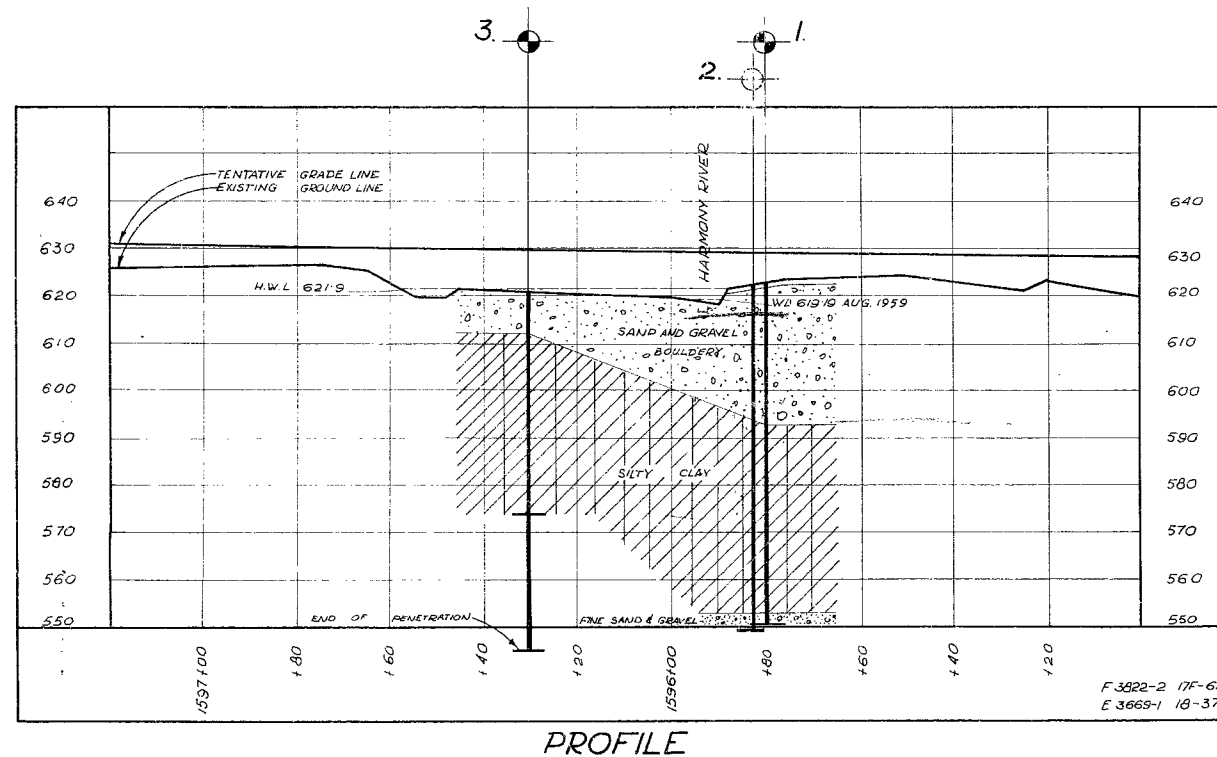
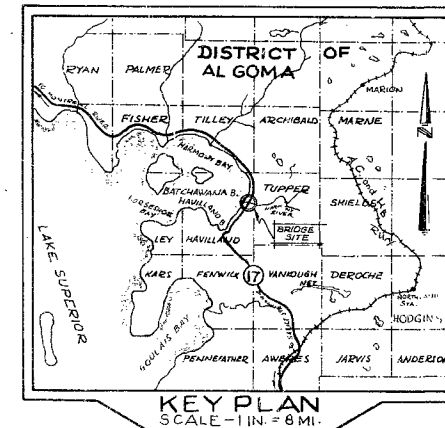
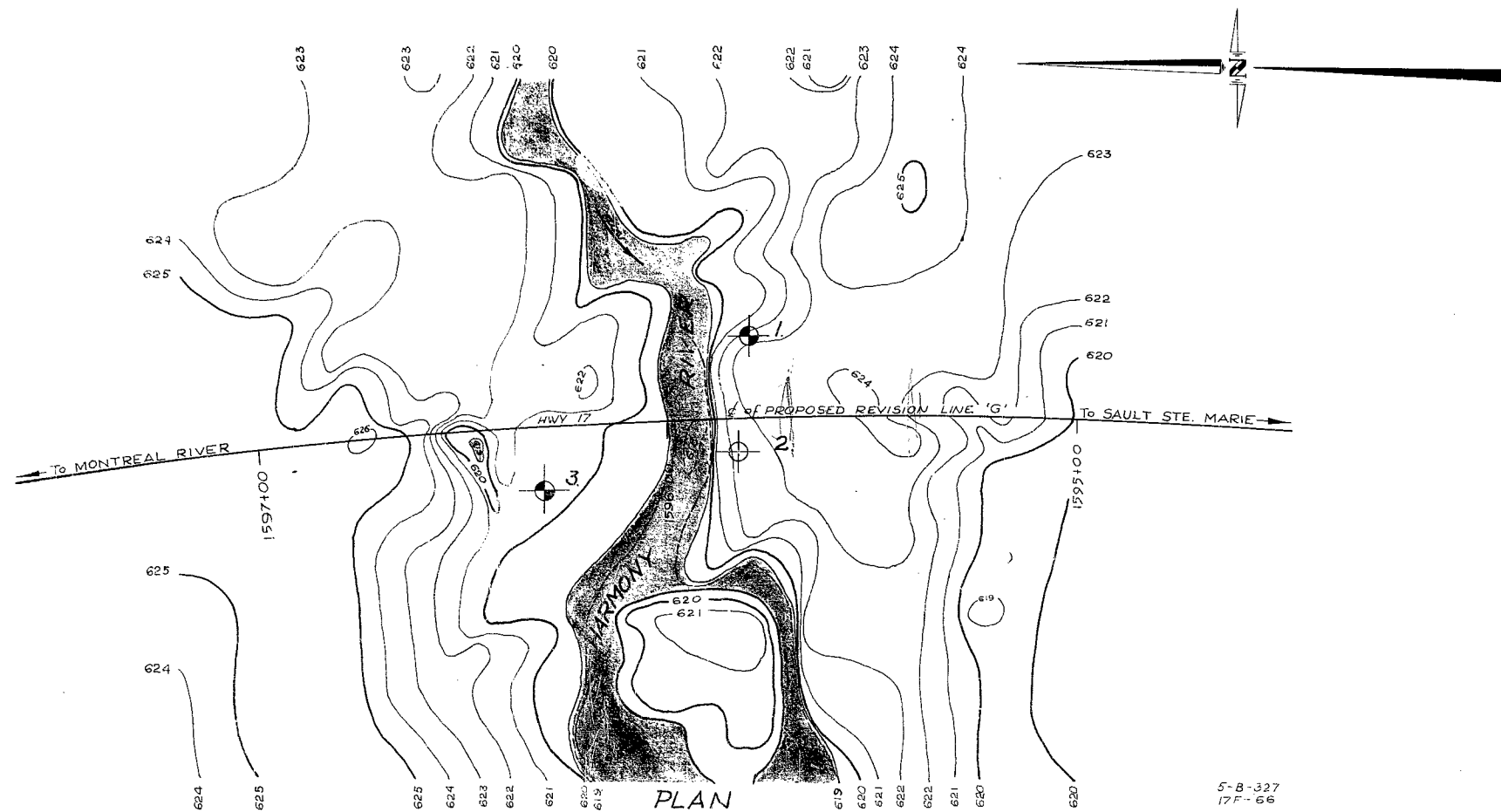


#59-F-99

W.P. 919-59

HWY #17 E

HARMONY RIVER



LEGEND			
BORE & PENETRATION HOLE			
PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E.
1.	624.5	1595+80	20' RT.
2.	622.5	1595+83	8' LT.
3.	622.5	1596+30	15' LT.

- 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			
<b>HARMONY RIVER PROPOSED CROSSING</b>			
SHOWING POSITIONS & ELEVATIONS OF HOLES			
HWY. 17	DISTRICT 18	COUNTY ALGOMA	
TOWNSHIP HAVILLAND	LOT	CON. SECTION 13	
LOCATION AT BATCHAWANA BAY (APPR 20 mile NORTH OF SAULT STE. MARIE)			
DRAWN BY: J. Feegedy	CHECKED BY: [Signature]	W.P. 919-59	
DATE 29 OCT 1959	APPROVED BY: [Signature]	DRAWING NO.	
SCALE 1/4 inch = 20 feet		F 59-99A	

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

November 18, 1959.

FOUNDATION REPORT - D.H.O. -  
W.J. P-59-99 -- W.P. 919-59.

Attention: Mr. S. McCombis.

Proposed Crossing - Harmony River -  
Approximately 20 Miles North of Sault Ste. Marie  
in the County of Algoma, Township of Havilland,  
Section 13. District 18.

In response to your request, we have carried out borings at the revised location of Harmony River Crossing, Bay. 17. Attached hereto, are the detailed boring logs and penetration resistance profiles. The locations of these borings and cone tests, as well as a plot of the estimated stratigraphy underlying this site, are shown on the appended Plan No. P-59-99A.

The subsoil conditions at this site consist of an upper deposit of sand and gravel containing numerous boulders, overlying a deep deposit of normally consolidated soft varved clay. The clay deposit was found to be underlain by a layer of sand and gravel in which artesian pressures were encountered.

The thickness of the upper sand and gravel stratum varied from 10 feet on the North side of the river, to a thickness of 30 feet on the South side of the river. The lower horizon of the soft clay layer was determined at Elev. 553.0', which corresponds to a depth below existing ground surface, of 70 feet. The upper layer of sand and gravel was found to be in a loose to medium state of relative density. The high percentage of oversized gravel and boulders in this layer resulted in normal wash boring procedures being impossible - it was necessary to use diamond casing bits to advance the holes through this layer.

cont'd. /2 ...

The varved clay deposit was found to have an average shear strength of 870 lb./sq.ft., and is described as a soft, very compressible stratum. The fine sand and gravel layer underlying the varved clay was found to be in a very dense state. The presence of artesian conditions, however, would most certainly result in bearing piles penetrating this layer to a depth in excess of 10 - 15 feet before pile capacities of the order of 40 tons could be realized. The actual capacities of piles founded in this layer could only be determined by pile tests - both static and dynamic.

In view of the variation of soil types and, also, the variation in thicknesses of these strata, it is our recommendation that serious consideration be given to the design of a box culvert for this site. If a box culvert is not suited because of hydraulic conditions, it will be necessary to support this structure on either, friction piles founded in the varved silty clay, or end-bearing piles driven into the dense layer of sand and gravel existing at a depth of approximately 70 feet below present ground elevation.

We would be pleased to carry out for you, the calculations necessary to determine pile capacities and settlements for either of these two pile types if a box culvert is not suitable.

The strength and compressibility of the soil types at this site are such that the proposed grade line shown at approximately elevation 630.0', will not give rise to approach fill instability.

If there are any queries in connection with the contents of this report, please do not hesitate to call our office.



LG/MSF  
Attach.

L. G. Sederman,  
PRINCIPAL SOILS & FOUNDATIONS ENGINEER.

cc: Messrs. A. K. Toys (2)  
H. A. Tregaskes  
D. G. Ramsay  
C. K. Hunter  
E. P. Collins  
E. R. Saint  
A. Watt  
Foundation Section  
Gen. Files.

APPENDIX I.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB P-59-99

W P 919-59

MOLE 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'-4.6'	Loose brown fine sand with gravel	2	-	-	-	-	-	No recovery
	S2	3.0'-5.0'	"	1	21.7	-	-	-	-	
	S3	6.6'-8.0'	"	6	14.7	-	-	-	-	
	S4	9'-10.6'	Boulders	42 for 1"	-	-	-	-	-	No recovery
	S5	9.0'-11.0'	Dense brown gravel	33	46.7	-	-	-	-	
	S6	12-13.6'	Medium gravelly sand, bouldery	12	17.4	-	-	-	-	
	S7	15.0'-16.6'	Boulders	26	-	-	-	-	-	No recovery
	S8	17.0-18'	Loose fine silty sand	P	37.6	-	-	-	-	
	S9	20-21.6'	Boulders	Refused	-	-	-	-	-	No recovery
	S10	21.6-23'	Medium to coarse gravel	24	-	-	-	-	-	Visual Inspection
	S11	28.6-30'	Soft reddish brown varved silty clay interbedded with sand layers	5	-	-	-	-	-	Visual Inspection
	T12	31'-32.6'	"	P	55.4	19.7	53.8	283	107.5	
	T13	35'-36.6'	Soft reddish brown varved silty clay interbedded with sand layers.	P	51.3	-	-	753	107.3	
	T14	40.9-42.3'	"	P	50.0	23.6	68.9	-	99.2	
	T15	46-47.6'	"	P	55.6	-	-	760	101.5	
	T16	50-51.6'	"	P	59.8	-	-	1063	103.0	

(2)

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB P-59-99WP 919-59

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST. BLOWS FT	MOIST CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH PSI	UNIT WEIGHT PCF	REMARKS
1	T17	55'-56.6'	Soft reddish brown varved silty clay interbedded with sand layers.	P	75.0	-	-	855	98.0	
	S18	60'-62.0'	"	P	75.5	-	-	-	-	
	S19	70-71.6'	Soft reddish brown varved clay 70'-71'. Medium fine silty sand with gravel 71'-71.6'	P 16 for 6"	-	-	-	-	-	
	S20	72.6-74.0'	Dense sandy gravel	45	55.5	-	-	-	-	
			Cone Only. Refusal 73.0'							
3	S1	3-4.6'	Medium brown-grey sandy gravel	23	64.0	-	-	-	-	
	S2	5.6'-7.0'	Boulders	18	-	-	-	-	-	No recovery
	S3	5.6'-7.6'	Medium grey sandy gravel with boulders	17	74.8	-	-	-	-	
	S4	9-10.6'	Soft reddish brown varved silty clay interbedded with sand layers.	3	-	-	-	-	-	No recovery
	S5	9'-11.0'	Soft reddish brown varved silty clay interbedded with sand layers.	P	27.3	13.8	23.9	-	-	M.C. & P.I. tests on clay-silt portion
	T6	15'-16.6'	"	P	37.4	-	-	594	115.0	

## SUMMARY OF FIELD & LABORATORY TESTS

JOB F-59-99

W P 919-59

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST (BLOWS/FT)	MOIST CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	SHEAR STRENGTH (PSF)	UNIT WEIGHT (PCF)	REMARKS
3	T7	20.6'-22.0'	Soft reddish brown varved clay interbedded with sand layers.	P	-	-	-	-	-	No recovery
	S8	22.8-24.8'	"	P	-	-	-	-	-	Visual inspection
	T9	25.0'-26.6'	"	P	63.4	17.7	57.4	-	-	M.C. & P.I. tests on clay portion. M.C. on clay silt portion M.C. on sand portion.
					24.7	-	-	-	-	
					19.8	-	-	-	-	
	T10	30.6-32.0'	"	P	56.6	-	-	-	-	M.C. test on clay portion
T11	35'-36.6'	"	P	50.5	27.4	71.8	606	106.0	Tests on clay portion M.C. test on sand portion	
				17.2	-	-	-	-		
T12	45.0-47.0'	"	P	62.4	23.3	75.6	976	100.0		
			S denotes split spoon sample T denotes shelby tube sample							



# DEPARTMENT OF HIGHWAYS - ONTARIO

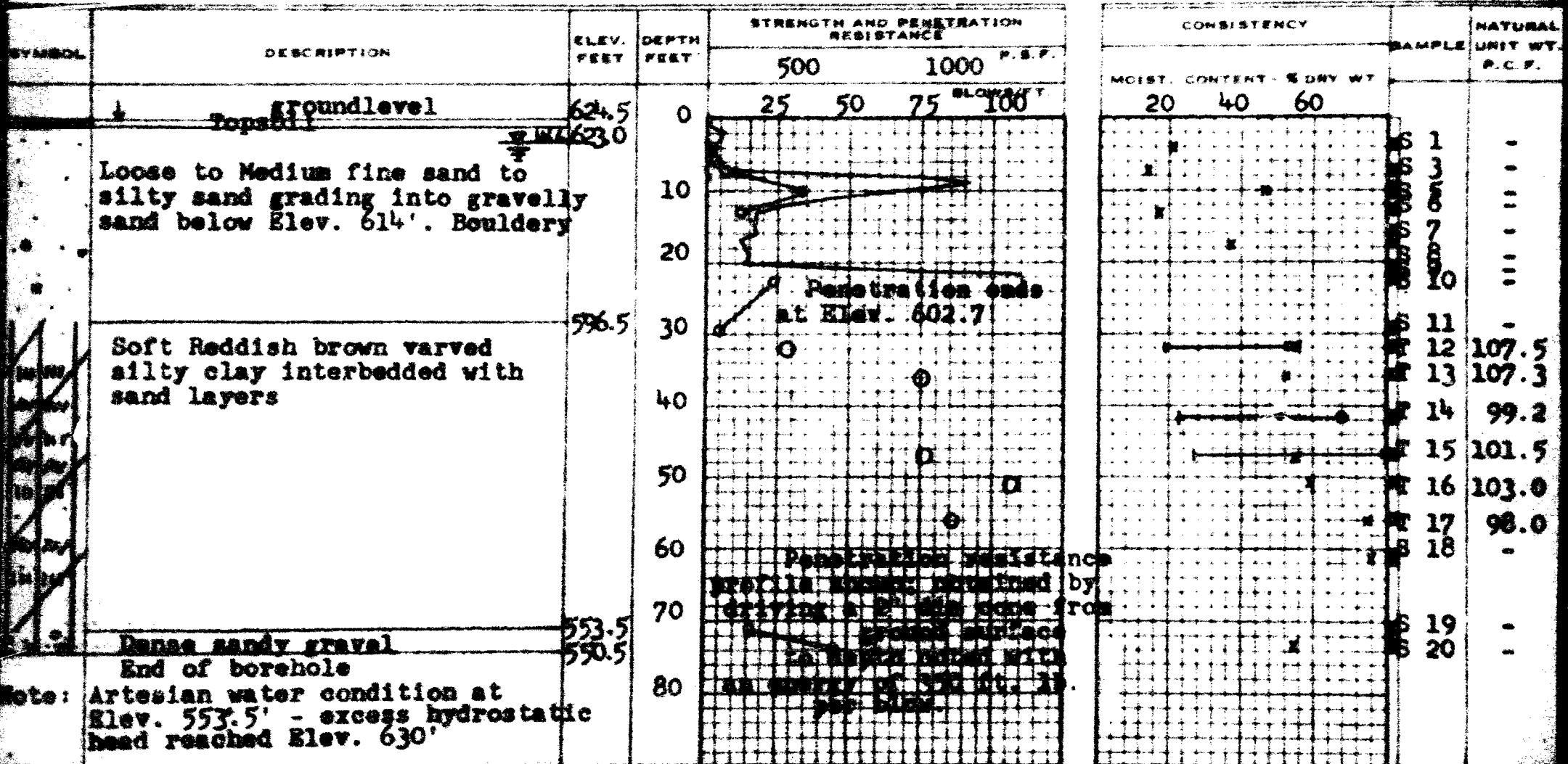
## MATERIALS AND RESEARCH SECTION

W.P. 219-59 BORE HOLE NO. 1  
 JOB P 59-99 STATION 1595+80 (20' RT of 6)  
 DATUM 624.5' COMPILED BY B.K.  
 BORING DATE Oct. 2/59 CHECKED BY IJJ

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

### LEGEND

1/2 UNCONFINED COMPRESSION (Q<sub>u</sub>) — O  
 VANE TEST (C) AND SENSITIVITY (S) — +  
 NATURAL MOISTURE AND LIQUIDITY INDEX — X  
 LIQUID LIMIT — —  
 PLASTIC LIMIT — —



# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 919-53

JOB P 59-99

DATUM 622.5'

BORING DATE Oct. 6/59

BORE HOLE NO. 2

STATION 1595+83(8' Lt of c)

COMPILED BY B.K.

CHECKED BY IJJ

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2" DIA. CONE

2" SHELBY

CASING

### LEGEND

1/2 UNCONFINED COMPRESSION (QU)

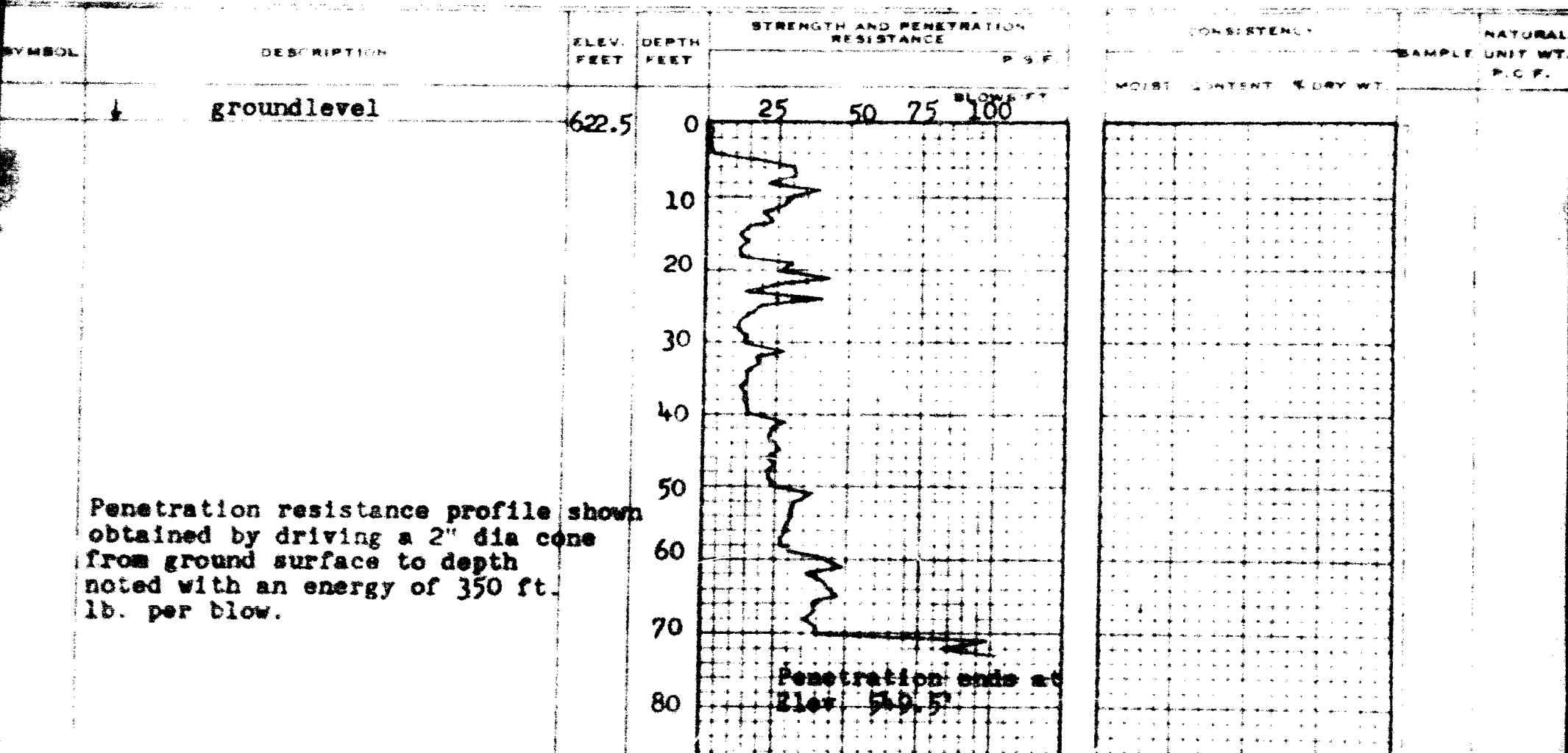
VANE TEST (C) AND SENSITIVITY (S)

NATURAL MOISTURE AND

LIQUIDITY INDEX

LIQUID LIMIT

PLASTIC LIMIT



# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 919-59

BORE HOLE NO. 3

(c)

JOB # 59-99

STATION 1596+30 (15' 1" of 2" DIA SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2" DIA CONE

2" SHELBY

CASING

DATUM 622.5'

COMPILED BY B.K.

BORING DATE Oct. 2/59

CHECKED BY IJJ

### LEGEND

UNCONFINED COMPRESSION (QU)

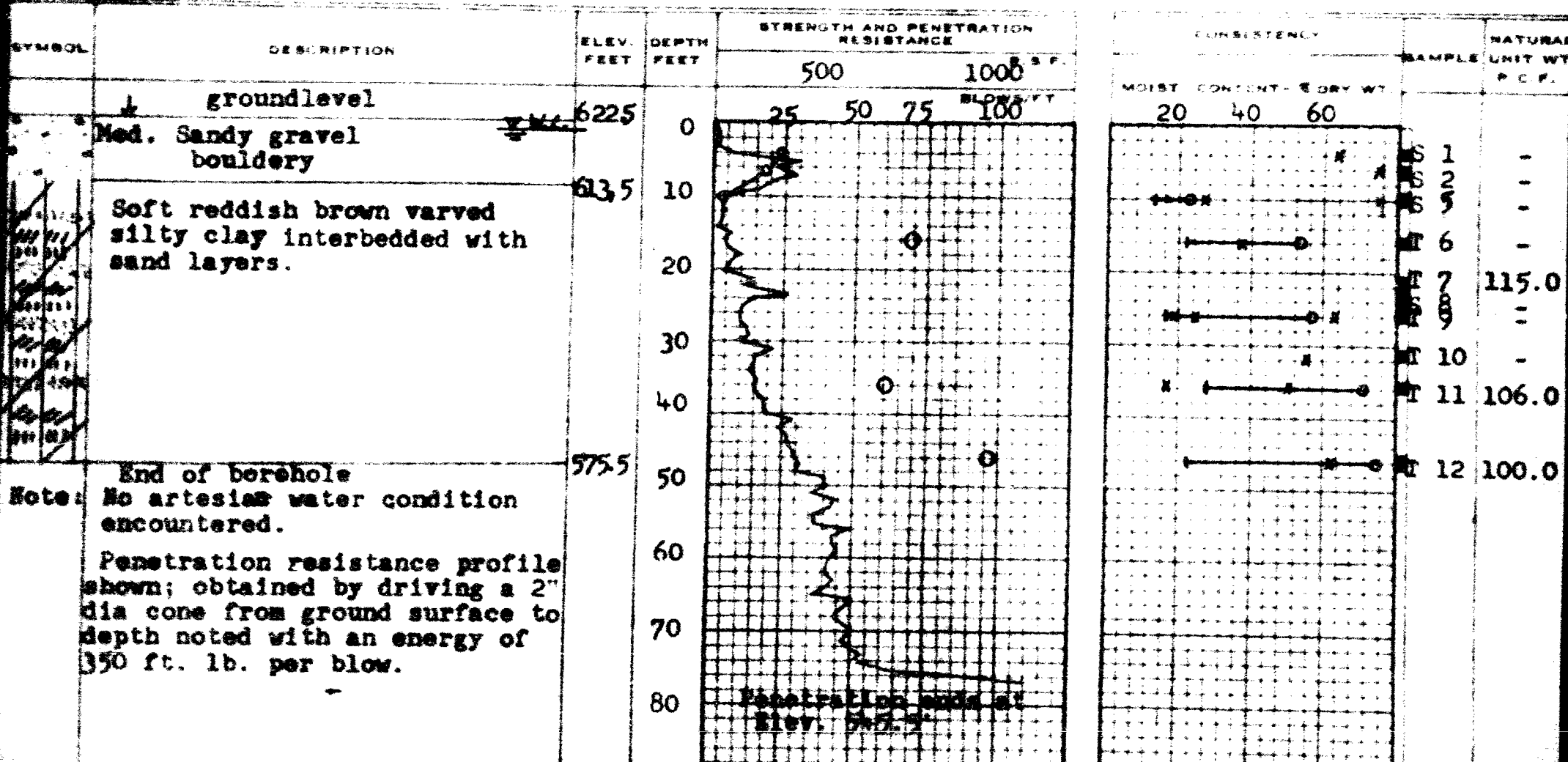
VANE TEST (C) AND SENSITIVITY (S)

NATURAL MOISTURE AND

LIQUIDITY INDEX

LIQUID LIMIT

PLASTIC LIMIT



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

August 13, 1959.

Re: Harmony Creek Crossing,  
 Hwy. 17 (TCH) W.F. 919-59,  
 District #18.

Attention: Mr. S. McCamble.

The foundation report submitted by Dominion Soil Investigation, Ltd. accompanying this memo, has been reviewed by this Section. The following comments have resulted from our examination of the report:-

- (1) If a bridge structure is to be built at this location, large displacement type end-bearing piles are recommended. Timber or steel monotube type piles will meet practical refusal in the sand and gravel layer - elevations 568' to 550'. Pile capacities of 15 and 40 tons for wood and steel monotube piles, respectively, may be used. Steel 'H' piles should not be used at this site.

If construction below the water table, or in the river is required to place abutments or piers, steel sheet piles will be used. These sheet piles may be driven to approximately elevation 500' for a pile cap founded at elevation 591' or higher. Adequate bracing should be provided, since the soft clay will offer little resistance to inward movement for the embedded portions of the sheet piling.

No stability problems are anticipated for road embankments built to the proposed elevation  $609.5 \pm 2$  at 2:1 side slopes.

- (2) An alternative to a bridge structure, is a flexible culvert. This culvert should be founded in the upper layer of sand and gravel at approximately elev. 598'. If the culvert is to be placed at a lower elevation, a minimum of one foot of sand and gravel should be placed between the culvert and the layer of soft reddish brown clay. A bearing capacity of 1500 p.s.f. may be used. Care should be taken that adequate compaction of suitable backfill material is carried out.

If further information is required regarding this foundation investigation, please contact the Foundation Section.

cc: Messrs.

A. M. Toye  
 H. A. Tregaskes  
 D. G. Ramsay  
 H. McArthur  
 D. F. Collins

L. G. Soderman,  
 PRINCIPAL SOILS & FOUND. ENGR.  
 per:

E. R. Saint  
 Foundation Office  
 Gen. Files.

E. Peaker,  
 Fdn. Field Supervising Eng

Department of Highways of Ontario  
Materials and Research Section  
Downsview Avenue - Toronto, Ontario

REPORT ON  
FOUNDATION INVESTIGATION  
HARMONY CREEK BRIDGE CROSSING  
ON HIGHWAY NO. 17 T.C.H.  
HARMONY BEACH  
WP 919-59 BW 270

Submitted by:

Dominion Soil Investigation Ltd.  
88 Eglinton Avenue East  
Toronto 12 Ontario

July 30, 1959

## TABLE OF CONTENTS

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5. SOIL DESCRIPTION . . . . .	2
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8. FOUNDATION CONDITIONS . . . . .	4
9. CONCLUSIONS . . . . .	4

## ENGINEERING DATA SHEETS

Location of Boreholes . . . . .	Encl. No. 1
Subsurface Sections . . . . .	Encl. No. 2
Borehole Logs . . . . .	Encl. Nos. 3 - 6 incl.

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

November 18, 1959.

FOUNDATION REPORT - D.H.O. -  
W.J. F-59-99 -- W.P. 919-59.

Attention: Mr. S. McCombie.

Proposed Crossing - Harmony River -  
Approximately 20 Miles North of Sault Ste. Marie  
in the County of Algoma, Township of Havilland,  
Section 13. District 18.

In response to your request, we have carried out borings at the revised location of Harmony River Crossing, Hwy. 17. Attached hereto, are the detailed boring logs and penetration resistance profiles. The locations of these borings and cone tests, as well as a plot of the estimated stratigraphy underlying this site, are shown on the appended Plan No. F-59-99A.

The subsoil conditions at this site consist of an upper deposit of sand and gravel containing numerous boulders, overlying a deep deposit of normally consolidated soft varved clay. The clay deposit was found to be underlain by a layer of sand and gravel in which artesian pressures were encountered.

The thickness of the upper sand and gravel stratum varied from 10 feet on the North side of the river, to a thickness of 30 feet on the South side of the river. The lower horizon of the soft clay layer was determined at Elev. 553.0', which corresponds to a depth below existing ground surface, of 70 feet. The upper layer of sand and gravel was found to be in a loose to medium state of relative density. The high percentage of oversized gravel and boulders in this layer resulted in normal wash boring procedures being impossible - it was necessary to use diamond casing bits to advance the holes through this layer.

cont'd. /2 ...

The varved clay deposit was found to have an average shear strength of 870 lb./sq.ft., and is described as a soft, very compressible stratum. The fine sand and gravel layer underlying the varved clay was found to be in a very dense state. The presence of artesian conditions, however, would most certainly result in bearing piles penetrating this layer to a depth in excess of 10 - 15 feet before pile capacities of the order of 40 tons could be realized. The actual capacities of piles founded in this layer could only be determined by pile tests - both static and dynamic.

In view of the variation of soil types and, also, the variation in thicknesses of these strata, it is our recommendation that serious consideration be given to the design of a box culvert for this site. If a box culvert is not suited because of hydraulic conditions, it will be necessary to support this structure on either, friction piles founded in the varved silty clay, or end-bearing piles driven into the dense layer of sand and gravel existing at a depth of approximately 70 feet below present ground elevation.

We would be pleased to carry out for you, the calculations necessary to determine pile capacities and settlements for either of these two pile types if a box culvert is not suitable.

The strength and compressibility of the soil types at this site are such that the proposed grade line shown at approximately elevation 630.0', will not give rise to approach fill instability.

If there are any queries in connection with the contents of this report, please do not hesitate to call our office.

*L. G. Soderman*

LGS/MdeF  
Attach.

L. G. Soderman,  
PRINCIPAL SOILS & FOUNDATIONS ENGINEER.

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
D. G. Ramsay  
G. K. Hunter  
D. P. Collins  
E. R. Saint  
A. Watt  
Foundation Section  
Gen. Files.



APPENDIX I.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB F-59-99

W.P. 919-59

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
1	S1	3'-4.6'	Loose brown fine sand with gravel	2	-	-	-	-	-	No recovery
	S2	3.0'-5.0'	"	1	21.7	-	-	-	-	
	S3	6.6'-8.0'	"	6	14.7	-	-	-	-	
	S4	9'-10.6'	Boulders	42 for 1"	-	-	-	-	-	No recovery
	S5	9.0'-11.0'	Dense brown gravel	33	46.7	-	-	-	-	
	S6	12-13.6'	Medium gravelly sand, bouldery	12	17.4	-	-	-	-	
	S7	15.0'-16.6'	Boulders	26	-	-	-	-	-	No recovery
	S8	17.0-18'	Loose fine silty sand	P	37.6	-	-	-	-	
	S9	20-21.6'	Boulders	Refused	-	-	-	-	-	No recovery
	S10	21.6-23'	Medium to coarse gravel	24	-	-	-	-	-	Visual Inspection
	S11	28.6-30'	Soft reddish brown varved silty clay interbedded with sand layers	5	-	-	-	-	-	Visual Inspection
	T12	31'-32.6'	"	P	55.4	19.7	53.8	283	107.5	
	T13	35'-36.6'	Soft reddish brown varved silty clay interbedded with sand layers.	P	51.3	-	-	753	107.3	
	T14	40.9-42.3'	"	P	50.0	23.6	68.9	-	99.2	
	T15	46-47.6'	"	P	55.6	-	-	760	101.5	
	T16	50-51.6'	"	P	59.8	-	-	1063	103.0	

(2)

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB F-59-99W.P. 919-59

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
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	S18	60'-62.0'	"	P	75.5	-	-	-	-	
	S19	70-71.6'	Soft reddish brown varved clay 70'-71'. Medium fine silty sand with gravel 71'-71.6'	P 16 for 6"	-	-	-	-	-	
	S20	72.6-74.0'	Dense sandy gravel	45	55.5	-	-	-	-	
			Cone Only. Refusal 73.0'							
3	S1	3-4.6'	Medium brown-grey sandy gravel	23	64.0	-	-	-	-	No recovery
	S2	5.6'-7.0'	Boulders	18	-	-	-	-	-	
	S3	5.6'-7.6'	Medium grey sandy gravel with boulders	17	74.8	-	-	-	-	
	S4	9-10.6'	Soft reddish brown varved silty clay interbedded with sand layers.	3	-	-	-	-	-	No recovery
	S5	9'-11.0'	Soft reddish brown varved silty clay interbedded with sand layers.	P	27.3	13.8	23.9	-	-	
	T6	15'-16.6'	"	P	37.4	-	-	694	115.0	M.C. & P.I. tests on clay-silt portion

JOB F-59-99  
W.P. 919-59

S denotes split spoon sample  
T denotes shelby tube sample

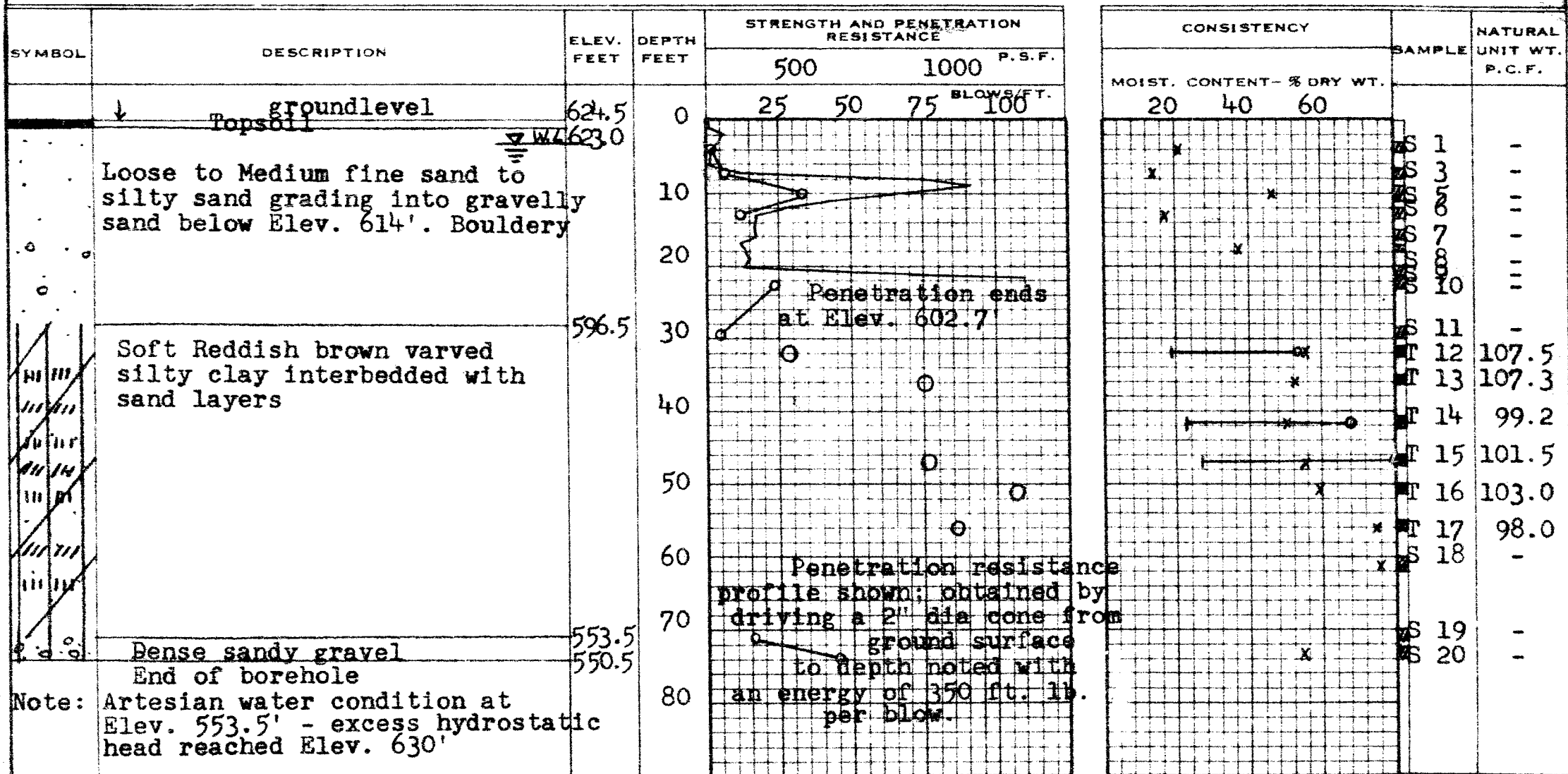
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 919-59 BORE HOLE NO. 1  
JOB F 59-99 STATION 1595+80 (20' RT of C)  
DATUM 624.5' COMPILED BY B.K.  
BORING DATE Oct. 2/59 CHECKED BY IJJ

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

## LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 919-59 \_\_\_\_\_ BORE HOLE NO. 2 \_\_\_\_\_

JOB F 59-99 STATION 1595+83(8' Lt o

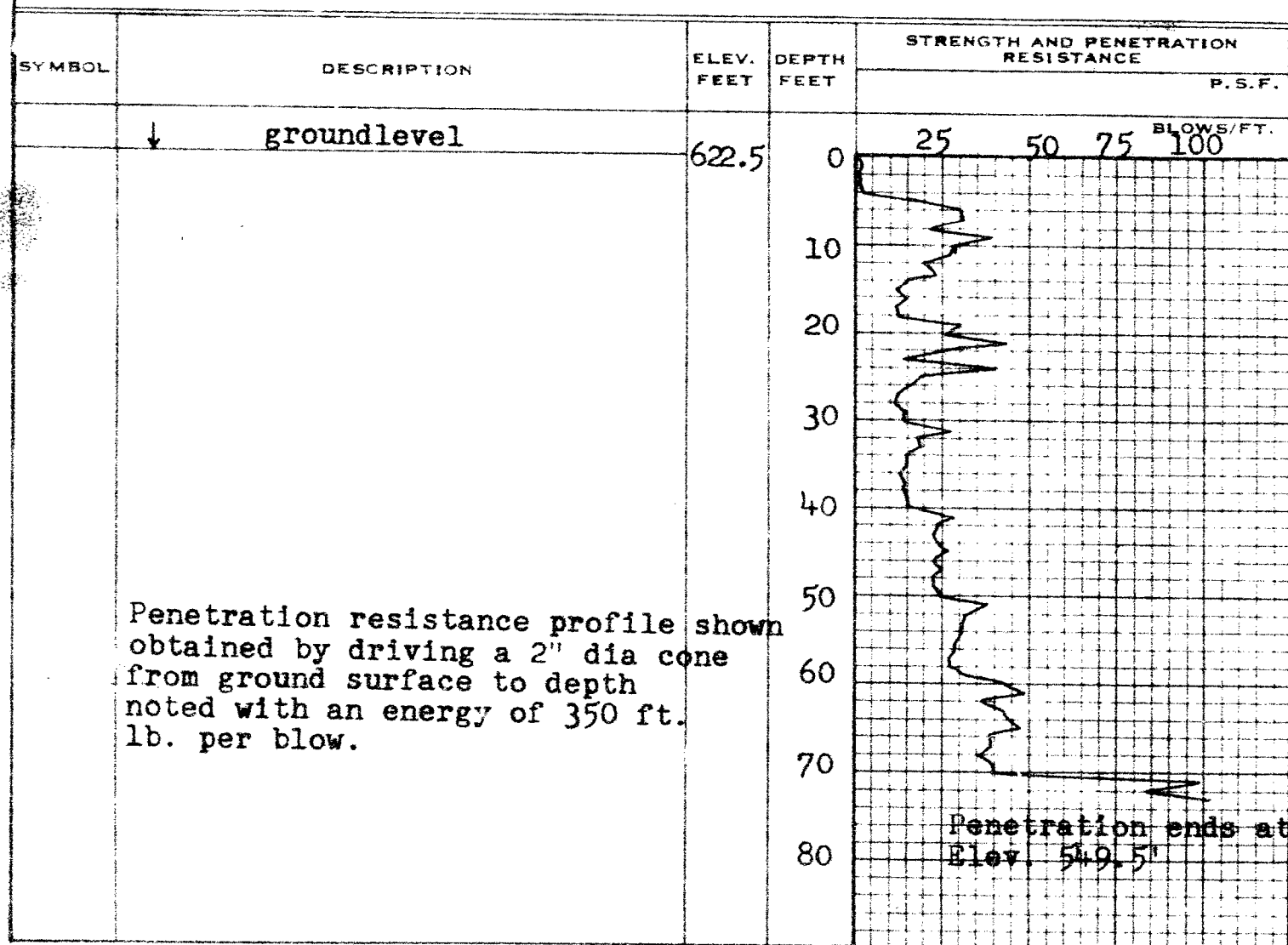
DATUM 622.5' COMPILED BY B.K.

BORING DATE Oct. 6/59 CHECKED BY IJJ

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

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) _____	C
VANE TEST (C) AND SENSITIVITY (S) _____	+3
NATURAL MOISTURE AND	
LIQUIDITY INDEX _____	L
LIQUID LIMIT _____	X
PLASTIC LIMIT _____	

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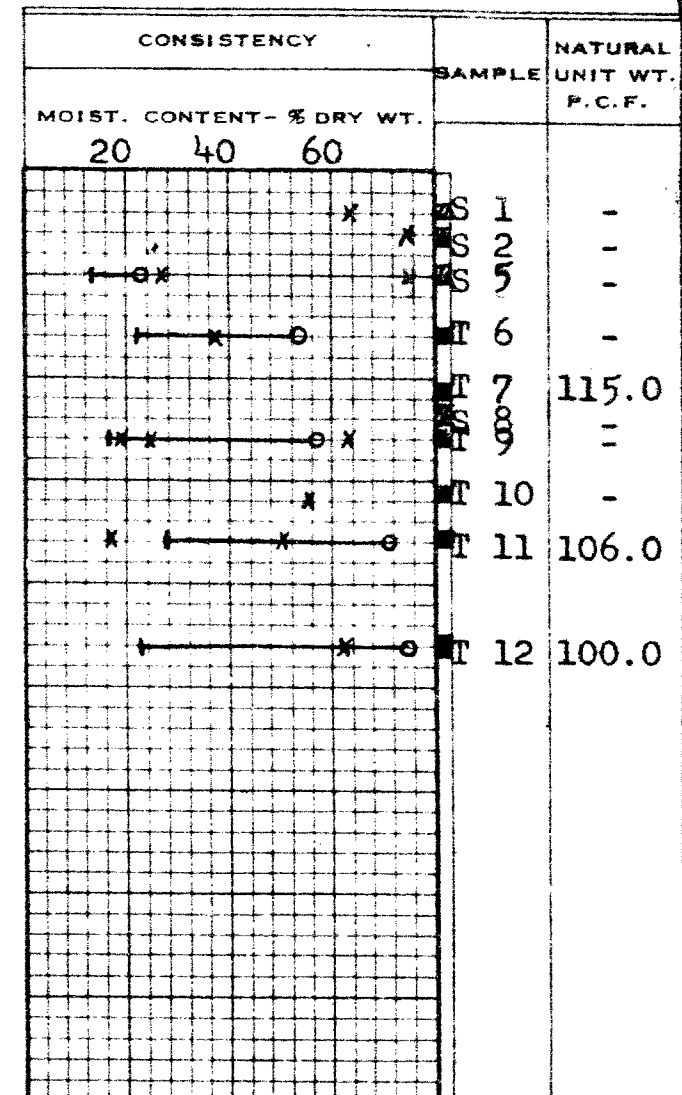
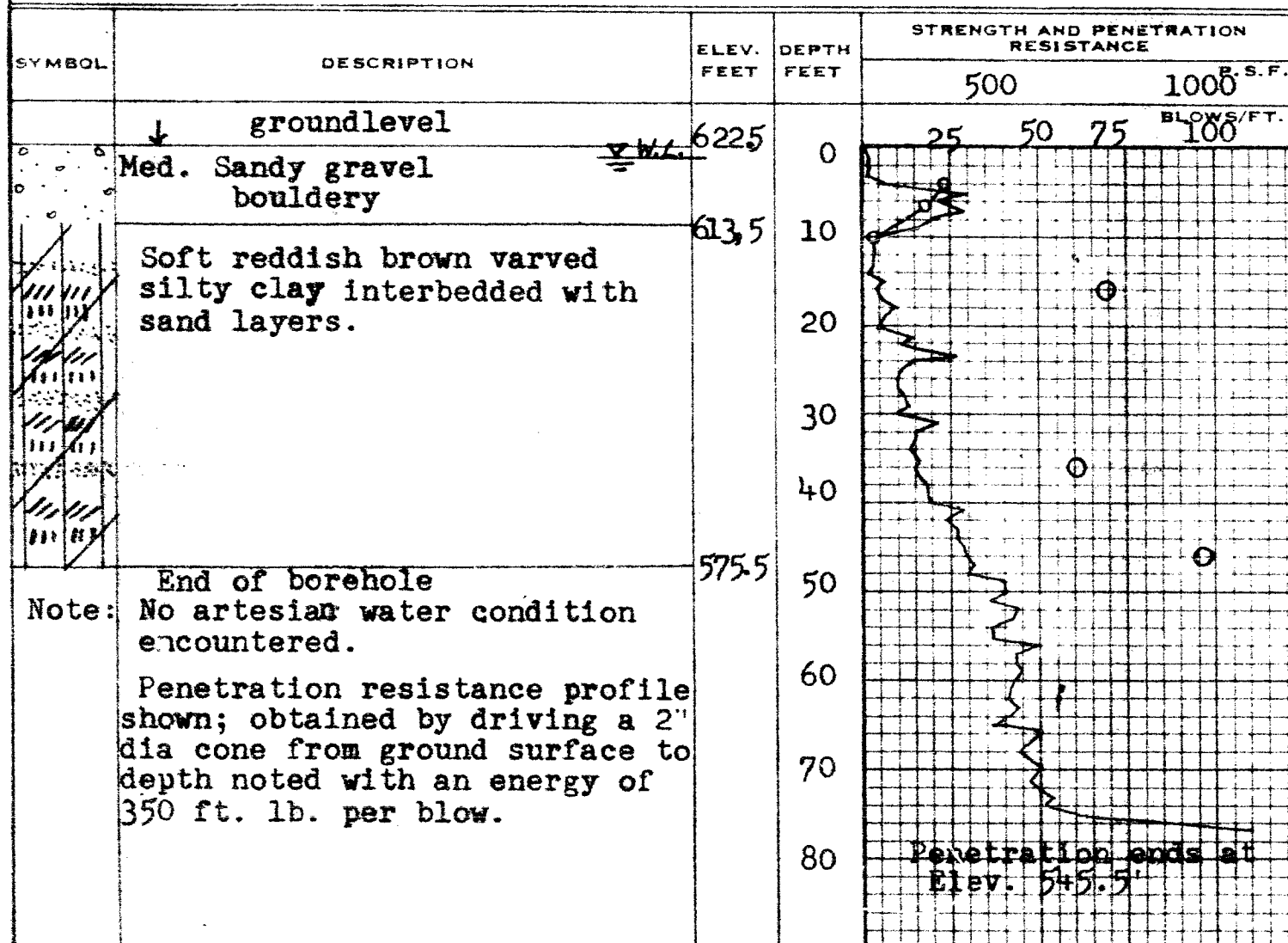
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

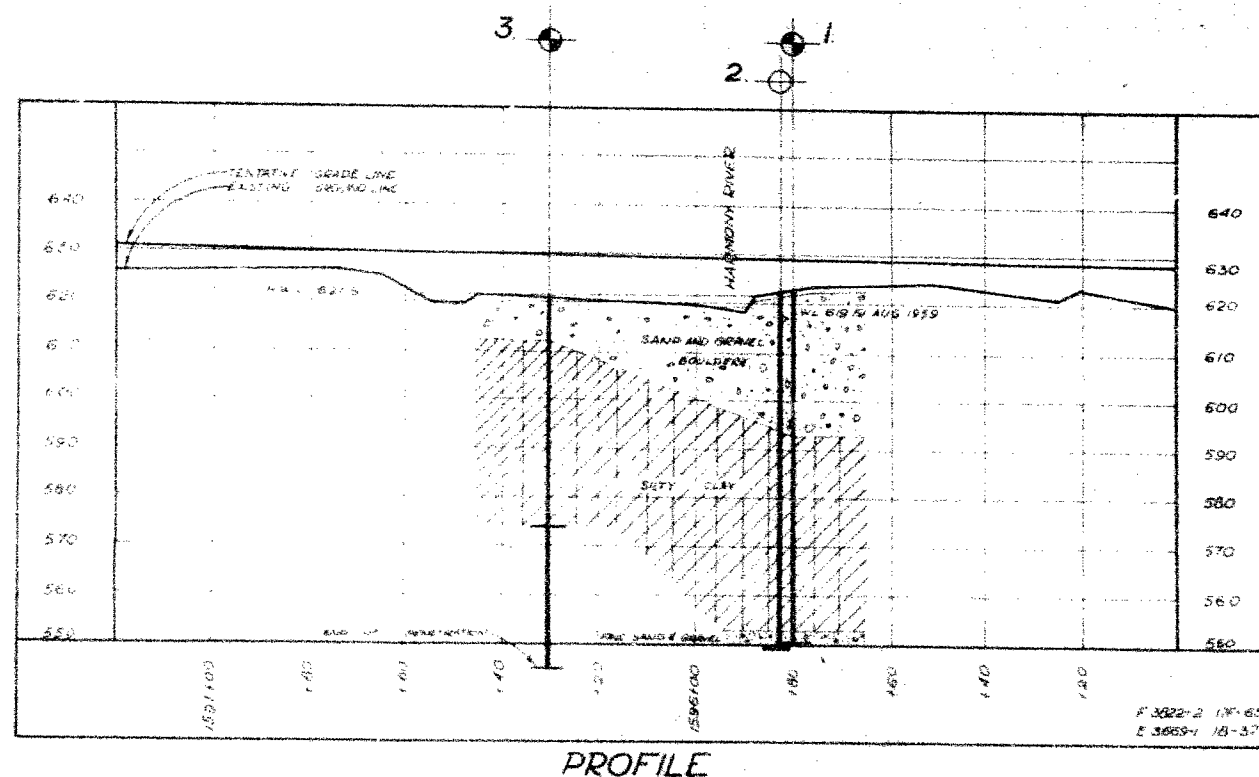
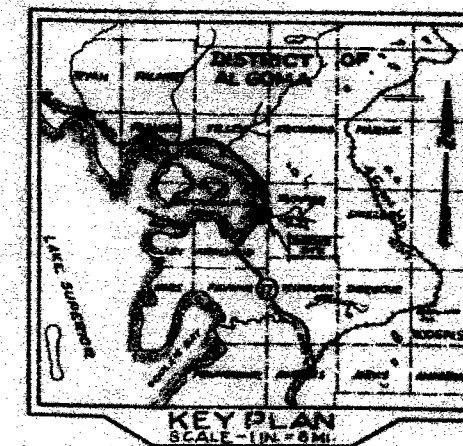
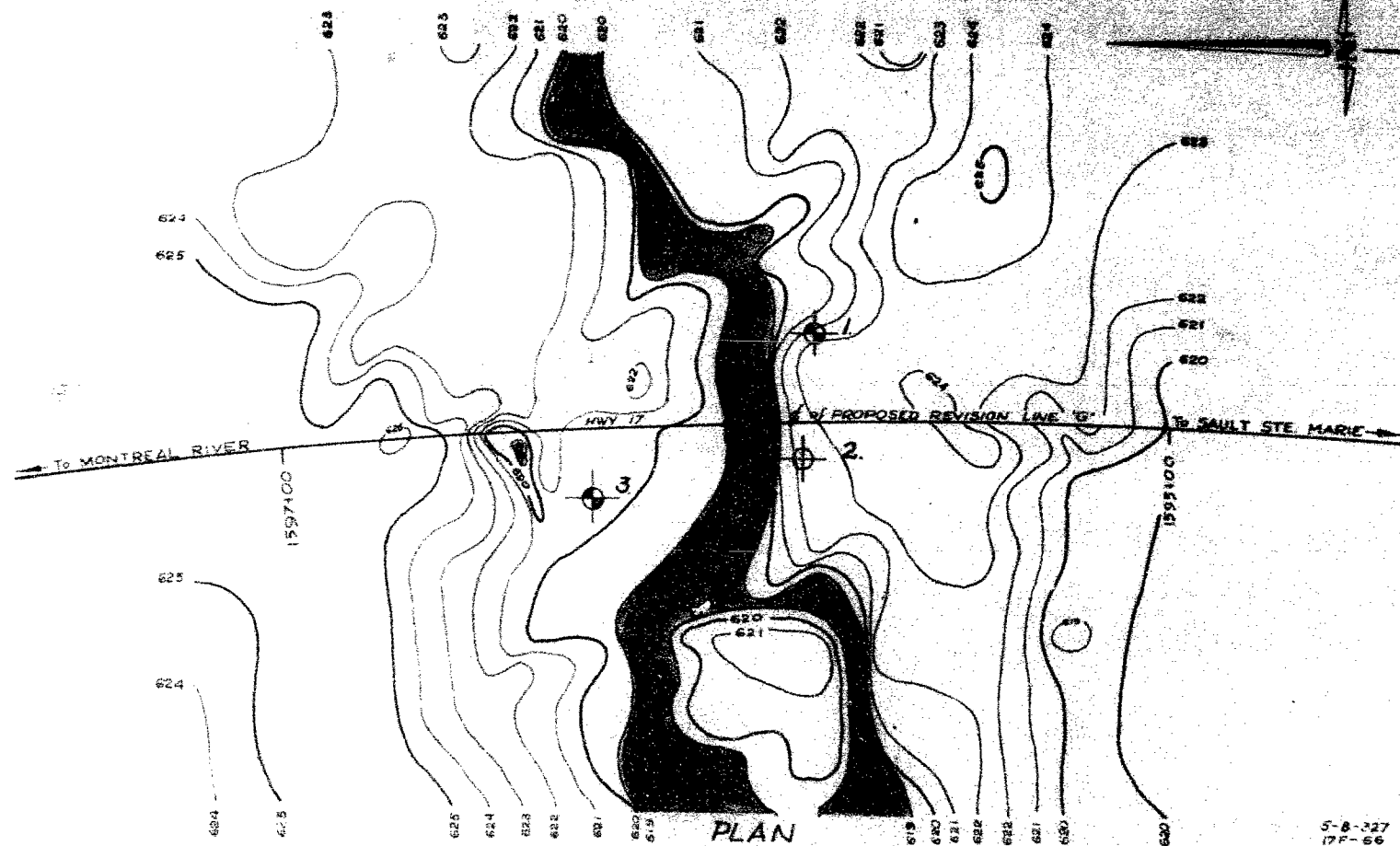
W.P. 919-59 BORE HOLE NO. 3  
 JOB F 59-99 STATION 1596+30 (15' 1" of 2" DIA. SPLIT TUBE)  
 DATUM 622.5' COMPILED BY B.K.  
 BORING DATE Oct. 7/59 CHECKED BY IJJ

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





LEGEND			
BORE & PENETRATION HOLE			
PENETRATION HOLE			
HOLE No.	ELEVATION	STATION	DISTANCE FROM §
1.	624.5	1595+60	20' RT.
2	622.5	1595+83	8' LT.
3	622.5	1596+30	15' LT.

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

**HARMONY RIVER  
PROPOSED CROSSING**

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY 17 DISTRICT 18 TOWNSHIP HAVILLAND LOCATION AT BAYCRAWAY BAY (APPR 20 MI. NORTH OF SAULT STE. MARIE)

SECTION 18

DRAWN BY: J. J. J. DATE: 29 OCT 1959 SCALE: 1 IN. = 20 FT.

CHECKED BY: [Signature] APPROVED BY: [Signature]

W.P. 910-59

DRAWING NO. F 3022-2



