

72-F-9	49-70-01	HWY. 11 & N. MUSKOGA RIVER	31E-60
W.O.	W.P.	LOCATION	GEOCRES NO.

● DATA ON FILE IN SOIL MECHANICS SECTION

REFER TO: CONTRACT FILE No. 73-80

REMARKS

GEOCRES INDEXING CARD FOR REPORTS NOT MICROFILMED

GI-20 AUG. 74

REPRODUCED DOCUMENT MAY
APPEAR AS MULTI-FEED ON FILM

MEMORANDUM

TO: Mr. A. Stermac,
Principal Foundation Engineer,
Downsview.

FROM: Bridge Planning,
North Bay.

ATTENTION:

DATE: 7 December 1971

OUR FILE REF.

IN REPLY TO

SUBJECT:

Re: W. P. 49-70-01 Site 42-58
Muskoka R. N. Branch @ High Falls
Hwy. #11 District # 11

Attached are prints of the preliminary site plan and field reconnaissance report for the above structure.


The existing through truss at the site will become the southbound lanes in the future; with the proposed structure located 74' east of the present centre line, being the northbound lanes.

The south abutment of the existing bridge is founded on bedrock while the north abutment is founded on short H-piles. Prints of drawings D-3146-1, 2 and 3 as well as the 1948 site plan E-2515-1.

I have shown in red on the site plan the probable location of the single span structure which will carry the northbound lanes. Bore holes shown in blue are required to give full coverage to the various possible designs. Although not shown, at least two holes should be placed in the river to give an accurate profile of the bedrock across the river. In order to meet the scheduled dates, a preliminary site plan has been used. When a completed plan is available, prints will be forwarded to you.

JCMcA/bn
attach.

c. c. - J. Anderson


J. C. McAllister,
Regional Bridge
Planning Supervisor.

MEMORANDUM

TO: Mr. A. Stermac,
Principal Foundation Engineer,
Downsview.

FROM: Bridge Planning,
North Bay.

ATTENTION:

DATE: 30 December 1971

CUR FILE REF.

IN REPLY TO

SUBJECT:

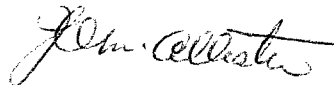
Re: W. P. 49-70-01 Site 42-58
Muskoka River (High Falls)
Hwy. # 11 District # 11

This will confirm my discussion with you earlier this week in which I requested that some additional boreholes be put down at the north approach during the foundation investigation for the structure.

The location of the holes is shown on the attached plan. The plan, however, is not too good and the location of the holes may be changed in the field. The location to be investigated is where the river turns to run parrallel to the existing fill.

I trust that this work can be taken care of during the Foundation investigation.

JCMcA/bn



J. C. McAllister,
Regional Bridge
Planning Supervisor.

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. K. Selby,
Sup. Foundation Engineer.

FROM: K. W. Ingham

ATTENTION:

DATE: February 8, 1972

OUR FILE REF.

IN REPLY TO

SUBJECT:

Foundation Investigation 72-11009;
North Muskoka River Bridge, Highway 11

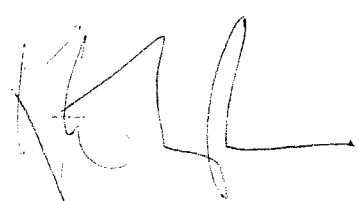
Eight holes drilled to bedrock and a number of soundings in the river channel indicate predictable bedrock conditions on the north and south banks of the river.

The rock intersected in the boreholes and exposed in a small outcrop on the north bank is a fine grained mica gneiss with bands and lenses of coarser grained granite gneiss. The most conspicuous structural feature is a system of vertical fractures spaced 3 to 5 ft. apart. Lamination in the rock has a shallow dip to the southwest and occasional fractures were noted parallel to this direction.

The bedrock elevation in each hole is given below:

Hole No. 1	Bedrock at	876.3
" 2	"	873.1
" 3	"	878.8
" 4	"	878.8
" 5	"	883.8
" 6	"	875.1
" 7	"	870.3
" 8	"	871.2

KWI:mv


K. W. Ingham,
Geologist.

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. J. McAllister, (2) FROM: Foundations Office,
Regional Bridge Planning Supervisor, Design Services Branch,
Northern Region, Central Bldg., Downsview.
North Bay, Ontario.

ATTENTION: DATE: February 17, 1972.

OUR FILE REF.

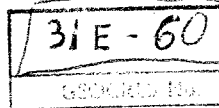
IN REPLY TO

FEB 17 1972

SUBJECT:

FOUNDATION INVESTIGATION
For
The Proposed Crossing of the
N. Muskoka River and
King's Hwy. 11 at High Falls
Lot 9, Con. VI
Township of Macaulay
District Municipality of Muskoka
District No. 11 (Huntsville)
W.J. 72-11009 - W.P. 49-70-01

CONT 73-80 site 42-58



Attached, we are forwarding to you our detailed foundation investigation report on the subsoil conditions existing at the above-mentioned site.

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

A handwritten signature in cursive script, appearing to read "A. G. Stermac".

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER.

AGS/ao
Attach.

cc: Messrs. D. W. Farren
B. R. Davis
A. Rutka
H. McArthur
R. S. Chapman
B. J. Giroux
R. Northwood
G. A. Wrong
E. A. Singh

Foundations Office ✓
Documents

TABLE OF CONTENTS

1. INTRODUCTION.
 2. DESCRIPTION OF SITE & GEOLOGY.
 3. FIELD & LABORATORY WORK.
 4. SUBSOIL CONDITIONS.
 - 4.1) General.
 - 4.2) Topsoil.
 - 4.3) Silt.
 - 4.4) Sand.
 - 4.5) Bedrock.
 5. GROUNDWATER CONDITIONS.
 6. DISCUSSION AND RECOMMENDATIONS.
 - 6.1) General.
 - 6.2) Abutments.
 - 6.3) Proposed Structure Approaches.
 7. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION
For
The Proposed Crossing of the
N. Muskoka River and
Kings Hwy. 11 at High Falls
Lot 9, Con. VI
Township of Macaulay
District Municipality of Muskoka
District No. 11 (Huntsville)
W.J. 72-11009 -- W.P. 49-70-01

1. INTRODUCTION:

The Foundations Office was requested to carry out an investigation at the above-mentioned location. The request was contained in a memo from the Bridge Planning Section, Northern Region (Mr. J. C. McAllister, Regional Bridge Planning Supervisor) dated December 7, 1971.

Subsequently, an investigation was carried out by this Office between January 10 and 28, 1972, to determine the subsoil conditions at the site. This report contains the results of the investigation, together with recommendations pertaining to the foundations of the proposed structure, as well as the stability of the approach fills.

2. DESCRIPTION OF SITE & GEOLOGY:

This foundation investigation site is located on Hwy. #11 approximately 600 ft. north of the junction of Hwy. 11 and Hwy. 118 easterly, and involves the crossing of the N. Muskoka River. Construction of a new bridge approximately 74 ft. east of the existing Hwy. 11 bridge is proposed. The new structure will carry the northbound traffic in the proposed four lane reconstruction of Hwy. 11 in this area. The existing steel truss bridge will carry the southbound traffic.

The north branch of the Muskoka River at this point has a considerable current and drops over High Falls approximately 700 ft. west of the site, and continues in a south-westerly direction through the town of Bracebridge and thence into Muskoka Lake. This branch of the river drains Vernon, Fairey and Mary Lakes in the vicinity of Huntsville to the north.

A complete visual examination of the site was severely hampered at this time of the year because of the snow cover. The area, however, appears to be predominantly of Granite Gneiss bedrock with a variable cover of sand, silt and muskeg. In post-glacial times, the river was much larger. Approximately 200 ft. inland from the east bank two distinct benches rise about 40 ft. above the present water level. The river bed most likely occupies a large fault zone of the Canadian Shield, as do most other rivers in the Muskoka area.

The rock of this area is of the Grenville province and consists of a light and dark banded mica and hornblende gneiss, with numerous intrusive veins of granitic material of a more recent origin.

The existing highway fill immediately west of the site on the north bank of the Muskoka River is approximately 12.7 ft. high, while that on the south bank is about 13.0 ft. in height.

The river bottom is generally bare bedrock with the usual jointing and occasional loose and displaced blocks freed by glacial action and weathering. Close to shore, in most places investigated, there is a shallow depth of silt, sand or muck especially in low lying and swampy areas.

3. FIELD & LABORATORY WORK:

Eight boreholes, two of which were accompanied by a dynamic cone penetration test, were put down in the vicinity of the proposed bridge abutment locations, during the course of the field investigation.

One additional dynamic cone penetration test was carried out to further define the overburden depth in the vicinity of the proposed south abutment (south-east corner). The borings were advanced by means of a small BBSI diamond drill rig adapted for soil sampling purposes.

Samples were obtained at the required depths, at two borehole locations, in a 2-inch O.D. split-spoon sampler which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests.

Bedrock was proven by core drilling 1 1/2" AX size at each of the eight borehole locations.

The groundwater level at two borehole locations was determined by recording the water level in the open boreholes, periodically during the investigation.

The locations and elevations of two boreholes and one cone test as well as the river ice level were surveyed in the field by personnel from Huntsville District. The locations and elevations of boreholes put down through the ice into the river bed were surveyed by the Foundations Office field supervisor at the site.

The borehole locations and elevations are shown on Drawing 72-11009 A together with an estimated stratigraphical profile across the site, as well as cross sections through the north and south abutments. All elevations in the report are referenced to a Geodetic datum.

All samples were subjected to a careful visual examination in the field and subsequently in the laboratory.

4. SUBSOIL CONDITIONS:

4.1) General:

Subsoil at the site generally consists of granite gneiss bedrock with scattered surficial deposits of sand, silt and muskeg varying in depth from 3.5 ft. to 9.0 ft. in Boreholes 1 and 5.

In most boreholes taken on the river there was no soil cover on the bedrock.

The soil strata is shown on the Record of Borelog sheets contained in the Appendix of this report. The stratigraphic profile and sections are based on this information.

From ground level downward the various soil types are as follows.

4.2) Topsoil:

This deposit, occurring in Boreholes 1 and 5 consists of from .3 ft. to 1.5 ft. of a mixture of orange-brown fine to medium silty sand and fibrous peaty organic material.

4.3) Silt:

Immediately beneath the surficial deposit in Borehole 1 there was found a 2.2 ft. depth of gray silt, while in Borehole 5 the material consisted of a 2 ft. depth of organic silt underlain by bedrock.

4.4) Sand:

In Borehole 1, the silt deposit was underlain by brown fine sand with layers of organic material over gray fine sand to bedrock. The total depth of this sandy material being 7.75 ft.

The sand, silt and organic materials described above showed 'N' values of from 3 to 11 blows per foot and indicate a density ranging from very loose to compact.

4.5) Bedrock:

Bedrock as encountered in all 8 boreholes was found to consist of sound hornblende and mica gneiss. All recovered rock cores were examined by Mr. K. Ingham, Geologist, whose report is as follows:

Eight holes drilled to bedrock and a number of soundings in the river channel indicate predictable bedrock conditions on the north and south banks of the river.

The rock intersected in the boreholes and exposed in a small outcrop on the north bank is a fine grained mica gneiss. The most conspicuous structural feature is a system

of vertical fractures spaced 3 to 5 ft. apart. Lineation in the rock has a shallow dip to the southwest and occasional fractures were noted parallel to this direction. The bedrock elevation in each hole is given below:

Hole No. 1	Bedrock at 876.3
" 2	" 873.1
" 3	" 878.8
" 4	" 878.8
" 5	" 883.8
" 6	" 875.1
" 7	" 870.3
" 8	" 871.2

In the areas investigated at this site, the observed rock slopes at the footing locations ranged from horizontal to a 3:1 slope.

5. GROUNDWATER CONDITIONS:

Groundwater levels in Boreholes 1 and 5 as determined during the course of the investigation ranged from 2.4 to 3.9 ft. below ground surface. This corresponds to levels of between 1.2 ft. below ice level (B.H. 1) and 2.0 ft. above ice level (B.H. 2).

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct a single span bridge (approx. 141 ft.) to carry the future northbound lanes of Highway No. 11 over the north branch of the Muskoka River. The existing Highway 11 bridge will be utilized to carry the two southbound lanes of traffic.

The centre line of the proposed new bridge will be located 74 ft. east of the present Highway 11 centre line.

6.2) Abutments:

Abutments will be of a closed type with retaining walls to retain the fill.

It is recommended that the proposed footings be founded

a minimum of 2 ft. below the existing rock surface, utilizing safe bearing pressures of up to 20 tons per square foot.

Due to the sloping nature of the bedrock surface, it will be necessary to provide steps for the footings, according to the various slopes, which can be determined from the cross-sections and stratigraphic profiles shown on Drawing 72-11009 A.

6.3) Proposed Structure Approaches:

If the foregoing is complied with no approach fill stability problems are anticipated providing that the fills are constructed with side slopes of 2 horizontal to 1 vertical.

Surficial organic deposits should be excavated where they occur. The areal extent and depth of this material should be determined by the Regional Materials Engineer during their routine soils investigation.

7. MISCELLANEOUS:

The field work for this project was carried out during the period of January 10 to January 28, 1972.

Equipment used was owned and operated by Canadian Longyear Ltd., under the supervision of Mr. W. Deike of this Office.

This report was prepared by Mr. W. Deike under the supervision of Mr. K. G. Selby, Supervising Foundation Engineer.

W. F. Deike

W. Deike,

K. G. Selby

K. G. Selby, P. Eng.

WD/ao

Feb. 16/72

APPENDIX I

FOUNDATION SECTION

JOB	72-11009	LOCATION	Sta. 322 + 53 14' Rt. of Hwy. 11 (Median)	ORIGINATED BY	WD
W.P.	49-70-01	BORING DATE	Jan. 11, 1972	COMPILED BY	WD
DATUM	Geodetic	BOREHOLE TYPE	Washboring & Diamond	CHECKED BY	<i>[Signature]</i>

[illegible]

FOUNDATION SECTION

JOB	72-11009	LOCATION	Sta. 322 + 13 14' Rt. 0 Hwy. 11 (Median)	ORIGINATED BY	WD
W.P.	49-70-01	BORING DATE	Jan. 17, 1972	COMPILED BY	WD
DATUM	Geodetic	BOREHOLE TYPE	Diamond	CHECKED BY	<i>[Signature]</i>

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLows / Foot	PLASTIC LIMIT — w_p	WATER CONTENT — w		
						SHEAR STRENGTH P.S.F.		w_p — w — w_L WATER CONTENT %			
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE					
882.8	Ice Level										
0.0	Water					880					
873.0											
9.8	Pedrock										
868.0	Hornblende & Mica Gneiss. Sound					870					
14.8	End of Borehole										
						860					

FOUNDATION SECTION

JOB	72-11009	LOCATION	Sta. 322 + 13 54' Rt. 0 Hwy. 11 (Median)	ORIGINATED BY	WD
W.P.	49-70-01	BORING DATE	Jan. 14, 1972	COMPILED BY	WD
DATUM	Geodetic	BOREHOLE TYPE	Diamond	CHECKED BY	<i>[Signature]</i>

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	BLOWS / FOOT	PLASTIC LIMIT — w_p	WATER CONTENT — w		
882.8	Ice Level											
878.8	Water					880						
4.0	Bedrock											
873.1	Hornblende & Mica Gneiss. Sound											
9.8	End of Borehole					870						

FOUNDATION SECTION

ORIGINATED BY WD

COMPILED BY WD.

CHECKED BY AK

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT	PLASTIC LIMIT — w_p	WATER CONTENT — w		
882.8	Ice Level										
0.0	Water					880					
4.0	Bedrock										
873.6	Hornblended and Mica Gneiss. Sound										
9.2	End of Borehole					870					

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

JOB 72-11009 LOCATION Sta. 320 + 28 14' Rt. & Hwy. 11 (Median ORIGINATED BY WD
W.P. 49-70-01 BORING DATE Jan. 19, 20, 1972 COMPILED BY WD
DATUM Geodetic BOREHOLE TYPE Diamond CHECKED BY AR

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w w_p ——— w ——— w_L WATER CONTENT %				BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE						
887.3	Ground Level												
885.3	Fibrous Peat. Soft		1	SS	6	880							
1.5	Organic silt, traces of sand. Stiff		2	SS	11								
883.8			3	SS	100								
3.5	Bedrock Hornblende & Mica Gneiss. Sound												
877.3													
10.0	End of Borehole												
						870							

[illegible]

FOUNDATION SECTION

JOB <u>72-11009</u>	LOCATION <u>Sta. 320 + 68 41' Rt. 0 Hwy. 11 (Median)</u>	ORIGINATED BY <u>WD</u>
W.P. <u>49-70-01</u>	BORING DATE <u>Jan. 24, 1972</u>	COMPILED BY <u>WD</u>
DATUM <u>Geodetic</u>	BOREHOLE TYPE <u>Diamond</u>	CHECKED BY <u>C.R.</u>

[illegible]

FOUNDATION SECTION

ORIGINATED BY WD

COMPILED BY WD

CHECKED BY *ML*

[illegible]

Department of Highways Ontario

Copy for the information of

A. STERMAC

Mr. J. McAllister
Regional Bridge Planning Engineer
NORTH BAY, Ontario

C.S. Grebski
Structural Design Engineer
Structural Office - West Bldg.
DOWNSVIEW, Ontario

July 14, 1972

North Muskoka River Bridge
(approx. 0.1 Mi. North of North Jct. Hwy. 118)
W.P. 49-70-01 Site 42-58
Hwy. No. 11 - Line 'E' - District 11

72-11-009

Attached herewith are prints of the Preliminary Bridge Plan Drawing D42-58-P1 for the above mentioned structure.

The estimated cost of the proposed structure is \$200,000 which includes tender, materials, engineering and sundry construction.

Any comments or revisions you may have should be submitted within three weeks.

CSG/hvh
Encls.

C.S. Grebski
Structural Design Engineer

cc A. McKim
B. Davis
A. Stermac (2) (MR. C. FARRELL)
J. Anderson
R. Murphy

BEDROCK ELEVATION IS
INCORRECTLY SHOWN. THIS WAS
DISCUSSED BY THE DESIGNER.
(MR. C. FARRELL)
IT IS UNDERSTOOD THAT
CORRECTION HAS BEEN MADE.

FARRELL
3516

A.K. 7.
16 Aug. 72

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, West Building.

FROM: Structural Office,
West Building, DOWNSVIEW.

ATTENTION:

DATE: December 6th, 1972

OUR FILE REF.

IN REPLY TO

SUBJECT:

North Muskoka River Bridge,
0.1 Miles N. of North Jct. Hwy. #118,
W.P.#49-70-01, Site #42-58,
Hwy. #11 Line "E", District #11.

72-11-009

Attached herewith we are submitting the final bridge
drawings which show the foundation design for this structure.

Kindly give us your comments at your earliest convenience.

CSG:dp
Attach.

C. S. Grebski
C. S. Grebski,
Structural Design Engineer.

cc. Foundation Office.

No comments

Jan 2, 73

Design Structural Office
25 Feb 73
AK

OVERSIZED DRAWINGS

General Layout
North Abutment