

GENERAL INFORMATION

INTRODUCTION

The project consists of the relocation of C.O. mile of USR 224, beginning 1000 feet east of Glenmount Avenue, C.O. mile south of existing JSR 224, extending eastward, and terminating 300 feet west of Arlington Street. Included in the report are profiles of the SR 2 (I.R. 77) Interchange ramps.

Proposed grades indicate the following maximum proposed cuts and fill embankments:

	CUTS (Max.)	FILL EMBANKMENTS (Max.)
USR 224	15'	35'
SR (I.R. 77) Interchange		
Ramp A	-	36'
Ramp B	10'	41'
Ramp B-1	-	39'
Ramp B-2	-	33'
Ramp C	14'	27'
Ramp C-1	3'	26'
Ramp C-2	-	22'
Ramp D	2'	22'

GEOLOGY OF THE PROJECT

The alignment traverses an area of glacial, alluvial, and sedimentary deposits in the Tuscarawas River valley, on the glaciated Allegheny Plateau. Underlying bedrock is comprised of shales, indurated clays, and sandstones, of Lower Pennsylvanian and Upper Mississippian age.

INVESTIGATIONAL DISCLOSURES

Materials occurring immediately below proposed grade consist predominantly of sandy silts (A-4a) and occasional sandy gravels (A-2-4) and silts (A-4b), having generally low moisture contents or moisture contents in the lower portions, or below the plastic range, as well as indurated clay bedrock.

Indurated clay bedrock is anticipated in the excavations at the following locations:

Ramp C-1

- Stations 12+00 to 13+00 - in the ditches.
- Stations 13+00 to 15+00 - at grade, in the ditches, and lower portion of the back slopes.
- Stations 15+00 to 16+00 in the ditches.

In the embankment foundation areas, soils are predominantly comprised of the following:

USR 224

Stations 224+00 to 230+00 - sands (A-3a), silts (A-4a, A-4b), clays (A-7-5, A-7-6), having generally high moisture contents or moisture contents in the upper portion of the plastic range, containing various amounts of organic matter, and wet, low strength, highly compressible peats.

Stations 230+00 to 274+00 - sandy gravels (A-1-a, A-1-b, A-2-4), sands (A-2a), and silts (A-4a, A-4b), generally having low moisture contents or moisture contents in the lower portion of the plastic range. Wet materials were encountered between stations 231+00 and 233+00 and at stations 243+00 and 249+00.

Ramps A, B, B-1, B-2, C, C-1, C-2, and D - unstratified gravels, sandy gravels, sandy silts and silts, in the A-1-a, A-1-b, A-2-4, A-4 and A-6 classifications, generally having low moisture contents or moisture contents in the lower portion of the plastic range. Wet materials, occasionally containing organic matter, were encountered at the following locations: Ramp A - station 13+00; Ramp B - station 3+00; Ramp B-1 - station 16+00; Ramp B-2 - station 13+00; Ramp C - stations 8+00 and 9+00; Ramp C-2 - station 3+00 and 4+00; and Ramp D - stations 14+00 and 21+00.

A 3-foot at-surface interval of peat was encountered overlying bedrock surface at Ramp B, station 12+00.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS - 358 SAMPLES TESTED

DESCRIPTION	H.R.B. CLASS	OHIO CLASS	% AGG.	% SAND	% SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED	
Gravel and stone fragments	A-1-a(C)	A-1-a	63	16	10	7	4	NP	NP	12	7	
Stone fragments with sand	A-1-b(O)	A-1-b	45	19	22	8	6	NP	NP	12	20	
Fine sand	A-3(O)	A-3	12	13	63	-	7	NP	NP	13	11	
Coarse and fine sand	-----	A-3a	7	3	60	12	5	27	0	17	39	
Stone fragments with sand and silt	A-2-4(O)	A-2-4	43	6	21	13	12	22	2	15	33	
Sandy silt	A-4(C)	A-4a	20	5	24	32	19	23	2	16	115	
Silt	A-4(S)	A-4b	2	1	12	59	26	25	3	23	41	
Elastic silt and clay	A-5(11)	A-5	0	1	14	49	36	54	8	27	1	
Silt and clay	A-6(7)	A-6a	20	2	11	37	30	27	11	19	13	
Silty clay	A-6(10)	A-6b	0	2	17	35	45	33	16	18	1	
Elastic clay	A-7-5(20)	A-7-5	0	1	8	58	33	66	43	70	13	
Clay	A-7-6(15)	A-7-6	3	1	8	53	35	49	24	43	8	
Fine-textured peat											VISUAL CLASSIFICATION	17
Loamy peat											VISUAL CLASSIFICATION	1
Sedimentary peat											VISUAL CLASSIFICATION	21
Marly sedimentary peat											VISUAL CLASSIFICATION	1
Weathered indurated clay											VISUAL CLASSIFICATION	7
Weathered shale											VISUAL CLASSIFICATION	2
Weathered sandstone											VISUAL CLASSIFICATION	2
Shale											VISUAL CLASSIFICATION	2
Sandstone											VISUAL CLASSIFICATION	2
Various other materials											VISUAL CLASSIFICATION	3
Random fill											VISUAL CLASSIFICATION	
Berm material												
Auger boring - plan view												
Auger boring plotted to vertical scale only												
Water content nearly equal to or greater than liquid limit												
Indicates a non-plastic material with high water content												
Free water												
Static water level												
Indicates broken rock interval												

NOTE: Figures beside borings indicate water content in percent. e.g. 15

SOIL PROFILE

SUMMIT COUNTY

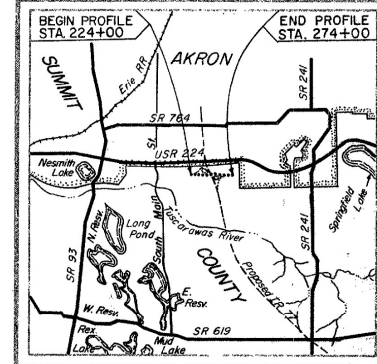
SUM-277-0-00

OHIO STATE HIGHWAY TESTING LABORATORY
1620 W. BROAD ST. COLUMBUS 23, OHIO

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NOTE: INFORMATION SHOWN BY THIS SUBGRADE PROFILE WAS OBTAINED SOLELY FOR USE IN ESTABLISHING DESIGN CONTROLS FOR THE PROJECT. THE STATE OF OHIO HIGHWAYS DOES NOT GUARANTEE THE ACCURACY OF THIS DATA AND IT IS NOT TO BE CONSIDERED AS A PART OF THE PLANS GOVERNING CONSTRUCTION OF THE PROJECT.

Fed. No. I-277-G-(3)123



LOCATION MAP

Recon - N.P.L. - 7/31/63
Drilling - Auger - J.A.G., B.D.L., L.M.D., C.M.C., A.J.P., 8/7/63 - 8/20/63
Drafting - E.J.S., E.A. - 9/2/63

SUMMARY OF SOIL TEST DATA

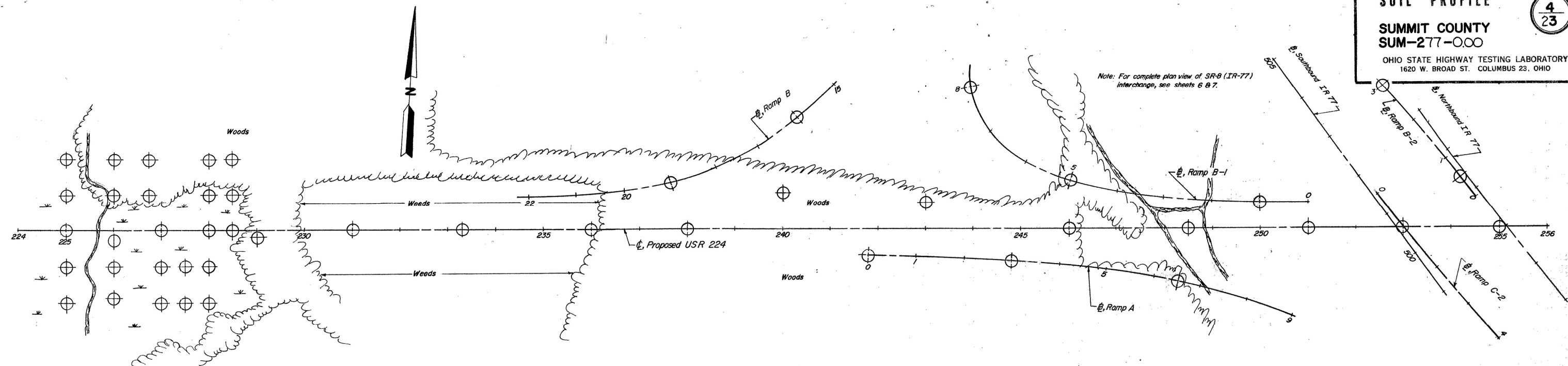
NOTE: NP shown in Liquid Limit and Plasticity Index columns indicate that the material is non-plastic.
*Denotes sample taken at or near grade.

Table with columns for Station & Offset, Depth, Agg., C.S., F.S., Silt, Clay, L.L., P.I., W.C., SHTL Class. It contains multiple columns of data for various soil profiles, including descriptions like 'Brickcoats, Stone Fragments and Wood with Soil' and 'Brown Silty Segimentary Peat'.

SUMMARY OF SOIL TEST DATA (Cont'd)

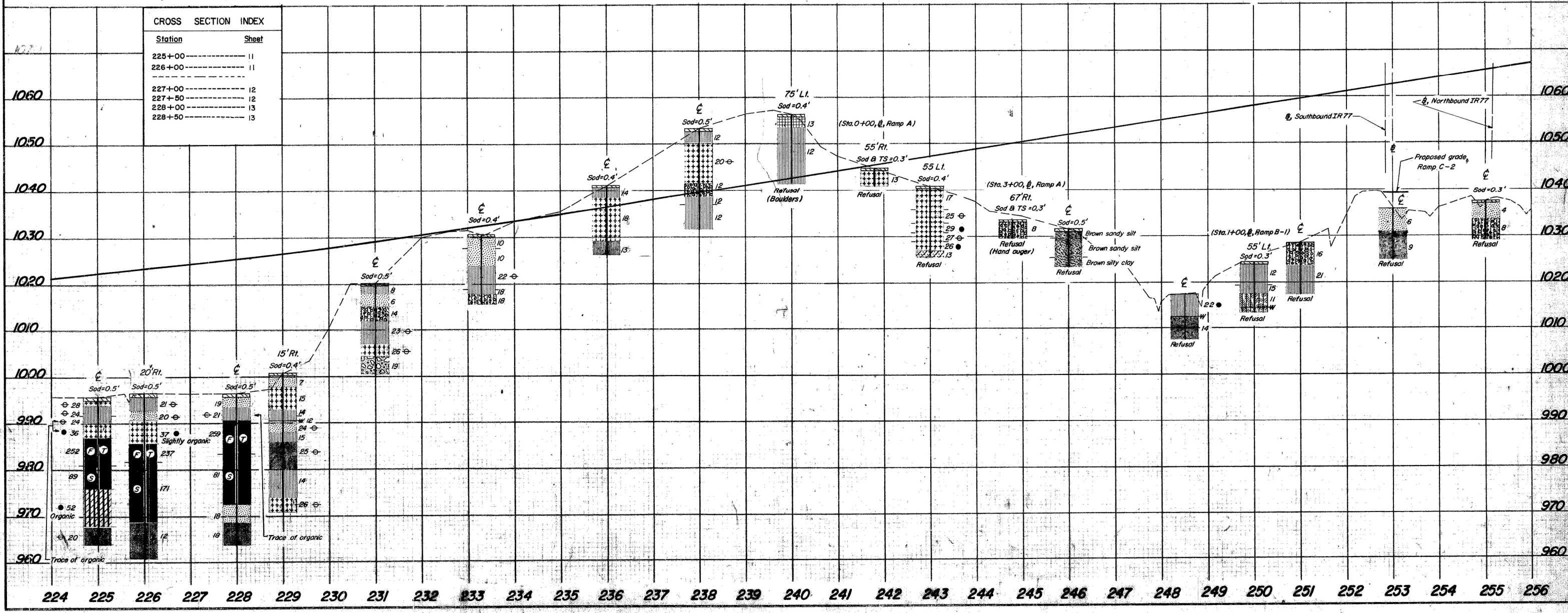
NOTE: NP shown in Liquid Limit and Plasticity Index columns indicates that the material is non-plastic.
 *Denotes sample taken at or near grade.

STATION & OFFSET	DEPTH FROM TO	%					L.L.	P.I.	W.C.	SHTL CLASS.	
		AGG.	C.S.	F.S.	SILT	CLAY					
<u>RAMP C-1 (CONT'D)</u>											
18+00	BL	0.0-2.5	19	11	36	17	17	NP	NP	10	A-2-4
		2.5-5.0	53	4	13	13	12	NP	NP	16	A-2-4
		5.0-10.0	35	9	24	18	14	NP	NP	16	A-2-4*
		10.0-14.0	41	6	21	24	8	NP	NP	16	A-2-4
		14.0-16.0	13	5	65	8	9	NP	NP	20	A-3a
16.0-18.0	43	7	18	24	8	NP	NP	17	A-2-4		
<u>RAMP C-2</u>											
5+00	BL	0.5-3.0	16	7	40	20	17	NP	NP	16	A-4a
		3.0-5.0	24	6	17	35	18	NP	NP	14	A-4a
		5.0-8.5	64	4	13	12	7	NP	NP	13	A-1-b
		8.5-12.0	44	3	2	27	24	NP	NP	15	A-4a
8+00	BL	0.4-6.0	37	5	25	11	22	NP	NP	19	A-2-4
		6.0-11.0	32	6	18	30	14	NP	NP	12	A-4a
		11.0-14.0	34	4	13	21	28	NP	NP	13	A-4a
11+00	BL	0.3-7.0	41	6	19	13	16	NP	NP	12	A-2-4
		7.0-10.0	45	5	26	13	11	NP	NP	13	A-1-b
		10.0-16.5	48	3	5	21	23	NP	NP	11	A-6a
15+00	BL	0.3-6.0	39	4	19	13	20	NP	NP	12	A-4a
		6.0-9.0	Gray Weathered Indurated Clay							11	Visual
17+00	BL	0.3-4.0	0	2	17	33	45	33	16	18	A-6a
		4.0-7.0	0	3	5	42	50	33	11	17	A-6a
		7.0-9.0	77	1	6	10	6	NP	NP	14	A-1-b
		9.0-11.0	38	1	5	33	22	NP	NP	11	A-6a
<u>RAMP D</u>											
0+00	BL	0.4-3.0	23	4	13	30	19	NP	NP	12	A-4a *
		3.0-6.0	69	4	11	10	6	NP	NP	8	A-1-b *
		6.0-9.0	36	2	7	33	22	NP	NP	4	A-4a
		9.0-13.5	Gray Weathered Indurated Clay							6	Visual
3+00	BL	0.0-1.5	Brown Broken Sandstone							6	Visual
6+00	BL	0.5-5.0	27	7	21	23	17	19	4	14	A-4a
		5.0-10.0	34	9	11	34	18	NP	NP	17	A-4a
		10.0-12.0	66	7	11	10	6	NP	NP	14	A-1-b
9+00	BL	0.6-2.5	55	3	11	13	12	22	7	14	A-2-4
11+20	BL	0.3-2.0	9	5	37	23	20	NP	NP	18	A-4a
		2.0-4.0	0	6	37	36	21	NP	NP	20	A-4a
		4.0-7.0	34	10	47	1	3	NP	NP	14	A-3
		7.0-8.5	17	3	27	43	11	NP	NP	17	A-4a
		8.5-11.0	26	3	17	37	17	NP	NP	15	A-4a
		11.0-16.5	47	1	2	32	18	NP	NP	11	A-6a
14+00	BL	0.3-4.0	16	17	34	17	16	NP	NP	21	A-3a
		4.0-6.0	24	7	15	33	21	NP	NP	13	A-4a
		6.0-11.0	44	4	16	21	15	NP	NP	13	A-4a
18+00	BL	0.4-3.0	20	14	23	19	14	NP	NP	15	A-2-4
		3.0-5.0	41	12	33	10	8	NP	NP	17	A-1-b
		5.0-10.0	20	4	14	43	19	NP	NP	16	A-4a
		10.0-15.0	28	9	6	18	19	NP	NP	14	A-2-4
		15.0-20.0	28	8	5	13	7	NP	NP	11	A-1-b
21+60	BL	0.4-3.0	38	1	27	20	17	NP	NP	5	A-4a
		3.0-6.0	1	1	15	20	22	NP	NP	23	A-4b
		6.0-8.0	11	7	22	48	11	NP	NP	11	A-4a
		8.0-12.0	23	4	13	44	16	NP	NP	16	A-4a
		12.0-17.0	23	6	17	36	16	NP	NP	16	A-4a
		17.0-20.0	23	10	23	28	9	NP	NP	12	A-4a

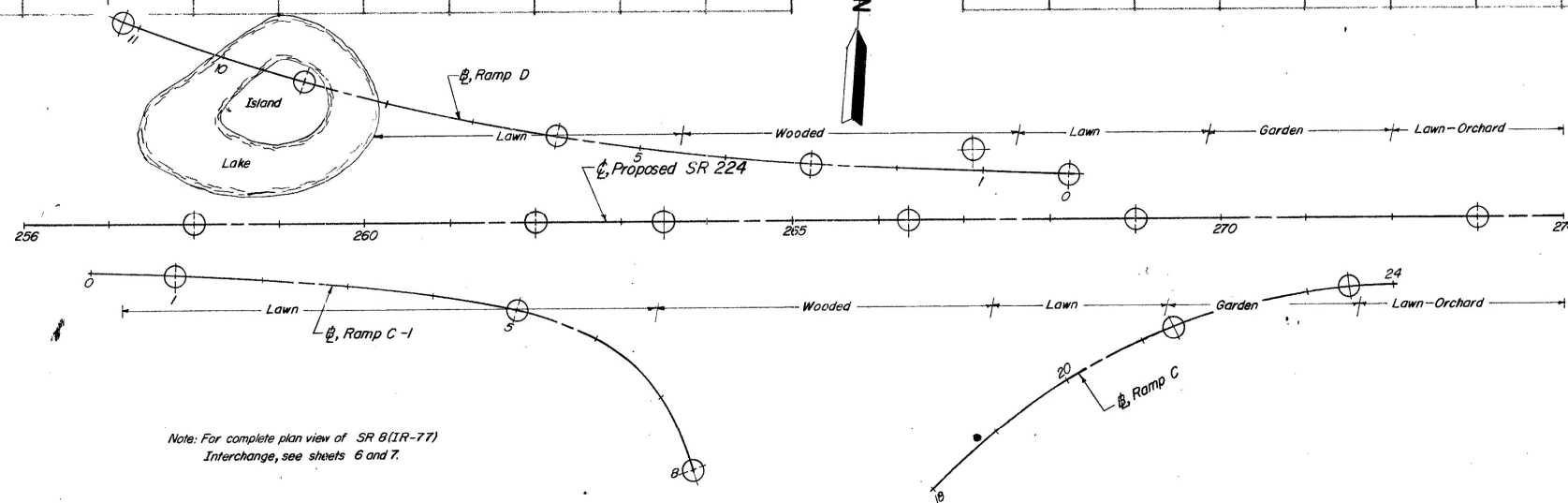


CROSS SECTION INDEX

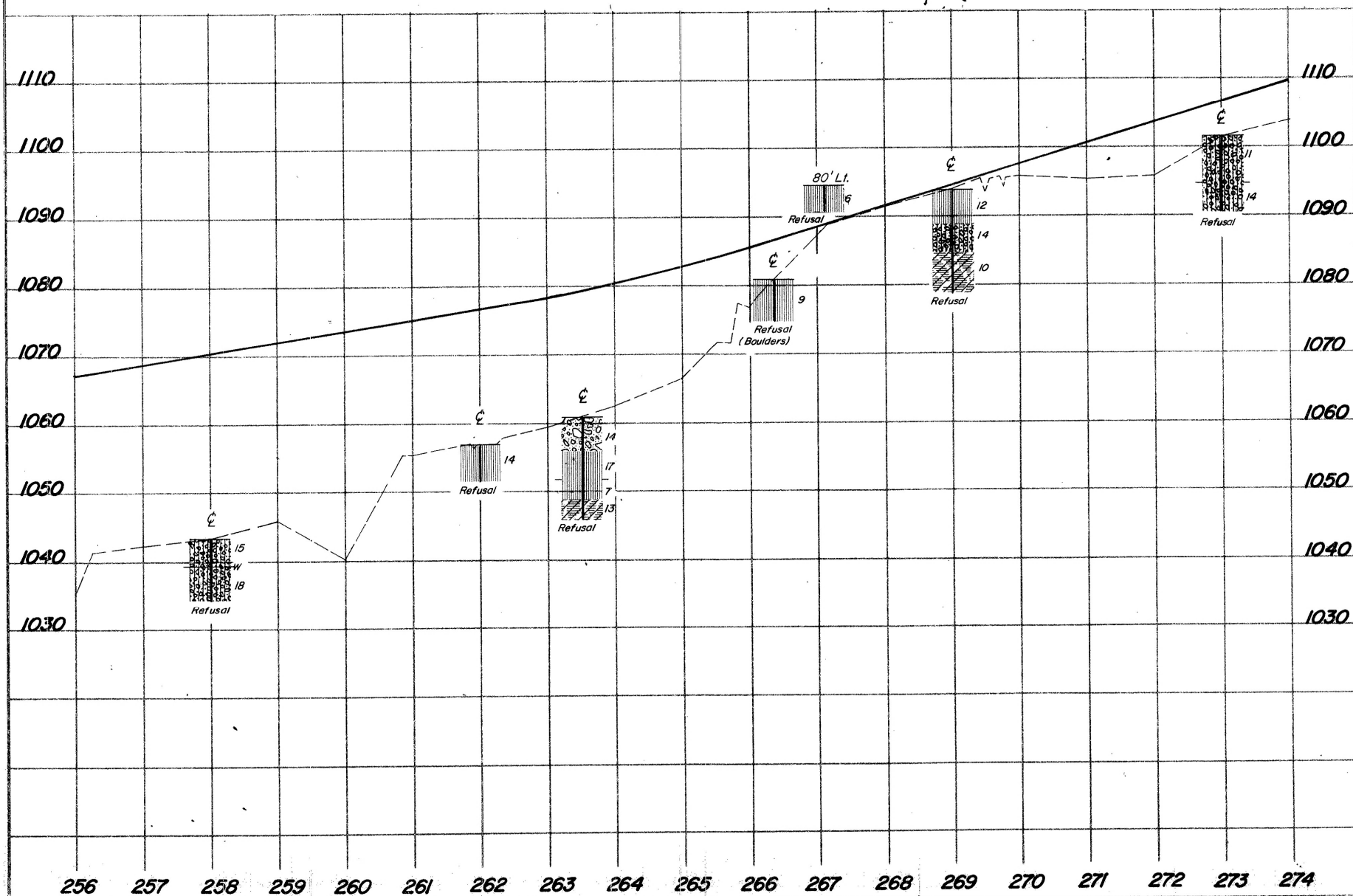
Station	Sheet
225+00	11
226+00	11
227+00	12
227+50	12
228+00	13
228+50	13

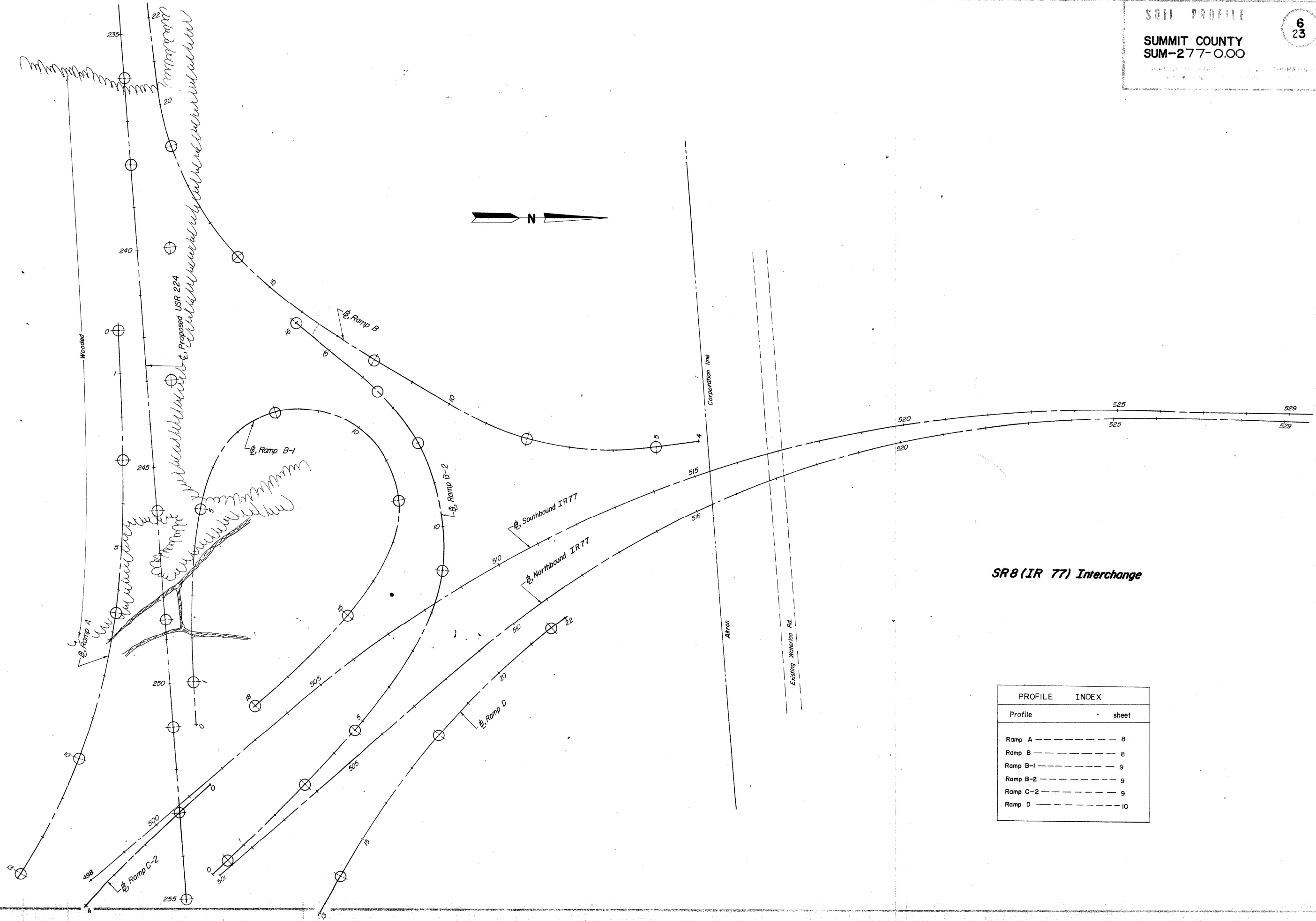
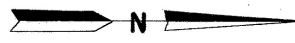


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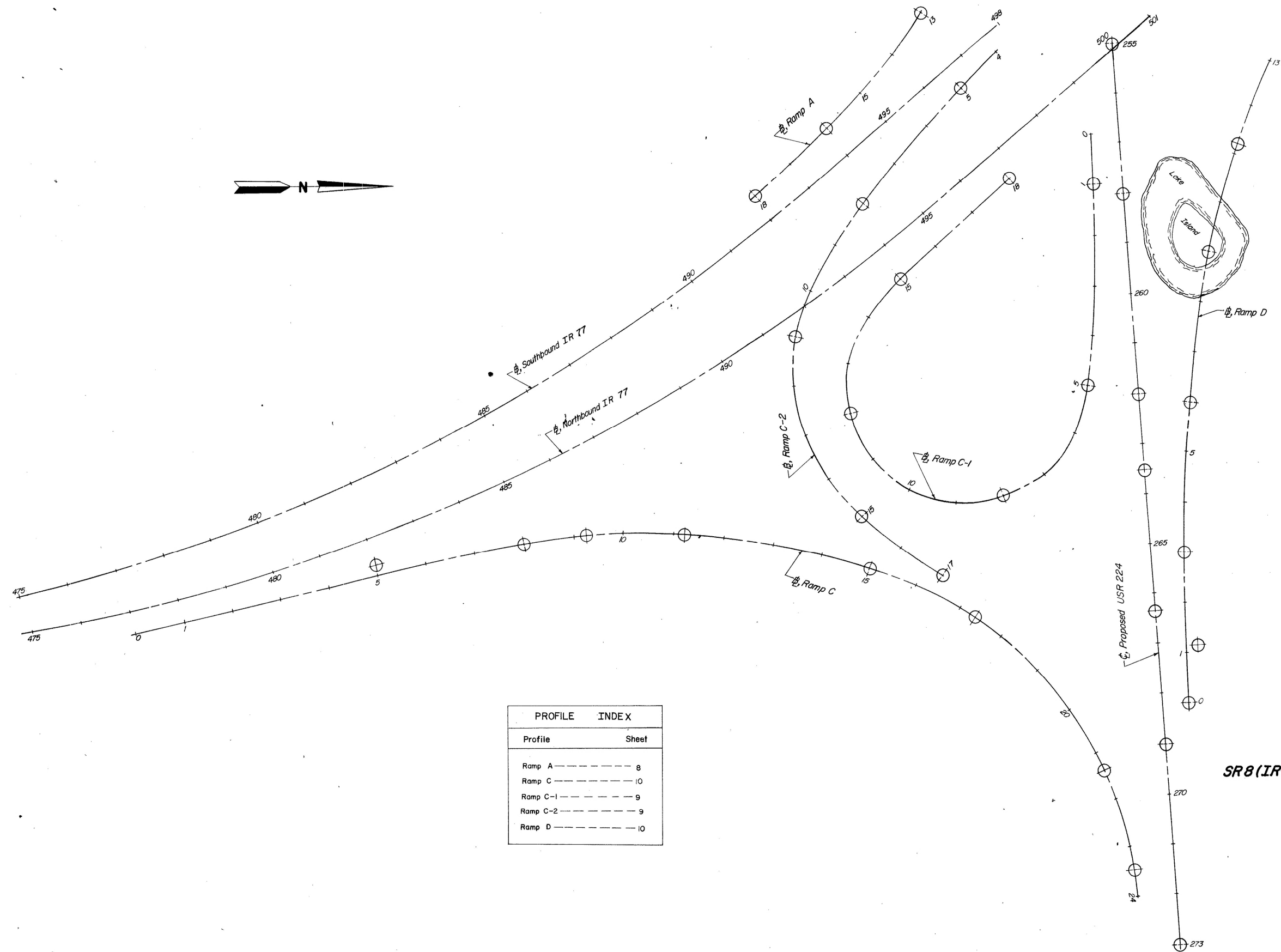
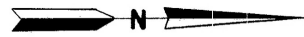
Note: For complete plan view of SR B(IR-77) Interchange, see sheets 6 and 7.





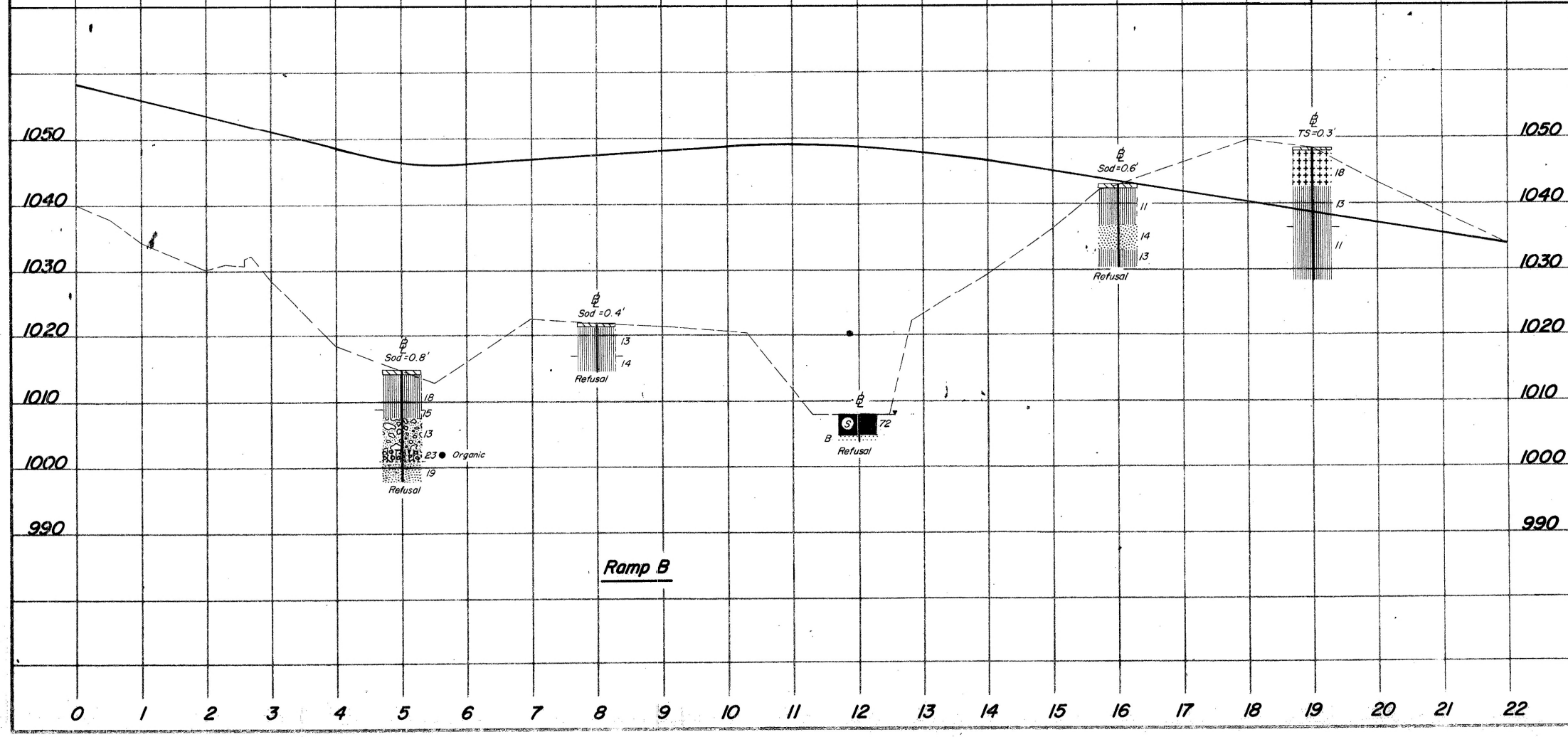
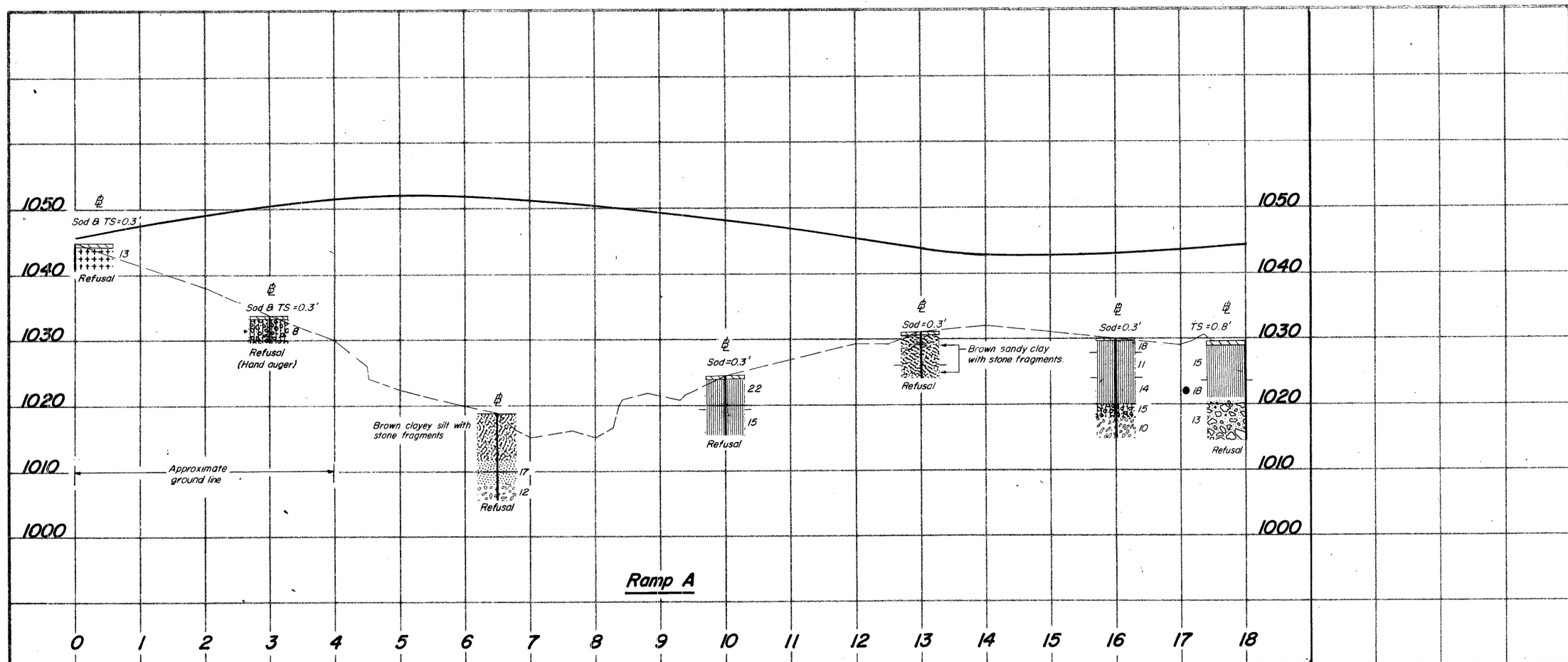
SR 8 (IR 77) Interchange

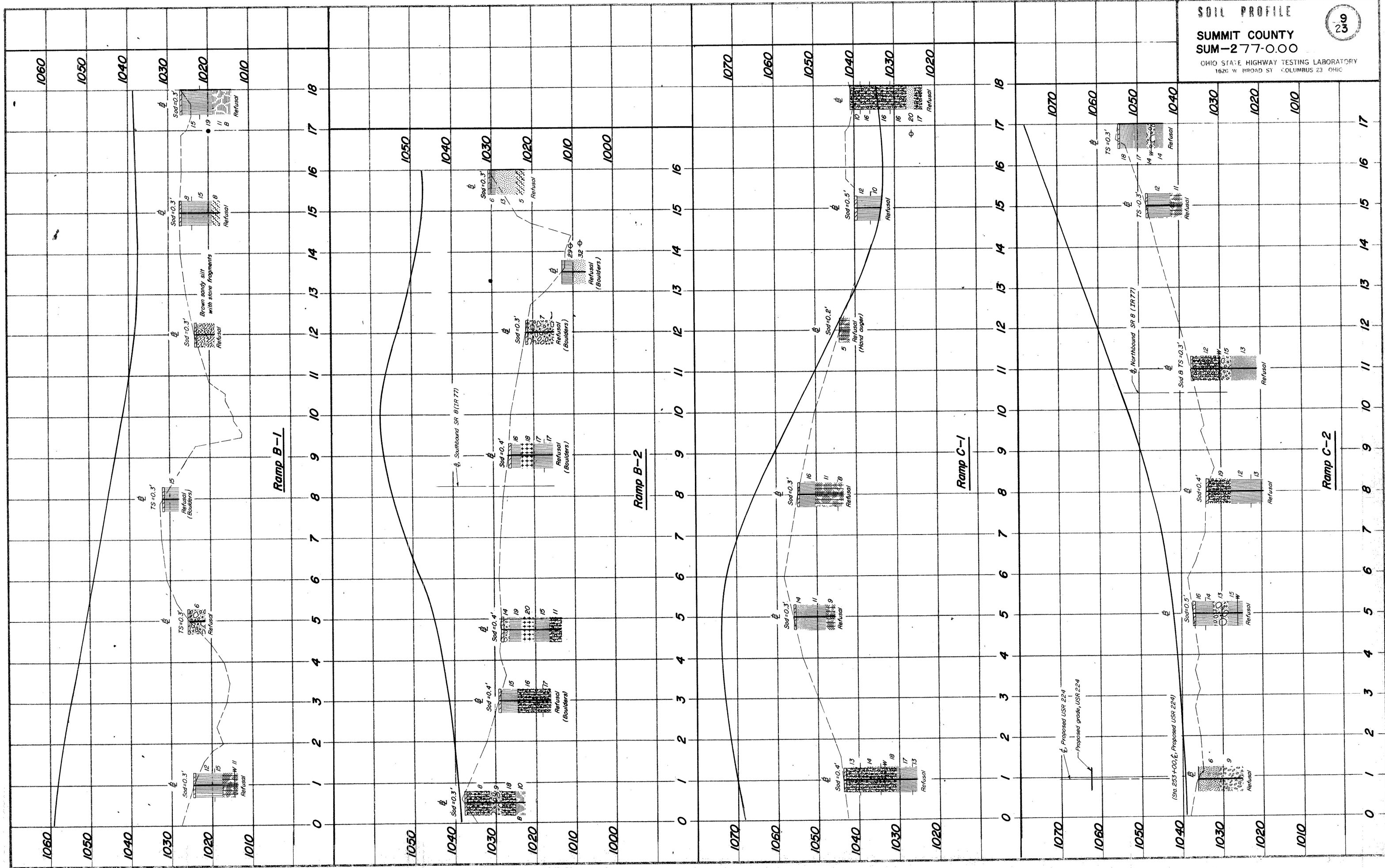
PROFILE	INDEX
Profile	sheet
Ramp A	8
Ramp B	8
Ramp B-1	9
Ramp B-2	9
Ramp C-2	9
Ramp D	10

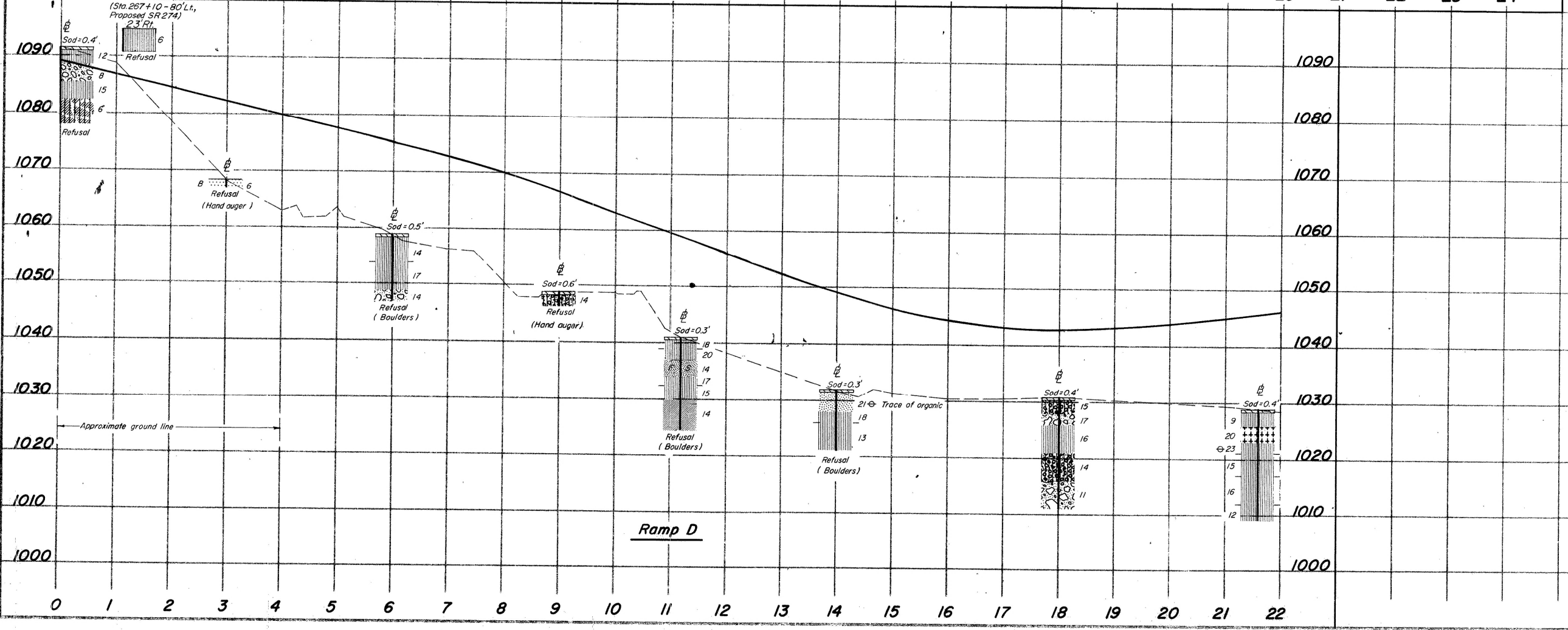
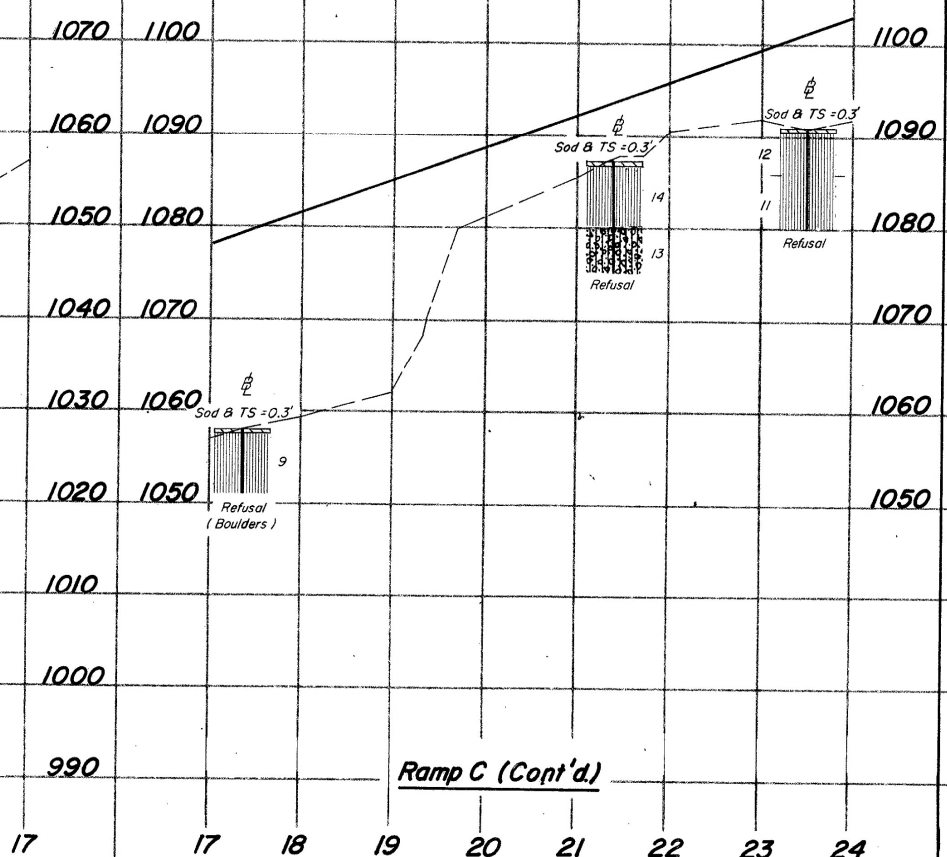
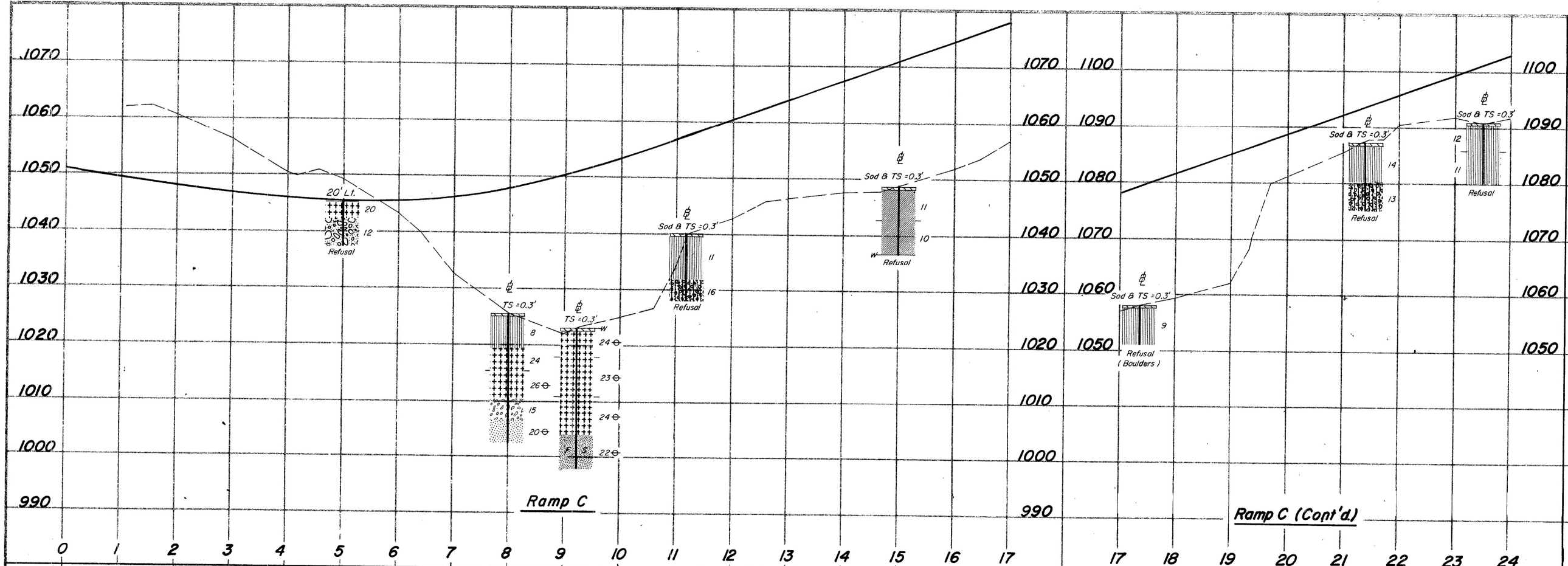


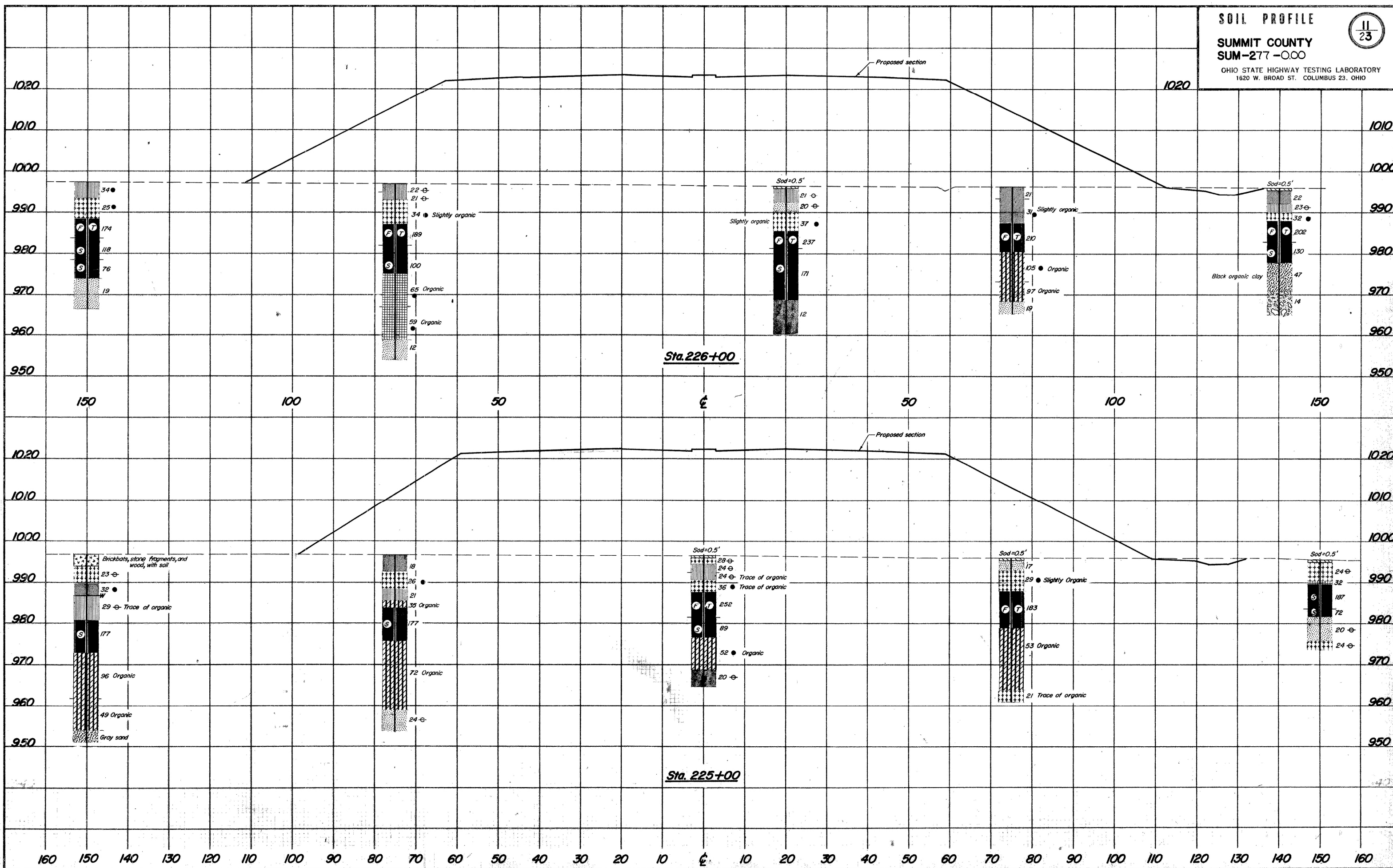
PROFILE	INDEX
Profile	Sheet
Ramp A	8
Ramp C	10
Ramp C-1	9
Ramp C-2	9
Ramp D	10

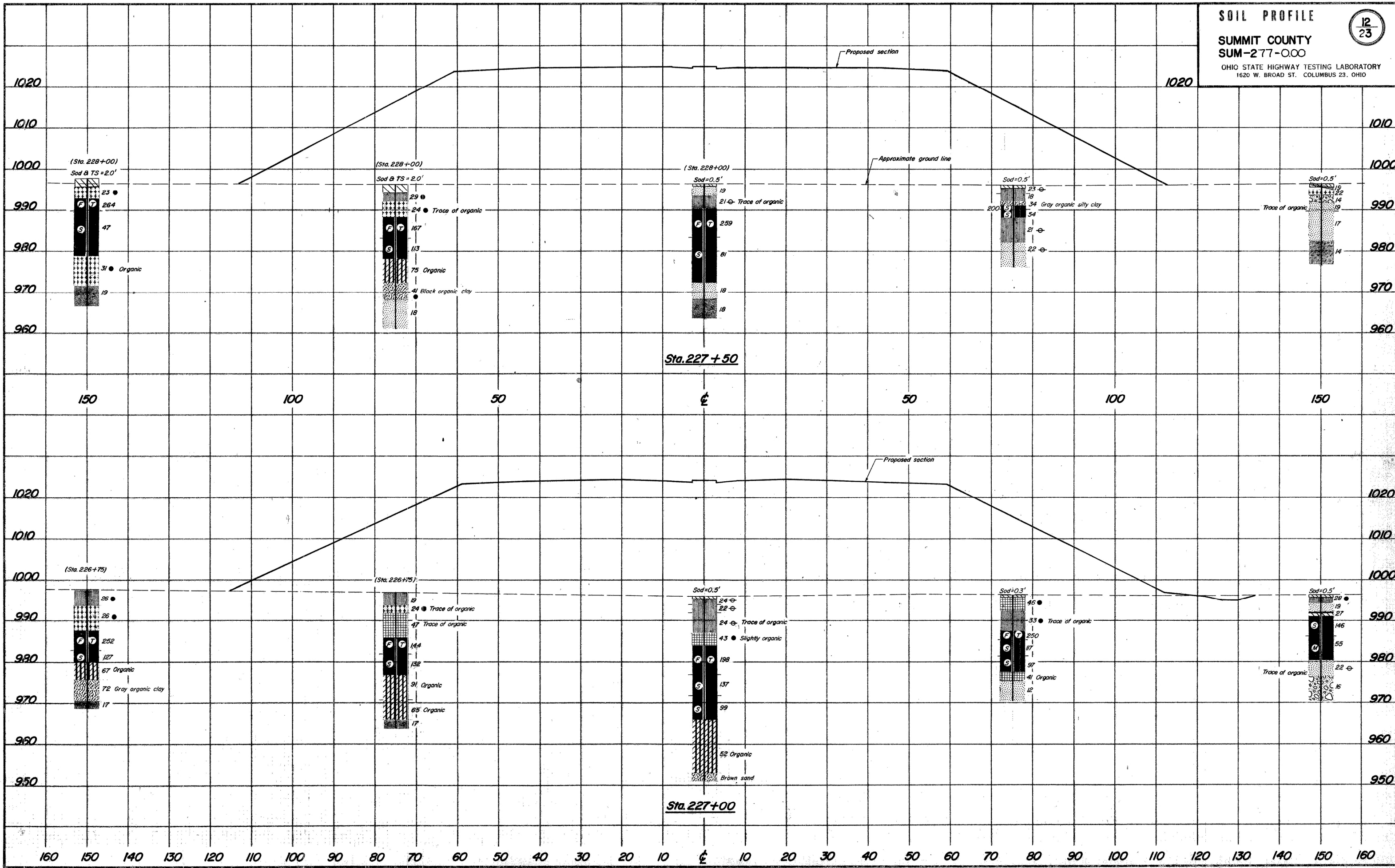
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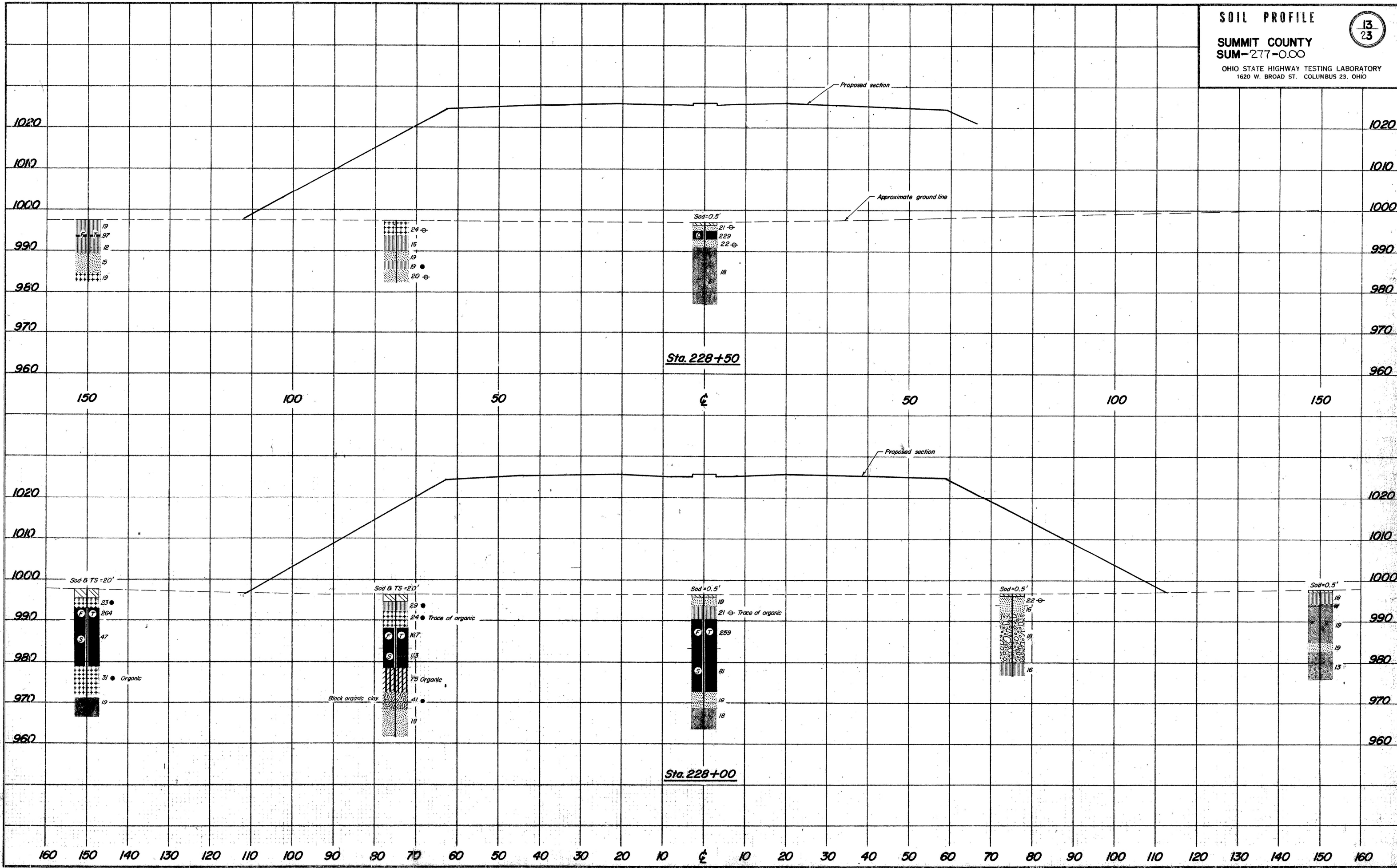












GEOLOGY OF THE SITE

The structure site is located on the rolling glaciated Allegheny Plateau. Thin glacial drift overlies shale and sandstone bedrock, of Pennsylvanian age.

EXPLORATION

The exploration consisted of two drive sample-core borings and twenty drive rod penetration tests, made between October 9 and 22, 1963.

INVESTIGATIONAL FINDINGS

Borings disclosed medium dense to dense silts, sand, and gravels to bedrock surface, encountered at 9 and 20-foot depths, elevations 1022 and 1020 feet. Borings were terminated at 25 and 30-foot depths, elevations 1012 and 1004 feet, after penetrating 10 and 16 feet of bedrock.

The rod soundings not uniform and erratic resistance to penetration with increasing depth and met refusal to penetration at 9 to 22-foot depths, elevations 1020 to 1014 feet, on the basis of the borings, considered to be on or above bedrock surface.

Following is a table indicating substructure units, proposed footing elevations, as shown on the site plan, and elevation of bedrock surface beneath each substructure unit, as determined by tests:

Substructure Unit	Proposed Footing Elevation		Approximate Elevation of Bedrock Surface		
	Left	Center	Left	Center	Right
Rear Abutment	1046.3'	1016'	1019'	1022'	1022'
First Pier	1032.0'	1026'	1023'	1024'	1024'
Second Pier	1032.0'	1021'	1023'	1024'	1024'
Third Pier	1031.0'	1022'	1023'	1023'	1017'
Fourth Pier	1030.5'	1024'	1024'	1024'	1024'
Fifth Pier	1030.5'	1024'	1025'	1025'	1025'
Forward Abutment	1050.7'	1026'	1025'	1024'	1024'

Free water was encountered in rod sounding hole number 16 at elevation 1036 feet and in sounding hole number 17 at elevation 1035 feet.

LEGEND

- Auger Boring - Plan View.
- Press and/or Drive Sample and/or Core Boring - Plan View.
- Drive Rod Penetration Resistance Soundings - Plan View.
- Electrical Resistivity Probe - Plan View.
- Indicates Auger Boring.
- Indicates Press and/or Drive Sample and/or Core Boring.
- Electrical Resistivity Probe plotted to vertical scale only.
- Top of Rock.
- Water saturated zone.
- Total Depth.

- Horizontal bar on log indicates the depth the sample was taken.
- Figures to the right of boring log in profile view indicate the number of blows for Standard Penetration Test.
X = First 6 inches
Y = Second 6 inches
- Casing.
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Indicates final measurement of penetration in inches.
- Indicates Free Water elevation.
- Indicates Static Water elevation.
- Footing
- Capped pile
- Footing on pile

SYMBOLS OF ROCK TYPES

- Coal.
- Weathered Indurated Clay.
- Indurated Clay.
- Weathered Shale.
- Shale.
- Weathered Sandstone.
- Sandstone.
- Leached Dolomite.
- Dolomite.
- Leached Limestone.
- Limestone.

GENERAL INFORMATION

Drive Rod Penetration Tests

Drive rod penetration resistance tests constitute driving a 1.5 inch diameter steel rod, with a 45° cone point, into the ground, using a 22 pound drop hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and collecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface conditions may be evaluated.

Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are by means of a rotary type drill rig, employing a 2" O.D., 1-3/8 I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 40 pound drop hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8 I.D. drive sampler, and 3" O.D. thin wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drilling rig.

The Boring Log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depths of press samples, field sample description, based on laboratory test results and the Casagrande-A.C. classification system, and gradation, plasticity and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.

Particle Size Definitions

8"	3"	20mm	0.42mm	0.075mm	0.005mm
Boulders	Cobbles	Gravel	Coarse Sand	Fine Sand	Silt Clay
No. 40 sieve	No. 40 sieve	No. 200 sieve			

LOG OF BORING

Date Started 10-9-63, Date Completed 10-10-63, Boring No. B-4, Station & Offset 251+65, 47' Lt. (FIRST PIER), Surface Elev. 1029.1', Water Elev. _____

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics							SHTL Class.	
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL		W.C.
1029.1	0														
1026.6	2				Brown Silty Sand										
	4	13/19													
1024.1	6				Brown and Gray Silty Gravelly Silt	1	0	8	21	45	26	22	4	16	
	8	9/7													
1021.6	8				Brown Silty Sand with Stone Fragments	2	34	4	16	28	18	NP	NP	19	
	8	6/9													
1020.1	10		0.6	0.4	TOP OF ROCK										
	12		3.9	1.1	Sandstone, gray, firm, medium-grained, separated into beds 0.2' to 0.4' thick by soft damp clay seams (comprising 20% of interval). (Broken and jointed orange-brown colored above 12.7'). Core loss 25%.										
	14														
1012.1	16		5.0	0.0											
	18				Shale, gray, firm, arenaceous, carbonaceous, broken in wedges and thin beds 0.1' to 0.2' thick and separated by soft clay shale seams (comprising 6% of interval). Core loss 3%.										
	20														
	22														
	24		4.7	0.3											
1004.1					BOTTOM OF BORING										

LOG OF BORING

Date Started 10-9-63, Date Completed 10-9-63, Boring No. B-18, Station & Offset 256+32, 47' Rt. (FIFTH PIER), Surface Elev. 1041.8', Water Elev. _____

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics							SHTL Class.	
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL		W.C.
1041.8	0														
	2														
	4														
1036.8	6				Brown Silty Sand	1	0	7	26	44	23	20	2	17	
	8	5/5													
1031.8	10				Brown and Gray Silty Gravelly Sand	2	27	8	34	20	11	NP	NP	15	
	12	9/12													
1029.3	14				Gray and Brown Silty Gravel	3	76	4	10	5	5	NP	NP	12	
	16	13/8													
1026.8	16				Gray Silty Sandy Gravel	4									
	16	16/17													
1024.3	18				Gray Silt with Stone Fragments	5	45	1	3	37	14	NP	NP	12	
	18	19/17													
1021.8	20				TOP OF ROCK										
	22														
	24		4.8	0.2	Shale, dark-gray, firm, dense, very broken and jointed in angular fragments 0.05' to 0.3' thick and interbedded with soft gray clay seams (comprising 3% of interval). (From 20.4' to 21.1', gray argillaceous sandstone). Core loss 4%.										
	26														
1014.9	28				Sandstone, gray, firm, fine-grained, in beds 0.3' to 1.0' thick separated by clay shale seams (comprising 4% of interval). (Above 28.7', interval is very argillaceous). Core loss 6%.										
	28	4.7	0.3												
1011.8	30				BOTTOM OF BORING										

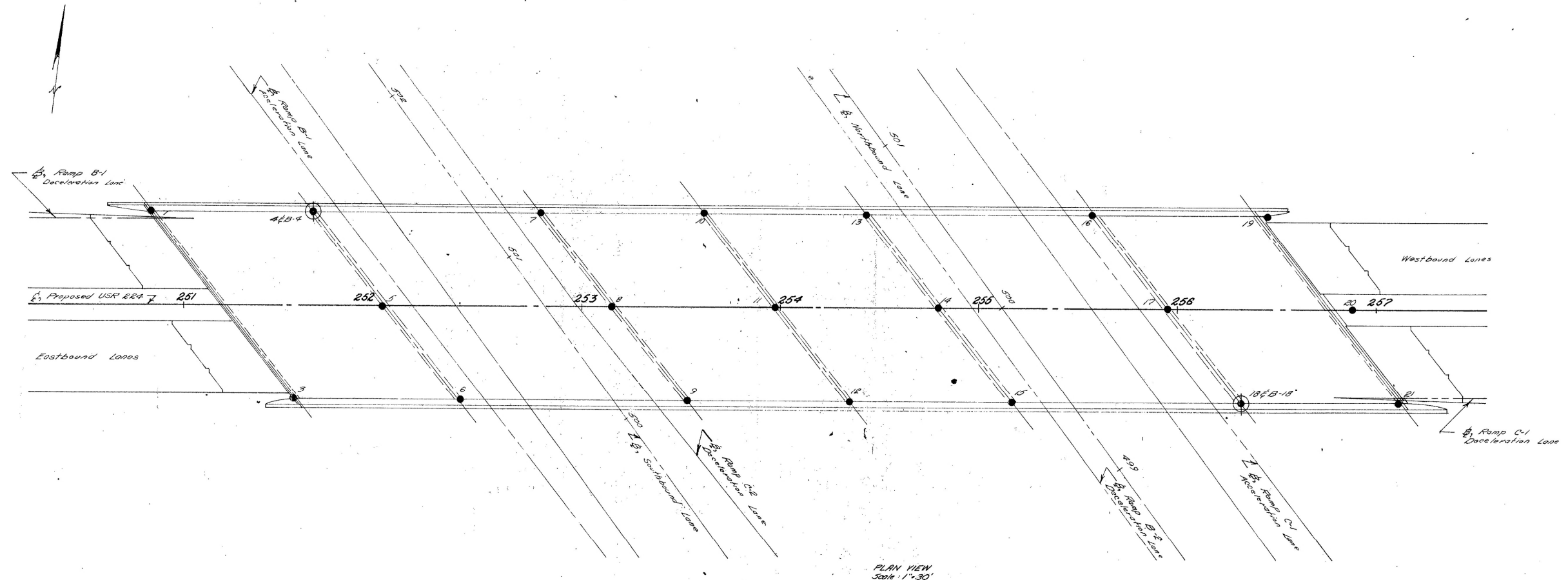
NOTE: Information shown by this subsurface investigation was obtained solely for the use in establishing design criteria for the project. The State of Ohio does not guarantee the accuracy of this data and it is not to be construed as a part of the plans governing construction of the project.

OHIO STATE HIGHWAY TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

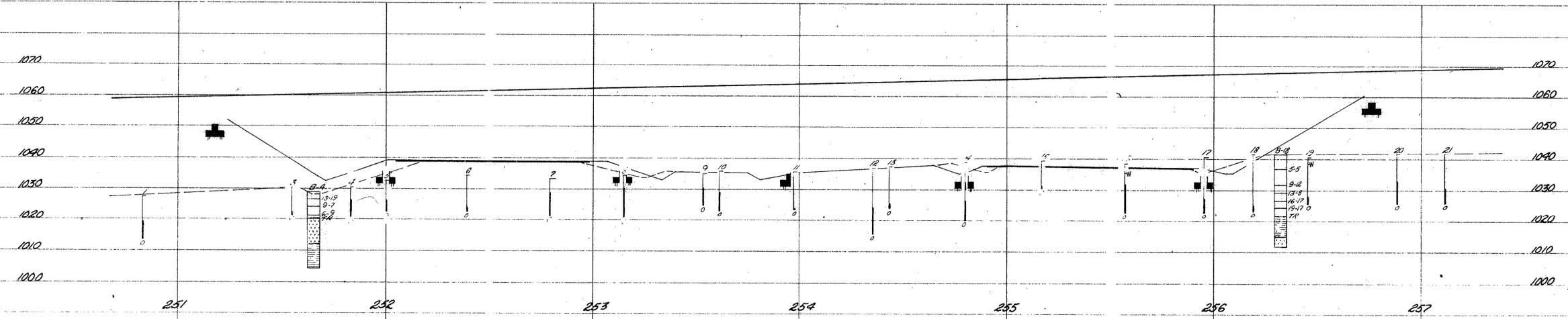
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PROJECT NO. SUM-277-0.00
OVER RELOCATED SR8
SEC. SUM-277-0.00

DATE: 11-1-63

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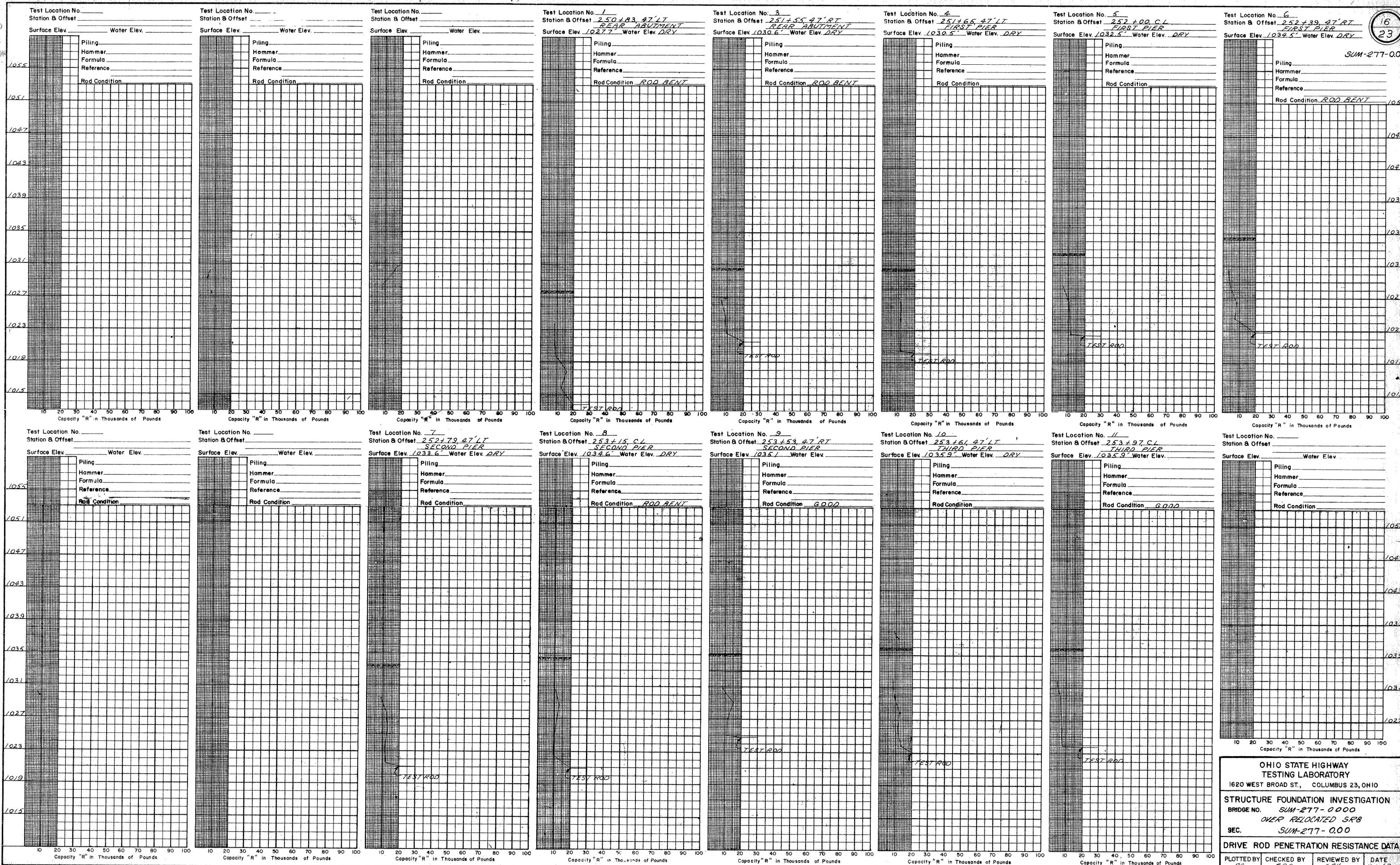
PLAN VIEW
 Scale: 1"=30'



PROFILE
 Vert. Scale: 1"=20'
 Horiz. Scale: 1"=30'

OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST., COLUMBUS 23, OHIO			
STRUCTURE FOUNDATION INVESTIGATION			
BRIDGE NO. SUM-277-0000			
OVER RELOCATED SR 8			
SEC. SUM-277-000			
PLAN AND PROFILE			
DRAWN BY R.L.F.	CHECKED BY R.D.B.	REVIEWED BY G.R.H.	DATE 11-1-68

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SUM-277-0.00

OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SUM-277-0000
OVER RELOCATED SR8
SEC. SUM-277-0.00

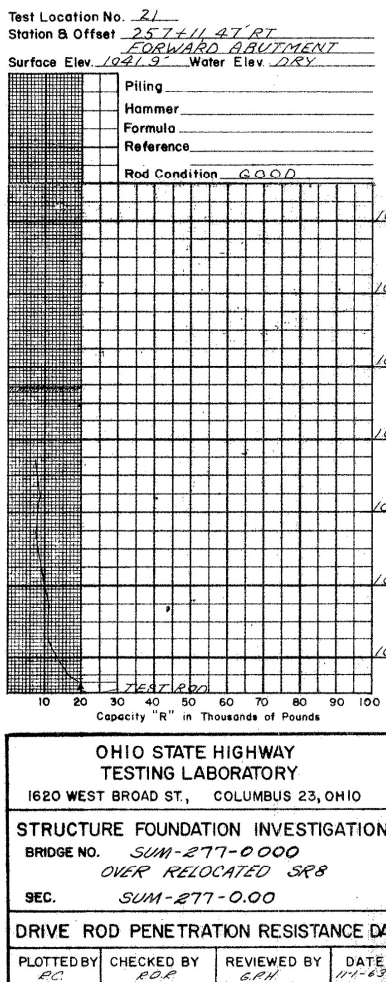
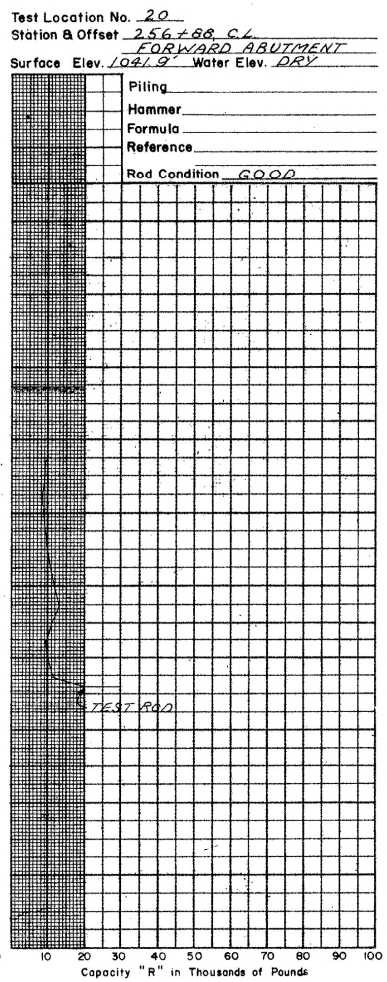
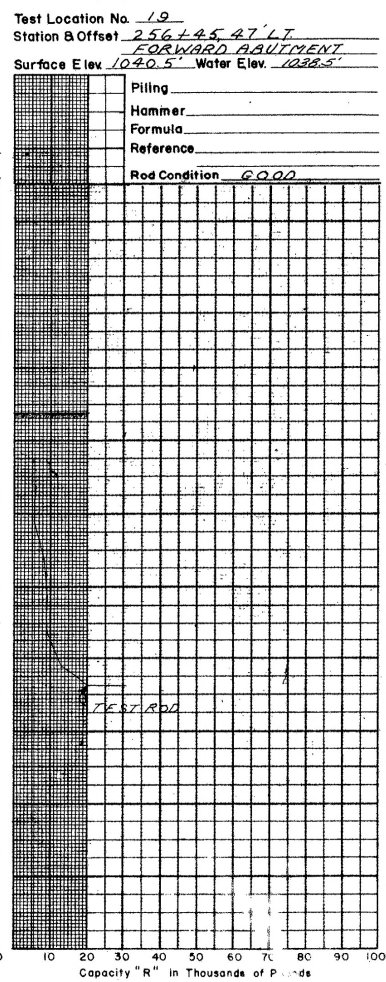
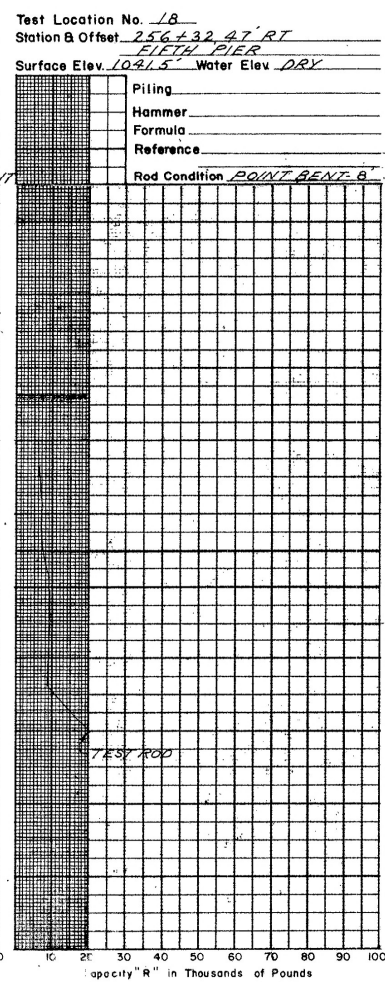
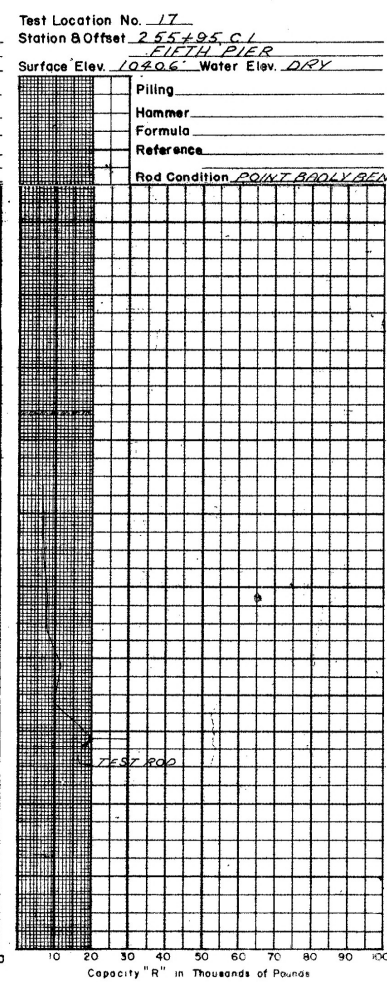
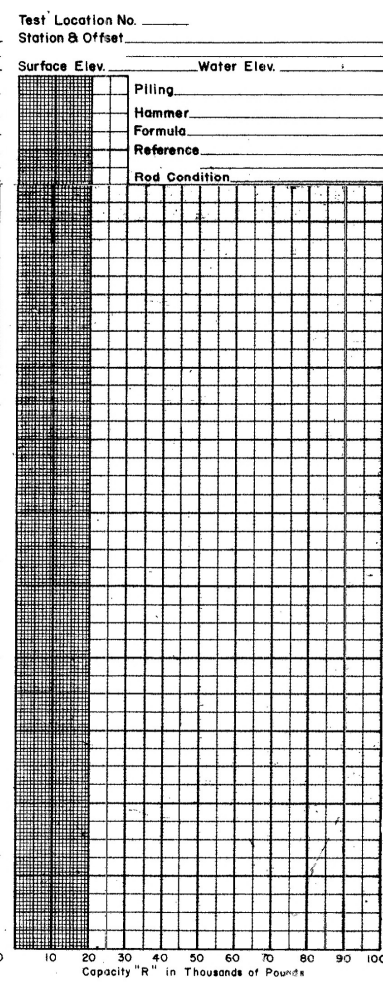
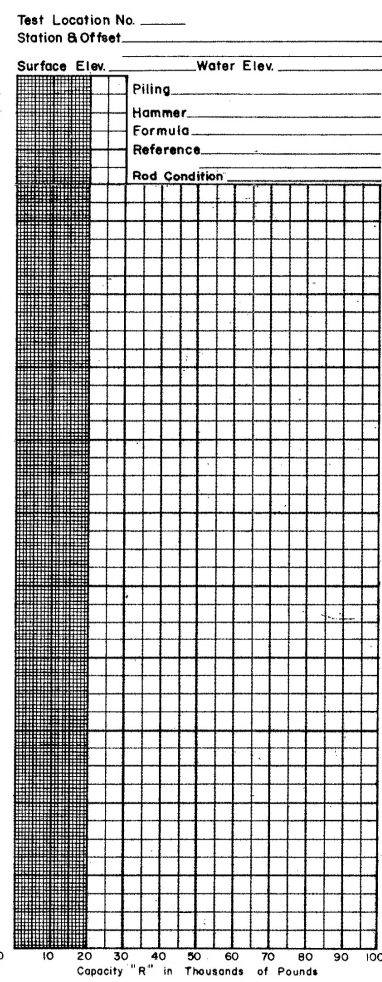
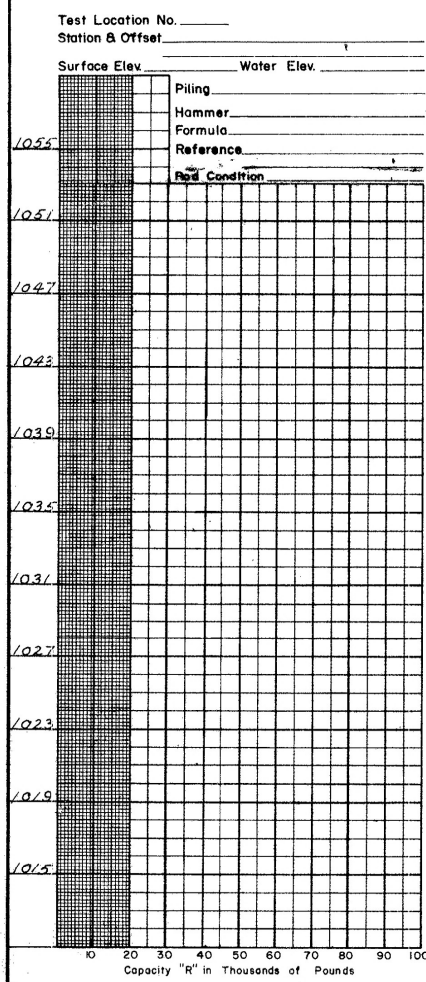
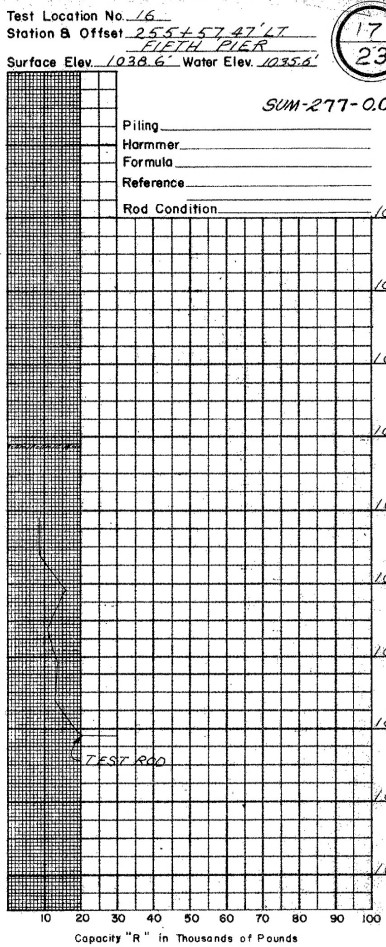
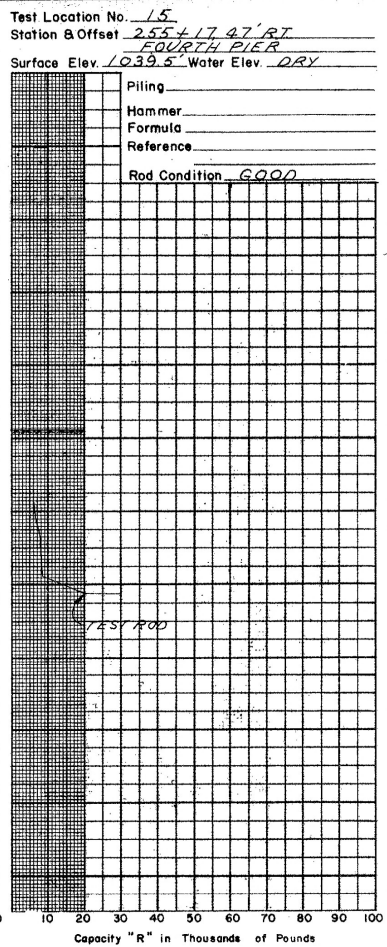
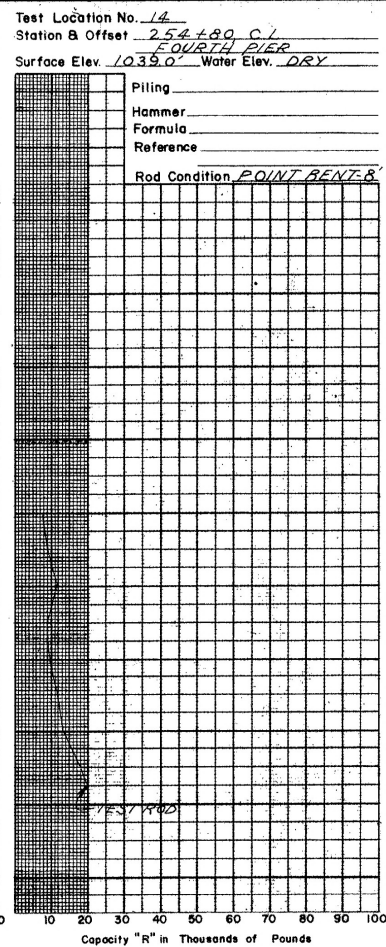
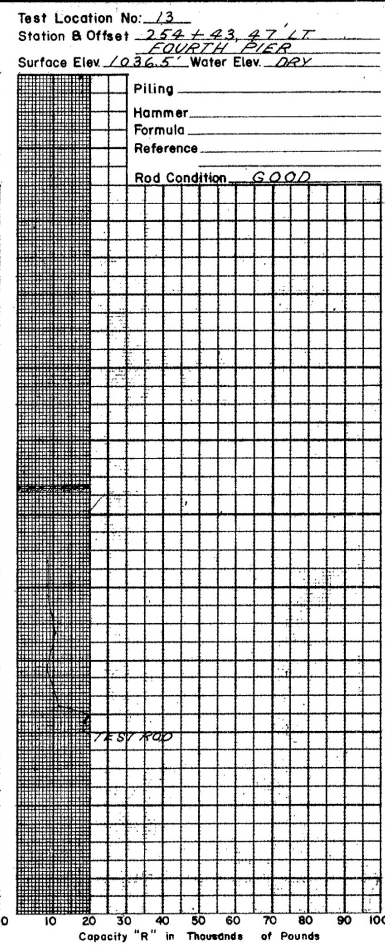
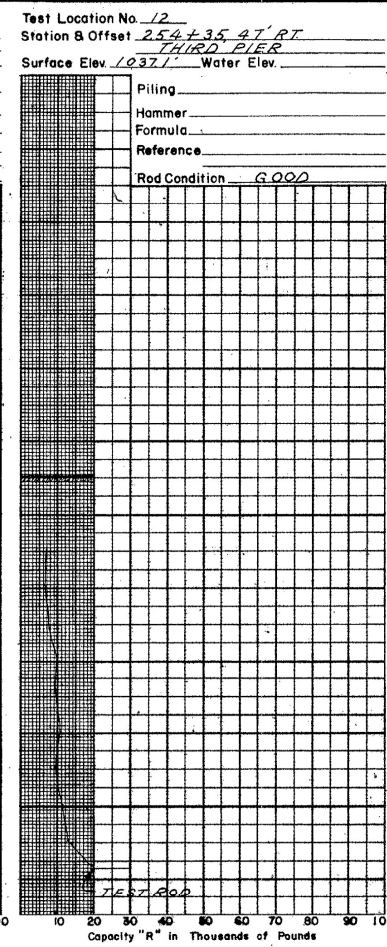
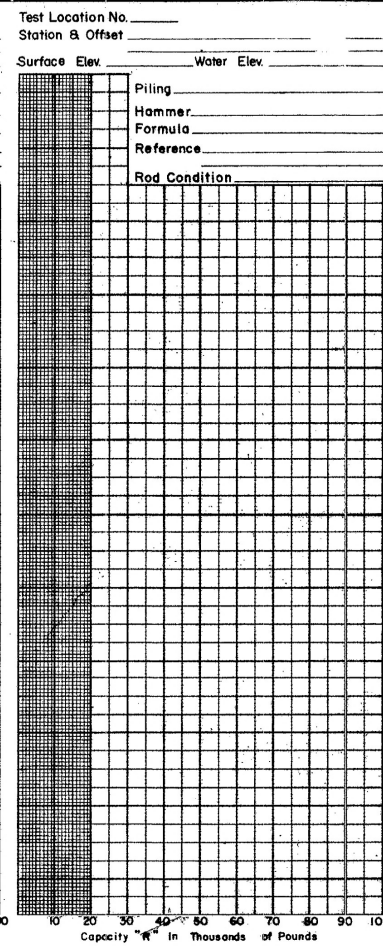
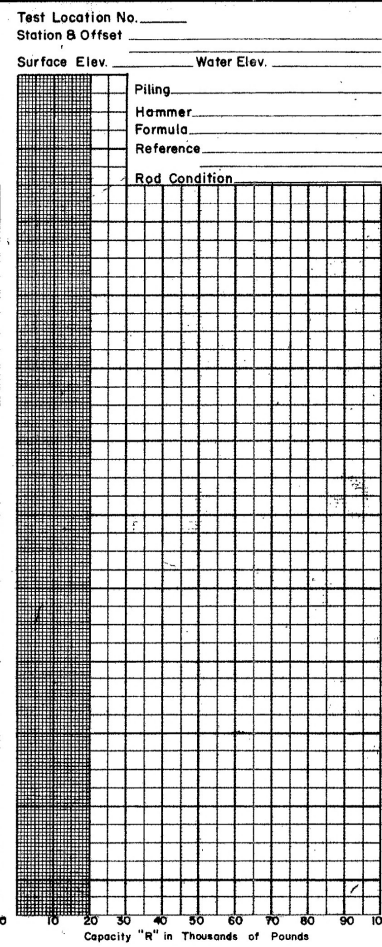
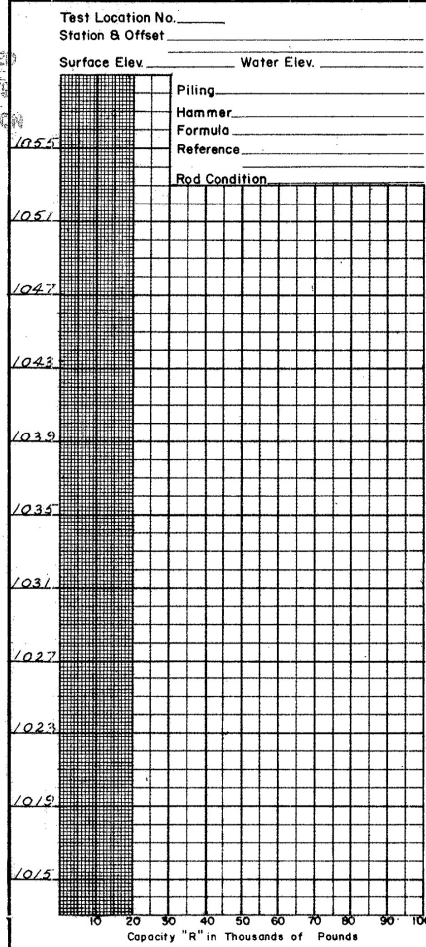
DRIVE ROD PENETRATION RESISTANCE DATA

PLOTTED BY RC	CHECKED BY GDB	REVIEWED BY GWH	DATE 11-68
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23

SUM-277-000



OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SUM-277-0000
OVER RELOCATED SR8
SEC. SUM-277-000

DRIVE ROD PENETRATION RESISTANCE DATA

PLOTTED BY	CHECKED BY	REVIEWED BY	DATE
EC	RDR	GPH	11-63

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JUL 23 1979
SERIALS SECTION

GENERAL INFORMATION

Drive Rod Penetration Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface conditions may be evaluated.

Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are by means of a rotary type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and 5-foot depth intervals, driven by means of a 140 pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The Boring Log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depths of press samples, field sample number, sample description based on laboratory test results and the Casagrande A.C. classification system and gradation, plasticity and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.

Particle Size Definitions

8"	3"	2.0mm	0.42mm	0.075mm	0.005mm
Boulders	Cobbles	Gravel	Coarse Sand	Fine Sand	Silt Clay
No. 10 sieve	No. 40 sieve	No. 200 sieve			

LEGEND

- Auger Boring - Plan View.
- Press and/or Drive Sample and/or Core Boring - Plan View.
- Drive Rod Penetration Resistance Soundings - Plan View
- Electrical Resistivity Probe - Plan View.
- Indicates Auger Boring.
- Indicates Press and/or Drive Sample and/or Core Boring.
- Electrical Resistivity Probe plotted to vertical scale only.
- Top of Rock
- Water saturated zone.
- Total Depth.
- Horizontal bar on log indicates the depth the sample was taken.
- Figures to the right of boring log in profile view indicate the number of blows for Standard Penetration test.
X = First 6 inches
Y = Second 6 inches
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" >= 10,000 lbs.
- Indicates final measurement of penetration in inches.
- Indicates Free Water elevation.
- Indicates Static Water elevation.
- Footing
- Capped pile
- Footing on pile

SYMBOLS OF ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GEOLOGY OF THE SITE

The structure site is located on the upland portion of the north valley wall of the Tuscarawas River valley in the glaciated Allegheny Plateau Region. Glacial drift, found to be 12 feet in depth, overlies shale and sandstone bedrock, of Pennsylvanian age.

EXPLORATION

The exploration consisted of two drive sample-core borings and eight drive rod penetration tests, made between October 4 and 15, 1963.

INVESTIGATIONAL FINDINGS

Borings disclose that sloping bedrock surface, encountered 12 feet below ground surface, elevation 1017 and 1013 feet, is overlain by very dense gravels, sands and silts. Borings were terminated 12 and 23 feet below bedrock surface, elevations 1001 and 995 feet.

Rod soundings encountered rapid, occasionally erratic, resistance to penetration with increase in depth and were terminated between elevations 1019 and 1012 feet, considered to be above, on, or slightly below bedrock surface, as revealed by the borings.

No free water was observed in any of the rod sounding holes.

LOG OF BORING

Date Started 10-4-63 Sampler Type SS Dia. 1 3/8"
Date Completed 10-8-63 Casing Length 21' Dia. 3 1/2"
Boring No. B-1 Station & Offset 7+36.4' Lt. (REAR ABUTMENT) Surface Elev. 1029.9'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics							SHTL Class.			
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL		W.C.		
1029.9	0																
1027.4	2				Brown Silty Silt	1	0	13	43	15	29	21	5	12			
1024.9	4	16/19			Brown Gravelly Silty Silt	2	17	5	22	35	21	NP	NP	16			
1022.4	6	12/15			Brown Gravelly Silty Silt	3	19	6	21	34	20	NP	NP	17			
1019.9	8	14/16			Brown Silty Gravelly Sand	4	38	10	34	17	11	NP	NP	8			
1017.4	10	16/17															
1014.4	12				TOP OF ROCK												
1005.4	16		1.4	2.9	Sandstone, brown, friable, medium-grained, porous, broken, in beds 0.1' to 1.5' thick at carbonaceous, cross-bedded, argillaceous laminae and clay seams (comprises 4% of total interval). (Above 22.0' sandstone very broken in fragments 0.05' thick and few beds 0.3' thick). Core loss 46%.												
1003.6	20		2.6	0.4	Shale, dark-gray, firm, arenaceous, in thin beds 0.1' thick, and is jointed and broken *												
994.9	24		4.7	0.3	Sandstone, gray, firm, fine-grained, with numerous argillaceous, carbonaceous seams, broken in beds 0.1' to 0.8' thick and fractured by diagonal joints and interbedded with few very arenaceous shale thin beds 0.5' thick above 30.5'. Below 30.5' interval decreases in argillaceous content and is in beds 0.2' to 1.0' thick, broken at thin clay seams. Core loss 3%.												
	28		5.0	0.0													
	32																
	34																

* in angular fragments, interbedded with soft, gray clay shale 0.2' thick (comprises 10% of interval). Core loss 20%.

LOG OF BORING

Date Started 10-8-63 Sampler Type SS Dia. 1 3/8"
Date Completed 10-8-63 Casing Length 10' Dia. 3 1/2"
Boring No. B-2 Station & Offset 9+26.23' Rt. (FORWARD ABUTMENT) Surface Elev. 1025.7'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics							SHTL Class.			
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL		W.C.		
1025.7	0																
1023.2	2				Brown and Gray Silty Sandy Gravel	1	43	9	32	6	10	NP	NP	10			
1020.7	4	18/15			Brown Gravelly Silty Silt	2	19	5	21	36	19	NP	NP	19			
1018.2	6	7/7			Brown Silty Sandy Gravel	3	46	4	12	24	14	NP	NP	16			
1015.7	8	11/11			Brown Silty Sandy Gravel	4	34	6	17	27	16	NP	NP	16			
1013.2	10	19/21* (0.3')			Brown Silty Sandy Gravel												
1010.2	12																
1007.2	14		2.3	0.2	TOP OF ROCK												
1000.7	16		5.0	0.0	Sandstone, reddish-brown, firm, porous, damp, medium grained, broken into beds 0.1' to 0.6' thick at argillaceous, friable, cross-bedded laminae and soft, damp, brown clay seams which comprise 2% of total interval. No core loss.												
	18																
	20																
	22																
	24																
	26																
	28																
	30																
	32																
	34																

* REFUSAL

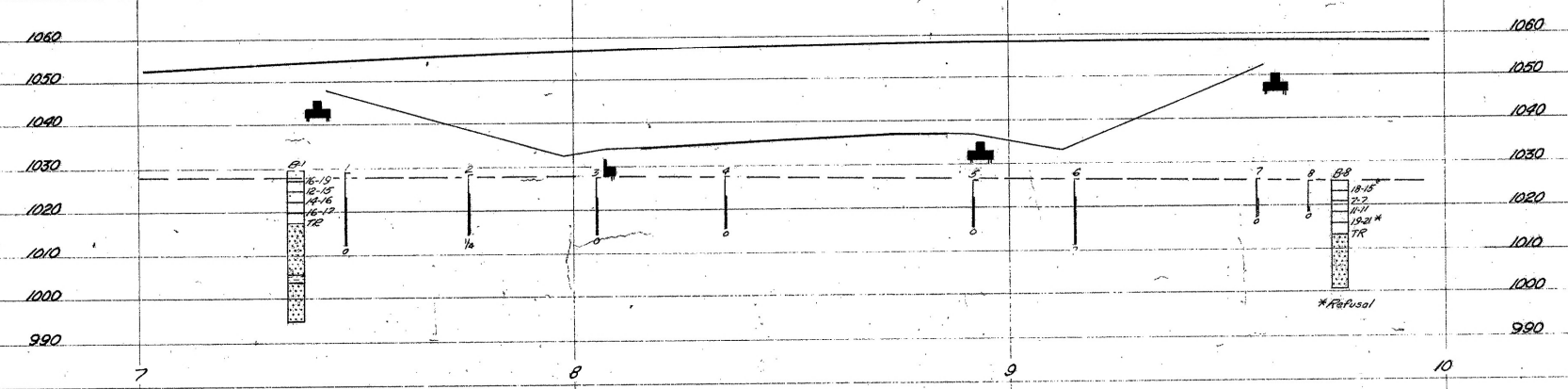
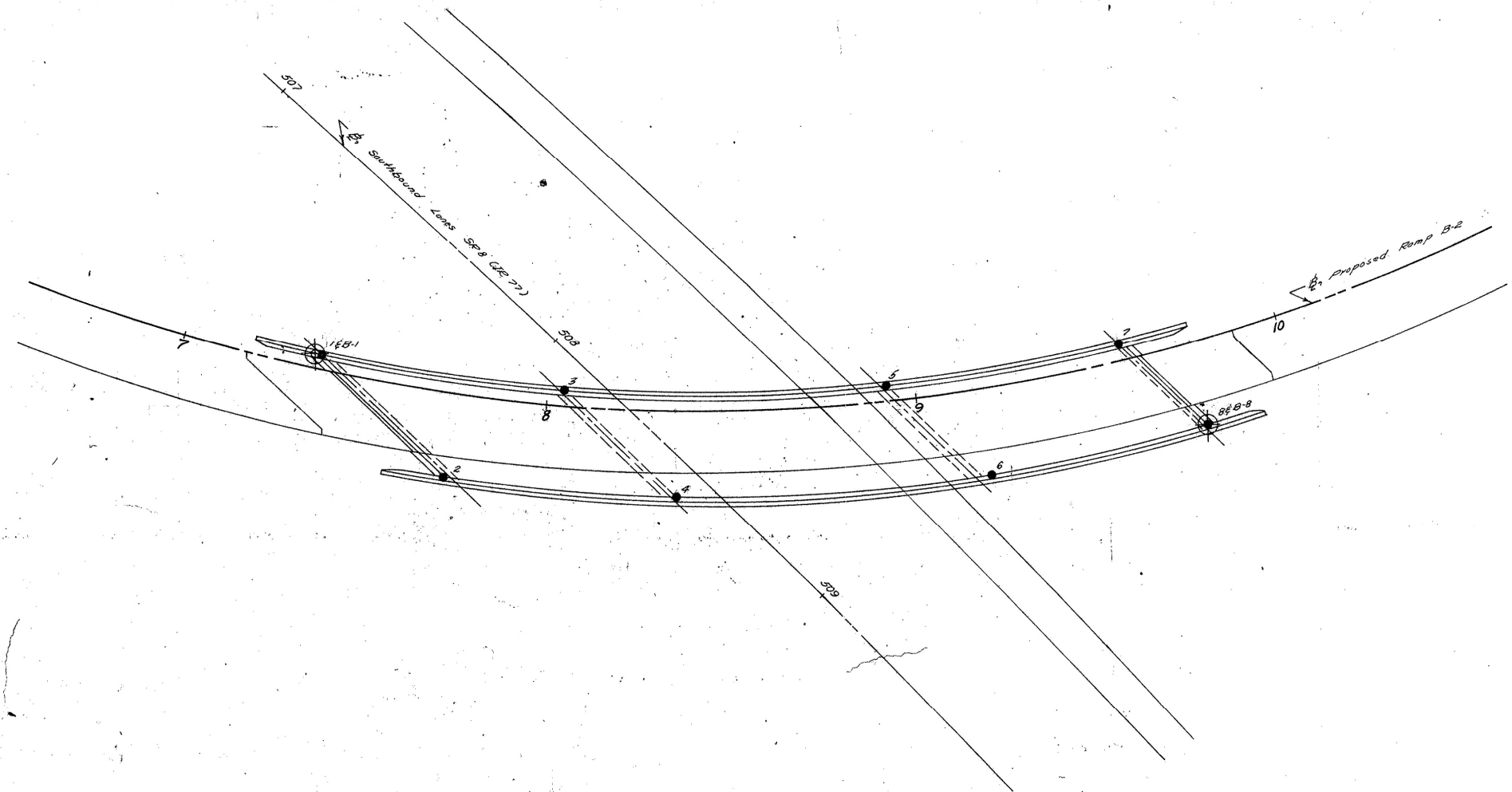
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OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SUM-8-0932
RAMP B-2 OVER RELOCATED SR8 C5B
SEC. SUM-277-0.00

CHECKED BY: RFW
REVIEWED BY: R.D.E.
DATE: 10-30-63

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OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. **SUM-8-0932**
RAMP B-2 OVER RELOCATED SRB (SR-77)
SEC. **SUM-277-0.00**

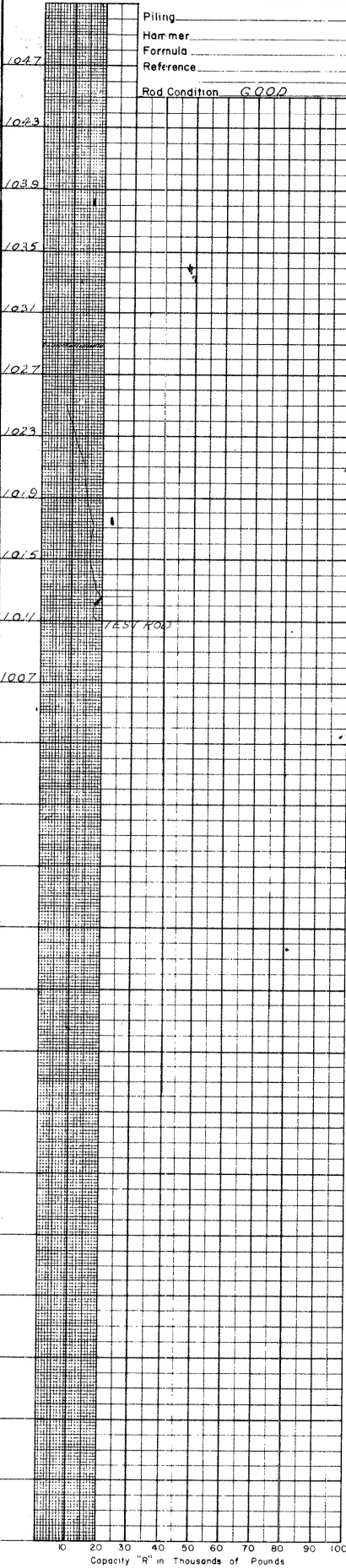
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DRAWN BY REL	CHECKED BY RAM	REVIEWED BY R.G.R.	DATE 10-30-63
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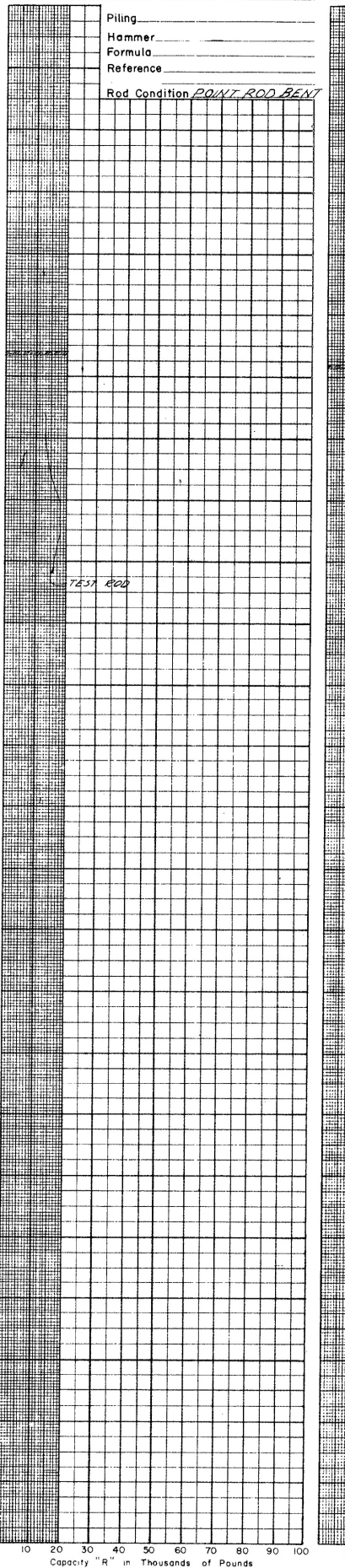
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JUL 21 1979
REPRODUCTION

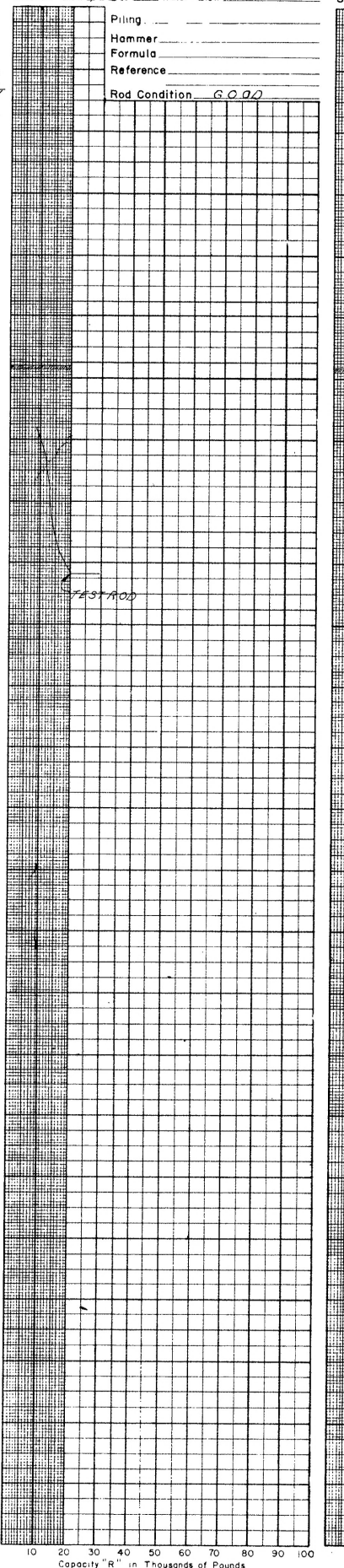
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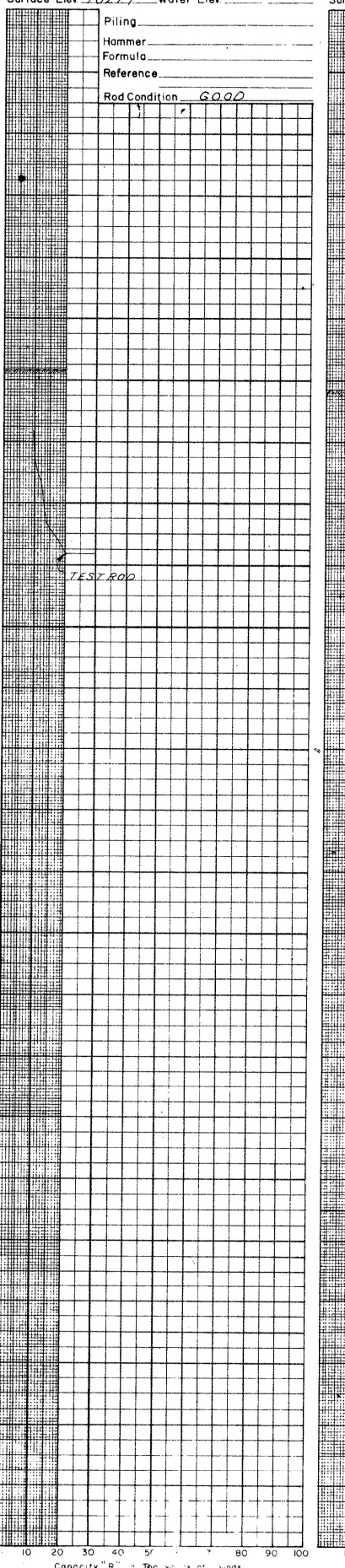
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Station & Offset 7+76.23 RT
REAR ABUTMENT
Surface Elev. 1028.6 Water Elev.



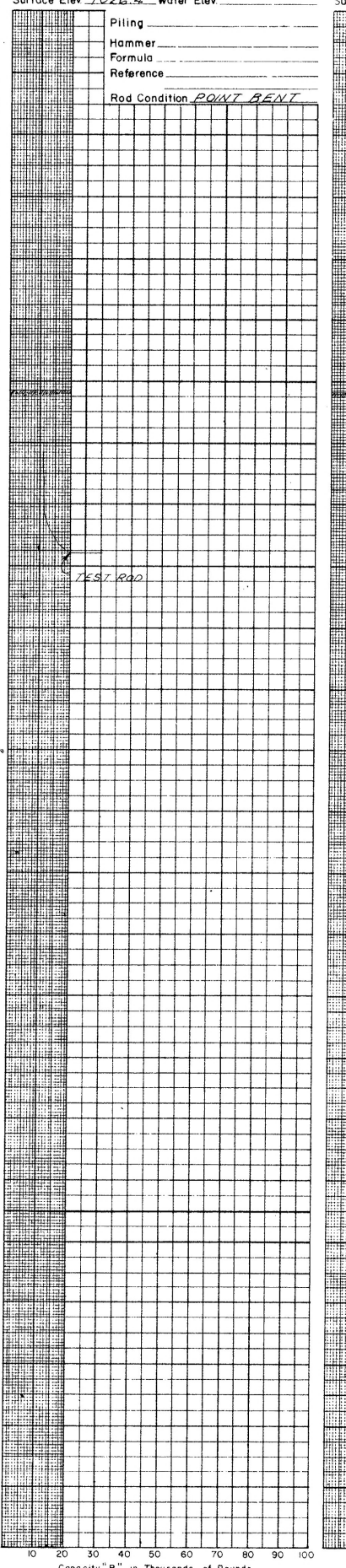
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REAR PIER
Surface Elev. 1027.8 Water Elev.



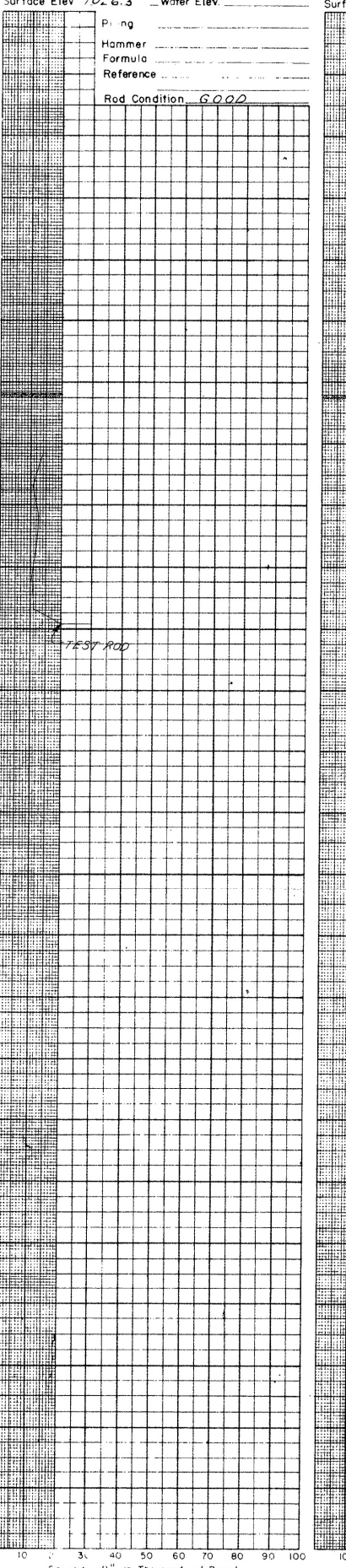
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REAR PIER
Surface Elev. 1027.7 Water Elev.



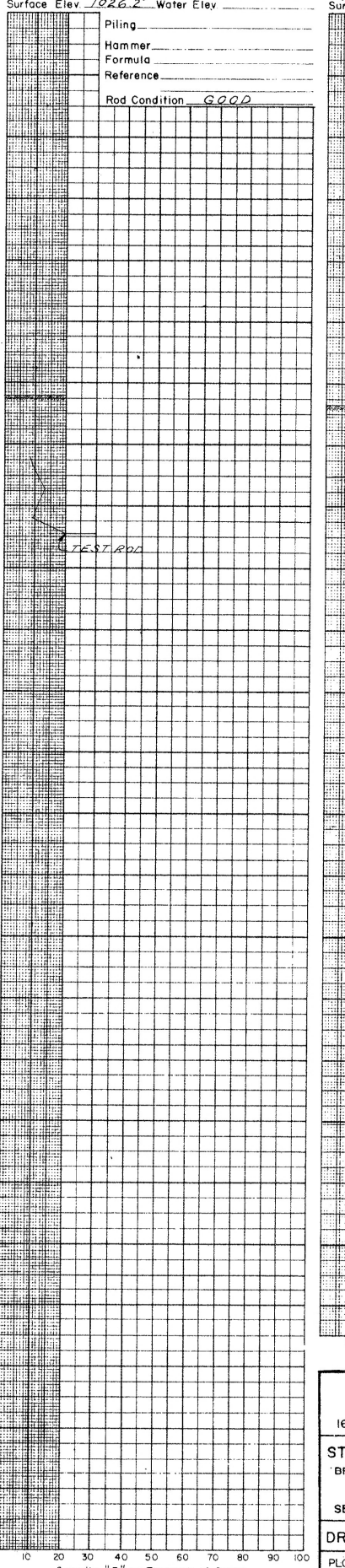
Test Location No. 5
Station & Offset 8+92.4 LT
FORWARD PIER
Surface Elev. 1026.4 Water Elev.



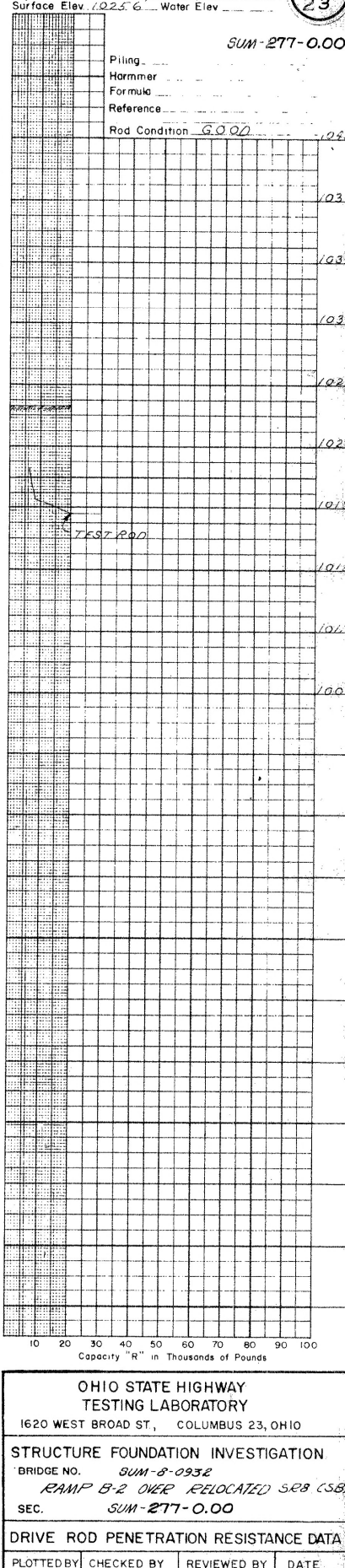
Test Location No. 6
Station & Offset 9+15.23 RT
FORWARD PIER
Surface Elev. 1026.3 Water Elev.



Test Location No. 7
Station & Offset 9+57.4 LT
FORWARD ABUTMENT
Surface Elev. 1026.2 Water Elev.



Test Location No. 8
Station & Offset 9+76.23 RT
FORWARD ABUTMENT
Surface Elev. 1025.6 Water Elev.



OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO
STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SUM-8-0932
RAMP B-2 OVER RELOCATED SR8 (SR8)
SEC. SUM-277-0.00
DRIVE ROD PENETRATION RESISTANCE DATA
PLOTTED BY EC CHECKED BY CPW REVIEWED BY BDR DATE 10-30-63

GENERAL INFORMATION

Drive Rod Penetration Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface conditions may be evaluated.

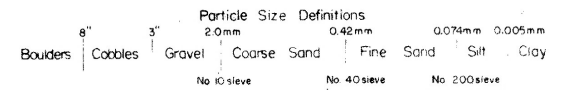
Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are by means of a rotary type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 140 pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The Boring Log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depths of press samples, field sample number, sample description - based on laboratory test results and the Casagrande A.C. classification system - and gradation, plasticity and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.



LEGEND

- Auger Boring - Plan View.
Press and/or Drive Sample and/or Core Boring - Plan View.
Drive Rod Penetration Resistance Soundings - Plan View.
Electrical Resistivity Probe - Plan View.
Indicates Auger Boring.
Indicates Press and/or Drive Sample and/or Core Boring.
Electrical Resistivity Probe plotted to vertical scale only.
Top of Rock.
Water saturated zone.
Total Depth.
Horizontal bar on log indicates the depth the sample was taken.
Figures to the right of boring log in profile view indicate the number of blows for "Standard Penetration" test.
Casing.
Resistance "R" <= 10,000 lbs.
Resistance "R" >= 10,000 lbs.
Indicates final measurement of penetration in inches.
Indicates Free Water elevation.
Indicates Static Water elevation.
Footings.
Footings on pile.

SYMBOLS OF ROCK TYPES

- Coal.
Weathered Indurated Clay.
Indurated Clay.
Weathered Shale.
Shale.
Weathered Sandstone.
Sandstone.
Leached Dolomite.
Dolomite.
Leached Limestone.
Limestone.

GEOLOGY OF THE SITE

The structure site is located on the upland portion of the north valley of the Tuscarawas River valley, in the glaciated Allegheny Plateau Region. Glacial drift, found to be 17 to 21 feet in depth, overlies shales and sandstone, of Pennsylvanian age.

EXPLORATION

The exploration consisted of two drive sample-core borings and eight drive rod penetration tests, made on October 2, 3, 9, and 10, 1963.

INVESTIGATIONAL FINDINGS

Borings disclosed moist, medium-dense to very dense sandy gravels with occasional silts, to 17 and 21-foot depths, elevations 1021 and 1013 feet, where bedrock surface was encountered. Borings were terminated 17 and 19 feet below bedrock surface at elevations 1009 and 994 feet.

Rod soundings met generally high, somewhat erratic resistance to penetration and encountered refusal or near refusal to penetration at 15 to 24-foot depths, between elevations 1024 and 1011 feet, on the basis of borings, considered to be on or slightly below bedrock surface.

On the basis of tests, bedrock surface is considered to slope downward from forward to rear, between approximate elevations 1022 and 1013 feet.

No free water was observed in any of the rod sounding holes.

LOG OF BORING table with columns: Elev., Depth, Std. Pen., Rec. Loss, Description, Sample No., Physical Characteristics, SHTL. Includes data for borings at elevations 1033.9 to 993.9.

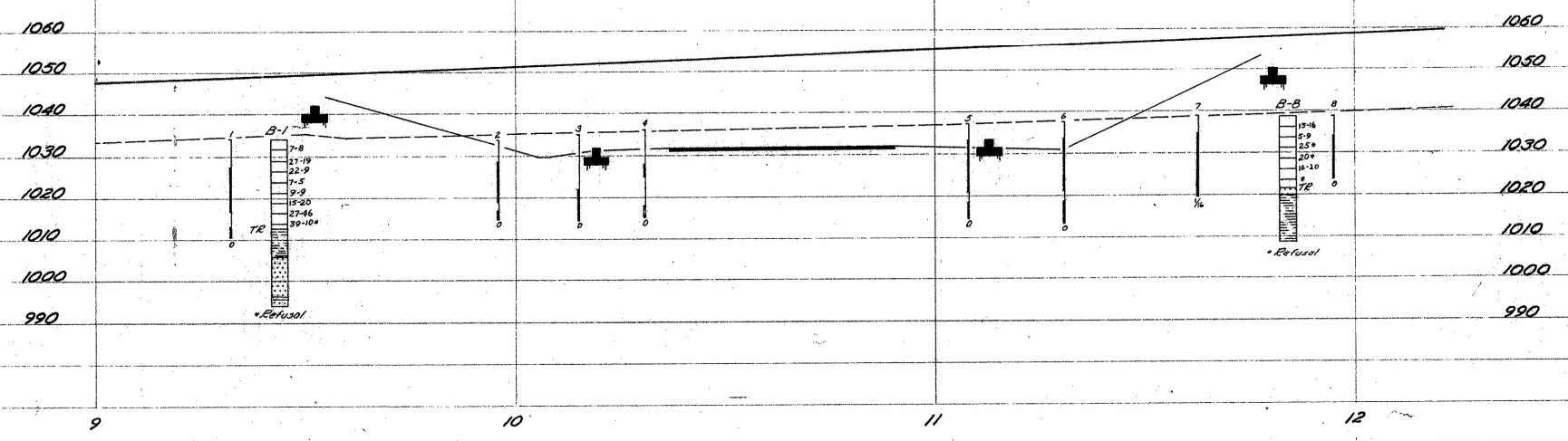
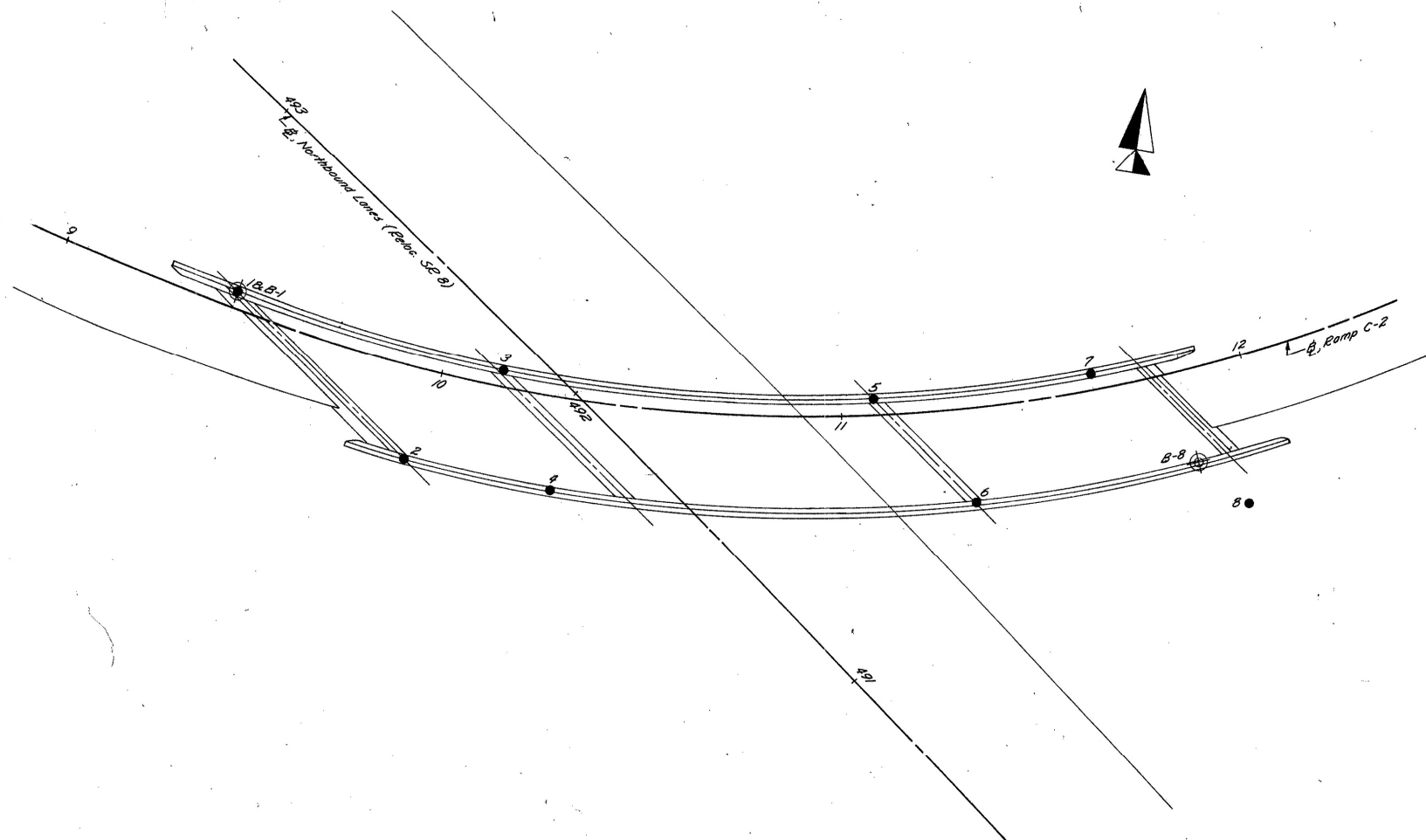
LOG OF BORING table with columns: Elev., Depth, Std. Pen., Rec. Loss, Description, Sample No., Physical Characteristics, SHTL. Includes data for borings at elevations 1038.6 to 1008.6.

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OHIO STATE HIGHWAY TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO
STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SUM-8-0930
RAMP C-2 OVER RELOC. SR 8 (NB)
SEC. SUM-277-0.00

CHECKED BY: EOE, REVIEWED BY: BAH, DATE: 10-30-63

MICROFILMED
JUL 21 1978
REPRODUCTION



OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. **SUM-8-0930**
RAMP C-2 OVER RELOC. SE 8 (NB)
SEC. **SUM-277-0.00**

PLAN AND PROFILE

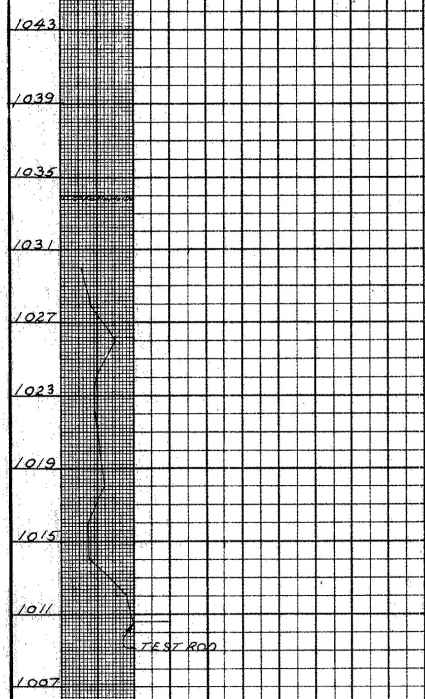
DRAWN BY R.P.W.	CHECKED BY R.D.P.	REVIEWED BY E.P.H.	DATE 10-25-62
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SCALE: 1" = 20'

REPRODUCTION
JUL 31 1979

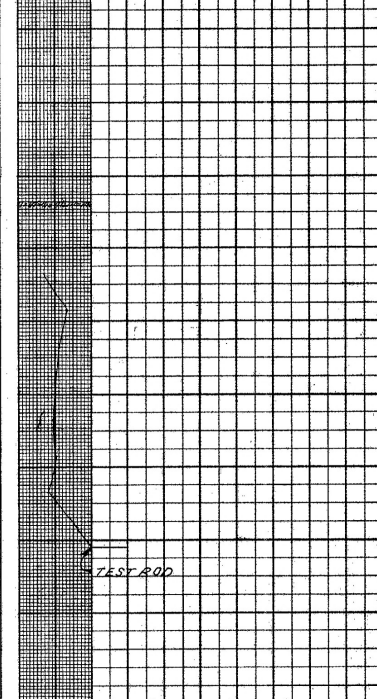
Test Location No. 1
Station & Offset 9+44.4 LT
REAR ABUTMENT
Surface Elev. 1032.0 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition GOOD



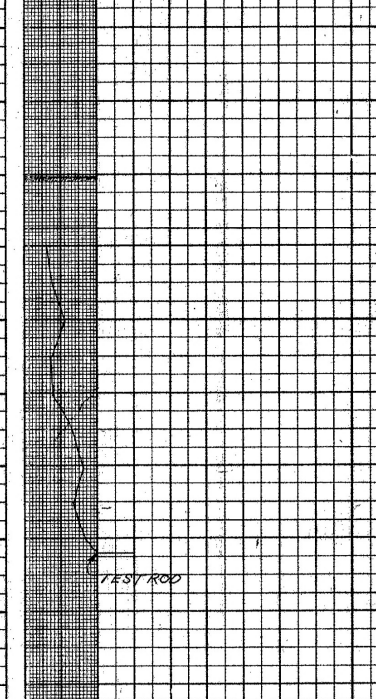
Test Location No. 2
Station & Offset 9+96.23 RT
REAR ABUTMENT
Surface Elev. 1033.6 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition GOOD



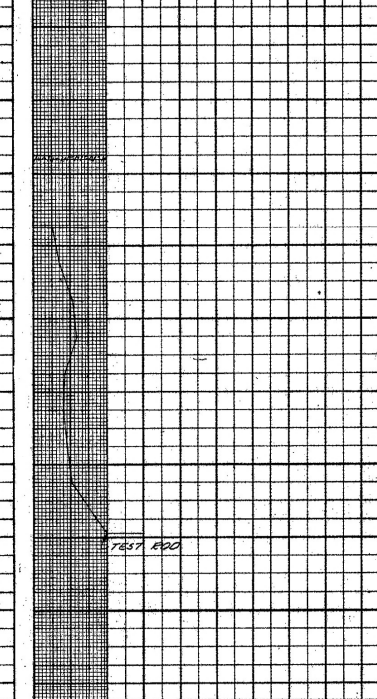
Test Location No. 3
Station & Offset 10+15.4 LT
REAR PIER
Surface Elev. 1034.9 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition GOOD



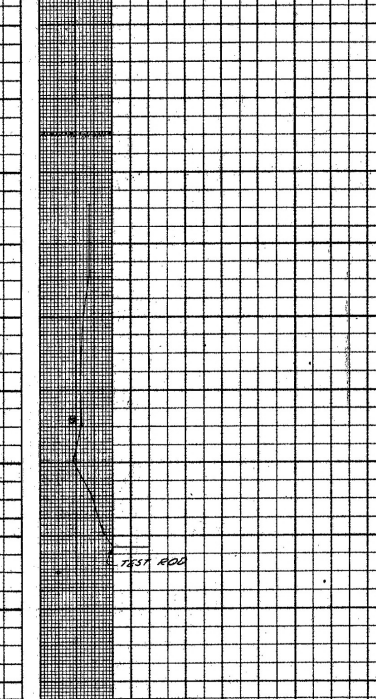
Test Location No. 4
Station & Offset 10+31.23 RT
REAR PIER
Surface Elev. 1036.0 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition GOOD



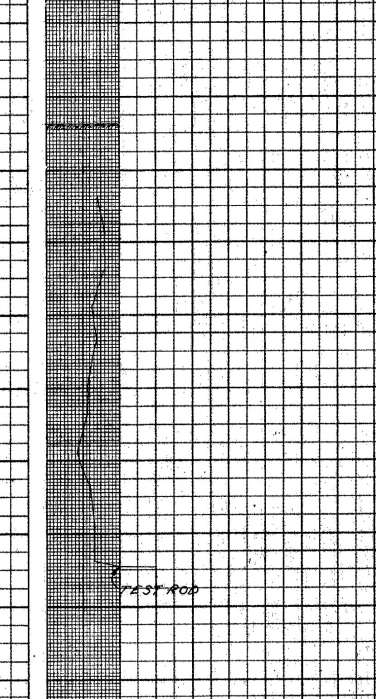
Test Location No. 5
Station & Offset 11+08.4 LT
FORWARD PIER
Surface Elev. 1037.2 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition POINT BENT



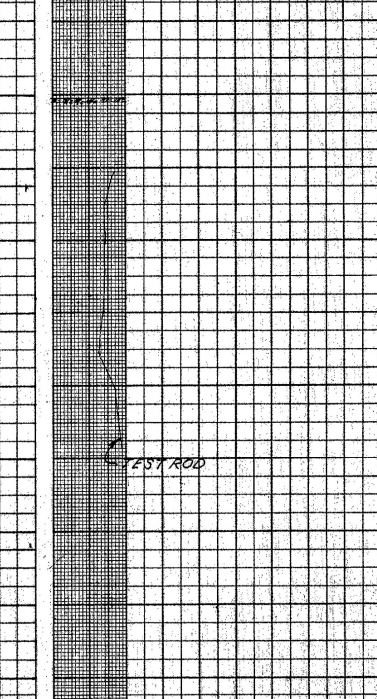
Test Location No. 6
Station & Offset 11+31.23 RT
FORWARD PIER
Surface Elev. 1037.5 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition POINT BENT



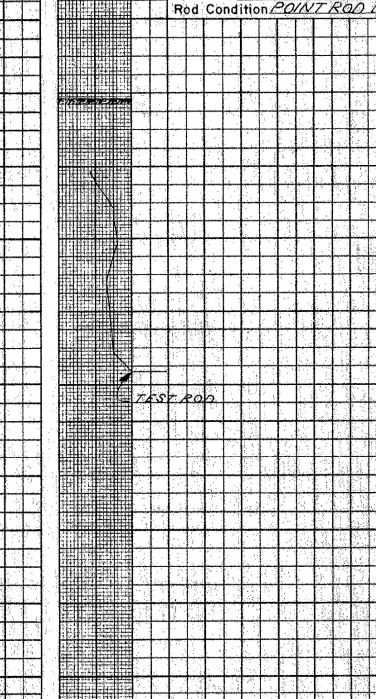
Test Location No. 7
Station & Offset 11+63.4 LT
FORWARD ABUTMENT
Surface Elev. 1038.8 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition ROD BENT 12'



Test Location No. 8
Station & Offset 11+93.36 RT
FORWARD ABUTMENT
Surface Elev. 1038.7 Water Elev.

Piling _____
Hammer _____
Formula _____
Reference _____
Rod Condition POINT ROD BENT



23
23

SUM-277-0.00

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

Capacity "R" in Thousands of Pounds

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DRIVE ROD PENETRATION RESISTANCE DATA

PLOTTED BY EC CHECKED BY ROR REVIEWED BY GRH DATE 10-25-67