FINAL REPORT
SUBGRADE EXPLORATION REPORT
FRA-71/270-28.27/25.99A
SAFETY AND SYSTEM PRESERVATION
FRANKLIN COUNTY, OHIO
PID#: 105435

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NEAS PROJECT 21-0012

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EXECUTIVE SUMMARY

The Ohio Department of Transportation (ODOT) has proposed an interchange improvement project (FRA-71/270-28.27/25.99, PID# 105435) for the Interstate Route (IR) 270 and IR-71 on the north side of Columbus, Franklin County, Ohio. It is our understanding that the overall project objective is to improve capacity to the IR-270 and IR-71 interchange. The interchange and mainline improvements purposed to accomplish this objective include: 1) widening of the IR-71 freeway segment within the project limits; 2) the construction/reconstruction of 5 connecting ramps (Ramp K, M, N, O, P); 3) the replacement of the existing bridge structure FRA-00071-28.265 carrying Ramp K (IR-270 WB to IR-71 SB) over IR-71; 4) the replacement of the existing bridge structure FRA-00071-28.294 carrying Ramp O (IR-71 NB to IR-270 WB) over IR-71; and, 5) the superstructure replacement of the existing bridge structure FRA-00270-25.990A carrying Ramp K (IR-270 WB to IR-71 SB) over Ramp O.

National Engineering & Architectural Services, Inc. (NEAS) has been contracted to perform geotechnical engineering services for the project. The purpose of the geotechnical engineering services was to perform geotechnical explorations within the project limits to obtain information concerning the subsurface soil and groundwater conditions relevant to the design and construction of the project. NEAS performed the site reconnaissance and exploration program for Part 1 of the project between April 9, 2021 and April 20, 2021 and Part 2 of the project between July 26 and August 10, 2022. Part 1 involved the subgrade exploration for Ramp P and Ramp M. Part 2 involved the subsurface exploration for Ramp K, Ramp N, Ramp O and three bridges. The entire project included 43 borings drilled to depths between 7.5 ft and 120.0 ft below ground surface (bgs) and 7 pavement cores for subgrade characterization and bridge design purposes. Additionally, between October 23 and October 25, 2023, NEAS also conducted six project borings for two planned retaining walls, which were subsequently eliminated from the design.

The subgrade conditions in the project area are relatively consistent and are generally comprised of primarily cohesive natural overburden soils (A-4a, A-6a, A-6b, and A-7-6) and minor non-cohesive overburden soils (A-1-a, A-1-b, A-2-4). With respect to sulfate within the subgrade soil, based on the project laboratory testing program, three soil samples present a sulfate content value greater than 5,000 ppm within all of the project borings performed. Groundwater was not encountered during drilling and after drilling in all the project borings performed. Bedrock was not encountered in all the project borings within the subgrade depth.

High sulfate content soils were encountered at the project site. Three soil samples in Borings B-008-0-21, B-014-0-21 and B-016-0-21 present a sulfate content greater than 3,000 ppm, however, less than 5,000 ppm. Three soil samples in Borings B-009-0-21, B-010-0-21 and B-040-021 present a sulfate content greater than 5,000 ppm.

Based on our evaluation of the subsurface conditions and our geotechnical engineering analyses of the proposed interchange improvement project, it is our opinion that subgrade conditions are generally satisfactory, and pavement can be designed without the need for extreme levels of remediation. Unstable subgrade conditions, including areas of weak soils and high moisture content soils, were encountered throughout 8 percent of the proposed pavement widening area along IR-71 NB and the IR-71 and IR-270 interchange associated ramps. NEAS recommends a global 12” cement stabilization for all ramps and IR-71 NB from Begin to Station 156+67 and undercut and replacement for IR-71 NB from Station 156+67 to End. Excavations are estimated to extend to the depth of 12 inches, with the excavated material being replaced with material in accordance with Section F "Excavate and Replace (Item 204)" of the ODOT GB1. Stabilization limits should extend 18-inches beyond the edge of the proposed paved roadway, shoulder or median and it is recommended removing any topsoil, existing pavement materials or abandoned structure foundation materials.

Overall, NEAS’s opinion is that the subgrade soils will provide adequate pavement support, assuming the pavement is designed and constructed in accordance with the recommendations provided within this report, as well as all applicable ODOT standards and specifications.

TABLE OF CONTENTS

1. INTRODUCTION 4
1.1. GENERAL 4
2. GEOLOGY AND OBSERVATIONS OF THE PROJECT 4
2.1. GEOLOGY AND PHYSIOGRAPHY 4
2.2. HYDROLOGY/HYDROGEOLOGY 5
2.3. MINING AND OIL/GAS PRODUCTION 5
2.4. HISTORICAL RECORDS AND PREVIOUS PHASES OF PROJECT EXPLORATION 5
2.5. FIELD RECONNAISSANCE 5
2.5.1. Land Use and Cover 6
2.5.2. Ramp P and Ramp M 6
2.5.3. IR-71 NB From Interchange to Project End 7
2.5.4. Bridge FRA-00071-27.94 8
2.5.5. Ramp K 10
2.5.6. Ramp O 11
3. GEOTECHNICAL EXPLORATION 12
3.1. ROADWAY EXPLORATION PROGRAM 12
3.2. PAVEMENT CORING EXPLORATION PROGRAM 14
3.3. RETAINING WALL EXPLORATION PROGRAM 15
3.4. LABORATORY TESTING PROGRAM 15
3.4.1. Classification Testing 15
3.4.2. Standard Penetration Test Results 15
3.4.3. Sulfate Testing 15
4. FINDINGS 16
4.1. EXISTING PAVEMENT 16
4.2. SUBGRADE CONDITIONS 18
4.2.1. I-71 18
4.2.1. Ramp K 18
4.2.2. Ramp M 19
4.2.3. Ramp N 19
4.2.4. Ramp O 19
4.2.1. Ramp P 20
4.2.2. Groundwater 20
4.2.3. Bedrock 20
5. ANALYSES AND RECOMMENDATIONS 20
5.1. SUBGRADE ANALYSIS 21
5.1.1. Pavement Design Recommendations 21
5.1.2. Unsuitable Subgrade 21
5.1.2.1. Rock 21
5.1.2.2. Prohibited Soils 21
5.1.3. Unstable Subgrade 21
5.1.3.1. Weak Soils 22
5.1.3.2. High Moisture Content Soils 22
5.1.4. High Sulfate Content Soils 23
5.2. STABILIZATION RECOMMENDATIONS 23
5.2.1. Subgrade Stabilization 23
5.3. EMBANKMENT CONSTRUCTION RECOMMENDATIONS 24
6. STRUCTURE BORING PROFILES 25
7. QUALIFICATIONS 25

LIST OF TABLES

TABLE 1: PROJECT BORING SUMMARY 13
TABLE 2: PAVEMENT CORE SUMMARY 14
TABLE 3: MEASURED PAVEMENT THICKNESSES BASED ON SUBGRADE BORINGS 17
TABLE 4: MEASURED PAVEMENT THICKNESSES BASED ON PAVEMENT CORES 18
TABLE 5: PAVEMENT DESIGN VALUES 21
TABLE 6: UNSTABLE SOIL LOCATIONS SUMMARY 22
TABLE 7: HIGH MOISTURE CONTENT SOILS LOCATION SUMMARY 23
TABLE 8: STABILIZATION RECOMMENDATIONS 24

LIST OF APPENDICES

APPENDIX A: SOIL BORING PLAN
APPENDIX B: BORING LOGS AND TEST RESULTS
APPENDIX C: GEOTECHNICAL BULLETIN 1 (GB1) ANALYSIS SPREADSHEETS

1. INTRODUCTION

1.1. General

National Engineering & Architectural Services, Inc. (NEAS) presents our Subgrade Exploration Report for the proposed FRA-71/270-28.27/25.99A Safety and System Preservation project, Franklin County, Ohio. The Safety and System Preservation project involves: 1) widening of the IR-71 freeway segment within the project limits; 2) the construction/reconstruction of 5 connecting ramps (Ramp K, M, N, O, P); 3) the replacement of the existing bridge structure FRA-00071-28.265 carrying Ramp K (IR-270 WB to IR-71 SB) over IR-71; 4) the replacement of the existing bridge structure FRA-00071-28.294 carrying Ramp O (IR-71 NB to IR-270 WB) over IR-71; and, 5) the superstructure replacement of the existing bridge structure FRA-00270-25.990A carrying Ramp K (IR-270 WB to IR-71 SB) over Ramp O.

This report presents a summary of the project encountered surficial and subsurface conditions and our recommendations for subgrade stabilization and pavement design parameters for I-71 and the corresponding ramps. The analysis performed as part of this report has been performed in accordance with ODOT's January 2019 revision of *Geotechnical Bulletin 1* (GB1) (ODOT [1], 2021) and *Pavement Design Manual* (PDM) (ODOT, 2020).

The exploration was conducted in general accordance with NEAS's proposals to TranSystems, dated January 8, 2021 and February 25, 2022, and ODOT's July 2022 revision of *Specifications for Geotechnical Explorations* (SGE) (ODOT, 2022).

The scope of work performed by NEAS as part of the referenced project included: a review of published geotechnical information; performing 43 total test borings (all of which were utilized within this report as part of the subgrade exploration) and 7 pavement cores; laboratory testing of soil samples in accordance with the SGE; performing geotechnical engineering analysis to assess subgrade stabilization requirements and recommended pavement design parameters; and development of this summary report.

2. GEOLOGY AND OBSERVATIONS OF THE PROJECT

2.1. Geology and Physiography

The project site is located within the Columbus Lowland Till Plains, a subdivision of the Southern Ohio Loamy Till Plain. This is a moderately low relief (25 ft) lowland surrounded in all directions by relative uplands, having a broad regional slope toward the Scioto Valley, containing many larger streams. Elevations of the region range from 600 to 850 ft above mean sea level (amsl) (950 ft amsl near Powell Moraine). The geology within this region is described as Wisconsinan-age till that is high lime in the west to medium-lime in the east. The geology is also described as containing extensive outwash in Scioto Valley overlying deep Devonian- to Mississippian-age carbonate rocks, shales and siltstones (ODGS, 1998).

Based on the Bedrock Geologic Units Map of Ohio (USGS & ODGS, 2005), bedrock within the project limits is comprised of Devonian-age Ohio Shale. The Devonian-age Ohio Shale is about 359 to 385 million years old, and the sedimentary rocks mainly consist of shale and siltstone with some sandstone. The shale unit at the project site is brownish black to greenish gray, weathers brown, carbonaceous to clayey, laminated to thin bedded, and is fissile parting. This unit is carbonated and/or siderite concretions in lowermost 50 feet, with petroliferous odor and about 250 to 500+ feet thick. Based on the ODNR

bedrock topography map of Ohio, bedrock elevations at the project site can be expected to range from 800 to 850 ft amsl, putting bedrock at a depth of 65 to 110 ft below ground surface (bgs).

The soils at the project site have been mapped (Web Soil Survey) by the Natural Resources Conservation Service as being gently rolling Udorthents-Urban land complex (USDA, 2015). The units of the Udorthents-Urban series account for 90% soils with none flood. The units can be classified as A-1-a, A-1-b, A-2-4, A-4a, A-6a, A-6b and A-7-6 soils according to the AASHTO method of soil classification.

2.2. Hydrology/Hydrogeology

Groundwater can be expected at an elevation consistent with that of the major local surface water bodies. A major regional hydraulic influence is the Alum Creek located about 2.0 miles to the east. The Water wells near the project site were noted to have a static water from 23 ft to 95 ft below ground surface.

Local variations in the groundwater table may exist in one of two reasons. First, if there has been extensive groundwater abstraction, water levels may be depressed by tens of feet over significantly large areas. Second, the presence of discontinuous bodies of glacial till provides the opportunity for localized pockets of perched groundwater to form.

The proposed project site is not located within a 0.2% and 1% Annual Chance Flood Hazard area based on available mapping by the Federal Emergency Management Agency's (FEMA) National Flood Hazard mapping program (FEMA, 2019).

2.3. Mining and Oil/Gas Production

No abandoned mines were noted on ODNR’s Abandoned Underground Mine Locator immediately adjacent to the project’s boundaries (ODNR [1], 2016).

No gas or oil wells were noted on ODNR’s Ohio Oil & Gas Locator within the immediate vicinity of the project’s boundaries (ODNR [2], 2016).

2.4. Historical Records and Previous Phases of Project Exploration

A historic record search was performed through ODOT's Transportation Information Management System (TIMS). Several historic projects were available for review within the limits of the FRA-71/270-28.27/25.99A project.

- FRA-270-24.47, Reconstruction and Widening, 2006
- FRA-270-15.50N, Project No. 011502,1963
- FRA-270-16.65N, Project No. 011503,1964

2.5. Field Reconnaissance

Field reconnaissance visits for the overall project area were conducted on April 9, 2021 and May 3, 202 for Part 1 and Part 2, respectively, within the project limits. Site conditions, including the existing land conditions and pavement conditions, were noted, and photographed during the visit. Photographs of notable features and a summary of our observations by road segment are provided below.

2.5.1. Land Use and Cover

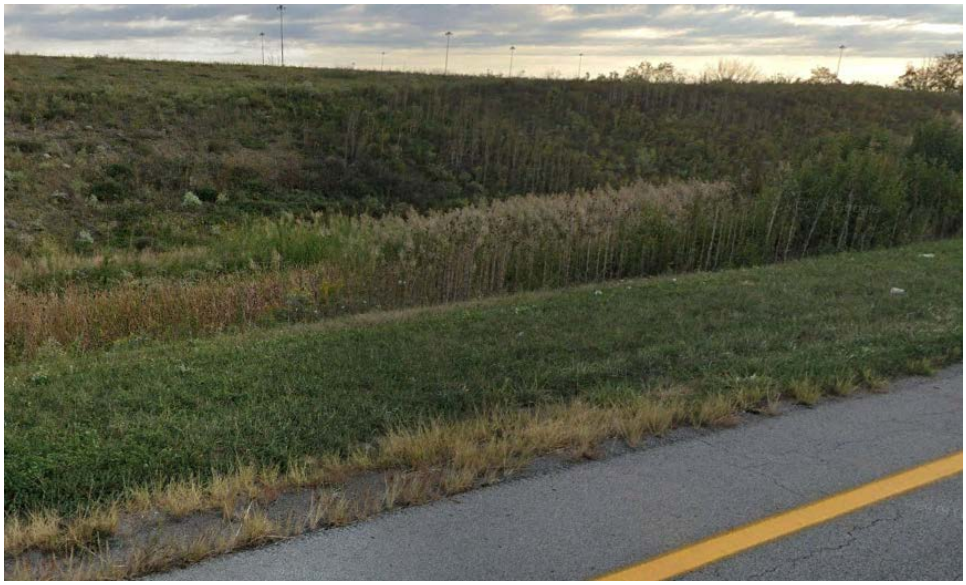
The land use of most of the project area consists of ODOT ROW (Right of Way), commercial properties (i.e., single family homes, apartments, etc.) and woodland.

2.5.2. Ramp P and Ramp M

In general, the pavement condition along Ramp P and Ramp M was observed to be good with signs of surface wear. The travel lanes were noted to be in markedly better condition than the shoulders along this section of roadway. Moderate severity longitudinal and transverse cracking was observed along this section as well as crack sealing deficiencies (Photograph 1). The roadway in this section sits atop a small embankment running from level with IR-270 up to the level of the ramp bridge. The embankment slopes are roughly 3H:1V (3 horizontal to one vertical). The roadway is relatively level in this section. The roadway drains to drainage ditches at the bottom of each side of the embankment (Photograph 2). The area is lightly vegetated for the most part with some signs of standing water were observed in the drainage ditches such as heavy vegetation and cattails (Photograph 2). The area appeared to be stable with no signs of geotechnical instability.

Photograph 1: Overall Pavement Condition of Ramp P and Ramp M

Photograph 2: Signs of Standing Water in Drainage Ditch



2.5.3. IR-71 NB From Interchange to Project End

In general, the pavement condition along this section of the project was observed to be good with signs of surface wear. The travel lanes were noted to be in markedly better condition than the shoulders along this section of roadway. Moderate severity longitudinal and transverse cracking was observed along this section as well as crack sealing deficiencies (Photograph 3). The roadway in this section sits in a cut with embankment slopes rising up on either side of the highway to the level of the surrounding land. The embankment slopes are roughly 2H:1V (2 horizontal to one vertical). The roadway is relatively level in this section. The roadway drains to drainage ditches at the bottom of each side of the embankment (Photograph 4). The area is lightly vegetated for the most part with some signs of standing water were observed in the drainage ditches. The area appeared to be stable with no signs of geotechnical instability.

Photograph 3: Overall Pavement Condition of IR-71 NB

Photograph 4: Drainage Ditch on at Bottom of Embankment

2.5.4. Bridge FRA-00071-27.94

The existing bridge carrying Ramp P from IR-270 EB to IR-71 NB consists of a five-span, multi-beam bridge with stub type abutments and cap and column type piers (Photograph 5). In the area of the referenced bridge, the terrain is roughly level with the surrounding area which rises very gently from north to south. Signs of instability were not observed during our site visit. The overall bridge structure appeared to be in good condition with few signs of distress observed. The spill-through slopes appeared to be at roughly 2H:1V (2 horizontal to one vertical) slopes and in good condition and protected from

erosion by rip rap. No apparent signs of distress due to geotechnical concerns were noted during our field reconnaissance visit.

The bridge deck and concrete wearing course was observed to be in good condition with minor severity pop-outs being common (Photograph 6). With respect to drainage, the bridge deck and adjacent pavement appeared to be well drained, with no signs of ponding or drainage issues observed during our field visit. The adjacent ramp appeared to drain to drainage ditches that runs parallel to the roadway. The bridge deck drained off of the north side of the bridge at either end of the bridge where the concrete guard rail terminates.

Photograph 5: Cap and Column Bridge Piers

Photograph 6: Bridge Deck Wearing Course

2.5.5. Ramp K

In general, the pavement condition of Ramp K east of IR-71 was observed to be good with some signs of weathering and surface wear. Moderate severity edge cracking was common along this section of the ramp, as well as crack sealing deficiencies (Photograph 7). The pavement condition of Ramp K west of IR-71 was observed to be in markedly worse condition than that east of IR-71. Moderate severity longitudinal and transverse cracking was common along this section of the ramp, as well as map cracking, and patching (Photograph 8). The ramp starts out on embankments above the surrounding land with slopes of roughly 3H:1V (3 ft horizontal to 1 ft vertical) and then transitions to level with the surrounding land in the area west of IR-71 and North of IR-270. The roadway in this section of the project drains directly off the northern shoulder of the ramp east of IR-71. The ramp then drains off of both shoulders of the ramp between the two aforementioned bridges. Finally, the ramp drains off the southern shoulder of the ramp west of IR-71. The area is moderately vegetated, and signs of standing water such as cattails were observed in the drainage ditch off the southern shoulder of the ramp west of IR-71. No signs of issues due to geotechnical conditions were observed.

Photograph 7: Overall Pavement Condition of Ramp K East of IR-71

Photograph 8: Overall Pavement Condition of Ramp K West of IR-71

2.5.6. Ramp O

In general, the pavement condition of Ramp O was observed to be good with some signs of weathering and surface wear. Moderate severity edge cracking was common along the ramp, as well as crack sealing deficiencies (Photograph 9). The ramp starts out level with the surrounding land near IR-71 N, then transitions to embankments above the surrounding land with slopes of roughly 3.5H:1V (3.5 ft horizontal to 1 ft vertical) right after it passes under ramp K. The roadway in this section of the project drains directly off the southwestern shoulder of the ramp. The area is moderately vegetated, and signs of standing water such as cattails were observed in the drainage ditch south of where Ramp O passes under Ramp K. No signs of issues due to geotechnical conditions were observed.

Photograph 9: Overall Pavement Condition of Ramp O

3. GEOTECHNICAL EXPLORATION

3.1. Roadway Exploration Program

The subsurface exploration for the project was conducted by NEAS between April 9, 2021, and April 20, 2021, and between July 26 and August 10, 22, and included 43 borings drilled to the depths between 7.5 ft and 120.0 ft bgs. The boring locations were selected by NEAS in general accordance with the guidelines contained in the SGE with the intent to evaluate subsurface soil and groundwater conditions. Borings were typically located either within existing pavement areas that are planned to undergo full-depth replacement or within areas where widening is planned. Target boring locations were located in the field by NEAS prior to drilling utilizing handheld GPS equipment and the boring locations were drilled in areas that were not restricted by underground utilities or dictated by terrain (i.e. steep embankment slopes). Each as-drilled project boring location and corresponding ground surface elevation was surveyed in the field following drilling. Each individual project boring log (included within Appendix B) includes the recorded boring latitude and longitude location (based on the surveyed Ohio State Plane South, NAD83, location) and the corresponding ground surface elevation, as summarized in Table 1.

Table 1: Project Boring Summary

Boring Number	Latitude	Longitude	Elevation (NAVD 88) (ft)	Alignment	Station	Offset	Depth (ft)	Substructure
B-001-0-21	40.110037	-82.977651	913.0	I-71	130+48	62' RT.	7.5	Subgrade
B-002-0-21	40.111052	-82.976900	914.1	I-71	134+73	77' RT.	7.5	Subgrade
B-003-0-21	40.112010	-82.976279	913.7	I-71	138+60	75' RT.	7.5	Subgrade
B-004-0-21	40.112998	-82.975669	911.1	I-71	142+56	79' RT.	7.5	Subgrade
B-005-0-21	40.113975	-82.975211	908.2	I-71	146+32	58' RT.	7.5	Subgrade
B-006-0-21	40.115133	-82.974503	903.0	I-71	150+94	91' RT.	7.5	Subgrade
B-007-0-21	40.116108	-82.974071	899.4	I-71	154+66	89' RT.	7.5	Subgrade
B-008-0-21	40.117174	-82.973656	895.2	I-71	158+69	85' RT.	7.5	Subgrade
B-009-0-21	40.118246	-82.973248	891.0	I-71	162+72	91' RT.	7.5	Subgrade
B-010-0-21	40.119281	-82.972942	887.8	I-71	166+56	86' RT.	7.5	Subgrade
B-011-0-21	40.120386	-82.972642	885.9	I-71	170+65	86' RT.	7.5	Subgrade
B-012-0-21	40.121451	-82.972399	886.8	I-71	174+56	86' RT.	7.5	Subgrade
B-013-0-21	40.122537	-82.972200	889.2	I-71	178+53	86' RT.	7.5	Subgrade
B-014-0-21	40.123658	-82.972045	891.6	I-71	182+61	85' RT.	7.5	Subgrade
B-015-0-21	40.124754	-82.971942	894.1	I-71	186+58	84' RT.	7.5	Subgrade
B-016-0-21	40.125854	-82.971865	896.6	I-71	190+59	84' RT.	7.5	Subgrade
B-017-0-21	40.126945	-82.971739	898.8	I-71	194+58	96' RT.	7.5	Subgrade
B-018-0-21	40.110560	-82.989002	921.6	Ramp M	84+94	3' LT.	7.5	Subgrade
B-019-0-21	40.110619	-82.987640	920.4	Ramp M	88+73	46' LT.	7.5	Subgrade
B-020-0-21	40.110342	-82.986326	917.4	Ramp M	92+48	4' LT.	7.5	Subgrade
B-021-0-21	40.109798	-82.985064	918.6	Ramp M	96+55	5' RT.	7.5	Subgrade
B-022-0-21	40.109199	-82.984109	920.6	Ramp M	100+01	3' RT.	7.5	Subgrade
B-023-0-21	40.108675	-82.982948	923.6	Ramp M	103+72	62' LT.	7.5	Subgrade
B-024-0-21	40.107974	-82.981926	925.6	Ramp M	107+55	49' LT.	7.5	Subgrade
B-025-0-21	40.107701	-82.980661	935.5	Ramp P	1011+38	22' LT.	7.5	Subgrade
B-026-0-21	40.108377	-82.978429	928.1	Ramp P	1018+46	4' RT.	7.5	Subgrade
B-027-0-21	40.109351	-82.977947	913.7	Ramp P	1022+29	18' LT.	7.5	Subgrade
B-028-0-21	40.110243	-82.972635	921.3	Ramp K	13+63	23' RT.	7.5	Subgrade
B-029-0-21	40.110499	-82.973656	929.0	Ramp K	16+67	25' RT.	7.5	Subgrade
B-030-0-21	40.110863	-82.974607	937.1	Ramp K	19+68	27' RT.	40.0	Bridge / Subgrade
B-031-0-21	40.111100	-82.975308	940.6	Ramp K	21+80	11' LT.	40.0	Bridge / Subgrade
B-032-0-21	40.111605	-82.976079	938.9	Ramp K	24+63	1' RT.	7.5	Subgrade
B-033-0-21	40.111894	-82.976618	913.3	Ramp K	26+46	10' RT.	119.7	Bridge / Subgrade
B-034-0-21	40.112095	-82.977907	926.7	Ramp K	30+16	2' LT.	11.5	Subgrade
B-035-0-21	40.111794	-82.979258	915.6	Ramp K	34+09	22' RT.	7.5	Subgrade
B-036-0-21	40.110627	-82.974843	916.2	Ramp O	19+28	29' RT.	7.5	Subgrade
B-037-0-21	40.111592	-82.975360	926.4	Ramp O	23+07	2' RT.	7.5	Subgrade
B-038-0-21	40.112234	-82.976395	912.8	Ramp O	26+82	1' LT.	120.0	Bridge / Subgrade
B-039-0-21	40.112423	-82.978119	929.8	Ramp O	31+80	5' LT.	7.5	Subgrade
B-040-0-21	40.112212	-82.979023	925.8	Ramp O	34+43	20' RT.	7.5	Subgrade
B-041-0-21	40.111728	-82.979914	921.7	Ramp O	37+47	58' LT.	7.5	Subgrade
B-042-0-21	40.112634	-82.975132	910.3	Ramp N	141+47	31' RT.	7.5	Subgrade
B-043-0-21	40.113588	-82.975142	906.0	Ramp N	145+00	11' RT.	7.5	Subgrade

Borings were drilled using a either CME 45B, CME 55T or CME 75T truck-mounted or track-mounted drilling rig utilizing 3.25-inch (inner diameter) hollow stem augers. Soil samples for subgrade borings were typically recovered continuously to a depth of 7.5 ft bgs, each using an 18-inch split spoon sampler

(AASHTO T-206 "Standard Method for Penetration Test and Split Barrel Sampling of Soils."). The soil samples obtained from the exploration program were visually observed in the field by the NEAS field representative and preserved for review by a Geologist for possible laboratory testing. Standard penetration tests (SPT) were conducted using CME auto hammer that has been calibrated to be 81.7%, 63.4%, 79% efficient (depending on the specific rig used and the calibration date of the hammer) as indicated on the boring logs (Appendix B).

Field boring logs were prepared by drilling personnel and included pavement description (where present), lithological description, SPT results recorded as blows per 6-inch increment of penetration and estimated unconfined shear strength values on specimens exhibiting cohesion (using a hand-penetrometer). Groundwater level observations were recorded both during and after the completion of drilling. These groundwater level observations are included on the individual boring logs (provided in Appendix B). After completing the borings, the boreholes were backfilled with either auger cuttings, bentonite chips, or a combination of these materials and patched accordingly with the cold patch asphalt and/or cement when drilling through the roadway.

3.2. Pavement Coring Exploration Program

The pavement coring investigation program for the project was conducted by NEAS concurrently with the subgrade exploration on April 21, 2021 and included a total of seven (7) pavement cores. As described in Section 3.1. of this report, the indicated target boring locations were located in the field by NEAS prior to drilling utilizing handheld GPS equipment in areas that were not restricted by maintenance of traffic efforts or utilities. Measurements, location information, photographs and other details of each core sample can be found in the Pavement Core Logs included within Appendix B, and are summarized in Table 2 below. The approximate location for each core is depicted on the Boring Location Plan provided in Appendix A.

Cores were drilled using a portable, truck-mounted, electric powered coring drill with a 4-inch (outer diameter) diamond tipped drill bit and utilizing water as the circulating fluid. Asphalt and concrete thicknesses were measured in the field after the cores were extracted and down-hole measurements were made. Each core sample was then photographed, logged, and placed in a core box for transportation to NEAS's laboratory. Following field documentation, photographs and borehole completion, the core hole was backfilled to existing grade with either asphalt patch or quick-set concrete (where appropriate). Once in the laboratory the cores were: 1) re-measured for thickness verification and photographed; 2) checked for composition; and 3) reviewed for individual layer identification and subsequent measurements.

Table 2: Pavement Core Summary

Pavement Core Number	Latitude	Longitude	Elevation (NAVD 88) (ft)	Alignment	Station	Offset	Length (in)
X-001-0-21	40.107653	-82.979486	912.3	Ramp P	1014+17	46' RT.	18.75
X-002-0-21	40.113628	-82.975595	909.1	I-71	144+42	23' LT.	16.75
X-003-0-21	40.120010	-82.973021	886.2	I-71	168+85	28' LT.	16.50
X-004-0-21	40.125285	-82.972180	895.0	I-71	188+28	33' LT.	17.00
X-005-0-21	40.111052	-82.976900	914.1	I-71	134+39	49' RT.	16.50
X-006-0-21	40.118246	-82.973248	891.0	I-71	162+45	56' RT.	18.00
X-007-0-21	40.125854	-82.971865	896.6	I-71	190+40	44' RT.	14.75

3.3. Retaining Wall Exploration Program

Between October 23 and October 25, 2023, NEAS also conducted six project borings for two planned retaining walls, which were subsequently eliminated from the design. The boring logs can be found in Appendix B.

3.4. Laboratory Testing Program

The laboratory testing program consisted of classification testing, moisture content determinations and sulfate content testing. Data from the laboratory testing program were incorporated onto the boring logs (Appendix B). Soil samples are retained at the laboratory for 60 days following report submittal, after which time they will be discarded.

3.4.1. Classification Testing

Representative soil samples were selected for index property (Atterberg Limits) and gradation testing for classification purposes on approximately 50% of the samples. At each boring location, the upper two samples obtained below the proposed top of subgrade elevation were generally tested while additional samples were selected for testing with the intent of properly classifying the subsurface soil and groundwater conditions within the planned project limits. Soils not selected for testing were compared to laboratory tested samples/strata and classified visually. Moisture content testing was conducted on all samples. The laboratory testing was performed in general accordance with applicable AASHTO specifications and ODOT Supplements.

Final classification of soil strata in accordance with AASHTO M-145 “Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes,” as modified by ODOT “Classification of Soils” was made once laboratory test results became available. The results of the soil classification are presented on the boring logs in Appendix B.

3.4.2. Standard Penetration Test Results

Standard Penetration Tests (SPT) and split-barrel (commonly known as split-spoon) sampling of soils were performed continuously in the project borings performed. To account for the high efficiency (automatic) hammers used during SPT sampling, field SPT N-values were converted based on the calibrated efficiency (energy ratio) of the specific drill rig's hammer. Field N-values were converted to an equivalent rod energy of 60% (N_{60}) for use in analysis or for correlation purposes. The resulting N_{60} values are shown on the boring logs provided in Appendix B.

3.4.3. Sulfate Testing

Sulfate testing was generally performed on one sample for each subgrade or roadway boring performed for pavement/subgrade design purposes. The selected samples were tested in accordance with ODOT Supplement 1122, “Determining Sulfate Content in Soils” dated July 17, 2015. In general, the upper most sample (within 3 ft of the proposed subgrade elevation) from each boring was tested when feasible. Testing results are summarized in ODOT Sulfate Supplement 1122 Table within Appendix C.

4. FINDINGS

The subsurface conditions encountered during NEAS's explorations are described in the following subsections and/or on each boring log presented in Appendix B. The boring logs represent NEAS's interpretation of the subsurface conditions encountered at each boring location based on our site observations, field logs, visual review of the soil samples by NEAS's geologist, and laboratory test results. The lines designating the interfaces between various soil strata on the boring logs represent the approximate interface location; the actual transition between strata may be gradual and indistinct. The subsurface soil and groundwater characterizations included herein, including summary test data, are based on the subsurface findings from the geotechnical explorations performed by NEAS as part of the referenced project. At the time of the composition of this report, pavement grade information has been assumed to be consistent with project profile basemap provided by TranSystems dated July 12, 2021. It should be noted that for the purposes of this report and our analysis the term 'subgrade' has been assumed to represent soils and/or soil conditions from 1.5 ft below proposed final pavement grades to a depth of 7.5 ft below the proposed pavement grades.

4.1. Existing Pavement

The pavement section thickness in terms of asphalt, concrete, and granular base was measured at representative subgrade borings and pavement cores. Pavement section thicknesses were measured during the subsurface exploration and are recorded on the test boring log and pavement core provided in Appendix B. A summary of these measurements is provided in Table 3 and 4 below.

Table 3: Measured Pavement Thicknesses Based on Subgrade Borings

Boring ID	Alignment	Asphalt Thickness (in)	Concrete Thickness (in)	Base thickness (in)	Total thickness (in)
B-001-0-21	I-71	17.0	-	7.0	24.0
B-002-0-21	I-71	16.0	-	8.0	24.0
B-003-0-21	I-71	16.0	-	8.0	24.0
B-004-0-21	I-71	17.0	-	7.0	24.0
B-005-0-21	I-71	17.0	-	7.0	24.0
B-006-0-21	I-71	19.0	-	7.0	26.0
B-007-0-21	I-71	17.0	-	7.0	24.0
B-008-0-21	I-71	16.0	-	7.0	23.0
B-009-0-21	I-71	18.0	-	7.0	25.0
B-010-0-21	I-71	18.0	-	7.0	25.0
B-011-0-21	I-71	18.0	-	18.0	36.0
B-012-0-21	I-71	18.0	-	6.0	24.0
B-013-0-21	I-71	15.0	-	7.0	22.0
B-014-0-21	I-71	14.0	-	6.0	20.0
B-015-0-21	I-71	15.0	-	7.0	22.0
B-016-0-21	I-71	15.0	-	6.0	21.0
B-017-0-21	I-71	14.5	-	6.0	20.5
B-018-0-21	Ramp M	17.0	-	6.0	23.0
B-019-0-21	Ramp M	16.0	-	7.0	23.0
B-020-0-21	Ramp M	16.0	-	6.0	22.0
B-021-0-21	Ramp M	18.0	-	6.0	24.0
B-022-0-21	Ramp M	18.0	-	7.0	25.0
B-023-0-21	Ramp M	18.0	-	5.0	23.0
B-024-0-21	Ramp M	18.0	-	7.0	25.0
B-025-0-21	Ramp P	17.0	-	8.0	25.0
B-026-0-21	Ramp P	16.0	-	9.0	25.0
B-027-0-21	Ramp P	16.0	-	8.0	24.0
B-028-0-21	Ramp K	9.0	9.0	5.0	23.0
B-029-0-21	Ramp K	8.0	9.0	5.0	22.0
B-030-0-21	Ramp K	11.0	-	6.0	17.0
B-031-0-21	Ramp K	12.0	-	5.0	17.0
B-032-0-21	Ramp K	9.0	-	6.0	15.0
B-033-0-21	Ramp K	6.0	7.0	5.0	18.0
B-034-0-21	Ramp K	8.0	-	6.0	14.0
B-035-0-21	Ramp K	9.0	-	7.0	16.0
B-036-0-21	Ramp O	8.0	-	8.0	16.0
B-037-0-21	Ramp O	10.0	-	7.0	17.0
B-038-0-21	Ramp O	18.0	-	6.0	24.0
B-039-0-21	Ramp O	8.0	-	7.0	15.0
B-040-0-21	Ramp O	4.0	8.0	6.0	18.0
B-041-0-21	Ramp O	4.0	8.0	6.0	18.0
B-042-0-21	Ramp N	12.0	-	6.0	18.0
B-043-0-21	Ramp N	12.0	-	8.0	20.0

Table 4: Measured Pavement Thicknesses Based on Pavement Cores

Core ID	Proposed Alignment	Top Layer Asphalt Thickness (in)	Second Layer Asphalt Thickness (in)	Third Layer Asphalt Thickness (in)	Fourth Layer Asphalt Thickness (in)	Total Asphalt Thickness (in)
X-001-0-21	Ramp P	10.00	8.75	-	-	18.75
X-002-0-21	I-71	3.50	3.00	10.25	-	16.75
X-003-0-21	I-71	1.50	15.00	-	-	16.50
X-004-0-21	I-71	3.50	5.00	8.50	-	17.00
X-005-0-21	I-71	1.50	15.00	-	-	16.50
X-006-0-21	I-71	2.00	3.25	4.25	8.50	18.00
X-007-0-21	I-71	3.50	4.50	6.75	-	14.75

4.2. Subgrade Conditions

The subgrade conditions in the project area are relatively consistent and are generally comprised of primarily cohesive natural overburden soils (A-4a, A-6a, A-6b, and A-7-6) and minor non-cohesive overburden soils (A-1-a, A-1-b, A-2-4). With respect to sulfate within the subgrade soil, based on the project laboratory testing program, three soil samples present a sulfate content value larger than 5,000 ppm within all the project borings performed.

The following subsections present a brief summary of the subsurface conditions by ramp/roadway segment with problem areas highlighted where present.

4.2.1. I-71

The subgrade soils encountered along I-71 consisted of 84% cohesive materials and 15% granular materials. Those cohesive materials are: 1) Sandy Silt (A-4a, 49%); 2) Silt and Clay (A-6a, 22% of samples); 3) Silty Clay (A-6b, 8% of samples); and 4) Clay (A-7-6, 5% of samples). With respect to the consistency of the fine-grained soils, the descriptions varied from stiff to hard correlating to N_{60} values between 10 and 41 bpf and hand penetrometer readings between 1.50 tsf and over 4.5 tsf. Natural moisture contents ranged from 5 to 28 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 22 to 39 percent and from 14 to 25 percent, respectively.

Sixteen percent (16%) of the samples taken along the I-71 were classified as non-cohesive soils and were comprised of: 1) Gravel and Stone Fragments with Sand (A-1-b, 10% of samples); 2) Stone Fragments (A-1-a, 3% of samples); and 3) Stone Fragments with Sand and Silt (A-2-4, one sample). With respect to the relative compactness of the coarse-grained soils, the descriptions varied from loose to very dense correlating to converted SPT-N values (N_{60}) values between 7 and 109 blows per foot (bpf). Natural moisture content ranged from 4 to 24 percent.

4.2.1. Ramp K

The subgrade soils encountered along Ramp K consisted of 93% cohesive materials and 7% granular materials. Those cohesive materials are: 1) Silty Clay (A-6b, 46% of samples); 2) Silt and Clay (A-6a, 32% of samples); and 3) Sandy Silt (A-4a, 14%). With respect to the consistency of the fine-grained soils, the descriptions varied from stiff to hard correlating to N_{60} values between 3 and 28 bpf. Natural moisture contents ranged from 10 to 26 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 24 to 37 percent and from 14 to 22 percent, respectively.

Seven percent (7%) of the samples taken along Ramp K were classified as non-cohesive soils and were comprised of Gravel and Stone Fragments with Sand (A-1-b, 7% of samples). With respect to the relative compactness of the coarse-grained soils, the descriptions varied from loose to medium dense correlating to converted SPT-N values (N_{60}) values between 5 and 12 blows per foot (bpf). Natural moisture content was 7 percent.

4.2.2. Ramp M

The subgrade soils encountered along Ramp M consisted of 89% cohesive materials and 11% granular materials. Those cohesive materials are: 1) Silt and Clay (A-6a, 36% of samples); 2) Silty Clay (A-6b, 29% of samples); 3) Clay (A-7-6, 11% of samples) and 4) Sandy Silt (A-4a, 14%). With respect to the consistency of the fine-grained soils, the descriptions varied from stiff to hard correlating to N_{60} values between 10 and 34 bpf and hand penetrometer reading ranging from 1.50 tsf to 4.50 tsf. Natural moisture contents ranged from 9 to 27 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 25 to 50 percent and from 16 to 22 percent, respectively.

Eleven percent (11%) of the samples taken along Ramp M were classified as non-cohesive soils and were comprised of: 1) Gravel and Stone Fragments with Sand (A-1-b, 7% of samples); and 2) Stone Fragments (A-1-a, 4% of samples). With respect to the relative compactness of the coarse-grained soils, the descriptions varied from loose to medium dense correlating to converted SPT-N values (N_{60}) values between 10 and 16 blows per foot (bpf). Natural moisture content ranged from 6 to 11 percent.

4.2.3. Ramp N

The subgrade soils encountered along Ramp N consisted of 88% cohesive materials and 12% granular materials. Those cohesive materials are: 1) Silt and Clay (A-6a, 50% of samples); 2) Sandy Silt (A-4a, 25%); and 3) Clay (A-7-6, 13% of samples). With respect to the consistency of the fine-grained soils, the descriptions varied from medium stiff to very stiff correlating to N_{60} values between 8 and 27 bpf and hand penetrometer readings ranging from 2.75 tsf to over 4.50 tsf. Natural moisture contents ranged from 10 to 28 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 25 to 53 percent and from 17 to 25 percent, respectively.

Twelve percent (12%) of the samples taken along Ramp N were classified as non-cohesive soils and were comprised of: 1) Stone Fragments with Sand and Silt (A-2-4, one sample). With respect to the relative compactness of the coarse-grained soils, the description was medium dense correlating to a converted SPT-N value (N_{60}) of 20 blows per foot (bpf). Natural moisture content was 7 percent.

4.2.4. Ramp O

The subgrade soils encountered along Ramp O consisted of 100% cohesive materials. Those cohesive materials are: 1) Silt and Clay (A-6a, 50% of samples); and 2) Sandy Silt (A-4a, 50%). With respect to the consistency of the fine-grained soils, the descriptions varied from stiff to hard correlating to N_{60} values between 8 and 26 bpf and hand penetrometer readings ranging from 4.00 tsf to over 4.50 tsf. Natural moisture contents ranged from 8 to 14 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 23 to 32 percent and from 13 to 17 percent, respectively.

4.2.1. Ramp P

The subgrade soils encountered along Ramp P consisted of 87% cohesive materials and 15% granular materials. Those cohesive materials are: 1) Sandy Silt (A-4a, 29%); 2) Silt and Clay (A-6a, 29% of samples); and 3) Silty Clay (A-6b, 29% of samples). With respect to the consistency of the fine-grained soils, the descriptions varied from stiff to hard correlating to N_{60} values between 5 and 35 bpf and hand penetrometer readings ranging from 2.50 tsf to 4.50 tsf. Natural moisture contents ranged from 10 to 19 percent. Based on Atterberg Limit tests performed on representative samples of the fine-grained subgrade soils obtained within these pavement widening limits, the liquid and plastic limits ranged from 24 to 39 percent and from 15 to 20 percent, respectively.

Thirteen percent (13%) of the samples taken along Ramp P were classified as non-cohesive soils and were comprised of: 1) Stone Fragments with Sand and Silt (A-2-4, one sample); 2) Gravel and Stone Fragments with Sand (A-1-b, 7% of samples); and 3) Stone Fragments (A-1-a, one sample). With respect to the relative compactness of the course-grained soils, the description ranged from loose to medium dense correlating to converted SPT-N values (N_{60}) value between 7 and 16 blows per foot (bpf). Natural moisture content ranged from 6 to 11 percent.

4.2.2. Groundwater

Groundwater was encountered only in boring B-033-0-21 during drilling in all the project borings performed as part of the referenced project. Based on measurements at this boring location groundwater was encountered at a depth of 18.0 ft bgs (elevation 895.3 ft amsl). It should be noted that groundwater is affected by many hydrologic characteristics in the area and may vary from those measured at the time of the exploration.

4.2.3. Bedrock

Bedrock was not encountered in all the project borings within the subgrade depth.

5. ANALYSES AND RECOMMENDATIONS

We understand that the project FRA-71/270-28.27/25.99A consists of widening IR-71 NB at the IR-270 and IR-71 interchange, as well as pavement replacement of five associated ramps. For this purpose, a roadway exploration and subsequent analysis was completed for the referenced project. The analysis completed for the proposed project included a subgrade (GB1) analysis. The subgrade analysis was performed in accordance with ODOT's GB1 criteria utilizing the ODOT provided *GB1: Subgrade Analysis Spreadsheet* (GB1_SubgradeAnalysis.xls, Version 14.6 dated February 11, 2022). Input information for the spreadsheet was based on the soil characteristics gathered during NEAS's subgrade exploration (i.e., SPT results, laboratory test results, etc.). A GB1 analysis was performed for each of the referenced pavement widening areas individually.

Based on our evaluation of the subsurface conditions and our geotechnical engineering analyses of the proposed project, it is our opinion that the subgrade conditions encountered are generally satisfactory and pavement can be designed without the need for extreme levels of remediation, especially with the use of global stabilization per the GB1. In general, the subgrade soils throughout the project will be globally stabilized by either Excavate and Replace (Item 204 with Geotextile) or chemical stabilization. The following sections provide further detail about the analysis performed and the recommended remediation.

5.1. Subgrade Analysis

A GB1 analysis was performed to identify the method, location, and dimensions (including depth) of required subgrade stabilization for the project. In addition to identifying stabilization recommendations, pavement design parameters are also determined to aid in pavement section design. The subsections below present the results of our GB1 analysis including pavement design parameters and unsuitable and/or unstable subgrade conditions if any are identified within the project limits. A GB1 analysis spreadsheet is provided in Appendix C.

5.1.1. Pavement Design Recommendations

A GB1 analysis was performed using the subgrade soil data obtained during our field exploration program to evaluate the soil characteristics and develop pavement parameters for use in pavement design. The subgrade analysis parameters recommended for use in pavement design are presented in Table 5 below. Provided in the table are ranges of maximum, minimum and average N_{60L} values for the indicated segments as well as the design CBR value recommended for use in pavement design.

Table 5: Pavement Design Values

Section	Maximum N_{60L}	Minimum N_{60L}	Average N_{60L}	Average PI Values	Design CBR
Entire Project	26	3	14	12	7
IR-71 NB	25	10	16	10	7
IR-71 NB Sta. 156+67 to End	20	11	16	9	8
Ramp K	16	3	11	15	6
Ramp M	22	10	14	18	6
Ramp N	25	8	18	14	7
Ramp O	26	8	15	11	7
Ramp P	22	5	12	14	6

5.1.2. Unsuitable Subgrade

Per ODOT's GB1, the presence of select subgrade conditions (i.e., unsuitable) are prohibited within the subgrade zone for new pavement construction. These unsuitable subgrade conditions generally include the presence of rock and specific soil types. With respect to the planned roadways, these subgrade conditions are further discussed in the following subsections.

5.1.2.1. Rock

Rock was not encountered in any of the borings performed within the project roadway limits.

5.1.2.2. Prohibited Soils

Unsuitable soil types per the GB1, which include A-4b, A-2-5, A-5, A-7-5, A-8a, A-8b, and soils with liquid limits greater than 65, were not encountered within the subgrade of the referenced project roadway segments.

5.1.3. Unstable Subgrade

The unstable subgrade conditions generally include the presence of weak soil conditions and overly moist soil conditions. With respect to the planned roadway sections, these subgrade conditions are further discussed in the following subsections.

5.1.3.1. Weak Soils

Soils for which the lowest N_{60} (N_{60L}) at the referenced boring location is less than 12 bpf and in some cases less than 15 bpf (i.e., where moisture content is greater than optimum plus 3 percent), or in which the lowest HP reading at the referenced boring location is less than 1.5 and, in some cases, less than 1.875 (i.e., where moisture content is greater than optimum plus 3 percent), subgrade stabilization depths are recommended per *Figure B - Subgrade Stabilization* within the GB1.

It should be noted that for the purposes of this report the term "weak soils" has been assumed to represent subgrade soils of these conditions. A summary of the boring locations where unstable soils were encountered and determined to have a potential impact on subgrade performance are shown in Table 6 below, per the roadway segment for which they were encountered. Also included is the associated GB1 recommended remediation depth with the method of either excavation and replacement or chemical treatment within the project limits.

Table 6: Unstable Soil Locations Summary

Boring ID	N_{60L}	Subgrade Depth (ft)	Remediation Depth (inches)		
			Excavate and Replace (Item 204 w/ Geotextile)	Excavate and Replace (Item 204 w/ Geogrid - SS 861)	Chemical Stabilization (Item 206)
Ramp K					
B-029-0-21	9	1.4 - 2.9	12	N/A	14
Ramp O					
B-041-0-21	11	1.1 - 2.6	12	N/A	12
Ramp P					
B-026-0-21	5	0.1 - 1.6	21	15	14
B-027-0-21	7	(-)1.1 - 0.4	15	N/A	14
Note: N/A, Not Applicable based on GB1- Figure B - Subgrade Stabilization					

It should be noted that *Figure B - Subgrade Stabilization* does not apply to soil types A-1-a, A-1-b, A-3, or A-3a, nor to soils with N_{60L} values of 15 or more. Per GB1 guidance, *these soils should be reworked to stabilize the subgrade.*

5.1.3.2. High Moisture Content Soils

High moisture content soils are defined by the GB1 as soils that exceed the estimated optimum moisture content (per *Figure A - Optimum Moisture Content* within the GB1) for a given classification by 3 percent or more. Per the GB1, soils determined to be above the identified moisture content levels are a likely indication of the presence of an unstable subgrade and may require some form of subgrade stabilization. High moisture content soils were encountered along proposed alignments within 3 ft of proposed finished grade of roadway segments. Therefore, remediation is needed for the high moisture content soils encountered at these roadway alignments. Summaries of the boring locations where high moisture content conditions were encountered within the limits of each proposed alignment are shown in Table 7 below.

Table 7: High Moisture Content Soils Location Summary

Boring ID	High MC Soil Type	Moisture Content (%)	Optimum Moisture Content (%)	Subgrade Depth (ft)
I-71				
B-001-0-21	A-6b	21	16	0.8 - 2.3
B-004-0-21	A-6a	17	14	1.6 - 3.1
B-014-0-21	A-4a	13	10	1.1 - 2.6
Ramp K				
B-029-0-21	A-6a	17	14	1.4 - 2.9
Ramp M				
B-018-0-21	A-7-6	25	19	1.9 - 3.4
Ramp N				
B-004-0-21	A-6a	17	14	0.3 - 1.8
B-005-0-21	A-4a	15	10	1.9 - 3.4
Ramp P				
B-026-0-21	A-6a	17	14	0.1 - 1.6
		19	14	1.6 - 3.1
B-001-0-21	A-6b	21	16	0.7 - 2.2

5.1.4. High Sulfate Content Soils

High sulfate content soils are defined as soils that exceed 3,000 ppm. Where high sulfate content soils are encountered, the GB1 prohibits the use of chemical stabilization without prior consultation with the District Geotechnical Engineer. Three soil samples in borings B-008-0-21, B-014-0-21 and B-016-0-21 present a sulfate content greater than 3,000 ppm, however, less than 5,000 ppm. Three soil samples in borings B-009-0-21, B-010-0-21 and B-040-0-21 present a sulfate content greater than 5,000 ppm.

5.2. Stabilization Recommendations

5.2.1. Subgrade Stabilization

Unstable subgrade conditions, including areas of weak soils and high moisture content soils, were encountered throughout 8 percent of the proposed pavement widening area along IR-71 NB and the IR-71 and IR-270 interchange associated ramps. Three soil samples in borings B-008-0-21, B-014-0-21 and B-016-0-21 present a sulfate content greater than 3,000 ppm, however, less than 5,000 ppm. Three soil samples in borings B-009-0-21, B-010-0-21 and B-040-0-21 present a sulfate content greater than 5,000 ppm. Although these materials were encountered throughout the site, guidance from ODOT's GB1 states that *"For all interstates and other divided highways with four or more lanes more than 1-mile length, the subgrade of the entire project shall be chemically stabilized (global stabilization)"* and therefore global chemical stabilization be performed for the proposed interstate interchange improvement project except where otherwise indicated in this report.

The global chemical stabilization of the referenced IR-71 NB and ramps subgrade soils included within this project, should be performed to a minimum depth of 12 inches utilizing cement as the stabilizing chemical. The stabilization efforts should extend a minimum of 18-inches beyond the edge of the paved roadway, shoulder or median. The mix design should be conducted in accordance with ODOT's CMS Supplement 1120 (Mixture Design for Chemically Stabilized Soils). For design purposes it may be assumed that the cement addition will be 5% using the following formula.

$$\text{Cement: } C = 0.75 \times T \times 115 \times 0.05$$

Where:

C = amount of chemical in pounds / square yard and

T = thickness of the treatment zone in inches

A dry density of 115-pounds per cubic foot (pcf) is assumed.

For areas where high sulfate content soils were encountered, NEAS discussed our recommendations with the District Geotechnical Engineer on August 17, 2022. It is recommended that Excavate and Replace with geotextile (Item 204) be performed to a depth of 12 inches below the proposed top of subgrade. Our recommended limits for the indicated project subgrade stabilization are provided in Table 8 below.

Table 8: Stabilization Recommendations

Segment	Average N_{60L}	Remediation Depth (inches)		
		Excavate and Replace (Item 204 w/ Geotextile)	Excavate and Replace (Item 204 w/ Geogrid - SS 861)	Chemical Stabilization (Item 206)
Ramps K, M, N, O, P & IR-71 NB from Begin to Sta. 156+67	16	12	N/A	12
IR-71 NB from Sta. 156+67 to End	11	12	N/A	N/A
Note: N/A, Not Applicable based on GB1- Figure B - Subgrade Stabilization				

5.3. Embankment Construction Recommendations

In areas where additional embankment material is proposed along existing slopes (i.e., side-hill sliver fills) that are steeper than 8H:1V but flatter than 4H:1V, it is recommended that the proposed embankment be benched into the existing slopes in accordance with Item 203.05 "Embankment Construction Methods" of the ODOT CMS. For areas where additional embankment material is proposed along existing slopes that are steeper than 4H:1V, it is recommended that the proposed embankment be designed and constructed in accordance with ODOT's GB2. For sidehill fills planned on existing slopes steeper than 4H:1V, ODOT's GB2 recommends that *the embankment slopes be constructed utilizing special benching in order to blend the new embankment with the existing slope to prevent the development of a weak shear plane at the interface between the proposed fill and existing slope material* (ODOT [2], 2021). As proposed cross-sections are not available at this time, at this stage of the project a special benching scheme similar to that shown in Figures 1, 2 or 3, as appropriate, of the ODOT GB2 should be used in areas where special benching is recommended. The height and width dimensions of the special benching scheme shown in these figures should be arranged to minimize the required cut and fill quantities, though the height of a single bench shall not exceed 20 ft without a stability analysis and design per OSHA requirements. Additionally, it may be appropriate to adjust the bench slope shown from a 1H:1V to a 1.75H:1V slope if the existing slope is made up of primarily granular materials. The benched material should be replaced with compacted engineered fill per Item 203 of the ODOT CMS, while proper lift thicknesses and material density should be maintained in the proposed fill per Item 203.06 of the ODOT CMS. In situations where it is not practical to extend the final bench through the existing roadway due to maintenance of traffic concerns, a benching scheme similar to that shown in Figure 1a of the ODOT GB2 can be used in order to avoid impacting the existing roadway, guardrail or shoulder. This scheme results in the placement of a temporary over-steepened fill that can later be "shaved-off" to bring the slope to the final proposed grade.

6. STRUCTURE BORING PROFILES

NEAS performed 6 project borings between October 23, 2023, and October 25, 2023 for the two planned retaining walls which later were eliminated. Each individual project boring log (included within Appendix B) includes the recorded boring latitude and longitude location (based on the surveyed Ohio State Plane South, NAD83, location) and the corresponding ground surface elevation.

7. QUALIFICATIONS

This investigation was performed in accordance with accepted geotechnical engineering practice for the purpose of characterizing the subsurface conditions along the referenced portions of roadways. This report has been prepared for TranSystems and ODOT to be used solely in evaluating the subgrade soils within the project limits and presenting geotechnical engineering recommendations specific to this project. The assessment of general site environmental conditions or the presence of pollutants in the soil, rock and groundwater of the site was beyond the scope of this geotechnical exploration. Our recommendations are based on the results of our field explorations, laboratory test results from representative soil samples, and geotechnical engineering analyses. The results of the field explorations and laboratory tests, which form the basis of our recommendations, are presented in the appendices as noted. This report does not reflect any variations that may occur between the borings or elsewhere on the site, or variations whose nature and extent may not become evident until a later stage of construction. In the event that any changes occur in the nature, design or location of the proposed improvement work, the conclusions and recommendations contained in this report should not be considered valid until they are reviewed and have been modified or verified in writing by a geotechnical engineer.

It has been a pleasure to be of service to TranSystems in performing this geotechnical exploration for the FRA-71/270-28.27/25.99A Safety and System Preservation project. Please call if there are any questions, or if we can be of further service.

Respectfully Submitted,

Zhao Mankoci, Ph.D., P.E.
Geotechnical Engineer

Chunmei (Melinda) He, Ph.D., P.E.
Project Manager

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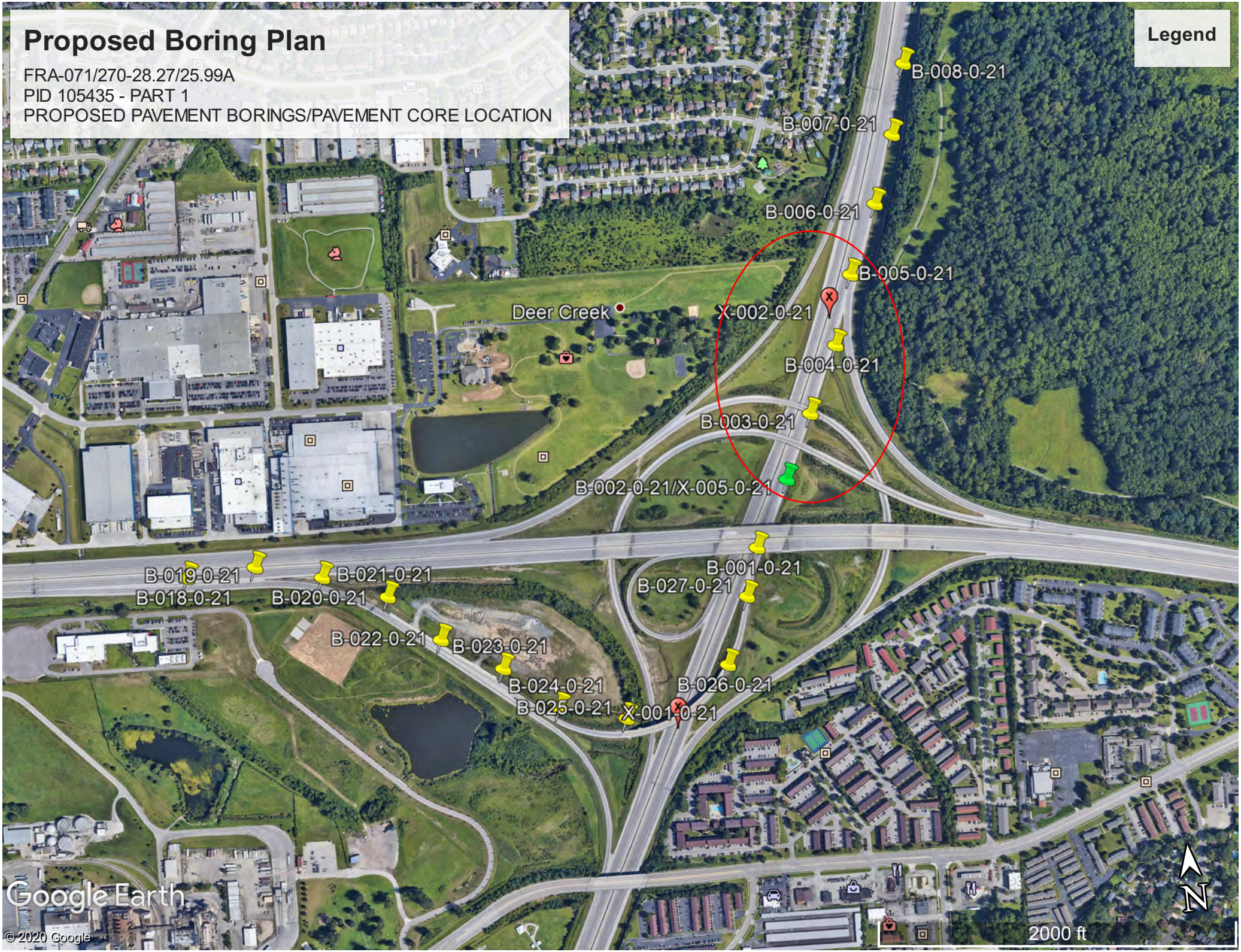
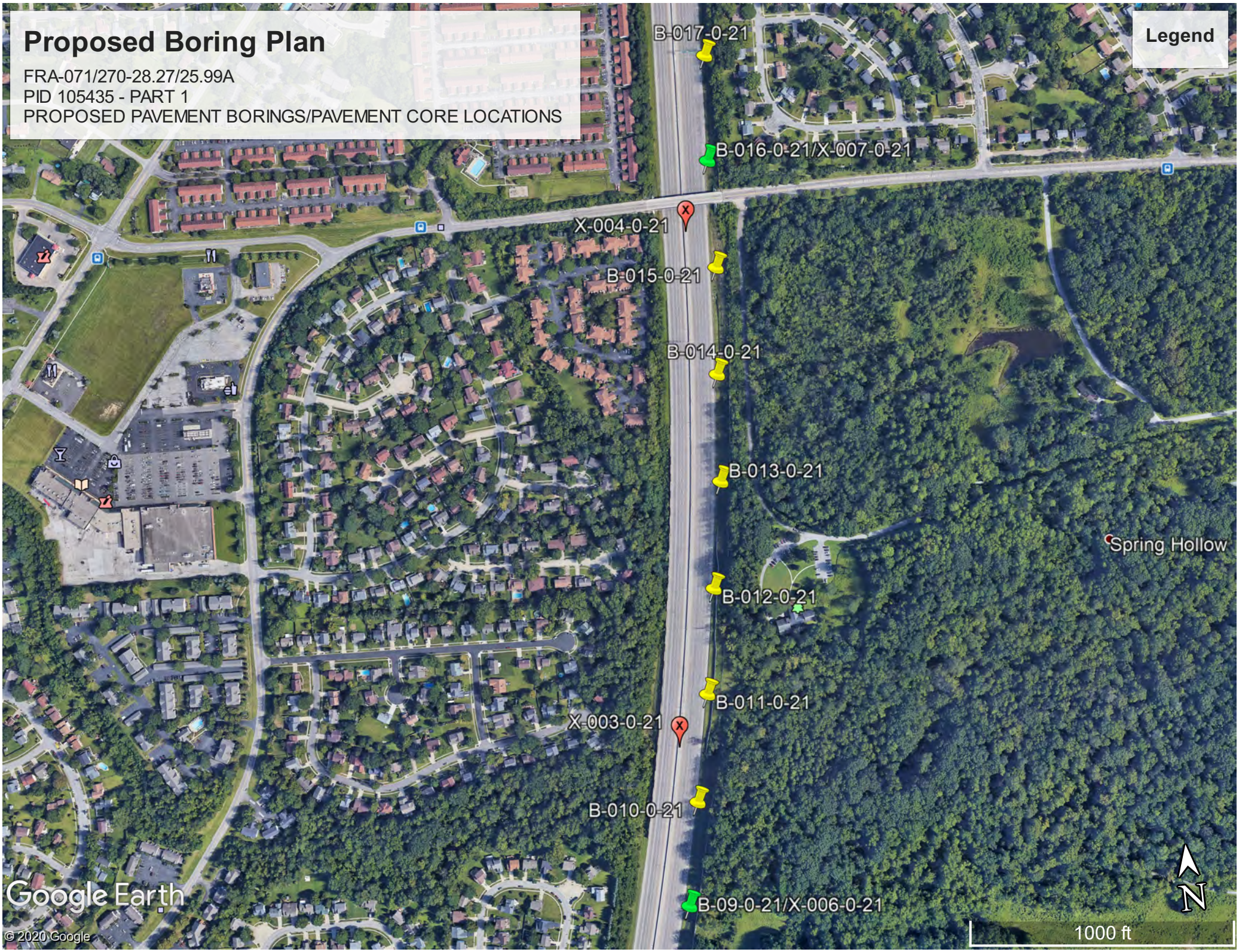
APPENDIX A

SOIL BORING LOCATION PLAN


Proposed Boring Plan
FRA-071/270-28.27/25.99A
PID 105435 - PART 1
PROPOSED PAVEMENT BORINGS/PAVEMENT CORE LOCATION
Legend
B-008-0-21
B-007-0-21
B-006-0-21
B-005-0-21
X-002-0-21
Deer Creek
B-004-0-21
B-003-0-21
B-002-0-21/X-005-0-21
B-001-0-21
B-027-0-21
B-019-0-21
B-018-0-21
B-021-0-21
B-020-0-21
B-022-0-21
B-023-0-21
B-024-0-21
B-025-0-21
X-001-0-21
B-026-0-21
Google Earth
© 2020 Google
N
2000 ft


Proposed Boring Plan
FRA-071/270-28.27/25.99A
PID 105435 - PART 1
PROPOSED PAVEMENT BORINGS/PAVEMENT CORE LOCATIONS
Legend
B-017-0-21
B-016-0-21/X-007-0-21
X-004-0-21
B-015-0-21
B-014-0-21
B-013-0-21
Spring Hollow
B-012-0-21
B-011-0-21
X-003-0-21
B-010-0-21
B-09-0-21/X-006-0-21
Google Earth
© 2020 Google
N
1000 ft

Part 2 Boring Plan

FRA-071/270-28.27/25.99A
PID 105435 - PART 2
Proposed Roadway / Structure Borings

Legend

Proposed Boring

B-043-0-21
B-042-0-21
B-039-0-21
B-001-1-64
B-040-0-21
B-034-0-21
B-038-0-21
B-010-0-64
B-033-0-21
B-041-0-21
B-009-0-64
B-035-0-21
B-002-0-64
B-032-0-21
B-037-0-21
B-001-0-64
B-031-0-21
B-030-0-21
B-008-0-64
B-036-0-21
B-029-0-21
B-028-0-21
Jack Nicklaus Fwy
71
270
119A
N
500 ft
Google Earth
Image Landsat / Copernicus

APPENDIX B

BORING LOGS AND TEST RESULTS

NEAS Inc.
National Engineering & Architectural Services Inc.

LEGEND

SYMBOL	DESCRIPTION	ODOT CLASSIFICATION
	Gravel and/or Stone Fragments	A-1-a
	Gravel and/or Stone Fragments with Sand	A-1-b
F.S.	Fine Sand	A-3
	Coarse and Fine Sand	A-3a
	Gravel and/or Stone Fragments with Sand and Silt	A-2-4 A-2-5
	Gravel and/or Stone Fragments with Sand, Silt and Clay	A-2-6 A-2-7
	Sandy Silt	A-4a
	Silt	A-4b
	Elastic Silt and Clay	A-5
	Silt and Clay	A-6a
	Silty Clay	A-6b
	Elastic Clay	A-7-5
	Clay	A-7-6
	Organic Silt	A-8a
	Organic Clay	A-8b

SYMBOL	DESCRIPTION	ODOT CLASSIFICATION
	Shale	Visual
	Weathered Shale	Visual
	Sandstone	Visual

GRADATION (%)

GR Gravel
CS Coarse Sand
MS Medium Sand
FS Fine Sand
SI Silt
CL Clay (<5 micron)

SAMPLER SYMBOLS

Shelby Tube

Rock Core

Split Spoon Sample (SS)

* Indicates a Sample Taken Within 3 ft of Proposed Grade

ABBREVIATIONS

LL	LIQUID LIMIT (%)	HP	HAND PENETROMETER
PI	PLASTIC INDEX (%0	PID	PHOTOIONIZATION DETECTOR
WC	MOISTURE CONTENT (%)	UC	UNCONFINED COMPRESSION
SPT	STANDARD PENETRATION TEST	ppm	PARTS PER MILLION
NP	NON PLASTIC	$\mathcal{W}$	WATER FIRST ENCOUNTERED
-200	PERCENT PASSING NO. 200 SIEVE	▼	WATER LEVEL UPON COMPLETION
N_{60}	ADJUSTED SPT RESULT		
EOB	END OF BORING		

MATERIAL CLASSIFIED BY VISUAL INSPECTION

Sod and Topsoil
Pavement or Base
Concrete

Uncontrolled Fill (Describe)

Bouldery Zone

Peat, S-Sedimentary
W-Woody F-Fibrous
L-Loamy & etc

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 130+48, 62' RT.	EXPLORATION ID B-001-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 913.0 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.110037, -82.977651	

MATERIAL DESCRIPTION AND NOTES	ELEV. 913.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)		1																	
	911.0	2	5 7 7	19	67	SS-1	-	33	16	12	24	15	NP	NP	NP	10	A-4a (1)	-	
MEDIUM DENSE, BROWN, **SANDY SILT**, SOME GRAVEL, LITTLE CLAY, DAMP	910.0	3	6 7 8	20	100	SS-2	4.50	1	4	11	43	41	39	19	20	21	A-6b (12)	233	
VERY STIFF TO HARD, BROWNISH GRAY AND ORANGISH BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, CONTAINS IRON STAINING, DAMP TO MOIST		4	6 9 12	29	33	SS-3	4.50	-	-	-	-	-	-	-	-	18	A-6b (V)	-	
	905.5	5	6 8 11	26	39	SS-4	3.75	-	-	-	-	-	-	-	-	25	A-6b (V)	-	
		EOB 6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 134+73, 77' RT.	EXPLORATION ID B-002-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 914.1 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/20/21 END: 4/20/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.111052, -82.976900	

MATERIAL DESCRIPTION AND NOTES	ELEV. 914.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	912.1	1																	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP **(FILL)**	911.1	2	13 12 8	27	72	SS-1	4.50	6	11	17	39	27	27	17	10	13	A-4a (6)	400	
HARD, BROWNISH GRAY WITH TRACE BLACK MOTTLES, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP TO MOIST **(FILL)**	908.1	3 4 5 6	4 7 7	19	67	SS-2	4.50	16	14	13	35	22	28	17	11	11	A-6a (5)	-	
VERY STIFF, BROWN WITH TRACE GRAY MOTTLES, **CLAY**, SOME SILT, LITTLE SAND, LITTLE GRAVEL, CONTAINS IRON STAINING AND BRICK FRAGMENTS, DAMP **(FILL)**	906.6	7 EOB	3 6 5	15	67	SS-3	4.50	-	-	-	-	-	-	-	-	19	A-6a (V)	-	
			3 3 5	11	56	SS-4	2.75	-	-	-	-	-	-	-	-	21	A-7-6 (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 138+60, 75' RT.	EXPLORATION ID B-003-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 913.7 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/20/21 END: 4/20/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.112010, -82.976279	

MATERIAL DESCRIPTION AND NOTES	ELEV. 913.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	911.7	1																	
MEDIUM DENSE TO DENSE, GRAY, **STONE FRAGMENTS**, LITTLE SAND, TRACE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	909.2	2	9 14 12	35	56	SS-1	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	-	
		3	9 10 12	30	44	SS-2	-	77	10	5	6	2	NP	NP	NP	4	A-1-a (0)	-	
VERY STIFF, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP TO MOIST		4																	
		5	5 6 7	18	67	SS-3	2.75	14	8	15	34	29	32	18	14	18	A-6a (7)	100	
		6	6 7 9	22	33	SS-4	2.25	-	-	-	-	-	-	-	-	21	A-6a (V)	-	
	906.2	7 EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 142+56, 79' RT.	EXPLORATION ID B-004-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 911.1 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/20/21 END: 4/20/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.112998, -82.975669	

MATERIAL DESCRIPTION AND NOTES	ELEV. 911.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)																			
	909.1		43 25 19	60	56	SS-1	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	-	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	908.1		12 12 14	35	89	SS-2	4.50	5	8	14	40	33	34	19	15	17	A-6a (10)	20	
VERY STIFF TO HARD, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, SS-2 CONTAINS IRON STAINING, DAMP	905.1		9 10 11	29	100	SS-3	3.50	8	10	14	36	32	32	17	15	16	A-6a (9)	-	
VERY STIFF, BROWN AND GRAY, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, DAMP	903.6	EOB	8 8 10	25	44	SS-4	3.50	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 146+32, 58' RT.	EXPLORATION ID B-005-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 908.2 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/20/21 END: 4/20/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.113975, -82.975211	

MATERIAL DESCRIPTION AND NOTES	ELEV. 908.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)																			
	906.2		45 15 11	35	100	SS-1	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	-	
DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	905.2		9 8 9	23	56	SS-2	4.50	14	13	17	34	22	26	17	9	14	A-4a (4)	260	
VERY STIFF TO HARD, BROWN AND GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, SS-3 CONTAINS 1.5" STONE FRAGMENTS, DAMP			8 7 8	20	22	SS-3	4.00	-	-	-	-	-	-	-	-	15	A-4a (V)	-	
			10 8 9	23	22	SS-4	4.25	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
	900.7	EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 150+94, 91' RT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 903.0 (MSL) EOB: 7.5 ft.
START: 4/14/21 END: 4/14/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.115133, -82.974503

EXPLORATION ID B-006-0-21

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 903.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
19.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	900.8	1																	
HARD, GRAY, **SANDY SILT**, LITTLE TO SOME CLAY, TRACE TO SOME GRAVEL, DAMP	898.5	2	8 7 6	18	100	SS-1	4.50	10	13	18	35	24	24	16	8	13	A-4a (5)	580	
		3	10 4 18	30	67	SS-2	4.50	27	13	16	27	17	25	16	9	9	A-4a (2)	-	
DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP	897.0	4																	
		5	12 12 15	37	44	SS-3	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	-	
HARD, GRAY, **SANDY SILT**, SOME CLAY, SOME GRAVEL, DAMP	895.5	6	10 14 16	41	39	SS-4	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
		EOB 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 154+66, 89' RT.	EXPLORATION ID B-007-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 899.4 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/14/21 END: 4/14/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.116108, -82.974071	

MATERIAL DESCRIPTION AND NOTES	ELEV. 899.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)																			
	897.4																		
MEDIUM DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	896.4	1	9 11 9	27	67	SS-1	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	1147	
VERY STIFF TO HARD, BROWN AND GRAY, **SANDY SILT**, SOME GRAVEL, LITTLE CLAY, DAMP		2	3 7 8	20	83	SS-2	4.50	29	14	15	27	15	23	16	7	9	A-4a (1)	-	
		3	2 3 5	11	100	SS-3	4.25	21	13	16	31	19	23	15	8	11	A-4a (3)	-	
	891.9	4	3 3 4	10	50	SS-4	2.25	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		EOB 5																	
		6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 158+69, 85' RT.	EXPLORATION ID B-008-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 895.2 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/14/21 END: 4/14/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.117174, -82.973656	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	895.2																		
VERY STIFF TO HARD, BROWNISH GRAY AND GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL AND STONE FRAGMENTS, DAMP	893.3	1	19 15 15	41	100	SS-1	4.50	13	13	18	34	22	23	16	7	9	A-4a (4)	4267	
		2	9 7 7	19	56	SS-2	4.50	12	13	17	36	22	23	15	8	10	A-4a (5)	-	
		3																	
		4	4 5 9	19	89	SS-3	4.00	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		5																	
		6	7 7 9	22	100	SS-4	4.25	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
	887.7	7 EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 162+72, 91' RT.	EXPLORATION ID B-009-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 891.0 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/14/21 END: 4/14/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.118246, -82.973248	

MATERIAL DESCRIPTION AND NOTES	ELEV. 891.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	888.9	1																	
HARD, BROWNISH GRAY BECOMING GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, DAMP		2	12 12 12	33	100	SS-1	4.50	-	-	-	-	-	-	-	-	9	A-4a (V)	8000	
		3	4 9 9	25	100	SS-2	4.50	11	11	18	37	23	24	14	10	9	A-4a (5)	-	
		4	2 4 5	12	100	SS-3	4.50	12	13	17	37	21	22	15	7	11	A-4a (5)	-	
@6.0'; SS-4 BECOMES STIFF	883.5	5	4 5 6	15	89	SS-4	1.75	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		EOB 6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A
TYPE: SUBGRADE
PID: 105435 SFN:
START: 4/14/21 END: 4/14/21

DRILLING FIRM / OPERATOR: NEAS / J. HODGES
SAMPLING FIRM / LOGGER: NEAS / J. HODGES
DRILLING METHOD: 3.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: CME 45B
HAMMER: CME AUTOMATIC
CALIBRATION DATE: 12/5/19
ENERGY RATIO (%): 81.7

STATION / OFFSET: 166+56, 86' RT.
ALIGNMENT: I-71
ELEVATION: 887.8 (MSL) EOB: 7.5 ft.
LAT / LONG: 40.119281, -82.972942

EXPLORATION ID B-010-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 887.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	885.7	1																	
VERY DENSE, BLACK AND BROWN, **STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS ASPHALT FRAGMENTS, DAMP **(FILL)**	884.8	2	13 10 28	52	33	SS-1	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	-	
HARD, BROWN, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, CONTAINS TRACE IRON STAINING, DAMP	881.8	3 4 5	6 9 6	20	56	SS-2	4.50	16	16	19	35	14	33	25	8	21	A-4a (3)	5767	
VERY STIFF, BROWN AND BROWNISH GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST	880.3	6	6 8 12	27	44	SS-3	4.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
	EOB	7	5 6 13	26	72	SS-4	3.50	4	7	15	43	31	33	19	14	20	A-6a (9)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 170+65, 86' RT.	EXPLORATION ID B-011-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 885.9 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/14/21 END: 4/14/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.120386, -82.972642	

MATERIAL DESCRIPTION AND NOTES	ELEV. 885.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 18.0" BASE (DRILLERS DESCRIPTION) @1.5' TO 3.0'; SS-1 IS GRANULAR BASE	882.9	1																	
		2	20 25 32	78	67	SS-1	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	-	
HARD, BROWNISH GRAY AND BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	881.4	3	3 6 7	18	56	SS-2	4.50	8	11	14	37	30	26	16	10	12	A-4a (6)	440	
		4																	
STIFF TO HARD, BROWNISH GRAY AND BROWN, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP TO WET		5	5 7 5	16	78	SS-3	4.50	14	11	13	35	27	28	17	11	13	A-6a (6)	-	
		6	6 6 7	18	100	SS-4	1.50	-	-	-	-	-	-	-	-	28	A-6a (V)	-	
	878.4	EOB 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 174+56, 86' RT.	EXPLORATION ID B-012-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 886.8 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.121451, -82.972399	

MATERIAL DESCRIPTION AND NOTES	ELEV. 886.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	884.8	1																	
VERY DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	883.8	2	31 18 20	52	39	SS-1	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	882.3	3 4	3 5 6	15	89	SS-2	4.50	5	13	17	36	29	28	17	11	14	A-6a (6)	220	
HARD, BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	880.8	5 6	5 5 6	15	78	SS-3	4.50	8	14	18	36	24	26	16	10	13	A-4a (5)	-	
VERY STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST	879.3	7 EOB	4 5 5	14	100	SS-4	2.50	-	-	-	-	-	-	-	-	22	A-6a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 178+53, 86' RT.	EXPLORATION ID B-013-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 889.2 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.122537, -82.972200	

MATERIAL DESCRIPTION AND NOTES	ELEV. 889.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
15.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	887.4	1																	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, WET **(FILL)**	886.2	2	10 43 16	80	44	SS-1	-	-	-	-	-	-	-	-	-	24	A-1-b (V)	-	
STIFF TO VERY STIFF, BROWN AND BROWNISH GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT**, LITTLE CLAY, NO INTACT SOIL FOR HP READINGS, DAMP	884.7	3 4 5	4 9 15	33	100	SS-2	-	28	23	15	21	13	24	17	7	9	A-2-4 (0)	1433	
VERY STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP TO MOIST	881.7	6 7 EOB	6 5 5	14	100	SS-3	4.25	9	11	13	38	29	24	14	10	12	A-4a (6)	-	
			5 5 4	12	100	SS-4	2.50	-	-	-	-	-	-	-	-	15	A-4a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 182+61, 85' RT.	EXPLORATION ID B-014-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 891.6 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.123658, -82.972045	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
14.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	891.6																		
	889.9	1																	
		2	14 11 14	34	100	SS-1	4.50	14	15	16	31	24	27	17	10	5	A-4a (4)	4767	
		3	5 7 8	20	100	SS-2	4.50	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		4	9 8 7	20	100	SS-3	4.50	14	26	19	25	16	24	16	8	11	A-4a (1)	-	
		5	8 8 9	23	100	SS-4	4.50	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
	884.1	6 EOB																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 186+58, 84' RT.	EXPLORATION ID B-015-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 894.1 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.124754, -82.971942	

MATERIAL DESCRIPTION AND NOTES	ELEV. 894.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
15.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	892.3	1																	
VERY DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	891.1	2	20 36 44	109	33	SS-1	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	-	
VERY STIFF TO HARD, BROWNISH GRAY BECOMING GRAY, **SANDY SILT**, LITTLE TO SOME CLAY, LITTLE GRAVEL, DAMP		3	17 6 5	15	72	SS-2	4.50	15	17	19	31	18	28	18	10	12	A-4a (3)	2300	
		4	4 3 5	11	100	SS-3	3.25	18	14	14	32	22	25	16	9	11	A-4a (4)	-	
	886.6	5	5 5 4	12	100	SS-4	3.25	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		EOB 6 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 190+59, 84' RT.	EXPLORATION ID B-016-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 896.6 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.125854, -82.971865	

MATERIAL DESCRIPTION AND NOTES	ELEV. 896.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
15.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	894.8																		
DENSE, BROWNISH GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, MOIST **(FILL)**	893.6		6 15 22	50	44	SS-1	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	-	
HARD, BROWNISH GRAY AND GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP			6 6 7	18	100	SS-2	4.50	10	14	16	36	24	25	16	9	11	A-4a (5)	3767	
			10 10 8	25	100	SS-3	4.50	15	12	15	34	24	25	16	9	12	A-4a (5)	-	
	889.1	EOB	9 11 7	25	100	SS-4	4.50	-	-	-	-	-	-	-	-	13	A-4a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 45B	STATION / OFFSET: 194+58, 96' RT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: I-71
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 898.8 (MSL) EOB: 7.5 ft.
START: 4/15/21 END: 4/15/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.126945, -82.971739

EXPLORATION ID B-017-0-21

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 898.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
14.5" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	897.1	1																	
HARD, BROWN AND BROWNISH GRAY, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP	895.8	2	11 5 12	23	100	SS-1	4.50	15	12	16	33	24	32	19	13	13	A-6a (6)	193	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, DAMP	894.3	3	9 9 12	29	100	SS-2	4.50	12	12	18	35	23	26	17	9	11	A-4a (5)	-	
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, LITTLE SAND, LITTLE GRAVEL, DAMP		4																	
		5	8 8 7	20	100	SS-3	4.50	-	-	-	-	-	-	-	-	11	A-6a (V)	-	
		6																	
	891.3	7	7 6 6	16	100	SS-4	3.75	-	-	-	-	-	-	-	-	11	A-6a (V)	-	
		EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 84+94, 3' LT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 921.6 (MSL) EOB: 7.5 ft.
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.110560, -82.989002

EXPLORATION ID B-018-0-21

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 921.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	919.7	1																	
HARD, GRAY AND BROWN, **SILTY CLAY**, SOME STONE FRAGMENTS, SOME SAND, STONE FRAGMENTS ARE WEAK SHALE, DAMP	918.6	2	4 8 7	20	100	SS-1	4.50	24	13	8	29	26	36	20	16	12	A-6b (6)	213	
STIFF TO VERY STIFF, BROWN WITH TRACE GRAY MOTTLES, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, MOIST TO DAMP		3	5 5 6	15	100	SS-2	2.25	5	6	16	33	40	50	22	28	25	A-7-6 (17)	-	
		4	3 3 4	10	100	SS-3	1.75	-	-	-	-	-	-	-	-	27	A-7-6 (V)	-	
	914.1	5	4 4 5	12	100	SS-4	1.50	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
		EOB 6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 88+73, 46' LT.	EXPLORATION ID B-019-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 920.4 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.110619, -82.987640	

MATERIAL DESCRIPTION AND NOTES	ELEV. 920.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	918.5	1																	
HARD, BROWN AND BROWNISH GRAY, **SILT AND CLAY**, SOME SAND, TRACE TO LITTLE GRAVEL, DAMP		2	9 8 6	19	100	SS-1	4.50	18	8	13	36	25	31	17	14	13	A-6a (7)	633	
		3	7 6 8	19	100	SS-2	4.50	8	11	17	38	26	28	17	11	14	A-6a (6)	-	
		4	4 5 6	15	22	SS-3	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
	912.9	5	5 5 6	15	22	SS-4	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
		EOB 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. BORING OFFSET 25.0' SOUTH.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 92+48, 4' LT.	EXPLORATION ID B-020-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 917.4 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.110342, -82.986326	

MATERIAL DESCRIPTION AND NOTES	ELEV. 917.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	915.6	1																	
HARD, BROWN AND BROWNISH GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, CONTAINS IRON STAINING, DAMP	914.4	2	15 10 11	29	100	SS-1	4.50	9	14	17	35	25	26	17	9	12	A-4a (5)	393	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, CONTAINS A 2.0" STONE FRAGMENT, DAMP	912.9	3 4	9 9 8	23	56	SS-2	4.50	12	14	15	34	25	27	16	11	12	A-6a (5)	-	
VERY STIFF, GRAY, **SILTY CLAY**, LITTLE TO SOME SAND, LITTLE GRAVEL, DAMP	909.9	5 6	3 3 4	10	44	SS-3	3.75	-	-	-	-	-	-	-	-	13	A-6b (V)	-	
	EOB	7	2 3 5	11	56	SS-4	2.25	-	-	-	-	-	-	-	-	14	A-6b (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 96+55, 5' RT.	EXPLORATION ID B-021-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 918.6 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.109798, -82.985064	

MATERIAL DESCRIPTION AND NOTES	ELEV. 918.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	916.6	1																	
HARD, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP		2	8 5 10	20	100	SS-1	4.50	8	10	16	36	30	32	18	14	13	A-6a (8)	293	
		3	8 7 10	23	100	SS-2	4.50	9	9	17	37	28	29	18	11	14	A-6a (6)	-	
		4	7 7 8	20	100	SS-3	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
		5	8 5 7	16	100	SS-4	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
	911.1	6 EOB																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 100+01, 3' RT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 920.6 (MSL) EOB: 7.5 ft.
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.109199, -82.984109

EXPLORATION ID B-022-0-21

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 920.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	918.5	1																	
MEDIUM DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, RESEMBLES GRANULAR BASE, DAMP **(FILL)**	916.1	2	4 6 6	16	78	SS-1	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	-	
		3	5 5 4	12	89	SS-2	-	54	20	8	14	4	NP	NP	NP	6	A-1-b (0)	-	
HARD, BROWN AND GRAY, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, DAMP	914.6	4 5	3 4 4	11	50	SS-3	4.25	3	8	14	39	36	38	19	19	18	A-6b (12)	240	
LOOSE, GRAY, **STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, MOIST	913.1	6	4 4 3	10	17	SS-4	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	-	
		EOB 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. BORING OFFSET 25.0' NORTH.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 103+72, 62' LT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP M
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 923.6 (MSL) EOB: 7.5 ft.
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.108675, -82.982948

EXPLORATION ID B-023-0-21

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 923.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 5.0" BASE (DRILLERS DESCRIPTION)	921.7	1																	
HARD, BROWN AND GRAY, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL AND STONE FRAGMENTS, CONTAINS TRACE IRON STAINING, DAMP		2	6 7 8	20	89	SS-1	4.50	-	-	-	-	-	-	-	-	14	A-6b (V)	533	
		3	10 7 6	18	100	SS-2	4.50	13	16	13	31	27	35	19	16	16	A-6b (7)	-	
	917.6	4	8 10 12	30	67	SS-3	4.25	-	-	-	-	-	-	-	-	11	A-6b (V)	-	
VERY STIFF, GRAY AND BROWN, **SILT AND CLAY**, "AND" STONE FRAGMENTS, SOME SAND, CONTAINS NO INTACT SOIL FOR HP READINGS, DAMP	916.1	5 6 7 EOB	8 9 16	34	44	SS-4	-	40	15	7	22	16	32	18	14	9	A-6a (2)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A
TYPE: SUBGRADE
PID: 105435 SFN:
START: 4/19/21 END: 4/19/21

DRILLING FIRM / OPERATOR: NEAS / J. LONG
SAMPLING FIRM / LOGGER: NEAS / J. LONG
DRILLING METHOD: 3.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: CME 45B
HAMMER: CME AUTOMATIC
CALIBRATION DATE: 12/5/19
ENERGY RATIO (%): 81.7

STATION / OFFSET: 107+55, 49' LT.
ALIGNMENT: RAMP M
ELEVATION: 925.6 (MSL) EOB: 7.5 ft.
LAT / LONG: 40.107974, -82.981926

EXPLORATION ID B-024-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 925.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
18.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)																			
	923.5	1																	
HARD, BROWN AND GRAY, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL, DAMP	922.6	2	15 6 10	22	100	SS-1	4.50	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
HARD, GRAY AND BROWNISH GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, DAMP		3	7 8 11	26	100	SS-2	4.50	11	11	16	37	25	26	16	10	11	A-4a (5)	1967	
		4																	
		5	13 10 11	29	100	SS-3	4.50	12	12	16	38	22	25	16	9	10	A-4a (5)	-	
		6	12 12 14	35	100	SS-4	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
	918.1	EOB 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 1011+38, 22' LT.	EXPLORATION ID B-025-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP P	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 935.5 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.107701, -82.980661	

MATERIAL DESCRIPTION AND NOTES	ELEV. 935.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
17.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	933.4	1																	
VERY STIFF TO HARD, BROWNISH GRAY BECOMING GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP		2	6 7 3	14	100	SS-1	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
		3	2 2 2	5	72	SS-2	2.50	10	11	17	39	23	25	15	10	13	A-4a (5)	1227	
		4	2 3 3	8	44	SS-3	3.75	8	13	17	38	24	24	15	9	13	A-4a (5)	-	
		5	2 3 4	10	39	SS-4	4.00	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
	928.0	6 EOB																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 45B	STATION / OFFSET: 1018+46, 4' RT.	EXPLORATION ID B-026-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP P	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 928.1 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 4/19/21 END: 4/19/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	LAT / LONG: 40.108377, -82.978429	

MATERIAL DESCRIPTION AND NOTES	ELEV. 928.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 9.0" BASE (DRILLERS DESCRIPTION)	926.0	1																	
VERY STIFF, BROWN AND BROWNISH GRAY, **SILT AND CLAY**, SOME SAND, TRACE TO LITTLE GRAVEL, DAMP		2	9 3 3	8	83	SS-1	3.00	6	9	16	37	32	32	17	15	17	A-6a (9)	673	
		3	4 3 4	10	89	SS-2	3.75	6	9	14	38	33	33	19	14	19	A-6a (9)	-	
		4	3 2 2	5	39	SS-3	3.50	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
	920.6	5	4 2 2	5	44	SS-4	2.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
		6 EOB																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A
TYPE: SUBGRADE
PID: 105435 SFN:
START: 4/19/21 END: 4/19/21

DRILLING FIRM / OPERATOR: NEAS / J. LONG
SAMPLING FIRM / LOGGER: NEAS / J. LONG
DRILLING METHOD: 3.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: CME 45B
HAMMER: CME AUTOMATIC
CALIBRATION DATE: 12/5/19
ENERGY RATIO (%): 81.7

STATION / OFFSET: 1022+29, 18' LT.
ALIGNMENT: RAMP P
ELEVATION: 913.7 (MSL) EOB: 7.5 ft.
LAT / LONG: 40.109351, -82.977947

EXPLORATION ID B-027-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
16.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	913.7																		
LOOSE, GRAY, **STONE FRAGMENTS WITH SAND AND SILT**, LITTLE CLAY, CONTAINS ASPHALT FRAGMENTS, DAMP **(FILL)**	911.7	1	6 3 2	7	28	SS-1	-	45	14	8	19	14	NP	NP	NP	10	A-2-4 (0)	-	
STIFF, GRAY, **SILT AND CLAY**, SOME TO "AND" STONE FRAGMENTS, SOME SAND, CONTAINS NO INTACT SOIL FOR HP READINGS, DAMP	910.7	2	3 7 7	19	100	SS-2	-	30	14	8	27	21	34	20	14	12	A-6a (4)	807	
		3	7 5 8	18	78	SS-3	-	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
		4	6 6 7	18	56	SS-4	-	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
	906.2	5 EOB																	
		6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 13+63, 23' RT.	EXPLORATION ID B-028-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 921.3 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/8/22 END: 8/8/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.110243, -82.972635	

MATERIAL DESCRIPTION AND NOTES	ELEV. 921.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
9.0" ASPHALT AND 9.0" CONCRETE AND 5.0" BASE (DRILLERS DESCRIPTION)	919.4	1																	
HARD, BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, DAMP		2	7 5 4	12	56	SS-1	4.50	9	12	16	34	29	34	17	17	15	A-6b (8)	200	
		3	3 4 6	13	100	SS-2	4.50	5	7	17	36	35	34	18	16	16	A-6b (10)	-	
		4	2 5 5	13	100	SS-3	4.50	-	-	-	-	-	-	-	-	15	A-6b (V)	-	
		5	3 5 7	16	100	SS-4	4.50	-	-	-	-	-	-	-	-	11	A-6b (V)	-	
	913.8	6 EOB																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 16+67, 25' RT.	EXPLORATION ID B-029-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 929.0 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/8/22 END: 8/8/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.110499, -82.973656	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
8.0" ASPHALT AND 9.0" CONCRETE AND 5.0" BASE (DRILLERS DESCRIPTION)	929.0																		
	927.2																		
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	926.0	1	3 3 4	9	44	SS-1	4.50	4	8	16	39	33	32	18	14	17	A-6a (9)	280	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE GRAVEL, MOIST		2	5 7 5	16	50	SS-2	2.25	7	7	16	36	34	35	18	17	20	A-6b (10)	-	
		3	2 3 4	9	100	SS-3	2.75	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
		4	3 5 6	14	100	SS-4	3.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
	921.5	5 EOB																	
		6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 9/7/22 14:03 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-071-270-28.27-25.99 A\GINT FILES\FRA-71-270 REPLACEMENT B

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 19+68, 27' RT.	EXPLORATION ID B-030-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN: 2511460	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 937.1 (MSL) EOB: 40.0 ft.	PAGE 1 OF 2
START: 8/9/22 END: 8/9/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.110863, -82.974607	

MATERIAL DESCRIPTION AND NOTES	ELEV. 937.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
11.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	935.7	1																	
LOOSE TO MEDIUM DENSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP	933.6	2	6 5 4	12	67	SS-1	-	49	19	12	14	6	NP	NP	NP	7	A-1-b (0)	-	
		3	3 2 2	5	89	SS-2A	-	-	-	-	-	-	-	-	-	7	A-1-b (V)	-	
						SS-2B	-	13	10	14	34	29	31	17	14	20	A-6a (7)	-	
STIFF TO HARD, BROWN, **SILT AND CLAY**, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL, SS-2B CONTAINS NO INTACT SOIL FOR HP READINGS, MOIST TO DAMP		4																	
		5	2 1 1	3	100	SS-3	1.25	-	-	-	-	-	-	-	-	26	A-6a (V)	-	
		6																	
		7	1 1 1	3	50	SS-4	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
		8	1 1 1	3	100	SS-5	3.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
	927.6	9																	
STIFF TO HARD, BROWN MOTTLED WITH GRAY, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE GRAVEL, MOIST		10																	
		11	2 3 5	11	100	SS-6	3.00	4	6	13	40	37	40	18	22	21	A-6b (13)	-	
		12																	
		13	1 2 2	5	100	SS-7	1.75	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
		14																	
		15																	
		16	2 4 6	13	100	SS-8	4.25	-	-	-	-	-	-	-	-	24	A-6b (V)	-	
		17																	
		18	2 5 6	14	100	SS-9	4.50	-	-	-	-	-	-	-	-	20	A-6b (V)	-	
	917.6	19																	
HARD, BROWN, **SANDY SILT**, SOME STONE FRAGMENTS, TRACE TO LITTLE CLAY, DAMP		20																	
		21	4 10 13	30	100	SS-10	4.50	26	9	11	44	10	21	16	5	8	A-4a (4)	-	
		22																	
SS-11 AND SS-12 BECOME TRACE TO LITTLE GRAVEL		23	3 9 10	25	100	SS-11	4.50	-	-	-	-	-	-	-	-	9	A-4a (V)	-	
		24																	
		25																	
		26	3 7 9	21	100	SS-12	4.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
	910.1	27																	
HARD, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP		28	3 7 11	24	72	SS-13	4.50	1	4	13	42	40	40	20	20	19	A-6b (12)	-	
		29																	

PID: 105435	SFN: 2511460	PROJECT: FRA-071/270-28.27/25.99A	STATION / OFFSET: 19+68, 27' RT.	START: 8/9/22	END: 8/9/22	PG 2 OF 2	B-030-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
HARD, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP *(continued)*	907.1	31	3 6 11	22	56	SS-14	4.50	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
		32																	
		33	3 5 8	17	100	SS-15	4.25	-	-	-	-	-	-	-	-	15	A-6b (V)	-	
		34																	
		35	5 5 6	14	100	SS-16	4.50	-	-	-	-	-	-	-	-	14	A-6b (V)	-	
		36																	
		37																	
		38																	
		39	4 5 5	13	100	SS-17	4.50	-	-	-	-	-	-	-	-	15	A-6b (V)	-	
	897.1	EOB 40																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; PUMPED 50 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 9/7/22 14:03 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-071-270-28.27-25.99 A\GINT FILES\FRA-71-270 REPLACEMENT B

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 21+80, 11' LT.	EXPLORATION ID B-031-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN: 2511460	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 940.6 (MSL) EOB: 40.0 ft.	PAGE 1 OF 2
START: 8/9/22 END: 8/9/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.111100, -82.975308	

MATERIAL DESCRIPTION AND NOTES	ELEV. 940.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
12.0" ASPHALT AND 5.0" BASE (DRILLERS DESCRIPTION)	939.2	1																	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST	937.6	2 3	7	83	SS-1	4.25	4	8	14	39	35	32	17	15	18	A-6a (10)	-	
VERY STIFF, GRAY AND BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, MOIST	936.1	3 3	8	44	SS-2	4.00	3	10	14	41	32	33	16	17	17	A-6b (10)	-	
STIFF TO VERY STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	933.1	2 3 4	9	28	SS-3	1.75	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
		3 4 4	11	33	SS-4	2.25	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, DAMP	931.1	2 3 5	11	100	SS-5	4.50	13	13	16	34	24	25	16	9	11	A-4a (5)	-	
HARD, BROWN, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL, DAMP	928.6	3 4 5	12	100	SS-6	4.25	41	6	10	14	29	33	17	16	15	A-6b (3)	-	
HARD, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	926.1	4 5 7	16	94	SS-7	4.50	10	14	16	36	24	27	16	11	12	A-6a (5)	-	
HARD, BROWN, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE GRAVEL, DAMP	921.1	4 6 9	20	100	SS-8	4.25	4	7	12	41	36	34	17	17	16	A-6b (11)	-	
		6 7 8	20	100	SS-9	4.50	-	-	-	-	-	-	-	-	10	A-6b (V)	-	
HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP	913.6	6 8 10	24	100	SS-10	4.50	-	-	-	-	-	-	-	-	8	A-4a (V)	-	
		5 5 7	16	33	SS-11	4.50	7	12	18	38	25	23	14	9	9	A-4a (6)	-	
		3 5 10	20	22	SS-12	4.50	-	-	-	-	-	-	-	-	9	A-4a (V)	-	
VERY STIFF TO HARD, BROWN AND GRAY, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL, DAMP TO MOIST		5 7 8	20	50	SS-13	4.00	-	-	-	-	-	-	-	-	20	A-6b (V)	-	

PID: 105435	SFN: 2511460	PROJECT: FRA-071/270-28.27/25.99A	STATION / OFFSET: 21+80, 11' LT.	START: 8/9/22	END: 8/9/22	PG 2 OF 2	B-031-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
VERY STIFF TO HARD, BROWN AND GRAY, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL, DAMP TO MOIST *(continued)*	910.6	31	6 8 11	25	78	SS-14	4.50	2	7	15	37	39	37	19	18	17	A-6b (11)	-	
		32																	
		33	5 10 14	32	44	SS-15	4.50	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
		34																	
		35																	
		36	6 8 12	26	39	SS-16	4.50	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
		37																	
		38																	
		39	6 9 10	25	44	SS-17	4.50	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
	900.6	EOB 40																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; PUMPED 50 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 24+63, 1' RT.	EXPLORATION ID B-032-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 938.9 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/10/22 END: 8/10/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.111605, -82.976079	

MATERIAL DESCRIPTION AND NOTES	ELEV. 938.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
9.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	937.6	1																	
HARD, BROWN BECOMING GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP		2	6 6 8	18	100	SS-1	4.50	9	13	18	38	22	24	15	9	11	A-4a (5)	240	
		3	3 4 5	12	39	SS-2	4.50	6	11	18	39	26	24	14	10	11	A-4a (6)	-	
		4																	
		5	2 3 5	11	100	SS-3	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
		6																	
	931.4	7 EOB	3 3 3	8	100	SS-4	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 55T 22	STATION / OFFSET: 26+46, 10' RT.
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K
PID: 105435 SFN: 2511372	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 913.3 (MSL) EOB: 35.0 ft.
START: 7/27/22 END: 7/28/22	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 63.4	LAT / LONG: 40.111894, -82.976618

EXPLORATION ID B-033-0-21A

MATERIAL DESCRIPTION AND NOTES	ELEV. 913.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
6.0" ASPHALT AND 7.0" CONCRETE AND 5.0" BASE (DRILLERS DESCRIPTION)	911.8																		
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	908.8		6 9 11	21	61	SS-1	4.50	8	13	16	36	27	27	17	10	11	A-4a (6)	-	
VERY STIFF, BROWNISH GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, CONTAINS A 2.0" STONE FRAGMENT, DAMP	906.3		5 7 5	13	67	SS-2	3.25	5	9	14	40	32	33	19	14	16	A-6a (9)	-	
STIFF TO VERY STIFF, BROWN MOTTLED WITH GRAY AND ORANGISH BROWN, **CLAY**, "AND" SILT, TRACE TO LITTLE SAND, TRACE GRAVEL, IRON STAINING, DAMP			5 6 9	16	94	SS-3	4.00	-	-	-	-	-	-	-	-	21	A-7-6 (V)	-	
ST-1 BECOMES DARK GRAY, SLIGHTLY TO MODERATELY ORGANIC, CONTAINS A STRONG ORGANIC ODOR					58	ST-1	3.50	1	2	8	46	43	53	24	29	24	A-7-6 (18)	-	
	898.8		4 3 4	7	78	SS-4	1.75	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	
VERY STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST	896.3		3 3 4	7	78	SS-5	3.75	-	-	-	-	-	-	-	-	24	A-6a (V)	-	
VERY STIFF, BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	893.8	W 895.3	4 5 7	13	89	SS-6	4.00	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
STIFF TO VERY STIFF, BROWN, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE STONE FRAGMENTS, DAMP			8 9 12	22	72	SS-7	2.50	8	14	17	36	25	27	17	10	16	A-4a (5)	-	
			7 8 10	19	56	SS-8	4.00	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
	886.3		5 4 5	10	56	SS-9	2.00	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
DENSE, GRAY, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, DAMP			7 13 18	33	67	SS-10	-	9	15	23	39	14	NP	NP	NP	14	A-4a (4)	-	

PID: 105435	SFN: 2511372	PROJECT: FRA-071/270-28.27/25.99A	STATION / OFFSET: 26+46, 10' RT.	START: 7/27/22	END: 7/28/22	PG 2 OF 2	B-033-0-21A

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
DENSE, GRAY, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, DAMP *(continued)*	883.3	31	10 14 21	37	44	SS-11	-	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
	878.3	EOB 35																	

CME 55T DRILL RIG BROKE DOWN AT 35.0'. RESUMED DRILLING WITH CME 75T TO COMPLETION. SEE B-033-0-21B FOR REMAINING BORING LOG INFORMATION.

NOTES: GROUNDWATER ENCOUNTERED AT 18.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; PUMPED 50 GAL. BENTONITE GROUT

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 26+46, 10' RT.
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K
PID: 105435 SFN: 2511372	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 913.3 (MSL) EOB: 119.7 ft.
START: 8/1/22 END: 8/2/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.111894, -82.976618

EXPLORATION ID: B-033-0-21B

PAGE: 1 OF 4

MATERIAL DESCRIPTION AND NOTES	ELEV. 913.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
SEE B-033-0-21A FOR FIRST 35.0' OF BORING LOG (DRILLED BY DIFFERENT RIG WHICH BROKE DOWN AT 35.0')		W 895.3																	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
	883.3	31																	
		32																	
		33																	
		34																	
DENSE TO VERY DENSE, GRAY, **SANDY SILT**, LITTLE CLAY, LITTLE GRAVEL, DAMP		35	21 31 35	87	100	SS-12	-	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		36																	
		37																	
		38																	
		39																	
		40	8 15 21	47	100	SS-13	-	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		41																	
	870.0	42																	
STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP TO MOIST		43																	
		44																	
		45	5 6 9	20	100	SS-14	4.25	7	12	18	37	26	23	15	8	13	A-4a (6)	-	
		46																	
		47																	
		48																	
		49																	
		50	4 6 8	18	100	SS-15	2.75	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		51																	
		52																	
		53																	
		54																	
		55	4 5 8	17	100	SS-16	2.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		56																	
		57																	
		58																	
		59																	
		60	5 8 12	26	100	SS-17	4.00	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		61																	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP TO MOIST *(continued)*	851.1	63																	
		64																	
		65	6 14 14	37	100	SS-18	1.50	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		66																	
		67																	
		68																	
		69																	
		70	5 9 11	26	100	SS-19	2.75	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		71																	
		72																	
		73																	
		74																	
		75	6 8 11	25	100	SS-20	4.00	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		76																	
		77																	
		78																	
		79																	
		80	5 10 14	32	100	SS-21	4.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		81																	
		82																	
		83																	
		84																	
		85	12 19 26	59	100	SS-22	3.75	-	-	-	-	-	-	-	-	17	A-4a (V)	-	
		86																	
		87																	
		88																	
		89																	
STIFF TO VERY STIFF, GRAY, **SILT AND CLAY**, TRACE TO LITTLE SAND, TRACE TO LITTLE GRAVEL, DAMP	824.5	90	8 10 17	36	100	SS-23	2.75	6	6	8	37	43	29	18	11	16	A-6a (8)	-	
		91																	
		92																	
		93																	
		94																	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
STIFF TO VERY STIFF, GRAY, **SILT AND CLAY**, TRACE TO LITTLE SAND, TRACE TO LITTLE GRAVEL, DAMP *(continued)*	819.0	95																	
		96	8 12 15	36	100	SS-24	2.75	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
		97																	
		98																	
		99																	
		100																	
		101	7 10 14	32	100	SS-25	3.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
		102																	
		103																	
		104																	
		105																	
		106	9 10 13	30	100	SS-26	2.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
		107																	
		108																	
		109																	
		110																	
		111	8 13 14	36	100	SS-27	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
		112																	
		113																	
		114																	
		115																	
		116	12 37 48	112	100	SS-28	1.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
	795.8	117																	
HARD, GRAY, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, DAMP		118																	
	793.6	119	8 46 50/2"	-	79	SS-29	4.50	10	16	23	31	20	23	14	9	10	A-4a (3)	-	
		EOB																	

NOTES: GROUNDWATER ENCOUNTERED AT 18.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; PUMPED 250 GAL. BENTONITE GROUT

PROJECT: FRA-071/270-28.27/25.99A
TYPE: SUBGRADE
PID: 105435 SFN:
START: 8/10/22 END: 8/10/22

DRILLING FIRM / OPERATOR: NEAS / J. HODGES
SAMPLING FIRM / LOGGER: NEAS / J. HODGES
DRILLING METHOD: 3.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: CME 75T
HAMMER: CME AUTOMATIC
CALIBRATION DATE: 1/24/22
ENERGY RATIO (%): 79

STATION / OFFSET: 30+16, 2' LT.
ALIGNMENT: RAMP K
ELEVATION: 926.7 (MSL) EOB: 11.5 ft.
LAT / LONG: 40.112095, -82.977907

EXPLORATION ID B-034-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 926.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
8.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	925.5																		
HARD, BROWN, **SILTY CLAY**, LITTLE TO SOME SAND, TRACE GRAVEL, IRON STAINING, DAMP		1																	
		2																	
		3	4 5 7	16	100	SS-1	4.50	3	7	14	38	38	37	18	19	17	A-6b (12)	-	
		4																	
		5	5 4 8	16	100	SS-2	4.50	-	-	-	-	-	-	-	-	13	A-6b (V)	-	
	919.7	6																	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP TO MOIST		7																	
		8	9 10 10	26	100	SS-3	4.50	6	10	15	36	33	32	18	14	15	A-6a (8)	-	
		9																	
		10																	
	915.2	11	7 7 8	20	100	SS-4	4.50	-	-	-	-	-	-	-	-	20	A-6a (V)	-	
		EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 34+09, 22' RT.	EXPLORATION ID B-035-0-22
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP K	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 915.6 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/10/22 END: 8/10/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.111794, -82.979258	

MATERIAL DESCRIPTION AND NOTES	ELEV. 915.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
9.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	914.3																		
HARD, BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, DAMP		1	5 5 7	16	22	SS-1	4.50	-	-	-	-	-	-	-	-	13	A-6b (V)	-	
		2	4 8 11	25	33	SS-2	4.50	6	8	16	35	35	34	17	17	14	A-6b (10)	80	
	909.6	3	5 9 12	28	100	SS-3	4.50	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
HARD, BROWNISH GRAY AND DARK GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, SLIGHTLY ORGANIC (3.1% LOI), CONTAINS A 1.5" SILT SEAM, DAMP	908.1	4	8 11 10	28	100	SS-4	4.50	2	4	10	47	37	34	22	12	19	A-6a (9)	-	
		EOB 5																	
		6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 19+28, 29' RT.	EXPLORATION ID B-036-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 916.2 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/10/22 END: 8/10/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.110627, -82.974843	

MATERIAL DESCRIPTION AND NOTES	ELEV. 916.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
8.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	914.9																		
VERY STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP		1 2 3 4 5 6 7	13 7 4	14	28	SS-1	4.50	14	12	17	34	23	24	14	10	10	A-4a (4)	600	
			4 5 5	13	33	SS-2	4.50	9	11	18	38	24	23	14	9	12	A-4a (5)	-	
			4 6 6	16	100	SS-3	4.50	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
	908.7	EOB	4 3 3	8	100	SS-4	4.00	-	-	-	-	-	-	-	-	11	A-4a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 23+07, 2' RT.	EXPLORATION ID B-037-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 926.4 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/10/22 END: 8/10/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.111592, -82.975360	

MATERIAL DESCRIPTION AND NOTES	ELEV. 926.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
10.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	925.0																		
HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP		1	9 8 6	18	50	SS-1	4.50	9	11	16	39	25	23	14	9	10	A-4a (6)	780	
		2																	
		3	4 7 8	20	39	SS-2	4.50	11	11	18	36	24	23	13	10	9	A-4a (5)	-	
		4																	
		5	6 9 10	25	22	SS-3	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
		6																	
	918.9	7 EOB	8 13 16	38	28	SS-4	4.50	-	-	-	-	-	-	-	-	9	A-4a (V)	-	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 26+82, 1' LT.	EXPLORATION ID B-038-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O	
PID: 105435 SFN: 2511224	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 912.8 (MSL) EOB: 120.0 ft.	PAGE 1 OF 4
START: 8/3/22 END: 8/4/22	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 79	LAT / LONG: 40.112234, -82.976395	

MATERIAL DESCRIPTION AND NOTES	ELEV. 912.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
18.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	910.8	1																	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	908.3	2 3 4	4 6 9	20	100	SS-1	4.50	6	13	19	38	24	26	16	10	12	A-4a (5)	-	
VERY STIFF TO HARD, BROWNISH GRAY AND BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP TO MOIST		5 6 7	3 5 8	17	100	SS-2	4.50	6	7	11	41	35	37	21	16	18	A-6b (10)	-	
		8 9	3 6 6	16	100	SS-3	4.50	-	-	-	-	-	-	-	-	20	A-6b (V)	-	
SS-4 BECOMES DARK GRAY, TRACE SAND, SLIGHTLY ORGANIC	900.8	10 11 12	2 5 7	16	100	SS-4	4.00	-	-	-	-	-	-	-	-	26	A-6b (V)	-	
VERY STIFF, BROWN MOTTLED WITH GRAY AND ORANGISH BROWN, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, IRON STAINING, DAMP	897.8	13 14	1 2 2	5	100	SS-5	2.25	-	-	-	-	-	-	-	-	27	A-7-6 (V)	-	
HARD, BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	896.8	15 16			88	ST-1	4.25	7	13	17	36	27	27	18	9	14	A-4a (6)	-	
MEDIUM DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, BOTTOM 12.0" OF ST-1 WOULD NOT EXTRUDE, MOIST	894.8	17 18	3 8 8	21	100	SS-6A	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	-	
						SS-6B	3.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
STIFF TO HARD, GRAY, **SANDY SILT**, LITTLE TO SOME CLAY, TRACE GRAVEL, DAMP		19 20 21	2 5 9	18	100	SS-7	4.00	9	16	21	34	20	21	14	7	12	A-4a (4)	-	
		22 23 24	3 5 7	16	56	SS-8	3.75	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		25 26 27	6 10 13	30	17	SS-9	4.25	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		28 29	7 8 11	25	22	SS-10	3.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
STIFF TO HARD, GRAY, **SANDY SILT**, LITTLE TO SOME CLAY, TRACE GRAVEL, DAMP *(continued)*	882.8	31	17 15 14	38	22	SS-11	2.50	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
		32																	
		33																	
		34																	
		35	5 9 9	24	100	SS-12	2.50	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
		36																	
		37																	
		38																	
		39																	
		40	4 5 8	17	100	SS-13	2.75	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
		41																	
		42																	
		43																	
		44																	
		45	5 5 6	14	100	SS-14	2.00	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
		46																	
		47																	
		48																	
		49																	
VERY STIFF TO HARD, GRAY, **SANDY SILT**, LITTLE CLAY, TRACE TO LITTLE GRAVEL, DAMP	864.5	50	3 7 9	21	100	SS-15	4.00	10	15	24	34	17	19	14	5	12	A-4a (3)	-	
		51																	
		52																	
		53																	
		54																	
		55	3 5 8	17	100	SS-16	3.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		56																	
		57																	
		58																	
		59																	
		60	3 5 9	18	100	SS-17	4.00	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		61																	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
VERY STIFF TO HARD, GRAY, **SANDY SILT**, LITTLE CLAY, TRACE TO LITTLE GRAVEL, DAMP *(continued)*	850.7	63																	
		64																	
		65	4 4 7	14	100	SS-18	4.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		66																	
		67																	
	844.5	68																	
VERY STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP TO MOIST		69																	
		70	3 6 10	21	100	SS-19	2.75	7	13	18	38	24	22	15	7	12	A-4a (5)	-	
		71																	
		72																	
		73																	
		74																	
		75	5 7 10	22	100	SS-20	4.25	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		76																	
		77																	
		78																	
		79																	
		80	4 8 12	26	100	SS-21	2.50	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
		81																	
		82																	
		83																	
		84																	
		85	4 6 11	22	100	SS-22	2.75	-	-	-	-	-	-	-	-	15	A-4a (V)	-	
		86																	
		87																	
		88																	
		89																	
		90	12 19 22	54	100	SS-23	4.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		91																	
		92																	
		93																	
		94																	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
VERY STIFF TO HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE TO LITTLE GRAVEL, DAMP TO MOIST *(continued)*	818.6	95	9 13 20	43	100	SS-24	4.50	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		96																	
		97																	
		98																	
		99																	
		100	5 9 16	33	100	SS-25	3.00	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
		101																	
		102																	
		103																	
		104																	
		105	7 10 19	38	100	SS-26	2.75	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		106																	
		107																	
		108																	
		109																	
		110	10 16 22	50	100	SS-27	4.50	-	-	-	-	-	-	-	-	11	A-4a (V)	-	
		111																	
	799.5	112																	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, LITTLE SAND, TRACE SILT, TRACE CLAY, WET		113																	
		114																	
		115	8 20 41	80	33	SS-28	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	-	
	795.3	116																	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY**, DAMP		117																	
		118																	
		119	10 39 49	116	39	SS-29	-	-	-	-	-	-	-	-	-	11	A-2-6 (V)	-	
	792.8	EOB 120																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; PUMPED 250 GAL. BENTONITE GROUT

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 31+80, 5' LT.	EXPLORATION ID B-039-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 929.8 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 8/10/22 END: 8/10/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 79	LAT / LONG: 40.112423, -82.978119	

MATERIAL DESCRIPTION AND NOTES	ELEV. 929.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
8.0" ASPHALT AND 7.0" BASE (DRILLERS DESCRIPTION)	928.5																		
HARD, BROWN AND BROWNISH GRAY BECOMING GRAY, **SILT AND CLAY**, SOME SAND, TRACE TO LITTLE GRAVEL, DAMP		1	8 8 6	18	39	SS-1	4.50	8	13	17	34	28	27	16	11	12	A-6a (6)	400	
		2	7 5 7	16	100	SS-2	4.50	-	-	-	-	-	-	-	-	12	A-6a (V)	-	
		3	5 5 6	14	100	SS-3	4.50	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
		4	6 5 7	16	100	SS-4	4.50	14	10	14	35	27	27	14	13	11	A-6a (7)	-	
	922.3	5 EOB																	
		6																	
		7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 55T 22	STATION / OFFSET: 34+43, 20' RT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 925.8 (MSL) EOB: 7.5 ft.
START: 7/26/22 END: 7/26/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.112212, -82.979023

EXPLORATION ID B-040-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
4.0" ASPHALT AND 8.0" CONCRETE AND 6.0" BASE (DRILLERS DESCRIPTION)	925.8																		
	924.3																		
HARD, BROWN AND GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	922.8	1	4 8 17	26	89	SS-1	4.50	10	13	17	35	25	23	14	9	8	A-4a (5)	6033	
HARD, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP		2	8 14 17	33	89	SS-2	4.50	7	11	17	37	28	27	16	11	11	A-6a (6)	-	
		3	5 11 16	29	100	SS-3	4.50	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
		4	6 15 16	33	56	SS-4	4.50	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
	918.3	EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 55T 22	STATION / OFFSET: 37+47, 58' LT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP O
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 921.7 (MSL) EOB: 7.5 ft.
START: 7/26/22 END: 7/26/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.111728, -82.979914

EXPLORATION ID B-041-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 921.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
4.0" ASPHALT AND 8.0" CONCRETE AND 6.0" BASE (DRILLERS DESCRIPTION)	920.2	1																	
HARD, GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	918.7	2	2 4 6	11	33	SS-1	4.50	9	11	15	38	27	25	15	10	12	A-4a (6)	2633	
HARD, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP		3	5 5 13	19	61	SS-2	4.50	5	10	16	36	33	32	17	15	13	A-6a (9)	-	
		4																	
		5	8 6 12	19	67	SS-3	4.50	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
		6	6 11 15	27	33	SS-4	4.50	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
	914.2	7 EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 55T 22	STATION / OFFSET: 141+47, 31' RT.
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP N
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 910.3 (MSL) EOB: 7.5 ft.
START: 7/26/22 END: 7/26/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.112634, -82.975132

EXPLORATION ID B-042-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 910.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
12.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	908.8	1																	
MEDIUM DENSE, GRAY, **STONE FRAGMENTS WITH SAND AND SILT**, TRACE CLAY, GRANULAR BASE, DAMP	907.3	2	26 11 8	20	56	SS-1	-	-	-	-	-	-	-	-	-	7	A-2-4 (V)	-	
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP TO MOIST		3	6 7 8	16	61	SS-2	4.50	7	11	17	37	28	30	17	13	14	A-6a (7)	1280	
	904.3	4	4 3 5	8	89	SS-3	2.75	-	-	-	-	-	-	-	-	22	A-6a (V)	-	
VERY STIFF, DARK BROWN, **CLAY**, "AND" SILT, TRACE SAND, TRACE GRAVEL, MODERATELY ORGANIC (5.0% LOI), CONTAINS A STRONG PETROLIFEROUS ODOR, MOIST	902.8	5	5 7 10	18	100	SS-4	3.50	2	2	7	40	49	53	25	28	28	A-7-6 (18)	-	
		EOB 6 7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: FRA-071/270-28.27/25.99A	DRILLING FIRM / OPERATOR: NEAS / J. LONG	DRILL RIG: CME 55T 22	STATION / OFFSET: 145+00, 11' RT.	EXPLORATION ID B-043-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / J. LONG	HAMMER: CME AUTOMATIC	ALIGNMENT: RAMP N	
PID: 105435 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 906.0 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 7/26/22 END: 7/26/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.113588, -82.975142	

MATERIAL DESCRIPTION AND NOTES	ELEV. 906.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
12.0" ASPHALT AND 8.0" BASE (DRILLERS DESCRIPTION)	904.3	1																	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	901.5	2	22 13 13	27	67	SS-1	4.50	6	10	18	39	27	28	17	11	14	A-6a (7)	160	
		3	11 10 11	22	94	SS-2	4.50	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
HARD, GRAY AND ORANGISH BROWN, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, IRON STAINING, DAMP		4																	
		5	5 8 8	17	89	SS-3	4.50	16	14	17	32	21	25	18	7	12	A-4a (4)	-	
	898.5	6	6 9 10	20	50	SS-4	4.50	-	-	-	-	-	-	-	-	10	A-4a (V)	-	
	EOB	7																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 1/24/24 18:01 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-71-270-28.27-25.99A MODIFICATION 2\GINT FILES\FRA-71-270-2

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 168+80, 82' RT.	EXPLORATION ID B-044-0-22
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71	
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 886.6 (MSL) EOB: 36.5 ft.	PAGE 1 OF 2
START: 10/25/23 END: 10/26/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.119886, -82.972786	

MATERIAL DESCRIPTION AND NOTES	ELEV. 886.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
8.0" ASPHALT AND 6.0" CONCRETE (DRILLERS DESCRIPTION)	885.4																	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME GRAVEL, LITTLE CLAY, DAMP	882.1		4 6 8	15	61	SS-1	4.50	23	13	15	30	19	26	16	10	10	A-4a (3)	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, SOME GRAVEL, DAMP	879.6		4 6 7	14	72	SS-2	4.50	21	10	14	31	24	27	16	11	13	A-6a (4)	
HARD, BROWNISH GRAY, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, DAMP	877.1		5 6 6	13	83	SS-3	4.50	-	-	-	-	-	-	-	-	13	A-4a (V)	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	874.6		6 5 4	10	94	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	
HARD, BROWNISH GRAY, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	872.1		8 7 6	14	94	SS-5	4.50	-	-	-	-	-	-	-	-	14	A-4a (V)	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP	869.6	W 869.6	6 6 7	14	83	SS-6	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, TRACE TO SOME SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, SS-8 CONTAINS NO INTACT SOIL FOR HP READINGS, DAMP			9 9 8	18	67	SS-7	4.25	15	14	13	30	28	27	16	11	14	A-6a (5)	
			6 9 10	20	33	SS-8	-	-	-	-	-	-	-	-	-	17	A-6a (V)	
			4 5 7	13	56	SS-9	2.75	-	-	-	-	-	-	-	-	16	A-6a (V)	
			5 6 8	15	94	SS-10	3.00	-	-	-	-	-	-	-	-	14	A-6a (V)	
			4 6 8	15	100	SS-11	3.00	-	-	-	-	-	-	-	-	17	A-6a (V)	

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 168+80, 82' RT.	START: 10/25/23	END: 10/26/23	PG 2 OF 2	B-044-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, TRACE TO SOME SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, SS-8 CONTAINS NO INTACT SOIL FOR HP READINGS, DAMP *(continued)*	856.6	31	5 7 8	16	94	SS-12	4.25	-	-	-	-	-	-	-	-	16	A-6a (V)	
		32																
		33	6 6 9	16	89	SS-13	3.50	-	-	-	-	-	-	-	-	16	A-6a (V)	
		34																
		35																
	850.1	36 EOB	6 7 10	18	100	SS-14	3.50	-	-	-	-	-	-	-	-	15	A-6a (V)	

NOTES: GROUNDWATER ENCOUNTERED AT 17.0' DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 169+87, 81' RT.
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 886.3 (MSL) EOB: 36.5 ft.
START: 10/25/23 END: 10/25/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.120176, -82.972712

EXPLORATION ID B-045-0-22

PAGE 1 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV. 886.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
7.0" ASPHALT AND 7.0" CONCRETE (DRILLERS DESCRIPTION)	885.1	1																
VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, MOIST **(FILL)**	882.3	2																
		3	16 21 29	53	44	SS-1	-	44	26	14	11	5	NP	NP	NP	12	A-1-b (0)	
VERY STIFF TO HARD, BROWN CHANGING TO BROWNISH GRAY, **SILT AND CLAY**, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL, DAMP TO MOIST **(FILL)**		4																
		5	3 4 7	12	89	SS-2	3.25	7	10	15	51	17	30	16	14	16	A-6a (8)	
		6																
		7																
		8	4 4 6	11	100	SS-3	4.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
		9																
		10																
		11	4 6 10	17	94	SS-4	2.75	-	-	-	-	-	-	-	-	17	A-6a (V)	
		12																
		13	5 6 13	20	78	SS-5	3.25	-	-	-	-	-	-	-	-	21	A-6a (V)	
		14																
		15																
		16	4 6 5	12	89	SS-6	2.50	-	-	-	-	-	-	-	-	28	A-6a (V)	
		17																
SS-7 AND SS-8 CONTAIN BLACK WOOD FRAGMENTS		18	5 5 6	12	94	SS-7	3.50	-	-	-	-	-	-	-	-	19	A-6a (V)	
		19																
		20																
		21	2 3 4	7	72	SS-8	4.25	-	-	-	-	-	-	-	-	15	A-6a (V)	
	864.3	22																
HARD, GRAY, **SILT AND CLAY**, TRACE TO LITTLE SAND, TRACE GRAVEL, GLACIAL TILL, DAMP		23	4 6 10	17	94	SS-9	4.50	6	7	13	38	36	28	17	11	15	A-6a (8)	
		24																
		25																
		26	5 7 9	17	100	SS-10	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	
		27																
		28	4 6 10	17	94	SS-11	4.25	-	-	-	-	-	-	-	-	15	A-6a (V)	
		29																

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 169+87, 81' RT.	START: 10/25/23	END: 10/25/23	PG 2 OF 2	B-045-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
HARD, GRAY, **SILT AND CLAY**, TRACE TO LITTLE SAND, TRACE GRAVEL, GLACIAL TILL, DAMP *(continued)*	856.3	31	5 6 9	16	94	SS-12	4.25	-	-	-	-	-	-	-	-	15	A-6a (V)	
		32																
		33	6 6 9	16	89	SS-13	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	
		34																
		35	6 7 10	18	100	SS-14	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	
	849.8	36 EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 1/24/24 18:02 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-71-270-28.27-25.99A MODIFICATION 2\GINT FILES\FRA-71-270-2

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 172+60, 80' RT.	EXPLORATION ID B-046-0-22
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71	
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 886.3 (MSL) EOB: 36.5 ft.	PAGE 1 OF 2
START: 10/24/23 END: 10/24/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.120920, -82.972536	

MATERIAL DESCRIPTION AND NOTES	ELEV. 886.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
8.0" ASPHALT AND 5.0" CONCRETE (DRILLERS DESCRIPTION)	885.2	1																
MEDIUM DENSE, GRAY, **STONE FRAGMENTS**, SOME SAND, LITTLE SILT, TRACE CLAY, GRANULAR BASE, DAMP **(FILL)**	882.3	2																
		3	5 8 8	17	56	SS-1	-	55	22	8	12	3	NP	NP	NP	7	A-1-a (0)	
		4																
VERY STIFF, BROWN AND DARK GRAY, **SILT AND CLAY**, SOME SAND, TRACE TO LITTLE GRAVEL, CONTAINS PLASTIC TRASH FRAGMENTS, DAMP **(FILL)**		5	4 4 5	10	72	SS-2	3.00	19	14	14	30	23	28	16	12	15	A-6a (4)	
		6																
		7																
		8	4 4 5	10	78	SS-3	3.50	-	-	-	-	-	-	-	-	15	A-6a (V)	
		9																
		10																
		11	3 3 2	5	94	SS-4	3.25	-	-	-	-	-	-	-	-	16	A-6a (V)	
		12																
	871.8	13	3 3 3	6	94	SS-5	2.50	9	10	14	37	30	27	16	11	16	A-6a (7)	
STIFF TO VERY STIFF, BROWN AND GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL, DAMP TO MOIST		14																
		15	2 2 2	4	94	SS-6	1.50	-	-	-	-	-	-	-	-	14	A-6a (V)	
		16																
		17																
		18	2 2 3	5	100	SS-7	2.50	-	-	-	-	-	-	-	-	23	A-6a (V)	
		19																
		20																
		21	2 3 2	5	100	SS-8	2.75	-	-	-	-	-	-	-	-	19	A-6a (V)	
		22																
		23	3 6 7	14	100	SS-9	4.00	-	-	-	-	-	-	-	-	21	A-6a (V)	
	861.8	24																
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, GLACIAL TILL, DAMP TO MOIST		25																
		26	4 7 7	15	94	SS-10	4.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
		27																
		28	4 6 9	16	94	SS-11	3.50	9	6	9	36	40	30	16	14	17	A-6a (10)	
		29																

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 172+60, 80' RT.	START: 10/24/23	END: 10/24/23	PG 2 OF 2	B-046-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, GLACIAL TILL, DAMP TO MOIST *(continued)*	856.3	31	5 8 10	19	89	SS-12	3.75	-	-	-	-	-	-	-	-	16	A-6a (V)	
		32																
		33	4 6 8	15	94	SS-13	3.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
		34																
		35	5 7 10	18	100	SS-14	4.00	-	-	-	-	-	-	-	-	16	A-6a (V)	
	849.8	36 EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 1/24/24 18:02 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-71-270-28.27-25.99A MODIFICATION 2\GINT FILES\FRA-71-270-2

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 174+51, 81' RT.	EXPLORATION ID B-047-0-22
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71	
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 887.0 (MSL) EOB: 36.5 ft.	PAGE 1 OF 2
START: 10/24/23 END: 10/24/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.121439, -82.972420	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
8.0" ASPHALT AND 6.0" CONCRETE (DRILLERS DESCRIPTION)	887.0																	
VERY DENSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, GRANULAR BASE, DAMP **(FILL)**	885.8																	
	883.0	3	13 21 27	51	28	SS-1	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
HARD, BROWN, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, DAMP **(FILL)**		6	4 5 5	11	94	SS-2	4.50	16	14	16	31	23	27	17	10	13	A-4a (4)	
	877.5	9	4 5 6	12	100	SS-3	4.50	-	-	-	-	-	-	-	-	15	A-4a (V)	
STIFF TO VERY STIFF, BROWN AND GRAY, **CLAY**, SOME SILT, LITTLE TO SOME SAND, TRACE GRAVEL, DAMP TO MOIST		11	3 3 3	6	100	SS-4	2.00	10	10	13	35	32	41	19	22	23	A-7-6 (11)	
		13	3 3 4	7	100	SS-5	3.25	-	-	-	-	-	-	-	-	18	A-7-6 (V)	
		16	3 4 4	8	94	SS-6	3.50	-	-	-	-	-	-	-	-	22	A-7-6 (V)	
	867.5	18	4 4 5	10	100	SS-7	3.75	-	-	-	-	-	-	-	-	21	A-7-6 (V)	
MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, LITTLE GRAVEL, TRACE SILT, TRACE CLAY, IRON STAINING, MOIST	865.0	21	5 5 6	12	72	SS-8	-	-	-	-	-	-	-	-	-	13	A-3a (V)	
LOOSE TO MEDIUM DENSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, MOIST		23	4 4 5	10	100	SS-9	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		26	5 5 5	11	94	SS-10	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
	860.0																	
VERY STIFF, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP TO MOIST		28	4 6 6	13	94	SS-11	3.75	10	10	9	34	37	28	16	12	15	A-6a (8)	

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 174+51, 81' RT.	START: 10/24/23	END: 10/24/23	PG 2 OF 2	B-047-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY STIFF, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP TO MOIST *(continued)*	857.0	31	5 6 7	14	100	SS-12	3.25	-	-	-	-	-	-	-	-	16	A-6a (V)	
		32																
		33	5 7 8	16	100	SS-13	2.50	-	-	-	-	-	-	-	-	18	A-6a (V)	
		34																
		35	6 7 8	16	100	SS-14	3.50	-	-	-	-	-	-	-	-	11	A-6a (V)	
	850.5	36 EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 1/24/24 18:02 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-71-270-28.27-25.99A MODIFICATION 2\GINT FILES\FRA-71-270-2

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 175+93, 80' RT.	EXPLORATION ID B-048-0-22
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71	
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 888.0 (MSL) EOB: 36.5 ft.	PAGE 1 OF 2
START: 10/23/23 END: 10/23/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.121828, -82.972346	

MATERIAL DESCRIPTION AND NOTES	ELEV. 888.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
7.0" ASPHALT AND 5.0" CONCRETE (DRILLERS DESCRIPTION)	887.0																	
MEDIUM DENSE TO DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, GRANULAR BASE, CONTAINS WOOD FRAGMENTS, DAMP TO MOIST **(FILL)**		1 2 3 4	6 10 13	24	-	SS-1	-	51	20	9	16	4	NP	NP	NP	6	A-1-b (0)	
		5 6 7	3 28 11	41	67	SS-2	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
	881.0																	
VERY STIFF TO HARD, BROWN CHANGING TO BROWNISH GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL AND STONE FRAGMENTS, CONTAINS WOOD FRAGMENTS, DAMP **(FILL)**		8 9 10 11	5 7 7	15	67	SS-3	4.50	10	7	8	35	40	32	18	14	14	A-6a (10)	
			5 6 6	13	89	SS-4	4.50	-	-	-	-	-	-	-	-	14	A-6a (V)	
		12 13 14	6 7 7	15	33	SS-5	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	
	871.0																	
STIFF TO VERY STIFF, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, DAMP TO MOIST		15 16 17	3 4 4	8	100	SS-6	3.75	-	-	-	-	-	-	-	-	16	A-6a (V)	
		18 19	3 4 5	10	100	SS-7	3.50	-	-	-	-	-	-	-	-	16	A-6a (V)	
		20 21 22	2 3 4	7	100	SS-8	3.25	7	6	9	31	47	30	17	13	16	A-6a (9)	
		23 24	3 4 5	10	94	SS-9	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
		25 26 27	3 4 4	8	100	SS-10	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
		28 29	3 4 5	10	100	SS-11	2.00	-	-	-	-	-	-	-	-	18	A-6a (V)	

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 175+93, 80' RT.	START: 10/23/23	END: 10/23/23	PG 2 OF 2	B-048-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
STIFF TO VERY STIFF, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, DAMP TO MOIST *(continued)*	858.0	31	2 3 3	6	72	SS-12	1.75	-	-	-	-	-	-	-	-	17	A-6a (V)	
		32																
		33	3 2 3	5	83	SS-13	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
		34																
		35	3 3 4	7	72	SS-14	1.75	-	-	-	-	-	-	-	-	16	A-6a (V)	
	851.5	36 EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 1/24/24 18:02 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\FRA-71-270-28.27-25.99A MODIFICATION 2\GINT FILES\FRA-71-270-2

PROJECT: FRA-71/270-28.27/25.99A MOD2	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 177+33, 80' RT.	EXPLORATION ID B-049-0-22
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-71	
PID: SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/24/22	ELEVATION: 888.8 (MSL) EOB: 36.5 ft.	PAGE 1 OF 2
START: 10/23/23 END: 10/23/23	SAMPLING METHOD: SPT	ENERGY RATIO (%): 63.4	LAT / LONG: 40.122211, -82.972276	

MATERIAL DESCRIPTION AND NOTES	ELEV. 888.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
6.0" ASPHALT AND 7.0" CONCRETE (DRILLERS DESCRIPTION)	887.7																	
MEDIUM DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP	884.8		5 5 6	12	72	SS-1	-	55	18	8	14	5	NP	NP	NP	7	A-1-b (0)	
VERY STIFF TO HARD, BROWNISH GRAY BECOMING GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, DAMP TO MOIST			3 3 4	7	100	SS-2	4.25	-	-	-	-	-	-	-	-	14	A-6a (V)	
			4 4 4	8	94	SS-3	2.75	12	6	9	36	37	27	16	11	15	A-6a (8)	
			3 4 5	10	94	SS-4	3.00	-	-	-	-	-	-	-	-	16	A-6a (V)	
			4 4 5	10	100	SS-5	3.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
			5 5 6	12	100	SS-6	3.00	-	-	-	-	-	-	-	-	16	A-6a (V)	
			5 6 6	13	94	SS-7	3.25	-	-	-	-	-	-	-	-	14	A-6a (V)	
			5 6 6	13	100	SS-8	3.00	-	-	-	-	-	-	-	-	16	A-6a (V)	
			5 5 5	11	94	SS-9	3.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
			5 6 6	13	100	SS-10	3.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
			6 5 6	12	100	SS-11	2.25	-	-	-	-	-	-	-	-	17	A-6a (V)	

PID:	SFN:	PROJECT:FRA-71/270-28.27/25.99A MOD2	STATION / OFFSET: 177+33, 80' RT.	START: 10/23/23	END: 10/23/23	PG 2 OF 2	B-049-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY STIFF TO HARD, BROWNISH GRAY BECOMING GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE TO LITTLE GRAVEL, GLACIAL TILL, DAMP TO MOIST *(continued)*	858.8	31	6 5 7	13	100	SS-12	2.50	-	-	-	-	-	-	-	-	17	A-6a (V)	
		32																
		33	6 6 7	14	94	SS-13	2.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
		34																
		35																
		36	6 7 6	14	100	SS-14	2.25	-	-	-	-	-	-	-	-	17	A-6a (V)	
	852.3	EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. DRILLED AS STAKED.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 0.5 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

OHIO DEPARTMENT OF TRANSPORTATION

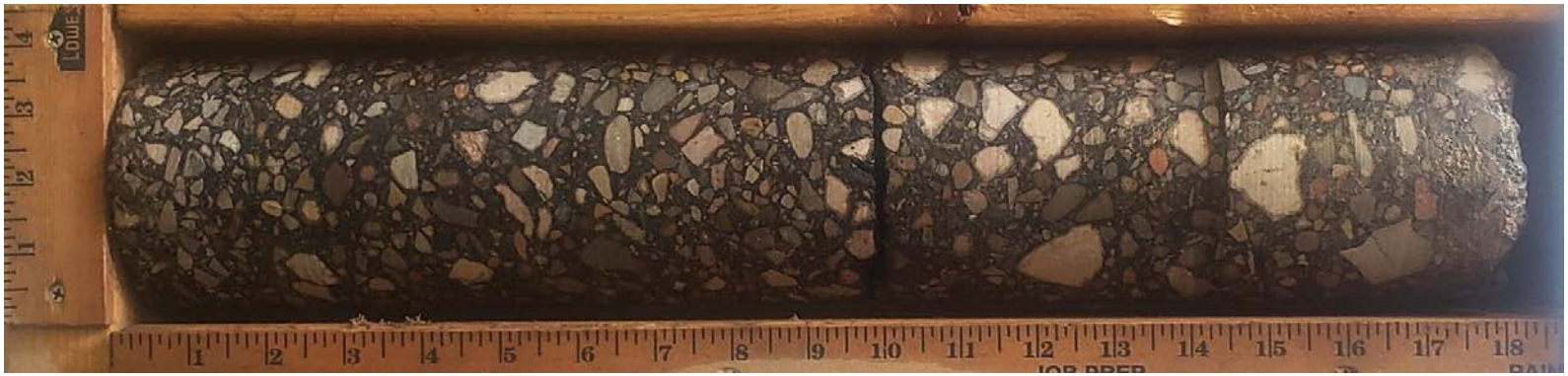
DETERMINING SULFATE CONTENT IN SOILS **SUPPLEMENT 1122**

Project C-R-S:	FRA-071/270-28.27
PID No:	105435
Report Date:	9/1/2022
Consultant:	NEAS Inc.
Technician:	L. Rosenbeck

Boring ID & Sample #	Station	Offset	Latitude & Longitude or State Plane Coordinates		Elevation	Soaking Time (hr)	Replicate Sample Readings						Sulfate Content (ppm)
							1		2		3		
							Dilution	Reading	Dilution	Reading	Dilution	Reading	
B-001-0-21 SS-2	130+13.45	33.64' RT.	40.110037	-82.977651	913.02	17.1	20	11	20	12	20	12	**233**
B-002-0-21 SS-1	134+38.61	48.74' RT.	40.111052	-82.976900	914.113	17.1	20	19	20	21	20	20	**400**
B-003-0-21 SS-3	138+27.06	46.29' RT	40.112010	-82.976279	913.661	17.1	20	5	20	5	20	5	**100**
B-004-0-21 SS-2	142+23.72	49.14' RT	40.112998	-82.975669	911.111	17.1	20	1	20	1	20	1	**20**
B-005-0-21 SS-2	146+00.36	27.13' RT	40.113975	-82.975211	908.243	17.1	20	12	20	14	20	13	**260**
B-006-0-21 SS-1	150+63.61	59.05' RT	40.115133	-82.974503	902.988	18.1	20	32	20	29	20	26	**580**
B-007-0-21 SS-1	154+37.05	56.17' RT	40.116108	-82.974071	899.363	18.2	20	52	20	58	20	62	**1147**
B-008-0-21 SS-1	158+40.65	50.43' RT	40.117174	-82.973656	895.22	18.1	100	46	100	42	100	40	**4267**
B-009-0-21 SS-1	162+45.49	55.74' RT	40.118246	-82.973248	890.984	16.3	100	>80	100	>80	100	>80	**>8000**
B-010-0-21 SS-2	166+30.55	49.53' RT	40.119281	-82.972942	887.8	16.3	100	61	100	56	100	56	**5767**
B-011-0-21 SS-2	170+40.03	48.88' RT	40.120386	-82.972642	885.897	16.3	20	22	20	22	20	22	**440**
B-012-0-21 SS-2	174+32.33	48.74' RT	40.121451	-82.972399	886.806	16.3	20	9	20	14	20	10	**220**
B-013-0-21 SS-2	178+30.59	47.78' RT	40.122537	-82.972200	889.171	16.3	100	14	100	15	100	14	**1433**
B-014-0-21 SS-1	182+39.72	46.26' RT	40.123658	-82.972045	891.613	21.3	100	53	100	45	100	45	**4767**
B-015-0-21 SS-2	186+38.44	44.65' RT	40.124754	-82.971942	894.132	21.3	100	27	100	22	100	20	**2300**
B-016-0-21 SS-2	190+39.61	43.68' RT	40.125854	-82.971865	896.565	21.3	100	39	100	35	100	39	**3767**
B-017-0-21 SS-1	194+38.28	56.43' RT	40.126945	-82.971739	898.808	21.3	20	11	20	10	20	8	**193**
B-018-0-21 SS-1	84+54.58	16.59' RT	40.110560	-82.989002	921.592	21.3	20	10	20	11	20	11	**213**
B-019-0-21 SS-1	88+33.68	26.22' LT	40.110619	-82.987640	920.357	21.3	20	28	20	32	20	35	**633**
B-020-0-21 SS-1	92+14.25	24.92' RT	40.110342	-82.986326	917.375	16.4	20	19	20	20	20	20	**393**
B-021-0-21 SS-1	96+33.42	43.71' RT	40.109798	-82.985064	918.563	16.4	20	14	20	15	20	15	**293**

B-022-0-21 SS-3	99+80.90	42.93' RT	40.109199	-82.984109	920.637	16.4	20	12	20	12	20	12	**240**
B-023-0-21 SS-1	103+52.16	22.33' LT	40.108675	-82.982948	923.572	16.4	20	26	20	27	20	27	**533**
B-024-0-21 SS-2	107+35.10	9.60' LT	40.107974	-82.981926	925.586	16.3	100	23	100	16	100	20	**1967**
B-025-0-21 SS-2	1010+98.56	CL	40.107701	-82.980661	935.545	16.4	40	30	40	31	40	31	**1227**
B-026-0-21 SS-1	1018+05.87	16.63' LT	40.108377	-82.978429	928.067	16.4	20	35	20	33	20	33	**673**
B-027-0-21 SS-2	1022+01.45	52.46' LT	40.109351	-82.977947	913.74	16.4	20	38	20	46	20	37	**807**
B-028-0-21 SS-1						18.0	20	10	20	10	20	10	**200**
B-029-0-21 SS-1						18.0	20	14	20	14	20	14	**280**
B-032-0-21 SS-1						18.0	20	12	20	12	20	12	**240**
B-035-0-21 SS-2						18.0	20	4	20	4	20	4	**80**
B-036-0-21 SS-1						18.0	20	30	20	30	20	30	**600**
B-037-0-21 SS-1						19.5	20	43	20	38	20	36	**780**
B-039-0-21 SS-1						19.5	20	21	20	20	20	19	**400**
B-040-0-21 SS-1						19.5	100	64	100	60	100	57	**6033**
B-041-0-21 SS-1						19.5	100	24	100	25	100	30	**2633**
B-042-0-21 SS-2						18.0	40	33	40	32	40	31	**1280**
B-043-0-21 SS-1						18.0	20	8	20	8	20	8	**160**

Core Photo: X-001-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**18.75**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	10			
2	8.75			
3				
4				
Rebar Encountered	N/A			

Latitude: 40.107653
Longitude -82.979486

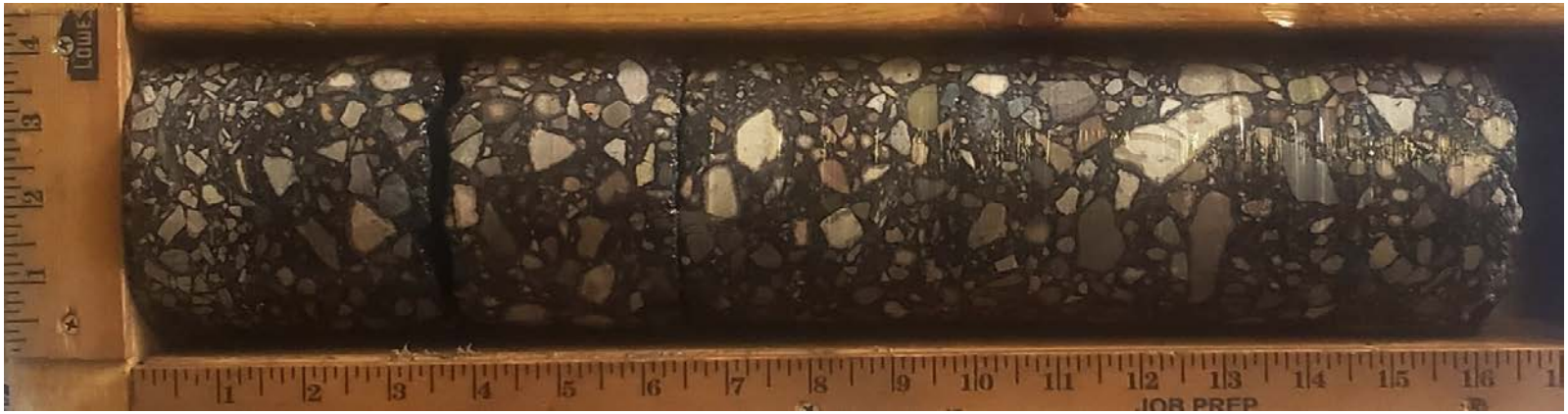
Pavement & Core Photo Log

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

National Engineering & Architectural Services Inc.

Core Photo: X-002-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**16.75**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	3.5			
2	3			
3	10.25			
4				
Rebar Encountered	N/A			

Latitude: 40.113628
Longitude -82.975595

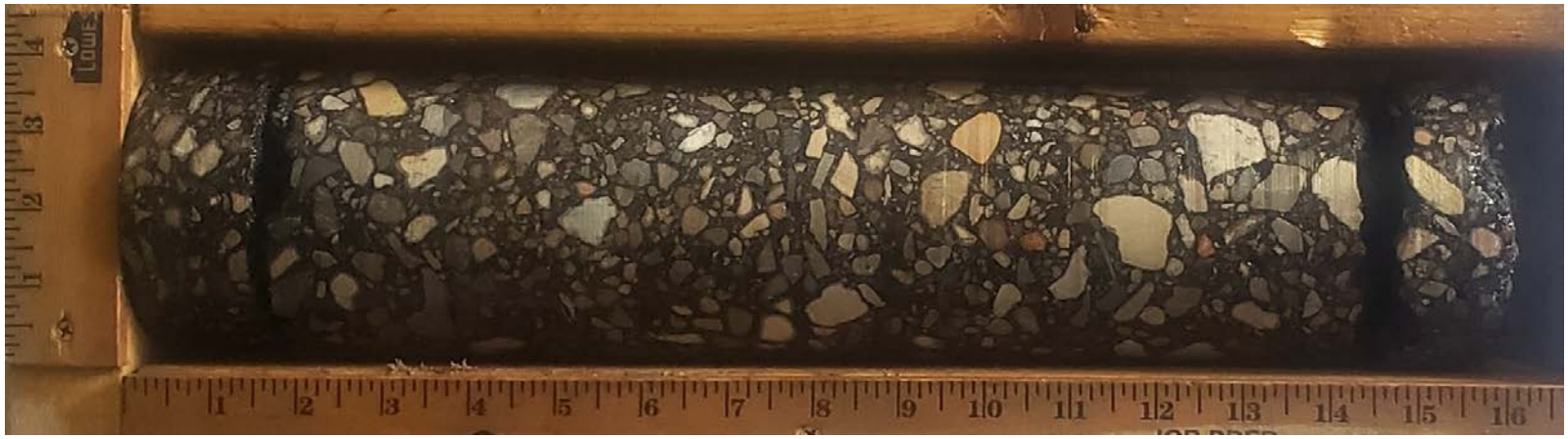
Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

Core Photo: X-003-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**16.5**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	1.5			
2	15			
3				
4				
Rebar Encountered	N/A			

Latitude: 40.120010
Longitude -82.973021

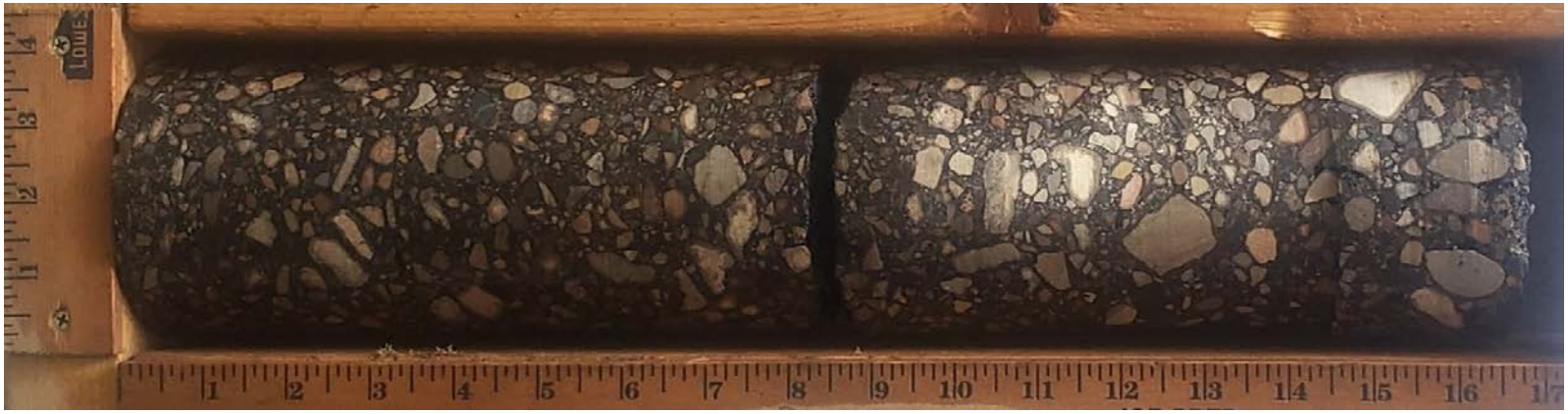
Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

Core Photo: X-004-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**17**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	3.5			
2	5			
3	8.5			
4				
Rebar Encountered	N/A			

Latitude: 40.125285
Longitude -82.972180

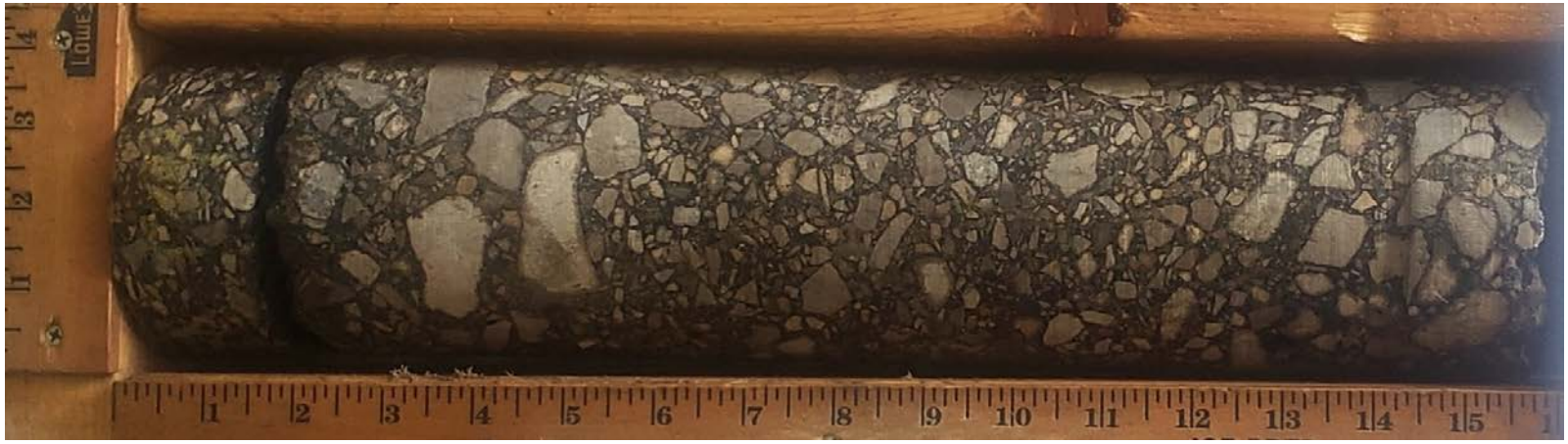
Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

Core Photo: X-005-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**16.5**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	1.5			
2	15			
3				
4				
Rebar Encountered	N/A			

Latitude: 40.111052
Longitude -82.976900

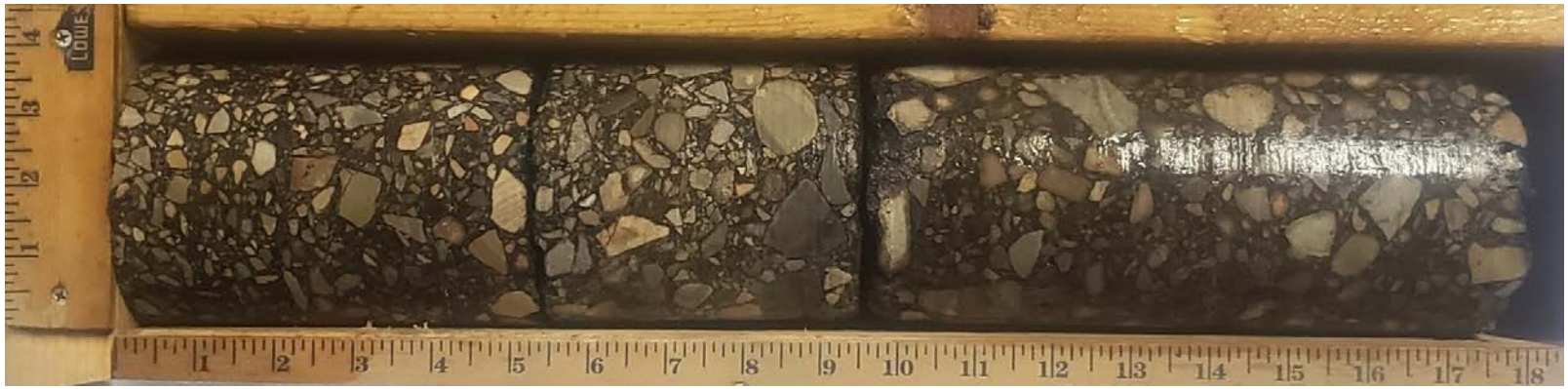
Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

Core Photo: X-006-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**18**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	2			
2	3.25			
3	4.25			
4	8.5			
Rebar Encountered	N/A			

Latitude: 40.118246
Longitude -82.973248

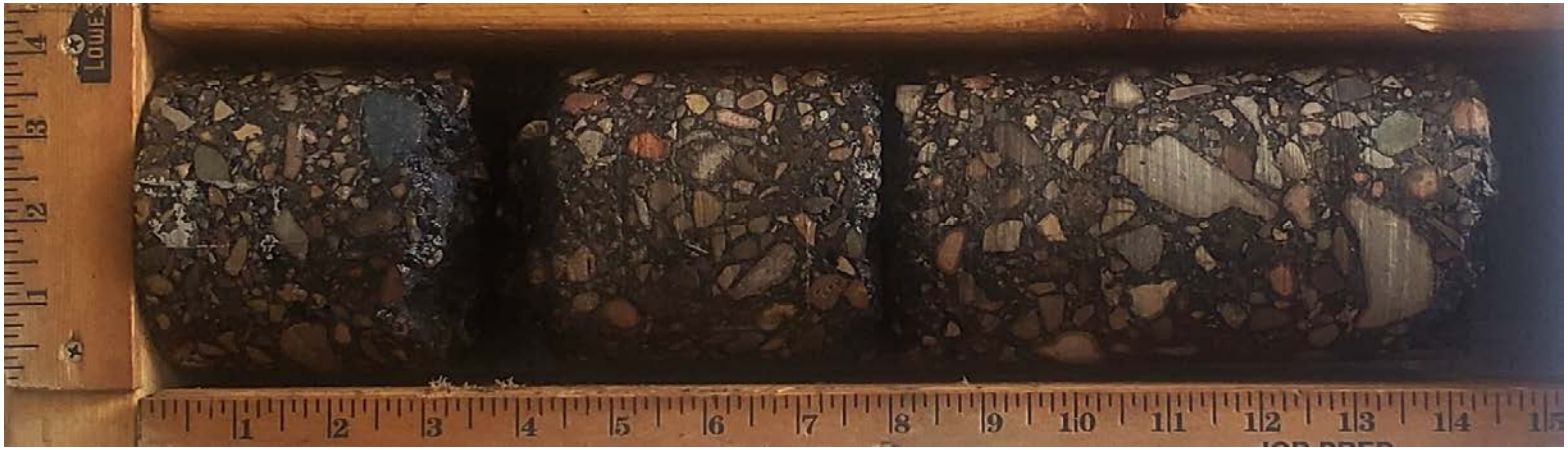
Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.:	105435
Date:	4/21/2021
Taken By:	MJ
Scale:	N/A

Core Photo: X-007-0-21



Core Information				
Core Diameter (in):			**4**	
Core Total Length (in):			**14.75**	
Layers	Core Composition & Thickness (in)			Remarks
	Asphalt	Concrete	Brick	
1	3.5			
2	4.5			
3	6.75			
4				
Rebar Encountered	N/A			

Latitude: 40.125854
Longitude -82.971865

Pavement & Core Photo Log

National Engineering & Architectural Services Inc.

Roadway Project
FRA-71/270

NEAS Project No.: 105435
Date: 4/21/2021
Taken By: MJ
Scale: N/A

APPENDIX C

GEOTECHNICAL BULLETIN 1 (GB1) ANALYSIS SPREADSHEETS

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

FRA-071/270-28.27/25.99A
105435

Entire Project - Improve Capacity to IR-270 WB to IR-71 NB

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 7, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 43

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-001-0-21	I-71	130+48	62	RT	CME 45B	82	913.0	910.8	2.2 C
2	B-002-0-21	I-71	134+73	77	RT	CME 45B	82	914.1	912.2	1.9 C
3	B-003-0-21	I-71	138+60	75	RT	CME 45B	82	913.7	912.0	1.7 C
4	B-004-0-21	I-71	142+56	79	RT	CME 45B	82	911.1	909.7	1.4 C
5	B-005-0-21	I-71	146+32	58	RT	CME 45B	82	908.2	906.0	2.2 C
6	B-006-0-21	I-71	150+94	91	RT	CME 45B	82	903.0	901.4	1.6 C
7	B-007-0-21	I-71	154+66	89	RT	CME 45B	82	899.4	897.7	1.7 C
8	B-008-0-21	I-71	158+69	85	RT	CME 45B	82	895.2	893.6	1.6 C
9	B-009-0-21	I-71	162+72	91	RT	CME 45B	82	891.0	889.6	1.4 C
10	B-010-0-21	I-71	166+56	86	RT	CME 45B	82	887.8	885.9	1.9 C
11	B-011-0-21	I-71	170+65	86	RT	CME 45B	82	885.9	884.7	1.2 C
12	B-012-0-21	I-71	174+56	86	RT	CME 45B	82	886.8	886.3	0.5 C
13	B-013-0-21	I-71	178+53	86	RT	CME 45B	82	889.2	888.0	1.2 C
14	B-014-0-21	I-71	182+61	85	RT	CME 45B	82	891.6	889.7	1.9 C
15	B-015-0-21	I-71	186+58	84	RT	CME 45B	82	894.1	891.3	2.8 C
16	B-016-0-21	I-71	190+59	84	RT	CME 45B	82	896.6	893.0	3.6 C
17	B-017-0-21	I-71	194+58	96	RT	CME 45B	82	898.8	894.7	4.2 C
18	B-018-0-21	Ramp M	84+94	3	LT	CME 45B	82	921.6	920.5	1.1 C
19	B-019-0-21	Ramp M	88+73	46	LT	CME 45B	82	920.4	918.1	2.2 C
20	B-020-0-21	Ramp M	92+48	4	LT	CME 45B	82	917.4	915.373	2.0 C
21	B-021-0-21	Ramp M	96+55	5	RT	CME 45B	82	918.6	916.6	1.9 C
22	B-022-0-21	Ramp M	100+01	3	RT	CME 45B	82	920.6	919.4	1.3 C
23	B-023-0-21	Ramp M	103+72	62	LT	CME 45B	82	923.6	922.4	1.2 C
24	B-024-0-21	Ramp M	107+55	49	LT	CME 45B	82	925.6	924.3	1.3 C
25	B-025-0-21	Ramp P	1011+38	22	LT	CME 45B	82	935.5	935.2	0.3 C
26	B-026-0-21	Ramp P	1018+46	4	RT	CME 45B	82	928.1	926.6	1.4 C
27	B-027-0-21	Ramp P	1022+29	18	LT	CME 45B	82	913.7	911.1	2.6 C
28	B-028-0-21	Ramp K	13+63	23	RT	CME 75T	79	921.3	922.8	1.6 F
29	B-029-0-21	Ramp K	16+67	25	RT	CME 75T	79	929.0	928.9	0.1 C
30	B-030-0-21	Ramp K	19+68	27	RT	CME 75T	79	937.1	938.6	1.5 F
31	B-031-0-21	Ramp K	21+80	11	LT	CME 75T	79	940.6	941.9	1.3 F
32	B-032-0-21	Ramp K	24+63	1	RT	CME 75T	79	938.9	939.2	0.3 F
33	B-033-0-21	I-71	137+81	9	RT	CME 55T/CME 75T	68.4/79	913.3	912.2	1.0 C
34	B-034-0-21	Ramp K	30+16	2	LT	CME 75T	79	926.7	925.8	0.8 C
35	B-035-0-21	Ramp K	34+09	22	RT	CME 75T	79	915.6	913.2	2.5 C
36	B-036-0-21	Ramp O	19+28	29	RT	CME 75T	79	916.2	914.5	1.7 C
37	B-037-0-21	Ramp O	23+07	2	RT	CME 75T	79	926.4	925.7	0.7 C
38	B-038-0-21	I-71	139+20	11	RT	CME 75T	79	912.8	911.7	1.1 C
39	B-039-0-21	Ramp O	31+80	5	LT	CME 75T	79	929.8	928.8	1.0 C
40	B-040-0-21	Ramp O	34+43	20	RT	CME 55T	63	925.8	924.7	1.1 C
41	B-041-0-21	Ramp O	37+47	58	LT	CME 55T	63	921.7	921.3	0.4 C
42	B-042-0-21	Ramp N	141+47	31	RT	CME 55T	63	910.3	909.6	0.7 C
43	B-043-0-21	Ramp N	145+00	11	RT	CME 55T	63	906.0	906.2	0.2 F

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	-0.7	0.8	19			NP	NP	NP	24	15	39	10	11	A-4a	1						
	001-0	SS-2	3.0	4.5	0.8	2.3	20		4.5	39	19	20	43	41	84	21	16	A-6b	12	233		Mc			
	21	SS-3	4.5	6.0	2.3	3.8	29		4.5							18	16	A-6b	16						
		SS-4	6.0	7.5	3.8	5.3	26	19	3.75							25	16	A-6b	16						
2	B	SS-1	1.5	3.0	-0.4	1.1	27		4.5	27	17	10	39	27	66	13	12	A-4a	6	400					
	002-0	SS-2	3.0	4.5	1.1	2.6	19		4.5	28	17	11	35	22	57	11	14	A-6a	5						
	21	SS-3	4.5	6.0	2.6	4.1	15		4.5							19	14	A-6a	10						
		SS-4	6.0	7.5	4.1	5.6	11	11	2.75							21	18	A-7-6	16						
3	B	SS-1	1.5	3.0	-0.2	1.3	35									9	6	A-1-a	0						
	003-0	SS-2	3.0	4.5	1.3	2.8	30			NP	NP	NP	6	2	8	4	6	A-1-a	0						
	21	SS-3	4.5	6.0	2.8	4.3	18		2.75	32	18	14	34	29	63	18	14	A-6a	7	100					
		SS-4	6.0	7.5	4.3	5.8	22	18	2.25							21	14	A-6a	10						
4	B	SS-1	1.5	3.0	0.1	1.6	60									9	6	A-1-b	0						
	004-0	SS-2	3.0	4.5	1.6	3.1	35		4.5	34	19	15	40	33	73	17	14	A-6a	10	20		Mc			
	21	SS-3	4.5	6.0	3.1	4.6	29		3.5	32	17	15	36	32	68	16	14	A-6a	9						
		SS-4	6.0	7.5	4.6	6.1	25	25	3.5							24	18	A-7-6	16						
5	B	SS-1	1.5	3.0	-0.7	0.8	35									8	6	A-1-b	0						
	005-0	SS-2	3.0	4.5	0.8	2.3	23		4.5	26	17	9	34	22	56	14	12	A-4a	4	260					
	21	SS-3	4.5	6.0	2.3	3.8	20		4							15	10	A-4a	8						
		SS-4	6.0	7.5	3.8	5.3	23	20	4.25							12	10	A-4a	8						
6	B	SS-1	1.5	3.0	-0.1	1.4	18		4.5	24	16	8	35	24	59	13	11	A-4a	5	580					
	006-0	SS-2	3.0	4.5	1.4	2.9	30		4.5	25	16	9	27	17	44	9	11	A-4a	2						
	21	SS-3	4.5	6.0	2.9	4.4	37									9	6	A-1-b	0						
		SS-4	6.0	7.5	4.4	5.9	41	18	4.5							10	10	A-4a	8						
7	B	SS-1	1.5	3.0	-0.2	1.3	27									5	6	A-1-b	0	1147					
	007-0	SS-2	3.0	4.5	1.3	2.8	20		4.5	23	16	7	27	15	42	9	11	A-4a	1						
	21	SS-3	4.5	6.0	2.8	4.3	11		4.25	23	15	8	31	19	50	11	10	A-4a	3						
		SS-4	6.0	7.5	4.3	5.8	10	10	2.25							12	10	A-4a	8						
8	B	SS-1	1.5	3.0	-0.1	1.4	41		4.5	23	16	7	34	22	56	9	11	A-4a	4	4267					
	008-0	SS-2	3.0	4.5	1.4	2.9	19		4.5	23	15	8	36	22	58	10	10	A-4a	5						
	21	SS-3	4.5	6.0	2.9	4.4	19		4							12	10	A-4a	8						
		SS-4	6.0	7.5	4.4	5.9	22	19	4.25							11	10	A-4a	8						
9	B	SS-1	1.5	3.0	0.1	1.6	33		4.5							9	10	A-4a	8	>8000					
	009-0	SS-2	3.0	4.5	1.6	3.1	25		4.5	24	14	10	37	23	60	9	10	A-4a	5						
	21	SS-3	4.5	6.0	3.1	4.6	12		4.5	22	15	7	37	21	58	11	10	A-4a	5						
		SS-4	6.0	7.5	4.6	6.1	15	12	1.75							13	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
10	B	SS-1	1.5	3.0	-0.4	1.1	52									5	6	A-1-a	0						
	010-0	SS-2	3.0	4.5	1.1	2.6	20		4.5	33	25	8	35	14	49	21	20	A-4a	3	5767					
	21	SS-3	4.5	6.0	2.6	4.1	27		4.5							12	10	A-4a	8						
		SS-4	6.0	7.5	4.1	5.6	26	20	3.5	33	19	14	43	31	74	20	14	A-6a	9						
11	B	SS-1	1.5	3.0	0.3	1.8	78									5	6	A-1-b	0						
	011-0	SS-2	3.0	4.5	1.8	3.3	18		4.5	26	16	10	37	30	67	12	11	A-4a	6	440					
	21	SS-3	4.5	6.0	3.3	4.8	16		4.5	28	17	11	35	27	62	13	14	A-6a	6						
		SS-4	6.0	7.5	4.8	6.3	18	16	1.5							28	14	A-6a	10						
12	B	SS-1	1.5	3.0	1.0	2.5	52									10	6	A-1-b	0						
	012-0	SS-2	3.0	4.5	2.5	4.0	15		4.5	28	17	11	36	29	65	14	14	A-6a	6	220					
	21	SS-3	4.5	6.0	4.0	5.5	15		4.5	26	16	10	36	24	60	13	11	A-4a	5						
		SS-4	6.0	7.5	5.5	7.0	14	14	2.5							22	14	A-6a							
13	B	SS-1	1.5	3.0	0.3	1.8	80									24	6	A-1-b	0						
	013-0	SS-2	3.0	4.5	1.8	3.3	33			24	17	7	21	13	34	9	10	A-2-4	0	1433					
	21	SS-3	4.5	6.0	3.3	4.8	14		4.25	24	14	10	38	29	67	12	10	A-4a	6						
		SS-4	6.0	7.5	4.8	6.3	12	12	2.5							15	10	A-4a	8						
14	B	SS-1	1.5	3.0	-0.4	1.1	34		4.5	27	17	10	31	24	55	5	12	A-4a	4	4767					
	014-0	SS-2	3.0	4.5	1.1	2.6	20		4.5							13	10	A-4a	8			Mc			
	21	SS-3	4.5	6.0	2.6	4.1	20		4.5	24	16	8	25	16	41	11	11	A-4a	1						
		SS-4	6.0	7.5	4.1	5.6	23	20	4.5							11	10	A-4a	8						
15	B	SS-1	1.5	3.0	-1.3	0.2	109									12	6	A-1-b	0						
	015-0	SS-2	3.0	4.5	0.2	1.7	15		4.5	28	18	10	31	18	49	12	13	A-4a	3	2300					
	21	SS-3	4.5	6.0	1.7	3.2	11		3.25	25	16	9	32	22	54	11	11	A-4a	4			N_{60}			
		SS-4	6.0	7.5	3.2	4.7	12	11	3.25							13	10	A-4a	8						
16	B	SS-1	1.5	3.0	-2.1	-0.6	50									14	6	A-1-b	0						
	016-0	SS-2	3.0	4.5	-0.6	0.9	18		4.5	25	16	9	36	24	60	11	11	A-4a	5	3767					
	21	SS-3	4.5	6.0	0.9	2.4	25		4.5	25	16	9	34	24	58	12	11	A-4a	5						
		SS-4	6.0	7.5	2.4	3.9	25	18	4.5							13	10	A-4a	8						
17	B	SS-1	1.5	3.0	-2.7	-1.2	23		4.5	32	19	13	33	24	57	13	14	A-6a	6	193					
	017-0	SS-2	3.0	4.5	-1.2	0.3	29		4.5	26	17	9	35	23	58	11	12	A-4a	5						
	21	SS-3	4.5	6.0	0.3	1.8	20		4.5							11	14	A-6a	10						
		SS-4	6.0	7.5	1.8	3.3	16	16	3.75							11	14	A-6a	10						
18	B	SS-1	1.5	3.0	0.4	1.9	20		4.5	36	20	16	29	26	55	12	16	A-6b	6	213					
	018-0	SS-2	3.0	4.5	1.9	3.4	15		2.25	50	22	28	33	40	73	25	19	A-7-6	17			Mc			
	21	SS-3	4.5	6.0	3.4	4.9	10		1.75							27	18	A-7-6	16						
		SS-4	6.0	7.5	4.9	6.4	12	10	1.5							22	18	A-7-6	16						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
19	B	SS-1	1.5	3.0	-0.7	0.8	19		4.5	31	17	14	36	25	61	13	14	A-6a	7	633					
	019-0	SS-2	3.0	4.5	0.8	2.3	19		4.5	28	17	11	38	26	64	14	14	A-6a	6						
	21	SS-3	4.5	6.0	2.3	3.8	15		4.5							16	14	A-6a	10						
		SS-4	6.0	7.5	3.8	5.3	15	15	4.5							15	14	A-6a	10						
20	B	SS-1	1.5	3.0	-0.5	1.0	29		4.5	26	17	9	35	25	60	12	12	A-4a	5	393					
	020-0	SS-2	3.0	4.5	1.0	2.5	23		4.5	27	16	11	34	25	59	12	14	A-6a	5						
	21	SS-3	4.5	6.0	2.5	4.0	10		3.75							13	16	A-6b	16						
		SS-4	6.0	7.5	4.0	5.5	11	10	2.25							14	16	A-6b	16						
21	B	SS-1	1.5	3.0	-0.4	1.1	20		4.5	32	18	14	36	30	66	13	14	A-6a	8	293					
	021-0	SS-2	3.0	4.5	1.1	2.6	23		4.5	29	18	11	37	28	65	14	14	A-6a	6						
	21	SS-3	4.5	6.0	2.6	4.1	20		4.5							15	14	A-6a	10						
		SS-4	6.0	7.5	4.1	5.6	16	16	4.5							15	14	A-6a	10						
22	B	SS-1	1.5	3.0	0.2	1.8	16									6	6	A-1-b	0						
	022-0	SS-2	3.0	4.5	1.8	3.3	12			NP	NP	NP	14	4	18	6	6	A-1-b	0						
	21	SS-3	4.5	6.0	3.3	4.8	11		4.25	38	19	19	39	36	75	18	16	A-6b	12	240					
		SS-4	6.0	7.5	4.8	6.3	10	10								11	6	A-1-a	0						
23	B	SS-1	1.5	3.0	0.3	1.8	20		4.5							14	16	A-6b	16	533					
	023-0	SS-2	3.0	4.5	1.8	3.3	18		4.5	35	19	16	31	27	58	16	16	A-6b	7						
	21	SS-3	4.5	6.0	3.3	4.8	30		4.25							11	16	A-6b	16						
		SS-4	6.0	7.5	4.8	6.3	34	18		32	18	14	22	16	38	9	14	A-6a	2						
24	B	SS-1	1.5	3.0	0.2	1.7	22		4.5							16	16	A-6b	16						
	024-0	SS-2	3.0	4.5	1.7	3.2	26		4.5	26	16	10	37	25	62	11	11	A-4a	5	1967					
	21	SS-3	4.5	6.0	3.2	4.7	29		4.5	25	16	9	38	22	60	10	11	A-4a	5						
		SS-4	6.0	7.5	4.7	6.2	35	22	4.5							10	10	A-4a	8						
25	B	SS-1	1.5	3.0	1.2	2.7	14		4.5							10	10	A-4a	8						
	025-0	SS-2	3.0	4.5	2.7	4.2	5		2.5	25	15	10	39	23	62	13	10	A-4a	5	1227					
	21	SS-3	4.5	6.0	4.2	5.7	8		3.75	24	15	9	38	24	62	13	10	A-4a	5						
		SS-4	6.0	7.5	5.7	7.2	10	5	4							13	10	A-4a							
26	B	SS-1	1.5	3.0	0.1	1.6	8		3	32	17	15	37	32	69	17	14	A-6a	9	673		N_{60} & Mc		**12"**	
	026-0	SS-2	3.0	4.5	1.6	3.1	10		3.75	33	19	14	38	33	71	19	14	A-6a	9			N_{60} & Mc			
	21	SS-3	4.5	6.0	3.1	4.6	5		3.5							13	14	A-6a	10						
		SS-4	6.0	7.5	4.6	6.1	5	5	2.5							17	14	A-6a	10						
27	B	SS-1	1.5	3.0	-1.1	0.4	7			NP	NP	NP	19	14	33	10	10	A-2-4	0			N_{60}		**15"**	
	027-0	SS-2	3.0	4.5	0.4	1.9	19			34	20	14	27	21	48	12	15	A-6a	4	807					
	21	SS-3	4.5	6.0	1.9	3.4	18									16	14	A-6a	10						
		SS-4	6.0	7.5	3.4	4.9	18	7								14	14	A-6a	10						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
28	B	SS-1	1.5	3.0	3.1	4.6	12		4.5	34	17	17	34	29	63	15	16	A-6b	8	200					
	028-0	SS-2	3.0	4.5	4.6	6.1	13		4.5	34	18	16	36	35	71	16	16	A-6b	10						
	21	SS-3	4.5	6.0	6.1	7.6	13		4.5							15	16	A-6b							
		SS-4	6.0	7.5	7.6	9.1	16	12	4.5							11	16	A-6b							
29	B	SS-1	1.5	3.0	1.4	2.9	9		4.5	32	18	14	39	33	72	17	14	A-6a	9	280		N_{60} & Mc			
	029-0	SS-2	3.0	4.5	2.9	4.4	16		2.25	35	18	17	36	34	70	20	16	A-6b	10						
	21	SS-3	4.5	6.0	4.4	5.9	9		2.75							21	16	A-6b	16						
		SS-4	6.0	7.5	5.9	7.4	14	9	3							22	16	A-6b							
30	B	SS-1	1.5	3.0	3.0	4.5	12			NP	NP	NP	14	6	20	7	6	A-1-b	0						
	030-0	SS-2A	3.0	3.5	4.5	5.0	5									7	6	A-1-b	0						
	21	SS-2B	3.5	4.5	5.0	6.0	5			31	17	14	34	29	63	20	14	A-6a	7						
		SS-3	4.5	6.0	6.0	7.5	3	3	1.25							26	14	A-6a							
31	B	SS-1	1.5	3.0	2.8	4.3	7		4.25	32	17	15	39	35	74	18	14	A-6a	10						
	031-0	SS-2	3.0	4.5	4.3	5.8	8		4	33	16	17	41	32	73	17	16	A-6b	10						
	21	SS-3	4.5	6.0	5.8	7.3	9		1.75							17	14	A-6a							
		SS-4	6.0	7.5	7.3	8.8	11	7	2.25							13	14	A-6a							
32	B	SS-1	1.5	3.0	1.8	3.3	18		4.5	24	15	9	38	22	60	11	10	A-4a	5	240					
	032-0	SS-2	3.0	4.5	3.3	4.8	12		4.5	24	14	10	39	26	65	11	10	A-4a	6						
	21	SS-3	4.5	6.0	4.8	6.3	11		4.5							10	10	A-4a	8						
		SS-4	6.0	7.5	6.3	7.8	8	11	4.5							10	10	A-4a							
33	B	SS-1	2.5	4.0	1.5	3.0	21		4.5	27	17	10	36	27	63	11	12	A-4a	6						
	033-0	SS-2	5.0	6.5	4.0	5.5	13		3.25	33	19	14	40	32	72	16	14	A-6a	9						
	21	SS-3	7.5	9.0	6.5	8.0	16		4							21	18	A-7-6							
		ST-1	10.0	12.0	9.0	11.0		13	3.5							24	18	A-7-6							
34	B	SS-1	2.5	4.0	1.7	3.2	16		4.5	37	18	19	38	38	76	17	16	A-6b	12						
	034-0	SS-2	5.0	6.5	4.2	5.7	16		4.5							13	16	A-6b	16						
	21	SS-3	7.5	9.0	6.7	8.2	26		4.5	32	18	14	36	33	69	15	14	A-6a							
		SS-4	10.0	11.5	9.2	10.7	20	16	4.5							20	14	A-6a							
35	B	SS-1	1.5	3.0	-1.0	0.5	16		4.5							13	16	A-6b	16						
	035-0	SS-2	3.0	4.5	0.5	2.0	25		4.5	34	17	17	35	35	70	14	16	A-6b	10	80					
	21	SS-3	4.5	6.0	2.0	3.5	28		4.5							16	16	A-6b	16						
		SS-4	6.0	7.5	3.5	5.0	28	16	4.5	34	22	12	47	37	84	19	17	A-6a	9						
36	B	SS-1	1.5	3.0	-0.2	1.3	14		4.5	24	14	10	34	23	57	10	10	A-4a	4	600					
	036-0	SS-2	3.0	4.5	1.3	2.8	13		4.5	23	14	9	38	24	62	12	10	A-4a	5						
	21	SS-3	4.5	6.0	2.8	4.3	16		4.5							11	10	A-4a	8						
		SS-4	6.0	7.5	4.3	5.8	8	8	4							11	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
37	B	SS-1	1.5	3.0	0.8	2.4	18		4.5	23	14	9	39	25	64	10	10	A-4a	6	780					
	037-0	SS-2	3.0	4.5	2.4	3.9	20		4.5	23	13	10	36	24	60	9	10	A-4a	5						
	21	SS-3	4.5	6.0	3.9	5.4	25		4.5							10	10	A-4a	8						
		SS-4	6.0	7.5	5.4	6.9	38	18	4.5							9	10	A-4a							
38	B	SS-1	2.5	4.0	1.4	2.9	20		4.5	26	16	10	38	24	62	12	11	A-4a	5						
	038-0	SS-2	5.0	6.5	3.9	5.4	17		4.5	37	21	16	41	35	76	18	16	A-6b	10						
	21	SS-3	7.5	9.0	6.4	7.9	16		4.5							20	16	A-6b							
		SS-4	10.0	11.5	8.9	10.4	16	17	4							26	16	A-6b							
39	B	SS-1	1.5	3.0	0.5	2.0	18		4.5	27	16	11	34	28	62	12	14	A-6a	6	400					
	039-0	SS-2	3.0	4.5	2.0	3.5	16		4.5							12	14	A-6a	10						
	21	SS-3	4.5	6.0	3.5	5.0	14		4.5							13	14	A-6a	10						
		SS-4	6.0	7.5	5.0	6.5	16	14	4.5	27	14	13	35	27	62	11	14	A-6a							
40	B	SS-1	1.5	3.0	0.4	1.9	26		4.5	23	14	9	35	25	60	8	10	A-4a	5	6033					
	040-0	SS-2	3.0	4.5	1.9	3.4	33		4.5	27	16	11	37	28	65	11	14	A-6a	6						
	21	SS-3	4.5	6.0	3.4	4.9	29		4.5							10	14	A-6a	10						
		SS-4	6.0	7.5	4.9	6.4	33	26	4.5							13	14	A-6a	10						
41	B	SS-1	1.5	3.0	1.1	2.6	11		4.5	25	15	10	38	27	65	12	10	A-4a	6	2633		N_{60}			
	041-0	SS-2	3.0	4.5	2.6	4.1	19		4.5	32	17	15	36	33	69	13	14	A-6a	9						
	21	SS-3	4.5	6.0	4.1	5.6	19		4.5							14	14	A-6a	10						
		SS-4	6.0	7.5	5.6	7.1	27	11	4.5							13	14	A-6a							
42	B	SS-1	1.5	3.0	0.8	2.3	20									7	10	A-2-4	0						
	042-0	SS-2	3.0	4.5	2.3	3.8	16		4.5	30	17	13	37	28	65	14	14	A-6a	7	1280					
	21	SS-3	4.5	6.0	3.8	5.3	8		2.75							22	14	A-6a	10						
		SS-4	6.0	7.5	5.3	6.8	18	8	3.5	53	25	28	40	49	89	28	22	A-7-6							
43	B	SS-1	1.5	3.0	1.7	3.2	27		4.5	28	17	11	39	27	66	14	14	A-6a	7	160					
	043-0	SS-2	3.0	4.5	3.2	4.7	22		4.5							13	14	A-6a	10						
	21	SS-3	4.5	6.0	4.7	6.2	17		4.5	25	18	7	32	21	53	12	13	A-4a	4						
		SS-4	6.0	7.5	6.2	7.7	20	17	4.5							10	10	A-4a							

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 43

Geotechnical Consultant: NEAS, Inc.

Prepared By: MWJ

Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12"

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	7

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	4%	HP ≤ 0.5	0%
$N_{60} < 12$	18%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	11%	1 < HP ≤ 2	4%
$N_{60} \geq 20$	44%	HP > 2	81%
M+	4%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

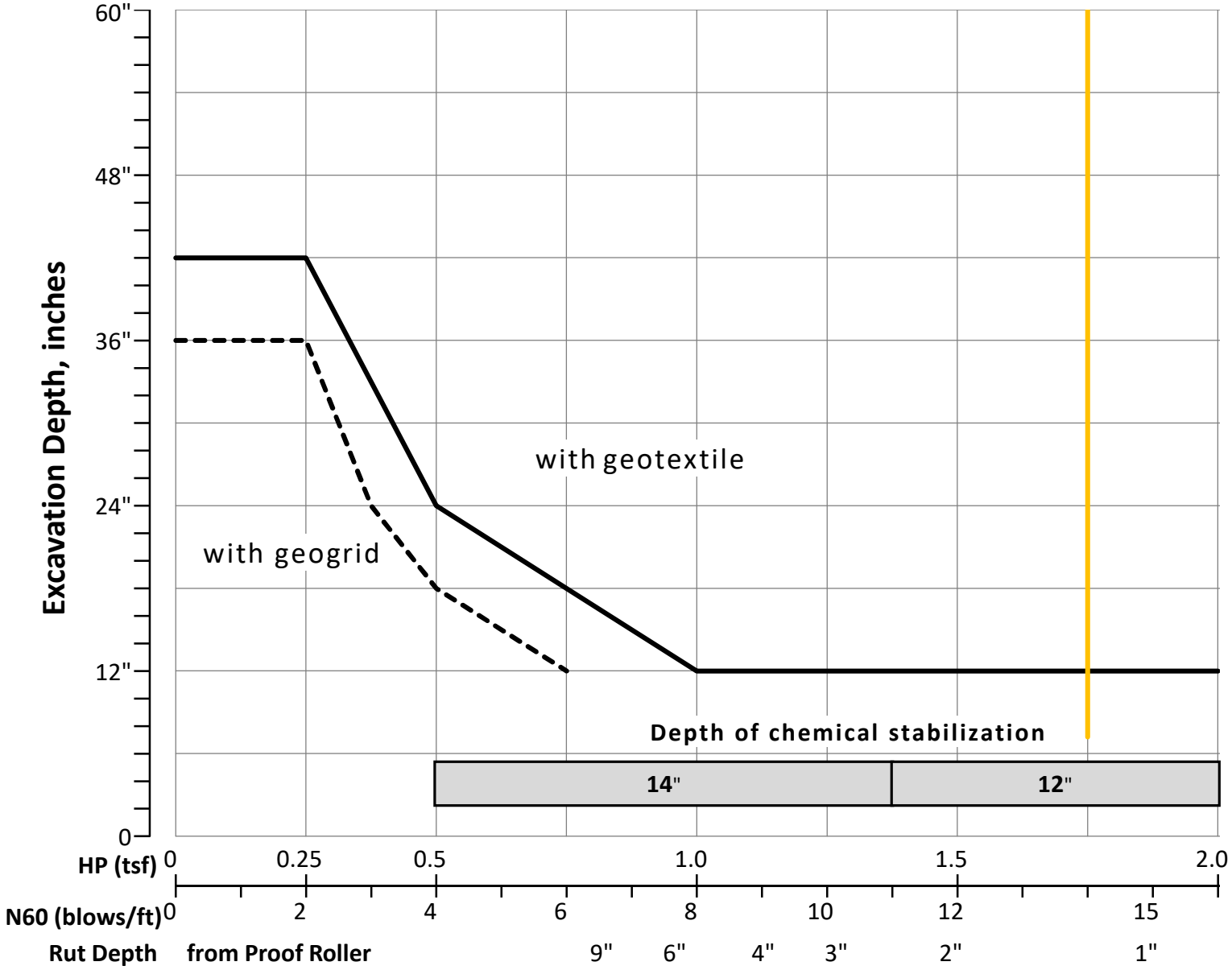
% Proposed Subgrade Surface	
Unstable & Unsuitable	11%
Unstable	11%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	21	14	4.03	29	17	12	34	26	60	14	13	7
Maximum	109	26	4.50	53	25	28	47	49	89	28	22	17
Minimum	3	3	1.25	22	13	7	6	2	8	4	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	4	12	3	0	0	0	0	0	62	0	0	54	27	0	8	0	0	170
Percent	0%	2%	7%	2%	0%	0%	0%	0%	0%	36%	0%	0%	32%	16%	0%	5%	0%	0%	100%
% Rock|Granular|Cohesive	0%	48%									52%								100%
Surface Class Count	0	3	10	3	0	0	0	0	0	37	0	0	26	11	0	1	0	0	91
Surface Class Percent	0%	3%	11%	3%	0%	0%	0%	0%	0%	41%	0%	0%	29%	12%	0%	1%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.03	0.50	☐ HP
14.02	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

FRA-071/270-28.27/25.99A
105435

IR-71 NB

NEAS, INC.

Prepared By: MWJ
Date prepared: Friday, September 09, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 20

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-027-0-21	I-71	127+88	104	RT	CME 45B	82	913.7	910.1	3.7 C
2	B-001-0-21	I-71	130+48	62	RT	CME 45B	82	913.0	910.8	2.2 C
3	B-002-0-21	I-71	134+73	77	RT	CME 45B	82	914.1	912.2	1.9 C
4	B-033-0-21	I-71	137+81	9	RT	CME 55T / CME 75T	63 / 79	913.3	912.2	1.0 C
5	B-003-0-21	I-71	138+60	75	RT	CME 45B	82	913.7	912.0	1.7 C
6	B-038-0-21	I-71	139+20	11	RT	CME 75T	82	912.8	911.7	1.1 C
7	B-004-0-21	I-71	142+56	79	RT	CME 45B	82	911.1	909.7	1.4 C
8	B-005-0-21	I-71	146+32	58	RT	CME 45B	82	908.2	906.0	2.2 C
9	B-006-0-21	I-71	150+94	91	RT	CME 45B	82	903.0	901.4	1.6 C
10	B-007-0-21	I-71	154+66	89	RT	CME 45B	82	899.4	897.7	1.7 C
11	B-008-0-21	I-71	158+69	85	RT	CME 45B	82	895.2	893.6	1.6 C
12	B-009-0-21	I-71	162+72	91	RT	CME 45B	82	891.0	889.6	1.4 C
13	B-010-0-21	I-71	166+56	86	RT	CME 45B	82	887.8	885.9	1.9 C
14	B-011-0-21	I-71	170+65	86	RT	CME 45B	82	885.9	884.7	1.2 C
15	B-012-0-21	I-71	174+56	86	RT	CME 45B	82	886.8	886.3	0.5 C
16	B-013-0-21	I-71	178+53	86	RT	CME 45B	82	889.2	888.0	1.2 C
17	B-014-0-21	I-71	182+61	85	RT	CME 45B	82	891.6	889.7	1.9 C
18	B-015-0-21	I-71	186+58	84	RT	CME 45B	82	894.1	891.3	2.8 C
19	B-016-0-21	I-71	190+59	84	RT	CME 45B	82	896.6	893.0	3.6 C
20	B-017-0-21	I-71	194+58	96	RT	CME 45B	82	898.8	894.7	4.2 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	-2.2	-0.7	7			NP	NP	NP	19	14	33	10	10	A-2-4	0						
	027-0	SS-2	3.0	4.5	-0.7	0.8	19			34	20	14	27	21	48	12	15	A-6a	4	807					
	21	SS-3	4.5	6.0	0.8	2.3	18									16	14	A-6a	10						
		SS-4	6.0	7.5	2.3	3.8	18	18								14	14	A-6a	10						
2	B	SS-1	1.5	3.0	-0.7	0.8	19			NP	NP	NP	24	15	39	10	11	A-4a	1						
	001-0	SS-2	3.0	4.5	0.8	2.3	20		4.5	39	19	20	43	41	84	21	16	A-6b	12	233		Mc			
	21	SS-3	4.5	6.0	2.3	3.8	29		4.5							18	16	A-6b	16						
		SS-4	6.0	7.5	3.8	5.3	26	19	3.75							25	16	A-6b	16						
3	B	SS-1	1.5	3.0	-0.4	1.1	27		4.5	27	17	10	39	27	66	13	12	A-4a	6	400					
	002-0	SS-2	3.0	4.5	1.1	2.6	19		4.5	28	17	11	35	22	57	11	14	A-6a	5						
	21	SS-3	4.5	6.0	2.6	4.1	15		4.5							19	14	A-6a	10						
		SS-4	6.0	7.5	4.1	5.6	11	11	2.75							21	18	A-7-6	16						
4	B	SS-1	2.5	4.0	1.5	3.0	21		4.5	27	17	10	36	27	63	11	12	A-4a	6						
	033-0	SS-2	5.0	6.5	4.0	5.5	13		3.25	33	19	14	40	32	72	16	14	A-6a	9						
	21	SS-3	7.5	9.0	6.5	8.0	16		4							21	18	A-7-6							
		ST-1	10.0	12.0	9.0	11.0		13	3.5							24	18	A-7-6							
5	B	SS-1	1.5	3.0	-0.2	1.3	35									9	6	A-1-a	0						
	003-0	SS-2	3.0	4.5	1.3	2.8	30			NP	NP	NP	6	2	8	4	6	A-1-a	0						
	21	SS-3	4.5	6.0	2.8	4.3	18		2.75	32	18	14	34	29	63	18	14	A-6a	7	100					
		SS-4	6.0	7.5	4.3	5.8	22	18	2.25							21	14	A-6a	10						
6	B	SS-1	2.5	4.0	1.4	2.9	20		4.5	26	16	10	38	24	62	12	11	A-4a	5						
	038-0	SS-2	5.0	6.5	3.9	5.4	17		4.5	37	21	16	41	35	76	18	16	A-6b	10						
	21	SS-3	7.5	9.0	6.4	7.9	16		4.5							20	16	A-6b							
		SS-4	10.0	11.5	8.9	10.4	16	17	4							26	16	A-6b							
7	B	SS-1	1.5	3.0	0.1	1.6	60									9	6	A-1-b	0						
	004-0	SS-2	3.0	4.5	1.6	3.1	35		4.5	34	19	15	40	33	73	17	14	A-6a	10	20		Mc			
	21	SS-3	4.5	6.0	3.1	4.6	29		3.5	32	17	15	36	32	68	16	14	A-6a	9						
		SS-4	6.0	7.5	4.6	6.1	25	25	3.5							24	18	A-7-6	16						
8	B	SS-1	1.5	3.0	-0.7	0.8	35									8	6	A-1-b	0						
	005-0	SS-2	3.0	4.5	0.8	2.3	23		4.5	26	17	9	34	22	56	14	12	A-4a	4	260					
	21	SS-3	4.5	6.0	2.3	3.8	20		4							15	10	A-4a	8						
		SS-4	6.0	7.5	3.8	5.3	23	20	4.25							12	10	A-4a	8						
9	B	SS-1	1.5	3.0	-0.1	1.4	18		4.5	24	16	8	35	24	59	13	11	A-4a	5	580					
	006-0	SS-2	3.0	4.5	1.4	2.9	30		4.5	25	16	9	27	17	44	9	11	A-4a	2						
	21	SS-3	4.5	6.0	2.9	4.4	37									9	6	A-1-b	0						
		SS-4	6.0	7.5	4.4	5.9	41	18	4.5							10	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
10	B	SS-1	1.5	3.0	-0.2	1.3	27									5	6	A-1-b	0	1147					
	007-0	SS-2	3.0	4.5	1.3	2.8	20		4.5	23	16	7	27	15	42	9	11	A-4a	1						
	21	SS-3	4.5	6.0	2.8	4.3	11		4.25	23	15	8	31	19	50	11	10	A-4a	3						
		SS-4	6.0	7.5	4.3	5.8	10	10	2.25							12	10	A-4a	8						
11	B	SS-1	1.5	3.0	-0.1	1.4	41		4.5	23	16	7	34	22	56	9	11	A-4a	4	4267					
	008-0	SS-2	3.0	4.5	1.4	2.9	19		4.5	23	15	8	36	22	58	10	10	A-4a	5						
	21	SS-3	4.5	6.0	2.9	4.4	19		4							12	10	A-4a	8						
		SS-4	6.0	7.5	4.4	5.9	22	19	4.25							11	10	A-4a	8						
12	B	SS-1	1.5	3.0	0.1	1.6	33		4.5							9	10	A-4a	8	>8000					
	009-0	SS-2	3.0	4.5	1.6	3.1	25		4.5	24	14	10	37	23	60	9	10	A-4a	5						
	21	SS-3	4.5	6.0	3.1	4.6	12		4.5	22	15	7	37	21	58	11	10	A-4a	5						
		SS-4	6.0	7.5	4.6	6.1	15	12	1.75							13	10	A-4a	8						
13	B	SS-1	1.5	3.0	-0.4	1.1	52									5	6	A-1-a	0						
	010-0	SS-2	3.0	4.5	1.1	2.6	20		4.5	33	25	8	35	14	49	21	20	A-4a	3	5767					
	21	SS-3	4.5	6.0	2.6	4.1	27		4.5							12	10	A-4a	8						
		SS-4	6.0	7.5	4.1	5.6	26	20	3.5	33	19	14	43	31	74	20	14	A-6a	9						
14	B	SS-1	1.5	3.0	0.3	1.8	78									5	6	A-1-b	0						
	011-0	SS-2	3.0	4.5	1.8	3.3	18		4.5	26	16	10	37	30	67	12	11	A-4a	6	440					
	21	SS-3	4.5	6.0	3.3	4.8	16		4.5	28	17	11	35	27	62	13	14	A-6a	6						
		SS-4	6.0	7.5	4.8	6.3	18	16	1.5							28	14	A-6a	10						
15	B	SS-1	1.5	3.0	1.0	2.5	52									10	6	A-1-b	0						
	012-0	SS-2	3.0	4.5	2.5	4.0	15		4.5	28	17	11	36	29	65	14	14	A-6a	6	220					
	21	SS-3	4.5	6.0	4.0	5.5	15		4.5	26	16	10	36	24	60	13	11	A-4a	5						
		SS-4	6.0	7.5	5.5	7.0	14	14	2.5							22	14	A-6a							
16	B	SS-1	1.5	3.0	0.3	1.8	80									24	6	A-1-b	0						
	013-0	SS-2	3.0	4.5	1.8	3.3	33			24	17	7	21	13	34	9	10	A-2-4	0	1433					
	21	SS-3	4.5	6.0	3.3	4.8	14		4.25	24	14	10	38	29	67	12	10	A-4a	6						
		SS-4	6.0	7.5	4.8	6.3	12	12	2.5							15	10	A-4a	8						
17	B	SS-1	1.5	3.0	-0.4	1.1	34		4.5	27	17	10	31	24	55	5	12	A-4a	4	4767					
	014-0	SS-2	3.0	4.5	1.1	2.6	20		4.5							13	10	A-4a	8			Mc			
	21	SS-3	4.5	6.0	2.6	4.1	20		4.5	24	16	8	25	16	41	11	11	A-4a	1						
		SS-4	6.0	7.5	4.1	5.6	23	20	4.5							11	10	A-4a	8						
18	B	SS-1	1.5	3.0	-1.3	0.2	109									12	6	A-1-b	0						
	015-0	SS-2	3.0	4.5	0.2	1.7	15		4.5	28	18	10	31	18	49	12	13	A-4a	3	2300					
	21	SS-3	4.5	6.0	1.7	3.2	11		3.25	25	16	9	32	22	54	11	11	A-4a	4			N_{60}			
		SS-4	6.0	7.5	3.2	4.7	12	11	3.25							13	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
19	B	SS-1	1.5	3.0	-2.1	-0.6	50									14	6	A-1-b	0						
	016-0	SS-2	3.0	4.5	-0.6	0.9	18		4.5	25	16	9	36	24	60	11	11	A-4a	5	3767					
	21	SS-3	4.5	6.0	0.9	2.4	25		4.5	25	16	9	34	24	58	12	11	A-4a	5						
		SS-4	6.0	7.5	2.4	3.9	25	18	4.5							13	10	A-4a	8						
20	B	SS-1	1.5	3.0	-2.7	-1.2	23		4.5	32	19	13	33	24	57	13	14	A-6a	6	193					
	017-0	SS-2	3.0	4.5	-1.2	0.3	29		4.5	26	17	9	35	23	58	11	12	A-4a	5						
	21	SS-3	4.5	6.0	0.3	1.8	20		4.5							11	14	A-6a	10						
		SS-4	6.0	7.5	1.8	3.3	16	16	3.75							11	14	A-6a	10						

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 20

Geotechnical Consultant: NEAS, INC.

Prepared By: MWJ

Date prepared: 9/9/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	NA

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	7

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	6%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	8%	1 < HP ≤ 2	3%
$N_{60} \geq 20$	59%	HP > 2	75%
M+	4%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

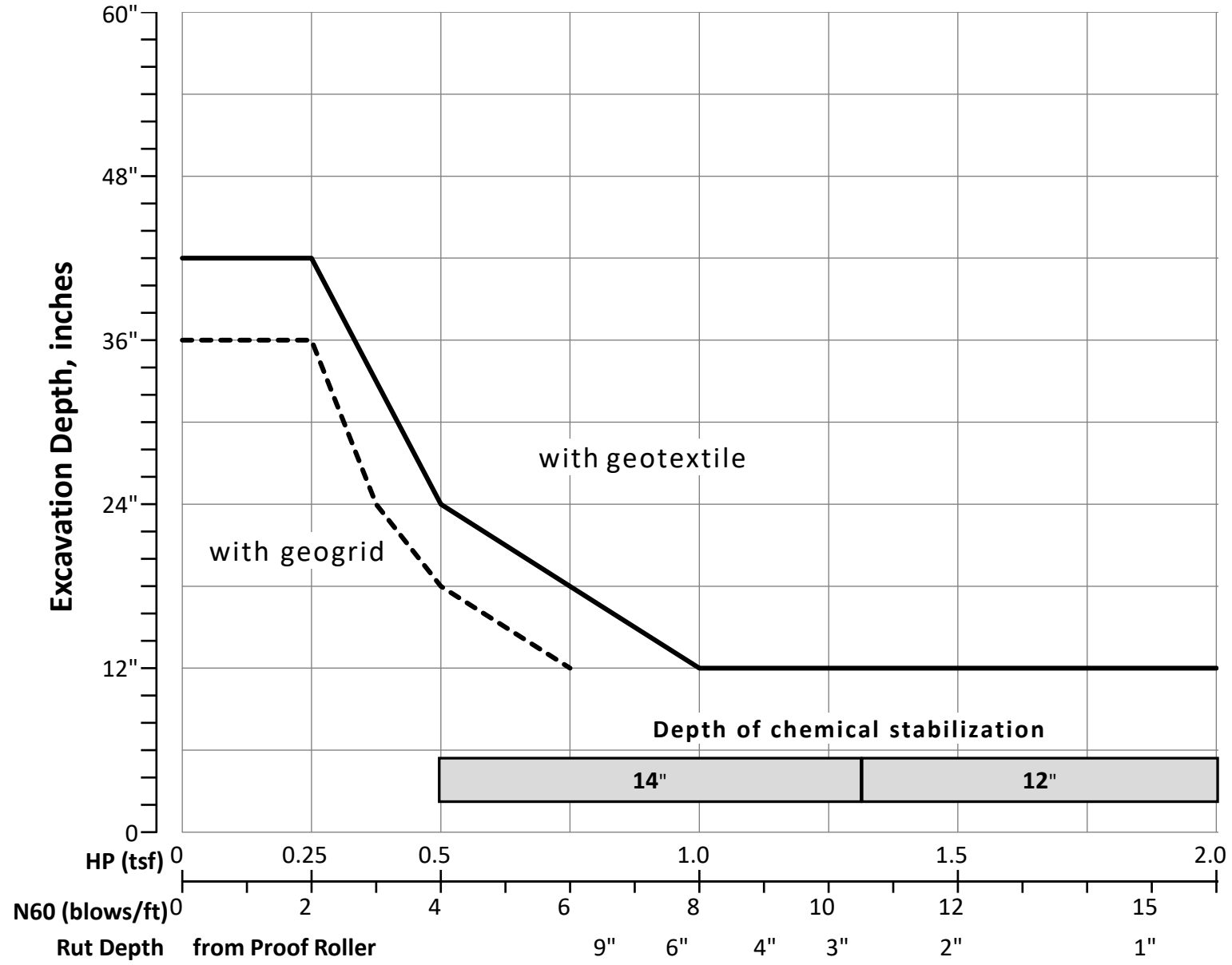
% Proposed Subgrade Surface	
Unstable & Unsuitable	8%
Unstable	8%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	26	16	4.01	28	17	10	34	24	57	14	12	6
Maximum	109	25	4.50	39	25	20	43	41	84	28	20	16
Minimum	7	10	1.50	22	14	7	6	2	8	4	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	3	8	1	0	0	0	0	0	38	0	0	17	6	0	4	0	0	77
Percent	0%	4%	10%	1%	0%	0%	0%	0%	0%	49%	0%	0%	22%	8%	0%	5%	0%	0%	100%
% Rock|Granular|Cohesive	0%	65%									35%								100%
Surface Class Count	0	3	8	2	0	0	0	0	0	26	0	0	10	2	0	0	0	0	51
Surface Class Percent	0%	6%	16%	4%	0%	0%	0%	0%	0%	51%	0%	0%	20%	4%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.01	0.50	☐ HP
16.35	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

FRA-071/270-28.27/25.99A
105435

North I-71 with high sulfate contents

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 07, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 9

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-008-0-21	I-71	158+69	85	RT	CME 45B	82	895.2	893.6	1.6 C
2	B-009-0-21	I-71	162+72	91	RT	CME 45B	82	891.0	889.6	1.4 C
3	B-010-0-21	I-71	166+56	86	RT	CME 45B	82	887.8	885.9	1.9 C
4	B-011-0-21	I-71	170+65	86	RT	CME 45B	82	885.9	884.7	1.2 C
5	B-012-0-21	I-71	174+56	86	RT	CME 45B	82	886.8	886.3	0.5 C
6	B-013-0-21	I-71	178+53	86	RT	CME 45B	82	889.2	888.0	1.2 C
7	B-014-0-21	I-71	182+61	85	RT	CME 45B	82	891.6	889.7	1.9 C
8	B-015-0-21	I-71	186+58	84	RT	CME 45B	82	894.1	891.3	2.8 C
9	B-016-0-21	I-71	190+59	84	RT	CME 45B	82	896.6	893.0	3.6 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	-0.1	1.4	41		4.5	23	16	7	34	22	56	9	11	A-4a	4	4267					
	008-0	SS-2	3.0	4.5	1.4	2.9	19		4.5	23	15	8	36	22	58	10	10	A-4a	5						
	21	SS-3	4.5	6.0	2.9	4.4	19		4							12	10	A-4a	8						
		SS-4	6.0	7.5	4.4	5.9	22	19	4.25							11	10	A-4a	8						
2	B	SS-1	1.5	3.0	0.1	1.6	33		4.5							9	10	A-4a	8	>8000					
	009-0	SS-2	3.0	4.5	1.6	3.1	25		4.5	24	14	10	37	23	60	9	10	A-4a	5						
	21	SS-3	4.5	6.0	3.1	4.6	12		4.5	22	15	7	37	21	58	11	10	A-4a	5						
		SS-4	6.0	7.5	4.6	6.1	15	12	1.75							13	10	A-4a	8						
3	B	SS-1	1.5	3.0	-0.4	1.1	52									5	6	A-1-a	0						
	010-0	SS-2	3.0	4.5	1.1	2.6	20		4.5	33	25	8	35	14	49	21	20	A-4a	3	5767					
	21	SS-3	4.5	6.0	2.6	4.1	27		4.5							12	10	A-4a	8						
		SS-4	6.0	7.5	4.1	5.6	26	20	3.5	33	19	14	43	31	74	20	14	A-6a	9						
4	B	SS-1	1.5	3.0	0.3	1.8	78									5	6	A-1-b	0						
	011-0	SS-2	3.0	4.5	1.8	3.3	18		4.5	26	16	10	37	30	67	12	11	A-4a	6	440					
	21	SS-3	4.5	6.0	3.3	4.8	16		4.5	28	17	11	35	27	62	13	14	A-6a	6						
		SS-4	6.0	7.5	4.8	6.3	18	16	1.5							28	14	A-6a	10						
5	B	SS-1	1.5	3.0	1.0	2.5	52									10	6	A-1-b	0						
	012-0	SS-2	3.0	4.5	2.5	4.0	15		4.5	28	17	11	36	29	65	14	14	A-6a	6	220					
	21	SS-3	4.5	6.0	4.0	5.5	15		4.5	26	16	10	36	24	60	13	11	A-4a	5						
		SS-4	6.0	7.5	5.5	7.0	14	14	2.5							22	14	A-6a							
6	B	SS-1	1.5	3.0	0.3	1.8	80									24	6	A-1-b	0						
	013-0	SS-2	3.0	4.5	1.8	3.3	33			24	17	7	21	13	34	9	10	A-2-4	0	1433					
	21	SS-3	4.5	6.0	3.3	4.8	14		4.25	24	14	10	38	29	67	12	10	A-4a	6						
		SS-4	6.0	7.5	4.8	6.3	12	12	2.5							15	10	A-4a	8						
7	B	SS-1	1.5	3.0	-0.4	1.1	34		4.5	27	17	10	31	24	55	5	12	A-4a	4	4767					
	014-0	SS-2	3.0	4.5	1.1	2.6	20		4.5							13	10	A-4a	8			Mc			
	21	SS-3	4.5	6.0	2.6	4.1	20		4.5	24	16	8	25	16	41	11	11	A-4a	1						
		SS-4	6.0	7.5	4.1	5.6	23	20	4.5							11	10	A-4a	8						
8	B	SS-1	1.5	3.0	-1.3	0.2	109									12	6	A-1-b	0						
	015-0	SS-2	3.0	4.5	0.2	1.7	15		4.5	28	18	10	31	18	49	12	13	A-4a	3	2300					
	21	SS-3	4.5	6.0	1.7	3.2	11		3.25	25	16	9	32	22	54	11	11	A-4a	4			N_{60}			
		SS-4	6.0	7.5	3.2	4.7	12	11	3.25							13	10	A-4a	8						
9	B	SS-1	1.5	3.0	-2.1	-0.6	50									14	6	A-1-b	0						
	016-0	SS-2	3.0	4.5	-0.6	0.9	18		4.5	25	16	9	36	24	60	11	11	A-4a	5	3767					
	21	SS-3	4.5	6.0	0.9	2.4	25		4.5	25	16	9	34	24	58	12	11	A-4a	5						
		SS-4	6.0	7.5	2.4	3.9	25	18	4.5							13	10	A-4a	8						

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 9

Geotechnical Consultant: NEAS, Inc.

Prepared By: MWJ

Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12''
Average(HP):	0''
Global Geogrid Average(N60L):	0''
Average(HP):	0''

Design CBR	8

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	3%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	14%	1 < HP ≤ 2	6%
$N_{60} \geq 20$	54%	HP > 2	77%
M+	3%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0''
Maximum	0''
Minimum	0''

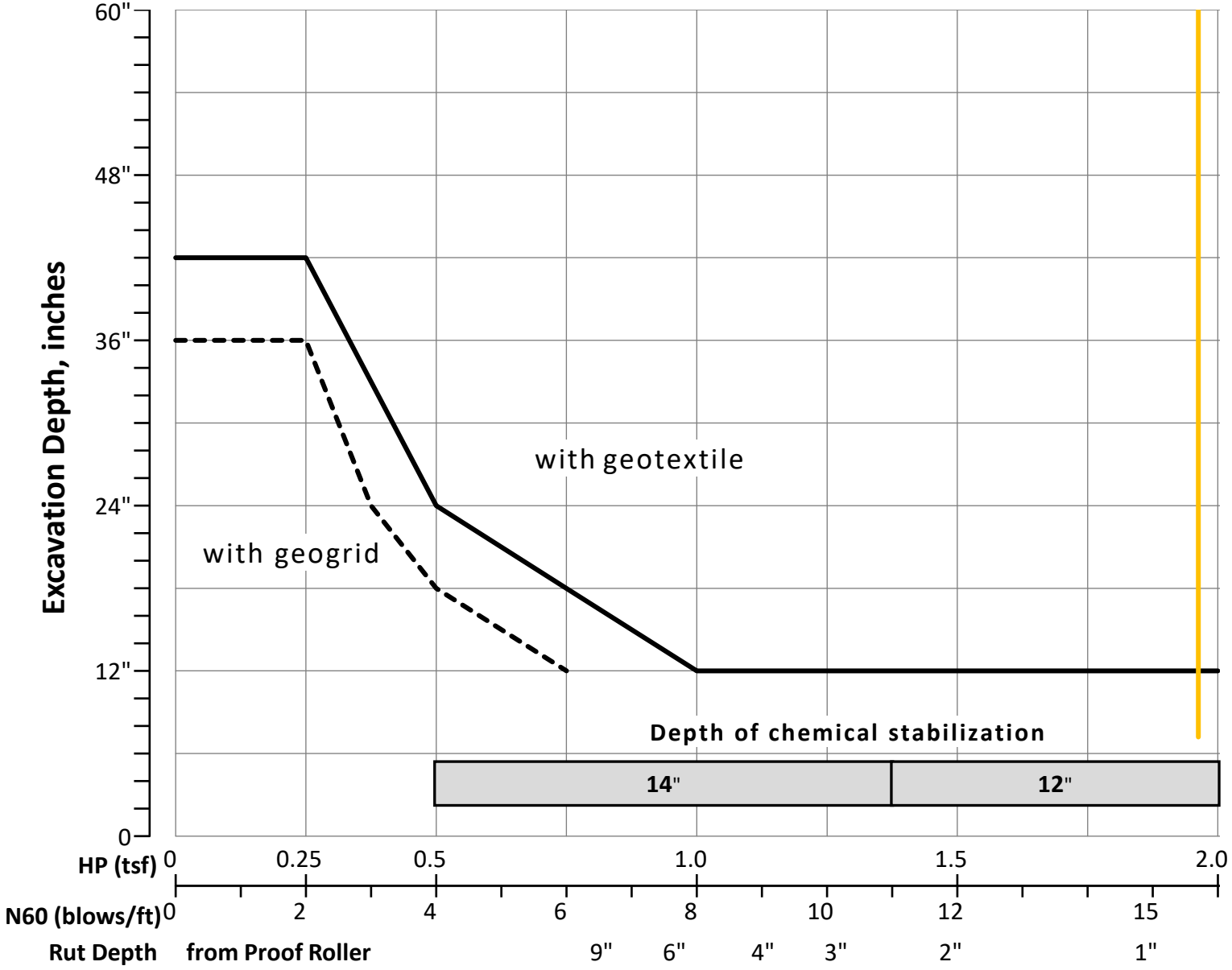
% Proposed Subgrade Surface	
Unstable & Unsuitable	9%
Unstable	9%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	28	16	4.01	26	17	9	34	23	57	13	11	5
Maximum	109	20	4.50	33	25	14	43	31	74	28	20	10
Minimum	11	11	1.50	22	14	7	21	13	34	5	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	1	4	1	0	0	0	0	0	24	0	0	5	0	0	0	0	0	35
Percent	0%	3%	11%	3%	0%	0%	0%	0%	0%	69%	0%	0%	14%	0%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	86%									14%								100%
Surface Class Count	0	1	5	1	0	0	0	0	0	15	0	0	1	0	0	0	0	0	23
Surface Class Percent	0%	4%	22%	4%	0%	0%	0%	0%	0%	65%	0%	0%	4%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.01	0.50	☐ HP
15.78	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

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FRA-071/270-28.27/25.99A
105435

Ramp K

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 07, 2022

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2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 7

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-028-0-21	Ramp K	13+63	23	RT	CME 75T	79	921.3	922.8	1.6 F
2	B-029-0-21	Ramp K	16+67	25	RT	CME 75T	79	929.0	928.9	0.1 C
3	B-030-0-21	Ramp K	19+68	27	RT	CME 75T	79	937.1	938.6	1.5 F
4	B-031-0-21	Ramp K	21+80	11	LT	CME 75T	79	940.6	941.9	1.3 F
5	B-032-0-21	Ramp K	24+63	1	RT	CME 75T	79	938.9	939.2	0.3 F
6	B-034-0-21	Ramp K	30+16	2	LT	CME 75T	79	926.7	925.8	0.8 C
7	B-035-0-21	Ramp K	34+09	22	RT	CME 75T	79	915.6	913.2	2.5 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	3.1	4.6	12		4.5	34	17	17	34	29	63	15	16	A-6b	8	200					
	028-0	SS-2	3.0	4.5	4.6	6.1	13		4.5	34	18	16	36	35	71	16	16	A-6b	10						
	21	SS-3	4.5	6.0	6.1	7.6	13		4.5							15	16	A-6b							
		SS-4	6.0	7.5	7.6	9.1	16	12	4.5							11	16	A-6b							
2	B	SS-1	1.5	3.0	1.4	2.9	9		4.5	32	18	14	39	33	72	17	14	A-6a	9	280		N_{60} & Mc			
	029-0	SS-2	3.0	4.5	2.9	4.4	16		2.25	35	18	17	36	34	70	20	16	A-6b	10						
	21	SS-3	4.5	6.0	4.4	5.9	9		2.75							21	16	A-6b	16						
		SS-4	6.0	7.5	5.9	7.4	14	9	3							22	16	A-6b							
3	B	SS-1	1.5	3.0	3.0	4.5	12			NP	NP	NP	14	6	20	7	6	A-1-b	0						
	030-0	SS-2A	3.0	3.5	4.5	5.0	5									7	6	A-1-b	0						
	21	SS-2B	3.5	4.5	5.0	6.0	5			31	17	14	34	29	63	20	14	A-6a	7						
		SS-3	4.5	6.0	6.0	7.5	3	3	1.25							26	14	A-6a							
4	B	SS-1	1.5	3.0	2.8	4.3	7		4.25	32	17	15	39	35	74	18	14	A-6a	10						
	031-0	SS-2	3.0	4.5	4.3	5.8	8		4	33	16	17	41	32	73	17	16	A-6b	10						
	21	SS-3	4.5	6.0	5.8	7.3	9		1.75							17	14	A-6a							
		SS-4	6.0	7.5	7.3	8.8	11	7	2.25							13	14	A-6a							
5	B	SS-1	1.5	3.0	1.8	3.3	18		4.5	24	15	9	38	22	60	11	10	A-4a	5	240					
	032-0	SS-2	3.0	4.5	3.3	4.8	12		4.5	24	14	10	39	26	65	11	10	A-4a	6						
	21	SS-3	4.5	6.0	4.8	6.3	11		4.5							10	10	A-4a	8						
		SS-4	6.0	7.5	6.3	7.8	8	11	4.5							10	10	A-4a							
6	B	SS-1	2.5	4.0	1.7	3.2	16		4.5	37	18	19	38	38	76	17	16	A-6b	12						
	034-0	SS-2	5.0	6.5	4.2	5.7	16		4.5							13	16	A-6b	16						
	21	SS-3	7.5	9.0	6.7	8.2	26		4.5	32	18	14	36	33	69	15	14	A-6a							
		SS-4	10.0	11.5	9.2	10.7	20	16	4.5							20	14	A-6a							
7	B	SS-1	1.5	3.0	-1.0	0.5	16		4.5							13	16	A-6b	16						
	035-0	SS-2	3.0	4.5	0.5	2.0	25		4.5	34	17	17	35	35	70	14	16	A-6b	10	80					
	21	SS-3	4.5	6.0	2.0	3.5	28		4.5							16	16	A-6b	16						
		SS-4	6.0	7.5	3.5	5.0	28	16	4.5	34	22	12	47	37	84	19	17	A-6a	9						

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 7

Geotechnical Consultant: NEAS, Inc.

Prepared By: MWJ

Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	No
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	14''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12''
Average(HP):	0''
Global Geogrid Average(N60L):	0''
Average(HP):	0''

Design CBR	6

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	13%	HP ≤ 0.5	0%
$N_{60} < 12$	39%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	26%	1 < HP ≤ 2	9%
$N_{60} \geq 20$	13%	HP > 2	78%
M+	4%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0''
Maximum	0''
Minimum	0''

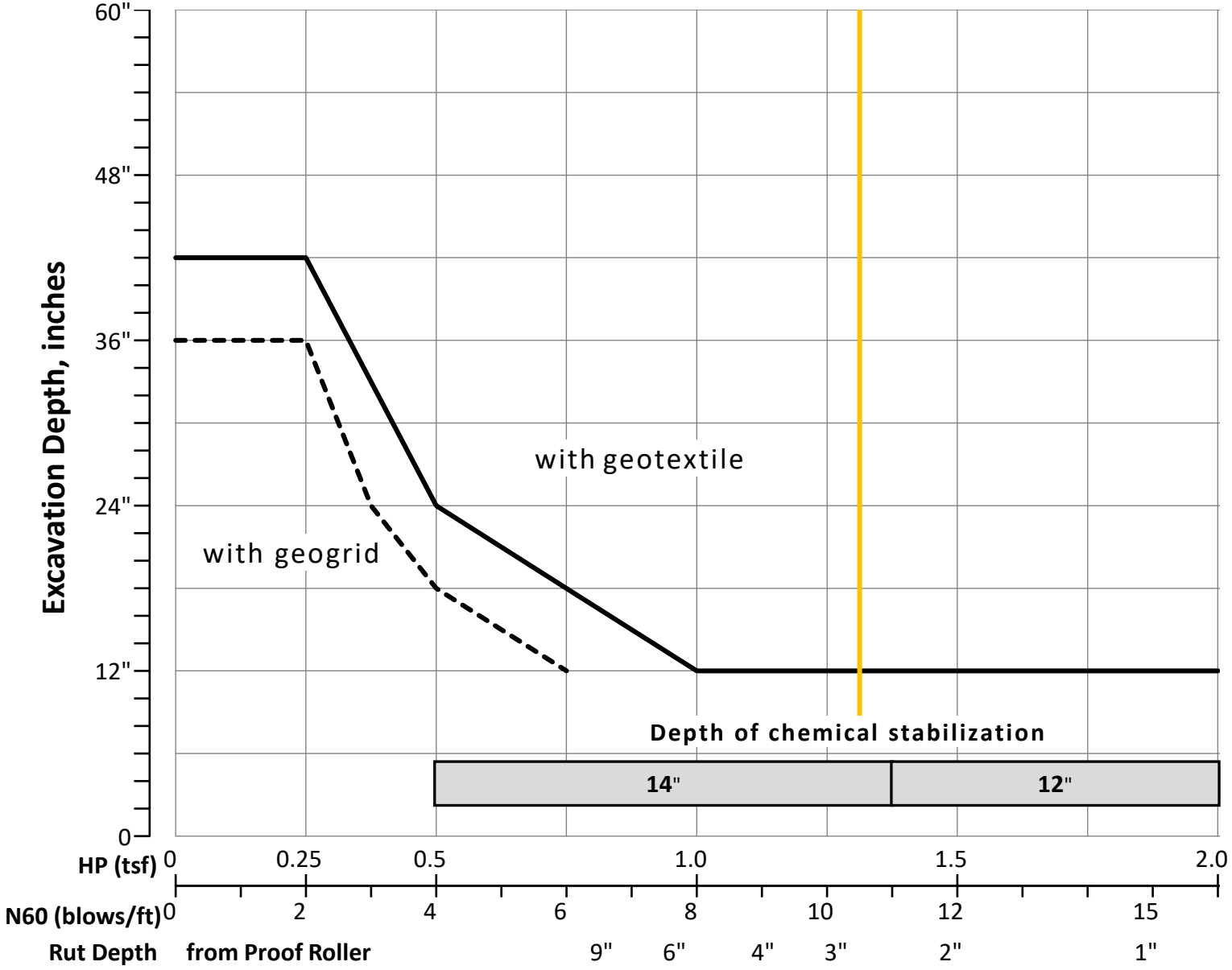
% Proposed Subgrade Surface	
Unstable & Unsuitable	14%
Unstable	14%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	14	11	3.92	32	17	15	36	30	66	15	14	9
Maximum	28	16	4.50	37	22	19	47	38	84	26	17	16
Minimum	3	3	1.25	24	14	9	14	6	20	7	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	2	0	0	0	0	0	0	4	0	0	9	13	0	0	0	0	28
Percent	0%	0%	7%	0%	0%	0%	0%	0%	0%	14%	0%	0%	32%	46%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	21%									79%								100%
Surface Class Count	0	0	0	0	0	0	0	0	0	1	0	0	2	4	0	0	0	0	7
Surface Class Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	14%	0%	0%	29%	57%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
3.92	0.50	☐ HP
10.57	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

FRA-071/270-28.27/25.99A
105435

Ramp M

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 07, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 7

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-018-0-21	Ramp M	84+94	3	LT	CME 45B	82	921.6	920.5	1.1 C
2	B-019-0-21	Ramp M	88+73	46	LT	CME 45B	82	920.4	918.1	2.2 C
3	B-020-0-21	Ramp M	92+48	4	LT	CME 45B	82	917.4	915.4	2.0 C
4	B-021-0-21	Ramp M	96+55	5	RT	CME 45B	82	918.6	916.6	1.9 C
5	B-022-0-21	Ramp M	100+01	3	RT	CME 45B	82	920.6	919.4	1.3 C
6	B-023-0-21	Ramp M	103+72	62	LT	CME 45B	82	923.6	922.4	1.2 C
7	B-024-0-21	Ramp M	107+55	49	LT	CME 45B	82	925.6	924.3	1.3 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	0.4	1.9	20		4.5	36	20	16	29	26	55	12	16	A-6b	6	213					
	018-0	SS-2	3.0	4.5	1.9	3.4	15		2.25	50	22	28	33	40	73	25	19	A-7-6	17			Mc			
	21	SS-3	4.5	6.0	3.4	4.9	10		1.75							27	18	A-7-6	16						
		SS-4	6.0	7.5	4.9	6.4	12	10	1.5							22	18	A-7-6	16						
2	B	SS-1	1.5	3.0	-0.7	0.8	19		4.5	31	17	14	36	25	61	13	14	A-6a	7	633					
	019-0	SS-2	3.0	4.5	0.8	2.3	19		4.5	28	17	11	38	26	64	14	14	A-6a	6						
	21	SS-3	4.5	6.0	2.3	3.8	15		4.5							16	14	A-6a	10						
		SS-4	6.0	7.5	3.8	5.3	15	15	4.5							15	14	A-6a	10						
3	B	SS-1	1.5	3.0	-0.5	1.0	29		4.5	26	17	9	35	25	60	12	12	A-4a	5	393					
	020-0	SS-2	3.0	4.5	1.0	2.5	23		4.5	27	16	11	34	25	59	12	14	A-6a	5						
	21	SS-3	4.5	6.0	2.5	4.0	10		3.75							13	16	A-6b	16						
		SS-4	6.0	7.5	4.0	5.5	11	10	2.25							14	16	A-6b	16						
4	B	SS-1	1.5	3.0	-0.4	1.1	20		4.5	32	18	14	36	30	66	13	14	A-6a	8	293					
	021-0	SS-2	3.0	4.5	1.1	2.6	23		4.5	29	18	11	37	28	65	14	14	A-6a	6						
	21	SS-3	4.5	6.0	2.6	4.1	20		4.5							15	14	A-6a	10						
		SS-4	6.0	7.5	4.1	5.6	16	16	4.5							15	14	A-6a	10						
5	B	SS-1	1.5	3.0	0.2	1.8	16									6	6	A-1-b	0						
	022-0	SS-2	3.0	4.5	1.8	3.3	12			NP	NP	NP	14	4	18	6	6	A-1-b	0						
	21	SS-3	4.5	6.0	3.3	4.8	11		4.25	38	19	19	39	36	75	18	16	A-6b	12	240					
		SS-4	6.0	7.5	4.8	6.3	10	10								11	6	A-1-a	0						
6	B	SS-1	1.5	3.0	0.3	1.8	20		4.5							14	16	A-6b	16	533					
	023-0	SS-2	3.0	4.5	1.8	3.3	18		4.5	35	19	16	31	27	58	16	16	A-6b	7						
	21	SS-3	4.5	6.0	3.3	4.8	30		4.25							11	16	A-6b	16						
		SS-4	6.0	7.5	4.8	6.3	34	18		32	18	14	22	16	38	9	14	A-6a	2						
7	B	SS-1	1.5	3.0	0.2	1.7	22		4.5							16	16	A-6b	16						
	024-0	SS-2	3.0	4.5	1.7	3.2	26		4.5	26	16	10	37	25	62	11	11	A-4a	5	1967					
	21	SS-3	4.5	6.0	3.2	4.7	29		4.5	25	16	9	38	22	60	10	11	A-4a	5						
		SS-4	6.0	7.5	4.7	6.2	35	22	4.5							10	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A
No. of Borings: 7

Geotechnical Consultant: NEAS, Inc.
Prepared By: MWJ
Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12''
Average(HP):	0''
Global Geogrid Average(N60L):	0''
Average(HP):	0''

Design CBR	6

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	18%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	7%	1 < HP ≤ 2	7%
$N_{60} \geq 20$	46%	HP > 2	79%
M+	4%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0''
Maximum	0''
Minimum	0''

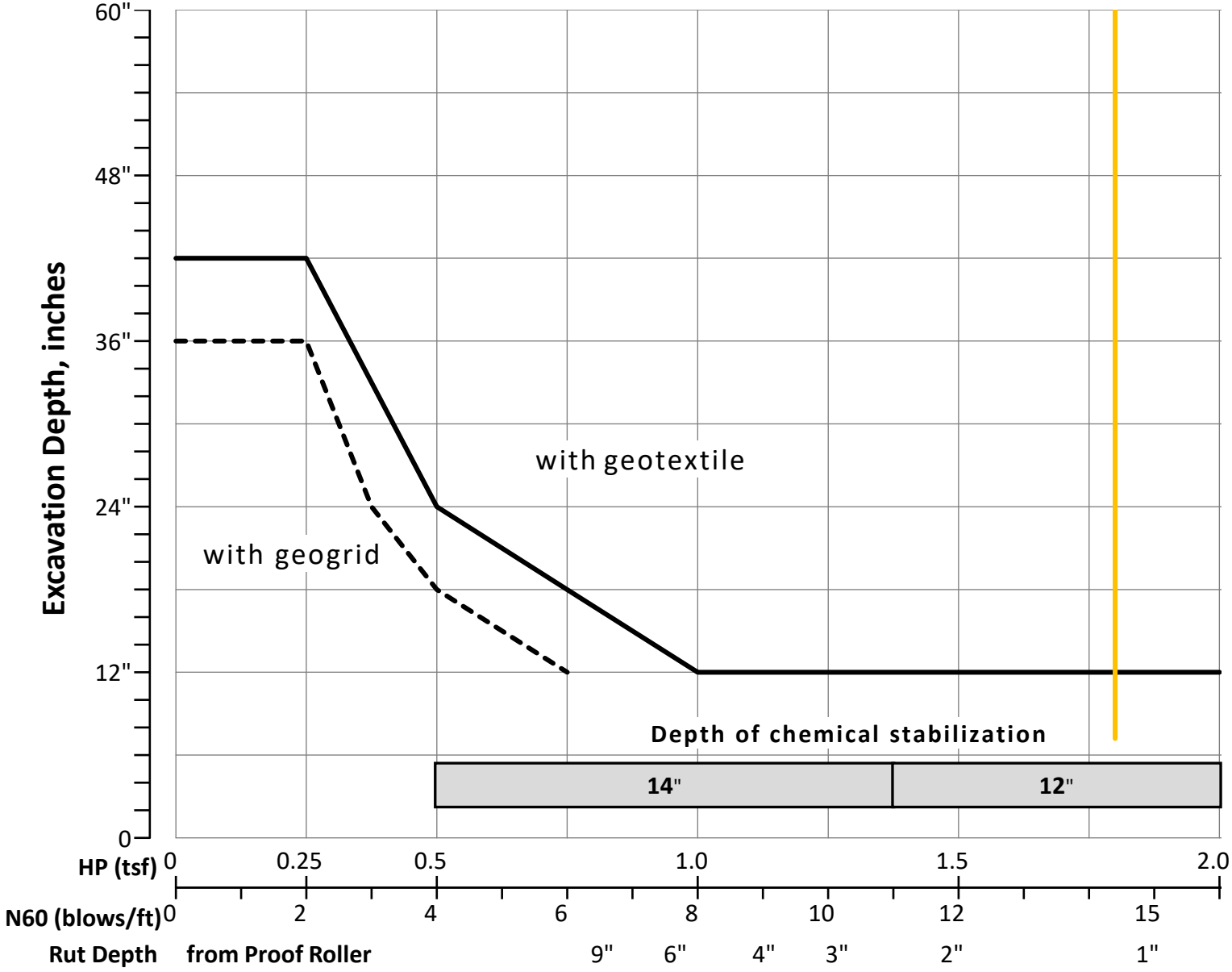
% Proposed Subgrade Surface	
Unstable & Unsuitable	6%
Unstable	6%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	19	14	4.02	32	18	14	33	25	58	14	14	9
Maximum	35	22	4.50	50	22	28	39	40	75	27	19	17
Minimum	10	10	1.50	25	16	9	14	4	18	6	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	1	2	0	0	0	0	0	0	4	0	0	10	8	0	3	0	0	28
Percent	0%	4%	7%	0%	0%	0%	0%	0%	0%	14%	0%	0%	36%	29%	0%	11%	0%	0%	100%
% Rock|Granular|Cohesive	0%	25%									75%								100%
Surface Class Count	0	0	2	0	0	0	0	0	0	2	0	0	7	5	0	1	0	0	17
Surface Class Percent	0%	0%	12%	0%	0%	0%	0%	0%	0%	12%	0%	0%	41%	29%	0%	6%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.02	0.50	☐ HP
14.43	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

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FRA-071/270-28.27/25.99A
105435

Ramp N

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 7, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 4

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-042-0-21	Ramp N	141+47	31	RT	CME 55T	63	910.3	909.6	0.7 C
2	B-004-0-21	Ramp N	142+87	123	LT	CME 45B	82	911.1	908.4	2.7 C
3	B-043-0-21	Ramp N	145+00	11	RT	CME 55T	63	906.0	906.2	0.2 F
4	B-005-0-21	Ramp N	146+30	42	LT	CME 45B	82	908.2	905.7	2.6 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	0.8	2.3	20									7	10	A-2-4	0						
	042-0	SS-2	3.0	4.5	2.3	3.8	16		4.5	30	17	13	37	28	65	14	14	A-6a	7	1280					
	21	SS-3	4.5	6.0	3.8	5.3	8		2.75							22	14	A-6a	10						
		SS-4	6.0	7.5	5.3	6.8	18	8	3.5	53	25	28	40	49	89	28	22	A-7-6							
2	B	SS-1	1.5	3.0	-1.2	0.3	60									9	6	A-1-b	0						
	004-0	SS-2	3.0	4.5	0.3	1.8	35		4.5	34	19	15	40	33	73	17	14	A-6a	10	20		Mc			
	21	SS-3	4.5	6.0	1.8	3.3	29		3.5	32	17	15	36	32	68	16	14	A-6a	9						
		SS-4	6.0	7.5	3.3	4.8	25	25	3.5							24	18	A-7-6	16						
3	B	SS-1	1.5	3.0	1.7	3.2	27		4.5	28	17	11	39	27	66	14	14	A-6a	7	160					
	043-0	SS-2	3.0	4.5	3.2	4.7	22		4.5							13	14	A-6a	10						
	21	SS-3	4.5	6.0	4.7	6.2	17		4.5	25	18	7	32	21	53	12	13	A-4a	4						
		SS-4	6.0	7.5	6.2	7.7	20	17	4.5							10	10	A-4a							
4	B	SS-1	1.5	3.0	-1.1	0.4	35									8	6	A-1-b	0						
	005-0	SS-2	3.0	4.5	0.4	1.9	23		4.5	26	17	9	34	22	56	14	12	A-4a	4	260					
	21	SS-3	4.5	6.0	1.9	3.4	20		4							15	10	A-4a	8			Mc			
		SS-4	6.0	7.5	3.4	4.9	23	20	4.25							12	10	A-4a	8						

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 4

Geotechnical Consultant: NEAS, Inc.

Prepared By: MWJ

Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	NA

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	0"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	7

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	7%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	0%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	73%	HP > 2	80%
M+	13%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

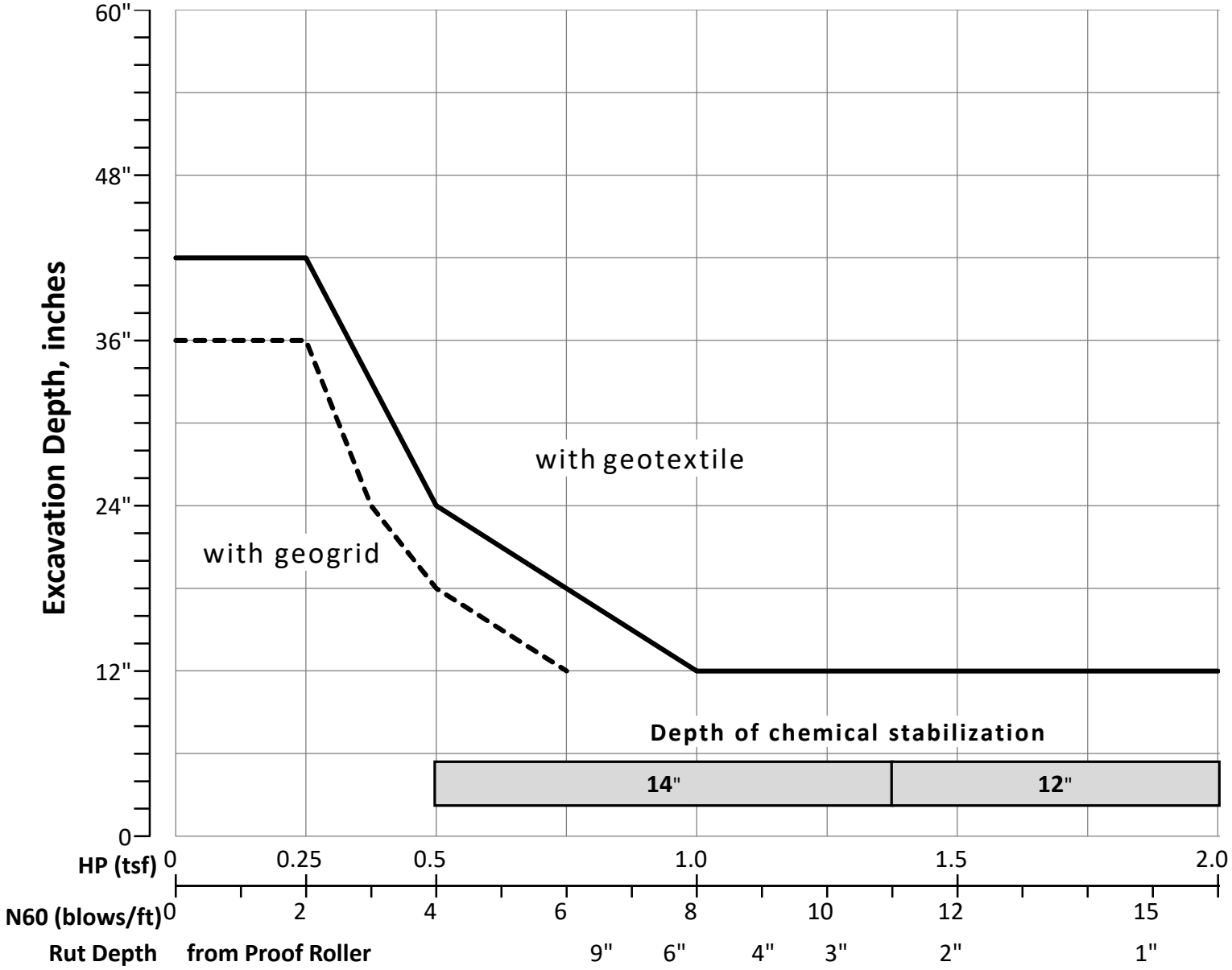
% Proposed Subgrade Surface	
Unstable & Unsuitable	22%
Unstable	22%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	25	18	4.08	33	19	14	37	30	67	15	13	7
Maximum	60	25	4.50	53	25	28	40	49	89	28	22	16
Minimum	8	8	2.75	25	17	7	32	21	53	7	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	2	1	0	0	0	0	0	5	0	0	6	0	0	2	0	0	16
Percent	0%	0%	13%	6%	0%	0%	0%	0%	0%	31%	0%	0%	38%	0%	0%	13%	0%	0%	100%
% Rock|Granular|Cohesive	0%	50%									50%								100%
Surface Class Count	0	0	2	1	0	0	0	0	0	2	0	0	4	0	0	0	0	0	9
Surface Class Percent	0%	0%	22%	11%	0%	0%	0%	0%	0%	22%	0%	0%	44%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.08	0.50	☐ HP
17.50	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

FRA-071/270-28.27/25.99A
105435

Ramp O

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 7, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 5

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-036-0-21	Ramp O	19+28	29	RT	CME 75T	79	916.2	914.5	1.7 C
2	B-037-0-21	Ramp O	23+07	2	RT	CME 75T	79	926.4	925.7	0.7 C
3	B-039-0-21	Ramp O	31+80	5	LT	CME 75T	79	929.8	928.8	1.0 C
4	B-040-0-21	Ramp O	34+43	20	RT	CME 55T	63	925.8	924.7	1.1 C
5	B-041-0-21	Ramp O	37+47	58	LT	CME 55T	63	921.7	921.3	0.4 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	-0.2	1.3	14		4.5	24	14	10	34	23	57	10	10	A-4a	4	600					
	036-0	SS-2	3.0	4.5	1.3	2.8	13		4.5	23	14	9	38	24	62	12	10	A-4a	5						
	21	SS-3	4.5	6.0	2.8	4.3	16		4.5							11	10	A-4a	8						
		SS-4	6.0	7.5	4.3	5.8	8	8	4							11	10	A-4a	8						
2	B	SS-1	1.5	3.0	0.8	2.4	18		4.5	23	14	9	39	25	64	10	10	A-4a	6	780					
	037-0	SS-2	3.0	4.5	2.4	3.9	20		4.5	23	13	10	36	24	60	9	10	A-4a	5						
	21	SS-3	4.5	6.0	3.9	5.4	25		4.5							10	10	A-4a	8						
		SS-4	6.0	7.5	5.4	6.9	38	18	4.5							9	10	A-4a							
3	B	SS-1	1.5	3.0	0.5	2.0	18		4.5	27	16	11	34	28	62	12	14	A-6a	6	400					
	039-0	SS-2	3.0	4.5	2.0	3.5	16		4.5							12	14	A-6a	10						
	21	SS-3	4.5	6.0	3.5	5.0	14		4.5							13	14	A-6a	10						
		SS-4	6.0	7.5	5.0	6.5	16	14	4.5	27	14	13	35	27	62	11	14	A-6a							
4	B	SS-1	1.5	3.0	0.4	1.9	26		4.5	23	14	9	35	25	60	8	10	A-4a	5	6033					
	040-0	SS-2	3.0	4.5	1.9	3.4	33		4.5	27	16	11	37	28	65	11	14	A-6a	6						
	21	SS-3	4.5	6.0	3.4	4.9	29		4.5							10	14	A-6a	10						
		SS-4	6.0	7.5	4.9	6.4	33	26	4.5							13	14	A-6a	10						
5	B	SS-1	1.5	3.0	1.1	2.6	11		4.5	25	15	10	38	27	65	12	10	A-4a	6	2633		N_{60}			
	041-0	SS-2	3.0	4.5	2.6	4.1	19		4.5	32	17	15	36	33	69	13	14	A-6a	9						
	21	SS-3	4.5	6.0	4.1	5.6	19		4.5							14	14	A-6a	10						
		SS-4	6.0	7.5	5.6	7.1	27	11	4.5							13	14	A-6a							

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A
No. of Borings: 5

Geotechnical Consultant: NEAS, Inc.
Prepared By: MWJ
Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12"

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	7

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	10%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	15%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	40%	HP > 2	100%
M+	0%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

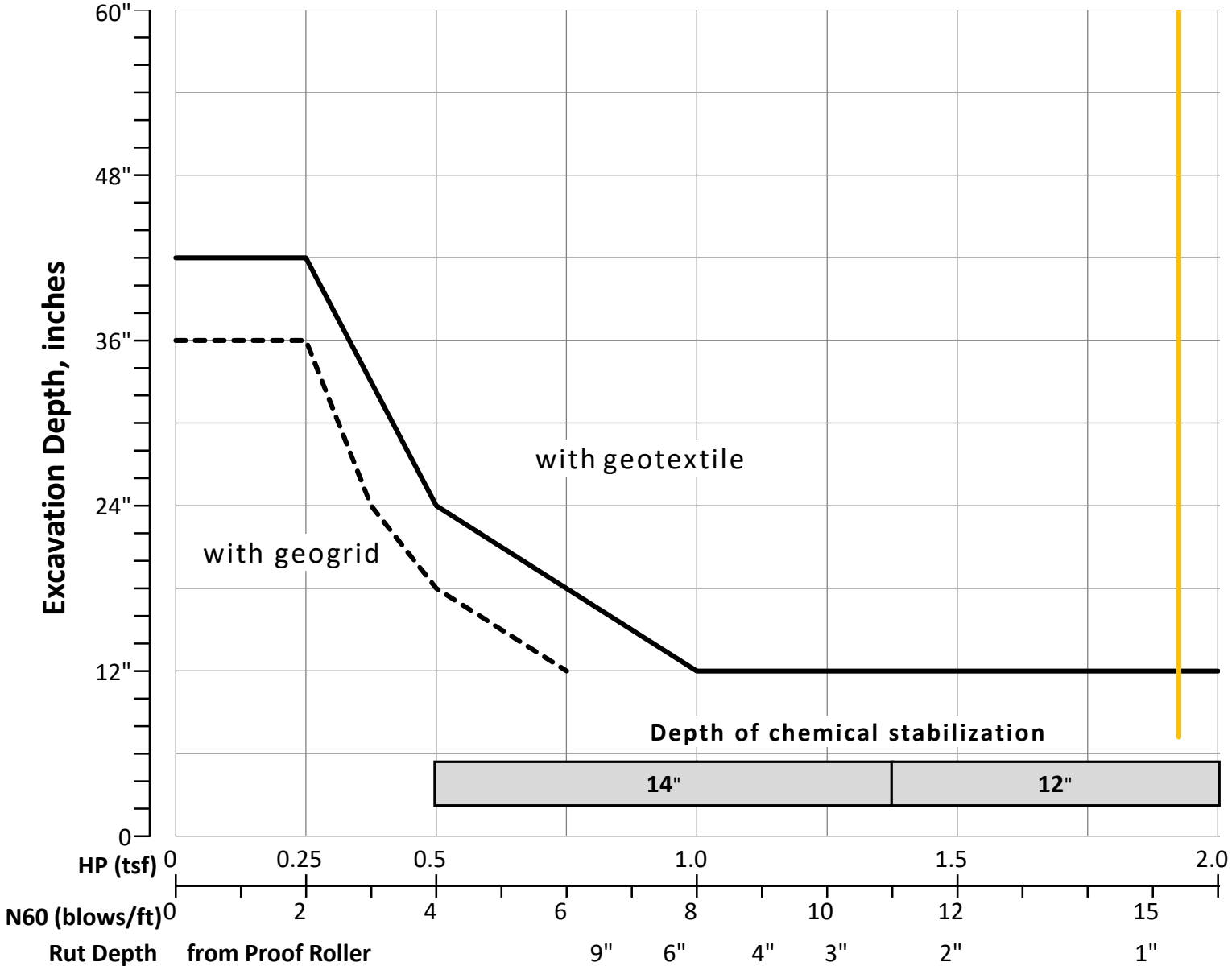
% Proposed Subgrade Surface	
Unstable & Unsuitable	10%
Unstable	10%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	21	15	4.48	25	15	11	36	26	63	11	12	7
Maximum	38	26	4.50	32	17	15	39	33	69	14	14	10
Minimum	8	8	4.00	23	13	9	34	23	57	8	10	4

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	20
Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	50%	0%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	50%									50%								100%
Surface Class Count	0	0	0	0	0	0	0	0	0	6	0	0	4	0	0	0	0	0	10
Surface Class Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	40%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.48	0.50	☐ HP
15.40	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

FRA-071/270-28.27/25.99A
105435

Ramp P

NEAS, Inc.

Prepared By: MWJ
Date prepared: Wednesday, September 07, 2022

Chunmei (Melinda) He, Ph.D, P.E.
2800 Corporate Exchange Drive
Suite 240
Columbus, OH, 43231
614-714-0299
che@neasinc.com

NO. OF BORINGS: 7

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-022-0-21	Ramp P	1000+06	26	RT	CME 45B	82	920.6	919.7	0.9 C
2	B-023-0-21	Ramp P	1003+80	22	LT	CME 45B	82	923.6	923.0	0.6 C
3	B-024-0-21	Ramp P	1007+63	6	RT	CME 45B	82	925.6	926.2	0.6 F
4	B-025-0-21	Ramp P	1011+38	22	LT	CME 45B	82	935.5	935.2	0.3 C
5	B-026-0-21	Ramp P	1018+46	4	RT	CME 45B	82	928.1	926.6	1.4 C
6	B-027-0-21	Ramp P	1022+29	18	LT	CME 45B	82	913.7	911.1	2.6 C
7	B-001-0-21	Ramp P	1024+89	27	LT	CME 45B	82	913.0	910.7	2.3 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	1.5	3.0	0.6	2.1	16									6	6	A-1-b	0						
	022-0	SS-2	3.0	4.5	2.1	3.6	12			NP	NP	NP	14	4	18	6	6	A-1-b	0						
	21	SS-3	4.5	6.0	3.6	5.1	11		4.25	38	19	19	39	36	75	18	16	A-6b	12	240					
		SS-4	6.0	7.5	5.1	6.6	10	10								11	6	A-1-a							
2	B	SS-1	1.5	3.0	0.9	2.4	20		4.5							14	16	A-6b	16	533					
	023-0	SS-2	3.0	4.5	2.4	3.9	18		4.5	35	19	16	31	27	58	16	16	A-6b	7						
	21	SS-3	4.5	6.0	3.9	5.4	30		4.25							11	16	A-6b	16						
		SS-4	6.0	7.5	5.4	6.9	34	18		32	18	14	22	16	38	9	14	A-6a							
3	B	SS-1	1.5	3.0	2.1	3.6	22		4.5							16	16	A-6b	16						
	024-0	SS-2	3.0	4.5	3.6	5.1	26		4.5	26	16	10	37	25	62	11	11	A-4a	5	1967					
	21	SS-3	4.5	6.0	5.1	6.6	29		4.5	25	16	9	38	22	60	10	11	A-4a							
		SS-4	6.0	7.5	6.6	8.1	35	22	4.5							10	10	A-4a							
4	B	SS-1	1.5	3.0	1.2	2.7	14		4.5							10	10	A-4a	8						
	025-0	SS-2	3.0	4.5	2.7	4.2	5		2.5	25	15	10	39	23	62	13	10	A-4a	5	1227					
	21	SS-3	4.5	6.0	4.2	5.7	8		3.75	24	15	9	38	24	62	13	10	A-4a	5						
		SS-4	6.0	7.5	5.7	7.2	10	5	4							13	10	A-4a							
5	B	SS-1	1.5	3.0	0.1	1.6	8		3	32	17	15	37	32	69	17	14	A-6a	9	673		N_{60} & Mc		**12"**	
	026-0	SS-2	3.0	4.5	1.6	3.1	10		3.75	33	19	14	38	33	71	19	14	A-6a	9			N_{60} & Mc			
	21	SS-3	4.5	6.0	3.1	4.6	5		3.5							13	14	A-6a	10						
		SS-4	6.0	7.5	4.6	6.1	5	5	2.5							17	14	A-6a	10						
6	B	SS-1	1.5	3.0	-1.1	0.4	7			NP	NP	NP	19	14	33	10	10	A-2-4	0			N_{60}		**15"**	
	027-0	SS-2	3.0	4.5	0.4	1.9	19			34	20	14	27	21	48	12	15	A-6a	4	807					
	21	SS-3	4.5	6.0	1.9	3.4	18									16	14	A-6a	10						
		SS-4	6.0	7.5	3.4	4.9	18	7								14	14	A-6a	10						
7	B	SS-1	1.5	3.0	-0.8	0.7	19			NP	NP	NP	24	15	39	10	11	A-4a	1						
	001-0	SS-2	3.0	4.5	0.7	2.2	20		4.5	39	19	20	43	41	84	21	16	A-6b	12	233		Mc			
	21	SS-3	4.5	6.0	2.2	3.7	29		4.5							18	16	A-6b	16						
		SS-4	6.0	7.5	3.7	5.2	26	19	3.75							25	16	A-6b	16						

PID: 105435

County-Route-Section: FRA-071/270-28.27/25.99A

No. of Borings: 7

Geotechnical Consultant: NEAS, Inc.

Prepared By: MWJ

Date prepared: 9/7/2022

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12''
Average(HP):	0''
Global Geogrid Average(N60L):	0''
Average(HP):	0''

Design CBR	6

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	11%	HP ≤ 0.5	0%
$N_{60} < 12$	37%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	7%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	33%	HP > 2	67%
M+	11%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	0''
Maximum	0''
Minimum	0''

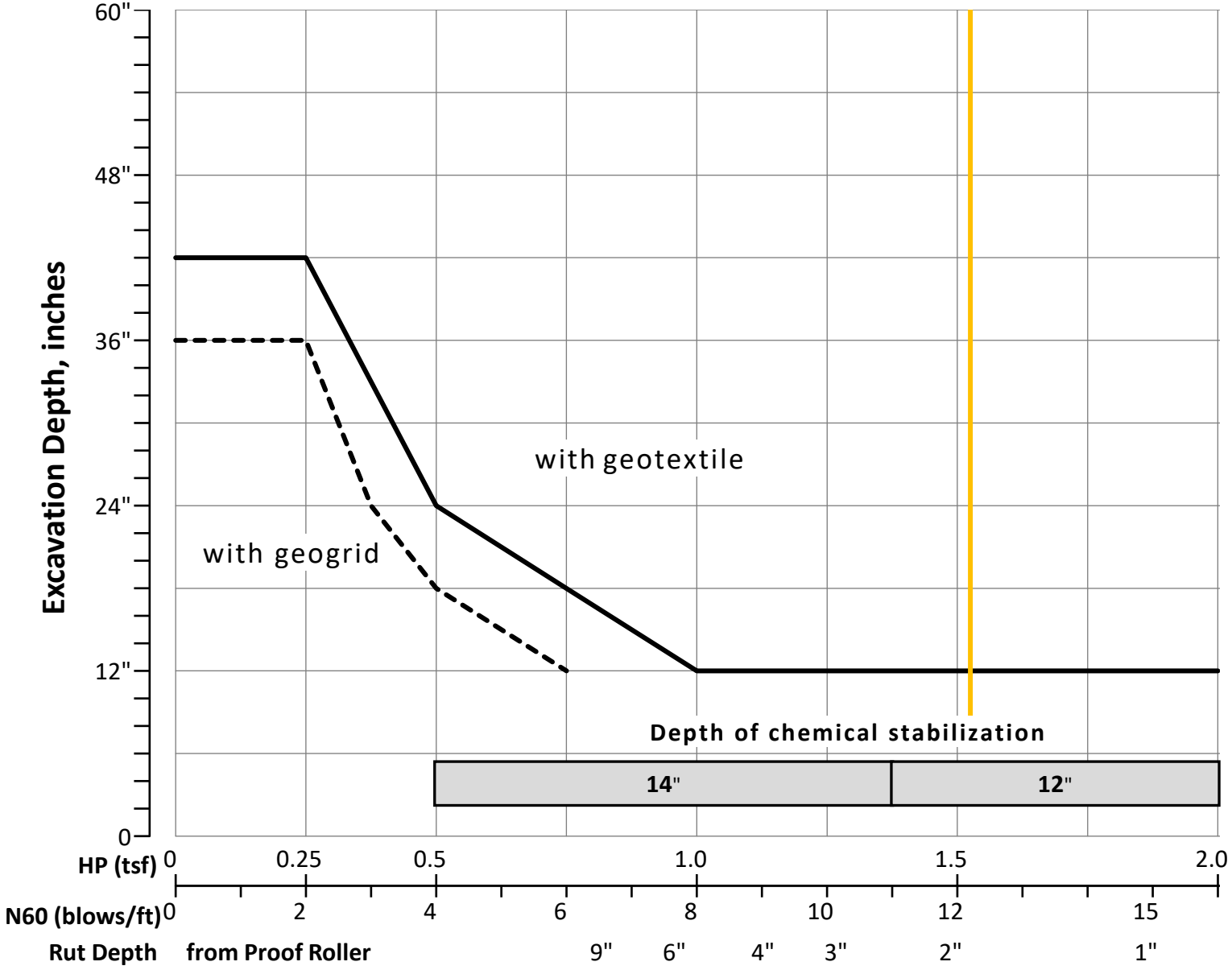
% Proposed Subgrade Surface	
Unstable & Unsuitable	27%
Unstable	27%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	17	12	3.99	31	18	14	32	24	56	14	13	9
Maximum	35	22	4.50	39	20	20	43	41	84	25	16	16
Minimum	5	5	2.50	24	15	9	14	4	18	6	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	1	2	1	0	0	0	0	0	8	0	0	8	8	0	0	0	0	28
Percent	0%	4%	7%	4%	0%	0%	0%	0%	0%	29%	0%	0%	29%	29%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	43%									57%								100%
Surface Class Count	0	0	2	1	0	0	0	0	0	3	0	0	4	5	0	0	0	0	15
Surface Class Percent	0%	0%	13%	7%	0%	0%	0%	0%	0%	20%	0%	0%	27%	33%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
3.99	0.50	☐ HP
12.29	6.00	☐ N60L

Average HP
Average N_{60L}