

MEMORANDUM

cc: 3511 P. 152 83-63-136

W.P. 16-63

To: Mr. B. R. Davis,  
Bridge Engineer,  
Bridge Division.

From: Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

Date: July 7, 1966

Our File Ref.

In Reply to JUL 19 1966

SUBJECT:

FOUNDATION INVESTIGATION REPORT  
For

Proposed Winona Road Underpass  
and Q.E.W., Twp. of Saltfleet,  
County of Wentworth  
District #4 (Hamilton)  
W.J. 66-F-49 -- W.P. 216-63

Attached, we are forwarding to you, our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that you will find the factual data and recommendations contained therein, adequate for your design requirements.

Should additional information be required, please do not hesitate to contact our Office.

AGS/MdeF  
Attach.

cc: Messrs. B. R. Davis (2)  
H. A. Tregaskes  
D. W. Farren  
G. K. Hunter (2)  
H. Greenland  
T. J. Kovich  
W. S. Melinyshyn  
A. Watt

Foundations Office  
Gen. Files

for  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

## TABLE OF CONTENTS

1. INTRODUCTION.
  2. SUBSOIL CONDITIONS.
  3. DISCUSSION AND RECOMMENDATIONS.
  4. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION REPORT  
For

Proposed Winona Road Underpass  
and Q.E.W., Twp. of Saltfleet  
County of Wentworth  
District #4 (Hamilton)

W.J. 66-F-49    --    W.P. 216-63

1. INTRODUCTION:

A request to carry out a foundation investigation for the proposed underpass at the crossing of the Q.E.W. and Winona Road, was received from the Bridge Location Section (memorandum from Mr. W. S. Melinyshyn, Regional Bridge Location Engineer, dated May 9, 1966). An investigation was subsequently carried out by this Section to determine the subsoil conditions at the site of the proposed structure. Presented in this report are the results of our investigation, together with recommendations pertaining to the foundations for the structure and the stability of the proposed approach embankments.

The site is a portion of the Niagara Fruit Belt, lying between the Niagara Escarpment and Lake Ontario, in the Township of Saltfleet, about 4.5 miles west of Grimsby. During the Pleistocene period the site was inundated by Lake Iroquois which carved the present relatively flat topography from the underlying glacial till. The glacial till extends to the bedrock (Queenston Shale) which is estimated to be some 70 to 80 ft. below ground surface.

2. SUBSOIL CONDITIONS:

Six borings, together with dynamic cone penetration tests, were carried out during the course of field work, revealing subsoil conditions to be generally uniform over the site area. The entire site is underlain by an extensive deposit of hard clayey silt with sand and occasional gravel. This deposit was proved to a maximum

2. SUBSOIL CONDITIONS: (cont'd.) ...

depth of some 84 ft. in B.H. #6. Occasional seams of silt and sand were observed within this deposit. Physical properties as determined from field and laboratory tests, are summarized as follows:

Liquid Limit	--	19% - 32%
Plastic Limit	--	12% - 22%
Moisture Content	--	8% - 17%
'N' Values	--	30 - > 100 blows/ft.

Observations carried out during the time of the field investigation, indicated that the water level in the boreholes was approximately between elev. 265 and elev. 268. The exact water levels are shown on the borehole logs.

3. DISCUSSION AND RECOMMENDATIONS:

It is proposed to reconstruct the existing Q.E.W. as a controlled access highway from Stoney Creek traffic circle to St. Catharines. In addition, two-lane service roads are proposed to be built on both sides of the Q.E.W. This reconstruction program necessitates the construction of several underpass structures.

At the crossing of Winona Road and the Q.E.W., an underpass structure is proposed. Present proposals call for a six-span (35' - 59' - 76.5' - 76.5' - 59' - 35') structure with approach fills having a maximum height of 22 ft. above existing ground level.

Since the subsoil consists of hard clayey silt with sand and occasional gravel, conditions are favourable for spread footing support, and in the case of the proposed piers, it is recommended that footings be placed at approximate elev. 265 with an allowable pressure of 3 t.s.f.

The proposed abutments may be constructed within the approach fills and supported on 12" Ø displacement piles driven to, but not beyond elev. 255. A 12" Ø pile could carry an allowable

cont'd. /3 ...

3. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

load of 30 tons/pile. During construction of the approaches, care should be taken to ensure no bouldery fill is placed at the locations through which piles have to be driven. As an alternative, the abutments may be supported on spread footings placed within the approach fills. The fill material below the tops of the footings should consist of well compacted granular material (G.B.C. class 'A') and should extend for a horizontal distance of at least 10 ft. from the footing edges in the plane of the footing tops. This portion of the fill should be built with side slopes 2:1. The remainder of the fill should be completed to about profile grade for a distance of about 50 ft. behind the abutments before re-excavating for the abutment footings. A design load of 2 t.s.f. may be used for the abutment foundations.

No major dewatering problems are anticipated during the construction of pier footings in view of the low permeability of the subsoil; however, care should be taken to prevent softening of the subsoil at the footing levels by surface run-off.

No stability problems are anticipated provided that standard 2:1 slopes are constructed.

4. MISCELLANEOUS:

The field work, performed during the period June 1 to June 10, 1966, together with the preparation of this report, was undertaken by Mr. V. Korlu, Project Foundation Engineer. The investigation was carried out under the general supervision of Mr. M. Devata, Senior Foundation Engineer, who also reviewed the report.

Equipment used was owned and operated by Canadian Longyear Co. Ltd.

July 1966

APPENDIX I

FOUNDATION SECTION

CHECKED BY M.D.

SOIL PROFILE		STRAT. PLT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	W <sub>L</sub>	W <sub>p</sub>		
269.7	Groundlevel											
0.0			1	SS	60							WL266.2
			2	SS	63							3.5
			3	SS	96	250						Gr3%Sa19%
			4	SS	89							Si53%Cl 25%
255.7	(Brown)		5	SS	42							
14.0	(Grey)		6	SS	58	250						
			7	SS	40							
	Clayey silt with sand and traces of gravel- Hard.		8	SS	58							
	(With occasional seams of silt and sand).		9	SS	52	240						
			10	SS	41							
			11	SS	51	230						
			12	SS	64							
			13	SS	100 1/4"	220						
			14	SS	100 5"							
			15	SS	153	210						
			16	SS	100 5"							
			17	SS	83	200						
198.2												Gr5%Sa23%
71.5	End of borehole.					190						Si49%Cl 23%

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS &amp; TESTING DIVISION

JOB 66-F-49

LOCATION QCM & Winona Rd. Sta. 31+71 O/S 23.5' Rt.

ORIGINATED BY V.K.

W. P. 216-63

BORING DATE June 3 & 7, 1966.

COMPILED BY W.T.E.

DATUM Geodetic

BOREHOLE TYPE Penn Drill.

CHECKED BY M.D.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.		WATER CONTENT %	P	
271.1	Groundlevel					270					
0.0	(Brown)		1	SS	22						NL267.6
	(Grey)		2	SS	50						3.5
256.1			3	SS	87						GrO%Sa19%
15.0			4	SS	74						S150%Cl 31%
	Clayey silt with some sand & traces of gravel - Hard.		5	SS	52						
	(With occasional thin seams of silt and sand.)		6	SS	54						
			7	SS	49						
			8	SS	54						
			9	SS	68						
			10	SS	58						
			11	SS	60						
			12	SS	100	6"	220				Gr3%Sa19%
			13	SS	100	4"	210				S152%Cl 26%
			14	SS	52		200				
189.6			15	SS	100	1"	190				Refusal
81.5	End of borehole.					180					

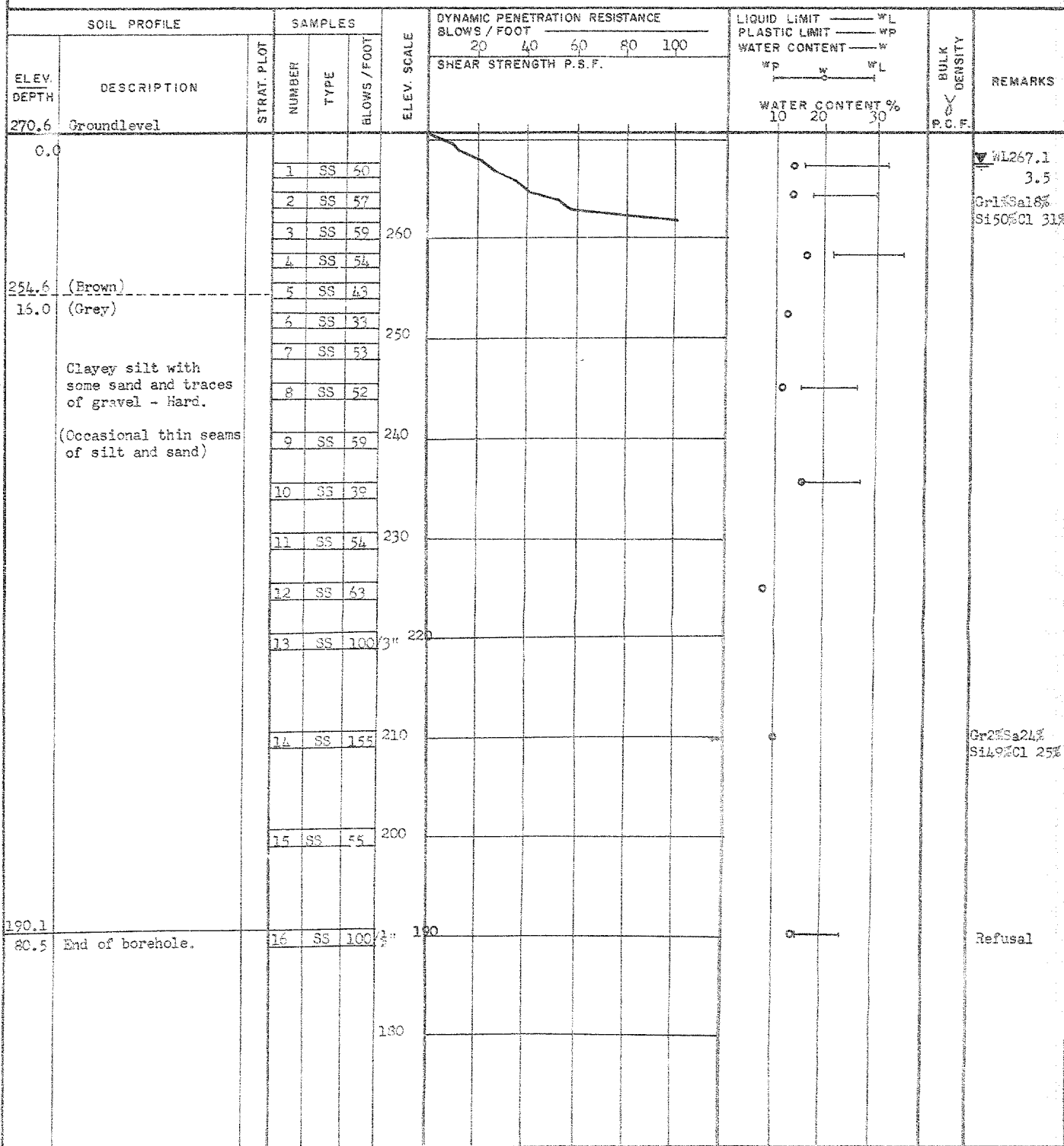


DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & TESTING DIVISION

## RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 66-F-49 LOCATION Q&W & Winona Rd. Sta. 31+35 O/S 30' Lt. ORIGINATED BY V.K.  
W.P. 216-63 BORING DATE June 3, 1966 COMPILED BY W.T.E.  
DATUM Geodetic BOREHOLE TYPE Cone; Penn Drill CHECKED BY M.D.



FOUNDATION SECTION

CHECKED BY M.D.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.			WATER CONTENT % 10 20 30			
270.5	Groundlevel												
0.0													
			1	SS	47								
			2	SS	75	260							
255.5	(Brown)												
15.0	(Grey)		3	SS	43								
	Clayey silt with some sand and traces of gravel - Hard.		4	SS	42	250							
	(Occasional thin seams of silt and sand)		5	SS	49								
			6	SS	45	240							
			7	SS	46	230							
219.0			8	SS	81	220							
51.5	End of borehole.												
						210							



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

JOB 66-F-49 LOCATION QEW & Winona Rd. Sta. 28+62.5 O/S 29.51t. ORIGINATED BY V.K.  
W.P. 216-63 BORING DATE June 10/66 COMPILED BY N.P.E.  
DATUM Geodetic BOREHOLE TYPE Penn Drill CHECKED BY N.E.

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W		BULK DENSITY P.C.F.	REMARKS					
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	20	40			60	80	100	WL	WP
268.9	Groundlevel														
0.0															
			1	SS	30										
			2	SS	44										
			3	SS	28										
			4	SS	44										
253.4	(Brown)		5	SS	36										
15.5	(Grey)		6	SS	35										
	Clayey silt with some sand and traces of gravel - Hard.		7	SS	38										
			8	SS	38										
			9	SS	30										
			10	SS	30										
			11	SS	40										
			12	SS	36										
212.9	(Grey)														
56.0	(Reddish Brown)														
			13	SS	100	5"									
185.1															
83.8	End of borehole.		14	SS	100	1"									

Gr 0%, Sal 0%  
S 153%  
Cl 37%

Refusal



## ABBREVIATIONS USED IN THIS REPORT

### PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

### DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

<u>CONSISTENCY</u>	<u>'N' BLOWS/FT.</u>	<u>c LB./SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS/FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

### TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H.	SAMPLE ADVANCED HYDRAULICALLY	
	P.M.	SAMPLE ADVANCED MANUALLY	

### SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL	S	SENSITIVITY

# ABBREVIATIONS USED IN THIS REPORT

## SOIL PROPERTIES

$\gamma$	UNIT WEIGHT OF SOIL (BULK DENSITY)
$\gamma_s$	UNIT WEIGHT OF SOLID PARTICLES
$\gamma_w$	UNIT WEIGHT OF WATER
$\gamma_d$	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
$\gamma'$	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
$S_r$	DEGREE OF SATURATION
$w_L$	LIQUID LIMIT
$w_p$	PLASTIC LIMIT
$I_p$	PLASTICITY INDEX
s	SHRINKAGE LIMIT
$I_L$	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
$I_C$	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
$e_{max}$	VOID RATIO IN LOOSEST STATE
$e_{min}$	VOID RATIO IN DENSEST STATE
$I_D$	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY $D_r$ IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
Q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
$m_v$	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
$c_v$	COEFFICIENT OF CONSOLIDATION
$C_c$	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
$T_v$	TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
$\tau_f$	SHEAR STRENGTH
$c'$	EFFECTIVE COHESION
$\phi'$	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
$c_u$	APPARENT COHESION
$\phi_u$	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
$\mu$	COEFFICIENT OF FRICTION
$S_r$	SENSITIVITY

## GENERAL

$\pi$	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

## STRESS AND STRAIN

u	PORE PRESSURE
$\sigma$	NORMAL STRESS
$\bar{\sigma}$	NORMAL EFFECTIVE STRESS ( $\bar{\sigma}$ IS ALSO USED)
$\tau$	SHEAR STRESS
$\epsilon$	LINEAR STRAIN
$\gamma$	SHEAR STRAIN
$\nu$	POISSON'S RATIO ( $\mu$ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
$\eta$	COEFFICIENT OF VISCOSITY

## EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
$\delta$	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
$K_0$	COEFFICIENT OF EARTH PRESSURE AT REST

## FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
$k_s$	MODULUS OF SUBGRADE REACTION

## SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
$\beta$	ANGLE OF SLOPE TO HORIZONTAL

## MEMORANDUM

To: Mr. A. G. Stermac,  
Principal Foundation Engineer,  
Room 107, Lab. Bldg.

From: Bridge Division,  
Downsview, Ontario.

Date: May 9th, 1966.

Our File Ref.

In Reply To:

SUBJECT: W.P. #216-63, Site #36-207, 66-A-49  
Winona Road Underpass,  
W.P. #217-63, Site #36-208, 66-A-55  
Fifty Road Interchange,  
W.P. #218-63, Site #18-191, 66-A-56  
Oakes Road Underpass,  
W.P. #224-63, Site #18-196, 66-A-54  
Orfield Road Interchange.

Herewith one print each of the following bridge site plans for the above structures, E-4731-1, E-4732-1, E-4728-1, and E-4729-1. The probable location of footings have been marked in red. Please arrange for a foundation investigation of sufficient scope to enable us to proceed with the design.

Also enclosed are the preliminary structure site report sheets.

JFW/cew  
Attach.  
cc. R. Forrest  
A. Crowley

*W. S. Melinyshyn*  
W. S. Melinyshyn,  
Regional Bridge Location Engineer.

COMPLETION DATE JULY 27, 1966.



## MEMORANDUM

To: Mr. A. C. Stermac,  
Principal Foundation Engineer,  
Room 107,  
Lab. Bldg.

FROM: Bridge Division,  
Downsview, Ontario.

DATE: September 7, 1966.

OUR FILE REF.

IN REPLY TO

SUBJECT: Highway 401 Re-Construction  
District 6.

(65-F-49) - W.P. 256-61 Birchmount Road Overpass Extension (65-F-49; carried out  
66-F-89 - W.P. 257-61 C.P.R. Overhead Extension by W.W.K.)  
→ W.P. 258-61 Kennedy Road New Structure (66-F-33)  
66-F-88 - W.P. 259-61 C.N.R. Overhead Extension  
66-F-87 - W.P. 260-61 Midland Avenue Extension  
→ W.P. 252-61-7 Highland Creek (Bendale Creek) (65-F-161) power  
Culvert. New Structure (66-F-34) Hi-Creek  
Retaining Walls Numbers 1, 2, 3, 4 and 5.

Herewith one print of plan B-1-29 showing the approximate locations of footings for the above structures (indicated in green) and retaining walls (indicated in red).

Suggested borehole locations are indicated by red circles. Borehole locations with numbers are those already drilled as per reports numbered WJ. 66F33 Kennedy Road and WJ. 66-F-34 Highland Creek (Bendale Ck.).

We believe the geometrics for these structures will be available to this office in about one month. The soils reports should also be available about that time.

RNC/aw

*J. C. McAllister*  
J. C. McAllister,  
for W. S. Melinyshyn,  
Regional Bridge Location Engineer.

Copy for the information of

Mr. A. Stermac, Principal Foundation Engineer,  
Room 107, Lab. Building

Mr. W.S. Melinyskyn,  
Regional Bridge Location Engineer,  
Central Region,  
Administration Building

Bridge Division,  
Downsview, Ontario

February 13, 1967

Winona Rd. Underpass  
4.5 Miles West of Grimsby  
W.P. 216-63, Site 36-207  
Q.E.W., District No. 4

Attached herewith are prints of the Preliminary Bridge  
Plan Drawing B-6024-F1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$136,000.  
This cost includes tender, materials, engineering and sundry  
construction.

Any comments or revisions you may have should be submitted  
within three weeks.

CSG:rd

C.B. Grebaki,  
Bridge Design Engineer

Attach.

C.C. E. Forrest  
E. Cross  
S. McCombie  
A. Stermac

Mr. C. S. Grebski,  
Bridge Design Engineer,  
Bridge Division,  
Admin. Bldg.

440  
Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

March 6, 1967

Winona Road Underpass  
4.5 Miles West of Grimsby  
W.P. 216-63 - Site 36-207  
Q.E.W., Dist. #4, W.J. 66-F-49

The Preliminary Bridge Plan Drawing D-6024-P1 for the above mentioned structure, has been reviewed.

The designer appears to have complied with the recommendations contained in the Foundation Report. This Section would like to install settlement plates at the above mentioned site prior to the commencement of approach fill construction. A note should be made on the construction drawings, so that the District Office will contact the Foundation Section one week prior to the starting of the approach fill construction.

ND/MdeF

cc: Messrs. S. McCombie  
W. S. Melnyshyn

Foundations Files ✓  
Gen. Files

*M. Devata*

M. Devata,  
SUPERVISING FOUNDATION ENGR.  
For:  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.

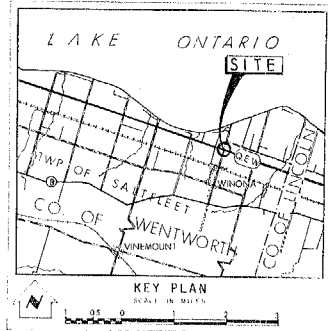
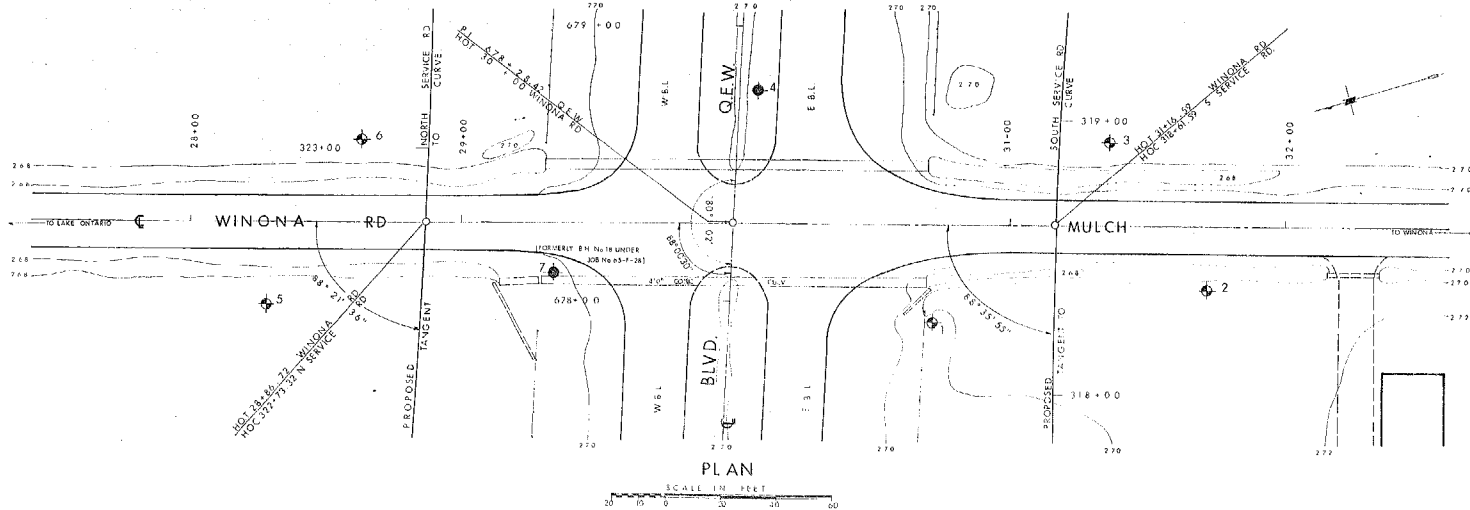
#66-F-49

W.P. #216-63

Q.E.W. &

WINONA RD.

UNDERPASS



LEGEND				
	Bore Hole			
	Cone Penetration Hole			
	Bore & Cone Penetration Hole			
	Water Levels established at time of field investigation, JUNE 1966			
NO.	ELEVATION	STATION	OFFSET	
1	269.7	30 + 72	35.5' & 1	
2	271.1	31 + 71	23.5' & 1	
3	270.6	31 + 35	30' & 1	
4	270.5	30 + 08	48' & 1	
5	268.7	28 + 27	58.5' & 1	
6	268.9	28 + 62	29.5' & 1	
7	270.0	29 + 34.5	18' & 1	

**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.

DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION - ROADWAY SECTION

**WINONA ROAD**

KING'S HIGHWAY NO. \_\_\_\_\_ Q.E.W. DIST. NO. **44**

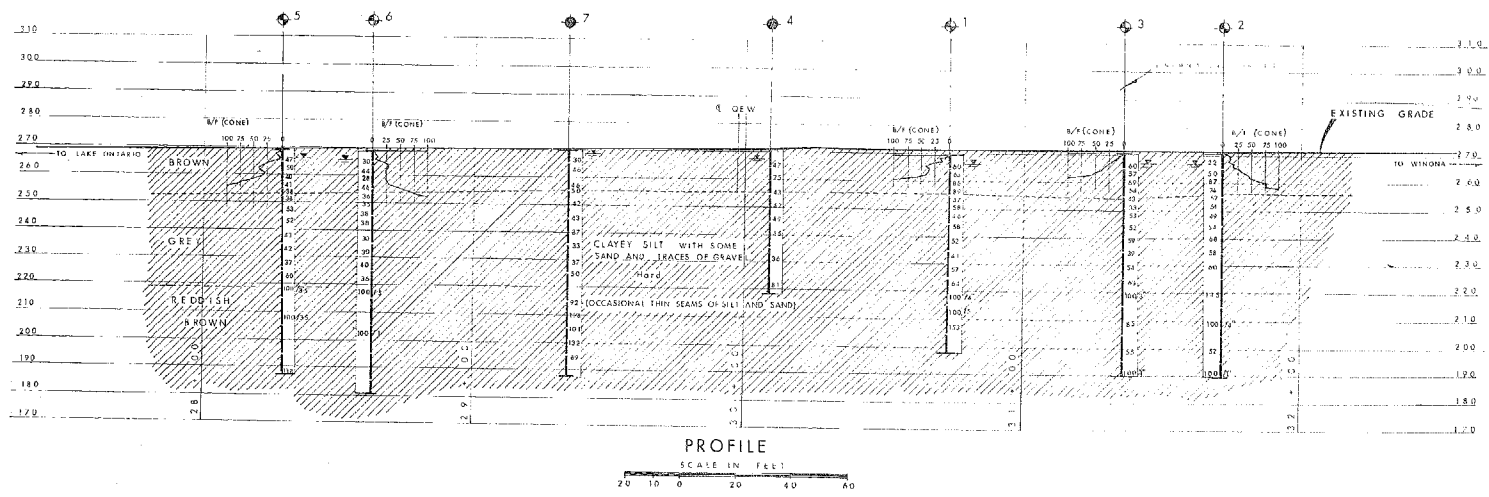
TWP. SAULTHEELOT LOT 4 & 5 COR. 1

**BORE HOLE LOCATIONS & SOIL STRATA**

DRAWN BY	CHECKED	DATE	BY	DATE	BY
J.N.	J.N.	JULY 1966	J.N.	JULY 1966	J.N.

PROJECT NO. 66-F-49A

BRIDGE NUMBER NO.



DATE	BY	DESCRIPTION