

1962

Year

Job. No.

00553

Changes

County

FRANKLIN

Bridge No.

FRA-1-0310.4R.

Section

PIC-FRA-1-(306)(0.00)

Location

over  under

S.R. 3

File No.

FES-63

4-2-29

00070

CONSULTANT PROJECT

Name of Consultant

BARRETT CARBO WITHERS & Assoc

Name of Drilling Contractor

H.C. NUTTING

Contents of File

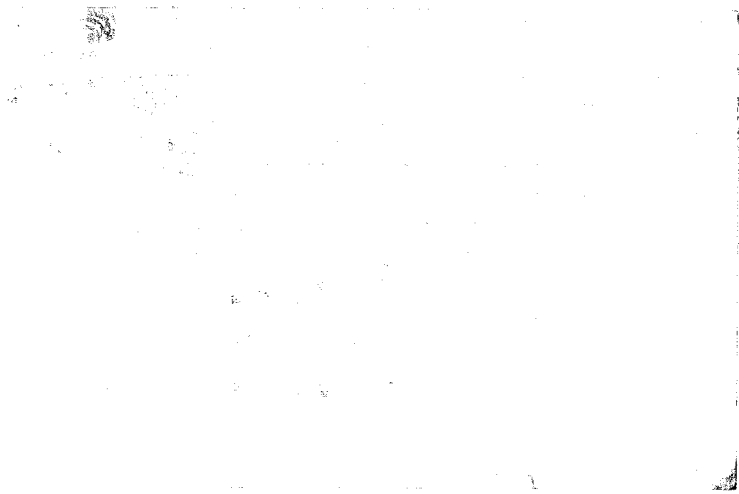
Date of Report

No. of Tracings

Date Received

Filed with Year

Remarks



REPORT OF FOUNDATION INVESTIGATION  
INTERSTATE 71  
BRIDGE NO. FRA-1-0310 R & L  
SR-1 (I-71) OVER STATE ROUTE NO. 3  
FRANKLIN COUNTY, OHIO  
1962

BARRETT, CARGO, WITHERS & ASSOCIATES, LTD.  
CONSULTING ENGINEERS

RECEIVED

AUG 24 1962

BARRETT, CARGO, WITHERS & ASSOCIATES, LTD.  
CONSULTING ENGINEERS  
COLUMBUS, OHIO

REPORT OF FOUNDATION  
INVESTIGATION

INTERSTATE 71

BRIDGE NO. FRA-1-0310 R & L

SR-1 (I-71) OVER STATE ROUTE NO. 3

FRANKLIN COUNTY, OHIO

BARRETT, CARGO, WITHERS & ASSOCIATES, LTD.  
CONSULTING ENGINEERS

FOUNDATION INVESTIGATION BY

THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO

# THE H. C. NUTTING COMPANY

MEMBER OF  
AMERICAN SOCIETY OF CIVIL ENGINEERS  
AMERICAN SOCIETY OF TESTING MATERIALS  
AMERICAN CONCRETE INSTITUTE  
AMERICAN WATERWORKS ASSOCIATION  
AMERICAN PUBLIC WORKS ASSOCIATION  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

ENGINEERS AND CHEMISTS

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

B-16814-ams  
Order No. 1770.8

August 22, 1962

Barrett, Cargo, Withers & Assoc., Ltd.  
Post Office Box 186  
Chillicothe, Ohio

Attention: Mr. Wm. I. Cargo

Re: Foundation Investigation  
Interstate 71  
Bridge No. FRA-1-0310 R & L  
Interstate Route 71 (SR-1)  
Over State Route 3

Gentlemen:


Submitted herewith is the foundation investigation report for Bridge No. FRA-1-0310 R & L, which will carry the proposed Interstate Route 71 over State Route No. 3 in Franklin County, Ohio. This report includes a summary of all laboratory test data, final laboratory logs and the results of our foundation analysis.

This work was accomplished in accordance with an agreement between Barrett, Cargo, Withers & Assoc., Ltd. and The H. C. Nutting Company dated March 20, 1962. This agreement covers the field and laboratory work on a reimbursable basis for the Ohio Department of Highways.

In addition, in accordance with your request, we have performed a foundation analysis to satisfy the requirements of Section IV-3, State of Ohio Department of Highway, "Specification for Subsurface Investigation" dated April 1, 1959, revised April 1, 1960.

Respectfully submitted,

THE H. C. NUTTING COMPANY

  
J. W. Snyder,  
Soils Engineer

George J. Thelen  
Assistant Engineer

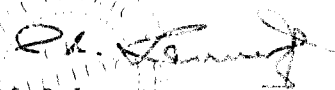
  
C. R. Lennertz,  
Chief Engineer

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## I. INTRODUCTION

This report covers the foundation investigation for the proposed Bridge No. FRA-1-0310 on the Interstate Route 71 to carry traffic on the Interstate Route over State Route 3 at Station 1004+00 to Station 1005+76 on the Interstate Route in Franklin County, Ohio. The proposed twin structures are to be continuous concrete slab with concrete substructure having overall lengths of about 176-ft. with 50-ft. wide roadways.

## II. DESCRIPTION OF SITE

All pertinent and existing conditions relative to the investigation are indicated on the site plan for the proposed structures. State Route 3 passes through the area in a northeast-southwest direction and is at the present time a two lane 20-ft. wide pavement constructed of Portland cement concrete. However, there are plans in the future for making State Route 3 four lanes wide, divided, so that the proposed structures to carry the Interstate over this highway are to be designed to accommodate the future dualization of the existing State Route 3. The proposed bridges are located in an approximately east-west direction and will carry the Interstate over State Route 3 at about a 27° skew.

For all practical purposes the existing topography within the area of these structures is relatively level at about elevation 873. Within the immediate area the site plan indicates the topography is relatively consistent with the general topography in the overall area, with the only breaks in the elevation of any consequence due to the drainage swales along the sides of the existing State Route 3 right-of-way. There is a slight rise to the southeast of the proposed crossing and a slight drop to the southwest. The difference in elevation between these high and low points is in the neighborhood of 5-ft. or less so that essentially the existing grade is nearly level at the site. The proposed finished grade of the Interstate Route is at about elevation 892 for the finished bridge structures. This means that there will be approximately 20-ft. of embankment fill required at the approaches to the structures to carry finished grade at the proposed elevation of the roadway surface on the bridges.

The subsurface materials at this site are glacial in origin and rather uniform, consisting of deep strata of glacial till extending from beneath the surface clays to the end of the borings. There is indicated at least one pocket of granular outwash materials as discovered in these borings. The glacial deposits originate from both the Illinoian and Wisconsin ice sheets. Bedrock at this site is of the Monroe formation of the Devonian System, primarily dolomites, and would be approximately 100-ft. below the ground surface.

### III. FIELD EXPLORATIONS

Six of the ten test borings as staked in the field by our engineer were drilled. The holes are numbered 1, 4, 5, 6, 7 and 10, and are located at the west abutment, the easternmost pier and the east abutment of the southbound structure and the west abutment, the westernmost pier and the east abutment of the northbound structure respectively. The existing ground elevation at each boring was determined by our field engineer. (See Plate I for a sketch indicating the "as drilled" locations.) Upon completion of the drilling of the first six holes an appraisal of the uniformity of the subsurface conditions by our engineer indicated that a relatively good correlation between borings Nos. 1, 4 and 5 for the southbound structure and Nos. 6, 7 and 10 for the northbound structure would permit omitting drilling any additional borings, in accordance with criteria previously established.

The six test borings were drilled during the period of July 7th thru July 11th, 1962. All six borings were made with a truck-mounted drill utilizing 3.5" I.D. hollow stem augers for advancing the holes. Sampling was accomplished with a split spoon sampler having an outside diameter of 2-inches and an inside diameter of 1-3/8 inches driven with a 140-lb. weight falling 30-inches. Samples were obtained at maximum intervals of 2.5-ft. from the indicated footing elevation as shown on the site plan to a depth of 20-ft. and at each change of material or at maximum intervals of 5-ft. thereafter. In accordance with the established criteria, the borings were taken 30-ft. into 30-blow material below the footing elevation. In addition to the spoon samples, five 3-inch diameter Shelby-tube samples were taken from test borings Nos. 4, 5 and 7 at depths as indicated on the laboratory logs. All borings at this site were carried to a depth of 56.5-ft. below the existing ground surface with the exception of boring No. 4 which extended only 51.5 feet. The total depth of the subsurface investigated extended to elevation 814.5.

All work was done in accordance with the governing specifications under the direction and supervision of a Field Engineer responsible to the Project Soil Engineer, both regular employees of The H. C. Nutting Company.

### IV. LABORATORY TESTS

All samples obtained in the six test borings were returned to our soil mechanics laboratory in Cincinnati, Ohio where they were tested in accordance with Section VII of the State of Ohio, Dept. of Highways, "Specifications for Subsurface Investigations" dated April 1, 1959 and revised April 1, 1960. All 111 samples obtained in the boring operations were then classified under the HRB and State of Ohio Testing Laboratory Classification Systems.



Undisturbed tests on specimens taken from the Shelby-tube samples consisted of five unconfined compression tests and one consolidation test.

The results of all tests and classifications are given in the Summary of Test Data forms. These tests are plotted in combination with the results of the field logs in the form of laboratory logs together with the undisturbed test data, all presented on appropriate forms included in Appendix II of this report.

#### V. SUMMARY OF SUBSURFACE CONDITIONS

On Plates II-a and II-b in Appendix I we have shown the summary of the field and laboratory phases of the subsurface investigation. On these figures we have included the following.

- A) A graphic log of each of the six test borings indicating various soil strata using the Ohio State Testing Laboratory Legend, ground water data, and the proposed footing elevations.
- B) A plot of the medians of the natural moisture content, liquid and plastic limits versus elevation.
- C) A plot of the N-values; i.e., the Standard Penetration Test versus elevation. In our analysis we have taken the N-value as being the total number of blows for the final foot of penetration in an overall penetration of 18-inches.

The details of the stratification and properties of the various subsurface strata indicated on the these summary sheets in Appendix I are listed on the laboratory logs and the Summary of Test Data sheets included in Appendix II of this report. The following are what we consider to be the most important points which will determine the design and performance of the foundation for the proposed structure at this site.

- A) The subsurface profile consists of a relatively deep deposit of glacial till extending to the end of the borings, elevation 814.5. There was encountered in one boring, test boring No. 1, a pocket of granular outwash sand and gravel which was not evidenced in any of the other borings at this site.

- B) The soil profile exhibits a rather heterogeneous character for a depth of about 25-ft.. It is likely that the last 5 to 10-ft. of this 25-ft. total is weathered till with the upper 15-ft. being a product of erosion and redeposition. For simplicity, however, we refer to this material as "weathered till". Also, based upon the available data contained on Plates II-a and II-b, it is our estimation that this weathered till terminates at about elevation 848 to 850. Except for the pocket of A-2-4 outwash material previously described, the weathered till contains varying amounts of sandy silt, A-4a and silt and clay, A-6a soils.
- C) A thin layer of topsoil and/or fill approximately 1-ft. in thickness covers the entire site except the area of the existing road surface. Immediately underlying the topsoil and/or fill material there is a layer of clay, A-7-6 or A-6b, soils which extends to a depth of about 2 to 4-ft. with the exception of boring No. 7 where the A-7-6 soil extended to a depth of about 7 or 8-ft. below the surface. These clay soils are the result of erosion and redeposition for the most part with the possibility of their partially being the result of some mechanical and chemical weathering processes of the underlying glacial till soils.
- D) The physical properties of the various soils which comprise the soil profile do show some variation; however, there is a remarkable similarity in the general trends of these properties with relation to elevation. In the weathered zone the Standard Penetration Resistances vary from 5 blows per foot near the surface to about 35-blow per ft. near elevation 850. A straight line drawn between these two values starting with 5 at elevation 774 and going to 35 at elevation 850 would not be too far from the average N-value curve through this range in elevations. As can be noted on Plates II-a and II-b in the appendix, the natural moisture contents and Atterberg limits are also quite uniform. Natural moisture will average close to 10% throughout the entire depth of the soil profile. The plastic limit decreases slightly with depth, varying from about 15% near the surface to 12% at approximately elevation 815. The liquid limit shows the greatest variation ranging from a high of 54% to a low of 19%. The surface clays yielded high liquid limits and in general these limits decreased to an elevation of about 862. There the trend is toward a slight decrease until elevation 850 is reached, and below elevation 850 there is a consistent decrease in the liquid limit from a value of 25% to about 20% at about elevation 815.

- E) Judging from the Standard Penetration resistances and the other physical characteristics, it is our estimation that the soils below elevation 848 to 849 are unweathered dense glacial tills. Although there appears to be a trend toward decreasing values in the Standard Penetration Resistances below elevation 830, it is not considered significant insofar as the stability and safety of the proposed structures is concerned. It is possible that the sandy silt soils at depths of about 50-ft. below the surface are under hydrostatic pressures and became slightly and temporarily quick due to the dynamic forces produced by driving the sampling spoon. This could have resulted in penetration resistances falling off from the high values of about 80 encountered at elevation 830 down to values of 40 to 45 below elevation 820.
- F) The ground water elevations as reported vary from about 863 to 867. This will be within 2 to 6-ft. below the bottom of the proposed pier footing elevations.
- G) Based upon the foregoing statements, we have assumed the following soil profile for our analyses.
- 1) From the surface to about elevation 868 or 869, topsoil and/or fill underlain by stiff surficial clays.
  - 2) From 868 or 869 to elevation 849 brown sandy silt and clay with some outwash sands and gravel varying from stiff to very stiff in consistency.
  - 3) Below elevation 849 to the limit of exploration, brown sandy silt, some clay, little gravel, varying from very stiff to hard in consistency.
  - 4) Ground water elevation = 864.

#### VI. DESIGN ANALYSIS

The preliminary design studies as represented on the site plan indicate tentative pier footing elevations at about 868 to 869 and the abutments are shown at elevation 880.5 to 882.7. Each pier consists of four 3-ft. diameter columns tied together as a rigid frame by a 3 to 4-ft. deep cap and a continuous footing. The columns will be approximately 15-ft. high. Judging by the site plan, it appears that the abutments will be approximately 60-ft. long with a footing width of about 6'-3".

The depth of the approach fill at the abutment locations will be about 19 to 22-ft. above the existing ground surface after topsoil and fill is removed. In performing a settlement analysis of the fill foundation materials (See Plate IV in Appendix I.) we assumed an average height of 20-ft.. The abutment footings will be an average of 9-ft. above the bottom of the fill. Because of the relatively light loads imposed by the abutments the total effect of the abutment on estimated settlement will be very slight. Our settlement analysis indicates a total potential settlement of fill of in excess of 3-inches. At least 90% of this total settlement should be realized within 60-days from time the fill is completed. By waiting at least 60-days after completion of the approach embankment fills before beginning of the construction of the abutment footings, settlement of the abutments due to consolidation of the subgrade soil should be of a non-detrimental quantity.

The soil pressure at the base of the abutment footings will be in the neighborhood of 2 kips per sq. ft. with 7 to 10-ft. of fill between the abutment footing and the top of the existing subgrade, these pressures will be reduced less than 1 kip per sq. ft. at the existing subgrade elevation. The fill and foundation soils will have more than sufficient shearing strength to support the abutments without danger of bearing capacity failure.

The problem is much more severe at the pier foundations, however. The pier footings seated in the surface clays with the ground water possibly as close as 2-ft. to the bottom of footings make it quite probable that excessive long term settlements could develop if spread footings are used to support the piers. A pile foundation therefore was analyzed for these piers.

Theoretical analyses of pile foundations provide only guides to the final length and capacity recommendations. This is especially true in construction procedures which use dynamic formulas as a criteria for determination of the final length of the piles in-place. Since a pile derives its supporting capacity from shear along the periphery of the pile and from the portion of load carried by the tip in end bearing, it is necessary that these values be established for the various soils found in the soil profile. Friction values assumed for the soils encountered at this site are given on Plate III in the appendix. For the stiff till it is assumed 1000-psf friction and for the hard till, 2000-psf skin friction is assumed. Although the amount of the total load carried by the pile tip would vary with the materials into which it is driven, we have used a figure of 30% of the ultimate pile load, assuming, as well as recommending, that the piles will be driven to at least elevation 845, or below, into the hard glacial till strata.

VIII. CONSTRUCTION PROBLEMS

The only anticipated problems at this site are those which are always present in construction of pile foundations; i.e., failure of the piles to penetrate to the recommended depth or excessive penetration of the pile. The former problem can generally be overcome by the use of pre-drilling. We would not anticipate at this site that this would be needed, however. The latter problem, again which we do not anticipate will present itself at this site, but is always possible, cannot be handled so easily.

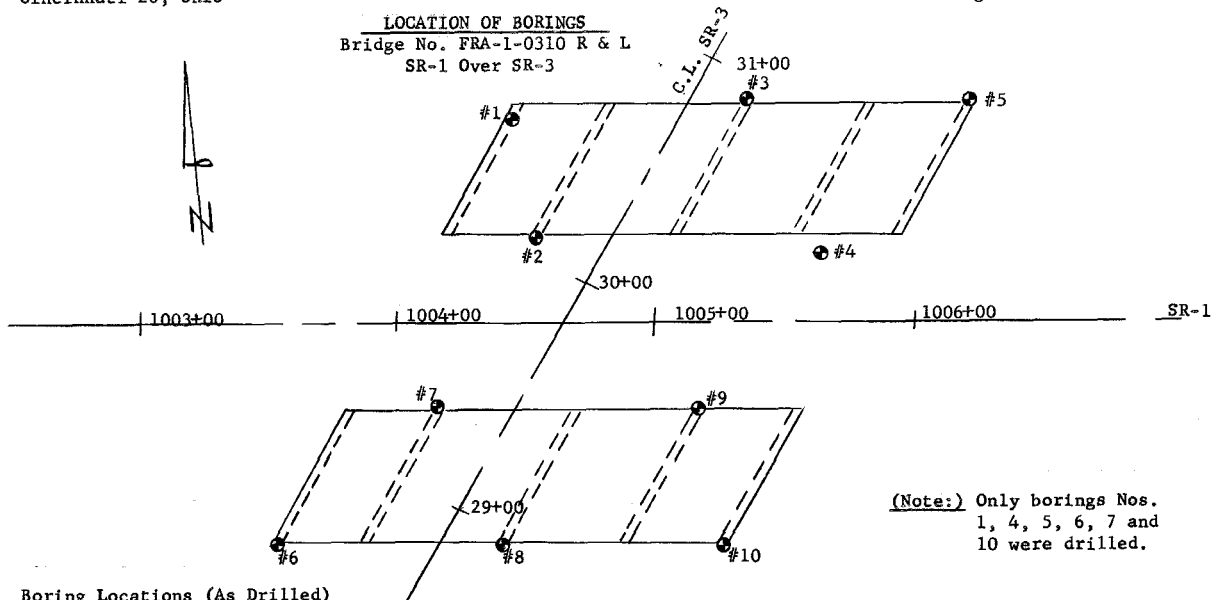
Preventing excessive pile penetration, especially when the subsurface investigations indicate satisfactory supporting capacities, can develop into a difficult problem. It is possible that the sandy silts might develop a temporarily quick condition when subjected to dynamic forces produced during pile driving operations. Under such conditions piles could continue to move, possibly until bedrock is encountered; yet if driving is discontinued for a short period of time, it may not be possible to drive the piles further when driving is resumed. The results of driving the first pile usually provide a good guide to use in making a decision with regard to the amount of maximum penetration of piles at any site. It is suggested that if at this site or any other site the first pile driven exceeds the recommended design depth without satisfying the requirements of the dynamic formula for that depth, driving of the pile should be discontinued for 24-hours. After waiting one day attempts to re-drive this pile should be made. If these attempts to re-drive still result in failure of the pile to satisfy the dynamic formula requirements, then driving can be continued until the requirements are met. In a silt soil under hydrostatic water pressure conditions, many times piles will not meet the driving formula conditions at the time of driving, but after driven to a design depth and waiting 24-hours it will be found impossible to re-drive the piling to any greater penetration which indicates that the piles do meet the formula conditions for the particular loading to be placed on the pile.

Ground water should be no problem, as excavations for the pile caps should not extend deep enough to penetrate the ground water at this site. The fill materials for the approach embankments should be compacted to the specifications as required for embankment construction by the State Highway Department.

The H. C. Nutting Company  
Cincinnati 26, Ohio

Barrett-Cargo-Withers & Assoc., Ltd.  
Interstate 71 - Bridge No. FRA-1-0310 R & L

LOCATION OF BORINGS  
Bridge No. FRA-1-0310 R & L  
SR-1 Over SR-3



(Note:) Only borings Nos.  
1, 4, 5, 6, 7 and  
10 were drilled.

Scale: 1" = 50'

Boring Locations (As Drilled)

<u>No.</u>	<u>Station</u>	<u>Offset</u>	<u>Existing Ground</u>	
			<u>Elevation</u>	
1	30+41	55' L.	873.5	
4	30+54	73' R.	873.8	
5	31+33	97' R.	874.6	
6	28+56	55' L.	871.0	
7	29+33	21' L.	873.5	
10	29+34	97' R.	873.2	

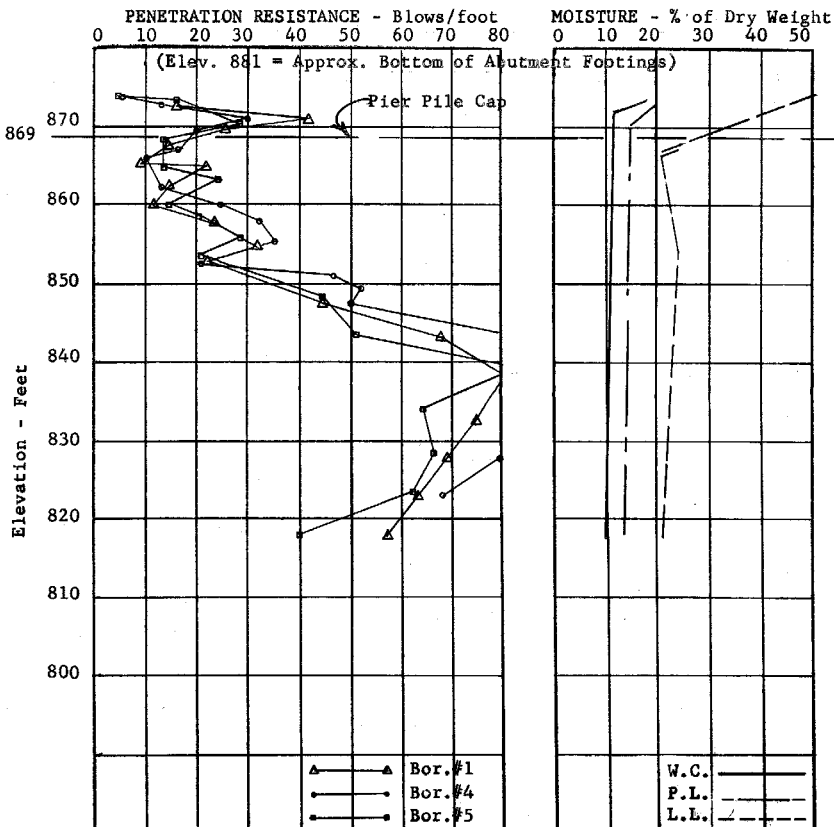
Station on SR-3

Plate I - SR-3

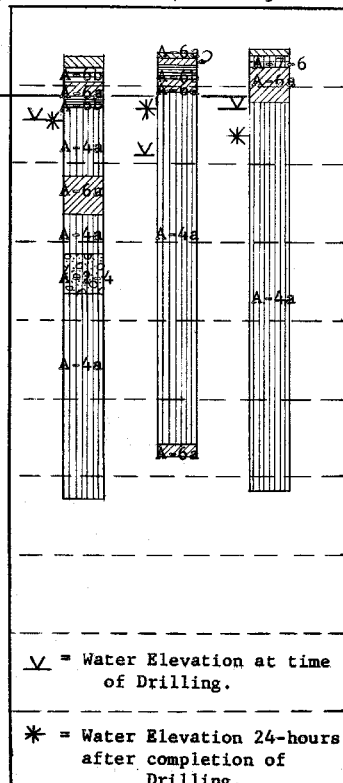
THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO

DATA SUMMARY SHEET

CLIENT: Barrett-Cargo-Withers & Assoc., Ltd.  
PROJECT: Interstate 71 - Bridge No. FRA-1-0310 R & L



SOIL PROFILE  
Bor. # 1 4 5



Classification System: OHIO - SHTL

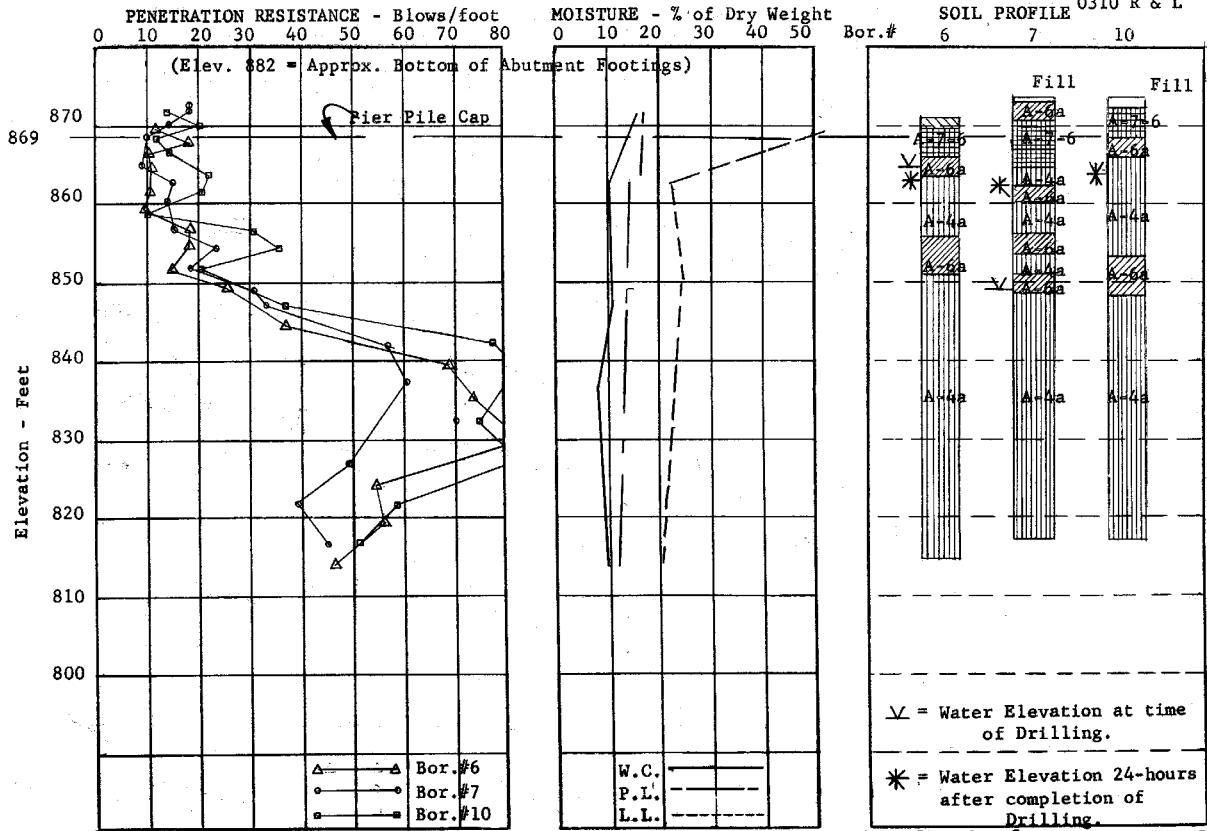
Date: 8/22/62

Plate II-a - SR-3

THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO

DATA SUMMARY SHEET

CLIENT Barrett-Cargo-Withers & Assoc., Ltd.  
PROJECT Interstate 71 - Bridge No. FRA-1-  
0310 R & L



Classification System: OHIO - SHFL

Date: 8/22/62

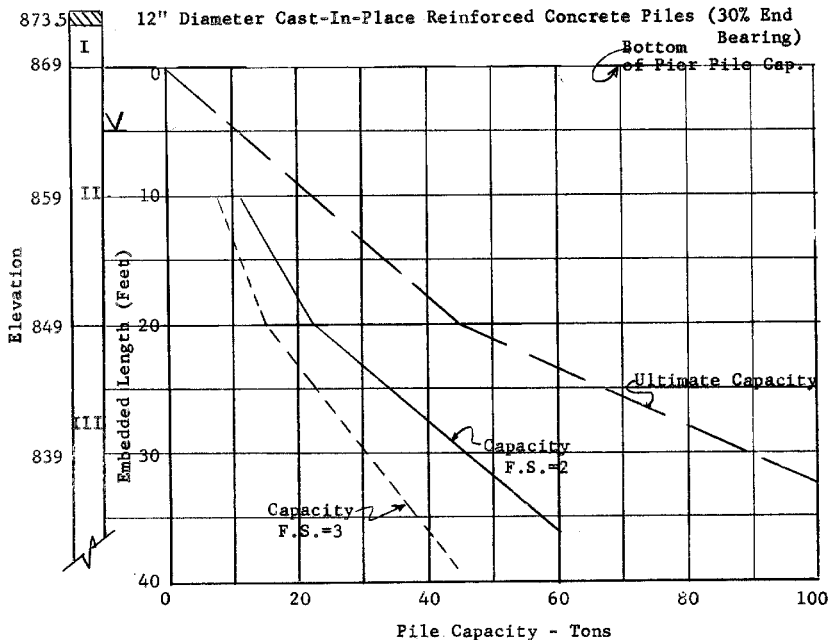
Plate II-b - SR-3



The H. C. Nutting Company  
Cincinnati 26, Ohio

Barrett-Cargo-Withers & Assoc., Ltd.  
Interstate 71 - Bridge No.  
FRA-1-0310 R & L

PILE LENGTH - CAPACITY CURVES  
SR-3, Piers



SOIL PROFILE

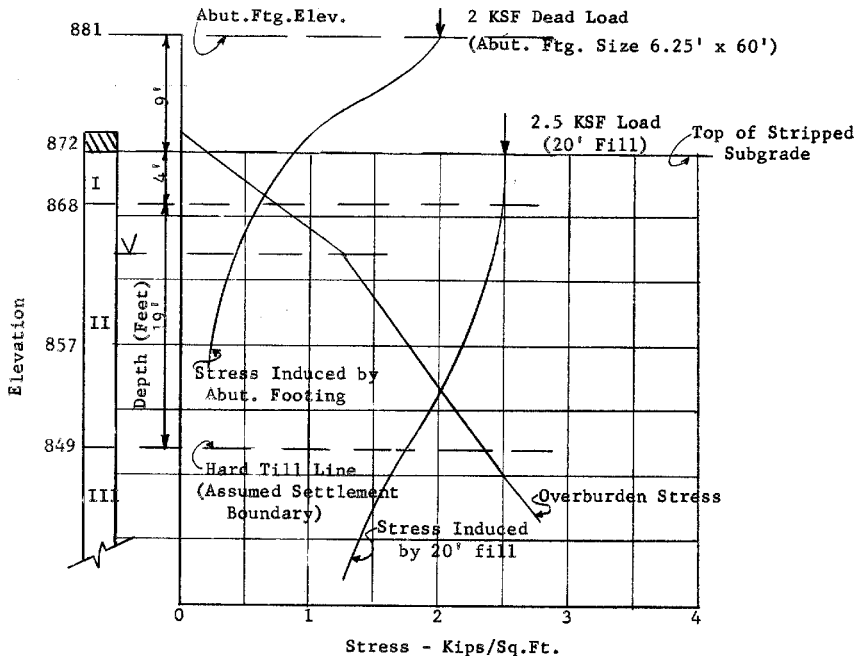
I - Clay  
 II - Stiff Till - Assumed Skin Friction = 1000 psf  
 III - Hard Till - Assumed Skin Friction = 2000 psf  
 Assume -  $P_{tip} = 30\% P_{ult}$ .  
 $P_{ult} = P_{frict.} + P_{tip} = P_{frict.}/0.7$   
 For 12" Dia. Pile,  $P_{ult} = 3.14 (D)(L)(F)/0.7 = 4.5 (L)(F)$

Recommended Design Capacity Curve - F.S. = 2

(Due to very hard consistency of soil below elevation 845, doubtful if piles will penetrate much below elevation 840 which will result in a 12" Diameter Pile Capacity of about 40 T. - with F.S. = 2)

Plate III - SR-3

LOAD SETTLEMENT DIAGRAM  
SR-3, Abutments



SOIL PROFILE

- I - Clay Stratum -  $\gamma = 130$  pcf,  $e_o = 0.50$ ,  $C_c = 0.06$
- II - Stiff Till Stratum -  $\gamma = 135$  pcf,  $\gamma_{sub} = 73$ ,  $e_o = 0.39$ ,  $C_c = 0.03$
- III - Hard Till Stratum

SETTLEMENT COMPUTATIONS

$$S = \left[ \frac{C_c}{1+e_o} \right] (H) \text{Log}_{10} \left[ \frac{(P_o + \Delta P)}{P_o} \right]$$

$$20' \text{ Fill } S = \left[ \frac{0.06}{1.50} \right] (4) \text{Log} \left[ \frac{(.5+2.5)}{.5} \right] + \left[ \frac{0.03}{1.39} \right] (19)$$

$$= 0.12 + 0.15 = 0.27\text{-ft. or } 3\frac{1}{4}\text{-inches}$$

Assuming  $P_o$  (Clay) = 50% of P. induced by 20-ft. Fill (after 30-days)

$$\text{Abut. Ftg. } S = \left[ \frac{0.06}{1.50} \right] (4) \text{Log} \left[ \frac{(1.25+.7)}{1.25} \right] + \left[ \frac{0.04}{1.39} \right] (19)$$

$$= 0.03 + 0.02 = 0.05\text{-ft. or } 5/8\text{-inch.}$$

## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

DATE STARTED 7/10/62 SAMPLER: TYPE Split Spoon DIA. 2"O.D. WATER ELEV. IMMEDIATE 866.0 CLIENT: Barrett-Cargo-Withers & Assoc.  
 DATE COMPLETED 7/11/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 24 HOURS 865.7 PROJECT: I-71 - Bridge No. FRA-1-0310  
 \_\_\_\_\_ Hollow Stem Augers \_\_\_\_\_  
 BORING No. 1 STATION AND OFFSET 30+41, 55' L. of C.L. of SR-3 SURFACE ELEV. 873.5 R & L

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics													
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS					
873.5	0																		
872.0	1	1	3-7-9	16"	Topsoil, dry - hard.	No Tests Performed.													
870.5	2																		
	2	2	10-19-33	15"	Brown silty clay, little sand, trace gravel, dry - hard.	9	7	11	38	35	38	22	9	A-6b					
868.5	4	3	15-14-12	16"	Brown silt and clay, some sand, little gravel, moist - very stiff.	12	12	13	38	25	29	14	12	A-6a					
	6	4	5-6-8	17"	Mottled brown and gray silt and clay, some sand, little gravel, moist - stiff.	10	9	12	37	32	40	23	18	A-6b					
866.0	8	5	4-5	12"	Brown sandy silt, little gravel, very moist - medium stiff.	13	15	18	39	15	21	6	15	A-4a					
	10	6	11	6"	Brown sandy silt, little gravel, moist - stiff.	15	20	17	38	10	19	6	10	A-4a					
858.5	12	7	10-7-7	16"	do do do	17	11	13	40	19	21	8	11	A-4a					
	14	8	6-6-6	17"	Brown sandy silt, little gravel, moist - medium stiff.	15	12	13	42	18	21	8	13	A-4a					
853.5	16	9	5-9-14	18"	Brown silt and clay, some sand, little gravel, moist - medium stiff.	13	11	15	39	22	25	11	13	A-6a					
	18	10	11-14-18	16½"	Brown silt and clay, some sand, trace gravel, moist - medium stiff.	8	11	15	41	25	25	12	12	A-6a					
848.5	20	11	8-10-12	17"	Gray sandy silt, little gravel, moist - stiff.	10	9	15	40	26	23	8	11	A-4a					
	22																		
843.5	24																		
	26	12	10-16-28	18"	Brownish gray silty sand, little gravel, moist - dense.	11	9	61	4	15	23	9	11	A-2-4					
843.5	28																		
	30	13	24-44	12"	Brownish gray sandy silt, little gravel, moist - very stiff.	10	7	17	41	25	23	10	8	A-4a					
	32																		
	34																		

## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/10/62 SAMPLER: TYPE Spoon DIA. 2" O.D. WATER ELEV. IMMEDIATE 866.0 CLIENT Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/11/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 24 HOURS 865.7 PROJECT: I-71 - Bridge No. FRA-1-0310  
Hollow Stem Augers R & LBORING No. 1 STATION AND OFFSET 30+41, 55' L. of C.L. of SR-3 SURFACE ELEV. 873.5

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics									
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS	
	34														
	36	14	32-49	12"	Brownish gray sandy silt, little gravel, moist - very stiff.	10	7	17	41	25	22	9	8	A-4a	
	38														
	40														
	42	15	17-26-39	17½"	do do do	11	8	16	39	26	22	9	10	A-4a	
	44														
	46	16	22-29-40	18"	do do do	16	7	16	39	22	21	8	10	A-4a	
	48														
	50														
	52	17	20-26-37	18"	do do do	12	8	16	40	24	22	8	9	A-4a	
	54														
817.0	56	18	13-23-24	18"	Brownish gray sandy silt, little gravel, moist - very stiff.	10	9	18	40	23	21	8	11	A-4a	
	58				Boring Completed.										
	60														
	62														

## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

DATE STARTED 7/8/62 SAMPLER: TYPE Spoon DIA. 2" O.D. WATER ELEV. IMMEDIATE 861.3 CLIENT: Barrett-Cargo-Withers & Assoc.  
 DATE COMPLETED 7/8/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 96 HOURS 867.8 PROJECT: I-71 - Bridge No. FRA-1-0310  
 BORING No. 4 STATION AND OFFSET 30+54, 73' R. of C.L. of SR-3 SURFACE ELEV. 873.8  
 Hollow Stem Augers R & L

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics													
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS					
873.8	0		3	4"															
873.3		1			<del>Topsoil - moist - soft.</del>	No	Tests	Performed											
872.3	2	2	5-8	8"	<del>Bsn. Silt &amp; Clay, little sand, dry - stiff.</del>	0	6	12	53	29	34	14	13	A-6a					
870.8		3			Brown silty clay, little sand, trace gravel, dry - very stiff.	8	8	11	39	34	35	20	6	A-6b					
868.8	4	4	9-10-10	17"	Brown silt and clay, some sand, little gravel, moist - stiff.	11	11	14	38	26	26	12	11	A-6a					
	6	S-1		12"	Brown sandy silt, trace gravel, moist - stiff.	7	11	14	42	26	24	9	12	A-4a					
	5		8	6"	Brown sandy silt, little gravel, moist - stiff.	12	12	16	40	20	21	8	11	A-4a					
	8	6	4-6	12"	Brown sandy silt, some gravel, very moist - medium stiff.	28	11	13	33	15	20	6	14	A-4a					
	10	S-2		12"	Brown sandy silt, some gravel, moist - medium stiff.	24	11	14	37	14	21	7	12	A-4a					
	12	7	6-6-7	15"	Brown sandy silt, little gravel, moist - stiff.	17	11	18	41	13	20	5	10	A-4a					
	14	8	7-10-14	12"	Brown sandy silt and gravel, moist - medium stiff.	38	7	11	30	14	20	6	12	A-4a					
	16	9	17-17-15	17"	Brown sandy silt, little gravel, moist - stiff.	16	9	15	38	22	22	8	10	A-4a					
	18																		
	20	10	9-15-20	18"	Brown sandy silt, some gravel, moist - stiff.	20	10	14	35	21	22	8	10	A-4a					
	22	11	5-8-13	18"	Brown sandy silt, little gravel, moist - stiff.	10	9	15	38	28	24	8	12	A-4a					
	24	12	11-21-26	18"	Brown sandy silt, little gravel, moist - very stiff.	17	8	14	37	24	24	9	11	A-4a					
	26	13	13-20-32	18"	do do do	11	9	14	39	27	25	10	12	A-4a					
	28	14	15-21-29	17"	Brown sandy silt, little gravel, moist - stiff.	12	10	18	39	21	23	8	10	A-4a					
	30																		
	32	15	25-40-61	18"	Brownish gray sandy silt, little gravel, moist - very stiff.	10	9	16	41	24	22	8	10	A-4a					
	34																		

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## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/8/62 SAMPLER: TYPE Spoon DIA. 2" O.D. WATER ELEV. IMMEDIATE 861.3 CLIENT: Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/8/62 CASING: LENGTH DIA 3.5" I.D. AFTER 96 HOURS 867.8 PROJECT: I-71 - Bridge No. FRA-1-0310  
Hollow Stem Augers R & LBORING No. 4 STATION AND OFFSET 30+54, 73' R. of C.L. of SR-3 SURFACE ELEV. 873.8

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics												
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS				
	34																	
	36	16	32-50	12"	Brownish gray sandy silt, little gravel, moist - very stiff.	10	8	18	42	22	20	6	10	A-4a				
	38																	
	40																	
	42	17	36-52	12"	Brownish gray sandy silt, trace gravel, moist - very stiff.	9	7	17	44	23	22	9	9	A-4a				
	44																	
	46	18	25-34-46	18"	do do do	8	8	18	42	24	21	7	9	A-4a				
	48																	
823.8	50																	
822.3	52	19	18-28-40		Brownish gray silt and clay, some sand, trace gravel, moist - very stiff.	5	9	18	44	24	27	14	10	A-6a				
	54				Boring Completed.													
	56																	
	58																	
	60																	



## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/8/62 SAMPLER: TYPE Spoon DIA. 2"O.D. WATER ELEV. IMMEDIATE 867.1 CLIENT: Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/9/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 72 HOURS 864.1 PROJECT: I-71 - Bridge No. FRA-1-0310

R &amp; L

BORING No. 5 STATION AND OFFSET 31+33, 97' R. of C.L. of SR-3 SURFACE ELEV. 874.6

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics														
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL. CLASS						
	34																			
	36	13	32-51	12"	Brownish gray sandy silt, trace gravel, moist - hard.	6	8	18	49	19	21	8	8							A-4a
	38																			
	40																			
	42	14	24-29-35	18"	Brownish gray sandy silt, little gravel, moist - hard.	10	8	18	43	21	21	8	9							A-4a
	44																			
	46	15	22-30-36	10"	Brownish gray sandy silt, trace gravel, moist - hard.	9	8	17	42	24	22	9	9							A-4a
	48																			
	50																			
	52	16	16-26-36	18"	Brownish gray sandy silt, little gravel, moist - hard.	12	8	17	43	20	20	8	9							A-4a
	54																			
818.1	56	17	11-16-24	18"	Brownish gray sandy silt, trace gravel, moist - hard.	9	8	20	42	21	21	9	10							A-4a
	58				Boring Completed.															
	60																			
	62																			



## TESTING ENGINEERS AND SOILS CONSULTANTS

## Split LOG OF BORING

DATE STARTED 7/9/62 SAMPLER: TYPE Spoon DIA. 2"O.D. WATER ELEV. IMMEDIATE 863.5 CLIENT: Barrett-Cargo-Withers & Assoc.  
 DATE COMPLETED 7/10/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 48 HOURS 862.5 PROJECT: I-71 - Bridge No. FRA-1-0310  
 BORING No. 6 STATION AND OFFSET 28+56, 55' L. of C.L. of SR-3 SURFACE ELEV. 871.0  
 Hollow Stem Augers R & L

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics											
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS			
871.0	0																
869.5	1		1-5-7	6"	Topsoil, moist - medium stiff.	No Tests Performed.											
	2	2	5-8-10	8"	Mottled brown and gray clay, trace sand, moist - very stiff.	0	2	7	39	52	47	26	18	A-7-6			
866.0	4	3	6-6-4	15"	Mottled brown and gray clay, little sand, moist - very stiff.	0	3	7	42	48	44	25	20	A-7-6			
	6	4	3-5-6	8"	Brown silt and clay, little sand, trace gravel, moist - stiff.	4	7	11	48	30	29	12	14	A-6a			
863.5	8																
	10	5	5-5-5	17½"	Brown sandy silt, little gravel, moist - medium stiff.	19	12	16	37	16	21	7	13	A-4a			
856.0	12	6	3-4-5	17"	do do do	17	11	14	40	18	19	5	13	A-4a			
	14	7	5-8-10	16"	Brown sandy silt, some gravel, moist - stiff.	27	9	10	37	17	21	8	13	A-4a			
	16	8	3-4-5	18"	Brown silt and clay, some sand, little gravel, moist - stiff.	10	10	14	38	28	25	11	15	A-6a			
	18	9	4-6-9	16"	Brownish gray silt and clay, some sand, little gravel, moist - stiff.	12	10	14	43	21	24	11	12	A-6a			
851.0	20																
	22	10	6-9-17	18"	Gray sandy silt, trace gravel, moist - stiff.	7	10	14	41	28	24	10	12	A-4a			
847.0	24																
	26	11	10-15-22	18"	Brown sandy silt, little gravel, moist - very stiff.	10	10	18	42	20	22	8	10	A-4a			
	28																
	30																
	32	12	20-29-40	17"	Brown sandy silt, trace gravel, moist - very stiff.	8	8	16	43	25	23	10	9	A-4a			
	34																



## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/10/62 SAMPLER: TYPE Spoon DIA. 2" O.D. WATER ELEV. IMMEDIATE 848.5 CLIENT: Barrett-Cargo-Withers & Assoc.  
 DATE COMPLETED 7/10/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 48 HOURS 863.0 PROJECT: I-71 - Bridge No. FRA-1-0310  
 Hollow Stem Augers \_\_\_\_\_ SURFACE ELEV. 873.5 R & L

BORING No. 7 STATION AND OFFSET 29+33, 21' L. of C.L. of SR-3 SURFACE ELEV. 873.5

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics													
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	SHTL CLASS					
873.5	0	1	9	6"	Crushed Limestone and Clay, Fill, dry														
873.0		2	10-8	9"	Brown silt and clay, some sand, trace gravel, fill, moist - stiff.	5	13	19	36	27	30	13	15						A-6a
870.5	2	3	6-7-7	4"	Brown silt and clay, fill, moist - stiff.	Insufficient Sample										A-6a			
	4	4	3-4-6	16"	Mottled brown and gray clay, little sand, moist - stiff. (visually)	0	4	9	38	49	54	36	14						A-7-6
	6	S-1		14"	do do do	0	3	7	43	47	48	30	21						A-7-6
864.5	8	5	3-4-5	15"	do do do	0	6	12	40	42	42	23	12						A-7-6
	10	6	9-7-8	17"	Brown sandy silt, little gravel, moist - stiff.	17	12	15	35	21	21	7	10						A-4a
862.0	12																		
860.0		7	10-7-7	6"	Brown silt and clay, little sand, some gravel, moist - stiff.	30	7	9	36	18	27	12	14						A-6a
	14																		
		S-2		16"	Brown sandy silt, some gravel, moist - stiff	20	12	12	38	18	21	7	12						A-4a
856.0	16	8	6-7-8	10"	do do do	29	9	11	35	16	23	10	13						A-4a
	18																		
		9	7-10-13	18"	Brownish gray silt and clay, some sand, little gravel, moist - very stiff.	14	12	15	38	21	24	11	10						A-6a
853.5	20																		
		10	6-8-10	18"	Brown sandy silt, little gravel, moist - very stiff.	15	9	13	38	25	25	10	13						A-4a
851.0	22																		
		11	10-14-17	18"	Brownish gray silt and clay, some sand, trace gravel, moist - very stiff.	7	9	15	44	25	25	11	11						A-6a
848.5	24																		
		12	10-14-19	18"	Brown sandy silt, little gravel, moist - stiff.	10	12	19	41	18	23	9	12						A-4a
	26																		
	28																		
	30																		
		13	14-21-36	18"	Brownish gray sandy silt, little gravel, moist - very stiff.	13	7	16	40	24	23	10	10						A-4a
	32																		
	34																		

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## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/10/62 SAMPLER: TYPE Spoon DIA. 2"O.D. WATER ELEV. IMMEDIATE 848.5 CLIENT: Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/10/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 48 HOURS 863.0 PROJECT: I-71 - Bridge No. FRA-1-0310  
Hollow Stem Augers R & LBORING No. 7 STATION AND OFFSET 29+33, 21' L. of C.L. of SR-3 SURFACE ELEV. 873.5

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics												
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	SHTL. CLASS				
	34																	
	36	14	17-26-35	17½"	Brownish gray sandy silt, trace gravel, moist - very stiff.	7	8	17	42	26	22	10	9	A-4a				
	38																	
	40																	
	42	15	22-34-36	17½"	Brownish gray sandy silt, little gravel, moist - hard.	13	7	17	38	25	23	10	9	A-4a				
	44																	
	46	16	13-20-29	18"	do do do	11	8	17	40	24	22	10	10	A-4a				
	48																	
	50																	
	52	17	12-16-23	18"	do do do	12	8	17	40	23	22	10	10	A-4a				
	54																	
817.0	56	18	14-19-26	18"	Brownish gray sandy silt, little gravel, moist - hard.	13	8	18	37	24	21	9	10	A-4a				
	58				Boring Completed.													
	60																	

## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/7/62 SAMPLER: TYPE Spoon DIA. 2" O.D. WATER ELEV. IMMEDIATE None CLIENT: Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/8/62 CASING: LENGTH DIA. 3.5" I.D. AFTER 96 HOURS 863.7 PROJECT: I-71 - Bridge No. FRA-1-0310  
Hollow Stem Augers R & LBORING No. 10 STATION AND OFFSET 29+34, 97' R. of C.L. of SR-3 SURFACE ELEV. 873.2

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics												
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	SHTL CLASS				
873.2	0																	
871.7	1	1	1-7-7	12"	Topsoil and brown sandy clay, with fine gravel, fill, dry - loose (visual)	No Tests	Performed.											
	2	2	7-9-12	14"	Brown clay, little sand, moist - very stiff.	0	4	6	37	53	54	36	15					A-7-6
868.2	4	3	5-6-6	17"	Mottled brown and gray clay, little sand, trace gravel, moist - very stiff	1	3	10	40	46	42	24	21					A-7-6
	6	4	5-7-7	17½"	Brown silt and clay, some sand, little gravel, moist - stiff.	11	10	14	41	24	26	11	14					A-6a
865.7	8																	
	10	5	5-11-11	18"	Brown sandy silt, some gravel, moist - stiff.	22	10	13	36	19	24	10	11					A-4a
	12	6	11-14-7	15"	do do do	21	10	12	36	21	23	9	10					A-4a
	14	7	4-4-6	17"	Brown sandy silt, little gravel, very moist - medium stiff.	17	11	14	40	18	22	9	14					A-4a
	16	8	11-13-18	18"	Brown sandy silt, some gravel, moist - stiff.	22	9	14	35	20	22	9	10					A-4a
	18																	
	20	9	9-15-21	18"	Brown sandy silt, little gravel, moist - stiff.	10	8	12	43	27	25	10	10					A-4a
853.2	22																	
	24	10	4-9-12	18"	Brown silt and clay, some sand, trace gravel, moist - stiff.	9	10	14	40	27	26	12	13					A-6a
848.2	26	11	7-15-22	17½"	Brown sandy silt, trace gravel, moist stiff.	9	9	17	44	21	24	10	11					A-4a
	28																	
	30																	
	32	12	21-33-45	18"	Brownish gray sandy silt, trace gravel moist - very stiff.	7	10	18	42	23	22	9	9					A-4a
	34																	

## TESTING ENGINEERS AND SOILS CONSULTANTS

## LOG OF BORING

Split

DATE STARTED 7/7/62 SAMPLER: TYPE Spoon DIA. 2"O.D. WATER ELEV. IMMEDIATE None CLIENT Barrett-Cargo-Withers & Assoc.DATE COMPLETED 7/8/62 CASING: LENGTH \_\_\_\_\_ DIA. 3.5" I.D. AFTER 96 HOURS 863.7 PROJECT: I-71 - Bridge No. FRA-1-0310  
Hollow Stem Augers R & LBORING No. 10 STATION AND OFFSET 29+34, 97' R. of C.L. of SR-3 SURFACE ELEV. 873.2

ELEV.	DEPTH	SAMPLE No.	STD. PEN. (N)	% REC.	DESCRIPTION	Physical Characteristics									
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.L.	W.C.	SHYL. CLASS	
	34														
	36	13	33-56	12"	Brownish gray sandy silt, little gravel, moist - very stiff.	11	10	17	40	22	22	9	8	A-4a	
	38														
	40														
	42	14	26-49	12"	Brownish gray sandy silt, trace gravel, moist - very stiff.	9	9	15	42	25	22	9	8	A-4a	
	44														
	46	15	22-37-50	18"	Brownish gray sandy silt, little gravel, moist - very stiff.	12	9	16	40	23	21	9	9	A-4a	
	48														
	50														
	52	16	15-24-35	18"	Brownish gray sandy silt, trace gravel, moist - very stiff.	9	8	17	40	26	21	9	10	A-4a	
	54														
816.7	56	17	13-21-30	18"	Brownish gray sandy silt, trace gravel, moist - very stiff.	8	9	19	39	25	21	9	10	A-4a	
	58				Boring Completed.										
	60														

## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 1 STATION & OFFSET 30+41, 55' L. of C.L. of SR-3 SURFACE ELEV. 873.5 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics									OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.		
1	0.0-1.5	0.0-1.5			Topsoil	No Tests Performed.									
2	1.5-3.0	1.5-3.0	A-6	A-6b	12	9	7	11	38	35	38	22	9		
3	3.0-4.5	3.0-5.0	A-6	A-6a	7	12	12	13	38	25	29	14	12		
4	5.0-6.5	5.0-7.5	A-6	A-6b	12	10	9	12	37	32	40	23	18		
5	7.5-8.5	7.5-15.0	A-4	A-4a	4	13	15	18	39	15	21	6	15		
6	8.5-9.0	7.5-15.0	A-4	A-4a	3	15	20	17	38	10	19	6	10		
7	10.0-11.5	7.5-15.0	A-4	A-4a	5	17	11	13	40	19	21	8	11		
8	12.5-14.0	7.5-15.0	A-4	A-4a	5	15	12	13	42	18	21	8	13		
9	15.0-16.5	15.0-20.0	A-6	A-6a	6	13	11	15	39	22	25	11	13		
10	17.5-19.0	15.0-20.0	A-6	A-6a	7	8	11	15	41	25	25	12	12		
11	20-21.5	20.0-25.0	A-4	A-4a	6	10	9	15	40	26	23	8	11		
12	25.0-26.5	25.0-30.0	A-2-4	A-2-4	0	11	9	61	4	15	23	9	11		
13	30.0-31.0	30.0-56.5	A-4	A-4a	7	10	7	17	41	25	23	10	8		
14	35.0-36.0	30.0-56.5	A-4	A-4a	6	10	7	17	41	25	22	9	8		
15	40.0-41.5	30.0-56.5	A-4	A-4a	6	11	8	16	39	26	22	9	10		
16	45.0-46.5	30.0-56.5	A-4	A-4a	5	16	7	16	39	22	21	8	10		
17	50.0-51.5	30.0-56.5	A-4	A-4a	6	12	8	16	40	24	22	8	9		





## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 4 STATION & OFFSET 30+54, 73<sup>o</sup> R. of C.L. of SR-3 SURFACE ELEV. 873.8 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	
1	0.0-0.5	0.0-0.5		Topsoil		No Tests Performed								
2	0.5-1.5	0.5-1.5	A-6	A-6a	10	0	6	12	53	29	34	14	13	
3	1.5-3.0	1.5-3.0	A-6	A-6b	12	8	8	11	39	34	35	20	6	
4	3.0-4.5	3.0-5.0	A-6	A-6a	7	11	11	14	38	26	26	12	11	
S-1	5.0-6.5	5.0-50.0	A-4	A-4a	7	7	11	14	42	26	24	9	12	Unconfined Compression
5	6.5-7.0	5.0-50.0	A-4	A-4a	5	12	12	16	40	20	21	8	11	
6	7.0-8.0	5.0-50.0	A-4	A-4a	3	28	11	13	33	15	20	6	14	
S-2	8.5-10.0	5.0-50.0	A-4	A-4a	3	24	11	14	37	14	21	7	12	Unconfined Compression
7	10.0-11.5	5.0-50.0	A-4	A-4a	4	17	11	18	41	13	20	5	10	
8	12.5-14.0	5.0-50.0	A-4	A-4a	2	38	7	11	30	14	20	6	12	
9	15.0-16.5	5.0-50.0	A-4	A-4a	5	16	9	15	38	22	22	8	10	
10	17.5-19.0	5.0-50.0	A-4	A-4a	4	20	10	14	35	21	22	8	10	
11	20.0-21.5	5.0-50.0	A-4	A-4a	6	10	9	15	38	28	24	8	12	
12	21.5-23.0	5.0-50.0	A-4	A-4a	5	17	8	14	37	24	24	9	11	
13	23.0-24.5	5.0-50.0	A-4	A-4a	6	11	9	14	39	27	25	10	12	
14	25.0-26.5	5.0-50.0	A-4	A-4a	5	12	10	18	39	21	33	8	10	
15	30.0-31.5	5.0-50.0	A-4	A-4a	6	10	9	16	41	24	22	8	10	





# THE H. C. NUTTING COMPANY

2120 AIRPORT ROAD  
CINCINNATI 26, OHIO

Form No. 531-16-95

## TESTING ENGINEERS AND SOILS CONSULTANTS

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### SUMMARY OF TEST DATA FOR SOILS

BORING No. 6 STATION & OFFSET 28+56, 55' L. of C.L. of SR-3 SURFACE ELEV. 871.0 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	
1	0.0-1.5	0.0-1.5		Topsoil		No Tests Performed.								
2	1.5-3.0	1.5-5.0	A-7-6	A-7-6	15	0	2	7	39	52	47	26	18	
3	3.0-4.5	1.5-5.0	A-7-6	A-7-6	15	0	3	7	42	48	44	25	20	
4	5.0-6.5	5.0-7.5	A-6	A-6a	9	4	7	11	48	30	29	12	14	
5	7.5-9.0	7.5-15.0	A-4	A-4a	4	19	12	16	37	16	21	7	13	
6	10.0-11.5	7.5-15.0	A-4	A-4a	5	17	11	14	40	18	19	5	13	
7	12.5-14.0	7.5-15.0	A-4	A-4a	4	27	9	10	37	17	21	8	13	
8	15.0-16.5	15.0-20.0	A-6	A-6a	7	10	10	14	38	28	25	11	15	
9	17.5-19.0	15.0-20.0	A-6	A-6a	7	12	10	14	43	21	24	11	12	
10	20.0-21.5	20.0-56.5	A-4	A-4a	7	7	10	14	41	28	24	10	12	
11	25.0-26.5	20.0-56.5	A-4	A-4a	5	10	10	18	42	20	22	8	10	
12	30.0-31.5	20.0-56.5	A-4	A-4a	7	8	8	16	43	25	23	10	9	
13	35.0-36.0	20.0-56.5	A-4	A-4a	7	7	7	17	43	26	22	9	8	
14	40.0-41.5	20.0-56.5	A-4	A-4a	7	7	8	17	44	24	21	8	9	
15	45.0-46.5	20.0-56.5	A-4	A-4a	6	11	8	17	42	22	22	9	9	
16	50.0-51.5	20.0-56.5	A-4	A-4a	6	10	9	17	40	24	21	9	10	
17	55.0-56.5	20.0-56.5	A-4	A-4a	5	14	8	17	38	23	22	10	10	

## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 7 STATION & OFFSET 29+33, 21' L. of C.L. of SR-3 SURFACE ELEV. 873.5 CLIENT Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	
1	0.0-0.5	0.0-0.5		Fill		No Tests Performed.								
2	0.5-1.5	0.5-3.0	A-6	A-6a	6	5	13	19	36	27	30	13	15	
3	1.5-3.0	0.5-3.0	A-6	A-6a	Visual - Insufficient Sample for Testing									
4	3.0-4.5	3.0-9.0	A-7-6	A-7-6	19	0	4	9	38	49	54	36	14	
S-1	5.0-6.5	3.0-9.0	A-7-6	A-7-6	18	0	3	7	43	47	48	30	21	Unconfined Compression
5	6.5-8.0	3.0-9.0	A-7-6	A-7-6	13	0	6	12	40	42	42	23	12	
6	9.0-10.5	9.0-11.5	A-4	A-4a	4	17	12	15	35	21	21	7	10	
7	11.5-13.0	11.5-13.5	A-6	A-6a	5	30	7	9	36	18	27	12	14	
S-2	13.5-15.0	13.5-17.5	A-4	A-4a	4	20	12	12	38	18	21	7	12	Consolidation & Unconfined Compr.
8	15.0-16.5	13.5-17.5	A-4	A-4a	3	29	9	11	35	16	23	10	13	
9	17.5-19.0	17.5-20.0	A-6	A-6a	6	14	12	15	38	21	24	11	10	
10	20.0-21.5	20.0-22.5	A-4	A-4a	6	15	9	13	38	25	25	10	13	
11	22.5-24.0	22.5-25.0	A-6	A-6a	8	7	9	15	44	25	25	11	11	
12	25.0-26.5	25.0-56.5	A-4	A-4a	5	10	12	19	41	18	23	9	12	
13	30.0-31.5	25.0-56.5	A-4	A-4a	6	13	7	16	40	24	23	10	10	
14	35.0-36.5	25.0-56.5	A-4	A-4a	7	7	8	17	42	26	22	10	9	
15	40.0-41.5	25.0-56.5	A-4	A-4a	6	13	7	17	38	25	23	10	9	



## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 10 STATION & OFFSET 29+34, 97' R. of C.L. of SR-3 SURFACE ELEV. 873.2 CLIENT Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics									OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.		
1	0.0-1.5	0.0-1.5		Fill	No Tests Performed										
2	1.5-3.0	1.5-5.0	A-7-6	A-7-6	19	0	4	6	37	53	54	36	15		
3	3.0-4.5	1.5-5.0	A-7-6	A-7-6	14	1	3	10	40	46	42	24	21		
4	5.0-6.5	5.0-7.5	A-6	A-6a	7	11	10	14	41	24	26	11	14		
5	7.5-9.0	7.5-20.0	A-4	A-4a	4	22	10	13	36	19	24	10	11		
6	10.0-11.5	7.5-20.0	A-4	A-4a	5	21	10	12	36	21	23	9	10		
7	12.5-14.0	7.5-20.0	A-4	A-4a	5	17	11	14	40	18	22	9	14		
8	15.0-16.5	7.5-20.0	A-4	A-4a	4	22	9	14	35	20	22	9	10		
9	17.5-19.0	7.5-20.0	A-4	A-4a	7	10	8	12	43	27	25	10	10		
10	20.0-21.5	20.0-25.0	A-6	A-6a	7	9	10	14	40	27	26	12	13		
11	25.0-26.5	25.0-56.5	A-4	A-4a	6	9	9	17	44	21	24	10	11		
12	30.0-31.5	25.0-56.5	A-4	A-4a	6	7	10	18	42	23	22	9	9		
13	35.0-36.0	25.0-56.5	A-4	A-4a	5	11	10	17	40	22	22	9	8		
14	40.0-41.0	25.0-56.5	A-4	A-4a	6	9	9	15	42	25	22	9	8		
15	45.0-46.5	25.0-56.5	A-4	A-4a	6	12	9	16	40	23	21	9	9		
16	50.0-51.5	25.0-56.5	A-4	A-4a	6	9	8	17	40	26	21	9	10		
17	55.0-56.5	25.0-56.5	A-4	A-4a	6	8	9	19	39	25	21	9	10		





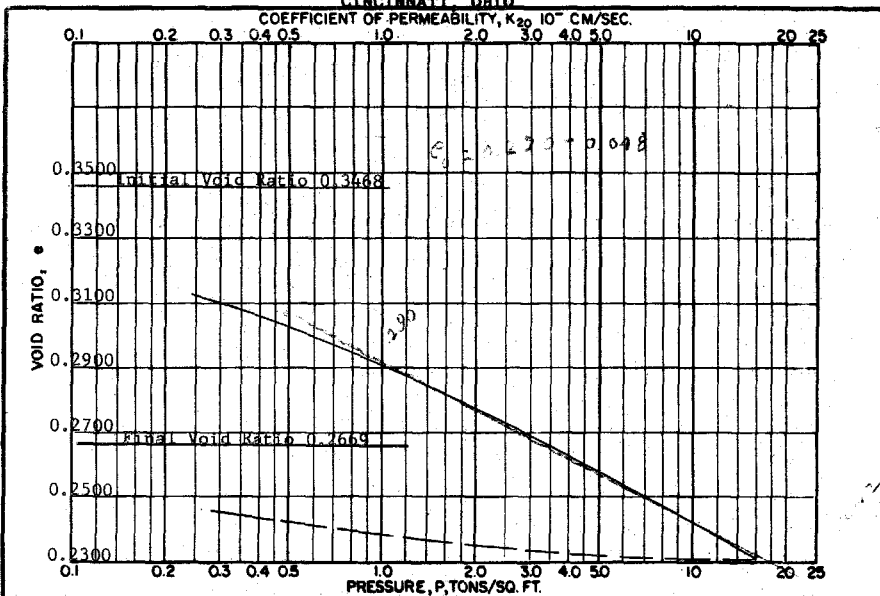




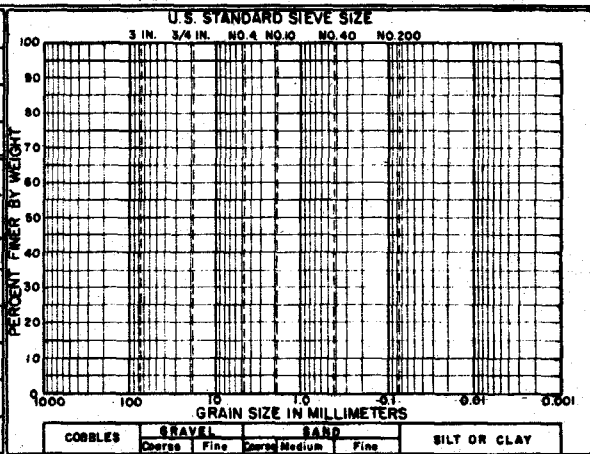




THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO

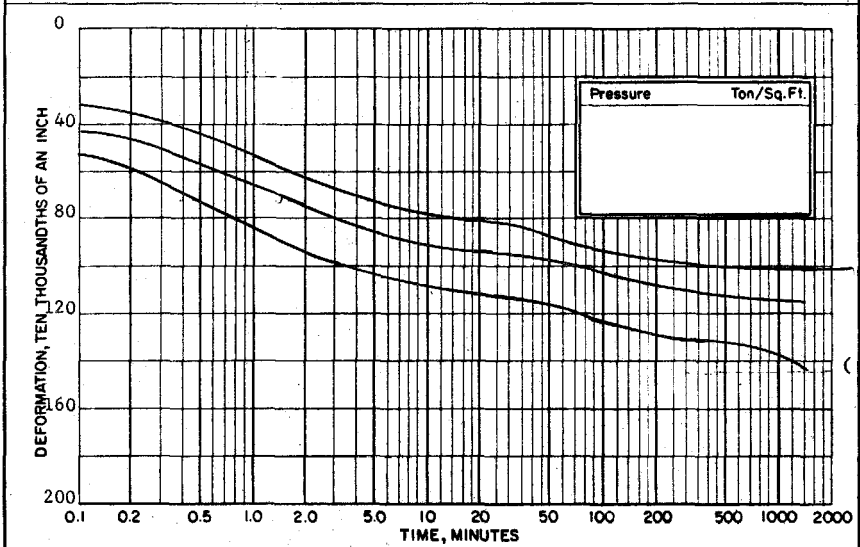
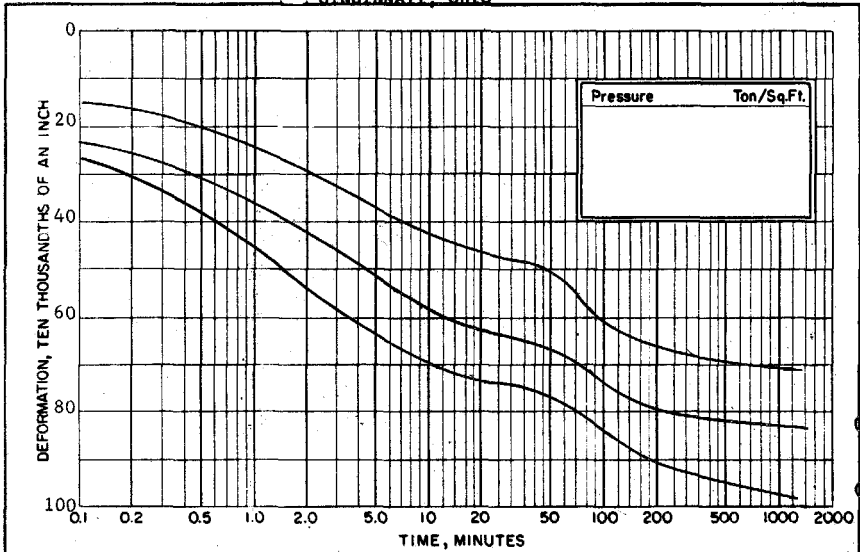


TEST DATA	
Type of Specimen	Undisturbed
Overburden Pressure, $P_0$	Tons/Sq. Ft.
Preconsol Pressure, $P_c$	Tons/Sq. Ft.
$C_c = 0.01$ Rebound	
Compression Index, $C_c = 0.05$ Virgin	
Permeability at Initial $e$	
$K_{20}$ _____ $\times 10^{-10}$ Cm/Sec	
_____ Ft./Min.	
Initial Ht. 0.0190 in.	Diam. 2.497 in.
Initial Saturation, $S_w$	% 100.6
Final Saturation, $S_f$	% 110.8
Initial Dry Density	Lbs./Cu. Ft. 129.3
Initial Water Content, $W_n$	% 12.5
Remarks: Final W.C. = 10.6	
Material: Brown Sandy	
SILT, Some Gravel, Moist-	
Stiff.	
Classification	A-4a
LL 21	Sp.G. 2.79
PL 14	$D_{60}$



Project I-71 + Bridge No. FRA-1-0310 - R & L	
Area SR-1 Over SR-3	
Spring No. 7	Sample No. S-2
Elev. or Depth 13.5-15'	Date 8/22/62
<b>CONSOLIDATION TEST REPORT</b>	
SHEET 1 OF 2	

THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO



Project I-71 - Bridge No FRA-1-0310 - R & L			
Area SR_1 Over SR-3			
Boring No. 7	Sample No. S-2	Elev. or Depth 13.5-15'	Date 8/22/62
<b>CONSOLIDATION TEST-TIME CURVES</b>			SHEET 2 of 2

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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7-18-62

## Field TEST BORING REPORT

\* &amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 1 SR-1 over SR-3  
LOCATION 30+41, 55' L

DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-10-62  
ELEVATION REFERENCE 873.5 DATE COMPLETED 7-11-62  
CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
DEPTH TO WATER; IMMEDIATE 7.5' UPON COMPLETION None  
DEPTH TO WATER 1 DAYS AFTER COMPLETION 7.8' WATER USED IN DRILLING No

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER		Recovery
						6" ON SAMPLER	in	
873.5	0'					3-7-9	16"	
872.0	1.5'	1.5' Topsoil, dry - hard	1	0-1.5	SS			
			2	1.5-3	SS	10-19-33	15"	
			3	3-4.5	SS	15-14-12	16"	
868.5	5'	3.5' Brown and gray sandy clay with fine gravel, dry - hard	4	5-6.5	SS	5-6-8	17"	
			5	7.5-8.5	SS	4-5	12"	
866.0	7.5'	2.5' Brown and gray sandy clay with fine gravel, moist - stiff						
865.0	8.5'	1' Brown and gray sandy clay with fine gravel, wet - medium dense	6	8.5-9	SS	11	6"	
			7	10-11.5	SS	10-7-7	16"	
863.5	10'	1.5' Brown sandy clay with fine gravel, dry - hard						
		2.5' <del>Brown</del> and gray sandy clay with fine to coarse gravel, moist - stiff						
861.0	12.5'		8	12.5-14	SS	6-6-6	17"	
			9	15-16.5	SS	5-9-14	18"	
			10	17.5-19	SS	11-14-18	16½"	

## REMARKS:

Elev. (proposed) bottom of footing = 882.0

Respectfully submitted,  
THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By 

PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 1 SR-1 over SR-3

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER		Recovery in inches
						ft ON SAMPLER	% Core Rec.	
861.0	12.5'							
853.5	20'	7.5' Brownish gray sandy clay with fine to coarse gravel, moist - stiff	11	20-21.5	SS	8-10-12		17"
848.5	25'	5' Gray sandy clay with fine gravel, moist - very stiff	12	25-26.5	SS	10-16-28		18"
843.5	30'	5' Brownish gray sandy clay with fine gravel, moist - hard	13	30-31	SS	24-44		12"
			14	35-36	SS	32-49		12"
			15	40-41.5	SS	17-26-39		17½"
			16	45-46.5	SS	22-29-40		18"
			17	50-51.5	SS	20-26-37		18"
			18	55-56.5	SS	13-23-34		18"
817.0	56.5'	26.5' Gray sandy clay with fine to coarse gravel, moist - hard						
		Boring completed						



# THE H. C. NUTTING COMPANY

 4120 AIRPORT ROAD  
 CINCINNATI 26, OHIO

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 B-12610-am5  
 7/11/62

Page 1 of 2

### FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway and Franklin Counties HOLE No. 4 SR-1 Over SR-3  
 LOCATION 30+54, 63' R. of C.L. of SR-3  
Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/8/62  
 ELEVATION REFERENCE 873.8 DATE COMPLETED 7/8/62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 12.5' UPON COMPLETION None  
 DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING Nona

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER OR % Core Rec.	Recovery in Inches
873.8	0'						
84							
873.3	0.5'	0.5' Topsoil, moist - soft.	1	0-0.5	SS	3	4"
			2	0.5-1.5	SS	5-8	8"
872.3	1.5'	1.0' Brown sandy clay, dry - hard.	3	1.5-3	SS	8-12-18	15"
		3.5' Brown and gray sandy clay, with fine to coarse gravel, dry - hard.	4	3-4.5	SS	9-10-10	17"
868.8	5.0'		S-1	5-6.5	3"ST		12"
		2.0' Brown and gray sandy clay, with fine to coarse gravel, moist - very stiff.	5	6.5-7	SS	8	6"
866.8	7.0'		6	7-8	SS	4-6	12"
		3.0' Brown and gray sandy clay, with fine to coarse gravel, moist - medium stiff.	S-2	8.5-10	3"ST		12"
863.8	10.0'		7	10-11.5	SS	6-6-7	15"
		2.5' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff.					
861.3	12.5'		8	12.5-14	SS	7-10-14	12"

REMARKS:

 Respectfully submitted,  
 THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By J.W. Sneyden

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12610-ams

7/11/62

Page 1 of 2

## FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway and Franklin Counties HOLE No. 4 SR-1 Over SR-3  
 LOCATION 30+54, 63' R. of C.L. of SR-3  
Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/8/62  
 ELEVATION REFERENCE 873.8 DATE COMPLETED 7/8/62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 12.5' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

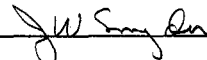
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
873.8	0'						
	0.5'	0.5' Topsoil, moist - soft.	1	0-0.5	SS	3	4"
	0.5'		2	0.5-1.5	SS	5-8	8"
	1.0'	1.0' Brown sandy clay, dry - hard.					
	1.5'		3	1.5-3	SS	8-12-18	15"
		3.5' Brown and gray sandy clay, with fine to coarse gravel, dry - hard.					
			4	3-4.5	SS	9-10-10	17"
	5.0'		S-1	5-6.5	3"ST		12"
		2.0' Brown and gray sandy clay, with fine to coarse gravel, moist - very stiff.					
			5	6.5-7	SS	8	6"
	7.0'		6	7-8	SS	4-6	12"
		3.0' Brown and gray sandy clay, with fine to coarse gravel, moist - medium stiff.					
			S-2	8.5-10	3"ST		12"
	10.0'		7	10-11.5	SS	6-6-7	15"
		2.5' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff.					
			8	12.5-14	SS	7-10-14	12"

REMARKS:

Respectfully submitted,  
 THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By



PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 4 SR-1 Over SR-3  
 (Bridge No. FRA-1-0310) and Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
861.3	12.5'						
858.8	15.0'	2.5' Brownish gray sandy clay, with fine to coarse gravel, moist - medium stiff.	9	15-16.5	SS	17-17-15	17"
		5.0' Brownish gray sandy clay, with fine to coarse gravel, moist - very stiff to hard.	10	17.5-19	SS	9-15-20	18"
853.8	20.0'		11	20-21.5	SS	5-8-13	18"
		1.5' Brownish gray sandy clay, with fine gravel, moist - very stiff.					
852.3	21.5'		12	21.5-23	SS	11-21-26	18"
		8.5' Brownish gray sandy clay, with fine gravel, dry - hard.	13	23-24.5	SS	13-20-32	18"
			14	25-26.5	SS	15-21-29	17"
843.8	30.0'		15	30-31.5	SS	25-40-61	18"
			16	35-36	SS	32-50	12"
		21.5' Gray sandy clay, with fine gravel, moist - hard.	17	40-41	SS	36-52	12"
			18	45-46.5	SS	25-34-46	18"
			19	50-51.5	SS	18-28-40	18"
822.3	51.5'						
		Boring Completed.					
		Remarks: Elevation (Proposed) Bottom of Footing - 863.0					
		cc: Ohio State Highway Testing Laboratory					

# THE H. C. NUTTING COMPANY

 4120 AIRPORT ROAD  
 CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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 B-12611-ams  
 7/11/62

Page 1 of 2

### FIELD TEST BORING REPORT

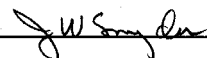
CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 5 SR-1 over SR-3  
 LOCATION 31+33, 97' E. of C.L. of SR-3 and Franklin Counties  
Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/8/62  
 ELEVATION REFERENCE 874.6 DATE COMPLETED 7/9/62  
 CASING: DIAMETER 3.5" I. D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 7.5' UPON COMPLETION None  
 DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
874.6	0'						
	1.0'	1.0' Topsoil, dry - loose.	1	0-1	SS	2-4	9"
873.6	1.5'	1.5' Brown and gray sandy clay, dry - hard.	2	1-1.5	SS	8	6"
872.1	2.5'	2.5' Brown and gray sandy clay, with fine gravel, dry - hard	3	2.5-4	SS	16-14-13	17"
869.6	5.0'	5.0' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff to medium stiff.	4	5-6.5	SS	5-6-7	12"
			S-1	7-8.5	3"ST		16"
864.6	10.0'		5	8.5-10	SS	6-6-7	14"
			6	10-11.5	SS	10-11-13	16"
		15.0' Brownish gray sandy clay, with fine to coarse gravel, moist - stiff.	7	12.5-14	SS	5-6-8	17"
			8	15-16.5	SS	8-10-11	18"
			9	17.5-19	SS	8-12-16	17"
			10	20-21.5	SS	6-10-11	18"
849.6	25.0'		11	25-26.5	SS	15-21-24	18"

REMARKS:

 Respectfully submitted,  
**THE H. C. NUTTING CO.**

By



PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 5 SR-1 over SR-3  
 and Franklin Counties  
 (Bridge No. FRA-1-0310)

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
849.6	25.0'						
844.6	30.0'	5.0' Brownish gray sandy clay, with fine gravel, dry - hard.	12	30-31.5	SS	14-22-29	17½"
			13	35-36	SS	32-51	12"
		26.5' Gray sandy clay, with fine gravel, moist - hard.	14	40-41.5	SS	24-29-35	18"
			15	45-46.5	SS	22-30-36	18"
			16	50-51.5	SS	16-26-36	18"
818.1	56.5'		17	55-56.5	SS	11-16-24	18"
		Boring Completed.					
		Remarks: Elevation (Proposed) Bottom of Footing - 880.5					
		cc: Ohio State Highway Testing Laboratory					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12770-vb

7-12-62

## FIELD TEST BORING REPORT

\*&amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 6 SR-1 over SR-3  
 LOCATION 28+56, 55' L. of CL of SR-3 (Bridge No. FRA-1-0310)

DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-9-62  
 ELEVATION REFERENCE 871.0 DATE COMPLETED 7-10-62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 7.5' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLER	BLOWS PER 6" ON SAMPLER		Recovery in inches
						Dr	% Core Rec.	
871.0	0'							
869.5	1.5'	1.5' Topsoil, moist - medium stiff	1	0-1.5	SS	1-5-7		6"
			2	1.5-3	SS	5-8-10		8"
			3	3-4.5	SS	6-6-4		15"
866.0	5'	3.5' Brown and gray sandy clay, moist - hard	4	5-6.5	SS	3-5-6		8"
			5	6.5-7.5	SS	7-7-5		17 1/2"
861.0	10'	2.5' Brown and gray sandy clay with fine to coarse gravel, and small layers of fine sand, moist - stiff	6	10-11.5	SS	3-4-5		17"
			7	12.5-14	SS	5-8-10		16"
			8	15-16.5	SS	3-4-5		18"
853.5	17.5'	7.5' Brownish gray sandy clay with fine to coarse gravel, moist - stiff to medium stiff	9	17.5-19	SS	4-6-9		16"

REMARKS: Elev. (proposed) bottom of footing = 882.8

Respectfully submitted,  
THE H. C. NUTTING CO.By 

Page 2

PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway & HOLE No. 6 SR-1 over SR-3  
/Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	RECOVERY in inches
853.5	17.5'						
851.0	20'	2.5' Gray sandy clay with fine gravel, moist - stiff	10	20-21.5	SS	6-9-17	18"
846.0	25'	5' Gray sandy clay with fine gravel and layers of fine sand, moist - medium stiff	11	25-26.5	SS	10-15-22	18"
841.0	30'	5' Brownish gray sandy clay with fine gravel, moist - hard	12	30-31.5	SS	20-29-40	17"
			13	35-36	SS	33-40	12"
		26.5' Gray sandy clay with fine gravel, moist - hard	14	40-41.5	SS	27-36-49	18"
			15	45-46.5	SS	15-23-31	18"
			16	50-51.5	SS	15-23-38	17½"
814.5	56.5'		17	55-56.5	SS	16-19-28	18"
		Boring completed					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12771-vb  
7-12-62

Field TEST BORING REPORT \* &amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 7 SR-1 over SR-3  
 LOCATION 29+33; 21' L. of CL of SR-3 Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-10-62  
 ELEVATION REFERENCE 873.5 DATE COMPLETED 7-10-62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER; IMMEDIATE 25' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
873.5	0'						
	0.5'	Crushed limestone and clay fill, dry - medium dense	1	0-0.5	SS	9	6"
873.0	0.5'		2	0.5-1.5	SS	10-8	9"
	2.5'	Brown sandy clay with fine to coarse gravel, fill, dry - hard	3	1.5-3	SS	6-7-7	4"
870.5	3'		4	3-4.5	SS	3-4-6	16"
	6'	Mottled brown and gray silty clay, moist - stiff	S-1	5-6.5	3"ST		14"
			5	6.5-8	SS	3-4-5	15"
864.5	9'		6	9-10.5	SS	9-7-8	17"
	4.5'	Brown and gray sandy clay with fine to coarse gravel, moist - very stiff to stiff	7	11.5-13	SS	10-7-7	6"
860.0	13.5'		S-2	13.5-15	3"ST		16"
	4'	Brownish gray sandy clay with fine to coarse gravel, moist - medium stiff to stiff	8	15-16.5	SS	6-7-8	10"
856.0	17.5'		9	17.5-19	SS	7-10-13	18"
			10	20-21.5	SS	6-8-10	18"
			11	22.5-24	SS	10-14-17	18"

## REMARKS:

Elev. (Proposed) bottom of footing = 869.0

Respectfully submitted,  
THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By J. W. Sander



PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway & Franklin Counties HOLE No. 7 SR-1 over SR-3

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in inches
856.0	17.5'						
	7.5'	Brownish gray sandy clay with fine to coarse gravel, moist - very stiff					
848.5	25'		12	25-26.5	SS	10-14-19	18"
	5'	Brownish gray sandy clay with fine gravel and layers of fine sand, wet - very stiff					
843.5	30'		13	30-31.5	SS	14-21-36	18"
			14	35-36.5	SS	17-26-35	17½"
	15'	Brownish gray sandy clay with fine gravel, moist - hard	15	40-41.5	SS	22-34-36	17½"
828.5	45'		16	45-46.5	SS	13-20-29	18"
			17	50-51.5	SS	12-16-23	18"
	11.5'	Gray sandy clay with fine gravel, moist - hard	18	55-56.5	SS	14-19-26	18"
817.0	56.5'	Boring completed					

# THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12612-ams  
7/11/62

Page 1 of 2

### FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway, 10 SR-1 over SR-3  
 LOCATION 29+34, 97' E. of C.L. of S.R.-3 - Bridge No. FRA-1-0310 and Franklin Counties  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/7/62  
 ELEVATION REFERENCE 873.2 DATE COMPLETED 7/8/62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE None UPON COMPLETION None  
 DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
873.2	0'						
		1.5' Brown sandy clay, with fine gravel and topsoil, (fill), dry - loose.	1	0-1.5	SS	1-7-7	12"
871.7	1.5'						
		1.5' Mottled brown and gray sandy clay, moist - hard.	2	1.5-3	SS	7-9-12	14"
870.2	3.0'						
		2.0' Mottled brown and gray sandy clay, moist - stiff.	3	3-4.5	SS	5-6-6	17"
868.2	5.0'						
		5.0' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff.	4	5-6.5	SS	5-7-7	17 1/2"
863.2	10.0'						
		2.5' Brown and gray sandy clay, with fine to coarse gravel and small silt layers, moist - stiff.	5	7.5-9	SS	5-11-11	18"
			6	10-11.5	SS	11-14-7	15"
860.7	12.5'						
		2.5' Brownish gray sandy clay, with fine gravel, moist - soft.	7	12.5-14	SS	4-4-6	17"
858.2	15.0'						
			8	15-16.5	SS	11-13-18	18"

Respectfully submitted,  
THE H. C. NUTTING CO.

By J.W. Sneyder

PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 10 SR-1 over SR-3  
 (Bridge No. FRA-1-0310) and Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER	Recovery
						6" ON SAMPLER or % Core Rec.	
858.2	15.0'						
		5.0' Gray sandy clay, with fine to coarse gravel, moist - hard.	9	17.5-19	SS	9-15-21	18"
853.2	20.0'		10	20-21.5	SS	4-9-12	18"
		5.0' Gray sandy clay, with fine to coarse gravel, moist - stiff.					
848.2	25.0'		11	25-26.5	SS	7-15-22	17½"
		5.0' Brownish gray sandy clay, with fine to coarse gravel, moist - hard.					
843.2	30.0'		12	30-31.5	SS	21-33-45	18"
			13	35-36	SS	33-56	12"
		26.5' Gray sandy clay, with fine gravel, dry - hard.	14	40-41	SS	26-49	12"
			15	45-46.5	SS	22-37-50	18"
			16	50-51.5	SS	15-24-35	18"
816.7	56.5'		17	55-56.5	SS	13-21-30	18"
		Boring Completed.					
		Remarks: Elevation (Proposed) Bottom of Footing - 88.4					
		cc: Ohio State Highway Testing Laboratory					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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## Field TEST BORING REPORT \* &amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 1 SR-1 over SR-3  
 LOCATION 30+41, 55' L  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-10-62  
 ELEVATION REFERENCE 873.5 DATE COMPLETED 7-11-62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 7.5' UPON COMPLETION None  
 DEPTH TO WATER 1 DAYS AFTER COMPLETION 7.8' WATER USED IN DRILLING No

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	Blows per 1' on sampler		Recovery in inches
						of % Core Rec.	inches	
872.0	1.5'	Topsoil, dry - hard	1	0-1.5	SS	3-7-9		16"
			2	1.5-3	SS	10-19-33		15"
			3	3-4.5	SS	15-14-12		16"
868.5	5'	Brown and gray sandy clay with fine gravel, dry - hard	4	5-6.5	SS	5-6-8		17"
			5	7.5-8.5	SS	4-5		12"
866.0	7.5'	Brown and gray sandy clay with fine gravel, moist - stiff	6	8.5-9	SS	11		6"
			7	10-11.5	SS	10-7-7		16"
865.0	8.5'	Brown and gray sandy clay with fine gravel, wet - medium dense	8	12.5-14	SS	6-6-6		17"
			9	15-16.5	SS	5-9-14		18"
863.5	10'	Brown sandy clay with fine gravel, dry - hard	10	17.5-19	SS	11-14-18		16½"
			11					
861.0	12.5'	Brown and gray sandy clay with fine to coarse gravel, moist - stiff						

## REMARKS:

Elev. (proposed) bottom of footing = 882.0

Respectfully submitted,  
THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By 

PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \*HOLE No. 1 SR-1 over SR-3

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLER	BLOWS PE.	Recovery
						6" ON SAMPLER or % Core Rec.	
861.0	12.5'						
853.5	20'	7.5' Brownish gray sandy clay with fine to coarse gravel, moist - stiff	11	20-21.5	SS	8-10-12	17"
848.5	25'	5' Gray sand, clay with fine gravel, moist - very stiff	12	25-26.5	SS	10-16-28	18"
843.5	30'	5' Brownish gray sandy clay with fine gravel, moist - hard	13	30-31	SS	24-44	12"
			14	35-36	SS	32-49	12"
			15	40-41.5	SS	17-26-39	17½"
			16	45-46.5	SS	22-29-40	18"
			17	50-51.5	SS	20-26-37	18"
817.0	56.5'	26.5' Gray sandy clay with fine to coarse gravel, moist - hard	18	55-56.5	SS	13-23-34	18"
		Boring completed					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12610-ams

7/11/62

Page 1 of 2

## FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway and Franklin Counties HOLE No. 4 SR-1 Over SR-3  
 LOCATION 30+54, 63<sup>rd</sup> R. of C.L. of SR-3  
Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/8/62  
 ELEVATION REFERENCE 873.8 DATE COMPLETED 7/8/62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 12.5' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
873.8	0 <sup>0</sup>						
	0.5 <sup>0</sup>	0.5 <sup>0</sup> Topsoil, moist - soft.	1	0-0.5	SS	3	4"
873.3	0.5 <sup>0</sup>		2	0.5-1.5	SS	5-8	8"
	1.5 <sup>0</sup>	1.0 <sup>0</sup> Brown sandy clay, dry - hard.					
872.3	1.5 <sup>0</sup>		3	1.5-3	SS	8-12-18	15"
		3.5 <sup>0</sup> Brown and gray sandy clay, with fine to coarse gravel, dry - hard.					
			4	3-4.5	SS	9-10-10	17"
868.8	5.0 <sup>0</sup>		S-1	5-6.5	3"ST		12"
		2.0 <sup>0</sup> Brown and gray sandy clay, with fine to coarse gravel, moist - very stiff.					
			5	6.5-7	SS	8	6"
866.8	7.0 <sup>0</sup>		6	7-8	SS	4-6	12"
		3.0 <sup>0</sup> Brown and gray sandy clay, with fine to coarse gravel, moist - medium stiff.					
			S-2	8.5-10	3"ST		12"
863.8	10.0 <sup>0</sup>		7	10-11.5	SS	6-6-7	15"
		2.5 <sup>0</sup> Brown and gray sandy clay, with fine to coarse gravel, moist - stiff.					
861.3	12.5 <sup>0</sup>		8	12.5-14	SS	7-10-14	12"

REMARKS:

Respectfully submitted,  
THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By J. W. Smyser

PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 4 SR-1 Over SR-3  
 (Bridge No. FRA-1-0310) and Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
861.3	12.5'						
858.8	15.0'	2.5' Brownish gray sandy clay, with fine to coarse gravel, moist - medium stiff.	9	15-16.5	SS	17-17-15	17"
		5.0' Brownish gray sandy clay, with fine to coarse gravel, moist - very stiff to hard.	10	17.5-19	SS	9-15-20	18"
853.8	20.0'		11	20-21.5	SS	5-8-13	18"
		1.5' Brownish gray sandy clay, with fine gravel, moist - very stiff.					
852.3	21.5'		12	21.5-23	SS	11-21-26	18"
		8.5' Brownish gray sandy clay, with fine gravel, dry - hard.	13	23-24.5	SS	13-20-32	18"
			14	25-26.5	SS	15-21-29	17"
843.8	30.0'		15	30-31.5	SS	25-40-61	18"
		21.5' Gray sandy clay, with fine gravel, moist - hard.	16	35-36	SS	32-50	12"
			17	40-41	SS	36-52	12"
			18	45-46.5	SS	25-34-46	18"
			19	50-51.5	SS	18-28-40	18"
822.3	51.5'						
		Boring Completed.					
		Remarks: Elevation (Proposed) Bottom of Footing - 868.0					
		cc: Ohio State Highway Testing Laboratory					

# THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

"AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC, AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS, OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL."

B-12611-ams  
7/11/62

Page 1 of 2

### FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 5 SR-1 over SR-3  
 LOCATION 31+33, 97' E. of C.L. of SR-3 and Franklin Counties  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/8/62  
 ELEVATION REFERENCE 874.6 DATE COMPLETED 7/9/62  
 CASING: DIAMETER 3.5" I. D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 7.5' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
874.6	0'						
873.6	1.0'	1.0' Topsoil, dry - loose.	1	0-1	SS	2-4	9"
		1.5' Brown and gray sandy clay, dry - hard.	2	1-1.5	SS	8	6"
872.1	2.5'	3' Brown and gray sandy clay, with fine gravel, dry - hard	3	2.5-4	SS	16-14-14	17"
869.6	5.0'	5.0' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff to medium stiff.	4	5-6.5	SS	5-6-7	12"
			S-1	7-8.5	3"ST		16"
864.6	10.0'		5	8.5-10	SS	6-6-7	14"
			6	10-11.5	SS	10-11-13	16"
		15.0' Brownish gray sandy clay, with fine to coarse gravel, moist - stiff.	7	12.5-14	SS	5-6-8	17"
			8	15-16.5	SS	8-10-11	18"
			9	17.5-19	SS	8-12-16	17"
			10	20-21.5	SS	6-10-11	18"
849.6	25.0'		11	25-26.5	SS	15-21-24	18"

REMARKS:

Respectfully submitted,  
 THE H. C. NUTTING CO.

By J. W. Smyth

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.



PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 5 SR-1 over SR-3  
 and Franklin Counties  
 (Bridge No. FRA-1-0310)

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in inches
849.6	25.0'						
844.6	30.0'	5.0' Brownish gray sandy clay, with fine gravel, dry - hard.	12	30-31.5	SS	14-22-29	17½"
			13	35-36	SS	32-51	12"
		26.5' Gray sandy clay, with fine gravel, moist - hard.	14	40-41.5	SS	24-29-35	18"
			15	45-46.5	SS	22-30-36	18"
			16	50-51.5	SS	16-26-36	18"
818.1	56.5'	Boring Completed.	17	55-56.5	SS	11-16-24	18"
		Remarks: Elevation (Proposed) Bottom of Footing = 880.5					
		cc: Ohio State Highway Testing Laboratory					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12612-rans

7/11/62

Page 1 of 2

## FIELD TEST BORING REPORT

CLIENT Barrett-Cargo-Withers & Associates, Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 10 SR-1 over SR-3  
and Franklin Counties  
 LOCATION 29+34, 97' R. of C.L. of S.R.-3 - Bridge No. FRA-1-0310.  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7/7/62  
 ELEVATION REFERENCE 873.2 DATE COMPLETED 7/8/62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE None UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
873.2	0'						
		1.5' Brown sandy clay, with fine gravel and topsoil, (fill), dry - loose.	1	0-1.5	SS	1-7-7	12"
871.7	1.5'		2	1.5-3	SS	7-9-12	14"
		1.5' Mottled brown and gray sandy clay, moist - hard.					
870.2	3.0'		3	3-4.5	SS	5-6-6	17" ✓
		2.0' Mottled brown and gray sandy clay, moist - stiff.					
868.2	5.0'		4	5-6.5	SS	5-7-7	17½"
		5.0' Brown and gray sandy clay, with fine to coarse gravel, moist - stiff.	5	7.5-9	SS	5-11-11	18"
863.2	10.0'		6	10-11.5	SS	11-14-7	15"
		2.5' Brown and gray sandy clay, with fine to coarse gravel and small silt layers, moist - stiff.					
860.7	12.5'		7	12.5-14	SS	4-4-6	17"
		2.5' Brownish gray sandy clay, with fine gravel, moist - soft.					
858.2	15.0'		8	15-16.5	SS	11-13-18	18"

Respectfully submitted,

THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By J.W. Snyder

PROJECT Interstate Rt. 71 - Ohio - Fayette, Madison, Pickaway HOLE No. 10 SR-1 over SR-3  
 (Bridge No. FRA-1-0310) and Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in Inches
858.2	15.0'						
		5.0' Gray sandy clay, with fine to coarse gravel, moist - hard.	9	17.5-19	SS	9-15-21	18"
853.2	20.0'		10	20-21.5	SS	4-9-12	18"
		5.0' Gray sandy clay, with fine to coarse gravel, moist - stiff.					
848.2	25.0'		11	25-26.5	SS	7-15-22	17½"
		5.0' Brownish gray sandy clay, with fine to coarse gravel, moist - hard.					
843.2	30.0'		12	30-31.5	SS	21-33-45	18"
			13	35-36	SS	33-56	12"
		26.5' Gray sandy clay, with fine gravel, dry - hard.	14	40-41	SS	26-49	12"
			15	45-46.5	SS	22-37-50	18"
			16	50-51.5	SS	15-24-35	18"
816.7	56.5'		17	55-56.5	SS	13-21-30	18"
		Boring Completed.					
		Remarks: Elevation (Proposed) Bottom of Footing - 881.4					
		cc: Ohio State Highway Testing Laboratory					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

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B-12770-vb  
7-12-62

## FIELD TEST BORING REPORT

\* &amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 6 SR-1 over SR-3  
 LOCATION 28+56, 55' L. of CL of SR-3 (Bridge No. FRA-1-0310)  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-9-62  
 ELEVATION REFERENCE 871.0 DATE COMPLETED 7-10-62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER; IMMEDIATE 7.5' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery in inches
871.0	0'						
	1.5'	Topsoil, moist - medium stiff	1	0-1.5	SS	1-5-7	6"
869.5	1.5'		2	1.5-3	SS	5-8-10	8"
	3.5'	Brown and gray sandy clay, moist - hard	3	3-4.5	SS	6-6-4	15"
866.0	5'		4	5-6.5	SS	3-5-6	8"
	2.5'	Brown and gray sandy clay with fine to coarse gravel, moist - stiff					
863.5	7.5'		5	7.5-9	SS	5-5-5	17½"
	2.5'	Brown and gray sandy clay with fine to coarse gravel, and small layers of fine sand, moist - stiff					
861.0	10'		6	10-11.5	SS	3-4-5	17"
	7.5'	Brownish gray sandy clay with fine to coarse gravel, moist - stiff to medium stiff	7	12.5-14	SS	5-8-10	16"
			8	15-16.5	SS	3-4-5	18"
853.5	17.5'		9	17.5-19	SS	4-6-9	16"

REMARKS: Elev. (proposed) bottom of footing = 882.8

Respectfully submitted,

THE H. C. NUTTING CO.

By J. W. [Signature]

PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway & \_\_\_\_\_ HOLE No. SR-1 over SR-3  
/Franklin Counties

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER Recovery	
						6" ON SAMPLER or % Core Rec.	in inches
853.5	17.5'						
851.0	20'	2.5' Gray sandy clay with fine gravel, moist - stiff	10	20-21.5	SS	6-9-17	18"
846.0	25'	5' Gray sandy clay with fine gravel and layers of fine sand, moist - medium stiff	11	25-26.5	SS	10-15-22	18"
841.0	30'	5' Brownish gray sandy clay with fine gravel, moist - hard	12	30-31.5	SS	20-29-40	17"
			13	35-36	SS	33-40	12"
		26.5' Gray sandy clay with fine gravel, moist - hard	14	40-41.5	SS	27-36-49	18"
			15	45-46.5	SS	15-23-31	18"
			16	50-51.5	SS	15-23-38	17½"
814.5	56.5'		17	55-56.5	SS	16-19-28	18"
		Boring completed					

## THE H. C. NUTTING COMPANY

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

## TESTING ENGINEERS AND SOILS CONSULTANTS

B-12771-vb  
7-12-62

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Field TEST BORING REPORT \* &amp; Franklin Counties

CLIENT Barrett-Cargo-Withers & Assoc., Ltd. ORDER No. 1770.8  
 PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway \* HOLE No. 7 SR-1 over SR-3  
 LOCATION 29+33, 21' L. of CL of SR-3 Bridge No. FRA-1-0310  
 DRILLER E. Philpot DRILL No. 17 DATE STARTED 7-10-62  
 ELEVATION REFERENCE 873.5 DATE COMPLETED 7-10-62  
 CASING: DIAMETER 3.5" I.D. Hollow Stem Augers HAMMER WT. FALL  
 SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"  
 DEPTH TO WATER: IMMEDIATE 25' UPON COMPLETION None  
 DEPTH TO WATER        DAYS AFTER COMPLETION        WATER USED IN DRILLING None

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER		Recovery in inches
						6" ON SAMPLER	% Core Rec.	
873.5	0'							
	0.5'	Crushed limestone and clay fill, dry - medium dense	1	0-0.5	SS	9		6"
873.0	0.5'		2	0.5-1.5	SS	10-8		9"
	2.5'	Brown sandy clay with fine to coarse gravel, fill, dry - hard	3	1.5-3	SS	6-7-7		4"
870.5	3'		4	3-4.5	SS	3-4-6		16"
	6'	Mottled brown and gray silty clay, moist - stiff	S-1	5-6.5	3"ST			14"
			5	6.5-8	SS	3-4-5		15"
864.5	9'		6	9-10.5	SS	9-7-8		17"
	4.5'	Brown and gray sandy clay with fine to coarse gravel, moist - very stiff to stiff	7	11.5-13	SS	10-7-7		6"
860.0	13.5'		S-2	13.5-15	3"ST			16"
	4'	Brownish gray sandy clay with fine to coarse gravel, moist - medium stiff to stiff	8	15-16.5	SS	6-7-8		10"
856.0	17.5'		9	17.5-19	SS	7-10-13		18"
			10	20-21.5	SS	6-8-10		18"
			11	22.5-24	SS	10-14-17		18"

## REMARKS:

Elev. (Proposed) bottom of footing = 869.0

Respectfully submitted,  
THE H. C. NUTTING CO.

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property, or designing of structures.

By 

PROJECT Interstate Rt. 71, Ohio, Fayette, Madison, Pickaway & /Franklin Counties HOLE No. 7 SR-1 over SR-3

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER	Recovery
						6" ON SAMPLER or % Core Rec.	in inches
856.0	17.5'						
	7.5'	Brownish gray sandy clay with fine to coarse gravel, moist - very stiff					
848.5	25'		12	25-26.5	SS	10-14-19	18"
	5'	Brownish gray sandy clay with fine gravel and layers of fine sand, wet - very stiff					
843.5	30'		13	30-31.5	SS	14-21-36	18"
			14	35-36.5	SS	17-26-35	17½"
	15'	Brownish gray sandy clay with fine gravel, moist - hard	15	40-41.5	SS	22-34-36	17½"
828.5	45'		16	45-46.5	SS	13-20-29	18"
			17	50-51.5	SS	12-16-23	18"
	11.5'	Gray sandy clay with fine gravel, moist - hard	18	55-56.5	SS	14-19-26	18"
817.0	56.5'						
		Boring completed					

## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 1 STATION & OFFSET 30+41, 55' L. of C.L. of SR-3 SURFACE ELEV. 873.5 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.	
1	0.0-1.5	0.0-1.5			Topsoil	No Tests Performed.								
2	1.5-3.0	1.5-3.0	A-6	A-6b	12	9	7	11	38	35	38	22	9	
3	3.0-4.5	3.0-5.0	A-6	A-6a	7	12	12	13	38	25	29	14	12	
4	5.0-6.5	5.0-7.5	A-6	A-6b	12	10	9	12	37	32	40	23	18	
5	7.5-8.5	7.5-15.0	A-4	A-4a	4	13	15	18	39	15	21	6	15	
6	8.5-9.0	7.5-15.0	A-4	A-4a	3	15	20	17	38	10	19	6	10	
7	10.0-11.5	7.5-15.0	A-4	A-4a	5	17	11	13	40	19	21	8	11	
8	12.5-14.0	7.5-15.0	A-4	A-4a	5	15	12	13	42	18	21	8	13	
9	15.0-16.5	15.0-20.0	A-6	A-6a	6	13	11	15	39	22	25	11	13	
10	17.5-19.0	15.0-20.0	A-6	A-6a	7	8	11	15	41	25	25	12	12	
11	20-21.5	20.0-25.0	A-4	A-4a	6	10	9	15	40	26	23	8	11	
12	25.0-26.5	25.0-30.0	A-2-4	A-2-4	0	11	9	61	4	15	23	9	11	
13	30.0-31.0	30.0-56.5	A-4	A-4a	7	10	7	17	41	25	23	10	8	
14	35.0-36.0	30.0-56.5	A-4	A-4a	6	10	7	17	41	25	22	9	8	
15	40.0-41.5	30.0-56.5	A-4	A-4a	6	11	8	16	39	26	22	9	10	
16	45.0-46.5	30.0-56.5	A-4	A-4a	5	16	7	16	39	22	21	8	10	
17	50.0-51.5	30.0-56.5	A-4	A-4a	6	12	8	16	40	24	22	8	9	





## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 4 STATION & OFFSET 30+54, 73' R. of C.L. of SR-3 SURFACE ELEV. 873.8 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	
1	0.0-0.5	0.0-0.5		Topsoil		No Tests Performed								
2	0.5-1.5	0.5-1.5	A-6	A-6a	10	0	6	12	53	29	34	14	13	
3	1.5-3.0	1.5-3.0	A-6	A-6b	12	8	8	11	39	34	35	20	6	
4	3.0-4.5	3.0-5.0	A-6	A-6a	7	11	11	14	38	26	26	12	11	
S-1	5.0-6.5	5.0-50.0	A-4	A-4a	7	7	11	14	42	26	24	9	12	Unconfined Compression
5	6.5-7.0	5.0-50.0	A-4	A-4a	5	12	12	16	40	20	21	8	11	
6	7.0-8.0	5.0-50.0	A-4	A-4a	3	28	11	13	33	15	20	6	14	
S-2	8.5-10.0	5.0-50.0	A-4	A-4a	3	24	11	14	37	14	21	7	12	Unconfined Compression
7	10.0-11.5	5.0-50.0	A-4	A-4a	4	17	11	18	41	13	20	5	10	
8	12.5-14.0	5.0-50.0	A-4	A-4a	2	38	7	11	30	14	20	6	12	
9	15.0-16.5	5.0-50.0	A-4	A-4a	5	16	9	15	38	22	22	8	10	
10	17.5-19.0	5.0-50.0	A-4	A-4a	4	20	10	14	35	21	22	8	10	
11	20.0-21.5	5.0-50.0	A-4	A-4a	6	10	9	15	38	28	24	8	12	
12	21.5-23.0	5.0-50.0	A-4	A-4a	5	17	8	14	37	24	24	9	11	
13	23.0-24.5	5.0-50.0	A-4	A-4a	6	11	9	14	39	27	25	10	12	
14	25.0-26.5	5.0-50.0	A-4	A-4a	5	12	10	18	39	21	33	8	10	
15	30.0-31.5	5.0-50.0	A-4	A-4a	6	10	9	16	41	24	22	8	10	



## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 5 STATION & OFFSET 31+33, 97' R. of C.L. of SR-3 SURFACE ELEV. 874.6 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	
1	0.0-1.0	0.0-1.0		Topsoil		No Tests Performed.								
2	1.0-1.5	1.0-2.5	A-7-6	A-7-6	18	0	4	9	35	52	51	32	18	
3	2.5-4.0	2.5-7.0	A-6	A-6a	7	13	11	12	37	27	28	12	11	
4	5.0-6.5	2.5-7.0	A-6	A-6a	5	21	12	12	33	22	26	11	13	
S-1	7.0-8.5	7.0-56.5	A-4	A-4a	4	22	10	12	33	23	23	9	14	Unconfined Compression
5	8.5-10.0	7.0-56.5	A-4	A-4a	4	20	14	13	35	18	20	6	11	
6	10.0-11.5	7.0-56.5	A-4	A-4a	6	15	11	10	40	24	22	8	11	
7	12.5-14.0	7.0-56.5	A-4	A-4a	5	16	10	14	34	26	24	10	12	
8	15.0-16.5	7.0-56.5	A-4	A-4a	6	9	9	17	40	25	23	10	11	
9	17.5-19.0	7.0-56.5	A-4	A-4a	6	14	8	11	42	25	24	10	13	
10	20.0-21.5	7.0-56.5	A-4	A-4a	6	13	10	13	45	19	23	9	11	
11	25.0-26.5	7.0-56.5	A-4	A-4a	6	10	8	19	45	18	24	10	10	
12	30.0-31.5	7.0-56.5	A-4	A-4a	6	13	7	16	46	18	22	9	9	
13	35.0-36.0	7.0-56.5	A-4	A-4a	7	6	8	18	49	19	21	8	8	
14	40.0-41.5	7.0-56.5	A-4	A-4a	6	10	8	18	43	21	21	8	9	
15	45.0-46.5	7.0-56.5	A-4	A-4a	6	9	8	17	42	24	22	9	9	
16	50.0-51.5	7.0-56.5	A-4	A-4a	6	12	8	17	43	20	20	8	9	



## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 6 STATION & OFFSET 28+56, 55' L. of C.L. of SR-3 SURFACE ELEV. 871.0 CLIENT: Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics									OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.		
1	0.0-1.5	0.0-1.5		Topsoil		No Tests Performed.									
2	1.5-3.0	1.5-5.0	A-7-6	A-7-6	15	0	2	7	39	52	47	26	18		
3	3.0-4.5	1.5-5.0	A-7-6	A-7-6	15	0	3	7	42	48	44	25	20		
4	5.0-6.5	5.0-7.5	A-6	A-6a	9	4	7	11	48	30	29	12	14		
5	7.5-9.0	7.5-15.0	A-4	A-4a	4	19	12	16	37	16	21	7	13		
6	10.0-11.5	7.5-15.0	A-4	A-4a	5	17	11	14	40	18	19	5	13		
7	12.5-14.0	7.5-15.0	A-4	A-4a	4	27	9	10	37	17	21	8	13		
8	15.0-16.5	15.0-20.0	A-6	A-6a	7	10	10	14	38	28	25	11	15		
9	17.5-19.0	15.0-20.0	A-6	A-6a	7	12	10	14	43	21	24	11	12		
10	20.0-21.5	20.0-56.5	A-4	A-4a	7	7	10	14	41	28	24	10	12		
11	25.0-26.5	20.0-56.5	A-4	A-4a	5	10	10	18	42	20	22	8	10		
12	30.0-31.5	20.0-56.5	A-4	A-4a	7	8	8	16	43	25	23	10	9		
13	35.0-36.0	20.0-56.5	A-4	A-4a	7	7	7	17	43	26	22	9	8		
14	40.0-41.5	20.0-56.5	A-4	A-4a	7	7	8	17	44	24	21	8	9		
15	45.0-46.5	20.0-56.5	A-4	A-4a	6	11	8	17	42	22	22	9	9		
16	50.0-51.5	20.0-56.5	A-4	A-4a	6	10	9	17	40	24	21	9	10		
17	55.0-56.5	20.0-56.5	A-4	A-4a	5	14	8	17	38	23	22	10	10		

## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 7 STATION & OFFSET 29+33, 21' L. of C.L. of SR-3 SURFACE ELEV. 873.5 CLIENT Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics								OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	LL	P.I.	W.C.	
1	0.0-0.5	0.0-0.5		Fill		No Tests Performed.								
2	0.5-1.5	0.5-3.0	A-6	A-6a	6	5	13	19	36	27	30	13	15	
3	1.5-3.0	0.5-3.0	A-6	A-6a	Visual - Insufficient Sample for Testing									
4	3.0-4.5	3.0-9.0	A-7-6	A-7-6	19	0	4	9	38	49	54	36	14	
S-1	5.0-6.5	3.0-9.0	A-7-6	A-7-6	18	0	3	7	43	47	48	30	21	Unconfined Compression
5	6.5-8.0	3.0-9.0	A-7-6	A-7-6	13	0	6	12	40	42	42	23	12	
6	9.0-10.5	9.0-11.5	A-4	A-4a	4	17	12	15	35	21	21	7	10	
7	11.5-13.0	11.5-13.5	A-6	A-6a	5	30	7	9	36	18	27	12	14	
S-2	13.5-15.0	13.5-17.5	A-4	A-4a	4	20	12	12	38	18	21	7	12	Consolidation & Unconfined Compr.
8	15.0-16.5	13.5-17.5	A-4	A-4a	3	29	9	11	35	16	23	10	13	
9	17.5-19.0	17.5-20.0	A-6	A-6a	6	14	12	15	38	21	24	11	10	
10	20.0-21.5	20.0-22.5	A-4	A-4a	6	15	9	13	38	25	25	10	13	
11	22.5-24.0	22.5-25.0	A-6	A-6a	8	7	9	15	44	25	25	11	11	
12	25.0-26.5	25.0-56.5	A-4	A-4a	5	10	12	19	41	18	23	9	12	
13	30.0-31.5	25.0-56.5	A-4	A-4a	6	13	7	16	40	24	23	10	10	
14	35.0-36.5	25.0-56.5	A-4	A-4a	7	7	8	17	42	26	22	10	9	
15	40.0-41.5	25.0-56.5	A-4	A-4a	6	13	7	17	38	25	23	10	9	





## TESTING ENGINEERS AND SOILS CONSULTANTS

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## SUMMARY OF TEST DATA FOR SOILS

BORING No. 10 STATION & OFFSET 29+34, 97' R. of C.L. of SR-3 SURFACE ELEV. 873.2 CLIENT Barrett-Cargo-Withers & Assoc.  
SR-1 Over SR-3 PROJECT: I-71 - Bridge No. FRA-1-  
0310 - R & L

SAMPLE No.	SAMPLE DEPTH	STRATUM DEPTH	HRB CLASS	SHTL CLASS	GROUP INDEX	Physical Characteristics									OTHER TESTS
						% AGG.	% C.S.	% F.S.	% SILT	% CLAY	L.L.	P.I.	W.C.		
1	0.0-1.5	0.0-1.5		Fill	No Tests Performed										
2	1.5-3.0	1.5-5.0	A-7-6	A-7-6	19	0	4	6	37	53	54	36	15		
3	3.0-4.5	1.5-5.0	A-7-6	A-7-6	14	1	3	10	40	46	42	24	21		
4	5.0-6.5	5.0-7.5	A-6	A-6a	7	11	10	14	41	24	26	11	14		
5	7.5-9.0	7.5-20.0	A-4	A-4a	4	22	10	13	36	19	24	10	11		
6	10.0-11.5	7.5-20.0	A-4	A-4a	5	21	10	12	36	21	23	9	10		
7	12.5-14.0	7.5-20.0	A-4	A-4a	5	17	11	14	40	18	22	9	14		
8	15.0-16.5	7.5-20.0	A-4	A-4a	4	22	9	14	35	20	22	9	10		
9	17.5-19.0	7.5-20.0	A-4	A-4a	7	10	8	12	43	27	25	10	10		
10	20.0-21.5	20.0-25.0	A-6	A-6a	7	9	10	14	40	27	26	12	13		
11	25.0-26.5	25.0-56.5	A-4	A-4a	6	9	9	17	44	21	24	10	11		
12	30.0-31.5	25.0-56.5	A-4	A-4a	6	7	10	18	42	23	22	9	9		
13	35.0-36.0	25.0-56.5	A-4	A-4a	5	11	10	17	40	22	22	9	8		
14	40.0-41.0	25.0-56.5	A-4	A-4a	6	9	9	15	42	25	22	9	8		
15	45.0-46.5	25.0-56.5	A-4	A-4a	6	12	9	16	40	23	21	9	9		
16	50.0-51.5	25.0-56.5	A-4	A-4a	6	9	8	17	40	26	21	9	10		
17	55.0-56.5	25.0-56.5	A-4	A-4a	6	8	9	19	39	25	21	9	10		







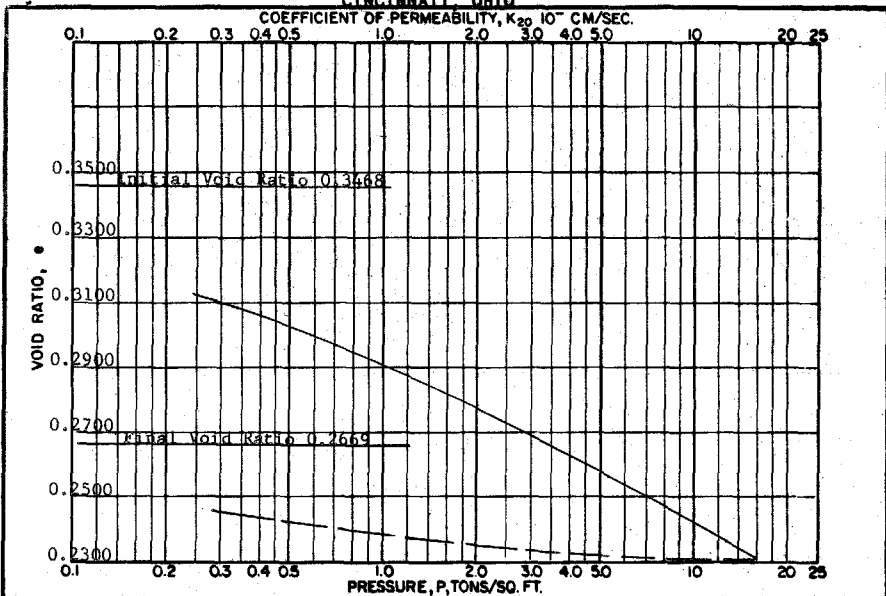




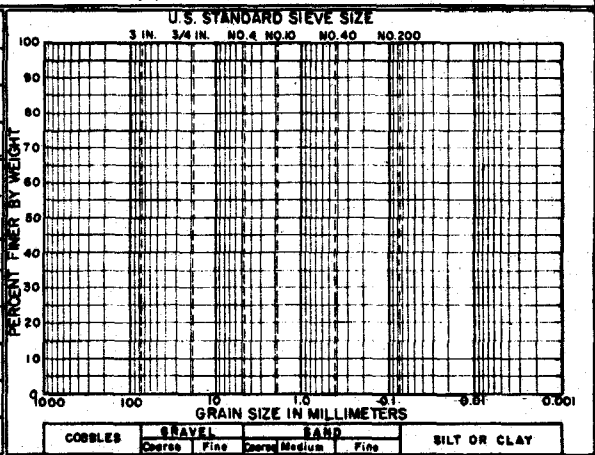
THE R. C. NUTTING COMPANY

CINCINNATI, OHIO

COEFFICIENT OF PERMEABILITY,  $K_{20}$   $10^{-6}$  CM/SEC.

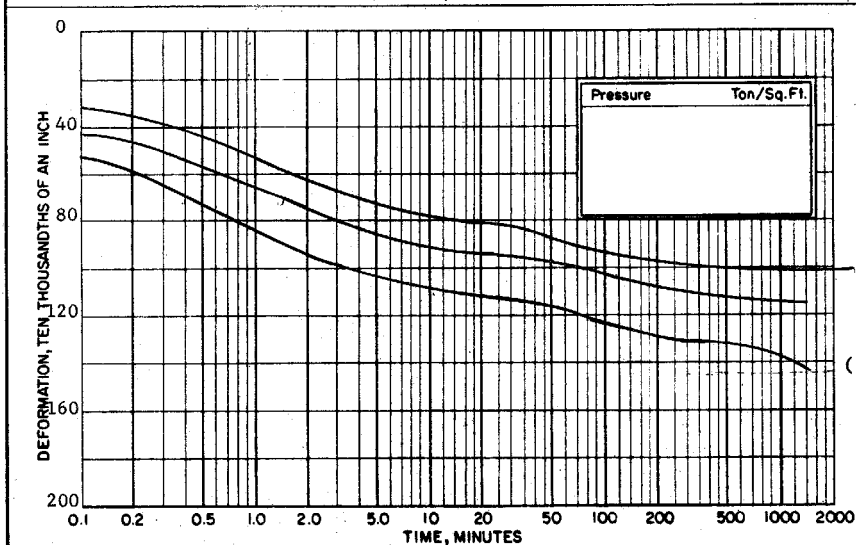
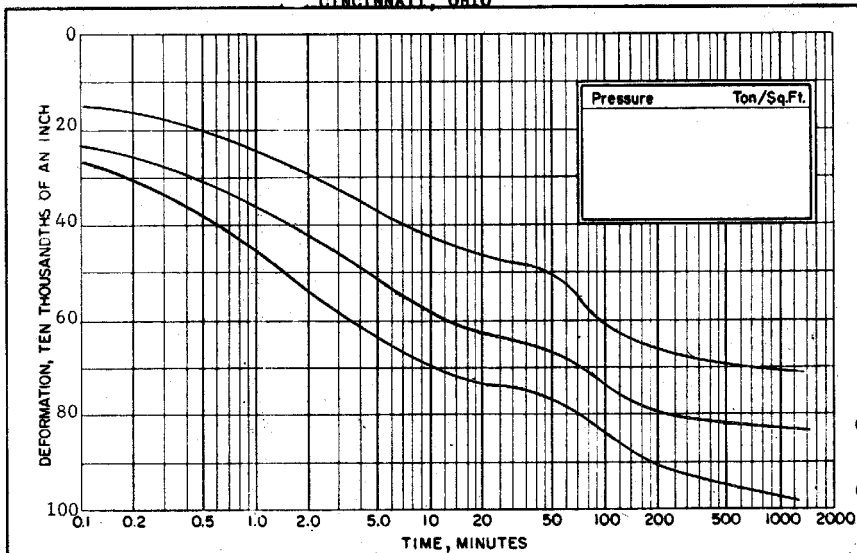


TEST DATA	
Type of Specimen	Undisturbed
Overburden Pressure, $P_0$	Tons/Sq. Ft.
Preconsol Pressure, $P_c$	Tons/Sq. Ft.
$C_c=0.01$ Rebound	
Compression Index, $C_c=0.05$ Virgin	
Permeability at initial $e$	
$K_{20}$	$\times 10^{-6}$ Cm/Sec
	Ft./Min.
Initial Ht. 0.0190 in.	2.497 in.
Initial Saturation, $S_0$	% 100.6
Final Saturation, $S_f$	% 110.8
Initial Dry Density	Lbs./Cu. Ft. 129.3
Initial Water Content, $W_0$	% 12.5
Remarks: Final W.C. = 10.6	
Material: Brown Sandy	
SILT, Some Gravel, Moist-Stiff.	
Classification	A-4a
LL 21	Sp.G. 2.79
PL 14	$D_{10}$



Project I-71 - Bridge No. FRA-1-0310 - R & L	
Area SR-1 Over SR-3	
Boring No. 7	Sample No. S-2
Elev. or Depth 13.5-15'	Date 8/22/62
<b>CONSOLIDATION TEST REPORT</b>	
SHEET 1 OF 2	

THE H. C. NUTTING COMPANY  
CINCINNATI, OHIO



Project I-71 - Bridge No FRA-1-0310 - R & L

Area SR\_1 Over SR-3

Boring No. 7

Sample No. S-2

Elev. or Depth 13.5-15'

Date 8/22/62

CONSOLIDATION TEST-TIME CURVES

SHEET 2 of 2





INVOICE

**THE H. C. NUTTING COMPANY**

ENGINEERS AND CHEMISTS

4120 AIRPORT ROAD  
CINCINNATI 26, OHIO

EAST 1-5816

*063*  
*8-27-62*

Barrett-Cargo-Withers & Assoc. Ltd.,  
TO Post Office Box 186,  
Chillicothe, Ohio

INVOICE No. R-3050

*7m 13-4-1*  
*7m*

..... DELACH HERE AND SEND UPPER PART WITH CHECK..... CANCELLED CHECK IS YOUR RECEIPT.....

TERMS: 30 DAYS NET NO DISCOUNT

CUST. No.	FOR Soil Tests	PROJECT Interstate Rt. 71 Bridge No. FRA-1-0310 R&L CONTRACTOR	INVOICE No. R-3050	ORDER No. 1770.8	DATE 8/24/62 (Ik)
	REPORT No.	DESCRIPTION	QUANTITY	RATE	TOTAL
		Moisture Content	104 ✓	\$ 1.50/ea	\$ 156.00
		Plastic Limit	104 ✓	4.00/ea	416.00
		Liquid Limit	104 ✓	6.00/ea	624.00
		Sieve & Hydrometer	104 ✓	10.00/ea	1040.00
		Unconfined Compression	5 ✓	12.00/ea	60.00
		Consolidation	1 ✓	60.00/ea	60.00
					<b>\$ 2356.00</b> ✓
		CI 5 - CL			

INVOICE

**THE H. C. NUTTING COMPANY**

ENGINEERS AND CHEMISTS  
 4120 AIRPORT ROAD  
 CINCINNATI 26, OHIO  
 EAST 1-5816

*Handwritten notes and signatures*

TO **Barrett-Cargo-Withers & Assoc. Ltd.,**  
 Post Office Box 186,  
 Chillicothe, Ohio

INVOICE NO. **R-3051**

.....DETACH HERE AND SEND UPPER PART WITH CHECK. CANCELLED CHECK IS YOUR RECEIPT. ....

TERMS: 30 DAYS NET NO DISCOUNT

CUST. No.	FOR Engineering Analysis	PROJECT Interstate Rt. 71 Bridge No. FRA-1-0310 R&L CONTRACTOR Over State Rt. 3	INVOICE No. R-3051	ORDER No. 1770.8	DATE 8/24/62 (IK)
REPORT No.	DESCRIPTION		QUANTITY	RATE	TOTAL
		Twin Structure			\$ 250.00
		CI 6 - CL			