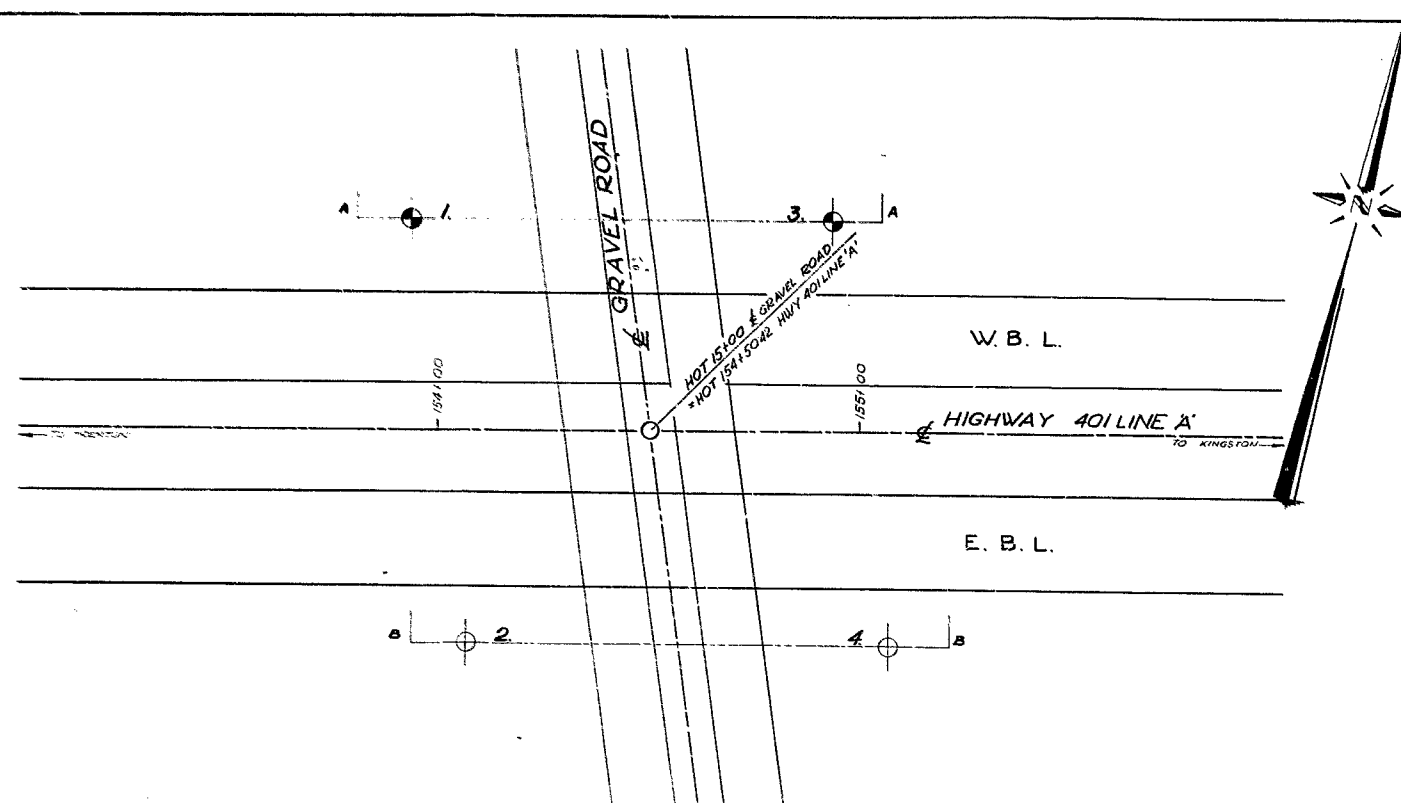
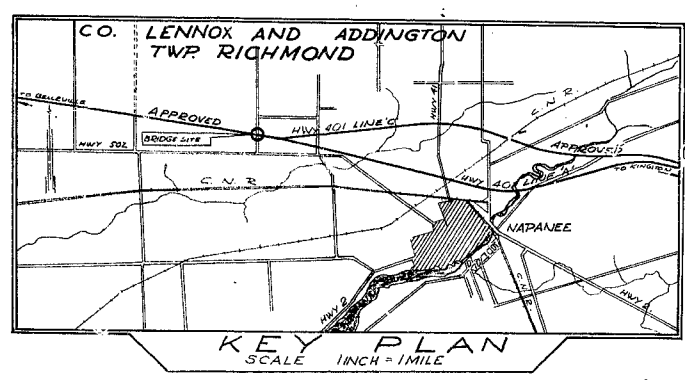


# 59-F-35  
W.P. # 74-59  
Hwy. # 401  
CROSSING  
GRAVEL RD.  
CON. # 3  
2 1/4 MILES N.W. OF  
NAPANEE



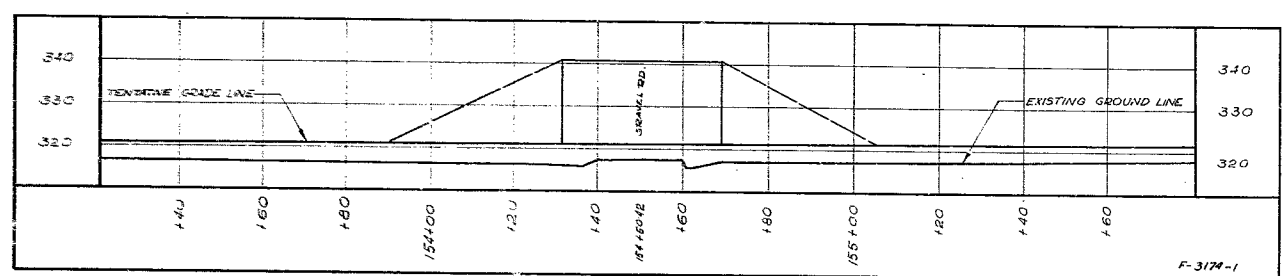
PLAN

F-3174



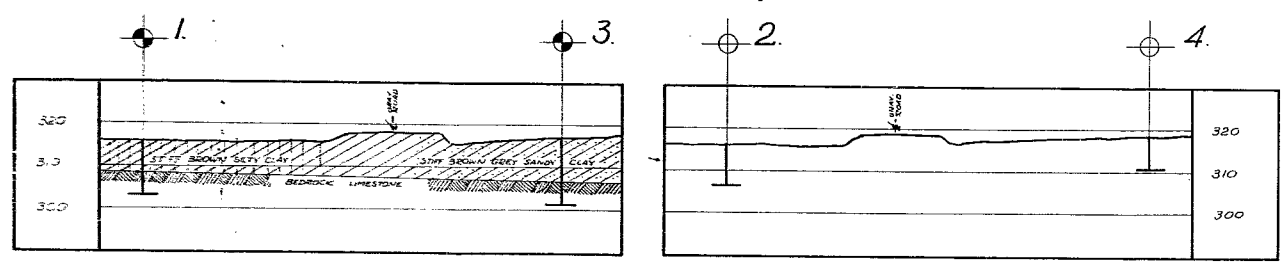
LEGEND			
BORE & PENETRATION			
PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM &
1.	317.00	353+96	50' LT.
2.	317.00	354+04	50' RT.
3.	316.00	354+96	50' LT.
4.	318.00	355+04	50' RT.

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.



PROFILE

F-3174-1



A — A

B — B

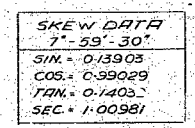
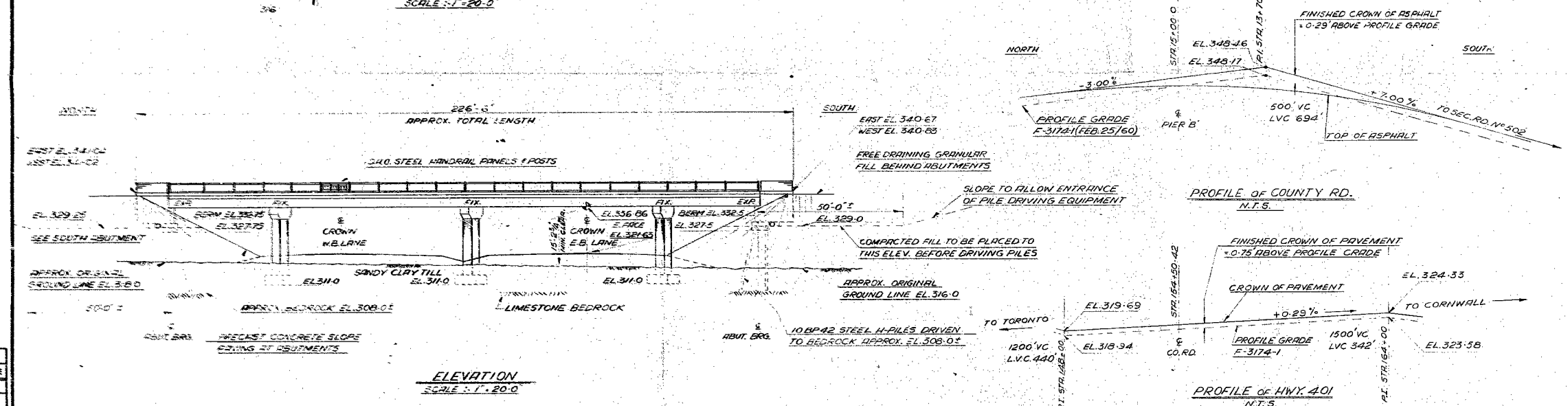
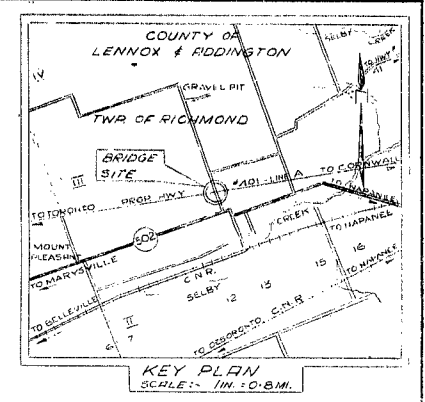
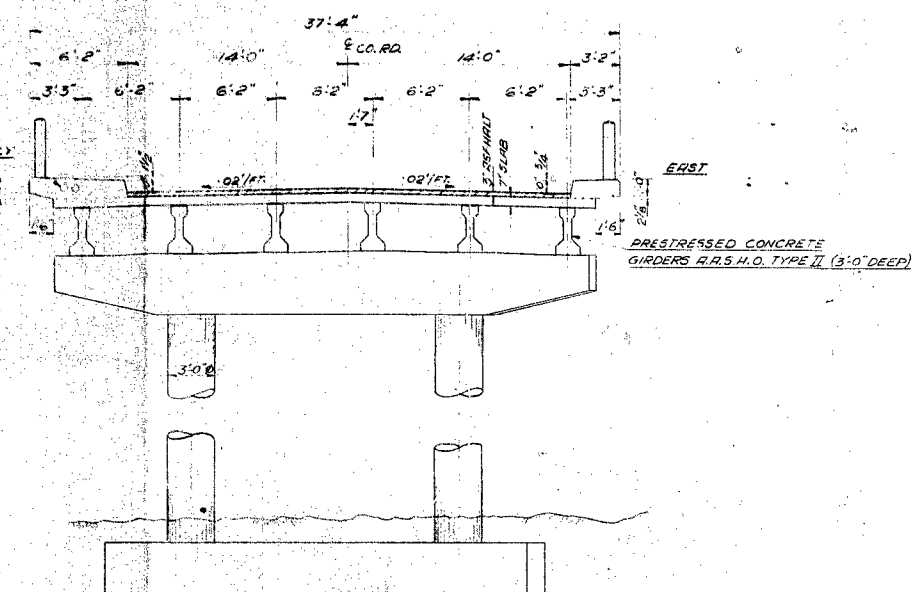
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION

**GRAVEL ROAD PROPOSED CROSSING**

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY. 401 DISTRICT 8 COUNTY LENNOX AND ADDINGTON  
TOWNSHIP RICHMOND LOT 12-13. CON. III.  
LOCATION 2 1/4 MILE N.W. OF NAPANEE

DRAWN BY J. J. J. CHECKED BY [Signature] W.P. 74-59  
DATE 1 DEC. 1959 APPROVED BY [Signature] DRAWING NO.  
SCALE 1 inch = 20 feet F-59-35 A.

[illegible][illegible]

<u>DEPARTMENT OF HIGHWAYS ONTARIO</u> <u>BRIDGE DIVISION</u>									
<u>COUNTY RD. UNDERPASS</u> <u>2 1/2 MILES WEST OF JCT. HWY. # 41</u>									
KING'S HIGHWAY No. <u>401</u>						DIST. No. <u>3</u>			
<u>CO. LENNOX &amp; ADDINGTON</u>						<u>RICHMOND TWP. BR. #5</u>			
<u>TWP. RICHMOND</u>						<u>LOT 12 &amp; 13</u>		<u>CON. 3</u>	
<u>PRELIMINARY</u>									
APPROVED _____ BRIDGE ENGINEER				SITE No. <u>18-52</u>		W.P. No. <u>74-69</u>			
DESIGN: <u>W.M.</u>		CHECK: _____		CONTRACT No. _____		_____		_____	
DRAWING: <u>V.S.R.</u>		CHECK: <u>D.S.</u>		_____		_____		_____	
DATE: <u>MAY 1963</u>		LOADING: <u>420 516</u>		DRAWING No. <u>D-5268-P1</u>		_____		_____	

Test H. Widdis June 1963.

Mr. S. McCombie,  
Bridge Planning Engr.,  
Bridge Division.

Attention: Mr. A. Watt

Mr. A. G. Stermac,  
Principal Foundation Engr.,  
Foundation Section,  
Materials & Research Division.

June 27, 1963

✓ W.P. 73-59 : County Rd. No. 10 Underpass  
W.P. 74-59 : County Rd. Underpass  
W.P. 177-61 : Mallorytown Rd. Interchange Underpass  
District No. 8

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We have received and reviewed the Preliminary Plans for the above-mentioned structures and herewith, submit our comments for your consideration:

At all three sites bedrock was found at relatively shallow depth. The subsoil overlying bedrock is dense and can be considered as good bearing ground.

All footings for structure W.P. 177-61 are founded on bedrock, either as spread footings or footings on piles resting on bedrock. In this way, identical condition are created for all supports, piers and abutments.

For the other two structures (W.P. 73-59 and W.P. 74-59), the piers are founded on spread footings resting above bedrock within the overburden, while the abutments are founded on piles driven to bedrock. From the above, it is evident that conditions for the different supports are not identical. In view of the very dense state of packing of the overburden and its relatively small thickness, the difference in support has no significance.

For the structure W.P. 73-59, the north abutment footing is only about 3 feet above natural ground. It appears to us that instead of using piles here, a more economical way would be to place this footing on well compacted fill. On the south side, the abutment is about 10 - 11 feet above natural ground and maybe, even here, it would be more economical to put the abutment footing on well compacted fill.

In case of structure W.P. 74-59, the compacted fill would have to be on both abutment locations, in the order of 10 - 13 feet.

AGG/MdeF

cc: Foundations Office  
Gen. Files

*A. G. Stermac*  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. A. G. Stermac  
Principal Foundations Engineer  
Lab. Bldg.

FROM: A. P. Watt

DATE: June 10, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: W. P. 74-59  
Bridge Site #18-52  
County Rd. Underpass  
2.1 miles west of Jct. Hwy. 41  
Hwy. 401. District #8.

Enclosed please find one copy of the preliminary plan  
D 5268-P1 for the above structure.

We would appreciate any comments you wish to make.

APW/ew  
c.c. Mr. N. D. Smith.

  
A. P. Watt  
Bridge Location Engineer.

Mr. B. R. Davis,  
Bridge Design Engr.,  
Bridge Division.

Attention: Mr. J. Keen

Mr. A. G. Stermac,  
Principal Foundation Engr.,  
Foundation Section,  
Materials & Research Division.

May 24, 1963

Re: W.P. 73-59 & W.P. 74-59  
Foundation Depth - Review

You have verbally requested on May 23, 1963, that we review the recommendations of the two above-mentioned reports concerning the foundation depths. We herewith, submit our comments for your consideration:

1. W.P. 73-59:

A safe load of 4.0 T/sq.ft. can be used for footings founded 5 ft. below ground level (elev. 357.0) in the dense and hard sandy clay till layer. Settlements should be negligible.

2. W.P. 74-59:

A safe load of 4.0 T/sq.ft. for footings founded at 6.0 ft. below ground surface (elev. 311.0) in the layer of stiff to hard brown silty clay. Settlements should be negligible.

In both above-mentioned cases, bedrock will be close to the foundation bottoms. However, it is felt that if very high bearing pressures are of no special advantage, the footings should be kept higher - i.e., at elevations that satisfy both the criteria of adequate bearing capacity and adequate frost protection. The above-quoted elevations have been determined on that basis.

AGS/MdeF

cc: Foundations Office  
Gen. Files

*A. G. Stermac*  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

23-63-266.

Mr. A. M. Toye,  
Bridge Engineer.  
Materials & Research Section.  
Attention: Mr. S. McCombie.

December 7, 1959.

Re: D.H.O. FOUNDATION REPORT

W.P. 74-59 -- W.J.P-59-35.

District #8 - Kingston, Ont

Existing Hwy. #401 & Gravel Road Crossing,  
Lots 12 & 13, Con. III, Twp. of Richmond,  
Approx. 2 1/4 Miles N.W. of Napanee,

We have completed a subsoil investigation, consisting of 2 boreholes and 2 separate cone tests, at the above noted structure location where existing Hwy. #401 underpasses the gravel road. Attached hereto, are the detailed borehole logs showing the results of our field and laboratory findings. The locations of the boreholes and cone tests, as well as their subsoil stratigraphy, are shown in the accompanying Drawing No. F-59-35A.

The site and its surrounding area are generally level. Gravelins, as well as bedrock outcrops are visible in the vicinity of the site. Subsoil at this site consists of a shallow overburden of stiff brown clay, 7' to 10' in thickness, overlying limestone bedrock. The limestone is in a sound condition with no signs of weathering or fracture. Bedrock surface was contacted at Elev. 309.7' in Boring 1 and at Elev. 306.3' in Boring 3.

The structure can be supported on spread footings bearing directly on the bedrock surface. A conservative bearing pressure of 10 t.s.f. can be used for design. The impermeable nature of the overburden of clay will allow footing excavations to be carried

cont'd. /2 ...

out in the dry. No approach fill stability problems are anticipated.

If there are any queries in connection with the contents of this report, please contact our office.

L. G. Soderman,  
PRINCIPAL SOILS & FOUNDATION ENGR.

per:

*AKG*

(M. E. Loh,  
PROJECT FOUNDATION ENGR.)

AKL/MdeF  
Shels.

cc: Messrs. A. W. Toye (2)  
H. A. Tregaskes  
D. C. Hamsay  
I. Campbell  
T. A. Sharpe  
J. C. Gruspier  
A. Watt

Foundation Section ✓  
Gen. Files.



APPENDIX I.

W.P. 74-59

## MATERIALS AND RESEARCH SECTION

W.P. --- 74-59 --- BORE HOLE NO. --- 1 ---

JOB F-59-35 STATION 154+50 (50' Lt.)

DATUM -- COMPILED BY H.S. & B.K.

BORING DATE April 23/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	—	○
VANE TEST (C) AND SENSITIVITY (S)	—	+ <sup>s</sup>
NATURAL MOISTURE AND		
LIQUIDITY INDEX	—	LI
LIQUID LIMIT	—	X
PLASTIC LIMIT	—	—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	4000
	↓ Ground level W.L. ▽	317.0	0	50	100	150	200
	Topsoil	316.0					
	Stiff brown silty clay						
		312	5				
	Bedrock	309.7					
			10				
	Limestone						
	End of Borehole	304.7					
	Penetration resistance profile shown obtained by driving a 2" dia. cone from ground surface to depth noted. Cone driven with energy equal to 350 ft. lb. per blow.		15				
			20				

CONSISTENCY				SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - 15 30					
				TW 1	116.5
				RC	-

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 74-59 BORE HOLE NO. 2

JOB F 59-35 STATION 154+50 (50' Rt)

DATUM            COMPILED BY B.K.

BORING DATE Apr. 24/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	O
SHREVE TEST (C) AND SENSITIVITY (S) -----	+ S
NATURAL MOISTURE AND LIQUIDITY INDEX -----	LI
LIQUID LIMIT -----	X
PLASTIC LIMIT -----	—






SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	↓ Ground level	316.0	0	50 100 150 200 <small>BLOWS/FT.</small>	
	Penetration resistance profile shown, obtained by driving a 2" dia. cone from ground level to depth noted. Cone driven with energy equal to 350 ft. lb. per blow.				
				Penetration Refusal at Elev. 307.5'	

[illegible]






# DEPARTMENT OF HIGHWAYS - ONTARIO

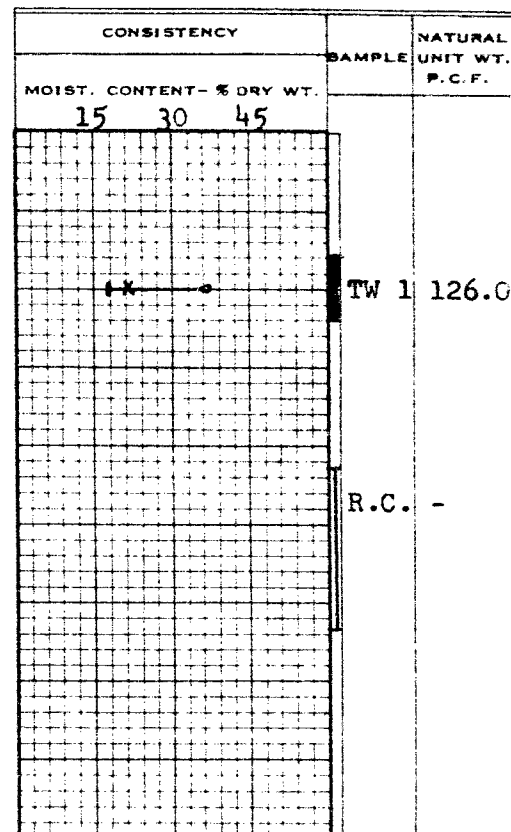
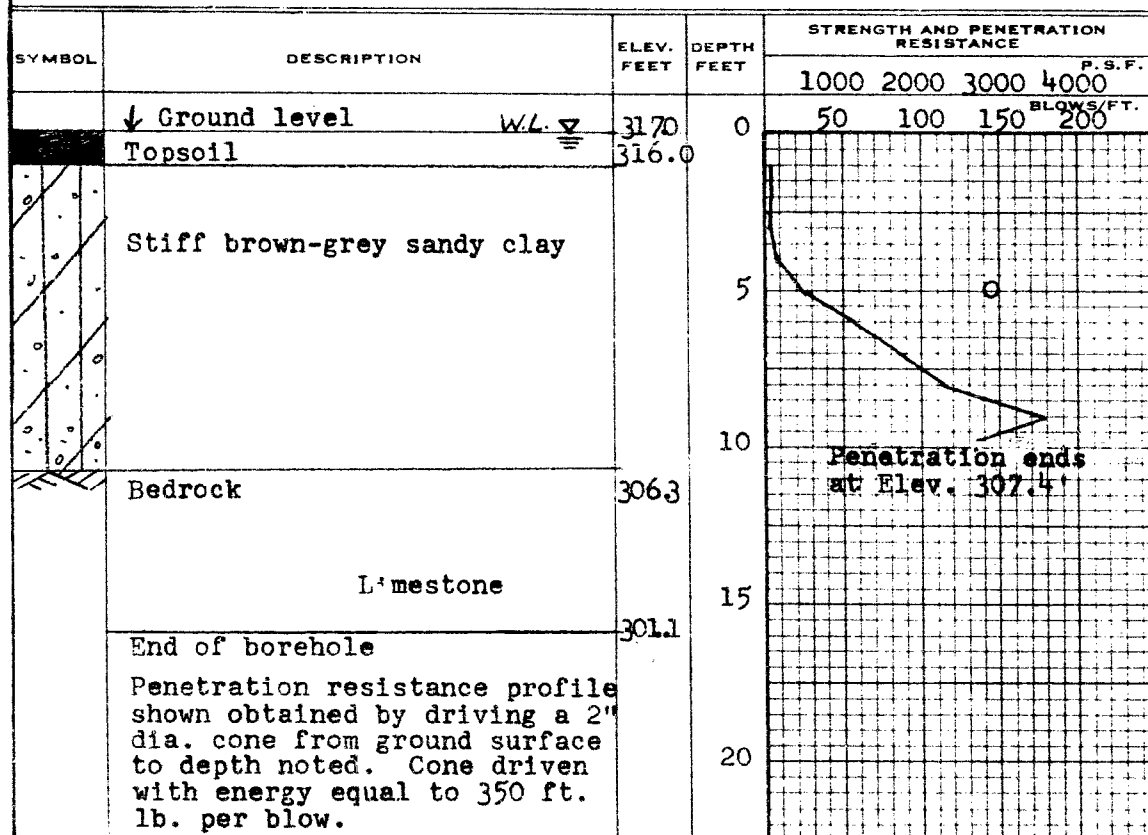
## MATERIALS AND RESEARCH SECTION

W.P. 74-57 BORE HOLE NO. 3JOB F 59-35 STATION 155+00 (50' Lt.)DATUM -- COMPILED BY B.K.BORING DATE Apr. 23/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE   
 2" SHELBY TUBE   
 2" SPLIT TUBE   
 2" D'4. CONE   
 2" SHELBY CASING 

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )   
 VANE TEST (C) AND SENSITIVITY (S)   
 NATURAL MOISTURE AND LIQUIDITY INDEX   
 LIQUID LIMIT   
 PLASTIC LIMIT 



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 74-59 BORE HOLE NO. 4

JOB F59-35 STATION 155+00 (50' Rt.)

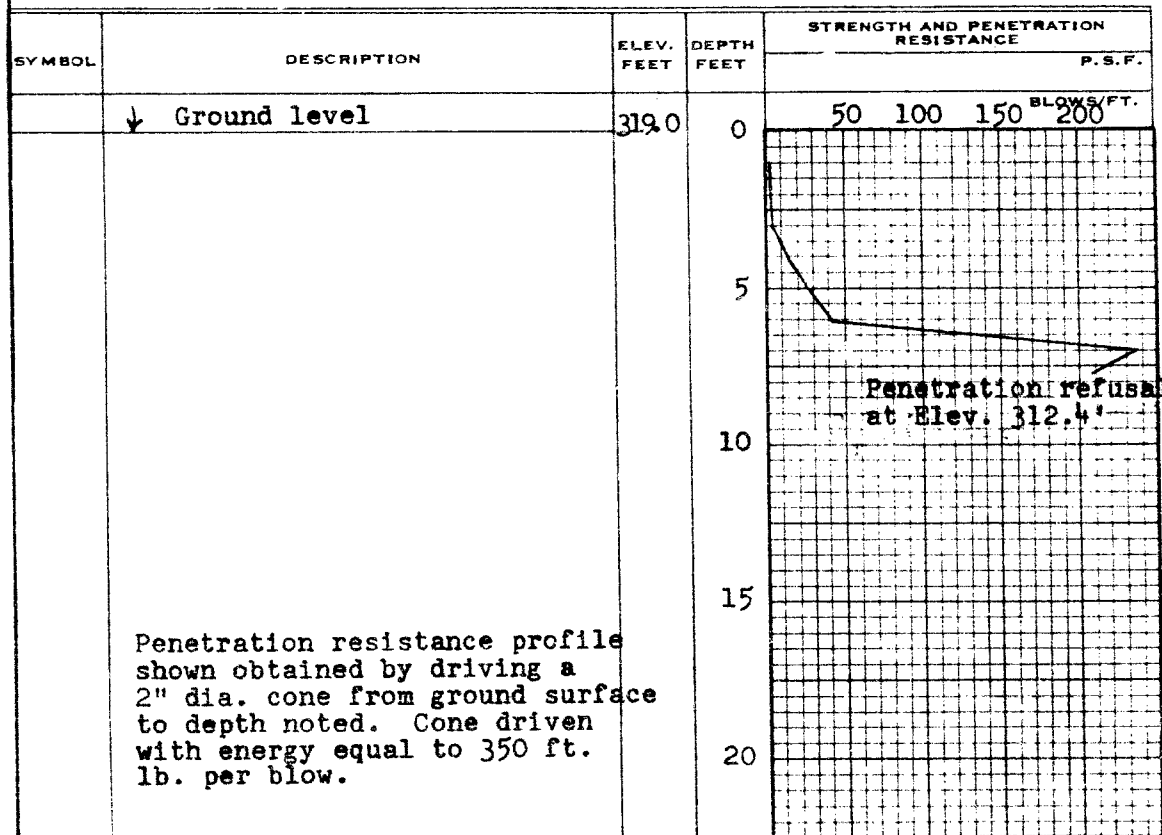
DATUM -- COMPILED BY B.K.

BORING DATE April 24/56 CHECKED BY A.L.

2" DIA. SPLIT TUBE \_\_\_\_\_  
2" SHELBY TUBE \_\_\_\_\_  
2" SPLIT TUBE \_\_\_\_\_  
2" DIA. CONE \_\_\_\_\_  
2" SHELBY \_\_\_\_\_  
CASING \_\_\_\_\_

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) --- O  
VANE TEST (C) AND SENSITIVITY (S) --- +  
NATURAL MOISTURE AND LIQUIDITY INDEX --- LI  
LIQUID LIMIT --- X  
PLASTIC LIMIT ---

[illegible]