TE - 118
600 - 4 - 66

14/25

CUYAHOGA COUNTY
CUY480-1.90
1/3

GEOLOGY OF THE SITE
THE STRUCTURE SITE IS LOCATED ON A PORTION OF THE GLACIATED LAKE PLAIN, IN AN AREA WHERE SHALLOW GLACIAL TILL OVERLIES SHALE BEDROCK, OF DEVONIAN AGE.

EXPLORATION
THE EXPLORATION CONSISTED OF TWO DRIVE SAMPLE-CORE BORINGS, MADE ON FEBRUARY 7, 1968, AND FIVE DRIVE ROD PENETRATION TESTS, MADE ON MARCH 6, 1968. ELEVEN SUPPLEMENTAL DRIVE ROD SOUNDINGS WERE MADE ON OCTOBER 14 AND 15, 1968. INCLUDED WITH THIS REPORT IS THE LOG OF A BORING MADE FOR THE ROADWAY INVESTIGATION.

INVESTIGATIONAL FINDINGS
DRIVE SAMPLE-CORE BORINGS DISCLOSED VERY DENSE SANDY SILTS AND SILTY SANDS TO BEDROCK SURFACE, ENCOUNTERED AT 10 AND 12-FOOT DEPTHS, ELEVATIONS 759 AND 758 FEET. THE BORINGS WERE TERMINATED AT 25 AND 26-FOOT DEPTHS, ELEVATIONS 744 TO 743 FEET, AFTER PENETRATING 14 AND 15 FEET OF BEDROCK. THE AUGER BORING PENETRATED TO 25-FOOT DEPTH, ELEVATION 745 FEET, AND IS CONSIDERED TO HAVE TERMINATED ON BEDROCK SURFACE.

THE ROD SOUNDINGS ENCOUNTERED RAPID INCREASE IN PENETRATION RESISTANCE WITH INCREASING DEPTH, AND WERE TERMINATED DUE TO RATHER ABRUPT REFUSAL TO PENETRATION AT 7 TO 25-FOOT DEPTHS, ELEVATIONS 763 TO 745 FEET, CONSIDERED TO BE ON OR SLIGHTLY BELOW BEDROCK SURFACE, AS REVEALED BY THE BORINGS, WITH THE EXCEPTION OF ROD SOUNDING NUMBER 2, WHICH IS CONSIDERED TO HAVE TERMINATED IN DENSE MATERIAL ABOVE BEDROCK SURFACE.

NO FREE WATER WAS OBSERVED IN ANY OF THE ROD SOUNDING HOLES.

IF IT IS THE INTENTION TO FOUND THE PIER SUBSTRUCTURE UNITS ON BEDROCK, IT IS CONSIDERED ADVISABLE THAT THE OPEN EXCAVATIONS BE INSPECTED IN THE FIELD IN ORDER TO INSURE THAT THE EXCAVATIONS HAVE BEEN EXTENDED TO ROCK THROUGHOUT THE ENTIRE FOUNDING AREA, PARTICULARLY IN THE VICINITY OF THE LEFT END OF THE REAR PIER AND THE CENTER PORTION OF THE FORWARD PIER.

UNCONFINED COMPRESSION TESTS ON SIMILAR SANDSTONE BEDROCK INDICATE A CRUSHING STRENGTH ON THE ORDER OF 250 TONS PER SQUARE FOOT.

LEGEND

- Auger Boring Location - Plan View.
- Press and / or Drive Sample and / or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- TR — Top of Rock
- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- X/Y — Figures Beside the Boring Log in Profile Indicate the Number of Blows for Standard Penetration Test.
  X = Number of Blows for First 6 inches.
  Y = Number of Blows for Second 6 inches.
- Drive Rod Penetration Resistance Sounding Log - Profile
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Z — Indicates Final Measurement of Penetration, in Inches.
- W — Indicates Free Water Elevation.
- Indicates Static Water Elevation.

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 Sounding 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 condition may be evaluated.

Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are made 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, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system - and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing, if performed, 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

Boulders	Cobbles	Gravel	Coarse Sand	Fine Sand	Silt	Clay
12"	3"	2.0mm (No. 10 sieve)	0.42mm (No. 40 sieve)	0.074mm (No. 200 sieve)	0.005mm	

LOG OF BORING

Date Started 2-7-68 — Sampler Type SS — Dia. 3 1/2" — Water Elev. —
Date Completed 2-7-68 — Casing: Length 11.5' — Dia. 3 1/2"
Boring No. B-6 — Station & Offset 250+12, 51' Rt. (Rear Pier) — Surface Elev. 769.4'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics: % Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTO Class.
769.4	0														
	2														
	4														
764.4	6	19/27			Grayish-Brown Sandy Silt	1	8	8	17	27	40	27	9	16	A-4a
761.9	8	26/36			Brownish-Gray Gravelly Sandy Silt	2	16	9	33	23	19	NP	NP	11	A-4a
759.4	10	29/41			Gray Silty Sand	3	10	2	57	15	16	NP	NP	13	A-3a
757.9	12				TOP OF ROCK										
	14														
	16		5.0	0.0	Sandstone, gray, firm, medium-grained, micaceous in part with carbonaceous laminae, broken and jointed. Core Loss 11%.										
	18														
	20		3.9	1.1											
748.4	22				Shale, gray, medium-firm, weathered with clay seams, broken.										
745.4	24		5.0	0.0	No Core Loss.										
743.9	26				Sandstone, gray, firm, medium-grained, micaceous, in part with carbonaceous laminae, broken and jointed. Core Loss 11%.										

State of Ohio
Department of Highways
Testing Laboratory

LOG OF BORING

Date Started 8-6-68 — Sampler Type Williams Auger — Water Elev. Immediate —
Date Completed 8-6-68 — After — Hours —
Boring No. A-1 — Station & Offset 251+00, 20' Rt. — Surface Elev. 770.0'

Elev.	Depth	Description	Field No.	Lab. Nos.	Physical Characteristics: % Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTO Class.
770.0	0												
	2	Brown Sandy Silt	1		9	5	21	26	39	25	9	18	A-4a
766.0	4												
	6	Brown Sandy Silt	2		7	3	29	19	42	25	8	21	A-4a
761.0	8												
	10	Brown Sandy Silt	3		8	3	38	17	34	21	8	25	A-4a
756.0	12												
	14												
	16	Brown Sandy Silt	4		14	4	31	18	33	23	7	24	A-4a
750.0	18												
	20												
	22	Brown Gravelly Sandy Silt	5		25	6	25	15	29	23	7	22	A-4a
745.0	24	BOTTOM OF BORING - Refusal											

LOG OF BORING

Date Started 2-7-68 — Sampler Type SS — Dia. 3 3/8" — Water Elev. —
Date Completed 2-7-68 — Casing: Length 30' — Dia. 3 1/2"
Boring No. B-9 — Station & Offset 251+52, 51' Lt. (Forward Pier) — Surface Elev. 769.2'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics: % Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTO Class.
769.2	0														
	2														
	4														
764.2	6	15/20			Brown Sandy Silt	1	7	6	18	21	48	28	10	15	A-4a
761.7	8	14/23			Brown Sandy Silt	2	10	6	13	24	47	30	9	16	A-4a
759.0	10														
	12				TOP OF ROCK										
	14		4.9	0.1											
	16				Sandstone, gray, medium-firm, medium-grained, cross-bedded, with carbonaceous laminae, broken and jointed. Core Loss 1%.											
	18		4.9	0.1											
	20														
	22														
	24		5.0	0.0											
744.2	26														

Revised - 10/31/68

NOTE: Information shown by this subsurface investigation was obtained solely for the use in establishing design controls 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 DEPARTMENT OF HIGHWAYS
TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. CUY-80-0470
OVER FITCH ROAD
SEC. CUY-80-1.90

CHECKED BY	REVIEWED BY	DATE
L.N.L.	R.D.R.	3/21/68