



RECORD OF BOREHOLE No 7

METRIC

W P 7812-80-01 LOCATION STA 10+430 9.0 m LT & HWY 605  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_

ORIGINATED BY \_\_\_\_\_  
COMPILED BY SO  
CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
0.0	GROUND SURFACE																
0.9	FINE SAND																
1.3	LT. BR. CLAY																
	GREY CLAY																
14.1	END OF BOREHOLE																
21.1	END OF CONE TEST																

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

RECORD OF BOREHOLE No 6

METRIC

W P 7812-80-01 LOCATION SIA 10+205 9.0m LT & HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY J.O  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
								20 40 60 80 100										
0.0	GROUND SURFACE																	
0.5	LT. BR CLAY																	
	GREY CLAY																	
9.0	SILT TRACE SAND & CLAY																	
10.2	FINE SAND WITH SILT TR. GRAVEL																	
11.3	END OF BOREHOLE PROBABLY BEDROCK																	

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15-0.5 (%) STRAIN AT FAILURE  
10



RECORD OF BOREHOLE No 5

METRIC

W P 7812-80-01 LOCATION SIA 17+190 8.5 m RT & HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY S.O.  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa									
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE									
								20	40	60	80	100					
0.0	GROUND SURFACE																
	GREY CLAY																
5.5	RED BROWN CLAY																
6.4	GREY CLAY																
11.6	END OF BORE HOLE PROBABLE BEDROCK																

RECORD OF BOREHOLE No 4

METRIC

W P 7812-80-01 LOCATION STA. 16+345 9.0m LT E HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY S.O.  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

[illegible]

+<sup>3</sup>, x<sup>5</sup> : Numbers refer to Sensitivity

20  
15  $\phi$  5 (%) STRAIN AT FAILURE  
10



RECORD OF BOREHOLE No 3

METRIC

W P 7812-80-01 LOCATION STA 15+307 10.0m LT of Hwy 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY J. O  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
0.0	GROUND SURFACE																
	BROWN CLAY																
4.5	GREY CLAY																
8.1	END OF BOREHOLE																
21.1	END OF CONE TEST																

RECORD OF BOREHOLE No 2

METRIC

W P 7B12-80-01 LOCATION STA 14+950 9.0m RT E HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY S.O.  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)		
								20 40 60 80 100										20 40 60 80 100		
0.0	GROUND LEVEL																			
	BROWN CLAY V. STIFF																			
4.2	GREY CLAY STIFF																			
12.7	END OF BOREHOLE																			
24.1	END OF CONE TEST																			

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

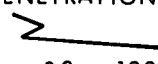
20  
15 0.5 (%) STRAIN AT FAILURE  
10



RECORD OF BOREHOLE No 8

METRIC

W P 7812-80-01 LOCATION STA 12+422 9.0 m LT & HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY SO  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH KPa									
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL	x LAB VANE						
0.0	GROUND SURFACE																
	LT. BR. CLAY																
2.5																	
	GREY CLAY																
14.1	END OF BORE HOLE																
24.1	END OF CONE TEST																

+<sup>3</sup>, x<sup>5</sup> : Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

## METRIC

W P 7812-80-01 LOCATION STA 14+003 7.0m LT E HWY 605 ORIGINATED BY \_\_\_\_\_  
DIST 20 HWY 605 BOREHOLE TYPE CONE TEST COMPILED BY S.O  
DATUM \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY \_\_\_\_\_

[illegible]

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to Sensitivity



# memorandum



To: Mr. P. Payer  
Foundations Engineer  
Pavement & Foundation Design Section  
Room 315, Central Building  
Downsview, Ontario

Date: 83 02 22

From: Geotechnical Section  
Northwestern Region

RE: W.P. 7812-01,02 - HIGHWAY 605  
FROM 4.4 KM NORTH OF JCT. HWY. 17 NORTHERLY 4.6 KM

This section of highway is being aligned to a new standard. The proposed highway will be constructed to accommodate a 6.0 m pavement, 1.0 m shoulders with 0.5 m roundings. The proposed fill heights vary from 1.5 m to 3.5 m above original ground.

Would you please analyze the attached data and determine if the subgrade will support the proposed fills at the stations outlined below.

<u>Township</u>	<u>Station to Station</u>	<u>Proposed Fill</u>
② Eton	14+950 to 14+955 9.0 Rt $\phi$	3.0 m
Eton	15+307 to 15+310 10.0 Lt $\phi$	3.5 m
④ Eton	16+343 to 16+345 9.0 Lt $\phi$	3.0 m
Eton	17+190 to 17+191 8.5-9.0 Rt $\phi$	3.5 m
EQUATION	18+048.284 = 10+000 A.H.D.	
Rugby	10+200 to 10+205 9.0 Lt $\phi$	2.0 m
Rugby	10+428 to 10+430 9.0 Lt $\phi$	2.0 m
Rugby	12+420 to 12+422 9.0 Lt $\phi$	2.0 m
① Rugby	14+003 to 14+006 7.0-8.0 Lt $\phi$	1.5 m

If any further information is required, please contact the undersigned.

A. MERKO  
Pavement Design & Evaluation Officer  
(For)  
J. R. GIRARD  
Head, Geotechnical Section

AM/lr

c.c. C. McKercher



W.P. 7812-80-01

Twp. Rugby

## Station 14+003 7.0 Lt C (D-0.2) - Cone Test

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost	1	1	1	2	2	1	1	2	1
	1	2	1	2	2	1	2	1	2	1
	1	1	1	1	1	2	2	2	3	3
	2	3	3	3	3	3	3	3	4	6
	4	4	5	5	6	6	6	5	6	7
	8	7	9	7	8	7	8	9	9	10
	10	9	11	10	11	12	12	13	13	14
	12	13	15	15	15	13	14	14	14	NFP

12  
20  
30  
40  
50  
60

## Station 14+006 8.0 Lt C (D-0.2)

0 - 3.0 Blk Org (V Soft Mostly Decomp)

3.0 - 14.1+ Gry Lt Cl Soft, Wet

## Vane Test

Depth	Vane	Remold	Sensitivity				
3.6	2 kN/m <sup>2</sup>	0 kN/m <sup>3</sup>		12.0	13.5	42	
5.1	7 "	0 "		17.0	18.5	144	
6.6	14 "	0 "		22.0	23.5	294	
8.1	19 "	2 "	9.5	27.0	28.5	399	
9.6	18 "	1 "	18	31.0	32.5	378	
11.1	26 "	1 "	26	36.0	37.5	546	
12.6	37 "	3 "	12.3	41.0	42.5	777	
14.1	35 "	2 "	17.5	46.0	47.5	735	

## Twp. Eton Station 14+950 9.0 Rt C (D-1.0) - Cone Test

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost		13	15	19	14	17	17	18	18
	21	20	26	23	23	17	12	12	12	11
	10	8	11	10	12	12	12	14	16	11
	12	12	16	15	15	14	15	15	16	13
	13	13	15	16	14	15	16	17	17	16
	14	16	17	25	39	42	38	32	23	23
	17	16	16	16	17	25	23	22	24	28
	30	37	38	30	27	28	38	37	38	NFP

## Station 14+955 9.0 Rt C (D-1.0)

0 - 200 Org Tps

200 - 4.2 Br Lt-M Cl (Moist, V. Stiff)

4.2 - 12.7+ Gry Lt Cl (Moist, Stiff)

## Vane Test

Depth	Vane	Remold	Sensitivity	DEPTH	CU		
1.5	Clay too stiff to penetrate				2000+		
3.0	Clay too stiff to penetrate				2000+		
5.1	71 kN/m <sup>2</sup>	5 kN/m <sup>3</sup>	14.2	17.0	1456		
6.6	56 "	1 "	56	21.6	1148		
8.1	35 "	1 "	35	26.6	718		
11.1	42 "	5 "	8.4	36.4	861		
12.6	65 "	6 "	10.8	41.3	1981		

3 1/2 m

Station 15+307 10.0 Lt C (D-1.2) - Cone Test

(3)

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost		10	7	10	22	26	20	14	24
	20	20	24	25	20	20	24	27	27	17
	9	11	12	11	13	12	14	19	21	20
	19	18	21	19	21	20	21	25	26	16
	22	16	15	16	16	18	18	21	23	37
	50	46	40	40	34	28	31	29	38	40
	30	35	41	51	54	42	44	55	49	NFP

2

Station 15+310 10.0 Lt C (D-1.2)

0 - 100 Tps  
100 - 4.5 Br Lt Cl  
4.5 - 8.1+ Gry Lt Cl

Vane Test

Depth	Vane	Remold	Sensitivity	DEPTH	CU
2.1	Cl too stiff to penetrate			6.9	2000+
3.6	140 kN/m <sup>2</sup>			11.8	2000+
5.1	62 "	6 kN/m <sup>3</sup>	10.3	16.7	1271
6.6	49 "	3 "	16.3	21.7	1005
8.1	48 "	2 "	24	26.6	984

Station 16+345 9.0 Lt C (D-1.7) - Cone Test

(4)

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost		5	1	9	10	8	12	14	13 ✓
	8	8	8	7	6	6	6	6	7	3 ✓
	2	1	2	2	1	3	2	3	7	4 ✓
	3	5	3	3	2	5	8	8	10	11 ✓
	7	10	10	8	6	7	8	7	8	6 ✓
	5	4	6	6	6	6	6	7	8	8 ✓
	6	8	8	8	9	9	9	9	9	11 ✓
	9	11	11	9	10	11	11	11	12	NFP

Station 16+343 9.0 Lt C (D-1.7)

2

0 - 150 Tps  
150 - 500 Br F Sa Tr Si  
500 - 12.6+ Gry Lt Cl

Vane Test

Depth	Vane	Remold	Sensitivity	DEPTH	CU
3.6	26 kN/m <sup>2</sup>	2 kN/m <sup>3</sup>	13	11.8	533
5.1	22 "	1 "	22	16.7	451
6.6	24 "	2 "	12	21.7	492
8.1	31 "	2 "	15.5	26.6	636
9.6	30 "	2 "	15	31.5	615
11.1	26 "	1 "	26	36.4	533
12.6	33 "	2 "	16.5	41.3	677

(5)

Station 17+190 8.5 Rt C (D-1.8) - Cone Test

3 1/2 m

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost	9	1	4	6	8	8	8	11	8
	7	8	8	8	9	9	10	10	10	10
	9	9	9	10	10	11	10	11	12	9
	10	11	11	13	15	18	31	30	NFP Rk @ 11.55	

Station 17+191 9.0 Rt C (D-1.8)

0 - 100 Tps  
100 - 5.5 Gry Lt Cl  
5.5 - 6.4 Red Br Lt Cl  
6.4 - 11.7 Gry Lt Cl  
11.7 NFP Rk

Vane Test

Depth	Vane	Remold	Sensitivity
2.1	153 kN/m <sup>2</sup>	13 kN/m <sup>3</sup>	11.8
3.6	53 "	1 "	53
5.1	58 "	1 "	58
6.6	93 "	8 "	11.6
8.1	60 "	3 "	20
9.6	64 "	3 "	21.3
11.1	77 "	9 "	8.6

DEPTH	CU
6.9	2000+
11.8	1087
16.7	1189
21.7	1907
26.6	1230
31.5	1951
36.4	1579

(6)

Station 18+048.284 = Station 10+000 A.H.D.

Twp. Rugby

Station 10+205 9.0 Lt C (D-0.7) - Cone Test

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frozen		9	7	6	7	6	5	6	8
	6	10	9	10	10	10	12	13	12	10
	8	7	7	6	6	7	6	7	8	9
	10	16	16	29	49	61	71	NFP Rk @ 11.25		

Station 10+200 9.0 Lt C (D-0.7)

0 - 50 Tps  
50 - 500 Lt Br Lt Cl V Stiff  
500 - 9.0 Gry Lt Cl  
9.0 - 10.2 Gry Si Tr Sa & Cl  
10.2 - 11.3 Gry F Sa with Si Tr Gr  
11.3 NFP Rk

Vane Test

Depth	Vane	Remold	Sensitivity
3.6	53 kN/m <sup>2</sup>	2 kN/m <sup>3</sup>	26.5
5.1	24 "	1 "	24
6.6	29 "	1 "	29
8.1	34 "	1 "	34
9.6	74 "	4 "	5

DEPTH	CU
11.8	1087
16.7	492
21.7	595
26.6	697
31.5	1517

7

Station 10+430 9.0 Lt C (D-0.6) - Cone Test

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Frost		8	8	5	6	8	10	9	8
	4	2	3	3	3	4	4	4	3	3
	3	4	4	4	4	4	5	5	5	4
	6	7	7	7	8	7	8	8	11	9
	8	8	11	8	10	10	10	10	10	8
	7	9	10	11	10	11	11	11	11	10
	10	11	14	12	13	12	15	14	14	NFP

Station 10+428 9.0 Lt C (D-0.6)

0 - 50 Tps  
50 - 900 Br F Sa with Si  
900 - 1.3 Lt Br Lt Cl (V Stiff)  
1.3 - 14.1+ Gry Lt Cl

Vane Test

Depth	Vane	Remold	Sensitivity	DEPTH	CU
3.6	24 kN/m <sup>3</sup>	2 kN/m <sup>3</sup>	12	11.8	492
5.1	14 "	0		16.7	287
6.6	14 "	1 "	14	21.7	287
8.1	24 "	1 "	24	26.6	492
9.6	22 "	1 "	22	31.5	451
11.1	29 "	1 "	29	36.4	595
12.6	33 "	1 "	33	41.3	677
14.1	36 "	1 "	36	46.3	738

Station 12+420 9.0 Lt C (D-1.6) - Cone Test

Depth:	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Blows:	Ice		1		1	1		1		1
			1		1		1	1	1	1
		1	1	1	1	1	2	1	2	1
	1	1	1	2	1	2	1	2	3	3
	3	3	4	4	3	4	6	6	5	4
	3	5	5	6	6	7	6	6	7	8
	6	7	9	9	9	9	9	9	10	9
	8	10	9	14	28	22	24	19	14	NFP

Station 12+422 9.0 Lt C (D-1.6)(Ditch)

0 - 400 Ice & Wat  
400 - 2.5 Lt Br Lt Cl  
2.5 - 14.1+ Gry Lt Cl

Vane Test

Depth	Vane	Remold	Sensitivity	DEPTH	CU
2.1	23 kN/m <sup>3</sup>	2 kN/m <sup>3</sup>	11.5	6.9	472
3.6	15 "	1 "	15	11.8	308
5.1	16 "	1 "	16	16.7	328
6.6	15 "	1 "	15	21.7	308
8.1	27 "	1 "	27	26.6	554
9.6	25 "	2 "	12.5	31.5	512
11.1	26 "	3 "	8.7	36.4	533
12.6	25 "	2 "	24.5	41.3	512
14.1	34 "	2 "	17	46.3	697