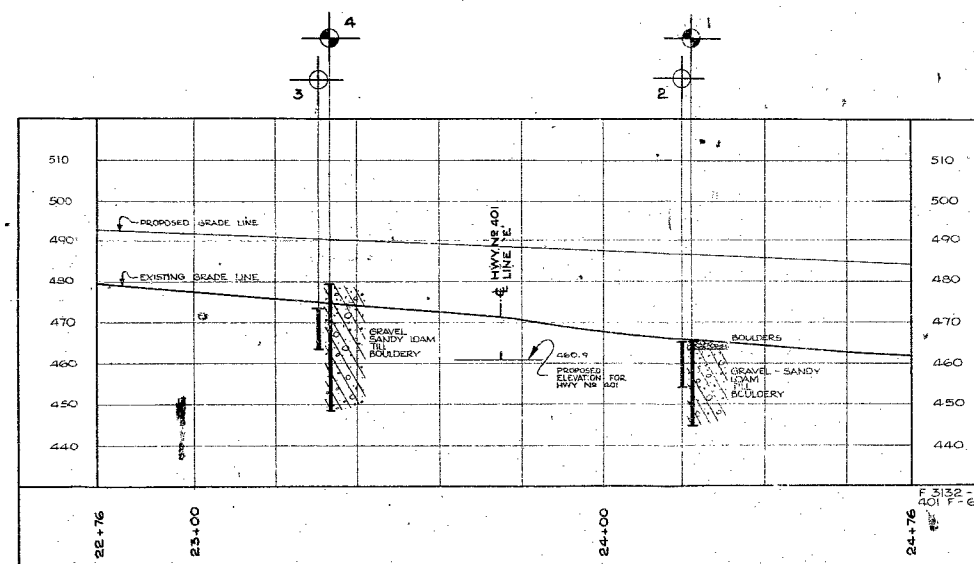
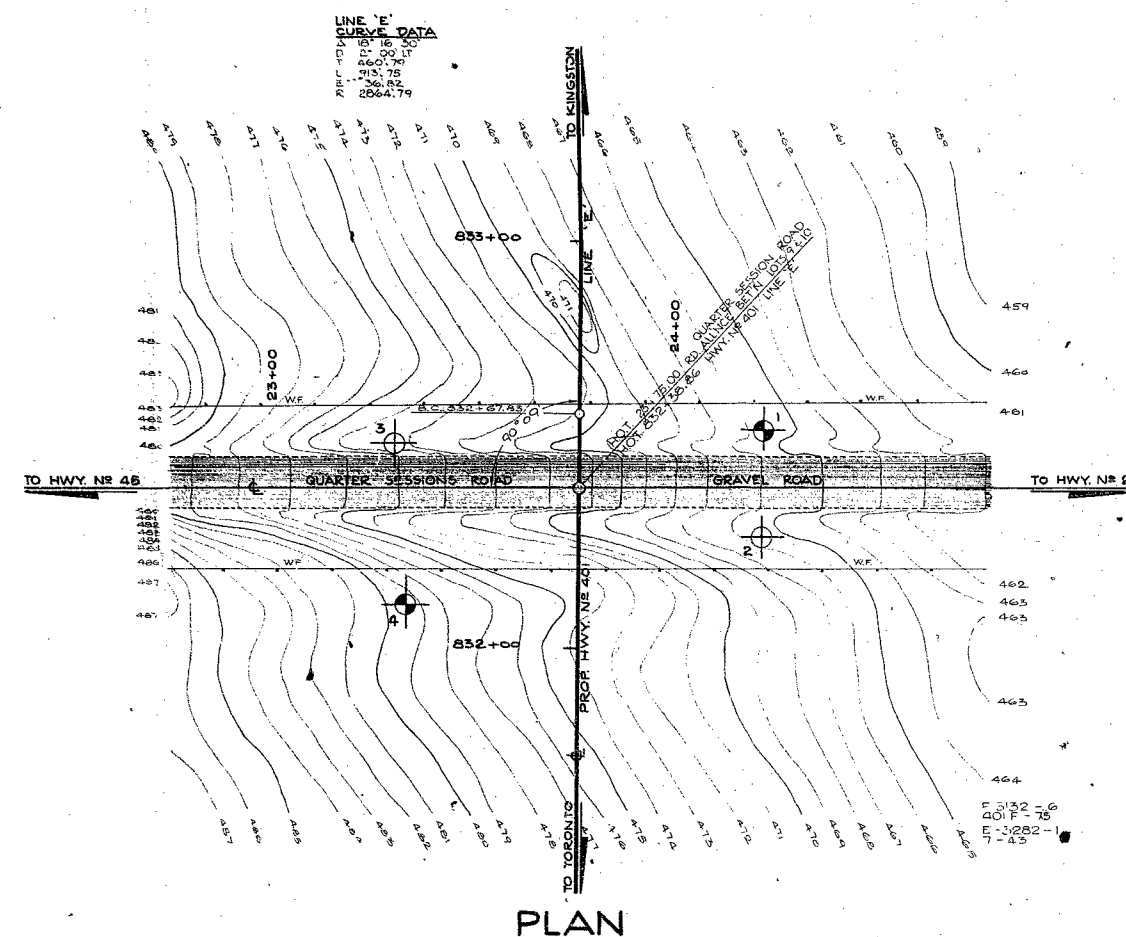


57-F-46
W.P. # 88-57
Hwy. # 401
UNDERPASSING
GRAVEL RD.
HAMILTON TWP.

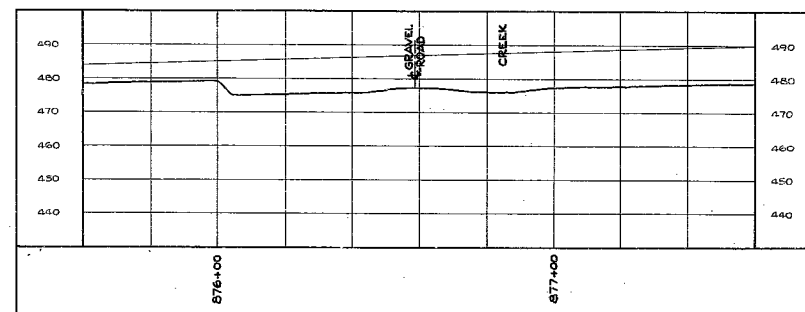
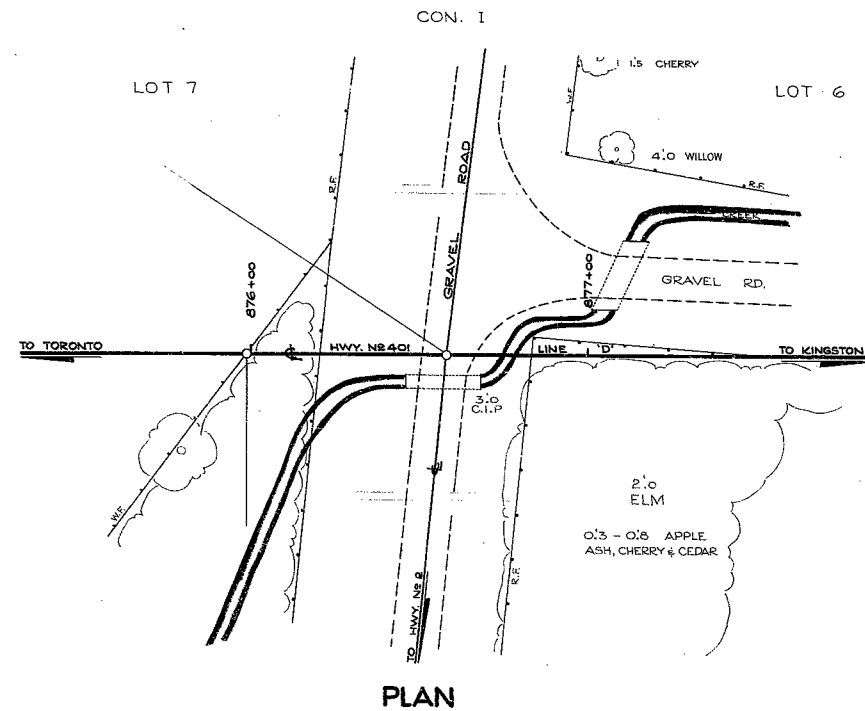
EDITED
FOR MICROFILMING
BY MB DATE 1/1/72



LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM Q.
1	465.5'	832+54'	45' RT.
2	465.5'	832+28'	45' RT.
3	473.5'	832+50'	45' LT.
4	479.5'	832+10'	42' LT.

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		
GRAVEL ROAD PROPOSED CROSSING 2 MILES N.E. OF COBourg SHOWING POSITION & ELEVATION OF HOLES		
HWY. NR. 401	W.P. 88-57	DIV. NR. 7
CO. NORTHUMBERLAND	LOT 10	CON. 1
TWP. HAMILTON		
SCALE 1 IN. = 20 FT.	SUBMITTED BY	DATE 3 MARCH 58
DRAWN BY R.E.F.	APPROVED BY	DRAWING NO. F-57-46A



LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E.
1	476.5'	576+50'	45' RT
2	476.8'	576+61'	45' RT
3	477.5'	576+68'	45' LT
4	478.0'	576+57'	45' LT

DEPARTMENT OF HIGHWAYS - ONTARIO		
MATERIALS & RESEARCH SECTION - DOWNSVIEW		
GRAVEL ROAD PROPOSED CROSSING 2.5 MILES N.E. OF COBOURG		
SHOWING POSITION & ELEVATION OF HOLES		
HWY. NO. 401	W.P. 207-58	DIV. NO. 7
CO. NORTHUMBERLAND	LOT 6 & 7	CON. I
TWP. HAMILTON		
SCALE 1 IN. = 20 FT.	SUBMITTED BY	DATE 8 APRIL 1958
DRAWN BY R. E. F.	APPROVED BY	DRAWING NO. F-57-44B

TRIM LINE

PR F-3132-6 } Site Plan?
Pr. F-3132-4 } 401 Cabong Loto 6 & 7.

H.D.S.

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

DRILL RIG 54-1 OPERATION BORE PENET. JOB F. 57-46 B. WP 207-57 BORING STA. 876+50 (45' RT.)
CASING BK (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1958
SAMPLER HAMMER WT. 250 LBS. DROP 19 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 10 FEB. 1958

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
CC - TRIAXIAL CONSOLIDATED QUICK	WT - WATER TABLE IN SOIL	γ - UNIT WEIGHT

SAMPLE TYPES

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

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	SYRAT PLOT ELEVATION SCALE	WATER CONTENT W %				PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)				CASING BLOW (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOVER
				20	0 - NAT	0 - P.W.	Δ - L.W.	D. CONE PEN. X-----X	STAND. PEN. ●-----●									
476.5'		GROUND LEVEL																476.5'
478.5'		TOPSOIL - FROZEN																
1.8																		
8.5		GRAVEL SANDY LOAM TILL																
16.5																		
16.5																		
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TL-129 (REV. 56)

H.D.R.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-1

OPERATION PENETRATION

JOB T-57-46 B

WR 207-57

BORING 2

STA. 876+61 (45' RT.)

CASING BX (standard samplers to fit unless noted)

DATUM GEODETIC

DATE REPORT MARCH 1959

SAMPLER HAMMER WT. 250 LBS. DROP 19 INCHES

COMPILED BY H.T. CHECKED BY A.L.

DATE BORING 14 FEB. 1958

ABBREVIATIONS

SAMPLE TYPES

SAMPLE CONDITION

SOIL PROFILE

SAMPLES

ELEVATION DEPTH

WATER CONDITIONS

DESCRIPTION

STRAT. PLOT

ELEVATION SCALE

WATER CONTENT W %

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. -----

CASING BLOWS (ACTUAL)

OTHER TESTS

CONDITION

TYPE

NO.

PENETRATION RESISTANCE

ELEV. RECOV.

476.8'

GROUND LEVEL

475

470

465

RETURN AT ELEV. 464.7' HAMMER BOUNCING

[illegible]

c.c. Foundation Section.

Mr. A. Tove.

April 23rd, 1958.

Bridge Engineer.

Materials & Research.

Re: Foundation Report - Highway #401
Lots 9 & 10. Township of Hamilton.
W.P. ~~287~~ - 57. W.J.F. 57 - 46.
88

We are forwarding herewith two copies of the above mentioned Report, which you will find self-explanatory.

F.C. Brownridge.
Materials & Research Engineer.

per:



A. RUTKA.
Principal Soils Engineer.

c.c. Mr. A. Tove.
Mr. H. Tregaskes.
Mr. D.G. Ramsay.
Mr. A. Watt.
Dr. P. Karrow.
Foundation Section.
File.

FOUNDATION REPORT

on

New bridge at Highway 401, line "E" underpassing
gravel road between lots 9 & 10, Township of
Hamilton, Northeast of Cobourg.

Plan No. F-3132-6
Station: 832/38.86

Distribution

Mr. A. Toye Bridge Engineer	(2)
Mr. H. Tregaskes Const. Engineer	(1)
Mr. D. G. Ramsay Design Engineer	(1)
Mr. H.D. Duff District Engineer, Port Hope, Ontario.	(1)
Mr. A. Watt Water Resources Commission	(1)
Dr. P. Karrow Dept. of Mines	(1)
Foundation Section	(1)
File	(1)

W.P. ~~207~~⁸⁸-57
W.J. F-57-46

INTRODUCTION

This report covers the subsoil investigation carried out in order to evaluate the competency of the subsoil layers to support the foundations of the proposed bridge, and also the approach embankments.

The new bridge is at the new highway No. 401 line "E", underpassing existing gravel road between lots 9 & 10 (Con. I), Township of Hamilton, (Station 832+38.86, Profile No. F-3132-5).

The work was started on Nov. 12, 1957 and was completed on Nov. 25, 1957.

DESCRIPTION OF SITE AND INVESTIGATIONS

The site is located within the shorelines of late Iroquois Lake. The country is characterized by drumlins with ravines in between. Generally these hollow places are filled with the material eroded from the shorecliffs by wave action. The terrain is bouldery till with shallow topsoil used for agriculture.

The investigations were carried out by means of skid mounted coredrill machine. In the course of investigations two boreholes with dynamic cone penetration and two separate dynamic cone penetrations were made.

The location of the boreholes is shown on drawing F-57-46A and their elevations on log sheets under Appendix I.

FIELD AND LABORATORY FINDINGS

The field explorations revealed the following stratigraphy of the subsoil at this site. Underlying the topsoil the subsoil is made up of one layer of gravelly, sandy loam till, down to the end of the borehole.

The samples extracted from the boreholes were tested in the laboratory.

The soil is made up of about 20% cohesive material, 45% fine aggregate, and 35% coarse aggregate. The moisture content was found to be about 5.5%.

During the sampling standard penetration tests were performed in the field and they registered more than hundred blows per foot penetration.

SUPPORT OF ABUTMENTS

The layer is very dense preconsolidated till, mostly made up of granular material. The standard penetration test results will be convenient to assess bearing value for the subsoil. And in this case the indications are that in its existing state the layer can provide a conservative bearing value of 3 - 3.5 T.s.f. with a safety factor of 3.

The final proposed Highway 401 surface elevation is 460.9 ft. Assuming the structure will be supported on 7 ft. wide continuous footing a depth factor of one will place the footings at elevation about 453 ft. at this elevation a bearing value of 3 T.s.f. with a safety factor of 3 can be used.

CONCLUSIONS AND RECOMMENDATIONS

From the above discussion it will follow that:

1. The subsoil stratigraphy indicates a layer of dense loamy till material spotted with boulders.
2. The material is mostly granular and the standard penetration tests have registered over hundred blows per foot penetration.
3. Elevation 453 ft. has been chosen for placing the footings on the assumption that 7 ft. wide footings will be used, and a depth factor of one is needed. From the findings a bearing value of 3 T.s.f. with a safety factor of 3 at this elevation is rather conservative and is proposed for design purposes.
4. The approach fills to the new structure do not present any stability problem.

V. Korlu
Foundation Engineer

APPENDIX I

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

DRILL RIG 54-1 OPERATION BORE & PENET'N JOB T-57-46 W.P. 88-57 BORING L STA. 832+54 (45' RT)
 CASING 3X (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 19 1/2 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 13 NOV 1957

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 S.S. - SLEEVE SAMPLE
 DO - DRIVE OPEN PS - PISTON SAMPLE
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE
 TO - THIN WALLED OPEN RC - ROCK CORE

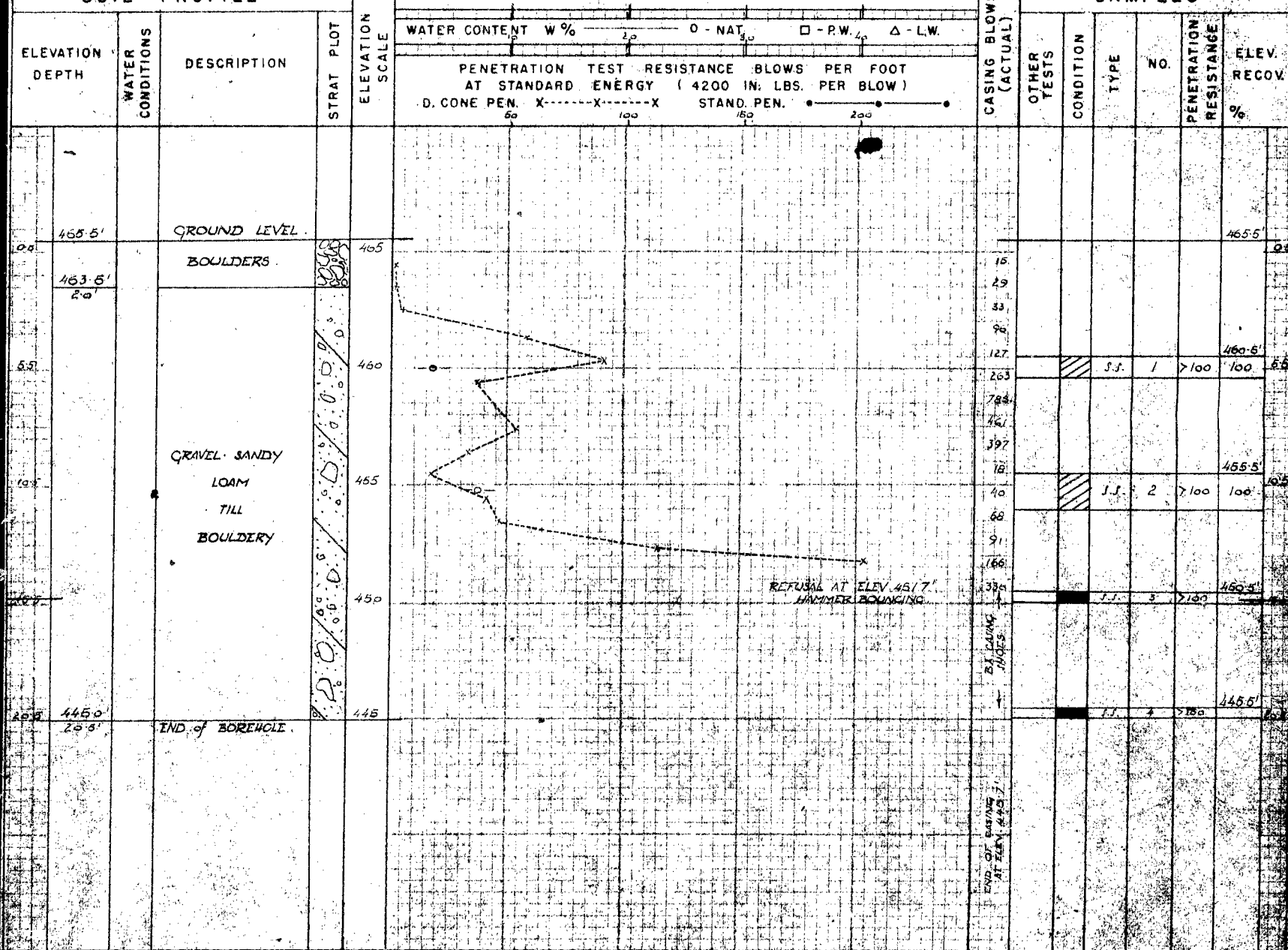
SAMPLE CONDITION



- DISTURBED
 - FAIR
 - GOOD
 - LOST

SOIL PROFILE

SAMPLES



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

DRILL RIG 54-1 OPERATION PENETRATION JOB F-57-46 W.P. 88-37 BORING 2 STA. 832+28 (45' RT)
CASING BK (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC. 1957
SAMPLER HAMMER WT. 250 LBS. DROP 19 1/2 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 19. NOV. 1957

ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY
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D.F. - DRIVE FOOT VALVE W.S. - WASHED SAMPLE
T.O. - THIN WALLED OPEN R.C. - ROCK CORE

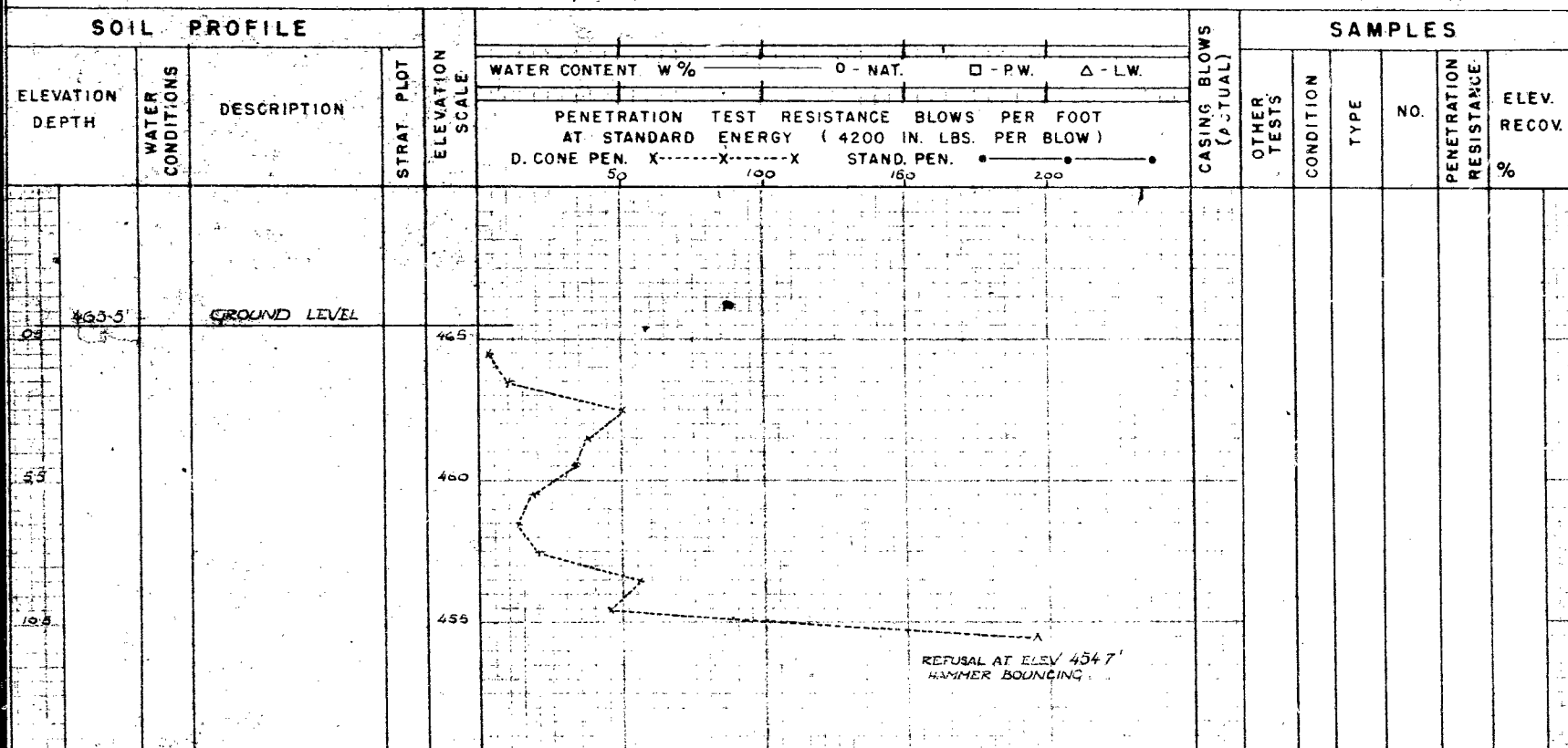
SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE

SAMPLES



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

DRILL RIG 54-1 OPERATION PENETRATION JOB F-57-46 W.P. 88-57 BORING 3 STA. 832.50 (45' LT)
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC. 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 19 1/2 INCHES COMPILED BY HJ CHECKED BY AL DATE BORING NOV. 19 1957

ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY
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 QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

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 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

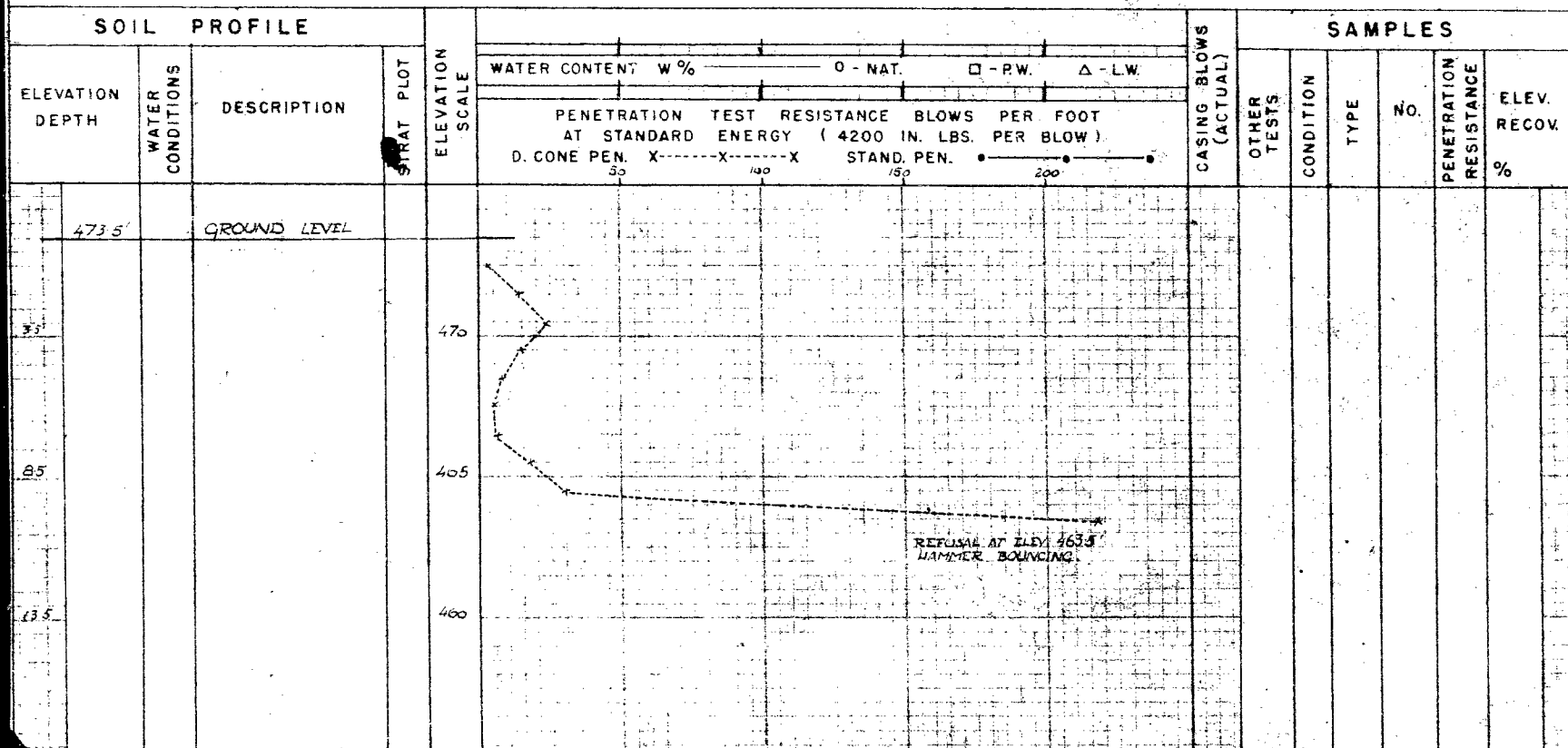
SAMPLE CONDITION



- DISTURBED
 - FAIR
 - GOOD
 - LOST

SOIL PROFILE

SAMPLES



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

DRILL RIG 54-1 OPERATION BORE & PENET'N JOB T-57-46 WP 88-57 BORING 4 STA. 832+10 (42' LT.)
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC. 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 19 1/4 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 21 NOV. 1957

ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY
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 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

