

W.P.-110-60

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. L. M. Toye,  
Bridge Engineer,  
Bridge Division.

FROM: Mr. A. G. Stermac,  
Principal Foundation Engr.,  
Foundation Section,  
Materials & Research Division.

Attention: Mr. S. McCombie

DATE: November 14, 1963

OUR FILE REF.

IN REPLY TO

SUBJECT:

FOUNDATION INVESTIGATION REPORT  
For

Proposed New Structures at C.E.W.  
North & South Service Roads, -  
Relocated Lincoln Co. Rd. #22,  
District #4, Hamilton.  
W.J. 63-F-116 -- W.P. 110-60

W.P. 110-60-2 (100 ft.)  
110-60-1 (100 ft.)

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

We believe that you will find the factual data and  
recommendations contained therein, adequate for your future  
design work. Should further information be required, please  
feel free to contact our Office.

AGS/MdeF  
Attach.

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
H. D. McMillan  
G. K. Hunter (2)  
H. Greenland  
T. J. Kovich  
A. Watt

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

Foundations Office ✓  
Gen. Files

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

FROM: F. DeVisser,

DATE: December 27, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 110-60-2 Site 19-179  
County Rd. #22 Underpass  
Q.E.W. South Service Rd. - District 4

63-F-116

Attached is one (1) print of our preliminary plan  
D 5412-P for the subject structure.

If you have any comments, please let me know.

*F. DeVisser*

FDeV/im

F. DeVisser,  
Bridge Location Engineer.

c.c. J. Walter

*Footings should be 6' below ground surface. As the drawing  
provision is made for 6' below ground surface.  
Assumptions are provided on file, which is not mentioned in report  
yet.*

*ENG*

*Jan 3/64*

## MEMORANDUM

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

FROM: F. DeVisser,

DATE: December 27, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 110-60-3 Site 19-180  
County Rd. #22 Underpass  
Q.E.W. North Service Rd. - District 4

63-F-116

Attached is one (1) print of our preliminary plan  
D 5411-P for the subject structure.

If you have any comments, please let me know.

*F. DeVisser*

FDeV/im

F. DeVisser,  
Bridge Location Engineer.

c.c. J. Walter

*S. pier footing is not provided 6' below ground surface as recommended. Abutments are founded on piles, which is not considered in our report yet.*

*BM*

*Jan. 9/64.*

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# FOUNDATION INVESTIGATION

For

Proposed New Structures at Q.E.W.  
North & South Service Roads,  
Relocated Lincoln Co. Rd. #22,  
W.J. 63-F-116 -- W.P. 110-60

District #4 Hamilton

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## 1. INTRODUCTION:

It is proposed to erect two new structures at the proposed crossing of relocated Lincoln County Road #22 and the proposed Q.E.W. North and South Service Roads. The foundation investigation for the main structure over the Q.E.W. is reported under W.J. #60-F-62. The request for the present investigation was received verbally from the Bridge Location Section during September 1963.

A field investigation was subsequently carried out by this section to determine the subsoil conditions existing at the locations of the proposed structures. Presented in this report are the results of this investigation, together with recommendations pertaining to the design of the proposed foundations.

## 2. DESCRIPTION OF THE SITE:

The site is located some 7 miles West of St. Catharines adjacent to the Q.E.W. The surrounding area is generally flat and wood covered.

Physiographically, the site is located in the Iroquois Plain, in the Niagara Fruit Belt. The upper subsoil layers are underlain by decomposed and sound Queenston shale.

3. FIELD INVESTIGATION:

A total of four boreholes and seven dynamic cone penetration tests was carried out during the field investigation. Boring was achieved by means of conventional diamond drilling equipment adapted for soil sampling purposes. Soil samples were obtained by means of a standard split spoon sampler. The dimensions of the split spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. Rock core samples were obtained by means of a BX core barrel. Dynamic cone penetration tests were carried out adjacent to each borehole and also at certain other locations. Driving energy to advance the cone was 350 ft. lbs. per blow.

4. LABORATORY TESTS:

Samples were visually examined and classified at the site as well as in the laboratory.

Laboratory tests were carried out on certain samples to determine the natural moisture content, Atterberg Limits and Grain size distribution. The test results are shown on the borehole record sheets which form part of this report.

5. SOIL TYPES AND SOIL CONDITIONS:

5.1) General:

The subsoil at the site consists of about four different deposits, followed by shale bedrock. The boundaries of the different deposits are shown on the accompanying borelog sheets.



5. SOIL TYPES AND SOIL CONDITIONS: (cont'd.)...

5.1) General:

The estimated stratigraphical profiles and sections shown on Drawings No. 63-F-116A and No. 63-F-116B, are based upon this information. From ground level downwards, the various soil types are as follows:

5.2) Sandy Silt:

In all boreholes except in B.H. #5 a four to five foot thick layer of brown sandy silt was found. The Moisture Content of this material varies from 10% to 35% with an average of about 20%. 'N' values varied from 29 to 58 blows/foot indicating a compact to very dense relative density.

5.3) Grey Clayey Silt, Sand and Gravel:

This layer was encountered in all boreholes and consisted of compact to very dense clayey silt containing some sand and gravels. It is a grey coloured glacial till deposit. The average depth was found to be 12 feet in boreholes No. 1 & #3, and 10.5 feet in boreholes No. 5 & No. 6. The average 'N' value is over 40 blows per foot.

The plastic limit varies from 12% to 18% with an average of 15% and the Liquid Limit varies from 17% to 32% with an average of 23%. The average natural moisture content is 14%. The undrained shear strength of the deposit is estimated to be more than 4000 p.s.f.

cont'd. /4 ...

5. SOIL TYPES AND SOIL CONDITIONS: (cont'd.)...

5.4) Red Clayey Silt with Sand, Gravel & Shale Fragments:

This stratum underlies the grey coloured clayey silt deposit and is reddish in colour. The material consisted of very dense clayey silt with some sand, gravels and occasional fragments of broken up shale. This deposit can be also classified as glacial till, with a very high relative density. The 'N' values for this layer exceeded 100 blows per foot.

The material was encountered in B.H. #1 & #3 at approximate elevation 260.0 or 17 feet below ground level, and extends to elevation 250.0 or 27 feet below ground level. The upper surface of this stratum in B.H. #5 & #6 is at Elevation 255.0

5.5) Red Shale Bedrock:

The elevation of the bedrock was found to be 250.0. The material consists of red shale with the upper 4.0 feet in a severely weathered state.

6. GROUND WATER CONDITIONS:

The water levels in the boreholes were recorded during the field investigation and were observed to be at elevations: 268.8', 264.4', and 262.1' in B.H. #1, #3 and #5 respectively.

7. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct two new bridges for the relocated County Rd. #22 over the Q.E.W. and the proposed North & South Service Roads.

cont'd. /5 ...



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

The investigation has revealed the presence of a clayey silt stratum which can provide adequate support for spread footing type foundations. The average 'N' value for this material is over 40 blows per foot, and it is estimated that at an elevation 6.0' or more below existing ground level at both structure sites a safe bearing pressure of 3 T.S.F. can be achieved. No dewatering problems are anticipated as the subsoil is relatively impermeable.

No stability problems are anticipated with regard to the proposed approach fills provided standard 2:1 slopes are employed.

8. SUMMARY:

A foundation investigation at the site of the proposed new structures at G.E.W. North and South Service Roads and Lincoln County Rd. #22 is reported.

The subsoil at the site was found to consist of compact to very dense grey clayey silt with sand and gravel, followed by very dense red coloured clayey silt with sand, gravel and shale fragments, followed by red shale bedrock.

For the proposed structures spread footing type foundations with an allowable pressure of 3 T.S.F. are recommended. Further details are given in (7) above.

9. MISCELLANEOUS:

The field work was carried out during the period

9. MISCELLANEOUS: (cont'd.)...

Oct. 4, 1963 to Oct. 17, 1963. Equipment used was owned and operated by Dominion Soil Investigation Ltd. The supervision of the field work together with the preparation of this report was carried out by P. Payer, Project Foundation Engineer under the supervision of Mr. K. G. Selby, Senior Foundation Engineer.

November, 1963.

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 1		FOUNDATION SECTION	
JOB <u>63-F-116</u>	LOCATION <u>Sta. 9+23, 30' Lt.</u>	ORIGINATED BY <u>P.P.</u>			
W.P. <u>110-60</u>	BORING DATE <u>Oct. 4, 7, 1963.</u>	COMPILED BY <u>P.P.</u>			
DATUM <u>G.S.C.</u>	BOREHOLE TYPE <u>Washbore- BX Casing.</u>	CHECKED BY <u>K.G.S.</u>			

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	BLOWS / FOOT					WATER CONTENT %				
							25	50	75	100	125	10	20			30
						SHEAR STRENGTH P.S.F.					WP — W — WL					
276.7	Groundlevel															
0.0	Topsoil															
	Sandy-silt															
272.7	Compact to dense.		1	SS	29											
4.0	Clayey-silt with some sand and gravels.		2	SS	44											
	Grey coloured.															
	Compact to very dense.		3	SS	25											
	(Glacial till)		4	SS	27											
260.7			5	SS	204											
16.0	Clayey-silt with some sand, gravel, and shale fragments.		6	SS	100+											
	Red coloured.		7	SS	100+											
	Very dense.		8	RC	-											
	Glacial Till)		9	RC	-											
250.0			10	RC	-											
26.7	Weathered red shale															
	(Bedrock)		11	RC	-											
245.8																
30.9	Sound red shale.															
	Bedrock.															
241.2																
35.5	End of borehole.															

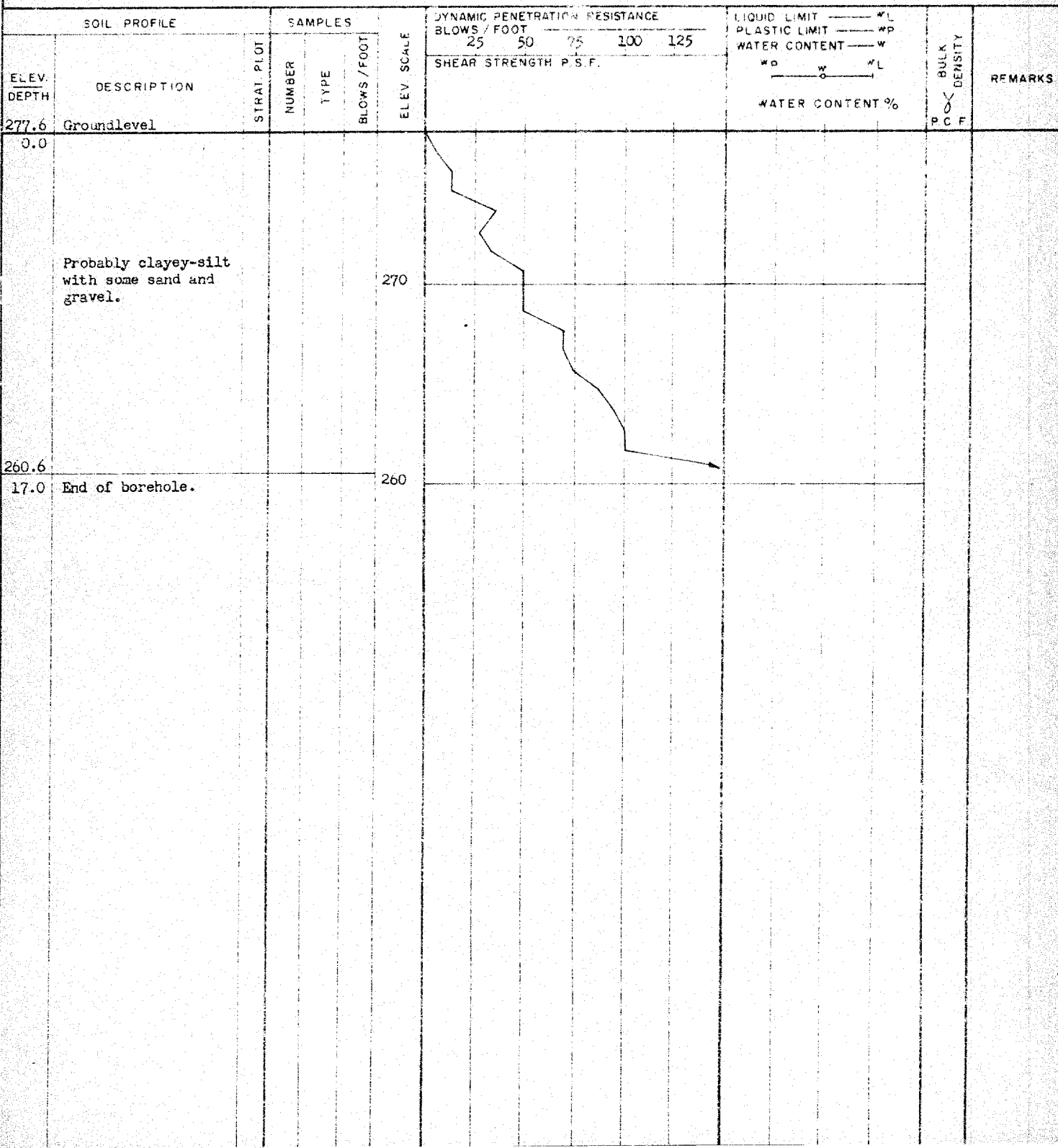
W.L.  
268.8  
From borehole observation.

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

# RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

JOB 63-F-116 LOCATION Sta. 9+75, 30' Rt. ORIGINATED BY P.P.  
W.P. 110-60 BORING DATE Oct. 10, 1963. COMPILED BY P.P.  
DATUM G.S.C. BOREHOLE TYPE Dynamic Cone Penetration Test. CHECKED BY K.G.S.



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

# RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 63-F-116 LOCATION Sta. 9+03, 30' Rt. ORIGINATED BY P.P.  
W.P. 110-60 BORING DATE Oct. 8, 9 & 10, 1963. COMPILED BY P.P.  
DATUM G.S.C. BOREHOLE TYPE Washbore - BX CHECKED BY K.G.S.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — % PLASTIC LIMIT — % WATER CONTENT — %	BULK DENSITY P C F	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	25	50	75	100	125		
277.6	Ground Elevation													
0.0	Topsoil													
	Sandy-silt													
	Compact to dense.		1	SS	32									
272.6														
5.0	Clayey-silt with some sand and gravels.		2	SS	30	270								
	Grey coloured.		3	SS	22									
	Compact-very dense.		4	SS	20									
	(Glacial Till)		5	SS	45									
260.5			6	SS	100	260								
17.1	Clayey-silt with some sand and gravels.		7	RC	-									
	Red coloured.		8	SS	100									
	Very dense.		9	RC	-									
	(Glacial till)		10	RC	-	250								
248.9	Weathered red shale		11	RC	-									
28.7	End of borehole.													

W.L.  
264.4  
From borehole observation.



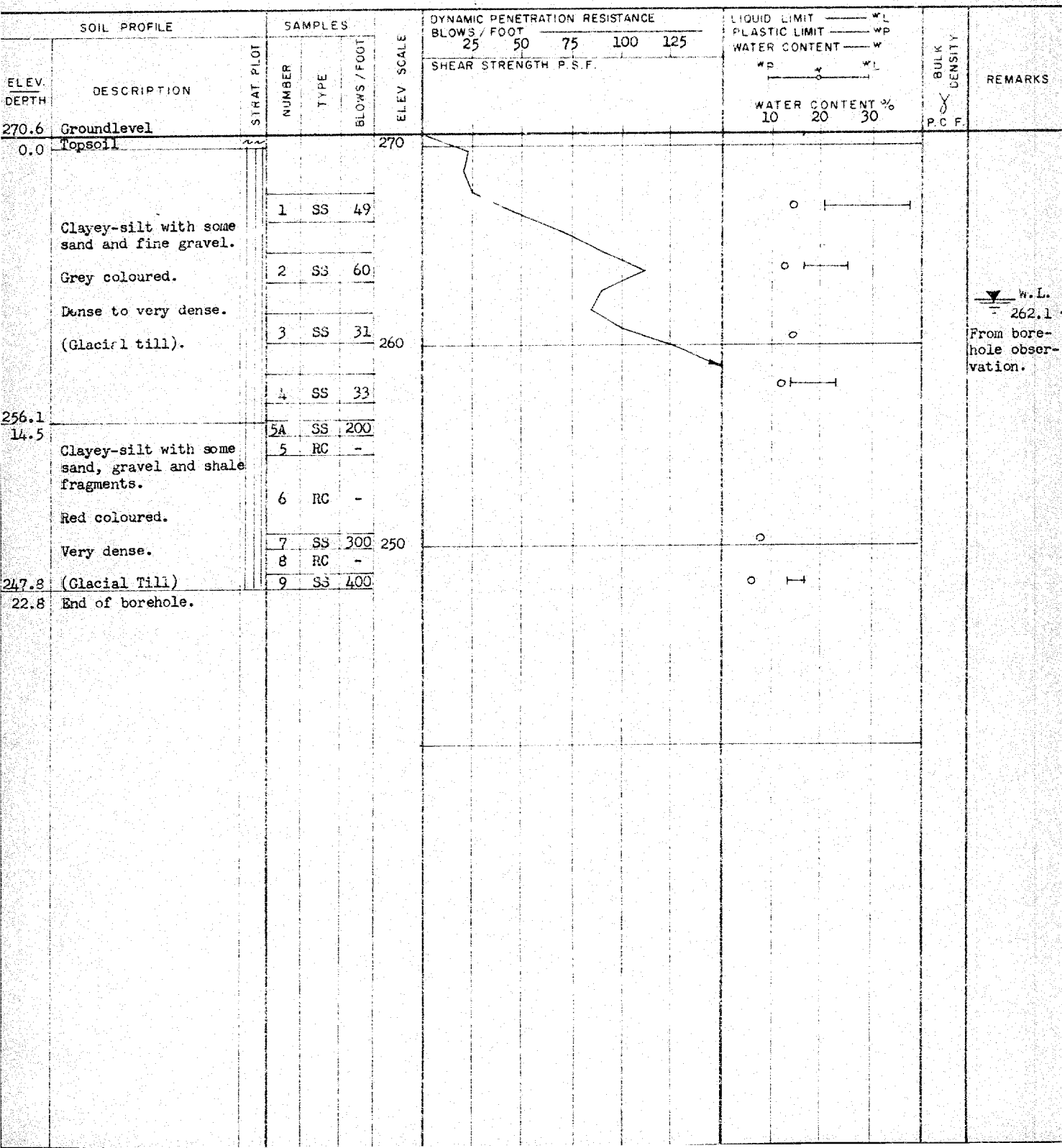
RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 63-F-116 LOCATION Sta. 8491, 30' Lt. ORIGINATED BY P.P.  
W.P. 110-60 BORING DATE Oct. 10, 1963. COMPILED BY P.P.  
DATUM G.S.C. BOREHOLE TYPE Dynamic Cone Penetration Test. CHECKED BY K.G.S.

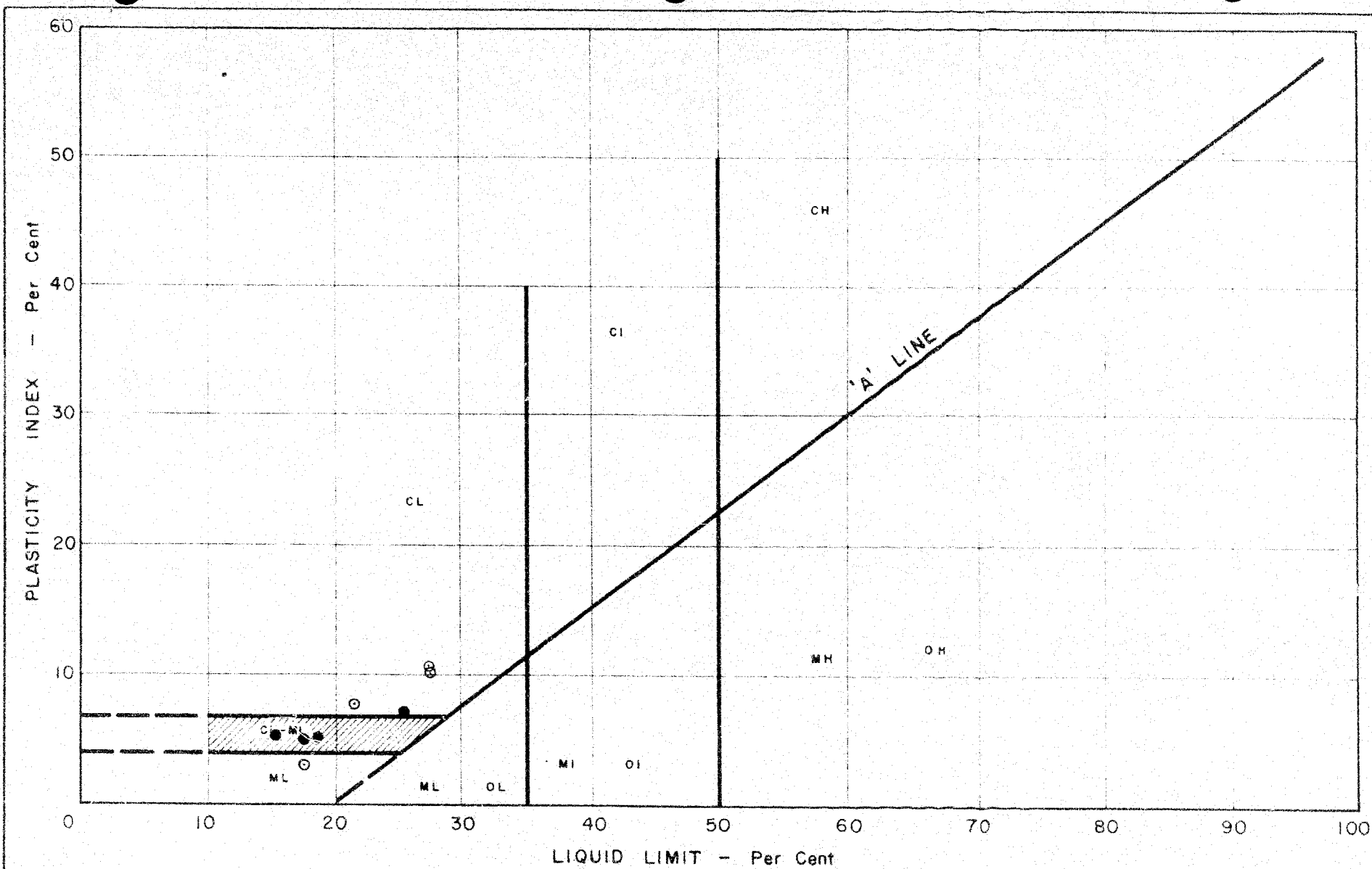
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— W <sub>L</sub>		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	PLASTIC LIMIT ——— W <sub>P</sub>		
276.7	Groundlevel						WATER CONTENT ——— W	P.C.F.	
0.0							# D ——— % L		
	Probably clayey-silt with some sand and gravel.					270			
261.7									
15.0	End of borehole.					260			

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		<b>RECORD OF SOREHOLE NO. 5</b>		FOUNDATION SECTION	
JOB <u>63-F-116</u>	LOCATION <u>Sta. 15+55, 30' It.</u>	ORIGINATED BY <u>P.P.</u>			
W.P. <u>110-60</u>	BORING DATE <u>Oct. 11 &amp; 15, 1963.</u>	COMPILED BY <u>P.P.</u>			
DATUM <u>G.S.C.</u>	BOREHOLE TYPE <u>Washbore-BK Casing.</u>	CHECKED BY <u>K.G.S.</u>			





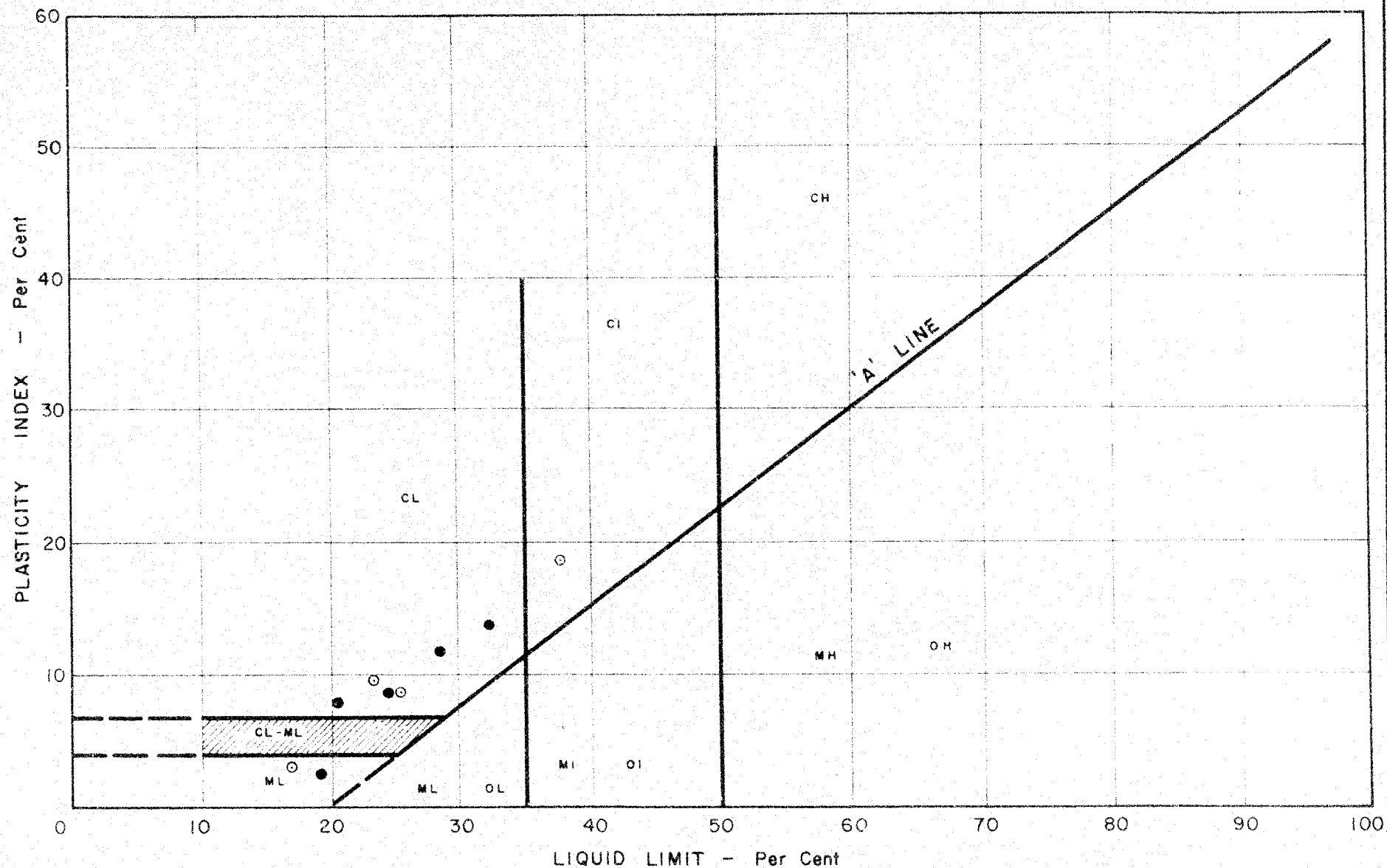




NOTES    ○ B.H. 3  
           ● B.H. 1

DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH DIVISION  
 PLASTICITY CHART

Job No. 63-F-116      W.P. No. 110-60  
 Location Q.E.W. & LINCOLN COUNTY RD. NO. 22



NOTES ○ BH 5  
● BH 6

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION  
**PLASTICITY CHART**

Job No. 63-F-116

W.P. No. 110-60

Location Q.E.W. and Lincoln Co. Rd. No. 22 (Vineland Side Rd.)



## ABBREVIATIONS USED IN THIS REPORT

### PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREE, DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

### DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS:-

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>c LB. / SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

### TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	C.S.	GESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H.	SAMPLE ADVANCED HYDRAULICALLY	
	P.M.	SAMPLE ADVANCED MANUALLY	

### SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
cd	DRAINED TRIAXIAL	S	SENSITIVITY

## ABBREVIATIONS USED IN THIS REPORT

### SOIL PROPERTIES

$\gamma$	UNIT WEIGHT OF SOIL (BULK DENSITY)
$\gamma_s$	UNIT WEIGHT OF SOLID PARTICLES
$\gamma_w$	UNIT WEIGHT OF WATER
$\gamma_d$	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
$\gamma'$	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
$S_r$	DEGREE OF SATURATION
$w_L$	LIQUID LIMIT
$w_P$	PLASTIC LIMIT
$I_P$	PLASTICITY INDEX
s	SHRINKAGE LIMIT
$I_L$	LIQUIDITY INDEX = $\frac{w - w_P}{I_P}$
$I_C$	CONSISTENCY INDEX = $\frac{w_L - w}{I_P}$
$e_{max}$	VOID RATIO IN LOOSEST STATE
$e_{min}$	VOID RATIO IN DENSEST STATE
$I_D$	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY $D_r$ IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
Q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
$m_v$	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
$c_v$	COEFFICIENT OF CONSOLIDATION
$C_c$	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
$T_v$	TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
$\tau_f$	SHEAR STRENGTH
c	EFFECTIVE COHESION INTERCEPT
$\phi'$	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
$c_u$	APPARENT COHESION
$\phi_u$	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
$\mu$	COEFFICIENT OF FRICTION
$S_i$	SENSITIVITY

### GENERAL

$\pi$	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

### STRESS AND STRAIN

u	PORE PRESSURE
$\sigma$	NORMAL STRESS
$\sigma'$	NORMAL EFFECTIVE STRESS ( $\bar{\sigma}$ IS ALSO USED)
$\tau$	SHEAR STRESS
$\epsilon$	LINEAR STRAIN
$\gamma$	SHEAR STRAIN
$\nu$	POISSON'S RATIO ( $\mu$ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
$\eta$	COEFFICIENT OF VISCOSITY

### EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
$\delta$	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
$K_0$	COEFFICIENT OF EARTH PRESSURE AT REST

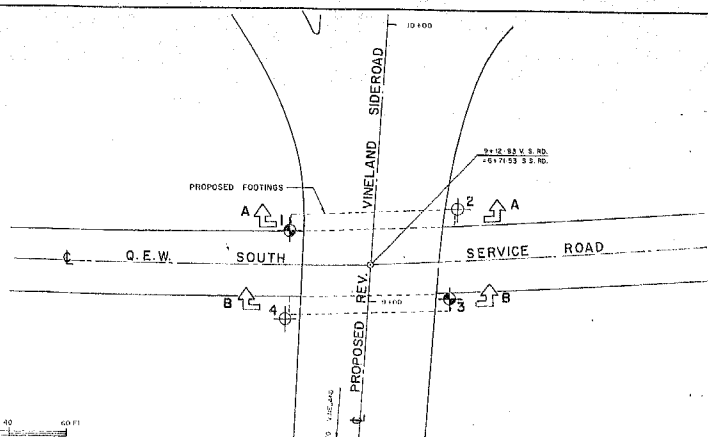
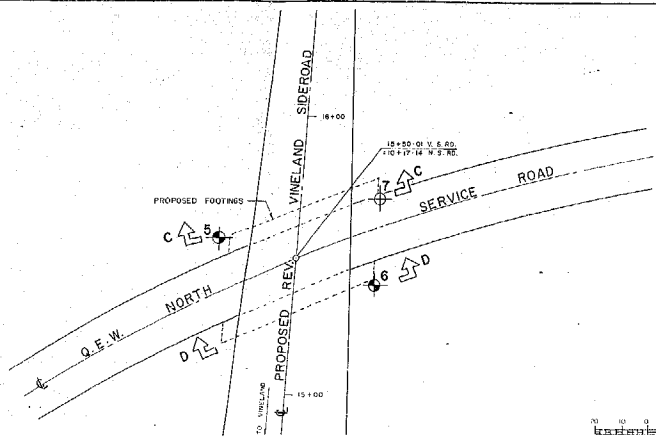
### FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
$k_s$	MODULUS OF SUBGRADE REACTION

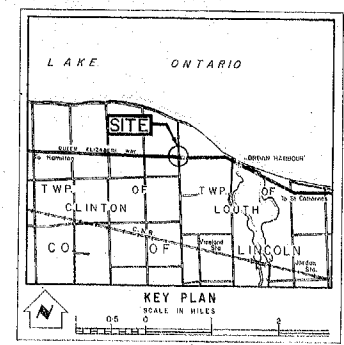
### SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
$\beta$	ANGLE OF SLOPE TO HORIZONTAL

134000 E 36.00-00  
178550 N



PLANS  
SCALE  
1" = 40 FT

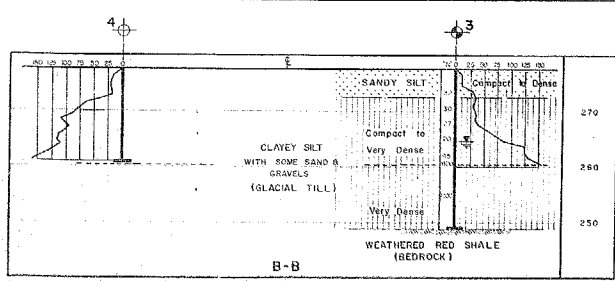
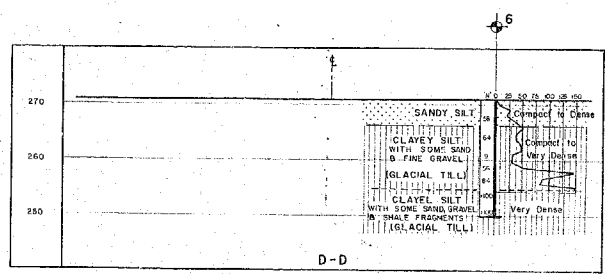
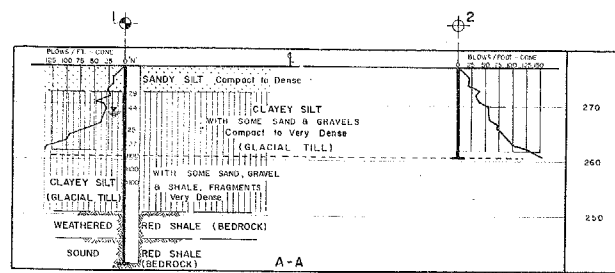
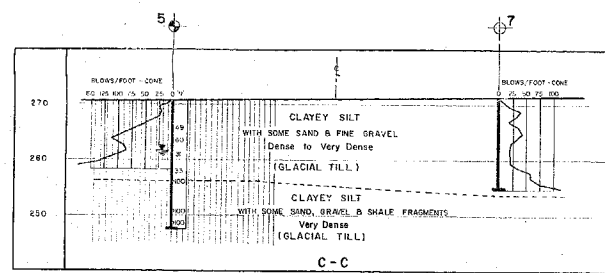


**LEGEND**

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, OCT. 1963

NO.	ELEVATION	STATION	OFFSET
1	276.7	9+23	30'LT.
2	277.6	9+35	30'W.
3	277.6	9+03	30'W.
4	276.7	8+91	30'LT.
5	270.6	15+35	30'LT.
6	271.2	15+42	30'W.
7	271.3	15+73	30'W.

**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  
SCALE  
1" = 30 FT

PRINT RECORD

NO.	FOR	DATE

DATE	BY	DESCRIPTION

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

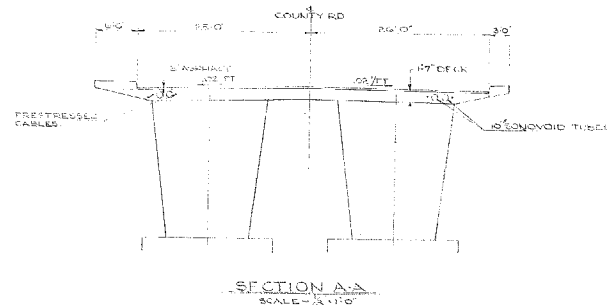
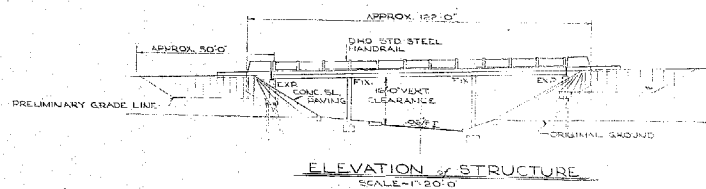
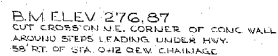
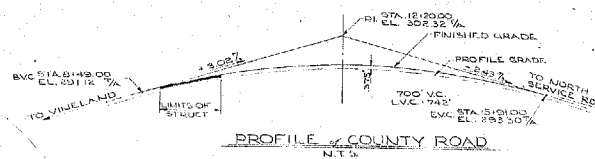
**VINELAND SIDE ROAD**  
PROPOSED REVISION

KING'S HIGHWAY NO. Q.E.W. SERVICE RD'S - N.B.S. DIST. NO. 4  
CO. LINCOLN

TWP. LOUTH & CLINTON LOT 23 CON. 'BF

**BORE HOLE LOCATIONS & SOIL STRATA**

SOUND. P.P. CHECKED BY *AS* W.R. NO. 110-60 M.B.R. DRAWING NO. *63-F-116 A*  
BRNRS *AC* CHECKED BY *AC* JOB NO. 63-P-116  
DATE NOV. 27, 1963 SITE NO. *63-F-116 A* BRIDGE DRAWING NO. *63-F-116 A*  
APPROVED *AC* IN CHARGE OF PROJECT  
PRINCIPAL ENGINEER

[illegible]

DATE	BY	DESCRIPTION
10/1/19	10/1/19	10/1/19
10/2/19	10/2/19	10/2/19
10/3/19	10/3/19	10/3/19
10/4/19	10/4/19	10/4/19
10/5/19	10/5/19	10/5/19
10/6/19	10/6/19	10/6/19
10/7/19	10/7/19	10/7/19
10/8/19	10/8/19	10/8/19
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10/29/19	10/29/19	10/29/19
10/30/19	10/30/19	10/30/19
10/31/19	10/31/19	10/31/19

DEPARTMENT OF HIGHWAYS ONTARIO			
BRIDGE DIVISION			
COUNTY RD. N° 22 UNDERPASS			
KING'S HIGHWAY N° 62 E.W. SERVICE RD.		DIST. N° 4	
CD LINCOLN			
TWP. LOUTH	LOT 23.	CON. B.F.	
PRELIMINARY PLAN			
APPROVED	PROJECT SUGGESTED	REV. NO.	REV. N°
		13-179	110-60-2
DESIGN	CHECK	CONTRACT	
DRAWING	D 14 B		
DATE	LOADING	DRAWING NO.	
	4/10	D-5412-P	

