DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40P1-73

DIST. 2 REGION Southwestern

W.P. No.

CONT. No.

W. O. No.

STR. SITE No.

HWY. No.

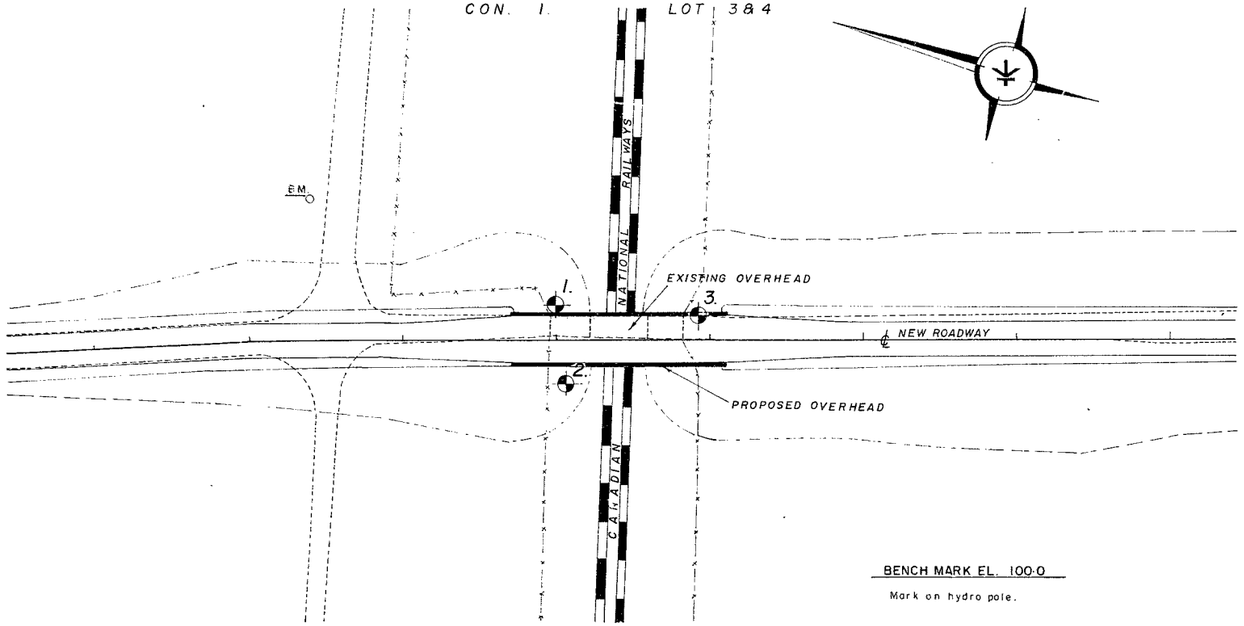
LOCATION CANNING RD & C.N.R RAILWAY, OXFORD CO.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 1

REMARKS: DOCUMENT TO BE UNFOLDED BEFORE MICROFILMED

G-1-30 SEPT. 1976

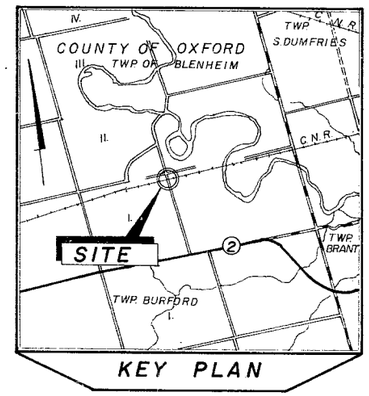
COUNTY OF OXFORD TOWNSHIP OF BLENHEIM



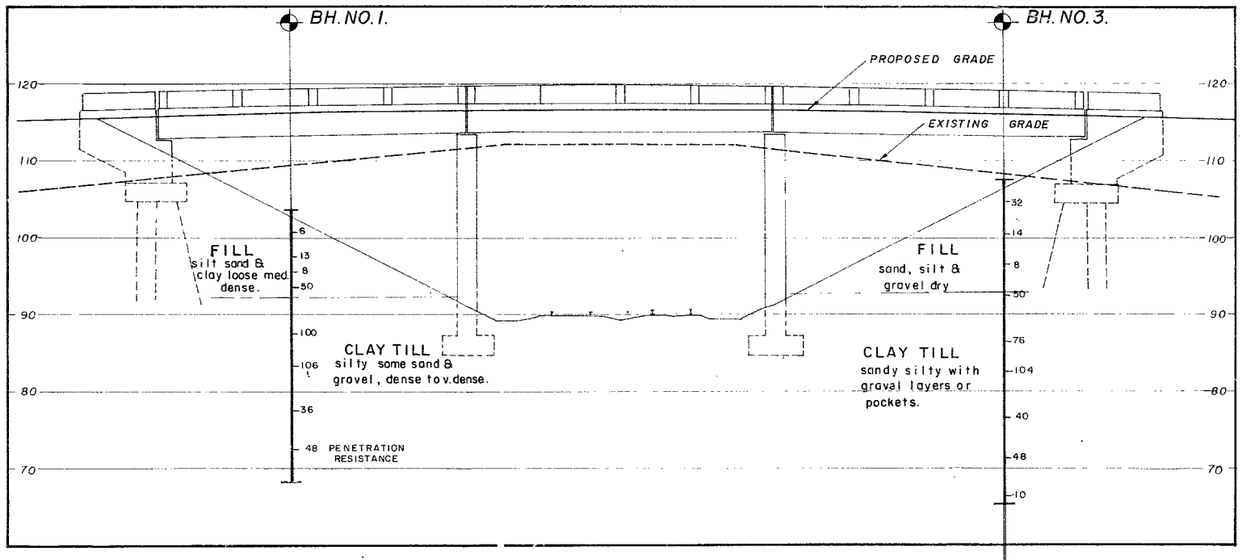
BENCH MARK EL. 100.0
Mark on hydro pole.

BORE HOLE LOCATION PLAN

SCALE 1"=50'



KEY PLAN



PROFILE

SCALE 1"= 10'

40P1-73

- NOTE -

Samples will be kept for 3 months from the date of this report unless otherwise directed.

WILLIAM A. TROW AND ASSOCIATES LIMITED

FOUNDATION INVESTIGATION

PROPOSED C.N.R. OVERHEAD

CO. OXFORD TWP. BLENHEIM ONTARIO

PROJECT NO. J. 1799 DATE FEB. 1965 DWG. NO. 1.

1850 Jane Street
Weston, Ontario
241-4644

William A. Trow
Associates Ltd.

Soil Mechanics
Consultants
W. A. Trow
MSc. MEIC. P. Eng.
K. Peaker
PhD. MEIC. P. Eng.
D. H. Shields
PhD. MEIC. P. Eng.

Project No: J1799

February 12, 1965

C. C. Parker and Associates Ltd.,
795 Main Street West,
Hamilton, Ontario.

Attention: Mr. D. Cramm, P. Eng.

Re: Foundation Investigation
Proposed CNR Overhead
Canning Road, Ontario

Dear Sirs:

In conformance with your letter of authorization dated January 13th, 1965, we have completed a foundation study at the above site. Our findings and conclusions are as follows:-

1) The subsoil at this site consists of a dense clay till. This till is variable in nature and contains pockets or seams of sand and gravel, as well as layers of silt and clay.

2) Foundations for the proposed structure may be simple spread type foundations designed for a safe net bearing value of 5 tsf at or below elevation 90.0. Foundations below this elevation will be required near the railway track. If piles are used to support spill through type abutment, these piles should be 12 inch diameter concrete filled steel piles. These piles should meet refusal near elevation ± 88 and may be designed using the safe structural capacity as determined for a short column, therefore 50 tons per pile will be quite safe.

3) No problems associated with ground water, settlement or stability of approach embankments are present. Comments related to possible earth pressures have been given in the body of this report.

These comments have resulted after consideration of the following details:-

THE SITE

The proposed overhead is located just north of Highway No. 2 on the Canning Side Road near Paris, Ontario. The area immediately adjacent to this site is flat and used for agricultural purposes. The site is presently occupied by a single lane wooden structure of dubious carrying capacity. Proposed plans will replace the existing structure with a simply supported three span structure incorporating spill through type abutments.

FIELD WORK AND SUBSOIL STRATIGRAPHY

The field work at this site comprised three sample boreholes located as shown on Drawing No. 1. Original plans called for four borings, however the field information was considered adequate, because of the dense nature of the subsoil, after the completion of the third hole. Boreholes were advanced, using Standard diamond drill soil sampling equipment. Water for advancing the boreholes was carried from a nearby river as no water was available on site. Samples of the subsoil were obtained using split spoon type samplers.

Detailed information as to the subsoil encountered in the borings has been included in the borehole logs Drawings 2 and 4 and in summary form on the estimated subsoil stratigraphy Drawing No. 1. The borehole logs also contain, in graphical form, the results of laboratory testing. Borehole elevations have been referenced to the bench mark as shown on Drawing No. 1.

The subsoil at this site can be described in general terms as a silt or clay till. This till is in a dense state and is variable in composition. In some areas pockets or seams of sand and gravel were encountered, while layering of clay and silt was also common. Ground water observations taken during the investigation and confirmed by the piezometer (standpipe) installed in Borehole No. 3 place ground water level below elevation $\pm$ 75.

FOUNDATIONS

Because of the preference for the spill through type abutment, both pile and spread type footings may be used on this project. Each type is discussed separately.

(a) Spread Footings: Foundations consisting of simple spread footings may be used to support the central piers, and also the abutment provided the retaining type abutment is used. These foundations should be designed using a safe net bearing pressure of 5 tsf and should be founded at or below elevation 90.0. Footings will be required below this elevation in the vicinity of the railway track. The bearing value has been determined from an empirical relationship * between the permissible bearing pressure and the penetration resistance of the soil.

* Gibb & Holtz, 1957 'Research on Determining the Density of Sand by Spoon Penetration Testing' - 4th Int.Conf. S.M.F.E., London.

No ground water problems associated with the excavation for these footings will be experienced at this site.

The settlement of spread footings will be insignificant, being composed of the elastic compression of the subsoil. The amount of total elastic settlement will depend on the sequence of construction. If the approach fills are completed after the bridge is in place, the settlement will be a maximum;, however, this settlement will not exceed 1/2 inch. This is confirmed by the low moisture content and high inplace density of the subsoil.

(b) Piled Footings: Piles may be selected to support spill through type abutments. In this case steel tube piles 12" in diameter and concrete filled should be used. These piles should meet refusal within 5 feet of contacting the dense till, i.e. at or near elevation ± 88. Borehole No. 1 indicates that little driving resistance will be experienced driving through the existing fill prior to reaching this level, however Hole No. 3 does not support this conclusion. The high resistance in Hole 3 is attributed to stones or dense pockets in the fill which should have little effect on the driving of the piles. Piles must not be stopped in the fill but driven to or below elevation 92.0. Piles driven to refusal in the till can be designed to carry a safe load of 50 tons/pile. This value considers the bearing capacity of the soil and the strength of the pile as a short column.

EARTH PRESSURES

If earth retaining type abutments are selected, they must be designed to withstand the earth pressure from the retained earth.

It is suggested for the simply supported type structure that the earth pressure co-efficient to be used in calculations equal 0.25. This co-efficient assumes a slight yield of the abutment if compaction is such that earth pressures tend to approach the at rest condition. For rigid frame structures and well compacted backfill, the design co-efficient should be increased to 0.35. With adequate drainage facilities the earth pressure p at any given depth h can be determined from the expression:-

$$p = KYh + Kq$$

where K = the appropriate earth pressure co-efficient

Y = 130 pcf the estimated unit weight of backfill material

q = the value of any surcharge (in psf) acting near the abutment.

APPROACH FILLS

Because of the dense nature of the subsoil, no problems associated with stability of the approach fills are present. These fills should be constructed with standard procedures and incorporate 2:1 side slopes.

It is hoped that these comments will assist in the design of the foundations for the structure. If we can be of further assistance please do not hesitate to contact this office.

Yours very truly,

K. Peaker

K. Peaker, P. Eng.

KP/chm
encls.

WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 2.

PROJECT No. J1799.

BOREHOLE No. 1.

PROJECT Proposed Overhead.

LOCATION Canning Road.

HOLE LOCATION See Dwg. 1.

HOLE ELEVATION 102.8 ft.

DATUM See Dwg. 1.

LEGEND

PENETRATION RESISTANCE
- 2" O.D. SPLIT TUBE
- 2" I.D. SHELBY TUBE
- 2" DIA. CONE

SHEAR STRENGTH
- UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE
- UNCONFINED COMPRESSION
- VANE TEST AND SENSITIVITY (S)

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS
- LIQUID LIMIT
- PLASTIC LIMIT

SAMPLE TYPE
- 2" O.D. SPLIT TUBE
- 2" I.D. SHELBY TUBE
- 3" O.D. SHELBY TUBE

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	SAMPLE TYPE AND No.	NATURAL UNIT WEIGHT P.C.F.
		102.8	0		
	FILL-SILT-sand and clay, upper 4' contain topsoil, loose to medium dense, brown.			1	
				2	
				3	
		92.3	10	4	139.4
	CLAY TILL-silty, with some sand and gravel, dense to very dense, brown. Some areas of layered silt and clay.			5	145.0
			20	6	
				7	140.5
			30	8	
	End of Borehole				
			40		

PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT
20 40 60 80
SHEAR STRENGTH P.S.F

NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT
10 20 30

Notes:
1) Hole advanced cased for full depth using conventional drilling equipment.
2) Water level at 7' on completion (not representative)

WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 3.

PROJECT No. J 1799.

BOREHOLE No. 2.

PROJECT Proposed Overhead.

LOCATION Canning Road,

HOLE LOCATION See Dwg. 1.

HOLE ELEVATION 95.65 ft.

DATUM See Dwg. 1.

LEGEND

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

2" DIA. CONE

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY (S)

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

3" O.D. SHELBY TUBE

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET
		95.7	0
	Black Organic Silt	92.7	
	CLAY TILL-silty sandy, gravelly dense - very dense brown some gravel seams or pockets noted.		10
			20
	End of Bore	68.7	
			30
			40

Notes:
1) Hole advanced cased for full depth using donventional drilling equipment.
2) No water noted.

PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT.
20 40 60 80
SHEAR STRENGTH P.S.F

NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS
% DRY WEIGHT
10 20 30

SAMPLE TYPE AND No	NATURAL UNIT WEIGHT P.C.F.
	142.5
	135

WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 4.
PROJECT No. J1799.

BOREHOLE No. 3.
PROJECT Proposed Overhead.
LOCATION Canning Road.
HOLE LOCATION See Dwg. 1.
HOLE ELEVATION 107.4 ft.
DATUM See Dwg. 1.

LEGEND

PENETRATION RESISTANCE
2" O.D. SPLIT TUBE
2" I.D. SHELBY TUBE
2" DIA. CONE
SHEAR STRENGTH
UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY (S)
NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX X^{LI}
ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
SAMPLE TYPE
2" O.D. SPLIT TUBE
2" I.D. SHELBY TUBE
3" O.D. SHELBY TUBE

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	SAMPLE TYPE AND No.	NATURAL UNIT WEIGHT P.C.F.
		107.4	0		
	FILL—sand, silt, and gravel relatively dry, top 3' contains some topsoil.		10		
		92.9			
	CLAY TILL—sandy silt with gravel layers or pockets up to 4" thick.		20	146	
				139	
			30	134	
		67.0	40		
	SILT AND CLAY, layered, stiff. End of Borehole.	65.4		1	
			50		
			60		
			70		

PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT.
20 40 60 80
SHEAR STRENGTH P.S.F.

NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT

Notes:
1) Hole advanced cased for full depth using conventional drilling equipment.
2) Installed piezometer as stand-pipe at 32'. No water noted.