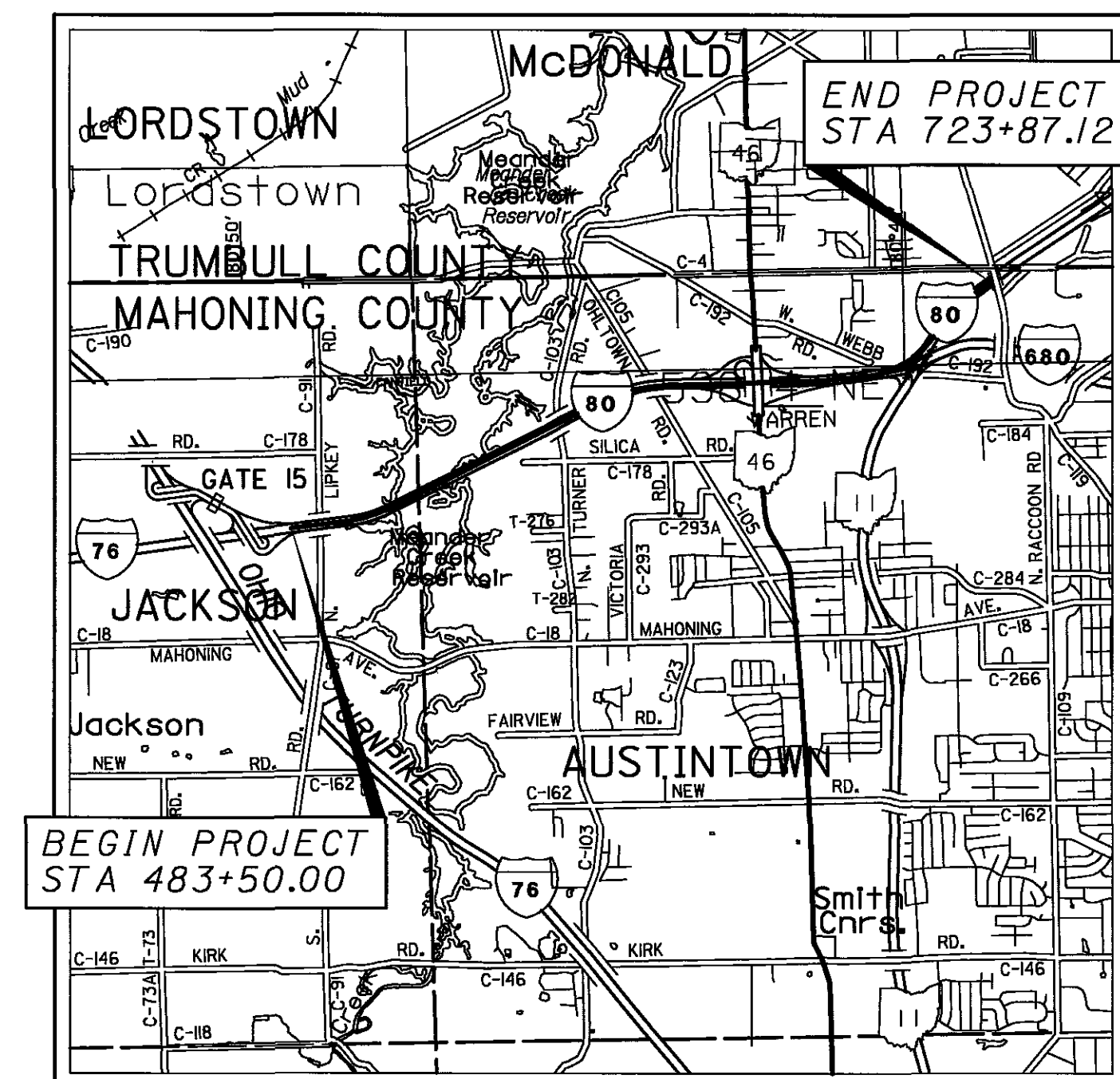


LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS- 106 SAMPLES TESTED

DESCRIPTION	ODOT CLASS	% AGG.	% C.SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLACTICITY INDEX	WATER CONTENT	SAMPLES TESTED
GRAVEL	A-1-a	--	--	--	--	--	--	--	--	0
GRAVEL WITH SAND	A-1-b	22	40	21	17*	--	NP	NP	6	3
COARSE AND FINE SAND	A-3a	4	29	32	12	23	NP	NP	12	1
GRAVEL WITH SAND AND SILT	A-2-4	33	15	20	16	17	NP	NP	13	2
SANDY SILT	A-4a(5)	14	9	16	32	30	23	7	13	29
SILT	A-4b(8)	1	2	7	59	31	27	6	26	3
SILT AND CLAY	A-6a(9)	10	6	10	30	44	32	13	17	35
SILTY CLAY	A-6b(11)	3	3	6	23	65	37	17	20	16
CLAY	A-7-6(13)	1	1	2	18	79	46	21	23	17
RANDOM FILL	VISUAL CLASSIFICATION									
WEATHERED SHALE	VISUAL CLASSIFICATION									
SHALE	VISUAL CLASSIFICATION									
WEATHERED SANDSTONE	VISUAL CLASSIFICATION									
SANDSTONE	VISUAL CLASSIFICATION									
WEATHERED SILTSTONE	VISUAL CLASSIFICATION									
SILTSTONE	VISUAL CLASSIFICATION									
VARIOUS OTHER MATERIAL	VISUAL CLASSIFICATION									
SOD AND/OR TOP SOIL - X - APPROXIMATE DEPTH										
BERM MATERIAL										
PRESS AND/OR DRIVE SAMPLE AND/OR CORE BORING LOCATION-PLAN VIEW.										

• WATER CONTENT NEARLY EQUAL TO OR GREATER THAN LIQUID LIMIT
 ◊ INDICATES A NON-PLASTIC MATERIAL WITH A HIGH WATER CONTENT
 W _____ INDICATES FREE WATER ELEVATION
 ▼ _____ INDICATES STATIC WATER ELEVATION
 TR = TOP OF ROCK
 WB = WESTBOUND
 EB = EASTBOUND
 PGL = PROFILE GRADE LINE
 * = COMBINED SILT AND CLAY PERCENTAGE

SAMPLER INFORMATION IS CENTERED AT THE SAMPLE MID-POINT ON STRATIGRAPHIC COLUMNS.
 SINGLE FIGURES BESIDE STRATIGRAPHIC COLUMNS INDICATE WATER CONTENT IN PERCENT, e.g. 15.
 X-Y-Z FIGURES BESIDE STRATIGRAPHIC COLUMNS INDICATE THE NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST.
 X = NO. OF BLOWS FOR FIRST 6 in A/B = 'A' BLOWS TO ADVANCE 'B' FEET
 Y = NO. OF BLOWS FOR SECOND 6 in WOR = WEIGHT OF ROD
 Z = NO. OF BLOWS FOR THIRD 6 in WOH = WEIGHT OF HAMMER
 WOR(WOH)/C = DISTANCE 'C' IN FEET WOR OR WOH CAUSED SAMPLER TO ADVANCE



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BRIDGE OVER MEANDER RESERVOIR	23-49
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EXISTING MAINLINE ALIGNMENT

RECON - S.M. 1/9/02
 Drilling - Drive - N.A.D.I. 1/28/02 TO 3/14/02
 L.G. Hetager 7/29/04 to 7/30/04
 Drafting - M.B. 3/29/02, J.M.T. 9/3/04

RESERVOIR CROSSING REALIGNMENTS & SPILL CONTAINMENT

RECON - S.S. 9/12/03, J.M.T. 8/27/02
 Drilling - Drive - L.G. Hetager 8/27/02 to 10/17/02
 L.G. Hetager 9/16/03 to 10/2/03
 Penn Drilling 9/25/03 to 10/1/03
 L.G. Hetager 7/19/04 to 7/27/04
 Drafting - J.M.T. 2/20/04 & 9/3/04

NOTE:

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE SOIL PROFILE SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS, SOIL TESTS, AND BEDROCK BORINGS 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, THE OFFICE OF ROADWAY ENGINEERING OR THE OFFICE OF STRUCTURAL ENGINEERING AT 1680 WEST BROAD STREET.

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 2.0 INCH O.D., 1.4 INCH I.D., SPLIT-SPOON SAMPLER, AT CONTINUOUS, 2.5 FOOT AND/OR 5.0 FOOT DEPTH INTERVALS, DRIVEN BY MEANS OF A 140 lb HAMMER WITH A FREE FALL OF 30 INCHES. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER THREE 6 INCH INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING A 3 INCH O.D. THIN WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILL RIG.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING AN NW-PAMCORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS SHOW A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST IN THREE 6 INCH INCREMENTS, AND A SAMPLE DESCRIPTION BASED ON LABORATORY TEST RESULTS, UTILIZING THE ODOT CLASSIFICATION SYSTEM. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, APPEAR GRAPHICALLY ON SEPARATE ENCLOSURES. ROCK SAMPLES ARE DISPLAYED ON THE LOG SHEETS, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, RECOVERY, RQD, AND A VISUAL CLASSIFICATION BASED ON TYPE, COLOR, DEGREE OF HARDNESS, GRAIN SIZE, DETERIORATION, BEDDING, ACID REACTION, AND OTHER QUALIFYING FACTORS.

AT DEPTHS WHERE MATERIALS ARE BOULDERY OR GRAVELLY TO THE EXTENT THAT A SAMPLER CANNOT BE UTILIZED, A WASH SAMPLE IS PROCURED AND VISUALLY CLASSIFIED, IN ORDER TO DETERMINE THE GENERAL CHARACTERISTICS OF THE MATERIAL. THESE SAMPLES ARE NOT CONSIDERED SUFFICIENTLY REPRESENTATIVE TO WARRANT LABORATORY TESTING.

INTRODUCTION

THIS REPORT CONSISTS OF THE SUBSURFACE EXPLORATION FOR THE PROPOSED WIDENING AND REALIGNMENT OF INTERSTATE 80 (IR-80) IN MAHONING COUNTY FOR ODOT PROJECT MAH-80-0.97. ALONG WITH THE PROPOSED WIDENING OF APPROXIMATELY 4.0 MILES OF HIGHWAY IS THE PROPOSED WIDENING OF THREE (3) PAIRS OF TWIN STRUCTURES CARRYING IR-80 OVER COUNTY ROADS. ALSO INCLUDED IN THIS PROJECT IS THE REPLACEMENT AND REALIGNMENT OF THE TWIN STRUCTURES CARRYING IR-80 OVER THE MEANDER CREEK RESERVOIR. ALSO INCLUDED IN THIS PROJECT WILL BE THE PROPOSED REPLACEMENT OF THE TWIN STRUCTURES CARRYING IR-80 OVER A BIKEWAY WITH A 14-FOOT BOX CULVERT. INCLUDED IN THIS REPORT ARE TYPED DRILLING LOGS AND LAB RESULTS AT THE TEST BORING LOCATIONS.

GEOLOGY OF THE PROJECT

THE PROJECT SITE LIES ON THE KILLBUCK- GLACIATED PITTSBURGH PORTION OF THE ALLEGHENY PLATEAU AT APPROXIMATE ELEVATIONS RANGING FROM 805 TO 1067 FEET. THE SITE WAS GLACIATED BY THE KANSAN AND WISCONSIN ICE SHEETS WHICH DEPOSITED DRIFT OF VARIABLE THICKNESS. THE SUBGRADE SOILS ENCOUNTERED AND TESTED CONSISTED OF SANDY SILT (A-4a), SILT (A-4b), SILT AND CLAY (A-6a), CLAY (A-7-6), SILTY CLAY (A-6b), AND SANDSTONE FRAGMENTS WITH SAND (A-1-b). THESE SOILS OVERLIE PENNSYLVANIAN-AGE SHALES, SILTSTONES, SANDSTONES, MUDSTONES, AND COALS OF THE POTTSVILLE AND ALLEGHENY SERIES.

MAINLINE REALIGNMENT INVESTIGATION

EXPLORATION

A TOTAL OF 67 EXPLORATORY TEST BORINGS WERE ADVANCED BY TRUCK OR TRACK MOUNTED, MECHANICALLY POWERED, HOLLOW-STEM ROTARY DRILL IN JANUARY - MARCH 2002 AND JULY 2004. FIFTY-ONE ROADWAY TEST BORINGS WERE ADVANCED IN THE MEDIAN OR ALONG RAMPS OF IR-80 BETWEEN THE OHIO TURNPIKE RAMPS AND STATE ROUTE II. SIXTEEN STRUCTURAL TEST BORINGS WERE ADVANCED FOR BRIDGE WIDENING OR REPLACEMENT AT IR-80 OVER LIPKEY ROAD, TURNER ROAD, OHLTOWN ROAD, AND THE MAHONING BIKEWAY.

INVESTIGATIONAL FINDINGS

SOILS ENCOUNTERED ALONG THE PROJECT SITE CONSISTED PRIMARILY OF COHESIVE EMBANKMENT FILL AND NATURAL SOILS CONSISTING OF SANDY SILT (A-4a), SILT AND CLAY (A-6a), CLAY (A-7-6), AND SILTY CLAY (A-6b). NON-COHESIVE SOILS ENCOUNTERED AND TESTED CONSISTED OF SANDSTONE FRAGMENTS WITH SAND (A-1-b). TWO (2) OF THE 27 COHESIVE SOILS TESTED FOR ATTERBERG LIMITS CONTAINED MOISTURE CONTENTS GREATER THAN OR EQUAL TO THEIR PLASTIC LIMITS BUT LESS THAN THEIR LIQUID LIMITS. THE CONSISTENCIES OF THE NATURAL COHESIVE SOILS RANGED FROM "SOFT" TO "HARD" BUT WERE GENERALLY "VERY STIFF". THE NON-COHESIVE SOILS RANGED IN RELATIVE DENSITY FROM "VERY LOOSE" TO "DENSE" BUT WERE PRIMARILY "MEDIUM DENSE".

ROCK UNDERCUT AND ROCK UNDERDRAINS SHOULD BE ANTICIPATED FROM STA 483+00 TO STA 484+50 AND FROM STA 652+00 TO STA 670+00 AND SERVICE ROAD STA 13+75 TO STA 15+00.

BEDROCK ACROSS THE FOUR BRIDGE SITES CONSISTED OF VERY SOFT TO VERY HARD SANDY SILTSTONE, VERY SOFT TO MEDIUM HARD SILTSTONE, VERY SOFT TO HARD SANDSTONE, AND SOFT TO MEDIUM HARD SHALE. THE BEDROCK RANGED FROM DECOMPOSED TO SLIGHTLY WEATHERED WITH UNCONFINED COMPRESSIVE STRENGTHS RANGING FROM 157 PSI (HIGHLY WEATHERED SANDY SILTSTONE) TO 22,299 PSI (SLIGHTLY WEATHERED SANDY SILTSTONE).

GROUNDWATER WAS ENCOUNTERED IN ONE ROADWAY TEST BORING (R-30) AT AN ELEVATION OF 1028.46 FEET DURING DRILLING AND AT AN ELEVATION OF 1029.46 FEET UPON COMPLETION. GROUNDWATER WAS ENCOUNTERED DURING DRILLING IN SEVEN (7) STRUCTURAL TEST BORINGS AT ELEVATION RANGING FROM 926.57 TO 1019.26 FEET. GROUNDWATER WAS NOT MEASURED UPON COMPLETION DUE TO WATER USED FOR ROCK CORING OPERATIONS.

FOR SPECIFIC CONDITIONS AT VARIOUS DEPTHS, PLEASE REFER TO THE INDIVIDUAL TEST BORING LOGS OR TO THE ODOT SOIL SUMMARY THAT FORMS A PART OF THESE PLANS.

RESERVOIR CROSSING REALIGNMENT INVESTIGATION

EXPLORATION

THIRTY-EIGHT (38) TEST BORINGS WERE DRILLED IN TWO PHASES FOR THE RESERVOIR CROSSING REALIGNMENT INVESTIGATIONS.

THE TEST BORINGS FOR THE CAUSEWAY CONCEPT WERE DRILLED FROM AUGUST 27 TO OCTOBER 17, 2002 AND ARE DESIGNATED BY A "CB" BORING NUMBER. A TRACK-MOUNTED ATV DRILL RIG EQUIPPED WITH HOLLOW STEM AUGERS ADVANCED SEVEN OF THE BORINGS LOCATED ON LAND, WHILE A BARGE-MOUNTED SKID RIG USING CASING AND WATER FLUSHING ADVANCED THE FOURTEEN BORINGS LOCATED IN THE RESERVOIR AND TWO REMOTE LAND BORINGS.

THE STRUCTURE TEST BORINGS FOR THE PROPOSED BRIDGES WERE DRILLED FROM SEPTEMBER 16 TO OCTOBER 2, 2003 AND ARE DESIGNATED BY A "BR" BORING NUMBER. A TRACK-MOUNTED ATV DRILL RIG USING CASING AND WATER FLUSHING ADVANCED THE FOUR BORINGS LOCATED AT THE ABUTMENTS, WHILE BARGE-MOUNTED RIGS USING CASING AND WATER FLUSHING ADVANCED THE ELEVEN BORINGS LOCATED IN THE RESERVOIR.

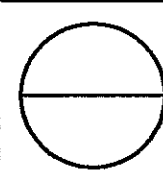
INVESTIGATION FINDINGS

ON THE WESTERN SIDE, THE SOIL BORINGS GENERALLY ENCOUNTERED LESS THAN 0.6 FEET OF TOPSOIL UNDERLAIN BY STIFF TO VERY STIFF TO HARD, LIGHT BROWN TO BROWN SANDY SILT TO SILTY CLAY OVERLYING VERY STIFF GREY CLAYS AND SILTS. STANDARD PENETRATION TESTS 'N-VALUES' IN THE UPPER MATERIALS RANGED FROM 11 BLOWS PER FOOT (BPF) TO IN EXCESS OF 30 BPF. N-VALUES IN THE LOWER MATERIALS RANGED FROM 8 TO 25 BPF. EXCEPTIONS WERE NOTED: AT CB-1 WHERE 13.5 FEET OF LOOSE TO MEDIUM DENSE GRANULAR FILL MATERIAL WAS ENCOUNTERED; AT CB-2 WHERE 4.5 FEET OF VERY SOFT SILT WAS ENCOUNTERED ON THE BOTTOM OF THE RESERVOIR; AND AT CB-4 WHERE, AT EL.873, 22 FEET OF MEDIUM STIFF CLAY WAS FOUND TO OVERLIE DENSE SAND AND GRAVEL.

ON THE EASTERN SIDE, THE SOIL BORINGS GENERALLY ENCOUNTERED VERY THIN TOPSOIL UNDERLAIN BY 9 TO 14 FEET OF STIFF TO VERY STIFF, BROWN TO MOTTLED BROWN AND GREY SANDY TO CLAY SILTS AND CLAY OVERLYING STIFF TO VERY STIFF GREY SILTY CLAY. N-VALUES IN THE UPPER MATERIALS AVERAGED 19 BPF AND N-VALUES IN THE LOWER MATERIAL AVERAGED 15 BPF. BORING CB-20, WHICH WAS DRILLED AT THE SHORELINE OF A EMBAYMENT FORMED BY THE IR-80 EMBANKMENT, FOUND ABOUT THREE FEET OF SOFT TO MEDIUM STIFF SILT AT THE GROUND SURFACE.

TWENTY-SEVEN DEEP BORINGS WERE DRILLED IN THE RESERVOIR, OR AT ABUTMENT LOCATIONS, ALONG THE CROSSING ALIGNMENTS. THE UPPERMOST MATERIAL IN DEEP WATER AREAS OF THE RESERVOIR CONSISTED OF 4 TO 12 FEET OF VERY SOFT MUCK (SANDY SILT).

BENEATH THE MUCK AND IN SHALLOW WATER AREAS, THE UPPER SOILS CONSISTED OF 4 TO 21 FEET OF MIXED STIFF SILTS AND CLAYS AND LOOSE TO MEDIUM DENSE SANDS AND GRAVELS THAT WERE NOT IDENTIFIABLE AS LOCALLY CONTINUOUS STRATA. AT DEPTHS OF 4 TO 21 FEET BELOW THE RESERVOIR BOTTOM, THE SOILS BECAME MORE CONSISTENTLY STRATIFIED: 20 TO 30 FEET OF MEDIUM STIFF TO STIFF GREY SILT AND CLAY (A-6a TO A-6b AND A-7-6) UNDERLAIN BY 12 TO 25 FEET OF MEDIUM STIFF/STIFF VARVED GREY CLAY AND SILTY CLAY (A-7-6 TO A-6b) UNDERLAIN BY 10 TO 35 FEET OF MEDIUM DENSE TO STIFF LOW PLASTICITY TO COHESIONLESS SOILS COMPRISED OF SILT, SANDY SILT TO SILT AND CLAY (A-4b AND A-4a TO A-6b). N-VALUES FOR ALL OF THESE SOILS WERE GENERALLY BETWEEN 8 AND 30 BPF, AND WERE TYPICALLY AVERAGED BELOW 15 BPF. UNDERLYING THE LOW PLASTICITY STRATA, THE BORINGS WERE TERMINATED IN MATERIALS THAT HAD N-VALUES IN EXCESS OF 30 BPF AND AS HIGH AS 50/0.2. THESE SOILS WERE ENCOUNTERED AT DEPTHS OF 68 TO 99 FEET AND CONSISTED OF VARYING MIXTURES OF SAND, GRAVEL, STONE FRAGMENTS, AND SILT WITH CLASSIFICATIONS INCLUDING A-1-a, A-1-b, A-2-4, A-3A AND A-4A.



SUMMARY OF SOIL DATA

NOTE: NP SHOWN IN LIQUID LIMIT AND PLASTICITY INDEX COLUMNS INDICATES THAT THE MATERIAL IS NON-PLASTIC

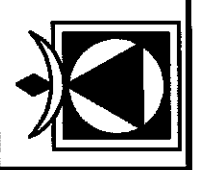
* SILT & CLAY COMBINED

** SAMPLE TAKEN AT OR NEAR FINAL GRADE

Station & Offset	Depth		% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class	Station & Offset	Depth		% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class						
483+50	0.0	1.5	Brown, Stiff to Very Stiff, SILT & CLAY, moist, some gravel, some sand, with sand lenses										22	VISUAL**	510+25	0.0	1.5	Black-dark grey SILT; little sand; trace organics; wet										Visual	
30' Lt. (RB-1)	1.5	3.0	34	20	9	39*		29	11	17	A-6a	204' Rt (CB-2)	1.5	3.0	1	3	12	52	32	29	6	38	A-4b						
	3.0	4.5	0	3	8	88*		39	20	16	A-6b		3.0	4.7	Black-dark grey SILT; little sand; trace organics; wet										Visual				
	4.5	7.2	Brown, Grey Mottles, Very Stiff to Hard, SILTY CLAY, moist, trace sand										16	VISUAL		4.7	5.5	4	29	32	12	23	NP	NP	20	A-3a			
	7.2	10.0	27	6	11	56*		29	11	13	A-6a		5.5	7.5	0	0	1	16	83	45	19	32	A-7-6						
487+50	0.0	1.5	Brown, Grey Mottles, Very Stiff, SANDY SILT, moist, some clay, little gravel										13	VISUAL**		7.5	9.0	3	3	6	29	59	36	15	20	A-6a			
30' Rt. (RB-2)	1.5	3.0	15	4	13	41	27	27	8	12	A-4a		9.0	10.5	Brown SILT & CLAY; wet										21	Visual			
	3.0	4.5	8	8	12	73*		31	12	16	A-6a		10.5	12.0	Brown SILT & CLAY; wet										19	Visual			
	4.5	7.5	6	5	12	39	38	24	8	18	A-4a		12.0	12.8	0	6	8	25	60	38	15	24	A-6a						
491+50	0.0	1.5	Brown, Stiff, SILT & CLAY, moist, little rock fragments, some sand										15	VISUAL**		12.8	16.8	Mottled brown and grey SILT & CLAY; wet										24	Visual
30' Lt. (RB-3)	1.5	2.5	18	10	11	61*		30	12	15	A-6a		16.8	19.0	3	13	23	38	23	NP	NP	15	A-4a						
	2.5	4.5	1	3	7	89*		36	18	27	A-6b		19.0	22.5	Grey SANDY SILT; moist										Visual				
	4.5	6.0	2	3	9	87*		36	16	19	A-6b		22.5	25.7	8	6	20	40	26	21	5	10	A-4a						
	8.5	10.0	Mottled Brown & Grey, Very Stiff to Hard, SILTY CLAY, moist, little sand										16	VISUAL		25.7	27.7	Weathered grey MUDSTONE; clay to sand-sized grain; horizontal bedding											
500+63.00	0.2	1.0	Gray-brown SANDY SILT (embankment fill)										--	VISUAL	512+77.09	0.3	1.0	Brown/gray/black SILT AND CLAY (embankment fill)										--	VISUAL
28.00' Rt. (R-01)	1.0	2.5	Gray-brown SANDY SILT (embankment fill)										14	VISUAL**	24.13' Lt. (R-04)	1.0	2.5	8	5	12		75*	31	12	16	A-6a**			
	2.5	3.5	Gray-brown SANDY SILT (embankment fill)										--	VISUAL		2.5	3.5	Brown/gray/black SILT AND CLAY (embankment fill)										--	VISUAL
	3.5	5.0	Gray-brown SANDY SILT (embankment fill)										14	VISUAL		3.5	4.6	Brown/gray/black SILT AND CLAY (embankment fill)										16	VISUAL
	5.0	5.5	Gray-brown SANDY SILT (embankment fill)										--	VISUAL		4.6	6.0	Gray-brown SILT AND CLAY (natural soil)										--	VISUAL
	5.5	6.0	Brown SANDY SILT (natural soil)										--	VISUAL		6.0	7.5	Gray-brown SILT AND CLAY (natural soil)										20	VISUAL
	6.0	7.5	3	6	14	40	36	26	7	19	A-4a		7.5	8.5	Gray-brown SILT AND CLAY (natural soil)										--	VISUAL			
	7.5	8.5	Brown SANDY SILT (natural soil)										--	VISUAL		8.5	10.0	Gray-brown SILT AND CLAY (natural soil)										22	VISUAL
	8.5	10.0	Brown SANDY SILT with sandstone fragments (natural soil)										15	VISUAL	513+78	0.0	0.6	Topsoil; Silt with organic matter; dark brown										Visual	
504+62.92	0.2	1.0	Gray and brown SANDY SILT (embankment fill)										--	VISUAL	140' Rt (CB-3)	0.6	1.3	Light brown SANDY SILT; trace gravel										Visual	
31.71' Lt. (R-02)	1.0	2.5	Gray and brown SANDY SILT (embankment fill)										12	VISUAL**		1.3	3.5	Light brown SANDY SILT; trace gravel										13	Visual
	2.5	3.5	Gray and brown SANDY SILT (embankment fill)										--	VISUAL		3.5	6.0	0	11	52	17	21	NP	NP	12	A-4a			
	3.5	5.0	Gray and brown SANDY SILT (embankment fill)										16	VISUAL		6.0	8.5	Light brown SANDY SILT; trace gravel; with 1/4" grey silt seams										11	Visual
	5.0	5.5	Gray and brown SANDY SILT (embankment fill)										--	VISUAL		8.5	13.9	0	0	1	8	91	47	18	24	A-7-6			
	5.5	6.0	Brown SANDY SILT (natural soil)										--	VISUAL		13.9	16.8	2	2	2	18	76	42	18	22	A-7-6			
	6.0	7.5	Brown SANDY SILT (natural soil)										11	VISUAL		16.8	20.0	Grey CLAY; trace gravel										23	Visual
	7.5	8.5	Brown SANDY SILT (natural soil)										--	VISUAL	515+39	0.0	1.5	Brown CLAY; trace gravel and organics; moist										Visual	
	8.5	10.0	Brown SANDY SILT (natural soil)										12	VISUAL	302' Rt (CB-4)	1.5	3.0	Brown CLAY; trace gravel and sand; no organics; moist										24	Visual
506+92	0.0	2.0	Brown SILT; dry; some gravel											Visual		3.0	4.5	Brown CLAY; trace gravel and sand; no organics; moist										Visual	
151' Rt (CB-1)	2.0	3.5	Brown SILTY SAND; dry; trace gravel											Visual		4.5	6.0	2	0	0	27	70	44	19	23	A-7-6			
	3.5	7.0	18	35	24	8	15	NP	NP	6	A-1-b		6.0	7.5	Brown CLAY; trace sand; moist										Visual				
	7.0	9.5	22	60	14	5*		NP	NP	5	A-1-b		7.5	9.0	Brown CLAY; trace sand; moist										24	Visual			
	9.5	13.5	Black GRAVEL WITH SAND; dry; trace brown Clay											Visual		9.0	11.2	Mottled brown and grey CLAY; trace sand; moist										Visual	
	13.5	17.5	Grey SANDY SILT; moist; trace brown mottling											Visual		11.2	12.0	1	2	4	24	69	35	14	22	A-6a			
	17.5	20.0	20	8	11	37	24	20	5	10	A-4a		12.0	13.5	Grey SILT & CLAY; moist; trace sand.										Visual				
508+64.63	0.3	1.0	Gray-brown SILT AND CLAY (embankment fill)										--	VISUAL		13.5	16.8	Grey SILT & CLAY; moist; trace sand.										21	Visual
28.98' Rt. (R-03)	1.0	2.5	Gray-brown SILT AND CLAY (embankment fill)										13	VISUAL**		16.8	24.5	Grey SILT & CLAY; moist; trace sand.										20	Visual
	2.5	3.5	Gray-brown SILT AND CLAY (embankment fill)										--	VISUAL		24.5	27.0	0	0	0	48	52	32	12	29	A-6a			
	3.5	5.0	5	4	11	80*	28		11	16	A-6a		27.0	31.8	Grey CLAY; moist										Visual				
	5.0	6.0	Gray-brown SILT AND CLAY (embankment fill)										--	VISUAL		31.8	39.5	0	0	0	2	98	53	25	37	A-7-6			
	6.0	7.5	Gray-brown SILT AND CLAY (embankment fill)										9	VISUAL		39.5	41.8	Grey SILT & CLAY; moist.										37	Visual
	7.5	8.5	Gray-brown SILT AND CLAY (embankment fill)										--	VISUAL		41.8	46.5	0	0	0	31	69	32	12	27	A-6a			
	8.5	10.0	Gray-brown SILT AND CLAY (embankment fill)										6	VISUAL		46.5	50.0	45	12	13	12	18	NP	NP	12	A-2-4			
516+97.87	0.3	1.0	Gray and brown SANDY SILT (embankment fill)										--	VISUAL	516+97.87	0.3	1.0	Gray and brown SANDY SILT (embankment fill)										--	VISUAL
27.61' Rt. (R-05)	1.0	2.5	Gray and brown SANDY SILT (embankment fill)										15	VISUAL**	27.61' Rt. (R-05)	1.0	2.5	Gray and brown SANDY SILT (embankment fill)										15	VISUAL**
	2.5	3.5	Gray and brown SANDY SILT (embankment fill)										--	VISUAL		2.5	3.5	Gray and brown SANDY SILT (embankment fill)										--	VISUAL
	3.5	4.4	Gray and brown SANDY SILT (embankment fill)										--	VISUAL		3.5	4.4	Gray and brown SANDY SILT (embankment fill)										--	VISUAL
	4.4	5.0	0	1	1	98*	46			23	A-7-6		4.4	5.0	0	1	1	98*	46			23	A-7-6						
	5.0	6.0	Brown and gray CLAY (natural soil)										--	VISUAL		5.0	6.0	Brown and gray CLAY (natural soil)										20	VISUAL
	6.0	7.5	Brown and gray CLAY (natural soil)										--	VISUAL		6.0	7.5	Brown and gray CLAY (natural soil)										20	VISUAL
	7.5	8.5	Brown and gray CLAY (natural soil)										--	VISUAL		7.5	8.5	Brown and gray CLAY (natural soil)										--	VISUAL
	8.5	10.0	Brown and gray CLAY (natural soil)										17	VISUAL		8.5	10.0	Brown and gray CLAY (natural soil)										17	VISUAL

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WESTERVILLE, OHIO 43081



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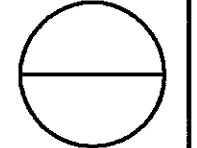
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M.W.W.

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J.M.T.

ROADWAY SOIL PROFILE
SUMMARY OF SOIL DATA

MAHONING COUNTY
MAH-80-0.97

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SUMMARY OF SOIL DATA

NOTE: NP SHOWN IN LIQUID LIMIT AND PLASTICITY INDEX COLUMNS INDICATES THAT THE MATERIAL IS NON-PLASTIC
 * SILT & CLAY COMBINED ** SAMPLE TAKEN AT OR NEAR FINAL GRADE

Station & Offset	Depth From To	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class	Station & Offset	Depth From To	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
517+50 229' Rt (CB-5)	0.0 0.6 2.0 4.7 6.0 7.8 11.0 16.8	0.6 2.0 4.7 6.0 7.8 11.0 16.8	Topsoil; SANDY SILT; dark brown; dry 10 1 2 1 2	12 2 1	20 5 3	27 26 71	32 66 38	24 18 18	6 7 17 15 21 22	Visual A-4a Visual A-6b Visual Visual A-6b Visual	555+70 163' Rt (CB-21)	0.0 2.0 4.5 5.7 7.5 9.5 14.0 18.3	2.0 4.5 5.7 7.5 9.5 14.0 18.3	Brown SILT; dry Brown SILT; dry; trace sandstone gravel (sub-angular) Brown SILT; dry; trace sandstone gravel (sub-angular) Brown SILTY SAND; moist 0 0 2 0			16 82 16 25	50 50 70 38	23 21 18	21 22	Visual Visual Visual A-7-6 Visual A-6b Visual
546+33.65 21.48' Lt. (R-06)	0.4 1.0 2.0 3.5 5.0 6.0 7.5 8.5	1.0 2.0 3.5 5.0 6.0 7.5 8.5	Light gray SLAG (fill) Light gray SLAG (fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill) Dark gray SHALE FRAGS W/ SAND, SILT & CLAY (embank. fill)						-- 20 12 -- 10 -- 8	VISUAL VISUAL** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL	558+22.17 32.54' Rt. (R-09)	0.3 1.0 2.5 3.5 5.0 6.0 7.5 8.5	1.0 2.5 3.5 5.0 6.0 7.5 8.5	Brown and gray SANDY SILT (embankment fill) 16 10 9 32 33 32					4	13 -- 11 -- 12 -- 11	Visual A-4a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL
546+75 179' Rt. (CB-18)	0.0 6.8 14.0	6.8 14.0 20.0	5 0 1	11 0 2	35 1 4	25 30 27	24 68 66	NP 19 17	7 20 23	A-4a A-7-6 A-6b	559+13 118' Rt (CB-22)	0.0 2.0 4.5 7.5 9.5 14.0 18.3	2.0 4.5 7.5 9.5 14.0 18.3	CLAY; brown and grey mottled; dry 1 1 1 14 83 48				20	19	24 24 22	Visual A-7-6 Visual A-6a A-6b
550+31 233' Rt (CB-19)	0.0 2.0 4.5 5.7 9.5 13.3 17.5	2.0 4.5 5.7 9.5 13.3 17.5	Brown SANDY SILT; dry; trace gravel 9 19 26 24 23				NP NP	NP NP	10 10 21 21	Visual A-4a Visual A-7-6 Visual A-6b	562+22.29 32.36' Lt. (R-10)	0.4 1.0 2.5 3.5 5.0 6.5 7.0 8.5	1.0 2.5 3.5 5.0 6.5 7.0 8.5	Brown-gray SILT AND CLAY (embankment fill) 3 3 6 26 63 37				15	19	-- 19 -- 19 -- 15 -- 22	VISUAL A-6a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL
550+39.07 33.66' Rt. (R-07)	0.2 1.0 2.5 3.5 5.0 6.0 7.5 8.5	1.0 2.5 3.5 5.0 6.0 7.5 8.5	Dark gray SANDY SILT & SHALE FRAGMENTS (embankment fill) 39 9 5 47*				NP NP	NP NP	10 10 13 11 -- 13	Visual A-4a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL	562+70 128' Rt (CB-23)	0.0 2.0 4.5 6.0 9.5 12.0 18.3	2.0 4.5 6.0 9.5 12.0 18.3	4 5 11 26 54 36				17	10	25 25 23	A-6b Visual Visual A-7-6 Visual A-6b Visual
552+84 251' Rt (CB-20)	0.0 2.0 4.5 7.0 9.5 13.5 18.3	2.0 4.5 7.0 9.5 13.5 18.3	Brown SILT AND CLAY; slight tan mottling; moist 7 7 36 16 34 29				12	12	15 15 22 22	Visual A-6a Visual A-7-6 Visual Visual A-6b	566+20.43 34.63' Rt. (R-11)	0.5 1.0 2.5 3.0	1.0 2.5 3.0	Brown SANDY SILT (embankment fill) 5 9 10 33 42				23	4	-- 14 -- -- 18 -- 15 -- 18	VISUAL A-4a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL
554+32.10 33.59' Lt. (R-08)	0.2 1.0 2.5 3.2 3.5 5.0 6.0 7.5 8.5 9.2	1.0 2.5 3.2 3.5 5.0 6.0 7.5 8.5 9.2	Brown and gray SANDY SILT (embankment fill) 18 17 13 23 30 32				4	4	17 17 -- 10 -- 12 -- 16	Visual A-4a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL	570+19.40 29.32' Lt. (R-12)	0.7 1.0 2.5 3.5 5.0 6.5 7.0 8.5	1.0 2.5 3.5 5.0 6.5 7.0 8.5	Brown SANDY SILT (possible natural soil) 13 10 15 28 35			30	10	-- 18 -- 15 -- 18 -- 18	VISUAL A-4a** VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL VISUAL	

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J.M.T.

ROADWAY SOIL PROFILE

SUMMARY OF SOIL DATA

MAHONING COUNTY

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82

SUMMARY OF SOIL DATA

NOTE: NP SHOWN IN LIQUID LIMIT AND PLASTICITY INDEX COLUMNS INDICATES THAT THE MATERIAL IS NON-PLASTIC

* SILT & CLAY COMBINED

** SAMPLE TAKEN AT OR NEAR FINAL GRADE

Station & Offset	Depth		% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class	Station & Offset	Depth		% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class	
574+21.44 32.62' Rt. (R-13)	0.5	1.0	Brown	2	3	5	91*	39	16	17	VISUAL	606+14.11 34.75' Rt. (R-19)	0.5	1.0	Brown and gray	17	14	12	30	26	28	9	11	VISUAL**
	2.5	3.5	Brown							19	VISUAL		2.5	3.5	Brown and gray								18	VISUAL
	3.5	5.0	Brown							19	VISUAL		3.5	5.0	4	2	8	86*	38		16	18	A-6b	
	5.0	6.0	Brown							18	VISUAL		5.0	6.0	Brown and gray								15	VISUAL
	6.0	7.0	Brown							18	VISUAL		6.0	7.5	Gray-brown								15	VISUAL
	7.0	8.5	Brown							24	VISUAL		7.5	8.0	Gray-brown								15	VISUAL
	8.5	10.0	Brown							24	VISUAL		8.0	8.5	Gray-brown								15	VISUAL
													8.5	10.0	Gray-brown								18	VISUAL
578+15.61 33.28' Lt. (R-14)	0.5	1.0	Brown							13	VISUAL**	610+34.80 20.36' Lt. (R-20)	0.4	1.0	Gray								11	A-4a**
	3.0	3.5	Brown							14	VISUAL		2.5	3.5	Gray								11	VISUAL
	3.5	5.0	Brown							14	VISUAL		3.5	5.0	Gray								11	VISUAL
	5.0	6.5	Brown							20	A-4a		5.0	6.0	Brown and gray								13	VISUAL
	6.5	7.5	1	2	16	49	32	25	7	20	A-4a		6.0	7.5	Brown and gray								13	VISUAL
	7.5	8.5	Brown							12	VISUAL		6.0	7.5	Brown and gray								13	VISUAL
	8.5	10.0	Brown							12	VISUAL		7.5	8.5	Brown and gray								14	VISUAL
													8.5	10.0	Brown and gray								14	VISUAL
590+22.05 33.93' Rt. (R-15)	0.3	1.0	Gray, brown and black							13	VISUAL**	614+55.40 33.63' Rt. (R-21)	0.3	1.0	Brown								17	VISUAL**
	1.0	2.5	Gray, brown and black							14	VISUAL		1.0	2.5	Brown								17	VISUAL**
	2.5	3.5	Gray, brown and black							14	VISUAL		2.5	3.5	Brown								19	VISUAL
	3.5	5.0	Gray, brown and black							14	VISUAL		3.5	4.2	Brown								19	VISUAL
	5.0	6.0	Gray, brown and black							14	VISUAL		4.2	5.0	Brown								19	VISUAL
	6.0	7.5	Gray, brown and black							14	VISUAL		4.2	5.0	Brown								19	VISUAL
	7.5	8.5	Gray, brown and black							13	VISUAL		5.0	6.0	Brown								10	VISUAL
	8.5	10.0	Gray, brown and black							13	VISUAL		5.0	6.0	Brown								10	VISUAL
594+16.18 33.99' Lt. (R-16)	0.5	1.0	Brown							18	A-7-6**	625+49.92 30.03' Lt. (R-22)	0.5	1.0	Brown-gray								19	A-4a**
	1.0	2.5	5	3	5	27	60	41	18	18	A-7-6**		1.0	2.5	30	8	9	24	29	34	9	19	A-4a**	
	2.5	3.5	Brown-gray							16	VISUAL		2.5	3.5	Brown-gray								16	VISUAL
	3.5	5.0	Brown-gray							7	VISUAL		3.5	5.0	Brown-gray								16	VISUAL
	5.0	6.0	Brown-gray							7	VISUAL		5.0	6.0	Brown-gray								16	VISUAL
	6.0	6.5	Brown-gray							7	VISUAL		6.0	6.5	Brown-gray								16	VISUAL
	6.5	6.8	Light brown, weathered							6	VISUAL		6.5	6.8	Light brown, weathered								16	VISUAL
	6.8	8.5	Light brown, weathered							6	VISUAL		6.8	8.5	Light brown, weathered								16	VISUAL
	8.5	8.7	Light brown, weathered							6	VISUAL		8.5	8.7	Light brown, weathered								13	VISUAL
598+14.48 33.31' Rt. (R-17)	0.3	1.0	Brown							15	A-6a**	629+45.52 25.61' Rt. (R-23)	0.3	1.0	Brown and gray								16	VISUAL**
	1.0	2.5	12	6	11	71*	33	15	15	15	A-6a**		1.0	2.5	Brown and gray								16	VISUAL**
	2.5	3.0	Brown							23	VISUAL		2.5	3.5	Brown and gray								15	VISUAL
	3.0	3.5	Brown-gray							23	VISUAL		3.5	5.0	Brown and gray								15	VISUAL
	3.5	5.0	Brown-gray							29	A-7-6		5.0	6.0	Brown and gray								14	VISUAL
	5.0	6.0	Brown-gray							29	A-7-6		3.5	5.0	Brown and gray								15	VISUAL
	6.0	7.5	1	1	4	93*	44	21	21	29	A-7-6		5.0	6.0	Brown and gray								16	VISUAL
	6.0	7.5	1	1	4	93*	44	21	21	29	A-7-6		6.0	7.5	18	6	7	69*	35		14	16	A-6a	
	7.5	8.5	Brown-gray							16	VISUAL		6.0	7.5	18	6	7	69*	35		14	16	A-6a	
	8.5	9.0	Brown-gray							16	VISUAL		7.5	8.5	Brown and gray								16	VISUAL
	9.0	10.0	Light brown and gray, decomposed							16	VISUAL		7.5	8.5	Brown and gray								16	VISUAL
										16	VISUAL		8.5	10.0	Brown and gray								11	VISUAL
602+24.38 32.66' Lt. (R-18)	0.5	1.0	Gray and brown							11	VISUAL**	634+08.56 34.46' Lt. (R-24)	0.3	1.0	Brown and gray								16	VISUAL**
	1.0	2.5	Gray and brown							11	VISUAL**		1.0	2.5	Brown and gray								16	VISUAL**
	2.5	3.5	Gray and brown							16	VISUAL		2.5	3.5	Brown and gray								16	VISUAL
	3.5	5.0	Gray and brown							16	VISUAL		2.5	3.5	Brown and gray								16	VISUAL
	5.0	6.0	Gray and brown							13	VISUAL		3.5	5.0	Brown and gray								16	VISUAL
	6.0	7.5	Gray and brown							13	VISUAL		5.0	6.0	Brown and gray								17	VISUAL
	6.0	7.5	Gray and brown							13	VISUAL		5.0	6.0	Brown and gray								17	VISUAL
	7.5	8.0	Gray and brown							13	VISUAL		6.0	7.5	Brown and gray								17	VISUAL
	7.5	8.0	Gray and brown							13	VISUAL		6.0	7.5	Brown and gray								17	VISUAL
	8.0	8.5	Gray							19	VISUAL		7.5	8.5	Brown and gray								17	VISUAL
	8.5	10.0	Gray							19	VISUAL		7.5	8.5	Brown and gray								17	VISUAL
										19	VISUAL		8.5	10.0	Brown and gray								12	VISUAL
										19	VISUAL		8.5	10.0	Brown and gray								12	VISUAL

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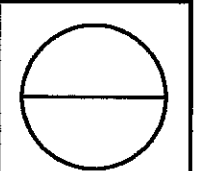
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4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081



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ROADWAY SOIL PROFILE
SUMMARY OF SOIL DATA

MAHONING COUNTY
MAH-80-0.97



SUMMARY OF SOIL DATA

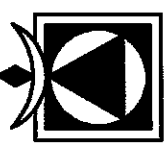
NOTE: NP SHOWN IN LIQUID LIMIT AND PLASTICITY INDEX COLUMNS INDICATES THAT THE MATERIAL IS NON-PLASTIC

* SILT & CLAY COMBINED

** SAMPLE TAKEN AT OR NEAR FINAL GRADE

Table with columns: Station & Offset, Depth (From, To), % Agg., % C.S., % F.S., % Silt, % Clay, L.L., P.I., % W.C., ODOT Class, Station & Offset, Depth (From, To), % Agg., % C.S., % F.S., % Silt, % Clay, L.L., P.I., % W.C., ODOT Class.

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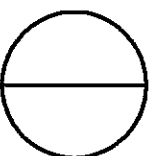


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DATE 9/03/04

REVIEWED M.W.W.

DRAWN J.M.T.



SUMMARY OF SOIL DATA

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* SILT & CLAY COMBINED

** SAMPLE TAKEN AT OR NEAR FINAL GRADE

Station & Offset	Depth From To	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class	Station & Offset	Depth From To	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class										
SERVICE ROAD BORINGS																															
700+88.27	0.3	1.0	Brown and gray SILT AND CLAY (embankment fill)										--	VISUAL																	
19.92' Rt.	1.0	2.5	Brown and gray SILT AND CLAY (embankment fill)										13	VISUAL**																	
IR-80 WB B.L. (R-40)	2.5	3.5	Brown and gray SILT AND CLAY (embankment fill)										--	VISUAL		8+45	0.0	4.5	11	5	12	33	39	32	14	12	A-6a**				
	3.5	4.0	Brown and gray SILT AND CLAY (embankment fill)										16	VISUAL		C.L. Service Rd.	4.5	6.4	16	24	20	20	20	31	14	13	A-6a				
	4.0	5.5	Brown SILT AND CLAY (natural soil)										--	VISUAL		(RB-4)	6.4	9.5	3	5	14	25	53	31	12	17	A-6a				
	5.5	6.0	Brown SILT AND CLAY (natural soil)										--	VISUAL			9.5	10.5	21	18	26	20	15	NP		14	A-2-4				
	6.0	7.5	3	4	8	84*	35	14	17	A-6a			10.5	12.8	Brown, Very Stiff, GRAVEL w/ SAND & SILT, moist										14	VISUAL					
	7.5	8.5	Brown SILT AND CLAY (natural soil)										--	VISUAL			12.8	13.5	0	0	1	54	45	34	11	24	A-6a				
	8.5	10.0	Brown SILT AND CLAY (natural soil)										19	VISUAL			13.5	14.6	Brown, Very Stiff, SILT & CLAY, moist										23	VISUAL	
704+87.68	0.3	1.0	Brown and gray SANDY SILT (embankment fill)										--	VISUAL			14.6	27.5	0	0	1	66	33	NP		24	A-4b				
113.00' Rt.	1.0	2.5	Brown and gray SANDY SILT (embankment fill)										13	VISUAL**			27.5	29.4	Grey SHALE, very weathered, very soft											VISUAL	
IR-80 WB B.L. (R-41)	2.5	3.0	Brown and gray SANDY SILT (embankment fill)										--	VISUAL			29.4	36.0	Interbedded SANDSTONE, SILTSTONE & SHALE											VISUAL	
	3.0	3.5	Brown-gray SILT AND CLAY (natural soil)										--	VISUAL																	
	3.5	5.0	Brown-gray SILT AND CLAY (natural soil)										12	VISUAL																	
	5.0	6.0	Brown-gray SILT AND CLAY (natural soil)										--	VISUAL																	
	6.0	7.5	Brown-gray SILT AND CLAY (natural soil)										13	VISUAL		13+50	0.0	3.5	3	4	2	33	58	42	19	14	A-7-6**				
	7.5	8.5	Brown-gray SILT AND CLAY (natural soil)										--	VISUAL		C.L. Service Rd.	3.5	4.5	14	6	17	63*	29		11	12	A-6a				
	8.5	9.8	Brown-gray SILT AND CLAY (natural soil)										11	VISUAL		(RB-5)	4.5	6.0	5	13	11	71*	32		13	14	A-6a				
708+70.79	0.2	1.0	Brown and gray SANDY SILT (embankment fill)										--	VISUAL			6.0	7.8	Brown, Hard, SILT & CLAY, moist, some sand, trace gravel										15	VISUAL	
21.30' Rt.	1.0	2.5	5	5	13	34	42	28	16	A-4a**			7.8	8.8	Lt. Brown, SILTSTONE, Soft											VISUAL					
IR-80 WB B.L. (R-42)	2.5	3.5	Brown and gray SANDY SILT (embankment fill)										--	VISUAL			8.8	13.4	Interbedded SANDSTONE & SHALE											VISUAL	
	3.5	5.0	Brown and gray SANDY SILT (embankment fill)										13	VISUAL			13.4	36.5	Interbedded SANDSTONE & SILTSTONE											VISUAL	
	5.0	6.0	Brown and gray SANDY SILT (embankment fill)										--	VISUAL																	
	6.0	7.5	Brown and gray SANDY SILT (embankment fill)										12	VISUAL																	
	7.5	8.5	Brown and gray SANDY SILT (embankment fill)										--	VISUAL																	
	8.5	10.0	Brown and gray SANDY SILT (embankment fill)										16	VISUAL																	
712+15	0.0	1.5	Brown, Very Stiff, SANDY SILT, moist, little gravel, some clay										13	VISUAL**																	
140' Rt. (RB-6)	1.5	3.0	18	6	13	33	30	27	10	12	A-4a																				
	3.0	4.5	18	8	13	61*		29	11	13	A-6a																				
	4.5	6.0	23	7	13	57*		28	11	11	A-6a																				
	8.5	10.0	19	4	12	65*		38	19	17	A-6b																				
716+72	0.0	1.5	Brown, Very Stiff to Hard, SANDY SILT, dry, some clay, little gravel										12	VISUAL**																	
48' Rt. (RB-7)	1.5	2.4	13	10	18	34	25	24	8	9	A-4a																				
	3.0	4.5	33	5	10	30	22	25	9	10	A-4a																				
	4.5	7.0	13	8	12	66*		27	11	11	A-6a																				
	7.0	10.0	Brown, Hard, SILT & CLAY, dry, some sand, some gravel										8	V:A-6a																	
720+25	0.0	1.5	Brown, Stiff to Hard, SANDY SILT, moist, some clay, little rock fragments										18	VISUAL**																	
25' Rt. (RB-8)	1.5	3.0	11	6	17	38	29	25	9	9	A-4a																				
	3.0	4.5	23	6	12	32	26	26	8	11	A-4a																				
	4.5	6.0	9	4	17	37	32	26	10	14	A-4a																				
	8.5	10.0	Brown, Very Stiff to Hard, SANDY SILT, moist, some clay, trace rock fragments										11	VISUAL																	
723+00	0.0	1.5	Brown, Stiff to Very Stiff, SILT & CLAY, moist some sand, little gravel										16	VISUAL**																	
30' Rt. (RB-9)	1.5	3.0	12	7	17	64*		29	12	16	A-6a																				
	3.0	4.5	12	8	15	65*		27	11	13	A-6a																				
	4.5	7.2	Brown, Stiff to Very Stiff, SILT & CLAY, moist some sand, little gravel										17	VISUAL																	
	7.2	10.0	3	2	8	59	28	25	6	15	A-4b																				

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GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081



DRAWN
J.M.T.

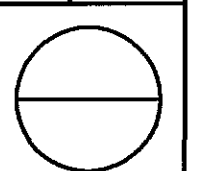
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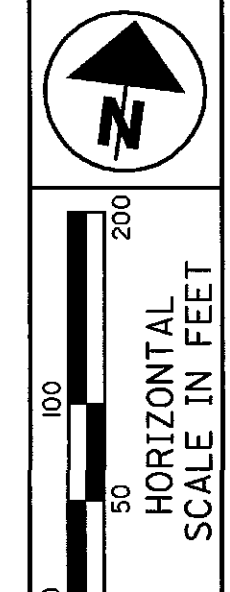
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ROADWAY SOIL PROFILE
SUMMARY OF SOIL DATA

MAHONING COUNTY
MAH-80-0.97

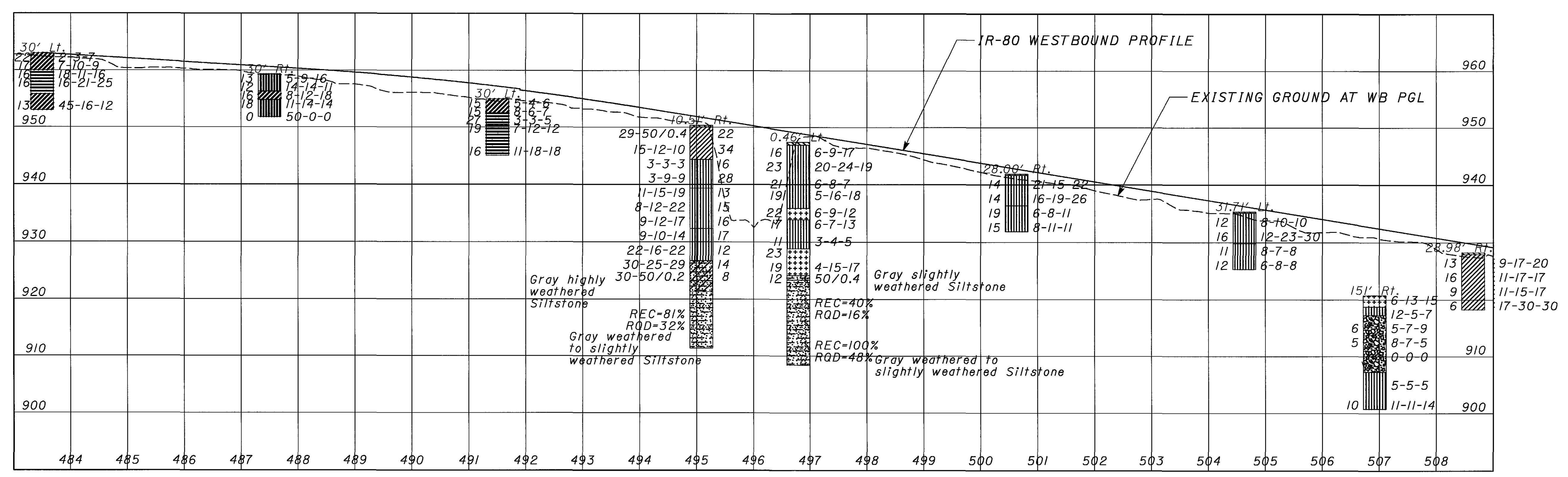
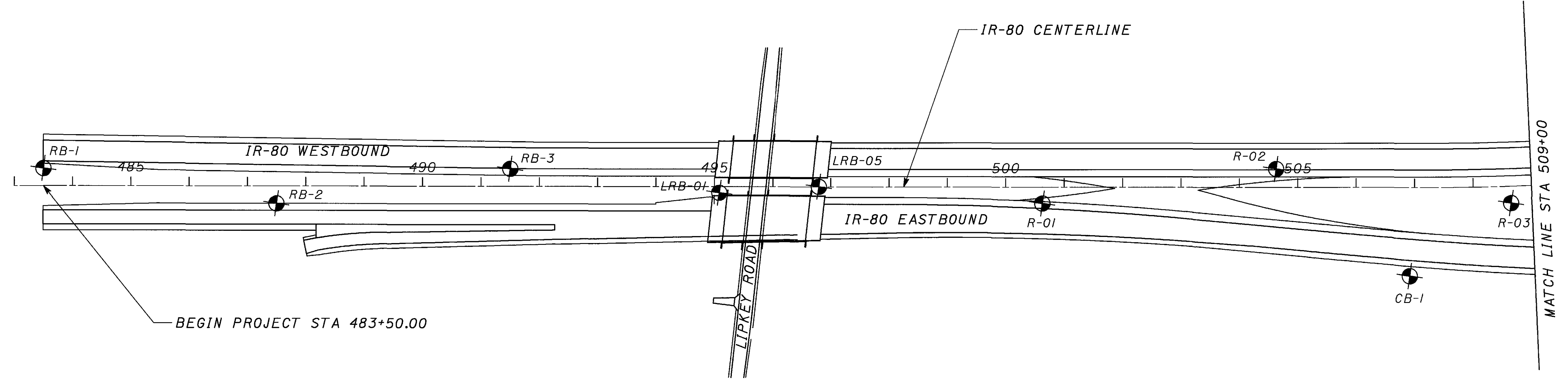


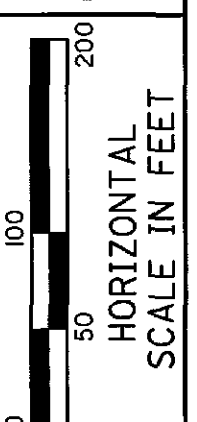
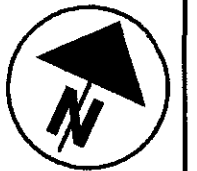
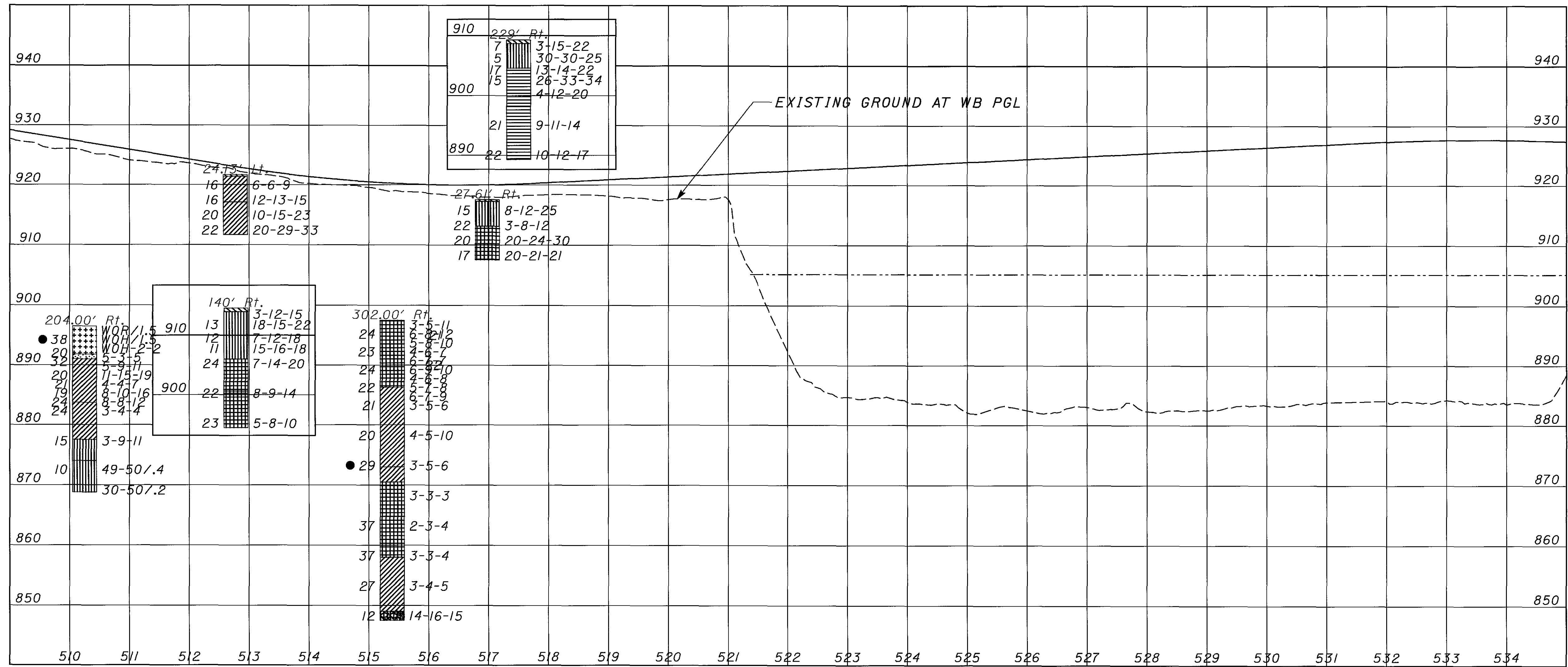
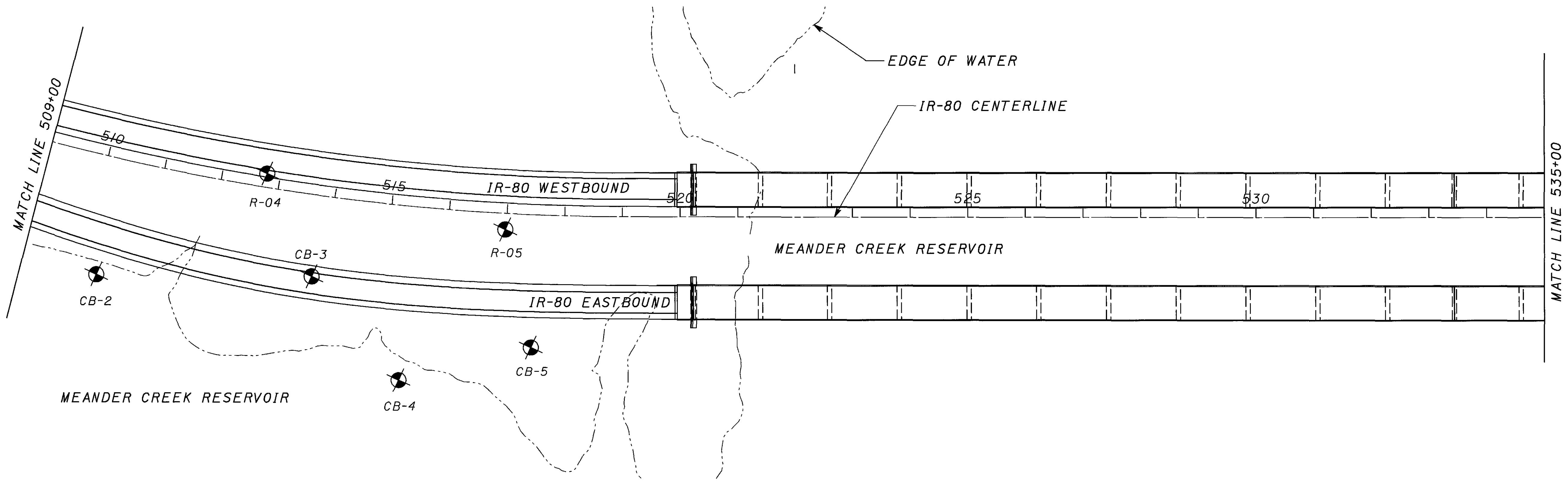


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J.M.T.	

ROADWAY SOIL PROFILE
STA. 483+50 TO STA 509+00

MAHONING COUNTY
MAH-80-0.97

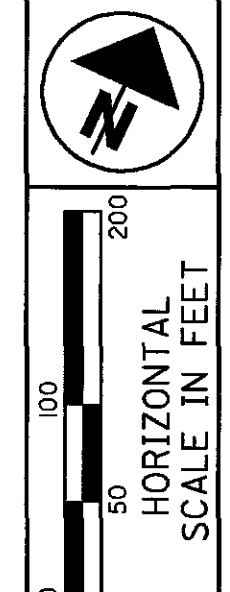




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ROADWAY SOIL PROFILE
STA. 509+00 TO STA. 535+00

MAHONING COUNTY
MAH-80-0.97

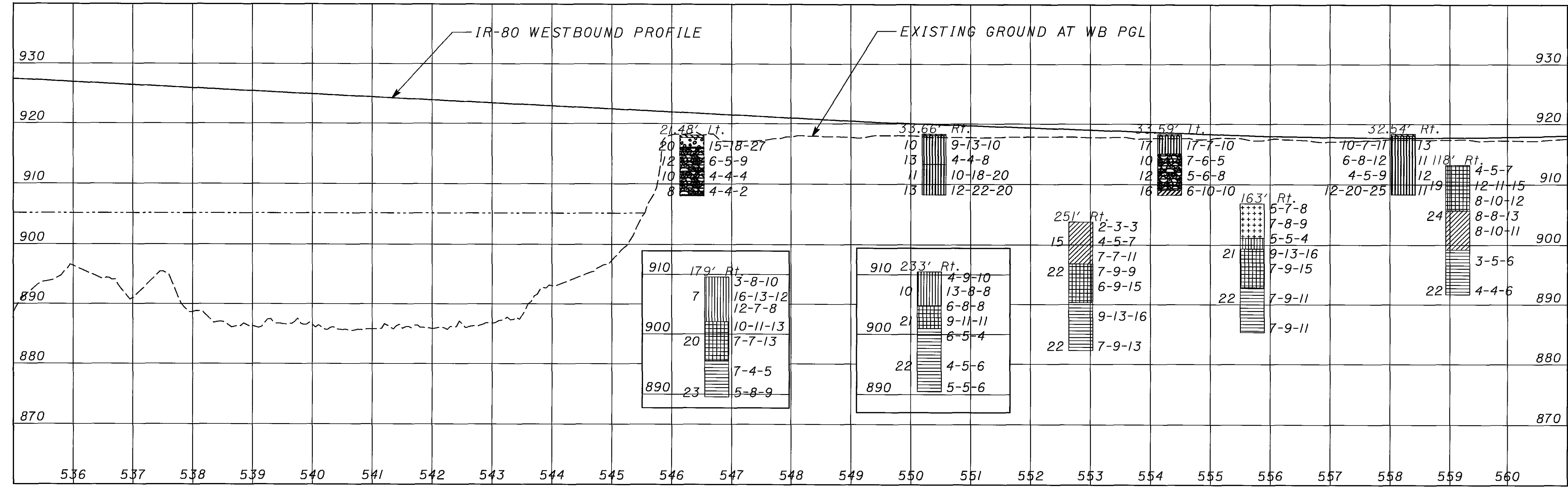
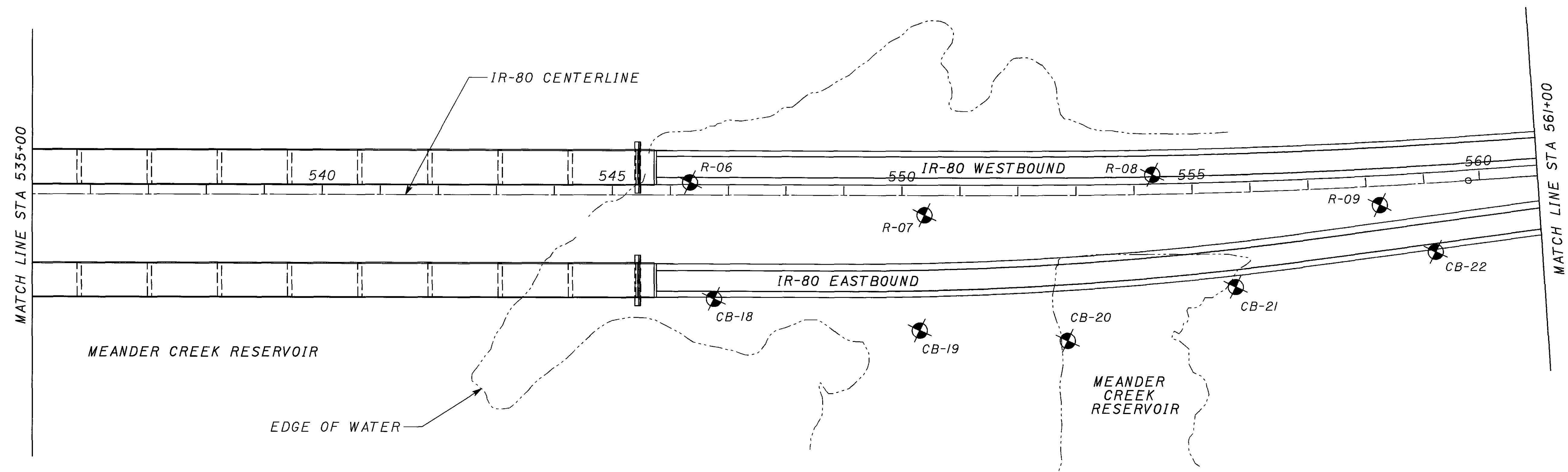


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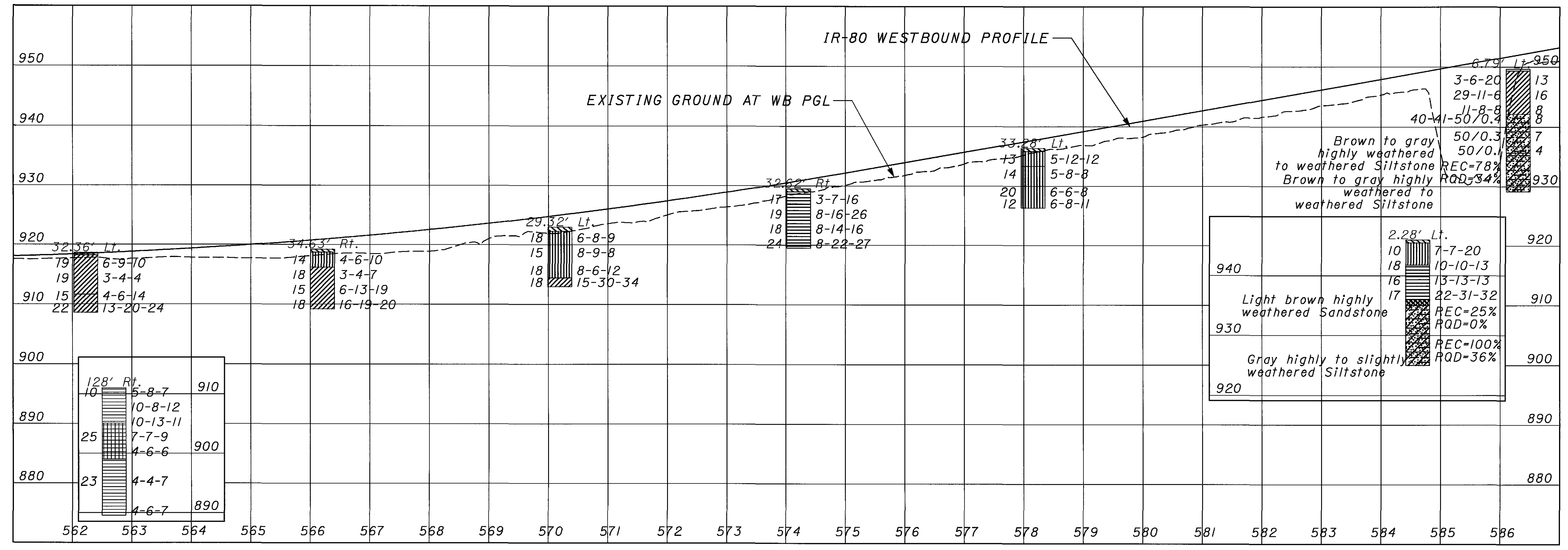
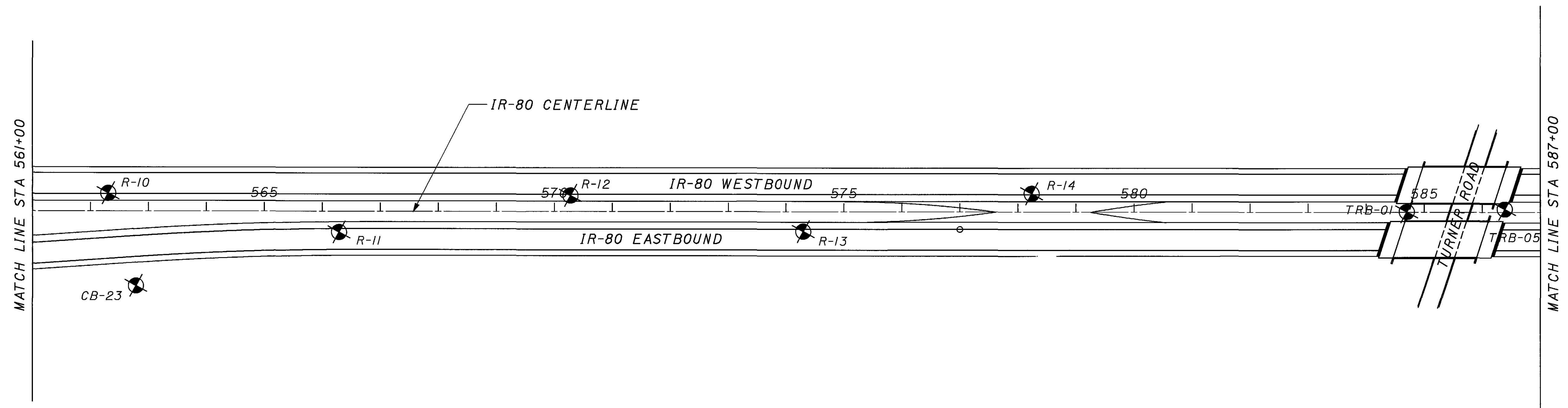
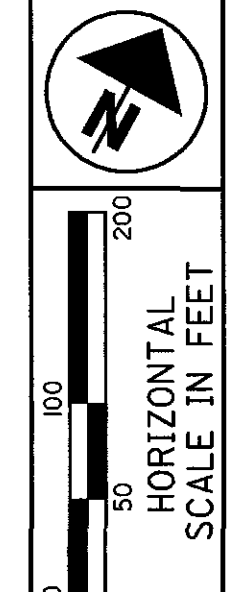
ROADWAY SOIL PROFILE
STA. 535+00 TO STA. 561+00

MAHONING COUNTY
MAH-80-0.97

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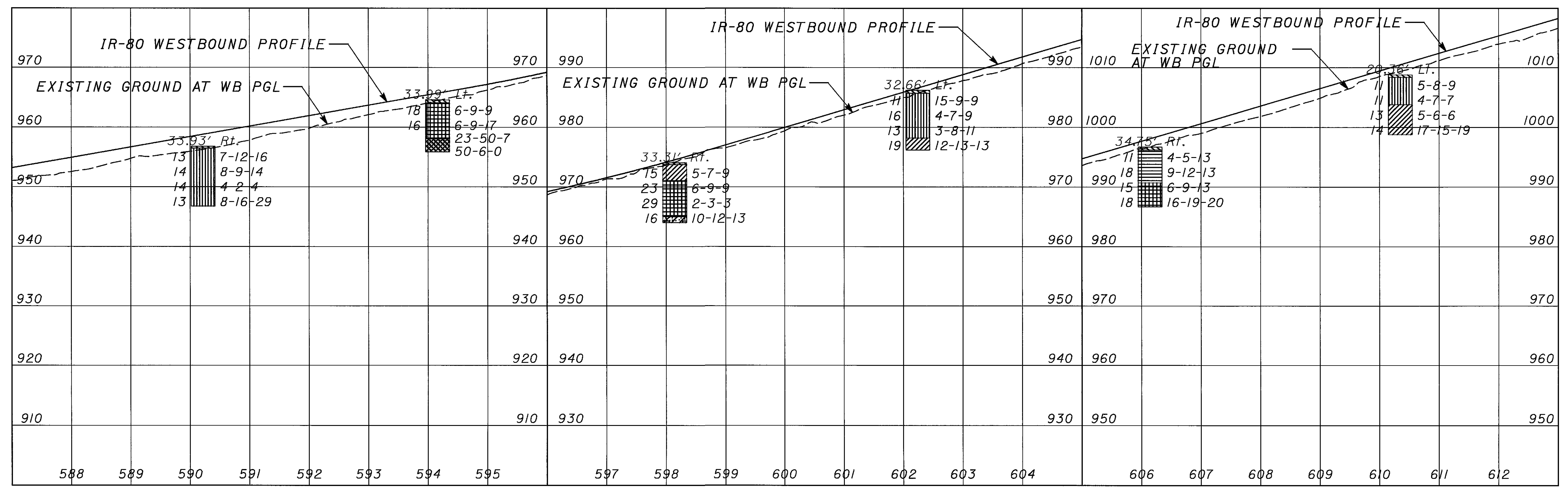
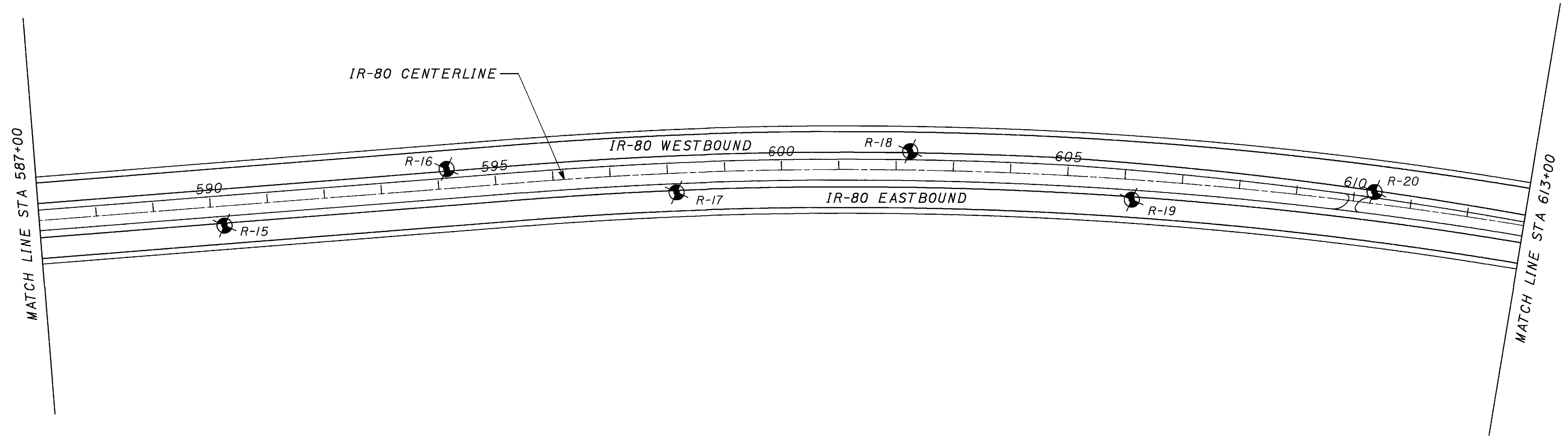
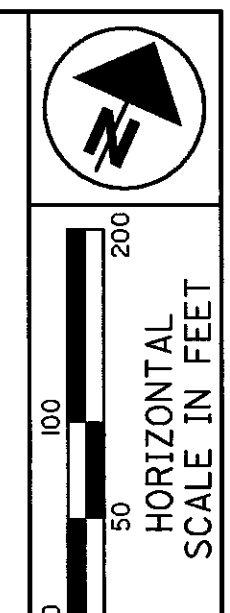


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REVIEWED	M.W.W.
DATE	2/04/05
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ROADWAY SOIL PROFILE
STA. 561+00 TO STA. 587+00

MAHONING COUNTY
MAH-80-0.97

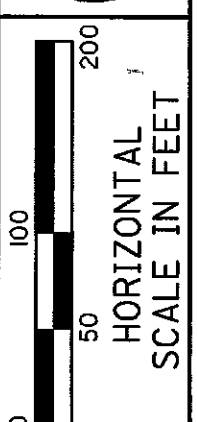
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ROADWAY SOIL PROFILE
STA. 587+00 TO STA. 613+00

MAHONING COUNTY
MAH-80-0.97



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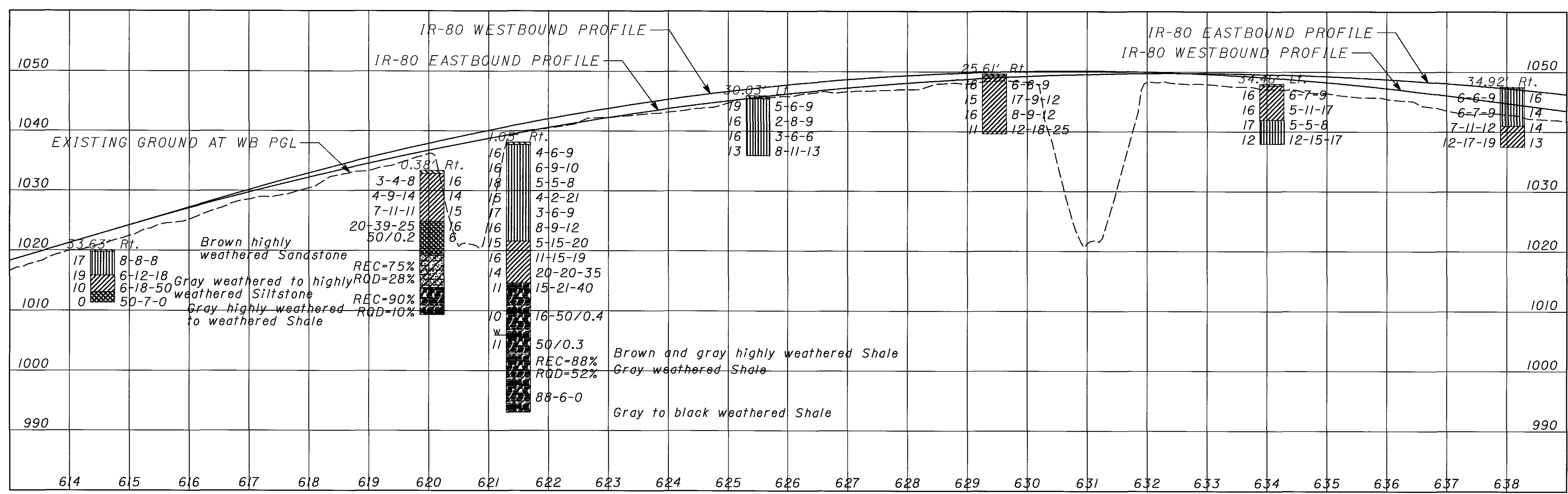
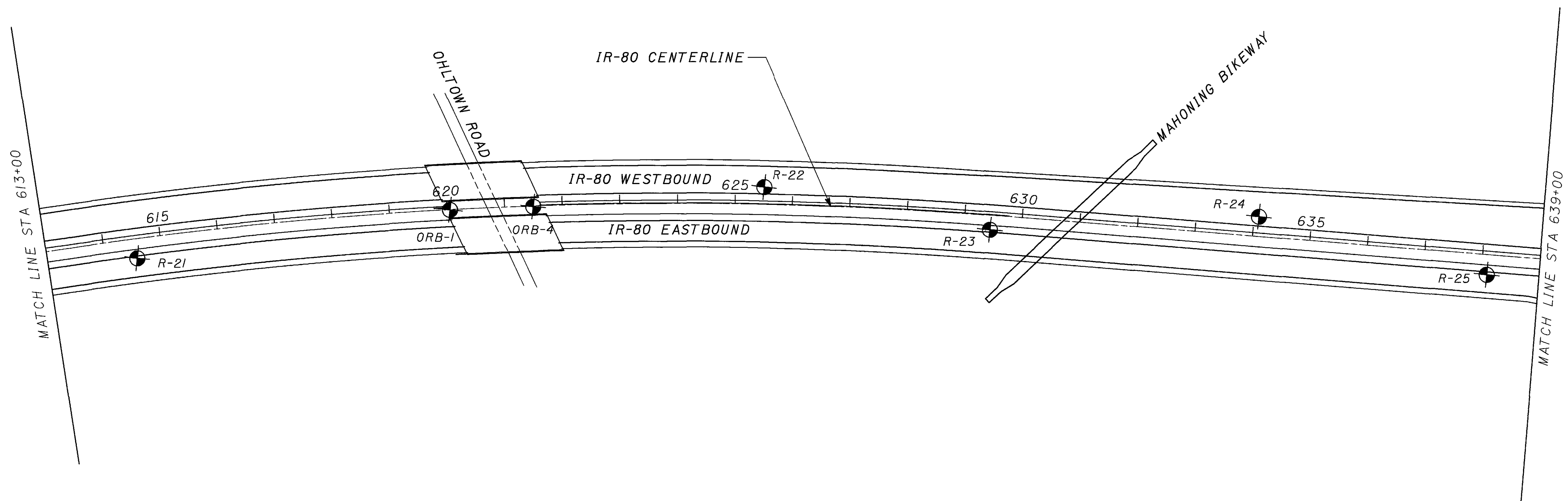
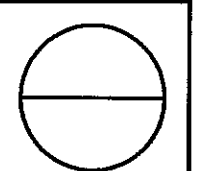
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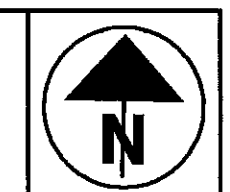
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ROADWAY SOIL PROFILE
STA. 613+00 TO STA. 639+00

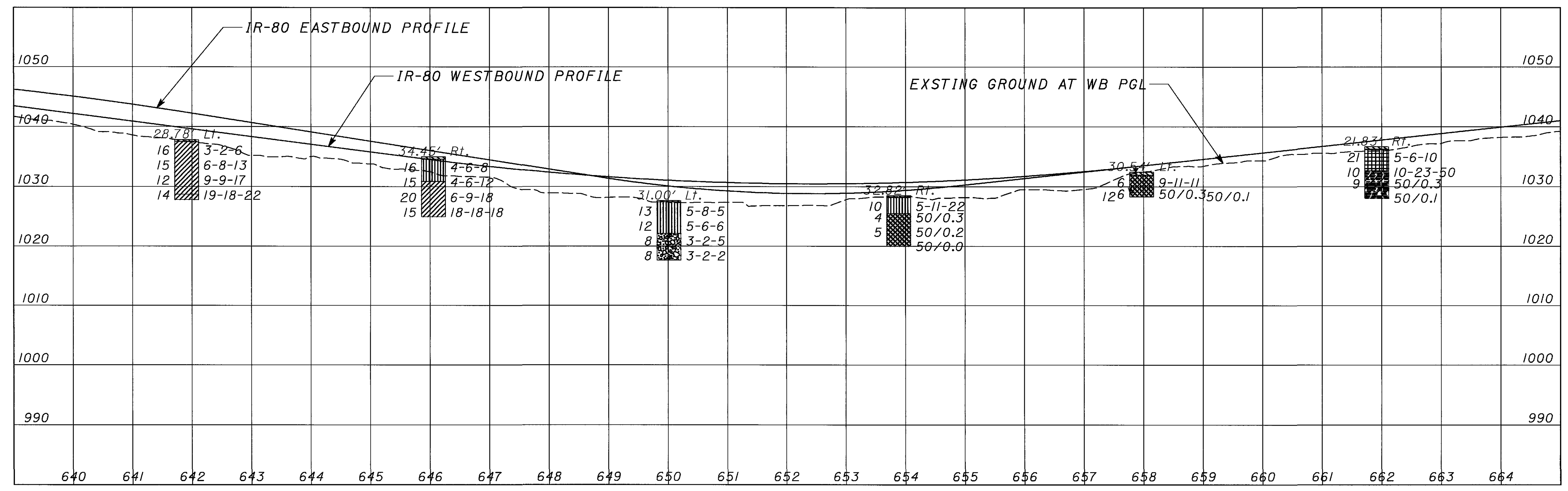
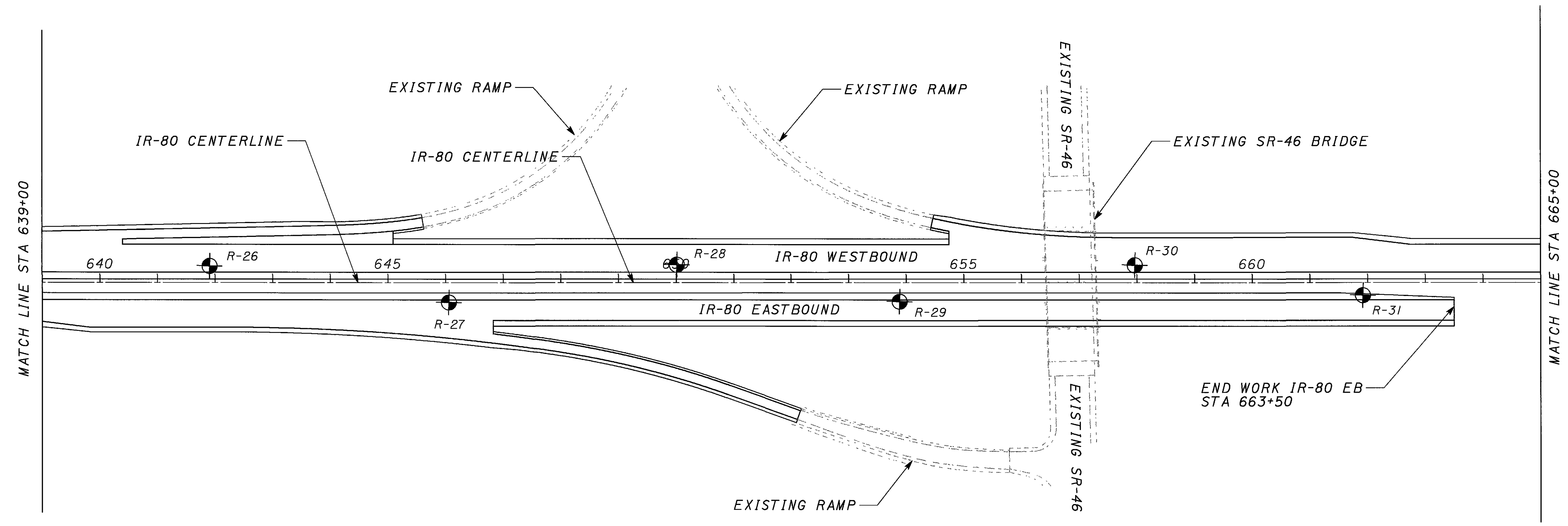
MAHONING COUNTY
MAH-80-0.97

13 / 82



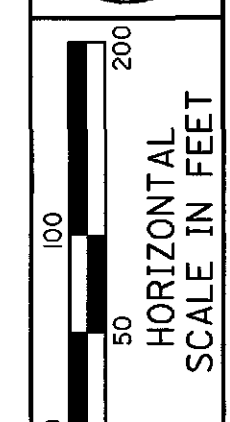


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ROADWAY SOIL PROFILE
STA. 639+00 TO STA. 665+00

MAHONING COUNTY
MAH-80-0.97



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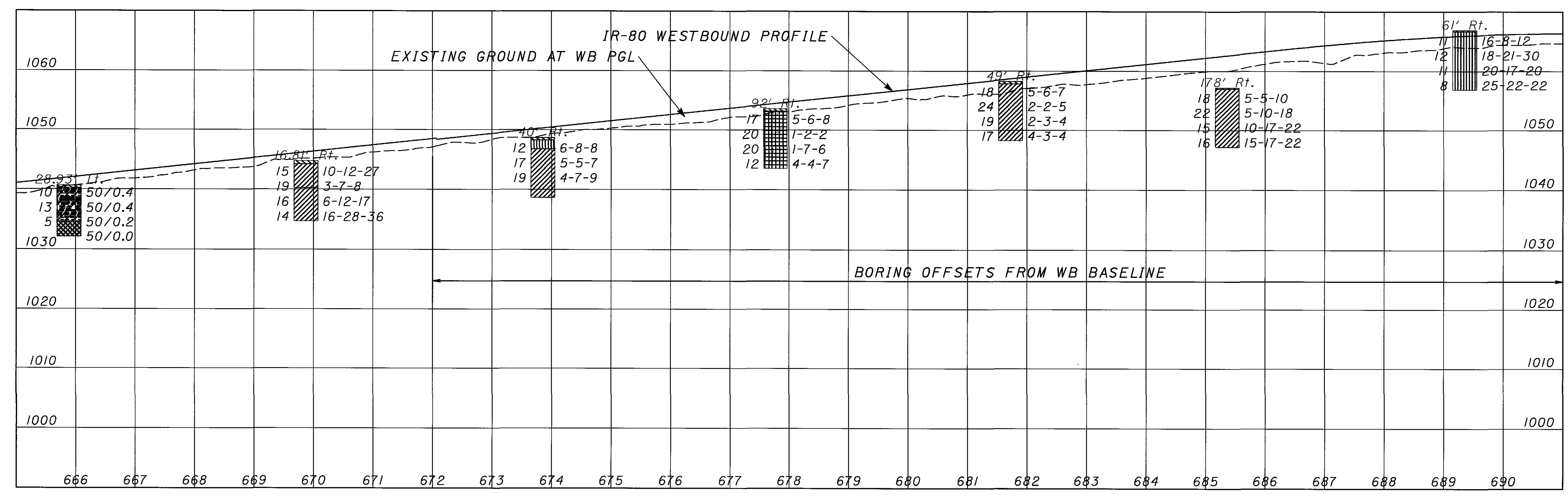
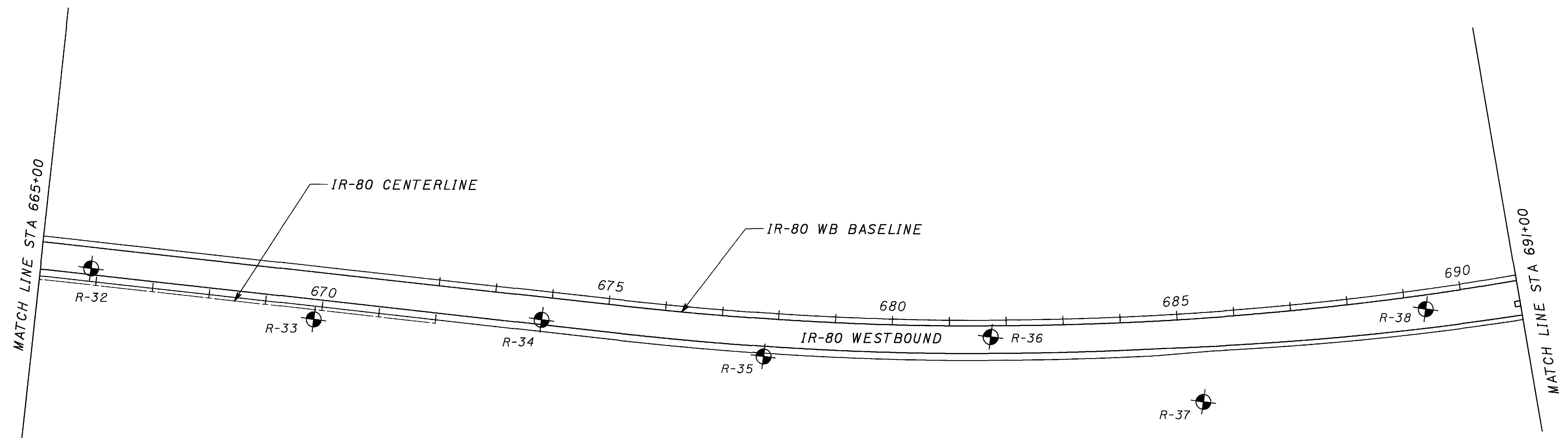
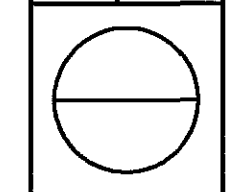
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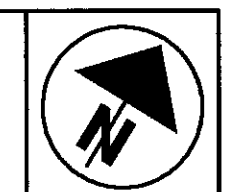
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ROADWAY SOIL PROFILE
STA. 665+00 TO STA. 691+00

MAHONING COUNTY
MAH-80-0.97



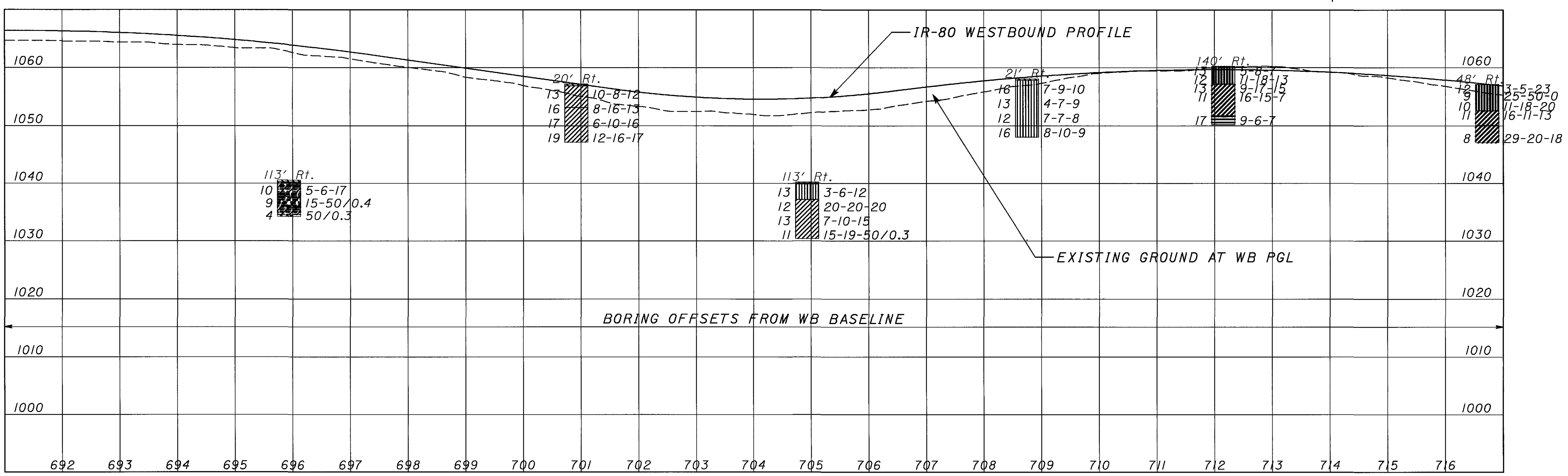
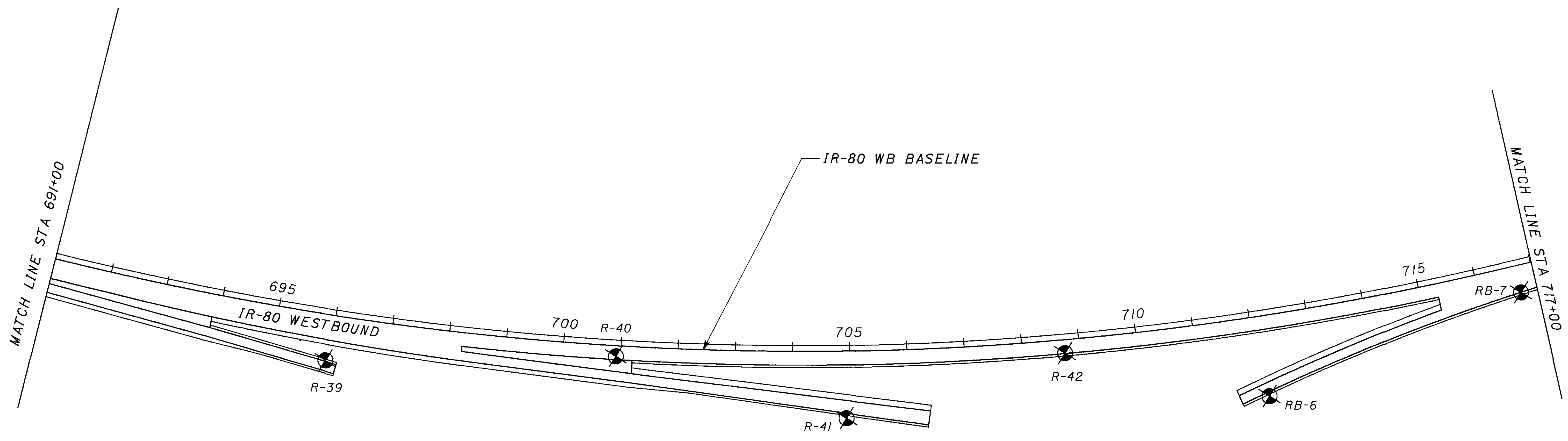
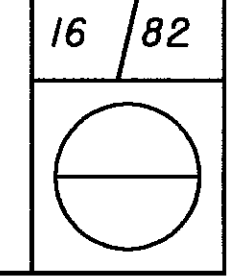


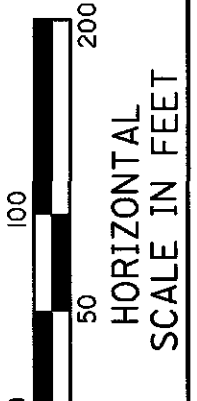
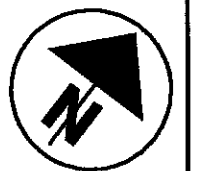
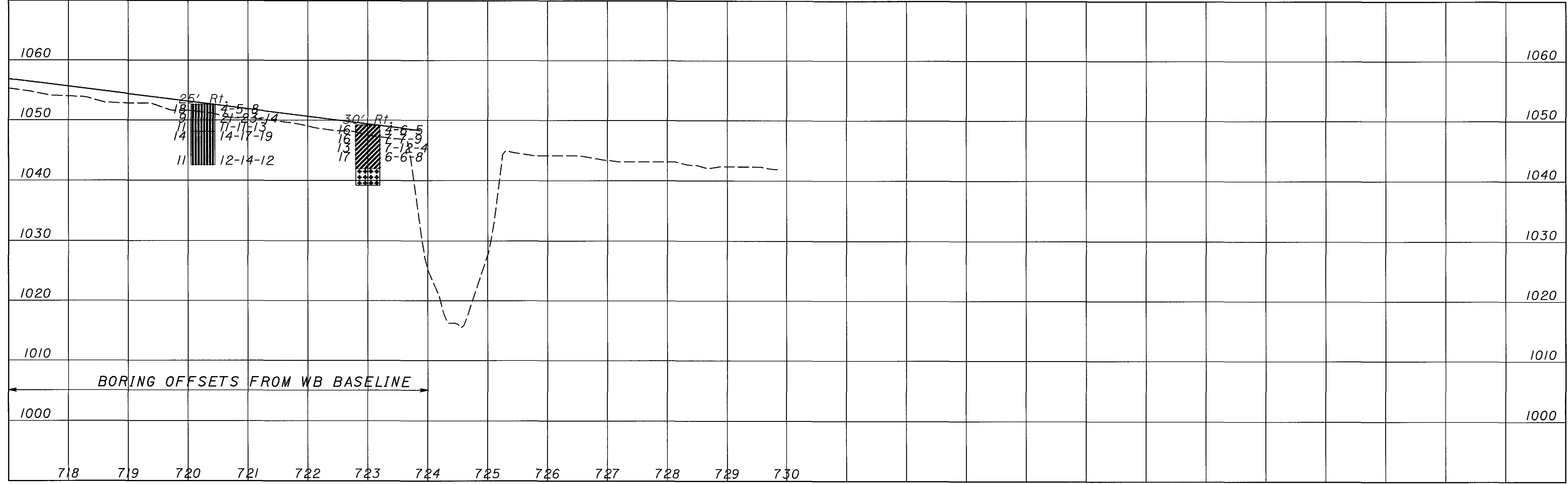
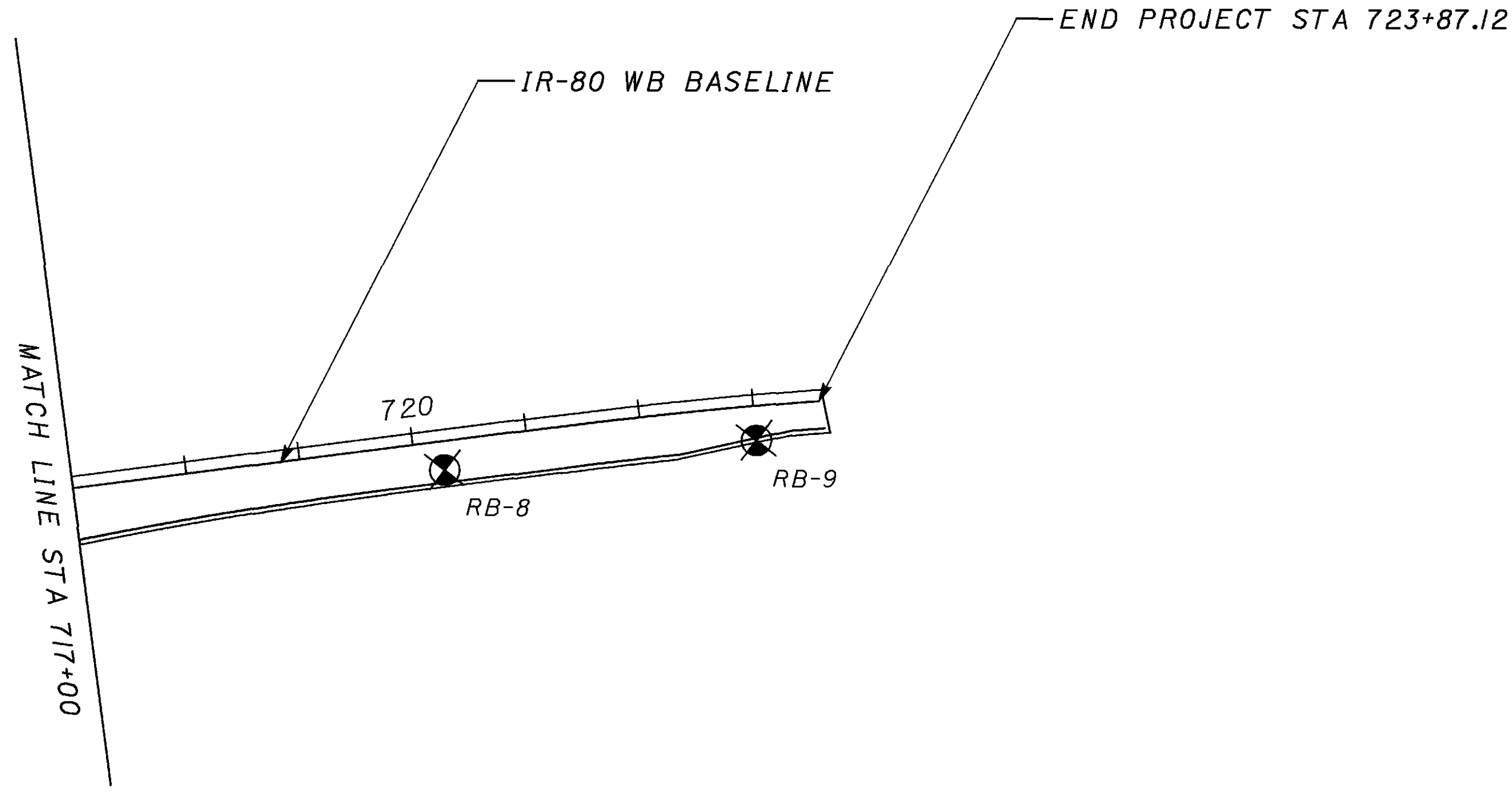
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ROADWAY SOIL PROFILE
STA. 691+00 TO STA. 717+00

MAHONING COUNTY
MAH-80-0.97

16 / 82

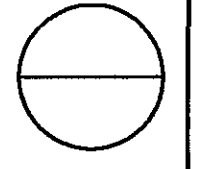




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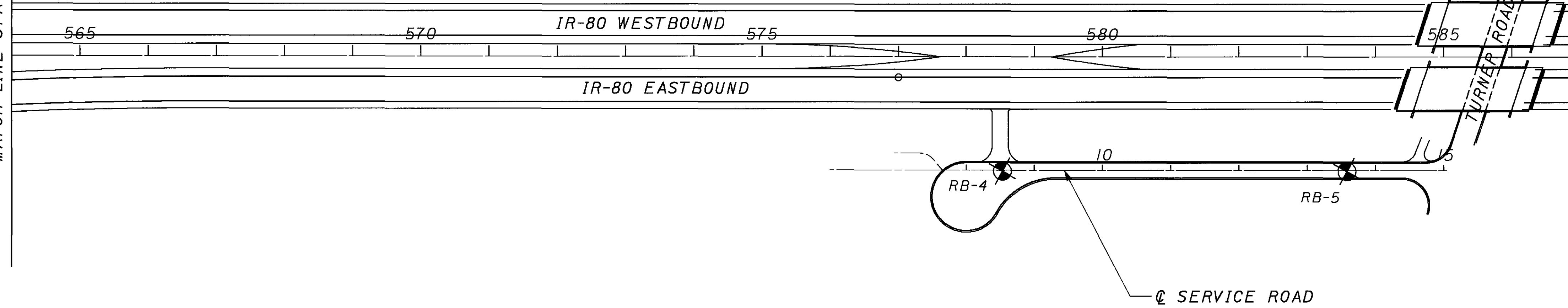
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 STA. 717+00 TO STA 723+87.12

MAHONING COUNTY
 MAH-80-0.97

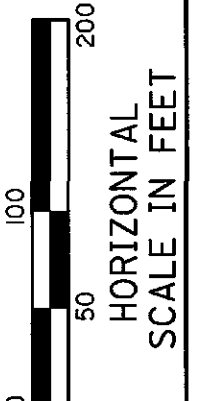
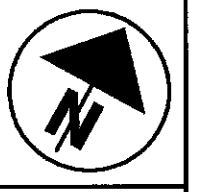
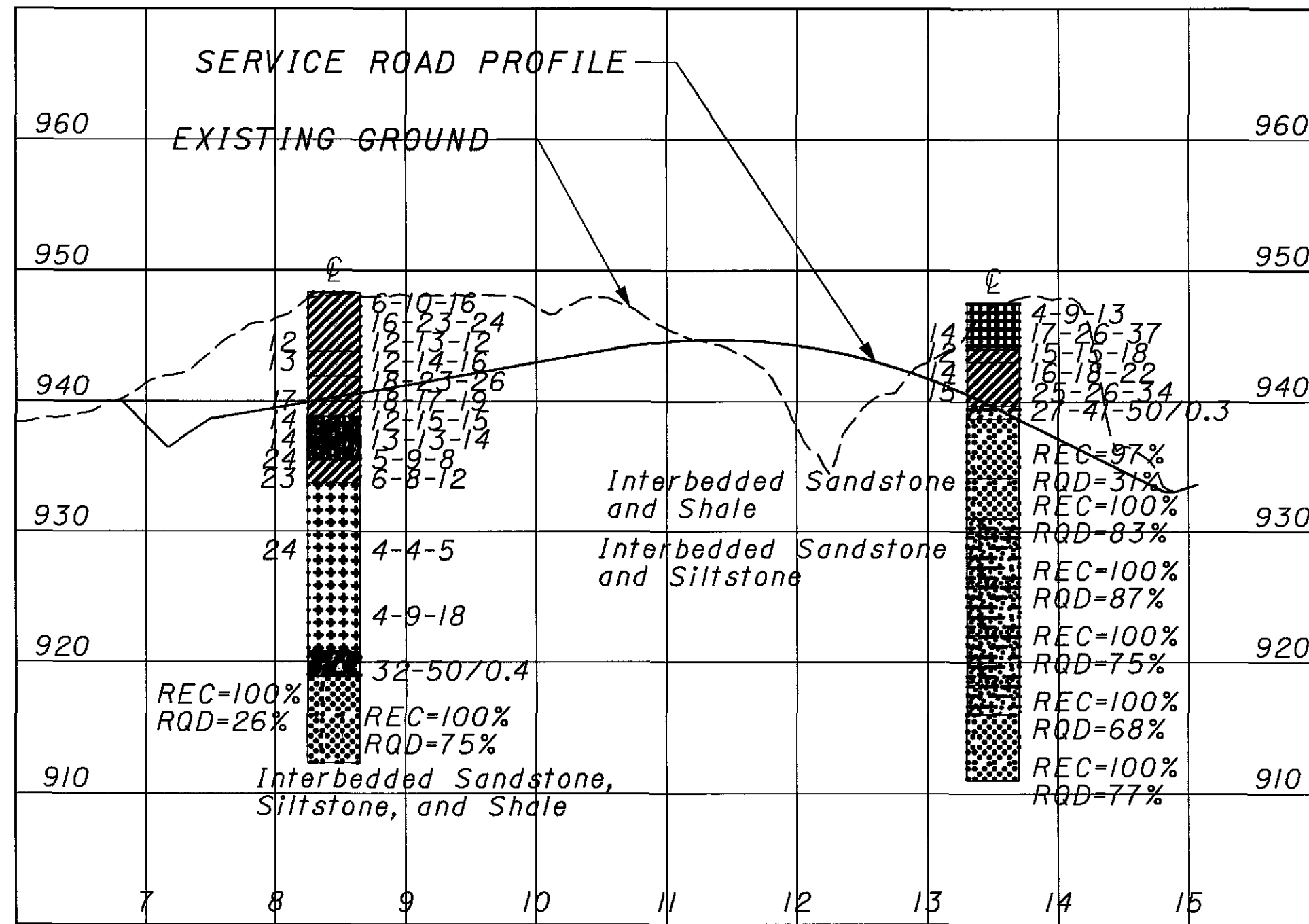


MATCH LINE STA 564+00

IR-80 ONLY SHOWN FOR REFERENCE PURPOSE. BORINGS FOR IR-80 NOT SHOWN.



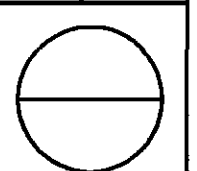
MATCH LINE STA 587+00

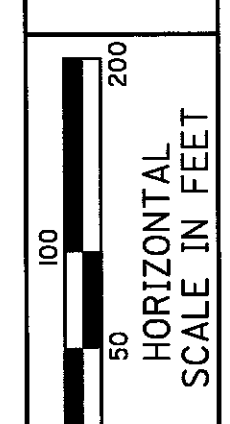
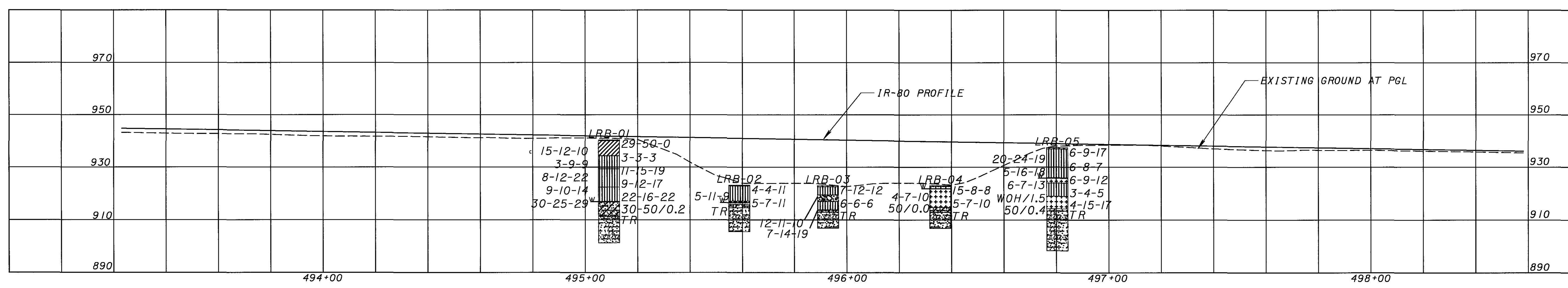
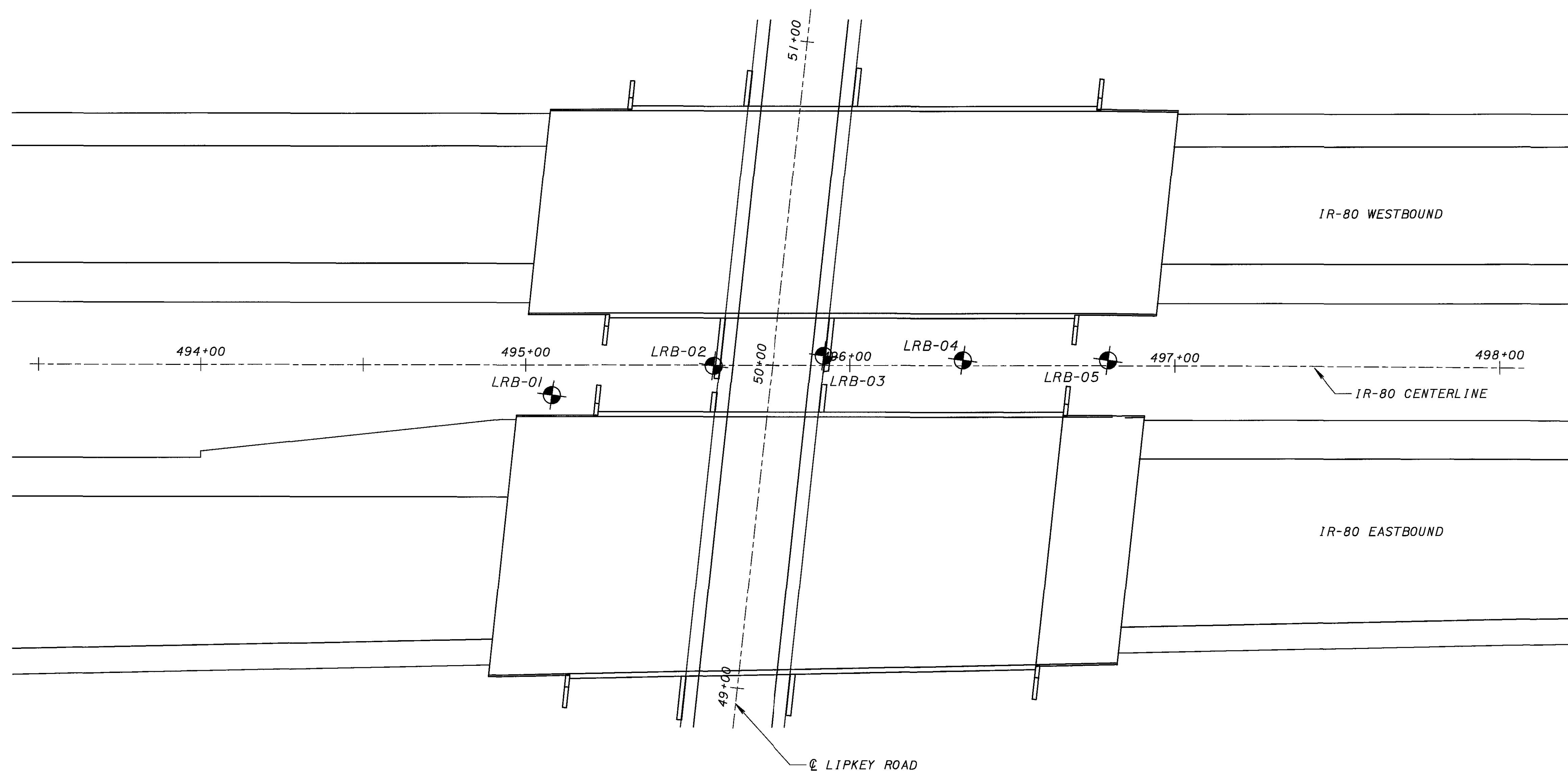


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ROADWAY SOIL PROFILE
 SERVICE ROAD

MAHONING COUNTY
 MAH-80-0.97





CALCULATED	DATE	REVIEWED	DRAWN
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STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0076 L/R OVER LIPKEY ROAD

MAHONING COUNTY
MAH-80-0.97



LOG OF BORING

Date Started 1/29/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 1/29/02 Casing: Length Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. LRB-01 Station & Offset 495+08.13, 10.51' Rt. Surface Elev 950.34ft

Elev. (ft)	Depth (ft)	Std. Pene. /Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
950.3	0				TOPSOIL	1	--	--	--	--	--	--	22	VISUAL
950.0	2	29 - 50/0.4			Very stiff to hard, gray and brown SILT AND CLAY (A-6a), some slag, trace asphalt, moist. (embankment fill)	2	--	--	--	--	--	--	34	VISUAL
944.3	4	15 - 12 - 10				3	19	8	11	30	25	8	16	A-4a
	6	3 - 3 - 3			Medium stiff to stiff, gray, cohesive SANDY SILT (A-4a), some clay, some gravel and slag, moist. (embankment fill)	4	--	--	--	--	--	--	28	VISUAL
	8	3 - 9 - 9				5	--	--	--	--	--	--	13	VISUAL
939.3	10	11 - 15 - 19			Hard to very stiff, brown-gray, cohesive SANDY SILT (A-4a), some clay, little gravel, moist. (natural soil)	6	--	--	--	--	--	--	15	VISUAL
	12	8 - 12 - 22				7	--	--	--	--	--	--	16	VISUAL
	14	9 - 12 - 17				8	--	--	--	--	--	--	17	VISUAL
932.3	16	9 - 10 - 14			Very stiff to hard, gray, cohesive SANDY SILT (A-4a), some to little clay, trace to little gravel and rock fragments, moist to wet.	9	--	--	--	--	--	--	12	VISUAL
	18	22 - 16 - 22				10	--	--	--	--	--	--	14	VISUAL
926.7	20	30 - 25 - 29			Note: Thin (<2.0" thick), SILT seam, wet at 23.5 feet during drilling	11	--	--	--	--	--	--	8	VISUAL
	22				Soft to medium hard, gray, decomposed to highly weathered SANDY SILTSTONE.									
	24	30 - 50/0.2				Run 1								
	26				Note: Augered to 29.0 feet and began coring bedrock.									
	28				Hard, gray, weathered to slightly weathered SANDY SILTSTONE very thin to thin, nearly horizontal bedding, some natural, very close to close natural fractures mainly along bedding planes. Poor condition as per RQD.									
921.3	30	RQD = 32%	8.1	1.9	Note: U.C. Strength at 32.8 feet = 2454 psi (medium strength)									
	32				Very stiff to hard, gray, cohesive SANDY SILT (A-4a), some to little clay, trace to little gravel and rock fragments, moist to wet.									
	34				Note: Some dark gray shale laminations and few, thin (<1.0" thick), dark gray, soft to medium hard SHALE seams throughout Run 1.									
915.3	36													
	38													
911.3					TERMINATION DEPTH = 39.0 FEET									

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



LOG OF BORING

Date Started 3/4/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/4/02 Casing: Length Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. LRB-02 Station & Offset 495+57.87, 1.35' Rt. Surface Elev 933.07ft

Elev. (ft)	Depth (ft)	Std. Pene. /Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
933.1	0				TOPSOIL	1	--	--	--	--	--	--	17	VISUAL
932.8	2	4 - 4 - 11			Stiff, mottled brown and gray to gray, cohesive SANDY SILT (A-4a), some clay, trace gravel, moist. (possible natural soil)	2	--	--	--	--	--	--	16	VISUAL
	4	5 - 11 - 9				3	--	--	--	--	--	--	21	VISUAL
927.1	6	5 - 7 - 11			Medium dense, gray, non-cohesive SILT (A-4b), little sand, little clay, wet. Note: Wet at 6.5 feet during drilling.	Run 1								
925.8	8				Soft to medium hard, brown-gray, decomposed to highly weathered SANDY SILTSTONE.									
924.6	10	RQD = 52%	5.0	0.0	Note: Augered to 8.5 feet and began coring bedrock.									
	12				Hard, gray, weathered to slightly weathered SANDY SILTSTONE with very thin to moderate, nearly horizontal bedding, some close natural fractures along bedding planes. Fair to poor condition as per RQD.									
	14	RQD = 45%	2.9	1.1	Note: U.C. Strength at 9.3 feet = 3748 psi (medium strength) Note: U.C. Strength at 11.2 feet = 1877 psi (low strength)	Run 2								
	16				Note: Few, thin (<1.0" thick), dark gray, medium hard SHALE seams throughout Runs 1 and 2.									
915.6					TERMINATION DEPTH = 17.5 FEET									

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)





Date Started 3/4/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/4/02 Casing: Length _____ Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. LRB-03 Station & Offset 495+91.95, 1.78' Lt. Surface Elev. 932.90ft

Elev. (ft)	Depth (ft)	Std. Pene. / FT or ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
932.9	0				TOPSOIL	1	--	--	--	--	--	--	--	13	VISUAL
932.5	2	7 - 12 - 12			Very stiff, gray, cohesive SANDY SILT (A-4a), some clay, trace gravel, moist. (natural soil)										
929.4	4	12 - 11 - 10			Medium dense, gray GRAVEL AND ROCK FRAGMENTS WITH SAND (A-b), little silt and clay, moist.	2								11	VISUAL
926.9	6	6 - 6 - 6			Stiff to hard, gray, cohesive SANDY SILT (A-4a), some to little clay, trace gravel, moist.	3								17	VISUAL
923.8	8	7 - 14 - 19			Soft, gray, decomposed to highly weathered SANDY SILTSTONE.	4								12	VISUAL
922.9	10	ROD = 57%	6.0	0.0	Note: Augered to 10.0 feet and began coring bedrock. Medium hard to hard, gray to dark gray, weathered to slightly weathered SANDY SILTSTONE, with very thin to thin, nearly horizontal bedding. Few to some close natural fractures mainly along bedding planes. Bedrock in fair condition as per ROD. Note: U.C. strength at 10.6 feet = 4470 psi (medium strength) Note: Few, thin (<1.0" thick), dark gray, medium hard SHALE seams throughout Run 1.	Run 1									
916.9	16				TERMINATION DEPTH = 16.0 FEET										

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



Date Started 3/5/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/5/02 Casing: Length _____ Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. LRB-04 Station & Offset 496+34.77, 0.51' Lt. Surface Elev. 932.89ft

Elev. (ft)	Depth (ft)	Std. Pene. / FT or ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
932.9	0				TOPSOIL	1	--	--	--	--	--	--	--	21	VISUAL
932.6	2	15 - 8 - 8			Medium dense, gray, non-cohesive SILT (A-4b), some to little clay, little sand, moist to wet. (natural soil) Note: Wet at 1.0 foot during drilling.	2								14	VISUAL
924.7	4	4 - 7 - 10			Medium hard, gray, highly weathered SANDY SILTSTONE. (sampled auger cuttings)	3								26	VISUAL
922.9	6	5 - 7 - 10			Note: Augered to 10.0 feet and began coring bedrock. Medium hard to hard, gray, highly weathered to slightly weathered SANDY SILTSTONE with thin to moderate, nearly horizontal bedding, few natural fractures mainly along bedding planes. Note: U.C. strength at 11.2 feet = 1581 psi (low strength) Note: Some, very thin (<1/2" thick), dark gray SHALE seams throughout Run 1. Thin, decomposed to highly weathered shale seams at 12.3 and 12.7 feet. Note: U.C. strength at 12.4 feet = 3427 psi (medium strength)	4							21	VISUAL	
916.9	10	50/10.0	6.0	0.0	Note: Bedrock in good condition as per ROD. TERMINATION DEPTH = 16.0 FEET	Run 1									

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)





Date Started 1/28/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 1/28/02 Casing: Length ft Dia. 3.25"

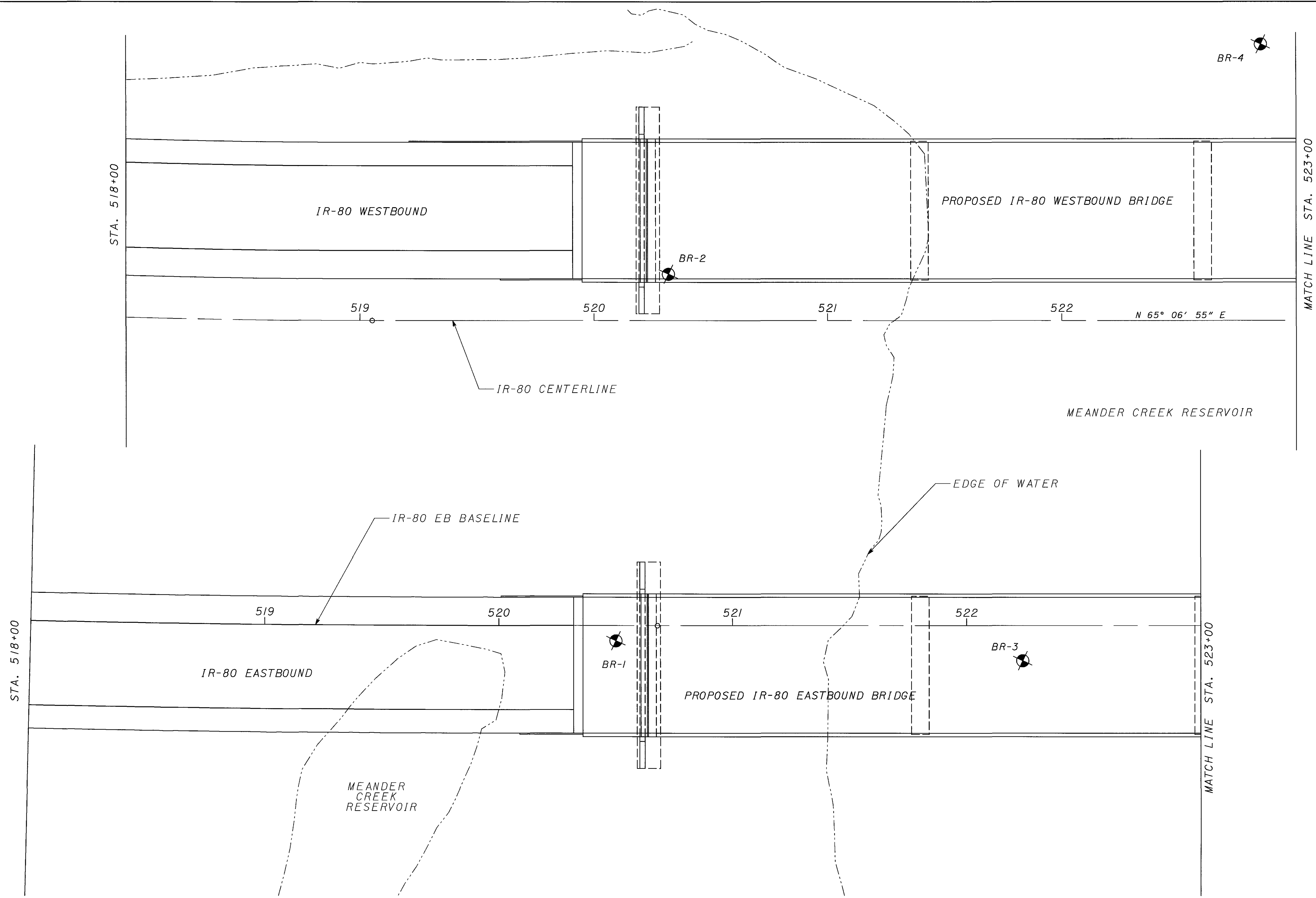
Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

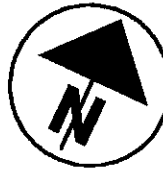
Boring No. LRB-05 Station & Offset 496+79.47, 0.46' Lt. Surface Elev. 947.38ft

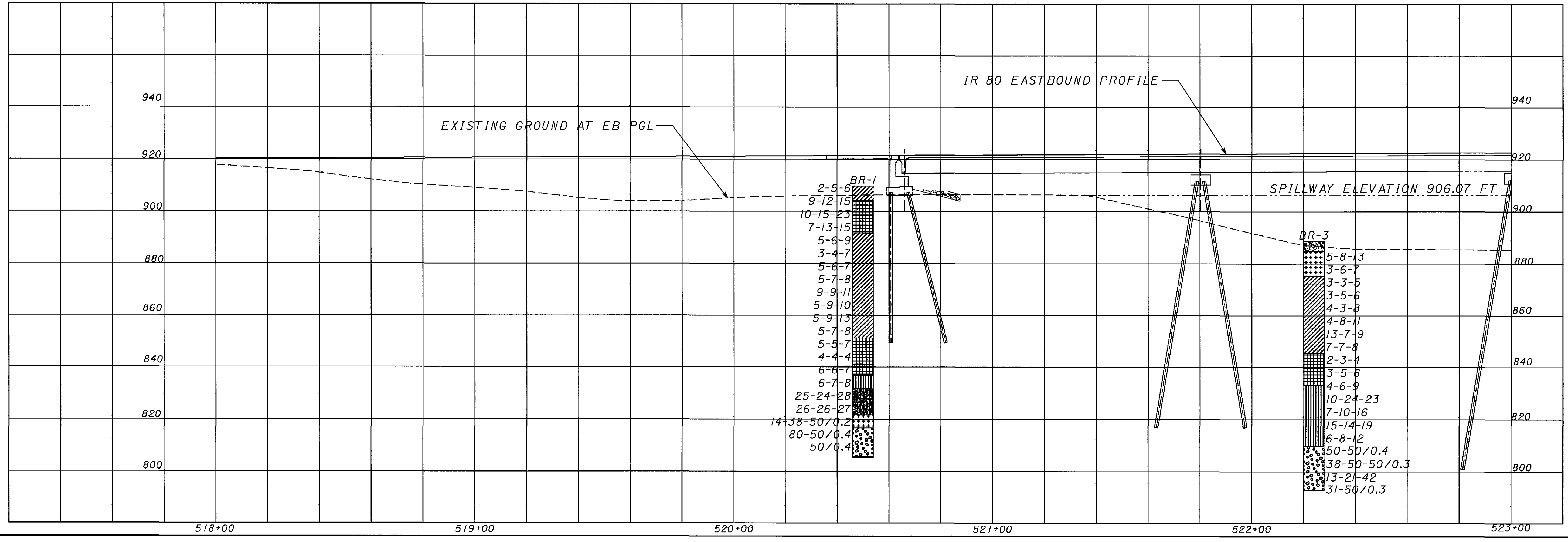
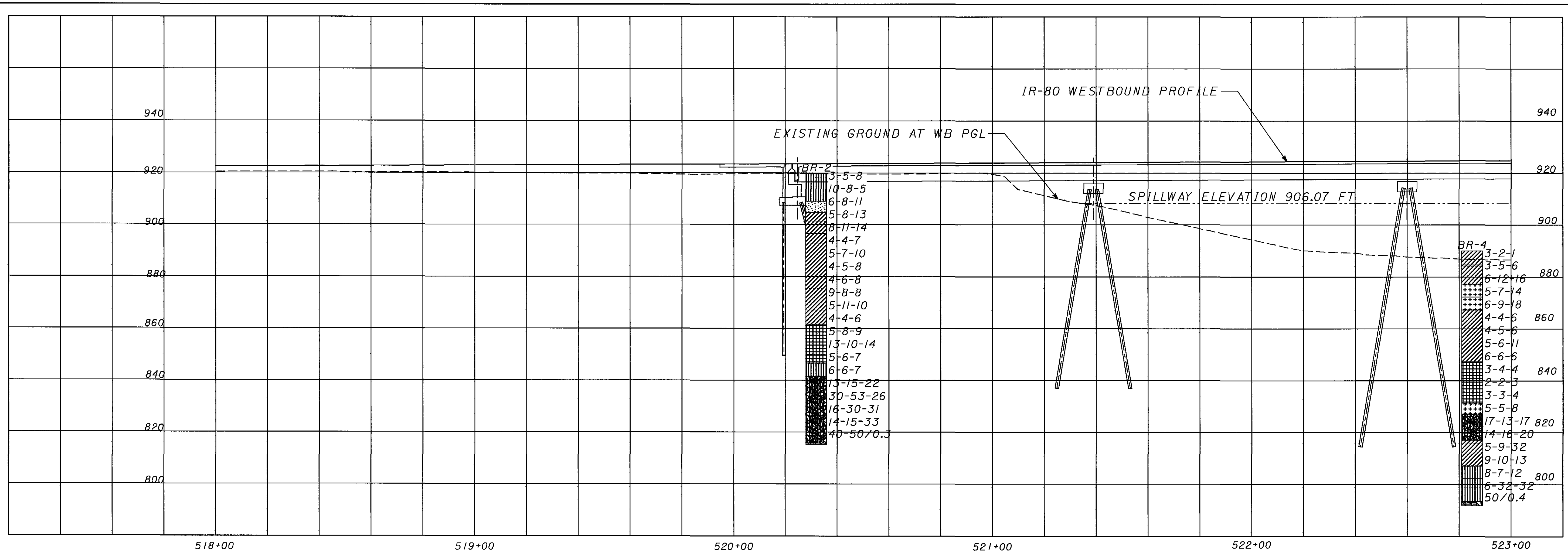
Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics						ODOT Class				
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.		
947.4	0																
946.9	0.5	6 - 9 - 17			TOPSOIL Stiff to hard, gray to brown, cohesive SANDY SILT (A-4a), some clay, little gravel and slag, moist. (embankment fill)	1	13	13	15	33	26	26	7	16	A-4a		
	2	20 - 24 - 19				2	--	--	--	--	--	--	--	23	VISUAL		
	4					3	--	--	--	--	--	--	--	21	VISUAL		
	6	6 - 8 - 7				4	--	--	--	--	--	--	--	19	VISUAL		
	8	5 - 16 - 18				5	--	--	--	--	--	--	--	22	VISUAL		
	10					6	--	--	--	--	--	--	--	17	VISUAL		
935.9	12	6 - 9 - 12			Note: Wet at 11.5 feet during drilling. Medium dense, brown to gray, non-cohesive SILT (A-4b), some sand, wet. (natural soil)	7	--	--	--	--	--	--	--	11	VISUAL		
933.9	14	6 - 7 - 13			Very stiff to stiff, gray, cohesive SILTY SAND (A-4a), some to little clay, trace gravel, moist.	8	--	--	--	--	--	--	--	23	VISUAL		
928.9	16	3 - 4 - 5				9	--	--	--	--	--	--	--	19	VISUAL		
	18	WOH/1.5				10	--	--	--	--	--	--	--	12	VISUAL		
	20				Very loose to dense, gray, non-cohesive SILT (A-4b), little sand, no to trace rock fragments, wet.	Run 1	--	--	--	--	--	--	--				
924.2	22	4 - 15 - 17					--	--	--	--	--	--	--				
923.4	24	50/0.4	4.0	6.0	Hard, gray, slightly weathered to weathered, SANDY SILTSTONE. Medium hard to hard, gray, weathered to slightly weathered SANDY SILTSTONE with thin to very thin, nearly horizontal bedding, some natural fractures mainly along bedding planes. Note: Bedrock is highly weathered from 24.5 to 24.8 feet and from 25.5 to 26.0 feet. Note: U.C. strength at 26.7 feet = 10,169 psi (high strength)	Run 1	--	--	--	--	--	--					
	26	RQD = 16%					--	--	--	--	--	--	--				
	28						--	--	--	--	--	--	--				
	30						--	--	--	--	--	--	--				
	32						--	--	--	--	--	--	--				
	34		5.0	0.0	Run 1 - Very poor condition as per RQD. Note: Some, thin (<2" thick), dark gray SHALE seams from 27.0 to 39.0 feet.	Run 2	--	--	--	--	--	--	--				
912.4	36	RQD = 48%					--	--	--	--	--	--	--				
	38						--	--	--	--	--	--	--				
908.4					Run 2 - Poor condition as per RQD. TERMINATION DEPTH = 39.0 FEET		--	--	--	--	--	--	--				

Particle Sizes: Agg -> 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)





  HORIZONTAL SCALE IN FEET	CALCULATED DATE 9/03/04	CHECKED S.S.
	DRAWN J.M.T.	REVIEWED M.W.W.
STRUCTURE FOUNDATION INVESTIGATION MAH-80-0123L/R STA 518+00 TO 523+00		
MAHONING COUNTY MAH-80-0.97		
23 / 82		



STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R STA 518+00 TO 523+00

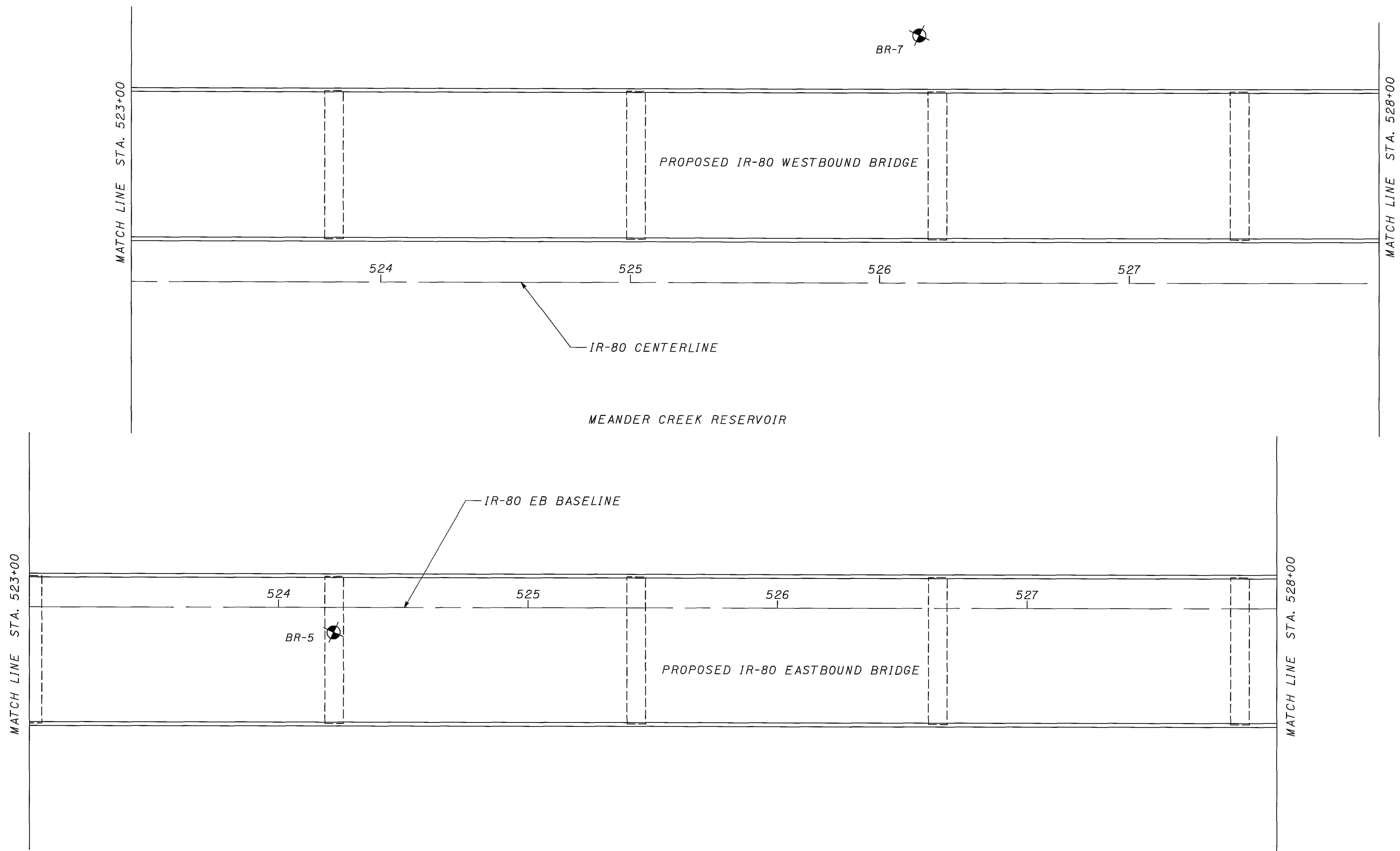
MAHONING COUNTY
MAH-80-0.97

24 / 82

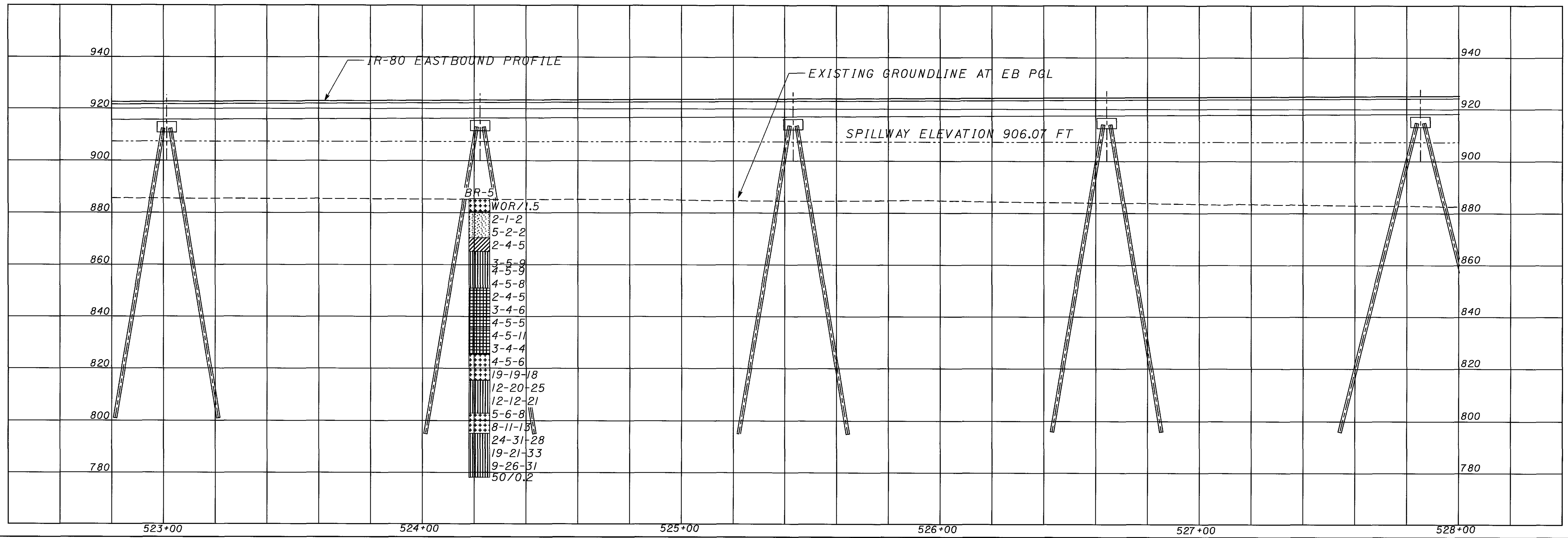
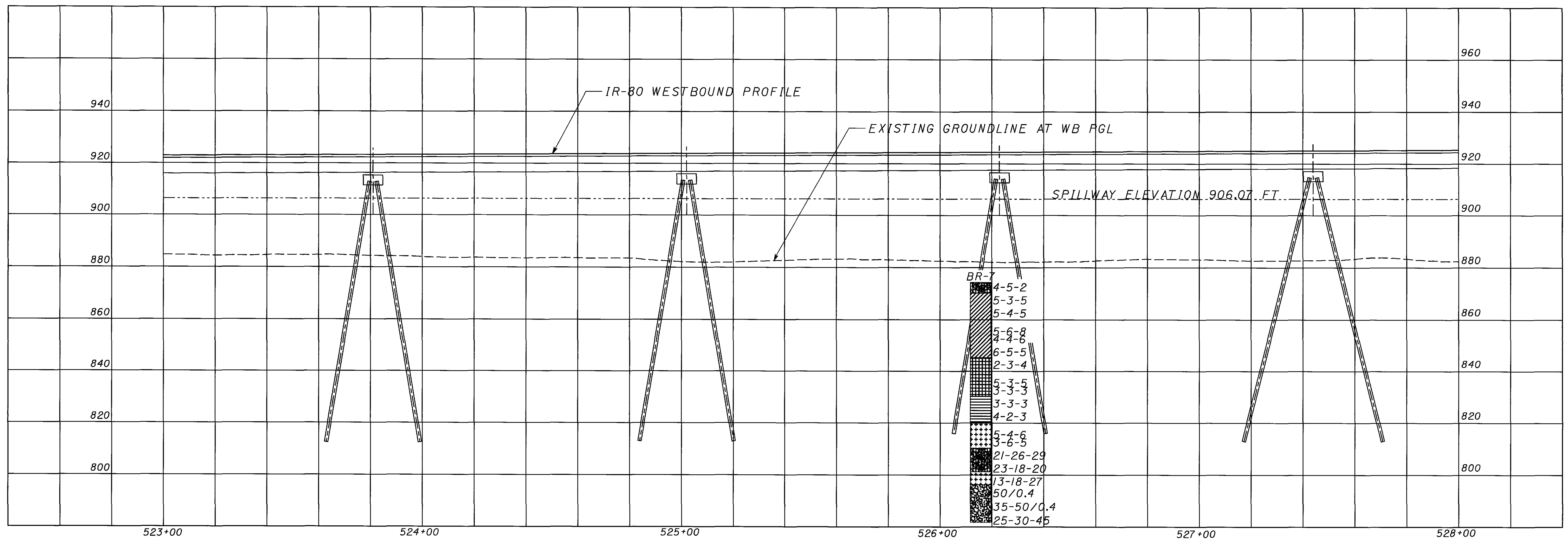
SCALE IN FEET
HORIZONTAL 200
VERTICAL 100

CHECKED S.S.
CALCULATED
DATE 9/03/04
REVIEWED M.W.W.
DRAWN J.M.T.

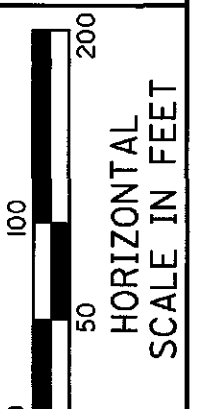
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	 HORIZONTAL SCALE IN FEET											
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<table border="1"> <tr> <td>DRAWN</td> <td>J.M.T.</td> </tr> <tr> <td>REVIEWED</td> <td>M.W.W.</td> </tr> <tr> <td>DATE</td> <td>9/03/04</td> </tr> <tr> <td>CALCULATED</td> <td></td> </tr> </table>	DRAWN	J.M.T.	REVIEWED	M.W.W.	DATE	9/03/04	CALCULATED		<table border="1"> <tr> <td>CHECKED</td> <td>S.S.</td> </tr> </table>	CHECKED	S.S.	
DRAWN	J.M.T.											
REVIEWED	M.W.W.											
DATE	9/03/04											
CALCULATED												
CHECKED	S.S.											
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MAHONING COUNTY MAH-80-0.97												
	25 / 82											



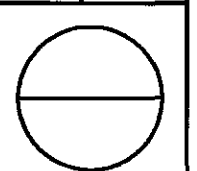
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 DRAWN J.M.T.
 CALCULATED
 CHECKED S.S.

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R STA 523+00 TO 528+00

MAHONING COUNTY
 MAH-80-0.97

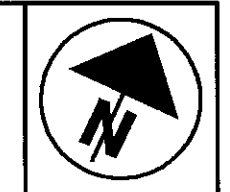
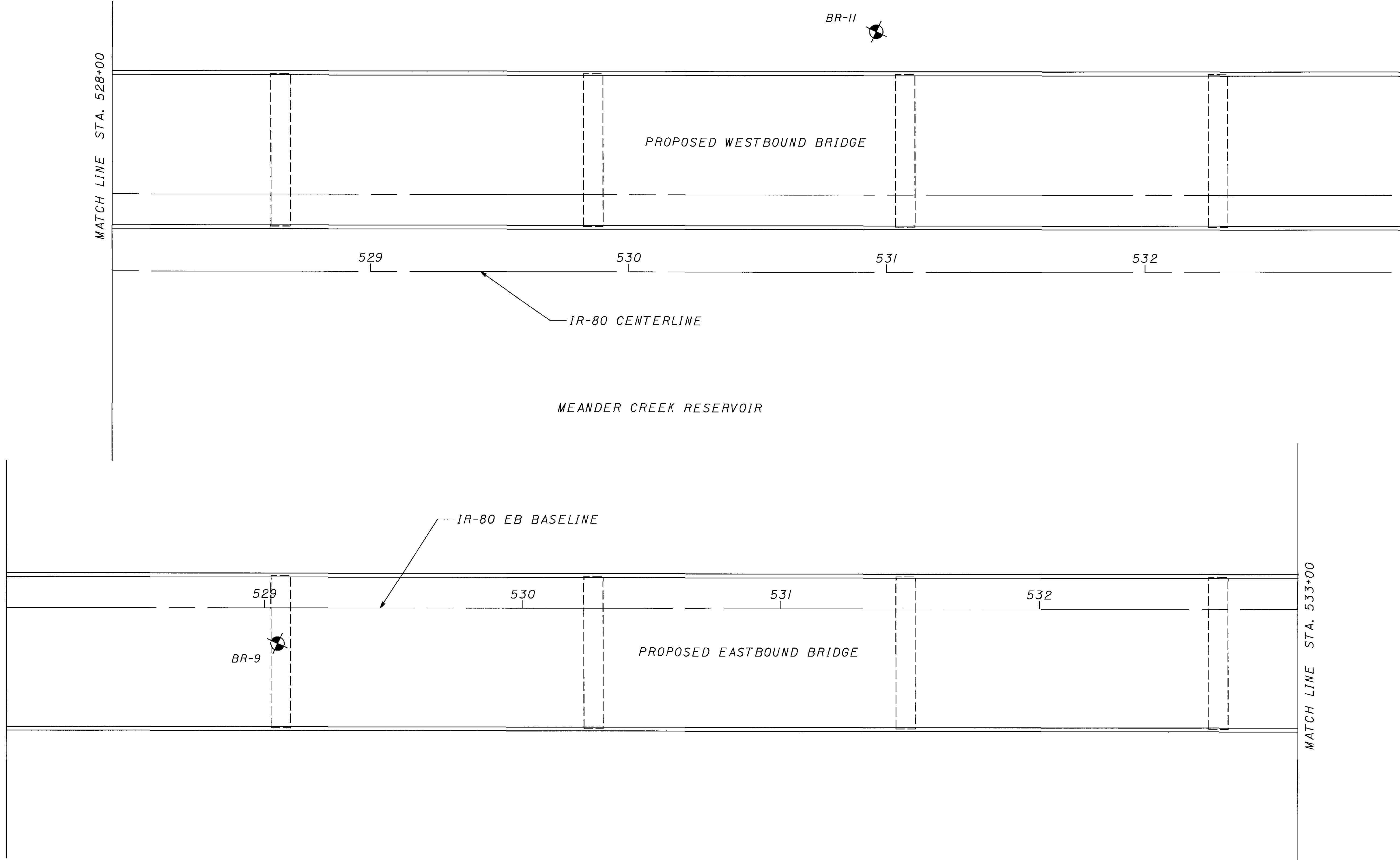


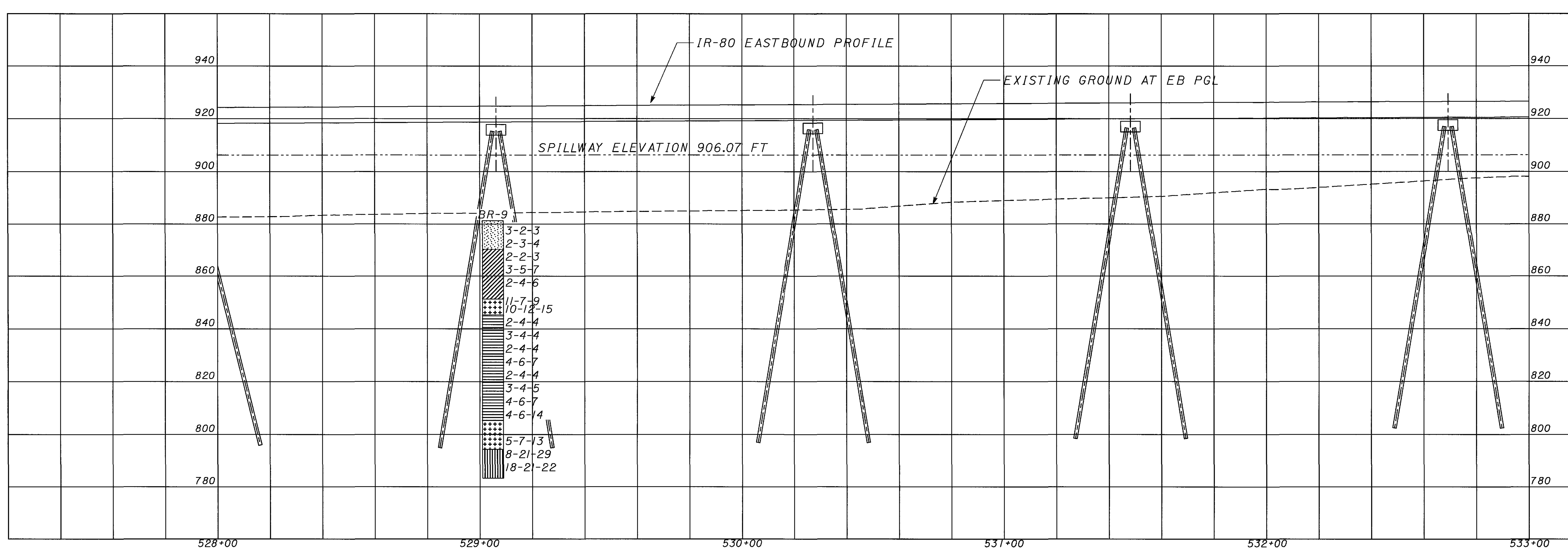
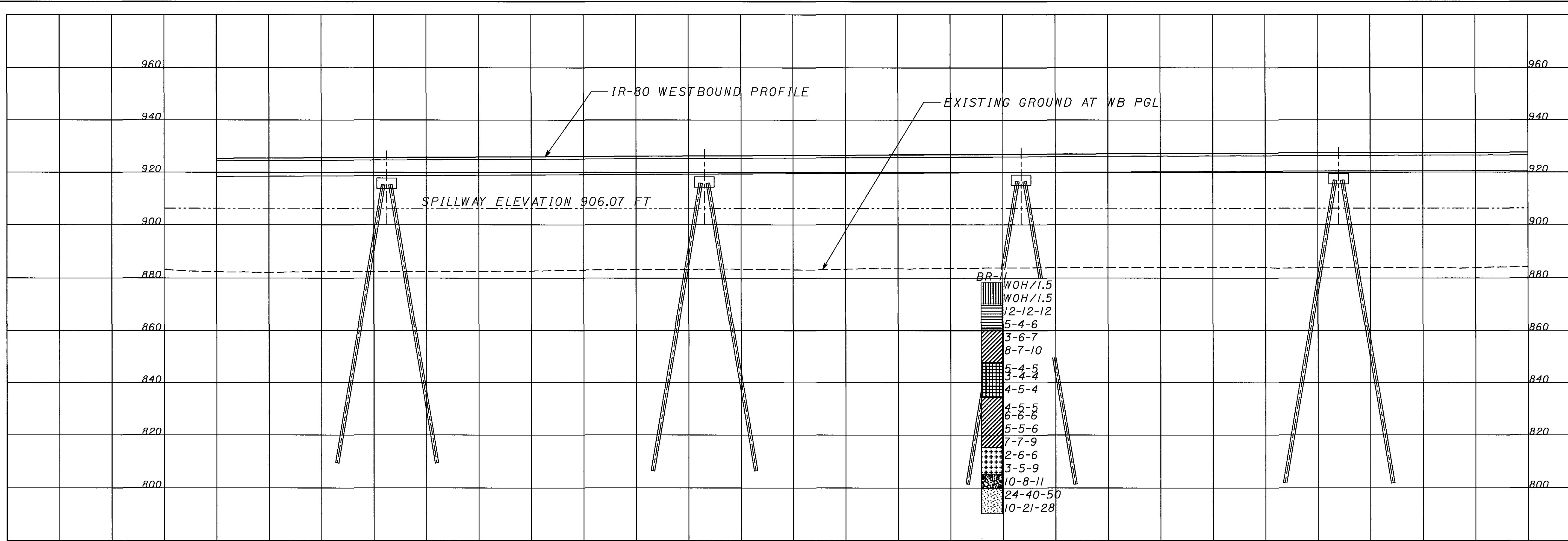
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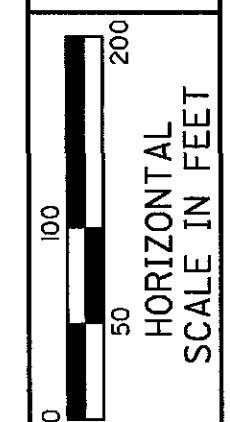
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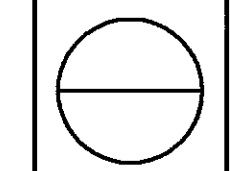
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 MAH-80-0123 L/R STA 528+00 TO 533+00

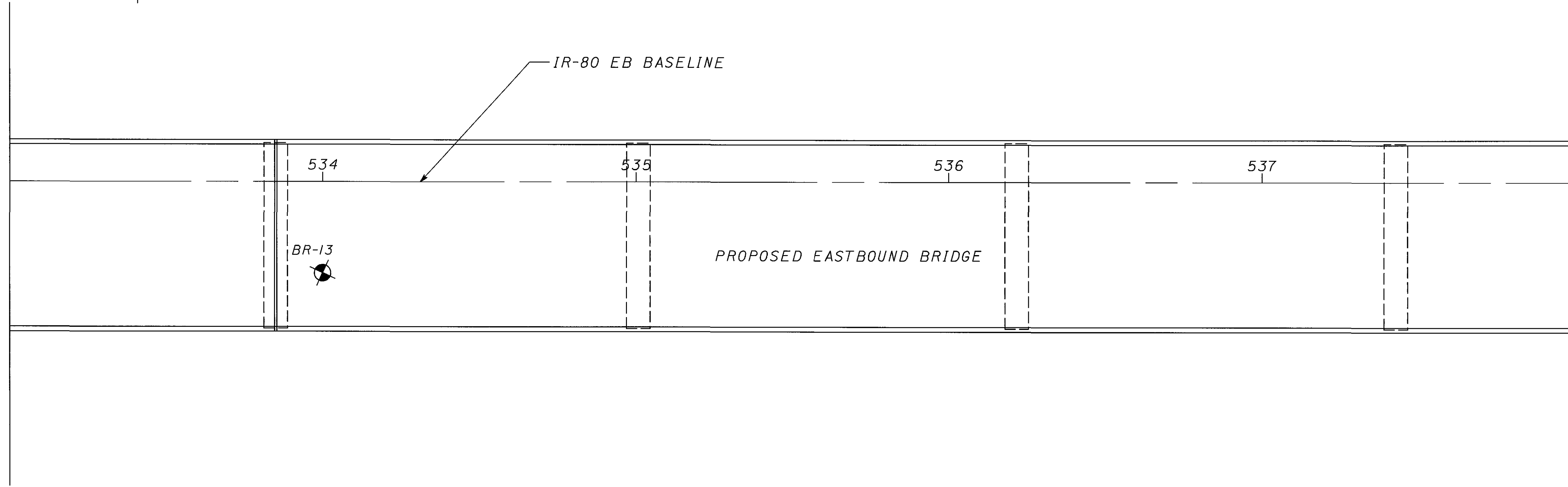
MAHONING COUNTY
 MAH-80-0.97



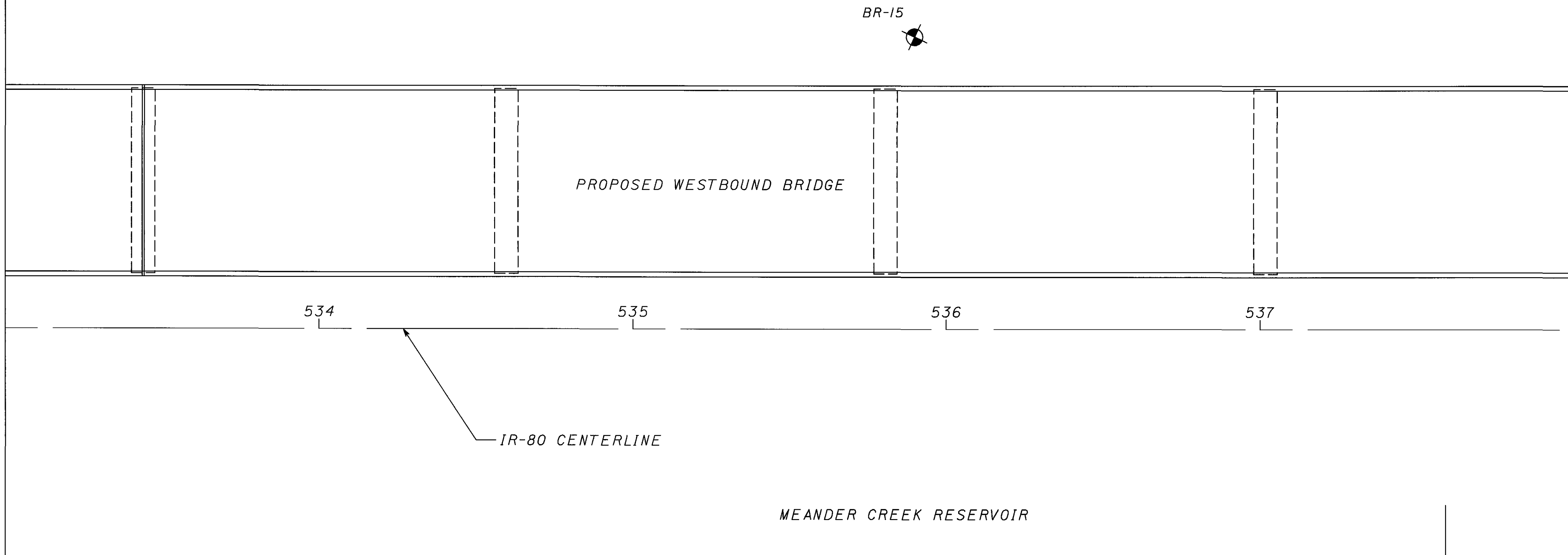
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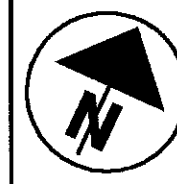
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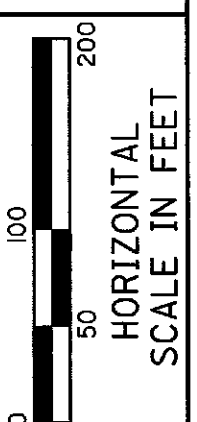
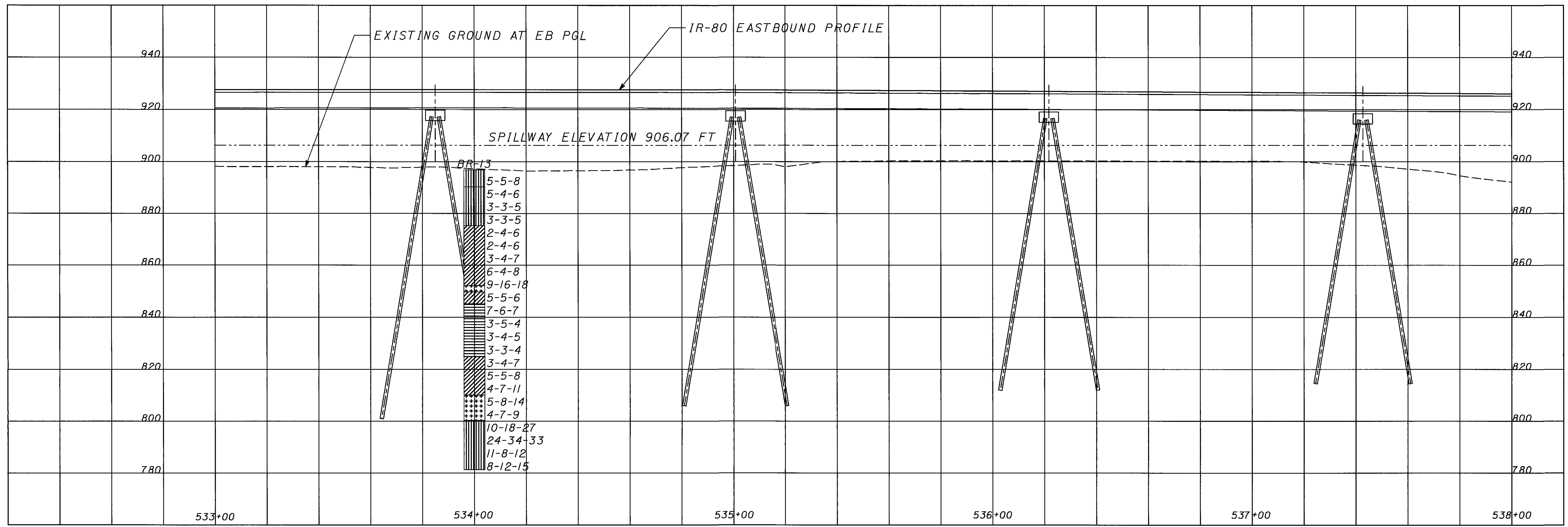
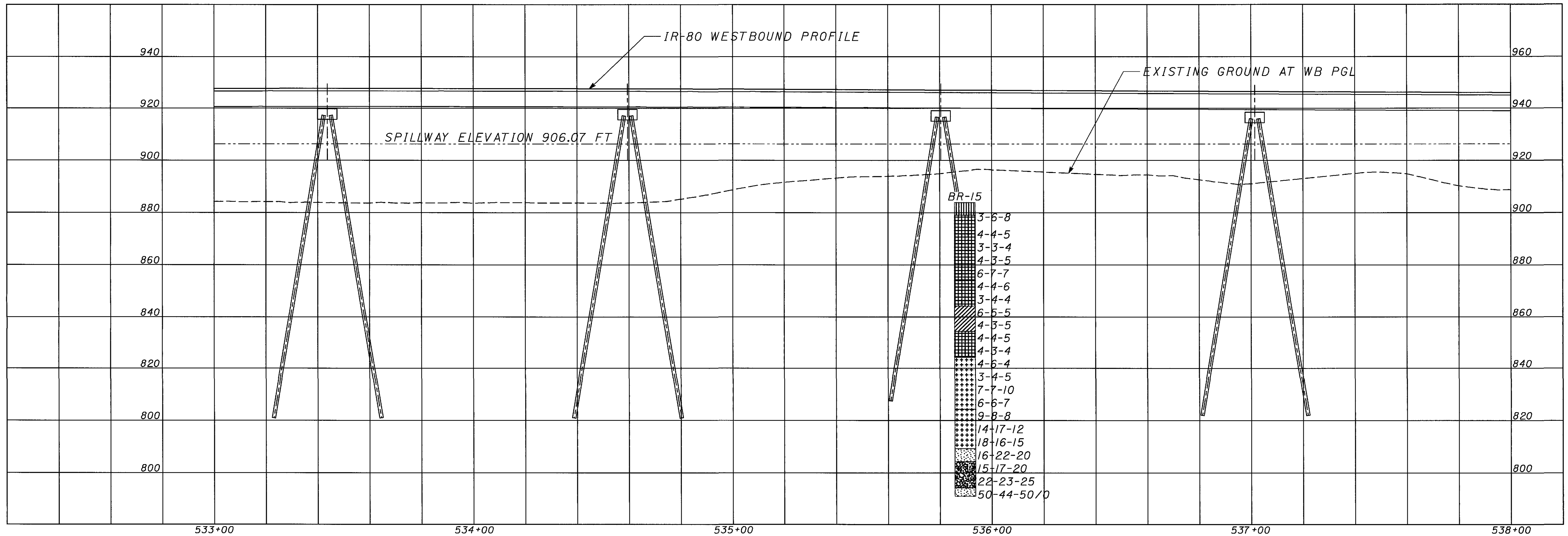


MATCH LINE STA. 538+00



MATCH LINE STA. 538+00





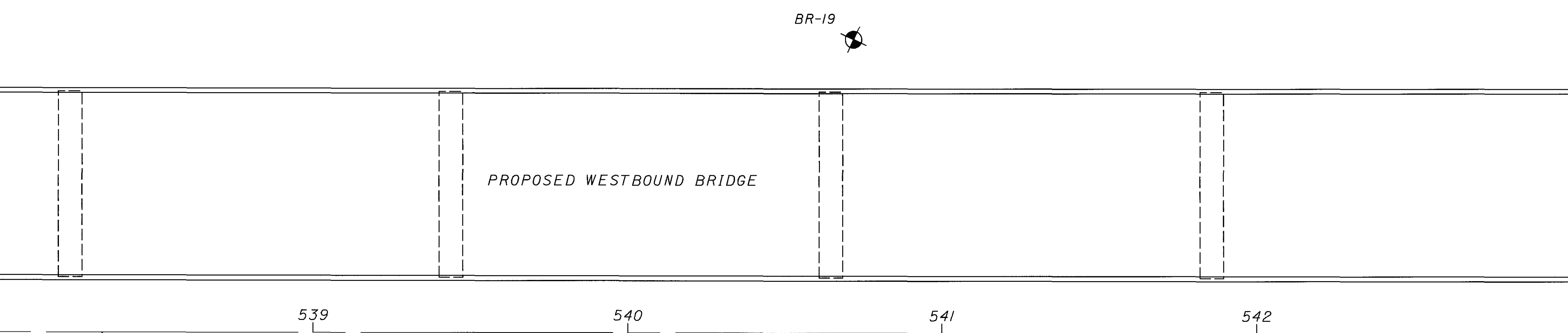
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STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R STA 533+00 TO 538+00

MAHONING COUNTY
MAH-80-0.97

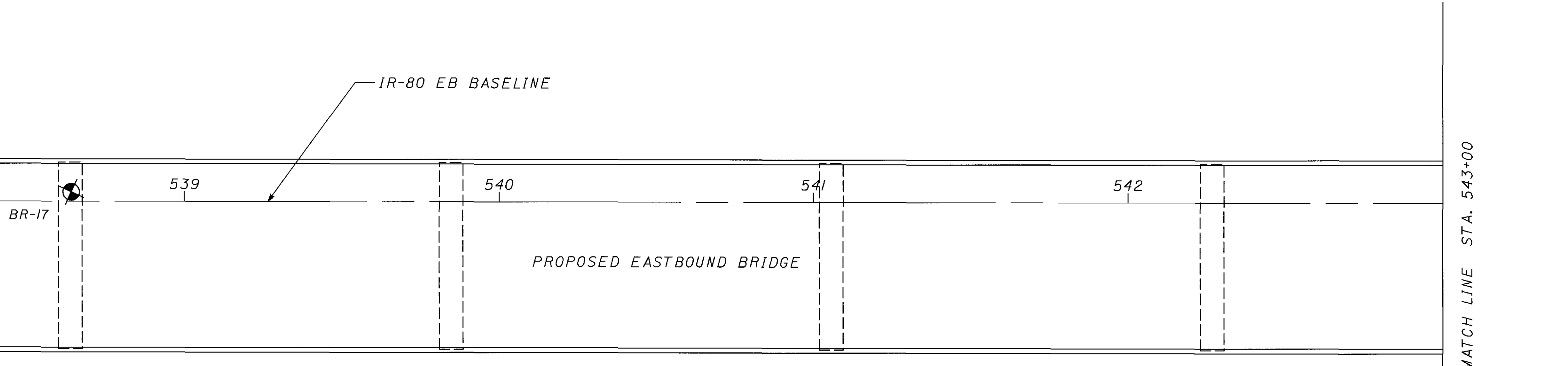
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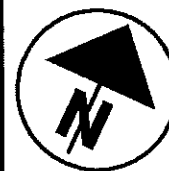


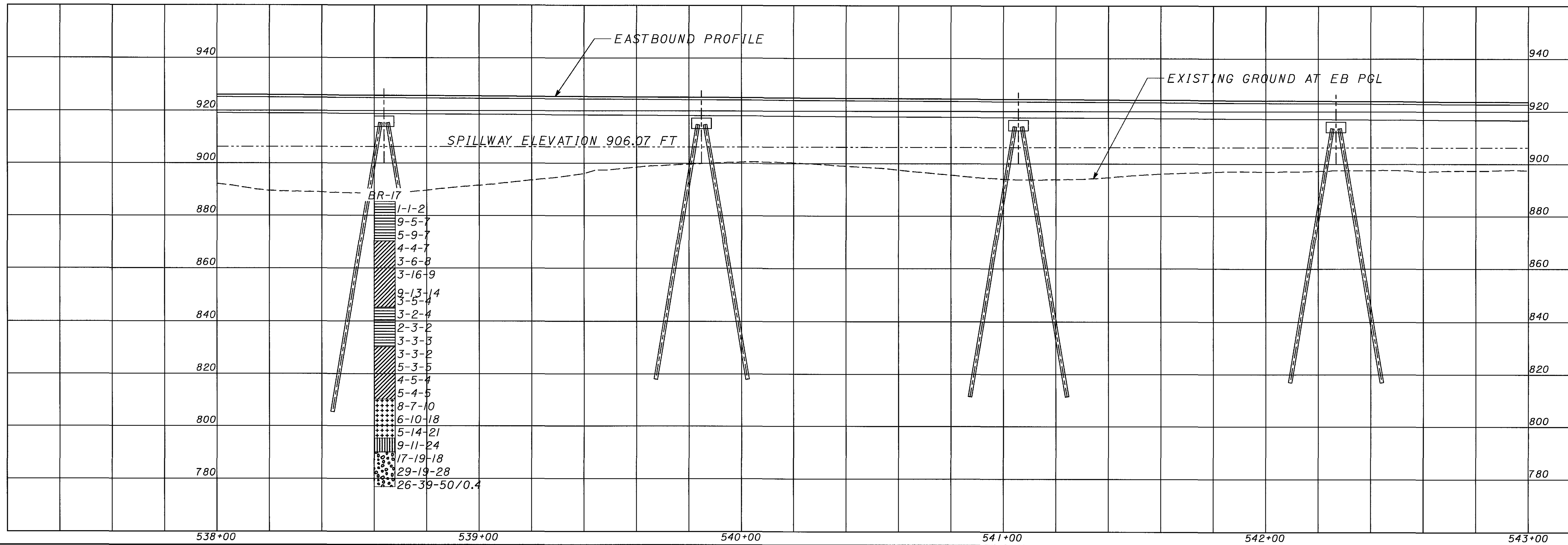
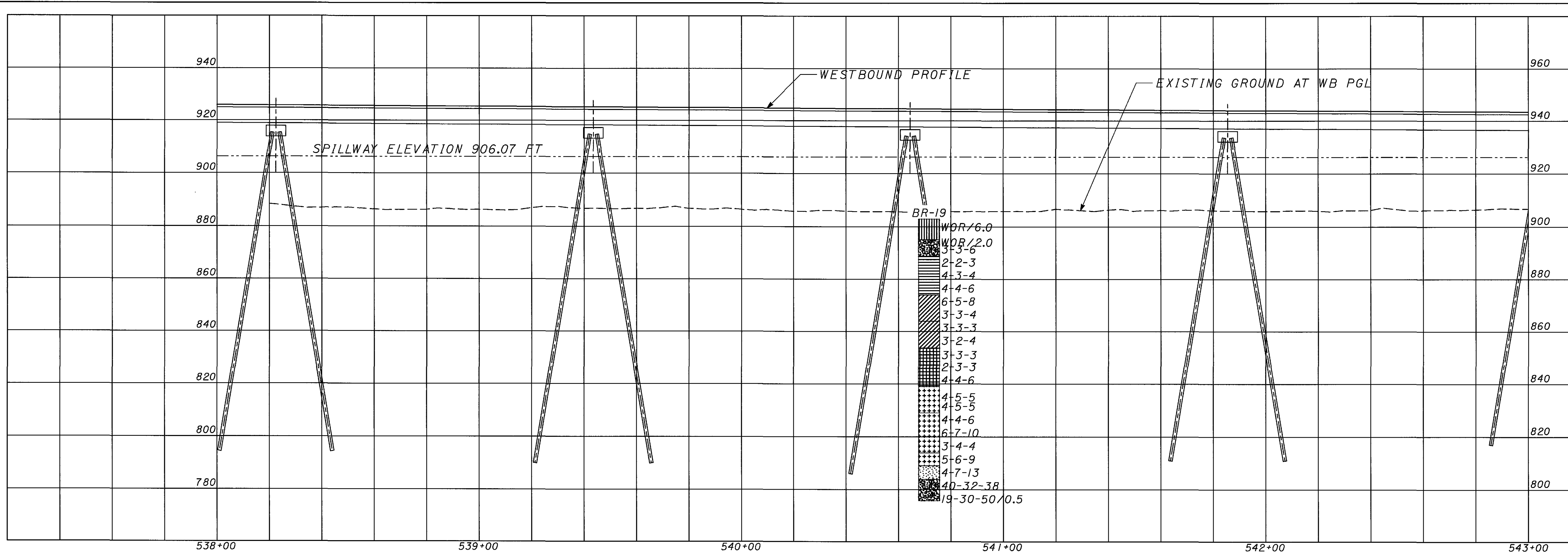
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MATCH LINE STA. 543+00





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DATE	9/03/04	
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DRAWN	J.M.T.	
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MAHONING COUNTY MAH-80-0.97		
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MATCH LINE STA. 543+00

MATCH LINE STA. 543+00

BR-21

544

545

546

547

MEANDER CREEK RESERVOIR

EDGE OF WATER

PROPOSED EASTBOUND BRIDGE

IR-80 EB BASELINE

BR-23

STA. 548+00

PROPOSED WESTBOUND BRIDGE

544

545

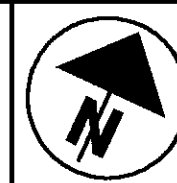
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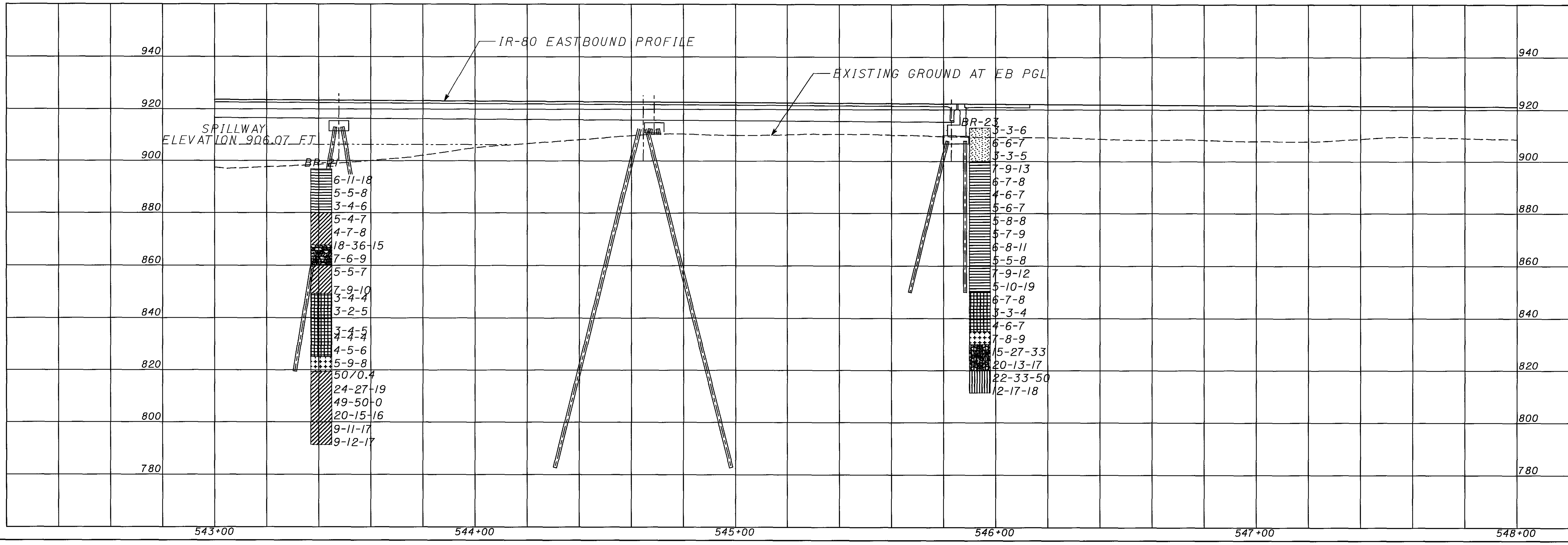
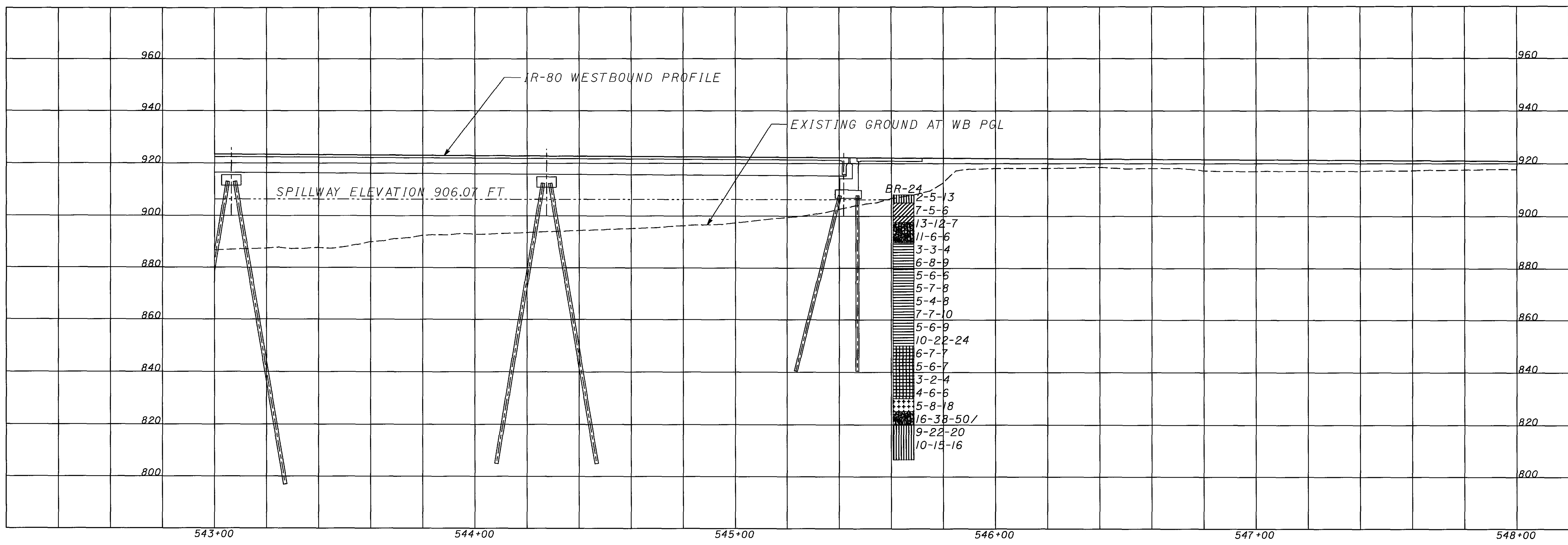
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STA. 548+00



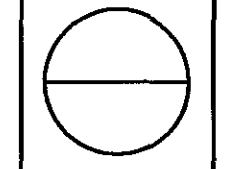
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DATE	
9/03/04	
DRAWN	
J.M.T.	

STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R STA 543+00 TO 548+00

MAHONING COUNTY
MAH-80-0:97



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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																	
Boring No. BR-1					Boring Location: 520+50, 6.5 ft RT, B.L. EB IR-80					Elev. Top of Hole: 909.7 ft							
Total Depth of Hole: 104.5 ft					Drilling Co: L.G. Helager, Inc.					Drill Rig: HH-250 #225							
Date Started: 9/18/03					Hollow-Stem: n/a					Casing Size: 3.25-inch ID							
Date Finished: 9/23/03					Sampler Type: 2-inch Split-Spoon					Drilling Fluid: Water							
					Inspector: Stephen Slomski												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics									
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.	ODOT Class.	
909.7	0	2-5-6	1.0	0.5	0.3 Topsoil Light brown SILT & CLAY; moist		S1	5	6	6	35	48	35	13	20	A-6a	
904.7 904.2	5	9-12-15	0.8	0.7	Grey CLAY; light brown mottling; moist	qh=4.5	S2										
899.7	10	10-15-23	1.2	0.3	greyish-brown	qh>4.5	S3	1	2	4	31	63	48	23	18	A-7-6	
894.7	15	7-13-15	0.7	0.8		qh>4.5	S4										
891.7																	
889.7	20	5-6-9	0.0	1.5	Grey SILT & CLAY; moist		S5									V: A-6a	
884.7	25	3-4-7	1.2	0.3		qh=1.25	S6										
879.7	30	5-6-7	0.8	0.7			S7										
874.7	35	5-7-8	1.5	0			S8										
869.7	40	9-9-11	1.5	0		qh=1.6	S9										
864.7	45	5-9-10	1.5	0		qh=1.3	S10										
859.7	50	5-9-13	1.5	0	sandier	qh=1.8	S11										

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.

Boring Coordinates
 N 531,181.7
 E 2,433,178.5

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																	
Boring No. BR-1					Boring Location: 520+50, 6.5 ft RT, B.L. EB IR-80					Elev. Top of Hole: 909.7 ft							
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics									
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.	ODOT Class.	
854.7	55	5-7-8	1.5	0			S12										
851.2																	
849.7	60	5-5-7	1.5	0	Grey CLAY varved with silt; moist	qh=0.90	S13										
844.7	65	4-4-4	1.5	0		qh=0.75	S14	0	0	0	14	86	51	24	36	A-7-6	
839.7	70	6-6-7	1.5	0		qh=0.75	S15										
836.7																	
834.7	75	6-7-8	1.5	0	Grey SANDY SILT; moist		S16	23	6	8	39	24	25	7	17	A-4a	
831.7																	
829.7	80	25-24-28	0.8	0.7	Grey GRAVEL with SAND & SILT; wet		S17	41	15	15	21	8	NP		8	A-2-4	
824.7	85	26-26-27	1.3	0.2			S18										
821.7																	
819.7	90	14-38-50/ .2	0.9	0.3	Grey SILT; wet		S19	1	1	7	68	23	NP		24	A-4b	
816.7																	
814.7	95	80-50/.4	0.5	0.4	Grey GRAVEL ROCK FRAGMENTS; wet		S20									V: A-1-a	
809.7	100	50/.4	0.1	0.3			S21										
805.7 805.2	105				Top of Rock Cored 0.5 ft Grey SHALE Bottom of Boring = 104.5 ft	Casing refusal											
	110																
	115																

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. BR-2		Boring Location: 520+32, 20 ft LT, C.L. IR-80					Elev. Top of Hole: 917.7 ft											
Total Depth of Hole: 104.5 ft		Drilling Co: L.G. Helager, Inc.					Drill Rig: HH-250 #225											
Date Started: 9/24/03		Hollow-Stem: n/a					Casing Size: 3.25-inch ID											
Date Finished: 9/24/03		Sampler Type: 2-inch Split-Spoon					Drilling Fluid: Water											
							Driller: Floyd Himes											
							Inspector: Stephen Slomski											
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
917.7	0	3-5-8	0.4	1.1	0.4 Gravelly Topsoil		S1											
912.7	5	10-8-5	0.1	1.4	Fill: Mottled grey & brown SANDY SILT; trace sandstone fragments		S2											V: A-4a
907.7	10	6-8-11	0.9	0.6	Fill: Light brown COARSE & FINE SAND; trace fines	qh=2.8	S3											V: A-3a
902.7	15	5-8-13	0.8	0.7	Grey SILT & CLAY; moist (grey clay on spoon)	qh=4.0	S4											V: A-6a
901.2			1.3	0.35		qh=4.0	ST-1	0	1	1	29	69	36	14	23			
897.7	20	8-11-14	0.0	1.5			S5											
894.5																		
892.7	25	4-4-7	0.0	1.5	Grey SILT & CLAY; moist (grey clay on spoon)		S6											
887.7	30	5-7-10	1.3	0.2		qh=1.5	S7											
882.7	35	4-5-8	1.0	0.5		qh=1.4	S8											
877.7	40	4-6-8	1.3	0.2		qh=1.8	S9											
872.7	45	9-8-8	1.1	0.4		qh=1.6	S10											
871.2			1.7	0		qh=2.25	ST-2	2	3	5	36	54	33	14	22			A-6a
867.7	50	5-11-10	0.5	1		qh=2.6	S11											

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Caved at 16 feet at completion.

Boring Coordinates
N 531,333.5
E 2,433,132.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. BR-2		Boring Location: 520+32, 20 ft LT, C.L. IR-80					Elev. Top of Hole: 917.7 ft											
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
862.7	55	4-4-6	1.5	0		qh=1.35	S12											
859.5					Grey CLAY varved with silt; moist	qh=2.5	S13											V: A-7-6
857.7	60	5-8-9	0.7	0.8														
852.7	65	13-10-14	0.3	1.2		qh=1.4	S14											
847.7	70	5-6-7	0.7	0.8		qh=0.90	S15											
844.5																		
842.7	75	6-6-7	0.3	1.2	Grey SANDY SILT; wet		S16											V: A-4a
839.5																		
837.7	80	13-15-22	0.1	1.4	Grey GRAVEL with SAND & SILT; wet		S17											V: A-2-4
832.7	85	30-53-26	1.0	0.5			S18											
827.7	90	16-30-31	0.7	0.8		qh>4.5	S19											
822.7	95	14-15-33	0.7	0.8		qh=1.5	S20											
817.7	100	40-50/3	0.0	0.8			S21											
813.7	105				Top of Rock Cored 0.5 ft Grey SHALE Bottom of Boring = 104.5 ft	Casing refusal												
115																		

STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081

DATE: 9/03/04
CHECKED: S.S.

REVISED: M.W.W.
DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-3		Boring Location: 522*24, 15 ft RT, B.L. EB IR-80					Elev. Top of Hole: 888.7 ft													
Total Depth of Hole: 95.8 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25															
Date Started: 9/17/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Lee Cook														
Date Finished: 9/17/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water		Inspector: Joe Troxell													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
888.7	0				Soft Muck															
884.8 883.7	5	5-8-13	0.7	0.8	Mottled brown & grey SILT; moist	qh=3.2	S1													
878.7	10	3-6-7	0.7	0.8		qh=2.0	S2	2	1	2	53	42	28	9	21					A-4b
875.3 873.7	15	3-3-5	1.2	0.3	Grey SILT & CLAY; moist	qh=0.5	S3	1	3	6	40	50	33	14	20					A-6a
868.7	20	3-5-6	0.1	1.4			S4													
863.7	25	4-3-8	0.1	1.4			S5													
858.7	30	4-8-11	0.5	1			S6													
853.7	35	13-7-9	0.1	1.4			S7													
848.7	40	7-7-8	0.0	1.5	(grey clay on spoon)		S8													
845.4 843.7	45	2-3-4	1.3	0.2	Grey CLAY varved with silt; moist	qh=0.25	S9	0	0	0	10	90	55	30	38					A-7-6
838.7	50	3-5-6	0.7	0.8		qh<0.25	S10													

"V": " denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 18.7 ft.

Boring Coordinates
 N 531,247.1
 E 2,433,339.7

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-3		Boring Location: 522*24, 15 ft RT, B.L. EB IR-80					Elev. Top of Hole: 888.7 ft													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
833.7 833.1	55	4-6-9	1.1	0.4	Grey SANDY SILT; moist		S11													
828.7	60	10-24-23	0.7	0.8		qh=3.0	S12													
823.7	65	7-10-16	0.2	1.3			S13													
818.7	70	15-14-19	0.2	1.3			S14													
813.7	75	6-8-12	0.7	0.8		qh=0.75	S15	0	1	5	45	49	30	10	23					A-4a
809.8 808.7	80	50-50/.4	0.1	0.8	Grey GRAVEL & STONE FRAGMENTS; wet		S16													
803.7	85	38-50-50/.3	0.2	1.1			S17													
798.7	90	13-21-42	0.5	1			S18													
793.7 792.9	95	31-50/.3	0.5	0.3	Sandstone Fragments		S19	73	10	6	9	2	NP		8					A-1-a
					Bottom of Boring = 95.8 ft															

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-4		Boring Location: 522*85, 118 ft LT, C.L. 1R-80					Elev. Top of Hole: 888.0 ft									
Total Depth of Hole: 98.2 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIETRICH D25											
Date Started: 9/30/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID			Driller: Lee Cook									
Date Finished: 9/30/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Joe Troxell								
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
888.0	0	3-2-1	0.4	1.1	Grey SILT & CLAY; moist	qh<0.25	S1	3	3	5	28	61	35	16	21	A-6a
883.3	5	3-5-6	0.8	0.7		qh=1.0	S2	0	1	3	33	63	37	15	21	
882.6																
878.3	10	6-12-16	0.6	0.9	Brown SILT & CLAY; moist		S3									A-6a
875.3																
873.3	15	5-7-14	0.1	1.4	Grey SILT; moist		S4									V: A-4b
870.3																
868.3	20	6-9-18	0.8	0.7	Brown SILT; moist	qh=2.5	S5	4	2	6	57	31	27	10	20	A-4b
865.3																
863.3	25	4-4-6	0.1	1.4	Grey SILT & CLAY; moist		S6									V: A-6a
858.3	30	4-5-6	0.1	1.4			S7									
853.3	35	5-6-11	0.1	1.4			S8									
848.3	40	6-6-6	0.1	1.4			S9									
845.3																
843.3	45	3-4-4	1.5	0	Grey CLAY varved with silt; moist	qh=0.25	S10									V: A-7-6
838.3	50	2-2-3	1.5	0		qh=0.38	S11									

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 19.3 ft.

Boring Coordinates
 N 531,528.3
 E 2,433,321.6

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-4		Boring Location: 522*85, 118 ft LT, C.L. 1R-80					Elev. Top of Hole: 888.0 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
833.3	55	3-3-4	1.5	0		qh=0.25	S12									
829.3	60	5-5-8	1.3	0.2	Grey SILT; moist	qh<0.25	S13									V: A-4b
828.3																
825.0																
823.3	65	17-13-17	0.3	1.2	Grey GRAVEL WITH SAND & SILT; moist		S14									V: A-2-4
818.3	70	14-16-20	0.1	1.4			S15									
815.0																
813.3	75	5-9-32	1.3	0.2	Grey SILT & CLAY; moist	qh=1.3	S16	0	0	4	48	48	29	12	25	A-6a
808.3	80	9-10-13	0.1	1.4			S17									
805.0																
803.3	85	8-7-12	0.9	0.6	Grey SANDY SILT; moist	qh=1.5	S18	6	6	11	46	31	24	7	15	A-4a
800.3																
798.3	90	6-32-32	1.3	0.2	Grey SANDY SILT; moist; little gravel		S19	31	14	17	28	10	16	1	10	A-4a
793.3	95	507.4	0.2	0.2	Siltstone fragments		S20									
791.5					Grey CLAYSTONE in bottom of casing	Casing refusal										
789.8					Bottom of Boring = 98.2 ft											

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																					
Boring No. BR-5		Boring Location: 524+22, 10 ft RT, B.L. EB IR-80						Elev. Top of Hole: 885.3 ft													
Total Depth of Hole: 107.2 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25																
Date Started: 9/18/03		Hollow-Stem: n/a			Casing Size: 3.25-inch ID			Driller: Lee Cook													
Date Finished: 9/18/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Joe Troxell													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.					
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.						
885.3	0				Soft Muck: Grey SILT; wet																
883.3		WOR/1.5	0.8	0.7			S1													V: A-4b	
880.3	5																				
878.3		2-1-2	1.0	0.5	Brown to reddish-brown COARSE & FINE SAND; wet		S2	0	1	83	10	6	NP	21							A-3a
873.3		5-2-2	0.1	1.4			S3														
870.3	15																				
868.3		2-4-5	0.2	1.3	Grey SILT & CLAY; moist		S4														V: A-6a
865.0	20																				
863.3				1.7	1.0	Grey SANDY SILT; moist	qh=1.0	ST-1	3	3	5	36	53	24	6	21					A-4a
861.3	25	3-5-9	0.0	1.5			S5														
858.3		4-5-9	0.1	1.4			S6														
853.3	30																				
850.8	35																				
848.3		2-4-5	1.1	0.4	Grey CLAY varved with silt; moist		S8														V: A-7-6
843.3	40																				
843.3		3-4-6	1.5	0			S9														qh=0.50
838.3	45																				
838.3		4-5-5	1.5	0			S10														qh<0.25
835.3	50																				
833.3		4-5-11	1.5	0	Grey CLAY; moist		S11	0	0	0	13	87	46	21	34						A-7-6

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 22.1 ft.

Boring Coordinates
 N 531,334.9
 E 2,433,517.6

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																						
Boring No. BR-5		Boring Location: 524+22, 10 ft RT, B.L. EB IR-80						Elev. Top of Hole: 885.3 ft														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.						
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.							
828.3	55	3-4-4	1.5	0			S12															
825.3	60																					
823.3		4-5-6	1.5	0	Grey SILT; wet	qh=0.75	S13	1	4	9	50	36	25	6	24						A-4b	
819.8	65																					
818.3		19-19-18	0.1	1.4			S14															
815.3	70																					
813.3		12-20-25	0.7	0.8	Grey SANDY SILT; moist	qh>4.5	S15	32	10	11	32	15	21	6	9						A-4a	
808.3	75																					
808.3		12-12-21	0.3	1.2			S16															
803.3	80																					
802.8		5-6-8	1.1	0.4	Grey SILT; wet	qh=2.0	S17															
798.3	85																					
798.3		8-11-13	1.4	0.1			S18	0	0	1	66	27	27	7	23							
795.0	90																					
793.3		24-31-28	0.5	1	Grey SANDY SILT; moist; some gravel		S19															
788.3	95																					
788.3		19-21-33	0.9	0.6			S20	44	12	6	22	16	23	7	9						A-4a	
783.3	100																					
783.3		9-26-31	0.2	1.3			S21															
778.3	105																					
778.1		507-2	0.0	0.2	Bottom of Boring = 107.2 ft	Casing refusal	S22															

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081
 DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.
 STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR
 MAHONG COUNTY
 MAH-80-0.97
 39/82

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-7		Boring Location: 526+16, 99 ft LT, C.L. IR-80					Elev. Top of Hole: 874.3 ft									
Total Depth of Hole: 92.5 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25											
Date Started: 10/01/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Lee Cook										
Date Finished: 10/01/03		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joe Troxell										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
874.3	0				Grey GRAVEL WITH SAND & SILT; wet		S1	40	13	21	20	6	NP	13	A-2-4	
873.3	4-5-2	0.7	0.8													
870.3	5				Grey SILT & CLAY; moist		S2									
868.3	5-3-5	0.1	1.4													
863.3	10						S3									
863.3	5-4-5	0.1	1.4													
858.3	15					qt=0.50 tsf qh=0.25 qh=0.38	ST-1	3	4	6	35	52	31	13	21	A-6a
856.3	5-6-8	0.3	1.2													
853.3	20						S4									
853.3	4-4-6	0.1	1.4													
848.3	25						S5									
848.3	6-5-5	0.1	1.4													
845.3	30				Grey CLAY varved with silt; moist	qh=0.25	S7									
843.3	2-3-4	1.5	0													
838.3	35					qh=0.25 qt=3.0 tsf qh<0.25	ST-2	0	0	0	24	76	42	21	34	A-7-6
836.3	5-3-5	1.5	0													
833.3	40					qh<0.25	S8									
833.3	3-3-3	1.5	0													
830.3	45				Grey SILTY CLAY; moist	qh=0.25	S9									
828.3	3-3-3	1.5	0													
823.3	50					qh=0.25	S10	0	0	1	34	65	38	18	28	A-6b
823.3	4-2-3	1.5	0													
820.3	55						S11									

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. "qt" = torvane undrained shear strength in tons/SF.
Reservoir at EL.+907.3; Water depth = 33.0 ft.
Boring Coordinates
N 531,651.2
E 2,433,629.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-7		Boring Location: 526+16, 99 ft LT, C.L. IR-80					Elev. Top of Hole: 874.3 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
818.3	55			0.0	Grey SILT; wet	qh<0.25	ST-3								A-4b	
816.3	5-4-6	1.5	0													
813.3	60			1.5		qh=0.25	S13									
813.3	3-6-5	1.5	0													
810.3	65				Grey GRAVEL WITH SAND & SILT; moist		S14	36	15	22	19	8	16	4	9	A-2-4
808.3	21-26-29	1.3	0.2													
805.3	70						S15									
803.3	23-18-20	0.2	1.3													
801.3	75				Grey SILT; wet	qh=1.5	S16	0	0	1	86	13	NP	24	A-4b	
798.3	13-18-27	1.1	0.4													
796.3	80				GRAVEL WITH SAND		S17								V: A-1-b	
793.3	50/4	0.0	0.4													
788.3	85			0.0			S18									
788.3	35-50/4	0.0	0.9													
783.3	90			0.0			S19									
783.3	25-30-45	0.0	1.5													
781.8					Bottom of Boring = 92.5 ft											
	95															
	100															
	105															
	110															
	115															

STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081

DATE: 9/03/04
CHECKED: S.S.
REVISED: M.W.W.
DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. BR-9		Boring Location: 529+05, 14 ft RT, B.L. EB IR-80				Elev. Top of Hole: 881.3 ft													
Total Depth of Hole: 98.0 ft		Drilling Co: L.G. Hetager, Inc.		Drill Rig: DIEDRICH D25															
Date Started: 9/22/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Lee Cook													
Date Finished: 9/23/03		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joe Troxell													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.			
881.3	0																		
878.3	3	2-3	1.5	0	Grey-brown COARSE & FINE SAND; wet; trace organics		S1												V: A-3a
873.3	5				(grey clay & sand on spoon)		S2												
870.3	10	2-3-4	0.0	1.5															
868.3	15	2-2-3	0.1	1.4	Grey SILT & CLAY; moist		S3												
863.3	20	3-5-7	0.1	1.4			S4												
858.3	25	2-4-6	0.1	1.4			S5												
853.3	30		2.0	0		qh=0.5	ST-1	5	5	6	30	54	33	15	20				A-6a
851.3	30	11-7-9	0.6	0.9	Grey SANDY SILT; moist	qh=3.0	S6												
848.3	35	10-12-15	0.9	0.6		qh=1.5	S7	6	7	13	57	17	19	2	15				A-4b
845.3	40																		
843.3	40	2-4-4	1.3	0.2	Grey SILTY CLAY varved with silt; moist	qh=0.25	S8												
838.3	45	3-4-4	1.4	0.1		qh=0.25	S9	0	0	0	32	68	39	16	29				A-6b
833.3	50	2-4-4	1.5	0		qh<0.25	S10												
830.3	55																		
828.3	55	4-6-7	1.5	0	Grey SILTY CLAY; moist	qh<0.25	S11												

"V" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 26.0 ft.

Boring Coordinates
 N 531,534.6
 E 2,433,957.0

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. BR-9		Boring Location: 529+05, 14 ft RT, B.L. EB IR-80				Elev. Top of Hole: 881.3 ft													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.			
823.3	55																		
	60	2-4-4	1.5	0		qh<0.25	S12												
818.3	65	3-4-5	1.5	0		qh<0.25	S13	0	0	1	37	62	35	16	27				A-6b
813.3	70	4-6-7	1.5	0		qh<0.25	S14												
808.3	75	4-6-14	1.5	0			S15												
805.3	80	dropped-rods	1.5	0	Grey SILT; wet		S16												
798.3	85	5-7-13	1.3	0.2		qh=0.25	S17	0	0	0	95	5	NP		24				A-4b
794.3	90	8-21-29	1.5	0	Grey SANDY SILT; wet		S18	2	21	38	25	4	NP		16				A-4a
788.3	95	18-21-22	1.5	0			S19												
783.3	100					Casing refusal													
	105																		
	110																		
	115					Bottom of Boring = 98.0 ft													

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-II		Boring Location: 530+96 , 93 ft LT, C.L. IR-80					Elev. Top of Hole: 878.3 ft									
Total Depth of Hole: 88.0 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25											
Date Started: 10/02/03		Hollow-Stem: n/a			Casing Size: 3.25-inch ID			Driller: Lee Cook								
Date Finished: 10/02/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Joe Troxell								
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
878.3	0	WOH/1.5	1.5	0	Soft Muck: Grey SANDY SILT; wet		S1	0	0	40	48	12	18	1	28	A-4a
873.3	5	WOH/1.5	0.1	1.4			S2									
868.3	10	12-12-12	0.2	1.3	Grey SILTY CLAY; moist; some gravel		S3									V: A-6b
863.3	15	5-4-6	0.2	1.3			S4									
858.3	20	3-6-7	0.1	1.4	Grey SILT & CLAY; moist		S5									
853.3	25	8-7-10	1.5	0		qh=0.50	S6	2	4	5	36	53	32	11	21	A-6a
848.3	30		2.0	0	Grey CLAY varved with silt; moist	qh=0.50 qt=4.5 tsf qh=0.38	ST-1	0	0	0	6	94	54	29	37	A-7-6
846.3		5-4-5	1.5	0			S7									
843.3	35	3-4-4	1.5	0		qh=0.25	S8									
838.3	40	4-5-4	1.5	0		qh<0.25	S9									
834.3	45		0.0	2	Grey SILT & CLAY; moist		ST-2									
831.3		4-5-5	1.5	0		qh=0.25	S10									
828.3	50	6-6-6	1.5	0		qh<0.25	S11	0	0	0	34	66	35	13	30	A-6a

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. "qt" = torvane undrained shear strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 29.0 ft.
 Boring Coordinates
 N 531,847.3
 E 2,434,067.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. BR-II		Boring Location: 530+96, 93 ft LT, C.L. IR-80					Elev. Top of Hole: 878.3 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
823.3	55	5-5-6	1.5	0		qh<0.25	S12									
818.3	60	7-7-9	1.5	0		qh=0.25	S13									
815.3																
813.3	65	2-6-6	1.5	0	Grey SILT; wet	qh=0.38	S14	0	0	0	83	17	NP		30	A-4b
808.3	70	3-5-9	1.5	0		qh=0.25	S15									
805.3																
803.3	75	10-8-11	1.5	0	Grey GRAVEL WITH SAND; wet		S16	16	48	23	8	5	NP		9	A-1-b
799.8																
798.3	80	24-40-50	1.5	0	Grey COARSE & FINE SAND; wet		S17									V: A-3a
793.3	85	10-21-28	1.5	0		Casing refusal	S18									
790.3					Bottom of Boring = 88.0 ft											
	90															
	95															
	100															
	105															
	110															
	115															

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-13		Boring Location: 534+00, 29 ft RT, B.L. EB 1R-80				Elev. Top of Hole: 896.8 ft														
Total Depth of Hole: 115.5 ft		Drilling Co: L.G. Helager, Inc.		Drill Rig: DIEDRICH D25																
Date Started: 9/23/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Lee Cook														
Date Finished: 9/24/03		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joe Troxell														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
896.8	0				Brown SANDY SILT; wet															
893.3	5	5-5-8	0.1	1.4			S1													V: A-4a
890.3																				
888.3	10	5-4-6	0.8	0.7	Grey SANDY SILT; moist	qh=1.25	S2													
883.3	15	3-3-5	0.6	0.9		qh<0.25	S3	0	0	1	40	59	33	10	28					A-4a
878.3	20	3-3-5	0.5	1		qh=0.25	S4													
875.3																				
873.3	25	2-4-6	0.1	1.4	Grey SILT & CLAY; moist		S5													
868.3	30	2-4-6	1.1	0.4		qh=0.38	S6	4	4	6	34	52	35	15	21					A-6a
863.3	35	3-4-7	1.2	0.3		qh=0.25	S7													
858.3	40	6-4-8	1.5	0		qh=0.25	S8													
853.3	45	9-16-18	1.5	0		qh=0.25	S9													V: A-4b
852.1					Grey SILT; wet															
849.6																				
848.3	50	5-5-6	1.5	0	Grey SILT & CLAY; moist	qh=0.38	S10													V: A-6a
845.1																				
843.3	55	7-6-7	1.5	0	Grey SILTY CLAY varved with silt; moist	qh=0.25	S11													

"V" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 10.5 ft.

Boring Coordinates
 N 531,729.4
 E 2,434,412.7

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-13		Boring Location: 534+00, 29 ft RT, B.L. EB 1R-80				Elev. Top of Hole: 896.8 ft														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
838.3	60	3-5-4	1.5	0		qh=0.25	S12	0	0	0	35	65	36	17	30					A-6b
833.3	65	3-4-5	1.5	0		qh<0.25	S13													
829.3	70	3-3-4	1.5	0		qh<0.25	S14													
825.1	75	3-4-7	1.5	0	Grey SILT & CLAY; moist	qh<0.25	S15													
818.3	80	5-5-8	1.5	0		qh<0.25	S16	0	0	0	50	50	31	13	25					A-6a
813.3	85	4-7-11	1.5	0		qh<0.25	S17													
810.1	90	5-8-14	1.4	0.1	Grey SILT; wet	qh<0.25	S18													
808.3	95	4-7-9	1.2	0.3		qh<0.25	S19	0	0	1	94	5	NP		26					A-4b
803.3	100	10-18-27	1.1	0.4	Grey SANDY SILT; wet		S20													
798.3	105	24-34-33	1.2	0.3			S21	0	0	61	33	6	NP		17					A-4a
788.3	110	11-8-12	1.5	0			S22													
783.3	115	8-12-15	0.8	0.7		Casing refusal	S23													
781.3					Bottom of Boring = 115.5 ft															

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-15		Boring Location: 535+90, 93 ft LT, C.L. IR-80						Elev. Top of Hole: 883.8 ft												
Total Depth of Hole: 112.8 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: SIMCO 4000															
Date Started: 9/30/03		Hollow-Stem: n/a			Casing Size: 3.0-inch ID			Driller: Jim Saccani (Penn)												
Date Finished: 10/01/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Stephen Slomski												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
883.8	0				Muck: Dark grey SANDY SILT; wet	Consistency like pudding														V: A-4a
879.1	5	3-6-8	1.5	0	Grey with light brown mottles CLAY; moist		S1													
872.5	10	4-4-5	1.4	0.1		qh=1.1	S2	1	4	6	37	52	42	22	24					A-7-6
867.5	15	3-3-4	0.1	1.4			S3													
862.5	20	4-3-5	0.9	0.6		qh=0.40	S4													
857.5	25	6-7-7	0.0	1.5	(grey clay on spoon)		S5													
854.3	30																			
852.5	30	4-4-6	1.2	0.3	Grey CLAY; moist	qh=1.00	S6													
847.5	35	3-4-4	1.5	0		qh=0.60	S7	0	0	0	10	90	47	20	35					A-7-6
844.3	40																			
842.5	40	6-5-5	1.5	0	Grey SILTY CLAY varved with silt; moist	qh=0.50	S8													V: A-6a
837.5	45	4-3-5	1.5	0		qh=0.75	S9													
834.3	50																			
832.5	50	4-4-5	1.5	0	Grey CLAY; moist	qh=0.50	S10													V: A-7-6

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 23.5 ft.

Boring Coordinates
 N 532,055.5
 E 2,434,515.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-15		Boring Location: 535+90, 93 ft LT, C.L. IR-80						Elev. Top of Hole: 883.8 ft												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
827.5	55	4-3-4	1.5	0		qh=0.65	S11													
824.3	60																			
822.5	60	4-6-4	1.5	0	Grey SILT; moist	qh=0.75	S12													
817.5	65	3-4-5	1.5	0		qh=0.50	S13	0	0	0	50	50	28	7	27					A-4b
812.5	70	7-7-10	1.5	0			S14													
807.5	75	6-6-7	1.5	0			S15													
804.3	80																			
802.5	80	9-8-8	1.5	0	Grey SILT; moist		S16													
797.5	85	14-17-12	1.0	0.5			S17	0	0	15	80	5	NP		25					A-4b
792.5	90	18-16-15	1.5	0			S18													
789.3	95																			
787.5	95	16-22-20	1.5	0	Grey COARSE & FINE SAND; moist		S19	1	41	42	13		NP		17					A-3a
784.3	100																			
782.5	100	15-17-20	1.4	0.1	Grey GRAVEL WITH SAND; moist		S20													V: A-1-b
777.5	105	22-23-25	1.5	0			S21													
774.3	110																			
772.4	110	50-44-50/.4	1.4	0	Grey COARSE & FINE SAND; moist		S22													V: A-3a
771.0	115				Bottom of Boring = 112.8 ft															

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. BR-17		Boring Location: 538+64, 3 ft LT, B.L. EB IR-80					Elev. Top of Hole: 885.3 ft												
Total Depth of Hole: 108.4 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25														
Date Started: 9/24/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Lee Cook													
Date Finished: 9/25/03		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joe Troxell													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.				
885.3	0				Grey SILTY CLAY; moist														
883.3	1-1-2	0.1	1.4			S1													
878.3	5				Grey SILTY CLAY; moist														
873.3	9-5-7	0.3	1.2			S2													
870.3	10				Grey SILTY CLAY; moist														
868.3	5-9-7	0.6	0.9			S3	31	3	4	26	36	35	17	16					
863.3	15				Grey SILT & CLAY; moist														
858.3	4-4-7	0.1	1.4			S4													
853.3	20				Grey SILT & CLAY; moist														
851.3	3-6-8	0.1	1.4			S5													
848.3	25				Grey SILTY CLAY varved with silt; moist														
845.3	3-16-9	0.1	1.4			S6													
843.3	30				Grey SILTY CLAY varved with silt; moist														
838.3	9-13-14	1.3	0.2			ST-1	1	3	5	34	57	34	15	18					
833.3	35				Grey SILTY CLAY varved with silt; moist														
	3-5-4	0.9	0.6			S7													
	40				Grey SILTY CLAY varved with silt; moist														
	3-2-4	1.3	0.2			S8													
	45				Grey SILTY CLAY varved with silt; moist														
	2-3-2	1.5	0			S9													
	50				Grey SILTY CLAY varved with silt; moist														
	3-3-3	1.5	0			S10	0	0	0	34	66	37	17	29					
	55				Grey SILTY CLAY varved with silt; moist														
	3-3-3	1.5	0			S11													

"V" denotes visual classification.
 "qh" = pocket penetrometer strength in tons/SF. "qt" = torvane undrained shear strength in tons/SF.
 Reservoir at EL+907.3; Water depth = 22.0 ft.

Boring Coordinates
 N 531,953.9
 E 2,434,819.6

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. BR-17		Boring Location: 538+64, 3 ft LT, B.L. EB IR-80					Elev. Top of Hole: 885.3 ft												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.				
830.3	55				Grey SILT & CLAY; moist														
828.3	3-3-2	1.5	0			S12													
823.3	60				Grey SILT & CLAY; moist														
818.3	5-3-5	1.5	0			S13	0	0	0	34	66	35	13	32					
813.3	65				Grey SILT & CLAY; moist														
810.3	4-5-4	1.5	0			S14													
808.3	70				Grey SILT & CLAY; moist														
803.3	5-4-5	1.5	0			S15													
800.3	75				Grey SILT; moist														
798.3	8-7-10	1.5	0			S16													
795.3	80				Grey SILT; moist														
793.3	6-10-18	1.2	0.3			S17	0	0	1	92	7	NP		25					
790.0	85				Grey SANDY SILT; wet														
788.3	5-14-21	1.5	0			S18													
786.3	90				Grey SANDY SILT; wet														
783.3	9-11-24	1.5	0			S19													
778.3	95				Grey to brown GRAVEL														
776.9	17-19-18	0.9	0.6			S20	63	20	10	5	2	NP		6					
	100				Grey to brown GRAVEL														
	29-19-28	0.7	0.8			S21													
	105				Grey to brown GRAVEL														
	26-39-50/4	0.9	0.5			S22													
	110				Bottom of Boring = 108.4 ft														
	115																		

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																							
Boring No. BR-19		Boring Location: 540+72, 93 ft LT, C.L. IR-80					Elev. Top of Hole: 882.9 ft																
Total Depth of Hole: 107.2 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: SIMCO 4000																		
Date Started: 9/25/03		Hollow-Stem: n/a			Casing Size: 3.0-inch ID			Driller: Jim Saccani (Penn)															
Date Finished: 9/29/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Stephen Slomski															
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics															
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.							
882.9	0	WOR/6'	2.0	4	Muck: Black to dark brownish-grey SANDY SILT; wet organic odor		S1														V: A-4a		
875.1	5	WOR/2'	2.0	0	Brownish-grey GRAVEL WITH SAND; wet		S2																
872.2	10	3-3-6	1.5	0			S3	19	40	8	20	3	NP	17								A-1-b	
868.9	15				Grey SILTY CLAY; moist	qh=0.75	S4	1	3	6	37	53	36	16	25							A-6b	
867.2	15	2-2-3	0.7	0.8																			
862.2	20	4-3-4	1.2	0.3	Grey SILT & CLAY; moist	qh=0.75	S5																
857.2	25	4-4-6	1.5	0			qh=1.0	S6															
853.9	30				Grey SILT & CLAY; moist	qh=0.75	S7	2	3	6	35	54	34	14	24								A-6a
852.2	30	6-5-8	1.2	0.3																			
847.2	35	3-3-4	0.9	0.6	Grey SILT & CLAY varved with silt; moist	qh=0.7	S8																
843.9	40						qh=1.0	S9	0	0	0	41	59	37	15	30							A-6a
842.2	40	3-3-3	1.2	0.3	Grey CLAY; moist	qh=0.75	S10																
837.2	45	3-2-4	1.4	0.1																			
833.6	50				Grey CLAY; moist	qh=0.3	S11																
831.7	50	3-3-3	1.5	0																			

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 24.3 ft.

Boring Coordinates
 N 532,257.7
 E 2,434,953.3

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																							
Boring No. BR-19		Boring Location: 540+72, 93 ft LT, C.L. IR-80					Elev. Top of Hole: 882.9 ft																
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics															
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.							
827.2	55	2-3-3	1.4	0.1		qh=0.4	S12	0	0	0	54	46	44	20	37							A-7-6	
822.2	60	4-4-6	1.5	0			qh=0.4	S13															
819.0	65				Grey SILT; moist	qh=0.25	S14															V: A-4b	
815.7	70	4-5-5	1.5	0																			
812.2	70	4-5-5	1.5	0	Grey SILT; wet	qh=0.30	S15																
809.0	75																						
807.2	75	4-4-6	1.5	0	Grey SILT; wet		S16																
802.2	80	6-7-10	1.5	0				S17	0	0	0	81	19	28	4	30							A-4b
797.2	85	3-4-4	1.5	0	Grey SANDY SILT; wet		S18																
793.9	90																						
792.2	90	5-6-9	1.5	0	Grey COARSE & FINE SAND; wet		S19																V: A-4b
789.0	95																						
787.2	95	4-7-13	1.5	0	Grey GRAVEL WITH SAND; wet		S20																V: A-3a
783.9	100																						
782.2	100	40-32-38	1.5	0	Bottom of Boring = 107.2 ft		S21	49	25	14	8	4	18	1	8								A-1-b
777.2	105	19-30-50/.5	1.5	0				S22															
775.7	110																						

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
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 DRAWN: J.M.T.

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. BR-21		Boring Location: 543+41, 14 ft RT, B.L. EB IR-80						Elev. Top of Hole: 896.8 ft												
Total Depth of Hole: 105.5 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: DIEDRICH D25															
Date Started: 9/25/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID			Driller: Lee Cook													
Date Finished: 9/26/03		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water			Inspector: Joe Troxell												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics												
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
896.8	0																			
893.3	5	6-11-18	0.7	0.8	Brown mottled with grey SILTY CLAY; moist	qh=2.5	S1	0	3	4	31	62	38	17	22					A-6b
888.3	10	5-5-8	1.0	0.5	grey		S2													
883.3	15	3-4-6	0.1	1.4			S3													
880.1																				
878.3	20	5-4-7	0.3	1.2	Grey SILT & CLAY; moist		S4													
873.3	25	4-7-8	1.1	0.4		qh=0.75	S5	4	4	6	34	52	35	15	21					A-6a
868.3 867.7	30	18-36-15	1.5	0			S6													
863.3	35	7-6-9	0.5	1	Grey GRAVEL WITH SILT; moist	qh>4.5	S7	34	26	7	15	18	28	11	11					A-2-6
860.3																				
858.3	40	5-5-7	0.7	0.8	Grey SILT & CLAY; moist	qh=0.50	S8													
853.3	45			2.0		qt=0.50 tsf qh=0.50	ST-1	3	3	6	34	54	33	15	22					A-6a
851.3		7-9-10	0.9	0.6		qh=0.75	S9													
849.3 848.3	50	3-4-4	1.5	0	Grey CLAY varved with silt; moist	qh=0.50	S10													A-7-6
843.3	55	3-2-5	1.3	0.2		qh=0.50	S11													

"V": denotes visual classification.
 "qh" = pocket penetrometer strength in tons/SF. "qt" = forvane undrained shear strength in tons/SF.
 Reservoir at EL.+907.3; Water depth = 10.5 ft.

Boring Coordinates
 N 532,138.8
 E 2,435,260.1

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																					
Boring No. BR-21		Boring Location: 543+41, 14 ft RT, B.L. EB IR-80						Elev. Top of Hole: 896.8 ft													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics													
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
	55																				
838.3	60		2.5	0		qt=3.0 tsf qh<0.25 qt=4.0 tsf	ST-2	0	0	0	14	86	45	20	40						A-7-6
835.8		3-4-5	1.5	0	Grey CLAY; moist	qh=0.50	S12														
833.3	65	4-4-4	1.5	0		qh=0.50	S13	0	0	0	14	86	43	19	33						A-7-6
828.3	70	4-5-6	1.5	0		qh<0.25	S14														
825.1																					
823.3	75	5-9-8	1.5	0	Grey SILT; moist	qh=1.0	S15														V: A-4b
819.3 818.3	80	50/7.4	0.1	0.3	Grey SILT & CLAY; moist		S16														
813.3	85	24-27-19	0.0	1.5			S17														
808.3	90	49-50/1.3	0.0	1.5			S18														
803.3	95	20-15-16	0.0	1.5	(grey clay on spoon)		S19														
801.8			0.0	1.1	(grey clay on tube)		ST-3	30	4	4	28	34	29	11	16						A-6a
798.3	100	9-11-17-26	0.1	1.9	(grey clay on spoon)		S20														
793.3	105	9-12-17-50/1.4	0.8	1.2		qh=4.0	S21														
791.3					Bottom of Boring = 105.5 ft																
	110																				
	115																				

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
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 REVISION: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. BR-23		Boring Location: 545+94, 3 ft RT, B.L. EB IR-80						Elev. Top of Hole: 913.0 ft											
Total Depth of Hole: 101.5 ft		Drilling Co: L.G. Hetager, Inc.				Drill Rig: HH250 #225													
Date Started: 9/16/03		Hollow-Stem: n/a				Casing Size: 3.25-inch ID				Driller: Floyd Himes									
Date Finished: 9/16/03		Sampler Type: 2-inch Split-Spoon				Drilling Fluid: Water				Inspector: Joe Troxell									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
913.0	0	3-3-6	0.8	0.7	1" Topsoil Brown COARSE & FINE SAND; moist	qh=1.25	S1												
908.0	5	6-6-7	1.2	0.3	Grey		S2	4	25	44	18	9	NP	14	A-3a				
903.0	10	3-3-5	0.8	0.7			S3												
900.0	15	7-9-13	1.0	0.5			Grey SILTY CLAY; moist	qh=2.0	S4										V: A-6b
898.0	15	7-9-13	1.0	0.5	Grey SILTY CLAY; moist	qh=2.0	S4												
893.0	20	6-7-8	1.4	0.1			qh=1.0	S5											
888.0	25	4-6-7	0.1	1.4	Grey SILTY CLAY; moist	qh=0.75	S6												
883.0	30	5-6-7	1.4	0.1			S7												
878.0	35	5-8-8	0.1	1.4			S8												
873.0	40	5-7-9	0.3	1.2	Grey SILTY CLAY; moist	qh=0.75	S9												
868.0	45	6-8-11	1.5	0			S10												
863.0	50	5-5-8	1.2	0.3			S11												

"V": denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.

Boring Coordinates
 N 532,255.7
 E 2,435,485.0

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. BR-23		Boring Location: 545+94, 3 ft RT, B.L. EB IR-80						Elev. Top of Hole: 913.0 ft										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
858.0	55	7-9-12	0.7	0.8		qh=0.50	S12											
853.0	60	5-10-19	1.5	0			S13											
850.0	65	6-7-8	1.5	0	Grey CLAY varved with silt; moist	qh=0.25	S14											V: A-7-6
848.0	65	6-7-8	1.5	0	S14													
843.0	70	3-3-4	1.5	0	Grey SILT; wet	qh<0.25	S15											
838.0	75	4-6-7	1.5	0			S16											
835.0	80	7-8-9	1.5	0	Grey SILT; wet	qh<0.25	S17	5	4	7	62	22	22	2	24	A-4b		
833.0	80	7-8-9	1.5	0			S17											
830.0	85	15-27-33	0.4	1.1	Grey GRAVEL WITH SAND & SILT; moist	qh<0.25	S18											
828.0	85	15-27-33	0.4	1.1	S18													
823.0	90	20-13-17	0.3	1.2	Grey SANDY SILT; moist	qh<0.25	S19	53	6	6	21	14	23	7	10	A-2-4		
820.0	95	22-33-50	0.2	1.3			S20											
818.0	95	22-33-50	0.2	1.3	S20													
813.0	100	12-17-18	0.2	1.3	Bottom of Boring = 101.5 ft		S21											
811.5	100	12-17-18	0.2	1.3			S21											

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0/23 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
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 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)															
Boring No. BR-24		Boring Location: 545+65, 19 ft LT, C.L. IR-80				Elev. Top of Hole: 908.1 ft									
Total Depth of Hole: 101.5 ft		Drilling Co: L.G. Hetager, Inc.		Drill Rig: HH-250 #225		Water Level At 0.0 ft After									
Date Started: 9/17/03		Hollow-Stem: n/a		Casing Size: 3.25-inch ID		Driller: Floyd Himes									
Date Finished: 9/18/03		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Stephen Slomski									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	
908.1	0	2-5-13	0.9	0.6	2" Topsoil Dark brown SANDY SILT; moist		S1	23	9	6	41	20	NP	12	A-4a
905.1															
903.1	5	7-5-6	0.0	1.5	Grey SILT & CLAY; moist		S2								
898.1 897.6	10	13-12-7	1.2	0.3		qh=1.2	S3	13	7	7	35	38	28	11	A-6a V: A-2-4
					Grey to brown GRAVEL WITH SAND & SILT; wet	qh=4.3									
893.1	15	11-6-6	0.1	1.4			S4								
890.1															
888.1	20	3-3-4	1.1	0.4	Grey SILTY CLAY; moist	qh=1.25	S5								
886.1			1.7	0.3		qh=1.5	ST-1	14	6	4	30	46	37	17	A-6b
883.1	25	6-8-9	0.0	1.5	(grey clay on spoon)		S6								
878.1	30	5-6-6	1.1	0.4		qh=1.2	S7								
873.1	35	5-7-8	0.9	0.6		qh=1.25	S8								
868.1	40	5-4-8	1.5	0		qh=1.8	S9								
863.1	45	7-7-10	0.0	1.5	(grey clay on spoon)		S10								
858.1	50	5-6-9	1.5	0		qh=1.4	S11								

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.

Boring Coordinates
 N 532,397.9
 E 2,435,431.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)															
Boring No. BR-24		Boring Location: 545+65, 19 ft LT, C.L. IR-80				Elev. Top of Hole: 908.1 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	
853.1	55	10-22-24	1.5	0		qh=1.3	S12								
850.1															
848.1	60	6-7-7	1.5	0	Grey CLAY varved with silt; moist	qh=0.80	S13								
843.1	65	5-6-7	1.5	0		qh=0.70	S14								
838.1	70	3-2-4	1.5	0		qh=0.50	S15								
836.1			2.2	0		qh=1.00	ST-2	0	0	0	16	84	47	25	A-7-6
833.1	75	4-6-6	1.5	0		qh=0.75	S16								
830.1															
828.1	80	5-8-18	0.0	1.5	Grey SILT (soil in spoon)		S17								V: A-4b
825.1															
823.1	85	16-38-50/ .5	0.1	1.4	Grey GRAVEL WITH SAND & SILT		S18								V: A-2-4
820.1															
818.1	90	9-22-20	0.7	0.8	Grey SANDY SILT; moist	qh=2.3	S19	7	4	7	40	42	27	10	A-4a
813.1	95	10-15-16	0.0	1.5	(grey clay on spoon)		S20								
808.1	100	11-15-16	0.8	0.7		qh=1.8	S21								
806.6					Bottom of Boring = 101.5 ft										

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081



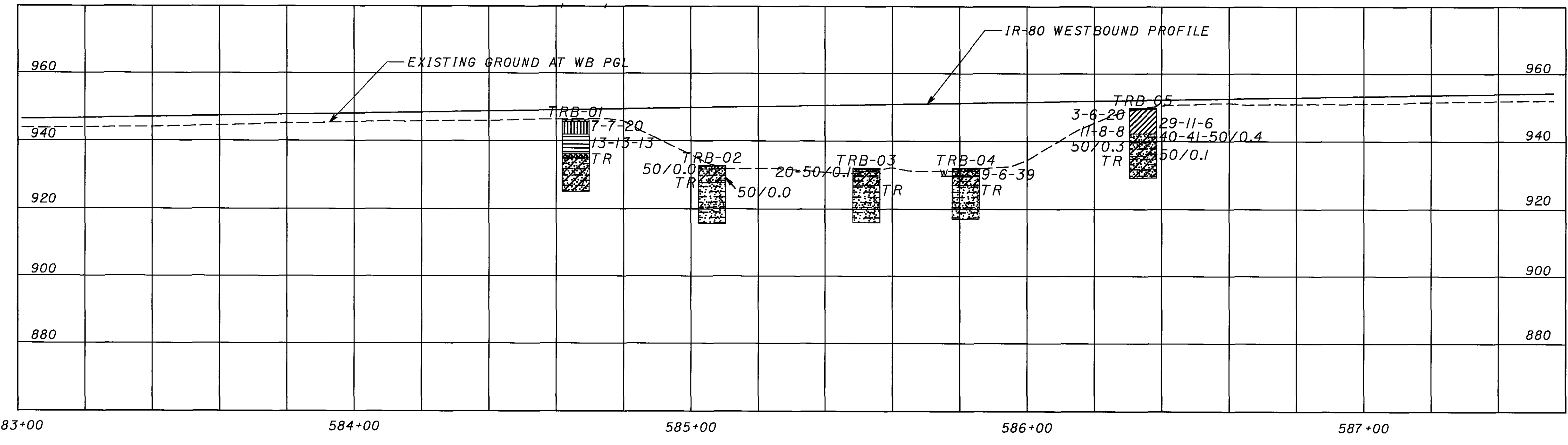
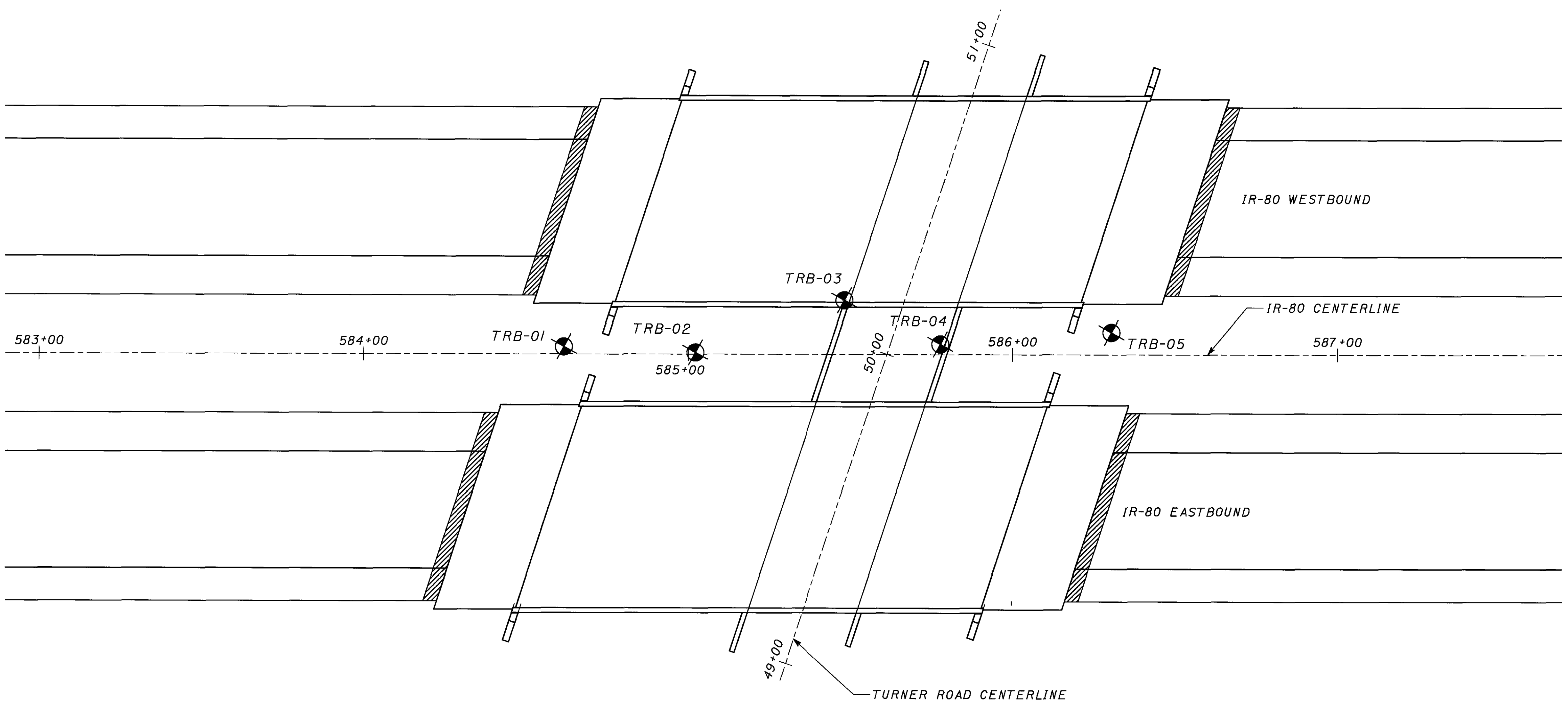
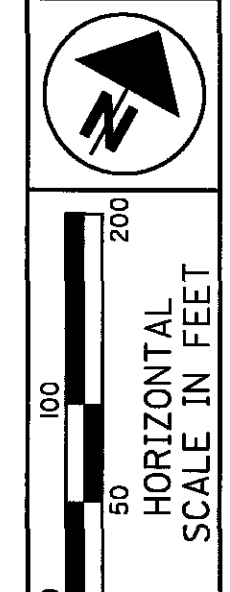
DATE: 9/03/04
 CHECKED: S.S.

REVISED: M.W.W.

DRAWN: J.M.T.

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97



CALCULATED	DATE	REVIEWED	DRAWN
	9/03/04	M.W.W.	J.M.T.
CHECKED			
S.S.			

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0245 L/R OVER TURNER ROAD

MAHONING COUNTY
 MAH-80-0.97



Date Started 2/18/02 Sampler: Type SS Dia. 2.0" Water Elev. ft Project: MAH-80-0.97
 Date Completed 2/18/02 Casing: Length _____ Dia. 3.25" Project No.: 601083
 Location: Mahoning County, Ohio

Boring No. TRB-01 Station & Offset 584+61.67, 2.28' Lt. Surface Elev. 945.99ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class						
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.			
946.0	0																	
945.5	2	7 - 7 - 20			TOPSOIL Medium dense, gray and brown, non-cohesive SANDY SILT (A-4a), some sandstone and shale fragments, little clay, moist. (embankment fill)	1	--	--	--	--	--	--	--	--	10			VISUAL
941.8	4	10 - 10 - 13			Very stiff to hard, mottled brown and gray SILTY CLAY (A-6b), some sand, trace to little gravel and rock fragments, moist. (natural soil)	2	9	7	14	--	71 *	36	18	18				A-6b
	6	13 - 13 - 13				3	--	--	--	--	--	--	--	--	16			VISUAL
	8	22 - 31 - 32			Note: Some rock fragments encountered in 8.5 foot sample.	4	--	--	--	--	--	--	--	--	17			VISUAL
936.0	10	RQD = 0%	1.5	4.5	Note: Auger refusal at 10.0 feet and began coring bedrock.	Run 1												
935.0	12				Medium hard, light brown, highly weathered, SANDSTONE with thin bedding and many close natural fractures.													
	14				Medium hard to very hard, gray, highly weathered to slightly weathered SANDY SILTSTONE with very thin to moderate bedding, some close natural fractures, interbedded with thin (<1.0"), soft SHALE seams.													
	16	RQD = 36%	5.0	0.0	Run 2 - Poor condition as per RQD.	Run 2												
	18				Note: U.C. Strength at 17.1 feet = 22,299 psi (high strength)													
	20				Note: Very soft to soft, gray, highly weathered to weathered SHALE from 19.3 to 19.9 feet.													
925.0					TERMINATION DEPTH = 21.0 FEET													

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay < 0.005mm (*Indicates silt & clay combined)



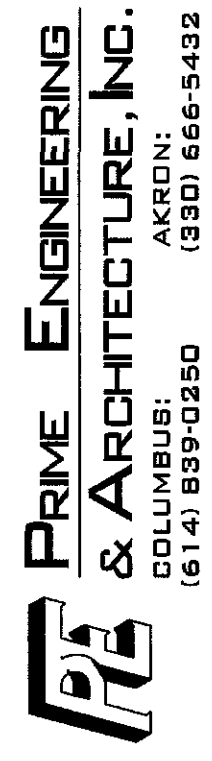
Date Started 3/4/02 Sampler: Type SS Dia. 2.0" Water Elev. ft Project: MAH-80-0.97
 Date Completed 3/4/02 Casing: Length _____ Dia. 3.25" Project No.: 601083
 Location: Mahoning County, Ohio

Boring No. TRB-02 Station & Offset 585+02.16, 0.53' Lt. Surface Elev. 932.59ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class						
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.			
932.6	0																	
932.4	2	50/0.0			TOPSOIL Brown GRAVEL AND ROCK FRAGMENTS WITH SAND, some silt	1	--	--	--	--	--	--	--	--	--			VISUAL
931.6	4	50/0.0			Very soft to soft, gray, decomposed to highly weathered SANDY SILTSTONE with iron staining.	2												
	6				Note: Spoon refusal at 3.5 feet, augered to 5.0 feet and began coring bedrock.	Run 1												
927.6	8	RQD = 30%	6.0	0.0	Soft and very hard, gray, weathered to highly weathered SANDY SILTSTONE with very thin to moderate, nearly horiz. bedding, some to few natural fractures mainly along bedding, interbedded with thin (<3"), medium hard, dark gray SHALE laminations and seams.													
	10				Note: U.C. Strength at 5.7 feet = 17,464 psi (high strength)													
	12	RQD = 74%	4.9	1.1	Run 2 - Fair condition as per RQD.	Run 2												
	14				Note: U.C. Strength at 13.7 feet = 502 psi (very low strength)													
	16				TERMINATION DEPTH = 17.0 FEET													

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay < 0.005mm (*Indicates silt & clay combined)





PRIME ENGINEERING & ARCHITECTURE, INC.
 COLUMBUS: (614) 839-0250 AKRON: (330) 666-5432

LOG OF BORING

Date Started 3/16/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/16/02 Casing: Length Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. TRB-03 Station & Offset 585+48.22, 16.59' Lt. Surface Elev. 931.90ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
931.9	0				TOPSOIL	1	--	--	--	--	--	--	6	VISUAL	
931.7	2	20 - 50/0.1			Brown and gray GRAVEL AND ROCK FRAGMENTS WITH SAND (A-1-b), some silt, moist.										
930.9	2				Soft to hard, gray, highly weathered to weathered SANDY SILTSTONE with iron staining.										
929.4	4				Soft to hard, gray, highly weathered to weathered SANDY SILTSTONE with iron staining.										
926.9	6	RQD = 32%	5.0	0.0	Note: Observed auger cuttings for visual classification. Medium hard to hard, gray, weathered to slightly weathered SANDY SILTSTONE with very thin to thin bedding, some nearly horizontal natural fractures mainly along bedding planes. Few thin (<2.5"), soft, dark gray shale laminations and seams.	Run 1									
	8				Note: Augered to 5.0 feet and began coring bedrock.										
	10	RQD = 60%	6.0	0.0	Run 1 - Poor condition as per RQD.	Run 2									
	12				Note: U.C. Strength of siltstone at 5.9 feet = 9013 psi (high strength)										
	14				Run 1 - Poor condition as per RQD.										
	16				Note: U.C. Strength of shale at 7.8 feet = 1860 psi (low strength)										
915.9					Run 2 - Fair condition as per RQD.										

TERMINATION DEPTH = 16.0 FEET

Particle Sizes: Agg -> 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



PRIME ENGINEERING & ARCHITECTURE, INC.
 COLUMBUS: (614) 839-0250 AKRON: (330) 666-5432

LOG OF BORING

Date Started 2/22/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 2/22/02 Casing: Length Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. TRB-04 Station & Offset 585+77.71, 3.18' Lt. Surface Elev. 931.96ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
932.0	0				TOPSOIL	1	--	--	--	--	--	--	10	VISUAL	
931.9	2	9 - 6 - 39			Brown and gray GRAVEL AND ROCK FRAGMENTS WITH SAND (A-1b), some silt, moist.										
931.1	2				Very soft to soft, gray, decomposed to highly weathered SANDY SILTSTONE with iron staining.										
929.5	4				Note: Groundwater encountered at 2.2 feet during drilling.										
927.0	6	RQD = 70%	5.0	0.0	Soft to medium hard, gray, highly weathered to weathered SANDY SILTSTONE with iron staining.	Run 1									
	8				Note: Augered to 5.0 feet and began coring bedrock.										
	10	RQD = 44%	4.4	0.6	Medium hard to hard, gray, weathered to slightly weathered SANDY SILTSTONE with very thin to moderate bedding, some natural fractures throughout both runs, interbedded with thin (<3.0" thick, medium hard, dark gray SHALE seams.	Run 2									
	12				Note: U.C. Strength at 5.2 feet = 6082 psi (medium strength)										
	14				Note: U.C. Strength at 6.3 feet = 714 psi (very low strength)										
917.0					Run 1 - Fair condition as per RQD.										
					Run 2 - Poor condition as per RQD.										

TERMINATION DEPTH = 15.0 FEET

Particle Sizes: Agg -> 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



PRIME ENGINEERING & ARCHITECTURE, INC.
 COLUMBUS: (614) 839-0250 AKRON: (330) 666-5432

LOG OF BORING

Date Started 1/29/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 1/29/02 Casing: Length Dia. 3.25"
 Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

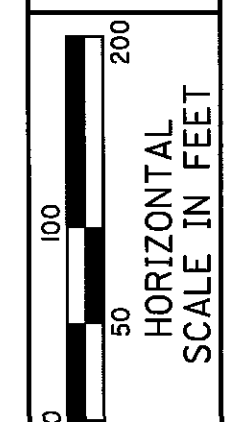
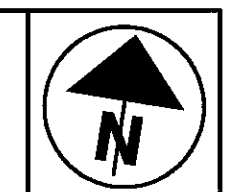
Boring No. TRB-05 Station & Offset 586+30.39, 6.79' Lt. Surface Elev. 949.65ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
949.7	0				TOPSOIL	1	--	--	--	--	--	--	13	VISUAL	
949.4	2	3 - 6 - 20			Very stiff, mottled brown and gray, cohesive SANDY SILT (A-4a), some slag and sandstone fragments, some clay, moist.										
	4	29 - 11 - 6			Note: Encountered sandstone fragments in embankment fill at 6.5 feet.	2	35	10	7	--	49 *	35	13	16	A-6a
	6	11 - 8 - 8			Soft to hard, brown to gray, highly weathered to weathered SANDY SILTSTONE.	3	--	--	--	--	--	--	8	VISUAL	
942.2	8	40-41-50/0.4				4	--	--	--	--	--	--	8	VISUAL	
	10														
	12	50/0.3				5	--	--	--	--	--	--	7	VISUAL	
	14	50/0.1	5.1	1.4	Note: Auger refusal at 14.0 feet and began coring bedrock.	6	--	--	--	--	--	--	4	VISUAL	
	16	RQD = 34%			Medium hard to hard, brown to gray, highly weathered to weathered SANDY SILTSTONE with indistinct to moderate bedding, many very close natural fractures, some iron staining throughout Run 1. Poor condition as per RQD.	Run 1									
	18				Note: U.C. Strength at 14.7 feet = 157 psi (very low strength)										
929.2	20				Note: U.C. Strength at 19.9 feet = 857 psi (low strength)										

TERMINATION DEPTH = 20.5 FEET

Particle Sizes: Agg -> 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)





CALCULATED

DATE 9/03/04

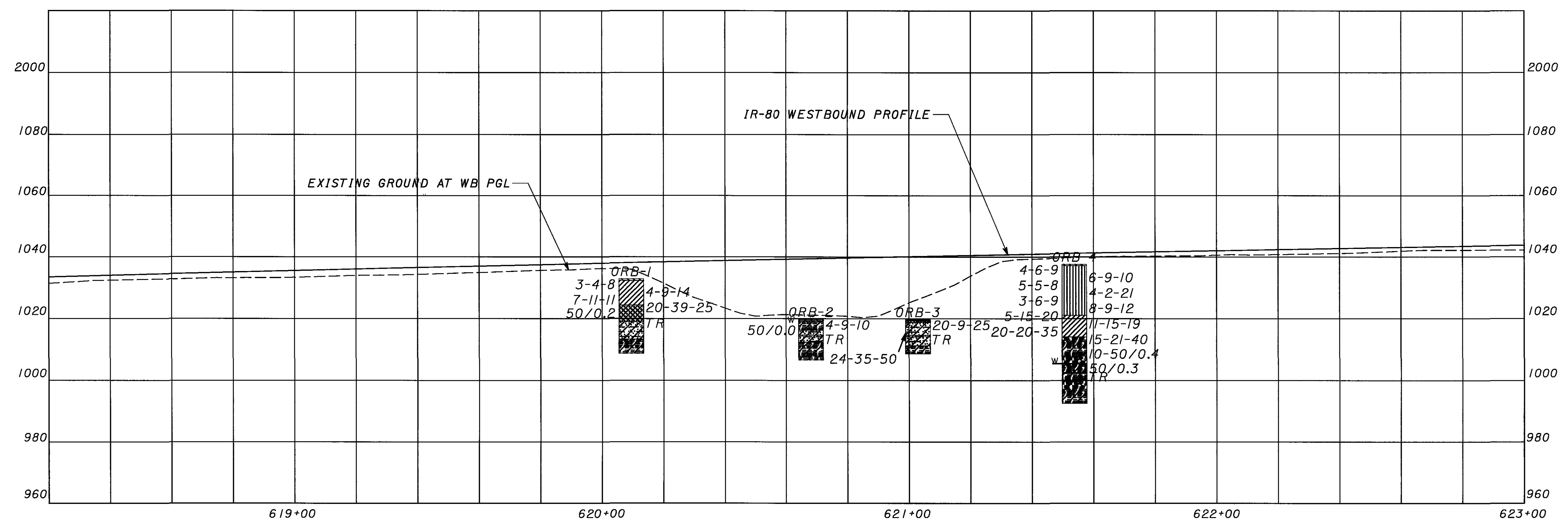
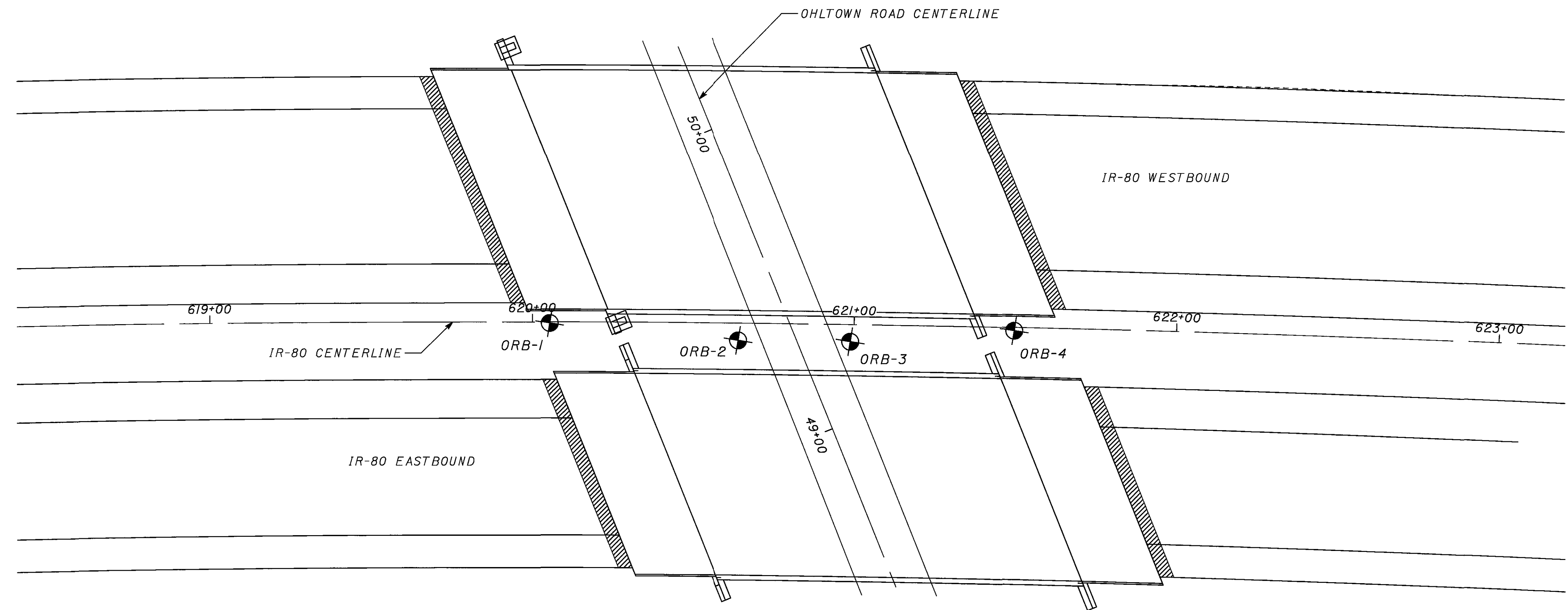
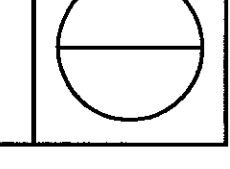
REVIEWED M.W.W.

DRAWN J.M.T.

CHECKED S.S.

STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0313 L/R OVER OHLTOWN ROAD

MAHONING COUNTY
MAH-80-0.97





PRIME ENGINEERING & ARCHITECTURE, INC.
 COLUMBUS: (614) 839-0250 AKRON: (330) 666-5432

Date Started 2/18/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 2/18/02 Casing: Length ft Dia. 3.25"

Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. ORB-1 Station & Offset 620+05.40, 0.38' Rt. Surface Elev. 1033.35ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics						ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
1033.4	0															
1032.9	2	3 - 4 - 8			TOPSOIL Stiff to hard, brown and gray SILT AND CLAY (A-6a), some sand, little gravel and rock fragments, moist. (embankment fill)	1	16	8	17	--	59 *	33	14	16	A-6a	
	4	4 - 9 - 14				2	--	--	--	--	--	--	--	14	VISUAL	
	6	7 - 11 - 11				3	--	--	--	--	--	--	--	15	VISUAL	
1024.9	8	20 - 39 - 25			Very soft to medium hard, brown, decomposed to highly, SANDSTONE.	4	--	--	--	--	--	--	--	16	VISUAL	
	10					5	--	--	--	--	--	--	--	6	VISUAL	
	12	50/0.2				Run 1										
1020.4	14	RQD = 28%	6.0	2.0	Note: Augered to 13.0 feet and began coring bedrock. Medium hard, brown, highly weathered, fine-grained SANDSTONE with very thin, nearly horizontal bedding, many natural fractures. Medium hard to very soft, gray, weathered to highly weathered SILTSTONE with thin to indistinct bedding and many natural fractures. Note: U.C. Strength at 15.0 feet = 642 psi (low strength)											
1019.5	16				Run 1 - Poor condition as per RQD.											
1013.9	18				Soft to medium hard, gray, highly weathered to weathered SHALE, fissile.											
	20					Run 2										
	22	RQD = 10%	2.7	0.3	Run 2 - Very poor condition as per RQD.											
1009.4	24				TERMINATION DEPTH = 24.0 FEET											

Particle Sizes: Agg > 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay < 0.005mm (*Indicates silt & clay combined)



PRIME ENGINEERING & ARCHITECTURE, INC.
 COLUMBUS: (614) 839-0250 AKRON: (330) 666-5432

Date Started 3/6/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/6/02 Casing: Length ft Dia. 3.25"

Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. ORB-2 Station & Offset 620+64.03, 5.43' Rt. Surface Elev. 1020.26ft

Elev. (ft)	Depth (ft)	Std. Pene. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics						ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
1020.3	0															
1019.9	2	4 - 9 - 10			TOPSOIL GRAVEL AND ROCK FRAGMENTS WITH SAND (A-1-b). Very soft to soft, brown, decomposed to highly weathered SHALE. Note: Wet at 1.0 feet during drilling.	1	--	--	--	--	--	--	--	15	VISUAL	
1019.5	4	50/0.0			Note: Split spoon refusal at 3.5 feet, augered to 5.0 feet and began coring bedrock. Very soft to medium hard, brown, highly weathered SILTSTONE. Note: Observed auger cuttings for visual classification.	2										
1016.8	6	RQD = 14%	8.0	0.0	Very soft to medium hard, brown to gray, highly weathered to close fractures, some iron staining. Note: U.C. Strength at 5.2 feet = 212 psi (very low strength)	Run 1										
1015.3	8				Grades into soft to medium hard, gray, fissile SHALE at approximately 7.3 feet. Iron staining to approximately 10 feet. Note: U.C. Strength at 8.8 feet = 1424 psi (low strength)											
1013.0	10				Note: Bedrock in very poor condition as per RQD.											
1007.3	12				TERMINATION DEPTH = 13.0 FEET											

Particle Sizes: Agg > 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay < 0.005mm (*Indicates silt & clay combined)

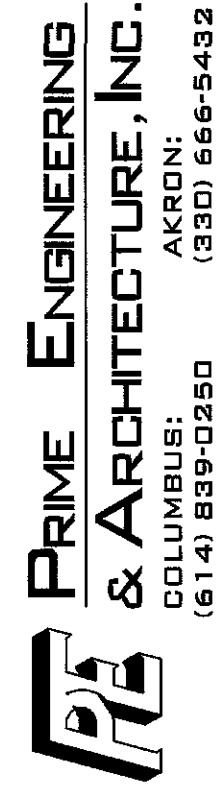




Date Started 2/22/02 Sampler: Type SS Dia. 2.0" Water Elev. ft Project: MAH-80-0.97
 Date Completed 2/22/02 Casing: Length Dia. 3.25" Surface Elev. 1020.21ft Project No.: G01083
 Boring No. ORB-3 Station & Offset 620+98.85, 5.35' Rt. Location: Mahoning County, Ohio

Elev. (ft)	Depth (ft)	Std. Pen. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
1020.2	0				TOPSOIL	1	--	--	--	--	--	--	14	VISUAL
1019.9	2	20 - 9 - 25			Brown GRAVEL AND ROCK FRAGMENTS WITH SAND AND SILT	Run 1								
1019.3	4	24 - 35 - 50			Very soft to soft, brown and gray, decomposed to highly weathered SILTSTONE with iron staining.									
1015.2	6	RQD = 23%	5.0	1.0	Very soft to medium hard, brown and gray, decomposed to weathered SILTSTONE with indistinct to thin, some iron staining, many very close natural fractures. Note: U.C. Strength at 5.2 feet = 177 psi (very low strength) Note: Run 1 in very poor condition as per RQD.									
1011.8	8				Medium hard to soft, brown to dark gray, weathered to highly weathered SHALE, fissile. Note: U.C. Strength at 9.4 feet = 217 psi (very low strength)									
1009.2	10				TERMINATION DEPTH = 11.0 FEET									

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



Date Started 2/16/02 Sampler: Type SS Dia. 2.0" Water Elev. ft Project: MAH-80-0.97
 Date Completed 2/16/02 Casing: Length Dia. 3.25" Surface Elev. 1038.09ft Project No.: G01083
 Boring No. ORB-4 Station & Offset 621+49.69, 1.05' Rt. Location: Mahoning County, Ohio

Elev. (ft)	Depth (ft)	Std. Pen. / Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
1038.1	0				TOPSOIL	1	18	9	13	31	29	10	16	A-4a
1037.7	2	4 - 6 - 9			Stiff to very stiff, brown and gray, cohesive SANDY SILT (A-4a), some clay, little to some rock fragments, moist. (embankment fill)	2	--	--	--	--	--	--	16	VISUAL
	4	6 - 9 - 10				3	--	--	--	--	--	--	18	VISUAL
	6	5 - 5 - 8				4	--	--	--	--	--	--	15	VISUAL
	8	4 - 2 - 21				5	--	--	--	--	--	--	17	VISUAL
	10	3 - 6 - 9				6	--	--	--	--	--	--	16	VISUAL
	12	8 - 9 - 12				7	--	--	--	--	--	--	15	VISUAL
	14	5 - 15 - 20				8	--	--	--	--	--	--	16	VISUAL
1021.6	16	11 - 15 - 19			Hard, brown and gray, SILT AND CLAY (A-6a), little sand, little gravel and rock fragments, moist. (possible natural soil)	9	--	--	--	--	--	--	14	VISUAL
	18	20 - 20 - 35				10	--	--	--	--	--	--	11	VISUAL
	20	15 - 21 - 40				11	--	--	--	--	--	--	10	VISUAL
	22	16 - 50/0.4				12	--	--	--	--	--	--	11	VISUAL
	24	50/0.3				12	--	--	--	--	--	--		
1014.6	26				Soft to medium hard, brown and gray, decomposed to highly weathered SHALE with iron staining.	Run 1								
	28					Run 1								
	30					Hard, gray, weathered SANDY SILTSTONE, thinly bedded. Soft to medium hard, dark gray to black, weathered CLAY SHALE, fissile.	Run 2							
	32					Run 2								
	34					Run 1 - Fair condition as per RQD. Note: U.C. Strength at 40.7 feet = 677 psi (low strength)								
	36	RQD = 52%	4.4	0.6	Run 2 - Very poor condition as per RQD. TERMINATION DEPTH = 45.0 FEET									
1003.1	38													
1002.8	40													
	42													
	44													

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)

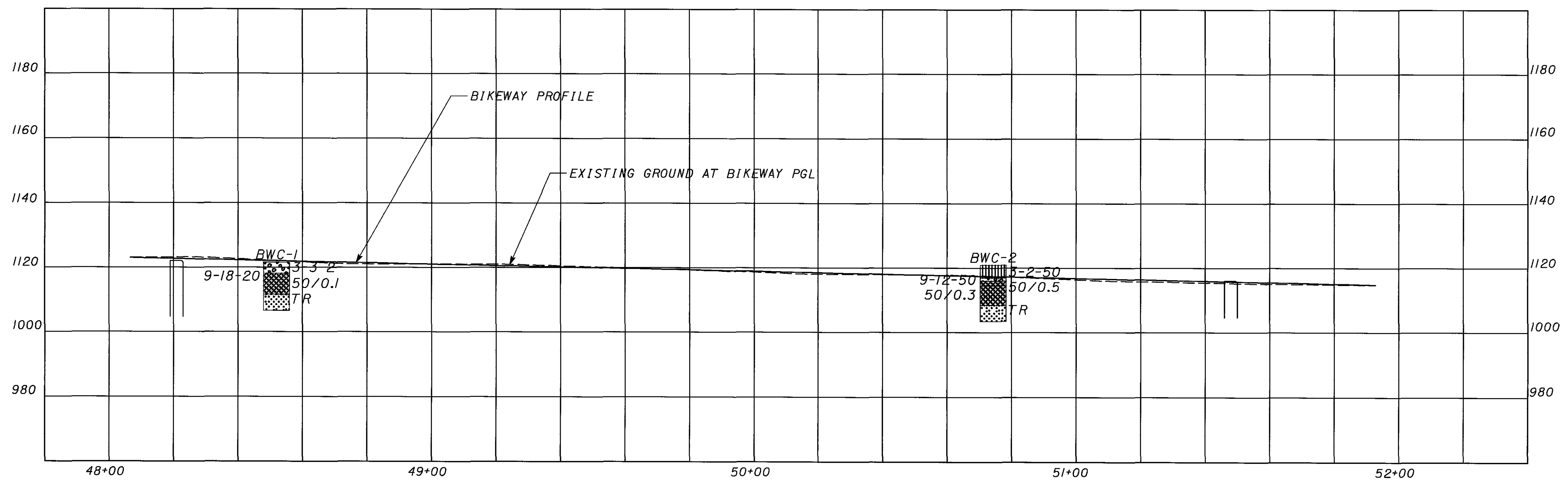
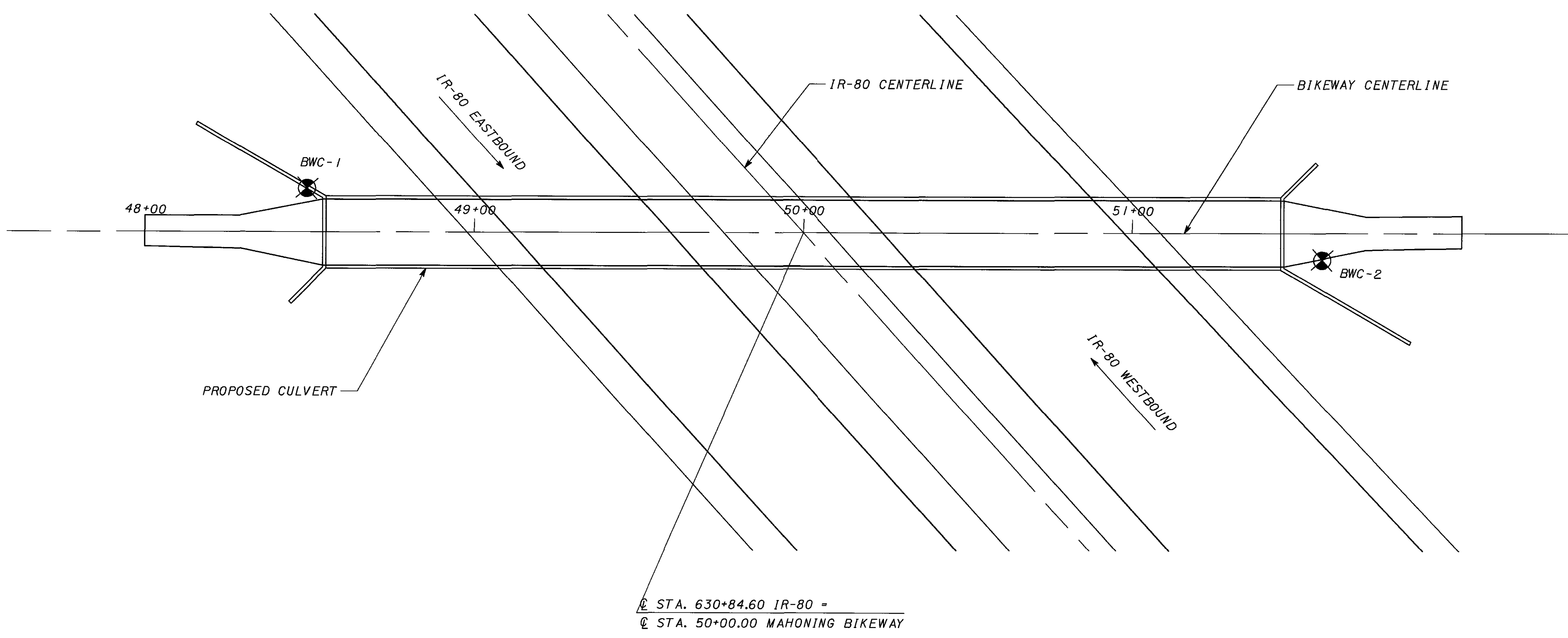




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DRAWN	
J.M.T.	

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0332 L/R OVER MAHONING BIKEWAY

MAHONING COUNTY
 MAH-80-0.97





Date Started 3/14/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/14/02 Casing: Length Dia. 3.25"

Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

Boring No. BWC-1 Station & Offset 629+73.69, 103.07' Rt. Surface Elev. 1022.08ft

Elev. (ft)	Depth (ft)	Std. Pene. /Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
1022.1	0					1A	--	--	--	--	--	--	24	VISUAL
	2	3 - 3 - 2			Loose, gray and brown SLAG, some silt and clay, little sand, moist. (fill)	1B	--	--	--	--	--	--	43	VISUAL
1018.6	4	9 - 18 - 20			Note: Trace coal fragments at 2.5 feet. Very soft to medium hard, brown and gray, decomposed to weathered MICACEOUS SANDSTONE.	2	--	--	--	--	--	--	13	VISUAL
	6	50/0.1				3	--	--	--	--	--	--	10	VISUAL
	8													
1012.1	10	RQD = 48%	5.0	0.0	Note: Augered to 10.0 feet and began coring bedrock. Medium hard to hard, gray, weathered to slightly weathered, medium to fine-grained MICACEOUS SANDSTONE with thin to moderate, nearly horizontal bedding, many very close to close fractures, much iron staining throughout core. Poor condition as per RQD. Note: U.C. Strength at 11.0 feet = 1269 psi (low strength) Note: U.C. Strength at 14.5 feet = 1460 psi (low strength)	Run 1								
1007.1	12				TERMINATION DEPTH = 15.0 FEET									
	14													

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



Date Started 3/14/02 Sampler: Type SS Dia. 2.0" Water Elev. ft
 Date Completed 3/14/02 Casing: Length Dia. 3.25"

Project: MAH-80-0.97
 Project No.: G01083
 Location: Mahoning County, Ohio

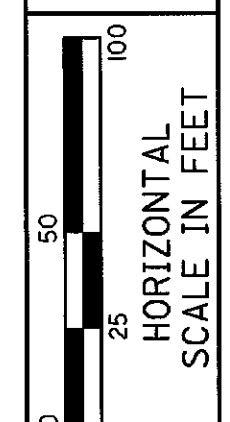
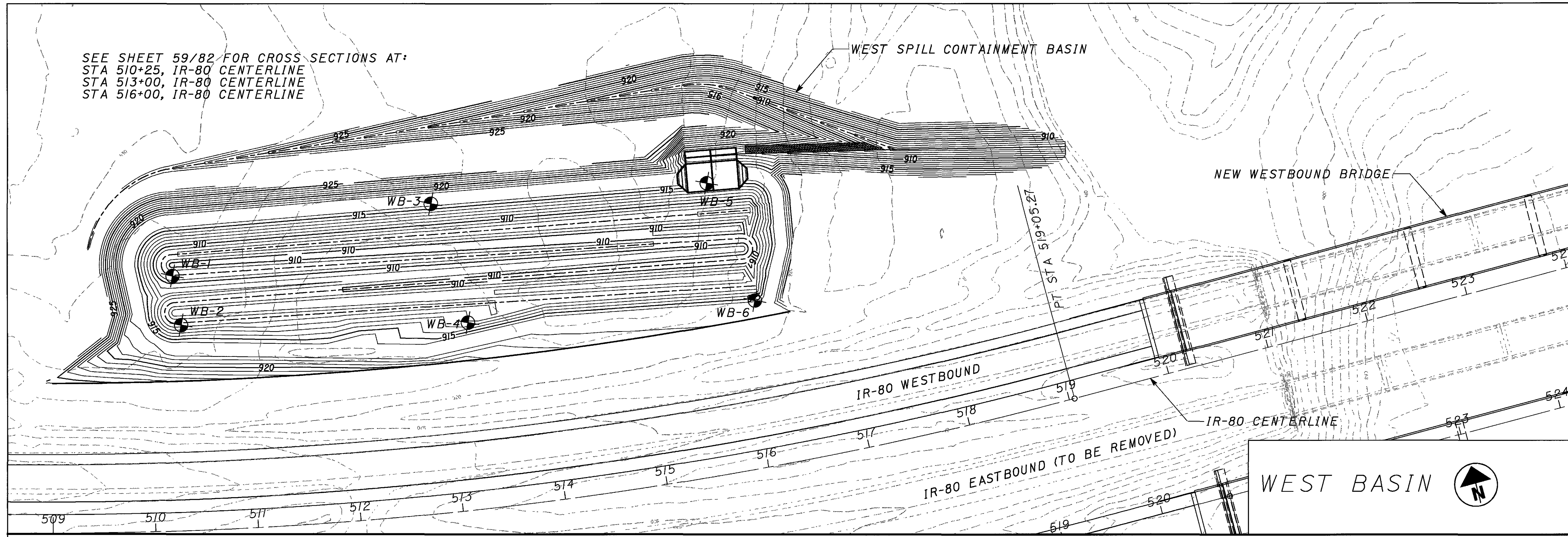
Boring No. BWC-2 Station & Offset 631+96.06, 111.71' Lt. Surface Elev. 1021.45ft

Elev. (ft)	Depth (ft)	Std. Pene. /Ft or RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics					ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.
1021.5	0					1	--	--	--	--	--	--	25	VISUAL
	2	3 - 2 - 50/0.1			Medium stiff, mottled brown and gray, cohesive SANDY SILT (A-4), some silt and rock fragments, some clay, moist. (fill) Note: Encountered wood (possibly a railroad tie) at 2.5 feet which caused a high N-VALUE.									
1017.5	4	9 - 12 - 50			Very dense, mottled brown and gray SLAG AND SANDSTONE FRAGMENTS (A-1-a), some sand, some silt, moist.	2A	--	--	--	--	--	--	14	VISUAL
1016.5	6	50/0.5			Soft, brown and gray, highly weathered SANDSTONE.	2B	--	--	--	--	--	--	14	VISUAL
1015.0	8				Soft to medium hard, brown to gray, highly weathered MICACEOUS SANDSTONE.	3	--	--	--	--	--	--	10	VISUAL
	10	50/0.3				4	--	--	--	--	--	--	9	VISUAL
	12													
1009.0	14	RQD = 80%	5.0	0.0	Medium hard to hard, gray, weathered to slightly weathered, medium to fine-grained MICACEOUS SANDSTONE with very thin to moderate, nearly horizontal bedding, few very close to close fractures. Good condition as per RQD. Note: U.C. Strength at 13.3 feet = 2723 psi (medium strength) Note: U.C. Strength at 15.7 feet = 5874 psi (medium strength)	Run 1								
1004.0	16				TERMINATION DEPTH = 17.5 FEET									

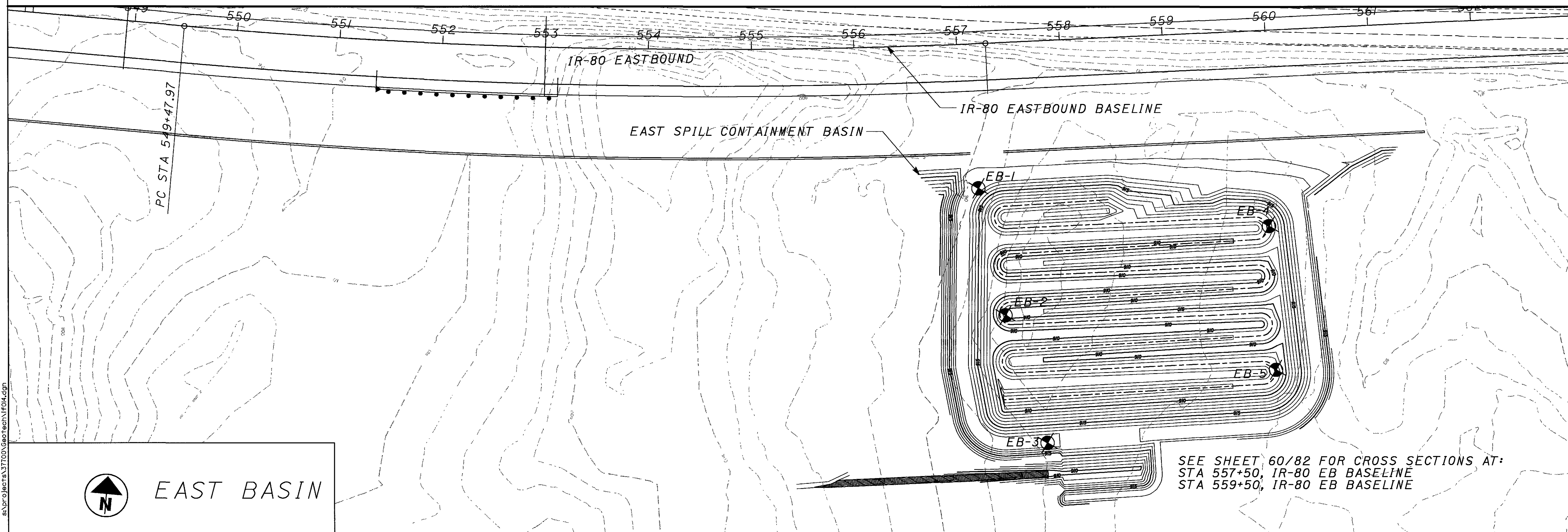
Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm (*Indicates silt & clay combined)



SEE SHEET 59/82 FOR CROSS SECTIONS AT:
 STA 510+25, IR-80 CENTERLINE
 STA 513+00, IR-80 CENTERLINE
 STA 516+00, IR-80 CENTERLINE



DRAWN	REVIEWED	DATE	CALCULATED
J.M.T.	M.W.W.	2/04/05	
			CHECKED
			S.S.



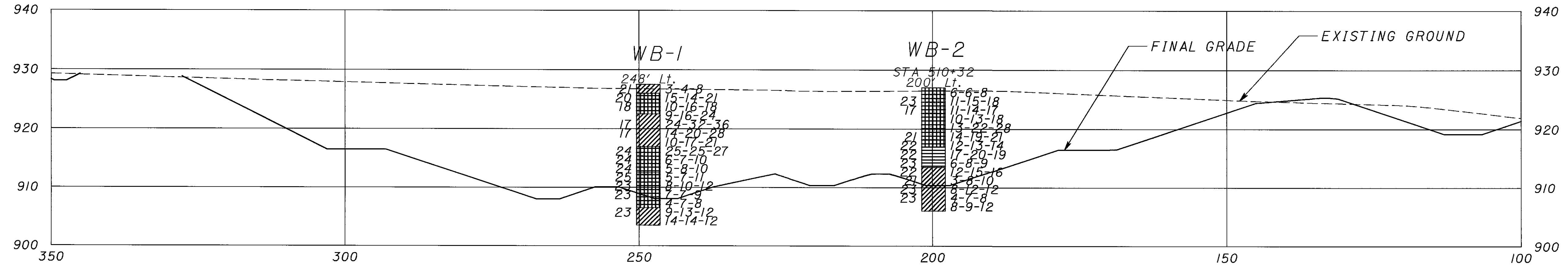
SEE SHEET 60/82 FOR CROSS SECTIONS AT:
 STA 557+50, IR-80 EB BASELINE
 STA 559+50, IR-80 EB BASELINE

SPILL CONTAINMENT BASINS
 SOIL BORING LOCATIONS

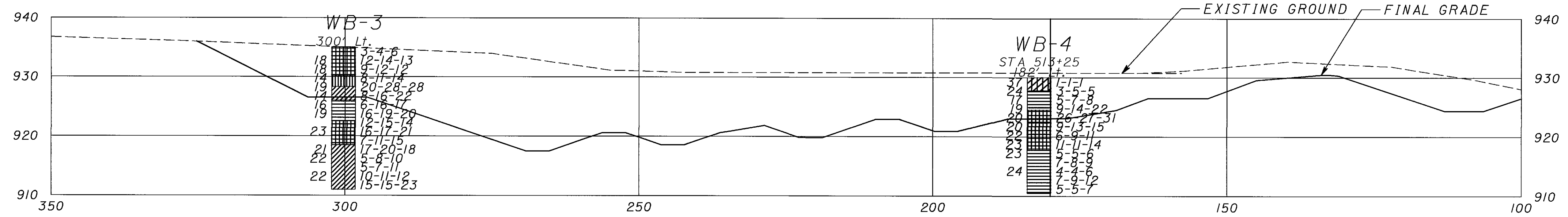
MAHONING COUNTY
 MAH-80-0.97

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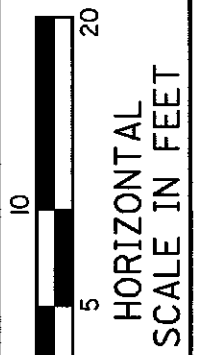
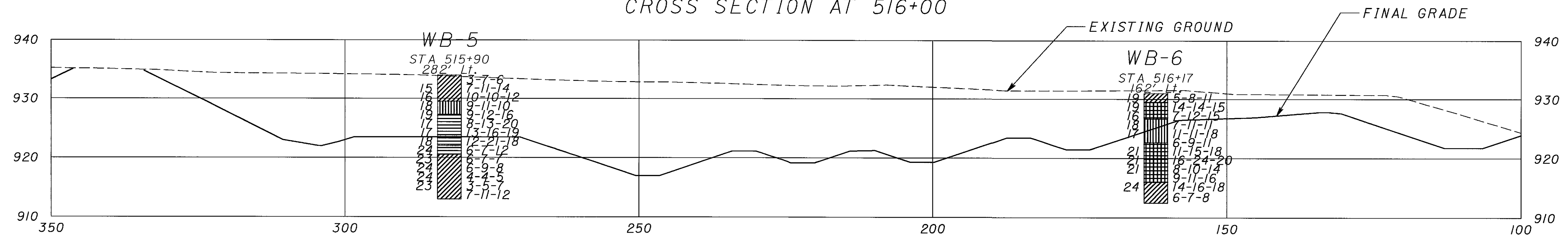
CROSS SECTION AT 510+25



CROSS SECTION AT 513+00



CROSS SECTION AT 516+00



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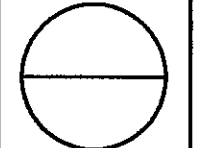
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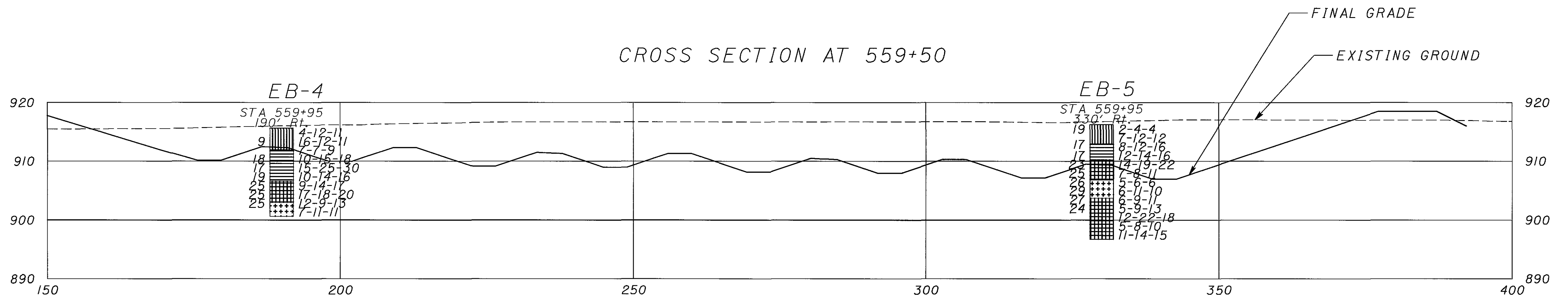
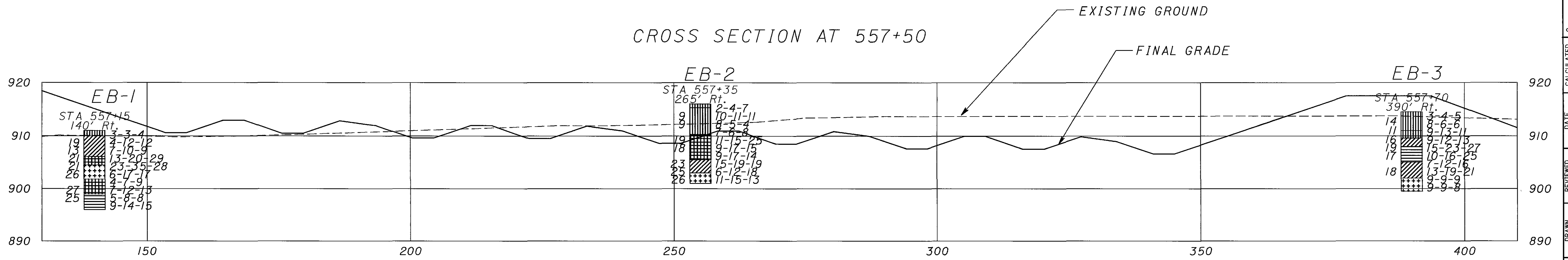
REVIEWED
 M.W.W.

DRAWN
 J.M.T.

SPILL CONTAINMENT BASINS
 WEST BASIN SOIL PROFILE SECTIONS

MAHONING COUNTY
 MAH-80-0.97

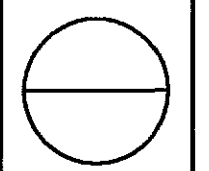




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SPILL CONTAINMENT BASINS
 EAST BASIN SOIL PROFILE SECTIONS

MAHONING COUNTY
 MAH-80-0.97

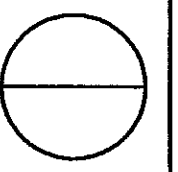


DRILLING LOG - MAH-80-0.97																	
Boring No.		Boring Location: 510+25 , 248' LT, C.L. IR-80					Elev. Top of Hole: 927.5 ft										
Total Depth of Hole:		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV					Groundwater: Not Encountered x										
Date Started:		Hollow-Stem: 4.25" I.D. Casing Size: n/a					Driller: Jim Hopkins										
Date Finished:		Sampler Type: 2-inch Split-Spoon Drilling Fluid: n/a					Inspector: S.Slonski										
Elev. (Ft)	Depth (Ft)	Blows or ROD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
927.5	0	3-4-8	0.8	0.7	0.4' Dark Brown SILT, w/ Organics Tan, Stiff, SILT & CLAY, moist, little sand		S1	0	2	15	82*	32	11	21		A-6a	
926.0		15-14-21	0.6	0.9	Grey w/ Brown Mottles, Hard, CLAY, moist, some sand	qh>4.5	S2	0	3	24	72*	46	22	20		A-7-6	
924.5		10-16-18	0.4	1.1			S3									18	
923.0	5	9-16-24	0.6	0.9			Brown w/ Grey Mottles, Hard, SILT & CLAY, moist, trace sand	qh>4.5	S4								
921.5		24-32-36	1.2	0.3	S5	1			2	6	91*	35	15	17			A-6a
920.0		14-20-28	1.3	0.2		qh>4.5	S6								17		
918.5	10	10-17-21	1.0	0.5	Brown, Very Stiff to Hard, CLAY, moist	qh>4.5	S7										
917.0		25-25-27	1.0	0.5			S8	0	1	1	98*	47	20	24			A-7-6
915.5		6-7-10	1.0	0.5			S9									24	
914.0		5-8-10	0.9	0.6		qh=3.9	S10	1	1	2	96*	43	18	24		A-7-6	
912.5	15	5-7-11	0.7	0.8	Grey, Very Stiff, CLAY, moist	qh=2.0	S11	0	1	2	97*	41	18	25		A-7-6	
911.0		8-10-12	1.0	0.5			S12									23	
909.5		7-7-9	1.2	0.3			S13									23	
908.0	20	4-7-8	1.0	0.5		qh=1.5	S14										
906.5		9-13-12	1.1	0.4	Grey, Very Stiff, SILT & CLAY, moist, trace sand	qh=1.3	S15	1	2	3	93*	35	14	23		A-6a	
905.0		14-14-12	1.2	0.3			S16										
903.5	25				Bottom of Boring = 24.0 ft												

*qh * denotes pocket penetrometer strength in tons/SF.
 ** * denotes combined silt and clay percentage.

DRILLING LOG - MAH-80-0.97																	
Boring No.		Boring Location: 510+32 , 200' LT, C.L. IR-80					Elev. Top of Hole: 927.0 ft										
Total Depth of Hole:		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV					Groundwater: Not Encountered x										
Date Started:		Hollow-Stem: 4.25" I.D. Casing Size: n/a					Driller: Jim Hopkins										
Date Finished:		Sampler Type: 2-inch Split-Spoon Drilling Fluid: n/a					Inspector: S.Slonski										
Elev. (Ft)	Depth (Ft)	Blows or ROD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
927.0	0	6-6-8	0.6	0.9	0.3' Dark Brown SILT w/ Organics Mottled Grey & Brown, Stiff to Very Stiff, CLAY, moist, some sand		S1										
925.5		11-15-18	0.5	1.0		qh>4.5	S2	0	4	23	72*	48	24	23		A-7-6	
924.0		11-14-17	0.5	1.0			S3									17	
922.5	5	10-13-18	1.0	0.5	Brown, Hard, CLAY, moist	qh>4.5	S4	0	1	2	97*	43	19	23		A-7-6	
922.0		13-22-28	0.9	0.6			S5										
919.5		14-19-21	1.2	0.3		qh>4.5	S6	0	2	3	96*	44	19	21		A-7-6	
918.0	10	12-13-14	1.1	0.4	Grey, Very Stiff to Hard, SILTY CLAY, moist	qh=2.8	S7								22		
917.0		17-20-19	0.9	0.6			S8	0	2	2	96*	37	16	22			A-6b
916.5		6-8-9	0.6	0.9			S9									23	
915.0						qh=2.3	S10	0	3	3	93*	36	15	22		A-6a	
913.5	15	12-15-16	1.3	0.2	Grey, Very Stiff, SILT & CLAY, moist, trace sand	qh=2.0	S11								21		
912.0		3-8-10	0.7	0.8			S12	0	3	4	94*	37	15	23			A-6a
910.5		8-12-12	1.2	0.3			S13									23	
909.0		4-7-8	0.8	0.7		qh=1.8	S14										
907.5	20	8-9-12	1.1	0.4		qh=1.8											
906.0					Bottom of Boring = 21.0 ft												

*qh * denotes pocket penetrometer strength in tons/SF.
 ** * denotes combined silt and clay percentage.



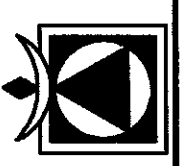
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DRILLING LOG - MAH-80-0.97																			
Boring No.		WB-3			Boring Location: 513+00 , 300' LT, C.L. IR-80					Elev. Top of Hole: 925.0 ft									
Total Depth of Hole:		24.0 ft			Drilling Co: L.G. Hetager					Drill Rig: HH 250 ATV									
Date Started:		7/26/04			Hollow-Stem: 4.25" I.D.					Casing Size: n/a									
Date Finished:		7/26/04			Sampler Type: 2-inch Split Split-Spoon					Drilling Fluid: n/a									
Inspector:		S. Slomski																	
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
925.0	0	3-4-6	0.6	0.9	0.2' Dark Brown Sandy Silt, w/ Organics, moist	qh=4.3	S1												
923.5		12-14-13	0.6	0.9	Tan w/ Grey Mottles, Very Stiff, CLAY, moist, little sand	qh=3.5	S2	1	3	9	87*		50	29	18			A-7-6	
922.0		9-12-12	0.5	1.0		qh>4.5	S3										18		
920.5	5	8-11-14	1.3	0.2	Brown, Very Stiff, SANDY SILT, moist, some clay		S4	3	9	29	36	23	19	4	14			A-4a	
919.0		20-28-28	1.2	0.3	Brown, Hard, SILT & CLAY, moist, trace sand	qh>4.5	S5										19		
918.3		8-16-22	1.0	0.5		qh>4.5	S6	1	2	6	92*		35	14	14			A-6a	
917.5		6-16-17	1.2	0.3	Brown, Hard, SILTY CLAY, moist	qh>4.5	S7										16		
916.0	10	16-19-20	0.4	1.1		qh>4.5	S8	0	0	0	99*		40	16	19			A-6b	
914.5		12-15-14	1.1	0.4	Grey, Very Stiff to Hard, CLAY, moist	qh>4.5	S9	0	0	1	99*		48	23	23			A-7-6	
913.0		16-17-21	0.8	0.7		qh=2.5	S10	1	1	1	97*		41	19	23			A-7-6	
912.5	15	7-11-15	0.5	1.0			S11												
911.5		17-20-18	1.1	0.4	Grey, Very Stiff to Hard, SILT & CLAY, moist, trace sand & gravel	qh=2.3	S12	4	1	2	93*		37	15	21			A-6a	
910.0		5-8-10	0.9	0.6		qh=2.3	S13										22		
909.5		5-7-11	1.2	0.3		qh=2.0	S14												
908.5	20	10-11-12	0.5	1.0		qh=1.5	S15	1	2	2	95*		36	15	22			A-6a	
907.0		15-15-23	0.5	1.0		qh=1.5	S16												
905.5	25				Bottom of Boring = 24.0 ft														

*qh * denotes pocket penetrometer strength in tons/SF.
 ** * denotes combined silt and clay percentage.

DRILLING LOG - MAH-80-0.97																		
Boring No.		WB-4			Boring Location: 513+25 , 182' LT, C.L. IR-80					Elev. Top of Hole: 920.0 ft								
Total Depth of Hole:		19.5 ft			Drilling Co: L.G. Hetager					Drill Rig: HH 250 ATV								
Date Started:		7/26/04			Hollow-Stem: 4.25" I.D.					Casing Size: n/a								
Date Finished:		7/26/04			Sampler Type: 2-inch Split-Spoon					Drilling Fluid: n/a								
Inspector:		S. Slomski																
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										ODOT Class.
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
920.0	0	1-1-1	0.6	0.9	0.1 Brown Silt, w/ Organics, wet Mottled Grey & Brown, Soft, ELASTIC CLAY w/ Organics, wet		S1	1	12	18	70*		42	11	37			A-7-5
918.5		3-5-5	0.7	0.8	Grey w/ Brown Mottles, Stiff to Hard, SILTY CLAY, moist, little sand, trace gravel	qh=1.5	S2	0	2	9	88*		35	17	24			A-6b
917.8		5-7-8	1.0	0.5		qh>4.5	S3	4	6	9	81*		37	17	17			A-6b
917.0		9-14-22	1.0	0.5		qh>4.5	S4										19	
915.5	5	26-27-31	0.9	0.6	Brown, Hard, CLAY, moist, trace sand	qh>4.5	S5	0	3	6	90*		44	21	20			A-7-6
914.5		9-13-15	0.6	0.9	Grey w/ Brown Mottles, Very Stiff, CLAY, moist	qh=4.3	S6										20	
914.0		6-9-11	0.7	0.8		qh=4.4	S7									46	20	22
912.5	10	11-11-14	0.7	0.8		qh=4.5	S8										23	
911.0		5-5-6	0.8	0.7	Grey, Stiff to Very Stiff, SILTY CLAY, moist, trace sand	qh=1.8	S9	1	1	2	96*		37	16	23			A-6b
909.5		7-8-9	0.8	0.7		qh=1.8	S10											
908.0	15	4-4-6	1.0	0.5		qh=1.4	S11										24	
906.5		7-9-12	0.4	1.1		qh=1.4	S12											
905.0	20	5-5-7	1.0	0.5		qh=1.3	S13											
903.5					Bottom of Boring = 19.5 ft													
902.0																		
900.5	25																	

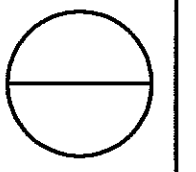
*qh * denotes pocket penetrometer strength in tons/SF.
 ** * denotes combined silt and clay percentage.



DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97



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DRILLING LOG - MAH-80-0.97																			
Boring No. WB-5		Boring Location: 515+90 , 282' LT, C.L. IR-80						Elev. Top of Hole: 924.0 ft											
Total Depth of Hole: 21.0 ft		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV						Groundwater: Not Encountered x											
Date Started: 7/23/04		Hollow-Stem: 4.25' I.D.		Casing Size: n/a		Driller: Jim Hopkins													
Date Finished: 7/23/04		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: n/a		Inspector: S.Slowski													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
924.0	0	3-7-6	0.8	0.7	0.2' Dark Brown Sandy Silt w/ Organics Tan w/ Grey Mottles, Stiff to Very Stiff, SILT & CLAY and SAND, moist	qh=4.3	S1												
922.5		7-11-14	0.8	0.7			qh=3.5	S2	3	8	30	59*	28	11	15				A-6a
921.0		10-10-12	1.0	0.5				S3								16			
919.5	5	9-11-10	1.2	0.3	Brown, Medium Dense, SANDY SILT, moist, little clay		S4	0	1	38	45	17	NP	18				A-4a	
918.0		9-12-16	1.2	0.3	Brown, Hard, SILTY CLAY, moist, trace sand	qh=4.5 qh>4.5	S5	2	3	7	88*	37	16	19				A-6b	
917.3		8-13-20	1.2	0.3			qh>4.5	S6								17			
916.5		13-16-19	1.2	0.3		qh>4.5	S7							17					
915.0	10	12-21-18	0.8	0.7		qh>4.5	S8							18					
912.0		6-7-12	1.1	0.4	Grey, Very Stiff, SILTY CLAY, moist	qh=3.4	S9	0	0	1	99*	38	17	24				A-6b	
910.5	15	6-7-7	1.3	0.2	Grey, Stiff, SILT & CLAY, moist	qh=1.3 qh=1.2 qh=1.0 qh=1.3	S10	0	2	4	94*	34	13	23				A-6a	
909.0		6-9-8	1.1	0.4			qh=1.0	S11							24				
907.5		4-4-5	1.0	0.5			qh=1.3	S12	0	2	3	95*	36	15	24				A-6a
906.0		3-5-7	1.1	0.4			qh=1.4	S13							23				
904.5	20	7-11-12	1.2	0.3		qh=1.4	S14												
903.0					Bottom of Boring = 21.0 ft														

*qh denotes pocket penetrometer strength in tons/SF.
 ** denotes combined silt and clay percentage.

DRILLING LOG - MAH-80-0.97																			
Boring No. WB-6		Boring Location: 516+17 , 162' LT, C.L. IR-80						Elev. Top of Hole: 921.0 ft											
Total Depth of Hole: 18.5 ft		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV						Groundwater: Not Encountered x											
Date Started: 7/23/04		Hollow-Stem: 4.25' I.D.		Casing Size: n/a		Driller: Jim Hopkins													
Date Finished: 7/23/04		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: n/a		Inspector: S.Slowski													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
921.0	0	5-8-11	1.0	0.5	Tan w/ Grey Mottles, Very Stiff, SILT & CLAY, dry		S1	0	3	10	87*	34	12	19				A-6a	
919.5		14-14-15	0.5	1.0	Tan w/ Grey Mottles, Very Stiff, CLAY, dry	qh>4.5	S2	0	1	8	91*	41	18	19				A-7-6	
918.0		7-12-15	1.1	0.4			qh>4.5	S3							16				
916.7	5	7-11-11	1.2	0.3	Brown, Medium Dense, SANDY SILT, moist, some clay	qh=2.5	S4	0	7	22	47	24	NP	18				A-4a	
915.0		11-11-18	1.0	0.5			qh>4.5	S5	1	15	31	27	26	22	8	17			
913.5		6-9-11	0.0	1.5	Brown, Hard, CLAY, moist	qh>4.5	S6												
912.7	10	11-15-18	1.0	0.5			qh>4.1	S7	0	1	1	98*	45	20	21				A-7-6
912.0		16-24-20	0.9	0.6			qh=2.9	S8	2	1	2	95*	41	17	21				A-7-6
910.5	15	8-10-14	1.0	0.5	Grey, Very Stiff to Hard, CLAY, moist, trace sand	qh=2.0	S9							21					
909.0		9-11-16	1.2	0.3			qh=2.0	S10											
907.5		14-16-18	1.2	0.3			qh=1.5	S11						38	15	24			
906.0		6-7-8-11	1.5	0.5		qh=1.7	S12												
904.5					Bottom of Boring = 18.5 ft														
902.5	20																		
	25																		
	30																		
	35																		
	40																		
	45																		
	50																		
	55																		

*qh denotes pocket penetrometer strength in tons/SF.
 ** denotes combined silt and clay percentage.

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.

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DRILLING LOG - MAH-80-0.97																		
Boring No.		Boring Location:				Elev. Top of Hole:												
EB-1		557+15 , 140' RT, B.L. EB IR-80				911.0 ft												
Total Depth of Hole:		Drilling Co:				Groundwater:												
15.0 ft		L.G. Hetager				Not Encountered x												
Date Started:		Hollow-Stem:				Casing Size:												
7/20/04		4.25' I.D.				n/a												
Date Finished:		Sampler Type:				Drilling Fluid:												
7/20/04		2-inch Split-Spoon				n/a												
		Inspector:																
		S.Slomski																
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
911.0	0	3-3-4	0.9	0.6	Brown, Loose, SANDY SILT, moist	qh=1.5	S1											VtA-4a
910.0																		
909.5		4-12-12	1.1	0.4	Tan w/ Grey Mottles, Very Stiff, SAND and SILT & CLAY, moist		S2	1	13	40	18	28	28	12	19		A-6a	
908.0						qh=1.8	S3									13		
906.5	5	7-10-9	0.9	0.6			S4	1	1	2	23	73	44	20	21		A-7-6	
906.1		13-20-29	1.0	0.5	Brown w/ Grey Mottles, Hard, CLAY, moist, trace gravel	qh>4.5	S5									21		
905.0							S6	0	0	0	56	44	32	10	26		A-4b	
904.5		23-35-28	1.0	0.5	Brown, Hard, SILT, wet	qh=1.8 qh=4.0	S7											
903.5		6-17-17	1.3	0.2			S8	0	0	1	15	84	43	19	27		A-7-6	
902.0	10	4-7-9	1.2	0.3	Grey, Very Stiff, CLAY, moist	qh=1.75	S9	0	0	0	22	78	40	17	25		A-6b	
901.8						qh=1.75	S10											
900.5		7-12-13	1.2	0.3														
899.0		5-8-8	0.6	0.9	Grey, Very Stiff, SILTY CLAY, moist	qh=1.75												
897.5						qh=1.3												
896.0	15	9-14-15	1.5	0														
					Bottom of Boring = 15.0 ft													

qh denotes pocket penetrometer strength in tons/SF.

DRILLING LOG - MAH-80-0.97																	
Boring No.		Boring Location:				Elev. Top of Hole:											
EB-2		557+35 , 265' RT, B.L. EB IR-80				916.0 ft											
Total Depth of Hole:		Drilling Co:				Groundwater:											
15.0 ft		L.G. Hetager				Not Encountered x											
Date Started:		Hollow-Stem:				Casing Size:											
7/20/04		4.25' I.D.				n/a											
Date Finished:		Sampler Type:				Drilling Fluid:											
7/20/04		2-inch Split-Spoon				n/a											
		Inspector:															
		S.Slomski															
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics									
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
916.0	0	2-4-7	1.1	0.4	Brown, Loose, SANDY SILT, w/ roots, moist		S1										VtA-4a
915.3																	
914.5		10-11-11	0.8	0.7	Tan, Stiff to Very Stiff, SANDY SILT, moist, some clay		S2	1	9	30	37	23	22	6	9		A-4a
913.0							S3									9	
911.5	5	8-5-4	1.2	0.3			S4										
910.3		7-6-8	1.4	0.1			S5	3	2	7	32	57	41	20	19		A-7-6
910.0		11-15-25	0.9	0.6	Brown w/ Grey Mottles, Hard, CLAY, moist, trace sand & gravel	qh>4.5	S6										
908.5						qh>4.5	S7									18	
907.0	10	9-17-15	1.1	0.4	0.4' sand seam at 8.0 ft	qh>4.5	S8										
905.5		9-17-14	1.2	0.3		qh>4.5	S9	0	0	0	41	59	37	13	25		A-6a
904.0		15-19-19	0.9	0.6	Grey, Hard, SILT & CLAY, moist	qh=3.4	S10	0	0	1	77	21	NP		26		A-4b
903.0		6-12-18	1.1	0.4		qh=3.0											
902.5		11-15-13	1.4	0.1	Grey, Very Stiff, SILT, wet												
901.0	15				Bottom of Boring = 15.0 ft												

qh denotes pocket penetrometer strength in tons/SF.

MAHONING COUNTY
 MAH-80-0.97
 STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR
 GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081
 DATE: 9/03/04
 CHECKED: S.S.
 REVISED: M.W.W.
 DRAWN: J.M.T.
 64/82

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DRILLING LOG - MAH-80-0.97																		
Boring No.		Boring Location: 557+70 , 390' RT, B.L. EB IR-80						Elev. Top of Hole: 914.5 ft										
Total Depth of Hole:		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV						Groundwater: Not Encountered x										
Date Started:		Hollow-Stem:		Casing Size:		Driller: Jim Hopkins												
Date Finished:		Sampler Type:		Drilling Fluid:		Inspector: S.Slowski												
Elev. (Ft)	Depth (Ft)	Blows or ROD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
914.5	0	3-4-5	0.5	1.0	Tan, Medium Dense, SANDY SILT, dry, some clay		S1											
913.0		8-6-6	0.2	1.3			S2	1	14	36	24	25	22	6	11			A-4a
911.5		9-13-11	1.2	0.3	Brown, Med. Dense, SANDY SILT, moist, some clay		S3	0	10	46	23	21	NP		14			A-4a
910.0	5	9-12-13	0.9	0.6	Brown w/ Grey Mottles, Very Stiff, SILT & CLAY	qh>4.5	S4	4	4	11	43	37	32	12	16			A-6a
909.6		15-23-27	1.1	0.4	Little sand, trace gravel	qh>4.5	S5	3	3	6	28	60	40	18	19			A-6b
908.5		10-16-25	1.0	0.5	Brown, Hard, SILTY CLAY, moist, trace sand & gravel	qh>4.5	S6								17			A-6b
905.5	10	7-12-16	0.9	0.6	Grey, Hard, SILT & CLAY, moist	qh>4.5	S7											A-6a
905.0		13-19-21	1.0	0.5		qh=4.0	S8	0	0	0	51	49	30	12	18			A-6a
904.0		9-9-9	1.3	0.2	Brown to Grey, Very Stiff, SILT, wet		S9											V:A-4b
902.5		9-9-8	1.2	0.3			S10											V:A-4b
899.5	15				Bottom of Boring = 15.0 ft													

*qh * denotes pocket penetrometer strength in tons/SF.

DRILLING LOG - MAH-80-0.97																		
Boring No.		Boring Location: 559+95 , 190' RT, B.L. EB IR-80						Elev. Top of Hole: 917.0 ft										
Total Depth of Hole:		Drilling Co: L.G. Hetager Drill Rig: HH 250 ATV						Groundwater: Not Encountered x										
Date Started:		Hollow-Stem:		Casing Size:		Driller: Jim Hopkins												
Date Finished:		Sampler Type:		Drilling Fluid:		Inspector: S.Slowski												
Elev. (Ft)	Depth (Ft)	Blows or ROD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
917.0	0	4-12-11	0.9	0.6	0.3' Topsoil- Grey SILT, trace sand		S1											
915.5		16-12-11	0.8	0.7	Brown, Medium Dense, SANDY SILT, moist, little gravel & clay		S2	17	23	24	18	18	20	3	9			A-4a
914.0		7-7-9	1.3	0.2			S3											A-4a
913.3	5	10-15-18	1.1	0.4	Brown, Hard, SILTY CLAY, moist, trace sand & gravel	qh=2.3 qh>4.5	S4	2	4	7	30	58	38	16	18			A-6b
912.5		15-25-30	0.7	0.8		qh>4.5	S5								17			A-6b
911.0		10-14-16	1.2	0.3		qh>4.5	S6	2	3	5	28	62	39	17	19			A-6b
909.5	10	9-14-17	1.2	0.3	Brown, Hard, CLAY, moist	qh=4.3	S7	0	0	0	20	80	45	19	25			A-4b
908.0		17-18-20	1.2	0.3		qh>4.5	S8								25			A-4b
906.5		12-9-13	1.0	0.5		qh=2.3	S9	0	0	1	80	19	NP		25			A-4b
905.0		7-11-11	1.0	0.5	Brown, Very Stiff, SILT, wet	qh=2.5	S10											A-4b
904.4																		
903.5																		
902.0	15				Bottom of Boring = 15.0 ft													

*qh * denotes pocket penetrometer strength in tons/SF.

MAHONING COUNTY
MAH-80-0.97

STRUCTURE FOUNDATION INVESTIGATION
MAH-80-0123 L/R OVER MEANDER RESERVOIR

DRAWN: J.M.T.
 REVISED: M.W.W.
 DATE: 9/03/04
 CHECKED: S.S.

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

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DRILLING LOG - MAH-80-0.97																		
Boring No. EB-5		Boring Location: 559+95 , 330' RT, B.L. EB IR-80					Elev. Top of Hole: 916.5 ft											
Total Depth of Hole: 19.5 ft		Drilling Co: L.G. Hetager					Drill Rig: HH 250 ATV											
Date Started: 7/20/04		Hollow-Stem: 4.25" I.D.			Casing Size: n/a			Groundwater: Not Encountered x										
Date Finished: 7/20/04		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: n/a			Driller: Jim Hopkins										
								Inspector: S. Slomski										
Elev. (Ft)	Depth (Ft)	Blows or ROD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
916.5	0	2-4-4	0.7	0.8	Grey & Brown Mottled, Loose to Medium Dense, SANDY SILT, moist		S1	3	6	19	35	37	30	10	19		A-4a	
915.0		7-12-12	0.0	1.5			S2											
913.5 913.2	5	8-12-16	1.1	0.4	Brownish-grey, Very Stiff, SILTY CLAY, moist, trace sand & gravel	qh>4.5	S3	2	3	6	30	59	37	17	17		A-6b	
912.0		12-14-16	0.9	0.6		qh>4.5	S4									17		
910.5		14-19-22	0.7	0.8		Brownish-grey, Very Stiff to Hard, CLAY, moist	qh>4.5	S5	0	2	0	21	77	43	19	23		A-7-6
909.0		7-8-11	1.0	0.5		qh=4.3	S6								25			
907.5 907.1 906.0	10	5-6-6	1.2	0.3	Brown, Medium Dense, SILT, wet, little clay		S7	0	0	1	82	17	NP		26		A-4b	
904.5 904.0 903.0		6-11-10	1.4	0.1			S8								29			
901.5	15	6-9-11	1.0	0.5	Grey, Very Stiff, CLAY, moist	qh=2.7	S9								27			
900.0		5-9-13	1.5	0		qh=4.2	S10	0	1	1	27	70	42	17	24		A-7-6	
898.5		12-22-18	1.0	0.5		qh=2.5	S11											
897.0		5-8-10	1.2	0.3		qh=3.2	S12											
		11-14-15	0.7	0.8		qh=2.5	S13											
	20				Bottom of Boring = 19.5 ft													
	25																	
	30																	
	35																	
	40																	
	45																	
	50																	
	55																	

*qh * denotes pocket penetrometer strength in tons/SF.

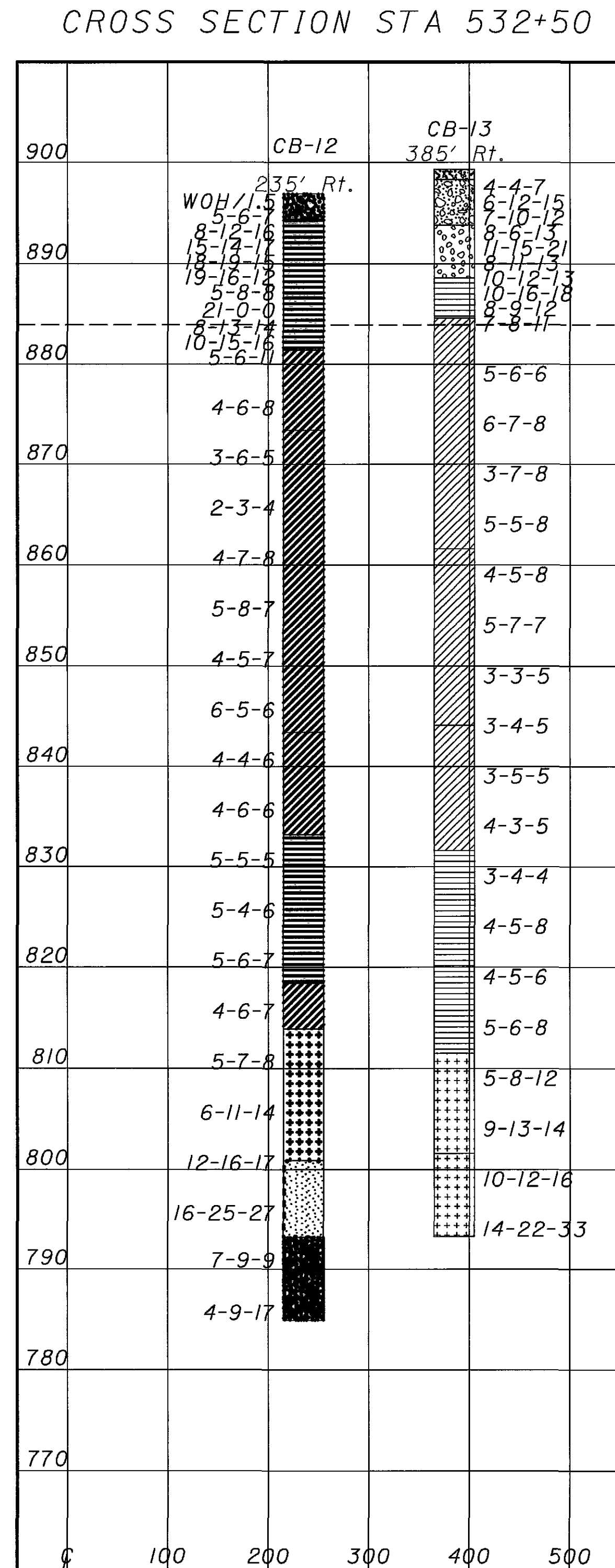
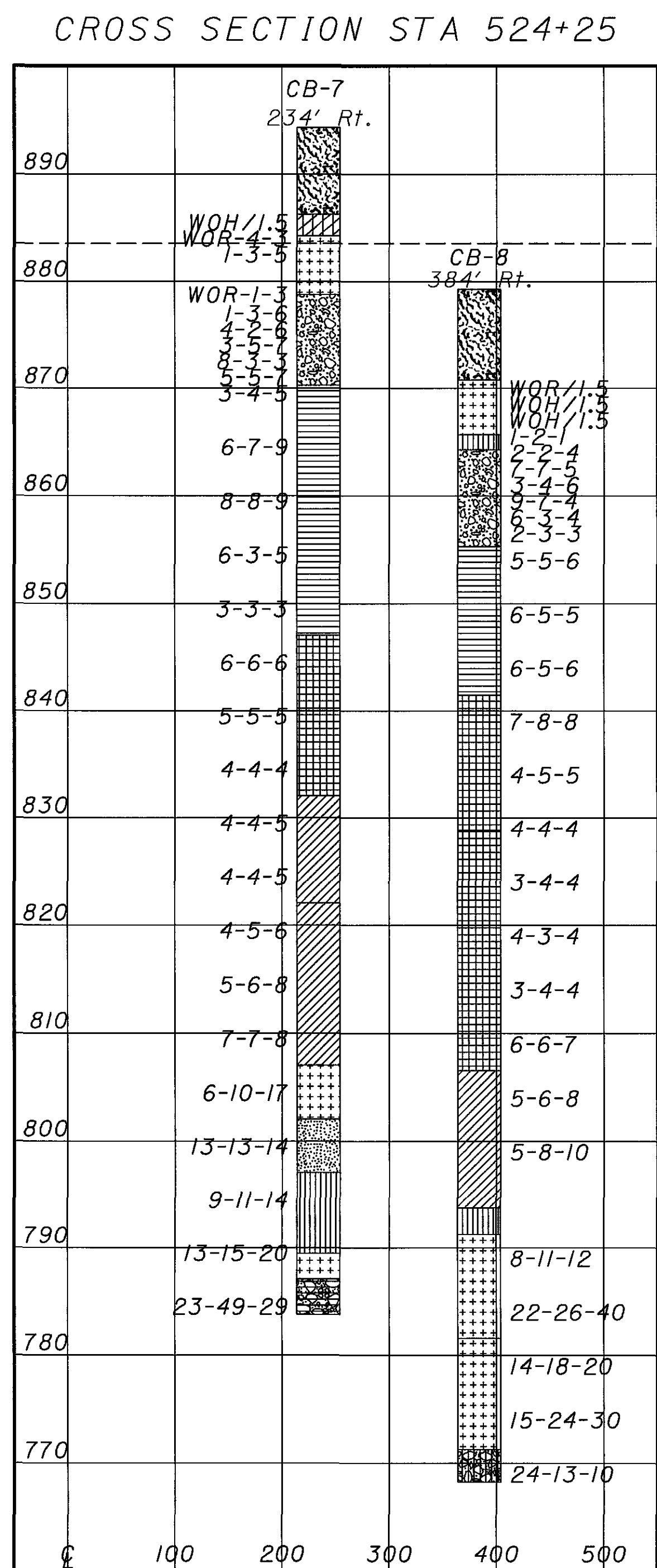
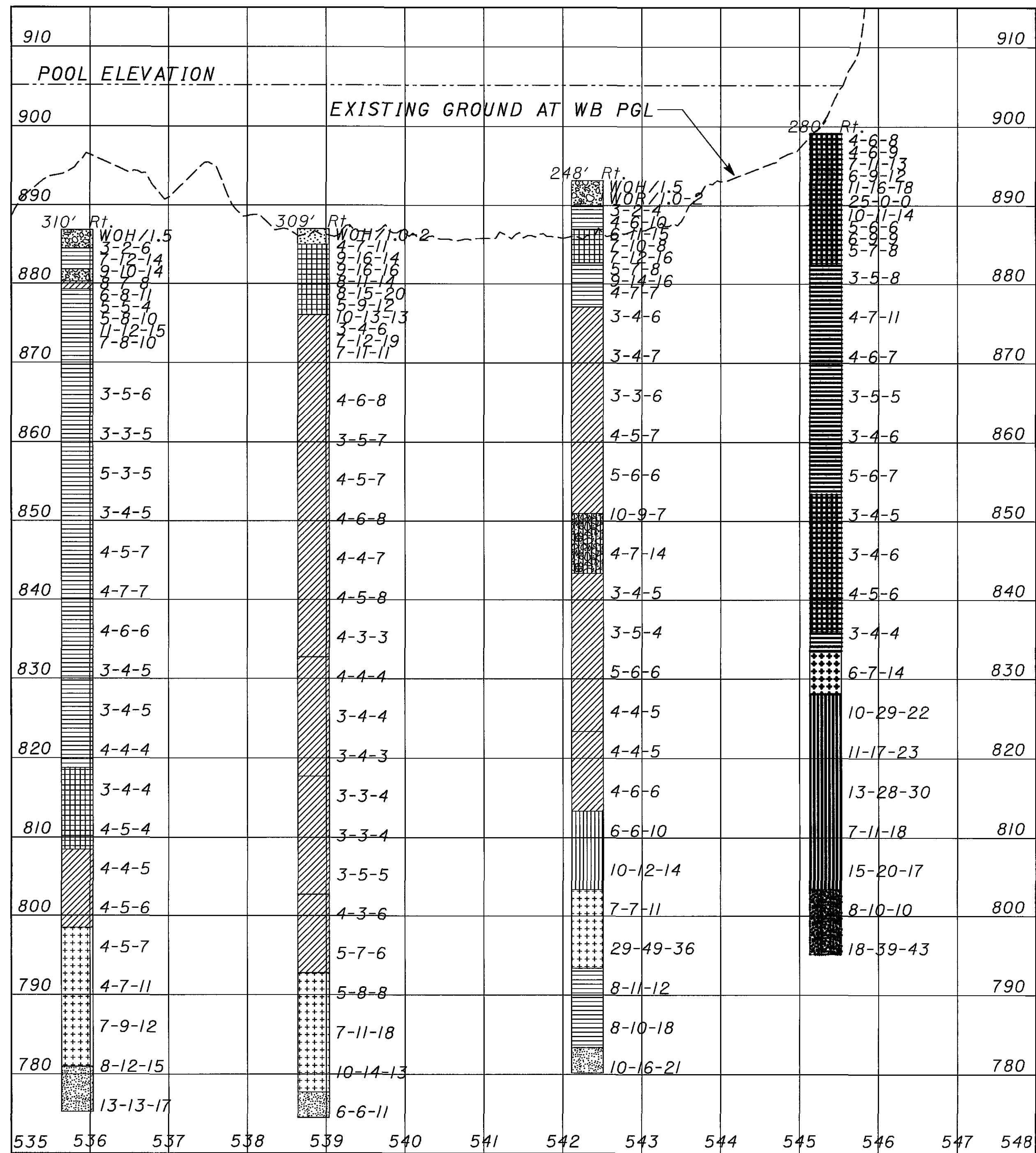
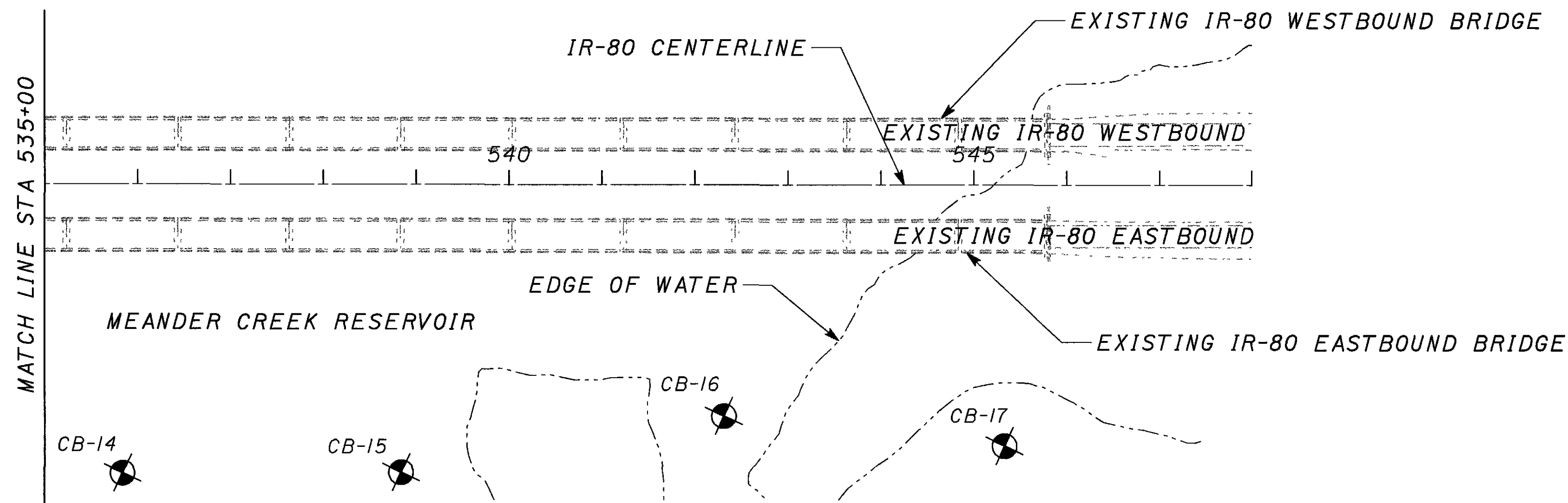
MAHONING COUNTY
 MAH-80-0.97

STRUCTURE FOUNDATION INVESTIGATION
 MAH-80-0123 L/R OVER MEANDER RESERVOIR


GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DRAWN J.M.T.	REVISIONS M.W.W.	DATE 9/03/04	CHECKED S.S.
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HORIZONTAL SCALE IN FEET

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DRAWN	REVIEWED	DATE	CALCULATED
J.M.T.	M.W.W.	2/04/05	
ROADWAY SOIL PROFILE			
CAUSEWAY BORINGS STA. 535+00 TO STA 548+00			
MAHONING COUNTY MAH-80-0.97			
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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. CB-2		Boring Location: 510+25 , 204 ft RT, C.L. IR-80						Elev. Top of Hole: 896.5 ft										
Total Depth of Hole: 27.7 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: Diedrich D25													
Date Started: 10/15/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook												
Date Finished: 10/15/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joseph Troxell												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
896.5	0	WOR/1.5	0.5	1	Black-dark grey SILT; little sand; trace organics; wet	qh=.031	S1											
895.0		WOH/1.5	1.2	0.3		qh=.094	S2	1	3	12	52	32	29	6	38			A-4b
893.5		WOH-2-2	1.2	0.3			S3											
892.0	5	5-3-5	1.3	0.2	Brown COARSE & FINE SAND; some silt & clay; wet	qh=2.0	S4	4	29	32	12	23	NP	NP	20			A-3a A-7-6
891.8							S5	0	0	1	16	83	45	19	32			
891.0		5-9-11	1.0	0.5	Brown CLAY to SILT & CLAY; wet	qh=2.5	S6	3	3	6	29	59	36	15	20			A-6a
890.5		11-15-19	1.4	0.1		qh=2.0	S7								21			
889.0		4-4-7	1.0	0.5	trace sand and gravel	qh=3.0	S8								19			
888.5	10	8-10-16	1.5	0		qh=3.0	S9	0	6	8	25	60	38	15	24			A-6a
886.3		3-4-4	0.7	0.8	Mottled brown and grey SILT & CLAY; wet	qh=2.0 qh=1.0	S10								24			
886.0																		
884.5		3-9-11	0.7	0.8	trace gravel Grey SANDY SILT; moist	qh=1.0 qh=2.0	S11	3	13	23	38	23	NP	NP	15			A-4a
884.0																		
883.7																		
883.0																		
878.0	20				Weathered grey MUDSTONE; clay to sand-sized grain; horizontal bedding	casing plugged; pulled 10' and redrilled	S12	8	6	20	40	26	21	5	10			A-4a
877.5																		
874.0																		
873.0	25	49-50/.4	0.8	0.1			S13											
869.5		30-50/.2	0.7	0	Bottom of Boring = 27.7 ft													
868.8																		

"qh" denotes pocket penetrometer strength in tons/SF.
 Reservoir at El.+901.5; Water depth = 5.0 ft.

Boring Coordinates
 N 530,784.2
 E 2,432,236.0

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. CB-4		Boring Location: 515+39 , 302 ft RT, C.L. IR-80						Elev. Top of Hole: 897.5 ft										
Total Depth of Hole: 50.0 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: Diedrich D25													
Date Started: 10/14/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook												
Date Finished: 10/14/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joseph Troxell												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
897.5	0	3-5-11	0.1	1.4	Brown CLAY; trace gravel and organics; moist	qh=2.0	S1											
896.0		6-8-12	1.5	0	no organics; trace sand	qh=2.0	S2										24	
895.0		5-8-10	0.9	0.6	coarse sand seam <0.1' thick at 6.5'	qh=2.0	S3											
894.5																		
893.0	5	4-6-7	1.4	0.1	no gravel; trace grey mottling	qh=2.5	S4	2	0	0	27	70	44	19	23			A-7-6
891.5		6-7-7	1.5	0		qh=2.5	S5											
890.0		6-9-10	1.3	0.2		qh=2.0	S6										24	
888.5	10	4-6-8	0.7	0.8	mottled brown & grey	qh=1.75	S7											
887.0		5-7-8	1.5	0	Grey SILT & CLAY; moist; trace sand.	qh=1.75	S8	1	2	4	24	69	35	14	22			A-6a
886.3		6-7-9	1.0	0.5		qh=0.5	S9											
885.5		3-5-6	1.0	0.5		qh=1.0	S10										21	
884.0	15																	
879.0	20	4-5-10	1.2	0.3		qh=1.25	S11										20	
874.0																		
873.0	25	3-5-6	1.2	0.3	Brown SILT & CLAY; moist; trace to no sand	qh=1.25	S12	0	0	0	48	52	32	12	29			A-6a
870.5					Grey CLAY; moist													
869.0	30	3-3-3	0.1	1.4			S13											
864.0	35	2-3-4	1.5	0		qh=0.28	S14	0	0	0	2	98	53	25	37			A-7-6
859.0																		
858.0	40	3-3-4	1.5	0	Grey SILT & CLAY; moist. Silt seams <0.1' thick at <0.1' to 0.1' intervals	qh=0.28	S15										37	
854.0	45	3-4-5	1.5	0	silt seams at <0.1' to 0.25' intervals no seams from 47.5' to 48.0'	qh=0.375	S16	0	0	0	31	69	32	12	27			A-6a
851.0					Grey GRAVEL W/ SAND & SILT; wet													
849.0		14-16-15	0.6	0.9			S17	45	12	13	12	18	NP	NP	12			A-2-4
847.5	50				Bottom of Boring = 50.0 ft													

"qh" denotes pocket penetrometer strength in tons/SF.
 Reservoir at El.+901.5; Water depth = 4.0 ft.

Boring Coordinates
 N 530,839.3
 E 2,432,972.8

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

DRAWN: J.M.T.
 REVIEWED: M.W.W.
 DATE: 2/20/04
 CALCULATED: S.S.
 CHECKED: S.S.

69 / 82

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																	
Boring No. CB-6		Boring Location: 52I+60 , 290 ft RT, C.L. IR-80				Elev. Top of Hole: 897.6 ft											
Total Depth of Hole: 57.5 ft		Drilling Co: L.G. Hefager, Inc.		Drill Rig: Diedrich D25													
Date Started: 10/10/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook											
Date Finished: 10/10/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joseph Troxell											
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
897.6	0	WOH/1.5	0.0	1.5	Brown Silty Sand & Gravel; wet		S1										V: A-3a
896.1		2-3-2	0.6	0.9	Brown SANDY SILT; moist		S2	7	28	24	23	18	20	6	15	A-4a	
895.6		3-5-8	0.7	0.8	Mottled grey and light brown; SILT and CLAY	qh=2.5	S3									V: A-6a	
893.1	5	7-12-15	0.7	0.8	0.4' brown fine sand & gravel seam at 8.6'	qh=2.75	S4										
892.3		3-4-6	0.7	0.8	Brown CLAY 0.1' gravel seam at 10.2'	qh=3.15	S5										
891.6		7-12-13	0.8	0.7	trace gravel	qh=2.6	S6	3	2	3	21	71	45	20	24	A-7-6	
888.6	10	4-5-7	1.5	0	(brown clay on spoon)	qh=1.5	S7								25		
887.1		7-12-13	0.0	1.5	(brown clay on spoon)		S8										
885.6		7-8-10	0.0	1.5			S9										
884.1	15	9-10-13	1.5	0	Grey SILTY CLAY; trace gravel	qh=2.5	S10								24		
883.1						qh=1.5											
881.6		3-5-8	0.0	1.5			S11										
876.6	20	4-4-5	1.5	0		qh=1.25	S12	2	4	6	26	62	40	18	22	A-6b	
871.6	25	3-4-6	0.6	0.9			S13								23		
868.4	30																
866.6		4-5-6	0.0	1.5	Grey SILT and CLAY (grey clay on spoon)		S14									V: A-6a	
861.6	35	4-5-6	0.1	1.4	(grey clay on spoon)	Running sand on first try at sampling.	S15										
856.6	40	9-5-9	0.1	1.4	(grey clay in spoon)		S16										
851.6	45	4-7-9	0.1	1.4	Grey Gravelly CLAY		S17										
848.4	50				Grey Silty CLAY varved with silt												
846.6		3-5-5	1.5	0		qh=1.0	S18								29	V: A-7-6	
	55																

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Reservoir at El.+901.6; Water depth = 4.0 ft.

Boring Coordinates
 N 531,074.6
 E 2,433,380.0

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No. CB-6		Boring Location: 52I+60, 290 ft RT, C.L. IR-80				Elev. Top of Hole: 897.6 ft										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
841.6	55															
840.1		3-6-5	1.5	0	Bottom of Boring = 57.5 ft		S19									
	60															
	65															
	70															
	75															
	80															
	85															
	90															
	95															
	100															
	105															
	110															
	115															

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081



DATE: 12/20/04
 REVIEWED: M.W.W.
 DRAWN: J.M.T.
 CALCULATED: S.S.
 CHECKED: S.S.

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. CB-7		Boring Location: 524+35, 234 ft RT, C.L. IR-80						Elev. Top of Hole: 890.3 ft											
Total Depth of Hole: 110.5 ft		Drilling Co: L.G. Hetager, Inc.				Drill Rig: Diedrich D25													
Date Started: 9/5/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook													
Date Finished: 9/9/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: J. Troxell / S.													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
890.3	0				Soft muck														
882.3	7	WOH/1.5	1.0	0.5	Grey ELASTIC CLAY; moist to wet; some organics		S1	0	1	7	51	41	42	12	54			A-7-5	
880.8	10	WOR-4-3	1.4	0.1	Brown SILT; wet less sandy	qh=0.25	S2												
880.3	10					qh<0.50	S3												
879.3	11	1-3-5	1.5	0		qh=0.20 top	ST-1	0	0	21	63	15	24	4	22			A-4b	
877.8	12		2.0	0		qh=0.50 bot													
875.8	15	WOR-1-3-4	0.7	1.3	Grey GRAVEL WITH SAND; wet; trace silt and clay		S4												
874.8	16						S5	12	39	36	3	10	NP	NP	20			A-1-b	
873.8	17	1-3-6	0.7	0.8			S6												
872.3	18	4-2-6	0.3	1.2			S7	35	33	24	4	4	NP	NP	17			A-1-b	
870.8	20	3-5-7	0.4	1.1			S8												
869.3	21	8-3-3	0.2	1.3			S9												
867.8	22	5-5-7	0.2	1.3			S10	2	3	5	30	60	38	16	23			A-6b	
866.3	24	3-4-5	0.7	0.8	Grey SILTY CLAY to SILT & CLAY; trace sand	qh=0.25													
861.3	30	6-7-9	0.1	1.4			S11												
856.3	35	8-8-9	0.2	1.3			S12												
851.3	40	6-3-5	1.3	0.2			S13												
846.3	45	3-3-3	0.8	0.7			S14												
843.1	48																		
841.3	50	6-6-6	1.5	0	Grey CLAY varved with silt; moist	qh=0.25	S15												
839.8	51		2.0	0			ST-2	0	0	0	33	67	41	20	30			A-7-6	
836.3	55	5-5-5	1.5	0		qh=0.25	S16												

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+902.8; Water depth = 12.5 ft.

Boring Coordinates
 N 531,272.6
 E 2,433,605.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. CB-7		Boring Location: 524+35, 234 ft RT, C.L. IR-80						Elev. Top of Hole: 890.3 ft											
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
831.3	60	4-4-4	1.5	0		qh=0.25	S17												
828.1	63				Grey SILT and CLAY, varved; moist	qh=0.25	S18	0	0	0	25	75	37	13	32			A-6a	
826.3	65	4-4-5	1.5	0															
821.3	70	4-4-5	1.5	0		qh=0.25	S19												
818.1	73				Grey SILT and CLAY; moist	qh=0.25	S20												V: A-6a
816.3	75	4-5-6	1.5	0															
811.3	80	5-6-8	1.5	0		qh=0.50	S21												
810.3	81																		
806.3	85	7-7-8	1.5	0			S22												
803.1	88				Grey SILT; no sand seams; no gravel														
801.3	90	6-10-17	1.1	0.4			S23	0	0	1	86	13	NP	NP	28			A-4b	
798.1	93				Grey fine SAND; some silt														
796.3	95	13-13-14	0.4	1.1			S24												V: A-3
793.1	98				Grey SANDY SILT														
791.3	100	9-11-14	1.5	0		qh=1.5	S25	1	2	3	37	57	31	9	24			A-4a	
786.3	105	13-15-20	1.5	0	Grey SILT	qh=2.1	S26												V: A-4b
785.5	106				Grey SAND, SILT and CLAY with ROCK FRAGMENTS														
783.1	108																		
781.3	110	23-49-29	0.6	0.9			S27												V: A-2-6
779.8	111				Bottom of Boring = 110.5 ft														
115	115																		

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

MAHONING COUNTY
 MAH-80-0.97
 CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

DRAWN: J.M.T.
 REVIEWED: M.W.M. 2/20/04
 DATE: 2/20/04
 CALCULATED: S.S.
 CHECKED: S.S.

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. CB-8		Boring Location: 524+33, 384 ft RT, C.L. IR-80					Elev. Top of Hole: 890.5 ft												
Total Depth of Hole: 111.0 ft		Drilling Co: L.G. Hetager, Inc.			Drill Rig: Diedrich D25			Driller: Lee Cook											
Date Started: 9/9/02		Hollow-Stem: n/a			Casing Size: 4-inch O.D.			Inspector: Stephen Slomski											
Date Finished: 9/11/02		Sampler Type: 2-inch Split-Spoon			Drilling Fluid: Water														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.			
890.5	0				Soft Muck														
882.0	8	WOR/1.5	0.8	0.7	Dark Grey SILT; organics; wet		S1												
880.5	10	WOH/1.5	1.5	0	0.2' Silty Fine SAND seam, greyish-brown at 11.3'		S2												
879.0	11.3	WOH/1.5	0.9	0.6	Grey SILT	qh<0.25	S3	0	0	7	52	41	33	10					
877.5	12	1-2-1	1.4	0.1	Grey SANDY SILT; with brown mottles		S4	0	4	44	30	22	NP	NP					
876.9	13	2-2-4	1.3	0.2	Brown to grey GRAVEL WITH SAND; wet; some silt		S5												
875.5	14	7-7-5	0.8	0.7			S6												
873.0	16	3-4-6	0.3	1.2			S7												
871.5	18	9-7-4	0.3	1.2			S8												
870.0	20	6-3-4	0.1	1.4			S9												
868.5	22	2-3-3	0.2	1.3			S10												
866.5	24				Grey SILTY CLAY (grey clay on spoon)		S11												
866.0	25	5-5-6	0.0	1.5															
861.0	29	6-5-5	0.1	1.4	(grey clay on spoon)		S12												
859.5	31			2.0		qh=1.0 top qh=1.5 bot qt=0.80 tsf	ST-1	2	2	6	37	53	36	19					
856.0	34	6-5-6	1.2	0.3		qh=0.90	S13												
852.7	37																		
851.0	39	7-8-8	0.1	1.4	(grey clay on spoon)		S14												
846.0	44	4-5-5	0.7	0.8	Grey CLAY; moist	qh=0.28	S15	0	1	1	7	92	51	25					
841.0	49																		
840.1	50	4-4-4	1.5	0	Grey CLAY varved with silt; moist	qh=0.75	S16												
836.0	55																		

"V" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+902.5; Water depth = 12.0 ft.

Boring Coordinates
 N 531,135.6
 E 2,433,666.9

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. CB-8		Boring Location: 524+33, 384 ft RT, C.L. IR-80					Elev. Top of Hole: 890.5 ft												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.			
834.5	55	3-4-4	1.5	0		qt=0.55 tsf qh=0.90	ST-2												
831.0	60	4-3-4	1.5	0		qh=0.60	S18												34
826.0	65	3-4-4	1.5	0		qh=0.58	S19	0	0	0	23	77	41	16					31
821.0	70	6-6-7	1.5	0		qh=0.50	S20												34
817.8					Grey SILT & CLAY; trace sand														
816.0	75	5-6-8	1.5	0		qh=0.25 to 0.50	S21	0	0	1	34	65	34	13					29
811.0	80	5-8-10	1.5	0		qh=0.50 to 0.70	S22												25
809.5				0.0			ST-3a												
806.0	85		1.7	0.1	Grey SANDY SILT; moist		ST-3	16	10	10	41	23	23	7					19
805.0																			
802.5					Grey SILT; trace to no gravel														
801.0	90	8-11-12	0.8	0.7		qh=0.75	S23												30
796.0	95	22-26-40	0.1	1.4	(1.5" sandstone fragment)		S24												
792.8																			
791.0	100	14-18-20	1.3	0.2	Grey SILT to FINE SAND		S25	0	0	32	56	12	NP	NP					22
786.0	105	15-24-30	1.1	0.4	trace gravel		S26												21
782.5					Grey SAND and SILT with ROCK FRAGMENTS														
781.0	110	24-13-10	0.4	1.1			S27												10
779.5					Bottom of Boring = 111.0 ft														
115																			

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081



CALCULATED
 CHECKED
 S.S.

DATE
 2/20/04

REVIEWED
 M.W.W.

DRAWN
 J.M.T.

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. CB-9		Boring Location: 527+49, 360 ft RT, C.L. IR-80					Elev. Top of Hole: 882.9 ft													
Total Depth of Hole: 133.5 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25																		
Date Started: 9/12/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.					Driller: Lee Cook													
Date Finished: 9/17/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water					Inspector: S. Slomski/J. Troxell													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.					
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.				
882.9	0	WOR/1.5	1.2	0.3	Muck - Dark grey SILT; very wet consistency of pudding		S1													
881.4		WOR/1.5	1.5	0	Grey SILT; wet		S2	0	0	7	53	39	33	8	40					A-4b
880.5		WOR/1.5	1.0	0.5			S3													
879.9		WOR/1.5	1.0	0.5			S3													
878.4	5	1-1-1	0.2	1.3	Grey COARSE & FINE SAND; trace fines; wet	No recovery from tube at 4.5-6.5'	S4													
876.9		1-1-1	0.5	1			S5	3	17	68	4	8	NP	NP	25					A-3a
875.4		1-1-1	0.2	1.3			S6													
873.9	10	4-5-6	0.2	1.3	Grey SILTY CLAY; trace gravel; moist (clay on spoon)		S7													
872.4		3-3-5	0.0	1.5			S8													
870.9			1.6	0.4			ST-1	2	2	6	36	54	34	16	23					A-6b
868.9	15	3-4-6	0.0	1.5			S9													
864.4	20																			
861.4		6-7-9	1.5	0	Grey SILT & CLAY; moist		S10	3	3	6	29	60	34	15	23					A-6a
856.4	25	4-4-6	0.4	1.1			S11													
851.4	30	5-6-6	1.3	0.2			S12													
849.9			2.2	0.0			ST-2	1	3	5	39	52	33	15	23					A-6a
846.7	35	3-3-4	1.5	0	Grey CLAY varved with silt; moist		S13	0	0	0	5	95	49	22	35					A-7-6
845.9																				
841.4	40	3-4-4	1.5	0			S14													
836.4	45	3-4-5	1.5	0			S15													
831.4	50	3-4-7	1.5	0			S16													
	55																			

"V" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Reservoir at El.+902.4; Water depth = 19.5 ft.

Boring Coordinates
 N 531,290.3
 E 2,433,943.7

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																					
Boring No. CB-9		Boring Location: 527+49+15, 360 ft RT, C.L. IR-80					Elev. Top of Hole: 882.9 ft														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.						
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.					
828.2	55				Grey CLAY; moist	qh=0.50	S17	0	0	0	15	85	42	16	33					A-7-6	
826.4		5-5-6	1.5	0																	
821.4	60	4-5-6	1.5	0		qh=0.30	S18													38	
818.2	65				Grey SILTY CLAY; moist																
816.4		4-6-6	1.5	0		qh=0.50	S19													26	
814.9	70		2.3	-0.3		qt=0.43 & 0.48 tsf qh=0.82	ST-3	0	0	2	38	60	35	16	28					A-6b	
812.2					Grey SILT; moist																
811.4	75	6-7-7	1.5	0		qh=0.70	S20													28	
806.4	80	5-7-9	1.5	0		qh=0.80	S21	0	0	0	54	46	28	9	23					A-4b	
803.2					Grey SILT; wet																
801.4	85	6-9-11	1.5	0			S22	0	0	0	81	19	NP	NP	32					A-4b	
796.4	90	6-7-14	1.3	0.2			S23													32	
793.2					Grey FINE SAND; trace fines; wet																
791.4	95	16-19-23	1.0	0.5			S24													23	
786.4	100	13-16-19	1.0	0.5			S25														
783.4					Grey GRAVEL & SAND; trace fines; wet Gravel sub-angular to sub-rounded																
781.4	105	24-28-25	0.9	0.6			S26	50	24	17	5	4	NP	NP	11					A-1-a	
776.4	110	36-27-23	0.8	0.7	Gravel predominately grey claystone fragments. Rock fragments black, orange, and brown color.		S27	67	13	8	8	4	NP	NP	8						A-1-a
771.4		25-25-26	0.8	0.7			S28														
	115																				

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

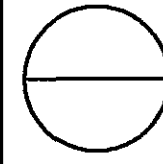
DRAWN: J.M.T. REVIEWED: M.W.W. DATE: 2/20/04 CALCULATED: CHECKED: S.S.

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

73 / 82

Boring No. CB-9					DRILLING LOG - MAH-80-0.97 (PID No. 6080)		Boring Location: 527+49+15, 360 ft RT, C.L. IR-80		Elev. Top of Hole: 882.9 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
766.4	115		0.1	0.1	(1 piece grey siltstone gravel, angular)		S29											
763.4	120				Grey SILT; little sand and gravel; wet													
761.4		26-46-50/ .4	0.9	0.5		qh=1.25	S30	14	8	6	58	14	NP	NP	18			A-4b
756.4	125		0.0	0.2			S31											
751.4	130		0.0	0.2			S32											
750.4			0.2	0.8	Grey Sandstone; may be from cobble or boulder		R1											
749.4					Bottom of Boring = 133.5 ft													
	135																	
	140																	
	145																	
	150																	
	155																	
	160																	
	165																	
	170																	
	175																	



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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No. CB-10		Boring Location: 528+49, 260 ft RT, C.L. IR-80						Elev. Top of Hole: 883.0 ft												
Total Depth of Hole: 113.7 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25						Driller: Lee Cook												
Date Started: 9/18/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.						Inspector: Joseph Troxell												
Date Finished: 9/19/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water																		
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.					
883.0	0				Muck - Dark grey SILT with organics															
882.0																				
881.5																				
880.8																				
880.5																				
879.0																				
877.5																				
876.0																				
874.5																				
873.0																				
871.5																				
870.0																				
868.5																				
864.0																				
862.0																				
857.0																				
853.8																				
852.0																				
847.0																				
842.0																				
838.8																				
837.0																				
832.0																				
828.8																				

"V" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+902.5; Water depth = 19.5 ft.

Boring Coordinates
 N 531,423.1
 E 2,433,992.3

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																						
Boring No. CB-10		Boring Location: 528+49, 260 ft RT, C.L. IR-80						Elev. Top of Hole: 883.0 ft														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.						
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.							
827.0	55	3-3-4	1.5	0	Grey CLAY; moist	qh=0.50	S18														V: A-7-6	
822.0	60	3-3-5	1.5	0		qh=0.25	S19															
817.0	65	6-5-6	1.5	0		qh=0.25	S20															
813.8	70																					
812.0	70	4-4-8	1.5	0	Grey SILTY CLAY; moist	qh=0.50	S21															V: A-6b
807.0	75	7-8-10	1.5	0		qh=0.50	S22															
803.8	80																					
802.0	80	8-11-15	1.5	0	Grey SILT; wet	qh=0.25	S23															
797.0	85	6-9-14	1.3	0.2		qh<0.25	S24															
792.0	90	11-17-24	0.1	1.4			S25															
787.0	95	10-18-18	1.1	0.4			S26	0	0	37	51	12	NP	NP	23						A-4b	
783.8	100																					
782.0	100	17-24-31	1.5	0	Grey GRAVEL & SAND; trace fine; wet Gravel sub-angular to sub-rounded	running sand to 98'	S27															
778.5	105																					
777.0	105	15-25-21	0.9	0.6			S28															
772.0	110																					
769.5	115	31-25-21	1.0	0.5		casing refusal at 113.5'	S29	59	19	10	7	5	NP	NP	8						A-1-a	
769.3	115		0.2	0	Bottom of Boring = 113.7 ft		S30															

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DRAWN: J.M.T. REVIEWED: M.W.W. DATE: 2/20/04
 CALCULATED: S.S. CHECKED: S.S.

MAHONING COUNTY
 MAH-80-0.97
 CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

75 / 82

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																						
Boring No.		CB-II		Boring Location: 529+49, 360 ft RT, C.L. IR-80				Elev. Top of Hole: 884.2 ft														
Total Depth of Hole:		113.9 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25																		
Date Started:		9/23/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.				Driller: Lee Cook														
Date Finished:		9/25/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water				Inspector: Joseph Troxell														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.						
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.							
884.2	0				Soft Muck																	
881.7	5	WOH/1.5	1.2	0.3	0.8' Brown-black SILT with Organics at 2.5'; wet Brown SANDY SILT; trace organics; wet		S1													V: A-4b		
880.9		WOH/1.5	1.0	0.5			S2	0	4	59	18	19	NP	NP	28							A-4a
878.7	10	1-2-2	0.5	1	grey-brown grey		S3															
877.2		WOH/1.0-2	0.1	1.4			S4															
875.7	15	2-1-2	0.6	0.9	Grey GRAVEL W/ SAND; trace clay; wet		S5															
874.2		1-2-3	1.1	0.4			S6															
873.2	20	2-2-3	0.2	1.3	more clayey		S7															
872.7		3-2-2	0.2	1.3			S8															
871.2	25	1-2-3	0.7	0.8	Grey SILT & CLAY; moist		S9	38	32	18	3	9	NP	NP	16						A-1-b	
869.7		13-6-4	0.1	1.4			S10															
868.2	30				qh=0.16		S11	2	3	6	25	64	32	11	25						A-6a	
864.2		4-2-4	0.4	1.1																		
861.7	35				qh=0.25		S12	37	30	18	5	10	NP	NP	12						A-1-b	
856.7		8-5-6	1.0	0.5																		
856.0	40				qh=0.28		S13	8	3	5	25	59	36	16	22						A-6b	
854.2		3-4-6	0.8	0.7																		
851.7	45				qh=0.25 to 0.5		S14	91	6	1	2		NP	NP	7						A-1-a	
851.2		11-4-5	0.4	1.1																		
849.2	50				qh=0.28		S15														V: A-6a	
846.7		4-5-6	1.4	0.1																		
845.2	55				qh=0.50		S16															
841.7		4-4-5	0.9	0.6																		
836.7	55				qh=0.50		S17	0	0	0	10	90	44	18	34						A-7-6	
833.4		3-4-5	1.5	0																		
831.7																						

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Reservoir at El.+902.2; Water depth = 18.0 ft.

Boring Coordinates
N 531,374.4
E 2,434,125.1

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																					
Boring No.		CB-II		Boring Location: 529+49, 360 ft RT, C.L. IR-80				Elev. Top of Hole: 884.2 ft													
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.					
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.						
826.7	55	3-4-4	1.5	0		qh=0.28	S18														
821.7	60	5-4-6	1.5	0			S19														
816.7	65					qh=0.20	S20														
813.4	70				Grey SILTY CLAY; moist																
811.7	75	5-6-7	1.5	0		qh=0.50	S21														V: A-6b
806.7	80	5-5-8	1.5	0		qh=0.28	S22														
801.7	85	9-10-12	1.5	0	Grey SILT; wet; trace sand		S23														
800.7	90					qh=0.19	S24														
796.7	95	10-12-16	1.3	0.2			S25	0	0	3	82	15	NP	NP	24						A-4b
791.7	100	12-13-13	1.0	0.5	Grey SILT to FINE SAND; wet		S26	0	0	22	64	14	NP	NP	24						A-4b
788.4	105						S27														
786.7	110				Grey to black GRAVEL & SAND; wet; trace fines gravel angular to sub-angular		S28	31	24	32	4	10	NP	NP	11						A-1-b
781.7	115	49-50-50/4	1.0	0.4			S29	58	13	13	8	8	NP	NP	7						A-1-b
778.2					Bottom of Boring = 113.9 ft																
776.7																					
775.2																					
771.7																					
770.3																					

CAUSEWAY REALIGNMENT CONCEPT
IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081

DRAWN: J.M.T. REVIEWED: M.W.W. DATE: 2/20/04 CALCULATED: CHECKED: S.S.

76 / 82

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No.		CB-12		Boring Location: 532+59, 235 ft LT, C.L. IR-80					Elev. Top of Hole: 896.9 ft										
Total Depth of Hole:		112.0 ft		Drilling Co: L.G. Helager, Inc.		Drill Rig: Diedrich D25													
Date Started:		9/30/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.			Driller: Lee Cook										
Date Finished:		10/1/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water			Inspector: Stephen Slomski										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
896.9	0	WOH/1.5	0.0	1.5	Brown Silty SAND		S1												V: A-1-b
895.4		5-6-7	0.5	1	with gravel		S2	7	2	4	20	67	40	16	20			A-6b	
894.4		8-12-16	1.3	0.2	Brown SILTY CLAY; moist		S3												
893.9					0.8' Brown Silty SAND & GRAVEL at 8.0';		S4												
893.1					wet (from 3" spoon)	No recovery from tube at 9.5-11.5'	S5												
892.4	5	15-14-17	0.0	1.5			S6												
890.9		18-19-15	0.0	1.5			S7												
889.4		19-16-12	0.8	0.7	Greyish-brown SILTY CLAY; trace sand & gravel; moist	qh=4.0	S8												
887.9		5-8-8	0.9	0.6	brown & grey	qh=3.8	ST-1	4	2	4	33	57	40	20	21			A-6b	
886.4	10				grey	qt=1.3 tsf	S9												
884.4		8-13-14	0.3	1.2	grey	qh=3.8	S10	0	1	5	26	68	36	13	28			A-6a	
882.9	15	10-15-16	0.0	1.5	Grey SILT & CLAY; trace sand; moist	qh=1.6													
881.4		5-6-11	1.2	0.3															
876.4	20	4-6-8	0.0	1.5	(silty clay on spoon)		S11												
873.4					Grey SILT & CLAY; trace gravel; moist														
871.4	25	3-6-5	1.2	0.3			S12												
866.4	30	2-3-4	0.0	1.5	(grey clay on spoon)		S13												
864.9						qt=0.56 tsf	ST-2	3	4	6	37	50	33	15	21			A-6a	
861.4	35	4-7-8	0.0	1.5	(grey clay on spoon)		S14												
856.4	40	5-8-7	1.1	0.4		qh=0.98	S15												
851.4	45	4-5-7	1.5	0			S16	4	4	6	31	55	33	12	22			A-6a	
846.4	50	6-5-6	1.4	0.1	0.3' Grey Silty SAND at 51.0'		S17												
843.4	55				Grey SILT & CLAY varved with silt; moist														

Drove 3-inch spoon from 4.0'-7.5' and recovered silty clay like S-3.
 "V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+901.9; Water depth = 5.0 ft.

Boring Coordinates
 N 531,618.3
 E 2,434,353.7

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No.		CB-12		Boring Location: 532+59, 235 ft LT, C.L. IR-80					Elev. Top of Hole: 896.9 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
841.4	55	4-4-6	1.5	0			S18											
836.4	60	4-6-6	1.5	0			S19	0	0	0	22	78	40	15	31			A-6a
833.2																		
831.4	65	5-5-5	1.5	0	Grey SILTY CLAY; moist	qh=0.78	S20											V: A-6b
826.4	70	5-4-6	1.5	0		qh=0.75	S21											
821.4	75	5-6-7	1.5	0			S22											
818.4	80				Grey SILT & CLAY; wet													
816.4		4-6-7	1.5	0		qh=0.53	S23											
814.9							ST-3	0	0	0	50	50	31	13	30			A-6a
813.9					Grey SILT; wet	qt=0.70 tsf												
811.4	85	5-7-8	1.5	0		qh=3.00	S24	0	0	0	62	38	NP	NP	33			A-4b
806.4	90	6-11-14	1.1	0.4		qh=1.20	S25											
801.4	95	12-16-17	1.1	0.4	Grey FINE SAND; some fines; wet		S26											
800.9																		
796.4	100	16-25-27	1.1	0.4	0.7' Brown medium sand, trace fines at 100.5'		S27	0	0	67	20	13	NP	NP	19			A-3a
793.2																		
791.9	105	7-9-9-5	0.4	1.6	Grey SAND & SILT; wet		S28											V: A-2-4
786.4	110	4-9-17	0.0	1.5	(traces of sand in spoon)		S29											
784.9					Bottom of Boring = 112.0 ft	Casing refusal.												
115																		

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

CALCULATED
 DATE 12/20/04
 REVIEWED M.W.W.
 DRAWN J.M.T.
 CHECKED S.S.

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No.		Boring Location: 532+59, 385 ft RT, C.L. IR-80						Elev. Top of Hole: 897.1 ft												
Total Depth of Hole:		Drilling Co: L.G. Helager, Inc.				Drill Rig: Diedrich D25														
Date Started:		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook														
Date Finished:		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Joseph Troxell														
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.				
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.					
897.1	0				Soft Muck															
896.1	4-4-7	0.7	0.8		Black to brown SAND W/ GRAVEL; wet		S1													
894.6	6-12-15	1.5	0		1.0' Brown & grey mottled CLAY at 3.0'	qh=3.5	S2													
894.1	7-10-12	0.7	0.8		Brown GRAVEL; little sand and fines; wet gravel sub-angular to rounded		S3	36	33	18	5	8	NP	NP	18					
893.1	8-6-13	0.2	1.3				S4													
891.6	11-15-21	0.7	0.8		0.7' Sandy Clay with gravel at 10.0'		S5	71	9	6	4	10	NP	NP	11					
890.1	8-11-13	0.1	1.4				S6													
888.6	10-12-13	0.8	0.7				S7													
887.1	10-16-18	1.5	0		Brown SILTY CLAY; grey mottling; moist; trace sand	qh=4.0 qh=2.5	S8													
886.4	8-9-12	1.0	0.5		Grey SILT & CLAY; trace sand; moist	qh=0.25	S9													
885.6	7-8-11	1.4	0.1				S10	4	4	6	27	59	32	12	20					
882.6	5-6-6	0.3	1.2		Grey SILT & CLAY; moist		S11													
882.4	6-7-8	0.1	1.4				S12													
877.6	3-7-8	0.1	1.4		Grey SILT & CLAY; moist		S13													
872.6	5-5-8	1.2	0.3				S14													
867.6	4-5-8	0.1	1.4		Grey SILT & CLAY; moist		S15													
862.6	5-7-7	1.5	0				S16													
859.4	3-3-5	1.4	0.1		Grey SANDY SILT; moist	qh=0.50	S17													
857.6	14-22-33	1.5	0				S18													
852.6																				
847.6																				
842.6																				

V: denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+902.1; Water depth = 5.0 ft.

Boring Coordinates
 N 531,482.2
 E 2,434,416.8

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No.		Boring Location: 532+59, 385 ft RT, C.L. IR-80						Elev. Top of Hole: 897.1 ft											
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
841.9	55	3-4-5	1.5	0	Grey SILT & CLAY varved with silt, moist		S18												
837.6	60	3-5-5	1.5	0	Grey SILTY CLAY; moist	qh=0.50	S19	0	0	0	26	74	37	14	31				A-6a
832.6	65	4-3-5	1.5	0			S20												
829.4	70	3-4-4	1.5	0	Grey SILTY CLAY; moist	qh=0.50	S21												V: A-6b
827.6	75	4-5-8	1.5	0			S22												
822.6	80	4-5-6	1.5	0	Grey SILT; moist	qh=0.375	S23												
817.6	85	5-6-8	1.5	0			S24												
812.6	90	5-8-12	1.5	0	Grey SILT; moist	qh=0.625	S25	0	0	0	78	22	NP	NP	32				A-4b
809.3	95	9-13-14	1.2	0.3			S26												
807.6	100	10-12-16	1.2	0.3	Grey SANDY SILT; moist	qh=0.375	S27												
802.6	105	14-22-33	1.5	0			S28	0	0	22	67	11	NP	NP	25				
799.4					Bottom of Boring = 106.0 ft														
797.6																			
792.6																			
791.1																			
	110																		
	115																		

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081



CALCULATED
 CHECKED
 S.S.

DATE
 2/20/04

REVIEWED
 M.W.W.

DRAWN
 J.M.T.

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

78 / 82



DRILLING LOG - MAH-80-0.97 (PID No. 6080)																	
Boring No.		Boring Location: 535+84, 310 ft RT, C.L. IR-80					Elev. Top of Hole: 899.9 ft										
Total Depth of Hole: 111.6 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25															
Date Started: 10/2/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.					Driller: Lee Cook										
Date Finished: 10/3/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water					Inspector: Stephen Slomski										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
899.9	0	WOH/1.5	0.0	1.5	Clayey SAND w/ GRAVEL; brown; wet (grab sample)		S1										V: A-1-b
898.3		3-2-6	0.9	0.6			S2	0	1	7	34	59	39	16	23	A-6b	
897.5		7-12-14	1.5	0	SILTY CLAY; trace sand; mottled grey & red-brown; moist	qh=3.3 qh=3.4	S3										
895.3	5	9-10-14	0.4	1.1	Brown Silty GRAVEL & SAND; wet		S4									V: A-1-b	
894.8		8-7-8	0.5	1	Brown SILT & CLAY; moist		S5									V: A-6a	
893.8		6-8-11	0.3	1.2	Grey SILTY CLAY; trace Sand & Gravel; moist	qh=2.6	S6								21		
892.3		5-5-4	0.1	1.4			S7										
890.8	10	5-8-10	0.6	0.9		qh=3.0	S8								19		
889.3		11-12-15	0.0	1.5	(grey clay on spoon)		S9										
887.8		7-8-10	0.0	1.5			S10										
886.3	15			1.4		qt=0.56 tsf qh=0.90	ST-1	2	3	5	36	54	32	16	19	A-6b	
884.8																	
879.8	20	3-5-6	0.6	0.9			S11										
874.8	25	3-3-5	0.9	0.6			S12								26		
869.8	30	5-3-5	1.4	0.1		qh=0.75	S13										
864.8	35	3-4-5	1.4	0.1		qh=1.00	S14								23		
859.8	40	4-5-7	0.0	1.5			S15										
858.3				1.8		qt=0.84 tsf qh=1.50	ST-2	5	4	5	37	49	34	17	21	A-6b	
854.8	45	4-7-7	0.0	1.5	(grey clay on spoon)		S16										
849.8	50	4-6-6	1.4	0.1		qh=1.30	S17								22		

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Reservoir at El.+901.8; Water depth = 1.9ft.

Boring Coordinates
N 531,687.0
E 2,434,680.1

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																
Boring No.		Boring Location: 535+84, 310 ft RT, C.L. IR-80					Elev. Top of Hole: 899.9 ft									
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics							ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
844.8	55	3-4-5	1.5	0	Grey SILTY CLAY varved with silt; moist	qh=0.5 to 0.75	S18									
844.4																
839.8	60	3-4-5	1.5	0		qh=1.00	S19									
838.3				2.2		qt=0.41 tsf qh=1.5	ST-3	0	0	0	36	64	36	16	32	A-6b
834.8	65	4-4-4	1.5	0		qh=0.83	S20									
831.8																
829.8	70	3-4-4	1.5	0	Grey CLAY; moist		S21									
824.8	75	4-5-4	1.5	0		qh=0.50	S22	0	0	0	8	92	45	19	38	A-7-6
821.5																
819.8	80	4-4-5	1.5	0	Grey SILT & CLAY; moist	qh=0.80	S23	0	0	0	26	74	37	14	30	A-6a
814.8	85	4-5-6	1.5	0		qh=0.75	S24	0	0	0	40	60	31	11	25	A-6a
811.5																
809.8	90	4-5-7	1.5	0	Grey SILT; wet		S25									
804.8	95	4-7-11	1.5	0			S26	0	0	0	80	20	NP	NP	33	A-4b
799.8	100	7-9-12	1.0	0.5			S27									
794.8	105	8-12-15	1.0	0.5	Grey SILT & FINE SAND; wet		S28									
794.0																
789.8	110	13-13-17	1.0	0.5			S29									V: A-4b
788.3					Bottom of Boring = 111.6 ft											
115																

CAUSEWAY REALIGNMENT CONCEPT
IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
MAH-80-0.97

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081

DRAWN: J.M.T.
REVIEWED: M.W.M.
DATE: 12/20/04
CALCULATED: S.S.
CHECKED: S.S.

79/82

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																			
Boring No. CB-15		Boring Location: 538+84, 309 ft RT, C.L. IR-80					Elev. Top of Hole: 897.8 ft												
Total Depth of Hole: 112.5 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25																	
Date Started: 10/3/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.					Driller: Lee Cook												
Date Finished: 10/4/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water					Inspector: Stephen Slomski												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.			
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
897.8	0	WOH/1-2	0.2	1.3	Coarse to medium SAND; brownish-grey; wet		S1											V: A-3a	
896.3		4-7-11	0.9	0.6	CLAY; trace sand; mottled red-brown and grey; moist mottled to brown brown	qh=3.9	S2											A-7-6	
895.8		9-16-14	0.8	0.7		qh=4.25	S3										22		
894.8		9-16-16	1.1	0.4		qh=3.7	S4												
893.3	5	8-11-14	1.1	0.4		qh=4.0	S5	2	2	3	20	72	42	19	23				
891.8		8-15-20	1.0	0.5		qh=3.8	S6												
890.3		5-9-12	1.0	0.5	qh=4.0	S7											22		
888.8	10	10-13-13	0.8	0.7	Grey SILT & CLAY; trace sand; moist	qh=1.5	S8											A-6a	
887.3		3-4-6	0.8	0.7		qh=1.8	S9												23
886.8		7-12-19	1.0	0.5		qh=2.5	S10	1	2	4	23	69	37	15	22				
885.8		7-11-11	0.0	1.5	(clay in spoon)		S11												
884.3	15																		
882.8																			
876.8	20	4-6-8	1.2	0.3		qh=1.3	S12										21		
871.8	25	3-5-7	0.0	1.5			S13												
866.8	30	4-5-7	0.2	1.3			S14												
861.8	35	4-6-8	0.0	1.5	(grey clay in spoon)		S15												
856.8	40	4-4-7	0.8	0.7		qh=0.80	S16	2	3	7	27	62	32	13	22				
851.8	45	4-5-8	0.0	1.5	(grey clay on spoon)		S17												
846.8	50	4-3-3	0.7	0.8			S18										30		
843.5	55																		

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF.
 Reservoir at El.+901.8; Water Deth = 4.0 ft.

Boring Coordinates
 N 531,814.5
 E 2,434,951.7

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																	
Boring No. CB-15		Boring Location: 538+84, 309 ft RT, C.L. IR-80					Elev. Top of Hole: 897.8 ft										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.	
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
841.8	55	4-4-4	1.5	0	Grey SILT & CLAY varved with silt; moist		S19	0	0	0	31	69	34	13	29		
836.8	60	3-4-4	1.5	0		qh=1.00	S20										
831.8	65	3-4-3	1.5	0		qh=0.80	S21										38
828.5	70																
826.8	75	3-3-4	1.5	0	Grey SILT & CLAY; moist	qh=0.75	S22										
821.8	80	3-3-4	1.5	0		qh=0.60	S23	0	0	0	22	78	38	13	31		
816.8	85	3-5-5	1.5	0	0.2' silt seam at 85.7'		S24										27
813.5	90																
811.8	95	4-3-6	1.5	0	Grey SILT & CLAY; moist	qh=0.80	S25										26
807.3	100	5-7-6	1.5	0		qh=0.90	S26										
806.8																	
803.5	105	5-8-8	1.5	0	Grey SILT; wet	qh=0.70	S27										33
801.8	110																
796.8	105	7-11-18	1.5	0			S28										29
791.8	100	10-14-13	1.3	0.2			S29	0	0	5	77	18	NP	NP	26		
788.5	95																
786.8	90	6-6-11	0.7	0.8	Grey FINE SAND; wet		S30	4	13	74	3	6	NP	NP	18		
785.3	85				Bottom of Boring = 112.5 ft												
	115																

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

GANNETT FLEMING ENGINEERS &
 ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DRAWN: J.M.T.
 REVIEWED: M.W.W.
 DATE: 2/20/04
 CALCULATED: S.S.
 CHECKED: S.S.

80/82

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No.		CB-16		Boring Location: 542+31, 248 ft RT, C.L. IR-80						Elev. Top of Hole: 898.8 ft										
Total Depth of Hole:		113.0 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25						Driller: Lee Cook										
Date Started:		10/7/02		Hollow-Stem: n/a Casing Size: 4-inch O.D.						Inspector: Stephen Slomski										
Date Finished:		10/8/02		Sampler Type: 2-inch Split-Spoon Drilling Fluid: Water						Inspector: Stephen Slomski										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.					
898.8	0	WOH/1.5	0.0	1.5	Dark brown silty SAND; trace gravel; wet (from traces in spoon)		S1													V: A-1-b
897.3		WOH/1.0-2	0.0	1.5			S2													
895.8		3-2-4	1.0	0.5	Mottled grey and brown SILTY CLAY; moist	qh=1.30	S3													
895.5					trace gravel	qh=2.00	S4	1	2	6	28	63	37	16	23					A-6b
894.3	5	4-6-10	0.9	0.6			S5													
892.8		6-11-15	1.5	0	Brown CLAY; trace gravel; moist	qh=3.75	S6	1	2	3	21	73	42	19	23					A-7-6
892.6						qh=2.5 to 3.5	S7													
891.3		7-10-8	1.5	0		qh=3.4	S8													V: A-6b
889.8	10	7-12-16	0.5	1			S9													
888.3		5-7-8	0.0	1.5	Grey SILTY CLAY; trace gravel; moist	qh=2.30	S10													
886.8		9-14-16	1.5	0		qh=4.5+	S11													
885.7		4-7-7	0.0	1.5			S12	2	3	5	31	59	33	14	22					A-6a
885.3	15				Grey SILT & CLAY; trace gravel; moist		S13													
882.7		3-4-6	0.2	1.3			S14	3	4	6	29	58	34	15	23					A-6a
882.3	20					qh=1.38	S15													
877.3		3-4-7	0.5	1			S16	29	29	11	14	17	23	8	12					A-2-4
872.3	25	3-3-6	0.3	1.2		qh=0.65	S17													
872.3	30					Casing plugged. Pulled 20' & redrilled	S18													
867.3		4-5-7	0.4	1.1			S19													
862.3	35	5-6-6	0.0	1.5	(grey clay in spoon)		S20													
857.3	40						S21													
856.6	45	10-9-7	1.3	0.2	Grey GRAVEL W/ SAND & SILT; some clay; wet		S22	0	0	0	30	70	38	15	29					A-6a
852.3		4-7-14	0.0	1.5			S23													
849.0	50						S24	4	8	9	31	48	27	9	19					A-4a
847.3		3-4-5	0.0	1.5	Grey SILT & CLAY; moist		S25													
	55						S26													V: A-4b
							S27													
							S28	0	2	3	19	76	40	16	25					A-6b
							S29													
							S30													V: A-3

"V:" denotes visual classification. "qh" = pocket penetrometer strength in tons/SF. Reservoir at El.+901.7; Water depth = 2.9 ft.

Boring Coordinates
N 532,015.8
E 2,435,241.3

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DRILLING LOG - MAH-80-0.97 (PID No. 6080)																				
Boring No.		CB-16		Boring Location: 542+31, 248 ft RT, C.L. IR-80						Elev. Top of Hole: 898.8 ft										
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics										ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.					
842.3	55				(grey clay in spoon)		S19													
		3-5-4	0.0	1.5																
837.3	60						S20													38
		5-6-6	0.2	1.3																
832.3	65				(grey clay in spoon)		S21													
		4-4-5	0.0	1.5																
829.0	70				Grey SILT & CLAY varved with silt; moist	qh=0.70	S22	0	0	0	30	70	38	15	29					A-6a
827.3		4-4-5	1.5	0																
826.5																				
822.3	75					qh=0.50	S23													27
		4-6-6	1.5	0																
819.0	80				Grey with red-brown mottles SANDY SILT; trace gravel; wet	qh=1.00	S24	4	8	9	31	48	27	9	19					A-4a
817.3		6-6-10	1.5	0																
812.3	85					qh=1.60	S25													16
		10-12-14	1.5	0																
809.0	90				Grey SILT; wet	qh=1.30	S26													31
807.3		7-7-11	1.2	0.3																
802.3	95				0.4' grey silty clay at 96.5'	qh=3.5 to 4.5+	S27													
		29-49-36	1.0	0.5																
799.0	100				Grey SILTY CLAY; trace sand and gravel; moist	qh=2.25	S28	0	2	3	19	76	40	16	25					A-6b
797.3		8-11-12	1.2	0.3																
792.3	105					qh=2.75	S29													27
		8-10-18	1.4	0.1																
789.0	110				Grey fine SAND; wet															
787.3		10-16-21	1.0	0.5			S30													V: A-3
785.8					Bottom of Boring = 113.0 ft															
	115																			

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
4151 EXECUTIVE PARKWAY, SUITE 350
WESTERVILLE, OHIO 43081



CHECKED
S.S.

DATE
2/20/04

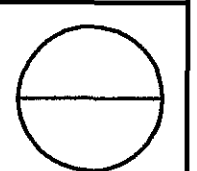
REVIEWED
M.W.W.

DRAWN
J.M.T.

CAUSEWAY REALIGNMENT CONCEPT
IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
MAH-80-0.97

81 / 82



DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. CB-17		Boring Location: 545+33, 280 ft RT, C.L. IR-80				Elev. Top of Hole: 899.1 ft												
Total Depth of Hole: 104.0 ft		Drilling Co: L.G. Hetager, Inc. Drill Rig: Diedrich D25																
Date Started: 10/8/02		Hollow-Stem: n/a		Casing Size: 4-inch O.D.		Driller: Lee Cook												
Date Finished: 10/9/02		Sampler Type: 2-inch Split-Spoon		Drilling Fluid: Water		Inspector: Stephen Slomski												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
899.1	0	4-6-8	0.6	0.9	Mottled grey and light brown CLAY; little silt; moist	qh=2.2	S1											
897.6		4-6-9	0.7	0.8	Organics in top 0.2'	qh=2.5	S2											24
896.1		7-11-13	0.8	0.7	Brown	qh=3.5	S3	4	2	2	20	72	43	19	21			A-7-6
894.6	5	6-9-12	0.9	0.6		qh=3.15	S4											
893.1		11-16-18	1.5	0		qh=4.5+	S5											21
891.6			1.6	0.4		qt=1.25 tsf qh=4.5+	ST-1	1	2	3	29	65	43	21	25			A-7-6
889.6	10	10-11-14	0.7	0.8		qh=1.50	S6											
888.1		5-6-6	1.5	0	(brown clay in spoon)		S7											28
886.6		6-9-9	0.0	1.5	(brown clay in spoon)		S8											
885.1	15	5-7-8	0.0	1.5			S9											
882.6																		
881.6		3-5-8	0.0	1.5	Grey SILTY CLAY; trace gravel; moist (grey clay in spoon)		S10											
876.6	20																	
875.1		4-7-11	0.0	1.5		pushed 1.7'	S11											
871.6	25		2.3	0		qh=1.50	ST-2	3	3	5	36	53	35	16	23			A-6b
866.6		4-6-7	0.5	1			S12											
861.6	30																	
856.6		3-5-5	0.6	0.9		qh=0.80	S13	7	3	5	28	58	35	16	22			A-6b
851.6	35																	
846.6		3-4-6	1.5	0		qh=0.80	S14											22
841.6	40																	
836.6		5-6-7	0.0	1.5	(grey clay in spoon)		S15											
831.6	45																	
826.6		3-4-5	1.3	0.2	Grey CLAY; moist		S16	0	0	0	4	96	50	24	36			A-7-6
821.6	50																	
816.6		3-4-6	1.5	0		qh=0.50	S17											
811.6	55																	

"V:" denotes visual classification.
 "qh" = pocket penetrometer strength in tons/SF. "qt" = torvane undrained shear strength in tons/SF.
 Reservoir at El.+901.6; Water depth = 2.5 ft.

Boring Coordinates
 N 532,113.6
 E 2,435,528.6

DRILLING LOG - MAH-80-0.97 (PID No. 6080)																		
Boring No. CB-17		Boring Location: 545+33, 280 ft RT, C.L. IR-80				Elev. Top of Hole: 899.1 ft												
Elev. (Ft)	Depth (Ft)	Blows or RQD	Rec (Ft)	Loss (Ft)	Description of Materials	Remarks	Sample No.	Physical Characteristics								ODOT Class.		
								% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
841.6	55	4-5-6	1.5	0			S18											39
839.6	60																	
836.6		3-4-4	1.5	0	Grey SILT & CLAY varved with silt; moist	qh=0.50 qh=0.75	S19											25
833.4	65				Grey SILT; wet	Casing plugged; Pulled 30' & redrilled.												
831.6		6-7-14	1.5	0			S20											31
828.1	70				Grey SANDY SILT; moist													
826.6		10-29-22	0.0	1.5	(grey clay & silt in spoon)		S21											
821.6	75				(grey sandy clay in spoon)													
816.6		11-17-23	0.0	1.5			S22											
811.6	80				(grey sandy clay in spoon)													
810.1		13-28-30	0.0	1.5			S23											
806.6	85				(grey clay in spoon)													
803.4		7-11-18	0.0	1.5	grey with red-brown mottles	Lifted barge & bent tube. qh=4.0 tsf	S24											
801.6	90				Grey FINE SAND; moist		ST-3	8	8	12	28	43	24	8	15			A-4a
796.6		15-20-17	0.8	0.7			S25											
795.1	95																	
		8-10-10	1.5	0			S26											
	100																	
		18-39-43	1.3	0.2			S27											
	105				Bottom of Boring = 104.0 ft													
	110																	
	115																	

GANNETT FLEMING ENGINEERS & ARCHITECTS, P.C.
 4151 EXECUTIVE PARKWAY, SUITE 350
 WESTERVILLE, OHIO 43081

DRAWN: J.M.T. CHECKED: S.S.
 REVIEWED: M.W.W. DATE: 12/20/04
 CALCULATED: DATE: 12/20/04

CAUSEWAY REALIGNMENT CONCEPT
 IR-80 OVER MEANDER CREEK RESERVOIR

MAHONING COUNTY
 MAH-80-0.97

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