

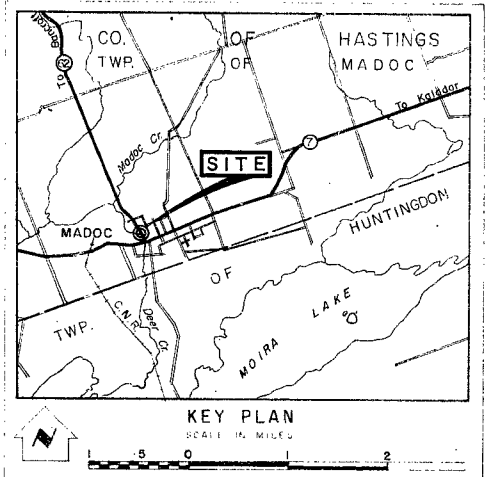
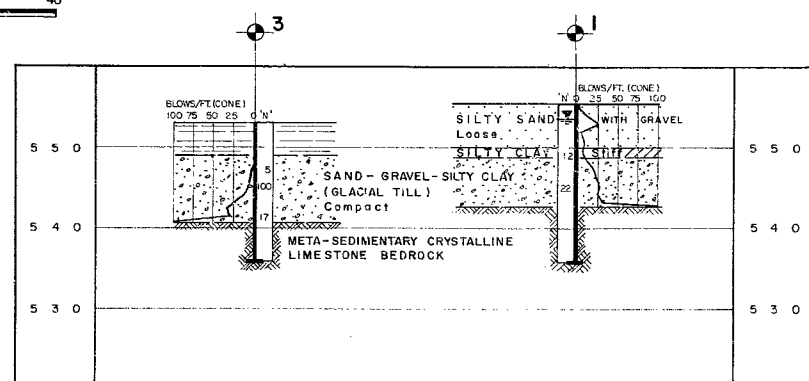
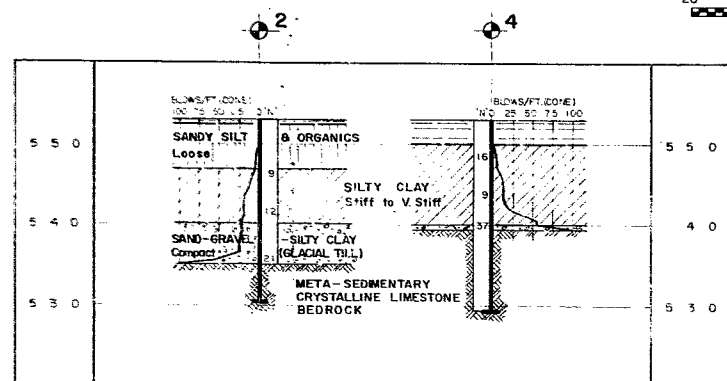
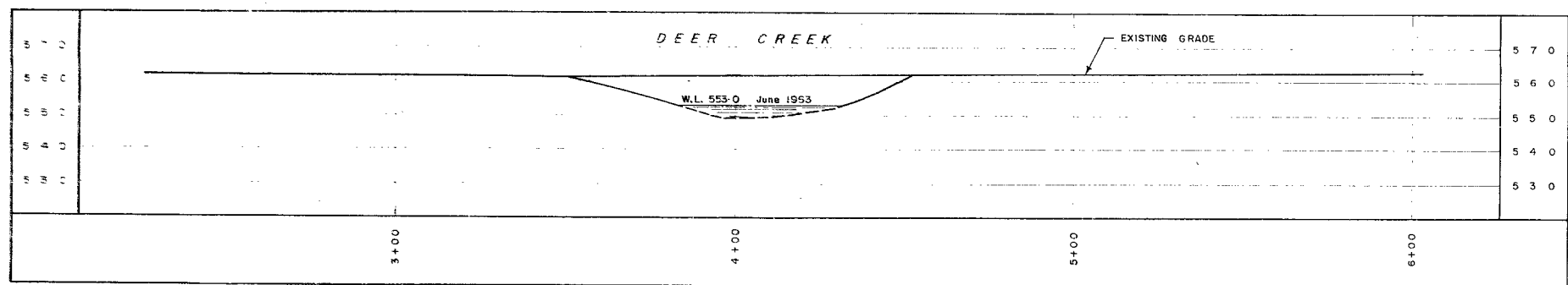
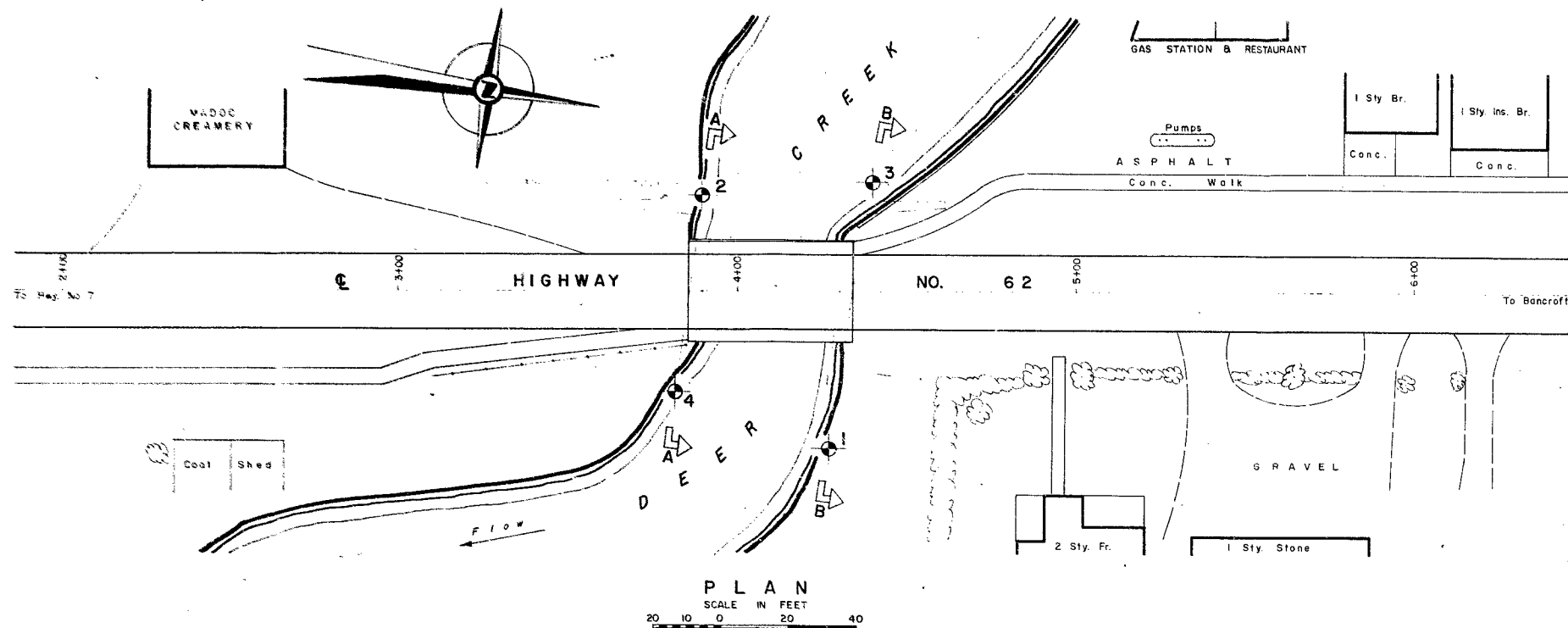
#63-F-60

W.P. MUNIC.

HWY. #62 &

DEER CREEK,

MADOC



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation (JUNE 1963)		

NO.	ELEVATION	STATION	OFFSET
1	555.3	4+27	46' RT.
2	553.0	3+90	28' LT.
3	553.0	4+40	32' LT.
4	553.0	3+82	30' RT.

NOTE
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION

DEER CREEK

KING'S H. NO. 62 DIST NO. 8
CO. HASTINGS VILLAGE OF MADOC
TWP. MADOC LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D B. G. CHECKED /	W.P. NO.	MBR. DRAWING NO.
DRAWN D. M. CHECKED /	JOB NO. 63-F-60	63-F-60 A
DATE 10 JULY 1963	SITE NO.	BRIDGE DRAWING NO.
APPROVED /	CONT. NO.	

Mr. A. M. Toye,
Bridge Engineer,
Bridge Division.

Attn: Mr. K. L. Kleinsteiber,
Mun. Bridge Liaison Engr.

Mr. A. G. Sternac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.
July 12, 1963

D.H.O. FOUNDATION INVESTIGATION REPORT --
Proposed New Structure over Deer Creek,
on Hwy. 62, (Connecting Link), in the
Village of Madoc, (Sta. 4+10), Dist. No. 8.
W.J. 63-F-60 -- W.O. 1050-62-149

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

We believe that you will find the factual data
and recommendations contained therein, adequate for your
future design work. Should you require additional information,
please do not hesitate to contact our Office.

AGS/MdEF
Attach.

cc: Messrs. A. M. Toye (3)
J. P. Howard
G. E. French
J. E. Gruspier
A. Watt

Foundations Office
Gen. Files

A. G. Sternac
A. G. Sternac,
PRINCIPAL FOUNDATION ENGINEER

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FOUNDATION INVESTIGATION

For

Proposed New Structure over Deer Creek
on Hwy. 62, (Connecting Link), in the
Village of Madoc (Sta. 4+10) Dist. No. 8
W.J. 63-F-60 -- W.O. 1050-62-149

1. INTRODUCTION:

It is proposed to construct a new bridge over Deer Creek on Hwy. 62 (Station 4+10 ±). A foundation investigation for this proposed structure was requested by the Municipal Bridge Liaison Engineer, in a memorandum dated May 24, 1963. Subsequently, an investigation was carried out at the site of this structure.

This report contains the field and laboratory findings, together with the recommendations for the foundation of the proposed new structure.

2. DESCRIPTION OF SITE:

The site is situated approximately 200 feet north of the junction of Hwy. 62 and 7, on Russel Street, in the Village of Madoc. The existing bridge is a single span structure (39'), and it appears to be in a stable condition. A plate attached to this bridge indicates it was built in 1929. The load carrying capacity of the bridge is 15 tons. A retaining wall existing in the North-west corner is constructed of hand-placed boulders protected by wooden planks. Deer Creek is a winding stream and flows in a direction from West to East under the bridge. The creek bed is covered with huge boulders in the area of this structure, and close by, an outcrop of rock is visible.

Geologically, the site is situated in the area known as the Canadian Shield.

cont'd. /2 ...

3. DESCRIPTION OF FIELD AND LABORATORY WORK:

Field work consisted of four sampled boreholes with dynamic cone penetration tests adjacent to each borehole. The location of these boreholes was chosen from the drawing provided.

The exploration programme was carried out by a standard core drill machine adapted for soil sampling. The machine was mounted on a 12' x 14' wooden raft when working on water. Conventional wash boring procedures were followed. Samples were recovered at required depths by means of a 2-inch O.D. split-spoon sampler. The dimension of this sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. Rock samples were obtained by the use of an AXT core barrel.

Samples were visually examined and identified in the field before transportation to the laboratory. Tests were carried out on a selection of samples for the determination of Atterberg limits, moisture contents and grain size distribution.

Laboratory and field tests have been summarized and are included in this report in Appendix I.

4. SUBSOIL CONDITIONS:

4.1) General:

The investigation has shown that a relatively shallow deposit of soil overlies bedrock. The depth of this deposit varies from a minimum of 8 feet in borehole 3, to a maximum of 17 feet in borehole 2. It contains three distinct layers in the following succession:

Silty sand or sandy silt with gravel
Silty clay
Glacial till

cont'd. /3 ...

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

A detailed description of these layers is given below:

4.2) Silty Sand or Sandy Silt with Gravel:

This layer of granular material was encountered in all borings. It lies below topsoil in boreholes 1 and 2 which were drilled on ground (B.H. 2 actually in 3" of water), and is about five feet in thickness. In boreholes 3 and 4 which were drilled in water, it is about a foot in thickness. Gravels up to a maximum of 1" Ø were encountered in this layer. Black-coloured organic material was also encountered. The material in this layer was found to be in a loose state of compactness. It is brown in colour.

4.3) Silty Clay:

Below the above-mentioned layer of granular material, a layer of silty clay was encountered in boreholes 1, 2 and 4. It was observed to be slightly more than 1 foot thick in borehole 1, close to 7 ft. thick in borehole 2, and about 9 ft. thick in borehole 4. The consistency of the material is stiff to very stiff with an average value of the penetration resistance 'N' of 11 blows per foot. It is of medium plasticity with average values of Atterberg limits of 46.6% and 22.3%, respectively. The moisture content averages 32%.

4.4) Glacial Till:

A layer of till material was encountered in all boreholes, just above bedrock. It consists of a heterogeneous mixture of sand, gravel and cohesive silty clay to clayey silt binder. It is 6 feet

cont'd. /4 ...

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.4) Glacial Till: (cont'd.) ...

thick in borehole 1, five feet in borehole 2, 7 feet thick in borehole 3, and only 7 inches thick in borehole 4. The material in this layer is in a compact to dense state with an average penetration resistance 'N' of 24 blows per foot. It has a grey to brownish-red colour and contains on the average, 54% silt and clay, 34% sand and 12% gravel. Moisture content is found to average 17%.

4.5) Bedrock:

Below the above-mentioned layer of glacial till, crystalline limestone bedrock was encountered in all borings. It is of meta-sedimentary origin. It contains minor impregnations of pyrite.

The elevations at which the bedrock was encountered are as follows:

<u>Borehole No.</u>	<u>Bedrock Elevation</u> (in feet)
1	542.9
2	535.3
3	540.9
4	529.3

In all cases, 100% of rock recovery was achieved.

5. GROUND WATER CONDITIONS:

The elevation of water in the creek was observed to be around 553.0 during the period of this investigation. The water level in borehole 1 which was drilled from the ground surface, was found to be at elevation 553.6.

cont'd. /5 ...

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new and wider bridge to carry Hwy. 62 (connecting link) over Deer Creek. It is located on Russel Street in the Village of Madoc.

In the preceding paragraphs, the different layers and their respective properties have been described. It is seen that a relatively shallow overburden of soil lies on bedrock.

According to the findings of the Hydrology Section of the Bridge Division, the minimum footing depth is at elevation 542.5. This depth coincides with the bedrock elevation in B.H. 1 and is only two to three feet above bedrock in boreholes 3 and 4. Only in B.H. 2 was bedrock found deeper - i.e., at elev. 535.3.

No problem is envisaged if the above-mentioned footing elevation is retained and an allowable bearing pressure of 2.5 T/sq.ft. is used. However, it appears to us that a technically sounder solution would be achieved if the entire footing is resting on rock. It would also be desirable to have both abutments founded on the same material, a provision that will not be satisfied if elev. 542.5 is used.

If our recommendation to found the footings on bedrock is followed, a load of 10 T/sq.ft. can be safely applied. The construction should not present any unusual problems. Because of the fact that the excavation will have to be carried out within or adjacent to the creek, a proper dewatering scheme will have to be used. For footings resting on bedrock, the dewatering cannot cause any problems insofar as boiling is concerned and, therefore, no special precautionary measures are necessary. If a higher foundation elevation is selected, we would recommend the use of sheet piles driven to bedrock.

cont'd. /6 ...

7. CONCLUSIONS:

A shallow layer of overburden which lies over limestone bedrock consists of: Silty sand or sandy silt with gravel, Silty clay; and Glacial Till.

Elevation of creek water level was found to be approximately 553.0.

Spread footings are recommended. Minimum depth for footings for scour protection is 542.5. At this elevation, an allowable bearing load of 2.5 T.S.F. can be applied. If it is decided to apply higher bearing load, the footings may be founded so as to rest on bedrock at a lower elevation. A bearing load of up to 10 T.S.F. can then be applied.

Since construction work will have to be carried out within or adjacent to the creek, a proper dewatering scheme should be adopted. Sheet piles, if used, should be driven to bedrock contact.

8. MISCELLANEOUS:

The field work was undertaken during the period from June 12 to June 18, 1963, by Mr. B. M. Ghadiali, Project Foundation Engineer, who also prepared this report under the general guidance of Mr. K. G. Selby, Senior Foundation Engineer.

Equipment was owned and operated by Raab Drilling Co. of Bancroft.

July 1963.

APPENDIX 1.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 63-F-60 LOCATION Stn. 4/27 and 46' to right of E (Hwy. 62) ORIGINATED BY B.M.G.
W.P. (Municipal) BORING DATE June 13, 1963. COMPILED BY B.M.G.
DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY K.G.S.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w _L		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100	PLASTIC LIMIT — w _P	WATER CONTENT — w		
555.3	Topsoil					555					
0.6	Silty sand with gravel. Loose. Brown.										
550.0	Silty clay. Stiff brown.		1	SS	15	550					
6.6	Sand-gravel-silty clay. (Glacial Till) Compact Br. red.		2	SS	22	545					
542.9	Meta-sedimentary crystalline limestone bedrock.		3	RC	-	540					
12.5	White.		4	RC	-						
536.0	End of borehole.					535					

FOUNDATION SECTION

[illegible]

FOUNDATION SECTION

ORIGINATED BY B.M.G.

COMPILED BY B.M.G.

CHECKED BY K.G.S.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 4		FOUNDATION SECTION
JOB <u>63-F-60</u>		LOCATION <u>Stn. 3/82 and 30' to right of E (Hwy. 62)</u>		ORIGINATED BY <u>B.M.G.</u>
W.P. <u>(Municipal)</u>		BORING DATE <u>June 18, 1963.</u>		COMPILED BY <u>B.M.G.</u>
DATUM <u>G.S.C.</u>		BOREHOLE TYPE <u>Washboring using BX Casing.</u>		CHECKED BY <u>K.G.S.</u>

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	20	40	60	80	100	WP	W		
553.0	Creek Water Level														
550.0	Groundlevel					550									
0.0	Sand-gravel-organics		1	SS	16										
1.0	Silty clay. (Trace of organics to El. 545). Stiff to V. Stiff. Grey and br. red.		2	SS	9	545									
540			3	SS	37	540									
10.0	Sand-gravel-silty clay														
10.7	(Glacial till) Dense Brown.		4	RC	-										
	Meta-sedimentary crystalline limestone bedrock.					535									
	Grey.		5	RC	-										
529.3						530									
30.7	End of borehole.														

(Refusal)