

54-F-14

Hwy. #17

PRAIRIE RIVER

MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 2  
CASING 5X (STANDARD SAMPLERS TO FIT UNLESS NOTED)  
SAMPLER HAMMER WT.        # DROP        INCHES

JOB F50-14 BORING NO. 1  
 DATUM ELEV. 632.9 STN 156712 26' 17 DATE REPORT 13 OCT 1954  
 COMPILED BY HLE CHECKED BY ..... BORING DATE 29 SEPT 1954

### SAMPLE CONDITION



## SAMPLE TYPES

CS - CRUNK  
DO - DRIVE OPEN  
DF - DRIVE FOOT VALVE  
TO - THIN WALLED OPEN  
WS - WASHED SAMPLE  
RC - ROCK CORE

## ABBREVIATIONS

ABBREVIATIONS

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

## SOIL PROFILE

[illegible]

MATERIALS LABORATORY - DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #2 \_\_\_\_\_  
CASING BX (STANDARD SAMPLERS TO FIT UNLESS NOTED)  
SAMPLER HAMMER WT \_\_\_\_\_ # DROP \_\_\_\_\_ INCHES

JOB F 54-1A BORING NO 2  
 DATUM ELEV 631.6 STA 54+20 12 LT DATE TESTED 13 OCT 1954  
 COMPILED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_ BORING DATE 27 SEPT 1954

SAMPLE CONDITION



## SAMPLE TYPES

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

## ABBREVIATIONS

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

## SOIL PROFILE

[illegible]

[illegible][illegible]

MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG # 2  
CASING Bx (STANDARD SAMPLERS TO FIT UNLESS NOTED)  
SAMPLER HAMMER WT. \_\_\_\_\_ # DROP \_\_\_\_\_ INCHES

JOB F54-14 BORING NO. 0  
 DATUM ELEV 621.7 STD 1565+85 LT 2.5 DATE REPORT 12<sup>TH</sup> OCT 1954  
 COMPILED BY H.E. CHECKED BY \_\_\_\_\_ BORING DATE 6<sup>TH</sup> OCT 1954

### SAMPLE CONDITION



DISTURBED  
GOOD  
LOST

## SAMPLE TYPES

C.S. - CRUNK  
D.O. - DRIVE OPEN  
D.F. - DRIVE FOOT VALVE  
T.O. - THIN WALLED OPEN

WS - WASHED SAMPLE  
RC - ROCK CORE

## ABBREVIATIONS

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

[illegible]

MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #2 JOB F54-14 BORING NO 10  
CASING 4x (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM ELEV 622.0 STN 365+85.28'6" DATE REPORT 6<sup>th</sup> OCT 1954  
SAMPLER HAMMER WT # DROP INCHES COMPILED BY H.E. CHECKED BY BORING DATE 5<sup>th</sup> OCT 1954

SAMPLE CONDITION



DISTURBED  
GOOD  
LOST

## SAMPLE TYPES

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

## ABBREVIATIONS

ABBREVIATIONS

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

[illegible]

MATERIALS LABORATORY - DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 1-2 JOB 537  
CASING 3x (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM ELEV 10075  
SAMPLER HAMMER WT 250 # DROP 62 INCHES COMPILED BY 442 CHECKED BY

### SAMPLE CONDITION



DISTURBED

GOOD

LOST

## SAMPLE TYPES

CS - CHUNK  
DO - DRIVE OPEN  
DF - DRIVE FOOT VALVE  
TO - THIN WALLED OPEN

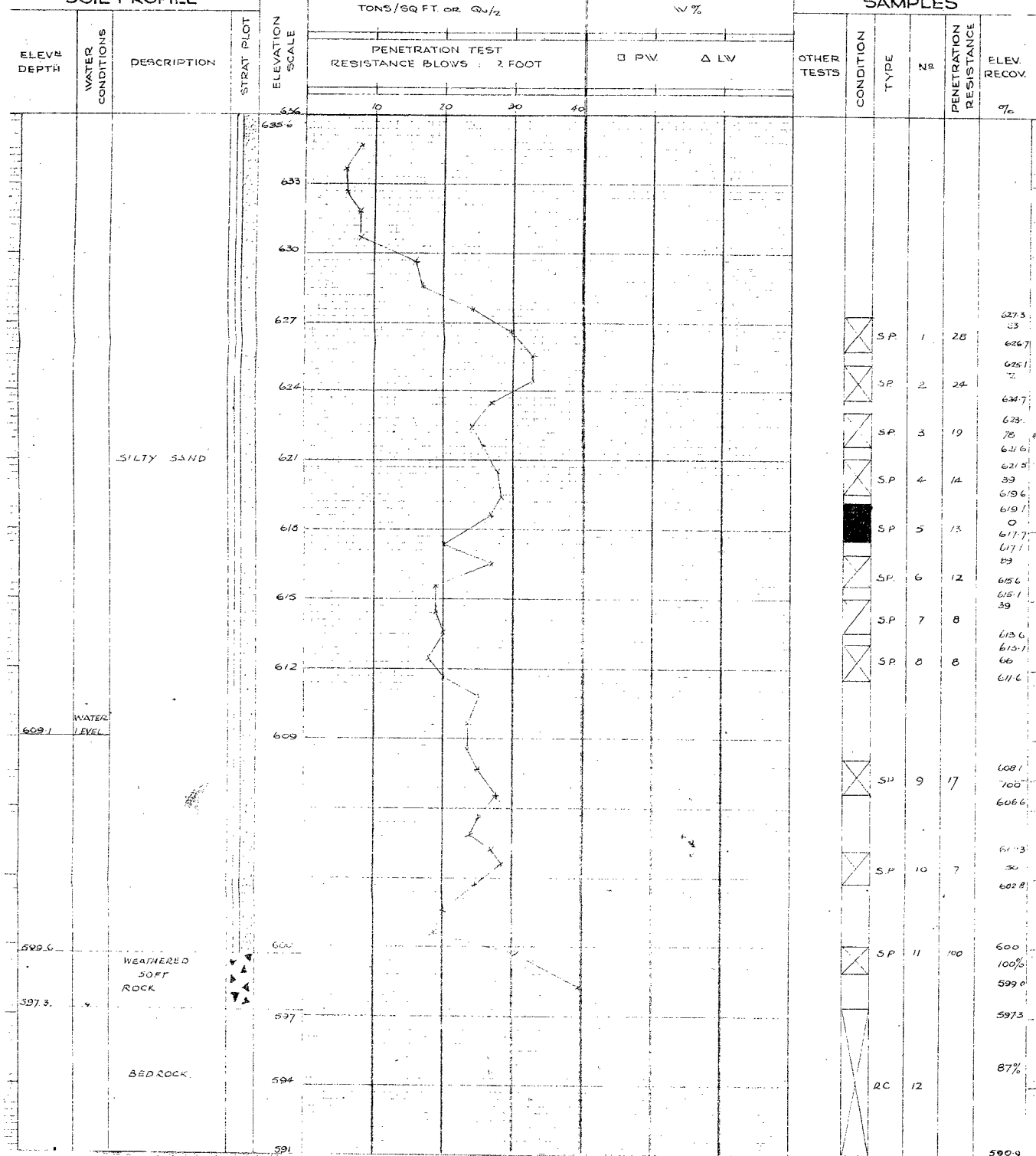
WS - WASHED SAMPLE  
RC - ROCK CORE

## ABBREVIATIONS

ABBREVIATIONS

V-INITU VANE SHEAR TEST	J-UNIT WEIGHT
M-MECHANICAL ANALYSIS	K-PERMEABILITY
U-UNCONFINED COMPRESSION	C-CONSOLIDATION
Qc-TRIAxIAL CONSOLIDATED QUICK	CA-CASING
Q-TRIAxIAL QUICK	WL-WATER LEVEL IN CASING
S-TRIAxIAL SLOW	WT-WATER TABLE IN SOIL

## SOIL PROFILE



MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG #2  
CASING - 2 3/8" (STANDARD SAMPLERS TO FIT UNLESS NOTED)  
SAMPLER HAMMER WT - 250 # DROP - 6 1/2" INCHES

JOB - F 54-14  
DATUM - 637.2  
COMPILED BY - JLF CHECKED BY

BORING N° - 13  
DATE REPORT - 19 OCT 1988  
BORING DATE - 16, 18 & 19 OCT 1984

### SAMPLE CONDITION



DISTURBED

GOOD

LOST

## SAMPLE TYPES

C.S - CHUNK  
D.O. - DRIVE OPEN  
D.F - DRIVE FOOT VALVE  
T.O. - THIN WALLED OPEN

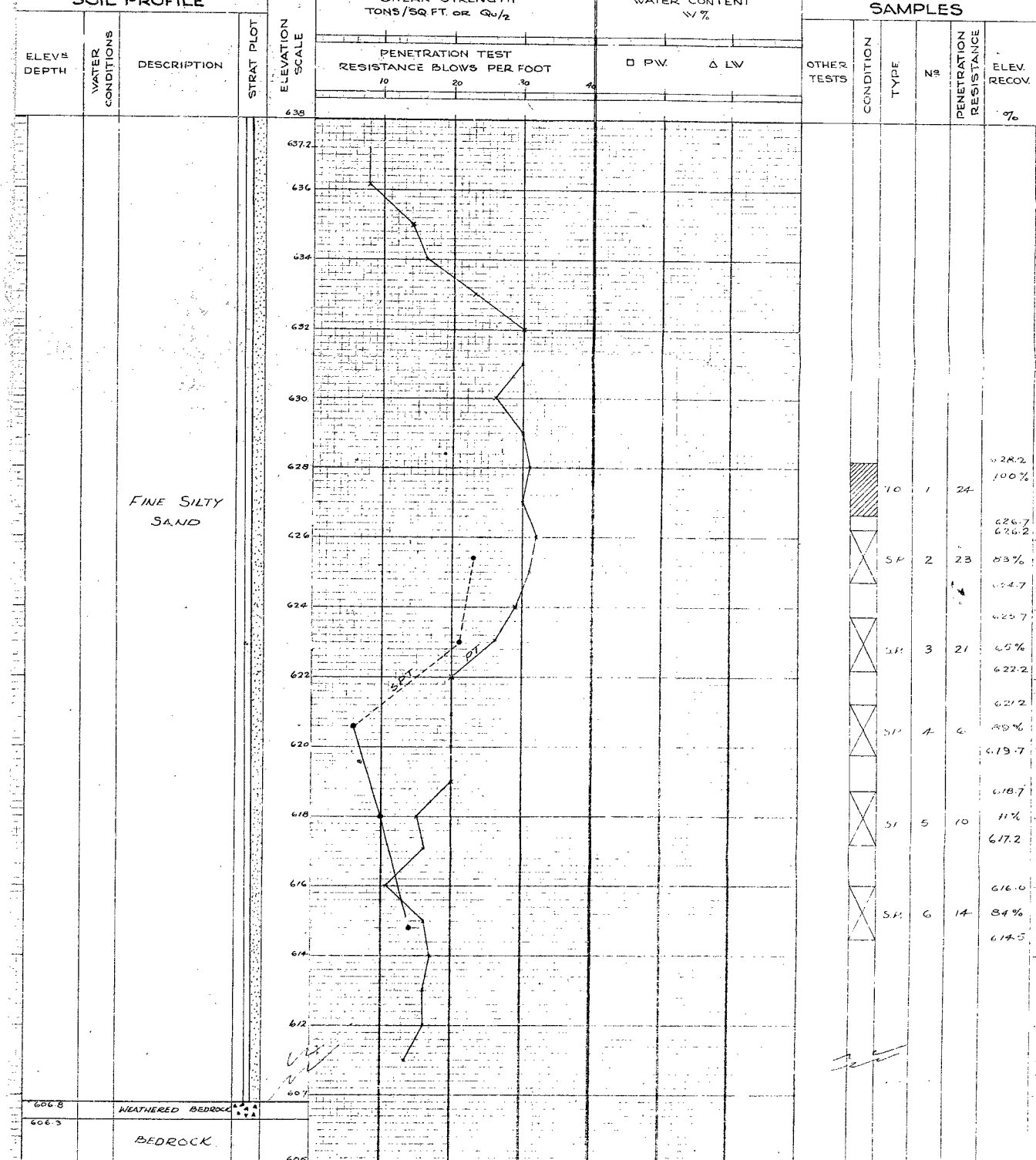
W.S. - WASHED SAMPLE  
R.C. - ROCK CORE

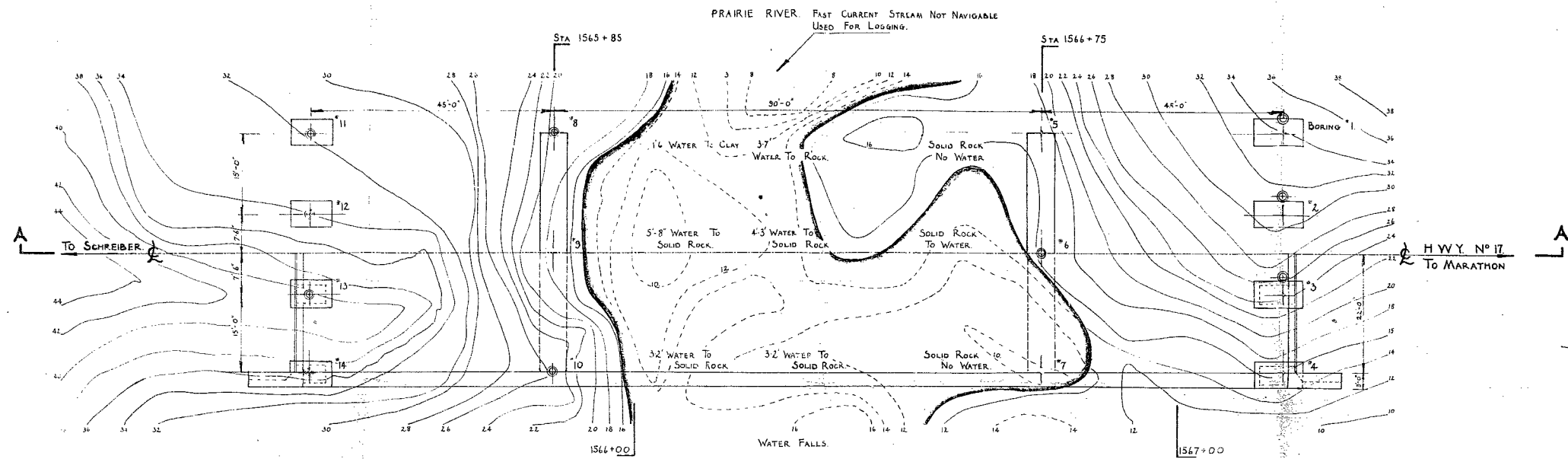
## ABBREVIATIONS

ABBREVIATIONS

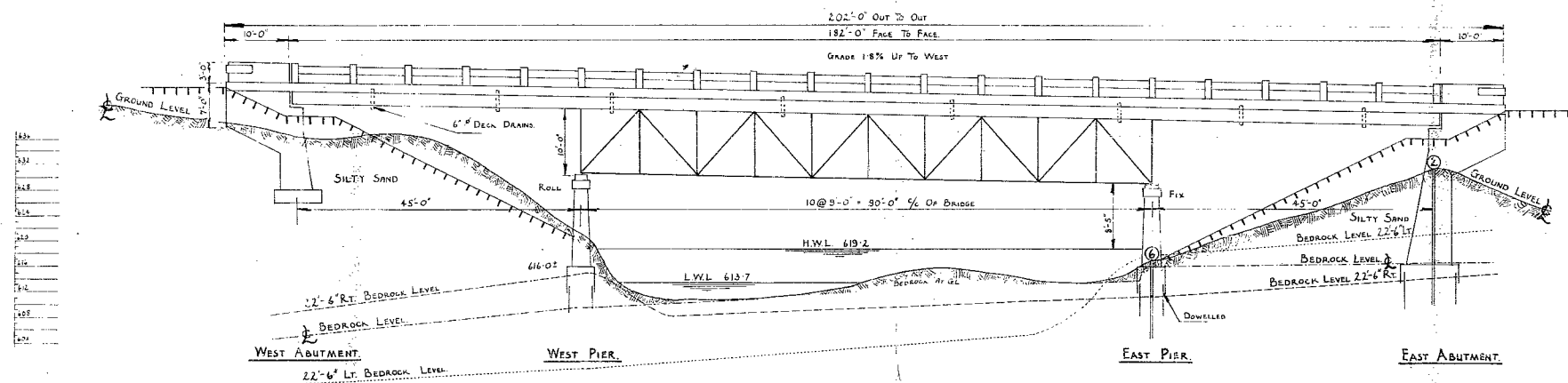
V-INSITU VANE SHEAR TEST	γ - UNIT WEIGHT
M-MECHANICAL ANALYSIS	K - PERMEABILITY
U-UNCONFINED COMPRESSION	C - CONSOLIDATION
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Q - TRIAXIAL QUICK	WL- WATER LEVEL IN CASING
S - TRIAXIAL SLOW	WT - WATER TABLE IN SOIL

## SOIL PROFILE

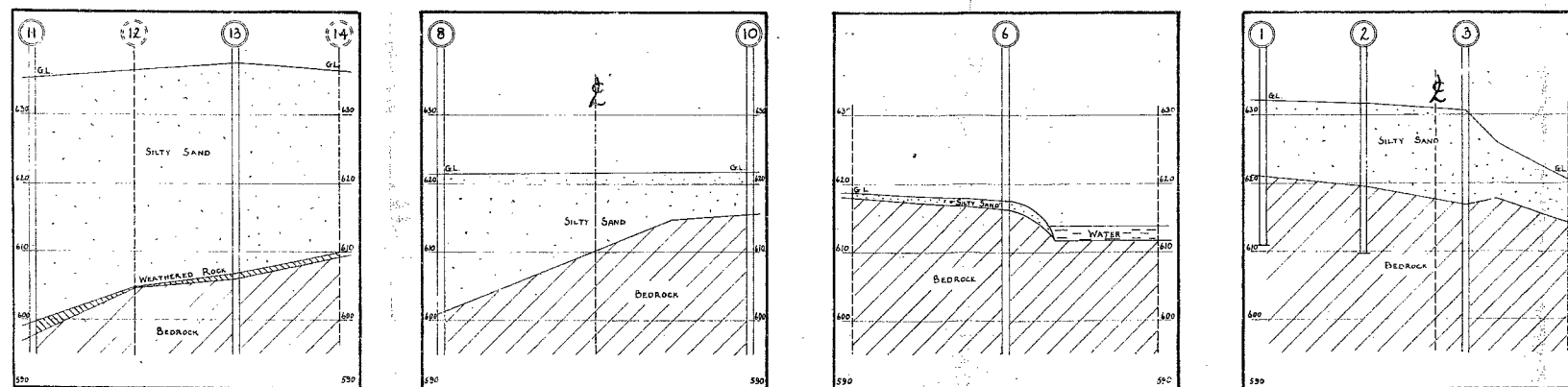




PLAN



SECTION A-A



CROSS SECTIONS THROUGH BOREHOLES.

LEGEND  
 Bore Hole  
 Penetration Test

DEPARTMENT OF HIGHWAYS-ONTARIO  
 MATERIALS LAB. TORONTO

## PRAIRIE RIVER BRIDGE

THE KING'S HIGHWAY NO. 17(T.C.H.) DIV. NO. 19  
 CO. DISTRICT OF THUNDER BAY SCALE 1/2" = 1'  
 TWP. 81 LOT. CON.

POSITIONS & SECTIONS THROUGH BORE HOLES

DRAWING NO. D-3493-A JOB NO. F-54-14  
 PLAN F-54-14A DATE 17<sup>TH</sup> NOVEMBER 1954  
 DRAWN BY M.L.F. CHECKED BY

Report of  
Foundation Investigation  
Highway #17  
at  
Prairie River, Ontario

Copies to: Mr. H. Lamont  
Bridge Engineer (2)

Mr. J. Walter  
Construction Engineer (1)

Project F-54-14

Mr. E. Cash  
Division Engineer, Fort William (1)

Mr. G. Farantatos (1)

File (1)



### Introduction

A site investigation was carried out to determine the bedrock and soil conditions at the site of a proposed structure crossing the Prairie River on Highway #17 between Schreiber and Marathon.

### Procedure

Eight boreroles, with corresponding preliminary penetration holes, were made at the locations as shown on Drawing No. F-54-144. The elevation and length of the proposed structure is also shown in relation to the borings.

The log of the individual boreroles is attached to this report, showing the strata encountered and the results of penetration tests.

### Soil Conditions

Above the bedrock is a thin layer of weathered rock which in turn is covered by silty sand which extends to the ground surface.

The elevation of the ground surface and bedrock is as shown on the cross-sections on Plan F-54-144.

### Water Conditions

In Borehole #11 water was encountered at elevation 609.1 and at elevation 615.2 in Borehole #18. The water in the other boreroles was found at about the same elevation as the river level.

The water in the river is fast flowing and will probably cause heavy scour. In addition, the location for the bridge is only a short distance above a waterfall.

### Recommendations

A high water level at elevation 619.2 and low water level at 613.7 were observed by the Department of Highways.

Dr. Karl Teraschi, from experiments and observations on actual structures, suggests that foundations of bridges over rivers should be carried at least to a depth three times the difference between the high water level and

the low water level. The reason for this recommendation is to protect the structure from scouring action. Depending on the river flow, the scouring is rapid or slow. For a structure such as the one at the Prairie River Crossing, the footings should be carried down to bedrock.

It is also suggested that the footings should be dowelled to the bedrock, thereby securing the structure against sliding.

The proposed elevations for the footings of this structure are very close to the bedrock elevation, except at the West abutment, which is located about 20 to 25 feet above bedrock.

From penetration tests it was found that the silty sand has very low shearing strength and is unsuitable for spread footings.

It is recommended, therefore, that the West abutment footing be carried to bedrock or supported on piles driven to bedrock.

The bedrock was examined for bearing strength. Unconfined compression tests were carried out on rock cores obtained from the site. The values were found to be very high compared with the various code recommendations. It is suggested that the safe bearing value for the bedrock should not exceed 30 tons per square foot.

#### Conclusion

The foundations of the two centre piers and East abutment should be brought down to bedrock and be dowelled to it.

The West abutment could be either founded on bedrock or on end bearing piles which will carry the load down to the bedrock.

The rock should carry a load of 30 tons per square foot.

F. C. Brownridge  
Materials and Research Engineer  
Per:

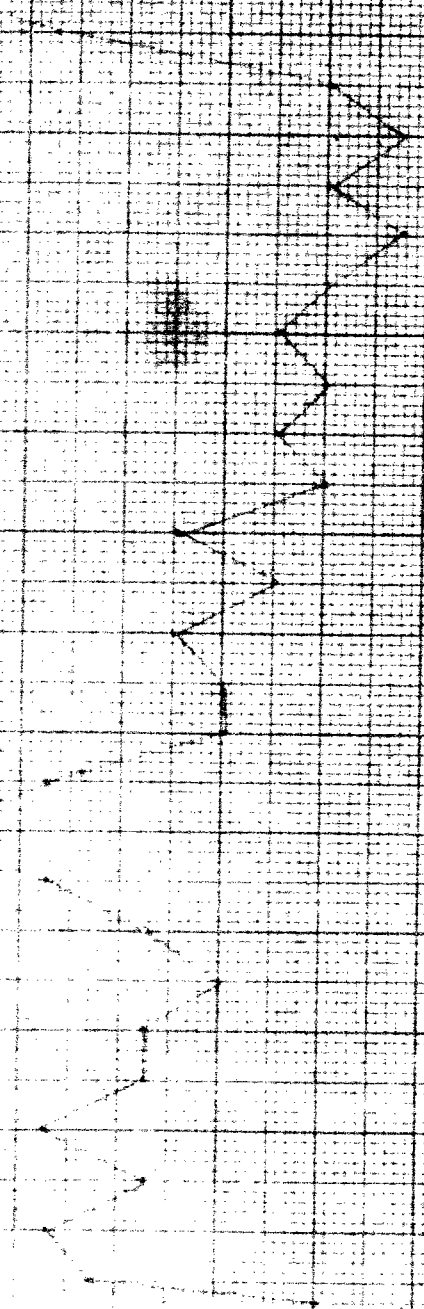
  
(G. Farantatos)

**APPENDIX A**

Job F-54-14

Penetration Test B.H. 12

elev G.I. at 136.4



END OF LOG 31 4'

boundary on rock

Job P. 54-14

Transit station East B H 14

elev. G.L. at 6363

end of East at 47'  
launching or rest.