

#62-F-298M

COUNTY RD #1

LOT #7 CONC 5



ONTARIO

DEPARTMENT OF HIGHWAYS

Bridge Division

Memo to	Mr. A. Stermac Principal Foundation Eng. Lab. Bldg. Downsview	Date	May 4, 1962
From	G.C.E. Burkhardt	Subject	<u>United Counties of Stormont Dundas & Glengarry, New Bridge South of Mountain. Twp. of Mountain, County of Dundas Lot 7, Con. V, Our File BA 1401</u>

We are enclosing herewith one copy of the Foundation Report, by John D. Patterson, and a copy of the Preliminary plan for your comments.

Our Hydrology Engineer is visiting the site at the present time, we expect that the H. W. L. is higher by several feet than the one given on the plan.

We would like to approve the plan before May 16, 1962 and would appreciate it very much if we could have your comments prior to this date.

GCER/m


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

*By phone May 8, 1962
AGJ*

BA 1401

JOHN D. PATERSON, BSC PENG

CONSULTING ENGINEERS & ARCHITECTS
OTTAWA, CANADA

MINISTRY OF TRANSPORT
LABORATORY
GENERAL INVESTIGATIVE
DIVISION

Chief Clerk
2ND FLOOR
395 COLLEGE AVENUE
OTTAWA, CANADA
K1P 6K6

ALSO SEE REPORT NO. S. 253-62
DATE: MARCH 27, 1962

2-5-298M

REPORT OF SOIL INVESTIGATION
PROPOSED NEW BRIDGE AND APPROACHES
ROAD NO. 1, LOT 7, CON. 5
TOWNSHIP OF MOUNTAIN
FOR
UNITED COUNTIES OF STORMONT, DUNDAS & GLENBARRY

G. C. PARKER & ASSOCIATES

DESIGN CONSULTANTS

REPORT NO. S. 253-62

OTTAWA, MARCH 27, 1962



Introduction:

At the request of Mr. D. C. Cross, P. Eng., G. C. Parker and Associates, Ltd., on behalf of the United Counties of Stormont, Dundas and Glengarry, a soil investigation was conducted at the site of a proposed new bridge over a tributary of the South Nation River on County Road No. 1, Lot 7, Concession 5, Mountain Township.

The proposed bridge is to replace the existing bridge now inadequate for present-day traffic and in poor condition structurally.

The investigation was undertaken to obtain sufficient information for foundation design of the new structure and for construction procedure for the road embankment approaches.

Fieldwork Procedure:

Two test holes were put down at diagonally opposite sides of the bridge at locations shown on the Test Boring Plan.

At each location a cone probe was driven to refusal to check the uniformity of the soils. At Hole 1 casing was driven, the soils sampled to 39 feet, and bedrock located. At Hole 2, casing was driven and the soils sampled to 25.3 feet.

All drilling equipment was supplied by the firm of F. E. Johnston Drilling Co., Ltd., and their work was directed and supervised at all times by a member of our staff. The equipment consisted of a standard drilling rig fully equipped for soil testing and mounted on a trailer.

Sampling and Testing:

Samples of the various soils were taken by means of Shelby thin-walled tubes (for cohesive soils) and Split Spoon Sampler (for granular soils).

The Shelby Tube samples were taken to the laboratory, extruded, and tested for unconfined compressive strength.

The split spoon samples were classified and retained in plastic bags. The Standard Penetration Test was conducted during the split spoon sampling and the results are recorded as "N" values.

The core samples of bedrock were examined, classified and retained in a core box.

Observations:

Observations:

(a) Soil Types.

In Hole No. 1 the following soil profile occurs:

- 0 - 1' Silty topsoil.
- 1' - 3' Weathered sandy silt and sand.
- 3' - 5.5' Stiff, fissured, weathered, silty clay with organic inclusions to 4.5 feet.
- 5.5' - 10' Stiff, grey, silty clay with minor sand and pockets of fissuring.
- 10' - 19' Stiff to hard, grey, silty clay with minor free sand and some fissuring.
- 19' - 26' Loose, grey, saturated silt.
- 26' - 28' Medium dense glacial till.
- 28' - 39.0' Very dense glacial till.
- 39.0' - 45.6' Bedrock. Limestone with minor shale lenses and some calcite.

In Hole No. 2 the following soil profile occurs:

- 0 - 2' Stony topsoil.
- 2' - 8' Soft, weathered, clayey silt.
- 8' - 14.2' Intermixed brown, fibrous peat and marl.
- 14.2' - 15' Very loose, gray silt.
- 15' - 22.5' Medium dense glacial till.
- 22.5' - 25.3' Very dense glacial till.

Details of borings and test holes are shown on the Soil Profile and Laboratory Test Sheets which form part of this report.

There is considerable difference in the soil types underlying each bank of the stream above the glacial till.

In Hole No. 1 the till is overlain by a 7-foot layer of silt which decreases in thickness to one foot at Hole No. 2.

Above the silt in Hole No. 2 is a thick band of peat and marl which pinches out to the north in the direction of Hole No. 2. The silt in Hole No. 1 is overlain by a stiff to hard clay.

(b) Groundwater.

The groundwater level at the completion of the investigation was found to be two feet below ground surface in both holes.

(c) Test Results.

The unconfined compressive strength test results are shown on the Soil Profile Sheets. The results indicate that the clay in Hole No. 1 is consistent and fairly stiff from 3 feet to about 15 feet but this layer is lacking in Hole No. 2 (South Bank).

Conclusions and Recommendations:

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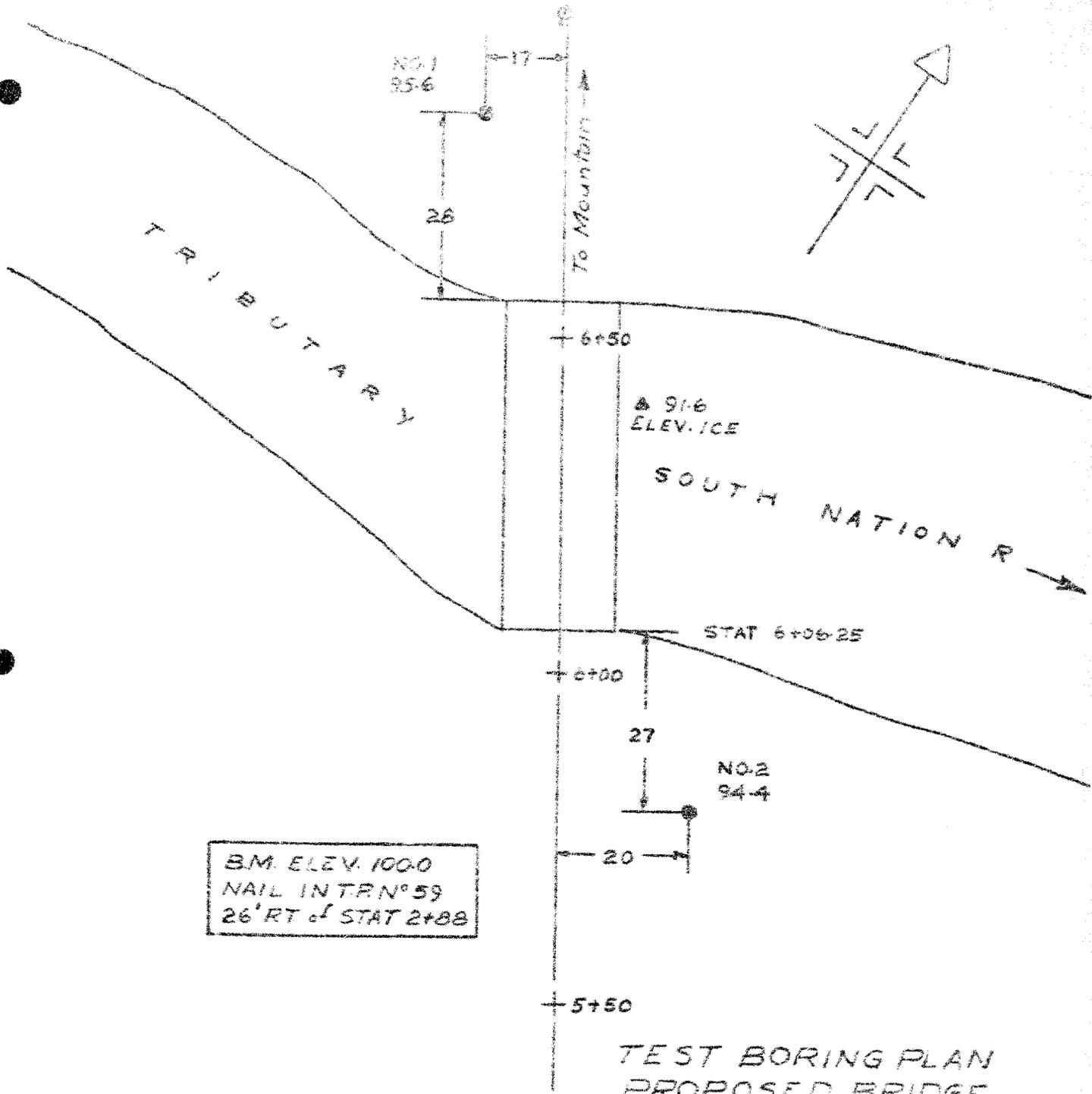
Because of the difference in the underlying soil conditions at the north and south abutments the use of spread footings cannot be recommended. It is, therefore, recommended that piles be driven to refusal in the dense glacial till or to the bedrock. Pressure-creosoted timber piles could be used but the driving will be hard for the first few feet on the north side of the stream. Steel "H" piles should also be considered as the driving will be easier through the stiff clay. Assuming that the pile caps will be approximately at Elevation 88 the expected length of the piles will be 30 to 32 feet — if steel piles are used.

The existing road profile indicates that additional embankment approach fill will be in the order of two to three feet. If this is the case no stability problem exists but the additional fill should consist of well compacted granular material.



J. D. Paterson, P. Eng.

JIP/MHC.



TRIBUTARY

To Mountain

91.6
ELEV. ICE

SOUTH NATION R

STAT 6+06.25

B.M. ELEV. 100.0
NAIL IN TR N° 59
26' RT of STAT 2+88

TEST BORING PLAN
PROPOSED BRIDGE
COUNTY ROAD 1
LOT 7 CON. 5
TOWNSHIP MOUNTAIN

SCALE 1"=20' MAR 1962

JOHN D. PATTERSON
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND LABORATORY TESTS

Location: County Road 1, Lot 7, Con. 5,
Township of Mountain.

Elevation (Zero Depth): 55.6
Remarks: Cone Probe and Test Borings.

Sheet No:
1 of 2

Hole No:
1

Borings by: S.F. Johnston Drilling Co., Ltd. Date: March 26, 1962.

Blows per Foot	Soil Description	Samples	U/c T/z'	N	Depth in Feet	Elev.	Moisture Content Per Cent.							
							30	40	50	60	70			
Cone	Ground Surface													
11	Silty loess	1			0	55.6								
3	Weathered sandy silt and sand	2			1									
7	Stiff, fissured, weathered, silty clay with organic inclusions to 3.5'	TW 2	1.80		2									
11	Stiff, grey, silty clay with minor sand and pockets of fissuring.	TW 3	1.27		4									
20		TW 4	1.40		6									
26						8								
26		10			10	55.6								
26	Stiff to hard grey, silty clay with minor fine sand and pockets of fissuring.	TW 5	1.67		12									
26		TW 6	1.64		14									
25						16								
24						18								
23		19			19	57.6								
36	Loose, grey, saturated silt.	TW 7	Disturbed		21									
31					22									
26					24									
21		26		6	24									
20	Medium dense glacial till.	SS 8			26									
31		28	SS 9		22	58.6								
95	Very dense glacial till.	SS 10			30									
122					32									
Refused					34									
					36	59.6								
		39.0			38									
	<u>BEDROCK.</u>				39									
	Limestone with minor shale lenses and some calcite.				42									
					45	50.6								
		45.6												

Core 9% Recovery.

SOIL PROFILE AND LABORATORY TESTS

JOHN O. PATTERSON
CONSULTING ENGINEERS
OTTAWA CANADA

Location: 24th Road 1, Lot 7, Sec. 4,
Township of Mountain.

Elevation (Zero Depth): 61.1.
Remarks: Cone Probe and Test Borings.

Sheet No:
1 of 2

Hole No:
2

Borings by: P.W. Johnston Drilling Co., Ltd. Date: March 7, 1958

Blows per Foot	Soil Description	Samples	U'c	N	Depth in Feet	Elev.	Moisture Content							
							30	40	50	60	70			
0	Ground Surface				0	61.1								
1	Heavy sand.	2			1									
2					2									
3	Soft, heavy sand, clayey silt.				3									
4					4									
5					5									
6					6									
7					7									
8					8									
9	Intermixed brown, fibrous peat and silt.				9									
10					10	61.2								
11					11									
12					12									
13					13									
14					14									
15					15									
16	Very loose, grey silt.	15	SS	23	7	16								
17					17									
18	Medium dense, glacial till.		SS	24	18	18								
19					19									
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22					22	61.4								
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for C. 1
Probably very dense glacial till to 37' ± 5'