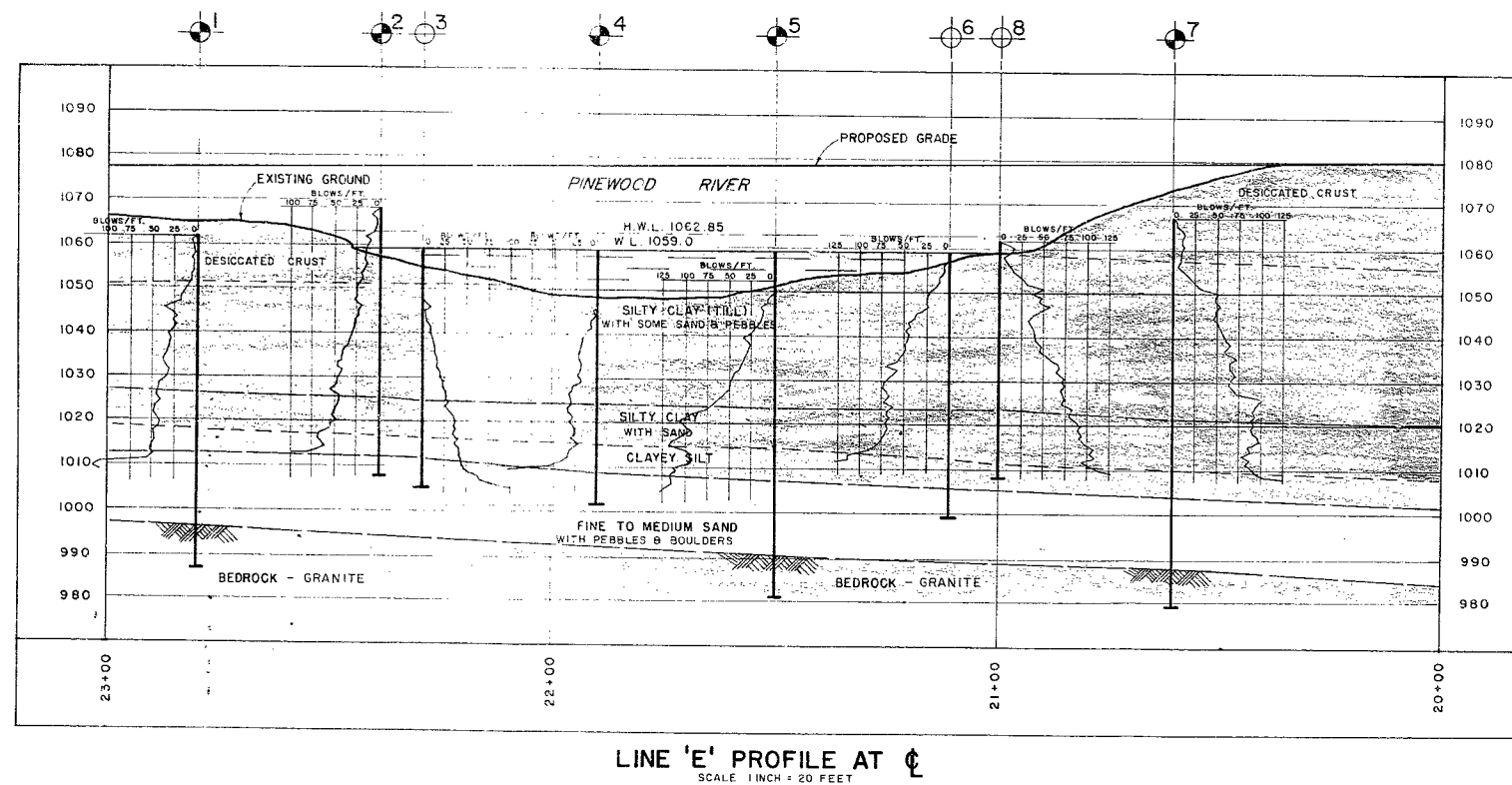
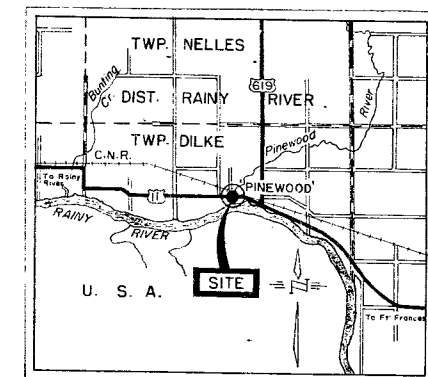
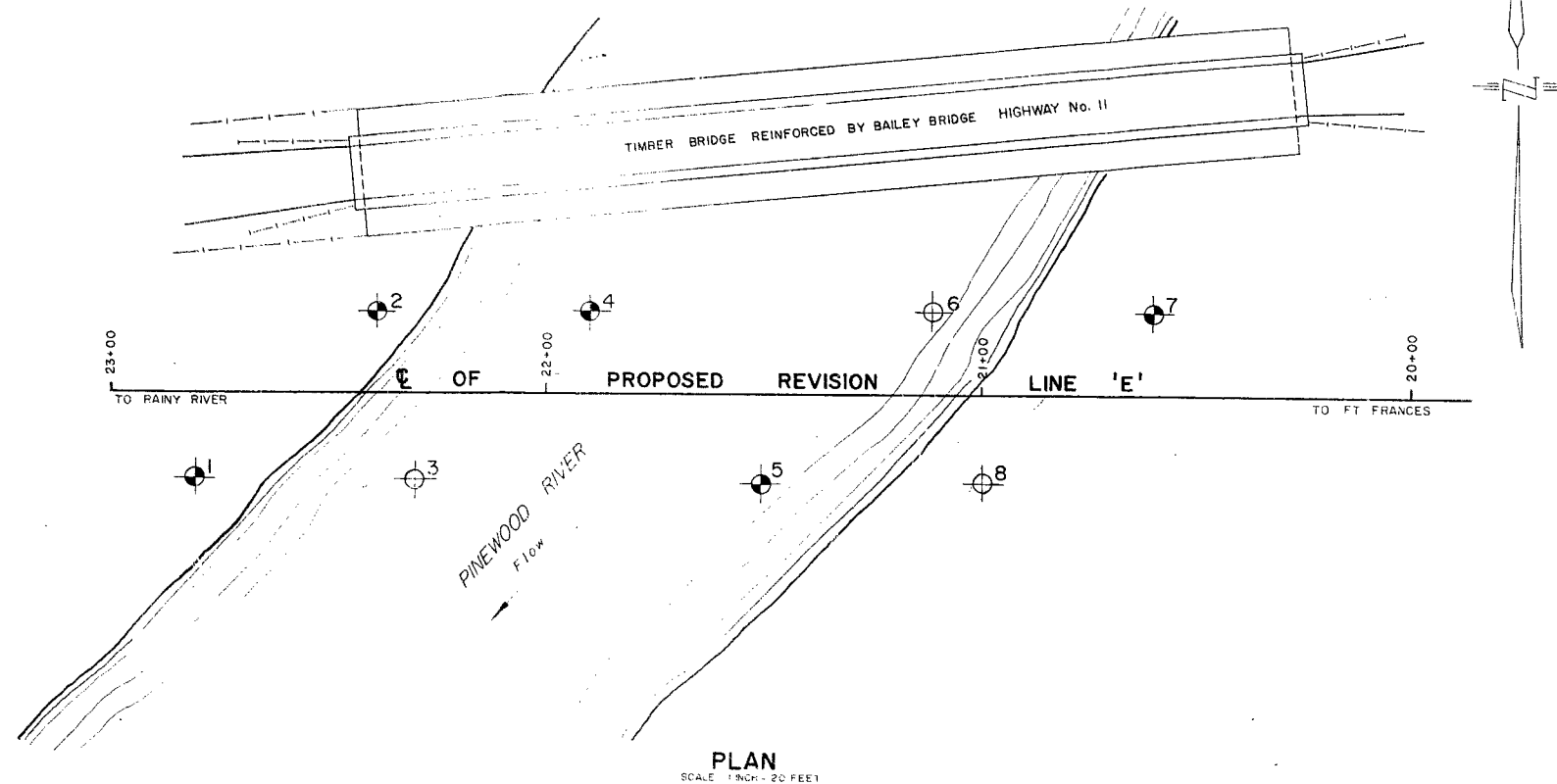


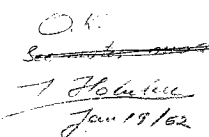
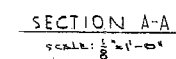
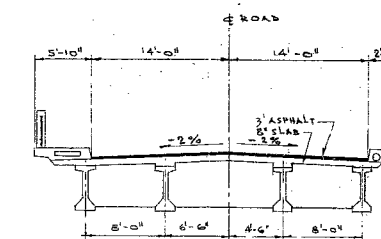
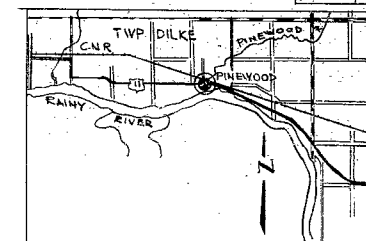
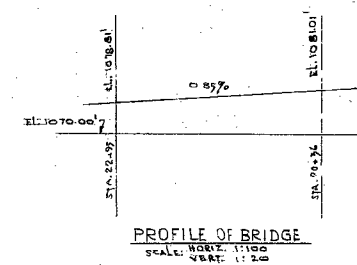
61-F-84
W.P. [#]119-61
Hwy [#]11
PINWOOD R.



LEGEND			
	BORE & PENETRATION HOLE		
	PENETRATION HOLE		
	BLOWS / FT DYNAMIC CONE		
HOLE ELEVATION	STATION	OFFSET	
1 1062	22+80	20' LT.	
2 1068	22+	20' RT.	
3 1059	22+30	20' LT.	
4 1059	21+90	20' RT.	
5 1059	21+50	20' LT.	
6 1059	21+10	20' RT.	
7 1067	20+60	20' RT.	
8 1062	21+00	20' LT.	

403500
537535
5204
15

DEPARTMENT OF HIGHWAYS - ONTARIO		
MATERIALS & RESEARCH SECTION		
PINEWOOD RIVER AND HIGHWAY NO. 11 LINE 'E' REVISION		
ORIGINATED I. HOLUBEC	DISTRICT NO 20	DATE 18 SEPT. 1961
DRAWN F. CLARK	W.P. NO 119-61	JOB NO 61-F-84
CHECKED	SCALE AS SHOWN	DRAWING NO.
APPROVED		61-F-84 A



PRELIMINARY

REVISIONS	DATE	BY	DESCRIPTION

<u>DEPARTMENT OF HIGHWAYS ONTARIO</u> <u>BRIDGE DIVISION</u>				
PROPOSED PINEWOOD RIVER BRIDGE				
KING'S HIGHWAY No. 11			DIST. No. 20	
CO. DISTRICT OF RAINY			RIVER.	
TWP. DILKE		LOT 22		CON. SEC. 27
GENERAL ARRANGEMENT				
APPROVED:			SITE No.	
BRIDGE ENGINEER			W.P. No. 119 - G1	
DESIGN	R.C.A.	CHECK	del. / S.T.	CONTRACT
DRAWING	S.T.	CHECK	R.C.A.	
DATE	15.12.51	LOADING	420-5-16	DRAWING No.

**FOUNDATION OF CANADA ENGINEERING
CORPORATION LIMITED**

C FENCO DWG. No. 2355-K-1.

~~CONFIDENTIAL~~

See files
23-62-207.

Mr. A. L. Foye,
Bridge Engineer,
Materials and Research Section,
(Foundations Office)

September 21, 1961.
F.N.O. FOUNDATION INVESTIGATION
REPORT
C.J. 61-7-8 -- R.F. 119-61.

Attention: Mr. A. L. Foye.

Re: Proposed Crossing at Pinewood River and
King's Hwy. to. 11 - Prop. Hwy. Line 'B'
District 210.

Accompanying this memo, is our detailed foundation
report on the subsoil conditions existing at the above site.

We believe you will find the conclusions and recom-
mendations summarized therein, adequate for your future design
work.

If we can be of further assistance in connection with
this project, please feel free to call on our office.

Althorway
G. L. Larnac,
District Engineer

A. L. Foye
attest.

cc: Extra. A. L. Foye (2)
R. A. Fregastee
B. L. Tullien
C. R. Hunter
R. B. Whiteley
A. F. Foye
T. J. LeVich
J. Key
G. L. Grunpiser
F. L. Saint
A. Watt
Foundations Office
Gen. Files.

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 - 4.2) Silty Clay with Some Sand & Pebbles (Till).
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 - 4.5) Sand, Fine to Medium, with Pebbles and Boulders.
 - 4.6) Bedrock.
 5. GROUND WATER OBSERVATIONS.
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-

FOUNDATION INVESTIGATION

For

Proposed Crossing at Pinewood River and
King's Hwy. No. 11 - Prop. Rev'n. Line 'E',
W.P. 119-61 -- District 520 -- W.J. 61-5-34.

1. INTRODUCTION:

It is proposed to construct a three-span bridge where the proposed Revision Line 'E' of the King's Highway No. 11 crosses Pinewood River, 0.3 Miles west of Pinewood.

In order to determine the subsoil conditions and decide on the most suitable type of foundation for a three-span structure, a field investigation was carried out. The results and discussion of the field investigation, as well as conclusions and recommendations, are presented in this report.

2. DESCRIPTION OF SITE AND GEOLOGY:

The proposed bridge site is located at the intersection of Hwy. No. 11 and Pinewood River, which is in the western outskirts of the Village of Pinewood. Rainy River is approx. 500 ft. south of the site and a C.N.R. line runs 300 ft. north of the site. The surrounding area is a flat clay plain with a highly developed farming industry.

At the proposed crossing, the river valley is approx. 300 ft. wide and 20 ft. deep.

In this area, Glacio-Lacustrine clay and calcareous till were deposited in the early stages of Lake Agassiz and Lacustrine and Fluvio-Lacustrine sands, silts and clays were laid down in the Pre-Glacial Lake Agassiz. The latter deposits predominate in the immediate vicinity of the site.

cont'd. /2 ...

3. FIELD INVESTIGATION PROCEDURE:

In order to determine the subsoil conditions at the mentioned location of the proposed structure, five sampled boreholes with dynamic cone penetration tests adjacent to them and three additional dynamic cone penetration tests were carried out. The denseness of the cohesionless material was determined by Standard Penetration Tests and in-situ shear strength and sensitivity of the cohesive material were determined by field vane tests. Samples recovered were used for classification purposes.

All boreholes were advanced 8 ft. into the bedrock to determine the soundness of the bedrock and its profile.

Water level observations were taken daily in each borehole during boring operations.

4. SUBSOIL CONDITIONS:

4.1) General:

The stratigraphy of the soil at the site consists of four strata and bedrock, all sloping in the easterly direction. The four strata were established in all boreholes and bedrock in 3 boreholes. The detailed description of various soil types encountered in each borehole are shown in the appendix of this report. The estimated stratigraphical profile of Drawing 61-F-84A is based on this information.

The subsoil consists of the following strata:-

- i) Silty Clay with some Sand & Pebbles (Till).
- ii) Silty Clay with some Sand.
- iii) Clayey Silt.
- iv) Sand, fine to medium, with Pebbles and Boulders.
- v) Bedrock.

cont'd. /3 ...

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

4.2) Silty Clay with some Sand & Pebbles (Till):

This material is predominantly a grey silty clay with about 10% of coarse sand and pebbles (Max. diameter less than 1") and has a soft to stiff consistency. The material's upper boundary is the ground surface and its lower boundary is sloping uniformly downward to the east from elevation 1027 to elevation 1021 at boreholes No's. 1 and 7, respectively. This material is overlain by about 1/2 ft. of topsoil on the bank at boreholes No's. 1, 2 and 7. Also at these locations, desiccation of this material was found to a depth of 3.0 ft. Since coarse sand and pebbles were found embedded in this material, and signs of reworking are present, this material can be classified as a till.

Results from field vane tests are as follows:-

	<u>Shearing Strength</u> <u>P.S.F.</u>	<u>Sensitivity</u>
Minimum	1,100	2.0
Maximum	3,500	3.0
Average of all values	1,300	2.3

4.3) Silty Clay with Sand:

This stratum underlies the silty clay with coarse sand and pebbles and is classified as a separate stratum because of the lack of pebbles. The thickness of this layer is 10 ft. and it also slopes downward to the east. The material has a stiff consistency with average shearing strength of 1700 P.S.F. and sensitivity of about 3.

cont'd. /4 ...

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

4.4) Clayey Silt:

This stratum underlies the silty clay with sand and it is also sloping to the east. The layer is about 5 ft. thick and is a lacustrine deposit of clayey silt. The material has a very stiff consistency with an average shearing strength of 2400 P.S.F. and sensitivity of 3.

4.5) Sand, Fine to Medium, with Pebbles and Boulders:

This stratum overlies bedrock and consists of sand with pebbles and boulders. The number and size of boulders increase with depth and the maximum encountered diameter of the boulders was about 3 ft. This layer is about 15 ft. in thickness and slopes to the east as the remaining strata.

4.6) Bedrock:

Granitic bedrock was established in B.H.'s No's. 1, 5 and 7. It is sloping downward to the east and it is overlain by sand with pebbles and boulders. The elevations of bedrock established in the 3 foregoing boreholes are shown on Drawing 61-P-24A.

5. GROUND WATER OBSERVATIONS:

The ground water level at the site was observed to be between elevations 1060' and 1065' at B.H.'s No. 2 and 5, respectively, the higher elevation being found on the northern bank.

cont'd. /5 ...

6. DISCUSSION AND RECOMMENDATIONS:

In view of the low shearing strength of the silty clay strata, it is recommended to found the proposed bridge on 'H' bearing piles driven to bedrock or to practical refusal in the sand and boulder strata above the bedrock. A design load of 60 tons may be used.

For all practical purposes, the subsoil may be considered as relatively impermeable, hence, dewatering of the excavations should present no special problems. Sheet piles driven at the pier locations for dewatering purposes, advanced to a depth of about 6 ft. below river bottom, should prove adequate.

Approach fill slopes of 2:1 should not present any stability problems. It is recommended that the latter be protected by rock rip-rap up to the H.W.L.

7. SUMMARY:

The subsoil at the site consists of silty clay with sand and pebbles (till), followed by silty clay with sand and clayey silt, sand, fine to medium, with pebbles and boulders, followed by bedrock.

Due to the low shear strength of the silty clay, it is recommended to support the structure on steel 'H' bearing piles driven to bedrock or to practical refusal. The safe bearing capacity of these piles would be 60 tons.

No major dewatering problems are anticipated because of the relatively impermeable nature of the subsoil. Sheet piling used in the river, when used for construction, may be driven about 6 ft. below the river bottom.

No stability problems are anticipated with regard to the approach fills. Rip-rap should be provided to protect the slopes below the H.W.L.

8. MISCELLANEOUS:

The field work was carried out from June 28 to August 5, 1961, by Canadian Longyear, Ltd., using a diamond core drill adapted for soil testing. The work was supervised by P. J. Mahony for the Ontario Department of Highways.

September 1961. REPORT PREPARED BY: *Robert F. Wad*
.....
for I. Holubec,
PROJECT FOUNDATION ENGINEER

REPORT APPROVED BY: *M. Devata*
.....
M. Devata,
SR. PROJECT FOUNDATION ENGINEER

APPENDIX 1.

OFFICE LOCATION -
DOWNSVIEW AVE.,
KEELE ST. - HIGHWAY 401
TORONTO, ONTARIO.



ONTARIO
DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS -
DEPARTMENT OF HIGHWAYS
PARLIAMENT BUILDINGS,
TORONTO 5, ONTARIO.

Bridge Division,
January 12, 1962.

MEMORANDUM TO:

Mr. A. G. Stermac,
Principal Foundation Engineer,
Department of Highways,
Room 107, Lab. Building,
Downsview, Ontario.

Murphy
Jan. 16, 1962
acp

ATTN; Mr. K. Selby

RE: W.P. 119-61
Pinewood River Bridge
Hwy #11 District #20

Attached please find one print of
Preliminary Plan D 4947 - P for the above
structure.

The abutments have been founded on
steel H-piles driven to bedrock as recommended
in the report made by D.H.O. However it has been
decided to utilize some precast beams remaining
from the Rainy Lake causeway bridge which
necessitates the use of steel pipe piles at the
piers.

Will you please let us have your
approval of this pier design.

J. C. McAllister

J. C. McAllister,
for S. McCombie,
Bridge Planning Engineer:

JCMcA/zf

No Comment
M. A.

1961 OCT 16 AM 9:49

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61-F-84

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DOWN BEAR 1 OCT 16 905A

G STLRMAC, ✓

FOUNDATION SECTION,

RE: W P 119-61

MAY 11 - DIST 20, PINWOOD RIVER

WOULD IT BE POSSIBLE TO OBTAIN ONE ADDITIONAL COPY OF THE FOUNDATION
REPORT FOR WP 119-61, PINWOOD RIVER? THE PROJECT DESIGN SUPERVISOR
NEEDS A COPY AS WELL AS FOR OUR RECORDS. WE ORIGINALLY RECEIVED ONE
COPY ONLY.

A MCCONNELL,

OFFICE PROJ. DESIGN ENG.

R D O

DS

Oct. 18/61

OFFICE LOCATION -
DOWNSVIEW AVE.,
KEELE ST. - HIGHWAY 401
TORONTO, ONTARIO.



ONTARIO
DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS -
DEPARTMENT OF HIGHWAYS
PARLIAMENT BUILDINGS,
TORONTO 5, ONTARIO.

*Drawn
sent to
1 also
June 21/61
as per telephone
conversation*
Bridge Division,
June 13, 1961.

MEMORANDUM TO:

Mr. L. G. Soderman,
Principal Soils & Foundation Engr.,
Department of Highways,
Room 107, Lab. Bldg.,
DOWNSVIEW, Ontario.

RE: W.P. 119-61,
Pinewood River,
Hwy. #11 - Dist. #20.

Attached are two prints of plan E 3990-1
showing the revision line and grade for the above
crossing.

The suggested bore holes shown on the plan
should give adequate information for any type of
structure which may be designed.

J.C. McAllister

JCMCA/eh

J.C. McAllister,
for S. McCombie,
Bridge Planning Engineer.

Mr. G. K. Hunter,
Sr. Project Design Engr.,
North Bay, Ontario.
Materials & Research Division,
(Foundations Office).

October 18, 1961.

Request for Extra Copy of
Foundation Investigation Report -
W.J. 61-F-84 -- W.P. 119-61.

Attention: Mr. A. McConnell,
Office Proj. Design Engr.

Re: Pinewood River and Highway No. 11,
Line 'E' Revision -- District 20.

In compliance to your recent request by teletype,
we are forwarding herewith, an extra copy of the above-mentioned
report.

Normally, we have a distribution of 14 copies of
each of our Foundation Reports, which includes one copy to the
Sr. Project Design Engineer - in this case, Mr. G. K. Hunter.
Unless a special request is made, we do not send more than one
copy to the Design Office. However, we are happy to be able
to fulfill your request.

AGS/MdeF
Attach.

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER.