

GEOLOGY OF THE SITE

THE STRUCTURE SITE IS LOCATED IN THE RELATIVELY FLAT GLACIATED LAKE PLAIN REGION ON THE STEEP VALLEY WALL OF AND OVER THE GRAND RIVER, IN AN AREA WHERE RELATIVELY SHALLOW TO DEEP GLACIAL AND ALLUVIAL DEPOSITS OVERLIE SHALE BEDROCK, OF DEVONIAN AGE.

EXPLORATION

THE EXPLORATION CONSISTED OF NINETEEN DRIVE SAMPLE BORINGS, SEVEN DRIVE SAMPLE-CORE BORINGS, FOUR DRIVE-PRESS SAMPLE-CORE BORINGS, SIX DRIVE-PRESS SAMPLE BORINGS, ONE PRESS SAMPLE BORING AND THREE CORE BORINGS MADE BY MEANS OF A MECHANICALLY-POWERED HOLLOW STEM AUGER MOUNTED ON A MOBILE PLATFORM, PERFORMED BETWEEN AUGUST 10 AND DECEMBER 14, 1983.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

THE BORINGS DISCLOSED THAT INTERVALS OF EXTREMELY LOOSE TO EXTREMELY DENSE UNSTRATIFIED BASIC SILTS, CLAYS, SAND AND GRAVEL (VARIOUS DEPTHS OF CINDERS AND SLAG OCCUR ON THE WEST SIDE OF THE STRUCTURE AND LARGE BOULDERS AND BLOCKS OCCUR AT-SURFACE AND RATHER DEEP SCATTERED THROUGHOUT THE EAST SIDE OF THE STRUCTURE AT WATER'S EDGE) THAT GRADUALLY INCREASE (ERRATIC AT TIMES) IN DENSITY WITH INCREASE IN DEPTH OVERLIE SLOPING BEDROCK SURFACE. BORINGS B-1 THRU B-25 (USR 20) ENCOUNTERED BEDROCK SURFACE AT 6.0 TO 39.0-FOOT DEPTH, ELEVATION 612.3 TO 573.3 FEET AND WERE TERMINATED AT 15.0 TO 40.3-FOOT DEPTH, ELEVATION 611.3 TO 561.0 FEET, AFTER PENETRATING 0.0 TO 14.0 FEET BELOW BEDROCK SURFACE. BORINGS B-26 THRU B-34 (USR 20) DID NOT ENCOUNTERED BEDROCK SURFACE AND WERE TERMINATED AT 3.1 TO 55.0-FOOT DEPTH, ELEVATION 618.1 TO 527.5 FEET DUE TO ENCOUNTERING BOULDERS OR RUNNING SAND OR HAVING PENETRATED 10.0 FEET OR MORE OF MATERIAL REQUIRING IN EXCESS OF 30 BLOWS PER FOOT IN THE STANDARD PENETRATION TEST. BORINGS B-36 AND B-37 (CASEMENT ROAD) DID NOT ENCOUNTERED BEDROCK SURFACE AND WERE TERMINATED AT 35.3 AND 31.5-FOOT DEPTHS, ELEVATIONS 617.6 AND 633.6 FEET RESPECTIVELY, AFTER HAVING PENETRATED 10.3 FEET AND 1.5 FEET OF MATERIAL REQUIRING IN EXCESS OF 30 BLOWS PER FOOT IN THE STANDARD PENETRATION TEST. BORINGS B-38 AND B-39 (ERIE ST. EXIT) DID NOT ENCOUNTERED BEDROCK SURFACE AND WERE TERMINATED AT 46.0-FOOT DEPTH, ELEVATIONS 602.2 AND 609.6 FEET, RESPECTIVELY, AFTER HAVING PENETRATED 26.0 AND 23.5 FEET OF MATERIAL REQUIRING IN EXCESS OF 30 BLOWS PER FOOT IN THE STANDARD PENETRATION TEST.

FREE WATER WAS OBSERVED AND MEASURED IN THE TEST BORINGS AS SHOWN IN THE FOLLOWING TABLE:

BORING NO.	DEPTH WATER ENCOUNTERED	ELEVATION
B-2	25.0'	610.4'
B-3	21.0'	606.8'
B-5	17.5'	605.5'
B-6	25.0'	592.2'
B-7	25.0'	589.7'
B-8	26.0'	590.6'
B-9	20.0'	580.6'
B-10	17.5'	583.5'
B-11	21.0'	580.5'
B-12	35.0'	580.2'
B-13	20.0'	680.6'
B-14	17.5'	582.2'
B-15	30.0'	585.0'
B-16	25.0'	574.8'
B-17	17.5'	581.7'
B-18	19.0'	580.0'
B-19	30.0'	580.0'
B-20	17.5'	580.5'
B-21	17.5'	579.8'
B-22	15.0'	579.8'
B-23	12.5'	580.5'
B-24	5.0'	577.0'
B-25	SURFACE	581.0'
B-26	3.0'	579.9'
B-27A	1.0'	581.5'
B-32	7.5'	644.6'
B-37	10.0'	655.6'
B-39	10.0'	645.6'

- 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
- Top of Rock

- SYMBOLS OF ROCK TYPES**
- Coal
 - Weathered Mudstone or Claystone
 - Mudstone or Claystone
 - Weathered Shale
 - Shale
 - Weathered Siltstone
 - Siltstone

LEGEND

- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- 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.
Z = Number of Blows for Third 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.

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.

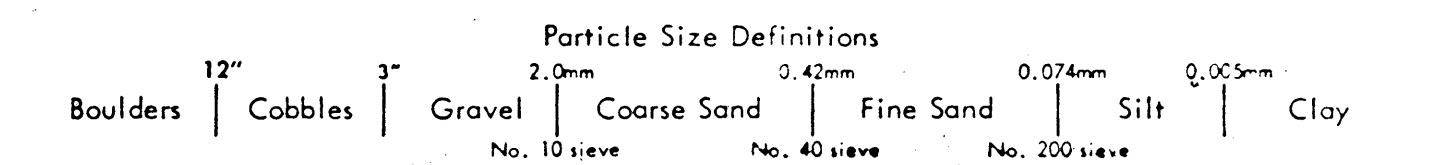
Drive Sample Borings - Drive-Press Sample Borings

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 18 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 three 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 cannot 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.



NOTE - ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS 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 BUREAU OF TESTS AT 1600 WEST BROAD STREET, THE PAVEMENT AND SOILS SECTION OF THE BUREAU OF LOCATION AND DESIGN OR IN THE BRIDGE BUREAU AT 25 SOUTH FRONT STREET.

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.

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. LAK-20-1714
OVER GRAND RIVER
SEC. LAK-20-17.04

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