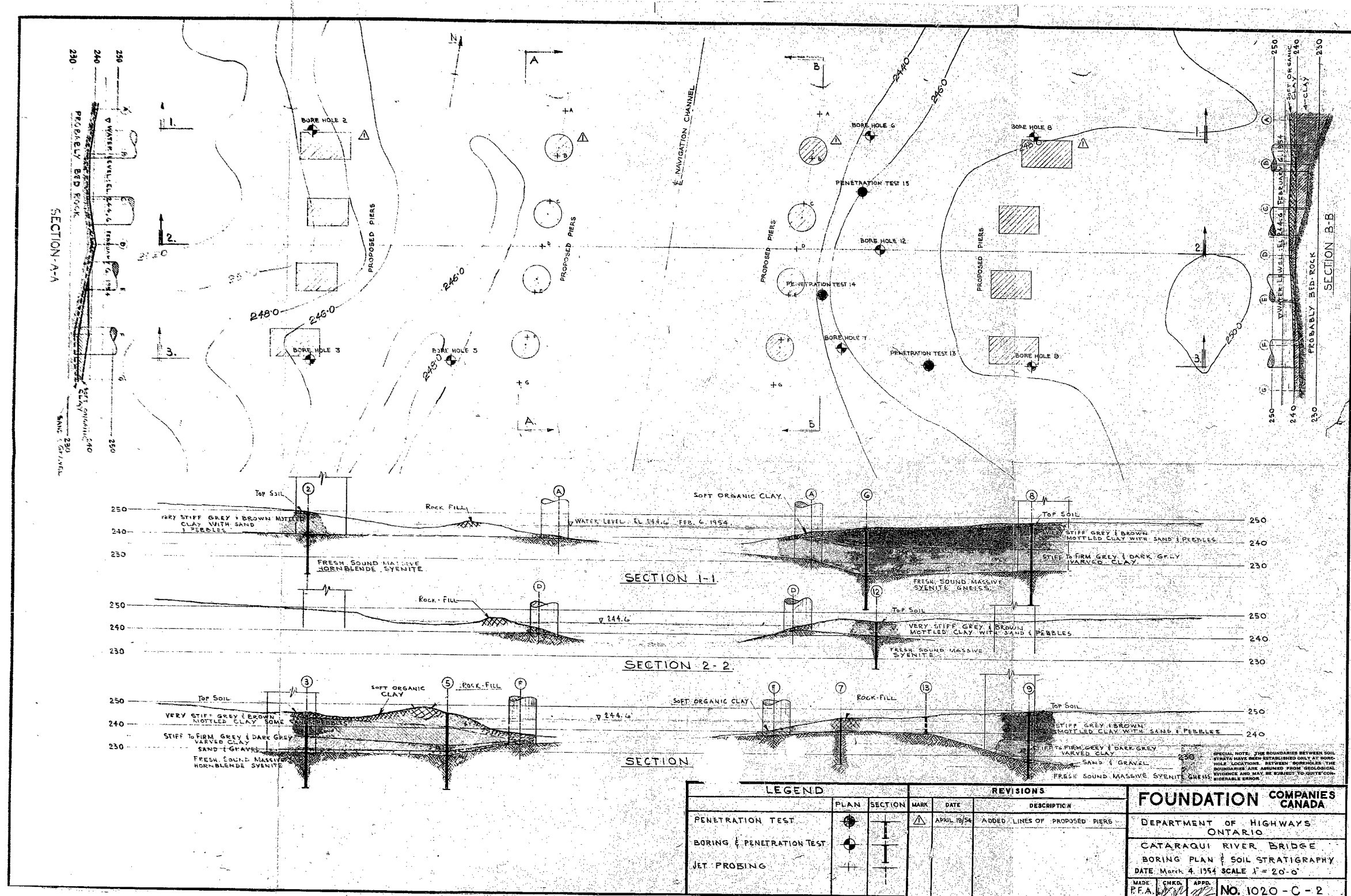


54-F-201C

CATARAQUI RIVER BRIDGE

NEAR KINGSTON MILLS



MONTREAL OFFICE
1830 SHERBROOKE ST. W.
MONTREAL, 25

FOUNDATION OF CANADA
ENGINEERING CORPORATION
LIMITED
200 BLOOR STREET EAST
TORONTO
April 28, 1954.

BA 354
CABLE ADDRESS
"FOUNDAMENG"
TORONTO
54-7-201c

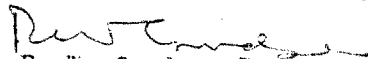
Ontario Department of Highways,
Attention Mr. H. N. Lamont,
Chief Bridge Engineer,
Room 1422,
Parliament Buildings,
Toronto, Ontario.

SITE INVESTIGATION
CATARAQUI RIVER BRIDGE

Gentlemen:

This letter accompanies our factual
report covering the investigation carried out at
the above site.

Yours very truly,
FOUNDATION OF CANADA
ENGINEERING CORPORATION LIMITED


R. W. Grudge, P. Eng.,
ASSISTANT TO THE VICE-PRESIDENT.

RWC:MP
Encl.
1020

FENCO

1020
REPORT
TO
ONTARIO DEPARTMENT OF HIGHWAYS
ON
SOIL CONDITIONS
CATARAQUI RIVER BRIDGE
KINGSTON, ONTARIO

Distribution -

- 2 copies - Ontario Department of Highways, Toronto, Ontario.
- 2 copies - Foundation of Canada Engineering Corporation,
Limited.
- 2 copies - Geotechnical Services.

April 21, 1954.
THE FOUNDATION COMPANIES
CANADA

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Appendix I - Office Reports on Soil Exploration

Drawing in Pocket at rear.

1020-C-2 Plot Plan & Soil Stratigraphy.

INTRODUCTION

The Foundation of Canada Engineering Corporation Limited has been retained by the Ontario Department of Highways (proposal dated January 11, 1954 and accepted January 14, 1954) to carry out a soil investigation at the site of the proposed bridge on the limited access highway crossing the Cataragui River, near Kingston Mills, Ontario.

The object of the investigation is to examine the soil and rock conditions at the locations of the bridge piers and abutments and to investigate the stability of the approach embankments.

This work has now been completed and is here reported in detail.

THE SITE

The proposed bridge crossing is located at a very narrow section of the Cataragui River which is also a part of the Rideau Canal. It is located about one-half mile below Kingston Mills.

At this site, the canal passes over Precambrian rock of the Frontenac Axis. Broken rock from this formation is seen on both banks of the canal at the site. Apparently this has been dredged from the channel which is a portion of the original canal constructed in 1826. No construction records are available to show either the original rock surface or the final rock surface after excavation.

The bed rock is overlain by a lacustrine clay deposit of glacial origin.

PROCEDURE

The field work was begun on January 25, 1954 and was completed on February 11, 1954. Eight exploratory borings with penetration tests and three separate penetration tests were made using a standard machine rig.

In addition, seven jet probings were made along the approximate line of each of the two piers which will be located in the water.

Drawing No. 1020-C-2 (in pocket at rear) shows the boring locations and the inferred soil stratigraphy. The elevations of the borings were determined by the Ontario Department of Highways. The Office Reports on Soil Exploration in Appendix I give the detailed log of each borehole and the laboratory test results.

PROCEDURE (Continued)

Laboratory tests have been carried out in the Geocon Ltd. laboratory and the remaining samples will be retained there for destruction after June 1st, 1954 unless other instructions are received.

SOIL CONDITIONS

The following are the principal soil strata which have been encountered:

Rock Fill

Rock Fill which has apparently been excavated to form the channel was encountered in Borehole No. 7. Borehole No. 5 is located just to one side of a ridge which is seen from the surface to be composed of rock fill.

Topsoil

One to two feet of clayey topsoil was encountered at most boreholes.

Soft Organic Clay

In Borehole No. 5 and in most of the jet probings some soft organic clay was encountered forming the river bottom. This is quite soft and contains a considerable amount of partially decomposed organic material.

Very Stiff Mottled Clay

The topsoil at most boreholes is underlain by 3 to 10 feet of very stiff mottled grey and brown clay. The unconfined compressive strength of this deposit is about 2 to 3 tons per square foot with a low sensitivity. The natural moisture content is about 30% and the liquid and plastic limits respectively about 40% and 20%.

The structure of the clay is generally somewhat chunky and crumbly. This together with the color and strength show that it has been preconsolidated by desiccation. It also contains some irregular but generally horizontal layers of silt or silty clay, at a frequency of one every 1/2 to 3 inches.

The clay contains a small amount of sand and small gravel.

Firm Varved Clay

The transition from the mottled to varved clay is a gradual one.

The varved clay contains alternating grey and dark grey layers. The thickness of a pair of layers is generally 1/4 to 1/2

Firm Varved Clay (Continued)

inch. The unconfined compressive strength is generally in the range 1/2 to 1-1/2 tons per square foot with a low to moderate sensitivity. The natural moisture content is about 35% with liquid and plastic limits respectively of about 50% and 25%.

Sand and Gravel

In several locations a small quantity - up to 2 feet - of sand and gravel was encountered just overlying bedrock. This sand and gravel is generally of low permeability containing enough silt and clay to fill most of the interstices.

Bedrock

Bedrock was encountered at elevations varying between 223 and 240.

The bedrock is consistently fresh, sound and massive Precambrian igneous rock of the Frontenac Axis. It is composed of hornblende syenite or syenite gneiss except in Borehole Nos. 5 and 7 where there occurs some pink fine to coarse grained granite with a small hornblende content.

Generally excellent core was obtained of the rock. Some joints were noted, but they were consistently cemented with a chlorite deposit.

WATER CONDITIONS

Due to the impermeable nature of the overburden, it is not believed that the ground water conditions at the site will cause any unusual difficulties during the proposed construction. Piezometers and slotted pipes, for long-time ground water table observations, were therefore omitted. It is believed that the permanent ground water table will be found near the average elevation of the water in the nearby Cataraqui River.

PERSONNEL

The site exploration work has been carried out by the Geotechnical Services Division of Geocoon Ltd. Field work was supervised by B.D. Benedict with driller J. Johnson. The report was written by B.D. Benedict and N.D. Lea.

BDB/jb

B.D. Benedict
B.D. Benedict,
P.Eng.

APPENDIX I
OFFICE REPORTS ON SOIL EXPLORATION

EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

It is the practice of The Foundation Company of Canada Limited to report boring results on Form C-149, entitled "Office Report on Soil Exploration". The object of this form of record is to combine all of the information which is gathered through the boring on one sheet of paper so that it will be possible, by reference to this sheet, to make a careful and complete study of the soil as disclosed by that particular boring. An explanation of the various columns of the report follows. They will be referred to as Columns 1 to 12. Note that Columns 1 to 4 inclusive are entitled "Soil Profile", Column 5 is entitled "Elevation Scale", Column 6 is the main body of the form in which results are presented in graphical form and Columns 7 to 12 have the caption "Samples".

COLUMN 1 — ELEVATION AND DEPTH OF BOUNDARIES

In this column are shown the elevation and the depth of important boundaries between the various soil strata. The elevation is shown above the line and the depth below the floor of the drilling platform is shown below the line. The datum to which the elevation refers is shown in the general heading of the form.

COLUMN 2 — WATER CONDITIONS

In this column the water level or water table is indicated to scale by a horizontal line in the appropriate location with the symbol W.L. or W.T. above the line. A distinction is made between water level and water table. The water level merely refers to the level of the water standing in the boring or standpipe. If there is no indication of the date on the form, then it will be the date on which the boring is made. The depth of the porous stone, or perforated section of the observation well, or the depth of the boring and casing at the time of water level observation, whichever applies, is also shown. The water table refers to what is believed to be the true water table in the soil on the date shown, based on results of a series of water level observations. Where there are complicated groundwater conditions, some notation on this will also be made in this Water Conditions column.

COLUMN 3 — DESCRIPTION

In the third column is shown a description of the soil. This description follows the standard terminology laid down in The Foundation Company of Canada Limited Circular No. 1102. Some of the most significant points of this terminology are as follows: "Clay" is always used to refer to material which displays an appreciable amount of plasticity. "Silt" is used to characterize a material finer than fine sand which shows very little or no plasticity but which shows a rapid response to the shaking test. "Till" is used to refer to a material which includes all grain sizes from clay size to boulder size. The term "Clay Till" is used when a till has considerable cohesion and "Sandy Till" or "Silty Till" when the till as a mass displays the properties of a sand or silt. Colours are referred to the colour standards of the U.S. Department of Agriculture.

Terms describing the consistency of cohesive soils are related to unconfined compressive strength in tons per square foot as follows:

Semi-liquid	— below 0.03
Very soft	— 0.03 to 0.25
Soft	— 0.25 to 0.5
Firm	— 0.5 to 1.0
Stiff	— 1.0 to 2.0
Very stiff	— 2.0 to 4.0
Hard	— over 4.0

Terms describing the relative density of non-cohesive soils are related to the penetration resistance of the 2" drive sampler as follows:

Very loose	— 0 to 4
Loose	— 4 to 10
Compact	— 10 to 30
Dense	— 30 to 50
Very dense	— over 50.

COLUMN 4 — STRATIGRAPHIC PLOT

The stratigraphic plot, Column 4, follows the standard symbols of the National Research Council, Canada.

COLUMN 5 — ELEVATION SCALE

The information in all columns is plotted to a true scale of elevation which is shown in this Column (No. 5). It is usually made so that one small square of Column 6 represents either a foot or half a foot.

COLUMN 6 — GRAPHS

The main body of the report forms a graph which is used to plot to correct depth scale the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

The first scale shown there is not filled in on the printed form but is usually used for the strength of the soil as determined either through unconfined compression, vane, or other strength tests.

The next scale is water content which is given in percent by weight of the dry solids in the soil. Using different symbols, there is shown on the graph the natural moisture content by an open circle, the liquid limit by an open square and the plastic limit by an open triangle. A line is drawn between the liquid and the plastic limits, as the length of this line represents the plasticity index.

The lowest scale is the penetration test resistance in blows-per-foot. The penetration test is performed using a conical point of 2" diameter with a sixty degree cone. The point

is fastened to a diamond-drill rod and driven into the ground several feet from the location of the boring. The blows-per-foot are recorded and each record is shown on the plot by a cross. A dotted line is drawn between these crosses. The hammer used for this test may weigh either 50, 140, 380 or 520 pounds. Nevertheless, whatever the weight of the hammer, the number of blows per foot is converted to an equivalent number of blows of 4200 inch-pounds of energy. It is this equivalent number of blows which is plotted on the graph. It has been our experience that, except for soft or very loose soils, the weight of the hammer used influences the results obtained only to a minor extent.

COLUMN 7 — OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted graphically in Column 6. The symbols used for this column are shown at the head of the form under the abbreviations.

COLUMNS 8, 9 AND 10 — SAMPLES

These columns describe the samples obtained from the boring. Column 10 gives the number of the sample, Column 9 the type and Column 8 the condition. The meaning of the symbols used for type and condition is shown at the head of the report. The symbols for condition of sample are made to correspond in a vertical scale with the location of the sample.

COLUMN 11 — PENETRATION RESISTANCE

In Column 11 is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. These blows-per-foot have been converted in the same way as those of the penetration test.

In the field, the penetration resistance is recorded for every 6 inches on the 2-inch Drive Sampler. The figure which is recorded in Column 11 is usually the sum of the resistances for driving the second and third increments of the sampler into the ground. For the thin-walled sampler, the penetration resistance is recorded in the field for each foot. Thus a single figure shown in Column 11 is usually an average.

When greatly different results are obtained for driving different increments of the same sample, then two or more figures are shown in Column 11. Such a series of figures does not necessarily represent the blows for successive feet but it does indicate the variation in penetration resistance measured as a rate of number of blows per foot.

The symbol "R" for refusal means that under 20 or more blows the advance was less than $\frac{1}{8}$ inch.

COLUMN 12 — ELEVATION AND RECOVERY

In this column is shown for each sample the elevation of the top of the sample and the percentage recovery.

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINEJOB 1020BORING # 2CASING 4 (STANDARD SAMPLERS TO FIT UNLESS NOTED)DATUM GEODETICDATE REPORT MAR. 4/54SAMPLER HAMMER, WT. 430 DROP 15 INCHESCOMPILED BY JA CHECKED BY MAJ M BORING DATE FEB 9/54

SAMPLE CONDITION



DISTURBED
FAIR
GOOD
LOST

SAMPLE TYPES

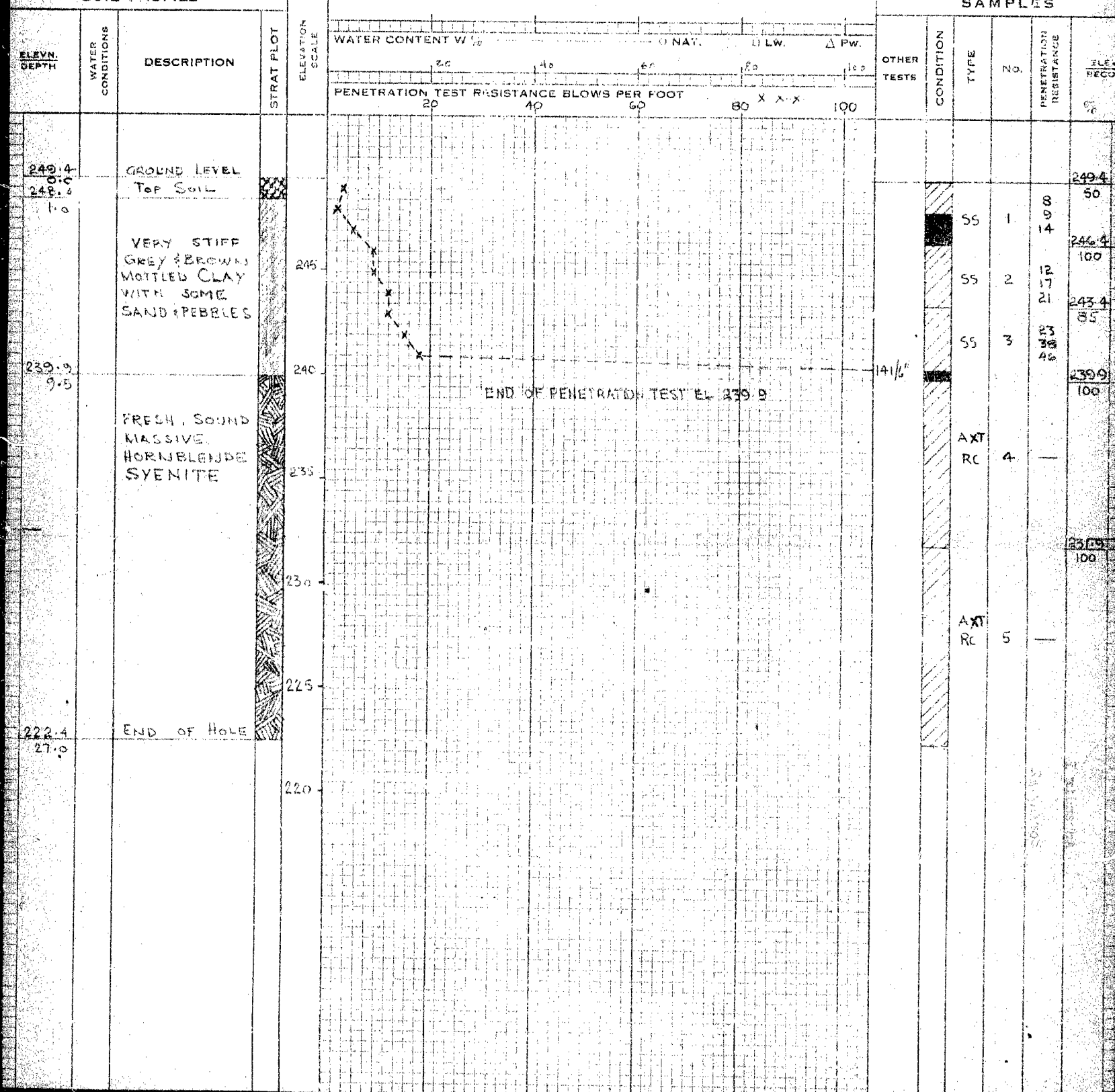
C.S. - CHUNK
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
D.P. - DRIVE PISTON
T.O. - THIN WALLED OPEN
T.P. - THIN WALLED PISTON
F.S. - FOIL SAMPLE
B.A. - BARREL AUGER
S.A. - SPIRAL AUGER
W.S. - WASHED SAMPLE
R.C. - ROCK CORE
S.S. - SLEEVE SAMPLE

ABBREVIATIONS

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

SOIL PROFILE

SAMPLES



OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE JOB 1020 BORING 3
 CASING 4" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GEODETIC DATE REPORT MARCH 4/54
 SAMPLER HAMMER WT. 430 # DROP 15 INCHES COMPILED BY JA CHECKED BY M.A.M. BORING DATE FEB. 8/54

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS



DISTURBED
FAIR
GOOD
LOST

C.S. - CHUNK

D.O. - DRIVE-OPEN

D.F. - DRIVE-FOOT VALVE

D.P. - DRIVE PISTON

T.O. - THIN WALLED OPEN

T.P. - THIN WALLED PISTON

F.S. - FOIL SAMPLE

B.A. - BARREL AUGER

S.A. - SPINAL AUGER

W.S. - WASHED SAMPLE

R.C. - ROCK CORE

S.S. - SLEEVE SAMPLE

V. - IN-SITU VANE SHEAR TEST

M. - MECHANICAL ANALYSIS

U. - UNCONFINED COMPRESSION

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S. - TRIAXIAL SLOW

Y. - UNIT WEIGHT

K. - PERMEABILITY

C. - CONSOLIDATION

CA. - CASING

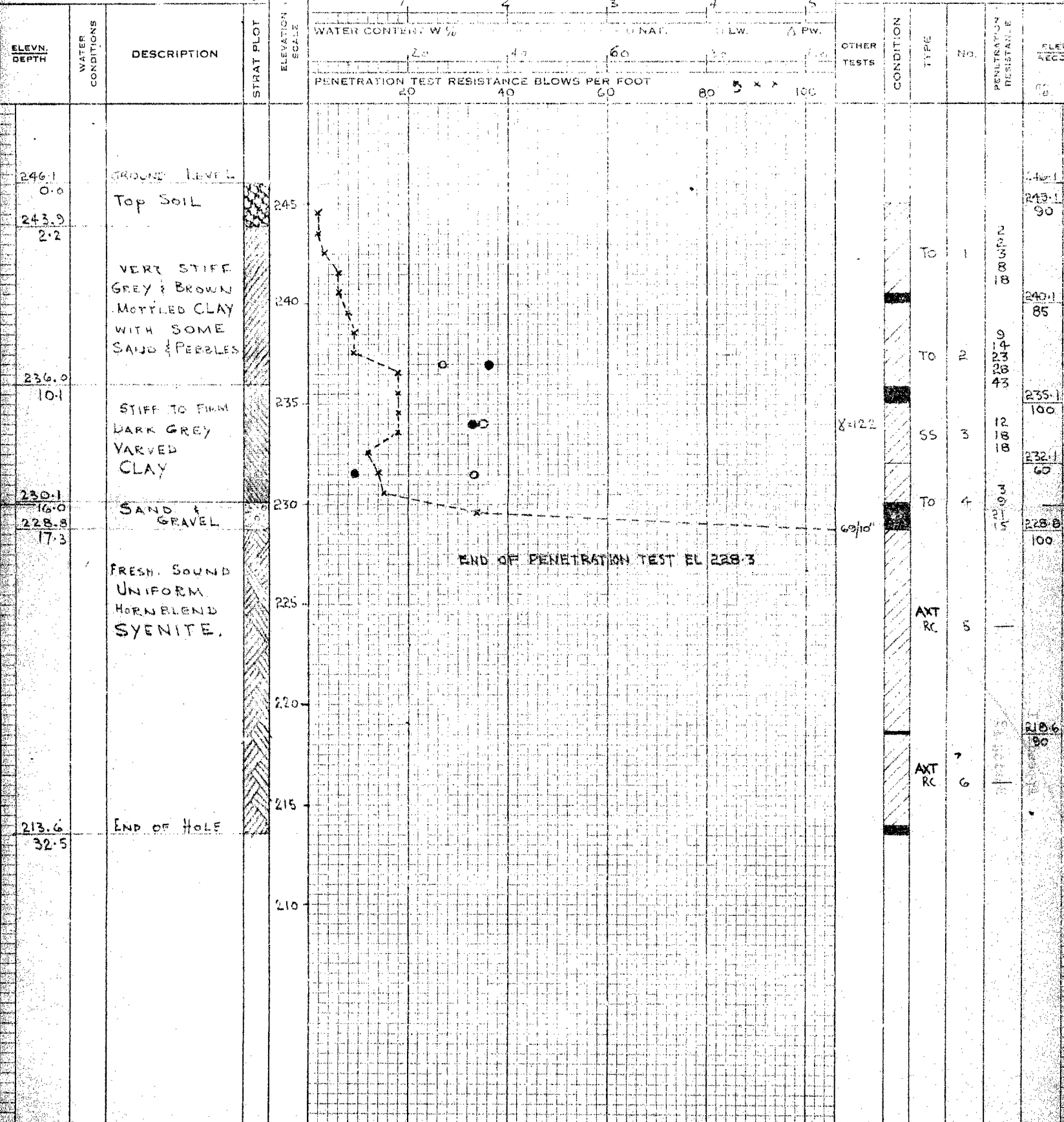
WL. - WATER LEVEL IN CASING

WT. - WATER TABLE IN SOIL

SOIL PROFILE

UNCONFINED COMPRESSIVE STRENGTH - TON./SQ. FT.

SAMPLES



OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE

JOE 1020

BORING # 5

CASING 4" (STANDARD SAMPLERS TO FIT UNLESS NOTED)

DATUM GEODETIC

DATE REPORT MAR 4/54

SAMPLER HAMMER, WT. 430 DROP 15 INCHES

COMPILED BY JA CHECKED BY MAJ.M. BORING DATE FEB. 5/54

SAMPLE CONDITION



DISTURBED
 FAIR
 GOOD
 LOST

SAMPLE TYPES

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

ABBREVIATIONS

Y. -IN-SITU VANE SHEAR TEST 7. -UNIT WEIGHT WET
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

UNCONFINED COMPRESSIVE STRENGTH: Tons/sq Foot •

SAMPLES

[illegible]

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

 DRILL RIG. MACHINE
 CASING 4" (STANDARD SAMPLERS TO FIT UNLESS NOTED)
 SAMPLER HAMMER. WT. 430 DROP. 15 INCHES

 JOB 1020
 DATUM. GEODETIC
 COMPILED BY JA CHECKED BY MAJN
 BORING # 6
 DATE REPORT JAN 4 54
 BORING DATE JAN 25 54

SAMPLE CONDITION


 DISTURBED
 FAIR
 GOOD
 LOST

SAMPLE TYPES

 C.S. - CHUNK
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 D.P. - DRIVE PISTON
 T.O. - THIN WALLED OPEN
 T.P. - THIN WALLED PISTON
 F.S. - FOIL SAMPLE
 B.A. - BARREL AUGER
 S.A. - SPIRAL AUGER
 W.S. - WASHED SAMPLE
 R.C. - ROCK CORE

ABBREVIATIONS

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

SOIL PROFILE

UNCONFINED COMPRESSIVE STRENGTH TONS/SQ. FOOT

WATER CONTENT W %

 NAT. LW. PW.
 20 40 60 80 100

PENETRATION TEST RESISTANCE BLOWS PER FOOT

20 40 60 80 100

SAMPLES

OTHER TESTS

CONDITION

TYPE

No.

PENETRATION RESISTANCE

ELEV. RECD

%

246.1
0.0

GROUND LEVEL

243.6
2.5

Top Soil

237.1
9.0
 VERY STIFF
 GREY & BROWN
 MOTTLED CLAY
 WITH PEBBLES
224.6
21.5

SAND, GRAVEL & BOULDERS

223.1
23.0
 FRESH, SOUND
 MASSIVE
 SYENITE
 GNEISS.
208.3
37.8

END OF HOLE

245

240

235

230

225

220

215

210

205

END OF PENETRATION TEST EL 224.1

Y=130

Y=122

177

TO

TO

TO

TO

TO

AXT
RC

G

4

16

65

31

77

26

3

5

100

100

100

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OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE
CASING BX (STANDARD SAMPLERS TO FIT UNLESS NOTED)
SAMPLER HAMMER, WT. 430 DROP 15 INCHES

108 1020

BORING # 7
DATE REPORT MARCH 4/54
BORING DATE JAN 28-29/54

DATUM GEODETIC

COMPILED BY JA CHECKED BY MAM BORING DATE JAN 28 29/54

SAMPLE CONDITION



DISTURBED
FAIR
GOOD
LOST

SAMPLE TYPES

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

ABBREVIATIONS

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S. - TRIAXIAL SLOW	WT. - WATER TABLE IN SOIL

SOU BROFUE

SOIL PROFILE					SAMPLES						
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W %	OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELE RECO
					<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. WACHING JOB. 1020 BORING # 8
 CASING 4" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM. GEODETIC DATE REPORT MAR 4/54
 SAMPLER HAMMER WT. 430 DROP. 15 INCHES COMPILED BY JA CHECKED BY MAJL BORING DATE FEB 5/54

SAMPLE CONDITION



DISTURBED
FAIR
GOOD
LOST

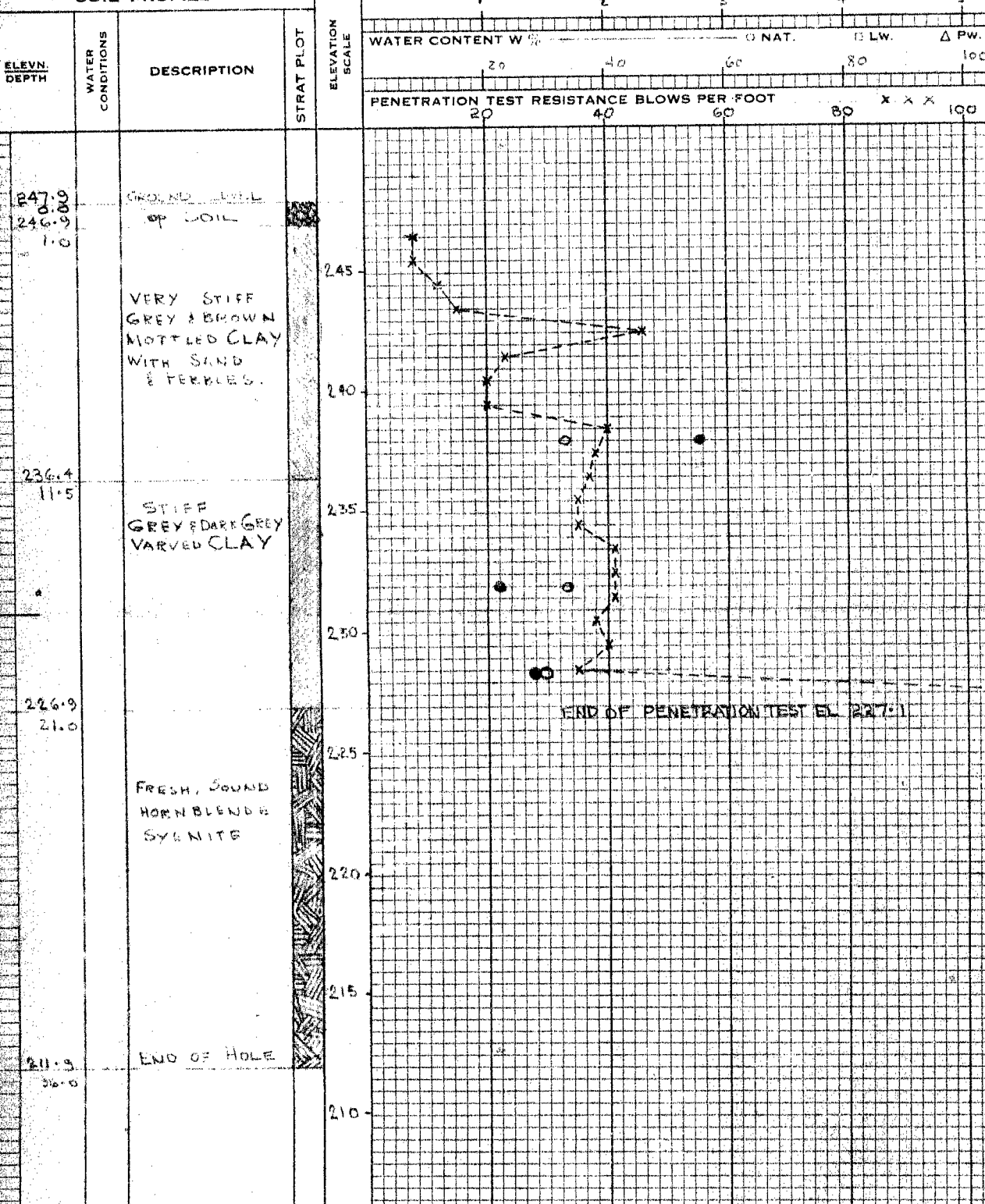
SAMPLE TYPES

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

ABBREVIATIONS

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

SOIL PROFILE



SAMPLES

OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELEV. RECORDED
					%
		TO	17		247.9
			18		246.9
			29		65
			35		
			58		
					241.9
					50
		SS	2	31	
			49		
			92		238.9
					65
		SS	3	26	
			34		
			46		235.9
					100
		SS	4	12	
			18		
			26		232.9
					65
		SS	5	17	
			15		
			18		229.9
					100
		SS	6	20	
			21		
			22		226.9
					100
		AXT RC	7		
					221.9
					90
		AXT RC	8		

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE

JOB

1020

BORING # 9

CASING 4" (STANDARD SAMPLERS TO FIT UNLESS NOTED)

DATUM GEODETIC

DATE REPORT MARCH 4/54

SAMPLER HAMMER WT. 430 DROP 15 INCHES

COMPILED BY J.A. CHECKED BY M.A.V. BORING DATE JAN 30/FEB 1/54

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS



DISTURBED
FAIR
GOOD
LOST

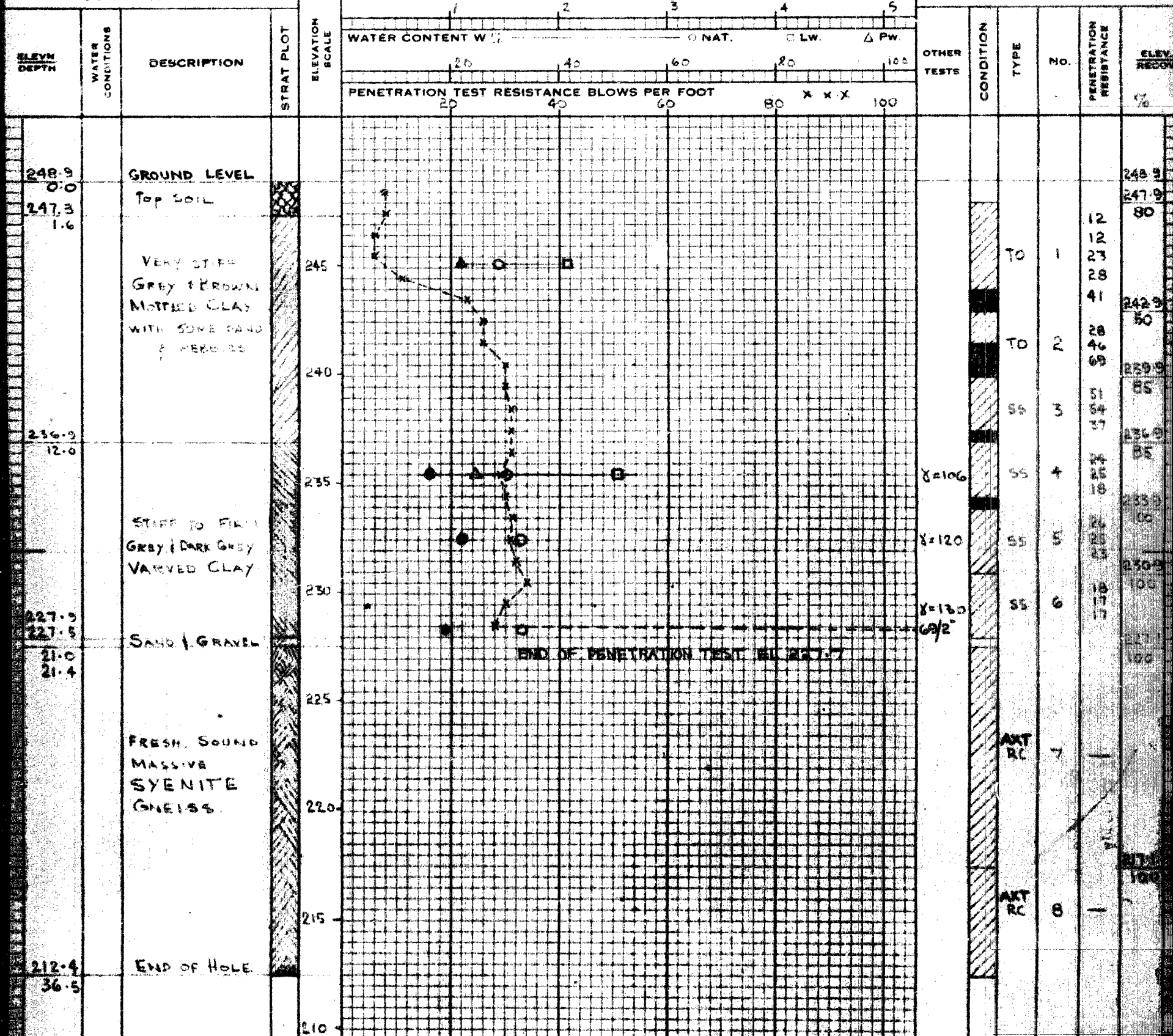
C.S. - CHUNK
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
D.P. - DRIVE PISTON
T.O. - THIN WALLED OPEN
T.P. - THIN WALLED PISTON
F.S. - FOIL SAMPLE
B.A. - BARREL AUGER
S.A. - SPIRAL AUGER
W.S. - WASHED SAMPLE
R.C. - ROCK CORE
S.S. - SLEEVE SAMPLE

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

SOIL PROFILE

UNCONFINED COMPRESSIVE STRENGTH TONS/SQ FOOT

SAMPLES



OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE JOB 1020 BORING # 12
 CASING BX (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GEODETIC DATE REPORT MAR 4 1954
 SAMPLER HAMMER WT. 430 DROP 15 INCHES COMPILED BY JA CHECKED BY M.A.M. BORING DATE FEB 2 1954

SAMPLE CONDITION



DISTURBED
 FAIR
 GOOD
 LOST

SAMPLE TYPES

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

F.S. - FOIL SAMPLE
 B.A. - BARREL AUGER
 S.A. - SPIRAL AUGER
 W.S. - WASHED SAMPLE
 R.C. - ROCK CORE

ABBREVIATIONS

V. - IN-SITU 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

SOIL PROFILE

WATER CONTENT W %	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOVER.
20 40 60 80 100						
246.2 245.2 1.0						246.2 245.2 80
240.2 6.0						240.2 100
225.7 20.5						235.7 100

DESCRIPTION

GROUND LEVEL
 STONE FILL
 STIFF
 GREY & BROWN
 MOTTLED CLAY
 WITH SAND
 & PEBBLES.

FRESH, SOUND
 MASSIVE
 SYENITE

END OF HOLE

ELEVATION SCALE

WATER CONTENT W % NAT. LW. PW.

PENETRATION TEST RESISTANCE BLOWS PER FOOT x x 80 x x 100

END OF PENETRATION TEST EL 240.2

SAMPLES

OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOVER.
		BX	1		246.2 245.2 80
		AXT RC	2		240.2 100
		AXT RC	3		235.7 100

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. 2400 (STANDARD SAMPLERS TO FIT UNLESS NOTED)
CASING 3.00 (STANDARD SAMPLERS TO FIT UNLESS NOTED)
SAMPLER HAMMER, WT. 400 DROP 15 INCHES

JOB 1020 PENETRATION BORING #13
 DATUM DATE REPORT
 COMPILED BY JA CHECKED BY BORING DATE

SAMPLE CONDITION

	DISTURBED
	FAIR
	GOOD
	LOST

SAMPLE TYPES

C. S. - CHUCK	F. S. - FOIL SAMPLE
D. O. - DRIVE-OPEN	B. A. - BARREL AUGER
D. F. - DRIVE-FOOT VALVE	S. A. - SPIRAL AUGER
D. P. - DRIVE PISTON	W. S. - WASHED SAMPLE
T. O. - THIN WALLED OPEN	R. C. - ROCK CORE
T. P. - THIN WALLED PISTON	

ABBREVIATIONS

V. - IN-SITU 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

SOIL PROFILE

SAMPLES

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W ₁				NAT. LW PW				OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECORD
					PENETRATION TEST RESISTANCE BLOWS PER FOOT													
246.3 0.0		PROBABLY CLAY		245														
239.5 6.8		PROBABLY BED ROCK		240														
					END OF PENETRATION TEST EL 240.3 NO ADVANCE													

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX

DRILL RIG. MACHINES
CASING. NO. 16 STANDARD SAMPLERS TO FIT UNLESS NOTED
SAMPLER HAMMER WT. 430 DROP 15 INCHES

JOB 020 REPERATION BORING #14
 DATUM GEOMETRIC DATE REPORT MAY 4/54
 COMPILED BY J.A. CHECKED BY J.V. BORING DATE FEB 1/54

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS



**DISTURBED
FAIR
GOOD
LOST**

C.S. - CHUCK
D.O. - DRIVE-OPEN
D.F. - DRIVE FOOT VALVE
D.P. - DRIVE PISTON
T.O. - THIN WALLED OPEN
T.P. - THIN WALLED PISTON

F.S. - FOIL SAMPLE
B.A. - BARREL AUGER
S.A. - SPIRAL AUGER
W.S. - WASHED SAMPLE
R.C. - ROCK CORE

V. - IN-SITU VANE SHEAR TEST W. - UNIT WEIGHT
M. - MECHANICAL ANALYSIS X. - PERMEABILITY
U. - UNCONFINED COMPRESSION Y. - CONSOLIDATION
Qc. - TRIAXIAL CONSOLIDATED QUICK Z. - CASING
Q. - TRIAXIAL QUICK WL - WATER LEVEL IN CASING
S. - TRIAXIAL SLOW WT. - WATER TABLE IN SOIL

SOIL PROFILE

SAMPLES

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W _L	NAT.	LW	Δ Pw	OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELEV. RECOVER
247.9 0.0		GROUND SURFACE												247.9
		PROBABLY CLAY		245										
241.0 6.9		PROBABLY BED ROCK		241										
					END OF PENETRATION TEST EL. 241.1									

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

DRILL RIG. MACHINE JOB. 1020 PENETRATION 15
 CASING 1 1/2" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GEODETIC DATE REPORT MAY 4/54
 SAMPLER HAMMER, WT. 400 DROP 15 INCHES COMPILED BY JA CHECKED BY M.A.M. BORING DATE FEB 2/54

SAMPLE CONDITION



DISTURBED
FAIR
GOOD
LOST

SAMPLE TYPES

C.S. - CHUNK
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
D.P. - DRIVE PISTON
T.O. - THIN WALLED OPEN
T.P. - THIN WALLED PISTON
F.S. - FOR SAMPLE
B.A. - BARREL AUGER
S.A. - SPIRAL AUGER
W.S. - WASHED SAMPLE
R.C. - ROCK CORE

ABBREVIATIONS

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

SOIL PROFILE

SAMPLES

