

**INTRODUCTION**

THIS SUBSURFACE INVESTIGATION REPORT PRESENTS THE FINDINGS OF A SUPPLEMENTAL GEOTECHNICAL INVESTIGATION PERFORMED TO CHARACTERIZE THE SUBSURFACE CONDITIONS OF THE PROPOSED US 33 MAINLINE ALIGNMENT THROUGH SOUTHERN ATHENS COUNTY. MORE SPECIFICALLY, THIS REPORT ADDRESSES THE PROJECT SEGMENT BETWEEN STA. 29+600 AND STA. 39+600, TRAVERSING THE TOWNSHIPS OF ATHENS, ALEXANDER, AND LODI. THIS IS THE NORTHERN PORTION OF THE LARGER US 33 ATHENS-DARWIN PROJECT INVOLVING A NEW "SUPER-TWO" HIGHWAY CORRIDOR THROUGH ATHENS AND MEIGS COUNTIES IN SOUTHEAST OHIO. THE PURPOSE OF THIS INVESTIGATION WAS TO PROVIDE ADDITIONAL SUBSURFACE INFORMATION ALONG THE PROPOSED US 33 CORRIDOR WHERE THE ORIGINAL ALIGNMENT AND PROFILE, SUBJECT OF RESOURCE INTERNATIONAL (R.I.) REPORT NO. W-7139, HAD BEEN CHANGED, ASSESS THEIR EMBANKMENT AND STRUCTURAL SUPPORT CAPABILITY AND SLOPE STABILITY, AND TO MAKE RECOMMENDATIONS RELATIVE TO THE DESIGN AND CONSTRUCTION OF THE PROPOSED STRUCTURES, EMBANKMENTS, CUT SLOPES, AND OTHER EARTHWORK FOR THE PROJECT.

THE SCOPE OF THIS WORK INCLUDED A REVIEW OF THE R.I. REPORT, (MUCH OF WHICH IS INCLUDED IN THIS DOCUMENT) AVAILABLE GEOLOGIC AND SOILS DATA FOR THE PROJECT AREA, A SUBSURFACE INVESTIGATION CONSISTING OF ADDITIONAL SOIL TEST BORINGS AND ASSOCIATED ROCK CORING, SELECTED LABORATORY TESTING, AND AN ENGINEERING ANALYSIS AND EVALUATION OF THE SUBSURFACE CONDITIONS ENCOUNTERED AT THE SITE. IN ADDITION, THIS REPORT INCLUDES THE WORK ASSOCIATED WITH THE CULVERT INVESTIGATION PERFORMED BY PRIME ENGINEERING GANNETT FLEMING'S WORK FOR FIVE STRUCTURES. THESE STRUCTURES ARE THE RAMP A AND RAMP B RETAINING WALLS, THE MAINLINE US 33 BRIDGE OVERPASS ABOVE ALBANY ROAD, AND THE TOWNSHIP ROUTE (TR) 55 AND TR 64 BRIDGE OVERPASSES ABOVE THE US 33 MAINLINE. DATA AND SOIL PROFILES FOR THESE STRUCTURES FOLLOW THE ROADWAY AND CULVERT INFORMATION IN THIS DOCUMENT. DETAILED INFORMATION AND DISCUSSION REGARDING THESE STRUCTURES IS AVAILABLE IN SEPARATE GEOTECHNICAL INVESTIGATION REPORTS SPECIFICALLY DEVELOPED FOR EACH STRUCTURE. THESE MAY BE OBTAINED FROM THE OHIO DEPARTMENT OF TRANSPORTATION (SEE NOTE ON THIS TITLE SHEET).

**OBSERVATIONS OF THE PROJECT AND SITE GEOLOGY**

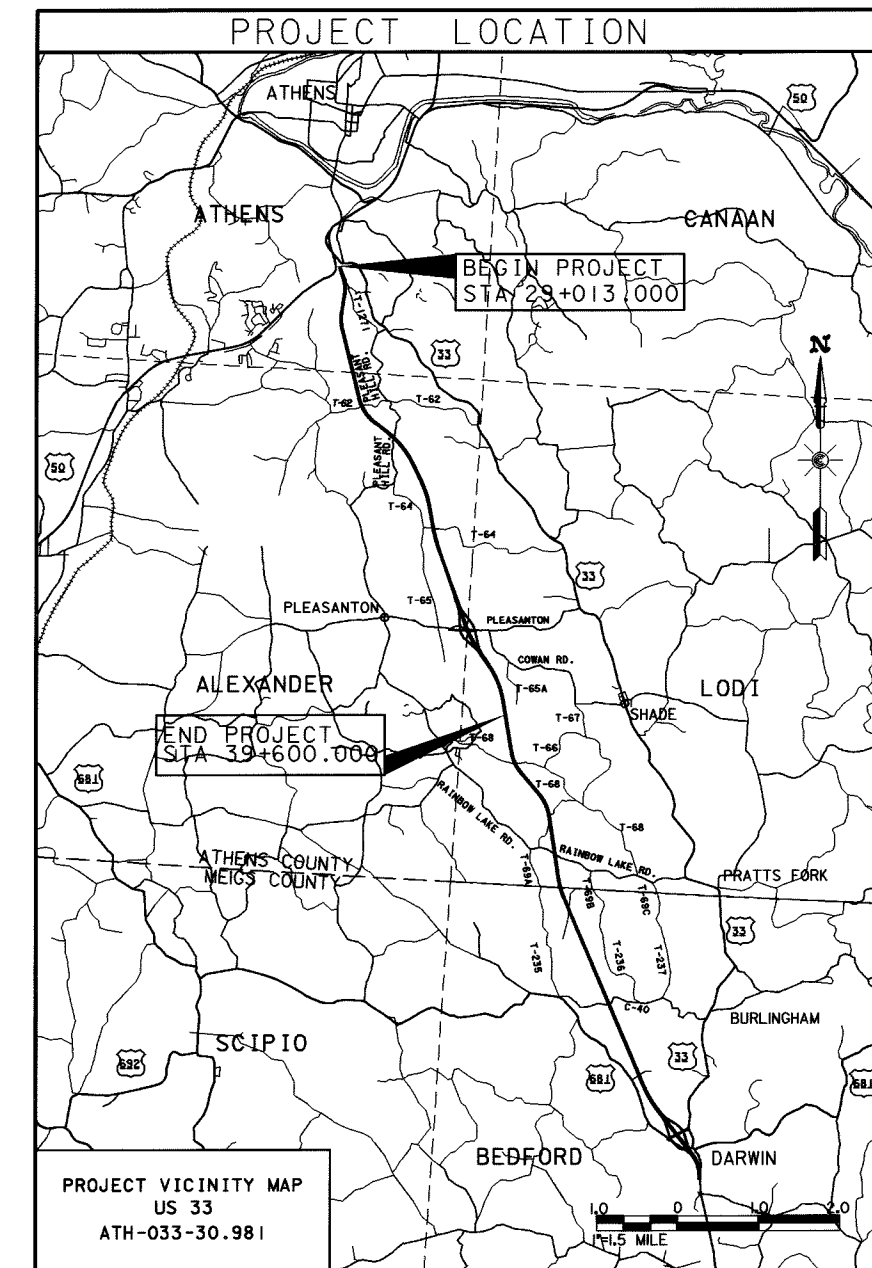
THE PROPOSED CORRIDOR FOR THE US 33 "SUPER TWO" HIGHWAY IS COMPRISED PRIMARILY OF FARMLAND AND RURAL RESIDENTIAL PROPERTY. WHILE MOST OF THE RESIDENTIAL PROPERTY IS MAINTAINED, THE FARMLAND CAN VARY BETWEEN OPEN PASTURE AND HEAVILY WOODED AREAS. FAIRLY SIGNIFICANT RELIEF IS PREVALENT ALONG THE CORRIDOR CENTERLINE AND THE PRESENT SURFACE ELEVATION CAN VARY FROM ABOUT ELEVATION 210 NEAR RICHLAND AVENUE TO ABOUT ELEVATION 298 NEAR STATION 33+300. NUMEROUS SMALL, NAMELESS CREEKS AND DRAINAGE SWALES ARE FREQUENTLY OBSERVED IN THE VALLEYS OF THIS GENERALLY WELL-DRAINED ROLLING TERRAIN. AS A CONSEQUENCE OF THIS TERRAIN AND RELIEF, RELATIVELY MASSIVE EARTHWORK IS REQUIRED, RESULTING IN DEEP CUTS AND FILLS. IN ORDER TO ACHIEVE THE DESIRED DESIGN PROFILE, SOME OF THESE CUTS AND FILLS ARE IN THE RANGE OF 30 METERS TO GREATER THAN 40 METERS IN MAGNITUDE.

THE PROJECT LIES IN A REGION PREDOMINATED BY RESIDUAL SOILS FORMED FROM PENNSYLVANIAN AGED SEDIMENTARY BEDROCK OF THE MARIETTA PLATEAU, A SUB MEMBER OF THE ALLEGHENY PLATEAU. SANDSTONE, SILTSTONE, SHALE, CLAY SHALE/MUDSTONE, ALONG WITH OCCASIONAL, DEEPER, THINLY BEDDED COAL SEAMS OF THE CONEMAUGH AND MONONGAHELA FORMATIONS DOMINATE THE BEDROCK PROFILE ALONG THE PROPOSED ROADWAY CORRIDOR. MUCH OF THE RESIDUAL SOIL MATERIAL IS COMPRISED OF CLAY AND SILTY CLAY MATERIAL DERIVED FROM THE SOFT CLAY SHALE/MUDSTONE DEPOSITS CALLED RED BEDS. THESE RED/MAROON TO VARIEGATED RED AND GRAY CLAYS AND SILTY CLAYS ARE NOTORIOUS FOR THEIR SLOPE INSTABILITY AND TENDENCY TO ERODE WHEN CUT AND EXPOSED. NUMEROUS SIGNS OF THIS BEHAVIOR CAN BE OBSERVED ALONG THE PROPOSED ALIGNMENT IN THE PASTURES, MANICURED RESIDENTIAL SLOPES, AND SOME OF THE PRESENT ROAD CUTS AROUND ATHENS, OHIO. IN THE VALLEYS, ALLUVIAL DEPOSITS ALONG THE CREEKS AND DRAINAGE SWALES WHERE INTERMITTENT FLOWS OCCUR CAN BE OBSERVED, ALONG WITH SANDSTONE AND SILTSTONE ROCK EXPOSURES IN THE BASE AND ALONG THE SIDES OF THESE CREEKS AND STREAMS. IN AREAS OF MORE PERSISTENT FLOW, GRAVEL AND BEDROCK ARE VERY PROMINENT IN THE STEEP STREAMBEDS NOTED ALONG THE PROPOSED ALIGNMENT. THE MORE PROMINENT OF THESE ROCK EXPOSURES HAVE BEEN NOTED ON THE ATTACHED SOIL PROFILE.

**LEGEND FOR PROJECT; AVERAGE TEST RESULTS FOR RESOURCE INTERNATIONAL BORINGS - 133 SAMPLES TESTED**

DESCRIPTION	HRB CLASS	OHIO CLASS	% AGG.	% SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
GRAVEL	A-1-a	A-1-a									
GRAVEL WITH SAND	A-1-b	A-1-b		4	72	-24				11	1
FINE SAND	A-3a	A-3a	3	17	53	-27				16	14
GRAVEL WITH SAND AND SILT	A-2-4(0)	A-2-4	4	35	31	-30		24	9	16	1
SANDY SILT	A-4a(3)	A-4a	8	9	34	27	22	27	10	18	27
SILT	A-4b(8)	A-4b	1	2	12	58	27			18	1
SILT AND CLAY	A-6a(8)	A-6a	6	6	20	38	30	32	14	21	21
SILTY CLAY	A-6b(11)	A-6b	8	5	16	34	37	37	19	20	23
CLAY	A-7-6(19)	A-7-6	5	3	7	30	55	53	31	25	45
SHALE											
WEATHERED SHALE											
LIMESTONE											
MUDSTONE											
INDURATED CLAY/WEATHERED MUDSTONE											
CLAY-SHALE											
INDURATED CLAY/WEATHERED CLAY-SHALE											
SILTSTONE											
WEATHERED SILTSTONE											
SANDSTONE											
WEATHERED SANDSTONE											
COAL											
ASPHALT											
SOD AND/OR TOPSOIL											
BERM MATERIAL											
SAND AND GRAVEL BASE											
DRIVE SAMPLE/GEOPROBE BORING - PLAN VIEW (ORIGINAL ROADWAY BORINGS BY RESOURCE INTERNATIONAL)											
DRIVE SAMPLE BORING - PLAN VIEW (GANNETT FLEMING)											
DRIVE SAMPLE - PLAN VIEW (CULVERT BORINGS BY PRIME ENGINEERING)											
TOP OF ROCK (CULVERT BORINGS)											
DRIVE SAMPLE/GEOPROBE BORING PLOTTED TO VERTICAL SCALE ONLY											
FREE WATER											
STATIC WATER LEVEL											
ROCK OUTCROP											
W/X/Y/Z OR W-X-Y-Z NUMBER OF BLOWS FOR STANDARD PENETRATION TEST											
W = NUMBER OF BLOWS FOR FIRST 15 CENTIMETERS											
X = NUMBER OF BLOWS FOR SECOND 15 CENTIMETERS											
Y = NUMBER OF BLOWS FOR THIRD 15 CENTIMETERS											
Z = NUMBER OF BLOWS FOR FOURTH 15 CENTIMETERS											

NOTE: FIGURES BESIDE BORINGS INDICATE WATER CONTENT IN PERCENT. E.G. 15



**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 MATERIALS MANAGEMENT AT 1600 WEST BROAD STREET, THE OFFICE OF ROADWAY ENGINEERING OR THE OFFICE OF STRUCTURAL ENGINEERING AT 1680 WEST BROAD STREET.

**EXPLORATION**

EXPLORATORY BORINGS WERE MADE BY MEANS OF A TRUCK-MOUNTED OR ATV-MOUNTED ROTARY DRILLING RIG, UTILIZING HOLLOW-STEM CONTINUOUS FLIGHT AUGERS TO ADVANCE THE HOLES IN SOIL, OR A GEOPROBE MODEL 4220, A VEHICLE-MOUNTED, HYDRAULICALLY-POWERED MACHINE THAT UTILIZES STATIC FORCE AND PERCUSSION TO ADVANCE A 122-CENTIMETER LONG BY 5.1-CENTIMETER DIAMETER SOIL SAMPLER. WHERE BORINGS EXTENDED INTO THE BEDROCK (AFTER ENCOUNTERING SPLIT-SPOON SAMPLE REFUSAL), A DOUBLE TUBE DIAMOND BIT CORE BARREL (EITHER WIRELINE OR CONVENTIONAL EQUIPMENT) WAS USED TO CORE (THE BEDROCK). CORING PRODUCED NX-SIZED (5.3-CENTIMETER DIAMETER) CORES, FROM WHICH THE TYPE OF ROCK AND ITS GEOLOGICAL CHARACTERISTICS WERE DETERMINED. RESOURCE INTERNATIONAL PERFORMED THE ORIGINAL ROADWAY BORINGS BETWEEN DECEMBER 15, 1997 AND JUNE 10, 1998. GANNETT FLEMING AND PRIME ENGINEERING PERFORMED THE ADDITIONAL ROADWAY BORINGS AND CULVERT BORINGS, RESPECTIVELY, BETWEEN MAY 24 AND OCTOBER 27, 1999.

**GANNETT FLEMING**  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

CALCULATED	CHECKED
DATE	
REVIEWED	
DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE**

**ATH-33-30.981**

1/05

INVESTIGATIONAL FINDINGS (ROADWAY BORINGS)

SOIL DRILLED ALONG THE ALIGNMENT IS GENERALLY BETWEEN 1.0 AND 5.0 METERS THICK, AVERAGING APPROXIMATELY 2.0 METERS THICK ON THE UPLANDS AND 3.0 METERS THICK IN THE VALLEYS. HOWEVER, THERE WERE SEVERAL LOCATIONS WHERE RESIDUAL SOILS WERE AS GREAT AS 8.0 TO 9.0 METERS THICK ON THE UPLANDS (E.G. B-52, STA. 35+000). THE TRANSITION TO BEDROCK IS NOT EASILY DISCERNABLE WHERE THE SURFACE ROCK IS SHALE, CLAY-SHALE, OR MUDSTONE. WHERE SANDSTONE, LIMESTONE, OR SILTSTONE IS THE SURFACE ROCK, TRANSITION (TO ROCK) WAS EASILY DISCERNABLE.

THE SOILS ARE ALMOST EXCLUSIVELY COHESIVE, DESCRIBED AS REDDISH BROWN CLAY (SILTY CLAY, SANDY CLAY) OF MEDIUM TO HIGH PLASTICITY (A-7-6), WITHIN THE NORTHERN HALF OF THE ALIGNMENT. SOILS BECOME MORE SANDY AND SILTY AT THE SOUTHERN END OF THE ALIGNMENT. WITHIN THE SOUTHERN QUARTER OF THE ALIGNMENT, THE SOILS ARE BEST DESCRIBED AS SANDY SILTS, SILTY SANDS, AND/OR SANDY CLAYS (A-4a) WITH SOME INTERVALS OF SILTY CLAY AND CLAY. AT THE NORTHERN END OF THE ALIGNMENT, THE SOILS ARE PREDOMINANTLY CLASSIFIED AS ODOT A-7-6 AS WELL AS A-6a, A-6b, AND VERY LITTLE A-4a.

IT IS NOTED THAT FILL, DESCRIBED AS NATIVE SOILS MIXED WITH CONSTRUCTION DEBRIS, WAS ENCOUNTERED IN THE TOP 5.0 METERS OF B-29 (ABOVE ELEVATION 262.7 METERS). HOWEVER, SINCE THE ALIGNMENT WAS SHIFTED IN THE VICINITY OF CR 21, THE AREA REPRESENTED BY B-29 IS NO LONGER WITHIN THE LIMITS OF THE PAVEMENT.

LABORATORY TESTING INDICATES THAT THE NATURAL MOISTURE CONTENTS OF THE SOIL ENCOUNTERED TO A DEPTH OF 1.5 METERS ARE TYPICALLY AT TO WELL ABOVE THEIR CORRESPONDING PLASTIC LIMITS. HOWEVER, BECAUSE OF THE HIGHLY PLASTIC NATURE OF THE CLAYS ENCOUNTERED, THE MOISTURE CONTENTS DO NOT TYPICALLY APPROACH THE SOILS' CORRESPONDING LIQUID LIMITS. SAMPLES COLLECTED DURING THE ADDITIONAL FIELDWORK TYPICALLY INDICATED MOISTURE CONTENTS RANGING FROM SLIGHTLY ABOVE TO OFTEN BELOW THE PLASTIC LIMIT. THIS IS MOST LIKELY DUE TO THE EXTENDED PERIOD OF HOT, DRY WEATHER PREVALENT AT THE TIME THE SAMPLES WERE OBTAINED. IN SOME BORINGS (I.E. 34+720, 36+660, 37+780, 38+420, 32+900, AND 34+000), THE SURFICIAL SOIL CONDITIONS WERE SO DESSICATED THAT INCREASES IN MOISTURE CONTENTS WERE NOTED WITH DEPTH. THIS IS IN GENERAL CONTRAST TO THE ORIGINAL ROADWAY BORINGS IN WHICH A DECREASE IN MOISTURE CONTENT WAS OBSERVED BELOW ABOUT 1.5 METERS DEEP. DURING BOTH INVESTIGATIONS, MOISTURE CONTENTS WERE TYPICALLY LESS THAN ABOUT 10 TO 12 % IN THE TRANSITIONAL MATERIAL (SOFT WEATHERED BEDROCK).

BEDROCK CAN BE EXPECTED IN EVERY CUT SECTION GREATER THAN 3.0 METERS. BEDROCK WITHIN THE NORTHERN THREE-QUARTERS OF THE ALIGNMENT CONSISTED PREDOMINANTLY OF SHALE, CLAY-SHALE, AND/OR MUDSTONE, PREDOMINANTLY IN POOR CONDITION. INTERBEDS OF SANDSTONE, LIMESTONE, AND SILTSTONE WERE ENCOUNTERED THROUGHOUT; SOME SECTIONS ARE QUITE MASSIVE. THE MUDSTONE AND SOME OF THE SHALE WAS FREQUENTLY SLICKENSIDED AND DETERIORATED WHEN EXPOSED TO WATER. AS MENTIONED ABOVE, WHERE THESE BEDROCKS WERE ENCOUNTERED, THE ROCK CONDITION WAS TYPICALLY SO POOR THAT IT WAS DIFFICULT TO IDENTIFY THE TRANSITION FROM SOIL TO ROCK.

INVESTIGATIONAL FINDINGS (CULVERT BORINGS)

MATERIALS ENCOUNTERED ACROSS THE PROJECT SITE CONSISTED OF GRAVEL WITH SAND (A-1-b), COARSE AND FINE SAND (A-3a), STONE FRAGMENTS WITH SAND, SILT AND CLAY (A-2-6), SANDY SILT (A-4a), SILT (A-4b), SILT AND CLAY (A-6a), SILTY CLAY (A-6b), CLAY (A-7-6) AND ELASTIC CLAY (A-7-5). THE SOIL ENCOUNTERED IN THE TEST BORINGS CONSISTED PRIMARILY OF COHESIVE AND/OR FINE GRAINED SOILS OVERLYING DECOMPOSED TO WEATHERED BEDROCK. OF THE SOIL SAMPLES TESTED FOR ATTERBERG LIMITS, 3.3 % CONTAINED MOISTURE CONTENTS EQUAL TO THEIR PLASTIC LIMITS AND 17.7% CONTAINED MOISTURE CONTENTS GREATER THAN THEIR PLASTIC LIMITS BUT LESS THAN THEIR LIQUID LIMITS. THE COHESIVE SOILS RANGED IN CONSISTENCY FROM "SOFT" TO "HARD", BUT WERE PREDOMINANTLY "VERY STIFF".

BEDROCK WAS ENCOUNTERED IN ALL OF THE TEST BORINGS. THE BEDROCK ENCOUNTERED CONSISTED OF DECOMPOSED TO WEATHERED CLAY SHALE, SANDSTONE, SILTY SHALE, SILTSTONE, LIMESTONE AND CLAY STONE. THE BEDROCK RANGED FROM VERY SOFT TO HARD WITH UNCONFINED COMPRESSIVE STRENGTHS RANGING FROM 0.508 TO 51.565 MPa OR VERY LOW TO MEDIUM STRENGTH.

GROUNDWATER WAS ENCOUNTERED DURING DRILLING IN TWO (2) OF THE TEST BORINGS ACROSS THE PROJECT SITE.

PROJECT INDEX					
STATIONS		PLAN VIEW	PROFILE	FILL EMB.	CUT
FROM	TO	SHEET	SHEET	MAX.	MAX.
29+500	30+200	10	11	0.7m	24.3m
CROSS SECTION 29+880		-	11	-	-
30+200	30+900	12	13	18.4m	35.2m
30+900	31+600	14	15	26.5m	20.8m
31+600	32+300	16	17	42.0m	7.4m
32+300	33+000	18	19	36.4m	11.4m
33+000	33+700	20	21	35.0m	2.6m
33+700	34+400	22	23	25.0m	8.8m
34+400	35+100	24	25	21.8m	16.0m
35+100	35+800	26	27	4.0m	14.0m
35+800	36+500	28	29	22.4m	14.5m
36+500	37+200	30	31	32.0m	15.2m
37+200	37+900	32	33	7.0m	22.8m
37+900	38+600	34	35	2.6m	21.6m
38+600	39+300	36	37	8.2m	26.8m
39+300	40+000	38	39	30.0m	19.2m
CROSS SECTION 30+480		-	40	-	-
CROSS SECTION 33+300		-	40	-	-
CROSS SECTION 35+000		-	41	-	-
CROSS SECTION 38+400		-	42	-	-
CROSS SECTION 39+400		-	43	-	-
TR 55		-	-	-	-
48+280	48+500	44	44	-	-
CR 21		-	-	-	-
3+005	3+300	45	45	-	-
TR 64		-	-	-	-
49+030	49+480	46	46	-	-
CR 16		-	-	-	-
50+220	50+520	47	47	-	-
50+520	50+790	48	48	-	-
STRUCTURES					
US 33 MAINLINE		-	-	-	-
BRIDGE OVERPASS		77	77	-	-
TR 55 BRIDGE OVERPASS		78	78	-	-
TR 64 BRIDGE OVERPASS		79	79	-	-
RAMP A RETAINING WALL		80	80	-	-
RAMP B RETAINING WALL		81	81	-	-

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GANNETT FLEMING  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

ROADWAY / CULVERT SOIL PROFILE

ATH-33-30.981

2 / 105

# SUMMARY OF SOIL TEST DATA

Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L	P.I	W.C.	SHTL Class.
(B-1) 144770.015 634241.813	0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.0	21 11 13 28	11 13 27 36	18 25 26	22 25 26	A-6b VISUAL VISUAL VISUAL				
(B-2) 144646.477 634282.292	0.5-0.9 1.1-1.2 1.2-1.6 1.8-2.3 2.6-2.8 4.1-4.3 5.7-5.8	SAME AS 1.1-1.2 5 2 2 19 72 74	51 36	37 36	37 36	37 36	37 36	37 36	37 36	37 36
(B-3) 144458.422 634437.611	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1	BROWN SILTY CLAY, SOME SAND LIGHT BROWN SANDY CLAY, SOME SILT, TRACE GRAVEL BROWN SILTY CLAY, TRACE SAND, TRACE GRAVEL SAME AS 1.1-1.6 SAME AS 1.1-1.6	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10	30 17 9 9 10
(B-4) 144471.272 634340.311	0.3-0.8 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.3 5.7-6.1 7.2-7.6 8.7-9.0 10.2-10.4	SAME AS 1.8-2.3 SAME AS 1.8-2.3 5 4 6 25 60 51 31	7 24 20 13	7 24 20 13	7 24 20 13	7 24 20 13	7 24 20 13	7 24 20 13	7 24 20 13	7 24 20 13
(B-5) 144354.317 634389.372	0.3-0.8 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.7-5.8 7.2-7.3 8.7-9.0 10.2-10.5 11.8-12.1 13.3-13.4	BROWN SILTY CLAY, SOME SAND, LITTLE TO SOME GRAVEL (FILL) SAME AS 0.3-0.8 BROWN WEATHERED SANDSTONE BROWN AND REDDISH-BROWN MUDSTONE SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1	13 9	13 9	13 9	13 9	13 9	13 9	13 9	13 9
(B-6) 144366.744 634339.381	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.7-6.0 7.2-7.6 8.7-8.8	SAME AS 0.5-0.9 8 1 4 18 69 61 41	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14	22 31 25 16 11 17 12 14
(B-7) 144228.912 634432.009	0.3-0.8 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.4 5.7-6.0 7.2-7.3 8.7-8.8 10.2-10.4	SAME AS 1.1-1.6 4 7 15 -74- 53 28	19 17 13 9	19 17 13 9	19 17 13 9	19 17 13 9	19 17 13 9	19 17 13 9	19 17 13 9	19 17 13 9
(B-8) 144196.170 634325.107	0-0.1 0.1-1.2 1.2-2.6 2.6-3.0	BROWN SILTY CLAY, LITTLE SAND, TRACE ORGANICS, TRACE GRAVEL (TOPSOIL) SAME AS 1.2-2.6 1 1 34 -64- 40 19	28 15	28 15	28 15	28 15	28 15	28 15	28 15	28 15
(B-9) 144201.968 634290.591	0-0.1 0.1-1.0 1.0-2.6 2.6-2.7 2.7-3.0	BROWN SILTY CLAY, SOME SAND, TRACE ORGANICS, TRACE GRAVEL (TOPSOIL) 14 4 5 21 56 55 35	19 14 14	19 14 14	19 14 14	19 14 14	19 14 14	19 14 14	19 14 14	19 14 14
(B-10) 143998.933 634291.974	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.6-5.8 7.2-7.3	BROWN SILTY CLAY, LITTLE TO SOME SAND, TRACE TO LITTLE GRAVEL SAME AS 0.5-0.9 0 2 5 23 70 49 28	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9	30 23 25 18 13 9 7 9
(B-11) 143860.636 634270.350	0.3-0.8 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.4 5.7-6.0 7.1-7.5 8.7-8.8	MOTTLED BROWN AND GRAY SILTY CLAY, SOME SAND, TRACE GRAVEL SAME AS 0.3-0.8 REDDISH-BROWN SAND, LITTLE GRAVEL (WEATHERED SANDSTONE FRAGMENTS), TRACE CLAYEY SILT 10 6 5 19 60 53 30	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14	18 16 12 19 18 14

Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L	P.I	W.C.	SHTL Class.
(B-12) 143867.047 634210.694	0.3-0.8 1.1-1.4 1.8-2.1 2.6-2.9 4.2-4.3	REDDISH-BROWN SAND, SOME SILT, TRACE CLAY, TRACE GRAVEL REDDISH-BROWN WEATHERED SANDSTONE SAME AS 1.1-1.4 SAME AS 1.1-1.4 SAME AS 1.1-1.4	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6	17 9 8 8 6
(B-13) 143700.873 634267.449	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.7-6.0	SAME AS 1.1-1.6 SAME AS 1.1-1.6 11 2 4 20 63 53 33	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11	25 27 23 19 15 12 11
(B-14) 143601.720 634280.038	0-0.4 0.4-1.1 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.7-6.1 7.2-7.3	1 3 13 53 30 35 14 30	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18	1 8 19 9 34 30 35 18
(B-15) 143465.374 634311.724	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.0	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26	14 7 21 35 23 35 14 26
(B-16) 143358.495 634337.739	0-0.5 0.5-0.9 1.1-1.3 1.8-2.0	BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL BROWN WEATHERED SANDSTONE BROWN SANDSTONE SAME AS 1.1-1.3	27 27 27 27	27 27 27 27	27 27 27 27	27 27 27 27	27 27 27 27	27 27 27 27	27 27 27 27	27 27 27 27
(B-17) 143271.048 634359.023	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.0	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31	16 9 23 31 21 40 15 31
(B-18) 143164.168 634385.038	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.6-5.9	SAME AS 0.5-0.9 5 6 28 -60- 34 17 18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8	18 17 10 10 10 16 8
(B-19) 143018.423 634420.512	0-0.4 0.4-0.9 1.1-1.6 1.8-2.3 2.6-3.0	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24	3 6 31 36 24 26 9 24
(B-20) 142927.172 634468.453	0-0.5 0.5-0.9 1.1-1.6 1.8-2.0	DARK BROWN TO REDDISH-BROWN SILTY CLAY, TRACE SAND, TRACE GRAVEL SAME AS 0.0-0.5 BROWN HIGHLY WEATHERED SANDSTONE SAME AS 1.1-1.6	18 27 12 8	18 27 12 8	18 27 12 8	18 27 12 8	18 27 12 8	18 27 12 8	18 27 12 8	18 27 12 8
(B-21) 142824.097 634467.811	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.7-3.0	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11	9 10 31 -50- 32 14 22 25 21 11
(B-22) 142690.484 634502.391	0-0.5 0.5-1.1 1.1-1.6 1.8-2.4 2.6-3.1 4.1-4.4 5.7-6.0	BROWN SILTY CLAY, SOME SAND, LITTLE GRAVEL, TRACE ORGANICS BROWN SAND, SOME GRAVEL (SANDSTONE FRAGMENTS) 0 8 19 18 55 47 31	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17	27 8 22 17 17 17 17
(B-23) 142508.316 634544.673	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3	SAME AS 0.5-0.9 4 3 5 27 61 51 28	38 27 17 11	38 27 17 11	38 27 17 11	38 27 17 11	38 27 17 11	38 27 17 11	38 27 17 11	38 27 17 11
(B-24) 142435.444 634562.410	0-0.5 0.5-0.9 1.1-1.4 1.8-2.1	RED TO BROWN SILTY CLAY, LITTLE SAND, TRACE GRAVEL SAME AS 0.0-0.5 BROWN INDURATED CLAY/CLAY-SHALE SAME AS 1.1-1.4	41 13 8 12	41 13 8 12	41 13 8 12	41 13 8 12	41 13 8 12	41 13 8 12	41 13 8 12	41 13 8 12
(B-25) 142382.975 634575.181	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.0	SAME AS 0.5-0.9 16 6 23 -55- 26 12 25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12	25 16 13 20 12

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 WESTERVILLE, OHIO 43081  
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ROADWAY / CULVERT SOIL PROFILE

ATH-33-30.981

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# SUMMARY OF SOIL TEST DATA

Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL Class.
(B-49) 139824.900 636063.200	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3	BROWN CLAYEY SILT, LITTLE SAND SAME AS 0-0.5 11 7 40 29 13 SAME AS 1.1-1.6 15 VISUAL								
(B-50) 139726.600 636081.500	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6 5.6-6.1 7.2-7.6	SAME AS 1.1-1.5 SAME AS 1.1-1.5 23 1 9 -67- 68 44 SAME AS 1.1-1.5 29 VISUAL 26 VISUAL 32 A-7-6 23 VISUAL 17 VISUAL 18 VISUAL 18 VISUAL BROWNISH-GRAY INDURATED CLAY/ WEATHERED MUDSTONE								
(B-51) 139608.700 636103.700	0.3-0.5 1.1-1.2	BROWN WEATHERED SANDSTONE SAME AS 0.3-0.5 VISUAL VISUAL								
(B-52) 139539.200 636159.400	0-0.5 0.5-0.9 1.1-1.6 1.8-2.3 2.6-3.1 4.1-4.6 5.6-6.1 7.2-7.7 8.7-8.8	BROWN CLAYEY SILT, SOME SAND, TRACE ORGANICS SAME AS 0-0.5 REDDISH-BROWN CLAY, LITTLE SILT, TRACE SAND SAME AS 1.1-1.6 SAME AS 1.1-1.6 SAME AS 1.1-1.6 SAME AS 1.1-1.6 21 4 5 25 45 41 19 17 SAME AS 7.2-7.7								
(B-53) 139413.800 636148.700	0-0.5 0.5-1.1 1.1-1.5 1.8-2.3 2.6-3.1	SAME AS 0.5-1.1 0 3 22 42 33 29 13 0 1 41 30 28 SAME AS 1.1-1.5 21 VISUAL 18 VISUAL BROWNISH-GRAY SANDY CLAY, LITTLE SILT								
(B-54) 139260.000 636192.600	0-0.5 0.5-0.9 1.1-1.6 1.8-2.0	BROWN SANDY SILT, LITTLE CLAY SAME AS 0-0.5 0 5 34 46 15 33 12 BROWN WEATHERED SANDSTONE								
(B-55) 139015.100 636291.900	0-0.5 0.5-1.1 1.1-1.3	BROWN SILTY CLAY, LITTLE SAND SAME AS 0-0.5 41 9 12 16 22 37 17 20 A-6b								
(B-56) 138895.000 636360.400	0-0.5 0.5-0.9 1.1-1.4 1.8-2.1 2.6-2.9 4.1-4.3 5.6-5.9 7.2-7.5 8.7-9.0 10.2-10.4	BROWN SILT, LITTLE CLAY, TRACE ORGANICS BROWN SILTY CLAY, TRACE SAND BROWN WEATHERED SANDSTONE SAME AS 1.1-1.4 SAME AS 1.1-1.4 SAME AS 1.1-1.4 BROWN INDURATED CLAY/ WEATHERED MUDSTONE SAME AS 5.6-5.9 SAME AS 5.6-5.9 SAME AS 5.6-5.9								
(B-57) 138687.400 636433.200	0-0.5 0.5-0.9 1.1-1.5 1.8-2.1 2.6-2.8	BROWN SILTY CLAY, TRACE SAND SAME AS 0-0.5 SAME AS 0-0.5 BROWN WEATHERED SANDSTONE SAME AS 1.8-2.1								
(B-58) 138462.600 636420.800	0-0.5 0.5-0.9 1.1-1.5 1.8-2.1 2.6-3.1 4.1-4.6 5.6-6.1 7.2-7.4 8.7-8.9	SAME AS 0.5-0.9 0 7 64 -29- SAME AS 0.5-0.9 BROWN WEATHERED SANDSTONE BROWN INDURATED CLAY/ WEATHERED MUDSTONE SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1 SAME AS 2.6-3.1								
(B-59) 138296.600 636527.600	0-1.2 1.2-1.9	7 4 4 37 48 43 24 11 BROWN INDURATED CLAY/ WEATHERED MUDSTONE								
(B-60) 138155.100 636577.200	0-0.5 0.5-0.9 1.1-1.7	SAME AS 1.1-1.7 SAME AS 1.1-1.7 0 33 23 23 21 32 10 18 A-4a								
(B-61) 138013.500 636626.800	0-1.2 1.2-1.6	REDDISH-BROWN SILTY CLAY, SOME SANDSTONE FRAGMENTS LIGHT BROWN INDURATED CLAY/ WEATHERED MUDSTONE								
(B-62) 137883.700 636619.300	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6	SAME AS 1.1-1.5 SAME AS 1.1-1.5 0 1 3 21 75 SAME AS 1.1-1.5 SAME AS 1.1-1.5 SAME AS 1.1-1.5								

Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL Class.
(B-63) 137692.800 636739.700	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6 5.6-5.7	SAME AS 1.8-2.3 SAME AS 1.8-2.3 SAME AS 1.8-2.3 1 3 25 -71- 53 29 26 VISUAL 23 VISUAL 28 A-7-6 23 VISUAL 14 VISUAL GRAY INDURATED CLAY/ WEATHERED MUDSTONE								
(B-64) 137540.100 636799.900	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3	SAME AS 0.5-0.9 0 4 23 30 43 76 58 26 14 2 20 38 26 21 SAME AS 1.1-1.5 19 VISUAL								
(B-65) 137423.900 636858.500	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.0	SAME AS 0.5-0.9 0 1 3 25 71 31 35 SAME AS 0.5-0.9 32 VISUAL SAME AS 0.5-0.9 27 VISUAL RED INDURATED CLAY/ WEATHERED MUDSTONE VISUAL								
(B-66) 137334.200 636934.500	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-2.9 4.1-4.4 5.6-6.1 6.1-6.6 7.2-7.3	BROWN SILTY CLAY, LITTLE SAND SAME AS 0-0.5 0 0 43 34 23 24 SAME AS 1.1-1.5 23 VISUAL BROWN WEATHERED SANDSTONE 16 VISUAL SAME AS 2.6-2.9 10 VISUAL SAME AS 2.6-2.9 VISUAL SAME AS 2.6-2.9 VISUAL SAME AS 2.6-2.9 VISUAL								
(B-67) 137203.200 636997.500	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-2.7	SAME AS 0.5-0.9 0 1 6 20 73 68 44 27 SAME AS 0.5-0.9 27 VISUAL SAME AS 0.5-0.9 14 VISUAL BROWN WEATHERED SANDSTONE 22 VISUAL								
(B-68) 137028.000 637122.200	0-0.5 0.5-0.9 1.1-1.5 1.8-2.1 2.6-2.8 4.4-4.5	0 1 4 47 48 18 29 SAME AS 0-0.5 VISUAL SAME AS 0-0.5 VISUAL BROWN INDURATED CLAY/ WEATHERED MUDSTONE VISUAL SAME AS 1.8-2.1 VISUAL SAME AS 1.8-2.1 VISUAL								
(B-69) 136918.200 637192.000	0-0.5 0.5-1.1 1.1-1.5 1.8-2.3 2.6-2.9 4.1-4.4 5.6-5.9	SAME AS 0.5-1.1 6 7 30 30 27 29 13 35 0 32 33 -35- 24 RED INDURATED CLAY/ WEATHERED MUDSTONE 23 VISUAL SAME AS 2.6-2.9 VISUAL SAME AS 2.6-2.9 VISUAL SAME AS 2.6-2.9 VISUAL								
(B-70) 136798.300 637304.000	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6 5.6-6.1 7.2-7.5 8.7-8.9	SAME AS 0.5-0.9 0 4 58 14 24 23 19 SAME AS 0.5-0.9 16 VISUAL BROWNISH-GRAY SILTY CLAY, TRACE SAND, TRACE GRAVEL 18 VISUAL SAME AS 1.8-2.3 25 VISUAL SAME AS 1.8-2.3 13 VISUAL BROWNISH-GRAY INDURATED CLAY/ WEATHERED MUDSTONE VISUAL SAME AS 5.6-6.1 VISUAL SAME AS 5.6-6.1 VISUAL								
(B-71) 136770.900 637256.300	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6 5.6-6.1 7.5-7.9	BROWN CLAY, SOME SILT, TRACE SAND SAME AS 0.5-0.9 SAME AS 4.1-4.6 SAME AS 4.1-4.6 SAME AS 4.1-4.6 0 4 23 37 36 36 15 17 SAME AS 4.1-4.6 28 VISUAL SAME AS 4.1-4.6 17 VISUAL								
(B-72) 136650.200 637347.100	0-0.5 0.5-1.1 1.1-1.5 1.8-2.3 2.6-3.1 4.4-4.9	SAME AS 0.5-1.1 0 1 4 42 53 58 33 31 SAME AS 0.5-1.1 19 VISUAL 0 1 19 35 45 46 25 22 SAME AS 1.8-2.3 21 VISUAL RED INDURATED CLAY/ WEATHERED MUDSTONE VISUAL								
(B-73) 136573.200 637423.800	0-0.5 0.5-0.9 1.1-1.5 1.8-2.3 2.6-3.1 4.1-4.6 5.6-6.1 7.2-7.4	SAME AS 1.1-1.5 SAME AS 1.1-1.5 0 5 19 36 40 28 32 SAME AS 1.1-1.5 21 VISUAL SAME AS 1.1-1.5 19 VISUAL SAME AS 1.1-1.5 18 VISUAL SAME AS 1.1-1.5 19 VISUAL SAME AS 1.1-1.5 18 VISUAL BROWN INDURATED CLAY/ WEATHERED MUDSTONE VISUAL								

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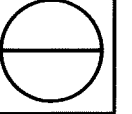
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ROADWAY / CULVERT SOIL PROFILE

ATH-33-30.981



# SUMMARY OF SOIL TEST DATA

	Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L	P.I	W.C.	SHTL Class.		
(B-74)	136375.300 637474.000	0-0.5	BROWN SILT, SOME CLAY, TRACE ORGANICS									30	VISUAL
		0.5-0.9	BROWN SILTY CLAY, TRACE SAND									26	VISUAL
		1.1-1.4	BROWN WEATHERED SANDSTONE										VISUAL
		1.8-2.0	SAME AS 1.1-1.4										VISUAL
(B-75)	136222.500 637482.900	0-0.1	BROWN CLAYEY SILT, SOME SAND, TRACE ORGANICS										VISUAL
		0.1-0.9	LIGHT BROWN SILTY CLAY, LITTLE SAND									15	VISUAL
		0.9-1.1	REDDISH-BROWN INDURATED CLAY/ WEATHERED MUDSTONE									15	VISUAL
		1.1-1.2	SAME AS 0.9-1.1									10	VISUAL
(B-76)	136130.600 637539.200	0-0.5	BROWN SILTY CLAY, LITTLE SAND, TRACE GRAVEL									25	VISUAL
		0.5-0.9	SAME AS 0-0.5									17	VISUAL
		1.1-1.5	SAME AS 0-0.5									15	VISUAL
		1.8-2.3	SAME AS 0-0.5									19	VISUAL
		2.6-3.1	SAME AS 0-0.5									28	VISUAL
		4.1-4.5	BROWN INDURATED CLAY/ WEATHERED MUDSTONE										VISUAL
		5.6-5.9	SAME AS 4.1-4.5										VISUAL
		7.2-7.4	SAME AS 4.1-4.5										VISUAL
		8.7-8.9	SAME AS 4.1-4.5										VISUAL
		10.2-10.4	SAME AS 4.1-4.5										VISUAL
		11.7-11.8	SAME AS 4.1-4.5										VISUAL
(B-78)	135838.200 637609.200	0-0.5	SAME AS 0.5-0.9									28	VISUAL
		0.5-0.9	6	2	2	30	60			28	VISUAL		
		1.1-1.5	SAME AS 0.5-0.9									28	VISUAL
		1.8-2.3	SAME AS 0.5-0.9									21	VISUAL
		2.6-3.1	SAME AS 0.5-0.9									17	VISUAL
		4.1-4.4	BROWN WEATHERED SILTSTONE										VISUAL
(B-79)	135828.200 637550.000	0-0.5	BROWN CLAYEY SILT, LITTLE SAND, TRACE ORGANICS									33	VISUAL
		0.5-0.9	BROWN SILTY CLAY, SOME SAND, LITTLE GRAVEL									21	VISUAL
		1.1-1.4	BROWN INDURATED CLAY, WEATHERED SHALE									15	VISUAL
		1.8-2.0	SAME AS 1.1-1.4										VISUAL
(B-80)	135684.500 637599.800	0-0.5	BROWN CLAYEY SILT, LITTLE SAND, TRACE ORGANICS									27	VISUAL
		0.5-0.9	BROWN SANDY SILT, TRACE CLAY									16	VISUAL
		1.1-1.5	SAME AS 1.1-1.5									14	VISUAL
		1.8-2.1	BROWN INDURATED CLAY/ WEATHERED SHALE										VISUAL
		2.6-2.8	SAME AS 1.8-2.1										VISUAL
(B-81)	135483.100 637608.700	0-0.5	SAME AS 1.1-1.7									27	VISUAL
		0.5-0.9	SAME AS 1.1-1.7									25	VISUAL
		1.1-1.7	0	8	28	36	28	38	17	26	A-6b		
		1.8-2.3	SAME AS 1.1-1.7									10	VISUAL
		2.6-2.9	GRAY WEATHERED SANDSTONE										VISUAL
		3.6-3.7	SAME AS 2.6-2.9										VISUAL

Northing & Easting	From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L	P.I	W.C.	SHTL Class.
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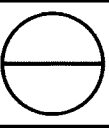
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**ROADWAY / CULVERT SOIL PROFILE**

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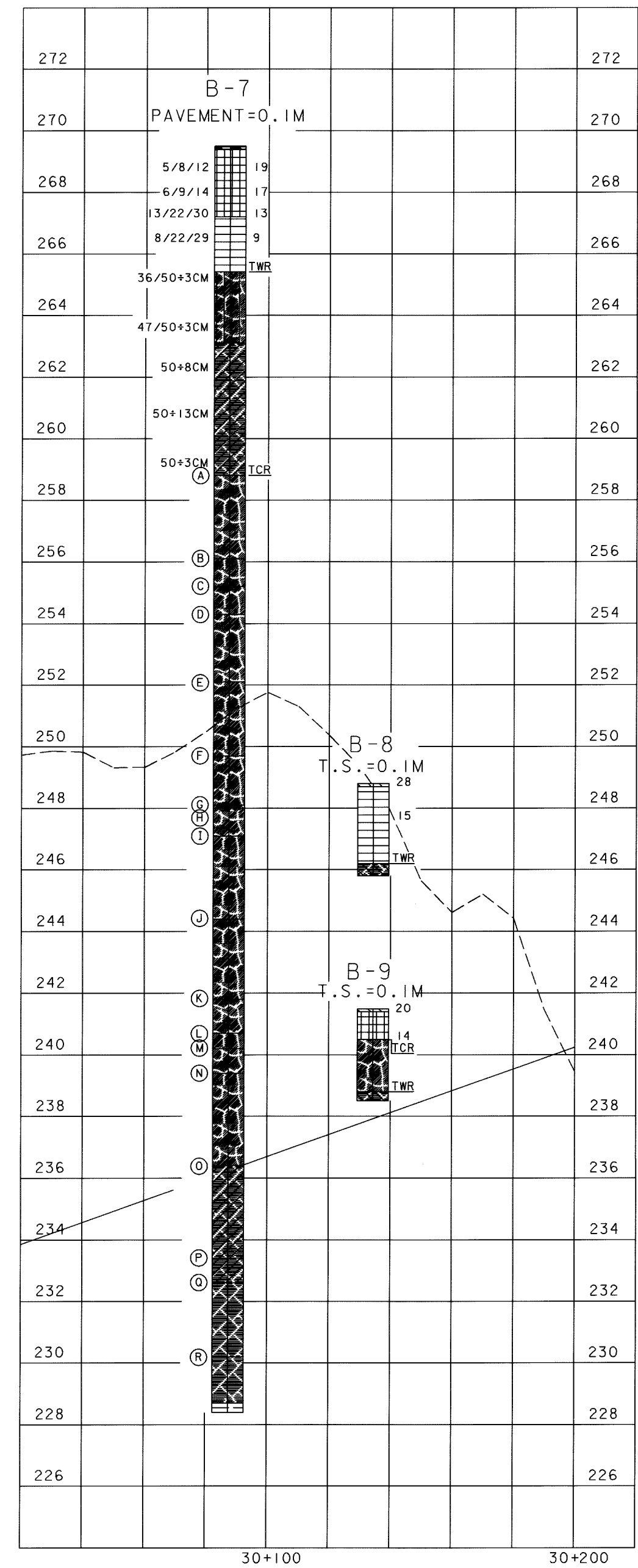
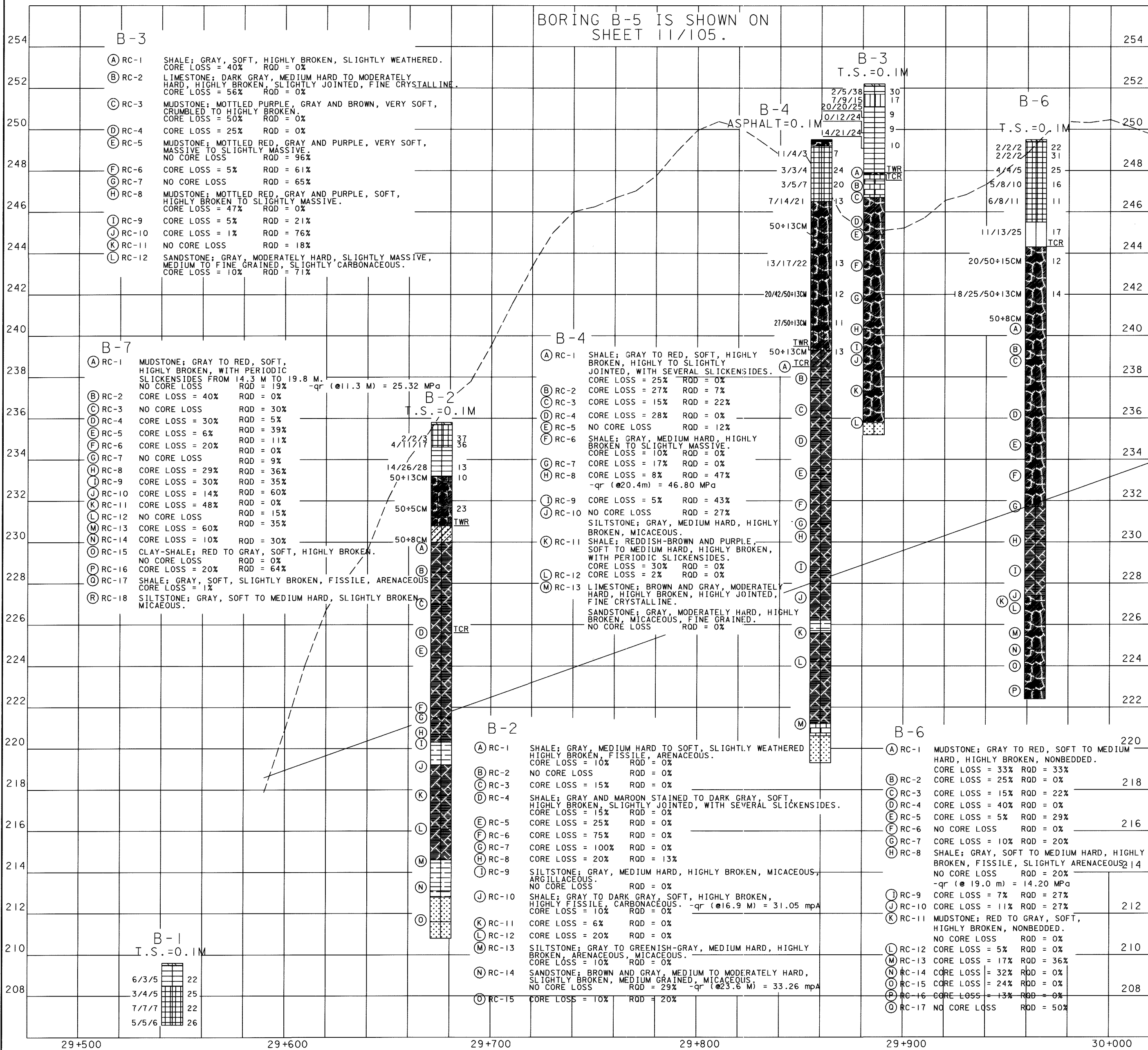


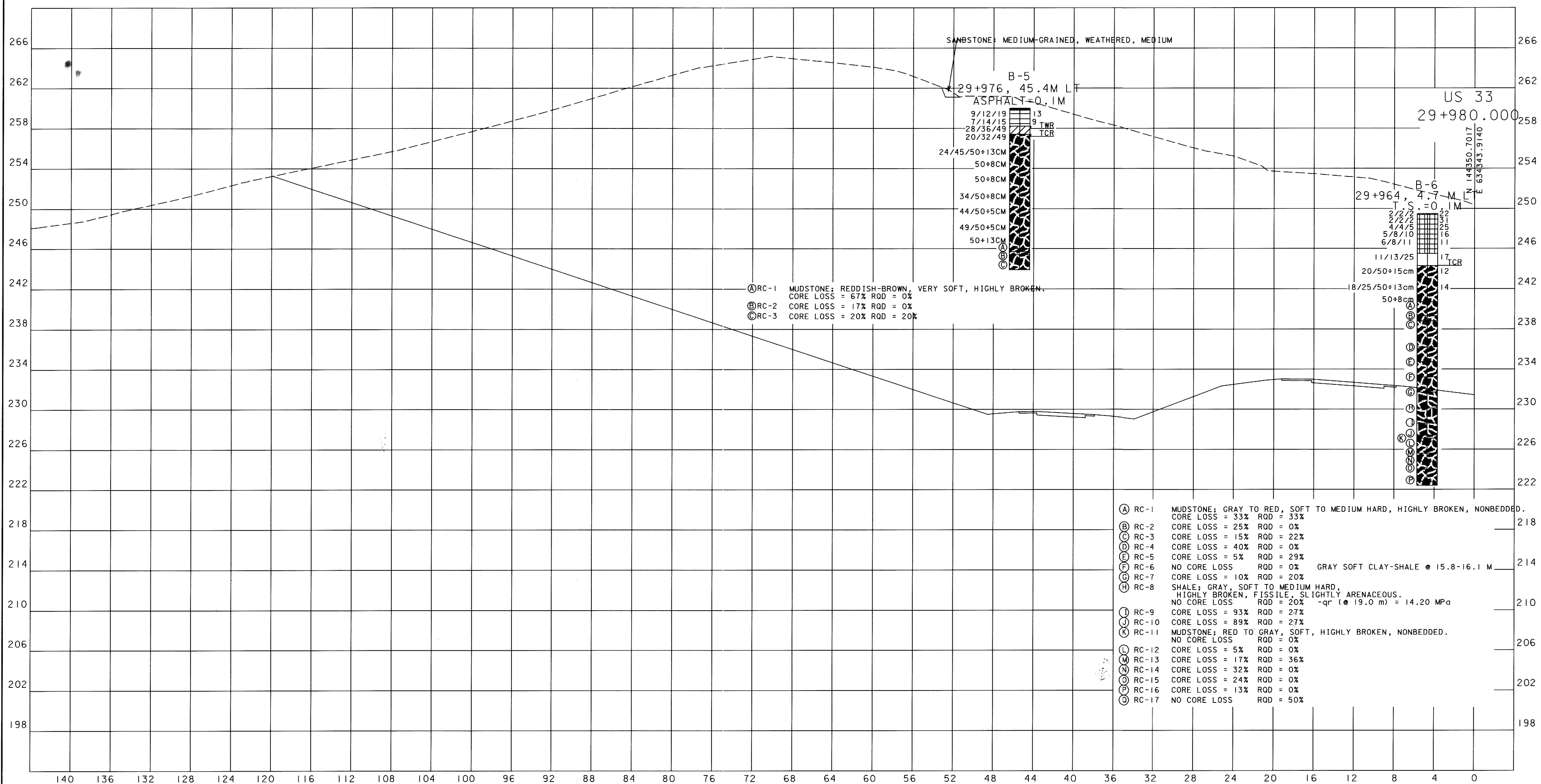




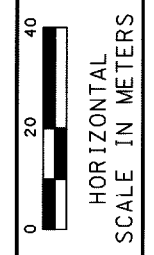








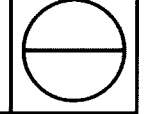
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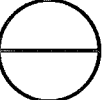
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ROADWAY CULVERT SOIL PROFILE  
CROSS SECTION 29+980

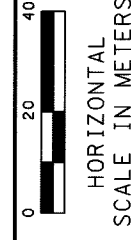
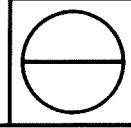
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 HORIZONTAL SCALE IN METERS	CALCULATED W. I. N.
	CHECKED S. S. S.
DATE 03/22/00	REVIEWED S. M.
DRAWN B. M.	STA. 30+200 TO STA. 30+900
ATH-33-30.981	ROADWAY / CULVERT SOIL PROFILE
12/105	



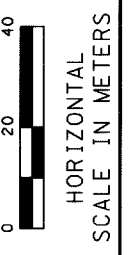
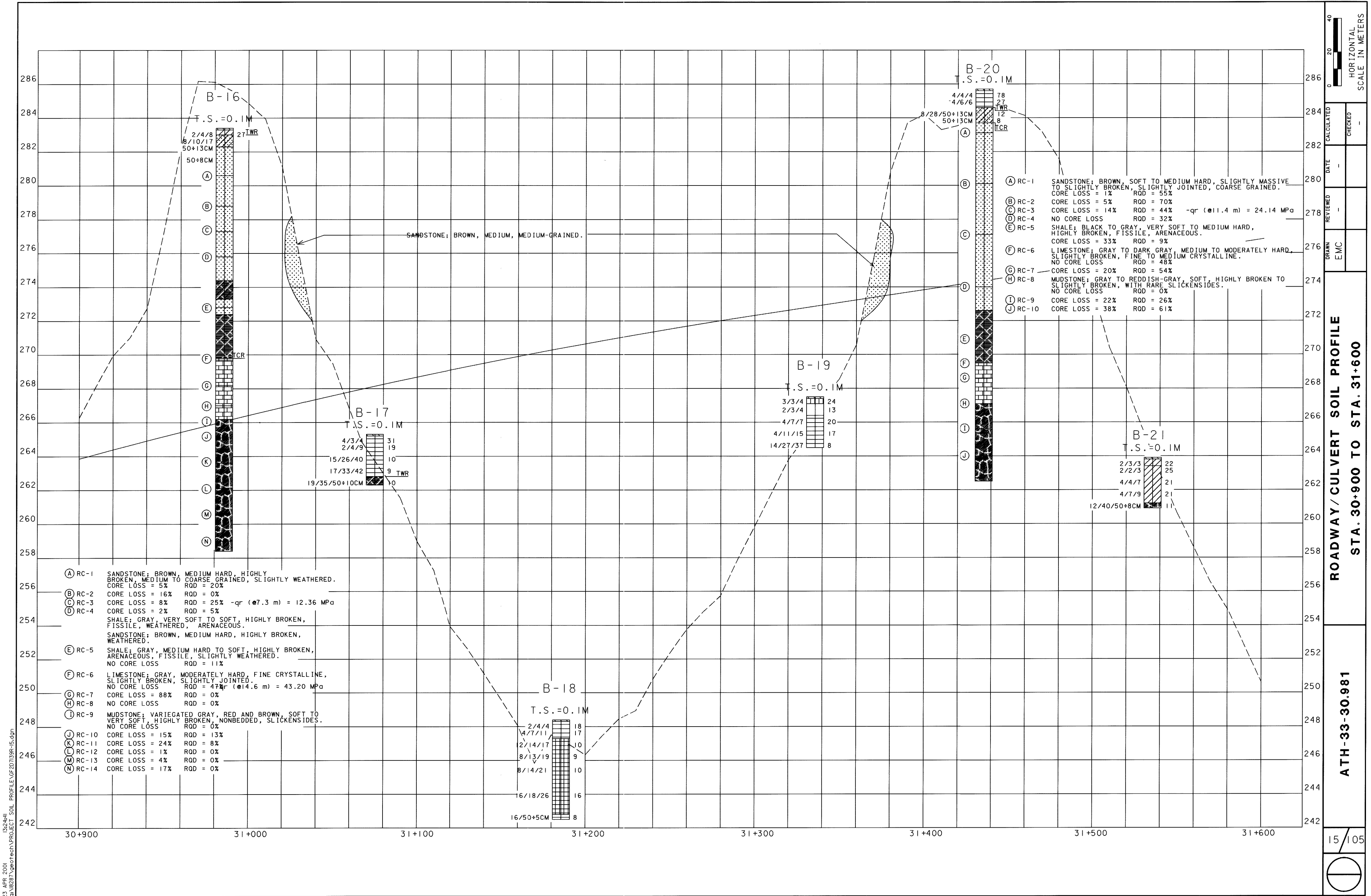


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	DRAWN

E.M.C.
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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 30+900 TO STA. 31+600**

**ATH-33-30.981**



DATE	CALCULATED	CHECKED
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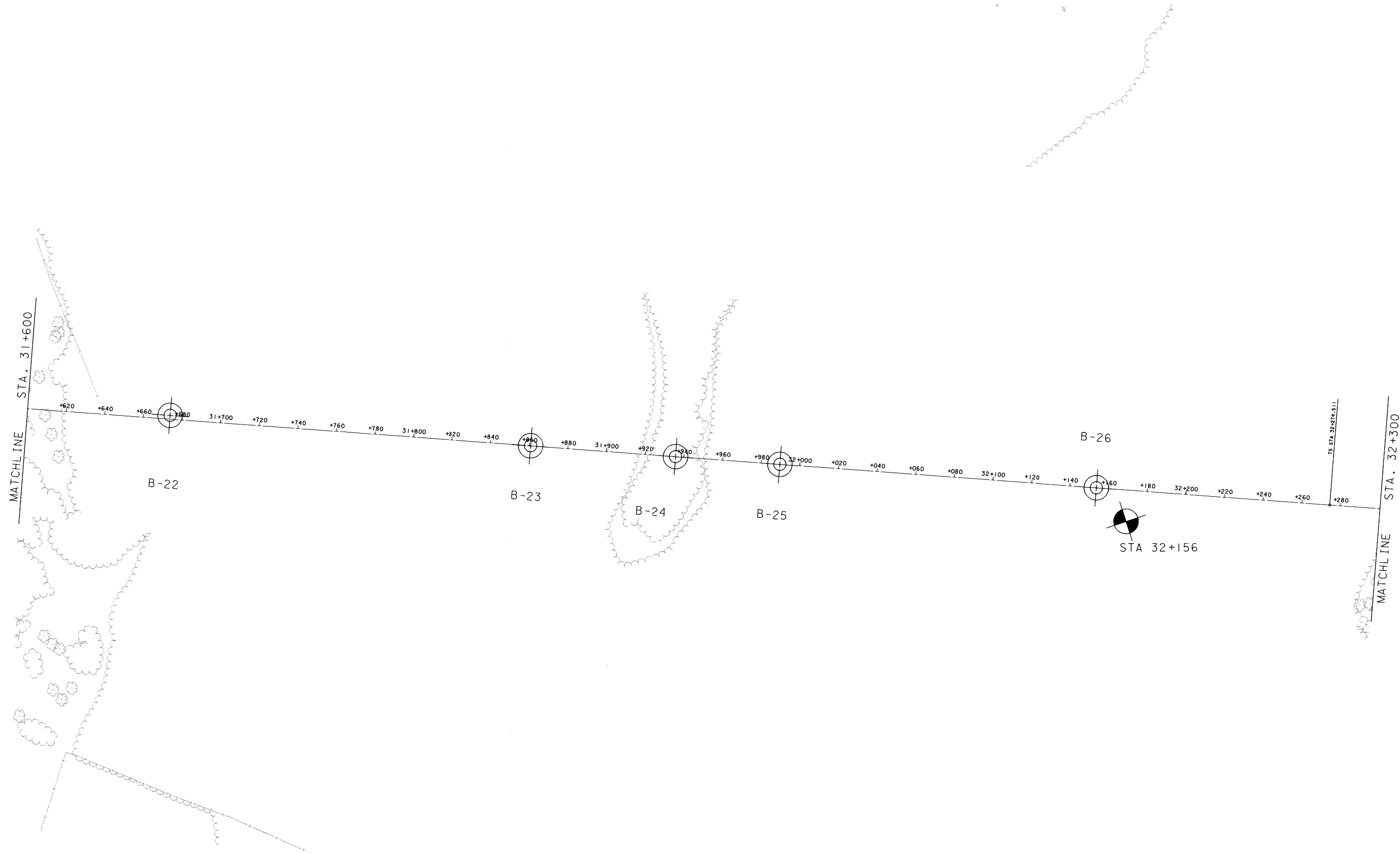
ROADWAY/CULVERT SOIL PROFILE  
STA. 30+900 TO STA. 31+600

ATH-33-30.981

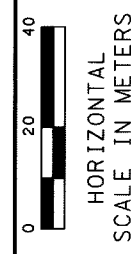
23 APR 2001 13:24:41 G:\B281\geotech\proj\SOIL\_PROFILE\2013198-15.dgn

- (A) RC-1 SANDSTONE; BROWN, MEDIUM HARD, HIGHLY BROKEN, MEDIUM TO COARSE GRAINED, SLIGHTLY WEATHERED. CORE LOSS = 5% RQD = 20%
- (B) RC-2 CORE LOSS = 16% RQD = 0%
- (C) RC-3 CORE LOSS = 8% RQD = 25% -qr (@7.3 m) = 12.36 MPa
- (D) RC-4 CORE LOSS = 2% RQD = 5%
- (E) RC-5 SHALE; GRAY, VERY SOFT TO SOFT, HIGHLY BROKEN, FISSILE, WEATHERED, ARENACEOUS. SANDSTONE; BROWN, MEDIUM HARD, HIGHLY BROKEN, WEATHERED. SHALE; GRAY, MEDIUM HARD TO SOFT, HIGHLY BROKEN, ARENACEOUS, FISSILE, SLIGHTLY WEATHERED. NO CORE LOSS RQD = 11%
- (F) RC-6 LIMESTONE; GRAY, MODERATELY HARD, FINE CRYSTALLINE, SLIGHTLY BROKEN, SLIGHTLY JOINTED. NO CORE LOSS RQD = 47% -qr (@14.6 m) = 43.20 MPa
- (G) RC-7 CORE LOSS = 88% RQD = 0%
- (H) RC-8 NO CORE LOSS RQD = 0%
- (I) RC-9 MUDSTONE; VARIEGATED GRAY, RED AND BROWN, SOFT TO VERY SOFT, HIGHLY BROKEN, NONBEDDED, SLICKENSIDES. NO CORE LOSS RQD = 0%
- (J) RC-10 CORE LOSS = 15% RQD = 13%
- (K) RC-11 CORE LOSS = 24% RQD = 8%
- (L) RC-12 CORE LOSS = 1% RQD = 0%
- (M) RC-13 CORE LOSS = 4% RQD = 0%
- (N) RC-14 CORE LOSS = 17% RQD = 0%

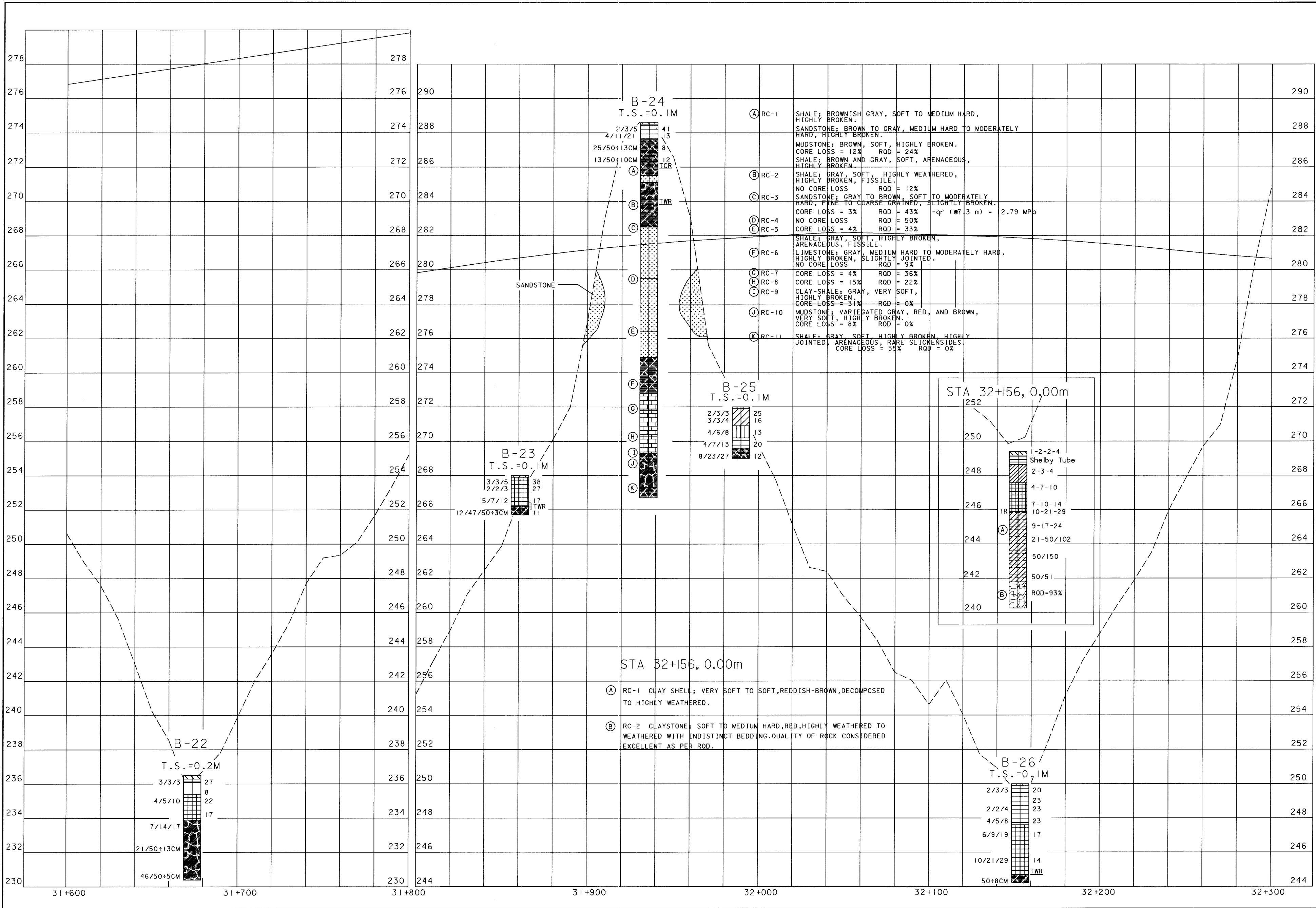
- (A) RC-1 SANDSTONE; BROWN, SOFT TO MEDIUM HARD, SLIGHTLY MASSIVE TO SLIGHTLY BROKEN, SLIGHTLY JOINTED, COARSE GRAINED. CORE LOSS = 1% RQD = 55%
- (B) RC-2 CORE LOSS = 5% RQD = 70%
- (C) RC-3 CORE LOSS = 14% RQD = 44% -qr (@11.4 m) = 24.14 MPa
- (D) RC-4 NO CORE LOSS RQD = 32%
- (E) RC-5 SHALE; BLACK TO GRAY, VERY SOFT TO MEDIUM HARD, HIGHLY BROKEN, FISSILE, ARENACEOUS. CORE LOSS = 33% RQD = 9%
- (F) RC-6 LIMESTONE; GRAY TO DARK GRAY, MEDIUM TO MODERATELY HARD, SLIGHTLY BROKEN, FINE TO MEDIUM CRYSTALLINE. NO CORE LOSS RQD = 48%
- (G) RC-7 CORE LOSS = 20% RQD = 54%
- (H) RC-8 MUDSTONE; GRAY TO REDDISH-GRAY, SOFT, HIGHLY BROKEN TO SLIGHTLY BROKEN, WITH RARE SLICKENSIDES. NO CORE LOSS RQD = 0%
- (I) RC-9 CORE LOSS = 22% RQD = 26%
- (J) RC-10 CORE LOSS = 38% RQD = 61%



DRAWN	REVIEWED	DATE	CALCULATED
B. M.	S. M.	03/22/00	W. J. N.
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			S. S. S.





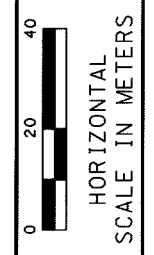


**ROADWAY/CULVERT SOIL PROFILE**  
**STA. 31+600 TO STA. 32+300**


**ATH-33-30.981**

DATE	03/22/00	CALCULATED	W. I. N.
REVIEWED	S. M.	CHECKED	S. S. S.
DRAWN	B. M.		

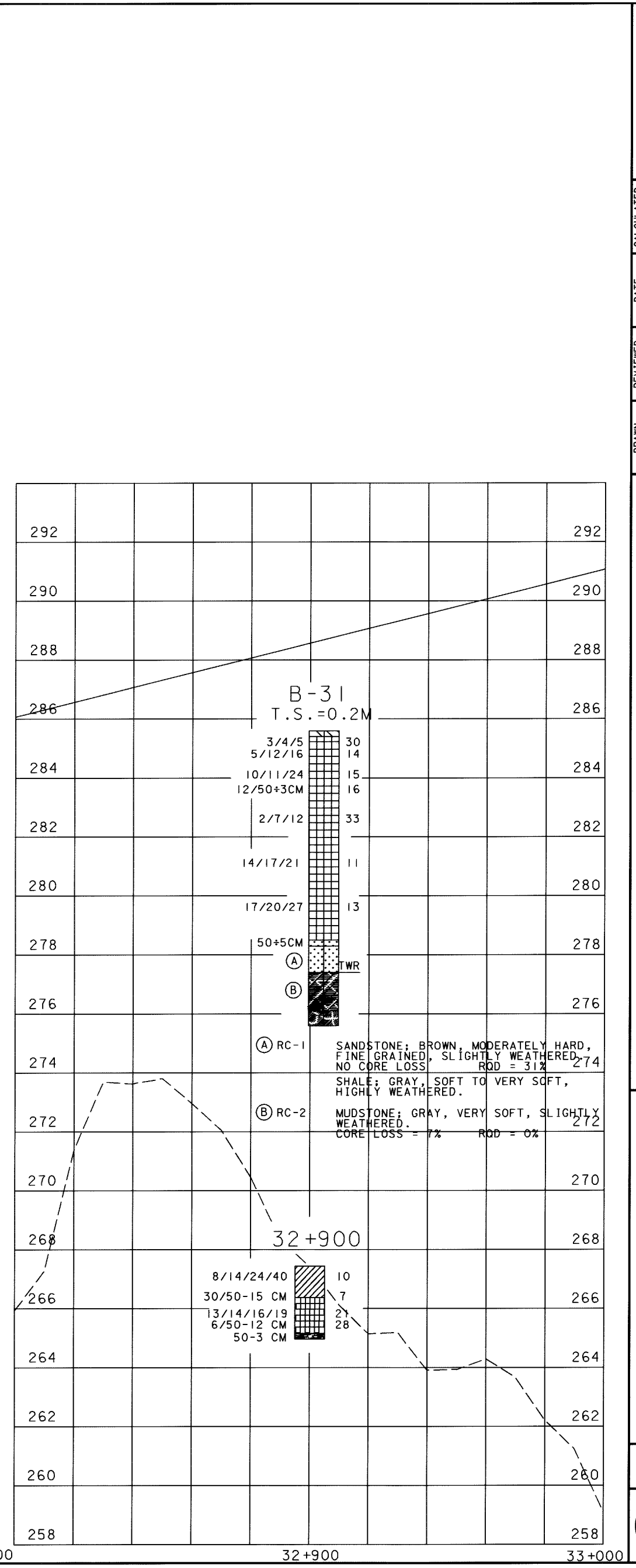
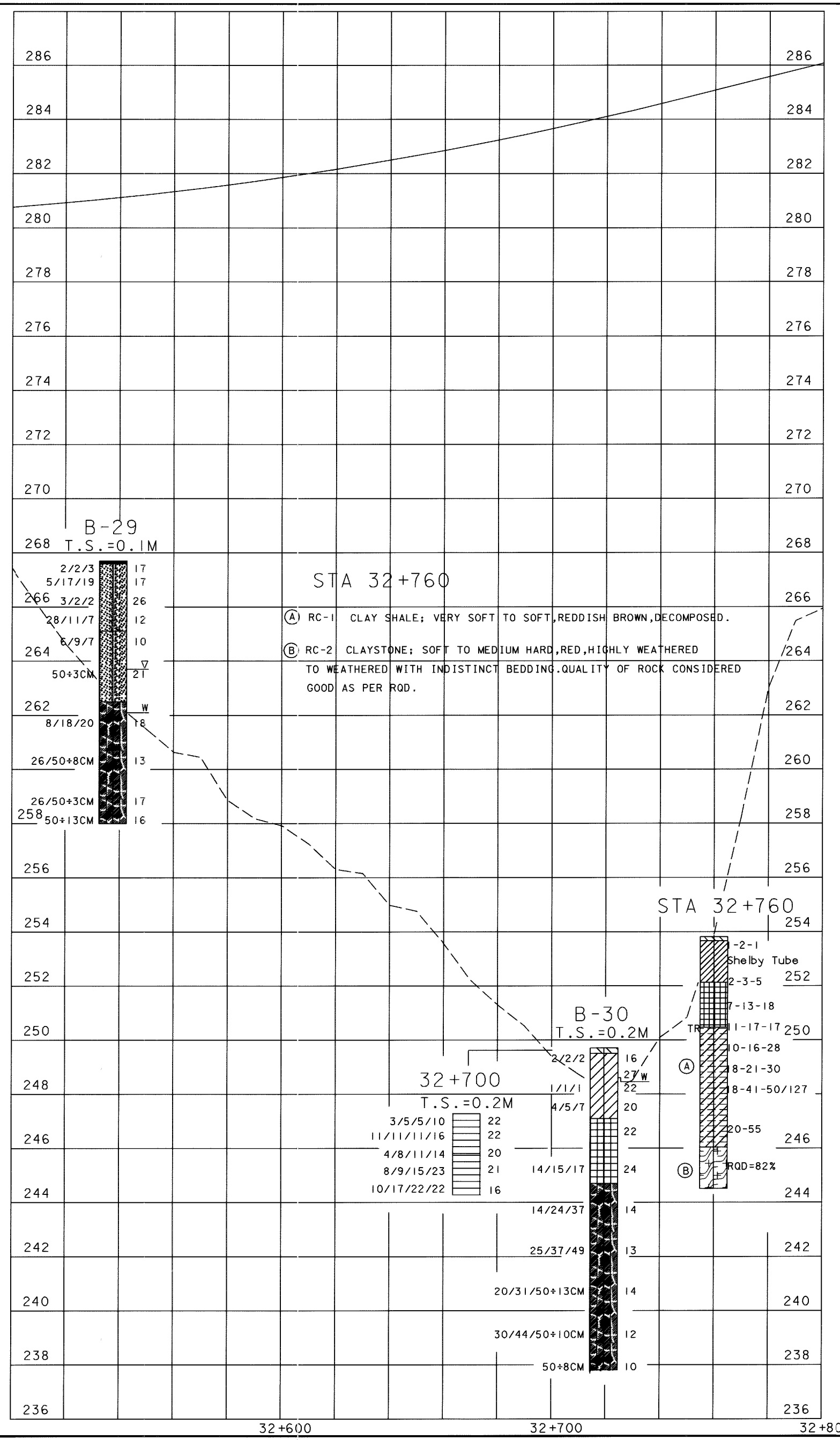
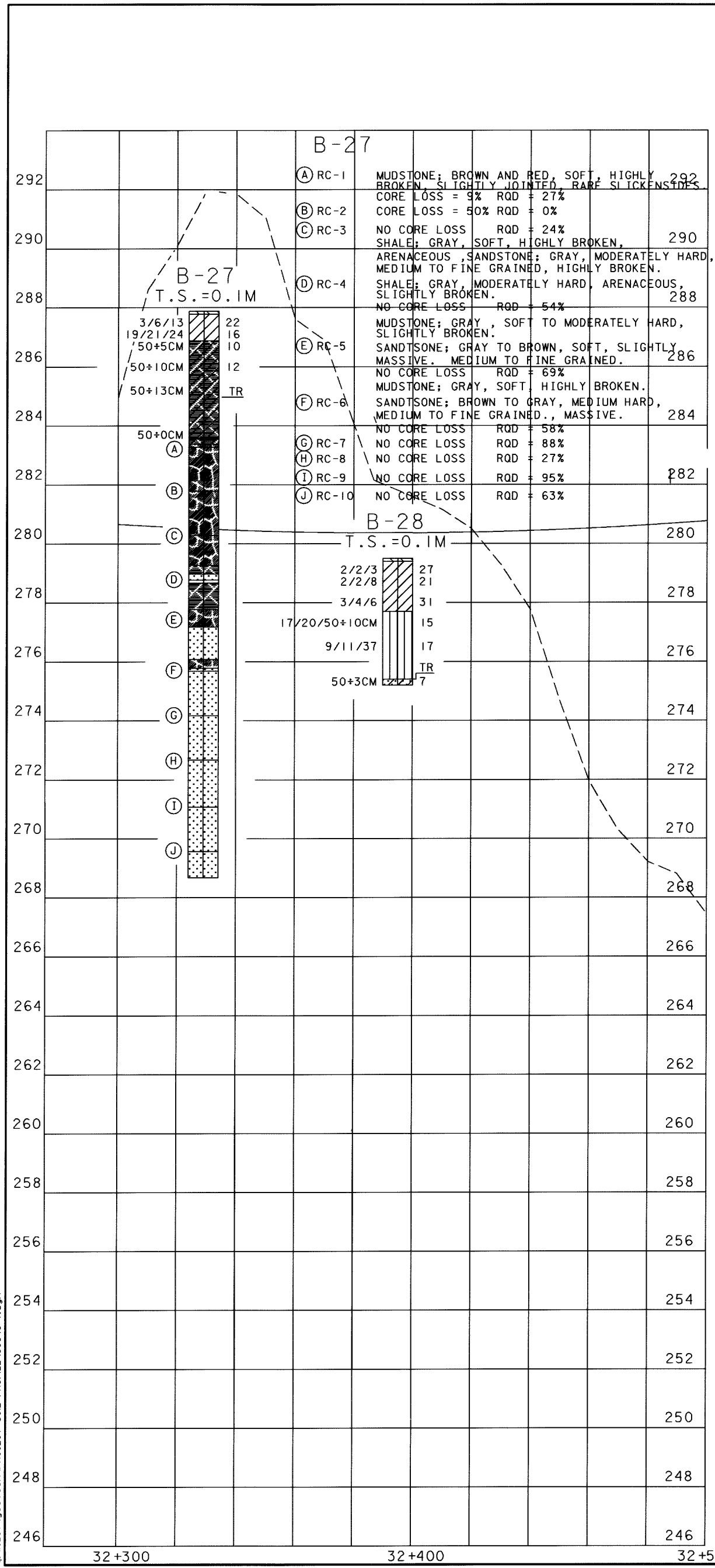
17/105





 HORIZONTAL SCALE IN METERS	0 20 40
	CALCULATED W. J. N.
DATE 03/22/00	CHECKED S. S. S.
REVIEWED S. M.	DRAWN B. M.
<b>ROADWAY / CULVERT SOIL PROFILE</b> <b>STA. 32+300 TO STA. 33+000</b>	
<b>ATH-33-30.981</b>	
18 / 05	

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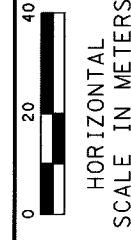
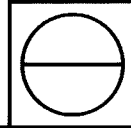


**ROADWAY/CULVERT SOIL PROFILE**  
**STA. 32+300 TO STA. 33+000**

**ATH-33-30.981**

SCALE IN METERS	0 20 40
HORIZONTAL	
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CALCULATED	
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S.S.S.	

19/05

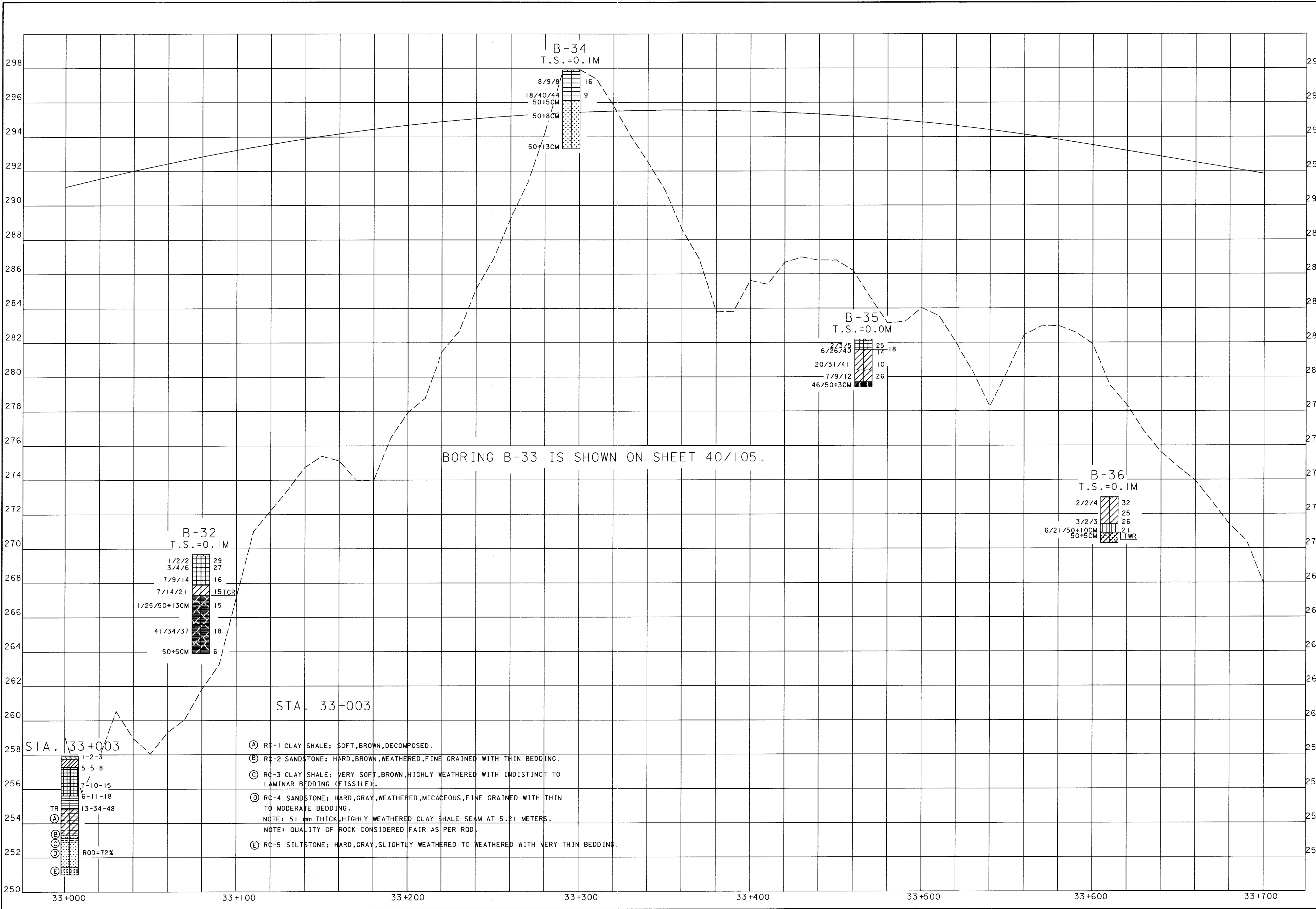


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DATE	CHECKED
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REVIEWED	
S. M.	
DRAWN	
B. M.	

**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 33+000 TO STA. 33+700**

**ATH-33-30.981**

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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 33+000 TO STA. 33+700**

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**ATH-33-30.981**

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21/105

SCALE IN METERS

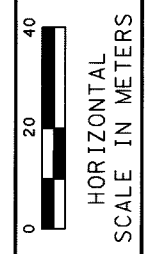
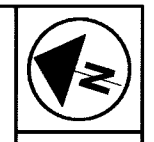
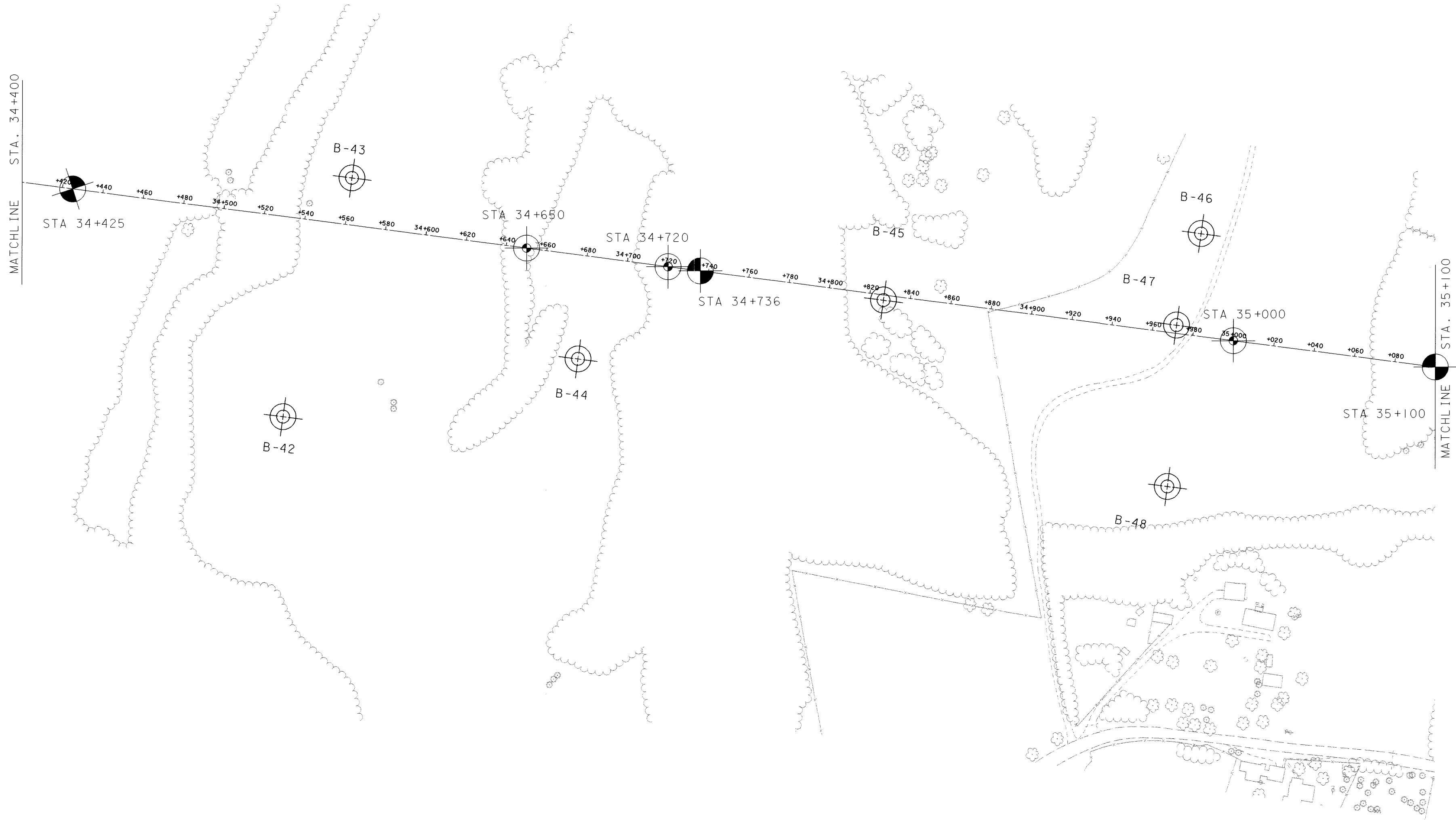
HORIZONTAL

DRAWN	B.M.	REVIEWED	S.M.	DATE	03/22/00	CALCULATED	W.I.N.
							CHECKED S.S.S.



	<p>HORIZONTAL SCALE IN METERS</p>	<table border="1" style="font-size: 8px;"> <tr> <td>DATE</td> <td>—</td> </tr> <tr> <td>REVIEWED</td> <td>—</td> </tr> <tr> <td>DRAWN</td> <td>E/MC</td> </tr> </table>	DATE	—	REVIEWED	—	DRAWN	E/MC	<table border="1" style="font-size: 8px;"> <tr> <td>CALCULATED</td> <td>—</td> </tr> <tr> <td>CHECKED</td> <td>—</td> </tr> </table>	CALCULATED	—	CHECKED	—	<p><b>ROADWAY / CULVERT SOIL PROFILE</b>  <b>STA. 33+700 TO STA. 34+400</b></p>
DATE	—													
REVIEWED	—													
DRAWN	E/MC													
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CHECKED	—													
<p><b>ATH-33-30.981</b></p>				<p>22 / 05</p>										

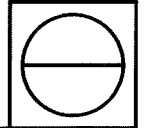




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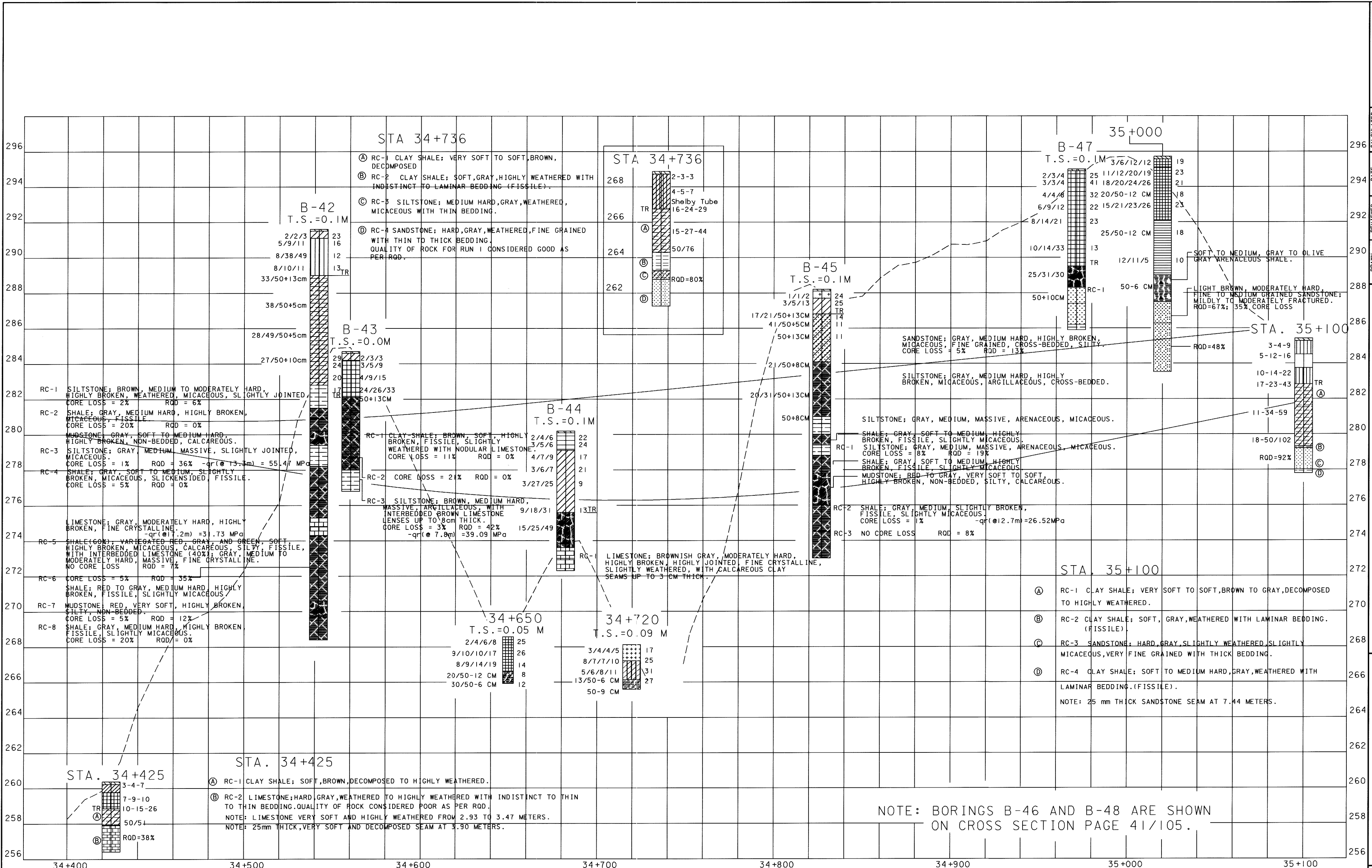
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**STA. 34+400 TO STA. 35+100**

**ATH-33-30.981**

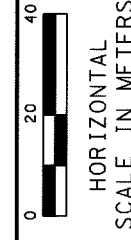
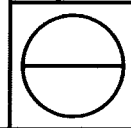




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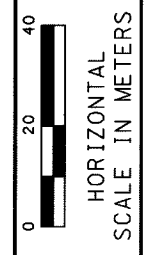
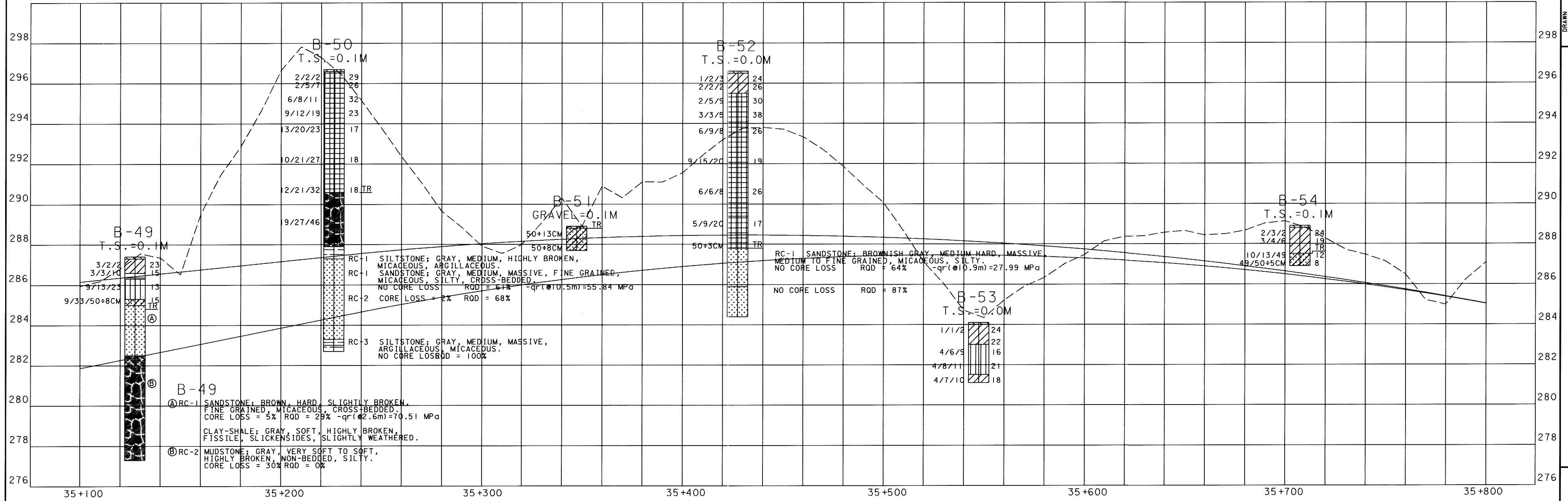
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DATE	REVIEWED	DRAWN	CHECKED
		E/MC	

**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 35+100 TO STA. 35+800**

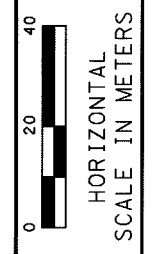
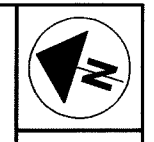
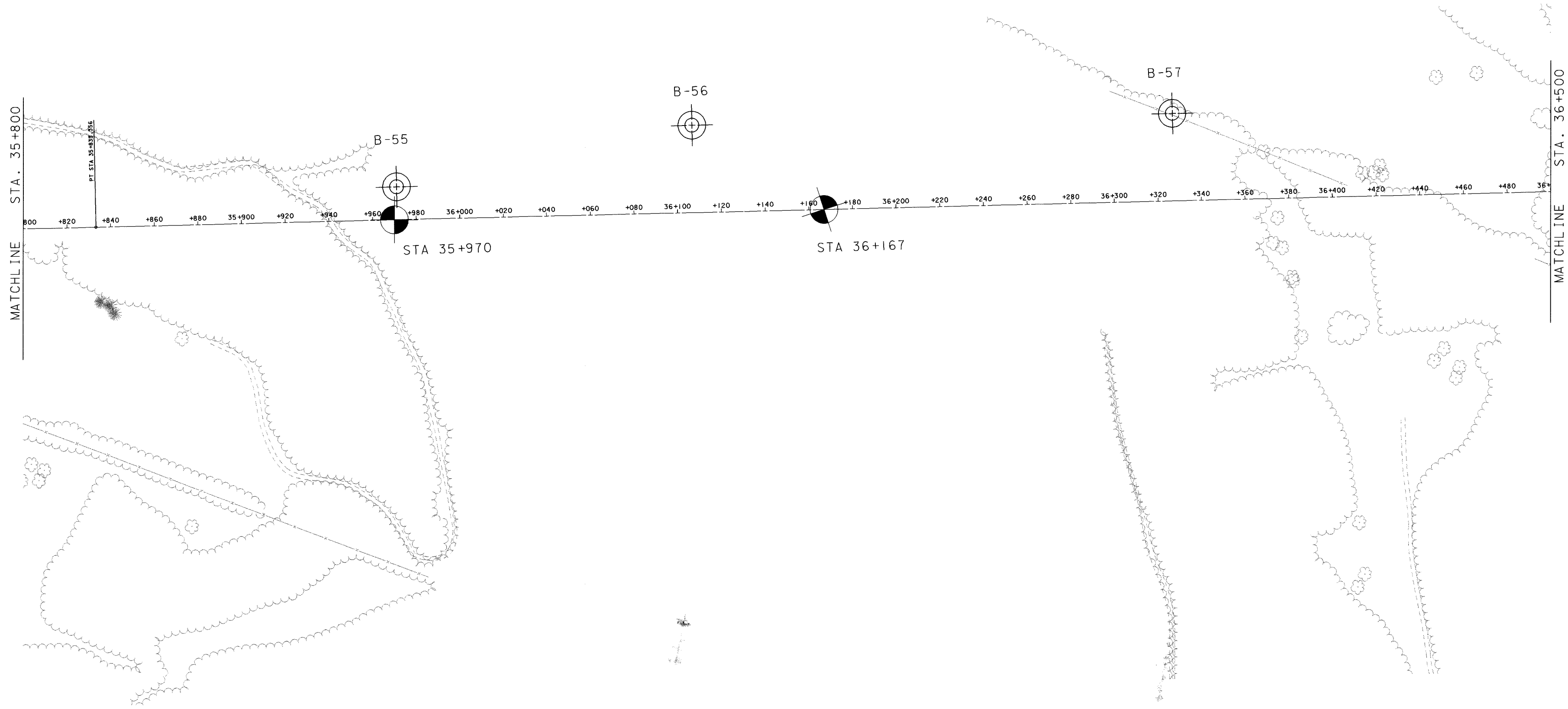
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**ROADWAY / CULVERT SOIL PROFILE**  
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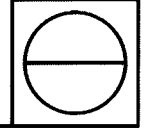
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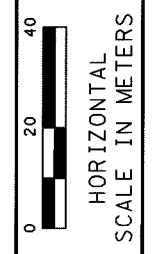
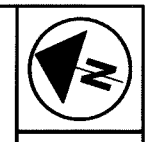


DATE	REVIEWED	DRAWN	CALCULATED
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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 35+800 TO STA. 36+500**

**ATH-33-30.981**

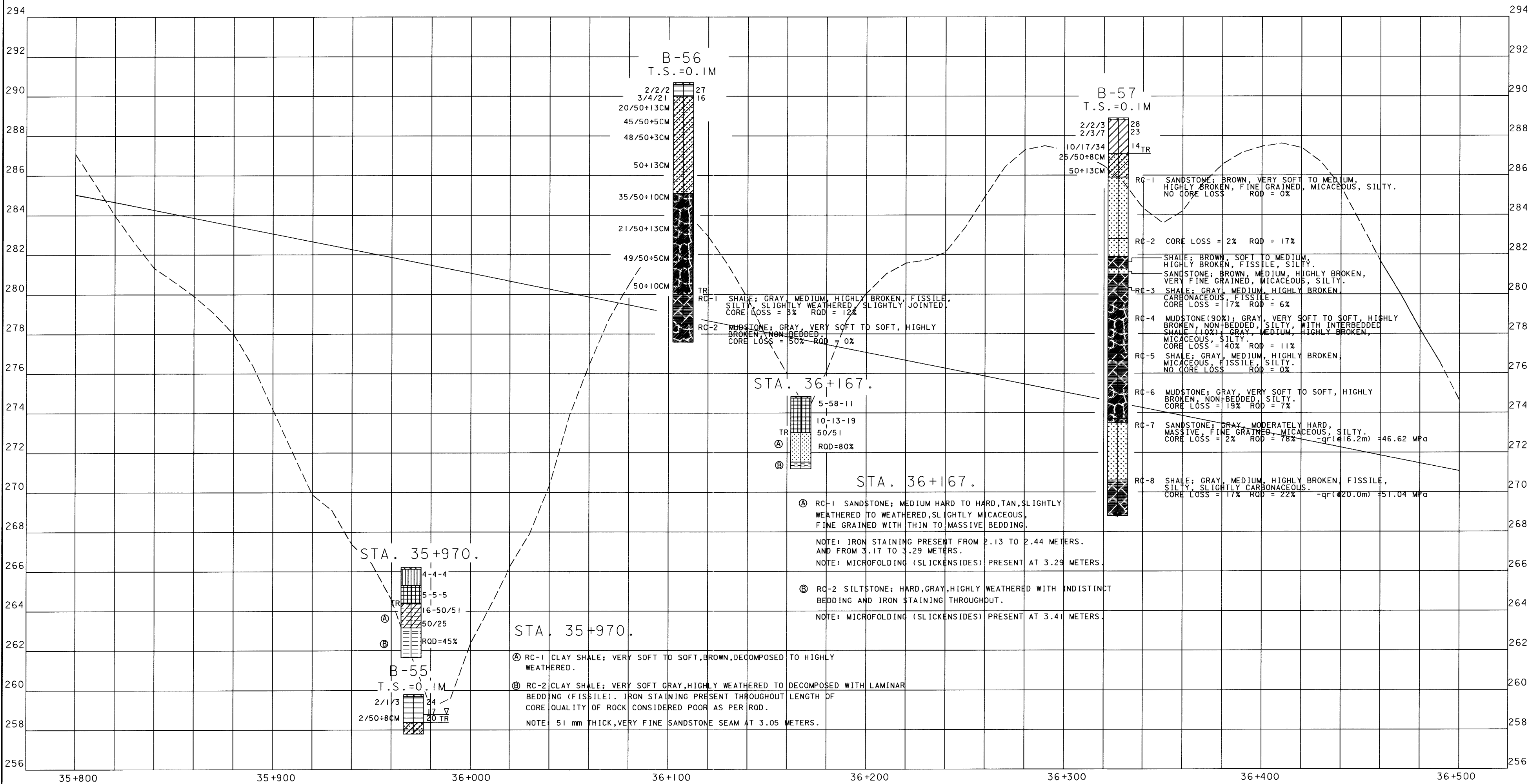
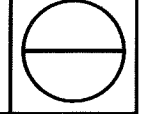




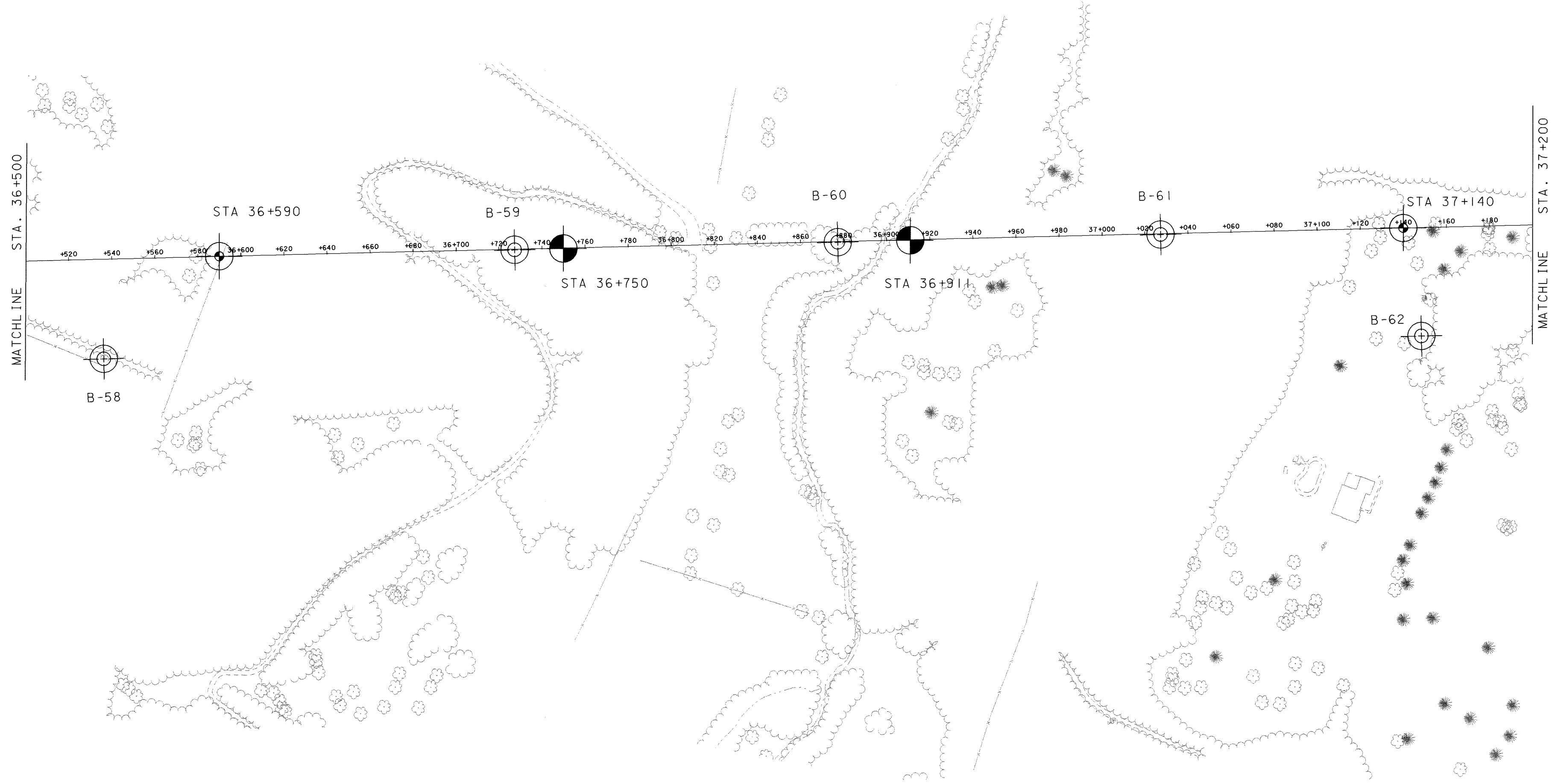
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DATE	CHECKED
03/22/00	S. S. S.
REVIEWED	S. M.
DRAWN	B. M.

**ROADWAY/CULVERT SOIL PROFILE  
STA. 35+800 TO STA. 36+500**

**ATH-33-30.981**

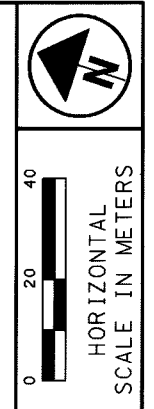


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MATCHLINE  
 STA. 36+500

MATCHLINE  
 STA. 37+200

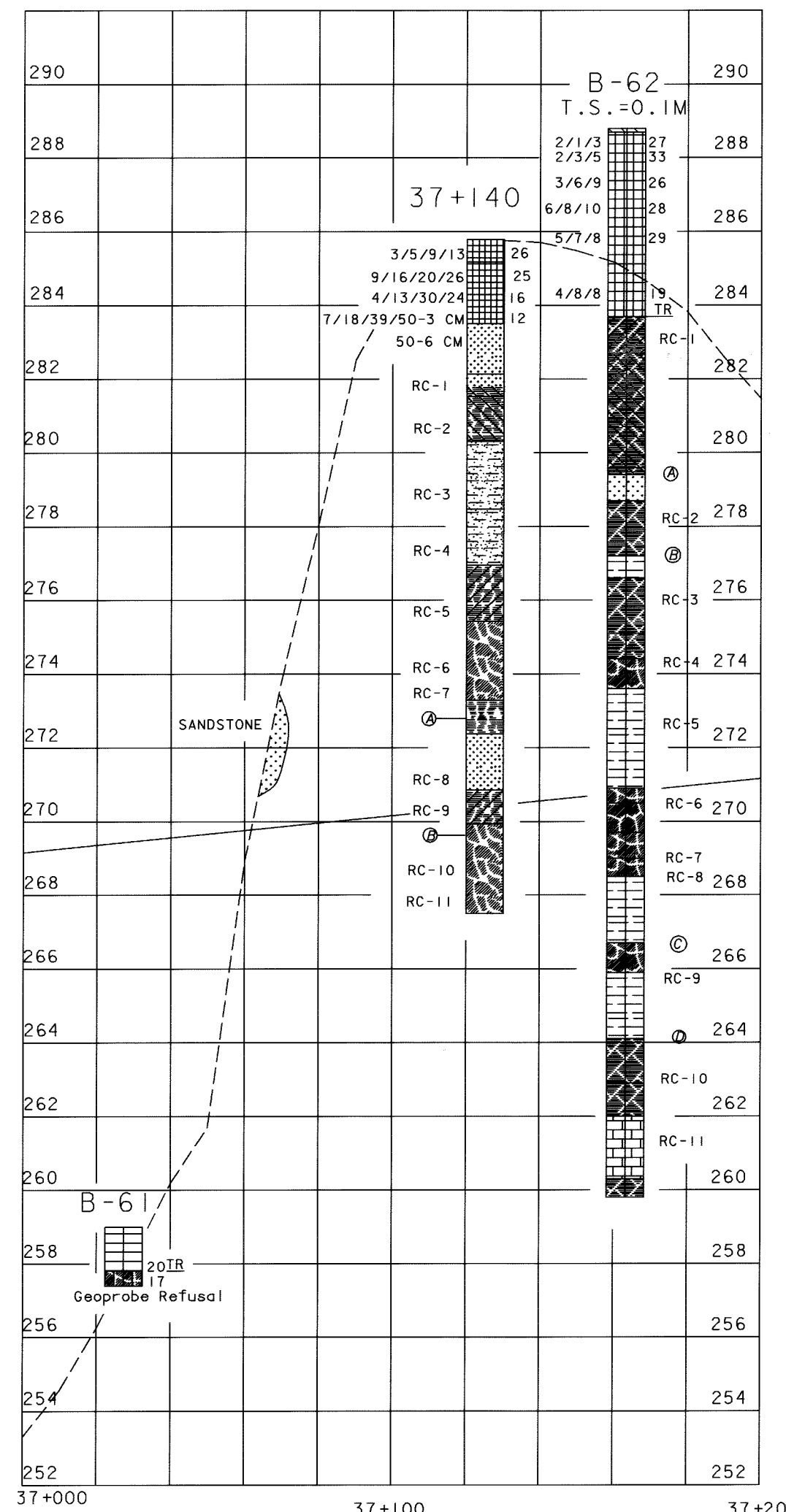
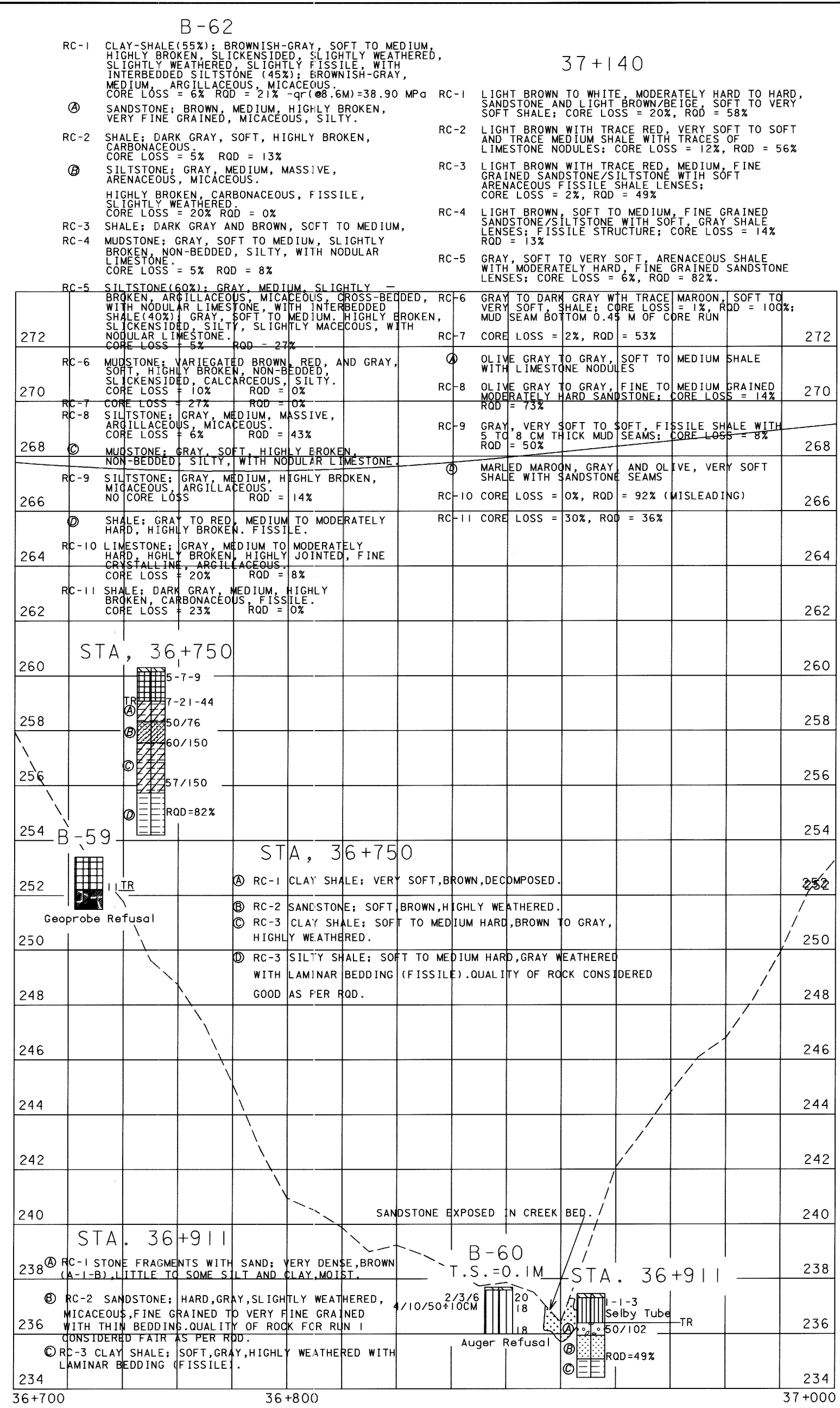
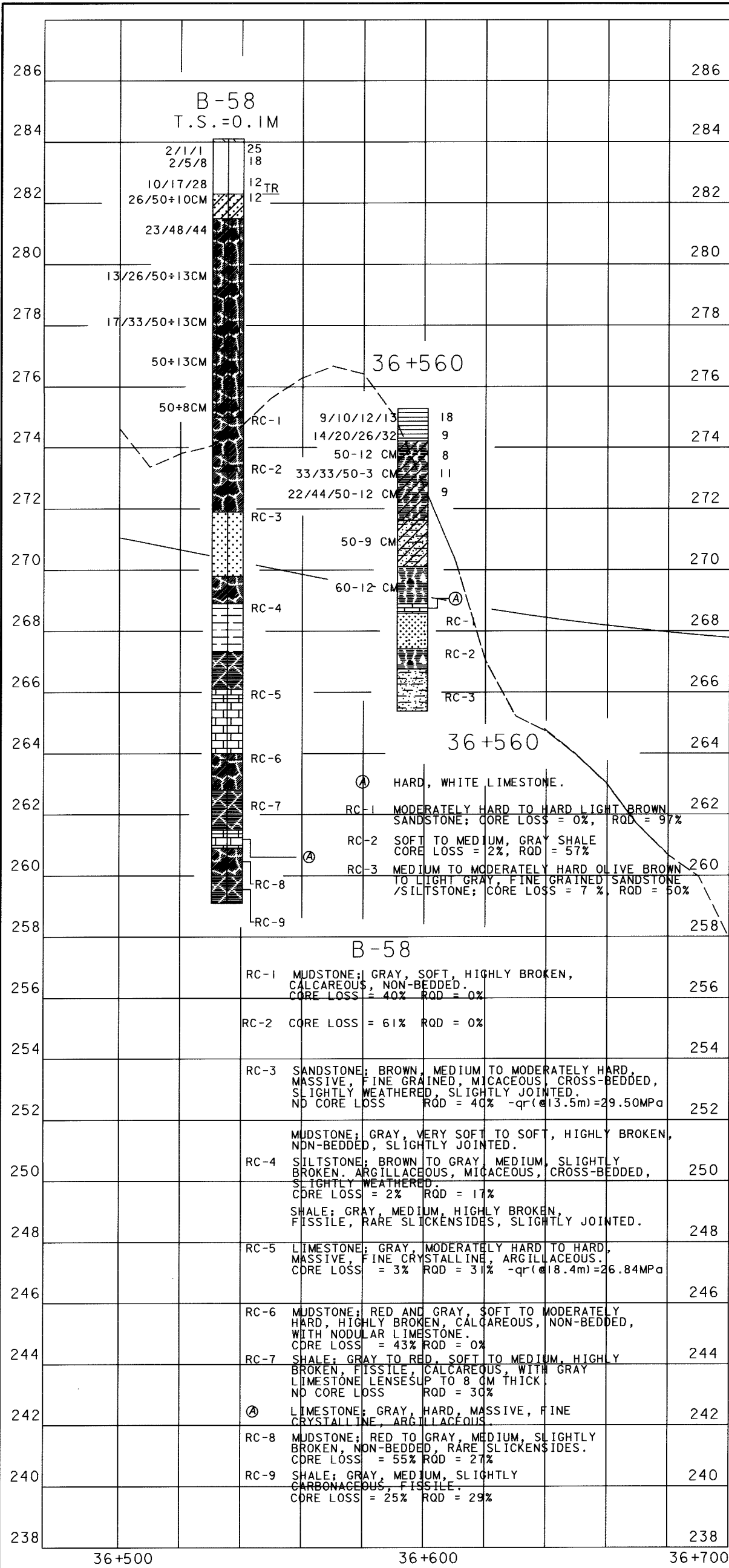


HORIZONTAL  
 SCALE IN METERS



DATE	03/22/00	CALCULATED	W. J. N.
REVIEWED	S. M.	CHECKED	S. S. S.
DRAWN	B. M.		

**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 36+500 TO STA. 37+200**

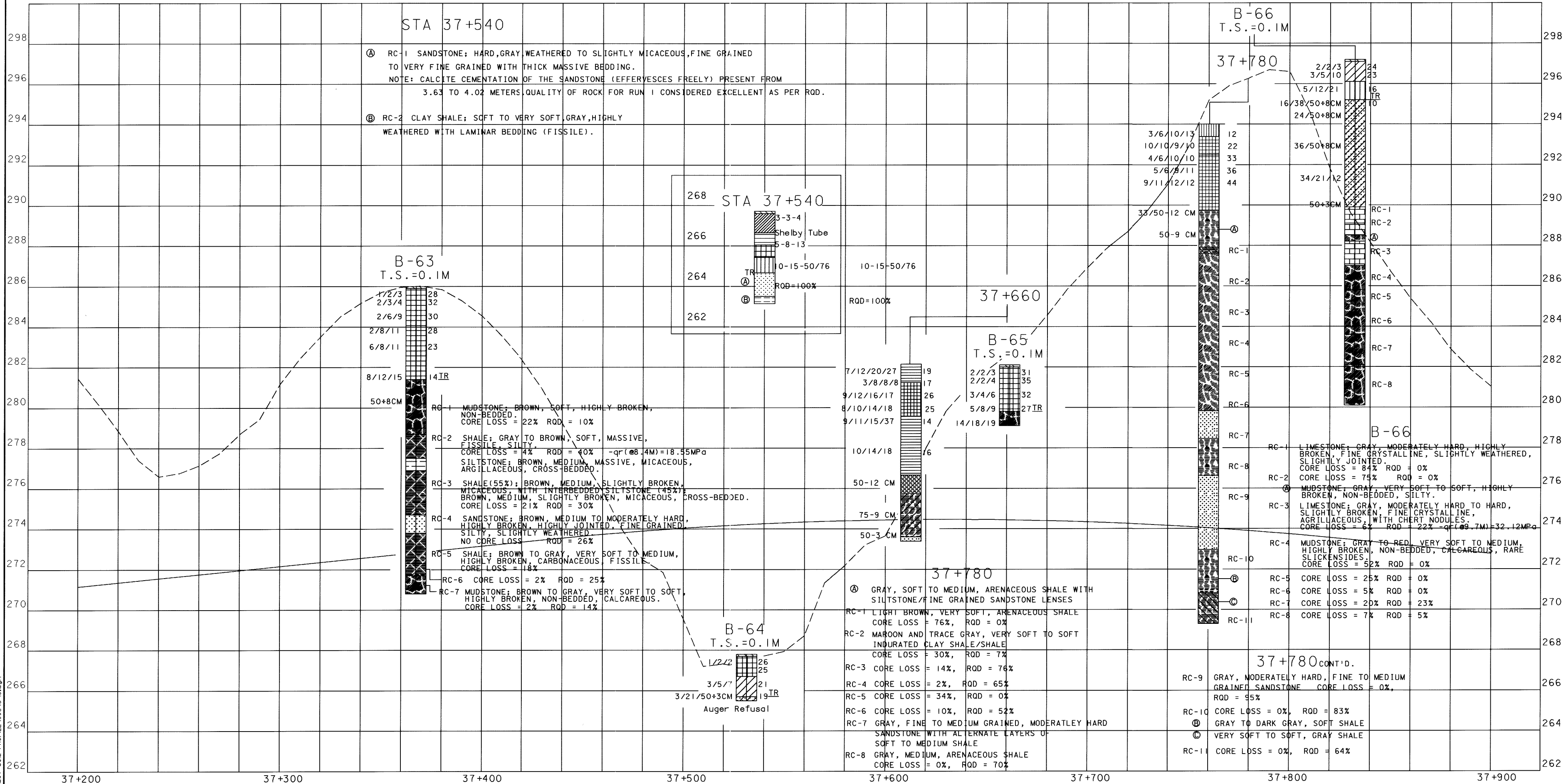
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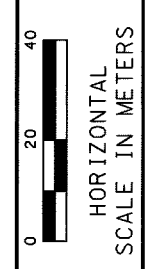
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	CHECKED S. S. S.
DATE 03/22/00	REVIEWED S. M.
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ATH-33-30.981	ROADWAY / CULVERT SOIL PROFILE
32 / 05	



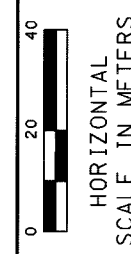
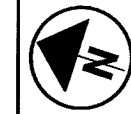
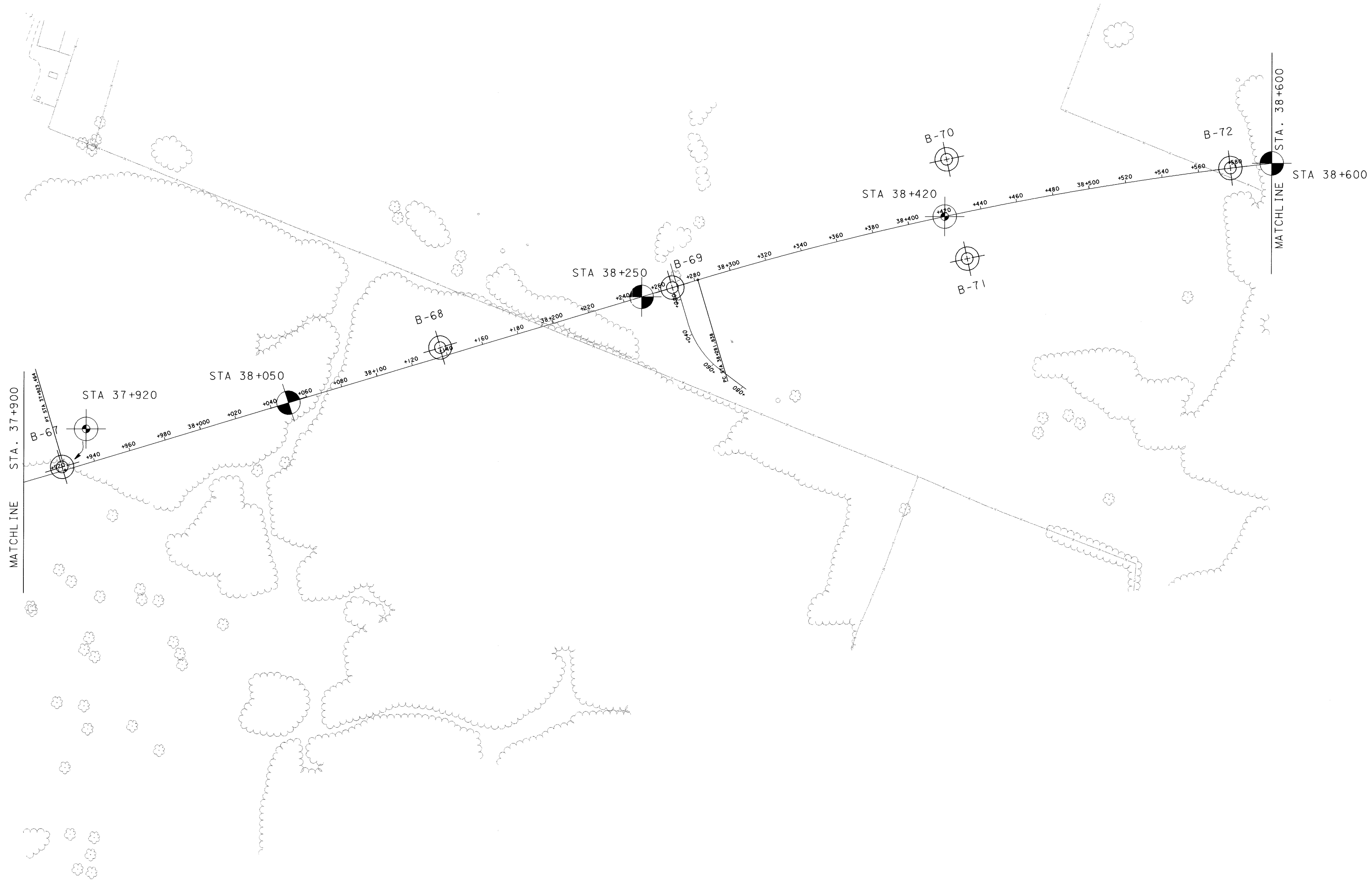


**ROADWAY/CULVERT SOIL PROFILE  
STA. 37+200 TO STA. 37+900**

**ATH-33-30.981**



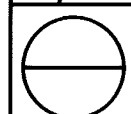
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DRAWN	B. M.		

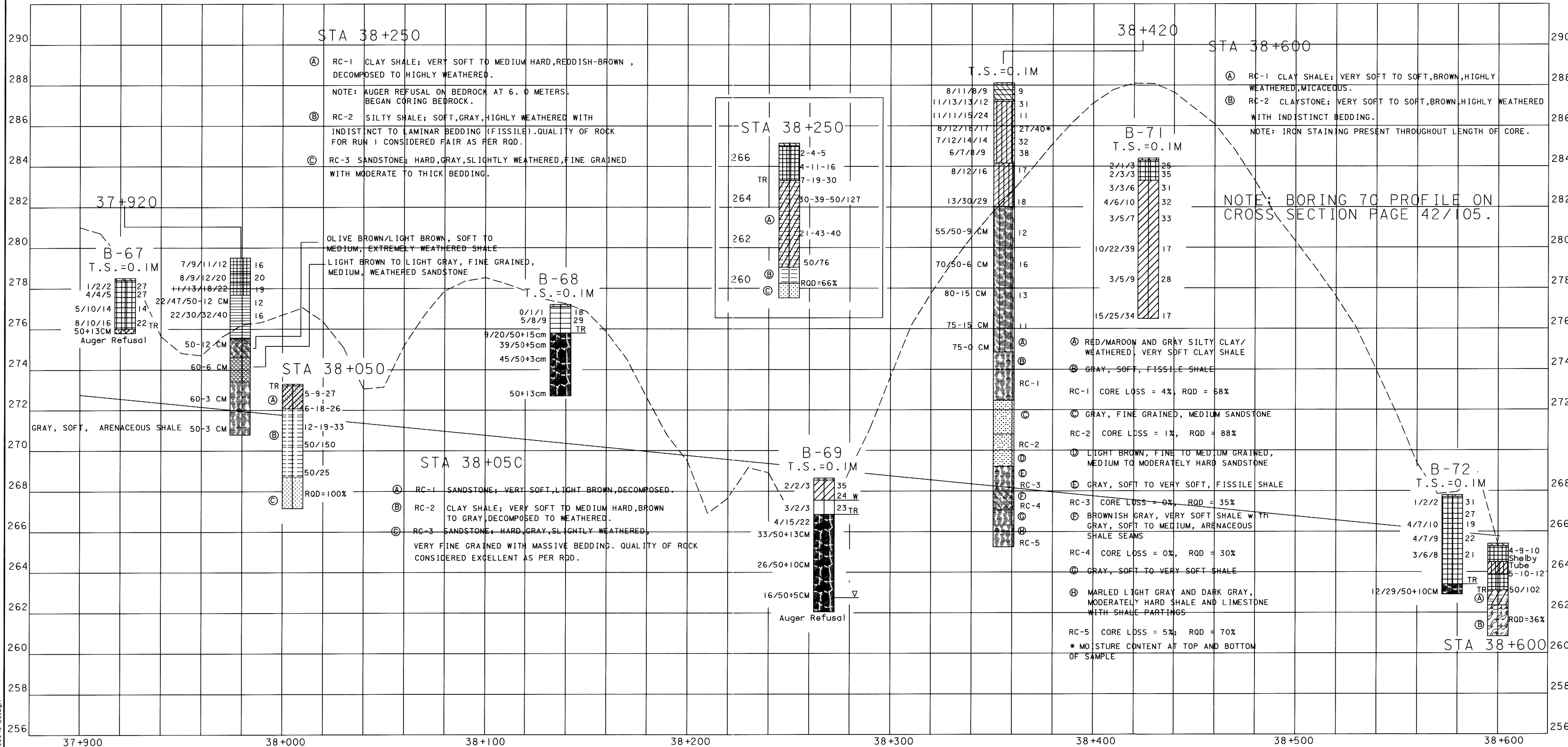


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REVIEWED	S. M.	CHECKED	S. S. S.
DRAWN	B. M.		

**ROADWAY/CULVERT SOIL PROFILE**  
**STA. 37+900 TO STA. 38+600**

**ATH-33-30.981**





0 20 40  
 HORIZONTAL SCALE IN METERS

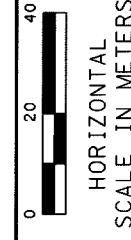
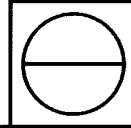
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DESIGNED	B. M.	REVIEWED	S. M.		

**ROADWAY/CULVERT SOIL PROFILE**

**STA. 37+900 TO STA. 38+600**

**ATH-33-30.981**

35/105

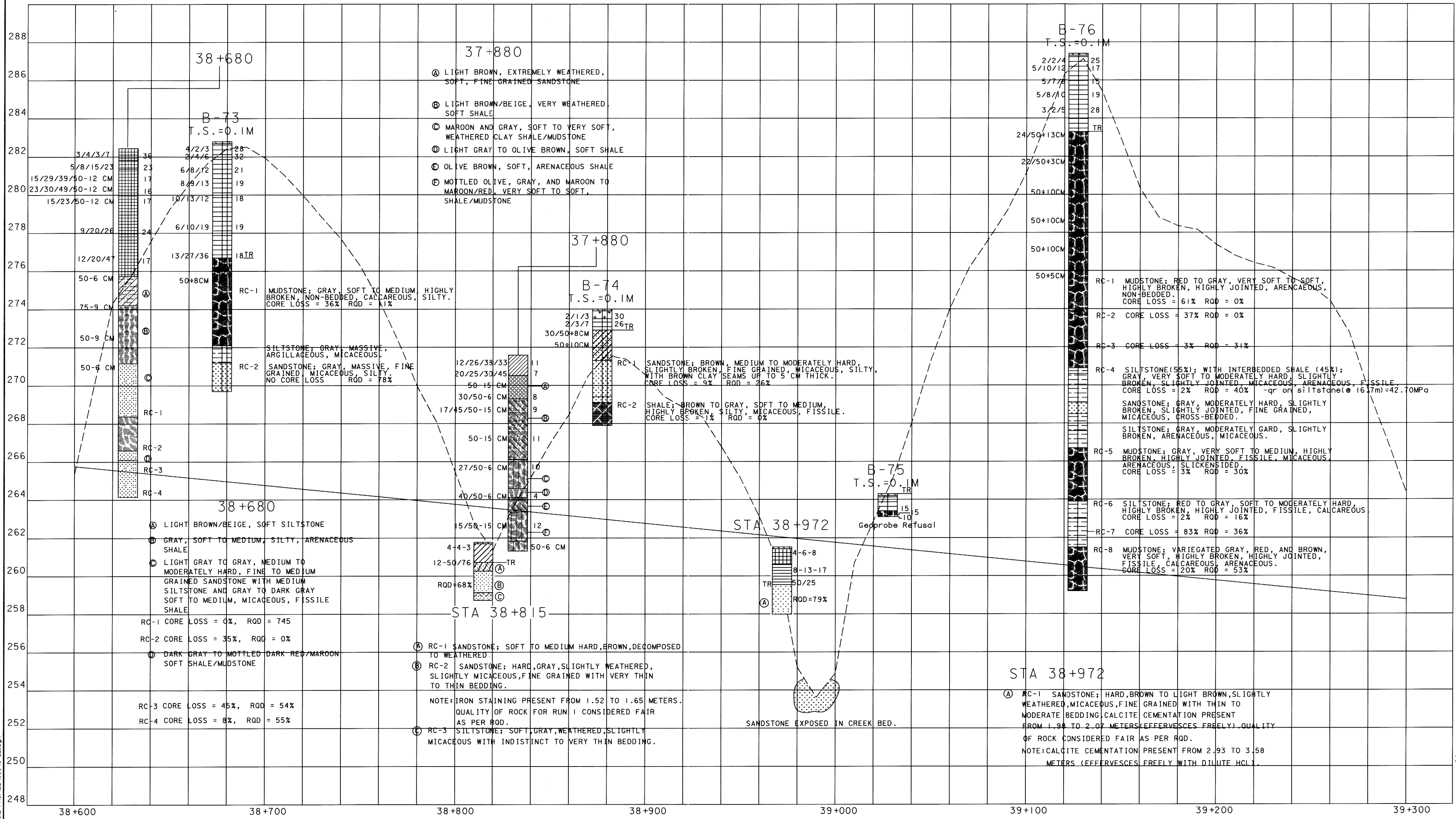


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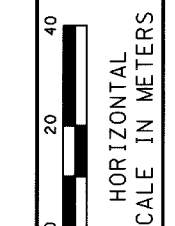
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B. M.	S. M.	03/22/00	W. I. N.
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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 38+600 TO STA. 39+300**

**ATH-33-30.981**

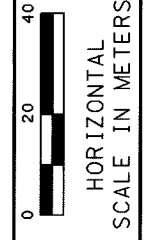
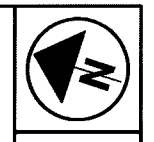
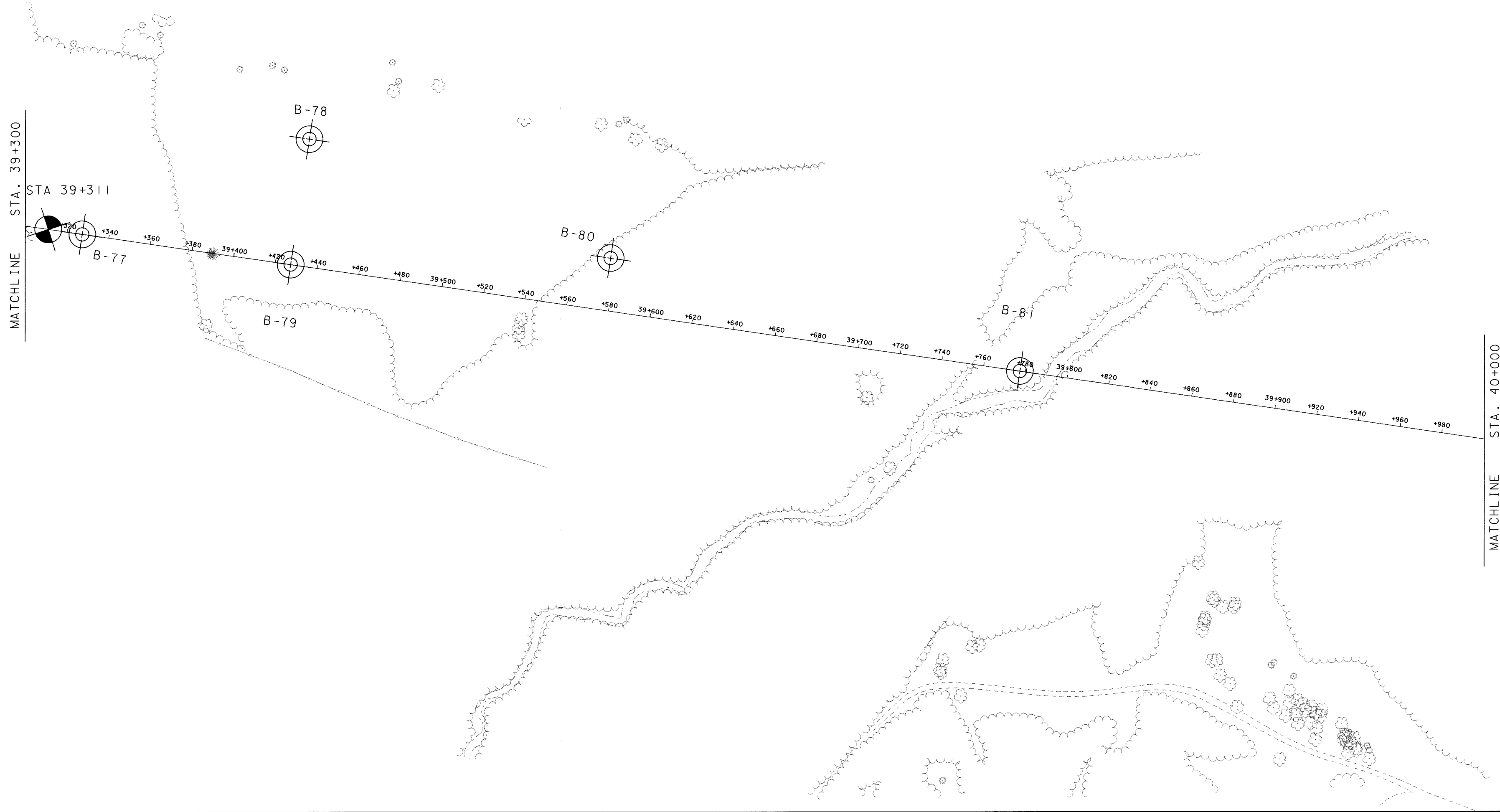


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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 38+600 TO STA. 39+300**

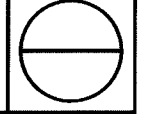
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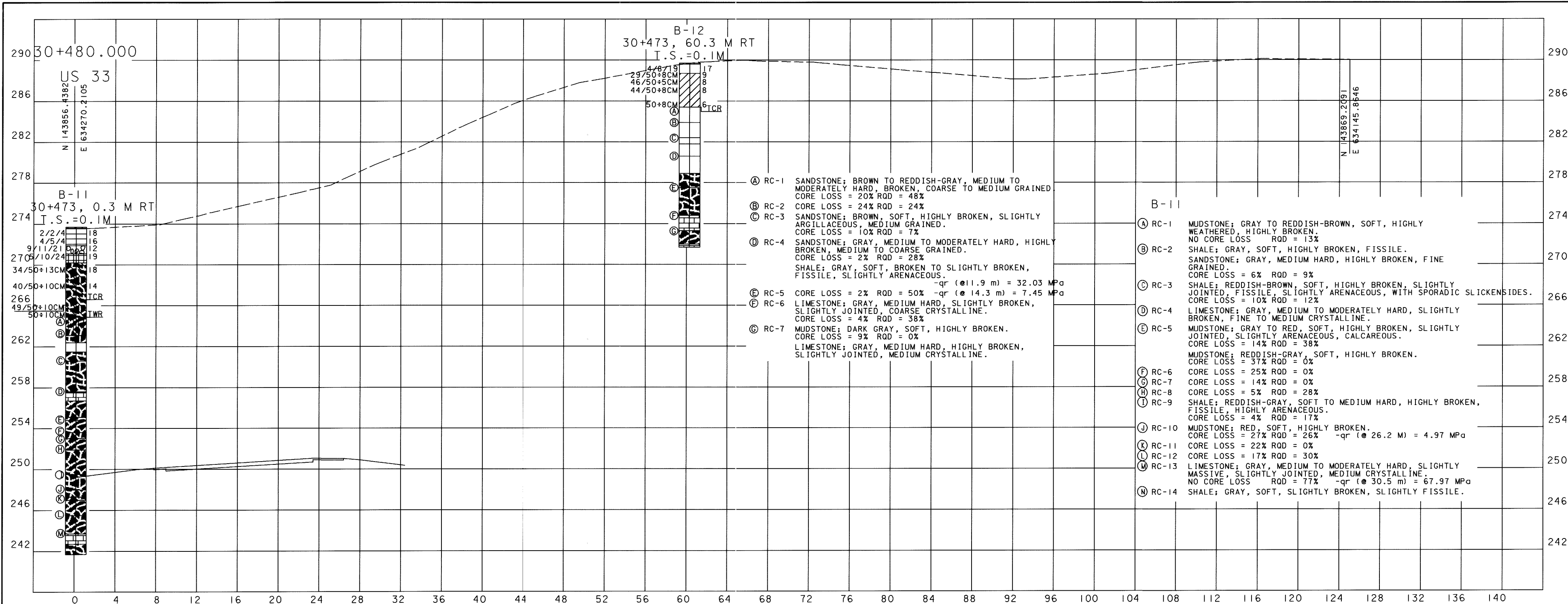
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**ROADWAY / CULVERT SOIL PROFILE**  
**STA. 39+300 TO STA. 40+000**

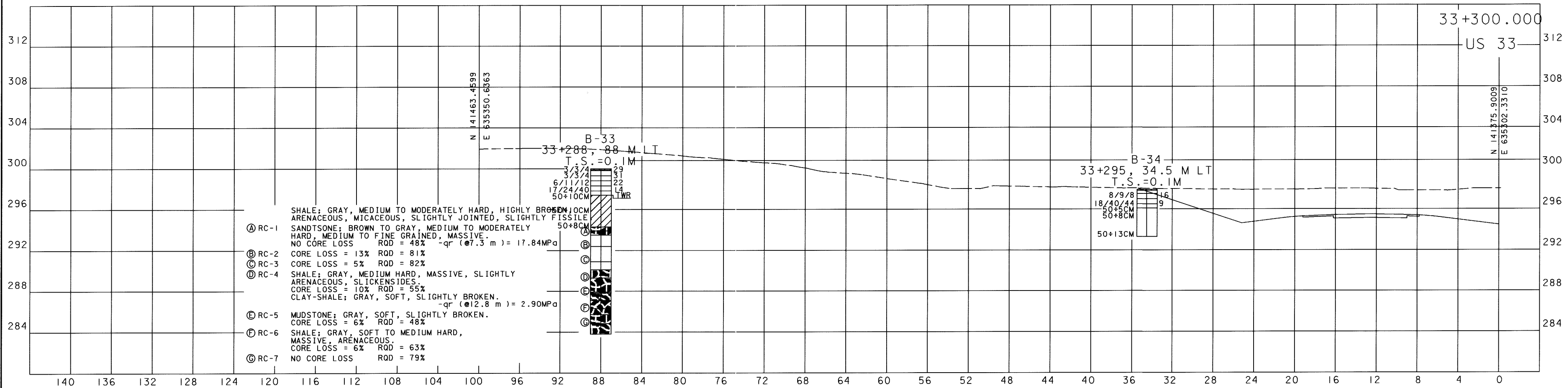
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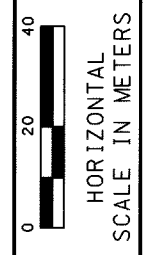




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CROSS SECTION 33+300 LEFT

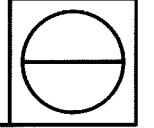


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DATE	
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DRAWN	EMC

ROADWAY / CULVERT SOIL PROFILE  
 CROSS SECTIONS 30+480 AND 33+300

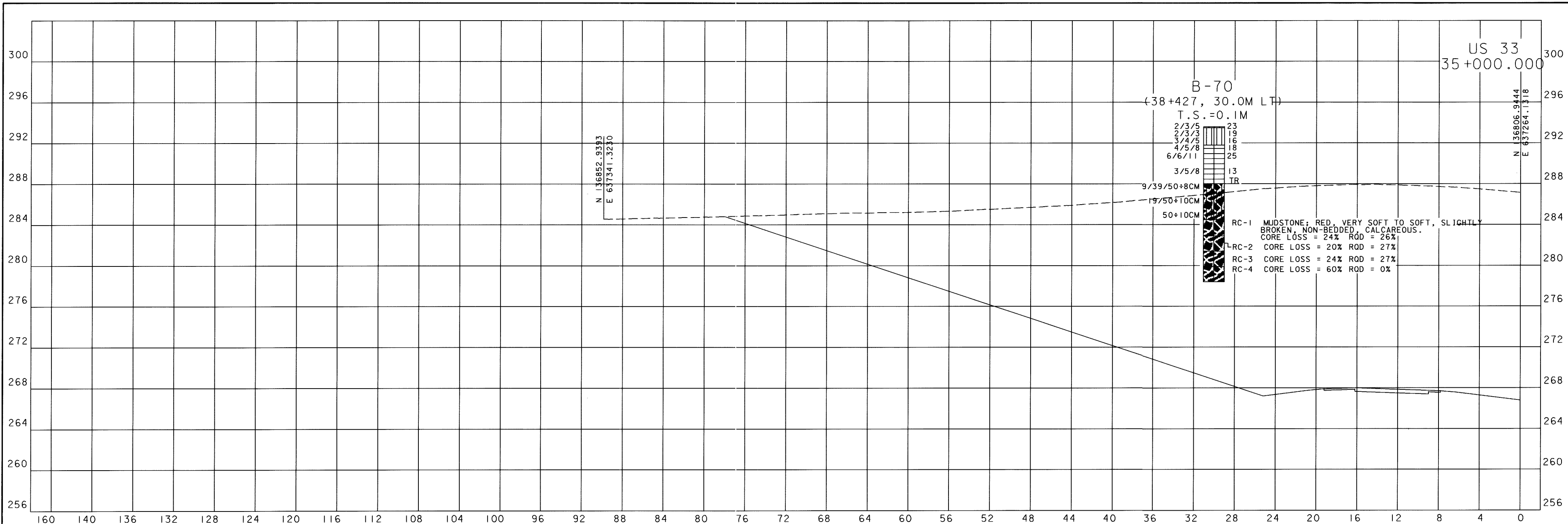
ATH -33-30.981

40 / 105

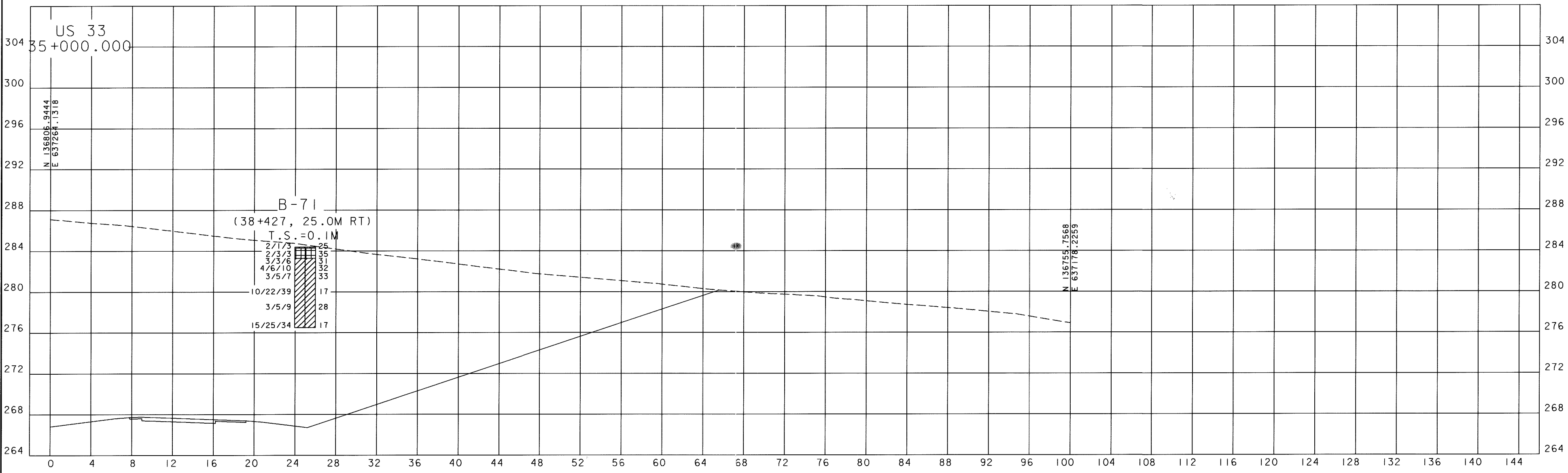




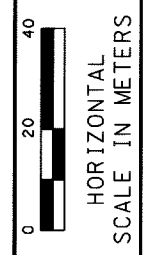




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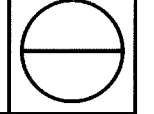
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CALCULATED	CHECKED
DATE	
REVIEWED	
DRAWN	EMC

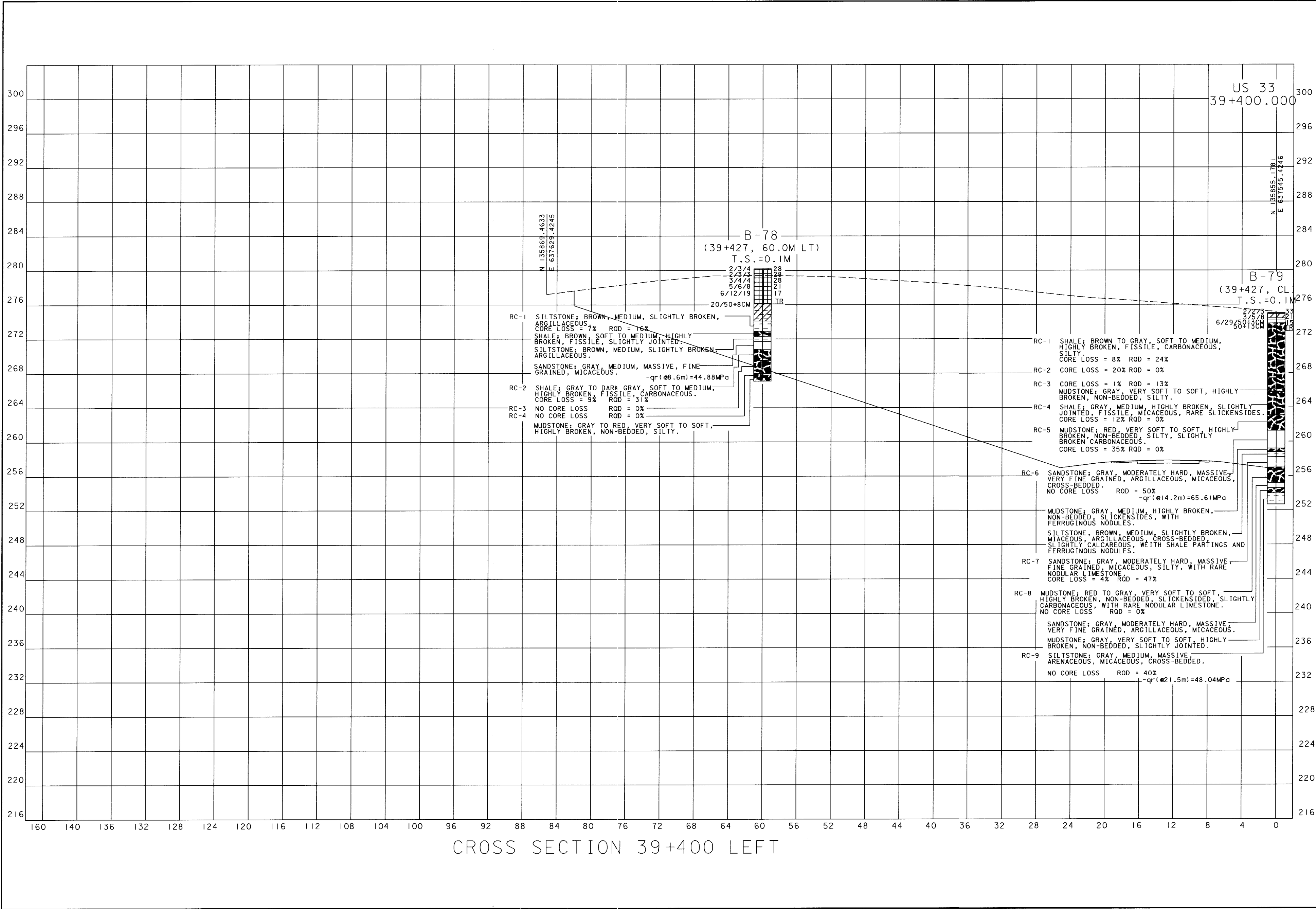
ROADWAY / CULVERT SOIL PROFILE  
 CROSS SECTION 38+400 LEFT AND RIGHT

ATH-33-30.981

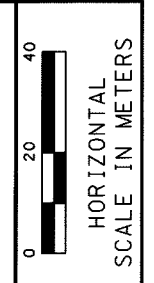


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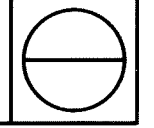
CROSS SECTION 39+400 LEFT



CALCULATED	
CHECKED	
DATE	
REVIEWED	
DRAWN	EMC

**ROADWAY / CULVERT SOIL PROFILE  
CROSS SECTION 39+400 LEFT**

**ATH-33-30.981**





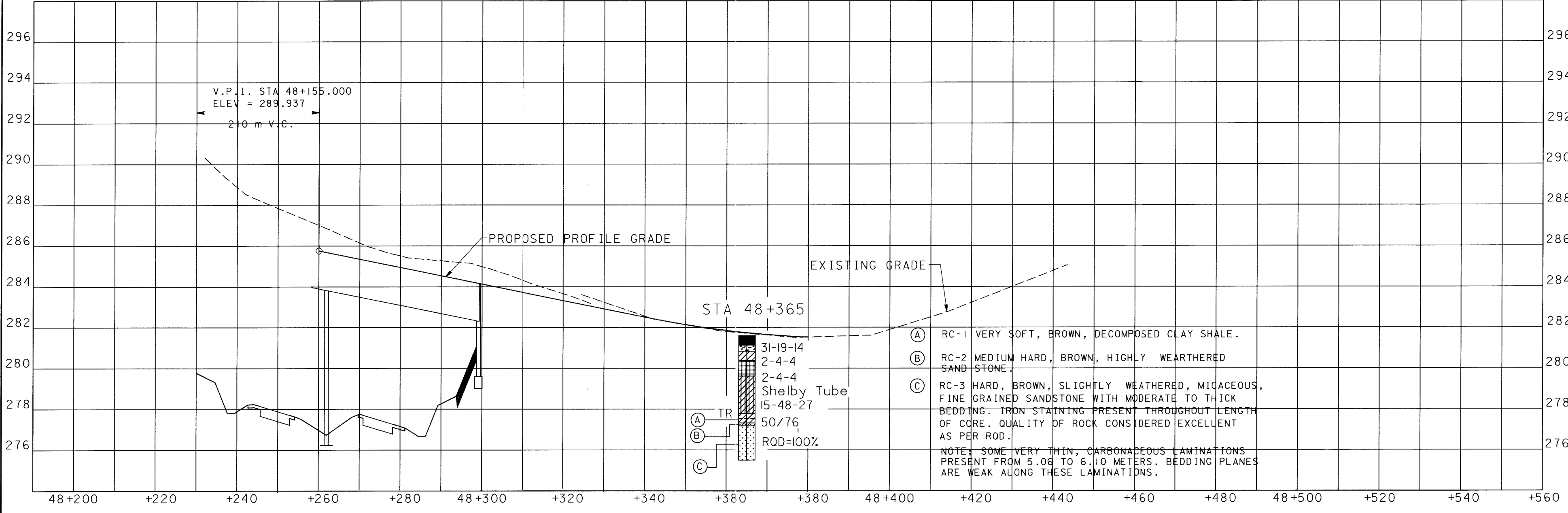
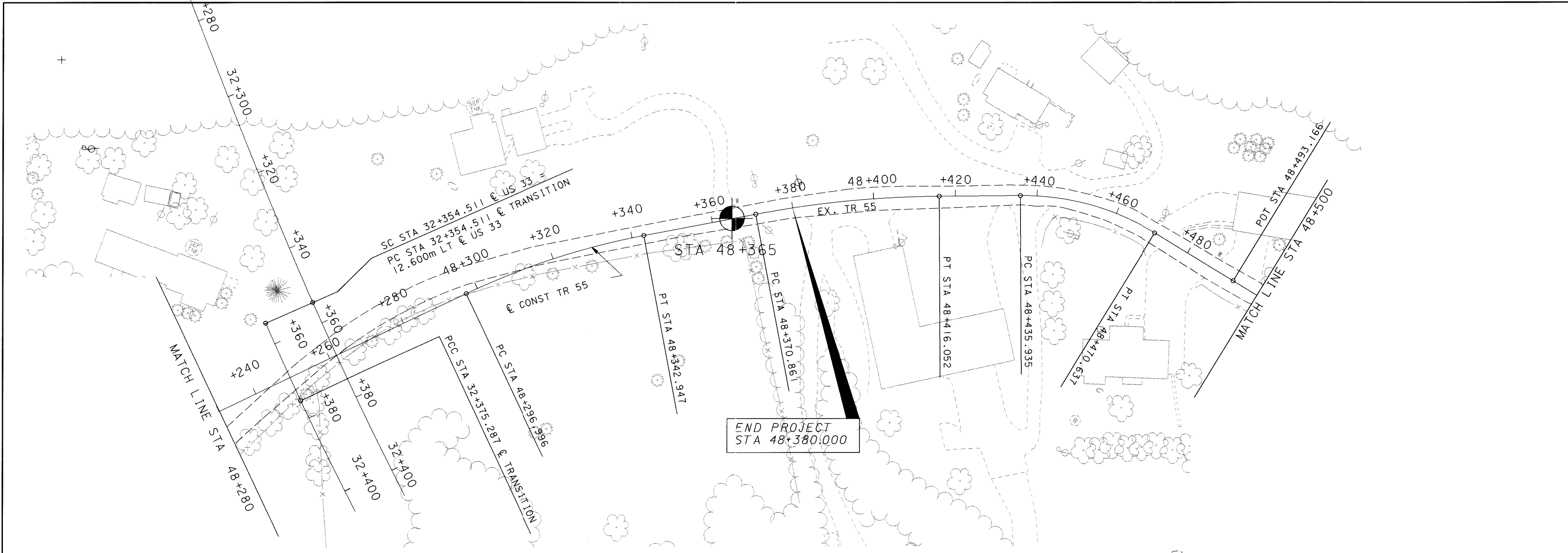
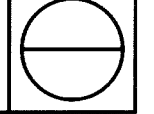
SCALE 1:500  
HORIZONTAL  
SCALE IN METERS

DRAWN	B.M.	REVIEWED	S.M.	DATE	03/22/00	CALCULATED	W.I.N.
							CHECKED
							S.S.S.

**ROADWAY / CULVERT SOIL PROFILE  
TR 55 (STA. 48+280 TO STA. 48+500)**

**ATH-33-30.981**

44 / 105

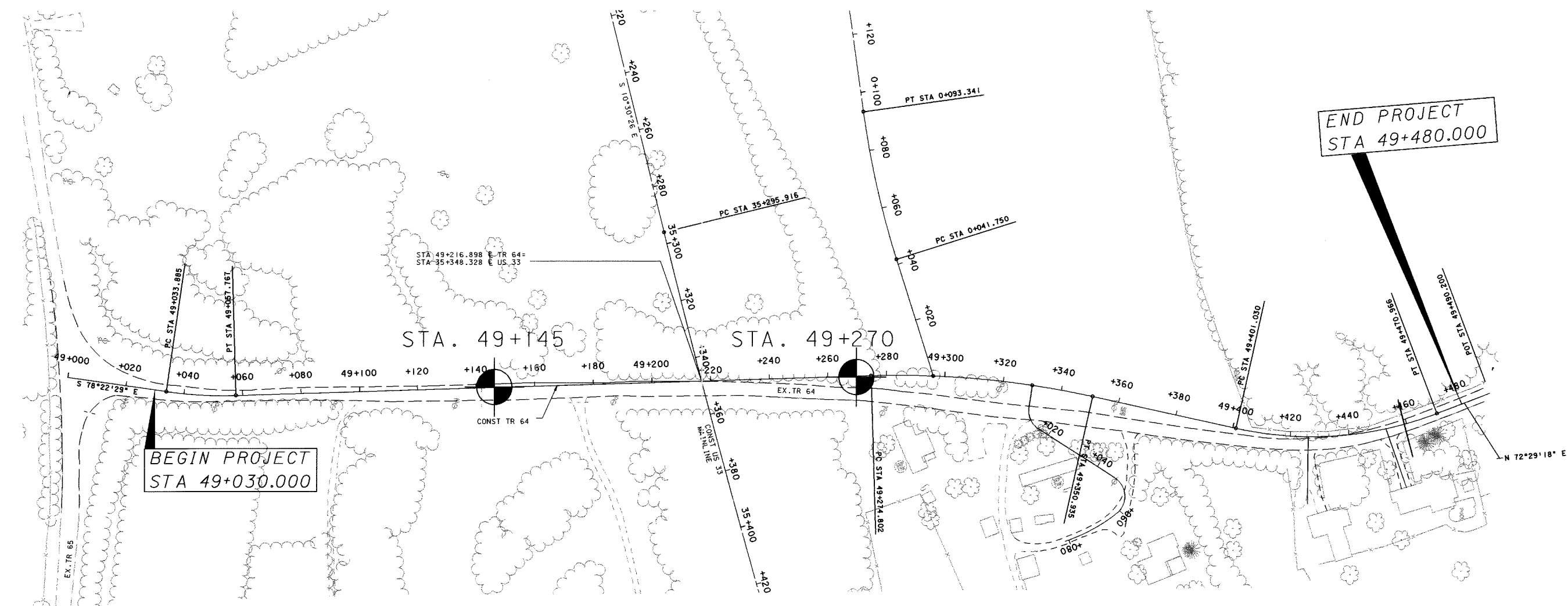
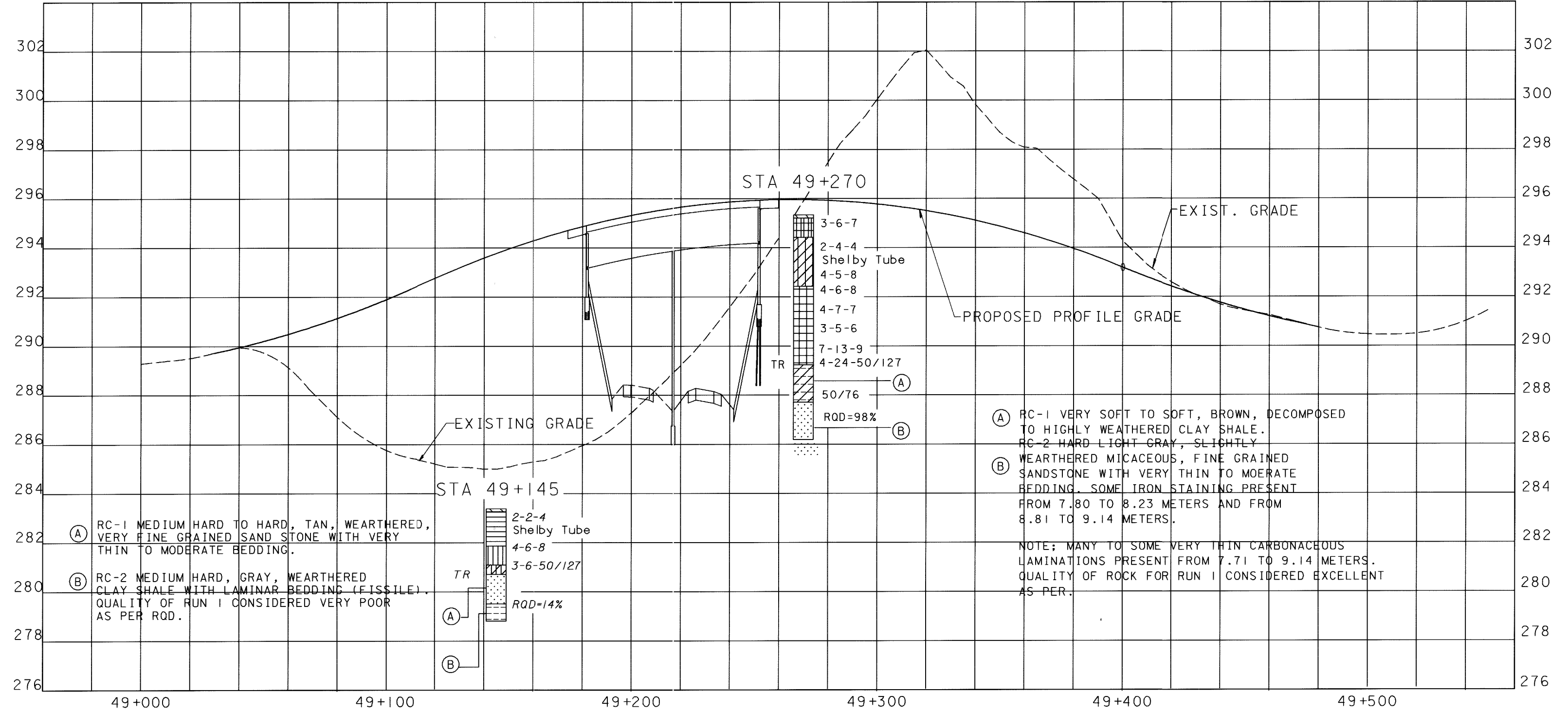


- (A) RC-1 VERY SOFT, BROWN, DECOMPOSED CLAY SHALE.
  - (B) RC-2 MEDIUM HARD, BROWN, HIGHLY WEATHERED SANDSTONE.
  - (C) RC-3 HARD, BROWN, SLIGHTLY WEATHERED, MICACEOUS, FINE GRAINED SANDSTONE WITH MODERATE TO THICK BEDDING. IRON STAINING PRESENT THROUGHOUT LENGTH OF CORE. QUALITY OF ROCK CONSIDERED EXCELLENT AS PER ROD.
- NOTE: SOME VERY THIN, CARBONACEOUS LAMINATIONS PRESENT FROM 5.06 TO 6.10 METERS. BEDDING PLANES ARE WEAK ALONG THESE LAMINATIONS.

23 APR 2001 1456f04 G:\8281\geotech\PROJECT SOIL PROFILE\99043-28.dgn



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SCALE 1:1000  
 HORIZONTAL  
 SCALE IN METERS

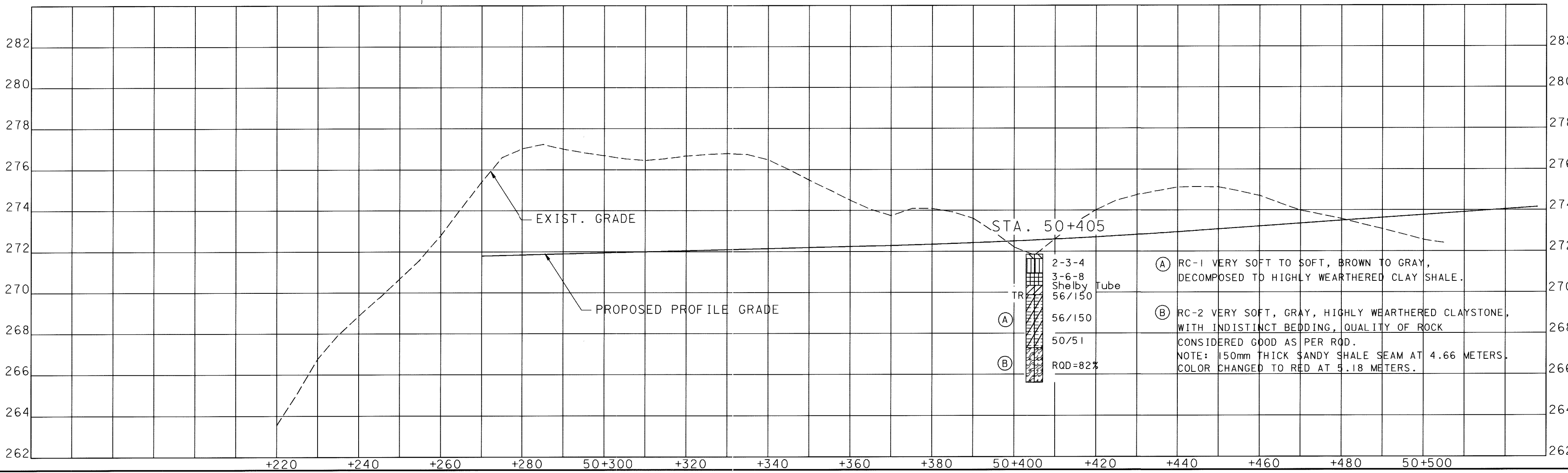
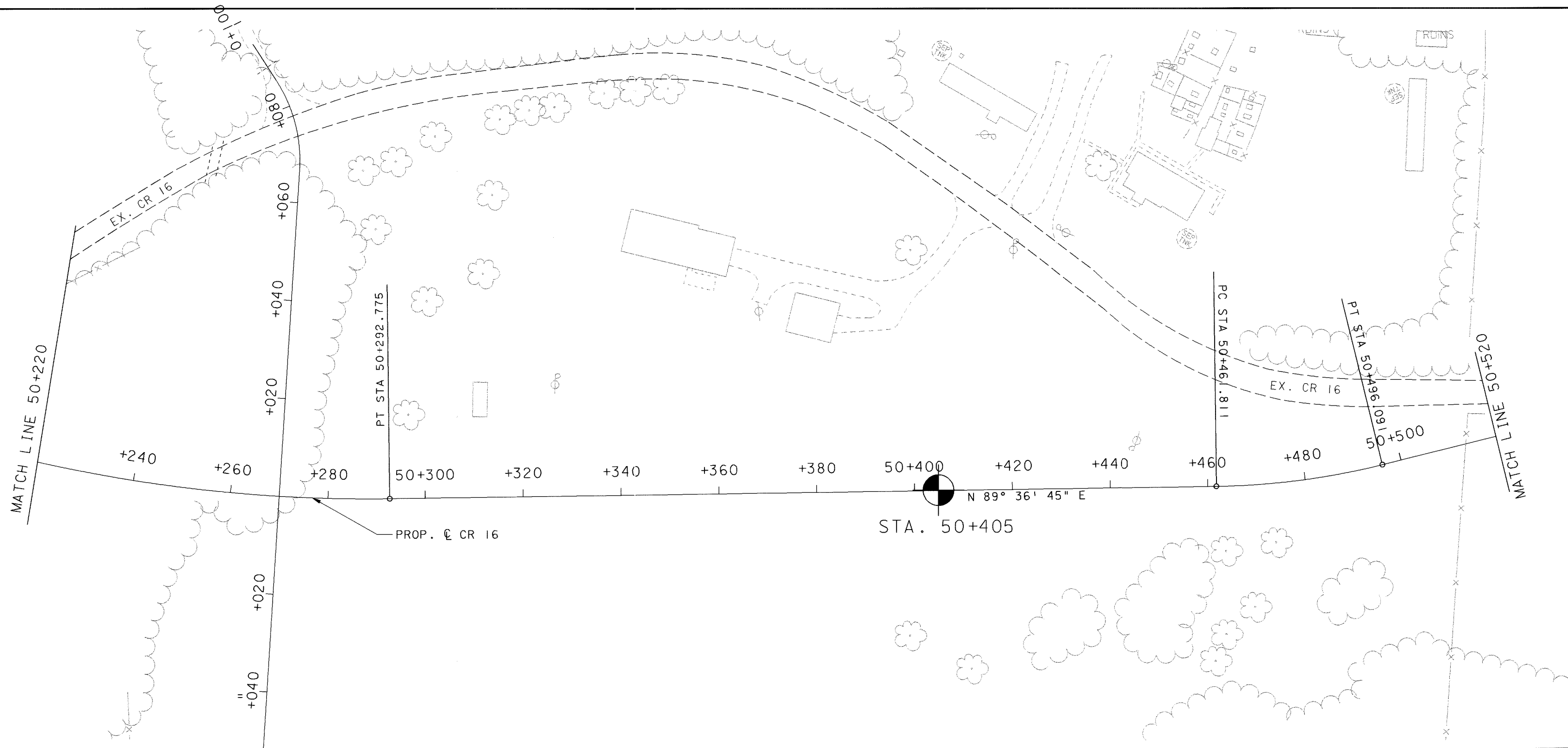
DRAWN B. M.	REVIEWED S. M.	DATE 03/22/00	CALCULATED W. J. N.	CHECKED S. S. S.
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ROADWAY / CULVERT SOIL PROFILE  
 TR 64 (STA. 49+030 TO STA. 49+480)

ATH-33-30.981

46 / 105

23 APR 2001 15:00:02  
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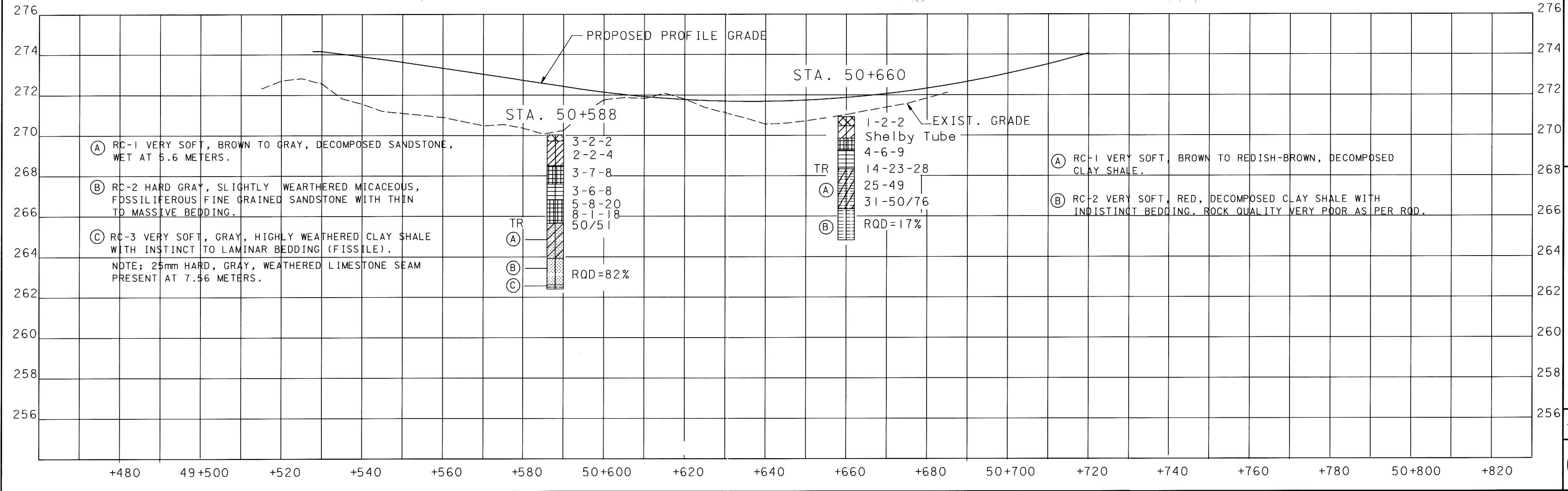
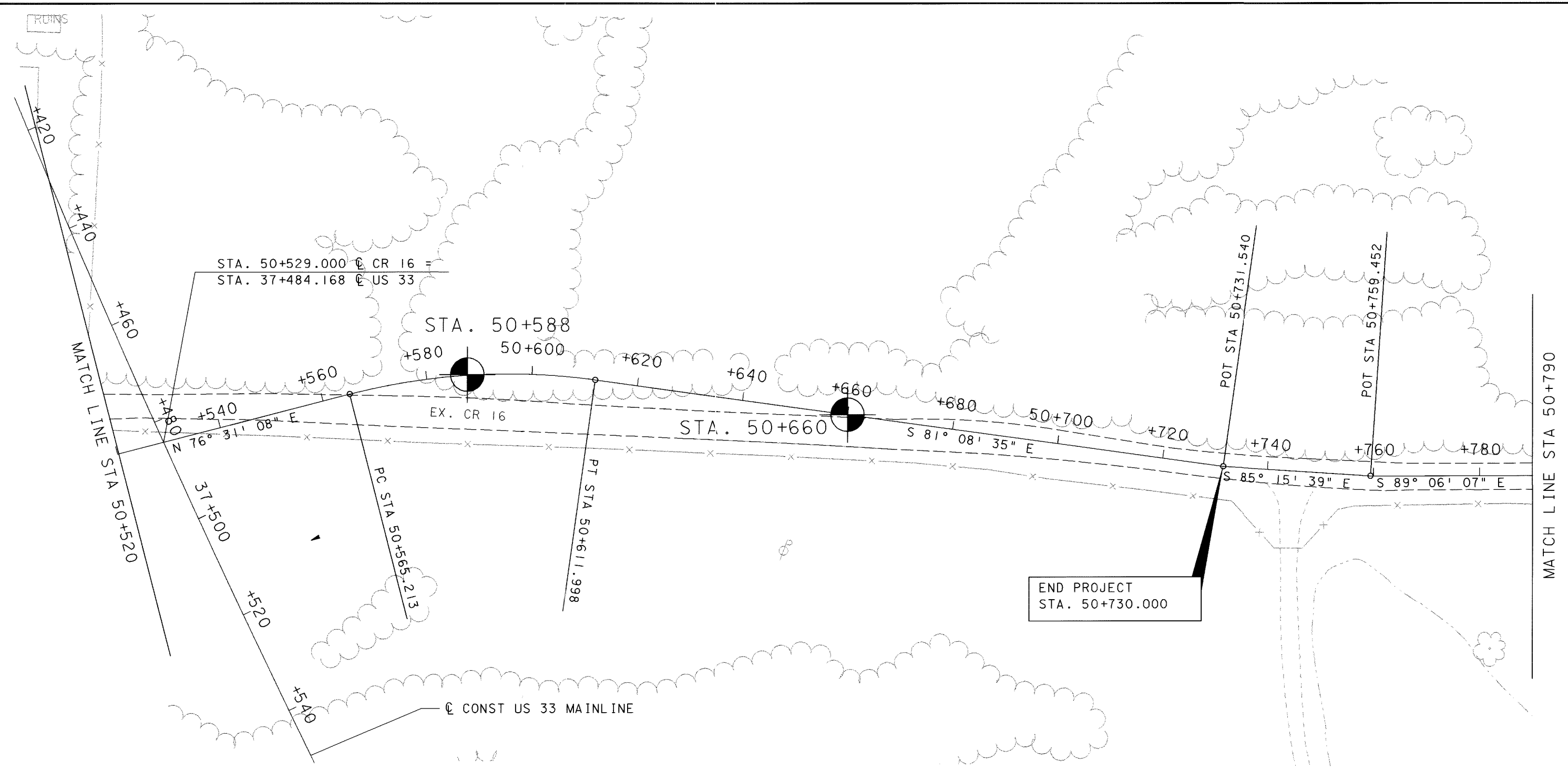
2-3-4  
 3-6-8  
 Shelby Tube  
 56/150

(A) RC-1 VERY SOFT TO SOFT, BROWN TO GRAY, DECOMPOSED TO HIGHLY WEATHERED CLAY SHALE.

(B) RC-2 VERY SOFT, GRAY, HIGHLY WEATHERED CLAYSTONE, WITH INDISTINCT BEDDING, QUALITY OF ROCK CONSIDERED GOOD AS PER ROD.  
 NOTE: 150mm THICK SANDY SHALE SEAM AT 4.66 METERS. COLOR CHANGED TO RED AT 5.18 METERS.

56/150  
 50/51  
 RQD=82%

CALCULATED W. I. N.	CHECKED S. S. S.
DATE 03/22/00	REVIEWED S. M.
DRAWN B. M.	
<b>ROADWAY / CULVERT SOIL PROFILE</b> <b>CR 16 (STA. 50+220 TO STA. 50+520)</b>	
<b>ATH-33-30.981</b>	
47 / 105	



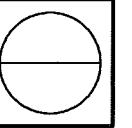


Date Started 080499 Date Completed 080499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 32+700 Station & Offset Surface Elev. 249.3 m Water Elev. \_\_\_\_\_

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
249.3		3-5-5-10	0.27	0.34	20 cm Topsoil--Brown very silty clay w/ traces of root hairs and fine sand (CL); moist, medium stiff. qh=1.75 kg/cm <sup>2</sup>	1										22	
248.7	1	11-11-11-16	0.30	0.30	Brown to mottled brown w/ traces of light brown silty clay w/ traces of oxides, little to some fine sand and traces of sandstone fragments; (CL) moist, very stiff to hard. qh=3.5 kg/cm <sup>2</sup>	2	3	0	0	0	97	36	16	22	A-6b		
248.1		4-8-11-14	0.43	0.18		3	10	0	0	44	46	0	0	20	A-6b		
247.5	2	8-9-15-23	0.61		qh=3.0 kg/cm <sup>2</sup> qh=1.75 kg/cm <sup>2</sup>	4								21			
246.9		10-17-22-22	0.43	0.18	qh=1.5 kg/cm <sup>2</sup>	5								16			
246.3	3				Bottom of boring @ 3.0 meters.												
	4																
	5																
	6																
	7																
	8																

Date Started 080499 Date Completed 080499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 32+900 Station & Offset Surface Elev. 268.6 m Water Elev. \_\_\_\_\_

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
268.6		8-14-24-40	0.34	0.27	5 cm Topsoil--Light brown silt/clayey silt w/ little to some siltstone/fine grained sandstone fragments (ML,CL-ML); slightly moist, hard.	1									10	
268.0	1	30-50/0.5	0.21	0.09		2								7		
267.6					Mottled brown, grayish brown and light brown silty clay w/ traces of fine sand and oxides (CL); slightly moist, hard.	3	0	0	0		100	48	20	21	A-7-6	
267.4		13-14-16-19	0.24	0.37	qh=4.5 kg/cm <sup>2</sup> qh=3.0 kg/cm <sup>2</sup>	4	2	0	0	24	74			28	A-7-6	
266.8	2	6-50/0.4	0.18	0.09		5										
266.3					Light gray medium sandstone/siltstone fragments.	5										
266.2		50/0.1	0.03													
266.2	3				Bottom of boring @ 2.5 meters.											
	4															
	5															
	6															
	7															
	8															







Date Started 081099 Date Completed 081099 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 33+700 Station & Offset 33+735, Approx. 4.5 m Right Surface Elev. 267.4 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
267.4		5-11-16-10	0.21	0.40	Light brown to mottled brown very silty clay/ clayey silt with traces of fine sand and oxides (CL,CL-ML); slightly moist, very stiff to hard. qh=4.5 kg/cm <sup>2</sup>	1	0	0	0	100	42	18	20	A-7-6		
266.8	1	6-14-16-20	0.40	0.21		2							16			
266.2					qh=4.5 kg/cm <sup>2</sup>	3	0	0	0	48	52		17	A-7-6		
265.6	2	10-16-17-20	0.43	0.18	qh=4.5 kg/cm <sup>2</sup>	4	0	0	0	100	43	22	18	A-7-6		
265.0		10-11-16-20	0.37	0.24	qh=4.5 kg/cm <sup>2</sup>	5	0	0	0	25	75		15	A-7-6		
264.8	3	11-16-15-15	0.34	0.27	Orange brown sandy silt to silt and fine sand with traces of oxides (ML,SM); moist, dense.											
263.8	4				Light brown fine-grained sandstone.											
263.3		50/0.3	0.03	0.02	Bottom of boring @ 4.2 meters due to auger refusal.	6										
263.3																
	5															
	6															
	7															
	8															

Date Started 080499 Date Completed 080499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 33+800 Station & Offset \_\_\_\_\_ Surface Elev. 275.5 m Water Elev. \_\_\_\_\_

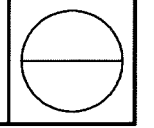
Elev. (m.)	Depth (m.)	Std. Pen./ ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
275.5		4-6-8-16	0.18	0.43	15 cm Topsoil-Light brown silty clay w/ traces of root hairs, oxides and fine sand (CH); moist, stiff to very stiff, qh=2.75 kg/cm <sup>2</sup>	1								21	A-7-5	
274.9	1	9-10-14-24	0.30	0.30	qh=4.5 kg/cm <sup>2</sup>	2	2	0	0	98	68	35	25			
274.3					qh=4.0 kg/cm <sup>2</sup>	3	0	0	0	26	74		24	A-7-5		
274.0		10-25-35-50/.4	0.43	0.15	Light olive brown/beige silty clay w/ traces of oxides (CL); moist, hard. Laminated structure [Extremely weathered shale]. 8% moisture content in bottom of sample 3 qh=4.5 kg/cm <sup>2</sup>	4										
273.7	2	41-40-50/0.5	0.24	0.21		5								13		
273.1		50/0.4	0.12	0.00	qh=4.5 kg/cm <sup>2</sup>											
273.0	3				qh=4.5 kg/cm <sup>2</sup>											
					Bottom of boring @ 2.6 meters.											
	4															
	5															
	6															
	7															
	8															



DATE 1/20/00  
 CALCULATED  
 CHECKED  
 REVIEWED  
 DRAWN MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**







Date Started 081099 Date Completed 081099 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 33+900 Station & Offset Surface Elev. 296.2 m Water Elev. Not Encountered

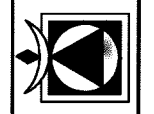
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics											
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.			
296.2		5-7-9-10	0.30	0.30	9 cm Topsoil--Light orange-brown silty clay w/ traces of root hairs (CH); moist, very stiff. $q_h=4.5+ \text{ kg/cm}^2$	1	0	0	0	100	53	27	20	A-7-6				
295.6																		
295.3	1	8-14-14-24	0.40	0.21	$q_h=4.5+ \text{ kg/cm}^2$ 17% moisture content in top of sample 2	2	5	0	0	63	32		8	A-4b				
295.0		42-50/0.3	0.21	0.03	Light brown silt w/ traces of fine sand (SM); slightly moist, dense to very dense.	3	5	0	0	67	32		9	A-4b				
294.7					[Extremely weathered, fine grained sandstone/siltstone]; Laminated structure.													
294.4	2	50/0.3	0.03	0.06	$q_h=4.5+ \text{ kg/cm}^2$	4												
					Light orange-brown, fine grained weathered sandstone.													
293.5	3				Light brown, soft to medium hard, fine to medium grained sandstone, thick bedding, poor rock quality.	5												
	4	40	1.16	0.37														
291.7																		
291.7	5	97	1.52		Light brown, medium, fine to medium grained sandstone. [Excellent rock quality, massive bedding] $q_u=31.5 \text{ kg/cm}^2$	6												
	6																	
290.2	7	100	1.52			7												
	8																	
288.7																		
288.0		77	1.22	0.30	$q_u=37.7 \text{ kg/cm}^2$	8												
287.6					Light brown, medium shale; good rock													

Date Started 081099 Date Completed 081099 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 33+900 Station & Offset Surface Elev. 296.2 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
287.2					quality. (Only 18 cm of shale noted in core run 7.6 m to 9.1m) Much slower coring.											
287.0					Mottled gray, very soft to soft shale; fair rock quality.	9										
	10	45	0.70	0.82												
285.6	11				Bottom of boring @ 10.6 meters.											
	12															
	13															
	14															
	15															
	16															
	17															

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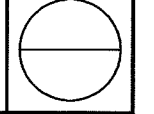
GANNETT FLEMING  
 SUITE 350  
 4151 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081



DRAWN MDH  
 REVIEWED  
 DATE 1/20/00  
 CALCULATED  
 CHECKED

ROADWAY / CULVERT SOIL PROFILE  
 BORING LOGS

ATH-33-30.981



Date Started 08/1999 Date Completed 08/1999 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 34+000 Station & Offset Surface Elev. 280.4 m Water Elev. \_\_\_\_\_

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
280.4		4-7-10-11	0.34	0.27	Light olive brown silty clay w/ traces of oxides (CL); moist, very stiff. qh=4.5+ kg/cm <sup>2</sup>	1	25	0	0	32	43			15	A-6a	
279.8																
279.7	1	11-14-17-23	0.21	0.40	Light orange brown silty clay (CL); slightly moist, very stiff; slight laminations present; traces of limestone/chert nodules in sample #5. qh=4.5+ kg/cm <sup>2</sup>	2	6	0	0	94	38	14	14	A-6a		
279.2																
278.6	2	14-15-21-22	0.30	0.30	Light olive brown silty clay w/ traces of oxides and shale fragments (CL); moist, very stiff; laminations present. qh=4.5+ kg/cm <sup>2</sup>	3							13			
278.0																
277.4	3	10-17-19-24	0.24	0.37	Light olive brown silty clay w/ traces of oxides and shale fragments (CL); moist, very stiff; laminations present. qh=4.5+ kg/cm <sup>2</sup>	4							15			
		8-15-30-37	0.46	0.15	Light olive brown silty clay w/ traces of oxides and shale fragments (CL); moist, very stiff; laminations present. qh=4.5+ kg/cm <sup>2</sup>	5							22			
					Bottom of boring @ 3.0 meters.											
	4															
	5															
	6															
	7															
	8															

Date Started 08/1999 Date Completed 08/1999 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 34+130 Station & Offset Surface Elev. \_\_\_\_\_ Water Elev. Not Encountered

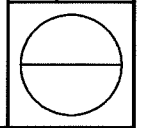
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
0.0		4-8-10-10	0.40	0.21	Brown w/ trace orange, very silty clay w/ traces of oxides and root hairs (CL); moist, very stiff. qh=4.5+ kg/cm <sup>2</sup>	1	4	0	0	48	48			19	A-6a	
0.6	1	12-15-16-20	0.30	0.30	Mottled light orange-brown w/ trace gray and maroon silty clay w/ traces of oxides (CH); slightly moist, hard; slight laminations present. qh=4.5+ kg/cm <sup>2</sup>	2	3	0	0	97	56	29	21	A-7-5		
1.1																
1.2	2	16-19-23-30	0.37	0.24	Light olive brown silty clay w/ traces of oxides and shale fragments (CL); moist, very stiff; laminations present. qh=4.5+ kg/cm <sup>2</sup>	3							18			
1.8																
2.4	2	6-8-16-28	0.37	0.24	Light olive brown silty clay w/ traces of oxides and shale fragments (CL); moist, very stiff; laminations present. qh=4.5+ kg/cm <sup>2</sup>	4							15			
2.4																
2.4	3	50/0.3	0.03	0.06	Soft, light olive brown, very weathered shale. qh=3.25 kg/cm <sup>2</sup>	5										
2.5					Bottom of boring @ 2.5 meters.											
	4															
	5															
	6															
	7															
	8															



DATE	1/20/00
REVIEWED	
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CHECKED	

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**









Date Started 080499 Date Completed 080499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 34+650 Station & Offset Surface Elev. 268.4 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
268.4		2-4-6-8	0.27	0.34	5 cm Topsoil--Light orange-brown silty clay w/ traces of root hairs (CL); moist, medium stiff. qh=2.75 kg/cm <sup>2</sup>	1	1	0	0		99	48	23	25	A-7-6	
267.9																
267.8	1	9-10-10-17	0.12	0.49	Mottled orange brown to beige silty clay w/ trace oxides and fine sand (CL); moist, very stiff.	2	0	0	0	24	76			26	A-7-6	
267.1																
		8-9-14-19	0.24	0.37	qh=4.5+ kg/cm <sup>2</sup>	3								14		
					qh=3.75 kg/cm <sup>2</sup>											
266.5	2	20-50/0.4	0.24	0.03	qh=3.25 kg/cm <sup>2</sup>	4								21		
266.4					8% moisture content in bottom of sample 4											
265.9		30-50/0.2	0.09	0.12	Light olive brown silty clay [Extremely weathered shale] (CL); slightly moist, hard; laminated structure.	5								12		
265.7	3				Bottom of boring @ 2.7 meters.											
	4															
	5															
	6															
	7															
	8															

Date Started 080499 Date Completed 080499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 34+720 Station & Offset Surface Elev. 267.9 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
267.9		3-4-4-5	0.30	0.30	7.5 cm Topsoil--Brown/light brown silty clay w/ traces of root hairs (CL); moist, medium stiff to stiff. qh=2.75 kg/cm <sup>2</sup>	1	0	0	0	61	39	27	6	17	A-4b	
267.3																
267.0	1	8-7-7-10	0.40	0.21	qh=2.25 kg/cm <sup>2</sup> 25% moisture content in top of sample 2	2	0	0	0	31	69			29	A-7-5	
266.7																
		5-6-8-11	0.18	0.43	Reddish brown to red silty clay w/ traces of oxides (CH); moist, stiff.	3	0	0	0	0	100	82	49	31	A-7-5	
					qh=1.75 kg/cm <sup>2</sup>											
266.1	2	13-50/0.2	0.18	0.03	qh=1.75 kg/cm <sup>2</sup>	4								27		
266.0					qh=1.5 kg/cm <sup>2</sup>											
265.5		50/0.3	0.06	0.03	Light olive brown/beige soft weathered shale.	5										
265.4	3				Bottom of boring @ 2.5 meters.											
	4															
	5															
	6															
	7															
	8															

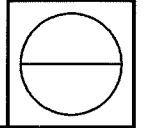
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GANNETT FLEMING  
 SUITE 350  
 4151 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

CALCULATED  
 DATE 1/20/00  
 REVIEWED  
 DRAWN MDH  
 CHECKED

ROADWAY / CULVERT SOIL PROFILE  
 BORING LOGS

ATH-33-30.981







Date Started 072399 Date Completed 072399 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 35+000 Station & Offset Surface Elev. 295.7 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
295.7		3-6-12-12	0.30	0.30	15 cm Topsoil--Brown, very silty clay/ clayey silt w/ traces of root hairs (CL,CL-ML); moist, very stiff. qh=1.75 kg/cm <sup>2</sup>	1										19	A-7-6
295.1	1	11-12-20-19	0.40	0.21	Red to red w/ gray silty clay (CL); moist, hard. qh=4.5+ kg/cm <sup>2</sup>	2	2	0	0	22	76				23		
294.5		18-20-24-26	0.30	0.30	qh=4.5+ kg/cm <sup>2</sup>	3	0	0	0	100	47	20	21				
293.9	2	20-50/0.4	0.21	0.06	qh=4.5+ kg/cm <sup>2</sup>	4									18		
293.3		15-21-23-26	0.40	0.21	qh=3.0 kg/cm <sup>2</sup>	5									23		
292.1	4				Mottled gray and red silty clay w/ olive shale fragments (CL); slightly moist, hard; predominantly gray below 5.2 m.	6	4	5	5	86	39	16	18				
291.6		13-18-38	0.37	0.09	qh=2.25 kg/cm <sup>2</sup>	6											
290.3					Olive brown w/ trace orange-brown very silty clay w/ traces of weathered shale fragments (CL); slightly moist, hard.	7									10		
290.1	6	25-50/0.4	0.24	0.03	qh=3.25 kg/cm <sup>2</sup>	7											
289.0	7				Olive brown silty clay w/ traces of oxides and shale fragments (CL); slightly moist, very stiff; laminated structure.	8											
288.6		12-11-5	0.24	0.21		8											
287.5	8				Soft to medium hard gray/olive gray arenaceous shale.	9											
287.1		50/0.2	0.06	0.00		9											

Date Started 072399 Date Completed 072399 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 35+000 Station & Offset Surface Elev. 295.7 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
286.3					Light brown, moderately hard, fine to medium grained sandstone; fair to poor rock quality. Auger refusal @ 10.1m.											
285.7	10					10										
285.1		67	0.40	0.21			10									
285.1	11				Loss of drillwater between core run intervals.											
284.3					qu=116.9 kg/cm <sup>2</sup>											
284.3	12	48	1.40	0.12			11									
283.6					Bottom of boring @ 12.2 meters.											
283.6	13															
	14															
	15															
	16															
	17															

Date Started 08/1999 Date Completed 08/1999 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 36+560 Station & Offset 36+560, 30m up station Surface Elev. Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
0.0		9-10-12-13	0.06	0.55	7.5 cm Topsoil-light orange-brown to light brown silty clay w/ traces of oxides (CL); slightly moist, very stiff to hard. qh=4.5+ kg/cm <sup>2</sup>	1										18	
0.6	1	14-20-26-32	0.37	0.24	qh=4.5+ kg/cm <sup>2</sup>	2										9	
1.1		50/0.4	0.06	0.06	Light olive brown/beige silty clay w/ traces of oxides (CL); slightly moist, hard [extremely weathered shale]; laminated structure.	3										8	
1.2	2	33-33-50/0.1	0.24	0.09		4											11
1.8		22-44-50/0.4	0.27	0.15		5											9
2.4	3																
3.7	4					Very soft light brown fine grained sandstone/siltstone.											
4.1		50/0.3	0.00	0.09	Olive gray to gray soft shale.	6											
5.2	5																
5.6	6	60/0.4	0.12	0.00		7											
6.6	7	97	0.91		Hard white limestone and moderately hard to hard light brown sandstone; excellent rock quality; limestone from 6.6 m to 6.9 m.	8											
7.5	8				Moderately hard to hard gray, fine grained sandstone w/ limestone nodules and soft to medium hard shale; fair rock quality. qu=246.7 kg/cm <sup>2</sup>												
8.0		57	1.49	0.03		9											
8.7																	

Date Started 08/1999 Date Completed 08/1999 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 36+560 Station & Offset 36+560, 30m up station Surface Elev. Water Elev. Not Encountered

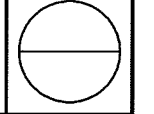
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
9.0		50	0.85	0.06	Soft to medium gray shale; fair rock quality. qu=107.6 kg/cm <sup>2</sup>	10										
9.3	10				Medium to moderately hard olive brown, fine grained sandstone/siltstone; fair rock quality. - light gray, fine grained sandstone/ siltstone w/ shale partings in bottom 15 cm.											
9.9					Bottom of boring @ 9.9 meters.											
	11															
	12															
	13															
	14															
	15															
	16															
	17															



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**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**











Date Started 080399 Date Completed 080399 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+140 Station & Offset Surface Elev. Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
18.3					Bottom of boring @ 18.3 meters.														
	19																		
	20																		
	21																		
	22																		
	23																		
	24																		
	25																		
	26																		

Date Started 072799 Date Completed 072799 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+660 Station & Offset Surface Elev. 282.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics													
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
282.5		7-12-20-27	0.21	0.40	5 cm Topsoil--Brown to light brown very silty clay/clayey silt w/ trace root hairs (CL,CL-ML); moist, very stiff. qh=1.75 kg/cm <sup>2</sup>	1														
281.9																				
281.6	1	3-8-8-8	0.03	0.58	Red/maroon w/ trace gray and light orange silty clay (CL); moist, very stiff.	2														
281.2																				
280.6	2				qh=3.0 kg/cm <sup>2</sup>	3		1	7	92	46	18	26							A-7-6
280.0					qh=3.25 kg/cm <sup>2</sup>	4														
279.9					qh=2.0 kg/cm <sup>2</sup>	5														
279.7	3	9-11-15-37	0.43	0.18	14% moisture content in bottom of sample 5 Beige/light brown w/ trace darker brown and orange silty clay (CL); moist, very stiff. Clayey silt seam w/ some fine sand noted in sample #6; oxide stains noted in sample #6.															
278.4	4				qh=2.5 kg/cm <sup>2</sup>															
		10-14	0.30	0.15	qh=1.25 kg/cm <sup>2</sup>	6														
277.0																				
276.8	6	50/0.4	0.06	0.06	Medium, weathered, light brown to gray, fine grained sandstone.	7														
276.1	7				Soft, gray arenaceous shale.															
275.3	8	75/0.3	0.09			8														
273.9																				
273.8	9	50/0.2	0.03	0.03	Medium to moderately hard, gray, fine to medium grained sandstone.	9														

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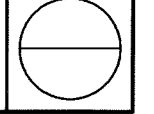
GANNETT FLEMING  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081



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**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**







Date Started 072799 Date Completed 072799 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+660 Station & Offset Surface Elev. 282.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics											
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.			
273.7					Bottom of boring @ 8.8 meters.													
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	

Date Started 072299 Date Completed 072299 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+780 Station & Offset 37+780, 20 m right Surface Elev. 292.5 m Water Elev. Not Encountered

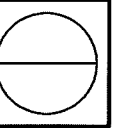
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics											
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.			
292.5		3-6-10-13	0.46	0.15	3 cm Topsoil--Light brown clayey fine sand and silt little oxides (SM-ML); moist, very stiff. qh=4.25 kg/cm <sup>2</sup>	1	0	3	51		45				12			A-4a
291.9	1	10-10-9-10	0.34	0.27	Light brown clayey silt w/ little to some sand and traces of oxides (ML/CL); moist, very stiff qh=2.25 kg/cm <sup>2</sup>	2	4	7	13		76	46	19	22				A-7-6
291.3		4-6-10-10	0.49	0.12		3	2	12	23		63	42	14	27				A-7-6
290.7	2	5-6-9-11	0.52	0.09	qh=2.25 kg/cm <sup>2</sup> 33% moisture in top of sample 3	4	0	1	2	21	76							A-7-6
290.1	3	9-11-12-12	0.52	0.09	Mottled olive brown and orange brown silty clay w/ traces of oxide stains (CL); moist, very stiff. Slightly higher plasticity below 2.4 m deep w/ increased moisture. qh=3.0 kg/cm <sup>2</sup>	5										44		
288.4	4				qh=4.0 kg/cm <sup>2</sup> qh=2.75 kg/cm <sup>2</sup>													
288.2		33.5/0.4	0.12	0.00	Soft to medium hard gray arenaceous shale w/ siltstone/fine grained sandstone lenses.	6												
286.9	5																	
286.7	6	50/0.3	0.00	0.09		7												
286.4		0	0.18	0.43	Light brown, very soft arenaceous shale.	8												
286.1	7	7	1.07	0.46		9												
284.6	8				Maroon and trace gray, very soft to soft indurated clay/shale. Very poor to good rock quality; laminated structure below 7.9 m; marled coloring in 'rock' core sample; increased red/ maroon and gray marbling 13.1m to 14.0 m.													
284.3		76	1.31	0.21		10												



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DATE	1/20/00
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DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**





Date Started 072299 Date Completed 072299 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+780 Station & Offset 37+780, 20 m right Surface Elev. 292.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics													
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
283.1																				
282.5	10	65	1.49	0.03	qu=9.6 kg/cm <sup>2</sup>	11														
281.8					qu=24.0 kg/cm <sup>2</sup>															
281.5	11																			
	12	0	1.01	0.52		12														
280.0																				
279.7	13	52	1.37	0.15	qu=123.7 kg/cm <sup>2</sup>	13														
278.5	14																			
278.3	15	72	1.28	0.24	Gray, fine to medium grained, moderately hard sandstone w/ alternate layers of soft to medium shale. Sandstone and shale layers 13 cm to 20 cm in thickness. Good rock quality. qu=203.9 kg/cm <sup>2</sup>	14														
277.0	16				Gray, medium arenaceous shale. Good rock quality.															
	17	70	1.52			15														
275.4																				
275.1		95	1.52		Gray, moderately hard, fine to medium grained sandstone. 15 cm shale layer at	16														

Date Started 072299 Date Completed 072299 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+780 Station & Offset 37+780, 20 m right Surface Elev. 292.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics													
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
273.9					about 17.7 m. Dark striations noted in sandstone. Mud seam noted at about 20.1. Good to excellent rock quality.															
273.3	19				qu=481.8 kg/cm <sup>2</sup>															
	20	83	3.05			17														
271.5	21				Soft, gray to dark gray shale. Fair rock quality.															
270.9																				
270.6	22				qu=86.1 kg/cm <sup>2</sup>															
	23	64	3.05			18														
269.4					Very soft to soft, gray shale. Fair rock quality.															
268.4	24				qu=11.4 kg/cm <sup>2</sup>															
267.8	25				Bottom of boring @ 24.7 meters.															
	26																			

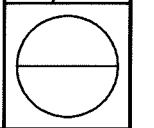
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GANNETT FLEMING  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

DRAWN MDH  
 REVIEWED 1/20/00  
 CALCULATED  
 CHECKED

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**





Date Started 072299 Date Completed 072299 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+780 Station & Offset 37+780, 20 m right Surface Elev. 292.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics													
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
283.1																				
282.5	10	65	1.49	0.03	qu=9.6 kg/cm <sup>2</sup>	11														
281.8					qu=24.0 kg/cm <sup>2</sup>															
281.5	11																			
	12	0	1.01	0.52		12														
280.0																				
279.7	13	52	1.37	0.15	qu=123.7 kg/cm <sup>2</sup>	13														
278.5	14																			
278.3	15	72	1.28	0.24	Gray, fine to medium grained, moderately hard sandstone w/ alternate layers of soft to medium shale. Sandstone and shale layers 13 cm to 20 cm in thickness. Good rock quality. qu=203.9 kg/cm <sup>2</sup>	14														
277.0	16				Gray, medium arenaceous shale. Good rock quality.															
	17	70	1.52			15														
275.4																				
275.1		95	1.52		Gray, moderately hard, fine to medium grained sandstone. 15 cm shale layer at	16														

Date Started 072299 Date Completed 072299 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+780 Station & Offset 37+780, 20 m right Surface Elev. 292.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics													
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.					
273.9					about 17.7 m. Dark striations noted in sandstone. Mud seam noted at about 20.1. Good to excellent rock quality.															
273.3	19				qu=481.8 kg/cm <sup>2</sup>															
	20	83	3.05			17														
271.5	21				Soft, gray to dark gray shale. Fair rock quality.															
270.9																				
270.6	22				qu=86.1 kg/cm <sup>2</sup>															
	23	64	3.05			18														
269.4					Very soft to soft, gray shale. Fair rock quality.															
268.4	24				qu=11.4 kg/cm <sup>2</sup>															
267.8	25				Bottom of boring @ 24.7 meters.															
	26																			

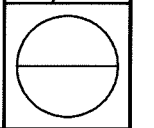
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GANNETT FLEMING  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

DRAWN MDH  
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 CHECKED

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**



Date Started 072799 Date Completed 072799 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 37+920 Station & Offset Surface Elev. 279.5 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
279.5		7-9-11-2-12	0.37	0.24	Light brown very silty clay/clayey silt w/ traces of root hairs (CL,CL-ML); very stiff, moist. qh=2.5 kg/cm <sup>2</sup>	1										16	
278.9																	
278.8	1	8-9-12-20	0.18	0.43	Light brown very silty clay/clayey silt w/ traces of root hairs (CL,CL-ML); very stiff, moist. qh=4.0 kg/cm <sup>2</sup>	2	0	1	5	94	44	21	20		A-7-6		
278.3					Reddish brown w/ trace light brown silty clay (CL); moist, very stiff.												
277.7	2	11-12-18-22	0.40	0.21	Mottled light brown/beige w/ trace gray and orange very silty clay/clayey silt w/ silt lenses and oxides (CL,CL-ML); slightly moist, hard. qh=2.5 kg/cm <sup>2</sup>	3	20	11	7	62	42	15	19		A-7-6		
277.1		22-47-50/0.4	0.37	0.06		4							12				
275.6					Olive brown/beige silty clay w/ traces of oxides (CL); slightly moist, hard. --Laminated structure, slickensides [extremely weathered shale]. Sample crumbles. qh=4.5 kg/cm <sup>2</sup>												
275.4	3	22-30-32-40	0.40	0.21		5							16				
275.6	4																
275.4		50/0.4	0.09	0.03	Extremely weathered, soft to medium, olive brown/light brown shale.	6											
274.7	5				Light brown to light gray, fine grained, medium sandstone.												
273.9	6	60/0.2	0.03	0.03		7											
272.8	7				Soft gray arenaceous shale.												
272.4		60/0.1	0.03	0.00		8											
270.9	8																
270.9		50/0.1	0.03	0.00	Bottom of boring @ 8.7 meters.	9											

Date Started 071499 Date Completed 071499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+420 Station & Offset Surface Elev. 288.1m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
288.1		8-11-8-9	0.15	0.46	9 cm Topsoil--Light brown clayey silt w/ traces of root hairs (CL); slightly moist, very stiff.	1										9	
287.5																	
287.2	1	11-13-13-12	0.37	0.24	Light orange brown and beige w/ trace gray, very silty clay/clayey silt (CL); slightly moist, very stiff. Traces of oxide stains in sample 4. qh=4.5 kg/cm <sup>2</sup>	2										31	
286.9																	
286.3	2	11-11-15-24	0.03	0.58		3										11	
285.6		8-12-18-17	0.40	0.21	27% moisture content in top of sample 4 qh=4.5+ kg/cm <sup>2</sup>	4	0	1	5	94	78	37	40		A-7-5		
285.0	3	7-12-14-14	0.46	0.15	Increased moisture noted in field at sample 5 qh=2.75 kg/cm <sup>2</sup>	5										32	
284.1																	
284.0	4	6-7-8-9	0.40	0.21	qh=2.75 kg/cm <sup>2</sup>	6	0	0	1	99	68	35	38		A-7-5		
282.4	5				Red/maroon and trace gray silty clay (CL); moist, very stiff to hard. qh=4.5+ kg/cm <sup>2</sup>	7	14	11	4	27	44		17		A-7-5		
282.4	6	13-30-29	0.24	0.21		8										18	
280.9	7																
280.9	8	55-50/0.3	0.21	0.03	qh=4.5+ kg/cm <sup>2</sup>	9										12	
279.4	9	70-50/0.2	0.15	0.06	qh=4.5+ kg/cm <sup>2</sup>	10										16	

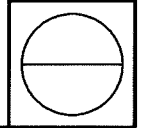
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GANNETT FLEMING  
 SUITE 350  
 415 EXECUTIVE PARKWAY  
 WESTERVILLE, OHIO 43081

CALCULATED	CHECKED
DATE	1/20/00
REVIEWED	
DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**







Date Started 071499 Date Completed 071499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+420 Station & Offset Surface Elev. 288.1m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
278.3	10				Isolated sandstone lens.														
277.9		80/0.5	0.15		Maroon/red and gray in sample 11 w/ slightly laminated structure.	11												13	
277.1	11				Isolated sandstone lens.														
276.3	12	75/0.5	0.15			12												11	
274.8	13																		
274.7		75/0.0	0.00	0.15	Soft gray shale; fair rock qualities. Spoon refusal at 13.3 m.	13													
273.0	14	68	1.52			14													
272.4	15																		
271.3	16				Gray, fine grained, medium sandstone. Good rock quality.														
270.8	17	88	3.02	0.03		15													
					qu=739.3 kg/cm <sup>2</sup>														
					Light brown, fine to medium grained, medium to moderately hard sandstone. Good rock quality.														

Date Started 071499 Date Completed 071499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+420 Station & Offset Surface Elev. 288.1m Water Elev. Not Encountered

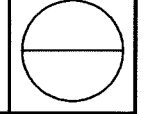
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
269.9																			
269.5					qu=233.5 kg/cm <sup>2</sup>														
269.2	19	35	1.98		Soft to very soft, gray shale; poor rock quality.	16													
268.0	20																		
267.0	21	30	0.91		Very soft, brownish gray shale (36%) w/ soft to medium, gray arenaceous shale seams (64%); poor rock quality.	17													
266.3	22	70	1.74	0.09	Soft to very soft, gray shale.														
265.2	23				Moderately hard, marled, gray shale and limestone w/ shale partings; fair to good rock quality. qu=146.2 kg/cm <sup>2</sup>	18													
	24																		
	25																		
	26																		
					Bottom of boring @ 22.8 meters.														



CALCULATED	CHECKED
DATE	1/20/00
REVIEWED	
DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH - 33 - 30.981**



Date Started 071499 Date Completed 071499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+420 Station & Offset Surface Elev. 288.1m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
278.3	10				Isolated sandstone lens.														
277.9		80/0.5	0.15		Maroon/red and gray in sample 11w/ slightly laminated structure.	11												13	
277.1	11				Isolated sandstone lens.														
276.3	12	75/0.5	0.15			12												11	
274.8	13																		
274.7		75/0.0	0.00	0.15	Soft gray shale; fair rock qualities. Spoon refusal at 13.3 m.	13													
273.0	14	68	1.52			14													
272.4	15																		
271.3	16				Gray, fine grained, medium sandstone. Good rock quality.														
270.8	17	88	3.02	0.03		15													
					qu=739.3 kg/cm <sup>2</sup>														
					Light brown, fine to medium grained, medium to moderately hard sandstone. Good rock quality.														

Date Started 071499 Date Completed 071499 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+420 Station & Offset Surface Elev. 288.1m Water Elev. Not Encountered

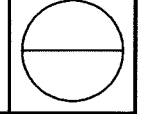
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics											
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.			
269.9																		
269.5					qu=233.5 kg/cm <sup>2</sup>													
269.2	19	35	1.98		Soft to very soft, gray shale; poor rock quality.	16												
268.0	20																	
267.0	21	30	0.91		Very soft, brownish gray shale (36%) w/ soft to medium, gray arenaceous shale seams (64%); poor rock quality.	17												
266.3	22	70	1.74	0.09	Soft to very soft, gray shale.													
265.2	23				Moderately hard, marled, gray shale and limestone w/ shale partings; fair to good rock quality. qu=146.2 kg/cm <sup>2</sup>	18												
	24				Bottom of boring @ 22.8 meters.													
	25																	
	26																	



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DATE	1/20/00
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DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

ATH-33-30.981



Date Started 052499 Date Completed 052599 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+680 Station & Offset Surface Elev. 282.4 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
282.4		3-4-3-7	0.40	0.21	5 cm Topsoil--Reddish brown silty clay w/ traces of root hairs (CL); moist, medium stiff. qh=2.25 kg/cm <sup>2</sup>	1	0	0	1	24	75			36	A-7-6	
281.8																
281.4	1	5-8-15-23	0.55	0.06	Reddish brown to red silty clay w/ trace light gray marbling (CL); slightly moist, very stiff. qh=4.5+ kg/cm <sup>2</sup>	2	1	3	4	92	44	21	23	A-7-6		
281.2																
280.6	2	15-29-39-50/4	0.49	0.09	Red w/ trace gray silty clay (CL); slightly moist, hard. Traces of slickensides, yellow coloring noted in sample #4.	3							17			
280.0																
		23-30-49-50/4	0.46	0.12	qh=4.5+ kg/cm <sup>2</sup>	4							16			
		15-23-50/0.4	0.30	0.12	qh=4.5+ kg/cm <sup>2</sup>	5							17			
278.5	4															
278.3		9-20-26	0.43	0.03	Dark red/maroon and gray silty clay (CL); moist, hard. Traces of beige and yellow in sample #7.	6							24			
					qh=2.25 kg/cm <sup>2</sup>											
276.8	6	12-20-47	0.46		qh=4.25 kg/cm <sup>2</sup>	7							17			
275.7	7				Soft, light brown/beige siltstone (fragments).											
275.3		50/0.2	0.03	0.03		8										
274.2	8															
273.7		75/0.3	0.06	0.03	Soft to medium, gray silty, arenaceous shale (fragments in spoon).	9										

Date Started 052499 Date Completed 052599 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+680 Station & Offset Surface Elev. 282.4 m Water Elev. Not Encountered

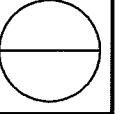
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
	10															
272.2		50/0.3	0.09			10										
271.1					Medium to moderately hard, gray sandstone. Auger refusal @ 12.2 m.											
270.7	12	50/0.2	0.00	0.06		11										
270.2																
	13	74	1.83		Light gray to gray, moderately hard, fine to medium grained sandstone (50%), gray, medium siltstone (20%), and gray to dark gray, soft to medium, fissile, micaceous shale (good rock quality). Thin laminations noted in siltstone.	12										
268.4	14															
268.4					Dark gray to mottled dark red/maroon soft shale/mudstone; laminated structure in gray shale, lack of bedding in red mudstone/shale; very poor rock quality.											
	15	0	1.22	0.63		13										
266.6	16															
266.5					Gray, fine grained, medium to moderately hard sandstone (possibly calcareous); fair rock quality.											
266.1		54	1.13	0.00		14										
					Gray to light gray, medium to moderately hard, calcareous sandstone; cemented; fair rock quality.											
265.4	17															
		55	1.22	0.05		15										



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ROADWAY / CULVERT SOIL PROFILE  
 BORING LOGS

ATH-33-30.981



Date Started 052499 Date Completed 052599 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+680 Station & Offset Surface Elev. 282.4 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
282.4		3-4-3-7	0.40	0.21	5 cm Topsoil--Reddish brown silty clay w/ traces of root hairs (CL); moist, medium stiff. qh=2.25 kg/cm <sup>2</sup>	1	0	0	1	24	75			36	A-7-6	
281.8																
281.4	1	5-8-15-23	0.55	0.06	Reddish brown to red silty clay w/ trace light gray marbling (CL); slightly moist, very stiff. qh=4.5+ kg/cm <sup>2</sup>	2	1	3	4	92	44	21	23	A-7-6		
281.2																
280.6	2	15-29-39-50/4	0.49	0.09	Red w/ trace gray silty clay (CL); slightly moist, hard. Traces of slickensides, yellow coloring noted in sample #4.	3							17			
280.0																
280.0		23-30-49-50/4	0.46	0.12	qh=4.5+ kg/cm <sup>2</sup>	4							16			
280.0																
280.0	3	15-23-50/0.4	0.30	0.12	qh=4.5+ kg/cm <sup>2</sup>	5							17			
278.5																
278.3	4															
278.3		9-20-26	0.43	0.03	Dark red/maroon and gray silty clay (CL); moist, hard. Traces of beige and yellow in sample #7.	6							24			
276.8																
276.8	5				qh=2.25 kg/cm <sup>2</sup>											
276.8	6	12-20-47	0.46		qh=4.25 kg/cm <sup>2</sup>	7							17			
275.7																
275.7	7				Soft, light brown/beige siltstone (fragments).											
275.3																
275.3	8	50/0.2	0.03	0.03		8										
274.2																
274.2	8				Soft to medium, gray silty, arenaceous shale (fragments in spoon).											
273.7																
273.7	8	75/0.3	0.06	0.03		9										

Date Started 052499 Date Completed 052599 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+680 Station & Offset Surface Elev. 282.4 m Water Elev. Not Encountered

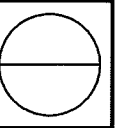
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics									
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.	
272.2	10															
272.2		50/0.3	0.09			10										
271.1																
270.7					Medium to moderately hard, gray sandstone. Auger refusal @ 12.2 m.											
270.7	12	50/0.2	0.00	0.06		11										
270.2																
270.2					Light gray to gray, moderately hard, fine to medium grained sandstone (50%), gray, medium siltstone (20%), and gray to dark gray, soft to medium, fissile, micaceous shale (good rock quality). Thin laminations noted in siltstone.	12										
268.4																
268.4	14	74	1.83			12										
268.4																
268.4	15	0	1.22	0.63	Dark gray to mottled dark red/maroon soft shale/mudstone; laminated structure in gray shale, lack of bedding in red mudstone/shale; very poor rock quality.	13										
266.6																
266.5																
266.5	16				Gray, fine grained, medium to moderately hard sandstone (possibly calcareous); fair rock quality.	14										
266.5		54	1.13	0.00		14										
265.4					Gray to light gray, medium to moderately hard, calcareous sandstone; cemented; fair rock quality.											
265.4	17															
265.4		55	1.22	0.05		15										



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ROADWAY / CULVERT SOIL PROFILE  
 BORING LOGS

ATH-33-30.981







Date Started 052499 Date Completed 052599 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+680 Station & Offset Surface Elev. 282.4 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
264.1					Bottom of boring @ 18.3 meters.														
	19																		
	20																		
	21																		
	22																		
	23																		
	24																		
	25																		
	26																		

Date Started 072899 Date Completed 072899 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+880 Station & Offset Surface Elev. 271.3 m Water Elev. Not Encountered

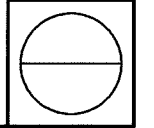
Elev. (m.)	Depth (m.)	Std. Pen./ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics												
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.				
271.3		12-29-38-33	0.27	0.34	7.5 cm Topsoil--Light brown clayey silt w/ little to some fine sand (ML/CL); slightly moist, dense to very dense.	1	5	9	24	62	34	12	11						A-6a
270.7					qh=4.0 kg/cm <sup>2</sup>	2													
270.2	1	20-25-30-45	0.37	0.24	Light brown, extremely weathered, fine grained, soft sandstone (fragments).	3													
270.1		50/0.5	0.09	0.06		4													
269.5	2	30-50/0.2	0.18	0.03		5													
269.0					Soft, light brown/beige, very weathered shale. Olive brown below 3.7 m; gray below 4.9m.	6													
268.8	3	17-45-50/0.5	0.34	0.12		7													
	4					8													
267.2		50/0.5	0.12	0.03		9													
	5					10													
265.8					Maroon and gray, very soft to soft, weathered clay shale.	11													
265.6	6	27-50/0.2	0.18	0.03		12													
	7					13													
264.3					Light gray to olive brown, soft shale.	14													
264.1		40-50/0.2	0.18	0.03		15													
263.8					Olive brown, soft, arenaceous shale.	16													
263.1					Mottled olive, gray, and maroon, very soft to soft shale.	17													
262.6		15-50/0.5	0.21	0.09		18	0	0	0	0	0	0	0	0	0	0	0	0	0



CALCULATED	CHECKED
DATE	1/20/00
REVIEWED	
DRAWN	MDH

**ROADWAY / CULVERT SOIL PROFILE BORING LOGS**

**ATH-33-30.981**





Date Started 072899 Date Completed 072899 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+880 Station & Offset \_\_\_\_\_ Surface Elev. 271.3 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
261.5	10				Maroon/red, soft to very soft shale.												
261.1 261.0		50/0.2	0.06	0.00	Bottom of boring @ 10.3 meters.	10	0	0	0	0	0	0	0	0	0	0	0
	11																
	12																
	13																
	14																
	15																
	16																
	17																



Date Started 072899 Date Completed 072899 Sampler: Type Split Spoon Dia. 5 cm  
 Boring No. 38+880 Station & Offset \_\_\_\_\_ Surface Elev. 271.3 m Water Elev. Not Encountered

Elev. (m.)	Depth (m.)	Std. Pen./ ROD	Rec. (m.)	Loss (m.)	Description	Sample No.	Physical Characteristics										
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	ODOT Class.		
261.5	10				Maroon/red, soft to very soft shale.												
261.1 261.0		50/0.2	0.06	0.00	Bottom of boring @ 10.3 meters.	10	0	0	0	0	0	0	0	0	0	0	0
	11																
	12																
	13																
	14																
	15																
	16																
	17																



State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/25/99 Sampler Type SS Dia. 51mm  
Date Completed 10/25/99 Casing Length 1.52m Dia. 83mm  
Project No.: ATH-33-30.981  
Location: Athens County, Athens, Ohio

Boring No. Station & Offset Sta 30+203, 0.00 m Surface Elev. 239.81m

Elev. (m)	Depth (m)	Std. Pen./ROD	Rec. (m)	Loss (m)	Description	Physical Characteristics						000T Class	
						Agg.	C.S.	F.S.	Shif	Clay	L.L.		P.I.
239.81	0	2-3-3-7			Medium stiff, reddish brown ELASTIC CLAY (A-7-5), moist.	0	0	0	100*	64	32	19	A-7-5
239.20	1	5-10-13			Very stiff, reddish brown CLAY (A-7-6), trace rock fragments, trace sand, moist.	1	1	1	97*	47	23	13	A-7-6
238.29	2	9-16-22			Very soft to medium hard, reddish brown to gray, decomposed CLAY SHALE	--	--	--	--	--	--	--	VISUAL
	3	25-44				--	--	--	--	--	--	--	VISUAL
	4	10-17-21				--	--	--	--	--	--	--	VISUAL
	5	40-50/76				--	--	--	--	--	--	--	VISUAL
232.49	7	ROD = 99%	1.85	0.03	Notes: Auger refusal on bedrock at 7.32 meters. Began coring bedrock. Medium hard, gray, weathered SILTY SHALE with laminar bedding (fissile).	--	--	--	--	--	--	--	VISUAL
231.49	8				Notes: Quality of rock considered excellent as per ROD. Used grey, slightly weathered Shelby Tube sample. SANDS, with very thin to thick bedding.	--	--	--	--	--	--	--	VISUAL
230.82					TERMINATION DEPTH = 8.95 METERS								

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/25/99 Sampler Type SS Dia. 51mm  
Date Completed 10/25/99 Casing Length 1.52m Dia. 83mm  
Project No.: ATH-33-30.981  
Location: Athens County, Athens, Ohio

Boring No. Station & Offset Sta 30+32, 0.00 m Surface Elev. 240.52m

Elev. (m)	Depth (m)	Std. Pen./ROD	Rec. (m)	Loss (m)	Description	Physical Characteristics						000T Class		
						Agg.	C.S.	F.S.	Shif	Clay	L.L.		P.I.	W.C.
240.51	0				TOPSOIL									
240.27		3-3-4			Medium stiff, brown SILT AND CLAY (A-6a), some sand, trace to and rock fragments, moist.	1	2	24	--	73*	33	12	14	A-6a
239.35		Shelby Tube												
238.90		3-4-26			Loose, brown SILTY FRAGMENTS WITH SAND, SILT AND CLAY (A-2-6), moist (Shelby Tube sample).	44	9	18	--	29*	31	11	13	A-2-6
	2				Very stiff, brown SILTY CLAY (A-4b), little rock fragments, little sand, moist.	16	11	7	--	65*	37	16	10	A-4b
237.83		9-20-50/76												
237.37		ROD = 38%	1.28	0.24	Very soft to soft, red to gray, decomposed CLAY SHALE. Notes: Auger refusal on bedrock at 3.20 meters. Began coring bedrock. Very soft to soft, red, decomposed to highly weathered CLAYSTONE with indistinct bedding.	--	--	--	--	--	--	--	7	VISUAL
	4				Notes: Quality of rock from Run 1 considered poor as per ROD.									
	5	ROD = 90%	1.32	0.00	Notes: Quality of rock from Run 2 considered excellent as per ROD.									
234.32	6				TERMINATION DEPTH = 6.25 METERS									

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/11/99 Sampler Type SS Dia. 51mm  
Date Completed 10/11/99 Casing Length 1.52m Dia. 83mm  
Project No.: ATH-33-30.981  
Location: Athens County, Athens, Ohio

Boring No. Station & Offset Sta 32+156, 0.00 m Surface Elev. 249.198m

Elev. (m)	Depth (m)	Std. Pen./ROD	Rec. (m)	Loss (m)	Description	Physical Characteristics						000T Class		
						Agg.	C.S.	F.S.	Shif	Clay	L.L.		P.I.	W.C.
249.20	0	1-2-2-4			TOPSOIL									
248.98		Shelby Tube			SOFT, brown SILTY CLAY (A-6b), some sand, little rock fragments, moist.	17	0	0	--	83*	33	11	15	A-6a
248.44		2-3-4			Medium stiff, brown SILT AND CLAY (A-6a), some sand, little rock fragments, moist.	18	5	24	--	53*	36	15	19	A-6a
247.37	2	4-7-10			Very stiff, reddish-brown CLAY (A-7-6), trace sand, no to trace rock fragments, moist.	0	1	1	--	98*	51	23	21	A-7-6
	3	7-10-14				1	1	1	--	98*	52	25	19	A-7-6
245.69	4	10-21-29			Very soft to soft, reddish-brown, decomposed to highly weathered CLAY SHALE	--	--	--	--	--	--	--	15	VISUAL
	5	9-11-24				--	--	--	--	--	--	--	14	VISUAL
	6	21-50/102				--	--	--	--	--	--	--	10	VISUAL
	7	50/150				--	--	--	--	--	--	--	7	VISUAL
241.58	8	50/51 ROD = 93%	1.52	0.00	Notes: Auger refusal on bedrock at 7.62 meters. Began coring bedrock. Soft to medium hard, red, highly weathered to weathered CLAYSTONE with indistinct bedding. Quality of rock considered excellent as per ROD.	--	--	--	--	--	--	--	--	VISUAL
240.05	9				TERMINATION DEPTH = 9.14 METERS									

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) Form TE-151 Revised 9/94

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/25/99 Sampler: Type SS Dia. 51mm Water Elev. m  
Date Completed 10/25/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 30+203, 0.00 m Surface Elev. 239.810m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class	
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
239.81	0	2-3-3-7			Medium stiff, reddish brown <u>ELASTIC CLAY</u> (A-7-5), moist.	1	0	0	0	--	100 *	64	32	19	A-7-5
239.20	1	5-10-13			Very stiff, reddish brown <u>CLAY</u> (A-7-6), trace rock fragments, trace sand, moist.	2	1	1	1	--	97 *	47	23	13	A-7-6
238.29	2	9-16-22			Very soft to medium hard, reddish brown to gray, decomposed <u>CLAY SHALE</u> .	3	--	--	--	--	--	--	--	11	VISUAL
	3	25-44				4	--	--	--	--	--	--	--	9	VISUAL
	4	10-17-21				5	--	--	--	--	--	--	--	10	VISUAL
	5	40-50/76				6	--	--	--	--	--	--	--	6	VISUAL
	6	33-21-22				7	--	--	--	--	--	--	--	8	VISUAL
232.49	7	RQD = 99%	1.65	0.03		Note: Auger refusal on bedrock at 7.32 meters. Began coring bedrock. Medium hard, gray, weathered <u>SILTY SHALE</u> with laminar bedding (fissile).	Run 1								
231.49	8				Note: Quality of rock considered excellent as per RQD. Hard, gray, slightly weathered, slightly micaceous, fine grained <u>SANDSTONE</u> with very thin to thick bedding.										
230.82					TERMINATION DEPTH = 8.99 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

LOG OF BORING

Date Started 10/25/99 Sampler: Type SS Dia. 51mm Water Elev. m  
Date Completed 10/25/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 30+732, 0.00 m Surface Elev. 240.572m

Elev. (m)	Depth (m)	Std. Pen./ ROD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
240.57	0				TOPSOIL											
240.27		3-3-4			Medium stiff, brown <u>SILT AND CLAY</u> (A-6a), some sand, trace to and rock fragments, moist.	1	1	2	24	--	73 *	33	12	14	A-6a	
239.35	1	Shelby Tube														
238.90		3-4-26			Loose, brown <u>STONE FRAGMENTS WITH SAND, SILT AND CLAY</u> (A-2-6), moist (Shelby Tube sample).	ST	44	9	18	--	29 *	31	11	13	A-2-6	
	2				Very stiff, brown <u>SILTY CLAY</u> (A-6b), little rock fragments, little sand, moist.	3	16	11	7	--	65 *	37	16	10	A-6b	
237.83		9-20-50/76			Very soft to soft, red to gray, decomposed <u>CLAY SHALE</u>	4	--	--	--	--	--	--	--	7	VISUAL	
237.37	3	ROD = 38%	1.28	0.24	Note: Auger refusal on bedrock at 3.20 meters. Began coring bedrock. Very soft to soft, red, decomposed to highly weathered <u>CLAYSTONE</u> with indistinct bedding. Note: Quality of rock from Run 1 considered poor as per ROD.	Run 1										
	4															
	5	ROD = 90%	1.52	0.00	Note: Quality of rock from Run 2 considered excellent as per ROD.	Run 2										
	6															
234.32					TERMINATION DEPTH = 6.25 METERS											

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)



State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/11/99 Sampler: Type SS Dia. 51mm Water Elev. 248.89m  
Date Completed 10/11/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 32+156, 0.00 m Surface Elev. 249.198m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						ODOT Class						
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.				
249.20	0																		
248.98	0.22	1-2-2-4			TOPSOIL	1	11	4	21	--	64 *	37	16	17					A-6b
248.44	0.76	Shelby Tube			Soft, brown SILTY CLAY (A-6b), some sand, little rock fragments, moist.	ST	17	0	0	--	83 *	33	11	15					A-6a
247.37	1.12	2-3-4			Medium stiff, brown SILT AND CLAY (A-6a), some sand, little rock fragments, moist.	3	18	5	24	--	53 *	36	15	19					A-6a
245.69	1.58	4-7-10			Very stiff, reddish-brown CLAY (A-7-6), trace sand, no to trace rock fragments, moist.	4	0	1	1	--	98 *	51	23	21					A-7-6
	1.82	7-10-14				5	1	1	1	--	98 *	52	25	19					A-7-6
	2.06	10-21-29			Very soft to soft, reddish-brown, decomposed to highly weathered CLAY SHALE.	6	--	--	--	--	--	--	--	15					VISUAL
	2.20	9-17-24				7	--	--	--	--	--	--	--	14					VISUAL
	2.34	21-50/102				8	--	--	--	--	--	--	--	10					VISUAL
	2.48	50/150				9	--	--	--	--	--	--	--	7					VISUAL
241.58	2.94	50/51 RQD = 93%	1.52	0.00	Note: Auger refusal on bedrock at 7.62 meters. Began coring bedrock. Soft to medium hard, red, highly weathered to weathered CLAYSTONE with indistinct bedding. Quality of rock considered excellent as per RQD.	10 Run 1	--	--	--	--	--	--	--	--					VISUAL
240.05	3.10																		

TERMINATION DEPTH = 9.14 METERS

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)

Form TE-151 Revised 9/94

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/11/99 Sampler Type SS Dia. 51mm Water Elev. 253.51m  
Date Completed 10/11/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30-981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No.	Elev. (m)	Depth (m)	Std. Rod Pen./ Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
	253.81	0				TOPSOIL											
	253.66	1	1-2-1			SOFT, brown SILTY AND CLAY (A-6a), trace rock fragments, moist.	1	5	0	0	--	95 *	33	13	23	A-6a	
	252.14	2	Shelby Tube				ST	4	2	5	--	89 *	31	11	27	A-6a	
		3	2-3-5			Medium stiff to hard, reddish-brown CLAY (A-7-6), little rock fragments, little to trace sand, moist to wet.	3	10	5	10	--	74 *	42	16	21	A-7-6	
		4	7-13-18				4	11	3	4	--	82 *	42	16	15	A-7-6	
	250.46	5	11-17-17			Very soft to soft, reddish brown, decomposed CLAY SHALE.	5	--	--	--	--	--	--	--	16	VISUAL	
		6	10-16-28				6	--	--	--	--	--	--	--	13	VISUAL	
		7	18-21-30				7	--	--	--	--	--	--	--	13	VISUAL	
		8	18-41-50/127				8	--	--	--	--	--	--	--	12	VISUAL	
	246.04	8	ROD = 82%	1.52	0.00	Note: Auger refusal on bedrock at 7.77 meters. Began coring bedrock. Soft to medium hard, red, highly weathered to weathered SANDSTONE with indistinct bedding. Quality of rock considered good as per ROD.	9	--	--	--	--	--	--	--	9	VISUAL	
	244.52	9				TERMINATION DEPTH = 9.30 METERS	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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/26/99 Sampler Type SS Dia. 51mm Water Elev. m  
Date Completed 10/26/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30-981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No.	Elev. (m)	Depth (m)	Std. Rod Pen./ Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class		
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.
	257.90	0				TOPSOIL										
	257.14	1	1-2-3			Medium stiff, brown SILTY AND CLAY (A-6a), some sand, little rock fragments, moist	1	12	6	25	--	51 *	30	11	11	A-6a
	257.29	2	5-5-8			Stiff to very stiff, brown to gray CLAY (A-7-6), some to trace sand, no to trace rock fragments, moist.	2	0	18	5	--	77 *	41	16	12	A-7-6
	255.61	3	7-10-15				3	1	3	4	--	91 *	48	22	11	A-7-6
	254.85	4	6-11-18			Very stiff, brown SILTY CLAY (A-6b), trace sand, trace rock fragments, moist.	4	1	3	6	--	90 *	40	17	10	A-6b
		5	13-34-48			Soft, brown, decomposed CLAY SHALE.	5	--	--	--	--	--	--	--	8	VISUAL
	253.32	5	ROD = 72%	2.32	0.00	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock. Hard, brown, weathered, fine grained SANDSTONE with thin bedding. Very soft, brown, highly weathered CLAY SHALE with indistinct to laminar bedding. Hard, gray, weathered, micaceous, fine grained SANDSTONE with thin to moderate bedding. Note: 51mm thick, highly weathered clay shale seam at 5.21 meters. Note: Quality of rock considered fair as per ROD.	Run 1									
	251.46	6				Hard, gray, slightly weathered to weathered SILTSTONE with very thin to thin bedding.										
	251.01	6				TERMINATION DEPTH = 6.89 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/14/99 Sampler Type SS Dia. 51mm Water Elev. 268.42m  
Date Completed 10/14/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30-981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No.	Elev. (m)	Depth (m)	Std. Rod Pen./ Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class		
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.
	268.73	0				TOPSOIL										
	268.57	1	3-6-7			STIFF, brown CLAY (A-7-6), trace rock fragments, trace sand, moist.	1	4	4	5	--	87 *	41	17	17	A-7-6
	267.81	2	8-10-12			Very stiff, brown SILTY AND CLAY (A-6a), little sand, trace rock fragments, moist.	2	2	6	5	--	89 *	34	15	12	A-6a
	266.90	3	56/150			Soft to medium hard, brown, decomposed to highly weathered SANDSTONE.	3	--	--	--	--	--	--	--	5	VISUAL
	265.68	4	50/25				4	--	--	--	--	--	--	--	5	VISUAL
		5	ROD = 93%	2.90	0.15	Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock. Hard, brown, slightly weathered, micaceous, fine grained SANDSTONE with very thin to moderate bedding. Quality of rock considered excellent as per ROD. Note: Iron staining present from 3.05 to 3.63 meters. Note: Color change to gray at 3.63 meters. Note: Many carbonaceous lamination present from 3.63 to 6.10 meters. Bedding planes weaker along laminations.	Run 1									
	262.63	6				Note: Sandstone grain size changes to very fine grained at 5.58 meters.										
		6				TERMINATION DEPTH = 6.10 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/11/99 Sampler: Type SS Dia. 51mm Water Elev. 253.51m  
Date Completed 10/11/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 32+760, 0.00 m Surface Elev. 253.813m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.		
253.81	0																
253.66	▽				TOPSOIL												
		1-2-1			Soft, brown SILT AND CLAY (A-6a), trace rock fragments, moist.	1	5	0	0	--	95 *	33	13	23		A-6a	
		Shelby Tube				ST	4	2	5	--	89 *	31	11	27		A-6a	
252.14		2-3-5			Medium stiff to hard, reddish-brown CLAY (A-7-6), little rock fragments, little to trace sand, moist to wet.	3	10	5	10	--	74 *	42	16	21		A-7-6	
		7-13-18				4	11	3	4	--	82 *	42	16	15		A-7-6	
250.46		11-17-17			Very soft to soft, reddish brown, decomposed CLAY SHALE.	5	--	--	--	--	--	--	--	16		VISUAL	
		10-16-28				6	--	--	--	--	--	--	--	13		VISUAL	
		18-21-30				7	--	--	--	--	--	--	--	13		VISUAL	
		18-41-50/127				8	--	--	--	--	--	--	--	12		VISUAL	
		20-55				9	--	--	--	--	--	--	--	9		VISUAL	
246.04		RQD = 82%	1.52	0.00	Note: Auger refusal on bedrock at 7.77 meters. Began coring bedrock. Soft to medium hard, red, highly weathered to weathered CLAYSTONE with indistinct bedding. Quality of rock considered good as per RQD.	Run 1											
244.52																	

TERMINATION DEPTH = 9.30 METERS

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

LOG OF BORING

Date Started 10/26/99 Sampler: Type SS Dia. 51mm Water Elev. m  
Date Completed 10/26/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 33+003, 0.00 m Surface Elev. 257.896m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class				
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.			
257.90	0				TOPSOIL													
257.74		1-2-3			Medium stiff, brown <u>SILT AND CLAY</u> (A-6a), some sand, little rock fragments, moist.	1	12	6	25	--	57 *	30	11	11		A-6a		
257.29	1	5-5-8			Stiff to very stiff, brown to gray <u>CLAY</u> (A-7-6), some to trace sand, no to trace rock fragments, moist.	2	0	18	5	--	77 *	41	16	12		A-7-6		
	2	7-10-15				3	1	3	4	--	91 *	48	22	11		A-7-6		
255.61		6-11-18			Very stiff, brown <u>SILTY CLAY</u> (A-6b), trace sand, trace rock fragments, moist.	4	1	3	6	--	90 *	40	17	10		A-6b		
254.85	3	13-34-48			Soft, brown, decomposed <u>CLAY SHALE</u> .	5	--	--	--	--	--	--	--	8		VISUAL		
	4																	
253.32		RQD = 72%	2.32	0.00	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock.	Run 1												
253.14	5				Hard, brown, weathered, fine grained <u>SANDSTONE</u> with thin bedding.													
252.93					Very soft, brown, highly weathered <u>CLAY SHALE</u> with indistinct to laminar bedding (fissile).													
	6				Hard, gray, weathered, micaceous, fine grained <u>SANDSTONE</u> with thin to moderate bedding. Note: 51mm thick, highly weathered clay shale seam at 5.21meters. Note: Quality of rock considered fair as per RQD.													
251.46																		
251.01					Hard, gray, slightly weathered to weathered <u>SILTSTONE</u> with very thin to thin bedding.													

TERMINATION DEPTH = 6.89 METERS

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)

State of Ohio  
 Department of Transportation  
 Division of Highways  
 Testing Laboratory  
 LOG OF BORING

Date Started 10/14/99 Sampler: Type SS Dia. 51mm Water Elev. 268.42m  
 Date Completed 10/14/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
 Project No.: 99043  
 Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 33+727, 0.00 m Surface Elev. 268.727m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						ODOT Class				
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.		
268.73	0																
268.57	▽				TOPSOIL												
		3-6-7			Stiff, brown CLAY (A-7-6), trace rock fragments, trace sand, moist.	1	4	4	5	--	87 *	41	17	17			A-7-6
267.81		8-10-12			Very stiff, brown SILT AND CLAY (A-6a), little sand, trace rock fragments, moist.	2	2	6	5	--	89 *	34	15	12			A-6a
266.90	2	56/150			Soft to medium hard, brown, decomposed to highly weathered SANDSTONE.	3	--	--	--	--	--	--	--	5			VISUAL
		50/25				4	--	--	--	--	--	--	--	5			VISUAL
265.68	3	RQD = 93%	2.90	0.15	Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock. Hard, brown, slightly weathered, micaceous, fine grained SANDSTONE with very thin to moderate bedding. Quality of rock considered excellent as per RQD.	Run 1											
	4				Note: Iron staining present from 3.05 to 3.63 meters. Note: Color change to gray at 3.63 meters. Note: Many carbonaceous lamination present from 3.63 to 6.10 meters. Bedding planes weaker along laminations.												
	5																
	6				Note: Sandstone grain size changes to very fine grained at 5.58 meters.												
262.63					TERMINATION DEPTH = 6.10 METERS												

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/26/99 Sampler Type SS Dia. 51mm Water Elev. m  
Date Completed 10/26/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Sta. Pen./ Rod	Rec. (m)	Loss (m)	Description	Physical Characteristics					000T Class			
						% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
269.60	0	1-2-1			Soft, brown SANDY SILT (A-4a), some sand, trace rock fragments, moist.	10	8	18	--	64 *	33	10	19	A-4a
268.38		Sheby Tube												
267.47	2	4-7-11			Soft to very stiff SILT AND CLAY (A-6a), some sand, little to some rock fragments, moist.	8	0	0	--	92 *	29	10	14	A-4a
267.31	3	50/76 ROD = 98%	2.35	0.00	Medium hard, brown, decomposed SANDSTONE. Note: Auger refusal on bedrock at 2.29 meters. Began coring bedrock. Hard, gray, weathered, micaceous, fine grained SANDSTONE with thin to thick bedding. Quality of rock considered excellent as per ROD. Note: Iron staining present from 2.29 to 3.47 meters. Note: Few small voids present from 2.47 to 3.23 meters.	14	3	17	--	66 *	36	15	15	A-6a
264.97	4				Run 1	25	4	16	--	55 *	38	13	9	A-6a

TERMINATION DEPTH = 4.63 METERS

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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Division of Highways  
Testing Laboratory

Date Started 10/27/99 Sampler Type SS Dia. 51mm Water Elev. m  
Date Completed 10/27/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Sta. Pen./ Rod	Rec. (m)	Loss (m)	Description	Physical Characteristics					000T Class			
						% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
260.33	0	3-4-7			TOPSOIL	5	3	12	--	80 *	38	13	15	A-6a
259.77		7-9-10			Very stiff, brown SILT AND CLAY (A-7-6), little sand, trace rock fragments, moist.	9	4	11	--	76 *	42	18	15	A-7-6
258.86	2	10-15-26			Soft, brown, decomposed to highly weathered CLAY SHALE.	--	--	--	--	--	--	--	17	VISUAL
257.94	3	50/51 ROD = 38%	1.52	0.00	Note: Auger refusal on bedrock at 2.44 meters. Began coring bedrock. Hard, gray, weathered to highly weathered LIMESTONE with indistinct to thin bedding. Quality of rock considered poor as per ROD. Note: Limestone very soft and highly weathered from 2.33 to 3.47 meters.	--	--	--	--	--	--	--	--	VISUAL
256.42					Run 1	--	--	--	--	--	--	--	--	VISUAL

TERMINATION DEPTH = 3.96 METERS

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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Department of Transportation  
Division of Highways  
Testing Laboratory

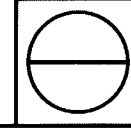
Date Started 10/12/99 Sampler Type SS Dia. 51mm Water Elev. m  
Date Completed 10/12/99 Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Sta. Pen./ Rod	Rec. (m)	Loss (m)	Description	Physical Characteristics					000T Class			
						% Agg	% C.S.	% F.S.	% Silt	% Clay		L.L.	P.I.	W.C.
268.88	0	2-3-3			TOPSOIL	1	2	6	--	91 *	63	33	22	A-7-5
268.73		4-5-7			Medium stiff to stiff, brown ELASTIC CLAY (A-7-5), trace to no rock fragments, trace to some sand, moist.	0	2	3	--	95 *	52	22	15	A-7-5
266.74	2	Shelby Tube 16-24-29			Very soft to soft, brown, decomposed to highly weathered CLAY SHALE.	4	14	19	--	64 *	48	18	14	A-7-5 VISUAL
	3	15-27-44				--	--	--	--	--	--	--	7	VISUAL
264.31	5	50/76 ROD = 80%	3.05	0.00	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock. Soft, gray, highly weathered CLAY SHALE with indistinct to laminar bedding (fissile).	--	--	--	--	--	--	--	3	VISUAL
263.27					Medium hard, gray, weathered, micaceous SILTSTONE with thin bedding.									
262.78					Hard, gray, weathered, fine grained SANDSTONE with thin to thick bedding. Quality of rock for Run 1 considered good as per ROD.									
261.26					Run 1									

TERMINATION DEPTH = 7.62 METERS

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)



State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/26/99 Sampler: Type SS Dia. 51mm Water Elev. m  
Date Completed 10/26/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 34+133, 0.00 m Surface Elev. 269.600m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.
269.60	0														
268.38	1	1-2-1 Sheby Tube			Soft, brown <u>SANDY SILT</u> (A-4a), some sand, trace rock fragments, moist.	1	10	8	18	--	64 *	33	10	19	A-4a
		4-7-11			Soft to very stiff <u>SILT AND CLAY</u> (A-6a), some sand, little to some rock fragments, moist.	3	14	3	17	--	66 *	36	15	15	A-6a
267.47 267.31	2	50/76 RQD = 98%	2.35	0.00	Medium hard, brown, decomposed <u>SANDSTONE</u> . Note: Auger refusal on bedrock at 2.29 meters. Began coring bedrock. Hard, gray, weathered, micaceous, fine grained <u>SANDSTONE</u> with thin to thick bedding. Quality of rock considered excellent as per RQD. Note: Iron staining present from 2.29 to 3.47 meters. Note: Few small voids present from 2.47 to 3.23 meters.	4 Run 1	25	4	16	--	55 *	38	13	9	A-6a
264.97	4														

TERMINATION DEPTH = 4.63 METERS

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)

State of Ohio  
 Department of Transportation  
 Division of Highways  
 Testing Laboratory  
 LOG OF BORING

Date Started 10/27/99 Sampler: Type SS Dia. 51mm Water Elev. m  
 Date Completed 10/27/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
 Project No.: 99043  
 Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 34+425, 0.00 m Surface Elev. 260.380m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class	
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
260.38	0														
260.23		3-4-7			TOPSOIL	1	5	3	12	--	80 *	38	13	15	A-6a
259.77					Stiff, brown SILT AND CLAY little sand, trace rock fragments, moist.										
	1	7-9-10			Very stiff, brown CLAY (A-7-6), little sand, trace rock fragments, moist.	2	9	4	11	--	76 *	42	18	15	A-7-6
258.86		10-15-26			Soft, brown, decomposed to highly weathered CLAY SHALE.	3	--	--	--	--	--	--	--	17	VISUAL
	2														
257.94		50/51 RQD = 38%	1.52	0.00	Note: Auger refusal on bedrock at 2.44 meters. Began coring bedrock.	4	--	--	--	--	--	--	--	--	VISUAL
	3				Hard, gray, weathered to highly weathered LIMESTONE with indistinct to thin bedding. Quality of rock considered poor as per RQD.	Run 1									
					Note: Limestone very soft and highly weathered from 2.93 to 3.47 meters.										
256.42					Note: 25 mm thick, very soft and decomposed seam at 3.90 meters.										
TERMINATION DEPTH = 3.96 METERS															

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)



State of Ohio  
 Department of Transportation  
 Division of Highways  
 Testing Laboratory  
 LOG OF BORING

Date Started 10/12/99 Sampler: Type SS Dia. 51mm Water Elev. m  
 Date Completed 10/12/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
 Project No.: 99043  
 Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 34+736, 0.00 m Surface Elev. 268.878m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.		
268.88	0																
268.73					TOPSOIL												
		2-3-3			Medium stiff to stiff, brown <u>ELASTIC CLAY</u> (A-7-5), trace to no rock fragments, trace to some sand, moist.	1	1	2	6	--	91 *	63	33	22		A-7-5	
		4-5-7				2	0	2	3	--	95 *	52	22	15		A-7-5	
266.74	2	Shelby Tube 16-24-29				ST	4	14	19	--	64 *	48	18	14		A-7-5	
					Very soft to soft, brown, decomposed to highly weathered <u>CLAY SHALE</u> .	4	--	--	--	--	--	--	--	5		VISUAL	
	3	15-27-44				5	--	--	--	--	--	--	--	7		VISUAL	
264.31	4																
	5	50/76 RQD = 80%	3.05	0.00	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock. Soft, gray, highly weathered <u>CLAY SHALE</u> with indistinct to laminar bedding (fissile).	6 Run 1	--	--	--	--	--	--	--	3		VISUAL	
263.27					Medium hard, gray, weathered, micaceous <u>SILTSTONE</u> with thin bedding.												
262.78	6				Hard, gray, weathered, fine grained <u>SANDSTONE</u> with thin to thick bedding.												
	7				Quality of rock for Run 1 considered good as per RQD.												
261.26																	

TERMINATION DEPTH = 7.62 METERS

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/12/99 Station & Offset Sta 35+10.0, 0.00 m Project: ATH-33-30.981  
Date Completed 10/12/99 Casing Length 1.52m Dia. 51mm Water Elev. 284.81m Location: Athens County, Athens, Ohio  
Sampler Type SS Dia. 51mm  
Casing Length 1.52m Dia. 83mm

Boring No.	Elev. (m)	Depth (m)	Std. Rod	Pen./Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
									% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
	285.42	0																
	285.27		3-4-9				TOPSOIL Medium dense, brown SANDY SILT (A-4a), some clay, trace rock fragments, moist.	1	4	6	34	32	24	--	--	13	A-4a	
	284.51		5-12-16				Medium dense, brown COARSE AND FINE SAND (A-3a), some silt and clay, trace rock fragments, moist.	2	2	7	57	--	34 *	--	--	10	A-3a	
	283.74		10-14-22				Dense, brown SANDY SILT (A-4a), little clay, trace rock fragments, moist.	3	5	7	52	--	36 *	--	--	14	A-4a	
	282.83		17-23-43				Very soft to soft, brown to gray, decomposed to highly weathered CLAY SHALE.	4	--	--	--	--	--	--	--	12	VISUAL	
			11-34-59					5	--	--	--	--	--	--	--	15	VISUAL	
	279.32		18-50/102		1.52	0.00	Note: Auger refusal on bedrock at 6.10 meters. Began coring bedrock. Soft, gray, weathered CLAY SHALE with laminar bedding (fissile). Hard, gray, slightly weathered, slightly micaceous, very fine grained SANDSTONE with thick bedding.	6	--	--	--	--	--	--	--	--	11	VISUAL
	279.20		ROD = 92%					Run 1										
	278.01						Soft to medium hard, gray, weathered CLAY SHALE with laminar bedding (fissile). Note: 25 mm thick sandstone seam at 1.44 meters. TERMINATION DEPTH = 7.62 METERS											
	277.80																	

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Boring No.	Elev. (m)	Depth (m)	Std. Rod	Pen./Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
									% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
	266.22	0																
	266.13		4-4-4				TOPSOIL Medium stiff, brown SANDY SILT (A-4a), some clay, trace rock fragments, moist.	1	9	5	18	32	36	28	9	13	A-4a	
	265.31		5-5-5				Stiff, brown CLAY (A-7-6), little sand, trace rock fragments, moist.	2	1	2	14	--	83 *	48	26	20	A-7-6	
	264.39		16-50/51				Very soft to soft, brown, decomposed to highly weathered CLAY SHALE.	3	--	--	--	--	--	--	--	10	VISUAL	
	263.17		50/25		1.31	0.21	Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock. Very soft, gray, highly weathered to decomposed CLAY SHALE with laminar bedding (fissile). Iron staining present throughout length of core. Quality bedrock considered poor. Note: 51mm thick, very fine grained sandstone seam at 3.05 meters.	4	--	--	--	--	--	--	--	--	VISUAL	
	261.65						TERMINATION DEPTH = 4.57 METERS	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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Boring No.	Elev. (m)	Depth (m)	Std. Rod	Pen./Rod	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
									% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
	274.84	0																
	274.75		5-58-11				TOPSOIL Very stiff to hard, brown CLAY (A-7-6), trace rock fragments, trace sand, moist.	1	6	4	2	--	88 *	51	23	19	A-7-6	
			10-13-19					2	8	3	4	--	85 *	42	16	13	A-7-6	
	273.01		50/51		1.43	0.09	Medium hard to hard, tan, slightly weathered to weathered, slightly micaceous, fine grained SANDSTONE with thin to massive bedding. Note: Auger refusal on bedrock at 2.13 meters. Began coring bedrock. Note: Iron staining present from 2.13 to 2.44 meters.	3	--	--	--	--	--	--	--	--	VISUAL	
	271.52		ROD = 80%				Note: Iron staining present from 3.17 to 3.29 meters. Note: Microfolding (slickensides) present at 3.29 meters.	Run 1										
	271.18						Hard, gray, highly weathered SILTSTONE with distinct bedding and iron staining throughout. Note: Microfolding (slickensides) present at 3.41 meters. TERMINATION DEPTH = 3.66 METERS											

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/12/99 Sampler: Type SS Dia. 51mm Water Elev. 284.81m  
Date Completed 10/12/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 35+100, 0.00 m Surface Elev. 285.420m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class	
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
285.42	0														
285.27					TOPSOIL										
284.51	1	3-4-9			Medium dense, brown <u>SANDY SILT</u> (A-4a), some clay, trace rock fragments, moist.	1	4	6	34	32	24	--	--	13	A-4a
283.74	2	5-12-16			Medium dense, brown <u>COARSE AND FINE SAND</u> (A-3a), some silt and clay, trace rock fragments, moist.	2	2	7	57	--	34 *	--	--	10	A-3a
282.83	3	10-14-22			Dense, brown <u>SANDY SILT</u> (A-4a), little clay, trace rock fragments, moist.	3	5	7	52	--	36 *	--	--	14	A-4a
	4	17-23-43			Very soft to soft, brown to gray, decomposed to highly weathered <u>CLAY SHALE</u> .	4	--	--	--	--	--	--	--	12	VISUAL
	5	11-34-59				5	--	--	--	--	--	--	--	15	VISUAL
279.32	6	18-50/102				6	--	--	--	--	--	--	--	11	VISUAL
279.20	7	RQD = 92%	1.52	0.00	Note: Auger refusal on bedrock at 6.10 meters. Began coring bedrock. Soft, gray, weathered <u>CLAY SHALE</u> with laminar bedding (fissile). Hard, gray, slightly weathered, slightly micaceous, very fine grained <u>SANDSTONE</u> with thick bedding.	Run 1									
278.01					Soft to medium hard, gray, weathered <u>CLAY SHALE</u> with laminar bedding (fissile).										
277.80					Note: 25 mm thick sandstone seam at 7.44 meters. TERMINATION DEPTH = 7.62 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/7/99 Sampler: Type SS Dia. 51mm Water Elev.       
Date Completed 10/7/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No.      Station & Offset Sta 35+970, 0.00 m Surface Elev. 266.221m

Elev. (m)	Depth (m)	Std. Pen./RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
266.22	0															
266.13					TOPSOIL											
		4-4-4			Medium stiff, brown SANDY SILT (A-4a), some clay, trace rock fragments, moist.	1	9	5	18	32	36	28	9	13		A-4a
265.31	1				Stiff, brown CLAY (A-7-6), little sand, trace rock fragments, moist.											
		5-5-5				2	1	2	14	--	83 *	48	26	20		A-7-6
264.39	2				Very soft to soft, brown, decomposed to highly weathered CLAY SHALE.									10		VISUAL
		16-50/51				3	--	--	--	--	--	--	--	--		
263.17	3				Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock.											
		50/25 ROD = 45%	1.31	0.21	Very soft, gray, highly weathered to decomposed CLAY SHALE with laminar bedding (fissile). Iron staining present throughout length of core. Quality of rock considered poor as per ROD.	4	--	--	--	--	--	--	--	--		VISUAL
					Note: 51mm thick, very fine grained sandstone seam at 3.05 meters.	Run 1										
	4															
261.65																

TERMINATION DEPTH = 4.57 METERS

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/8/99 Sampler: Type SS Dia. 51mm Water Elev. 274.54m  
Date Completed 10/8/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 36+167, 0.00 m Surface Elev. 274.842m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class			
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.		
274.84	0																
274.75	0.1				<u>TOPSOIL</u> Very stiff to hard, brown <u>CLAY</u> (A-7-6), trace rock fragments, trace sand, moist.	1	6	4	2	--	88 *	51	23	19		A-7-6	
	0.5	5-58-11															
	1.0	10-13-19															
273.01	2.0	50/51 RQD = 80%	1.43	0.09	Medium hard to hard, tan, slightly weathered to weathered, slightly micaceous, fine grained <u>SANDSTONE</u> with thin to massive bedding. Note: Auger refusal on bedrock at 2.13 meters. Began coring bedrock. Note: Iron staining present from 2.13 to 2.44 meters.	3 Run 1	--	--	--	--	--	--	--	--	--		VISUAL
271.52	3.0				Note: Iron staining present from 3.17 to 3.29 meters. Note: Microfolding (slickensides) present at 3.29 meters.												
271.18	3.66				Hard, gray, highly weathered <u>SILTSTONE</u> with indistinct bedding and iron staining throughout. Note: Microfolding (slickensides) present at 3.41 meters. TERMINATION DEPTH = 3.66 METERS												

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)

State of Ohio  
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Division of Highways  
Testing Laboratory

Date Started 10/13/99 Date Completed 10/13/99  
Sampler Type SS Dia. 51mm Water Elev. 260.20m  
Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Std. Pen./ROD	Station & Offset	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
260.30	0		Sta 36+150, 80.00 m L.T.														
260.15	0	5-7-9				TOPSOIL Very stiff, brown CLAY (A-7-6), some rock fragments, little sand, moist.	1	31	9	2	--	57*	55	27	15	A-7-6	
259.08	1	7-21-44				Very soft, brown, decomposed CLAY SHALE.	2	--	--	--	--	--	--	--	14	VISUAL	
258.32	2	50/76				Soft, brown, highly weathered SANDSTONE.	3	--	--	--	--	--	--	--	5	VISUAL	
257.56	3	60/150				Soft to medium hard, brown to gray, highly weathered CLAY SHALE.	4	--	--	--	--	--	--	--	9	VISUAL	
255.73	5	57/150 ROD = 82%		1.40	0.12	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock. Soft, to medium hard, gray, weathered SILTY SHALE with laminar bedding (fissile). Quality of rock considered good as per ROD.	5 Run 1	--	--	--	--	--	--	--	7	VISUAL	
254.20	6					TERMINATION DEPTH = 6.10 METERS											

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/13/99 Date Completed 10/13/99  
Sampler Type SS Dia. 51mm Water Elev. 236.85m  
Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Std. Pen./ROD	Station & Offset	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
237.46	0		Sta 36+911, 0.00 m														
237.31	0	1-1-3				TOPSOIL Soft, brown SANDY SILT (A-4a), some rock fragments, little clay, moist.	1	26	12	21	--	41*	27	10	18	A-4a	
236.39	1	Shelby Tube				Very dense, brown SILTSTONE FRAGMENTS WITH SAND (A-1-b), little to some organic material on bedrock at 1.52 meters. Began coring bedrock.	ST	56	18	14	--	12*	--	--	13	A-1-b	
235.94	2	50/102 ROD = 49%		1.37	0.15	Note: Auger refusal on bedrock at 1.52 meters. Began coring bedrock. Hard, gray, slightly weathered, micaceous, fine grained to very fine grained SANDSTONE with thin bedding.	3 Run 1	45	9	23	--	22*	--	--	11	A-1-b	
235.08	3					Quality of rock for Run 1 considered fair as per ROD. Soft, gray, highly weathered CLAY SHALE with laminar bedding (fissile).											
234.41	3					TERMINATION DEPTH = 3.05 METERS											

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

Date Started 10/16/99 Date Completed 10/16/99  
Sampler Type SS Dia. 51mm Water Elev. 267.41m  
Casing Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Std. Pen./ROD	Station & Offset	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						000T Class			
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.	
267.72	0		Sta 37+540, 0.00 m														
267.60	0	3-3-4				TOPSOIL Medium stiff, brown SILT AND CLAY (A-6a), some sand, trace rock fragments, moist.	1	6	9	22	--	63*	36	11	20	A-6a	
266.65	1	Shelby Tube				Stiff, brown SILTY CLAY (A-6b), trace rock fragments, moist.	ST	1	0	0	--	99*	39	18	18	A-6b	
266.04	2	5-8-13				Very stiff, brown CLAY (A-7-6), moist.	4	0	0	0	--	100*	42	22	19	A-7-6	
265.43	3	10-15-50/76 ROD = 100%		1.52	0.00	Very stiff, brown SANDY SILT (A-4a) and clay, some rock fragments, moist.	4	24	0	0	34	42	27	6	12	A-4a	
264.67	3					Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock. Hard, gray, weathered to slightly weathered, slightly micaceous, fine grained to very fine grained SANDSTONE with thick to massive bedding.	Run 1										
263.51	4					Note: Calcite cementation of the sandstone (effervesces freely) present from 3.63 to 4.02 meters.											
263.15	4					Quality of rock for Run 1 considered excellent as per ROD. Soft, very soft, gray, highly weathered CLAY SHALE with laminar bedding (fissile).											
263.15	4					TERMINATION DEPTH = 4.57 METERS											

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)

State of Ohio  
 Department of Transportation  
 Division of Highways  
 Testing Laboratory  
 LOG OF BORING

Date Started 10/13/99 Sampler: Type SS Dia. 51mm Water Elev. 260.00m  
 Date Completed 10/13/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
 Project No.: 99043  
 Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 36+750, 80.00 m Lt. Surface Elev. 260.300m

Elev. (m)	Depth (m)	Std. Pen./ROD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics							ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
260.30	0															
260.15	▽				TOPSOIL											
		5-7-9			Very stiff, brown <u>CLAY</u> (A-7-6), some rock fragments, little sand, moist.	1	31	9	2	--	57 *	55	27	15		A-7-6
259.08	1															
		7-21-44			Very soft, brown, decomposed <u>CLAY SHALE</u> .	2	--	--	--	--	--	--	--	14		VISUAL
258.32	2															
		50/76			Soft, brown, highly weathered <u>SANDSTONE</u> .	3	--	--	--	--	--	--	--	5		VISUAL
257.56	3															
		60/150			Soft to medium hard, brown to gray, highly weathered <u>CLAY SHALE</u> .	4	--	--	--	--	--	--	--	9		VISUAL
	4															
255.73	5	57/150 ROD = 82%	1.40	0.12	Note: Auger refusal on bedrock at 4.57 meters. Began coring bedrock. Soft to medium hard, gray, weathered <u>SILTY SHALE</u> with laminar bedding (fissile). Quality of rock considered good as per ROD.	5 Run 1	--	--	--	--	--	--	--	7		VISUAL
	6															
254.20																

TERMINATION DEPTH = 6.10 METERS

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/13/99 Sampler: Type SS Dia. 51mm Water Elev. 236.85m  
Date Completed 10/13/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 36+911, 0.00 m Surface Elev. 237.460m

Elev. (m)	Depth (m)	Std. Pen./ROD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						ODOT Class		
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.
237.46	0														
237.31					TOPSOIL										
		I-1-3			Soft, brown SANDY SILT (A-4a), some rock fragments, little clay, moist.	1	26	12	21	--	41 *	27	10	18	A-4a
236.39	1	Sheby Tube				ST	56	18	14	--	12 *	--	--	13	A-1-b
235.94		50/102 ROD = 49%	1.37	0.15	Very dense, brown STONE FRAGMENTS WITH SAND (A-1-b), little to some silt and clay, moist. Note: Auger refusal on bedrock at 1.52 meters. Began coring bedrock.	3	45	9	23	--	22 *	--	--	11	A-1-b
235.08	2				Hard, gray, slightly weathered, micaceous, fine grained to very fine grained SANDSTONE with thin bedding.	Run 1									
235.08					Quality of rock for Run 1 considered fair as per ROD.										
234.41	3				Soft, gray, highly weathered CLAY SHALE with laminar bedding (fissile).										

TERMINATION DEPTH = 3.05 METERS

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)



State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory

LOG OF BORING

Date Started 10/6/99 Sampler: Type SS Dia. 51mm Water Elev. 267.41m  
Date Completed 10/6/99 Casing: Length 1.52m Dia. 83mm

Project: ATH-33-30.981  
Project No.: 99043  
Location: Athens County, Athens, Ohio

Boring No. \_\_\_\_\_ Station & Offset Sta 37+540, 0.00 m Surface Elev. 267.717m

Elev. (m)	Depth (m)	Std. Pen./ RQD	Rec. (m)	Loss (m)	Description	Sample No.	Physical Characteristics						ODOT Class				
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.		P.I.	W.C.		
267.72	0																
267.60	0.1				TOPSOIL												
		3-3-4			Medium stiff, brown <u>SILT AND CLAY</u> (A-6a), some sand, trace rock fragments, moist.	1	6	9	22	--	63 *	36	11	20			A-6a
266.65	1	Shelby Tube				ST	1	0	0	--	99 *	39	18	18			A-6b
266.04		5-8-13			Very stiff, brown <u>CLAY</u> (A-7-6), moist.	4	0	0	0	--	100*	42	22	19			A-7-6
265.43	2																
		10-15-50/76			Very stiff, brown <u>SANDY SILT</u> (A-4a) and clay, some rock fragments, moist.	4	24	0	0	34	42	27	6	12			A-4a
264.67	3	RQD = 100%	1.52	0.00	Note: Auger refusal on bedrock at 3.05 meters. Began coring bedrock.	Run 1											
					Hard, gray, weathered to slightly weathered, slightly micaceous, fine grained to very fine grained <u>SANDSTONE</u> with thick to massive bedding.												
					Note: Calcite cementation of the sandstone (effervesces freely) present from 3.63 to 4.02 meters.												
263.51	4				Quality of rock for Run 1 considered excellent as per RQD.												
263.15					Soft to very soft, gray, highly weathered <u>CLAY SHALE</u> with laminar bedding (fissile).												
TERMINATION DEPTH = 4.57 METERS																	

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/16/99 Sampler Type SS Dia. 51mm Water Elev. 271.56m Project: ATH-33-30.981  
Date Completed 10/16/99 Casing Length 1.52m Dia. 83mm Water Elev. 271.56m Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Sta. Pen./ Rod	Station & Offset		Loss (m)	Rec. (m)	Description	Sample No.	Physical Characteristics						000T Class		
			Sta	Off					% Agg	% C.S.	F.S.	Silt	Clay	L.L.		P.I.	W.C.
273.30	0						TOPSOIL										
273.20		5-9-27					Very soft, light brown, decomposed SANDSTONE.	1									VISUAL
272.08	2	6-18-26					Very soft to medium hard, brown to gray, decomposed to weathered CLAY SHALE.	2									VISUAL
	3	12-19-33						3									VISUAL
	4	50/150						4									VISUAL
268.72	5	50/25 ROD = 100%			1.55	0.00	Notes: Auger refusal bedrock at 4.57 meters. Began coring bedrock. Hard, gray, slightly weathered, very fine grained SANDSTONE with massive bedding. Quality of rock considered excellent as per ROD.	5 Run 1									VISUAL
267.17	6						TERMINATION DEPTH = 6.13 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/16/99 Sampler Type SS Dia. 51mm Water Elev. m Project: ATH-33-30.981  
Date Completed 10/16/99 Casing Length 1.52m Dia. 83mm Water Elev. m Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Std. Pen./ Rod	Station & Offset		Loss (m)	Rec. (m)	Description	Sample No.	Physical Characteristics						000T Class		
			Sta	Off					% Agg	% C.S.	F.S.	Silt	Clay	L.L.		P.I.	W.C.
267.14	0																
267.02		2-4-5					TOPSOIL	1									A-7-6
	1	4-11-16					Stiff to very stiff, reddish-brown CLAY (A-7-6), little to trace rock fragments, moist.	2									A-7-6
265.31	2	7-19-30					Very soft to medium hard, reddish-brown, decomposed to highly weathered CLAY SHALE.	3									VISUAL
	3	30-39-50/127						4									VISUAL
	4	21-43-40						5									VISUAL
261.04	6	50/76 ROD = 66%			1.45	0.08	Notes: Auger refusal on bedrock at 6.10 meters. Began coring bedrock. soft clay, highly weathered SILTY SHALE with indistinct to laminar bedding. Quality of rock for run 1 considered fair as per ROD.	6 Run 1									VISUAL
260.25	7						Hard, gray, slightly weathered. Fine grained SANDSTONE with moderated to thick bedding.										
259.52							TERMINATION DEPTH = 7.82 METERS										

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)

State of Ohio  
Department of Transportation  
Division of Highways  
Testing Laboratory  
LOG OF BORING

Date Started 10/16/99 Sampler Type SS Dia. 51mm Water Elev. m Project: ATH-33-30.981  
Date Completed 10/16/99 Casing Length 1.52m Dia. 83mm Water Elev. m Project No.: 99043  
Location: Athens County, Athens, Ohio

Elev. (m)	Depth (m)	Std. Pen./ Rod	Station & Offset		Loss (m)	Rec. (m)	Description	Sample No.	Physical Characteristics						000T Class		
			Sta	Off					% Agg	% C.S.	F.S.	Silt	Clay	L.L.		P.I.	W.C.
265.40	0																
265.28		4-9-10					TOPSOIL	1									A-7-6
264.48	1	Shelby Tube					Very stiff, light brown CLAY (A-7-6), little to trace sand, trace to no rock fragments, moist.	ST									A-7-5
263.87	2	5-10-12					Very stiff, brown ELASTIC CLAY (A-7-5), trace rock fragments, moist.	3									A-7-6
263.11	3	50/102					Very stiff, light brown CLAY (A-7-6), trace sand, moist.	4									VISUAL
262.35	4	ROD = 36%			1.22	0.30	Notes: Auger refusal on bedrock at 3.05 meters. Began coring bedrock. Very soft to soft, brown, highly weathered, micaceous CLAY SHALE, indistinct bedding.	Run 1									
260.83							Notes: Iron staining present throughout length of core.										
							TERMINATION DEPTH = 4.57 METERS										

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)

