

DOCUMENT MICROFILMING IDENTIFICATION

G.I.F-30 SEPT. 1976

GEOCRES No. 40P13-14

DIST. 3 REGION southwestern

W.P. No. _____

CONT. No. _____

W. O. No. _____

STR. SITE No. _____

HWY. No. _____

LOCATION LOT 12 & 13

CONCESSION 3 ASHFIELD TWP

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: DOCUMENT TO BE UNFOLDED BEFORE

MICROFILM

BA 2029

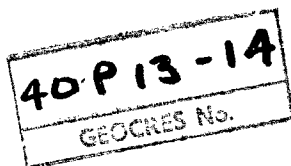
DOMINION SOIL INVESTIGATION LIMITED
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FOUNDATION ENGINEERS

ASSOCIATED COMPANY
SOIL TESTING AND ENGINEERING LTD.
34 BRENTFORD ROAD,
KINGSTON 5, JAMAICA, WEST INDIES
TELEPHONE: 68689



London, November 30th, 1964

4-10-L17
Report

Mr. J. W. Britnell, P. Eng.,
Huron County Engineer,
Court House,
GODERICH, Ontario.

Dear Mr. Britnell:

Report on Soil Investigation for
Culvert No. 2, Sta. 86 + 35.67
Huron County Road 27.

RECEIVED
DEC 1 1964

HURON COUNTY HIGHWAYS

The project has been completed in accordance with your letter dated 27th October, 1964, and this report is a record of our findings and recommendations.

FIELD WORK

The field work was carried out on 4th and 5th of November, 1964 and consisted of one borehole at the location specified on the sketch supplied to us.

The hole was advanced by washboring and lined with Bx casing. Standard penetration tests were performed at frequent intervals of depth to determine the consistency of the clay strata or the relative density of granular strata, and to recover representative samples. A dynamic cone penetration test was performed adjacent to the borehole position.

The results of the field tests are recorded on the geotechnical data sheet, enclosure 2. Elevations have been referred to a local geodetic datum as shown on enclosure 2.

SUBSURFACE CONDITIONS

Detailed descriptions of the strata encountered are shown on the geotechnical data sheet. The general profile consists of a 3 inch thickness of topsoil, and an 8 foot thickness of clay fill overlying glacial till which was penetrated a distance of 11 feet. The glacial till is mainly a very stiff clay deposit but contains a stratum of dense sand from 12 feet to 14 feet 6 inches depth.

The water level in the borehole after completion of the drilling was elevation 834.1 and the water level in the stream at the time of the field work was 832.9.

DISCUSSION

It is proposed to construct the footings for the new culvert at about elevation 827.0. In this case it would be founded in the layer of dense water bearing sand and there would be a danger of disturbing and loosening the soil below the footing level. It would therefore be more appropriate to found the culvert at the bottom of the sand layer (El. 825.9).

A nett allowable soil pressure of 5,000 pounds per square foot could be used. Settlement for the above loading would be very small. It is not known from the results of one boring whether the sand stratum is continuous, or whether its thickness and elevation are constant. Allowance should therefore be made to adjust the footing elevation during construction.

It is anticipated that the sides of excavations in the till will stand vertically with a minimum of bracing. The upper fill strata should be sloped at 1:1. If the sand stratum proves to be continuous and water bearing, there may be a substantial discharge of both sand and water into the excavation. In this case it will be necessary to provide lateral support for the sand. The discharge of water will be easily controlled by pumping.

If we can be of any further service to you in this matter, please do not hesitate to get in touch with us.

Soil samples are normally stored for a period of 3 months from the date of issue of the report, and thereafter destroyed. Kindly advise us if you have any other instruction.

Yours very truly

DOMINION SOIL INVESTIGATION LIMITED



C. J. W. Atkinson, M. Sc.,
Project Engineer.

CA/sg

Encl. 2

LIST OF SYMBOLS, ABBREVIATIONS AND NOMENCLATURE.

SOIL COMPONENTS AND GROUND WATER CONDITIONS.

BOULDER	COBBLE	GRAVEL		SAND			SILT	CLAY	ORGANICS	BEDROCK	GROUND WATER LEVEL	DEPTH OF CAVE-IN
		COARSE	FINE	COARSE	MEDIUM	FINE						
Ø	> 8"	3"	3/4"	4.76mm	2.0	0.42	0.074	0.002	>	NO SIZE LIMIT		
U.S. Standard Sieve Size :				No.4	No.10	No.40	No.200					

SAMPLE TYPES.

AS Auger sample
CS Sample from casing
ChS Chunk sample

RC Rock core
% Recovery
SS Split spoon sample

TP Piston, thin walled tube sample
TW Open, thin walled tube sample
WS Wash sample

SAMPLER ADVANCED BY static weight : w
" pressure : p
" tapping : t

OBSERVATIONS
MADE WHILE CORING
Steady pressure
No pressure
Intermittent pressure

Washwater returns
Washwater lost

PENETRATION RESISTANCES.

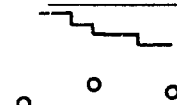
DYNAMIC PENETRATION RESISTANCE : to drive a 2" ϕ , 60° cone attached to the end of the drilling rods into the ground, expressed in blows per foot.

STANDARD PENETRATION RESISTANCE, -N- : to drive a 2" outside dia, split spoon sampler 1 foot into the ground, expressed in blows per foot.

EXTRAPOLATED -N- VALUE

The energy for the penetration resistances is supplied by a 140 lb. hammer falling 30 inches

SYMBOL :



322

SOIL PROPERTIES.

W % Water content
LL % Liquid limit
PL % Plastic limit
PI % Plasticity index
LI Liquidity index

γ Natural bulk density (unit weight)
e Void ratio
RD Relative density
C_v Coeff. of consolidation
m_v Coeff. of volume compressibility

k Coeff. of permeability
C Shear strength — in terms of total stress
 ϕ Angle of int. friction
C' Cohesion — in terms of effective stress
 ϕ' Angle of int. friction

UNDRAINED SHEAR STRENGTH.

— DERIVED FROM —

TRIAXIAL COMPRESSION TEST
UNCONFINED TEST

LABORATORY VANE TEST
FIELD

POCKET PENETROMETER TEST

Strain at failure is represented by direction of stem
20%
15% + 5%
10%

St : sensitivity = $\frac{\text{shear strength in undisturbed state}}{\text{shear strength in remoulded state}}$

SOIL DESCRIPTION.

COHESIONLESS SOILS :

Very loose 0 - 15 %
Loose 15 - 35 %
Compact 35 - 65 %
Dense 65 - 85 %
Very dense 85 - 100 %

RD :

COHESIVE SOILS :

Very soft less than 250
Soft 250 - 500
Firm 500 - 1000
Stiff 1000 - 2000
Very stiff 2000 - 4000
Hard over 4000

C lbs/sq.ft.

GEOTECHNICAL DATA SHEET FOR BOREHOLE

OUR REFERENCE NO 4-10-117

CLIENT: County of Huron

PROJECT: Culvert

LOCATION: County Road 27, Sta. 86 + 23.67, 14' E.

DATUM ELEVATION 840.74 Geodetic of center of road Sta. 86 + 35.67

METHOD OF BORING Washboring

DIAMETER OF BOREHOLE 1 1/2 size (3 inch)

ENCLOSURE NO. 2

DATE: 4th & 5th, November, 1964

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE		CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	N or Advancement of Sampler	blows per foot	SHEAR STRENGTH lbs. sq ft		
840.4	0.0	Ground Surface								
	0.5	Topsoil								
		Firm grey & brown mottled very sandy silty clay (Fill)		1	SS	8				
831.9	8.5	Very stiff grey sandy silty Clay with fine gravel (Glacial Till)		2	SS	37				
828.4	12.0	Dense grey silty fine, medium & coarse Sand (Glacial Till)		3	SS	38				
825.9	14.5	Very stiff grey silty Clay with a little fine gravel (Glacial Till)		4	SS	47				
820.9	19.5	End of Borehole		5	SS	55				

2" dia. cone

Borehole 1

Geodetic Datum
Sta. 86 + 35.67
[of road
El. 840.74