

66-F-255M

COUNTY Rd. No. 15

HALTON

B.A. 2385

UNIVERSAL
GEOTECHNIQUE
LIMITED



66-F-255M

REPORT

on

SOIL INVESTIGATION

for

PROPOSED BRIDGE

COUNTY ROAD N° 15

COUNTY OF HALTON

ONTARIO

REPORT

on

SOIL INVESTIGATION

for

PROPOSED BRIDGECOUNTY ROAD N° 15COUNTY OF HALTONONTARIOINTRODUCTION

The County Engineer of Halton is planning the realignment of the County Road N° 15 just west of Stewarttown and the construction of a new bridge where the road crosses a small creek. Universal GEOTECHNIQUE Limited were requested to carry out an investigation of the proposed site of the bridge and accordingly this Report contains the results of subsurface exploration together with information relative to foundation design.

AVAILABLE INFORMATION

The County Engineers drawing shows the location of the existing bridge that presently carries the existing road over the small creek and drawing N° 1 accompanying this Report has been reproduced from the Engineers drawing and shows the actual positions at which subsurface exploration was carried out in relation to the new and existing bridges.

The existing bridge is a single span structure, and the proposed new bridge is understood to be tentatively designed as a single span structure with a deck of precast concrete beams.

THE SITE

The site of the new bridge is immediately adjacent to the existing structure on the downstream side and located in concession 7 of the Township of Esquesing.

SUBSURFACE EXPLORATION

Subsurface exploration was carried out during the period 27th to the 31st of July, 1966, and on commencing the investigation with borehole BH.2 it was found necessary to dig a small pit to remove large gravel and boulders immediately beneath the ground surface before the actual borehole could be extended. Further difficulties with boulders necessitated relocating each borehole after penetrating about 7 feet in borehole BH.1 and 13'-6" in borehole BH.2. Borehole BH.1A met refusal on a boulder just below elevation 780 but borehole BH.2A was extended to nearly elevation 770 without meeting obstructions.

The locations of the boreholes were staked and the ground surface elevations adjacent to the boreholes obtained by the Staff of GEOTECHNIQUE, all elevations being referred to the benchmark in the base of the hydro pole at station 7 + 65 with an elevation of 807.17'. During the operations of soil boring, soil samples were obtained at frequent intervals and where noticeable changes of strata occurred the depths of such changes were recorded.

The state of compaction of essentially cohesionless strata and the general consistency of any cohesive strata was determined by standard penetration tests taken during the operation of soil sampling. (The standard penetration test, as referred to in this Report, involves the recording of the number of blows (N) of a 140 lb. hammer falling 30 inches that are required to drive a 2 inch diameter split barrel sampler 1 foot into the soil at the bottom of the borehole).

Visual examination and classification of all soil samples was carried out in the laboratory and the descriptions of the strata obtained from the foregoing examination together with the results of standard penetration tests are given on the borehole logs included with this Report.

Subsurface conditions given in this Report are those indicated by material encountered in the boreholes. The accuracy of interpolation and extrapolation to obtain the soil profile should be associated directly with the geological conditions and inversely with the spacing of the boreholes.

GEOLOGICAL FEATURES

The site of the proposed bridge is close to the boundary of a glacial spillway and a drumlinized till plain and from the information obtained from the subsurface investigation it may be concluded that the strata down to the explored depths can be classified as a few feet of fluvial material overlying glacio-fluvial sands and gravels.

DISCUSSION

The results of the subsurface exploration have disclosed that the site of the proposed bridge is underlain by glacio-fluvial deposits consisting essentially of sandy gravels which are very permeable. Generally these deposits exist in a firm state but in boreholes BH.2 & 2A the material down to about elevation 795 was in a loose state.

Boreholes BH.1 & 1A were located in the bed of the creek where the elevation was 803.6 which is at approximately the low water level, and any excavation for footings below this level will require continuous heavy pumping from within cofferdams if such footings were to be placed in the dry.

It is understood that the tentative design for this bridge envisages normal spread footings with the underside located at elevation 799.47 which is about 4 feet below the existing bed of the creek and the low water level. With the underside of footings located at elevation 799.47 it will be expedient to limit the allowable bearing capacity to 1.0 tons/sq.ft. to allow for possible loose pockets of fluvial material that may exist to a depth slightly below the foregoing elevation as indicated for example in boreholes BH.2 & 2A down to elevation 795. If such loose pockets could be eliminated by compaction or replacement with weak concrete the allowable bearing capacity could be increased to 1.75 tons/sq.ft.

CONCLUSIONS

From the results of the investigation the following conclusions may be stated:

1. The site of the proposed bridge is underlain by a few feet of loose fluvial material composed of sand, gravel and boulders and underlain by glacio-fluvial deposits consisting essentially of sandy gravels existing in a generally firm state.
2. With the underside of normal spread footings to the abutments located at elevation 799.47 the allowable bearing capacity for the design of such footings should not exceed 1.0 tons/sq.ft. because of the possibility that in parts they may be resting on looser fluvial materials as disclosed down to elevation 795 in boreholes BH.2 & 2A.

3. If the underside of the footings are to be retained at elevation 799.47 due to the obvious difficulties of dewatering cofferdams in such permeable strata, it may be expedient to provide for the removal by grabbing under water if necessary for any very loose deposits and replacing with weak concrete if compaction of such loose deposits is impracticable.

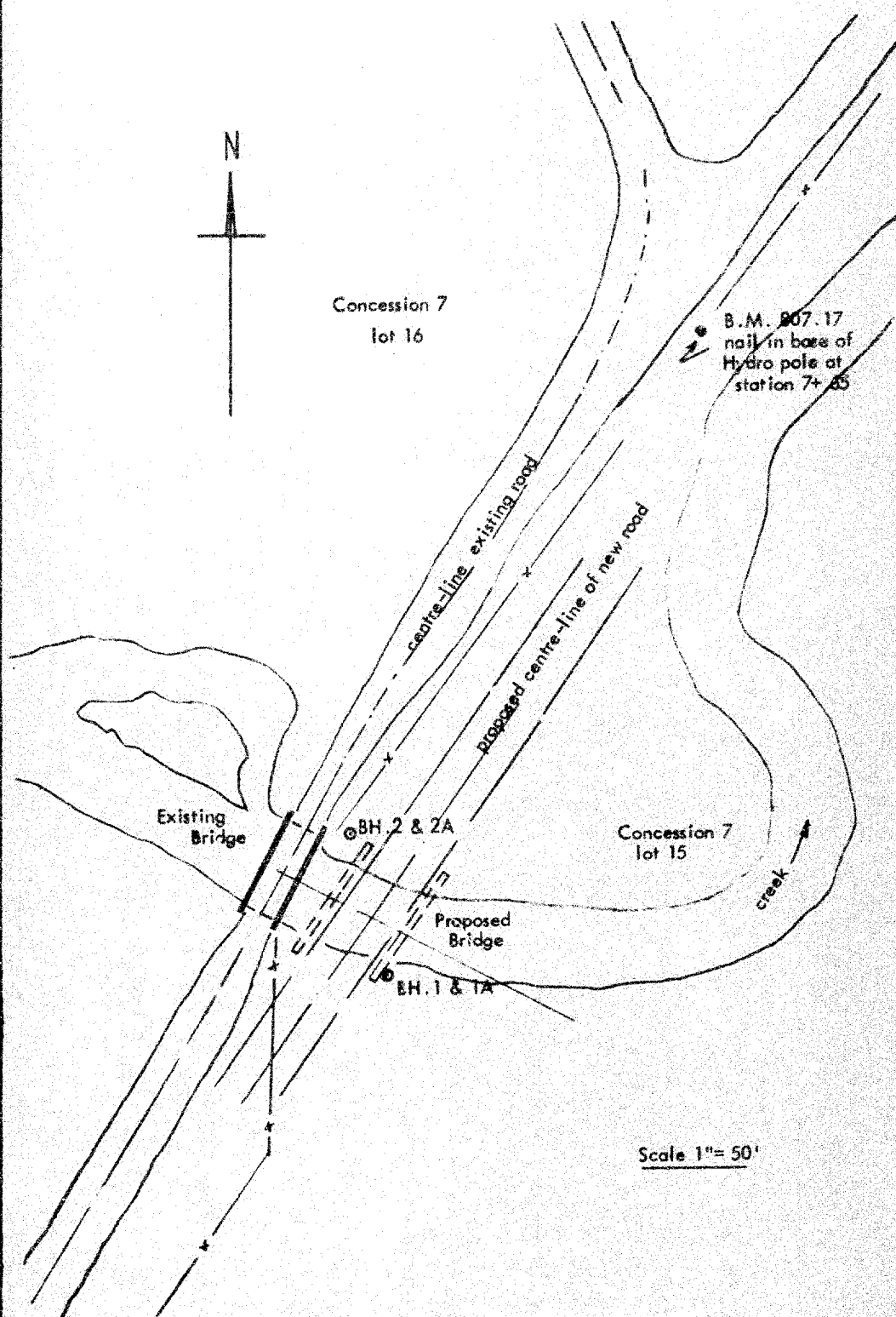
Universal GEOTECHNIQUE Limited,


J. Owen Lake,
President.

Report N° T.576/66

August, 1966.

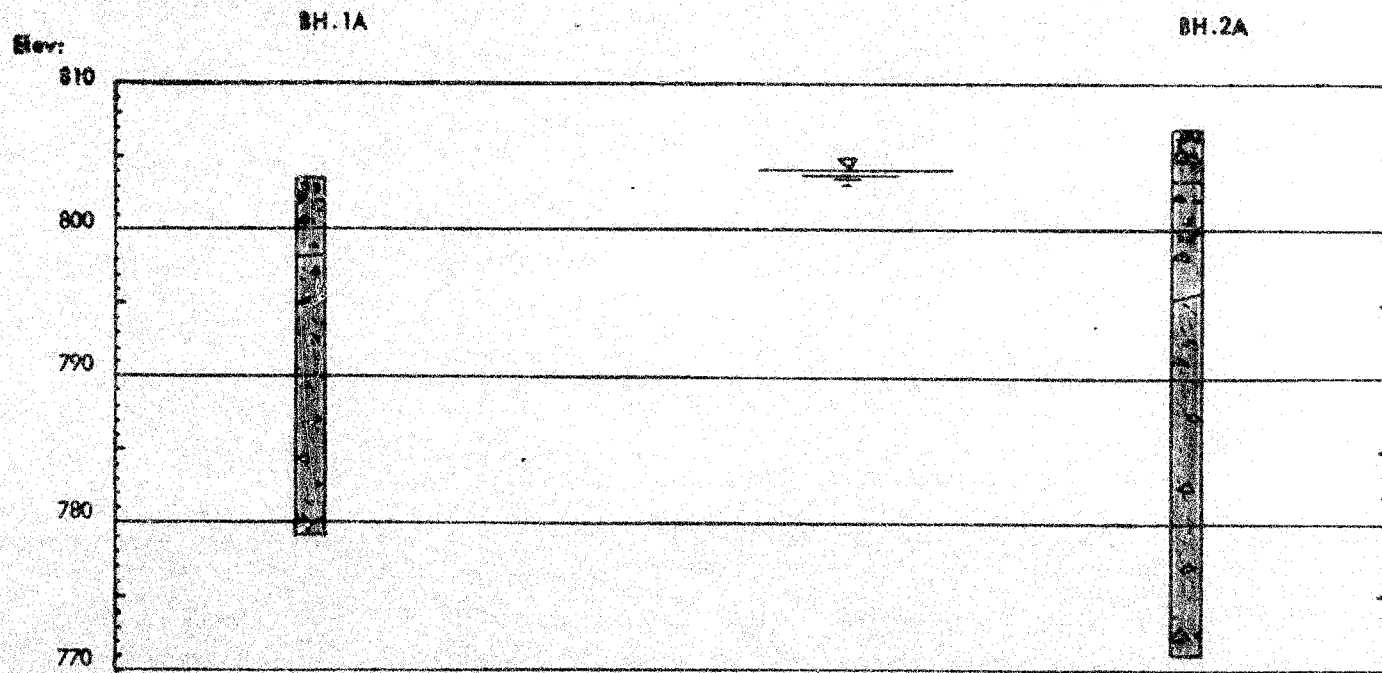
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PROJECT N° 15 Side Road Bridge, Halton County
TITLE Borehole Location Plan
DRG. No. 1 ORDER NO. T.576/66



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Legend:



Fluvial Sands, Gravels,
& Boulders



Glacio-Fluvial Sandy Gravel

PROJECT N° 15 Side Road Bridge, Halton County

TITLE Geological Section

DWG. NO. 2 ORDER NO. T.576/66





UNIVERSAL
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SOIL MECHANICS LABORATORY

BOREHOLE LOGPROJECT N° 15 Side Road Bridge, County of Halton, Ontario.ORDER NO. T.576/66CLIENT County of HaltonBOREHOLE NO. BH.1 & 1ADIAMETER 2-1/2"CASING BXBOREHOLE LOCATION See PlanINCLINATION Vertical

BEARING

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
BH.1	803.6			Zero			
Loose to firm brown fine to coarse angular to subangular GRAVEL & silty fine SAND. Firm reddish-brown silty fine to medium SAND & fine to medium angular to subangular gravel with greenish-grey silt.	800		• 1			37	Wet; no dry strength.
			• 2	7'-3"		22	do low dry strength.
				End of Borehole			Casing deflected by boulder.
BH.1A	803.6			Zero			
As BH.1	800		• 1			29	Wet; no dry strength.
Firm brown fine to coarse angular to subangular GRAVEL & fine to coarse SAND.			• 2			24	do low dry strength.
Firm reddish-brown silty fine to medium SAND & fine to coarse angular to subangular GRAVEL.			• 3			22	do slight dry strength.
do do	790		• 4			25	do do
do do			• 5			23	do do
	780			24'-3"			Refusal Condition.
				End of Borehole			

FORM 8-1A 800
UNIVERSAL GEOTECHNICAL LTD.

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT No 15 Side Road Bridge, County of Halton, Ontario. ORDER NO. T. 576/66CLIENT County of HaltonBOREHOLE NO. BH.2 DIAMETER 2-1/2" CASING BXBOREHOLE LOCATION See Plan INCLINATION Vertical BEARING

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Topsoil.	806.8			Zero			
Gravel & Boulders.							
Firm dark brown fine SAND some fine to medium subangular gravel & organic matter.			• 1	3'-6"		26	Damp; slight dry strength
Firm reddish-brown silty fine SAND & fine to medium subangular gravel with greenish-grey silt.	800		• 2			28	Wet; low to medium dry strength
Very loose brown GRAVEL & sands.			• 3			4	
			• 4			4	No recovery.
			• 5			4	do do
Firm dark brown silty fine SAND & fine to coarse angular to subangular GRAVEL.			• 6	12'-0"			
				13'-6"		21	Wet; low to medium dry strength.
				End of Borehole			Casing deflected by boulder.

SCALE: 1" = 5'-0" • DISTURBED SAMPLE

■ UNDISTURBED SAMPLE

SOIL MECHANICS LABORATORY










BOREHOLE LOG

PROJECT N° 15 Side Road Bridge, County of Halton, Ontario. ORDER No. T.576/66

CLIENT County of Halton

BOREHOLE NO. BH.2A DIAMETER 2-1/2" CASING BX

BOREHOLE LOCATION See Plan INCLINATION Vertical BEARING

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
As BH.2	806.6			Zero			
Loose brown angular to subangular fine to coarse GRAVEL with fine silty sand.	800		• 1			4	Wet. no recovery.
			• 2			4	do
Firm reddish-brown fine to coarse angular to subangular GRAVEL with fine silty sand.			• 3			20	do medium dry strength
do do	790		• 4			22	do low dry strength.
do do			• 5			21	do do
do do	780		• 6			24	do do
do do			• 7			21	do do
do do			• 8	35'-6"		26	do do
				End of Borehole			

SCALE: 1" = 5'-0" • DISTURBED SAMPLE

■ UNDISTURBED SAMPLE