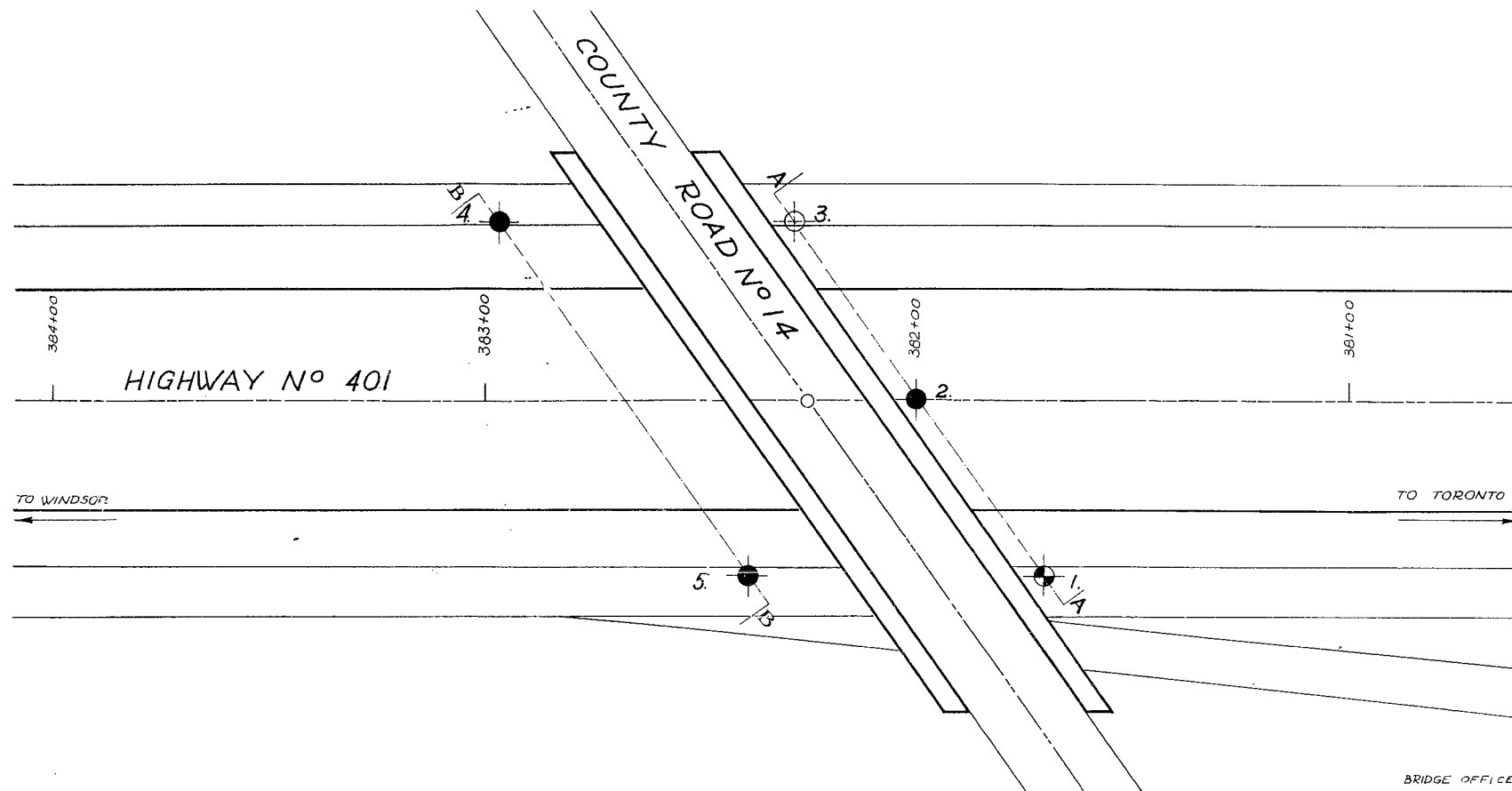
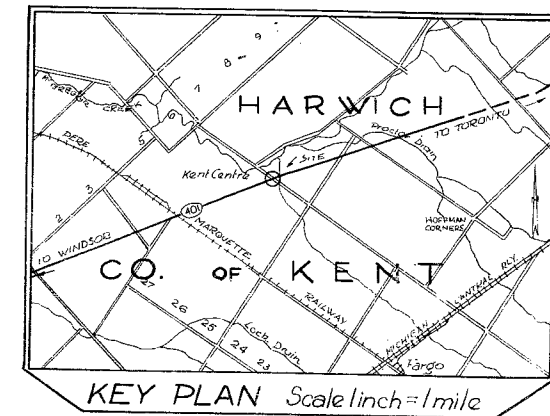


#59-F-76
W.P. 82-59
HWY. #401 E
CTY. RD. #14
CROSSING

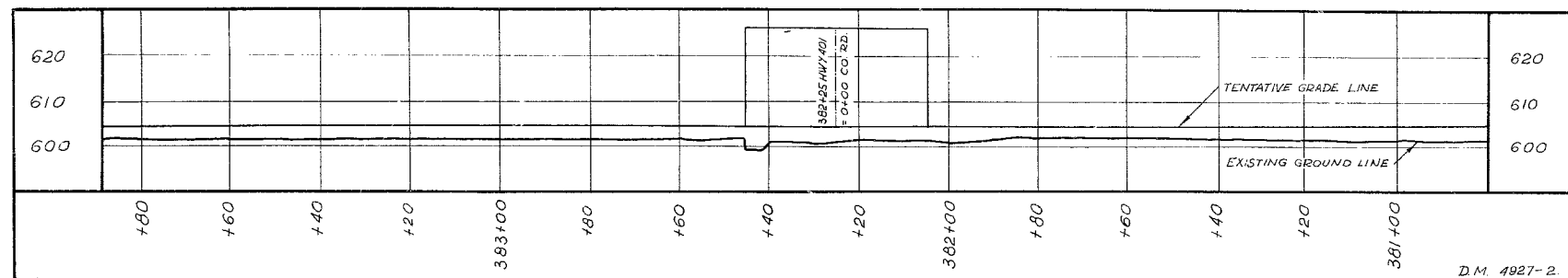


PLAN

BRIDGE OFFICE
DRAWING BW-285



KEY PLAN Scale 1 inch = 1 mile



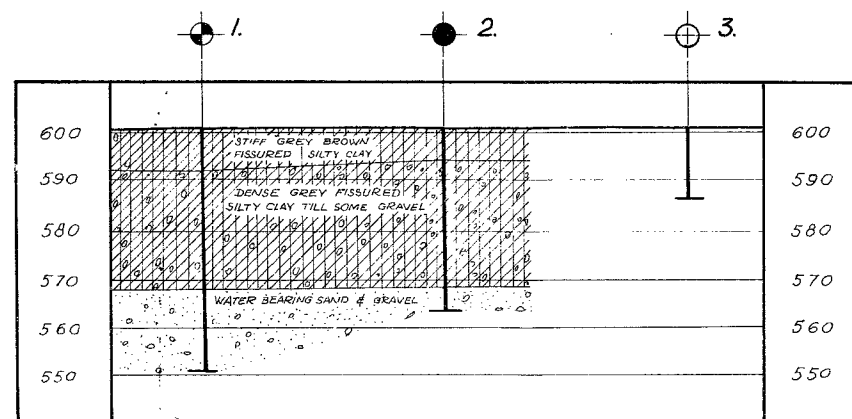
PROFILE

D.M. 4927-2

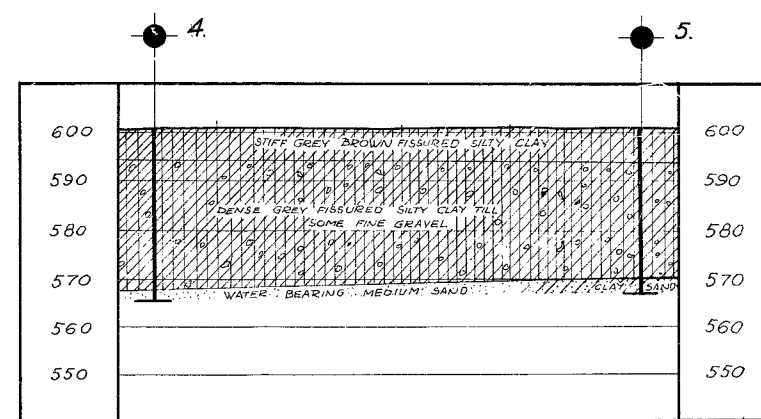
LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE No.	ELEVATION	STATION	DISTANCE FROM E
1.	601.0	381+70	40' LT.
2.	601.0	382+00	£
3.	601.0	382+26	41' RT.
4.	601.0	382+96	41' RT.
5.	601.0	382+38	40' LT.

- 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.



A - A



B - B

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
COUNTY ROAD No 14. PROPOSED CROSSING			
SHOWING POSITIONS & ELEVATIONS OF HOLES			
HWY 401	DISTRICT 1	COUNTY KENT	
TOWNSHIP HARWICH	LOT 25-26	CON I.W.C.R.-E.C.R.	
LOCATION KENT CENTRE			
DRAWN BY T. Szegvary	CHECKED BY	W.P. 82-59	
DATE 21 AUG. 1959.	APPROVED BY		
SCALE 1 inch = 20 feet			F 59-76 A.

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

February ., 1960.
D.H.O. FOUNDATION REPORT -
W.P. 82-59 -- W.J. F-59-76.

Re: Hwy. 401 & County Road No. 14 Crossing
at Kent Centre -- District No. 1.

We have completed a subsoil investigation at the above noted structure location where proposed Hwy. 401 underpasses County Road No. 14 at Kent Centre. Presented herein are the results of our field and laboratory findings, as well as our recommendations for the foundation of the structure.

SITE INVESTIGATION:

During the period of the 14th and 17th of July, 1959, 4 sampled boreholes and one separate cone test were carried out by a trailer-mounted continuous flight auger, adapted for soil sampling. Conventional auger boring procedures were followed and samples were recovered by means of a split barrelled spoon sampler, or using thin-walled Shelby tubes. The dimensions of the spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. Upon recovery, samples were visually examined and classified at the site and wax-sealed or placed in moisture proof containers for transport to our laboratory. Upon receipt in the laboratory, samples were visually examined and identified. Triaxial shear and routine index tests were performed on selected representative samples. Results of our field and laboratory tests have been presented in

SITE INVESTIGATION: (cont'd.) ...

the borehole logs and are summarized in Table No. 1. The locations of the boreholes as well as their subsoil profile, are shown in the accompanying Drawing No. F-59-76A.

Subsoil consists of a dense clay till stratum underlain by a layer of water-bearing sand and gravel. According to our boring data in the vicinity of this site, this layer of water-bearing sand and gravel is, in turn, underlain by dense clay till, which extends a considerable depth to bedrock. The upper portion of the silty clay till has been subjected to oxidation, resulting in its present brownish colour. Below the oxidized zone, the colour is predominantly grey. The silty clay till exists in a dense condition with shear strengths well in excess of 3000 p.s.f. measured in the laboratory. It contains some gravel and occasional boulders and is fissured throughout the stratum. The average unit weight and moisture content were found to be 134 p.c.f. and 15%, respectively. Atterberg Limit tests show that the silty clay till is of very low plasticity.

An artesian water condition was noted at approximately Elev. 568' in each of the sampled boreholes where the layer of sand and gravel was encountered during the exploration programme. The excess hydrostatic head reached Elev. 582' in each of the sampled boreholes. The critical elevation below which 'piping' will occur during footing excavations, has been estimated to be at 575'.

FOUNDATION CONSIDERATIONS:

The dense clay till stratum is competent to provide satisfactory foundation support for the structure. Strength and compressibility characteristics are such that spread footing support can be obtained in the clay till at Elev. 595' or below. At this elevation or below, for footings typically 7' to 10' wide, an allowable bearing pressure of at least 3 t.s.f. can be used for design. Little settlement of any consequence, need be anticipated.

cont'd. /3 ...

FOUNDATION CONSIDERATIONS: (cont'd.) ...

The impermeable nature of the clay till will allow footing excavations to be carried out in the dry. To avoid 'piping' during footing excavations, footings should not be placed below Elev. 575'.

Under the proposed grade line of County Road No. 14, the maximum height of fill is approximately 25 ft. The subsoil can safely support this proposed embankment loading.

CONCLUSIONS & RECOMMENDATIONS:

- (1) The site is underlain by a dense clay till stratum followed by a layer of water-bearing sand and gravel, which, according to our previous boring data, in this locality, is in turn, underlain by a dense clay till stratum extending to bedrock.
- (2) Subsoil conditions are such that spread footing support can be obtained at Elev. 595' or below. For footings typically 7' to 10' in width, an allowable footing pressure of at least 3 t.s.f. is recommended. Little settlement of any consequence, need be anticipated.
- (3) No ground water seepage problems during footing excavations are anticipated if footings are placed above Elev. 575'.
- (4) No approach fill stability problems are anticipated.

If there are any queries concerning the contents of this report, please contact the Foundation Section.

AKL/MdeF

Encis.

cc: Messrs. A. M. Teye (2)
H. A. Tregaskes
D. G. Ramsay
A. Gater
G. U. Howell
J. Roy
A. Watt
Foundation Section
Gen. Miles.

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

AKGL
(A. K. Loh,
PROJECT FOUNDATION ENGR.)

APPENDIX I.

TABLE NO. 1.

SUMMARY OF FIELD & LABORATORY TESTS

JOB F 59-76

W.P. 82-59

[illegible]

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETR REFR T. BLOWS FT	MOIST CONT.	PLASTIC LIMIT	LIQUID LIMIT %	SHEAR STRENGTH PSI	UNIT WEIGHT PCF	REMARKS
5	S1	5' - 6.5'	Dense grey fissured silty clay till, some gravel.	14	27.2	-	-	-	123.6	Occasional boulders in the clay till throughout
	S2	10'-11.5'	" " " " " "	20	16.1	-	-	-	137.1	
	S3	15'-16.5'	" " " " " "	24	-	-	-	-	136.1	
	S4	20'-21.5'	" " " " " "	28	13.2	-	-	-	136.1	
	S5	25'-26.5'	" " " " " "	32	15.2	-	-	-	127.5	
	S6	32.5'-33.5'	Water bearing clay sand	85	12.6	-	-	-	-	
			S - Denotes Split Spoon T - Denotes Thin-Walled Shelby Sample C - Denotes Chunk Sample							

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 82-59 BORE HOLE NO. 1
JOB F 59-76 STATION See Drawing
DATUM 601.0' COMPILED BY BK
BORING DATE July 14/59 CHECKED BY AL

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE				P.S.F.	CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.			
				2000	4000	6000	8000		MOIST. CONTENT - % DRY WT.							
				25	50	75	100	B.LWS./FT.	10	20	30					
	↓ ground level Topsoil	601.0	0									S1	-			
	Stiff grey-brown fissured silty clay	592.0	10												S2	-
	Dense grey fissured silty clay till, some gravel.		20												S3	131.8
			30										T4	133.6		
		568.0	40												T5	133.7
	Water bearing sand & gravel		50												T6	138.0
			60										T7	134.6		
		551.0	70												S8	130.1
	End of borehole		80													
	Artesian water condition at Elev. 562':-- excess hydrostatic head reached Elev. 582.0'															
	Cone penetration:- 350 ft. lb. with 2" Dea. cone.															

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 82-59 BORE HOLE NO. 2
JOB F 59-76 STATION See Drawing
DATUM 601.0' COMPILED BY BK
BORING DATE July 15/59 CHECKED BY AL

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				2000	4000	6000	8000
	↓ ground level			25	50	75	100
	Topsoil	601.0	0				
	Stiff grey-brown fissured silty clay.	594.0	10				
	Dense grey fissured silty clay till, some gravel		20				
		568.0	30				
	Water bearing sand & gravel	564.0	40				
	End of borehole		50				
	Artesian water condition at Elev. 568.0':- excess hydrostatic head reached Elev. 583'		60				
			70				
			80				

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT - % DRY WT.			UNIT WT. P.C.F.
<pre>graph TD T1 --> T2 T2 --> T3 T3 --> T4 T4 --> T5 T5 --> S6 S6 --> S7 T1 --> T3 T2 --> T4</pre>		T1	
		T2	136.6
		T3	134.2
		T4	
		T5	132.5
		S6	-
		S7	-

B.H. No. 2

W.P. 82-59 BORE HOLE NO. 3
JOB F 59-76 STATION See Drawing
DATUM 601.0' COMPILED BY BK
BORING DATE July 16/59 CHECKED BY AL

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	
	↓ ground level	601.0	0	25 50 75 100 BLOWS/FT.	
			10		
			20	REFUSAL @ Elev. 587'	
			30		
			40		
			50		
			60		
			70		
			80		

Cone Penetration:
350 Ft. Lb. With 2" Dia.
cone.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 82-59 BORE HOLE NO. 4
 JOB F 59-76 STATION See Drawing
 DATUM 601.0' COMPILED BY BK
 BORING DATE July 16/59 CHECKED BY AL

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			SAMPLE	NATURAL UNIT WT. P.C.F.
				P.S.F.		MOIST. CONTENT - % DRY WT				
	↓ ground level			BLOWS/FT.		10	20	30		
	Topsoil	601.0	0	25	50	75	100			
	Stiff grey-brown silty clay	594.0	10						S1	132.7
			20						S2	134.1
	Dense grey fissured silty clay till, some gravel		30						S3	132.6
			40						S4	140.0
			50						S5	132.4
	Water bearing medium sand	568.0	60						S6	-
	End of borehole	566.0	70							
			80							
	Artesian water condition at Elev. 568.0':- excess hydrostatic head reached Elev. 583'.									

B.F. No. 4

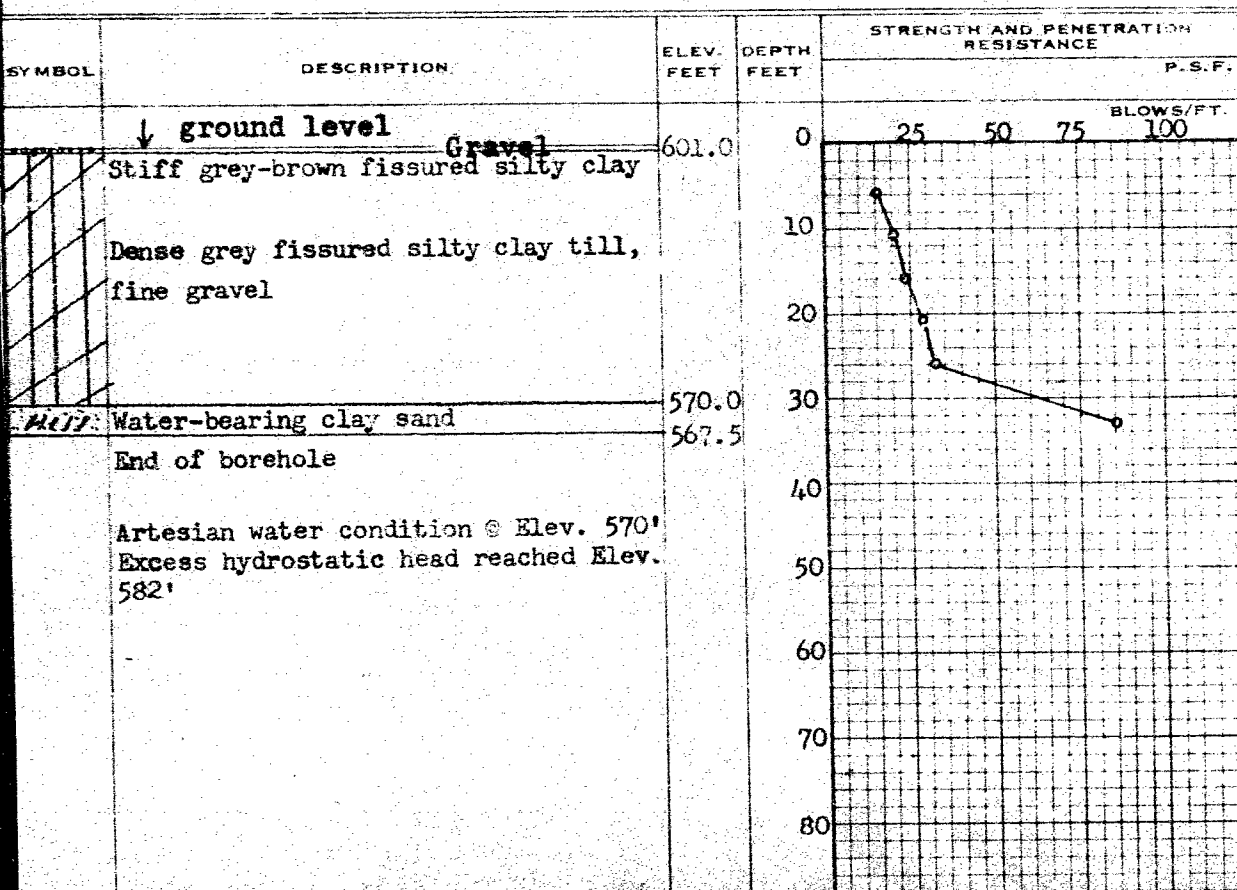
DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 82-59 BORE HOLE NO. 5
JOB F 59-76 STATION See Drawing
DATUM 601.0' COMPILED BY BK
BORING DATE July 17/59 CHECKED BY Al

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



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
10	20	30	
		S1	123.6
		S2	137.1
		S3	136.1
		S4	136.1
		S5	127.5
		S6	--