

**PROJECT DESCRIPTION**

PLUG AND FILL THE EXISTING TWIN 42" CONCRETE CULVERTS, JACK AND BORE A NEW 66" CULVERT, CONSTRUCT NEW HEADWALLS, AND MINOR GRADING.

**HISTORIC RECORDS**

HISTORICAL BORINGS WERE OBTAINED FROM ODOT OFFICE OF GEOTECHNICAL ENGINEERING, AND/OR DISTRICT FOR A SETTLEMENT INVESTIGATION, DAR-127-13.54. BORINGS B-001-0-68, B-002-0-68, AND B-003-0-69 THROUGH B-005-0-69 WERE USED IN THE CURRENT PROJECT DESIGN AND ARE SHOWN WITHIN THIS EXPLORATION. LOCATIONS ARE SHOWN ON THE PLAN VIEW ONLY WITH BORING LOGS PROVIDED. DIGITAL IMAGES OF THE PLANS ARE AVAILABLE ON THE ODOT GEOMS WEBSITE, WHICH CAN BE FOUND HERE: [HTTP://GIS.DOT.STATE.OH.US/TIMS/MAP/GEOTECH](http://gis.dot.state.oh.us/tims/map/geotech)

**GEOLOGY**

THE PROJECT IS LOCATED WITHIN UNION CITY-BLOOMER TRANSITIONAL TERRAIN WHICH IS CHARACTERIZED BY WELL-DEFINED MORAINES WITH LOW RELIEF TOPOGRAPHY. ISOLATED AREA OF HIGHLY ORGANIC SOILS AND PEAT DEPOSITS ARE PRESENT IN LOW LYING AREA. THE THICK COHESIVE GLACIALLY DEPOSITED TILLS ARE OVERLYING BEDROCK OF ORDOVICIAN AGE.

**RECONNAISSANCE**

FIELD RECONNAISSANCE WAS COMPLETED BY PERSONNEL FROM THE OFFICE OF GEOTECHNICAL ENGINEERING ON MAY 18, 2017. THE PROJECT AREA WAS NOTED AS BEING LOCATED IN A PREDOMINATELY AGRICULTURAL AREA. THE EXISTING ASPHALT PAVEMENT WAS NOTED AS BEING IN GOOD CONDITION. THE EXISTING CULVERT WAS NOTED AS BEING IN POOR CONDITION WITH THE WESTERN END BEING PITCHED UPWARD NOT ALLOWING FOR FLOW WITHIN THE PIPE.

**SUBSURFACE EXPLORATION AND FINDINGS**

SEVEN (7) CONE PENETRATION TEST SOUNDINGS LOCATIONS, C-001-0-17, C-002-0-17 THROUGH C-002-2-17, C-003-0-17, C-003-1-17, AND C-004-0-17, WERE COMPLETED ALONG THE CULVERT LOCATION. SOUNDINGS WERE COMPLETED ON JUNE 14 AND AUGUST 23, 2017. ALL SOUNDINGS WERE COMPLETED WITH A HYSON 23 T CRAWLER IN ACCORDANCE WITH ASTM D-5778. SOUNDINGS WERE TERMINATED WHEN TARGET DEPTH WAS MET, EXCEPT FOR C-002-0-17 WHICH ENCOUNTERED REFUSAL AT A SHALLOW DEPTH THAT FACILITATED SOUNDING C-002-1-17. ALL SOUNDINGS WERE COMPLETED OUTSIDE OF EXISTING PAVEMENT.

THE SOUNDINGS INDICATED THAT SENSITIVE SOILS, ASSUMED TO BE HIGHLY ORGANIC OR PEAT, WERE PRESENT UNDER THE WESTERN END OF THE CULVERT AND UNDER SOUTHBOUND EDGE OF PAVEMENT. WITHIN THE MEDIAN THESE SOILS ARE NOT PRESENT.

ADDITIONALLY, FIVE (5) HISTORICAL BORINGS, B-001-0-68, B-002-0-68, AND B-003-0-69 THROUGH B-005-0-69, WERE EVALUATED FOR SUBSURFACE CONDITIONS. THESE HISTORICAL BORINGS ALSO INDICATED THE PRESENCE OF ORGANIC SOILS, PEAT AND ELASTIC CLAYS WITHIN THE VICINITY OF THE WESTERN END OF THE CULVERT.




**SPECIFICATIONS**

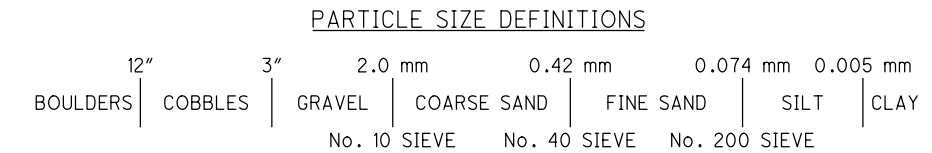
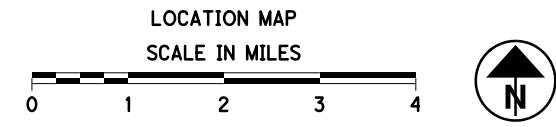
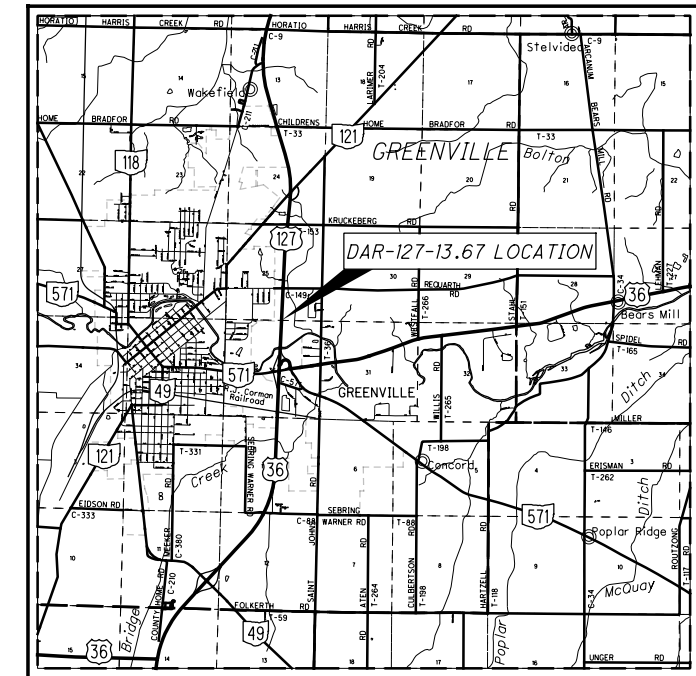
THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 15, 2016.

**AVAILABLE INFORMATION**

ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE GEOTECHNICAL EXPLORATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL EXPLORATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE OR THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1980 WEST BROAD STREET.

**LEGEND**

-  C-00X-0-17 CONE PENETRATION SOUNDING LOCATION - PLAN VIEW
-  HISTORIC BORING LOCATION - PLAN VIEW - DAR-127-13.54, 1968 & 1969
-  CONE PENETRATION SOUNDING PLOTTED TO VERTICAL SCALE ONLY.



RECON. - PPP 05/18/17  
 CPT PUSH - JB 06/14/17 & 08/23/17  
 DRAWN - GLM 03/2018  
 REVIEWED - SAT 03/2018

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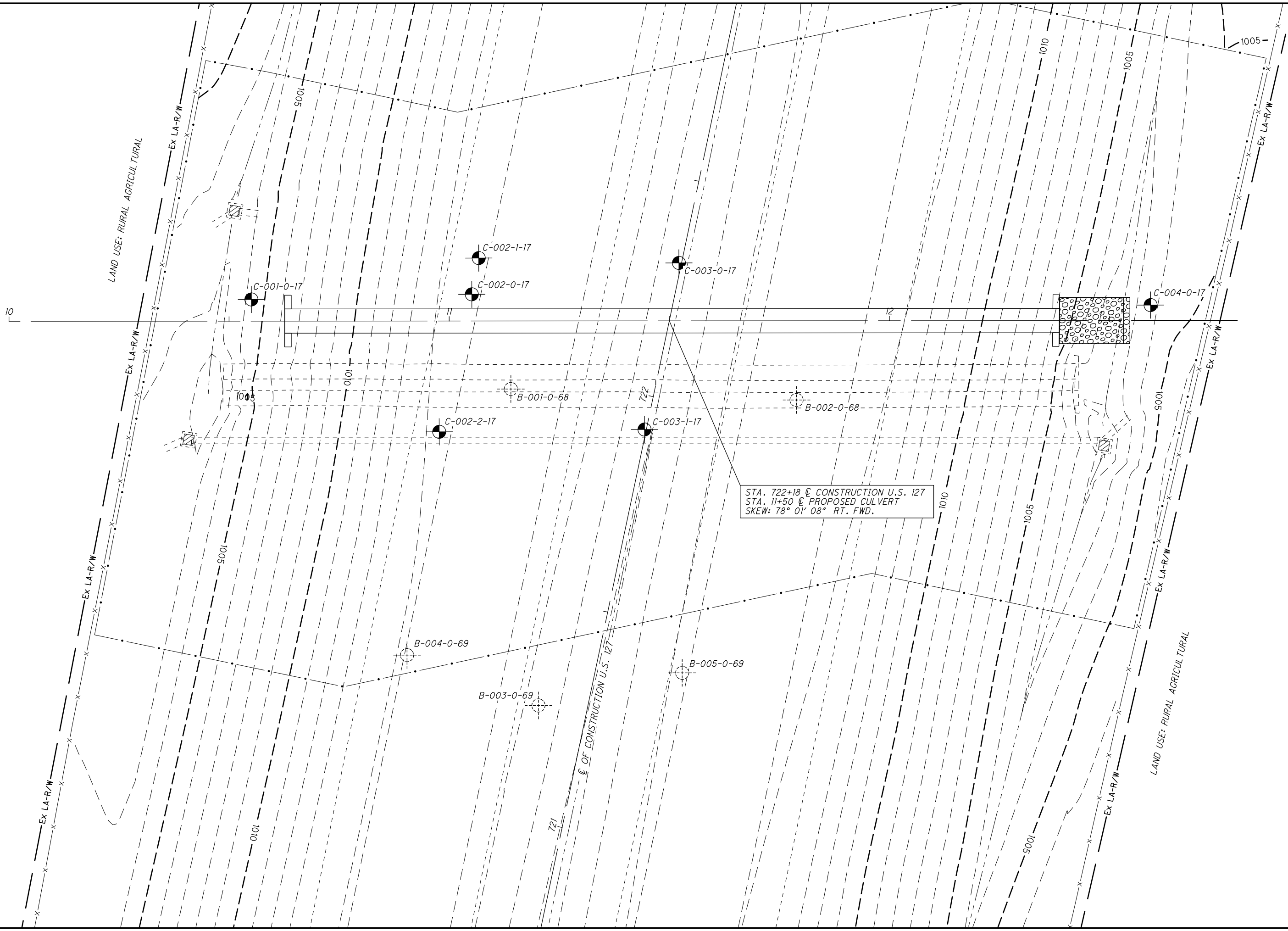
DESIGN AGENCY  
 OHIO DEPARTMENT OF TRANSPORTATION  
 OFFICE OF GEOTECHNICAL ENGINEERING  
 1980 W. BROAD ST., COLUMBUS, OH 43223

PID NO.  
**99866**

**STRUCTURE FOUNDATION EXPLORATION**  
**U.S. 127-13.67 CULVERT ON UNNAMED DITCH**

**DAR-49/127 -**  
**14.65 / 13.67 / 14.89**

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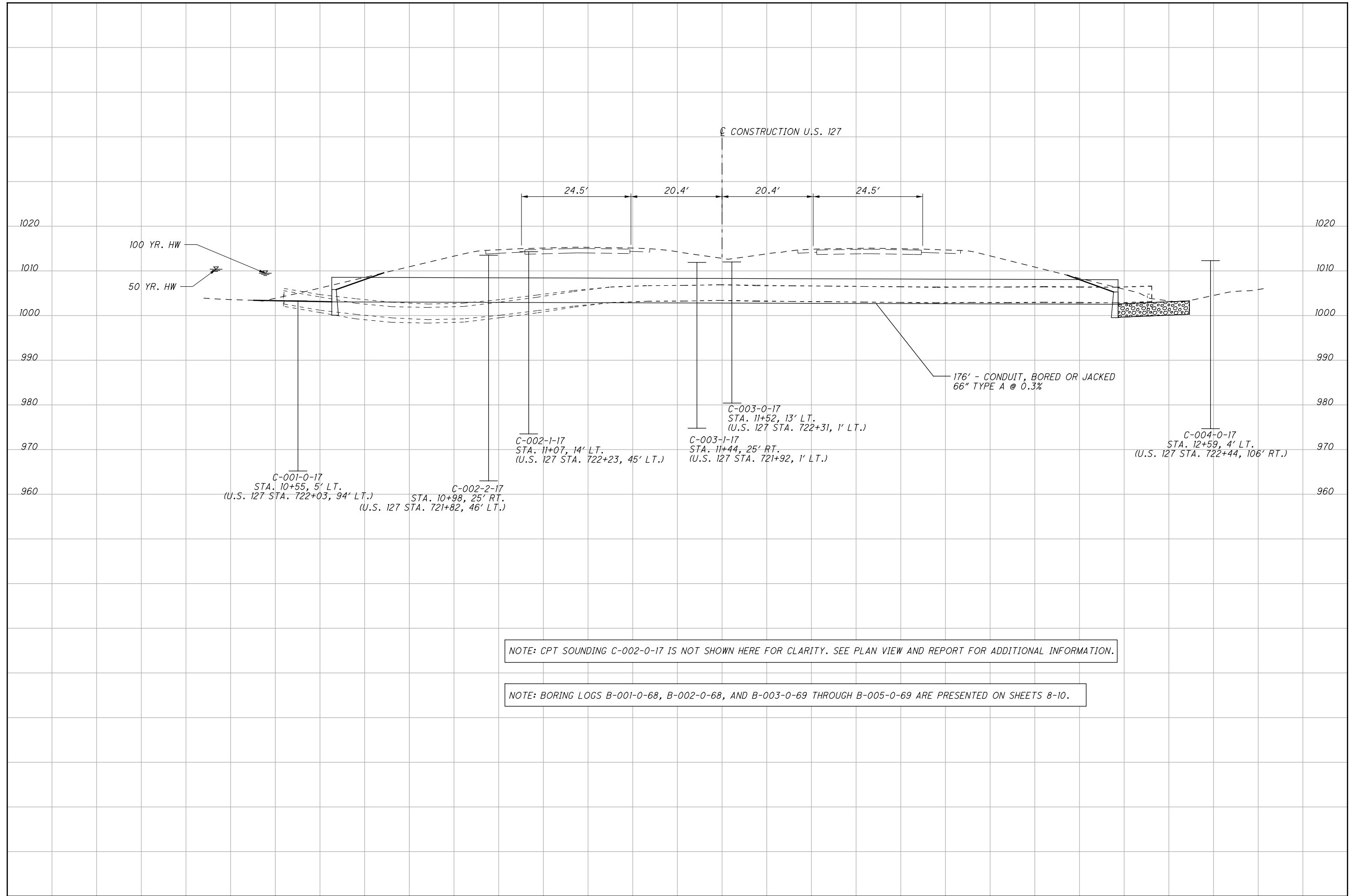


STA. 722+18 @ CONSTRUCTION U.S. 127  
 STA. 11+50 @ PROPOSED CULVERT  
 SKEW: 78° 01' 08" RT. FWD.

  
  
 HORIZONTAL SCALE IN FEET  
 DRAWN: GLM  
 CHECKED: SAT

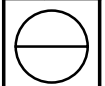
**PLAN-STRUCTURE FOUNDATION EXPLORATION  
 U.S. 127-13.67 CULVERT ON UNNAMED DITCH**

**DAR-49 / 127-  
 14.65 / 13.67 / 14.89**



NOTE: CPT SOUNDING C-002-0-17 IS NOT SHOWN HERE FOR CLARITY. SEE PLAN VIEW AND REPORT FOR ADDITIONAL INFORMATION.

NOTE: BORING LOGS B-001-0-68, B-002-0-68, AND B-003-0-69 THROUGH B-005-0-69 ARE PRESENTED ON SHEETS 8-10.





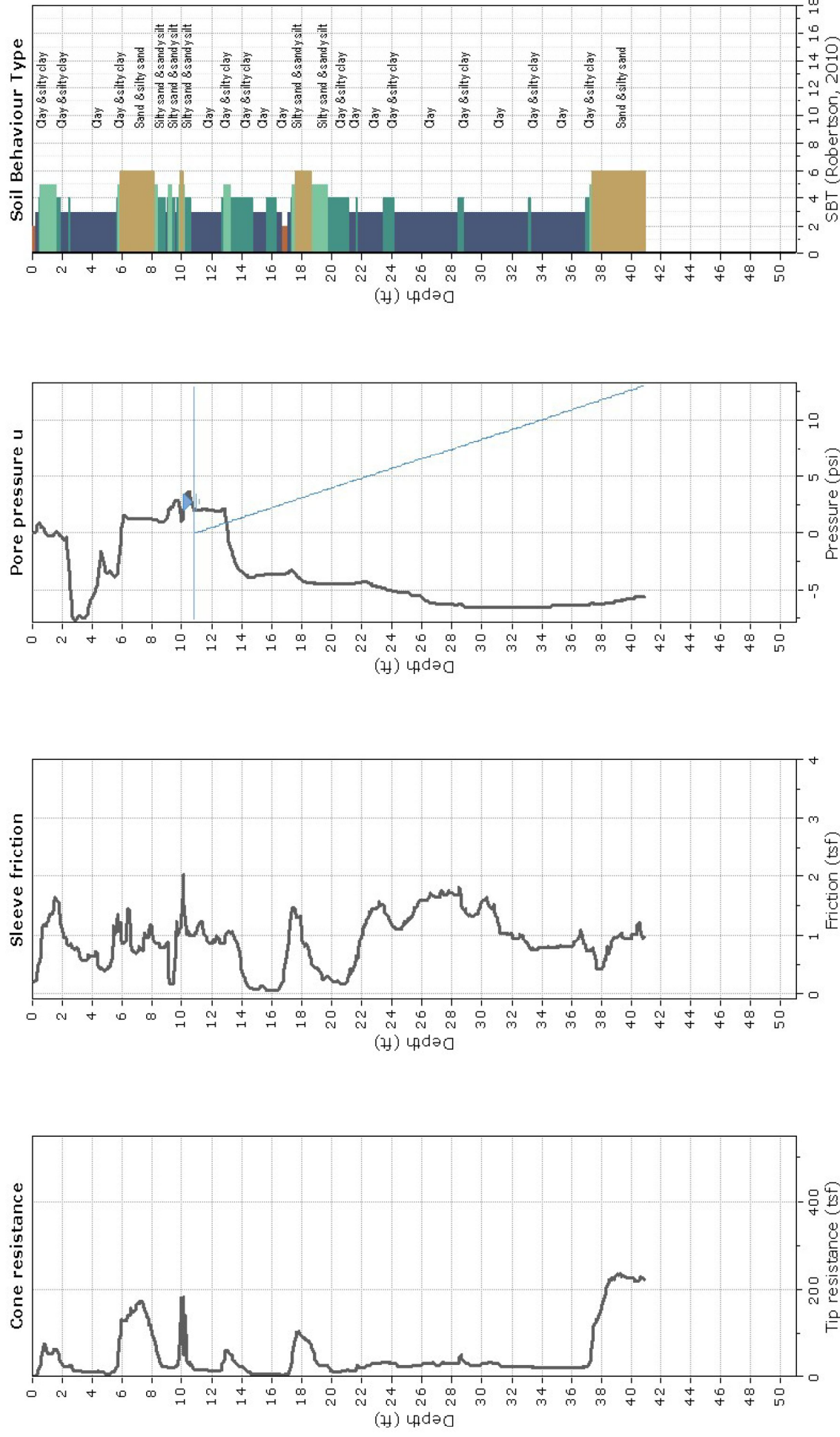




Office of Geotechnical Engineering  
 Geology, Exploration, and Laboratory Section  
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

**Project:** DAR-127-13.67  
**Location:** Darke County, Ohio

**CPT: C-002-1-17**  
 Total depth: 40.81 ft, Date: 6/14/2017  
 Surface Elevation: 1014.30 ft  
 Coords: lat 40.107477° lon -84.607164°



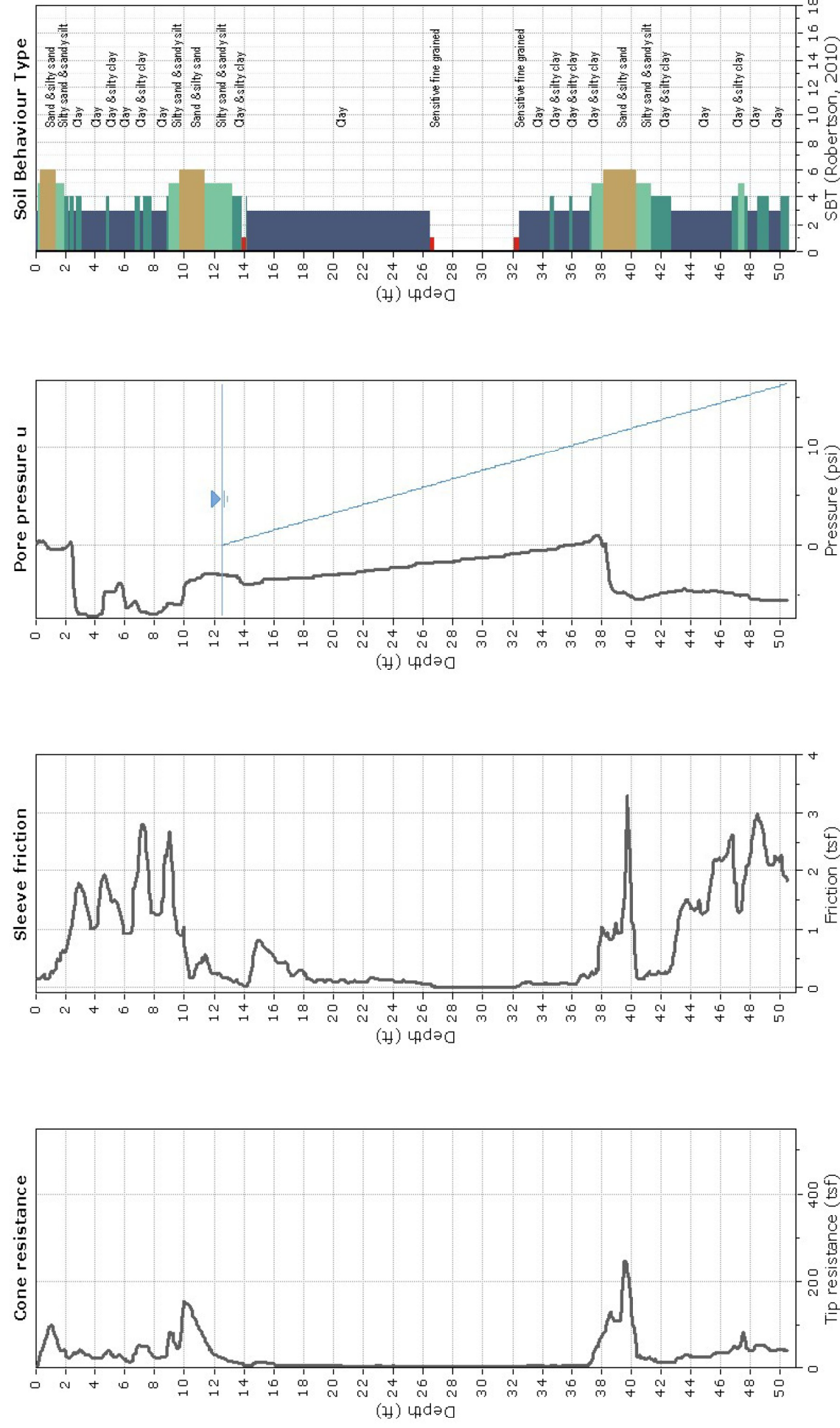
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<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

**Project:** DAR-127-13.67  
**Location:** Darke County, Ohio

**CPT: C-002-2-17**  
 Total depth: 50.46 ft, Date: 8/23/2017  
 Surface Elevation: 1013.50 ft  
 Coords: lat 40.107366° lon -84.607169°



CPeT-IT v.2.0.2.5 - CPTU data presentation & interpretation software - Report created on: 3/9/2018, 10:47:35 AM



DAR-49 / 127 -  
 14.65 / 13.67 / 14.89

STRUCTURE FOUNDATION EXPLORATION  
 U.S. 127-13.67 CULVERT ON UNNAMED DITCH  
 CPT BORINGS C-002-1-17 AND C-002-2-17

DRAWN  
 GLM  
 CHECKED  
 SAT

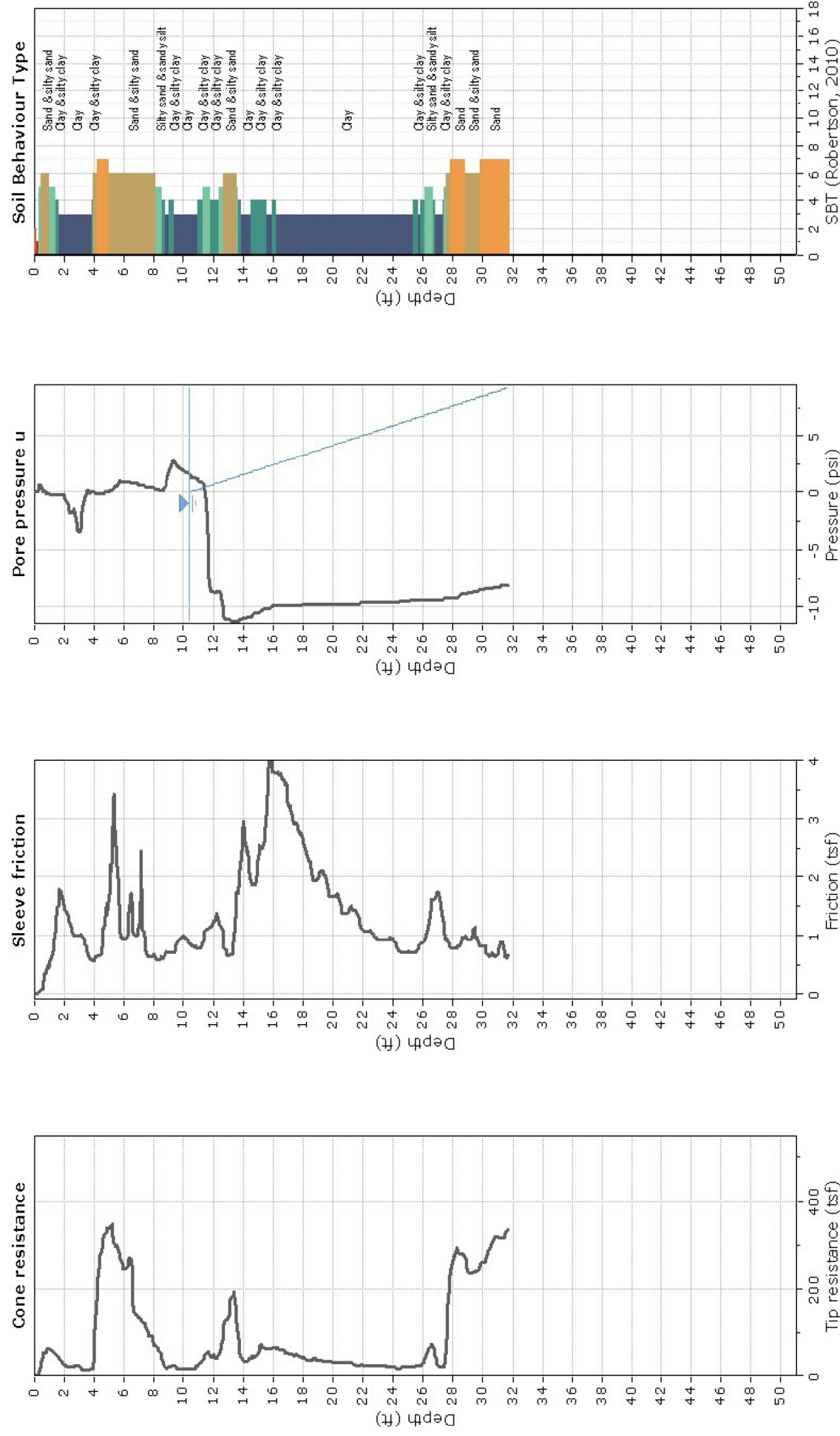




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**Project:** DAR-127-13.67  
**Location:** Darke County, Ohio

**CPT: C-003-0-17**  
 Total depth: 31.63 ft, Date: 8/23/2017  
 Surface Elevation: 1012.00 ft  
 Coords: lat 40.107497° lon -84.60697°



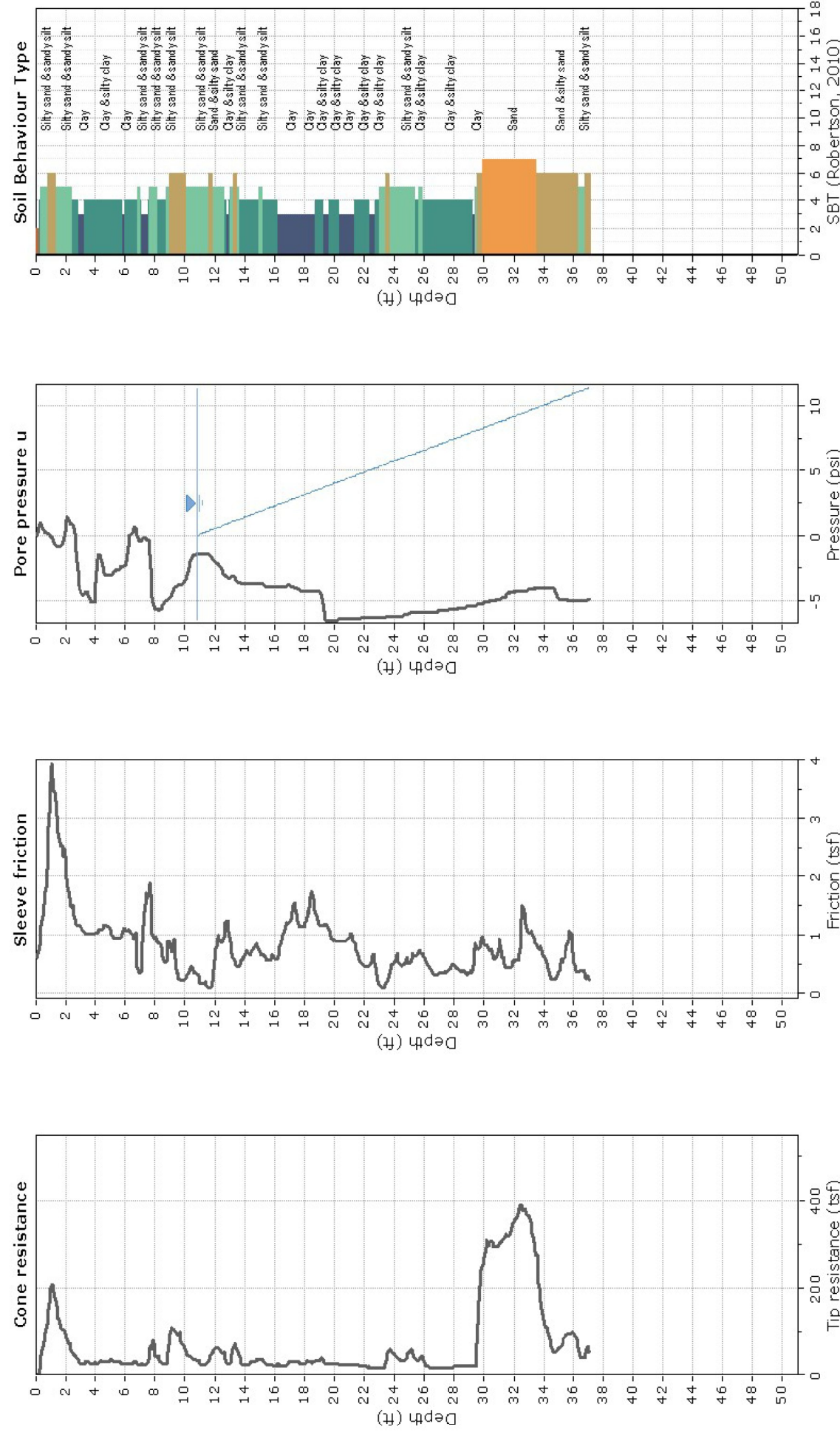
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Office of Geotechnical Engineering  
 Geology, Exploration, and Laboratory Section  
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

**Project:** DAR-127-13.67  
**Location:** Darke County, Ohio

**CPT: C-003-1-17**  
 Total depth: 37.07 ft, Date: 8/23/2017  
 Surface Elevation: 1011.90 ft  
 Coords: lat 40.107391° lon -84.606972°



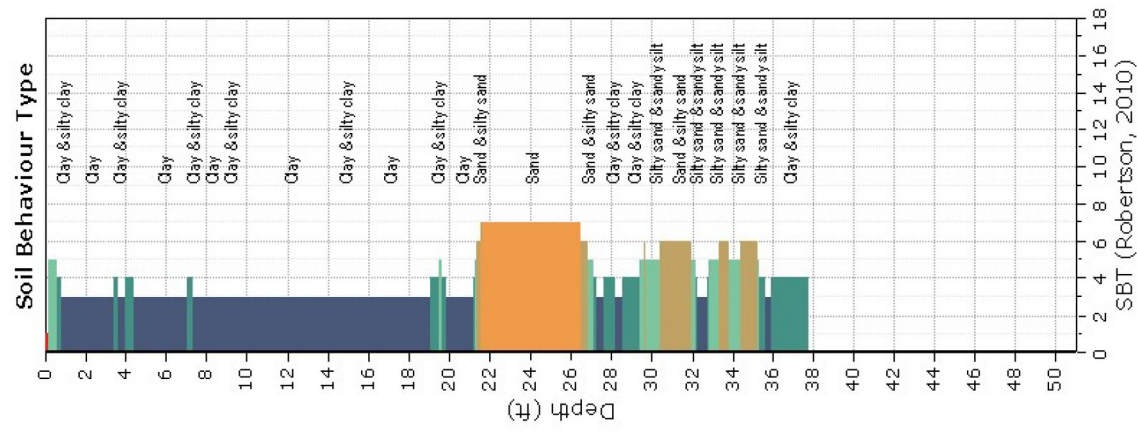
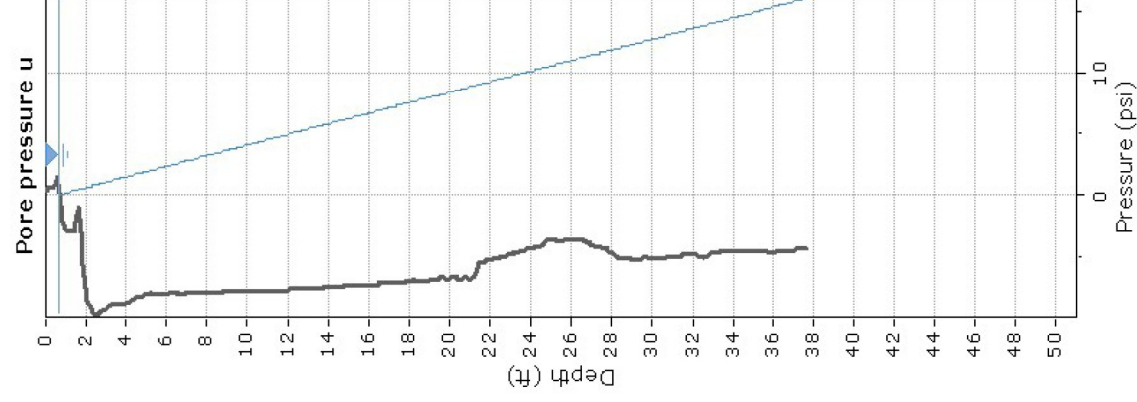
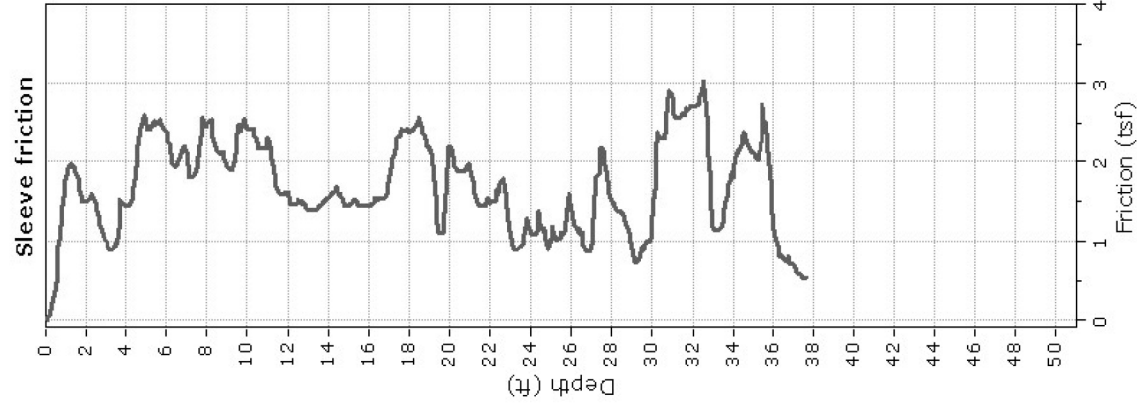
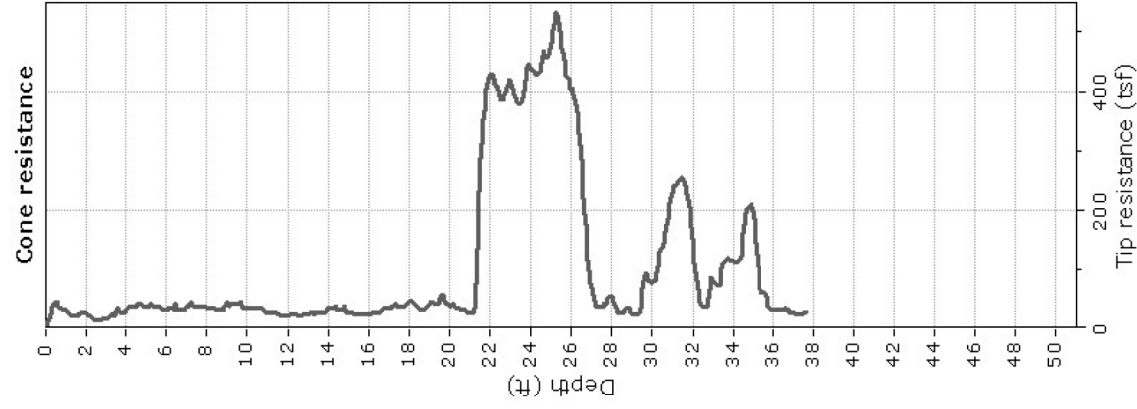
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**DAR-49 / 127 -**  
**14.65 / 13.67 / 14.89**

**STRUCTURE FOUNDATION EXPLORATION**  
**U.S. 127-13.67 CULVERT ON UNNAMED DITCH**  
**CPT BORINGS C-003-0-17 AND C-003-1-17**

DRAWN  
 GLM  
 CHECKED  
 SAT





State of Ohio  
Department of Highways  
Testing Laboratory

Date Started 6-24-68 Sampler Type SS Dia. 1 3/8" Water Elev. \_\_\_\_\_  
 Date Completed 6-25-68 Casing Length 25.0' Dia. 3 1/2"

Project Identification: DARKE  
DAR-127-13.54  
 Settlement Investigation

Boring No. B-001-0-68 Station & Offset 721+95, CL S.B. Lane Surface Elev. 1014.0'

Elev	Depth	Std Pen. (N)	Description	Field No.	Lab Nos.	Physical Characteristics						SHTL Class		
						% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L. P1.		W.C.	
1014.0	0													
1009.0	5	3/5	Brown Sandy Silt and Clay, Trace of Gravel	1	73205	9	12	12	33	34	15	27	A-6a	
1006.5	8	5/5	Brown Sandy Silt, Clay and Gravel	2	73206	36	8	9	24	23	12	24	A-6a	
1004.0	10	8/8	Brown Sandy Silt and Clay With Some Gravel	3	73207	-	-	-	-	-	30	24	Visual	
1001.5	14	2/3	Gray Sandy Elastic Clay	4	73208	0	13	11	26	50	19	45	A-7-5	
999.0	16	2/2	Gray Elastic Clay and Shale Fragments, Slightly Organic	5	73209	41	6	3	17	33	118	83	A-7-5	
996.5	18	1*	Gray Silty Clay, Slightly Organic (#1 blow = 1' penetration)	6	73210	0	3	1	46	50	101	84	A-7-5	
994.0	20	1/1	Gray Silt, Trace of Organic	7	73211	0	1	2	59	38	NP	26	A-4b	
991.5	24	9/12	Gray Silty Sand With Some Gravel	8	73212	24	14	18	26	18	NP	14	A-4a	
989.0	26	6/9	Gray Sandy Clayey Silt and Gravel	9	73213	33	10	16	29	22	21	14	A-4a	
986.5	28	9/11	Gray Sandy Silt and Clay	10	73214	0	10	16	27	47	27	15	A-6a	
984.0	30	12/14	Gray Silty Clay and Gravel	11	73215	38	6	8	14	34	32	15	A-6a	
979.0	36	14/20	Gray Sandy Silt and Clay With Some Gravel BOTTOM OF BORING	12	73216	21	14	13	16	36	30	14	16	A-6a

Particle Sizes Agg: >200mm, Coarse Sand=200-0.42mm, Fine Sand=0.42-0.074mm, Silt=0.074-0.005mm, Clay=<0.005mm

State of Ohio  
Department of Highways  
Testing Laboratory

Date Started 6-26-68 Sampler Type SS Dia. 1 3/8" Water Elev. \_\_\_\_\_  
 Date Completed 6-26-68 Casing Length 20.0' Dia. 3 1/2"

Project Identification: DARKE  
DAR-127-13.54  
 Settlement Investigation

Boring No. B-002-0-68 Station & Offset 722+06, CL - N.B. Lane Surface Elev. 1014.0'

Elev	Depth	Std Pen. (N)	Description	Field No.	Lab Nos.	Physical Characteristics						SHTL Class		
						% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L. P1.		W.C.	
1014.0	0													
1009.0	5	25/19	Brown Sandy Silt and Clay, Trace of Gravel	1	73198	8	9	16	22	45	28	15	20	A-6a
1004.0	10	7/7	Gray Sandy Clayey Silt With Little Gravel	2	73199	16	6	13	34	31	31	7	17	A-4a
1002.0	12	9/13	Brown Sandy Silt With Little Gravel	3	73200	18	11	16	24	31	21	5	7	A-4a
999.0	16	19/21	Gray Sandy silt and Clay With Little Gravel	4	73201	18	7	11	21	43	28	13	17	A-6a
996.5	18	16/25	Gray Sandy Silt and Clay With Little Gravel	5	73202	17	9	11	20	43	26	11	15	A-6a
994.0	20	15/15	Gray Sandy Silt and Clay With Some Gravel	6	73203	20	5	10	23	42	28	12	12	A-6a
989.0	26	14/16	Gray Silt, Clay and Gravel BOTTOM OF BORING	7	73204	33	5	8	23	31	25	10	20	A-4a

Particle Sizes: Agg: >2.00mm, Coarse Sand=200-0.42mm, Fine Sand=0.42-0.074mm, Silt=0.074-0.005mm, Clay=<0.005mm



DAR-49 / 127 -  
14.65 / 13.67 / 14.89

STRUCTURE FOUNDATION EXPLORATION  
 U.S. 127-13.67 CULVERT ON UNNAMED DITCH  
 HISTORIC BORING LOGS B-001-0-68 AND B-002-0-68

DRAWN  
GLM  
CHECKED  
SAT



State of Ohio  
Department of Highways  
Testing Laboratory

**LOG OF BORING**

Date Started 6-26-69 Sampler Type Williams Auger Water Elev. Immediate After \_\_\_\_\_ Hours \_\_\_\_\_  
Date Completed 6-26-69 Station & Offset 721+26, 11' Rt of S.B. Lane Surface Elev. \_\_\_\_\_  
Project Identification: DARKE  
DAR-127-13.54

Elev.	Depth	Description	Lab. No.	Physical Characteristics					SHTL Class.			
				% C.S. Agg.	% F.S.	% Silt	% Clay	P.I.		W.C.		
	0											
	2											
	4	Brown Sandy Silt and Clay with Little Gravel	7 93513	14	8	11	21	46	35	15	15	A-6a
	6											
	8											
	10											
	12	Gray Silty Clayey Sand with Some Gravel	8 93514	26	15	16	19	24	25	9	17	A-4a
	14											
	16	Gray Sand with Some Gravel	9 93515	23	29	18	11	19	NP	NP	13	A-2-4
	18											
	20											
	22	Gray Sandy Silt and Clay, Trace of Gravel	10 93516	8	8	14	25	45	25	11	12	A-6a
	24											
	26	∟ BOTTOM OF BORING										
	28											
	30											
	32											
	34											
	36											

Particle Sizes: Agg. > 2.00mm Coarse Sand = 2.00 - 0.42mm, Fine Sand=0.42- 0.074mm, Silt= 0.074-0.005mm, Clay < 0.005 mm

State of Ohio  
Department of Highways  
Testing Laboratory

**LOG OF BORING**

Date Started 6-26-69 Sampler Type Williams Auger Water Elev. Immediate After \_\_\_\_\_ Hours \_\_\_\_\_  
Date Completed 6-26-69 Station & Offset 721+31, 11' Rt of S.B. Lane Surface Elev. \_\_\_\_\_  
Project Identification: DARKE  
DAR-127-13.54

Elev.	Depth	Description	Lab. No.	Physical Characteristics					SHTL Class.			
				% C.S. Agg.	% F.S.	% Silt	% Clay	P.I.		W.C.		
	0											
	2											
	4											
	6	Brown Sandy Silt and Clay (Fill Material)	1 93507	3	8	14	26	49	28	11	14	A-6a
	8											
	10											
	12	Gray Silty Clay	2 93508	0	1	2	28	69	58	30	18	A-7-6
	14											
	16	Gray Sedimentary Peat	3 93509	-	-	-	-	-	74	-	68	Visual
	18											
	20											
	22	Gray Sedimentary Peat	4 93510	-	-	-	-	-	107	-	84	Visual
	24											
	26	Gray Silty Clay, Slightly Organic	5 93511	0	1	3	48	48	36	18	36	A-6b
	28											
	30	Gray Silt and Clay	6 93512	0	4	1	42	53	31	11	35	A-6a
	32											
	34	∟ BOTTOM OF BORING										
	36	Depth to Water 25.0'										

Particle Sizes: Agg. > 2.00mm Coarse Sand = 2.00 - 0.42mm, Fine Sand=0.42- 0.074mm, Silt= 0.074-0.005mm, Clay < 0.005 mm



DAR-49 / 127 -  
14.65 / 13.67 / 14.89

STRUCTURE FOUNDATION EXPLORATION  
U.S. 127-13.67 CULVERT ON UNNAMED DITCH  
HISTORIC BORING LOGS B-003-0-69 AND B-004-0-69

DRAWN  
GLM  
CHECKED  
SAT

State of Ohio  
Department of Highways  
Testing Laboratory

LOG OF BORING

Date Started 6-26-69 Sampler Type Williams Auger Water Elev. Immediate After \_\_\_\_\_ Hours  
Date Completed 6-26-69

Project Identification: DARKE  
127-13.67-14.89

Boring No. B-005-0-69 Station & Offset 721+40, 51' Lt. of S.B. Lane Surface Elev. \_\_\_\_\_

Elev.	Depth	Description	Field No.	Lab. Nos.	Physical Characteristics						SHTL Class.		
					% App. C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
	0		11	93517	0	2	7	31	60	86	46	58	A-7-5
	2	Gray Elastic Clay, Slightly Organic											
	4												
	6												
	8	Gray Sedimentary Peat	12	93518	-	-	-	-	-	152	-	135	Visual
	10												
	12												
	14	Gray Sedimentary Peat	13	93519	-	-	-	-	-	228	-	63	Visual
	16												
	18	Gray Sedimentary Peat	14	93520	-	-	-	-	-	598	-	84	Visual
	20												
	22												
	24	Gray Silt and Clay, Trace of Organic	15	93521	0	2	1	43	54	31	13	37	A-6a
	26												
	28												
	30	Gray Elastic Clay, Slightly Organic	16	93522	0	1	3	50	46	86	41	56	A-7-5
	32												
	34												
	36	↳ BOTTOM OF BORING											

Particle Sizes: Avg. > 2.00mm, Coarse Sand = 2.00 - 0.42mm, Fine Sand = 0.42 - 0.074mm, Silt = 0.074 - 0.005mm, Clay = < 0.005mm



DAR-49 / 127 -  
14.65 / 13.67 / 14.89

STRUCTURE FOUNDATION EXPLORATION  
U.S. 127-13.67 CULVERT ON UNNAMED DITCH  
HISTORIC BORING LOG B-005-0-69

DRAWN  
GLM  
CHECKED  
SAT