

PROJECT DESCRIPTION

THE PROJECT IS REPLACEMENT OF THE TWIN BRIDGE STRUCTURES WOO-75-1304 L&R TO ACCOMMODATE A THIRD LANE IN BOTH DIRECTIONS ALONG IR-75 OVER US 6 IN WOOD COUNTY, OHIO. ACCELERATED BRIDGE CONSTRUCTION (ABC) HAS BEEN SELECTED.

HISTORIC RECORDS

TWO HISTORIC DRIVE SAMPLE-CORE BORINGS AS PART OF A 1964 PROGRAM THAT INCLUDED 20 DRIVE ROD PENETRATION SOUNDINGS, DATED 1964, ARE PRESENTED ON THIS SOIL PROFILE.

GEOLOGY

THE SITE IS LOCATED WITHIN THE NEAR-LEVEL MAUMEE LAKE PLAINS PHYSIOGRAPHIC REGION OF NORTHWESTERN OHIO. THE SOILS UNDERLYING THE PROJECT AREA ARE COMPOSED PRIMARILY LAKE MODIFIED TILLS INCLUDING OVERLYING AND INTERBEDDED LACUSTRINE DEPOSITS OF MOSTLY SILTY CLAY. THE UPPER PARTS OF THE LACUSTRINE DEPOSITS ARE USUALLY VARVED. THE UNDERLYING CONSOLIDATED ROCKS ARE MAPPED AT AN ELEVATION OF ABOUT 655-675 FT AS SILURIAN LOCKPORT DOLOMITE.

RECONNAISSANCE

BOB WESTERVILLE VISITED THE SITE ON MARCH 19, 2012 IN CONJUNCTION WITH ESTABLISHING THE BORING LOCATIONS. THE BRIDGES AND ASSOCIATED APPROACH EMBANKMENTS FORM A HIGH POINT IN THE OTHERWISE FLAT AND RELATIVELY FEATURELESS TERRAIN, RISING TO A HEIGHT OF ABOUT 24 FT ABOVE THE SURROUNDING AREA.

THE INDEPENDENT PARALLEL BRIDGES APPEAR TO BE PERFORMING WELL FROM A GEOTECHNICAL STANDPOINT. NO EVIDENCE OF FOUNDATION INDUCED DISTRESS WAS NOTED. THE PARAPETS AND EDGE BEAMS MAINTAIN A SMOOTH GRADE SUGGESTING THAT SETTLEMENT, IF IT HAS OCCURRED, HAS BEEN EVEN.

THE BROAD GRASSED MEDIAN SEPARATING THE BRIDGES IS GRADED TO A SWALE FOR DRAINAGE. THE CROSS SLOPES APPEAR TO BE ADEQUATE, BUT THE PRESENCE OF STANDING WATER AT SOME LOCATIONS ALONG THE SWALE SUGGESTS THAT THE LONGITUDINAL GRADES ARE NOT SUFFICIENT.

STANDING WATER WAS OBSERVED IN THE SWALE BENEATH THE STRUCTURES ALONG BOTH SIDES OF US 6 AND MAY INDICATE THE PRESENCE OF WEAK OR COMPRESSIBLE FOUNDATION SOILS. THE CONDITION OF A SUBSET OF THE PIERS APPEARS TO BE GOOD.

OVERALL, THE APPROACH AND SPILL THROUGH EMBANKMENT SLOPES ARE IN GOOD CONDITION. THEY ARE FORMED TO A GRADE OF 2 HORIZONTAL TO 1 VERTICAL (2:1) EVIDENCE OF LIMITED REPAIRS WAS NOTED - APPARENTLY TO REMEDIATE AN EROSION SCAR THAT HAD FORMED DOWN AN APPROACH EMBANKMENT SIDE SLOPE BEHIND ONE OF THE ABUTMENTS.

SUBSURFACE EXPLORATION

AN INITIAL SUBSURFACE EXPLORATION INCLUDED 7 BORINGS DRILLED BETWEEN 10 FT AND 45.5 FT BGS BETWEEN APRIL 11-17, 2012. FIVE WERE POSITIONED TO CORRESPOND TO STATIONING AT EACH EXISTING PAIR OF ADJACENT PIERS AND THE ABUTMENTS. THE REMAINING TWO WERE DRILLED IN THE IR-75 MEDIAN FOR SUBGRADE EVALUATION PURPOSES. AN ABC SUPPLEMENTAL EXPLORATION INCLUDED 6 BORINGS DRILLED BETWEEN 17 AND 18.75 FT BGS BETWEEN JULY 9-12, 2013. ALL BORINGS WERE DRILLED USING AN ALL TERRAIN VEHICLE MOUNTED MOBILE B-57 DRILLING RIG WITH 3.25-INCH ID HOLLOW STEM AUGERS THAT WERE USED TO ADVANCE THE BORINGS THROUGH UNCONSOLIDATED MATERIAL AND TO SERVE AS A CASING FOR ROCK CORING. SOIL SAMPLES WERE RECOVERED AT INTERVALS OF 2.5 FT PRIMARILY USING A SPLIT SPOON SAMPLER (AASHTO T-206 "STANDARD METHOD FOR PENETRATION TEST AND SPLIT BARREL SAMPLING OF SOILS.") AND PLACED IN SEALED JARS. RELATIVELY UNDISTURBED SAMPLES OF THE FOUNDATION SOILS WERE COLLECTED AT SEVERAL LOCATIONS USING SHELBY TUBE THIN-WALLED SAMPLERS. THE STANDARD PENETRATION TEST (SPT) WAS CONDUCTED USING AN AUTO-HAMMER THAT HAS BEEN CALIBRATED AS 95.1% EFFICIENT. WHEN CORING WAS REQUIRED, THE AUGERS SERVED AS SURFACE CASING AND A 10-FT LONG NX CORE BARREL WAS USED TO EXTRACT THE ROCK CORE IN 5-FT RUNS, USING WATER AS THE DRILLING FLUID. CORE WAS LOGGED IN THE FIELD AND PERCENT RECOVERY AND RQD WERE CALCULATED. THE MATERIAL WAS PLACED IN CORE BOXES FOR SHIPMENT TO THE LABORATORY.

EXPLORATION FINDINGS

GEOTECHNICAL EXPLORATION FOR THE EXISTING STRUCTURES ENCOUNTERED BEDROCK AT ELEVATION ABOUT 662 FT OVERLAIN BY ABOUT 13 FT OF CLAY- AND SILT-RICH GLACIAL TILL. THIS STRATIGRAPHY WAS CONFIRMED DURING THE RECENT FIELD EXPLORATIONS, ALTHOUGH THE ADDITION OF THE IR-75 APPROACH EMBANKMENTS HAS INCREASED THE OVERBURDEN THICKNESS SIGNIFICANTLY AT THE ABUTMENTS TO ABOUT 36 FT. THE TILL OVERBURDEN INCREASES IN STRENGTH FROM 'STIFF' TO 'HARD' AT AN ELEVATION OF ABOUT 668 FT, AND THE BEDROCK ELEVATION VARIES BY LESS THAN 5 FT IN THE RANGE 657-662 FT. THE NATURAL SOILS (EXCLUDING THE EXISTING EMBANKMENTS) CONSIST PRIMARILY OF SILT AND CLAY MIXTURES WITH VARYING (SMALL) AMOUNTS OF SAND THAT ARE CLASSIFIED AS A-4a, A-6a, A-6b AND A-7-6. THREE TO FIVE FEET OF FILL (A-6a AND A-4a) WAS NOTED IN BORINGS B-003-0-12 AND B-004-01-12. BENEATH THE FILL THE SOIL IS USUALLY A-6a OR A-6b TO AN ELEVATION OF ABOUT 664 FT BEYOND WHICH IT IS TYPICALLY A-4a. THE UPPER OVERBURDEN SOILS WERE FOUND BY LABORATORY TESTING TO BE 'STIFF' (su = 1829 PSF), ALTHOUGH SPT TESTS AND HAND PENETROMETER RESULTS PLACE THEM IN THE 'VERY STIFF' CATEGORY. COMPRESSIBILITY IS LOW AND THE SOILS ARE SIGNIFICANTLY OVER-CONSOLIDATED (OCR = 5) INDICATING THAT RE-COMPRESSON WILL BE THE DOMINANT MECHANISM FOR CONSOLIDATION FOR ALL BUT THE HIGHEST APPLIED LOADS. THE EMBANKMENTS ARE COMPOSED ALMOST EXCLUSIVELY OF VERY STIFF TO HARD A-6b SOIL.

LEGEND

DESCRIPTION	ODOT CLASS	CLASSIFIED MECH./VISUAL	
GRAVEL AND/OR STONE FRAGMENTS	A-1-a	0	3
GRAVEL AND/OR STONE FRAGMENTS WITH SAND	A-1-b	0	2
COARSE AND FINE SAND	A-3a	0	1
SANDY SILT	A-4a	7	10
SILT	A-4b	0	1
SILT AND CLAY	A-6a	12	12
SILTY CLAY	A-6b	15	18
CLAY	A-7-6	4	6
	TOTAL	38	53
DOLOMITE	VISUAL		
LIMESTONE	VISUAL		

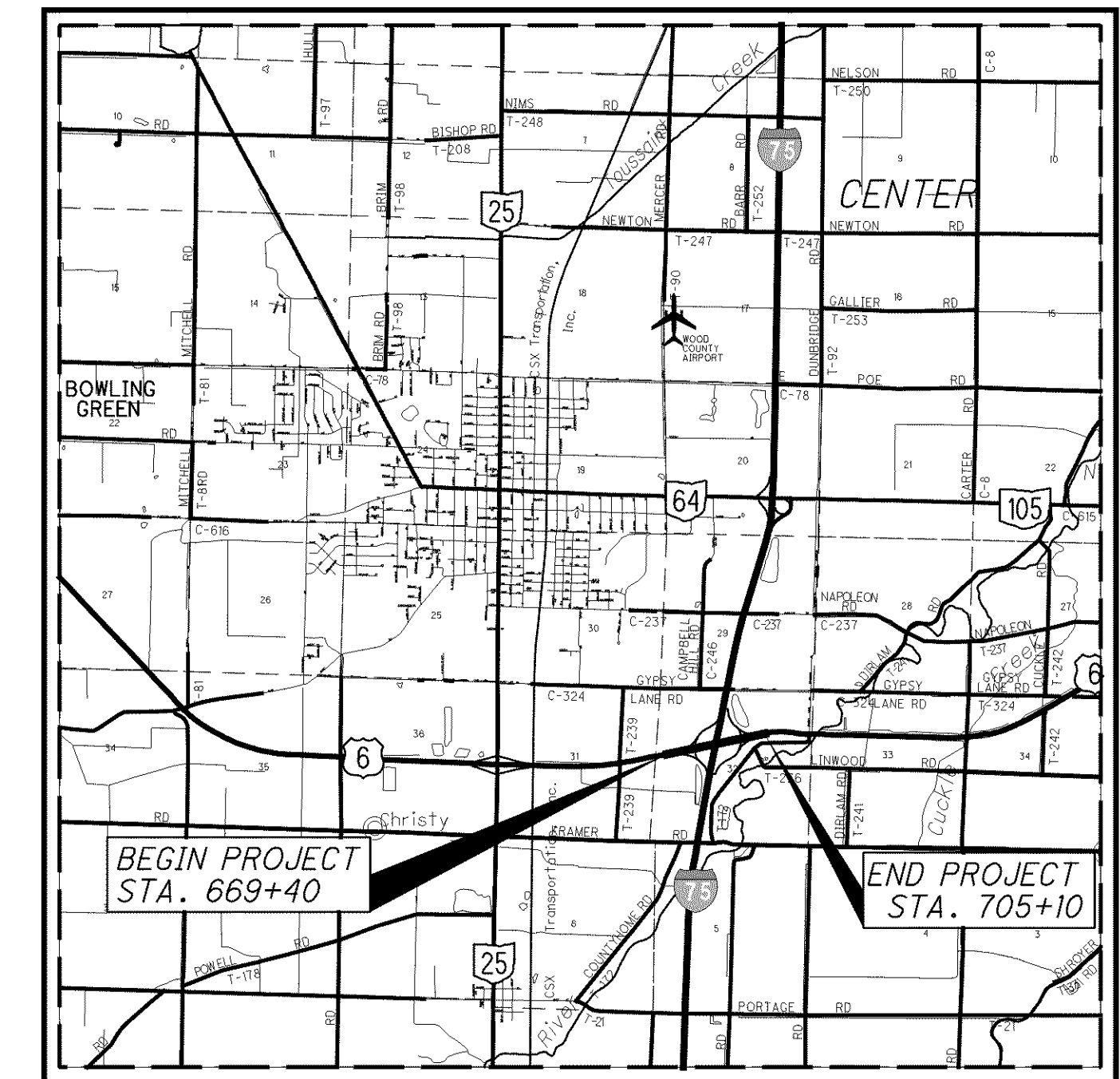
HISTORIC BORING DESCRIPTIONS	ODOT CLASS	CLASSIFIED MECH./VISUAL	
GRAVEL AND/OR STONE FRAGMENTS WITH SAND	A-1-b	1	0
SILT	A-4b	3	0
SILT AND CLAY	A-6a	3	0
	TOTAL	7	0
DOLOMITE	VISUAL		

SPECIFICATIONS

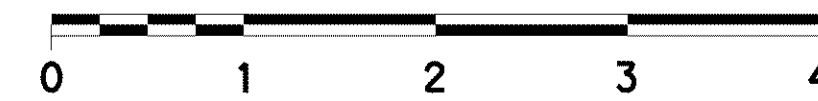
THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JANUARY 2012.

AVAILABLE INFORMATION

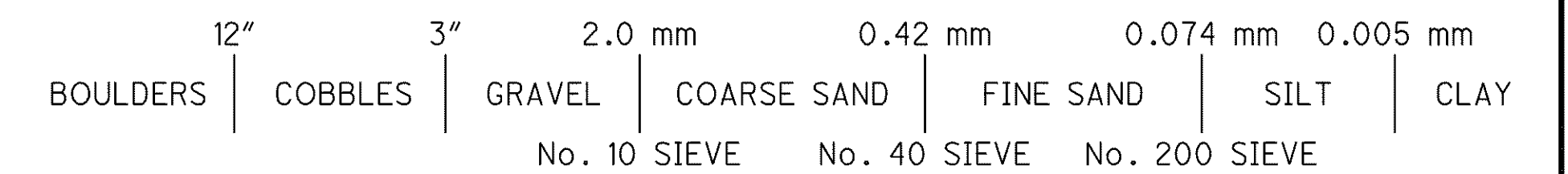
ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE GEOTECHNICAL EXPLORATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL EXPLORATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1600 WEST BROAD STREET OR THE OFFICE OF STRUCTURAL ENGINEERING AT 1980 WEST BROAD STREET.



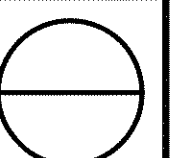
LOCATION MAP
SCALE IN MILES



PARTICLE SIZE DEFINITIONS

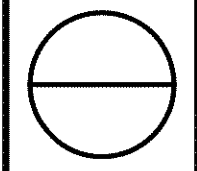


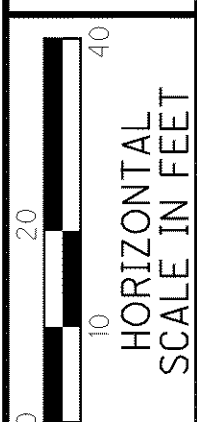
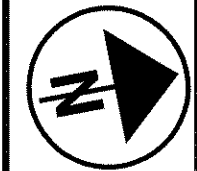
RECON. - B. WESTERVILLE 03/19/2012
 DRILLING - R. WEBB 04/11-17/12, 07/9-13/13
 DRAWN - C. HE 07/01-05/2012
 REVIEWED - S. EDWARDS 08/28/2013



SUMMARY OF SOIL TEST DATA
IR 75

EXPLORATION NO., STATION & OFFSET	FROM	TO	SAMPLE ID	% REC	% AGG	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	OHIO CLASS
B-001-0-12	01.00	02.50	SS-1	28	2	6	14	29	49	36	15	21	16	A-6b (12)
STA. 680+32.9, 9.8' RT.	03.50	05.00	SS-2	61	5	8	16	32	39	28	14	14	11	A-6a (9)
LATITUDE = 41.348761068	06.00	07.50	SS-3	39				SAME AS SS-2					19	A-6a (V)
LONGITUDE = -83.622716593	08.50	10.00	SS-4	50				SAME AS SS-2					19	A-6a (V)
B-007-0-12	01.00	02.50	SS-1	44	4	6	13	33	44	31	16	15	14	A-6a (10)
STA. 699+05.1, 11.6' RT.	03.50	05.00	SS-2	17	3	6	14	37	40	29	15	14	13	A-6a (10)
LATITUDE = 41.353815085	06.00	07.50	SS-3	89	4	6	13	31	46	30	15	15	13	A-6a (10)
LONGITUDE = -83.621486360	08.50	10.00	SS-4	44				SAME AS B-005-0-12 SS-2					18	A-7-6 (V)

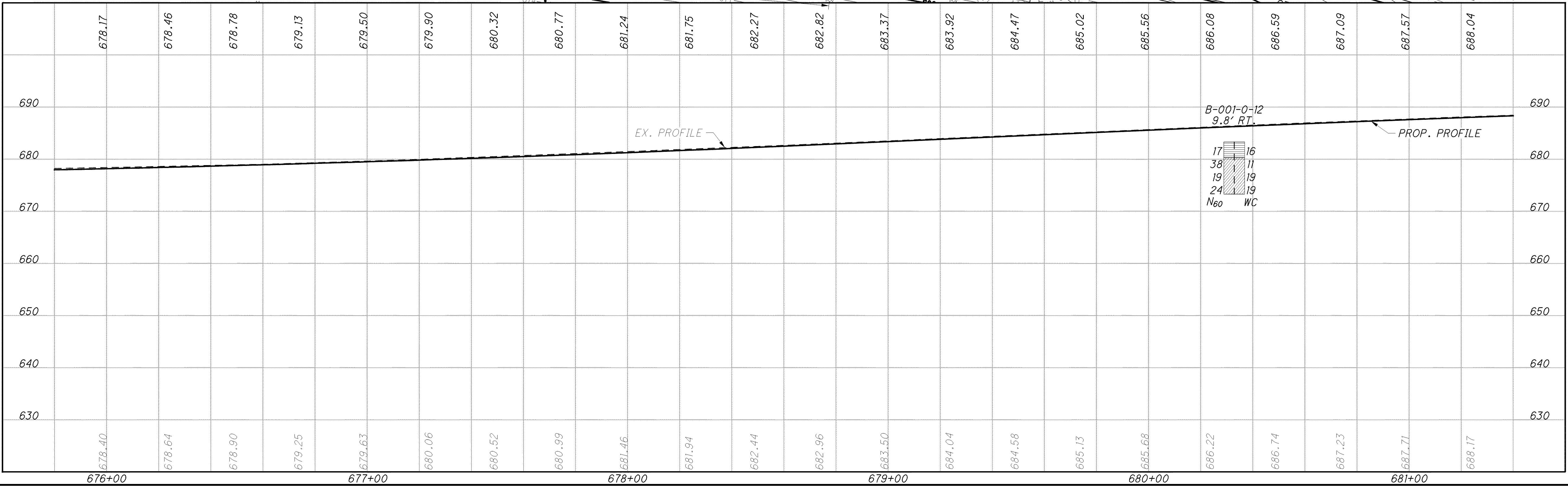
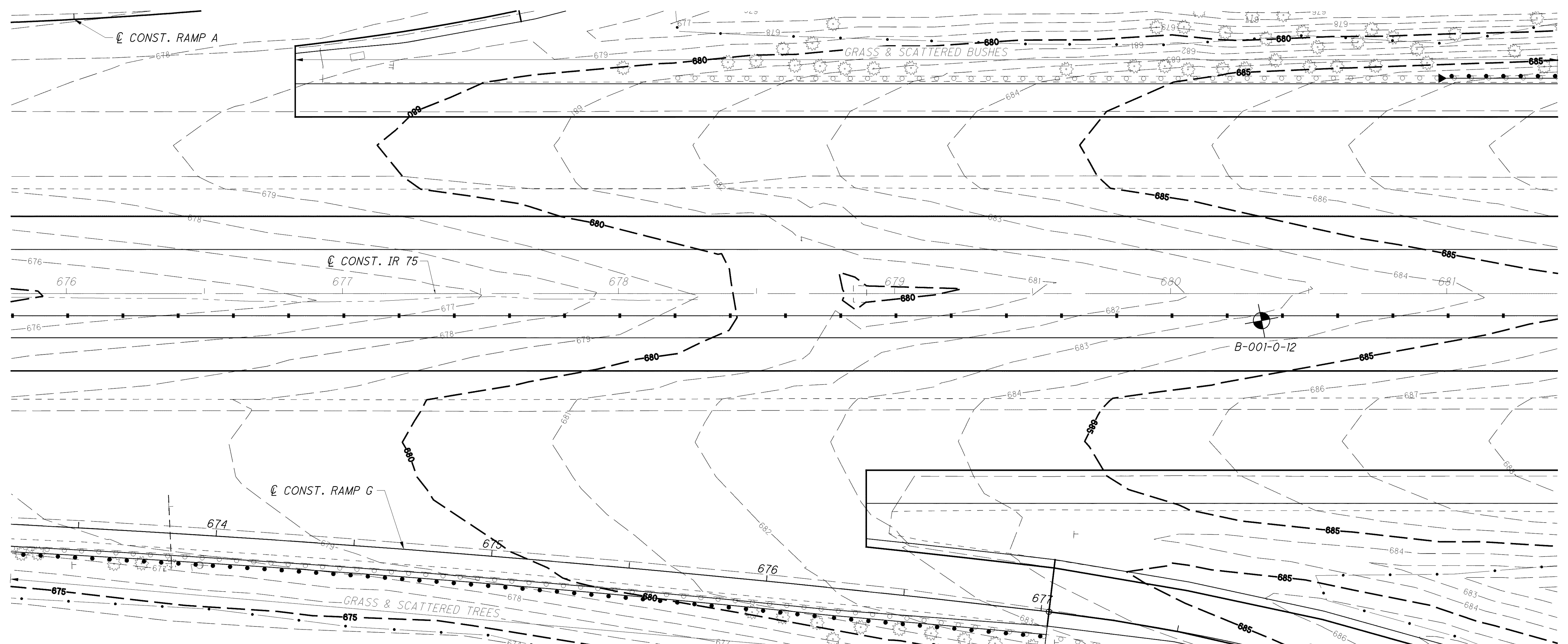
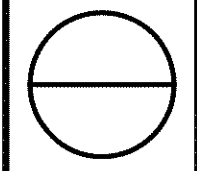




DRAWN CMH
CHECKED SE

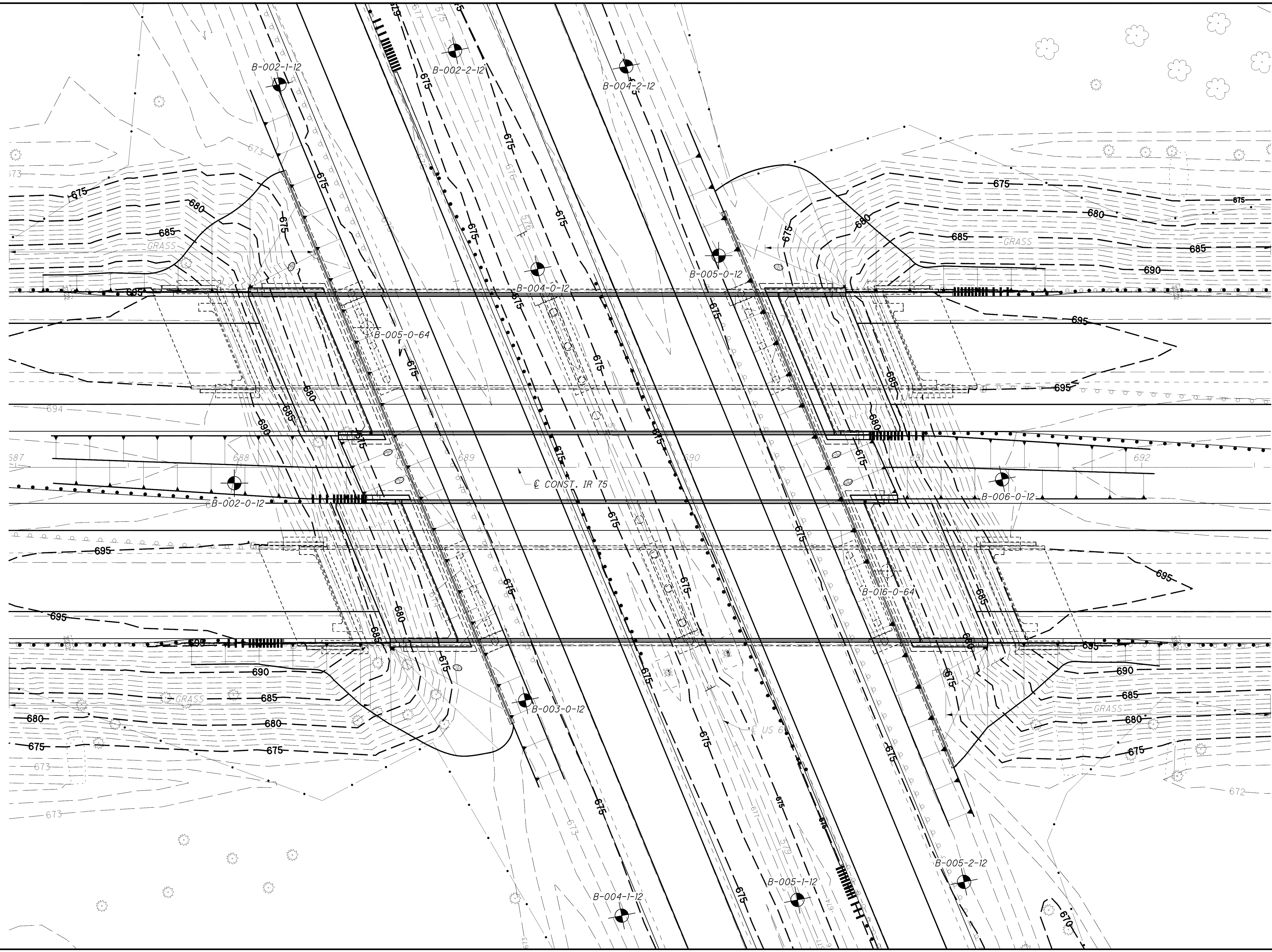
STRUCTURE FOUNDATION EXPLORATION
STA. 675+80 TO STA. 681+40 IR 75

W00-75-10.61




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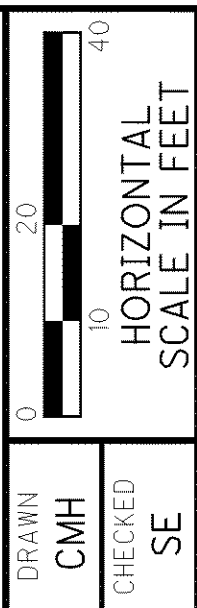
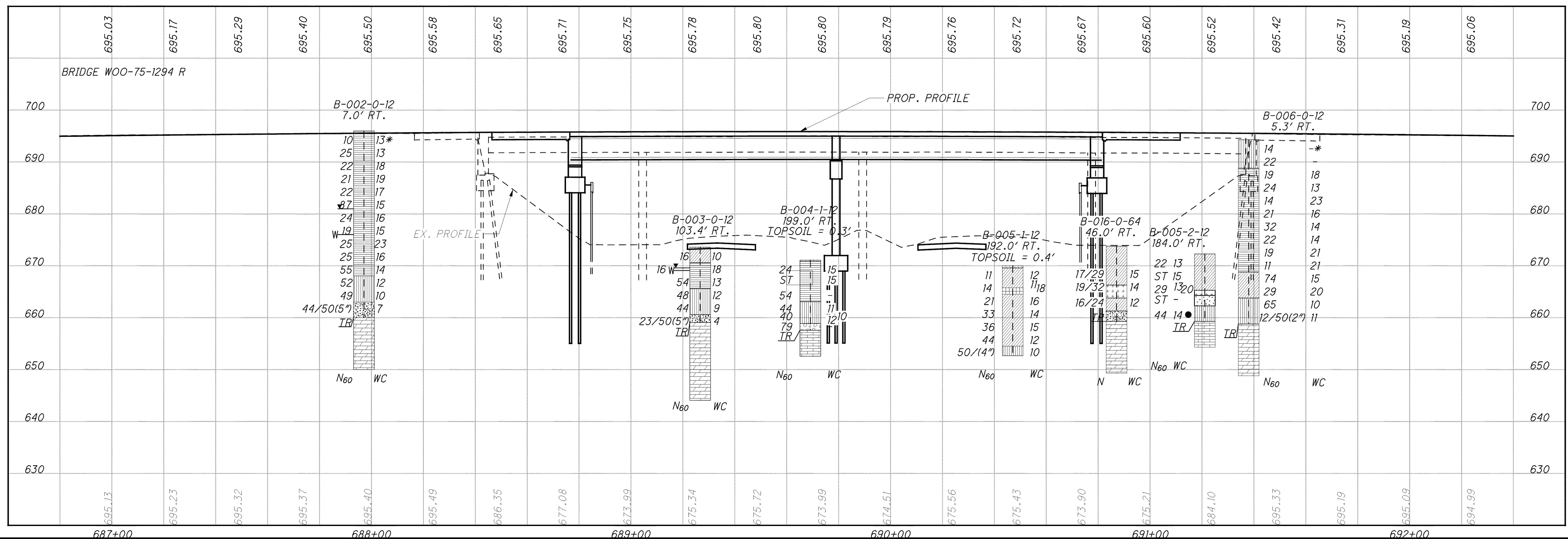
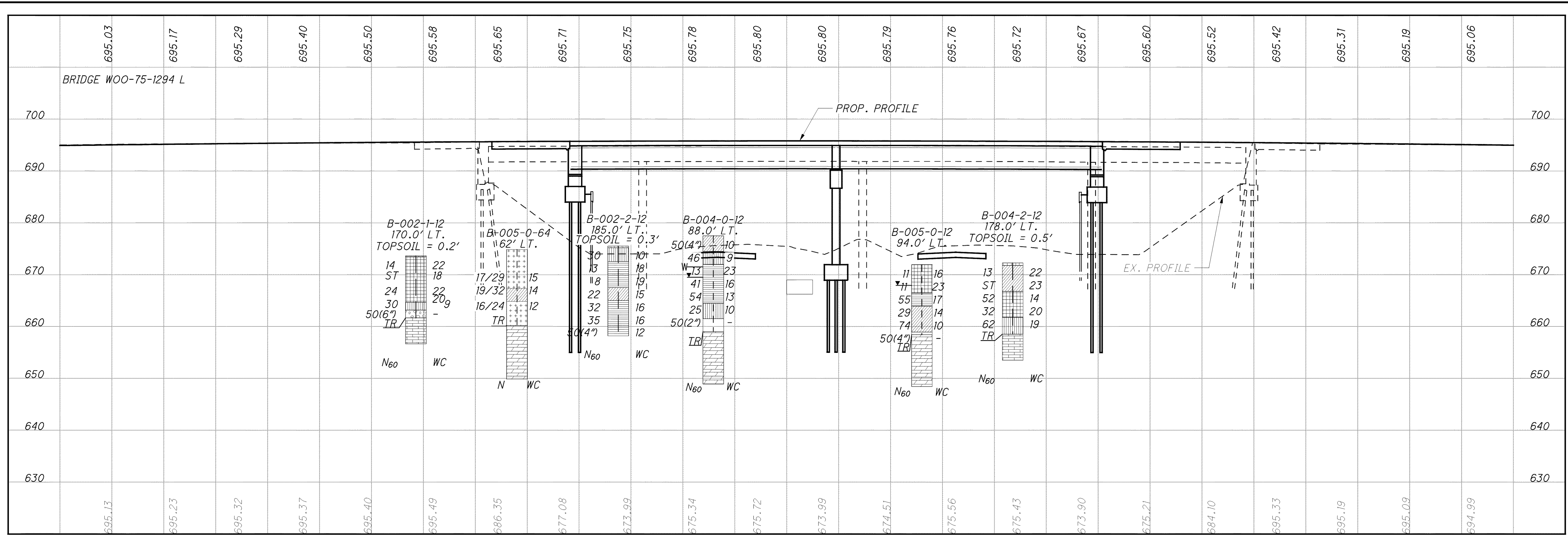


 HORIZONTAL SCALE IN FEET

STRUCTURE FOUNDATION EXPLORATION
BRIDGE W00-75-1304 L/R OVER US 6

W00-75-10.61

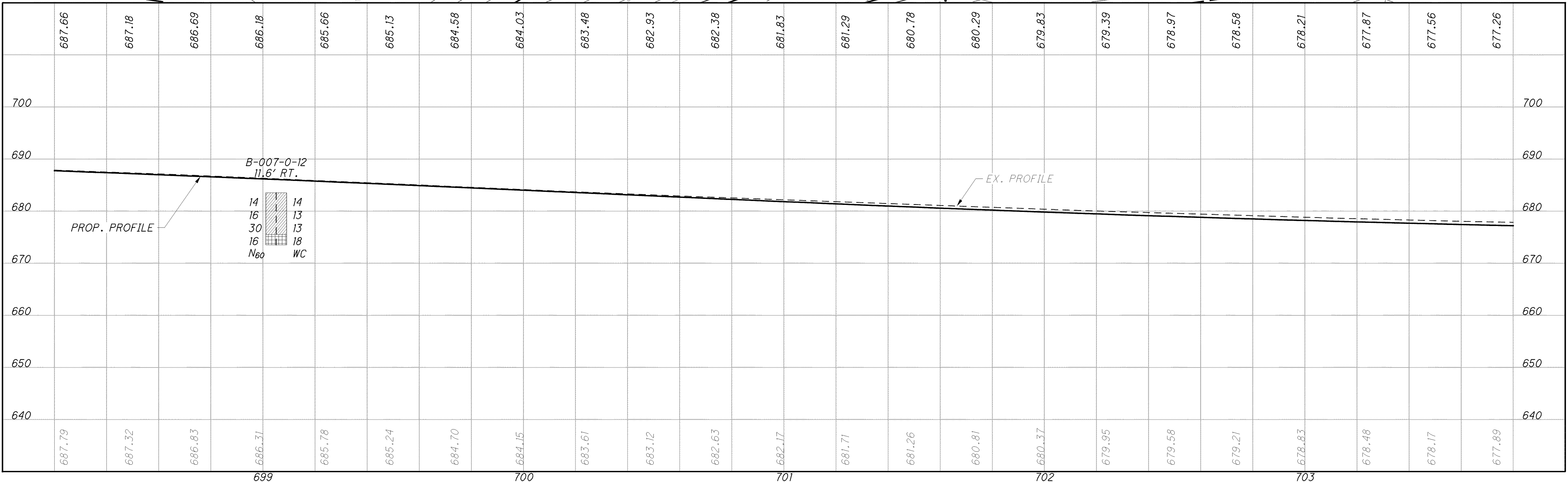
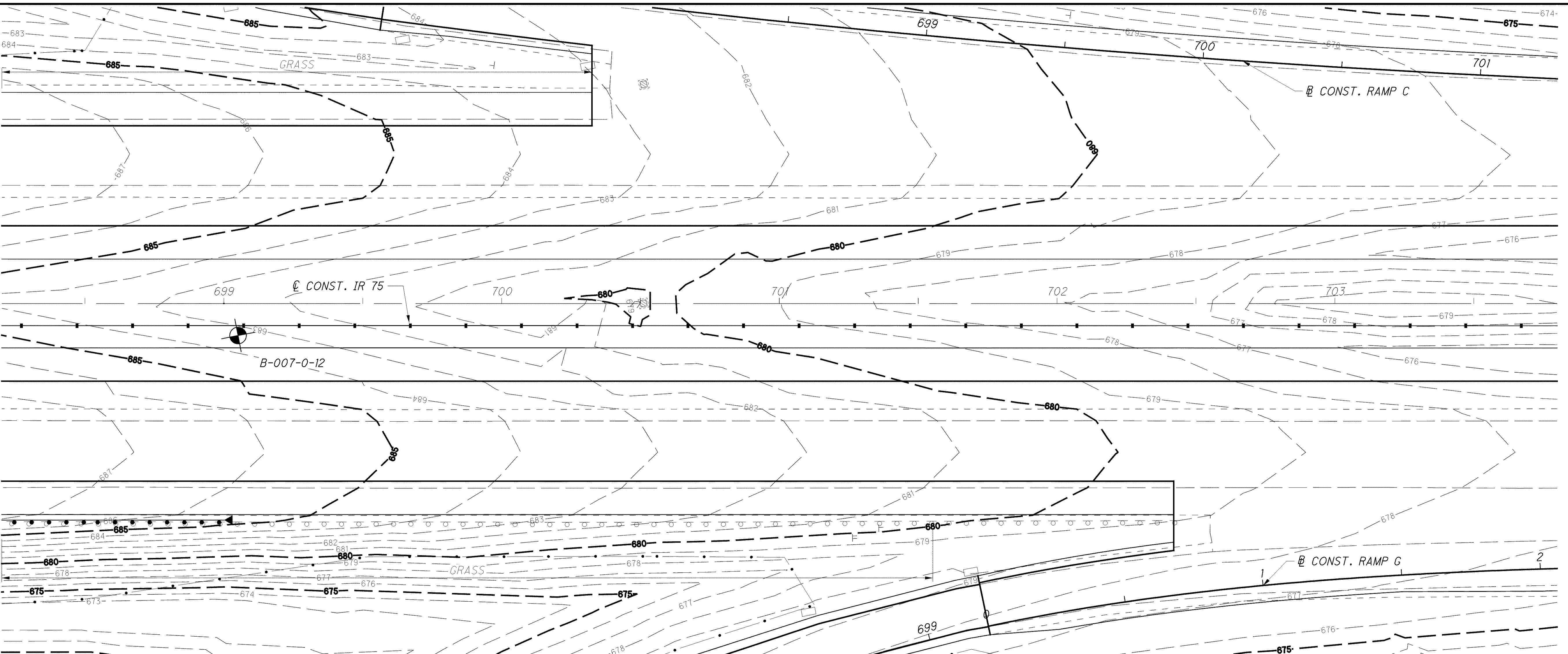
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**STRUCTURE FOUNDATION EXPLORATION
BRIDGE WOO-75-1304 L/R OVER US 6**

WOO-75-10.61

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HORIZONTAL SCALE IN FEET

DRAWN CMH
 CHECKED SE
STRUCTURE FOUNDATION EXPLORATION
STA. 695+60 TO STA. 703+80 IR 75

W00-75-10.61
 6 / 19

PROJECT: WOO-75-10.61		DRILLING FIRM / OPERATOR: B&P / R. WEBB		DRILL RIG: MOBILE B57 ORV		STATION / OFFSET: 687+92.81, RT		EXPLORATION ID												
TYPE: M.O.T. PAVEMENT		SAMPLING FIRM / LOGGER: B&P / P. MCKINLEY		HAMMER: DIEDRICH AUTOMATIC		ALIGNMENT: I-75		B-002-0-12												
PID: 95435 BR ID: 1304		DRILLING METHOD: 3.25" HSA / NQ		CALIBRATION DATE: 6/30/11		ELEVATION: 696.0 (MSL), EOB: 46.0 ft.		PAGE												
START: 4/11/12 END: 4/11/12		SAMPLING METHOD: SPT / NQ		ENERGY RATIO (%): 95.1		COORD: 41.350817582, 83.622254941		1 OF 1												
MATERIAL DESCRIPTION AND NOTES		ELEV.		SPT / RQD		REC SAMPLE (%)		HP (tsf)		GRADATION (%)		ATTERBERG		HOLE CLASS (G)						
		696.0		DEPTHS		N ₆₀		ID		GR CS FS SI CL LL PL WC		LL PL WC		ODOT						
VERY STIFF TO HARD. BROWN CHANGING TO BROWN MOTTLED WITH GRAY, SILTY CLAY, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL, DAMP TO MOIST	1																			
	2						16	SS-1	2.75	9	8	19	26	38	35	16	19	13	A-6b (9)	
	3																			
	4						25	SS-2	3.25-4.3+	16	6	15	24	39	34	16	18	13	A-6b (9)	
	5																			
	6						22	SS-3	4.0-4.5	-	-	-	-	-	-	-	-	-	18	A-6b (V)
	7																			
	8																			
	9						21	SS-4	1.75-4.0	-	-	-	-	-	-	-	-	-	19	A-6b (V)
	10																			
	11						22	SS-5	3.25-4.5	2	4	14	28	52	36	17	19	17	A-6b (12)	
	12																			
	13																			
	14						87	SS-6	3.5-4.5+	-	-	-	-	-	-	-	-	-	15	A-6b (V)
	15																			
@13.5'; SS-6 TO SS-11 SOME SAND	16																			
	17						24	SS-7	3.5-4.5+	5	7	14	28	46	34	14	20	16	A-6b (12)	
	18																			
	19						19	SS-8	1.75-2.25	-	-	-	-	-	-	-	-	15	A-6b (V)	
	20																			
	21						25	SS-9	2.75-3.5	-	-	-	-	-	-	-	-	23	A-6b (V)	
	22																			
	23																			
	24						25	SS-10	4.5+	5	7	14	30	44	33	17	16	16	A-6b (10)	
	25																			
	26						55	SS-11	4.5+	4	8	14	29	45	31	13	18	14	A-6b (11)	
	27																			
	28																			
	29						52	SS-12	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)	
	30																			
31						49	SS-13	4.5+	12	11	17	38	22	18	10	8	10	A-4a (5)		
32																				
33																				
34																				
35																				
36																				
37																				
38																				
39							83	NX-1											CORE	
40																				
41																				
42																				
43																				
44							75	NX-2											CORE	
45																				
46																				

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING, 20.0' UPON COMPLETION AND 15' AFTER 29 HOURS. CAVE DEPTH 38.0'
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED .5 BAG BENTONITE GROUT, PUMPED CEMENT

PROJECT: W00-75-10.61		DRILLING FIRM / OPERATOR: B&P / CHAD		DRILL RIG: MOBILE B57 ORV		STATION / OFFSET: 688+90.81, 181.0 LT		EXPLORATION ID											
TYPE: A.B.C. BRIDGE REPLACEMENT		SAMPLING FIRM / LOGGER: B&P / R.BLASKO		HAMMER: DIEDRICH AUTOMATIC		ALIGNMENT: US-6		B-002-2-12											
PID: 95435 BR ID: 1304		DRILLING METHOD: 3.25" HSA / NQ		CALIBRATION DATE: 6/30/11		ELEVATION: 675.5 (MSL), EOB: 17.33 ft.		PAGE											
START: 7/10/13 END: 7/10/13		SAMPLING METHOD: SPT		ENERGY RATIO (%): 95.1		COORD: 41.351038000, -83.623318000		1 OF 1											
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
4.0" TOPSOIL		675.5	1																
HARD, GRAY-BROWN, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, CONTAINS IRON STAINS AND FEW ROOTS, DAMP		675.2	2	6	30	83	SS-1	4.5+											
			3																
STIFF TO VERY STIFF, BROWN MOTTLED WITH ORANGE-BROWN AND GRAY, SILTY CLAY, SOME SAND, TRACE GRAVEL, MOIST		672.5	4	5	13	67	SS-2	2.5-3.25	1	2	28	29	40	36	17	19	18	A-6b (10)	
			5	4															
			6	2	8	67	SS-3	1.75-3.25									19	A-6b (V)	
		667.5	7	2															
HARD, BROWN, SILT AND CLAY SOME SAND, TRACE GRAVEL, DAMP			8																
			9	3	22	89	SS-4	4.5+	7	9	15	27	42	31	17	14	15	A-6a (8)	
			10																
HARD, GRAY-BROWN MOTTLED WITH BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, DAMP		665.0	11	5	32	83	SS-5	4.5+									16	A-6b (V)	
			12	8															
			13																
			14	8	35	78	SS-6	4.5+	1	3	9	23	64	40	18	22	16	A-6b (13)	
			15	12															
			16	6															
@16.0' SS-7 BECOMES VERY STIFF TO HARD WITH "AND" SAND		658.2	17	6		94	SS-7	3.0-4.0									12	A-6b (V)	
			EOB	8															
				50/4"															

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. CAVE DEPTH 17.0'.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .5 BAG BENTONITE CHIPS

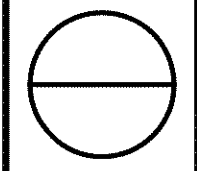
STANDARD ODOT SOIL BORING LOG (11 X 17) - OH DOT GDT - 10/24/13 10:32 - X:ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\W00-75-12\94\W00-75-ABC.GPJ

PROJECT: WOO-75-10.61		DRILLING FIRM / OPERATOR: B&P / R. WEBB		DRILL RIG: MOBILE B57 ORV		STATION / OFFSET: 689+21.91, 96.0 RT		EXPLORATION ID								
TYPE: M.O.T. PAVEMENT		SAMPLING FIRM / LOGGER: B&P / P. MCKINLEY		HAMMER: DIEDRICH AUTOMATIC		ALIGNMENT: I-75		B-003-0-12								
PID: 95435 BR ID: 1304		DRILLING METHOD: 3.25" HSA / NQ		CALIBRATION DATE: 6/30/11		ELEVATION: 673.6 (MSL), EOB: 29.5 ft.		PAGE								
START: 4/16/12 END: 4/17/12		SAMPLING METHOD: SPT / NQ		ENERGY RATIO (%): 95.1		COORD: 41.351118759, 83.621825064		1 OF 1								
MATERIAL DESCRIPTION AND NOTES		ELEV.		REC SAMPLE ID		GRADATION (%)		ATTERBERG		HOLE						
		673.6		N ₆₀ (%)		GR CS FS SI CL LL PL WC		LL PL PI		ODOT CLASS (G) SEALED						
VERY STIFF, BROWN, SILT AND CLAY SOME SAND, LITTLE GRAVEL, MANY ROOTS, CONTAINS ASPHALT FRAGMENTS, DAMP (FILL)	1	5	16	28	SS-1	-	-	-	-	-	10	A-6a (V)				
	2	5	16	28	SS-1	-	-	-	-	-	10	A-6a (V)				
HARD, BROWN MOTTLED WITH GRAY, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, FEW ROOTS, MOIST TO DAMP	3	4	16	50	SS-2	4.0	-	-	-	-	18	A-6b (V)				
	4	4	16	50	SS-2	4.25+	-	-	-	-	18	A-6b (V)				
	5															
HARD, GRAY, SANDY SILT, LITTLE CLAY, LITTLE GRAVEL, MOIST TO DAMP @8.5'; SS-4 IRON STAINING	6	5	54	78	SS-3	4.5+	2	6	13	29	50	34	14	20	13	A-6b (12)
	7	12	22													
	8															
	9	3	12	48	72	SS-4	4.5+	-	-	-	-	-	-	-	12	A-4a (V)
	10	18														
DENSE GRAY, STONE FRAGMENTS WITH SAND TRACE SILT, TRACE CLAY, DAMP	11	6	44	100	SS-5	4.25	18	11	17	34	20	18	12	6	9	A-4a (4)
	12	12	16													
	13															
	14	23	50/5"	-	64	SS-6	-	-	-	-	-	-	-	-	4	A-1-b (V)
	15															
	16															
	17	78		95	NX-1											CORE
	18															
	19															
	20															
DOLOMITE LIGHT GRAY TO GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG TO STRONG, VERY THICK BEDDED, STYLOLITIC, VUGGY, WITH SOME CALCITE FILLED VOIDS, JOINT DISCONTINUITIES (BREAKS EASILY ALONG STYOLITES); FEW DIAGONAL FRACTURES, MODERATELY TO SLIGHTLY FRACTURED, TIGHT TO NARROW, VERY ROUGH; RQD 81.2%, REC 88.9%	21															
	22	82		82	NX-2											CORE
	23															
	24															
	25															
	26															
	27	84		90	NX-3											CORE
	28															
	29															

EOB

STANDARD ODOT BORING LOG (11 X 17) - OH DOT GDT - 10/24/13 09:42 - X:\ACTIVE PROJECTS\WOO-75-12.94\WOO-75-12.94.GPJ

NOTES: GROUNDWATER ENCOUNTERED AT 4.5' DURING DRILLING, 4.0' UPON COMPLETION. CAVE DEPTH 14.0'.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 30 GAL. BENTONITE GROUT



PROJECT: WOO-75-10.61 TYPE: M.O.T. PAVEMENT PID: 95435 BR ID: 1304 START: 4/15/12 END: 4/15/12	DRILLING FIRM / OPERATOR: B&P / R. WEBB SAMPLING FIRM / LOGGER: B&P / P. MCKINLEY DRILLING METHOD: 3.25" HSA / NQ SAMPLING METHOD: SPT / NQ	DRILL RIG: MOBILE B57 ORV HAMMER: DIEDRICH AUTOMATIC CALIBRATION DATE: 6/30/11 ENERGY RATIO (%): 95.1	STATION / OFFSET: 689+27.41, 95.0 LT ALIGNMENT: I-75 ELEVATION: 677.5 (MSL), EOB: 28.6 ft. COORD: 41.351227890, 83.622507363										EXPLORATION ID B-004-0-12									
			GRADATION (%)		ATTERBERG		GR		PL		WC			HOLE CLASS (G)	SEAL							
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL			LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEAL	
HARD, GRAY-BROWN, SILT AND CLAY LITTLE SAND, LITTLE GRAVEL, CONTAINS FEW ROOTS, DAMP (FILL)	677.5	1	4																			
		2	50.4"			63	SS-1	4.5+											10	A-6a (V)		
HARD, GRAY, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, CONTAINS CONCRETE AND GLASS FRAGMENTS, DAMP (FILL)	674.5	3																				
		4	17		46	50	SS-2	4.5+	10	15	23	32	20	26	17	9			9	A-4a (3)		
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, SILTY CLAY LITTLE SAND, TRACE GRAVEL, MOIST TO DAMP	672.0	5																				
		6	4		13	50	SS-3	2.75-3.25												23	A-6b (V)	
@11.0'; SS-5 IRON STAINING		7																				
		8																				
HARD, GRAY, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, DAMP	664.5	9			41	61	SS-4	2.25-3.50												16	A-6b (V)	
		10																				
SS-7 NO RECOVERY	661.5	11																				
		12			54	56	SS-5	4.25-4.5+	2	4	10	28	56	34	16	18	13			13	A-6b (11)	
DOLOMITE LIGHT GRAY TO GRAY, UNWEATHERED, STRONG, VERY THICK BEDDED, STYOLITIC, VUGGY, WITH SOME CALCITE FILLED VOIDS, JOINT DISCONTINUITIES (BREAKS ALONG STYOLITES), INTACT, TIGHT, VERY ROUGH; RQD 92.2%, REC 94.3%.	659.0	13			25	100	SS-6	4.0-4.5+													10	A-4a (V)
		14																				
CORE		15																				
		16																				
CORE	649.0	17																				
		18																				
CORE		19																				
		20																				
CORE		21																				
		22																				
CORE		23																				
		24																				
CORE		25																				
		26																				
CORE		27																				
		28																				

EOB

STANDARD ODOT SOIL BORING LOG (11 X 17) - OH DOT GDT - 10/24/13 09:43 - X:ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\WOO-75-12.94\WOO-75-12.94.GPJ

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. 6.0' UPON COMPLETION AND 8.0' AFTER 12 HOURS. CAVE DEPTH 19.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 1 BAG BENTONITE GROUT; PUMPED .25 BAG CEMENT

PROJECT: WOO-75-10.61		DRILLING FIRM / OPERATOR: B&P / R. WEBB		DRILL RIG: MOBILE B57 ORV		STATION / OFFSET: 690+07.81, 101.0 LT		EXPLORATION ID																													
TYPE: M.O.T. PAVEMENT		SAMPLING FIRM / LOGGER: B&P / P. MCKINLEY		HAMMER: DIEDRICH AUTOMATIC		ALIGNMENT: I-75		B-005-0-12																													
PID: 95435 BR ID: 1304		DRILLING METHOD: 3.25" HSA / NQ		CALIBRATION DATE: 6/30/11		ELEVATION: 672.0 (MSL), EOB: 24.0 ft.		PAGE																													
START: 4/16/12 END: 4/16/12		SAMPLING METHOD: SPT / NQ		ENERGY RATIO (%): 95.1		COORD: 41.351447835, 83.622476304		1 OF 1																													
MATERIAL DESCRIPTION AND NOTES		ELEV.		SPT / RQD		REC SAMPLE (%)		GRADATION (%)		ATTERBERG		HOLE																									
		672.0		DEPTHS		ID		GR CS FS SI CL LL PL WC		PL PI		ODOT CLASS (G) SEALED																									
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, CLAY, SOME SILT, LITTLE SAND, TRACE GRAVEL, DAMP TO MOIST HARD, GRAY-BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, MOIST VERY STIFF TO HARD, GRAY, SILT AND CLAY SOME SAND, TRACE GRAVEL, MOIST DENSE, GRAY, STONE FRAGMENTS TRACE SAND, DAMP DOLOMITE LIGHT GRAY TO GRAY, UNWEATHERED, MODERATELY STRONG TO STRONG, VERY THICK BEDDED, STYLOLITIC, VUGGY WITH SOME CALCITE FILLED VOILDS, JOINT DISCONTINUITIES (BREAKS EASILY ALONG STYOLITES), MODERATELY FRACTURED WITH FRACTURES DECREASING WITH DEPTH, TIGHT, VERY ROUGH; RQD 82.1%, REC 87.5%.		666.5		1		SS-1		4		-		-		16		A-7-6 (V)																					
		664.0		2		SS-2		2.25		2		4		10		25		59		41		16		25		23		A-7-6 (14)									
		659.0		3		3		11		83		3.25		4.5+		-		-		-		-		-		-		-		-							
		658.5		4		3		11		78		2.25		2		4		10		25		59		41		16		25		23		A-7-6 (14)					
		648.0		5		4		8		29		3.5		4.5+		-		-		-		-		-		-		-		-		14		A-6a (V)			
		648.0		6		14		55		100		4.5+		-		-		-		-		-		-		-		-		-		-		-			
		648.0		7		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		10		A-6a (V)	
		648.0		8		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		9		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		10		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		11		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		12		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		13		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		14		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		15		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		16		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		17		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		18		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		19		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		20		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		21		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		22		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		23		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
		648.0		24		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-	
648.0		TR		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
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648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
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648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75		4.5+		-		-		-		-		-		-		-		-		-		-		-			
648.0		50.4"		21		74		83		2.75																											

PROJECT: W00-75-10.61	DRILLING FIRM / OPERATOR: B&P / CHAD	DRILL RIG: MOBILE B57 ORV	STATION / OFFSET: 690+42.81, 185.0 RT	EXPLORATION ID
TYPE: A.B.C. BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: B&P / R.BLASKO	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: US-6	B-005-1-12
PID: 95435 BR ID: 1304	DRILLING METHOD: 3.25" HSA / NQ	CALIBRATION DATE: 6/30/11	ELEVATION: 677.1 (MSL), EOB: 17.3 ft.	PAGE
START: 7/9/13 END: 7/9/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 95.1	COORD: 41.351269000, -83.621887000	1 OF 1
MATERIAL DESCRIPTION AND NOTES				
5.0" TOPSOIL	ELEV. 677.1	SPT/ RQD	GRADATION (%)	HOLE CLASS (G)
HARD, GRAY-BROWN, SILT AND CLAY SOME SAND, TRACE GRAVEL, MOIST	676.7	1		
		2		
		3		
		4		
		5		
VERY STIFF, LIGHT BROWN, CLAY, LITTLE SILT, LITTLE SAND, TRACE GRAVEL, DAMP	672.8	2		
		4		
		5		
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, SILT AND CLAY SOME SAND TRACE GRAVEL, DAMP	671.6	4		
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PROJECT: WOO-75-10.61	DRILLING FIRM / OPERATOR: B&P / CHAD	DRILL RIG: MOBILE B57 ORV	STATION / OFFSET: 691+19.81, 177.0 RT	EXPLORATION ID														
TYPE: A.B.C. BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: B&P / R.BLASKO	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: US-6	B-005-2-12														
PID: 95435 BR ID: 1304	DRILLING METHOD: 3.25" HSA / NQ	CALIBRATION DATE: 6/30/11	ELEVATION: 672.3 (MSL), EOB: 18.0 ft.	PAGE														
START: 7/11/13 END: 7/11/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 95.1	COORD: 41.351527130, -83.621880460	1 OF 1														
MATERIAL DESCRIPTION AND NOTES																		
<p>VERY STIFF TO HARD, BROWN, SILT AND CLAY SOME SAND, LITTLE GRAVEL, DAMP</p> <p>MEDIUM DENSE, GRAY, SILT, SOME SAND, LITTLE CLAY, MOIST</p> <p>GRAY, COARSE AND FINE SAND SOME SILT, LITTLE GRAVEL, MOIST</p> <p>VERY STIFF, GRAY, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, (CONTAINS SILTY CLAY LENSES), DAMP</p> <p>DOLOMITE GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG TO STRONG, VERY THICK BEDDED, FOSSILIFEROUS, VUGGY - SOME CRYSTAL FILLED CAVITIES, CONTAINS STYOLITES, JONT DISCONTINUITIES WITH STYOLITES, HIGH ANGLE FRACTURE 15.4°, SLIGHTLY FRACTURED, NARROW, VERY ROUGH; RQD 82.1%, REC 90%.</p>	ELEV.	DEPTHS	SPT / RQD	REC (%)	REC SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED	
	672.3	1	4															
		2	6	8	22	100	4.5+	14	8	17	24	37	30	15	15	13		A-6a (7)
		3																
		4			64	64	4.5+	6	6	15	33	40	32	17	15	15		A-6a (10)
		5																
		6																
	665.3	7	7	8	29	89	4.5+	-	-	-	-	-	-	-	-	13		A-6a (V)
	664.3	8		10												20		A-4b (V)
		9			0	0	ST-4	-	-	-	-	-	-	-	-	-		A-3a (V)
	662.3	10																
		11																
		12		12	44	100	2.75	6	12	22	43	17	17	14	3	14		A-4a (5)
		13		16			3.0											
	659.3	14																
		15		82	90	90	NQ-1											CORE
		16																
		17																
654.3	18																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. CAVE DEPTH 9.0'.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .5 BAG BENTONITE CHIPS

STANDARD ODOT SOIL BORING LOG (11 X 17) - OH DOT GDT - 10/24/13 10:32 - X:ACTIVE PROJECTS\WOO-75-1294\WOO-75-ABC.GPJ

PROJECT: WOO-75-10.61 M.O.T. PAVEMENT PID: 95435 BR ID: 1304 START: 4/12/12 END: 4/12/12	DRILLING FIRM / OPERATOR: B&P / R. WEBB SAMPLING FIRM / LOGGER: B&P / P. MCKINLEY DRILLING METHOD: 3.25" HSA / NQ SAMPLING METHOD: SPT / NQ	DRILL RIG: MOBILE B57 ORV HAMMER: DIEDRICH AUTOMATIC CALIBRATION DATE: 6/30/11 ENERGY RATIO (%): 95.1	STATION / OFFSET: 391+33.71, 2.0 LT. ALIGNMENT: I-75 ELEVATION: 694.3 (MSL), EOB: 45.5 ft. COORD: 41.351738809, 83.622038006										EXPLORATION ID B-006-0-12			
			GRADATION (%)		ATTERBERG			ODOT CLASS (G)		HOLE SEAL						
MATERIAL DESCRIPTION AND NOTES		SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	
HARD, BROWN, SANDY SILT, LITTLE CLAY, TRACE GRAVEL, DAMP		1-4	14	11	SS-1	4.5+	-	-	-	-	-	-	-	-	-	A-4a (V)
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY AND DARK GRAY, SILTY CLAY, LITTLE TO SOME SAND, TRACE GRAVEL, MOIST TO DAMP		5-8	22	0	SS-2	-	-	-	-	-	-	-	-	-	-	-
@8.5'; SS-4 CHANGES TO GRAY		9-10	24	39	SS-4	3.25	-	-	-	-	-	-	-	-	13	A-6b (V)
@21.0'; SS-9 CHANGES TO DARK GRAY MOTTLED WITH GREEN-BROWN HAS ORGANIC ODOR		11-20	14	50	SS-5	4.5+	5	12	29	49	36	15	21	23	-	A-6b (12)
@23.5'; SS-10 CHANGES TO BROWN MOTTLED WITH GRAY		21-25	21	39	SS-6	4.5+	-	-	-	-	-	-	-	-	-	-
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, SILT AND CLAY, SOME SAND, TRACE GRAVEL, MOIST		26-30	32	67	SS-7	4.5+	-	-	-	-	-	-	-	-	14	A-6b (V)
HARD GRAY, SANDY SILT, SOME TO LITTLE CLAY, TRACE GRAVEL, DAMP		31-33	22	44	SS-8	3.5-4.5+	5	6	13	30	46	33	14	19	14	A-6b (12)
@33.5'; SS-14 BECOMES DENSE		34-35	19	72	SS-9	2.5-3.75	-	-	-	-	-	-	-	-	21	A-6b (V)
DOLOMITE LIGHT GRAY, UNWEATHERED, MODERATELY STRONG TO STRONG, VERY THICK BEDDED, STYLOLITIC, VUGGY WITH SOME CALCITE FILLED VOILDS, JOINT DISCONTINUITIES (BREAKS EASILY ALONG STYOLITES), MODERATELY FRACTURED, TIGHT, VERY ROUGH; RQD 64.2%, REC 64.2%.		36-45	11	56	SS-10	2.25	0	2	20	32	46	40	17	23	21	A-6b (13)
CORE		99	65	94	SS-13	4.5+	7	11	17	38	27	20	13	7	10	A-4a (6)
CORE		29	-	21	SS-14	-	-	-	-	-	-	-	-	-	11	A-4a (V)

DEPTHS	ELEV.	TR	EOB
1	694.3		
2			
3			
4			
5	688.8		
6			
7			
8			
9			
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12			
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22			
23			
24			
25	668.8		
26			
27			
28			
29			
30	663.8		
31			
32			
33			
34			
35	658.8	TR	
36			
37			
38			
39			
40			
41			
42			
43			
44			
45	648.8		EOB

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. CAVE DEPTH 35.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 60 GAL. BENTONITE GROUT

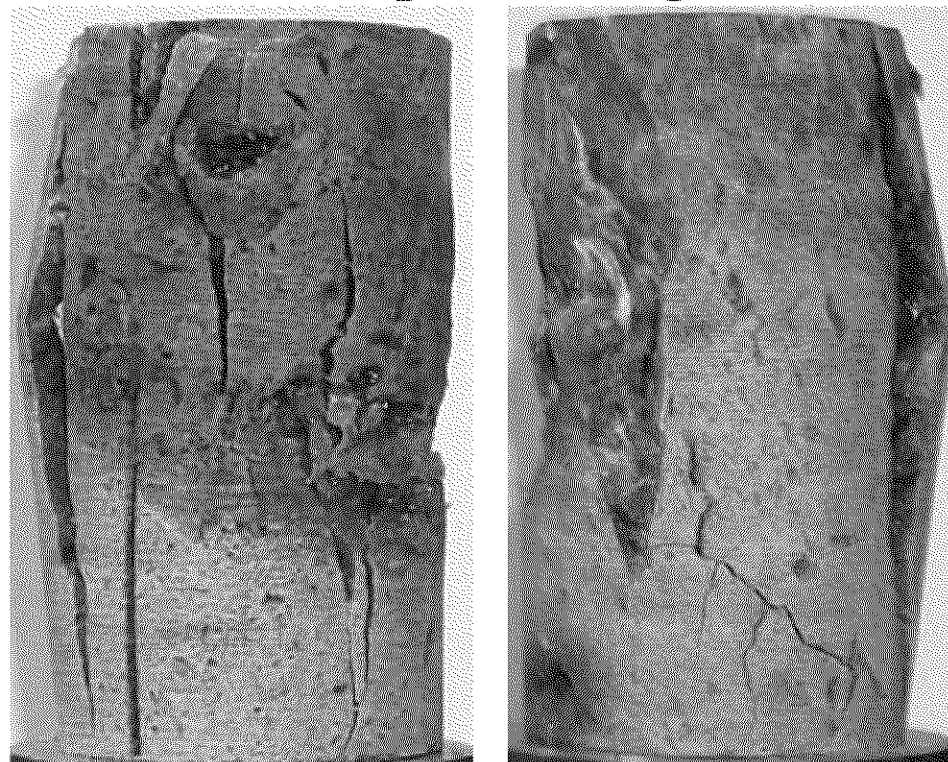
Unconfined Compressive Strength Test

(Project:WOO-75-12.94 , Boring Location:B-004-0-12 ,R-1 , Depth: 19.1 - 19.5 ft)
Tested Date: 6/18/2012

Specimen Properties

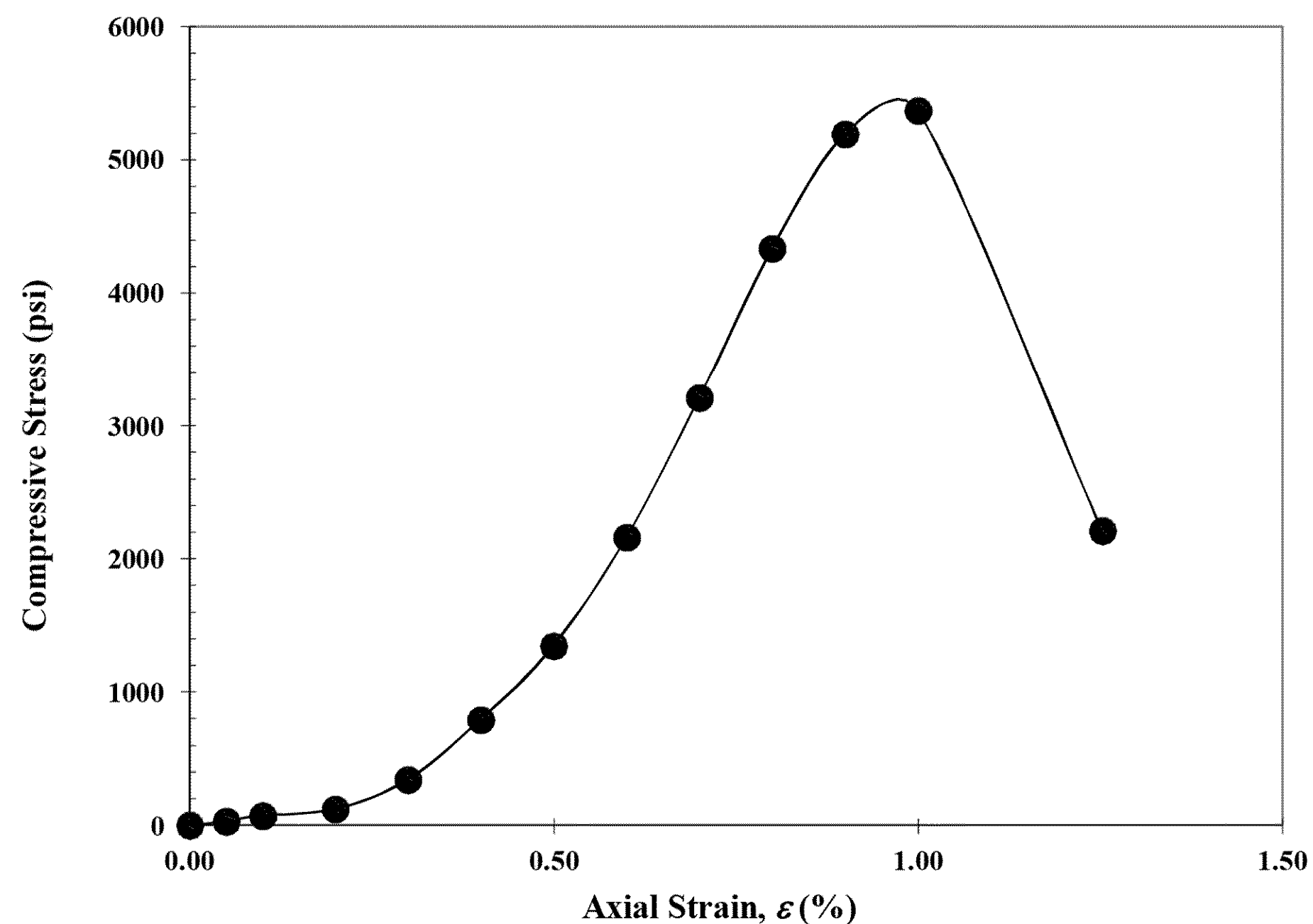
Average Dia., D_{avg} (in):	1.97
Average Height H_{avg} (in):	3.99
Area, A (in ²):	3.06
Volume, V (in ³):	12.20
Wet Mass of Specimen (lb):	1.2
Moisture Content (%):	0.7
Dry Mass of Specimen (lb):	1.2
Wet Unit Weight, γ (lb/ft ³):	165.7
Dry Unit Weight, γ_d (lb/ft ³):	164.6

Final Specimen Figure



Results

Unconfined Compressive Strength (psi): 5368.1
Strain (%): 1.0



NOTES: Moderately strong, gray, DOLOMITE.

Unconfined Compressive Strength Test

(Project:WOO-75-12.94 , Boring Location:B-004-0-12 ,R-2 , Depth: 24.0 - 24.4 ft)
Tested Date: 6/18/2012

Specimen Properties

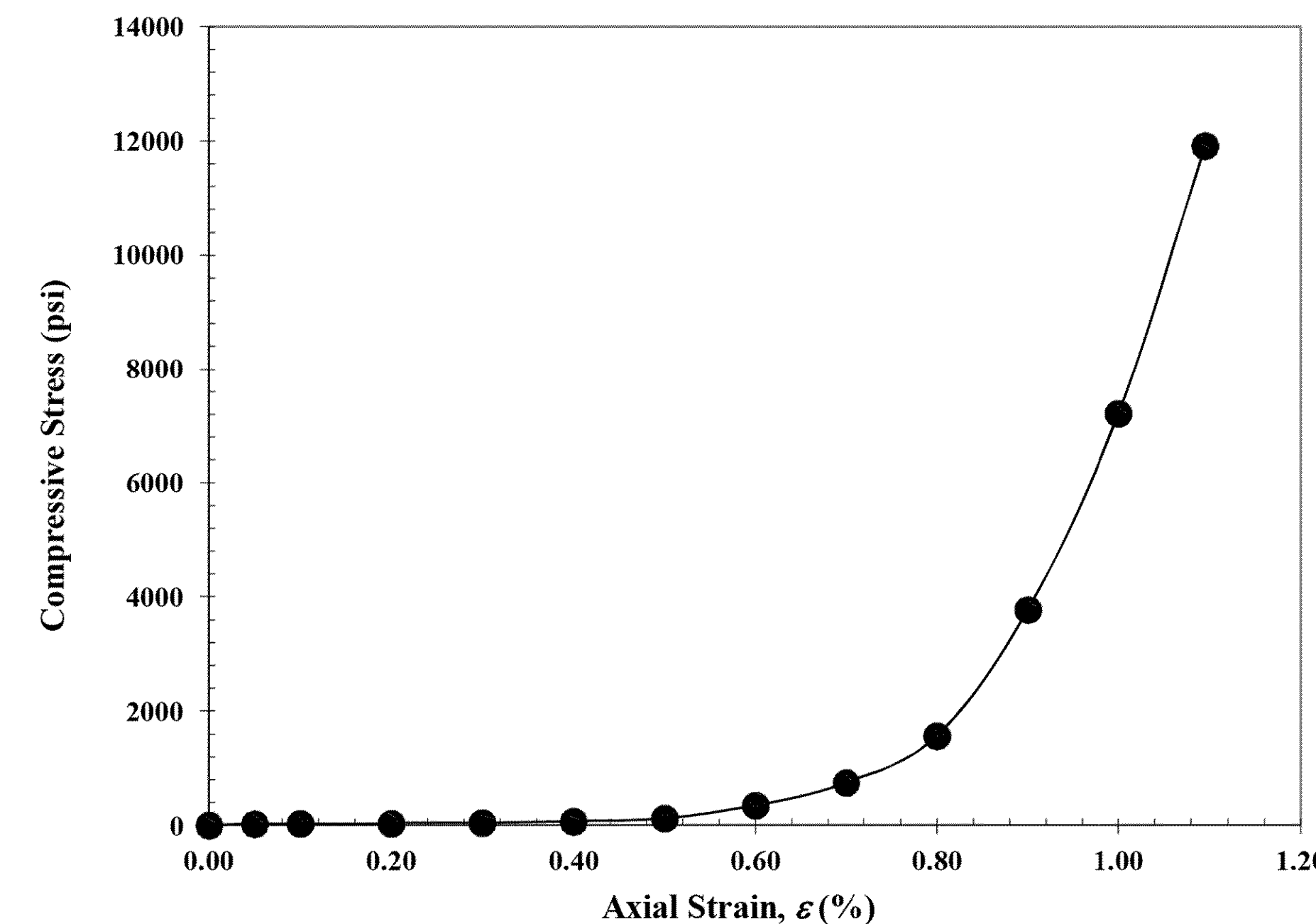
Average Dia., D_{avg} (in):	1.97
Average Height H_{avg} (in):	4.02
Area, A (in ²):	3.04
Volume, V (in ³):	12.20
Wet Mass of Specimen (lb):	1.2
Moisture Content (%):	0.3
Dry Mass of Specimen (lb):	1.2
Wet Unit Weight, γ (lb/ft ³):	167.6
Dry Unit Weight, γ_d (lb/ft ³):	167.1

Final Specimen Figure

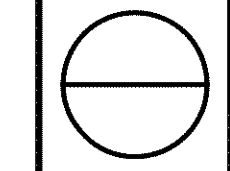


Results

Unconfined Compressive Strength (psi): 11913.3
Strain (%): 1.1



NOTES: Strong, gray, DOLOMITE.



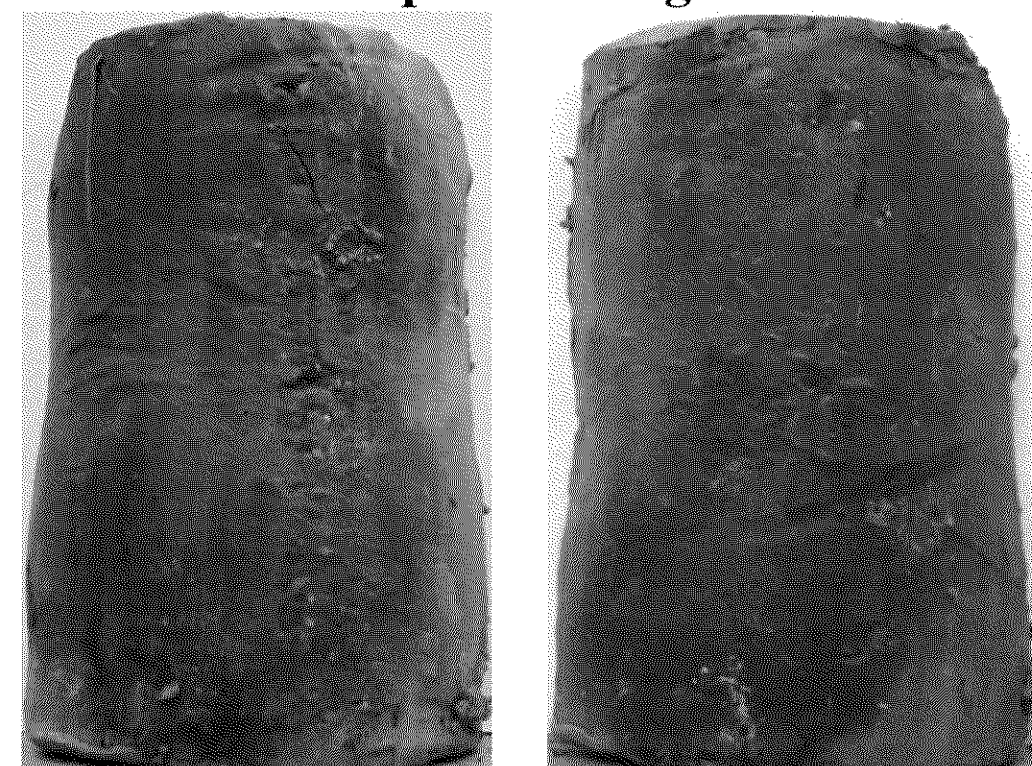
Unconsolidated-Undrained Triaxial Compression Test

(Project: WOO-75-12.94, Boring Location: ABC-006, ST-2, Depth: 3.0 - 5.0 ft)
Tested Date: 8/9/2013

Specimen Properties

Average Dia., D_{avg} (in):	2.85
Average Height, H_{avg} (in):	5.84
Area, A (in ²):	6.40
Volume, V (in ³):	37.36
Wet Mass of Specimen (lb):	2.9
Initial Moisture Content (%):	17.4
Dry Mass of Specimen (lb):	2.5
Wet Unit Weight, γ (lb/ft ³):	134.3
Dry Unit Weight, γ_d (lb/ft ³):	114.4

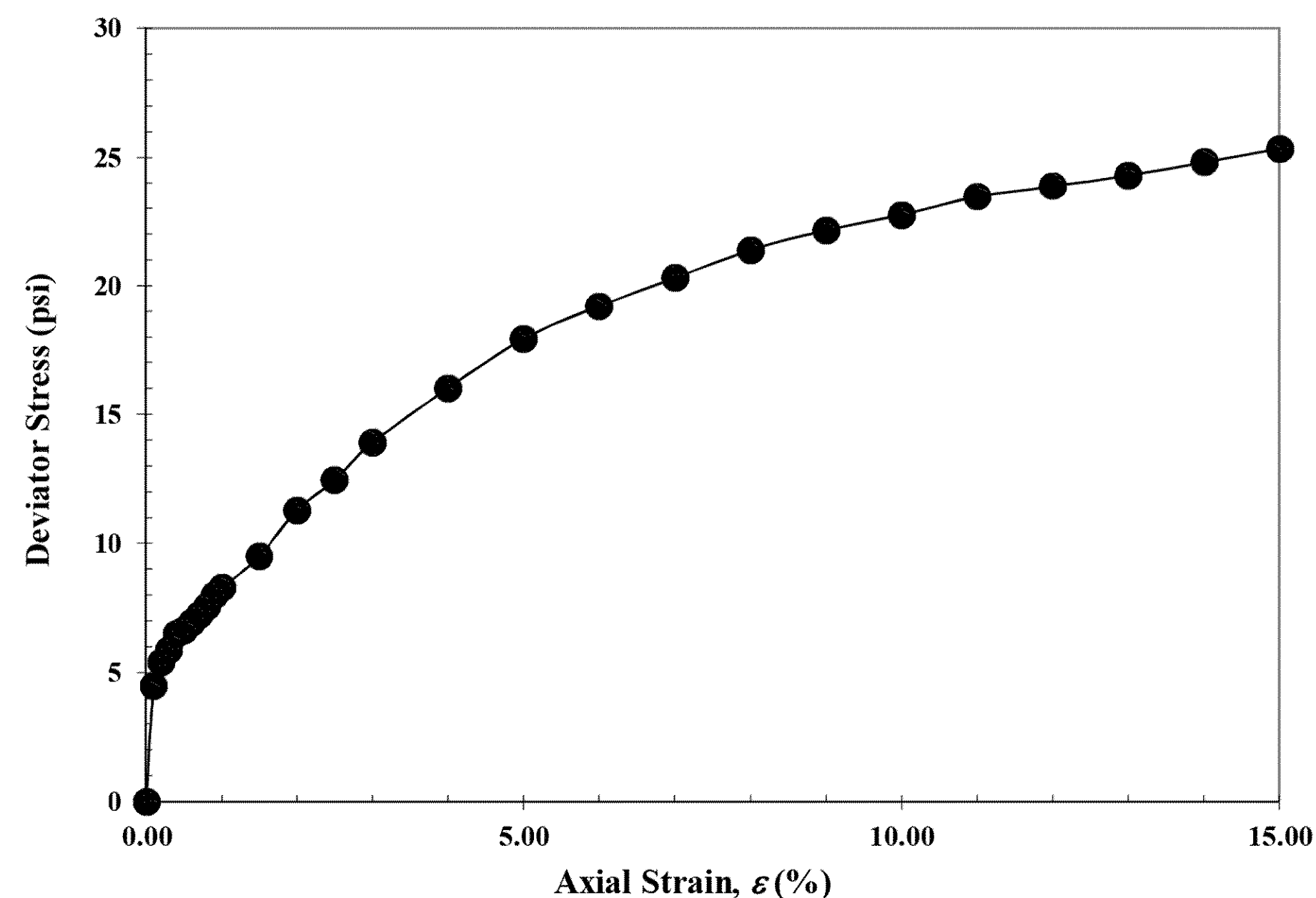
Final Specimen Figure



Effective Confining Stress (psi): 5.0

Results

Maximum Deviator Stress (psi):	25.3
Undrained Shear Stress, C_u (psi):	12.7
Strain (%):	15.0



Notes: Water content was obtained from the the entire specimen.

Consolidation Test

Project Name: WOO-75-12.94 Prepared by: CH
Source: B-005-0-13 (ST-2, Depth: 3.0 - 5.0 ft) Checked by: EC
Description: Brown mottled with dark brown, SILT & CLAY, some sand, moist. Date: 8/9/2013

Test Specification: ASTM D 2435-04
Initial Void Ratio: 0.616 Initial Bulk Unit Weight (lb/ft³): 128
In-situ Vertical Effective Stress: 600 psf Dry Unit Weight (lb/ft³): 104

Compression and Swelling Index

Compression Index (C_c): 0.147 Preconsolidation Pressure (σ'_c): 3100 psf
Recompression Index (C_r): 0.038 Over-Consolidation Ratio (OCR): 5.17

Consolidation Curve

