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CUYAHOGA COUNTY
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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 BETWEEN FEBRUARY 7 AND 9, 1968, AND THREE DRIVE ROD PENETRATION TESTS, MADE ON MARCH 5, 1968.

INVESTIGATIONAL FINDINGS
BORINGS DISCLOSED MEDIUM-DENSE TO VERY DENSE SILTS, SANDS, AND GRAVELS, AND VERY STIFF CLAYS AND SOME COBBLES TO BEDROCK SURFACE, ENCOUNTERED AT 15 TO 20-FOOT DEPTHS, ELEVATIONS 738 AND 733 FEET. THE BORINGS WERE TERMINATED AT 35 AND 40-FOOT DEPTHS, ELEVATIONS 718 TO 714 FEET, AFTER PENETRATING 20 FEET OF BEDROCK.

THE ROD SOUNDINGS ENCOUNTERED RAPID INCREASE IN PENETRATION RESISTANCE WITH INCREASING DEPTH, AND WERE TERMINATED DUE TO RATHER ABRUPT REFUSAL TO PENETRATION AT 12 TO 15-FOOT DEPTHS, ELEVATIONS 742 TO 737 FEET, CONSIDERED TO BE IN THE VERY DENSE MATERIAL ABOVE BEDROCK SURFACE, AS REVEALED BY THE BORINGS.

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

IF IT IS THE INTENTION TO FOUND PIER AND FORWARD ABUTMENT 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. IT IS FURTHER SUGGESTED THAT THE AREA OF THE FOOTING CONTACT NOT BE SUBJECTED TO PROLONGED ATMOSPHERIC EXPOSURE, AND THAT THE EXCAVATION BE WELL DRAINED AT ALL TIMES.

UNCONFINED COMPRESSION TESTS ON SIMILAR SHALE BEDROCK INDICATES A CRUSHING STRENGTH ON THE ORDER OF 100 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 samplertis 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
		2.0mm (No. 10 sieve)	0.42mm (No. 40 sieve)	0.074mm (No. 200 sieve)	0.005mm	
8"	3"					

LOG OF BORING

Date Started 2-7-68 — Sampler Type SS — Dia. 1 3/8" — Water Elev. ____
Date Completed 2-8-68 — Casing: Length 15' — Dia. 3 1/2"
Boring No. B-9 — Station & Offset 18+08, 23' Lt. (Rear Pier) — Surface Elev. 753.9'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL Class.
753.9	0														
	2														
	4														
748.9	6	13/16			Brown Sandy Clay	1	7	5	9	34	45	36	13	22	A-6a
746.4	8														
	8	16/24			Gray Sandy Silt	2	10	8	11	32	39	30	9	12	A-4a
743.9	10	35/*			Gray Silty Sandy Gravel	3	40	18	12	16	14	22	4	9	A-2-4
743.4	12														
	14														
	16				Limestone and Shale Cobbles With Till.										
	18														
733.9	20				TOP OF ROCK										
	22														
	24		5.0	0.0											
	26														
	28		5.0	0.0											
	30														
	32				Shale, dark-gray, medium-firm, carbonaceous, fissile, badly broken and jointed. Core Loss 1%.										
	34		5.0	0.0											
	36														
	38		4.7	0.3											
713.9	40				BOTTOM OF BORING										

*Refusal

LOG OF BORING

Date Started 2-6-68 — Sampler Type SS — Dia. 1 3/8" — Water Elev. ____
Date Completed 2-9-68 — Casing: Length 22' — Dia. 3 1/2"
Boring No. B-10 — Station & Offset 20+28, 19' Rt. (Forward Abutment) — Surface Elev. 753.1'

Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL Class.
753.1	0														
	2														
	4														
748.1	6	10/13			Brownish-Gray Sandy Clay	1	7	5	9	30	49	36	11	19	A-6a
745.6	8														
	8	11/15			Gray Silty Clay	2	0	1	1	24	74	46	19	24	A-7-6
743.1	10														
	10	17/17			Gray Sandy Gravelly Silt	3	19	10	9	25	37	27	6	10	A-4a
740.6	12				TOP OF EXTREMELY WEATHERED ROCK										
738.1	14	21/24			Gray Sandy Gravelly Silt	4	26	10	10	24	30	26	7	26	A-4a
	16	35/*			Gray Extremely Weathered Shale TOP OF ROCK	5	35	13	9	24	19	24	6	9	Visual
735.6	18	40/*			Gray Extremely Weathered Shale	6	42	11	8	24	15	25	4	10	Visual
733.1	20		2.0	0.0	Shale, dark-gray, medium-firm, carbonaceous, fissile, weathered, with thick clay seams. No Core Loss.										
	22														
	24		4.7	0.3											
	26														
	28		4.5	0.5	Shale, dark-gray, carbonaceous, fissile, very badly broken and jointed. Core Loss 5%.										
	30														
	32														
	34		5.0	0.0											
718.1					BOTTOM OF BORING										

*Refusal

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
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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. CUY-80-
UNDER COLUMBIA ROAD
SEC. CUY-80-1.90

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