FRA-71-270-28.71

MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 9/10/2024 TIME: 11:11:27 AM USER: Lindsay_Walker
pw:\\hq-pwint01.a-e.transyscorp.com:transyscorp-pw1\Documents\Projects_2020\CL402\402200080\Agency_Folders\400-Engineering\Drainage\2LMN BMP Exhibits\TRAN_105435_FRA-71-270 28.71+25.99A_DB001_Upgrade.dgn

PROJECT DATA	
TOTAL AREA (RIGHT-OF-WAY) - - - - - - - - - - - - - 108.64 AC	RUNOFF COEFFICIENT FOR - - - - - - - - - - - - 0.77 PRE-CONSTRUCTION SITE
PROJECT EARTH DISTURBED AREA - - - - - - - 34.53 AC	RUNOFF COEFFICIENT FOR - - - - - - - - - - - -0.79 POST CONSTRUCTION SITE
ESTIMATED CONTRACTOR EARTH - - - - - - - - - - - 2.0 AC DISTURBED AREA	POST CONSTRUCTION BMP: VEGETATED FILTER STRIP #1, STA. 70+40 (RAMP M) TO STA. 79+00 (RAMP M) VEGETATED FILTER STRIP #2, STA. 80+20 (RAMP M) TO STA. 91+00 (RAMP M) VEGETATED FILTER STRIP #3, STA. 96+50 (RAMP M) TO STA. 109+50 (RAMP M) VEGETATED FILTER STRIP #4, STA. 997+00 (RAMP P) TO STA. 1011+70 (RAMP P)
NOTICE OF THE INTENT EARTH - - - - - - - - - - - - 36.53 AC DISTURBED AREA	
IMPERVIOUS (PAVED) AREA FOR - - - - - - - - - - 13.314 AC PRE-CONSTRUCTION SITE	IMMEDIATE RECEIVING WATERS - TRIBUTARY TO ALUM CREEK
IMPERVIOUS (PAVED) AREA FOR - - - - - - - - - 17.122 AC POST CONSTRUCTION SITE	SUBSEQUENT RECEIVING WATER - - - - - - ALUM CREEK

BMP TYPE	LATITUDE/LONGITUDE				BMP WIDTH	EDA TREATMENT CREDIT
	BEGIN		END		(FT)	(ACRES)
VEGETATED FILTER STRIP #1	40.110820°	-82.994186°	40.110621°	-82.991147°	24-25	1.395
VEGETATED FILTER STRIP #2	40.110591°	-82.990720°	40.110385°	-82.986872°	25	1.924
VEGETATED FILTER STRIP #3	40.109784°	-82.985131°	40.107461°	-82.981611°	17-25	1.840
VEGETATED FILTER STRIP #4	40.109836°	-82.984834°	40.107728°	-82.980593°	17-25	2.045
			TREATMENT PROVIDED			7.20
			TREATMENT REQUIRED*			6.91

* CALCULATED PER L&D VOL. 2, SEC. 1115.7

USGS MAP: NORTHEAST COLUMBUS, OH 2016
USGS MAP MRC: 40082A8

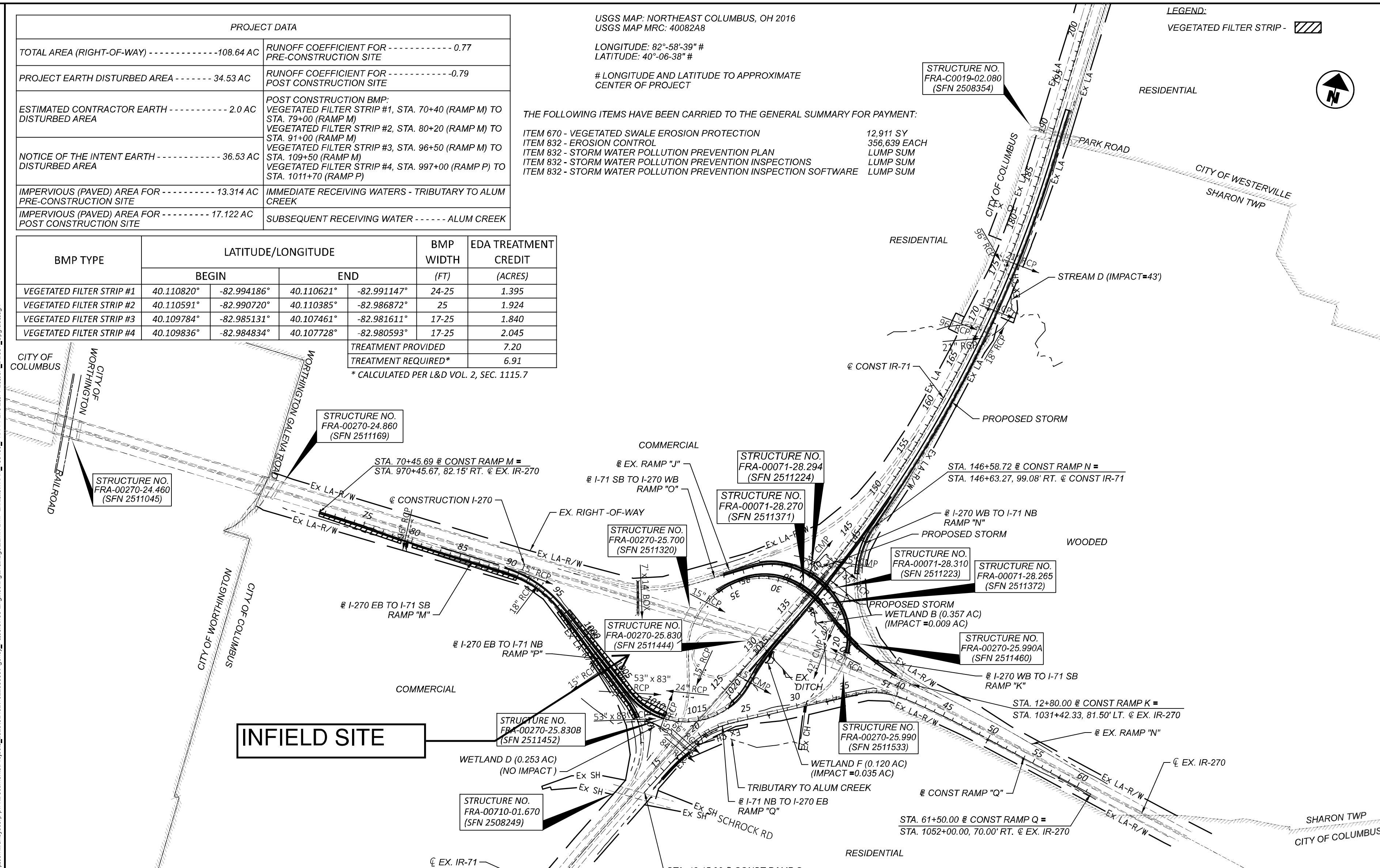
LONGITUDE: 82°-58'-39" #
LATITUDE: 40°-06-38" #

LONGITUDE AND LATITUDE TO APPROXIMATE CENTER OF PROJECT

THE FOLLOWING ITEMS HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR PAYMENT:

ITEM 670 - VEGETATED SWALE EROSION PROTECTION	12,911 SY
ITEM 832 - EROSION CONTROL	356,639 EACH
ITEM 832 - STORM WATER POLLUTION PREVENTION PLAN	LUMP SUM
ITEM 832 - STORM WATER POLLUTION PREVENTION INSPECTIONS	LUMP SUM
ITEM 832 - STORM WATER POLLUTION PREVENTION INSPECTION SOFTWARE	LUMP SUM

LEGEND:
VEGETATED FILTER STRIP -



PROJECT DESCRIPTION:

THIS PROJECT WILL IMPROVE CAPACITY AND REHABILITATE FACILITIES IN NEED OF REPAIR OR REPLACEMENT IN THE IR-270 AND IR-071 INTERCHANGE ON THE NORTH SIDE OF COLUMBUS. THERE WILL BE THE ADDITION OF CAPACITY TO THE IR-270 EASTBOUND TO IR-071 NORTHBOUND MOVEMENT. TWO RAMP BRIDGES WILL BE REPLACED, ONE BRIDGE WILL HAVE THE SUPERSTRUCTURE REPLACED, AND ONE BRIDGE WILL BE RESTRIPED.

HORIZONTAL SCALE IN FEET
0 150 300 600

PROJECT SITE PLAN

DESIGN AGENCY
2LMN
DESIGNER SS
REVIEWER LAW 09-10-24
PROJECT ID 105435
SHEET P.256 TOTAL 791

INTEROFFICE COMMUNICATION

To: Richard Ortman, P.E., District 6 – Capital Programs

COPY: Jeff Hipp, P.E. & Jeremiah Masey, P.E., District 6 Geotechnical Engineering

FROM: P. Paul Painter, Office of Geotechnical Engineering

DATE: October 28, 2024

SUBJECT: FRA-71-8.91, PID 105435, Waste area evaluation

Pursuant to your request, the Office of Geotechnical Engineering (OGE) has completed a preliminary evaluation of the waste area located in the southwest quadrant of the FRA71/270 interchange. This limited exploration was performed to evaluate the conditions of materials found within the infields for potential use as fill material for upcoming work at the FRA71/270 interchange. Figure 1 presents the study area.

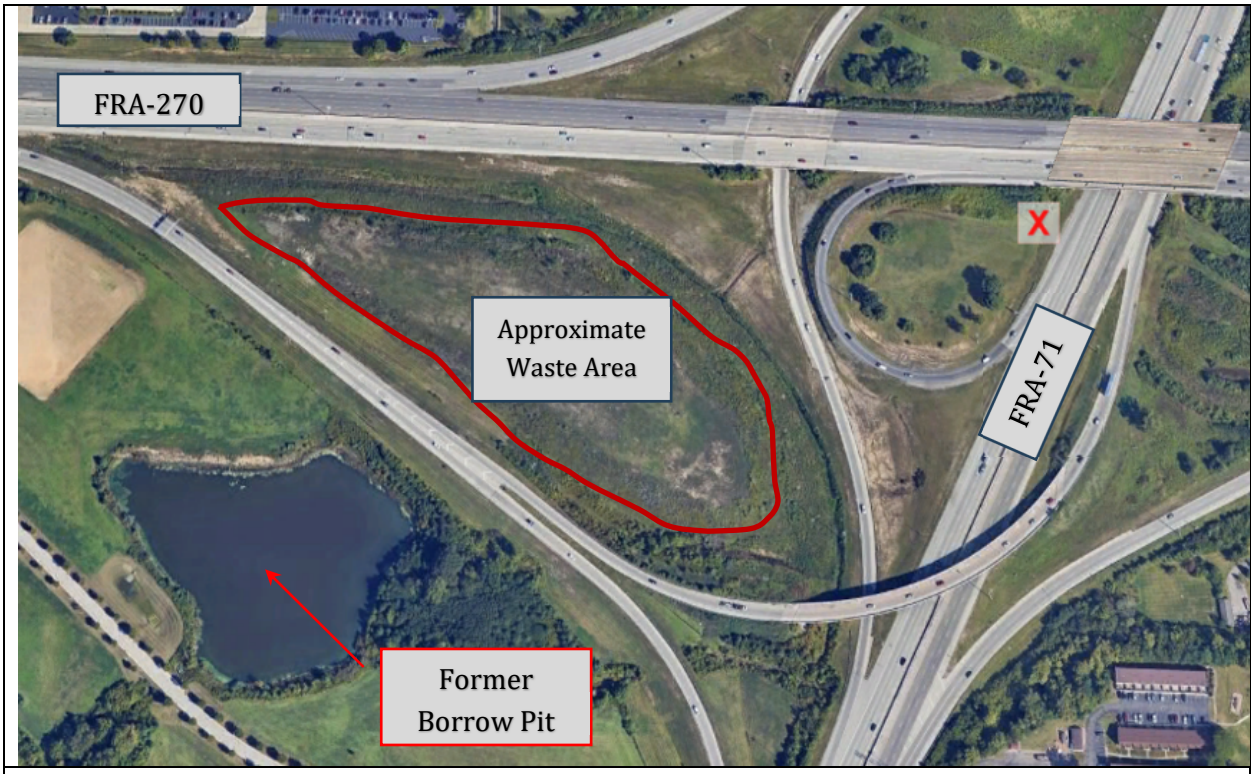


Figure 1. Study Area
From Google Earth; accessed 2024-09-23

The study waste area has been generated through multiple projects. The western base was initially generated during the construction of the current ramp configurations from eastbound IR270 to IR71 north and southbound. The majority of the remaining waste materials were generated during the IR270/US23/SR315 reconfiguration projects. The core of the waste area was anticipated to consist of shale covered by soil. OGE reviewed historical aerial imagery via Google Earth in an attempt to determine potential composition of the waste area. Aerial imagery from 2005 through 2023 was accessed on September 23, 2024, for review. From the imagery obtained it appears that multiple types of construction waste, (shale, soils, asphalt, and concrete) were placed within the disposal area. Figure 2 presents a summary of the aerial review.

Figure 2. Aerial Imagery of disposal area

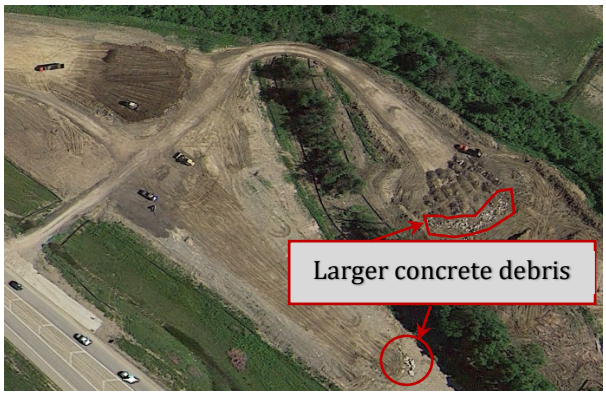
	Aerial Imagery: 2005-06-20 Original configuration of FRA-71/270 interchange. The highlighted area is approximate project area.
	Aerial Imagery: 2006-06-16 Construction of new ramps FRA-71/270 interchange The highlighted area is approximate project area.
	Aerial Imagery: 2011-10-27 New configuration ramp FRA-71/270 interchange between construction projects. The highlighted area is approximate project area.

Figure 2. Aerial Imagery of disposal area (continued)

Aerial Imagery:
2014-06-14

Disposal of waste IR270/US23/SR315 Projects.

The highlighted area is approximate project area.



Aerial Imagery:
2014-06-14
Closer view

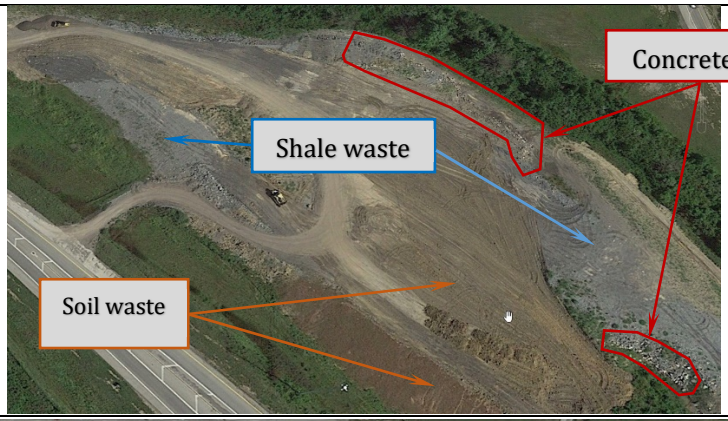
Areas of visible large concrete debris disposal are highlighted.

Aerial Imagery:
2015-05-22

Disposal of waste IR270/US23/SR315 Projects.

The highlighted area is approximate project area.

Figure 2. Aerial Imagery of disposal area (continued)



Aerial Imagery: 2015-05-22
Closer view

Areas of visible large concrete debris disposal area highlighted.

Aerial Imagery: 2016-08-29

Disposal of waste IR270/US23/SR315 Projects.

The highlighted area is approximate project area.

Aerial Imagery: 2016-08-29
Closer view

Area of visible large concrete debris disposal is highlighted.

Figure 2. Aerial Imagery of disposal area (continued)

Aerial Imagery: 2017-08-12

Disposal of waste IR270/US23/SR315 Projects.

The highlighted area is approximate project area.

Aerial Imagery: 2017-08-12

Aerial Imagery: 2023-08-31

Current state of disposal area.

The highlighted area is approximate project area.

Four (4) test pits, T-001-0-24 through T-004-0-24, were completed across the top of the waste area to explore the upper portion conditions of the project area. The excavations were completed on September 13, 2024, utilizing a Kobelco 85 mini excavator. The test pit excavations extend to depths of between 4.4 and 6.2 feet below existing grade. Bulk samples were collected from each exposed stratum within the test pit for testing. Classification testing was completed on soil and shale/soil

materials encountered within the test pits. When larger shale particles were present, bucket slake tests (bucket) were run in accordance with CMS 703.16 as well as two-cycle slake durability (SDI) testing in accordance with ASTM D4644. Strength testing by point load strength index testing (PL) was completed on block samples prepared from the larger samples collected in accordance with ASTM D5731. Below is a summary of the findings for each test pit location.

Test Pit 1:

Test pit #1 was completed at the western end of the waste area. This location encountered 4-inches of topsoil underlain by approximately 2.5 feet of Gravel and Stone Fragments with Sand, Silt, and Clay (A-2-6) which was moderately organic. Beneath this upper stratum the test pit encountered Stone Fragments with Sand, Silt, and Clay (A-2-6) which was slightly organic and extended to the base of the excavation. Within the lower stratum large shale, limestone, and glacial erratic particles were also encountered. Moisture density curves were completed from both strata with oversize correction. From the lower strata the shale was tested for durability utilizing the bucket, SDI, and PL tests with additional PL testing of the limestone and glacial erratic pieces. Figure 3 presents photos of the completed test pit and materials removed during the excavation, and a log of test pit excavation is attached which summarizes the findings.

Test pit 1 after completion

Materials removed from test pit 1

Figure 3. Test Pit 1

Test Pit #2

Test pit #2 was completed within the western third of the waste area. This location encountered 2-inches of topsoil underlain by approximately 3.8 feet of Gravel and Stone Fragments with Sand and Silt (A-2-4) which was slightly organic and contained large shale, asphalt, and concrete particles. At a depth of 2-ft. a large slab of asphalt (35”x32”x7”) was encountered. Beneath this upper stratum the test pit encountered Silt and Clay (A-6a) which was slightly organic and contained large shale particles which extended to the base of the excavation. Moisture density curves were completed from

only the lower stratum with oversize correction. Additionally, from the lower stratum, the shale was tested for durability utilizing the bucket, SDI, and PL tests. Figure 4 presents photos of the completed test pit and materials removed during the excavation, and a log of test pit excavation is attached which summarizes the findings.

Test pit 2 after completion

Materials removed from test pit 2

Figure 4. Test Pit 2

Test Pit #3

Test pit #3 was completed within the eastern third of the waste area. This location encountered 2-inches of topsoil underlain by Silt and Clay (A-6a) which was slightly organic and contained large shale, asphalt, and concrete cobble and boulder sized particles which became more prevalent near the base of the excavation. A large concrete slab was encountered near the surface presented in Figure 5. A Moisture density curve was completed with oversize correction. Figure 6 presents photos of the completed test pit and materials removed during the excavation, and a log of test pit excavation is attached which summarized the findings.

Figure 5. Concrete slab buried at Test Pit 3

Block size: 5’ x 3’9” x 10”

Test pit 3 after completion

Materials removed from test pit 3

Figure 6. Test Pit 3

Test Pit #4

Test pit #4 was completed within the outer third of the waste area. Scattered along the surface were large asphalt, concrete, and glacial erratic boulder sized particles. Figure 6 presents some of these items found at the ground surface. This location encountered 3 inches of topsoil underlain by approximately 2.1 feet of Silt and Clay (A-6a) that contained gravel and stone fragments which was moderately organic. Below the upper stratum, the test pit encountered Gravel and Stone Fragments with Sand, Silt, and Clay (A-2-6) that contains large shale, asphalt, and concrete particles extending to the base of the excavation. Occasional general construction waste was noted within the lower stratum. From the lower stratum, the shale was tested for durability utilizing the bucket, SDI, and PL tests. Figure 7 presents photos of the completed test pit and materials removed during the excavation, and a log of test pit excavation is attached which summarizes the findings.

Block size: 3’5” x 17” x 8’6”

Block size: 3’7” x 2’5” x 7”

Figure 7. Surface debris within vicinity of Test Pit 4

Test pit 4 after completion

Materials removed from test pit 4

Figure 8. Test Pit 4

Summary of Testing

Bulk samples were collected from test pits T-001-0-4 through T-004-0-24 from each identified stratum. For strata that contained a significant amount of soil a standard proctor was completed to determine the maximum dry density and optimum moisture content. Since all strata contained rock, shale, asphalt, and concrete particles, oversize correction was applied. Results of this testing indicate corrected maximum dry densities of the waste materials range from 120.9 to 131.7 pounds per cubic foot (pcf) and corrected optimum moisture contents range from 10.0% to 15.4%. The Standard Proctor testing results are presented in Table 1.

Table 1. Standard Proctor Test Results

Test Pit Location	Sample Depth (ft)		ODOT Soil Class	Max. Dry Density (PCF)	Optimum Moisture (%)	Corrected Max. Dry Density (PCF)	Corrected Optimum Moisture (%)
	To	From					
T-001-0-24	0.4	2.6	A-2-4	117.2	10.8	124.2	10.0
T-001-0-24	2.6	5.4	A-2-6	122.3	11.6	131.7	10.8
T-002-0-24	3.8	6.2	A-6a	111.8	15.4	120.9	15.4
T-003-0-24	0.1	6.8	A-6a	119.1	13.8	127.5	12.8

Materials which appeared slightly organic or higher had organic content determination through completion of Loss on Ignition (LOI) testing in accordance with AASHTO T 267. Results of this testing are presented in Table 2.

Table 2. LOI Test Results					
Test Pit Location	Sample Depth (ft)		ODOT Soil Class	LOI (%)	Modifier*
	To	From			
T-001-0-24	0.4	2.6	A-2-4	4.6	Moderately
T-001-0-24	2.6	5.4	A-2-6	2.5	Slightly
T-002-0-24	0.1	3.8	A-2-6	3.9	Slightly
T-002-0-24	3.8	6.2	A-6a	3.2	Slightly
T-003-0-24	0.1	6.8	A-6a	3.0	Slightly
T-004-0-24	0.3	2.1	A-6a	4.7	Moderately
T-004-0-24	2.1	4.4	A-2-6	3.7	Slightly
'* Per ODOT Specifications for Geotechnical Explorations Section 603.5 (Table 600-7)					

Due to the significant amount of shale waste, characterization of the shale relative to determining if the material should be considered a durable or nondurable shale was completed. When larger shale pieces were present within the excavated materials, individual blocks were collected from which individual specimens were prepared. These specimens were then tested for bucket slake tests (bucket), two cycle slake durability (SDI) testing and point load strength index testing (PL). Samples were collected from T-001-0-24, T-002-0-24, and T-004-0-24. Samples collected for the bucket test had results ranging from 93% to 98% retained on the ¾-inch sieve, which is greater than the target of 75%. In addition to the bucket test, samples were also prepared for SDI testing. The second cycle (Id_2) results of the SDI tests ranged from 94.3% to 96.2% with fragments representing Type I to Type III materials. Test reports for each individual test are attached. PL testing completed yielded strength result between 627 psi and 1,838 psi. Additionally, PL testing was also completed on limestone and glacial erratic (granite) samples collected from T-001-0-24 with results of 5,601 and 4,735 psi, respectively. Bedrock testing results are summarized and presented in Table 3.

Table 3. Bedrock Testing Results							
Test Pit Location	Sample Depth (ft)		Rock Type	Bucket[1] (%)	SDI[2]		PL[3] (psi)
	To	From			Id_2 (%)	Type	
T-001-0-24	2.6	5.4	Shale	98	96.2	II	1,509
T-001-0-24	2.6	5.4	Limestone	NT	NT	NT	5,601
T-001-0-24	2.6	5.4	Glacial (granite)	NT	NT	NT	4,735
T-002-0-24	3.8	6.2	Shale	98	94.3	II	1,289
					99.2	I	1,838
T-004-0-24	2.1	4.4	Shale	93	95.5	II	627
[1]Bucket testing in accordance with ODOT C&MS 703.16; excluding roller pass [2]SDI in accordance with ASTM D 4644 [3]PL in accordance with ASTM D 5731 NT: Not Tested							

Historical Geotechnical Testing

Geotechnical explorations were conducted for the various construction projects which produced waste materials located within the project area. Data located within ODOT's Transportation Information Mapping System (TIMS) were identified as FRA-270-24.47, subbatch 17936, completed in 2004 for the relocation of the ramps from IR270 to IR71 and widening of existing IR270; FRA-270-21.63, subbatch 20100, completed in 2005 for improvement to the IR270/US23/SR315 interchanges; FRA-270-34.240 (metric), subbatch 17990, completed in 1995 for IR270/SR315 improvements.

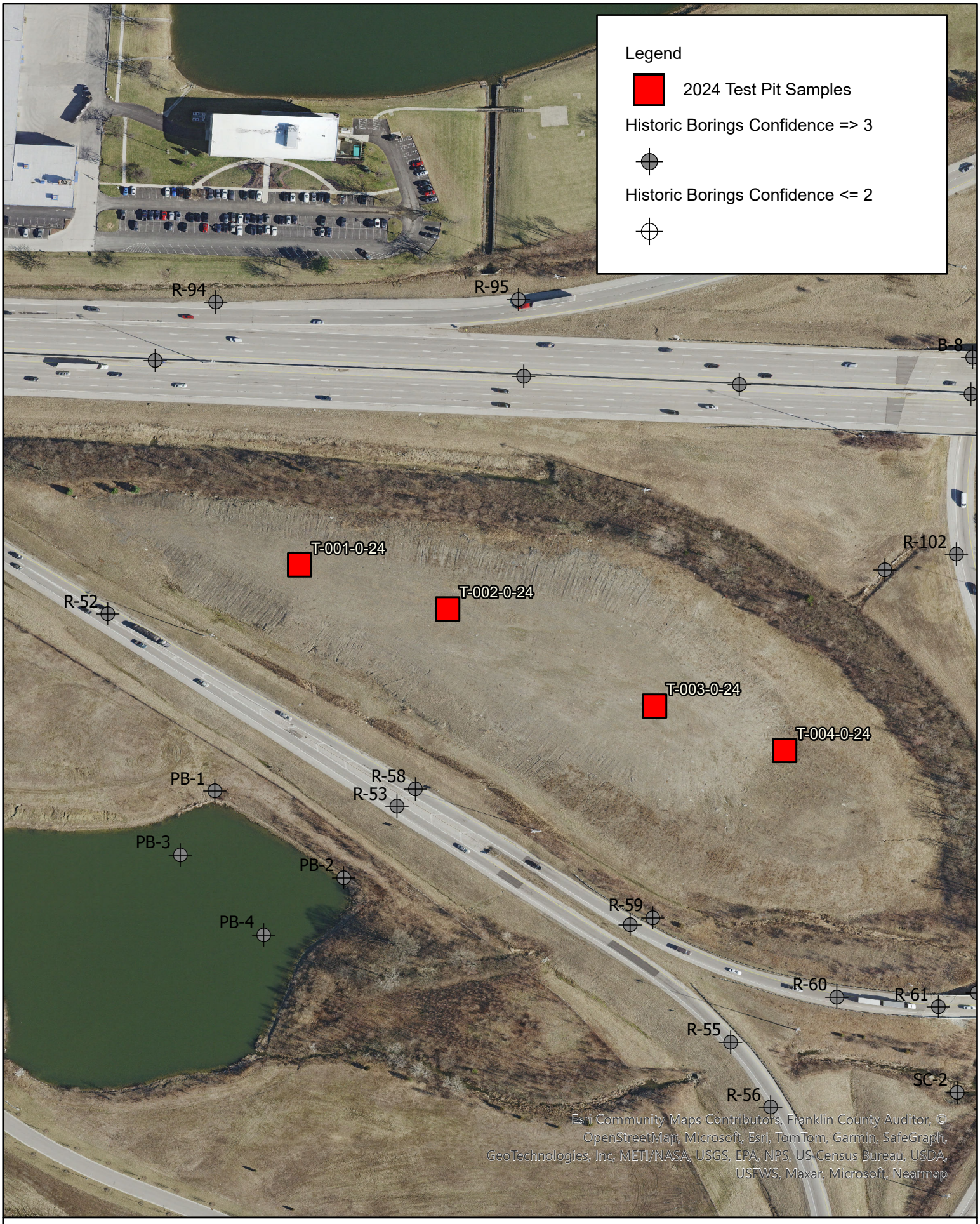
Borings completed for the ramp relocation encountered 1 to 14 inches of topsoil, which from aerial photography appears to have been stripped and wasted within the western base of the current project area. The soils encountered were predominately cohesive soils ranging from Sandy Silt (A-4a) to Silty Clay (A-6b). Borings encountered for the widening of IR270 encountered shale fill within the embankment core which exhibited minimal degradation since the original construction.

Borings completed for the US23 and SR315 improvements were typically advanced into the weathered bedrock through augering and SPT sampling prior to coring. Limited testing was conducted on the core samples collected with variability within the compressive strength testing ranging from 1,620 psi to 13,750 psi. and SDI testing ranged from 97.6% to 98.2% with all material types being identified as Type I.

Conclusion

To evaluate the material currently stockpiled between IR270EB and ramp to IR71NB/SB a limited number of test pits were completed. These test pits disclosed highly variable materials ranging from cohesive and noncohesive soils, glacial erratics (cobbles and boulders), shale, concrete, and asphalt. Based on preliminary bucket durability testing, the shale material appears to be considered durable shale (greater than 75% retained on a 3/4-inch sieve after a 48-hr. soaking). The size of many of the shale pieces, boulders, concrete and asphalt slabs are greater than the allowable size to be incorporated into an engineered construction lift. However, with effort, such as utilization of an on-site crusher, these materials can be dimensioned so that they can be incorporated into a fill lift. Limited Standard Proctor testing and classification testing did not disclose materials with a liquid limit exceeding 65, classified as A-5 or A-7-5, or a maximum dry density less than 90 pcf.

Attachments:
Exploration Location Plan
Log of Test Pit: T-001-0-24, T-002-0-24, T-003-0-24, T-004-0-24
Slake Durability Test Results
Point Load Strength Index Test Results
Laboratory Compaction Characteristics of Soil Using Standard Effort (AASHTO T99) Reports



FRA-71-8.91
Exploration Plan

0 55 110 220
Feet

PROJECT: FRA-71-08.91	DRILLING FIRM / OPERATOR: ODOT	DRILL RIG: KOBELCO 85	STATION / OFFSET:	EXPLORATION ID T-001-0-24	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / PAINTER	HAMMER: NONE	ALIGNMENT:		
PID: 105435 SFN:	DRILLING METHOD:	CALIBRATION DATE: N/A	ELEVATION: 938.9 (MSL) EOB: 5.4 ft.	PAGE 1 OF 1	
START: 8/13/24 END: 8/13/24	SAMPLING METHOD:	ENERGY RATIO (%): 60	LAT / LONG: 40.109732, -82.983545		

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)	ABAN-DONED
TOPSOIL (4")	938.9 938.5																	
BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT**, TRACE CLAY, MODERATELY ORGANIC (LOI = 4.6%), MAXIMUM SHALE FRAGMENT 7"X6.5"X24", DAMP @1.5'; MAXIMUM DRY DENSITY = 117.2 PCF @ 10.8% OPTIMUM MOISTURE, OVERSIZED DRY DENSITY = 124.2 @ 10.0% OPTIMUM MOISTURE	936.3	1 2			100	BS-1	-	66	7	6	12	9	32	22	10	7	A-2-4 (0)	
BROWN, **STONE FRAGMENTS WITH SAND, SILT, AND CLAY**, SLIGHTLY ORGANIC (LOI = 2.5%), MAXIMUM BLOCK SIZE 15"X36"X24", AVERAGE 15"X7"X3",, DAMP @3.5'; MAXIMUM DRY DENSITY = 122.3 PCF @ 11.6% OPTIMUM MOISTURE, OVERSIZED DRY DENSITY = 131.7 AT 10.8% OPTIMUM MOISTURE.	933.5	3 4 5 EOB			100	BS-2	-	64	7	4	14	11	31	20	11	9	A-2-6 (0)	

SHALE BUCKET TEST PER 703.16 = 98% RETAINED ON 3/4" SIEVE
SHALE = S_c = 1,509 psi; Id2 = 96.2%
LIMESTONE = S_c = 5,601
GRANITE = S_c = 4,735

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

PROJECT: FRA-71-08.91	DRILLING FIRM / OPERATOR: ODOT	DRILL RIG: KOBELCO 85	STATION / OFFSET:	EXPLORATION ID T-002-0-24	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / PAINTER	HAMMER: NONE	ALIGNMENT:		
PID: 105435 SFN:	DRILLING METHOD:	CALIBRATION DATE: N/A	ELEVATION: 942.1 (MSL) EOB: 6.2 ft.	PAGE 1 OF 1	
START: 8/13/24 END: 8/13/24	SAMPLING METHOD:	ENERGY RATIO (%): 60	LAT / LONG: 40.109526, -82.982853		

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)	ABAN-DONED
TOPSOIL (2")	942.1																	
	941.9																	
BROWN WITH GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY**, SLIGHTLY ORGANIC (LOI = 3.9%), CONTAINS SHALE, ASPHALT AND CONCRETE SLABS; MAXIMUM CONCRETE SLAB 15"X12"X9", MAXIMUM ASPHALT SALB 35"X32"X7", MAXIMUM SHALE SLAB 16"X15"X6", DAMP		1			100	BS-1	-	54	8	7	15	16	33	19	14	5	A-2-6 (1)	
	938.3	2																
BROWN, **SILT AND CLAY**, "AND" GRAVEL AND STONE FRAGMENTS, LITTLE SAND, SLIGHTLY ORGANIC (LOI = 3.2%), DAMP @4.5'; MAXIMUM DRY DENSITY = 111.8 PCF @ 15.4% OPTIMUM MOISTURE, OVERSIZED DRY DENSITY = 120.9 @ 15.3% OPTIMUM MOISTURE		3			100	BS-2	-	48	8	7	18	19	31	20	11	15	A-6a (1)	
	935.9	4																
		5																
		6																
		EOB																

SHALE BUCKET TEST PER 703.16 = 98% RETAINED ON 3/4" SIEVE
SHALE = S_c = 1,838 psi; Id2 = 99.2%
SHALE = S_c = 1,289 psi; Id2 = 94.3%

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 10/28/24 13:06 - X:\GINT\PROJECTS\601159.GPJ

PROJECT: FRA-71-08.91	DRILLING FIRM / OPERATOR: ODOT	DRILL RIG: KOBELCO 85	STATION / OFFSET:	EXPLORATION ID T-003-0-24
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / PAINTER	HAMMER: NONE	ALIGNMENT:	
PID: 105435 SFN:	DRILLING METHOD:	CALIBRATION DATE: N/A	ELEVATION: 943.7 (MSL) EOB: 6.8 ft.	PAGE 1 OF 1
START: 8/13/24 END: 8/13/24	SAMPLING METHOD:	ENERGY RATIO (%): 60	LAT / LONG: 40.109073, -82.981886	

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)	ABAN-DONED
943.7																		
TOPSOIL (2")	943.5																	
BROWN, **SILT AND CLAY**, "AND" GRAVEL AND STONE FRAGMENTS, LITTLE SAND, SLIGHTLY ORGANIC (LOI = 3.0%), CONTAINS COBBLES AND BOULDERS; AVERAGE ASPHALT 29"X29"X7", AVERAGE CONCRETE 22"X18'X9", DAMP		1																
@2.0'; CONCRETE SLAB 72"X45"X10"		2																
@2.5'; MAXIMUM DRY DENSITY = 119.1 PCF @ 13.8% OPTIMUM MOISTURE, OVERSIZED DRY DENSITY = 127.5 @ 12.8%		3			100	BS-1	-	50	6	7	19	18	30	19	11	9	A-6a (1)	
		4																
		5																
@5.5'; CONCRETE AND ASPHALT PIECES		6																
	936.9	EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 10/28/24 13:06 - X:\GINT\PROJECTS\601159.GPJ

PROJECT: FRA-71-08.91	DRILLING FIRM / OPERATOR: ODOT	DRILL RIG: KOBELCO 85	STATION / OFFSET:	EXPLORATION ID T-004-0-24
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / PAINTER	HAMMER: NONE	ALIGNMENT:	
PID: 105435 SFN:	DRILLING METHOD:	CALIBRATION DATE: N/A	ELEVATION: 937.6 (MSL) EOB: 4.4 ft.	PAGE 1 OF 1
START: 8/13/24 END: 8/13/24	SAMPLING METHOD:	ENERGY RATIO (%): 60	LAT / LONG: 40.108864, -82.981279	

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)	ABAN-DONED
TOPSOIL (3")	937.6 / 937.4																	
BROWN, **SILT AND CLAY**, SOME GRAVEL AND STONE FRAGMENTS, LITTLE SAND, MODERATELY ORGANIC (LOI = 4.7%), DAMP		1			100	BS-1	-	32	6	9	28	25	35	21	14	8	A-6a (5)	
	935.5	2																
GRAY AND BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY**, SLIGHTLY ORGANIC (LOI = 3.7%), SHALE AND CONSTRUCTION DEBRIS, DAMP		3			100	BS-2	-	67	4	4	14	11	33	21	12	7	A-2-6 (0)	
	933.2	4 EOB																

SHALE BUCKET TEST PER 703.16 = 93% RETAINED ON 3/4" SIEVE
SHALE = S_c = 627 psi; Id2 = 95.5%

NOTES: NONE

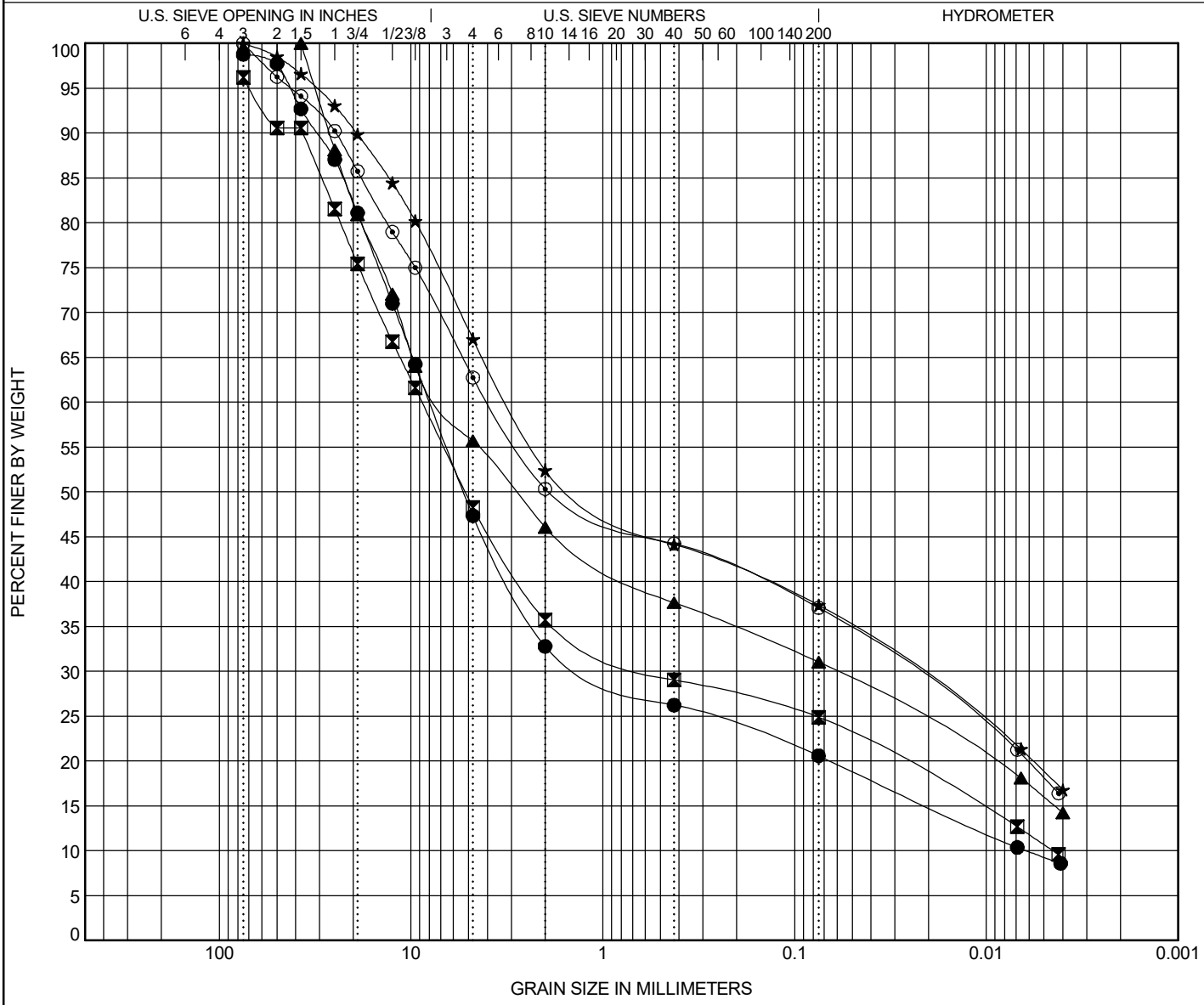
ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

GRAIN SIZE DISTRIBUTION

OHIO DEPARTMENT OF TRANSPORTION
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT FRA-71-08.91 **PID** 105435

OGE NUMBER 601159 **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	T-001-0-24	0.3	**A-2-4 ~ CLAYEY GRAVEL with SAND(GC)**	32	22	10
⊠	T-001-0-24	2.6	**A-2-6 ~ CLAYEY GRAVEL with SAND(GC)**	31	20	11
▲	T-002-0-24	0.2	**A-2-6 ~ CLAYEY GRAVEL with SAND(GC)**	33	19	14
★	T-002-0-24	3.8	**A-6a ~ CLAYEY GRAVEL with SAND(GC)**	31	20	11
⊙	T-003-0-24	0.2	**A-6a ~ CLAYEY GRAVEL with SAND(GC)**	30	19	11

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	T-001-0-24	0.3	30.9	5.295	1.033	0.006	66	7	6	12	9	21.66	1292.42
⊠	T-001-0-24	2.6	36.564	5.194	0.532	0.004	64	7	4	14	11	7.22	1951.81
▲	T-002-0-24	0.2	26.659	2.847	0.062		54	8	7	15	16		
★	T-002-0-24	3.8	19.206	1.273	0.024		48	8	7	18	19		
⊙	T-003-0-24	0.2	24.642	1.832	0.026		50	6	7	19	18		

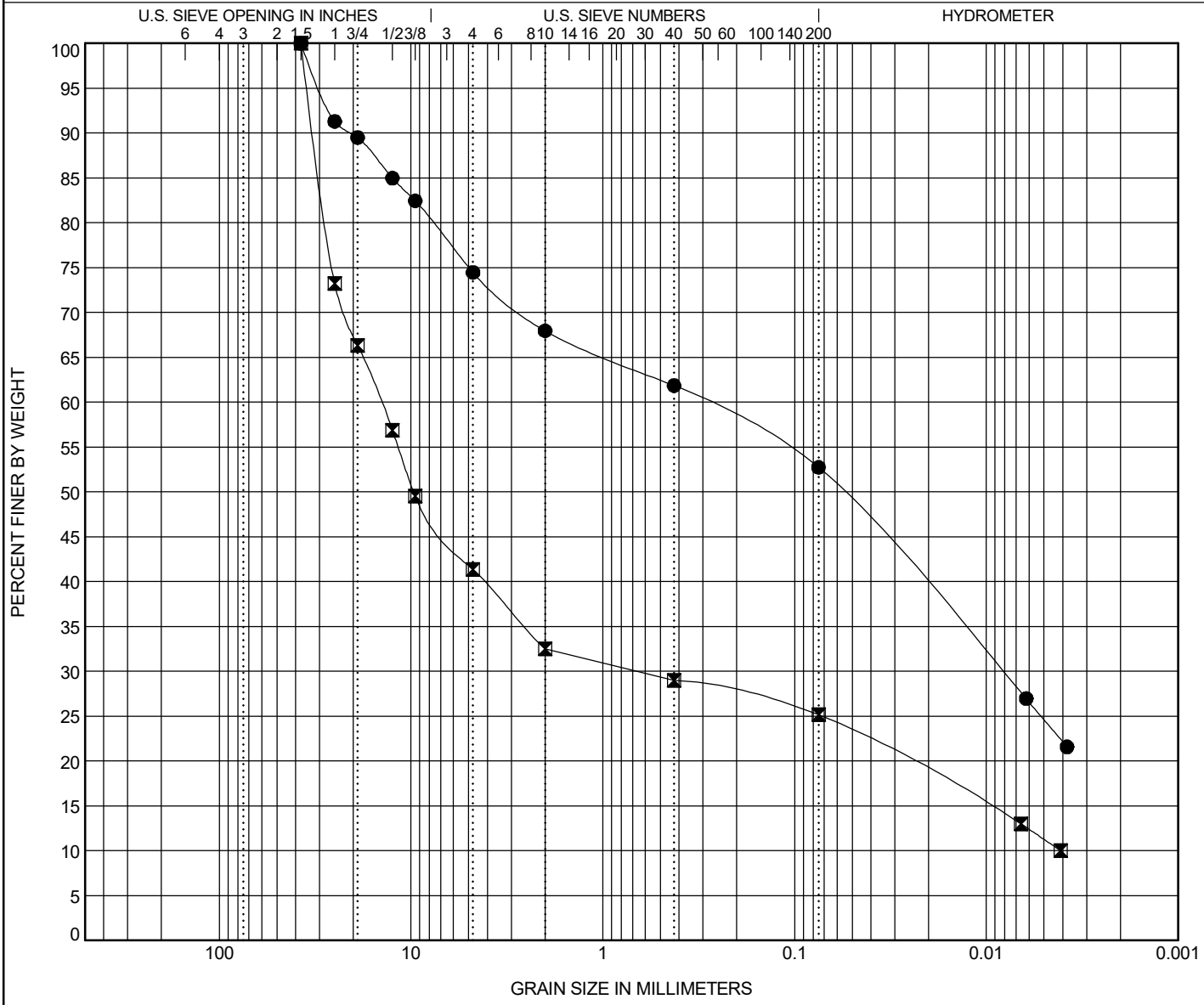
GRAIN SIZE - OH DOT.GDT - 10/28/24 13:10 - X:\GINT\PROJECTS\601159.GPJ

GRAIN SIZE DISTRIBUTION

OHIO DEPARTMENT OF TRANSPORTION
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT FRA-71-08.91 **PID** 105435

OGE NUMBER 601159 **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification		ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	**T-004-0-24 0.3**	**A-6a ~ GRAVELLY LEAN CLAY with SAND(CL)**	**35**	**21**	**14**
⊠	**T-004-0-24 2.1**	**A-2-6 ~ CLAYEY GRAVEL with SAND(GC)**	**33**	**21**	**12**

Specimen Identification		D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	**T-004-0-24 0.3**	**20.463**	**0.058**	**0.008**		**32**	**6**	**9**	**28**	**25**		
⊠	**T-004-0-24 2.1**	**32.229**	**9.671**	**0.667**		**67**	**4**	**4**	**14**	**11**		

GRAIN SIZE - OH DOT.GDT - 10/28/24 13:10 - X:\GINT\PROJECTS\601159.GPJ

SLAKE DURABILITY TEST

ASTM D 4644

Office of Geotechnical Engineering

Lab No.:	
Report Date:	10/15/2024
Tech:	C. B

County	FRA	Route	71	Section	8.91
Boring Number	T-001-0-24	Distirict	6	PID	105435
Station		Offset	NA	Offsest Direction	NA
Latitude	NA	Longitude	NA	Ground Elev. (Ft)	NA
Sample Number	1	Top Depth		Bottom Depth	

Geologic Unit	Ohio Shale
Description	Shale

NATURAL MOISTURE DETERMINATION

Pan ID	Sample Weight (g)	Tare Weight (g)		IN: 10/08/24	OUT: 10/09/24	Moisture Content (%)
1	503.09	1233.06	Time	14:10	7:15	
			Mass	1736.15	1726.28	2.00%

Start Time (mil):	End Time (mil):		First Cycle (I_{d1})					
11:25	11:35		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/09/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	1	1233.06	Time	11:41	2:50	
23.1	23.2	23.15			Mass	1730.91	1717.42	484.36

Start Time (mil):	End Time (mil):		Second Cycle (Id2)					
15:12	15:22		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/10/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	1	1233.06	Time	15:25	7:40	
23.2	23.2	23.2			Mass	1723.13	1707.46	474.4

Before First Cycle

After Second Cycle

Slake Durability Index

$I_{d2}=\{(W_F-C)/(B-C)\}*100$

I_{d2} = 96.2%

Retained Material Type: II (Reference Below)

WF = Drum mass + oven dried specimum after second cycle; B = Drum mass + specimen prior to test; C = Drum mass

From ASTM D4644

T 1 — Retained pieces remain virtually unchanged

T 2 — Retained material consists of large and small pieces

T 3 — Retained material is exclusively small pieces

SLAKE DURABILITY TEST

ASTM D 4644

Office of Geotechnical Engineering

Lab No.:	
Report Date:	10/15/2024
Tech:	C. B

County	FRA	Route	71	Section	8.91
Boring Number	T-002-0-24	Distirict	6	PID	105435
Station		Offset	NA	Offsest Direction	NA
Latitude	NA	Longitude	NA	Ground Elev. (Ft)	NA
Sample Number	1	Top Depth		Bottom Depth	

Geologic Unit	Ohio Shale
Description	Unweathered Shale

NATURAL MOISTURE DETERMINATION

Pan ID	Sample Weight (g)	Tare Weight (g)		IN: 10/08/24	OUT: 10/09/24	Moisture Content (%)
7	518.17	1232.52	Time	14:10	7:20	
			Mass	1750.69	1744.21	1.27%

Start Time (mil):	End Time (mil):		First Cycle (I_{d1})					
11:25	11:35		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/09/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	7	1232.52	Time	11:41	2:50	
22.6	22.5	22.55			Mass	1730.91	1717.42	484.9

Start Time (mil):	End Time (mil):		Second Cycle (Id2)					
15:12	15:22		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/10/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	7	1232.52	Time	15:25	7:40	
23.0	22.8	22.9			Mass	1753.48	1740.36	507.84

Before First Cycle

After Second Cycle

Slake Durability Index

$I_{d2}=\{(W_F-C)/(B-C)\}*100$

I_{d2} = 99.2%

Retained Material Type: I (Reference Below)

WF = Drum mass + oven dried specimum after second cycle; B = Drum mass + specimen prior to test; C = Drum mass

From ASTM D4644

T 1	Retained pieces remain virtually unchanged

T 2	Retained material consists of large and small pieces

T 3	Retained material is exclusively small pieces

SLAKE DURABILITY TEST

ASTM D 4644

Office of Geotechnical Engineering

Lab No.:	
Report Date:	10/15/2024
Tech:	C. B

County	FRA	Route	71	Section	8.91
Boring Number	T-002-0-24	Distirict	6	PID	105435
Station		Offset	NA	Offsest Direction	NA
Latitude	NA	Longitude	NA	Ground Elev. (Ft)	NA
Sample Number	2	Top Depth		Bottom Depth	

Geologic Unit	Ohio Shale
Description	Weathered Shale

NATURAL MOISTURE DETERMINATION

Pan ID	Sample Weight (g)	Tare Weight (g)		IN: 10/08/24	OUT: 10/09/24	Moisture Content (%)
8	497.57	1232.70	Time	14:10	7:20	
			Mass	1730.27	1722.60	1.57%

Start Time (mil):	End Time (mil):		First Cycle (I_{d1})					
11:25	11:35		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/09/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	8	1232.7	Time	11:41	2:50	
22.6	22.5	22.55			Mass	1726.19	1712.15	479.45

Start Time (mil):	End Time (mil):		Second Cycle (Id2)					
15:12	15:22		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/10/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	8	1232.7	Time	15:25	7:40	
22.9	22.6	22.75			Mass	1712.30	1694.73	462.03

Before First Cycle

After Second Cycle

Slake Durability Index

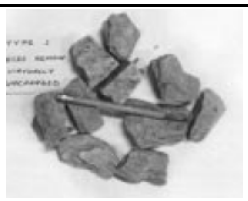
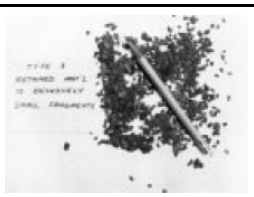
$I_{d2}=\{(W_F-C)/(B-C)\}*100$

I_{d2} = 94.3%

Retained Material Type: II (Reference Below)

WF = Drum mass + oven dried specimum after second cycle; B = Drum mass + specimen prior to test; C = Drum mass

From ASTM D4644

					
T 1	Retained pieces remain virtually unchanged	T 2	Retained material consists of large and small pieces	T 3	Retained material is exclusively small pieces

SLAKE DURABILITY TEST

ASTM D 4644

Office of Geotechnical Engineering

Lab No.:	
Report Date:	10/15/2024
Tech:	C. B

County	FRA	Route	71	Section	8.91
Boring Number	T-004-0-24	Distirict	6	PID	105435
Station		Offset	NA	Offsest Direction	NA
Latitude	NA	Longitude	NA	Ground Elev. (Ft)	NA
Sample Number	1	Top Depth		Bottom Depth	

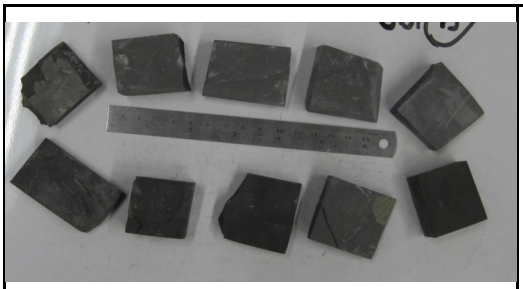
Geologic Unit	Ohio Shale
Description	Shale

NATURAL MOISTURE DETERMINATION

Pan ID	Sample Weight (g)	Tare Weight (g)		IN: 10/08/24	OUT: 10/09/24	Moisture Content (%)
3	519.59	1231.16	Time	14:10	7:20	
			Mass	1750.75	1737.38	2.64%

Start Time (mil):	End Time (mil):		First Cycle (I_{d1})					
11:25	11:35		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/09/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	3	1231.16	Time	11:41	2:50	
23.6	23.5	23.55			Mass	1744.74	1727.72	496.56

Start Time (mil):	End Time (mil):		Second Cycle (Id2)					
15:12	15:22		Drum ID	Tare Weight (g)		IN: 10/9/24	OUT: 10/10/24	Final Dry Mass (g)
Start Temp (ºC):	End Temp (ºC):	Avg. Temp (ºC)	3	1231.16	Time	15:25	7:40	
22.3	22.8	22.55			Mass	1740.13	1714.48	483.32



Before First Cycle

After Second Cycle

Slake Durability Index

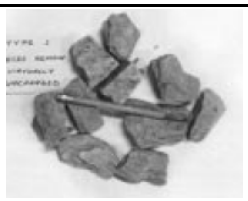
$I_{d2}=\{(W_F-C)/(B-C)\}*100$

I_{d2} = 95.5%

Retained Material Type: II (Reference Below)

WF = Drum mass + oven dried specimum after second cycle; B = Drum mass + specimen prior to test; C = Drum mass

From ASTM D4644

	T 1	Retained pieces remain virtually unchanged		T 2	Retained material consists of large and small pieces
	T 3	Retained material is exclusively small pieces			

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT: FRA-71-8.91 **DISTRICT No.:** 6 **PID No.** 106959 **Tech:** AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	$D_e^2{}_{(50)}$	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-001-0-24		Shale	28.50	26.00	27.250	29.72	21.27	737.98	3.36	2478.15	1.551	0.49	71	12	*1711*
			20.00	17.00	18.500	32.00	31.73	747.40	3.38	2524.15	2.42	0.75	109	18	~~*2620*~~
			36.00	28.00	32.000	38.65	28.39	1156.71	4.11	4754.90	3.428	0.57	82	14	*1970*
			33.00	25.50	29.250	38.30	28.53	1062.52	3.96	4203.91	3.338	0.62	90	15	2170
			33.00	28.50	30.750	29.74	26.13	1023.05	3.89	3979.34	1.343	0.27	38	6	922
			30.00	22.50	26.250	28.85	26.04	870.32	3.62	3147.75	2.765	0.69	100	17	~~2401~~
			29.50	21.00	25.250	40.00	46.22	1485.94	4.60	6837.01	6.053	0.70	101	17	2420
			19.00	12.00	15.500	33.00	24.40	481.54	2.77	1334.38	0.525	0.31	45	7	*1075*
			24.00	19.50	21.750	33.80	27.55	762.94	3.41	2600.61	1.167	0.35	51	8	1226
			28.00	26.00	27.000	40.00	30.22	1038.89	3.92	4069.00	0.038	0.01	1	0	~~26~~
			28.00	24.00	26.000	30.00	25.78	853.43	3.58	3059.53	0.646	0.17	24	4	577
			24.50	20.00	22.250	26.50	23.90	677.08	3.23	2187.20	0.257	0.09	13	2	~~321~~
												Average Strength (Sc)			**1509**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT: FRA-71-8.91 **DISTRICT No.:** 6 **PID No.** 106959 **Tech:** AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	D_e^2 (50)	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-001-0-24		Limestone	31.00	27.00	29.000	41.57	35.72	1318.92	4.36	5751.52	12.307	1.68	244	40	*5848*
			45.00	42.00	43.500	41.38	34.07	1887.00	5.12	9667.91	7.31	0.59	86	14	~~*2067*~~
			30.00	25.00	27.500	37.36	39.74	1391.46	4.47	6215.79	11.66	1.47	214	35	*5127*
			27.50	23.00	25.250	35.76	37.60	1208.81	4.19	5068.57	11.313	1.75	254	42	6100
			30.50	26.50	28.500	36.78	37.59	1364.04	4.43	6038.98	13.404	1.74	253	42	6067
			27.00	23.50	25.250	39.03	33.22	1068.00	3.97	4235.38	10.851	2.01	292	48	~~*7002*~~
			29.50	25.00	27.250	35.58	33.54	1163.70	4.12	4796.58	9.73	1.59	231	38	5544
			29.50	26.00	27.750	33.07	26.54	937.72	3.74	3507.29	6.019	1.35	195	32	~~*4691*~~
			26.00	21.50	23.750	37.47	32.99	997.60	3.85	3836.63	9.088	1.86	270	45	6474
			36.00	32.50	34.250	32.97	26.46	1153.88	4.11	4738.02	8.48	1.41	204	34	4892
			26.50	23.00	24.750	39.16	24.46	770.80	3.42	2639.55	8.568	2.55	370	61	~~*8872*~~
			28.50	25.00	26.750	37.51	19.87	676.76	3.23	2185.70	3.805	1.37	198	33	4758
												Average Strength (Sc)			**5601**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT: FRA-71-8.91 **DISTRICT No.:** 6 **PID No.** 106959 **Tech:** AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	D_e^2 (50)	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-001-0-24		Glacial	32.00	30.50	31.250	36.00	51.08	2032.41	5.30	10766.64	5.658	0.41	60	10	~~*1436*~~
		(Granite)	29.00	23.50	26.250	37.72	52.86	1766.72	4.97	8787.30	19.109	1.71	248	41	~~*5944*~~
			28.50	24.00	26.250	37.53	62.94	2103.62	5.38	11317.88	20.103	1.40	202	33	*4855*
			24.00	21.00	22.500	34.87	50.33	1441.85	4.54	6544.82	11.204	1.34	195	32	4679
			22.50	18.50	20.500	35.44	50.73	1324.13	4.37	5784.43	9.589	1.30	189	31	4531
			27.50	22.50	25.000	34.44	53.51	1703.28	4.89	8333.50	16.269	1.53	222	37	5336
			24.00	20.00	22.000	36.63	53.30	1493.00	4.61	6884.16	16.616	1.90	275	45	~~*6597*~~
			27.50	23.00	25.250	32.61	59.36	1908.38	5.15	9827.18	17.606	1.41	204	34	*4897*
			28.00	24.00	26.000	28.00	55.22	1828.02	5.05	9232.83	18.412	1.57	227	38	5450
			27.00	22.50	24.750	33.89	67.28	2120.17	5.40	11447.28	18.122	1.24	180	30	4327
			30.50	26.50	28.500	35.15	67.22	2439.24	5.75	14027.54	19.453	1.09	158	26	~~*3790*~~
			30.00	26.00	28.000	35.44	66.77	2380.40	5.69	13539.60	18.869	1.09	159	26	3809
												Average Strength (Sc)			**4735**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT:	FRA-71-8.91	DISTRICT No.:	6	PID No.	106959	Tech:	AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	$D_e^2{}_{(50)}$	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-002-0-24	Unweathered Shale		23.00	21.00	22.000	32.27	59.22	1658.83	4.83	8020.03	2.629	0.26	37	6	~~*896*~~
			17.00	16.00	16.500	28.97	44.07	925.84	3.72	3443.05	4.792	1.09	159	26	~~*3804*~~
			40.00	36.00	38.000	30.97	33.94	1642.12	4.81	7903.18	5.495	0.55	79	13	*1900*
			25.00	23.00	24.000	32.08	41.19	1258.67	4.27	5374.50	2.76	0.40	58	10	1404
			22.00	20.00	21.000	23.83	45.31	1211.50	4.20	5084.91	4.718	0.73	106	17	2536
			41.00	39.00	40.000	32.08	32.96	1678.64	4.86	8159.29	4.329	0.42	60	10	1450
			42.00	38.00	40.000	32.07	44.42	2262.29	5.56	12576.49	5.884	0.37	53	9	1279
			24.00	20.00	22.000	29.46	44.53	1247.34	4.25	5304.48	5.229	0.77	112	19	*2694*
			24.00	23.00	23.500	27.37	41.08	1229.16	4.22	5192.74	1.509	0.23	33	5	~~*794*~~
			15.00	22.00	18.500	27.98	42.78	1007.68	3.86	3892.98	4.474	0.90	131	22	~~*3141*~~
			35.00	30.00	32.500	31.82	38.84	1607.21	4.77	7660.72	4.497	0.46	67	11	1604
												Average Strength (Sc)			**1838**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT: FRA-71-8.91 **DISTRICT No.:** 6 **PID No.** 106959 **Tech:** AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	$D_e^2{}_{(50)}$	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-002-0-24	Weathered Shale		38.00	36.00	37.000	24.53	38.44	1810.90	5.03	9107.77	2.321	0.20	29	5	*697*
			37.00	35.00	36.000	19.83	34.73	1591.91	4.75	7555.17	1.784	0.19	27	4	*645*
			27.00	14.00	20.500	28.84	40.29	1051.63	3.94	4141.55	2.342	0.44	64	11	*1546*
			22.00	19.00	20.500	22.55	27.34	713.61	3.31	2360.39	1.981	0.66	96	16	2294
			32.00	30.00	31.000	25.05	34.96	1379.89	4.45	6140.97	1.058	0.14	20	3	~~471~~
			22.00	19.00	20.500	29.85	37.33	974.37	3.81	3707.75	3.825	0.81	117	19	~~2820~~
			25.00	22.00	23.500	24.78	38.81	1161.24	4.12	4781.90	3.963	0.65	94	16	~~2265~~
			40.00	37.00	38.500	22.40	37.36	1831.38	5.05	9257.46	2.837	0.24	35	6	*838*
			20.00	19.00	19.500	20.65	35.75	887.61	3.65	3238.80	0.681	0.17	24	4	~~575~~
			19.00	16.00	17.500	32.10	33.63	749.33	3.38	2533.63	1.532	0.47	69	11	1653
			21.00	20.00	20.500	34.65	38.63	1008.30	3.86	3896.44	1.259	0.25	37	6	883
			22.00	20.00	21.000	38.82	35.52	949.74	3.76	3572.63	2.3	0.51	73	12	1760
												Average Strength (Sc)			**1289**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

The Ohio Department of Transportation
Office of Geotechnical Engineering

PROJECT: FRA-71-8.91 **DISTRICT No.:** 6 **PID No.** 106959 **Tech:** AW

Point Load Strength Calc*: $Is = P / (D_e^2)$ $D_e^2 = 4A/\pi$ $A = (WD')$ $F = (D_e/50)^{0.45}$ Strength = Is * K K = 24

Sample #	Approx. El. (Ft.)	Material Type	D (mm) Initial	D (mm) Final	D' (mm) Avg	L (mm)	W (mm)	D_e^2	F	$D_e^2{}_{(50)}$	Failure Load (kN)	Is_{50} (MPa)	Is_{50} (psi)	Strength S_c (MPa)	Strength S_c (psi)
T-004-0-24		Shale	19.00	17.00	18.000	39.99	31.31	717.57	3.32	2379.41	1.242	0.41	59	10	*1427*
			31.00	22.00	26.500	32.42	40.18	1355.71	4.42	5985.56	1.293	0.17	25	4	*590*
			16.00	13.50	14.750	39.56	28.44	534.11	2.90	1550.71	0.041	0.02	3	0	*72*
			27.00	23.00	25.000	38.65	32.92	1047.88	3.93	4120.15	0.083	0.02	2	0	~~55~~
			19.00	12.00	15.500	39.21	32.73	645.93	3.16	2042.85	1.126	0.43	63	10	~~1507~~
			26.50	22.00	24.250	38.32	33.58	1036.82	3.91	4057.26	0.29	0.06	8	1	195
			23.50	17.00	20.250	34.17	35.75	921.75	3.71	3420.98	0.54	0.12	18	3	431
			25.50	23.00	24.250	38.12	35.28	1089.31	4.00	4358.45	0.585	0.11	15	3	*367*
			12.50	10.00	11.250	36.97	29.31	419.84	2.61	1093.77	1.374	0.99	143	24	~~3433~~
			13.00	10.00	11.500	37.28	40.83	597.84	3.05	1826.06	0.77	0.33	48	8	1153
			13.00	11.00	12.000	31.67	36.97	564.86	2.98	1681.81	0.074	0.03	5	1	120
			19.00	17.00	18.000	29.14	34.08	781.06	3.44	2690.63	0.057	0.02	2	0	~~58~~
			21.00	19.00	20.000	34.33	29.38	748.16	3.38	2527.86	0.515	0.16	23	4	557
			14.00	12.00	13.000	32.34	27.94	462.47	2.72	1258.43	0.623	0.39	56	9	1353
												Average Strength (Sc)			**627**

Comments: Point Load sample collected from test pit and prepared as Block samples. Highlighted Sc values excluded in Average Strength Sc calculation.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT

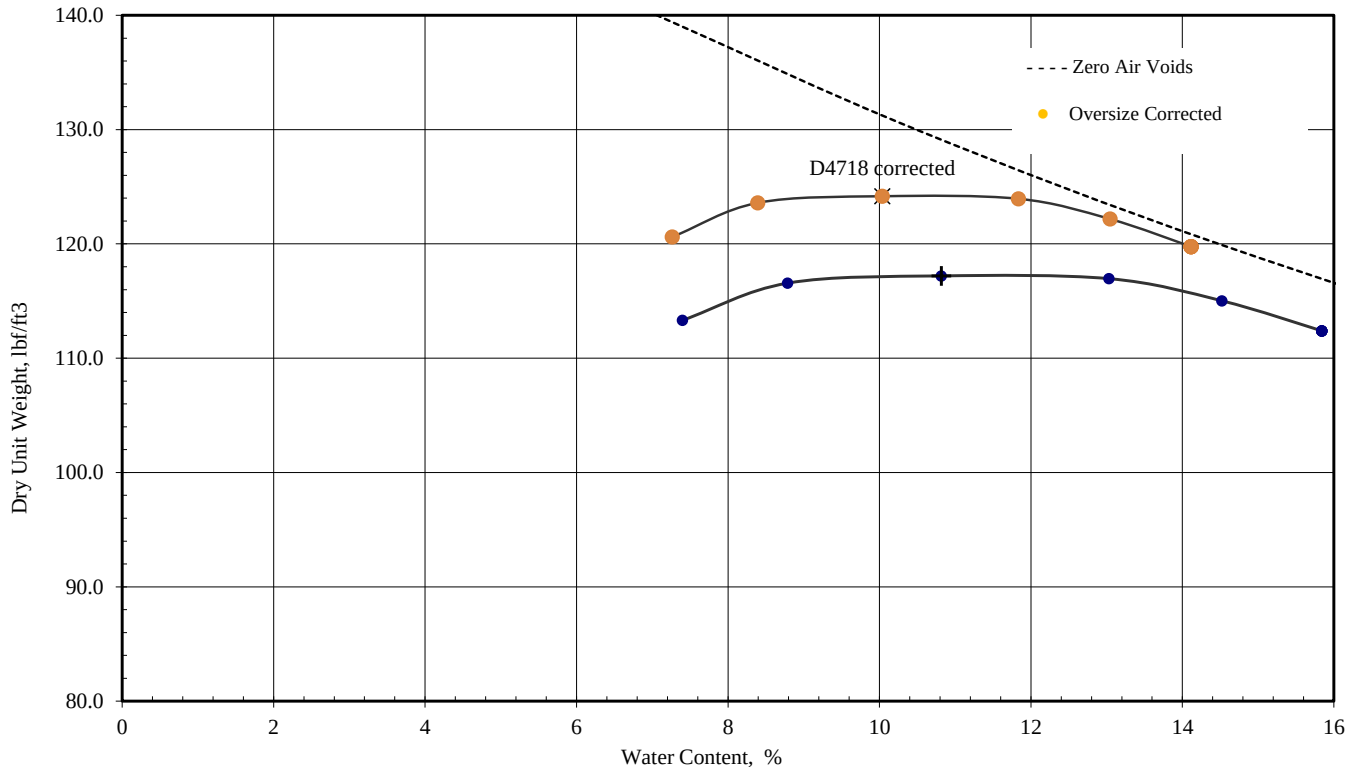
AASHTO T 99

ODOT - Office of Geotechnical Engineering

Lab No.	OGE Geotechnical La
Report Date:	
Tech:	mkerins

Site Name	601159	Soil Description		Sample No.	1
Job Ref	fra-71-8.91~pid106959	Top Depth (ft)	0.33	Sample Type	
Borehole/Pit No.	T-001-0-24	Bottom Depth (ft)	2.60	KeyLAB ID	OGEL202409130
Specimen Reference	2024-008-194	Ground Elevation (ft)		Northing	
Specimen Depth (ft)		Date started	10/3/2024	Easting	

Specimen Description	



Preparation Dry preparation method

As received water content 6.7 %

Specific gravity - 2.67 Assumed

Test method used D

Type of rammer Mechanical - sector face

Percentage of material retained on:

19 mm sieve	18.9	%
9.5 mm sieve	0.0	%
4.75 mm sieve	33.7	%

Standard Optimum Water Content **10.8** %

Standard Maximum Dry Unit Weight **117.2** lbf/ft3

D4718 corrected values :

Water Content of coarse fraction 6.7 %

Corrected Standard Optimum Water Content 10.0 %

Corrected Standard Maximum Dry Unit Weight 124.2 lbf/ft3

18.9 % larger than 19 mm sieve, removed

Checked	Approved	Remarks	**Figure No.**
			1
			Sheet 1 of 1

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT

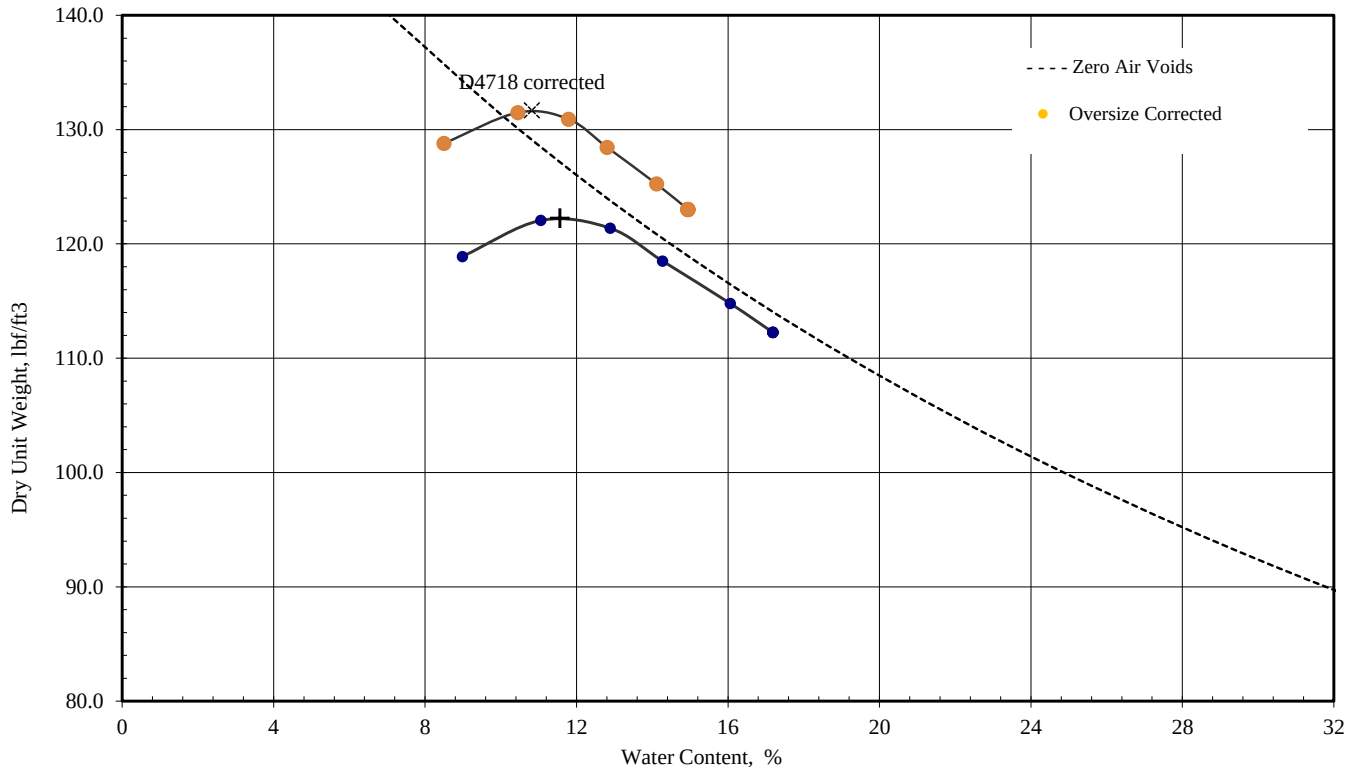
AASHTO T 99

ODOT - Office of Geotechnical Engineering

Lab No.	OGE Geotechnical La
Report Date:	
Tech:	mkerins

Site Name	601159	Soil Description		Sample No.	2
Job Ref	fra-71-8.91~pid106959	Top Depth (ft)	2.60	Sample Type	
Borehole/Pit No.	T-001-0-24	Bottom Depth (ft)	5.40	KeyLAB ID	OGEL202409131
Specimen Reference	2024-008-195	Ground Elevation (ft)		Northing	
Specimen Depth (ft)		Date started	10/4/2024	Easting	

Specimen Description	



Preparation	Dry preparation method			**Standard Optimum Water Content**	**11.6**	%
As received water content		8.8	%			
Specific gravity -		2.67	Assumed	**Standard Maximum Dry Unit Weight**	**122.3**	lbf/ft3
Test method used		D		D4718 corrected values :		
Type of rammer	Mechanical - sector face			Water Content of coarse fraction	8.8	%
Percentage of material retained on:	19 mm sieve	26.8	%	Corrected Standard Optimum Water Content	10.8	%
	9.5 mm sieve	0.0	%			
	4.75 mm sieve	26.3	%	Corrected Standard Maximum Dry Unit Weight	131.7	lbf/ft3

26.8 % larger than 19 mm sieve, removed

Checked	Approved	Remarks	**Figure No.**
			1
			Sheet 1 of 1

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT

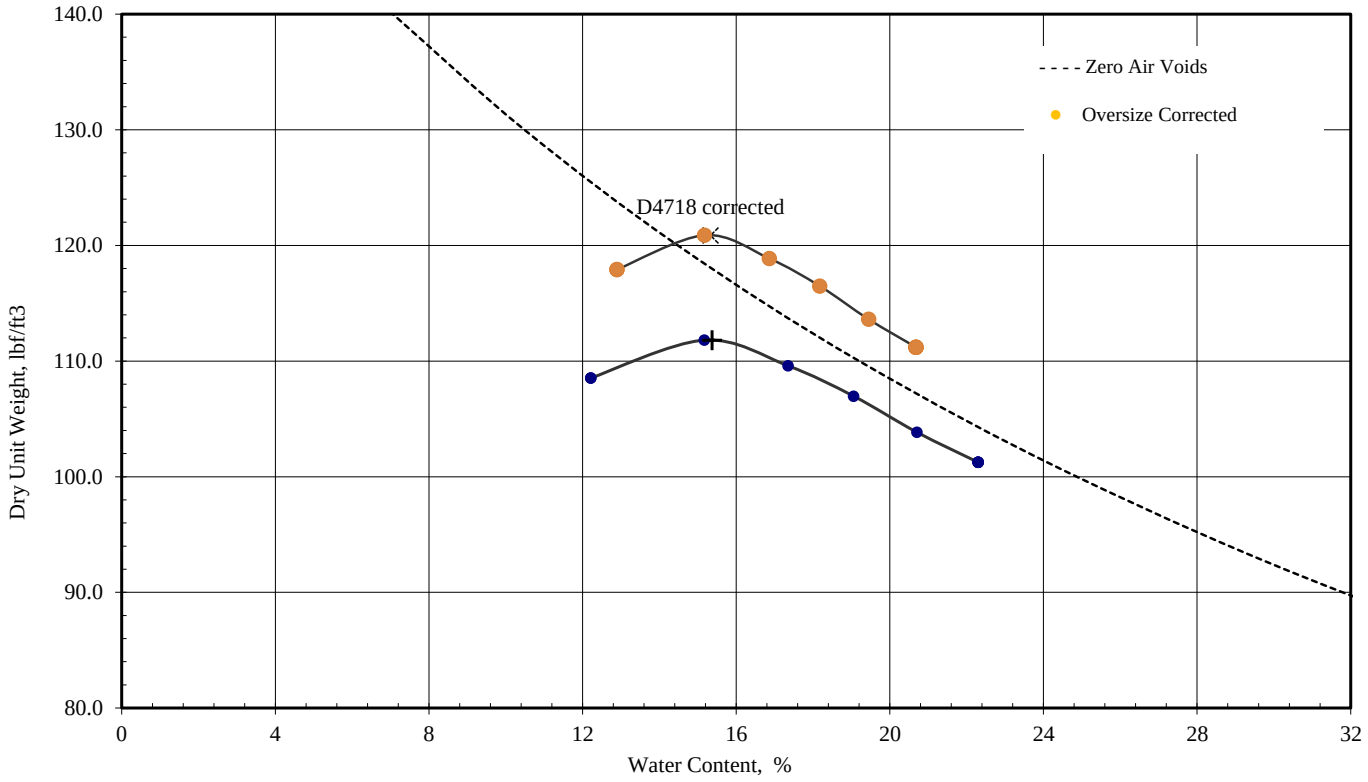
AASHTO T 99

ODOT - Office of Geotechnical Engineering

Lab No.	OGE Geotechnical La
Report Date:	
Tech:	mkerins

Site Name	601159	Soil Description		Sample No.	2
Job Ref	fra-71-8.91~pid106959	Top Depth (ft)	3.80	Sample Type	
Borehole/Pit No.	T-002-0-24	Bottom Depth (ft)	6.20	KeyLAB ID	OGEL202409133
Specimen Reference	2024-008-197	Ground Elevation (ft)		Northing	
Specimen Depth (ft)		Date started	10/8/2024	Easting	

Specimen Description	



Preparation	Dry preparation method		
As received water content		15.2	%
Specific gravity -		2.67	Assumed
Test method used		A	
Type of rammer		Mechanical - circular face	
Percentage of material retained on:	19 mm sieve	10.1	%
	9.5 mm sieve	0.0	%
	4.75 mm sieve	22.8	%

Standard Optimum Water Content	**15.4**	%
Standard Maximum Dry Unit Weight	**111.8**	lbf/ft3
D4718 corrected values :		
Water Content of coarse fraction	15.2	%
Corrected Standard Optimum Water Content	15.3	%
Corrected Standard Maximum Dry Unit Weight	120.9	lbf/ft3

22.8 % larger than 4.75 mm sieve, removed

Checked	Approved	Remarks	**Figure No.**
			1
			Sheet 1 of 1

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT

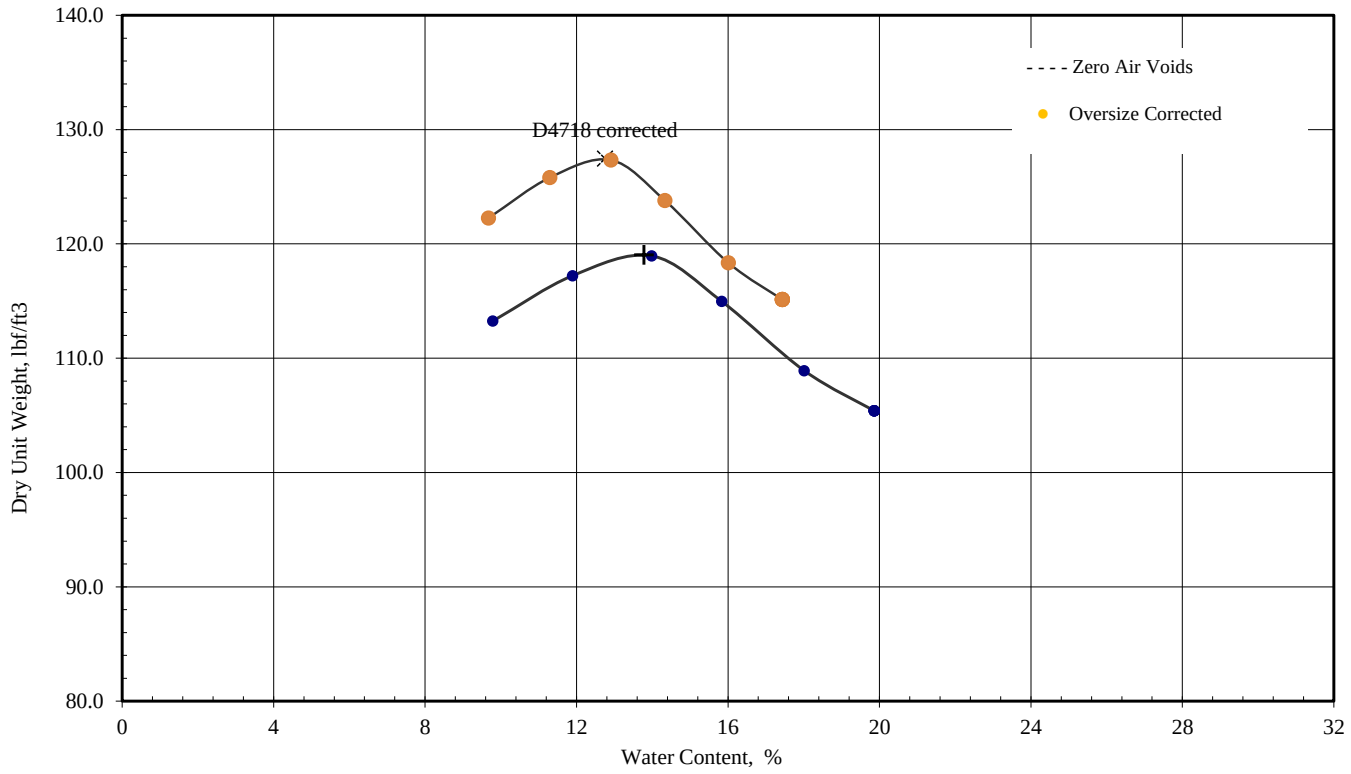
AASHTO T 99

ODOT - Office of Geotechnical Engineering

Lab No.	OGE Geotechnical La
Report Date:	
Tech:	mkerins

Site Name	601159	Soil Description		Sample No.	1
Job Ref	fra-71-8.91~pid106959	Top Depth (ft)	0.20	Sample Type	
Borehole/Pit No.	T-003-0-24	Bottom Depth (ft)	6.80	KeyLAB ID	OGEL202409134
Specimen Reference	2024-008-198	Ground Elevation (ft)		Northing	
Specimen Depth (ft)		Date started	10/11/2024	Easting	

Specimen Description	



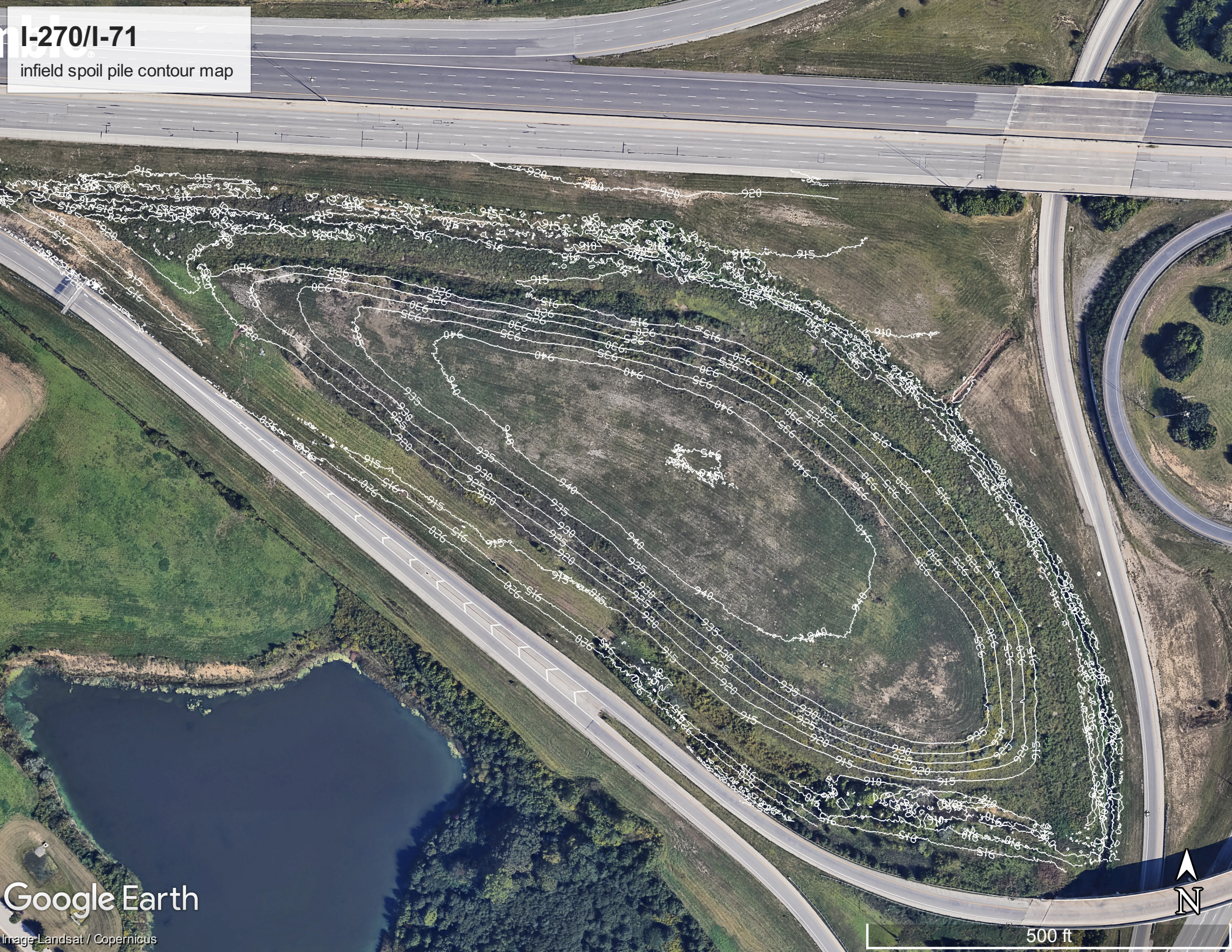
Preparation	Dry preparation method			**Standard Optimum Water Content**	**13.8**	%
As received water content		9.3	%	**Standard Maximum Dry Unit Weight**	**119.1**	lbf/ft3
Specific gravity -		267.00	Assumed			
Test method used		A		D4718 corrected values :		
Type of rammer	Mechanical - circular face			Water Content of coarse fraction	9.3	%
Percentage of material retained on:	19 mm sieve	14.2	%	Corrected Standard Optimum Water Content	12.8	%
	9.5 mm sieve	0.0	%			
	4.75 mm sieve	23.0	%	Corrected Standard Maximum Dry Unit Weight	127.5	lbf/ft3

23 % larger than 4.75 mm sieve, removed

Checked	Approved	Remarks	**Figure No.**
			1

I-270/I-71

infield spoil pile contour map



Stockpile Report

Project file data		Coordinate System	
Name:		Name:	United States/NAD83
Size:		Zone:	Ohio South 3402
Modified:		Datum:	NAD83(2011)
Time zone:		Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	
Comment 2:		Calibrated site:	
Comment 3:			

Stockpile Volume Report

Name	Base Area	Slope Area	Volume	Date	Initial Surface	Final Surface
_Minimum_elevation_Average_elevation	494764.8 ft²	510449.4 ft²	269442.2 yd³	10/24/2024	Generated Initial1	Generated Final1

10/24/2024 3:47:56 PM		Trimble Business Center