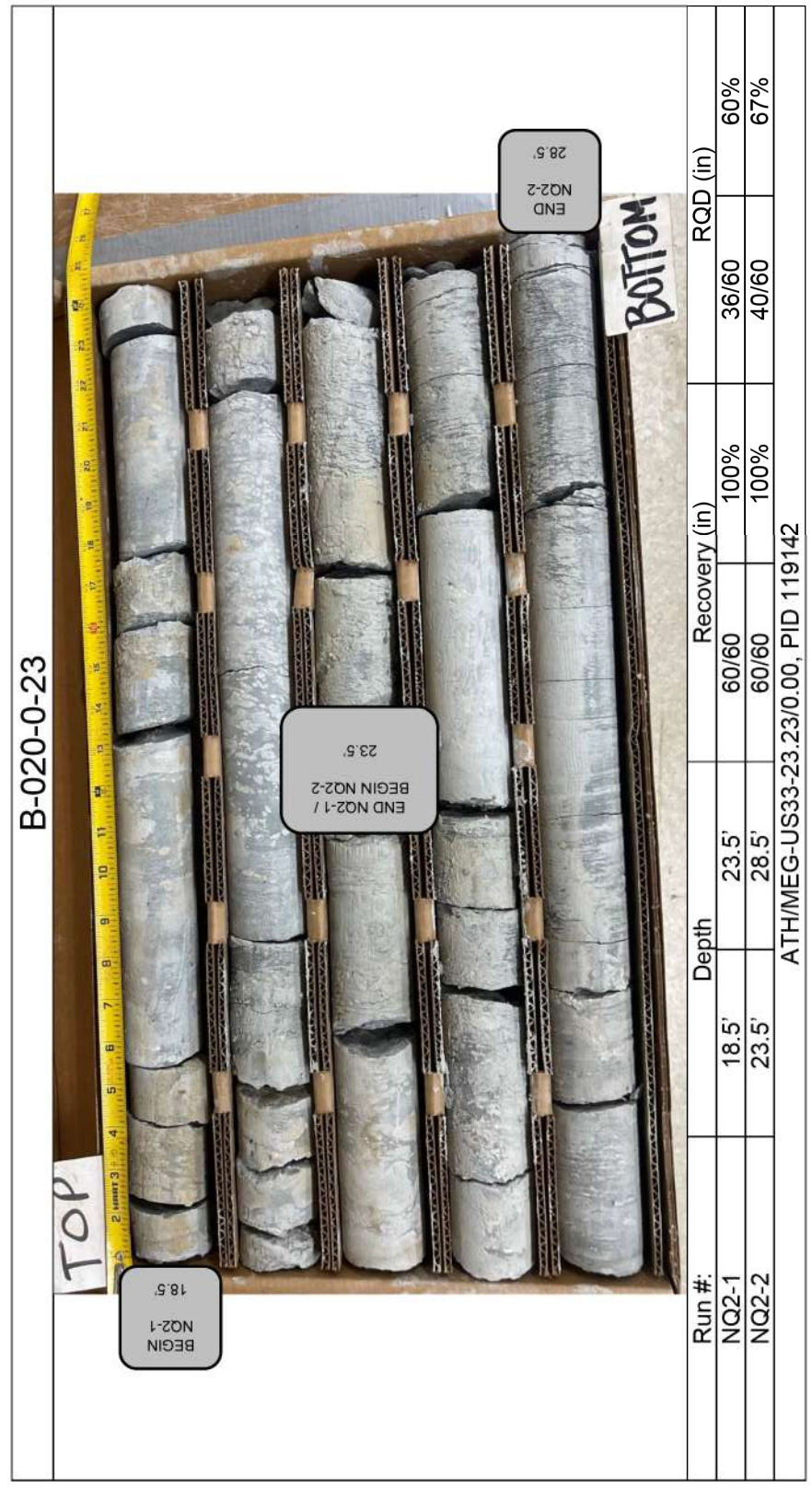
PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:		CTL / H. BROWN		STATION / OFFSET:		1284+28, 61' RT.		EXPLORATION ID							
	TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	HAMMER:	MOBILE AUTOMATIC	ALIGNMENT:	US 33	ELEVATION:	755.9 (MSL)	EOB:	33.5 ft.	PAGE					
PID:	119142	SFN:	0501204	DRILLING METHOD:	3.25" HSA / NQ2	SAMPLING METHOD:	SPT / NQ2	ELEVATION:	755.9 (MSL)	EOB:	33.5 ft.	LAT / LONG:	39.207538, -82.057048	1 OF 2				
START:	11/16/23	END:	11/16/23	SAMPLING METHOD:	SPT / NQ2	REC SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
TOPSOIL (12")																		
STIFF, BROWN, SILTY CLAY, SOME SAND, TRACE GRAVEL, CONTAINS ORGANICS, MOIST		754.9	1	3	12	100	2.00	1	7	17	36	39	40	24	16	37		A-6b (10)
@3.5'; VERY STIFF, DAMP			2	3														
@6.0'; NO ORGANICS			3	4	9	100	2.25	-	-	-	-	-	-	-	-	13		A-6b (V)
HARD, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, CONTAINS ORGANICS, DAMP		747.4	4	3	12	100	2.75	6	8	16	30	40	40	23	17	20		A-6b (10)
@10.0'; LITTLE SAND			5	5														
HARD, BROWN, CLAY, SOME SILT, TRACE SAND, CONTAINS ORGANICS, DAMP		744.4	6	5	17	100	4.50	2	11	15	40	32	35	22	13	19		A-6a (9)
HARD, BROWN, SILTY CLAY, LITTLE SAND, DAMP		742.9	7	7	19	100	4.25	1	3	15	41	40	37	22	15	20		A-6a (10)
SHALE, GRAY, HIGHLY WEATHERED.		738.9	8	8	19	100	4.25	0	1	9	34	56	48	26	22	16		A-7-6 (14)
INTERBEDDED SANDSTONE (50%) AND SHALE (50%), RQD 63%, REC. 100%;		737.4	9	7	20	100	4.50	0	0	14	43	43	39	22	17	16		A-6b (11)
SANDSTONE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY STRONG;			10	8	23	100	4.50	0	0	11	47	42	39	21	18	12		A-6b (11)
SHALE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY STRONG.			11	8														
@18.5'-23.5'; SLAKE DURABILITY INDEX = 71.5% @21.7'-22.3'; UCS = 10,260 PSI ON SANDSTONE			12	10														
@25.5'-26.0'; UCS = 6,060 PSI ON SANDSTONE			13	15														
			14	15														
			15	50/4"														
			16															
			17															
			18															
			19															
			20															
			21															
			22															
			23															
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			26															
			27															
			28															
			29															

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - 0\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1284+28.61' RT.	START: 11/16/23	END: 11/16/23	PG 2 OF 2	B-020-0-23									
MATERIAL DESCRIPTION AND NOTES		ELEV: 725.9	SPT/ RQD	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED	
INTERBEDDED SANDSTONE (75%) AND SHALE (25%), RQD 77% REC. 100% SANDSTONE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY STRONG; SHALE, GRAY, SLIGHTLY WEATHERED, SLIGHTLY STRONG. (continued)			77	100											CORE	
		DEPTHS														
			31													
		722.4														

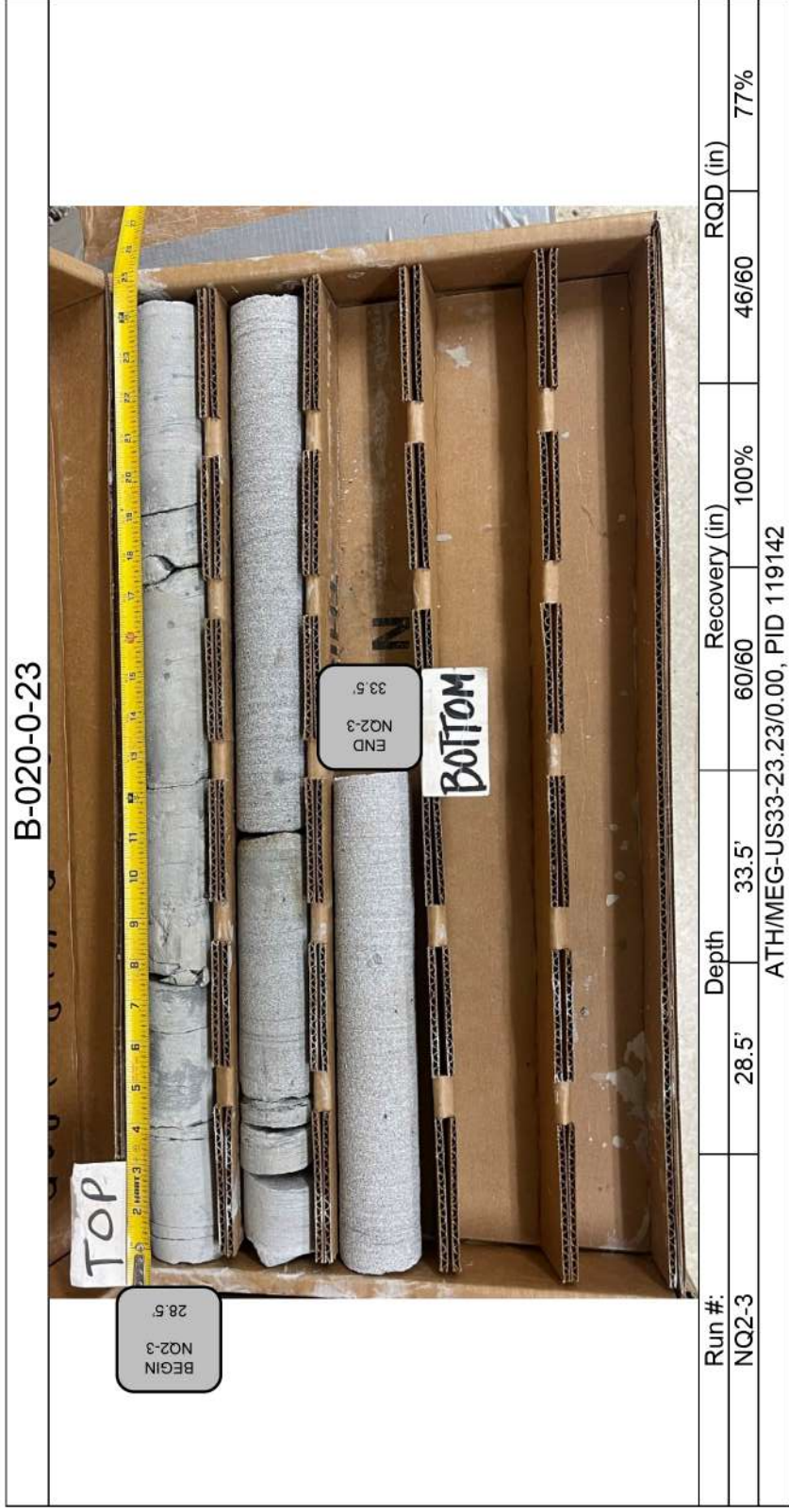
EOB

NOTES: CAVED AT 18'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT





B-020-0-23



Run #:	28.5'	Depth	33.5'	Recovery (in)	60/60	46/60	RQD (in)	77%
Run #:	28.5'	Depth	33.5'	Recovery (in)	60/60	46/60	RQD (in)	77%
ATH/MEG-US33-23.23/0.00, PID 119142								

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / H. BROWN		STATION / OFFSET:	1285+32, 90' RT.		EXPLORATION ID	B-021-0-23				
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / H. BROWN		ALIGNMENT:	US 33			HOLE	SEAL		
PID:	119142	SFN:	0501204	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	762.0 (MSL)	EOB:	24.0 ft. <th>PAGE</th> <td>1 OF 1 </td>	PAGE	1 OF 1			
START:	11/18/23	END:	11/18/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.207255, -82.056971	ENERGY RATIO (%)	76.8					
MATERIAL DESCRIPTION AND NOTES		SPT/RQD	REC SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)
TOPSOIL (3') MEDIUM DENSE, BROWN, COARSE AND FINE SAND, LITTLE SILT, TRACE CLAY, DAMP		1-3	SS-1	-	0	14	63	16	7	NP	NP	NP	9	A-3a (0)
VERY STIFF, BROWN, CLAY, TRACE SAND, TRACE GRAVEL, MOIST		4-6	SS-2	-	0	9	66	17	8	NP	NP	NP	6	A-3a (0)
SANDSTONE, GRAY, HIGHLY WEATHERED, @9.0'; AUGER REFUSAL ENCOUNTERED		7-8	SS-3	2.25	-	-	-	-	-	-	-	-	32	A-7.6 (V)
SANDSTONE, GRAY, SLIGHTLY WEATHERED, STRONG; @10.5'-11.0'; UCS = 9,490 PSI		9	SS-4	-	-	-	-	-	-	-	-	-	8	Rock (V)
CLAYSTONE, BROWN AND GRAY, MODERATELY WEATHERED, VERY WEAK; RQD 17%, REC 100%. @12.0'-17.0'; SLAKE DURABILITY INDEX = 1.2%		10-17	NQ2-1	97										CORE
@15.0'-15.5'; UCS = 80 PSI		17	NQ2-2	100										CORE
SHALE GRAY, MODERATELY WEATHERED, SLIGHTLY TO MODERATELY STRONG; RQD 86%, REC 100%		19-23	NQ2-3	100										CORE
@23.5'-24.0'; UCS = 5,720 PSI		23	NQ2-4	100										CORE

NOTES: CAVED AT 9'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY
GTL ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43234
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

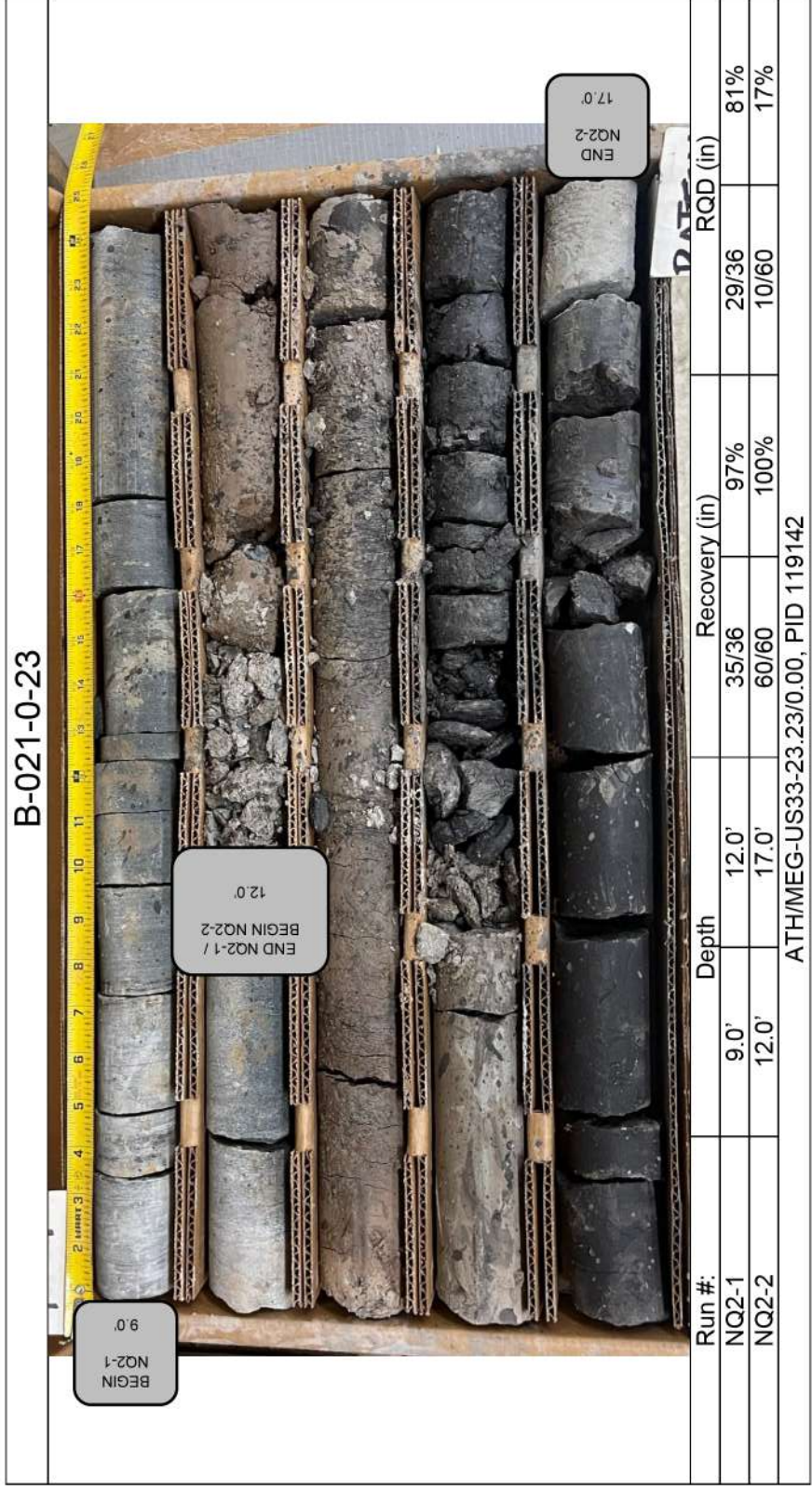
PROJECT ID
 119142

SUBSET TOTAL
 65 172

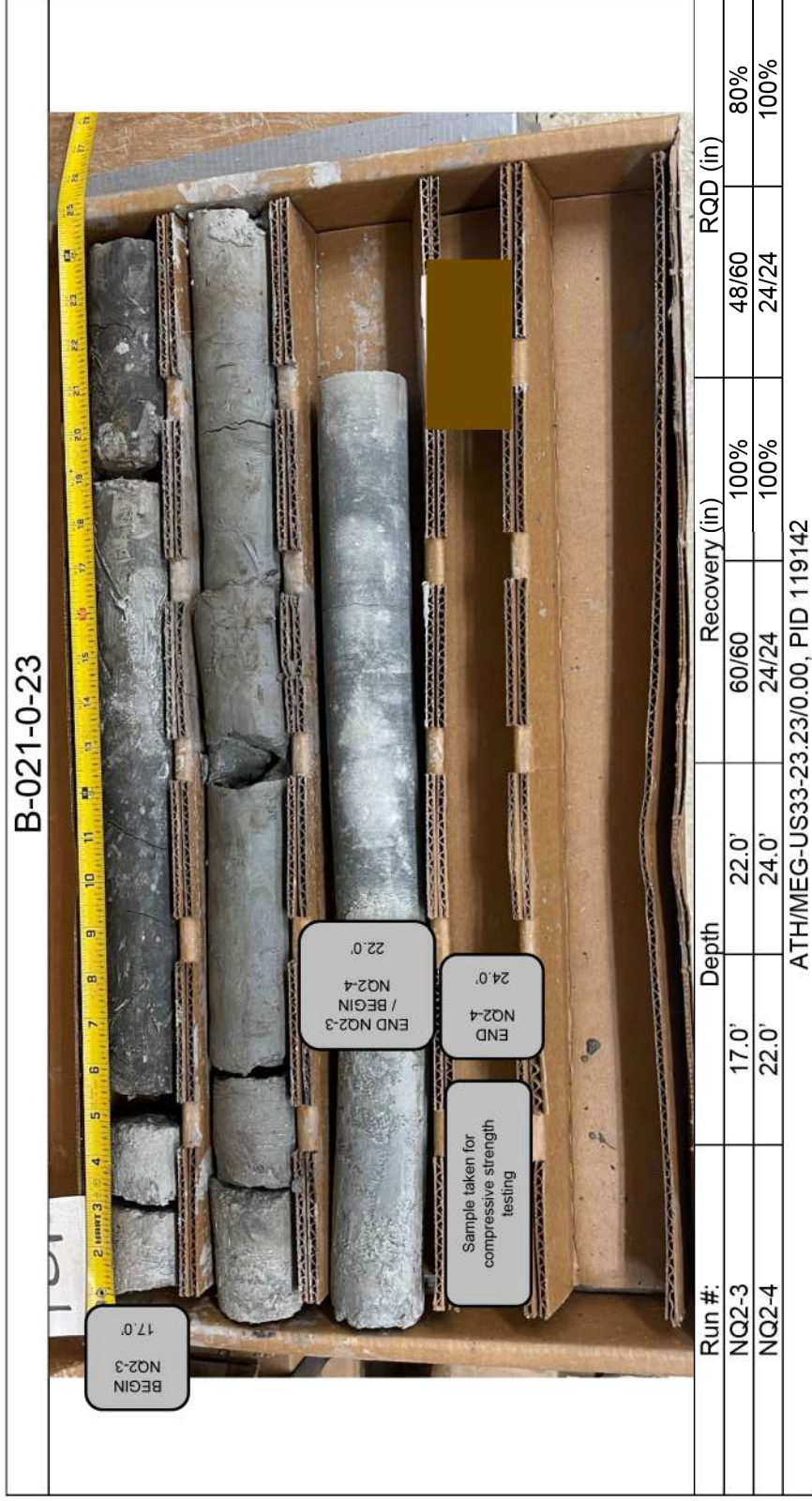
SHEET TOTAL
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B-021-0-23



B-021-0-23



DESIGN AGENCY



DESIGNER

N.K.S

REVIEWER

SM 11-06-24

PROJECT ID

119142

SUBSET TOTAL

66 172

SHEET TOTAL

- -

GEOTECHNICAL PROFILE - ROADWAY
 ROCK CORE PHOTO FOR B-021-0-23

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 14:51:47 USER: ACAD
 D:\Dept_05\COL\2.3050059COL\East_Section\Mod_30.10.24\Working\109142ZL020.dgn


PROJECT: ATH-US 33-23.23 TYPE: BRIDGE	DRILLING FIRM / OPERATOR: CTL / H. BROWN SAMPLING FIRM / LOGGER: CTL / H. BROWN	STATION / OFFSET: 1286+58.65' RT. ALIGNMENT: US 33	EXPLORATION ID B-022-0-23					
				DRILL RIG: MOBILE B-57 TRACK HAMMER: MOBILE AUTOMATIC				
PID: 119142 SFN: 0501204	DRILLING METHOD: 3.25" HSA / NQ2	ELEVATION: 831.3 (MSL) EOB: 60.0 ft.	PAGE 1 OF 2					
START: 11/18/23 END: 11/18/23	SAMPLING METHOD: SPT / NQ2	LAT / LONG: 39.206981, -82.056703	ENERGY RATIO (%): 76.8					
MATERIAL DESCRIPTION AND NOTES								
TOPSOIL (3') VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, LITTLE GRAVEL, CONTAINS ORGANICS, MOIST	ELEV. 831.3	SPT/ RQD	REC SAMPLE ID	HP (tsf)	GRADATION (%)	ATTERBERG	ODOT CLASS (G)	HOLE SEALED
	831.1	3	9	SS-1	2.75	12 14 19 34 21 34 23 11 23	A-6a (4)	
	827.8	4	100	SS-2			Rock (V)	
	826.3							
SANDSTONE, BROWN, HIGHLY WEATHERED.		73	100	NQ2-1			CORE	
		92	100	NQ2-2			CORE	
@15.0'-15.5', SLIGHTLY STRONG, UCS = 3,290 PSI		90	100	NQ2-3			CORE	
		82	100	NQ2-4			CORE	
@18.0'-18.6'; UCS = 2,900 PSI		82	100	NQ2-5			CORE	

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142 SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1286+58.65' RT.	START: 11/18/23	END: 11/18/23	PG 2 OF 2	B-022-0-23			
MATERIAL DESCRIPTION AND NOTES									
SANDSTONE, BROWN, SLIGHTLY WEATHERED, STRONG; RQD 83%, REC 100%. (continued)	ELEV. 801.3	SPT/ RQD	REC SAMPLE ID	HP (tsf)	GRADATION (%)	ATTERBERG	ODOT CLASS (G)	HOLE SEALED	
		69	100	NQ2-6			CORE		
		60	100	NQ2-7			CORE		
	@35.0'; GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY TO MODERATELY STRONG.		100	NQ2-8			CORE		
			85	100	NQ2-9			CORE	
	@40.0'; BROWN AND GRAY, FERRIFEROUS.		83	100	NQ2-10			CORE	
			97	100	NQ2-11			CORE	
	@50.0'; GRAY.		21	100	NQ2-12			CORE	
	SHALE, GRAY, MODERATELY WEATHERED, WEAK TO SLIGHTLY STRONG, CONTAINS COAL SEAMS; RQD 21%, REC 100%.	773.3							
		771.3							

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

NOTES: CAVED AT 33'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

 2860 FISHER ROAD
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 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 67 172

SHEET TOTAL
 - -

**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-022-0-23**



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	5.0'	36/36	26.4/36
NQ2-2	8.0'	60/60	55/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	13.0'	60/60	54/60
NQ2-4	18.0'	60/60	49/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-5	23.0'	60/60	49/60
NQ2-6	28.0'	60/60	41.5/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-7	33.0'	60/60	36/60
NQ2-8	38.0'	60/60	60/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-9	43.0'	60/60	51/60
NQ2-10	48.0'	60/60	50/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-022-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-11	53.0'	60/60	58/60
NQ2-12	58.0'	24/24	5/24

ATH/MEG-US33-23.23/0.00, PID 119142



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
70	172
SHEET	TOTAL
-	-

ATH/MEG-33-23-23/0.00


MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 14:55:45 USER: ACAO
 D:\Dept_05\COL\23050059COL\East_Section\Mod_30_10_24\Working\191422L024.dgn

PROJECT: ATH-US 33-23-23		DRILLING FIRM / OPERATOR: CTL / H. BROWN		STATION / OFFSET: 1287+85.39' RT.		EXPLORATION ID									
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: CTL / H. BROWN		ALIGNMENT: US 33		B-023-0-23									
PID: 119142 SFN: 0501204		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 863.7 (MSL) EOB: 72.0 ft.		PAGE									
START: 11/20/23 END: 11/20/23		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.206696, -82.056448		1 OF 3									
MATERIAL DESCRIPTION AND NOTES				GRADATION (%)											
DEPTH (ft)	ELEV. (ft)	SPT / RQD	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
1	863.7	5	100	4.50	5	9	19	35	32	34	20	14	18	A-6a (B)	
2	863.2	6	100	4.50											
3															
4		7	100	4.00									15	A-6a (V)	
5		6													
6		7	100	4.50									7	A-6a (V)	
7		8													
8		10	100	4.50									12	A-6a (V)	
9	854.2	10	100	4.50											
10		10	100	4.50											
11															
12		13	40	NQ2-1										CORE	
13															
14															
15	848.7														
16															
17		38	80	NQ2-2										CORE	
18															
19															
20															
21															
22		52	100	NQ2-3										CORE	
23															
24															
25	838.7														
26															
27		40	100	NQ2-4										CORE	
28															
29	833.7														

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23-23		DRILLING FIRM / OPERATOR: ATH-US 33-23-23		STATION / OFFSET: 1287+85.39' RT.		EXPLORATION ID									
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: ATH-US 33-23-23		ALIGNMENT: US 33		B-023-0-23									
PID: 119142 SFN: 0501204		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 863.7 (MSL) EOB: 72.0 ft.		PAGE									
START: 11/20/23 END: 11/20/23		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.206696, -82.056448		1 OF 3									
MATERIAL DESCRIPTION AND NOTES				GRADATION (%)											
DEPTH (ft)	ELEV. (ft)	SPT / RQD	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
31	833.7	60	100	NQ2-5										CORE	
32															
33															
34															
35															
36															
37		65	100	NQ2-6										CORE	
38															
39															
40	823.7														
41															
42		90	100	NQ2-7										CORE	
43															
44															
45															
46															
47		88	100	NQ2-8										CORE	
48															
49															
50															
51															
52		100	100	NQ2-9										CORE	
53															
54															
55															
56															
57		97	100	NQ2-10										CORE	
58															
59															
60															
61															

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

DESIGN AGENCY

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 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 71 172

SHEET TOTAL
 - -

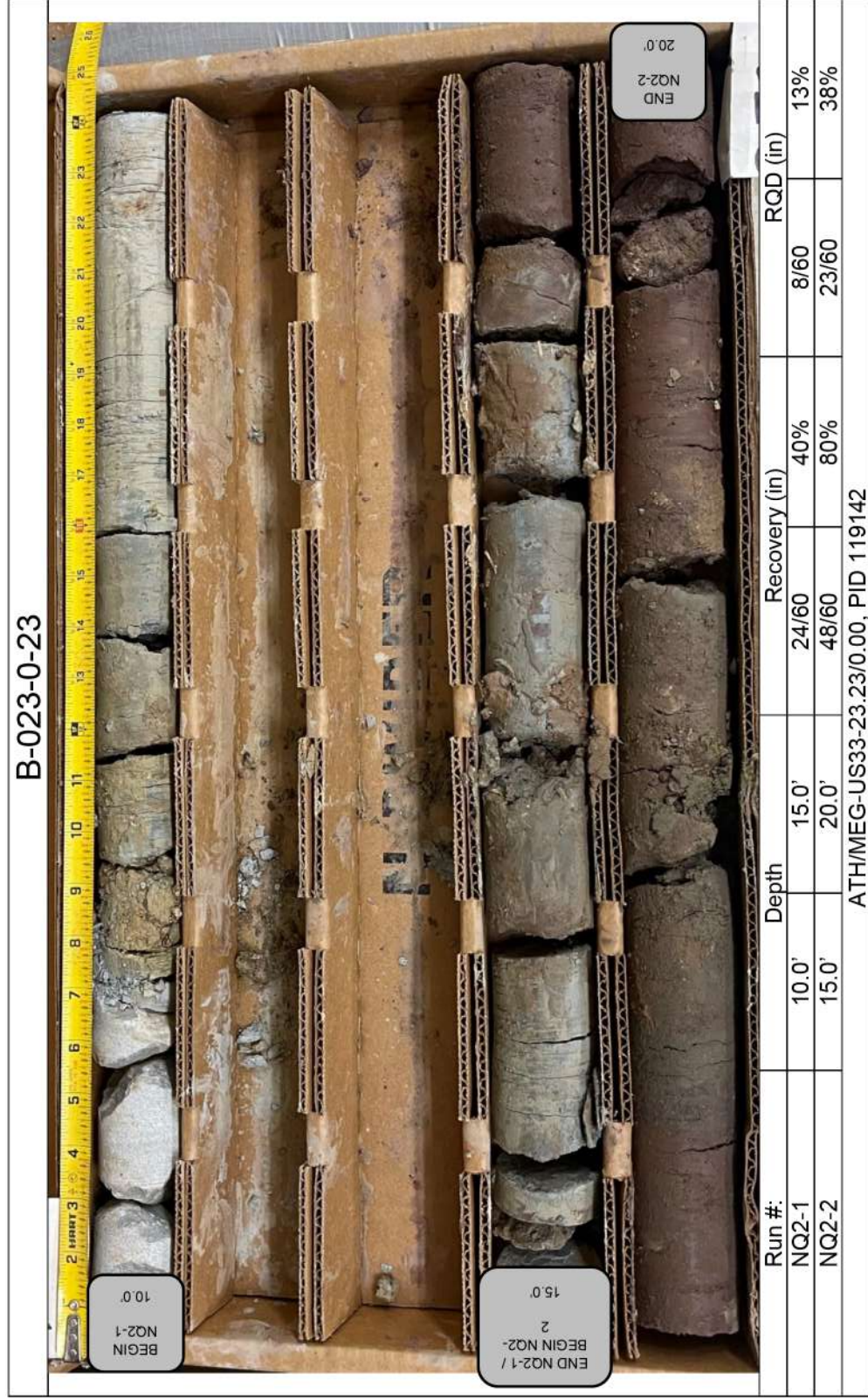
**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-023-0-23**

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1287+85.39' RT.	START: 11/20/23	END: 11/20/23	PG 3 OF 3	B-023-0-23												
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED		
SANDSTONE, BROWN AND GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 95%, REC 100%. (continued)		801.6	63	100	100												CORE		
			64																
			65																
			66																
			67	95			100												CORE
			68																
			69																
	70																		
	71			88	100													CORE	
	791.7		72															CORE	

EOB

NOTES: CAVED AT 50'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT





B-023-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	20.0'	60/60	31/60
NQ2-4	25.0'	60/60	24/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-023-0-23

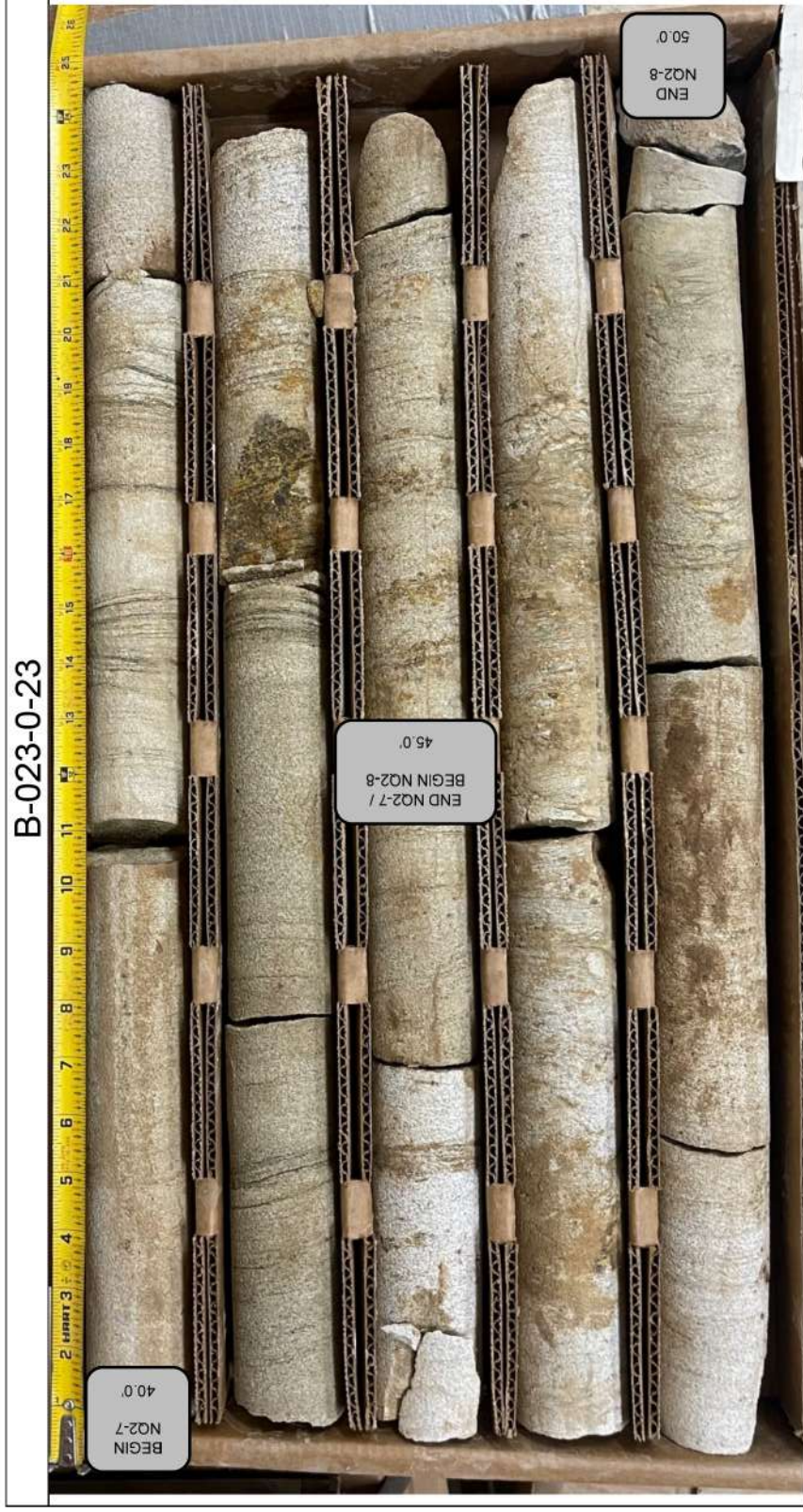


Run #:	Depth	Recovery (in)	RQD (in)
NQ2-5	30.0'	60/60	36/60
NQ2-6	35.0'	60/60	39/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-023-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-7	40.0'	60/60	54/60
NQ2-8	45.0'	60/60	53/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-023-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-9	50.0'	60/60	60/60
NQ2-10	55.0'	60/60	58/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-023-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-11	60.0'	60/60	60/60
NQ2-12	65.0'	60/60	57/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-023-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-13	70.0'	24/24	21/24
ATH/MEG-US33-23.23/0.00, PID 119142			

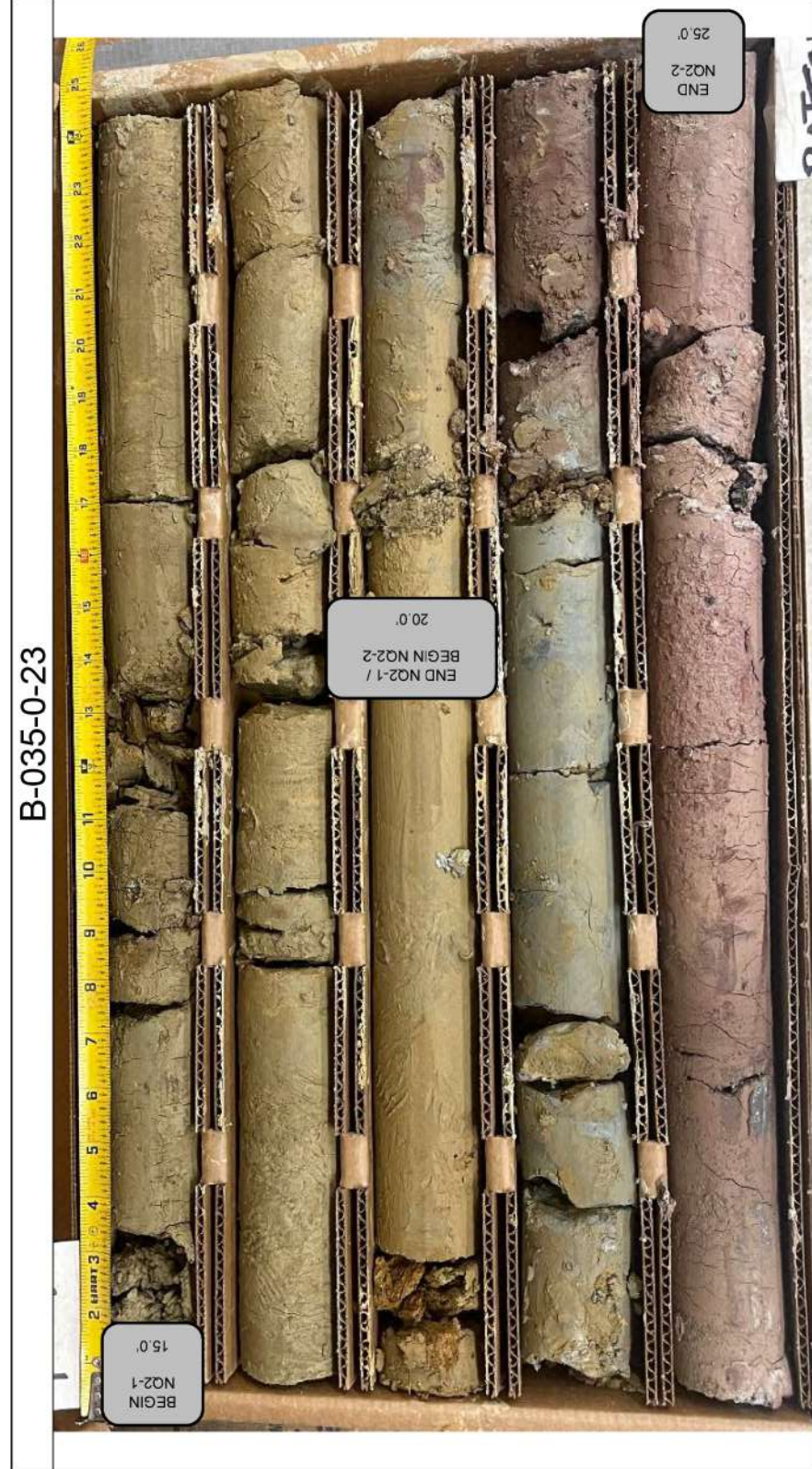


DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
75	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER: 11x17 (in.) DATE: 06-11-2024 TIME: 15:04:57 USER: ACAD
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PROJECT: ATH-US 33-23.23		DRILLING FIRM / OPERATOR: CTL / H. BROWN		STATION / OFFSET: 1420+74.42' RT.		EXPLORATION ID										
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: CTL / H. BROWN		ALIGNMENT: US 33		B-035-0-23										
PID: 119142 SFN: 0501190		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 730.0 (MSL) EOB: 30.0 ft.		PAGE										
START: 11/28/23 END: 11/28/23		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.172135, -82.042893		1 OF 1										
MATERIAL DESCRIPTION AND NOTES				GRADATION (%)												
TOPSOIL (6")				GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED		
VERY STIFF BROWN AND RED-BROWN, SILT AND CLAY, SOME SAND, LITTLE GRAVEL, CONTAINS ROCK FRAGMENTS, DAMP				4	15	100	2.75	13	10	24	25	28	32	19	13	A-6a (5)
@6.0'; NO GRAVEL				3	4	100	2.75	-	-	-	-	-	-	19	A-6a (V)	
@8.5'; HARD, LIGHT BROWN				6	17	100	2.75	0	2	20	43	35	34	19	A-6a (10)	
CLAYSTONE, LIGHT BROWN, VERY WEAK.				7	8	100	4.50	-	-	-	-	-	-	17	A-6a (V)	
SHALE, BROWN, SEVERELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK, VERY THIN TO THIN BEDDED, ARGILLACEOUS; ROD 59%; REC 100%.				8	20	100	4.50	-	-	-	-	-	-	-	-	-
@17.0'-17.6'; UCS = 180 PSI				9	23	100	4.50	-	-	-	-	-	-	-	-	-
@20.2'-20.7'; UCS = 120 PSI				12	68	100	-	-	-	-	-	-	-	-	6	Rock (V)
@20.0'-25.0'; SLAKE DURABILITY INDEX = 4.9%				18	35	-	-	-	-	-	-	-	-	-	-	-
@21.0'; GRAY TO RED-GRAY, HIGHLY WEATHERED, WEAK, THIN TO MEDIUM BEDDED.				58	-	100	NQ2-1	-	-	-	-	-	-	-	-	CORE
@27.0'; RED-GRAY TO DARK GRAY, HIGHLY TO MODERATELY WEATHERED, THIN BEDDED.				65	-	100	NQ2-2	-	-	-	-	-	-	-	-	CORE
NOTES: CAVED AT 15'				55	-	100	NQ2-3	-	-	-	-	-	-	-	-	CORE
ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT				700.0	-	-	-	-	-	-	-	-	-	-	-	-



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	15.0'	60/60	35/60
NQ2-2	20.0'	60/60	39/60
ATH/MEG-US33-23.23/0.00, PID 119142			

DESIGN AGENCY
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DESIGNER: N.K.S
 REVIEWER: SM 11-06-24
 PROJECT ID: 119142
 SUBSET: 76 TOTAL: 172
 SHEET: TOTAL: -

GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG & ROCK CORE PHOTO FOR B-035-0-23



B-035-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	25.0'	30.0'	33/60
		60/60	100%
			55%

ATH/MEG-US33-23.23/0.00, PID 119142

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL_05129050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / TOM		STATION / OFFSET:	1420+17, 24' LT.		EXPLORATION ID										
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / TOM		ALIGNMENT:	US 33		B-035-1-23									
PID:	119142	SFN:	DRILLING METHOD:	3.25" HSA / NQ2	SPT / NQ2	ELEVATION:	750.3 (MSL)	EOB:	35.0 ft.										
START:	4/17/24	END:	4/17/24	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.172350, -82.042757	PAGE	1 OF 2										
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
ASPHALT (2')		750.3	1	11	22	78	SS-1	4.50	15	18	28	16	23	25	15	10	12	A-4a (1)	
CONCRETE (5')		750.1	2	11	6														
HARD, BROWN, SANDY SILT, SOME CLAY, LITTLE GRAVEL, (FILL), DAMP		749.7	3	4	6	16	SS-2	2.50	-	-	-	-	-	-	-	-	-	12	A-4a (V)
@3.5'; VERY STIFF			4	6	6														
MEDIUM DENSE, BROWN, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, (FILL), DAMP		744.3	5	2	4	11	SS-3	-	4	5	39	32	20	NP	NP	15		A-4a (3)	
@11.0'; LOOSE			6	4	4														
VERY STIFF, BROWN AND RED, CLAY, "AND" SILT, LITTLE SAND, TRACE GRAVEL, (FILL), DAMP		736.8	7	4	4	12	SS-4	-	-	-	-	-	-	-	-	-	-	19	A-4a (V)
@23.5'; STIFF			8	4	5														
HARD, RED, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP		721.8	9	2	3	9	SS-5	-	-	-	-	-	-	-	-	-	-	18	A-4a (V)
			10	3	4														
			11	3	5	13	SS-6	3.50	-	-	-	-	-	-	-	-	-	19	A-7-6 (V)
			12	5	5	89	SS-7	-	5	3	7	44	41	42	22	20		A-7-6 (12)	
			13			100	ST-7	-											
			14	4	4	12	SS-8	3.00	-	-	-	-	-	-	-	-	-	16	A-7-6 (V)
			15	4	5														
			16	2	2	7	SS-9	2.00	-	-	-	-	-	-	-	-	-	20	A-7-6 (V)
			17	2	3														
			18	2	3														
			19	6	10	34	SS-10	4.50	-	-	-	-	-	-	-	-	-	12	A-6a (V)
			20	16	16														

ATH/MEG-33-23-23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:07:50 USER: ACAD
 D:\Dept_05\COL\23050059COL\East_Section\Mod_30_10_24\Working\191422L031.dgn

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST


PID: 119142	SFN: ATH-US 33-23-23	PROJECT: ATH-US 33-23-23	STATION / OFFSET: 1420+17.24' LT.	START: 4/17/24	END: 4/17/24	PG 2 OF 2	B-035-1-23
MATERIAL DESCRIPTION AND NOTES							
HARD, RED, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP (continued)	ELEV. 720.3	DEPTHS 31, 32, 33, 34, 35	SPT/ RQD	REC SAMPLE (%)	HP (tsf)	GRADATION (%)	ODOT CLASS (G)
				100	ST-11	4 5 30 26 35 28 15 13	11 A-6a (6)
@33.5'; VERY STIFF, CONTAINS ROCK FRAGMENTS	ELEV. 715.3		13, 14, 27	SS-12	4.00		10 A-6a (V)

DEPTH (ft)	SPT/ RQD	REC SAMPLE (%)	HP (tsf)	GRADATION (%)						ODOT CLASS (G)	HOLE SEALED		
				GR	CS	FS	SI	CL	LL			PL	PI
1	2	100	3.50	1	3	12	45	39	22	17	21	A-6b (11)	
2	3	100	2.00	3	4	12	26	55	52	25	27	A-7-6 (17)	
3	3	100	3.00	-	-	-	-	-	-	-	-	A-7-6 (V)	
4	6	100	3.75	1	7	20	31	41	37	19	18	A-6b (11)	
5	7	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
6	10	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
7	8	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
8	9	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
9	11	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
10	12	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
11	15	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
12	30	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
13	40	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	
14	53	100	4.50	-	-	-	-	-	-	-	-	A-6b (V)	

NOTES: CAVED AT 4'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23-23	DRILLING FIRM / OPERATOR: CTL / H. BROWN	STATION / OFFSET: 1421+78.52' RT.	EXPLORATION ID
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CTL / H. BROWN	ALIGNMENT: US 33	B-036-0-23
PID: 119142 SFN: 0501190	DRILLING METHOD: 3.25" HSA / NQ2	ELEVATION: 697.2 (MSL) EOB: 35.0 ft.	PAGE
START: 11/22/23 END: 11/22/23	SAMPLING METHOD: SPT / NQ2	LAT / LONG: 39.171863, -82.042785	1 OF 2
MATERIAL DESCRIPTION AND NOTES			
TOPSOIL (5')	ELEV. 697.2	DEPTHS 1-5	
VERY STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, DAMP	696.8	6-8	
STIFF, BROWN, CLAY, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	694.2	9-11	
@6.0'; VERY STIFF, RED-BROWN, DAMP		12-13	
VERY STIFF, RED-BROWN, SILTY CLAY, SOME SAND, TRACE GRAVEL, DAMP	689.2	14-18	
@11.0'; HARD, MOIST		19-20	
@13.0'; DAMP		21-29	
CLAYSTONE, RED-GRAY, VERY WEAK.	678.7	TR	
SHALE, BROWN TO GRAY, SEVERELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK; RQD 48%, REC 100% @20.0'-25.0'; SLAKE DURABILITY INDEX = 41.1%	677.2		
@26.2'-26.6'; UCS = 370 PSI			

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 78 172

SHEET TOTAL
 - -

**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOGS FOR B-035-1-23 & B-036-0-23**

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SN: ATH-US 33-23.23	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1421+78.52' RT.	START: 11/22/23	END: 11/22/23	PG 2 OF 2	B-036-0-23													
MATERIAL DESCRIPTION AND NOTES		ELEV: 667.2	DEPTHS	SPT/ RQD	REC SAMPLE ID (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED			
SHALE, BROWN TO GRAY, SEVERELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK; RQD 48%, REC 100% (continued) @30.0': GRAY, HIGHLY TO MODERATELY WEATHERED, SLIGHTLY STRONG.			31																	
			32	52	100	NQ2-3														
			33																	
			34																	
		662.2	EOB	35																

NOTES: CAVED AT 25'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	20.0'	60/60	24/60
NQ2-2	25.0'	60/60	32/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-036-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	30.0'	60/60	31/60
		100%	52%

ATH/MEG-US33-23.23/0.00, PID 119142

PROJECT:	ATH-US 33-23.23	DRILLING FIRM / OPERATOR:	CTL / H. BROWN	STATION / OFFSET:	1423+49, 81' RT.	EXPLORATION ID	B-037-0-23										
TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	ALIGNMENT:	US 33												
PID:	119142 SFN: 0501190	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	674.5 (MSL) EOB: 55.0 ft.	PAGE	1 OF 2										
START:	11/29/23 END: 11/29/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.171396, -82.042647												
MATERIAL DESCRIPTION AND NOTES		SPT/ RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED	
TOPSOIL (8')																	
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, LITTLE SILT, LITTLE CLAY, TRACE GRAVEL, DAMP		1	3	83	SS-1	1	8	57	20	14	NP	NP	NP	13	A-3a (0)		
@5.5'; LOOSE		2	4														
		3	6														
		4	6	19	SS-2	-	-	-	-	-	-	-	-	14	A-3a (V)		
		5	9														
		6	3	8	SS-3	1	9	56	19	15	NP	NP	NP	19	A-3a (0)		
		7	3														
		8	3														
LOOSE, BROWN, SANDY SILT, LITTLE CLAY, WET		9	2	8	SS-4	0	0	64	22	14	NP	NP	NP	24	A-4a (0)		
		10	3														
MEDIUM DENSE, GRAY, FINE SAND, TRACE COARSE SAND, TRACE SILT, TRACE CLAY, WET		11	4	12	SS-5	0	9	84	3	4	NP	NP	NP	28	A-3 (0)		
		12	4	10	SS-6	0	3	83	7	7	NP	NP	NP	-	A-3a (0)		
LOOSE, GRAY, COARSE AND FINE SAND, TRACE SILT, TRACE CLAY, CONTAINS WOOD FRAGMENTS, WET		13	3	10	SS-6	0	3	83	7	7	NP	NP	NP	-	A-3a (0)		
		14	4	10	SS-7	0	3	82	1	5	NP	NP	NP	-	A-3 (0)		
LOOSE, GRAY, FINE SAND, TRACE COARSE SAND, TRACE SILT, TRACE CLAY, TRACE GRAVEL, CONTAINS WOOD FRAGMENTS, WET		15	4	12	SS-8	0	3	77	1	5	NP	NP	NP	-	A-3 (0)		
@14.5'; MEDIUM DENSE, LITTLE COARSE SAND		16	3	14	SS-8	0	3	14	77	1	5	NP	NP	-	A-3 (0)		
		17	5	14	SS-9	0	-	-	-	-	-	-	-	30	A-3 (V)		
		18	6														
VERY STIFF, BROWN, SILTY CLAY, TRACE SAND, MOIST		19	3	15	SS-10	0	1	5	50	44	40	22	18	25	A-6b (11)		
		20	6														
		21	6	22	SS-11	2.75	-	-	-	-	-	-	-	24	A-6b (V)		
		22	8														
		23	9														
		24	4	20	SS-12	2.75	-	-	-	-	-	-	-	25	A-6b (V)		
		25	6														
		26	4	23	SS-13	1.25	-	-	-	-	-	-	-	31	A-6b (V)		
@26.0'; STIFF		27	8														
		28	10														
		29	5	26	SS-14	2.75	-	-	-	-	-	-	-	19	A-6b (V)		
@28.5'; VERY STIFF, DAMP		30	9														

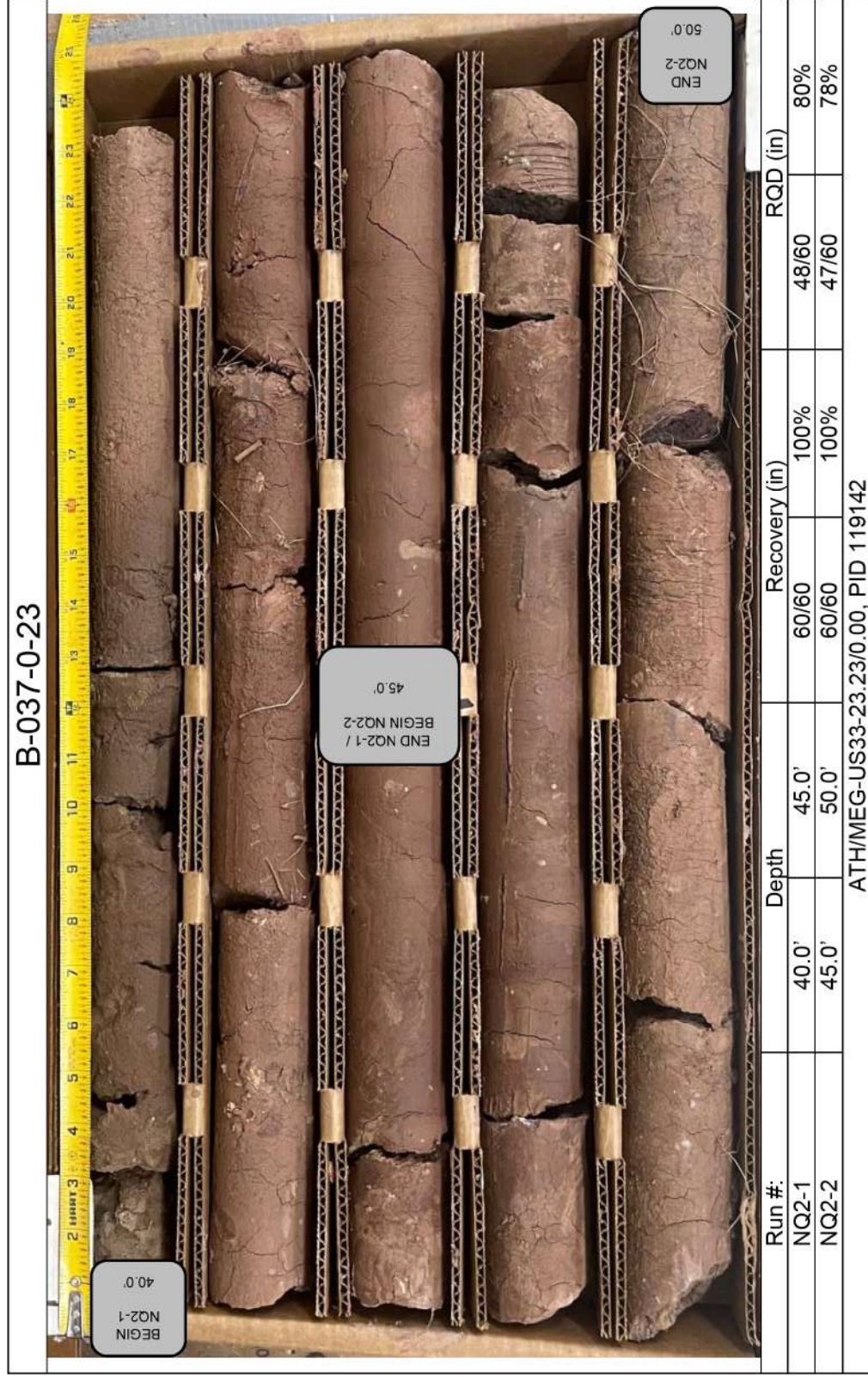
ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:11:14 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTR OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1423+49, 81' RT.	START: 11/29/23										END: 11/29/23			PG 2 OF 2	B-037-0-23
				GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	SEALED				
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)	CL	LL	PL	PI	WC	ODOT CLASS (G)	SEALED		
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP		644.5	31	6	26	100	SS-15	3.00	9	15	34	33	19	14	12	A-6a (8)		
@33.5'; HARD		644.0	32	8	12													
			33															
			34	14	44	100	SS-16	4.50	-	-	-	-	-	14	A-6a (V)			
			35	20														
CLAYSTONE, RED-BROWN, SEVERELY WEATHERED, VERY WEAK.		638.5	36	11	21	73	SS-17	-	-	-	-	-	-	7	Rock (V)			
			37	36														
			38															
SHALE, RED-BROWN AND BROWN, SEVERELY WEATHERED.		636.0	39	39	50/3"	100	SS-18	-	-	-	-	-	-	12	Rock (V)			
			40															
SHALE, RED-BROWN AND BROWN, SEVERELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK, VERY THIN TO MEDIUM BEDDED; RQD 78%, REC 100% @40.0'-45.0'; SLAKE DURABILITY INDEX = 14.5% @42.0'-42.6'; UCS = 110 PSI		634.5	41	80		100	NQ2-1								CORE			
			42															
			43															
			44															
			45															
			46															
			47	78		100	NQ2-2								CORE			
			48															
			49															
			50															
			51															
			52															
			53	75		100	NQ2-3								CORE			
			54															
			55															
		619.5	EOB															

NOTES: CAVED AT 10.4'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
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 FAX: (614) 276-8377

DESIGNER: N.K.S.
 REVIEWER: SM 11-06-24
 PROJECT ID: 119142
 SUBSET: 81 TOTAL: 172
 SHEET: TOTAL:

GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-037-0-23 & ROCK CORE PHOTO FOR B-037-0-23



B-037-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	50.0'	60/60	45/60
		100%	75%
ATH/MEG-US33-23.23/0.00, PID 119142			

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / H. BROWN		STATION / OFFSET:	1424+23, 67' RT.		EXPLORATION ID							
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / H. BROWN		ALIGNMENT:	US 33		B-038-0-23						
PID:	119142	SFN:	0501190	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	679.9 (MSL)	EOB:	55.0 ft.							
START:	11/30/23	END:	11/30/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.171225, -82.042498	PAGE	1 OF 2							
MATERIAL DESCRIPTION AND NOTES		SPT/ RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	HOLE CLASS (G)	SEALED
TOPSOIL (7')																
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, LITTLE SILT, LITTLE CLAY, DAMP		4	23	72	SS-1	0	7	65	17	11	NP	NP	NP	11	A-3a (0)	
VERY STIFF, BROWN, SANDY SILT, SOME CLAY, MOIST		6	28	83	SS-2	-	-	-	-	-	-	-	-	12	A-3a (V)	
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, MOIST		2	8	89	SS-3	3.75	0	42	30	25	17	8	21	A-4a (4)		
LOOSE, BROWN, COARSE AND FINE SAND, TRACE SILT, TRACE CLAY, WET		3	9	83	SS-4	2.50	0	26	42	32	19	13	23	A-6a (9)		
LOOSE, BROWN, GRAVEL WITH SAND AND SILT, TRACE CLAY, WET		2	6	89	SS-6	-	0	4	85	4	7	NP	NP	29	A-3a (0)	
MEDIUM DENSE, GRAY, COARSE AND FINE SAND, TRACE SILT, TRACE CLAY, WET		3	9	100	SS-8	-	-	-	-	-	-	-	-	19	A-2-4 (V)	
@23.5'; LOOSE		3	9	100	SS-9	-	-	-	-	-	-	-	-	39	A-2-4 (V)	
		3	9	100	SS-10	-	-	-	-	-	-	-	-	29	A-3a (V)	
		2	8	89	SS-11	-	-	-	-	-	-	-	-	29	A-3a (V)	
		2	6	83	SS-12	-	0	9	78	5	8	NP	NP	18	A-3a (0)	

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:14:04 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL_ATH MEG-033-18-70-00-00_HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1424+23, 67 RT.	START: 11/30/23	END: 11/30/23	PG 2 OF 2			B-038-0-23										
						GR	CS	FS											
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	HP (tsf)	GRADATION (%)			ATTERBERG			W/C	PI	ODOT CLASS (G)	HOLE SEALED		
MEDIUM DENSE, GRAY, COARSE AND FINE SAND, TRACE SILT, TRACE CLAY, WET (continued)		649.9	31	3	10	100	SS-13	-	-	-	-	-	-	-	-	-	-	-	
			32	3	5														21
@33.5'; MEDIUM DENSE		644.4	33																
			34	3	5	12	89	SS-14	-	-	-	-	-	-	-	-	-	-	-
CLAYSTONE, RED-BROWN AND BROWN, SEVERELY WEATHERED, VERY WEAK		644.4	35																
			36	10	27	83	100	SS-15	-	-	-	-	-	-	-	-	-	-	-
SHALE, RED-BROWN AND GRAY, HIGHLY WEATHERED, WEAK, VERY THIN TO MEDIUM BEDDED, RQD 83%, REC 100% @42.0'-42.5'; UCS = 90 PSI		639.9	37	38															
			38																
@45.0'-50.0'; SLAKE DURABILITY INDEX = 0.7%		639.9	39	40															
			40	31	40	50/11'													
@47.4'-47.9'; UCS = 100 PSI			41																
			42	82															
CORE			43																
			44																
CORE			45																
			46																
CORE			47	77															
			48																
CORE			49																
			50																
CORE			51																
			52																
CORE			53	92															
			54																
			55																

NOTES: CAVED AT 11'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	40.0'	60/60	49/60
NQ2-2	45.0'	60/60	46/60

ATH/MEG-US33-23.23/0.00, PID 119142

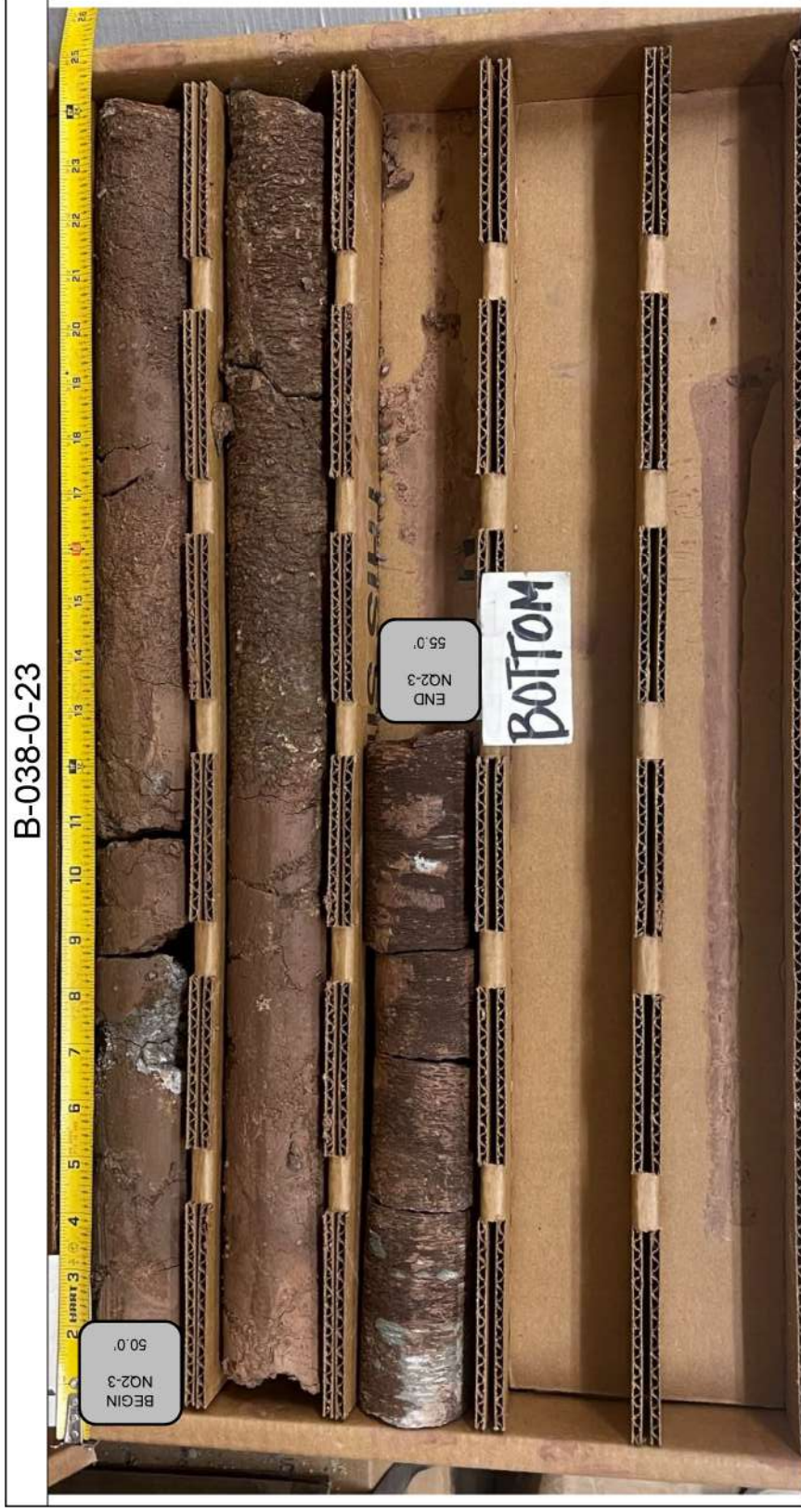
DESIGN AGENCY
GTL ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER: N.K.S
 REVIEWER: SM 11-06-24
 PROJECT ID: 119142
 SUBSET: 83 TOTAL: 172
 SHEET: TOTAL:

GEOTECHNICAL PROFILE - ROADWAY
BORING LOG FOR B-038-0-23 CONTINUED & ROCK CORE PHOTO FOR B-038-0-23



B-038-0-23



Run #:	Depth	Recovery (in)	RQD (in)	RQD (%)
NQ2-3	50.0'	55.0'	60/60	100%
			55/60	92%

ATH/MEG-US33-23.23/0.00, PID 119142

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / H. BROWN		STATION / OFFSET:	1425+51.132' RT.		EXPLORATION ID								
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / H. BROWN		ALIGNMENT:	US 33		B-039-0-23							
PID:	119142	SFN:	0501190	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	676.8 (MSL)	EOB:	55.0 ft.								
START:	11/30/23	END:	11/30/23	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.170832, -82.042536	PAGE	1 OF 2								
MATERIAL DESCRIPTION AND NOTES		SPT/ RQD	N ₆₀	REC SAMPLE (%)	ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	HOLE CLASS (G)	SEALED
TOPSOIL (9')		1															
VERY STIFF, BROWN AND RED-BROWN, CLAY, "AND" SILT, SOME SAND, TRACE GRAVEL, MOIST		2	8	100	SS-1	2.75	2	4	19	39	36	47	24	23	33	A-7-6 (15)	
@3.5'; DAMP		3	8	100	SS-2	3.50	-	-	-	-	-	-	-	-	20	A-7-6 (V)	
@6.0'; TRACE SAND, MOIST		4	10	100	SS-3	3.00	1	0	6	45	48	45	23	22	29	A-7-6 (14)	
STIFF, BROWN, SILTY CLAY, TRACE SAND, MOIST		5	9	100	SS-4	1.50	0	1	9	55	35	37	21	16	25	A-6b (10)	
STIFF, BROWN, CLAY, "AND" SILT, TRACE SAND, TRACE GRAVEL, MOIST		6	5	83	SS-5	1.50	-	-	-	-	-	-	-	-	25	A-6b (V)	
STIFF, BROWN, CLAY, "AND" SILT, TRACE SAND, TRACE GRAVEL, MOIST		7	6	89	SS-6	1.50	-	-	-	-	-	-	-	-	25	A-6b (V)	
STIFF, BROWN, CLAY, "AND" SILT, TRACE SAND, TRACE GRAVEL, MOIST		8	12	100	SS-7	2.00	-	-	-	-	-	-	-	-	26	A-7-6 (V)	
LOOSE, BROWN, FINE SAND, TRACE COARSE SAND, TRACE CLAY, TRACE SILT, WET		9	13	100	SS-8	1.75	-	-	-	-	-	-	-	-	25	A-7-6 (V)	
@26.0'; MEDIUM DENSE		10	5	72	SS-9	-	-	-	-	-	-	-	-	-	30	A-3 (V)	
		11	5	78	SS-10	-	-	-	-	-	-	-	-	-	27	A-3 (V)	
		12	14	89	SS-11	-	0	6	85	4	5	NP	NP	NP	20	A-3 (0)	
		13	18	100	SS-12	-	-	-	-	-	-	-	-	-	17	A-3 (V)	

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:18:36 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1425+51.132 RT.	START: 11/30/23	END: 11/30/23	PG 2 OF 2		B-039-0-23		
						GR	CS		FS	SI
MATERIAL DESCRIPTION AND NOTES										
LOOSE, BROWN, FINE SAND, TRACE COARSE SAND, TRACE CLAY, TRACE SILT, WET (continued)										
@31.0'; LOOSE										
@33.5'; VERY LOOSE										
SHALE, RED-BROWN.										
SHALE, RED-BROWN-GRAY, SEVERELY TO MODERATELY WEATHERED, VERY WEAK TO WEAK, VERY THIN TO MEDIUM BEDDED; ROD 77%, REC 100% @40.0'-45.0'; SLAKE DURABILITY INDEX = 5.6%										
@44.4'-45.0'; UCS = 90 PSI										
@46.0'-46.5'; UCS = 140 PSI										
CORE										
CORE										
CORE										

NOTES: CAVED AT 13'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	40.0'	60/60	41/60
NQ2-2	45.0'	60/60	46/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-039-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	50.0'	60/60	52/60
	55.0'	100%	87%

ATH/MEG-US33-23.23/0.00, PID 119142

PROJECT:	ATH-US 33-23.23		DRILLING FIRM / OPERATOR:	CTL / TOM		STATION / OFFSET:	1425+96, 24' L.T.		EXPLORATION ID	
	TYPE:	BRIDGE		SAMPLING FIRM / LOGGER:	CTL / TOM		ALIGNMENT:	US 33		B-039-1-23
PID:	119142 SFN:		DRILLING METHOD:	3.25" HSA / NQ2		ELEVATION:	743.4 (MSL) EOB: 90.0 ft.		PAGE	
START:	4/15/24 END: 4/15/24		SAMPLING METHOD:	SPT / NQ2		LAT / LONG:	39.170883, -82.041969		1 OF 3	
MATERIAL DESCRIPTION AND NOTES										
ASPHALT (2")										
CONCRETE (8")										
HARD, BROWN, SILT AND CLAY, "AND" SAND, LITTLE GRAVEL, (FILL), DAMP										
@3.5'; VERY STIFF, BROWN AND RED										
@6.0'; TRACE GRAVEL										
@11.0'; LITTLE SAND, CONTAINS ROCK FRAGMENTS										
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, SOME SILT, TRACE CLAY, (FILL), CONTAINS ROCK FRAGMENTS, DAMP										

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL_05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 86 172

SHEET TOTAL
 - -

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:17:41 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1425+96.24 LT.	START: 4/15/24				END: 4/15/24				PG 2 OF 3	B-039-1-23						
				GR	CS	FS	SI	CL	LL	PL	PI			WC	ODOT CLASS (G)	HOLE SEALED			
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC SAMPLE (%)	ID	HP (tsf)	GRADATION (%)										
VERY STIFF, BROWN, SILT AND CLAY. SOME SAND, TRACE GRAVEL, (FILL), CONTAINS ROCK FRAGMENTS, DAMP (continued)		713.4	31																
			32																
			33																
			34	8	12	26	89	SS-11	-	-	-	-	-	-	10	A-6a (V)			
			35																
			36																
			37																
			38																
			39		8	7	17	100	SS-13	3.00	-	-	-	-	-	14	A-4a (V)		
			40																
VERY STIFF, RED AND GRAY, SILT AND CLAY. SOME SAND, LITTLE GRAVEL, (FILL), DAMP		696.4	41																
			42																
			43																
			44	4	10	32	100	SS-14	2.50	-	-	-	-	-	-	19	A-4a (V)		
			45																
			46																
			47																
			48																
			49	3	3	9	78	SS-15	4.00	15	4	20	38	23	28	17	11	17	A-6a (V)
			50																
BROWN, SANDSTONE BOULDERS, (FILL)		694.9	51																
			52																
			53																
			54	6	6	28	89	SS-16	4.00	-	-	-	-	-	-	-	15	A-6a (V)	
			55																
			56																
			57																
			58																
			59	12	14	50	100	SS-17	-	-	-	-	-	-	-	-	9	Rock (V)	
			60																
	61																		

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PID: 119142	SFN:	PROJECT: ATH-US 33-23.23	STATION / OFFSET: 1425+96.24 LT.	START: 4/15/24				END: 4/15/24				PG 3 OF 3	B-039-1-23					
				GR	CS	FS	SI	CL	LL	PL	PI			WC	ODOT CLASS (G)	HOLE SEALED		
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC SAMPLE (%)	ID	HP (tsf)	GRADATION (%)									
BROWN, SANDSTONE BOULDERS, (FILL) (continued)		681.3	63															
			64	50/4"			100	SS-18	-	-	-	-	-	-	10	Rock (V)		
			65															
			66															
			67															
			68															
			69	50/3"			100	SS-19	1.50	-	-	-	-	-	-	13	Rock (V)	
			70															
			71															
			72															
@70.0'; ENCOUNTERED AUGER REFUSAL		669.9	73															
			74	4	5	15	100	SS-21	2.00	-	-	-	-	-	14	A-7-6 (V)		
			75															
			76															
			77															
			78															
			79	5	6	16	100	SS-22	3.50	0	0	6	47	43	23	20	25	A-7-6 (V)
			80															
			81															
			82															
BROWN, SILT AND CLAY, LITTLE SAND, MOIST		662.4	83															
			84	4	5	20	100	SS-24	-	-	-	-	-	-	24	A-3a (V)		
			85															
			86															
			87															
			88															
			89	6	9	26	100	SS-26	-	-	-	-	-	-	-	28	A-3a (V)	
			90															
			EOB															

NOTES: CAVED AT 4'; GROUNDWATER MEASURED AT 45.0' AFTER CORING THROUGH ROCKFILL (BOULDERS)
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET TOTAL
 87 172

SHEET TOTAL
 - -

**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-039-1-23 CONTINUED**

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:34:02 USER: ACAD
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PROJECT: MEG-33-1.60	DRILLING FIRM / OPERATOR: ODOT / WEIS	DRILL RIG: ACKER REBEL XL	STATION / OFFSET: 1425+88.112' RT.	EXPLORATION ID: B-039-2-24
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: ODOT / KOLBERG	HAMMER: ACKER AUTOMATIC	ALIGNMENT: CL US 33	
PID: 119141 SFN: 5300509	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 11-7-23	ELEVATION: 714.2 (ft) EOB: 46.4 ft.	PAGE: 1 OF 1
START: 10-2-24 END: 10-3-24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90"	LAT / LONG: 39:170824, -82.042201	

DEPTH (ft)	SPT / ROD	REC SAMPLE ID	HP (tsf)	GRADATION (%)	ATTERBERG					WC	ODOT CLASS (G)	SO4 ppm	HOLE SEALED		
					GR	CS	FS	SI	CL					LL	PL
1															
2															
3															
4	2	8	56	2.50	6	2	24	27	41	26	17	9	13	A-4a (7)	
5	3														
6															
7															
8															
9	3	8	56	3.00	27	1	10	17	45	29	21	8	13	A-4a (5)	
10	2														
11															
12															
13															
14	3	5	18	2.50	22	1	26	13	38	29	16	13	14	A-6a (4)	
15	7														
16															
17															
18															
19	15	86	53	-	33	3	25	17	22	24	18	6	6	A-4a (1)	
20	30	27													
21															
22															
23															
24	11	9	33	4.50	31	1	5	19	44	32	20	12	10	A-6a (6)	
25	13														
26															
27	18	50	83	-	2	6	63	18	11	NP	NP	NP	5	A-3a (0)	
28	12	21													
29	10	14	42	67	SS-7	-	5	4	67	7	NP	NP	6	A-3a (0)	
30	14														
31															
32	10	18	45	86	SS-8	-	19	2	55	15	NP	NP	6	A-3a (0)	
33	12														
34	21	14	44	75	SS-9	-	32	4	45	9	NP	NP	4	A-3a (0)	
35	15														
36	50/3"														
37	0														
38	50/1"														
39	33														
40															
41	0														
42	21														
43															
44	0														
45															
46	0														

MATERIAL DESCRIPTION AND NOTES

TOPSOIL (3.0")

VERY STIFF, REDDISH BROWN, SANDY SILT, "AND" CLAY, TRACE STONE FRAGMENTS, FILL, DAMP

@8.5': REDDISH BROWN AND GRAY, SOME STONE FRAGMENTS

VERY STIFF, REDDISH BROWN AND BROWN, SILT AND CLAY, SOME SAND, SOME STONE FRAGMENTS, FILL, DAMP

@16.0' - 17.0': ENCOUNTERED COBBLES

HARD, GRAY AND BROWN, SANDY SILT, SOME STONE FRAGMENTS, SOME CLAY, ENCOUNTERED SANDSTONE AND SHALE COBBLES AND BOULDERS, FILL, DAMP

HARD, MOTTLED REDDISH BROWN AND GRAY, SILT AND CLAY, SOME STONE FRAGMENTS, TRACE SAND, FILL, DAMP

DENSE, YELLOWISH BROWN, COARSE AND FINE SAND, LITTLE SILT, LITTLE CLAY, TRACE STONE FRAGMENTS, CONTAINS TRACE FRIABLE SANDSTONE FRAGMENTS, FILL, DAMP

@28.5': TRACE CLAY

@31.5': LITTLE STONE FRAGMENTS

@33.5': SOME STONE FRAGMENTS, TRACE SILT

VERY DENSE, LIGHT BROWN AND REDDISH BROWN, STONE FRAGMENTS, LITTLE SAND, LITTLE CLAY, TRACE SILT, PREDOMINATELY SANDSTONE COBBLES AND BOULDER SHOT ROCK, FILL, DAMP TO MOIST SANDSTONE, LIGHT BROWN.

@ 38.6' - 39.0': $\gamma = 157$ pcf, $Q_u = 6,655$ psi

@ 41.5' - 41.8': $\gamma = 145$ pcf, $Q_u = 1,789$ psi

VERY STIFF, BROWN AND GRAYISH BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MODERATELY ORGANIC (LOI = 4.3%), MOIST

VERY STIFF, GRAY OXIDIZING TO BROWN, CLAY, "AND" SILT, LITTLE SAND, MODERATELY ORGANIC (LOI = 5.4%), MOIST

NOTES: HOLE DRY BEFORE CORING; ENERGY RATIO CAPPED AT 90%. LAT/LONG/ELEV FROM OGE SURVEY GRADE INSTRUMENTS. ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 50 LB. BENTONITE CHIPS; TREATED 70 GAL. BENTONITE GROUT

STANDARD ODOT LOG W/ SULFATES (11 X 17) - OH DOT.GDT - 31-10-24 20:12 - G:\2024\CTO\BERR\30250059COL\East Section CORRECTIONS\24_10_29 EAST SECTION CORRECTIONS\601162.GPJ	
ELEV. 714.2	
ELEV. 713.9	
ELEV. 700.7	
ELEV. 695.7	
ELEV. 690.7	
ELEV. 688.2	
ELEV. 678.2	
ELEV. 670.2	
ELEV. 668.2	
ELEV. 667.8	

DESIGN AGENCY	GTL ENGINEERING	
DESIGNER	N.K.S	
REVIEWER	SM 11-06-24	
PROJECT ID	119142	
SUBSET	TOTAL	
88	172	
SHEET	TOTAL	

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:34:02 USER: ACAD

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STANDARD ODOT LOG W/ SULFATES (11 X 17) - OH DOT.GDT - 31-10-24 20:12 - G:\2024\CTO\BERR\30250059COL\East Section CORRECTIONS\24_10_29 EAST SECTION CORRECTIONS\601162.GPJ

GEOTECHNICAL PROFILE - ROADWAY
BORING LOG FOR B-039-2-24



2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:42:09 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05129505059COL_ATH MEG-033-18-70-00-00 HNTR OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT:	ATH-US 33-23.23	DRILLING FIRM / OPERATOR:	CTL / H. BROWN	STATION / OFFSET:	1317+19, 78' RT.	EXPLORATION ID	B-050-0-23
TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	ALIGNMENT:	US 33	HOLE CLASS (G)	SEALED
PID:	119142 SFN:	DRILLING METHOD:	3.25" HSA	ELEVATION:	888.1 (MSL) EOB: 14.0 ft.	ODOT CLASS (G)	
START:	1/11/24 END: 1/11/24	SAMPLING METHOD:	SPT	LAT / LONG:	39.198758, -82.055313	WC	
MATERIAL DESCRIPTION AND NOTES							
GRAVEL (12")	ELEV. 888.1	DEPTHS 1-14					
MEDIUM DENSE, RED AND BROWN, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, (FILL), DAMP	887.1						
VERY STIFF, RED, CLAY, DAMP	885.1						
@6'-14"; VERY SOFT							
AUGER REFUSAL ENCOUNTERED AT 14.0'	874.1	EOB					

BORING ENCOUNTERED SOFT ZONE AT 6.0'. AUGERS DROPPED (WITHOUT ROTATION) TO A DEPTH OF 14.0'

NOTES: NONE


ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05129505059COL_ATH MEG-033-18-70-00-00 HNTR OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT:	ATH-US 33-23.23	DRILLING FIRM / OPERATOR:	CTL / H. BROWN	STATION / OFFSET:	1317+19, 65' RT.	EXPLORATION ID	B-050-0A-23
TYPE:	BRIDGE	SAMPLING FIRM / LOGGER:	CTL / H. BROWN	ALIGNMENT:	US 33	HOLE CLASS (G)	SEALED
PID:	119142 SFN:	DRILLING METHOD:	3.25" HSA / NQ2	ELEVATION:	888.1 (MSL) EOB: 30.0 ft.	ODOT CLASS (G)	
START:	1/11/24 END: 1/11/24	SAMPLING METHOD:	SPT / NQ2	LAT / LONG:	39.198758, -82.055313	WC	
MATERIAL DESCRIPTION AND NOTES							
GRAVEL (12")	ELEV. 888.1	DEPTHS 1-14					
VERY STIFF, RED, SILT AND CLAY. SOME SAND, SOME GRAVEL, (FILL), MOIST	887.1						
HARD, RED, CLAY, "AND" SILT, TRACE SAND, TRACE GRAVEL, DAMP	885.1						
@6.0-14.0'; VERY SOFT							
CLAYSTONE, BROWN AND RED, SEVERELY WEATHERED.	879.6	TR					
CLAYSTONE, BROWN, MODERATELY WEATHERED, VERY WEAK; RQD 23% REC 100% @16.1-16.5'; UCS = 30 PSI	873.1						
SHALE GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; RQD 74% REC 100% @24.3'-25.0'; UCS = 6,280 PSI	864.6						
	858.1	EOB					

NOTES: CAVED AT 12'. BORING WAS OFFSET 13' EAST FROM BORING B-050-0-23

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY	
	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
89	172
SHEET	TOTAL

**GEOTECHNICAL PROFILE - ROADWAY
BORING LOGS FOR B-050-0-23 & B-050-0A-23**



B-050-0A-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	15.0'	60/60	15/60
NQ2-2	20.0'	60/60	25/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-050A-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	25.0'	60/60	41/60
ATH/MEG-US33-23.23/0.00, PID 119142			

ATH/MEG-33-23-23/0.00

MODEL: Sheet PAPER: 11x17 (in.) DATE: 06-11-2024 TIME: 15:44:47 USER: ACAD
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PROJECT: ATH-US 33-23.23		DRILLING FIRM / OPERATOR: CTL / H. BROWN		STATION / OFFSET: 1317+99.3' RT.		EXPLORATION ID									
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: CTL / H. BROWN		ALIGNMENT: US 33		B-051-0-23									
PID: 119142 SFN:		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 889.7 (MSL) EOB: 35.0 ft.		PAGE									
START: 1/12/24 END: 1/12/24		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.198551, -82.055076		1 OF 2									
MATERIAL DESCRIPTION AND NOTES				GRADATION (%)				ATTERBERG				HOLE			
				GR CS FS SI				CL LL PL PI				ODOT CLASS (G) SEALED			
ELEV. 889.7				SPT/ RQD				REC SAMPLE ID				HP (tsf)			
DEPTHS				N ₆₀				(%)				WC			
GRAVEL (12")				1											
VERY STIFF, GRAY AND RED, CLAY, SOME SILT, TRACE SAND, TRACE GRAVEL, (FILL), DAMP				2				6 5 13 100				3.00		19	
				3				5							
				4				6 6 14 100				3.50		28	
@3.5'; RED, NO GRAVEL				5											
HARD, RED, SILT AND CLAY, TRACE SAND, MOIST				6											
				7				8 10 24 100				4.50		20	
				8											
@8.5'; DAMP				9				9 9 24 100				4.50		19	
				10											
@11.0'; VERY STIFF				11											
				12				7 8 20 100				3.50		11	
				13											
@13.5'; SOME GRAVEL, SOME SAND, MOIST				14				8 8 22 100				4.00		20	
				15											
SHALE, RED, SEVERELY WEATHERED.				16											
				17				19 24 72 100				4.50		7	
				18											
				19				40 42 111 22				4.50		8	
				20											
SHALE, BROWN, SEVERELY WEATHERED, VERY WEAK; RQD 9%, REC 100%.				21											
				22											
				23				0				100		CORE	
				24											
				25											
SANDSTONE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, MODERATELY STRONG; RQD 87%, REC 100%.				26											
@25.7'-26.2'; UCS = 6,180 PSI				27											
				28				80				100		CORE	
				29											
				30											
				31											
				32											
				33											
				34											
				35											

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23.23		DRILLING FIRM / OPERATOR: ATH-US 33-23.23		STATION / OFFSET: 1317+99.3' RT.		EXPLORATION ID									
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: ATH-US 33-23.23		ALIGNMENT: US 33		B-051-0-23									
PID: 119142 SFN:		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 889.7 (MSL) EOB: 35.0 ft.		PAGE									
START: 1/12/24 END: 1/12/24		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.198551, -82.055076		1 OF 2									
MATERIAL DESCRIPTION AND NOTES				GRADATION (%)				ATTERBERG				HOLE			
				GR CS FS SI				CL LL PL PI				ODOT CLASS (G) SEALED			
ELEV. 859.7				SPT/ RQD				REC SAMPLE ID				HP (tsf)			
DEPTHS				N ₆₀				(%)				WC			
SHALE, GRAY, HIGHLY WEATHERED, WEAK; RQD 17%, REC 100%.				31											
				32											
SANDSTONE, GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; RQD 83%, REC 100%.				33											
@32.3'-32.7'; UCS = 5,370 PSI				34											
				35											

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70-00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

NOTES: CAVED AT 14'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE (614) 276-8123
 FAX (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

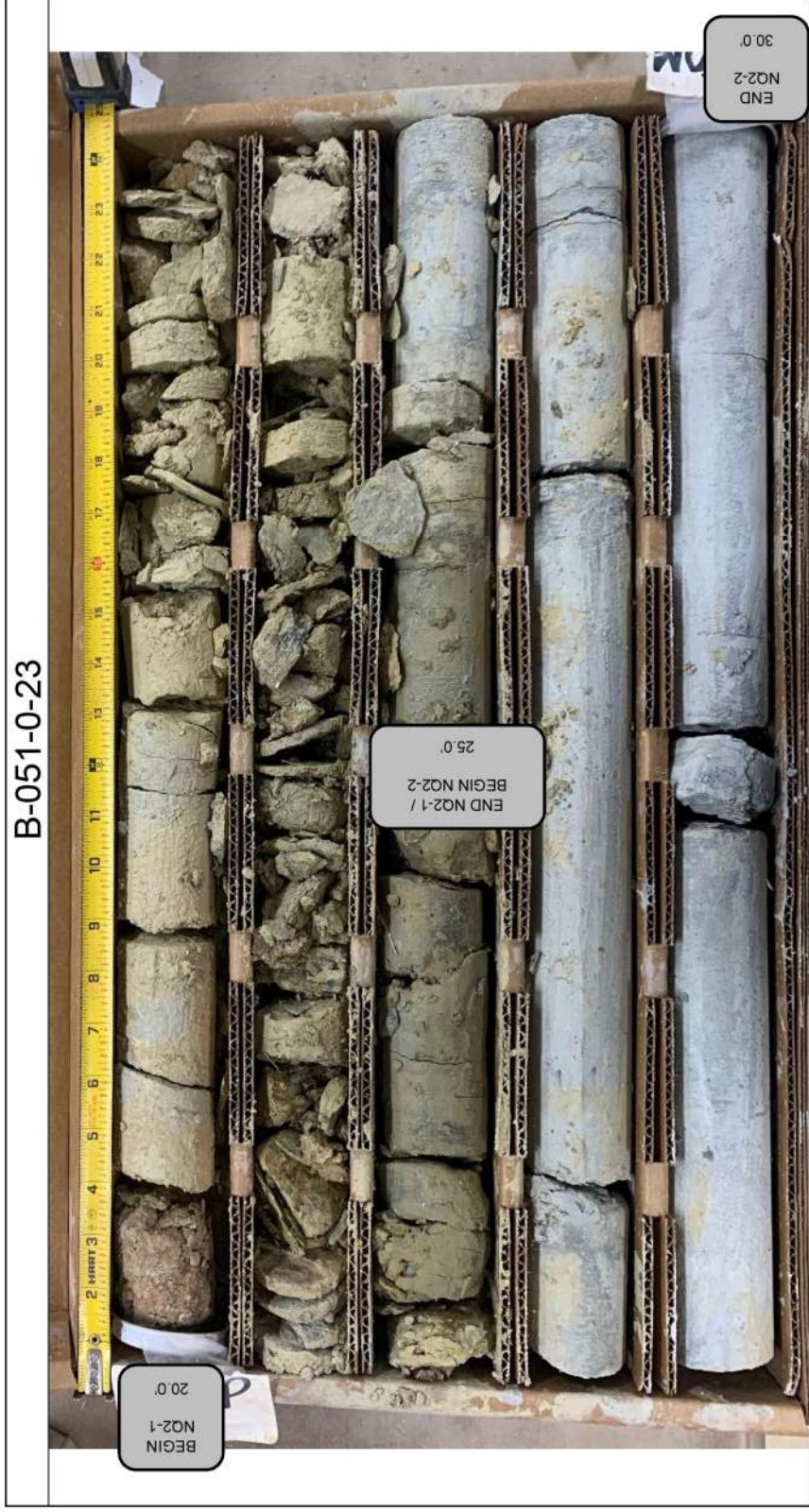
SUBSET TOTAL
 91 172

SHEET TOTAL
 - -

**GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-051-0-23**



B-051-0-23

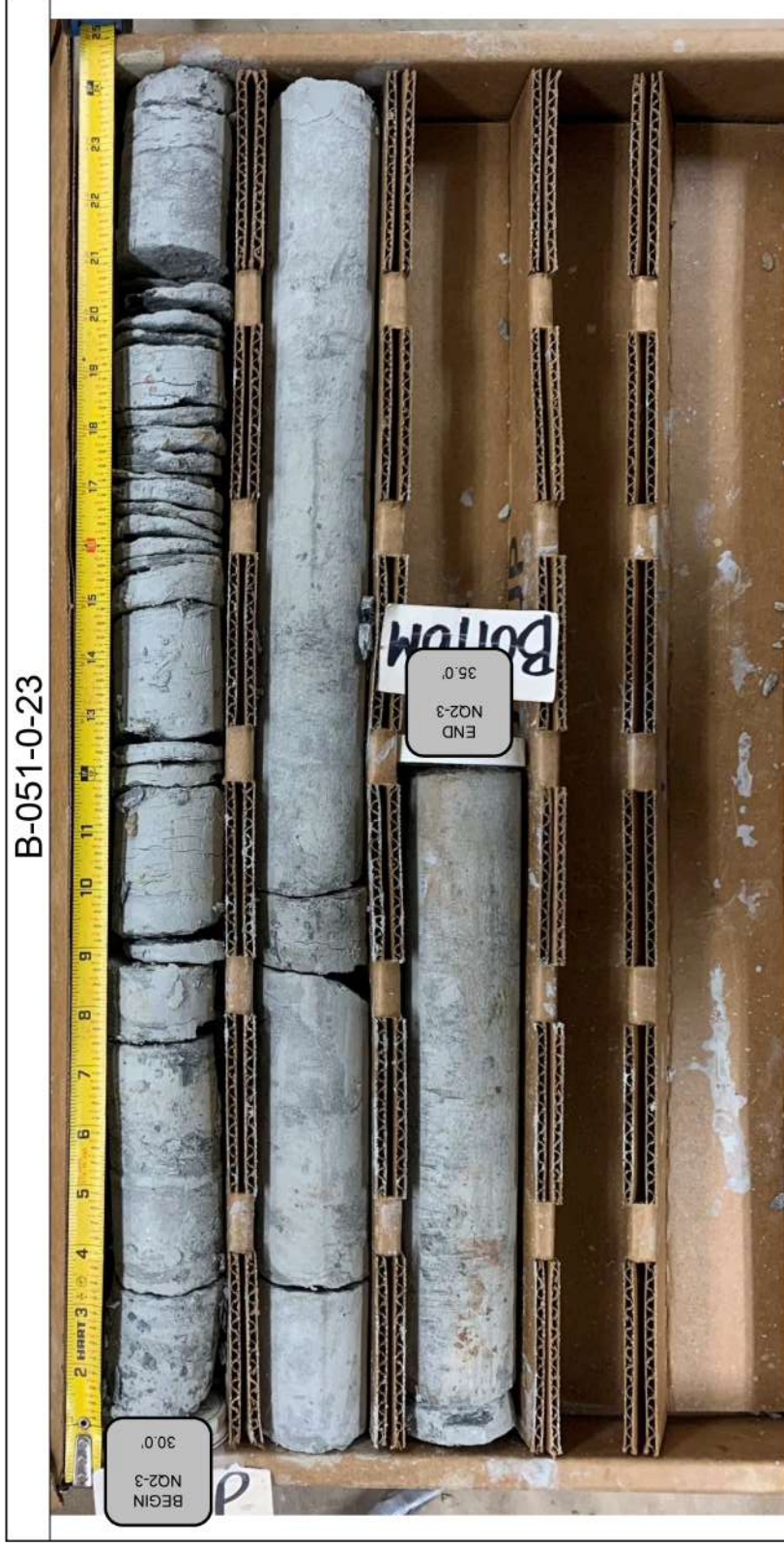


Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	20.0'	60/60	0/60
NQ2-2	25.0'	60/60	48/60

ATH/MEG-US33-23.23/0.00, PID 119142



B-051-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	30.0'	60/60	39/60

ATH/MEG-US33-23.23/0.00, PID 119142

ATH/MEG-33-23-23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 15:45:53 USER: ACAD
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STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23.23		DRILLING FIRM / OPERATOR: CTL / H. BROWN		STATION / OFFSET: 1318+39, 68' L.T.		EXPLORATION ID										
TYPE: BRIDGE		SAMPLING FIRM / LOGGER: CTL / H. BROWN		ALIGNMENT: US 33		B-052-0-23										
PID: 119142 SFN: 1/12/24		DRILLING METHOD: 3.25" HSA / NQ2		ELEVATION: 890.3 (MSL) EOB: 35.0 ft.		PAGE										
START: 1/12/24 END: 1/12/24		SAMPLING METHOD: SPT / NQ2		LAT / LONG: 39.198456, -82.054814		1 OF 2										
MATERIAL DESCRIPTION AND NOTES		ELEV.		GRADATION (%)		HOLE										
		890.3		GR CS FS SI CL LL PL PI WC		ODOT CLASS (G) SEALED										
GRAVEL (12") MEDIUM DENSE, RED AND BROWN, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, TRACE CLAY, TRACE SILT, (FILL), DAMP	1	5	15	100	SS-1	3.00	27	35	19	9	10	NP	NP	NP	7	A-1-b (0)
	2	5	7													
	3															
	4	5	6	14	100	SS-2	-	8	46	37	4	NP	NP	NP	6	A-1-b (0)
	5															
	6	6	6	17	100	SS-3	3.00	0	1	1	6	92	40	42	37	A-7-5 (20)
	7	6	7													
	8															
	9	7	7	19	100	SS-4	2.50	0	1	8	91	104	40	64	42	A-7-5 (20)
	10	8														
@8.5'; MOIST CLAYSTONE, BROWN AND GRAY, SEVERELY WEATHERED.	11															
	12	16	19	54	100	SS-5	4.50	-	-	-	-	-	-	-	13	Rock (V)
	13	19	23													
	14	20	19	55	100	SS-6	4.50	-	-	-	-	-	-	-	14	Rock (V)
	15	20	24													
	16	27	29	81	100	SS-7	4.25	-	-	-	-	-	-	-	13	Rock (V)
	17	34														
	18															
	19	40	47	-	36	SS-8	-	-	-	-	-	-	-	-	4	Rock (V)
	20	50/2'														
@22.8'-23.4'; UCS = 8,150 PSI @25.0'; MODERATELY STRONG. @25.1'-25.8'; UCS = 5,150 PSI SANDSTONE, GRAY, SEVERELY WEATHERED. SANDSTONE, TAN, SLIGHTLY WEATHERED, STRONG; ROD 51%, REC 100%.	21															
	22															
	23	55														
	24															
	25															
	26															
	27															
	28															
	29															
	30															
@855.3 EOB SHALE, BROWN TO GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 48%, REC 100%.	31															
	32															
	33															
	34															
	35															


STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

PROJECT: ATH-US 33-23.23		DRILLING FIRM / OPERATOR: ATH-US 33-23.23		STATION / OFFSET: 1318+39, 68' L.T.		EXPLORATION ID										
PID: 119142 SFN:		SAMPLING FIRM / LOGGER: ATH-US 33-23.23		ALIGNMENT: US 33		B-052-0-23										
MATERIAL DESCRIPTION AND NOTES		ELEV.		GRADATION (%)		HOLE										
		880.3		GR CS FS SI CL LL PL PI WC		ODOT CLASS (G) SEALED										
SHALE, BROWN TO GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG; ROD 48%, REC 100%.	31															
	32															
	33															
	34															
	35															

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 9/3/24 19:59 - O:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\MAST

NOTES: CAVED AT 12'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-6377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

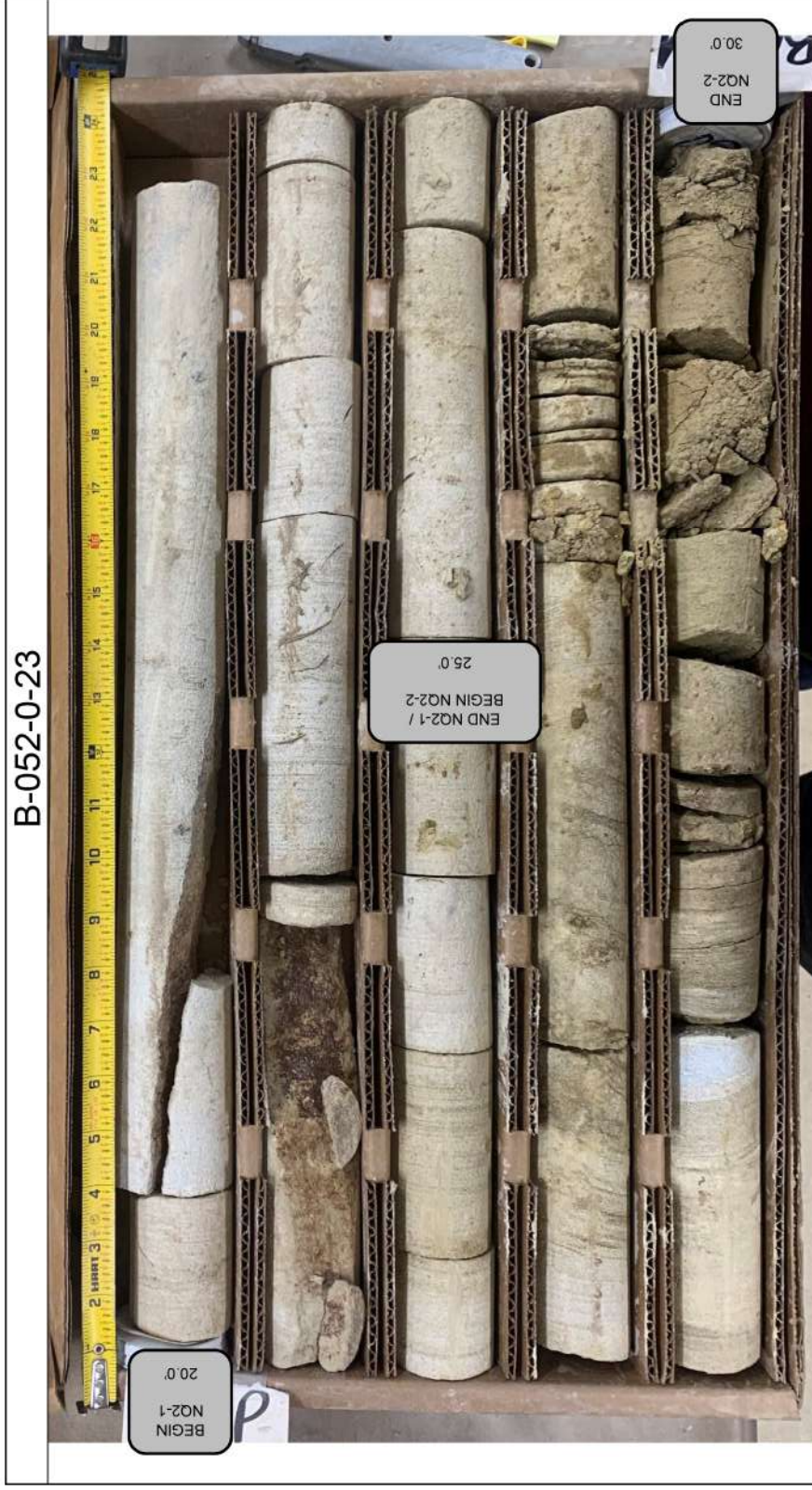
SUBSET TOTAL
 93 172

SHEET TOTAL
 - -

GEOTECHNICAL PROFILE - ROADWAY
 BORING LOG FOR B-052-0-23



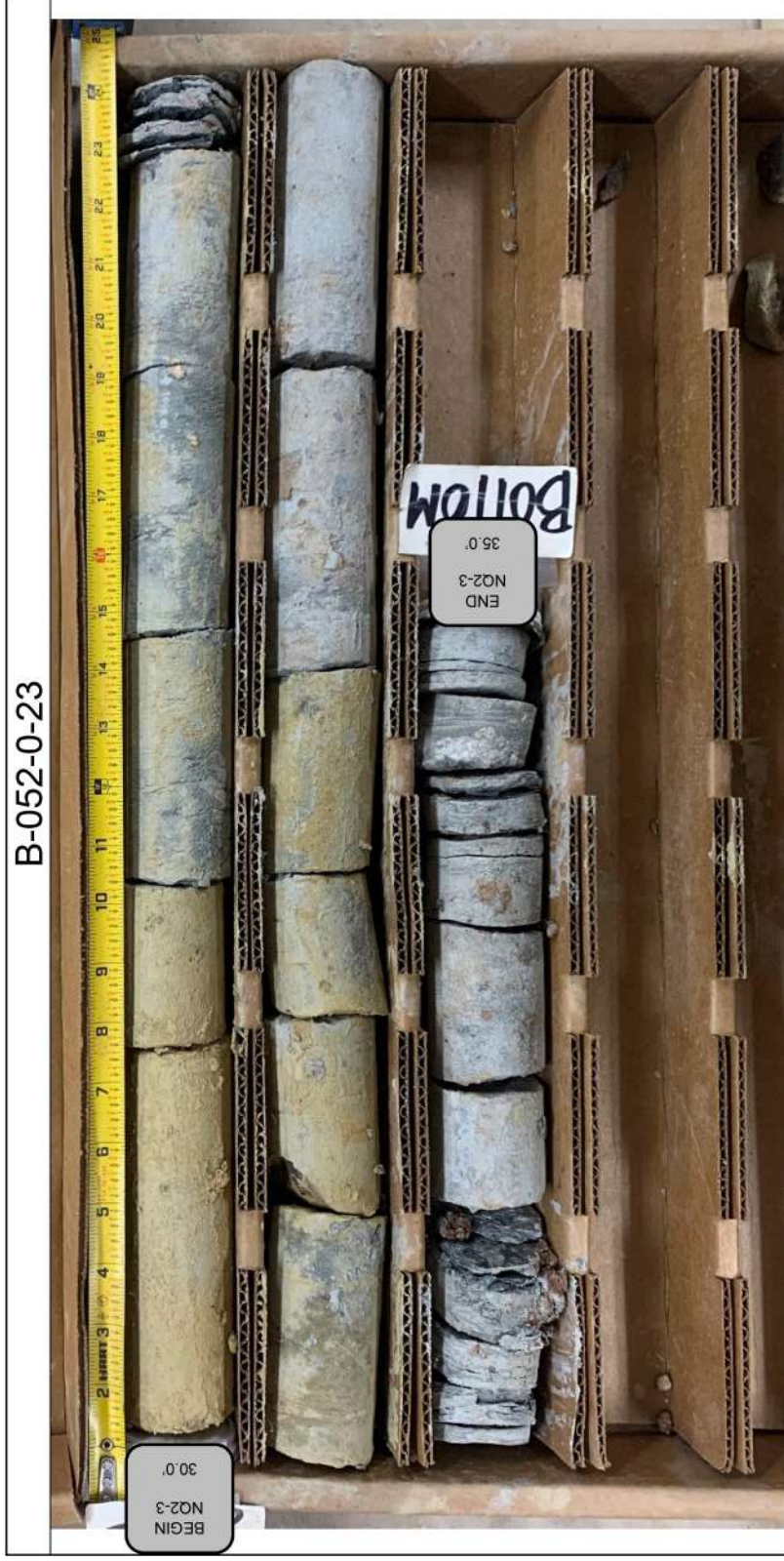
B-052-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	20.0'	60/60	33/60
NQ2-2	25.0'	60/60	28/60
ATH/MEG-US33-23.23/0.00, PID 119142			



B-052-0-23



Run #:	Depth	Recovery (in)	RQD (in)
NQ2-3	30.0'	60/60	29/60
ATH/MEG-US33-23.23/0.00, PID 119142			

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 11x17 (in.) DATE: 06-11-2024 TIME: 16:05:28 USER: ACAD
 D:\Dept_05\COL\23050059COL_East_Section\Mod_30_10_24\Working\1914.2ZL048.dgn

PROJECT: ATH-US 33-23.23	DRILLING FIRM / OPERATOR: CTL / H. BROWN	STATION / OFFSET: 1529+78.462' RT.	EXPLORATION ID: B-058-0-23
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CTL / H. BROWN	ALIGNMENT: US 33	
PID: 119142 SFN:	DRILLING METHOD: 3.25" HSA / NQ2	ELEVATION: 662.7 (MSL) EOB: 20.0 ft.	PAGE 1 OF 1
START: 12/5/23 END: 12/5/23	SAMPLING METHOD: SPT / NQ2	LAT / LONG: 39.145100, -82.026247	
MATERIAL DESCRIPTION AND NOTES			
TOPSOIL (8')	ELEV. 662.7	SPT/ RQD	REC SAMPLE ID
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP	662.0	2 3 3	SS-1 2.50 1
@3.5'; STIFF, NO GRAVEL, MOIST		3 4 4	SS-2 2.00 0
@6.5'; DAMP	656.7	4 3 5	SS-3 2.00 0
		5 6	SS-4 1.25 0
SANDSTONE, GRAY, SEVERELY WEATHERED.	654.7	9	SS-5 - - -
		21 40	SS-6 - - -
SANDSTONE GRAY, SLIGHTLY TO MODERATELY WEATHERED, MODERATELY STRONG, RQD 83%, REC 100%.	652.7	39 50/3'	
@12.0'-12.5'; UCS = 4,680 PSI		73	NQ2-1
		93	NQ2-2
	642.7		

NOTES: CAVED AT 4.2'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT



B-058-0-23

Run #:	Depth	Recovery (in)	RQD (in)
NQ2-1	10.0'	60/60	48/60
NQ2-3	15.0'	60/60	60/60

ATH/MEG-US33-23.23/0.00, PID 119142

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:07:35 USER: ACAD
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DCP TEST DATA

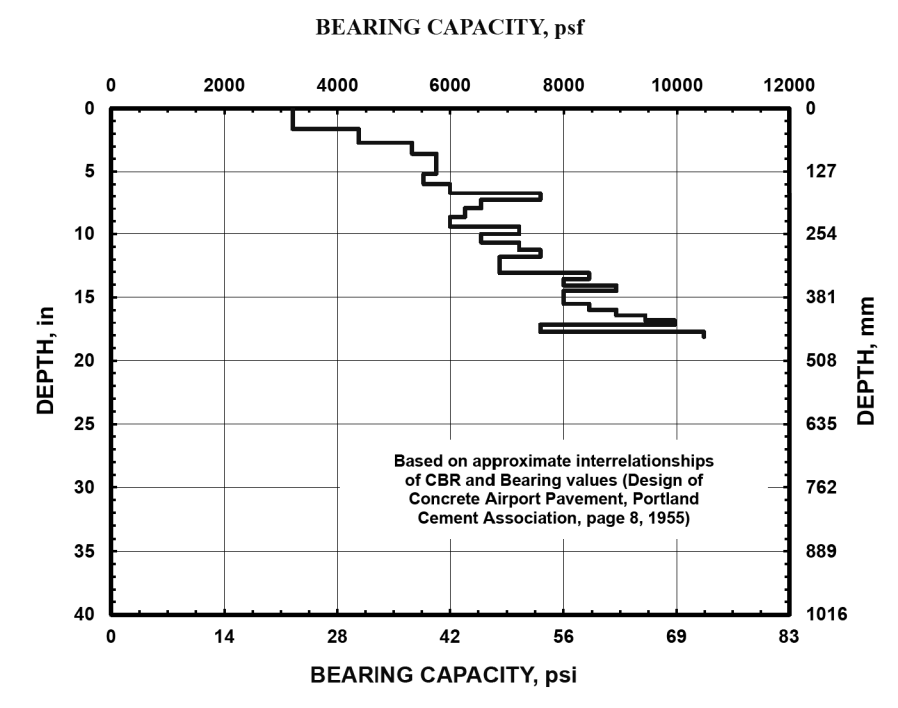
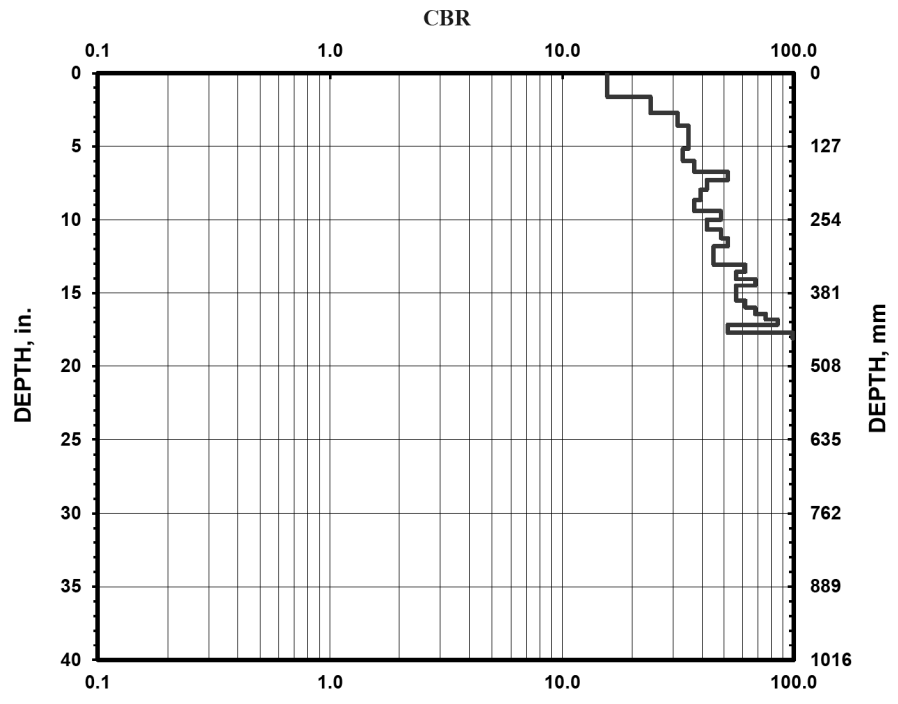
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-017-0-23 Date: 6/13/2023
 Elevation: 835.5 Surface Materials: 1" Topsoil
 Lat / Long: 39.210957, -82.060175 Test Starting Depth (ft): 0.0

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	41	1
3	69	1
3	91	1
3	111	1
3	131	1
3	152	1
3	171	1
3	185	1
3	202	1
3	220	1
3	239	1
3	254	1
3	271	1
3	286	1
3	300	1
3	316	1
3	332	1
3	344	1
3	357	1
3	368	1
3	381	1
3	394	1
3	406	1
3	417	1
3	427	1
3	436	1
3	450	1
3	456	1
3	460	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service. Sounding terminated at refusal.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET:		EXPLORATION ID							
TYPE: ROADWAY		LOGGER: ODOT / KERINS				ALIGNMENT: CL US 33		D-017-0-23							
PID: 119141		EQUIPMENT:				ELEVATION: 835.5 (ft)		PAGE 1 OF 1							
START: 6/13/23		END: 6/13/23				LAT / LONG: 39.210957, -82.060175									
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (G)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC		
835.3			TOPSOIL (2")												
	1		BROWN AND GRAY, SANDY SILT, SOME GRAVEL AND STONE FRAGMENTS, SOME CLAY, DAMP												
	2			AS-1	29	2	4	38	27	31	21	10	8	A-4a (6)	
833.1															

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-017-0-23



DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
98	172
SHEET	TOTAL
	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:09:16 USER: ACAD
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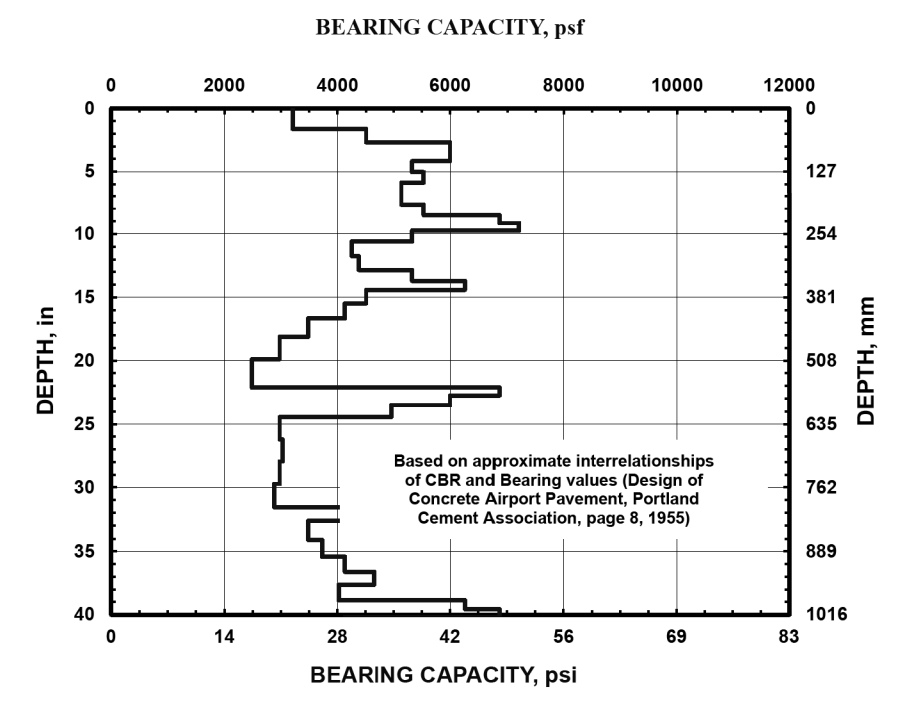
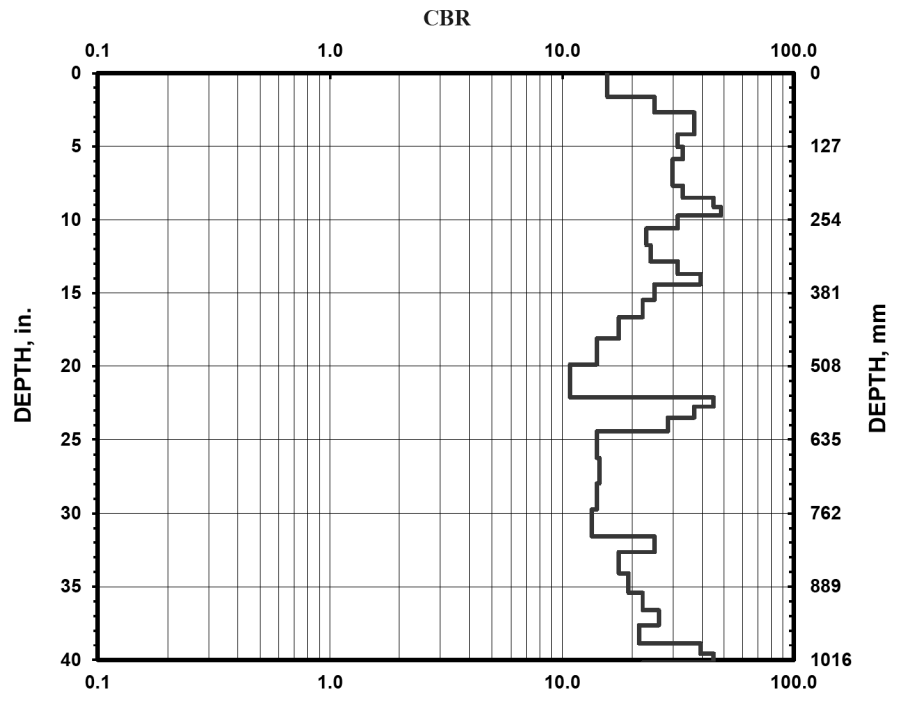
DCP TEST DATA

Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-018-0-23 Date: 6/13/2023
 Elevation: 847.0 Surface Materials: 2" Topsoil
 Lat / Long: 39.208892, -82.057932 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type: CH CL All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	41	1
3	68	1
3	87	1
3	106	1
3	128	1
3	149	1
3	172	1
3	195	1
3	216	1
3	232	1
3	247	1
3	269	1
3	298	1
3	326	1
3	348	1
3	366	1
3	393	1
3	423	1
3	460	1
3	505	1
3	562	1
3	578	1
3	597	1
3	621	1
3	666	1
3	710	1
3	755	1
3	802	1
3	829	1
3	866	1
3	900	1
3	930	1
3	956	1
3	987	1
3	1005	1
3	1021	1
3	1051	1
3	1097	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG		STATION / OFFSET: _____		EXPLORATION ID: D-018-0-23								
TYPE: ROADWAY		LOGGERS: ODOT / KERINS		ALIGNMENT: CL US 33		PAGE: 1 OF 1								
PID: 119141		SFN: _____		ELEVATION: 847.0 (ft)		LAT / LONG: 39.208892, -82.057932								
START: 6/13/23		END: 6/13/23		EQUIPMENT: _____		ODOT CLASS (G):								
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)				ATTERBERG				ODOT CLASS (G)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC	
846.8			TOPSOIL (2")											
	1		LIGHT BROWN, SANDY SILT, SOME CLAY, LITTLE GRAVEL AND STONE FRAGMENTS, DAMP											
	2													
	3			AS-1	16	8	10	32	34	30	21	9	9	A-4a (6)
844.0														

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-018-0-23

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER: N.K.S
 REVIEWER: SM 11-06-24
 PROJECT ID: 119142
 SUBSET: 99 TOTAL: 172
 SHEET: TOTAL:

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SCALE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:10:14 USER: ACAD
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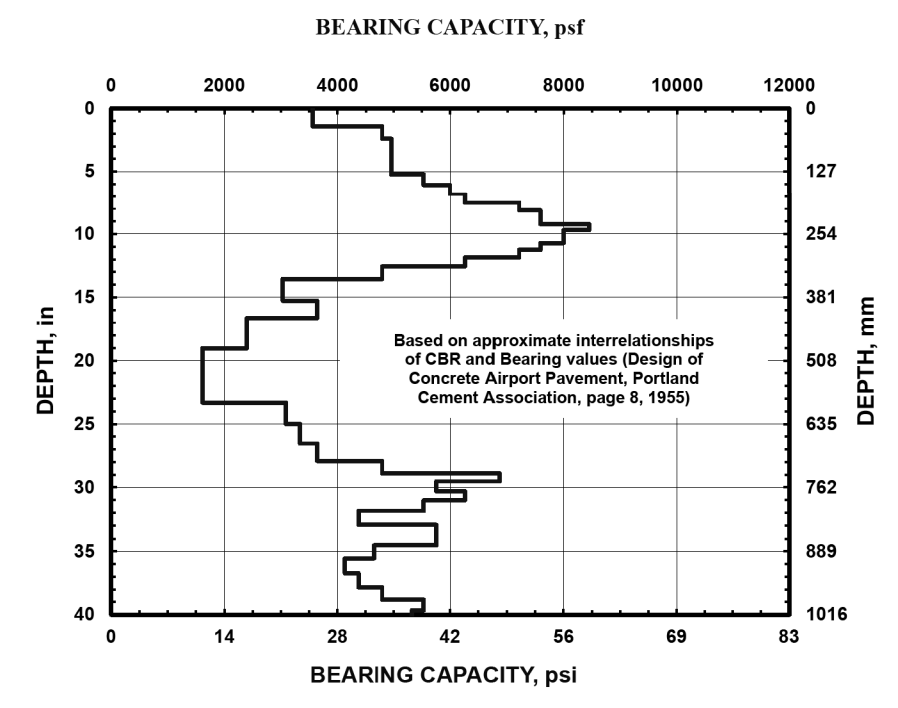
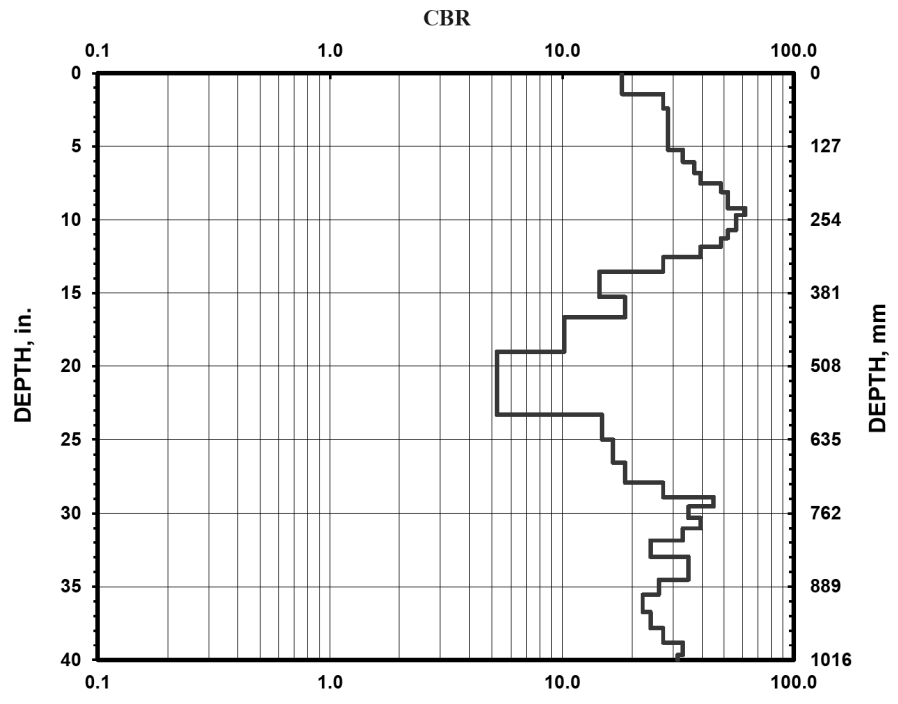
DCP TEST DATA

Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-019-23 Date: 6/13/2023
 Elevation: 882.3 Surface Materials: 2" Topsoil
 Lat / Long: 39.201644, -82.055313 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type: CH CL All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	36	1
3	61	1
3	85	1
3	109	1
3	133	1
3	154	1
3	173	1
3	191	1
3	206	1
3	220	1
3	234	1
3	246	1
3	259	1
3	272	1
3	286	1
3	301	1
3	319	1
3	344	1
3	388	1
3	423	1
3	483	1
3	592	1
3	635	1
3	674	1
3	709	1
3	734	1
3	750	1
3	770	1
3	788	1
3	809	1
3	837	1
3	857	1
3	877	1
3	903	1
3	933	1
3	961	1
3	986	1
3	1007	1
3	1029	1
3	1054	1
3	1085	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET: _____		EXPLORATION ID: D-019-0-23								
TYPE: ROADWAY		PID: 119141		SFN: _____		ALIGNMENT: CL US 33		PAGE: 1 OF 1								
START: 6/13/23		END: 6/13/23		LOGGER: ODOT / KERINS		ELEVATION: 882.3 (ft)		LAT / LONG: 39.201644, -82.055313								
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (G)		
					GR	CS	FS	SI	CL	LL	PL	PI	WC			
882.1			TOPSOIL (2")													
	1		REDDISH BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP													
	2															
	3			AS-1	1	9	14	41	35	36	25	11	12	A-6a (8)		
879.3																

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-019-0-23



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
100	172
SHEET	TOTAL

DCP TEST DATA

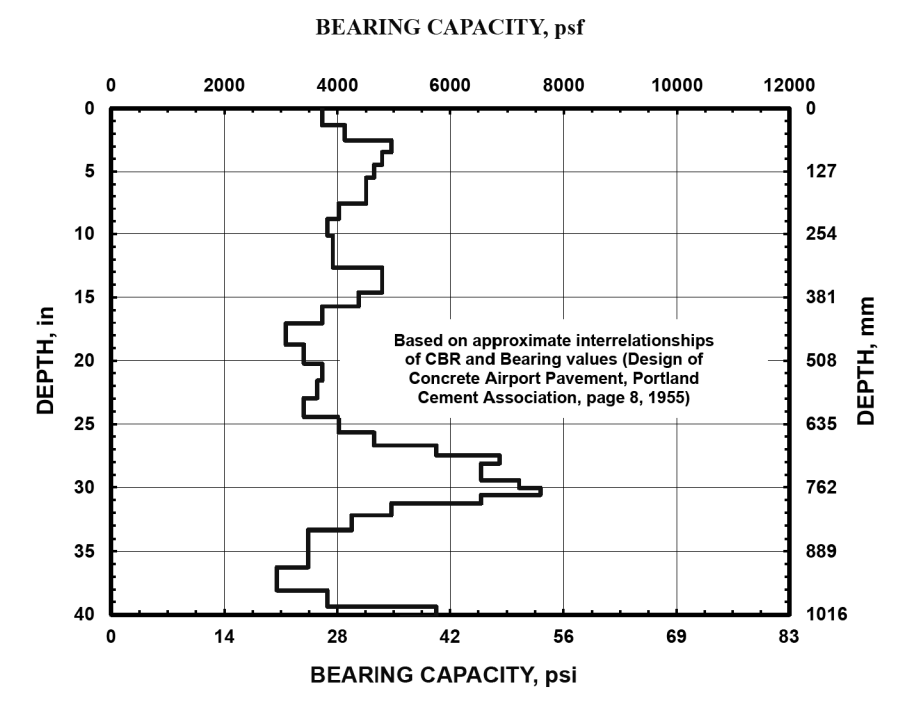
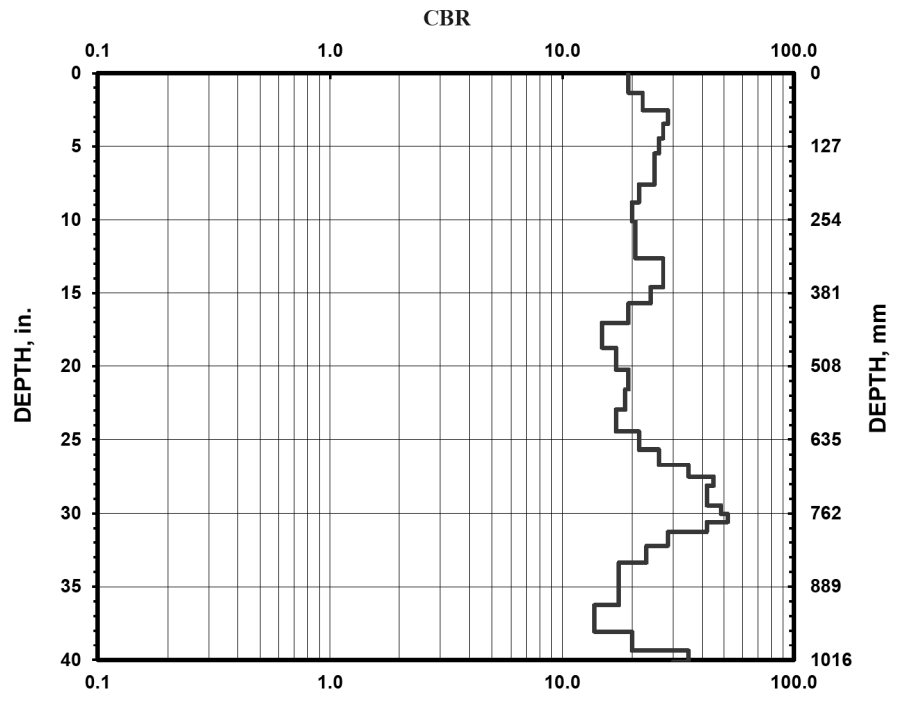
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-020-23 Date: 6/13/2023
 Elevation: 888.8 Surface Materials: 1" Topsoil
 Lat / Long: 39.198073, -82.055031 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type: CH CL All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	34	1
3	64	1
3	88	1
3	113	1
3	139	1
3	166	1
3	193	1
3	224	1
3	257	1
3	289	1
3	321	1
3	346	1
3	371	1
3	399	1
3	433	1
3	476	1
3	514	1
3	548	1
3	583	1
3	621	1
3	652	1
3	678	1
3	698	1
3	714	1
3	731	1
3	748	1
3	763	1
3	777	1
3	794	1
3	818	1
3	847	1
3	884	1
3	921	1
3	967	1
3	1000	1
3	1020	1
3	1043	1
3	1073	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
101	172
SHEET	TOTAL
-	-

DCP TEST DATA

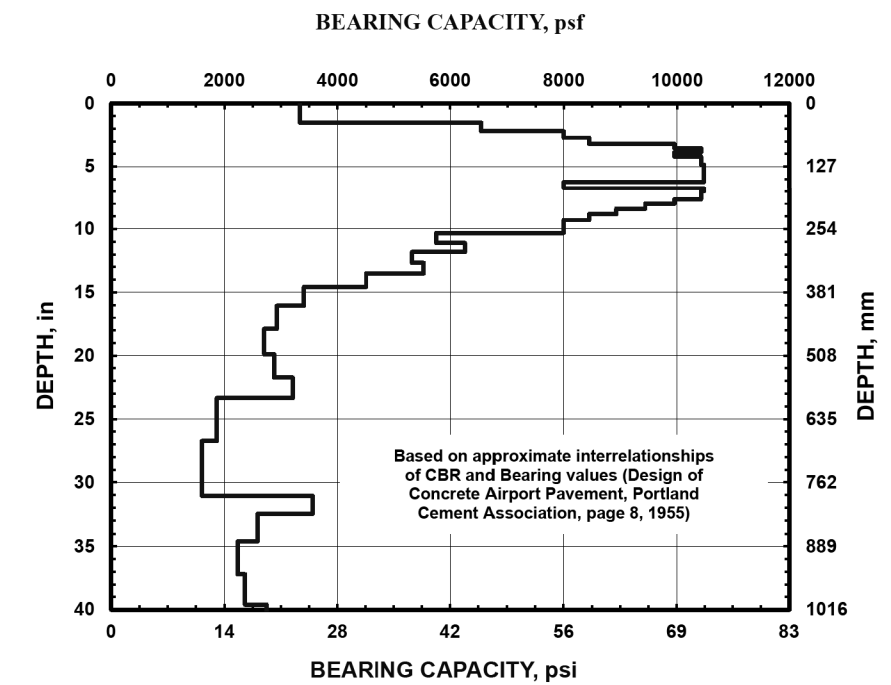
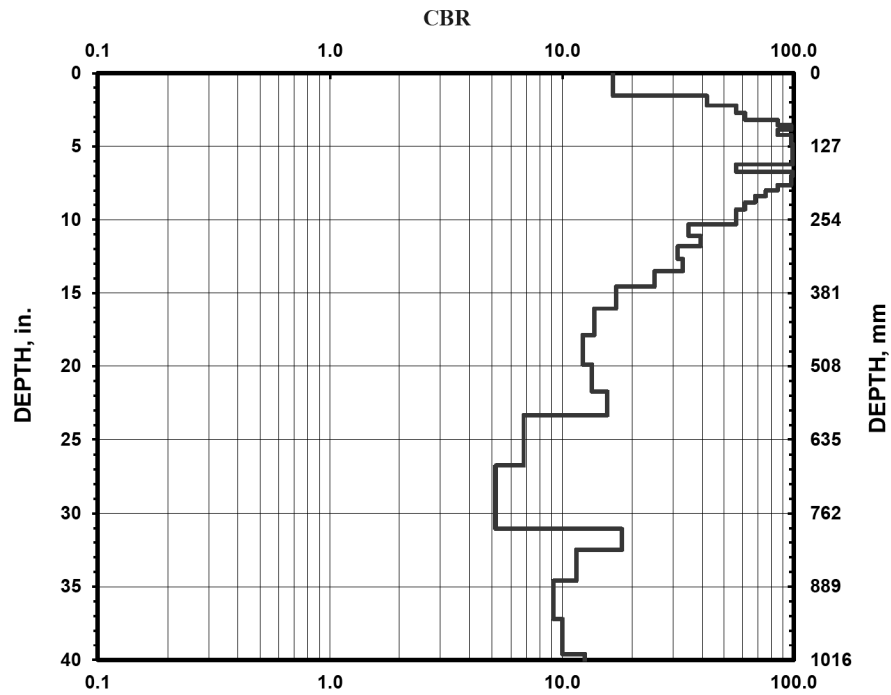
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-021-0-23 Date: 6/13/2023
 Elevation: 865.3 Surface Materials: 3" Topsoil
 Lat / Long: 39.189648, -82.052152 Test Starting Depth (ft): 0.0

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	39	1
3	56	1
3	69	1
3	81	1
3	90	1
3	98	1
3	107	1
3	115	1
3	123	1
3	130	1
3	137	1
3	144	1
3	151	1
3	158	1
3	171	1
3	178	1
3	186	1
3	194	1
3	203	1
3	213	1
3	224	1
3	236	1
3	249	1
3	262	1
3	282	1
3	300	1
3	322	1
3	343	1
3	370	1
3	408	1
3	454	1
3	505	1
3	552	1
3	593	1
3	679	1
3	789	1
3	825	1
3	879	1
3	945	1
3	1006	1
3	1056	1
3	1090	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT:		ATH-33-18.70		HAND AUGER EXPLORATION LOG		STATION / OFFSET:		EXPLORATION ID								
TYPE:		ROADWAY		LOGGERS:		CL US 33		D-021-0-23								
PID:		119141		SFN:		ELEVATION:		PAGE								
START:		6/13/23		END:		865.3 (ft)		1 OF 1								
LAT / LONG:		39.189648, -82.052152		EQUIPMENT:												
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES				GRADATION (%)		ATTERBERG				ODOT CLASS (G)			
865.0			TOPSOIL (4")													
	1		BROWN, SANDY SILT, SOME CLAY, LITTLE GRAVEL, DAMP													
							GR	CS	FS	SI	CL	LL	PL	PI	WC	
							19	7	15	35	24	21	15	6	5	A-4a (5)
863.8			BROWN AND RED, SILTY CLAY, "AND" SAND, TRACE GRAVEL, MODERATELY ORGANIC (LoI = 4.4%), DAMP													
	2															
							3	32	29	20	16	36	20	16	17	A-6b (1)
862.3																
	3															

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SCALE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:14:20 USER: ACAD
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DCP TEST DATA

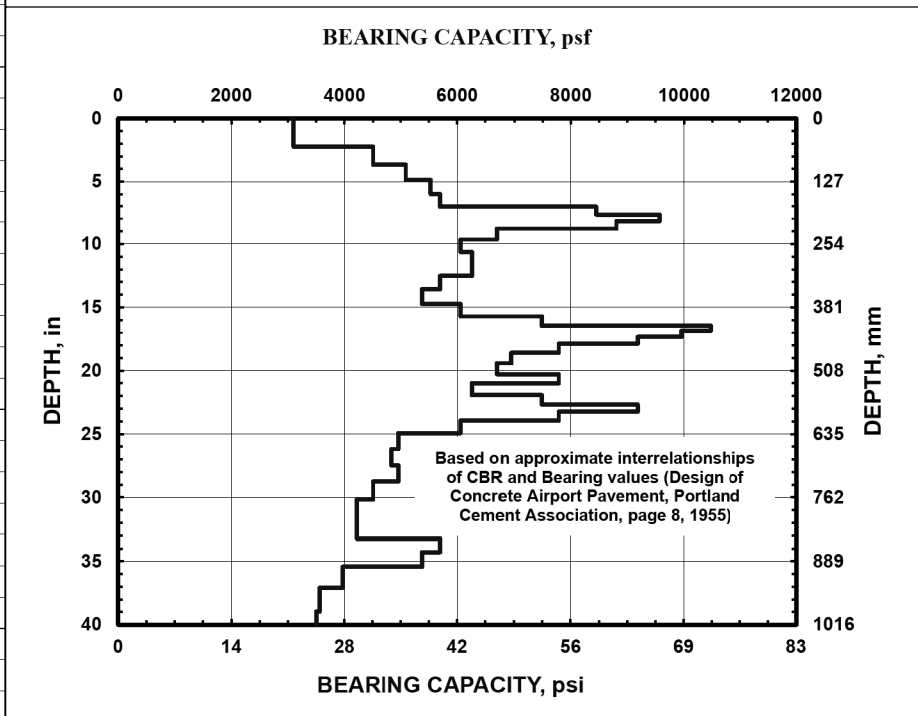
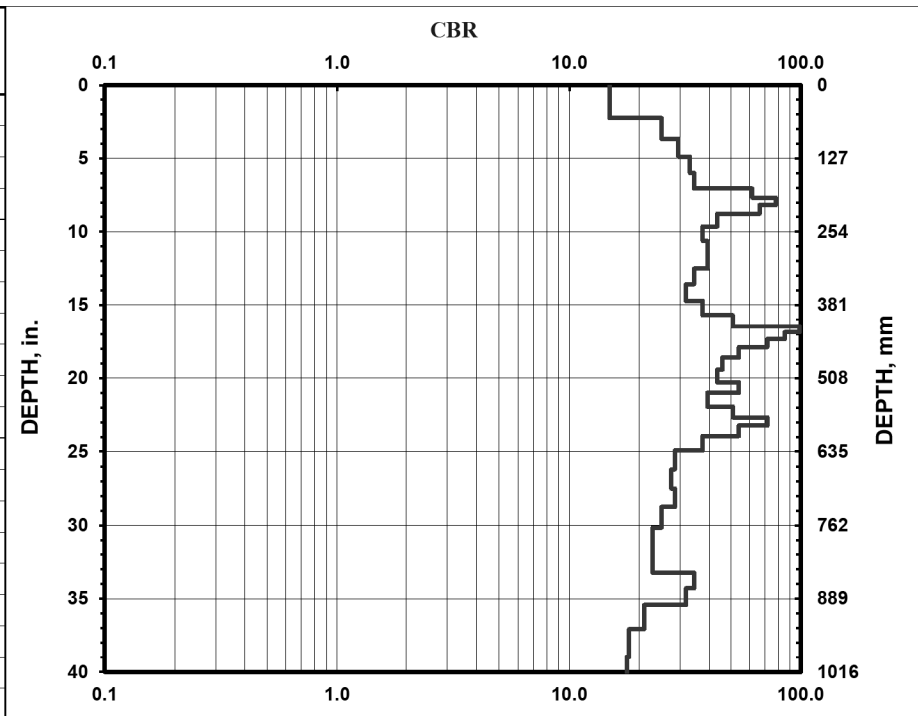
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-022-0-23 Date: 6/13/2023
 Elevation: 858.2 Surface Materials: 1" Topsoil
 Lat / Long: 39.187368, -82.050905 Test Starting Depth (ft): 0.0

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
4	57	1
4	93	1
4	124	1
4	152	1
4	179	1
4	195	1
4	208	1
4	223	1
4	245	1
4	270	1
4	294	1
4	318	1
4	345	1
4	374	1
4	399	1
4	418	1
4	428	1
4	440	1
4	454	1
4	472	1
4	493	1
4	515	1
4	533	1
4	557	1
4	576	1
4	590	1
4	608	1
4	633	1
4	665	1
4	698	1
4	730	1
4	766	1
4	805	1
4	844	1
4	871	1
4	900	1
4	942	1
4	990	1
4	1039	1
4	1091	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT:		ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET:		EXPLORATION ID								
TYPE:		ROADWAY						ALIGNMENT:		D-022-0-23								
PID:		119141		LOGGER:				CL US 33		PAGE								
START:		6/13/23		EQUIPMENT:				ELEVATION:		1 OF 1								
								LAT / LONG:		39.187368, -82.050906								
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES					GRADATION (%)				ATTERBERG				ODOT CLASS (G)		
			TOPSOIL (4")					GR	CS	FS	SI	CL	LL	PL	PI	WC		
857.9			BROWN AND GRAY, SANDY SILT, "AND" CLAY, LITTLE GRAVEL AND STONE FRAGMENTS, DAMP															
	1							11	2	9	32	46	27	17	10	8	A-4a (8)	
	2		@1.5'; BROWN, SOME CLAY															
								13	4	25	31	27	23	16	7	7	A-4a (5)	
855.2	3																	

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-022-0-23

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S
 REVIEWER
 SM 11-06-24
 PROJECT ID
 119142
 SUBSET TOTAL
 103 172
 SHEET TOTAL
 - -

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SCALE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:16:11 USER: ACAA
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DCP TEST DATA

Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-023-0-23 Date: 6/13/2023
 Elevation: 847.0 Surface Materials: 2" Topsoil
 Lat / Long: 39.184041, -82.049138 Test Starting Depth (ft): 0.0

Hammer

10.1 lbs.

17.6 lbs.

Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

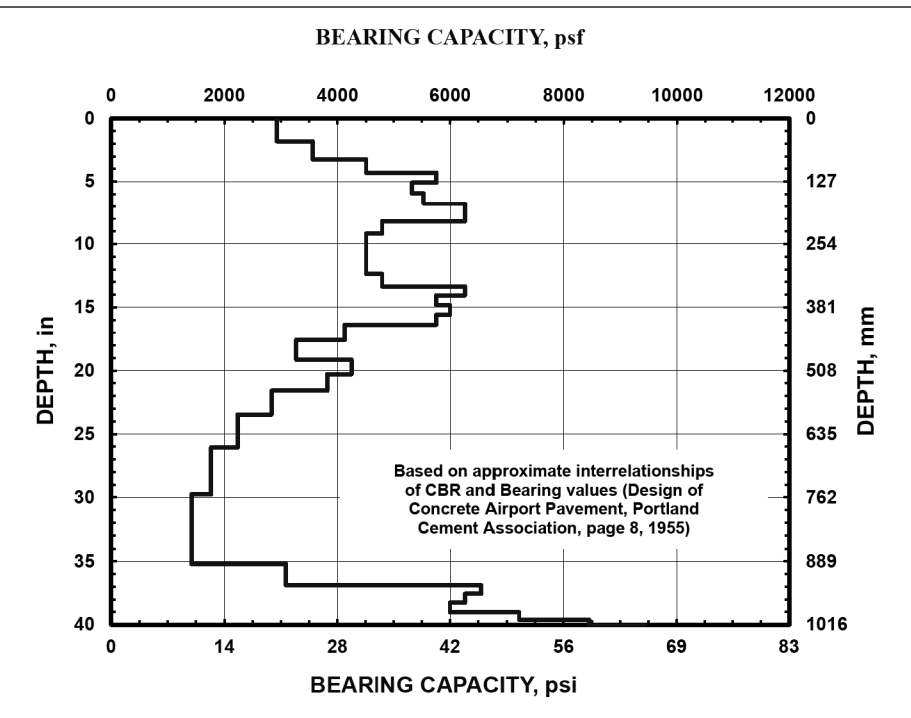
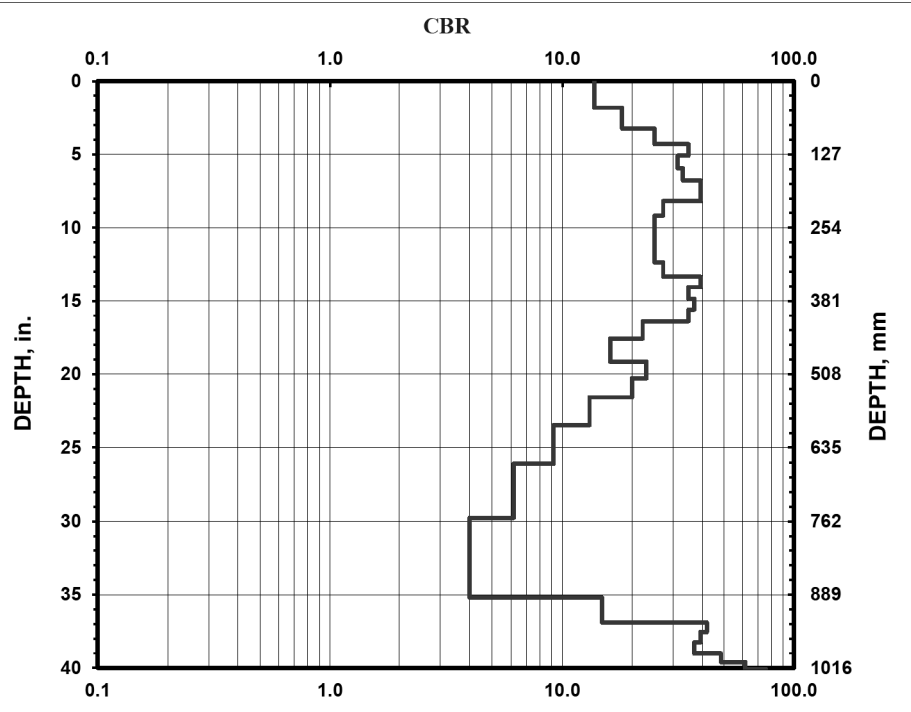
Soil Type

CH

CL

All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	46	1
3	82	1
3	109	1
3	129	1
3	151	1
3	172	1
3	190	1
3	208	1
3	233	1
3	260	1
3	287	1
3	314	1
3	339	1
3	357	1
3	377	1
3	396	1
3	416	1
3	446	1
3	486	1
3	515	1
3	548	1
3	596	1
3	662	1
3	756	1
3	894	1
3	937	1
3	954	1
3	972	1
3	991	1
3	1006	1
3	1018	1
3	1028	1
3	1037	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

GEOTECHNICAL PROFILE - ROADWAY
DCP SOUNDING LOG FOR D-023-0-23

DESIGN AGENCY

2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
104	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:19:30 USER: ACAD
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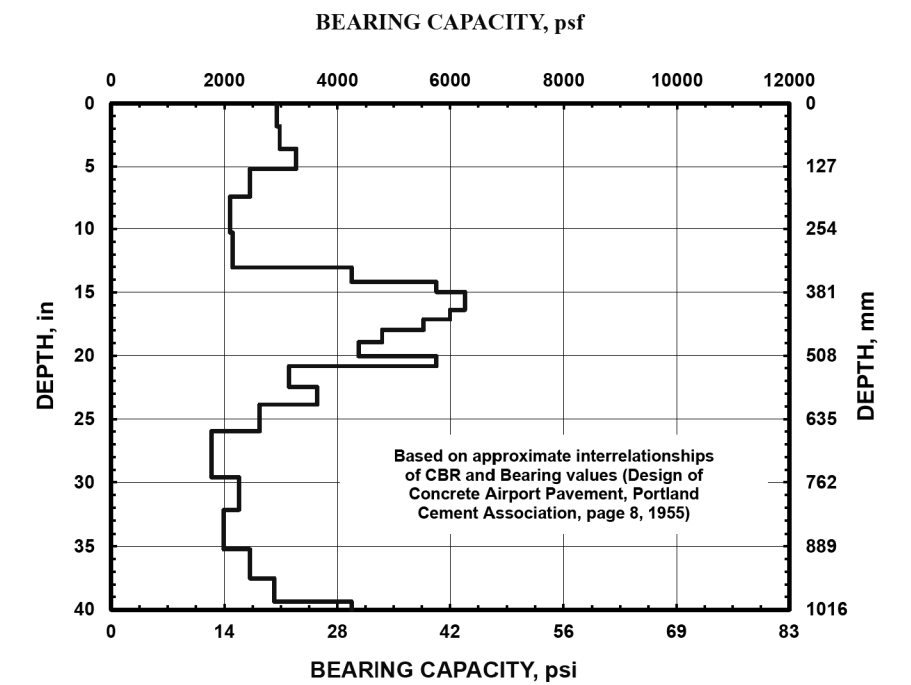
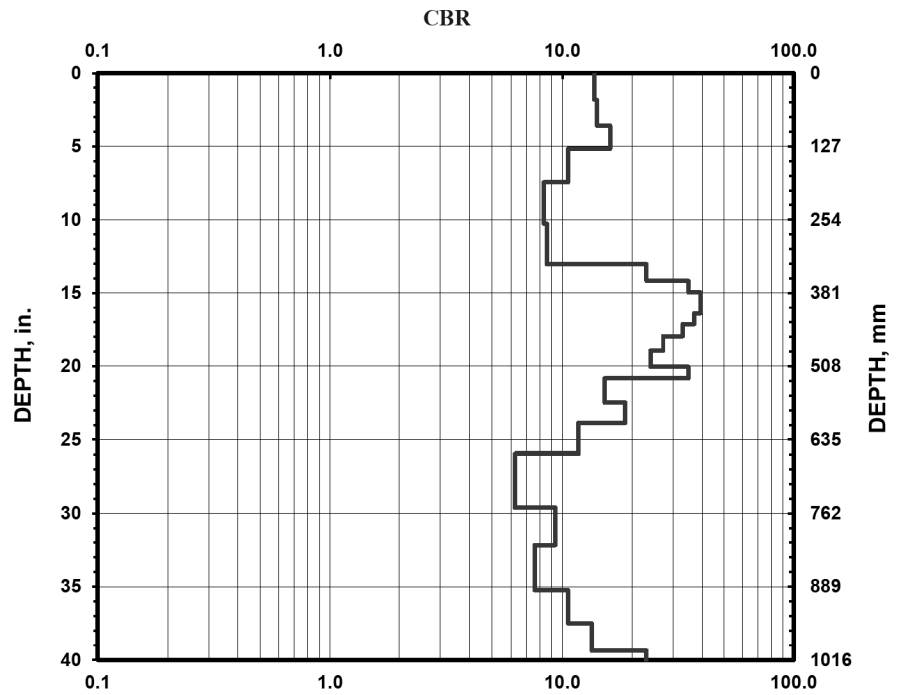
DCP TEST DATA

Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-024-0-23 Date: 6/13/2023
 Elevation: 842.6 Surface Materials: 1" Topsoil
 Lat / Long: 39.181799, -82.047886 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	46	1
3	91	1
3	131	1
3	189	1
3	261	1
3	331	1
3	360	1
3	380	1
3	398	1
3	416	1
3	435	1
3	456	1
3	481	1
3	509	1
3	529	1
3	571	1
3	606	1
3	659	1
3	752	1
3	817	1
3	895	1
3	953	1
3	1000	1
3	1029	1
3	1044	1
3	1063	1
3	1077	1
3	1088	1
3	1101	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET: _____		EXPLORATION ID: D-024-0-23							
TYPE: ROADWAY		PID: 119141		SFN: _____		ALIGNMENT: CL US 33		PAGE: 1 OF 1							
START: 6/13/23		END: 6/13/23		LOGGER: ODOT / KERINS		ELEVATION: 842.6 (ft)		LAT / LONG: 39.181799, -82.047886							
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (G)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC		
842.4			TOPSOIL (2")												
	1		REDDISH BROWN, SILT AND CLAY, LITTLE SAND, LITTLE GRAVEL, DAMP	AS-1	13	6	12	38	31	33	18	15	12	A-6a (9)	
	2		@2.3'; SOME SAND	AS-2	20	5	29	26	20	30	19	11	15	A-6a (3)	
839.6	3														

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-024-0-23

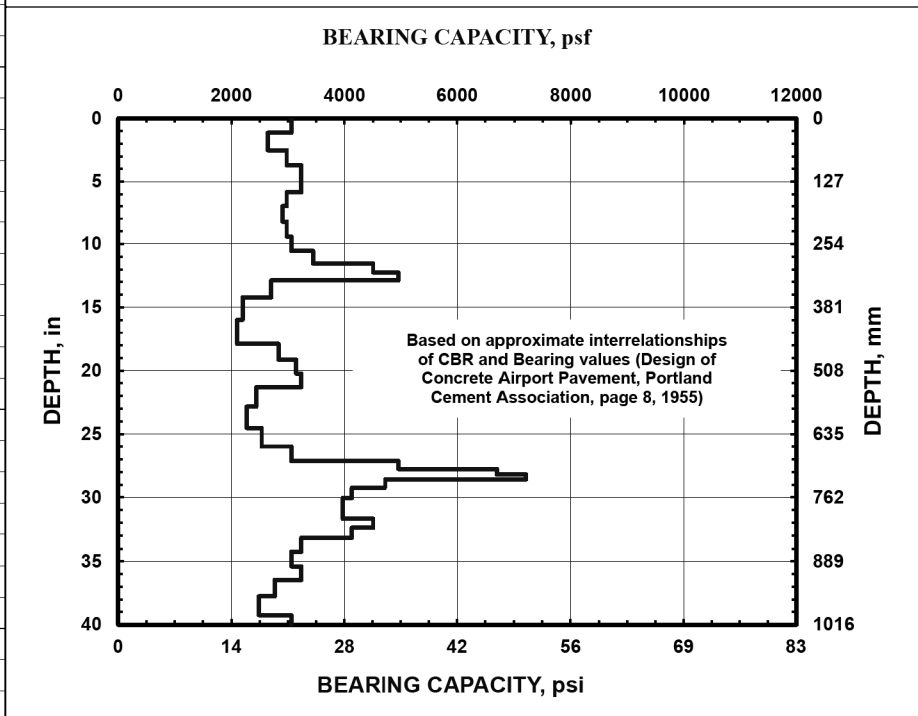
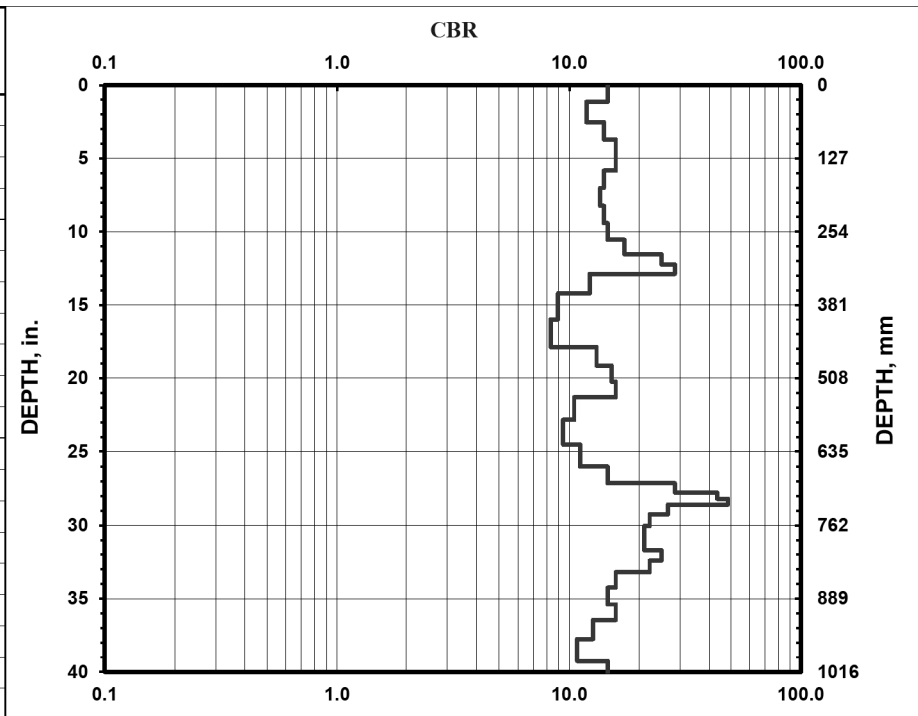


DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
105	172
SHEET	TOTAL
-	-

DCP TEST DATA	
Project: <u>ATH/MEG-33-18.70/0.00</u>	PID: <u>119141</u>
Exploration ID: <u>D-025-0-23</u>	Date: <u>6/13/2023</u>
Elevation: <u>835.3</u>	Surface Materials: <u>1" Topsoil</u>
Lat / Long: <u>39.179886, -82.046896</u>	Test Starting Depth (ft): <u>0.0</u>

Hammer <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used	Office of Geotechnical Engineering Geology, Exploration, and Laboratory Section http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical	Soil Type <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	---	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	29	1
2	64	1
2	94	1
2	121	1
2	148	1
2	178	1
2	209	1
2	239	1
2	268	1
2	293	1
2	311	1
2	327	1
2	361	1
2	406	1
2	454	1
2	486	1
2	514	1
2	541	1
2	580	1
2	623	1
2	660	1
2	689	1
2	705	1
2	716	1
2	726	1
2	743	1
2	763	1
2	784	1
2	805	1
2	823	1
2	843	1
2	870	1
2	899	1
2	926	1
2	959	1
2	997	1
2	1026	1
2	1043	1
2	1065	1
2	1088	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
106	172
SHEET	TOTAL
1	1

ATH/MEG-33-23.23/0.00

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DCP TEST DATA

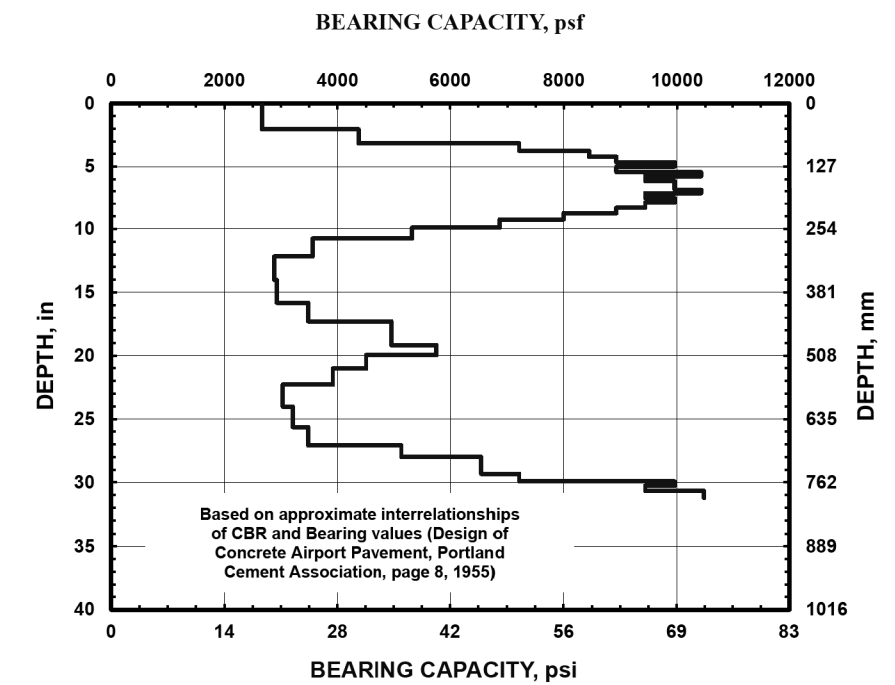
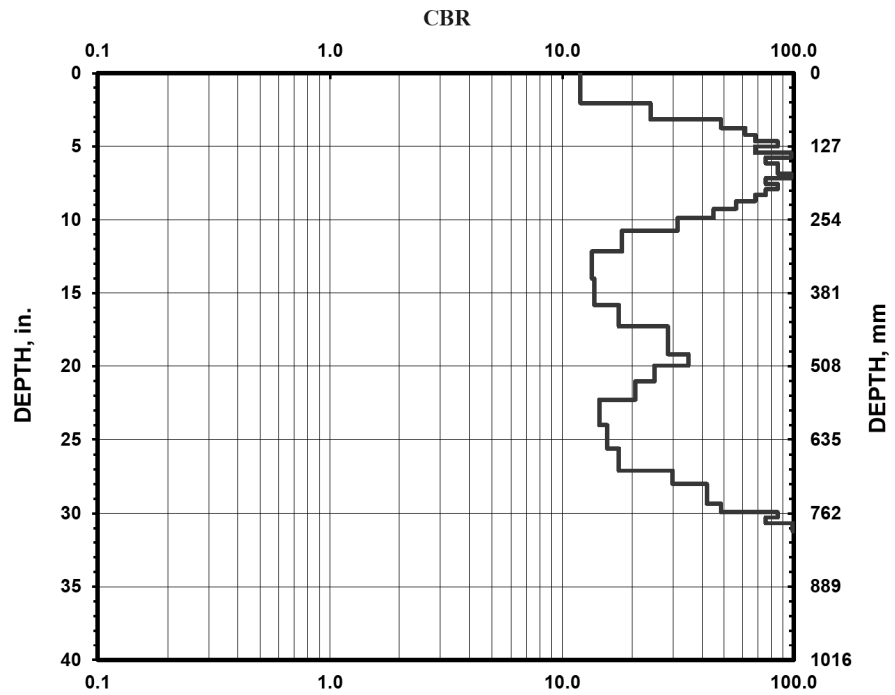
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-026-0-23 Date: 6/13/2023
 Elevation: 766.1 Surface Materials: 1" Topsoil
 Lat / Long: 39.173667, -82.043508 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type: CH CL All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	52	1
3	80	1
3	95	1
3	107	1
3	118	1
3	127	1
3	138	1
3	146	1
3	156	1
3	165	1
3	174	1
3	182	1
3	192	1
3	201	1
3	211	1
3	222	1
3	235	1
3	251	1
3	273	1
3	309	1
3	356	1
3	402	1
3	439	1
3	463	1
3	487	1
3	507	1
3	534	1
3	566	1
3	610	1
3	651	1
3	688	1
3	711	1
3	728	1
3	745	1
3	760	1
3	769	1
3	779	1
3	786	1
3	793	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service. Sounding terminated at refusal.

PROJECT:		ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET:		EXPLORATION ID								
TYPE:		ROADWAY		LOGGERS:				CL US 33		D-026-0-23								
PID:		119141		ODOT / KERINS				ELEVATION:		PAGE								
START:		6/13/23		EQUIPMENT:				766.1 (ft)		1 OF 1								
END:		6/13/23						LAT / LONG:		39.173667, -82.043508								
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES					GRADATION (%)				ATTERBERG				ODOT CLASS (Gr)		
765.9			TOPSOIL (2")					GR	CS	FS	SI	CL	LL	PL	PI	WC		
	1		BROWN, SANDY SILT, SOME CLAY, TRACE GRAVEL, DAMP															
																		A-4a (3)
764.6			REDDISH BROWN, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL, DAMP															
	2																	
																		A-6a (9)
763.6																		

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-026-0-23

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S
 REVIEWER
 SM 11-06-24
 PROJECT ID
 119142
 SUBSET TOTAL
 107 172
 SHEET TOTAL
 -

DCP TEST DATA			
Project:	ATH/MEG-33-18.70/0.00	PID:	119141
Exploration ID:	D-027-0-23	Date:	6/13/2023
Elevation:	761.7	Surface Materials:	1" Topsoil
Lat / Long:	39.167426, -82.040185	Test Starting Depth (ft):	0.0

Hammer

10.1 lbs.

17.6 lbs.

Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

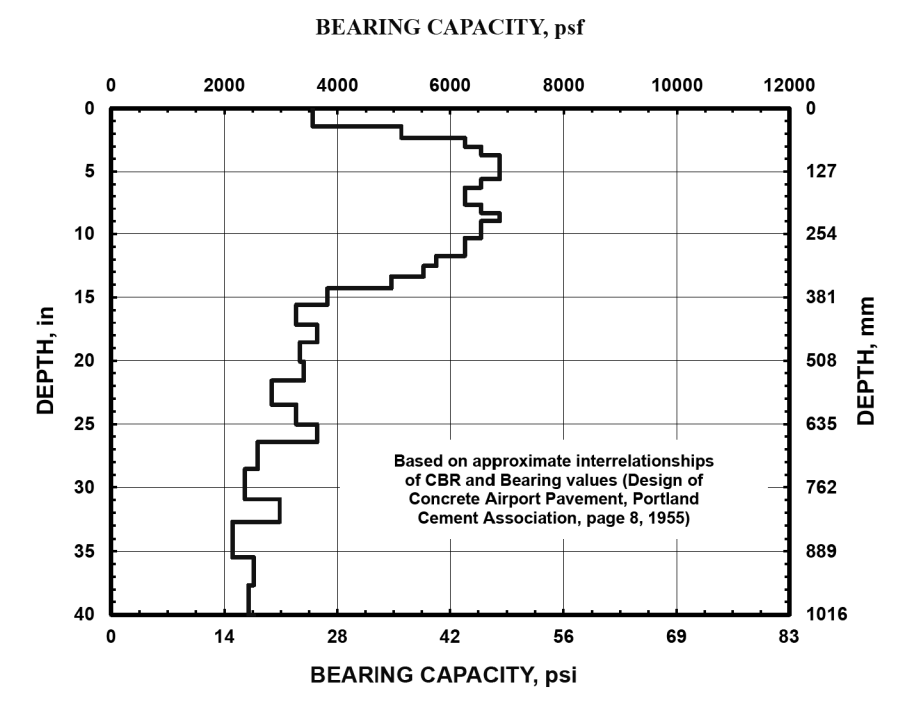
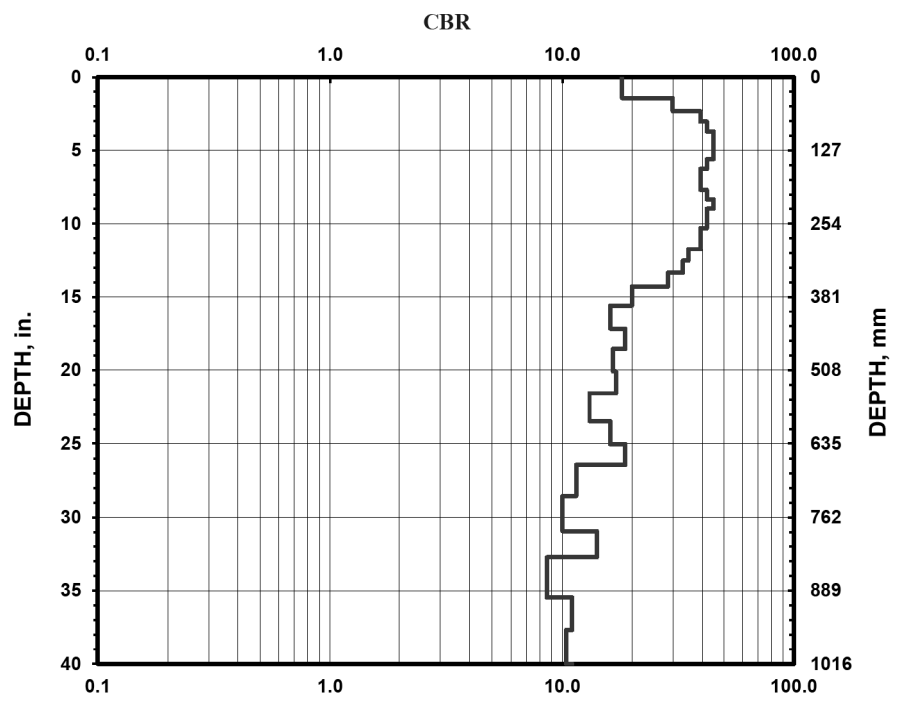
Soil Type

CH

CL

All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	36	1
3	59	1
3	77	1
3	94	1
3	110	1
3	126	1
3	142	1
3	159	1
3	177	1
3	195	1
3	212	1
3	228	1
3	245	1
3	262	1
3	280	1
3	298	1
3	318	1
3	339	1
3	363	1
3	396	1
3	436	1
3	471	1
3	510	1
3	548	1
3	596	1
3	636	1
3	671	1
3	725	1
3	786	1
3	831	1
3	901	1
3	957	1
3	1016	1
3	1072	1

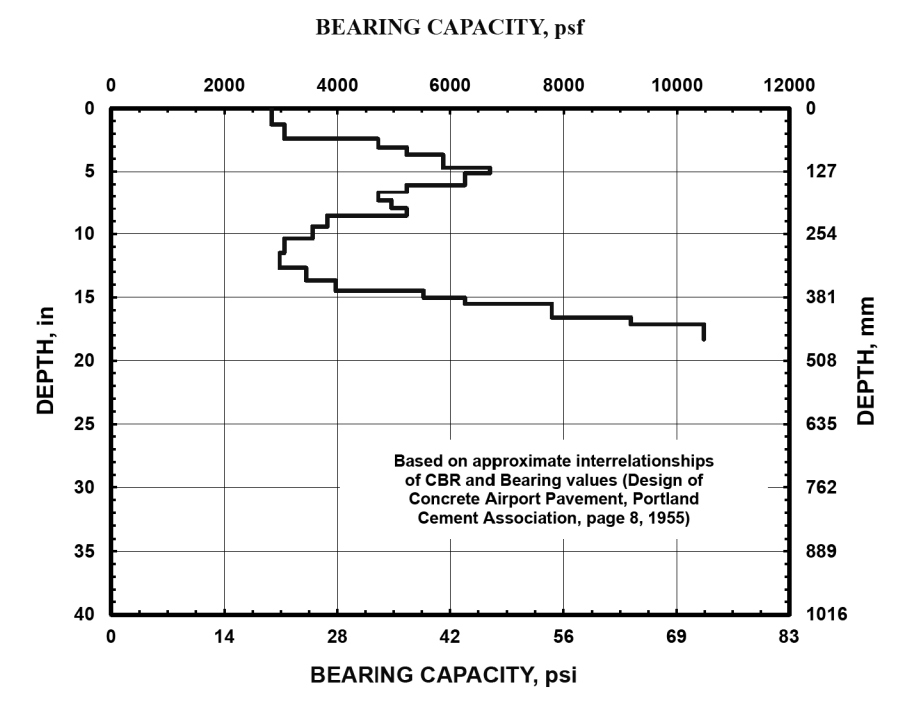
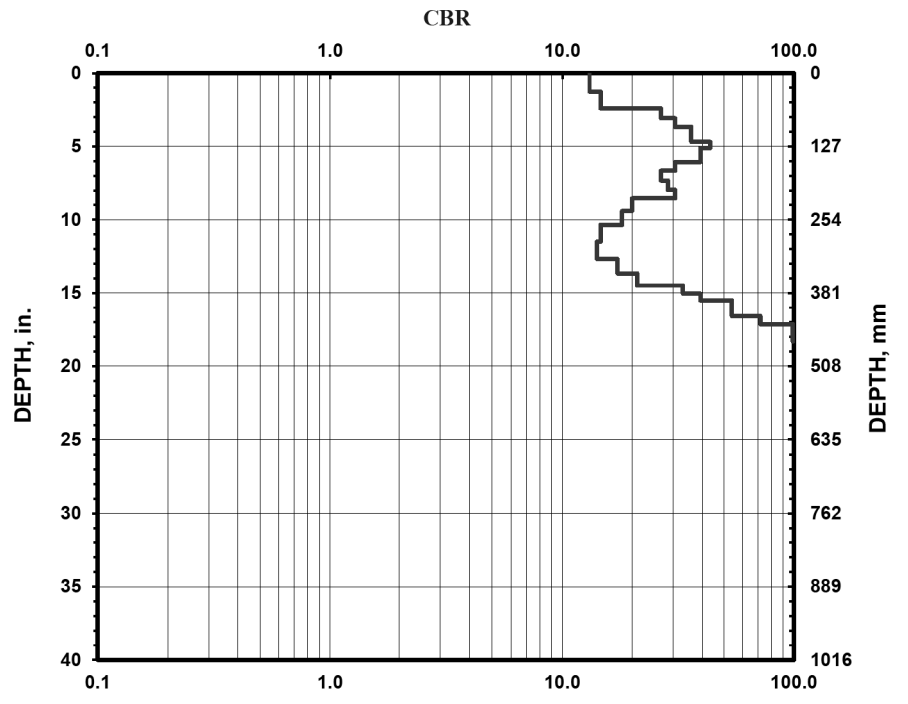


NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

DCP TEST DATA	
Project: <u>ATH/MEG-33-18.70/0.00</u>	PID: <u>119141</u>
Exploration ID: <u>D-028-0-23</u>	Date: <u>6/13/2023</u>
Elevation: <u>788.3</u>	Surface Materials: <u>1" Topsoil</u>
Lat / Long: <u>39.162975, -82.037751</u>	Test Starting Depth (ft): <u>0.0</u>

<p>Hammer</p> <ul style="list-style-type: none"> <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used 	<p>Office of Geotechnical Engineering Geology, Exploration, and Laboratory Section http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical</p>	<p>Soil Type</p> <ul style="list-style-type: none"> <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	--	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	32	1
2	61	1
2	78	1
2	93	1
2	106	1
2	119	1
2	130	1
2	142	1
2	154	1
2	169	1
2	186	1
2	202	1
2	217	1
2	239	1
2	263	1
2	292	1
2	322	1
2	347	1
2	368	1
2	382	1
2	394	1
2	403	1
2	412	1
2	421	1
2	428	1
2	435	1
2	440	1
2	445	1
2	449	1
2	454	1
2	458	1
2	462	1
2	465	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service. Sounding terminated at refusal.

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SCALE: 17x11 (in.) DATE: 05-11-2024 TIME: 22:26:27 USER: ACAD
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DCP TEST DATA

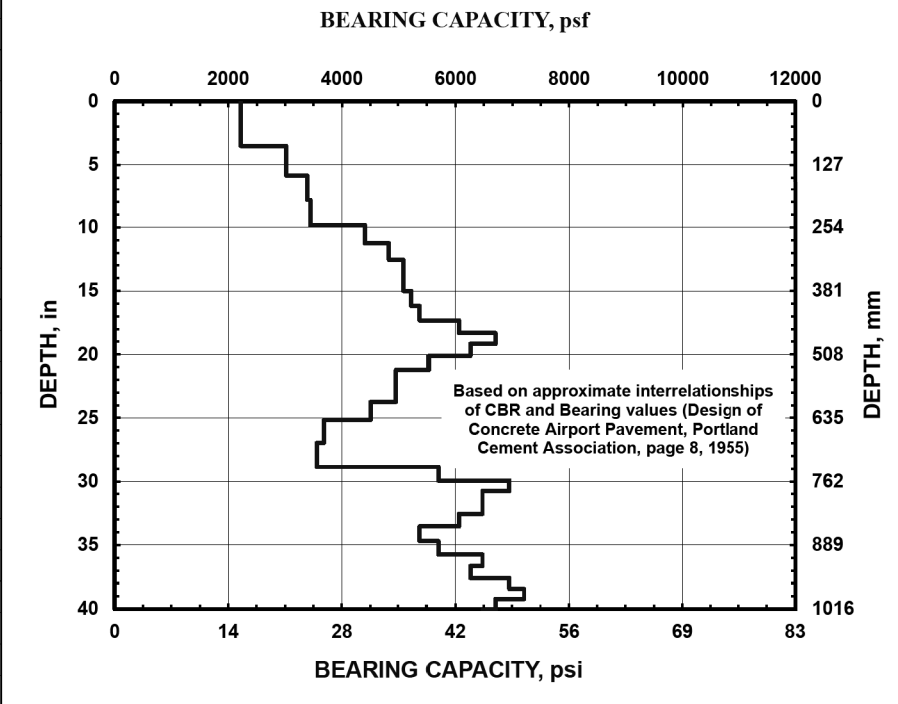
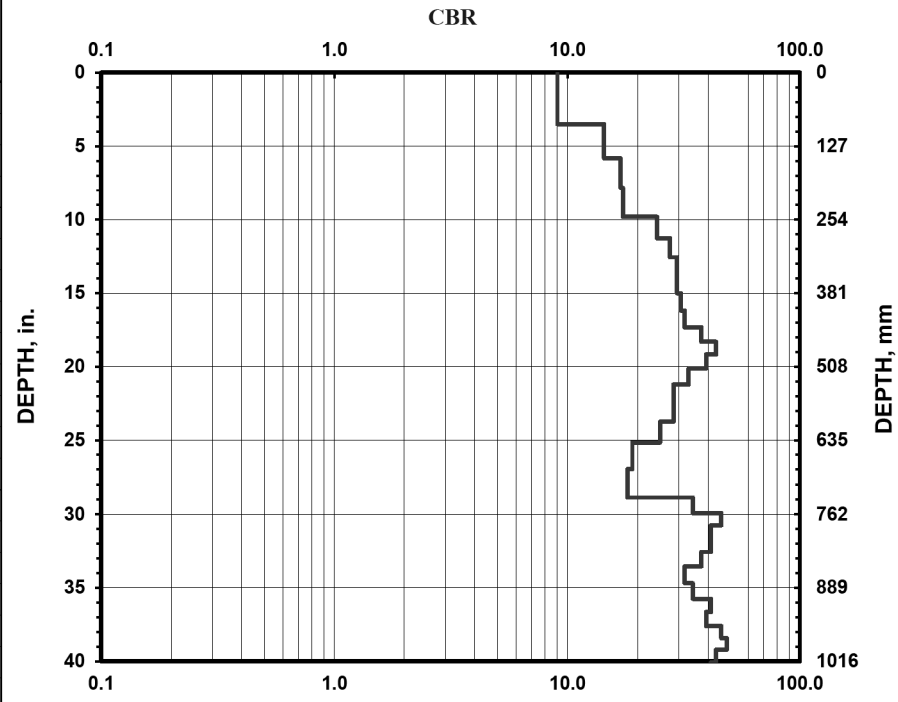
Project: ATH/MEG-33-18.70/0.00 PID: 119141
 Exploration ID: D-029-0-23 Date: 6/13/2023
 Elevation: 791.6 Surface Materials: 1" Topsoil
 Lat / Long: 39.159962, -82.036144 Test Starting Depth (ft): 0.0

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
4	89	1
4	148	1
4	199	1
4	249	1
4	286	1
4	319	1
4	350	1
4	381	1
4	411	1
4	440	1
4	465	1
4	487	1
4	511	1
4	539	1
4	571	1
4	603	1
4	639	1
4	685	1
4	733	1
4	760	1
4	781	1
4	804	1
4	827	1
4	852	1
4	881	1
4	908	1
4	931	1
4	955	1
4	976	1
4	996	1
4	1018	1
4	1041	1
4	1065	1
4	1089	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT: ATH-33-18.70				HAND AUGER EXPLORATION LOG				STATION / OFFSET: _____				EXPLORATION ID			
TYPE: ROADWAY				LOGGERS: ODOT / KERINS				ALIGNMENT: CL US 33				D-029-0-23			
PID: 119141				EQUIPMENT: _____				ELEVATION: 791.6 (ft)				PAGE			
START: 6/13/23				END: 6/13/23				LAT / LONG: 39.159962, -82.036144				1 OF 1			
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (G)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC		
791.4			TOPSOIL (2")												
	1		BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP												
	2			AS-1	3	3	17	39	38	30	19	11	12	A-6a (8)	
789.2															

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-029-0-23

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

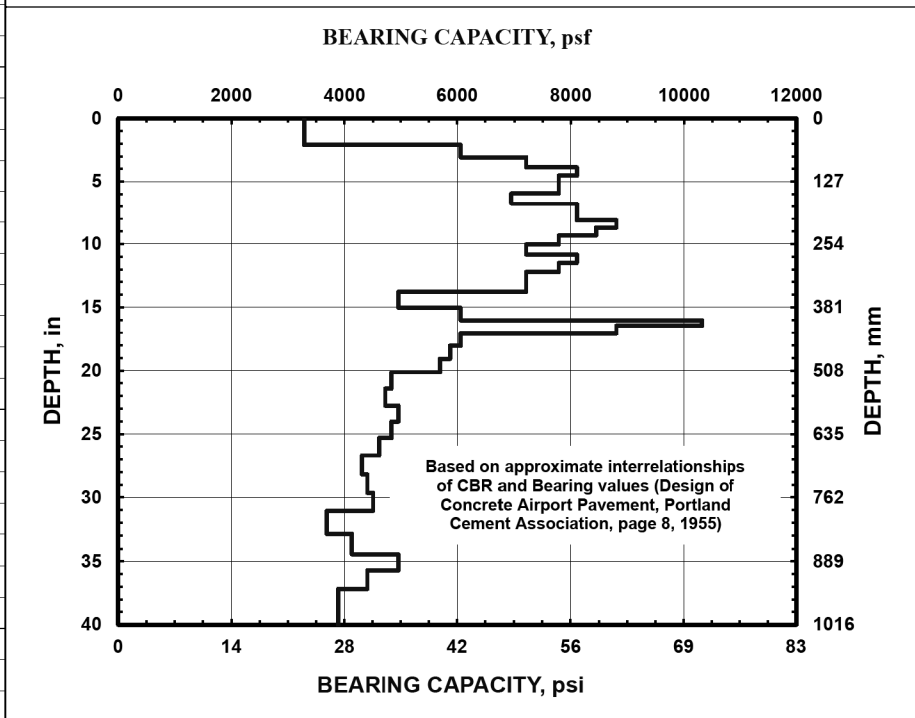
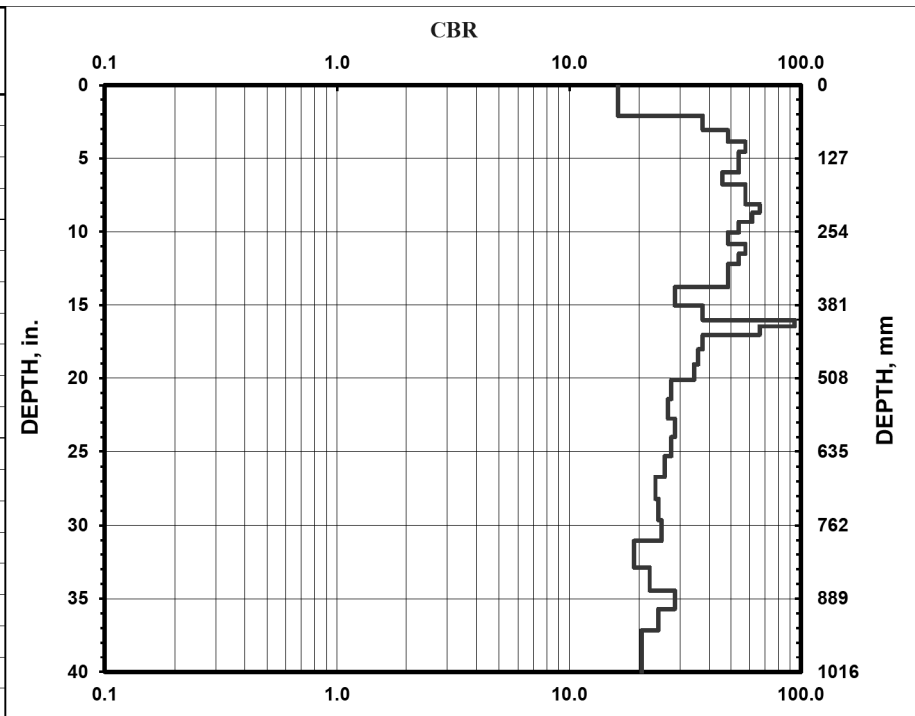
SUBSET	TOTAL
110	172

SHEET TOTAL
 -

DCP TEST DATA	
Project: <u>ATH/MEG-33-18.70/0.00</u>	PID: <u>119141</u>
Exploration ID: <u>D-030-0-23</u>	Date: <u>6/13/2023</u>
Elevation: <u>771.2</u>	Surface Materials: <u>3" Topsoil</u>
Lat / Long: <u>39.155822, -82.03385</u>	Test Starting Depth (ft): <u>0.0</u>

Hammer <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used	Office of Geotechnical Engineering Geology, Exploration, and Laboratory Section http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical	Soil Type <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	---	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
4	53	1
4	78	1
4	98	1
4	115	1
4	133	1
4	151	1
4	172	1
4	189	1
4	206	1
4	221	1
4	237	1
4	255	1
4	275	1
4	292	1
4	310	1
4	330	1
4	350	1
4	382	1
4	407	1
4	418	1
4	433	1
4	458	1
4	484	1
4	511	1
4	544	1
4	578	1
4	610	1
4	643	1
4	678	1
4	716	1
4	753	1
4	789	1
4	835	1
4	875	1
4	907	1
4	944	1
4	987	1
4	1030	1
4	1073	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	111
TOTAL	172
SHEET	-
TOTAL	-

DCP TEST DATA	
Project: ATH/MEG-33-18.70/0.00	PID: 119141
Exploration ID: D-031-0-23	Date: 6/13/2023
Elevation: 760.3	Surface Materials: 2" Topsoil
Lat / Long: 39.15387, -82.032413	Test Starting Depth (ft): 0.0

Hammer

10.1 lbs.

17.6 lbs.

Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

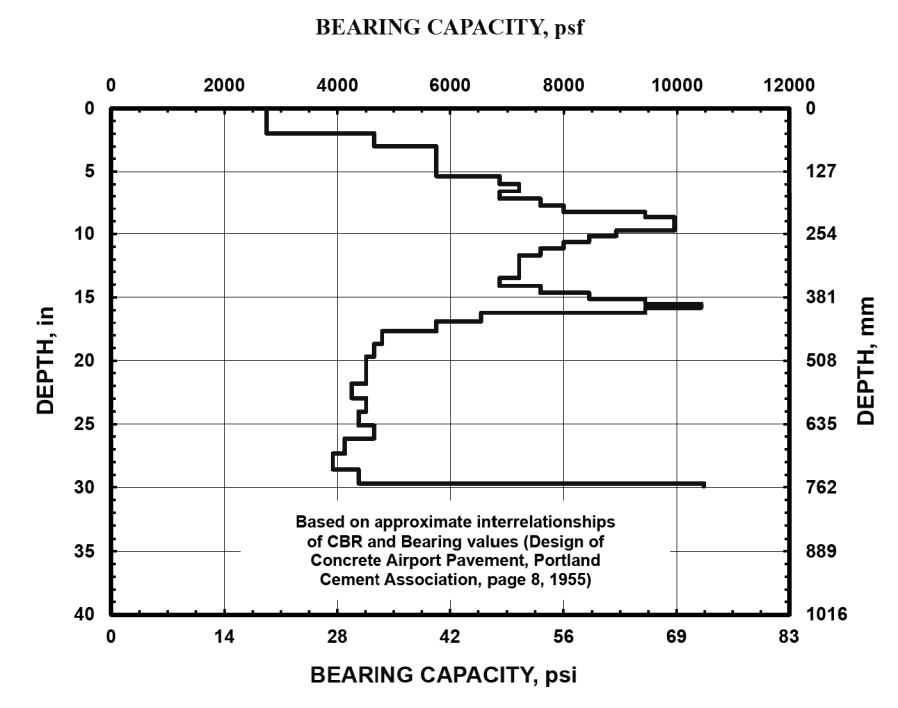
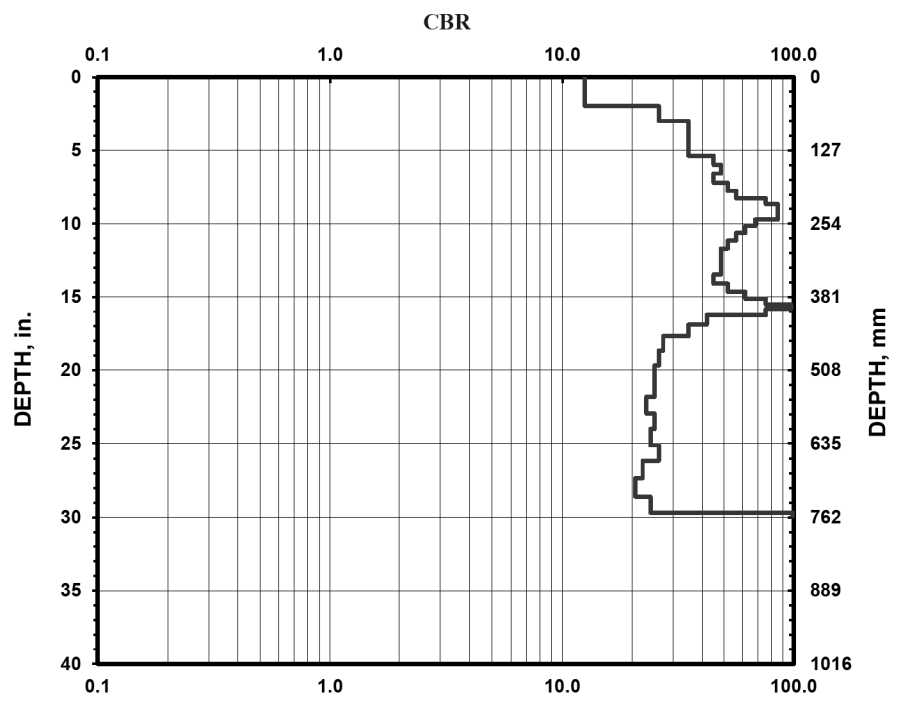
Soil Type

CH

CL

All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	50	1
3	76	1
3	96	1
3	116	1
3	136	1
3	152	1
3	167	1
3	183	1
3	197	1
3	210	1
3	220	1
3	229	1
3	238	1
3	247	1
3	258	1
3	270	1
3	283	1
3	297	1
3	312	1
3	327	1
3	342	1
3	358	1
3	372	1
3	384	1
3	394	1
3	402	1
3	412	1
3	429	1
3	449	1
3	474	1
3	500	1
3	527	1
3	554	1
3	583	1
3	610	1
3	638	1
3	664	1
3	694	1
3	726	1
3	754	1
3	760	1
3	765	1



NOTES: NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service. Sounding terminated at refusal.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG				STATION / OFFSET:		EXPLORATION ID	
TYPE: ROADWAY						ALIGNMENT: CL US 33		D-031-0-23	
PID: 119141		SFN:		LOGGER: ODOT / KERINS		ELEVATION: 760.3 (ft)		PAGE 1 OF 1	
START: 6/13/23		END: 6/13/23		EQUIPMENT:		LAT / LONG: 39.153870, -82.032413			

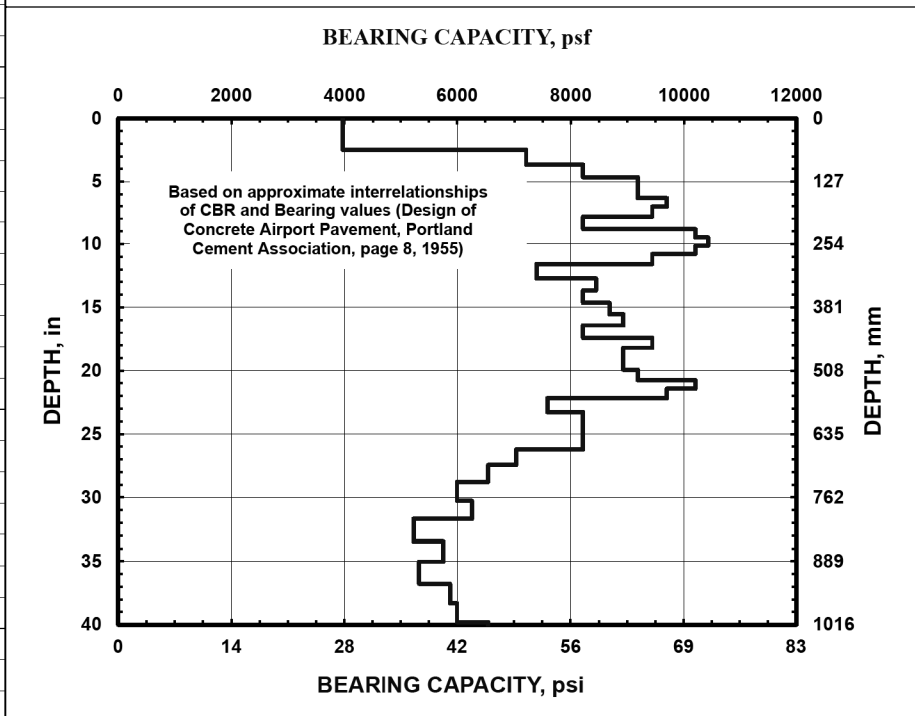
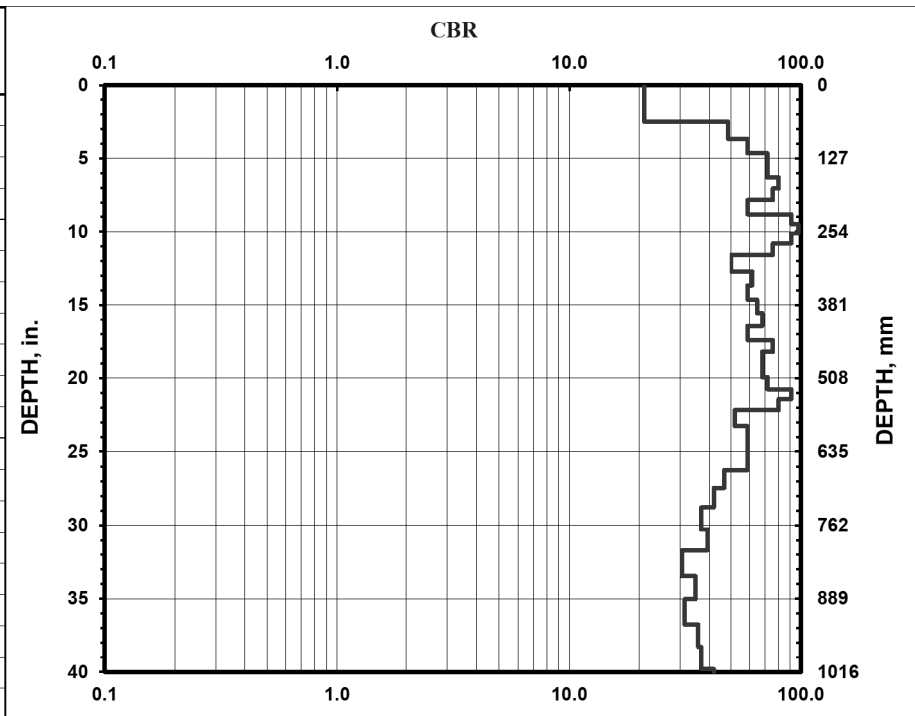
ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (Gr)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC		
760.1			TOPSOIL (2")												
	1		BROWN, SANDY SILT, SOME CLAY, LITTLE GRAVEL AND STONE FRAGMENTS, DAMP												
	2			AS-1	12	7	25	30	26	29	20	9	8	A-4a (4)	
757.7															

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

DCP TEST DATA	
Project: <u>ATH/MEG-33-18.70/0.00</u>	PID: <u>119141</u>
Exploration ID: <u>D-032-0-23</u>	Date: <u>6/13/2023</u>
Elevation: <u>739.9</u>	Surface Materials: <u>1" Topsoil</u>
Lat / Long: <u>39.150221, -82.029333</u>	Test Starting Depth (ft): <u>0.0</u>

Hammer <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used	Office of Geotechnical Engineering Geology, Exploration, and Laboratory Section http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical	Soil Type <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	---	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
6	63	1
6	93	1
6	118	1
6	139	1
6	160	1
6	179	1
6	199	1
6	224	1
6	241	1
6	257	1
6	274	1
6	294	1
6	323	1
6	347	1
6	372	1
6	395	1
6	417	1
6	442	1
6	462	1
6	484	1
6	506	1
6	527	1
6	544	1
6	563	1
6	591	1
6	616	1
6	641	1
6	666	1
6	697	1
6	731	1
6	769	1
6	805	1
6	850	1
6	890	1
6	934	1
6	973	1
6	1011	1
6	1045	1
6	1078	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
113	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 05-11-2024 TIME: 23:13:43 USER: ACAD
 D:\Dept_05\COL\2305059COL_East_Section\Mod_30_10_24\Working\19142\0024.dgn

DCP TEST DATA	
Project: ATH/MEG-33-18.70/0.00	PID: 119141
Exploration ID: D-033-0-23	Date: 6/13/2023
Elevation: 714.2	Surface Materials: 1" Topsoil
Lat / Long: 39.146833, -82.02617	Test Starting Depth (ft): 0.0

Hammer

10.1 lbs.

17.6 lbs.

Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

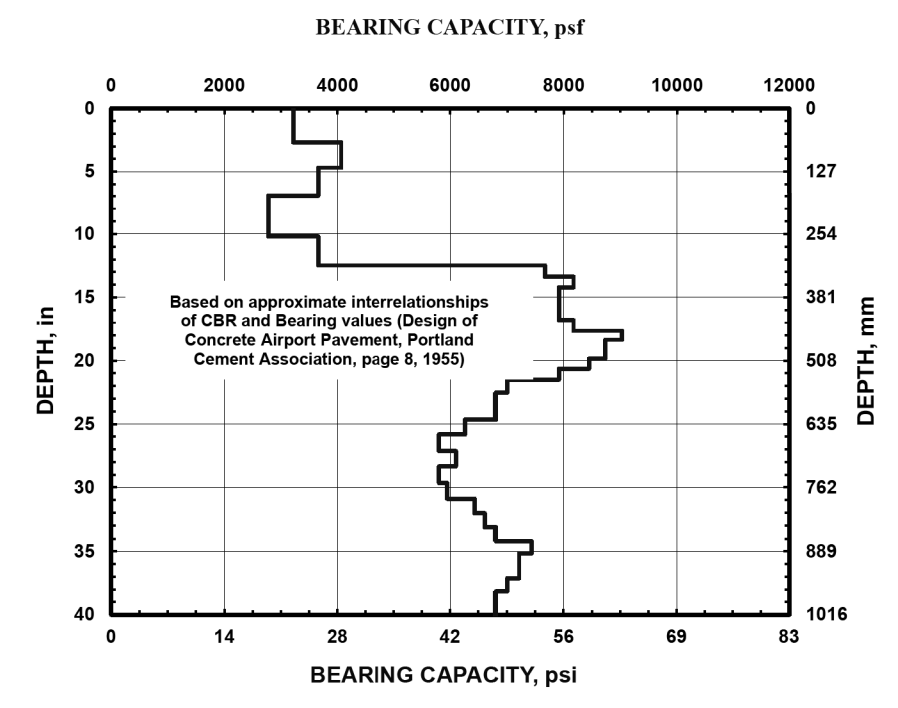
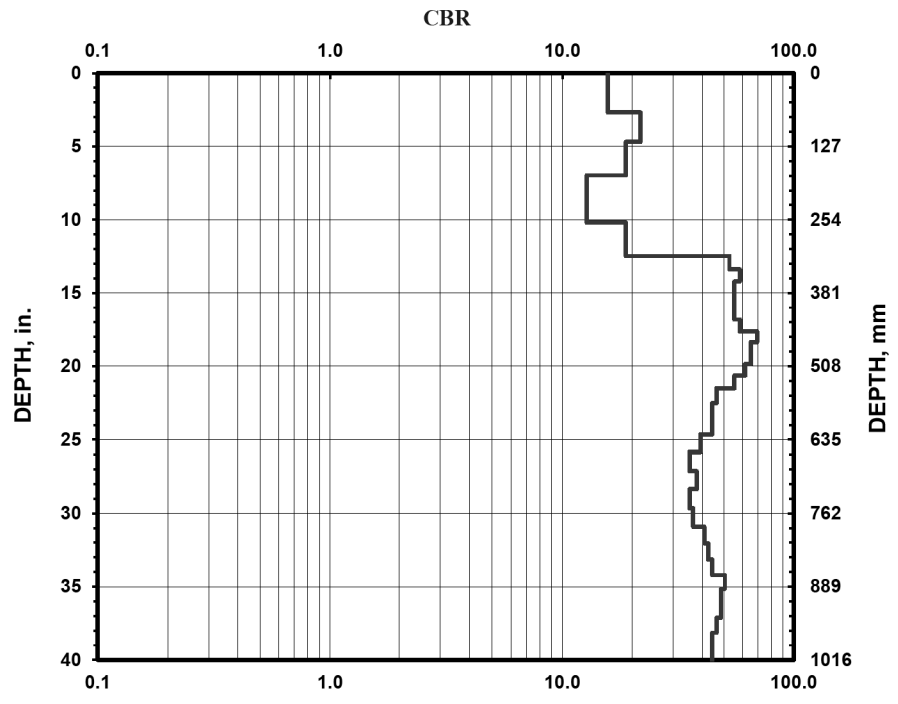
Soil Type

CH

CL

All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
5	68	1
5	119	1
5	177	1
5	259	1
5	317	1
5	340	1
5	361	1
5	383	1
5	405	1
5	427	1
5	448	1
5	466	1
5	485	1
5	504	1
5	524	1
5	546	1
5	572	1
5	599	1
5	626	1
5	656	1
5	689	1
5	720	1
5	753	1
5	785	1
5	814	1
5	842	1
5	869	1
5	893	1
5	918	1
5	943	1
5	969	1
5	996	1
5	1023	1
5	1050	1
5	1084	1



NOTES: Latitude/Longitude from Juniper Geode GNS3 receiver utilizing the ODOT VRS network. Elevation from USGS 3DEP map service.

PROJECT: ATH-33-18.70		HAND AUGER EXPLORATION LOG		STATION / OFFSET: _____		EXPLORATION ID: D-033-0-23	
TYPE: ROADWAY		LOGGER: ODOT / KERINS		ALIGNMENT: CL US 33		PAGE: 1 OF 1	
PID: 119141		SFN: _____		ELEVATION: 714.2 (ft)		LAT / LONG: 39.146833, -82.026170	
START: 6/13/23		END: 6/13/23		EQUIPMENT: _____		ODOT CLASS (G):	

ELEV. FT msl	DEPTH FT	HP (tsf)	MATERIAL DESCRIPTION AND NOTES	SAMPLE ID	GRADATION (%)					ATTERBERG				ODOT CLASS (G)	
					GR	CS	FS	SI	CL	LL	PL	PI	WC		
714.0			TOPSOIL (2")												
	1		YELLOWISH BROWN, SANDY SILT, SOME CLAY, TRACE GRAVEL, DAMP												
	2			AS-1	2	12	31	24	31	28	19	9	13	A-4a (4)	
711.2	3														

NOTES: LAT/LONG FROM OGE HANDHELD GPS UNIT. ELEV FROM USGS 3DEP MAP SERVICE. HOLE DRY UPON COMPLETION. ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GEOTECHNICAL PROFILE - ROADWAY
 DCP SOUNDING LOG FOR D-033-0-23

DESIGN AGENCY

2860 FISHER ROAD
COLUMBUS, OHIO 43204
PHONE: (614) 276-8123
FAX: (614) 276-8377

DESIGNER: N.K.S
 REVIEWER: SM 11-06-24
 PROJECT ID: 119142
 SUBSET TOTAL: 114 172
 SHEET TOTAL: -

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
 Columbus, OH 43204

Project No.: 23050059COL
 Project: ATH/MEG-033-23.23/0.00
 Client: HNTB Ohio, Inc
 Boring No.: B-025-0A-23
 Sample No.: ST-1

Sample Type: Undisturbed Specimen
 Test Date: 1/19/2024
 Checked By: SM
 Tested By: MW

Soil Description: Brown Clay (A-7-6)
 Specific Gravity: 2.659
 Initial Dry Unit Weight 113.5 pcf

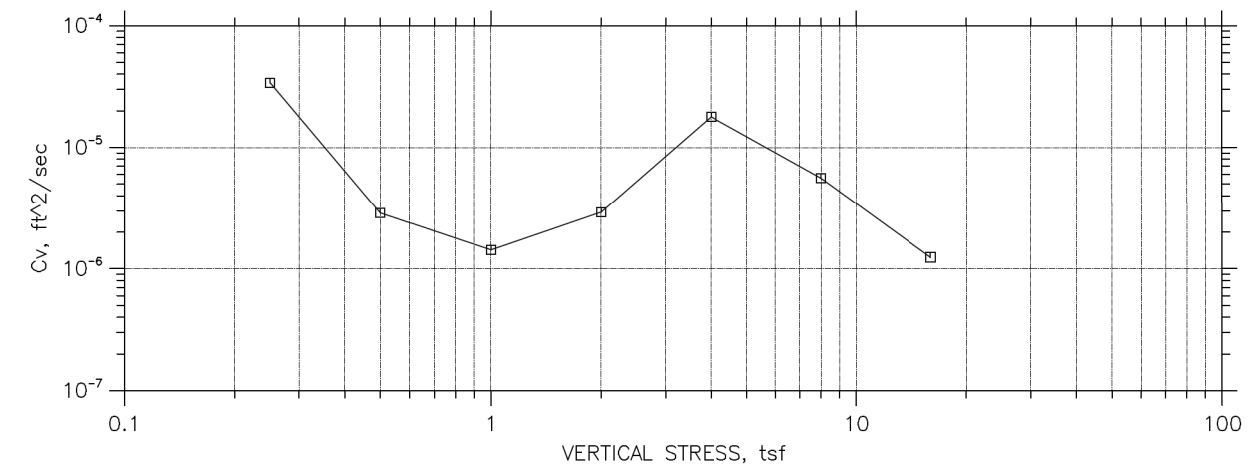
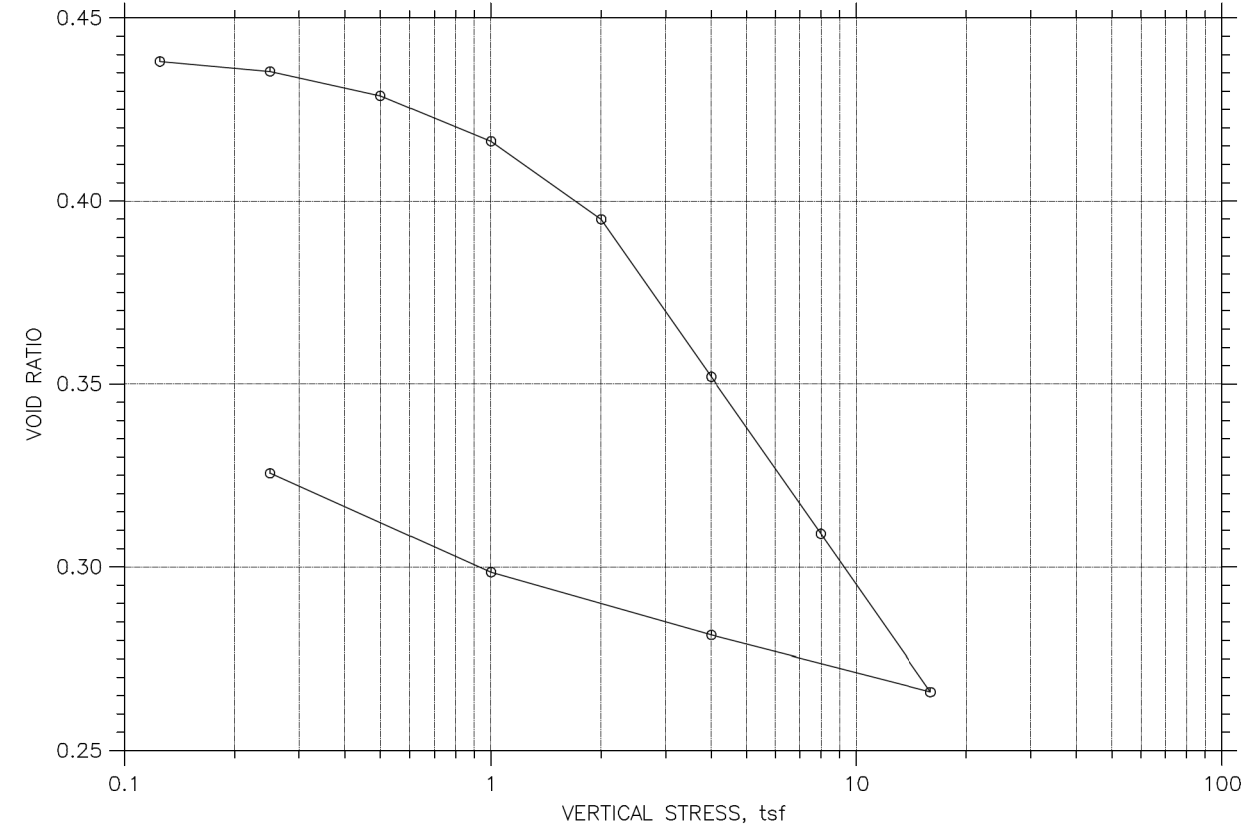
LL: 42
 PL: 25
 Initial Moisture 18.0%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	0.0009058	0.438	0.09	0	0.00E+00
2	0.25	0.002814	0.435	0.28	0.6	4.25E-05
3	0.5	0.007473	0.429	0.75	8.5	2.88E-06
4	1	0.01611	0.416	1.61	14.6	1.65E-06
5	2	0.03096	0.395	3.09	8.3	2.83E-06
6	4	0.06095	0.352	6.08	1.1	2.08E-05
7	8	0.09084	0.309	9.06	4.9	4.29E-06
8	16	0.1209	0.266	12.05	18.3	1.08E-06
9	4	0.1101	0.281	10.98	4.1	4.68E-06
10	1	0.09815	0.299	9.79	27.7	7.17E-07
11	0.25	0.07932	0.326	7.91	111.1	1.85E-07

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 1.70	Initial Void Ratio: 0.44
Compression Index (C _c): 0.14	Compression Ratio: 0.10
Recompression Index (C _r): 0.025	Recompression Ratio: 0.017



CONSOLIDATION TEST DATA SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 12:00:24



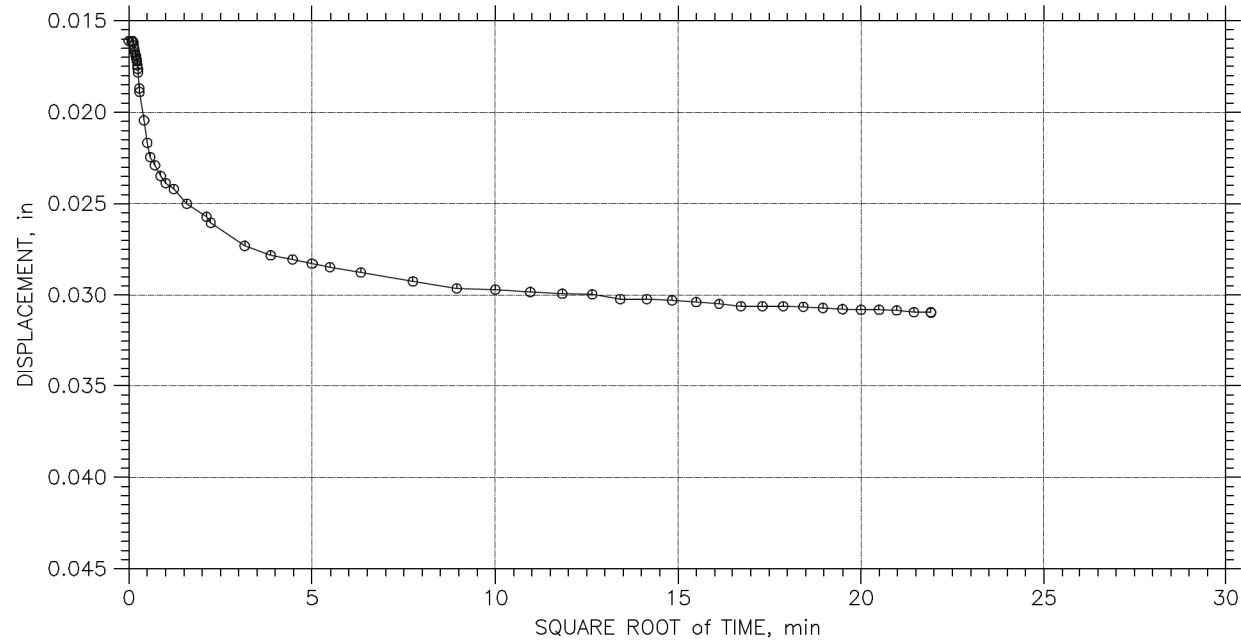
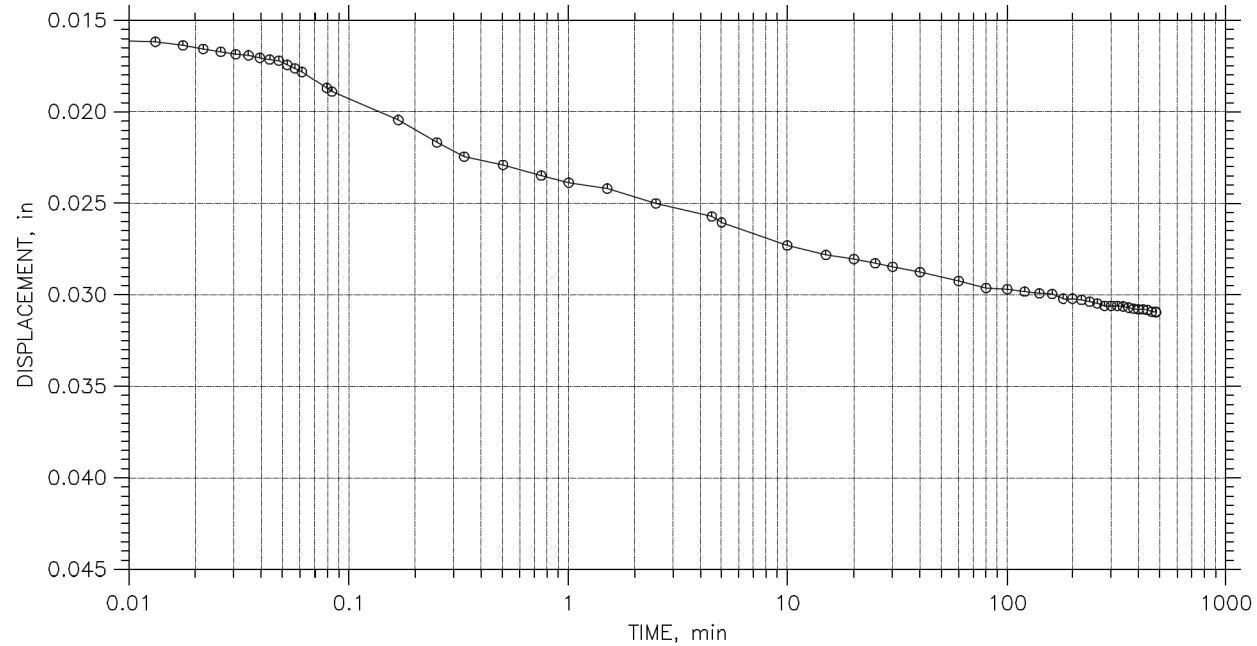
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
115	172
SHEET	TOTAL
1	1

ATH/MEG-33-23.23/0.00

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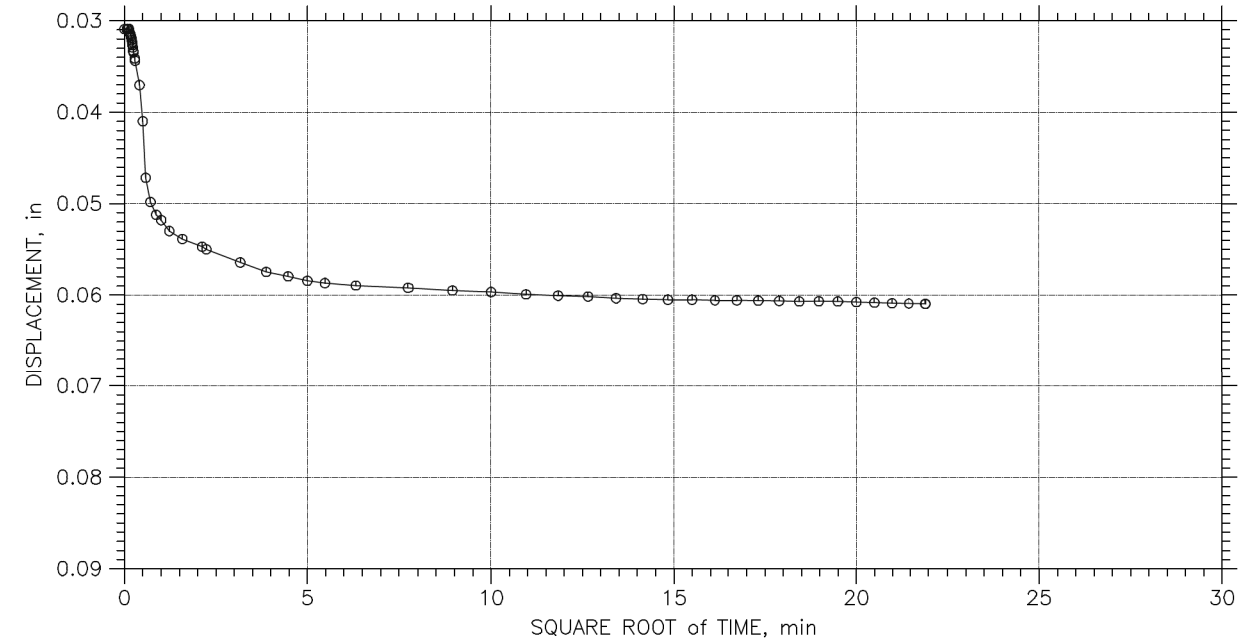
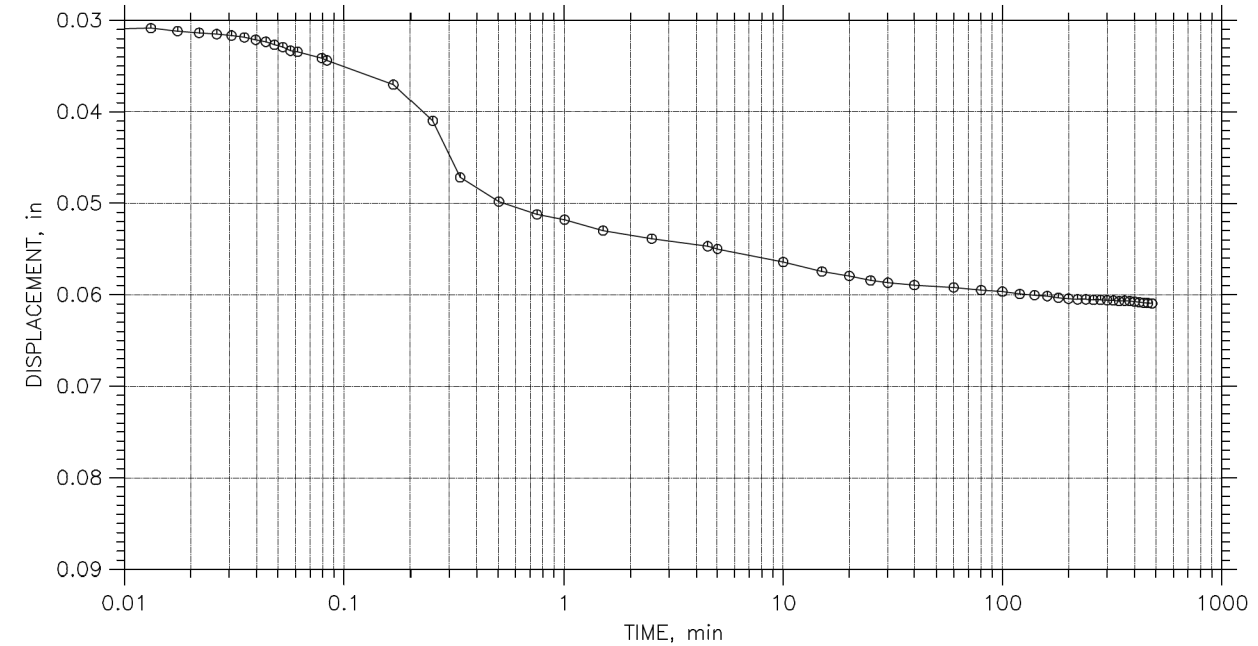
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 12:00:30

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 12:00:31

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS



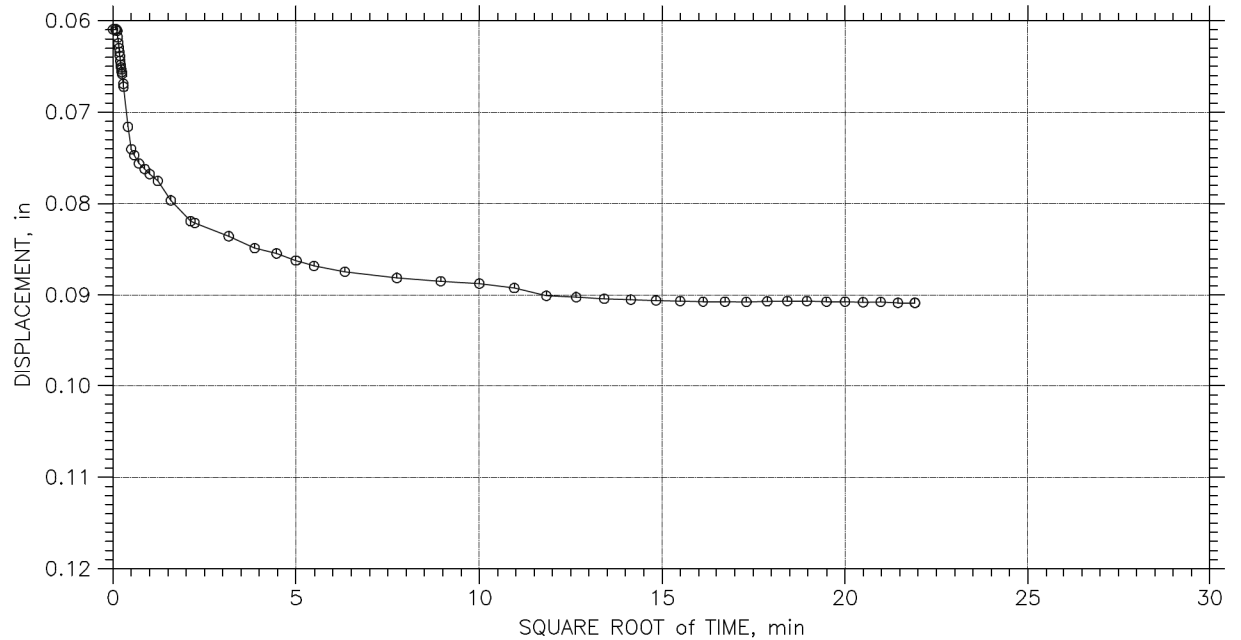
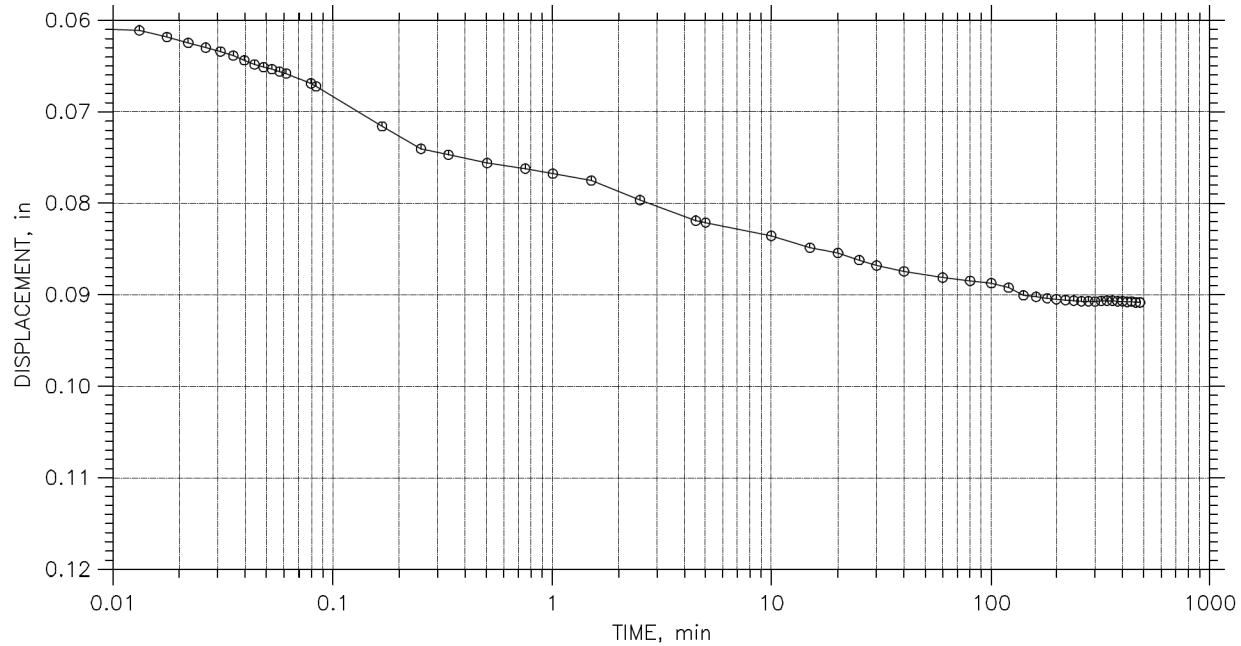
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
116	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 11:53:16 USER: ACAD
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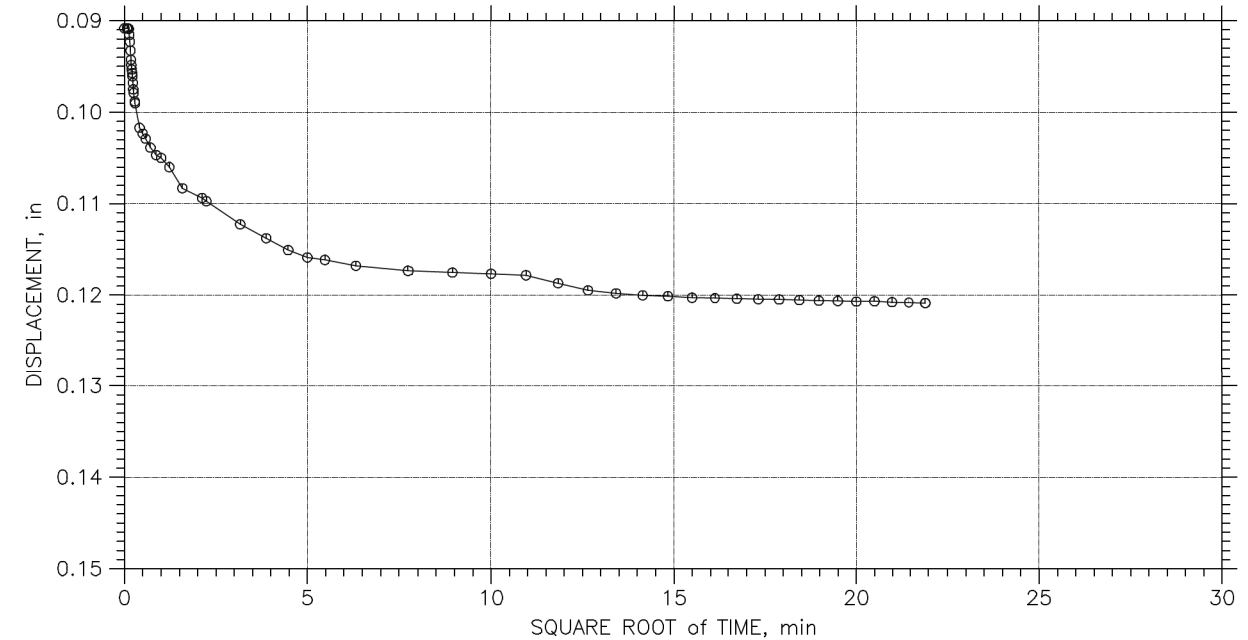
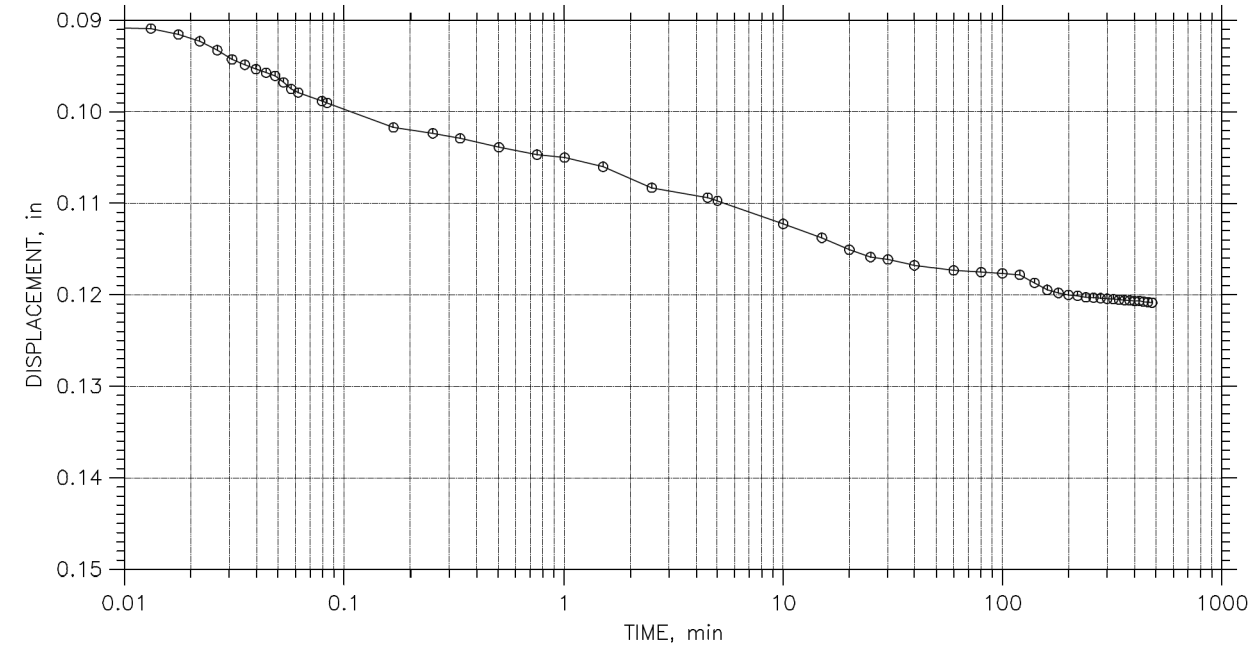
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 12:00:32

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 12:00:33

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

PROJECT ID
 119142

SUBSET	TOTAL
117	172

SHEET	TOTAL
-	-

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.: 23050059COL
Project: ATH/MEG-033-23.23/0.00
Client: HNTB Ohio, Inc
Boring No.: B-035-1-23
Sample No.: ST-7

Sample Type: Undisturbed Specimen
Test Date: 4/25/2024
Checked By: SM
Tested By: MW

Soil Description: Brown and Red Clay (A-7-6)
Specific Gravity: 2.703
Initial Dry Unit Weight 101.8 pcf

LL: 42
PL: 22
Initial Moisture 22%

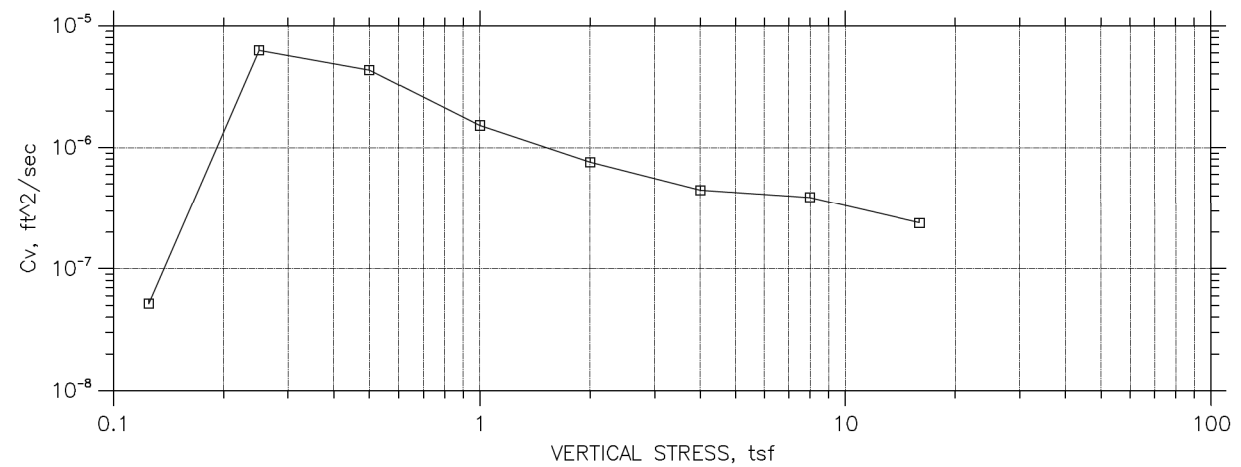
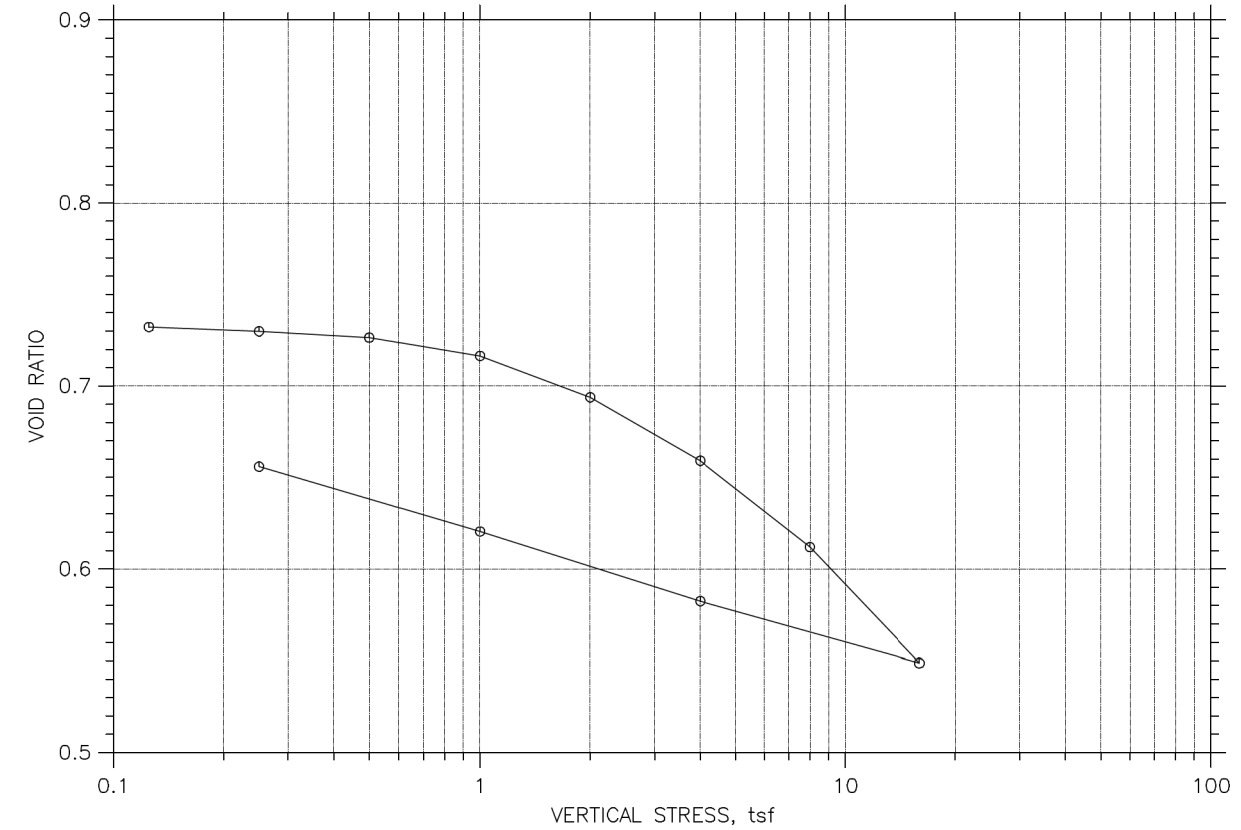
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	-0.0044	0.732	-0.44		
2	0.25	-0.003009	0.73	-0.3		
3	0.5	-0.001003	0.726	-0.1		
4	1	0.004788	0.716	0.48	16.2	1.51E-06
5	2	0.01789	0.694	1.79	38.3	6.26E-07
6	4	0.03795	0.659	3.8	58.6	3.95E-07
7	8	0.06525	0.612	6.53	59.7	3.69E-07
8	16	0.1019	0.549	10.2	76.4	2.69E-07
9	4	0.0824	0.582	8.25		
10	1	0.06033	0.62	6.04		
11	0.25	0.03982	0.656	3.99		

CONSOLIDATION PARAMETERS

Preconsolidation Pressure (tsf): 3.00	Initial Void Ratio: 0.73
Compression Index (C _c): 0.21	Compression Ratio : 0.12
Recompression Index (C _r): 0.055	Recompression Ratio: 0.032



CONSOLIDATION TEST DATA
SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-7	Test Date: 04/25/24	Depth: 15'-17'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown and Red Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 13:52:27

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 11:53:56 USER: ACAD
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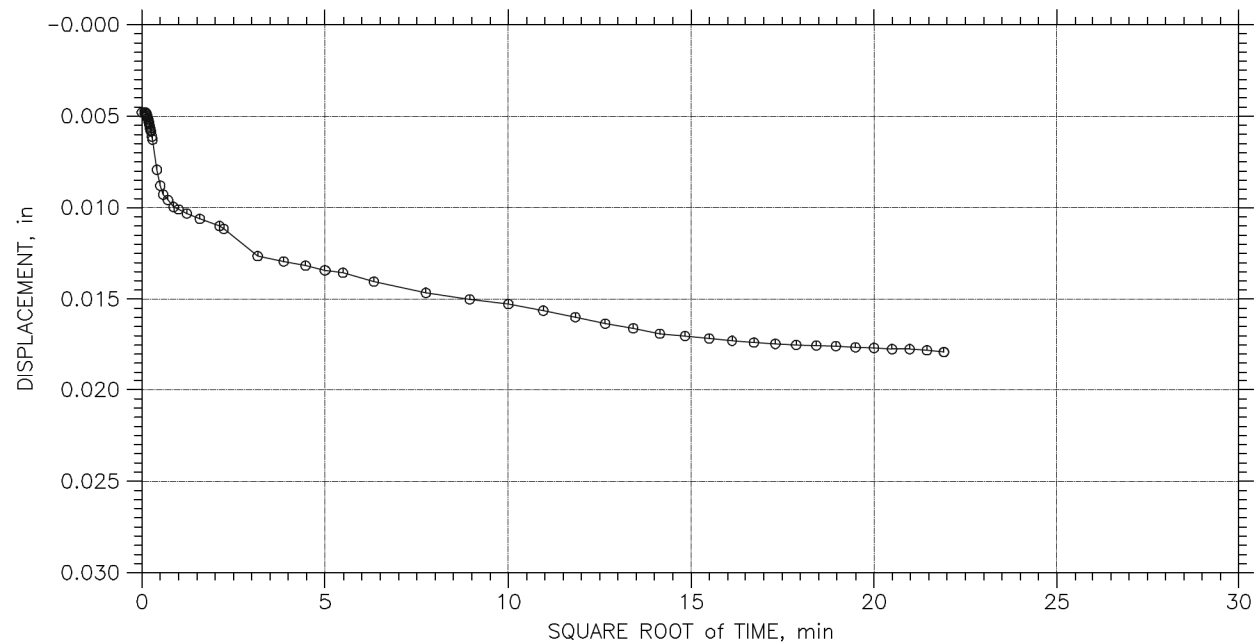
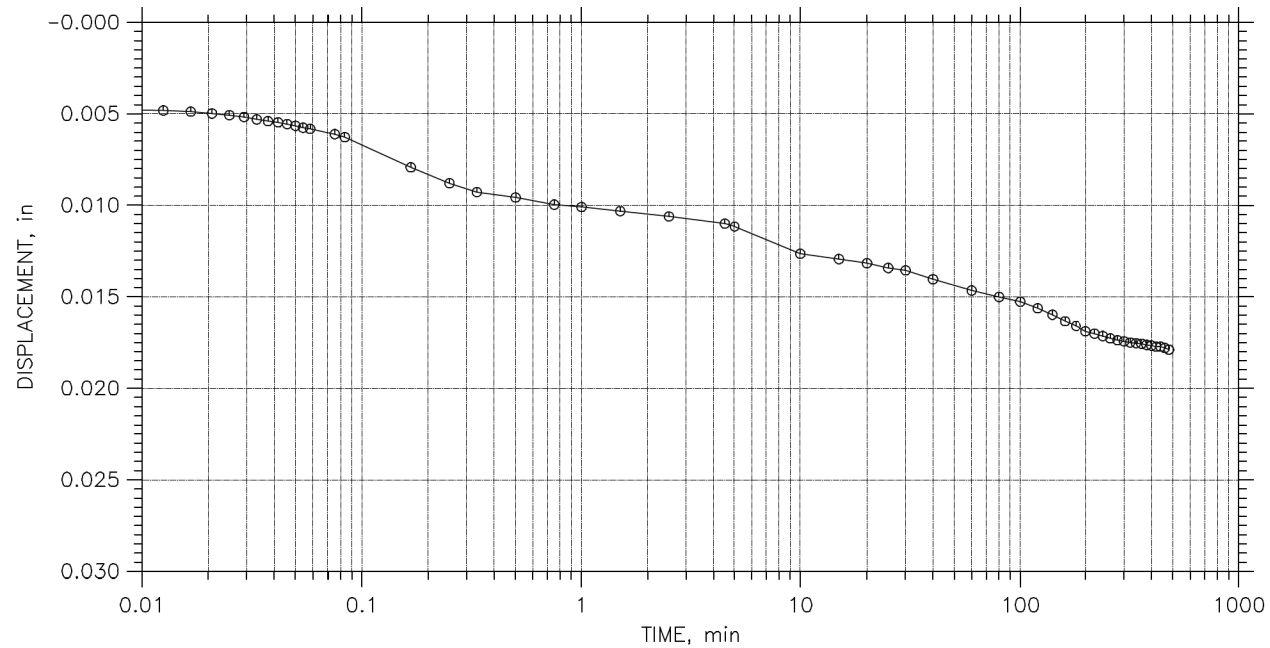
GEOTECHNICAL PROFILE - ROADWAY
CONSOLIDATION RESULTS



DESIGN AGENCY	CTL ENGINEERING
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
118	172
SHEET	TOTAL
	-

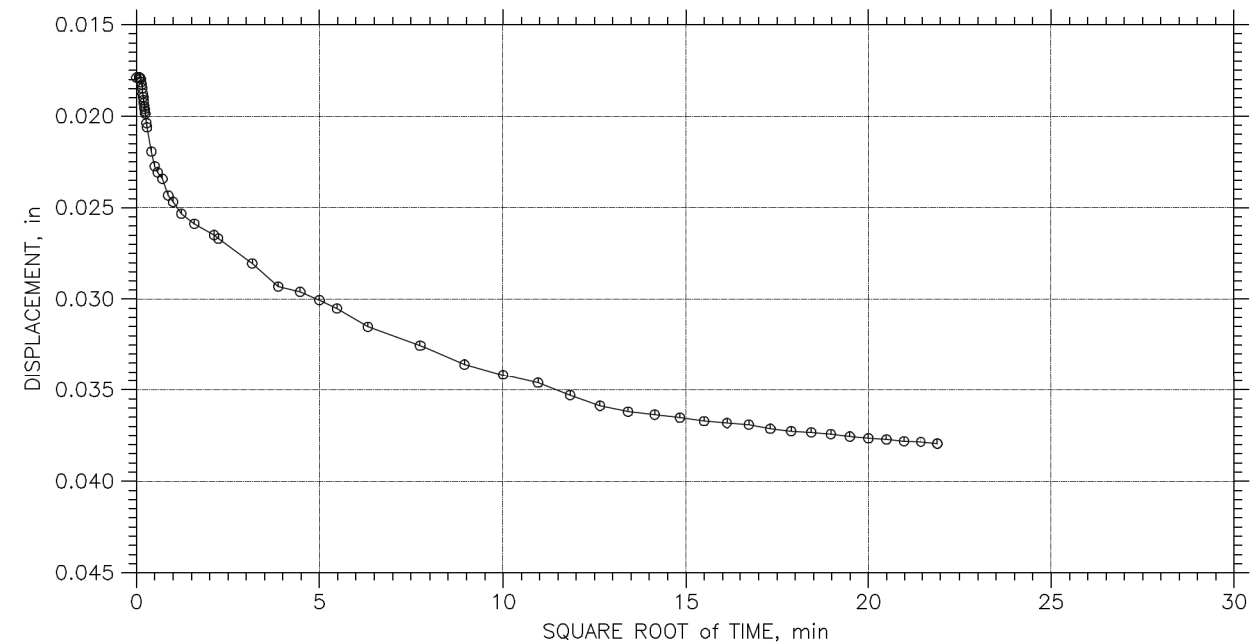
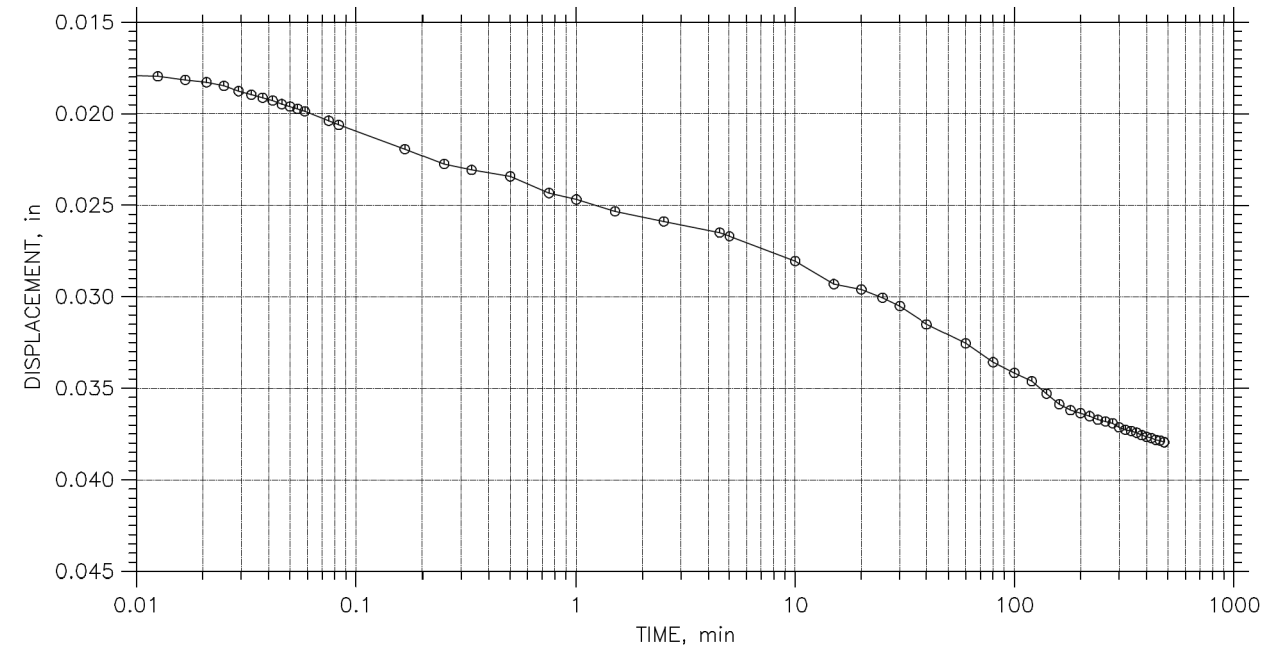
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-7	Test Date: 04/25/24	Depth: 15'-17'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown and Red Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 13:52:33

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-7	Test Date: 04/25/24	Depth: 15'-17'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown and Red Clay (A-7-6)		
Remarks:		

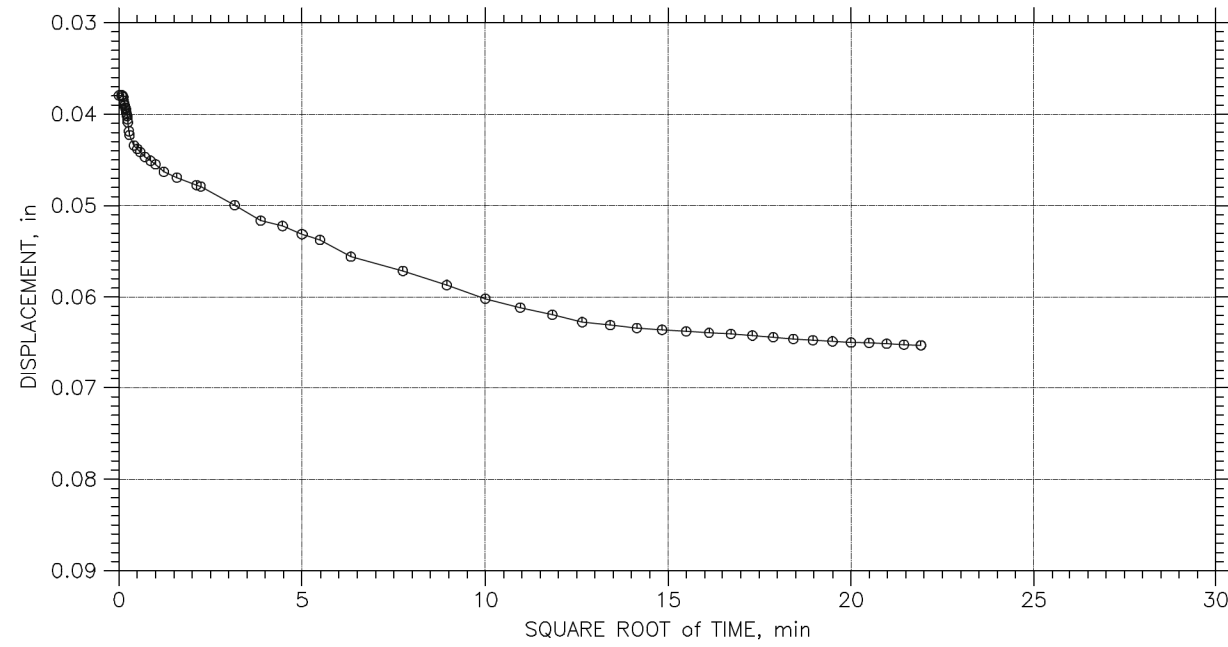
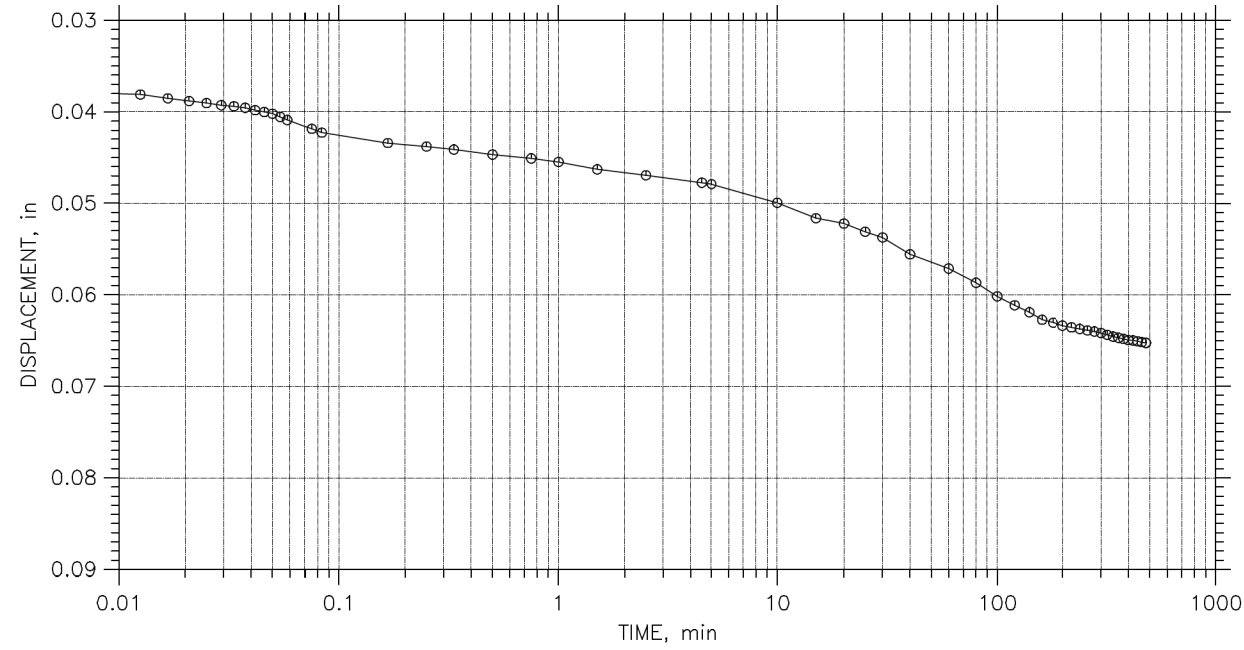
Tue, 03-SEP-2024 13:52:34



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
119	172
SHEET	TOTAL
-	-

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf

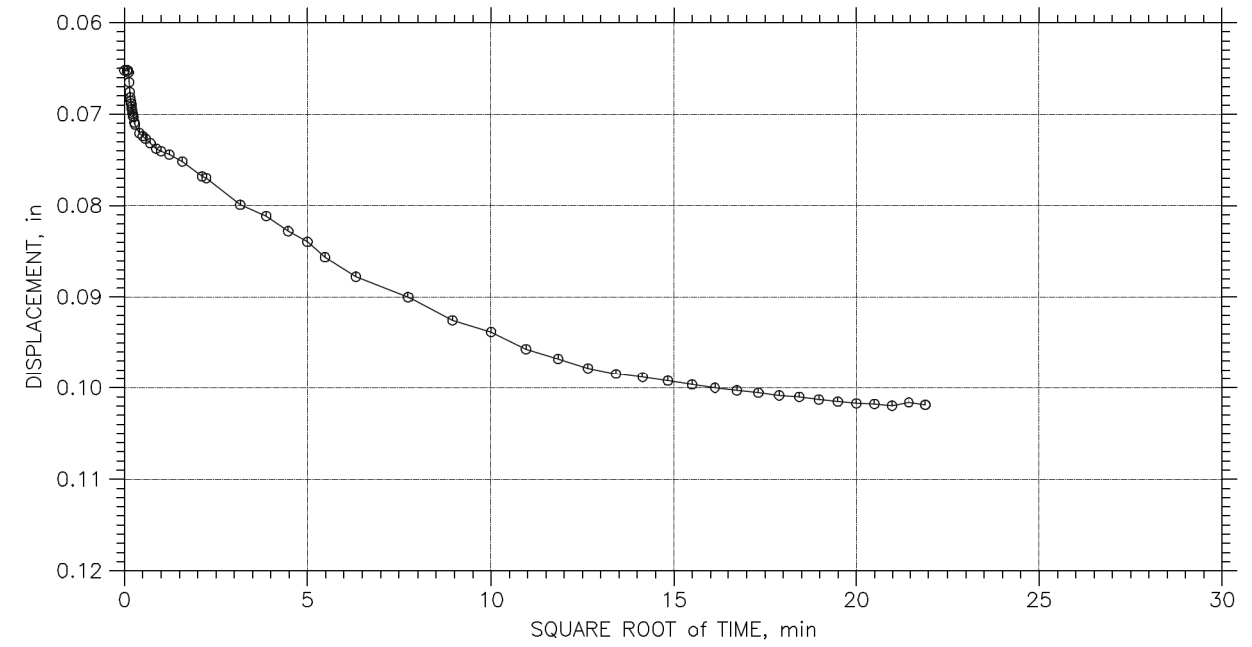
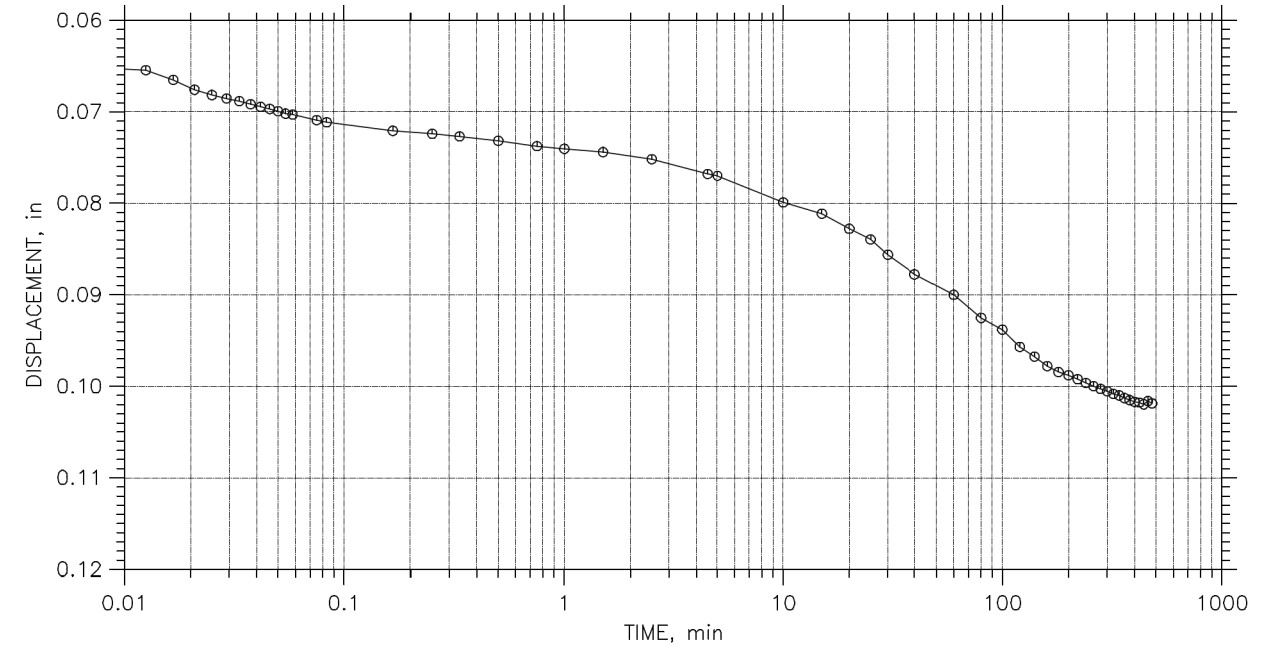


Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-7	Test Date: 04/25/24	Depth: 15'-17'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown and Red Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 13:52:35

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-7	Test Date: 04/25/24	Depth: 15'-17'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown and Red Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 13:52:36



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
120	172
SHEET	TOTAL
1	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 11:56:26 USER: ACAD
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One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
 Columbus, OH 43204

Project No.: 23050059COL
 Project: ATH/MEG-033-23.23/0.00
 Client: HNTB Ohio, Inc
 Boring No.: B-035-1-23
 Sample No.: ST-11

Sample Type: Undisturbed Specimen
 Test Date: 4/30/2024
 Checked By: SM
 Tested By: MW

Soil Description: Red Silt and Clay (A-6a)
 Specific Gravity: 2.640
 Initial Dry Unit Weight 126.1 pcf

LL: 28
 PL: 15
 Initial Moisture 11.3%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.125	-0.01336	0.351	-1.34		
2	0.25	-0.01016	0.347	-1.02		
3	0.5	-0.006017	0.342	-0.6		
4	1	0.000647	0.333	0.06	8.6	2.87E-06
5	2	0.01242	0.317	1.24	18.5	1.31E-06
6	4	0.02556	0.3	2.56	18.5	1.28E-06
7	8	0.04193	0.278	4.19	22.5	1.02E-06
8	16	0.06231	0.251	6.23	14.5	1.52E-06
9	4	0.04995	0.267	4.99		
10	1	0.03329	0.289	3.33		
11	0.25	0.01724	0.311	1.72		

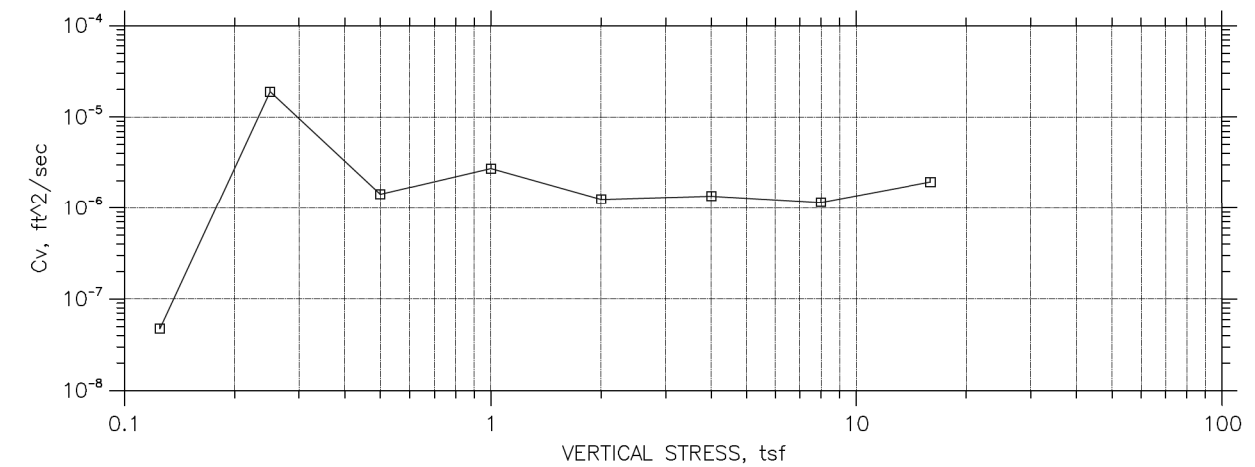
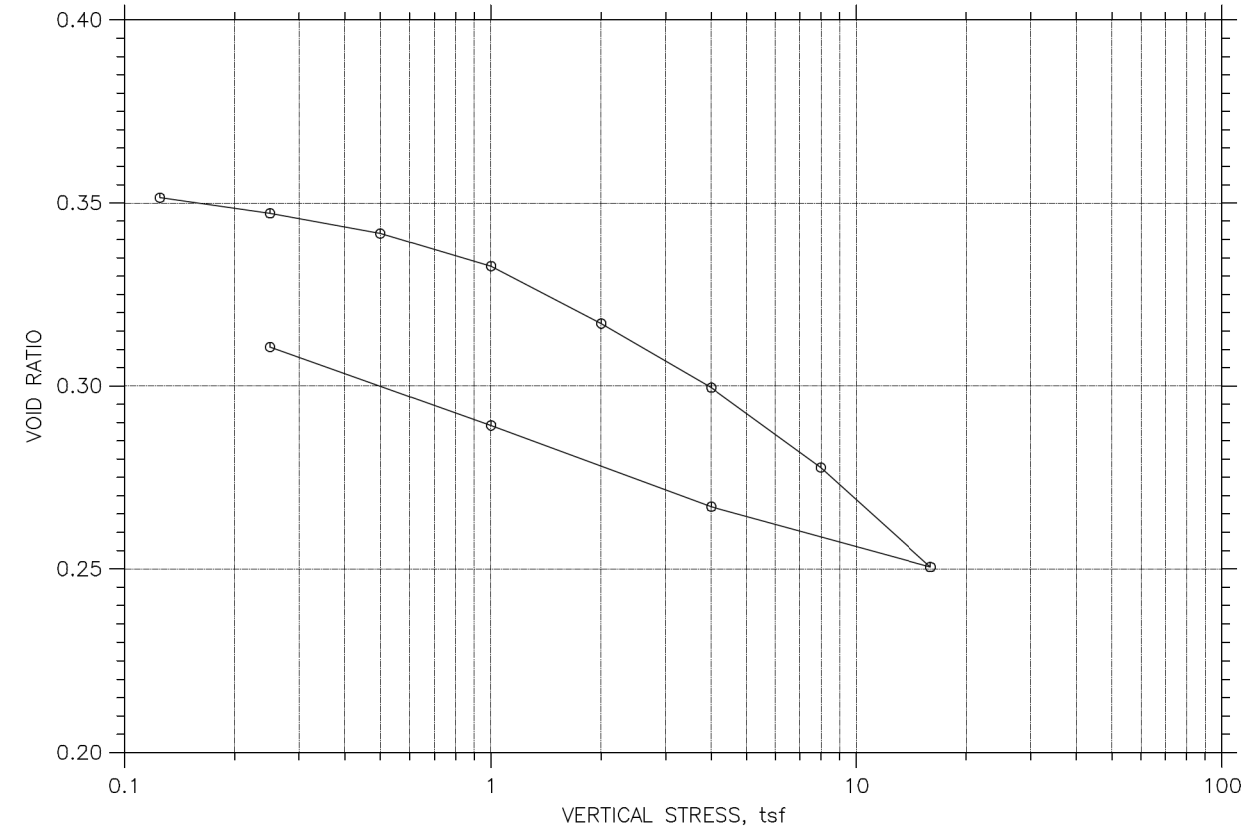
CONSOLIDATION PARAMETERS

Preconsolidation Pressure (tsf): 2.50 Initial Void Ratio: 0.35
 Compression Index (C_c): 0.09 Compression Ratio: 0.07
 Recompression Index (C_r): 0.027 Recompression Ratio: 0.020



CONSOLIDATION TEST DATA

SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-11	Test Date: 04/30/24	Depth: 31'-33'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 13:59:48

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS



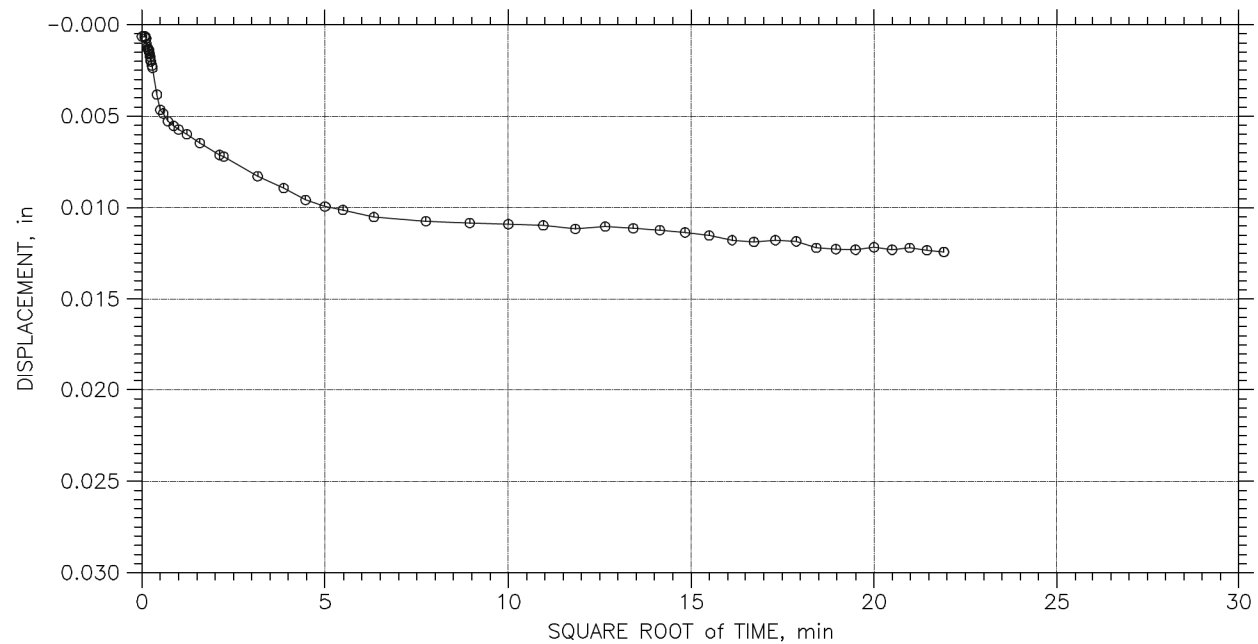
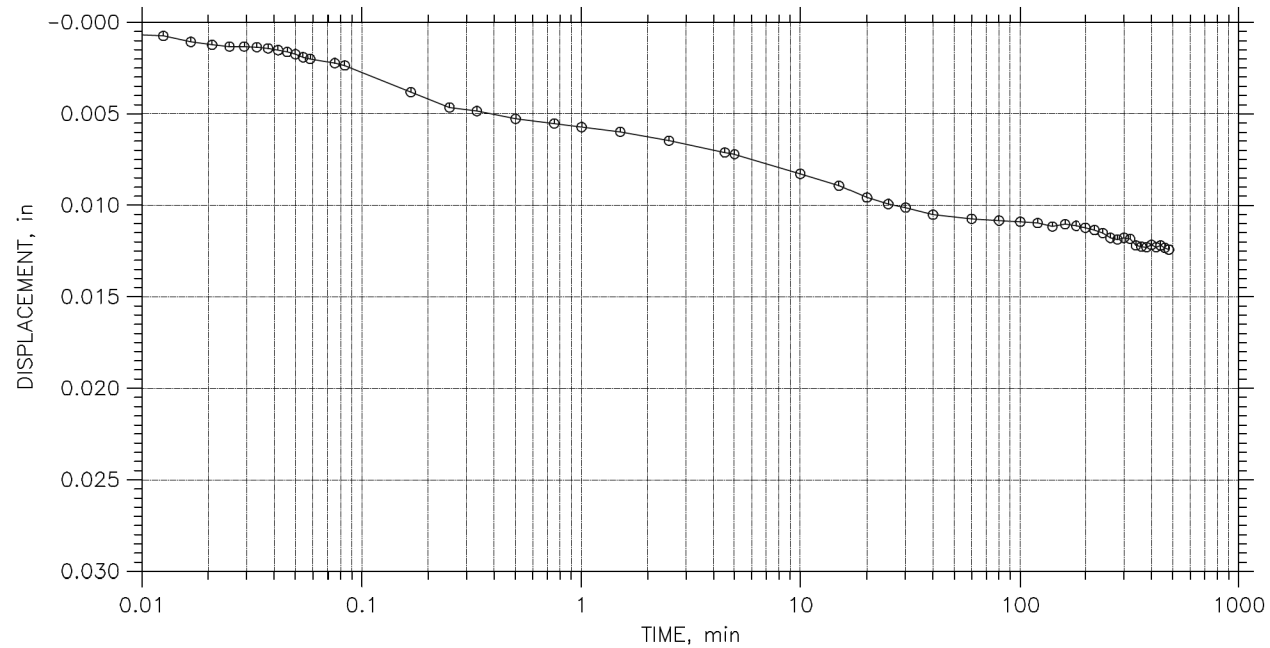
DESIGN AGENCY	GTL ENGINEERING
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	121
TOTAL	172
SHEET	-
TOTAL	-

ATH/MEG-33-23.23/0.00

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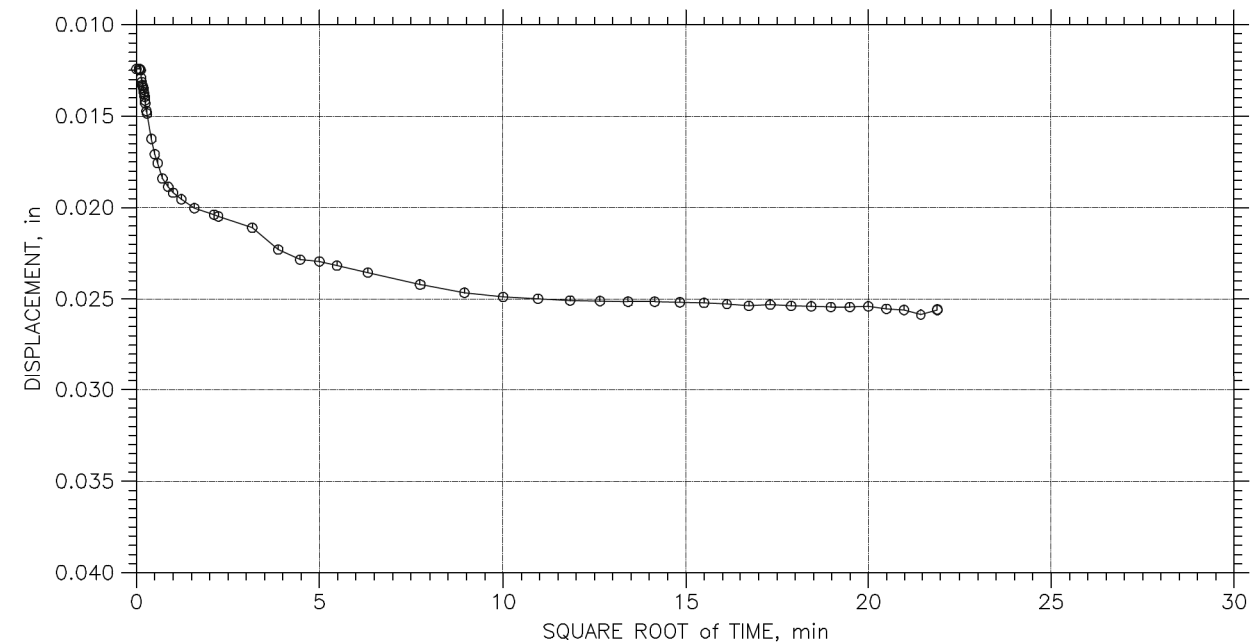
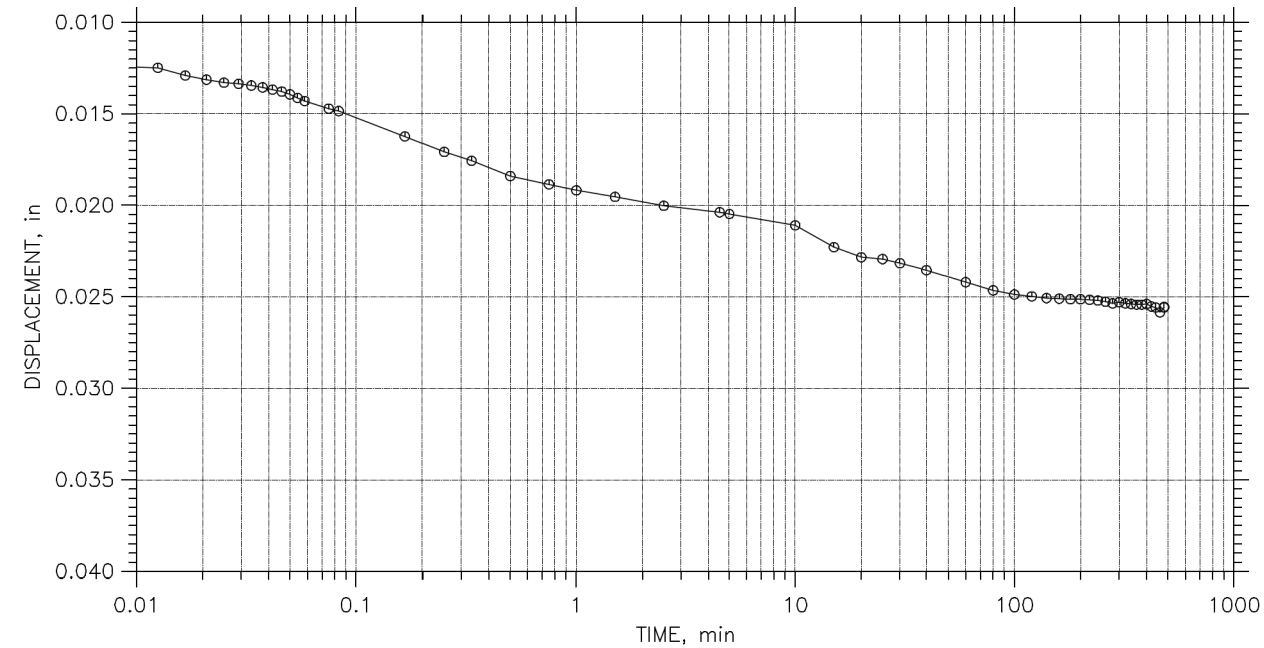
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-11	Test Date: 04/30/24	Depth: 31'-33'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 13:59:55

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-11	Test Date: 04/30/24	Depth: 31'-33'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 13:59:55

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS



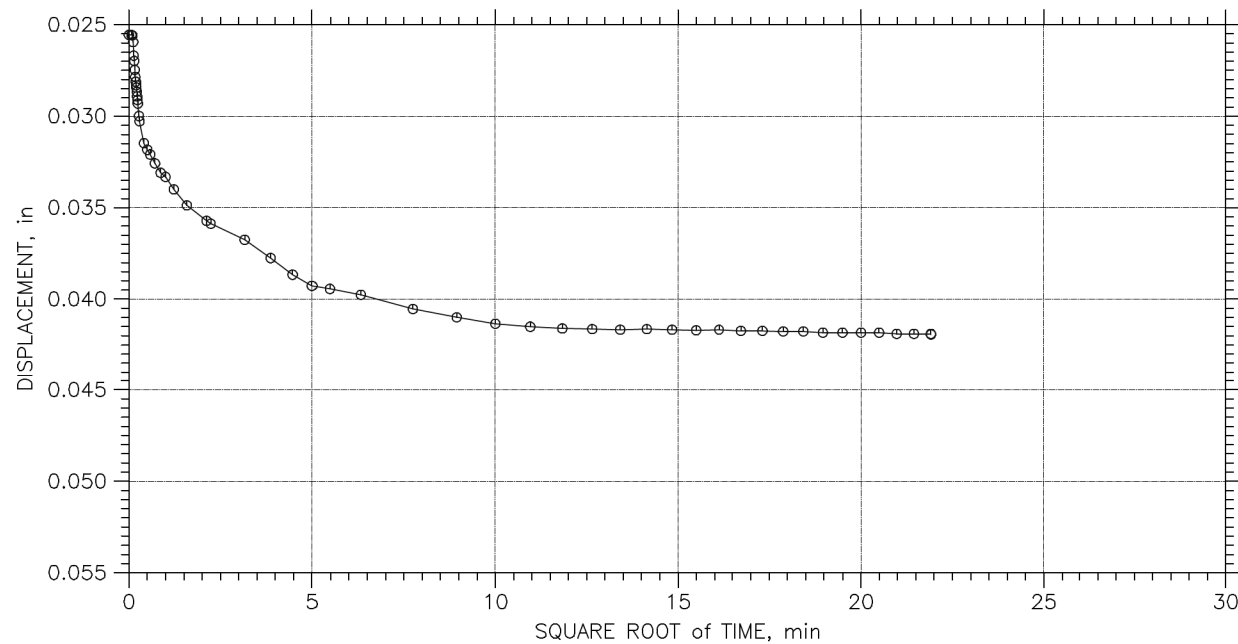
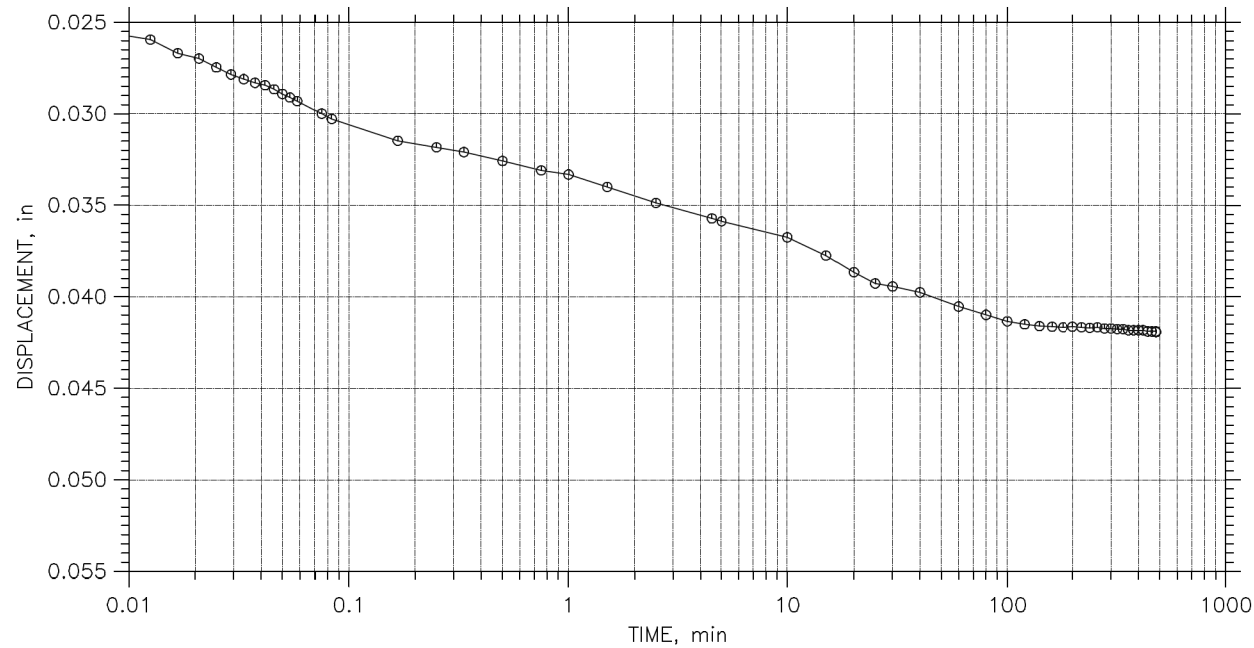
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
122	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/Size: 17x11 (in.) DATE: 06-11-2024 TIME: 11:57:48 USER: ACAD
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CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-11	Test Date: 04/30/24	Depth: 31'-33'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 13:59:56

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
 Columbus, OH 43204

Project No.: 23050059COL
 Project: ATH/MEG-033-23.23/0.00
 Client: HNTB Ohio, Inc
 Boring No.: B-039-1-23
 Sample No.: ST-12

Sample Type: Undisturbed Specimen
 Test Date: 5/22/2024
 Checked By: SM
 Tested By: MW

Soil Description: Brown, Sandy Silt (A-4a)
 Specific Gravity: 2.667
 Initial Dry Unit Weight 117.2 pcf

LL: 26
 PL: 16
 Initial Moisture 15%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	-0.0005823	0.39	-0.06		
2	0.25	0.0007764	0.389	0.08		
3	0.5	0.004853	0.383	0.49	1.4	1.80E-05
4	1	0.009867	0.376	0.99	0.5	4.44E-05
5	2	0.0185	0.364	1.85	0.6	3.84E-05
6	4	0.03106	0.346	3.11	0.6	4.13E-05
7	8	0.0482	0.323	4.82	1	2.26E-05
8	16	0.07266	0.289	7.27	1	2.16E-05
9	4	0.06379	0.301	6.39		
10	1	0.05335	0.315	5.34		
11	0.25	0.03963	0.335	3.97		

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 3.00	Initial Void Ratio: 0.39
Compression Index (C _c): 0.11	Compression Ratio: 0.08
Recompression Index (C _r): 0.020	Recompression Ratio: 0.014



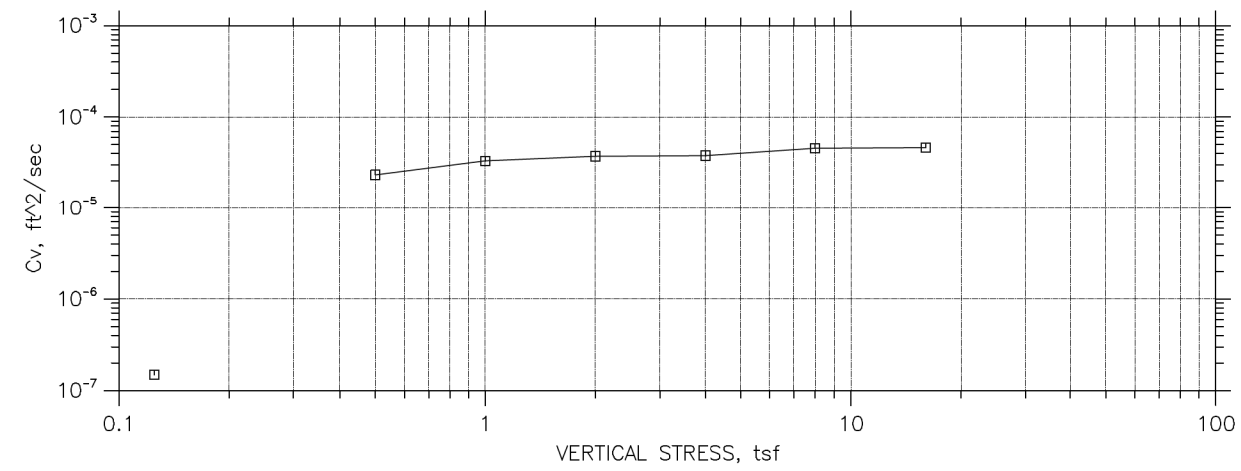
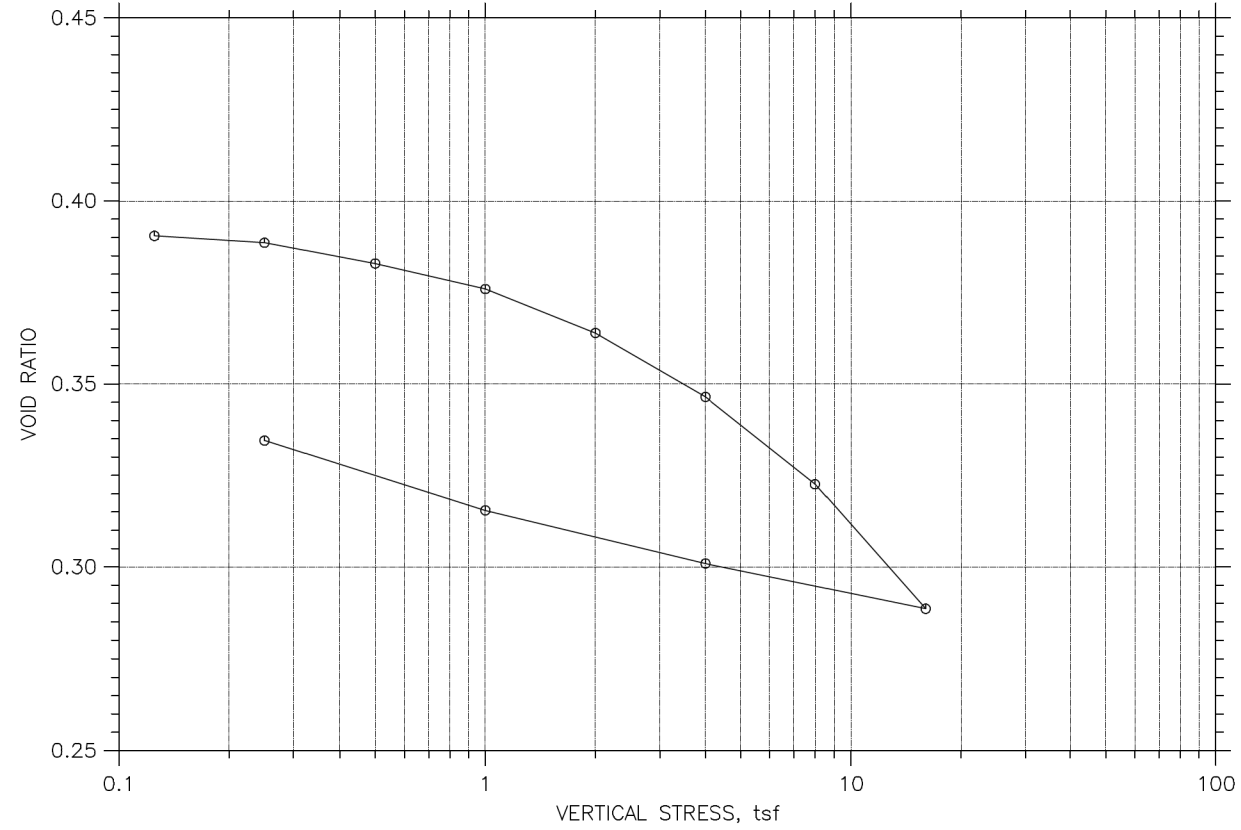
**GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS**

DESIGN AGENCY	
2860 FISHER ROAD COLUMBUS, OHIO 43204 PHONE: (614) 276-8123 FAX: (614) 276-8377	
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
123	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

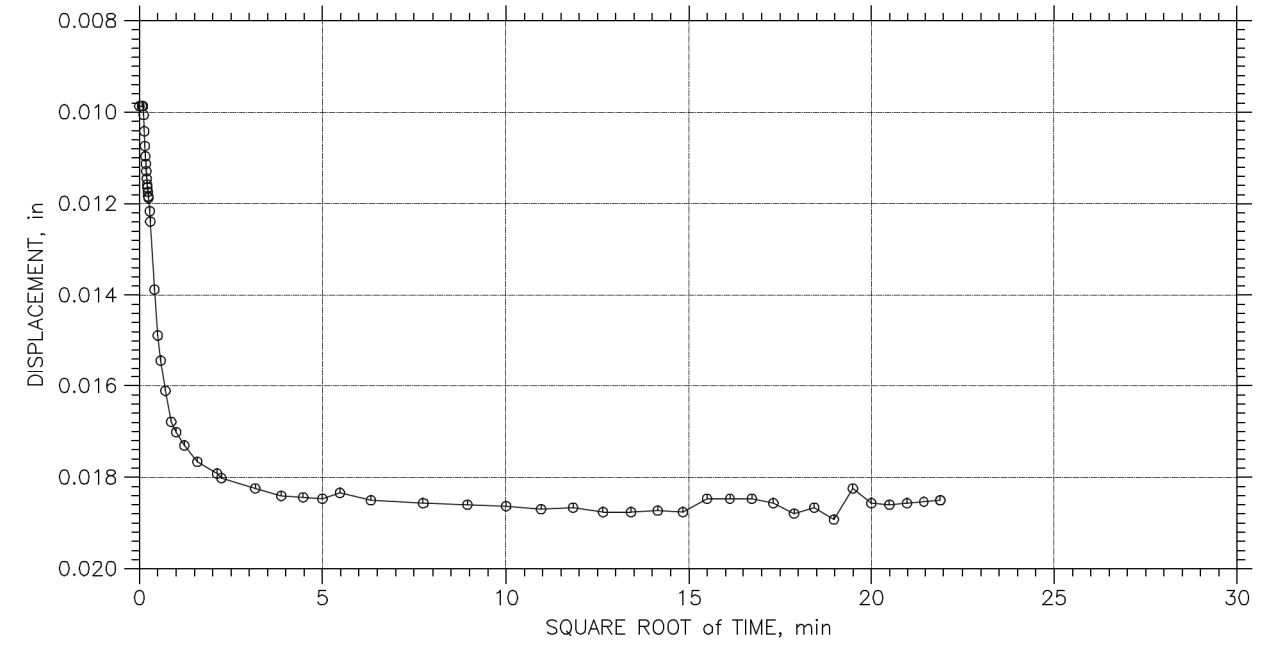
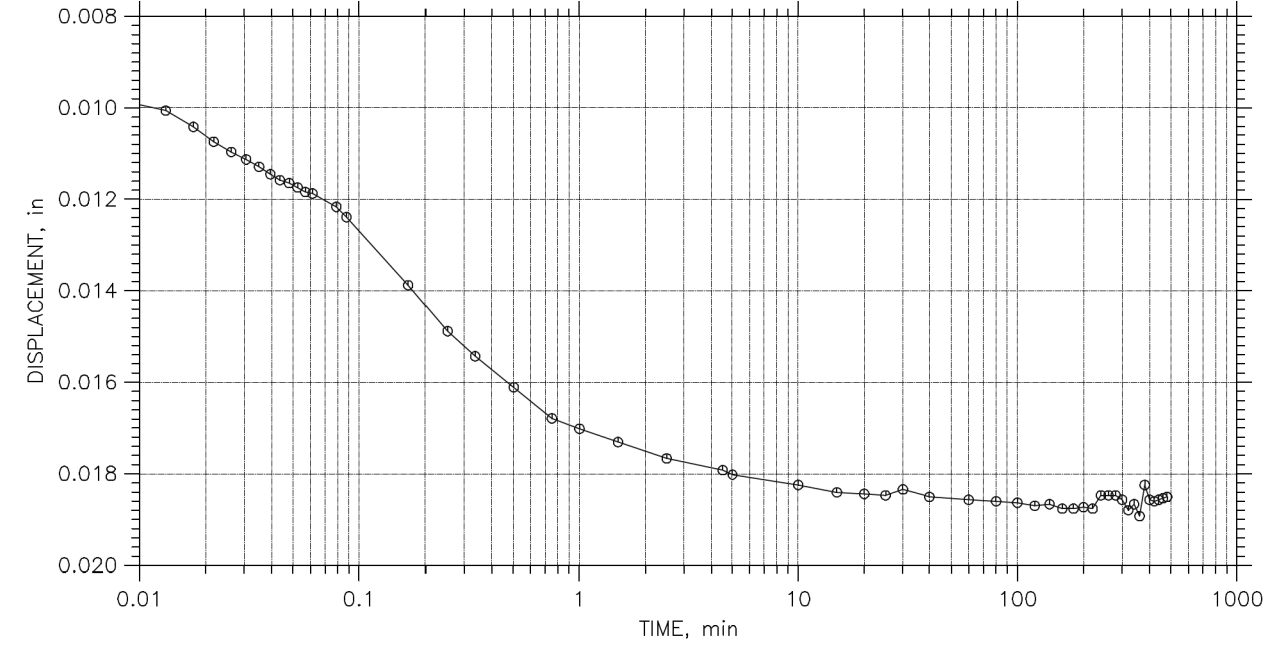
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CONSOLIDATION TEST DATA
 SUMMARY REPORT



CONSOLIDATION TEST DATA
 TIME CURVES

Step: 5 of 11
 Stress: 2. tsf



Project: ATH-MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-12	Test Date: 05/22/24	Depth: 36'-38'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Sandy Silt (A-4a)		
Remarks:		

Tue, 03-SEP-2024 14:08:02

Project: ATH-MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-12	Test Date: 05/22/24	Depth: 36'-38'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Sandy Silt (A-4a)		
Remarks:		

Tue, 03-SEP-2024 14:08:08

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

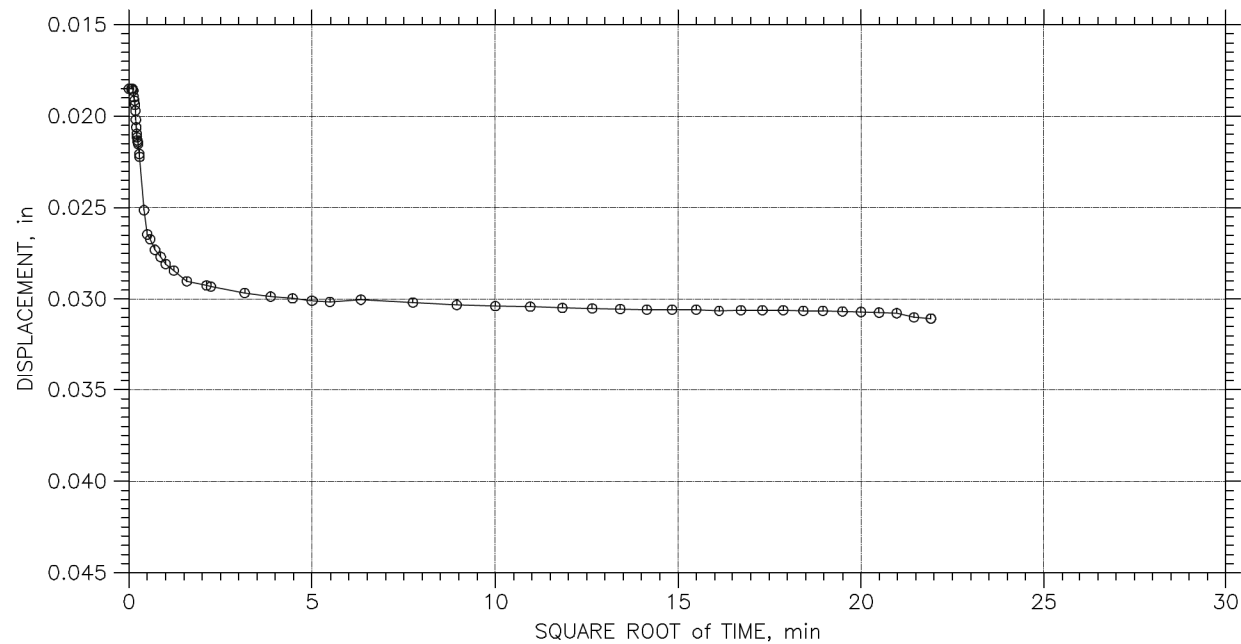
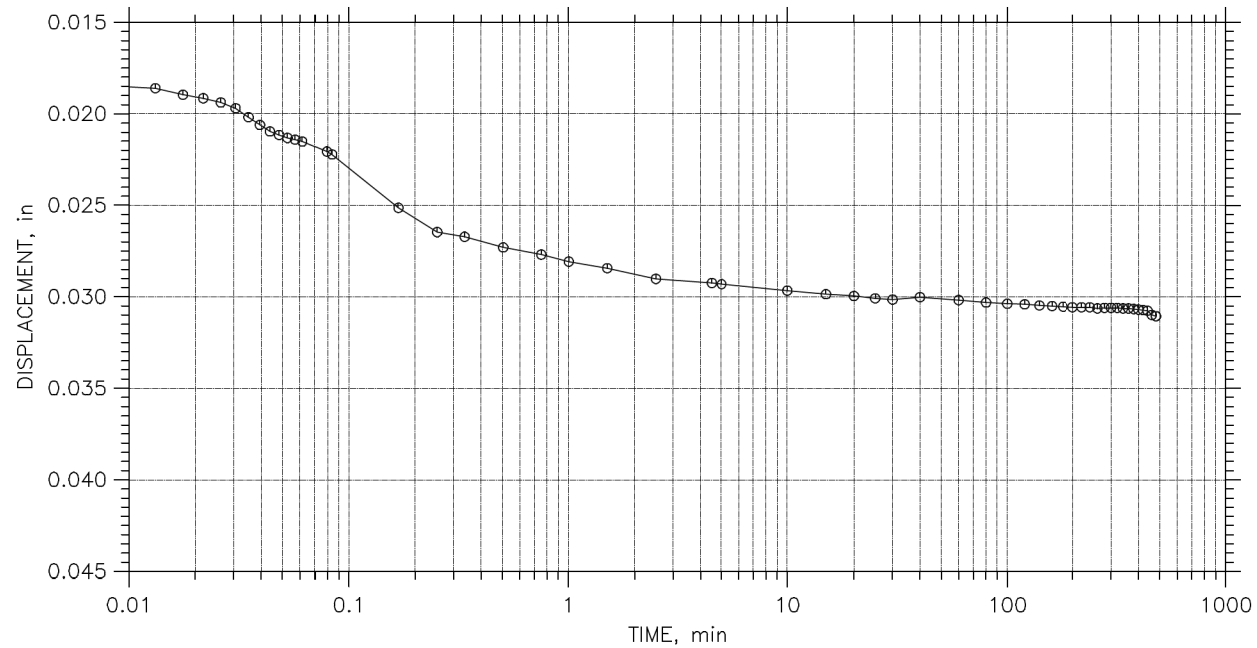
PROJECT ID
 119142

SUBSET	TOTAL
124	172

SHEET	TOTAL
-	-

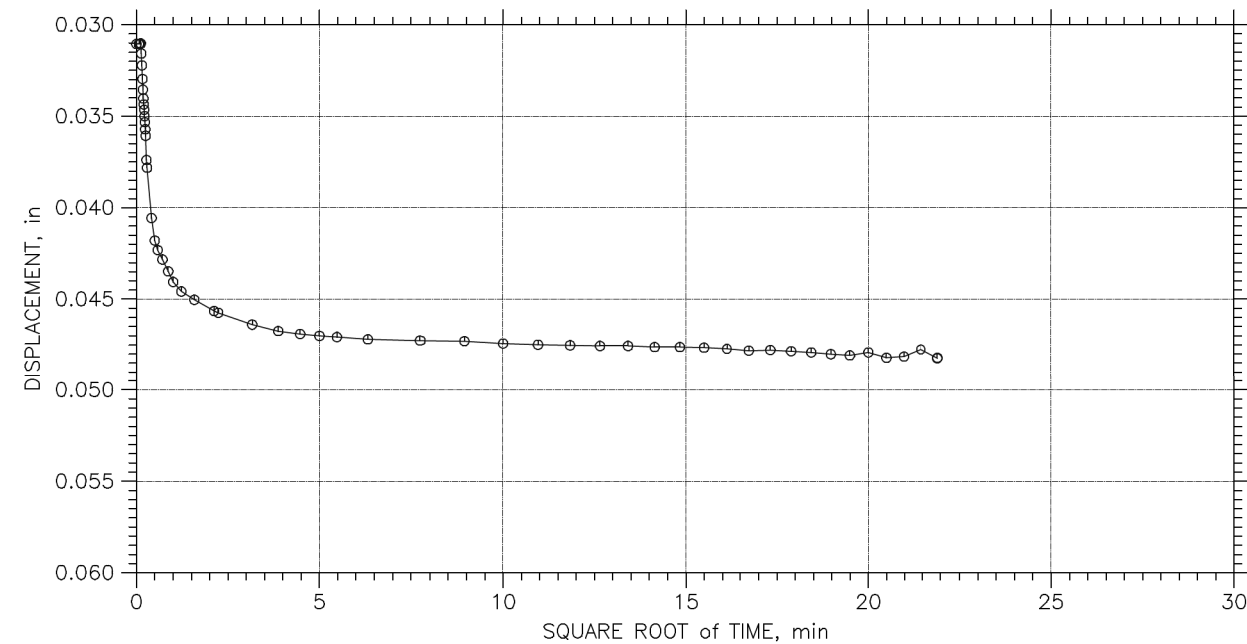
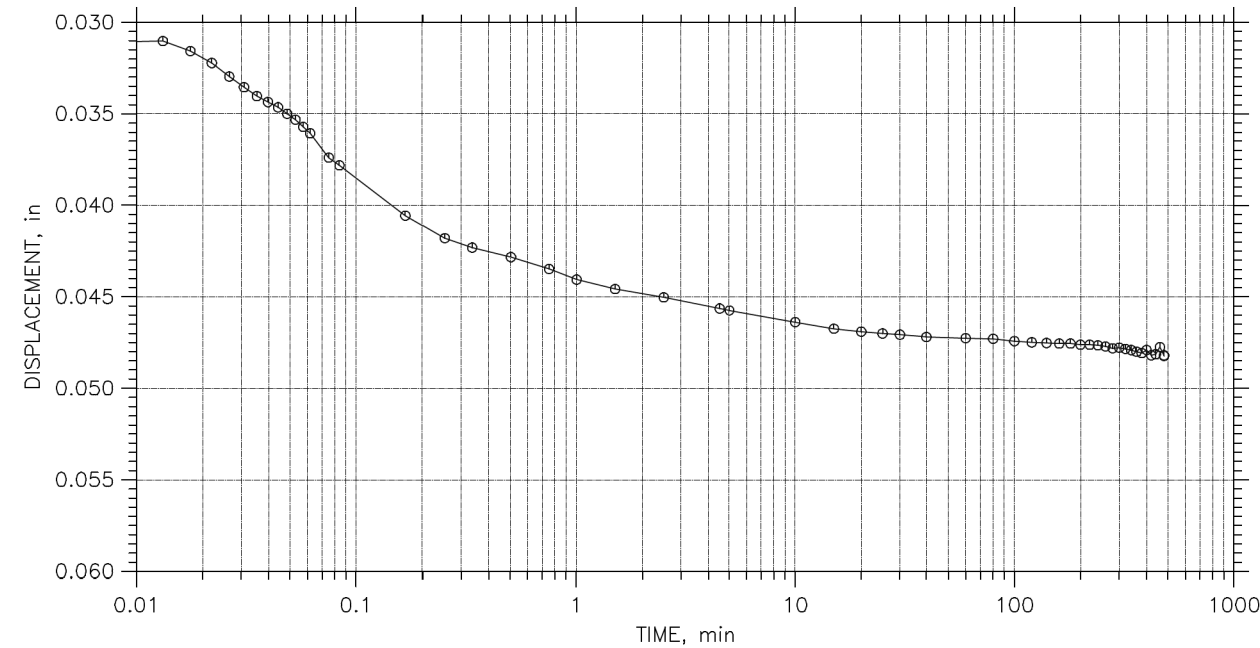
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



Project: ATH-MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-12	Test Date: 05/22/24	Depth: 36'-38'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Sandy Silt (A-4a)		
Remarks:		

Tue, 03-SEP-2024 14:08:09

Project: ATH-MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-12	Test Date: 05/22/24	Depth: 36'-38'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Sandy Silt (A-4a)		
Remarks:		

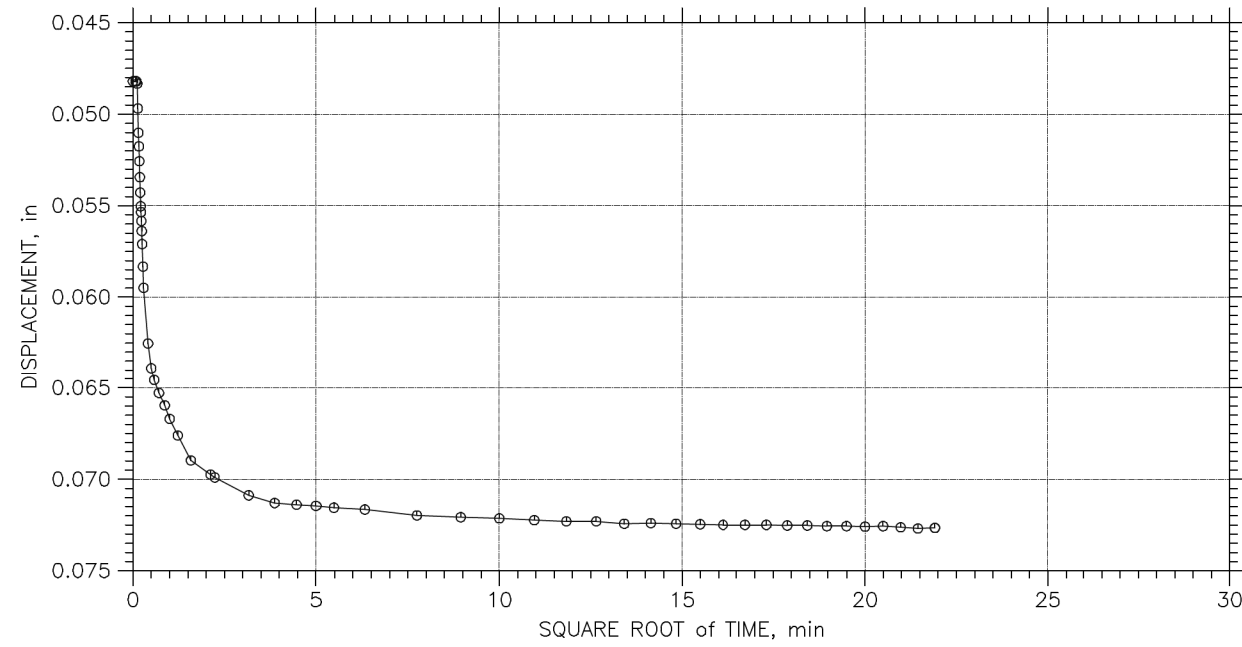
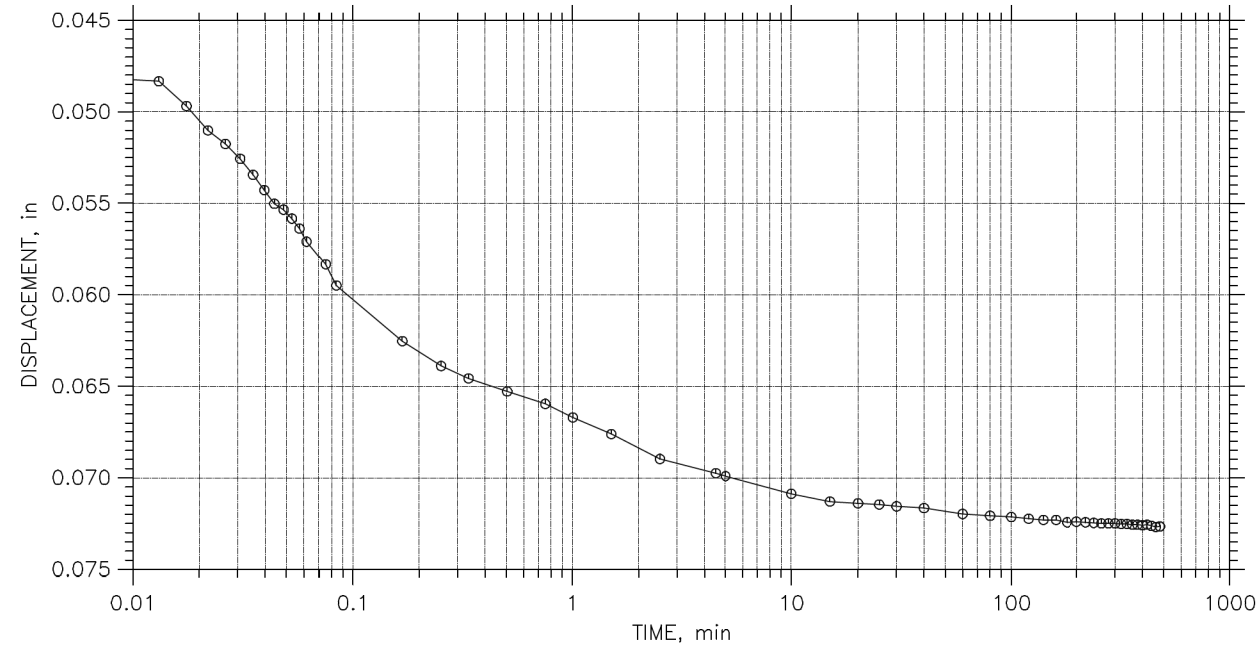
Tue, 03-SEP-2024 14:08:10



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
125	172
SHEET	TOTAL
	-

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf

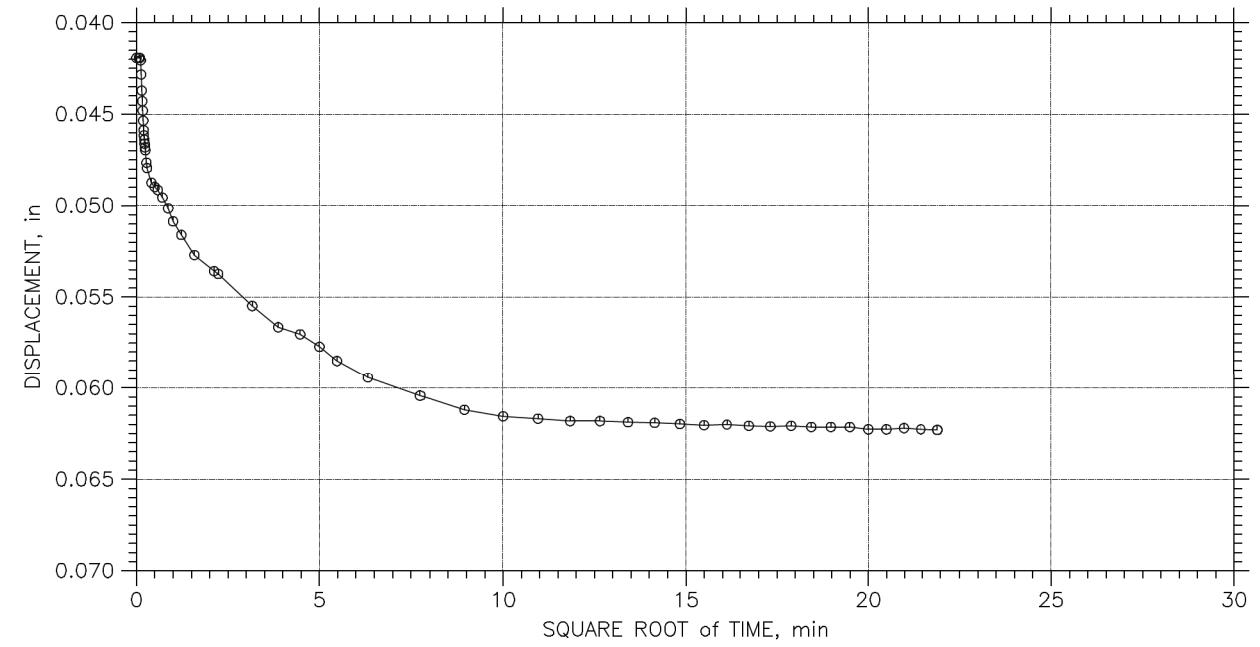
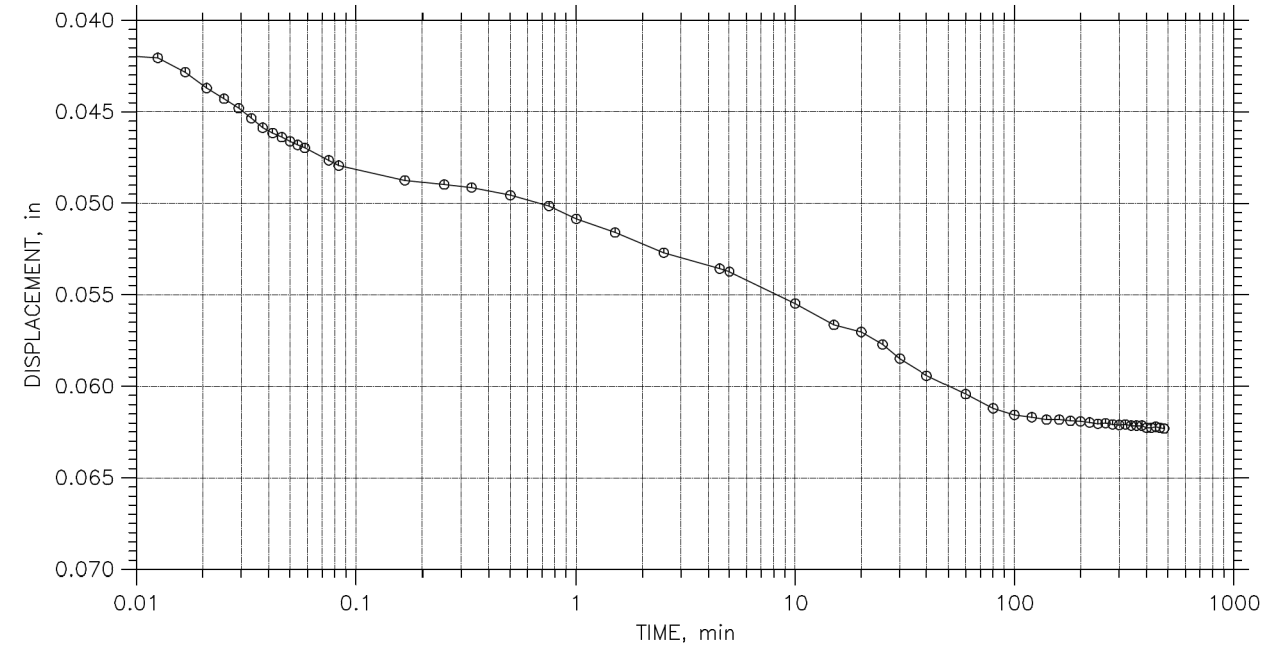


Project: ATH-MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-12	Test Date: 05/22/24	Depth: 36'-38'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Sandy Silt (A-4a)		
Remarks:		

Tue, 03-SEP-2024 14:08:11

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-035-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-11	Test Date: 04/30/24	Depth: 31'-33'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 13:59:57



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
126	172
SHEET	TOTAL
1	-

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 12:00:54 USER: ACAD
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One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
 Columbus, OH 43204

Project No.: 23050059COL
 Project: ATH/MEG-033-23.23/0.00
 Client: HNTB Ohio, Inc
 Boring No.: B-039-1-23
 Sample No.: ST-23

Sample Type: Undisturbed Specimen
 Test Date: 5/18/2024
 Checked By: SM
 Tested By: MW

Soil Description: Brown, Silt and Clay (A-6a)
 Specific Gravity: 2.646
 Initial Dry Unit Weight 106.0 pcf

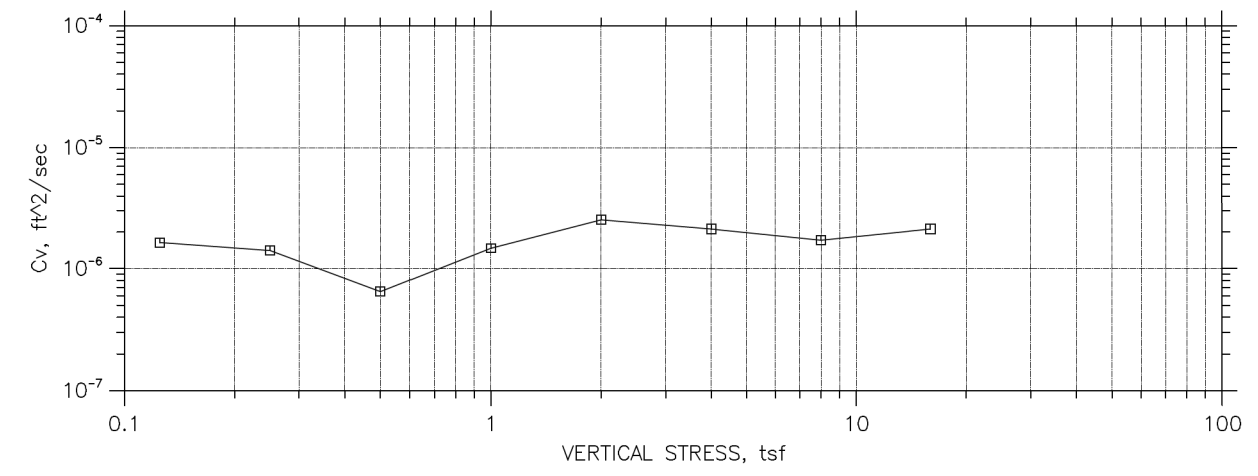
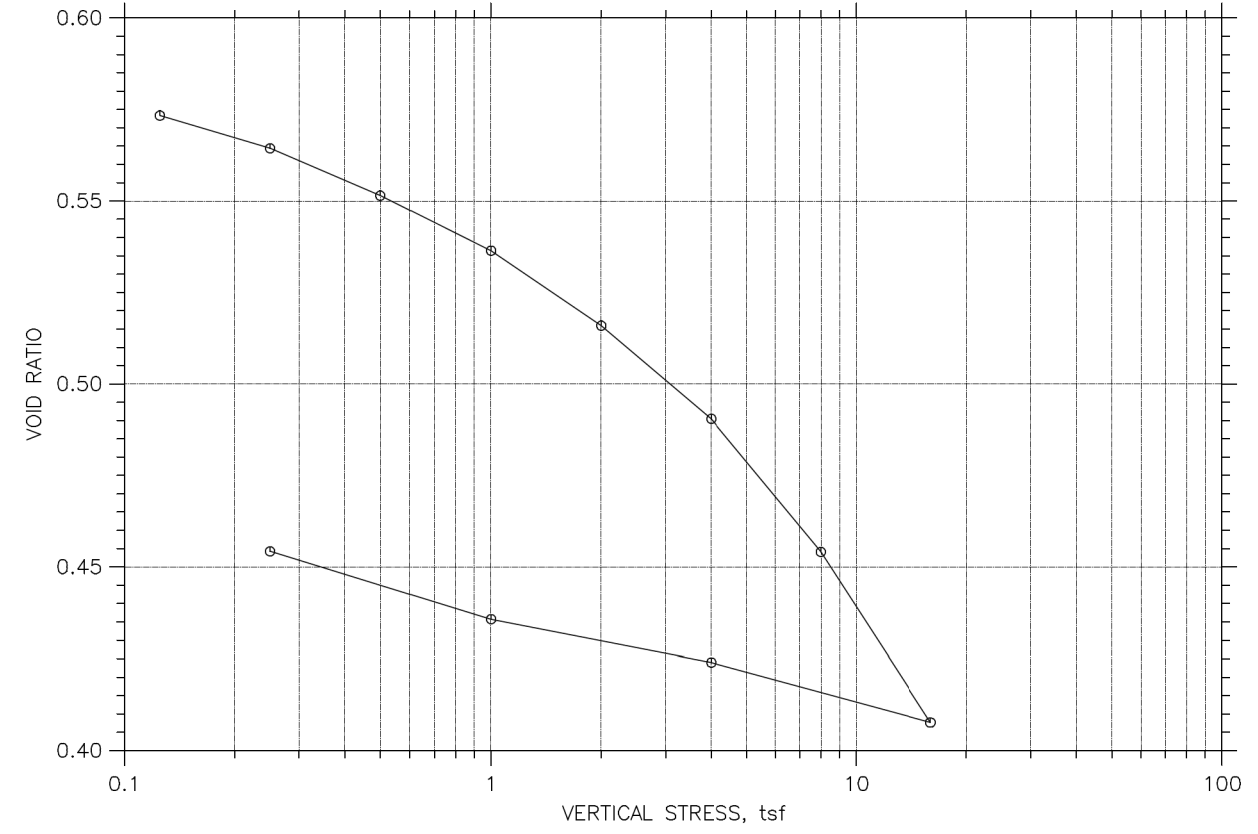
LL: 31
 PL: 18
 Initial Moisture 21.5%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.125	0.004691	0.573	0.47	12.8	1.90E-06
2	0.25	0.01032	0.564	1.04	18.3	1.31E-06
3	0.5	0.01847	0.551	1.85	28.8	8.21E-07
4	1	0.02795	0.536	2.81	14.7	1.58E-06
5	2	0.04086	0.516	4.1	14.5	1.57E-06
6	4	0.0569	0.49	5.71	8	2.74E-06
7	8	0.07981	0.454	8.01	14.9	1.42E-06
8	16	0.1091	0.408	10.95	9.7	2.06E-06
9	4	0.09876	0.424	9.92		
10	1	0.09139	0.436	9.18		
11	0.25	0.07971	0.454	8		

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 5.00	Initial Void Ratio: 0.57
Compression Index (C _c): 0.15	Compression Ratio : 0.10
Recompression Index (C _r): 0.027	Recompression Ratio: 0.017



CONSOLIDATION TEST DATA SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-23	Test Date: 05/18/24	Depth: 81'-83'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 14:09:05

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS

DESIGN AGENCY

 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER
 N.K.S

REVIEWER
 SM 11-06-24

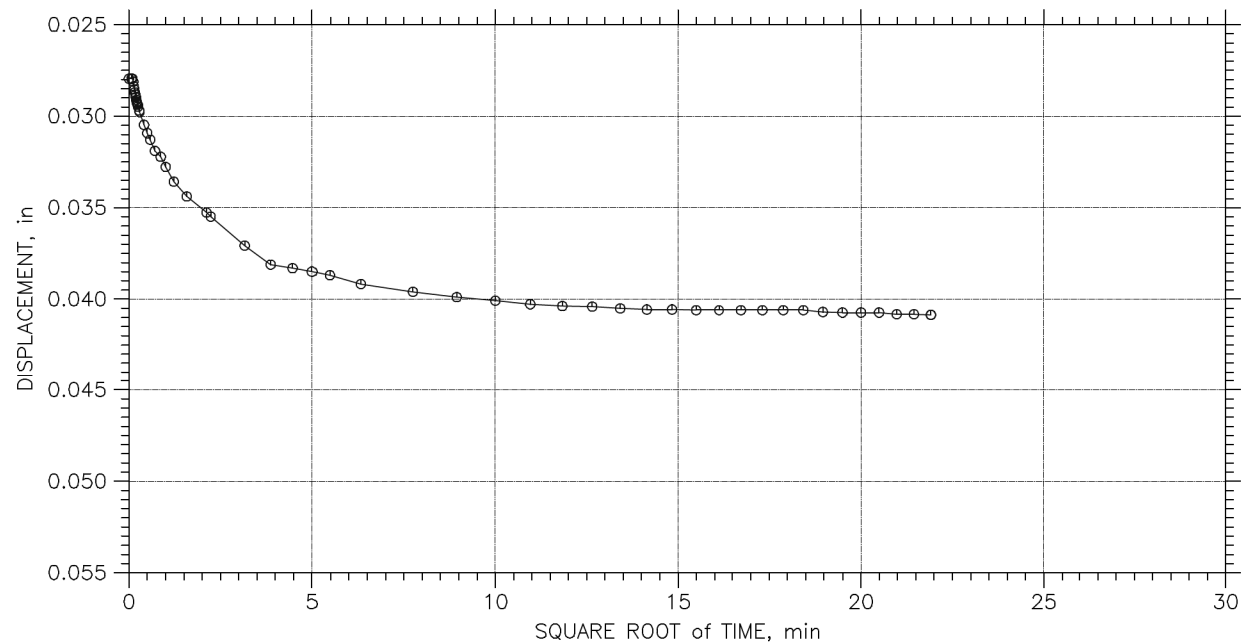
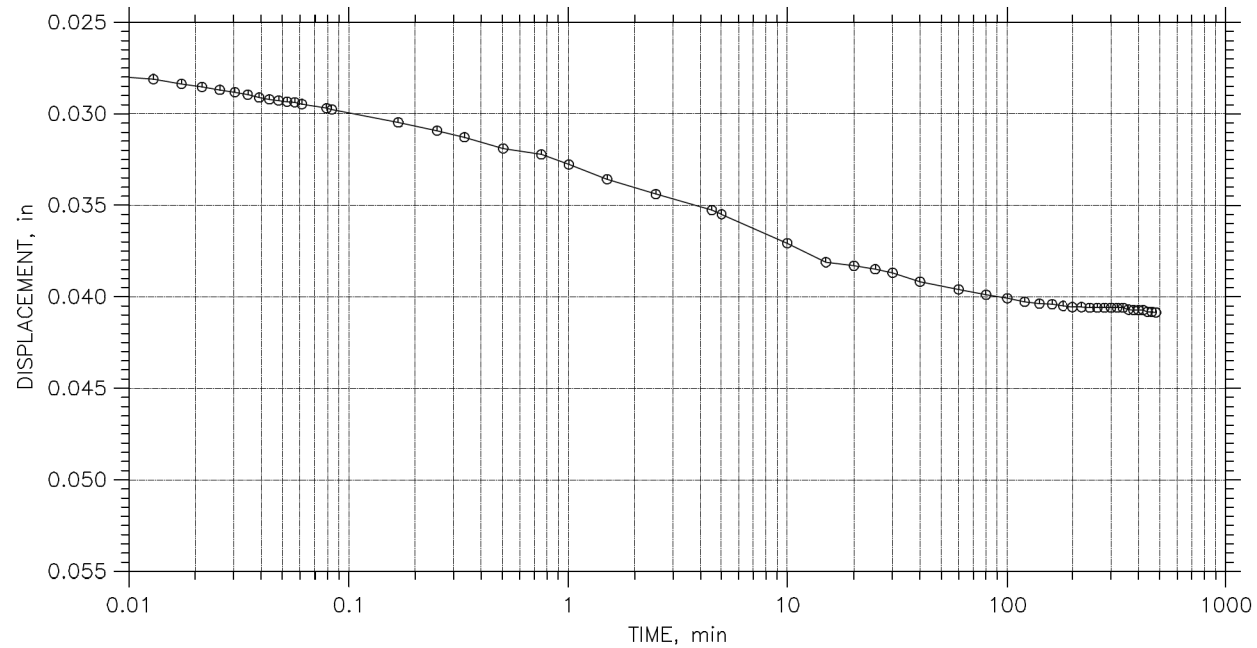
PROJECT ID
 119142

SUBSET	TOTAL
127	172

SHEET TOTAL
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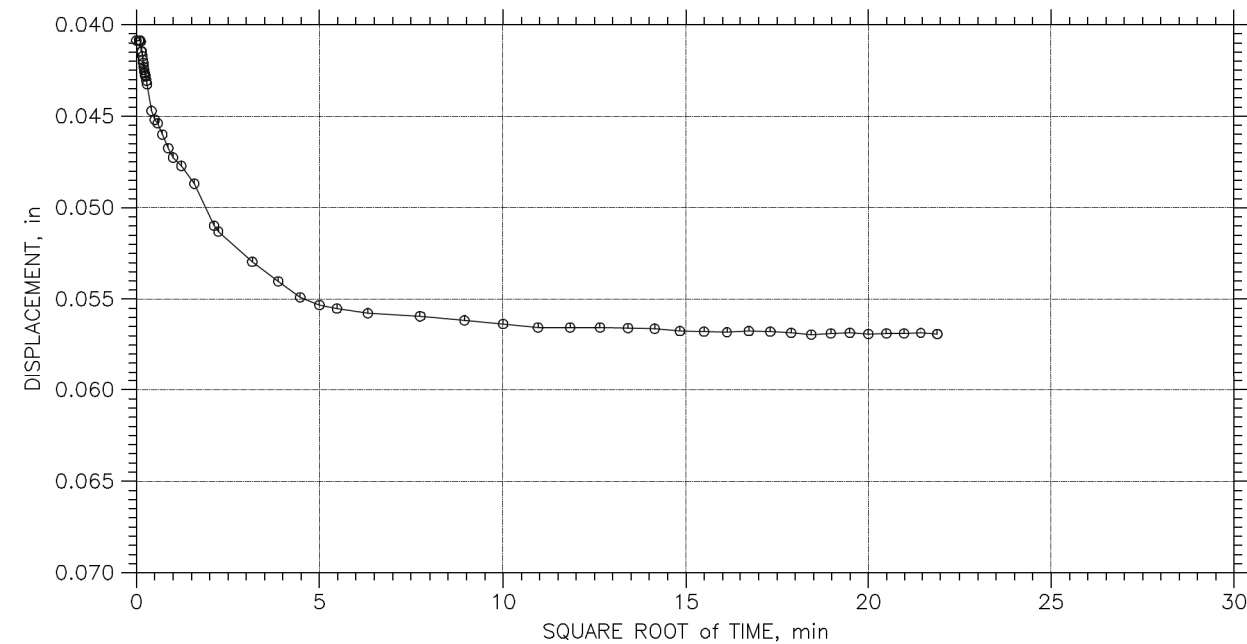
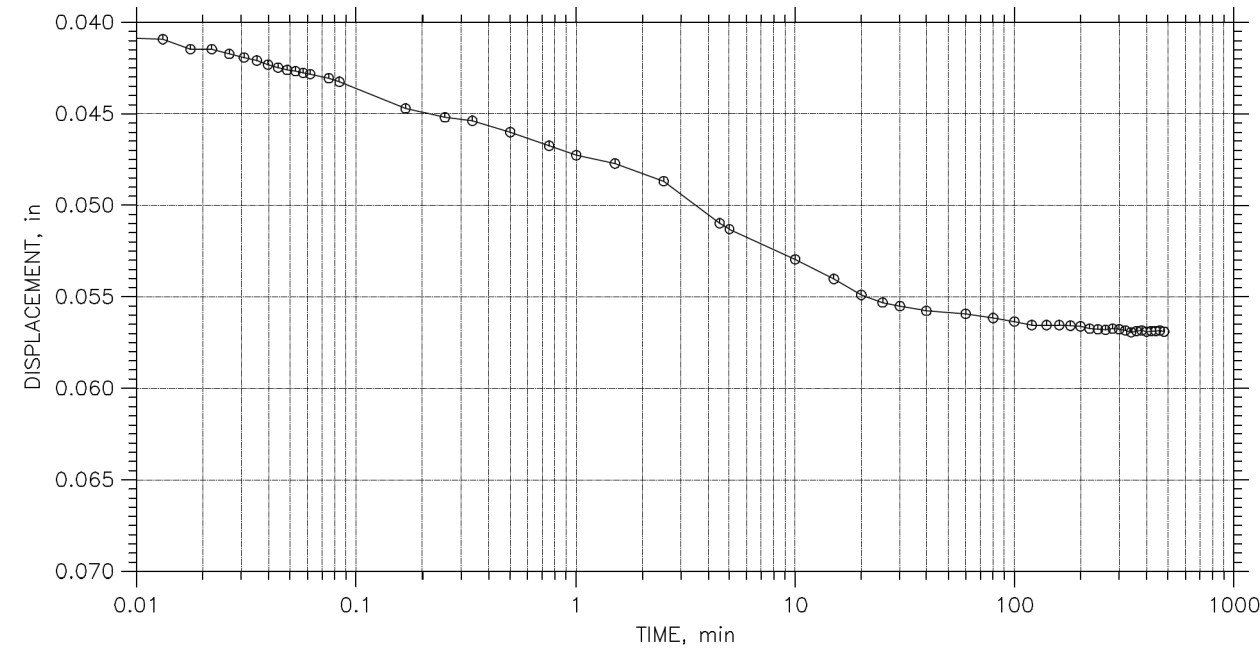
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-23	Test Date: 05/18/24	Depth: 81'-83'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 14:09:11

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-23	Test Date: 05/18/24	Depth: 81'-83'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 14:09:12



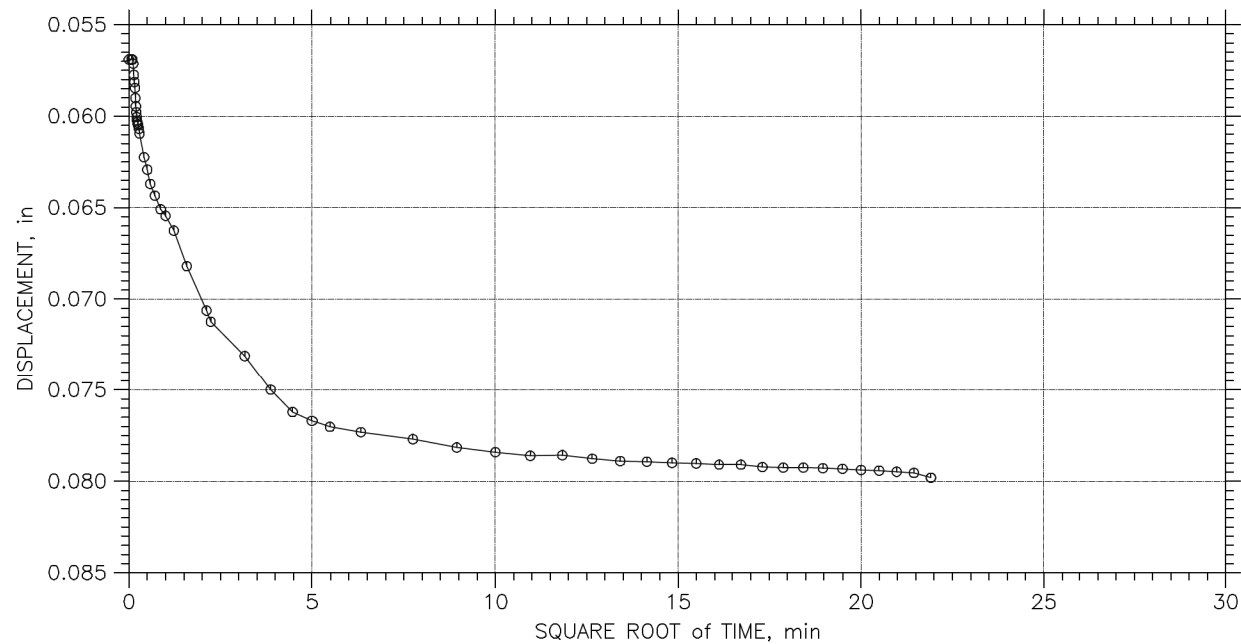
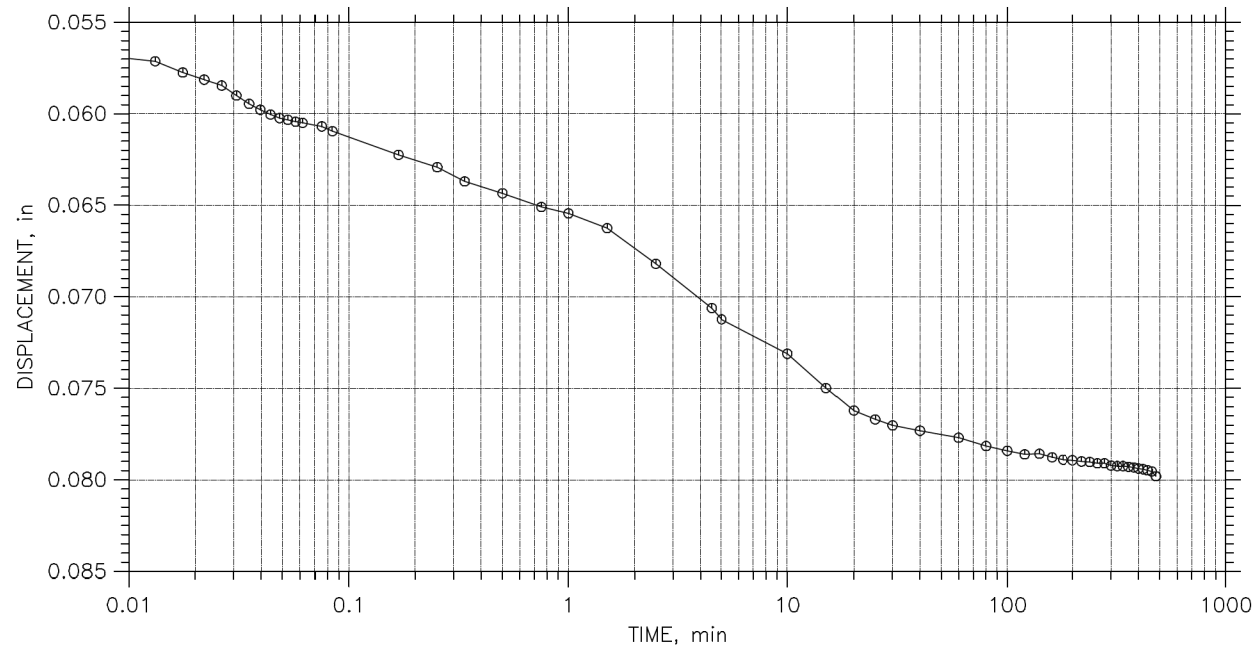
DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
128	172
SHEET	TOTAL
-	-

ATH/MEG-33-23.23/0.00

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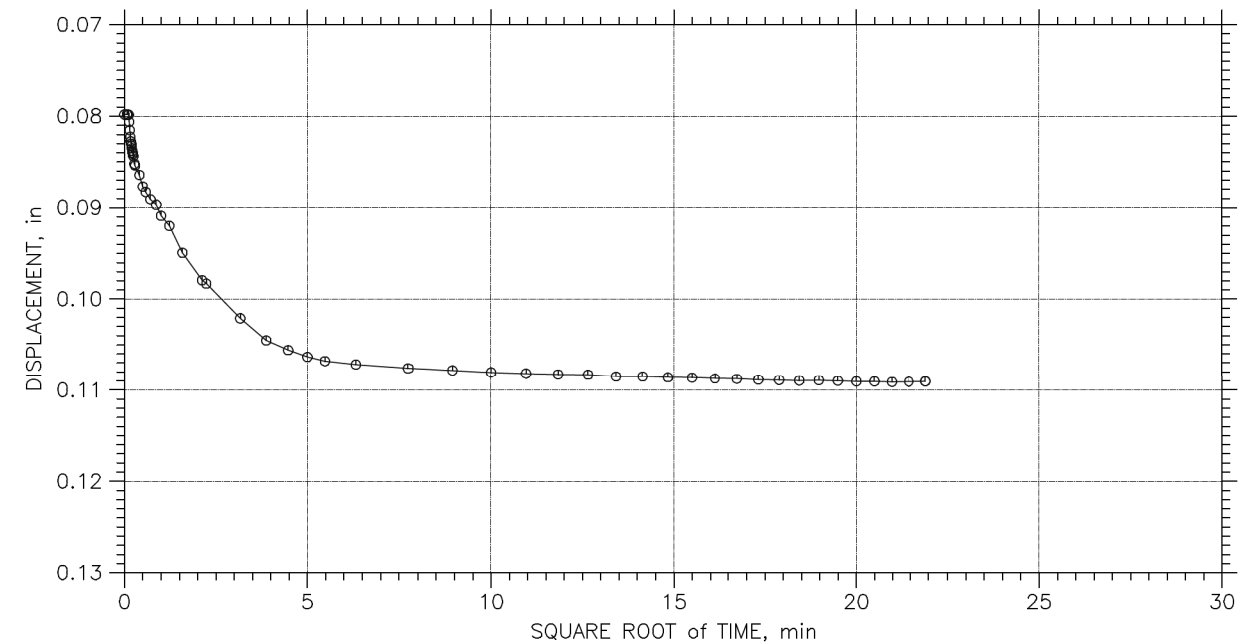
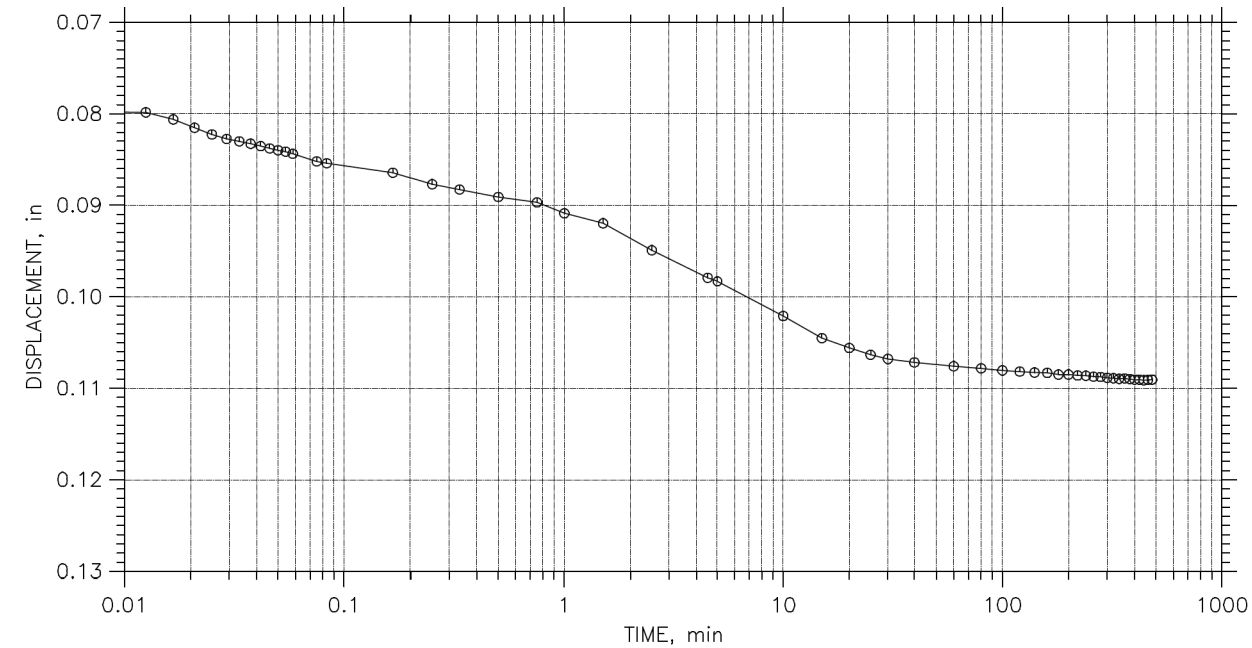
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-23	Test Date: 05/18/24	Depth: 81'-83'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 14:09:13

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-039-1-23	Tested By: MW	Checked By: SM
Sample No.: ST-23	Test Date: 05/18/24	Depth: 81'-83'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Silt and Clay (A-6a)		
Remarks:		

Tue, 03-SEP-2024 14:09:14

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
129	172
SHEET	TOTAL
1	-

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.: 23050059COL
Project: ATH/MEG-033-23.23/0.00
Client: HNTB Ohio, Inc
Boring No.: B-050-0B-23
Sample No.: ST-1

Sample Type: Undisturbed Specimen
Test Date: 5/10/2024
Checked By: SM
Tested By: MW

Soil Description: Red, Silt and Clay (A-6a)
Specific Gravity: 2.815
Initial Dry Unit Weight 115.7 pcf

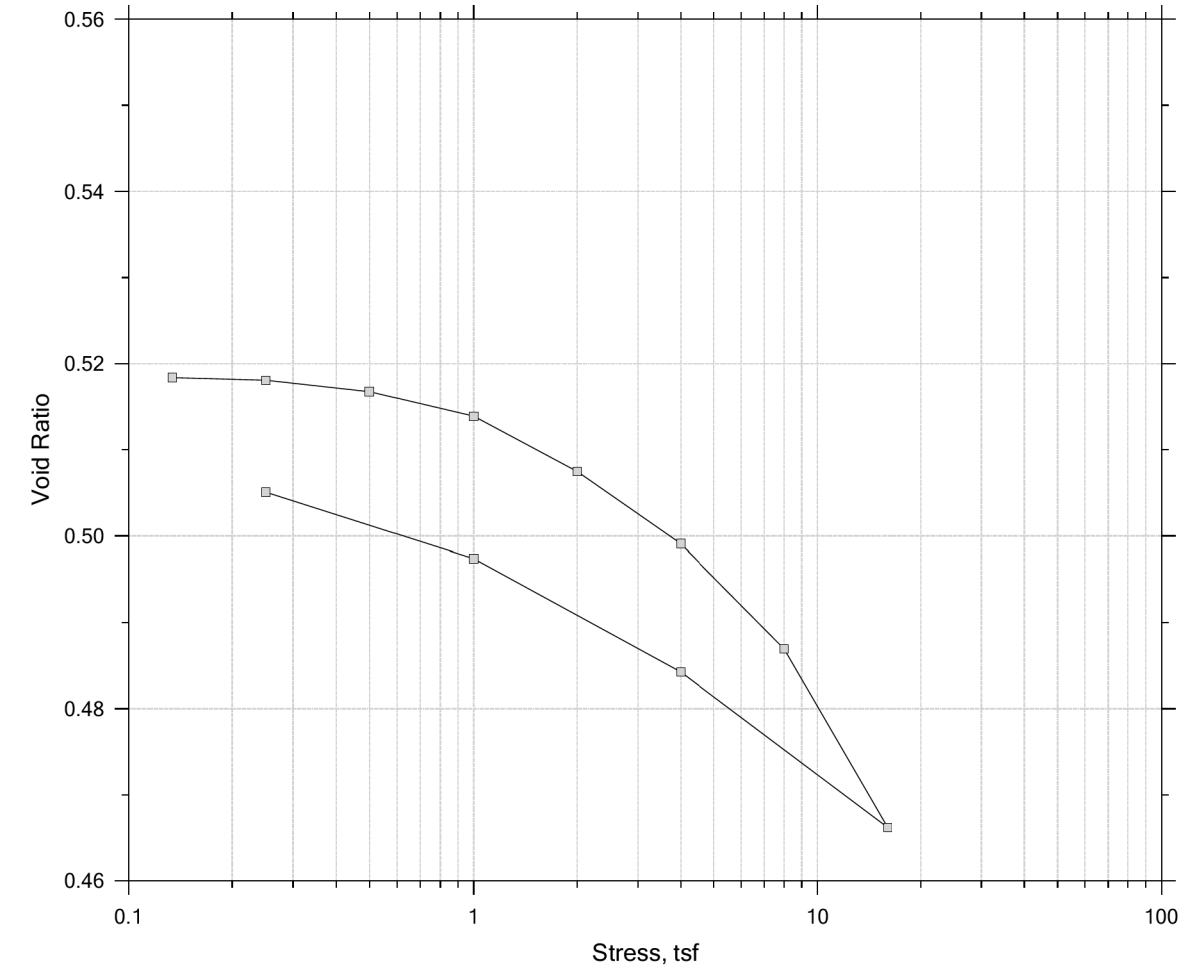
LL: 29
PL: 18
Initial Moisture 15.8%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.134	0.0004961	0.518	0.0491		
2	0.25	0.0006946	0.518	0.0688		
3	0.5	0.001588	0.517	0.157	2.503	9.97E-06
4	1	0.003473	0.514	0.344	4.909	5.07E-06
5	2	0.00774	0.507	0.767	7.06	3.50E-06
6	4	0.0133	0.499	1.32	6.39	3.83E-06
7	8	0.02138	0.487	2.12	4.402	5.49E-06
8	16	0.03518	0.466	3.48	6.473	3.65E-06
9	4	0.02317	0.484	2.3	2.751	
10	1	0.01444	0.497	1.43	6.04	
11	0.25	0.009327	0.505	0.924	11.484	

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 4.00	Initial Void Ratio: 0.52
Compression Index (C _c): 0.07	Compression Ratio: 0.05
Recompression Index (C _r): 0.030	Recompression Ratio: 0.020

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-1	Test Date: 5/09/24	Depth: 1'-3'
Test Number:	Preparation:	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		
Displacement at End of Increment		

2024-09-03 17:20:38 V 3.0.19.158

1

2024-05-10 09:42:45 V 3.0.19.158

GEOTECHNICAL PROFILE - ROADWAY
CONSOLIDATION RESULTS



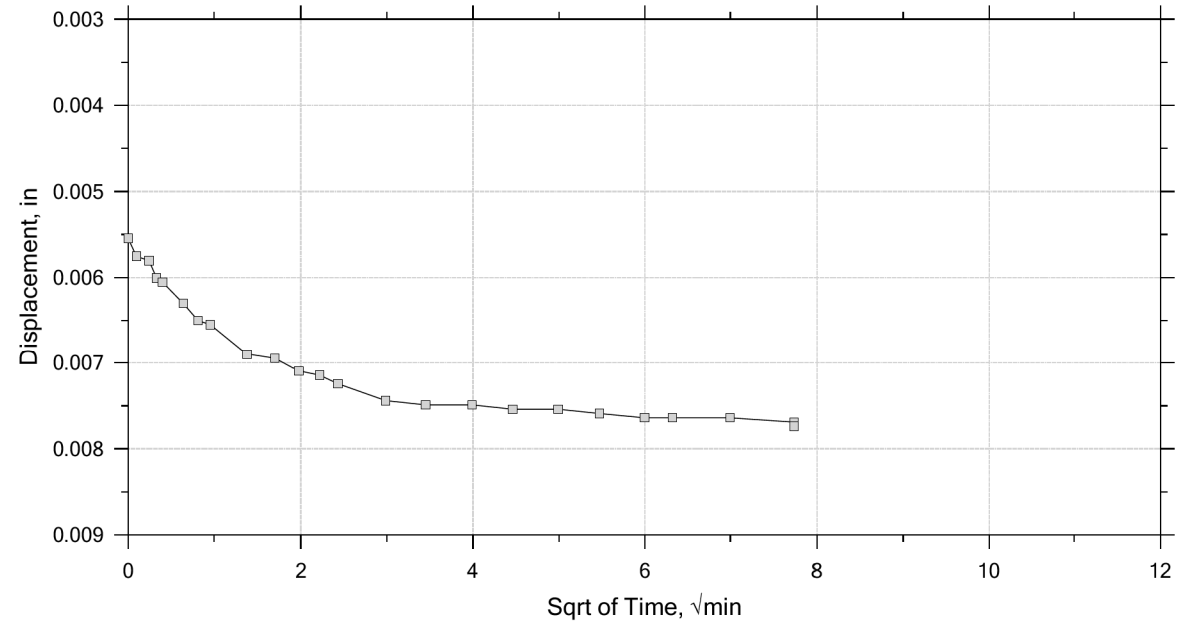
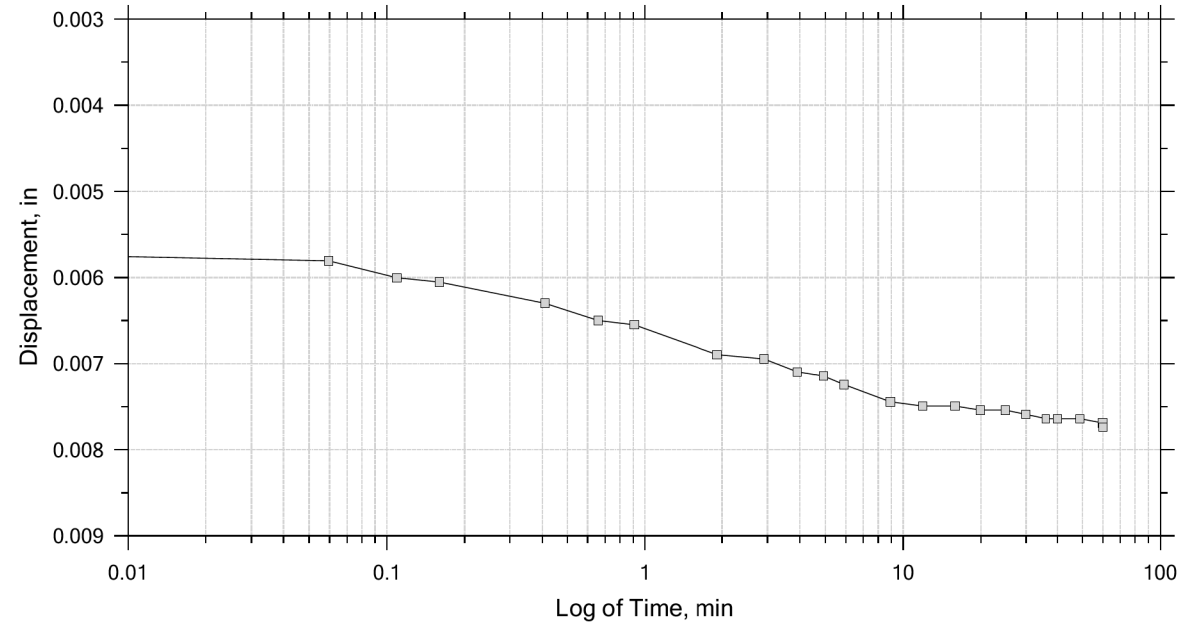
DESIGN AGENCY	DESIGNER	REVIEWER
CTL ENGINEERING	N.K.S	SM
PROJECT ID	119142	
SUBSET	TOTAL	
130	172	
SHEET	TOTAL	
	-	

ATH/MEG-33-23.23/0.00

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One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 11
 Constant Load Step
 Stress: 2 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-1	Test Date: 5/09/24	Depth: 1'-3'
Test Number:	Preparation:	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

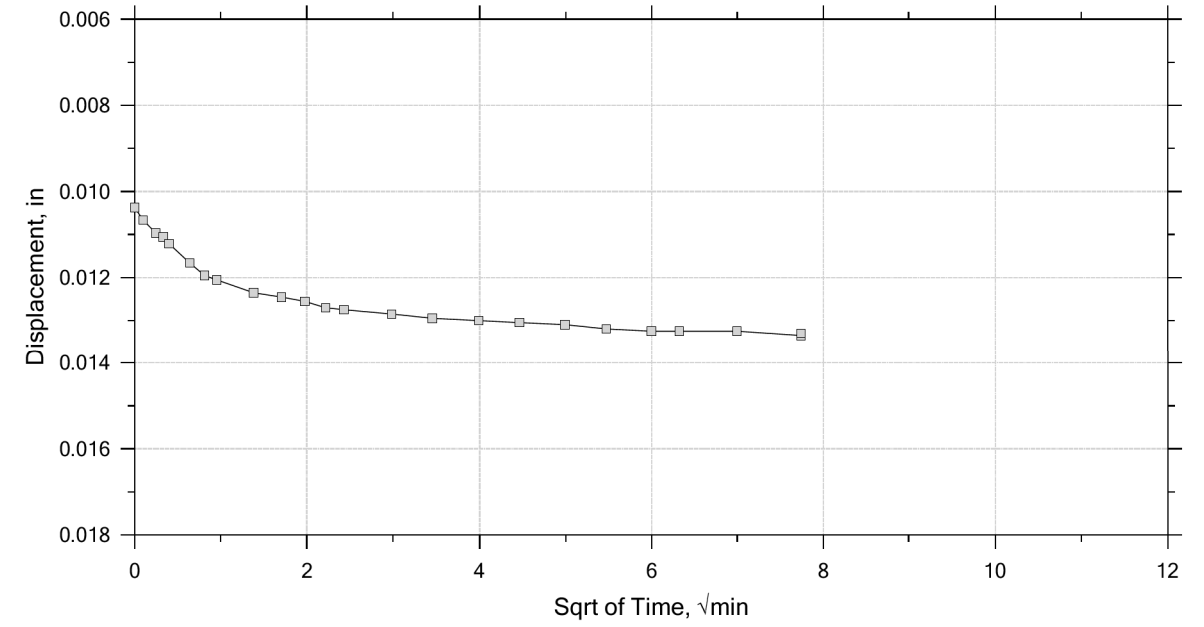
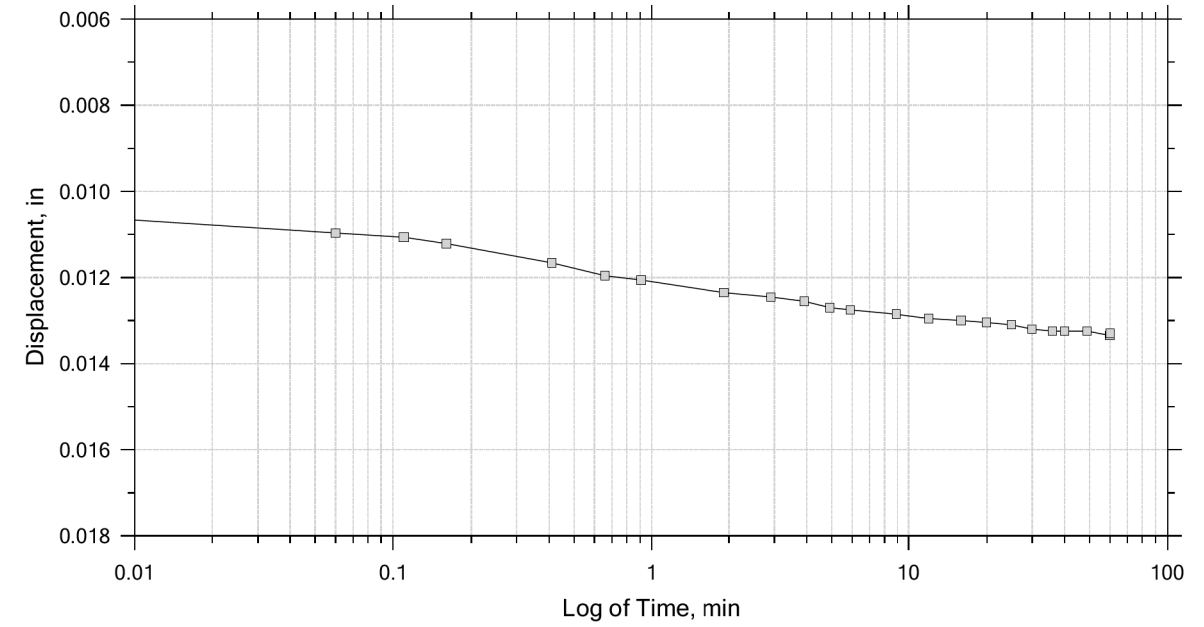
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2024-05-10 09:42:45 V 3.0.19.158

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 11
 Constant Load Step
 Stress: 4 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-1	Test Date: 5/09/24	Depth: 1'-3'
Test Number:	Preparation:	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

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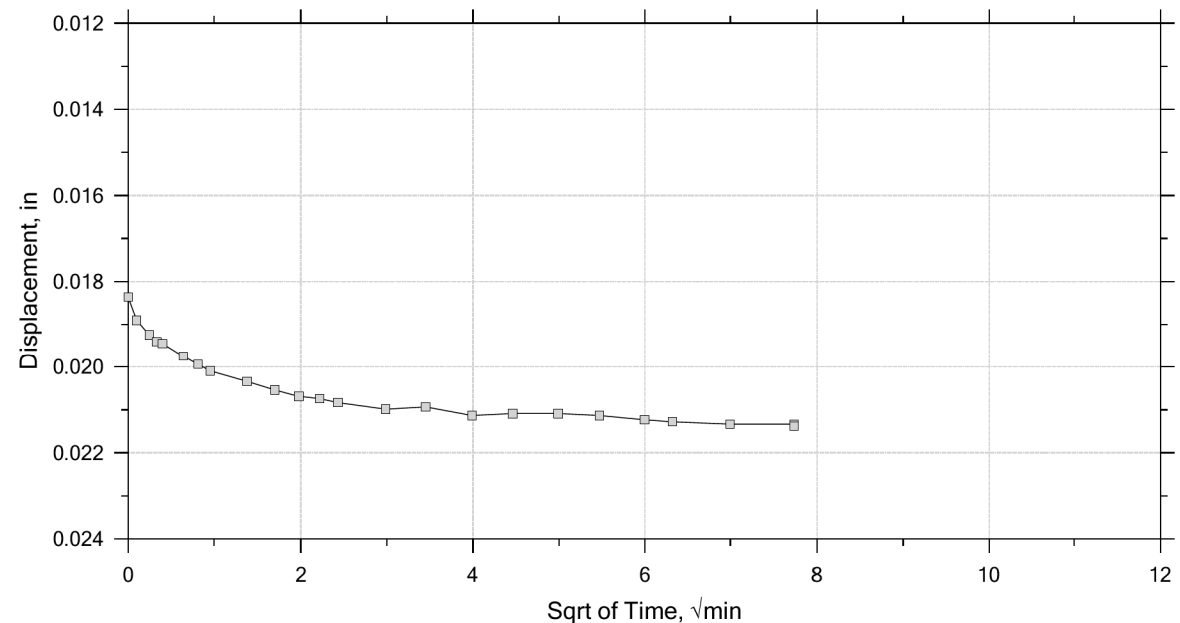
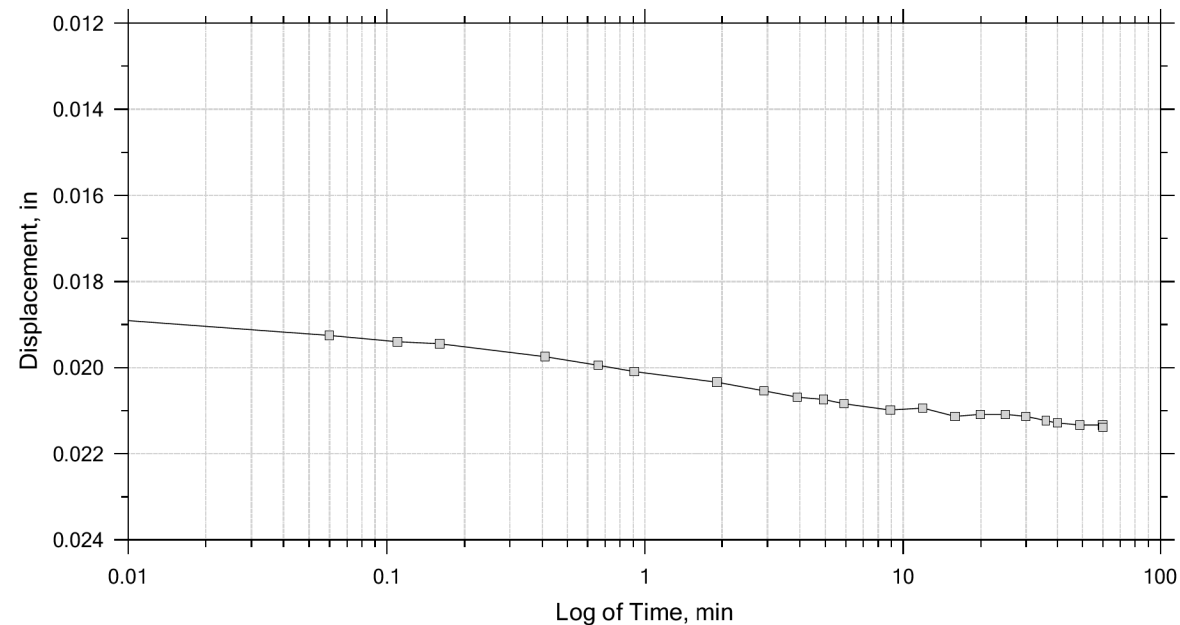
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DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
131	172
SHEET	TOTAL
1	1

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 11
 Constant Load Step
 Stress: 8 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-1	Test Date: 5/09/24	Depth: 1'-3'
Test Number:	Preparation:	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

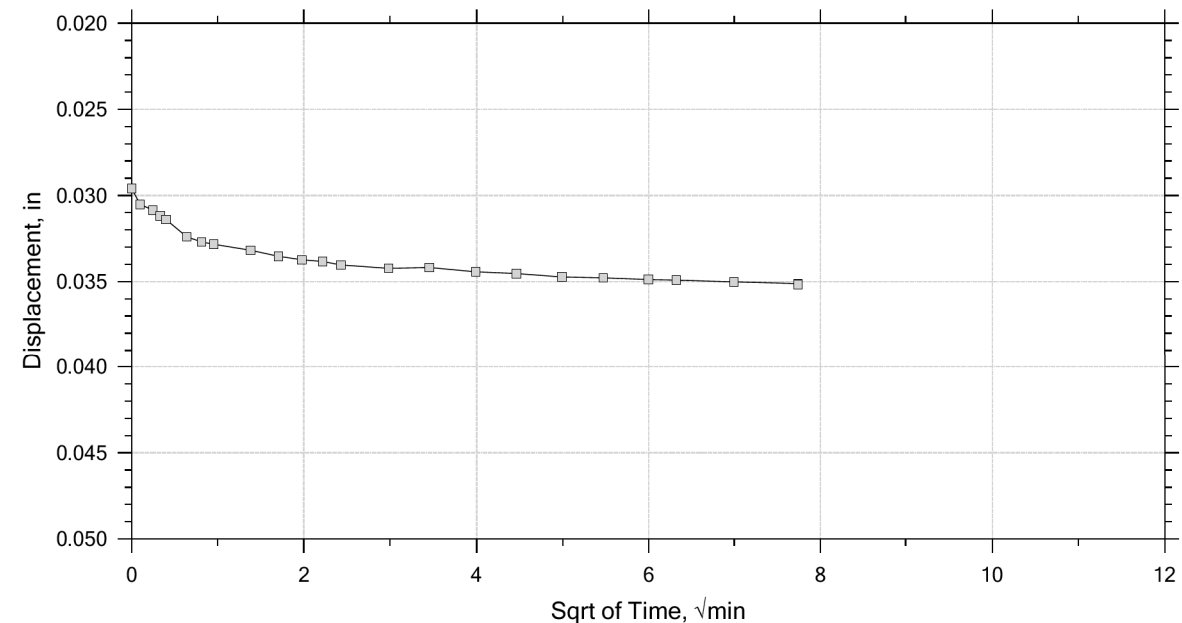
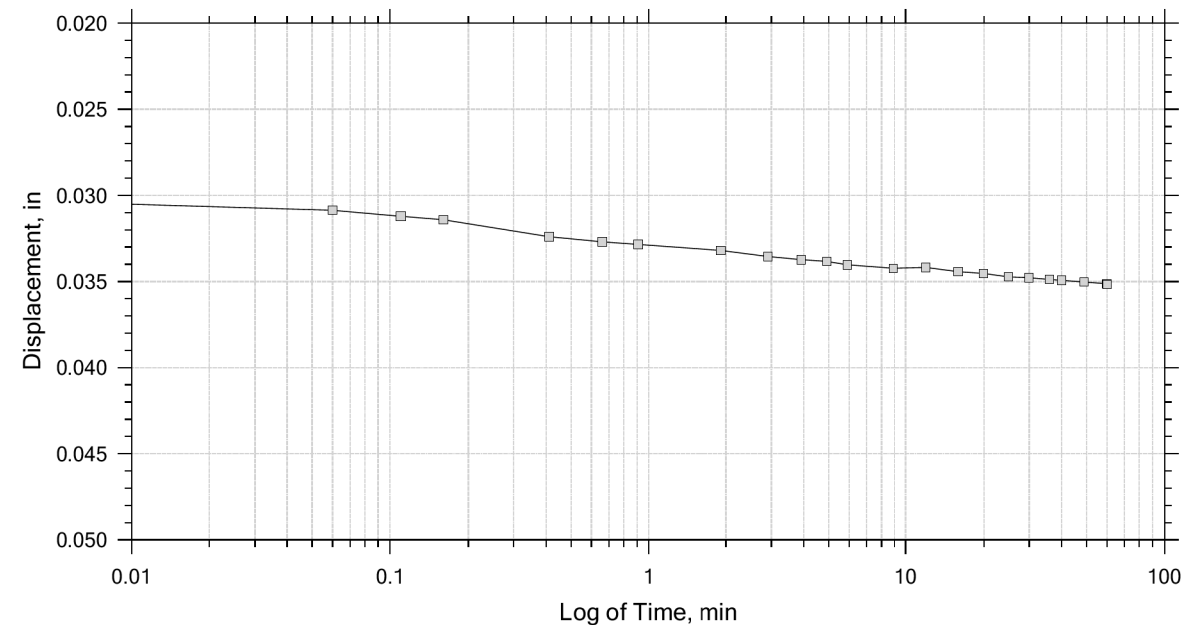
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2024-05-10 09:42:45 V 3.0.19.158

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 11
 Constant Load Step
 Stress: 16 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-1	Test Date: 5/09/24	Depth: 1'-3'
Test Number:	Preparation:	Elevation:
Description: Red, Silt and Clay (A-6a)		
Remarks:		

2024-09-03 17:20:39 V 3.0.19.158

11

2024-05-10 09:42:45 V 3.0.19.158

DESIGN AGENCY



DESIGNER

N.K.S

REVIEWER

SM 11-06-24

PROJECT ID

119142

SUBSET TOTAL

132 172

SHEET TOTAL

1 -

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
 Columbus, OH 43204

Project No.: 23050059COL
 Project: ATH/MEG-033-23.23/0.00
 Client: HNTB Ohio, Inc
 Boring No.: B-050-0B-23
 Sample No.: ST-2

Sample Type: Undisturbed Specimen
 Test Date: 5/12/2024
 Checked By: SM
 Tested By: MW

Soil Description: Red, Clay (A-7-6)
 Specific Gravity: 2.767
 Initial Dry Unit Weight 93.7 pcf

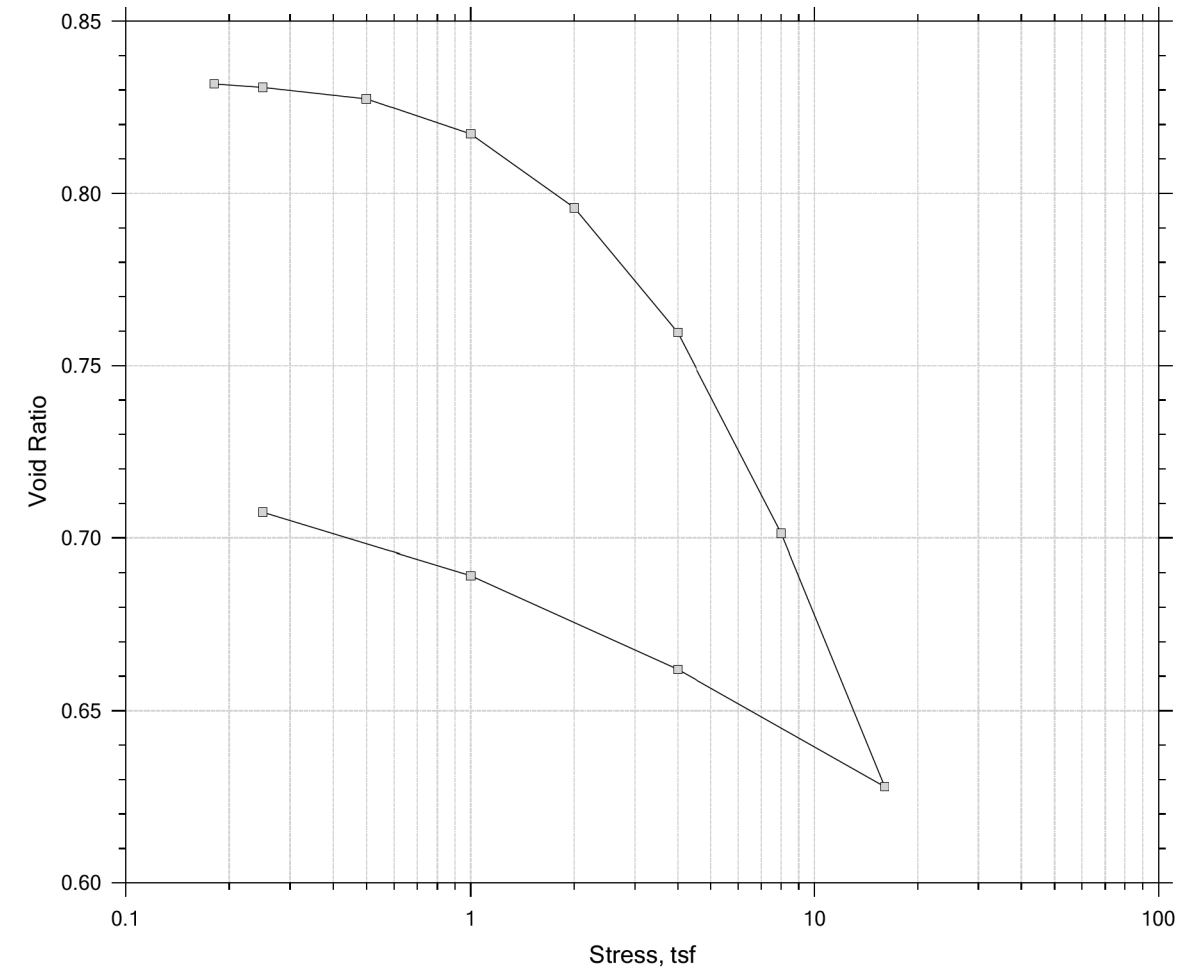
LL: 55
 PL: 27
 Initial Moisture 27.4%

Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.181	0.006152	0.832	0.613		
2	0.25	0.006698	0.831	0.667		
3	0.5	0.008484	0.827	0.845	32.115	7.58E-07
4	1	0.01404	0.817	1.4	7.417	3.26E-06
5	2	0.0257	0.796	2.56	13.584	1.75E-06
6	4	0.04545	0.76	4.53	7.593	3.03E-06
7	8	0.0772	0.701	7.69	18.359	1.19E-06
8	16	0.1172	0.628	11.7	38.193	5.28E-07
9	4	0.09863	0.662	9.83	25.404	
10	1	0.0838	0.689	8.35	55.647	
11	0.25	0.07387	0.707	7.36		

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 3.00	Initial Void Ratio: 0.83
Compression Index (C _c): 0.24	Compression Ratio : 0.13
Recompression Index (C _r): 0.056	Recompression Ratio: 0.031

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-2	Test Date: 5/12/24	Depth: 4'-6"
Test Number:	Preparation:	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		
Displacement at End of Increment		

2024-09-03 17:35:21 V 3.0.19.158

1

2024-05-12 11:35:43 V 3.0.19.158

**GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS**



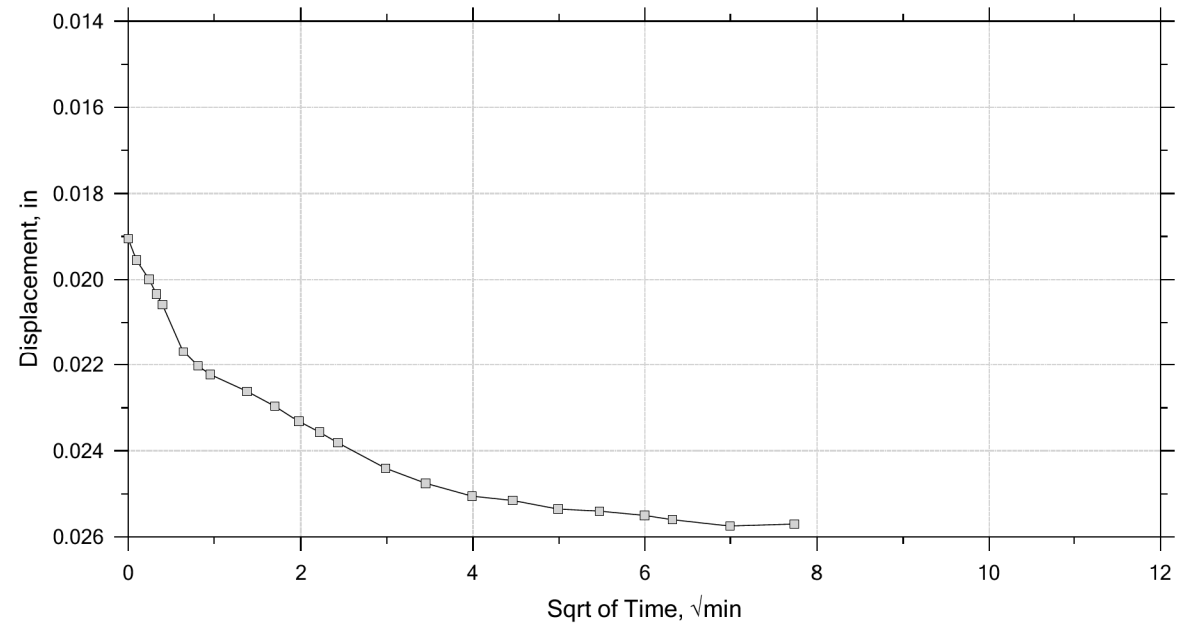
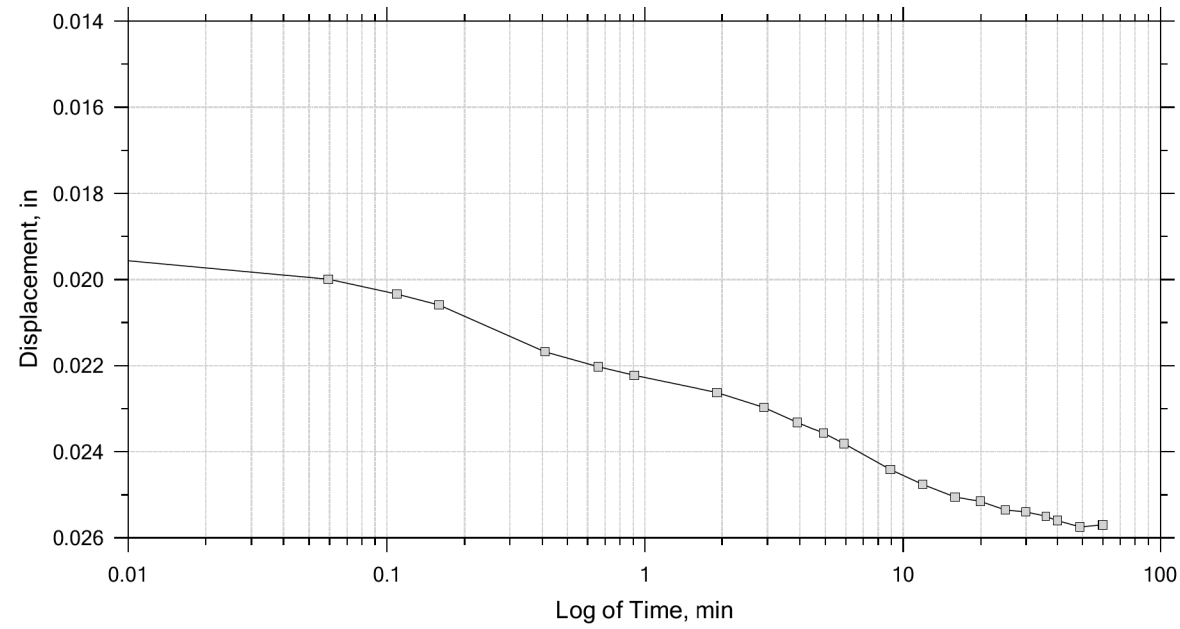
DESIGN AGENCY	DESIGNER
CTL ENGINEERING	N.K.S
REVIEWER	
SM	11-06-24
PROJECT ID	
119142	
SUBSET	TOTAL
133	172
SHEET	TOTAL

ATH/MEG-33-23.23/0.00

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One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 11
 Constant Load Step
 Stress: 2 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-2	Test Date: 5/12/24	Depth: 4'-6"
Test Number:	Preparation:	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

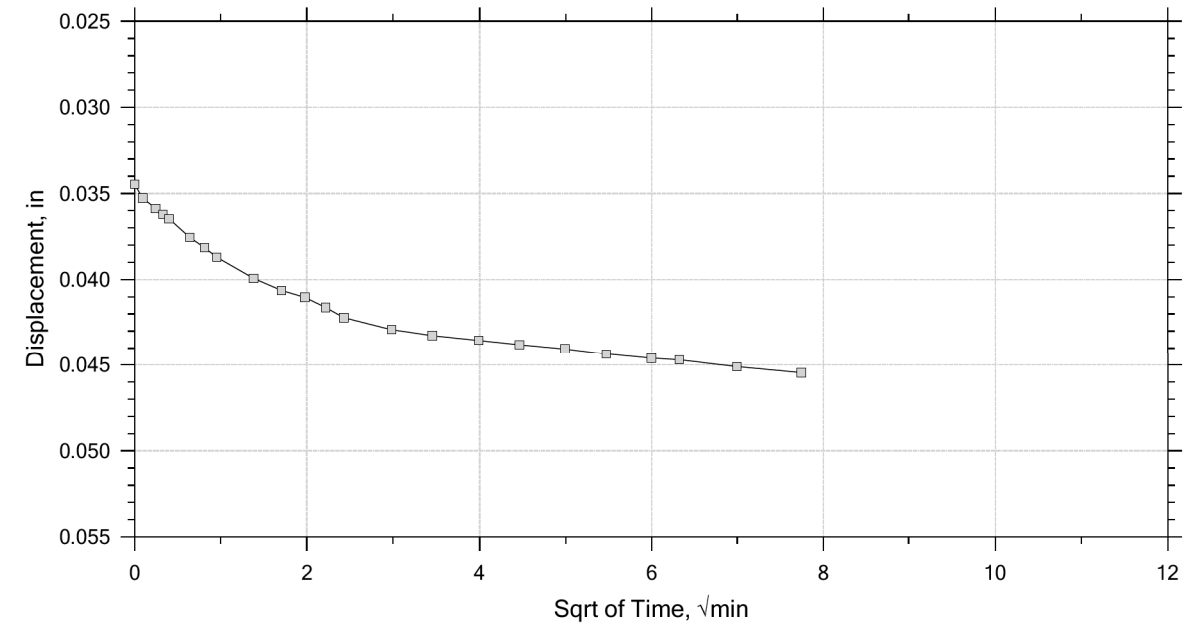
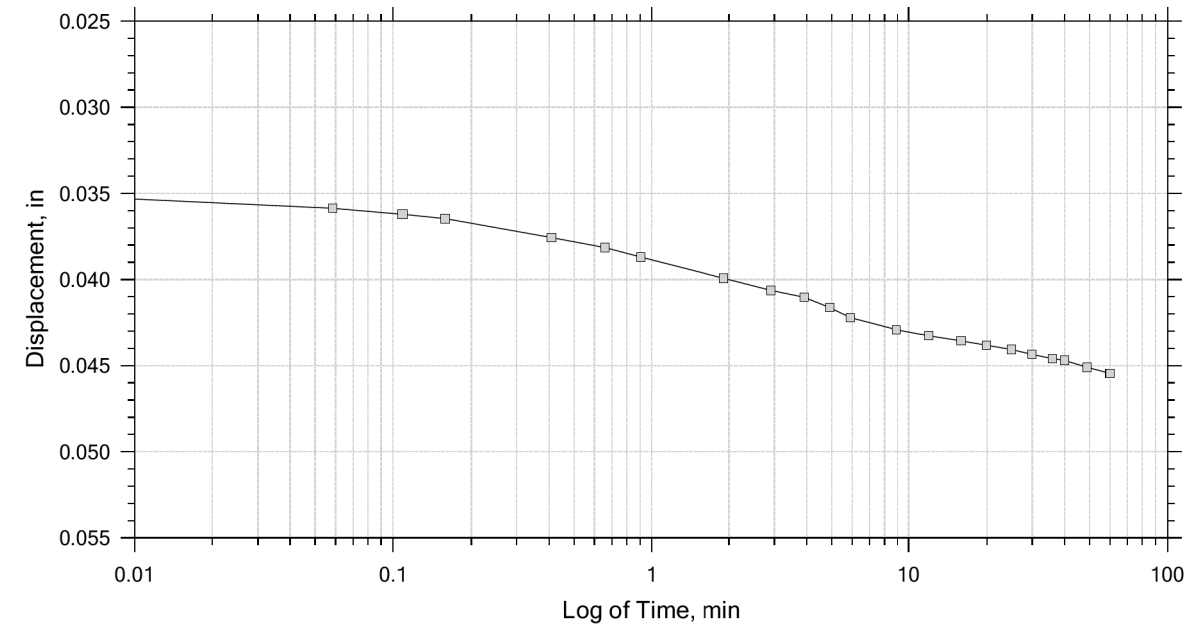
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8

2024-05-12 11:35:43 V 3.0.19.158

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 11
 Constant Load Step
 Stress: 4 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-2	Test Date: 5/12/24	Depth: 4'-6"
Test Number:	Preparation:	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

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9

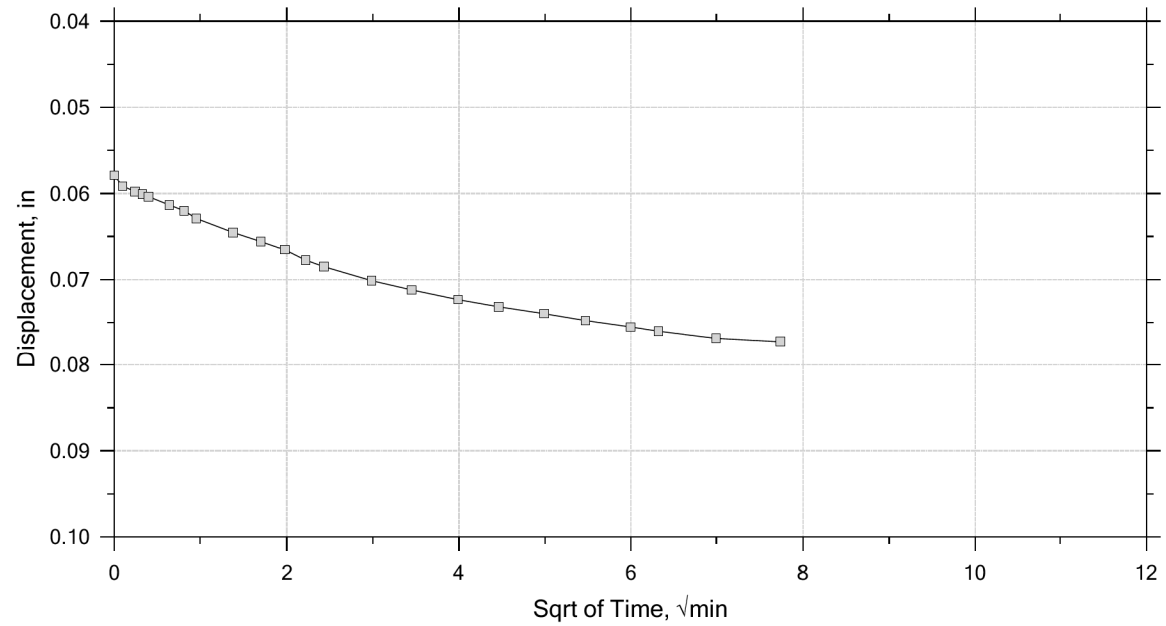
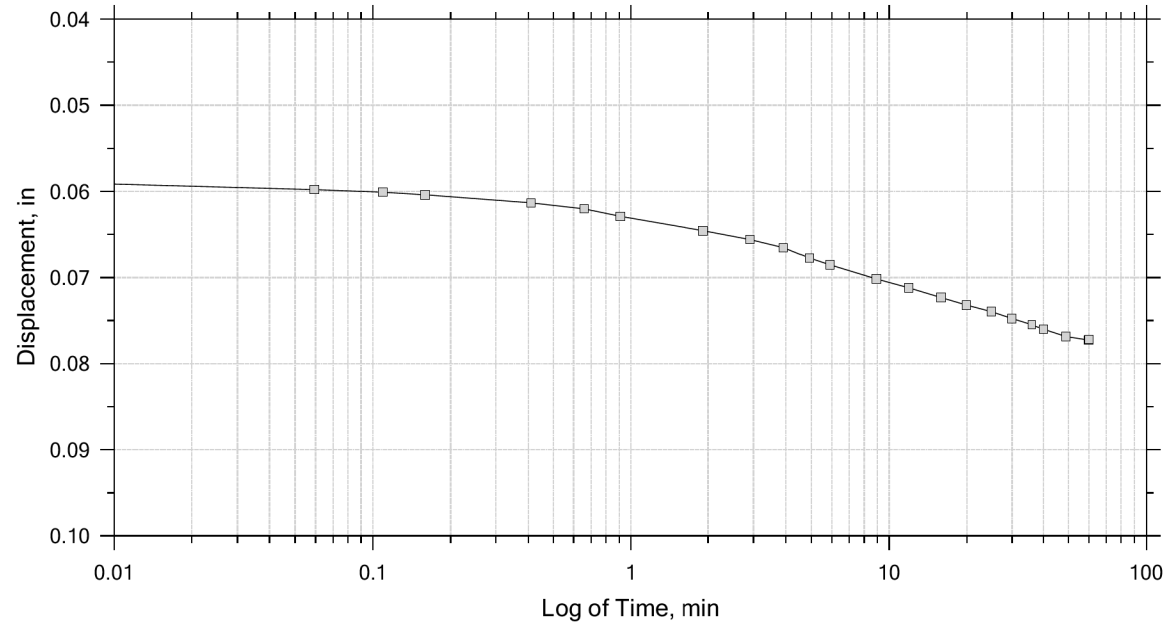
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ATH/MEG-33-23-23/0.00

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One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 11
 Constant Load Step
 Stress: 8 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-2	Test Date: 5/12/24	Depth: 4'-6"
Test Number:	Preparation:	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

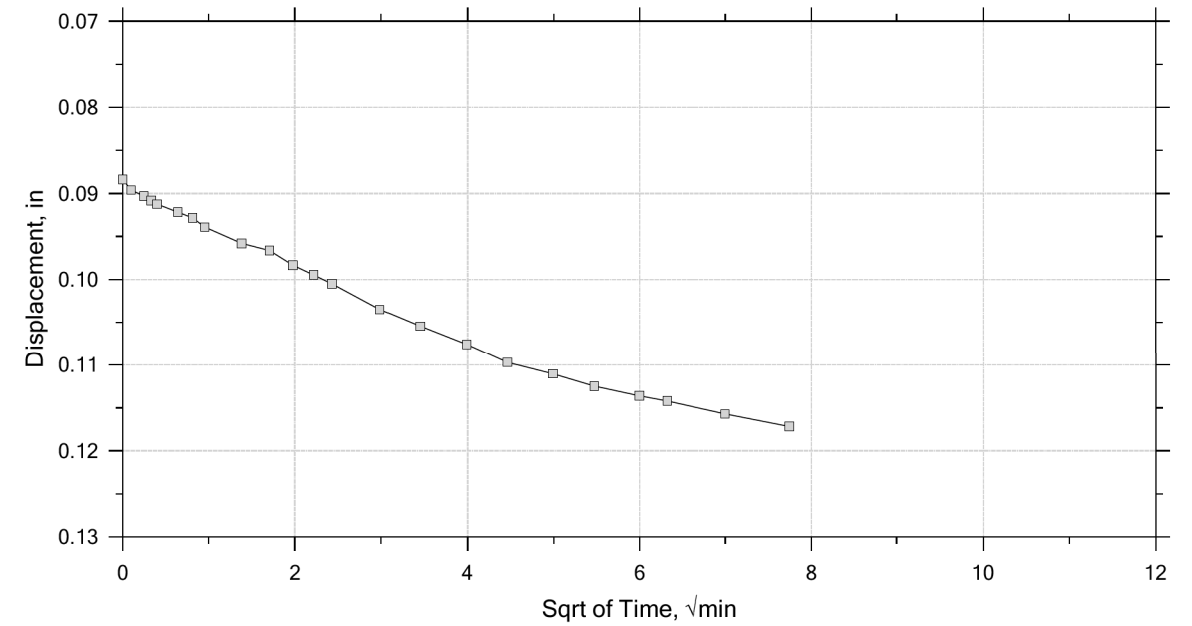
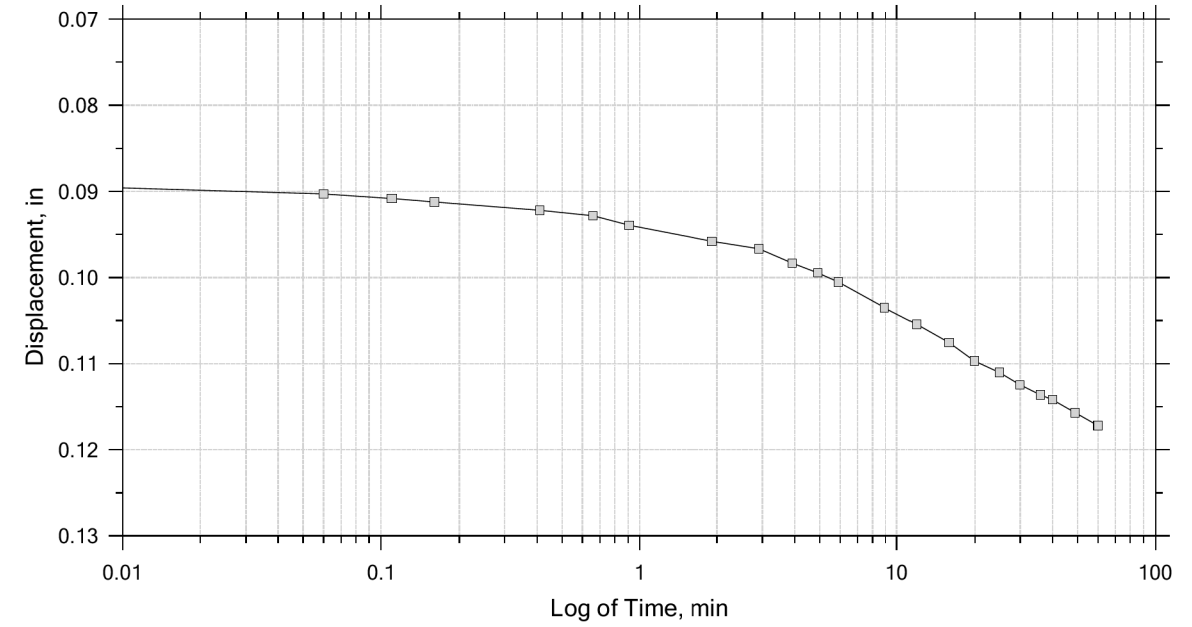
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10

2024-05-12 11:35:43 V 3.0.19.158

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 11
 Constant Load Step
 Stress: 16 tsf



Project Name: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project Number: 23050059COL
Boring Number: B-050-0B-23	Tester: DS	Checker:
Sample Number: ST-2	Test Date: 5/12/24	Depth: 4'-6"
Test Number:	Preparation:	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

2024-09-03 17:35:21 V 3.0.19.158

11

2024-05-12 11:35:43 V 3.0.19.158

GEOTECHNICAL PROFILE - ROADWAY
 CONSOLIDATION RESULTS

DESIGN AGENCY
GTL
 ENGINEERING
 2860 FISHER ROAD
 COLUMBUS, OHIO 43204
 PHONE: (614) 276-8123
 FAX: (614) 276-8377

DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
135	172
SHEET	TOTAL
-	-

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.: 23050059COL
Project: ATH/MEG-033-23.23/0.00
Client: HNTB Ohio, Inc
Boring No.: B-052-0A-23
Sample No.: ST-1

Sample Type: Undisturbed Specimen
Test Date: 5/9/2024
Checked By: SM
Tested By: MW

Soil Description: Red Clay (A-7-6)
Specific Gravity: 2.641
Initial Dry Unit Weight 97.7 pcf

LL: 49
PL: 20
Initial Moisture 30.8%

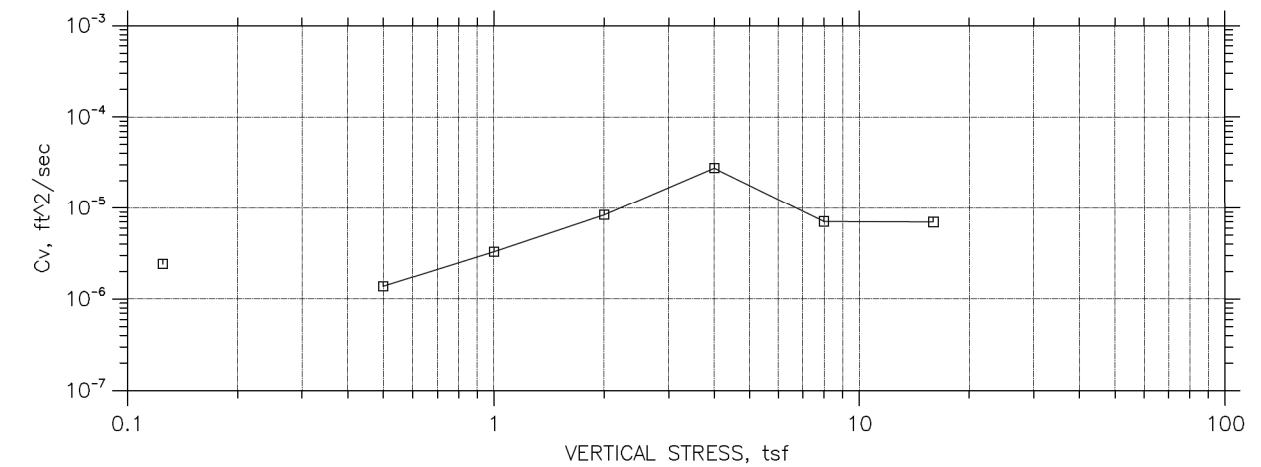
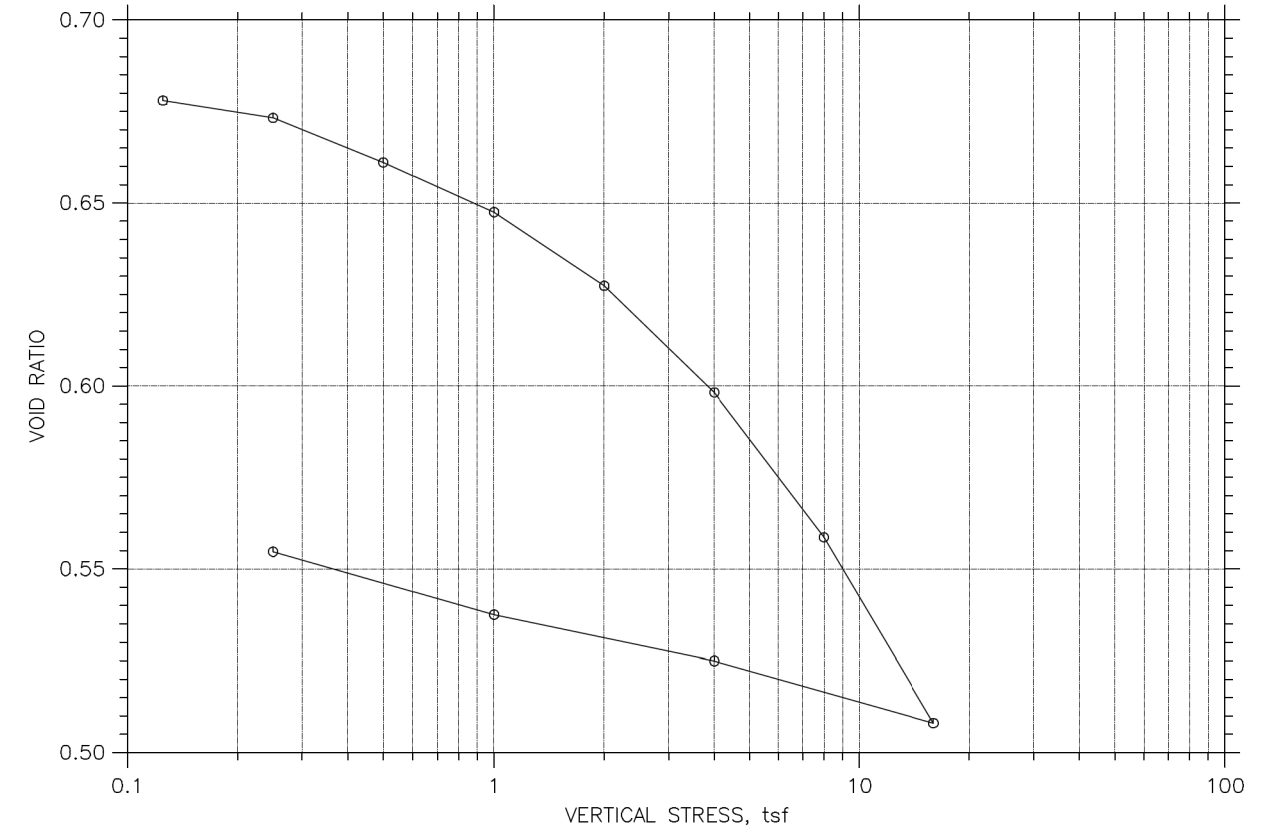
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T_{90} (min)	C_v (ft ² /sec)
1	0.125	0.004723	0.678	0.47		
2	0.25	0.007538	0.673	0.75		
3	0.5	0.01475	0.661	1.48	19.4	1.24E-06
4	1	0.02281	0.647	2.28	9.6	2.46E-06
5	2	0.03474	0.627	3.47	4.8	4.81E-06
6	4	0.05202	0.598	5.2	1.5	1.54E-05
7	8	0.0755	0.559	7.55	4.4	4.89E-06
8	16	0.1055	0.508	10.55	4.4	4.63E-06
9	4	0.0955	0.525	9.55	0.2	
10	1	0.08802	0.538	8.8	9	
11	0.25	0.07783	0.555	7.78	34.6	

CONSOLIDATION PARAMETERS

Preconsolidation Pressure (tsf): 2.00 Initial Void Ratio: 0.68
Compression Index (C_c): 0.17 Compression Ratio: 0.10
Recompression Index (C_r): 0.028 Recompression Ratio: 0.017



CONSOLIDATION TEST DATA
SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-052-0A-24	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 05/09/24	Depth: 7'-9'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:27:45

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 12:12:11 USER: ACAD
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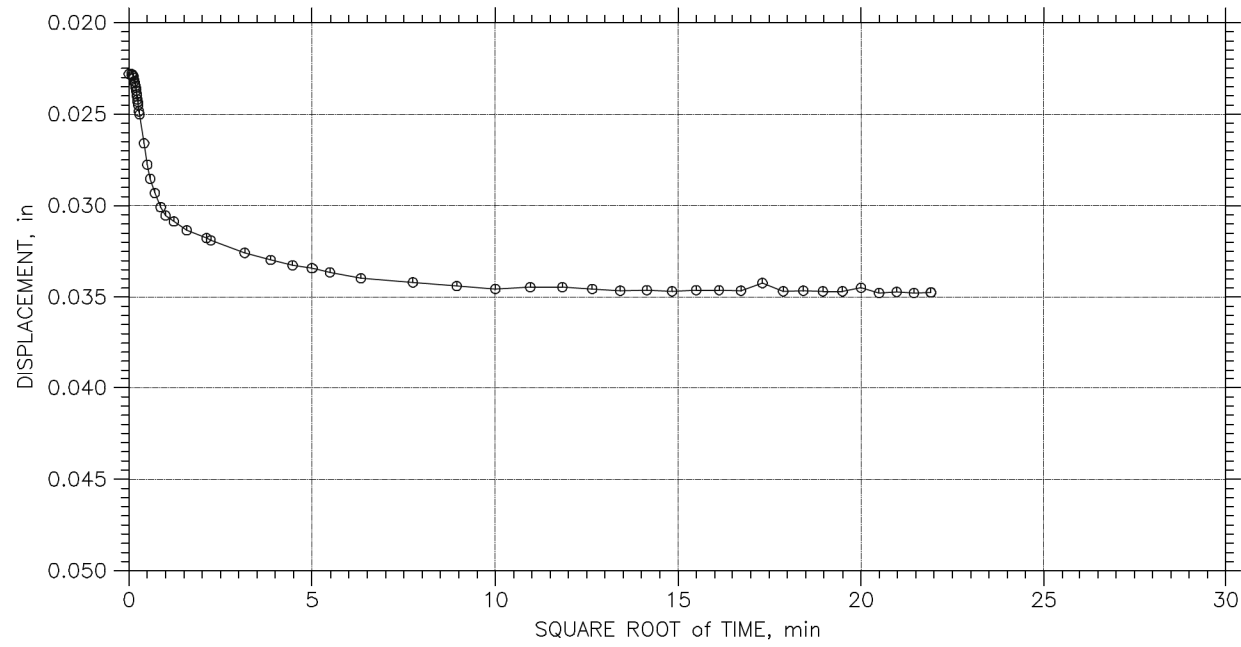
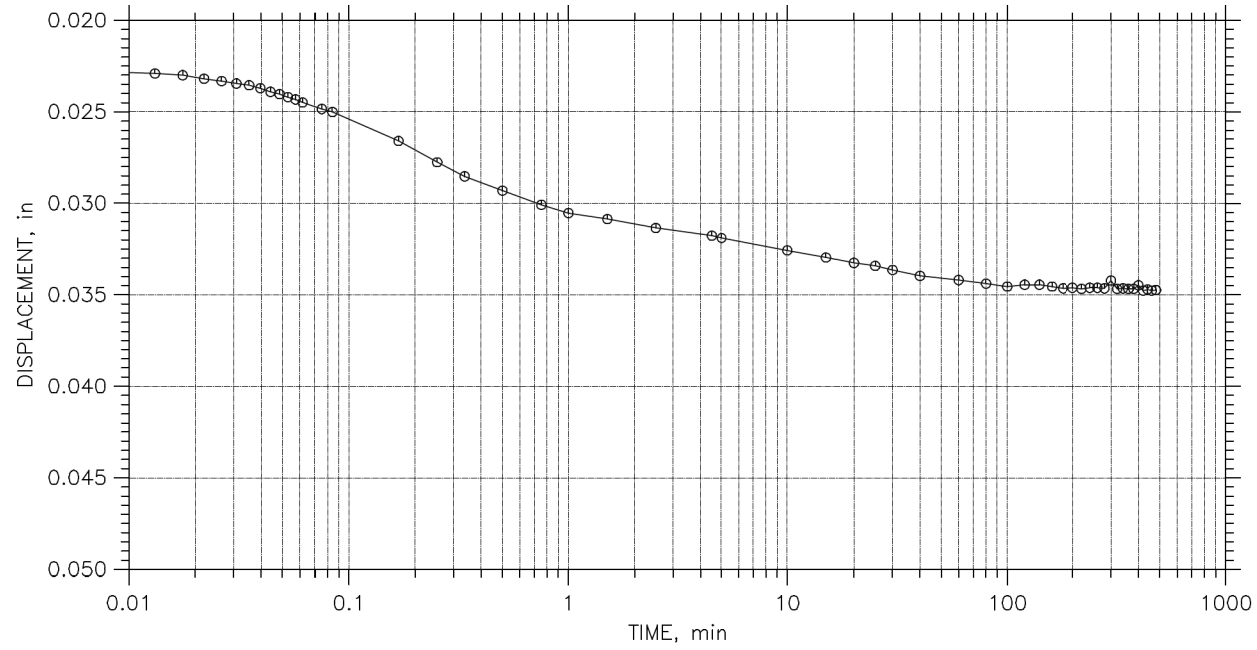
GEOTECHNICAL PROFILE - ROADWAY
CONSOLIDATION RESULTS



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
136	172
SHEET	TOTAL
-	-

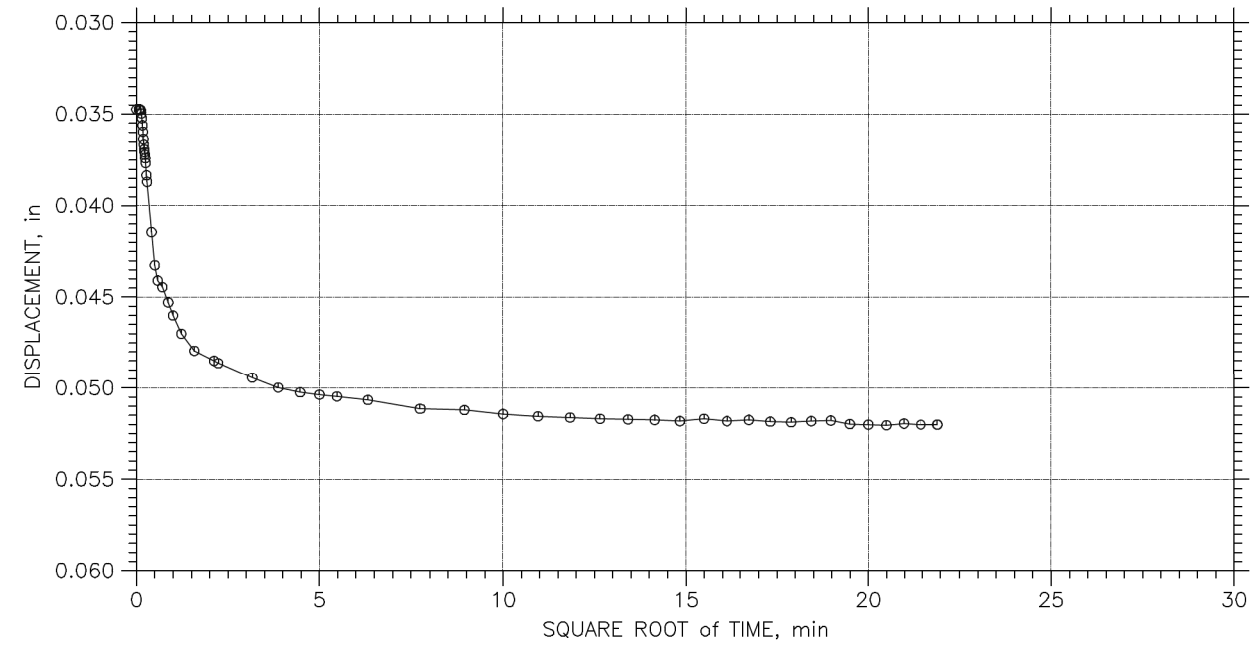
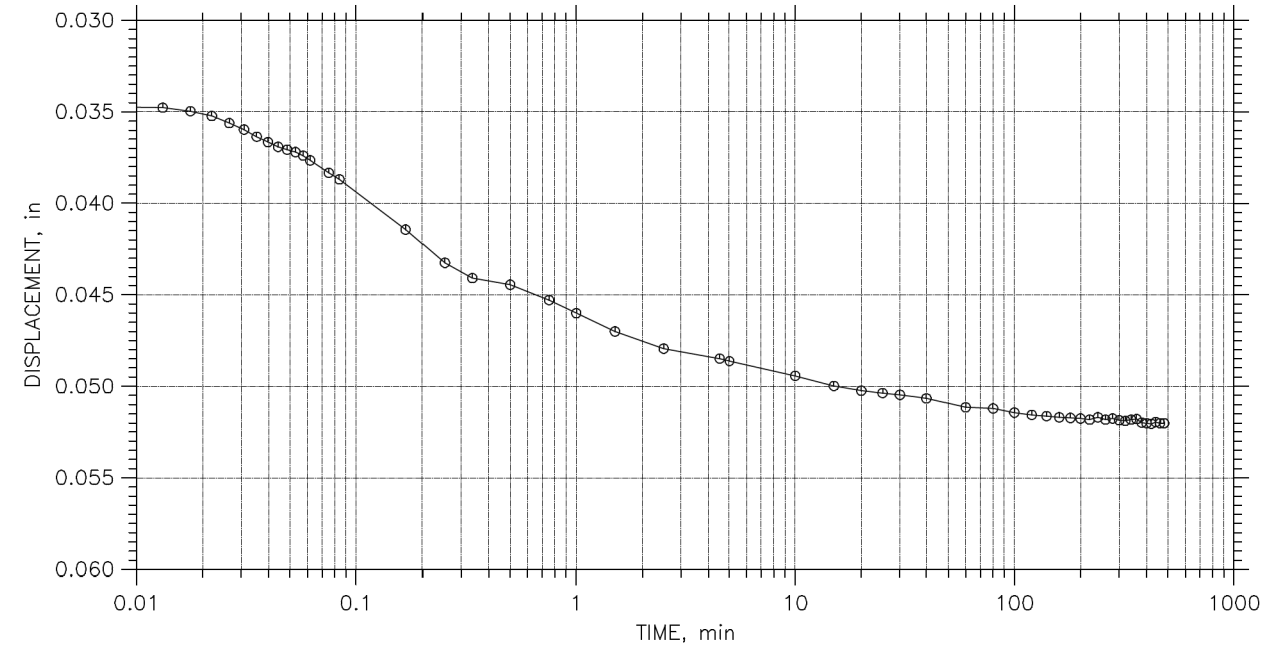
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-052-0A-24	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 05/09/24	Depth: 7'-9'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:27:52

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-052-0A-24	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 05/09/24	Depth: 7'-9'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

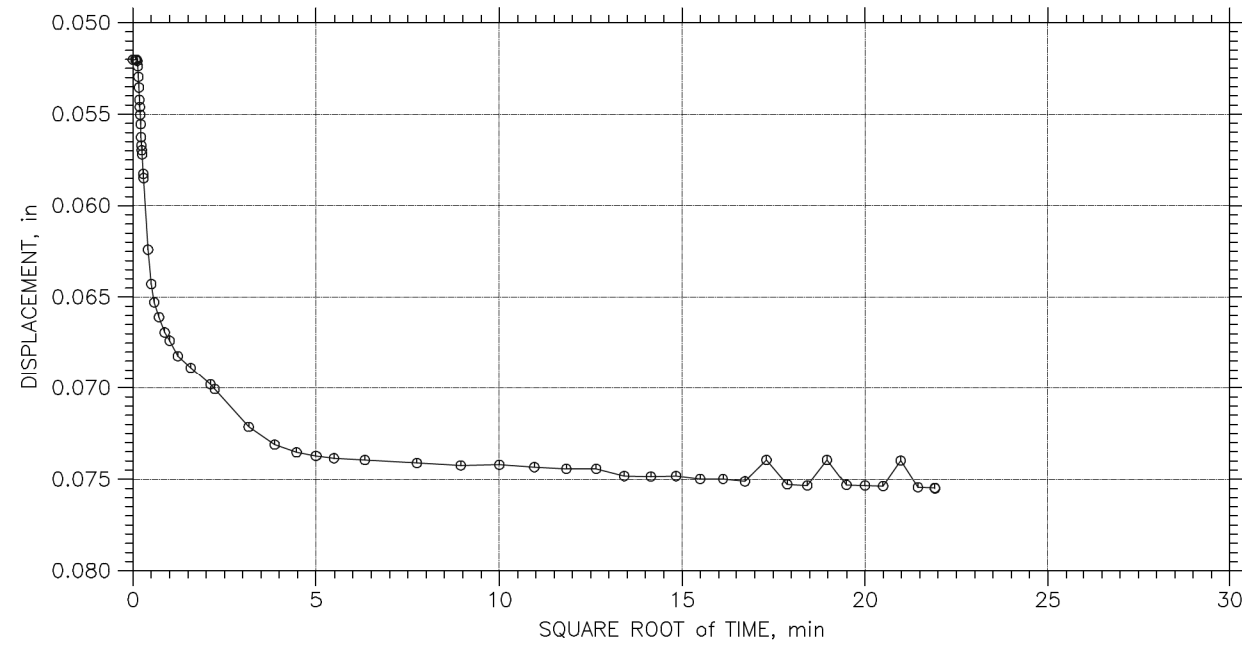
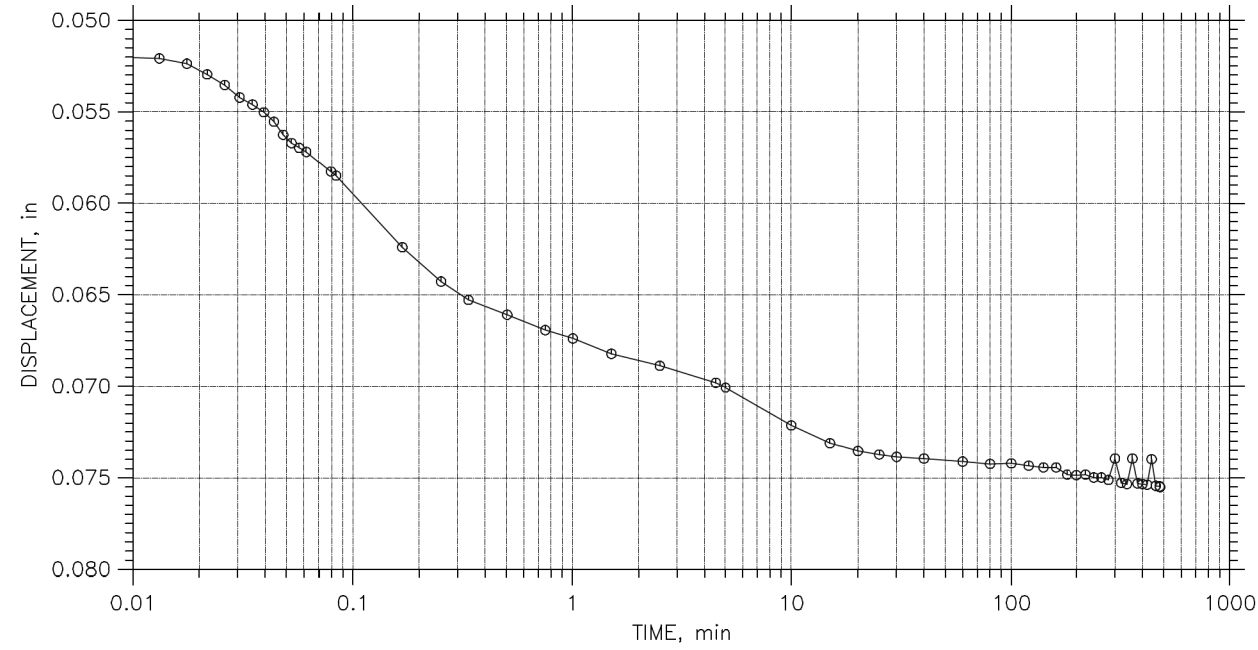
Tue, 03-SEP-2024 16:27:53



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	137
TOTAL	172
SHEET	-
TOTAL	-

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf

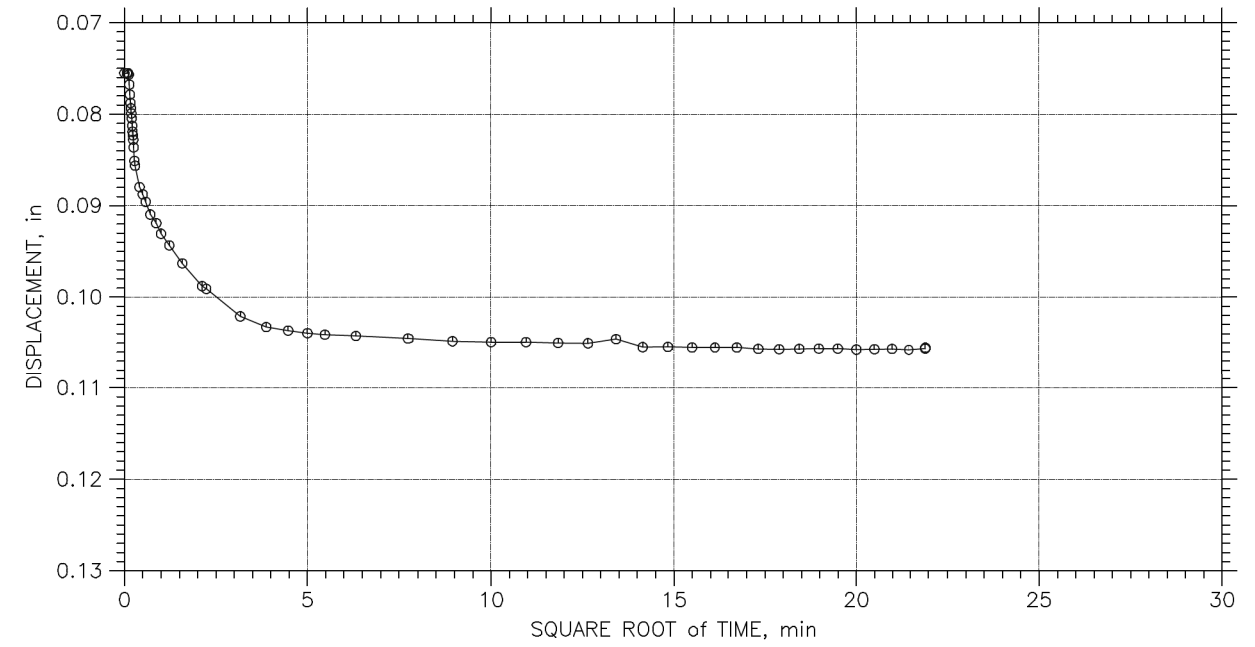
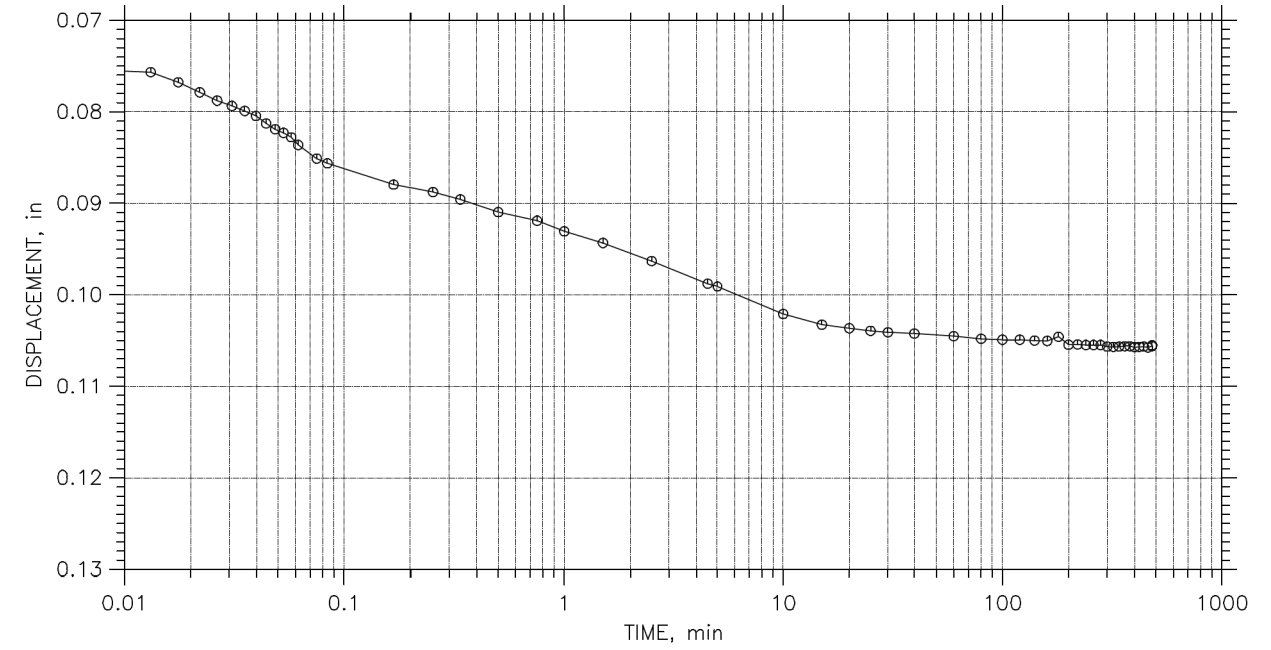


Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-052-0A-24	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 05/09/24	Depth: 7'-9'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:27:54

CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-052-0A-24	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 05/09/24	Depth: 7'-9'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:27:54



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
138	172
SHEET	TOTAL
-	-

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.: 23050059COL
Project: ATH/MEG-033-23.23/0.00
Client: HNTB Ohio, Inc
Boring No.: B-057-0A-23
Sample No.: ST-1

Sample Type: Undisturbed Specimen
Test Date: 2/13/2024
Checked By: SM
Tested By: MW

Soil Description: Red Clay (A-7-6)
Specific Gravity: 2.627
Initial Dry Unit Weight 97.0 pcf

LL: 53
PL: 26
Initial Moisture 28.5%

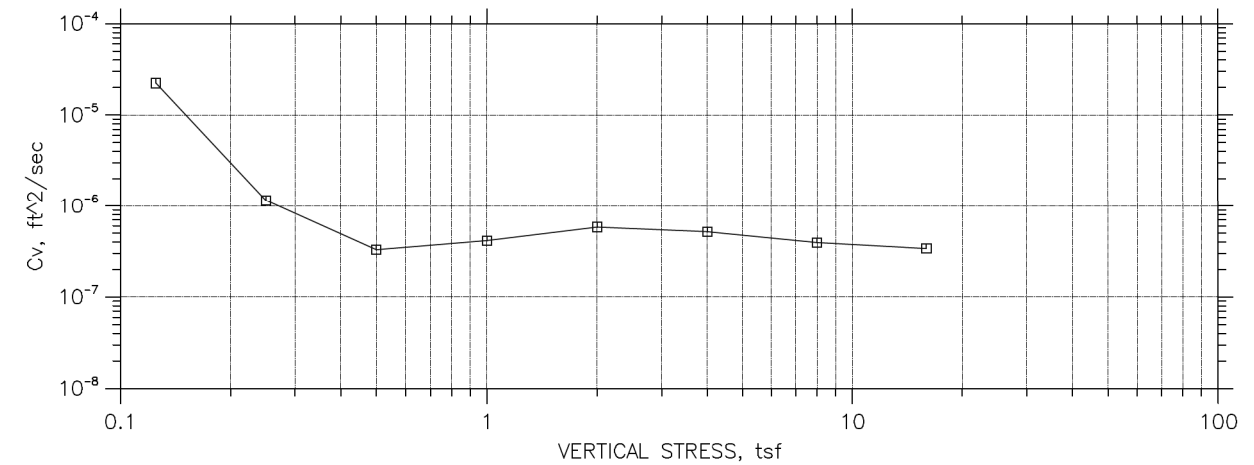
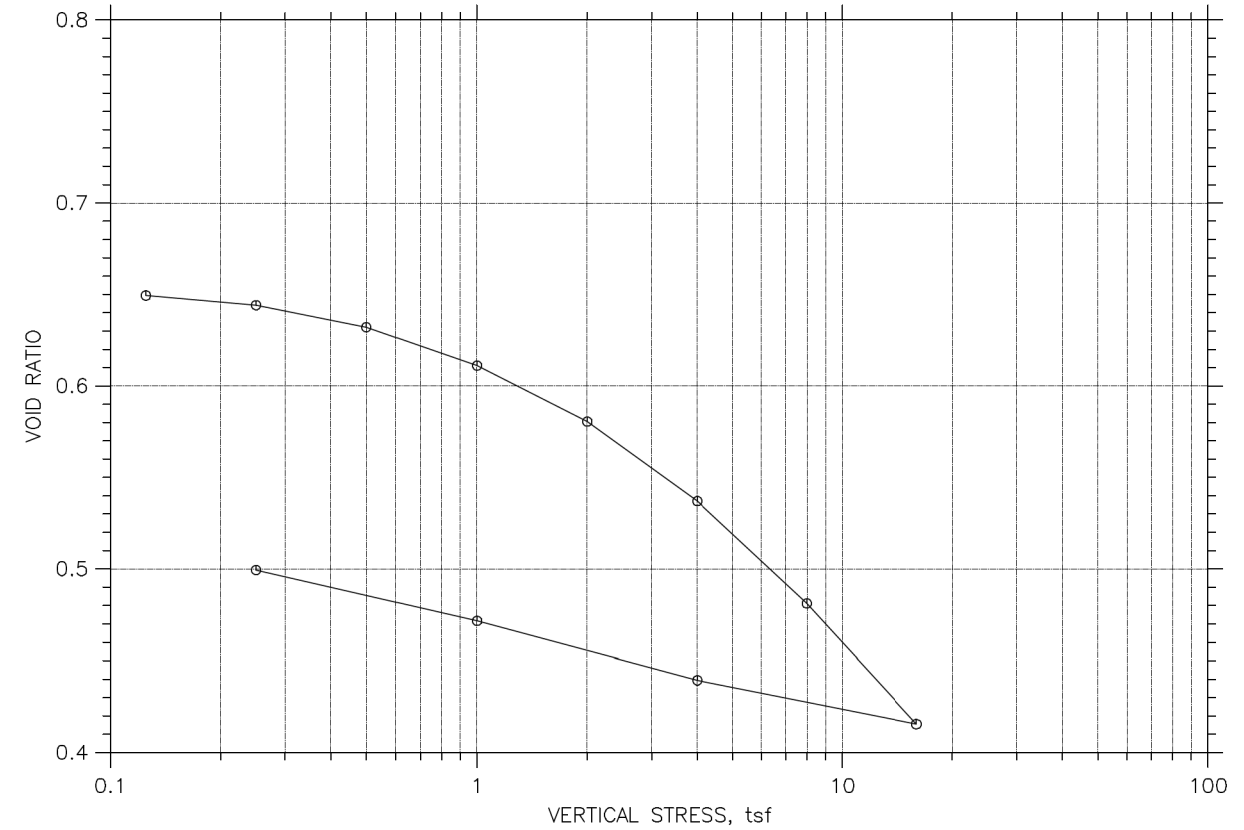
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.125	0.00207	0.649	0.21	1.5	1.62E-05
2	0.25	0.005241	0.644	0.53	24.9	9.73E-07
3	0.5	0.01255	0.632	1.26	70.8	3.38E-07
4	1	0.02517	0.611	2.52	59.2	3.96E-07
5	2	0.04364	0.581	4.38	39.2	5.80E-07
6	4	0.06984	0.537	7.01	38.9	5.57E-07
7	8	0.1036	0.481	10.39	39.8	5.11E-07
8	16	0.1431	0.416	14.36	38.1	4.92E-07
9	4	0.1287	0.439	12.91	4.3	4.24E-06
10	1	0.1093	0.472	10.96	69.4	2.73E-07
11	0.25	0.09259	0.499	9.29	315.8	6.24E-08

CONSOLIDATION PARAMETERS

Preconsolidation Pressure (tsf): 1.90	Initial Void Ratio: 0.65
Compression Index (C _c): 0.22	Compression Ratio: 0.13
Recompression Index (C _r): 0.038	Recompression Ratio: 0.023



CONSOLIDATION TEST DATA
SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:28:55

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 12:15:46 USER: ACAD
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GEOTECHNICAL PROFILE - ROADWAY
CONSOLIDATION RESULTS

DESIGN AGENCY
CTL ENGINEERING
2860 FISHER ROAD
COLUMBUS, OH 43204
PHONE: (614) 276-8123
FAX: (614) 276-8377

DESIGNER
N.K.S

REVIEWER
SM 11-06-24

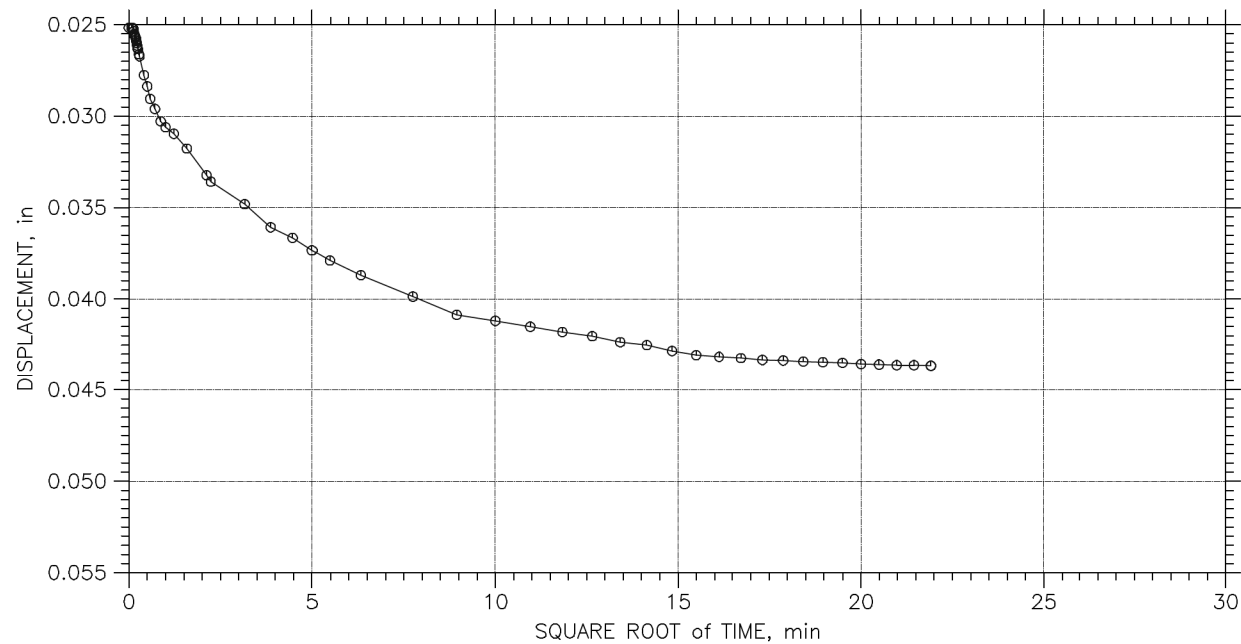
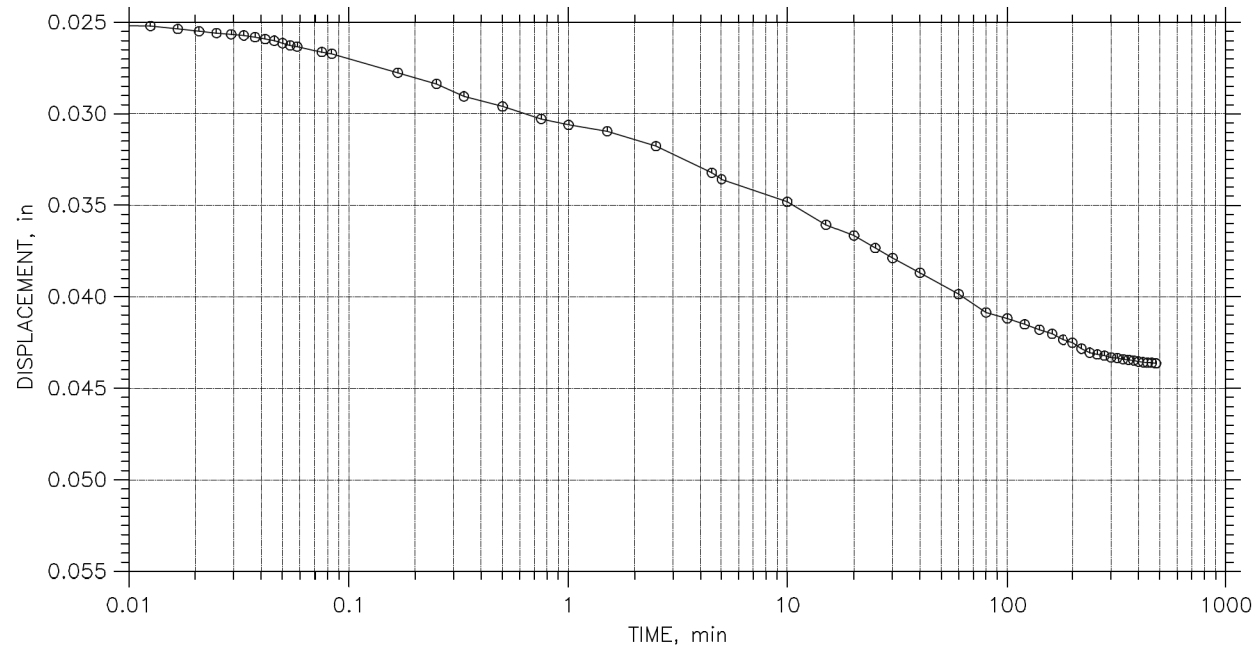
PROJECT ID
119142

SUBSET	TOTAL
139	172

SHEET	TOTAL
-	-

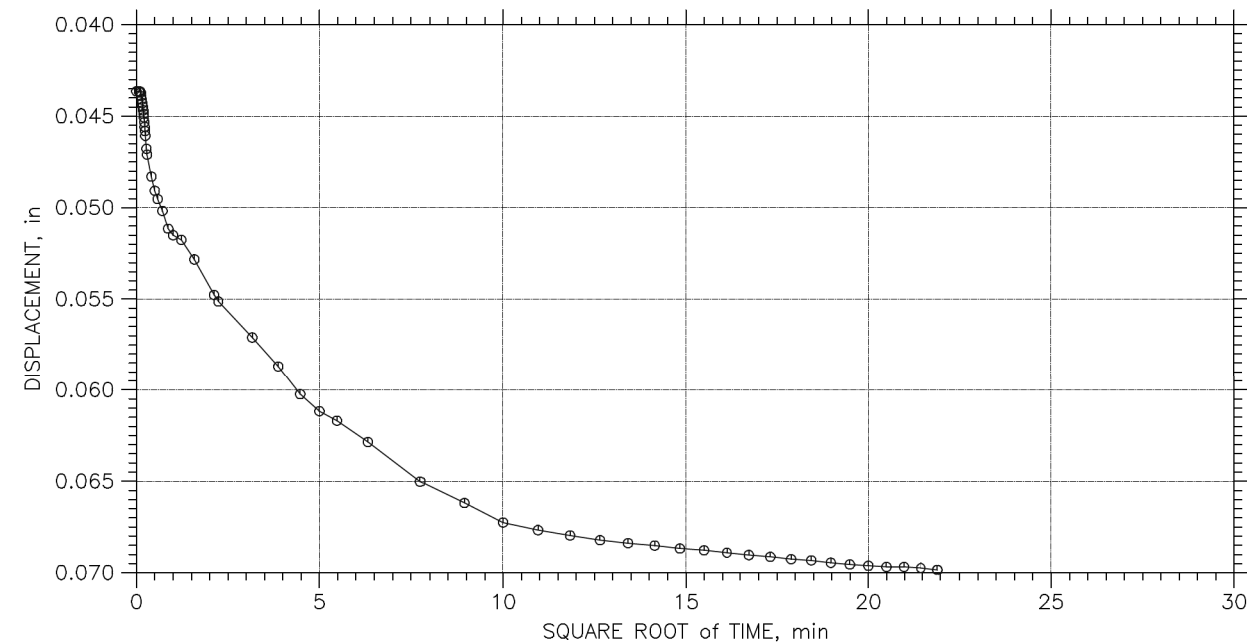
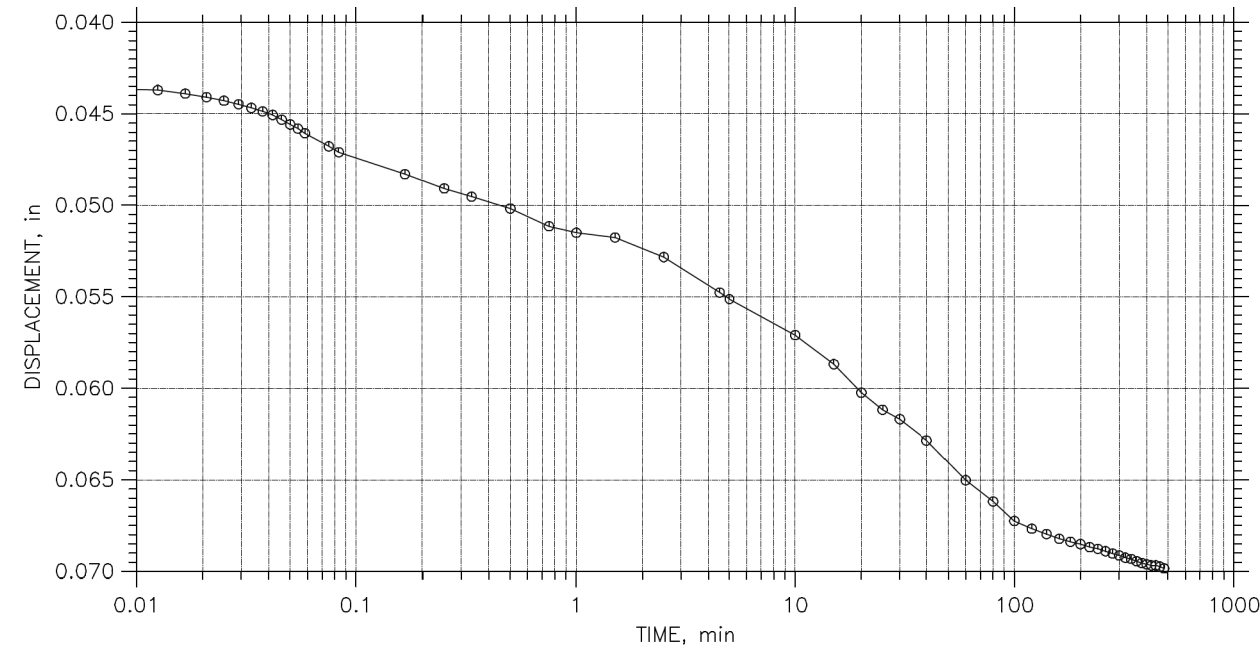
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:29:02

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

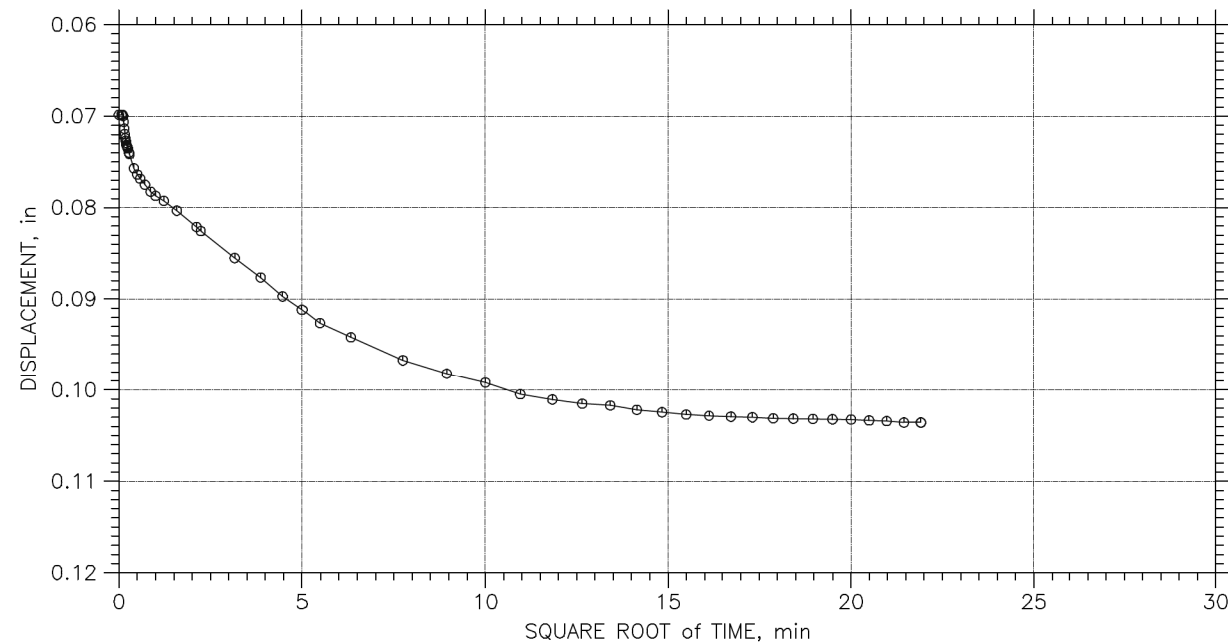
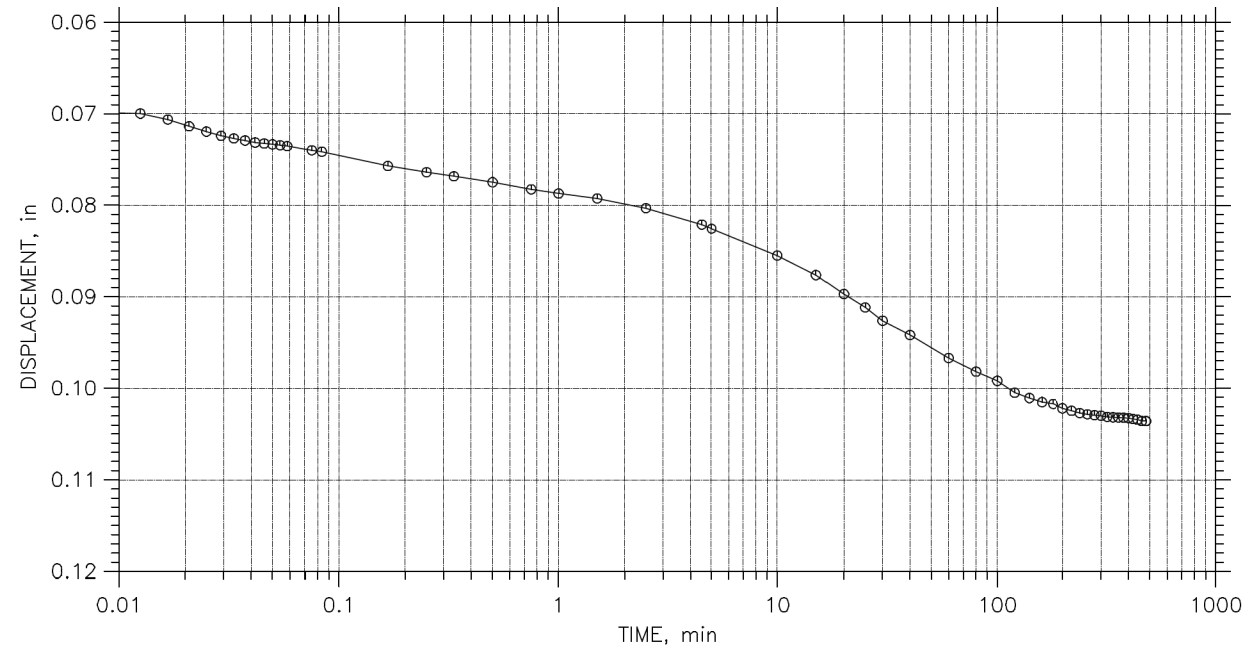
Tue, 03-SEP-2024 16:29:03



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
140	172
SHEET	TOTAL
-	-

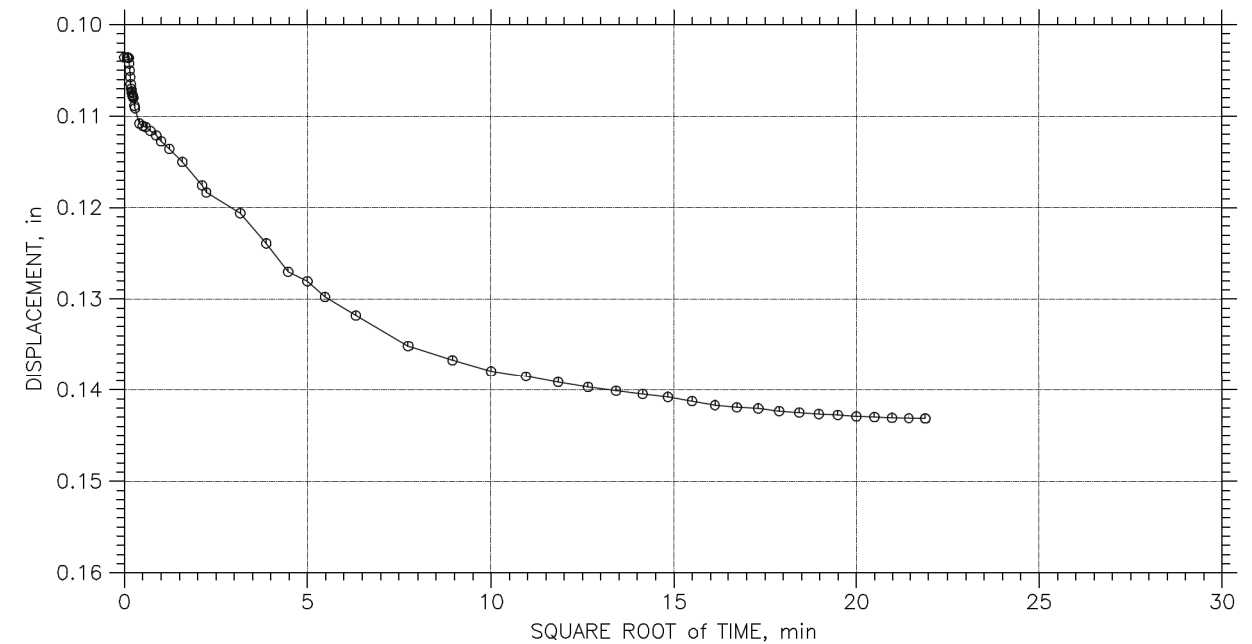
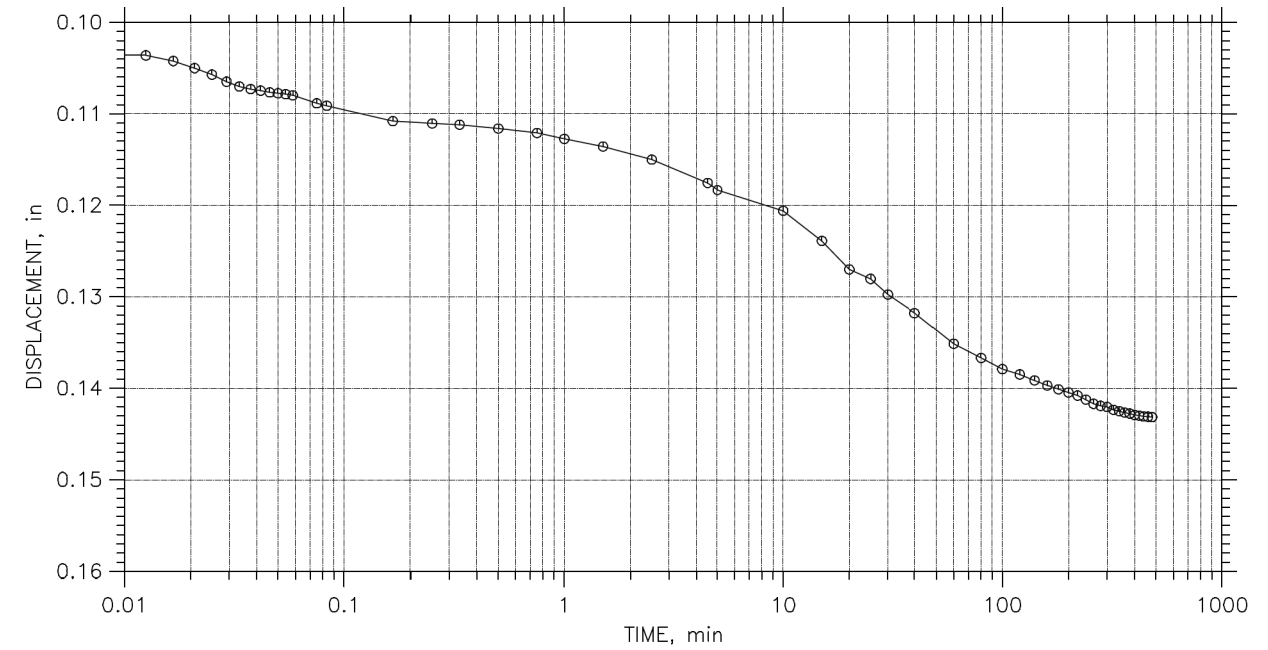
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:29:04

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:29:05



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	TOTAL
141	172
SHEET	TOTAL
-	-

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435
CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.: 23050059COL
Project: ATH/MEG-033-23.23/0.00
Client: HNTB Ohio, Inc
Boring No.: B-060-0-23
Sample No.: ST-2

Sample Type: Undisturbed Specimen
Test Date: 1/5/2024
Checked By: SM
Tested By: MW

Soil Description: Brown, Clay (A-7-6)
Specific Gravity: 2.666
Initial Dry Unit Weight 100.6 pcf

LL: 42
PL: 22
Initial Moisture 25.7%

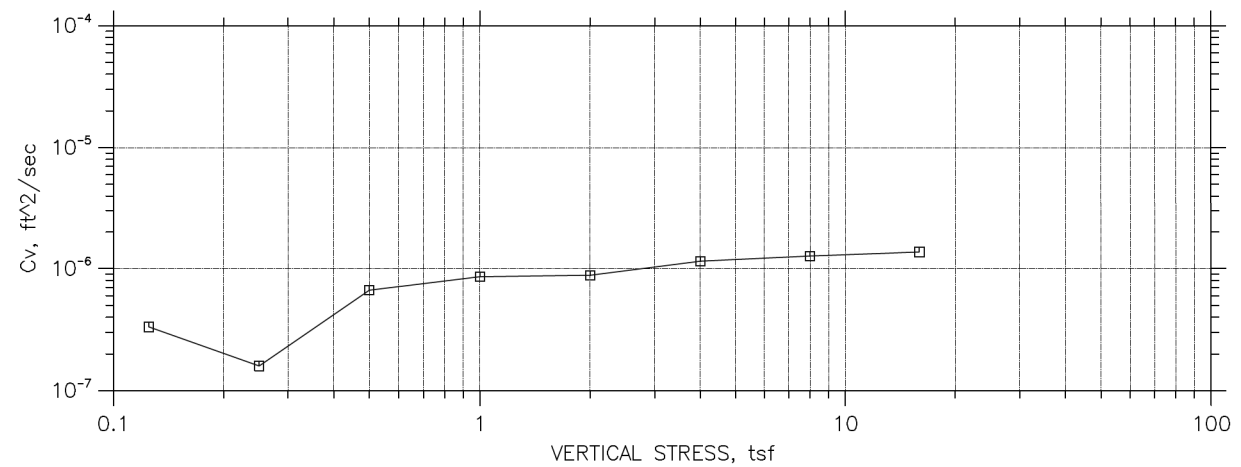
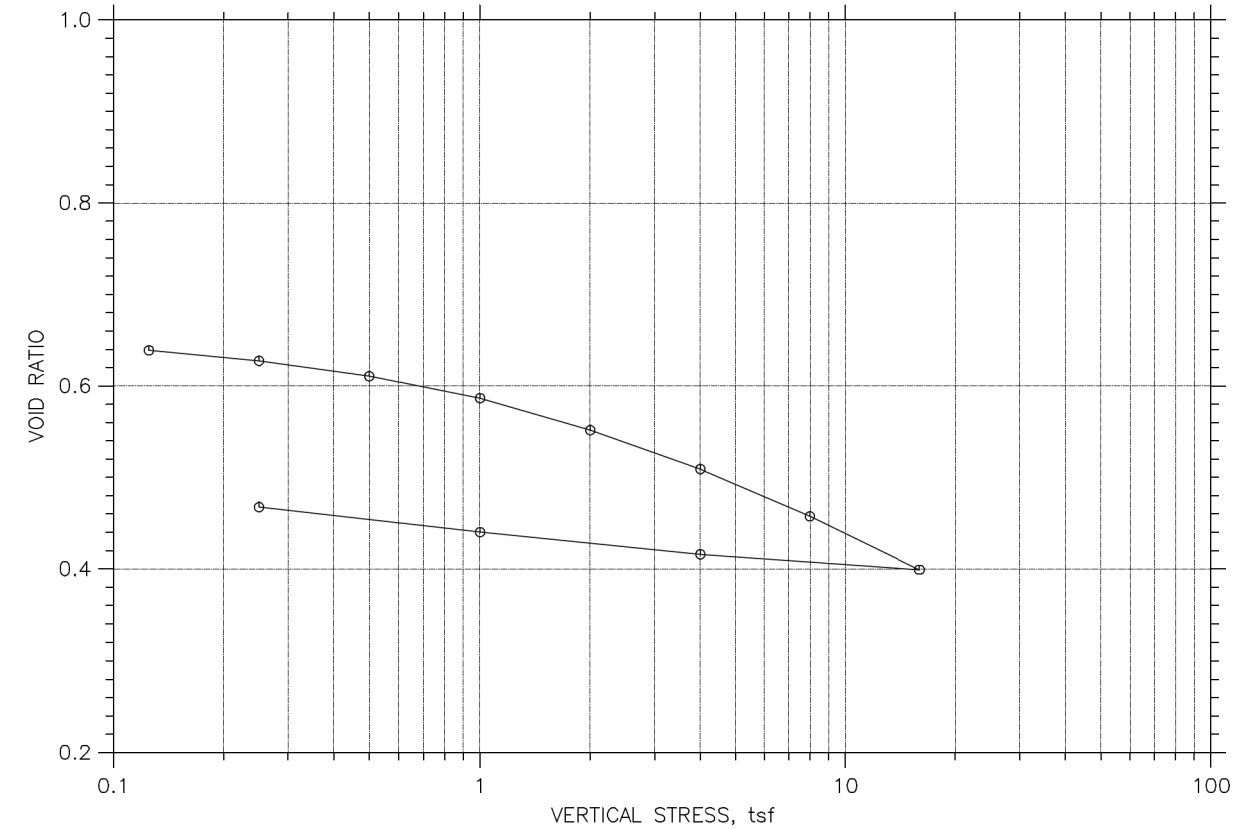
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	Cv (ft ² /sec)
1	0.125	0.008961	0.639	0.9	56.9	4.26E-07
2	0.25	0.01592	0.627	1.59	215.4	1.11E-07
3	0.5	0.02604	0.611	2.61	29.6	7.91E-07
4	1	0.04053	0.587	4.06	23.9	9.56E-07
5	2	0.06163	0.552	6.18	22.2	9.91E-07
6	4	0.08728	0.509	8.75	18.1	1.16E-06
7	8	0.1184	0.458	11.86	14.9	1.32E-06
8	16	0.1537	0.399	15.4	13.5	1.36E-06
9	4	0.1435	0.416	14.38	0.9	1.93E-05
10	1	0.1289	0.44	12.91	29.4	6.20E-07
11	0.25	0.1124	0.468	11.26	80	2.36E-07

CONSOLIDATION PARAMETERS

Preconsolidation Pressure (tsf): 1.70 Initial Void Ratio: 0.64
Compression Index (C_c): 0.20 Compression Ratio: 0.12
Recompression Index (C_r): 0.028 Recompression Ratio: 0.017



CONSOLIDATION TEST DATA
SUMMARY REPORT



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:30:12

ATH/MEG-33-23.23/0.00

MODEL: Sheet PAPER/SIZE: 17x11 (in.) DATE: 06-11-2024 TIME: 12:27:42 USER: ACAD
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GEOTECHNICAL PROFILE - ROADWAY
CONSOLIDATION RESULTS

DESIGN AGENCY
CTL ENGINEERING
2860 FISHER ROAD
COLUMBUS, OH 43204
PHONE: (614) 276-8123
FAX: (614) 276-8377

DESIGNER
N.K.S

REVIEWER
SM 11-06-24

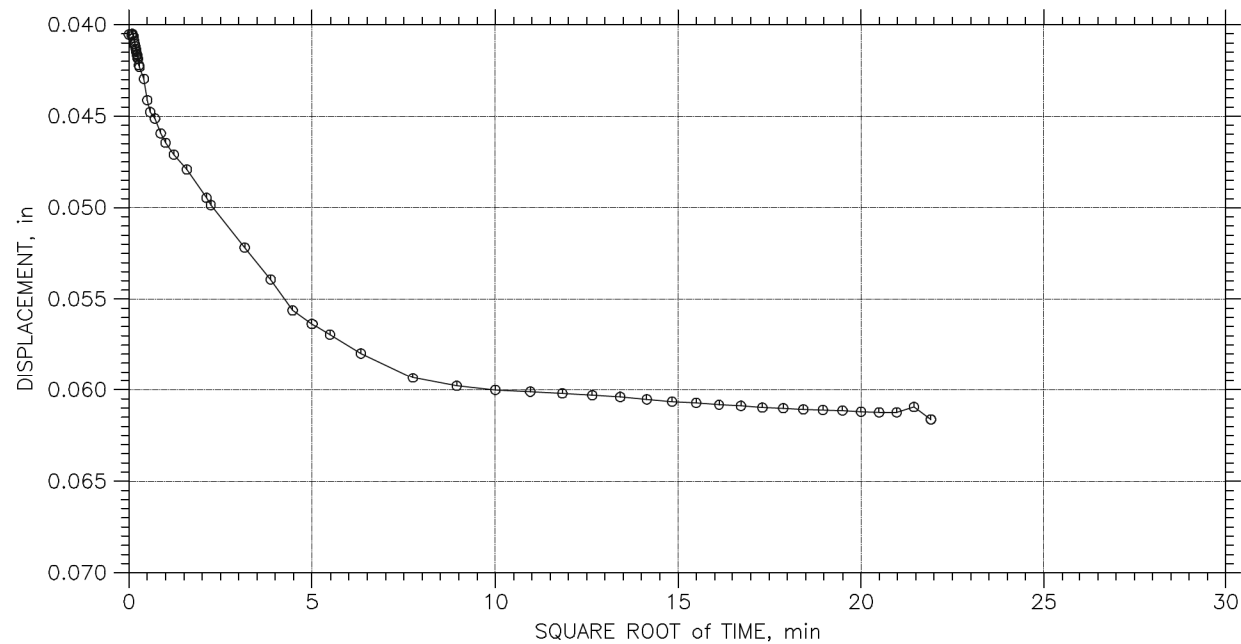
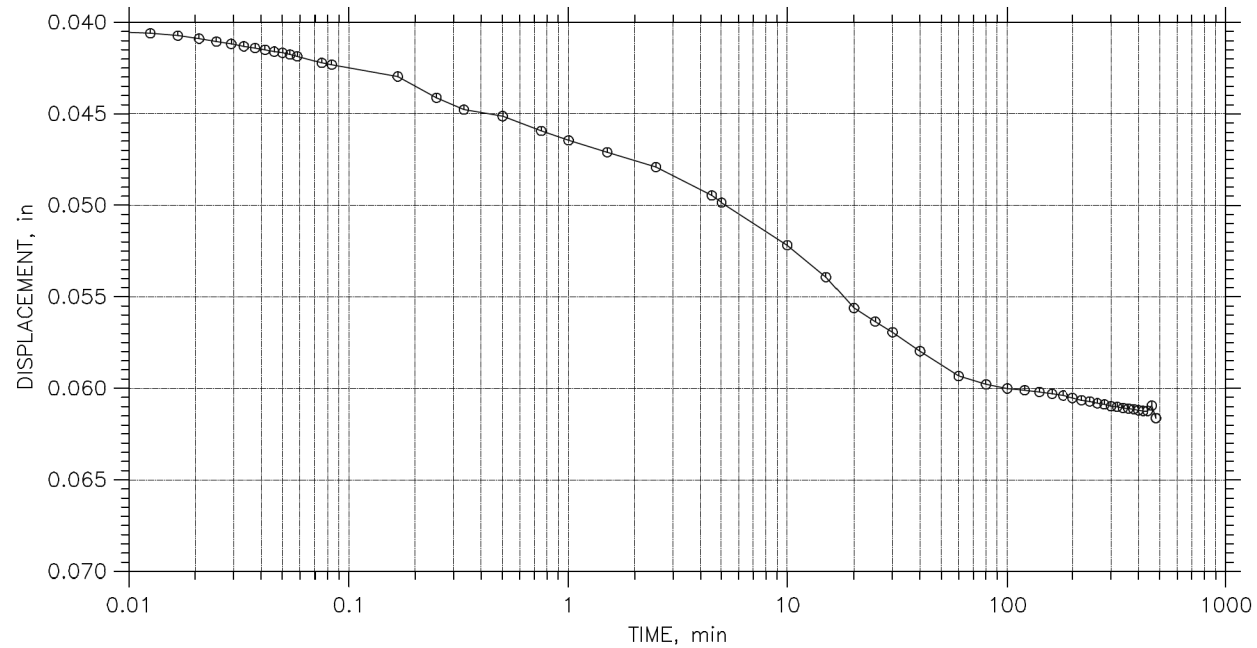
PROJECT ID
119142

SUBSET	TOTAL
142	172

SHEET	TOTAL
1	1

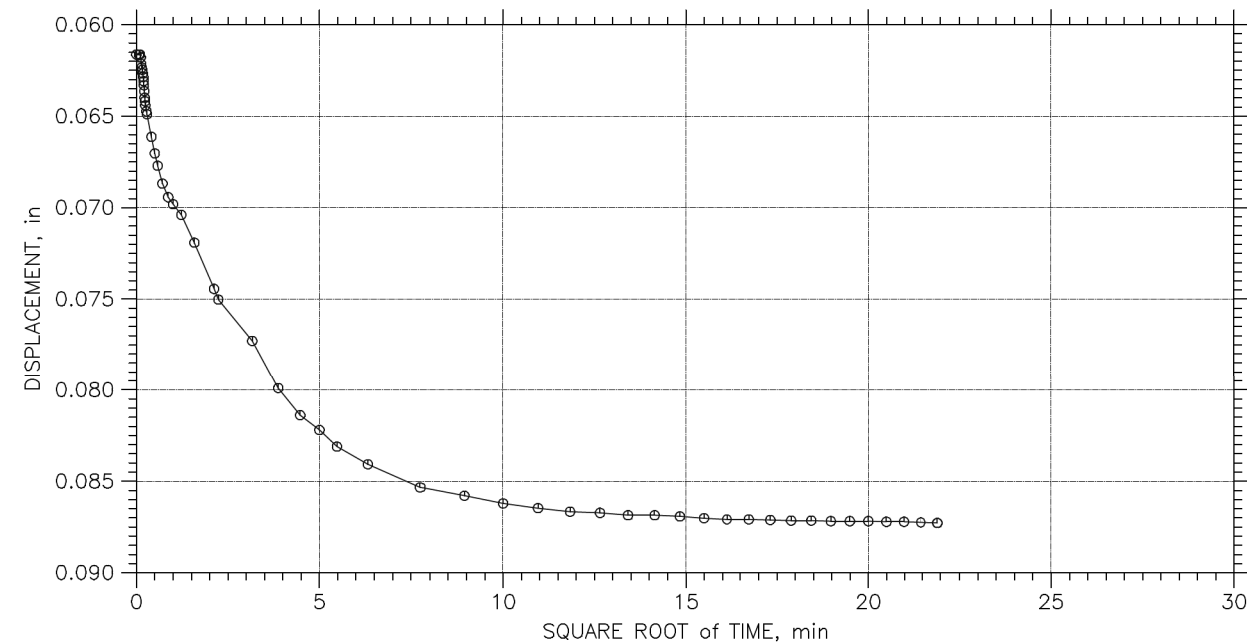
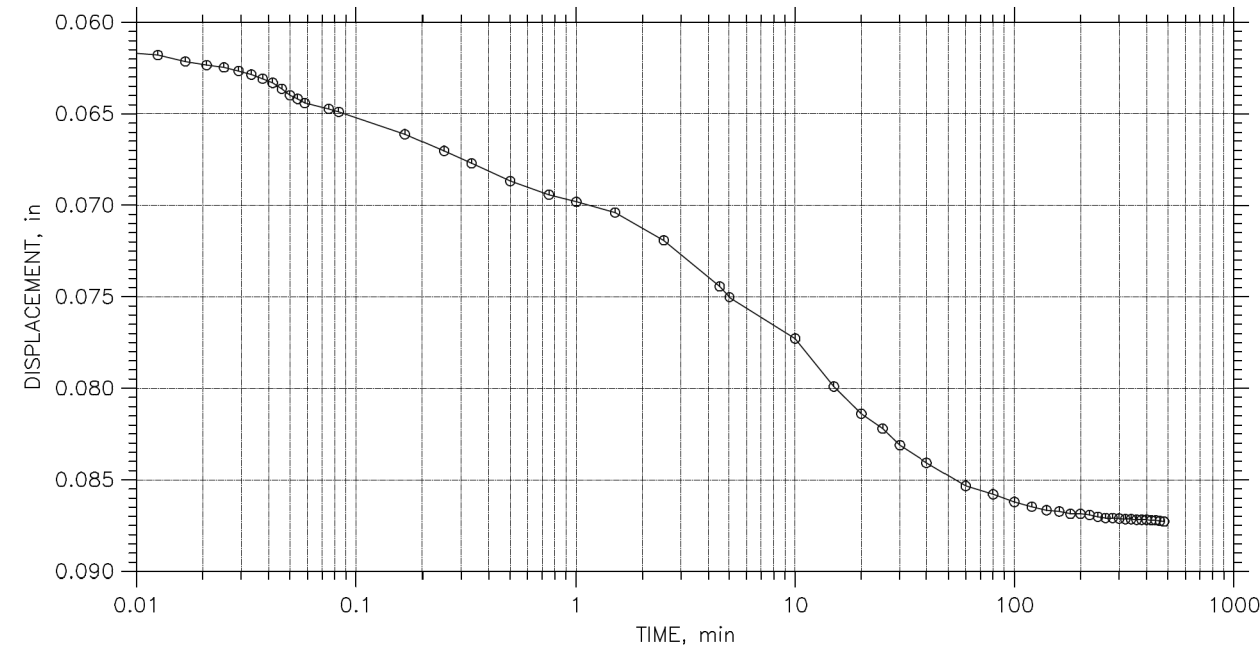
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 5 of 11
 Stress: 2. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 6 of 11
 Stress: 4. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:30:19

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

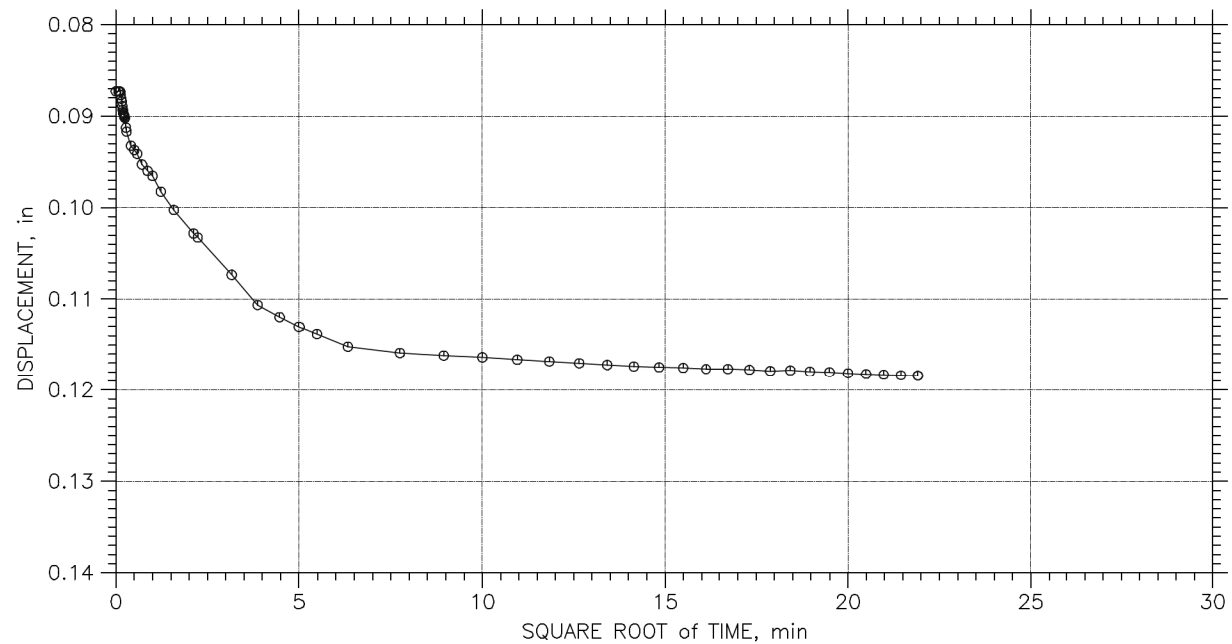
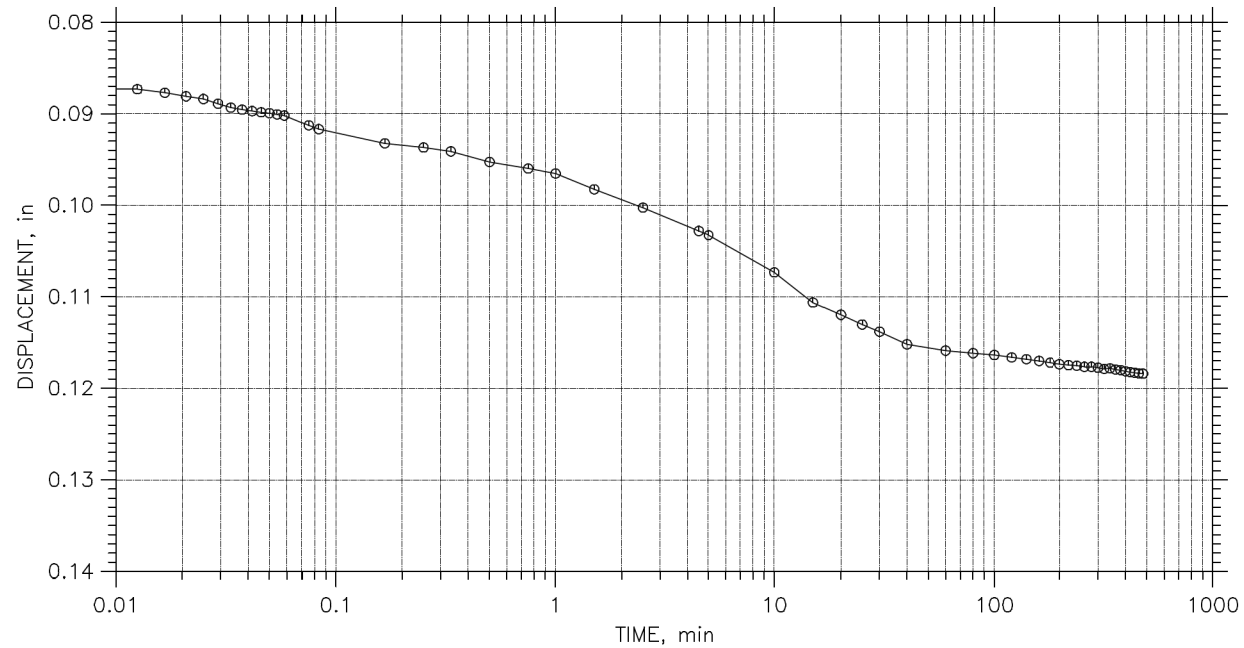
Tue, 03-SEP-2024 16:30:19



DESIGNER	N.K.S
REVIEWER	SM 11-06-24
PROJECT ID	119142
SUBSET	TOTAL
143	172
SHEET	TOTAL
-	-

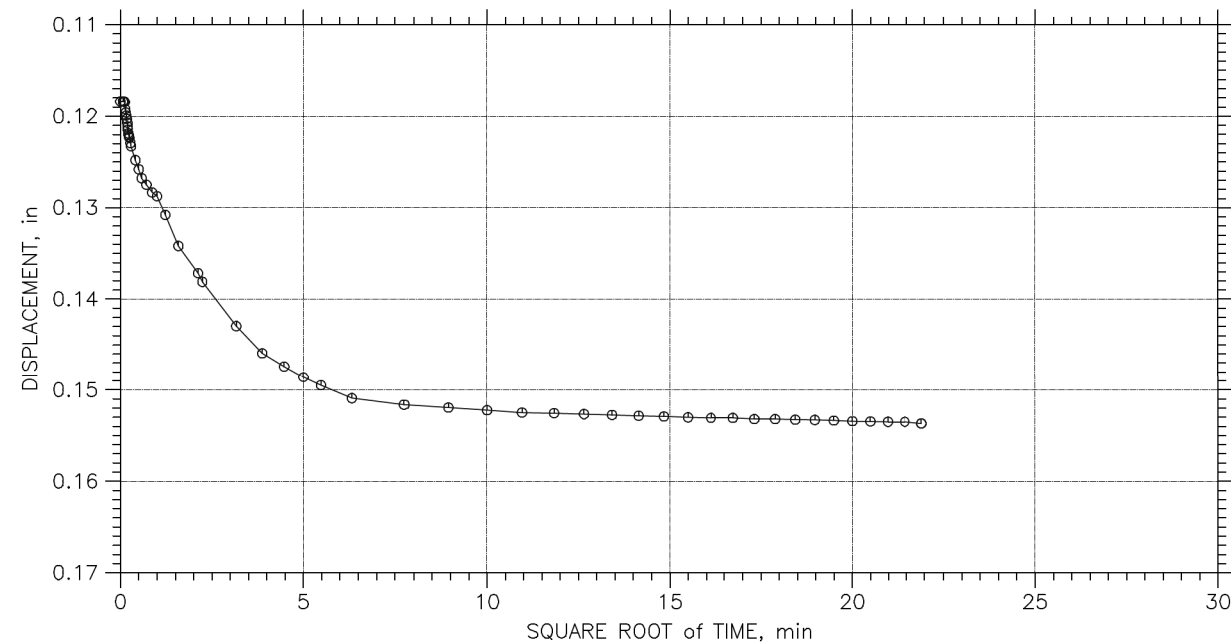
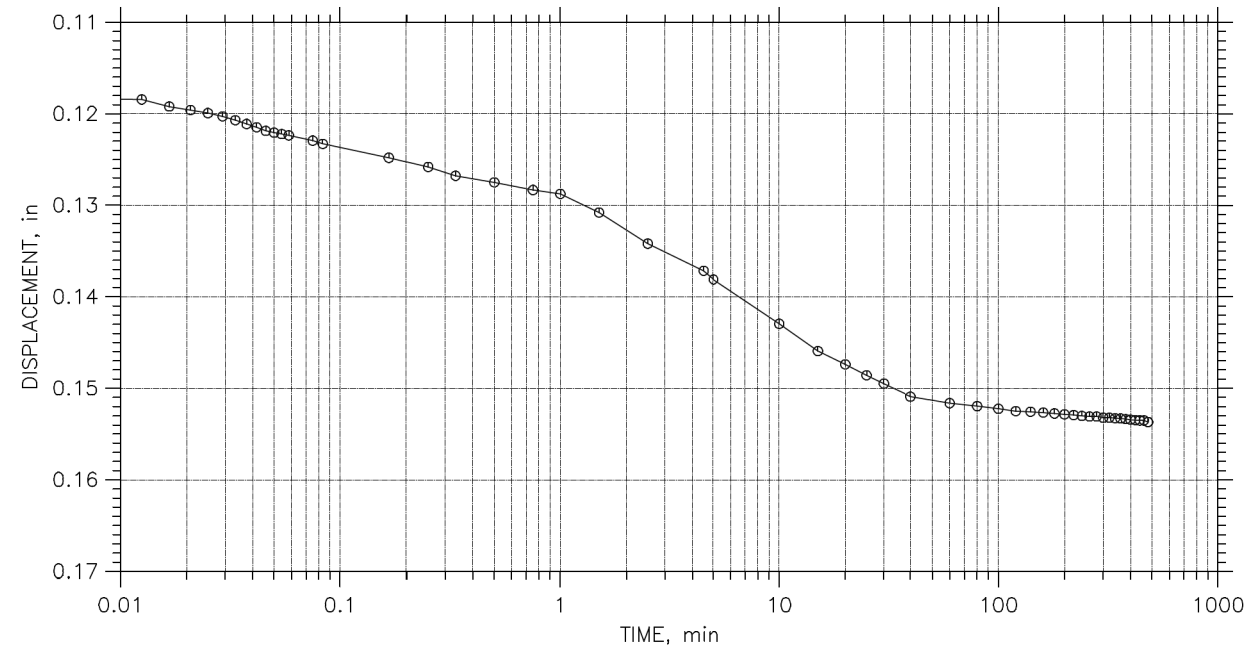
CONSOLIDATION TEST DATA

TIME CURVES
 Step: 7 of 11
 Stress: 8. tsf



CONSOLIDATION TEST DATA

TIME CURVES
 Step: 8 of 11
 Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:30:20

Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

Tue, 03-SEP-2024 16:30:21



DESIGNER	N.K.S
REVIEWER	SM
PROJECT ID	119142
SUBSET	144
TOTAL	172
SHEET	-
TOTAL	-

CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767

CTL ENGINEERING, INC.
2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 PID NO. 119142
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'

Lab Code No. NA
 Reviewed by: SM

Sample Type	Undisturbed	
Date Set-up:	1/24/2024	1/24/2024
Date Sheared:	1/29/2024	1/29/2024
Avg. Sample Height (in.):	5.7387	5.7773
Avg. Sample Diameter (in.):	2.8750	2.8750
Height-to-diameter ratio:	2.00	2.01
Wet Density (pcf):	129.5	136.3
Dry Density (pcf):	104.0	113.8
Void Ratio:	0.620	0.480
Specific Gravity (assumed):	2.7	2.7
Moisture Content (%):	24.5	19.8
Cross Sectional Area (ft ²):	0.045	0.045
Volume (ft ³):	0.02	0.02
Confining Pressure (psf):	1440	2880
Rate of Axial Strain (%/min):	0.2091	0.2077
Compressive Strength (psf):	2263	3735
Minor Principal Stress at Failure (psf):	1440	2880
Major Principal Stress at Failure (psf):	3703	6615
Failure Criterion (%):	Point of Maximum Obliquity	
β:	0.98	0.95
Specimen Saturation:	Wet Method	



POST SHEAR
1440 psf



POST SHEAR
2880 psf



POST SHEAR
5760 psf

Grading (ASTM D422)

% Agg.	2
% Sand	12
% Silt	48
% Clay	38

Atterberg Limits (ASTM D 4318)

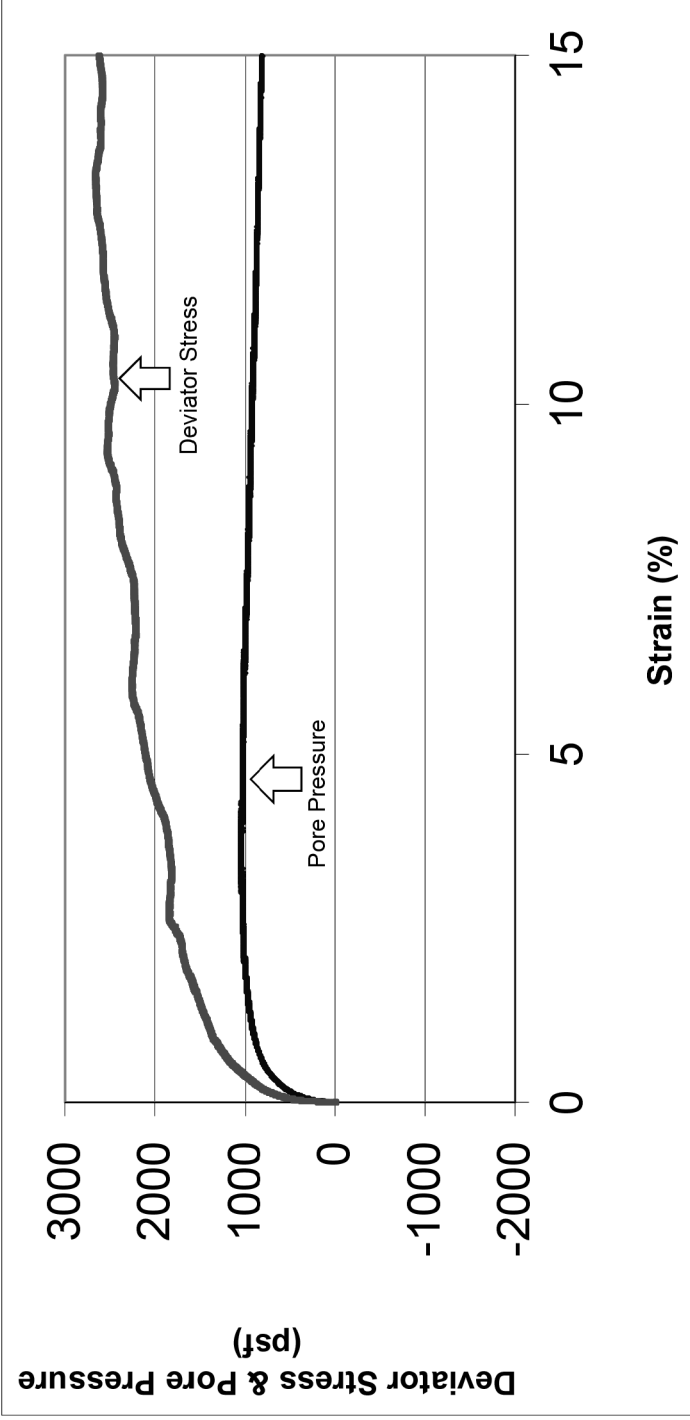
L.L.:	38
P.L.:	20
P.I.:	18

Visual Classification: Brown, Silty Clay (A-6b)

Deviator Stress & Pore Pressure vs. Strain

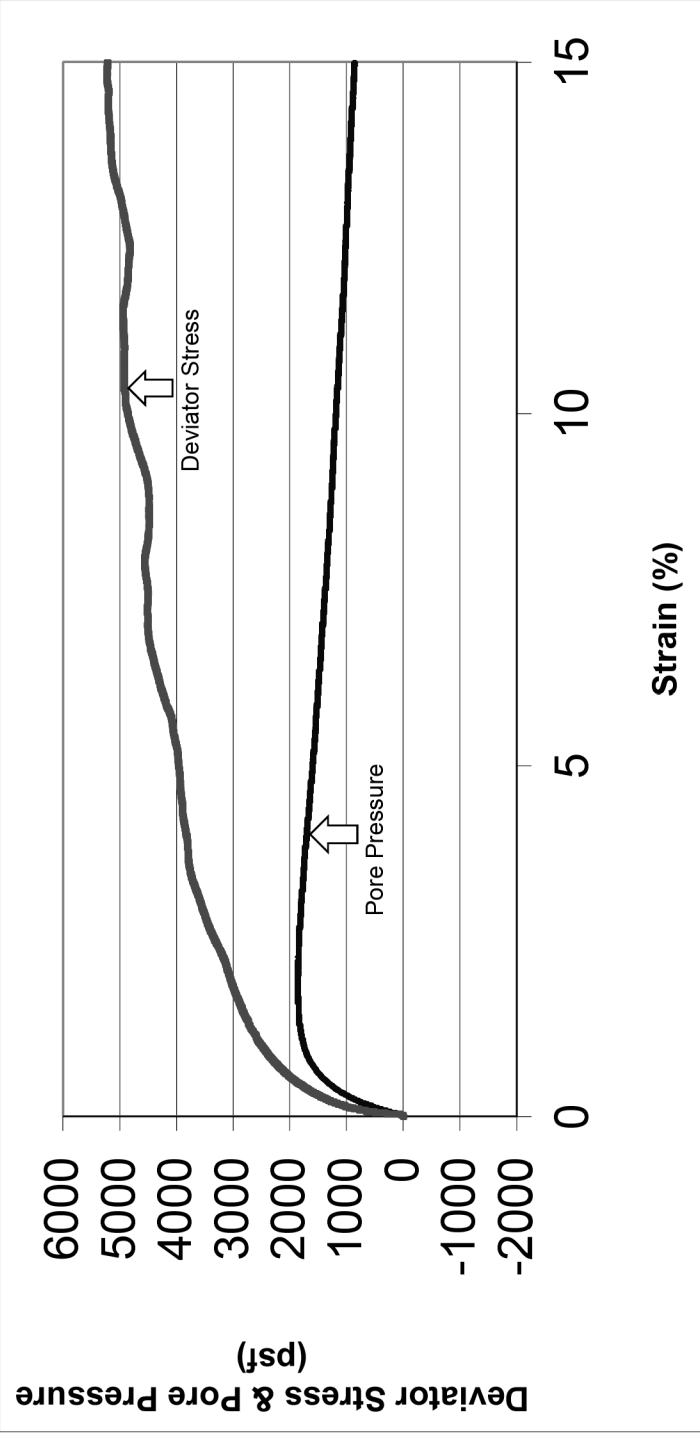
CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'
 Confining Pressure (psf): 1440



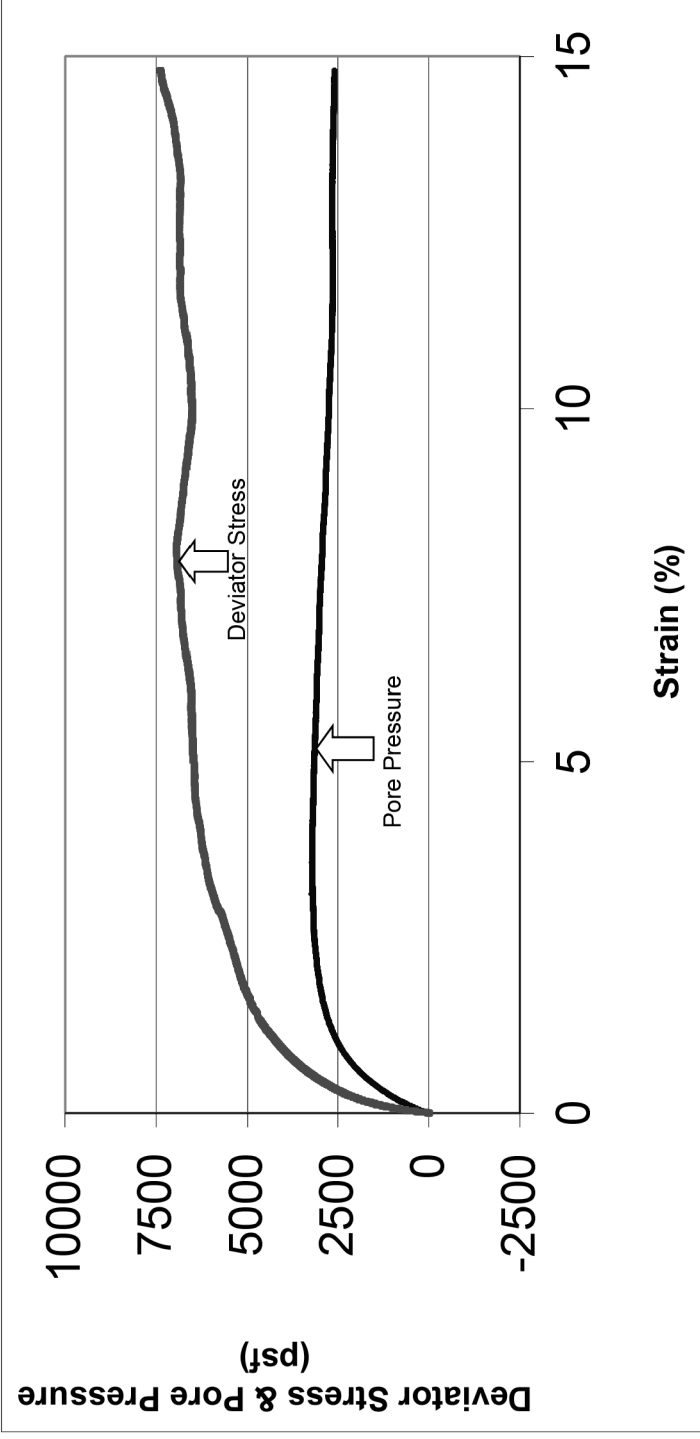
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-028-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 2880
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

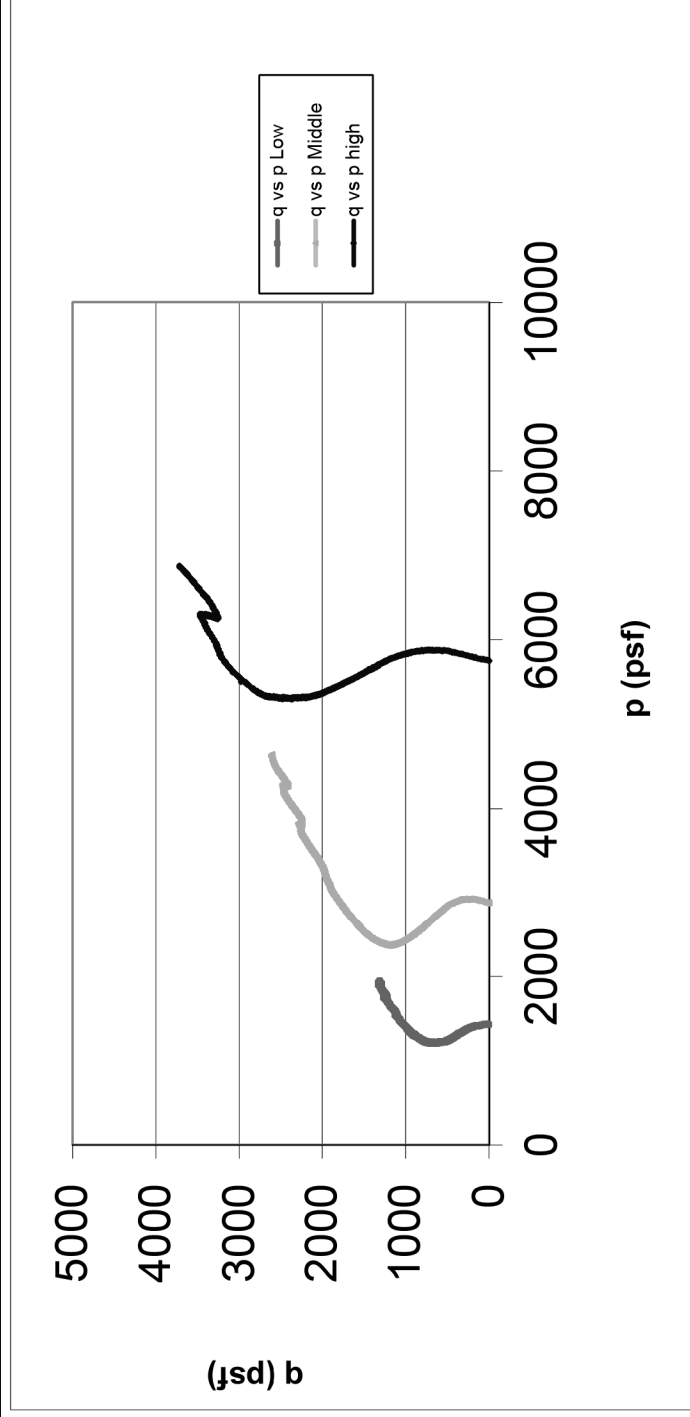


Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-028-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 5760
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

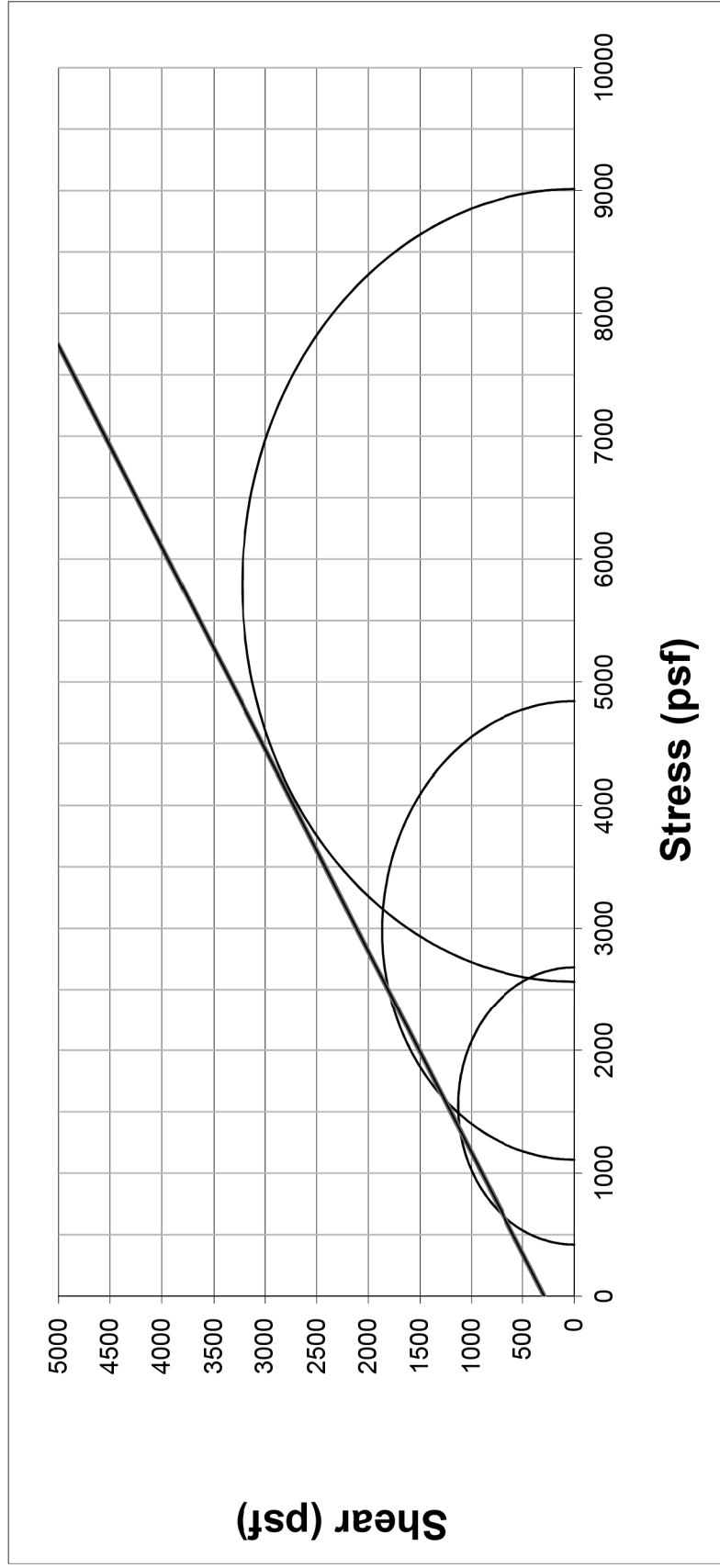


q vs. p			
CLIENT:	HNTB Ohio, Inc	Sample ID:	B-028-0A-23, ST, 3'-5'
PROJECT:	ATH/MEG-033-23.23/0.00	Confining Pressure (psf):	Low 1440 Middle 2880 High 5760
LOCATION:	Athens & Meigs County, Ohio		
PROJECT #:	23050059COL		



Mohr Circle Effective Stress

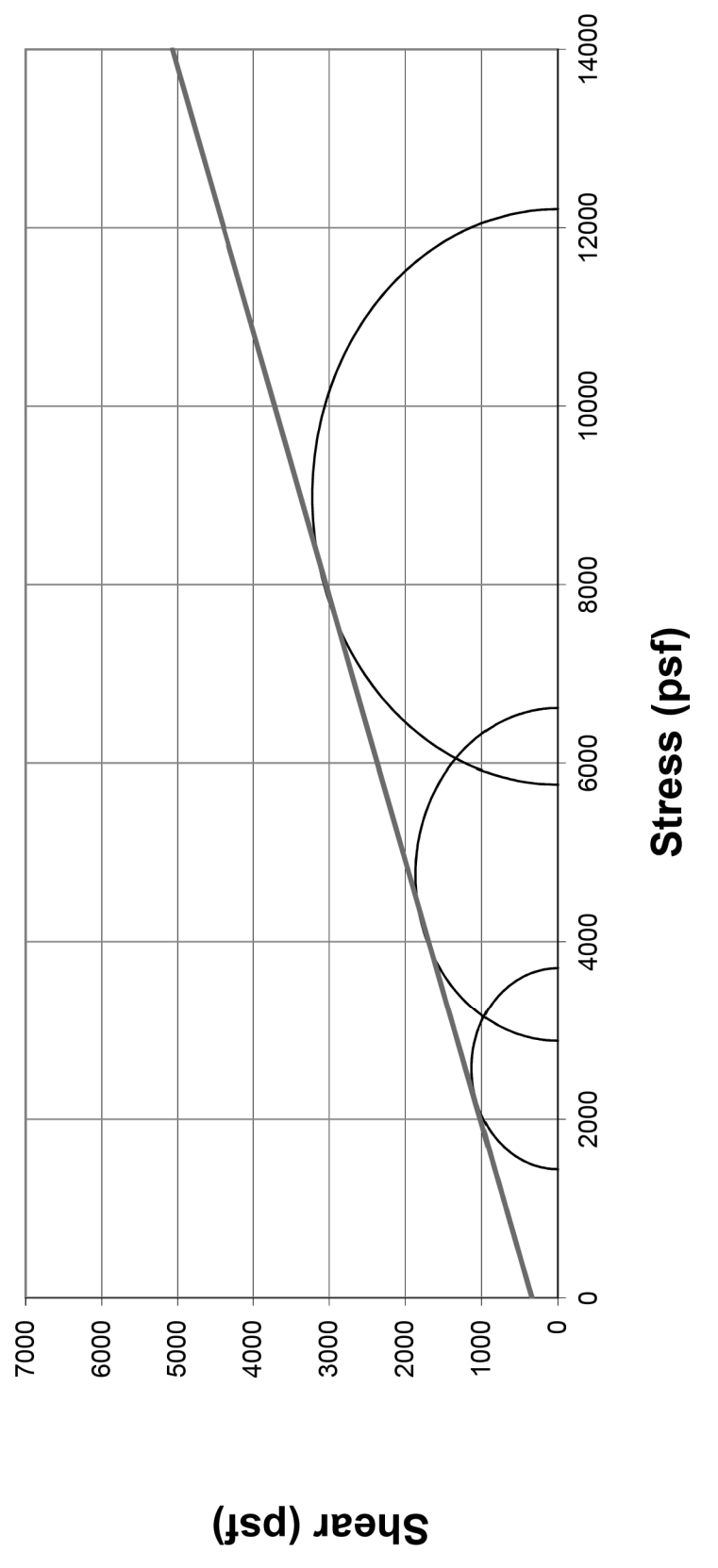
CLIENT:	HNTB Ohio, Inc	Sample ID:	B-028-0A-23, ST, 3'-5'
PROJECT:	ATH/MEG-033-23.23/0.00	Confining Pressure (psf):	1440 2880 5760
LOCATION:	Athens & Meigs County, Ohio	Cohesion(ps f):	290
PROJECT #:	23050059COL	Angle of Friction(°):	31



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'
 Confining Pressure (psf): 1440 2880 5760
 Cohesion(psf): 350
 Angle of Friction(°): 19



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767**

Sample Type	ST-1
Date Set-up:	1/30/2024
Date Sheared:	2/1/2024
Avg. Sample Height (in.):	5.6787
Avg. Sample Diameter (in.):	2.8750
Height-to-diameter ratio:	1.98
Wet Density (pcf):	136.3
Dry Density (pcf):	110.9
Void Ratio:	0.451
Specific Gravity (assumed):	2.7
Moisture Content (%):	17.4
Cross Sectional Area (ft ²):	0.045
Volume (ft ³):	0.02
Confining Pressure (psf):	1440
Rate of Axial Strain (%/min):	0.2113
Compressive Strength (psf):	2640
Minor Principal Stress at Failure (psf):	1440
Major Principal Stress at Failure (psf):	4080
Failure Criterion (%):	Point of maximum obliquity
β:	0.95
Specimen Saturation:	Wet Method

Grading (ASTM D422)

% Agg:	0
% Sand:	18
% Silt:	41
% Clay:	41

Atterberg Limits (ASTM D 4318)

L.L.:	34
P.L.:	19
P.I.:	15

Visual Description: Brown, Silt and Clay (A-6a)

CTL ENGINEERING, INC.
 2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 PID NO. 119142
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-033-0A-23, ST, 3'-5'
 Lab Code No. NA
 Reviewed by: SM



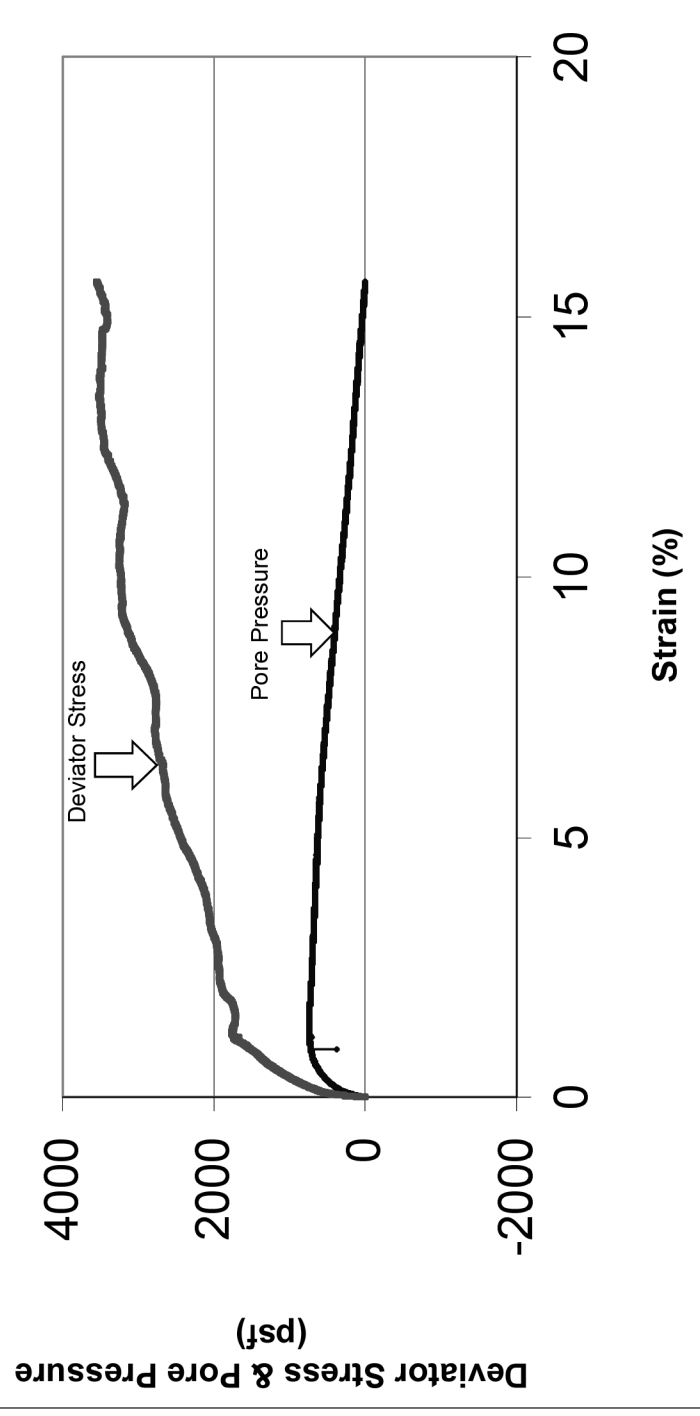
POST SHEAR
1440 psf



POST SHEAR
4320 psf

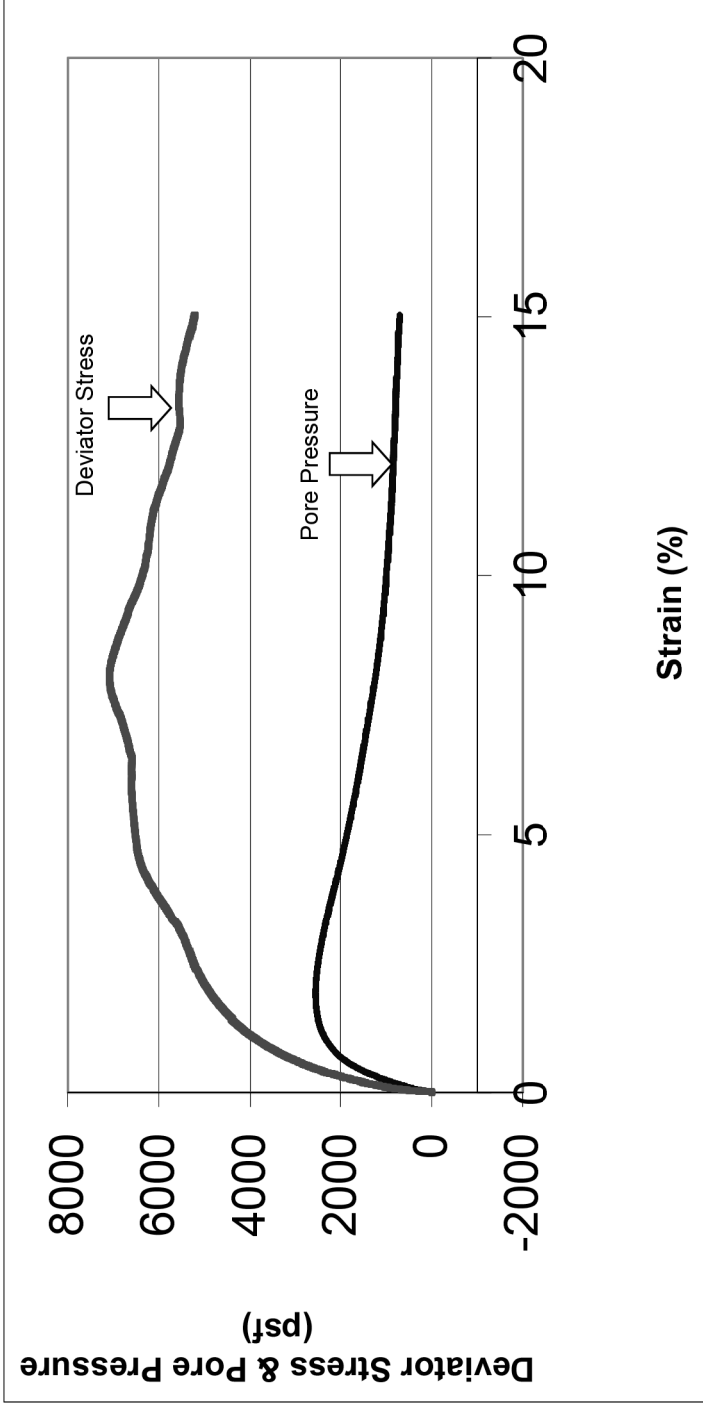
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-033-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 1440
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-033-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 4320
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



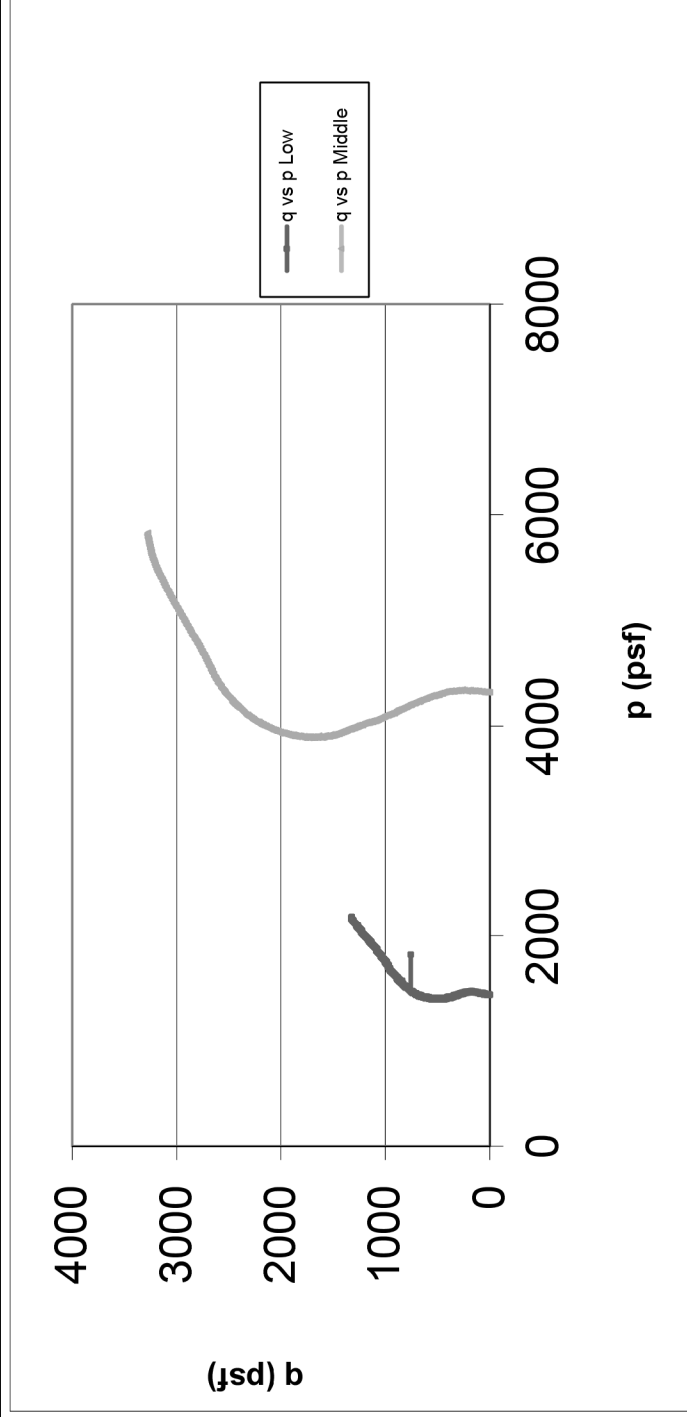
q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-033-0A-23, ST, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): Low Middle

LOCATION: Athens & Meigs County, Ohio 1440 4320

PROJECT #: 23050059COL



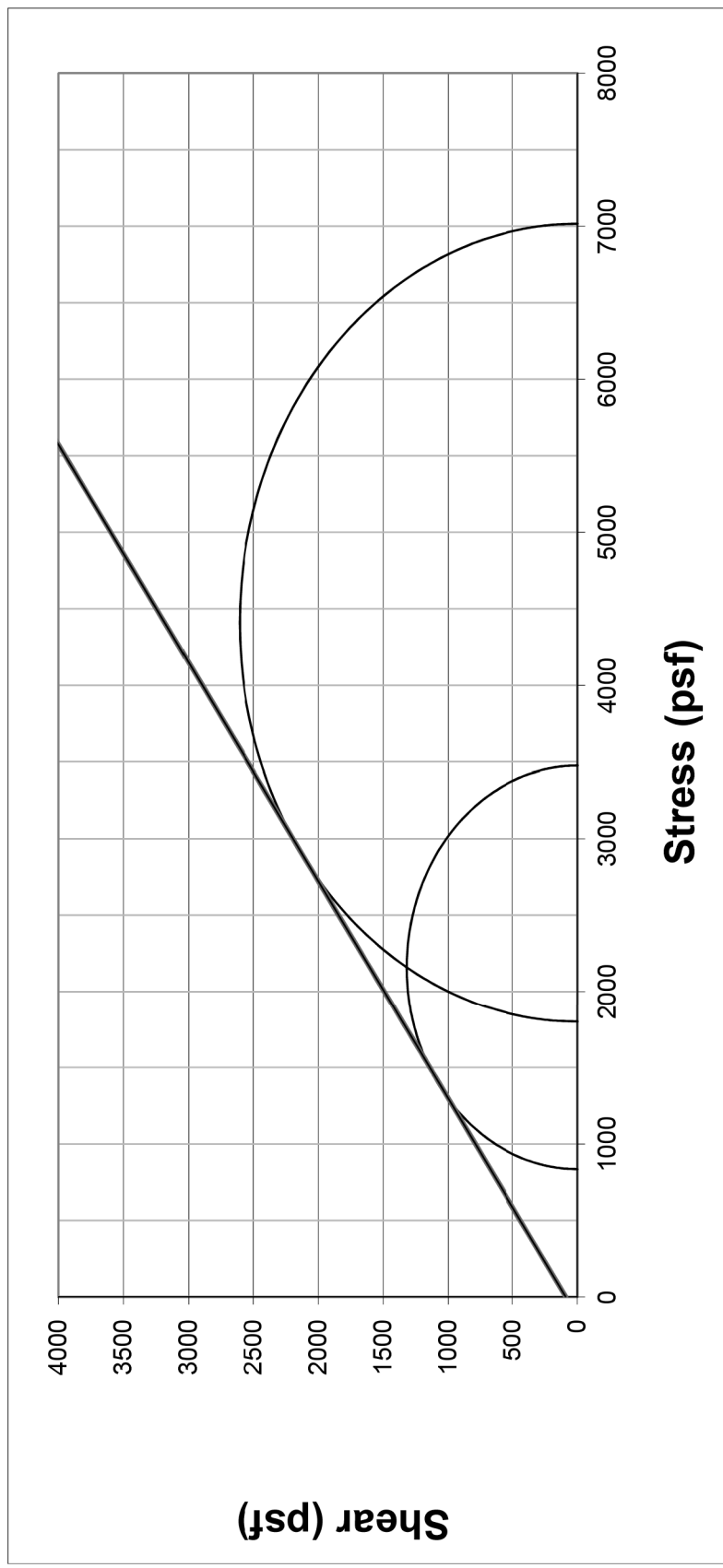
Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc Sample ID: B-033-0A-23, ST, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 1440 4320

LOCATION: Athens & Meigs County, Ohio Cohesion (psf): 89

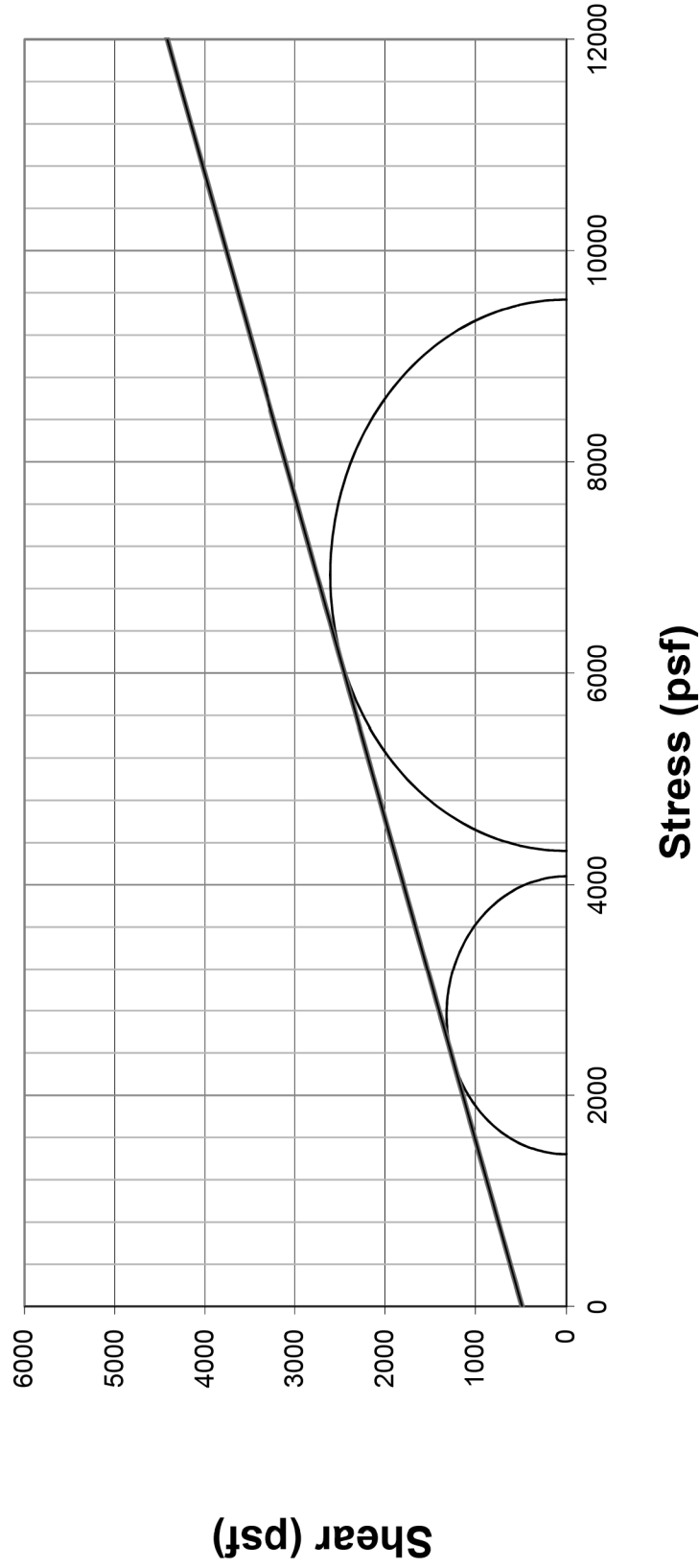
PROJECT #: 23050059COL Angle of Friction (°): 35



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-033-0A-23, ST, 3'-5'
 Confining Pressure (psf): 1440 4320
 Cohesion(psf): 480
 Angle of Friction(°): 18



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767**

Sample Type	ST-1
Date Set-up:	2/2/2024
Date Sheared:	2/6/2024
Avg. Sample Height (in.):	5.7503
Avg. Sample Diameter (in.):	2.8750
Height-to-diameter ratio:	2.00
Wet Density (pcf):	129.9
Dry Density (pcf):	138.3
Void Ratio:	111.5
Specific Gravity (assumed):	0.511
Moisture Content (%):	2.7
Cross Sectional Area (ft^2):	16.5
Volume (ft^3):	0.045
Confining Pressure (psf):	0.02
Rate of Axial Strain (%/min):	0.02
Compressive Strength (psf):	720
Minor Principal Stress at Failure (psf):	2880
Major Principal Stress at Failure (psf):	0.2087
Failure Criterion (%):	1618
β:	720
Specimen Saturation:	2880
	0.2064
	3763
	2880
	6643
	Point of maximum obliquity
	0.98
	0.97
	Wet Method

Grading (ASTM D422)

% Agg:	0
% Sand:	26
% Silt:	46
% Clay:	28

Atterberg Limits (ASTM D 4318)

L.L.:	29
P.L.:	17
P.I.:	12

Visual Description: Red and Gray Silty Clay (A-6b)



POST SHEAR
720 psf

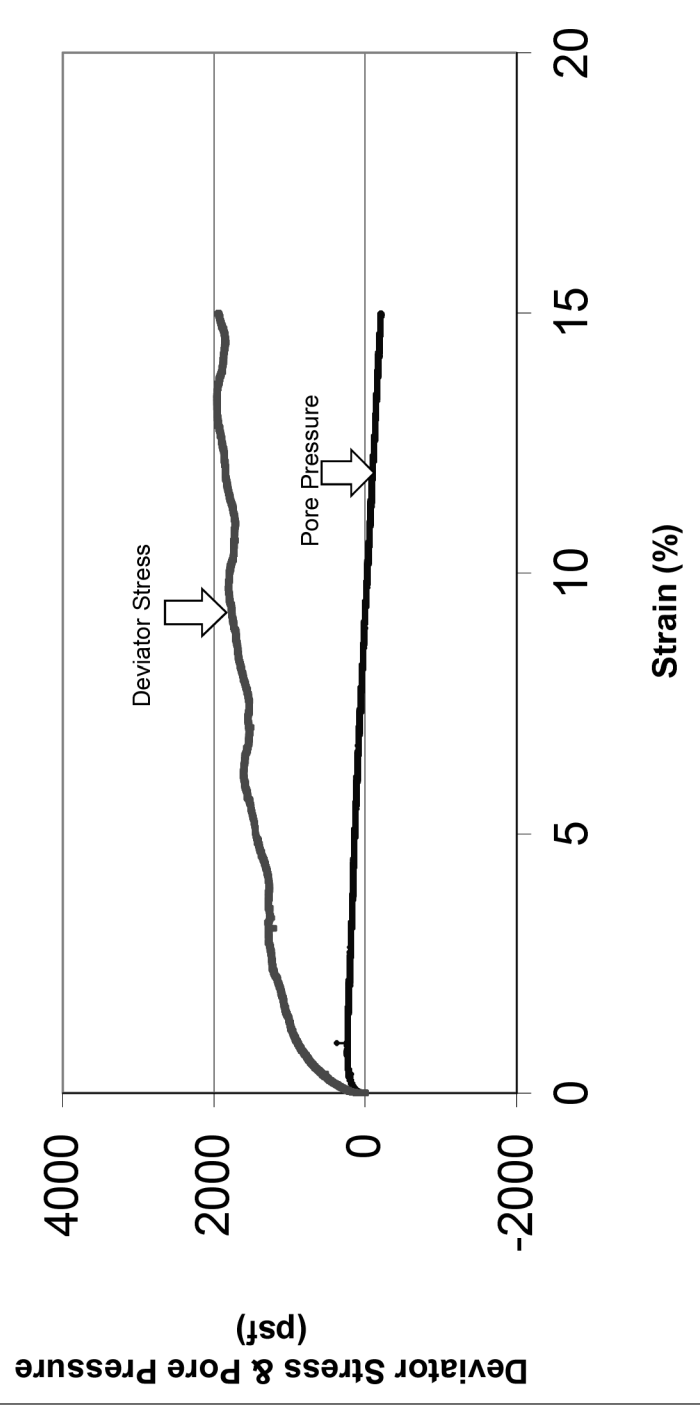


POST SHEAR
2880 psf

<p style="text-align: center;">CTL ENGINEERING, INC. 2860 Fisher Road Columbus, Ohio 43204</p> <p>Client: HNTB Ohio, Inc PID NO. 119142 Project: ATH/MEG-033-23.23/0.00 Location: Athens & Meigs County, Ohio</p> <p>Project No. 23050059COL</p> <p>Sample ID: B-034-0A-23, ST, 1'-3' Lab Code No. NA Reviewed by: SM</p>	<p style="text-align: center;">CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS AASHTO T 297 & ASTM D4767</p> <p>Sample Type: ST-1</p> <p>Date Set-up: 2/2/2024</p> <p>Date Sheared: 2/6/2024</p> <p>Avg. Sample Height (in.): 5.7503</p> <p>Avg. Sample Diameter (in.): 2.8750</p> <p>Height-to-diameter ratio: 2.00</p> <p>Wet Density (pcf): 129.9</p> <p>Dry Density (pcf): 138.3</p> <p>Void Ratio: 111.5</p> <p>Specific Gravity (assumed): 0.511</p> <p>Moisture Content (%): 2.7</p> <p>Cross Sectional Area (ft^2): 16.5</p> <p>Volume (ft^3): 0.045</p> <p>Confining Pressure (psf): 0.02</p> <p>Rate of Axial Strain (%/min): 0.02</p> <p>Compressive Strength (psf): 720</p> <p>Minor Principal Stress at Failure (psf): 2880</p> <p>Major Principal Stress at Failure (psf): 0.2087</p> <p>Failure Criterion (%): 1618</p> <p>β: 720</p> <p>Specimen Saturation: 2880</p> <p>Grading (ASTM D422)</p> <p>% Agg: 0</p> <p>% Sand: 26</p> <p>% Silt: 46</p> <p>% Clay: 28</p> <p>Atterberg Limits (ASTM D 4318)</p> <p>L.L.: 29</p> <p>P.L.: 17</p> <p>P.I.: 12</p> <p>Visual Description: Red and Gray Silty Clay (A-6b)</p>
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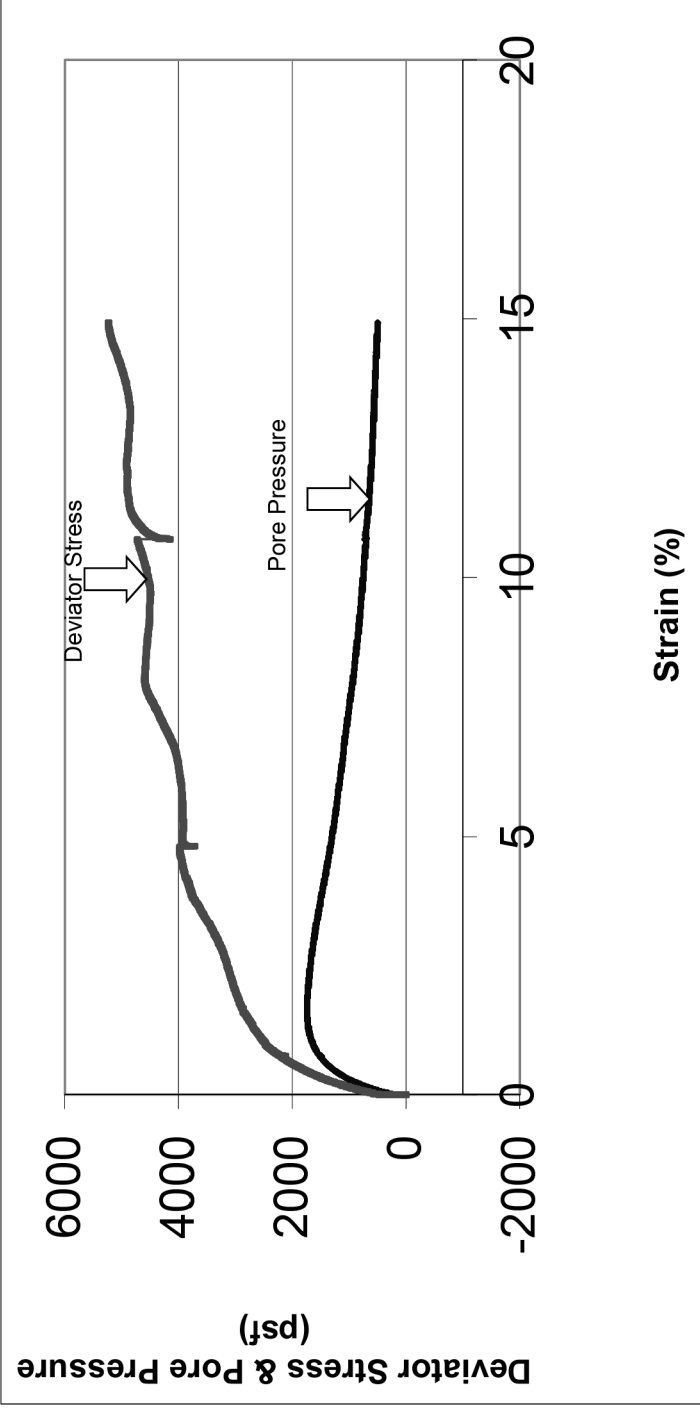
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-034-0A-23, ST, 1'-3'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 720
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-034-0A-23, ST, 1'-3'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 2880
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



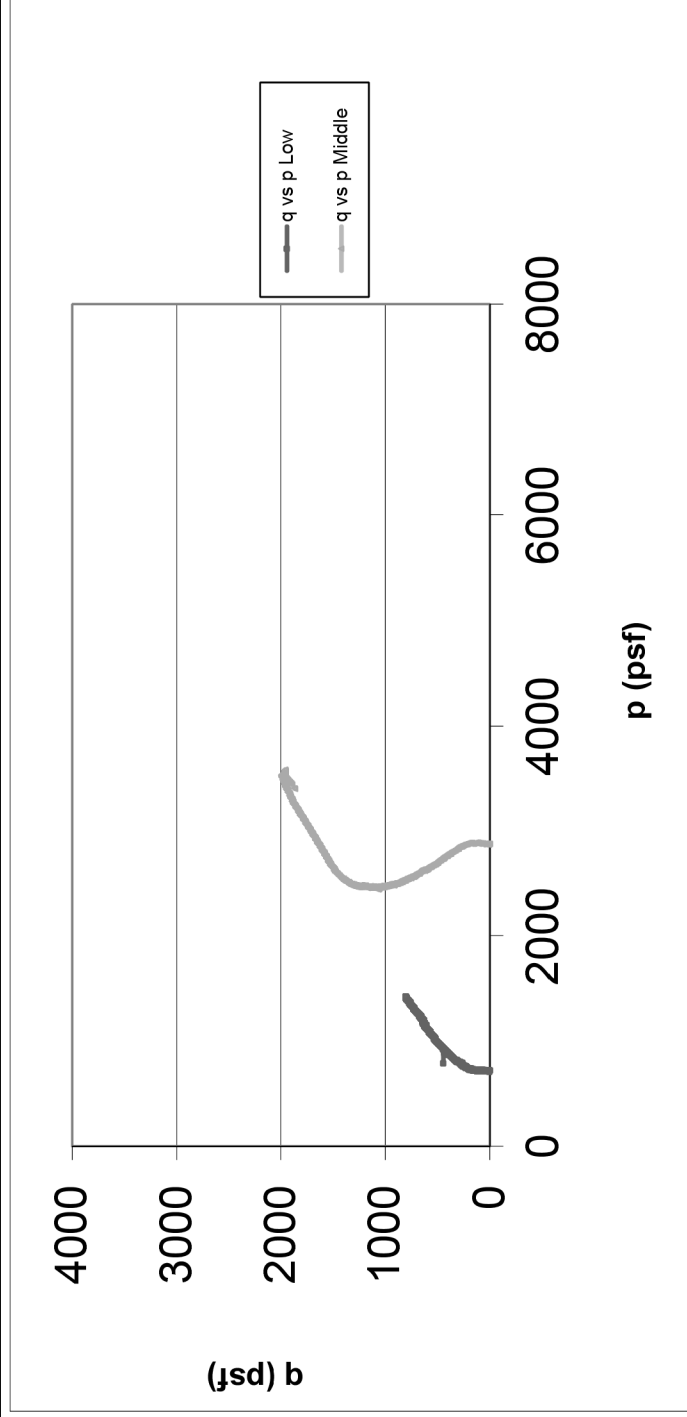
q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-034-0A-23, ST, 1'-3'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): Low Middle

LOCATION: Athens & Meigs County, Ohio 720 2880

PROJECT #: 23050059COL



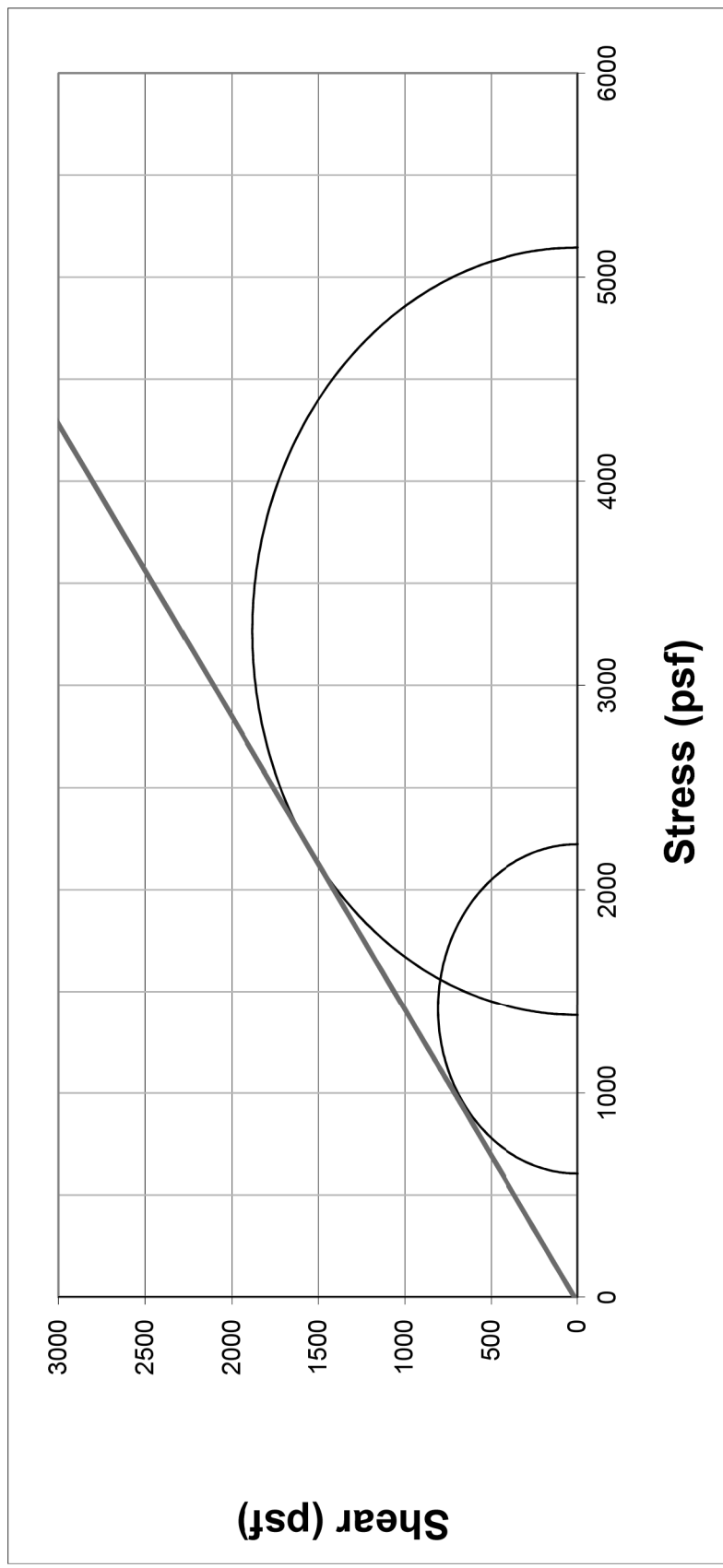
Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc Sample ID: B-034-0A-23, ST, 1'-3'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 720 2880

LOCATION: Athens & Meigs County, Ohio Cohesion (psf): 0

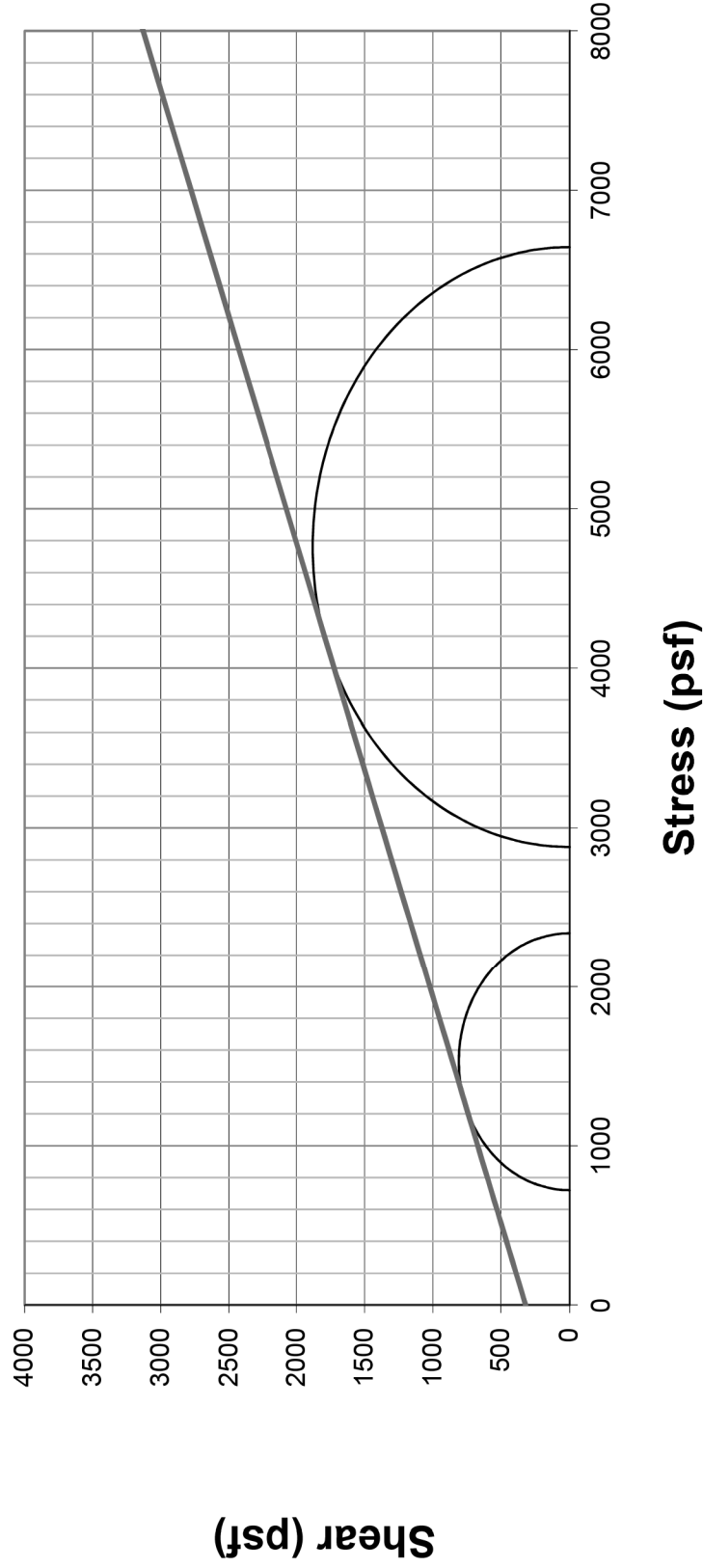
PROJECT #: 23050059COL Angle of Friction (°): 34.5



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-034-0A-23, ST, 1'-3'
 Confining Pressure (psf): 720 2880
 Cohesion (psf): 300
 Angle of Friction(°): 19



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767**

Sample Type	ST-1
Date Set-up:	4/24/2024
Date Sheared:	4/30/2024
Avg. Sample Height (in.):	5.6800
Avg. Sample Diameter (in.):	2.8600
Height-to-diameter ratio:	1.99
Wet Density (pcf):	123.7
Dry Density (pcf):	102.0
Void Ratio:	0.652
Specific Gravity (assumed):	2.7
Moisture Content (%):	21.3
Cross Sectional Area (ft ²):	0.045
Volume (ft ³):	0.02
Confining Pressure (psf):	1440
Rate of Axial Strain (%/min):	0.2113
Compressive Strength (psf):	1969
Minor Principal Stress at Failure (psf):	1440
Major Principal Stress at Failure (psf):	3409
Failure Criterion (%):	Point of maximum obliquity
β:	0.98
Specimen Saturation:	Wet Method



Grading (ASTM D422)

% Agg:	5
% Sand:	10
% Silt:	44
% Clay:	41

Atterberg Limits (ASTM D 4318)

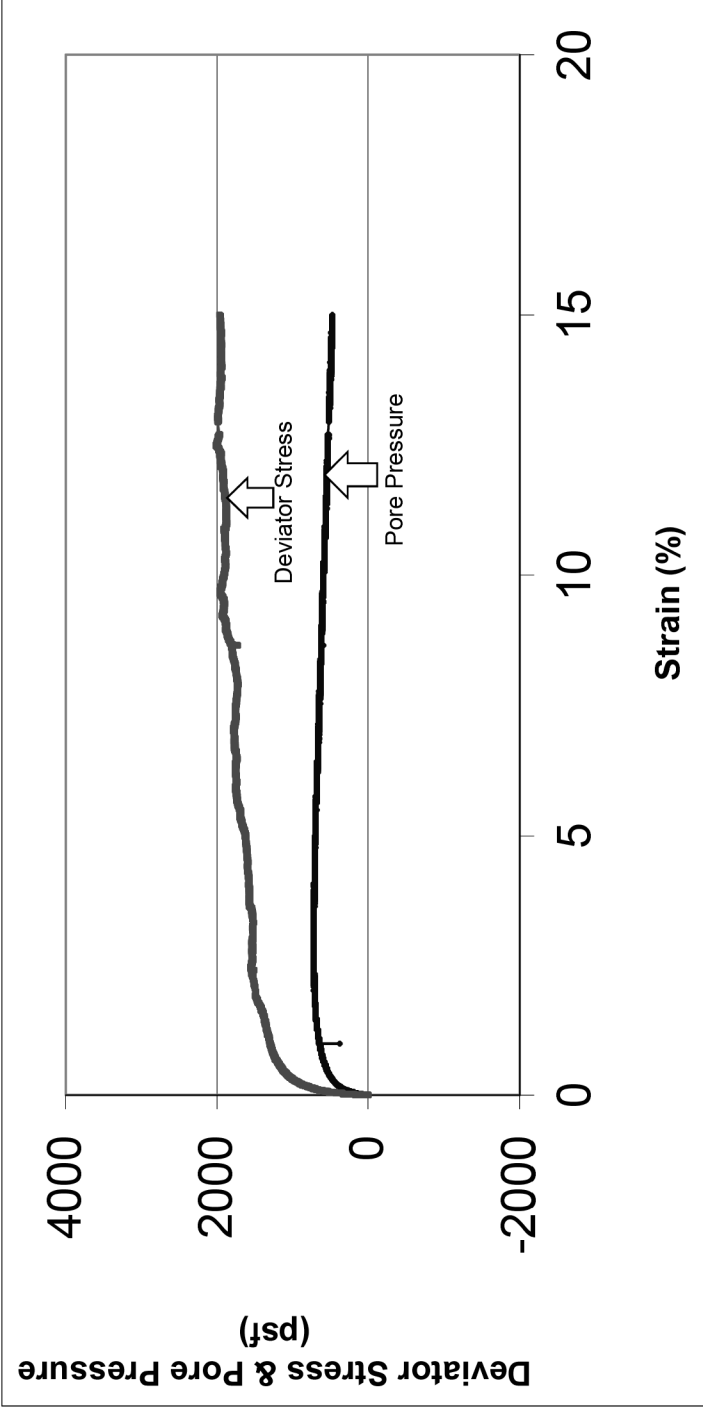
L.L.:	42
P.L.:	22
P.I.:	20

Visual Description: Brown and Red Clay (A-7-6)

<p style="text-align: center;">CTL ENGINEERING, INC. 2860 Fisher Road Columbus, Ohio 43204</p> <p>Client: HNTB Ohio, Inc PID NO. 119142 Project: ATH/MEG-033-23.23/0.00 Location: Athens & Meigs County, Ohio</p> <p>Project No. 23050059COL</p> <p>Sample ID: B-035-1-23, ST-7, 15'-17' Lab Code No. NA Reviewed by: SM</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>POST SHEAR 1440 psf</p> </div> <div style="text-align: center;">  <p>POST SHEAR 4320 psf</p> </div> </div>
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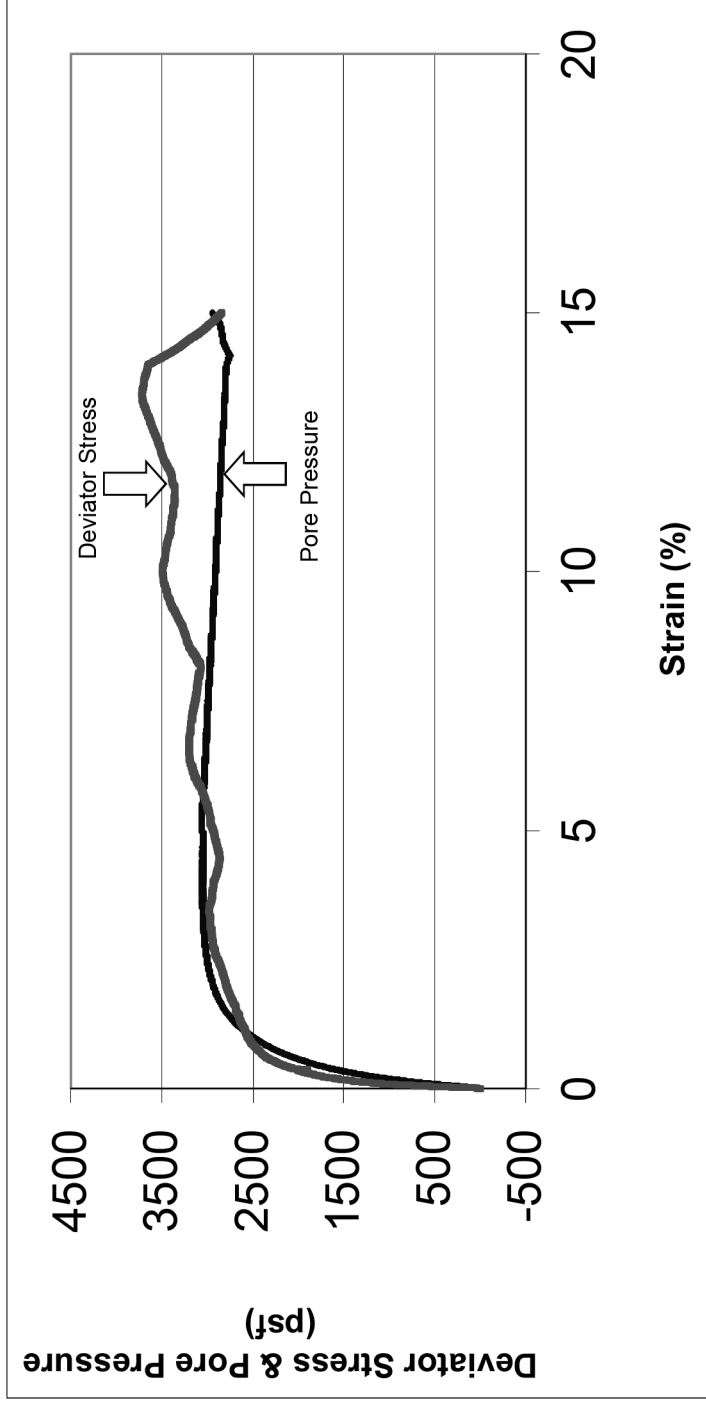
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-035-1-23, ST-7, 15'-17'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 1440
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



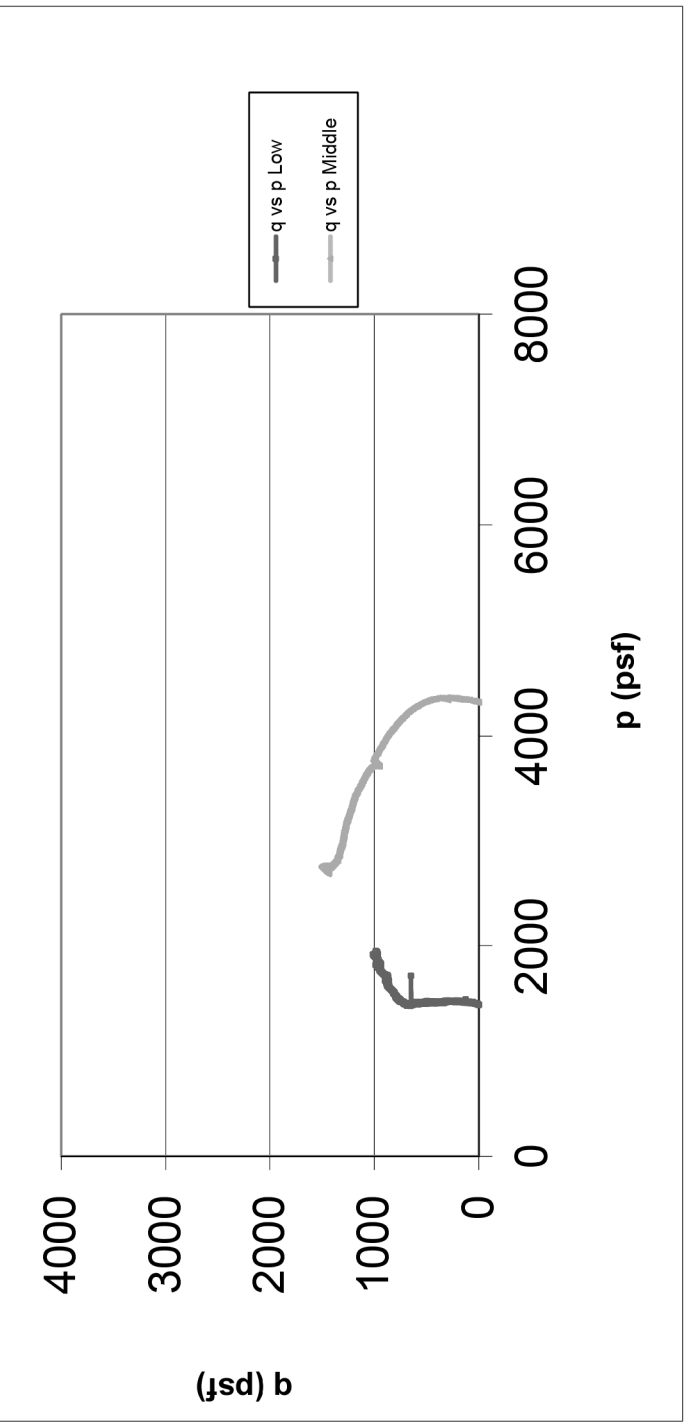
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-035-1-23, ST-7, 15'-17'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 4320
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



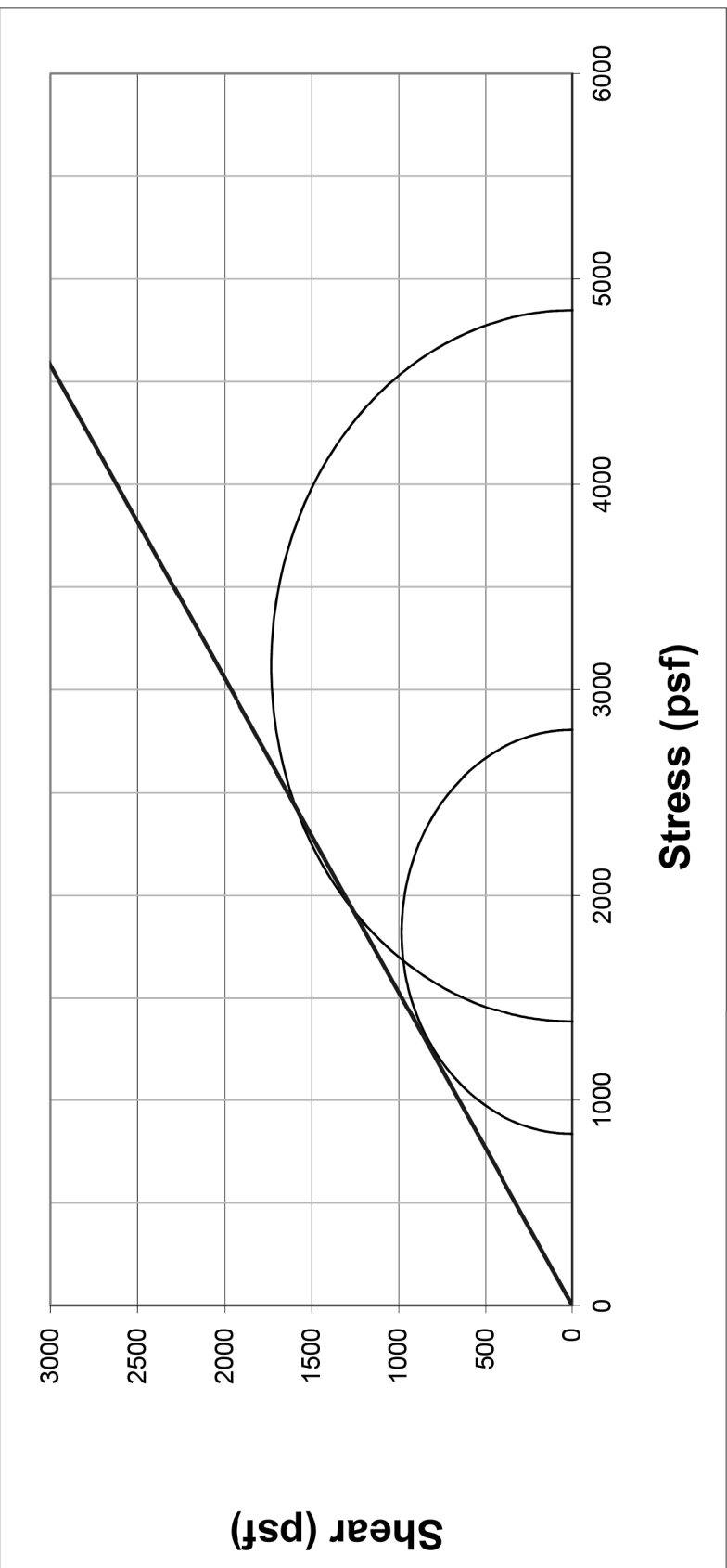
q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-035-1-23, ST-7, 15'-17'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): Low Middle
 LOCATION: Athens & Meigs County, Ohio 1440 4320
 PROJECT #: 23050059COL



Mohr Circle Effective Stress

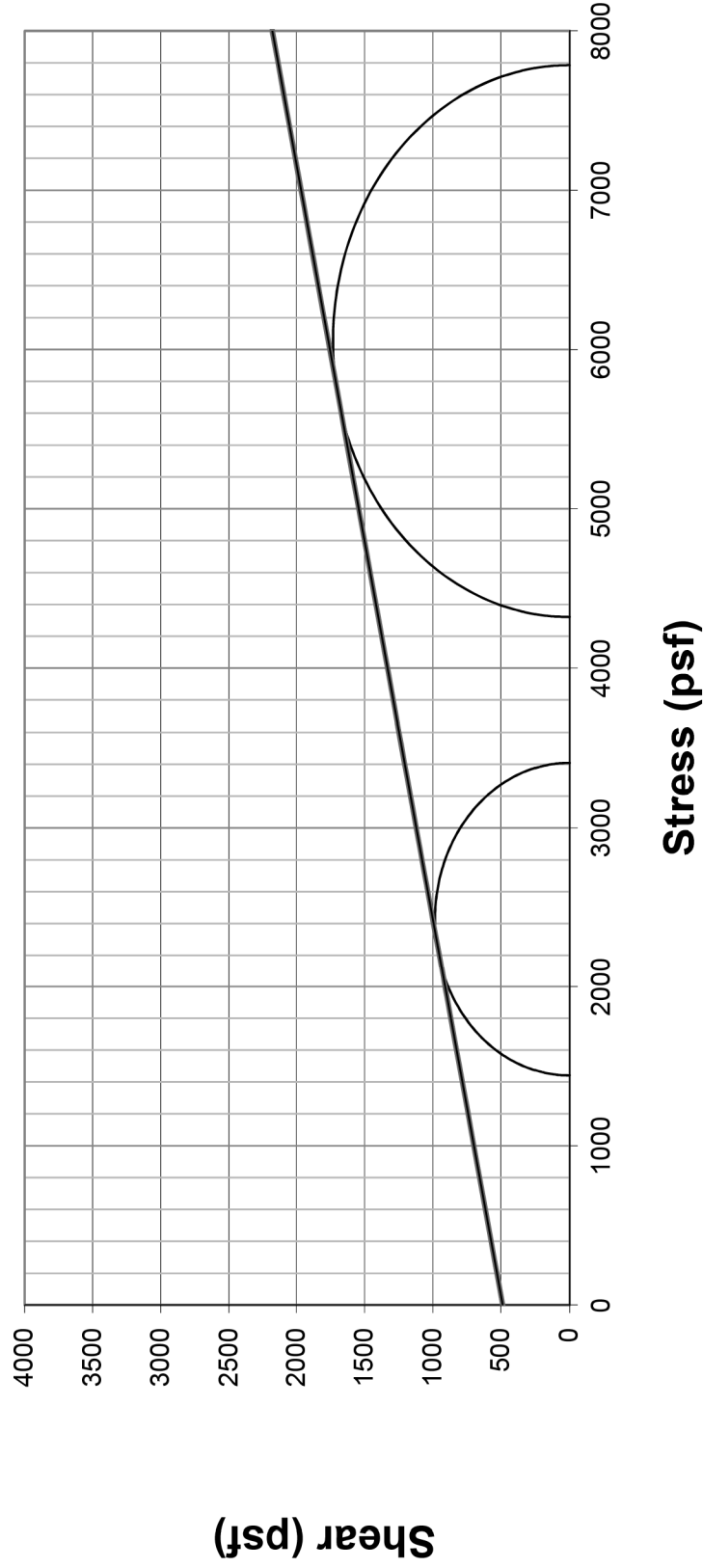
CLIENT: HNTB Ohio, Inc Sample ID: B-035-1-23, ST-7, 15'-17'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 1440 4320
 LOCATION: Athens & Meigs County, Ohio Cohesion (psf): 0
 PROJECT #: 23050059COL Angle of Friction (°): 33



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-035-1-23, ST-7, 15'-17'
 Confining Pressure (psf): 1440 4320
 Cohesion (psf): 485
 Angle of Friction(°): 12



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767**

Sample Type	Undisturbed
Date Set-up:	4/29/2024
Date Sheared:	5/2/2024
Avg. Sample Height (in.):	5.8473
Avg. Sample Diameter (in.):	2.8750
Height-to-diameter ratio:	2.03
Wet Density (pcf):	129.0
Dry Density (pcf):	107.6
Void Ratio:	0.566
Specific Gravity (assumed):	2.7
Moisture Content (%):	19.9
Cross Sectional Area (ft ²):	0.045
Volume (ft ³):	0.02
Confining Pressure (psf):	5760
Rate of Axial Strain (%/min):	0.2052
Compressive Strength (psf):	7237
Minor Principal Stress at Failure (psf):	5760
Major Principal Stress at Failure (psf):	12997
Failure Criterion (%):	Point of maximum obliquity
β:	0.98
Specimen Saturation:	Wet Method



Grading (ASTM D422)

% Agg:	0
% Sand:	19
% Silt:	51
% Clay:	30

Atterberg Limits (ASTM D 4318)

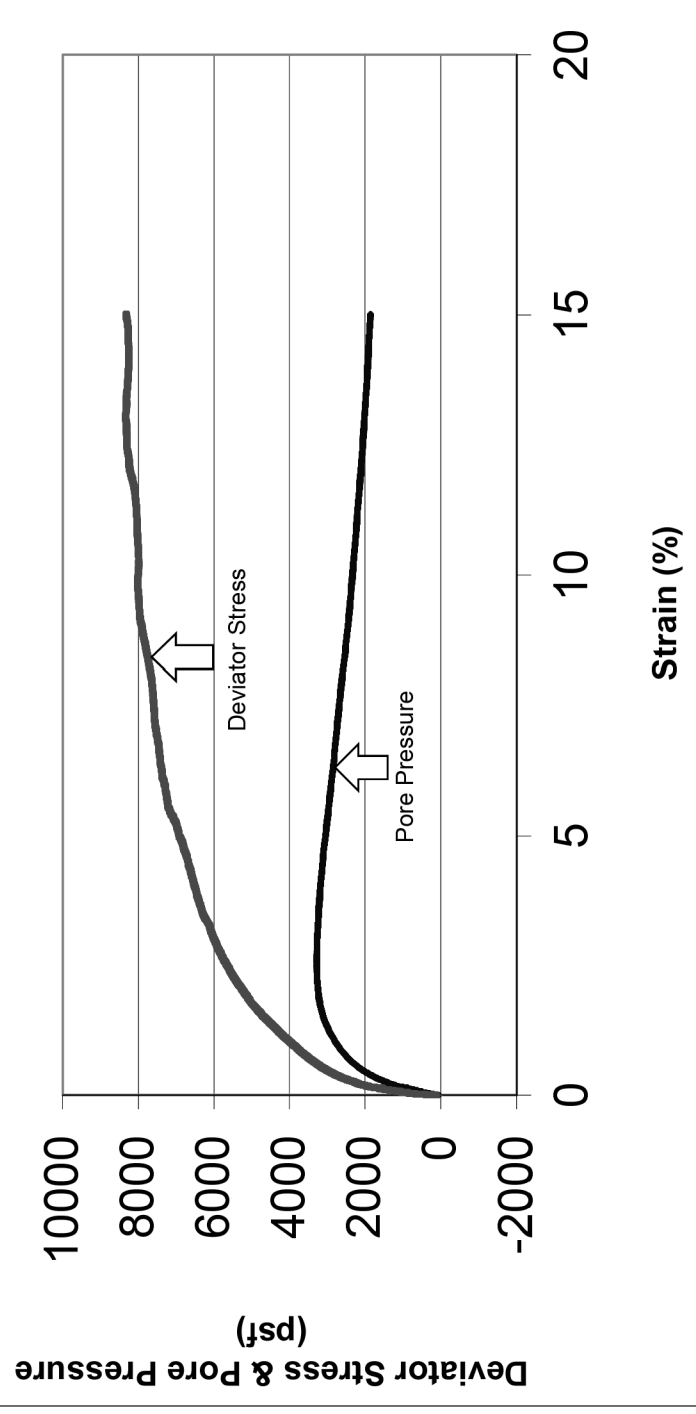
L.L.:	31
P.L.:	18
P.I.:	13

Visual Description: Brown, Silt and Clay (A-6a)

<p>CTL ENGINEERING, INC. 2860 Fisher Road Columbus, Ohio 43204</p> <p>Client: HNTB Ohio, Inc PID NO. 119142 Project: ATH/MEG-033-23.23/0.00 Location: Athens & Meigs County, Ohio</p> <p>Project No. 23050059COL</p> <p>Sample ID: B-039-1-23, ST-23, 81'-83' Lab Code No. NA Reviewed by: SM</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>POST SHEAR 5760 psf</p> </div> <div style="text-align: center;">  <p>POST SHEAR 10080 psf</p> </div> </div>
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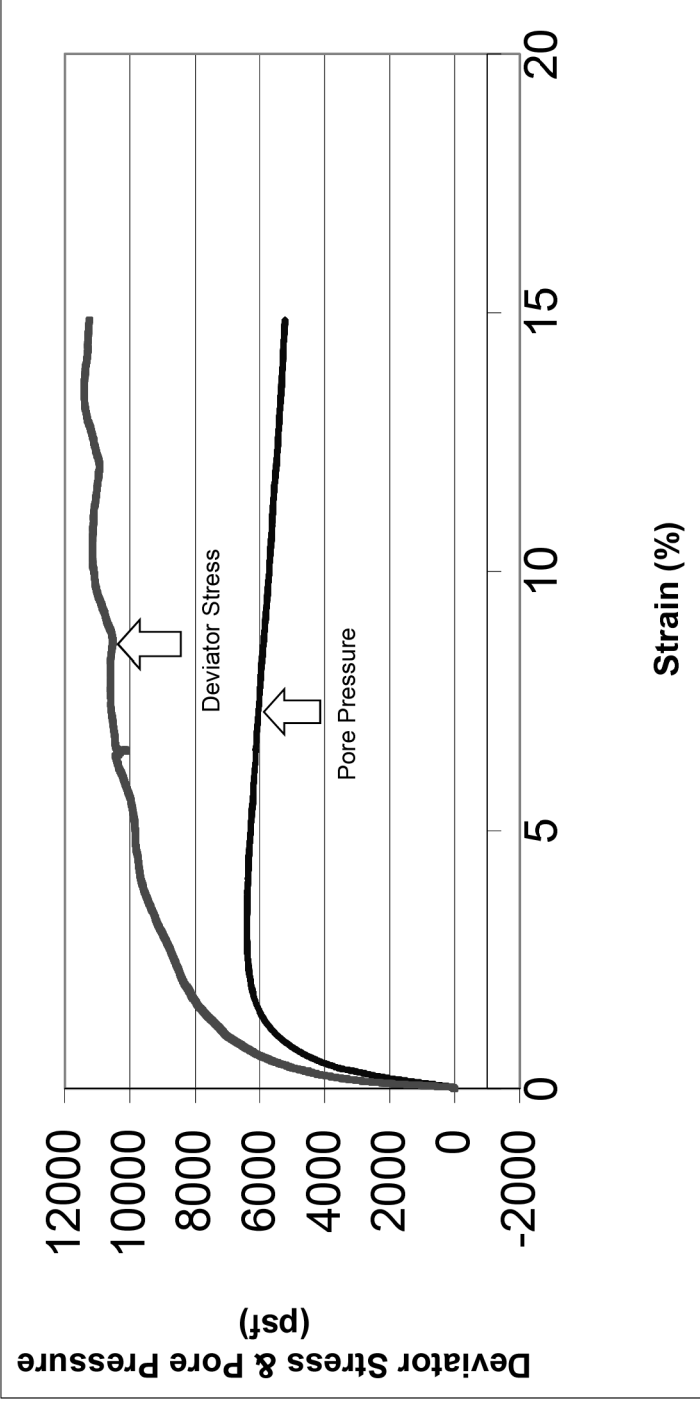
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-039-1-23, ST-23, 81'-83'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 5760
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-039-1-23, ST-23, 81'-83'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 10080
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



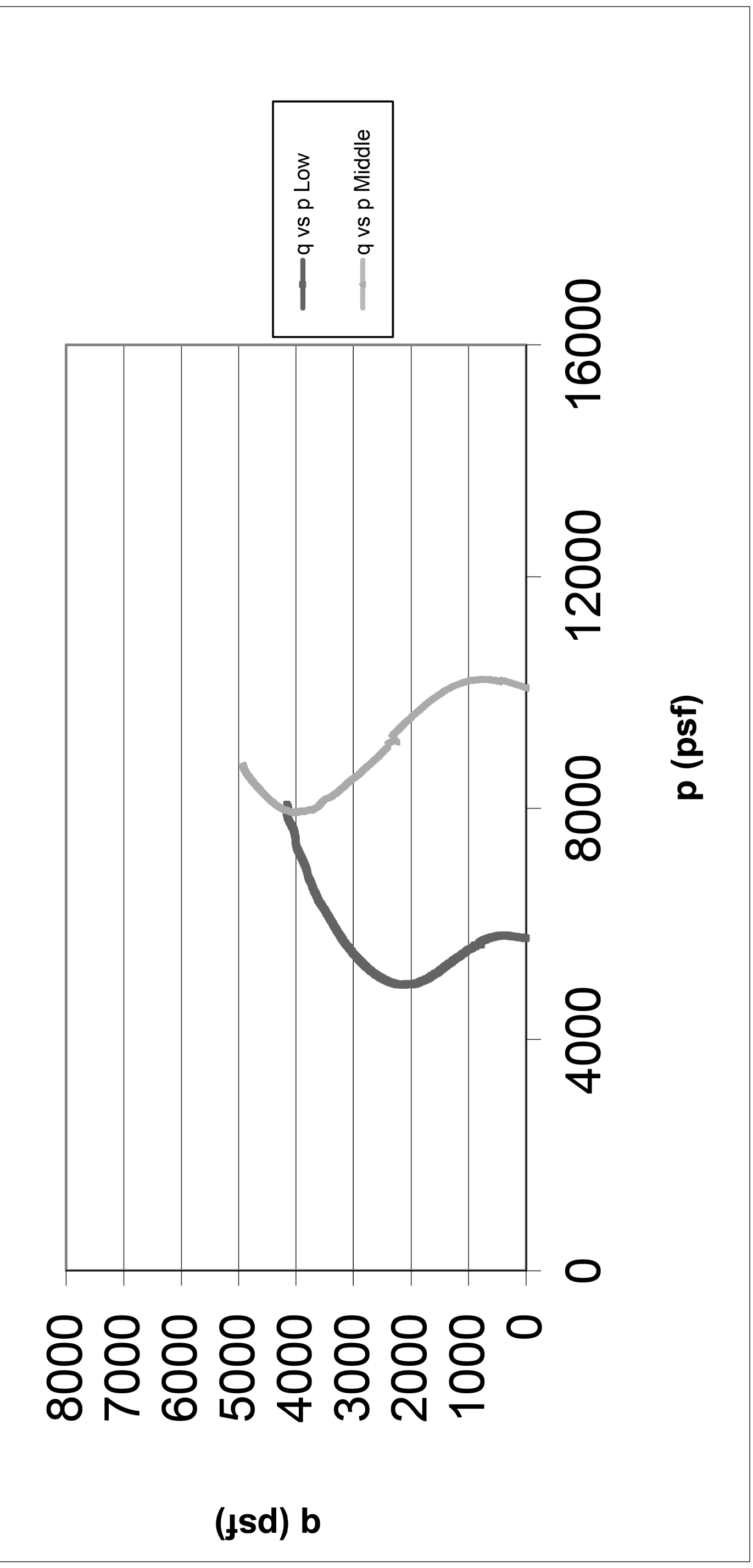
q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-039-1-23, ST-23, 81'-83'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): Low Middle

LOCATION: Athens & Meigs County, Ohio 5760 10080

PROJECT #: 23050059COL 10080



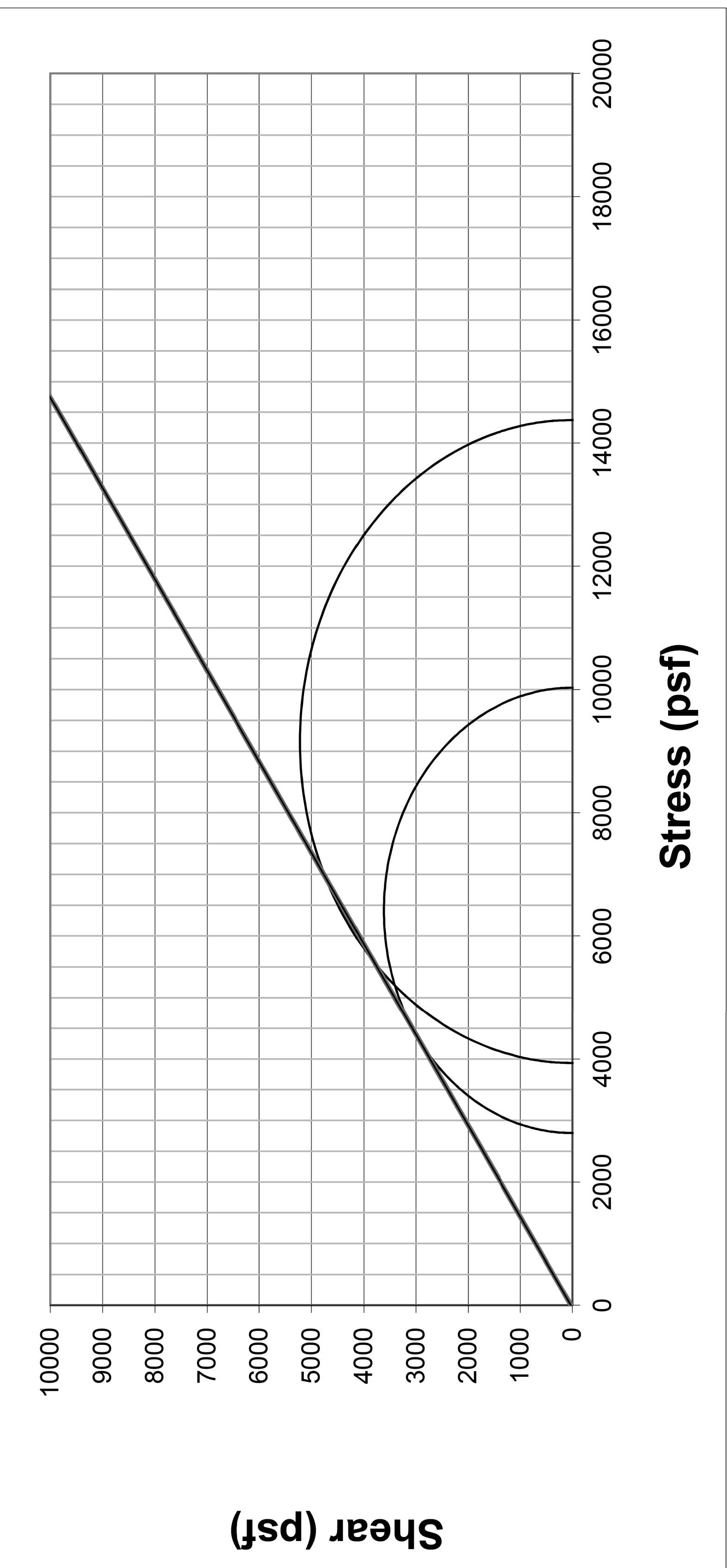
Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc Sample ID: B-039-1-23, ST-23, 81'-83'

PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 5760 10080

LOCATION: Athens & Meigs County, Ohio Cohesion (psf): 0

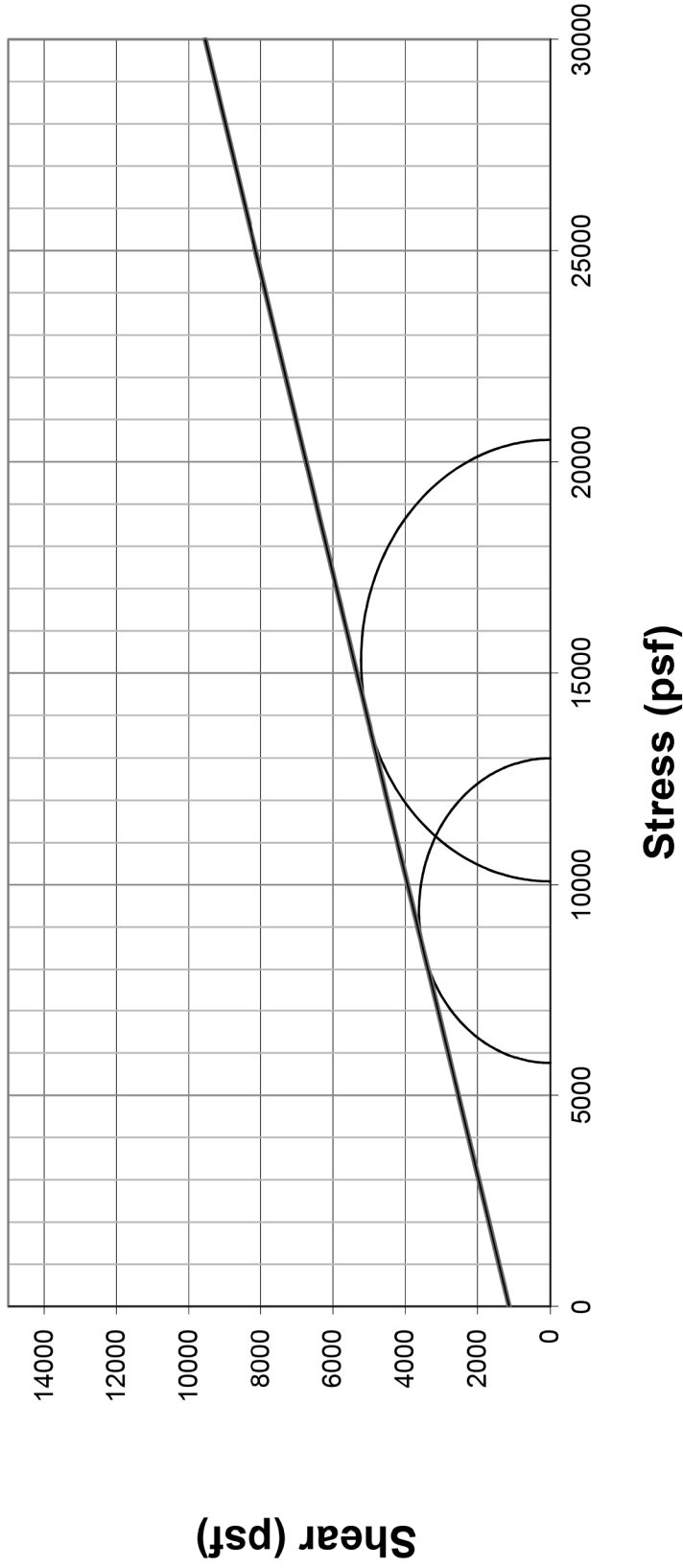
PROJECT #: 23050059COL Angle of Friction (°): 33



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-039-1-23, ST-23, 81'-83'
 Confining Pressure (psf): 5760 10080
 Cohesion (psf): 1120
 Angle of Friction (°): 15



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767**

Sample Type	Undisturbed	
Date Set-up:	12/15/2023	12/15/2023
Date Sheared:	12/21/2023	12/21/2023
Avg. Sample Height (in.):	5.7390	5.7467
Avg. Sample Diameter (in.):	2.8600	2.8750
Height-to-diameter ratio:	2.01	2.01
Wet Density (pcf):	135.5	134.6
Dry Density (pcf):	118.9	110.5
Void Ratio:	0.417	0.525
Specific Gravity (assumed):	2.7	2.7
Moisture Content (%):	14.0	21.8
Cross Sectional Area (ft ²):	0.045	0.045
Volume (ft ³):	0.02	0.02
Confining Pressure (psf):	360	1080
Rate of Axial Strain (%/min):	0.2091	0.2088
Compressive Strength (psf):	1129	3224
Minor Principal Stress at Failure (psf):	360	2160
Major Principal Stress at Failure (psf):	1489	5384
Failure Criterion (%):	Point of Maximum Obliviquity	
β :	0.97	0.87
Specimen Saturation:	Wet Method	

Grading (ASTM D422)

% Agg:	2
% Sand:	41
% Silt:	21
% Clay:	36

Atterberg Limits (ASTM D 4318)

L.L.:	28
P.L.:	17
P.I.:	11

Visual Classification: Brown, Silt and Clay (A-6a)

Due to the presence of rock pieces, the data from 1080 psf point was not utilized while developing the Mohr Circle - Effective and Total Stress plots

CTL ENGINEERING, INC.
 2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 PID NO. 119142
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens & Meigs County, Ohio

Project No. 23050059COL
 Sample ID: B-040-0-23, ST-2, 3'-5'
 Lab Code No. NA
 Reviewed by: SM



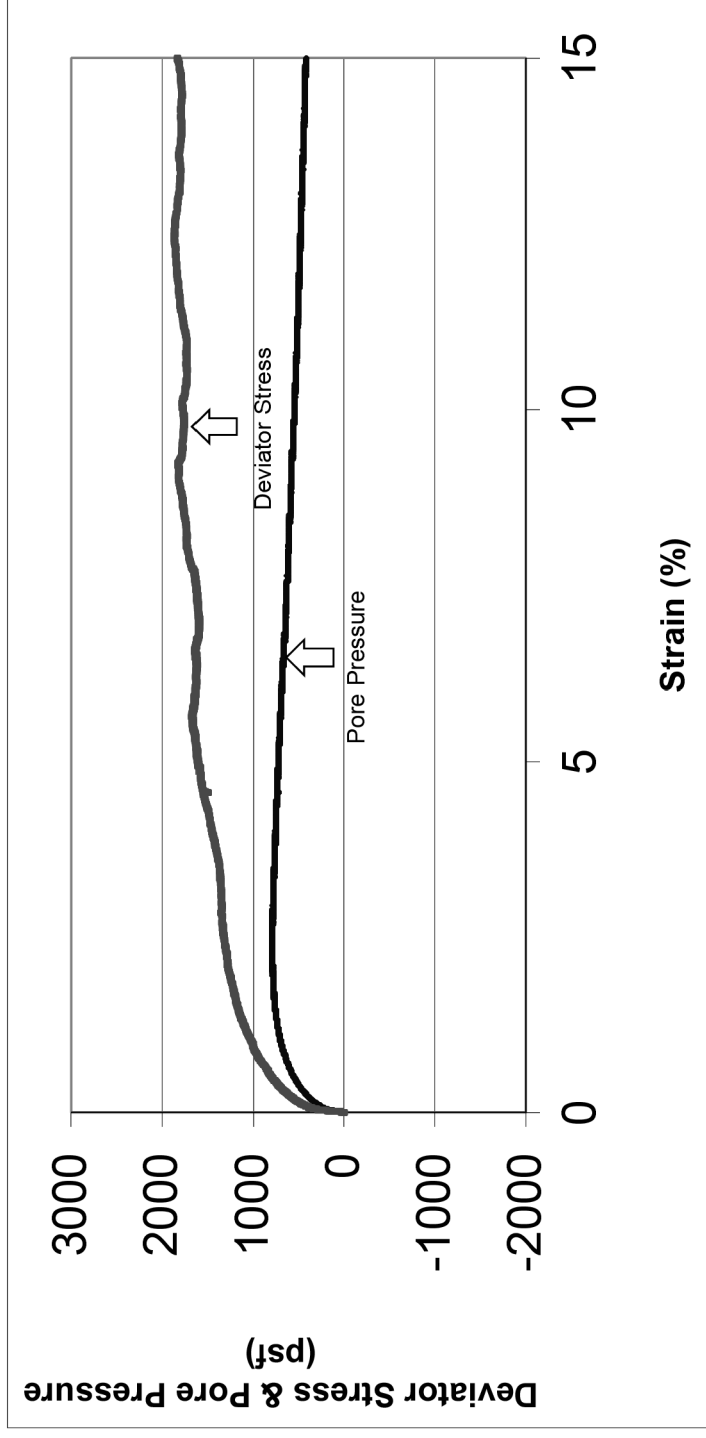
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-040-0-23, ST-2, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 360
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



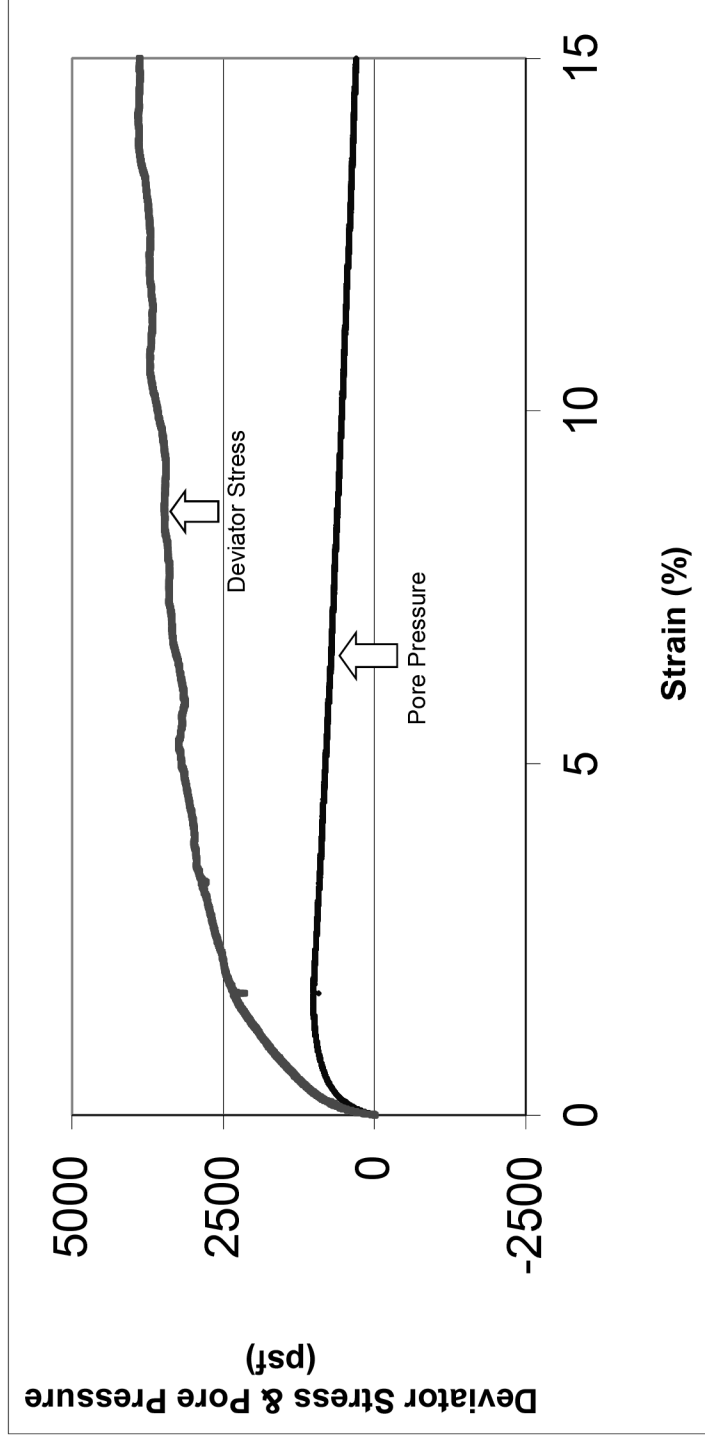
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-040-0-23, ST-2, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 1080
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



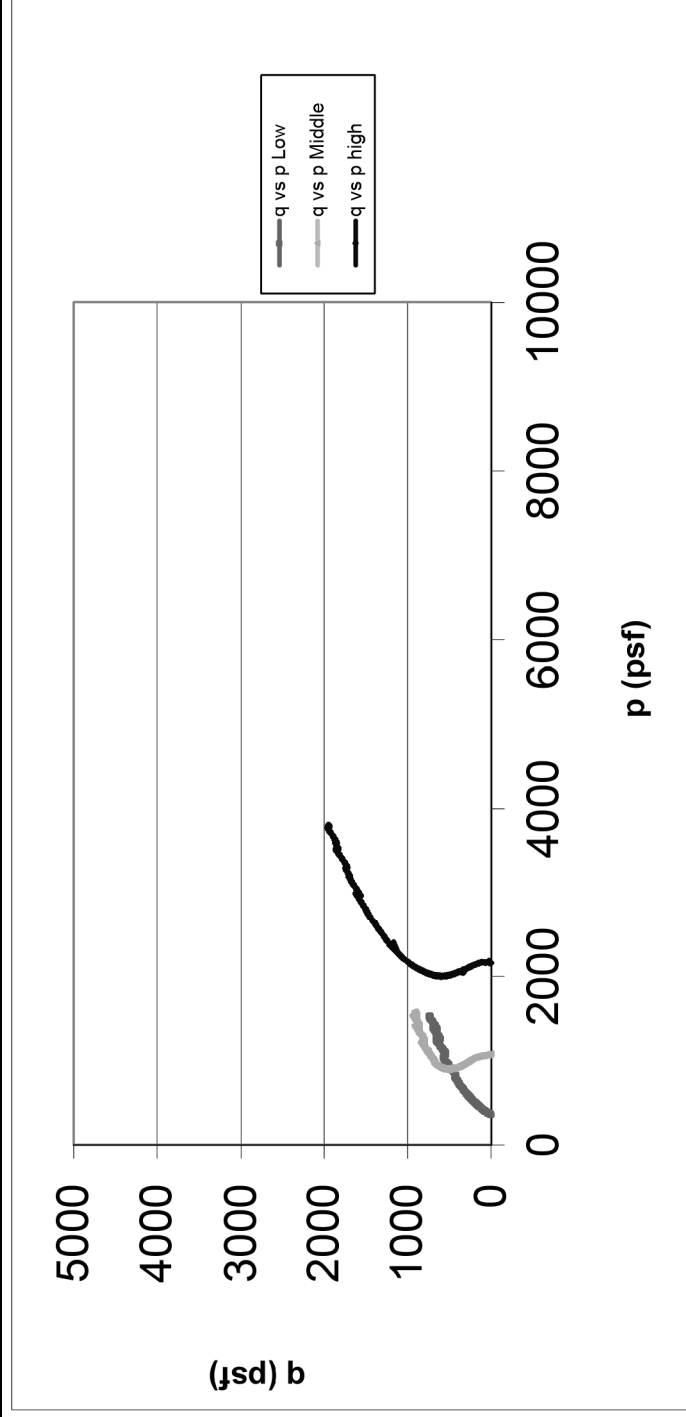
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-040-0-23, ST-2, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 2160
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-040-0-23, ST-2, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): Low 360 Middle 1080 High 2160
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

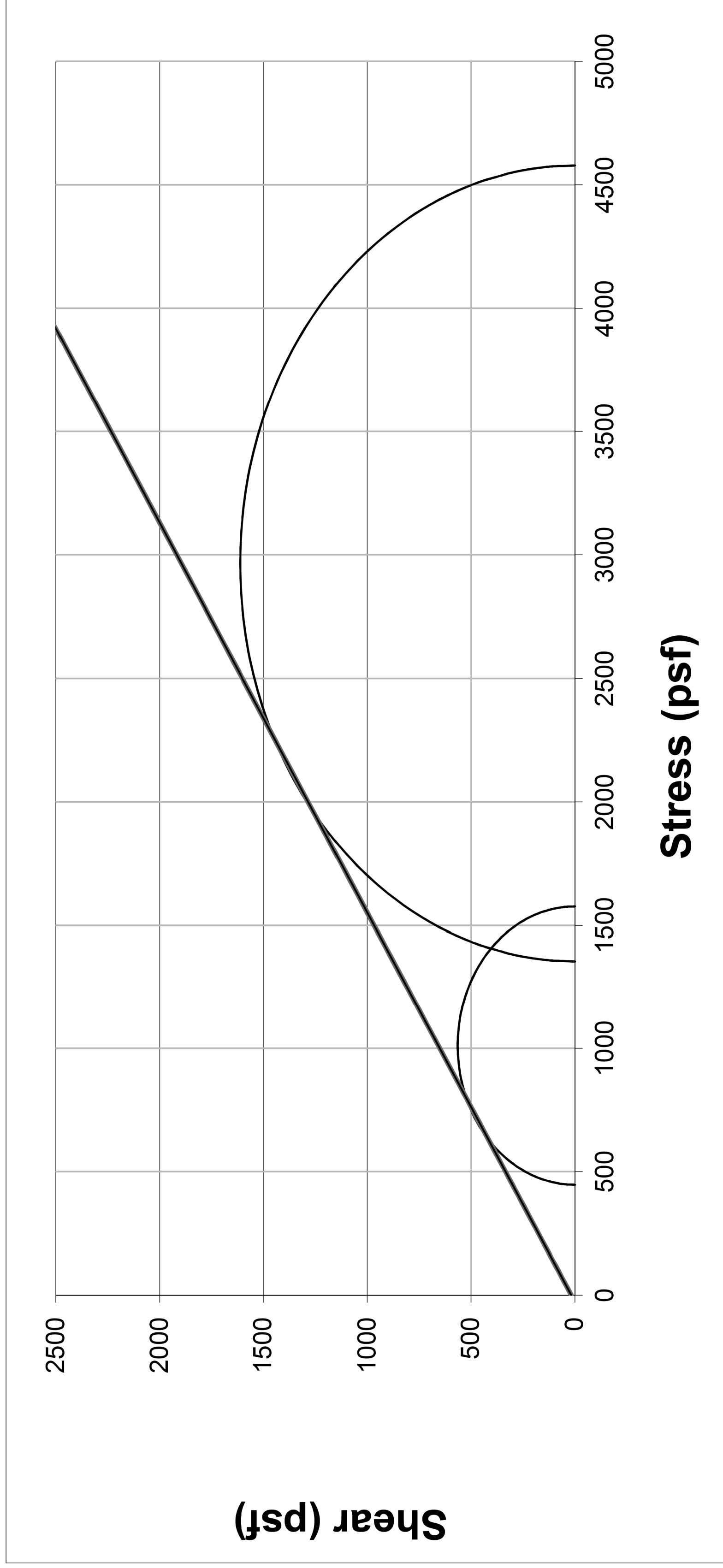


Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'

Confining Pressure (psf): 360
 Cohesion (psf): 15
 Angle of Friction (°): 32

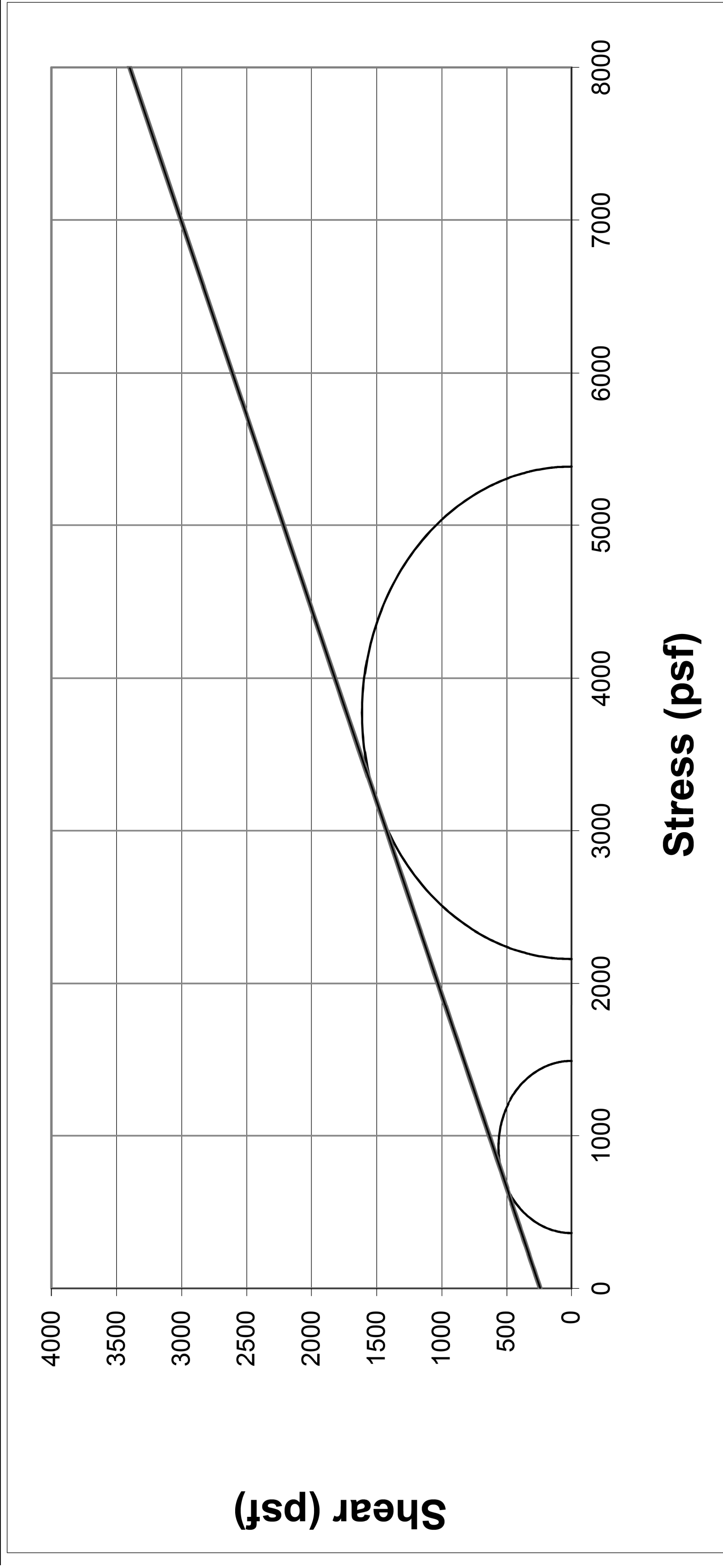


Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'

Confining Pressure (psf): 360
 Cohesion (psf): 240
 Angle of Friction (°): 21.5



CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
 AASHTO T 297 & ASTM D4767

CTL ENGINEERING, INC.
 2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 PID NO. 119142
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens & Meigs County, Ohio

Project No. 23050059COL
 Sample ID: B-041-0A-23, ST, 3'-5'
 Lab Code No. NA
 Reviewed by: SM

Sample Type	Undisturbed	
Date Set-up:	2/6/2024	2/6/2024
Date Sheared:	2/9/2024	2/9/2024
Avg. Sample Height (in.):	5.7903	5.7773
Avg. Sample Diameter (in.):	2.8750	2.8800
Height-to-diameter ratio:	2.01	2.01
Wet Density (pcf):	131.3	134.5
Dry Density (pcf):	113.6	114.7
Void Ratio:	0.483	0.469
Specific Gravity (assumed):	2.7	2.7
Moisture Content (%):	15.6	17.3
Cross Sectional Area (ft ²):	0.045	0.045
Volume (ft ³):	0.02	0.02
Confining Pressure (psf):	1440	2880
Rate of Axial Strain (%/min):	0.2072	0.2077
Compressive Strength (psf):	3584	6544
Minor Principal Stress at Failure (psf):	1440	2880
Major Principal Stress at Failure (psf):	5024	9424
Failure Criterion (%):	Point of Maximum Obliquity	
β:	0.97	0.95
Specimen Saturation:	Wet Method	



POST SHEAR
1440 psf



POST SHEAR
2880 psf



POST SHEAR
4320 psf

Grading (ASTM D422)

% Agg:	1
% Sand:	40
% Silt:	39
% Clay:	20

Atterberg Limits (ASTM D 4318)

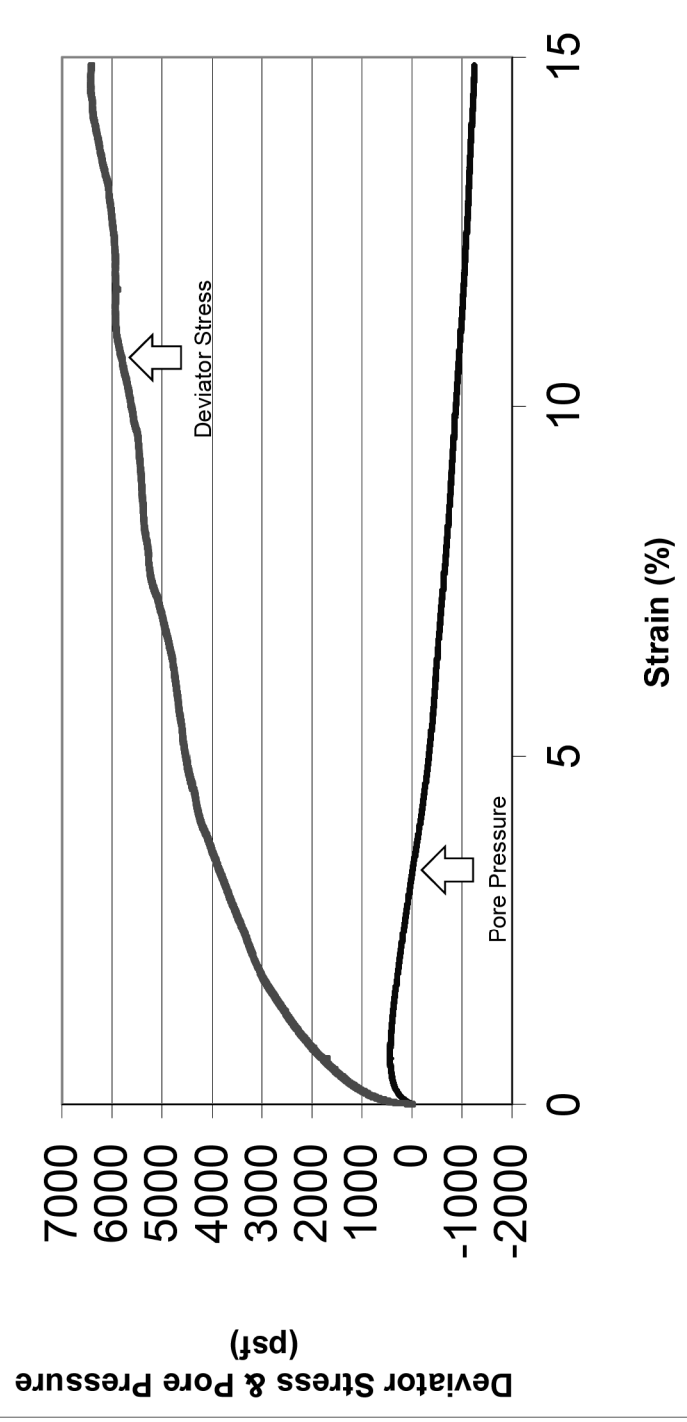
L.L.:	28
P.L.:	21
P.I.:	7

Visual Classification: Brown, Sandy Silt (A-4a)

Deviator Stress & Pore Pressure vs. Strain

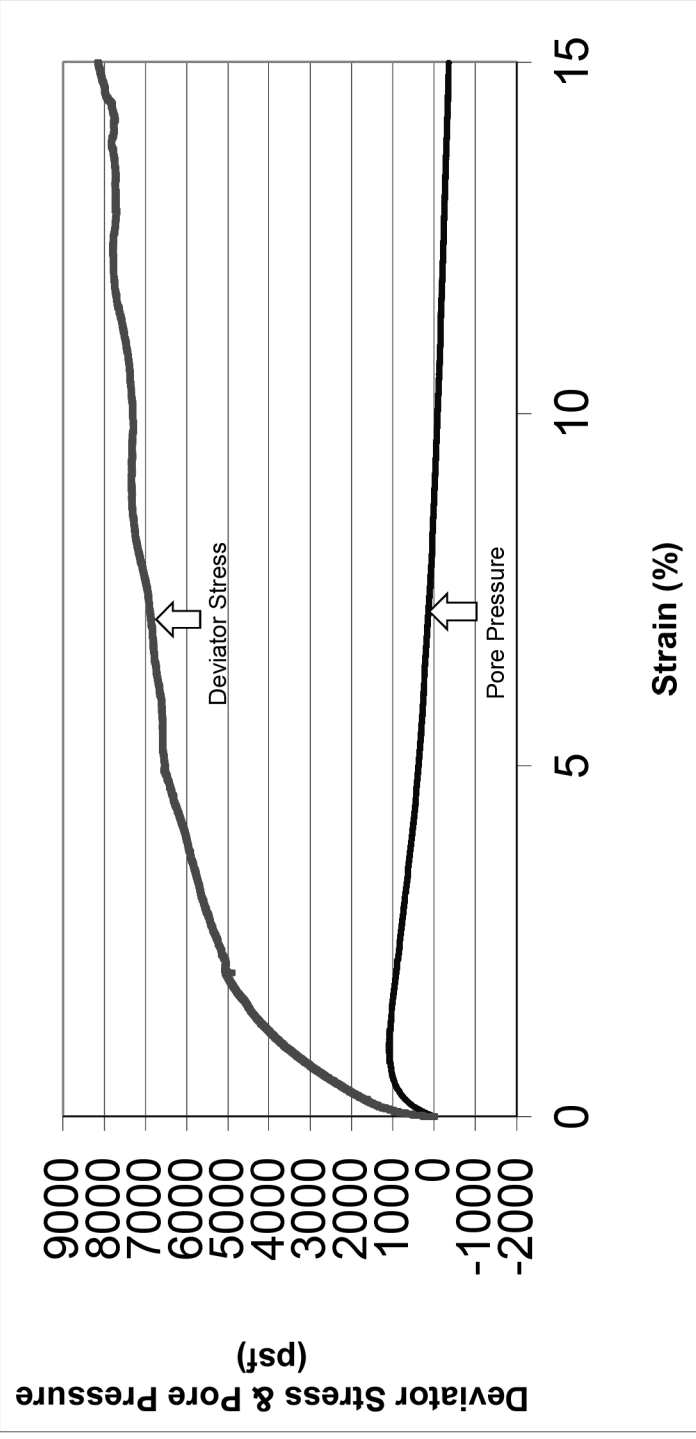
CLIENT: HNTB Ohio, Inc
 PROJECT: ATH/MEG-033-23.23/0.00
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL

Sample ID: B-041-0A-23, ST, 3'-5'
 Confining Pressure (psf): 1440



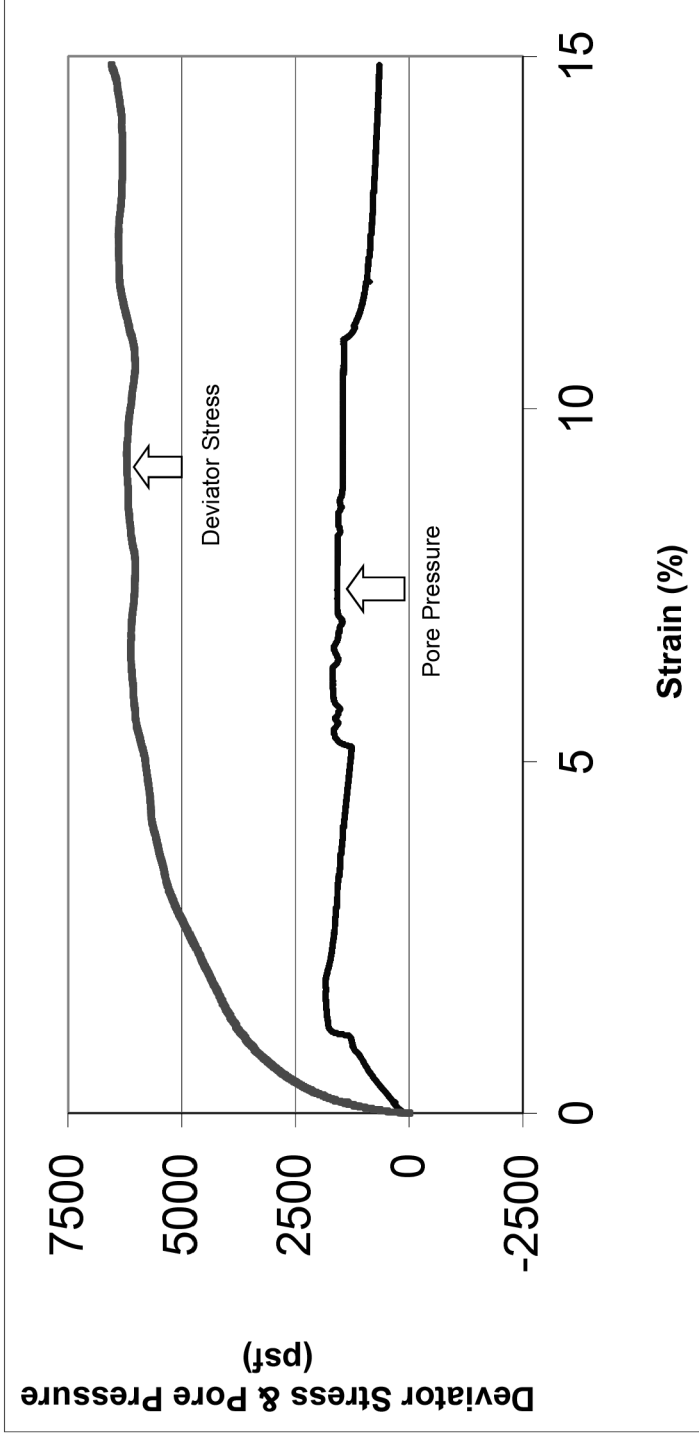
Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-041-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 2880
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc Sample ID: B-041-0A-23, ST, 3'-5'
 PROJECT: ATH/MEG-033-23.23/0.00 Confining Pressure (psf): 4320
 LOCATION: Athens & Meigs County, Ohio
 PROJECT #: 23050059COL



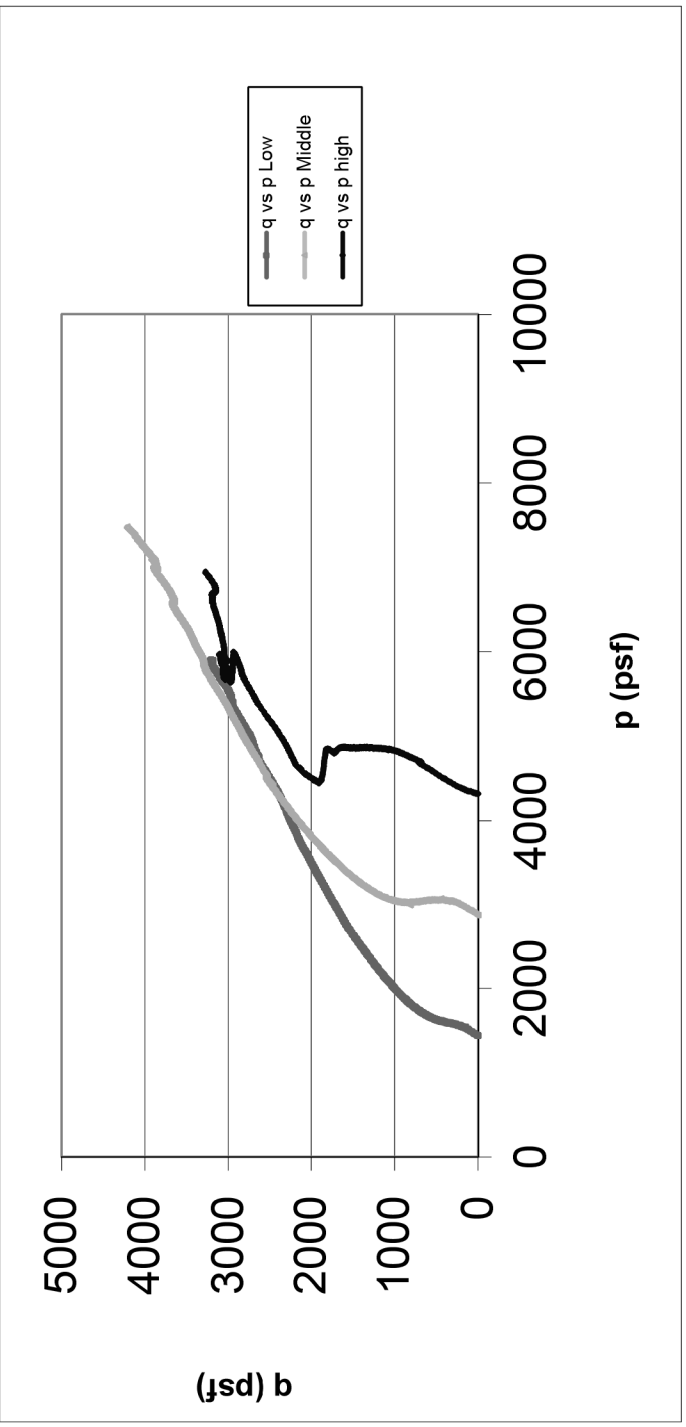
q vs. p

CLIENT: HNTB Ohio, Inc Sample ID: B-041-0A-23, ST, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00

LOCATION: Athens & Meigs County, Ohio Confining Pressure (psf): Low Middle High

PROJECT #: 23050059COL 1440 2880 4320



Mohr Circle Effective Stress

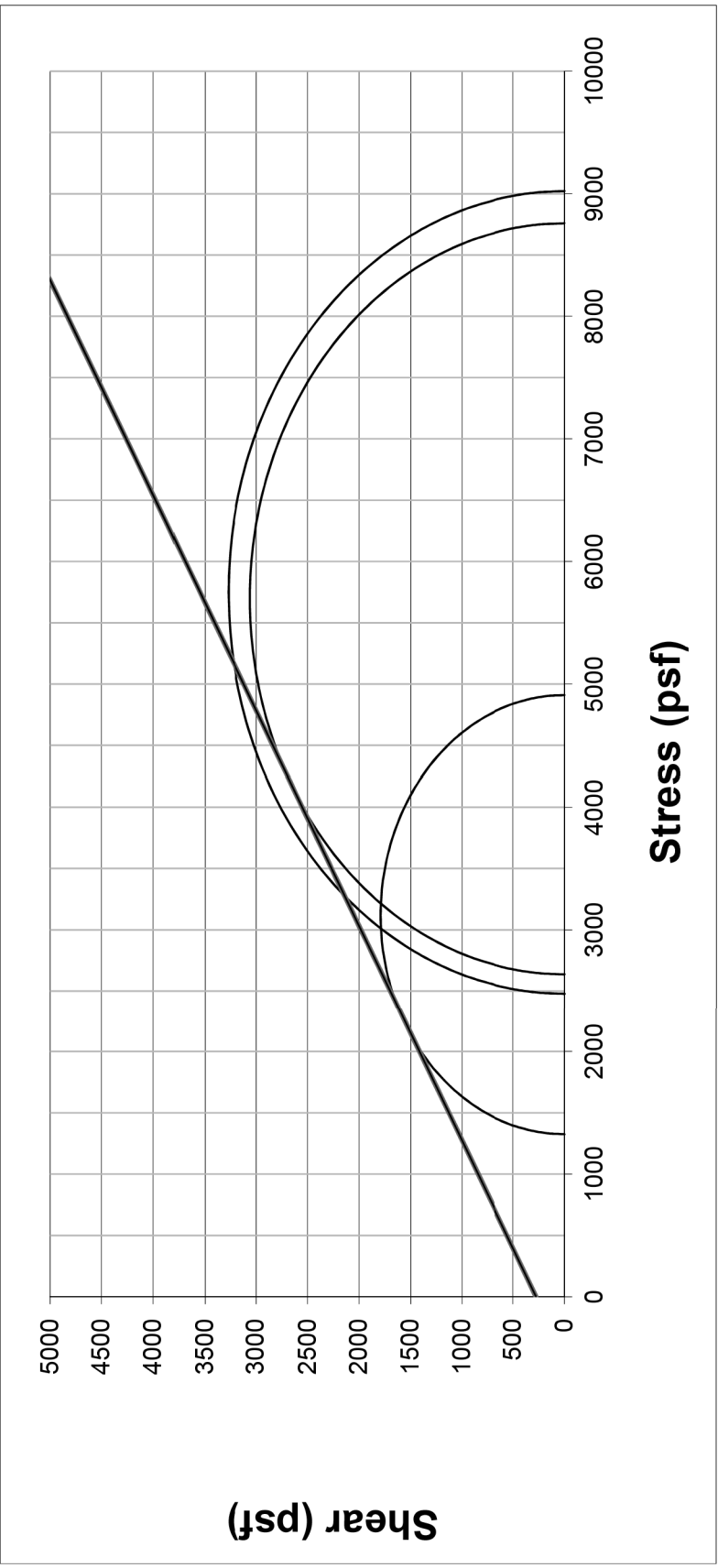
CLIENT: HNTB Ohio, Inc Sample ID: B-041-0A-23, ST, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00

LOCATION: Athens & Meigs County, Ohio Confining Pressure (psf): 1440 2880 4320

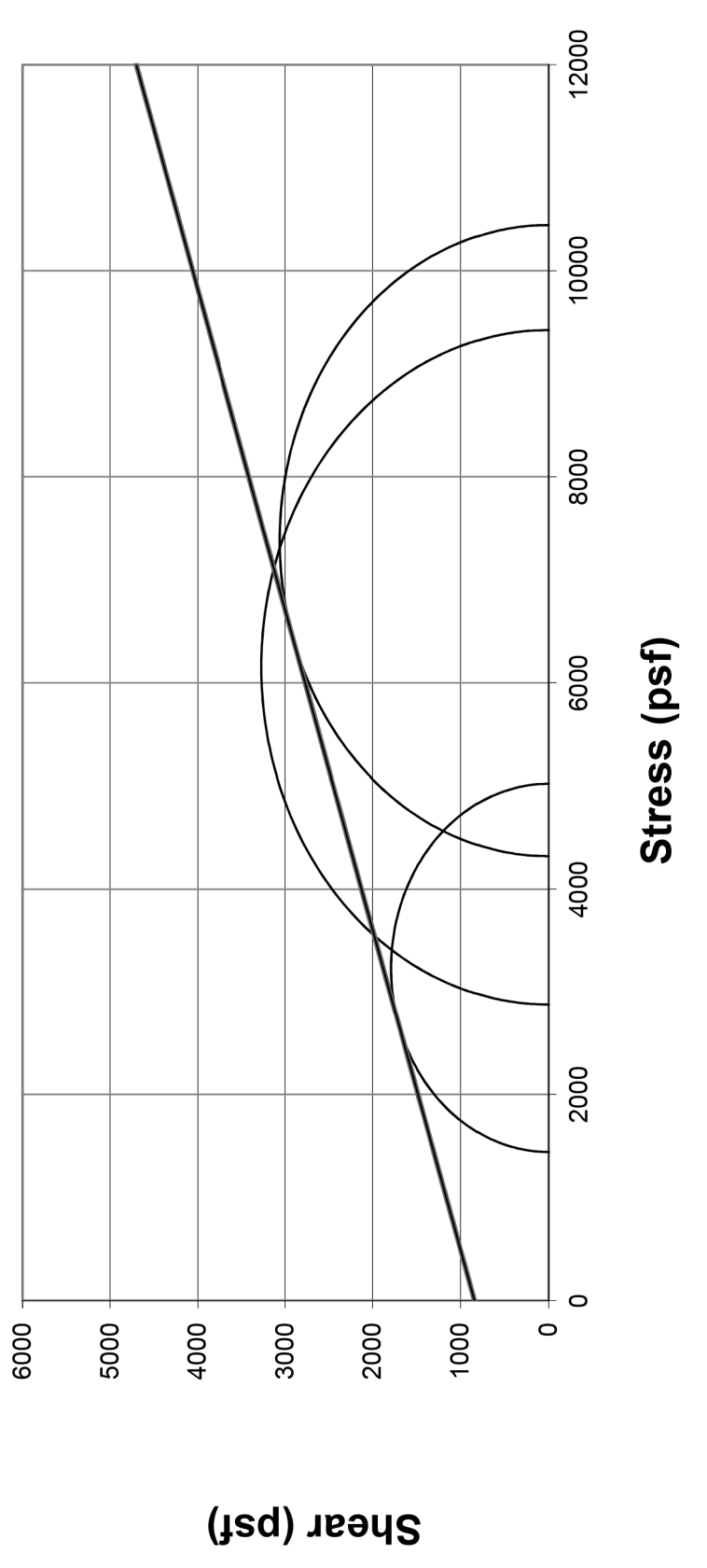
PROJECT #: 23050059COL Cohesion (psf): 275

Angle of Friction(°): 29



Mohr Circle Total Stress

CLIENT:	HNTB Ohio, Inc	Sample ID:	B-041-0A-23, ST, 3'-5'
PROJECT:	ATH/MEG-033-23.23/0.00	Confining Pressure (psf):	1440 2880 4320
LOCATION:	Athens & Meigs County, Ohio	Cohesion(psf):	840
PROJECT #:	23050059COL	Angle of Friction(°):	18.0



Unconfined Compression Test Results
ASTM D 2166, D 5102

Sample ID: B-017-1A-23, ST-1, 2'-4'

Avg. Sample Height (in.): 5.76
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.00
 Ultimate Strength (ksf): 1.71
 Shear Strength (Ksf): 0.86
 Avg. Rate of Strain to Failure(%): 1.99
 Strain at Failure (%): 10.60
 Initial Dry Density (pcf): 110.43

Moisture Content (%): 16.9 (Obtained Post Shear)
 Classification: Silt and Clay (A-6a)

Degree of Saturation: NA
 Sensitivity: NA
 Failure Type: Diagonal

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

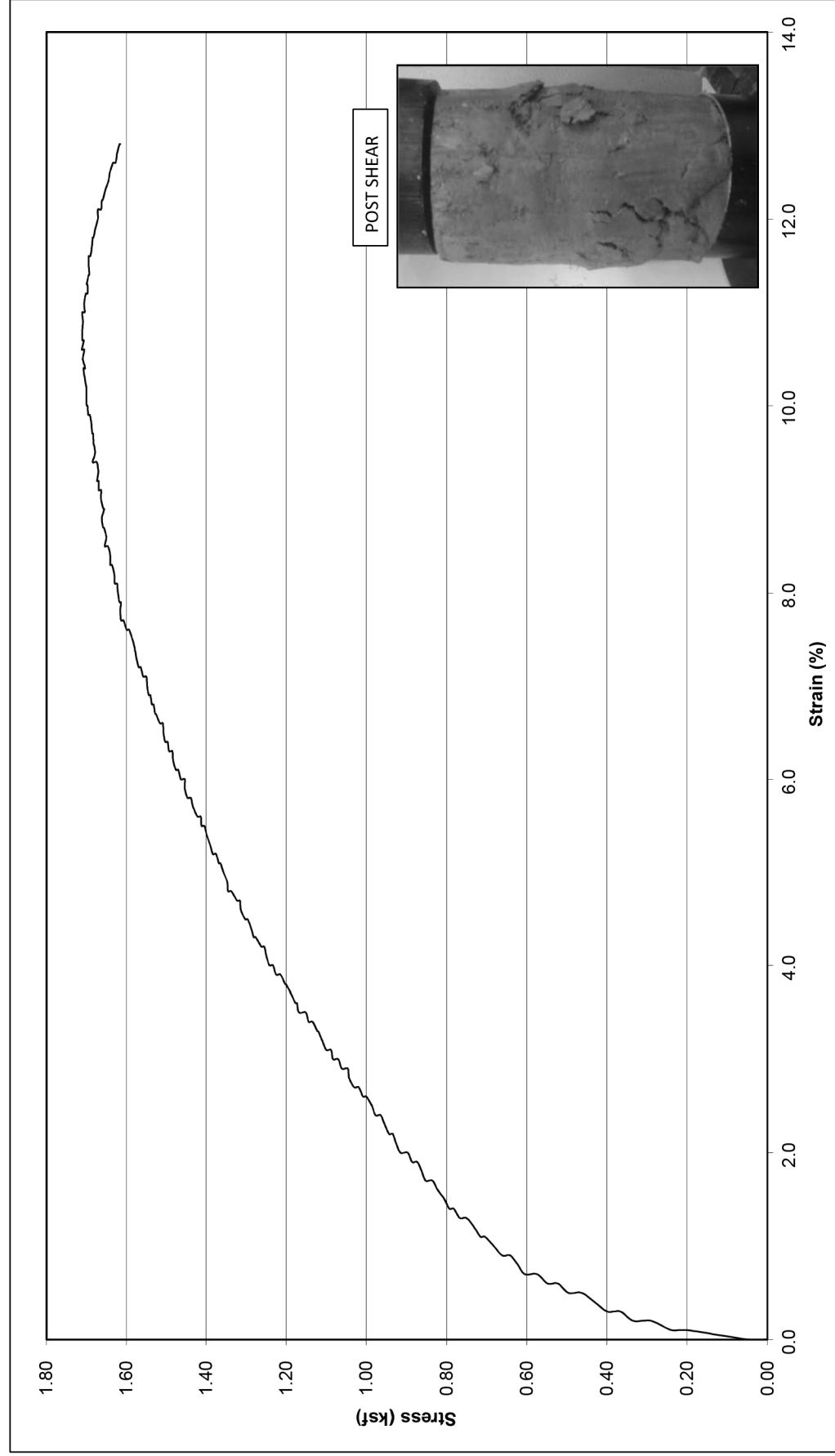
Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/23/2024
 Reviewed by: SM

ASTM D 4318

LL: 35
 PL: 21

ASTM D 6913

Gravel (%): 10
 Sand(%): 23
 Silt(%): 43
 Clay(%): 24



Unconfined Compression Test Results
ASTM D 2166, D 5102

Sample ID: B-025-0A-23, ST-1, 2'-4'

Avg. Sample Height (in.): 5.81
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.02
 Ultimate Strength (ksf): 3.47
 Shear Strength (Ksf): 1.73
 Avg. Rate of Strain to Failure(%): 1.93
 Strain at Failure (%): 12.50
 Initial Dry Density (pcf): 104.68

Moisture Content (%): 23.0 (Obtained Post Shear)

Classification: Clay (A-7-6)

Degree of Saturation: NA

Sensitivity: NA

Failure Type: Diagonal

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/22/2024
 Reviewed by: SM

ASTM D 4318

LL: 42

PL: 25

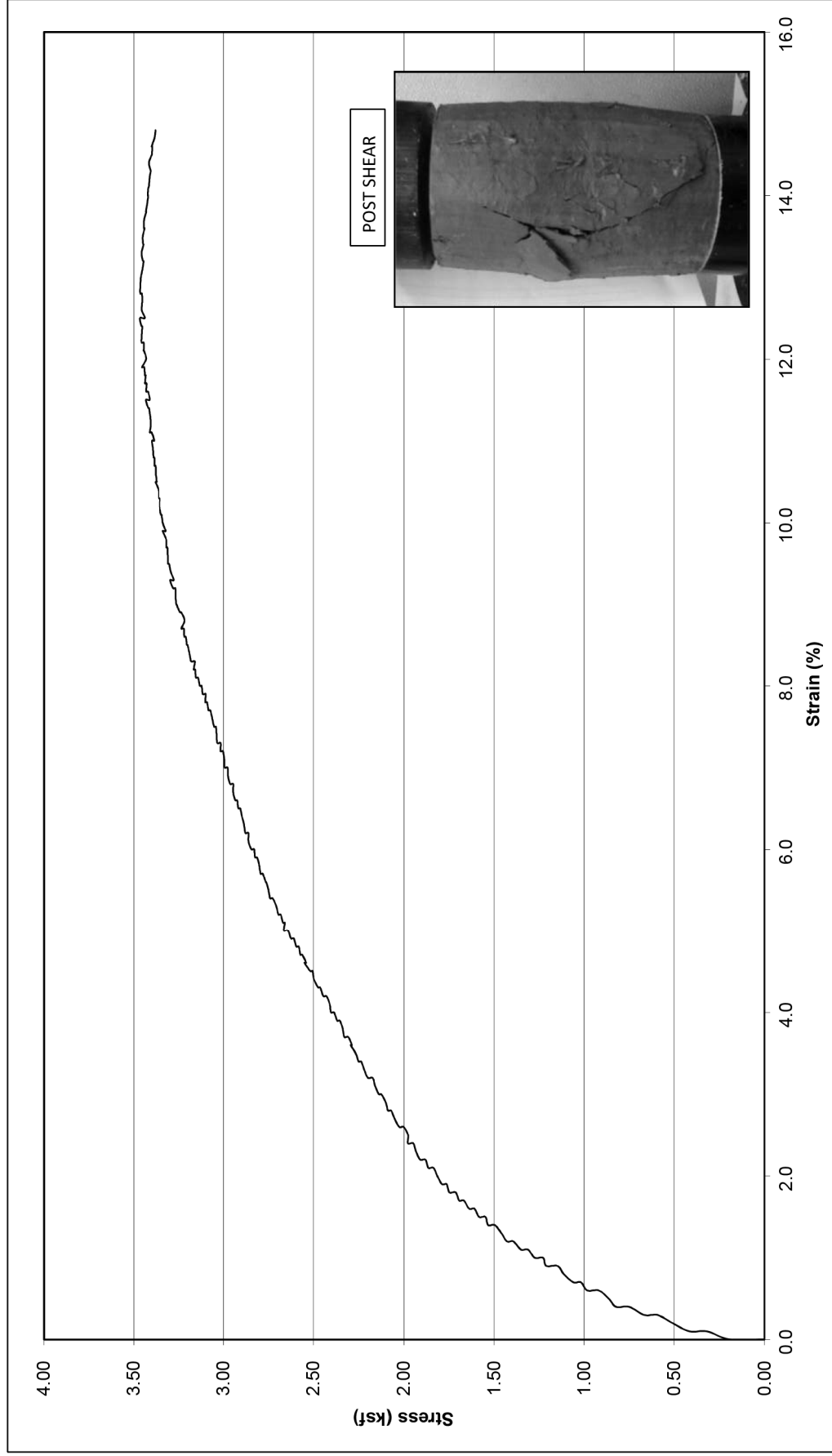
ASTM D 6913

Gravel (%): 0

Sand(%): 15

Silt(%): 42

Clay(%): 43



DESIGNER	N.K.S	
REVIEWER	SM	
PROJECT ID	119142	
SUBSET	TOTAL	
169	172	
SHEET	TOTAL	
-	-	

Unconfined Compression Test Results

ASTM D 2166, D 5102

Sample ID: B-060-0-23, ST-2, 3'-5'

Avg. Sample Height (in.): 5.75
 Avg. Sample Diameter (in.): 2.89
 Height-to-diameter ratio: 1.99
 Ultimate Strength (ksf): 2.43
 Shear Strength (Ksf): 1.21
 Avg. Rate of Strain to Failure(%): 2.02
 Strain at Failure (%): 3.70
 Initial Dry Density (pcf): 118.25

Moisture Content (%): 13.9 (Obtained Post Shear)

Classification: Clay (A-7-6)

Degree of Saturation: NA

Sensitivity: NA

Failure Type: Diagonal

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/9/2024
 Reviewed by: SM

ASTM D 4318

LL: 42

PL: 22

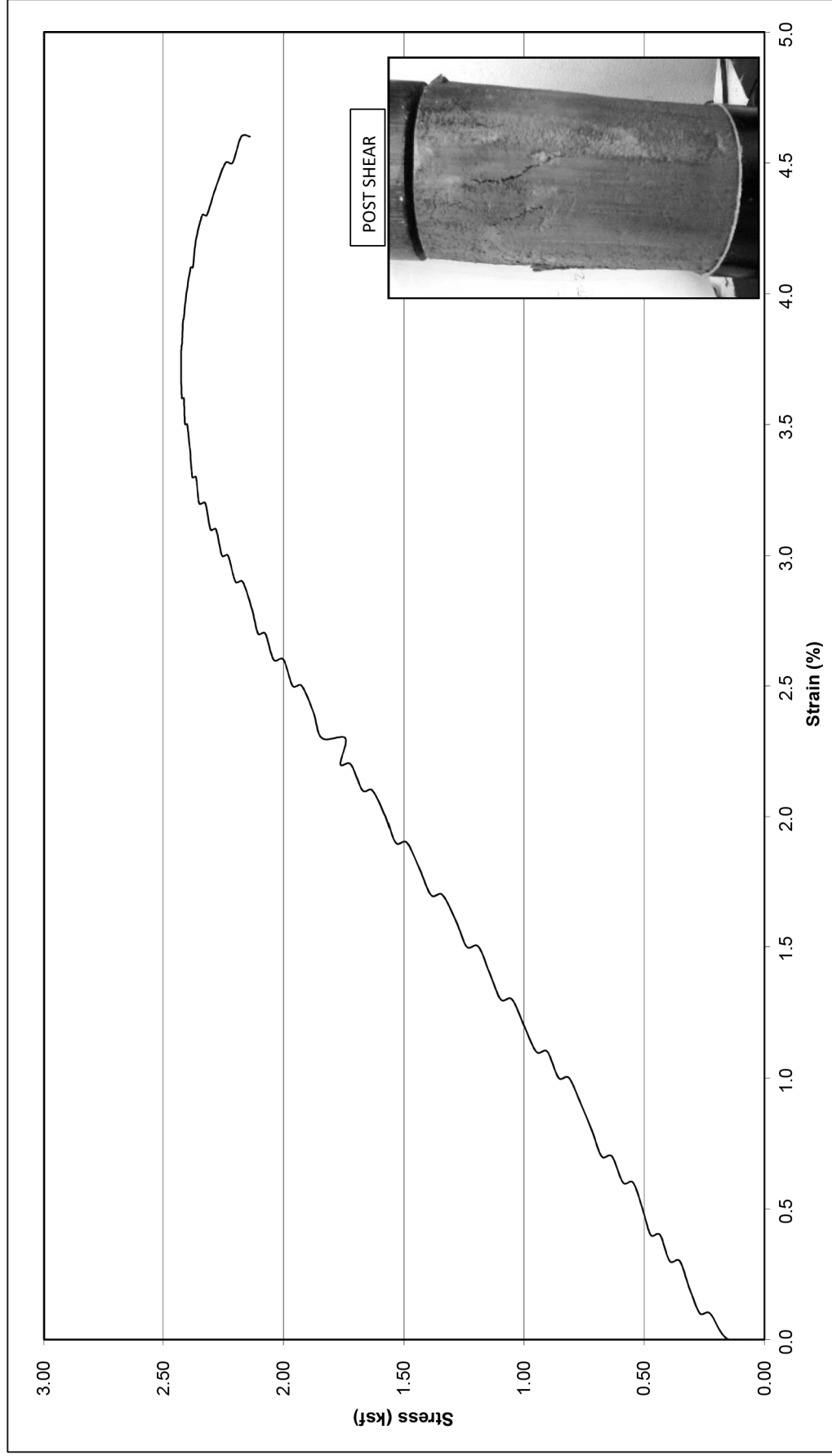
ASTM D 6913

Gravel (%): 0

Sand(%): 18

Silt(%): 38

Clay(%): 44



Unconfined Compression Test Results

ASTM D 2166, D 5102

Sample ID: B-064-0-23, ST-2, 2.5'-4.5'

Avg. Sample Height (in.): 5.76
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.00
 Ultimate Strength (ksf): 1.28
 Shear Strength (Ksf): 0.64
 Avg. Rate of Strain to Failure(%): 1.99
 Strain at Failure (%): 3.60
 Initial Dry Density (pcf): 113.98

Moisture Content (%): 18.7 (Obtained Post Shear)

Classification: Silty clay (A-6b)

Degree of Saturation: NA

Sensitivity: NA

Failure Type: Diagonal

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc

Project: ATH/MEG-033-23.23/0.00

Location: Athens and Meigs County, Ohio

Project No. 23050059COL

Lab Code No. NA

Date Tested: 7/2/2024

Reviewed by: SM

ASTM D 4318

LL: 37

PL: 21

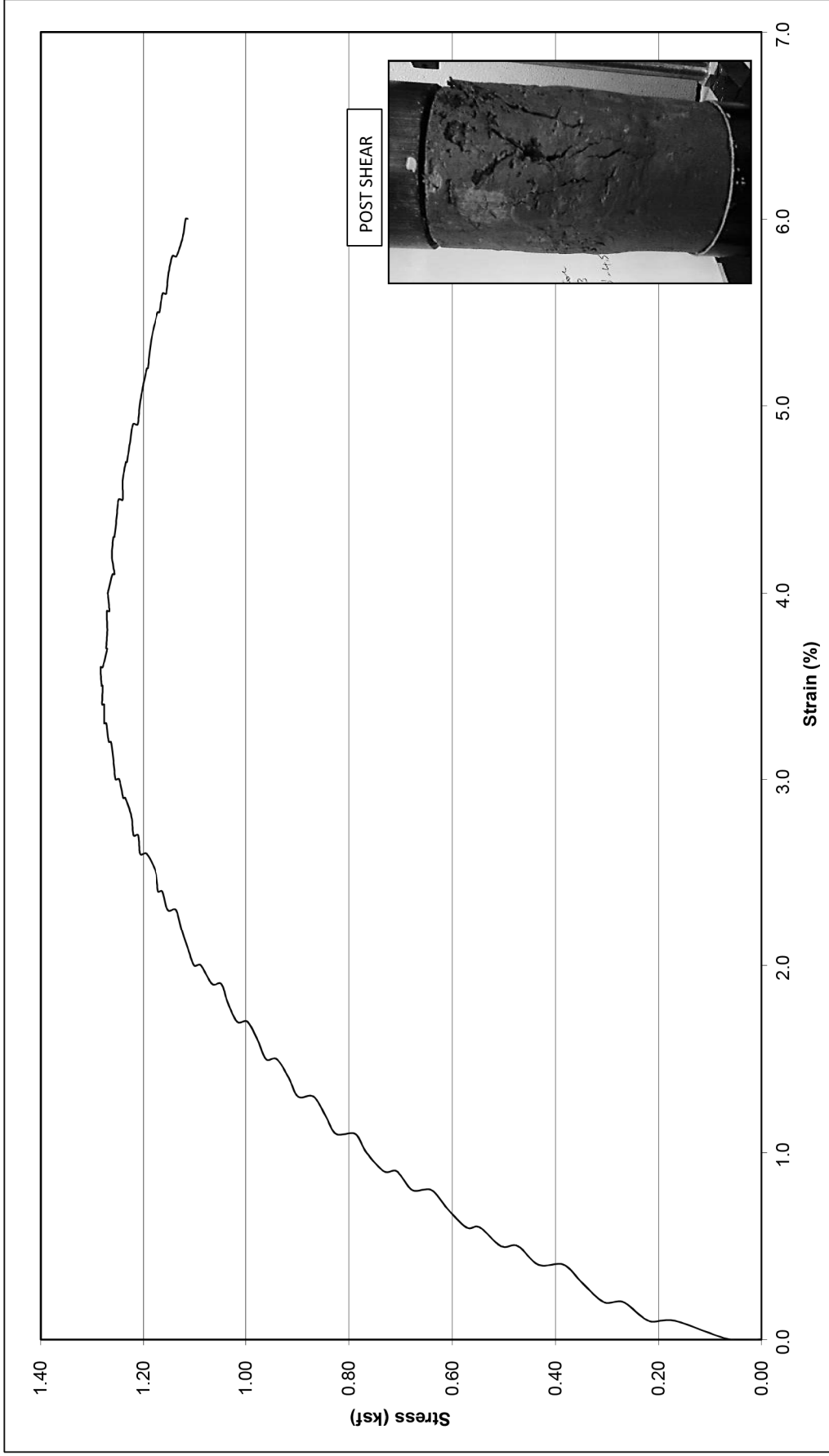
ASTM D 6913

Gravel (%): 6

Sand(%): 14

Silt(%): 48

Clay(%): 32



Unconfined Compression Test Results

ASTM D 2166, D 5102

Sample ID: B-064-0-23, ST-4, 7.5'-9.5'

Avg. Sample Height (in.): 5.76
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.00
 Ultimate Strength (ksf): 0.66
 Shear Strength (Ksf): 0.33
 Avg. Rate of Strain to Failure(%): 2.04
 Strain at Failure (%): 13.00
 Initial Dry Density (pcf): 103.47

Moisture Content (%): 25.1 (Obtained Post Shear)

Classification: Silty Clay (A-6b)

Degree of Saturation: NA

Sensitivity: NA

Failure Type: Diagonal

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc

Project: ATH/MEG-033-23.23/0.00

Location: Athens and Meigs County, Ohio

Project No. 23050059COL

Lab Code No. NA

Date Tested: 7/2/2024

Reviewed by: SM

ASTM D 4318

LL: 37

PL: 20

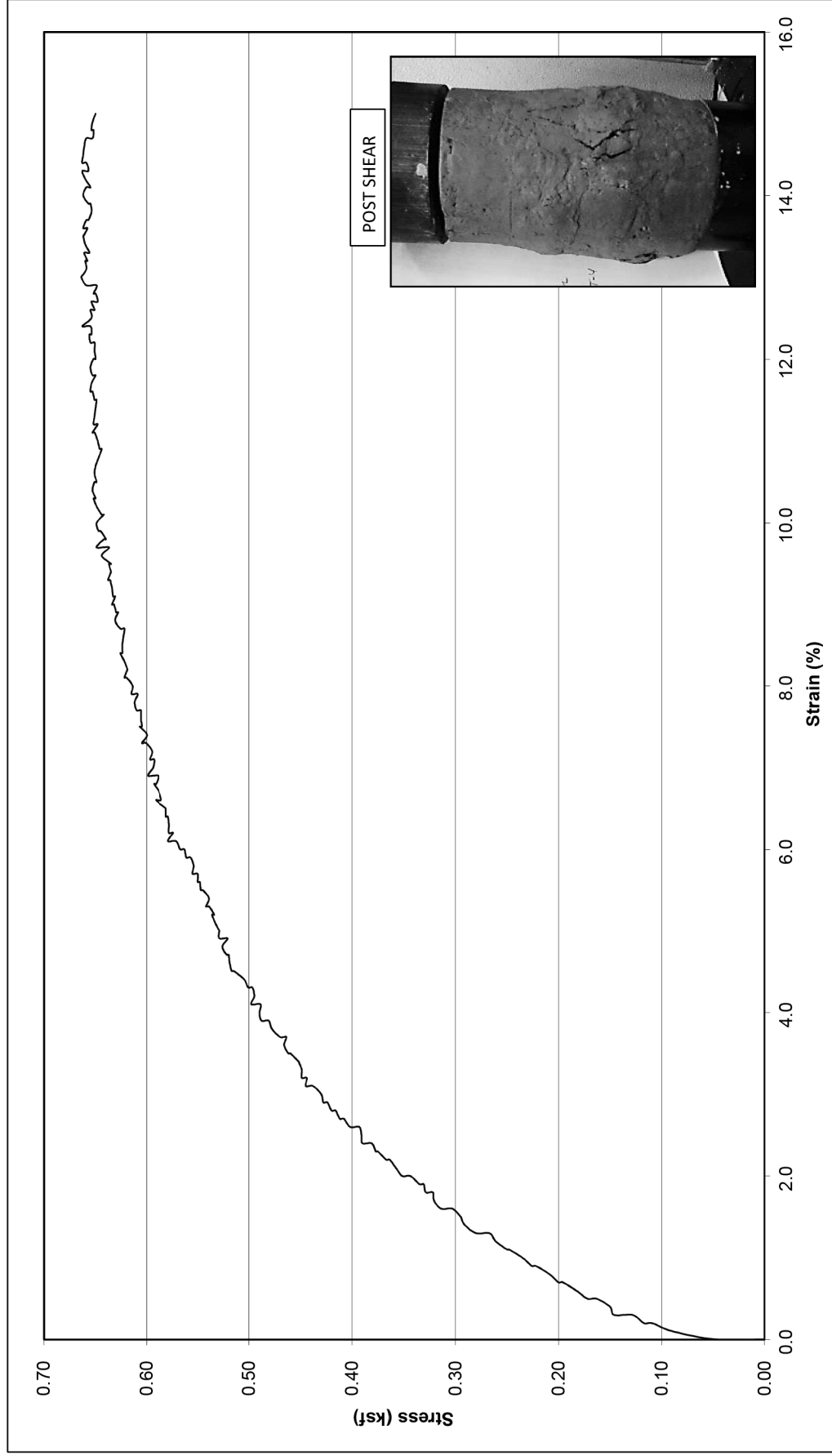
ASTM D 6913

Gravel (%): 10

Sand(%): 10

Silt(%): 42

Clay(%): 38



APPENDIX B
TEST BORING RECORDS



STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PID: 119142		SFN: _____		PROJECT: ATH-US 33-23.23		STATION / OFFSET: 1252+07, 9' LT.		START: 12/14/23		END: 12/14/23		PG 2 OF 3		B-016-0-23						
MATERIAL DESCRIPTION AND NOTES			ELEV. 788.2	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
										GR	CS	FS	SI	CL	LL	PL	PI			
VERY STIFF, GRAY, SANDY SILT , SOME CLAY, LITTLE GRAVEL, CONTAINS ROCK FRAGMENTS, (FILL), DAMP <i>(continued)</i>			784.7	31																
HARD, RED AND GRAY, SILT AND CLAY , SOME SAND, LITTLE GRAVEL, CONTAINS BOULDERS, (FILL), DAMP				34	21 27 33	77	100	SS-11	4.50	-	-	-	-	-	-	-	-	12	A-6a (V)	
@43.5'; VERY STIFF			764.7	39	27 31 43	95	100	SS-12	4.50	12	8	16	47	17	34	21	13	10	A-6a (7)	
				44	9 9 14	29	100	SS-13	3.75	-	-	-	-	-	-	-	-	-	14	A-6a (V)
				49	10 16 13	37	100	SS-14	3.50	-	-	-	-	-	-	-	-	12	A-6a (V)	
VERY STIFF, BROWN, CLAY , "AND" SILT, TRACE SAND, (FILL), DAMP				54	26 29 34	81	100	SS-15	2.50	-	-	-	-	-	-	-	-	16	A-7-6 (V)	
				59	32 36 41	99	100	SS-16	2.75	0	0	2	56	42	41	27	14	15	A-7-6 (10)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOT\SLAB REPORTS\M\

PID: 119142 | SFN: | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1252+07, 9' LT. | START: 12/14/23 | END: 12/14/23 | PG 3 OF 3 | B-016-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 756.0	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
VERY STIFF, BROWN, CLAY, "AND" SILT, TRACE SAND, (FILL), DAMP (continued) @63.5'; HARD	751.2	63																
		64	30	93	100	SS-17	4.50	-	-	-	-	-	-	-	10	A-7-6 (V)		
HARD, BROWN, CLAY, DAMP	748.2	65	36															
		66	37															
		67																
		68																
		69	40	118	100	SS-18	4.50	-	-	-	-	-	-	6	A-7-6 (V)			
		70	44															
		EOB	48															

NOTES: CAVED AT 55'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - 0:\PROJECT\2023\COL-05123050599COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1252+39, 162' RT.</u>	EXPLORATION ID: <u>B-016-1-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>766.3 (MSL)</u> EOB: <u>15.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/15/23</u> END: <u>12/15/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.214338, -82.064231</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4")	766.3																	
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE GRAVEL, (FILL), DAMP	766.0		3															
	763.8		4	10	100	SS-1	1.25	6	6	34	27	27	28	19	9	14	A-4a (4)	
MEDIUM DENSE, BROWN, COARSE AND FINE SAND , LITTLE SILT, TRACE CLAY, (FILL), DAMP	762.8	W 763.3	4															
MEDIUM DENSE, BROWN, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, (FILL), DAMP	762.8		4	12	100	SS-2	1.50	1	10	48	23	18	NP	NP	NP	16	A-4a (1)	
@6.0'; WET			4															
			5															
@8.5'; DAMP			4															
			5	13	100	SS-3	0.50	-	-	-	-	-	-	-	-	24	A-4a (V)	
			5															
			6															
			6															
			6	13	100	SS-4	1.50	-	-	-	-	-	-	-	-	17	A-4a (V)	
STIFF, BROWN, CLAY , "AND" SILT, TRACE SAND, DAMP	756.3		4	6														
			5															
			5	14	100	SS-5	1.00	-	-	-	-	-	-	-	-	19	A-7-6 (V)	
			6															
@13.5'; VERY STIFF			6															
			6	19	100	SS-6	3.50	-	-	-	-	-	-	-	-	18	A-7-6 (V)	
	751.3	EOB	9															

NOTES: CAVED AT 10'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1252+39, 162' RT.</u>	EXPLORATION ID <u>B-016-1A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>766.3 (MSL)</u> EOB: <u>4.0 ft.</u>	PAGE 1 OF 1
START: <u>12/15/23</u> END: <u>12/15/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.214338, -82.064231</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI		
Augered Down to 2 feet	766.3																
LOOSE, BROWN, COARSE AND FINE SAND , TRACE CLAY, (FILL), DAMP	764.3					ST-1	-	0	7	68	15	10	NP	NP	NP	-	A-3a (0)
	762.3	EOB															

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1278+29, 12' LT.</u>	EXPLORATION ID: <u>B-017-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>847.3 (MSL)</u> EOB: <u>45.0 ft.</u>	PAGE: <u>1 OF 2</u>
START: <u>12/15/23</u> END: <u>12/15/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.208991, -82.058032</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8")	847.3																	
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, CONTAINS ORGANICS, (FILL), DAMP	846.6	1	6															
		2	6	7	17	100	SS-1	2.75	0	18	8	53	21	37	23	14	20	A-6a (9)
	843.8	3																
MEDIUM DENSE, BROWN, SANDY SILT , LITTLE GRAVEL, LITTLE CLAY, (FILL), DAMP		4	6															
		5	6	7	17	100	SS-2	-	-	-	-	-	-	-	-	-	9	A-4a (V)
@6.0'; BROWN AND GRAY, CONTAINS ROCK FRAGMENTS		6																
	838.8	7	8	9	20	100	SS-3	-	19	12	29	26	14	NP	NP	NP	10	A-4a (1)
		8																
MEDIUM DENSE, BROWN AND GRAY, COARSE AND FINE SAND , SOME STONE FRAGMENTS, (FILL), DAMP		9	8	9	22	100	SS-4	4.00	-	-	-	-	-	-	-	-	11	A-3a (V)
	836.3	10																
VERY STIFF, BROWN, CLAY , "AND" SILT, SOME SAND, TRACE GRAVEL, (FILL), DAMP		11	6	8	20	100	SS-5	3.00	9	8	15	38	30	43	23	20	22	A-7-6 (11)
	833.8	12																
HARD, BROWN, SILTY CLAY , SOME SAND, TRACE GRAVEL, (FILL), DAMP		13																
	831.3	14	7	7	20	100	SS-6	4.50	2	3	19	34	42	36	19	17	9	A-6b (11)
		15																
VERY STIFF, GRAY, SANDY SILT , SOME GRAVEL, LITTLE CLAY, CONTAINS ROCK FRAGMENTS, (FILL), DAMP		16	8	9	27	100	SS-7	4.00	-	-	-	-	-	-	-	-	9	A-4a (V)
		17																
		18																
		19	12	14	32	100	SS-8	3.50	28	10	7	42	13	31	22	9	8	A-4a (4)
		20		11														
		21																
		22																
		23																
		24	9	9	24	100	SS-9	3.00	-	-	-	-	-	-	-	-	9	A-4a (V)
		25		10														
		26																
		27																
	819.3	28																
VERY STIFF, GRAY, CLAY , SOME SILT, TRACE SAND, DAMP		29	8	8	19	100	SS-10	4.00	-	-	-	-	-	-	-	-	9	A-7-6 (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTISLAB REPORTS\M\

PID: 119142 | SFN: _____ | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1278+29, 12' LT. | START: 12/15/23 | END: 12/15/23 | PG 2 OF 2 | B-017-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 817.3	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
VERY STIFF, GRAY, CLAY, SOME SILT, TRACE SAND, DAMP (continued) @32.0'; RED @43.5'; HARD		31																
		32																
		33																
		34	7	7	20	100	SS-11	3.75	-	-	-	-	-	-	-	24	A-7-6 (V)	
		35		9														
		36																
		37																
		38																
		39	8	8	24	100	SS-12	4.00	-	-	-	-	-	-	-	25	A-7-6 (V)	
		40		11														
	41																	
	42																	
	43																	
	44		9	10	26	100	SS-13	4.25	0	1	1	27	71	55	26	29	25	A-7-6 (19)
	45		10	10														

EOB

NOTES: CAVED AT 37'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1277+90, 152' RT.</u>	EXPLORATION ID: <u>B-017-1-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>813.6 (MSL)</u> EOB: <u>15.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/15/23</u> END: <u>12/15/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.208783, -82.058562</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6")	813.6																	
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE GRAVEL, CONTAINS ROCK FRAGMENTTS (FILL), DAMP	813.1	1	7															
		2	7	6	17	100	SS-1	4.50	5	8	21	38	28	35	22	13	13	A-6a (7)
	810.1	3																
VERY STIFF, BROWN, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, (FILL), DAMP		4	11															
		5	7	7	18	100	SS-2	2.50	2	33	11	41	13	30	21	9	12	A-4a (4)
@6.0'; HARD		6																
		7	7	8	19	100	SS-3	4.25	-	-	-	-	-	-	-	-	14	A-4a (V)
	805.1	8																
STIFF, RED, CLAY , SOME SILT, TRACE SAND, CONTAINS ORGANICS, WET		9	4															
		10	4	5	12	100	SS-4	-	-	-	-	-	-	-	-	-	46	A-7-6 (V)
@11.0'; VERY STIFF, MOIST		11																
		12	5	7	18	100	SS-5	2.50	-	-	-	-	-	-	-	-	27	A-7-6 (V)
@13.5'; DAMP		13																
		14	5	7	20	100	SS-6	3.00	-	-	-	-	-	-	-	-	20	A-7-6 (V)
	798.6	15		9														
		EOB																

NOTES: CAVED AT 13'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1277+90, 152' RT.</u>	EXPLORATION ID: <u>B-017-1A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>813.6 (MSL)</u> EOB: <u>4.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/15/23</u> END: <u>12/15/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.208783, -82.058562</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI		
Augered down to 2 feet	813.6																
MEDIUM STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, (FILL), DAMP @2.0'; UCS = 1.71 KSF	809.6	4			-	ST-1	-	10	16	7	43	24	35	21	14	17	A-6a (8)

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - 0:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.M/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1310+29, 82' RT.</u>	EXPLORATION ID: <u>B-024-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>867.3 (MSL)</u> EOB: <u>20.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/18/23</u> END: <u>12/18/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.200646, -82.055541</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (5")	867.3																	
HARD, BROWN, SANDY SILT , SOME CLAY, (FILL), DAMP	866.9	1	8															
		2	12 15	35	100	SS-1	4.50	0	17	8	46	29	25	17	8	11	A-4a (8)	
@3.5'; GRAY, CONTAINS ROCK FRAGMENTS		3																
		4	17 25	47	100	SS-2	-	-	-	-	-	-	-	-	-	5	A-4a (V)	
		5																
	861.3	6	7															
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE GRAVEL, (FILL), DAMP		7	7 9	20	100	SS-3	3.25	3	20	8	43	26	35	20	15	19	A-6a (9)	
@8.5'; HARD		8																
		9	7 8	19	100	SS-4	4.50	-	-	-	-	-	-	-	-	12	A-6a (V)	
		10																
		11	10 12	28	100	SS-5	4.50	1	19	10	49	21	31	19	12	9	A-6a (8)	
		12																
@13.5'; VERY STIFF, WET		13																
		14	9 8	22	100	SS-6	2.25	-	-	-	-	-	-	-	-	37	A-6a (V)	
		15																
	851.3	16	10 12	31	100	SS-7	-	0	32	9	48	11	30	21	9	4	A-4a (5)	
HARD, BROWN, SANDY SILT , LITTLE CLAY, (FILL), DRY		17																
		18																
	848.8	19	9 8	23	100	SS-8	4.50	-	-	-	-	-	-	-	-	13	A-7-6 (V)	
HARD, BROWN AND RED, CLAY , CONTAINS ORGANICS, (FILL), DAMP	847.3	20																
		EOB																

NOTES: CAVED AT 16'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:30 - C:\PROJECT\2023\CIL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1325+00, 155' RT.</u>	EXPLORATION ID: <u>B-025-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>847.6 (MSL)</u> EOB: <u>13.6 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/12/23</u> END: <u>12/12/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.196602, -82.055438</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (12") VERY STIFF, BROWN, CLAY , "AND" SILT, TRACE SAND, DAMP	847.6 847.1		4															
		1	5	13	100	SS-1	3.00	0	4	6	49	41	44	25	19	24	A-7-6 (12)	
		2	5															
		3																
CLAYSTONE , BROWN, SEVERELY WEATHERED, (SOIL LIKE).	844.1	TR	9															
		4	40	102	100	SS-2	-	-	-	-	-	-	-	-	-	6	Rock (V)	
		5	40															
		6	12															
		7	14	40	100	SS-3	4.50	-	-	-	-	-	-	-	-	20	Rock (V)	
		8	17															
		9	40															
		10	45	116	100	SS-4	-	-	-	-	-	-	-	-	-	7	Rock (V)	
		11	46															
CLAYSTONE , BROWN, SEVERELY WEATHERED.	836.6		45															
		12	45	120	100	SS-5	4.50	-	-	-	-	-	-	-	-	10	Rock (V)	
		13	49															
	834.0	EOB																

@13.6'; AUGER REFUSAL ENCOUNTERED

NOTES: CAVED AT 10'
ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1325+00, 155' RT.</u>	EXPLORATION ID <u>B-025-0A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>847.6 (MSL)</u> EOB: <u>4.0 ft.</u>	PAGE 1 OF 1
START: <u>12/12/23</u> END: <u>12/12/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.196602, -82.055438</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI		
augered down to 2 feet	847.6																
VERY STIFF, BROWN, CLAY , "AND" SILT, LITTLE SAND, DAMP	845.6																
@2.0'; UCS= 3.47 KSF	843.6	EOB			83	ST-1	-	0	5	10	42	43	42	25	17	23	A-7-6 (11)

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.M/

PID: 119142 | SFN: | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1329+84, 12' LT. | START: 12/20/23 | END: 12/20/23 | PG 3 OF 3 | B-025-1-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 819.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED	
								GR	CS	FS	SI	CL	LL	PL	PI				
CLAYSTONE, RED AND BROWN, SEVERELY WEATHERED.	818.7	TR	10	26	100	SS-41	3.75	-	-	-	-	-	-	-	-	-	14	A-7-6 (V)	
		63	11																
		64	14	35	100	SS-42	4.50	2	9	9	45	35	35	18	17	7	Rock (V)		
		65	30																
		66	38	105	100	SS-43	4.50	-	-	-	-	-	-	-	-	8	Rock (V)		
		66	44																
		67	50/2"																
		68	40																
		69	42	111	100	SS-45	3.50	-	-	-	-	-	-	-	-	3	Rock (V)		
		70	43																
	70	45	116	100	SS-46	4.50	-	-	-	-	-	-	-	-	10	Rock (V)			
	71	50/2"																	
	809.6	EOB	50/2"																
			50/2"		100	SS-47												Rock (V)	
			50/2"		100	SS-48												Rock (V)	

NOTES: CAVED AT 55'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS.M/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1329+64, 137' RT.</u>	EXPLORATION ID: <u>B-025-2-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>808.1 (MSL)</u> EOB: <u>19.77 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.195306, -82.055188</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 808.1	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
VERY STIFF, RED, CLAY , "AND" SILT, LITTLE SAND, TRACE GRAVEL, CONTAINS ORGANICS, DAMP @3.0'; BROWN @7.5'; STIFF, MOIST @9.0'; VERY STIFF, BROWN AND GRAY, DAMP @10.5'; SOME SILT, TRACE SAND @13.5'; HARD		1	7 7	20	100	SS-1	2.50	2	7	7	46	38	45	23	22	18	A-7-6 (14)	
		2	8 8	23	100	SS-2	2.00	-	-	-	-	-	-	-	-	15	A-7-6 (V)	
		3	9 8	22	100	SS-3	2.50	-	-	-	-	-	-	-	-	14	A-7-6 (V)	
		4	7 7	19	100	SS-4	3.00	2	4	7	41	46	49	24	25	21	A-7-6 (16)	
		5	6 7	19	100	SS-5	3.25	-	-	-	-	-	-	-	-	19	A-7-6 (V)	
		6	7 7	17	100	SS-6	1.50	-	-	-	-	-	-	-	-	26	A-7-6 (V)	
		7	8 7	15	100	SS-7	3.50	1	4	6	38	51	43	25	18	20	A-7-6 (12)	
		8	9 8	22	100	SS-8	3.25	0	6	3	26	65	48	25	23	19	A-7-6 (15)	
		9	10 8	20	100	SS-9	3.50	-	-	-	-	-	-	-	-	18	A-7-6 (V)	
		10	11 8	23	100	SS-10	4.25	-	-	-	-	-	-	-	-	11	A-7-6 (V)	
CLAYSTONE , BROWN, SEVERELY WEATHERED.	793.1	15	30 35	96	100	SS-11	-	-	-	-	-	-	-	-	9	Rock (V)		
		16	42 44	114	100	SS-12	-	-	-	-	-	-	-	-	9	Rock (V)		
		17	46 49	127	89	SS-13	-	-	-	-	-	-	-	-	9	Rock (V)		
	788.3	19	50 60/2"	-	100	SS-14	-	-	-	-	-	-	-	-	10	Rock (V)		

NOTES: CAVED AT 17'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PID: 119142 SFN: _____ PROJECT: ATH-US 33-23.23 STATION / OFFSET: 1331+95, 27' RT. START: 11/15/23 END: 11/16/23 PG 2 OF 2 B-026-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 829.0	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
HARD, BROWN AND RED, SILT AND CLAY , LITTLE SAND, TRACE GRAVEL, (FILL), DAMP (<i>continued</i>)		31																
		32																
		33																
		34	4	7	20	67	SS-11	4.50	-	-	-	-	-	-	-	13	A-6a (V)	
HARD, RED, CLAY , "AND" SILT, TRACE SAND, DAMP	820.5	35	6															
		36																
		37																
		38																
		39	12	7	27	44	SS-12	4.50	-	-	-	-	-	-	-	12	A-7-6 (V)	
		40	11															
		41																
		42																
	43																	
	44	7	9	27	72	SS-13	4.50	0	2	3	37	58	45	22	23	15	A-7-6 (14)	
	45	9																
	46																	
	47																	
	48																	
	49	4	6	23	72	SS-14	4.50	-	-	-	-	-	-	-	-	16	A-7-6 (V)	
	809.0	9																
		EOB																

NOTES: CAVED AT 28.7'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.MI/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1333+78, 157' RT.</u>	EXPLORATION ID: <u>B-027-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>800.4 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.194149, -82.054956</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (5") VERY STIFF, RED, SILTY CLAY , TRACE SAND, TRACE GRAVEL, (FILL), DAMP	800.4 800.0																	
		1	7															
		2	6	15	100	SS-1	3.25	5	4	4	41	46	39	21	18	20	A-6b (11)	
		3																
SANDSTONE , BROWN, SEVERELY WEATHERED.	796.9	TR	50/2"	-	100	SS-2	-	-	-	-	-	-	-	-	-	5	Rock (V)	
		4																
		5																
		6	50/1"	-	0	SS-3	-	-	-	-	-	-	-	-	-	-	Rock (V)	
		7																
		8																
		9	50/1"	-	0	SS-4	-	-	-	-	-	-	-	-	-	-	Rock (V)	
		10																
@10.0'; AUGER REFUSAL ENCOUNTERED																		

NOTES: CAVED AT 7'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1333+78, 157' RT.</u>	EXPLORATION ID <u>B-027-0A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>800.4 (MSL)</u> EOB: <u>4.0 ft.</u>	PAGE 1 OF 1
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.194149, -82.054956</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
	800.4																	
		1																
NO RECOVERY IN ST SAMPLE	798.4	2																
		3			0	ST-1	-	-	-	-	-	-	-	-	-	-		
	796.4	4																
		EOB																

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70-00-HNTB OH INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1341+18, 167' RT.</u>	EXPLORATION ID: <u>B-028-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>816.3 (MSL)</u> EOB: <u>33.0 ft.</u>	PAGE: <u>1 OF 2</u>
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.192149, -82.054154</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6")	816.3																	
STIFF, BROWN, CLAY , "AND" SILT, LITTLE SAND, TRACE GRAVEL, CONTAINS ORGANICS (FILL), MOIST	815.8	1	5															
		2	6	15	100	SS-1	1.75	1	10	6	44	39	48	24	24	28	A-7-6 (15)	
	813.3	3																
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL, CONTAINS ORGANICS (FILL), DAMP	812.8	4	7															
HARD, BROWN, CLAY , "AND" SILT, LITTLE SAND, TRACE GRAVEL, (FILL), DAMP		5	8	26	100	SS-2	4.50	1	9	5	53	32	64	21	43	16	A-7-6 (20)	
		6																
@6.0'; VERY STIFF, MOIST		7	7	17	100	SS-3	2.00	-	-	-	-	-	-	-	-	28	A-7-6 (V)	
		8																
HARD, BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL, (FILL), DAMP	807.8	9	7	15	100	SS-4	4.25	3	7	7	42	41	40	21	19	18	A-6b (12)	
		10	6															
@11.0'; VERY STIFF, MOIST		11	7															
		12	7	20	100	SS-5	2.50	-	-	-	-	-	-	-	-	26	A-6b (V)	
		13																
@13.5'; HARD		14	8	27	100	SS-6	4.25	-	-	-	-	-	-	-	-	12	A-6b (V)	
		15	9															
	800.3	16	10	23	100	SS-7	4.50	0	3	4	45	48	42	21	21	20	A-7-6 (13)	
HARD, BROWN, CLAY , "AND" SILT, TRACE SAND, (FILL), DAMP		17	9															
		18																
		19	9	28	100	SS-8	4.50	-	-	-	-	-	-	-	-	18	A-7-6 (V)	
		20	9															
		21																
		22																
		23																
DENSE, GRAY, GRAVEL AND/OR STONE FRAGMENTS WITH SAND , (FILL), DRY	792.8	24	12	37	100	SS-9	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		25	14															
		26	15															
		27																
		28																
@28.5'; VERY DENSE		29	50/3"	-	100	SS-10	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 - HNTB OHIO INCREPOTSLAB REPORTS.M/

PID: 119142 | SFN: _____ | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1341+18, 167' RT. | START: 12/21/23 | END: 12/21/23 | PG 2 OF 2 | B-028-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 786.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
DENSE, GRAY, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, (FILL), DRY (continued)																		
			31															
			32															
	783.3	EOB																

@33.0'; AUGER REFUSAL ENCOUNTERED

NOTES: CAVED AT 26'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050599COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1341+18, 167' RT.</u>	EXPLORATION ID <u>B-028-0A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>816.3 (MSL)</u> EOB: <u>5.0 ft.</u>	PAGE 1 OF 1
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.192149, -82.054154</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
Augered down to 3'	816.3																	
HARD, BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL, (FILL), DAMP	811.3	EOB			90	ST-1	-	2	7	5	48	38	38	20	18	25	A-6b (11)	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREMENTAL REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1363+11, 204' RT.</u>	EXPLORATION ID: <u>B-029-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>807.9 (MSL)</u> EOB: <u>15.8 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/21/23</u> END: <u>12/21/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.186555, -82.051279</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (7")	807.9																	
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE GRAVEL, MOIST	807.3	1	5	12	100	SS-1	1.50	2	6	20	39	33	33	18	15	21	A-6a (9)	
		2	5	4														
	804.4	3																
STIFF, BROWN, SILTY CLAY , SOME SAND, MOIST		4	7	17	100	SS-2	1.75	0	8	18	41	33	38	20	18	20	A-6b (11)	
		5	7	6														
	801.9	6																
CLAYSTONE , BROWN, SEVERELY WEATHERED.		7	28	87	100	SS-3	-	-	-	-	-	-	-	-	-	7	Rock (V)	
		8	33															
		9	30															
		10	37	101	100	SS-4	-	-	-	-	-	-	-	-	-	7	Rock (V)	
		11	40															
		12	41	110	100	SS-5	-	-	-	-	-	-	-	-	-	10	Rock (V)	
		13	45															
		14	42															
		15	46	119	100	SS-6	-	-	-	-	-	-	-	-	-	17	Rock (V)	
			47															
	792.1																	

@15.8'; AUGER REFUSAL ENCOUNTERED

EOB

NOTES: CAVED AT 12'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 - HNTB OHIO INCREMENTAL REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1367+18, 215' RT.</u>	EXPLORATION ID: <u>B-030-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>742.4 (MSL)</u> EOB: <u>22.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/28/23</u> END: <u>12/28/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.185514, -82.050762</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (12")	742.4																	
VERY STIFF, BROWN AND RED, SILT AND CLAY , TRACE SAND, TRACE GRAVEL, CONTAINS ORGANICS (FILL), MOIST	741.4	1	5															
		2	5	6	14	100	SS-1	2.50	-	-	-	-	-	-	-	-	26	A-6a (V)
@3.5'; STIFF, NO ORGANICS		3																
	733.9	4	5	6	14	100	SS-2	1.25	1	4	4	46	45	37	22	15	24	A-6a (10)
@6.0'; NO GRAVEL		5																
		6	5	7	15	100	SS-3	2.00	0	2	6	56	36	34	20	14	21	A-6a (10)
VERY STIFF, BROWN AND RED, SILTY CLAY , TRACE SAND, (FILL), MOIST	731.4	8																
		9	6	5	14	100	SS-4	2.50	0	3	4	46	47	39	22	17	24	A-6b (11)
VERY STIFF, RED AND GRAY, SILT AND CLAY , "AND" SAND, TRACE GRAVEL, (FILL), MOIST	722.4	10																
@13.5'; DAMP		11	6	7	15	100	SS-5	3.50	-	-	-	-	-	-	-	-	21	A-6a (V)
		12																
@16.0'; MOIST	720.4	13																
		14	8	7	18	100	SS-6	2.00	2	22	25	23	28	30	17	13	13	A-6a (4)
@18.5'; CONTAINS ORGANICS		15																
	720.4	16	6	5	14	100	SS-7	2.50	-	-	-	-	-	-	-	-	23	A-6a (V)
@22.0'; AUGER REFUSAL ENCOUNTERED		17																
		18	7	7	19	100	SS-8	2.00	-	-	-	-	-	-	-	-	27	A-6a (V)
CLAYSTONE , BROWN, SEVERELY WEATHERED.	722.4	TR	50/1"	-	0	SS-9	-	-	-	-	-	-	-	-	-	-	-	Rock (V)
	720.4	EOB																

NOTES: CAVED AT 16'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.M/

PID: 119142 SFN: _____ PROJECT: ATH-US 33-23.23 STATION / OFFSET: 1369+12, 25' RT. START: 11/14/23 END: 11/15/23 PG 2 OF 2 B-031-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 802.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
DENSE, BROWN, COARSE AND FINE SAND , LITTLE SILT, LITTLE CLAY, (FILL), DAMP (continued)																		
	799.2	31																
		32																
		33																
HARD, BROWN, SANDY SILT , SOME CLAY, TRACE GRAVEL, (FILL), DAMP		34	37	41	56	SS-11	4.25	1	5	36	28	30	26	16	10	15	A-4a (5)	
		35	17															
		36	10															
		37																
		38																
		39	9	18	39	SS-12	4.50	-	-	-	-	-	-	-	-	13	A-4a (V)	
		40	6	6														
		41																
		42																
	789.2	43																
HARD, BROWN, SANDY SILT , SOME CLAY, TRACE GRAVEL, MOIST		44	6	26	67	SS-13	4.25	-	-	-	-	-	-	-	-	19	A-4a (V)	
		45	9	8														
		46																
		47																
		48																
	783.8	EOB	50/5"	-	100	SS-14	4.50	-	-	-	-	-	-	-	-	18	A-4a (V)	

NOTES: CAVED AT 22.5'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH AUGER CUTTINGS; BENTONITE CHIPS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.MI/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1372+49, 159' RT.</u>	EXPLORATION ID: <u>B-032-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>799.3 (MSL)</u> EOB: <u>25.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/28/23</u> END: <u>12/28/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.184229, -82.049853</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6")	799.3																	
VERY STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE GRAVEL, (FILL), DAMP	798.8	1	5															
		2	5	5	13	56	SS-1	2.75	2	14	16	30	38	39	20	19	18	A-6b (10)
@3.5'; MOIST		3																
		4	7	7	22	100	SS-2	3.25	-	-	-	-	-	-	-	-	22	A-6b (V)
		5																
	793.3	6	7	7	18	100	SS-3	2.75	1	6	12	35	46	44	21	23	25	A-7-6 (14)
VERY STIFF, BROWN, CLAY , LITTLE SAND, TRACE GRAVEL, (FILL), MOIST		7																
		8																
		9	7	8	19	100	SS-4	3.75	-	-	-	-	-	-	-	-	22	A-7-6 (V)
@11.0'; DAMP		10																
		11	7	7	19	100	SS-5	2.75	0	5	16	32	47	44	22	22	17	A-7-6 (14)
		12																
		13																
		14	9	9	22	100	SS-6	4.00	-	-	-	-	-	-	-	-	11	A-7-6 (V)
		15																
	783.3	16	8	9	23	100	SS-7	4.50	0	4	38	29	29	25	15	10	13	A-4a (5)
HARD, BROWN AND RED, SANDY SILT , SOME CLAY, (FILL), DAMP		17																
@18.5'; VERY STIFF		18																
		19	8	12	28	100	SS-8	3.50	-	-	-	-	-	-	-	-	15	A-4a (V)
		20																
		21																
		22																
	775.8	23																
SANDSTONE , BROWN, SEVERELY WEATHERED.		24	22	30	92	17	SS-9	4.50	-	-	-	-	-	-	-	-	13	Rock (V)
	774.3	25	42															
		EOB																

NOTES: CAVED AT 21'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050599COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1388+87, 142' RT.</u>	EXPLORATION ID: <u>B-033-0-23</u>
TYPE: <u>BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>805.5 (MSL)</u> EOB: <u>8.75 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/29/23</u> END: <u>12/29/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.180097, -82.047566</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (5")	805.5																	
STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE GRAVEL, (FILL), MOIST	805.1	1	5															
	803.0	2	5	13	100	SS-1	1.75	1	4	24	26	45	39	19	20	22	A-6b (11)	
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, (FILL), DAMP	802.0	3																
VERY STIFF, GRAY, CLAY , "AND" SILT, TRACE SAND, (FILL), DAMP	802.0	4	7	19	100	SS-2	2.25	0	1	6	39	54	57	29	28	28	A-7-6 (19)	
	799.5	5	8															
VERY STIFF, RED, CLAY , "AND" SILT, TRACE SAND, (POSSIBLE DECOMPOSED BEDROCK), DAMP	797.0	6	15															
	796.8	7	18	51	100	SS-3	3.50	-	-	-	-	-	-	-	-	17	A-7-6 (V)	
	796.8	8	22															
SHALE , GRAY, SEVERELY WEATHERED.	796.8	TR	50/3"	-	100	SS-4	-	-	-	-	-	-	-	-	-	6	Rock (V)	

NOTES: CAVED AT 8'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1388+87, 142' RT.</u>	EXPLORATION ID <u>B-033-0A-23</u>
TYPE: <u>BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>805.5 (MSL)</u> EOB: <u>5.0 ft.</u>	PAGE 1 OF 1
START: <u>12/29/23</u> END: <u>12/29/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.180097, -82.047566</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
Augered down to 3 feet	805.5																	
BROWN, SILT AND CLAY, LITTLE SAND, (FILL), DAMP	802.5																	
	800.5	EOB			-	ST-1	-	0	3	15	41	41	34	19	15	17	A-6a (10)	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00_HNTB OHIO INCREPOTSLAB REPORTS.M/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1405+31, 10' LT.</u>	EXPLORATION ID: <u>B-034-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>797.0 (MSL)</u> EOB: <u>68.0 ft.</u>	PAGE: <u>1 OF 3</u>
START: <u>1/2/24</u> END: <u>1/2/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.176098, -82.044830</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6") HARD, RED AND GRAY, SILT AND CLAY , SOME SAND, CONTAINS ROCK FRAGMENTS (FILL), DAMP	797.0	0																
	796.5	1	5															
	794.5	2	5 6	14	100	SS-1	4.50	0	9	17	46	28	29	17	12	9	A-6a (9)	
VERY STIFF, RED AND GRAY, SILTY CLAY , TRACE SAND, TRACE GRAVEL, (FILL), DAMP		3																
		4	6 6	17	100	SS-2	3.75	-	-	-	-	-	-	-	-	11	A-6b (V)	
		5																
@6.0'; LITTLE SAND, NO GRAVEL, MOIST		6	5 6	14	100	SS-3	2.25	0	5	10	43	42	38	21	17	25	A-6b (11)	
		7																
		8																
@8.5'; DAMP		9	5 5	14	100	SS-4	2.25	-	-	-	-	-	-	-	-	18	A-6b (V)	
		10																
		11	5 6	15	100	SS-5	3.25	1	4	9	46	40	38	19	19	14	A-6b (12)	
		12																
		13	5 5	15	100	SS-6	4.00	-	-	-	-	-	-	-	-	13	A-6b (V)	
		14																
	781.0	15																
BROWN, SANDSTONE BOULDERS, (FILL)		16	6 7	-	93	SS-7	-	-	-	-	-	-	-	-	-	13	Rock (V)	
		17	50/3"															
		18																
		19	50/1"	-	0	SS-8	-	-	-	-	-	-	-	-	-	-	Rock (V)	
		20																
		21																
		22																
		23																
		24	12 19 21	51	100	SS-9	-	-	-	-	-	-	-	-	-	13	Rock (V)	
		25																
		26																
		27																
		28																
		29	30 37 41	100	100	SS-10	-	-	-	-	-	-	-	-	-	3	Rock (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:31 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS.MI/

PID: 119142 | SFN: _____ | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1405+31, 10' LT. | START: 1/2/24 | END: 1/2/24 | PG 3 OF 3 | B-034-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 734.8	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
SANDSTONE , BROWN AND GRAY, MODERATELY WEATHERED, MODERATELY STRONG; RQD 81%, REC 96%. <i>(continued)</i>			39		83	NQ2-1											CORE	
		63																
		64																
		65		93		100	NQ2-2										CORE	
		66																
	67																	
	729.0	EOB																

NOTES: CAVED AT 43'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1405+31, 10' LT.</u>	EXPLORATION ID <u>B-034-0A-23</u>
TYPE: <u>BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>797.0 (MSL)</u> EOB: <u>3.0 ft.</u>	PAGE 1 OF 1
START: <u>1/2/24</u> END: <u>1/2/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.176098, -82.044830</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
Augered down to 1 feet	797.0																	
RED AND GRAY, SILTY CLAY , TRACE SAND, TRACE GRAVEL, (FILL), DAMP	796.0	1																
	794.0	2			-	ST-1	-	2	2	6	56	34	38	20	18	17	A-6b (11)	
		3																
		EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH AUGER CUTTINGS; BENTONITE CHIPS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 -HNTB OHIO INCREPOT\SLAB REPORTS\M/

PID: 119142 SFN: _____ PROJECT: ATH-US 33-23.23 STATION / OFFSET: 1428+04, 116' RT. START: 11/30/23 END: 11/30/23 PG 2 OF 2 B-040-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 658.9	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
@25.0'; BLIND AUGER TO AUGER REFUSAL ON TOP OF BEDROCK (continued)		31																
		32																
		33																
		34																
		35																
		36																
		37																
		38																
		39																
		40																
		41																
		42																
		645.9	43															

FTR3

@43.0'; AUGER REFUSAL ON BEDROCK ENCOUNTERED

NOTES: CAVED AT 14.9'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1510+43, 188' RT.</u>	EXPLORATION ID: <u>B-041-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>704.5 (MSL)</u> EOB: <u>15.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>1/3/24</u> END: <u>1/3/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.149821, -82.029517</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	HOLE SEALED	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (6") STIFF, BROWN, SANDY SILT , LITTLE CLAY, (FILL), MOIST @3.0'; VERY STIFF, DAMP	704.5 704.0	1	4															
		2	4	10	100	SS-1	2.00	0	7	43	31	19	27	19	8	20	A-4a (3)	
		3																
		4	5	13	100	SS-2	3.75	-	-	-	-	-	-	-	-	17	A-4a (V)	
		5	5															
	698.5	6	5	14	100	SS-3	2.75	0	19	47	17	17	NP	NP	NP	11	A-3a (0)	
MEDIUM DENSE, BROWN AND GRAY, COARSE AND FINE SAND , LITTLE SILT, LITTLE CLAY, DAMP		7	5	6														
	696.0	8																
MEDIUM DENSE, BROWN AND GRAY, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, DAMP		9	5	15	100	SS-4	2.75	-	-	-	-	-	-	-	-	13	A-4a (V)	
		10	6	6														
		11	5															
		12	6	18	83	SS-5	2.75	1	8	53	25	13	NP	NP	NP	10	A-4a (1)	
		13	8															
@13.5'; DENSE, CONTAINS ROCK FRAGMENTS		14	12	41	89	SS-6	3.75	-	-	-	-	-	-	-	-	12	A-4a (V)	
	689.5	15	15	17														
		EOB																

NOTES: CAVED AT 12'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREMENTAL REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1510+43, 188' RT.</u>	EXPLORATION ID <u>B-041-0A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>704.5 (MSL)</u> EOB: <u>5.0 ft.</u>	PAGE 1 OF 1
START: <u>1/3/24</u> END: <u>1/3/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.149821, -82.029517</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
Augered down to 3 feet	704.5																	
BROWN, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, (FILL), DAMP	701.5																	
	699.5	EOB			100	ST-1	-	1	6	34	39	20	28	21	7	16	A-4a (5)	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREMENTAL REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / TOM</u>	DRILL RIG: <u>CME 55 #393</u>	STATION / OFFSET: <u>1311+17, 73' LT.</u>	EXPLORATION ID: <u>B-053-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / TOM</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>11/4/22</u>	ELEVATION: <u>887.4 (MSL)</u> EOB: <u>49.25 ft.</u>	PAGE: <u>1 OF 2</u>
START: <u>2/14/24</u> END: <u>2/14/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>79.3</u>	LAT / LONG: <u>39.200435, -82.054977</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (2") VERY STIFF, RED, SILT , SOME CLAY, TRACE SAND, TRACE GRAVEL, (FILL), DAMP	887.4	1																
		2																
		3																
		4	4															
	882.4	5	5	12	67	SS-1	4.00	1	3	4	67	25	29	20	9	11	A-4b (8)	
HARD, RED, SILT , SOME CLAY, TRACE SAND, TRACE GRAVEL, DAMP		6																
		7																
		8																
@8.5'; GRAY		9	6															
		10	8	22	89	SS-2	4.50	-	-	-	-	-	-	-	-	10	A-4b (V)	
		11																
		12																
@13.5'; VERY STIFF		13																
		14	4															
		15	6	19	67	SS-3	4.00	-	-	-	-	-	-	-	-	14	A-4b (V)	
		16																
		17																
		18																
		19	5															
		20	6	15	100	SS-4	4.00	-	-	-	-	-	-	-	-	12	A-4b (V)	
		21																
		22																
		23																
@23.5'; HARD		24	5															
		25	6	22	67	SS-5	4.50	-	-	-	-	-	-	-	-	16	A-4b (V)	
		26																
		27																
		28																
	858.9	29	8															
VERY STIFF, GRAY, SILTY CLAY , LITTLE SAND, TRACE GRAVEL, MOIST		30	7	22	100	SS-6	2.75	3	9	8	53	27	36	20	16	29	A-6b (10)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PID: 119142 | SFN: | PROJECT: ATH-US 33-23.23 | STATION / OFFSET: 1311+17, 73' LT. | START: 2/14/24 | END: 2/14/24 | PG 2 OF 2 | B-053-0-23

MATERIAL DESCRIPTION AND NOTES	ELEV. 857.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
VERY STIFF, GRAY, SILTY CLAY , LITTLE SAND, TRACE GRAVEL, MOIST (continued) @31.0'; DAMP	857.4	31	8															
		32	8	8	21	67	SS-7	4.00	-	-	-	-	-	-	-	-	11	A-6b (V)
HARD, GRAY, SILT AND CLAY , LITTLE SAND, TRACE GRAVEL, DAMP	853.9	33	8															
		34	25	19	58	100	SS-8	-	-	-	-	-	-	-	-	-	10	A-6a (V)
HARD, BROWN, ELASTIC CLAY , TRACE SAND, DAMP	848.9	35	6															
		36	9	23	42	100	SS-9	-	1	13	5	56	25	33	20	13	11	A-6a (9)
@41.0'; VERY STIFF	838.9	37	12															
		38	8	8	21	100	SS-10	4.25	-	-	-	-	-	-	-	-	19	A-7-5 (V)
@43.5'; HARD, RED	838.1	39	7															
		40	8	11	25	100	SS-11	3.75	-	-	-	-	-	-	-	-	25	A-7-5 (V)
VERY STIFF, RED, SILT , LITTLE CLAY, LITTLE SAND, LITTLE GRAVEL, (POSSIBLE DECOMPOSED BEDROCK), DAMP	838.1	41	8															
		42	14	23	49	100	SS-12	4.50	0	0	1	61	38	53	31	22	21	A-7-5 (15)
VERY STIFF, RED, SILT , LITTLE CLAY, LITTLE SAND, LITTLE GRAVEL, (POSSIBLE DECOMPOSED BEDROCK), DAMP	838.1	43	10															
		44	14	20	45	100	SS-13	4.50	-	-	-	-	-	-	-	-	15	A-7-5 (V)
		45	47															
		46	50/3"															
		47																
		48																
		49																

EOB

NOTES: CAVED AT 7'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M/

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / TOM</u>	DRILL RIG: <u>CME 55 #393</u>	STATION / OFFSET: <u>1315+16, 105' LT.</u>	EXPLORATION ID: <u>B-054-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / TOM</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>11/4/22</u>	ELEVATION: <u>887.4 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>2/14/24</u> END: <u>2/14/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>79.3</u>	LAT / LONG: <u>39.199347, -82.054763</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (2")	887.4																	
VERY STIFF, RED, SILT , LITTLE CLAY, LITTLE SAND, TRACE GRAVEL, DAMP		1	13															
		2	12 13	33	39	SS-1	4.00	1	4	7	69	19	28	19	9	11	A-4b (8)	
@3.5'; HARD		3																
		4	6															
		5	9	22	78	SS-2	4.50	-	-	-	-	-	-	-	-	12	A-4b (V)	
		6																
VERY STIFF, RED, SILT AND CLAY , TRACE SAND, DAMP	881.4	7	14															
		8	10	26	56	SS-3	4.00	0	1	1	56	42	34	20	14	12	A-6a (10)	
		9																
@8.5'; HARD		10	22	77	100	SS-4	4.50	-	-	-	-	-	-	-	-	9	A-6a (V)	
	877.4	EOB	23 35															

NOTES: CAVED AT 4'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1319+80, 106' RT.</u>	EXPLORATION ID: <u>B-055-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>868.5 (MSL)</u> EOB: <u>20.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/19/23</u> END: <u>12/19/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.198037, -82.055392</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6") VERY STIFF, BROWN AND RED, SILT AND CLAY , SOME SAND, TRACE GRAVEL, CONTAINS ORGANICS, DAMP	868.5																	
	868.0		10															
		1	10	24	100	SS-1	2.50	6	7	24	38	25	34	20	14	20	A-6a (7)	
		2	9															
	865.0	3																
CLAYSTONE , BROWN TO GRAY, SEVERELY WEATHERED.		TR																
		4	15	67	100	SS-2	-	-	-	-	-	-	-	-	-	9	Rock (V)	
		5	22															
		6	30															
		7	25	77	100	SS-3	-	-	-	-	-	-	-	-	-	10	Rock (V)	
		8	28															
		9	32															
		10	37	100	100	SS-4	-	-	-	-	-	-	-	-	-	8	Rock (V)	
		11	41															
		12	24	73	100	SS-5	-	-	-	-	-	-	-	-	-	4	Rock (V)	
		13	26															
		14	31															
		15	27	83	100	SS-6	-	-	-	-	-	-	-	-	-	6	Rock (V)	
		16	30															
		17	35															
		18	48	113	100	SS-7	-	-	-	-	-	-	-	-	-	7	Rock (V)	
		19	40															
	848.5	EOB	38	106	100	SS-8	-	-	-	-	-	-	-	-	-	6	Rock (V)	
		20	42															
			41															

NOTES: CAVED AT 14'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1315+98, 113' RT.</u>	EXPLORATION ID: <u>B-056-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>890.1 (MSL)</u> EOB: <u>19.67 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/19/23</u> END: <u>12/19/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.199082, -82.055510</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6") VERY STIFF, RED, SILTY CLAY , LITTLE GRAVEL, TRACE SAND, (FILL), DAMP	890.1																	
	889.6																	
		1	10															
		2	12 14	33	100	SS-1	4.50	11	5	4	37	43	38	21	17	15	A-6b (11)	
	886.6	3																
CLAYSTONE , RED AND BROWN, SEVERELY WEATHERED.		4	11 14 17	40	100	SS-2	3.50	-	-	-	-	-	-	-	-	18	Rock (V)	
		5																
		6	8															
		7	10 11	27	100	SS-3	4.50	-	-	-	-	-	-	-	-	17	Rock (V)	
		8																
		9	12 15 16	40	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	Rock (V)	
		10																
		11	15 18 21	50	100	SS-5	4.50	-	-	-	-	-	-	-	-	10	Rock (V)	
		12																
		13																
		14	26 29 32	78	100	SS-6	4.50	-	-	-	-	-	-	-	-	8	Rock (V)	
		15																
		16	28 33 37	90	100	SS-7	4.50	-	-	-	-	-	-	-	-	13	Rock (V)	
		17																
		18																
		19	35 40 50/2"	-	100	SS-8	4.50	-	-	-	-	-	-	-	-	10	Rock (V)	
	870.5																	

EOB

NOTES: CAVED AT 16'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - C:\PROJECT\2023\COL-0512305059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1318+15, 353' RT.</u>	EXPLORATION ID: <u>B-057-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>834.2 (MSL)</u> EOB: <u>13.75 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/19/23</u> END: <u>12/19/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.198439, -82.056302</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (3") STIFF, RED, CLAY , "AND" SILT, TRACE SAND, TRACE GRAVEL, (FILL), MOIST	834.2																	
	833.9	1	3															
		2	4	10	100	SS-1	2.00	2	1	6	43	48	49	23	26	26	A-7-6 (16)	
@3.5'; VERY STIFF, LITTLE SAND		3																
		4	4															
		5	6	20	100	SS-2	2.25	4	8	6	38	44	47	22	25	23	A-7-6 (15)	
	828.2	6																
CLAYSTONE, GRAY, SEVERELY WEATHERED.		7	7	41	100	SS-3	-	-	-	-	-	-	-	-	-	6	Rock (V)	
		8																
		9	10	32	100	SS-4	-	-	-	-	-	-	-	-	-	10	Rock (V)	
		10	11															
		11	14															
		12	28															
		13	50/5"	-	100	SS-5	-	-	-	-	-	-	-	-	-	8	Rock (V)	
	820.4	EOB	50/3"	-	100	SS-6	-	-	-	-	-	-	-	-	-	11	Rock (V)	

NOTES: CAVED AT 5.5'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - C:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INCREPOTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1318+15, 353' RT.</u>	EXPLORATION ID <u>B-057-0A-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>834.2 (MSL)</u> EOB: <u>5.0 ft.</u>	PAGE 1 OF 1
START: <u>12/19/23</u> END: <u>12/19/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.198439, -82.056302</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
Augered down to 3 feet	834.2																	
RED, CLAY , "AND" SILT, TRACE SAND, TRACE GRAVEL, (FILL), MOIST	831.2																	
	829.2	EOB			-	ST-1	-	2	1	6	38	53	53	26	27	29	A-7-6 (17)	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00 HNTB OHIO INC\REPORTS\LAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / H. BROWN</u>	DRILL RIG: <u>MOBILE B-57 TRACK</u>	STATION / OFFSET: <u>1525+80, 96' LT.</u>	EXPLORATION ID: <u>B-060-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / H. BROWN</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>5/3/23</u>	ELEVATION: <u>708.9 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>12/19/23</u> END: <u>12/19/23</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>76.8</u>	LAT / LONG: <u>39.146887, -82.025496</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				HOLE SEALED	
								GR	CS	FS	SI	CL	LL	PL	PI	WC		ODOT CLASS (GI)
TOPSOIL (7")	708.9																	
STIFF, BROWN, SANDY SILT , LITTLE CLAY, (FILL), DAMP	708.4	1	3															
		2	4	13	100	SS-1	2.00	0	7	44	31	18	27	18	9	12	A-4a (3)	
	705.9	3																
STIFF, BROWN, CLAY , "AND" SILT, LITTLE SAND, (FILL), MOIST @3.0'; UCS= 2.43 KSF		4			100	ST-2	-	0	2	16	38	44	42	22	20	26	A-7-6 (12)	
		5																
	702.9	6	4															
MEDIUM DENSE, BROWN, COARSE AND FINE SAND , LITTLE SILT, LITTLE CLAY, TRACE GRAVEL, (FILL), DAMP		7	3	13	100	SS-3	-	1	8	59	17	15	NP	NP	NP	11	A-3a (0)	
		8																
		9	7															
	698.9	10	7	17	100	SS-4	-	-	-	-	-	-	-	-	-	11	A-3a (V)	
		EOB																

NOTES: CAVED AT 2.2'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 9/6/24 16:32 - O:\PROJECT\2023\COL-05123050059COL-ATH MEG-033-18-70 00-00_HNTB OHIO INCREPRTSLAB REPORTS\M\

PROJECT: <u>ATH-US 33-23.23</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>1325+74, 186' LT.</u>	EXPLORATION ID: <u>B-064-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / A. WILDER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 33</u>	
PID: <u>119142</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>857.5 (MSL)</u> EOB: <u>14.7 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/20/24</u> END: <u>6/20/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>39.196470, -82.054217</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6")	857.5																	
VERY STIFF, RED, SILTY CLAY , TRACE SAND, TRACE GRAVEL, DAMP	857.0	1	12															
@2.5'; MEDIUM STIFF, LITTLE SAND, UCS= 1.28 KSF		2	8	18	100	SS-1	4.00	1	2	2	61	34	37	20	17	11	A-6b (11)	
		3			100	ST-2	-	6	11	3	48	32	37	21	16	19	A-6b (10)	
@6.0'; VERY STIFF		4																
		5																
@7.5'; SOFT, TRACE SAND, UCS= 0.66 KSF		6	2	6	100	SS-3	2.50	-	-	-	-	-	-	-	-	14	A-6b (V)	
		7	3	2														
		8			83	ST-4	-	10	5	5	42	38	37	20	17	25	A-6b (11)	
		9																
		10																
CLAYSTONE, RED, SEVERELY WEATHERED.	846.5	11	5	30	100	SS-5	-	13	8	4	- 75 -	34	19	15	14	Rock (V)		
		12	10	13														
		13																
		14	38		100	SS-6	3.75	-	-	-	-	-	-	-	-	15	Rock (V)	
	842.8	EOB	50/2"		100	SS-7	4.50	-	-	-	-	-	-	-	-	13	Rock (V)	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: TREMIED BENTONITE GROUT

APPENDIX C

LABORATORY TEST RESULTS



**Unconfined Compression Test Results
ASTM D 2166, D 5102**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Sample ID: B-017-1A-23, ST-1, 2'-4'

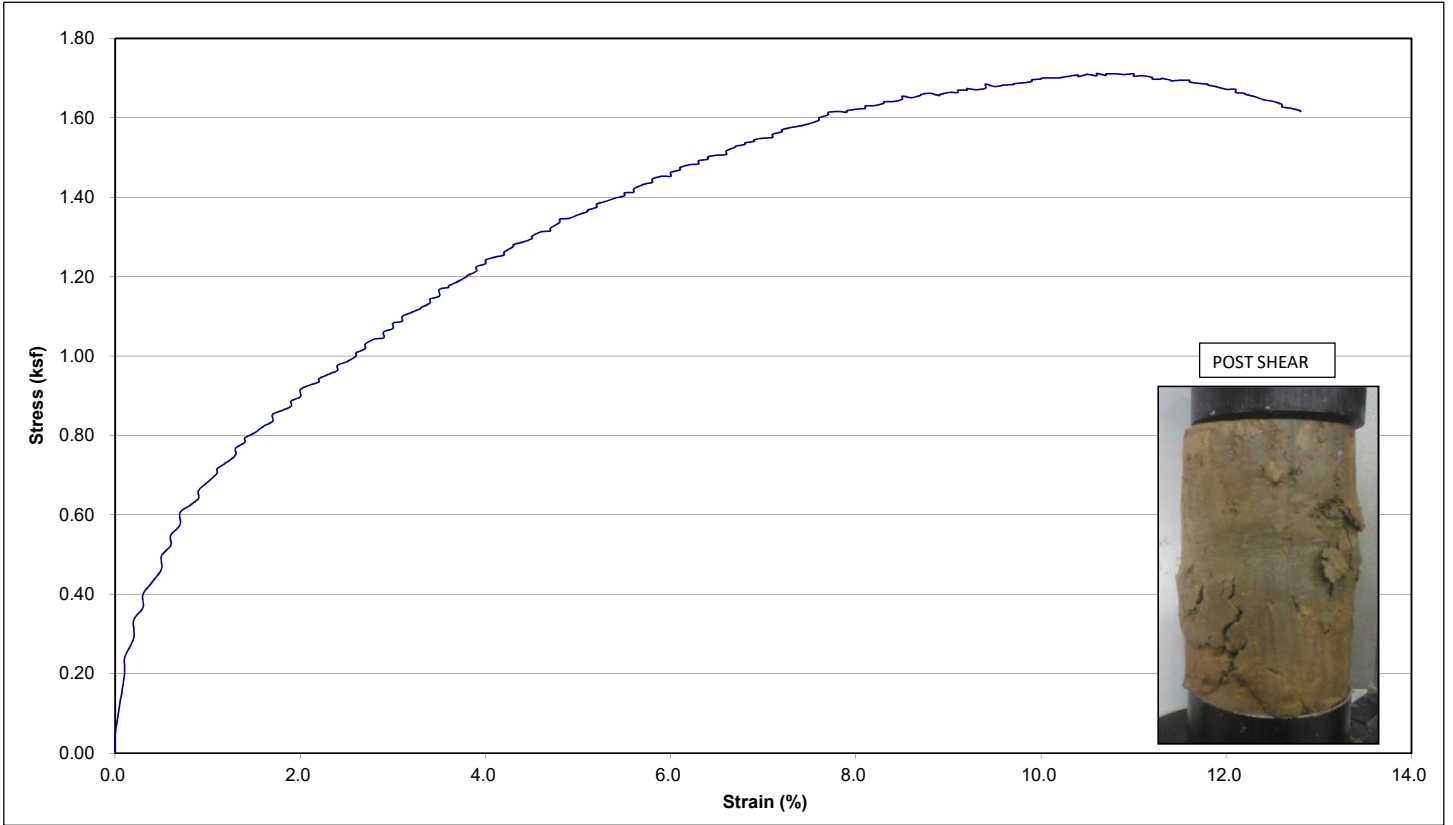
Avg. Sample Height (in.): 5.76
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.00
 Ultimate Strength (ksf): 1.71
 Shear Strength (Ksf): 0.86
 Avg. Rate of Strain to Failure(%): 1.99
 Strain at Failure (%): 10.60
 Initial Dry Density (pcf): 110.43
 Moisture Content (%): 16.9 (Obtained Post Shear)
 Classification: Silt and Clay (A-6a)
 Degree of Saturation: NA
 Sensitivity: NA
 Failure Type: Diagonal

Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/23/2024
 Reviewed by: SM

ASTM D 4318

ASTM D 6913

LL: 35 Gravel (%): 10 Silt(%): 43
 PL: 21 Sand(%): 23 Clay(%): 24



**Unconfined Compression Test Results
ASTM D 2166, D 5102**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Sample ID: B-025-0A-23, ST-1, 2'-4'

Avg. Sample Height (in.): 5.81
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.02
 Ultimate Strength (ksf): 3.47
 Shear Strength (Ksf): 1.73
 Avg. Rate of Strain to Failure(%): 1.93
 Strain at Failure (%): 12.50
 Initial Dry Density (pcf): 104.68
 Moisture Content (%): 23.0 (Obtained Post Shear)
 Classification: Clay (A-7-6)
 Degree of Saturation: NA
 Sensitivity: NA
 Failure Type: Diagonal

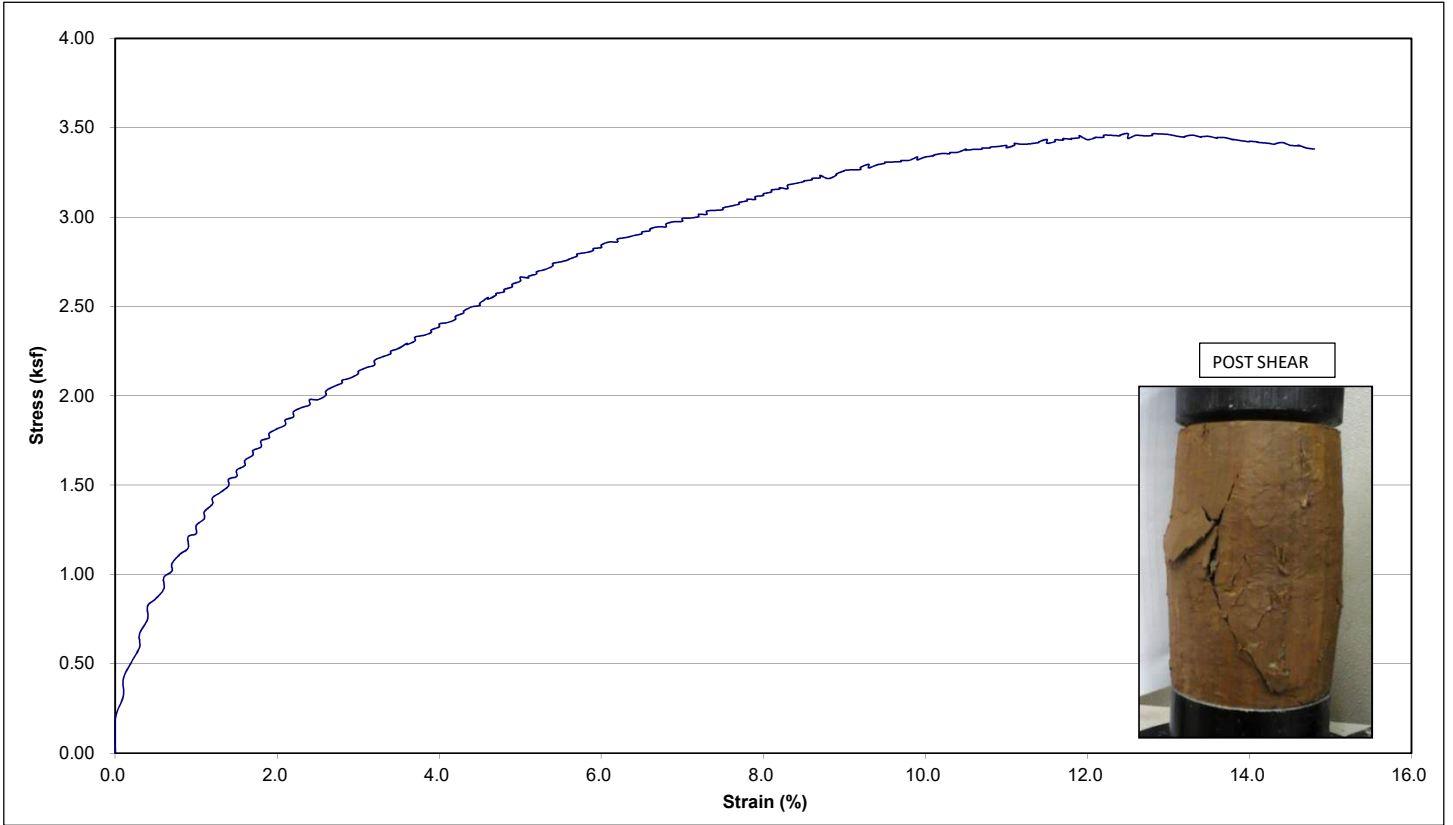
Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/22/2024
 Reviewed by: SM

ASTM D 4318

LL: 42
 PL: 25

ASTM D 6913

Gravel (%): 0
 Sand(%): 15
 Silt(%): 42
 Clay(%): 43



**Unconfined Compression Test Results
ASTM D 2166, D 5102**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Sample ID: B-060-0-23, ST-2, 3'-5'

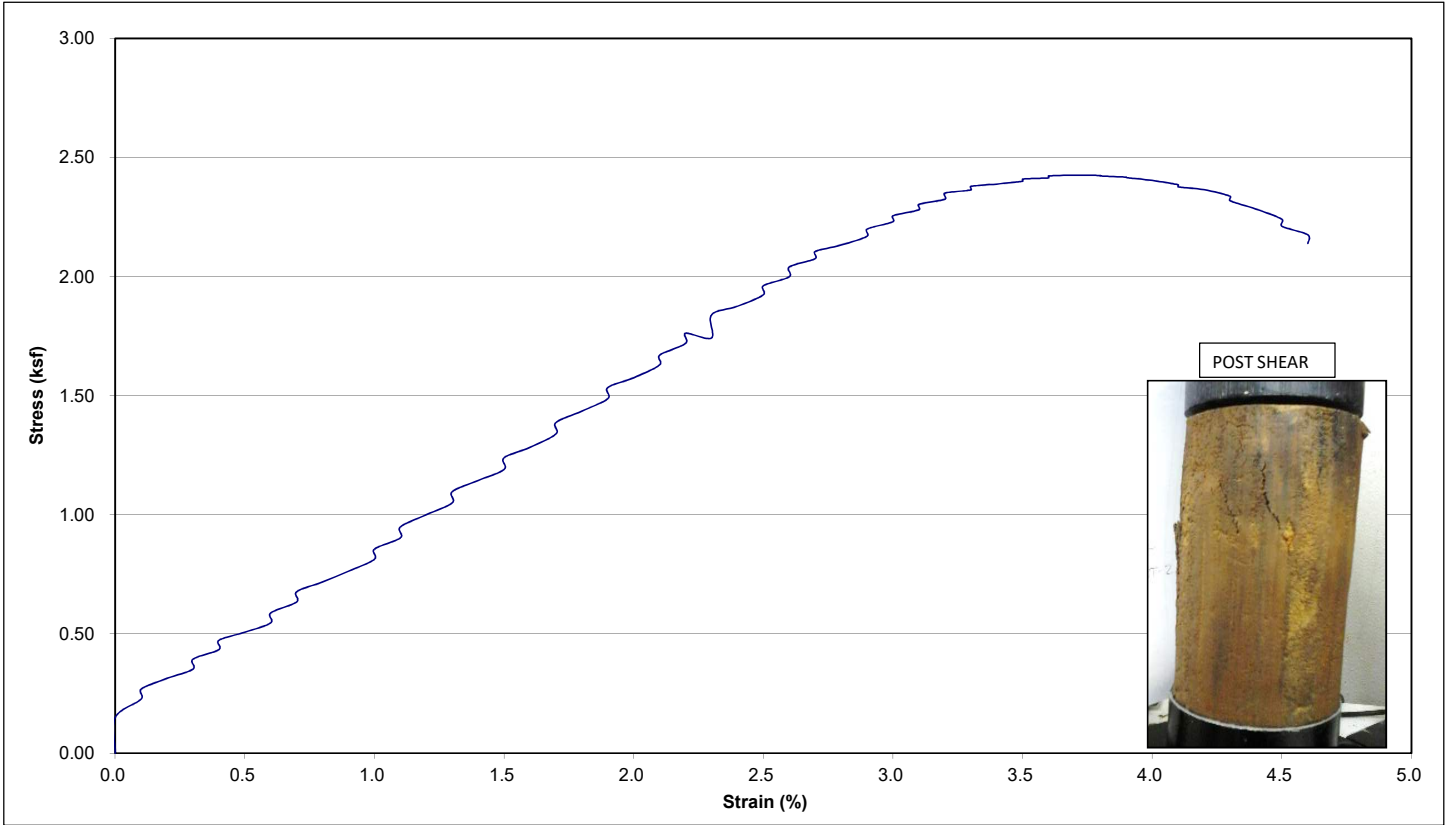
Avg. Sample Height (in.): 5.75
 Avg. Sample Diameter (in.): 2.89
 Height-to-diameter ratio: 1.99
 Ultimate Strength (ksf): 2.43
 Shear Strength (Ksf): 1.21
 Avg. Rate of Strain to Failure(%): 2.02
 Strain at Failure (%): 3.70
 Initial Dry Density (pcf): 118.25
 Moisture Content (%): 13.9 (Obtained Post Shear)
 Classification: Clay (A-7-6)
 Degree of Saturation: NA
 Sensitivity: NA
 Failure Type: Diagonal

Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 1/9/2024
 Reviewed by: SM

ASTM D 4318

ASTM D 6913

LL: 42 Gravel (%): 0 Silt(%): 38
 PL: 22 Sand(%): 18 Clay(%): 44



**Unconfined Compression Test Results
ASTM D 2166, D 5102**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Sample ID: B-064-0-23, ST-2, 2.5'-4.5'

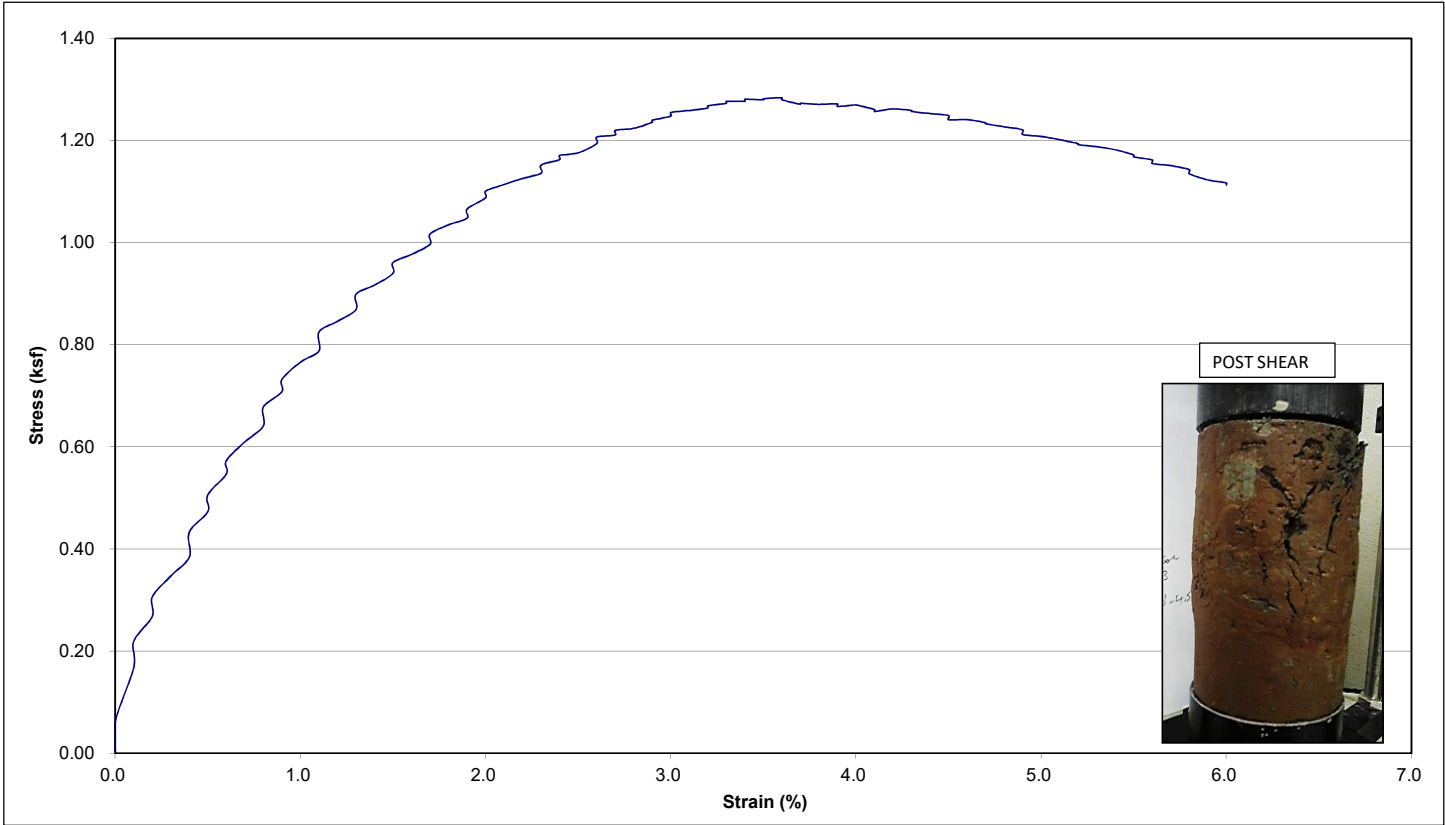
Avg. Sample Height (in.): 5.76
Avg. Sample Diameter (in.): 2.88
Height-to-diameter ratio: 2.00
Ultimate Strength (ksf): 1.28
Shear Strength (Ksf): 0.64
Avg. Rate of Strain to Failure(%): 1.99
Strain at Failure (%): 3.60
Initial Dry Density (pcf): 113.98
Moisture Content (%): 18.7 (Obtained Post Shear)
Classification: Silty clay (A-6b)
Degree of Saturation: NA
Sensitivity: NA
Failure Type: Diagonal

Client: HNTB Ohio, Inc
Project: ATH/MEG-033-23.23/0.00
Location: Athens and Meigs County, Ohio
Project No. 23050059COL
Lab Code No. NA
Date Tested: 7/2/2024
Reviewed by: SM

ASTM D 4318

ASTM D 6913

LL: 37 Gravel (%): 6 Silt(%): 48
PL: 21 Sand(%): 14 Clay(%): 32



**Unconfined Compression Test Results
ASTM D 2166, D 5102**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Sample ID: B-064-0-23, ST-4, 7.5'-9.5'

Avg. Sample Height (in.): 5.76
 Avg. Sample Diameter (in.): 2.88
 Height-to-diameter ratio: 2.00
 Ultimate Strength (ksf): 0.66
 Shear Strength (Ksf): 0.33
 Avg. Rate of Strain to Failure(%): 2.04
 Strain at Failure (%): 13.00
 Initial Dry Density (pcf): 103.47
 Moisture Content (%): 25.1 (Obtained Post Shear)
 Classification: Silty Clay (A-6b)
 Degree of Saturation: NA
 Sensitivity: NA
 Failure Type: Diagonal

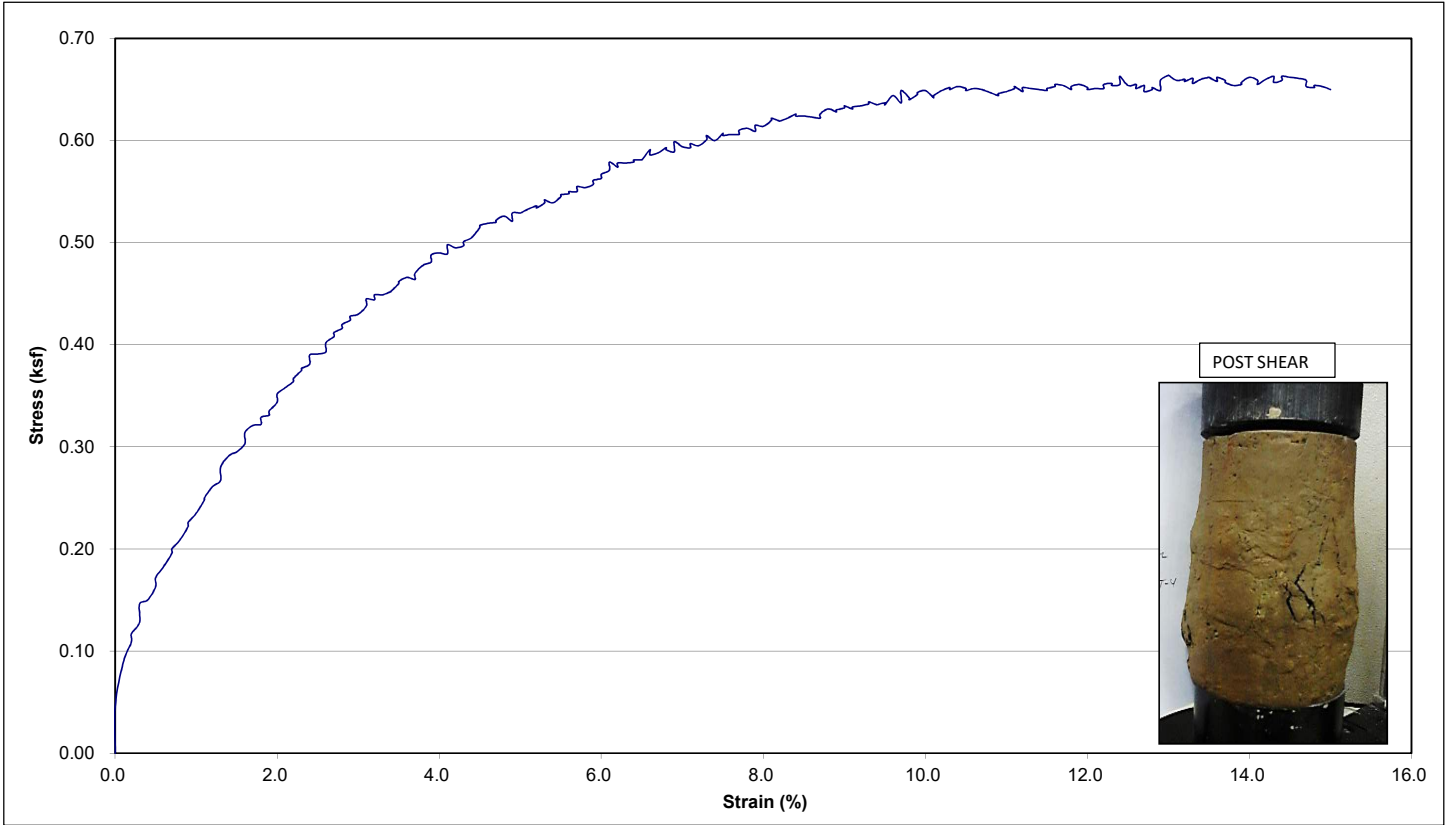
Client: HNTB Ohio, Inc
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens and Meigs County, Ohio
 Project No. 23050059COL
 Lab Code No. NA
 Date Tested: 7/2/2024
 Reviewed by: SM

ASTM D 4318

LL: 37
 PL: 20

ASTM D 6913

Gravel (%): 10 Silt(%): 42
 Sand(%): 10 Clay(%): 38



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
PID NO. 119142
Project: ATH/MEG-033-23.23/0.00
Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'

Lab Code No. NA
Reviewed by: SM

Sample Type	Undisturbed		
	Date Set-up:	1/24/2024	1/24/2024
Date Sheared:	1/29/2024	1/29/2024	1/29/2024
Avg. Sample Height (in.):	5.7387	5.7773	5.8248
Avg. Sample Diameter (in.):	2.8750	2.8750	2.8750
Height-to-diameter ratio:	2.00	2.01	2.03
Wet Density (pcf):	129.5	136.3	138.5
Dry Density (pcf):	104.0	113.8	123.2
Void Ratio:	0.620	0.480	0.368
Specific Gravity (assumed):	2.7	2.7	2.7
Moisture Content (%):	24.5	19.8	12.4
Cross Sectional Area (ft ²):	0.045	0.045	0.045
Volume (ft ³):	0.02	0.02	0.02
Confining Pressure (psf):	1440	2880	5760
Rate of Axial Strain (%/min):	0.2091	0.2077	0.2060
Compressive Strength (psf):	2263	3735	6449
Minor Principal Stress at Failure (psf):	1440	2880	5760
Major Principal Stress at Failure (psf):	3703	6615	12209
Failure Criterion (%):	Point of Maximum Obliquity		
β:	0.98	0.95	0.96
Specimen Saturation:	Wet Method		

Grading (ASTM D422)

% Agg:	2
% Sand:	12
% Silt:	48
% Clay:	38

Atterberg Limits (ASTM D 4318)

L.L.:	38
P.L.:	20
P.I.:	18

Visual Classification: Brown, Silty Clay (A-6b)

POST SHEAR

1440 psf



POST SHEAR

2880 psf



POST SHEAR

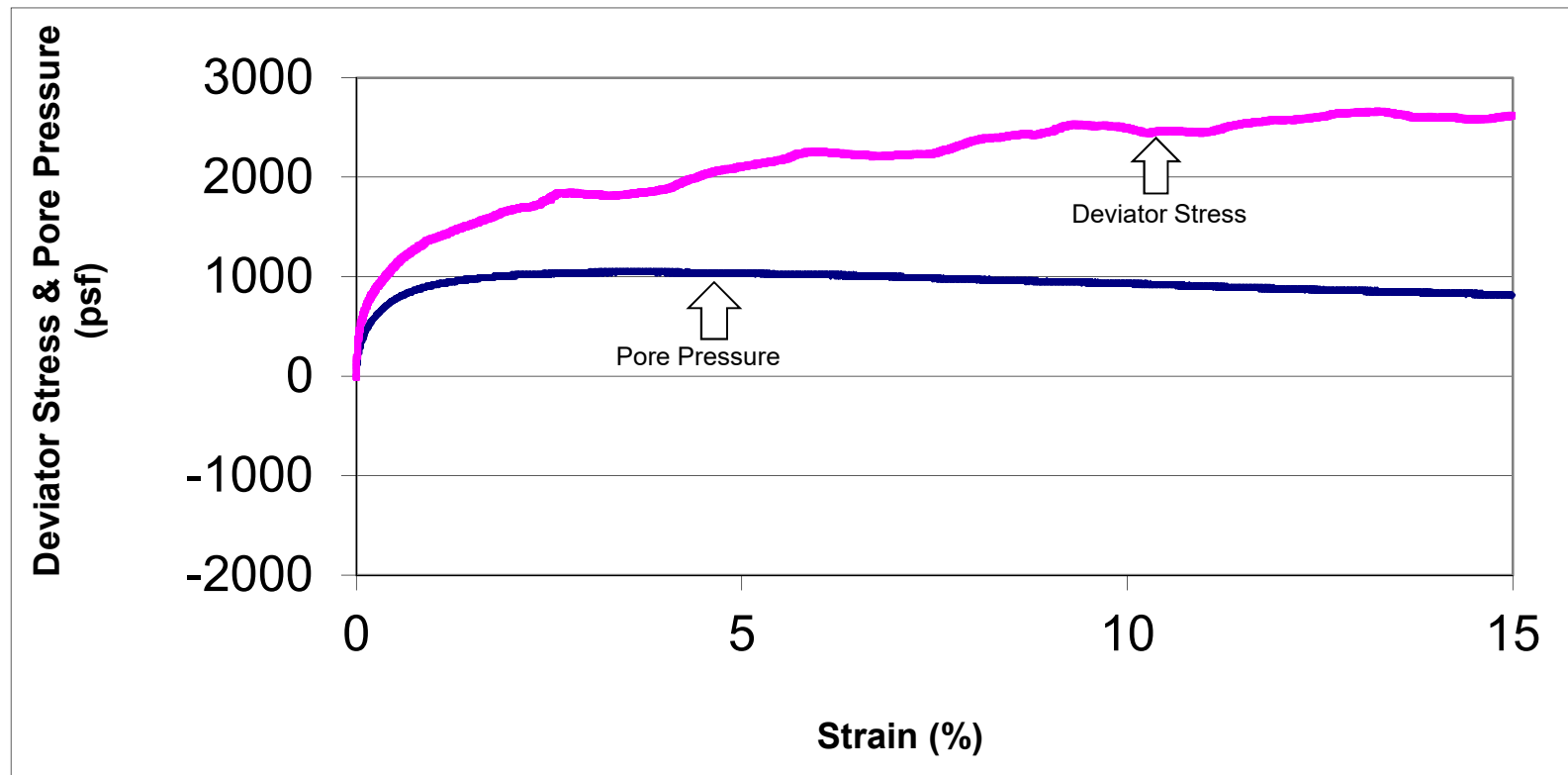
5760 psf



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

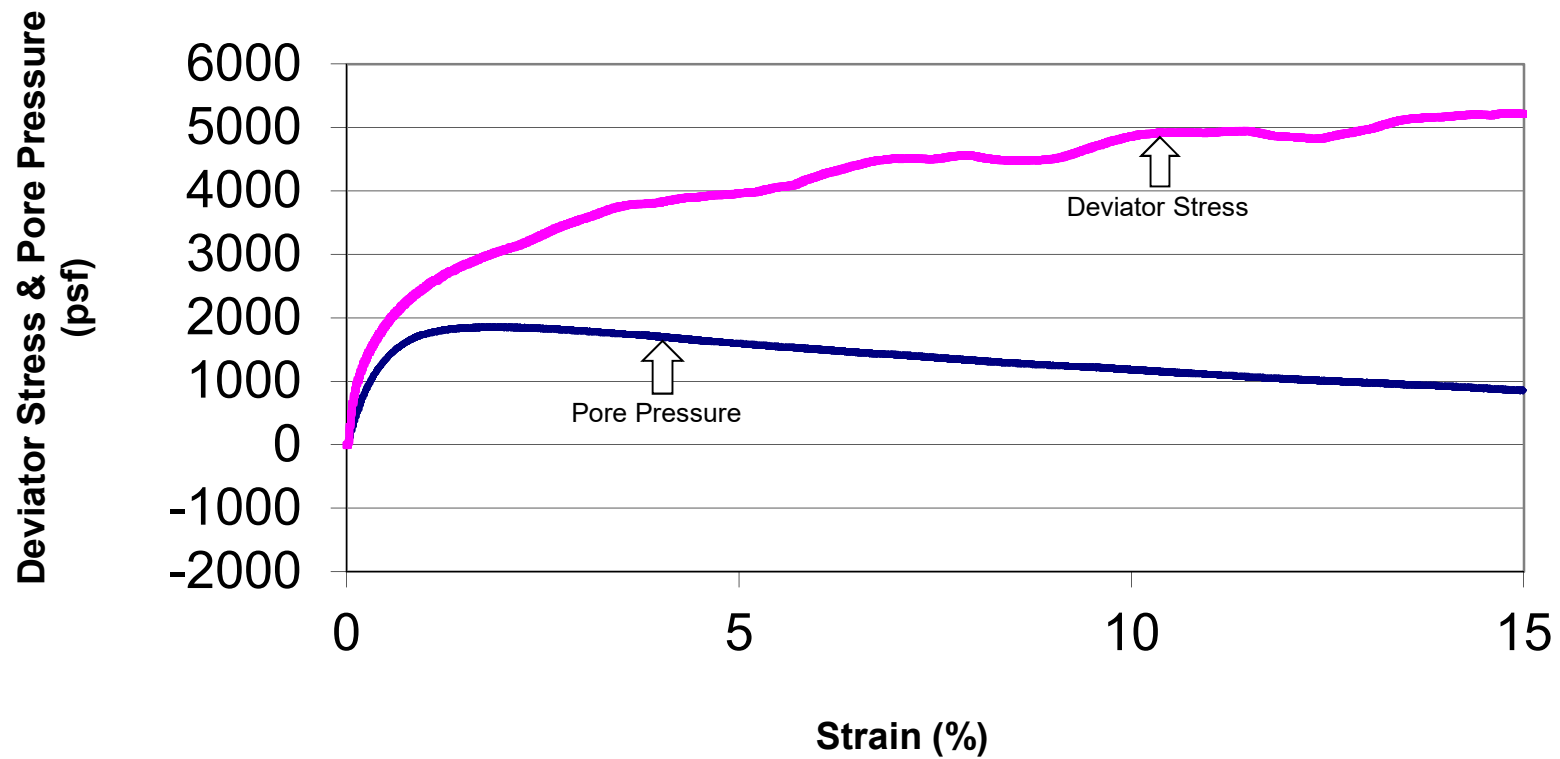
Sample ID: B-028-0A-23, ST, 3'-5'
Confining Pressure (psf): 1440



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

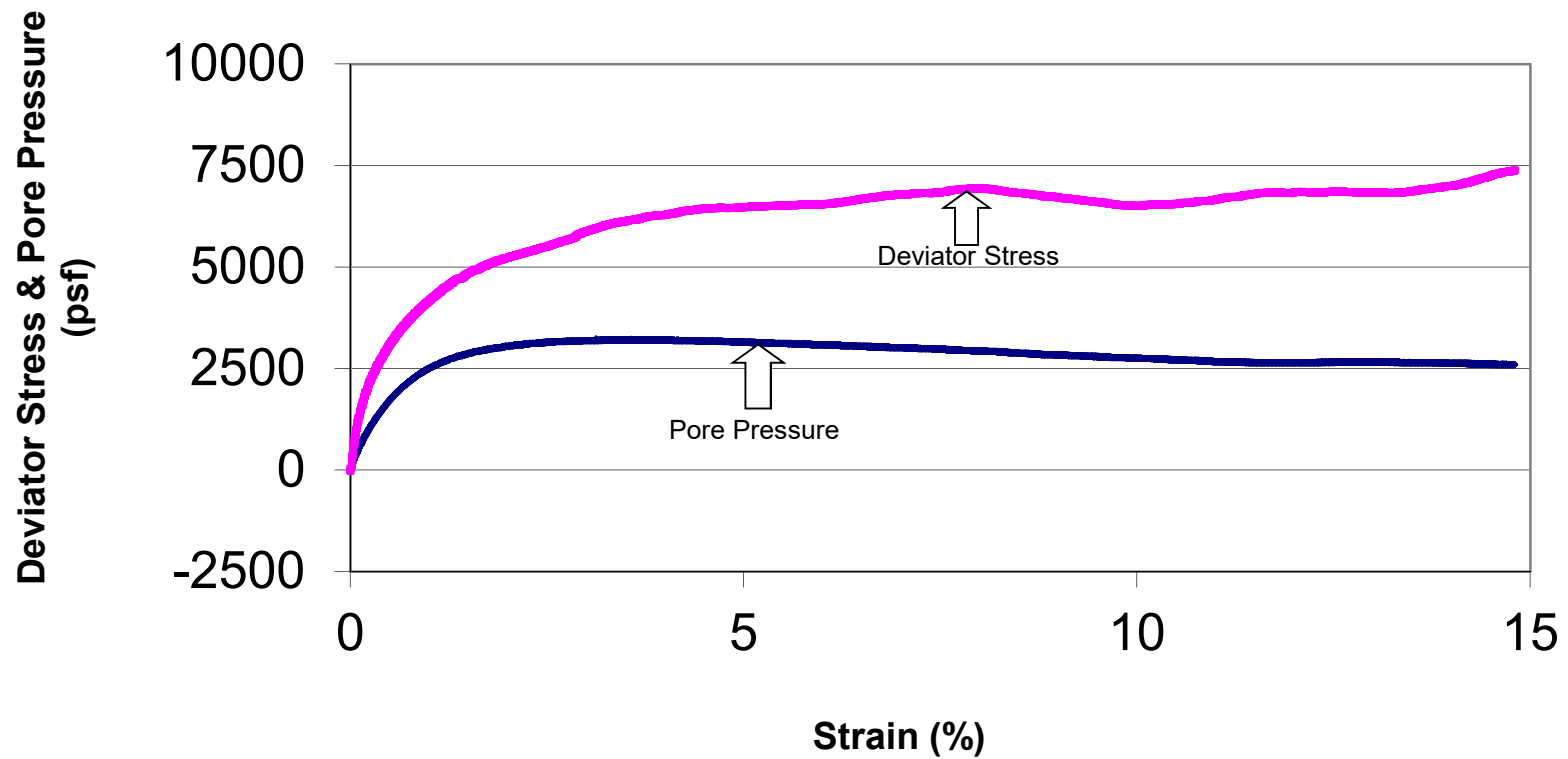
Sample ID: B-028-0A-23, ST, 3'-5'
Confining Pressure (psf): 2880



Deviator Stress & Pore Pressure vs. Strain

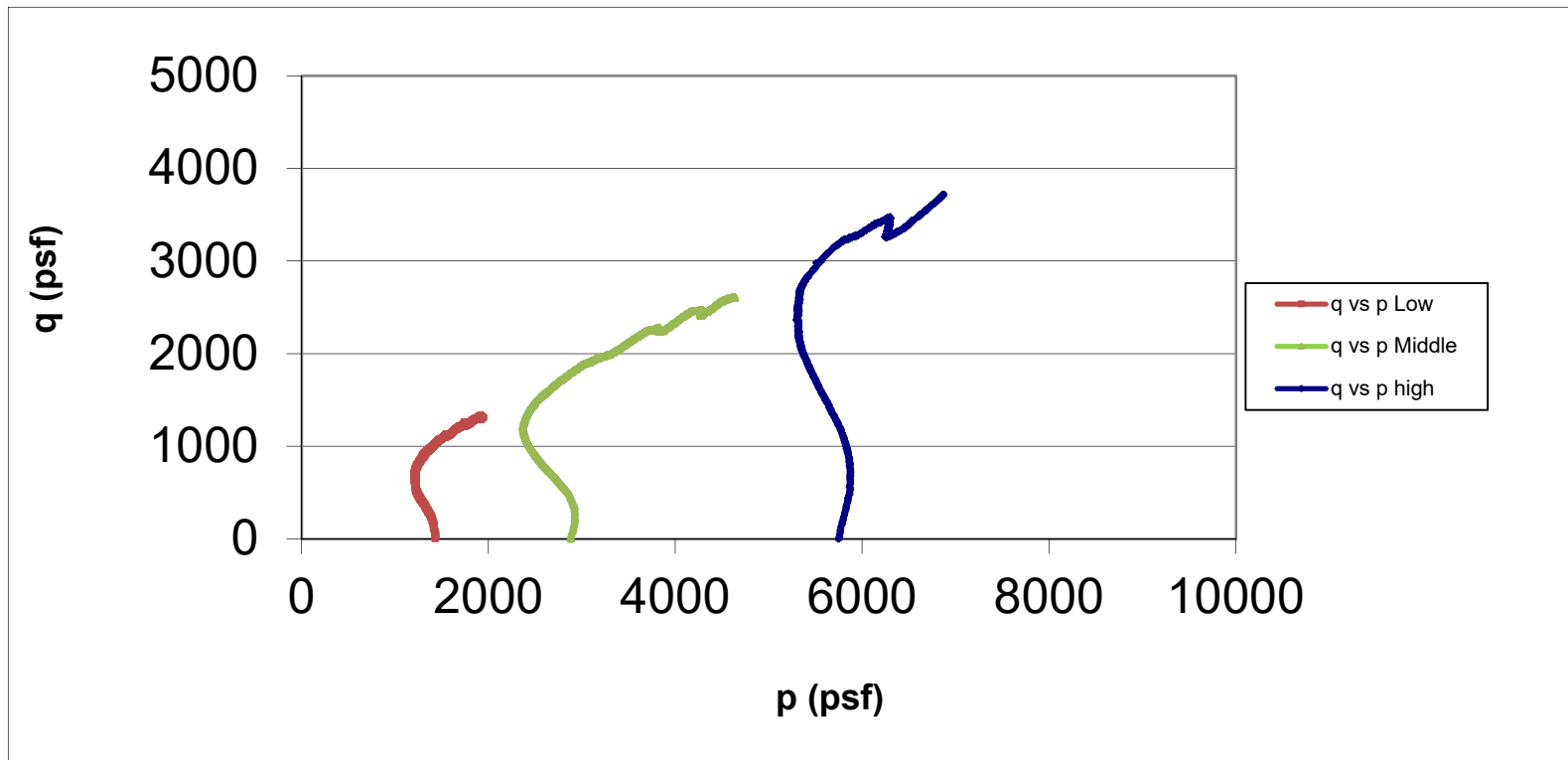
CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'
Confining Pressure (psf): 5760



q vs. p

CLIENT:	HNTB Ohio, Inc	Sample ID:	B-028-0A-23, ST, 3'-5'		
PROJECT:	ATH/MEG-033-23.23/0.00				
LOCATION:	Athens & Meigs County, Ohio	Confining Pressure (psf):	Low	Middle	High
PROJECT #:	23050059COL		1440	2880	5760

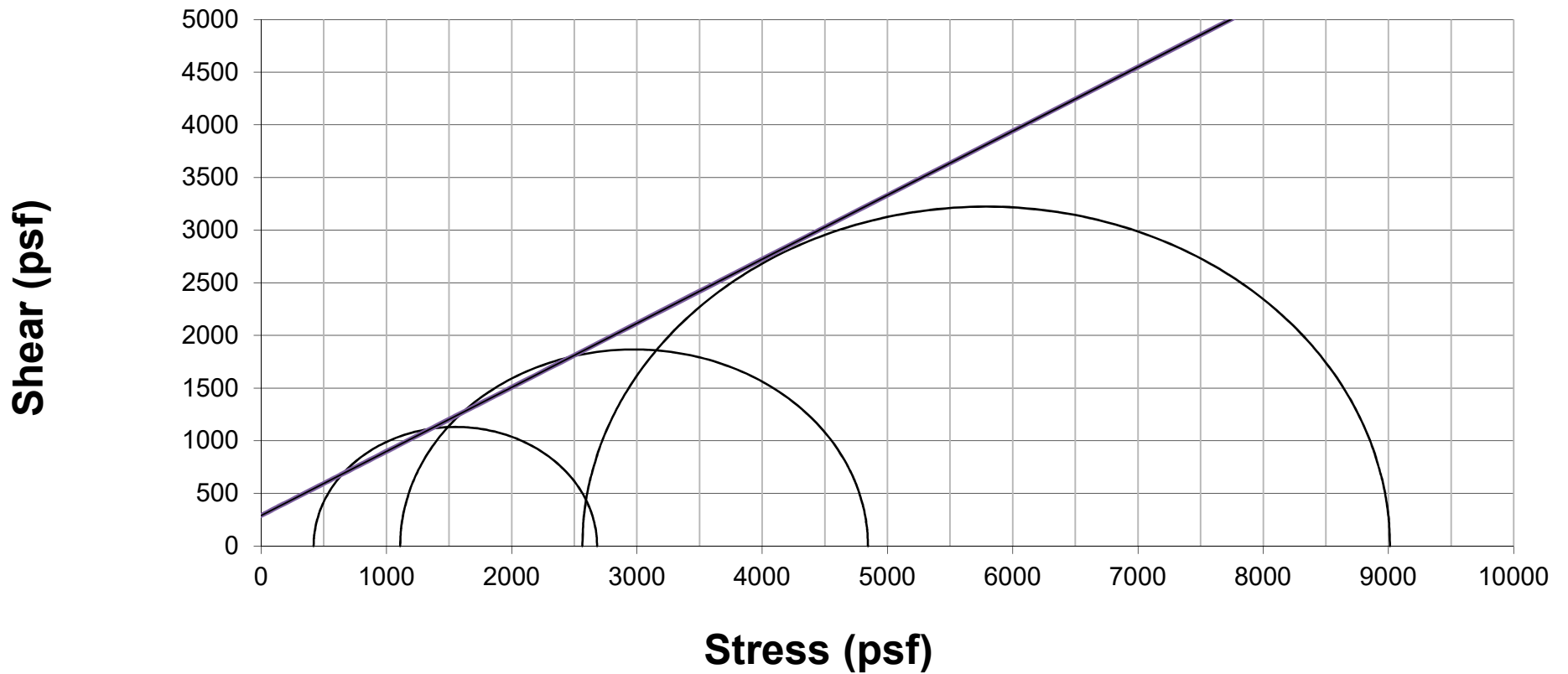


Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'

Confining Pressure (psf): 1440 2880 5760
Cohesion (psf): 290
Angle of Friction(°): 31

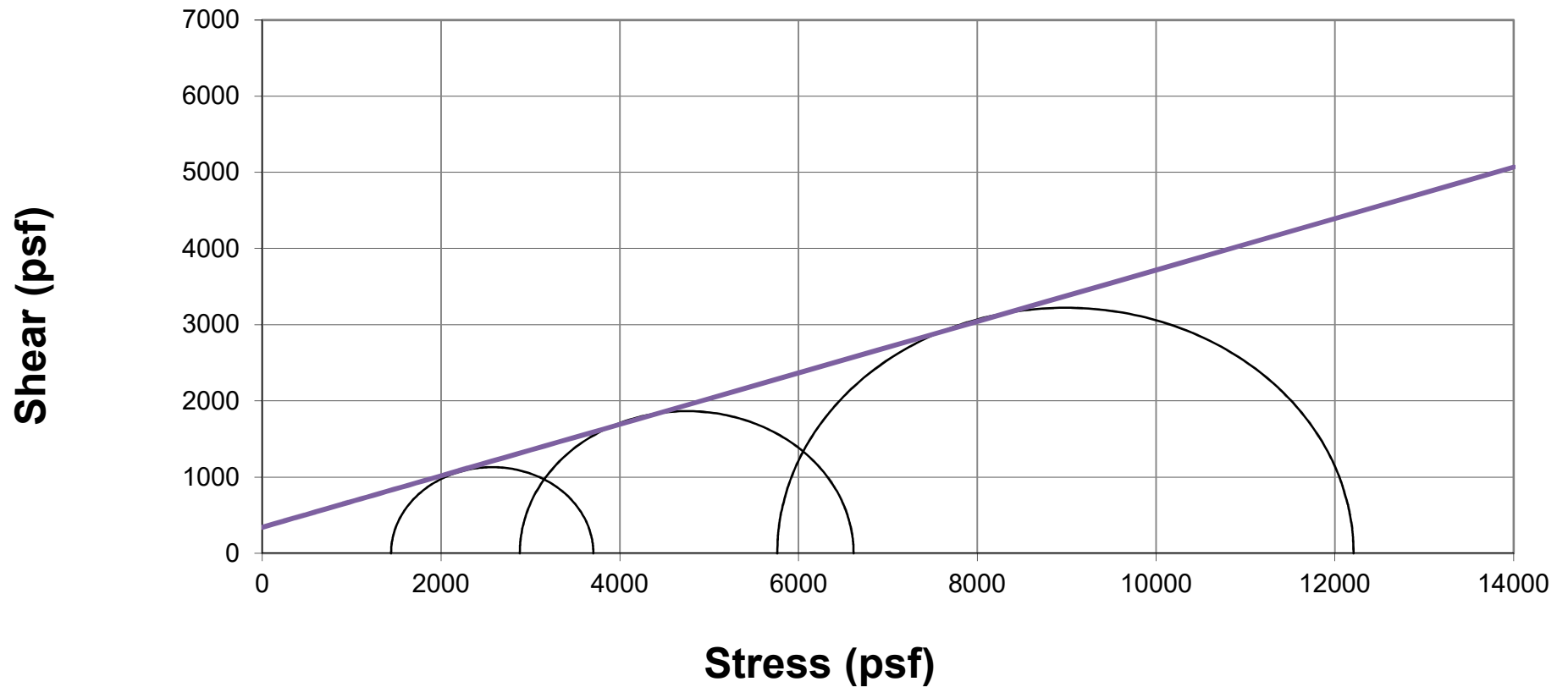


Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-028-0A-23, ST, 3'-5'

Confining Pressure (psf):	1440	2880	5760
Cohesion(psf):	350		
Angle of Friction(°):	19		



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
PID NO. 119142
Project: ATH/MEG-033-23.23/0.00
Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-033-0A-23, ST, 3'-5'
Lab Code No. NA
Reviewed by: SM

Sample Type	ST-1	
Date Set-up:	1/30/2024	1/30/2024
Date Sheared:	2/1/2024	2/1/2024
Avg. Sample Height (in.):	5.6787	5.6817
Avg. Sample Diameter (in.):	2.8750	2.8750
Height-to-diameter ratio:	1.98	1.98
Wet Density (pcf):	136.3	130.2
Dry Density (pcf):	116.1	110.9
Void Ratio:	0.451	0.519
Specific Gravity (assumed):	2.7	2.7
Moisture Content (%):	17.4	17.4
Cross Sectional Area (ft ²):	0.045	0.045
Volume (ft ³):	0.02	0.02
Confining Pressure (psf):	1440	4320
Rate of Axial Strain (%/min):	0.2113	0.2112
Compressive Strength (psf):	2640	5216
Minor Principal Stress at Failure (psf):	1440	4320
Major Principal Stress at Failure (psf):	4080	9536
Failure Criterion (%):	Point of maximum obliquity	
β:	0.95	0.95
Specimen Saturation:	Wet Method	

Grading (ASTM D422)

% Agg:	0
% Sand:	18
% Silt:	41
% Clay:	41

Atterberg Limits (ASTM D 4318)

L.L.:	34
P.L.:	19
P.I.:	15

Visual Description: Brown, Silt and Clay (A-6a)

POST SHEAR
1440 psf



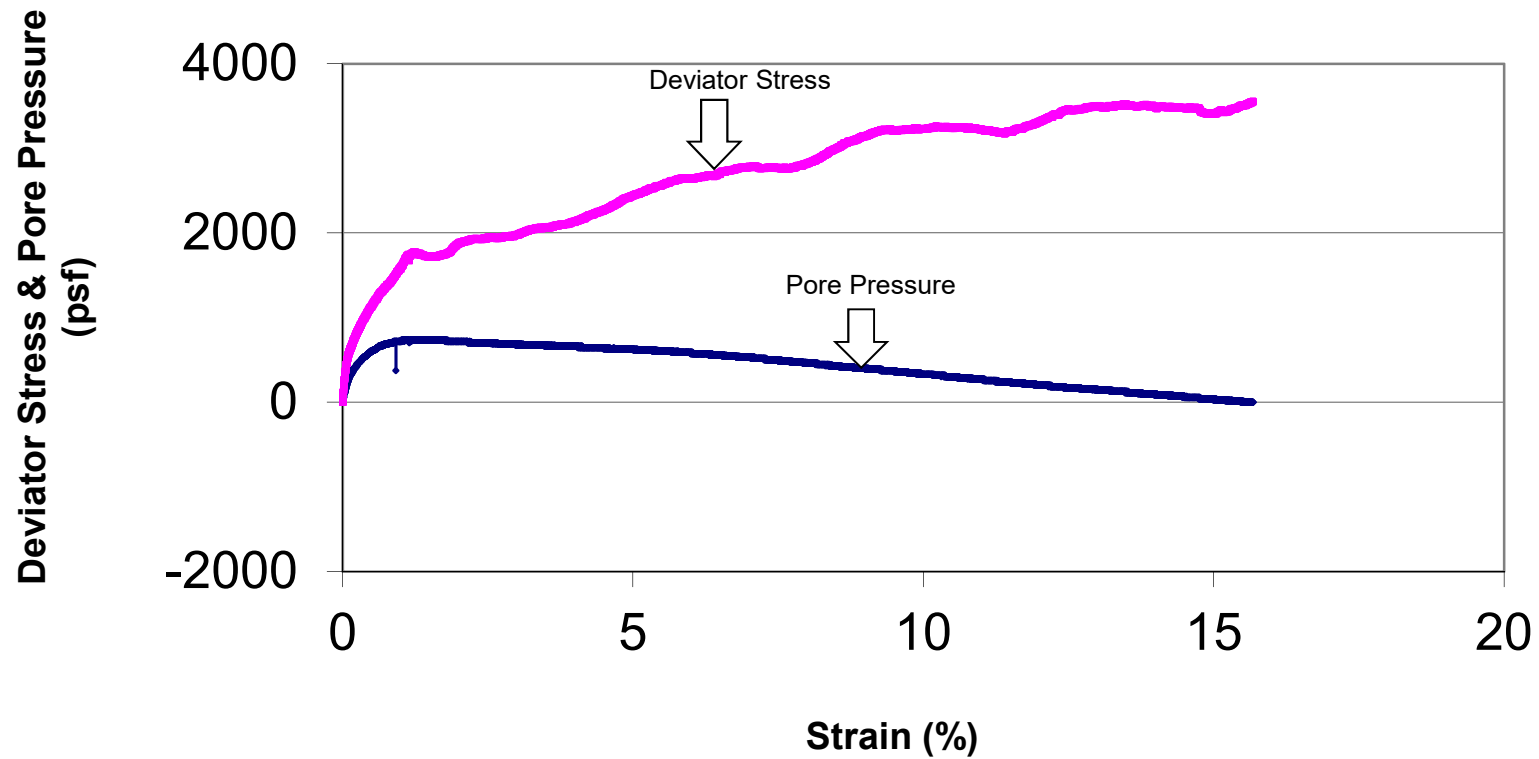
POST SHEAR
4320 psf



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

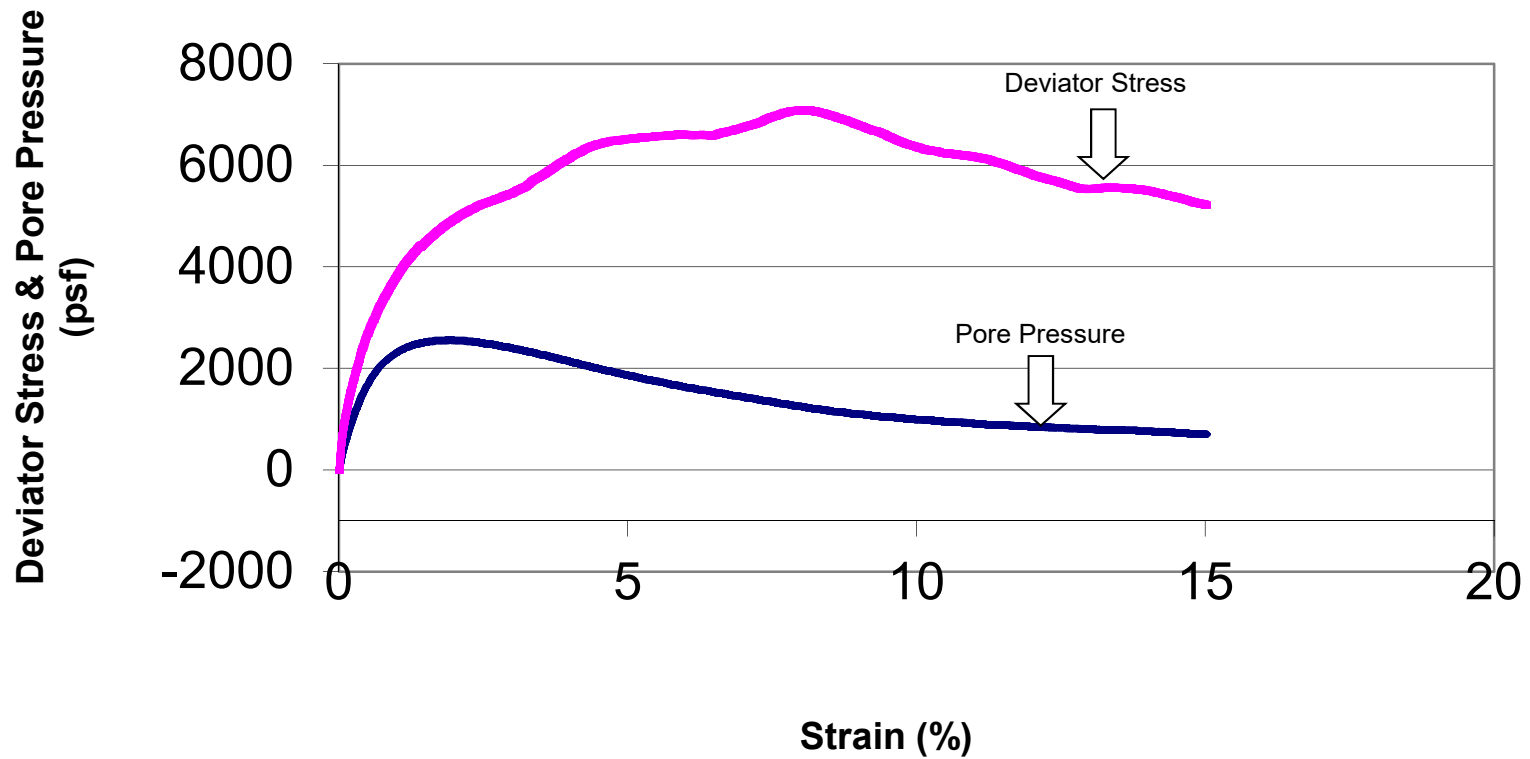
Sample ID: B-033-0A-23, ST, 3'-5'
Confining Pressure (psf): 1440



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-033-0A-23, ST, 3'-5'
Confining Pressure (psf): 4320



q vs. p

CLIENT: HNTB Ohio, Inc

Sample ID:

B-033-0A-23, ST, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00

Confining Pressure (psf):

Low

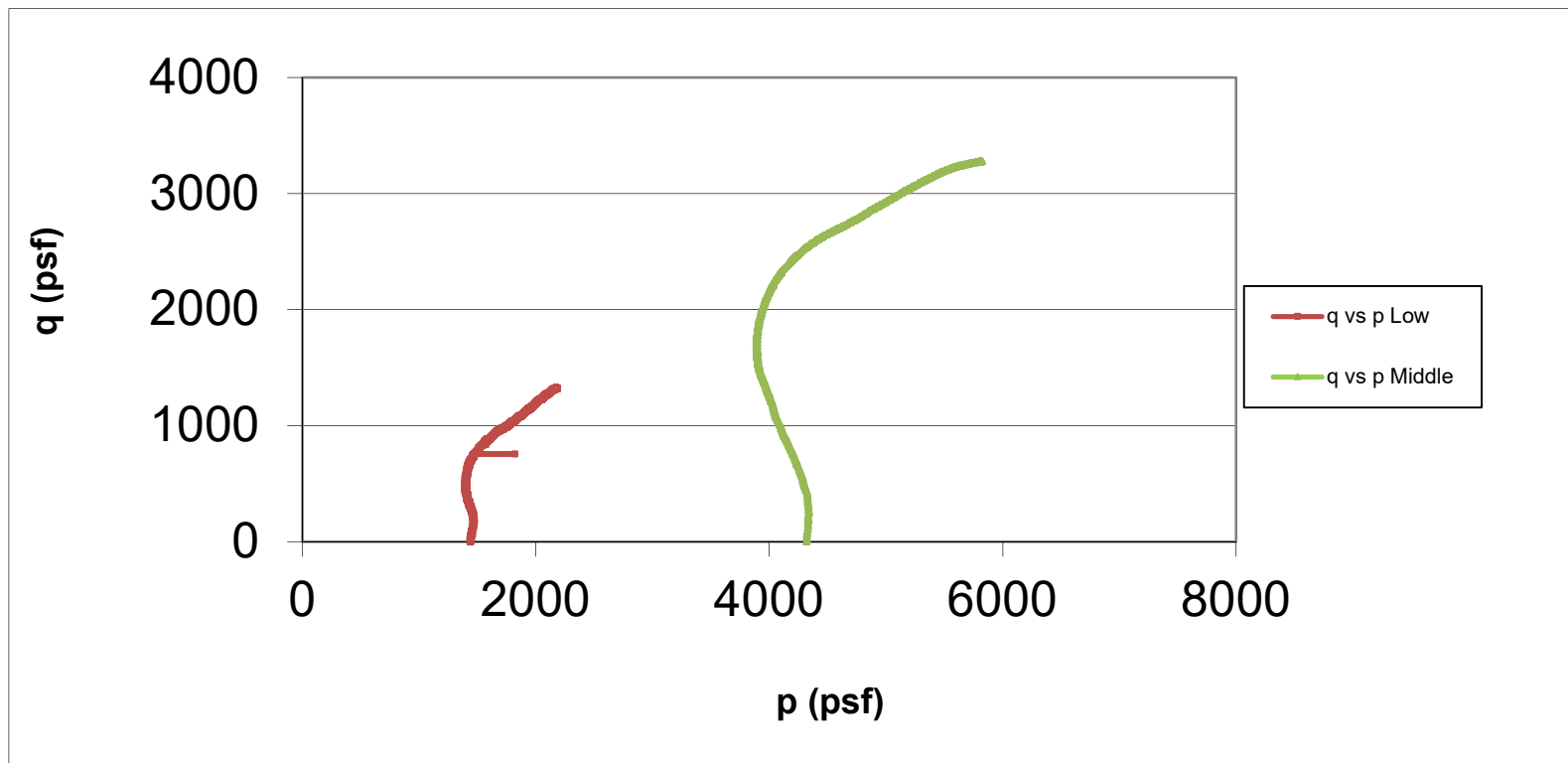
Middle

LOCATION: Athens & Meigs County, Ohio

1440

4320

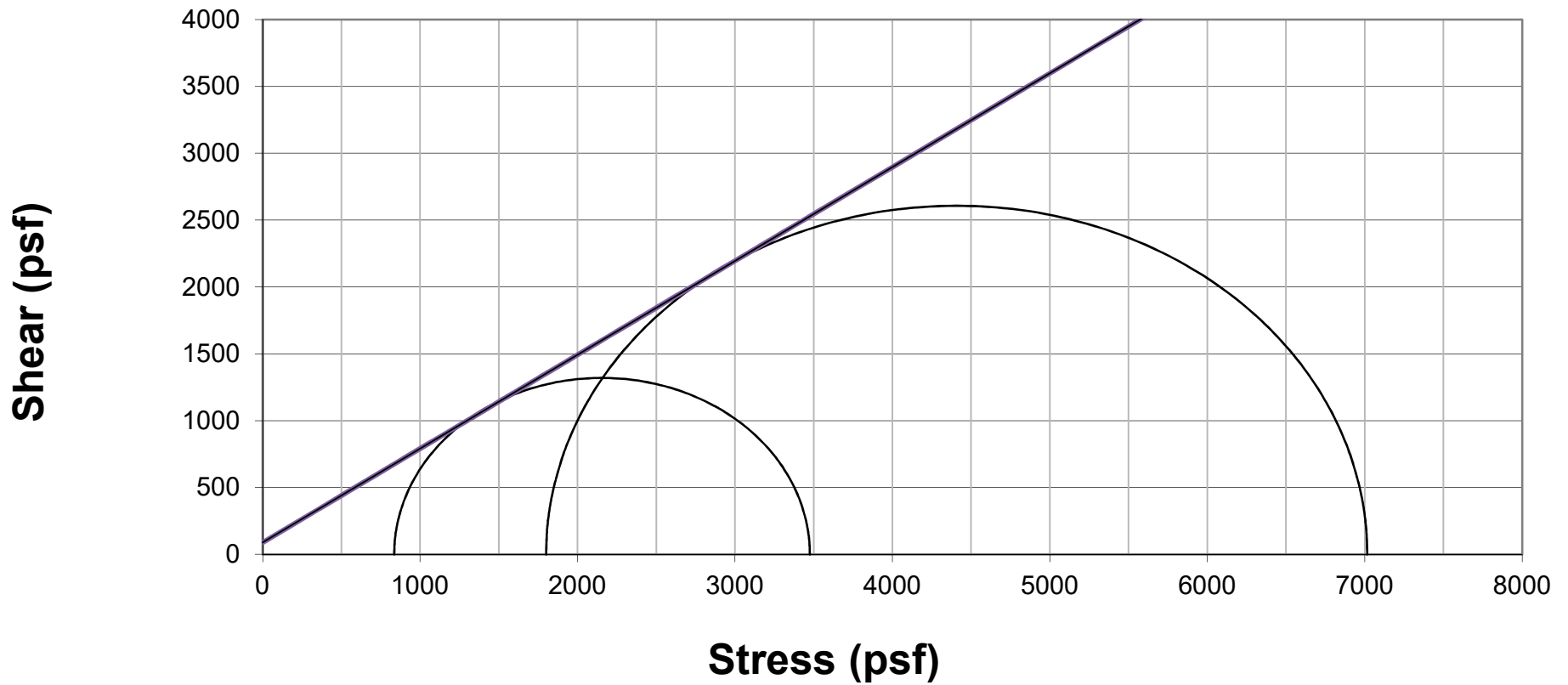
PROJECT #: 23050059COL



Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

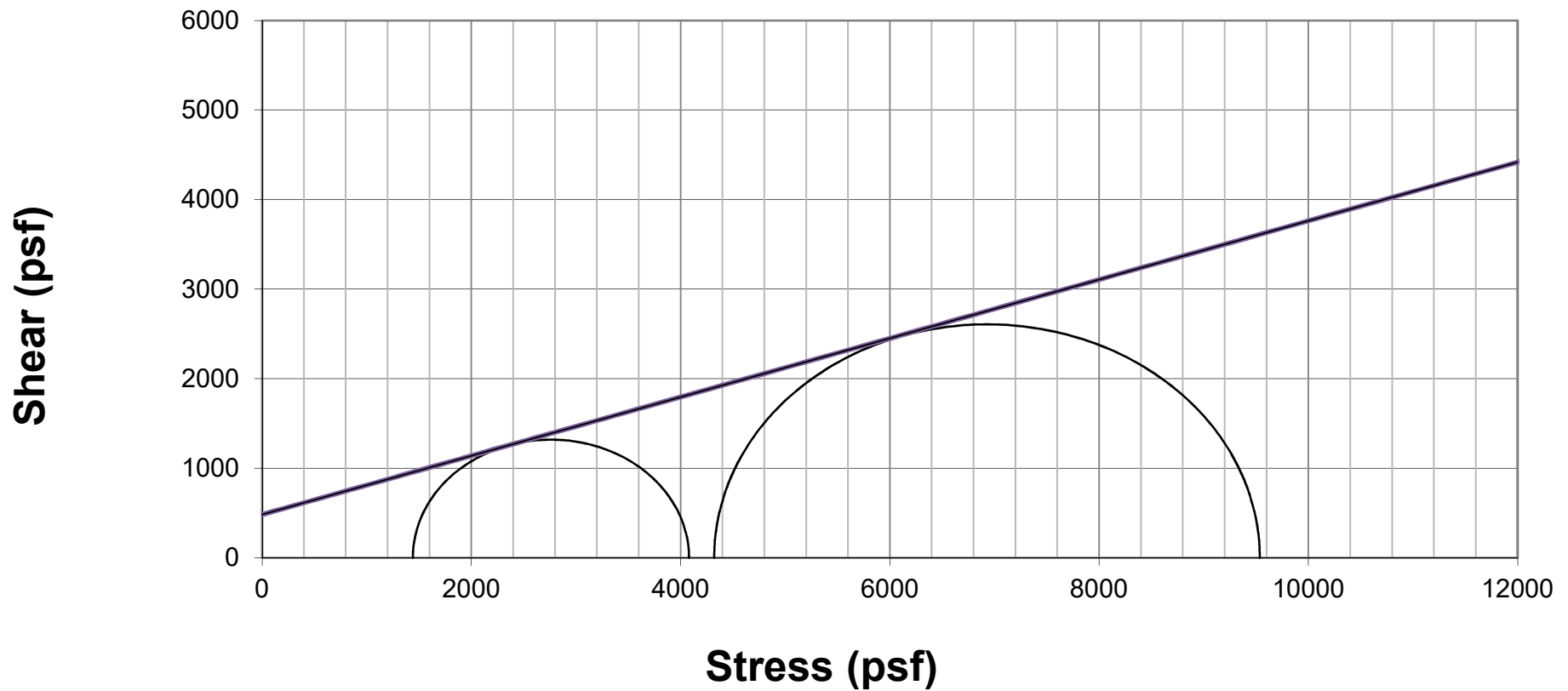
Sample ID: B-033-0A-23, ST, 3'-5'
Confining Pressure (psf): 1440 4320
Cohesion(psf): 89
Angle of Friction(°): 35



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-033-0A-23, ST, 3'-5'
Confining Pressure (psf): 1440 4320
Cohesion(psf): 480
Angle of Friction(°): 18



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
 PID NO. 119142
 Project: ATH/MEG-033-23.23/0.00
 Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-034-0A-23, ST, 1'-3'
 Lab Code No. NA
 Reviewed by: SM

Sample Type	ST-1	
Date Set-up:	2/2/2024	2/2/2024
Date Sheared:	2/6/2024	2/6/2024
Avg. Sample Height (in.):	5.7503	5.8127
Avg. Sample Diameter (in.):	2.8750	2.8750
Height-to-diameter ratio:	2.00	2.02
Wet Density (pcf):	129.9	138.3
Dry Density (pcf):	111.5	119.4
Void Ratio:	0.511	0.411
Specific Gravity (assumed):	2.7	2.7
Moisture Content (%):	16.5	15.8
Cross Sectional Area (ft ²):	0.045	0.045
Volume (ft ³):	0.02	0.02
Confining Pressure (psf):	720	2880
Rate of Axial Strain (%/min):	0.2087	0.2064
Compressive Strength (psf):	1618	3763
Minor Principal Stress at Failure (psf):	720	2880
Major Principal Stress at Failure (psf):	2338	6643
Failure Criterion (%):	Point of maximum obliquity	
β:	0.98	0.97
Specimen Saturation:	Wet Method	

Grading (ASTM D422)

% Agg:	0
% Sand:	26
% Silt:	46
% Clay:	28

Atterberg Limits (ASTM D 4318)

L.L.:	29
P.L.:	17
P.I.:	12

Visual Description: Red and Gray Silty Clay (A-6b)

POST SHEAR
720 psf



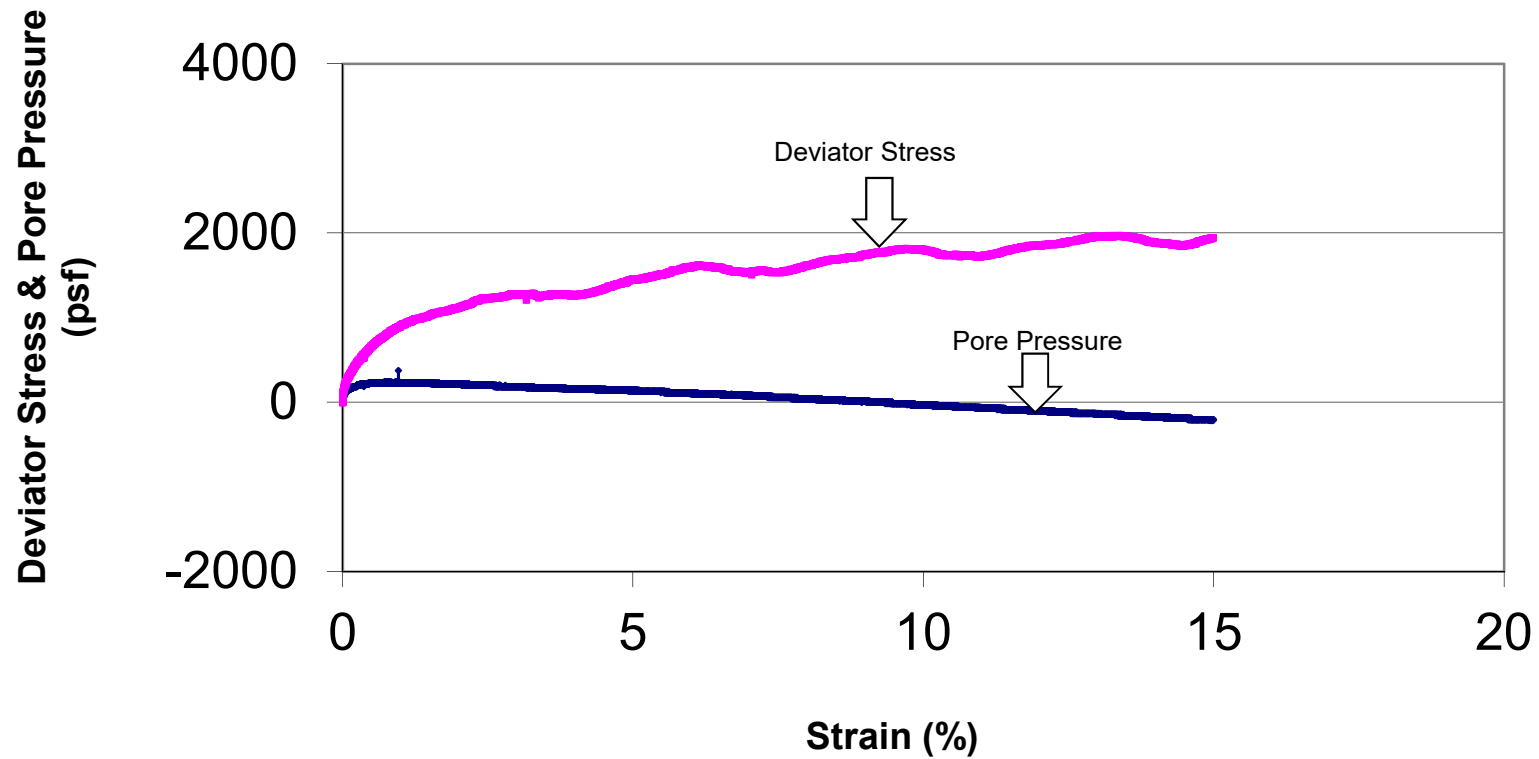
POST SHEAR
2880 psf



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

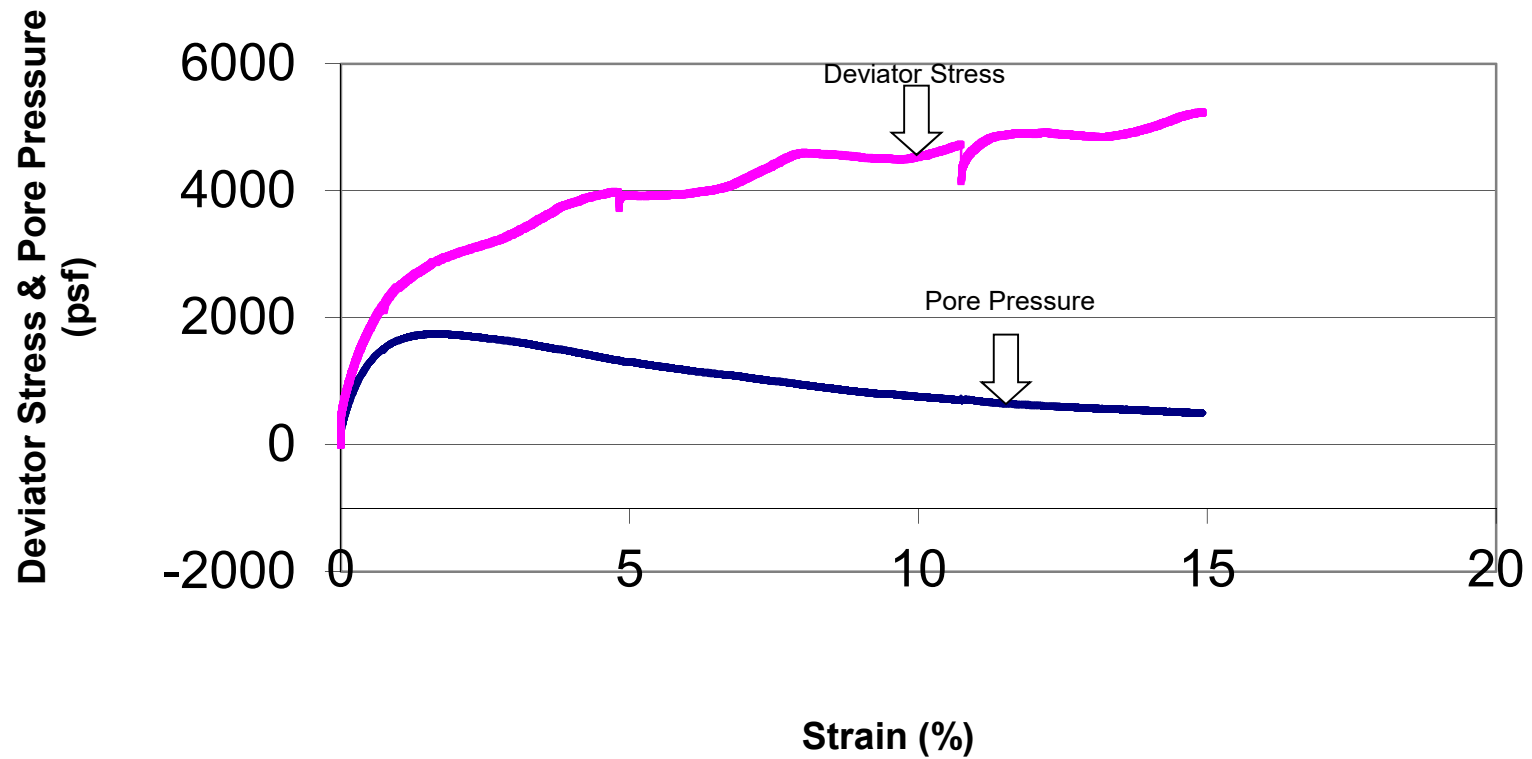
Sample ID: B-034-0A-23, ST, 1'-3'
Confining Pressure (psf): 720



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-034-0A-23, ST, 1'-3'
Confining Pressure (psf): 2880



q vs. p

CLIENT: HNTB Ohio, Inc

Sample ID:

B-034-0A-23, ST, 1'-3'

PROJECT: ATH/MEG-033-23.23/0.00

Confining Pressure (psf):

Low

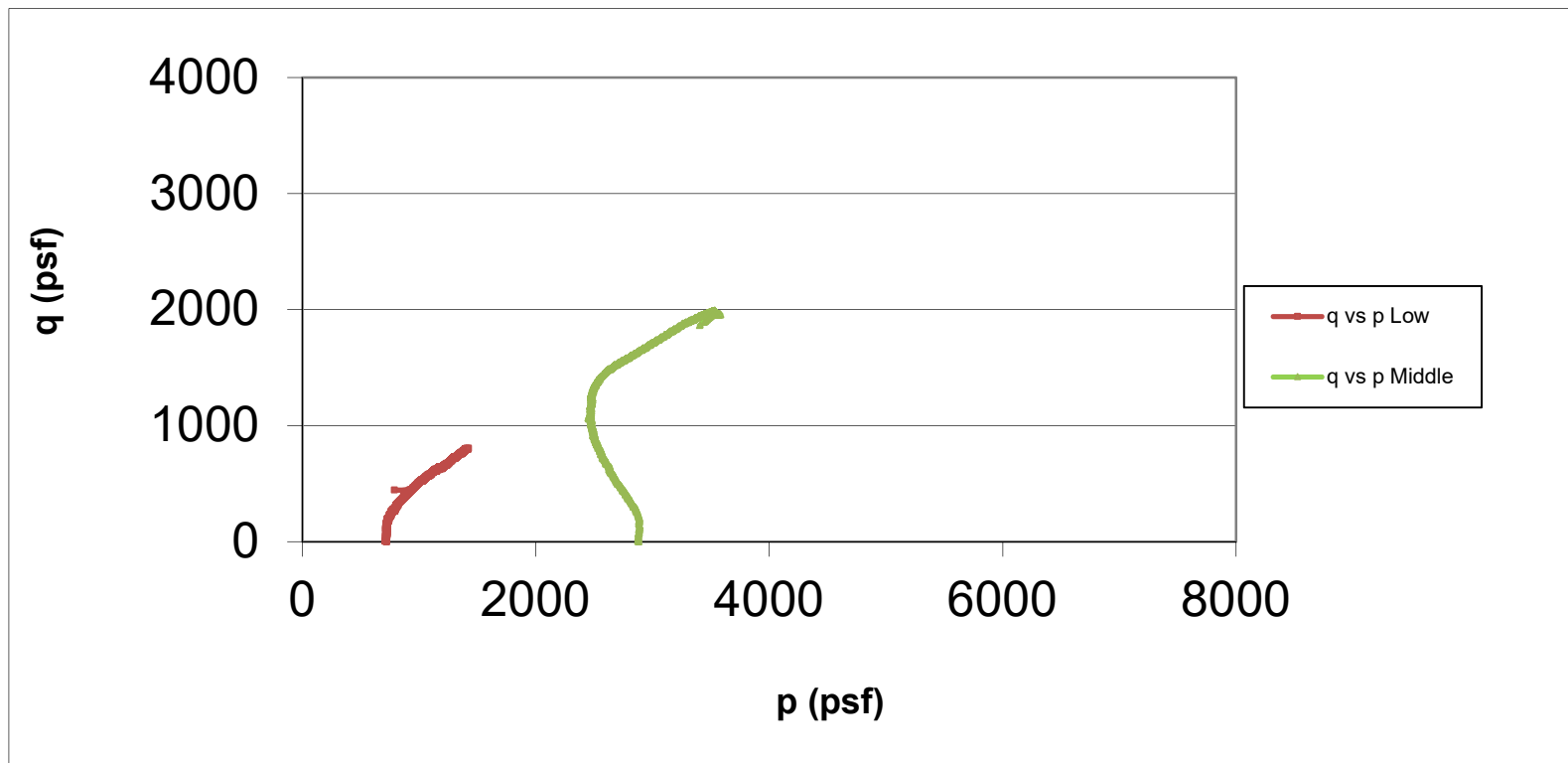
Middle

LOCATION: Athens & Meigs County, Ohio

720

2880

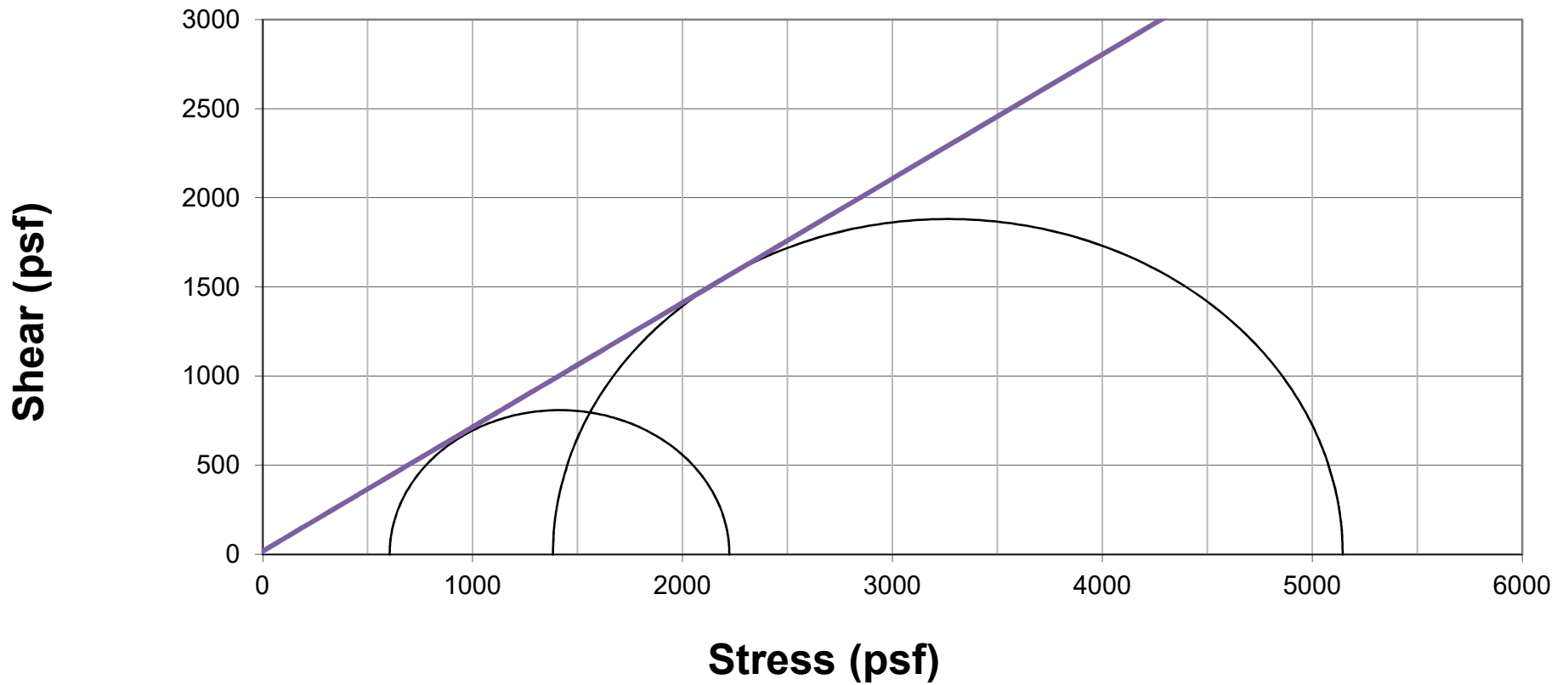
PROJECT #: 23050059COL



Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

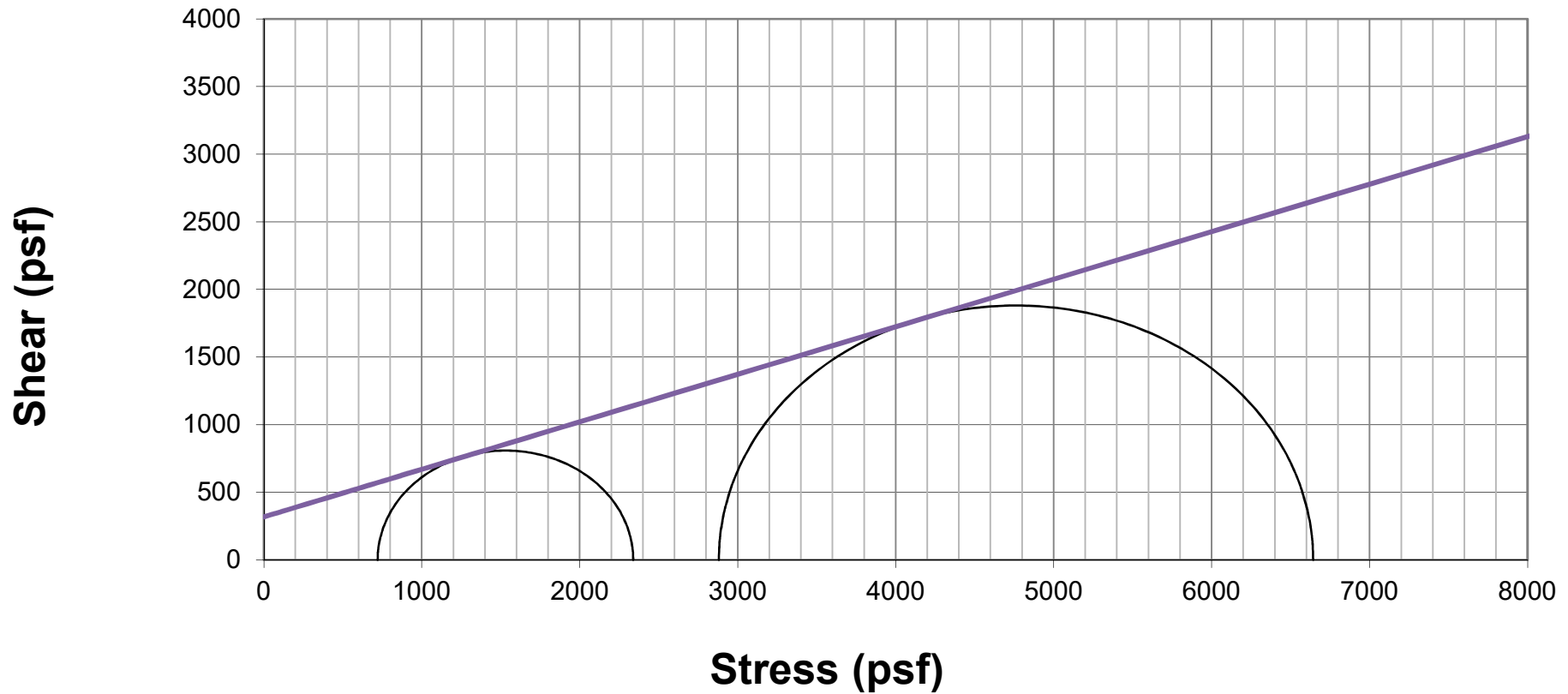
Sample ID: B-034-0A-23, ST, 1'-3'
Confining Pressure (psf): 720 2880
Cohesion(psf): 0
Angle of Friction(°): 34.5



Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-034-0A-23, ST, 1'-3'
Confining Pressure (psf): 720 2880
Cohesion (psf): 300
Angle of Friction(°): 19



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
PID NO. 119142
Project: ATH/MEG-033-23.23/0.00
Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'

Lab Code No. NA
Reviewed by: SM

Sample Type	Undisturbed		
	Date Set-up:	12/15/2023	12/15/2023
Date Sheared:	12/21/2023	12/21/2023	12/21/2023
Avg. Sample Height (in.):	5.7390	5.7467	5.7820
Avg. Sample Diameter (in.):	2.8600	2.8600	2.8750
Height-to-diameter ratio:	2.01	2.01	2.01
Wet Density (pcf):	135.5	134.6	133.0
Dry Density (pcf):	118.9	110.5	114.6
Void Ratio:	0.417	0.525	0.470
Specific Gravity (assumed):	2.7	2.7	2.7
Moisture Content (%):	14.0	21.8	16.0
Cross Sectional Area (ft ²):	0.045	0.045	0.045
Volume (ft ³):	0.02	0.02	0.02
Confining Pressure (psf):	360	1080	2160
Rate of Axial Strain (%/min):	0.2091	0.2088	0.2075
Compressive Strength (psf):	1129		3224
Minor Principal Stress at Failure (psf):	360		2160
Major Principal Stress at Failure (psf):	1489		5384
Failure Criterion (%):	Point of Maximum Obliquity		
β:	0.97	0.87	0.96
Specimen Saturation:	Wet Method		

Grading (ASTM D422)

% Agg:	2
% Sand:	41
% Silt:	21
% Clay:	36

Atterberg Limits (ASTM D 4318)

L.L.:	28
P.L.:	17
P.I.:	11

Visual Classification: Brown, Silt and Clay (A-6a)

POST SHEAR
360 psf



POST SHEAR
1080 psf



POST SHEAR
2160 psf

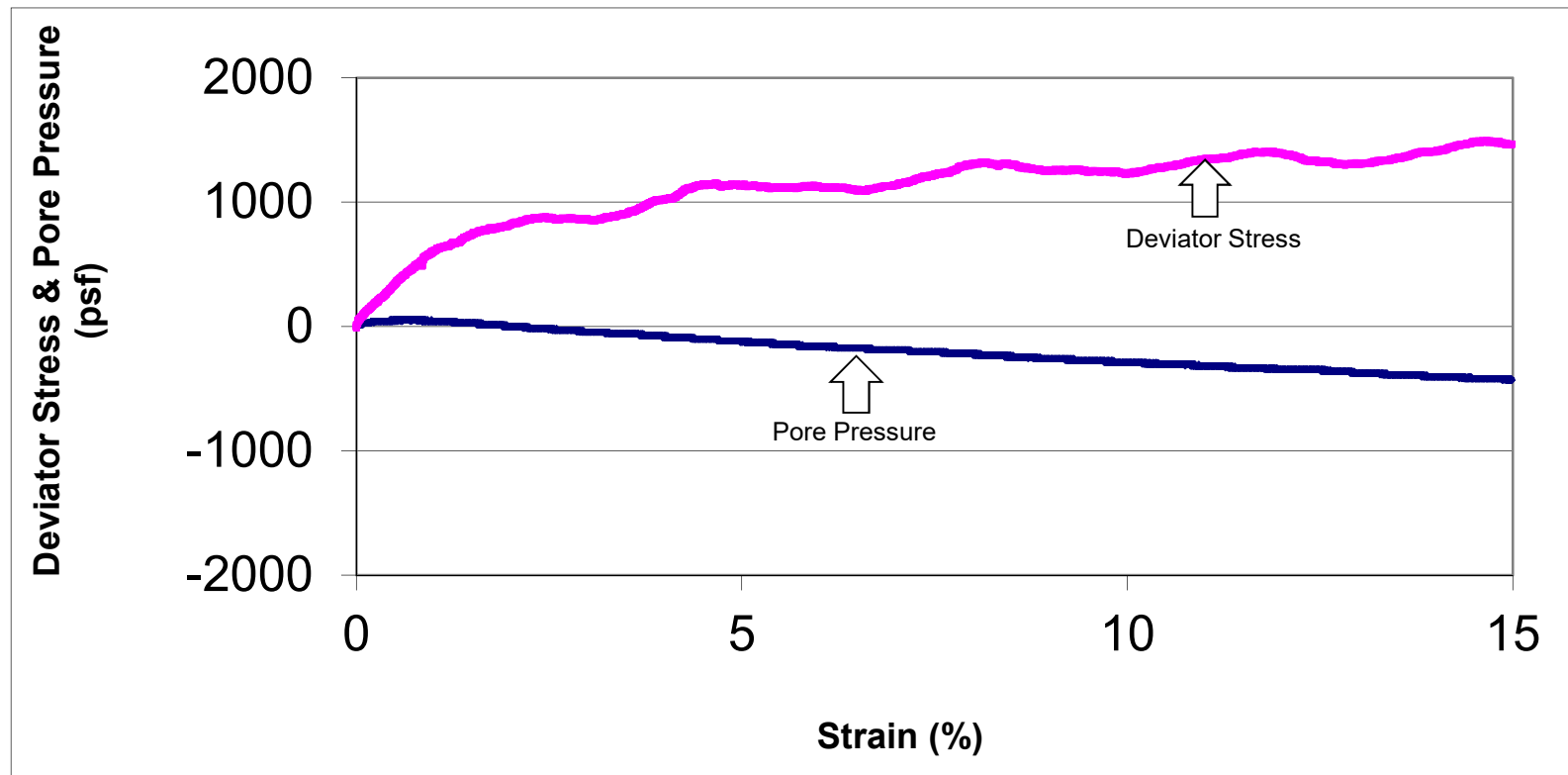


Due to the presence of rock pieces, the data from 1080 psf point was not utilized while developing the Mohr Circle - Effective and Total Stress plots

Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

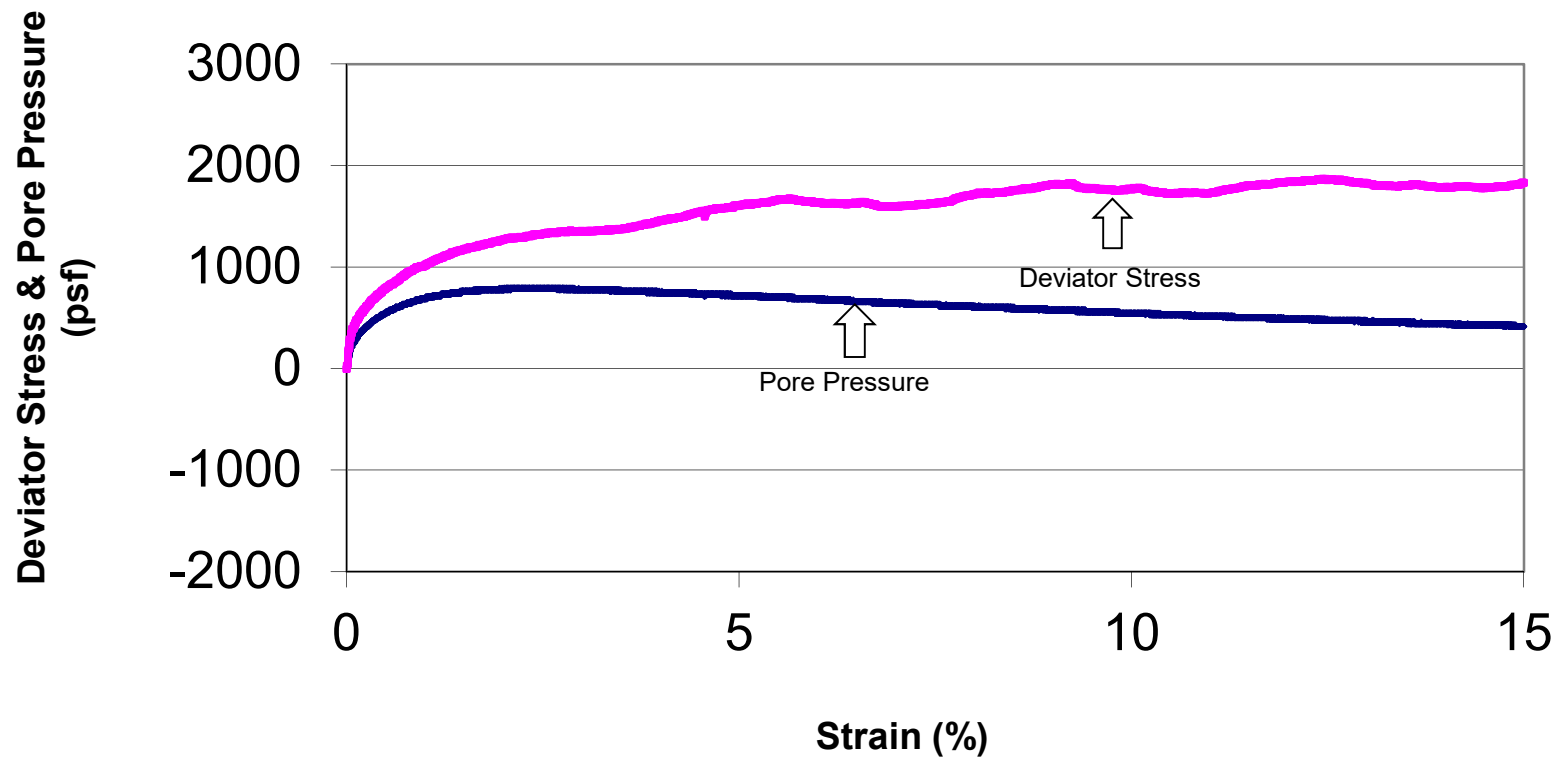
Sample ID: B-040-0-23, ST-2, 3'-5'
Confining Pressure (psf): 360



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

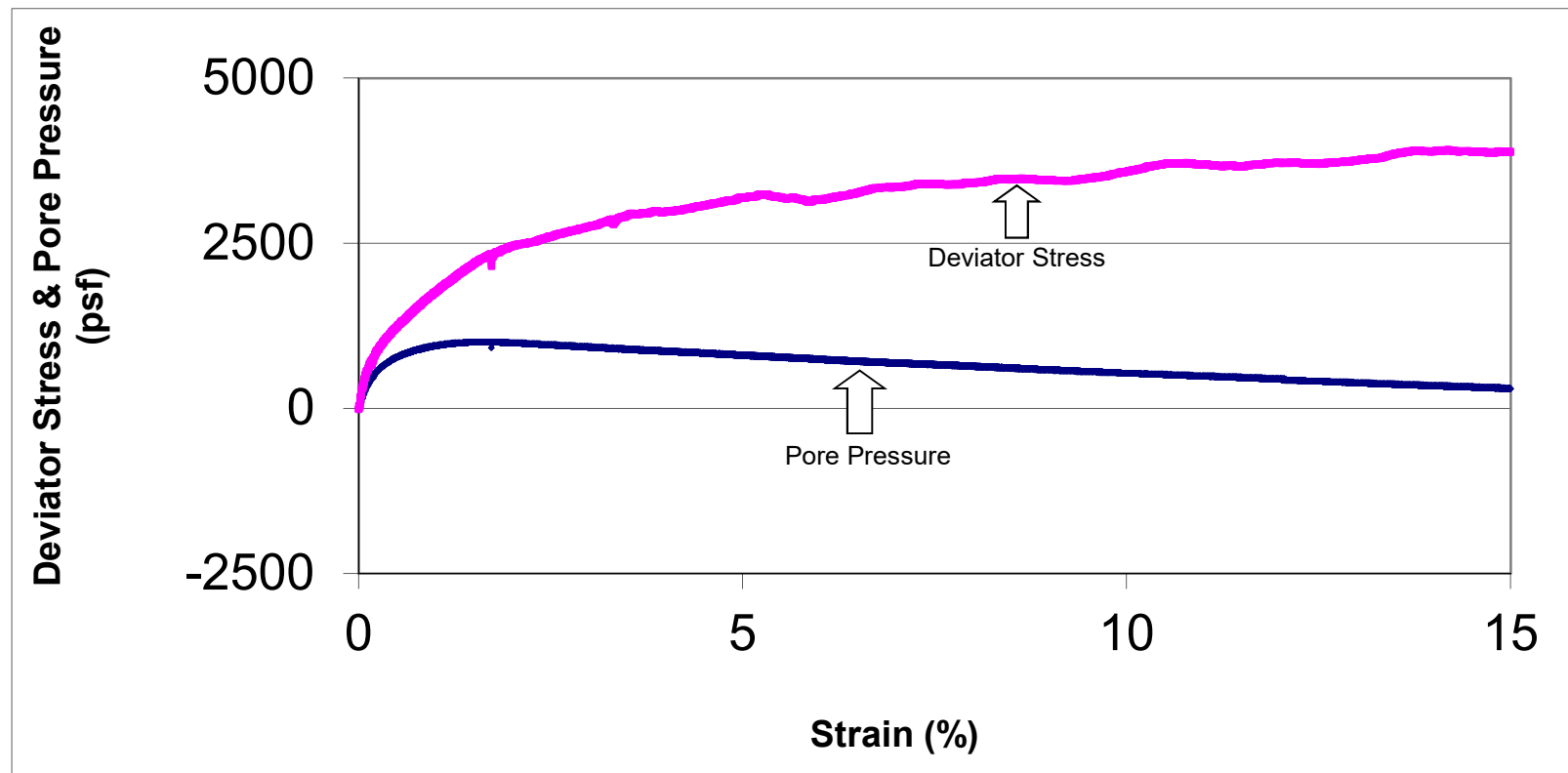
Sample ID: B-040-0-23, ST-2, 3'-5'
Confining Pressure (psf): 1080



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'
Confining Pressure (psf): 2160



q vs. p

CLIENT: HNTB Ohio, Inc

Sample ID:

B-040-0-23, ST-2, 3'-5'

PROJECT: ATH/MEG-033-23.23/0.00

LOCATION: Athens & Meigs County, Ohio

Confining Pressure (psf):

Low

Middle

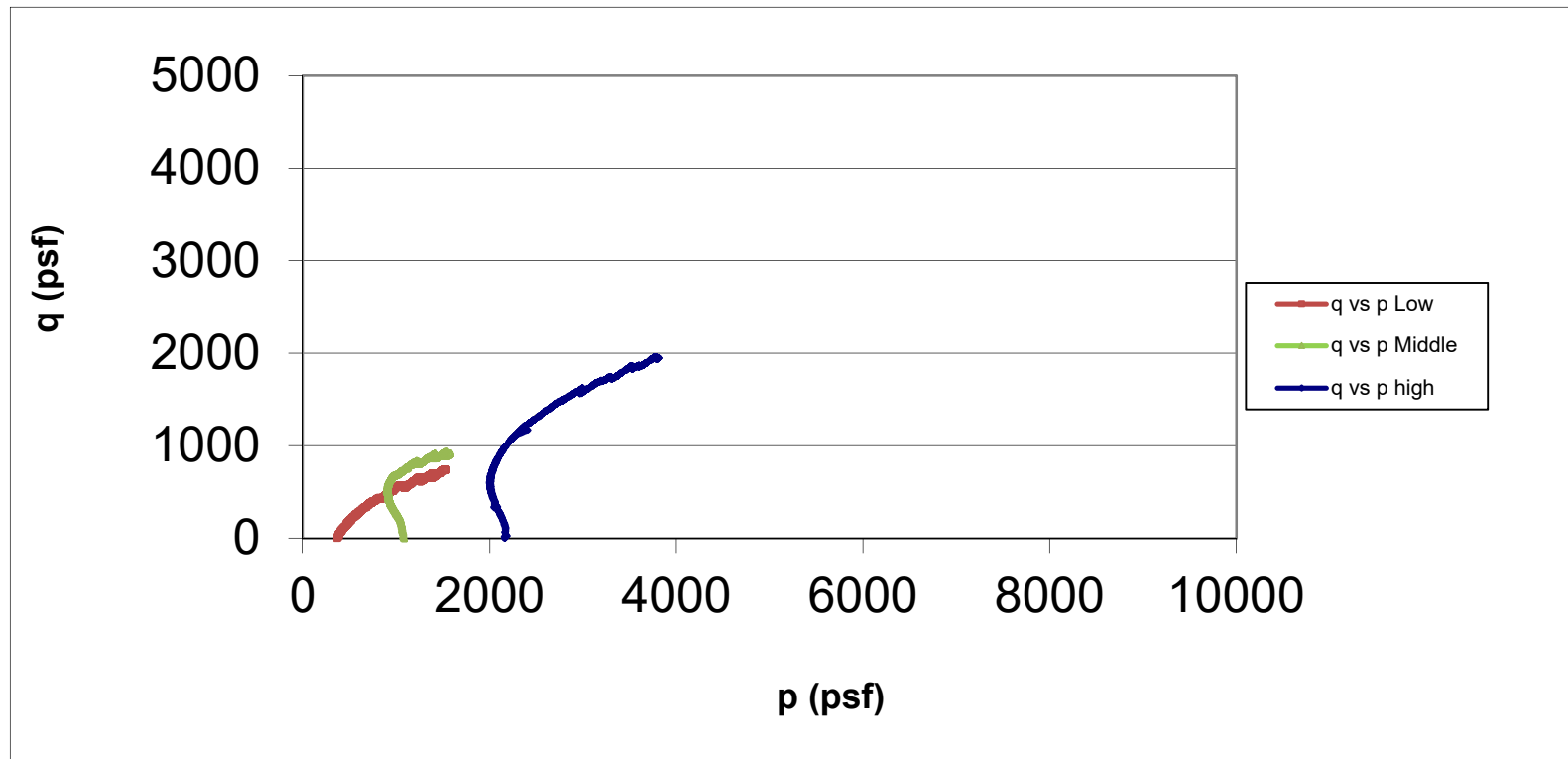
High

PROJECT #: 23050059COL

360

1080

2160

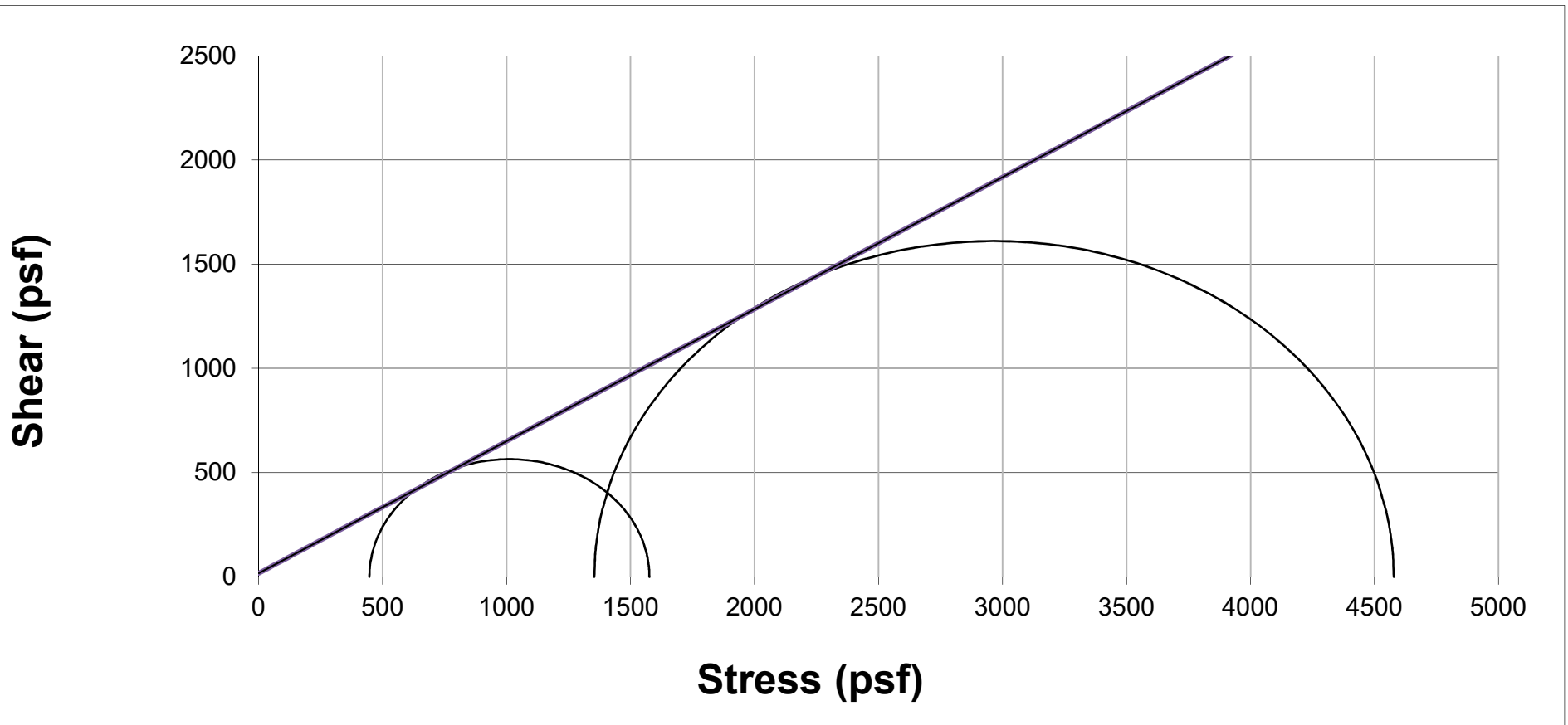


Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'

Confining Pressure (psf): 360 2160
Cohesion(psf): 15
Angle of Friction(°): 32

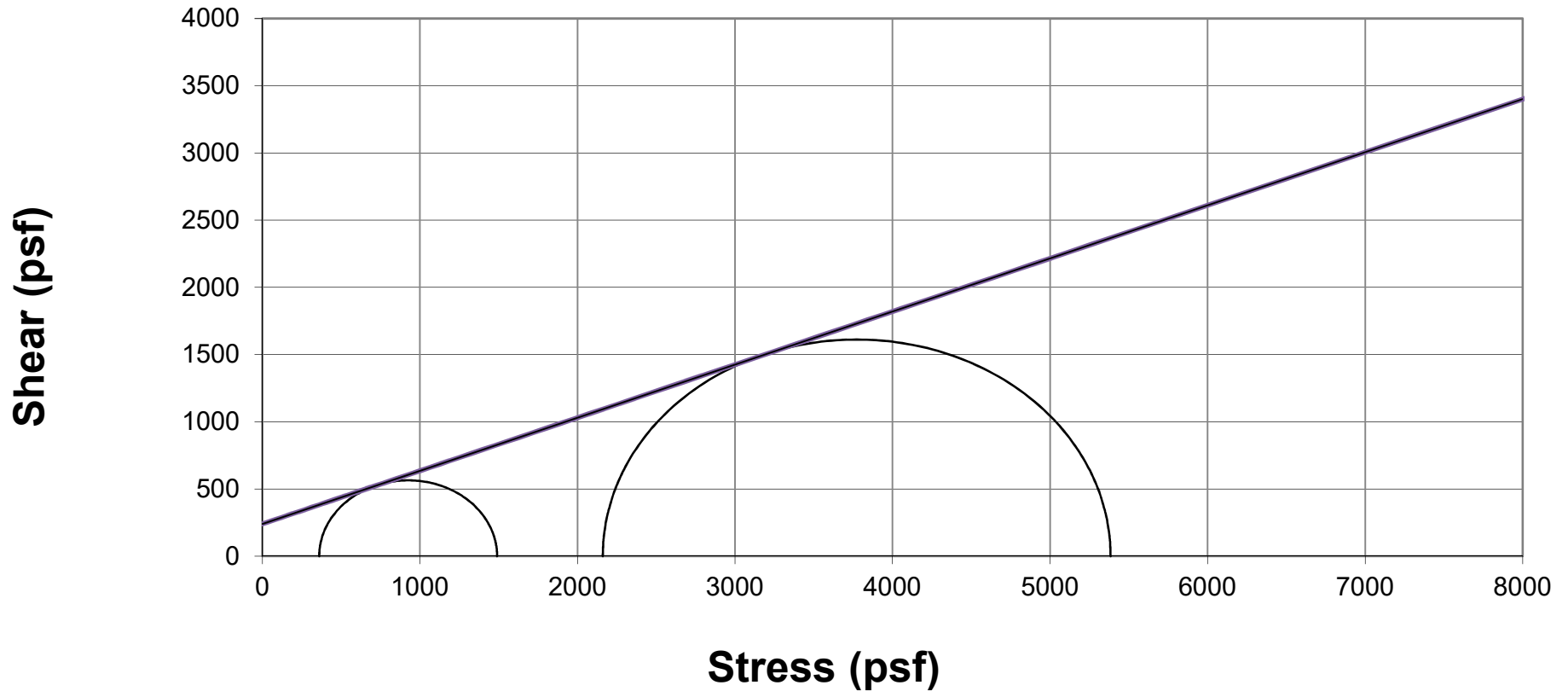


Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-040-0-23, ST-2, 3'-5'

Confining Pressure (psf): 360 2160
Cohesion (psf): 240
Angle of Friction(°): 21.5



**CONSOLIDATED UNDRAINED TRIAXIAL TEST ON COHESIVE SOILS
AASHTO T 297 & ASTM D4767**

CTL ENGINEERING, INC.

2860 Fisher Road Columbus, Ohio 43204

Client: HNTB Ohio, Inc
PID NO. 119142
Project: ATH/MEG-033-23.23/0.00
Location: Athens & Meigs County, Ohio

Project No. 23050059COL

Sample ID: B-041-0A-23, ST, 3'-5'

Lab Code No. NA
Reviewed by: SM

Sample Type	Undisturbed		
	Date Set-up:	2/6/2024	2/6/2024
Date Sheared:	2/9/2024	2/9/2024	2/9/2024
Avg. Sample Height (in.):	5.7903	5.7773	5.7883
Avg. Sample Diameter (in.):	2.8750	2.8800	2.8750
Height-to-diameter ratio:	2.01	2.01	2.01
Wet Density (pcf):	131.3	134.5	122.2
Dry Density (pcf):	113.6	114.7	97.4
Void Ratio:	0.483	0.469	0.730
Specific Gravity (assumed):	2.7	2.7	2.7
Moisture Content (%):	15.6	17.3	25.5
Cross Sectional Area (ft ²):	0.045	0.045	0.045
Volume (ft ³):	0.02	0.02	0.02
Confining Pressure (psf):	1440	2880	4320
Rate of Axial Strain (%/min):	0.2072	0.2077	0.2073
Compressive Strength (psf):	3584	6544	6123
Minor Principal Stress at Failure (psf):	1440	2880	4320
Major Principal Stress at Failure (psf):	5024	9424	10443
Failure Criterion (%):	Point of Maximum Obliquity		
β:	0.97	0.95	0.99
Specimen Saturation:	Wet Method		

Grading (ASTM D422)

% Agg:	1
% Sand:	40
% Silt:	39
% Clay:	20

Atterberg Limits (ASTM D 4318)

L.L.:	28
P.L.:	21
P.I.:	7

Visual Classification: Brown, Sandy Silt (A-4a)

POST SHEAR

1440 psf



POST SHEAR

2880 psf



POST SHEAR

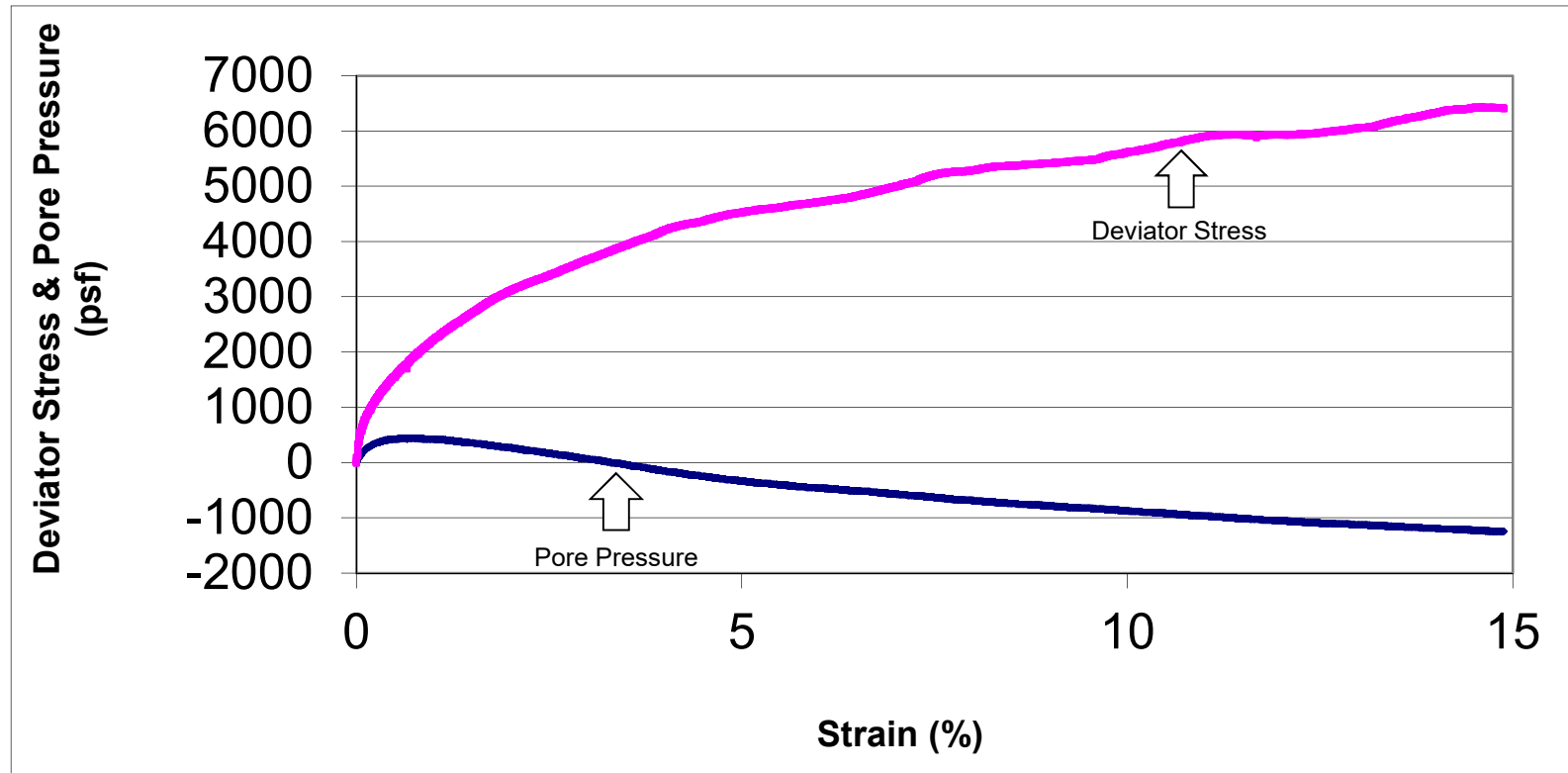
4320 psf



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

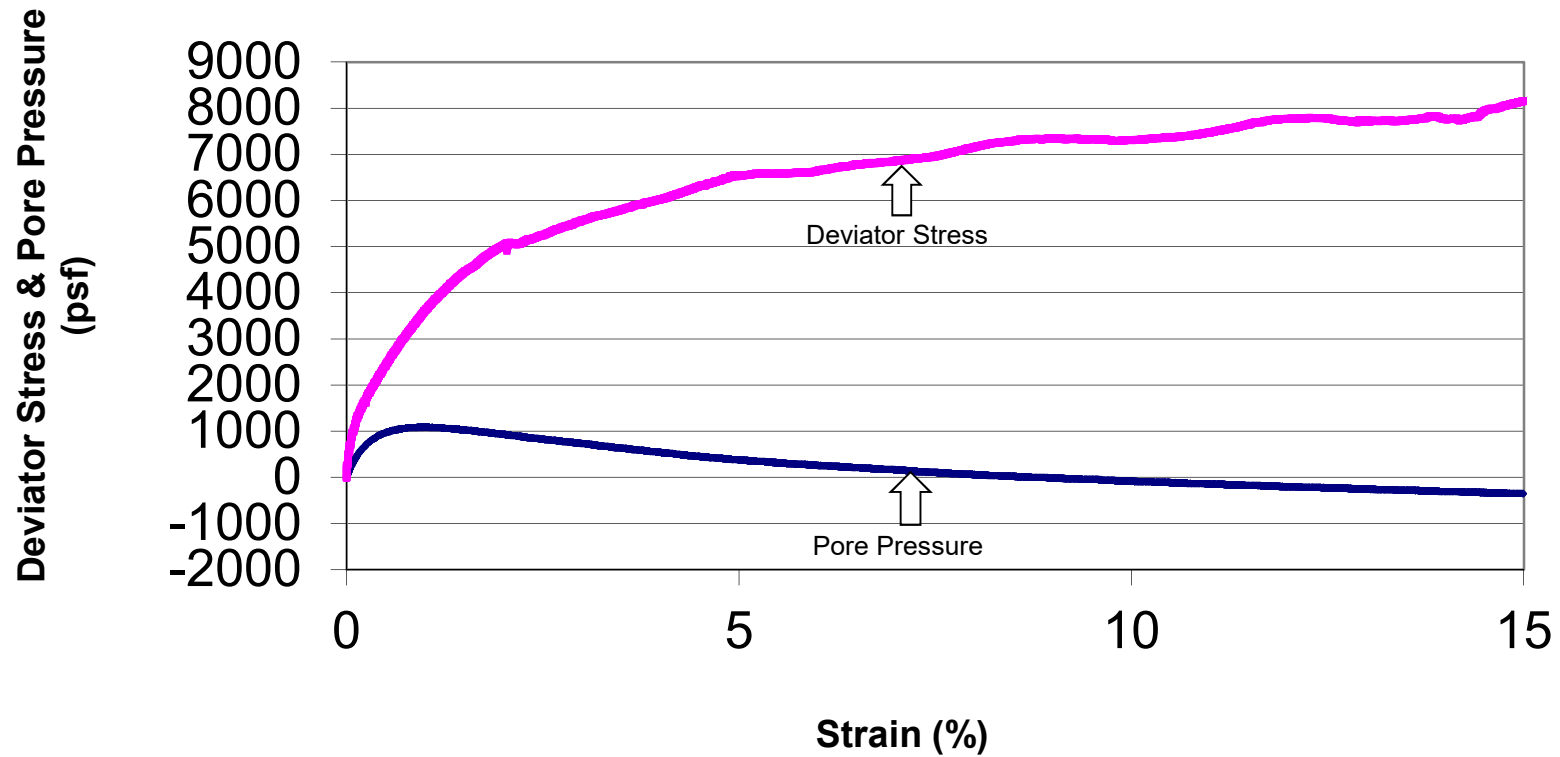
Sample ID: B-041-0A-23, ST, 3'-5'
Confining Pressure (psf): 1440



Deviator Stress & Pore Pressure vs. Strain

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

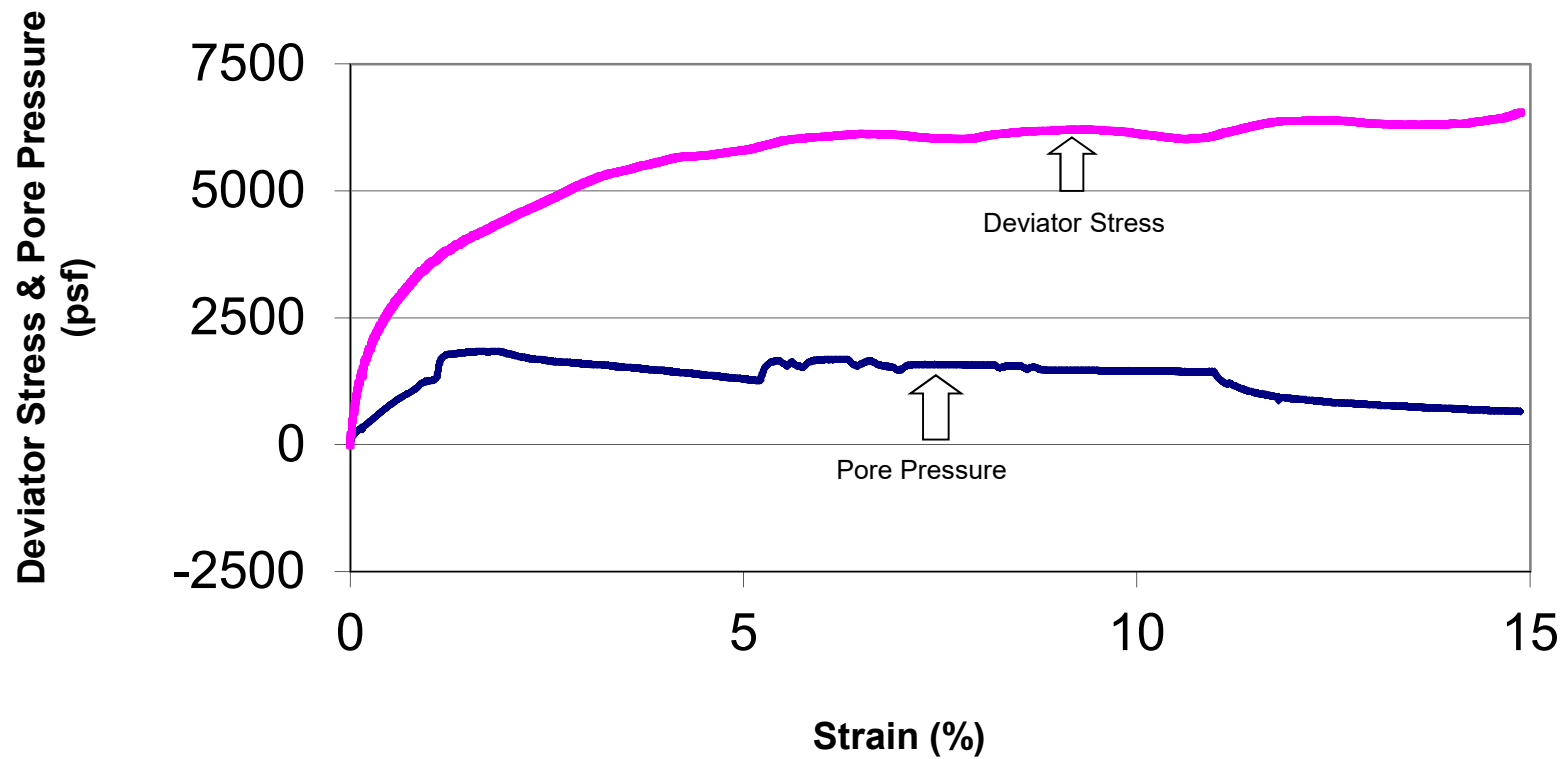
Sample ID: B-041-0A-23, ST, 3'-5'
Confining Pressure (psf): 2880



Deviator Stress & Pore Pressure vs. Strain

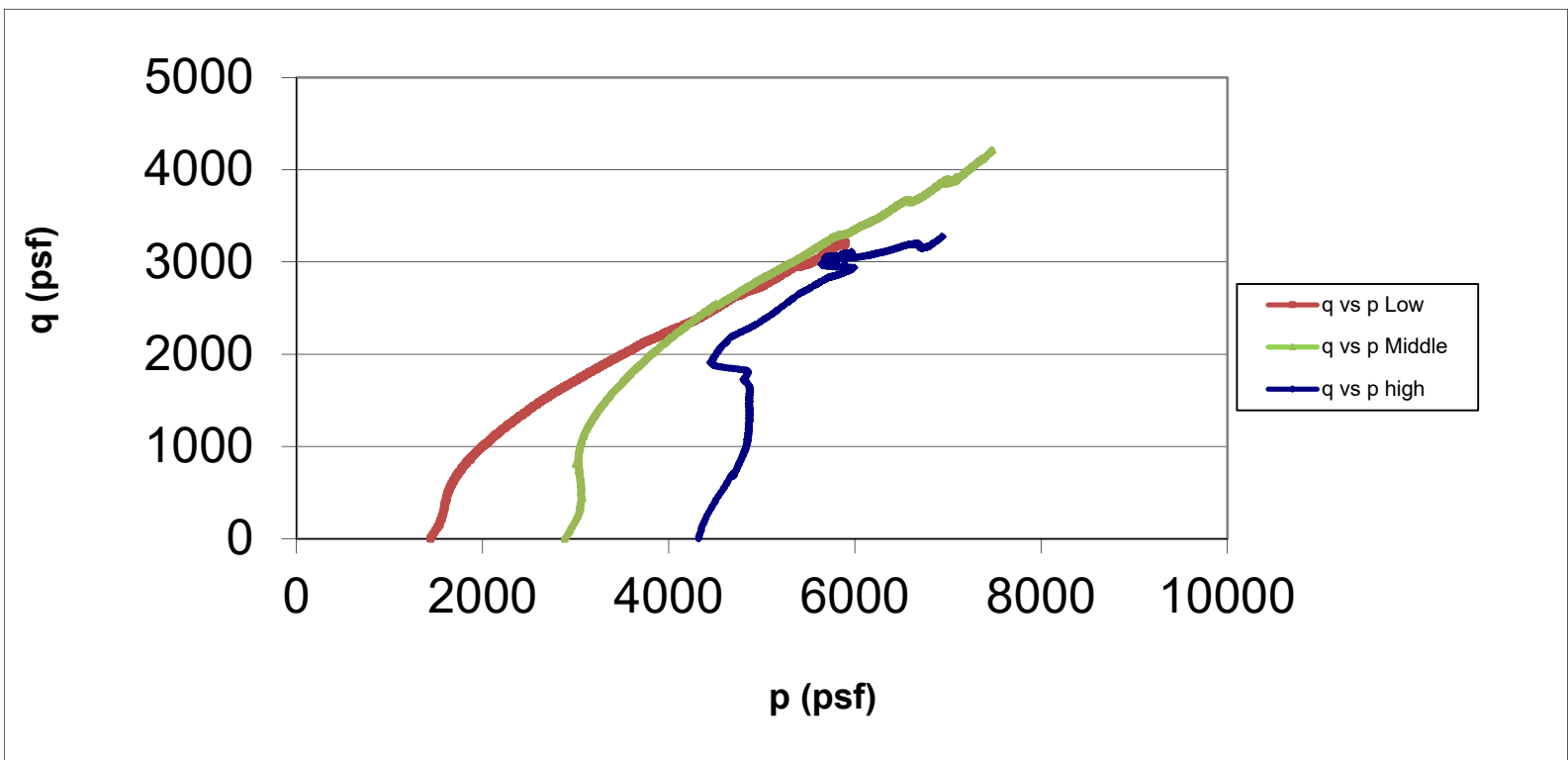
CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-041-0A-23, ST, 3'-5'
Confining Pressure (psf): 4320



q vs. p

CLIENT:	HNTB Ohio, Inc	Sample ID:	B-041-0A-23, ST, 3'-5'		
PROJECT:	ATH/MEG-033-23.23/0.00				
LOCATION:	Athens & Meigs County, Ohio	Confining Pressure (psf):	Low	Middle	High
PROJECT #:	23050059COL		1440	2880	4320

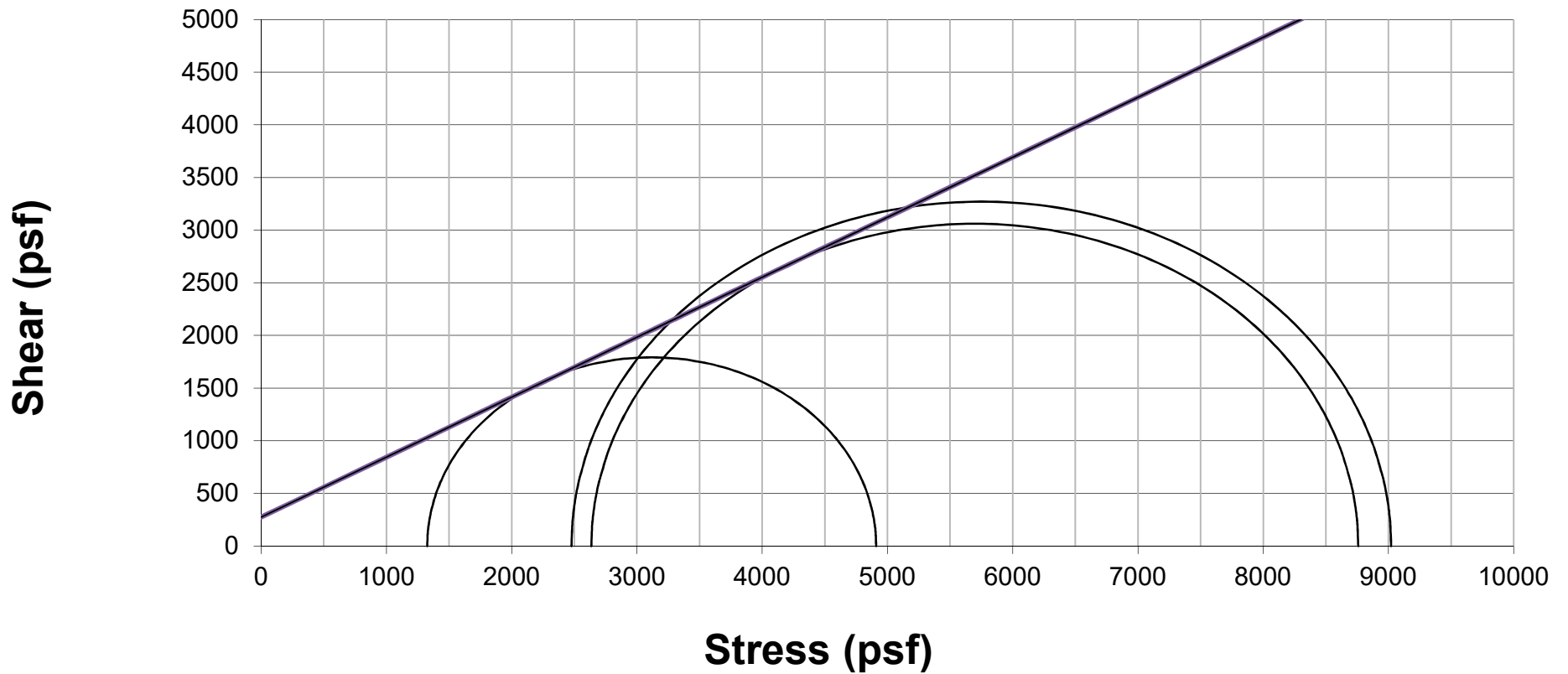


Mohr Circle Effective Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-041-0A-23, ST, 3'-5'

Confining Pressure (psf):	1440	2880	4320
Cohesion (psf):	275		
Angle of Friction(°):	29		

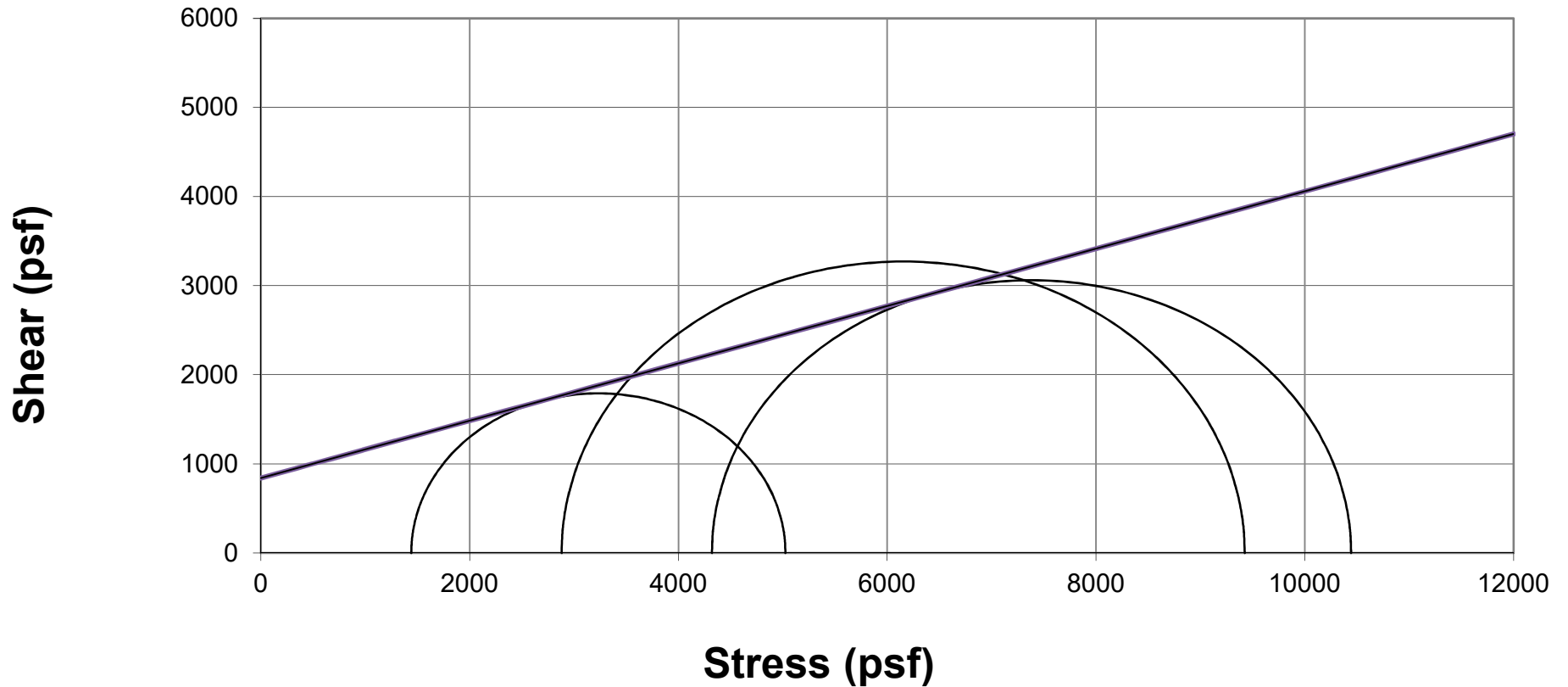


Mohr Circle Total Stress

CLIENT: HNTB Ohio, Inc
PROJECT: ATH/MEG-033-23.23/0.00
LOCATION: Athens & Meigs County, Ohio
PROJECT #: 23050059COL

Sample ID: B-041-0A-23, ST, 3'-5'

Confining Pressure (psf): 1440 2880 4320
Cohesion(psf): 840
Angle of Friction(°): 18.0



One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.:	23050059COL	Sample Type:	Undisturbed Specimen
Project:	ATH/MEG-033-23.23/0.00	Test Date:	1/19/2024
Client:	HNTB Ohio, Inc	Checked By:	SM
Boring No.:	B-025-0A-23	Tested By:	MW
Sample No.:	ST-1		

Soil Description:	Brown Clay (A-7-6)	LL:	42
Specific Gravity:	2.659	PL:	25
Initial Dry Unit Weight	113.5 pcf	Initial Moisture	18.0%

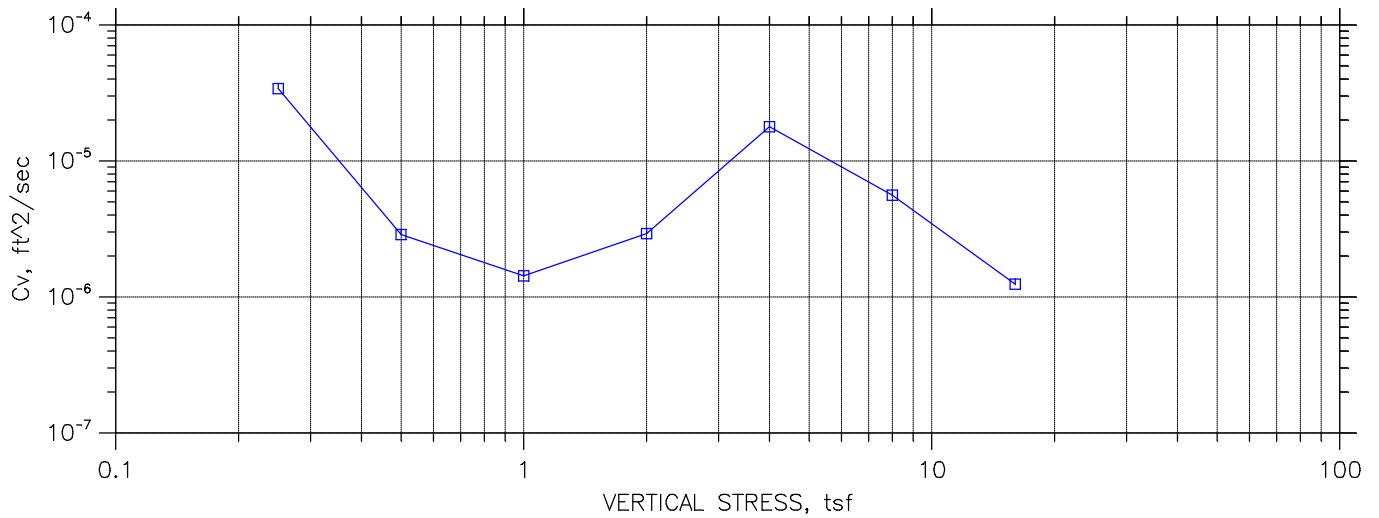
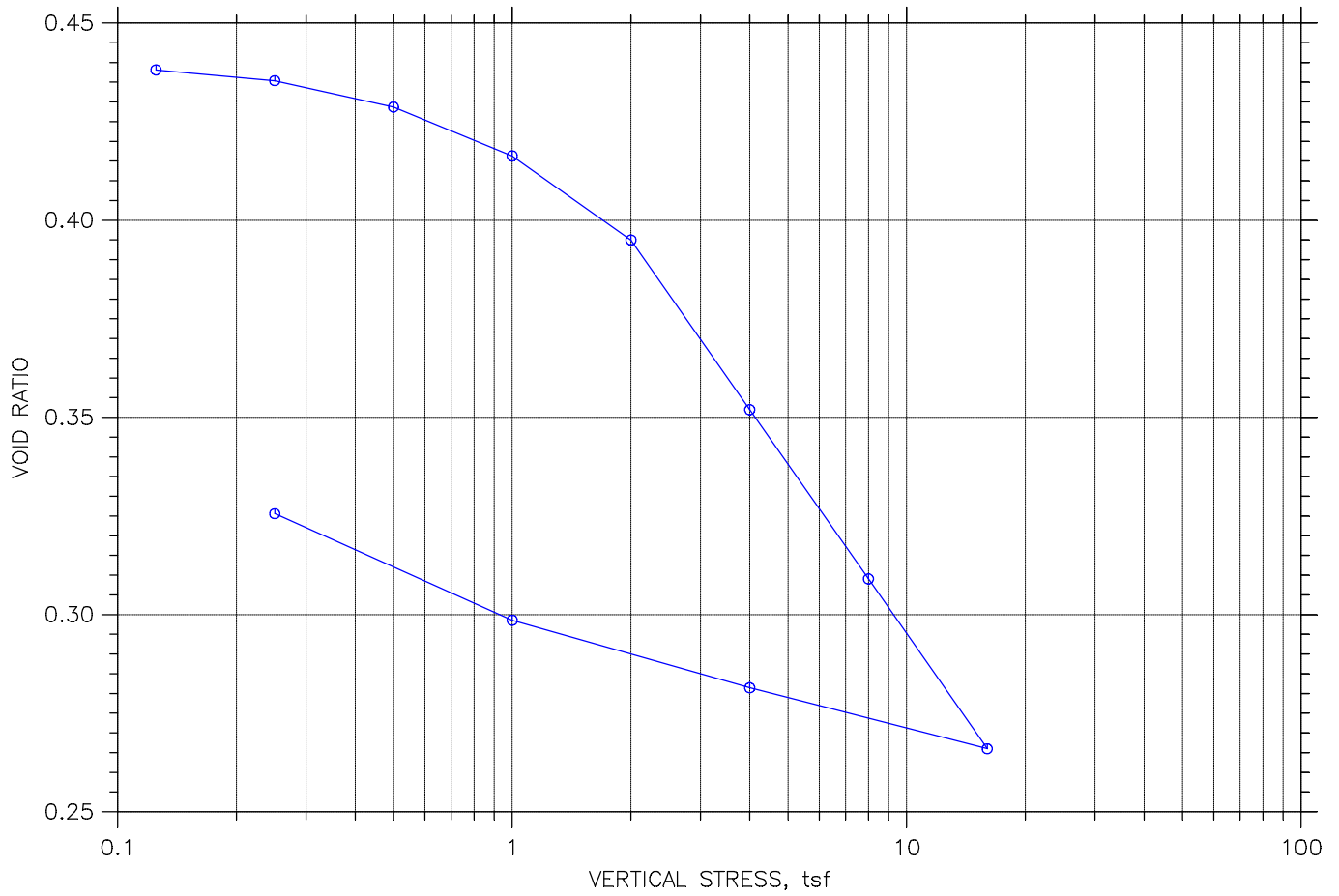
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	0.0009058	0.438	0.09	0	0.00E+00
2	0.25	0.002814	0.435	0.28	0.6	4.25E-05
3	0.5	0.007473	0.429	0.75	8.5	2.88E-06
4	1	0.01611	0.416	1.61	14.6	1.65E-06
5	2	0.03096	0.395	3.09	8.3	2.83E-06
6	4	0.06095	0.352	6.08	1.1	2.08E-05
7	8	0.09084	0.309	9.06	4.9	4.29E-06
8	16	0.1209	0.266	12.05	18.3	1.08E-06
9	4	0.1101	0.281	10.98	4.1	4.68E-06
10	1	0.09815	0.299	9.79	27.7	7.17E-07
11	0.25	0.07932	0.326	7.91	111.1	1.85E-07

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 1.70	Initial Void Ratio: 0.44
Compression Index (C _c): 0.14	Compression Ratio : 0.10
Recompression Index (C _r): 0.025	Recompression Ratio: 0.017



CONSOLIDATION TEST DATA

SUMMARY REPORT



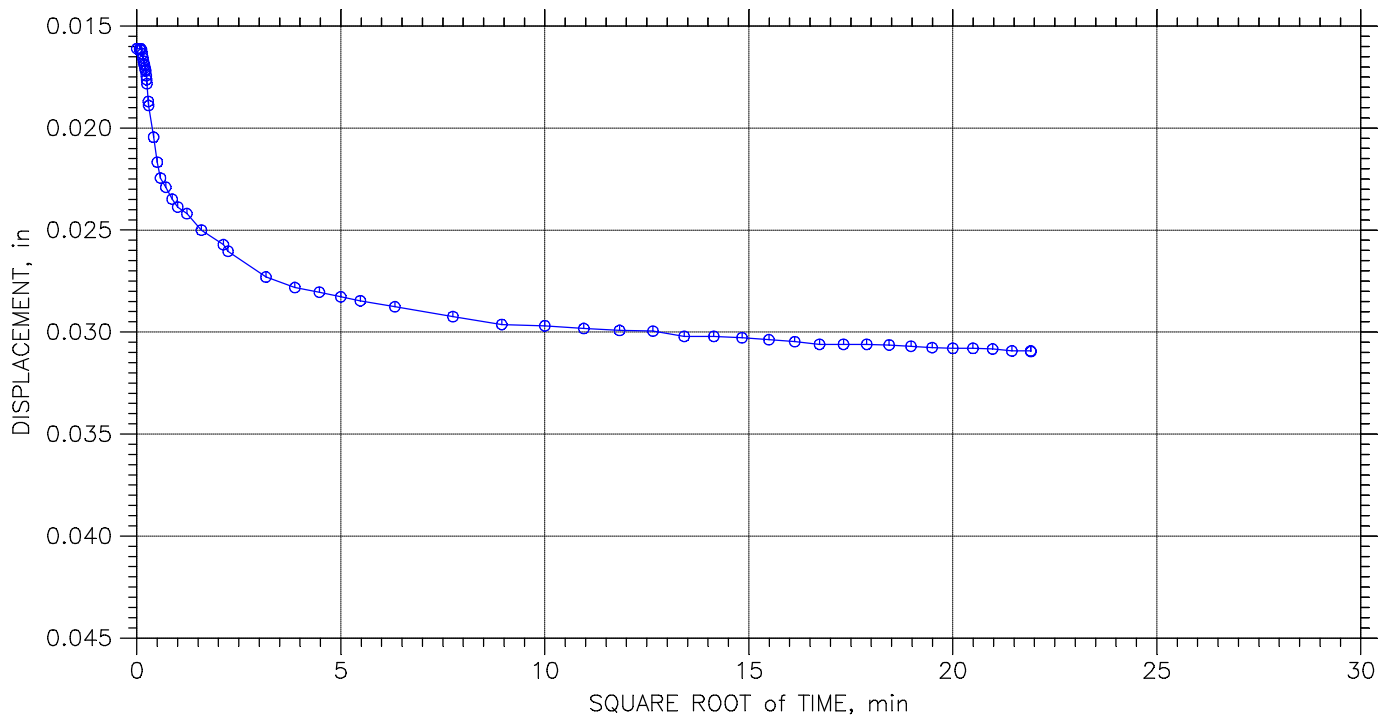
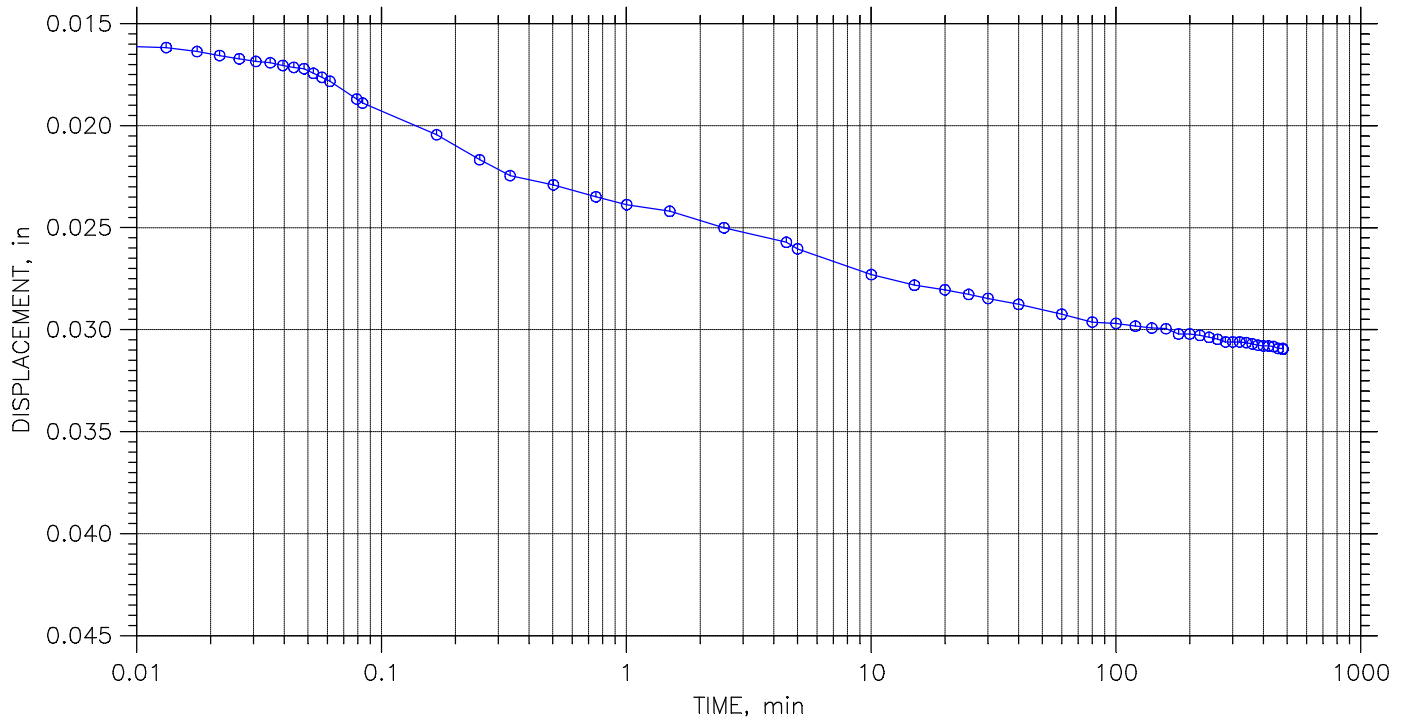
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 5 of 11

Stress: 2. tsf



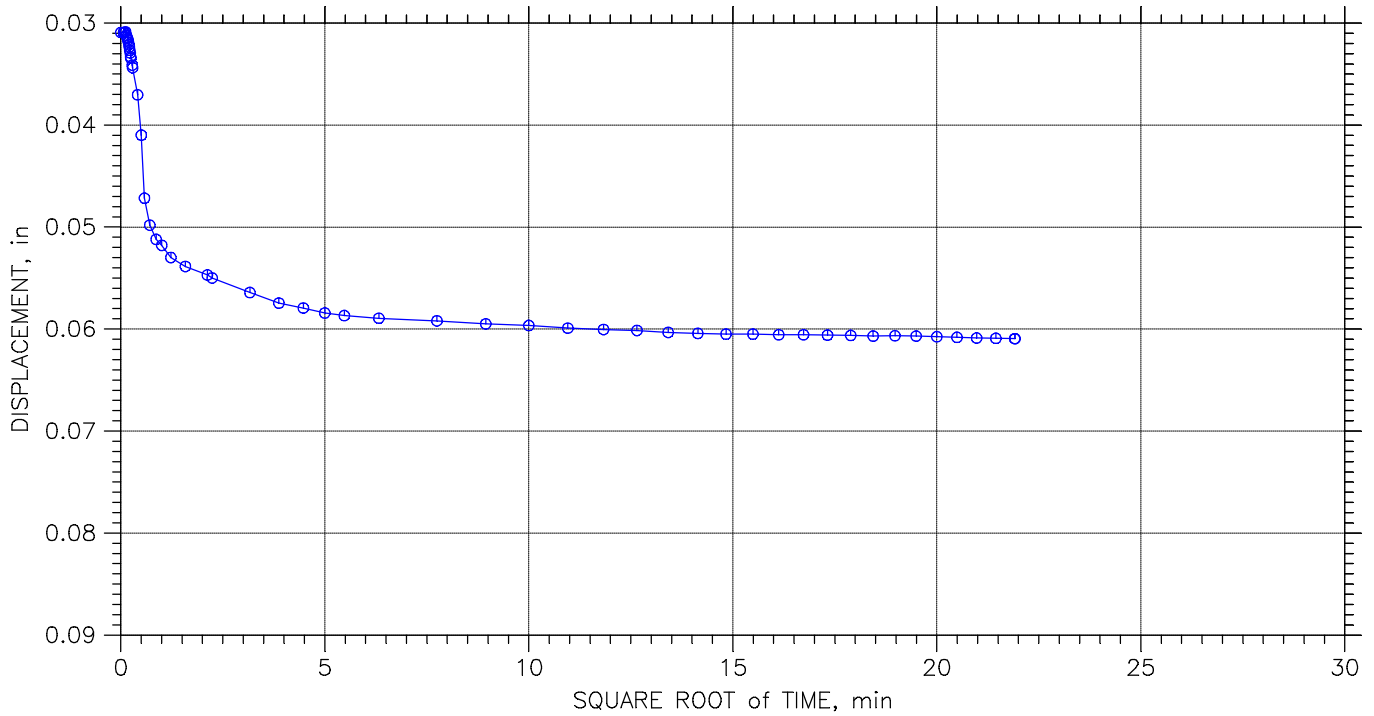
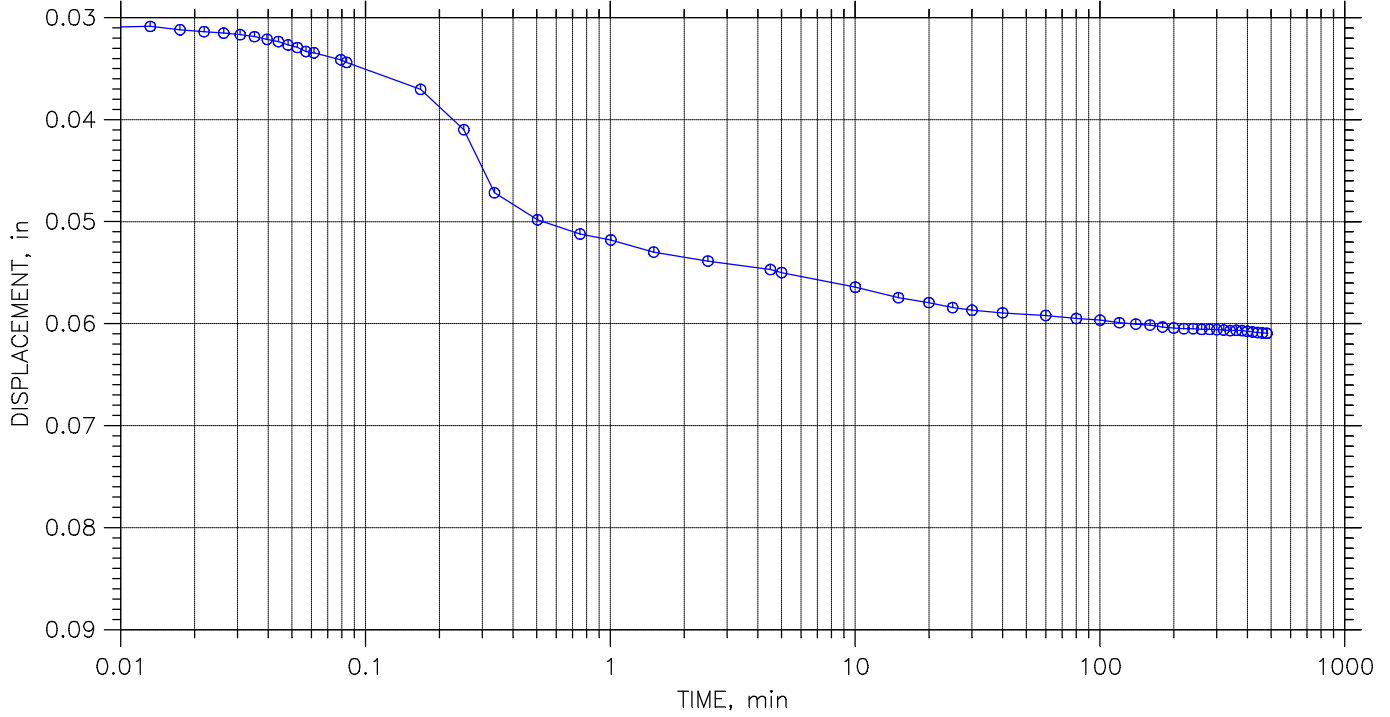
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 6 of 11

Stress: 4. tsf



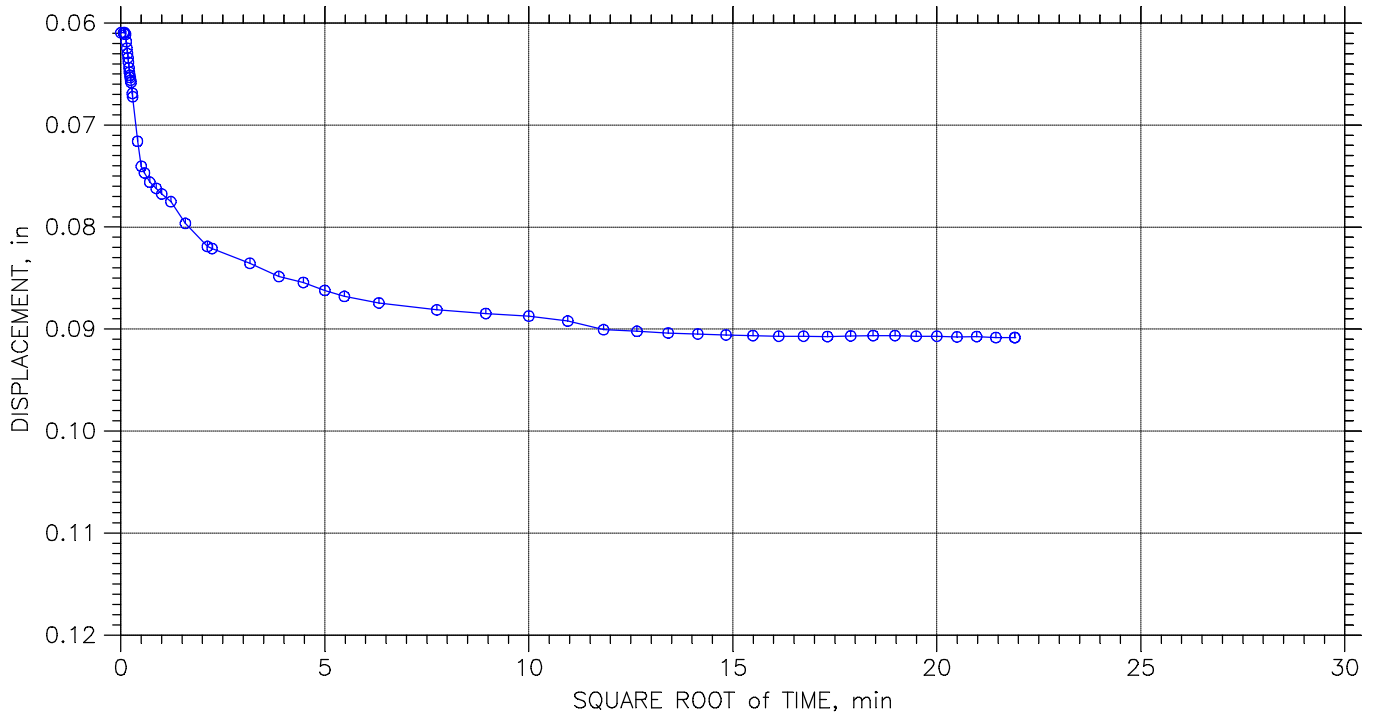
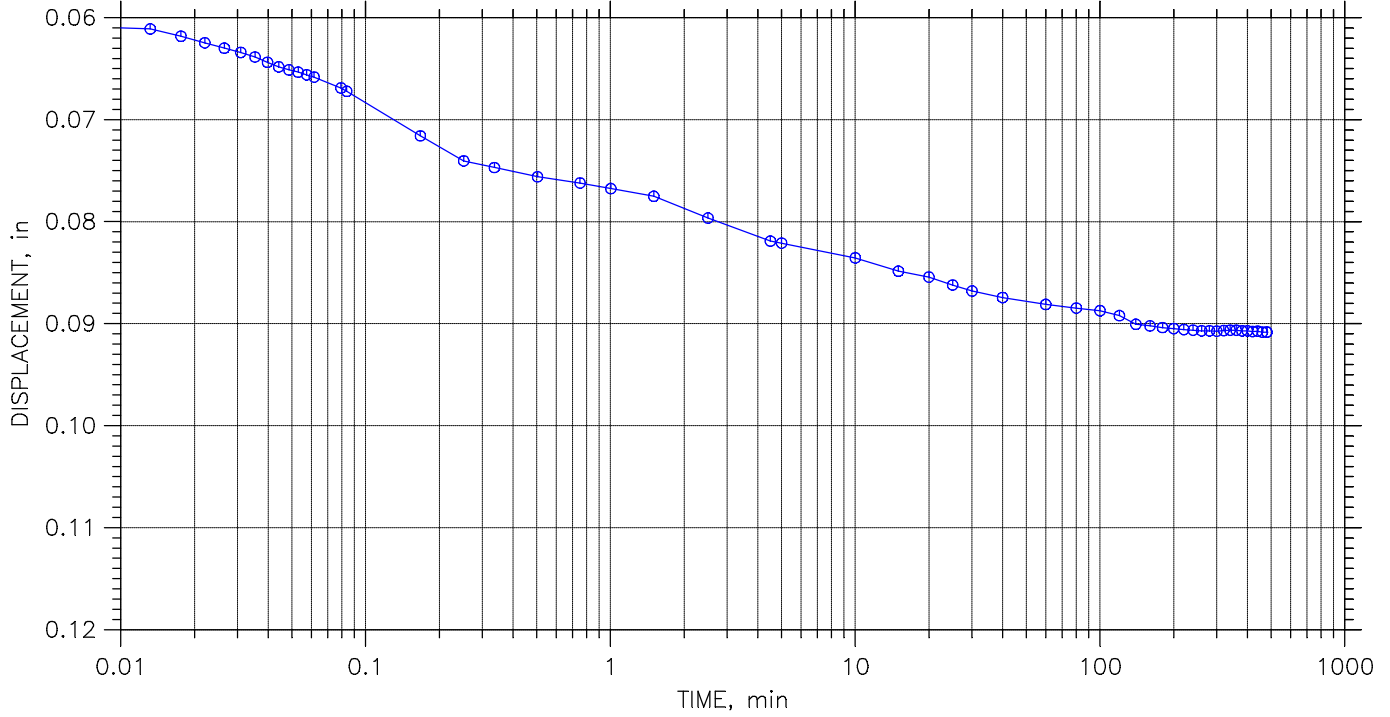
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 7 of 11

Stress: 8. tsf



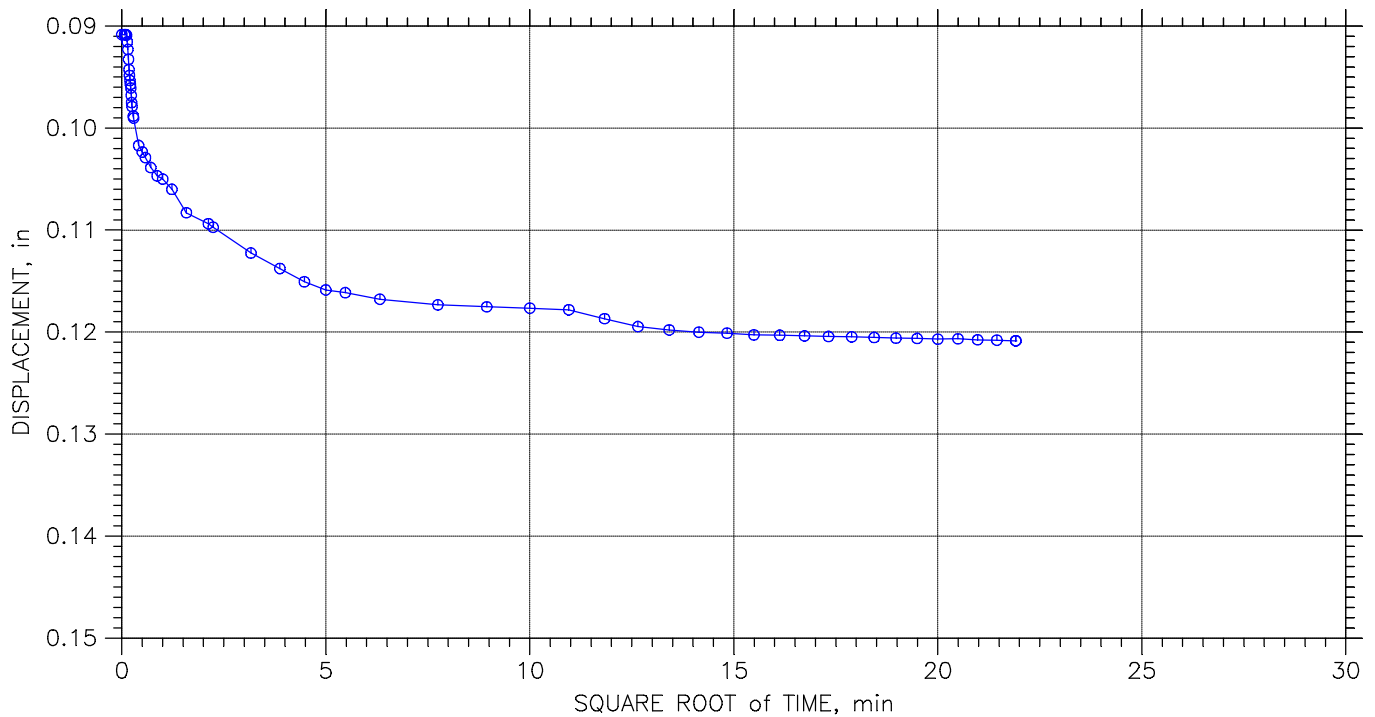
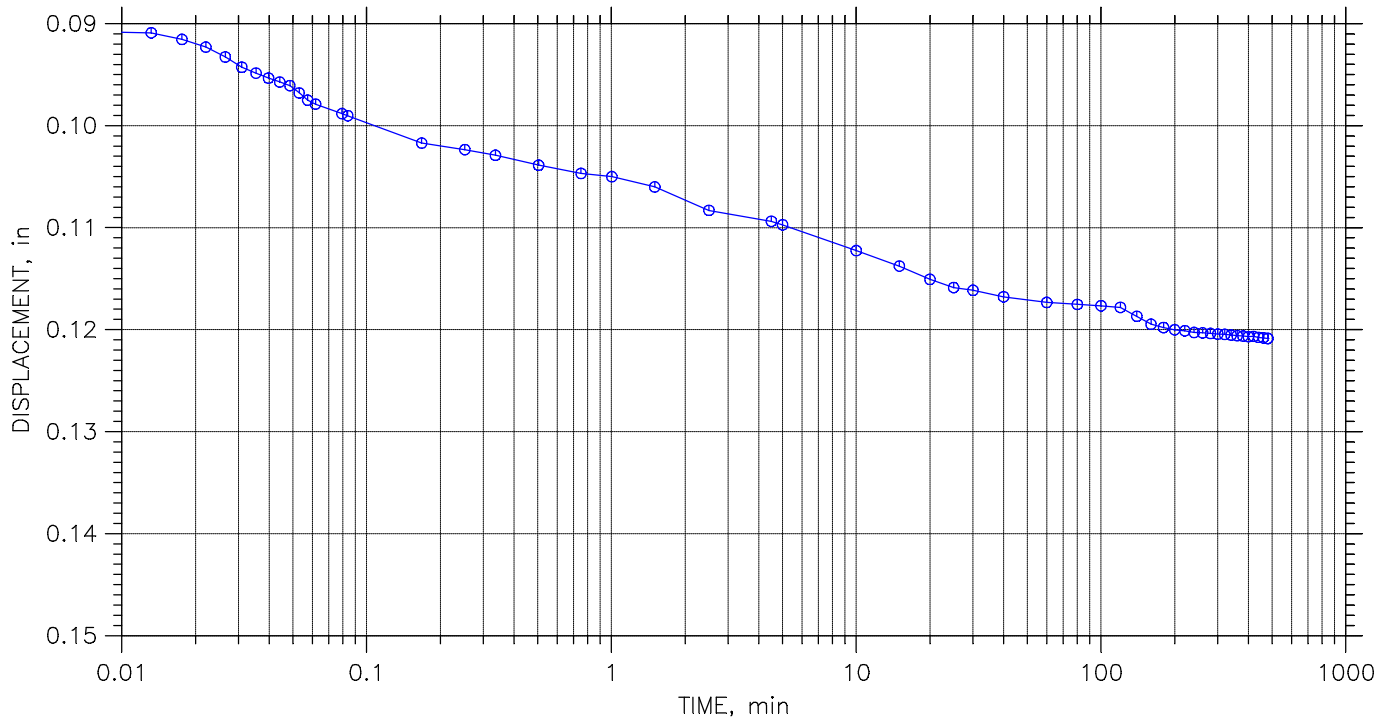
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 8 of 11

Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-025-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 01/19/24	Depth: 2'-4'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.:	23050059COL	Sample Type:	Undisturbed Specimen
Project:	ATH/MEG-033-23.23/0.00	Test Date:	2/13/2024
Client:	HNTB Ohio, Inc	Checked By:	SM
Boring No.:	B-057-0A-23	Tested By:	MW
Sample No.:	ST-1		

Soil Description:	Red Clay (A-7-6)	LL:	53
Specific Gravity:	2.627	PL:	26
Initial Dry Unit Weight	97.0 pcf	Initial Moisture	28.5%

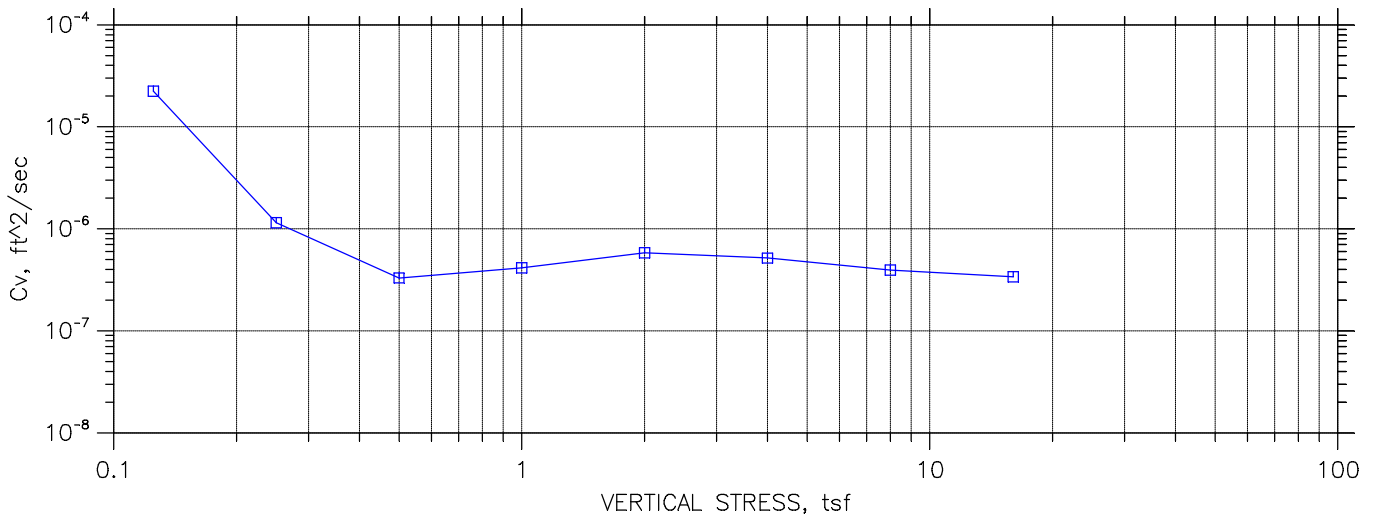
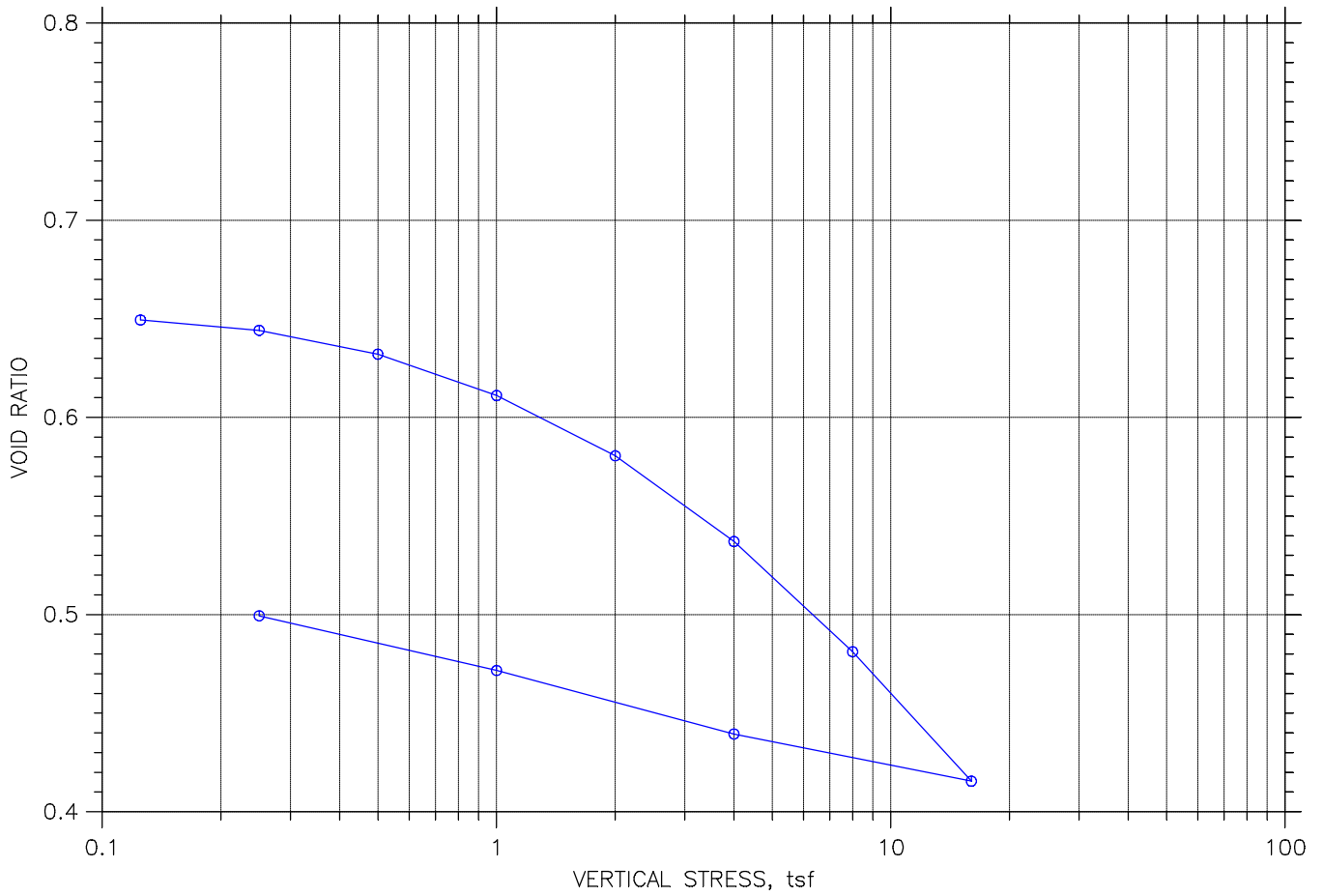
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	0.00207	0.649	0.21	1.5	1.62E-05
2	0.25	0.005241	0.644	0.53	24.9	9.73E-07
3	0.5	0.01255	0.632	1.26	70.8	3.38E-07
4	1	0.02517	0.611	2.52	59.2	3.96E-07
5	2	0.04364	0.581	4.38	39.2	5.80E-07
6	4	0.06984	0.537	7.01	38.9	5.57E-07
7	8	0.1036	0.481	10.39	39.8	5.11E-07
8	16	0.1431	0.416	14.36	38.1	4.92E-07
9	4	0.1287	0.439	12.91	4.3	4.24E-06
10	1	0.1093	0.472	10.96	69.4	2.73E-07
11	0.25	0.09259	0.499	9.29	315.8	6.24E-08

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 1.90	Initial Void Ratio: 0.65
Compression Index (C _c): 0.22	Compression Ratio : 0.13
Recompression Index (C _r): 0.038	Recompression Ratio: 0.023



CONSOLIDATION TEST DATA

SUMMARY REPORT



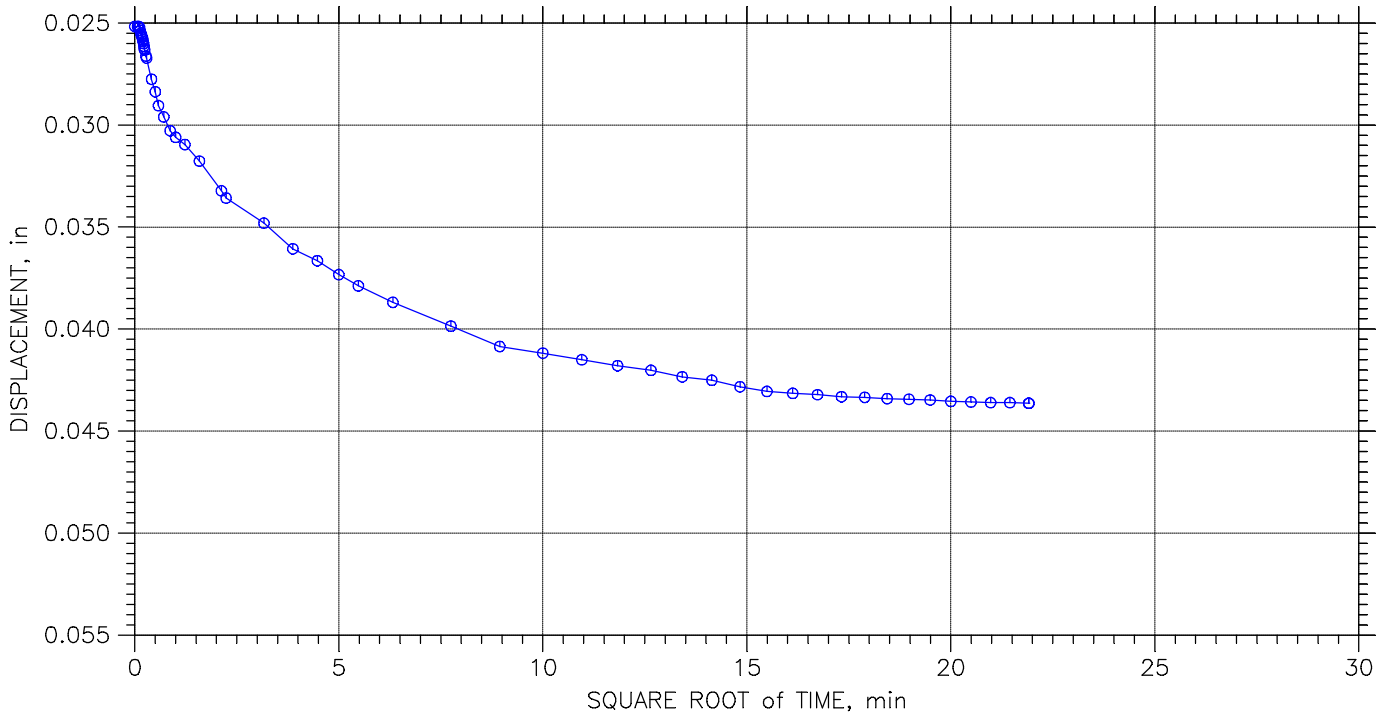
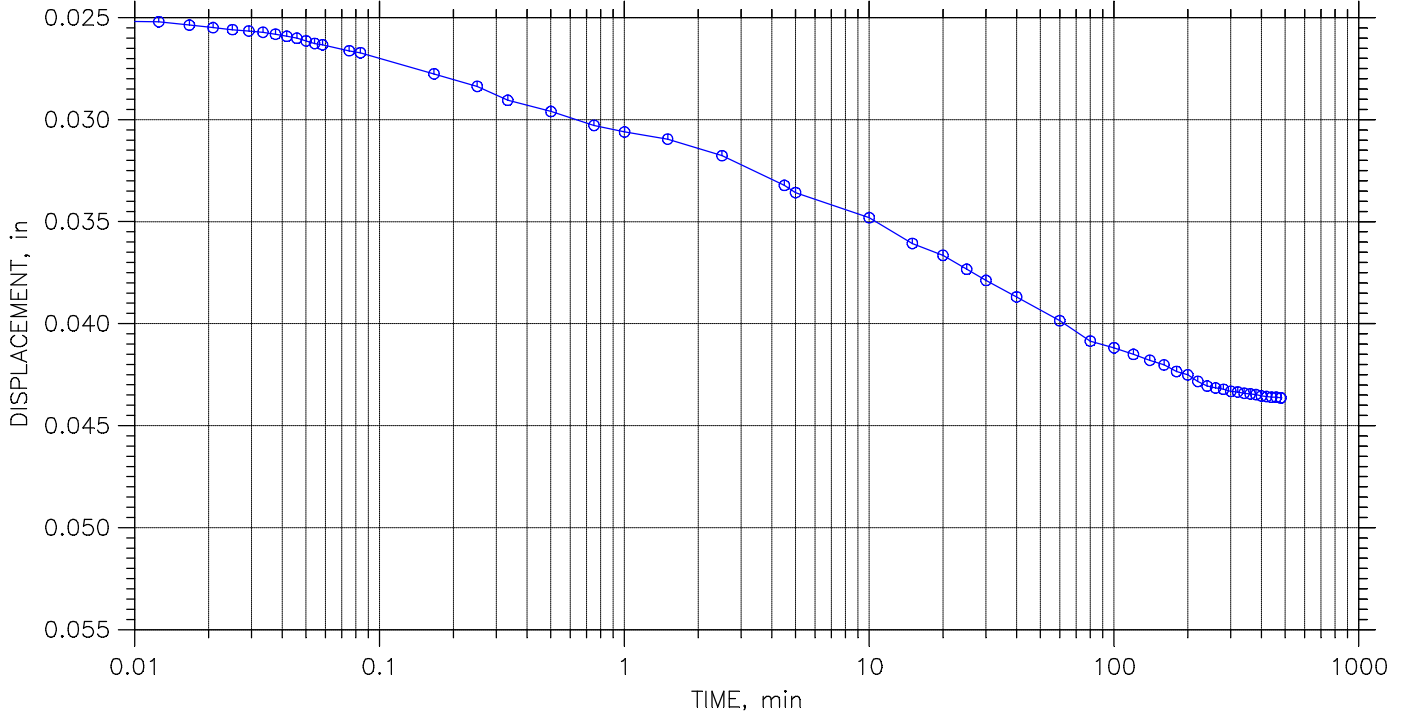
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 5 of 11

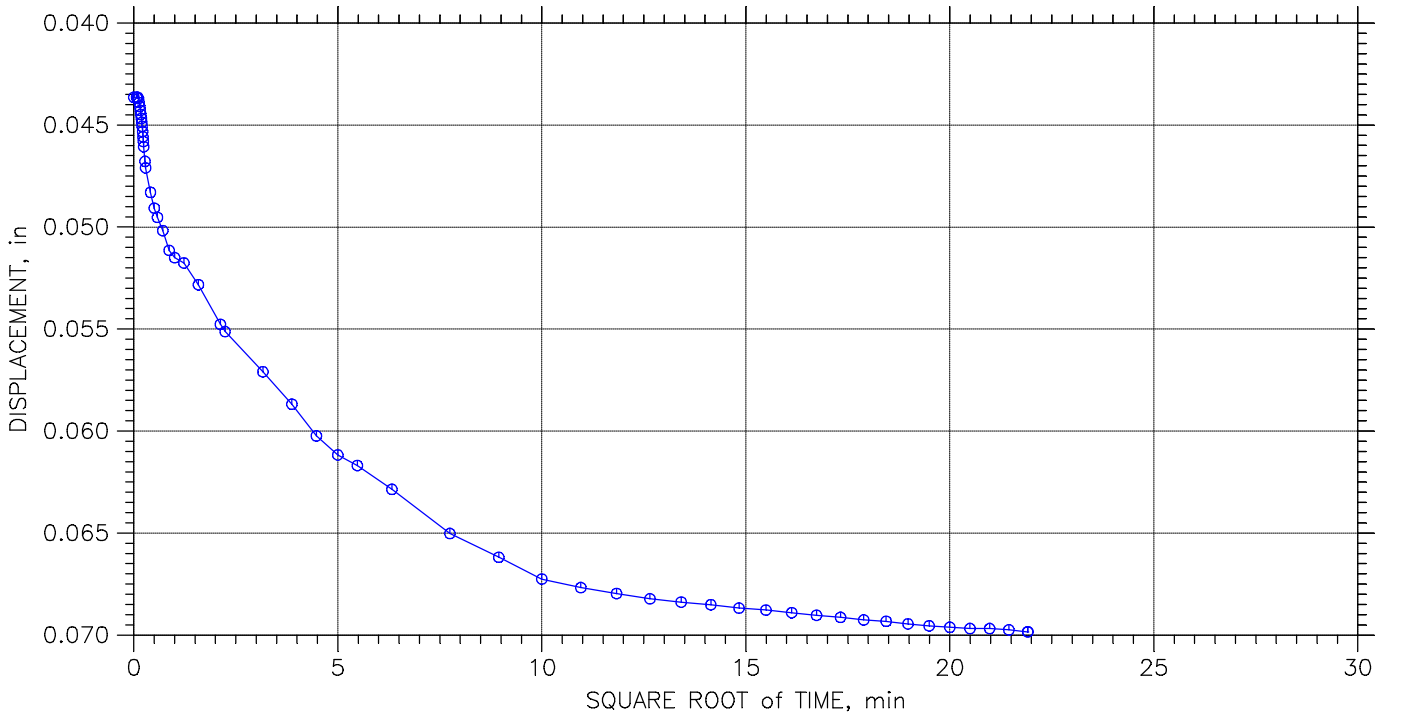
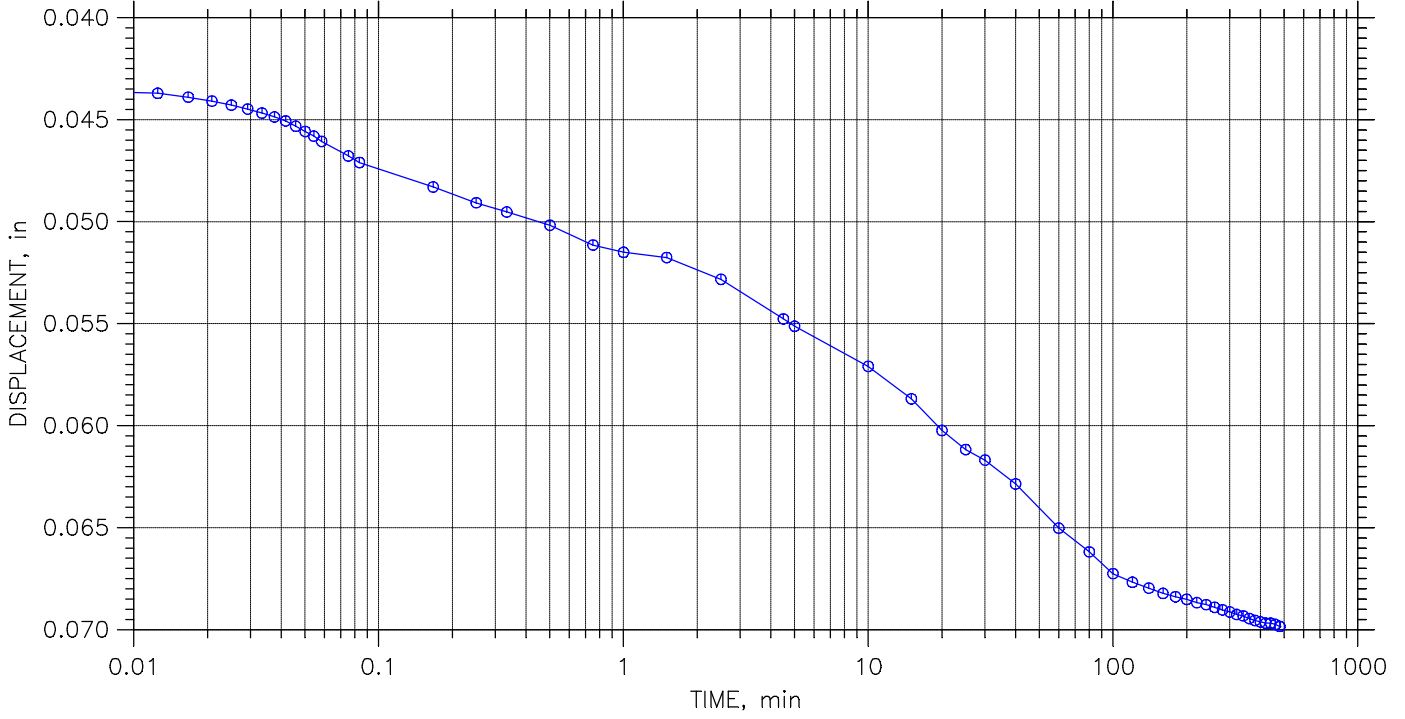
Stress: 2. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES
Step: 6 of 11
Stress: 4. tsf



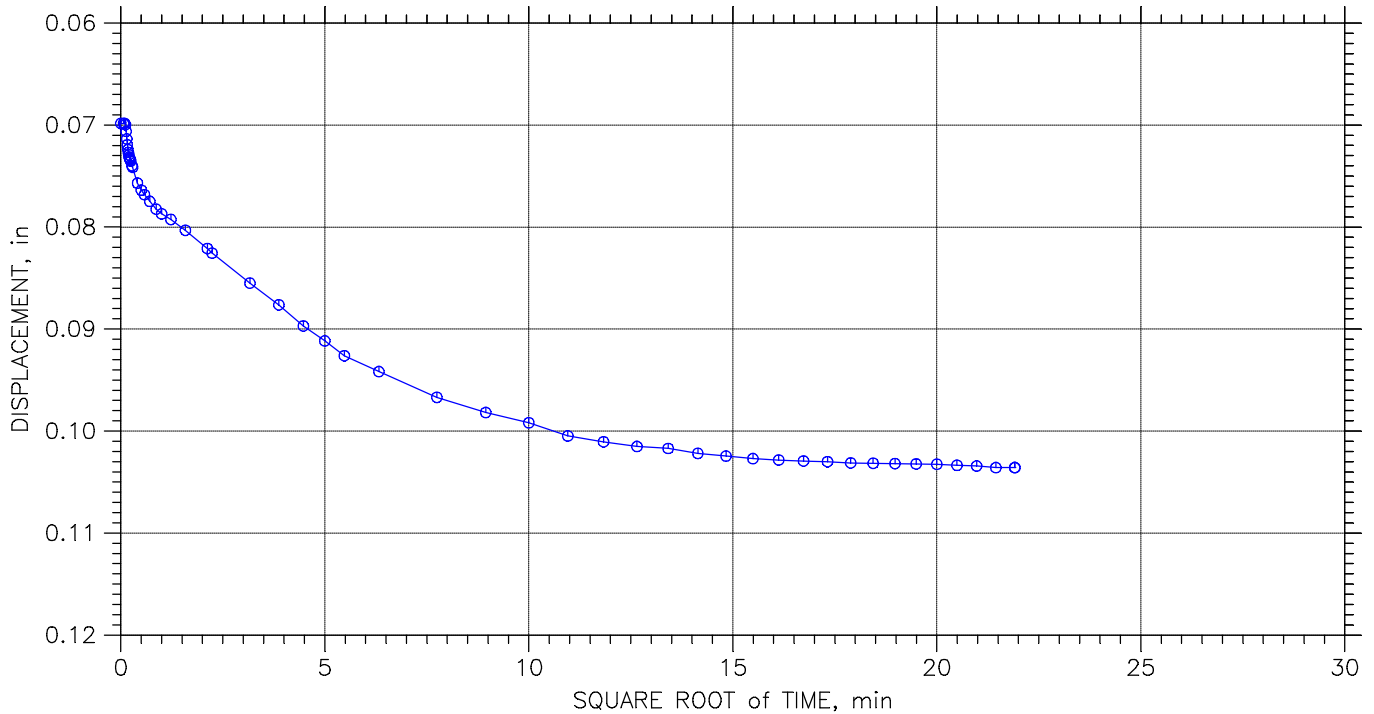
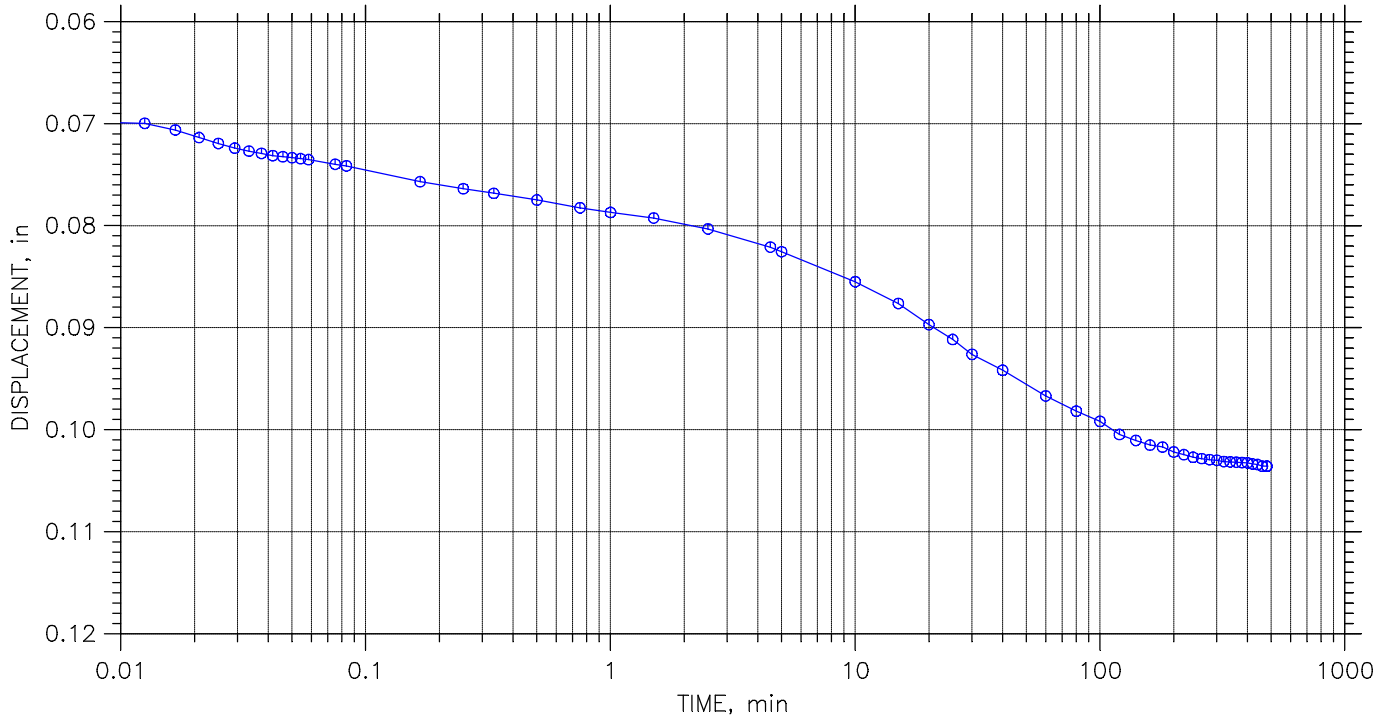
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 7 of 11

Stress: 8. tsf



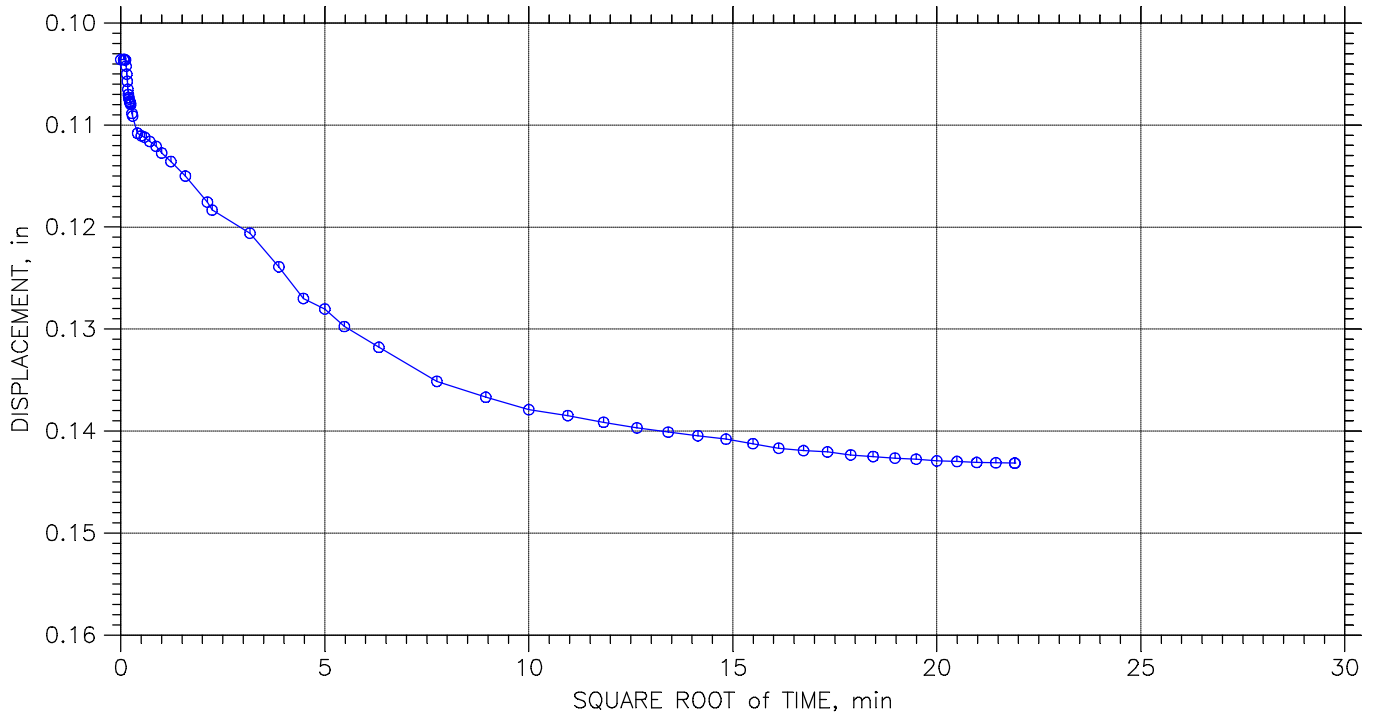
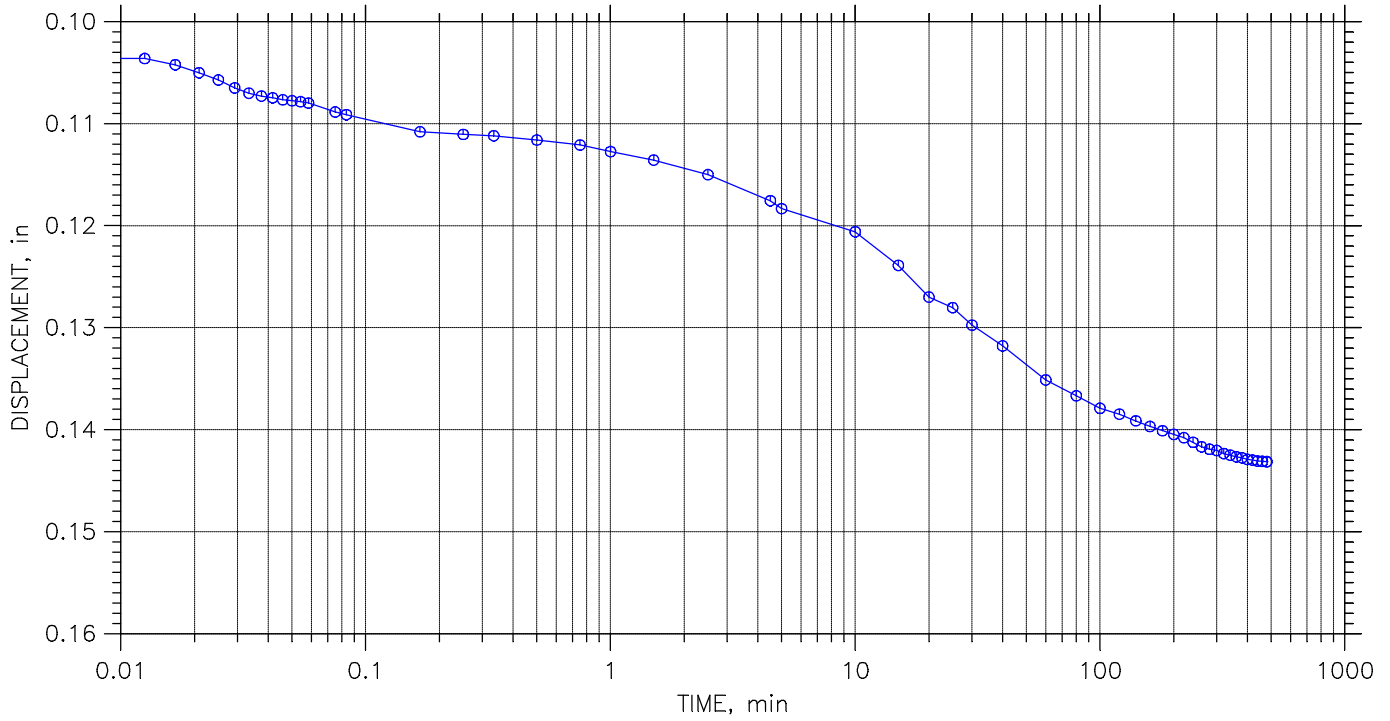
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 8 of 11

Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-057-0A-23	Tested By: MW	Checked By: SM
Sample No.: ST-1	Test Date: 02/13/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Red, Clay (A-7-6)		
Remarks:		

One Dimensional Consolidation and Swell Properties of Soil - ASTM D 2435

CTL ENGINEERING, INC.

2860 Fisher Road
Columbus, OH 43204

Project No.:	23050059COL	Sample Type:	Undisturbed Specimen
Project:	ATH/MEG-033-23.23/0.00	Test Date:	1/5/2024
Client:	HNTB Ohio, Inc	Checked By:	SM
Boring No.:	B-060-0-23	Tested By:	MW
Sample No.:	ST-2		

Soil Description:	Brown, Clay (A-7-6)	LL:	42
Specific Gravity:	2.666	PL:	22
Initial Dry Unit Weight	100.6 pcf	Initial Moisture	25.7%

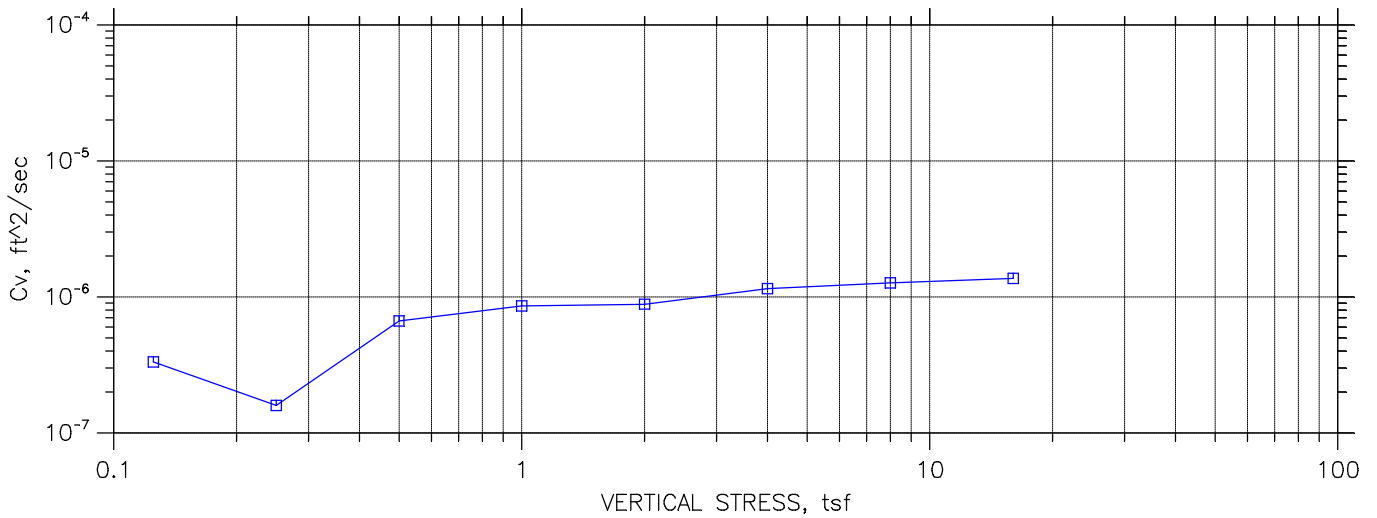
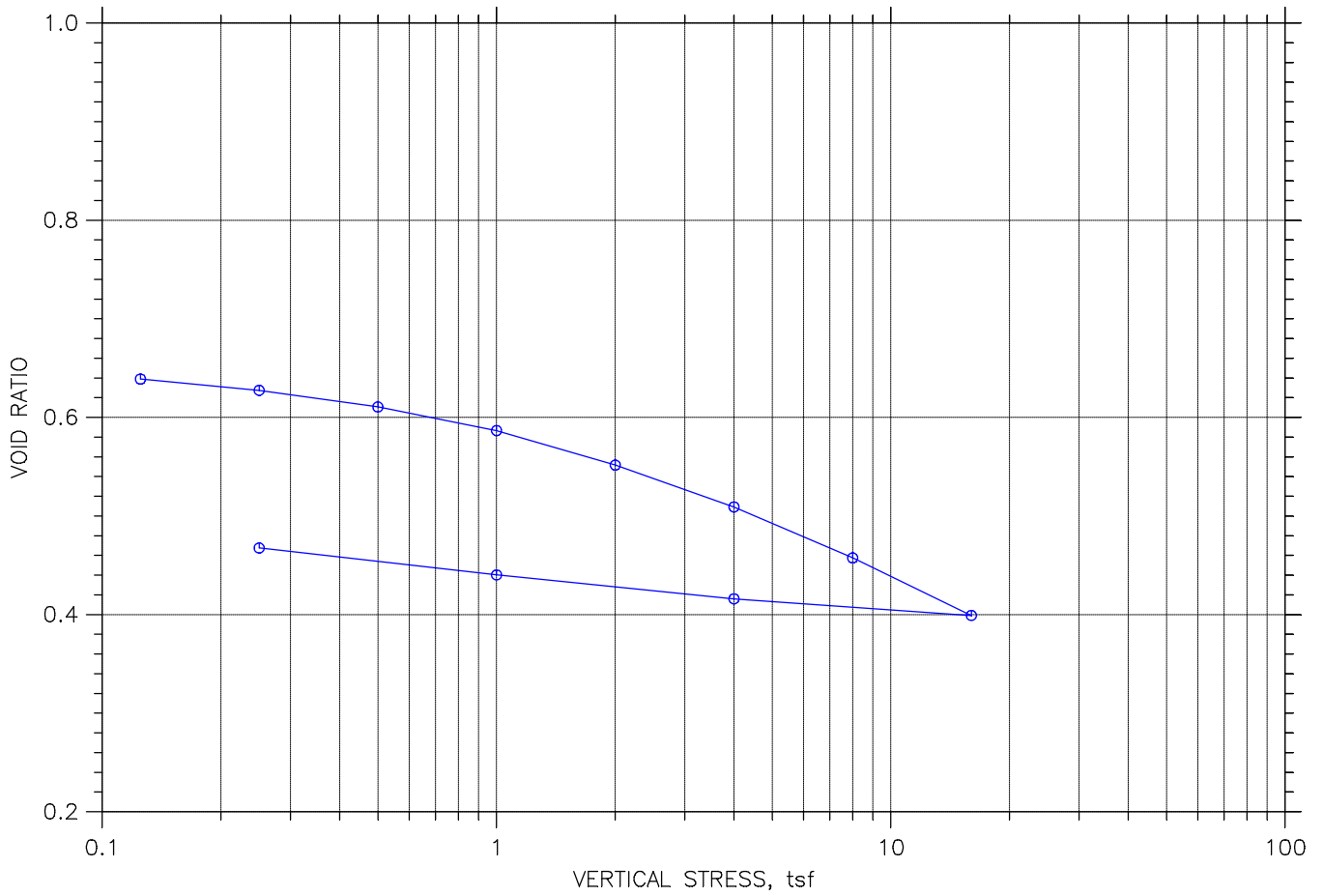
Step No.	Applied Stress (tsf)	Final Displacement (in)	Void Ratio	Strain at End (%)	Sqrt T ₉₀ (min)	C _v (ft ² /sec)
1	0.125	0.008961	0.639	0.9	56.9	4.26E-07
2	0.25	0.01592	0.627	1.59	215.4	1.11E-07
3	0.5	0.02604	0.611	2.61	29.6	7.91E-07
4	1	0.04053	0.587	4.06	23.9	9.56E-07
5	2	0.06163	0.552	6.18	22.2	9.91E-07
6	4	0.08728	0.509	8.75	18.1	1.16E-06
7	8	0.1184	0.458	11.86	14.9	1.32E-06
8	16	0.1537	0.399	15.4	13.5	1.36E-06
9	4	0.1435	0.416	14.38	0.9	1.93E-05
10	1	0.1289	0.44	12.91	29.4	6.20E-07
11	0.25	0.1124	0.468	11.26	80	2.36E-07

CONSOLIDATION PARAMETERS	
Preconsolidation Pressure (tsf): 1.70	Initial Void Ratio: 0.64
Compression Index (C _c): 0.20	Compression Ratio : 0.12
Recompression Index (C _r): 0.028	Recompression Ratio: 0.017



CONSOLIDATION TEST DATA

SUMMARY REPORT



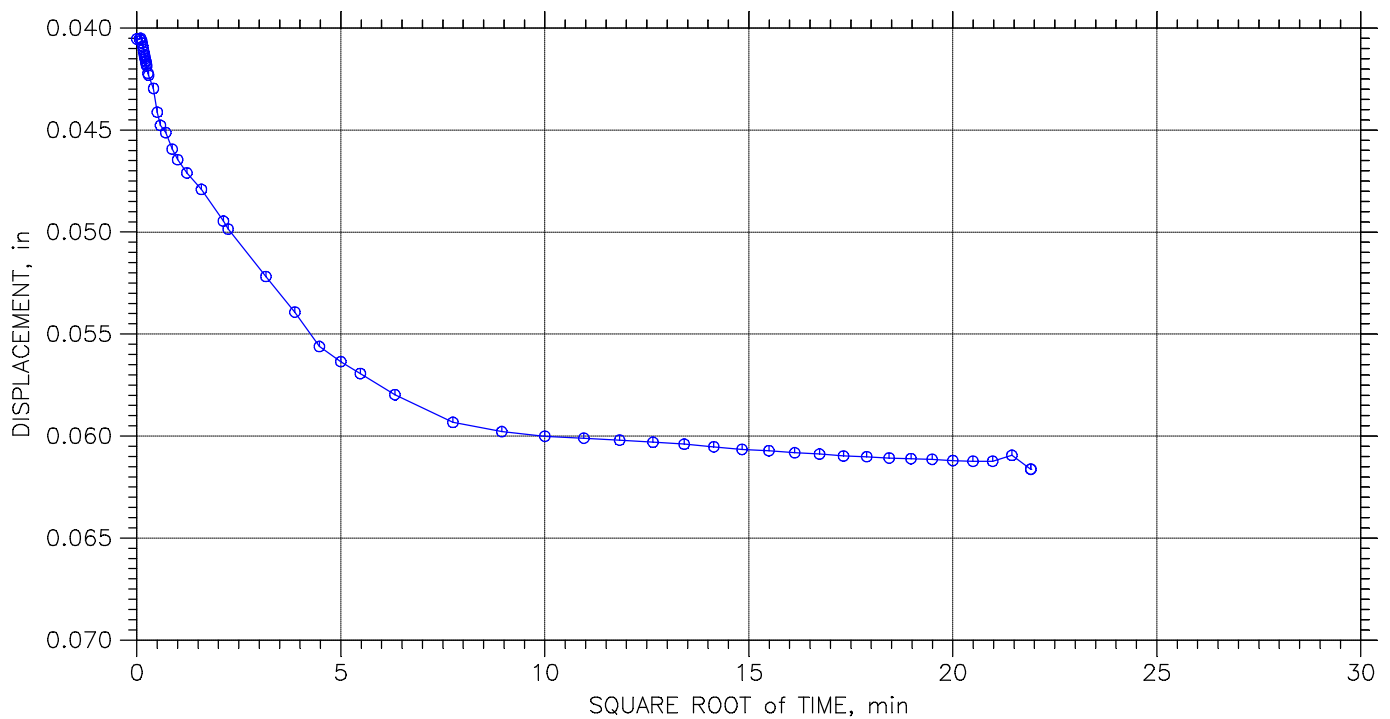
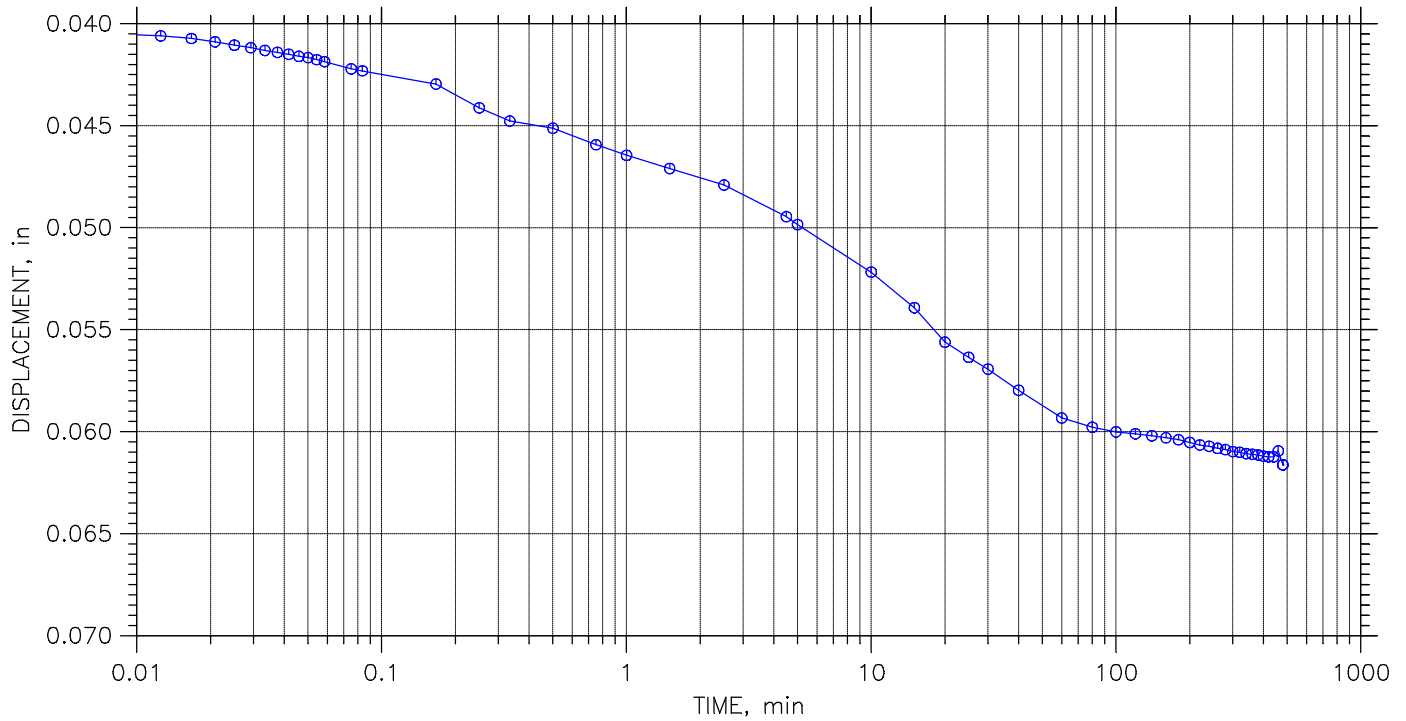
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 5 of 11

Stress: 2. tsf



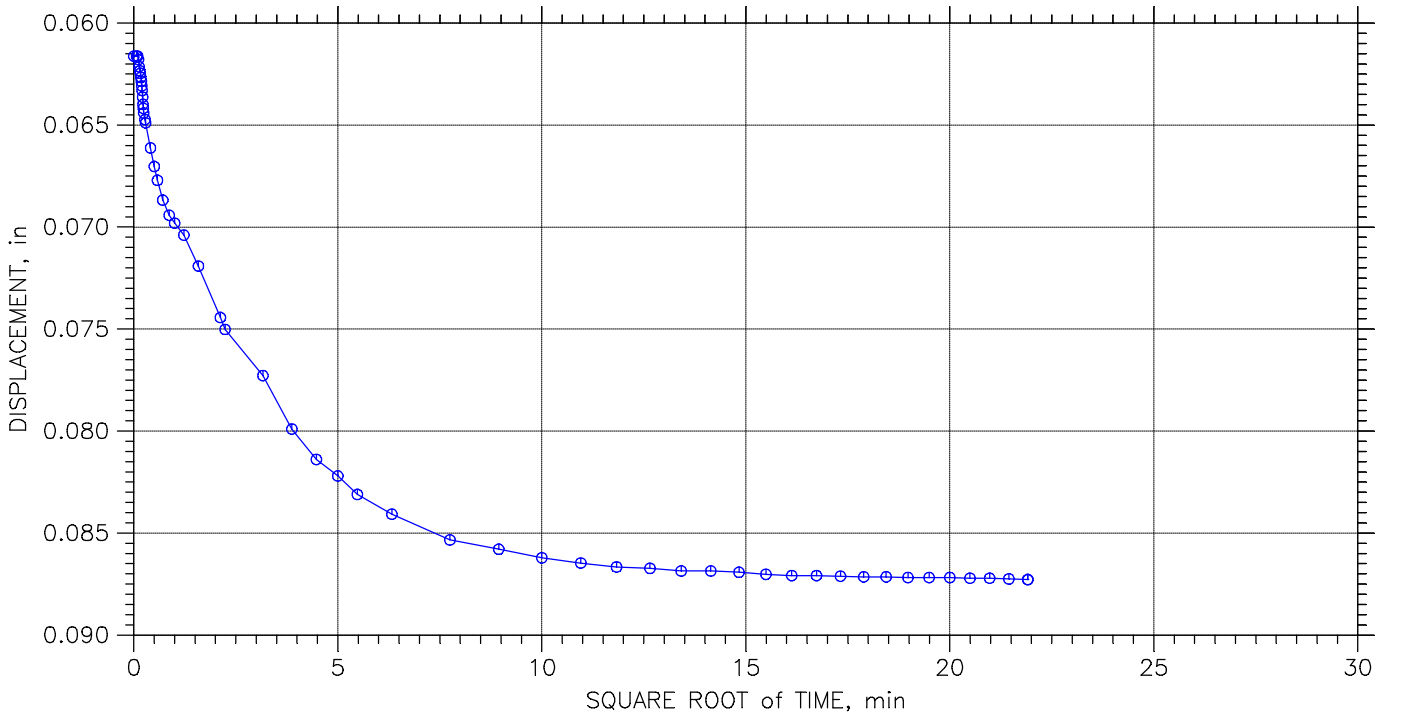
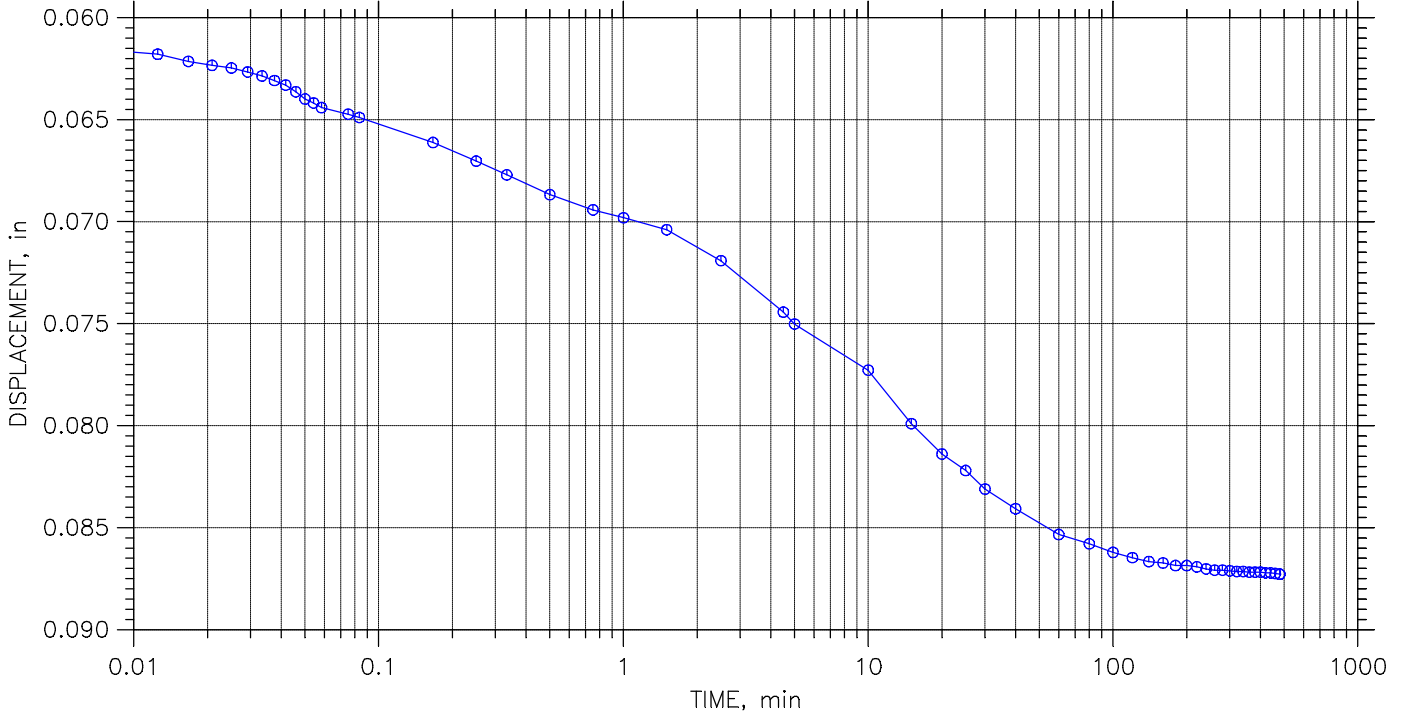
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Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 6 of 11

Stress: 4. tsf



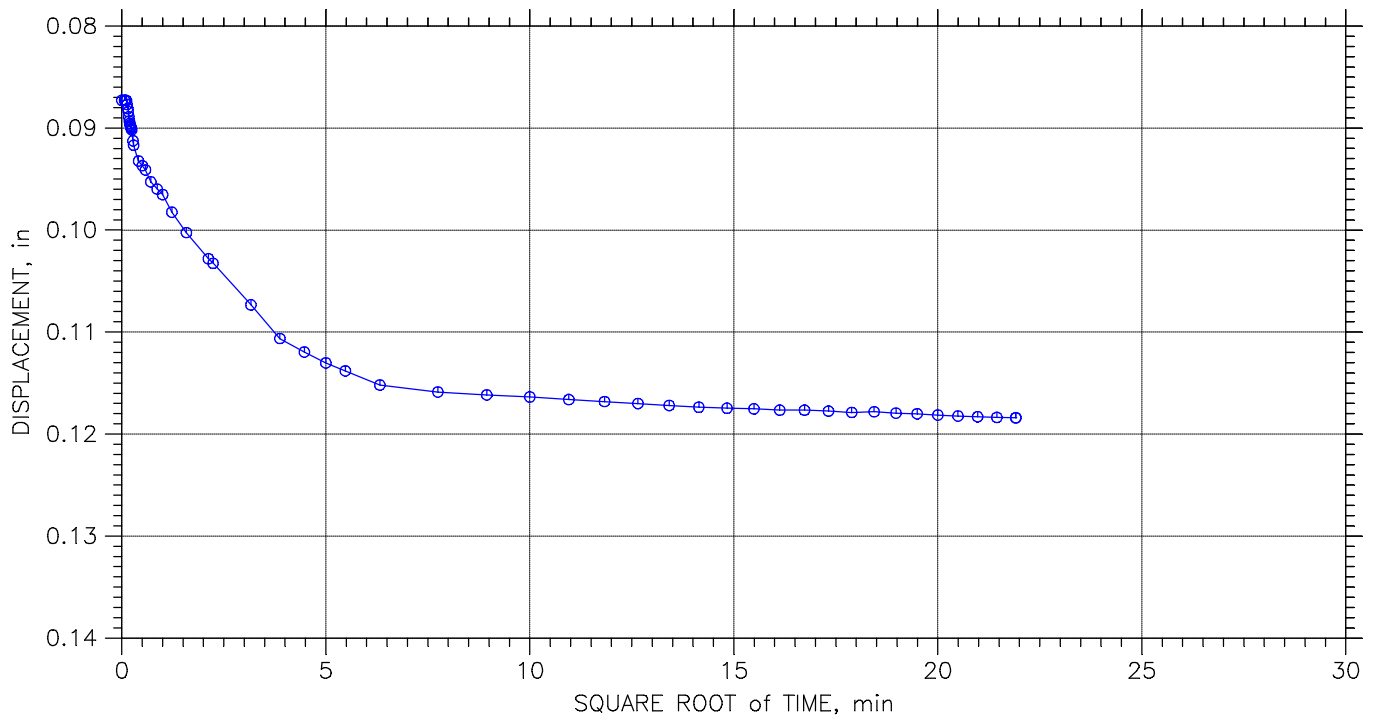
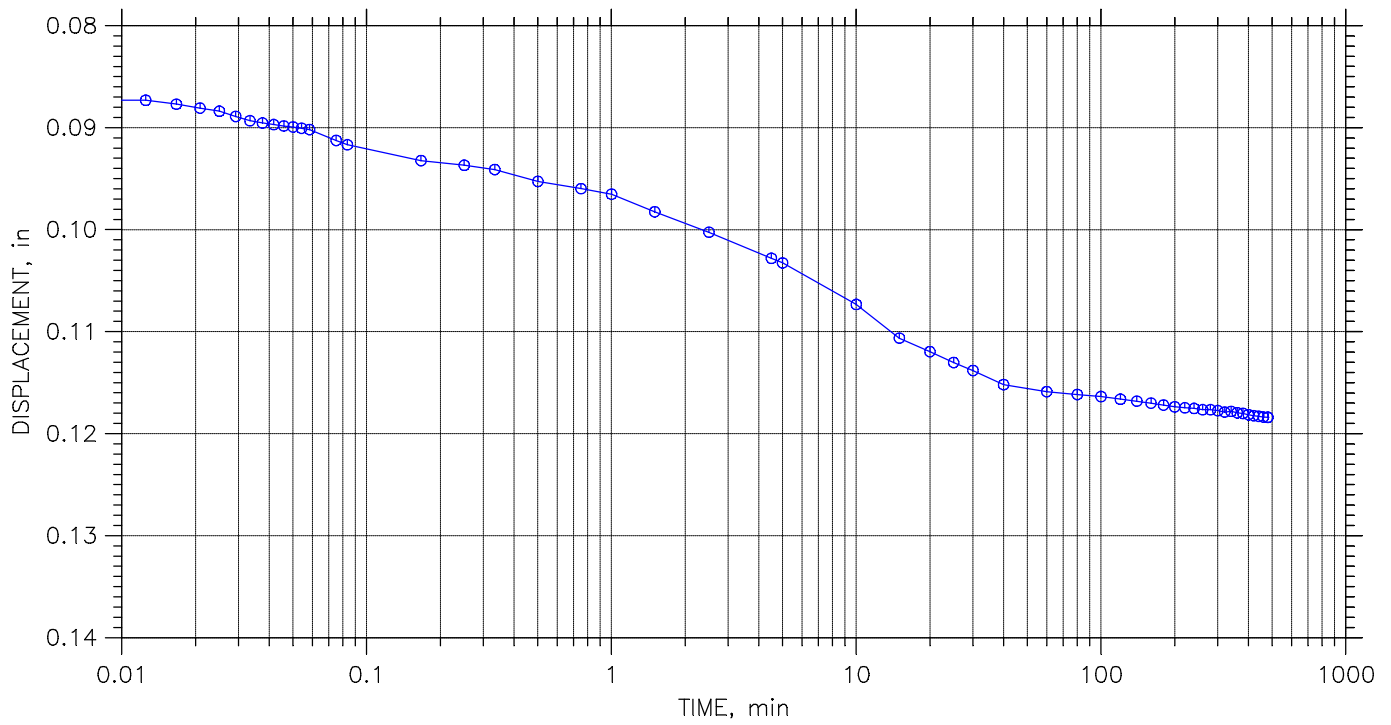
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Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 7 of 11

Stress: 8. tsf



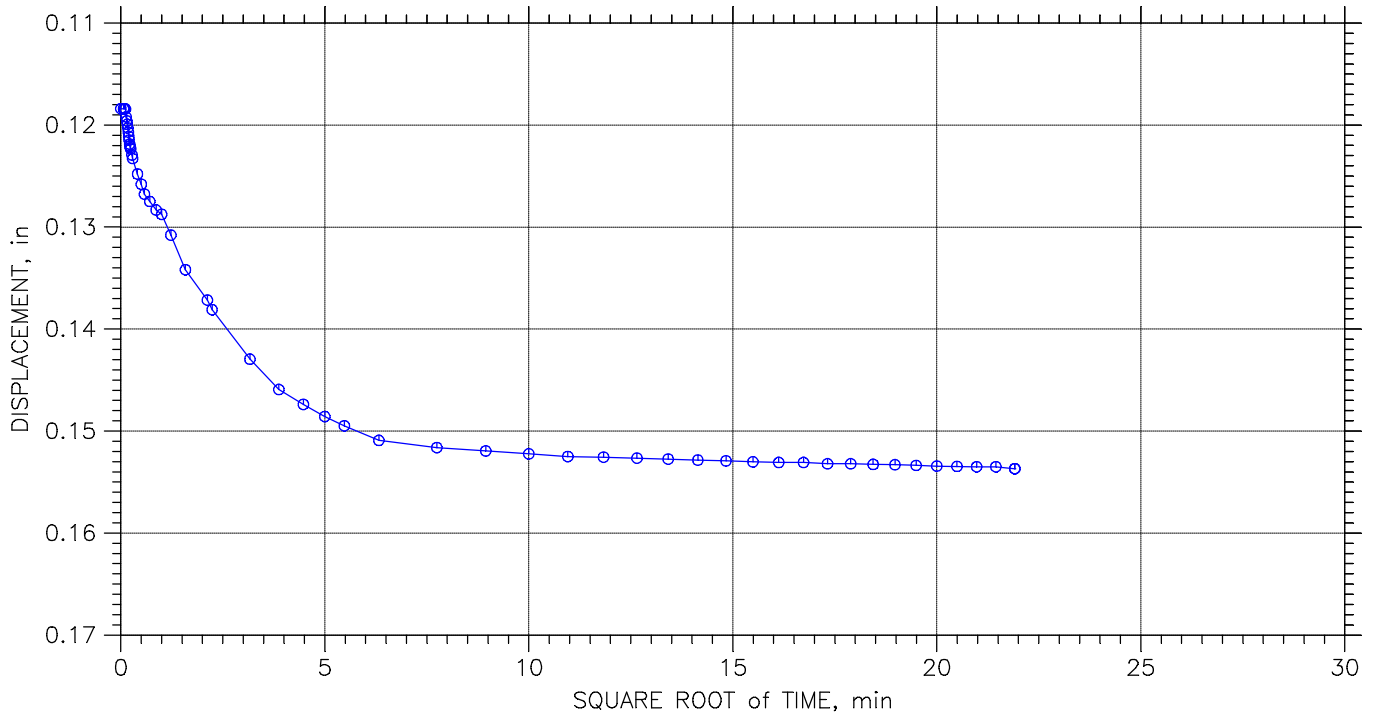
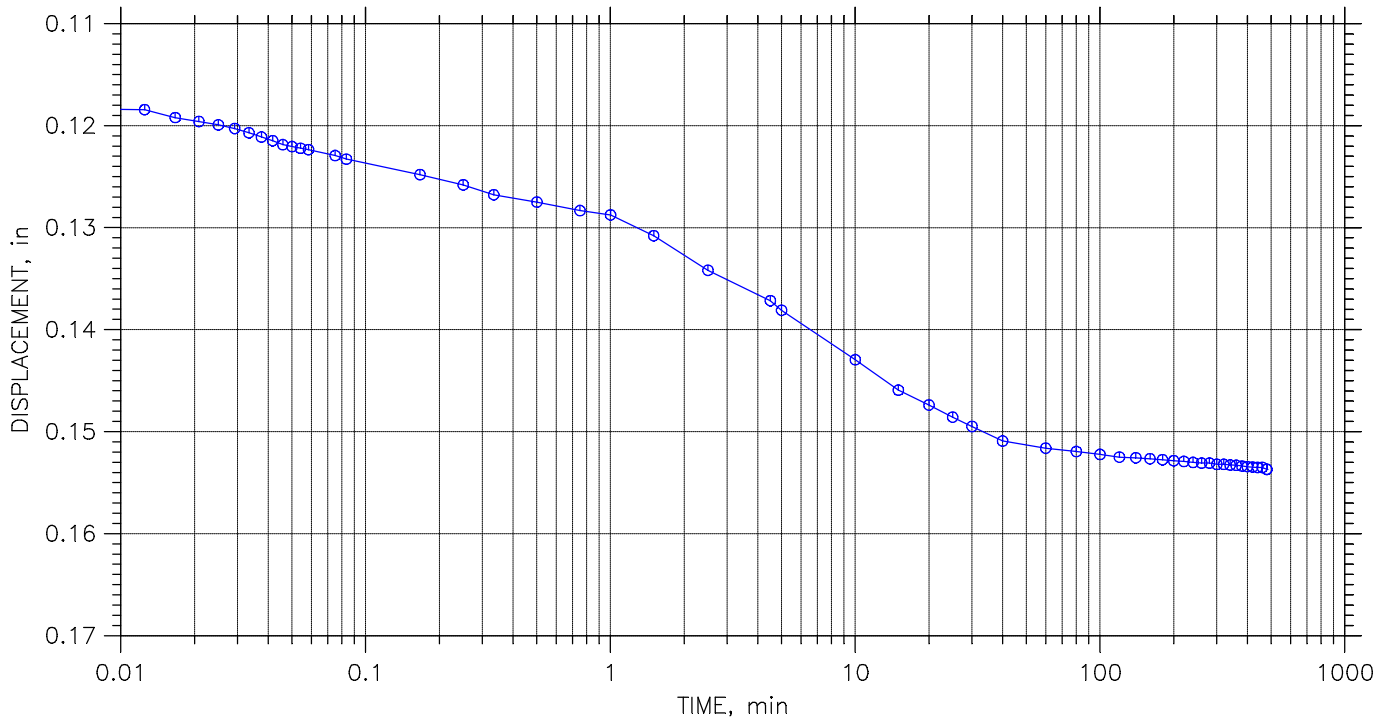
Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

CONSOLIDATION TEST DATA

TIME CURVES

Step: 8 of 11

Stress: 16. tsf



Project: ATH/MEG-033-23.23/0.00	Location: Athens & Meigs County, OH	Project No.: 23050059COL
Boring No.: B-060-0-23	Tested By: MW	Checked By: SM
Sample No.: ST-2	Test Date: 01/05/24	Depth: 3'-5'
Test No.: 1	Sample Type: Shelby Tube	Elevation:
Description: Brown Clay (A-7-6)		
Remarks:		

APPENDIX D
GLOBAL STABILITY ANALYSES



Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1252+50
 Boring No.: B-016-0-23, B-016-1-23
 Date: 9/3/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Total Stress		Effective Stress		Reference
								Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	818.2	802.2	16	A-6a/A-6b or A-4a Ex. Fill	122	14	17	1750	0	170	23	1,2,3
						18	13					
						13	18					
						14	16					
						12	27					
						12	25					
			Avg	A-6a/A-6b or A-4a	122	14	19					
2	802.2	794.7	7.5	A-3 Ex. Fill	130	35	15	0	37.5	0	37.5	4
						50	5					
						43	10					
			Avg	A-3	130	43	10					
3	794.7	784.7	10	A-4a Ex. Fill	135	51	10	6375	0	420	28	1,2,3
						50	8					
						51	9					
			Avg	A-4a	135	51	9					
4	784.7	764.7	20.0	A-6a/A-6b or A-4a Ex. Fill	128		12	4125	0	310	27	1,2,3
							10					
						29	14					
						37	12					
			Avg	A-6a/A-6b or A-4a	128	33	12					
5	764.7	751.2	13.5	A-4a (2) Ex. Fill	122	10	16	0	31.5	0	31.5	4
						13	24					
						13	17					
			Avg	A-4a (2)	122	12	19					
6	751.2	747.2	4.0	A-7-6	125	14	19	2125	0	200	24	1,2,3
						19	18					
						17	19					
			Avg	A-7-6	125	17	19					

Note: Soil parameters for layers 1 through 4 were taken from boring B-016-0-23, and soil parameters for layers 5 and 6 were taken from boring B-016-1-23

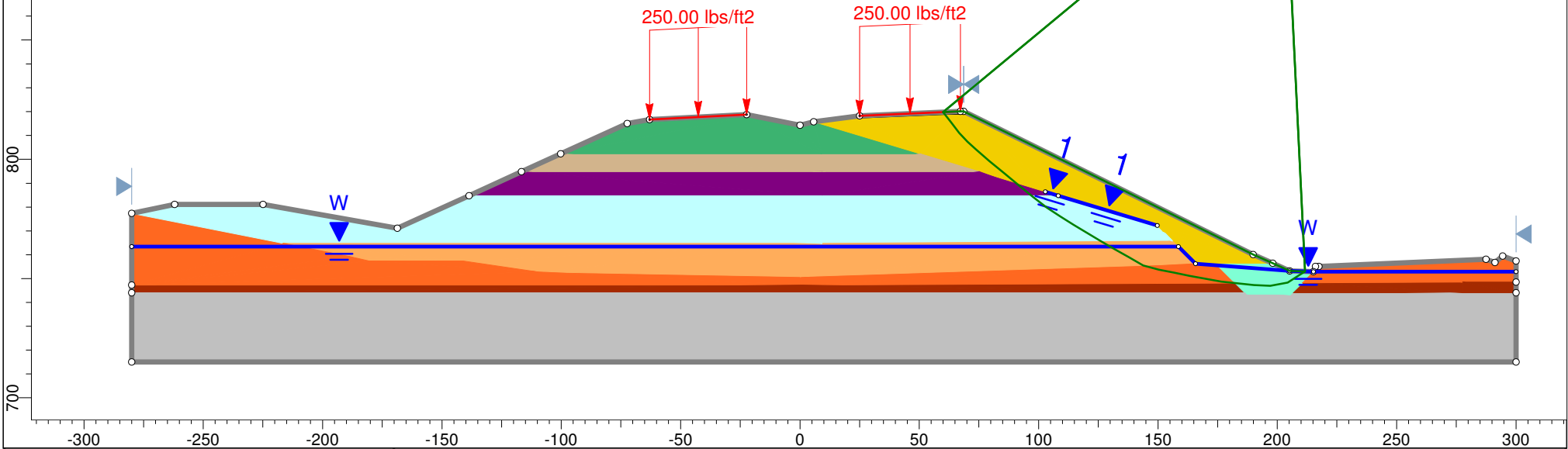
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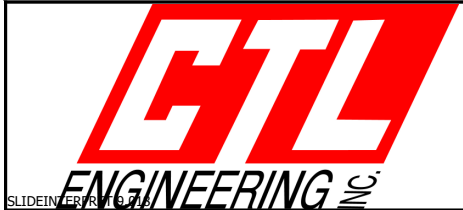
- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6a, A-6b, A-4a Existing Fill (Drained)	Green	122	Mohr-Coulomb	170	23	Water Surface
A-3 Existing Fill (Drained)	Tan	130	Mohr-Coulomb	0	37.5	Water Surface
A-4a Existing Fill (Drained)	Purple	135	Mohr-Coulomb	420	28	Water Surface
A-4a Saturated Existing Fill (Drained)	Dark Purple	135	Mohr-Coulomb	420	28	Piezometric Line 1
A-4a, A-6a, A-6b Existing Fill (Drained)	Cyan	128	Mohr-Coulomb	310	27	Water Surface
A-4a (2) Existing Fill (Drained)	Orange	122	Mohr-Coulomb	0	31.5	Water Surface
A-7-6 Native Soil (Drained)	Light Orange	125	Mohr-Coulomb	200	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Coreable Bedrock	Grey	150	Mohr-Coulomb	3220	21	Water Surface
Dumped Rock Fill (Drained)	Light Green	130	Mohr-Coulomb	0	36	Water Surface

Station 1252+50 Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.4

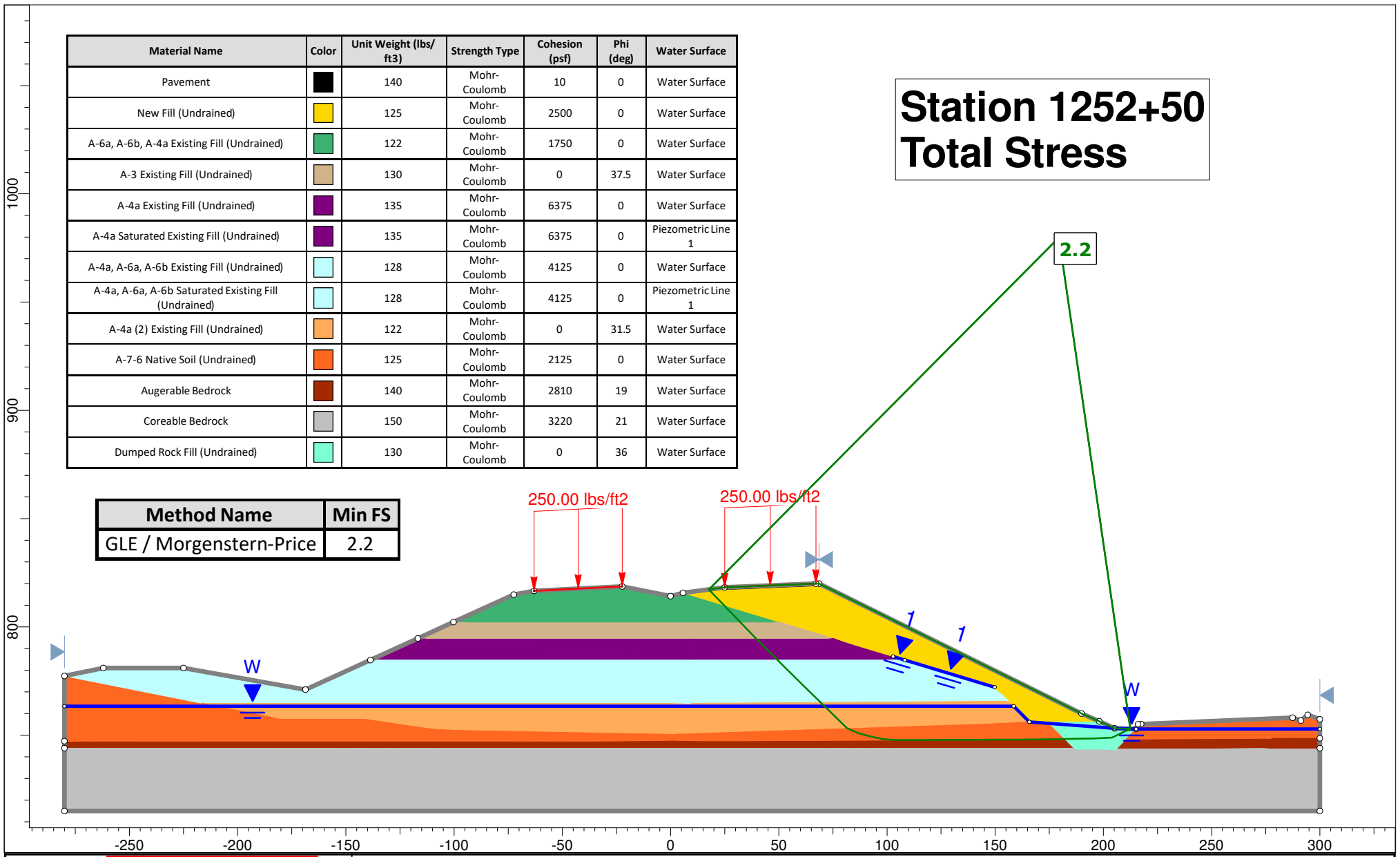



	Project ATH/MEG-33-23.23/00.00	Scenario Master Scenario
	Group Group 1	Company CTL Engineering, Inc.
	Drawn By CTL Engineering, Inc.	File Name 1252+50 ES.slmd
	Date	

Station 1252+50 Total Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6a, A-6b, A-4a Existing Fill (Undrained)	Green	122	Mohr-Coulomb	1750	0	Water Surface
A-3 Existing Fill (Undrained)	Tan	130	Mohr-Coulomb	0	37.5	Water Surface
A-4a Existing Fill (Undrained)	Purple	135	Mohr-Coulomb	6375	0	Water Surface
A-4a Saturated Existing Fill (Undrained)	Purple	135	Mohr-Coulomb	6375	0	Piezometric Line 1
A-4a, A-6a, A-6b Existing Fill (Undrained)	Light Blue	128	Mohr-Coulomb	4125	0	Water Surface
A-4a, A-6a, A-6b Saturated Existing Fill (Undrained)	Light Blue	128	Mohr-Coulomb	4125	0	Piezometric Line 1
A-4a (2) Existing Fill (Undrained)	Orange	122	Mohr-Coulomb	0	31.5	Water Surface
A-7-6 Native Soil (Undrained)	Orange	125	Mohr-Coulomb	2125	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Coreable Bedrock	Grey	150	Mohr-Coulomb	3220	21	Water Surface
Dumped Rock Fill (Undrained)	Light Green	130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	2.2



	Project	ATH/MEG-33-23.23/00.00	
	Group	Group 1	Scenario Master Scenario
	Drawn By	CTL Engineering, Inc.	Company CTL Engineering, Inc.
	Date		File Name 1252+50 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1269+50
 Boring No.: B-017-0-23, SB-51
 Date: 10/25/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	836.9	783.9	53.0	A-7-6 or A-6a/A-4a Ex. Fill	125	20	22	43	23	3125	0	260	25	1,2,3
						20	9	36	19					
			Avg	A-7-6 or A-6a/A-4a	125	25	11							
2	783.9	777.4	6.5	A-6b/A-4a	108	2				250	0	25	18	1,2,3
						2								
			Avg	A-6b/A-4a	108	2								

Note: Soil parameters for layer 1 were taken from boring B-017-0-23, and soil parameters for layer 2 were taken from historic boring SB-51

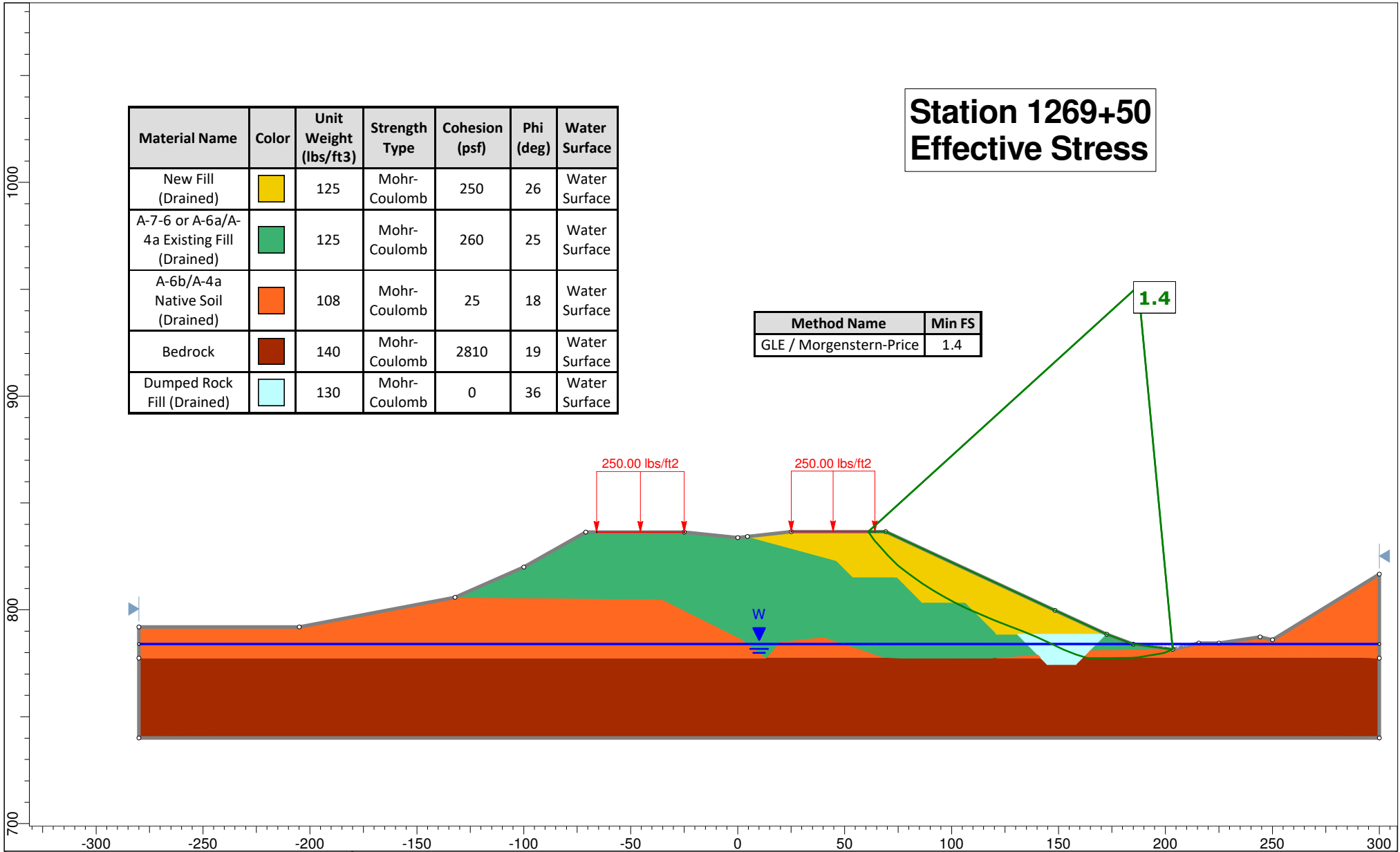
Reference Key


- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2

Station 1269+50 Effective Stress

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-7-6 or A-6a/A-4a Existing Fill (Drained)	Green	125	Mohr-Coulomb	260	25	Water Surface
A-6b/A-4a Native Soil (Drained)	Orange	108	Mohr-Coulomb	25	18	Water Surface
Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Drained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.4

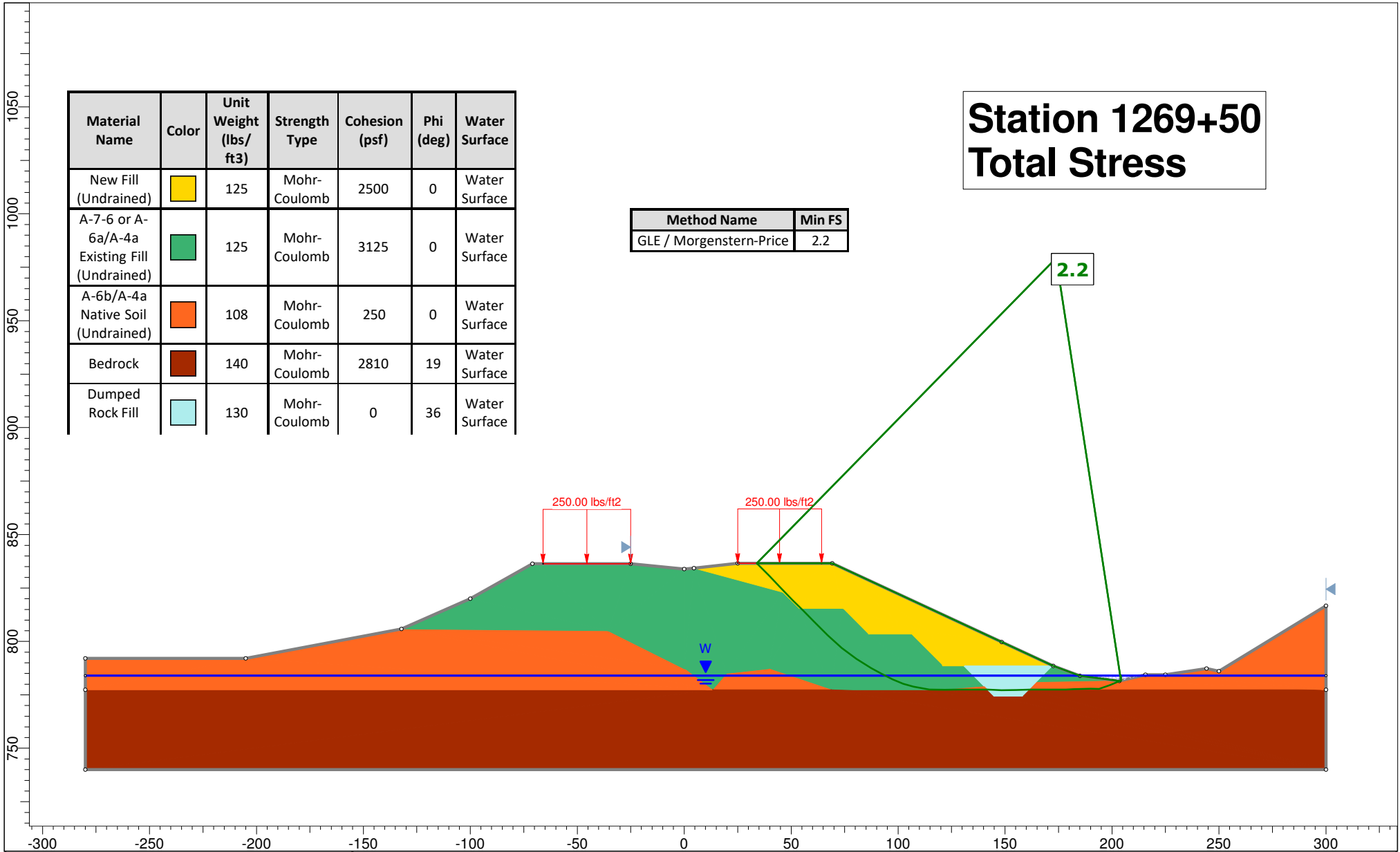



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	Group		Group 1	Scenario
	Drawn By			Company
	Date		10/14/2024, 2:47:32 PM	File Name
				Master Scenario
			CTL Engineering, Inc.	
			1269+50.slmd	

Station 1269+50 Total Stress

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-7-6 or A-6a/A-4a Existing Fill (Undrained)	Green	125	Mohr-Coulomb	3125	0	Water Surface
A-6b/A-4a Native Soil (Undrained)	Orange	108	Mohr-Coulomb	250	0	Water Surface
Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill	Light Blue	130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	2.2



	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	Scenario
	Drawn By			Company
	Date		10/14/2024, 2:47:32 PM	File Name
				1269+50 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1278+00
 Boring No.: B-017-0-23, B-017-1-23
 Date: 9/18/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	847.3	836.3	11	A-4a/A-3a Ex. Fill	125	17	9			0	34	0	34	1
						20	10							
			Avg	A-4a/A-3a		22	11							
2	836.3	819.3	17.0	A-7-6 or A-6a/A-4a Ex. Fill	125	20	22	43	23	3125	0	260	25	2,3,4
						20	9	36	19					
			Avg	A-7-6 or A-6a/A-4a		27	9							
						32	8							
						24	9							
3	819.3	805.1	14.2	A-7-6/A-4a	122	17	13	35	22	855	0	80	24	5
						18	12	30	21					
			Avg	A-7-6/A-4a		19	14							
4	805.1	798.6	6.5	A-7-6	122	12	46			2125	0	200	24	2,3,4
						18	27							
			Avg	A-7-6		20	20							
						17	31							

Note: Soil parameters for layer 1, 2 were taken from boring B-017-0-23, and soil parameters for layers 3, 4 were taken from boring B-017-1-23

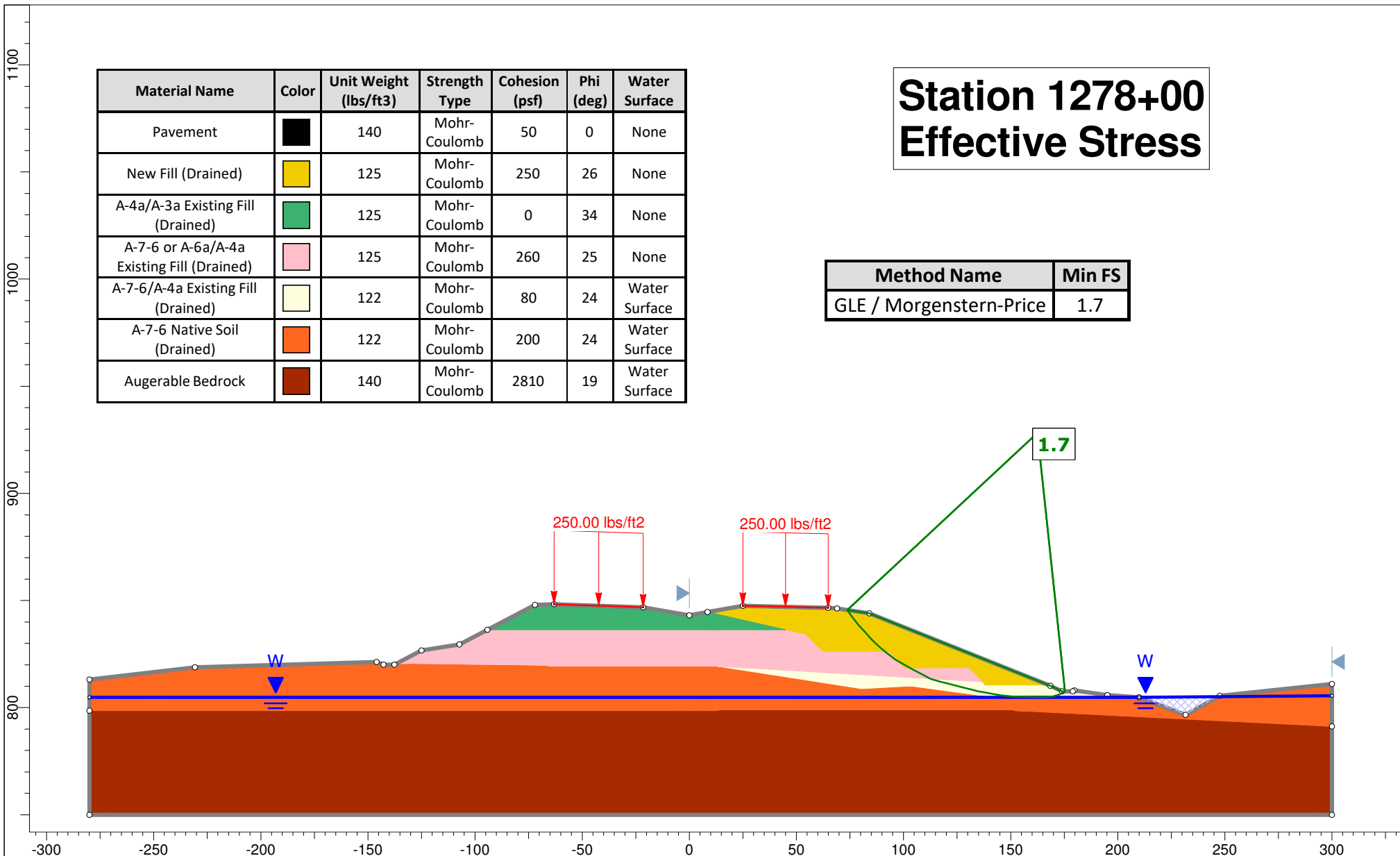
Reference Key


- 1 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1
- 2 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 3 Total stress friction angle of cohesive soils estimated to be 0
- 4 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 5 Laboratory unconfined compression test results of B-017-1A-23_ST-1_2'-4'

Station 1278+00 Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	50	0	None
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	None
A-4a/A-3a Existing Fill (Drained)	Green	125	Mohr-Coulomb	0	34	None
A-7-6 or A-6a/A-4a Existing Fill (Drained)	Pink	125	Mohr-Coulomb	260	25	None
A-7-6/A-4a Existing Fill (Drained)	Light Yellow	122	Mohr-Coulomb	80	24	Water Surface
A-7-6 Native Soil (Drained)	Orange	122	Mohr-Coulomb	200	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.7

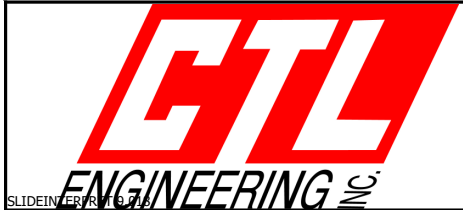
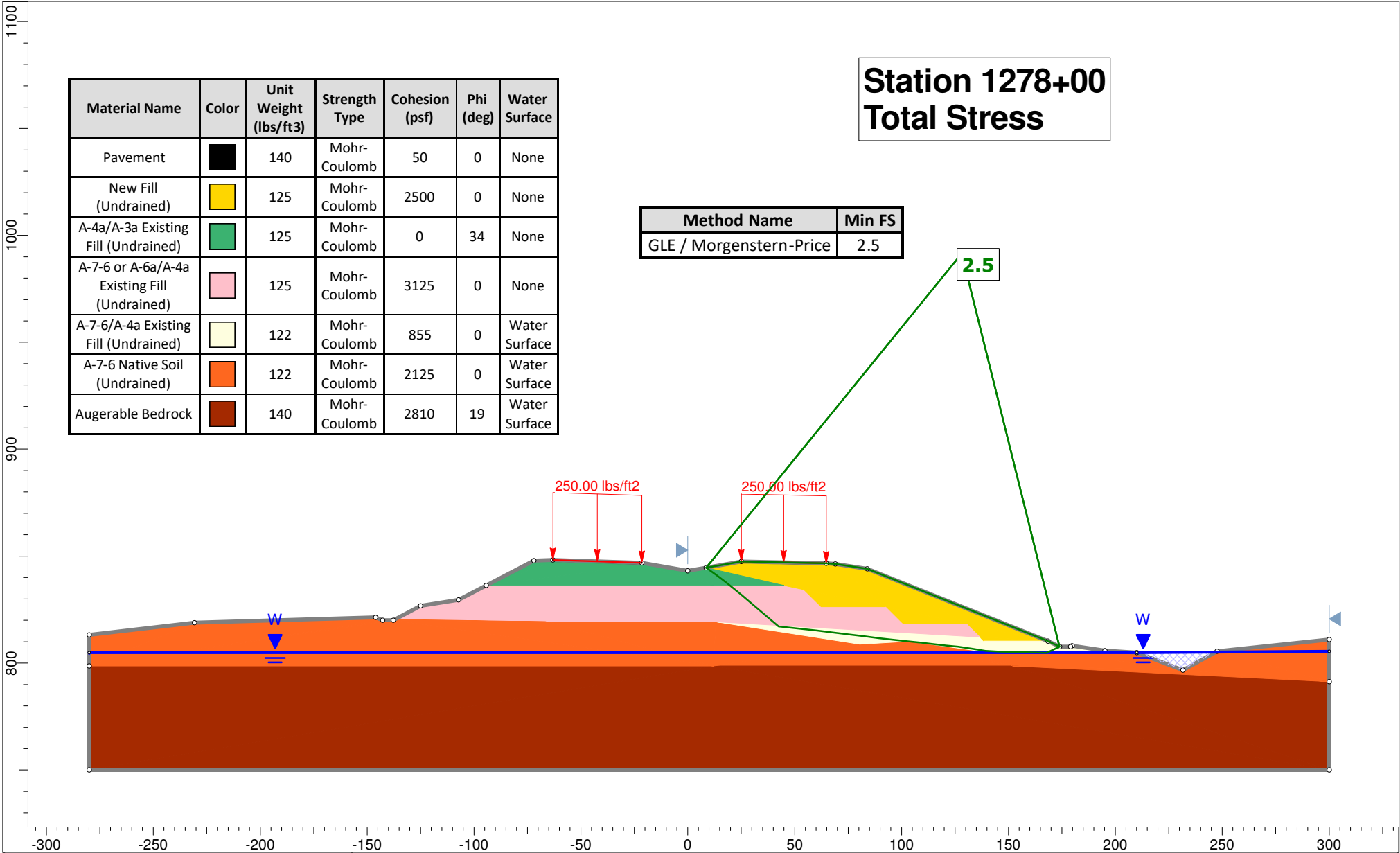


	Project		ATH/MEG-33-23.23/00.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1278+00 ES.slmd

Station 1278+00 Total Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	50	0	None
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	None
A-4a/A-3a Existing Fill (Undrained)	Green	125	Mohr-Coulomb	0	34	None
A-7-6 or A-6a/A-4a Existing Fill (Undrained)	Pink	125	Mohr-Coulomb	3125	0	None
A-7-6/A-4a Existing Fill (Undrained)	Light Yellow	122	Mohr-Coulomb	855	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	122	Mohr-Coulomb	2125	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	2.5



Project	ATH/MEG-33-23.23/00.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1278+00 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1310+50
 Boring No.: B-024-0-23, B-99
 Date: 9/3/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	867.3	861.3	6	A-4a Ex. Fill	132	35	11	25	17	5125	0	360	28	1,2,3
				Avg		A-4a	47	5	41					
2	861.3	836.0	25.3	A-6a/A-4a or A-7-6 Ex. Fill	125	20	19	35	20	3000	0	250	25	1,2,3
						19	12							
						28	9	31	19					
						22	37							
						31	4	30	21					
Avg	A-6a/A-4a or A-7-6	24	16											
3	836.0	829	7	A-6b	122	13	21			2375	0	220	25	1,2,3
						17	21							
						26								
Avg	A-6b	19	21											

Note: Soil parameters for layer 1, 2 were taken from boring B-024-0-23, and soil parameters for layers 3 was taken from historic boring B-99

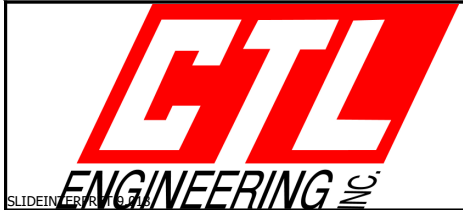
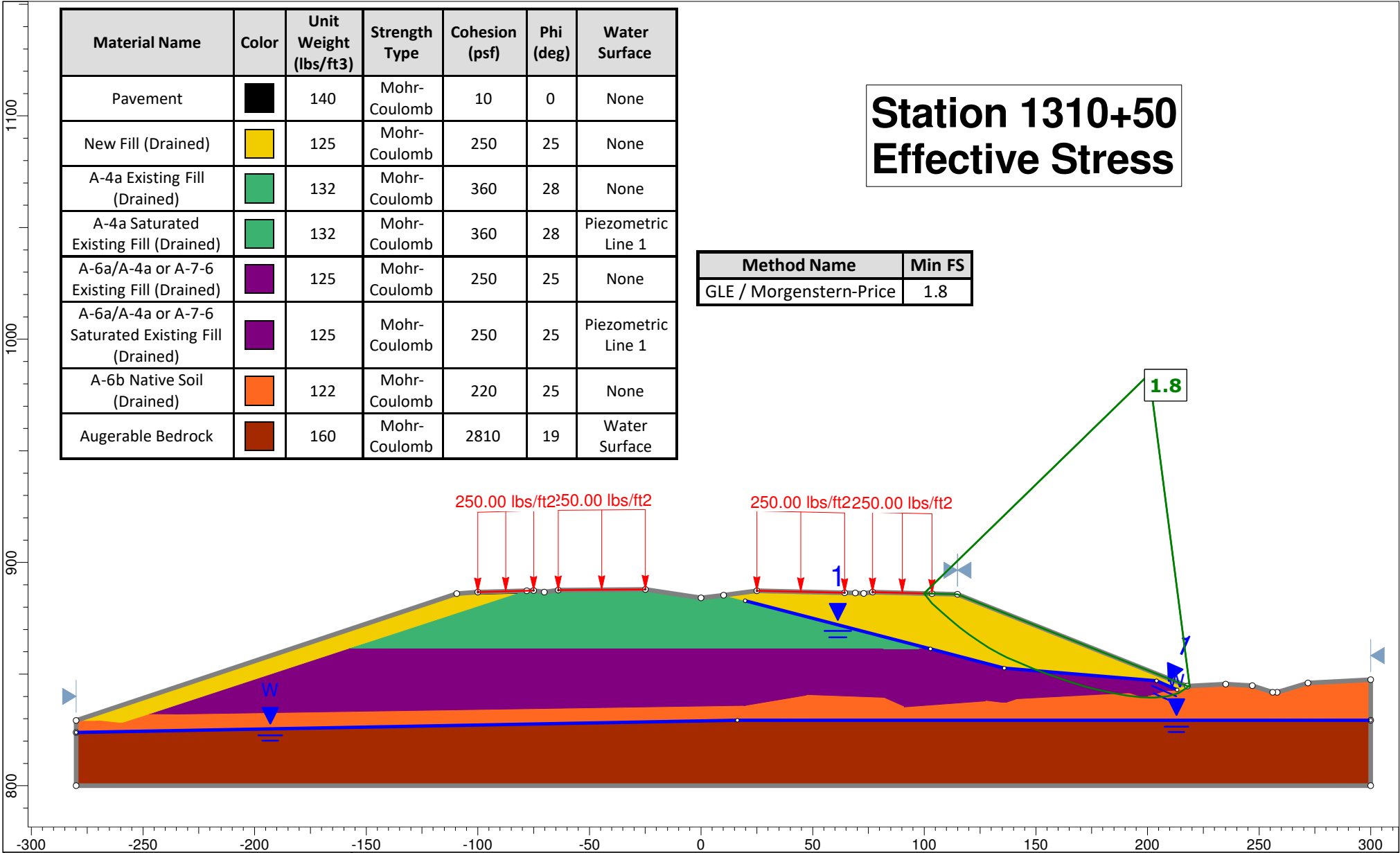
Reference Key

- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2

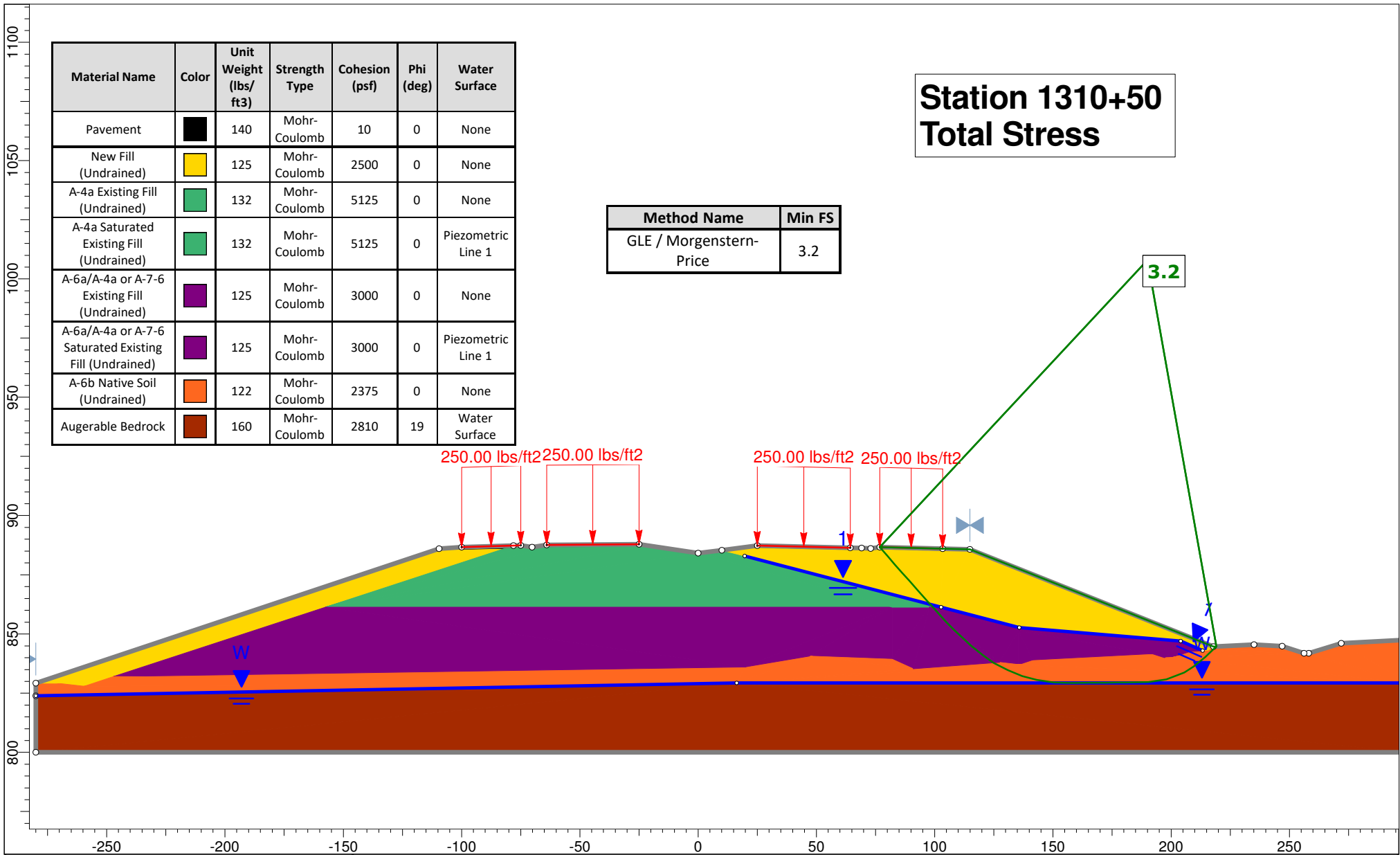
Station 1310+50 Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	None
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	25	None
A-4a Existing Fill (Drained)	Light Green	132	Mohr-Coulomb	360	28	None
A-4a Saturated Existing Fill (Drained)	Dark Green	132	Mohr-Coulomb	360	28	Piezometric Line 1
A-6a/A-4a or A-7-6 Existing Fill (Drained)	Purple	125	Mohr-Coulomb	250	25	None
A-6a/A-4a or A-7-6 Saturated Existing Fill (Drained)	Dark Purple	125	Mohr-Coulomb	250	25	Piezometric Line 1
A-6b Native Soil (Drained)	Orange	122	Mohr-Coulomb	220	25	None
Augerable Bedrock	Brown	160	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.8



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1310+50 ES.slmd



Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	None
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	None
A-4a Existing Fill (Undrained)	Green	132	Mohr-Coulomb	5125	0	None
A-4a Saturated Existing Fill (Undrained)	Light Green	132	Mohr-Coulomb	5125	0	Piezometric Line 1
A-6a/A-4a or A-7-6 Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	3000	0	None
A-6a/A-4a or A-7-6 Saturated Existing Fill (Undrained)	Dark Purple	125	Mohr-Coulomb	3000	0	Piezometric Line 1
A-6b Native Soil (Undrained)	Orange	122	Mohr-Coulomb	2375	0	None
Augerable Bedrock	Brown	160	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	3.2

**Station 1310+50
Total Stress**



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1310+50 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1320+00
 Boring No.: B-052-0-23, B-055-0-23
 Date: 9/3/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	886.1	880.4	5.7	A-1-b Ex. Fill	125	15	7			0	37.5	0	37.5	1
				Avg		14	6							
2	880.4	873.2	7.2	A-6a	125	24	20	34	20	3000	0	250	24	2,3,4
				Avg		24	20	34	20					

Note: Soil parameters for layer 1 were taken from boring B-052-0-23, and soil parameters for layers 2 were taken from boring B-055-0-23

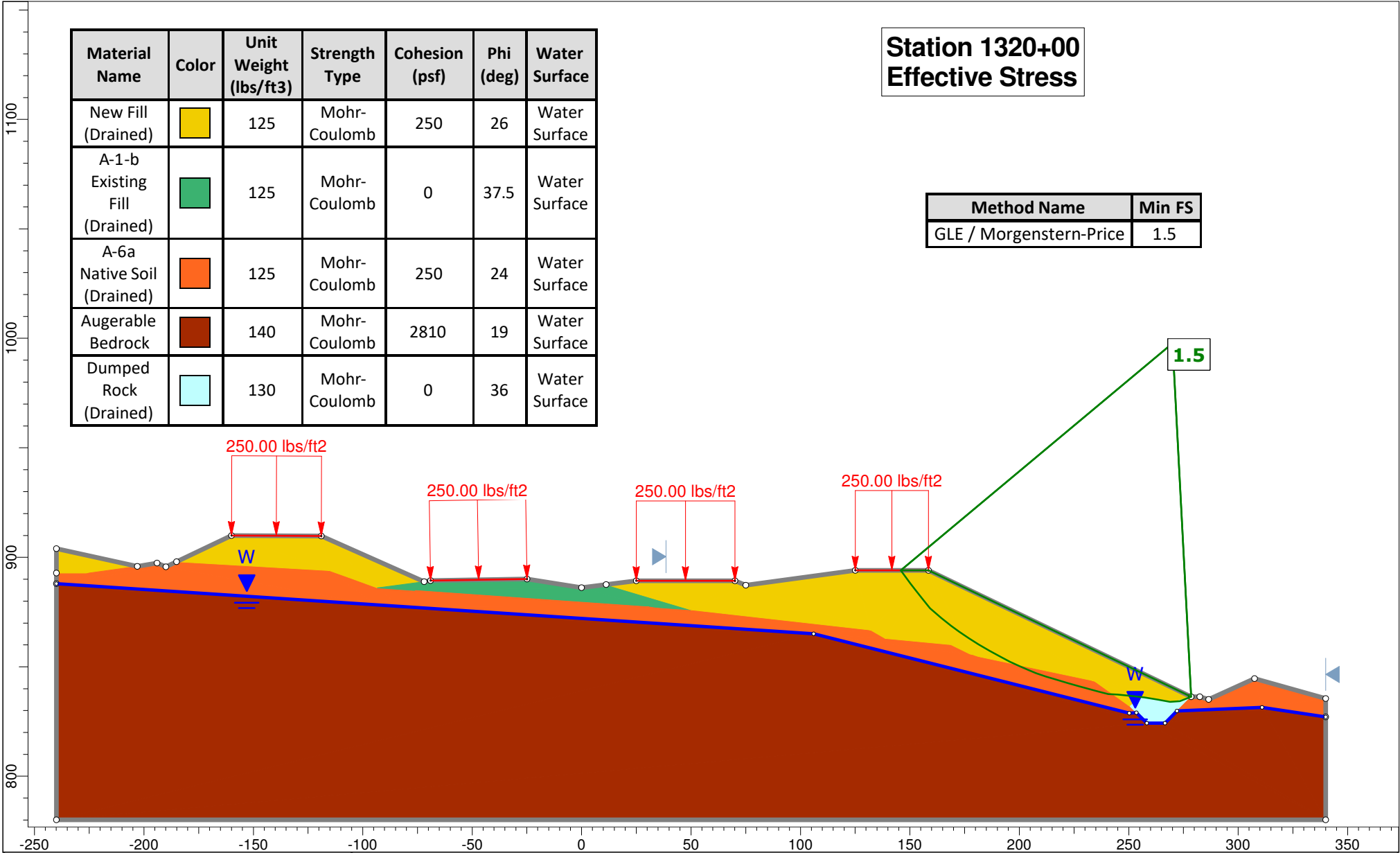
Reference Key

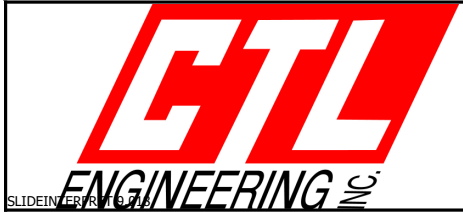
- 1 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1
- 2 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 3 Total stress friction angle of cohesive soils estimated to be 0
- 4 Effective stress friction angle for cohesive soils estimated using GB7 Table 2

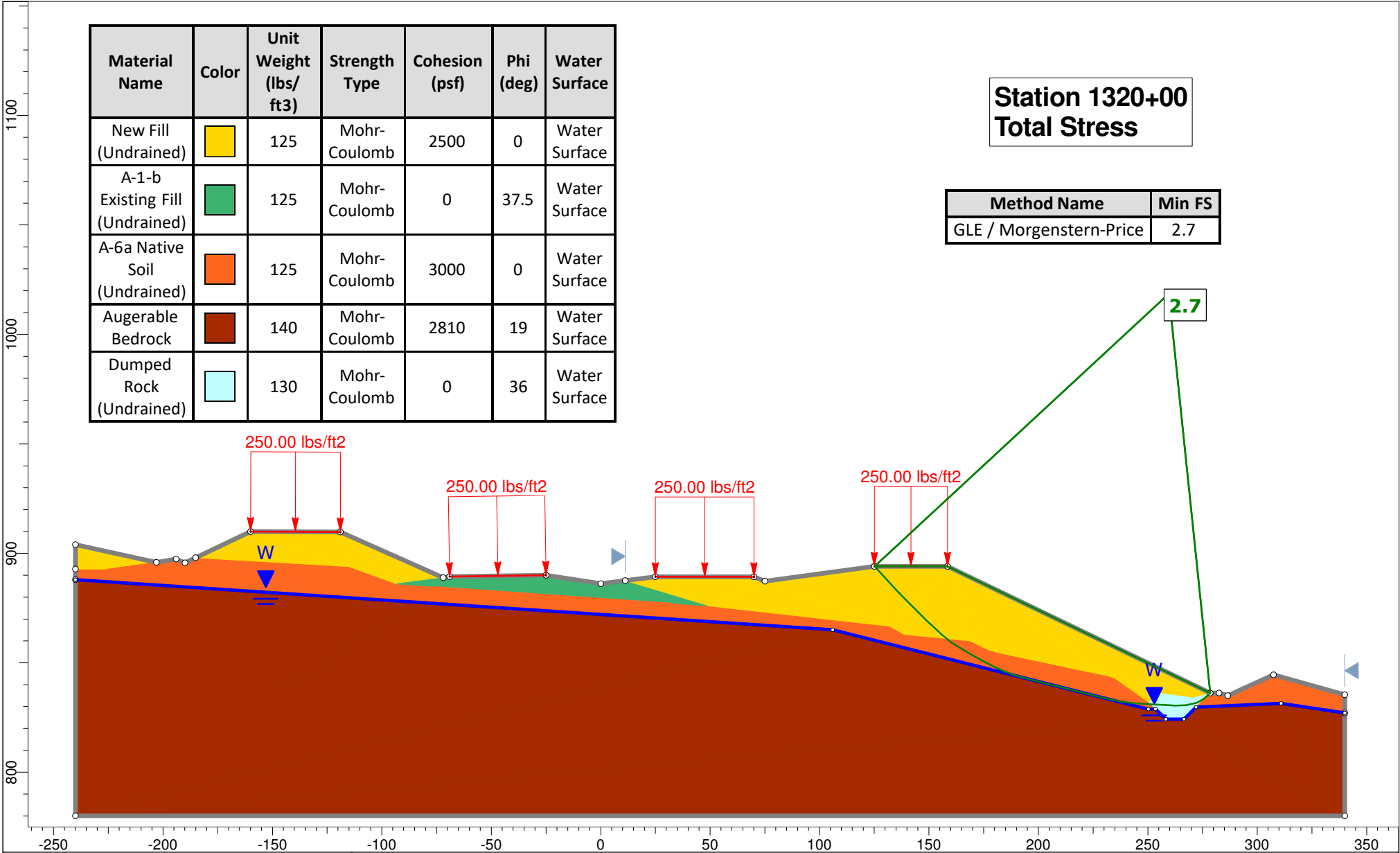
Station 1320+00 Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.5

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-1-b Existing Fill (Drained)	Green	125	Mohr-Coulomb	0	37.5	Water Surface
A-6a Native Soil (Drained)	Orange	125	Mohr-Coulomb	250	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock (Drained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface



	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1320+00 ES.slmd

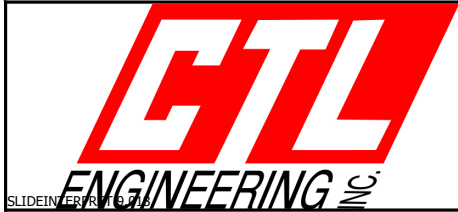


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-1-b Existing Fill (Undrained)	Green	125	Mohr-Coulomb	0	37.5	Water Surface
A-6a Native Soil (Undrained)	Orange	125	Mohr-Coulomb	3000	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock (Undrained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface

**Station 1320+00
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	2.7

2.7

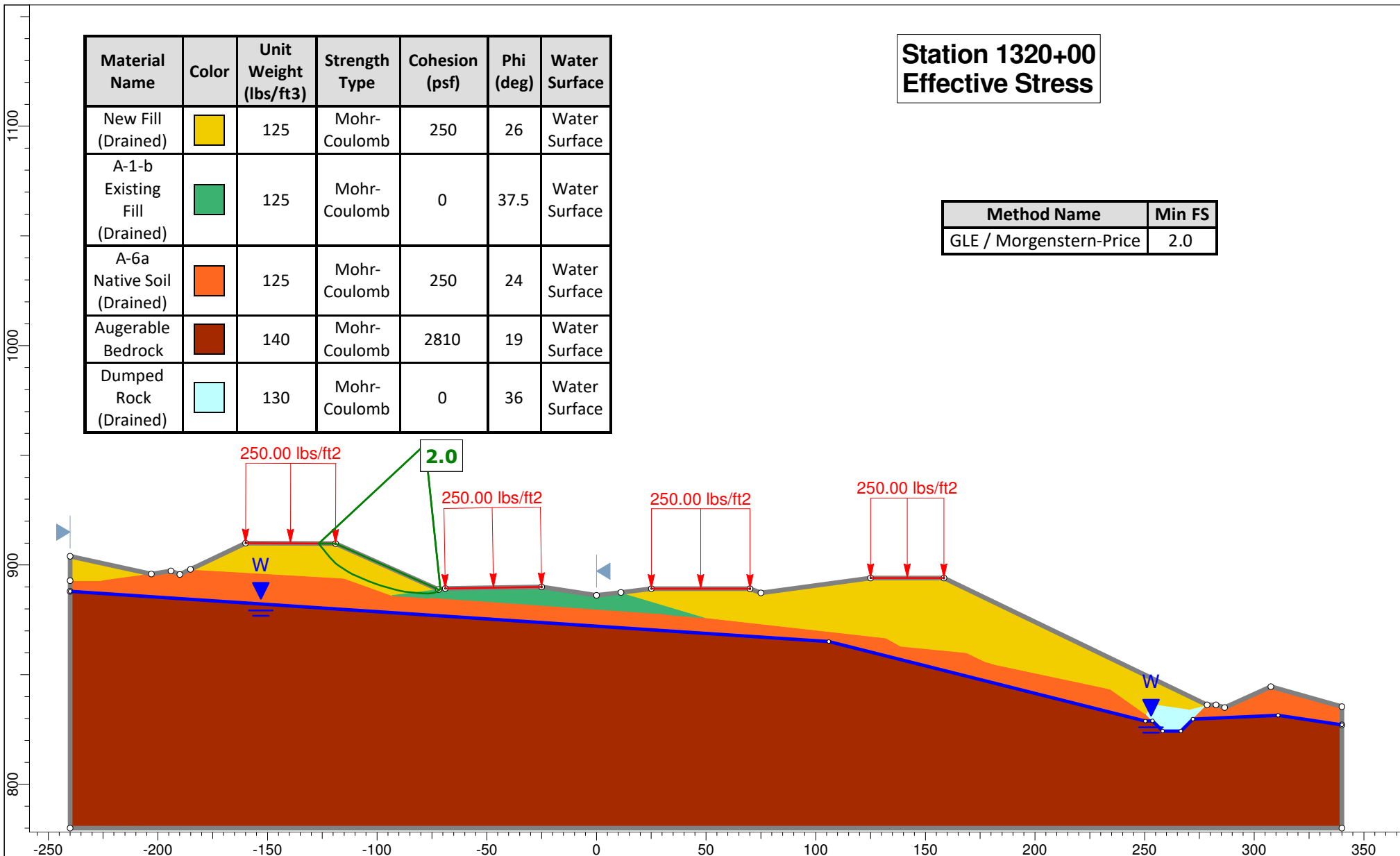



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1320+00 TS.slmd

Station 1320+00 Effective Stress






Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-1-b Existing Fill (Drained)	Green	125	Mohr-Coulomb	0	37.5	Water Surface
A-6a Native Soil (Drained)	Orange	125	Mohr-Coulomb	250	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock (Drained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	2.0



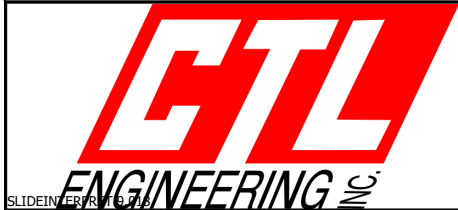
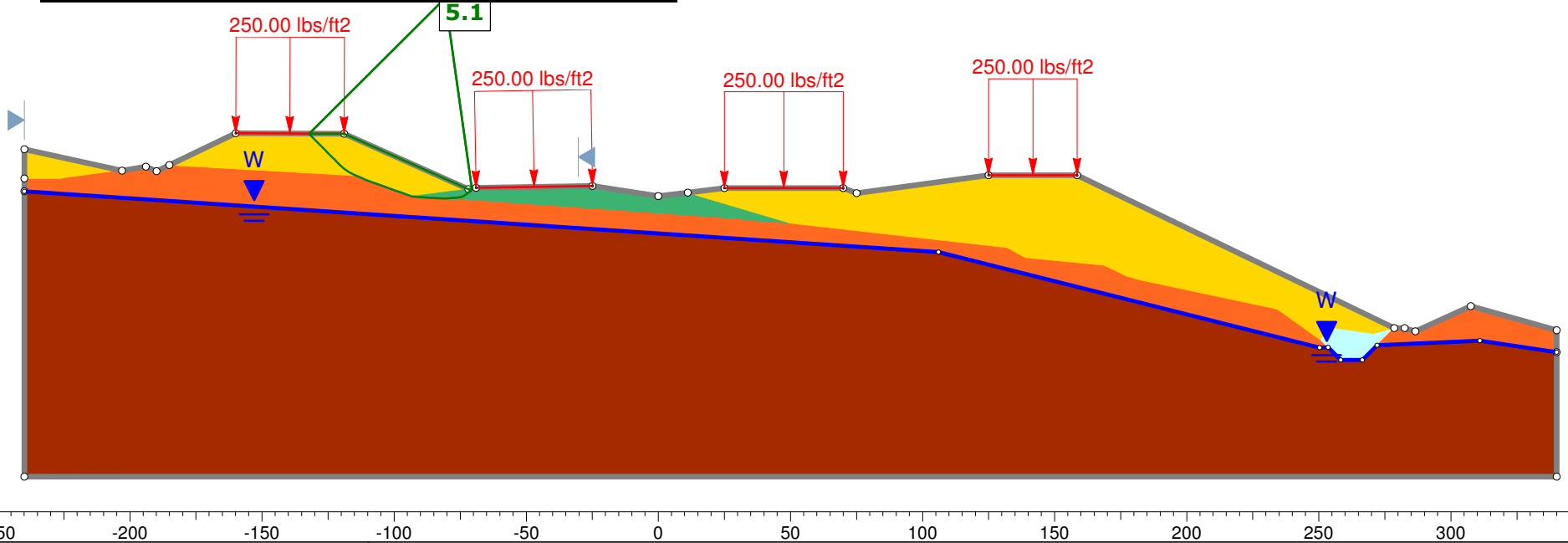
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	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1320+00 ES.sldm

1100
1050
1000
950
900
850
800

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)		125	Mohr-Coulomb	2500	0	Water Surface
A-1-b Existing Fill (Undrained)		125	Mohr-Coulomb	0	37.5	Water Surface
A-6a Native Soil (Undrained)		125	Mohr-Coulomb	3000	0	Water Surface
Augerable Bedrock		140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock (Undrained)		130	Mohr-Coulomb	0	36	Water Surface

**Station 1320+00
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	5.1



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1320+00 TS.sldm

Soil Parameters

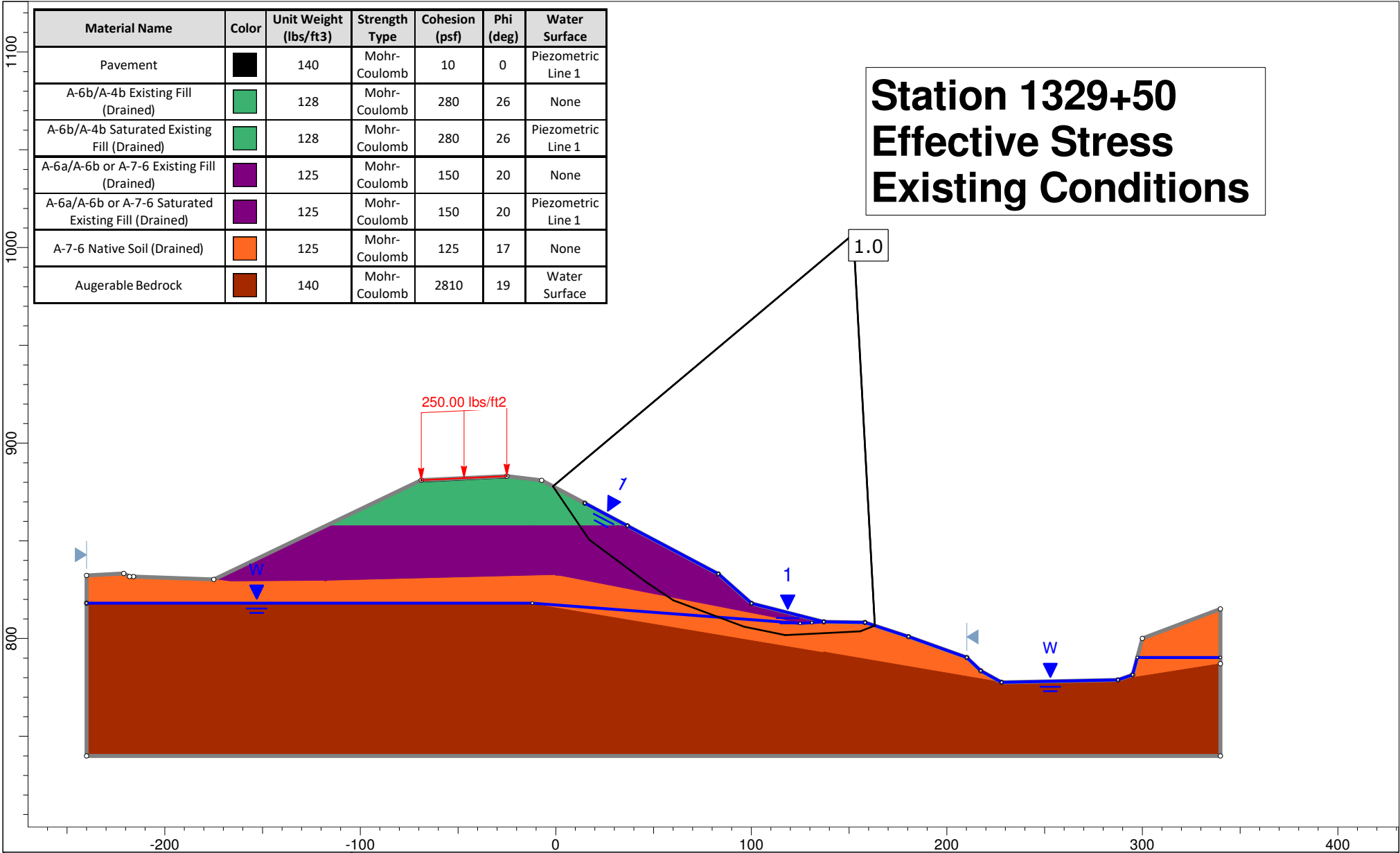
Project: ATH/MEG-33-23.23/0.00
 Station: 1329+50
 Boring No.: B-025-1-23, B-025-2-23
 Date: 12/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference				
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)					
1	881.7	857.7	24	A-6b/A-4b Ex. Fill	128	15	15											
						28	11											
						26	10											
						29	6	28	19									
						41	8											
						28	16											
						32	21											
						27	11											
						27	11	29	19									
						23	11											
Avg			A-6b/A-4b	128	28	12	29	19	3500	0	280	26	1,2,3					
2	857.7	832.2	25.5	A-6a/A-6b or A-7-6 Ex. Fill	125	19	9	34	19									
						17	14	38	20									
						23	13											
						26	8											
						22	24											
						20	17											
						27	5	32	19									
						38	5											
						20	21											
						15	20											
						17	12											
						28	14											
						20	20											
26	15	35	24															
23	17																	
23	15																	
Avg			A-6a/A-6b or A-7-6	125	23	14			2875	0	150	20	2,4					
3	832.2	793.1	39.1	A-7-6	125	20	18	45	23									
						23	15											
						22	14											
						19	21	49	24									
						19	19											
						17	26											
						15	20	43	25									
						22	19	48	25									
						20	18									225	25	Right side
						23	11									100	22	Left Side
Avg			A-7-6	125	20	18	46	24	2500	0			2,5					

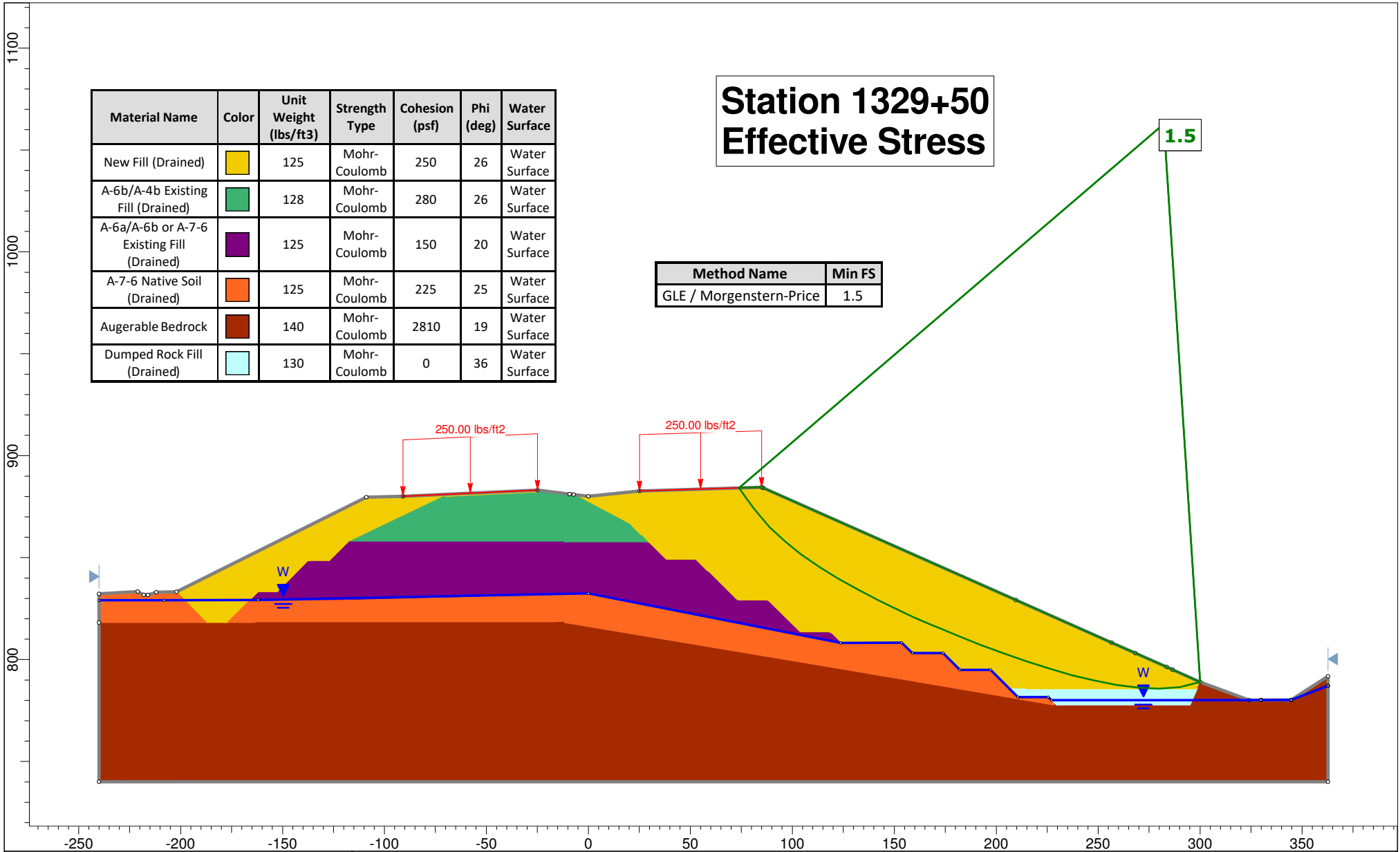
Note: Soil parameters for layer 1, 2 were taken from boring B-025-1-23, and soil parameters for layers 3 was taken from boring B-025-2-23


Reference Key

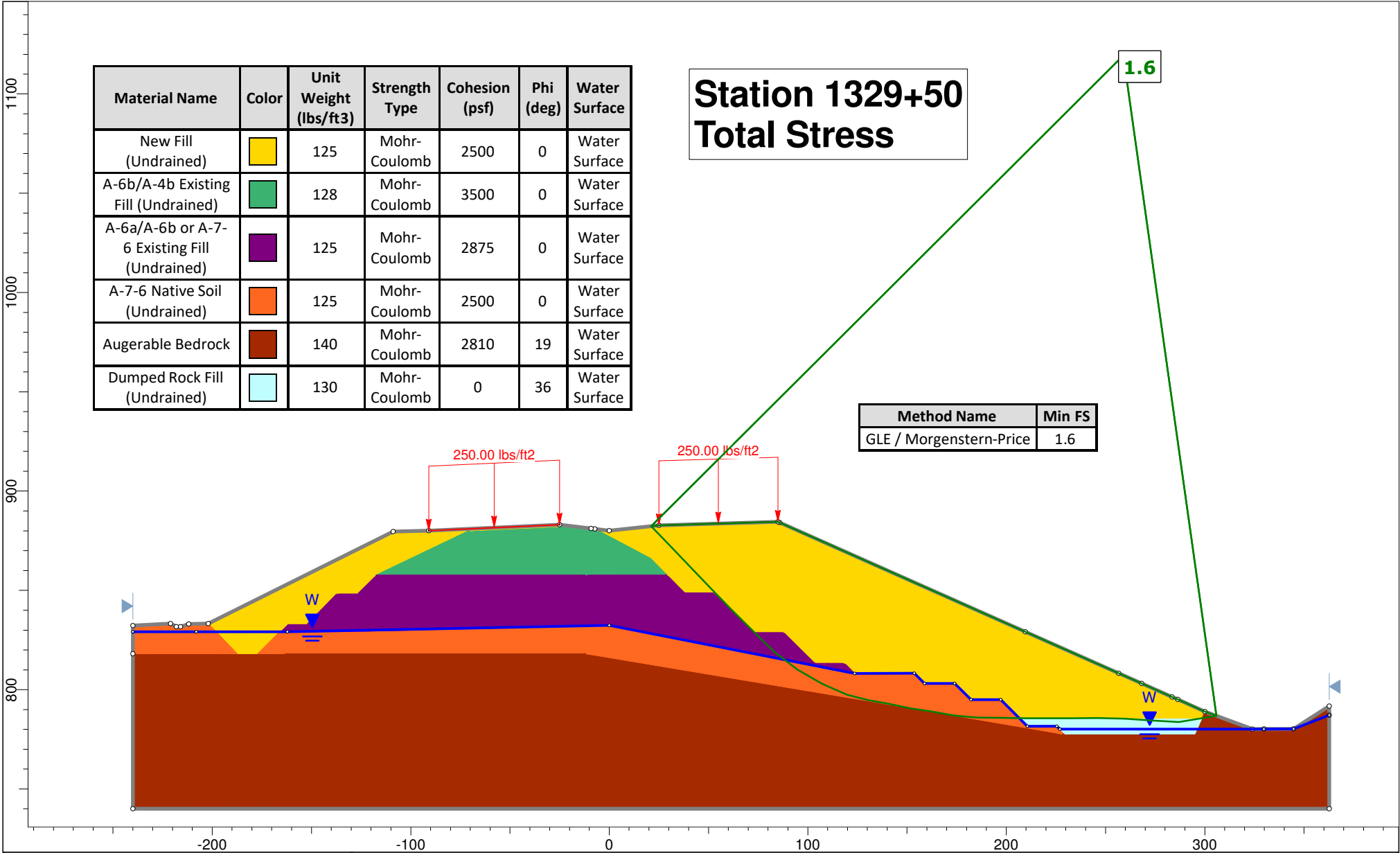
- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Effective cohesion and friction angle for layers 2 and 3 back-calculated to achieve a F.S of 1.0 in "Existing Conditions" model
- 5 ODOT recommended values for effective cohesion and friction angle for left side and right side



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1329+50 Existing Conditions.slmd



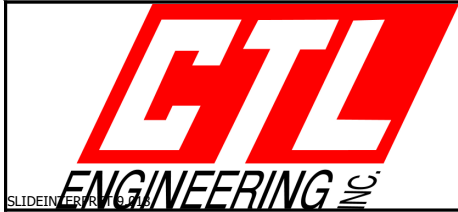
	Project	ATH/MEG-33-23.23/0.00	
	Group	Group 1	Scenario Master Scenario
	Drawn By	CTL Engineering, Inc.	Company CTL Engineering, Inc.
	Date		File Name 1329+50 With Dumped Rock Fill ES Right.slmd



Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-4b Existing Fill (Undrained)	Green	128	Mohr-Coulomb	3500	0	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	2875	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	125	Mohr-Coulomb	2500	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

**Station 1329+50
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	1.6

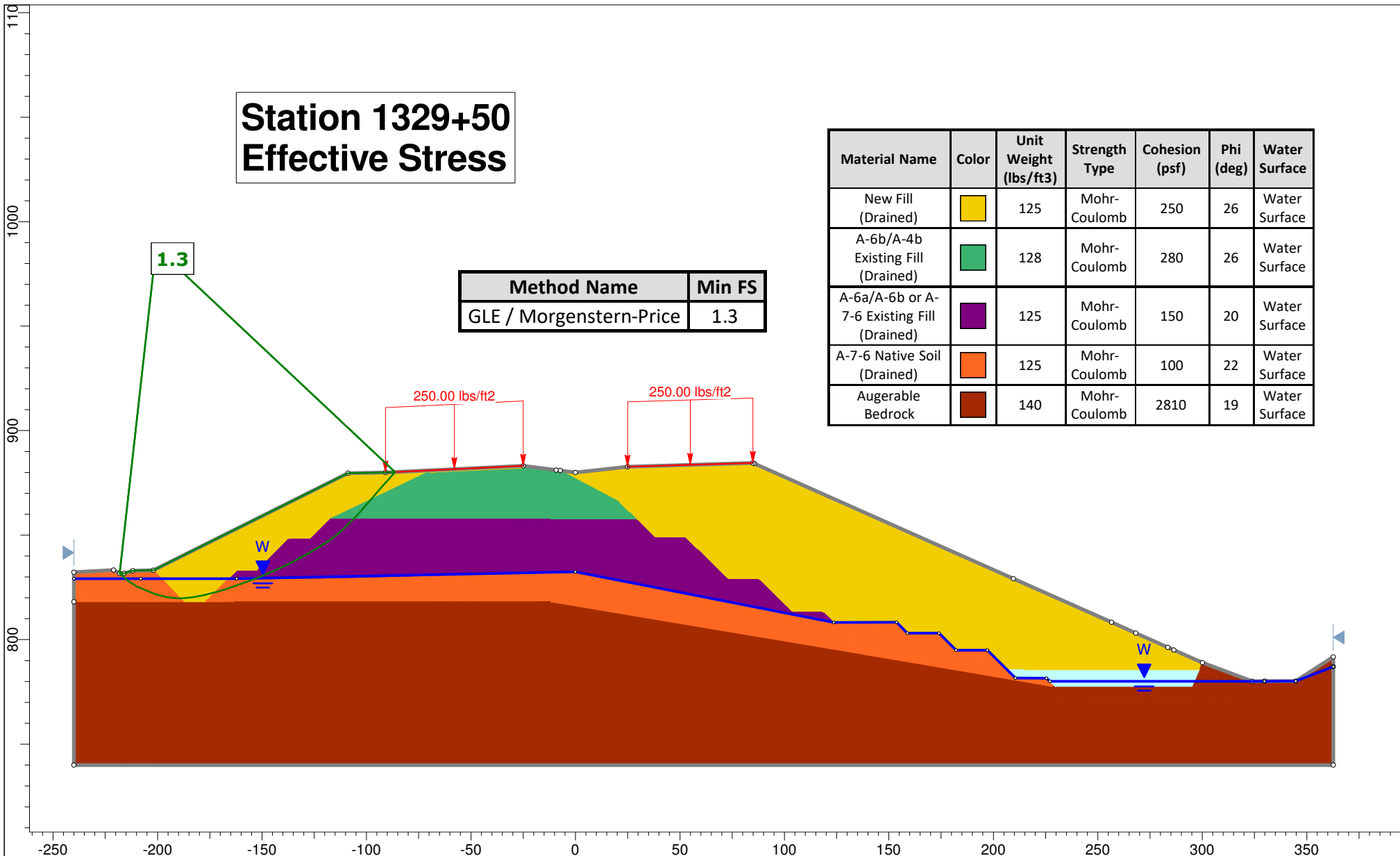



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1329+50 With Dumped Rock Fill TS Right.slmd

Station 1329+50 Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6b/A-4b Existing Fill (Drained)	Green	128	Mohr-Coulomb	280	26	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Drained)	Purple	125	Mohr-Coulomb	150	20	Water Surface
A-7-6 Native Soil (Drained)	Orange	125	Mohr-Coulomb	100	22	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.3

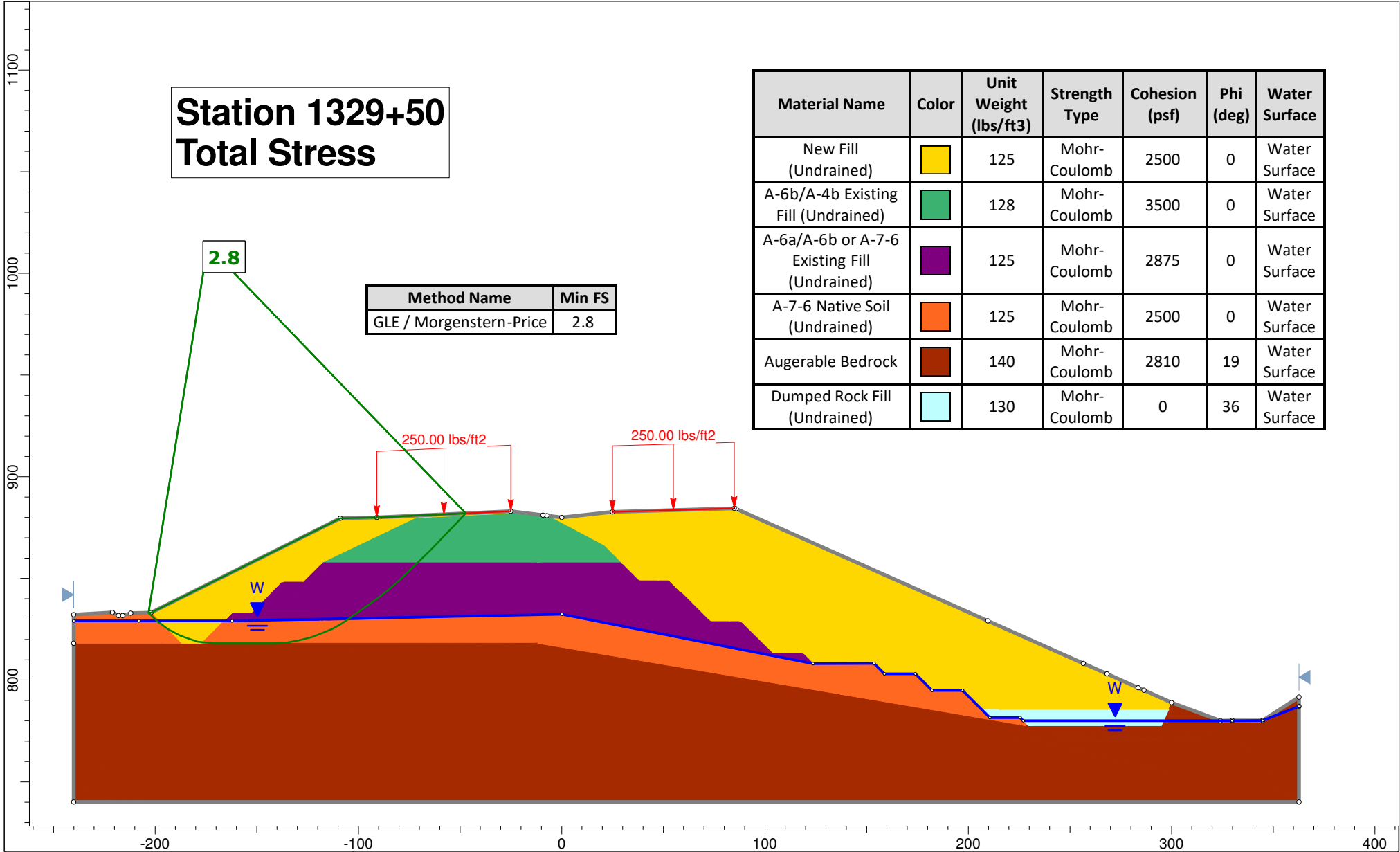


	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	
	Scenario		Master Scenario	
	Drawn By		CTL Engineering, Inc.	
Date		Company		CTL Engineering, Inc.
		File Name		1329+50 Without Dumped Rock Fill ES Left.slmd

Station 1329+50 Total Stress

Method Name	Min FS
GLE / Morgenstern-Price	2.8

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-4b Existing Fill (Undrained)	Green	128	Mohr-Coulomb	3500	0	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	2875	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	125	Mohr-Coulomb	2500	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1329+50 Without Dumped Rock Fill TS Left.slmd

Soil Parameters

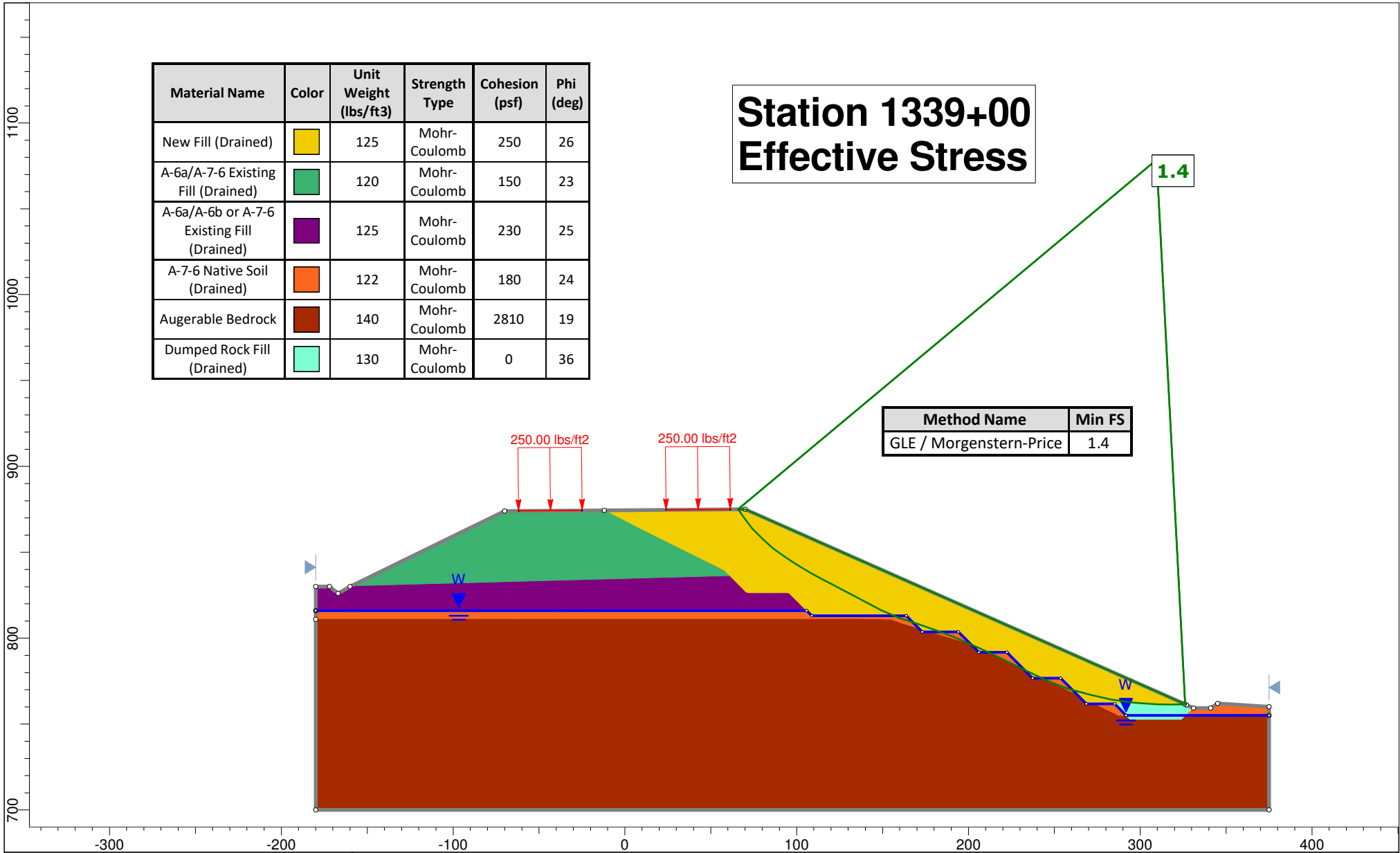
Project: ATH/MEG-33-23.23/0.00
 Station: 1339+00
 Boring No.: B-026-0-23, B-027-0-23
 Date: 11/25/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	859	835.5	23.5	A-6a/A-7-6 Ex. Fill	120	14	13	35	20					
						8	14							
						11	17							
						14	15							
						18	17							
						9	15							
						11	16							
Avg	A-6a/A-7-6	120	12	16	40	22	1500	0	150	23	1,2,3			
2	835.5	820.5	15.0	A-6a/A-6b or A-7-6 Ex. Fill	125	20	11	33	19					
						23	14							
						20	13							
						Avg	A-6a/A-6b or A-7-6							
3	820.5	814	6.5	A-6b	122	15	20	39	21					
						Avg	A-6b							

Note: Layer 1 and 2 soil properties taken from boring B-026-0-23. Layer 3 soil properties were taken from boring B-027-0-23

Reference Key

- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2

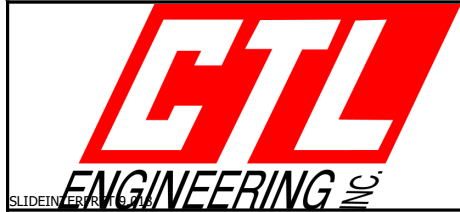


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26
A-6a/A-7-6 Existing Fill (Drained)	Green	120	Mohr-Coulomb	150	23
A-6a/A-6b or A-7-6 Existing Fill (Drained)	Purple	125	Mohr-Coulomb	230	25
A-7-6 Native Soil (Drained)	Orange	122	Mohr-Coulomb	180	24
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19
Dumped Rock Fill (Drained)	Cyan	130	Mohr-Coulomb	0	36

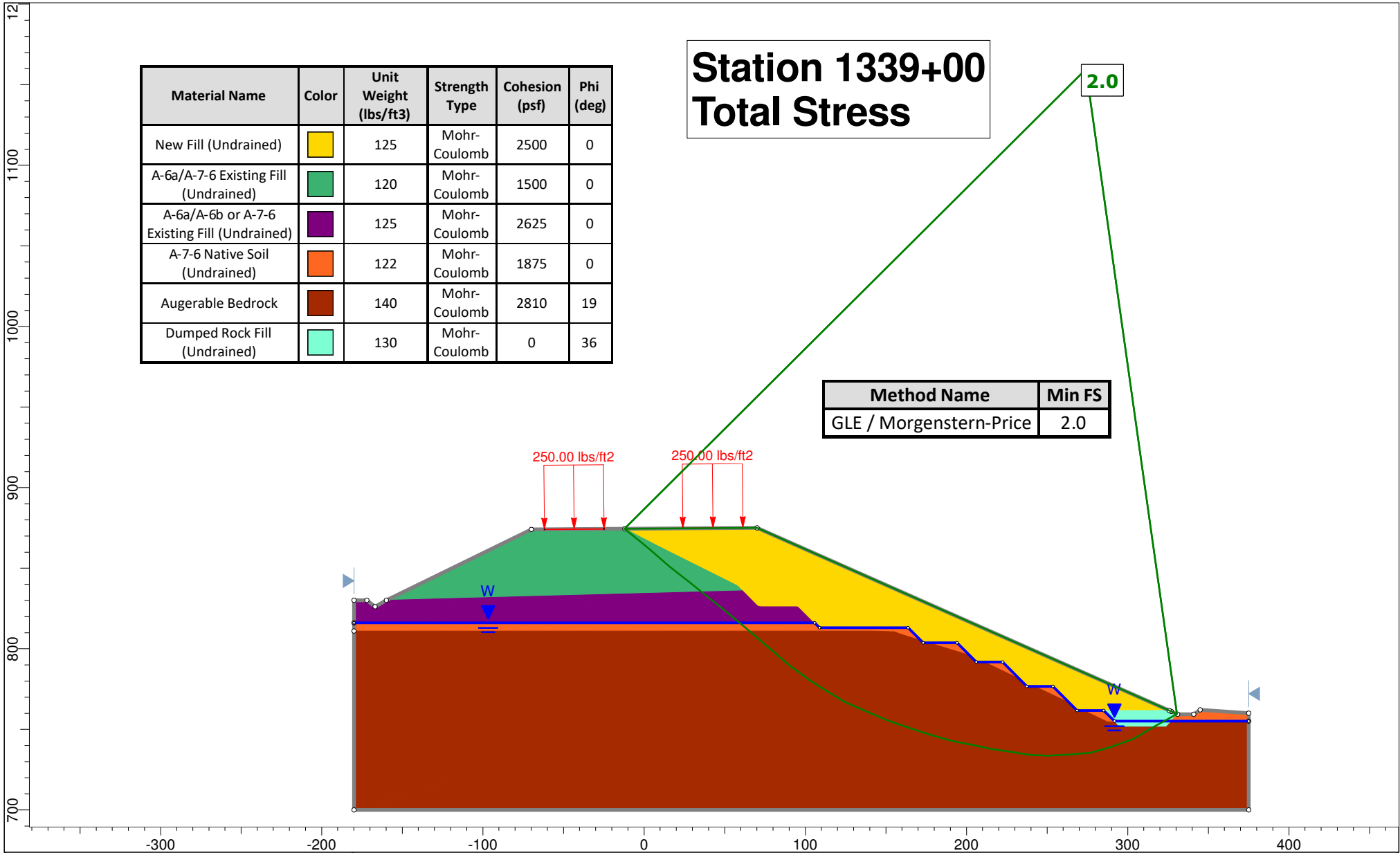
Station 1339+00 Effective Stress


Method Name	Min FS
GLE / Morgenstern-Price	1.4

1.4



Project		ATH/MEG-US33-70.00/00.00	
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1339+00 ES.slmd



	Project		ATH/MEG-US33-70.00/00.00	
	Group	Group 1	Scenario	Master Scenario
	Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
	Date		File Name	1339+00 TS.sldm
	SLIDE IN FRONT OF FILE			

Soil Parameters

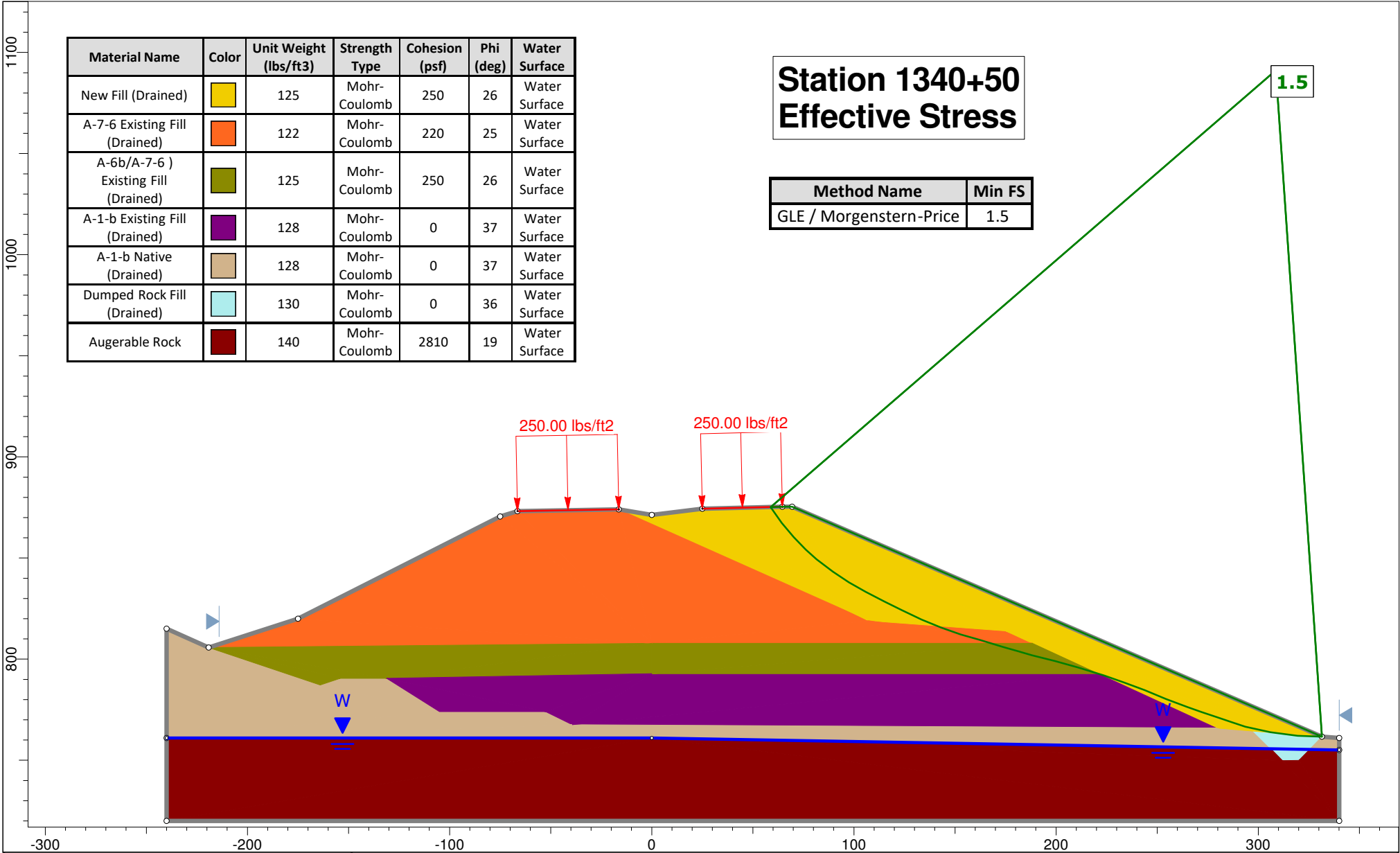
Project: ATH/MEG-33-23.23/0.00
 Station: 1340+50
 Boring No.: B-028-0-23, SB-49
 Date: 9/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	816.3	807.8	8.5	A-7-6 Ex. Fill	122	15	28	48	24	2375	0	220	25	1,2,3
						26	16	64	21					
			Avg	A-7-6	122	19	24	56	23					
2	807.8	792.8	15.0	A-6b/A-7-6 Ex. Fill	125	15	18	40	21	2875	0	250	26	1,2,3
						20	26							
			Avg	A-6b/A-7-6	125	23	19	41	21					
3	792.8	767.5	25.3	A-1-b Ex. Fill	128	23	20	NP	NP	0	37	0	37	4
						28	18							
			Avg	A-1-b	128	26	19	NP	NP					
4	767.5	761	6.5	A-1-b	128	14		NP	NP	0	37	0	37	4
						39								
			Avg	A-1-b	128	27		NP	NP					

Note: Layer 1 through 3 soil properties taken from boring B-028-0-23. Layer 4 soil properties were taken from historic boring SB-49

Reference Key

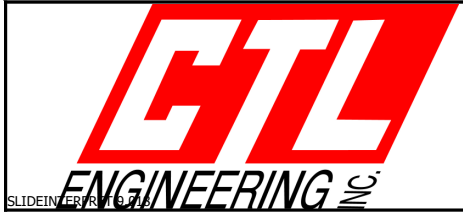
- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1 and cohesion assumed to be 0

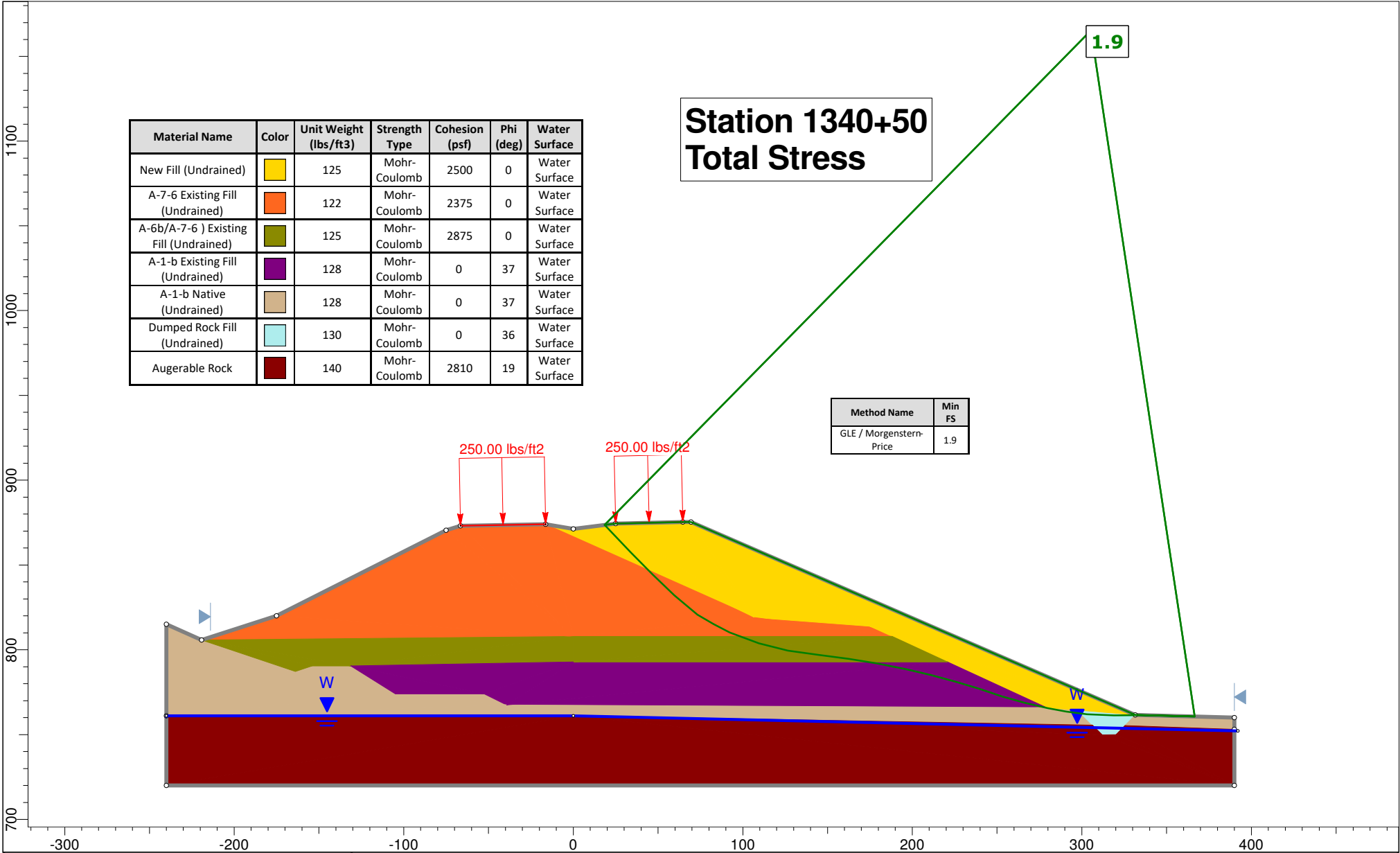


Station 1340+50 Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.5

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-7-6 Existing Fill (Drained)	Orange	122	Mohr-Coulomb	220	25	Water Surface
A-6b/A-7-6) Existing Fill (Drained)	Green	125	Mohr-Coulomb	250	26	Water Surface
A-1-b Existing Fill (Drained)	Purple	128	Mohr-Coulomb	0	37	Water Surface
A-1-b Native (Drained)	Tan	128	Mohr-Coulomb	0	37	Water Surface
Dumped Rock Fill (Drained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface
Augerable Rock	Dark Red	140	Mohr-Coulomb	2810	19	Water Surface

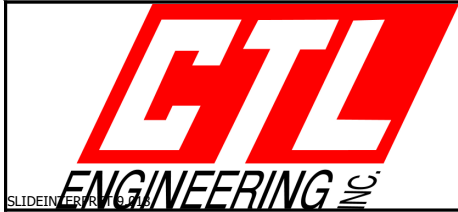
	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1340+50 ES.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-7-6 Existing Fill (Undrained)	Orange	122	Mohr-Coulomb	2375	0	Water Surface
A-6b/A-7-6 Existing Fill (Undrained)	Green	125	Mohr-Coulomb	2875	0	Water Surface
A-1-b Existing Fill (Undrained)	Purple	128	Mohr-Coulomb	0	37	Water Surface
A-1-b Native (Undrained)	Tan	128	Mohr-Coulomb	0	37	Water Surface
Dumped Rock Fill (Undrained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface
Augerable Rock	Dark Red	140	Mohr-Coulomb	2810	19	Water Surface

**Station 1340+50
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	1.9



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1340+50 TS.slmd





Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1352+00
 Boring No.: B-033-0-23
 Date: 10/25/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	771	761.0	10.0	A-6b/A-7-6 Existing Fill	122	13 19	22 28	39 57	19 29					
			Avg	A-6b/A-7-6	122	16				2000	0	200	24	1,2,3

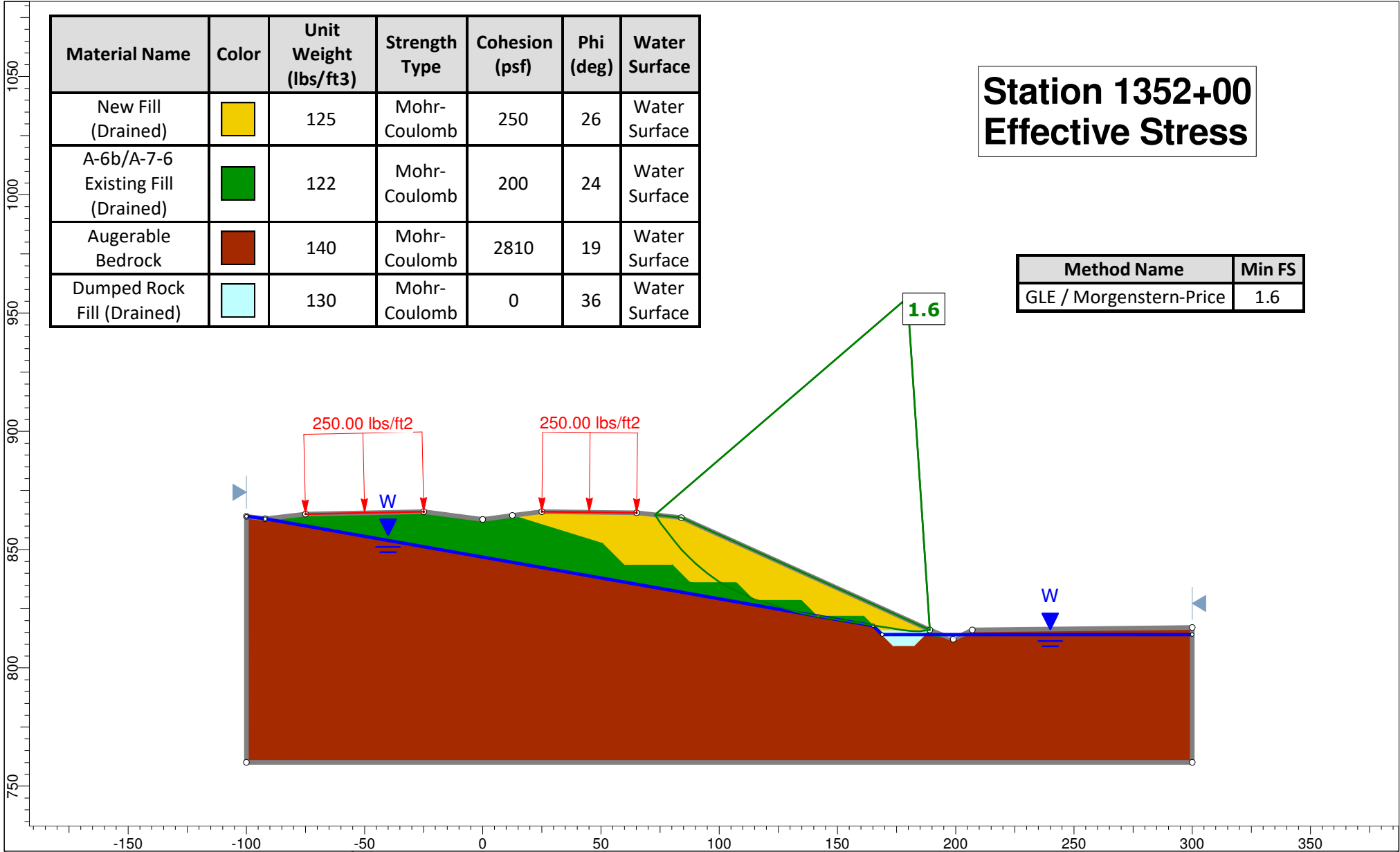
Reference Key


- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)		125	Mohr-Coulomb	250	26	Water Surface
A-6b/A-7-6 Existing Fill (Drained)		122	Mohr-Coulomb	200	24	Water Surface
Augerable Bedrock		140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Drained)		130	Mohr-Coulomb	0	36	Water Surface





Station 1352+00 Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.6

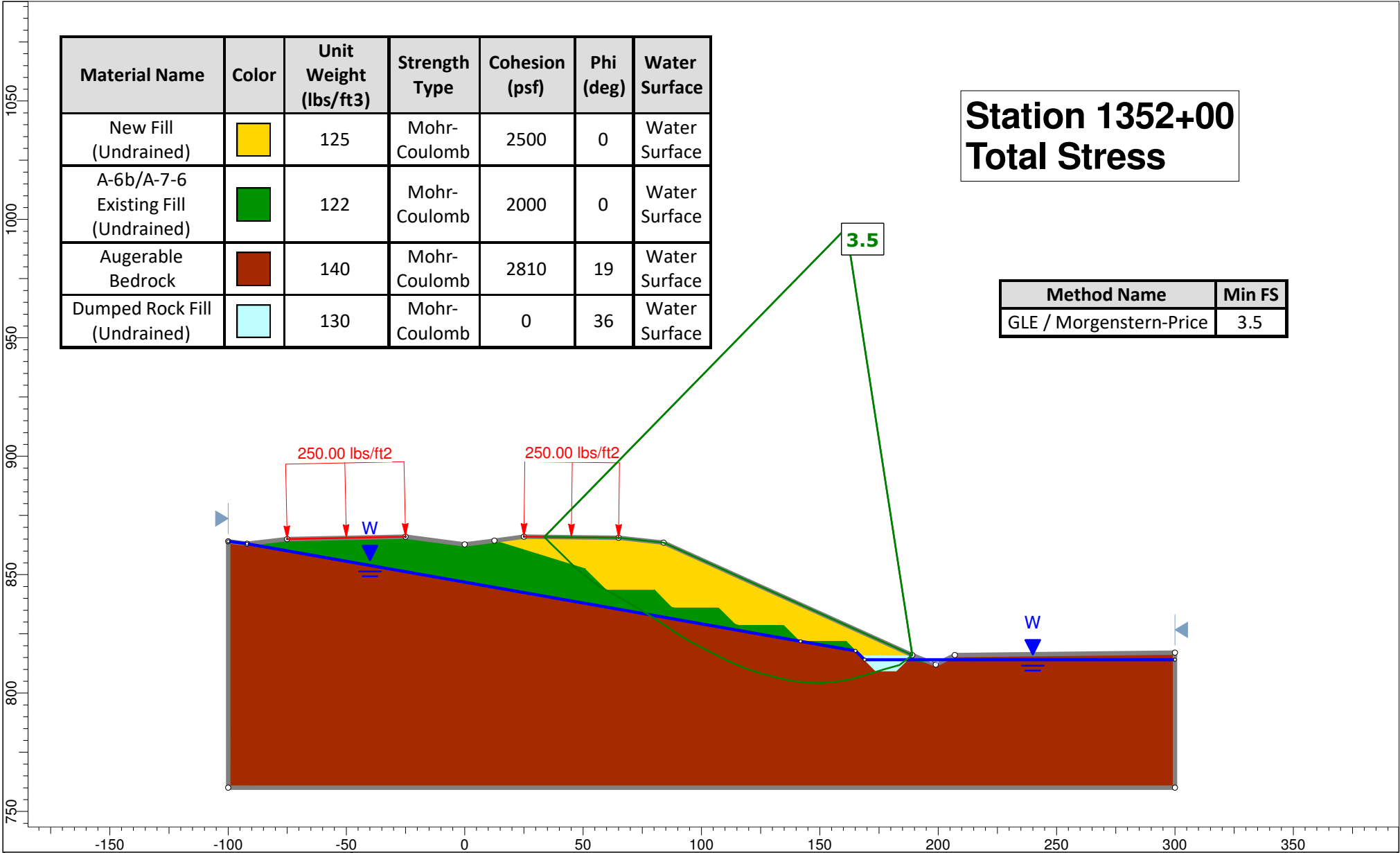


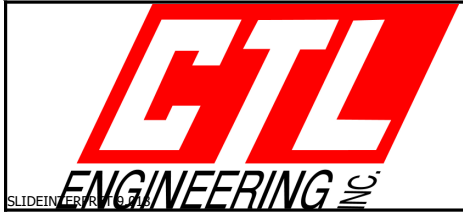
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	Group		Group 1	
	Scenario		Master Scenario	
	Drawn By		CTL Engineering, Inc.	
	Company		CTL Engineering, Inc.	
Date		10/24/2024, 1:58:50 PM		
File Name		1352+00.slmd		

Station 1352+00 Total Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)		125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-7-6 Existing Fill (Undrained)		122	Mohr-Coulomb	2000	0	Water Surface
Augerable Bedrock		140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)		130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	3.5



	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date		10/24/2024, 1:58:50 PM	File Name
			Master Scenario	CTL Engineering, Inc.
				1352+00.slmd

Soil Parameters

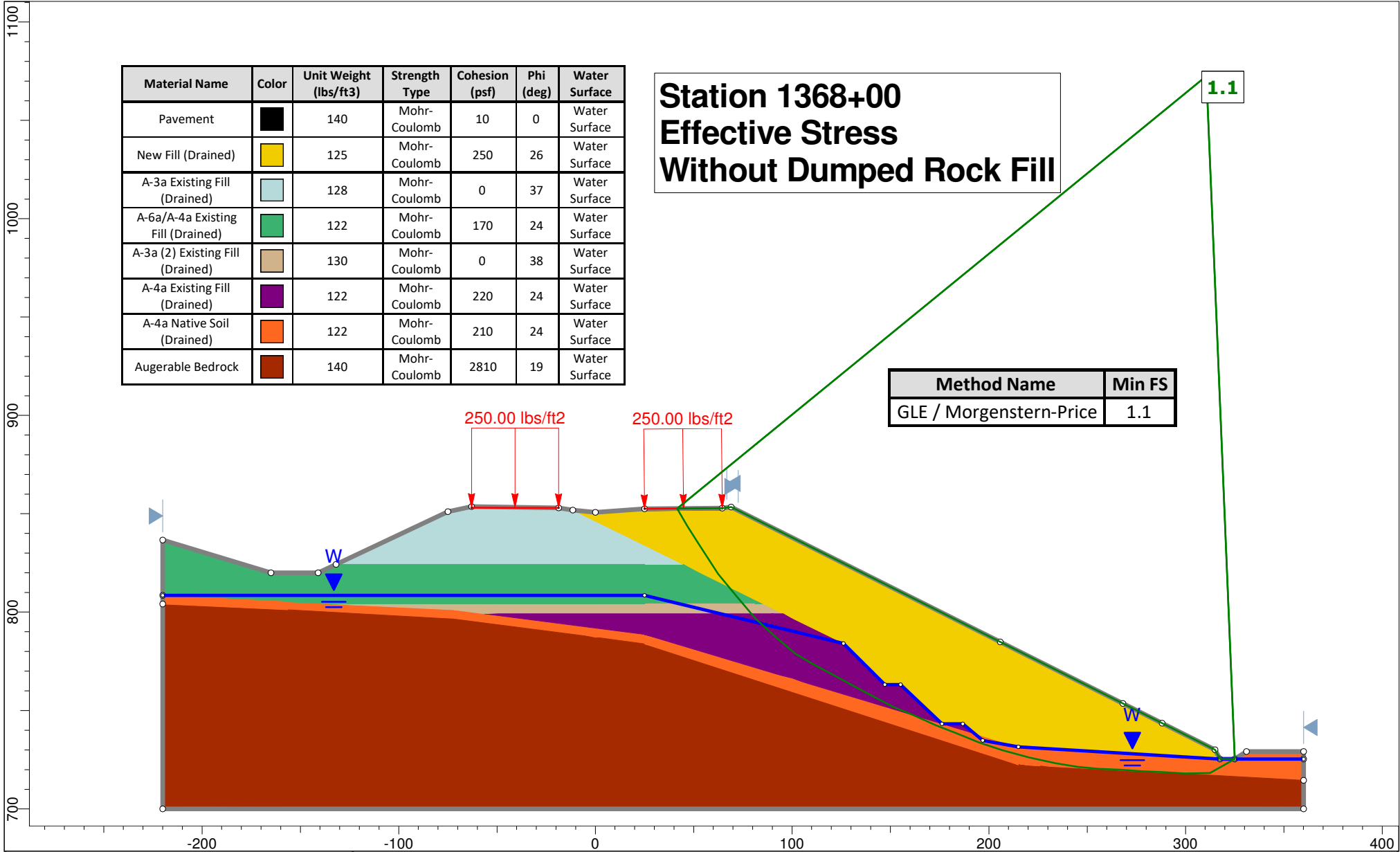
Project: ATH/MEG-33-23.23/0.00
 Station: 1368+00
 Boring No.: B-030-0-23, B-031-0-23
 Date: 9/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	832.7	824.2	8.5	A-3a Ex. Fill	128	47	6	NP	NP	0	37	0	37	1
						20	7							
			Avg	A-3a	128	30	7	NP	NP					
2	824.2	804.2	20.0	A-6a/A-4a Ex. Fill	122	17	8	23	16	1750	0	170	24	2,3,4
						12	12	34	20					
			Avg	A-6a/A-4a	122	14	12	29	18					
3	804.2	799.2	5	A-3a Ex. Fill	130	38	12	NP	NP	0	38	0	38	1
			Avg	A-3a	130	38	12	NP	NP					
4	799.2	789.2	10	A-4a/A-6a Ex. Fill	122	41	15	16		2375	0	220	24	2,3,4
						18	13							
			Avg	A-4a/A-6a	122	19	21	32	21					
5	789.2	783.8	5.4	A-4a/ A-6a	122	26	21			2250	0	210	24	2,3,4
						15								
			Avg	A-4a/ A-6a	122	18	21	30	17					

Note: Layer 1 through 3 soil properties taken from boring B-031-0-23. Layer 4 and 5 soil properties taken from boring B-030-0-23

Reference Key

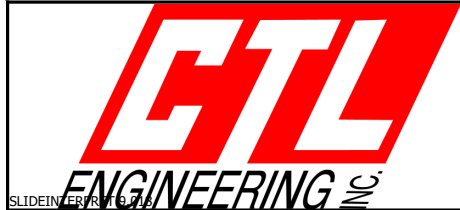
- 1 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1
- 2 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1 and cohesion assumed to be 0.
- 3 Total stress friction angle of cohesive soils estimated to be 0
- 4 Effective stress friction angle for cohesive soils estimated using GB7 Table 2



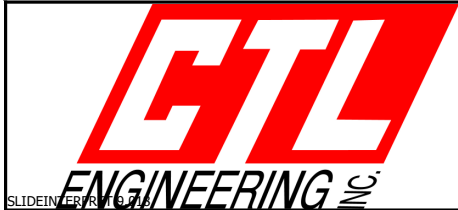
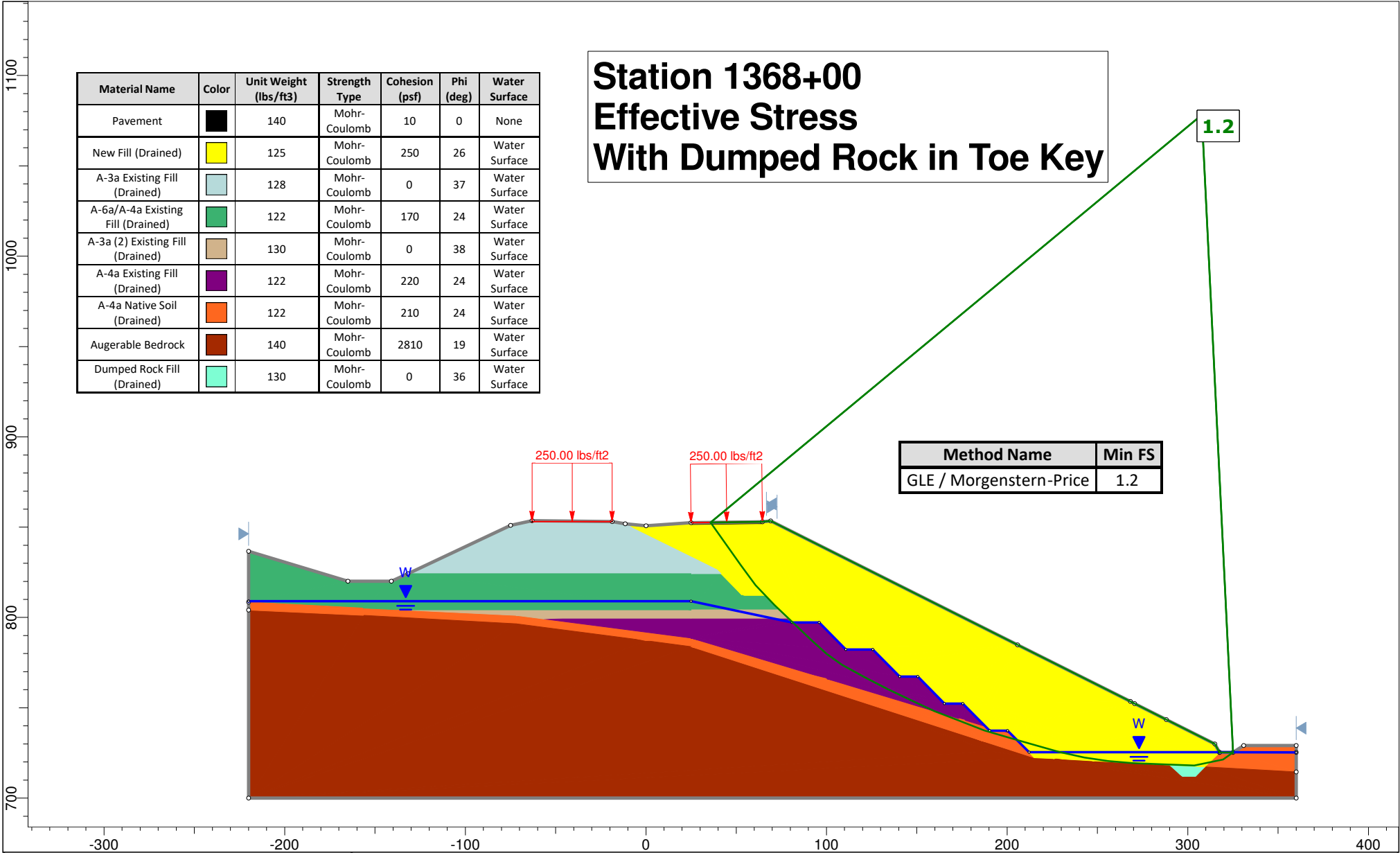
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-3a Existing Fill (Drained)	Light Blue	128	Mohr-Coulomb	0	37	Water Surface
A-6a/A-4a Existing Fill (Drained)	Green	122	Mohr-Coulomb	170	24	Water Surface
A-3a (2) Existing Fill (Drained)	Light Brown	130	Mohr-Coulomb	0	38	Water Surface
A-4a Existing Fill (Drained)	Purple	122	Mohr-Coulomb	220	24	Water Surface
A-4a Native Soil (Drained)	Orange	122	Mohr-Coulomb	210	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

**Station 1368+00
Effective Stress
Without Dumped Rock Fill**

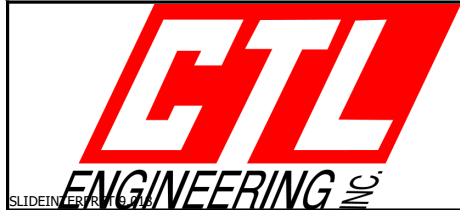
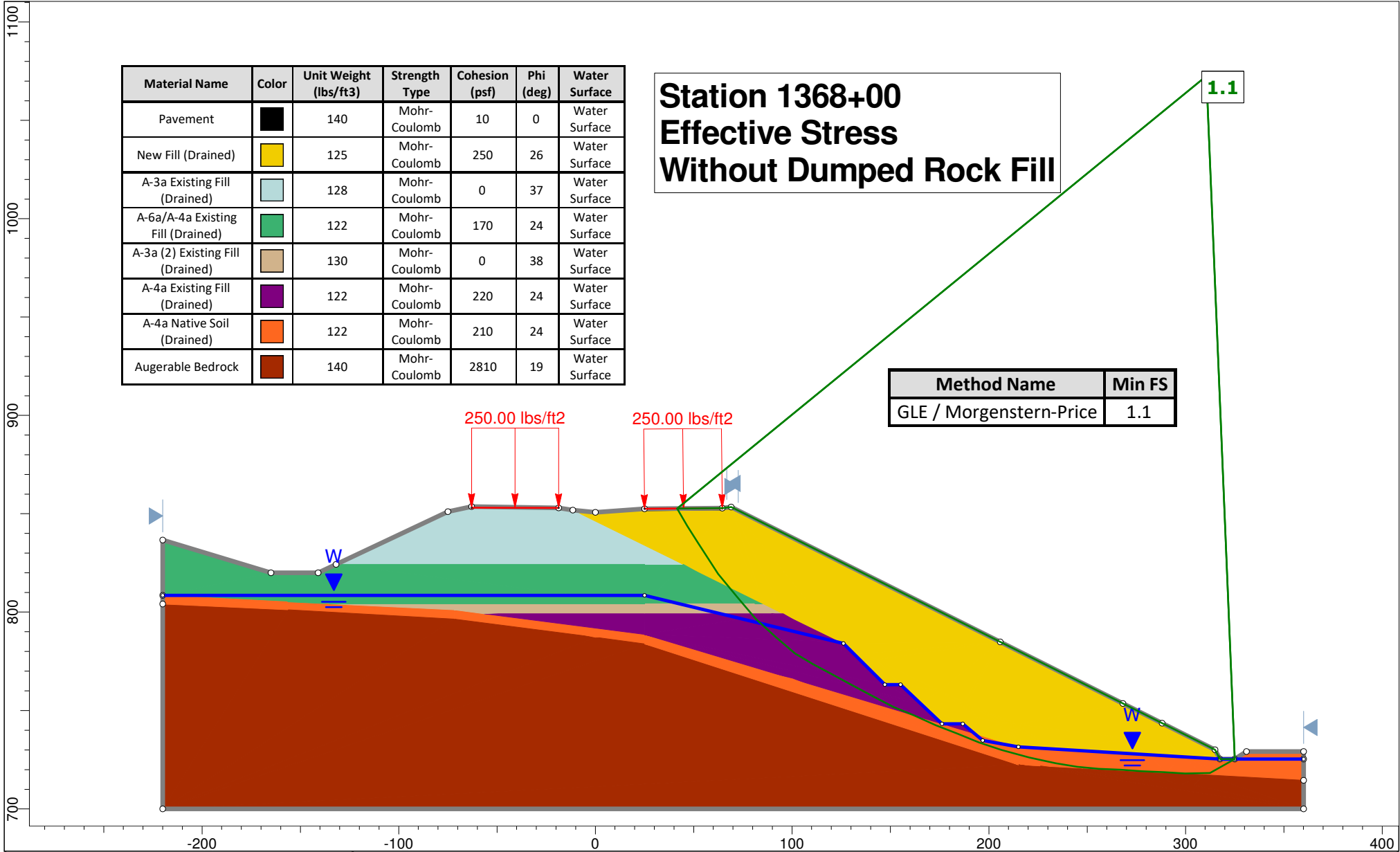
Method Name	Min FS
GLE / Morgenstern-Price	1.1



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1368+00 ES Without Dumped Rock.slmd



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	24.12.05 1368+00 ES.slmd



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1368+00 ES Without Dumped Rock.slmd

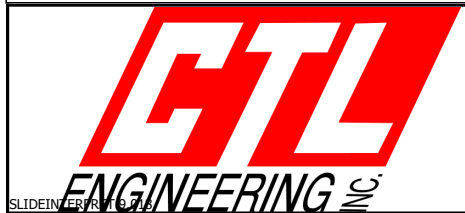
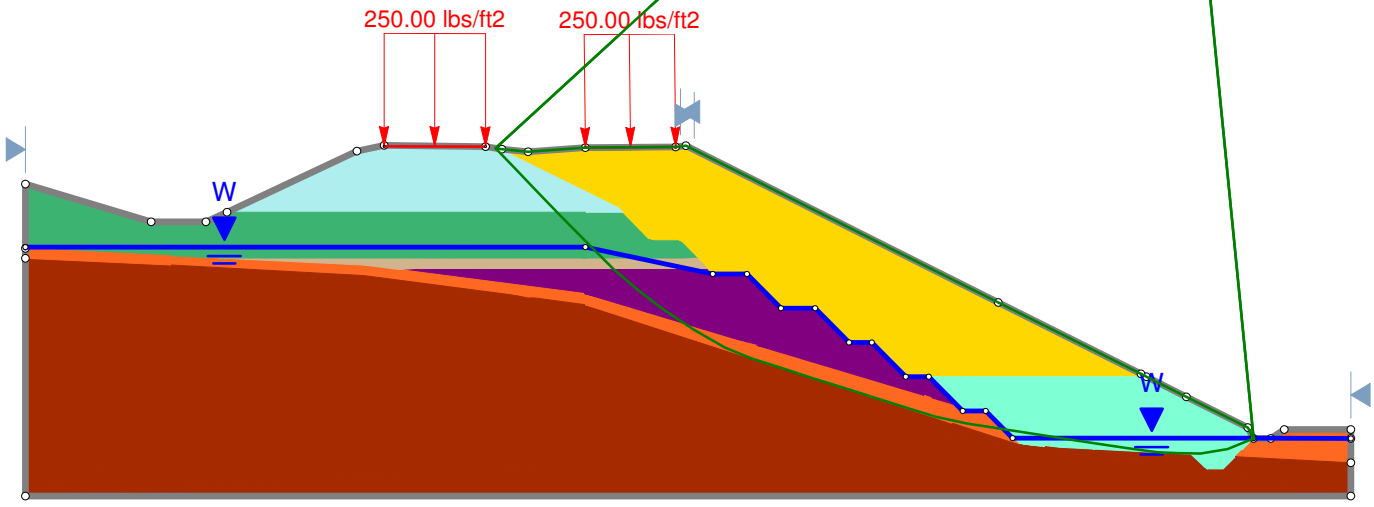
1200
1100
1000
900
800
700

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-3a Existing Fill (Undrained)	Light Blue	128	Mohr-Coulomb	0	37	Water Surface
A-6a/A-4a Existing Fill (Undrained)	Green	122	Mohr-Coulomb	1750	0	Water Surface
A-3a (2) Existing Fill (Undrained)	Tan	130	Mohr-Coulomb	0	38	Water Surface
A-4a Existing Fill (Undrained)	Purple	122	Mohr-Coulomb	2375	0	Water Surface
A-4a/A-7-6 Native Soil (Undrained)	Orange	122	Mohr-Coulomb	2400	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

Station 1368+00 Total Stress With Dumped Rock Fill

Method Name	Min FS
GLE / Morgenstern-Price	1.3

1.3



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	24.11.27 1368+00 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1386+00
 Boring No.: B-033-0-23, SB-44
 Date: 10/24/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	771	761.0	10.0	A-6b/A-7-6 Existing Fill	122	13	22	39	19	2000	0	200	24	1,2,3
						19	28	57	29					
2	761	756.0	5.0	A-3	125	8				0	31.5	0	31.5	4
						21								
3	756.0	747.5	8.5	A-6a	132	24				5250	0	370	28	1,2,3
						59								
			Avg	A-6a	132	42								

Note: Layer 1 soil properties taken from boring B-033-0-23. Layer 2 and 3 soil properties taken from historic boring SB-44

Reference Key

- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6b/A-7-6 Existing Fill (Drained)	Green	122	Mohr-Coulomb	200	24	Water Surface
A-3a Native Soil (Drained)	Orange	125	Mohr-Coulomb	0	31.5	Water Surface
A-6a Native Soil (Drained)	Olive Green	132	Mohr-Coulomb	370	28	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Station 1386+00 Effective Stress Without Toe Key

1000

900

800

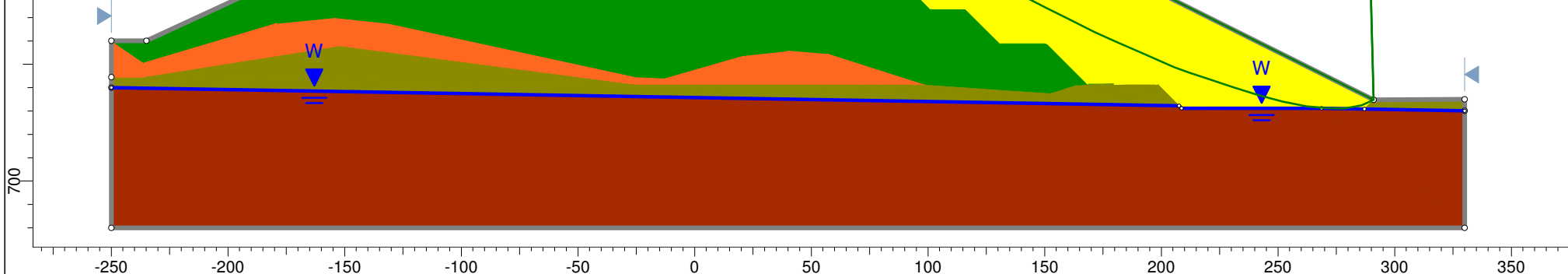
700


250.00 lbs/ft2

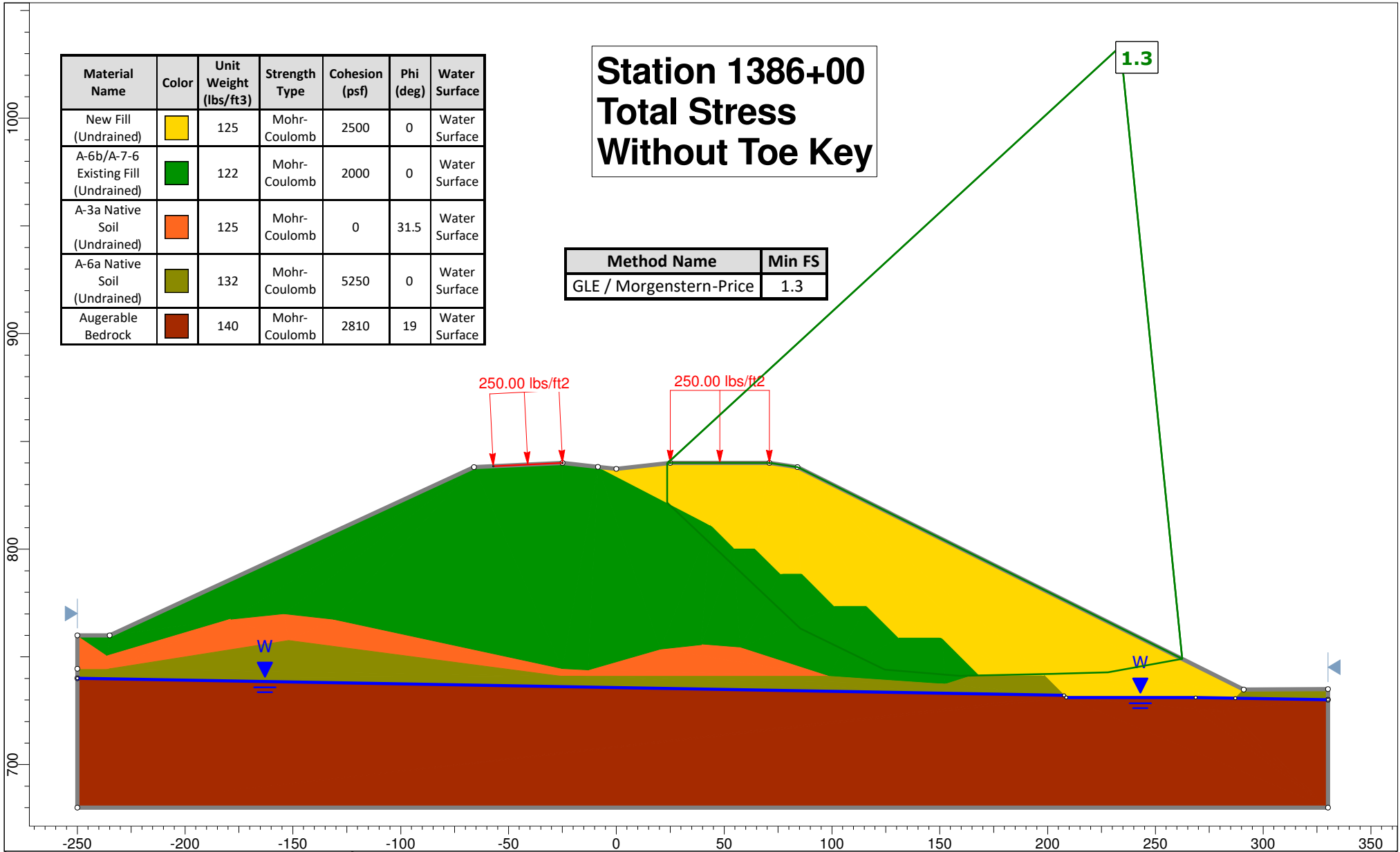
250.00 lbs/ft2


1.3

Method Name	Min FS
GLE / Morgenstern-Price	1.3



	Project	ATH/MEG-33-23.23/0.00	
	Group	Group 1	Scenario Master Scenario
	Drawn By	CTL Engineering, Inc.	Company CTL Engineering, Inc.
	Date		File Name 1386+00 ES no toe key.slmd



	Project		ATH/MEG-33-23.23/0.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1386+00 TS no toe key.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1405+50
 Boring No.: B-034-0-23, R-63, R-64
 Date: 9/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	797	781	16	A-6a/A-6b Ex. Fill	134.1	14	9	29	17	300	19	0	34.5	1
						17	11							
						14	25	38	21					
						14	18							
						15	14	38	19					
						15	13							
Avg	A-6a/A-6b	134.1	15	15	35	19								
2	781.0	752	29	Dumped rock Ex. Fill	125					0	36	0	36	5
						Avg	Dumped rock	125	--					
3	716.0	713.5	2.5	A-4a/A-6a	120	14				1250	0	120	22	2,3,4
						6								
Avg	A-4a/A-6a	120	10	--										
4	713.5	711	2.5	A-3a	130	39				0	38	0	38	6
Avg	A-3a	130	39	--										

Note: Layer 1 and 2 soil properties taken from boring B-034-0-23. Layer 3 soil properties taken from historic borings R-63 and R-64.

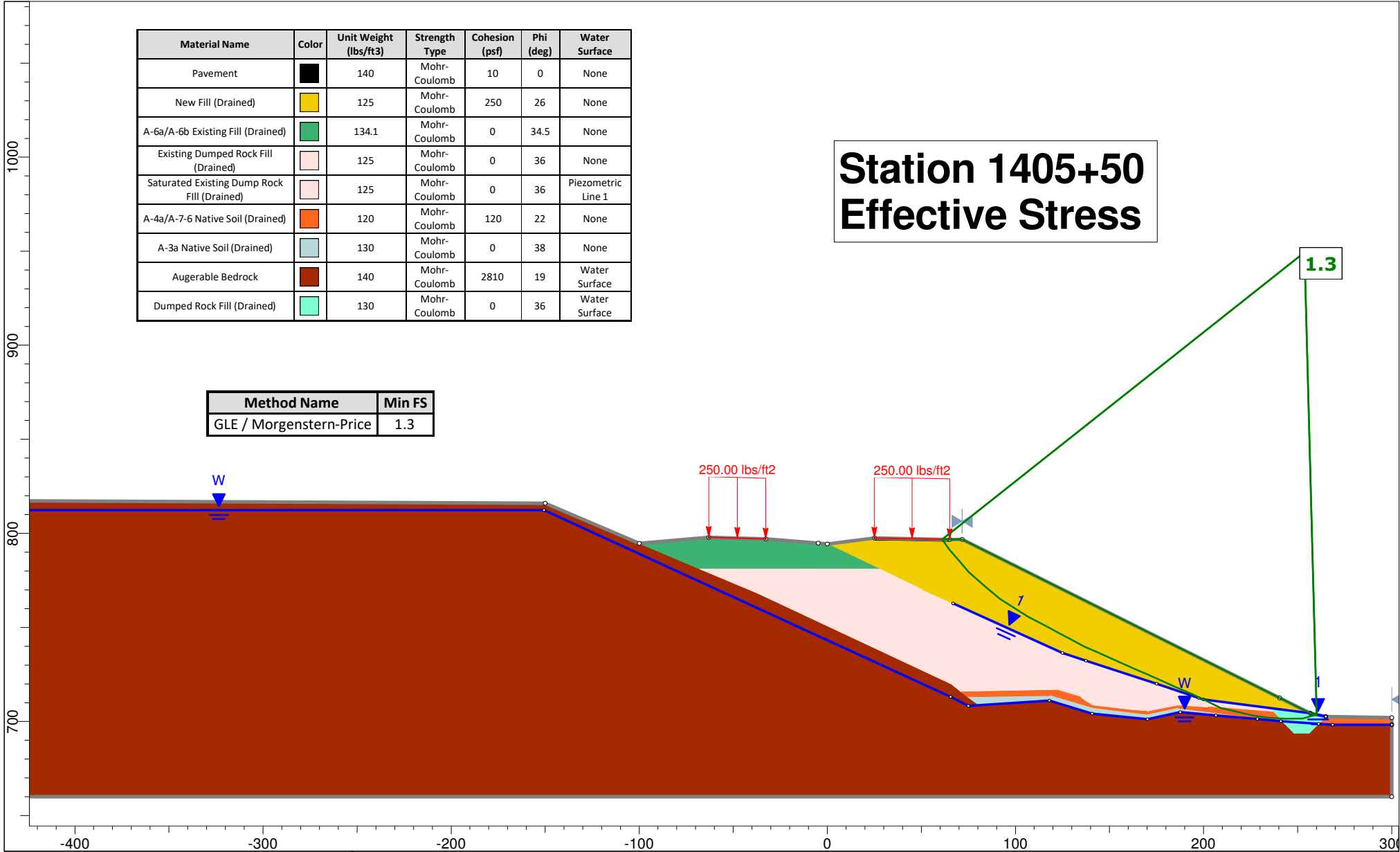
Reference Key

- 1 Laboratory consolidated undrained triaxial test results of B-034-A-23_ST-1_3'-5'
- 2 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 3 Total stress friction angle of cohesive soils estimated to be 0
- 4 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 5 Dumped rock fill friction angle estimated using engineering judgement
- 6 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1 and cohesion assumed to be 0.

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	None
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	None
A-6a/A-6b Existing Fill (Drained)	Green	134.1	Mohr-Coulomb	0	34.5	None
Existing Dumped Rock Fill (Drained)	Pink	125	Mohr-Coulomb	0	36	None
Saturated Existing Dump Rock Fill (Drained)	Light Pink	125	Mohr-Coulomb	0	36	Piezometric Line 1
A-4a/A-7-6 Native Soil (Drained)	Orange	120	Mohr-Coulomb	120	22	None
A-3a Native Soil (Drained)	Light Blue	130	Mohr-Coulomb	0	38	None
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Drained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

Station 1405+50 Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.3

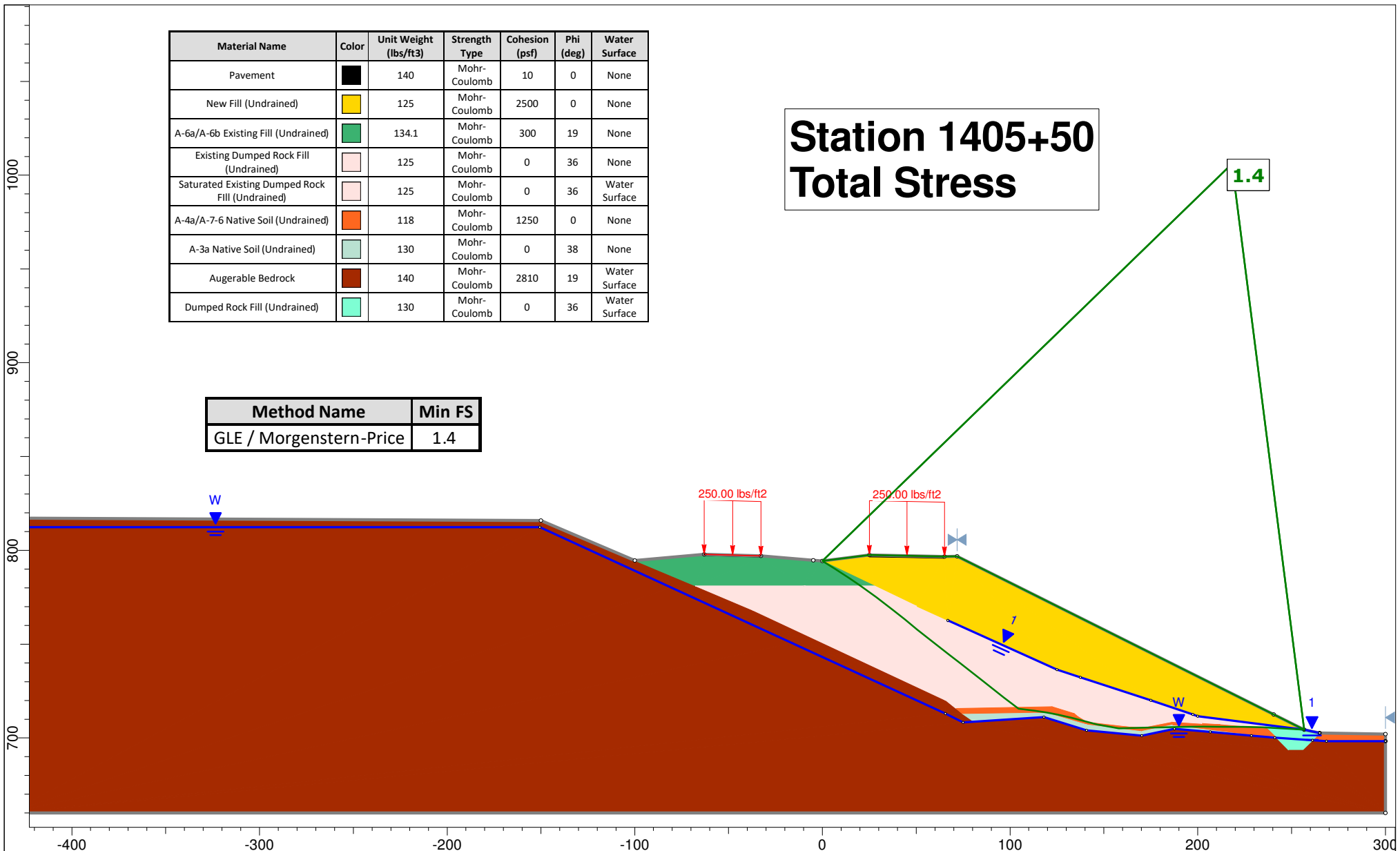


Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1405+50 ES.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	None
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	None
A-6a/A-6b Existing Fill (Undrained)	Green	134.1	Mohr-Coulomb	300	19	None
Existing Dumped Rock Fill (Undrained)	Pink	125	Mohr-Coulomb	0	36	None
Saturated Existing Dumped Rock Fill (Undrained)	Light Pink	125	Mohr-Coulomb	0	36	Water Surface
A-4a/A-7-6 Native Soil (Undrained)	Orange	118	Mohr-Coulomb	1250	0	None
A-3a Native Soil (Undrained)	Light Green	130	Mohr-Coulomb	0	38	None
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

**Station 1405+50
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	1.4



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1405+50 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1428+00
 Boring No.: B-038-0-23, B-039-0-23, B-039-1-23, B-040-0-23
 Date: 9/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference					
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)						
1	743.4	724.9	18.5	A-6a Ex. Fill	122	19	12	28	17	1875	0	180	24	1,2,3					
						17	12												
						13	14	30	18										
						16	14												
						13	13	31	20										
						13	17												
						16													
			Avg	A-6a	122	15	14	30	18										
2	724.9	714.9	10.0	A-3a Ex. Fill	125	26	10	NP	NP	0	35	0	35	4					
						22	11												
						Avg	A-3a	125	24						11	NP	NP		
3	714.9	696.4	18.5	A-6a/A-4a Ex. Fill	128.5	19	12	30	19	1120	15	0	33	5					
						26	10												
						15	15	26	16										
						17	14												
						32	19												
																	24		
			Avg	A-6a/A-4a	128.5	24	14	28	18										
4	696.4	680.4	16	A-6a Ex. Fill	134.4	10	17			240	21.5	15	32	6					
						17	13	28	17										
						Avg	A-6a	134.4	14						15	27	17		
5	680.4	670.4	10	A-3a Ex. Fill	122	10	14	NP	NP	0	32.5	0	32.5	4					
						14	17												
						10	20												
						Avg	A-3a	122	11						17	NP	NP		
6	670.4	667.9	2.5	A-7-6/A-6b	118	8	33	47	24	1125	0	110	22	1,2,3					
						8	20												
						10	29	45	23										
						9	25	37	21										
						5	25												
						6	25												
						12	26												
						13	25												
						Avg	A-7-6/A-6b	118	9						26	47	24		
7	667.9	644.4	23.5	A-3/A-3a	122	13	29	NP	NP	0	32	0	32	4					
						9	32												
						8	29												
						6	18												
						10	21												
						12	25												
						Avg	A-3/A-3a	122	10						26	NP	NP		

Note: Layer 1 through 3 soil properties taken from boring B-039-1-23. Layer 4 and 5 soil properties taken from boring B-040-023.
 Layer 6 soil properties taken from boring B-039-023. Layer 7 soil properties taken from boring B-038-023.

Reference Key

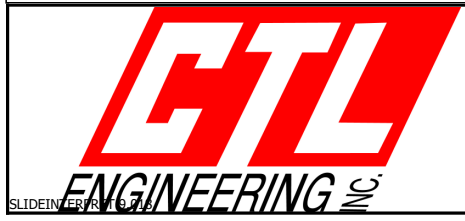
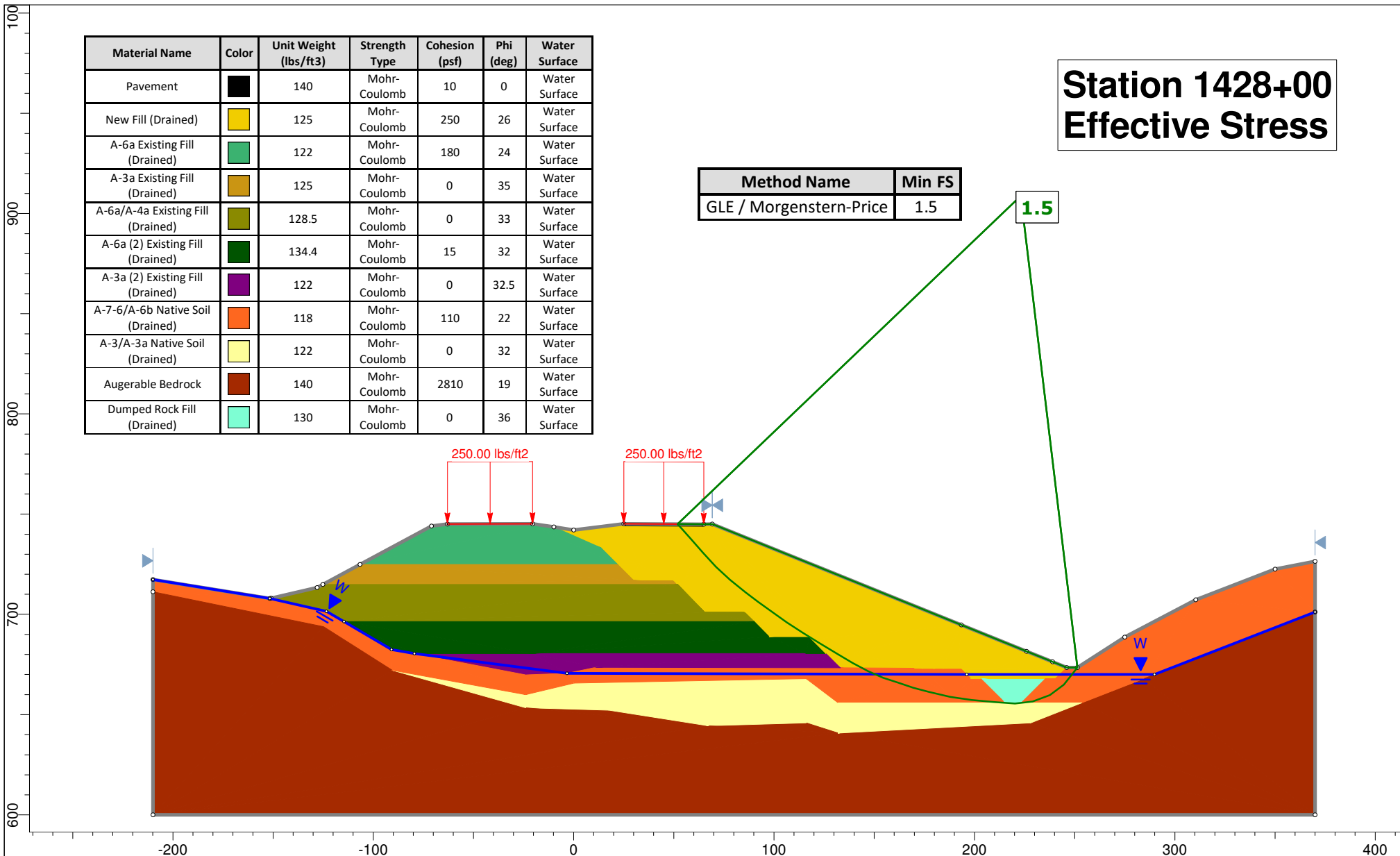
- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1 and cohesion assumed to be 0
- 5 Laboratory consolidated undrained triaxial test results of B-039-1-23_ST-12_36'-38'
- 6 Laboratory consolidated undrained triaxial test results of B-040-A-23_ST-1_3'-5'

Station 1428+00 Effective Stress

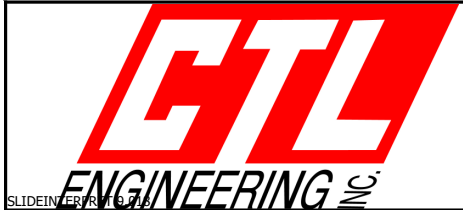
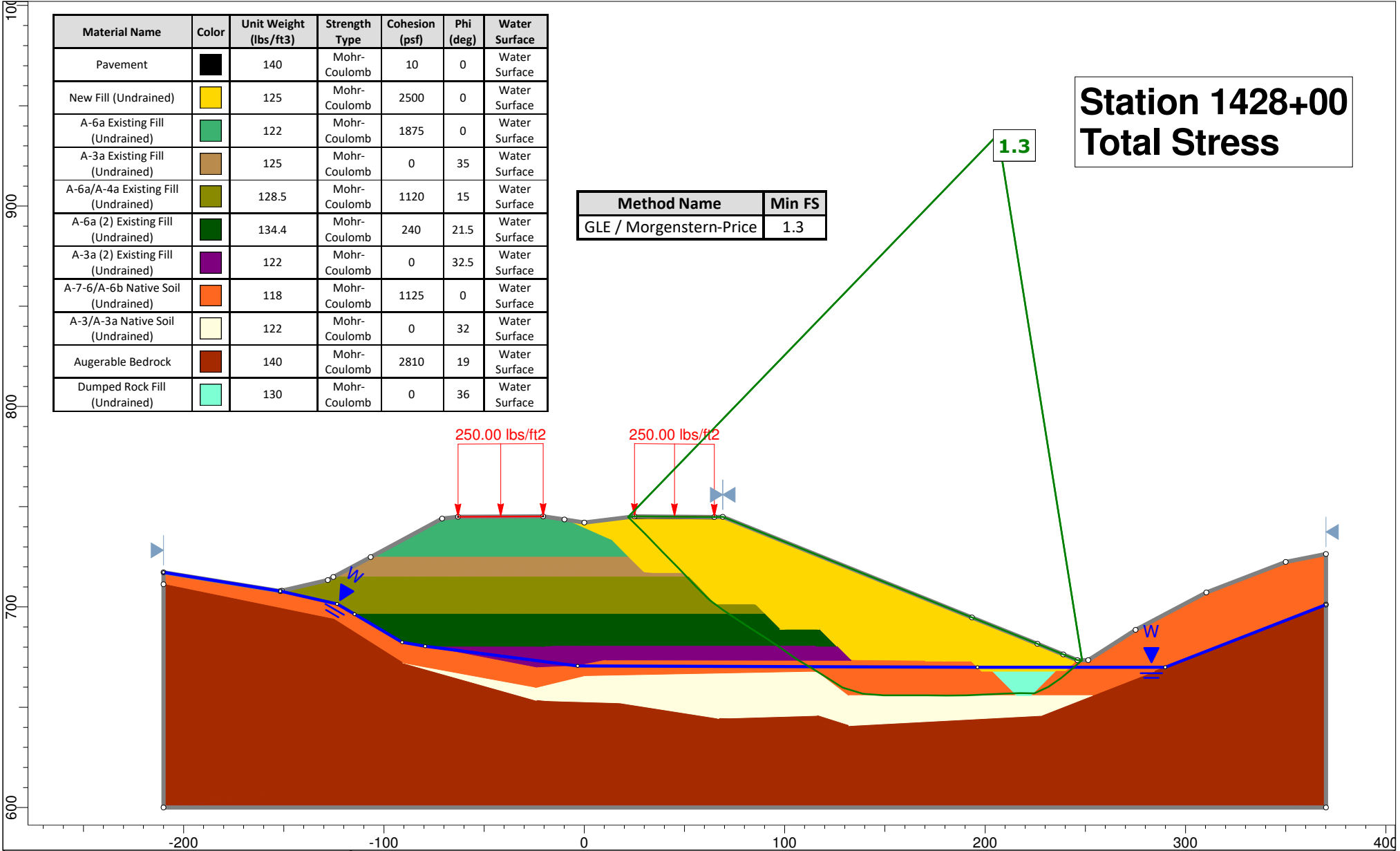
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6a Existing Fill (Drained)	Light Green	122	Mohr-Coulomb	180	24	Water Surface
A-3a Existing Fill (Drained)	Orange	125	Mohr-Coulomb	0	35	Water Surface
A-6a/A-4a Existing Fill (Drained)	Light Yellow	128.5	Mohr-Coulomb	0	33	Water Surface
A-6a (2) Existing Fill (Drained)	Dark Green	134.4	Mohr-Coulomb	15	32	Water Surface
A-3a (2) Existing Fill (Drained)	Purple	122	Mohr-Coulomb	0	32.5	Water Surface
A-7-6/A-6b Native Soil (Drained)	Light Orange	118	Mohr-Coulomb	110	22	Water Surface
A-3/A-3a Native Soil (Drained)	Light Yellow	122	Mohr-Coulomb	0	32	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Drained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.5

1.5



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1428+00 ES.slmd



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1428+00 TS.sldm

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 1511+00
 Boring No.: B-041-0-23
 Date: 9/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	704.5	698.5	6	A-4a	129.3	10	20	27	19	840	18	275	29	1
				Ex. Fill		13	17							
			Avg	A-4a	129.3	12	19							
2	698.5	689.5	9.0	A-3a/A-4a	125	14	11			0	32	0	32	2
						15	13							
			Avg	A-3a/A-4a	125	16	11							

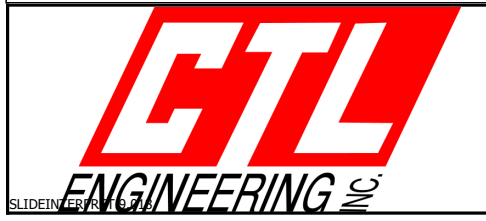
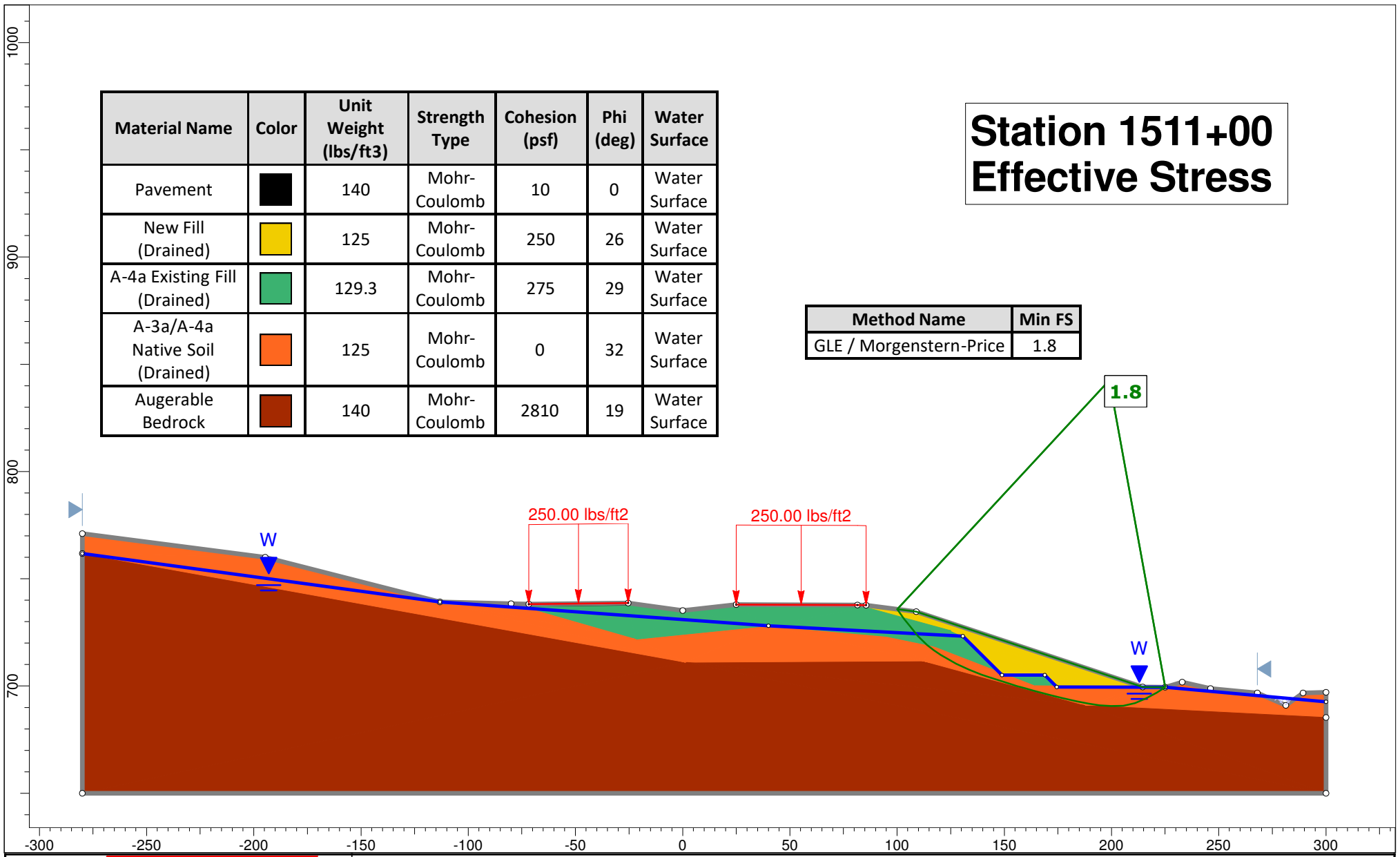
Reference Key

- 1 Laboratory consolidated undrained triaxial test results of B-041-A-23_ST-1_3'-5'
- 2 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1 and cohesion assumed to be 0

Station 1511+00 Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-4a Existing Fill (Drained)	Green	129.3	Mohr-Coulomb	275	29	Water Surface
A-3a/A-4a Native Soil (Drained)	Orange	125	Mohr-Coulomb	0	32	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.8

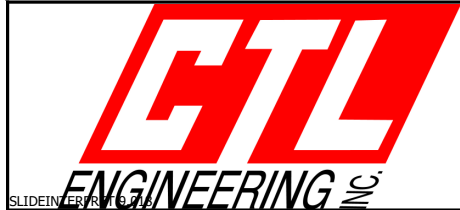
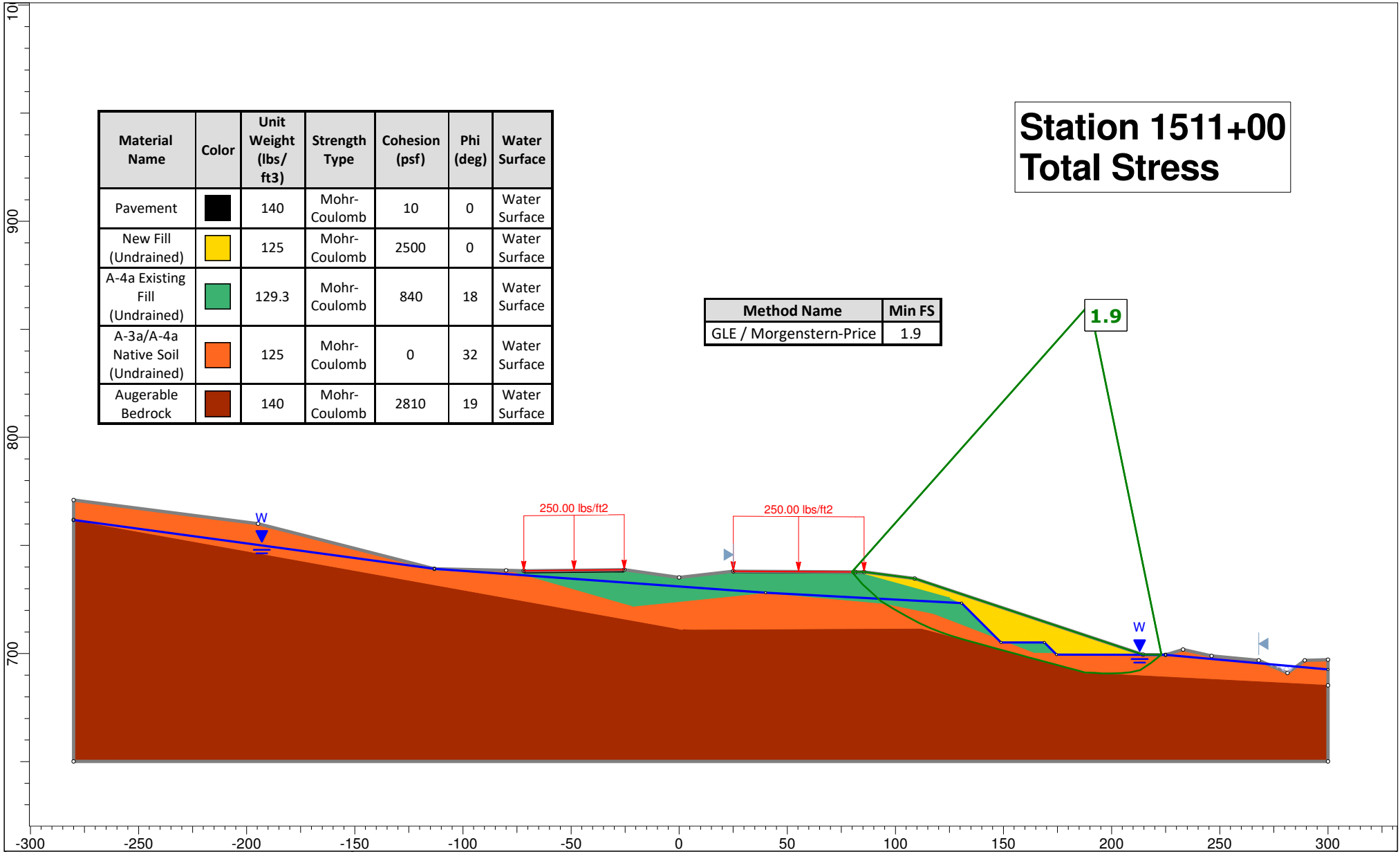


Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1511+00 ES.slmd

Station 1511+00 Total Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Pavement	Black	140	Mohr-Coulomb	10	0	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-4a Existing Fill (Undrained)	Green	129.3	Mohr-Coulomb	840	18	Water Surface
A-3a/A-4a Native Soil (Undrained)	Orange	125	Mohr-Coulomb	0	32	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.9



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1511+00 TS.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 326+50 Ramp 89L
 Boring No.: B-025-0-23, B-025-1-23
 Date: 10/25/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	881.7	857.7	24	A-6b/A-4b Ex. Fill	128	15	15							
						28	11							
						26	10							
						29	6	28	19					
						41	8							
						28	16							
						32	21							
						27	11							
						27	11	29	19					
						23	11							
		Avg	A-6b/A-4b	128	28	12	29	19	3500	0	280	26	1,2,3	
2	857.7	832.2	25.5	A-6a/A-6b or A-7-6 Ex. Fill	125	19	9	34	19					
						17	14	38	20					
						23	13							
						26	8							
						22	24							
						20	17							
						27	5	32	19					
						38	5							
						20	21							
						15	20							
						17	12							
						28	14							
						20	20							
						26	15	35	24					
23	17													
23	15													
		Avg	A-6a/A-6b or A-7-6	125	23	14			2875	0	250	25	2,4	
3	832.2	828.7	3.5	A-7-6	120	13	24	44	25					
		Avg	A-7-6	120	13	24	44	25	1730	0	170	24	2,4	

Note: Soil parameters for layer 1, 2 were taken from boring B-025-1-23, and soil parameters for layers 3 was taken from boring B-025-0-23

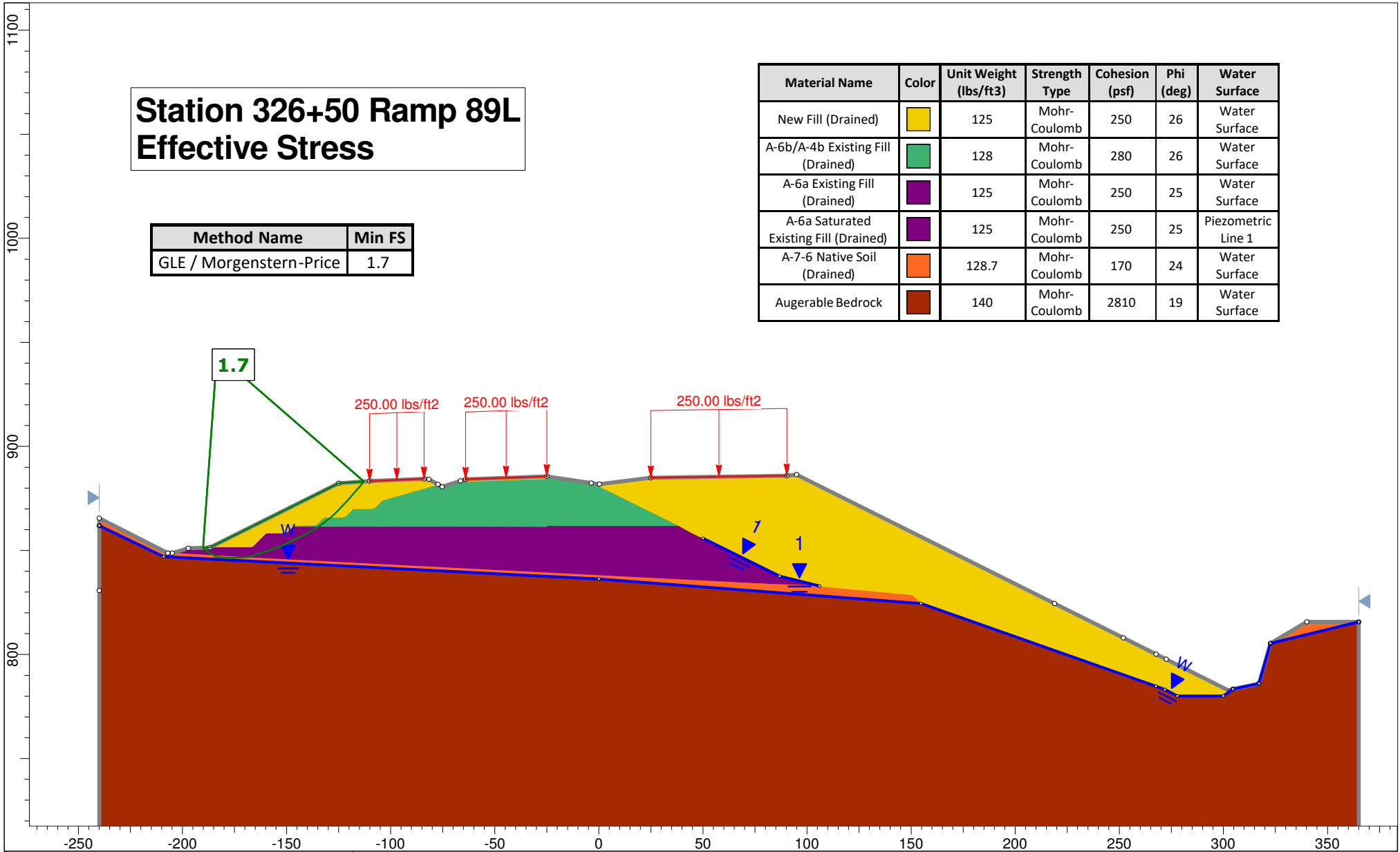
Reference Key


- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Laboratory unconfined compression test results of B-025-0-23_ST-1_2'-4'

Station 326+50 Ramp 89L Effective Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.7

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6b/A-4b Existing Fill (Drained)	Green	128	Mohr-Coulomb	280	26	Water Surface
A-6a Existing Fill (Drained)	Purple	125	Mohr-Coulomb	250	25	Water Surface
A-6a Saturated Existing Fill (Drained)	Purple	125	Mohr-Coulomb	250	25	Piezometric Line 1
A-7-6 Native Soil (Drained)	Orange	128.7	Mohr-Coulomb	170	24	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

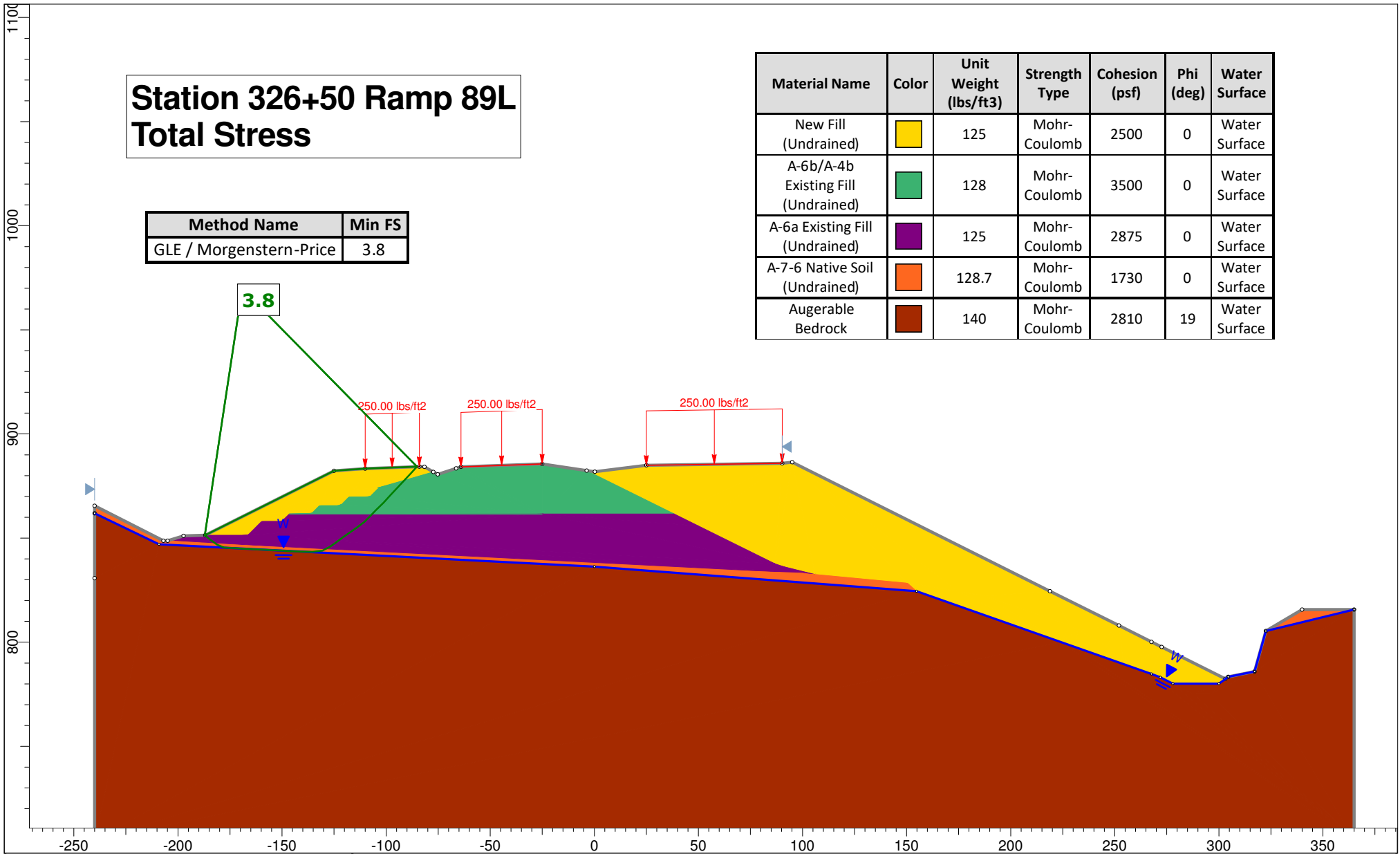



	Project		ATH/MEG-US33-70.00/00.00	
	Group	Group 1	Scenario	Master Scenario
	Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
	Date	5/2/24	File Name	326+50.slmd

Station 326+50 Ramp 89L Total Stress

Method Name	Min FS
GLE / Morgenstern-Price	3.8

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-4b Existing Fill (Undrained)	Green	128	Mohr-Coulomb	3500	0	Water Surface
A-6a Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	2875	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	128.7	Mohr-Coulomb	1730	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface



	Project		ATH/MEG-US33-70.00/00.00	
	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date		5/2/24	File Name
				326+50.slmd

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Station: 425+50 Ramp 681N
 Boring No.: B-060-0-23, SB-35
 Date: 12/4/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	708.9	702.9	6	A-4a/A-7-6 Ex. Fill	120	13	12 26	27 42	18 22					
			Avg	A-4a/A-7-6	120	13	19	35	20	1625	0	160	23	1,2,3
2	702.9	682.9	20.0	A-3a Ex. Fill	125	13 17	11 11	NP	NP					
			Avg	A-3a	125	15	11	NP	NP	0	32	0	32	4
3	682.9	679.9	3.0	A-6a	100	0								
			Avg	A-6a	100	0				250	0	20	15	1,2,3
4	679.9	675.9	4.0	A-4a	118	3								
				A-4a	118	3		NP	NP	0	26	0	26	4
5	679.9	674.2	5.7	A-6b	125	26								
			Avg	A-6b	125	26				3250	0	270	25	1,2,3

Note: Layer 1 and 2 soil properties taken from boring B-060-0-23. Layer 3 through 5 soil properties taken from historic boring SB-35

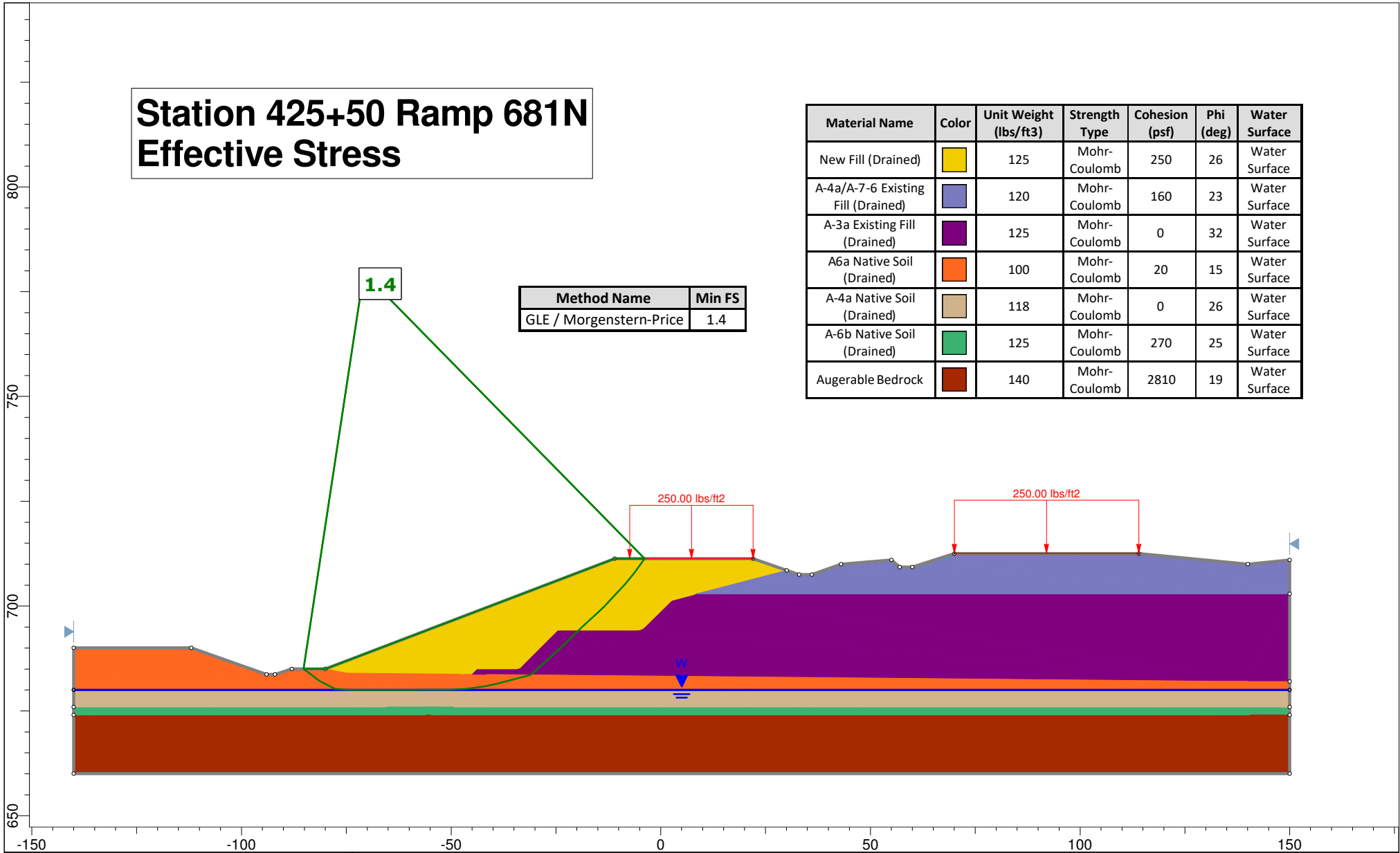
Reference Key


- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Non plastic soils - Friction angle estimated from AASHTO Table 10.4.6.2.4-1

Station 425+50 Ramp 681N Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-4a/A-7-6 Existing Fill (Drained)	Blue	120	Mohr-Coulomb	160	23	Water Surface
A-3a Existing Fill (Drained)	Purple	125	Mohr-Coulomb	0	32	Water Surface
A6a Native Soil (Drained)	Orange	100	Mohr-Coulomb	20	15	Water Surface
A-4a Native Soil (Drained)	Tan	118	Mohr-Coulomb	0	26	Water Surface
A-6b Native Soil (Drained)	Green	125	Mohr-Coulomb	270	25	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.4

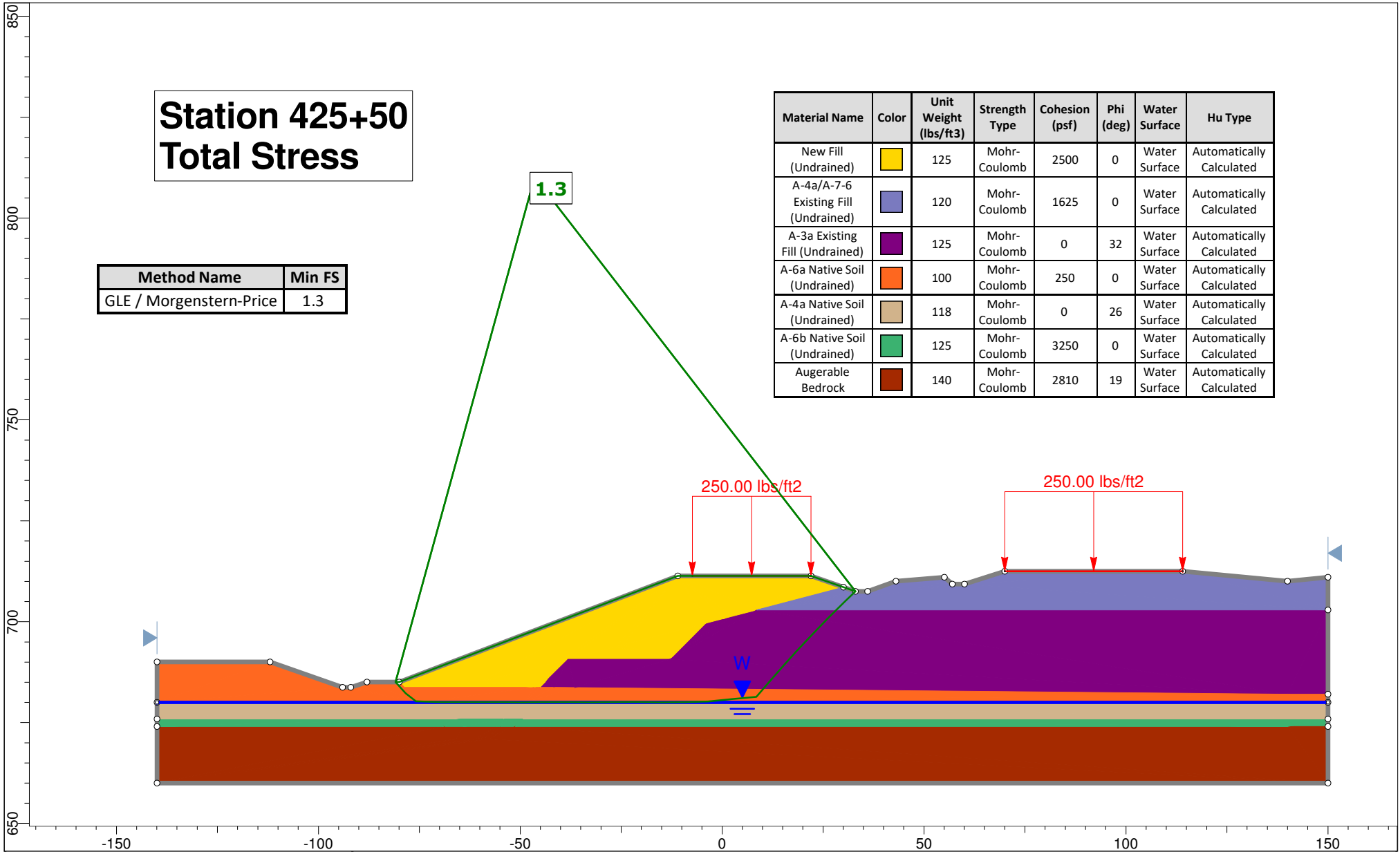


	Project		ATH/MEG-33-23.23/0.00		
	Group		Group 1	Scenario	
	Drawn By		CTL Engineering, Inc.	Company	
	Date			File Name	
			24.11.27 425+50 Ramp 681N ES.slmd		

Station 425+50 Total Stress

Method Name	Min FS
GLE / Morgenstern-Price	1.3

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface	Automatically Calculated
A-4a/A-7-6 Existing Fill (Undrained)	Blue-Gray	120	Mohr-Coulomb	1625	0	Water Surface	Automatically Calculated
A-3a Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	0	32	Water Surface	Automatically Calculated
A-6a Native Soil (Undrained)	Orange	100	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
A-4a Native Soil (Undrained)	Tan	118	Mohr-Coulomb	0	26	Water Surface	Automatically Calculated
A-6b Native Soil (Undrained)	Green	125	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface	Automatically Calculated



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	24.11.27 425+50 Ramp 681N TS.slmd

APPENDIX D1

GLOBAL STABILITY ANALYSES REQUESTED BY ODOT



Soil Parameters

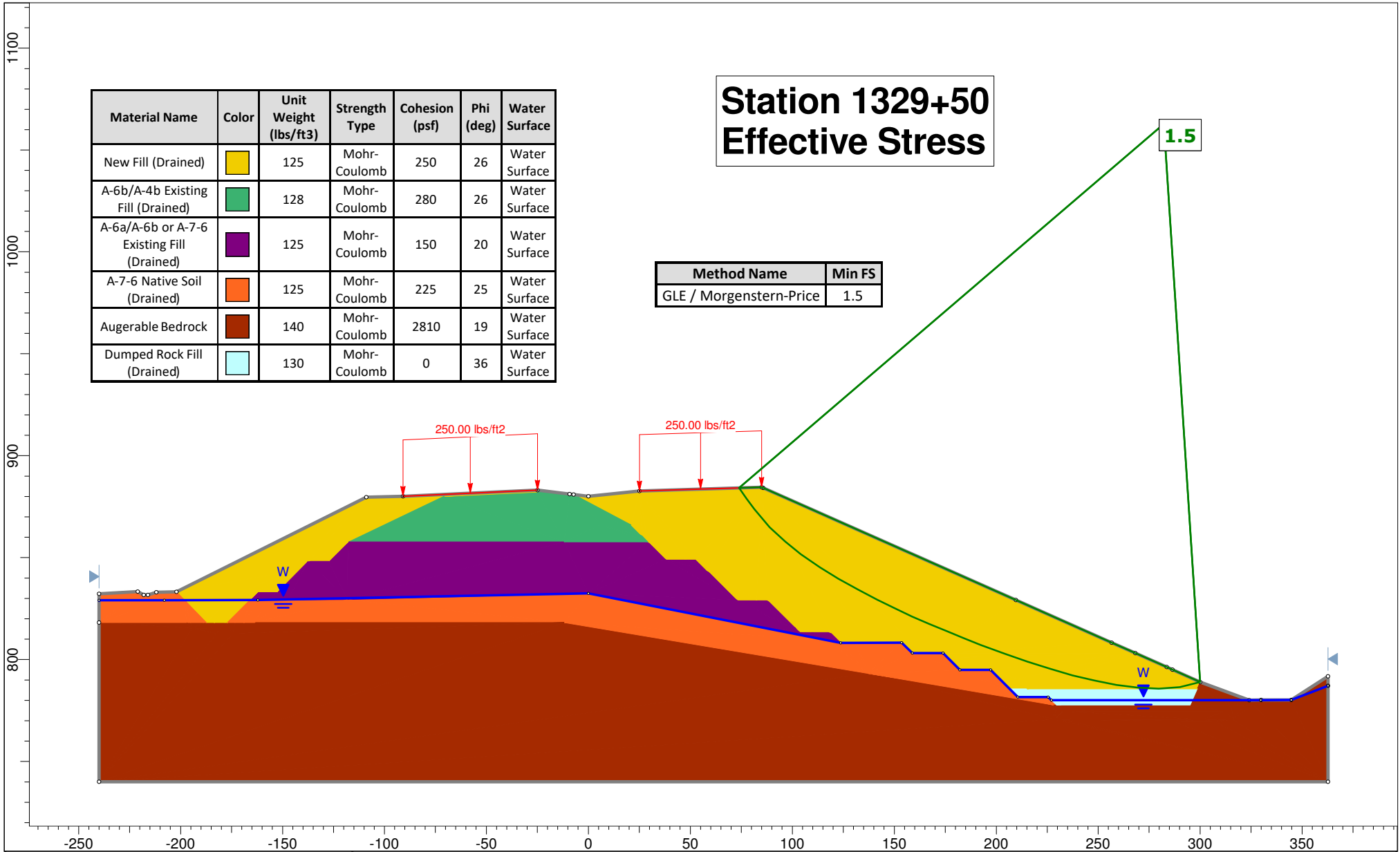
Project: ATH/MEG-33-23.23/0.00
 Station: 1329+50
 Boring No.: B-025-1-23, B-025-2-23
 Date: 12/4/24


Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference				
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)					
1	881.7	857.7	24	A-6b/A-4b Ex. Fill	128	15	15											
						28	11											
						26	10											
						29	6	28	19									
						41	8											
						28	16											
						32	21											
						27	11											
						27	11	29	19									
						23	11											
Avg			A-6b/A-4b	128	28	12	29	19	3500	0	280	26	1,2,3					
2	857.7	832.2	25.5	A-6a/A-6b or A-7-6 Ex. Fill	125	19	9	34	19									
						17	14	38	20									
						23	13											
						26	8											
						22	24											
						20	17											
						27	5	32	19									
						38	5											
						20	21											
						15	20											
						17	12											
						28	14											
						20	20											
26	15	35	24															
23	17																	
23	15																	
Avg			A-6a/A-6b or A-7-6	125	23	14			2875	0	150	20	2,4					
3	832.2	793.1	39.1	A-7-6	125	20	18	45	23									
						23	15											
						22	14											
						19	21	49	24									
						19	19											
						17	26											
						15	20	43	25									
						22	19	48	25									
						20	18									225	25	Right side
						23	11									100	22	Left Side
Avg			A-7-6	125	20	18	46	24	2500	0			2,5					

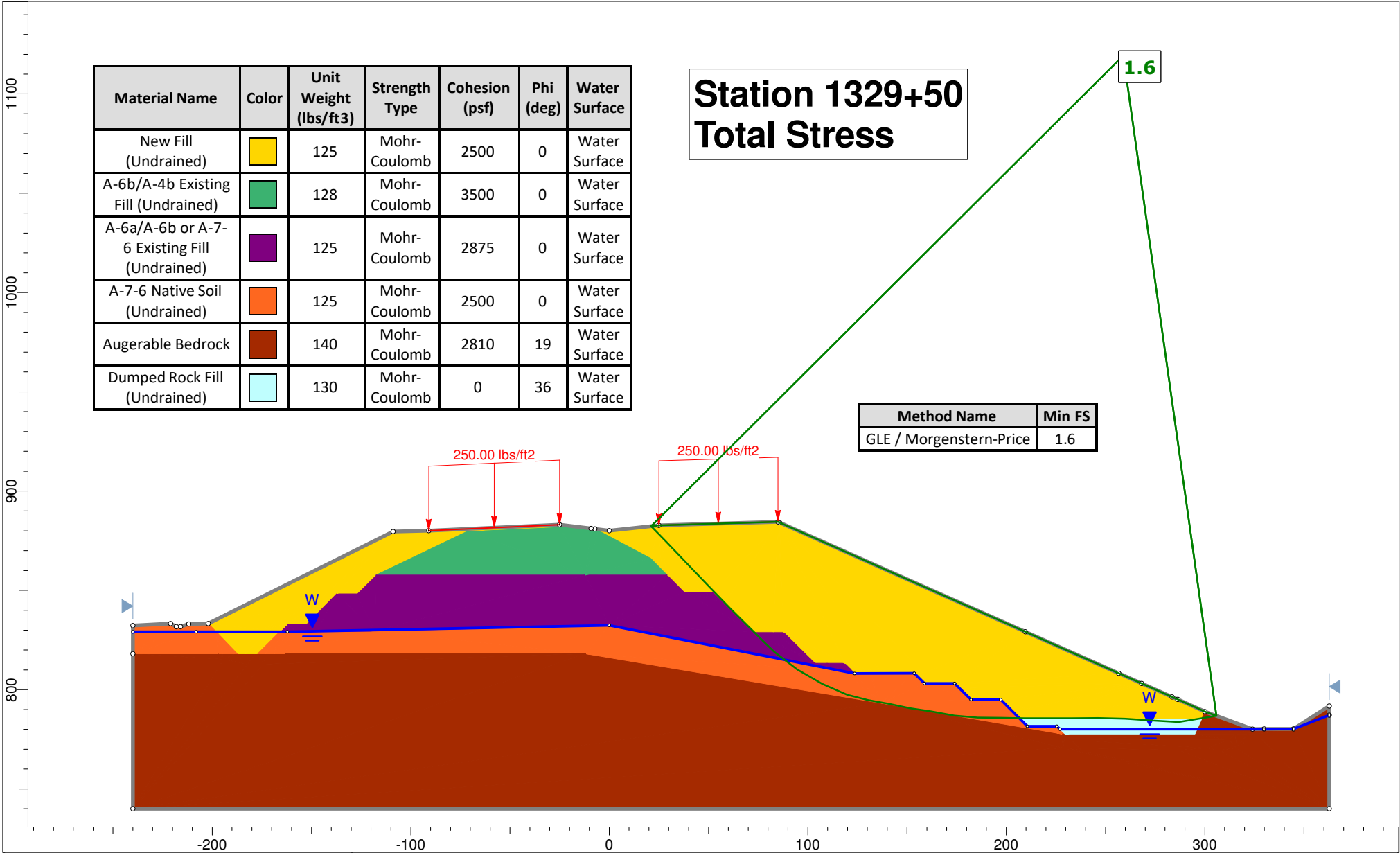
Note: Soil parameters for layer 1, 2 were taken from boring B-025-1-23, and soil parameters for layers 3 was taken from boring B-025-2-23

Reference Key

- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2
- 4 Effective cohesion and friction angle for layers 2 and 3 back-calculated to achieve a F.S of 1.0 in "Existing Conditions" model
- 5 ODOT recommended values for effective cohesion and friction angle for left side and right side



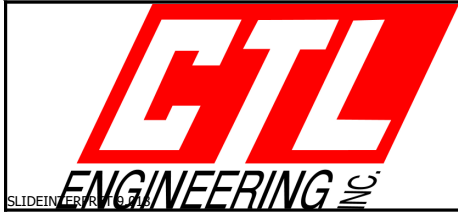
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	Group Group 1	Scenario Master Scenario
	Drawn By CTL Engineering, Inc.	Company CTL Engineering, Inc.
	Date	File Name 1329+50 With Dumped Rock Fill ES Right.slmd



Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-4b Existing Fill (Undrained)	Green	128	Mohr-Coulomb	3500	0	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	2875	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	125	Mohr-Coulomb	2500	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Cyan	130	Mohr-Coulomb	0	36	Water Surface

**Station 1329+50
Total Stress**

Method Name	Min FS
GLE / Morgenstern-Price	1.6

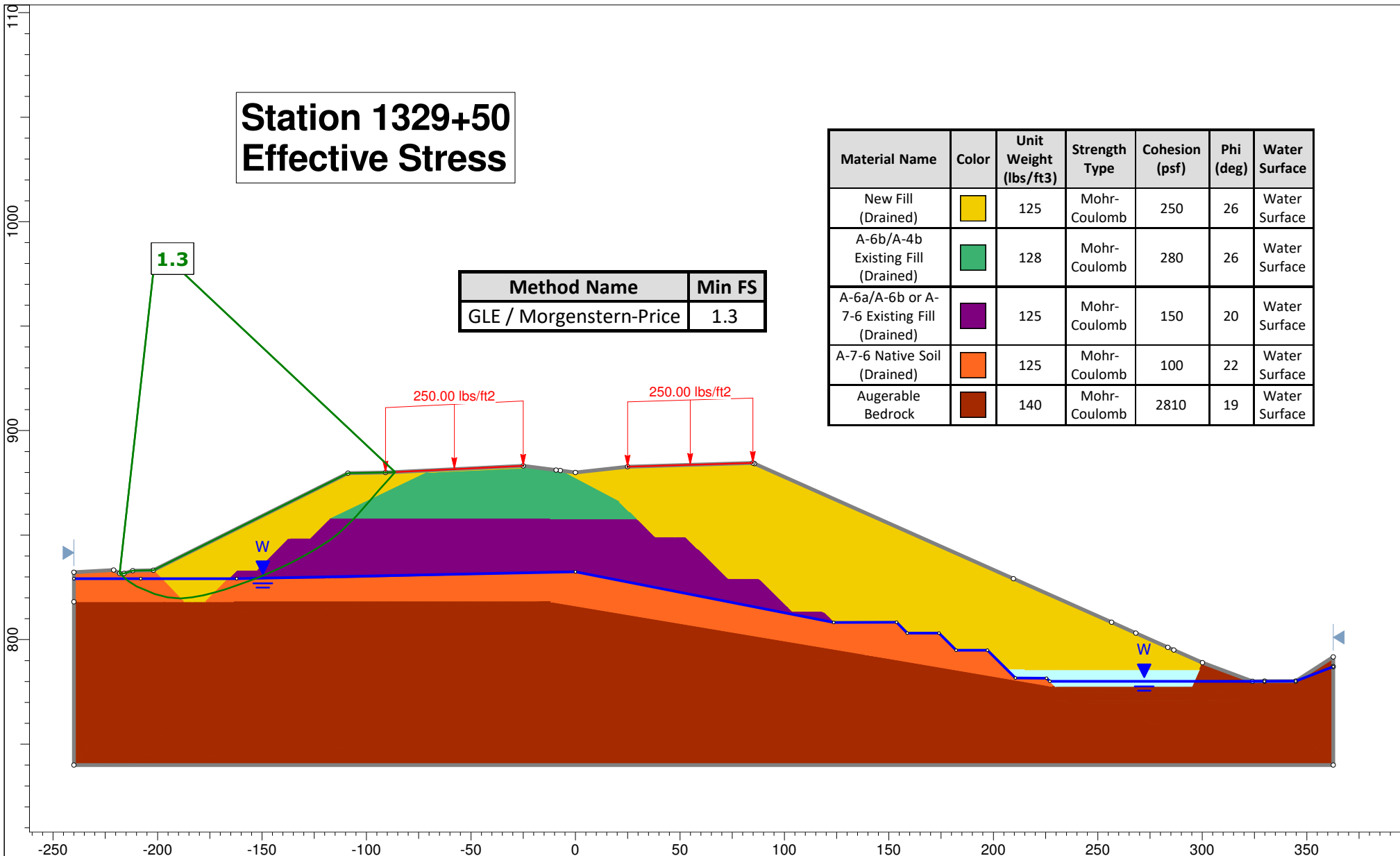



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1329+50 With Dumped Rock Fill TS Right.slmd

Station 1329+50 Effective Stress

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Drained)	Yellow	125	Mohr-Coulomb	250	26	Water Surface
A-6b/A-4b Existing Fill (Drained)	Green	128	Mohr-Coulomb	280	26	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Drained)	Purple	125	Mohr-Coulomb	150	20	Water Surface
A-7-6 Native Soil (Drained)	Orange	125	Mohr-Coulomb	100	22	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface

Method Name	Min FS
GLE / Morgenstern-Price	1.3

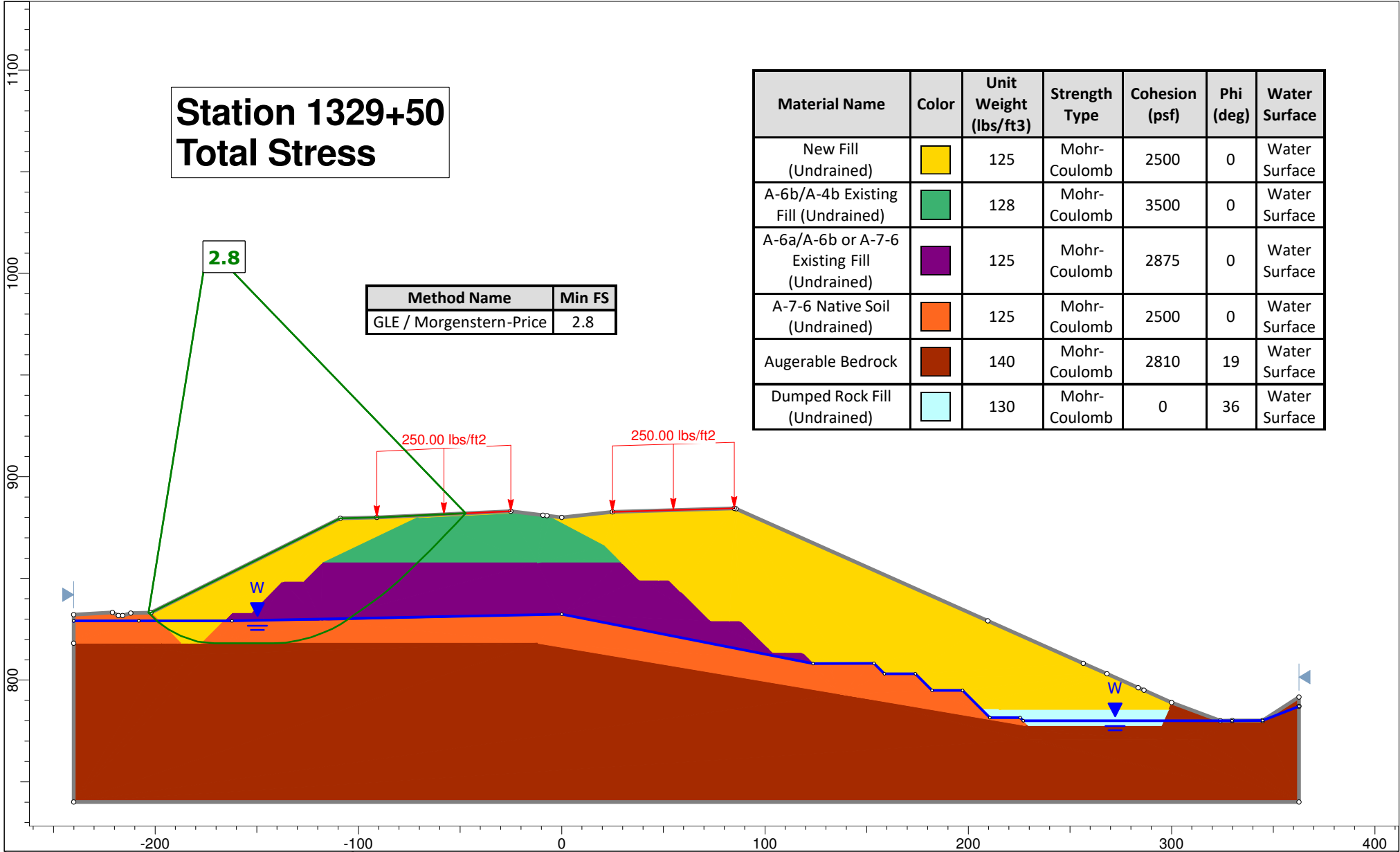


	Project ATH/MEG-33-23.23/0.00	
	Group Group 1	Scenario Master Scenario
	Drawn By CTL Engineering, Inc.	Company CTL Engineering, Inc.
	Date	File Name 1329+50 Without Dumped Rock Fill ES Left.slmd

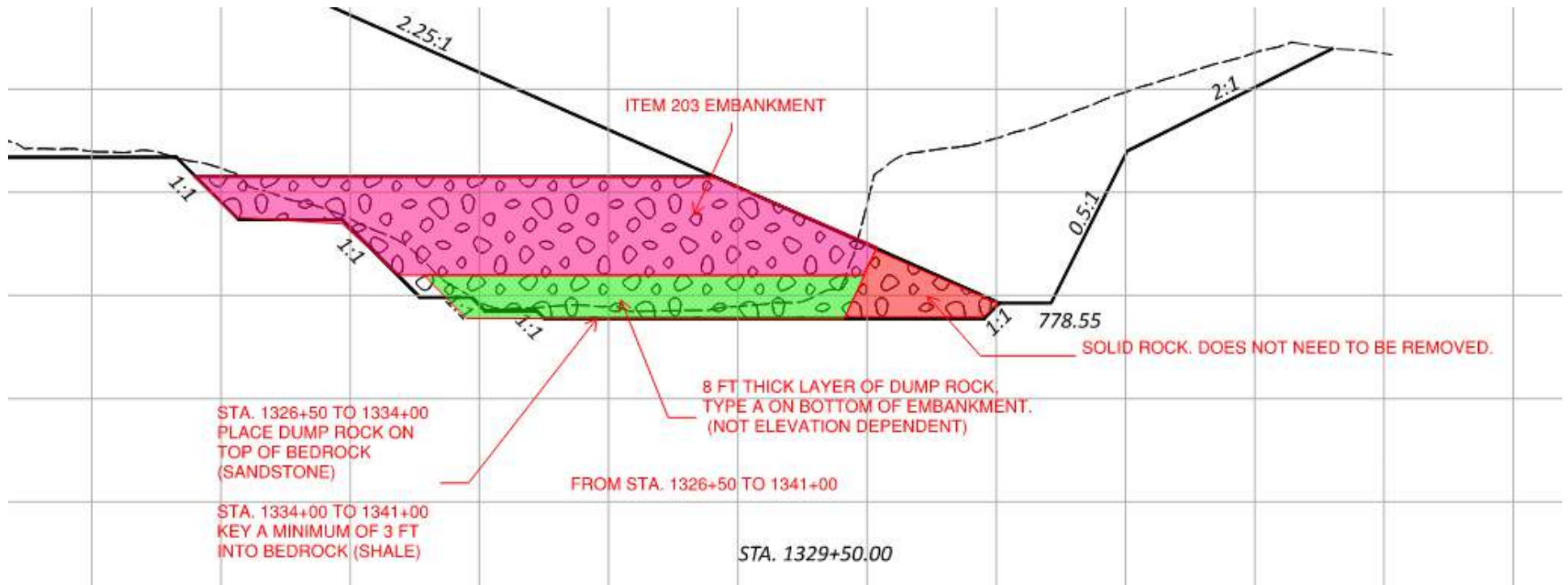
Station 1329+50 Total Stress

Method Name	Min FS
GLE / Morgenstern-Price	2.8

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
New Fill (Undrained)	Yellow	125	Mohr-Coulomb	2500	0	Water Surface
A-6b/A-4b Existing Fill (Undrained)	Green	128	Mohr-Coulomb	3500	0	Water Surface
A-6a/A-6b or A-7-6 Existing Fill (Undrained)	Purple	125	Mohr-Coulomb	2875	0	Water Surface
A-7-6 Native Soil (Undrained)	Orange	125	Mohr-Coulomb	2500	0	Water Surface
Augerable Bedrock	Brown	140	Mohr-Coulomb	2810	19	Water Surface
Dumped Rock Fill (Undrained)	Light Blue	130	Mohr-Coulomb	0	36	Water Surface



Project	ATH/MEG-33-23.23/0.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1329+50 Without Dumped Rock Fill TS Left.slmd



Per District's email dated 12/3/2024

Soil Parameters

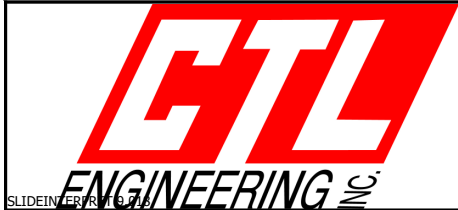
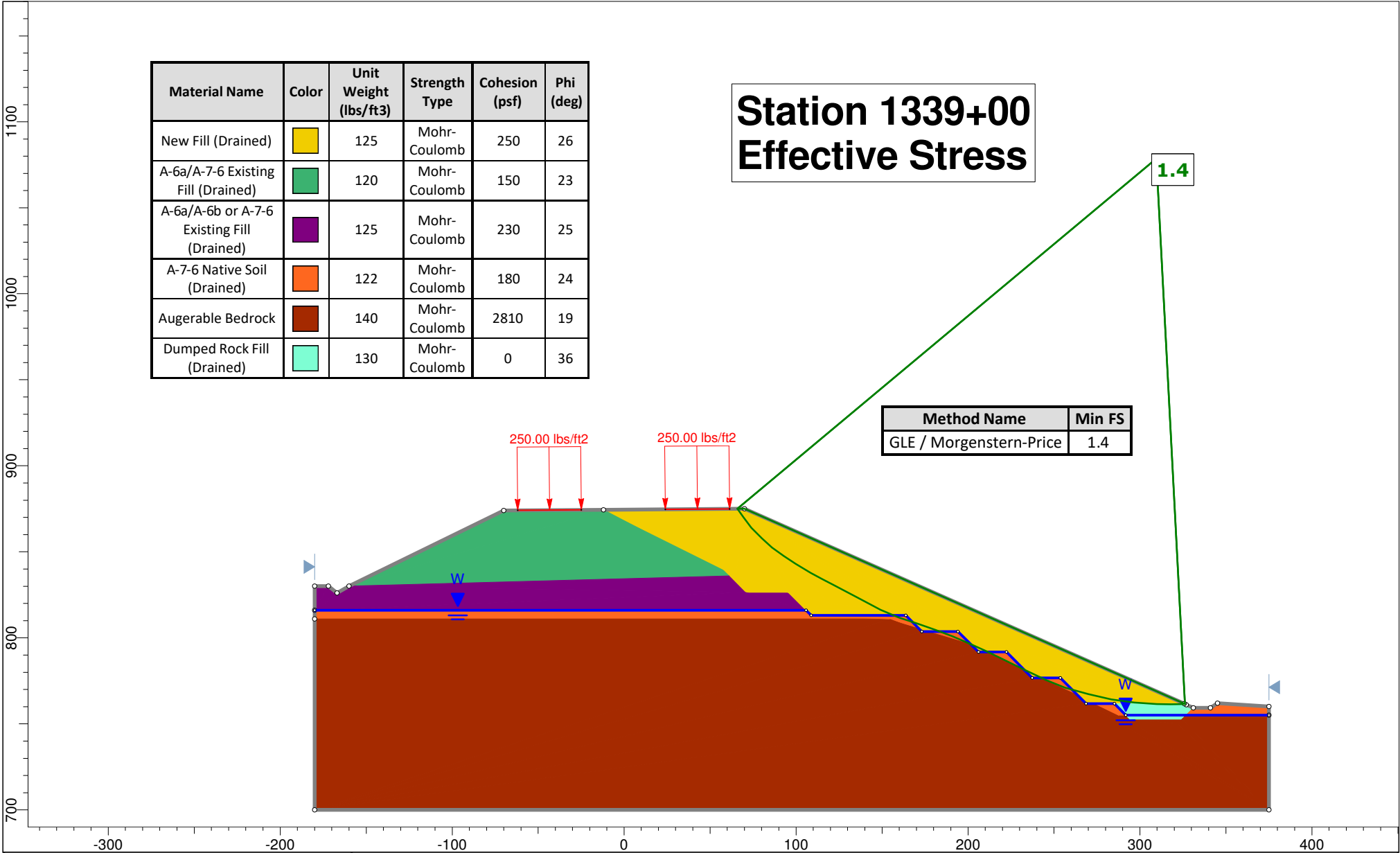
Project: ATH/MEG-33-23.23/0.00
 Station: 1339+00
 Boring No.: B-026-0-23, B-027-0-23
 Date: 11/25/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Total Stress		Effective Stress		Reference
										Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
1	859	835.5	23.5	A-6a/A-7-6 Ex. Fill	120	14	13	35	20					
						8	14							
						11	17							
						14	15							
						18	17							
						9	15							
						11	16							
Avg	A-6a/A-7-6	120	12	16	40	22	1500	0	150	23	1,2,3			
2	835.5	820.5	15.0	A-6a/A-6b or A-7-6 Ex. Fill	125	20	11	33	19					
						23	14							
						20	13							
Avg	A-6a/A-6b or A-7-6	125	21	13	33	19	2625	0	230	25	1,2,3			
3	820.5	814	6.5	A-6b	122	15	20	39	21					
						Avg	A-6b							

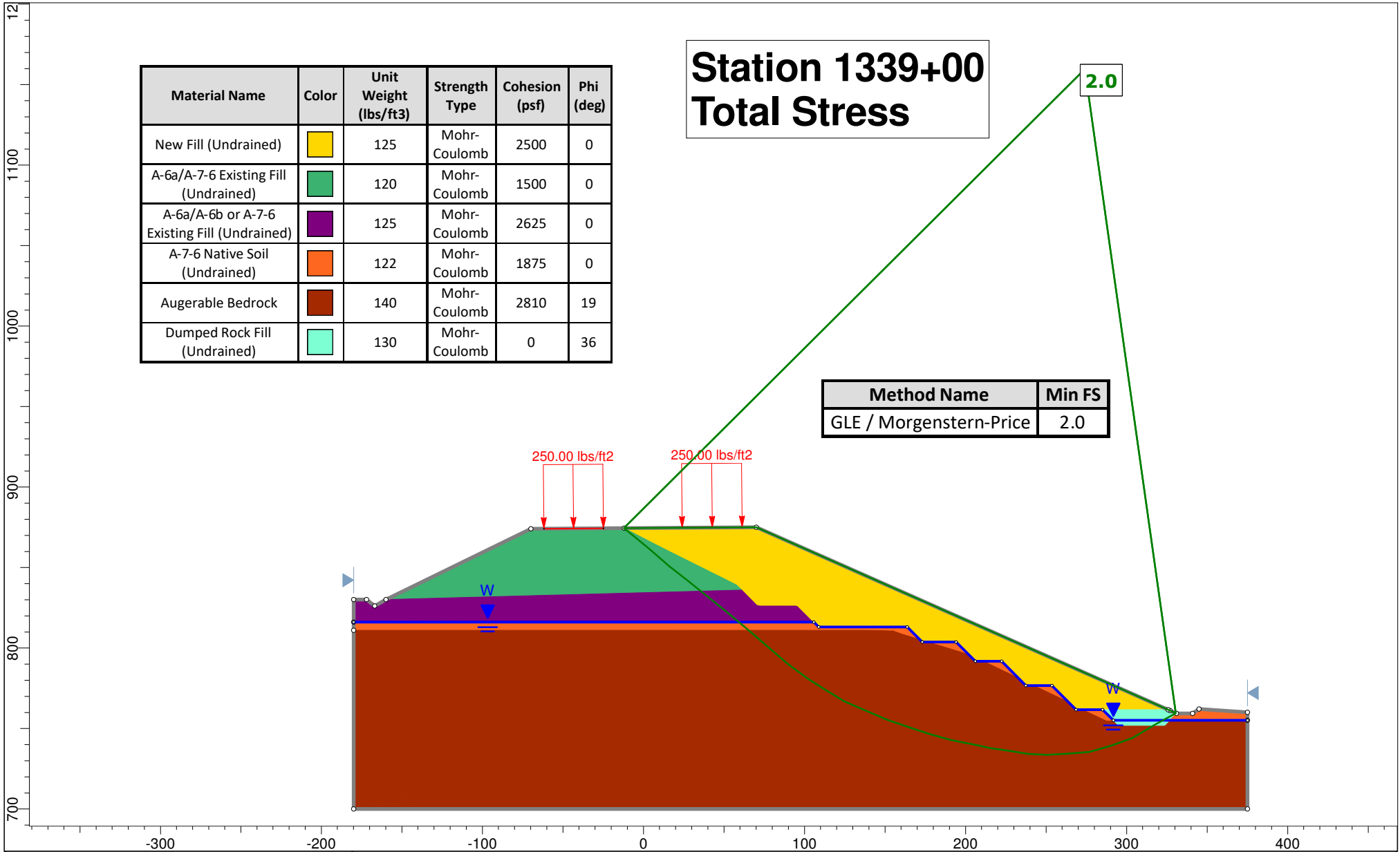
Note: Layer 1 and 2 soil properties taken from boring B-026-0-23. Layer 3 soil properties were taken from boring B-027-0-23


Reference Key

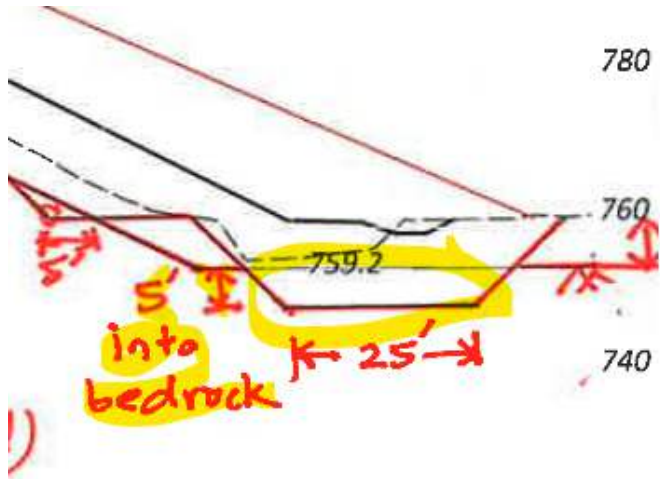
- 1 Total stress and effective stress cohesion estimated according to ODOT GDM Section 404.1
- 2 Total stress friction angle of cohesive soils estimated to be 0
- 3 Effective stress friction angle for cohesive soils estimated using GB7 Table 2



Project	ATH/MEG-US33-70.00/00.00		
Group	Group 1	Scenario	Master Scenario
Drawn By	CTL Engineering, Inc.	Company	CTL Engineering, Inc.
Date		File Name	1339+00 ES.slmd



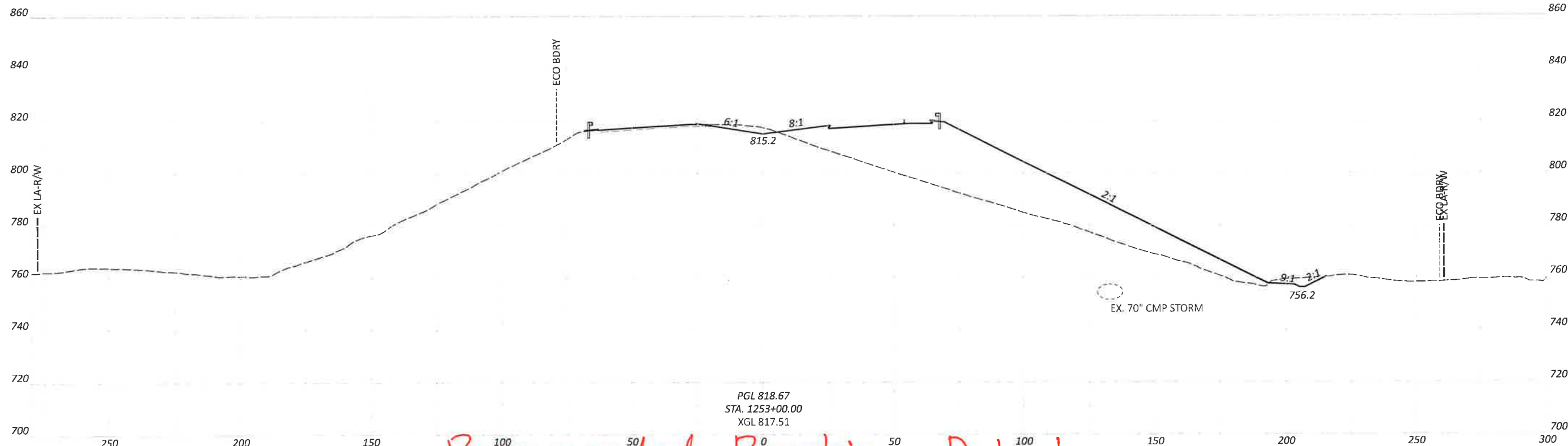
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	Group		Group 1	Scenario
	Drawn By		CTL Engineering, Inc.	Company
	Date			File Name
				1339+00 TS.sldm



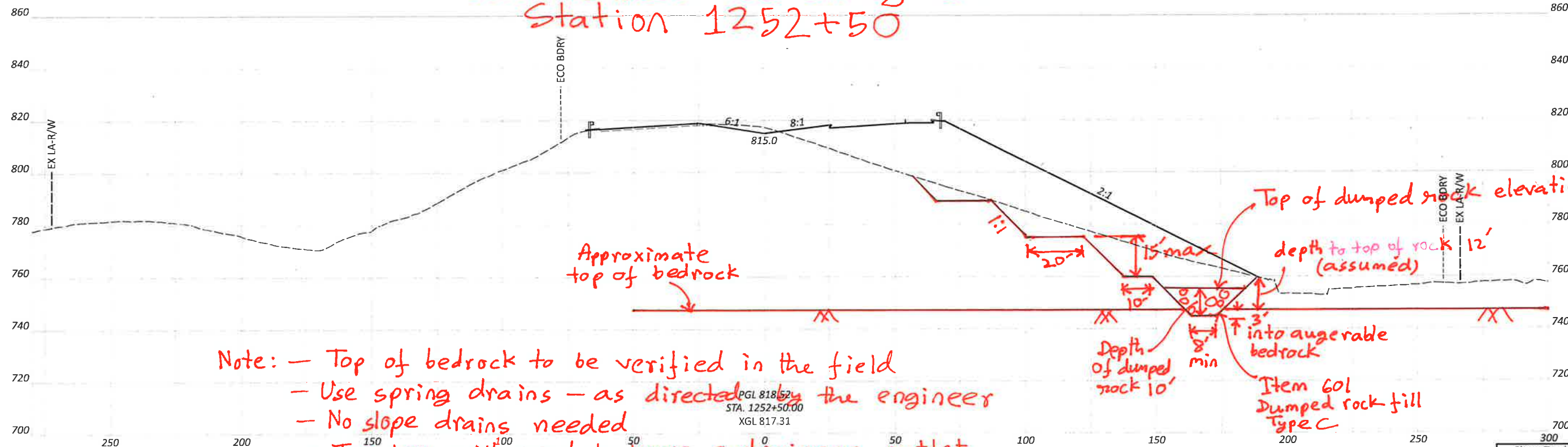
Per District's email dated 12/3/2024

APPENDIX E
SPECIAL BENCHING SKETCHES





**Recommended Benching Detail
 Station 1252+50**



- Note: — Top of bedrock to be verified in the field
 — Use spring drains — as directed by the engineer
 — No slope drains needed
 — Toe key will need to have a drainage outlet

PGL 818.67
 STA. 1252+50.00
 XGL 817.31

CROSS SECTIONS - U.S. 33
 STA. 1252+50.00 TO STA. 1253+00.00

DESIGN AGENCY



DESIGNER

SGM

REVIEWER

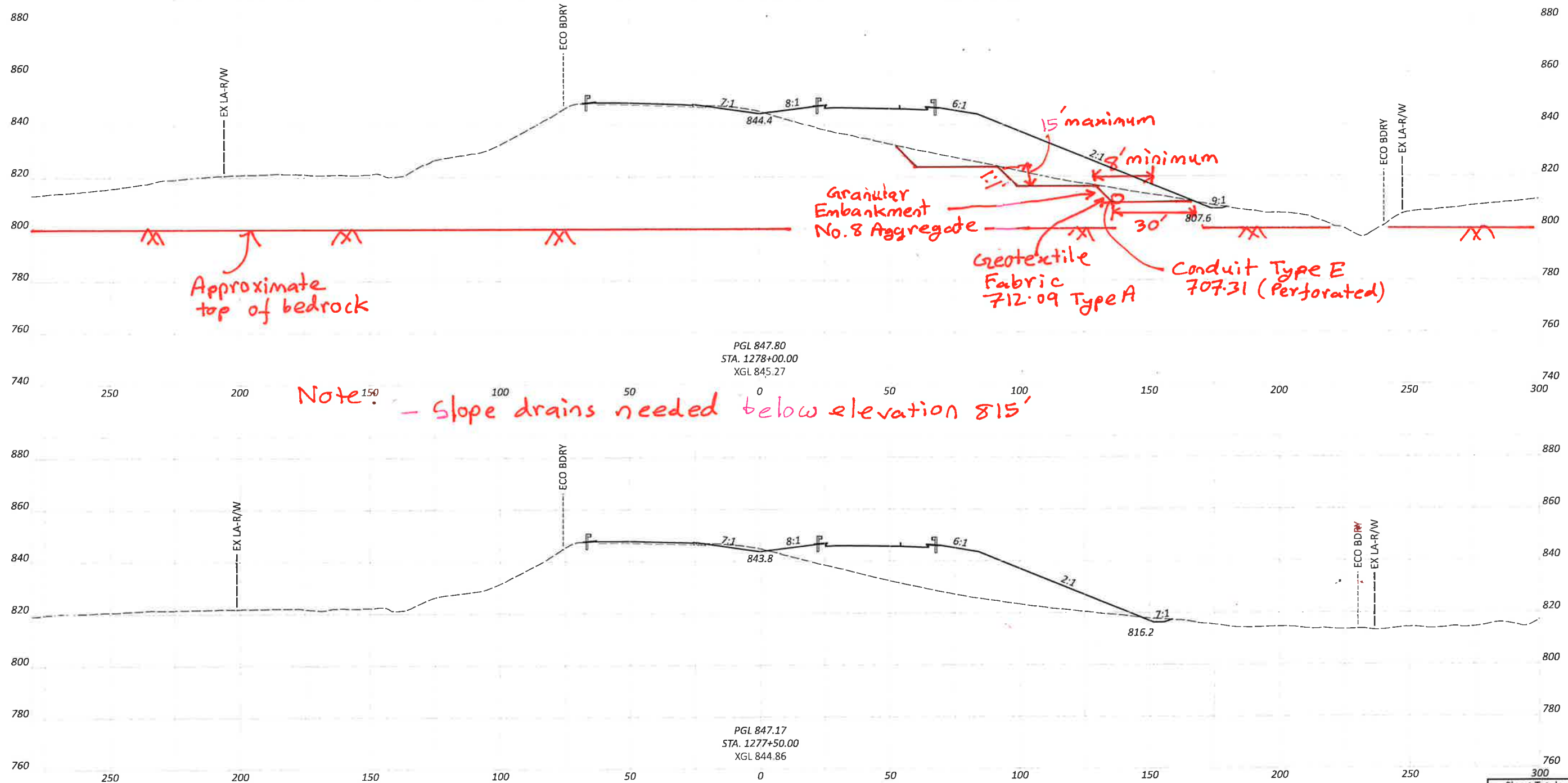
KKP 05-14-24

PROJECT ID

119142

Sheet Totals			TOTAL	
Seeding	Cut	Fill	SHEET	TOTAL
			184	798

Recommended Benching Detail Station 1278+00



Note: - Slope drains needed below elevation 815'

PGL 847.80
STA. 1278+00.00
XGL 845.27

PGL 847.17
STA. 1277+50.00
XGL 844.86

CROSS SECTIONS - U.S. 33
STA. 1277+50.00 TO STA. 1278+00.00

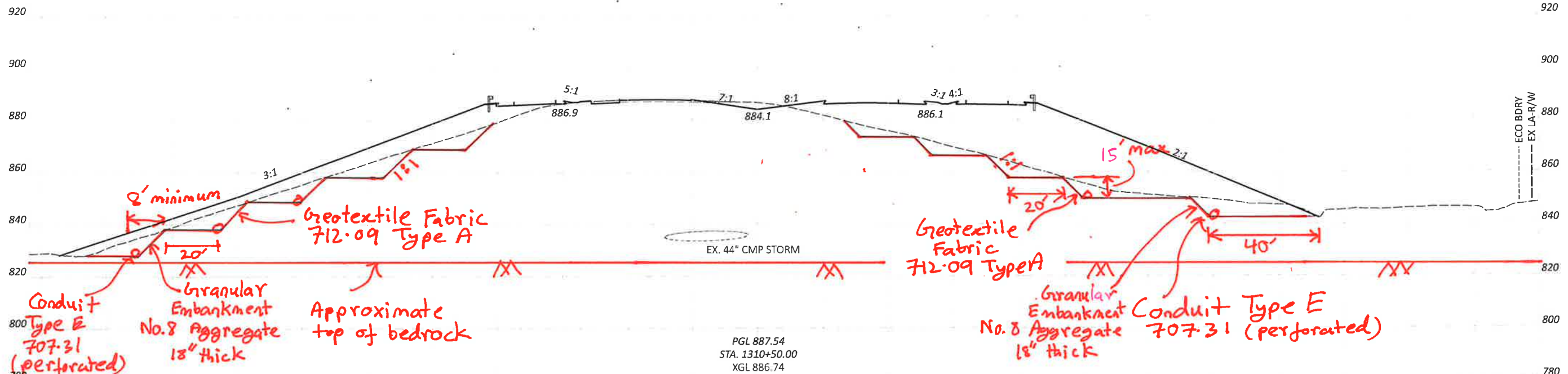
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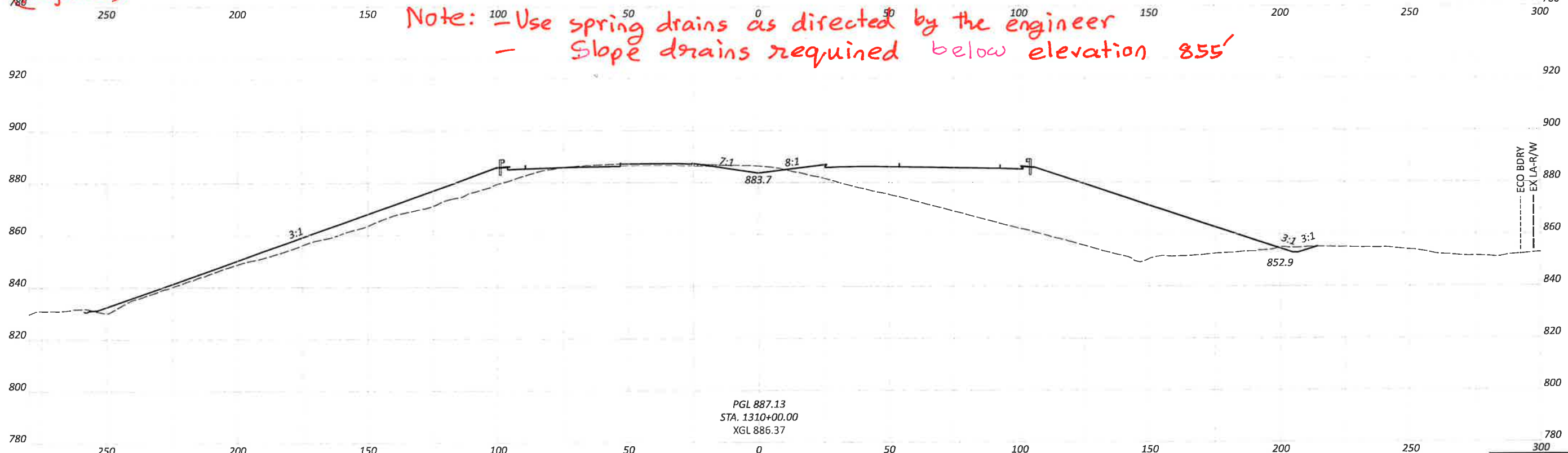
DESIGN AGENCY	
HNTB	
DESIGNER	
SGM	
REVIEWER	
KKP 05-14-24	
PROJECT ID	
119142	
SHEET TOTAL	
212	798

300		
Sheet Totals		
Seeding	Cut	Fill

Recommended Benching Detail Station 1310+50



Note: - Use spring drains as directed by the engineer
- Slope drains required below elevation 855'



CROSS SECTIONS - U.S 33
STA. 1310+00.00 TO STA. 1310+50.00

ATH/MEG-33-23.23/0.00

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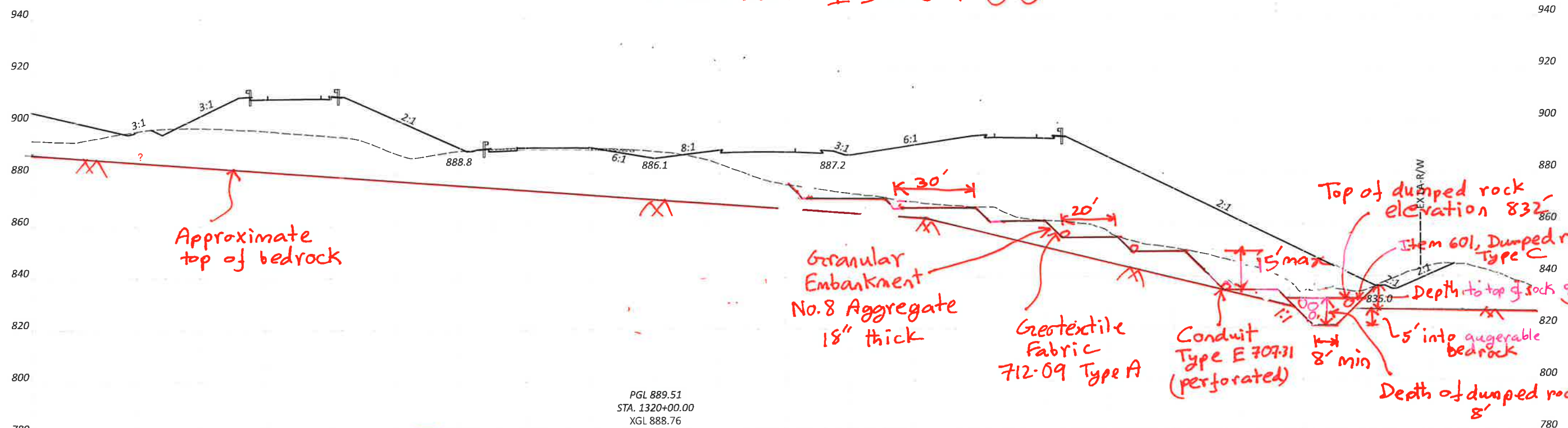
PGL 887.54
STA. 1310+50.00
XGL 886.74

PGL 887.13
STA. 1310+00.00
XGL 886.37

Sheet Totals			TOTAL	
Seeding	Cut	Fill	SHEET	TOTAL
			240	798

DESIGN AGENCY
DESIGNER
SGM
REVIEWER
KKP 05-14-24
PROJECT ID
119142

Recommended Benching Detail Station 1320+00



- Note:**
- Top of bedrock to be verified in the field
 - Toe key needs to have drainage outlet
 - Use spring drains as needed above Elev. 860
 - Use slope drains below Elev. 860
 - Use the benching detail between Station 1320+00 to 1320+50 and at Station 1326+00

CROSS SECTIONS - S. 33
STA. 1319+50.00 TO STA. 1320+00.00

ATH/MEG-33-23.23/0.00

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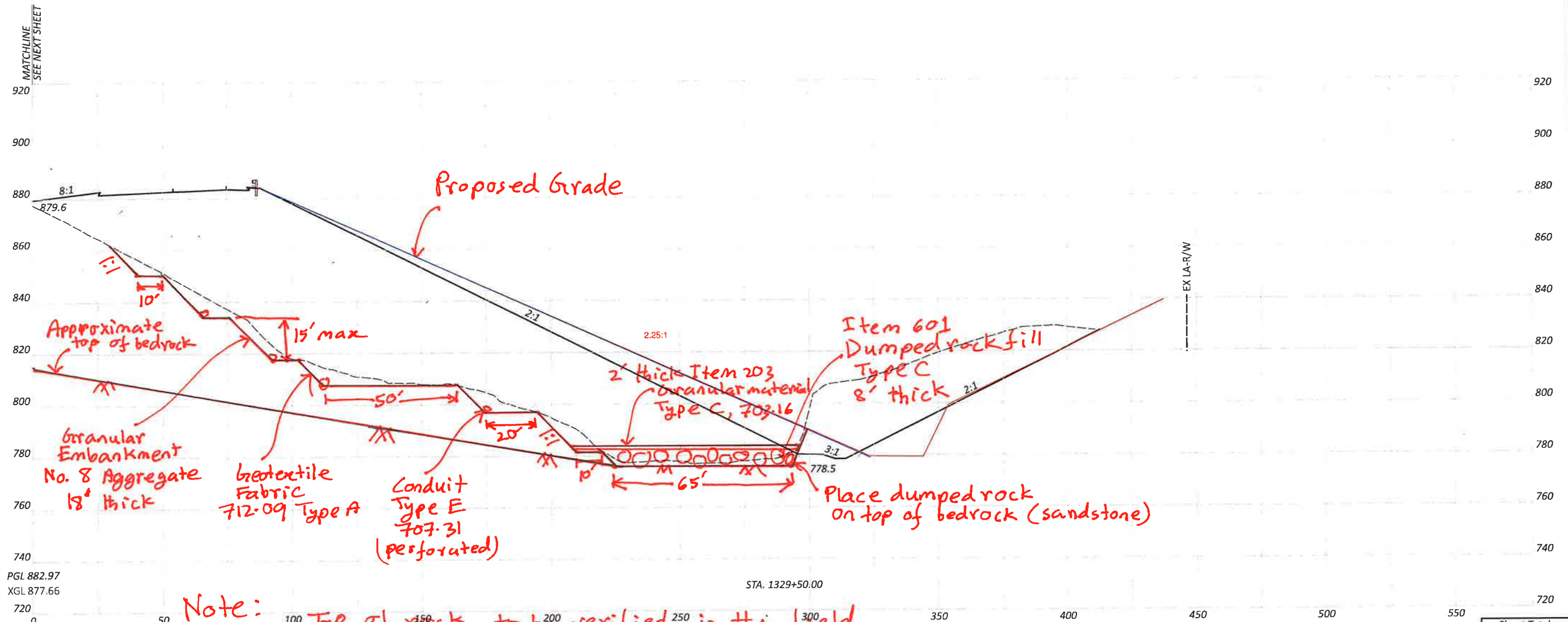
PGL 889.51
STA. 1320+00.00
XGL 888.76

PGL 889.68
STA. 1319+50.00
XGL 888.98

Sheet Totals		
Seeding	Cut	Fill
249		798

DESIGN AGENCY
DESIGNER SGM
REVIEWER KKP 05-14-24
PROJECT ID 119142
SHEET TOTAL 249 798

Recommended Benching Detail Station 1329+50



Note:

- Top of rock to be verified in the field
- Slope drains required below elevation 851'
- Toe key needs to have drainage outlet

ATH/MEG-33-23.23/0.00

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PGL 882.97
XGL 877.66

STA. 1329+50.00

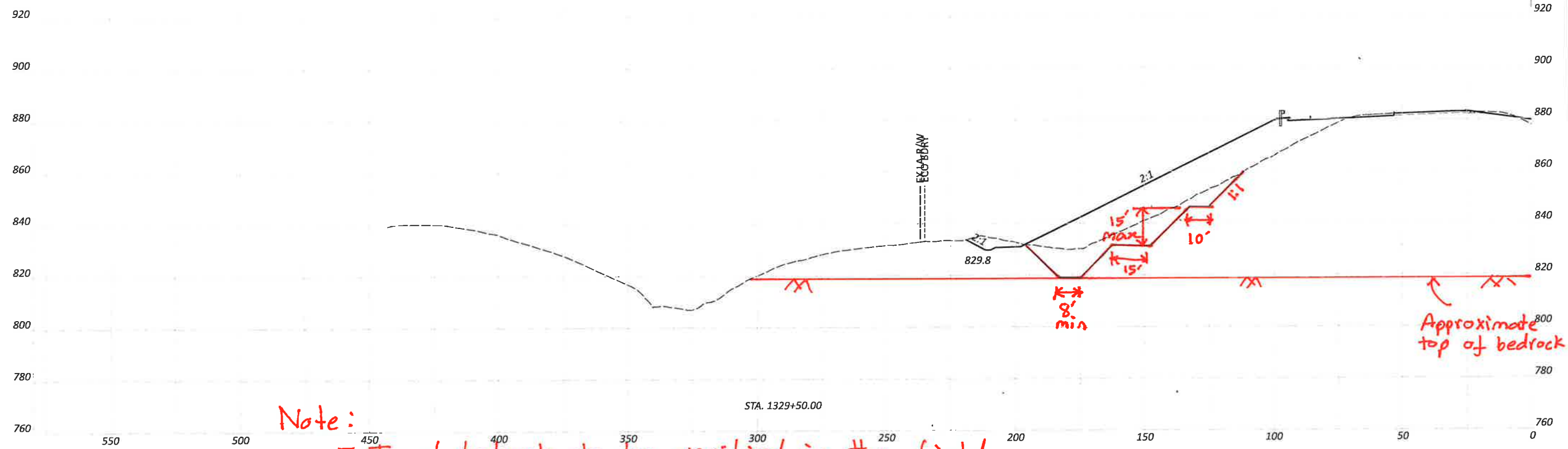
Sheet Totals			PROJECT ID	
Seeding	Cut	Fill	119142	
			SHEET	TOTAL
			264	798

CROSS SECTIONS - U.S. 33
STA. 1329+50.00

DESIGN AGENCY

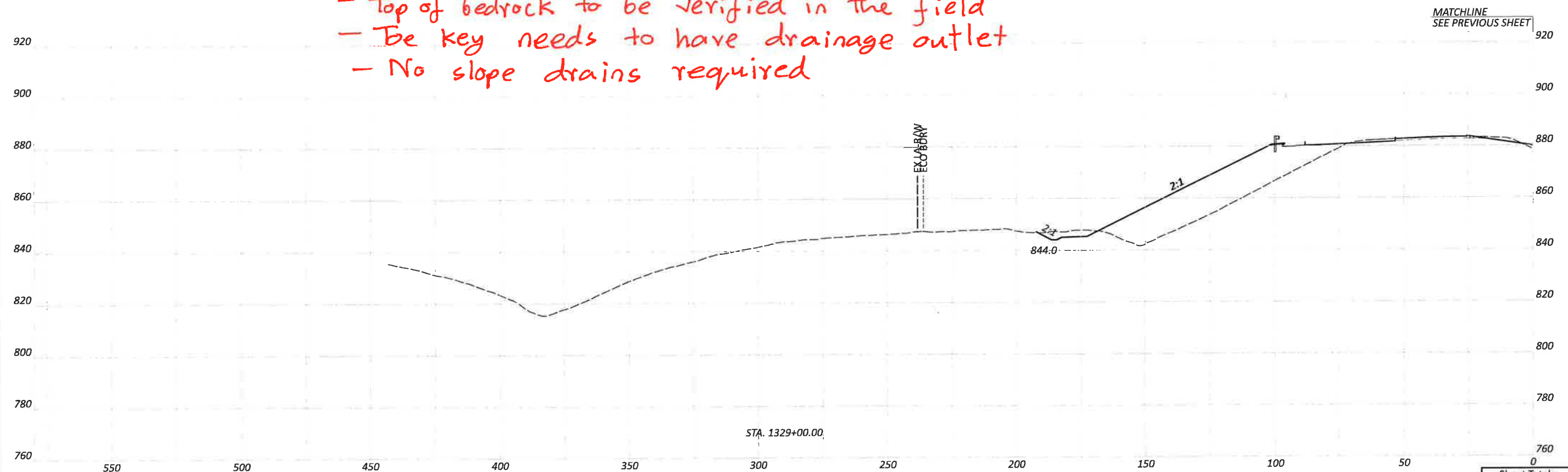
DESIGNER
SGM
REVIEWER
KKP 05-14-24
PROJECT ID
119142

Recommended Benching Detail Station 1329+50



Note:

- Top of bedrock to be verified in the field
- Be key needs to have drainage outlet
- No slope drains required



CROSS SECTIONS - U.S. 33
STA. 1329+00.00 TO STA. 1329+50.00

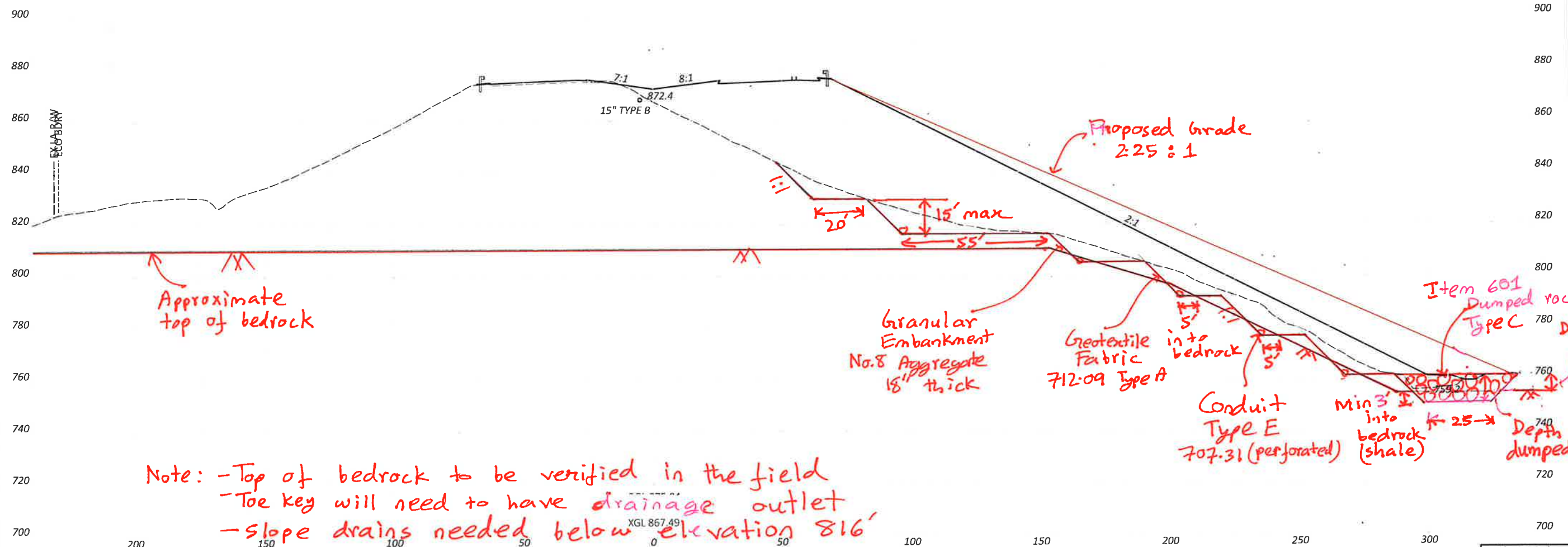
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Sheet Totals			PROJECT ID	
Seeding	Cut	Fill	119142	
			SHEET	TOTAL
			265	798

DESIGN AGENCY
DESIGNER
SGM
REVIEWER
KKP 05-14-24

Recommended Benching Detail Station 1339+00



Note: - Top of bedrock to be verified in the field
 - Toe key will need to have drainage outlet
 - Slope drains needed below elevation 816'

CROSS SECTIONS - U.S. 33
STA. 1339+00.00

ATH/MEG-33-23.23/0.00

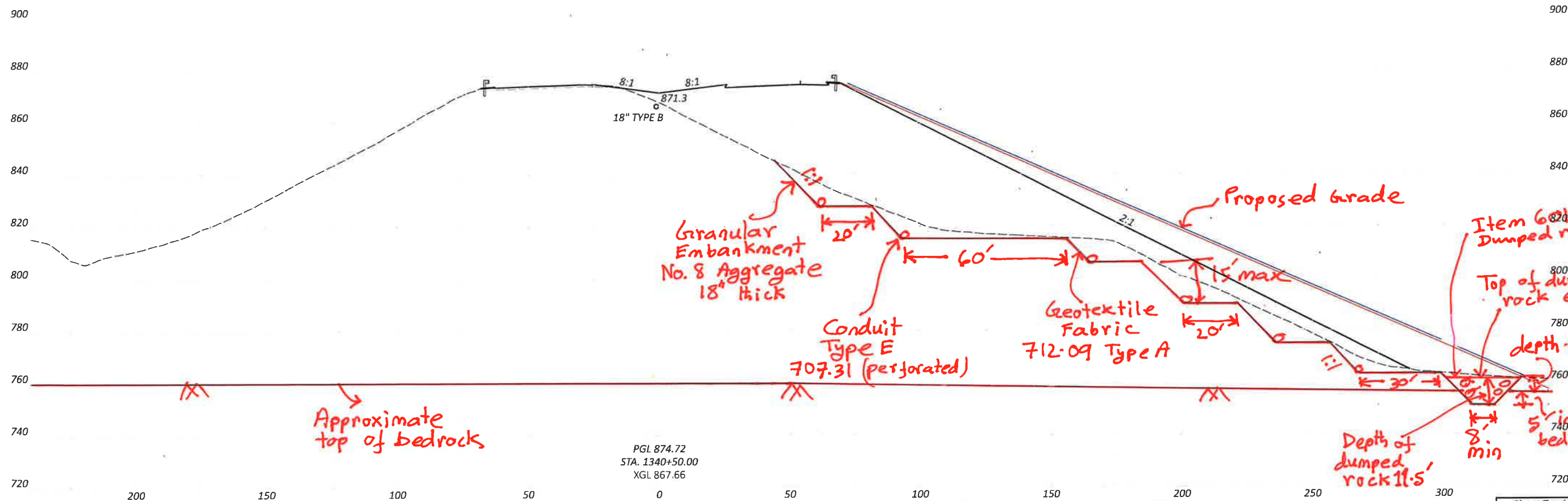
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SIGN AGENCY	
DESIGNER	SGM
REVIEWER	KKP
PROJECT ID	119142
Sheet Totals	
Seeding	Cut
292	798

Recommended Benching Detail Station 1340+50

ATH/MEG-33-23.23/0.00

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CROSS SECTIONS - U.S. 33
 STA. 1340+50.00

Approximate top of bedrock

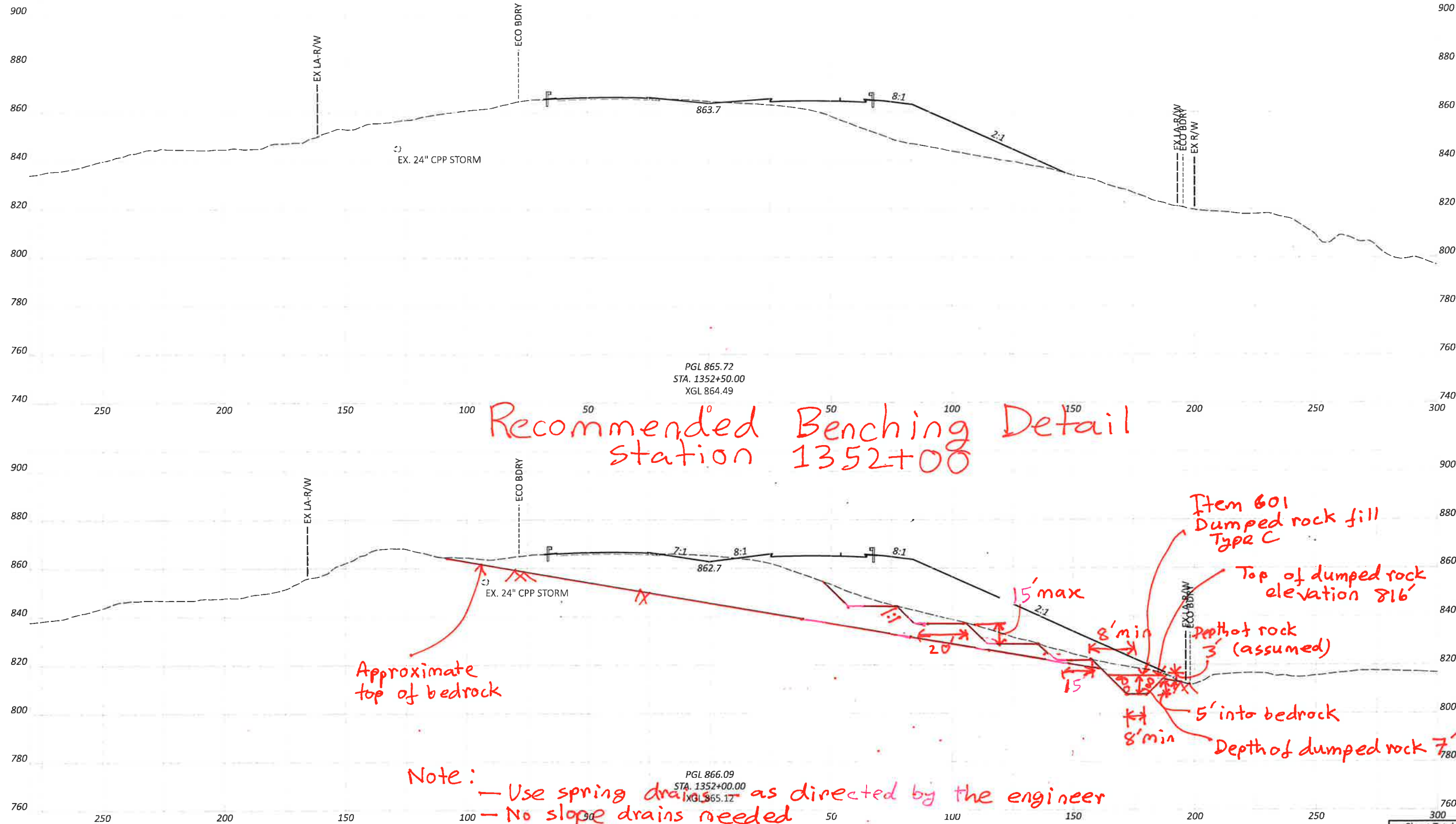
PGL 874.72
 STA. 1340+50.00
 XGL 867.66

Note: - Top of bedrock to be verified in the field
 - Toe key needs to have drainage outlet

Item 602
 Dumped rock fill, Type C
 Top of dumped rock elevation 761.5'
 depth to top of rocks 5' (assumed)
 Depth of dumped rock 11.5'
 8' min
 5' into augerable bedrock

Sheet Totals			PROJECT ID	
Seeding	Cut	Fill	119142	
295		798		

DESIGNER
 SGM
 REVIEWER
 KKP 05-14-24



Recommended Benching Detail
 Station 1352+00

Approximate top of bedrock

Item 601
 Dumped rock fill
 Type C
 Top of dumped rock
 elevation 816'
 Depth of rock
 3' (assumed)
 5' into bedrock
 Depth of dumped rock 7'

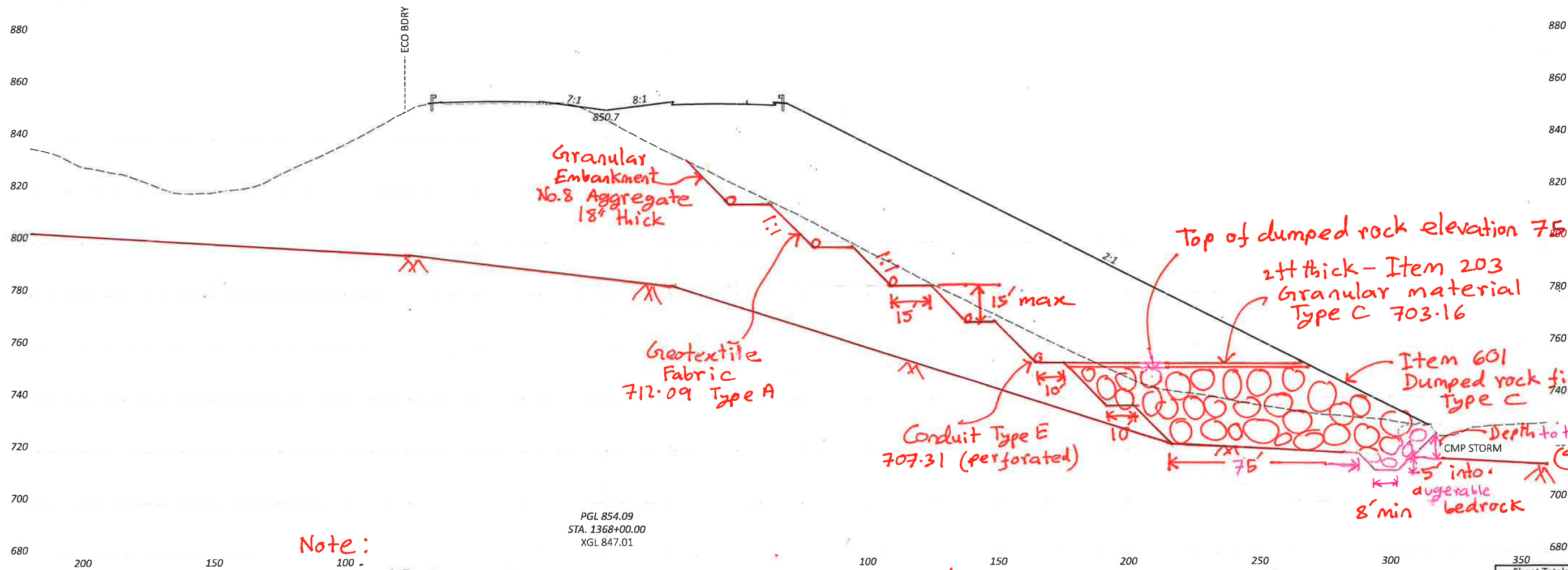
Note:
 - Use spring drains as directed by the engineer
 - No slope drains needed
 - Top of bedrock to be verified in the field
 - Toe key needs to have drainage outlet

Sheet Totals		
Seeding	Cut	Fill

DESIGN AGENCY	
DESIGNER	SGM
REVIEWER	KKP 05-14-24
PROJECT ID	119142
SHEET	TOTAL
307	798

CROSS SECTIONS - U.S. 33
 STA. 1352+00.00 TO STA. 1352+50.00

Recommended Benching Detail Station 1368+00



Note:

- Top of bedrock to be verified in the field
- Toe key needs to have drainage outlet

CROSS SECTIONS - U.S. 33
STA. 1368+00.00

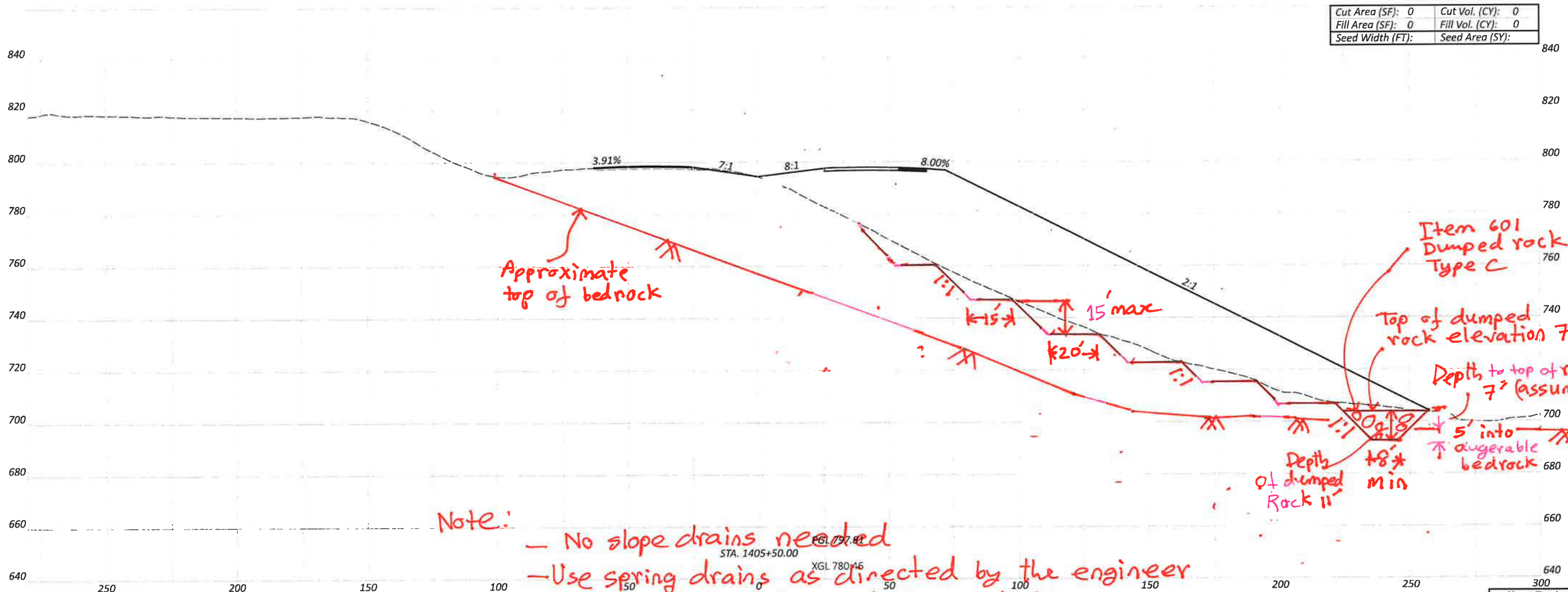
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DESIGN AGENCY			
DESIGNER	SGM		
REVIEWER	KKP 05-14-24		
PROJECT ID	119142		
Sheet Totals			
Seeding	Cut	Fill	SHEET TOTAL
			325 798

Recommended Benching Detail Station 1405+50

CROSS SECTIONS
U.S. 33



Cut Area (SF):	0	Cut Vol. (CY):	0
Fill Area (SF):	0	Fill Vol. (CY):	0
Seed Width (FT):		Seed Area (SY):	

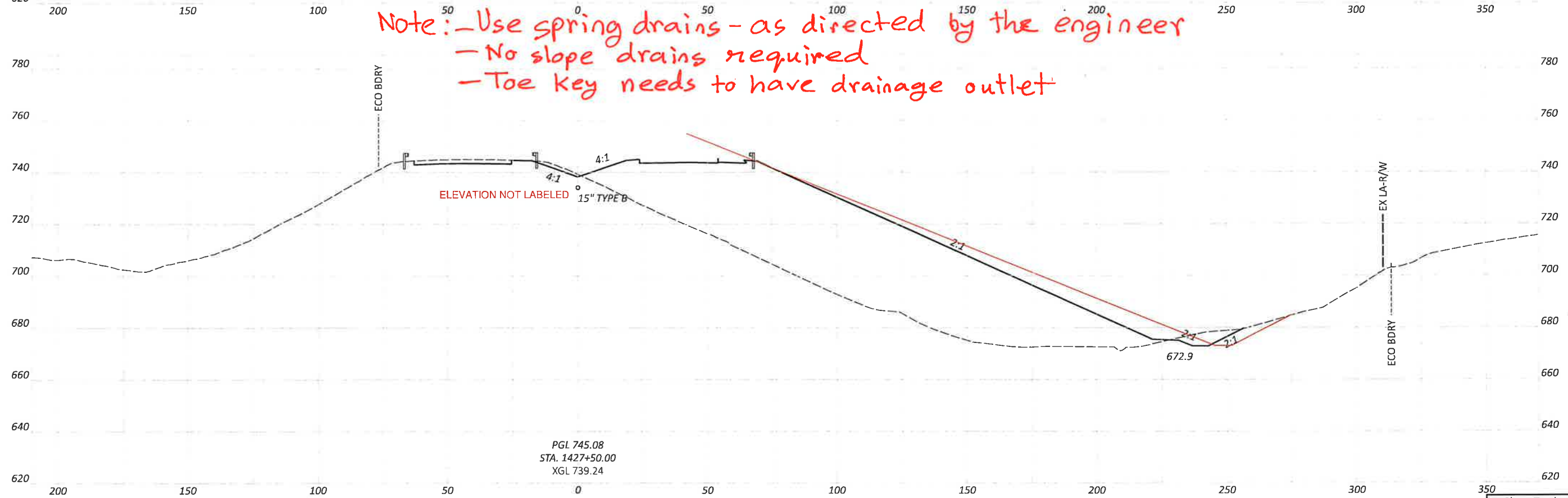
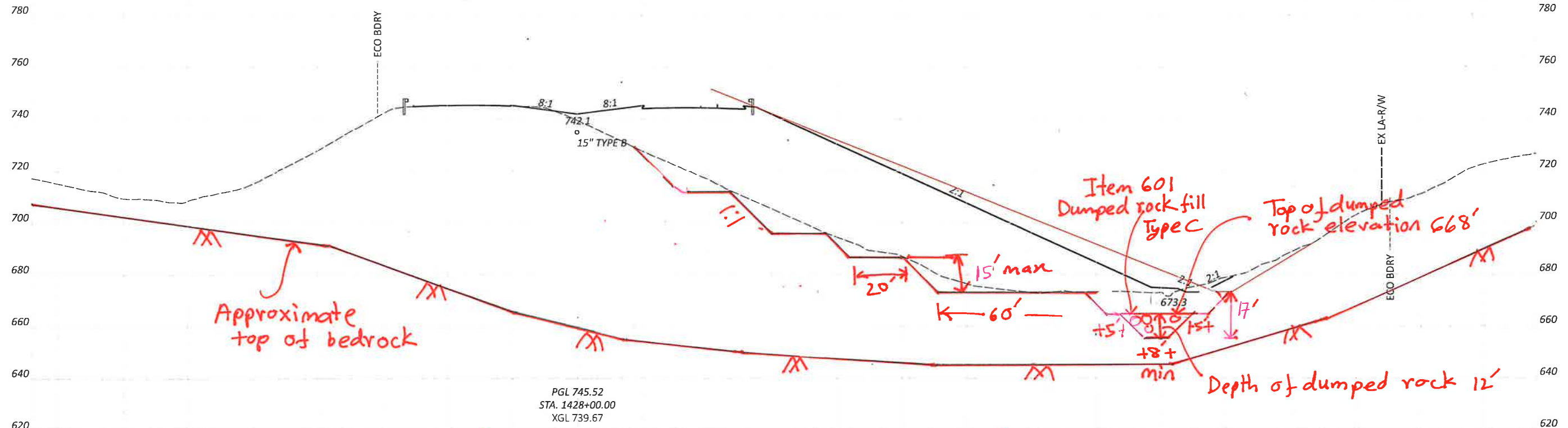
- Note:**
- No slope drains needed
 - Use spring drains as directed by the engineer
 - Toe key needs to have drainage outlet
 - Top of bedrock to be verified in the field

Sheet Totals		
Seeding	Cut	Fill

DESIGN AGENCY	
DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	0
SHEET P.O.	TOTAL 0

CTY-RTE-SECTION
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Recommended Benching Detail Station 1428+00



Note: - Use spring drains - as directed by the engineer
 - No slope drains required
 - Toe Key needs to have drainage outlet

ATH/MEG-33-23.23/0.00

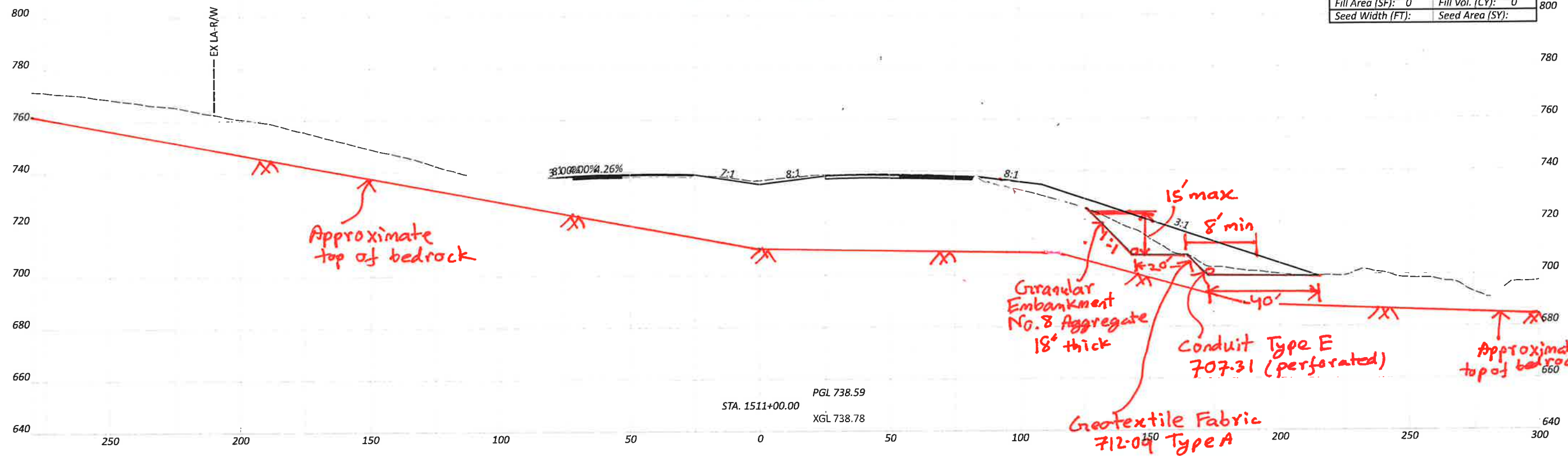
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CROSS SECTIONS - U.S. 33
 STA. 1427+50.00 TO STA. 1428+00.00

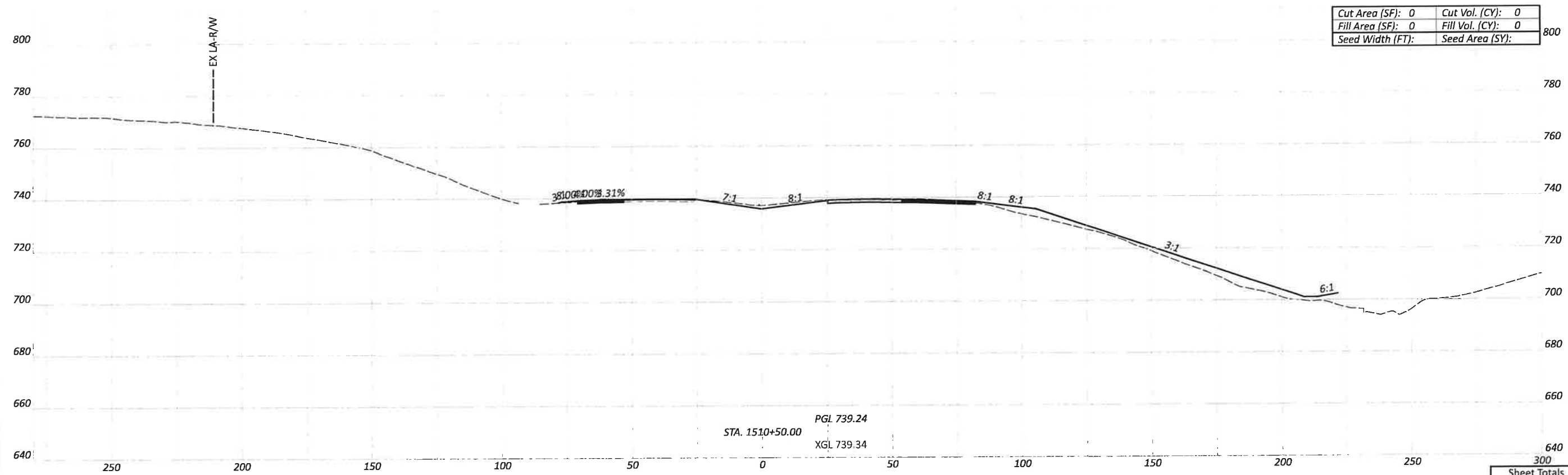
DESIGN AGENCY	
HNTB	
DESIGNER	
SGM	
REVIEWER	
KKP 05-14-24	
PROJECT ID	
119142	
Sheet Totals	
Seeding	Cut
389	798
SHEET	TOTAL
389	798

Recommended Benching Detail Station 1511+00

Cut Area (SF):	0	Cut Vol. (CY):	0
Fill Area (SF):	0	Fill Vol. (CY):	0
Seed Width (FT):		Seed Area (SY):	



Cut Area (SF):	0	Cut Vol. (CY):	0
Fill Area (SF):	0	Fill Vol. (CY):	0
Seed Width (FT):		Seed Area (SY):	

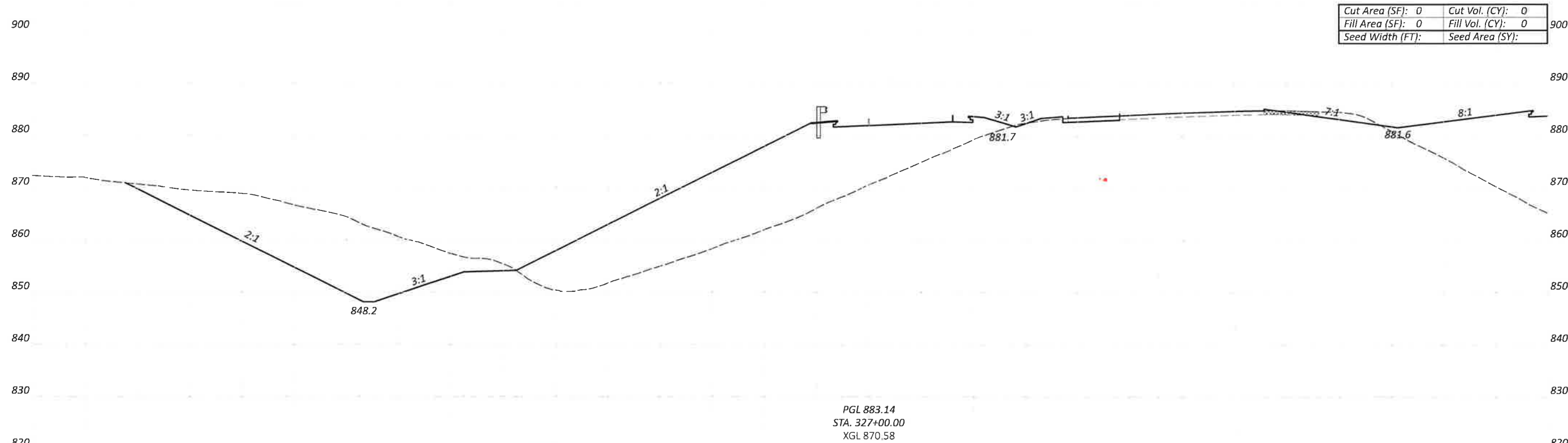


Sheet Totals			SHEET	TOTAL
Seeding	Cut	Fill		
			P.0	0

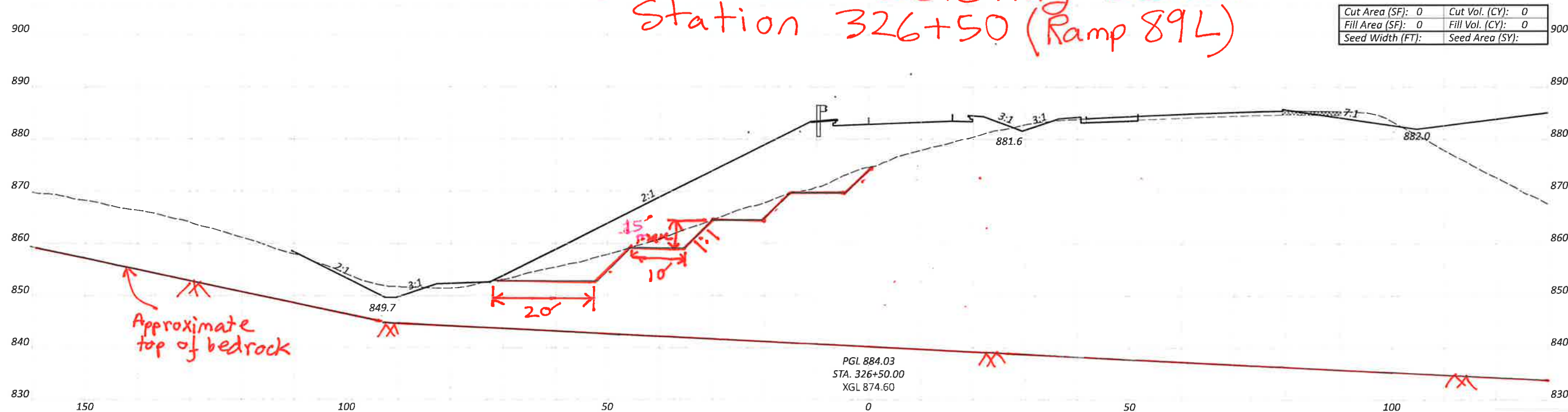
CROSS SECTIONS
U.S. 33

DESIGN AGENCY	
DESIGNER	XXX
REVIEWER	XXX MM-DD-Y
PROJECT ID	0

CTY-RTE-SECTION
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Recommended Benching Detail
 Station 326+50 (Ramp 89L)



Approximate top of bedrock

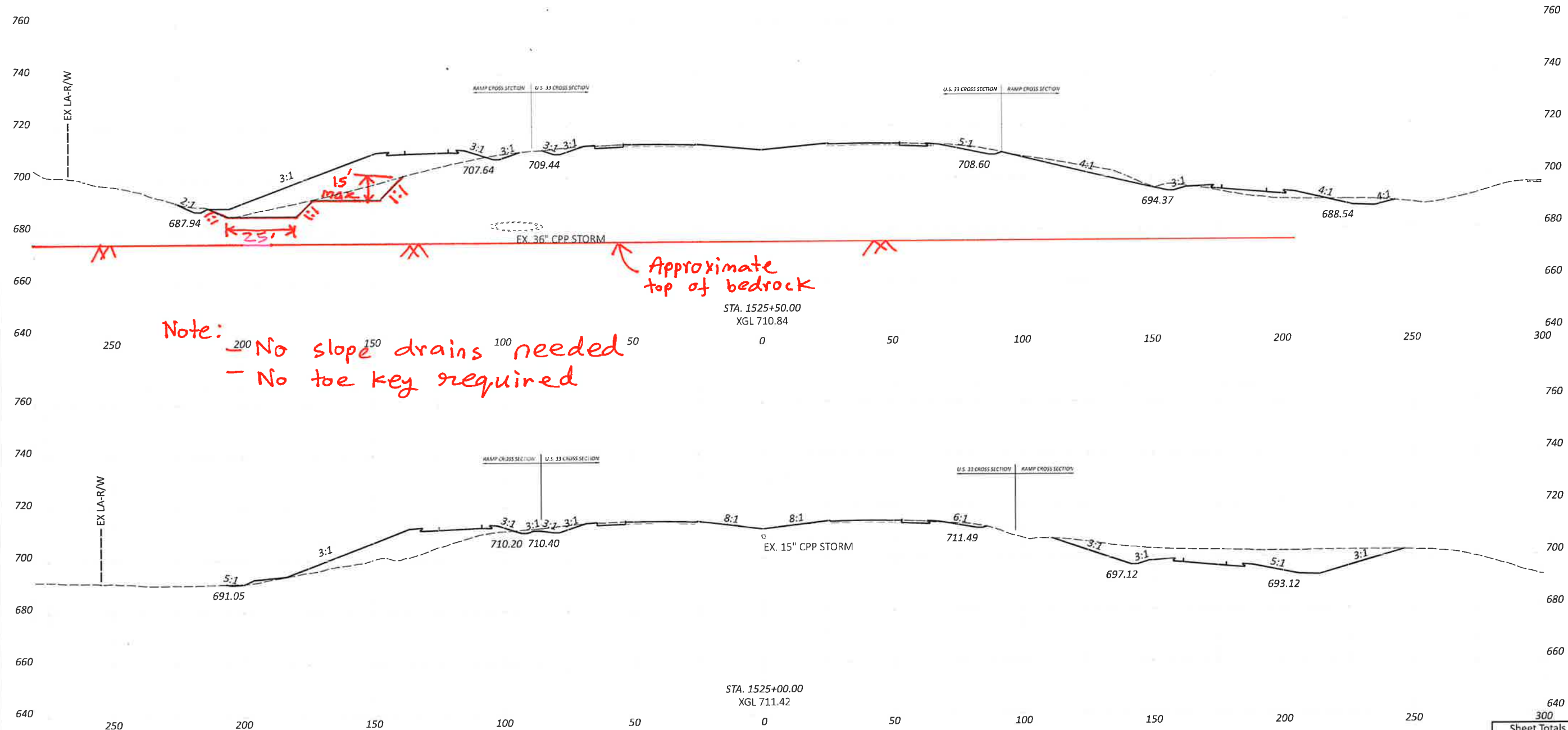
Note: - No slope drains needed
 - No toe key required

Sheet Totals	
Seeding	Total
Cut	582
Fill	798

CROSS SECTIONS - RAMP L
 STA. 326+50.00 TO STA. 327+00.00

DESIGN AGENCY
HNTB
 DESIGNER
 AS
 REVIEWER
 KKP 06/01/24
 PROJECT ID
 119142

Recommended Benching Detail Station 425+50 (Ramp 681N)



Note:
 - No slope drains needed
 - No toe key required

Approximate top of bedrock

CROSS SECTIONS - U.S. 33
 STA. 1525+00.00 TO STA. 1525+50.00

ATH/MEG-33-23.23/0.00

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DESIGN AGENCY	
HNTB	
DESIGNER	
SGM	
REVIEWER	
KKP 05-14-24	
PROJECT ID	
119142	
Sheet Totals	
Seeding	TOTAL
Cut	487
Fill	798

APPENDIX F
ROCK CUT SLOPE DESIGN



Rock Cut Slope Design
Sta. 1242+00

Boring No= B-82
 Surface Elevation = 269.9 meters
 Surface Elevation = 885.5 feet
 Rock Cut Limits= 1236+08 to 1246+50
 Lowest Catchment Ditch
 Elevation = 820.7 feet (Station 1246+00)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	2.6	0.0	8.5	269.9	267.3	885.5	877.0	Soil	--	--	--	--	--	--	NA	3:1	Overburden bench required (10 ft min. width)
2.6	8.7	8.5	28.5	267.3	261.2	877.0	857.0	Weathered Sandstone/Indurated Clay/Mudstone	Augerable	Augerable	--	--	--	--	Incompetent	2:1	
8.7	10.9	28.5	35.8	261.2	259.0	857.0	849.7	Sandstone	Medium to Moderately Hard	Slightly Strong to Moderately Strong	34	--	--	--	Incompetent	2:1	Construct 10' wide bench below this layer
10.9	14.6	35.8	47.9	259.0	255.3	849.7	837.6	Shale/Sandstone/Shale/Mudstone /Siltstone	Very Soft to Moderately Hard	Very Weak to Moderately Strong	8 to 66	--	--	--	Incompetent	2:1	Construct 10' wide bench below this layer
14.6	25.9	47.9	85.0	255.3	244.0	837.6	800.5	Sandstone	Medium to Moderately Hard	Slightly Strong to Moderately Strong	44 to 97	--	3153.1	--	Incompetent** to Competent	0.5:1	0.5:1 cut slope proposed based on historical cross section and Tier 1 rating from "Rockfall Geohazard Rating Form", dated 6-23-08

*Strength descriptor determined by UCS test result when laboratory data available, otherwise taken from visual descriptor on historic boring log

** Incompetent based on "Medium" descriptor on Historic Boring Log and UCS test result at elevation 832.0

Rock Cut Slope Design
Sta. 1291+00

Boring No= B-95 & R-47 (Bottom Layer Only)
 Surface Elevation = 293.1 meters
 Surface Elevation = 961.6 feet
 Rock Cut Limits= 1287+62 to 1304+50
 Lowest Catchment Ditch
 Elevation = 855.5 feet (Station 1287+62.13)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	1.6	0.0	5.2	293.1	291.5	961.6	956.4	Soil	--	--	--	--	--	--	NA	3:1	No overburden bench per District Recommendation
1.6	4.6	5.2	15.1	291.5	288.5	956.4	946.5	Indurated Clay/Weathered Mudstone	Augerable	Augerable	--	--	--	--	Incompetent	3:1	
4.6	12.2	15.1	40.0	288.5	280.9	946.5	921.6	Mudstone/Clayshale/Shale	Very Soft to Medium	Very Weak to Slightly Strong	0 to 31	--	--	--	Incompetent	3:1	Contains Slickensides
12.2	13.7	40.0	44.9	280.9	279.4	921.6	916.7	Siltstone	Medium	Strong*	31	--	9296.9	--	Competent	3:1	
13.7	25.0	44.9	82.0	279.4	268.1	916.7	879.6	Mudstone	Very Soft to Soft	Very Weak to Weak	0 to 52	--	--	--	Incompetent	3:1	Significant Erosion between elevations 880 and 910 per District Comments. Use 3:1 Cut Slope. Install 10' wide bench at Elev. 900 to break up concentrated flow and reduce erosion
25.0	34.3	82.0	112.4	268.1	258.9	879.6	849.2	Claystone	Soft to Medium Hard	Weak to Slightly Strong	28 to 90	--	--	--	Incompetent	3:1	Contains Slickensides in R-47

*Strength descriptor determined by UCS test result when laboratory data available, otherwise taken from visual descriptor on historic boring log

**Rock Cut Slope Design
Sta. 1396+50**

Boring No= B-120
 Surface Elevation = 271.7 meters
 Surface Elevation = 891.4 feet
 Rock Cut Limits= 1391+00 to 1402+00
 Lowest Catchment Ditch
 Elevation = 806.8 feet (Station 1402+00)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	1.8	0.0	5.9	271.7	269.9	891.4	885.5	Soil	--	--	--	--	--	--	NA	3:1	No overburden bench per District recommendation
1.8	13.7	5.9	44.9	269.9	258.0	885.5	846.5	Indurated Clay/Weathered Mudstone	Augerable	Augerable	--	--	--	--	Incompetent	3:1	Use 3:1 cut slope and construct 10' wide bench at elev. 870 to break up concentrated flow per District recommendation
13.7	15.8	44.9	51.8	258.0	255.9	846.5	839.6	Sandstone/Siltstone/Mudstone	Very Soft to Moderately Hard	Very Weak to Moderately Strong	45	--	--	--	Incompetent	3:1	Use 3:1 slope and construct 10' wide bench below per District recommendation
15.8	20.4	51.8	66.9	255.9	251.3	839.6	824.5	Sandstone/Siltstone	Soft to Moderately Hard	Weak to Moderately Strong	47 to 82	--	--	--	Incompetent	2:1	Contains Slickensides
20.4	24.1	66.9	79.1	251.3	247.6	824.5	812.3	Siltstone	Moderately Hard to Hard	Moderately Strong to Strong	46 to 47	--	--	--	Incompetent	2:1	
24.1	25.6	79.1	84.0	247.6	246.1	812.3	807.4	Mudstone	Very Soft to Soft	Very Weak to Weak	16	--	--	--	Incompetent	2:1	Contains Slickensides
25.6	28.0	84.0	91.9	246.1	243.7	807.4	799.5	Siltstone	Hard	Strong	45	--	--	--	Competent	2:1	Use 2:1 Slope per District Recommendation

Rock Cut Slope Design
Sta. 1409+50

Boring No= B-124
 Surface Elevation = 259.0 meters
 Surface Elevation = 849.7 feet
 Rock Cut Limits= 1407+50 to 1413+50
 Lowest Catchment Ditch 770.5 feet (Station 1413+00)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	2.5	0.0	8.2	259.0	256.5	849.7	841.5	Soil	--	--	--	--	--	--	NA	3:1	No overburden bench per District recommendation
2.5	2.7	8.2	8.9	256.5	256.3	841.5	840.9	Shale	Augerable	Augerable	--	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation.
2.7	3.4	8.9	11.2	256.3	255.6	840.9	838.6	Shale	Soft	Weak	18	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation.
3.4	7.9	11.2	25.9	255.6	251.1	838.6	823.8	Sandstone	Medium	Moderately Strong*	18 to 20	--	6639.8	--	Competent	3:1	Use 3:1 slope per District recommendation. Construct 10' wide bench at bottom of layer
7.9	10.4	25.9	34.1	251.1	248.6	823.8	815.6	Mudstone/Siltstone	Very Soft to Medium	Very Weak to Slightly Strong	16	--	--	--	Incompetent	3:1	Contains Clay Seams. Use 3:1 slope per District recommendation
10.4	11.2	34.1	36.7	248.6	247.8	815.6	813.0	Sandstone	Medium	Slightly Strong	41	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation.
11.2	14.9	36.7	48.9	247.8	244.1	813.0	800.9	Mudstone	Very Soft to Soft	Very Weak to Weak	0 to 38	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation.
14.9	16.8	48.9	55.1	244.1	242.2	800.9	794.6	Siltstone	Medium	Slightly Strong	67	--	8167.0	--	Incompetent	3:1	Use 3:1 slope per District recommendation. Construct 10' wide bench at bottom of layer
16.8	25.3	55.1	83.0	242.2	233.7	794.6	766.7	Sandstone	Moderately Hard	Moderately Strong	60 to 70	--	--	--	Competent	0.5:1	

*Strength descriptor determined by UCS test result when laboratory data available, otherwise taken from visual descriptor on historic boring log

Rock Cut Slope Design
Sta. 1450+50

Boring No= R-74
 Surface Elevation = 257.8 meters
 Surface Elevation = 845.8 feet
 Rock Cut Limits= 1442+50 to 1456+00
 Lowest Catchment Ditch
 Elevation = 764.3 feet (Station 1442+50)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	4.0	0.0	13.1	257.8	253.8	845.8	832.7	Soil	--	--	--	--	--	--	NA	3:1	No overburden bench per District recommendation
4.0	5.3	13.1	17.4	253.8	252.5	832.7	828.4	Sandstone/Limestone	Augerable	Augerable	--	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation. Construct 10' wide bench below
5.3	9.7	17.4	31.8	252.5	248.1	828.4	814.0	Limestone/ Sandstone	Hard	Strong	60 to 100	--	--	--	Competent	1:1	Construct 10' wide bench below
9.7	16.0	31.8	52.5	248.1	241.8	814.0	793.3	Claystone/Siltstone/Sandstone	Very Soft to Hard	Very Weak to Strong	0 to 97	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation. Construct 10' wide bench below
16.0	25.9	52.5	85.0	241.8	231.9	793.3	760.8	Limestone/Sandstone	Medium Hard to Hard	Slightly Strong to Strong	97 to 100	--	--	--	Competent	0.5:1	

Rock Cut Slope Design
Ramp 681M Sta. 323+00

Boring No= B-153 & R-94 (Bottom Layer)
 Surface Elevation = 233.9 meters
 Surface Elevation = 767.2 feet
 Rock Cut Limits= 320+00 to 325+50 Ramp 681M
 Lowest Catchment Ditch
 Elevation = 692.7 feet (Station 325+50)

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	2.6	0.0	8.5	233.9	231.3	767.2	758.7	Soil	--	--	--	--	--	--	NA	3:1	Overburden bench required (10 ft min. width)
2.6	5.9	8.5	19.4	231.3	228.0	758.7	747.8	Sandstone	Augerable	Augerable	--	--	--	--	Incompetent	3:1	
5.9	14.0	19.4	45.9	228.0	219.9	747.8	721.3	Sandstone	Very Soft to Medium	Very Weak to Slightly Strong	0	--	--	--	Incompetent	3:1	
14.0	21.6	45.9	70.9	219.9	212.3	721.3	696.3	Siltstone/Coal	Augerable	Augerable	--	--	--	--	Incompetent	3:1	Coal Seam from Elev. 702.5 to 700.5

Rock Cut Slope Design
Ramp 681N Sta. 429+50 (Left and Right Sides)

Boring No= R-95
 Surface Elevation = 231.2 meters
 Surface Elevation = 758.5 feet
 Rock Cut Limits= 426+00 to 430+00 Ramp 681N
 Lowest Catchment Ditch Elevation = 685.3 feet (Station 430+00) Ramp 681N Left Side

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	3.2	0.0	10.5	231.2	228.0	758.5	748.0	Soil	--	--	--	--	--	--	NA	3:1	Decomposed Sandstone. 3:1 slopes are recommended, but 2:1 slopes may be used to stay within the Eco Boundary. No overburden bench per District recommendation
3.2	4.6	10.5	15.0	228.0	226.7	748.0	743.5	Sandstone	Augerable	Augerable	--	--	--	--	Incompetent	3:1	3:1 slopes are recommended, but 2:1 slopes may be used to stay within the Eco Boundary
4.6	17.9	15.0	58.8	226.7	213.3	743.5	699.7	Sandstone	Medium Hard	Slightly Strong	68 to 100	--	--	--	Incompetent	3:1	3:1 slopes are recommended, but 2:1 slopes may be used to stay within the Eco Boundary. Construct 10'-wide bench below this layer.
17.9	25.6	58.8	84.0	213.3	205.6	699.7	674.5	Coal/Claystone/Limestone/Sandstone	Very Soft to Hard	Very Weak to Strong	0 to 95	--	--	--	Incompetent	3:1	Coal Seam from Elev. 699.9 to 697.6

**Rock Cut Slope Design
Ramp 6810 Sta. 135+00**

Boring No= R-97
 Surface Elevation = 247.0 meters
 Surface Elevation = 810.2 feet
 Rock Cut Limits= 131+00 to 137+73.3
 Lowest Catchment Ditch Elevation = 677.0 feet (Station 137+73.3) Ramp 6810 Right Side
 Lowest Ditch Elevation = 668.7 (Station 132+00) Ramp 6810 Left Side

Top Depth (meters)	Bottom Depth (meters)	Top Depth (feet)	Bottom Depth (feet)	Top Elevation (meters)	Bottom Elevation (meters)	Top Elevation (feet)	Bottom Elevation (feet)	Material Type	Strength (Historic Hardness Descriptor Prior to 2007)*	Strength (Geologic Strength Descriptor)*	RQD (%)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Id ₂ SDI (%)	Competent or Incompetent	Cut Slope Rate (H:V)	Comments
0.0	0.9	0.0	3.0	247.0	246.1	810.2	807.2	Soil	--	--	--	--	--	--	NA	3:1	Overburden bench required (10 ft min. width)
0.9	6.1	3.0	20.0	246.1	240.9	807.2	790.1	Sandstone/Siltstone/Claystone/Shale	Augerable	Augerable	--	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation
6.1	9.5	20.0	31.2	240.9	237.5	790.1	779.0	Claystone	Soft to Medium Hard	Weak to Slightly Strong	0 to 75	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation
9.5	10.8	31.2	35.5	237.5	236.2	779.0	774.7	Siltstone	Medium Hard	Slightly Strong	75 to 100	--	--	--	Incompetent	3:1	Use 3:1 slope per District recommendation. Construct 10'-wide bench below.
10.8	21.8	35.5	71.5	236.2	225.2	774.7	738.7	Sandstone	Medium Hard to Hard	Slightly Strong to Strong	99 to 100	--	--	--	Incompetent	1:1	Construct a 5'-wide construction bench at elevation 756.7. Construct a 10'-wide bench below this layer.
21.8	24.8	71.5	81.5	225.2	222.2	738.7	728.7	Claystone	Medium Hard	Slightly Strong	98 to 99	--	--	--	Incompetent	2:1	Construct a 10'-wide bench below this layer.
24.8	32.8	81.5	107.5	222.2	214.2	728.7	702.6	Sandstone	Hard	Strong	90 to 100	--	--	--	Competent	1:1	Construct a 10' wide bench below this layer.
32.8	46.9	107.5	154.0	214.2	200.1	702.6	656.2	Claystone/Coal/Sandstone/Claystone	Soft to Hard	Weak to Strong	81 to 95	--	--	--	Incompetent	2:1	Coal between elevations 697.4 to 695.4

*Strength descriptor determined by UCS test result when laboratory data available, otherwise taken from visual descriptor on historic boring log

APPENDIX G
BENCHING AND CUT SLOPE SUMMARY



Begin Station	End Station	Majority Cut/Fill	Benching/ Rock Cut Criteion
1227+00	1228+00	Cut	Use 3:1 cut slopes or flatter
1228+50	1228+50	Fill	Use Special Benching per ODOT Comment on Stage 2 Plans
1229+00	1229+30.62	Fill	Use 3:1 fill Slopes with Standard Benching
1229+30.62	1236+38.35	--	Bridge No. ATH-00033-23250R
1236+50	1244+50	Cut	Use 1242+00 Rock Cut Slope Design
1245+00	1246+50	Cut	Use 3:1 cut slopes or flatter
1247+00	1250+50	Fill	Use Standard Benching
1251+00	1251+00	Fill	Use Benching Detail per District comments dated 11.21.24
1251+50	1253+00	Fill	Use 1252+50 Benching Detail
1253+50	1253+50	Fill	Use Benching Detail per District comments dated 11.21.24
1254+00	1256+50	Cut/Fill	Use 1:1 cut slope or flatter in Sandstone and 3:1 cut slope in soils, 2:1 fill slopes or flatter with standard benching
1257+00	1260+50	Cut/Fill	Use 3:1 cut slope in soils, if possible, 2:1 fill slopes or flatter with standard benching
1261+00	1267+00	Cut	Use 1265+50 Rock Cut Slope Design
1267+50	1268+00	Cut	Use 3:1 cut slopes or flatter
1268+50	1268+50	Fill	Use Standard Benching
1269+00	1269+00	Fill	Use Benching Detail per District comments dated 11.21.24
1269+50	1270+00	Fill	Use 2.5:1 fill slopes, refer to 1269+50 Benching Detail
1270+50	1270+50	Fill	Use Benching Detail per District comments dated 11.21.24
1271+00	1273+50	Cut/Fill	Use 3:1 cut slope in soils, if possible, 2:1 fill slopes or flatter with standard benching
1274+00	1275+50	Cut	Use 3:1 cut slopes or flatter
1276+00	1276+50	Fill	Use Standard Benching
1277+00	1279+00	Fill	Use 1278+00 Benching Detail
1279+50	1280+00	Fill	Use Standard Benching
1280+50	1282+02.96	Cut/Fill	Use 3:1 cut slopes or flatter
1282+02.96	1287+62.13	--	Bridge No. ATH-00033-24250R
1287+62.13	1304+50	Cut	Use 1291+00 Rock Cut Slope Design
1305+00	1306+00	Fill	Use Standard Benching
1306+50	1306+50	Fill	Use Standard Benching (right side), use 1310+50 Benching detail for the left side slopes
1307+00	1311+00	Fill	Use 1310+50 Benching Detail for both left and right side slopes
1311+50	1312+50	Fill	Use Standard Benching (right side), use 1310+50 Benching detail for the left side slopes
1313+00	1315+50	Cut	Use 3:1 cut slopes or flatter
1316+00	1324+00	Fill	Refer to Ramp sections
1324+50	1326+00	Fill	Use 1320+00 Benching Detail
1326+50	1334+00	Fill	Use 1329+50 Benching Detail
1334+50	1341+00	Fill	Use 1339+00 Benching Detail
1341+50	1343+00	Fill	Use 1340+50 Benching Detail
1343+50	1344+00	Fill	Use Benching Detail per District comments dated 11.21.24
1345+00	1345+50	Fill	Use Standard Benching
1346+00	1350+50	Fill	Use Standard Benching
1351+00	1351+00	Fill	Use Benching Detail per District comments dated 11.21.24
1351+50	1352+00	Fill	Use 1352+00 Benching Detail
1352+50	1352+50	Fill	Use Benching Detail per District comments dated 11.21.24
1353+00	1353+50	--	Grueser Road underpass
1354+00	1360+50	Cut	Use 3:1 cut slopes or flatter
1361+00	1361+50	Fill	Use Standard Benching
1362+00	1365+00	Fill	Use Benching Detail per District comments dated 11.21.24
1365+50	1371+00	Fill	Use 1368+00 Benching Detail
1371+50	1374+00	Fill	Use Benching Detail per District comments dated 11.21.24
1374+50	1375+00	Fill	Use Standard Benching
1375+50	1382+00	Cut	Use 3:1 cut slopes or flatter
1382+50	1382+50	Fill	Use Standard Benching
1383+00	1387+50	Fill	Use 1386+00 Benching Detail
1388+00	1390+50	Fill	Use Benching Detail per District comments dated 11.21.24
1391+00	1391+50	Cut/Fill	Use 3:1 cut slope in soils, if possible, 3:1 fill slopes or flatter with standard benching
1392+00	1400+00	Cut	Use 1396+50 Rock Cut Slope Design
1400+50	1402+00	Cut	Use 3:1 cut slopes or flatter
1402+50	1403+00	Fill	Use Standard Benching
1403+50	1404+00	Fill	Use Benching Detail per District comments dated 11.21.24
1404+50	1405+50	Fill	Use 1405+50 Benching Detail
1406+00	1406+00	Fill	Use Benching Detail per District comments dated 11.21.24
1406+50	1406+50	Fill	Use Standard Benching
1407+00	1407+50	Cut	Use 3:1 cut slopes or flatter
1408+00	1413+00	Cut	Use 1409+50 Rock Cut Slope Design
1413+50	1413+50	Cut	Use 3:1 cut slopes or flatter
1414+00	1415+00	Fill	Use Benching Detail per District comments dated 11.21.24
1415+50	1416+00	Fill	Use 1405+50 Benching Detail
1416+50	1417+00	Fill	Use Benching Detail per District comments dated 11.21.24
1417+50	1420+00	Cut/Fill	Use 3:1 cut slopes or flatter, 3:1 fill slopes or flatter with standard benching
1420+50	1420+65.74	Fill	Use 3:1 fill Slopes with Standard Benching
1420+65.74	1425+48.40	--	Bridge No. MEG-00033-0151R
1425+48.40	1432+00	Fill	Use 1428+00 Benching Detail
1432+50	1433+00	Fill	Use Benching Detail per District comments dated 11.21.24
1433+50	1437+50	Cut	Use 3:1 cut slopes or flatter, if possible
1438+00	1438+00	Fill	Use 2:1 Slopes or Flatter with Standard Benching
1438+50	1439+00	Fill	Use Benching Detail per District comments dated 11.21.24
1439+50	1439+50	Fill	Use 1405+50 Benching Detail
1440+00	1440+50	Fill	Use Benching Detail per District comments dated 11.21.24
1441+00	1442+00	Cut	Use 3:1 cut slopes or flatter
1442+50	1442+50	Cut	Use 2:1 cut slope per District comments
1443+00	1456+00	Cut	Use 1450+50 Rock Cut Slope Design
1456+50	1474+50	Cut	Use 3:1 cut slopes or flatter
1475+00	1475+00	Fill	Use Standard Benching
1475+50	1475+50	Fill	Use Benching Detail per District comments dated 11.21.24
1476+00	1476+00	Fill	Use Standard Benching
1476+50	1486+00	Cut	Use 3:1 cut slopes or flatter
1486+50	1487+50	Fill	Use 2:1 Slopes or Flatter with Standard Benching
1488+00	1491+00	Fill	Use Benching Detail per District comments dated 11.21.24
1491+50	1495+50	Fill	Use 1405+50 Benching Detail
1496+00	1496+50	Fill	Use Benching Detail per District comments dated 11.21.24
1497+00	1498+00	Fill	Use 2:1 Slopes or Flatter with Standard Benching
1498+50	1507+50	Cut	Use 3:1 cut slopes or flatter
1508+00	1508+00	Fill	Use Standard Benching
1508+50	1513+50	Fill	Use 1511+00 Benching Detail

	Structure limits
	Majority Cut Limits
	Majority Fill Limits
	Cut/Fill Limits

CR/Ramp ID	Begin Station	End Station	Majority Cut/Fill	Benching/ Rock Cut Criterion
89	401+50	404+00	Fill	Use Standard Benching
	404+50	406+50	Fill	Use 2:1 slopes or flatter
	407+00	408+00	Fill	Use Benching Detail per District comments dated 11.21.24
	408+50	408+50	Fill	Use 3:1 slopes or flatter with standard benching
	409+00	410+08.22	Fill	Refer to Ramp cross-sections
	410+08	411+77.44	--	Bridge
	411+77.44	414+00	Fill	Refer to Ramp cross-sections
	414+50.00	415+50	Fill	Use 2:1 slopes or flatter with toe key
	416+00	420+57	Fill	Use 3:1 or flatter with standard benching
89I	40+04.31	41+50	Fill	Use US 33 1310+50 Benching Detail
	42+00	42+00	Fill	Use 2:1 slopes or flatter with standard benching
	42+50	44+00	Cut	Use 2:1 cut slopes or flatter
	44+50	46+00	Cut/fill	Use 2:1 cut slopes or flatter and standard benching
	46+50	46+50	Fill	Standard benching
89J	310+32.48	312+50	Fill	Use US 33 1310+50 Benching Detail
	313+00	316+50	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 3:1 Fill Slopes or Flatter
	317+00	318+50	Fill	Use Standard Benching
89K	317+00	324+14.04	Fill	Use US 33 1320+00 Benching Detail
89L	319+50	323+50	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 2:1 Fill Slopes or Flatter
	324+00	325+00	Fill	Use 2:1 slopes or flatter with standard benching
	325+50	328+16.24	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 326+50 Benching Detail
681M	313+15.86	314+00	Fill	Use Standard Benching
	314+50	319+00	Cut	Use 3:1 Cut Slopes or Flatter
	319+50	319+50	Fill	Use Standard Benching
	320+00	325+50	Cut	Use 323+50 Rock Cut Design
	326+00	326+50	Cut/Fill	Use 3:1 Cut Slopes or flatter & Standard Benching
	327+00	328+00	Cut	Use 3:1 Cut Slopes or Flatter
681N	423+32.68	424+50	Cut	Use 3:1 Cut Slopes or Flatter
	425+00	425+50	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 425+50 Benching Detail
	426+00	426+00	Fill	Standard benching
	426+50	430+00	Cut	Use 429+50 Rock Cut Design
	430+50	433+50	Cut	Use 3:1 Cut Slopes or Flatter
681O	126+50	129+50	Fill	Use 3:1 Fill Slopes
	130+00	131+00	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 3:1 Fill Slopes or Flatter
	131+50	137+73.30	Cut	Use 135+00 Rock Cut Design
681P	233+50	243+25.9	Cut/Fill	Use 3:1 Cut Slopes or Flatter & 3:1 Fill Slopes or Flatter

	Areas of Cut and Fill
	Majority Cut Limits
	Majority Fill Limits
	Structure limits

APPENDIX H
CATCHMENT DESIGN



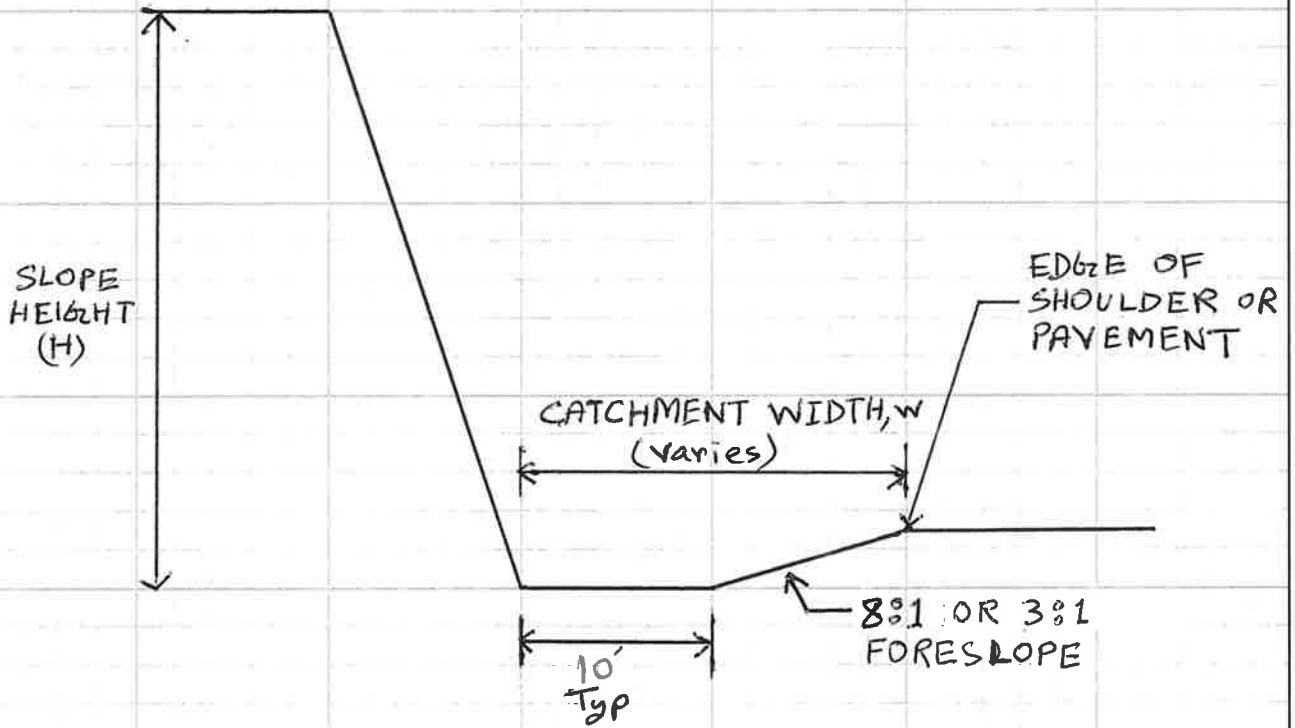


Figure: Typical Ditch Configuration for a Catchment Area with Flat Catchment Area and Angled Foreslope

Not to Scale

CRSP Input File -O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1242+00_updated IO Files.doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 91.5
Analysis Point 2 X-Coordinate:
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 860
Initial Y-Base Starting Zone Coordinate: 860

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.8	.2	0	860	20.6	849.7
2	.5	.8	.2	20.6	849.7	30.6	849.7
3	.5	.75	.15	30.6	849.7	54.6	837.7
4	.5	.75	.15	54.6	837.7	64.6	837.7
5	.5	.8	.2	64.6	837.7	71.5	823.9
6	.5	.8	.2	71.5	823.9	81.5	823.9
7	.5	.8	.2	81.5	823.9	91.5	825.1

CRSP Simulation Specifications: Used with O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1242+00_updated IO Files.doc

Total Number of Rocks Simulated: 100
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 165 lb/ft³
Rock Shape: Discoidal
Diameter: 3.0 ft

Thickness: 1.7 ft

CRSP Analysis Point 1 Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1242+00_updated IO Files.doc

Analysis Point 1: X = 91.5, Y = 825

Total Rocks Passing Analysis Point: 1

Cumulative Probability Bounce Ht. (ft)	Velocity (ft/sec)	Energy (ft-lb)
50%	5.61	1524
75%	5.61	1524
90%	5.61	1524
95%	5.61	1524
98%	5.61	1524

Velocity (ft/sec) (ft-lb)	Bounce Height (ft)	Kinetic Energy
Maximum: 5.61	Maximum: .01	Maximum: 1524
Average: 5.61	Average: .01	Average: 1524
Minimum: 5.61	G. Mean: .01	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Data Collected at End of Each Cell - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1242+00_updated IO Files.doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	17	15	1	0	0
2	10	7	1.52	0	0
3	20	16	1.43	1	0
4	12	8	2.09	0	0

5	30	25	2.63	8	2
6	13	8	2.37	0	0
7	6	6	0	0	0

CRSP Rocks Stopped Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1242+00 _updated IO Files.doc

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	6
30 To 40 ft	4
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	6
70 To 80 ft	42
80 To 90 ft	40
90 To 91.5 ft	1

CRSP Input File -O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1396+50 IO Files.doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 5
Analysis Point 1 X-Coordinate: 151.5
Analysis Point 2 X-Coordinate: 0
Analysis Point 3 X-Coordinate: 0
Initial Y-Top Starting Zone Coordinate: 870
Initial Y-Base Starting Zone Coordinate: 870

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.8	.2	0	870	90	840
2	.5	.8	.2	90	840	100	840
3	.5	.8	.2	100	840	131.5	824.3
4	.5	.8	.2	131.5	824.3	141.5	824.3
5	.5	.8	.2	141.5	824.3	151.5	825.5

CRSP Simulation Specifications: Used with O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1396+50 IO Files.doc

Total Number of Rocks Simulated: 100
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 5
Rock Density: 165 lb/ft³
Rock Shape: Spherical
Diameter: 2.3 ft

CRSP Analysis Point 1 Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1396+50 IO Files.doc

Analysis Point 1: X = 151.5, Y = 826

NO ROCKS PAST ANALYSIS POINT 1

CRSP Data Collected at End of Each Cell - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1396+50 IO Files.doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	16	12	1.91	0	0
2	7	6	0	0	0
3	22	19	0	1	0
4	11	9	0	0	0
5	No rocks past end of cell				

CRSP Rocks Stopped Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1396+50 IO Files.doc

X Interval	Rocks Stopped
0 To 10 ft	79
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	18
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	0
130 To 140 ft	0

140 To 150 ft
150 To 151.5 ft

3
0

CRSP Input File -O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1450+50 IO Files.doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 129.7
Analysis Point 2 X-Coordinate: 0
Analysis Point 3 X-Coordinate: 0
Initial Y-Top Starting Zone Coordinate: 828.4
Initial Y-Base Starting Zone Coordinate: 828.4

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.9	.25	0	828.4	14.4	814
2	.5	.9	.25	14.4	814	24.4	814
3	.5	.8	.2	24.4	814	86.5	793.3
4	.5	.8	.2	86.5	793.3	96.5	793.3
5	.5	.8	.2	96.5	793.3	104.7	776.8
6	.5	.8	.2	104.7	776.8	114.7	776.8
7	.5	.8	.2	114.7	776.8	129.7	778.7

CRSP Simulation Specifications: Used with O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1450+50 IO Files.doc

Total Number of Rocks Simulated: 100
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 165 lb/ft³
Rock Shape: Cylindrical
Diameter: 1.4 ft
Length: 3.4 ft

CRSP Analysis Point 1 Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1450+50 IO Files.doc

Analysis Point 1: X = 129.7, Y = 779

Total Rocks Passing Analysis Point: 1

Cumulative Probability Bounce Ht. (ft)	Velocity (ft/sec)	Energy (ft-lb)
50%	5.43	586
75%	5.43	586
90%	5.43	586
95%	5.43	586
98%	5.43	586

Velocity (ft/sec) (ft-lb)	Bounce Height (ft)	Kinetic Energy
Maximum: 5.43	Maximum: .07	Maximum: 586
Average: 5.43	Average: .07	Average: 586
Minimum: 5.43	G. Mean: .07	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Data Collected at End of Each Cell - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1450+50 IO Files.doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	27	25	1.24	1	0
2	19	12	2.87	1	0
3	25	20	1.89	1	0
4	21	15	2.24	1	0
5	30	24	2.2	15	10
6	37	12	9.26	4	0

7

5

5

0

0

0

CRSP Rocks Stopped Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\1450+50 IO Files.doc

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	2
110 To 120 ft	68
120 To 129.7 ft	29

CRSP Input File -O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\135+00- 3H TO 1V IO Files.doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 195.8
Analysis Point 2 X-Coordinate: 0
Analysis Point 3 X-Coordinate: 0
Initial Y-Top Starting Zone Coordinate: 774.7
Initial Y-Base Starting Zone Coordinate: 774.7

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.8	.2	0	774.7	36	738.7
2	.5	.8	.2	36	738.7	46	738.7
3	.5	.8	.2	46	738.7	66	728.7
4	.5	.8	.2	66	728.7	76	728.7
5	.5	.9	.25	76	728.7	102.1	702.6
6	.5	.9	.25	102.1	702.6	112.1	702.6
7	.5	.8	.2	112.1	702.6	160.8	678.3
8	.5	.8	.2	160.8	678.3	170.8	678.3
9	.5	.8	.2	170.8	678.3	195.8	686.6

CRSP Simulation Specifications: Used with O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\135+00- 3H TO 1V IO Files.doc

Total Number of Rocks Simulated: 100
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1

Ending Cell Number: 9
 Rock Density: 165 lb/ft³
 Rock Shape: Discoidal
 Diameter: 5.5 ft
 Thickness: 4.5 ft

CRSP Analysis Point 1 Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\135+00- 3H TO 1V IO Files.doc

Analysis Point 1: X = 195.8, Y = 687

NO ROCKS PAST ANALYSIS POINT 1

CRSP Data Collected at End of Each Cell - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\135+00- 3H TO 1V IO Files.doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	39	35	1.67	1	0
2	26	21	2.02	0	0
3	35	27	2.3	1	0
4	25	20	2.01	0	0
5	46	38	4.37	11	1
6	28	21	4.79	1	0
7	38	31	3.48	1	0
8	30	25	3.05	1	0
9	No rocks	past end of cell			

CRSP Rocks Stopped Data - O:\PROJECT\2023\COL-05\23050059COL_ATH MEG-033-18-70 00-00_HNTB Ohio Inc\Design\Roadway Design Calculations\East Section\Catchment Design\135+00- 3H TO 1V IO Files.doc

X Interval	Rocks Stopped
0 To 10 ft	0

10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	0
130 To 140 ft	0
140 To 150 ft	0
150 To 160 ft	0
160 To 170 ft	0
170 To 180 ft	0
180 To 190 ft	69
190 To 195.8 ft	31

APPENDIX I
SETTLEMENT ANALYSES



Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Boring No.: B-025-0-23
 Location: US 33 Mainline
 Station: 1325+00
 Date: 9/5/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Gs	e ₀	C _c	C _r	C _c /1+e ₀	C _r /1+e ₀	C _v (cm ² /sec)	Pre-Consolidation Stress σ _p (psf)	Reference
1	847.6	844.1	3.5	A-7-6	133.9	13	24	44	25	2.659	0.438	0.14	0.025					
			Avg	A-7-6	133.9	13	24	44	25	2.66	0.438	0.14	0.025	0.0974	0.0174	0.0026	3400.0	1

Reference Key

1 Laboratory consolidation test results for boring B-025-0-23, ST-1_2'-4'

Settlement Calculations

Boring No.: B-025-0-23
Location: US 33 Mainline
Station 1325+00

Existing Grade

Elevation

	Emb. Fill	
	Unit Wt. =	125 pcf
847.6	Height =	30 ft
	N ₆₀ Avg =	13 bpf
	Layer A	Unit Wt. = 133.9 pcf
844.1		
	Bedrock	

Embankment Geometry

B₁ = 50 ft
 B₂ = 60 ft

Emb. Fill Ht. 30 ft
 Unit Wt. = 125 pcf
 q = 3750 psf

Layer	Thickness (H _c) (ft)	Unit Weight(pcf)	z (ft)	σ' _o (psf)	B ₁ / z	B ₂ / z	I*	N ₆₀ Avg	σ' _p (psf)	σ' _f (psf)	Consolidation	Settlement (in) **
A	3.5	133.9	1.75	234.325	28.6	34.3	1.00	13	3,400.0	3,984.3	OC	1.1
											Total	1.1

*The influence value (I) for embankment loading was computed based on "Influence Values for Vertical Stresses in Semi- Infinite Loading" charts (After Osterberg 1957).

**The settlement value of Cohesive soils is computed based on LRFD Equation 10.6.2.4.3-1

Time Rate of Settlement Determination

Boring No.: B-025-0-23
Location: US 33 Mainline
Station: 1325+00

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
847.6	844.1	1	1.13	3.5	0.0026	0.243712	7	0.139264	0.43	0.6
	Net=		1.13	in					Total	0.6 in

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
847.6	844.1	1	1.13	3.5	0.0026	0.243712	30	0.596847	0.81	0.2
	Net=		1.13	in					Total	0.2 in

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Boring No.: B-057-0-23
 Location: Ramp 89K
 Station: 318+00
 Date: 9/5/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Gs	e ₀	C _c	C _r	C _v (cm ² /sec)	Pre-Consolidation Stress σ' _p (psf)	Reference
1	834.2	828.2	6.0	A-7-6	124.6	10	26	49	23	2.627						1
			Avg	A-7-6	124.6	15	23	47	22		0.649	0.22	0.038			
							25	48	23	2.63	0.649	0.22	0.038	0.0005	3800.0	

Reference Key

1 Laboratory consolidation test results for boring B-057-0-23, ST-1_3'-5'

Settlement Calculations

Boring No.: B-057-0-23
Location: Ramp 89K
Station: 318+00

Existing Grade

Elevation

	Emb. Fill	
	Unit Wt. =	125 pcf
834.2	Height =	27.5 ft
	N_{60} Avg =	15 bpf
Layer A	Unit Wt. =	124.6 pcf
828.2		
	Bedrock	

Embankment Geometry

B_1 = 18 ft
 B_2 = 55 ft

Emb. Fill Ht. 27.5 ft
 Unit Wt. = 125 pcf
 q = 3437.5 psf

Layer	Thickness (H_c) (ft)	Unit Weight(pcf)	z (ft)	σ'_o (psf)	B_1 / z	B_2 / z	I^*	N_{60} Avg	σ'_p (psf)	σ'_f (psf)	Consolidati on	Settlement (in) **
A	6	124.6	3	373.8	6.0	18.3	1.00	15	3,800.0	3,811.3	OC	1.7
											Total	1.7

*The influence value (I) for embankment loading was computed based on "Influence Values for Vertical Stresses in Semi- Infinite Loading" charts (After Osterberg 1957).

**The settlement value of Cohesive soils is computed based on LRFD Equation 10.6.2.4.3-1

Time Rate of Settlement Determination

Boring No.: B-057-0-23
Location: Ramp 89K
Station: 318+00

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm ² /sec)	Cv (ft ² /day)	t (days)	Tv	U (%)	Settlement Remaining (in)
834.2	828.2	1	1.67	6	0.0005	0.048612	7	0.009452	0.21	1.33
	Net=		1.67	in					Total	1.33 in

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm ² /sec)	Cv (ft ² /day)	t (days)	Tv	U (%)	Settlement Remaining (in)
834.2	828.2	1	1.67	6	0.0005	0.048612	30	0.04051	0.27	1.23
	Net=		1.67	in					Total	1.23 in

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Boring No.: B-064-0-23
 Location: Ramp 89L
 Station: 327+00
 Date: 9/5/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Gs	e ₀	C _c	C _r	C _v (cm ² /sec)	Su (psf)	Pre-Consolidation Stress $\bar{\sigma}'_p$ (psf)	Reference
1	857.5	851.5	6.0	A-6b	122	18	11	37	20	2.70	0.3	0.223	0.045	0.0200	2250	13154	1,2,3
				Avg	A-6b	122	18	11	37								
2	851.5	846.5	5.0	A-6b	115	6	14	37	20	2.70	0.38	0.230	0.046	0.0200	750	4338	1,2,3
				Avg	A-6b	115	6	14	37								

Reference Key

- 1 Skempton (1957), FHWA-IF-03-017- GEC-N0.7, TABLE 3.7 used for computing $\bar{\sigma}'_p$ if no consolidation data is available
- 2 Kulhawy and Mayne (1990) per GEC 5 (2016), Figure 6-36 used for computing C_c and C_r if no consolidation data is available
- 3 FHWA GEC 5 (2016) Figure 6-37, Reloading (lower bound) curve used for C_v computation of Cohesive soil if no consolidation data is available

Settlement Calculations

Boring No.: B-064-0-23
Location: Ramp 89L
Station: 327+00

		Elevation	
Existing Grade		857.5	Emb. Fill Unit Wt. = 125 pcf
	Layer A	851.5	N ₆₀ Avg = 18 bpf Unit Wt. = 122 pcf
	Layer B		N ₆₀ Avg = 6 bpf Unit Wt. = 115 pcf
		846.5	Bedrock

Embankment Geometry

B₁ = 20 ft
 B₂ = 48.9 ft

Emb. Fill Ht. = 16.3 ft
 Unit Wt. = 125 pcf
 q = 2037.5 psf

Layer	Thickness (H _c) (ft)	Unit Weight (pcf)	z (ft)	σ' _o (psf)	B ₁ / z	B ₂ / z	I*	N ₆₀ Avg	Coarse Fraction	Fine Fraction	BCI	σ'p (psf)	σ' _i (psf)	Consolidation	Settlement (in) **
A	6	122	3	366	6.7	16.3	1.00	18				13,154	2,404	OC	2.0
B	5	115	8.5	1020	2.4	5.8	1.00	6				4,338	3,057	OC	1.0
Total															3.0

*The influence value (I) for embankment loading was computed based on "Influence Values for Vertical Stresses in Semi- Infinite Loading" charts (After Osterberg 1957).

**The settlement value of Cohesive soils is computed based on LRFD Equation 10.6.2.4.3-1

Time Rate of Settlement Determination

Boring No.: B-064-0-23
Location: Ramp 89L
Station: 327+00

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
857.5	851.5	1	2.0	6	0.0200	1.86	7	0.361667	0.67	0.7
851.5	846.5	1	1.0	5	0.0200	1.86	7	0.5208	0.78	0.2
	Net=		3.0	in					Total	0.9 in

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
857.5	851.5	1	2.0	6	0.0200	1.86	30	1.55	0.98	0.0
851.5	846.5	1	1.0	5	0.0200	1.86	30	2.232	1.00	0.0
	Net=		3.0	in					Total	0.0 in

Soil Parameters

Project: ATH/MEG-33-23.23/0.00
 Boring No.: B-060-0-23, B-154
 Location: Ramp 681N
 Station: 425+50
 Date: 9/5/24

Layer No.	Top Elev	Bottom Elev	Thickness (feet)	Type	Total Weight (pcf)	N ₆₀ value (bpf)	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Gs	e ₀	C _c	C _r	C _v (cm ² /sec)	Su (psf)	Pre-Consolidation Stress $\bar{\sigma}'_p$ (psf)	Reference
1	698.9	695.9	3.0	A-4a	120	13	12	27	18	2.70	0.32	0.122	0.024	0.0200	1625	11340	1,2,5
			Avg	A-4a	120	13	12	27	18	2.70							
2	695.9	692.9	3.0	A-7-6	127		26	42	22	2.67	0.639	0.200	0.028	0.0009	3400	3	
			Avg	A-7-6	127		26	42	22	2.67							
3	692.9	682.9	10.0	A-3a	122	13 17	11 11			2.65	0.29			0.0281	0	0.0	4
			Avg	A-3a	122	15	11			2.65							
4	682.9	678.3	4.6	A-3a	110	0	39 26			2.65	0.87			0.0281	0	0.0	4
			Avg	A-3a	110	0	33			2.65							
5	678.3	674.0	4.3	A-7-6	127		26	43	19	2.70	0.639	0.200	0.028	0.0009	3400	3	
			Avg	A-7-6	127		26	43	19	2.67							

Note: Soil parameters for layer 1,2,3 were taken from boring B-060-0-23 and parameters for layer 4 and 5 were taken from historic boring B-154

Reference Key

- 1 Skempton (1957), FHWA-IF-03-017- GEC-N0.7, TABLE 3.7 used for computing $\bar{\sigma}'_p$ if no consolidation data is available
- 2 Kulhawy and Mayne (1990) per GEC 5 (2016), Figure 6-36 used for computing C_c and C_r if no consolidation data is available
- 3 Laboratory Consolidation Test Results B-060-0-23, ST-1, 3'-5'
- 4 FHWA GEC 5 (2016) Figure 6-37, Virgin Compression used for C_v computation of granular soils if no consolidation data is available
- 5 FHWA GEC 5 (2016) Figure 6-37, Reloading (lower bound) curve used for C_v computation of Cohesive soil if no consolidation data is available

Settlement Calculations

Boring No.: B-060-0-23, B-154
Location: Ramp 681N
Station: 425+50

Existing Grade

Embankment Geometry

B₁ = 20 ft
 B₂ = 40.5 ft

Emb. Fill Ht. = 13.5 ft
 Unit Wt. = 125 pcf
 q = 1687.5 psf

Elevation

	Emb. Fill	
	Unit Wt. =	125 pcf
698.9		
	N ₆₀ Avg =	13 bpf
	Layer A Unit Wt. =	120 pcf
695.9		
	N ₆₀ Avg =	bpf
	Layer B Unit Wt. =	127 pcf
692.9		
	N ₆₀ Avg =	15 bpf
	Layer C Unit Wt. =	122 pcf
682.9		
	N ₆₀ Avg =	0 bpf
	Layer D Unit Wt. =	110 pcf
678.3		
	N ₆₀ Avg =	bpf
	Layer E Unit Wt. =	127 pcf
674		
	Bedrock	

Layer	Thickness (H _c) (ft)	Unit Weight(pcf)	z (ft)	σ' _o (psf)	B ₁ / z	B ₂ / z	I*	N ₆₀ Avg	Coarse Fraction	Fine Fraction	BCI	σ' _p (psf)	σ' _i (psf)	Consolidation	Settlement (in) **
A	3	120	1.5	180	13.3	27.0	1.00					11,340	1,868	OC	0.7
B	3	127	4.5	550	4.4	9.0	1.00					3,400	2,238	OC	0.4
C	10	122	11	1350	1.8	3.7	1.00	15	0.9	0.1	72.42	-	3,038	NC	0.6
D	4.6	110	18.3	2213	1.1	2.2	0.98	0	0.7	0.3	21.36	-	3,867	NC	0.6
E	4.3	127	19.75	2739	1.0	2.1	0.96					3,400	4,359	OC	0.8
Total															3.0

*The influence value (I) for embankment loading was computed based on "Influence Values for Vertical Stresses in Semi- Infinite Loading" charts (After Osterberg 1957).

**The settlement value of granular soils is computed based on the Hough Method and LRFD Equation 10.6.2.4.2b-2.

**The settlement value of Cohesive soils is computed based on LRFD Equation 10.6.2.4.3-1

Time Rate of Settlement Determination

Boring No.: B-060-0-23, B-154
Location: Ramp 681N
Station: 425+50

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
698.9	695.9	1	0.7	3	0.0200	1.86	7	1.446667	0.98	0.0
695.9	692.9	1	0.4	3	0.0009	0.082958	7	0.064523	0.31	0.3
692.9	682.9	2	0.6	5	0.0281	2.6133	7	0.731724	0.87	0.1
682.9	678.3	2	0.6	2.3	0.0281	2.6133	7	3.458053	1.00	0.0
678.3	674	1	0.8	4.3	0.0009	0.086932	7	0.032911	0.25	0.6
	Net=		3.0	in					Total	0.9 in

Top Elev	Bottom Elev	1 or 2 sides Drained	Total Settlement (in)	H (feet)	Cv (cm2/sec)	Cv (ft2/day)	t (days)	Tv	U (%)	Settlement Remaining (in)
698.9	695.9	1	0.7	3	0.0200	1.86	30	6.2	1.00	0.0
695.9	692.9	1	0.4	3	0.0009	0.082958	30	0.276525	0.59	0.2
692.9	682.9	2	0.6	5	0.0281	2.6133	30	3.13596	1.00	0.0
682.9	678.3	2	0.6	2.3	0.0281	2.6133	30	14.82023	1.00	0.0
678.3	674	1	0.8	4.3	0.0009	0.086932	30	0.141047	0.43	0.4
	Net=		3.0	in					Total	0.6 in

APPENDIX J
RESPONSE TO COMMENTS



Comments received from ODOT District 10 on Geotechnical Profile- Roadway Sheets

Comment 1: Remove “According to Stage 2 Plans” from the Project Description section of the title sheet (Sheet 1/153)

CTL Response 1: CTL has removed the sentence.

Comment 2: Remove “Per the direction of the District, no re-work was done to include the historic boring information on the current soil profile sheets” from the Historic Records section of the title sheet (Sheet 1/153)

CTL Response 2: CTL has removed the sentence.

Comment 3: “Turn off Survey Levels at the outlet of culvert. Just use Lidar” (Sheet 13/153)

CTL Response 3: CTL has turned off the survey levels at the outlet of the culvert.

Comment 4: Show “Existing Landslide” (Sheet 22/153)

CTL Response 4: CTL has added the Existing Landslide limits

Comment 5: Show “Rock Outcrop” (Sheet 24/153)

CTL Response 5: CTL has added the Rock Outcrop using data from Historic Boring R-52.

Comment 6: Show “Existing Landslide” (Sheet 26/153)

CTL Response 6: CTL has added the Existing Landslide limits.

Comment 6: Show “Existing Landslide” (Sheet 26/153)

CTL Response 6: CTL has added the Existing Landslide limits.

Comment 6: Show “Existing Landslide” (Sheet 42/153)

CTL Response 6: CTL has added the Existing Landslide limits