

59-F-96

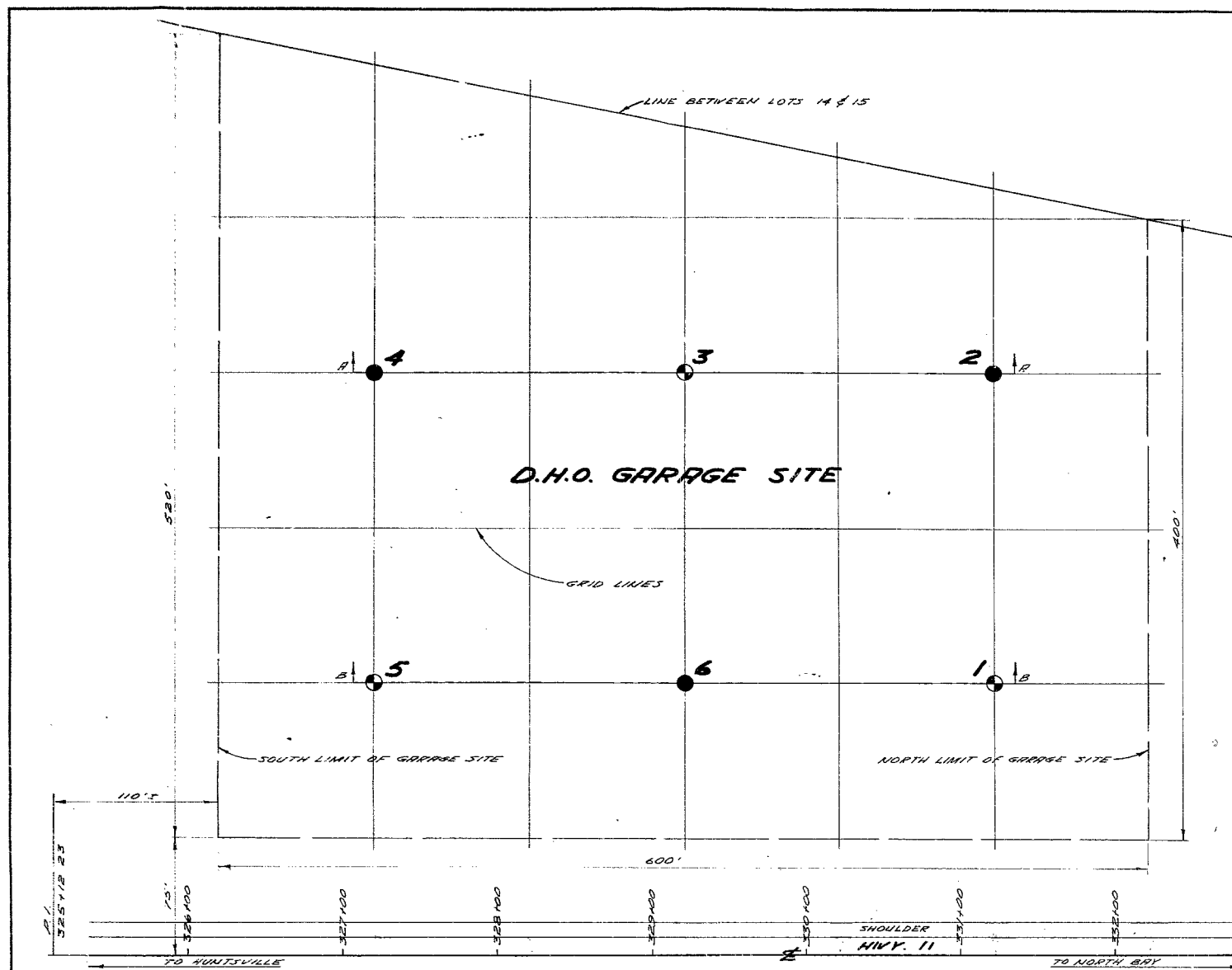
Hwy. #11

PROP. GARAGE

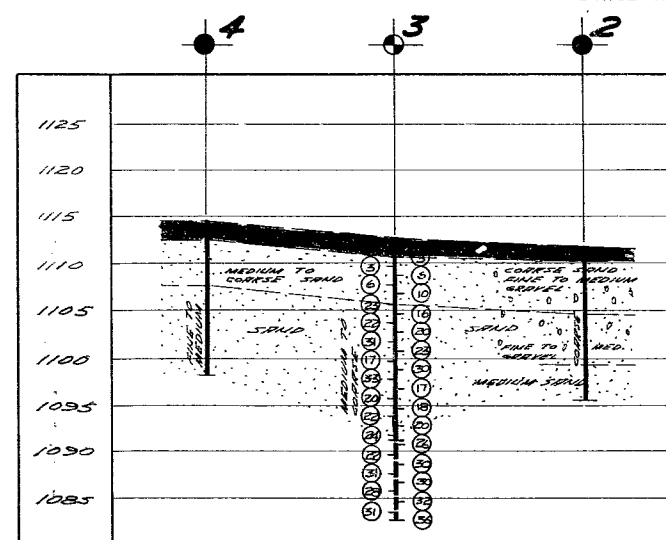
;& PATROL YARD

CON. # 5 AT

EMSDALE

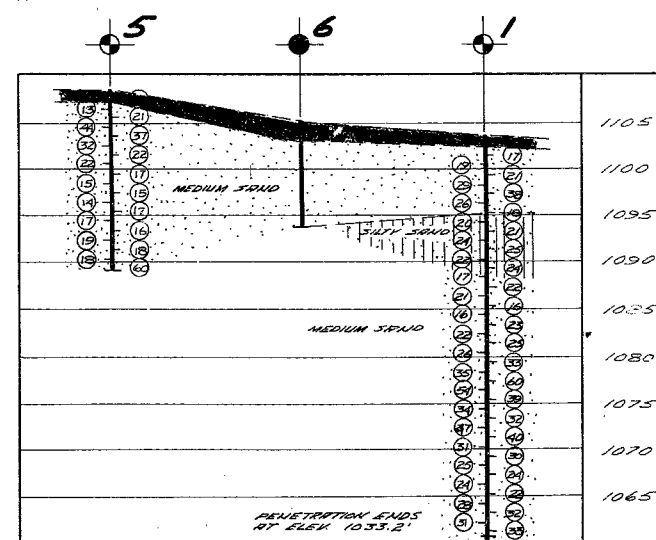


PLAN
SCALE 1IN = 50 FT.

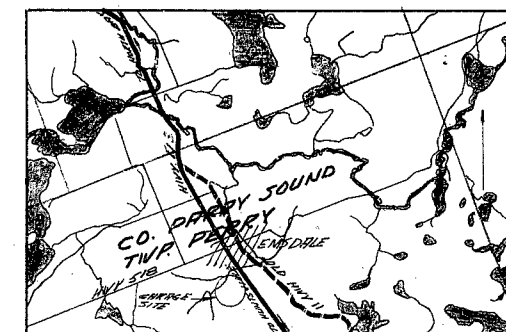


A-A

(1) PENETRATION BLOWS PER FOOT



B-B



KEY PLAN

SCALE:
1in. = 1mi.

LEGEND

- BORE HOLE
- PENETRATION HOLE
- BORE & PENETRATION HOLE

BORE HOLE NO.	ELEVATION	STATION	DISTANCE FROM E.
1	1103.2	331+1/6	175' LT.
2	1111.7	331+1/6	375' LT.
3	1112.7	329+1/6	375' LT.
4	1114.7	327+1/6	375' LT.
5	1108.7	327+1/6	175' LT.
6	1105.2	329+1/6	175' 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

**EMSDALE GARAGE
PROPOSED SITE**

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY. 11	DISTRICT 11	COUNTY PERRY SOUND
TOWNSHIP PERRY	LOT 15	CON. 2
LOCATION ST. EMSDALE	DRAWN BY: J. MELLORE	CHECKED BY: M.D.
DATE 22 SEPT 59	APPROVED BY: M.D.	DRAWING NO. F59-96A
SCALE AS SHOWN		

Dist. 28-11.

Mr. F. H. Cavell,
Superintendent of Building
Services.
Materials & Research Section.

September 25, 1959.

Re: Ensdele Garage and
Patrol Yard.
W.J. 59-96 - Dist. 11.

Attention: Mr. J. Hamilton.

Enclosed herewith is our foundation report for the proposed garage and patrol yard. The results of the investigation carried out, indicate that the subsoil is underlain by a competent stratum of free-draining, granular material consisting of fine to medium sand with a small percentage of gravel.

It has been recommended that the structure be supported on spread footings with the least width of 2 feet, founded at a minimum depth below final grade elevation, of 5 feet. The design footing pressure has been given as 2 tons/sq.ft.

Information from local residents indicates that domestic sources of water have been obtained at a depth of 50 feet at this site.

If we can be of further assistance in connection with the above, please do not hesitate to contact the Foundation Section.

L. G. Soderman
for

LCB/mdeF
Encl.

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

cc: Messrs. F. H. Cavell (2)
H. A. Tregaskes
H. D. McMillan
C. Packaberry
H. C. Dernier
P. Arkema
Foundation Section.
Gen. Files

FOUNDATION INVESTIGATION

for

Proposed D.H.O. Garage and Patrol Yard
at Emsdale,

Cty. of Parry Sound, Twp. of Perry,
Conc. V, Lot (Part of) 15 - Dist. 11.

W.J. F59-96.

Presented in this report are the results of an investigation carried out on Sept. 16th, 1959, at the site of the proposed D.H.O. garage and patrol yard on the West side of Hwy. #11 of the northern end of the Town of Emsdale.

DESCRIPTION OF THE SITE:

The site is mainly fairly flat at the West end, dipping about 5 ft. towards the East end. The area in the vicinity of the site is pasture land with a few scattered trees on the western portion of the proposed garage site. A small creek crosses Hwy. #11 approximately 1/2 mile South of the proposed site.

DESCRIPTION OF FIELD WORK:

The investigation consisted of 6 boreholes, carried out by a skid-mounted core-drill machine adapted for soil sampling. Conventional wash boring procedures were followed and samples were recovered at depths required. Samples were obtained by means of 2" O.D. split barrellled spoon sampler. The dimensions of this spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test.

In addition to the sampled boreholes, three dynamic cone penetration tests were carried out.

cont'd. /2 ...

DESCRIPTION OF FIELD WORK: (cont'd.) ...

At the time of the investigation, no drawing showing the proposed locations of the buildings was available. Therefore, the site was divided into a 100 x 100 ft. grid as shown on the drawing included in this report.

Elevations shown have been determined by hand level only, and are believed to be correct to ± 6 inches. All levels are referenced to the top of the pavement (C of Hwy. 11) at Station 330+22.23 (Elev. 1103.7).

Upon receipt in the laboratory, samples were visually examined and identified. Routine index tests were carried out on selected representative samples.

Laboratory and field test results have been summarized in Table No. 1 and are included in this report under Appendix I.

Drawing No. F 59-96A shows the borehole locations and the estimated subsoil stratigraphy.

SUBSOIL CONDITIONS:

The proposed site is underlain by grey-brown medium sand. In each of the sampled boreholes, topsoil, described as dark-brown silty sandy soil, was found to be approximately 18" to 24" in thickness. Underneath this material, medium sand was encountered and found to be continuous over the site. The upper zone of the sand stratum has been subjected to oxidation resulting in its present brownish colour. Below the oxidized zone, the colour is predominantly greyish brown. The average moisture content was found to be 9%. Standard Penetration tests carried out during sampling gave 'N' values varying from 16 to 40 blows with an average value considered to be 18.

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

Based upon this average 'H' value, the properties of the sand layer, are as follows:-

$$\begin{aligned} N &= 15 \\ \phi &= 32^\circ \\ \gamma &= 100 \text{ p.c.f.} \\ N_\gamma &= 13 \\ N_q &= 15 \end{aligned}$$

WATER CONDITIONS:

Observations and measurements carried out during the exploration programme, indicate that the ground water table is approximately at Elev. 1064.00. In view of the fact that no artesian water conditions or water-bearing sand seams were encountered during the exploration programme, seepage in-flow during footing excavations, will be local and of minor quantities.

RECOMMENDATIONS:


- (1) The strength and compressibility characteristics of the sand stratum underlying the topsoil, are such that spread footings can be founded in this layer at a recommended depth of 5 ft. below existing ground surface.

For perimeter strip footings or individual square footings, an allowable bearing pressure of 2 tons/sq. ft., incorporating a safety factor of 2.5, can be used. Perimeter strip footings should have the least width of 2 feet.

cont'd. /4 ...

RECOMMENDATIONS: (cont'd.) ...

- (2) Ground water conditions are such that excavations to place footings at the above recommended depth, should be sensibly dry. Seepage that does occur, will be the result of the prevailing weather conditions.
- (3) In the area of the service roads, parking lot, etc., the topsoil should be removed. Where no grading is required, it will be sufficient to place 9 inches G.B.C. class 'A' directly upon the sand subsoil. This same thickness of base course will be adequate if the fill material for graded areas is of a granular nature. If the fill material consists of a cohesive type material, this material should be well compacted and the base course materials for roads and parking lots should consist of 18 inches G.B.C. class 'B', topped with 6 inches G.B.C. class 'A'.
- (4) Where the base course has been prepared as specified in the preceding recommendation, a 4-inch thickness of H.L.-4 pavement is recommended.
- (5) Information obtained from local residents, indicates that domestic wells in the area have been developed at a depth of approximately 50 ft. below existing ground surface. The quantity of water to be expected at this depth at this site, has not been proven by our Section.

for 
M. Devata,
Project Foundation Engr.

APPENDIX I.

SUMMARY OF FIELD & LABORATORY TESTS

JOB F 59-96

W.P. -

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	4'-5.5'	Brown medium sand	22	9.6	-	-	-	-	
	S2	8'-9.5'	Grey-brown silty sand	23	18.0	-	-	-	-	
	S3	12'-13.5'	"	20	18.7	-	-	-	-	
	S4	17'-18.5'	Grey medium sand	13	19.4	-	-	-	-	
	S5	22'-23.5'	"	16	13.1	-	-	-	-	
	S6	27'-28.5'	Layers of grey and brown medium sand	49	-	-	-	-	-	
	S7	32'-33.5'	"	44	-	-	-	-	-	
	S8	40'-41.5'	"	35	20.9	-	-	-	-	
2	S1	4.0'-5.5'	Brown coarse sand with fine to medium gravel	44	4.4	-	-	-	-	
	S2	7' - 8.5'	Light brown coarse sand with fine to medium gravel	28	8.8	-	-	-	-	
	S3	10'-11.5'	"	53	6.1	-	-	-	-	
	S4	15'-16.5'	Grey brown medium sand	46	-	-	-	-	-	
3.	S1	4'-5.5'	Brown medium to coarse sand	34	11.5	-	-	-	-	
	S2	7'-8.5'	Grey medium to coarse sand with pockets of brown sand	32	12.1	-	-	-	-	
	S3	10'-11.5'	"	30	14.1	-	-	-	-	
	S4	15'-16.5'	"	22	7.0	-	-	-	-	
	S5	20'-21.5'	"	26	8.5	-	-	-	-	
4.	S1	4'-5.5'	Brown medium to coarse sand	39	9.0	-	-	-	-	
	S2	7'-8.5'	Grey fine to medium sand	33	14.3	-	-	-	-	
	S3	10'-11.5'	"	20	4.9	-	-	-	-	
	S4	15'-16.5'	"	25	7.3	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB F 59-96

W.P. -

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	S1	4'-5.5'	Light brown medium sand	45	7.3	-	-	-	-	
	S2	7'-8.5'	"	27	7.9	-	-	-	-	
	S3	10'-11.5'	Grey brown medium sand	22	7.8	-	-	-	-	
	S4	15'-16.5'	"	26	7.7	-	-	-	-	
	S5	20'-21.5'	"	28	11.3	-	-	-	-	
6	S1	4'-5.5'	Light brown sand	24	6.1	-	-	-	-	
	S2	7'-8.5'	"	28	8.4	-	-	-	-	
	S3	10'-11.5'	Grey brown medium sand	24	8.4	-	-	-	-	
			S Denotes Split Spoon Sample							

DEPARTMENT OF HIGHWAYS - ONTARIO

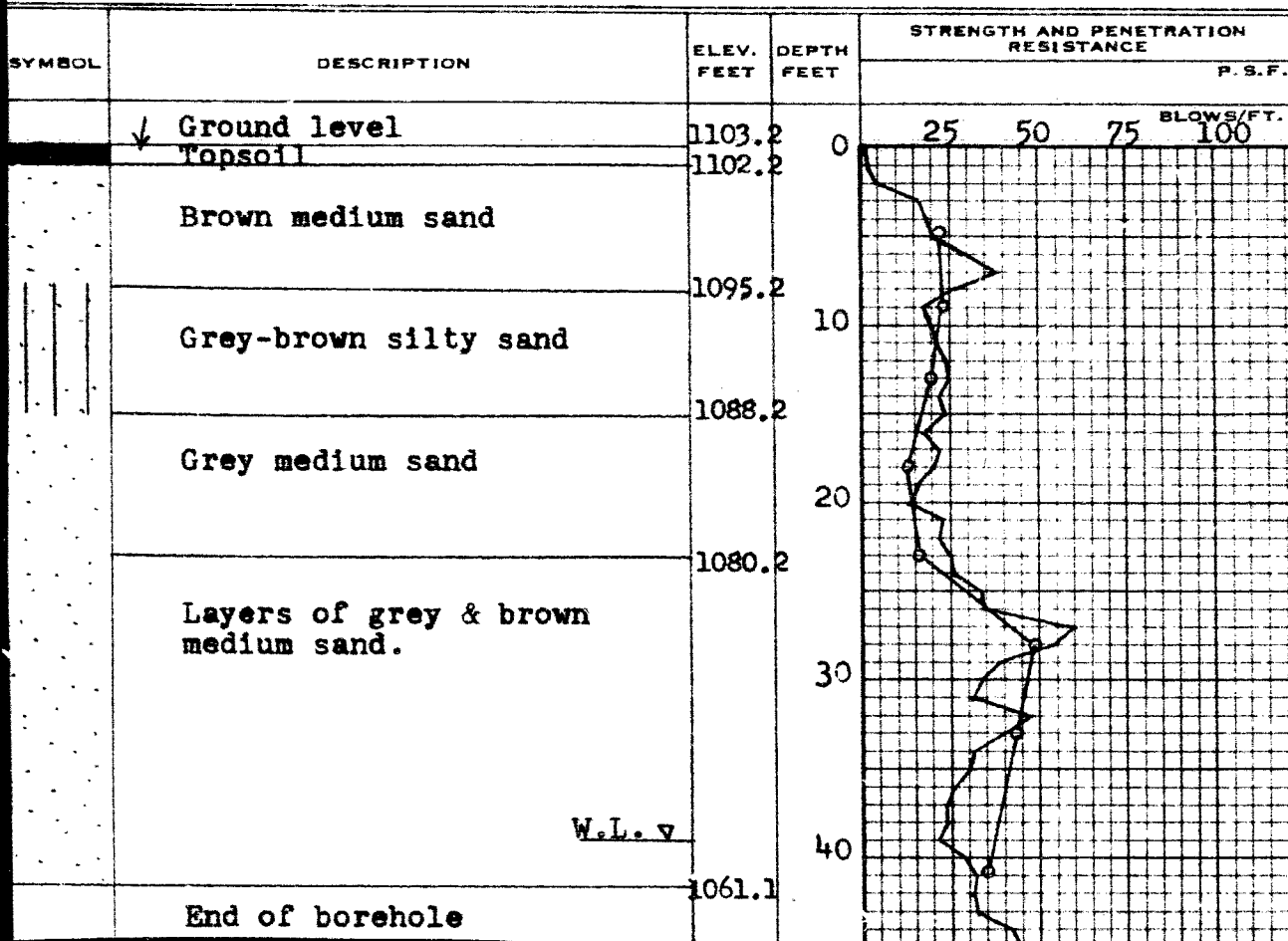
MATERIALS AND RESEARCH SECTION

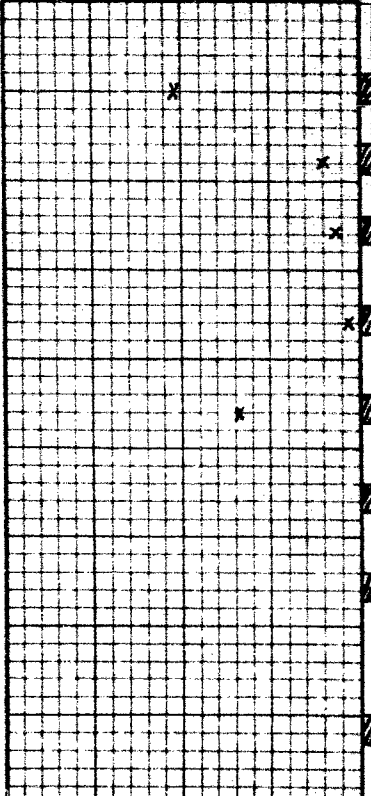
W.P. _____ BORE HOLE NO. 1
 JOB F 59-96 STATION 331+16 (175' Lt)
 DATUM 1103.2' COMPILED BY B.K.
 BORING DATE Sept. 17/59 CHECKED BY M.D.

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

LEGEND

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



CONSISTENCY			SAMPLE	NATURAL UNIT WT P.C.F.
MOIST. CONTENT - % DRY WT.				
5	10	15		
			S1	-
			S2	-
			S3	-
			S4	-
			S5	-
			S6	-
			S7	-
			S8	-

MATERIALS AND RESEARCH SECTION

W.P. _____ BORE HOLE NO. 1 (Cont)

JOB F59-96 STATION 331+16 (175' Lt.)

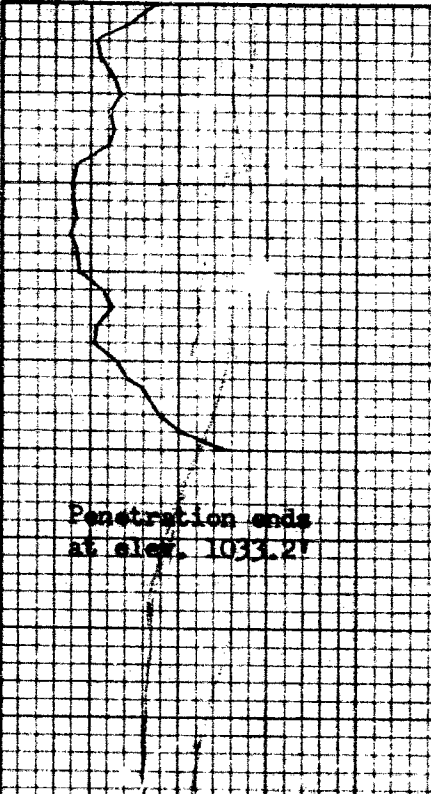
DATUM 1103.2' _____ COMPILED BY BK _____

BORING DATE Sept. 17/59 CHECKED BY M.D.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE				
				P.S.F.				
		1031.2		25	50	75	100	BL/FT.
								
	Cone penetration: 350 ft. lb. with 2" Dia. cone.							

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

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. _____ BORE HOLE NO. 2

JOB F59-96 STATION 331+16 (375' Lt.)

DATUM 1111.2' COMPILED BY B.K.

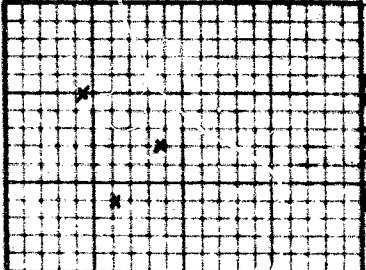
BORING DATE Sept. 18/59 CHECKED BY M.D.

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	
				P.S.F.	BLOWS/FT.
	↓ Ground level	1111.7	0		25 50 75 100
	Topsoil	1110.2			
	Brown coarse sand with fine to medium gravel	1104.7			
	Light brown coarse sand with fine to medium gravel	1099.7	10		
	Grey-brown medium sand	1095.2			
	End of borehole		20		
			30		
			40		

CONSISTENCY		SAMPLE	NATURAL UNIT WEIGHT P.C.F.
MOIST. CONTENT- % DRY WT.			
5	10	15	
			
			S1 -
			S2 -
			S3 -
			S4 -

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. _____ BORE HOLE NO. 3
 JOB F 59-96 STATION 329+16 (375' t.t.)
 DATUM 1112.7' COMPILED BY B.K.
 BORING DATE Sept. 18/59 CHECKED BY M.D.






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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLOWS/FT.
	Ground level	1112.7	0		25 50 75 100
	Topsoil	1110.7			
	Brown medium to coarse sand.	1105.7			
	Grey medium to coarse sand with pockets of brown sand.		10		
			20		
	End of borehole	1191.2			
	Cone Penetration: 350 Ft. lb. with 2" Dia. cone.		30		
			40		

Penetration ends at
elev. 1082.7'

CONSISTENCY		SAMPLE	NATURAL UNIT WT P.C.F.
MOIST. CONTENT - % DRY WT.			
5	10	15	
			S1 -
			S2 -
			S3 -
			S4 -
			S5 -

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. ----- BORE HOLE NO. 4
 JOB E59-96 STATION 327+16 (375' Lt.)
 DATUM 1114.7' COMPILED BY B.K.
 BORING DATE Sept. 19/59 CHECKED BY M.D.

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 -----

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLOWS/FT.
	↓ Ground level	1114.7	0	25 50 75 100	
	Topsoil	1112.2			
	Brown medium to coarse sand.	1107.7			
	Grey fine to medium sand.		10		
		1098.2			
	End of borehole		20		
			30		
			40		

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.				
5	10	15		
			S1	-
			S2	-
			S3	-
			S4	-

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

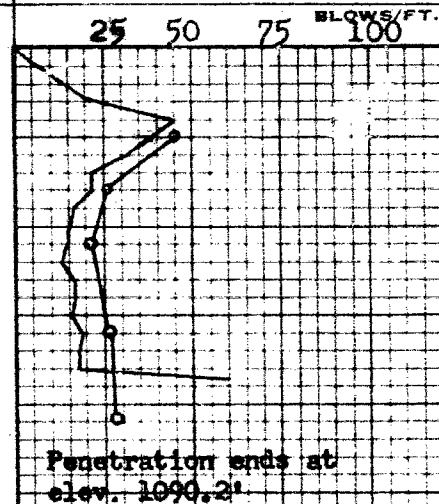
W.P. ----- BORE HOLE NO. 5
 JOB F 59-96 STATION 322+16 (175' Lt.)
 DATUM 1108.7' COMPILED BY BK
 BORING DATE Sept. 19/9 CHECKED BY MD

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.
	↓ Ground level	1108.7	0	25 50 75 100
	Topsoil	1107.2		
	Light brown medium sand			
		1098.7	10	
	Grey-brown medium sand			
		1089.2	20	
	End of borehole			
	Cone penetration: 350 ft. lb. with 2" Dia. cone.		40	



MOIST. CONTENT - % DRY WT.	CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
5 10 15			
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-

DEPARTMENT OF HIGHWAYS - ONTARIO

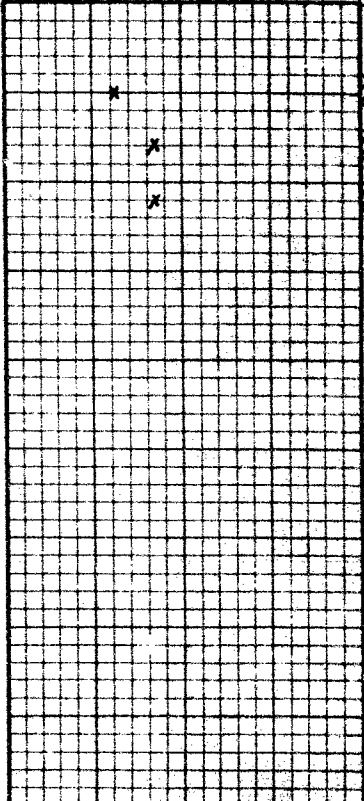
MATERIALS AND RESEARCH SECTION

W.P. _____ BORE HOLE NO. 6
 JOB F59-96 STATION 329+16 (175' Lt.) 2" DIA. SPLIT TUBE _____
 DATUM 1105.2' COMPILED BY B.K. 2" SHELBY TUBE _____
 BORING DATE Sept. 19/59 CHECKED BY M.D. 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 _____

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				P.S.F.			
	↓ Ground level	1105.22	0	25	50	75	100
	Top soil	1103.2					
	Light brown sand	1097.2					
	Grey-brown medium sand	1093.7	10				
	End of borehole		40				

CONSISTENCY			SAMPLE	NATURAL UNIT WEIGHT
MOIST. CONTENT- % DRY WT.				P.C.F.
5	10	15		
			S1	-
			S2	-
			S3	-