

## MEMORANDUM

To: Mr. B. R. Davis  
Bridge Engineer  
Bridge Division  
Admin. Bldg.

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

Attn: Mr. S. McCombie

DATE: October 24, 1968

OUR FILE REF.

IN REPLY TO

OCT 28 1968

## SUBJECT:

Foundation Investigation Report  
for  
Proposed Crossing of Bear Brook  
Tributaries by Highway #417  
Twp. Gloucester - Co. Carleton  
District No. 9 (Ottawa)

W.J. 68-F-57 -- W.P. 34-66-~~11~~

*W.P. # has been  
Cancelled*

*In  
see 108*

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

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

*Agthomas*

A. G. Stermac

PRINCIPAL FOUNDATION ENGINEER

AGS:mt

cc: Messrs. B.R. Davis (2)  
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Foundation Files ✓  
General Files

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Foundation Investigation Report  
for  
Proposed Crossing of Bear Brook  
Tributaries by Highway #417  
Twp. Gloucester - Co. Carleton  
District No.9 (Ottawa)  
W.J. 68-F-57    --    W.P. 34-66-05

1. INTRODUCTION:

The Foundation Section was requested to carry out a subsurface investigation for the West and East-Bound Lane crossings of Bear Brook Tributaries by the proposed Highway 417. The request was contained in a memo from the Bridge Division (Mr. G. Scott, Regional Bridge Location Engineer) dated June 14, 1968. Subsequently an investigation was carried out by this Section in order to determine the subsoil conditions at the above site. This report contains the results of this investigation together with recommendations pertaining to the foundations for the proposed crossings and the stability of the approach fills.

2. DESCRIPTION OF THE SITE & GEOLOGY:

The site is located in an area bounded by 8th Line Rd. to the south and Halls Road to the east, on Lot 6, Concession VII, Twp. of Gloucester, County of Carleton. At this location Bear Brook is a shallow stream which meanders along a valley floor some 200 ft. in width and located 25 to 30 ft. below the surrounding ground surface. In addition, occasional tributaries and erosional gullies lead into Bear Brook in the site vicinity. At the proposed E.B.L. crossing, the tributary valley is some 20 ft. deep, whereas at the proposed W.B.L. crossing, the erosional gullies are 5 to 10 ft. deep. The ground to the west of Bear Brook is covered by moderately dense tree growth, whereas to the east, the land is used chiefly for cattle grazing.

The area is located in the physiographic region known as the "Russell and Prescott Sand Plains" in which deep "Leda" clay deposits are capped by a mantle of silts and fine sands. The clay is underlain by a glacial till overlying shale bedrock of the Lorraine formation.

3. FIELD AND LABORATORY WORK:

Four sampled boreholes, each accompanied by a dynamic cone penetration test, were put down using a conventional diamond drill rig adapted for soil sampling purposes. In addition, one shallow vane hole was advanced manually in an area not easily accessible to the drill rig.

Samples were recovered at required depths in 2 in. I.D. shelby tubes which were manually pushed into the soil. In addition, samples of the surficial deposits and glacial till were obtained using a 2 in. O.D. split spoon sampler which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests. Field vane tests were carried out in the cohesive portion of the over burden, where possible, to determine the undrained shear strength of the stratum. Bedrock was proven at one borehole location by diamond core drilling in BXL size. The groundwater level conditions across the site were determined by observing the water levels in the open boreholes upon completion of the field work. Additional observations were made in piezometers installed during a previous investigation (W.J. 67-F-111) in this general area.

The locations and elevations of all borings were surveyed by personnel from the Kingston Region Engineering Surveys Section, and are shown on Drawings 68-F-57A (E.B.L.) and 68-F-57B (W.B.L.) together with the estimated stratigraphical profiles at the respective crossings. All elevations given in the report are referenced to a geodetic datum.

All samples were subjected to a careful visual examination in the field and subsequently in the laboratory . Following this examination, laboratory testing was carried out on selected representative samples to determine the following physical properties of the overburden:

Natural Moisture Contents  
Bulk Densities  
Atterberg Limits  
Grain Size Distributions  
Undrained Shear Strengths  
Consolidation Characteristics.

The results of this testing are plotted on the Record of Borelog sheets and are summarized on the Figures in Appendix I of this report.

#### 4. SUBSOIL CONDITIONS:

##### 4.1) General:

The predominant stratum across the site is a sensitive marine clay which ranges in thickness between 75 and 94 feet. This deposit is overlain by a surficial stratum of fine sand or clayey silt, some 3 to 8 ft. in thickness and is underlain by a cohesive glacial till of up to 35 ft. in thickness, which is followed by a shaley limestone bedrock at a depth of about 124 feet.

From ground surface downwards, the following soil strata were encountered:

##### 4.2) Fine Sand or Clayey Silt - Surficial Deposit:

Underlying a surficial cover of topsoil, a stratum of fine sand was encountered at Boreholes 1, 2 and 3, whereas at Boreholes 3A and 4, a stratum of clayey silt was encountered. The thicknesses of these strata varied between 2.5 and 8 ft. The clayey silt stratum contained thin seams

of silty clay was well as fine sand. The Standard Penetration Test "N" Values in the sand stratum ranged between 4 and 18 blows per foot and in the clayey silt stratum between 9 and 10 blows per foot, indicating fine sand stratum to be loose to compact and the clayey silt stratum to be stiff.

#### 4.3) Clay:

The surficial deposits are underlain by the predominant overburden stratum across the site, a sensitive marine clay with occasional inclusions of organic matter and silt seams. The thickness of this stratum ranged from 75 ft. on the valley floor (B.H.#2) to 94 ft. on the top of the valley bank (B.H.#1). The upper 10 to 20 ft. of the clay contains alternate brown and grey colored seams of silt and sand up to 1 inch in thickness. The physical properties of the stratum, as determined by field and laboratory testing, are shown on Figure 1 in the Appendix and summarized on the following table:

	Range	Average
Natural Moisture Content (W) - %	52 - 89	70
Liquid Limit ( $W_L$ ) %	68 - 83	75
Plastic Limit ( $W_p$ ) %	23 - 27	25
Bulk Density ( $\gamma$ ) pcf	95 - 106	100
UNDRAINED Shear Strength ( $C_u$ ) PSF:		Sensitivity
i) Field Vanes	400 - 2000	4 - 13
ii) Lab. Vanes	400 - 1300	4 - 20
iii) Lab. Testing	350 - 1200	-

The Atterberg limits shown on the Plasticity Chart, Figure 2 of the Appendix, indicate that the clay is inorganic and of high plasticity. Referring to Figure 1, it is seen that the undrained shear strength increases linearly with depth resulting in a  $C_u/p$  ratio of about 0.25, where p is the effective overburden pressure. The consistency of the deposit varies from firm immediately below the surficial deposits, to stiff with depth.

The consolidation characteristics of the stratum were determined by carrying out two laboratory tests; the resulting e-log p curves are shown on Figures 3 and 4 in the Appendix. It is estimated from these tests that the clay deposit is preconsolidated by atleast 1000 psf in excess of the existing overburden pressure near the surface.

4.4) Clayey silt with some sand and gravel - Glacial Till:

A stratum of clayey silt with some sand and gravel (glacial till) was encountered beneath the clay deposit i.e. at between elevations 148 and 151. Occasional boulders up to 6 inches in size were encountered throughout the deposit. The lower boundary of this stratum was established only at Boreholes 1 and 2 which indicated a thickness for the stratum of between 23 and 35 feet. The Standard Penetration Resistance "N" Values ranged between 25 blows / ft. in the upper portion of the deposit to well over 100 blows/ft. below about elevation 135, indicating a very stiff to hard consistency for the deposit.

4.5) Bedrock:

Bedrock was established by core drilling at Borehole 1 or by driving the EX casing to practical refusal at Boreholes 2 and 4. At Borehole 1 bedrock was encountered at elevation 129 and is inferred to have been encountered at Boreholes 2 and 4 respectively at about elevations 112 and 129. The bedrock cored at Borehole 1 consisted of a shaley limestone which was in a generally sound condition except for bedding plane and associated jointing at close spacing in the upper 2 ft.

5. GROUNDWATER CONDITIONS:

Water level observations were carried out in the open boreholes upon completion of the field work. These observations are tabulated below:

<u>Borehole</u>	<u>Ground Elev.</u>	<u>Water Level Elev.</u>
2	226.0	226.0
3	241.2	235.5
3A	236.0	234.0
4	247.9	239.4

In addition, observations were made in the piezometers installed in the overburden at Boreholes 8 and 9 under W.J. No. 67-F-111. These indicated that the piezometric water level ranges between elevations 238 and 242. Based on the foregoing it is estimated that the groundwater level is at the contact between the sand and clay strata.

## 6. DISCUSSION AND RECOMMENDATIONS:

### 6.1) General:

It is proposed to construct a 4 lane limited access highway (Hwy.#417) from the southeastern limits of Ottawa (Ramsayville) easterly to Eighth Line Rd. Construction of structures and/or embankments at various roadway and creek crossings will therefore be necessary. In the vicinity of Bear Brook the East Bound Lane of the proposed Hwy.#417 will cross a ravine (tributary of Bear Brook) some 20 ft. in depth and located west of Bear Brook, whereas the West Bound Lane will cross shallow gullies 5 to 10 ft. in depth located east of Bear Brook. These crossings can be accomplished either by filling the gullies and ravine with suitable earth fill material or by bridging. Since the fill heights for the EBL and WBL crossings vary considerably, recommendations for each crossing are made separately, as follow:

### 6.2) WBL Crossing:

The proposed profile grade for the WBL of Hwy.#417 between Stations 436+00 and 438+00 is about elevation 250, thus requiring up to 10 ft. of fill in the erosional gullies. No major stability and settlement problems are anticipated for such fills. It is estimated that fills up to 10 ft. in height will undergo maximum consolidation settlements in the order of 6 inches over a period of 25 years.



6.3) EBL Crossing:

The proposed profile grade for the EBL of Hwy. #417 between stations 430+00 and 432+00 is about elevation 248. The ravine floor elevation is about 229 and the distance across the crests of the ravine is about 170 ft. Available information indicates that there are no hydrologic problems at this site and therefore a culvert may not be required. The proposed crossing may therefore be achieved either by filling the ravine with suitable earth material to profile grade or by bridging. Recommendations pertinent to the two alternatives are as follows:

If embankments are contemplated to fill the ravine, heights of fill of the order of 18 ft. maximum will be required. Stability analyses have been carried out in terms of total stresses using the following data:

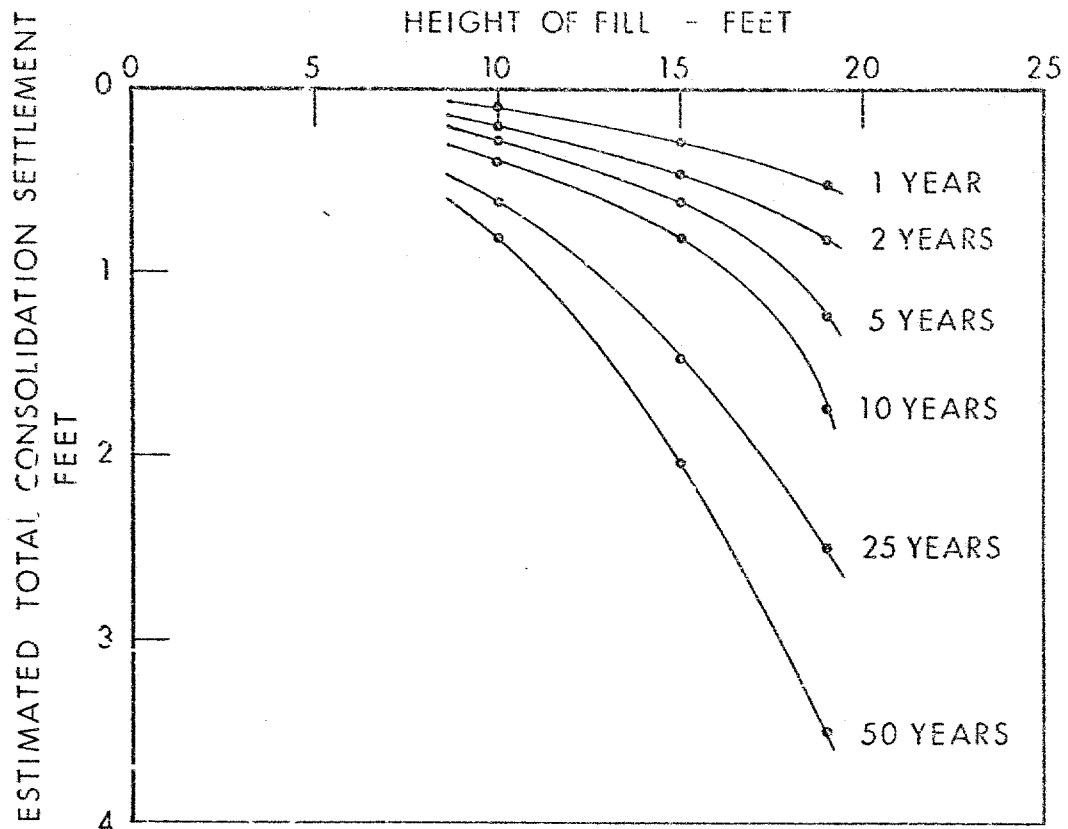
Fill Height	18 ft. (max.)
Side Slopes (Transverse Direction)	2:1
Embankment Width	36 ft.

Soil Properties

	<u><math>\gamma</math> - pcf</u>	<u><math>\phi</math> - degrees</u>	<u>Cu - psf</u>
Fill Material	125	30	-
Natural Soil:			
a) Surficial Deposits	110	30	0
b) Clay	95	0	750-1000

Stability analyses based on the above data indicate that the proposed fills will be stable.

Settlement analyses have been carried out for the proposed crossing using 10, 15 and 18 ft. heights of fill and for various time periods. The results are summarized on the following page.



If the estimated settlements are considered excessive for the type of highway proposed, consideration should be given to a structure crossing of the ravine.

In order to minimize the length of the structure across the ravine, approach embankments having a maximum height of 10 ft. at the abutment locations can be constructed. The estimated settlements for fill heights of 10 ft. have been discussed previously. If this scheme is adopted, the abutments and piers (if any), can be supported on end bearing piles driven to practical refusal into the underlying glacial till stratum. For estimating purposes, it can be assumed that steel H-piles (12BP74) will meet refusal at approximately elevation 135. Such piles may be designed for a load of 90 tons/pile.

No major dewatering problems are anticipated for the construction of pile caps.

The final choice between the two alternatives should be decided not only on the basis of economic considerations but also in view of the anticipated long term settlements which will require continued maintenance.

7. MISCELLANEOUS:

The field work for this project was carried out during the period July 9 to 18, 1968, under the supervision of Mr. C. Mirza, Project Foundation Engineer, who also prepared this report. This project was carried out under the general supervision of Mr. M. Devata, Supervising Foundation Engineer who also reviewed this report.

The equipment used was owned and operated by Dominion Soil Investigation Ltd.

October 1968

APPENDIX I

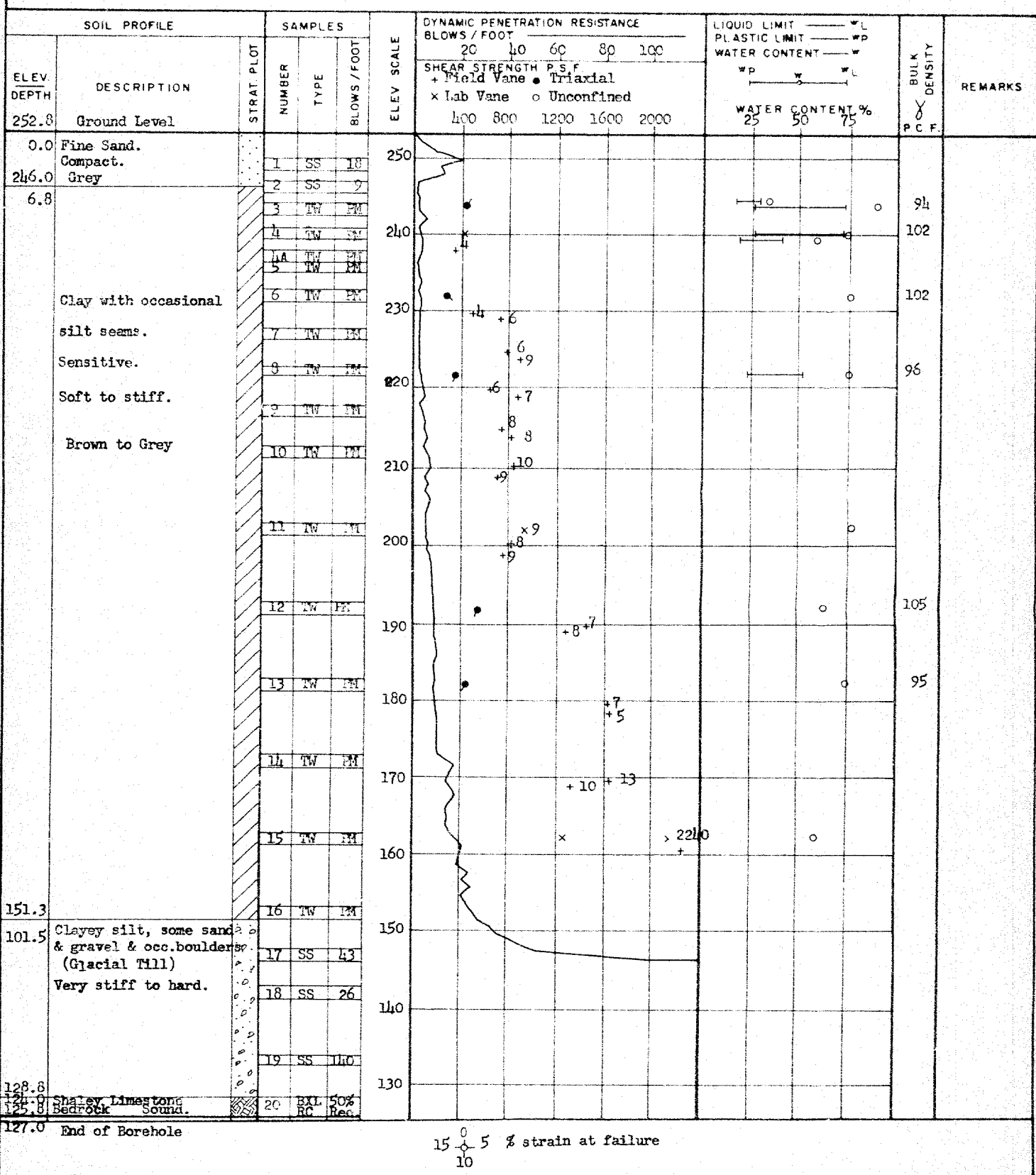
DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

# RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 60-F-57 LOCATION Sta. 437+75 @ Hwy. 417 WBL o/s 12' Lt. ORIGINATED BY PBS  
W.P. 34-66-05 BORING DATE July 9-11, 1968 COMPILED BY CM  
DATUM Geodetic BOREHOLE TYPE Diamond Drill - NX, BX Casing CHECKED BY \_\_\_\_\_



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS &amp; TESTING DIVISION

## RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

JOB 68-F-57

LOCATION Sta. 431+00 @ Hwy. 417 EBL o/s 22' I.t.

ORIGINATED BY PBS

W.P. 34-66-05

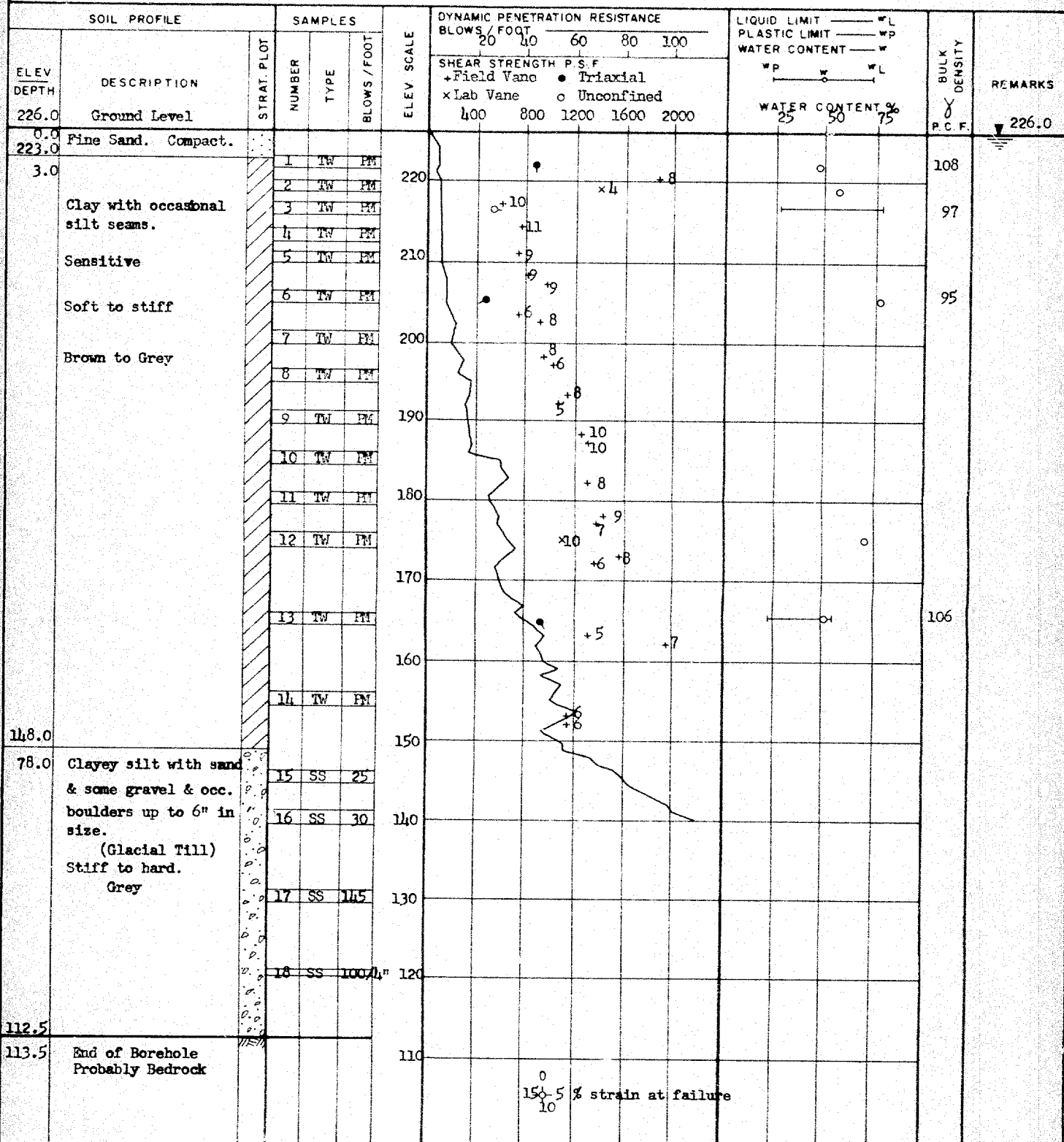
BORING DATE July 9-11, 1968

COMPILED BY CM

DATUM Geodetic

BOREHOLE TYPE Diamond Drill, NX - BX Casing

CHECKED BY



## DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS &amp; TESTING DIVISION

## RECORD OF BOREHOLE NO. 3

## FOUNDATION SECTION

JOB 68-F-57

LOCATION Sta. 436+25 @ Hwy. 417 WBL

ORIGINATED BY CM

W. P. 34-66-05

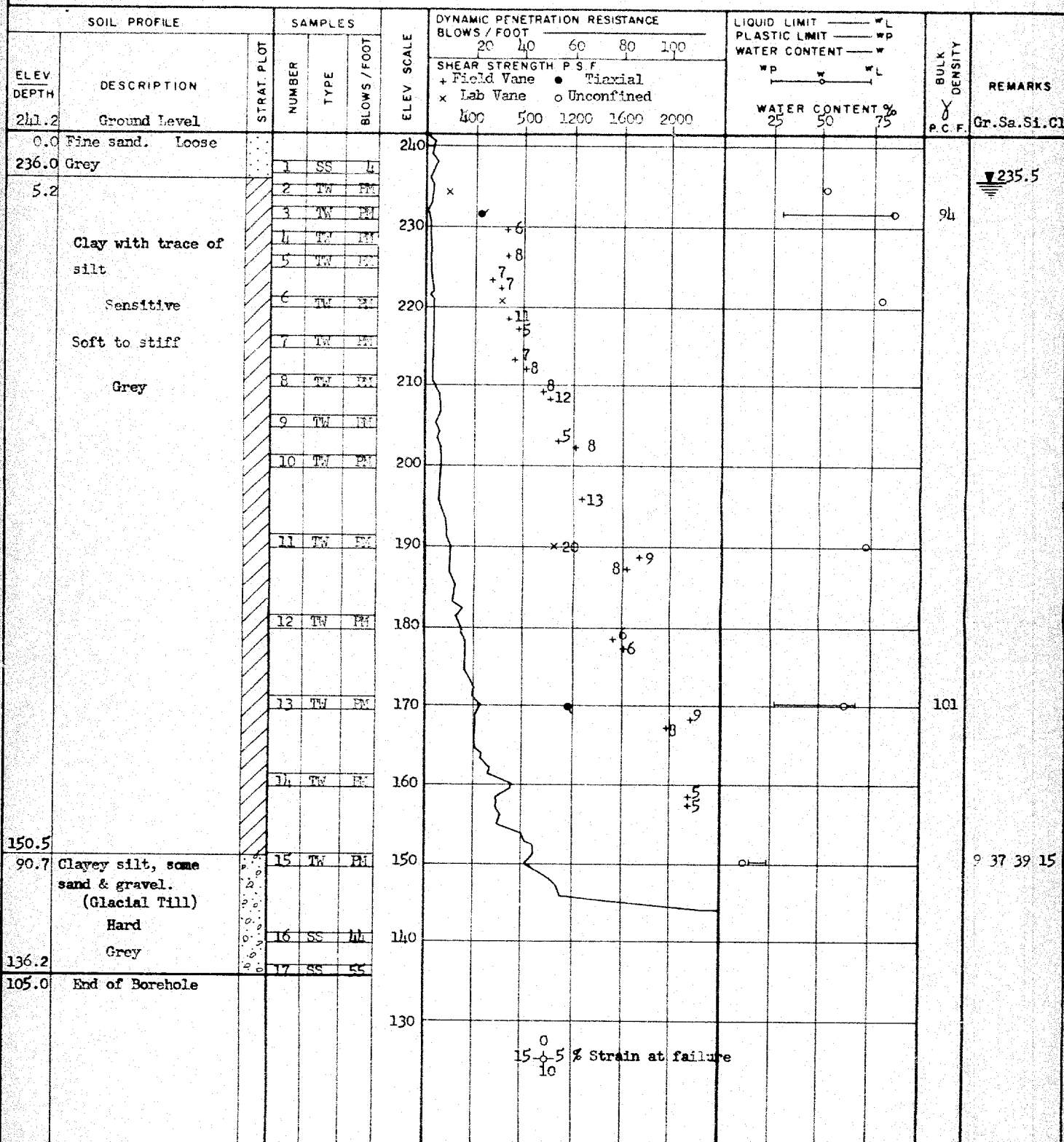
BORING DATE July 15-17, 1968

COMPILED BY CM

DATUM Geodetic

BOREHOLE TYPE Diamond Drill - NX Casing

CHECKED BY \*



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

# RECORD OF BOREHOLE NO. 3A

FOUNDATION SECTION

JOB 68-P-57 LOCATION Sta. 436+25 @ Hwy. 417 WBL o/s 110' Rt. ORIGINATED BY CM  
W P 31-66-05 BORING DATE July 15-17, 1968 COMPILED BY CM  
DATUM Geodetic BOREHOLE TYPE Vane Pole CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT ——— % L PLASTIC LIMIT ——— % P WATER CONTENT ——— % WATER CONTENT %		BULK DENSITY P C F	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	SHEAR STRENGTH P S F + Field Vane							
236.0	Ground Level						500	800	1200	1600	2000			
0.0	Clayey silt with													
233.5	fine sand seams													
2.5	Clay		1	TW	PM	230	+6							
	Soft to Firm						+5	+6						
	Sensitive							+8						
	Grey							+4						
222.0														
14.0	End of Borehole					220								

234.0



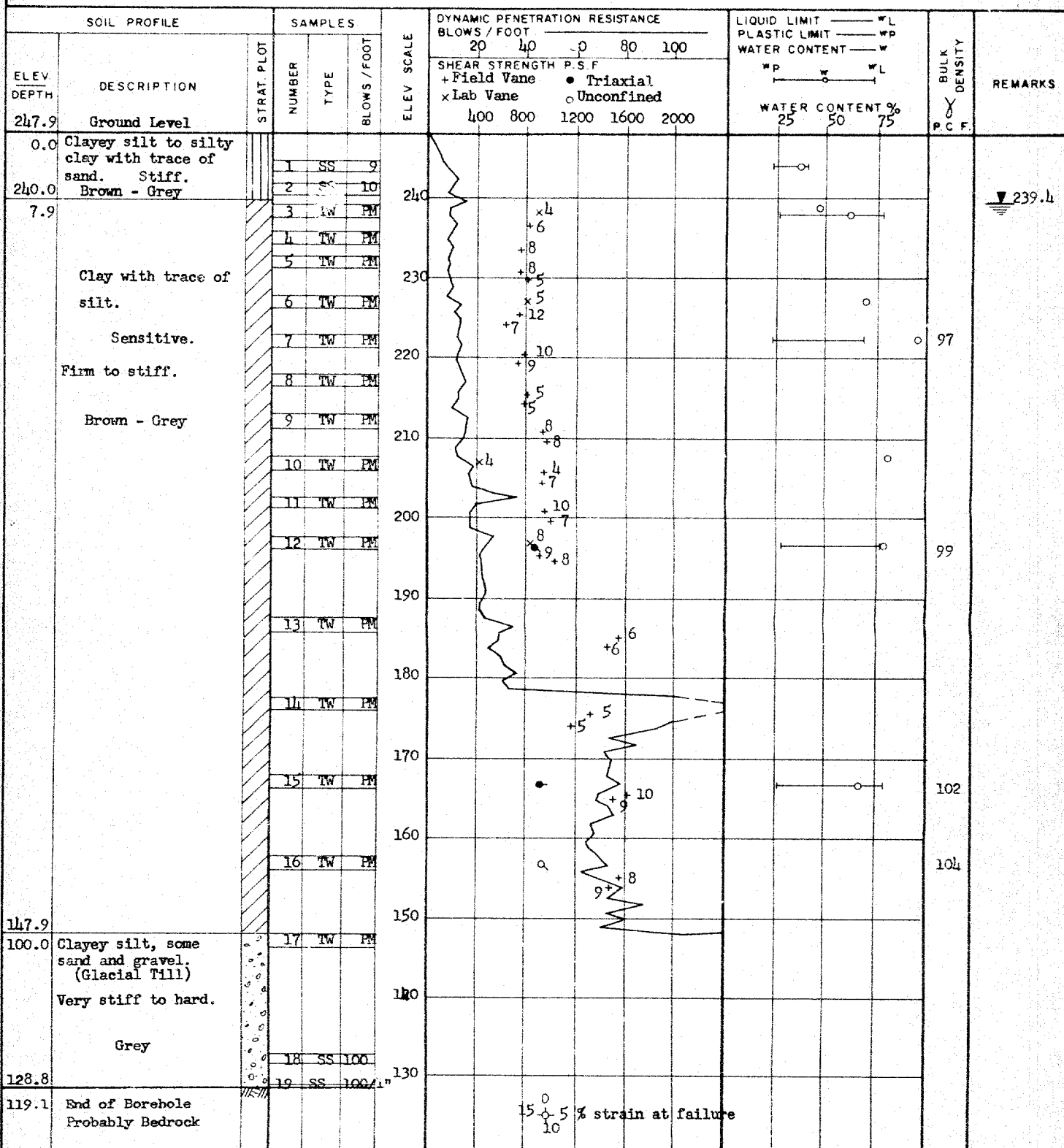
DEPARTMENT OF HIGHWAYS - ONTARIO

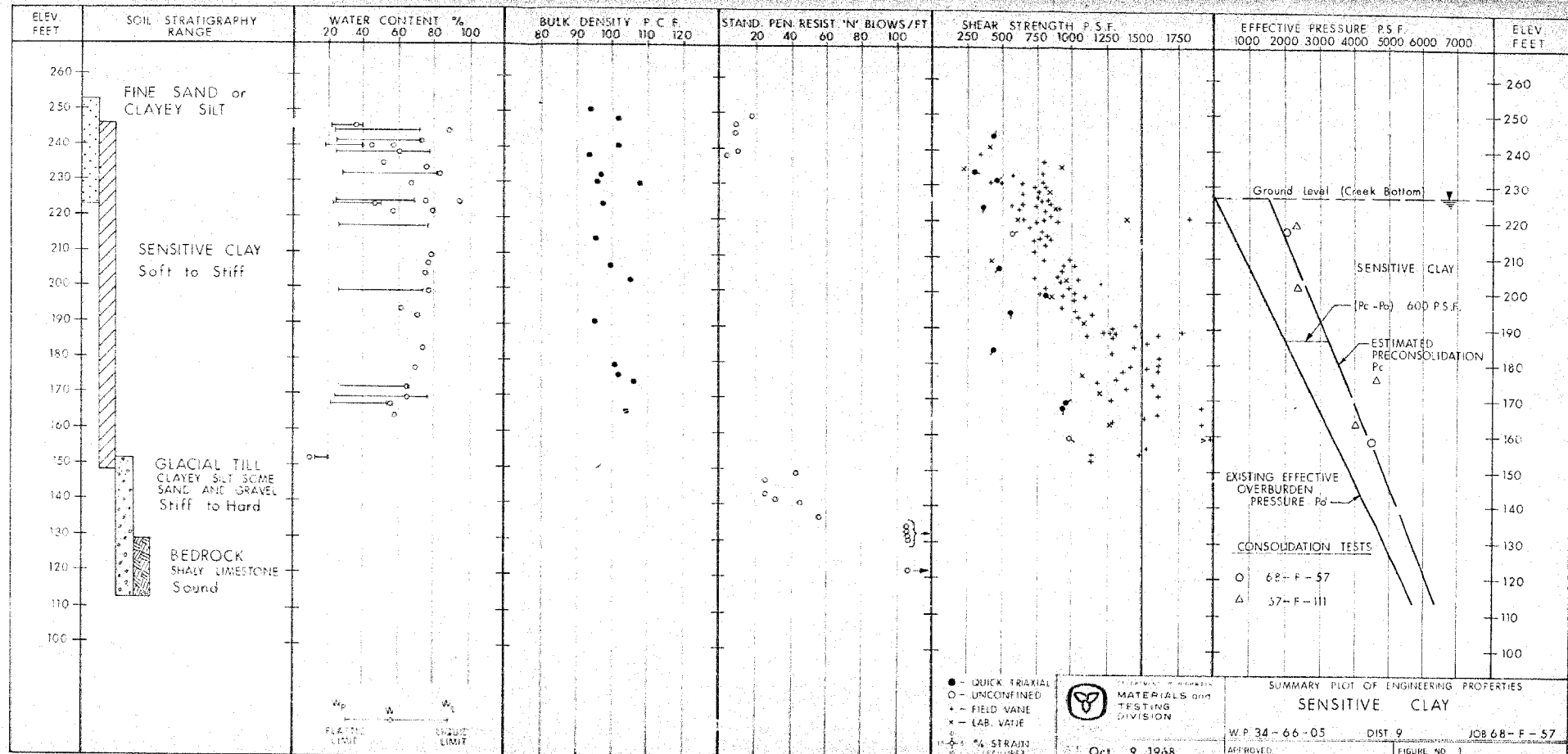
## MATERIALS &amp; TESTING DIVISION

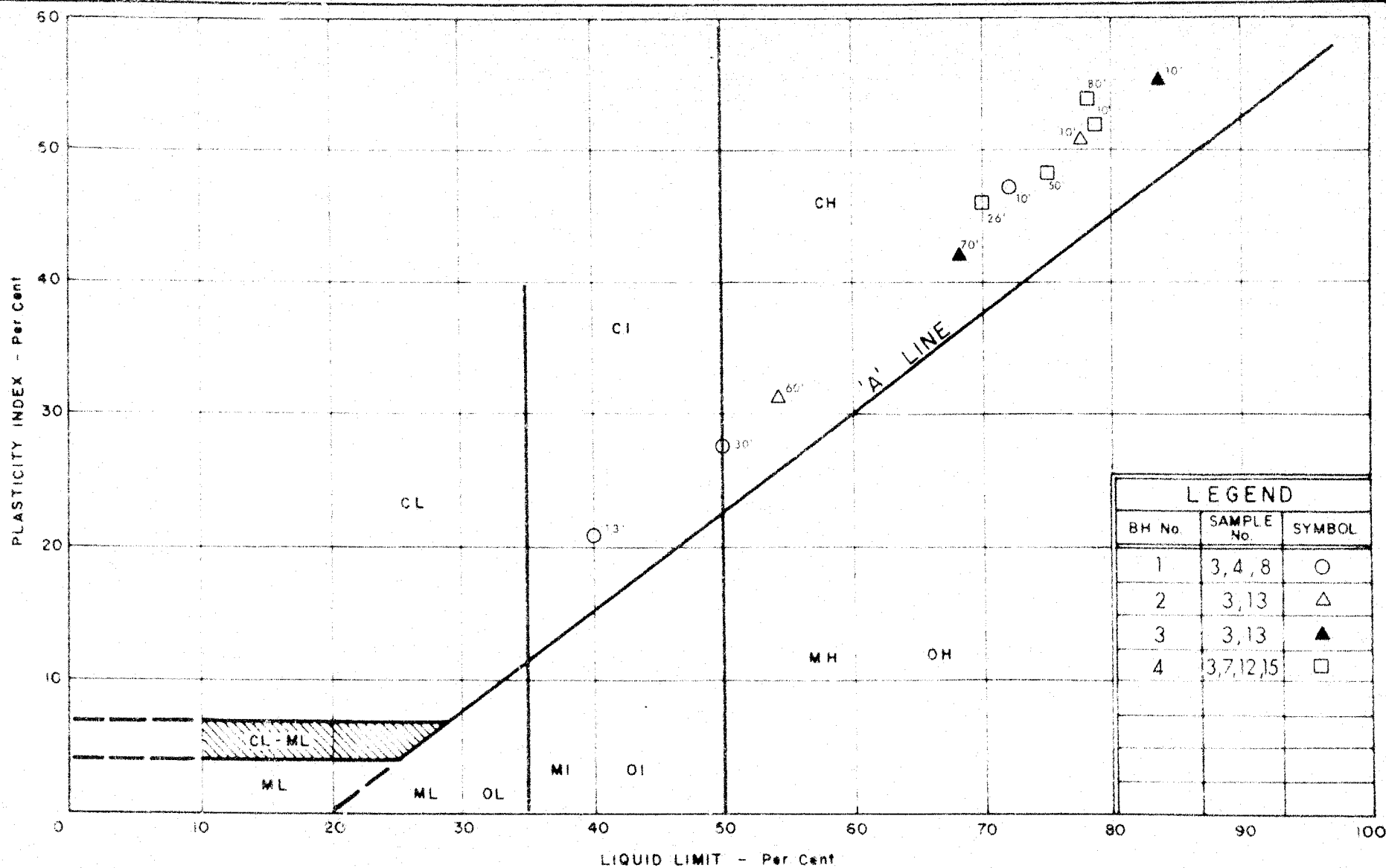
## RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 68-F-57 LOCATION Sta. 429+85 @ Hwy. 417 EBL o/s 20' Lt. ORIGINATED BY CM  
W.P. 34-66-05 BORING DATE July 15-17, 1968 COMPILED BY CM  
DATUM Geodetic BOREHOLE TYPE Diamond Drill, NX Casing CHECKED BY \_\_\_\_\_







DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

# PLASTICITY CHART SENSITIVE CLAY

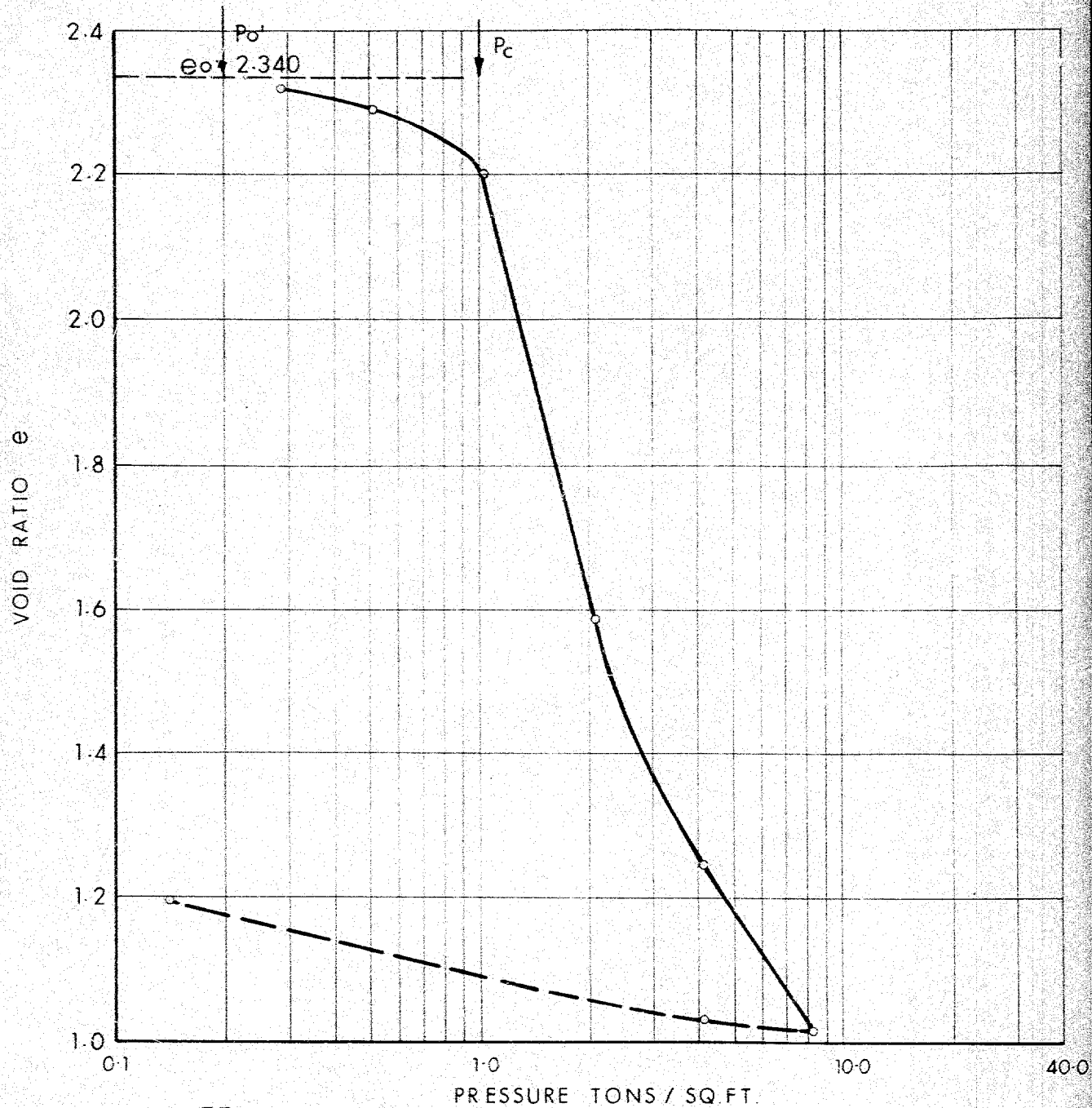
W.P. No. 34-66-05

JOB No. 68-F-57

FIG. NO. 2

# VOID RATIO VS PRESSURE

BORE HOLE 2  
SAMPLE 3  
DEPTH 10'-3"  
ELEV. 216



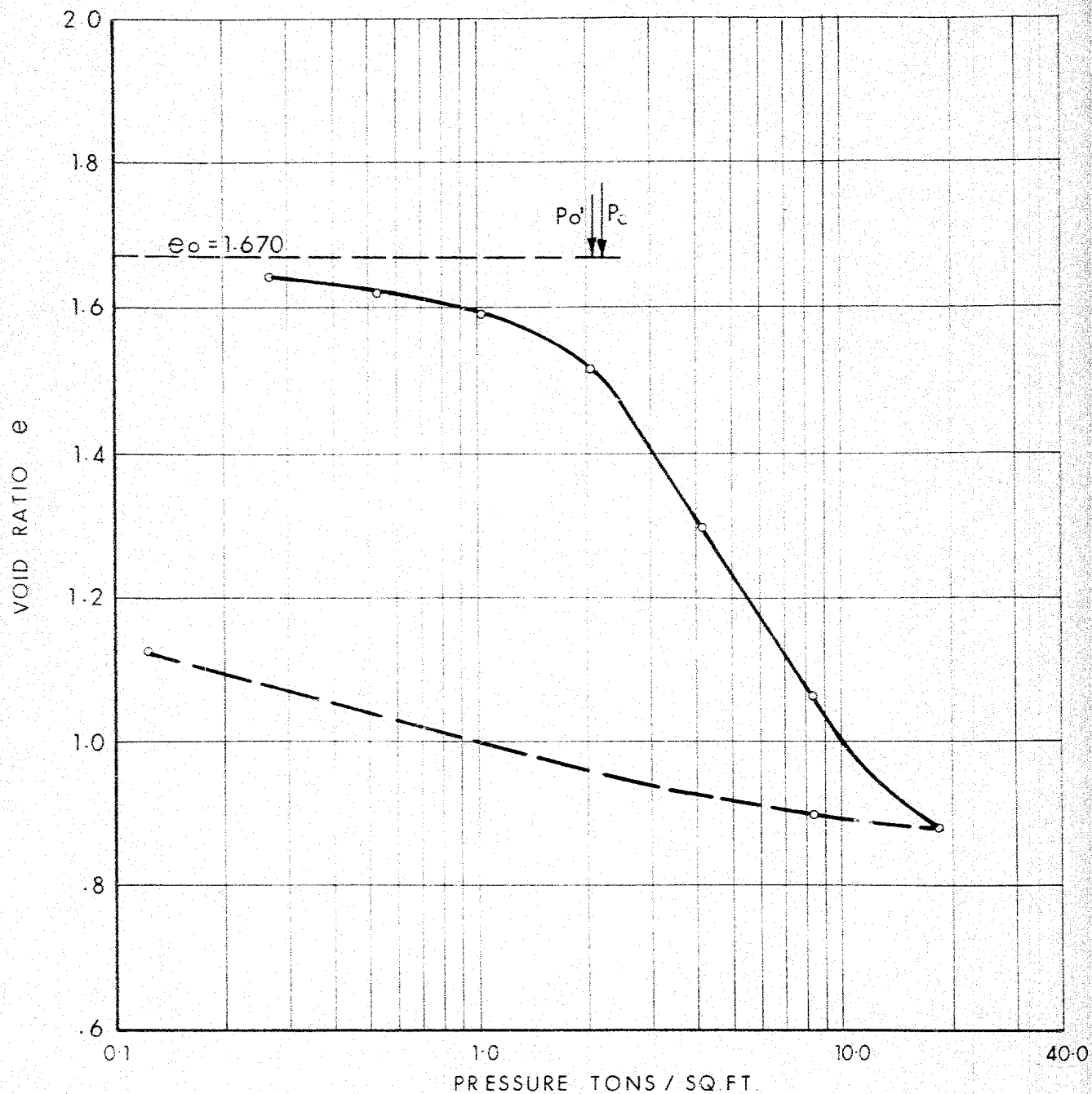
$W_L = 77$   
 $W_P = 26$   
 $W = 87.5\%$   
 $C_c = 2.020$

FIG. 3

JOB NO. 68-F-57

# VOID RATIO VS PRESSURE

BORE HOLE 4  
SAMPLE 16  
DEPTH 91'-0"  
ELEV. 157



$W_L = 78$   
 $W_p = 24$   
 $W = 60.3\%$   
 $C_c = 0.785$

FIG. 4

## 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 FREELY A 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	O.S.	OESTERBERG 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

Q <sub>u</sub>	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Q <sub>cu</sub>	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q <sub>d</sub>	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
$\phi'$	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
$c_u$	APPARENT COHESION
$\phi_u$	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
$\mu$	COEFFICIENT OF FRICTION
$S_r$	SENSITIVITY

### GENERAL

$\pi$	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF $\sigma$
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF $\sigma$ 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

*M. Devata*  
37  
FILE.



Structural Office,  
West Building.

February 16th, 1973.

C.N.R. Overhead,  
0.4 Mi. E. of Port McNicoll  
Diversion West Limits,  
W.P.#650-64-05, Site #30-432,  
Hwy. #12N, District #3.

At Head Office Review on February 16th, 1973, the method of slope protection for the N.W. end span slope was discussed in connection with the review of the above structure.

The Foundations Investigation Report recommended (on P. 10) that an 18 in ch thick blanket of granular "A" be placed over the N.W. slope to stabilize and protect it from the effect of the spring water emerging randomly in the longitudinal direction. An 18 inch blanket of granular "A" was shown accordingly on structure drawing D-7085-1.

A 1 ft. thick layer of "crushed rock slope protection" was also shown to be placed over the granular "A".

The need for the 1 ft. thick layer of crushed rock slope protection was questioned by Mr. L. Eadie. Mr. Eadie felt that the granular "A" alone would be sufficient. Others at the meeting (F. Allen, R. Bennett, G. Wrong) agreed with Mr. Eadie that the 1 ft. thick crushed rock was not necessary and could be omitted and that the granular "A" did not require such protection.

It was explained to those present (by J. Keen) that it was the opinion of the Structural Office that because of the surficial drainage from the top of the slopes and large area exposed to the elements (i.e. not covered by the end span) protection against erosion of the granular "A" blanket should be provided and this would be best accomplished by the 1 ft. thick layer of crushed rock slope protection shown on the drawing.

Those entering into the discussion still maintained that the crushed rock slope protection was unnecessary.

Upon instructions of the Head Office Contract Review Committee, the 1 ft. thick crushed rock slope protection will be removed from the structure drawings.

JLK:dp  
cc. M. Devata, S. Kryzevicius.

J. L. Keen,  
Reg. Structural Design Engineer.



Department of Highways Ontario

Copy for the information of

Mr. M. Devata, Foundation Section

Mr. M.J. MacMaster,  
Sr. Project Design Engineer,  
Road Design Office,  
Kingston Region

Bridge Office,  
Downsview, Ontario

February 19, 1969

W.P. 34-66-05 - Bear Brook Bridge (E.B.L.)  
W.P. 34-66-10 - Ramsay Creek Bridge (E.B.L.)  
Highway 417, District 9 - Ottawa

At the recent Regional Review of the above projects the District personnel brought up the subject concerning the dewatering problem anticipated during the construction of Piers 2 and 3 of Ramsay Creek Structure (W.P. 34-66-10) and Pier 3 of Bear Brook Structure (W.P. 34-66-05).

We have re-examined the footing depths and discussed same with the Foundation Section. It is their opinion that some dewatering scheme may be required in casting the pier footings, but no serious problem or unusual difficulty will be anticipated with reference to the soil condition where the piers are located. Therefore we will maintain the footing elevations as shown on our drawings so as to keep the bottom of the footings below the frost line.

WL:rd

C.S. Grebski,  
Bridge Design Engineer

c.c. M. Devata  
K. Westerby

~~Mr. S. J. Markiewicz~~  
Regional Road Design Engineer  
Road Design Office, Kingston

Materials and Testing Office  
Kingston

January 22, 1969

Re: Hwy. 417, W.P. 34-66-01  
Ramsayville to Eighth Line Road

Your proposed culvert construction at Bearbrook tributary (Sta. 431+00 E.B.L.) has been discussed with the Foundation Section who have recommended that the culvert be constructed to the invert elevations indicated on the attached sketch. This recommendation is based on the predicted 15 year settlement under the core of the embankment and proportionately less under the sloped portion.

*H. A. Meyer*  
H. A. Meyer

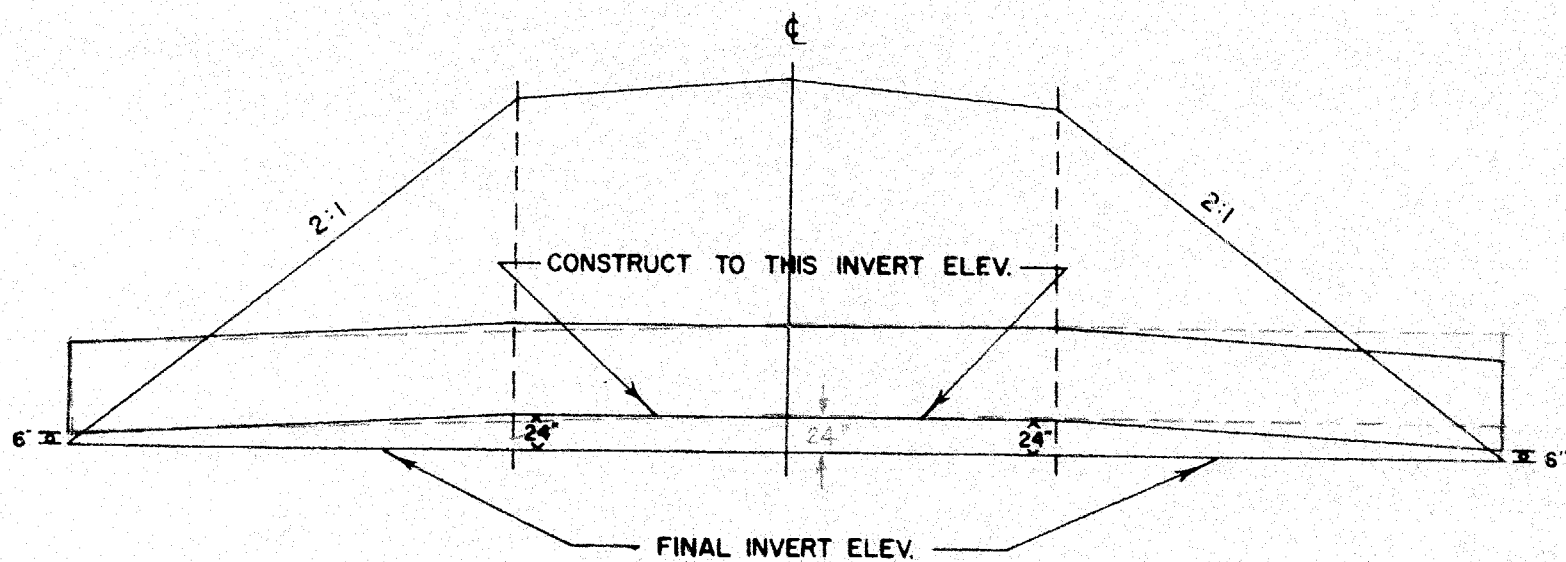
for: J. E. Gruspier  
Regional Materials Engineer

HAM:mgm  
Atch.

cc: A. G. Sternac  
G. A. Wrong

Note:- Advised Hunter Meyer in Kingston Region by telephone on Jan 27th 69 about the details of camber for the proposed. Recommended camber is shown ~~on red~~ red on the enclosed sketch.

*M. Devata*  
Jan 28/69



Department of Highways Ontario

Copy for the information of

Mr. A. Stermac

~~Re: Mr.~~

G. Scott, Kingston Region  
C.R. Robertson, Ottawa District  
L. Forster, Kingston Region  
S. Markiewicz, Kingston Region

Bridge Division,  
Downsview, Ontario

October 30, 1968

Dear Brook Tributary Bridge  
M.P. 34-55-13, Site 3-266  
Highway 417 (E.B.L.), District 9

Attached herewith are prints of the Preliminary Bridge Plan Drawing D-6584-P for the above-mentioned structure.

The estimated cost of the proposed structure is \$79,000. This cost includes tender, materials, engineering and sundry construction.

Any comments or revisions you may have should be submitted within three weeks.

CAC:rd

C.S. Grebaki,  
Bridge Design Engineer

Attach.

c.c. S. McCombie  
A. Stermac (2)  
D. Barr  
J. Anderson

*No comment  
M. Levata  
7th Nov/68*

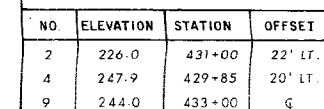
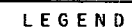
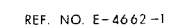
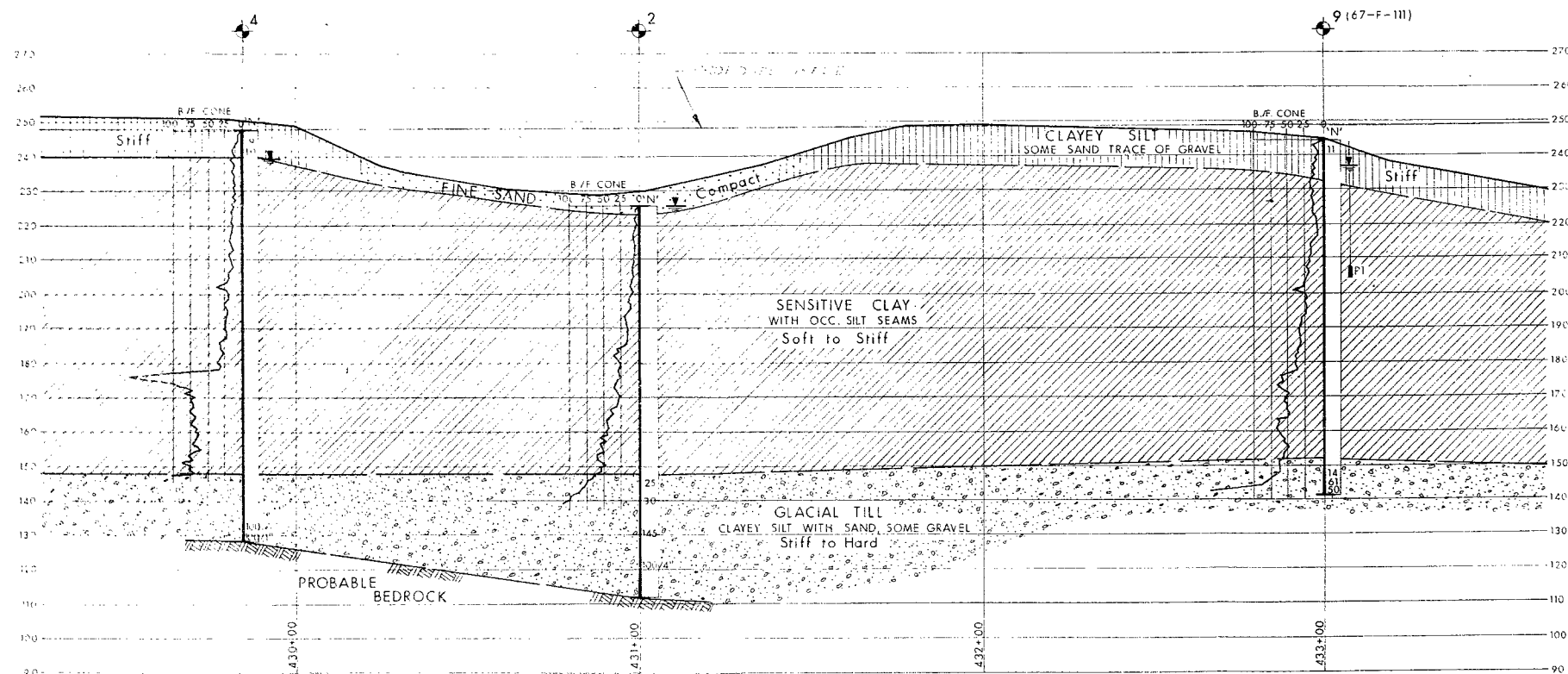
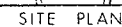
#68-F-57

W.P. #34-66-05

Hwy #417

BEAR BROOK

TRIBUTARIES



- 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.

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

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

BEAR BROOK E.B.L. APPROACH

KING'S HIGHWAY NO. 417 E.B.L. DIST. NO. 9

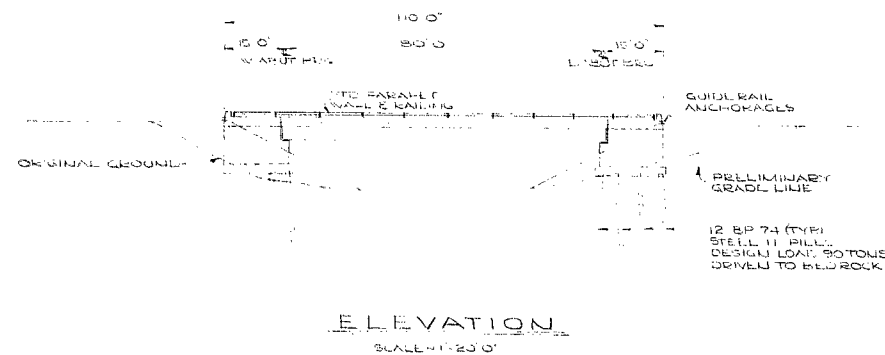
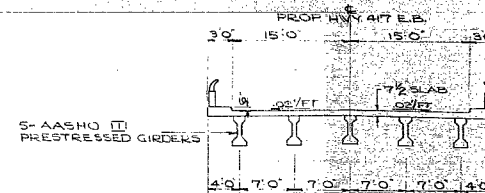
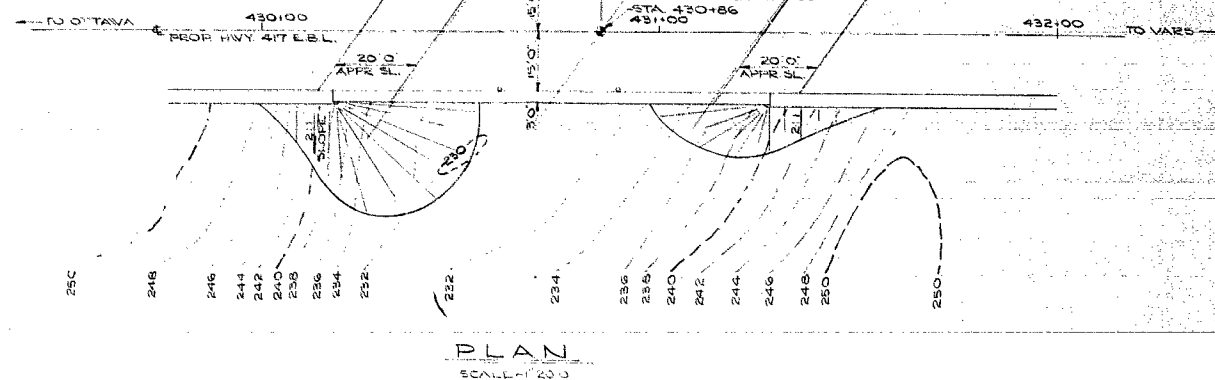
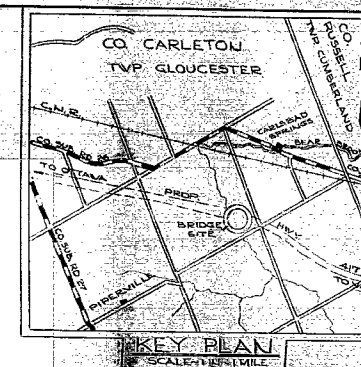
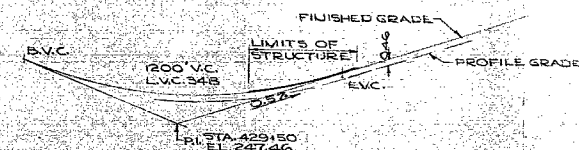
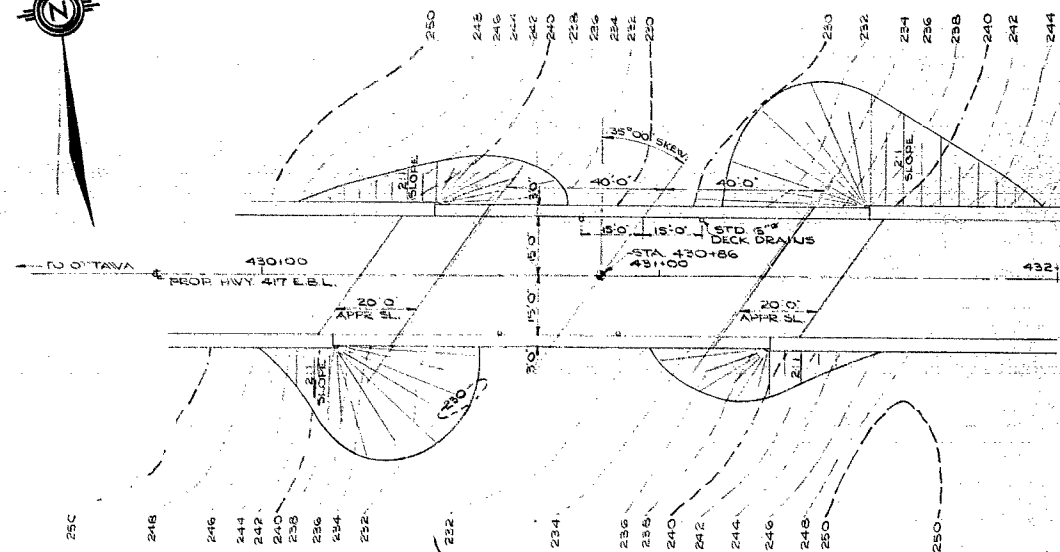
CO. CARLETON  
TWP. GLOUCESTER      LOTS 6 & 7      CON. VII

BORE HOLE LOCATIONS &amp; SOIL STRATA

SUBM'D C. M.	CHECKED	W.P. NO. 34-66-05	M & T. DRAWING NO.
DRAWN G. P.	CHECKED	JOB NO. 68-F-57	68-F-57A
DATE Oct. 9, 1968	SITE NO	BRIDGE DRAWING NO.	
APPROVED <i>A. G. Thomas</i>	CONT NO		





[illegible]

CLASS OF CONCRETE:	
DECK, CURBS & PARAPET WALLS	- 4000 PS.I
PRESTRESSED BEAMS	- 5000 PS.I
REMAINDER	- 3000 PS.I

CLEAR COVER ON REINFORCING STEEL	
FOOTINGS & ABUTMENTS	" 3"
CURBS	" 2"
DECK	TOP - 1/2" BOTTOM - 1"

CONSTRUCTION NOTES:  
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS, WITH A TOLERANCE OF  $\pm 1/8"$ .  
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED.

[illegible]

DEPARTMENT OF HIGHWAYS, ONTARIO BRIDGE DIVISION	
<u>BEAR BROOK TRIBUTARY</u> <u>BRIDGE</u>	
KING'S HIGHWAY No. 417 (E.B.L.)	DIST. No. 9
CO. CARLETON	
TWP. GLOUCESTER	LOT
	CON.
<u>PRELIMINARY</u>	

APPROVED		SHEET No. 3-266	W.P. No. 34-66-15
BRIDGE ENGINEER	CONTRACT No.		
DESIGN W.L.L. CHECK	DRAWING D.H.B. CHECK		
DATE OCT / 65	LOADING H 520-4	DRAWING No.	D-6584-P