

61-F-16

W.P. # 119-58

Hwy. # 401

WAVERLY RD.

UNDERPASS

Br. # 12

DARLINGTON TWP.

BA 851-A

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

March 14, 1961.

ADDITIONAL FOUNDATION
INVESTIGATION REPORT -
W.J. 61-F-16 -- W.P. 119-58

Attention: Mr. S. McCombie.

Re: Darlington Twp. Bridge No. 12,
Waverly Road Underpass at Hwy. 401
Intersection -- District No. 7.

An additional investigation has been carried out at the above mentioned site in order to complete the subsoil information already available. On the basis of the results of this investigation, the following recommendations are forwarded for your consideration:-

On the Preliminary Plan, Drawing D-4838-P1, a four-span continuous structure is shown. This proposed structure can be founded on spread footings. For footings of an average width of 6 - 8 ft., the following elevations are recommended -

North Abutment	- Sta. 0+68.80 - North	....	273.0'
South Abutment	- Sta. 1+55.70 - South	....	274.0'
Pier No. 1	.... - Sta. 0+28.80 - North	....	273.0'
Pier No. 2	.... - Sta. 0+43.45 - South	....	274.0'
Pier No. 3	.... - Sta. 1+15.70 - South	....	274.0'

For the above elevations a safe load of 3 T/sq.ft. for the abutments and 4 T/sq.ft. for the piers, can be used.

Spill-through type abutments are shown on the above mentioned drawing. If, as an alternative, piles are considered, they should be driven through the embankment fill down into the

cont'd. /2 ...

dense till stratum. It is anticipated that the piles will meet practical refusal when they penetrate a few feet into the dense till stratum. Six blows per inch penetration for the last two feet can be considered as practical refusal. Such piles can be safely loaded with 30 tons per pile.

Difficulties can be experienced during pile driving if the embankment fill is very well compacted; therefore, steel 'H'-piles are recommended. The length of the piles can be computed on the assumption that they will be driven about 3 ft. below the elevations given for the bottom of the abutment footings.

Because of the convenient subsoil conditions, it is recommended that a two-span structure with retaining wall type abutments be also considered as a solution. For approach fills, no stability problems are anticipated.

REPORT PREPARED BY:

..... *V. Korlu*
V. Korlu,
Project Foundation Engineer.

REPORT APPROVED BY:

..... *A. G. Stermac*
A. G. Stermac,
Supervising Foundation Engineer.

VK/ndef

cc: Messrs. A. M. Teye (2)
H. A. Tregaskes
H. D. McMillan
J. C. Campbell
G. F. Wetherall
T. J. Kovich
Foundations Office
Gen. Files.

Mr. A. M. Toys.

March 20, 1961.

Bridge Engineer.

REVIEW OF PRELIMINARY PLAN -

Materials & Research Section.

by: Foundations Office.

Attention: Mr. F. De Visser,
----- Bridge Location Engineer.

Re. W.P. 118-58,
Darlington Twp. #8

W.P. 119-58,
Darlington Twp. #12
Hwy. 401 - Dist. #7.

In reviewing the preliminary bridge plans for the two above mentioned sites, we have found that the designer has not followed our recommendations regarding the foundation bottom elevations.

L. C. Loderman,
PRINCIPAL FOUNDATION ENGR.
Per:

AGS/MdeF

L. C. Sternac
(A. C. Sternac,
SUPERVISING FOUNDATION ENGR.)

cc: Foundations Office
Gen. Files.

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-7-14
 W.P. 119-28

NO. OF TESTS	SAMPLE NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PERCENT WATER BY WEIGHT	MOIST CONTENT (%)	PLASTIC INDEX (%)	LIQUID LIMIT (%)	SHRINKAGE INDEX (%)	UNIT WEIGHT (PCF)	REMARKS
1	T1	4'-5.5'	Brown clayey silt with some sand	Levered	26.2	19.0	40.5	920	120.3	
	S2	5.5'-7'	Brown clayey silt with some sand and gravel.	27	20.4	-	-	-	-	
	S3	10'-11.5'	Brown clayey sandy silt with some gravel	37	12.6	-	-	-	-	
	S4	15'-13.5'	Grey clayey silty sand (till) gravelly	78-80	5.6	-	-	-	-	
2	T1	3'-4.2'	Brown clayey silt some sand & gravel	7	12.3 23.9	16.9	48.6	811.5	127.0	
	S2	4.2'-5.7'	light brown sandy, clay silt with some gravel	47	13.1	-	-	-	-	
	S3	9'-10.5'	" "	98	7.3	-	-	-	-	
	S4	14'-14.5'	Grey clayey silt sand (till)	78-80	6.7	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-P-16

W P 117-58

NO	SAMP NO	DEPTH (ft)	MATERIAL DESCRIPTION	PERCENT SAND	PERCENT SILT	PERCENT CLAY	WATER CONTENT (%)	FLUIDITY	REMARKS
3	S1	4'-5.5'	Brown clayey silt with some sand.	48	15.7	-	-	-	
	S2	9'-10.5'	Brown clayey silty sand with some gravel.	98	6.3	-	-	-	
	S3	14'-15.5'	Brown clayey silt with some sand.	63	13.3	-	-	-	
	S4	19'-20.5'	Grey "	96	10.3	-	-	-	
	S5	24'-25.5'	" "	83	10.5	-	-	-	
4	S1	4'-5.5'	Brown clayey silt with some sand.	27	20.1	-	-	-	
	T2	5.5'-6.5'	Brown sandy silt with some clay.	Levered	15.4	15.4	31.8	3530	131.9
	S3	10.5'-12'	Brown silty sand with some clay and gravel.	49	7.2	-	-	-	
	S4	14'-15.5'	Grey clayey silt with some sand.	28	20.7	-	-	-	
	S5	19'-20.5'	Grey clayey silt with some sand and gravel.	75	10.9	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB AL-P-16WF 119-58

WELL NO	SAMP NO	DEPTH (FEET)	MATERIAL DESCRIPTION	PERCENT MOISTURE	WATER CONTENT	PLASTIC LIMIT	SHRINKAGE LIMIT	LIQUID LIMIT	UNSAT. WAT. CONTENT	REMARKS
5	T1	4'-5.5'	Brown clayey silt, some sand.	Levered	18.7	17.6	10.9	2950	132.1	
	S2	5.5'-7'	Brown " "	41	13.8	-	-	-	-	
	S3	9'-10.5'	" sandy clayey silt, some gravel.	42	9.8	-	-	-	-	
	S4	14'-15.5'	Grey sandy clayey silt.	127	12.1	-	-	-	-	
			3 denotes split spoon sample							
			2 " shelly tube sample							

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W P 119-50

JOB 61-F-16

DATUM 283.0'

BORING DATE Mar. 7/61

BORE HOLE NO 1

STATION 1+55.70' South
(12' West)

COMPILED BY B.K.

CHECKED BY V.E.

FIELD SP. LOG

DATE OF LOG

BY SP. LOG

BY SP. LOG

BY SP. LOG

CASSID

LEGEND

UNSATURATED COMPRESSION (Q_u)

LAB. TEST (SAND SENSITIVITY)

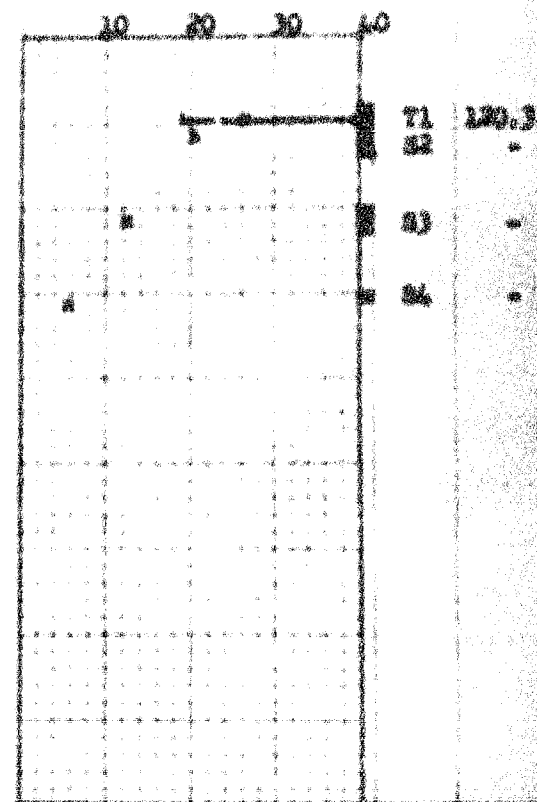
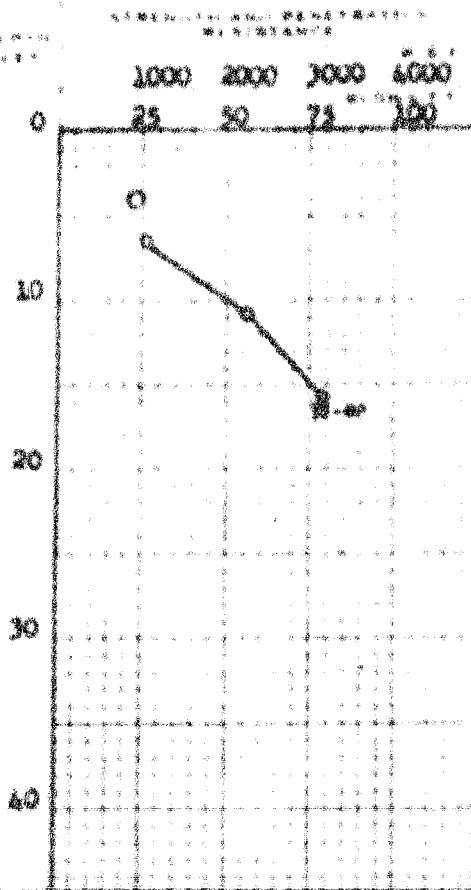
NATURAL MOISTURE AND

WATER CONTENT

WATER LIMIT

PLASTIC LIMIT

Groundlevel	283.0
Granular fill	280.5
Brown clayey silt	278.0
Brown pebbly silty sand.	
	270.0
Gray gravelly silty sand till	267.5
End of borehole	



DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W P 119-58

BORE HOLE NO 2

JOB 61-P-16

STATION 1+12.70' South
(0' East)

DATUM 281.5'

COMPILED BY R.K.

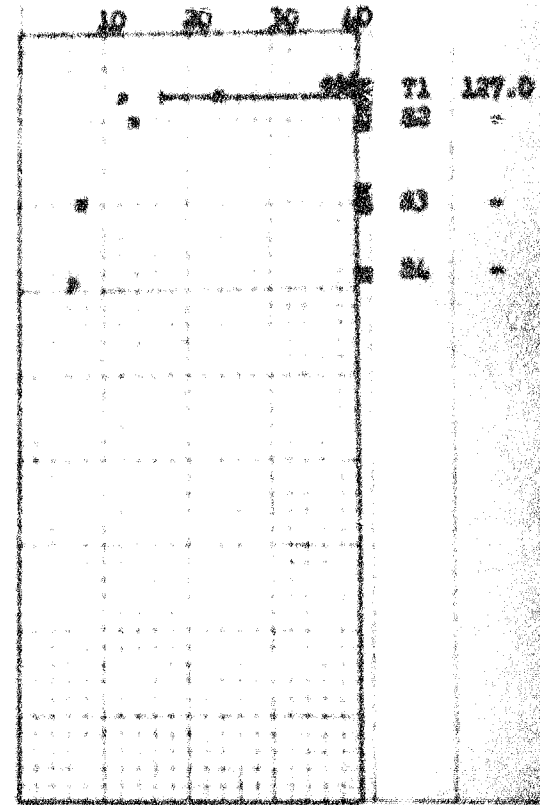
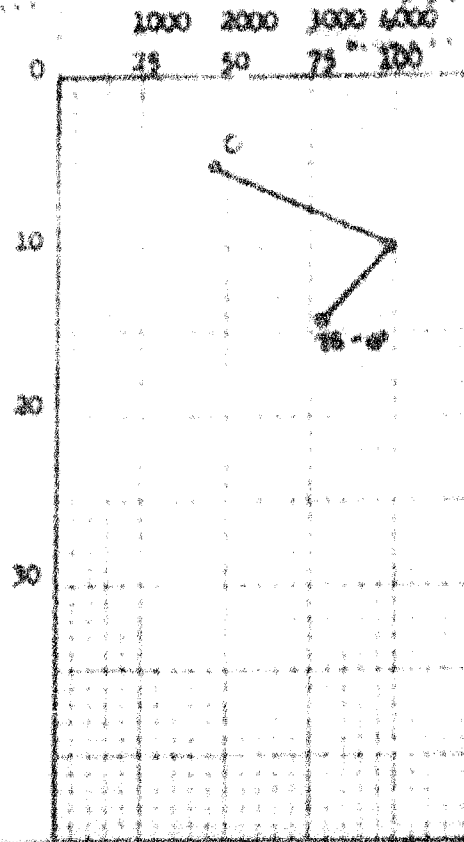
BORING DATE Mar. 7/61

CHECKED BY V.K.

LEGEND

UNCONSOLIDATED COMPRESSION (QU)
 VANE TESTS AND SENSITIVITY (S)
 NATURAL MOISTURE AND
 LIQUIDITY LIMITS
 PLASTICITY INDEX

Groundlevel	281.5
Granular fill	279.5
Brown clayey silt	277.5
Light brown pebbly silty sand.	
	270.0
Grey gravelly silty sand till	267.0
End of borehole	



DEPTH IN FEET DUE TO
CORRECTION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

P. 119-58

BORE HOLE NO 3

JOB 61-P-16

STATION 0+43.45' South
(1/2' wheel)

DATUM 282.0'

DATE 11/1/61 B.K.

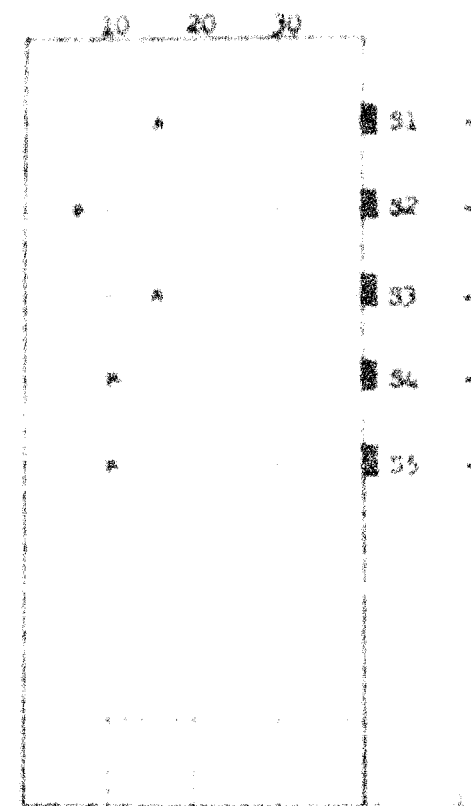
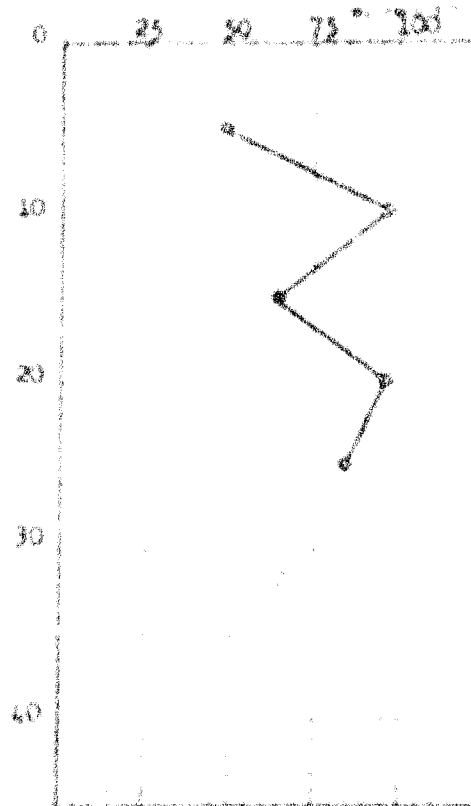
BOHRING DATE: Mar. 8/61

DATE 11/1/61 V.R.

LEGEND

UNSATURATED SOIL COMPRESSION (C_u)
CENT. PLAST. AND SHRE. (P.L. & S.)
NAT. MOISTURE AND
LIQ. LIMITS

Groundlevel	282.0
Granular fill	274.0
Brown clayey silt	277.0
Brown gravelly silty sand	270.0
Grey gravelly silty sand (till)	256.5
End of borehole	



DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 119-58

BORE HOLE NO. 4

JOB 61-F-16

STATION 0+28.80' North
(9' East)

DATUM 282.0'

CONDUCTED BY B.R.

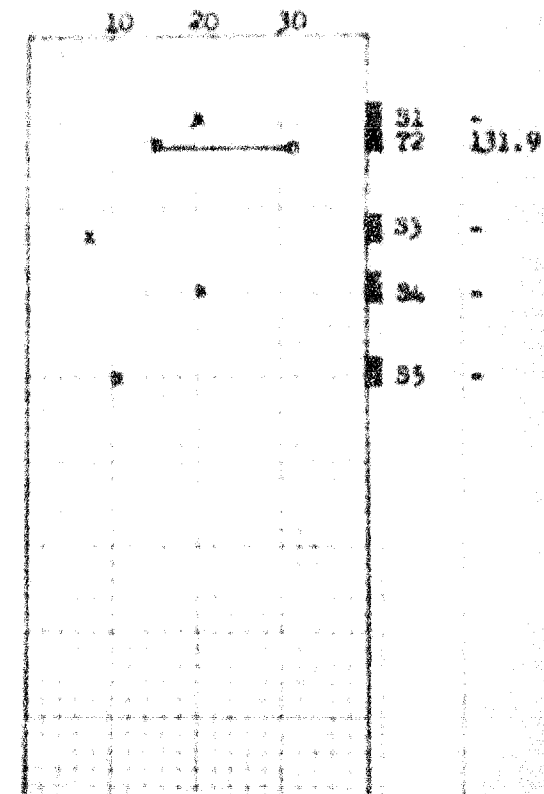
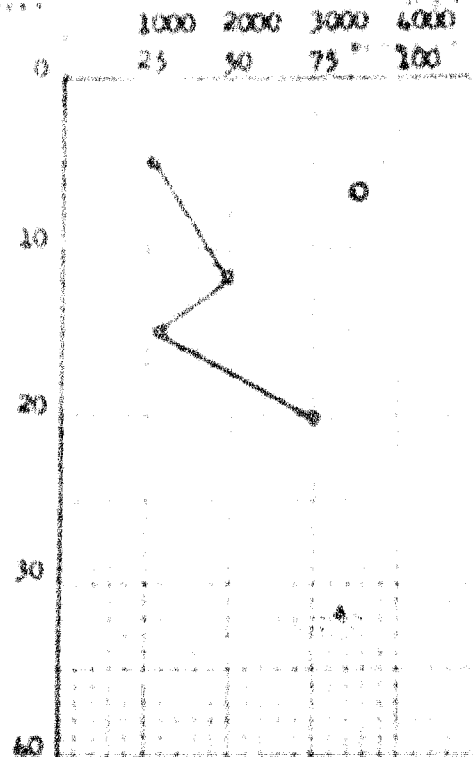
BORING DATE Mar. 8/61

BY V.R.

LEGEND

1. SOIL SAMPLES
2. TESTS
3. NATURAL MOISTURE AND
4. TESTS

Groundlevel	282.0	0
Granular fill	280.0	
Brown clayey silt	276.5	
Brown pebbly silty sand	268.5	10
Grey gravelly silty sand (fill)	261.5	20
End of borehole		



DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 119-58

JOB 61-P-16

DATUM 210.0'

BORING DATE Mar. 8/61

BORE HOLE NO 5

STATION 0+68.80 North

COMPILED BY D.K.

CHECKED BY V.N.

1 0.4 SPLIT TUBE

2 SHELBY TUBE

3 SPLIT TUBE

4 DIA. 4.0"

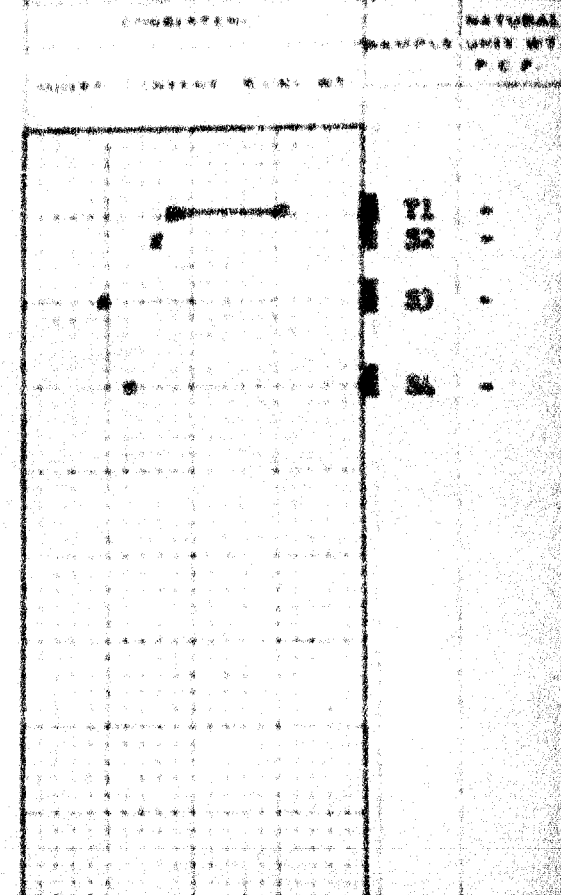
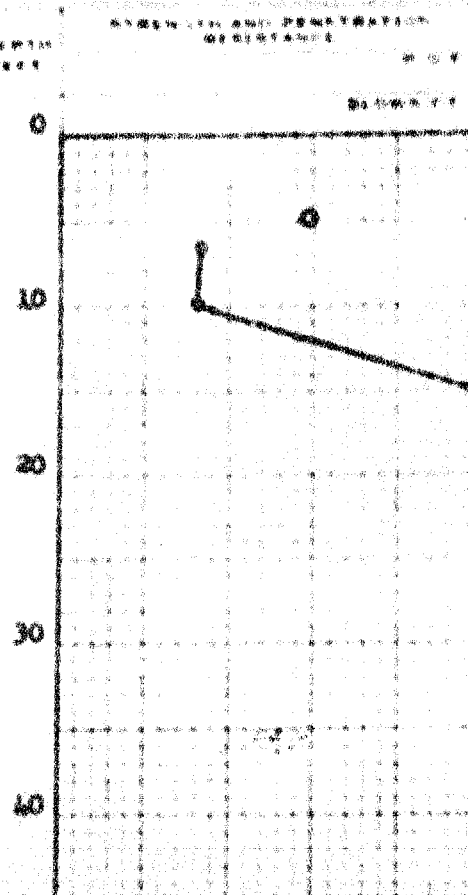
5 SHELBY

C.S. 1970

LEGEND

1 UNCONSOLIDATED COMPRESSION (Qu)
2 VANE TEST (C AND SENSITIVE) (Vs)
3 NATURAL MOISTURE AND
LIQUIDITY INDEX
4 LIQUID LIMIT
5 PLASTIC LIMIT

DEPTH	DESCRIPTION
283.0	Groundlevel
281.0	Granular fill
277.5	Brown pebbly clayey silt
270.0	Light brown pebbly silty sand (till)
267.5	Grey gravelly silty sand till
	End of borehole



DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT

Fine

SAND

Medium

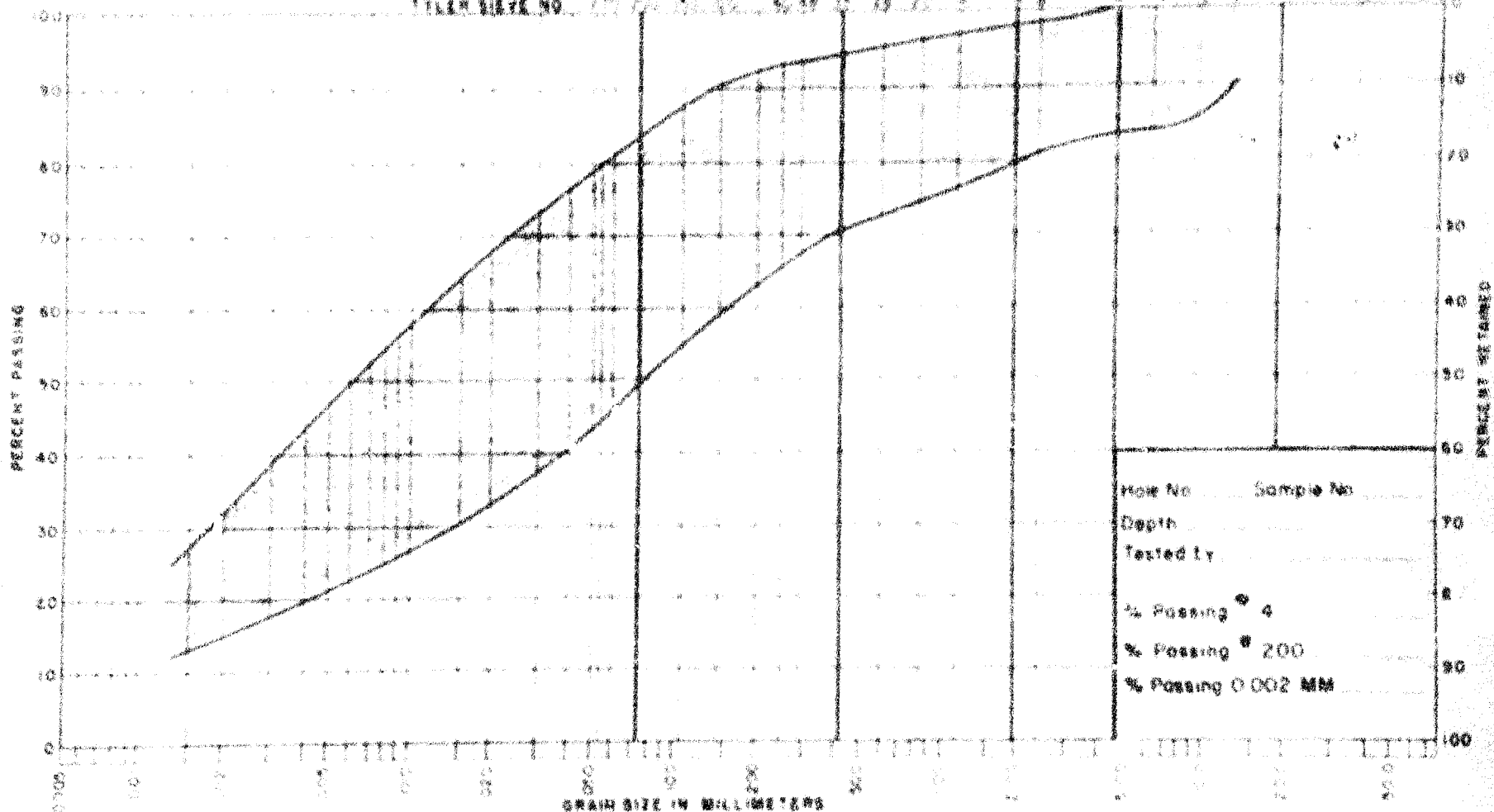
Coarse

Fine

GRAVEL

Coarse

TITLE PAGE NO. 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Hole No. Sample No.

Depth

Tested by

% Passing # 4

% Passing # 200

% Passing 0.002 MM

NOTES GREY GRAVELLY SILTY SAND TILL

DEFECTS IN NEGATIVE DUE TO
CONTACT OF ORIGINAL DOCUMENT

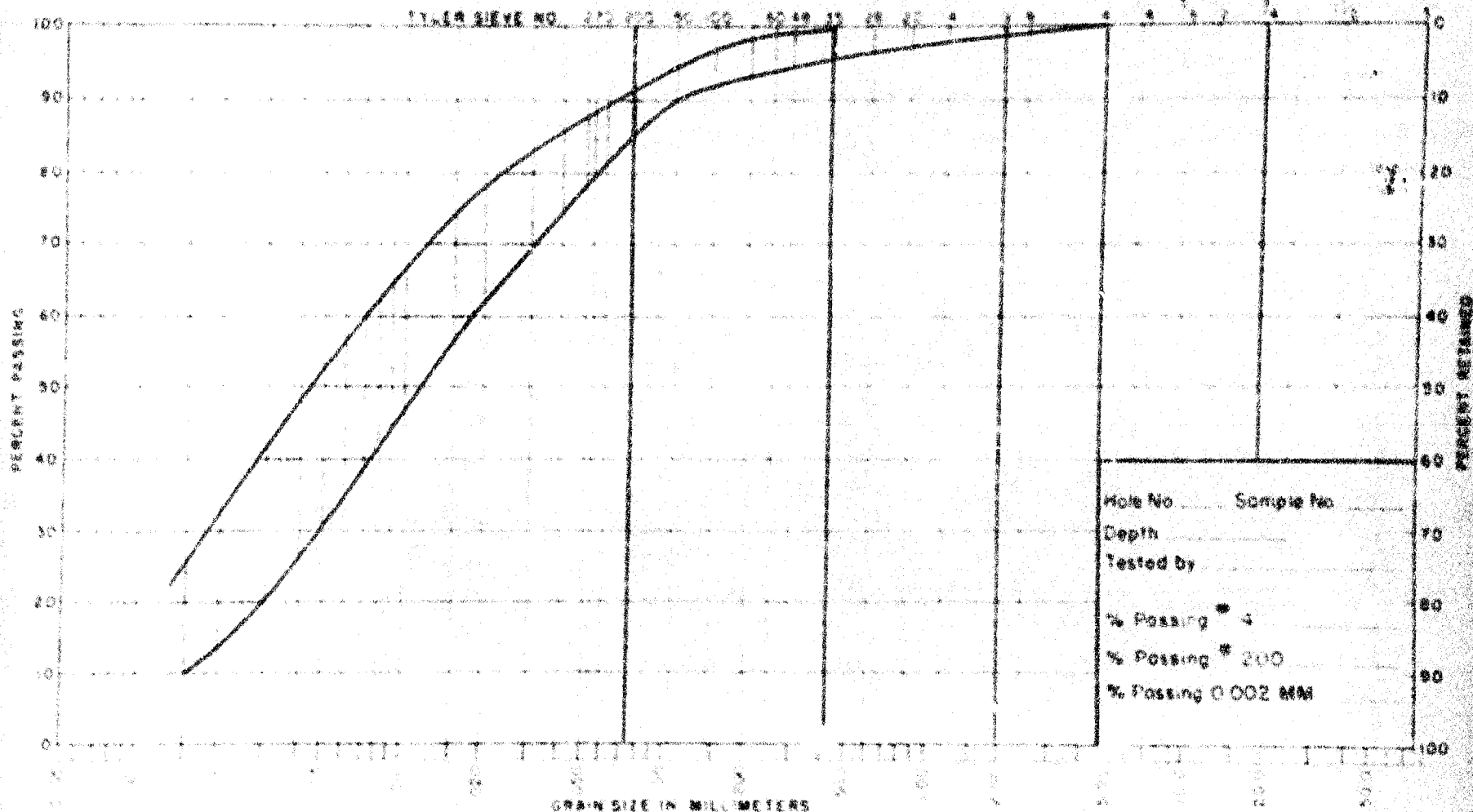
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
GRAIN SIZE DISTRIBUTION

Job No. 61-F-16

WP No. 119-58

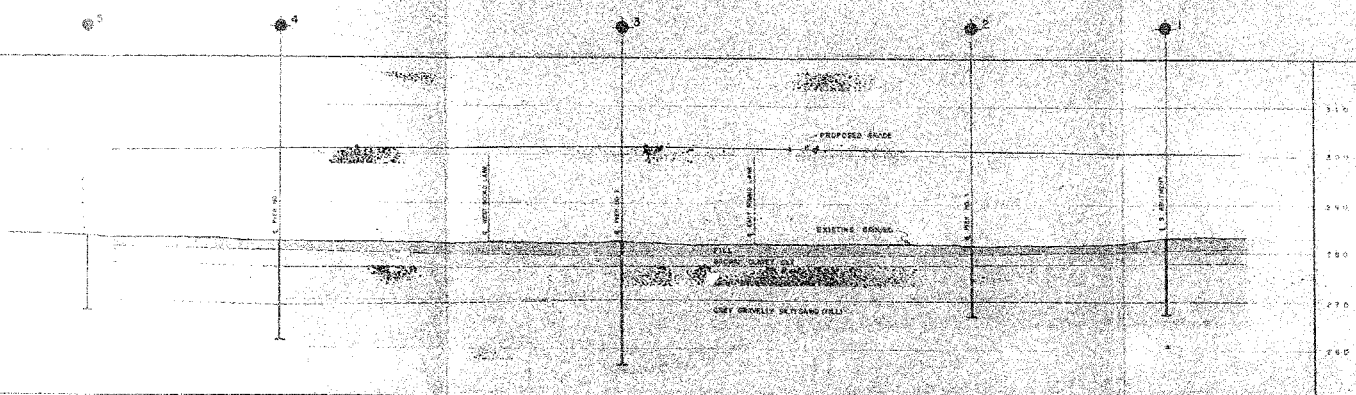
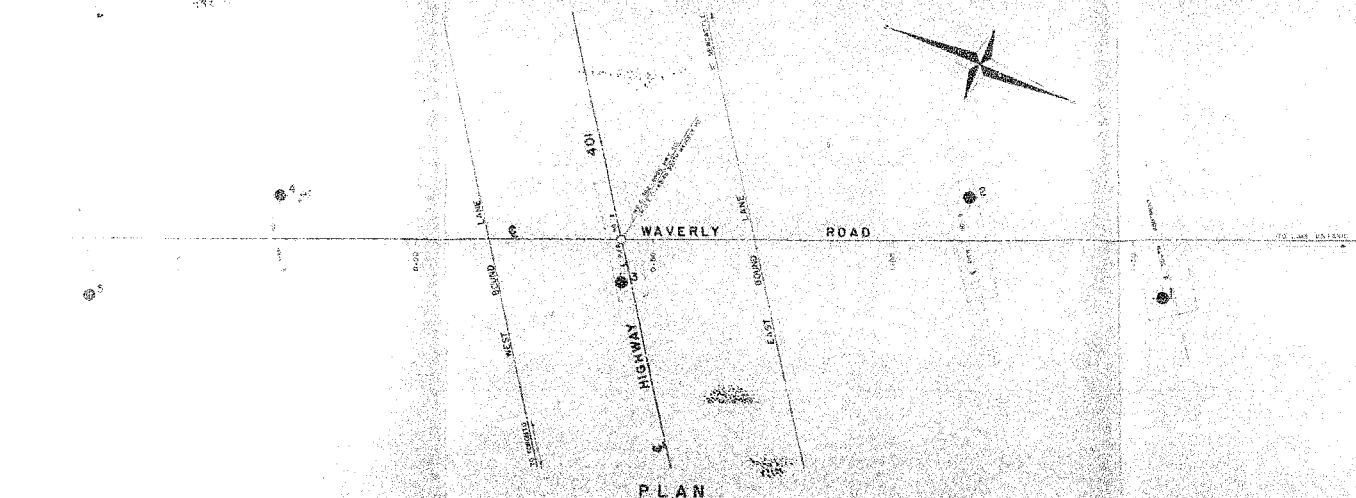
Location Waverly Rd. 2 Hwy. 901

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse
0	0	0	0	0	0
10	10	10	10	10	10
20	20	20	20	20	20
30	30	30	30	30	30
40	40	40	40	40	40
50	50	50	50	50	50
60	60	60	60	60	60
70	70	70	70	70	70
80	80	80	80	80	80
90	90	90	90	90	90
100	100	100	100	100	100

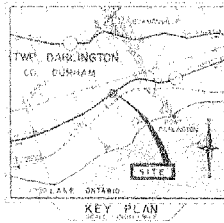


7. Posting 0002 HAN

LOCATION WAVERLY RD. & HWY. 40



SECTION



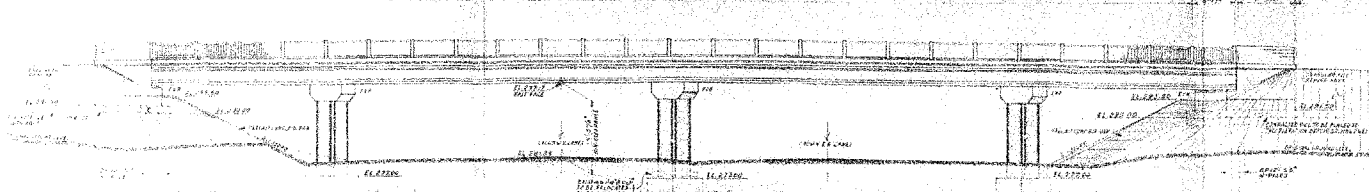
LEGEND				
BRIDGE HOLES				
NO.	ELEVATION	ADJACENT STATION	DISTANCE FROM	
1	240.0	1.55 TO SOUTH	12	WEST
2	270.0	1.15 TO SOUTH	10	EAST
3	280.0	2.45 TO SOUTH	9	WEST
4	290.0	0.25 TO SOUTH	5	EAST
5	300.0	0.45 TO NORTH	12	WEST

DEPARTMENT OF HIGHWAYS (ONTARIO)
MATERIALS & RESEARCH SECTION

DARLINGTON TWP. BRIDGE NO. 12
AND
HIGHWAY 401
(WAVERTY ROAD UNDERPASS)

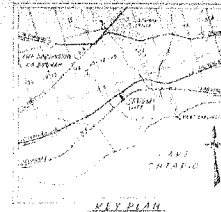
DESIGNED BY: J. J. JONES	CHECKED BY: J. J. JONES	DATE: 10/10/50
DRAWN BY: J. J. JONES	APPROVED BY: J. J. JONES	DATE: 10/10/50
CONTRACT NO. 100-100	PROJECT NO. 100-100	SECTION NO. 100-100
SHEET NO. 100-100		61-5-18A

10117H

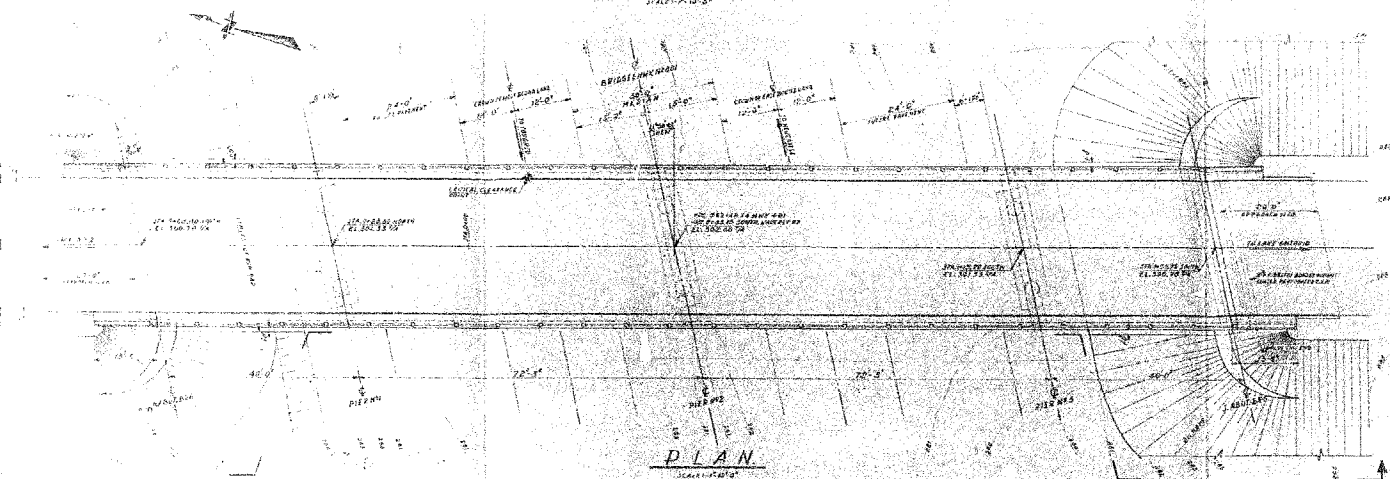


ELEVATION (A-A)

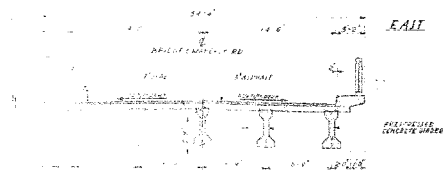
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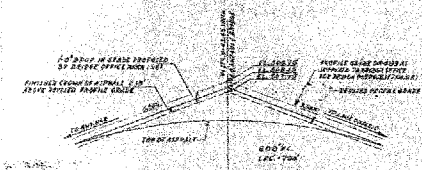
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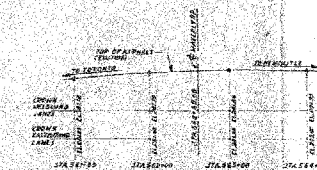
DIAN



EXH. A' DECK SECTION



PROFILE OF WAVEPLY BOARD



PROFILE OF HWY N#40!
AS PER PROFILE ON 10/28

W.P. 119 28
 DEPARTMENT OF HIGHWAYS-ONTARIO
 SURVEY OFFICE - TORONTO
DARLINGTON TWP BRIDGE #12
WAVERLY ROAD UNDERPASS
 THE KING'S HIGHWAY NO. 401 _____ DIST. NO. 2
 OR. ROAD NO. _____
 TWP. DARTMOUTH _____ CO. 12-10-00 C.D. S.F. _____
PRELIMINARY PLAN
 APPROVED _____
 BRIDGE ENGINEER _____ SECTION ENGINEER _____
 DESIGNED BY _____ DRAWN BY _____
 CHECKED BY _____
 APPROVED BY _____
 D-4838-PI