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G.I.-30 SEPT. 1976

GEOCRES No. 30 M15-41

DIST. 6 REGION CENTRAL

W.P. No. _____

CONT. No. _____

W. O. No. _____

STR. SITE No. _____

HWY. No. _____

LOCATION OSHAWA RIVER NEAR

COLUMBUS

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: DOCUMENTS TO BE UNFOLDED
BEFORE MICRO FILM

30M15 map



WARNOCK HERSEY SOIL INVESTIGATIONS LTD.

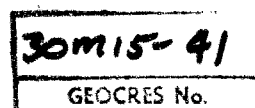
250 MADISON AVENUE, TORONTO 7, ONT. 924-9691

October 15, 1964.

S-64-358

County of Ontario,
County Building,
Whitby, Ontario.

Attn: Mr. W. A. Twelvetrees, P. Eng.,
County Engineer.




Dear Sirs:

We enclose herewith our report on the Soil Investigation recently completed for the proposed re-construction of Bridge B-78 near Columbus, County of Ontario.

We believe this report to be complete but should you require further information with regard to content or interpretation, please contact the undersigned.

Yours truly,

WARNOCK HERSEY SOIL INVESTIGATIONS LTD.


P. E. Lawrence, P. Eng.,
Manager.

PBL/dbr

COMPLETE FOUNDATION AND SUBGRADE INVESTIGATIONS

SOIL BORINGS AND SAMPLING • LABORATORY AND FIELD TESTING • LOAD BEARING TESTS • PILE LOADING TESTS • ROCK AND CONCRETE CORING • SEISMIC INVESTIGATIONS



INTRODUCTION

We were authorized by Mr. W. A. Twelvetrees, County Engineer, to proceed with a Soil Investigation for the proposed re-construction of Bridge B-78 near Columbus, in the County of Ontario.

The purpose of this investigation was to determine -

- (a) The engineering properties of the sub-soil including the allowable bearing values.
- (b) Ground water conditions.
- (c) The depth of fill.
- (d) The location and type of foundation best suited for this site.

The work consisted of drilling and sampling one hole to 40 foot depth and one hole to 30 foot depth.

PROCEDURE

The locations of the bore holes were set out by our Engineering Staff at the locations shown on the enclosed sketch. Surface elevations of the bore holes were taken with reference to Bench Mark #1 (Elevation 100.0).

The drilling commenced on September 29th and was completed on October 1st, 1964. The bore holes were advanced using the wash boring procedure, and standard split spoon samples were taken ahead of the BX size pipe used to case the holes. For each split spoon sample, the penetration blows to drive the sampler one foot were recorded. The energy of each blow was 4200 inch-pounds obtained by a 140 pound hammer falling a distance of 30 inches.

Continued

S-64-358



PROCEDURE
(Cont)

These penetration blows (N value) in sand and finer grained soils provide an empirical means of determining the strength, density, and bearing value of the soil. All samples were returned to our laboratory for examination and classification. Ground water levels were observed at the completion of each hole and 24 hours after the hole had been completed.

SOIL PROFILES

Bore Hole #1 was drilled on the existing bridge approach showing 10 feet of fine brown sand fill. In Bore Hole #2 there was 10 feet of brown sand on the surface. Below the fill in Bore Hole #1 and below the brown sand in Bore Hole #2 there is a grey fine to medium sand which extended to 35 feet in Bore Hole #1 and to 28 feet in Bore Hole #2. The remainder of both bore holes consisted of a very dense coarse sand and gravel. The bore holes were terminated 2 to 5 feet into this coarse gravel.

The ground water at this site is at Elevation 91 feet.

CONCLUSIONS

1. The theoretical allowable bearing values of the sub-soil based on the split spoon blows are as follows:

Continued



CONCLUSIONS
(Cont)

ALLOWABLE BEARING VALUES
Tons/Square Foot

Bore Hole No. -	<u>1</u>		<u>2</u>	
Footing Width -	5' or <u>less 5-10'</u>		5' or <u>less 5-10'</u>	
<u>Elevation</u>				
90	0.5	0.4	0.7	0.6
88	0.7	0.6	0.7	0.6
85	1.4	1.1	3.1	2.7
80	1.4	1.1	3.1	2.7
75	3.1	2.7	3.5	3.0
70	4.8	4.1	3.5	3.0
65	4.8	4.1	3.5	3.0

These theoretical allowable bearing values are based on a factor of safety with respect to strength of 3.0 and a maximum settlement of one (1) inch.

2. We would recommend that normal spread footings be used if the allowable bearing values given above are not exceeded. If the unit loadings of the bridge exceed the allowable bearing values at footing depth, pile foundation would be required.
3. If a pile foundation is used, we would recommend that wood piles be used. We estimate that the piles would penetrate to approximately Elevation 75 in the area of Bore Hole #1 and to Elevation 80 in the area of Bore Hole #2. All piles should be driven to the required penetration using the Hiley Formula as laid out in the National Building Code.
4. The sub-soils at this site are all cohesionless. The sides of excavations above Elevation 91 should be sloped back at an angle of 45°. Excavations below Elevation 91 will require

Continued

S-64-358



CONCLUSIONS
(Cont)

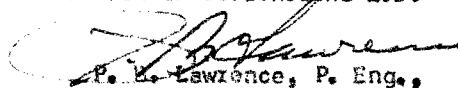
- closed sheeting to prevent inflow of sand into the excavation.
5. The existing bridge approaches are constructed of a brown fine sand. This material would make excellent fill for the approaches to the new structure. All fill should be compacted to 95% Modified Proctor Density.
 6. If the bridge abutments are unprotected, then the depth of scour during flood periods should be considered. The normal assumption of scourdepth is 3 times the annual rise and fall of the stream.

SUMMARY

The sub-soils at this site are of low to medium bearing capacity. A pile foundation would be required for heavy loads at shallow depth.

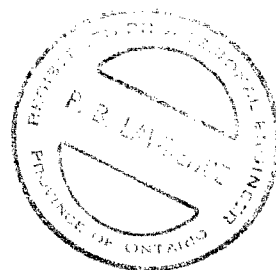
Respectfully submitted,

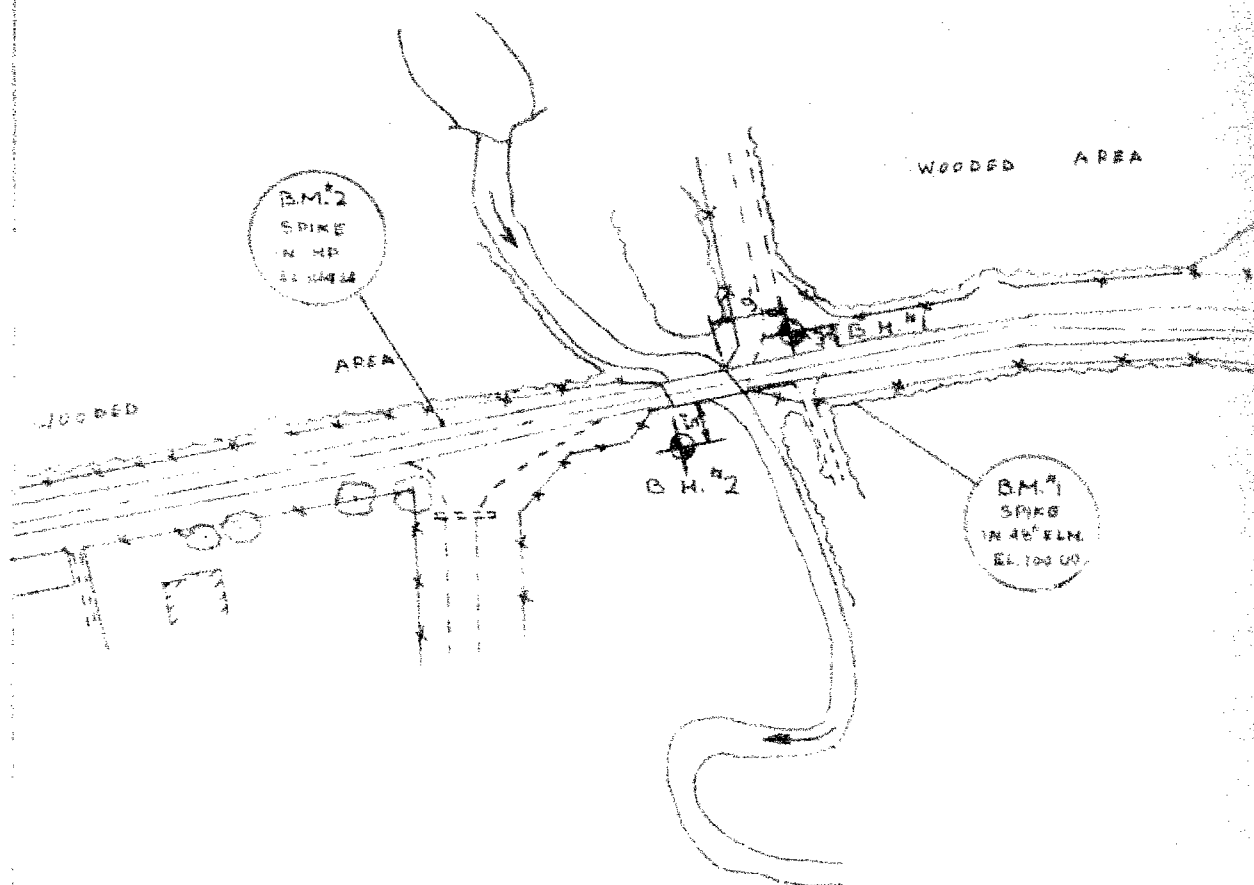
WARNOCK HERSEY SOIL INVESTIGATIONS LTD.


P. E. Lawrence, P. Eng.,
Manager.

Report by
R. Graves.

PBL/dbr





LOCATION OF BOREHOLES	
BRIDGE B-78	
COLUMBUS	ONTARIO
COUNTY OF ONTARIO	
WHITBY	ONTARIO
S-64-358	DATE N.T.S.
OCT. 5/64	BY M.F.

Warnock Hersey Soil Investigations Ltd



Office Report Of Soil Exploration

Casing BX Diameter 2 3/8" Elevn. 101.0
 Casing Hammer 350 lbs. Wt. 24" Drop
 Sample Hammer 140 lbs. Wt. 30" Drop

Client County of Ontario Order Number S-64-358
 Reconstruction of Bridge B-78 Borehole Number 1
 Columbus, Ontario Date Sept. 30, 1964.

SAMPLE CONDITION & TYPE Ref. B. M. = Elev. 100.0

ABBREVIATIONS



Disturbed

Good

Lost

SS - Split Spoon
 CS - Chunk

DO - Drive Open

DF - Drive Footvalve

TO - Thinwalled Open

WS - Washed Sample

RC - Rock Core

V - Insitu Vane Shear Test

M - Mechanical Analysis

U - Unconfined Compression

Qc - Triaxial Consolidated Quick

Q - Triaxial Quick

S - Triaxial Slow

- Unit Weight

K - Permeability

C - Consolidation

CA - Casing

WL - Water Level in Casing

WT - Water Table in Soil

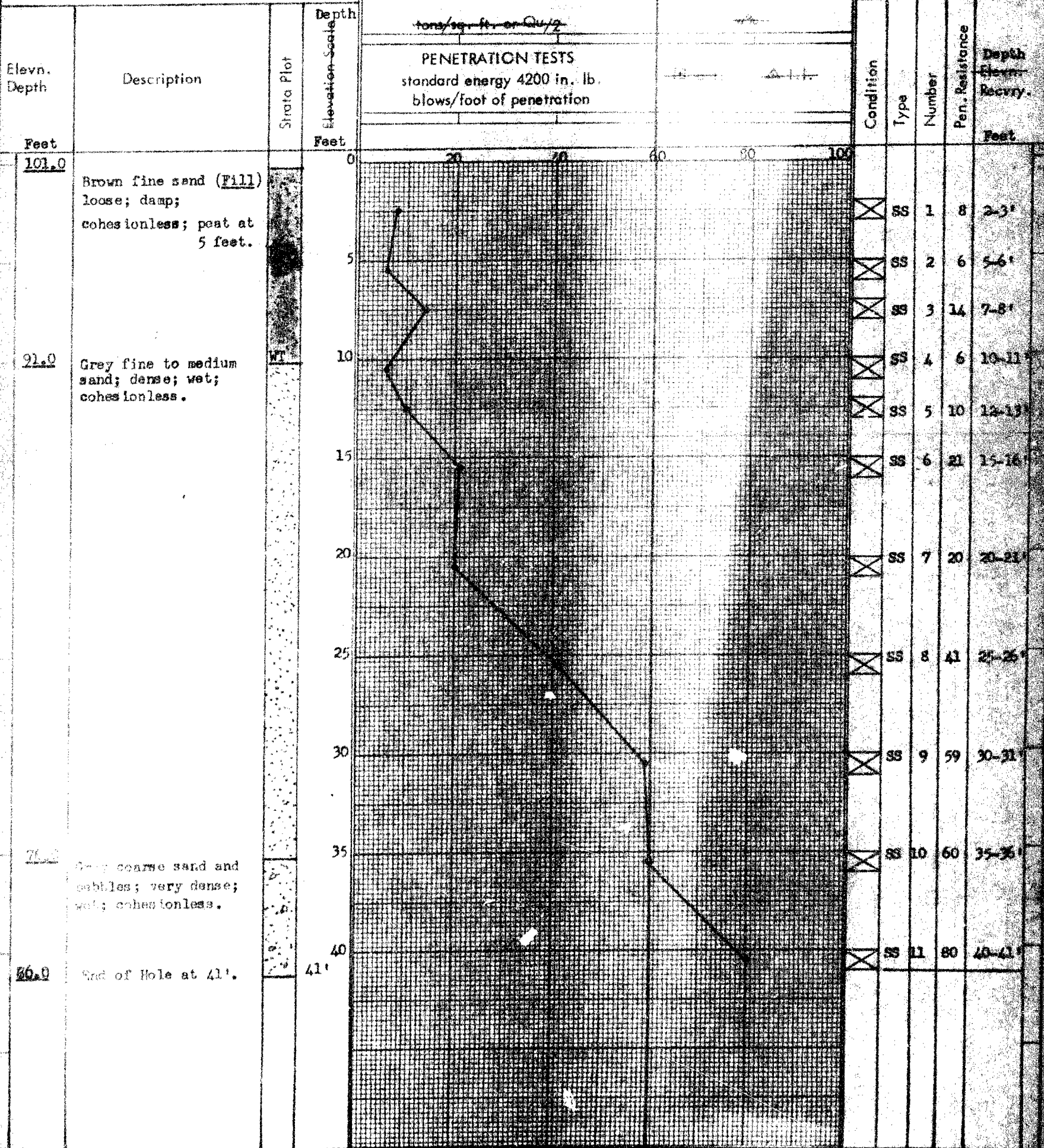
GEOLOGICAL No. 30M15-41

SOIL PROFILE

SHEAR STRENGTH

WATER CONTENT

SAMPLES



Warnock Hersey Soil Investigations Ltd



Office Report Of Soil Exploration

Casing 3" Diameter 2 3/8" Elevn. 94.1
 Casing Hammer 350 lbs. Wt. 24" Drop
 Sample Hammer 140 lbs. Wt. 30" Drop

Client County of Ontario Order Number S-64-358
 Reconstruction of Bridge B - 78 Borehole Number 2
 Columbus, Ontario. Date Sept. 29, 30, 1964.

SAMPLE CONDITION & TYPE



Disturbed
 Good
 Lost

SS - Split Spoon
 CS - Chunk
 DO - Drive Open
 DF - Drive Footvalve
 TO - Thinwalled Open
 WS - Washed Sample
 RC - Rock Core

ABBREVIATIONS

V - Insitu Vane Shear Test
 M - Mechanical Analysis
 U - Unconfined Compression
 Qc - Triaxial Consolidated Quick
 Q - Triaxial Quick
 S - Triaxial Slow
 - Unit Weight
 K - Permeability
 C - Consolidation
 CA - Casing
 WL - Water Level in Casing
 WT - Water Table in Soil

30M15-41
 GEOTECH. No.

SOIL PROFILE

SHEAR STRENGTH

WATER CONTENT

SAMPLES

