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57-F-209C

W.P. # 749-56

#

Hwy 401

GRAVEL ROAD

CROSSING

S. NEWTONVILLE

e. m. peto associates ltd.

BA 602

YOUR REFERENCE:-

OUR REFERENCE:- 5749

850 roselawn avenue,
TORONTO, ONTARIO.
RUssell 1 - 4955.

REPORT ON
SOIL SITE INVESTIGATION
at
HIGHWAY NO. 401 - GRAVEL ROAD CROSSING
SOUTH OF NEWTONVILLE
CLARKE TWP. #20 W.P. 749-56
for
DEPARTMENT OF HIGHWAYS OF ONTARIO
PLANNING AND DESIGN BRANCH

TERMS OF REFERENCE:

We were retained, by a letter from Mr. J. C. McAllister dated April 29th, 1957, to perform a complete soil site investigation at the above mentioned gravel road crossing.

We were required to drive four test holes at locations shown on the D.H.C. drawing E-2861-1 of the bridge site. Test holes were to be driven initially using EX casing and sampling in the standard manner to a depth of approximately 25 ft., depending upon the soil conditions. Standard penetration tests were to prove a minimum of 15 ft. of good bearing soil, with standard penetration test results of 30 blows or more.

Water table levels were to be carefully noted, both during the performance of the work and after the casing had been pulled.

METHOD OF OPERATIONS:

The work was performed using a Longyear Straightline Junior drill rig with A-frame, which was trucked to the site from our office in Toronto on May 14th, 1957. Work was completed on May 17th, and on May 21st final checks on water levels were made and the equipment was moved a few miles East to another Highway 401 gravel Road crossing.

METHOD OF OPERATIONS: (Cont'd)

The four boreholes were located as shown on the site plan attached at the rear of this report. Unfortunately the D.H.O. bench mark at the site had been destroyed or removed prior to the arrival of our crew on site. Therefore, a temporary bench mark was used for recording ground levels at the holes, this being the top of a 1" square iron bar on the proposed Highway 401 centre line at station 1109 + 84.48. The elevation of the top of this bar was taken to be 100.00.

All samples obtained on site were carefully examined in our laboratory and complete borehole logs were drawn up. These are included at the rear of this report. All samples will be retained for a period of at least 30 days, after which they will be discarded unless we are otherwise notified.

SITE AND GEOLOGY:

The site, which is generally level to undulating, lies in the general physiographic area known as the Lake Iroquois till plain. The particular division of this region with which we are dealing is located South of the old gravelly beaches marking the borders of glacial Lake Iroquois. Therefore, the limestone materials contained in the till have undergone reworking by the action of water at the time Lake Iroquois was in existence.

The composition of the till is dominated by limestone content, and contains fewer large stones and boulders than is characteristic of drumlinized till plains. The matrix generally consists of silt and clay and small deposits of water-laid materials. The occurrence of Precambrian type rocks such as granite is not noticeable as in the till plains to the North of this division. The depth of till is shallow over most of this area, but bedrock is rarely exposed. Frequently the till is underlain by heavy compact lacustrine deposits.

SOIL CONDITIONS:

The site is generally overlain by from 1 to 2 ft. of sandy organic topsoil. Beneath the topsoil is a thin stratum from 1 to 3 ft. thick of fine brown sand with minor silt content. This sand is wet due to surface waters percolating downwards, and is probably loose.

The soil stratum of major significance on this site is the till which directly underlies the fine brown sand. Due to its method of deposition and possibly also due to the reworking of this material by water, it is of a variable and heterogeneous character. Its colour was found to vary from light brown through light grey-brown to grey. The density of this material generally increased with depth, and standard penetration tests resistances varied from a low of 29 blows to a high of well over 80 blows per foot.

SOIL CONDITIONS: (Cont'd)

Exclusive of the variations in the till material itself, soil conditions on the site were very uniform. For this reason no soil profile was drawn. It is readily apparent that the till is an excellent foundation material, and will provide more than adequate bearing capacities for any type of proposed structure.

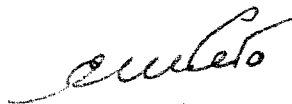
WATER CONDITIONS:

Despite the extreme density of the till material, it is permeable to water to some extent. Water levels at the time that this soil investigation was performed were generally at our elevation 97.0 no more than 1 or 2 ft. below ground surface. However, some portion of this ground water was undoubtedly derived from the prolonged rains occurring just prior to and during this investigation. It is quite likely that the water levels will drop in a drier part of the year.

RECOMMENDATIONS AND CONCLUSIONS:

1. The proposed bridge structure for the overpass can most certainly be founded on spread footings near surface, with any settlements remaining well within the tolerable limits. Such spread footings could have allowable bearing capacities of 2.9 tons per sq. ft. if their least dimension is limited to 10 ft., and can be loaded to 3.6 tons per sq. ft. if their least dimension is limited to 5 ft.
2. We recommend that all footings be placed at the same elevation at approximately 5 to 6 ft. depths. This corresponds to an elevation of roughly 92.0 (our datum). Should you desire to use higher loadings than the above stated values, this could be done either by placing the footings at a lower elevation, or by increasing the loading at the 5 to 6 ft. depth and anticipating a small amount of settlement during the construction period.
3. There should be little trouble with water in the relatively shallow excavations required for the footings, particularly if these are constructed during a period of little or no rain. In any case, any water occurring in the excavations, can certainly be pumped out. If the water level persists at only 1 ft. below surface, as at the present, then it may be necessary to sheet off only the top 3 or 4 ft., to prevent any seepage from the wet fine brown sand.

E. M. PETO ASSOCIATES LTD.,



E. M. Peto, P. Eng.

NM:sb

May 29th, 1957.





e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name HWY. 401-GRAVEL ROAD CROSSING Job No. 5749 Borehole No. 1
 Client DEPT. OF HIGHWAYS OF ONTARIO Casing BX (2 1/2" DIAM.) Boring Date MAY 17, 1957
 Datum ASSUMED Compiled By M. MINDESS Checked By E.M.P.

SAMPLE CONDITION










-  UNDISTURBED
-  FAIR
-  DISTURBED
-  LOST

SAMPLE TYPE

- S.S. 2" STANDARD SPLIT TUBE SAMPLE
- S.L. SPLIT BARREL WITH LINERS
- S.T. THIN-WALLED SHELBY TUBE SAMPLE
- W.S. WASH SAMPLE
- R.C. ROCK CORE

ABBREVIATIONS

- V.T. IN SITU VANE SHEAR TEST
- Q_u UNCONFINED COMPRESSIVE STRENGTH
- W.L. WATER LEVEL IN CASING
- W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOR	Density & Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
ORGANIC SANDY TOPSOIL			0'0" 98.2					
FINE SAND								
FINE TO MED. SAND, WITH GRITS AND ROCK FRAGMENTS	LIGHT BROWN	DENSE	5'0" 93.2		1	 S.S.	32	WET
FINE TO COARSE SAND, MANY GRITS.	BROWN.	EXTREMELY DENSE	10'0" 88.2		2	 W.S.		
CLAYEY FINE SAND, WITH GRITS AND ROCK FRAGMENTS.	GREY	EXTREMELY DENSE	14'0" 84.2					
(GLACIAL TILL)			16'0" 82.2		3	 S.S.	80	SLIGHTLY MOIST.
				HOLE TERMINATED.				

BOREHOLE LOG

Checked By E.M.P.

W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Soil Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
ORGANIC SANDY TOPSOIL FINE SAND	BROWN	Σ	0'0" 98.0			W.L.		WATER SEEPAGE AT 1 FT.
CLAYEY FINE SAND, GRITS AND ROCK FRAGMENTS. (GLACIAL TILL)	MOTTLED GREYISH-BROWN	COMPACT TO DENSE	2'0" 96.0					
" "	BROWNISH-GREY	DENSE	5'0" 93.0		1 ⊗	S.S.	30	MOIST.
" "	"	"	10'0" 88.0		2 ▨	S.S.	40	MOIST.
" "	"	"	15'0" 83.0		3 ▨	S.S.	44	SLIGHTLY MOIST. Q _v = 580 T.S.F.
" "	"	"	20'0" 78.0		4 ■	S.S.	55	SOME STONE INTERFERENCE.
SILTY FINE SAND, WITH GRITS AND ROCK FRAGMENTS. MINOR CLAY CONTENT.	GREY	EXTREMELY DENSE	24'8" 73.3		5 ⊗	S.S.	80/8"	SLIGHTLY MOIST.
			HOLE TERMINATED					

BOREHOLE LOG

Checked By E.M.R.

W. T. GROUND WATER TABLE IN SOIL

[illegible]

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

HWY. 401- GRAVEL ROAD CROSSING

Job No. 5749

Borehole No.4.....

Boring Date MAY 16, 1957

Compiled ByM. MINDESS

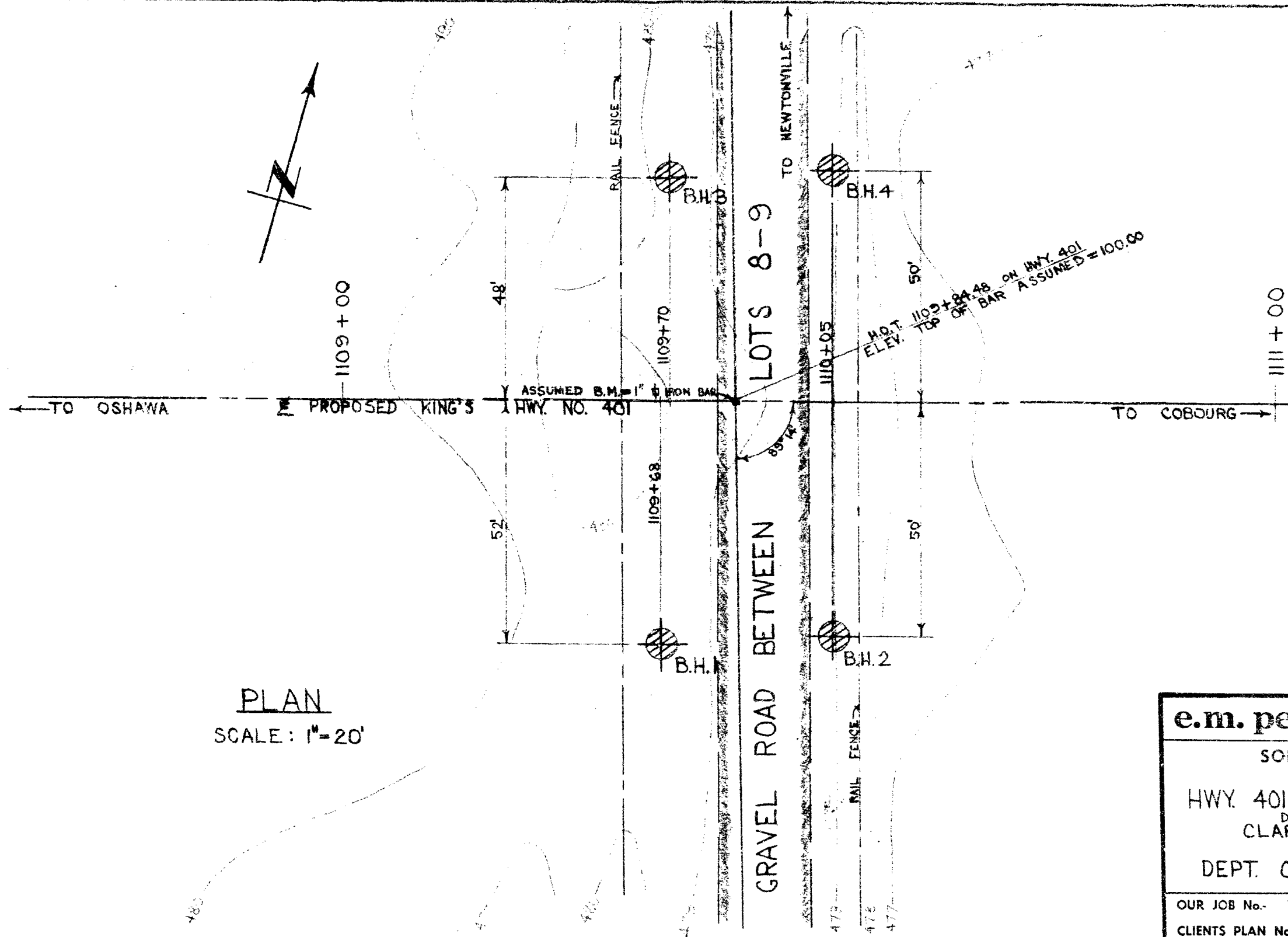
Checked ByE.M.P.

ABBREVIATIONS

S. S. 2" STANDARD SPLIT TUBE SAMPLE
S. L. SPLIT BARREL WITH LINERS
S. T. THIN-WALLED SHELBY TUBE SAMPLE
W. S. WASH SAMPLE
R. C. ROCK CORE

V.T. IN SITU VANE SHEAR TEST
Q/u UNCONFINED COMPRESSIVE STRENGTH
W.L. WATER LEVEL IN CASING
W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft	WATER LEVELS, SOIL MOISTURE & REMARKS
ORGANIC SANDY TOPSOIL			0'0" 98.7					W.L. MAY 17 TH
FINE SAND. SILT CONTENT	BROWN							WET
VERY FINE TO FINE SAND GRITS AND MINOR SILT CONTENT	LIGHT BROWN	DENSE	5'0" 93.7		1	S.S.	50	SLIGHTLY MOIST
SILTY FINE SAND, GRITS AND GRAVEL, MINOR CLAY CONTENT.	LIGHT GREY-BROWN	VERY DENSE	10'0" 83.7		2	S.S.	54	MORE COHESIVE MATERIAL THAN IN THE ABOVE SAMPLE
AS ABOVE (GLACIAL TILL)	GREY	EXTREMELY DENSE	15'0" 83.7		3	S.S.	60/8"	MOIST GRAVEL THROUGHOUT CONSISTS OF DARK BROWN, ANGULAR DOLOMITE FRAG- MENTS.
MED. TO COARSE SAND, SOME GRAVEL	GREYISH- BROWN	" "	19'0" 79.7 20'7" 78.1		4	S.S.	70/7"	WET
				HOLE	TERMINATED			



PLAN
SCALE: 1"=20'



e.m. peto & associates ltd.

SOIL SITE INVESTIGATION
AT
HWY. 401 - GRAVEL ROAD CROSSING
DUE SOUTH OF NEWTONVILLE
CLARKE TWP. #20 WP 749-56
FOR
DEPT. OF HIGHWAYS OF ONTARIO

OUR JOB No. 5749
CLIENTS PLAN No. E-2861-1
DATE MAY 28, 1957
PER. M.M.

e. m. peto associates ltd.

BA 602

YOUR REFERENCE:-

OUR REFERENCE:- 5749

850 roselawn avenue,
TORONTO, ONTARIO.

RUssell 1 - 4955.

May 29th, 1957.

Department of Highways of Ontario,
280 Davenport Road,
Toronto, Ontario.

Re: Soil Site Investigation,
Clarke Twp. #20 W.P. 749-56

Attention: Mr. J. C. McAllister

Dear Sir:

Attached hereto are the usual four (4) copies of our report for the above project, which we believe to be complete and to contain all the information that you require.

The field work for two other Highway 401 crossings to the East, namely Hope Township #5 W.P. 751-56 and Hope Township #1 W.P. 752-56, has been completed and the reports will follow next week.

In accordance with your verbal instructions, our crew will start work on the Wooler Road Crossing on May 30th, 1957 and the preliminary results will be given to you verbally. We trust that this is to your satisfaction.

Yours very truly,

E. M. PETO ASSOCIATES LTD.,



E. M. Peto, P. Eng.

MM:sb