

*Foundation Section.*

Mr. A. Toye,  
Bridge Engineer,  
Materials & Research Section.

December 6, 1956.

Foundation Report  
MacKenzie Creek Hwy. # 6  
W.P. 538-56, W.J. F-56-19  
Sta. 123/25

We are submitting herewith two copies of the above mentioned report which you will find self explanatory.

The design of this structure has already been given to the consultants by your office and they have asked for our Foundation Report as soon as possible.

F. C. Brownridge  
Materials & Research Engineer.

Per:



(A. Rutha)

AR/ad  
Copies to: Mr. H. Tregaskes,  
Mr. J. Walter,  
Mr. R. E. Richardson,  
Foundation Section,  
file.

FOUNDATION REPORT

on

Mackenzie Creek Bridge on Highway No. 6

Between: Caledonia and Hagersville.

Site Plan No.

Station: 123/25

Distribution:

Mr. A. Toye, Bridge Engineer	(2)
Mr. H. A. Tregaskes, Construction Engineer	(1)
Mr. J. Walter, Design Engineer	(1)
Mr. R. E. Richardson, District Engineer, Hamilton, Ontario.	(1)
Foundation Section	(1)
File	(1)

W. F. 538-56

W. J. F-56-19

I. INTRODUCTION:

A subsoil investigation was made to determine the bearing capacity of the layers at this site.

The location is between Caledonia and Hagersville, where the proposed diversion line of Highway No. 6 is crossing the Mackenzie Creek (profile no. F-3473, station 123+25).

II. PROCEDURE:

The field investigations were carried out by means of a skid mounted core drill machine.

Four boreholes, with dynamic cone penetrations (no. 1, 2, 10, 11) were made on both sides of the creek to investigate the supporting capacity for the bridge foundations. From the bridge site some 1200 ft. to the west (from station 124+00 to 136+00), where the proposed diversion line meets again the existing Highway No. 6, the new grade-line is elevated some 10-12 ft. above the ground level. To investigate the stability of the approach fill, which will continue all along this strip of about 1200 ft., eight boreholes were made.

The locations and elevations of the boreholes are shown in Drawing No. F-56-19 A, and their logs under Appendix I.

III. SUBSOIL FINDINGS AND ANALYSIS:

The course of the creek is slow and gentle. The high water level is some six feet above the normal water level. On the eastern side the waters are confined to their basin by the quick rising terrain. On the western side, however, the ground

### III. SUBSOIL FINDINGS AND ANALYSIS: (cont'd.)

is low and flat and during times of high water is covered with flood waters.

From the subsoil investigations, it was found that the terrain is glacial till covered with probable lacustrine clay. Soil formation and stratification is the same on both sides of the river.

Under the topsoil there is a layer of 2-4 ft. of clay. The laboratory test results show its being light, inorganic clay with medium plasticity, and having shearing strength of 670 p.s.f. Underlying this clay is the boulder clay till which extends down to about elevation 610 ft. From the extracted samples it was observed that the layer is stiff, bouldery and impervious. The laboratory test results and field penetration tests show that the layer at about elevation 622 ft. can provide a bearing value of 2 t.s.f. with a safety factor of 3.

From the underlying bedrock, samples were extracted by means of core drill. The examinations showed it to be layers of dolomite interbedded with shale and some gypsum.

### IV. CONCLUSIONS AND RECOMMENDATIONS:

From the above discussion it would be concluded that:

1. Under the few feet of top clay layer the soil is boulder clay till, very stiff and impervious. At elevation 622 ft. the layer can provide a bearing value of 2 t.s.f. with a safety factor of 3.

IV. CONCLUSIONS AND RECOMMENDATIONS: (cont'd.)

It will be satisfactory to support the proposed bridge on spread footing foundations at about elevation 622 ft. If the footings are placed at this elevation, the hazard of scouring should be given due consideration.

The approach fills to the bridge and continuation toward west will only require the excavation of the top soil. The new fill thus placed, will be safe for stability purposes.

V. Korlu  
Foundation Engineer

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N. JOB F-56-19 WP 538-56 BORING 1 STA. 123+85 (61' RT.)  
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT OCT. 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY      DATE BORING 15 OCT. 1956

## ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
 M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
 U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
 QC - TRIAXIAL CONSOLIDATED QUICK WT. - WATER TABLE IN SOIL γ - UNIT WEIGHT

## SAMPLE TYPES

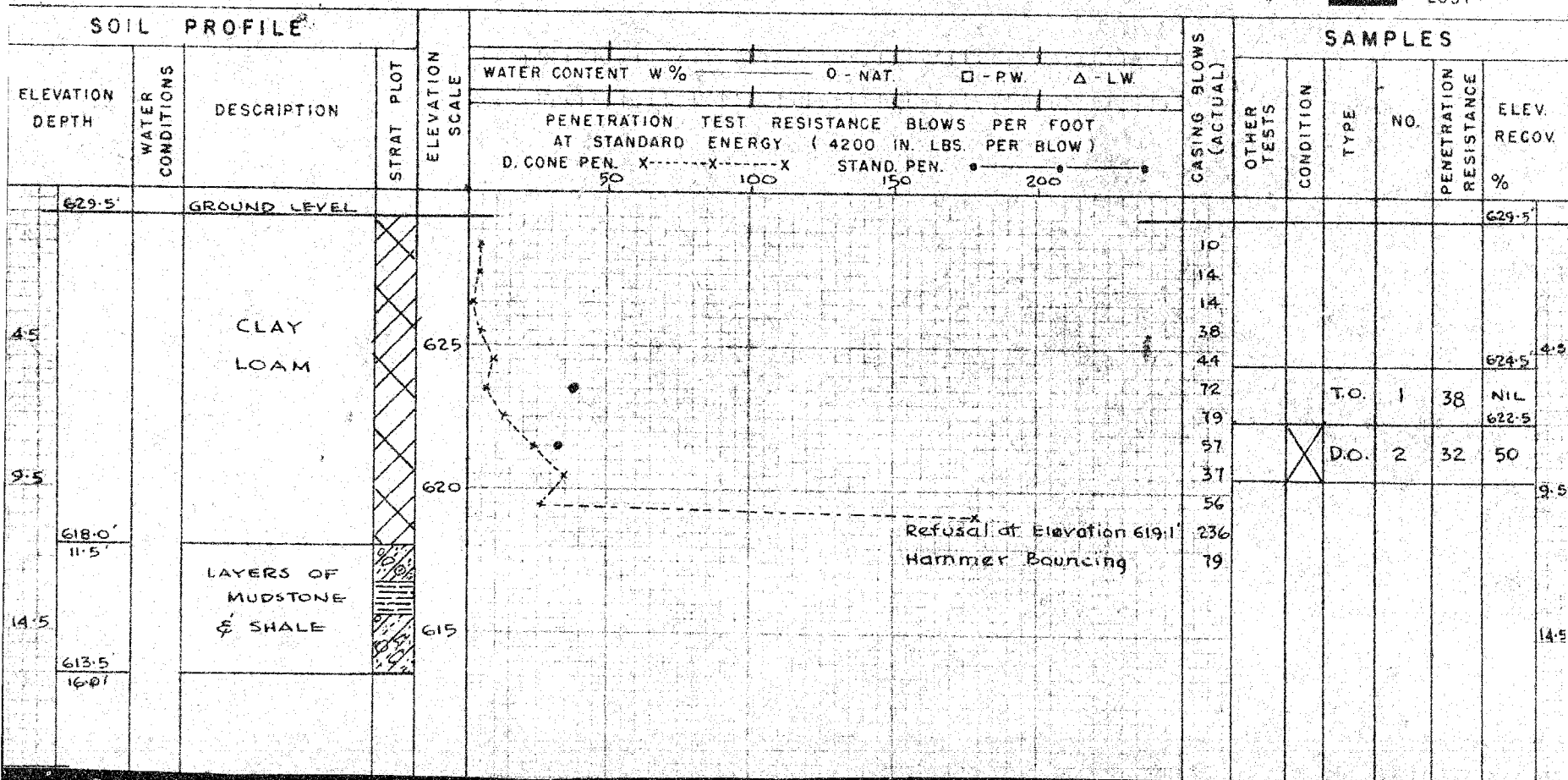
CS - CHUNK SS - SLEEVE SAMPLE  
 D.O. - DRIVE OPEN PS - PISTON SAMPLE  
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
 T.O. - THIN WALLED OPEN RC - ROCK CORE

## SAMPLE CONDITION



- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

## SOIL PROFILE



DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N JOB F-56-19 WR 538-56 BORING 2 STA. 124+06.3' RT  
 CASING B-X (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT OCT. 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY  DATE BORING 16 OCT. 1956

## ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
 M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
 U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
 Qc - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

## SAMPLE TYPES

CS - CHUNK SS - SLEEVE SAMPLE  
 DO - DRIVE OPEN PS - PISTON SAMPLE  
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
 TO - THIN WALLED OPEN RC - ROCK CORE

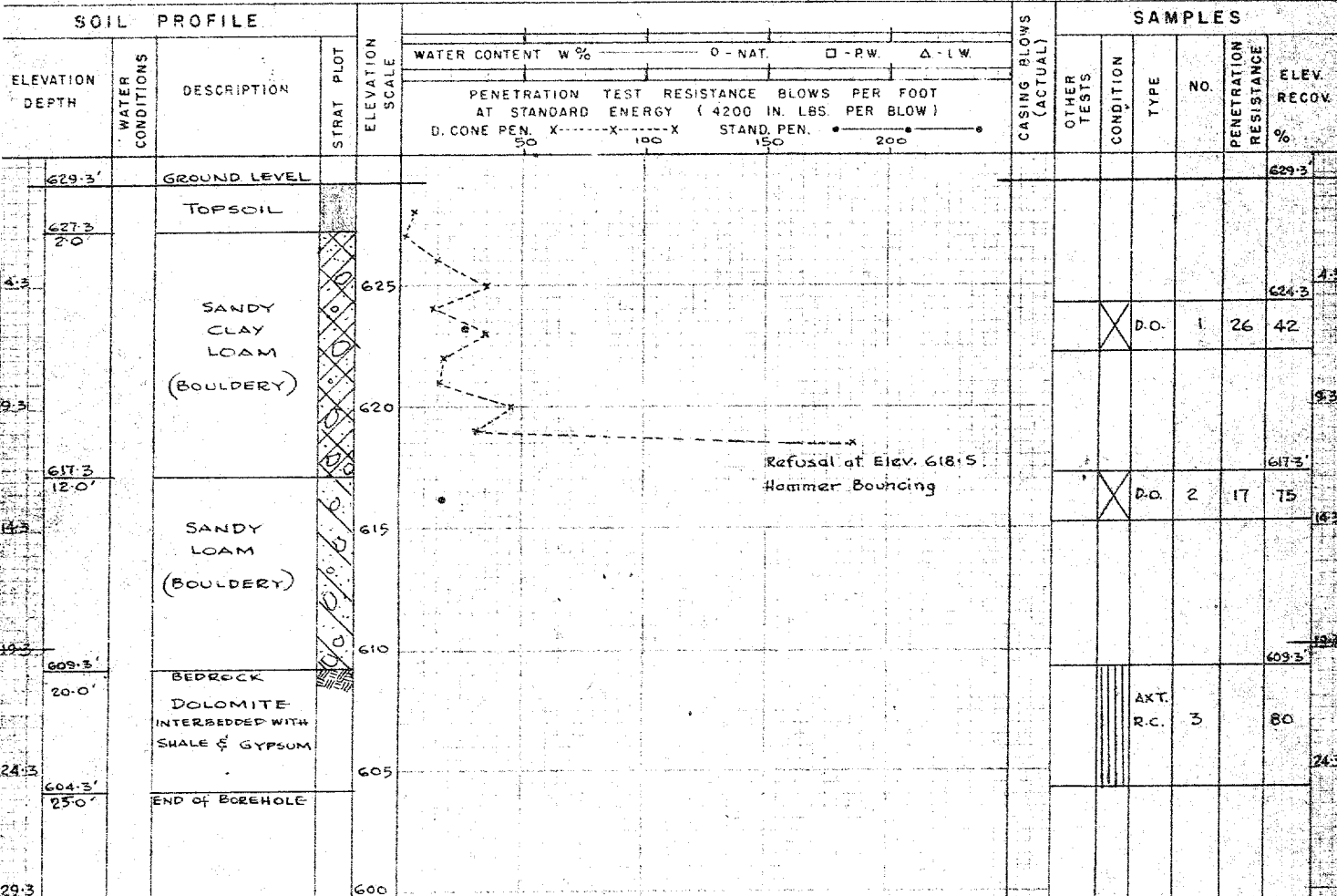
## SAMPLE CONDITION



- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

## SOIL PROFILE

## SAMPLES





DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N JOB F-56-19 WP 538-56 BORING 3 STA. 124+15.24 RT.  
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT OCT. 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY --- DATE BORING 17 OCT. 1956

## ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
 M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
 U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
 QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL  $\gamma$  - UNIT WEIGHT

## SAMPLE TYPES

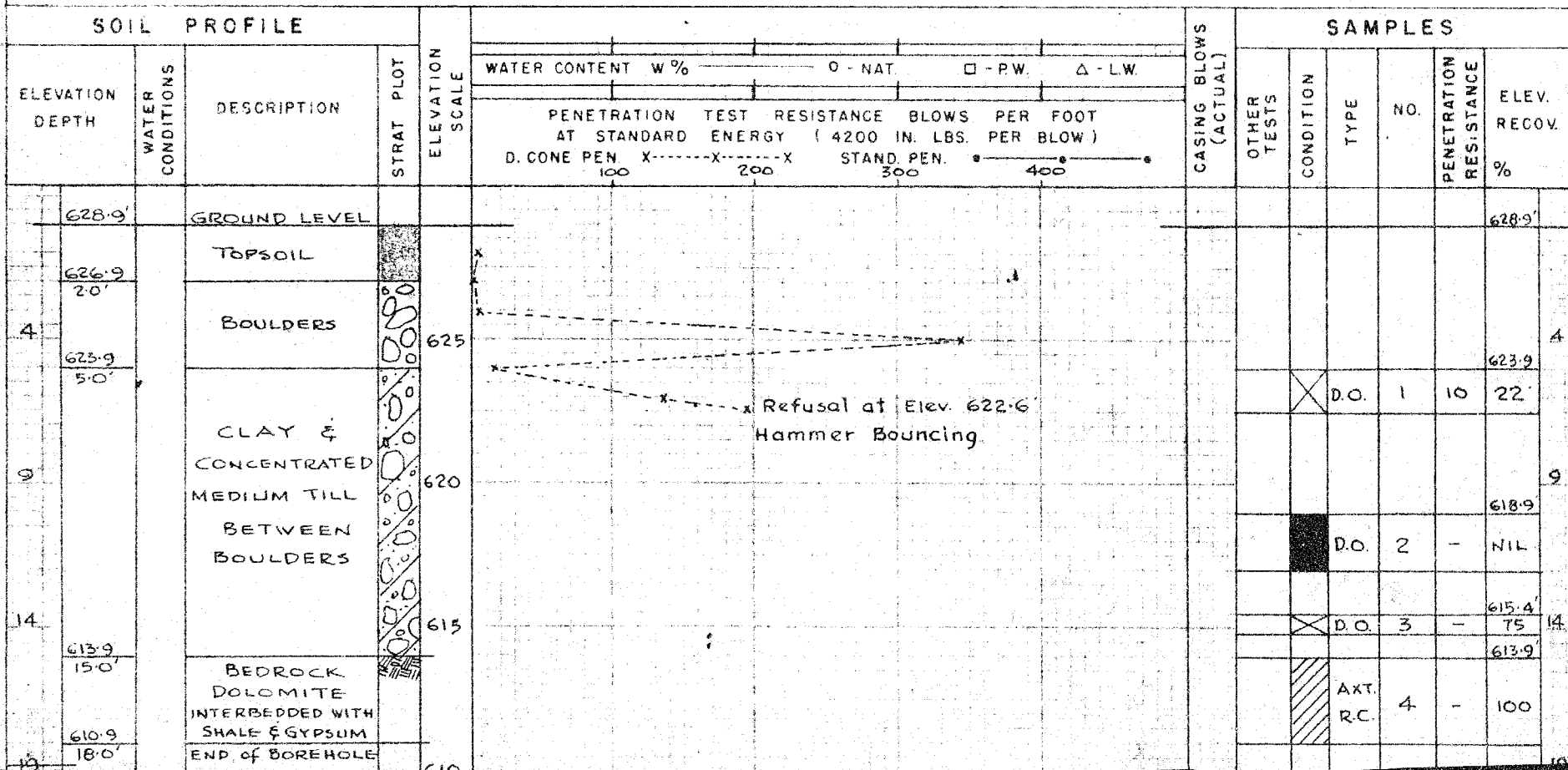
CS - CHUNK SS - SLEEVE SAMPLE  
 DO - DRIVE OPEN PS - PISTON SAMPLE  
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
 TO - THIN WALLED OPEN RC - ROCK CORE

## SAMPLE CONDITION



- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

## SOIL PROFILE



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N. JOB F-56-19 WP 538-56 BORING 4 STA. 132+00 E  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT OCT 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY DATE BORING 18 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL  $\gamma$  - UNIT WEIGHT

**SAMPLE TYPES**

CS - CHUNK SS - SLEEVE SAMPLE  
DO - DRIVE OPEN PS - PISTON SAMPLE  
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
TO - THIN WALLED OPEN RC - ROCK CORE

**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**

SOIL PROFILE					SAMPLES												
ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W %			PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY ( 4200 IN. LBS. PER BLOW )			CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV
					O - NAT.	□ - P.W.	△ - L.W.	D. CONE PEN. X-----X-----X	STAND. PEN. •-----•-----•	PENETRATION RESISTANCE %							
					50	100	150	200									
627.7		GROUND LEVEL															627.7'
627.0 0.7'		TOPSOIL															626.7'
624.7 3.0'		MEDIUM CLAY		625							3-100 P.C.F. U=440 P.S.F.		T.O.	1	46 PUSHED	624.7'	2.7
623.7 4.0'		BROWN MEDIUM CLAY									24-385 P.C.F. U=500 P.S.F.		T.O.	2	67 PUSHED	623.7'	
620.7 7.0'		BROKEN ROCK															620.7'
		BEDROCK		620													7.7
		DOLOMITE INTERBEDDED WITH SHALE & GYPSUM												AXT. RC.		POOR	
616.7 11.0'		END OF BOREHOLE		615													12.7

Refusal at Elev. 623.0  
Hammer Bouncing

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N JOB F-56-19 WP 538-56 BORING 5 STA. 133+00.4  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY      DATE BORING 19 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
Q<sub>c</sub> - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

C.S. - CHUNK S.S. - SLEEVE SAMPLE  
D.O. - DRIVE OPEN P.S. - PISTON SAMPLE  
D.F. - DRIVE FOOT VALVE WS - WASHED SAMPLE  
T.O. - THIN WALLED OPEN R.C. - ROCK CORE

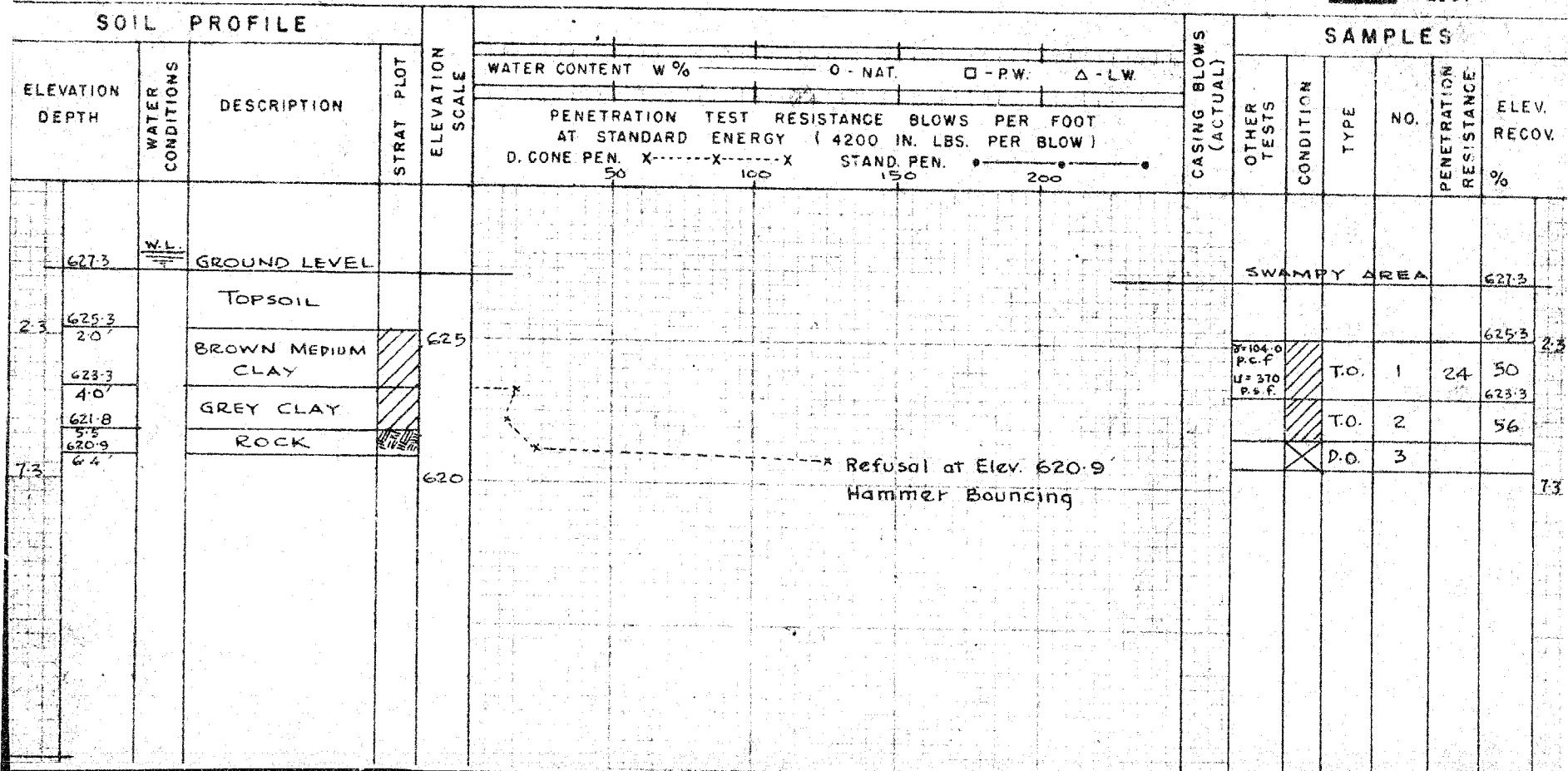
**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**

**SAMPLES**



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #1 OPERATION BORE & PENET'N JOB F-56-19 WP 538-56 BORING 6 STA. 135+03 &  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT NOV. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY     DATE BORING 20 OCT. 1956

## ABBREVIATIONS

Q - TRIAXIAL QUICK

K - PERMIABILITY

C.S. - CHUNK

S.S. - SLE

- FAIR

- GOOD

- LOST

W.L - WATER LEVEL

D.F. - DRIVE FOOT

WT - WATER TABLE IN SOIL

L      2 - UNIT W

W.S. - WASHED SAMPLE

[illegible]

T.O. - THIN WALLED OPEN

R.C. - ROCK CORE

## SOIL PROFILE

## SAMPLES

SOIL PROFILE					SAMPLES									
ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W %			CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV %
					O - NAT.	□ - P.W.	Δ - L.W.							
PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)														
D. CONE PEN. X-----X-----X STAND. PEN. •-----•-----•														
50 100 150 200														
628.8		GROUND LEVEL												628.8
626.8 2.0'		TOPSOIL						7						626.8
4 625		RED BROWN CLAY						13	p=121.5 p.c.f. u=1180 p.s.f.	TO.	1	13	38	4
								10						
								15						
								21						
9 620		ROCK						34	p=146.5 p.c.f. u=1850 p.s.f.	TO.	2	31	58	9
								44						
								58						
								54						
617.7 9.5'								131		S.S.	3		33	
615					Refusal at Elev. 617.7' Hammer Bouncing			400						14

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #1 OPERATION BORE & PENET. JOB F-56-19 WP 538-56 BORING 7 STA. 130+00  
CASING BX (standard sampler to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY DATE BORING 22 OCT. 1956

## ABBREVIATIONS

Y - INSITU VANE SHEAR TEST      Q - TRIAXIAL QUICK      K - PERMIABILITY  
M - MECHANICAL ANALYSIS      S - TRIAXIAL SLOW      C - CONSOLIDATION  
U - UNCONFINED COMPRESSION      WL - WATER LEVEL IN CASING      CA - CASING  
QC - TRIAXIAL CONSOLIDATED QUICK      WT - WATER TABLE IN SOIL       $\gamma$  - UNIT WEIGHT

## SAMPLE TYPES

C.S. - CHUCK	S.S. - SLEEVE SAMPLE
D.O. - DRIVE OPEN	P.S. - PISTON SAMPLE
D.F. - DRIVE FOOT VALVE	W.S. - WASHED SAMPLE
T.O. - THIN WALLED OPEN	R.C. - ROCK CORE

SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

## SOIL PROFILE

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG # 1 OPERATION BORE & PENET'N JOB F-56-19 WP 538-56 BORING 8 STA. 127+50.4  
CASING EX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY      DATE BORING 23 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

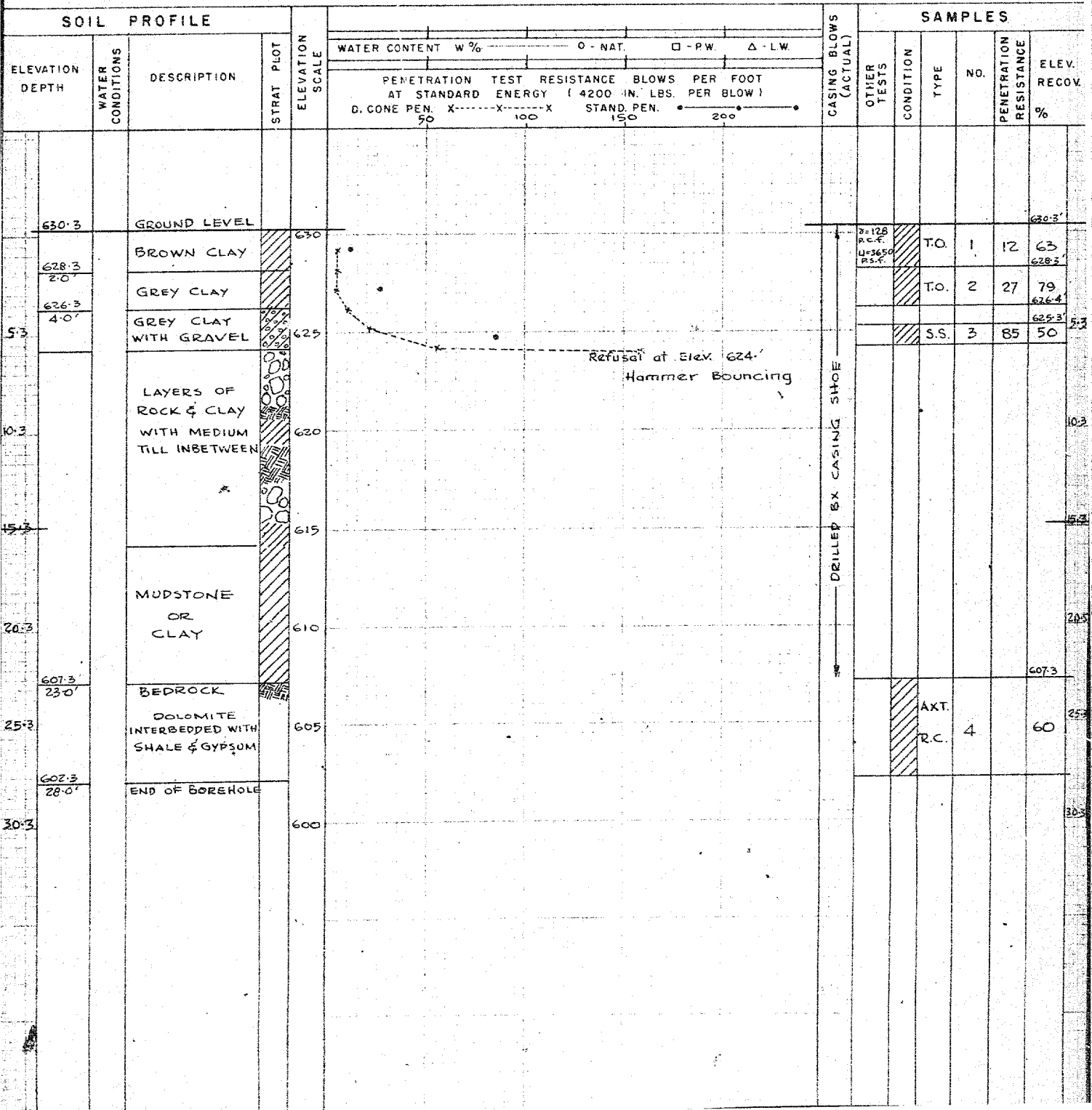
C.S. - CHUNK DO - DRIVE OPEN  
D.F. - DRIVE FOOT VALVE WS - WASHED SAMPLE  
T.O. - THIN WALLED OPEN RC - ROCK CORE

**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N JOB F-56-19 WP 538-56 BORING 9 STA. 125+50.4  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY     DATE BORING 24 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
B - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

CS - CHUNK SS - SLEEVE SAMPLE  
DO - DRIVE OPEN PS - PISTON SAMPLE  
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
TO - THIN WALLED OPEN RC - ROCK CORE

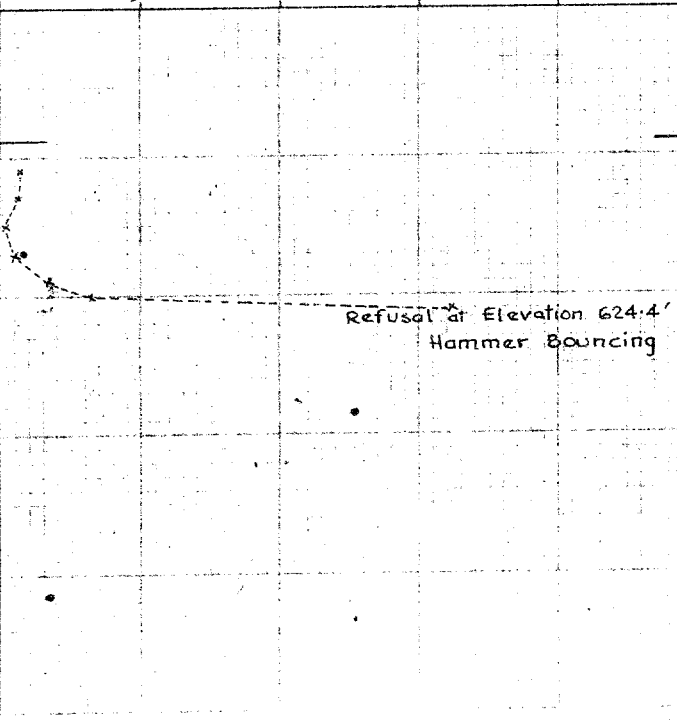
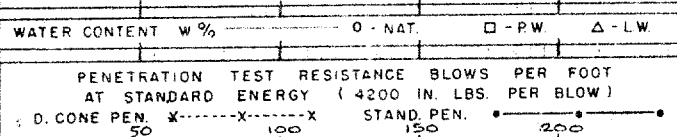
**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
630.6'		GROUND LEVEL		630
628.6'		TOPSOIL		628
625.6'		BROWN LIGHT CLAY		625
620.1'		DENSE TILL (BOULDERY)		620
615.6'		SANDY LOAM TILL		615
610'		BEDROCK (DOLOMITE)		610



**SAMPLES**

CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV.
						630.6'
						627.6'
			TO	1	7	50
						621.6'
			SS	2	127	100
						615.6'
			SS	3	17	100
						610'

DRILLED BX CASING SHOWN

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N JOB E-56-19 WP 638-56 BORING NO. STA. 123+00 26' LT.  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY DATE BORING 25 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

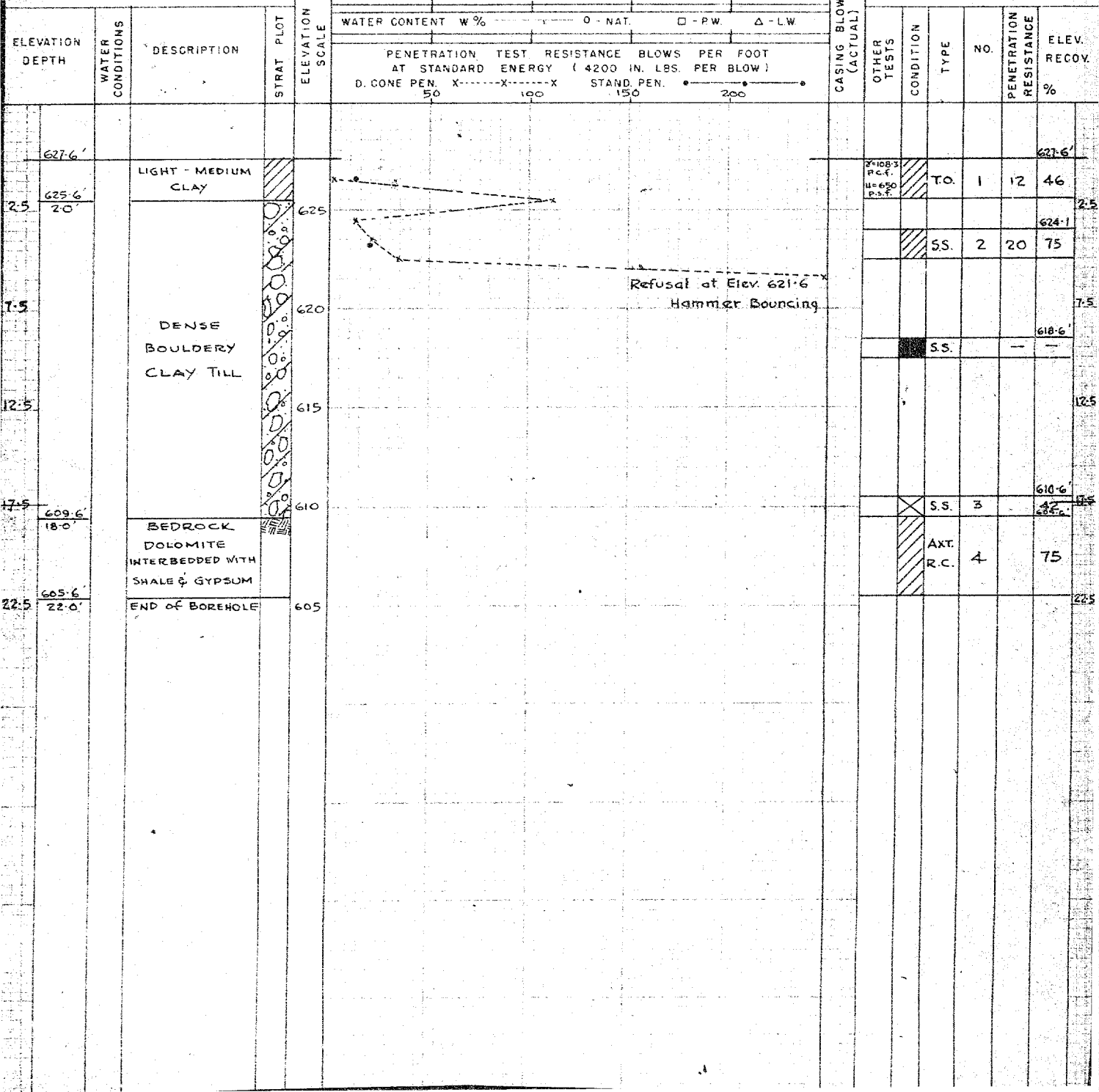
CS - CHUNK SS - SLEEVE SAMPLE  
DO - DRIVE OPEN PS - PISTON SAMPLE  
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
TO - THIN WALLED OPEN RC - ROCK CORE

**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**





DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION BORE & PENET'N. JOB F-56-19 WP 538-56 BORING II STA 122+48 33' RT.  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY DATE BORING 26 OCT. 1956

**ABBREVIATIONS**

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY  
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION  
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
D<sub>c</sub> - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

CS - CHUNK SS - SLEEVE SAMPLE  
DO - DRIVE OPEN PS - PISTON SAMPLE  
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
TO - THIN WALLED OPEN RC - ROCK CORE

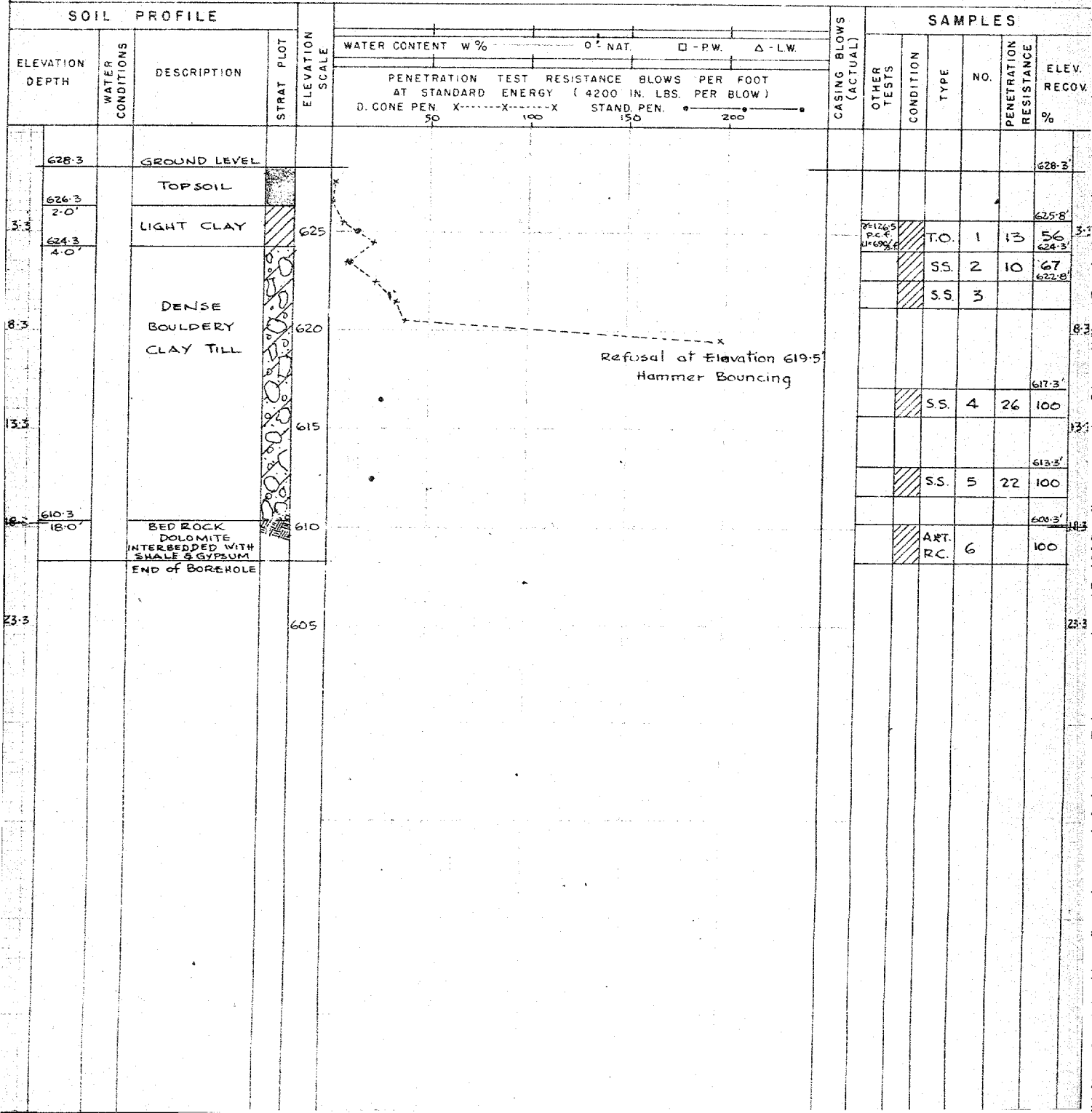
**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST

**SOIL PROFILE**

**SAMPLES**



# OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #1 OPERATION BORE & PENET'N. JOB F-56-19 WP 538-56 BORING 12 STA 121+43 C  
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT Nov. 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY \_\_\_\_\_ DATE BORING 29 OCT. 1956

## ABBREVIATIONS

V - INSITU VANE SHEAR TEST	Q - TRIAXIAL QUICK	K - PERMIABILITY
M - MECHANICAL ANALYSIS	S - TRIAXIAL SLOW	C - CONSOLIDATION
U - UNCONFINED COMPRESSION	WL - WATER LEVEL IN CASING	CA - CASING
QC - TRIAXIAL CONSOLIDATED QUICK	WT - WATER TABLE IN SOIL	$\gamma$ - UNIT WEIGHT

## SAMPLE TYPES

C.S. - CHUNK	S.S. - SLEEVE SAMPLE
D.O. - DRIVE OPEN	P.S. - PISTON SAMPLE
D.F. - DRIVE FOOT VALVE	W.S. - WASHED SAMPLE
T.O. - THIN WALLED OPEN	R.C. - ROCK CORE

SAMPLE CONDITION

- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

## SOIL PROFILE

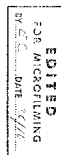
SOIL PROFILE					SAMPLES									
ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W% ————			CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE %	ELEV. RECOV.
					0 - NAT.	□ - P.W.	Δ - L.W.							
					PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY ( 4200 IN. LBS. PER BLOW )									
					D. CONE PEN. X-----X-----X STAND. PEN. ●-----●									
					50 100 150 200									
654.2		GROUND LEVEL												654.2
652.2 2.0'		TOPSOIL						7						
4.2		MEDIUM CLAY		650				10						
647.2 7.0'		HEAVY CLAY		645				19						
9.2			645					22						
14.2			640					31						
19.2			635					25						
24.2			630					25						
29.2			625					28						
			625					34						
			625					37						
			625					42						
			625					42						
622.7 31.5'		HARD CLAY & SHALE		620				52						
621.7 32.5'			620					52						
4.2			620					76						
								64						
								74						
								79						
								66						
								94						
								87						
								85						
								80						
								82						
								76						
								77						
								83						
								83						
								77						
								200						
								300						

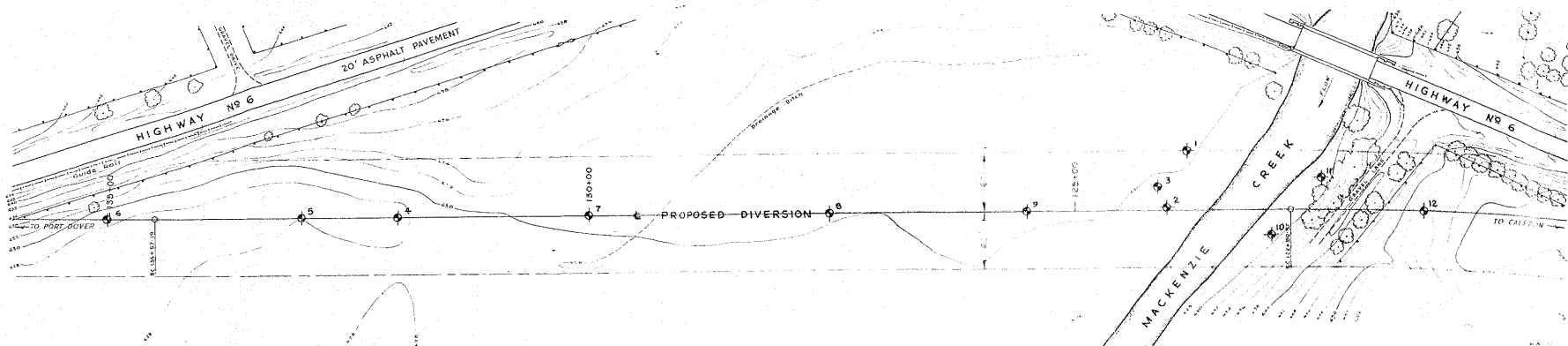
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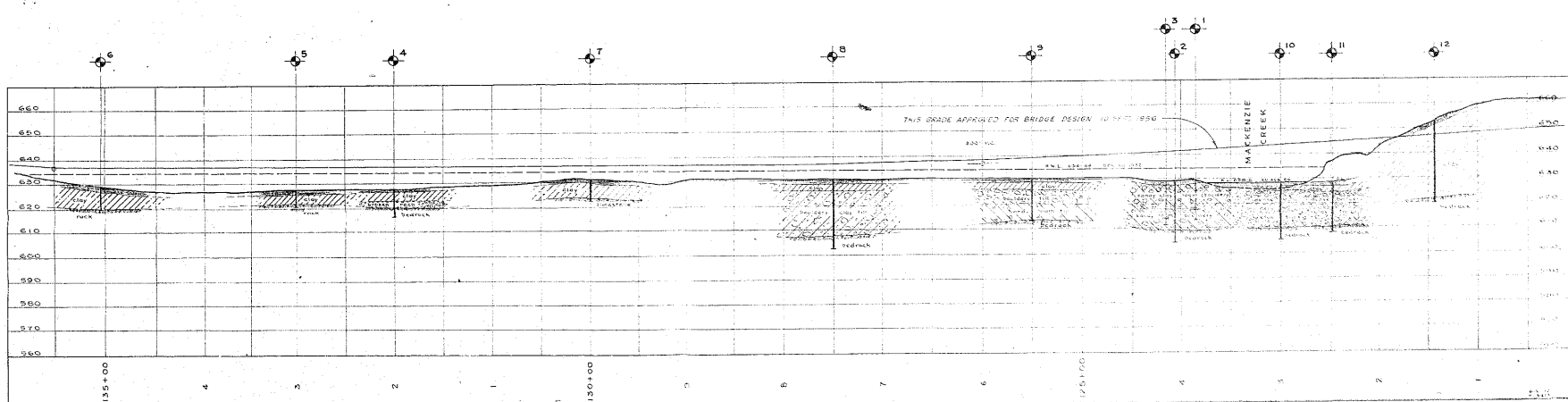
Hwy #6

BETWEEN  
CALEDONIA &  
HAGERSVILLE





**PLAN**  
Scale - 1 inch = 50 feet



**PROFILE**  
Scale - Vert. 1 inch = 20 feet  
Horiz. 1 inch = 50 feet

LEGEND			
Bore Hole			
Penetration Hole			
Bore & Penetration Hole			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM 0
1	629.5	123+05	61' RT.
2	629.3	124+06	5' RT.
3	628.9	124+15	24' RT.
4	627.7	132+00	0
5	627.5	133+00	0
6	628.8	135+03	0
7	630.0	135+00	0
8	630.3	127+50	0
9	630.6	125+50	0
10	627.6	125+00	26' LT.
11	628.5	122+48	35' RT.
12	654.2	121+45	0

**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 - DOWNSVIEW

**MACKENZIE CREEK  
PROPOSED CROSSING**

THE KING'S HIGHWAY No. 6 DIV. No. 4  
CO. HALDIMAND  
TWP. ONEIDA LOT 4 CON. RANGE E

**POSITIONS AND ELEVATIONS OF HOLES**

APPROVED

DESIGNER: H. B. K. CHECKED: W. B. K. APPROVED: W. B. K. DIV. 56  
DATE: 26 November 1956

**F-56-19 A**