

63-F-268 M

LINE 20 BRIDGE

LOT 9. CON. XX/XX, 1

McGILLIVRAY

Twp.

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundations
Engineer,
Room 107, Lab. Bldg.,
Downsview, Ontario.

From: G. C. E. Burkhardt

Date: October 21, 1963.

Our File Ref.

In Reply To

Subject: Township of McGillivray,
Line 20 Bridge
Lot 9, Con. XX/XXI,
County of Middlesex,
Structure Site No. 20-455,
Our File No. BA 1698

Attached please find one copy of the Foundation Report, by Dominion Soil Investigation Limited, for your information.

The structure proposed by the designer is a 23 foot clear span concrete rigid frame founded on spread footings at Elevation 84.50.

We have approved of the preliminary plans as submitted by the designer of M. M. Dillon & Co. Ltd., Consulting Engineers.

GCEB:go


G. C. E. Burkhardt,
for K. L. Kleinstreiber,
Municipal Bridge Liaison Engineer.

NOTE:

ONLY ONE BOREHOLE - BUT CONSULTANT
HAS APPROPRIATELY COMMENTED UPON.

2003 ?

OTHERWISE NO COMMENTS

BY PHONE TO G.C.E.B.

OCT 30, 1963

AGB.

D O M I N I O N S O I L I N V E S T I G A T I O N L I M I T E D

77 CROCKFORD BOULEVARD

SCARBOROUGH, ONTARIO

TELEPHONE 421-2567

BRANCH

QUEENS AVENUE
LONDON, ONTARIO
TELEPHONE GE. 3-3851



FOUNDATION ENGINEERS

P.O. BOX 933
SAULT STE. MARIE
ONTARIO
TELEPHONE AL. 4-2615

London, 6 August 1963.

3-7-L1 Report

63 F-268 M

Messrs. M.M. Dillon and Company Limited,
Consulting Engineers,
141 Maple Street,
London, Ontario.

Attention: Mr. A. Phillips

Soil Investigation for Culvert,
Lot 9, Concessions 20 and 21,
Township of McGillivray

Gentlemen:

In accordance with your verbal instruction of 20th June 1963, a soil investigation has been carried out at a site in the township of McGillivray where it is proposed to replace an existing culvert with a new structure. The existing culvert carries the gravel road running between concessions 20 and 21 across a tributary stream of the Ausable River. It is understood that the new structure will be some distance to the south of the existing one, and the single borehole which was made to reveal the subsurface conditions was therefore placed at a distance of 30 feet to the south of the existing culvert.

The site lies approximately 5 miles north of Parkhill in an area of flat ground moraine which forms part of the so-called Huron Slope. Characteristically, the soils in this area are dense, heavily preconsolidated glacial tills.

Field Work

Field work was carried out on the 2nd of July, 1963, and consisted of one borehole at the location shown on enclosure 2. Standard Penetration tests were made at 5-foot intervals to determine the consistency of the soil and to recover disturbed samples. One dynamic cone penetration test was performed

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Messrs. M.M. Dillon and Company Limited,
London, Ontario.
3-7-L1 Report
6 August 1963.

adjacent to the borehole. The results of the field tests are shown on enclosure 3, and elevations have been referred to a local datum as shown on enclosure 2.

Subsurface Conditions

Details of the stratification at the borehole are shown on enclosure 3, and a subsurface profile showing the stratification in relation to the adjacent creek bed is given on enclosure 2.

The upper 5 feet of soil consists of the road bed and embankment fill. Below this material at El. 92.8, a hard silty clay till was encountered and explored to El. 71.1. This is a dense, impervious, heavily preconsolidated material. Its moisture content is below the plastic limit (by visual inspection) and it contains only a trace of fine gravel particles.

At the time of the investigation the level of water in the creek was El. 92.4 feet.

Foundations

The bed of the creek lies at El. 91.6 feet and, allowing a depth of 5 feet for scour protection, it is assumed that the footings will be placed at or about 86.6 feet. This level is well into the hard till stratum where the blow-count was 37. On the basis of this figure a net soil pressure of 7000 p.s.f. is recommended for the design of spread footings.

Provided that the footings are poured on a clean undisturbed grade, the total settlement resulting from this figure is not expected to exceed *one inch*.

Because the conclusions reached here are based on the result of a single boring, particular care should be taken when inspecting the excavation to ensure that the conditions encountered in the borehole are truly representative of the entire site.

In view of the stiff impervious nature of the soil, no unusual construction problems are anticipated. Shallow excavations will remain open without bracing and no special dewatering techniques should be necessary.

Messrs. M.M. Dillon and Company Limited,
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6 August 1963.

Although the soil is not unduly susceptible to disturbance, it is recommended that a thin protective layer of lean concrete should be spread over the footing grade as soon as it has been examined and approved.

We are glad to have had this opportunity to be of service to you, and should any questions arise in connection with the report or during excavation for the structure, 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.



Encl.
JP/mc

Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED

A handwritten signature in cursive script, appearing to read "James Park".

James Park, M.Sc., P.Eng.
London Branch Manager

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	RC	Rock core	TP	Piston, thin walled tube sample
CS	Sample from casing	%	Recovery	TW	Open, thin walled tube sample
ChS	Chunk sample	SS	Split spoon sample	WS	Wash sample
SAMPLER ADVANCED BY		static weight : w	OBSERVATIONS MADE WHILE CORING		Steady pressure
"		pressure : p			No pressure
"		tapping : t			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 :



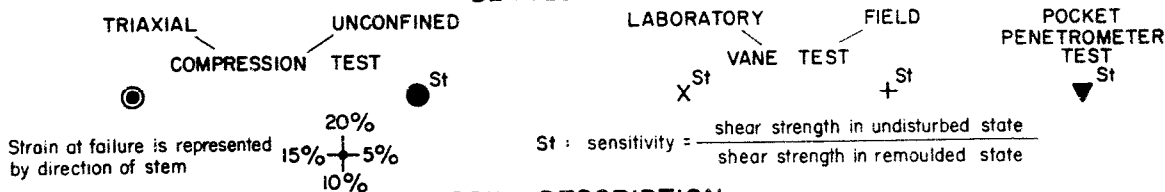
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SOIL PROPERTIES.

W %	Water content	γ_s	Natural bulk density (unit weight)	k	Coeff. of permeability
LL %	Liquid limit	e	Void ratio	C	Shear strength
PL %	Plastic limit	RD	Relative density	ϕ	Angle of int. friction
PI %	Plasticity index	Cv	Coeff. of consolidation	C'	Cohesion
LI	Liquidity index	m _v	Coeff. of volume compressibility	ϕ'	Angle of int. friction
					in terms of effective stress

UNDRAINED SHEAR STRENGTH.

- DERIVED FROM -



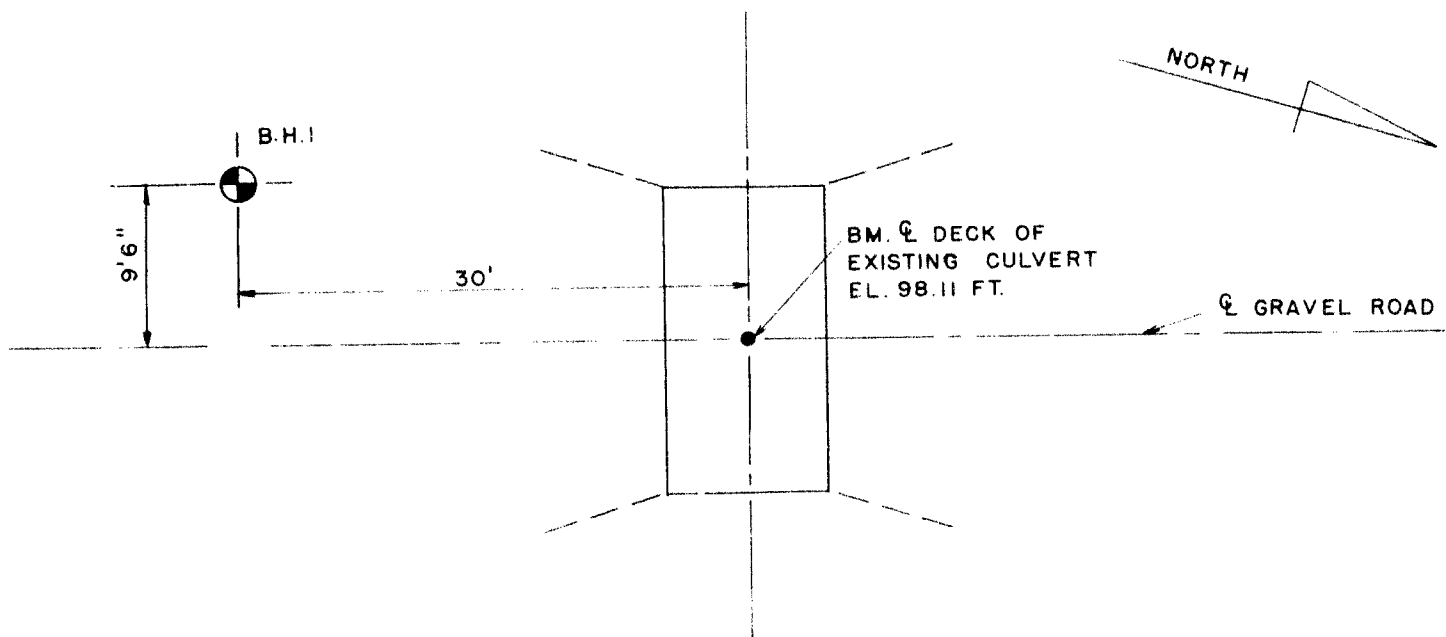
SOIL DESCRIPTION.

COHESIONLESS SOILS :

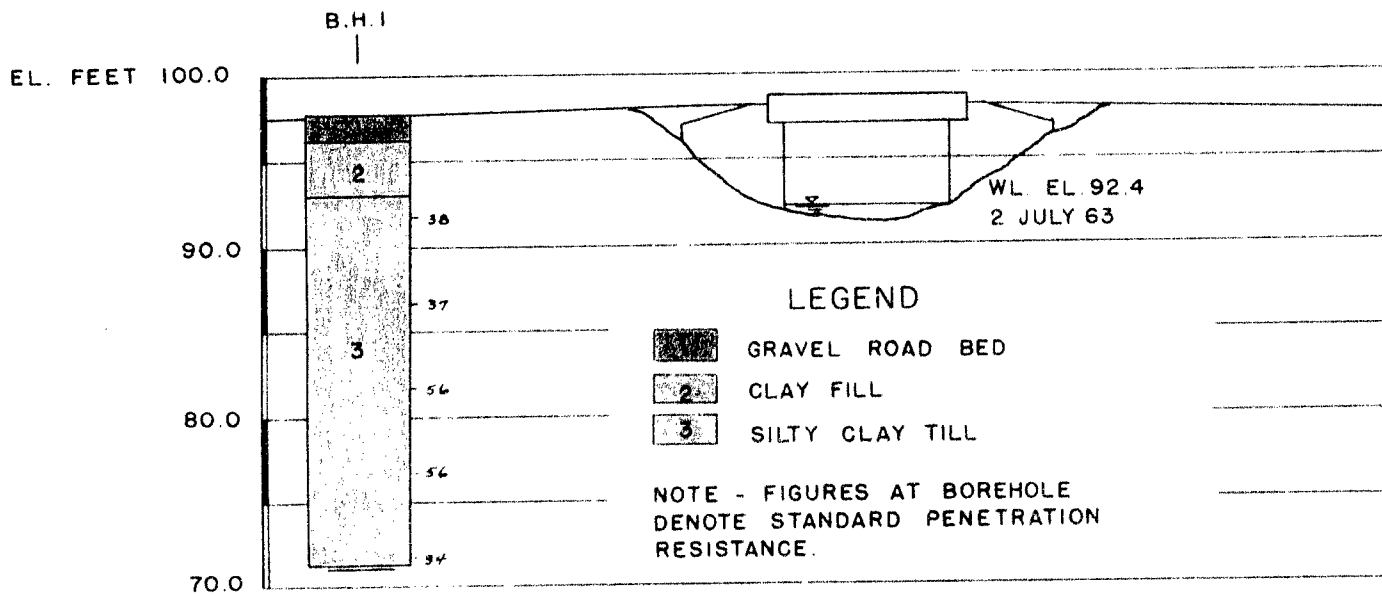
	RD :
Very loose	0 - 15 %
Loose	15 - 35 %
Compact	35 - 65 %
Dense	65 - 85 %
Very dense	85 - 100 %

COHESIVE SOILS :

	C lbs/sq.ft.
Very soft	less than 250
Soft	250 - 500
Firm	500 - 1000
Stiff	1000 - 2000
Very stiff	2000 - 4000
Hard	over 4000



LOCATION OF BOREHOLE
SCALE - 1 INCH TO 10 FEET



SUBSURFACE PROFILE (LOOKING WEST)
SCALE - 1 INCH TO 10 FEET

GEOTECHNICAL DATA SHEET FOR BOREHOLE ...1....

OUR REFERENCE NO. 3-7-11

CLIENT: Messrs. M.M. Dillon & Company Limited METHOD OF BORING Washboring
 PROJECT: Culvert DIAMETER OF BOREHOLE Bx (3-inch)
 LOCATION: McGillivray Township DATE 2 July 63
 DATUM ELEVATION: Deck of adjacent culvert El. 98.11 ft.

ENCLOSURE NO. 3

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	N or Advance- ment of Sample	20	40	60	80	100	PL	W	
97.6	0	Ground surface												
		Gravel road bed												
		Brown clay fill												
92.8	5			1	SS	38								
		brown grey		2	SS	37								
88.6	10			3	SS	56								
		Hard silty clay till		4	SS	56								
	20			5	SS	34								
71.1	25	End of borehole												

VERTICAL SCALE: 1 IN. TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: MC

CH'D JP