

73-62-704.

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section.
(Foundations Office).
Attention: Mr. S. McCombie.

April 18, 1961.

RE: D.H.O. FOUNDATION INVESTI-
GATION REPORT.
W.J. 61-F-18 -- W.P. 148-61.

Re: Underpass at Hwy. 50 and C.P.R. Crossing,
1-1/2 Mi. South of Bolton, Twp. of Albion,
County of Peel, District No. 6.

Attached hereto, we are forwarding to you the
Soil Investigation Report for the above mentioned location.

We believe that you will find the factual data
and recommendations contained therein, adequate for your
future design work.

However, if there are any queries in connection
with this project, please feel free to call on our Office.

L. G. Soderman,
PRINCIPAL FOUNDATION ENGR.
Per:

Afterman

(A. G. Sternac,
SUPERVISING FOUNDATION ENGR.)

AGS/McC

Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
I. C. Campbell
C. Fraser
T. J. Kovich
A. Watt

Foundations Office ✓
Gen. Files.

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FOUNDATION INVESTIGATION

For

Underpass at Hwy. 50 and C.P.R. Crossing,
1-1/2 Mi. South of Bolton, Twp. of Albion,
County of Peel, District No. 6.
W.J. 61-F-18 -- W.P. 148-61.

1. INTRODUCTION:

A bridge structure is planned to carry Hwy. 50 over the C.P.R. crossing, approximately 1-1/2 miles South of Bolton - (Sta. 86 + 36.41, Plan. 7-B-279).

At this location, the existing Hwy. 50 passes between Con. VI and VII and Lot 5.

A subsoil investigation was carried out at this site, and this report contains the field and laboratory findings and recommendations concerning the foundation of the structure.

2. DESCRIPTION OF SITE AND GEOLOGY:

Building structures exist on either side of Hwy. 50, which runs North to South. About 600 ft. North of the Hwy. 50 and C.P.R. crossing, a gravel road runs East to West between Lots 5 and 6. Wire fences run on either side of Hwy. 50 and the rail-road crossing. The C.P.R. crossing is supplied with wig-wag signals.

The entire area in the vicinity of the site is fairly flat and level, and it was covered with a thin blanket of snow at the time of this investigation.

Geologically, the site is located in the Peel Plain area. The underlying geological material of this plain is a till or boulder clay containing large amounts of Palaeozoic shale and limestone.

3. DESCRIPTION OF FIELD AND LABORATORY WORK:

Field work consisted of two sampled boreholes and dynamic cone penetration tests adjacent to each borehole. In addition, two more dynamic cone penetration tests were made. Locations of the boreholes were chosen from the given plan of the site (7-B-279), and were surveyed by the surveying crew of District No. 6. Very slight revisions had to be made in setting up the standard core drilling machine, due to overhead and underground utility cables.

Conventional wash boring procedure was followed. Samples were recovered at depths required, by means of a split-spoon sampler. The dimension of the spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test.

Samples were visually examined and identified in the field before being transported to the laboratory. Upon receipt in the laboratory, grain-size distribution curves and Atterberg limits of a few representative samples were determined. Laboratory and field test results have been summarized and are given at the end of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

The investigation has shown the general stratification of the subsoil to be regular. Below a thin surface layer of top soil, a layer of till material consisting of silty clay with some sand and fine gravel, was encountered.

cont'd. /3 ...

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

4.2) Silty Clay Till:

The upper portion of this silty clay stratum has been subjected to oxidation, resulting in its present brown colour. Below the oxidized zone, the colour is predominantly grey.

At the top, up to approximately 14 ft. in depth, it exists in a hard condition with average 'N' values upwards of 50. Then, up to a depth of 30 ft., the consistency drops with average 'N' values of 26 blows and again, it becomes hard at further depths with 'N' values upwards of 50 blows.

A small percentage of sand and gravel exists in this layer throughout the entire depth.

It is of low to medium plasticity and is preconsolidated.

The average moisture content of the layer is 19.5%, and the values for average Atterberg limits are 30.5% and 16.6%.

4.3) Ground Water Conditions:

The exact ground water level could not have been established during the investigation, because of the relatively low permeability of the subsoil. It is believed that the ground water table does not lie above 25 ft. depth.

5. DISCUSSION AND RECOMMENDATIONS:

The upper hard silty clay stratum is competent to provide adequate foundation support for the structure.

Strength and compressibility characteristics are such that spread footing support can be used. A safe maximum load of 3 T.S.F. is recommended for footings of an average width of 6 ft. to 8 ft.

cont'd. /4 ...

5. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

The footings should be placed at least 5 ft. below the existing ground level to provide for frost protection.

Settlements occurring due to this bearing pressure, will be within tolerable limits for this single span structure.

No ground water problems with regard to footing excavation will occur.

No approach fill stability problems are anticipated.

6. SUMMARY:

- a) The site is underlain by silty clay till material.
- b) Spread footings 6' to 8' wide placed at a minimum of 5' below the present ground surface and with a maximum load of 3.0 T.S.F. are recommended.
- c) No ground water problems will arise during footing excavations.
- d) No approach fill stability problems are anticipated.

7. MISCELLANEOUS:

The field work was commenced on March 13, 1961, and completed by March 16, 1961, under the supervision of Mr. B. Ghadiali of this Section. D.H.C. crew and equipment were employed for drilling work.

April 1961.

REPORT PREPARED BY:

.....*B. M. Ghadiali*.....
B. Ghadiali,
PROJECT FOUNDATION ENGR.

REPORT APPROVED BY:

.....*A. G. Stermac*.....
A. G. Stermac,
SUPERVISING FOUNDATION ENGR.

APPENDIX I

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-18

W.P. 148-61

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
2	S1	3'-4.5'	V. silty clay with some sand and fine gravels. Hard. Brown.	52	-	-	-	-	-	
	S2	6'-7.5'	" " "	69	-	-	-	-	-	
	S3	10'-11.5'	" " "	53	20.2	18.6	36.2	-	127.0	
	S4	15'-16.5'	V. silty clay with sand and gravels in trace. V. stiff. Br. grey.	26	22.2	17.3	32.5	-	-	
	S5	20'-21.5'	Silty clay with sand and gravels in trace. V. stiff. Grey.	26	20.5	16.5	29.5	-	-	
	S6	25'-26.5'	Silty clay with a thin layer slate pyrite rock. V. stiff. Grey.	25	-	-	-	-	-	
	S7	35'-36.5'	Silty clay with some fine gravels. Hard. Grey.	48	16.1	14.8	26.6	-	-	
	S8	45'-46.5'	" " "	54	-	-	-	-	-	
3 & 4		cone penetrations only								
			S denotes split spoon sample.							

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-18W.P. 148-61

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psi	UNIT WEIGHT pcf	REMARKS
1	S1	3'-4.5'	V. silty clay with some sand and fine gravels. Hard. Br. grey.	68	-	-	-	-	-	
	S2	6'-7.5'	" " "	60	20.1	17.5	37.3	-	131.9	
	S3	9'-10.5'	" " "	50	-	-	-	-	-	
	S4	15'-16.5'	Silty clay, with sand & fine gravels in trace. V. stiff. Grey.	28	18.2	15.8	27.5	-	-	
	S5	20'-21.5'	" " "	23	-	-	-	-	-	
	S6	25'-26.5'	" " "	21	24.8	19.1	35.7	-	122.2	
	S7	30'-31.5'	Silty clay with sand and fine gravels. Hard. Grey.	33	-	-	-	-	-	
	S8	40'-41.5'	Silty clay with sand and fine gravels. Hard. Grey.	59	14.2	14.0	18.5	-	129.1	

MATERIALS AND RESEARCH SECTION

BORING DATE Mar. 13/61. CHECKED BY B.M.G.

... ..

LEGEND

[illegible][illegible]

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
10	20	30	40
		S1	-
		S2	131.9
		S3	-
		S4	-
		S5	-
		S6	122.2
		S7	-
		S8	129.1

End of borehole.
Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350 ft. lb. per blow.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 148-61 BORE HOLE NO. 2

JOB 61-F-18 STATION 86-46 (27' Lt.)

DATUM 823.5' COMPILED BY B.K.

BORING DATE Mar. 14/61. CHECKED BY B.M.G.

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) _____	0
VANE TEST (C) AND SENSITIVITY (S) _____	+ 6
NATURAL MOISTURE AND LIQUIDITY INDEX _____	LI
LIQUID LIMIT _____	X
PLASTIC LIMIT _____	—

[illegible]

CONSISTENCY				SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.					
0	10	20	30	40	
					S1 -
					S2 -
					S3 127.0
					S4 -
					S5 -
					S6 -
					S7 -
					S8 -

End of borehole 777.0 8 58 -

Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of

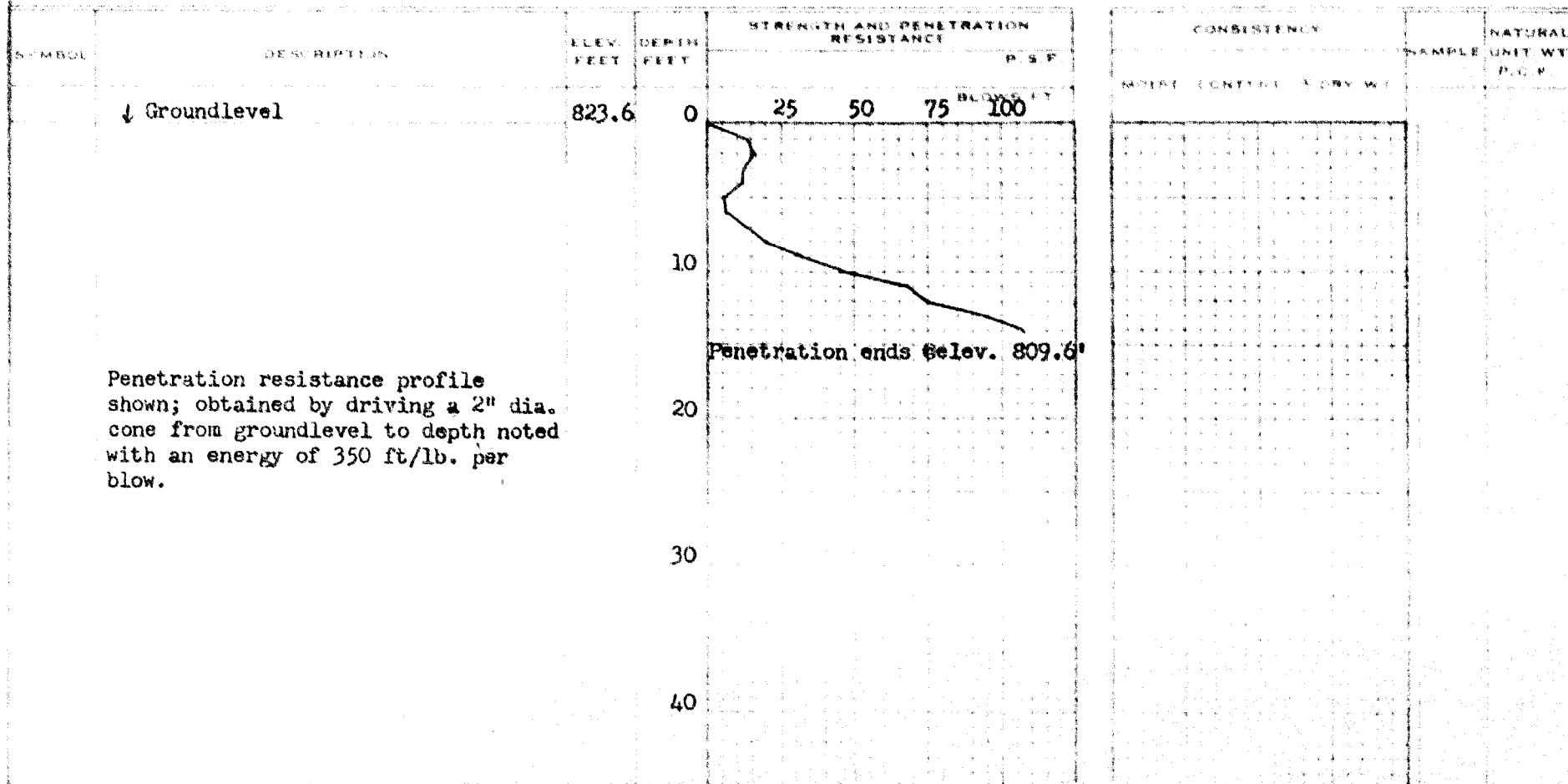
DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 148-61 BORE HOLE NO. 3
 JOB 61-F-18 STATION 86+95 (20' Lt.)
 DATUM 823.6' COMPILED BY B.K.
 BORING DATE Mar. 15/61 CHECKED BY B.H.G.

2" DIA SPLIT TUBE
 2" SHELBY TUBE
 2" SPLIT TUBE
 2" DIA CONE
 2" SHELBY
 CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u)
 VANE TEST (C) AND SENSITIVITY (S)
 NATURAL MOISTURE AND
 LIQUIDITY INDEX
 LIQUID LIMIT
 PLASTIC LIMIT



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 148-61

BORE HOLE NO. 4

JOB 61-F-18

STATION 85+70 (20' Rt.)

DATUM 823.5'

COMPILED BY B.K.

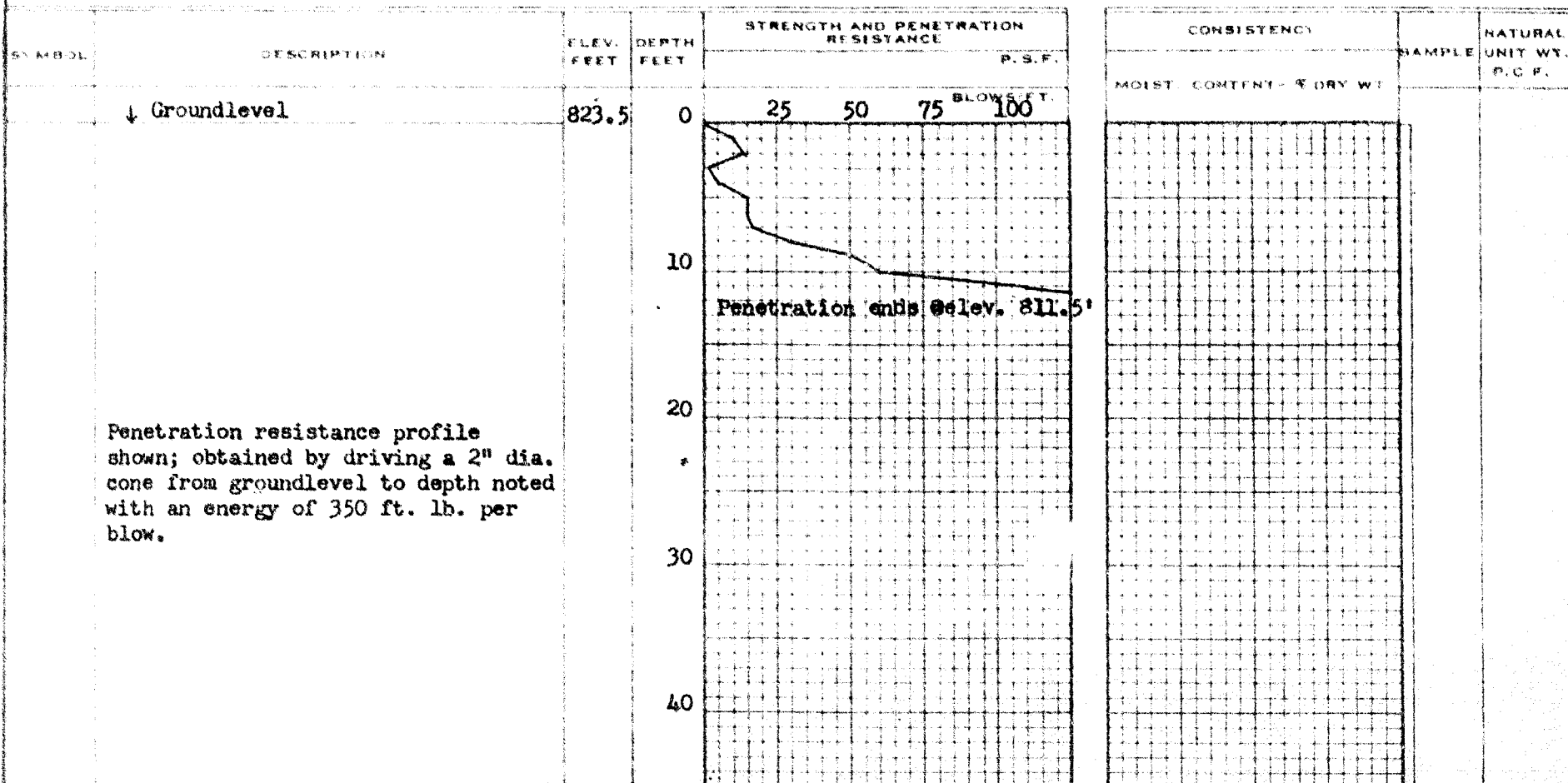
BORING DATE Mar. 15/61.

CHECKED BY B.M.G.

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) O
VANE TEST (C) AND SENSITIVITY (S) +
NATURAL MOISTURE AND LIQUIDITY INDEX LI
LIQUID LIMIT X
PLASTIC LIMIT



Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section,
(Foundations Office).

August 14, 1961.
REVIEW OF PRELIMINARY PLAN
by Foundations Office.

Attention: Mr. Bruce Davis.

Re: W.P. 148-61,
C.P.R. Overhead,
0.7 Miles South of
Bolton South Limits

In reply to a memo from Mr. F. DeVisser concerning the Preliminary Plan for the above structure, we submit the following comments:-

- (1) The abutments could be supported by spread footings placed in thoroughly compacted fill.
- (2) If it is desired to use pile foundations for the abutments, 12" Ø tube piles should be used. These should not be driven beyond elev. 812.0'. A design load of 35 tons per pile is permissible in this case.

XGS/MdeF
cc: Mr. F. DeVisser

K. G. Selby
K. G. Selby,
PROJECT FOUNDATION ENGINEER

Foundations Office ✓
Gen. Files.

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,
August 9, 1961.

MEMORANDUM TO:

Mr. A. Stermac,
Supervising Foundation Engineer,
Department of Highways,
Room 107,
Downsview, Ontario.

RE: W.P. 148-61,
C.P.R. Overhead,
0.7 Miles South of
Bolton South Limits.

Attached, for your information, please find
two prints of the preliminary plan for the subject
structure.

Please contact us if you have any comments.

FDeV/mg

A handwritten signature in cursive script, appearing to read "F. DeVisser".

F. DeVisser,
Bridge Location Engineer.

61-F-18

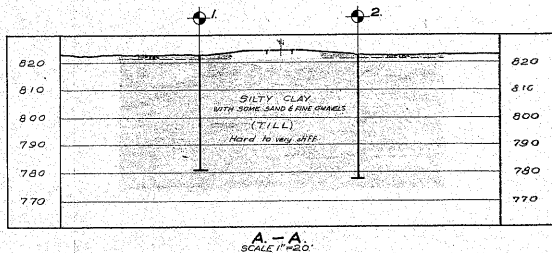
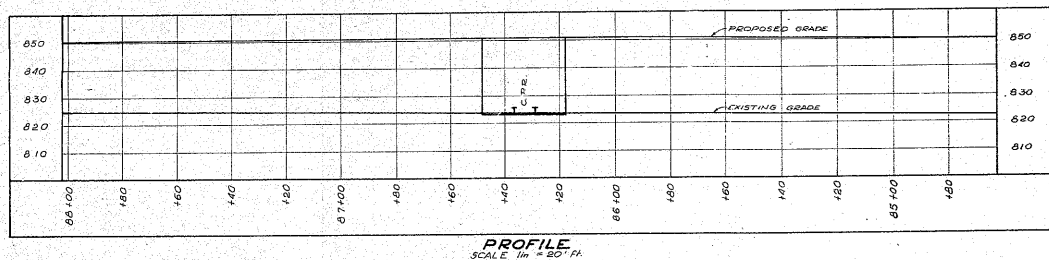
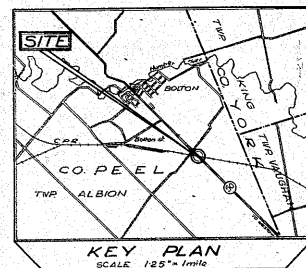
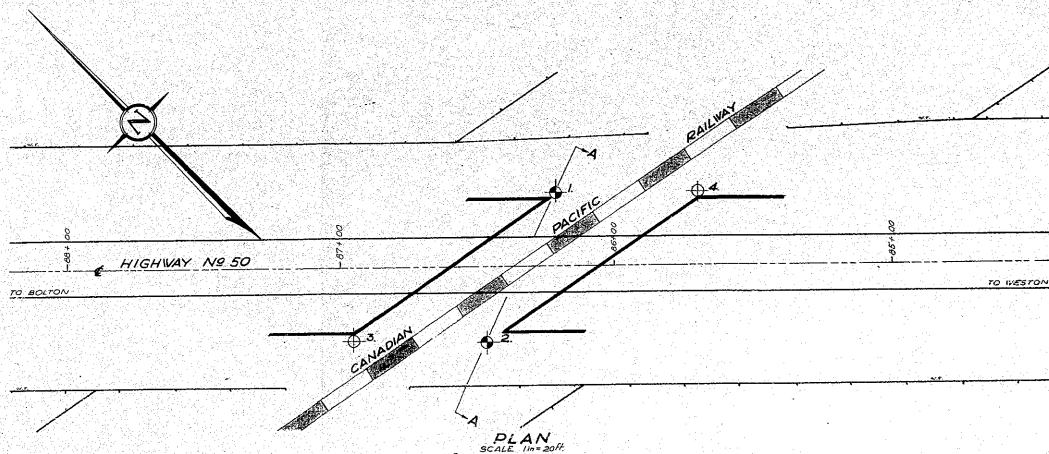
W.P.# 148-61

Hwy. # 50 &

C.P.R. CROSSING

1½ MILES S. OF

BOLTON



LEGEND			
	BORE AND PENETRATION HOLE		
	PENETRATION HOLE		
HOLE	ELEVATION	STATION	DIST FROM E
1	823.0'	86+21	20 RT.
2	823.5'	86+46	27 LT.
3	823.0'	86+95	20 LT.
4	823.5'	85+70	20 RT.

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
CANADIAN PACIFIC RAILWAY AND HIGHWAY NO 50			
ORIGINATED BY: <i>GRADUAL</i>	DISTRICT NO.: <i>12</i>	DATE: <i>11 APRIL 1961</i>	
DRAWN BY: <i>W. J. G. G. G.</i>	W.P. NO.: <i>145-01</i>	JOB NO.: <i>61-F-18</i>	
CHECKED BY: <i>W. J. G. G.</i>	SCALE: <i>1 inch = 20 feet</i>	DRAWING NO.	
APPROVED: <i>W. J. G. G.</i>		61-F-18A	

