

23-22-264

Mr. A. M. Toya,
Bridge Engineer.
Materials & Research Section.

May 31, 1960.
D.E.O. FOUNDATION INVESTIGATION
W.P. 92-60 -- W.J. 60-F-15.

Attention: Mr. S. McCombie.

Re: Highway 17 and Maillieur's Bay
District 13.

This report presents the results of a preliminary boring program carried out at the proposed crossing of Maillieur's Bay, designated as Line 'C'. Detailed boring logs and a plan showing the subsoil profile, are attached.

Your attention is drawn to the fact that a deposit of very soft, normally consolidated clay was found to underlie the proposed centre line. The thickness of this clay deposit varied from 10 to 15 feet between Station 293+00 and Station 296+00. The depth of water, at the time of the investigation, averaged 10 feet. The soft clay is underlain by a dense layer of sand and gravel. At the proposed culvert location, the clay layer was found to vary from 0 to 10 feet.

In view of the consistency of the clay subsoil, and the depth of this stratum, it is our recommendation that consideration be given to maintaining the existing alignment. The degree of curvature could be reduced by widening of the existing fill on the South side, East of Station 294+00. This proposal would eliminate difficult construction procedures, and possible poor performance due to incomplete displacement of the clay stratum, which are anticipated if proposed Line 'C' is approved.

cont'd. /2 ...

We would be pleased to have a further meeting with you once you have considered the field information contained in this report. If proposed Line 'C' cannot be altered, we will have to carry out a more detailed testing program of the soft clay and, also, carry out more field work East of the proposed culvert location with a view to relocation of this culvert.

LGS/ndef

Attach.


L. G. Soderman,
PRINCIPAL SOILS & FOUNDATIONS ENGINEER

cc: Messrs. A. M. Toye (2)
E. A. Tregaskes
D. G. Ramsay
G. K. Hunter
J. D. Foster
E. H. Saint
A. Watt
Foundations Office
Gen. Files.

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 1
JOB 60-F-15 STATION 296+39 c
DATUM 367.6' COMPILED BY A.K.L.
BORING DATE Feb. 15/60 CHECKED BY

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

LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	0
YANE TEST (C) AND SENSITIVITY (S)	+5
NATURAL MOISTURE AND LIQUIDITY INDEX	X
LIQUID LIMIT	—
PLASTIC LIMIT	—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
					P. S. F.
	↓ Ice Level	367.6	0		
	Ice	366.0			
	Water				
	Sand & Gravel	361.6			
	Boulders				
	End of borehole	355.6			

BLAWS/FT.

Hammer

Cone Refusal at
Elev. 361.6'

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 2
JOB 60-E-15 STATION 296+09 c
DATUM 367.6 COMPILED BY A.K.L.
BORING DATE Feb. 17/60 CHECKED BY

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	LI
LIQUIDITY INDEX _____	X
LIQUID LIMIT _____	—
PLASTIC LIMIT _____	—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F. BLOWS/FT.	
↓	Ice level	367.6	0		
---	Water	362.6	5		
///	Very soft clay	355.6	10		
●	Boulders, sand & gravel		15		
	End of borehole	339.6	30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 3
JOB 60-F-15 STATION 296+09 (18' RT)
DATUM 367.6' COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

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 _____	X
LIQUID LIMIT _____	
PLASTIC LIMIT _____	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
					P.S.F.
↓	Ice level	367.6	0		
---	Ice	366.6			
---	Water	364.6			
///	Very soft clay	362.6	5		
⬢	Boulders, Sand & Gravel		10		
			15		
			20		
	End of borehole	348.0	20		
			25		
			30		
			35		

Penetration resistance profile shown obtained by driving a 2" dia. cone from elevation noted with an energy of 350 ft. lb. per blow.

Blows/ft. 20 40 60 80

Hanner

Cone penetration stopped at elev. 337.6

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT - % DRY WT.			UNIT WT P.C.F.
		S1	-
		S2	-
		S3	-

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 4
JOB 60-P-15 STATION 296+39(20' LT)
DATUM 367.6 COMPILED BY H.S.
BORING DATE Feb. 19/60 CHECKED BY A.K.L.

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) _____ 0
VANE TEST (C) AND SENSITIVITY (S) _____ + 5
NATURAL MOISTURE AND _____ LI
LIQUIDITY INDEX _____ X
LIQUID LIMIT _____ →
PLASTIC LIMIT _____

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	↓ Ice Level	367.6	0	20	40 60 80
---	Ice	366.0			
	Water				
		360.6	5	Hammer	
	Very soft clay	357.6	10		
	Boulders, sand and gravel				
	End of borehole	351.1	15	Penetration ends at Elev. 353.62 Refusal	

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

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT - % DRY WT.			UNIT WT. P.C.F.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 5
JOB 60-F-15 STATION 296+39(20' RT)
DATUM 367.6' COMPILED BY A.K.L.
BORING DATE Feb. 15/60 CHECKED BY

LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	0
VANE TEST (C) AND SENSITIVITY (S)	+5
NATURAL MOISTURE AND	LI
LIQUIDITY INDEX	X
LIQUID LIMIT	—
PLASTIC LIMIT	—

[illegible][illegible]

W.P. 98-60 BORE HOLE NO. 6
JOB 60-F-15 STATION 296+09(20' LT)
DATUM 367.6 COMPILED BY A.K.L.
BORING DATE Feb. 17/60 CHECKED BY

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

1/2 UNCONFINED COMPRESSION (Qu)	0
VANE TEST (G) AND SENSITIVITY (S)	+5
NATURAL MOISTURE AND	LI
LIQUIDITY INDEX	X
LIQUID LIMIT	0
PLASTIC LIMIT	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
					P.S.F. BLOWS/FT.
	Ice Level	367.6	0		
↓	Ice				
	Water		5		
		360.6			
	Very soft clay		10		
		352.6	15		
	End of Sounding. Refusal		20		
	Probably boulders		25		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 7
JOB 60-F-15 STATION 295+50
DATUM 367.6 COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	0
VANE TEST (C) AND SENSITIVITY (S)	+5
NATURAL MOISTURE AND	
LIQUIDITY INDEX	LI
LIQUID LIMIT	X
PLASTIC LIMIT	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	Ice level			20	40
↓	Ice	367.6	0		
---	Water.				
---			5		
---		360.6	10		
\\	Very Soft Clay		15		
\\		350.0	20		
	Probably boulders, sand & gravel. Cone test only.		25		
			30		

Penetration ends at Elev. 341.6'

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 8
JOB 60-F-15 STATION 295+00(20' LT)
DATUM 362.6 COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

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)	---	+s
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	X
LIQUID LIMIT	---	
PLASTIC LIMIT	---	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
					P.S.F.
↓	Ice level	367.6	0		
---	Water	361.0	5		
///	Very Soft Clay		10		
			15		
			20		
		343.6	25		
	End of Sounding refusal Probably boulders, sand & gravel.		30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 28-60 BORE HOLE NO. 9
JOB 60-F-15 STATION 295+00(20' RT)
DATUM 367.6 COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

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)	+5
NATURAL MOISTURE AND	LI
LIQUIDITY INDEX	X
LIQUID LIMIT	0
PLASTIC LIMIT	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	BLOWS/FT.
↓	Ice	Ice Level	367.6	0	
	Water		361.0	5	
	Very soft clay			10	Sounding
	End of Sounding - Refusal	350.6		15	
	probably boulders, sand & gravel			20	
				25	
				30	

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P.	98-60	BORE HOLE NO.	10
JOB	60-F-15	STATION	294+50c
DATUM	367.6'	COMPILED BY	A.K.L.
BORING DATE	Feb. 18/60	CHECKED BY	

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
					P.S.F.
	Ice level	367.6	0	20	40
	Ice	362.6			
	Water				
	Very soft clay		5		
			10	Hammer	
			15		
			20		
		345.6	25		
	Probably boulders, sand & gravel. Dynamic cone penetration only.		30		
					End of penetration at elev. 338.6

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 11
JOB 60-F-15 STATION 294+00 (20' LT)
DATUM 367.6' COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

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)	+S
NATURAL MOISTURE AND	
LIQUIDITY INDEX	LI
LIQUID LIMIT	X
PLASTIC LIMIT	—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F. BLOWS/FT.	
↓	Ice level	867.6	0		
---	Ice	862.6			
---	Water	852.6	5		
\\	Very soft clay		10		
		852.6	15		
	End of Sounding - Refusal probably sand & gravel.		20		
			25		
			30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 12

JOB 60-F-15 STATION 294+00 (20' RT)

DATUM 367.6' _____ COMPILED BY A.K.L.

BORING DATE Feb. 18/60 CHECKED BY

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)	---	+3
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	LI
LIQUID LIMIT	---	X
PLASTIC LIMIT	---	0

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	BLOWS/FT.
↓	Ice Level	367.6	0		
---	Ice				
---	Water	361.0	5		
\\	Very soft clay		10		
	End of Sounding - refusal Probably boulders, sand & gravel.	347.6	20		
			25		
			30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 13

JOB 60-F-15 STATION 293+50 CL

DATUM 367.6 COMPILED BY A.K.L.

BORING DATE Feb. 18/60 CHECKED BY _____

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

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	0
WANE TEST (C) AND SENSITIVITY (S) -----	+s
NATURAL MOISTURE AND	
LIQUIDITY INDEX -----	Li
LIQUID LIMIT -----	X
PLASTIC LIMIT -----	o

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	Ice level				
↓	Ice	367.6	0		
---	Water				
---		362.0	5		
\\	Very soft clay		10		
\\		351.6	15		
	End of cone test - Refusal probably boulders.		20		
			25		
			30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 14
JOB 60-F-15 STATION 293+00 (20' IT)
DATUM 367.6 COMPILED BY A.K.L.
BORING DATE Feb. 18/60 CHECKED BY

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
↓	Ice level	367.6	0		
---	ice				
---	Water	362.1	5		
///	Very soft clay	356.6	10		
...	Fine sand	354.6	15		
	End of Sounding. Refusal probably boulders		20		
			25		
			30		

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 15
 JOB 60-F-15 STATION 293+00 (20' RT)
 DATUM 367.6 COMPILED BY A.K.L.
 BORING DATE Feb. 18/60 CHECKED BY _____

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 _____

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE		CONSISTENCY		NATURAL UNIT WT. P.C.F.
				P.S.F.	BLOWS/FT.	MOIST. CONTENT - % DRY WT.	SAMPLE	
	Ice level	367.6	0					
	Ice							
	Water	362.6	5					
	Very soft clay	355.6	10					
	Fine sand	349.6	15					
	End of Sounding - Refusal probably boulders		20					

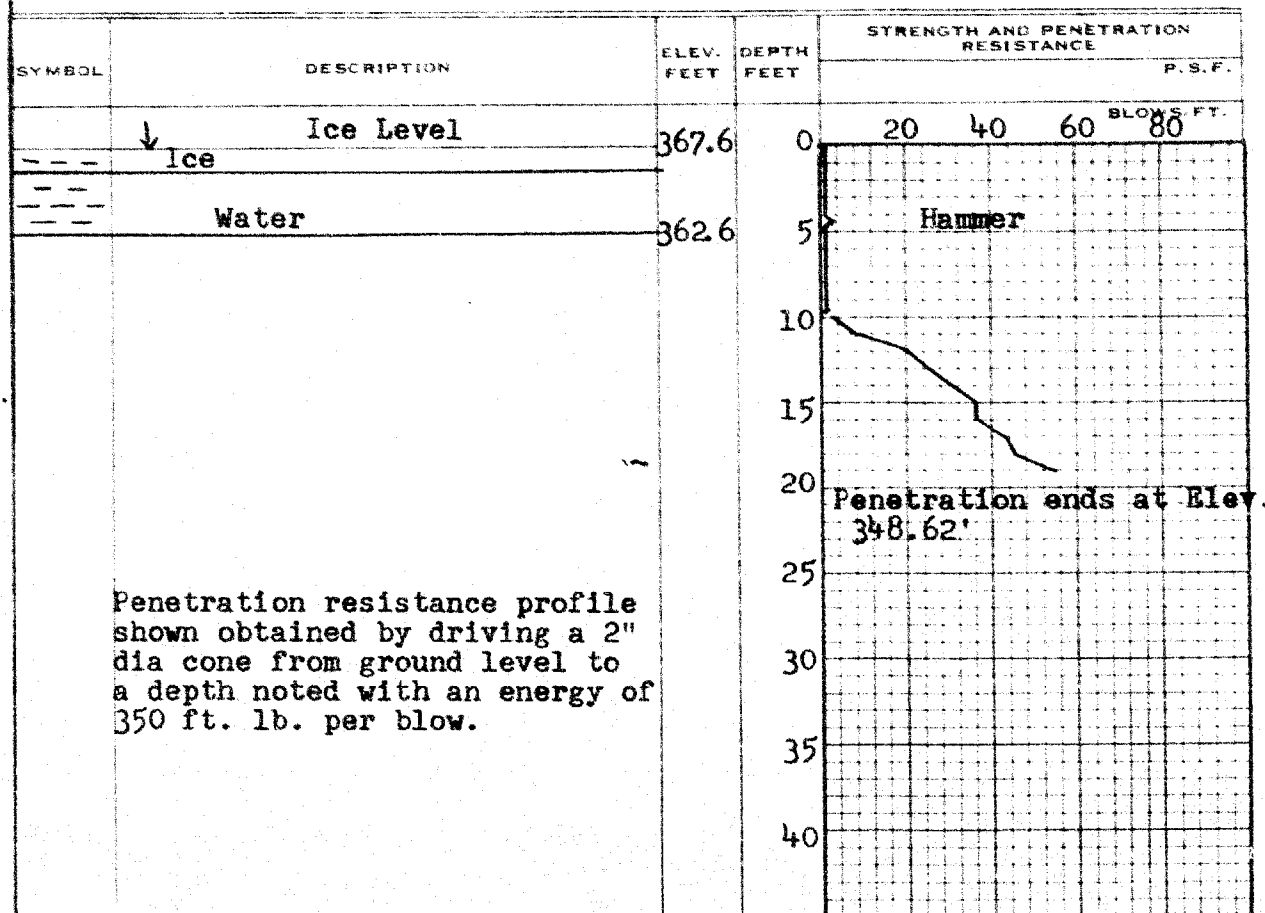
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 98-60 BORE HOLE NO. 16
JOB 60-F-15 STATION 297+50 \$
DATUM 367.62 COMPILED BY H.S.
BORING DATE Feb. 16/60 CHECKED BY A.K.L.

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) _____	+ S
NATURAL MOISTURE AND	U
LIQUIDITY INDEX _____	X
LIQUID LIMIT _____	
PLASTIC LIMIT _____	

[illegible]

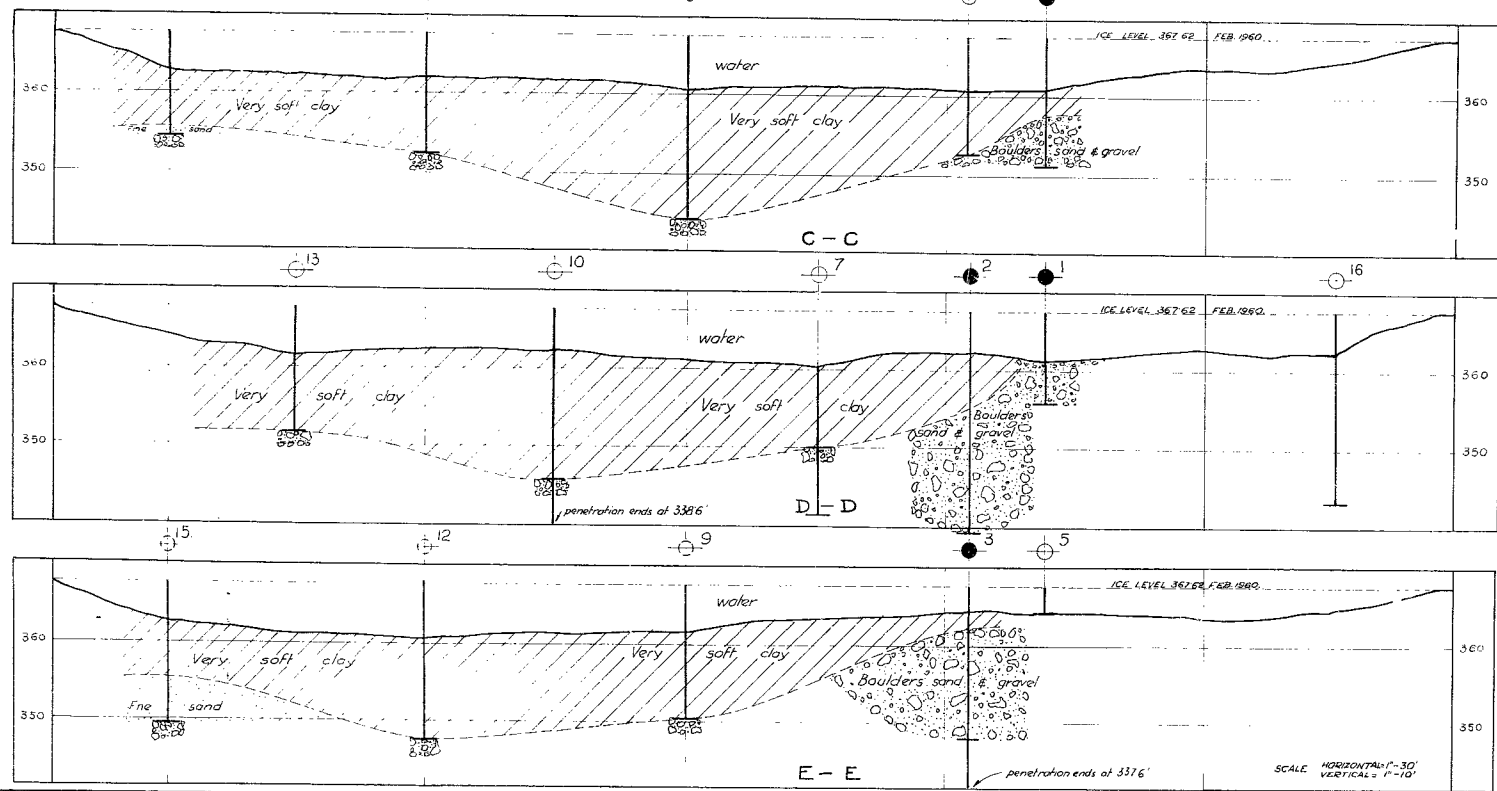
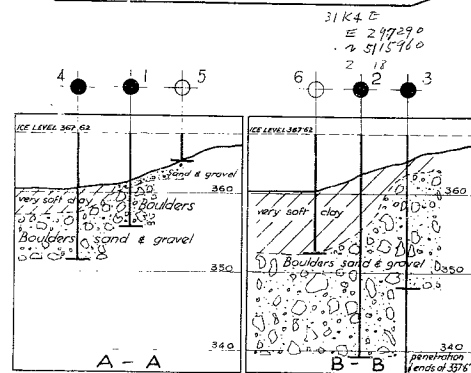
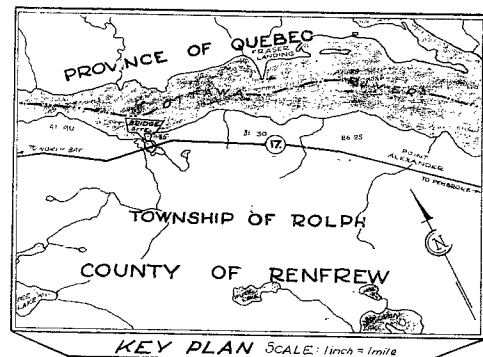
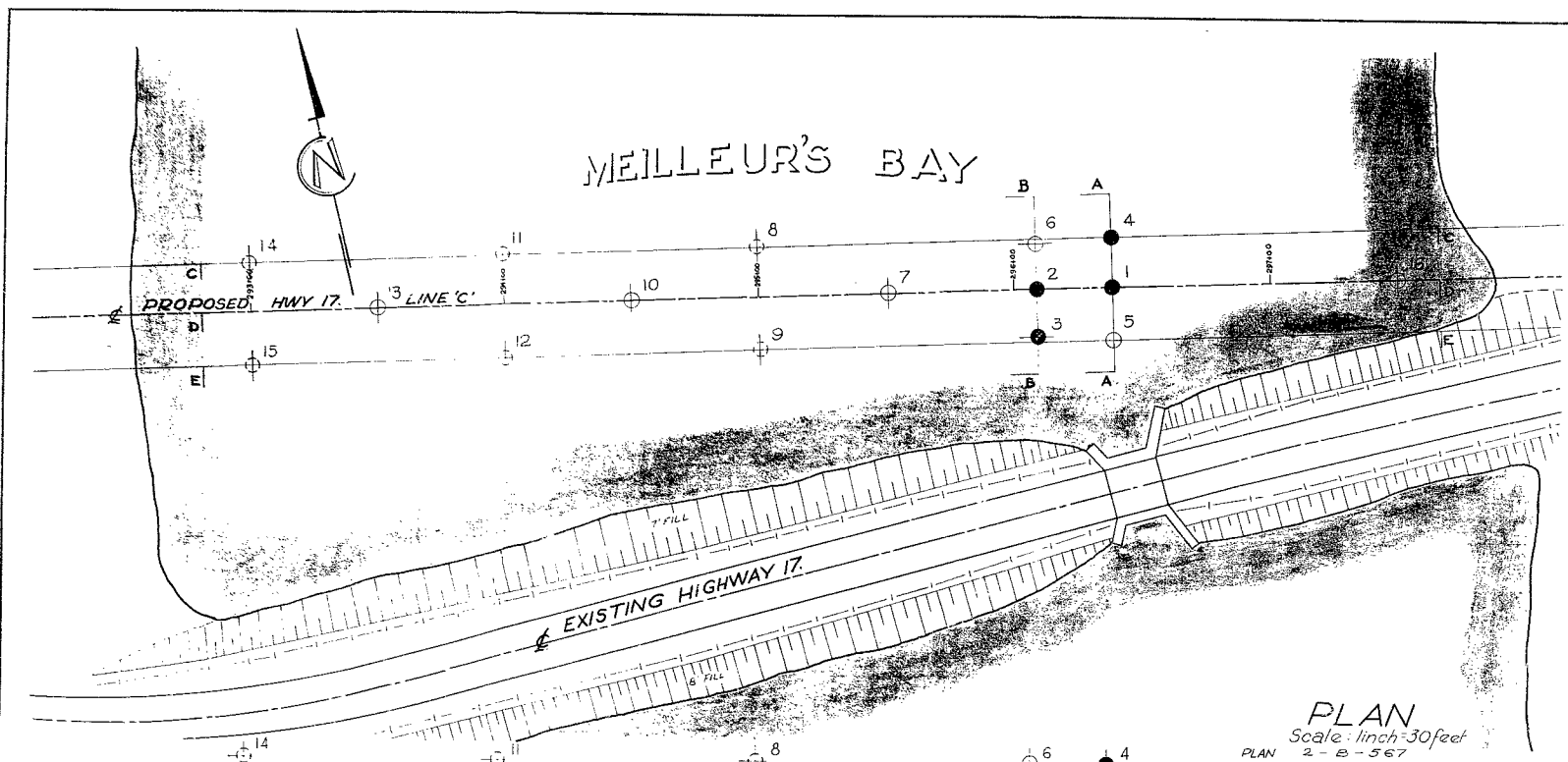
#60-F-15

W.P.#98-60

HWY#17 &

MEILLEUR'S

BAY



LEGEND					
BORE HOLE ● PENETRATION HOLE ⊕ SOUNDING ⊕					
ELEVATION 367.62 (ICE LEVEL)					
HOLE NO.	STATION	DISTANCE FROM E	HOLE NO.	STATION	DISTANCE FROM E
1	296+39	E	9	295+00	20' RT.
2	296+09	E	10	294+50	E
3	296+09	18' RT.	11	294+00	20' LT.
4	296+39	20' LT.	12	294+00	20' RT.
5	296+39	20' RT.	13	293+50	E
6	296+09	18' LT.	14	293+00	20' LT.
7	295+50	E	15	293+00	20' RT.
8	295+00	20' LT.	16	297+50	E

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.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH SECTION

MEILLEUR'S BAY PROPOSED CROSSING

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY 17 DISTRICT 9 COUNTY RENFREW

TOWNSHIP ROLPH LOT 36 CON. RANGE A-B.

LOCATION 4 MILES N.W. OF POINT ALEXANDER

DRAWN BY *McCarthy* CHECKED BY *W. J. 98-60*

DATE 18 MARCH 1960 APPROVED BY *AKK.* DRAWING NO. 60-F-15A.

SCALE AS SHOWN