

#61-F-52

W.P. # 9-60

W.P. # 16-60-01

W.P. # 16-60-02

Hwy. # 86 REV. E

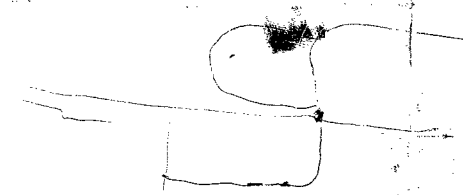
MAITLAND RIVER

BRIDGE  
AT WINGHAM



Map.  
R.R. #2  
Harold. Parsons.

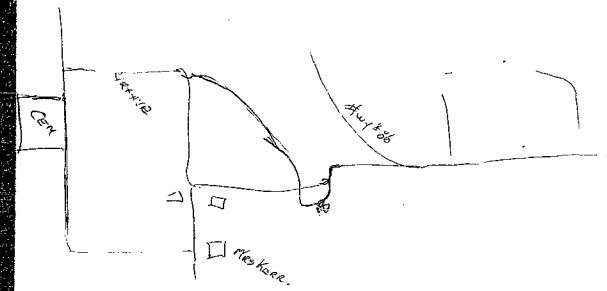
232+00.5  
232+00.0  
232+00.5



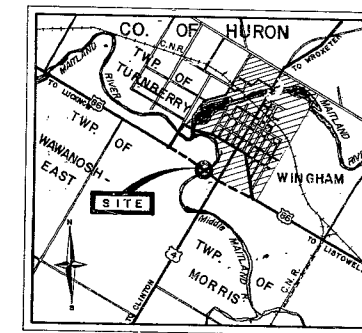
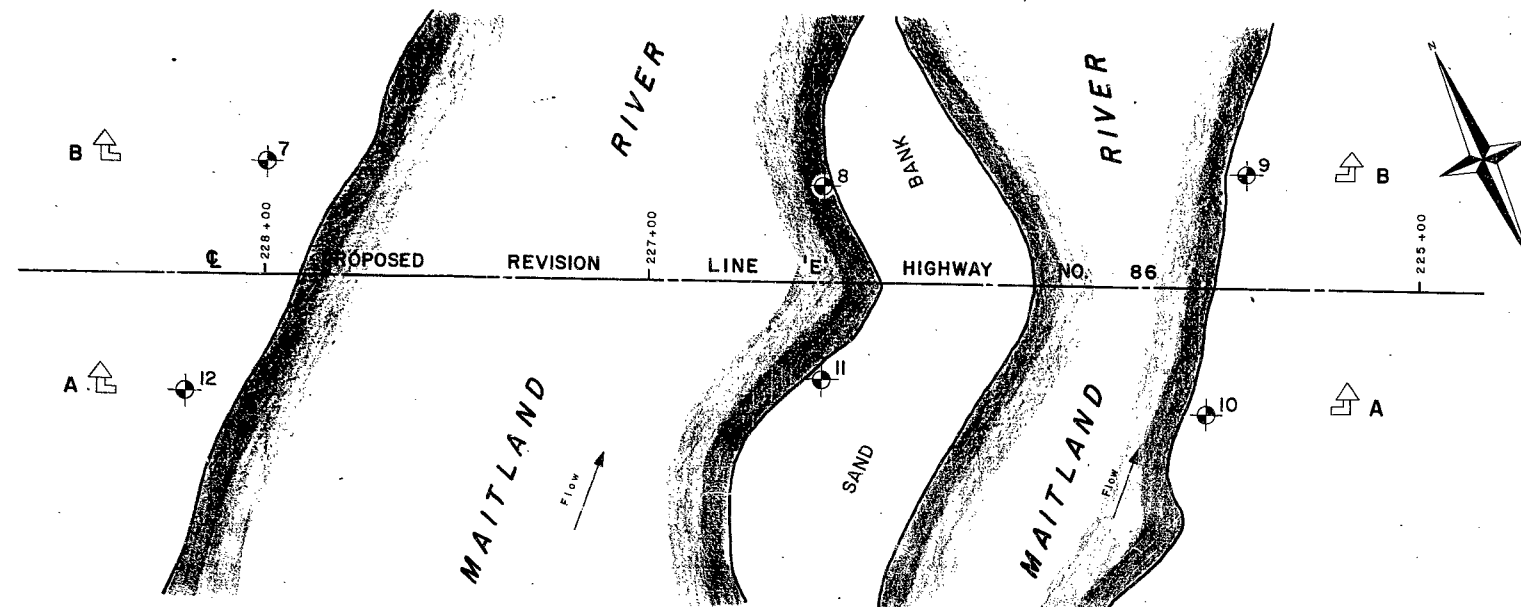
Wm. Lee Kim.

Vineyard Co.

Gen.  
S. H. H. H.

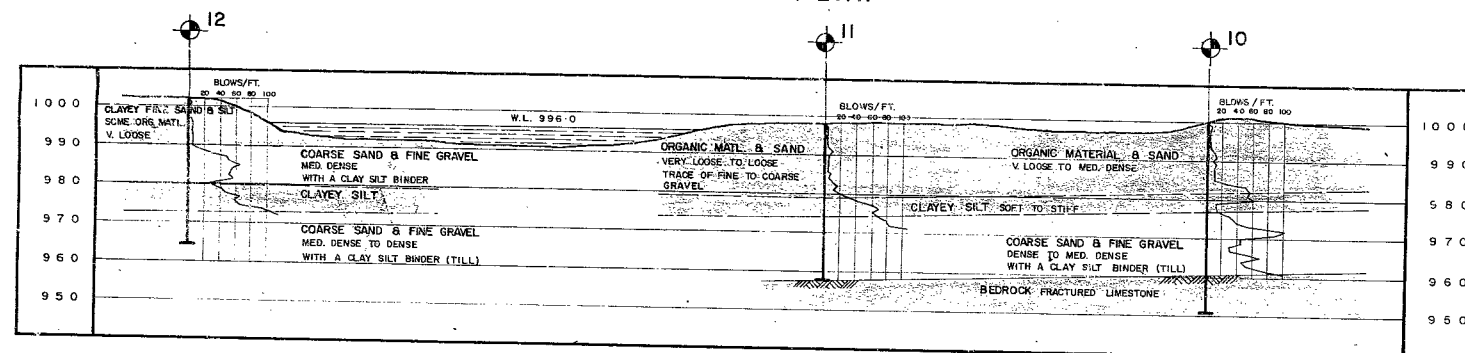


SOME DEFECTS IN NEGATIVE DUE  
TO CONDITION OF ORIGINAL DOCUMENTS

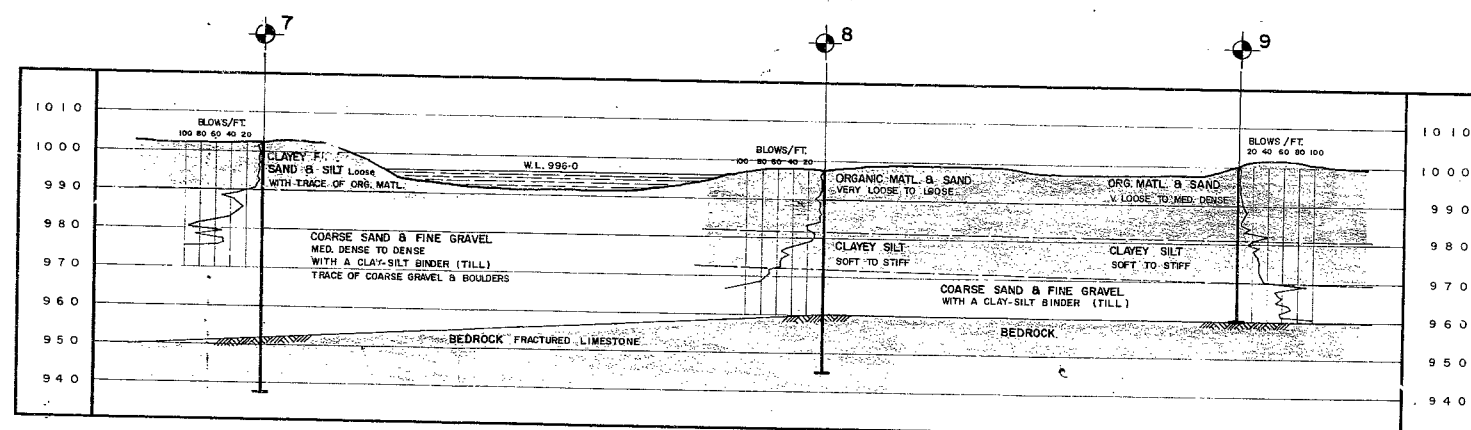


KEY PLAN  
SCALE: 1 in. = 0.8 mi.

PLAN



A - A



B - B

# LEGEND

BORE & PENETRATION HOLE

HOLE	ELEVATION	STATION	OFFSET
7	1002	228+00	30' RT.
8	998	226+00	25' RT.
9	1000	225+45	30' RT.
10	1000	225+55	33' LT.
11	998	226+55	25' RT.
12	1002	228+20	30' LT.

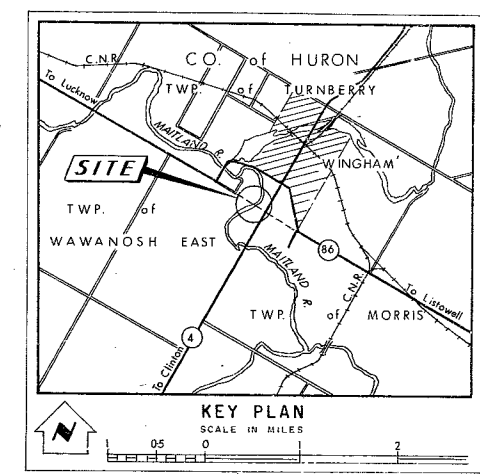
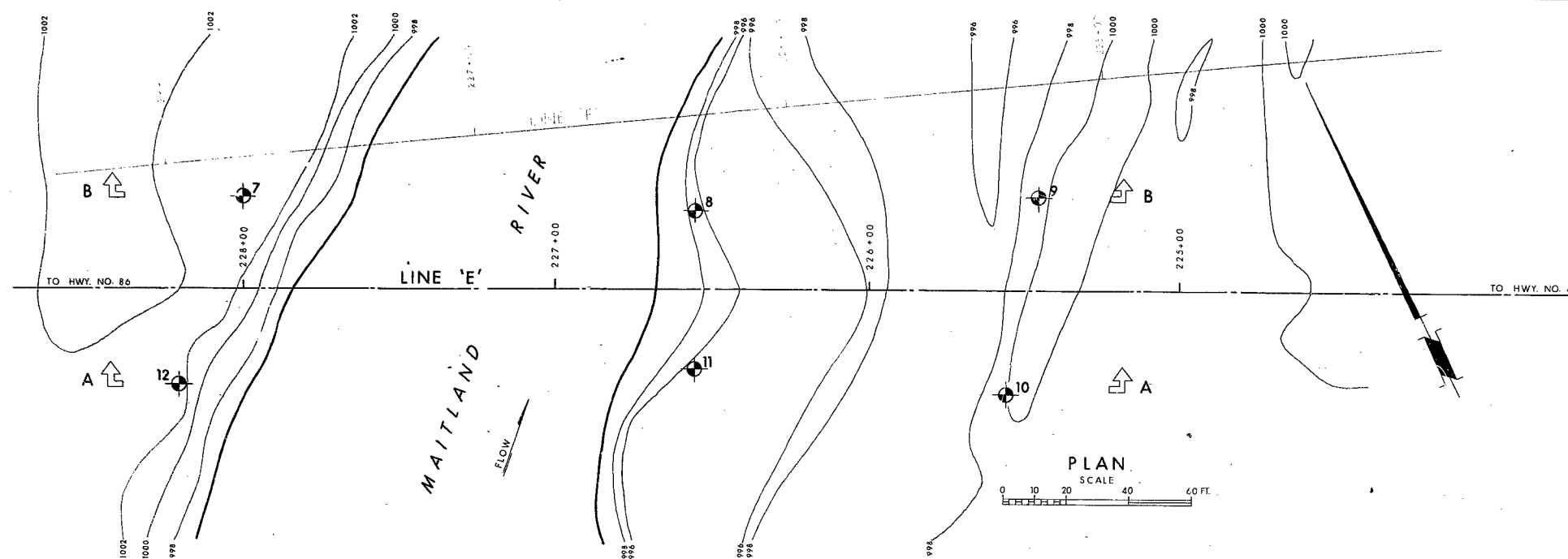
# NOTE

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

## MAITLAND RIVER AND PROP REV'N HIGHWAY NO. 86 LINE 'E'

ORIGINATED G. CHERRINGTON	DISTRICT NO. 3	DATE 7 SEPT. 1961
DRAWN D. MUMFORD	W.P. NO. 9-60	JOB NO. 61-F-52
CHECKED G. CHERRINGTON	SCALE	DRAWING NO.
APPROVED R. L. BARRY	1 in. = 20 ft.	61-F-52A

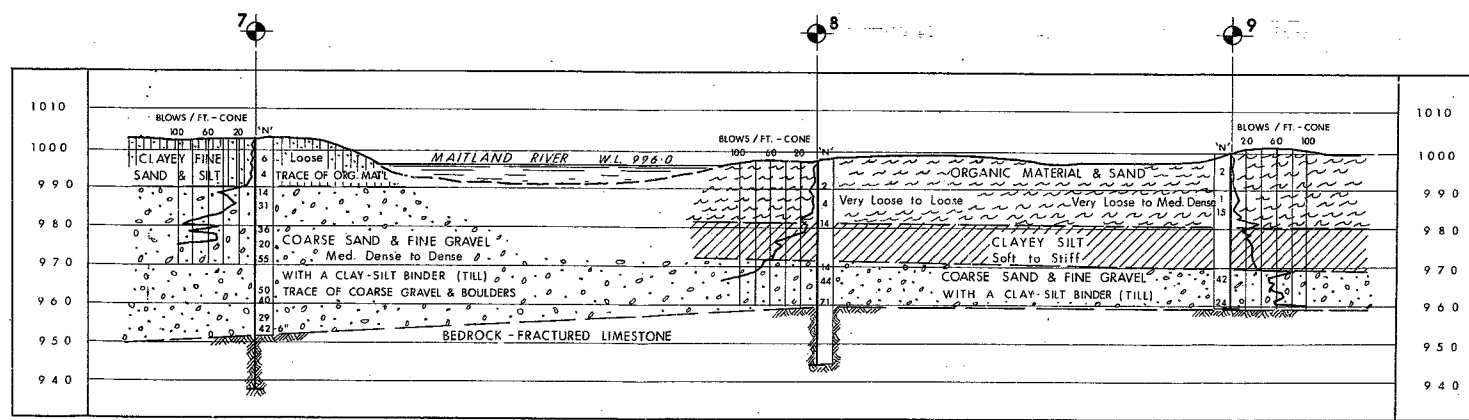
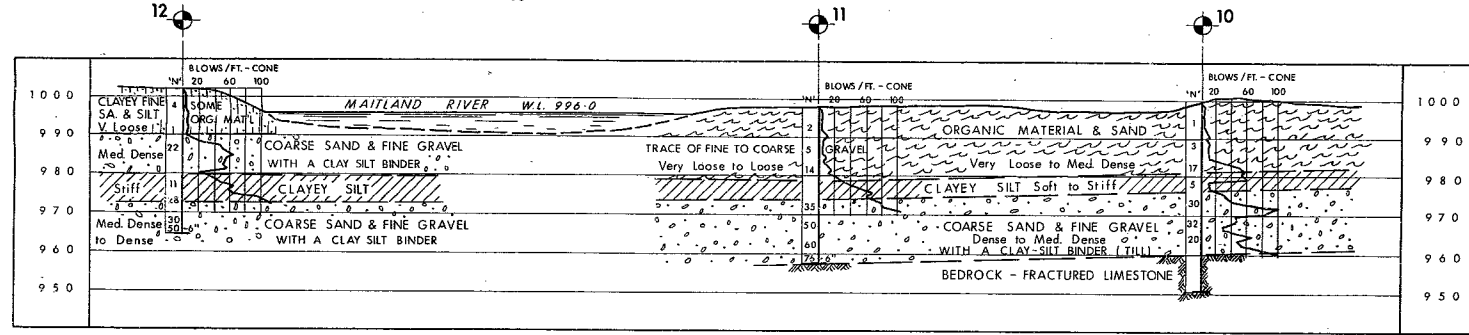


**LEGEND**

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, June 1961.
- Artesian Head observed below El. 967.0 with a pressure head to El. 1004.0

NO.	ELEVATION	LINE 'E' STATION	OFFSET
7	1002	228+00	30' RT.
8	998	226+00	25' RT.
9	1000	225+45	30' RT.
10	1000	225+55	33' LT.
11	998	226+55	25' LT.
12	1002	228+20	30' 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.



**SECTIONS**  
0 10 20 40 60 FT.

**PRINT RECORD**

NO.	FOR	DATE

**REVISIONS**

NO.	DATE	BY	DESCRIPTION
1	JAN. 7/63		LINE 'F' PROPOSED REVISION ADDED

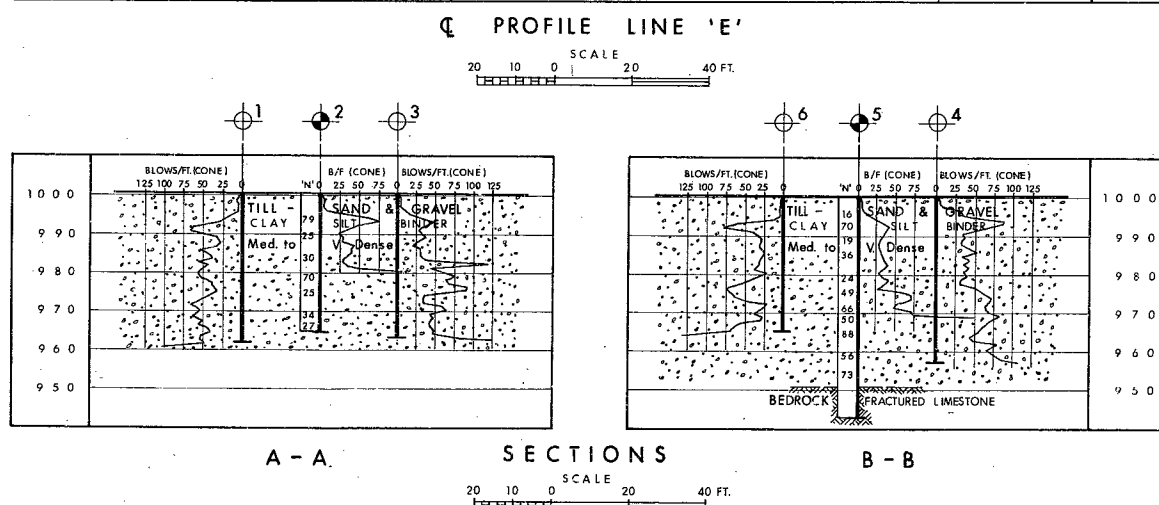
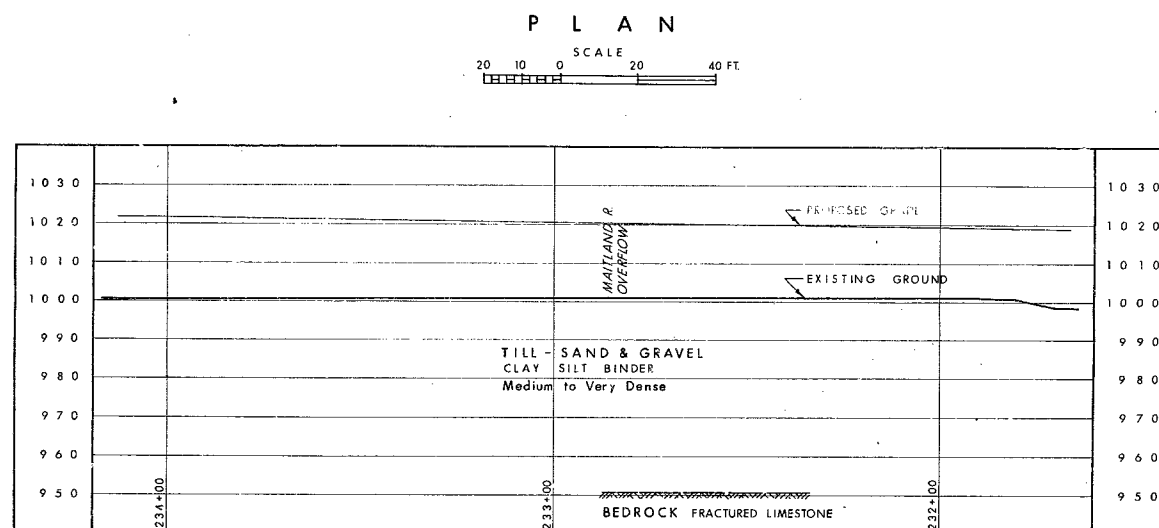
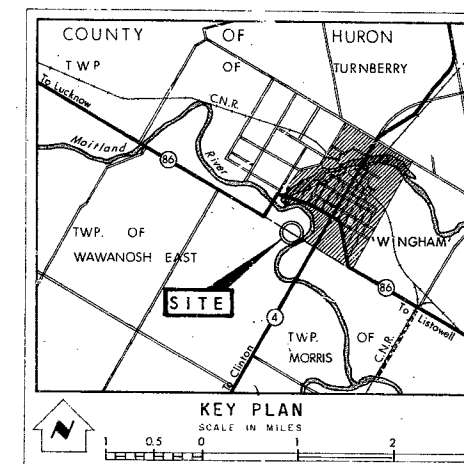
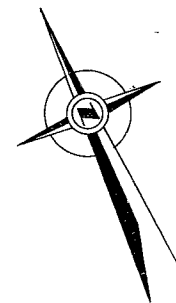
**DEPARTMENT OF HIGHWAYS - ONTARIO**  
MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION

**MAITLAND RIVER**

KING'S HIGHWAY NO. 36 PROP. REV'N LINES 'E' & 'F' DIST. NO. 3  
CO. HURON  
TWP. TURNBERRY & WAWANOSH LOT 42 CON. XIV

**BORE HOLE LOCATIONS & SOIL STRATA**

SUBM'D. G.C.	CHECKED <i>[initials]</i>	W.P. NO. 9-60	M.B.R. DRAWING NO.
DRAWN <i>[initials]</i>	CHECKED <i>[initials]</i>	JOB NO. 61-F-52	61-F-52A
DATE SEPT. 7, 1961	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>[signature]</i>	CONT. NO.		

[illegible]

- 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			
	JAN.13/65	D.M.	REVISION LINE 'F' ADDED
	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION			
MAITLAND RIVER OVERFLOW			
KING'S HIGHWAY NO. 86 LINE 'E' & 'F'		DIST. NO. 3	
CO. HURON			
TWP. WAWANOSH EAST		LOT 42	CON. XIV
BORE HOLE LOCATIONS & SOIL STRATA			
SUBM'D G.C.	CHECKED <input checked="" type="checkbox"/>	W.P. NO. 9-60	W.B.R. DRAWING NO.  <b>61-F-52</b>  BRIDGE DRAWING NO.
DRAWN D.M.	CHECKED <input checked="" type="checkbox"/>	JOB NO. 61-F-52	
DATE 26 SEPT. 1961			
SITE NO.			
APPROVED <i>[Signature]</i>		CONT. NO.	

[illegible]

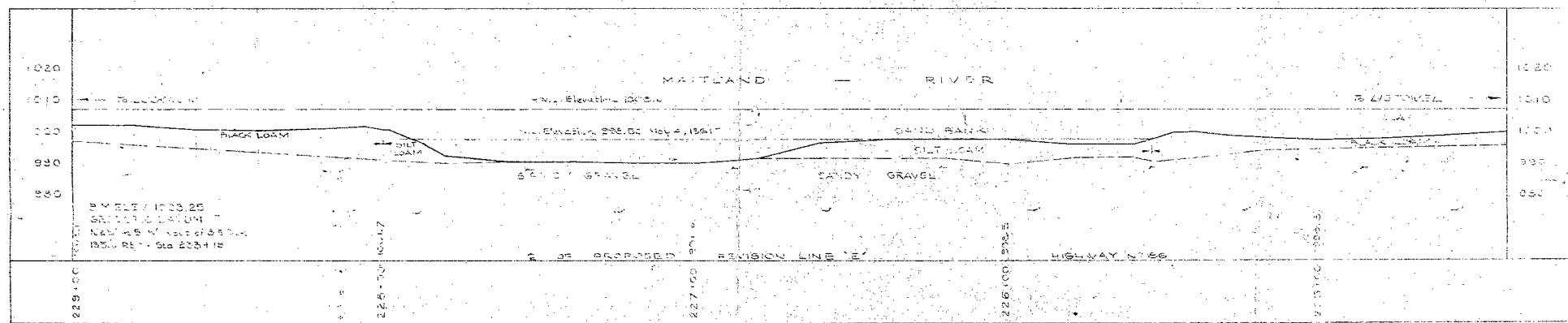
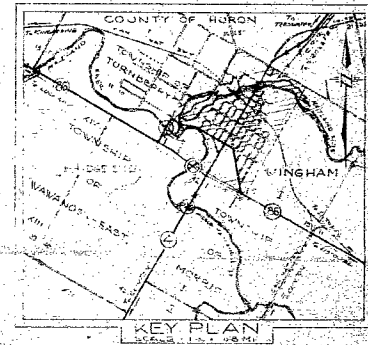
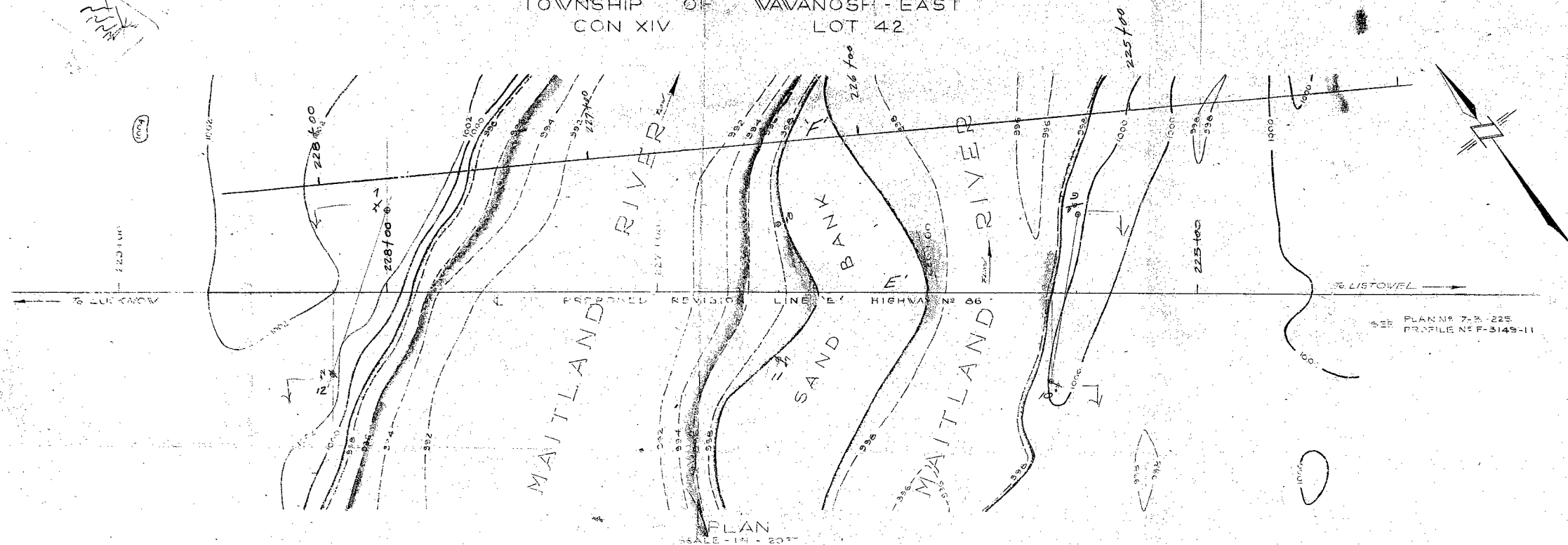
E-3987-3

E-3987-3

E-3987-3

E-3987-3

COUNTY OF HURON  
TOWNSHIP OF WAWANOSH - EAST  
CON XIV LOT 42

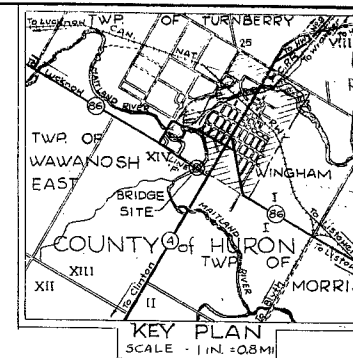
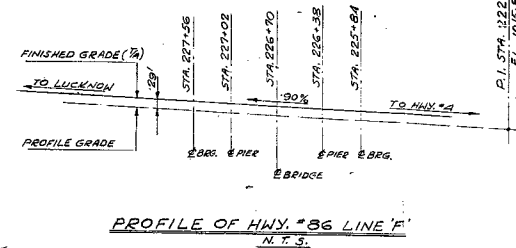


DEPARTMENT OF HIGHWAYS - ONTARIO	
PLANNING & DESIGN BRANCH	
SOUTH WESTERN REGION	
DISTRICT NO. 3	
PROPOSED CROSSING	
AT	
MAITLAND RIVER	
AND	
THE KINGS HWY. NO. 86 - PROP. REVISION LINE 'E'	
SOUTH-WEST LIMITS OF WINGHAM	
LOT 42	
CON. XIV	
TOWNSHIP OF WAWANOSH - EAST	
COUNTY OF HURON	
BRIDGE SITE	
DESIGNED BY	APPROVED
CHARTERED ENGINEER	CHARTERED ENGINEER
SUPERVISOR	SUPERVISOR
DATE OF SURVEY: MAY 1966	DATE OF PLAN: MAY 1966
DRAFTSMAN	PLAN - 1 OF 1
SUPERVISOR	PLAN E-3987-3

SOME DEFECTS IN NEGATIVE DUE  
TO CONDITION OF ORIGINAL DOCUMENTS





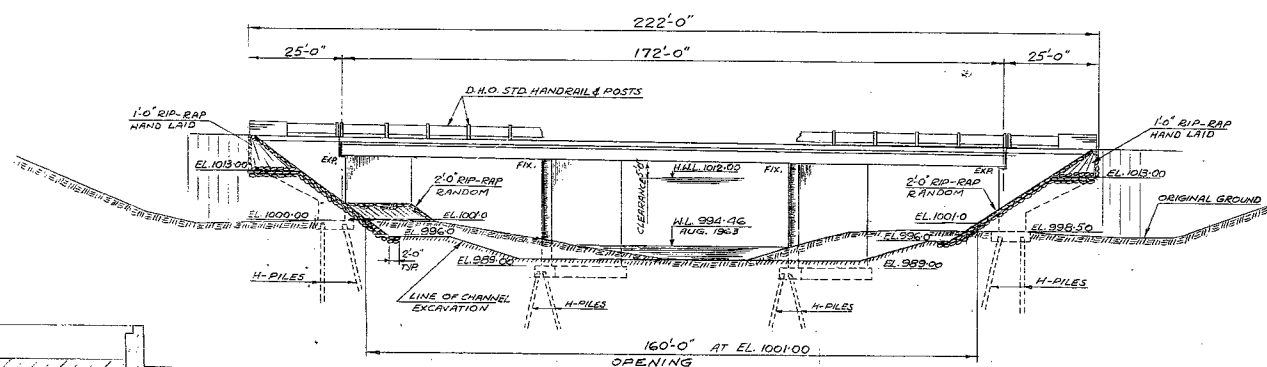


NOTE:  
EXISTING BAILEY BRIDGE TO BE REMOVED  
PRIOR TO CONSTRUCTION.  
DETOUR TO BE THRU WINGHAM DURING  
CONSTRUCTION.

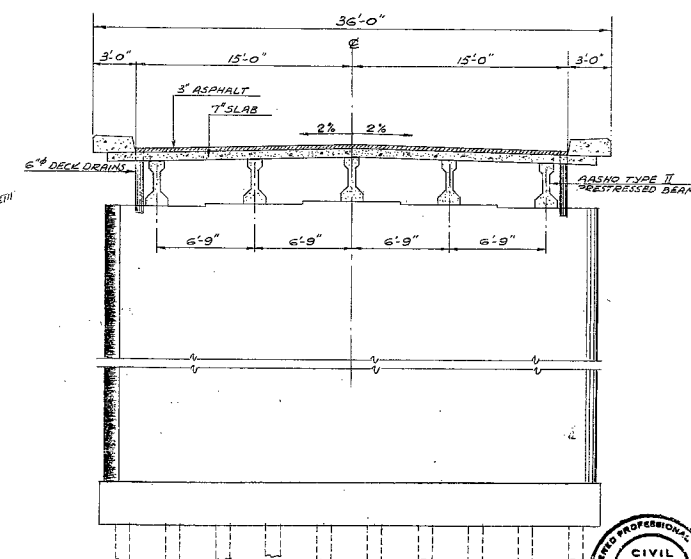
REFERENCE DWGS.

SURVEY PLAN	B-225-11
PROFILE	C 225-5
SITE PLAN	E 4307-1

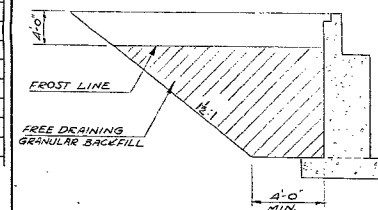
PLAN  
SCALE: 1" = 20'-0"



SOUTH ELEVATION  
SCALE: 1"=20'-0"



SECTION A-A  
SCALE: 1/8"=1'-0"

[illegible]

GRANULAR BACKFILL  
N.T.S.

G. B. M. № 314 ELEV. 1038-323  
POST OFFICE NORTH SIDE WALL IN STONE FOUNDATION,  
2 FEET 8 INCHES FROM FRONT CORNER AND 18 INCHES  
ABOVE SIDEWALK. BOLT SET HORIZONTALLY.  
PUBLICATION № 19 "WINGHAM"

<b>REVISIONS</b>			
	<b>DATE</b>	<b>BY</b>	<b>DESCRIPTION</b>

DEPARTMENT OF HIGHWAYS ONTARIO  
BRIDGE DIVISION

MAITLAND RIVER BRIDGE

APPROX. 0.2 MI. WEST OF HWY. #4

KING'S HIGHWAY No. 86 LINE 'F' DIST. No. 3  
CO. HURON

TWP. WAWANOSH E. LOT 42 CON. XIV

PRELIMINARY

SITE No.	W.P. No.
	16-60-2

APPROVED _____		BRIDGE ENGINEER		CONTRACT Nos.			
DESIGN	A. K.	CHECK	L. N. F.	DRAWING No.	D-5597-P		
DRAWING	G. P.	CHECK	L. N. F.				
DATE	NOV 54	LOADING	420.516				





ONTARIO  
DEPARTMENT OF HIGHWAYS

To: Mr. A. M. Toye, Date November 20, 1961.  
Bridge Engineer. Subject D.H.O. FOUNDATION INVESTIGATION  
REPORT  
From Materials & Research Division, W.J. 61-F-52 -- W.P. 9-60.  
(Foundation Section)  
Attention: Mr. S. McCombie.

Re: Proposed Maitland River Bridge (2 structures)  
At Wingham, Ontario, Hwy. #86, Rev. Line 'E',  
Wingham By-pass, District #3, Stratford, Ont.  
W.J. 61-F-52 -- W.P. 9-60.

W.P. 16-60-2

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

We believe the factual data and recommendations contained therein, should prove adequate for your future design work. Should clarification or additional information be required, please feel free to contact our Office.

AGS/XdeF  
Attach.

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
H. D. McMillan  
A. Gater  
L. D. Barrett  
J. Roy  
J. E. Gruspier  
T. J. Kovich  
E. R. Saint  
F. Norman  
A. Watt  
Foundations Office ✓  
Gen. Files.

*A. G. Stermac*  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

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  2. DESCRIPTION OF THE SITE AND GEOLOGY.
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  7. DISCUSSION AND RECOMMENDATIONS:
    - 7.1) West Structure.
    - 7.2) East Structure.
  8. MISCELLANEOUS.
-

# FOUNDATION INVESTIGATION

For

Proposed Maitland River Bridge (2 structures)  
At Wingham, Ontario, Hwy. #86, Rev. Line 'E',  
Wingham By-pass, District #3, Stratford, Ont.  
W.J. 61-F-52      --      W.P. 9-60.

## 1. INTRODUCTION:

It is proposed to construct the Wingham By-pass in two stages. The first stage involves construction of the permanent embankments, together with temporary Bailey bridges at the proposed structure locations. The second stage involves the construction of the permanent structures, which will be carried out at a later date.

One structure will span the permanent waterway of the Maitland River; the other will span a waterway which is operative only in times of flood. The structures will be approximately 600' apart.

A foundation investigation was carried out by this office to determine the subsoil conditions existing at the proposed structure locations. A preliminary report indicating the length and type of piles required for the Bailey bridge supports, was completed in July, 1961.

This report contains the results of our investigations, together with conclusions and recommendations pertaining to the design of the permanent structures.

cont'd. /2 ...

## 2. DESCRIPTION OF THE SITE AND GEOLOGY:

The site is located in the flood plain of the Middle Maitland River. The eastern half is a swampy area, and the western half is a till plain covered with bush and occasional trees. Generally, the area is flat, differences in elevation being only in the order of 5 to 10 feet.

Physiographically, the site is located on a former spillway in the region known as the Teeswater Drumlin Field. This region was traversed by large meltwater rivers draining the ice fronts to the north and west of the "Ontario Island" during the latter stages of the Pleistocene period. These rivers cut broad valleys which now carry branches of the Saugeen and Maitland Rivers. The drumlin fields contain considerable areas of swampy land which are related to the old spillways.

## 3. FIELD INVESTIGATION PROCEDURE:

A total of eight sampled boreholes and twelve dynamic cone penetration tests were carried out at the site. Disturbed samples were recovered by means of a 2-inch O.D. split spoon. Undisturbed samples were recovered by means of 2-inch I.D. Shelby tubes. Shelby tubes were pushed into the soil by hand. Driving energy to advance the split-spoon sampler and the dynamic cone was 350 ft. lbs. per blow.

The locations and elevations of all boreholes, together with the estimated stratigraphical profiles, are shown on Drawing #61-F-52A, and #61-F-52B, which accompany this report.

cont'd. /3 ...

#### 4. LABORATORY TESTS:

Laboratory tests were carried out on a selection of samples to determine the following physical properties:-

- (1) Natural Moisture Content.
- (2) Atterberg Limits.
- (3) Consolidation Properties.
- (4) Grain Size Distribution.
- (5) Bulk Density.

Results of the above tests, are shown in Appendix #1 of this report.

#### 5. SUBSOIL CONDITIONS:

##### 5.1) West Structure:

At this location, subsoil consists of a compact to very dense deposit of glacial till extending from the surface to a depth of about 50'. It is underlain by limestone bedrock. The material is a heterogeneous mixture of clayey silt, sand and gravel. Physical properties as determined in the laboratory and 'N' values determined in the field, are given in the Appendix of this report.

##### 5.2) East Structure:

At this location, loose to compact organic deposits, containing varying quantities of sand and gravel, extend for about 20'. These are underlain by a 5' to 10' layer of soft to firm clayey silt, followed by a very dense till extending for about 15' to bedrock. Physical properties as determined in the laboratory and in the field, for the various layers, are given in Appendix #1 of this report.

6. GROUND WATER CONDITIONS:

Water level observations carried out during the investigation, indicated that the water table was at the same elevation as the river water level. An artesian head was observed below elev. 967.0' at both structure locations, with a pressure head to elev. 1004.5'.

7. DISCUSSION AND RECOMMENDATIONS:

7.1) West Structure:

At this location, subsoil consists of a very dense granular deposit of glacial till. Spread footings may be founded at about elev. 994.0' using a design load of 2 tons per sq. ft. Because of the relatively impermeable nature of the subsoil, dewatering should present no special problems.

No problems are anticipated with regard to the stability of the approach fills.

7.2) East Structure:

At this location, the 'upper' subsoil consists of loose deposits of organic silt and peat with varying quantities of sand and gravel. In view of this fact, the most practical method of supporting the structure would be piled foundations. 'H' piles driven to bedrock, are recommended. Design loads will be dependent on the 'H' pile section and may be as high as 70 tons per pile if a section 14 BP 73 is used.

In view of the permeability of the subsoil, dewatering of the excavations carried out below the water table, may present

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

7.2) East Structure: (cont'd.) ...

some problems. If sheeting is used, it should be driven about 6.0' beyond the foundation elevation.

With regard to the approach fills for this structure, settlements are likely to occur, where they are constructed on the organic layers. It is, therefore, recommended that final paving should be postponed until the fills in question, have been in place for at least 12 months.

8. MISCELLANEOUS:

The field work was carried out during the period June 7th to June 26th, 1961. Equipment used was owned and operated by F. E. Johnston Drilling Co., Ltd., and consisted of a diamond drill adapted for soil sampling purposes.

The field work was supervised by Mr. G. Cherrington and Mr. I. Holubec, of the Ontario Department of Highways.

November 1961.

REPORT PREPARED BY:

... *B.M.G. Cherrington* .....  
G. G. Cherrington,  
PROJECT FOUNDATION ENGR. &  
*for* I. Holubec,  
PROJECT FOUNDATION ENGR.

REPORT APPROVED BY:

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



APPENDIX I.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-P-52

W.P. 9-60

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			cone penetration.							
2	S1	5-6.5	Fine to med. sand and fine gravel, very dense, with a clay silt binder.	78	-	-	-	-	-	
	S2	10-11.5	Fine sand, brown med. dense.	24	-	-	-	-	-	
	S3	15-16.5	Coarse sand and fine gravel, med. dense, some fine to medium sand.	29	-	-	-	-	-	
	S4	20-21.5	Clayey fine sand, very dense, with coarse sand and fine gravel.	68	-	-	-	-	-	Till.
	S5	25-26.5	Clayey silt and fine sand, med. dense, light brown, with coarse sand and fine gravel.	24	-	-	-	-	-	Till.
	S6	30-31.5	Clayey silt and fine sand, dense, light brown, with coarse sand and fine gravel.	34	-	-	-	-	-	Till.
	S7	35-36.5	Clayey silt and fine sand, med. dense, with coarse sand and fine gravel.	27	-	-	-	-	-	Till.
3			cone penetration only.							
4			cone penetration only.							
5	S1	3-3.5 3.5-4.5	Clayey silt and fine sand, dk. brown, changing to silt and fine sand, med. dense, light brown, with some med. to coarse sand & fine gravel.	16	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52

W.P. 9-60

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
5	S2	6-7.5	Fine to coarse sand and fine gravel with coarse gravel, very dense, with a clay silt binder.	69	-	-	-	-	-	Till.
	S3	10-11.5	Fine gravel changing to fine sand, med. dense, brown.	18	-	-	-	-	-	
	S4	14-15.6	Fine to coarse sand and fine gravel, dense, with a clay silt binder.	35	-	-	-	-	-	Till.
	S5	20-21.5	Med. to coarse sand, med. dense some fine gravel, trace of coarse gravel.	24	-	-	-	-	-	
	S6	24-25.5	Clayey silt and fine sand, dense, some coarse sand and fine gravel, trace of coarse gravel.	48	6.4	-	-	-	-	Till.
	S7	28-29.5	-	66	-	-	-	-	-	Sample Lost.
	S8	30.5-31	-	50 for 6"	-	-	-	-	-	Sample Lost 1½" Ø pc. of coarse gravel in S.S.
	S9	34.5-35.0	Fine sand with some fine gravel changing to							
		35.0-36.0	Clayey silty fine sand, very dense with some coarse sand and fine gravel.	88	-	-	-	-	-	Till.
	S10	40.5-42.0	Clayey silt and fine sand very dense, some coarse sand and fine gravel.	56	-	-	-	-	-	Till.
	S11	45-46.5	Coarse sand and fine gravel, very dense, with a clay silt binder.	73	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52W.P. 9-60

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
5	RC12	51-52.5	Fractured limestone.	-	-	-	-	-	-	100% recovery.
	RC13	52.5-58.0	Fractured limestone.	-	-	-	-	-	-	61% recovery.
6	cone	penetration	only.							
7	S1	4-5.5	Clayey fine sand, loose, dark brown, trace of organic materials.	5	-	-	-	-	-	
	S2	8-9.5	Clayey fine sand, very loose, gray brown, with organic material.	4	-	-	-	-	-	
	S3	12-13.5	Coarse sand and fine gravel, med. dense, with a binder of clayey silt.	14	-	-	-	-	-	Till.
	S4	16-17.5	Fine sand, med. dense, brown, with some med. to coarse sand and fine gravel.	30	-	-	-	-	-	
	S5	22-23.5	Med. to coarse sand and fine gravel, dense, with a binder of clayey silt, trace of coarse gravel.	36	-	-	-	-	-	Till.
	S6	26-27.5	Coarse sand and fine gravel, med. dense, (material is broken angular limestone chips).	21	-	-	-	-	-	
	S7	30-31.5	Coarse sand and fine gravel, very dense, some coarse gravel, trace of clayey silt and fine sand.	54	-	-	-	-	-	Till.
	S8	38-39.5	-	50	-	-	-	-	-	Sample Lost.

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52W.P. 9-60

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
7	S9	40-41.5	Coarse sand and fine gravel, dense, with a binder of clayey silt and fine sand.	42	-	-	-	-	-	Till.
	S10	45-46.5	Coarse sand and fine gravel, med. dense, with a binder of clayey silt and fine sand.	28	-	-	-	-	-	Till.
	S11	50-50.5	-	42 for 6"	-	-	-	-	-	Sample Lost.
8	S1	5-6.5	Sand, fine to med. very loose, gray-brown, containing large amounts of decayed organic material.	2	-	-	-	-	-	
	S2	10-11.5	As above.	3	-	-	-	-	-	
	S3	15-16.5	Clayey silt and fine sand, med. dense lt. brown, slightly plastic.	14	-	-	-	-	-	
	T4	20-21.5	Clayey silt and fine sand, stiff, lt. brown.	Pushed	19.6	16.2	23.9	TR=1335 V=490	129.1	
	T5	25-26	As above.	Pushed	19.5	13.0	20.9	TR=690 V=1000	135.0	
	S6	26-27.5	Clayey silt and fine sand, med. dense lt. brown, trace of coarse sand and fine gravel.	15	-	-	-	-	-	
	S7	30-30.8	Slightly clayey fine sand, dense, light brown, some coarse sand and fine gravel, trace of coarse gravel.	44	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52

W.P. 9-60

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
8	S8	35-35.8	Fine gravel, (broken angular limestone) very dense, some clayey silt and fine sand, trace of coarse gravel.	70	-	-	-	-	-	
	RC9	37.5-40.8	Fractured limestone.	-	-	-	-	-	-	53% Recovery.
	RC10	40.8-46.3	Fractured limestone.	-	-	-	-	-	-	15% Recovery.
	RC11	46.3-51.0	Fractured limestone.	-	-	-	-	-	-	39% Recovery.
	RC12	51-53	Fractured limestone.	-	-	-	-	-	-	58% Recovery.
9	S1	5-6.5	Slightly clayey silty fine sand, ver. loose, lt. brown, trace of organics.	2	-	-	-	-	-	
	S2	10-11.5	Fine sand, very loose, dark brown, with organic material.	1	-	-	-	-	-	
		15-15.5	Fine sand and silt brown changing to							
	S3	15.5-16.5	Fine sand and silt, med. dense, gray.	17	-	-	-	-	-	
	S4	20-21.5	Clayey very fine sand and silt, medium stiff, lt. brown.	6	-	-	-	-	-	
	T5	22-23.5	Silty clay, stiff, lt. brown.	P	22.2	15.1	20.8	TR=1170	132.0	
	T6	27-28.5	As above.	P	22.4	15.2	23.3	TR=1165 V=1155	128.0	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52

W.P. 9-60

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
9	S7	32-33.5	Clayey very fine sand and silt, very dense, some med. to coarse sand and fine gravel, trace of coarse gravel.	52	-	-	-	-	-	Till.
	S8	37-38.5	Clayey very fine sand and silt, dense some med. to coarse sand and fine gravel, trace of coarse gravel.	31	-	-	-	-	-	Till.
10	S1	5-6.5	Fine sand, very loose, gray-brown, with organic material.	1	-	-	-	-	-	Shear strength determined by pocket penetrometer.
	S2	10-11.5	Fine to med. sand, very loose, gray-brown, with organic material.	4	-	-	-	-	-	
	S3	15-16.5	Very fine sand and silt, med. dense, gray, some coarse sand and fine gravel, trace of organic material.	21	-	-	-	-	-	
	S4	20-21.5	Clay-silt, medium stiff, gray, with thin sand seams.	6	-	-	-	600	-	
	T5	22-23.2	Clayey silt and fine sand, soft, gray, some med. to coarse sand and fine gravel.	P	15.8	17.9	20.4	TR=670 V=325	130.0	
	S6	25-26.5	Clayey fine sand, dense, lt. brown some med. to coarse sand and fine gravel.	38	-	-	-	-	-	Till.

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52

W.P. 9-60

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
10	S7	30-31.5	Coarse sand and fine gravel, dense, some clay-silt as a binder.	39	-	-	-	-	-	Till.
	S8	36-37.5	Coarse sand and fine gravel medium dense, trace of a clay-silt binder.	25	-	-	-	-	-	Till.
	RC9	39.5-41.4	Fractured limestone.	-	-	-	-	-	-	91% Recovery.
	RC10	41.4-45.6	Fractured limestone.	-	-	-	-	-	-	82% Recovery.
	RC11	45.6-49.5	Fractured limestone.	-	-	-	-	-	-	79% Recovery.
11	S1	5-6.5	Fine to coarse sand, very loose, gray-brown, some organic material.	2	-	-	-	-	-	
	S2	10-11.5	Fine to coarse sand, very loose gray-brown, some organic material trace of fine gravel.	4	-	-	-	-	-	
	S3	15-16.5	Fine sand, loose, gray, some organic material trace of fine to coarse gravel.	13	-	-	-	-	-	
	T4	22-23.5	Clayey silt, stiff, lt. brown.	P	19.4	15.4	24.2	TR=1230 V=718	134.0	
	S5	25-26.5	Clayey fine sand, med. dense, lt. brown, some coarse sand and fine gravel.	36	-	-	-	-	-	Till.
	S6	30.5-32.0	As above.	50	-	-	-	-	-	Till.
	S7	35-36.5	Fine to coarse gravel, very dense, some fine to med. sand (material is broken angular limestone).	59	-	-	-	-	-	



## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 61-F-52W.P. 9-60

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
11	S8	40-40.5	-	76 for 6"	-	-	-	-	-	Sample Lost.
12	S1	5-6.5	Slightly clayey fine sand and silt very loose, dark brown, with some organic material.	3	-	-	-	-	-	
	S2	10-11.5	Slightly clayey fine sand and silt, very loose, trace of organic material.	1	-	-	-	-	-	
	S3	15-16.0	Fine gravel changing to							
		16-16.5	Fine to med. sand, medium, dense, brown.	22	-	-	-	-	-	
	S4	20-21.5	Fine gravel, med. dense, with some coarse sand and trace of a clay silt binder.	27	-	-	-	-	-	
	S5	25-26.5	Clayey silt, stiff, lt. brown, with trace of fine gravel.	11	-	-	-	-	-	
	S6	28'-29.5'	Clayey silt, very stiff, light brown.	28	-	-	-	-	-	
	S7	34-35.5	Clayey silt and fine sand, med. dense, lt. brown, containing coarse sand and fine gravel.	29	-	-	-	-	-	Till.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-52

W.P. 9-60

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
12	S8	36-36.6	Coarse sand and fine gravel, dense, (material is broken angular limestone chips).  S denotes split spoon sample.  T " shelby tube "  RC " rock core "  TR " triaxial compression test  V " lab. vane.	50 for 6"	-	-	-	-	-	

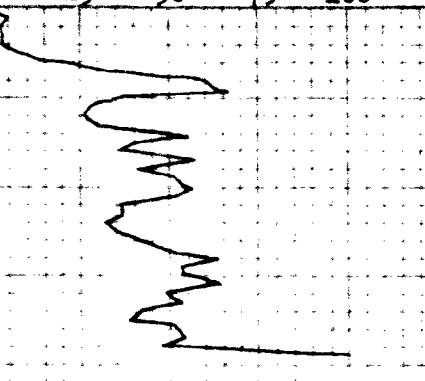
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 1  
JOB 61-F-52 STATION 233+55 (20' Lt.)  
Geodetic  
DATUM 1001+ COMPILED BY B.K.  
BORING DATE June 16/61. CHECKED BY K.S.

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	
LIQUIDITY INDEX	X
LIQUID LIMIT	
PLASTIC LIMIT	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE		CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
					P.S.F. BLOWS/FT.			
↓	Groundlevel	1001.0	0	25	50	75	100	
								
				Penetration ends @ elev. 962.3'				
				50				
				60				
				70				
				80				

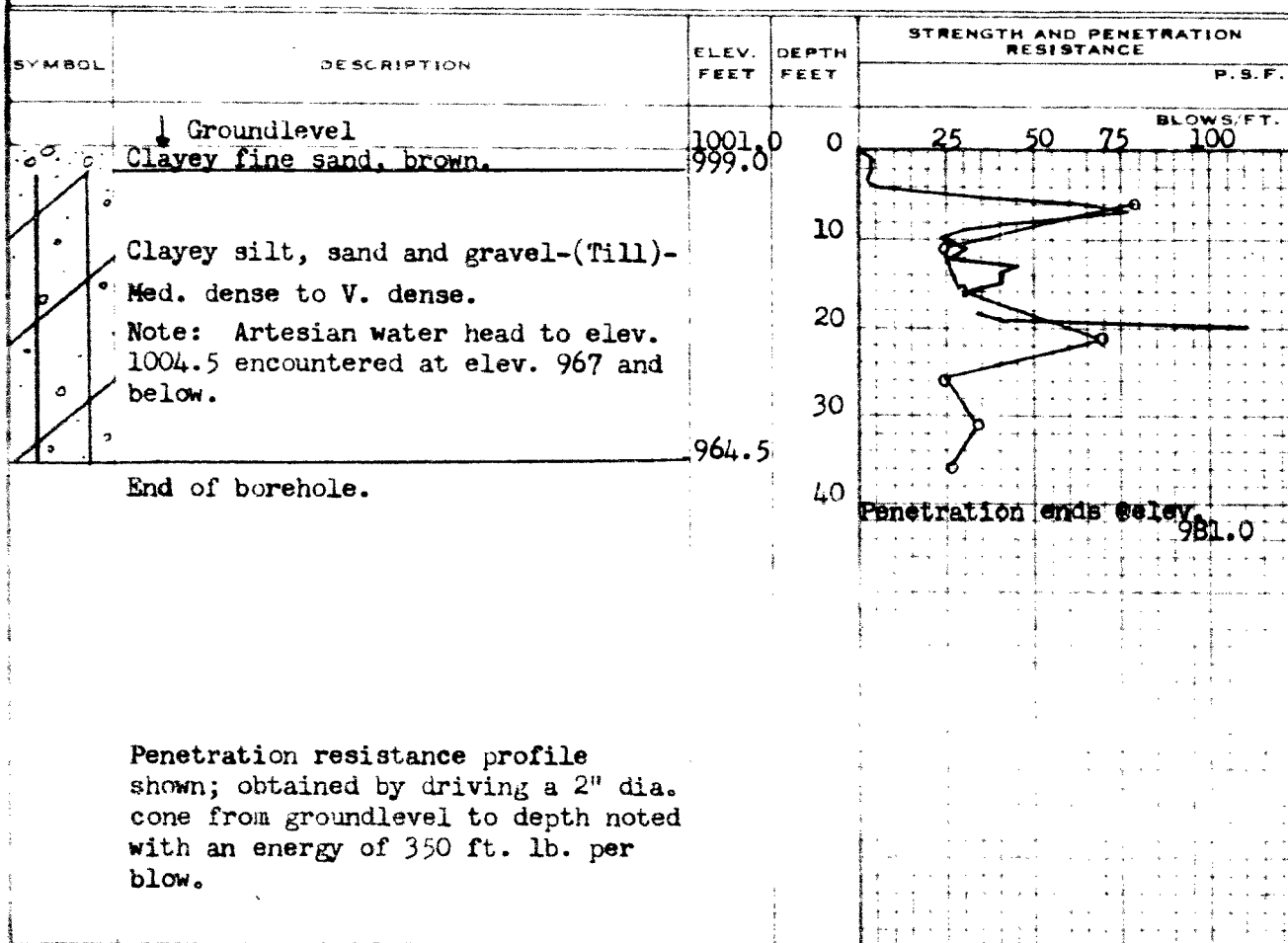
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 2  
 JOB 61-F-52 STATION 233+55 on E  
 Geodetic  
 DATUM 1001.7 COMPILED BY G.G.C. & B.K.  
 BORING DATE June 16/61. CHECKED BY K.S.

## LEGEND

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

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



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.		
	S1	-
	S2	-
	S3	-
	S4	-
	S5	-
	S6	-
	S7	-

W.P. 9-60 BORE HOLE NO 3  
JOB 61-F-52 STATION 233+55 20' Rt.  
Geodetic  
DATUM 10017 COMPILED BY B.K.  
BORING DATE June 16/61. CHECKED BY K.S.

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

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	
↓	Groundlevel	1001.0	0	25 50 75 100	
			10		
			20		
			30		
			40	Penetration ends @ elev 962.5'	
			50		

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.

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

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 4

JOB 61-F-52 STATION 232+50 20' Rt.  
Geodetic

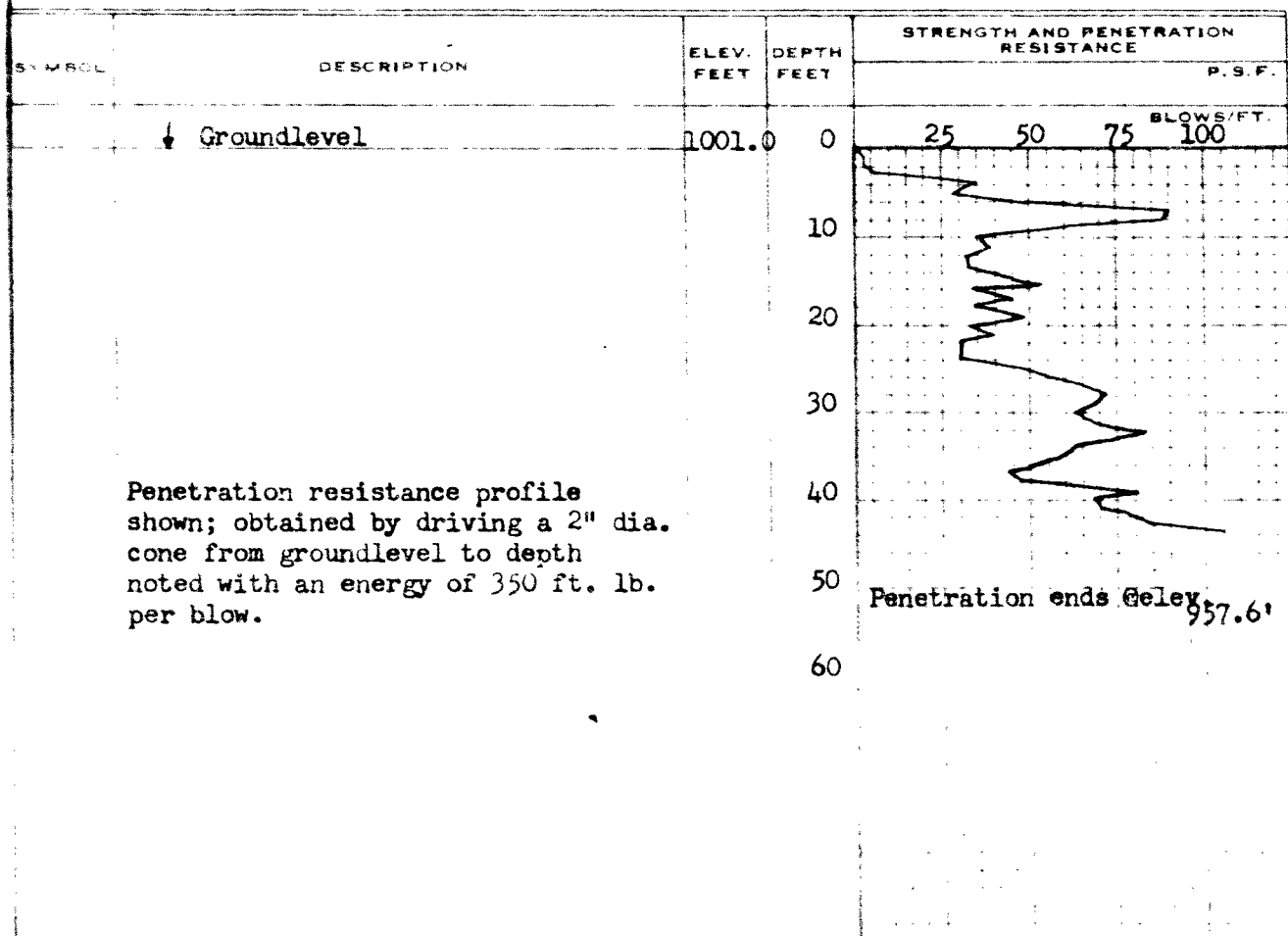
DATUM 10017 COMPILED BY G.G.C.

BORING DATE June 16/61. CHECKED BY K.S.

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)	---	+ <sup>1</sup>
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	X
LIQUID LIMIT	---	
PLASTIC LIMIT	---	



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

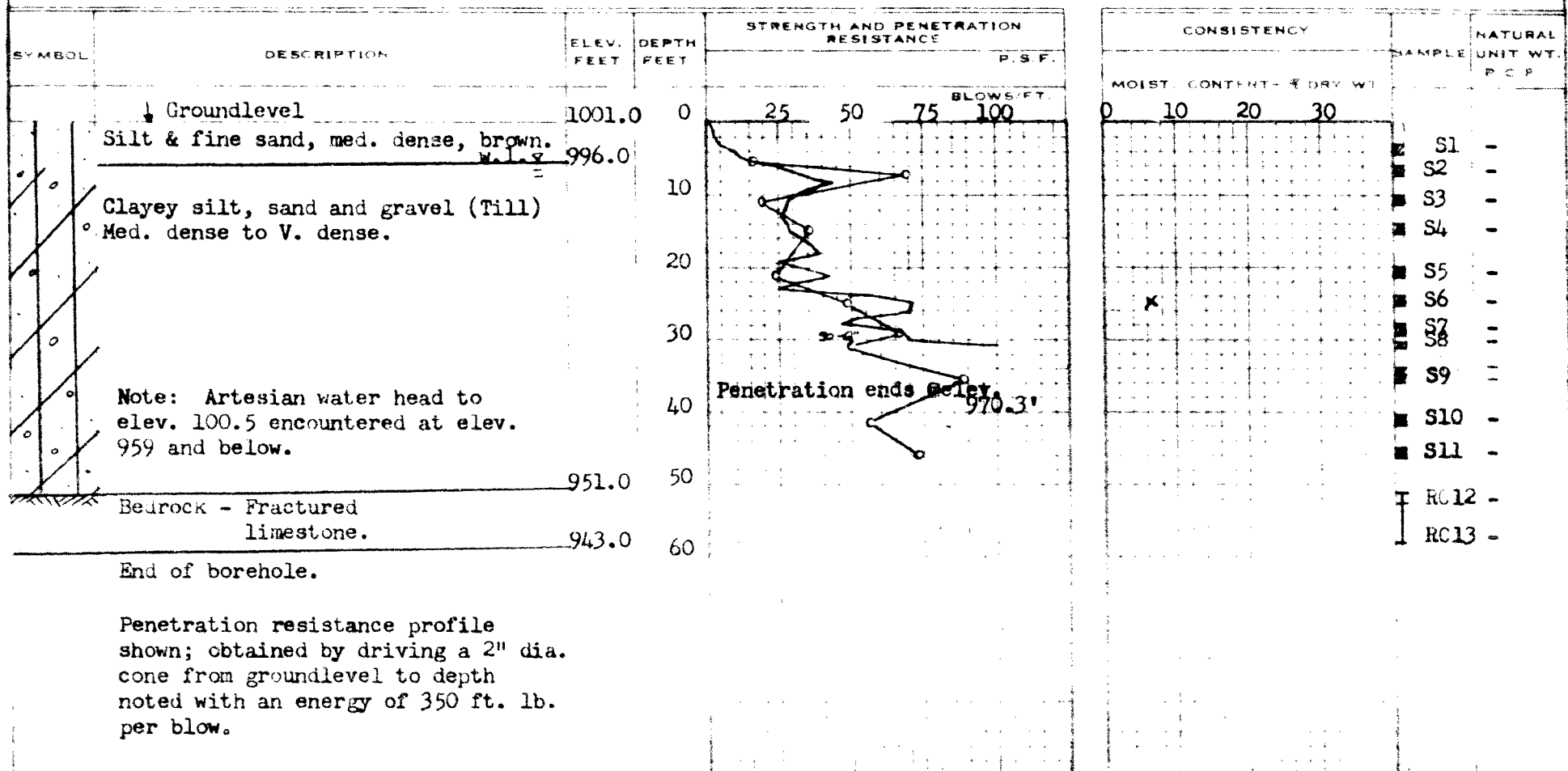
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 5  
JOB 61-F-52 STATION 232+50 on E  
Geodetic  
DATUM 1001.7 COMPILED BY G.G.C. & B.K.  
BORING DATE June 12/61, CHECKED BY G.G.C.

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



W.P. 9-60 BORE HOLE NO. 6  
JOB 61-F-52 STATION 232/50 20' Lt.  
Geodetic  
DATUM 10017 COMPILED BY G.G.C.  
BORING DATE June 61. CHECKED BY K.S.

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

1/2 UNCONFINED COMPRESSION (Qu)	---	O
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		CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
				P.S.F.				
	↓ Groundlevel	1001.0	0	BLOWS/FT 25 50 75 100		MOIST. CONTENT - % DRY WT.		
			10					
			20					
			30					
			40					
			50	Penetration ends @ elev. 995.0'				

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.



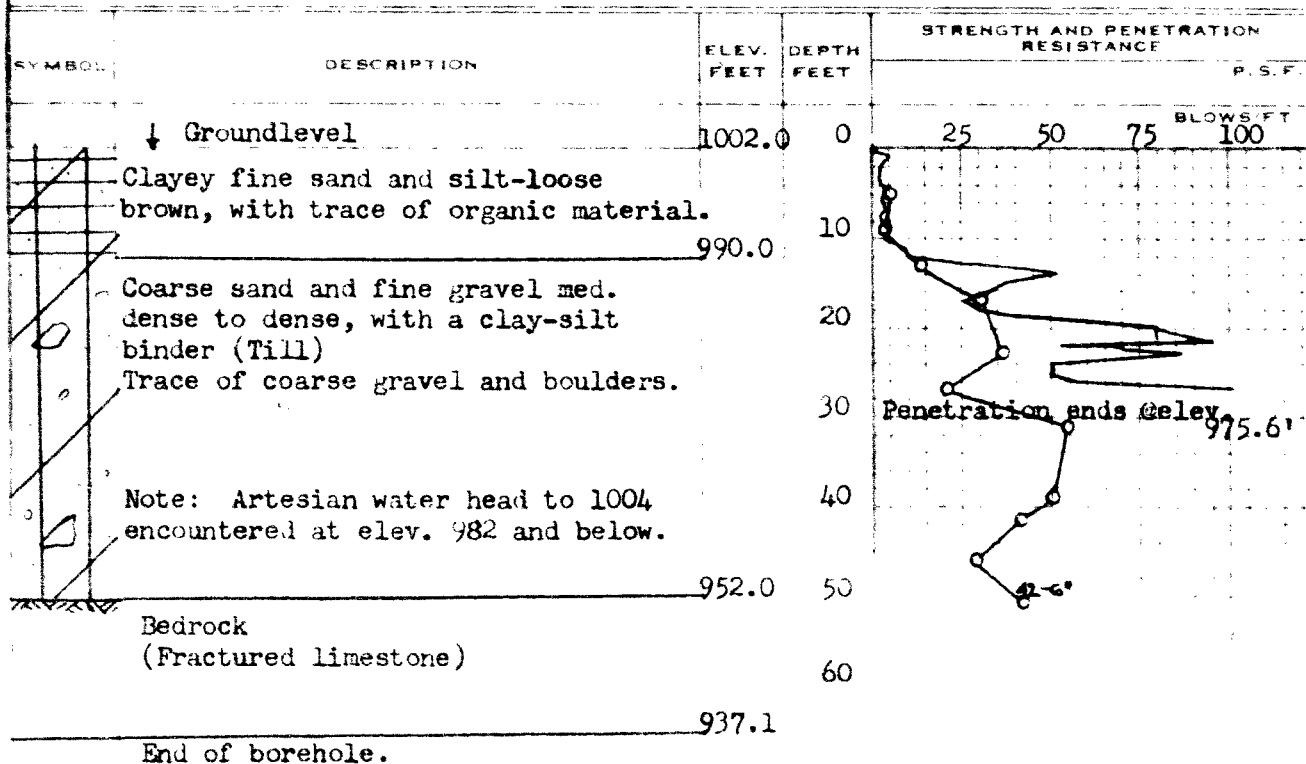
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

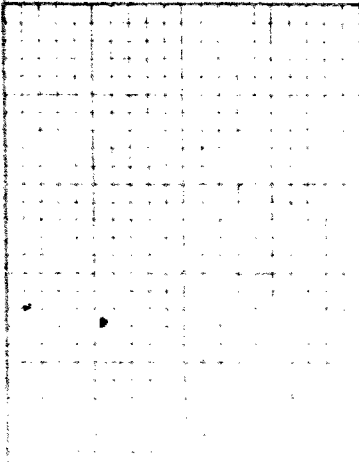
W.P. 9-60 BORE HOLE NO. 7  
 JOB 61-F-52 STATION 228/00 30' Bt.,  
 Geodetic  
 DATUM 10027 COMPILED BY G.G.C. & B.K.  
 BORING DATE June/61 CHECKED BY G.G.C.

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

## LEGEND

1/2 UNCONFINED COMPRESSION (QU)  $\bigcirc$   
 VANE TEST (C) AND SENSITIVITY (S)  $+$   
 NATURAL MOISTURE AND LIQUIDITY INDEX  $\nabla$   
 LIQUID LIMIT  $\circ$   
 PLASTIC LIMIT  $\times$



CONSISTENCY		SAMPLE	NATURAL UNIT WT P.C.F.
MOIST. CONTENT - % DRY WT.			
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	-
		S7	-
		S8	-
		S9	-
		S10	-
		S11	-

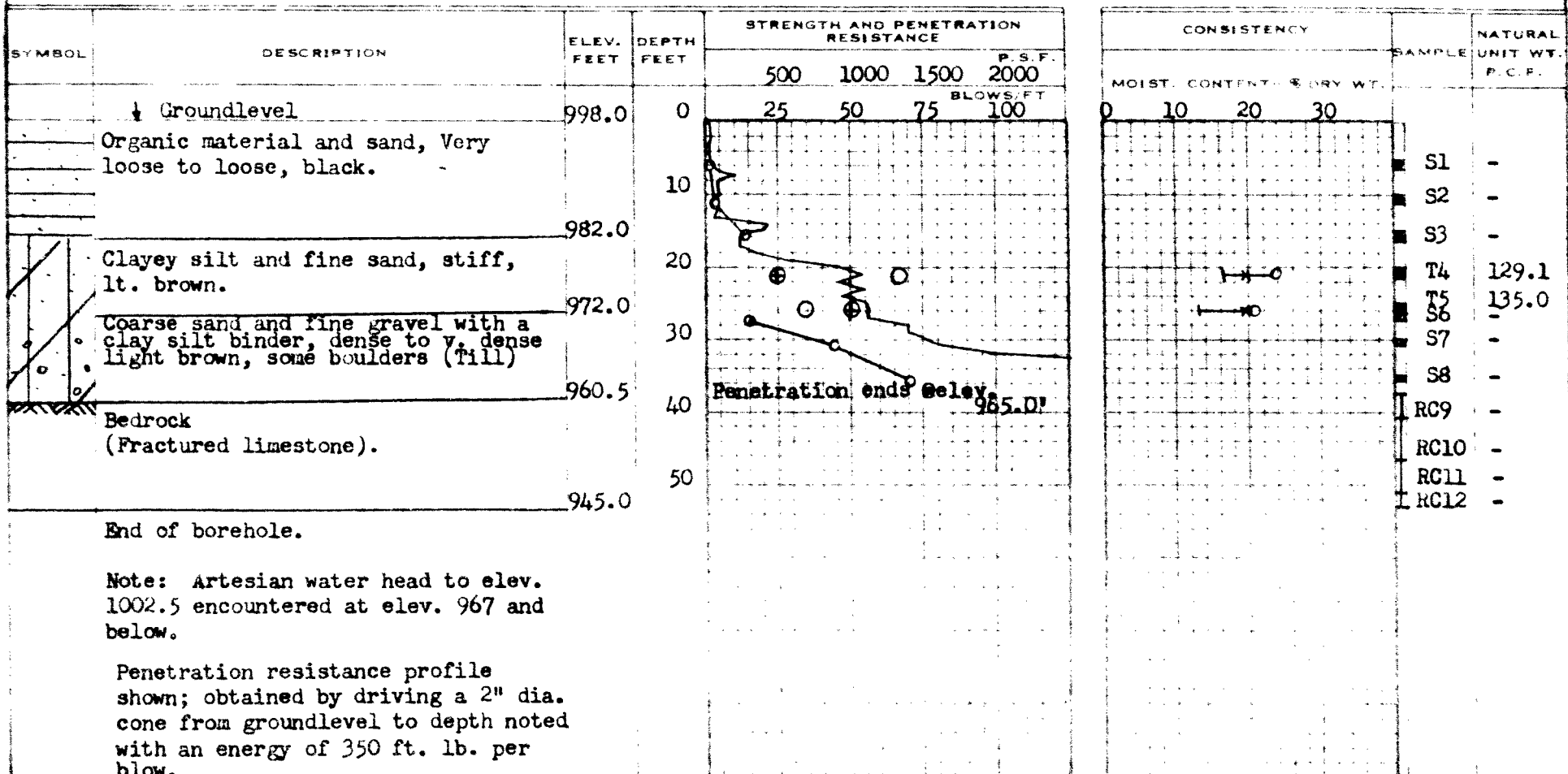
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 8  
JOB 61-F-52 STATION 226+55.25 Rt.  
Geodetic  
DATUM 9987 COMPILED BY G.G.C. & B.K.  
BORING DATE June/61. CHECKED BY G.G.C.

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

LEGEND Lab vane - - - - - ⊕

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

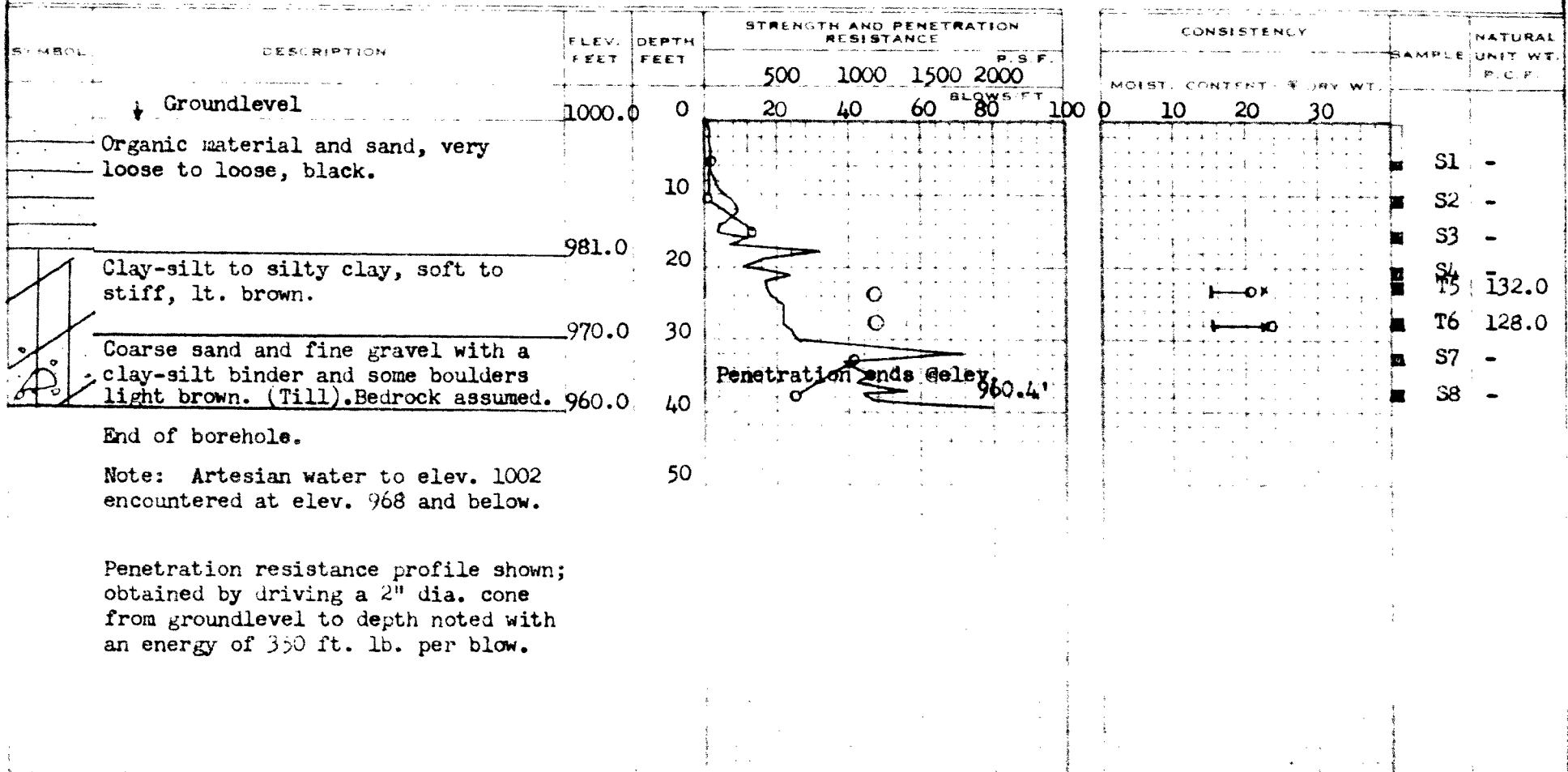


# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 9  
JOB 61-F-52 STATION 225+45 30' Rt.  
Geodetic  
DATUM 1000± COMPILED BY G.G.C. & B.K.  
BORING DATE June/61. CHECKED BY G.G.C.

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — ○  
VANE TEST ( $C$ ) AND SENSITIVITY ( $S$ ) — +  
NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
LIQUID LIMIT — L<sub>L</sub>  
PLASTIC LIMIT — P<sub>L</sub>

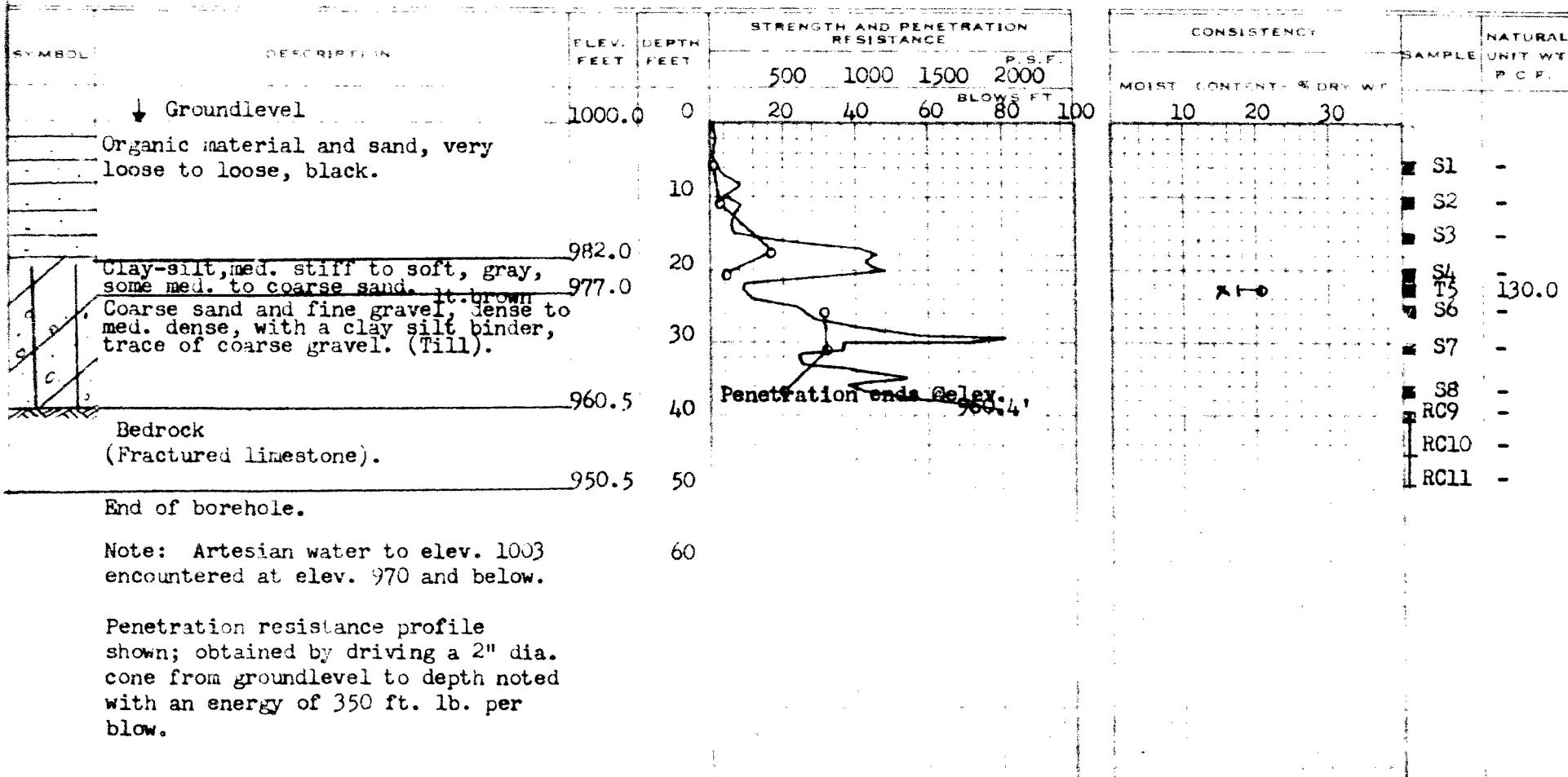


# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 10  
 JOB 61-F-52 STATION 225+55 33' Lt.  
 Geodetic  
 DATUM 1000+ COMPILED BY G.G.C. & B.K.  
 BORING DATE June/61. CHECKED BY G.G.C.

## LEGEND

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



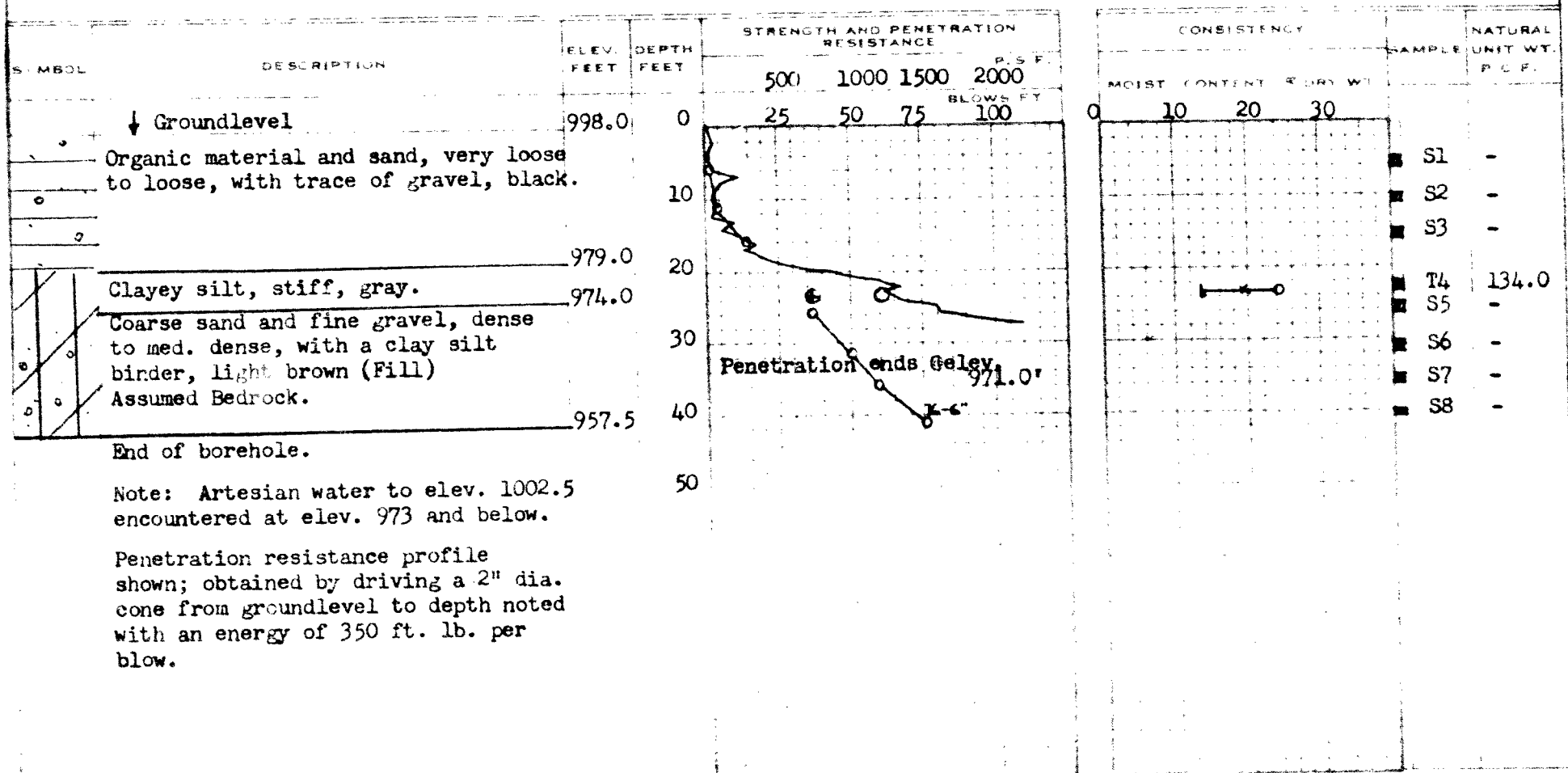
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 11  
 JOB 61-F-52 STATION 226+55 25' Lt.  
 Geodetic  
 DATUM 9987 COMPILED BY G.G.C.&B.K.  
 BORING DATE June/61. CHECKED BY G.G.C.

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

LEGEND Lab vane - - - - - ⊕

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



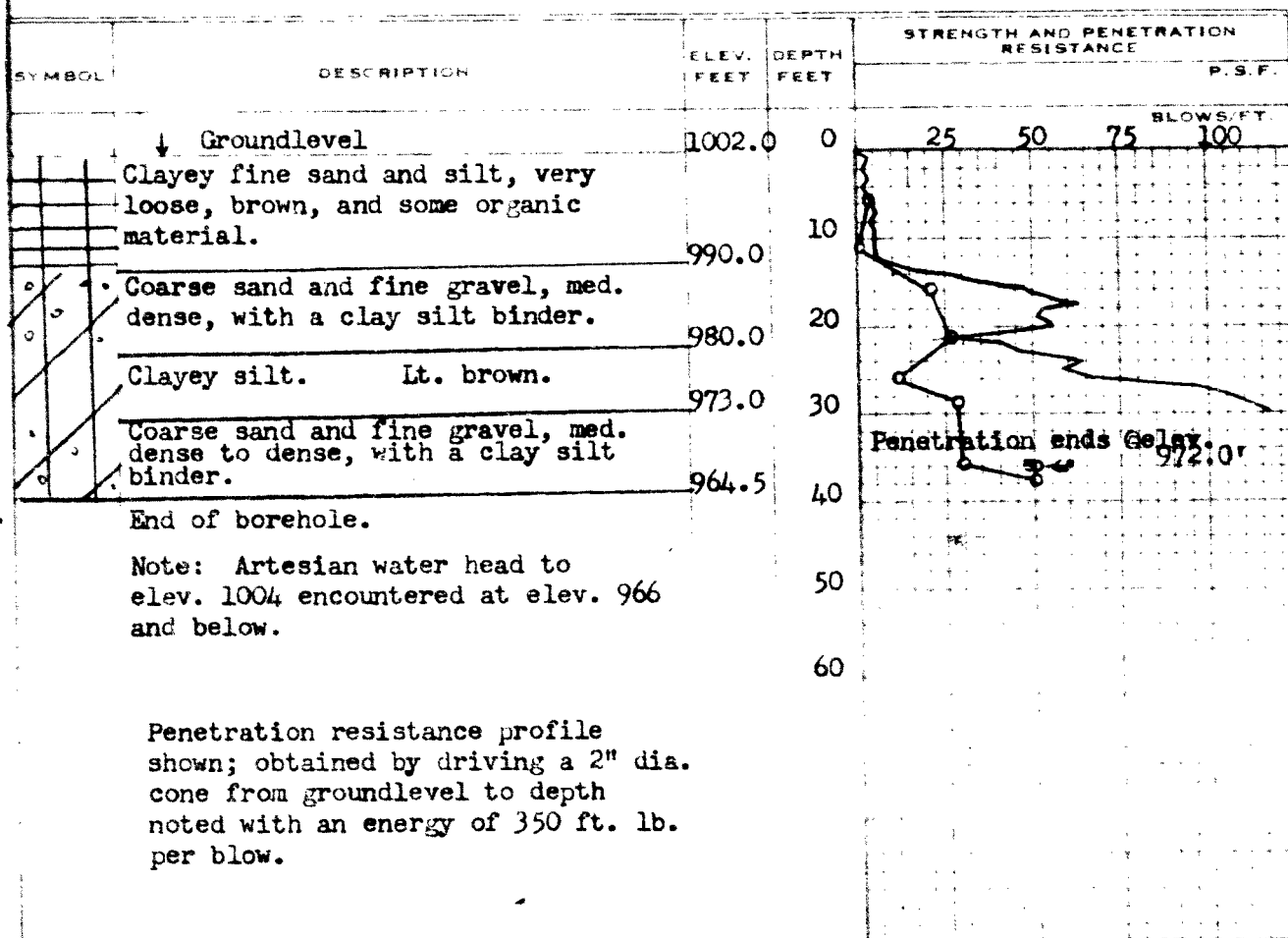
# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 9-60 BORE HOLE NO. 12  
 JOB 61-F-52 STATION 228/20 30' Lt.  
 Geodetic  
 DATUM 1002± COMPILED BY G.G.C. & B.K.  
 BORING DATE June/61. CHECKED BY G.G.C.

### LEGEND

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



CONSISTENCY		SAMPLE	NATURAL	
MOIST. CONTENT - % DRY WT.			UNIT WT.	P.C.P.
		S1	-	
		S2	-	
		S3	-	
		S4	-	
		S5	-	
		S6	-	
		S7	-	
		S8	-	

OFFICE LOCATION -

DOWNSVIEW AVE.,

7 EEELE ST. - HIGHWAY 401

TORONTO, ONTARIO.



ONTARIO

DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS -

DEPARTMENT OF HIGHWAYS

PARLIAMENT BUILDINGS,

TORONTO 5, ONTARIO.

Bridge Division,  
June 2, 1961.

MEMORANDUM TO:

Mr. N. D. Smith,  
Materials & Research Branch,  
Department of Highways,  
Downsview, Ontario.

*Conver*  
*WP 16-60-142*

RE: W.P. 9-60  
Wingham Bypass  
Highway 86 Revision  
District #3

The above project involves placing the permanent embankments, leaving gaps for the future permanent structures, and spanning these gaps with bailey bridging at this time.

The attached portion plan 7-B-225 shows line E, the proposed location of the Bypass, and we have marked in red the approximate centre lines of the piers and abutments proposed for the permanent structures.

As Soil information is required to determine the lengths of piles needed for the bailey bridges we recommend that the soil investigation for the permanent structures be made at this time.

The work for this project is planned for this summer and the design of the bailey structures is now proceeding. We would appreciate, therefore, having an early reply as to the length of piles required. The complete report could follow in due course.

The profile shows the deck of the west structure at approximately 1020 and of the east structure at approximately 1018.5.

A handwritten signature in cursive script, appearing to read "Gavin Scott".

GS/et

Gavin Scott,  
Bridge Location Engineer.

cc. S. McCombie  
cc. E. VanBeilen  
cc. A. Gater

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

July 18, 1961.

PRELIMINARY REPORT -

W.P. 9-60 -- W.J. 61-F-52.

Attention: Mr. Gavin Scott

Re: Hwy. #86 - Wingham  
District #3, Stratford.

This Section has recently completed a foundation investigation at the above noted site.

In general, the subsoil consists of 10 - 20' of loose sand with organics overlying a medium dense to dense deposit of coarse sand and fine gravel with a clay-silt binder (Till). Occasional pieces of coarse gravel, cobbles and boulders were encountered in this material. Boreholes placed near the river bank showed that a deposit of soft, clayey silt between 5 and 10' in thickness is sandwiched between the loose sand and the underlying sand and gravel.

Fractured limestone bedrock was found under the deposit of sand and gravel at elevations varying between elev. 950 and 960'. Artesian water originating in the bedrock was encountered in all boreholes at various depths, with the highest artesian water contact being at elev. 980'. The water had a head rising to elev. 1003-1004'.

Since existing ground level is at elev. 1000  $\pm$ , the length of piles to bedrock will vary between 40 and 50'. No difficulty should be encountered in driving 'H' piles to bedrock to support the Bailey Bridges. However, some twisting of the piles while driving, may be encountered due to the presence of pieces of coarse gravel, cobbles and boulders in the sand and gravel.

It is not anticipated that any artesian water will flow up around the piles due to the essentially granular nature of the underlying material. If artesian flow did occur, it would not be of any serious consequence in the case of temporary piles driven for construction of the Bailey Bridge. However, if this condition occurred during construction of the permanent bridge footings, it would be necessary to take corrective measures.

cont'd. /2 ...



- 2 -

We hope this information will allow you to proceed with your design work. The complete Foundation Report will be sent to you as soon as it is finished.

If we can be of any further assistance, please contact our Office.

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

*per Alston*

*for* (G.G. Cherrington,  
PROJECT FOUNDATION ENGR.)

GCC/MdeF

cc: Foundations Office  
Gen. Files.

MEMORANDUM

*Ken Selby*  
*23 Nov/64*

To: Mr. A. Stermac,  
Principal Foundation Engineer,  
Lab. Bldg, Room 107

FROM: Bridge Division,  
Downsview, Ontario.

DATE: November 17, 1964.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 16-60-1 (61-F-52 A & B)  
Bridge Site 12-70  
Maitland River Relief Bridge  
Hwy. 86 - Dist. 3

We are sending to you herewith two prints of preliminary plan D-5596-P of the above structure.

Would you please let us have your written comments.

*N. Zoltay*

NZ/sp

N. Zoltay,  
for G. Scott,  
Regional Bridge Location Engineer.

cc. S. McCombie  
G. Scott  
N. D. Smith  
R. Fitzgibbon

*OK. H. L. Selby*

DEPARTMENT OF HIGHWAYS ONTARIO  
MEMORANDUM

*Ken Selby*  
*23 Nov/64*

To: Mr. A. Stermac,  
Principal Foundation Engineer,  
Lab. Bldg., Room 107

From: Bridge Division,  
Downsview, Ontario.

Date: November 17, 1964.

Our File Ref.

In Reply To

SUBJECT: W.P. 16-60-2      *61-F-52 A & B*  
Bridge Site 12-70  
Maitland River Relief Bridge  
Hwy. 86 - Dist. 3

We are sending to you herewith two prints of preliminary plan D-5597-P of the above structure.

Would you please let us have your written comments.

*N. Zoltay*

NZ/sp

N. Zoltay,  
for G. Scott,  
Regional Bridge Location Engineer.

cc. S. McCombie  
G. Scott  
N. D. Smith  
R. Fitzgibbon

*OK*      *1-1-65*

Mr. S. McCombie,  
Bridge Planning Engr.,  
Bridge Division.

Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Attention: Mr. N. Zoltay

December 8, 1964

Maitland River Relief Bridges -  
Hwy. #86 -- District #3.  
W.P. 16-60-1 & 2 -- W.J. 61-F-52

We have reviewed Preliminary Plans D5596-P and D5597-P, for the above-mentioned structures with regard to the subsoil conditions as reported in our Foundation Report 61-F-52.

We believe the foundation design for both structures to be satisfactory.

*A. G. Sternac*

KGS/MdeF  
cc: Foundations Office/  
Gen. Files

A. G. Sternac,  
PRINCIPAL FOUNDATION ENGINEER

## MEMORANDUM

To: Mr. A. Stermac,  
Principal Foundation Engineer,  
Room 107, Lab. Bldg.

From: Bridge Division,  
Downsview, Ontario.

Date: December 16, 1964.

Our File Ref.

In Reply To

SUBJECT: W.P. 16-60-1  
Bridge Site 12-70  
Maitland River Relief Bridge  
Highway #86 - District #3

Please find herewith one copy of the revised Preliminary Plan D-5596-P2 for the above structure. Plan D-5596-P, issued November 17th 1964 is superseded. Please destroy the copy which is in your possession.

The revised Preliminary Plan shows the bridge shifted 33' easterly in order to eliminate the removal of a sanitary sewer.

The change being minor we assume you have no objection to our proposals otherwise we would be glad to receive your answer within the next two weeks.



NZ/im  
cc. S. McCombie  
cc. G. Scott  
cc. R. Fitzgibbon  
D. SMITH

N. Zoltay,  
for G. Scott,  
Regional Bridge Location Engineer.