

G.I. 30 SEPT. 1976

GEOCRES No. 40J7-13

DIST. 1 REGION SOUTH WESTERN

W.P. No. 257-66-21/25

CONT. No. 76-75

W. O. No. \_\_\_\_\_

STR. SITE No: 6-304

HWY. No. \_\_\_\_\_

LOCATION E.C. Row Expressway

Service Road overpass - 0.7 miles west  
of Walker Road

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: ② documents to be unfolded  
before microfilming





MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A.P. Watt,  
Reg. Structural Planning Eng.,  
Southwestern Region, London.

FROM: Soil Mechanics Section,  
Geotechnical Office,  
West Bldg., Downsview.

ATTENTION:

DATE: September 17th, 1974.

OUR FILE REF.

IN REPLY TO

SEP 27 1974

SUBJECT:

FOUNDATION INVESTIGATION REPORT  
For  
Service Road Overpass, 0.6 Miles  
West of Walker Road,  
E.C. Row Expressway,  
District #1, Chatham.

W.P. 257-66-21, Bridge Site #6-304.

Cont. 76-75

40J7-13

GEOCRE No.

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

We believe that the factual data and recommendations contained therein will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

*K.G. Selby*

K.G. Selby,  
Supervising Engineer.

KGS/mj

c.c. E.J. Orr  
B.R. Davis  
A. Wittenberg  
F.C. Brown  
B.J. Giroux  
J.R. Roy  
G.A. Wrong  
P. Lewycky

Files  
Documents

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FOUNDATION INVESTIGATION REPORT  
For  
Service Road Overpass, 0.6 Miles  
West of Walker Road, E.C. Row Expressway,  
District #1, Chatham.

W.P. 257-66-21, Bridge Site# 6-304.

1. INTRODUCTION:

As requested by Mr. A.P. Watt, Regional Structural Planning Engineer, in a memorandum dated August 7th, 1974, the Soil Mechanics Section has conducted a foundation investigation at the abovementioned location. The purpose of the investigation was to determine the existing subsoil conditions for the foundations of the proposed Service Road Overpass.

Owing to the urgency of the project, a summary of our findings was submitted in a letter on August 27th, 1974. Contained in the Report are the detailed results of our field investigation and laboratory tests, together with our recommendations for the structure foundations and approach embankments.

2. SITE DESCRIPTION:

The site of the proposed Service Road Overpass is located in the eastern part of the City of Windsor, approximately 0.6 miles west of Walker Road. It is bounded in the north by the North Service Road and in the south by E.C. Row Boulevard.

The topography of the surrounding terrain is quite flat, with no major reliefs. The site was once a built-up residential district of detached homes, but most of the buildings have already been removed in preparation for the E.C. Row Expressway project. The area is presently grassy, with a few trees and occasional shrubs.

Physiographically, the site is located in the region referred to as the "St. Clair Clay Plain".

..... /2

3. FIELD WORK:

A total number of six sampled boreholes were put down during the course of the field work. All boreholes were advanced by hollow stem auger. Disturbed samples were recovered by means of a split-spoon sampler driven into the soil by a 140 lb. hammer with a free fall of 30 in. in accordance with the specification of the Standard Penetration Test. The number of blows required to drive the split-spoon sampler 12 in. into the soil is recorded as the 'N' values. Undisturbed samples were obtained by means of 2 in. I.D. Shelby tubes which were pushed into the soil either hydraulically or manually. Whenever possible, in-situ undrained shear strength were measured by field vane tests taken at elevation generally 12 in. below sampled depths.

Free water surfaces observed in the boreholes are recorded as groundwater levels.

Locations and elevations of all six boreholes were taken by the personnel from London Region Engineering Surveys Section, and are shown in Drawing 2576621-A enclosed in this Report.

All samples were visually examined and classified at the site before being transported to the laboratory.

4. LABORATORY TEST:

All samples were subjected to careful visual examination in the laboratory, and tests were then performed on representative samples to determine the following physical properties:

- Atterberg Limits
- Natural Moisture Content
- Grain-size Distribution
- Undrained Shear Strength
- Bulk Density

The test results are summarized on the Record of Borehole Sheets contained in the Appendix of this Report.

5. SUBSOIL CONDITIONS:

5.1) Clayey Silt.

Subsoil at the site was found to be generally uniform. It consists mainly of a deep deposit of clayey silt, with some sand and traces of gravel, extending from ground surface (elev. 613.0 $\pm$ ) to sound limestone bedrock (elev. 482.5 $\pm$ ) for a depth of some 130.5 ft. Sound limestone bedrock was actually proven in B.H.#1 by diamond drilling.

The upper 14 ft. is desiccated, having a very stiff to hard consistency. The 'N' values from the Standard Penetration Test range from 10 blows/ft. to 42 blows/foot. The undrained shear strength determined by lab compression tests are of the order of 2,500 p.s.f.

Below the desiccated crust, the consistency of the soil decreases with depth from stiff to firm. The 'N' values fluctuate very slightly about 9 blows/foot, and the undrained shear strengths decrease from 1800 p.s.f. to 700 p.s.f.

Other physical properties, as determined from field and laboratory tests, are as follows:

Natural Moisture Content (%)	11.0 - 20.5
Liquid Limit (%)	22.0 - 32.0
Plastic Limit (%)	14.0 - 17.0
Bulk Density (p.c.f.)	133 - 144
Lab Undrained Shear Strength (p.s.f.)	640-2,800
Field Vane Test (p.s.f.)	880-2,000(+)
Sensitivity	1.2 - 1.8

..... /4



A plot of the Atterberg Limits on the Plasticity Chart (Fig. 1) shows that the soil belongs to the CL category.

Results of Grain-Size Analysis indicated that there are approximately less than 5% gravel, 22-32% sand, 39-46% silt, and 24-30% clay. Typical grain-size distribution curves are shown in Fig. 2.

#### 5.2) Limestone Bedrock.

The abovenoted clayey silt is underlain by limestone bedrock, the existence of which was inferred in B.H.#6 by meeting practical refusal in augering and was actually proven in B.H.#1 by rock core samples. In B.H.#1, limestone bedrock was encountered at Elev. 482.0 and in B.H.#6 at Elev. 482.5.

A 98% recovery of 5' coresample indicates that the limestone encountered is in a sound condition.

#### 5.3) Groundwater Levels.

The free water surfaces observed in the Boreholes were recorded as the groundwater levels. Because of the relatively impermeable nature of the subsoil and the short duration of the field work, the stable groundwater levels have not been established. However, in our opinion, the groundwater level probably exists at elev. 597.5±, some 16 ft. below the ground surface. No artesian water was encountered.

#### 6. RECOMMENDATIONS:

It is proposed that a 41 foot span concrete rigid frame type or a 44 foot span simple beam type of structure would be used at this site. The proposed overpass would have 15'-3" clearance and approach embankments of some 17 ft. in height. In view of the hard desiccated crust and the sound limestone bedrock, the following recommendations are proposed for the structure foundations.

6.1) Spread Footings.

The proposed overpass structure may be supported on spread footings placed within the very stiff to hard desiccated zone between elev. 609 and 605. For design purposes, a bearing capacity of 3.0 t.s.f. may be assumed. Because of the compressible nature of the subsoil, consolidation settlements will occur over a long-term period due to the imposed loads of structure and embankments. Under the pressure mentioned above, footing settlements are estimated to be of the order of 1.0 in. to 1.5 in., with a consequent differential settlement not greater than 1.0 in. Since the desiccated zone is susceptible to softening upon contact with water, it is recommended that the base of footing excavation be protected by a concrete working slab, immediately on exposure. All footings should be provided with 4 foot cover for frost protection. No dewatering problems are anticipated.

6.2) End-Bearing Piles.

Alternatively, the proposed structure can be supported on end-bearing piles which may consist of either 12-3/4" O.D. by 1/4" tube piles or steel H-piles. The piles are to be driven to bedrock which was found to exist at elev. 482.3±. In the case of steel H-piles, the maximum allowable load for the particular section may be assumed for design purposes; whereas in the case of the tube piles mentioned above, a maximum load of 120 tons per pile may be assumed. This loading for tube piles has been confirmed by load tests. To avoid tube piles from being damaged on contact with bedrock, a 30,000 ft.-lb. limit of driving energy is recommended when the pile is within 3 ft. from bedrock. This latter requirement does not apply in the case of "H" piles.

6.3) Approach Embankments.

Subsoil can safely support the 17 ft. high approach embankments constructed with 2:1 side slopes. The fill should consist of well compacted acceptable material. Care should be taken to ensure that no bouldery fill is placed within the approaches through which piles have to be driven.

7. MISCELLANEOUS:

Field work was conducted in the period from August 21st to August 23rd, 1974 under the supervision of Mr. B. Ly.

Drilling equipment used was owned and operated by Dominion Soil Investigation Limited.

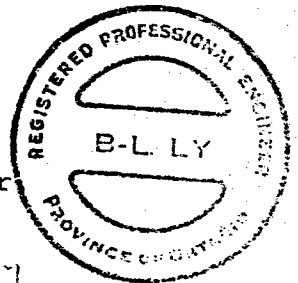
This Report was prepared by Mr. B. Ly and reviewed by Mr. K.G. Selby, Supervising Engineer.

B. Ly

B. Ly, P. Eng.,  
Project Engineer

K.G. Selby

K.G. Selby,  
Supervising Engineer.



BL/mj

September/74

A P P E N D I X    I

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

# RECORD OF BOREHOLE NO 1

JOB

LOCATION Co-ords. 15,362,002 N: 866,542 E.

ORIGINATED BY BL

W.P. 257-66-21

BORING DATE August 23, 1974

COMPILED BY BL

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger, BX R.C.

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 500 1000 2000			WATER CONTENT % 10 20 30				
612.4	Ground Level													
0.0	Clayey silt with sand & traces of gravel.		1	SS	16	610								
	Very Stiff to Hard		2	SS	42	600					○	—	142.0	0 31 42 27
			3	TW	PH					●	○	—	137.5	
			4	SS	14	590					○	—		
			5	TW	PH			○	+1.8		○	—	135.5	6 28 42 24
			6	SS	8	580								
	Stiff to Firm		7	TW	PH		●		+1.4		○	—	133.0	4 29 42 27
			8	SS	8	570								
			9	TW	PH			○	+1.2		○	—	135.5	
			10	TW	PH	560								
			11	SS	9	550								
			12	SS	7	540								
						530								
	layer of silty clay		13	SS	9							○	—	0 3 32 65
						520								
			14	SS	23	510								
508.4														

104.0

20  
15 5  
10 % STRAIN AT FAILURE

Continued

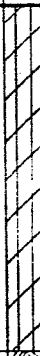

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 1 Continued

JOB \_\_\_\_\_ LOCATION Co-ords. 15,362,002 N; 866,542 E. ORIGINATED BY BL  
 W.P. 257-66-21 BORING DATE August 23, 1974 COMPILED BY BL  
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger, BX RC CHECKED BY CP

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— $W_L$			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT			PLASTIC LIMIT ——— $W_p$				
508.4	(continued)					SHEAR STRENGTH P.S.F.			WATER CONTENT %			$\gamma$		
						O UNCONFINED + FIELD VANE			$W_p$ ——— $W$ ——— $W_L$			P.C.F.	GR.SA.SI.CL	
						● QUICK TRIAXIAL x LAB VANE								
						500	1000	2000	10	20	30			
104.0	Clayey silt, with sand & traces of gravel.													
	Stiff to Firm		15	SS	15									
482.0														
130.4	Limestone Bedrock		16	BX	Rec. 98%									
477.0	Sound													
135.4	End of Borehole													
	Note: Water level not established													

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 2

JOB \_\_\_\_\_ LOCATION Co-ords. 15,361,951 N; 866,560 E.

ORIGINATED BY BL

W.P. 257-66-21 BORING DATE August 21, 1974

COMPILED BY BL

DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 500 1000 2000			WATER CONTENT % 10 20 30					
613.2	Ground Level														
0.0	Clayey silt with sand & traces of gravel.  Very Stiff to Hard    Stiff to Firm		1	SS	11	610									
			2	SS	32										
			3	SS	27										
			4	SS	17										
			5	TW	PH										
			6	SS	9										
			7	TW	PH										
			8	SS	9										
			9	SS	9										
571.7															
41.5	End of Borehole														

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FOUNDATIONS OFFICE

# RECORD OF BOREHOLE NO 3

JOB \_\_\_\_\_ LOCATION Co-ords. 15,361,902 N; 866,577 E.  
 W.P. 257-66-21 BORING DATE August 21, 1974  
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger

ORIGINATED BY BL  
 COMPILED BY BL  
 CHECKED BY BL

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT ——— $w_L$ PLASTIC LIMIT ——— $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 500 1000 2000			WATER CONTENT % 10 20 30						
613.3	Ground Level															
0.0	Clayey silt with sand & traces of gravel.		1	SS	9	610							141.0	0 31 43 26		
			2	SS	30											
			3	SS	34											
	Very Stiff to Hard		4	SS	15	600								144.0	2 27 42 29	
			5	TW	PH											
			6	SS	10											
	Stiff to Firm		7	SS	10	590								137.0	4 31 40 25	
			8	TW	PH											
			9	SS	9											
571.8																
41.5	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION



DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 4

 JOB \_\_\_\_\_ LOCATION Co-ords. 15362,018 N; 866,578 E.  
 W.P. 257-66-21 BORING DATE August 21, 1974  
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger

 ORIGINATED BY BL  
 COMPILED BY BL  
 CHECKED BY CP

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 500 1000 2000			WATER CONTENT % 10 20 30				
613.3	Ground Level													
0.0	Clayey silt with sand & traces of gravel.		1	SS	24	610						○	145.0	
	Very Stiff to Hard		2	SS	40							○		
			3	SS	34									
			4	SS	14	600								
	Stiff to Firm		5	TW	PH				○			137.0	3 29 40 28	
			6	SS	8	590			+	1.4				
			7	TW	PH				○			134.5	2 28 43 27	
			8	SS	10	580			+	1.3				
571.8			9	SS	9									
41.5	End of Borehole													

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 5

JOB \_\_\_\_\_ LOCATION Co-ords. 15,361,965 N; 866,598 E. ORIGINATED BY BL  
 W.P. 257-66-21 BORING DATE August 22, 1974 COMPILED BY BL  
 DATUM Geodetic BOREHOLE TYPE Hollow Stem CHECKED BY P.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.			WATER CONTENT %					
							$\phi$ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB VANE		$w_p$ $w$ $w_L$					
613.4	Ground Level					500	1000	2000							
0.0	Clayey silt with sand & traces of gravel.														
			1	SS	9										
			2	SS	40										
	Very Stiff to Hard		3	SS	17										
			4	TW	PH										
			5	SS	9										
	Stiff to Firm		6	TW	NR										
			7	TW	NR										
571.9	End of Borehole	8	SS	8											
41.0	Note: Water level not established														

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 6

JOB \_\_\_\_\_ LOCATION Co-ords. 15,361,911 N; 866,611 E.

ORIGINATED BY BL

W.P. 257-66-21 BORING DATE August 22, 1974

COMPILED BY BL

DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger

 CHECKED BY *BL*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE			$w_p$ $w$ $w_L$	WATER CONTENT % 10      20      30				
613.6	Ground Level						500	1000	2000		10	20	30		
0.0	Clayey silt with sand & trace of gravel.		1	SS	9	610								144.0	
			2	SS	33						○	—			
			3	SS	38										
	Very Stiff to Hard		4	SS	17	600									
			5	TW	PH				○ +1.8		○	—		137.0	2 29 39 30
			6	SS	7	590									
	Stiff to Firm		7	TW	PH		●		+1.5		○	—		137.0	
			8	SS	8	580									
			9	TW	PH						○	—			3 29 39 29
			10	SS	8	570			+1.2						
			11	TW	PH		●				○	—		135.5	
						560			+1.2						
			12	SS	16	550									
			13	SS	10	540					○				5 23 42 30
			14	SS	8	530						○			
						520									
			15	SS	17	510									

509.6

104.0

 20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10

Continued

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 6 Continued

JOB \_\_\_\_\_ LOCATION Co-ords. 15,361,911 N; 866,611 E.

ORIGINATED BY BL

W.P. 257-66-21

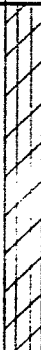
BORING DATE August 22, 1974

COMPILED BY BL

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger

CHECKED BY BL

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT — $w_L$			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT			PLASTIC LIMIT — $w_p$				
							SHEAR STRENGTH P.S.F.			WATER CONTENT — $w$				
509.6	(continued)													
104.0	Clayey silt with sand & trace of gravel					500								3 22 46 29
	Stiff		16	SS	21									
482.5	Probable Bedrock					490								
131.1	End of Borehole													
	Note: 1. Auger refusal at El. 482.5 2. Water level not established.													

OFFICE REPORT ON SOIL EXPLORATION

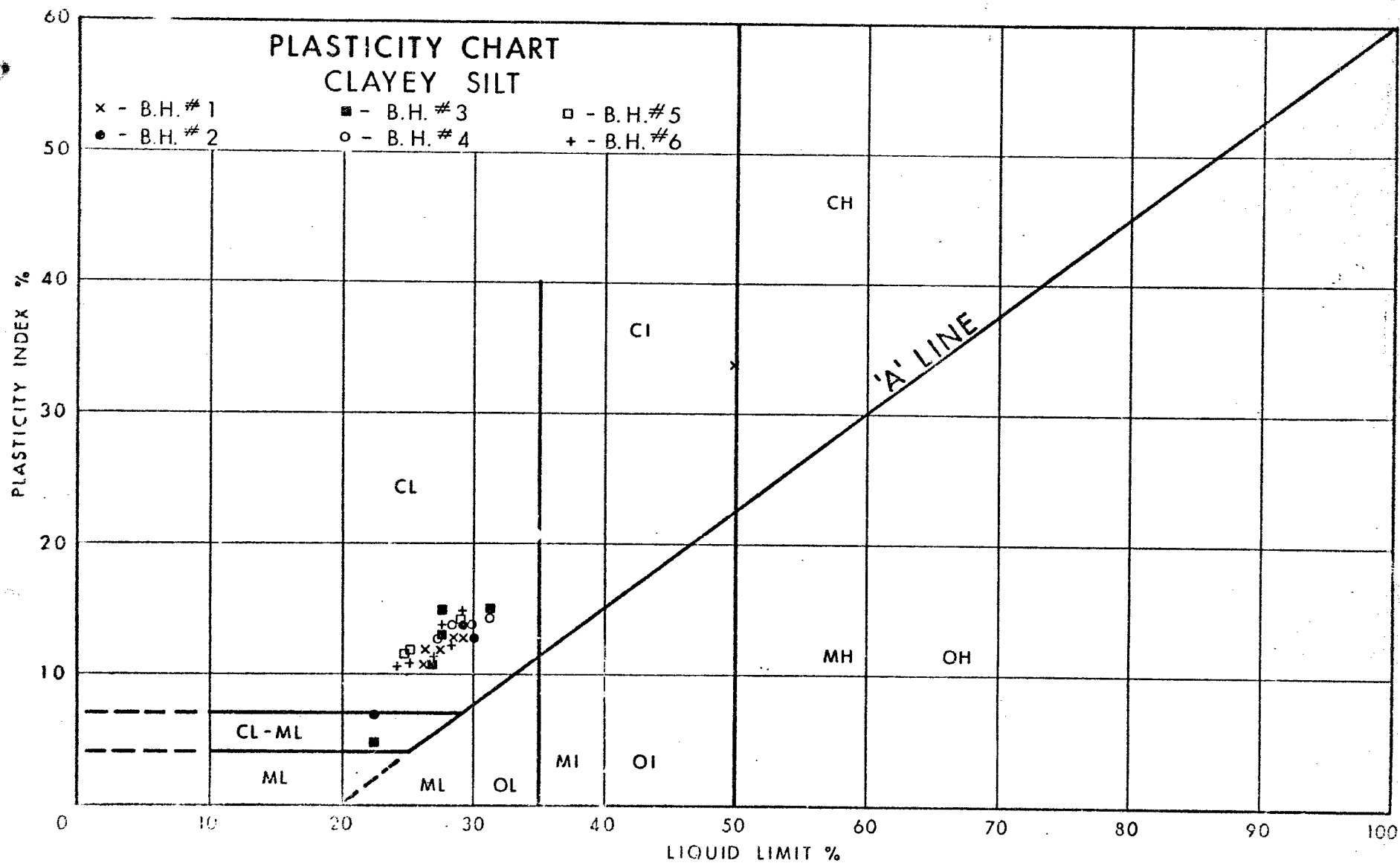


FIG. 1

# GRAIN SIZE DISTRIBUTION

## UNIFIED SOIL CLASSIFICATION SYSTEM

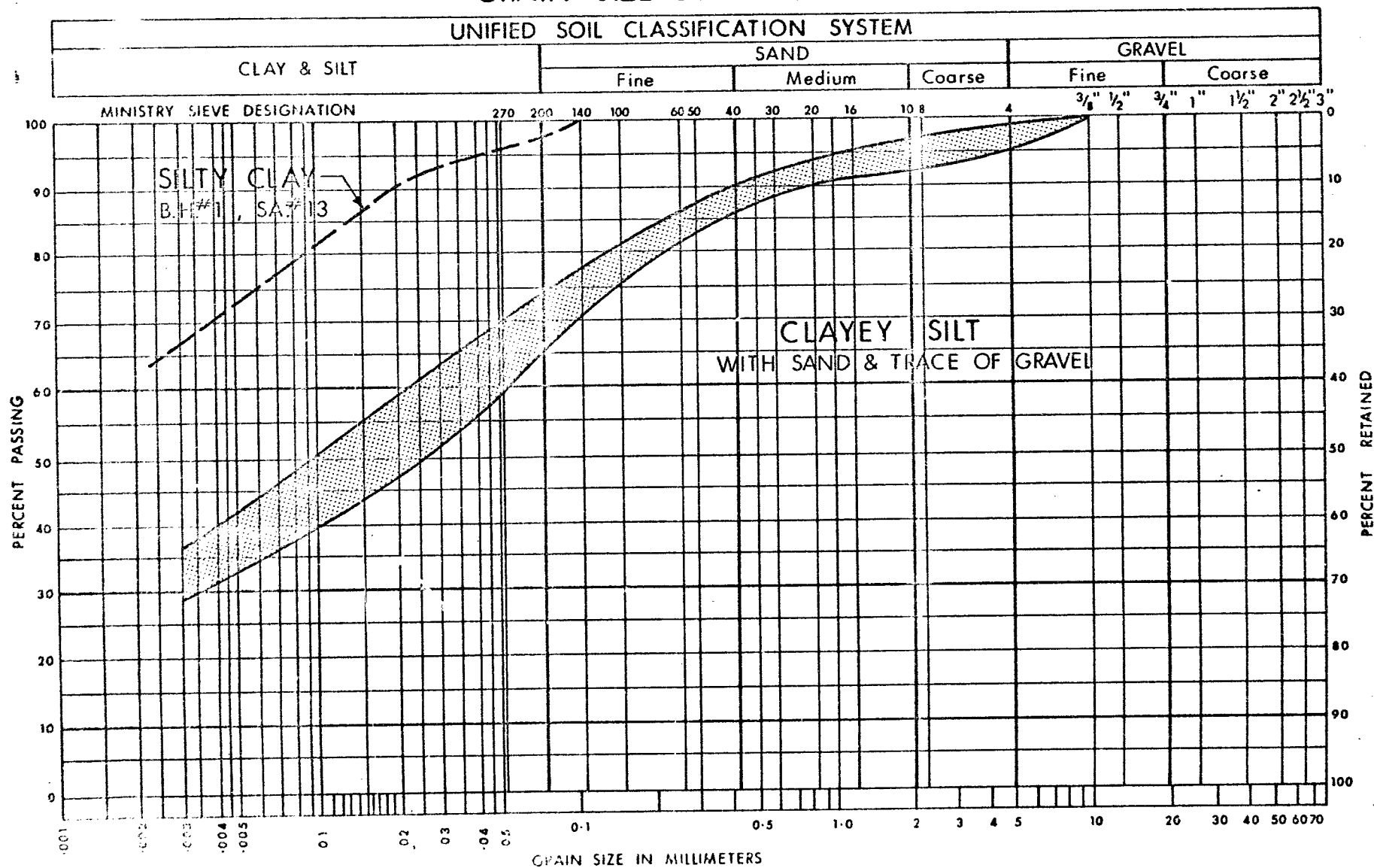


FIG 2

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTPENETRATION RESISTANCE

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

TERMS TO BE USED IN DESCRIBING SOILS:-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

TYPE OF SAMPLE

S.S	SPLIT SPOON	T.W	THINWALL OPEN
W.S	WASHED SAMPLE	T.P	THINWALL PISTON
S.T	SLOTTED TUBE SAMPLE	O.S	OESTERBERG SAMPLE
A.S	AUGER SAMPLE	F.S	FOIL SAMPLE
C.S	CHUNK SAMPLE	R.C	ROCK CORE

P.H SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V	FIELD VANE
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

# ABBREVIATIONS & SYMBOLS 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
$w_s$	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 INTERCEPT
$\phi'$	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
$c_u$	APPARENT COHESION
$\phi_u$	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
$\mu$	COEFFICIENT OF FRICTION
$S_i$	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
$\sigma'$	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

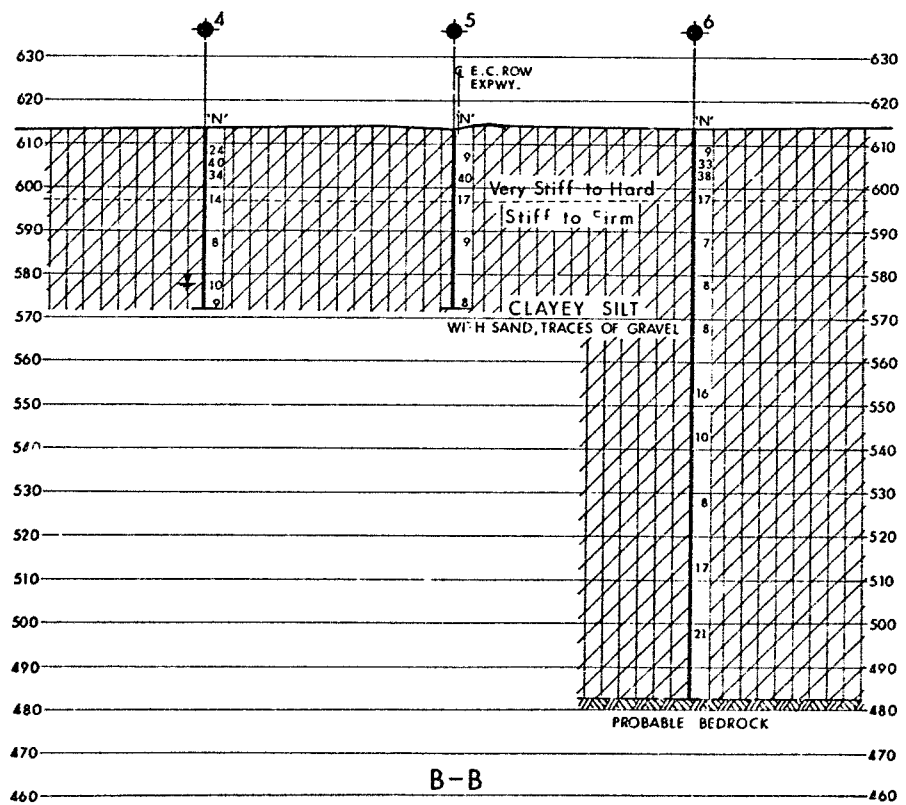
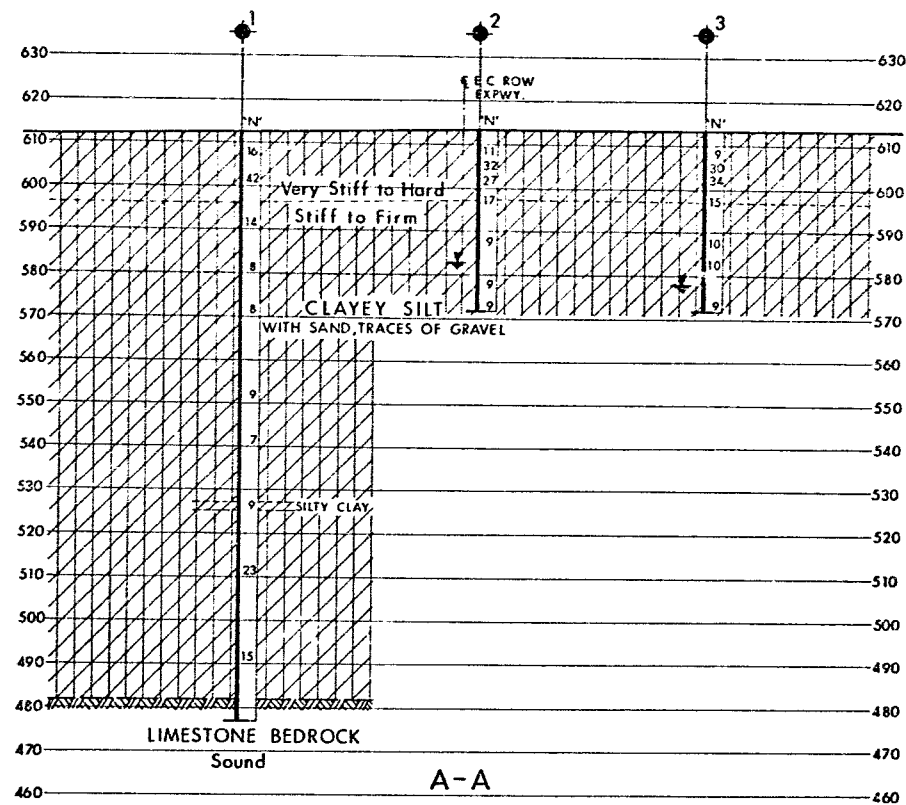
## FOUNDATIONS

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

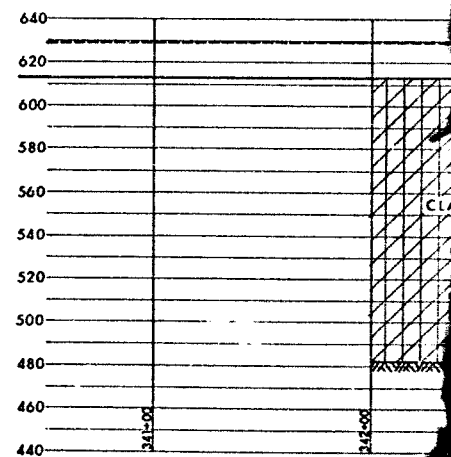
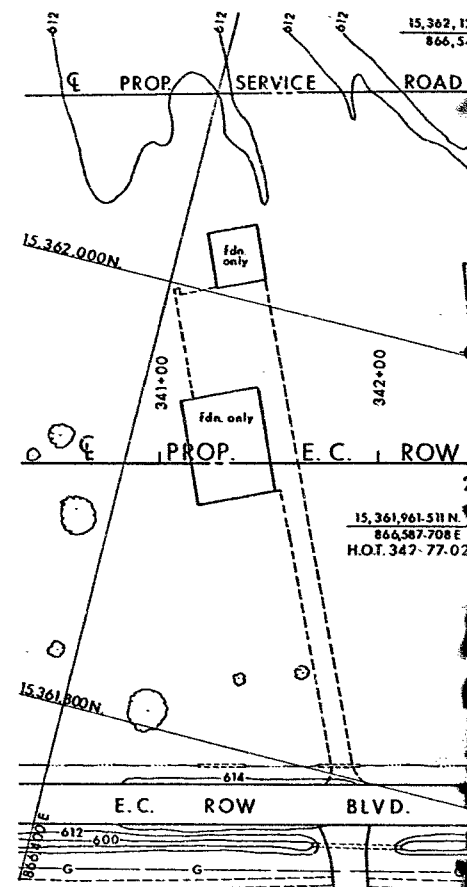
H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
$\beta$	ANGLE OF SLOPE TO HORIZONTAL





B-B  
SECTIONS

SCALE  
20 10 0 20 40 FT.



40 20 0



## INDEX

<u>Page No.</u>	<u>Description</u>
1	Index
2-3	Abbreviations & Symbols
	Foundation Investigation Reports For
4-21	W.P. 257-66-25 Walker Road Overpass
22-35	W.P. 257-66-21 Service Road Overpass

NOTE For purposes of this contract these reports supercede all other Foundation Investigation Reports prepared by or for the Ministry in connection with the above mentioned projects.

## ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

### PENETRATION RESISTANCE

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

TERMS TO BE USED IN DESCRIBING SOILS :-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

### TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.T.	SLOTTED TUBE SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE

P.H. SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

### SOIL TESTS

U	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V.	FIELD VANE
CU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" " ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

# ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

## SOIL PROPERTIES

$\gamma$	UNIT WEIGHT OF SOIL (BULK DENSITY)
$\gamma_s$	UNIT WEIGHT OF SOLID PARTICLES
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$k_s$	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

# FOUNDATION INVESTIGATION REPORT

For

Walker Road Overpass  
E.C. Row Expy. City of Windsor  
W.P. 257-66-25, District 1, Chatham

---

## INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project. Fieldwork was performed during the periods March 21 to April 1, 1968 and November 15 to November 16, 1971. Equipment used consisted of a continuous flight auger machine with 4 inch dia. solid type augers and a conventional diamond drill adapted for soil sampling purposes.

## SITE DESCRIPTION

The site of the proposed overpass structure is situated in the eastern part of the City of Windsor, approximately 1.5 miles north of the existing Hwy. #2 and Walker Road intersection.

The surrounding terrain is flat and built up residential and commercial area.

Physiographically, the site is located in the region referred to as the St. Clair Clay Plain.

## SUBSURFACE CONDITIONS

### General

Generally uniform subsoil conditions were found to prevail over the site area. The subsoil consists of a deep deposit of cohesive soil, followed by limestone bedrock. The boundaries between different deposits are shown on the Record of Borehole Sheets attached to the Appendix. The estimated stratigraphical profile of Drawing 6-285-2 of the Contract Documents is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

Clayey Silt With Sand and Traces of Gravel

This deposit was intersected in all borings and extends from immediately below the ground surface down to the bedrock surface for a minimum depth of 128 feet. The material in the deposit consists of clayey silt with sand and traces of gravel. A plot of Plasticity Index versus Liquid Limit (Fig. 1) shows the great majority of the points to fall within the CL Zone. In some boreholes relatively thin layers of granular soils were found to occur within the main deposit.

A highly overconsolidated zone, due to desiccation and/or weathering, with a thickness ranging from 8 to 14, was found to extend from the upper surface of the stratum. This zone is brown in color due to oxidation and apart from the upper 3 to 5 ft. (frost affected zone) has a very stiff to hard consistency: 'N' Values ranged from 29 to 96 blows per foot. Based on the Standard Penetration Test results only, the undrained shear strength of this desiccated zone is estimated to be in the order of 2500 psf. to 10,000 psf. Below the desiccated layers the color of the soil is grey and the consistency ranges somewhat randomly from stiff to hard. For design purposes the following in-situ undrained shear strength values are suggested:

From Ground Level - Elev. 610	2,000 PSF
Elev. 610 - 600	5,000 PSF
Elev. 600 - 590	2,500 PSF
Elev. 590 - 570	1,700 PSF
Elev. 570 - 560	2,000 PSF
Elev. 560 - 488	1,500 PSF

Physical properties of the overall deposit, as determined from field and laboratory tests, are as follows:

Natural Moisture Content: (%)	11.0 - 29.5
Liquid Limit: (%)	24.5 - 31.5
Plastic Limit: (%)	13.5 - 19.6
Bulk Density: (PCF)	136

Typical Grain-Size distribution curves are included in the Appendix of this report (Fig. 2).

### Bedrock

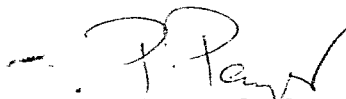
Bedrock at this site was found to consist of generally sound limestone at Elevation 489. (B.H. #63)

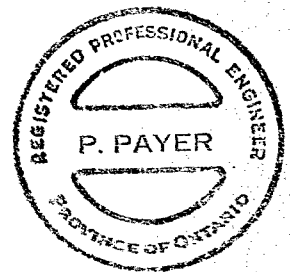
### Groundwater

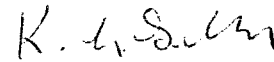
The following groundwater levels were observed during the field investigation:

B.H. # 63	Elev. 617.1
64	615.8
65	Not Established
66	Not Established
121	Not Established
125	Not Established
130	Not Established

It is pointed out that the foregoing quoted figures may not represent the true groundwater levels due to the relatively impermeable nature of the subsoil and the short duration of the fieldwork.

  
P. Payer, P. Eng.  
Senior Engineer



  
K.G. Selby, P. Eng.  
Supervising Engineer

May, 1976



## APPENDIX

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

# RECORD OF BOREHOLE NO 63

WP 257-66-25 LOCATION Co-ords. 100,124 N; 76,759 E.  
 DIST 1 HWY E.C.Row Exp. BORING DATE March 28 & 29, 1968  
 DATUM Geodetic BOREHOLE TYPE Penn Drill & Core Drill and Cone Test

ORIGINATED BY PP  
 COMPILED BY PP  
 CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT			LIQUID LIMIT ——— $w_L$ PLASTIC LIMIT ——— $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$ PCF	REMARKS  % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20 40 60 80 100			$w_p$ — $w$ — $w_L$				
							SHEAR STRENGTH PSF			WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			10 20 30				
617.4	Ground Level													
0.0			1	SS	17									
			2	SS	48	610								
			3	SS	62									
	Hard to Very Stiff		4	SS	49				136					
			5	SS	26	600								
			6	TW	PH									
			7	TW	PH	590			+1.6					
	Stiff		8	TW	PH				+1.6					
	Clayey silt with sand, traces of gravel		9	SS	12	580			+1.7					
			10	TW	PH				+1.6					
			11	SS	12	570			+1.7					
566.4	Very Stiff		12	TW	PM				+ +					
51.0	Sand Seams					560								
562.4			13	TW	PM				+1.6					
55.0						550								
547.4			14	TW	PH				+ +					
70.0	Sand seams					540								
542.4			15	TW	PH				+ +					
75.0						530								
			16	TW	PM				+1.5					
						520								
			17	TW	PM									
513.4														

## ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

## RECORD OF BOREHOLE No 63 Continued


WP 257-66-25 LOCATION Co-ords. 100,124 N; 76,759 E.

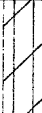

ORIGINATED BY PP

DIST 1 HWY E.C.Row Exp. BORING DATE March 28 &amp; 29, 1968

COMPILED BY PP

DATUM Geodetic BOREHOLE TYPE Penn Drill &amp; Core Drill and Cone Test

CHECKED BY 

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
513.4	continued															
104.0	Clayey silt with sand					510										
	Traces of gravel		18	SS	33											
	Very Stiff					500										
			19	SS	18											
489.2						490										
128.2	Limestone Bedrock															
484.2			20	RC AXT	Rec 95%											
133.2	End of Borehole															

%  
GR SA SI CL

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 64

WP 257-66-25 LOCATION Co-ords. 100, 022 N; 76, 549 E.  
 DIST 1 HWY 66 ROW Expy BORING DATE March 28 & 29, April 1, 1968  
 DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger & Cone Test



ORIGINATED BY P.P.  
 COMPILED BY P.P.  
 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
618.8	Ground Level					ELEV	500	1000	1500	2000	2500	10	20	30		GR SA SI CL
0.0			1	SS	13											
			2	SS	20											
			3	SS	67	610										
			4	SS	68											
			5	SS	35											
	Hard to		6	SS	19	600										4 28 34 34
	Very Stiff		7	SS	18											
			8	TW	PM	590										
	Stiff		9	SS	20											
	Clayey silt with sand, traces of gravel		10	TW	PM	580										3 28 35 34
			11	SS	16											
			12	TW	PM	570										
567.8																
51.0	Sand Seams															
562.8																
56.0			13	TW	PM	560										3 29 42 26
			14	TW	PM	550										
			15	TW	PM	540										
			16	TW	PM	530										
	Stiff															
	Very Stiff to hard.		17	SS	43	520										4 26 49 21
514.8																
104.0																

## ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 64 Continued

WP 257-66-25 LOCATION Co-ords. 100, 022 N; 76, 549 E. ORIGINATED BY P.P.  
 DIST 1 HWY EC ROW Expy BORING DATE March 28 & 29, April 1, 1968 COMPILED BY P.P.  
 DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger & Cone Test CHECKED BY EP

SOIL PROFILE		SAMPLES				GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20   40   60   80   100					$w_p$ — $w$ — $w_L$				
							SHEAR STRENGTH					WATER CONTENT %				
							○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE									
514.8																
104.0	Clayey silt with sand, traces of gravel  Very stiff to hard.		18	SS	38	510										
						500										
						490										
487.8																
131.0	Probable Bedrock End of Borehole															

 %  
GR SA SI CL



## ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 121

WP 257-66-25

LOCATION

Co-ords. 100,071 N; 76,761 E.

ORIGINATED BY PP

DIST 1

HWY E.C.Row Exp.

BORING DATE

November 15, 1971

COMPILED BY PP

DATUM

Geodetic

BOREHOLE TYPE

Cont. Flight Auger and Cone Test

CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
617.9	Ground Level															
0.0			1	SS	16											
			2	SS	16											
			3	SS	30											
			4	SS	42											
			5	SS	65											
			6	SS	56											
			7	SS	29											
			8	SS	21											
			9	SS	17											
			10	SS	20											
			11	SS	14											
			12	TW	PH											
			13	TW	PH											
			14	TW	PH											
			15	TW	PH											
559.4			16	SS	-											
58.5																
556.4																
61.5																

Note: Water level not established.

## RECORD OF BOREHOLE No 123

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT	LIQUID LIMIT $W_L$	UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20 40 60 80 100	PLASTIC LIMIT $W_P$		
617.5	Ground Level						SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE		$W_P$ — $W$ — $W_L$ WATER CONTENT %	
0.0	Probable clayey silt with sand, trace of gravel.					610				
601.5										
16.0	End of Cone Test									



## RECORD OF BOREHOLE No 124

ORIGINATED BY PP

COMPILED BY PP  
A

CHECKED BY SP.

SHEAR STRENGTH

○ UNCONFINED      + FIELD VANE

● QUICK TRIAXIAL    × LAB VANE

## RECORD OF BOREHOLE No 125

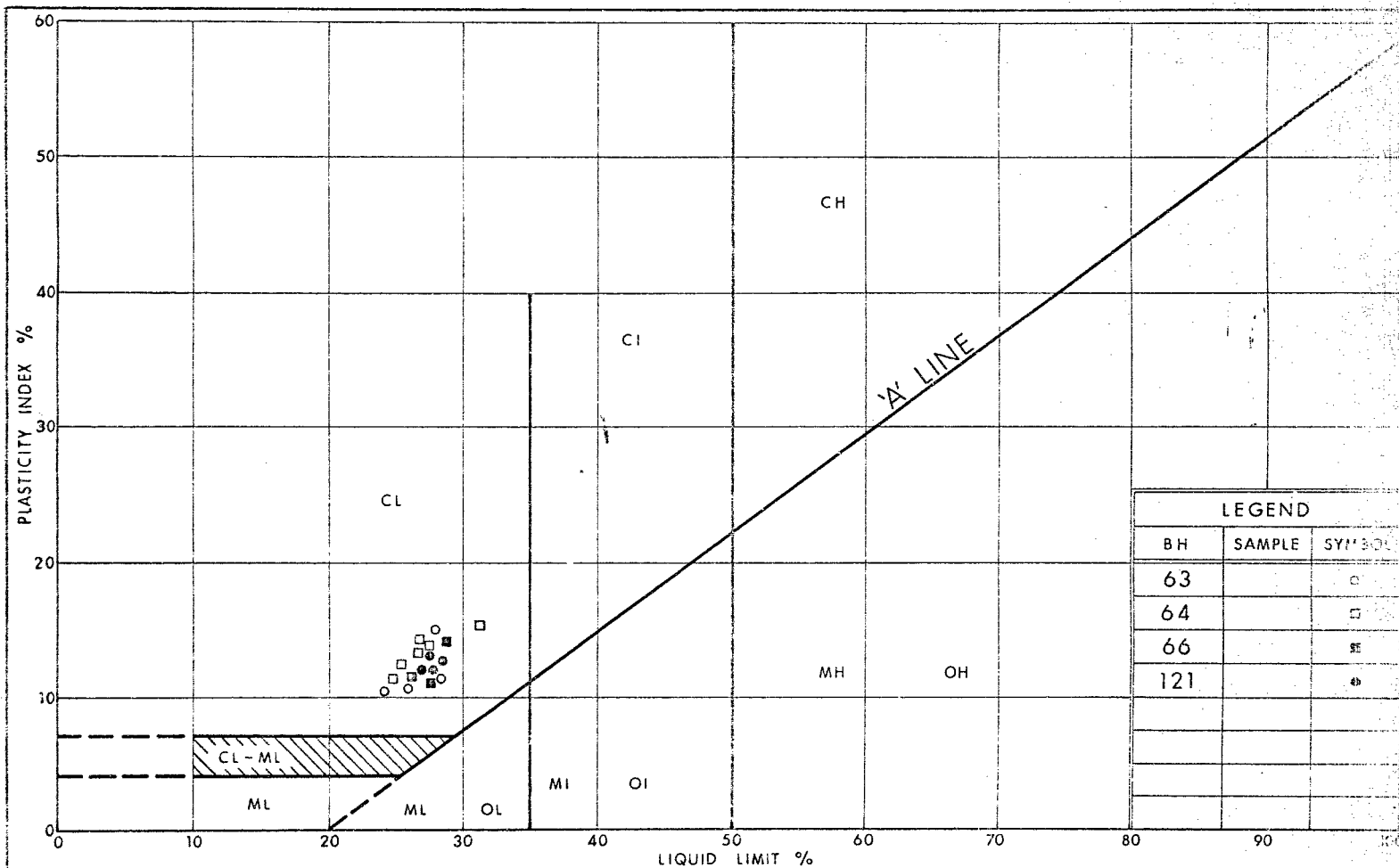
SOIL PROFILE			SAMPLES			GROUND WATER	DYNAMIC CONE PENETRATION RESISTANCE PLOT		LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$		UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20 40 60 80 100	SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	$w_p$ — $w$ — $w_L$	WATER CONTENT %		
617.8	Ground Level					ELEV	1000 2000		10 20 30			% GR SA SI CL
0.0	Clayey silt with sand, trace of gravel.		1	SS	6							
			2	SS	24							
			3	SS	52							
			4	SS	68							
			5	SS	96							
			6	SS	63							
	Firm to Hard		7	SS	48							
			8	SS	23							
			9	SS	22							
596.3			10	SS	19							

[illegible]









ENGINEERING SERVICES BRANCH

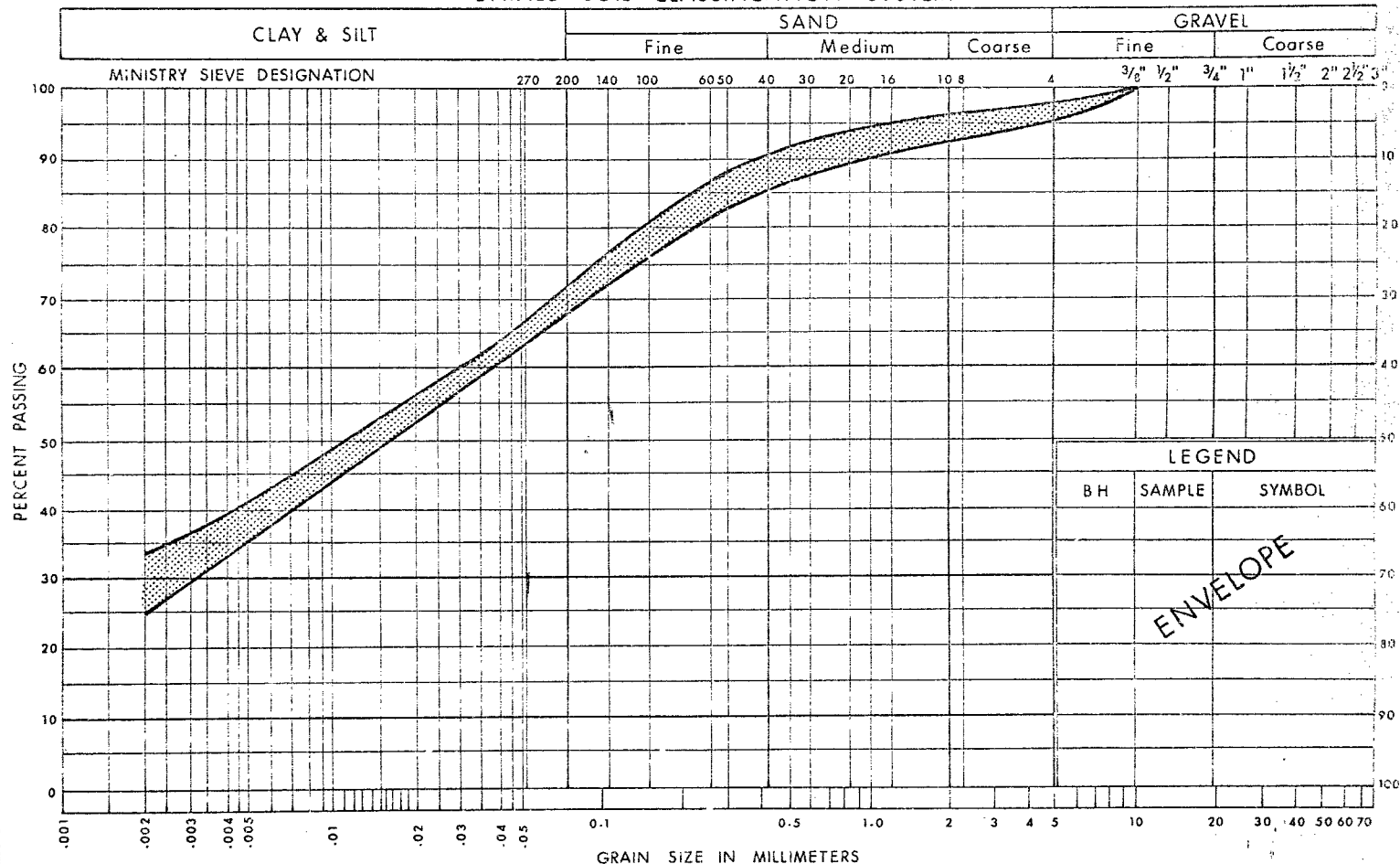
Ministry of  
Transportation and  
Communications

PLASTICITY CHART  
CLAYEY SILT  
WITH SAND, TRACES OF GRAVEL

FIG No 1

W P 257-66-25

# UNIFIED SOIL CLASSIFICATION SYSTEM



Ministry of  
Transportation and  
Communications  
Ontario  
ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION  
CLAYEY SILT  
WITH SAND, TRACES OF GRAVEL

FIG No 2

W P 257-66-25

## MEMORANDUM

TO: Mr. K. G. Selby, Supvrg. Eng.  
Soils Mechanics Section  
Geotechnical Office  
West Bldg., Downsview

FROM: Structural Planning Office  
Southwestern Region

ATTENTION:

DATE: August 7, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 257-56-21, Bridge Site 6-304  
Service Road Overpass  
0.7 miles west of Walker Road  
E. C. Row Expressway  
District 1, Chatham

Would you kindly arrange to have a foundation investigation conducted at the above location.

I have enclosed two portion prints of aerial plan B-835-11 showing the location of the Service Road Overpass at Sta. 342 + 79+ centreline E. C. Row Expressway with the structure at right angles to the Expressway.

Utilities near the site are 6" water line, 8' north of the north edge of pavement of existing E. C. Row Boulevard; 2" gas line, 18' north of the north edge of pavement of existing E. C. Row Boulevard, each to be confirmed. Bell Canada and Hydro are aerial at the site.

The proposed cross section and profile grade both over and under are shown on the attached profile paper. It is proposed that a 41 foot span concrete rigid frame type or 41 foot span simple beam type of structure would be used at this site.

I have also enclosed a field reconnaissance report and a portion print of the City of Windsor map showing the location for your use.

The bridge site plan will be available in approximately two weeks time.

Because the design of the Service Road Overpass has to be completed by November of this year, would you kindly send me a letter giving the subsoil recommendations for the structure in advance of the final foundation investigation report as soon as possible.



A. P. Watt  
Regional Structural Planning Engineer

APW:sm  
Enc.

cc A. Crowley  
J. Anderson  
J. L. Keen  
G. Edwards





Telephone: (416) 248-3282.

Soil Mechanics Section,  
Geotechnical Office,  
West Building,  
1201 Wilson Avenue,  
DOWNSVIEW, Ontario. M3M 1J8

August 26, 1974.

Dominion Soil,  
440 Balmoral St.,  
P.O. Box 242, Stn. "F",  
Thunder Bay, Ontario.

Dear Sirs:

This letter confirms our request by telephone of August 15, 1974 for the supply of a Type III Auger, M.V. Mounted W.H.S.A. (Item 5.3 i), together with all necessary equipment, as per your Tender for Supply Contract S74-1577, at Windsor, Ontario on August 21st, 1974.

Mobilisation will be from Windsor.

Our Project Number is W.P. 257-66-21.

Yours truly,

*K. G. Selby*

K.G. Selby  
Supervising Engineer.

KGS/rgb

c.c. W.W. Fry  
(ATTN: Mrs. M. Porter)

Files  
Documents

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

Copy for the information of Mr. K. Selby

~~Mr. G. S. Grebski~~

Structural Design Engineer  
Structural Office  
West Bldg., Downsview

Mr. J. L. Keen

Regional Structural Design Eng.

Structural Planning Office  
Southwestern Region, London

August 27, 1974

W.P. 257-66-21, Bridge Site 6-304  
Service Road Underpass  
0.7 miles west of Walker Road  
E. C. Row Expressway  
District 1, Chatham

Attached please find a print of the aerial plan B-835-11 and a print of the cross section and proposed profile for the above structure for use in your evaluation.

Also attached please find copies of correspondence received from Mr. G. J. Edwards, Project Design Engineer, Systems Design Office and Mr. R. J. Gladding, James F. MacLaren Ltd.

You will note in the correspondence that Mr. Gladding has requested our evaluation of the technical feasibility of locating the proposed 30 inch diameter pipe sewer under the projected crossing of the Expressway. With reference to the correspondence, the 30 inch sewer will have an invert elevation of 582.5 approximately 31.5 feet below the existing ground surface.

Would you kindly evaluate the Consultant's proposal of taking the sewer through and under proposed 41 foot clear opening of the Service Road Underpass. It is my understanding that you propose to use a reinforced concrete rigid frame type of structure supported on spread footings.

I have discussed this query with Mr. K. Selby, Supervising Engineering, Soil Mechanics Section, and he is in the process of finalizing the Foundation Investigation Report for the site and is prepared to discuss this proposal with you.

Your earliest consideration would be appreciated by the Consultant.

By a copy of this memorandum, I am sending Mr. K. Selby a copy of all information supplied to you.



A. P. Watt  
Regional Structural Planning Engineer

APW:sm  
Enc.

cc K. Selby - Enc.





Ontario

Ministry of  
Transportation  
and  
Communications

August 20, 1974.

MEMORANDUM TO: Mr. A. P. Watt,  
Regional Structural Engineer,  
Structural Office,  
Southwestern Region,  
LONDON, Ontario.

RE: E. C. Row Expressway - Phase 1(b)  
-----

Please find attached a copy of letter from J. P. MacLaren Limited, which is self-explanatory. The sewer will be installed late 1974 or early 1975.

Could you please confirm whether or not Structural Office have any objections to the proposal to cross at the underpass location or require any particular conditions to be met, etc.

*J. Sanderson*  
for G. J. Edwards,  
Project Design Engineer,  
For:  
T. A. Hickey,  
Sr. Project Design Engineer,  
Systems Design Branch.

GJE/fs  
Encl.

**RECEIVED**  
BRIDGE PLANNING

AUG 20 1974

SOUTHWESTERN REGION

**JAMES F. MacLAREN LIMITED ENVIRONMENTAL CONSULTANTS**  
880 QUELLETTE AVENUE, WINDSOR 14, ONTARIO, CANADA

Reference: 10184

August 16, 1974

Ministry of Transportation & Communications  
P. O. Box 6338  
London, Ontario N5V 2Z1

Attention: Mr. G. Edwards, P. Eng.

CITY OF WINDSOR  
North Devon Sub-Trunk Sanitary Sewer

Gentlemen:

Further to a meeting, held on July 24, 1974 in the Windsor Office of James F. MacLaren Limited and attended by Mr. Edwards, we enclose a plan dated August 14, 1974 showing the recommended route for the above-noted sewer, and two alternative routes, in the vicinity of the future E. C. Row Expressway in the City of Windsor.

All routes evaluated would cross the E. C. Row Expressway at the location of the underpass, as proposed by the Acting Commissioner of Planning for the City of Windsor, just east of Bishop J. C. Cody School. Our preliminary design indicates that the proposed sewer would be a 30-inch diameter pipe with an approximate invert elevation of 582.5 (i.e., approximately 31.5 feet below the existing ground surface).

As indicated on the enclosed plan, the recommended route would, after crossing the E. C. Row Expressway, follow the route of a new road proposed by the City of Windsor, Department of Planning and Urban Renewal. We would expect that the sewer along the recommended route would be installed in open cut. In all likelihood the trench would be backfilled with Granular 'B' compacted to 100% of the optimum density as determined by the Standard Proctor Density Test.

.../2

- 2 -

Ministry of Transportation & Communications August 16, 1974

We trust that this information is sufficient for your evaluation of the technical feasibility of locating the proposed sewer under the projected crossing of the Expressway. If this is not feasible we would ask that you indicate a suitable alternative location for such a crossing. We understand that in addition to an indication of technical feasibility the Corporation would be required to make formal application for a permit to construct such an undercrossing of the Expressway.

Should you require additional information to assist you in reaching a decision on this matter, please contact the writer. We would appreciate your early consideration of the matter because of scheduling commitments relating to financial subsidy of the cost of construction of the proposed sewer.

Yours very truly,

*R. J. Gladding*  
R. J. Gladding, P. Eng.  
Manager

WER/mhb  
encl.

cc - Mr. H. G. Payne, P. Eng.



Mr. C. Grebski,  
Structural Design Engineer,  
Structural Design Section,  
West Bldg., Downsview

J. Keen

Soil Mechanics Section,  
Geotechnical Office,  
West Bldg., Downsview.

August 27th, 1974.

W.P.'s 257-66-03,04,05,06,07,09,21  
E.C. Row Expy., Windsor,  
District #1 (Chatham)

---

Following is a summary of the main points of our discussion on August 22, 1974 regarding piled foundations for the abovementioned projects.

1. For the C. & O. Rwy. structures a cost estimate of spread footings versus piled foundations indicates a much smaller saving in favour of spread footings than previously anticipated. This is partly due to the fact that as a result of the recent pile tests we are able to reduce the number of piles required by about 25%. In view of this and other (mainly settlement) considerations it was decided to adopt the piled foundation design.

2. A restriction on the use of pile driving hammers delivering more than 30,000 ft.lbs. per blow when the pile tips are within 3 ft. of bedrock, to be incorporated in the contract, requires that the bedrock surface be defined accurately at locations where piles are to be driven. To achieve this it will be necessary for the Soil Mechanics Section to carry out additional borings at all of the structure sites. In order to meet the present design schedule this drilling work should be completed and reported on by the end of October 1974.

*K. G. Selby*

K.G. Selby  
Supervising Engineer

KGS/rgb

C.C. A. Watt  
J. Anderson

Files  
Documents

Mr. A.P. Watt,  
Regional Structural Planning  
Engineer,  
Structural Planning Office  
Southwestern Region.

Soil Mechanics Section,  
Geotechnical Office,  
West Building, Downsview.

August 27, 1974

W.P. 257-66-21, Bridge Site 6-304,  
Service Road Overpass,  
0.7 Miles West of Walker Road,  
E. C. Row Expressway  
District #1, (Chatham).

---

We have completed a foundation investigation at the above location. Owing to the urgency of the project, we are outlining below the subsoil conditions and our recommendations for the structure foundations so that design work can proceed without delay:

1. SUBSOIL CONDITIONS.

Subsoil at the site was found to be generally uniform. It consists mainly of a deep deposit of clayey silt, with some sand and gravel, extending from ground surface to sound limestone bedrock for a depth of approximately 130.5 ft. The upper 14 ft. is desiccated, having a very stiff to hard consistency. Below the desiccated crust, the consistency decreases with depth from stiff to firm.

Because of the relatively impermeable nature of the subsoil and the short duration of the field investigation, the true groundwater levels have not been established. However, in our opinion, the groundwater level at the site may exist at elev. 597.5 ±. No artesian water was encountered.

2. RECOMMENDATIONS.

The proposed 40 ft. single span structure can be supported on spread footings placed at elev. 605.0 within the very stiff desiccated zones. For design purposes, a bearing capacity of 3.0 tsf. may be assumed. Under this pressure, footing settlements are estimated to be of the order of 1.0 in. to 1.5 in. with a consequent differential settlement not greater than 1 in. Since the desiccated zone is susceptible to softening upon contact with water, it is recommended that bottoms of footing excavation be covered with concrete working slabs upon exposure. All footings should be provided with 4 ft. cover for frost protection. No dewatering problems are anticipated.

Alternatively, the proposed structure can be supported on end-bearing pile foundations, which may consist of either 12 3/4" O.D. - 1/4" tube piles or steel H-piles. The piles are to be driven to bedrock which was found to exist at elev. 483.0 ±. In the case of steel H-piles, the maximum load for the particular section may be assumed for design purposes; whereas in the case of the tube piles mentioned above, a maximum load of 120 tons per pile may be assumed.

No stability problem is anticipated for the embankment fill provided it is constructed with a 2:1 side slope.

We hope our information will enable you to design the structure. A complete report will be submitted in the near future. Should you have any queries, please feel free to contact this office.

B. Ly  
Project Engineer  
for:  
K.G. Selby  
Supervising Engineer

BL/rgb

c.c. A. Crowley  
J. Anderson  
J. Keen  
G. Edwards

Files  
Documents



MEMORANDUM

TO: Mr. K. G. Selby, Supvrg. Eng.  
Soil Mechanics Section  
Geotechnical Office  
West Bldg., Downsview

FROM: Structural Planning Office  
Southwestern Region  
London

ATTENTION:

DATE: August 28, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 257-66-21, Bridge Site 6-304  
Service Road Overpass  
0.7 miles west of Walker Road  
E. C. Row Expressway  
District 1, Chatham

Further to my memorandum of August 7, 1974, requesting that a foundation investigation be conducted at the above noted site, please find enclosed two prints of the Bridge Site Plan E-5358-1 for your use.



A. P. Watt  
Regional Structural Planning Engineer

APW:sm  
Enc.



TO: Mr. A. Watt,  
Regional Structural Planning Eng.,  
Southwestern Region, London.

FROM: Structural Office,  
West Building,  
Downsview.

ATTENTION:

DATE: September 24th, 1974.

OUR FILE REF.

IN REPLY TO

SUBJECT: Service Road Overpass,  
0.7 Miles West of Walker Road,  
City of Windsor, Essex Co.,  
W. P. #257-66-21, Site No. 6-304  
District #1, E.C. Row Expressway.

Attached herewith are prints of the detailed Preliminary Bridge Plan Drawing 6-304, P1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$312,000.00 which includes tender, materials, engineering, and sundry construction.

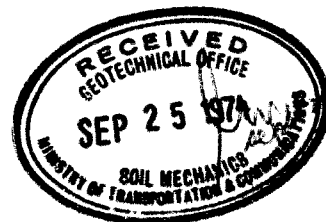
Any comments or revisions you may have should be submitted at your earliest convenience.

CSG/cf  
Attch.

  
C. S. Grebski,  
Structural Design Engineer.

c.c. B.R. Davis,  
W.D. Birch,  
A.E. McKim,  
J. Keen,  
M. Stoyanoff,  
C. Mirza, ✓  
J. Anderson,  
A. Crowley.

No Comments (B. Loy  
Sept. 30<sup>th</sup>, 1974)



MEMORANDUM

TO: Mr. K.G. Selby,  
Supervising Engineer,  
Soil Mechanics Section,  
Geotechnical Office, Downsview.

FROM: Structural Office,  
West Building,  
Downsview, Ontario.

ATTENTION:

DATE: October 8, 1974.

OUR FILE REF.

IN REPLY TO

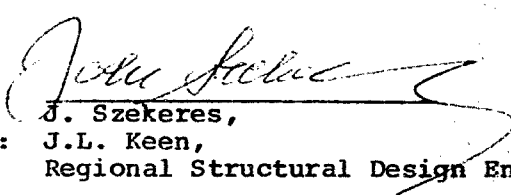
SUBJECT:

W.P. 257-66-21, Site 6-304  
Service Road Overpass  
E.C. Row Expressway  
District #1, Chatham

Enclosed please find a revised preliminary drawing (6-304-P1) for the above structure for your comments.

As discussed with you on the third of this month after we received the final Foundation Report, we raised the bottom of the footings by 1.0 foot from El. 605.00 to El. 606.00 which provides us 4.3'+ minimum cover at E of E.C. Row Expressway and 5.3'+ maximum cover at north face of abutment.

Your earliest comments would be appreciated.

  
for: J. Szekeres,  
Regional Structural Design Eng.

JS/JLK/ac

Enclosure

cc: A.P. Watt - 2 dwg. enc.  
T.A. Hickey - 1 dwg. enc.



*B. J. y.*

*Oct. 8 1974*



## Memorandum

To: Mr. C. Mirza,  
Head,  
Soils Mechanics Office,  
West Building, Downsview.

Attention:

From: Structural Office,  
West Building,  
Downsview.

Date: December 4th, 1974.

Our File Ref.

In Reply to

Subject:

Service Road Overpass,  
0.7 Miles West of Walker Road,  
W.P. 257-66-21, Site 6-304,  
E.C. Row Expressway, District 1.

Attached herewith we are submitting the final bridge drawings  
which show the foundation design for this structure.

Kindly give us your comments at your earliest convenience.

JLK/cf  
Encl

J. L. Keen,  
Regional Structural Design Engineer



KG5

No comments.

B. by

Jan. 17<sup>th</sup>, 1975

finalized  
Jan 20/75  
cf.

Copy for the information of

W.P. 257-66-21  
BRIDGE SITE 6-304  
SERVICE RD OVERPASS

A. P. Watt

Chatham District Office,  
District # 1,  
CHATHAM, Ontario.

G. J. Edwards,  
Planning & Design Branch,  
London, Ontario.

Mr. J. Byres

January 10, 1975.

E. C. Row Expressway  
North Devon Sanitary Sub-Trunk

With reference to your letter of January 3, 1975 with respect to above, this office has reviewed the consultants' plans No. 1 of 10 and 3 and 10. The location of the sewer in relation to the proposed overpass foundation is acceptable in that it conforms to previously expressed requirements of Bridge Foundation Office.

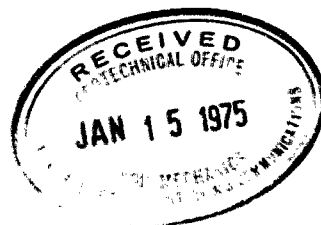
It should be noted, however, that the 50' and 70' dimensions have been pencilled on the plans. The sewer alignment is, in fact, not tied down to any existing fixed location or property bar on these drawings. To complete the offset dimensions to the sewer an additional dimension is required from centreline of expressway to south edge of overpass foundation. This dimension should read 75.5'.

Regional M. & T. have previously requested granular backfill and a high degree of compaction, and this must be provided across the expressway. Anticipated award date for Phase 1B of E. C. Row is April 30th, 1975 and the sanitary sewer should be completed before that date.

I would suggest the Permit be issued for the construction, however, the alignment adjacent to the overpass should be checked and approved on site by M.T.O. staff during construction in order to confirm the clearances from the overpass foundations.

*G. J. Edwards*

G. J. Edwards,  
Sr. Project Manager,  
Per:  
T. A. Hickey,  
Area Manager.



GJE/rs

c.c. A. P. Watt (2)  
J. Forster  
T. Sealey  
J.L. KRAM  
K. SELLBY

JAN 13/75

**RECEIVED**  
BRIDGE PLANNING

JAN 10 1975

**SOUTHWESTERN BRANCH**

The excavation for the 30" sewer is acceptable if it is constructed conforming to Mr. Sealey's suggestion to Mr. Watt, as shown in the attached sketch. (Bm Ly, Jan. 27th, 1975)

THE CORPORATION OF THE  
**CITY OF WINDSOR**

J. M. BEAUDOIN, M.I.N.A., A.A.C.I.  
PROPERTY DIRECTOR



68 CHATHAM ST. E.  
WINDSOR, ONTARIO  
N9A 6S1

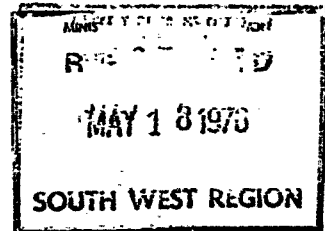
TELEPHONE 254-1611  
AREA CODE 519

**PROPERTY DEPARTMENT**

257-66-25

May 14th, 1976

Mr. A. G. Kelly  
District Engineer  
Ministry of Transportation & Communications  
Box 910  
CHATHAM, Ontario



Re: E. C. Row Expressway  
Contract Award, Walker Road  
and Expressway construction to  
the West

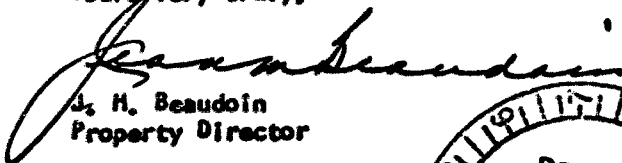
Dear Sir:

All the property required for the completion of this contract is vested in the City, by Plan of Expropriation, deed, or both, without encumbrances.

Lands covered by the Fox property request are vested in the City and the portion of the property on which construction will proceed is vacant.

Lands covered by the Zuliani property request are also vested in the City, but by an agreement between Zuliani and the City possession of that property is not to be given until October 15th, 1976. Because of possible costly damage to the large stock of glass in the Zuliani building, the award should contain a provision restricting pile driving in the Walker Road area until after October 15th, 1976.

Yours very truly,

  
J. M. Beaudoin  
Property Director

JMB/ym

cc: Mr. R. M. Kilpatrick  
Mr. A. Hickey  
Mr. T. W. Szalay

cc: J. L. McNeil  
14 STAYNOR  
M. SPAIN



**RECEIVED**  
STRUCTURAL PLANNING

MAY 19 1976



Mr. A.G. Kelly,  
District Engineer,  
District #1, Chatham.

Construction Office,  
3rd Floor, Central Building.

Mr. W.G.H. Sawyer,  
District Construction Engineer.

February 2nd, 1977.

Contract 76-75, Walker Road Overpass,  
E.C. Row Expressway, Site No. 6-286,  
District #1, Chatham.

---

I would like to confirm the recommendations given by telephone to the Project Supervisor of the above contract regarding pile #17 of the South Pier. As reported on January 24th, 1977, the pile buckled in the northerly direction during driving. After consulting the Designer, this office recommended that an additional pile be driven adjacent (4'-0" c/c) south of the buckled pile.

The extra pile was subsequently driven and reported by the field office that the pile reached refusal at a penetration of approximately 104 feet below ground level. Driving was stopped and the field office was advised to accept the two piles as adequate to carry the design load per pile.

L. Hessina,  
Structural Construction Engineer.

LEH:jg

cc: R.A. Norton ✓



# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #4

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
 CONTRACTOR FRANKI CANADA LTD DESIGN LOAD OF PILE 120 TONS  
 HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 lbs HEIGHT OF FALL OR ENERGY 26,300  
 TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1179 lbs  
 PILE DETAILS 12 3/4" OD X 0.25" WALL STEEL TUBE @ 33 1/2" / FT, 13 1/2" X 1 1/4" SHOE BATTER: VERTICAL  
 PILE NO. 4 LOCATION WEST ABUTMENT FTG, WALKER RD. STRUCT DATE DRIVEN NOV 23/24/76

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
START	1	0	26	25	51	22	76	36			
NOV 23	2	15	27	25	52	23	77	34			
50'	3	28	28	25	53	24	78	37			
	4	25	29	24	54	30	79	36			
	5	30	30	23	55	33	80	33			
HAMMER STOPPED UP BY OPERATOR →	6	18	31	25	56	34	81	35			
	7	22	32	24	57	30	82	34			
	8	25	33	18	58	26	83	33			
	9	25	34	16	59	4	84	33			
	10	23	35	19	60	25	85	33			
	11	19	36	14	61	24	86	33			
	12	20	37	19	62	25	87	33			
	13	21	38	19	63	24	88	32			
	14	21	39	18	64	24	89	32			
	15	20	40	18	65	25	90	33			
	16	22	41	19	66	25	91	34			
	17	20	42	19	67	27	92	38			
	18	20	43	19	68	28	93	42			
	19	21	44	19	69	29	94	40			
	20	20	45	19	70	31	STOP 3:47 PM → 95	40			
	21	23	STOP 2:08 PM → 46	18	71	34	NOV 24 11:3	96	41		
	22	23	150' START 7:28	47	19	72	31	114' 3" / 97	44		
	23	25		48	20	73	30	START 4:47	98	40	
	24	25	100'	49	23	74	30	STOP 4:49	99	40	
	25	24		50	22	75	32	START NOV 24	100	↑	

DETAILS OF FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION					

REPORT TO BE SENT TO:-

GEOTECHNICAL OFFICE  
 ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
 MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
 DOWNSVIEW, ONTARIO

SIGNED J.R. Lyon  
 NAME (PRINT) \_\_\_\_\_  
 DATE \_\_\_\_\_  
 ATTACH SKETCH OF PILE NUMBERING SYSTEM



**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #4

DISTRICT NO. 1 CONTRAC: NO. 76-75 STRUCTURE W.P. NO. \_\_\_\_\_

CONTRACTOR \_\_\_\_\_ DESIGN LOAD OF PILE \_\_\_\_\_

HAMMER DETAILS: TYPE \_\_\_\_\_ WEIGHT \_\_\_\_\_ HEIGHT OF FALL OR ENERGY \_\_\_\_\_

TYPE OF ANVIL OR CAP \_\_\_\_\_ WEIGHT OF ANVIL OR CAP \_\_\_\_\_

PILE DETAILS \_\_\_\_\_ BATTER: \_\_\_\_\_

PILE NO. 4 LOCATION \_\_\_\_\_ DATE DRIVEN Nov 23/76

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1			26			51			76	
	2			27			52			77	
	3			28			53			78	
MISSED	4			29			54			79	
	5			30			55			80	
	6			31			56			81	
	7			32			57			82	
	8			33			58			83	
	9			34			59			84	
	10			35			60			85	
ADD 14'4"	11	69		36			61			86	
STRET 9'7"	12	67		37			62			87	
NOV 24	13	64		38			63			88	
128'7"	14	63		39			64			89	
	15	70		40			65			90	
	16	75		41			66			91	
	17	78		42			67			92	
	18	65		43			68			93	
	19	65		44			69			94	
	20	67		45			70			95	
	21	78		46			71			96	
	22	125		47			72			97	
	23	128		48			73			98	
	24	150		49			74			99	
10:00 AM	124.5	160	←	50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	LAST INCH
BLOWS PER INCH						80
MEASURED REBOUND IN INCHES						3/4"
FINAL LENGTH OF PILE <u>125'6"</u>	FINAL CUT OFF ELEVATION <u>613.75</u>					

REPORT TO BE SENT TO: -

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED G. R. Leon  
NAME (PRINT) G. R. LEON  
DATE Nov 24/76  
ATTACH SKETCH OF PILE NUMBERING SYSTEM

**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.





# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #5

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
CONTRACTOR FRANKI CANADA LTD DESIGN LOAD OF PILE 120 TONS  
HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 lbs HEIGHT OF FALL OR ENERGY 26300  
TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1179 lbs  
PILE DETAILS 12 3/4" O.D. X .25 WALL STEEL TUBE @ 33 lbs/ft, 13 1/4" X 14" SHOE BATTER: A:1  
PILE NO. 29 LOCATION EAST ABUTMENT FOOTING, WALKER RD. STRUT DATE DRIVEN NOV 25/76

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
1:29 PM	1	8		26	15		51	21		76	66
50'	2	9		27	17		52	23		77	75
	3	10		28	15		53	26		78	70
	4	14		29	17		54	25		79	62
	5	15		30	16		55	23		80	65
	6	17		31	17		56	22		81	81
	7	21		32	17		57	22		82	75
	8	20		33	17		58	23		83	66
	9	20		34	17		59	23		84	65
	10	18		35	17		60	21		85	60
	11	17		36	17		61	25		86	58
	12	15		37	17		62	28		87	45
	13	17		38	17		63	30		88	45
	14	16		39	18		64	32		89	45
	15	16		40	18		65	38		90	44
	16	16		41	18	HAMMER NOT RUNNING PROPERLY	66	57		91	42
	17	16		42	18	↓	67	46		92	45
	18	15		43	19		68	48		93	43
	19	16		44	19		69	44		94	48
	20	16		45	20		70	37	STOP 3:17 →	95	60
	21	16	STOP 1:49 PM →	46	20		71	35	START 4:05 →	96	30
	22	16	START 2:51 PM →	47	20		72	41	131'	97	28
	23	17	100'	48	20		73	45	HAMMER	98	41
	24	16		49	25		74	46	REFUELED	99	44
	25	17		50	21		75	53		100	43

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION					

REPORT TO BE SENT TO: -

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED S.R. Leon  
NAME (PRINT) G.R. LEON  
DATE Nov 25/76  
ATTACH SKETCH OF PILE NUMBERING SYSTEM

**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

# BRIDGE CONSTRUCTION - PILE DRIVING RECORD<sup>#5</sup>

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. \_\_\_\_\_

CONTRACTOR \_\_\_\_\_ DESIGN LOAD OF PILE \_\_\_\_\_

HAMMER DETAILS: TYPE \_\_\_\_\_ WEIGHT \_\_\_\_\_ HEIGHT OF FALL OR ENERGY \_\_\_\_\_

TYPE OF ANVIL OR CAP \_\_\_\_\_ WEIGHT OF ANVIL OR CAP \_\_\_\_\_

PILE DETAILS \_\_\_\_\_ BATTER: \_\_\_\_\_

PILE NO. 29 LOCATION \_\_\_\_\_ DATE DRIVEN Nov 25/76

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	101	42	578P 4-45PM	1255	340 ← REDDOR	51				76	
	102	43		27		52				77	
	103	45		28		53				78	
	104	42		29		54				79	
	105	46		30		55				80	
	106	47		31		56				81	
	107	50		32		57				82	
	108	52		33		58				83	
	109	53		34		59				84	
	110	62		35		60				85	
	111	61		36		61				86	
	112	60		37		62				87	
	113	79		38		63				88	
	114	90		39		64				89	
	115	110		40		65				90	
	116	121		41		66				91	
	117	105		42		67				92	
	118	90		43		68				93	
	119	95		44		69				94	
	120	100		45		70				95	
	121	90		46		71				96	
	122	88		47		72				97	
	123	94		48		73				98	
	124	83		49		74				99	
	125	500		50		75				100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	1" <sup>LAST</sup>
BLOWS PER INCH						100
MEASURED REBOUND IN INCHES						3/8"
FINAL LENGTH OF PILE	126'6"					FINAL CUT OFF ELEVATION 613.75

\* CONTRACTOR SLOWED HAMMER DOWN BUT WAS INSTRUCTED TO  
REPORT TO BE SENT TO: - SPEED IT UP TO AVOID A  
FALSE REFUSAL.

GEOTECHNICAL OFFICE FINAL 6" WAS DRIVEN AT FULL THROTTLE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED G.R. Leon

NAME (PRINT) G.R. LEON

DATE Nov 25/76

ATTACH SKETCH OF PILE NUMBERING SYSTEM

**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

File Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.



# BRIDGE CONSTRUCTION - PILE DRIVING RECORD # 80

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
CONTRACTOR FRANK & CANADA LTD DESIGN LOAD OF PILE 120 TON  
HAMMER DETAILS: TYPE L.R. 520 WEIGHT 5070 HEIGHT OF FALL OR ENERGY 26300  
TYPE OF ANVIL OR CAP \_\_\_\_\_ WEIGHT OF ANVIL OR CAP 1179 lb  
PILE DETAILS 12 3/4" O.D. x .25 WALL STEEL TUBES (23 3/4" x 14 1/2" SHOE) BATTER: B: 1  
PILE NO. 11 LOCATION EAST ABUT FOOT, WALKER RD DATE DRIVEN Jan-12-77

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
1:35	1	4		26	22		51	32		76	105
	2	8		27	23		52	30		77	140
	3	10		28	23		53	26		78	140
	4	12		29	23		54	26		79	145
	5	14		30	23		55	27		80	150
	6	14		31	23		56	30		81	155
	7	14		32	23		57	32		82	190
	8	20		33	24		58	34		83	180
	9	20		34	24		59	30		84	155
	10	20		35	24		60	30		85	130
	11	10		36	24		61	35		86	150
	12	10		37	24		62	37	STOP	87	150
	13	14		38	24		63	37	3:25	88	150
	14	15		39	24		64	40	START	89	125
	15	16		40	25	(spills 125 etc)	65	40	4:40	90	130
	16	16		41	25		66	46		91	145
	17	20		42	20		67	50		92	145
	18	20		43	22		68	70		93	145
	19	18		44	25		69	70		94	150
	20	20		45	25		70	72		95	150
	21	20		46	25		71	74		96	154
	22	21		47	25		72	80		97	150
	23	22		48	25		73	90		98	150
	24	22		49	25		74	90	5:25	99	150
	25	22		50	26		75	100		100	150

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION					

REPORT TO BE SENT TO: -

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED \_\_\_\_\_  
NAME (PRINT) \_\_\_\_\_  
DATE \_\_\_\_\_  
ATTACH SKETCH OF PILE NUMBERING SYSTEM

Today Hammer Not Running properly



8 NOTES:

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

File Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.



# BRIDGE CONSTRUCTION - PILE DRIVING RECORD <sup>8</sup>

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
 CONTRACTOR FRANKI CANADA LTD DESIGN LOAD OF PILE 120 TONS  
 HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 HEIGHT OF FALL OR ENERGY 26300  
 TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1179 LB  
 PILE DETAILS 27" O.D. X 25 WALL STEEL / 1326 1/2" S406 BATTER: 3:1  
 PILE NO. 11 LOCATION EAST ABUT. F.O.T. WALKER RD DATE DRIVEN Jan-12-77

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1	60		26	170		51			76	
	2	60		27	170		52			77	
	3	62		28	175		53			78	
	4	64		29	180		54			79	
	5	65		30	190		55			80	
	6	66		31	190		56			81	
	7	66		32	190		57			82	
	8	68		33	200		58			83	
	9	68		34	210		59			84	
	10	70		35	215		60			85	
	11	70		135	350		61			86	
	12	71		37			62			87	
	13	72		38			63			88	
	14	80		39			64			89	
	15	100		40			65			90	
	16	110		41			66			91	
	17	110		42			67			92	
	18	130		43			68			93	
	19	135		44			69			94	
	20	155		45			70			95	
	21	140		46			71			96	
	22	135		47			72			97	
	23	140		48			73			98	
	24	170		49			74			99	
	25	170		50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1/4"	2	3	4	5	6
BLOWS PER INCH	80					270
MEASURED REBOUND IN INCHES	1/4"					
FINAL LENGTH OF PILE <u>135'-8"</u>	FINAL CUT OFF ELEVATION <u>614.00</u>					

REPORT TO BE SENT TO:-

GEOTECHNICAL OFFICE:  
 ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
 MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
 DOWNSVIEW, ONTARIO

SIGNED J. BATSAGUTSAS  
 NAME (PRINT) J. BATSAGUTSAS  
 DATE Jan-13-77  
 ATTACH SKETCH OF PILE NUMBERING SYSTEM

**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #9

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
CONTRACTOR FRANKI CANADA DESIGN LOAD OF PILE 120 TONS  
HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 lbs HEIGHT OF FALL OR ENERGY 26.300  
TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1179 lb  
PILE DETAILS: 12 3/4" O.D. X .25 WALL STEEL TUBE @ 33 lbs/ft 13 1/2" I.D. BATTER: 8:1  
PILE NO. 11 LOCATION SOUTH PIER FOOTING DATE DRIVEN JAN 19 1970

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1	5		26	11		51	21		76	27
	2	10		27	12		52	21		77	24
	3	10		28	14		53	21		78	25
	4	10		29	12		54	20		79	25
	5	12		30	12		55	22		80	25
	6	14		31	12		56	22		81	30
	7	14		32	12		57	22		82	25
	8	14		33	12		58	22		83	30
	9	14		34	12		59	19		84	29
	10	12		35	12		60	18		85	28
	11	10		36	15		61	18		86	30
	12	9		37	15		62	18		87	26
	13	9		38	14		63	20		88	30
	14	10		39	15		64	21		89	30
	15	11		40	14		65	22		90	30
	16	11		41	15		66	25		91	31
	17	12		42	15		67	25		92	30
	18	11		43	15		68	25		93	33
	19	11		44	15 STOP		69	25 STOP		94	32
	20	11		45	16 + 11 1/2		70	25		95	35
	21	11		46	18 + 12 1/2		71	20		96	31
	22	14		47	18 START		72	24		97	37
	23	14		48	18		73	24		98	38
	24	11		49	20		74	24		99	40
	25	11		50	20		75	24		100	40

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION					

REPORT TO BE SENT TO: -

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED \_\_\_\_\_

NAME (PRINT) \_\_\_\_\_

DATE \_\_\_\_\_

ATTACH SKETCH OF PILE NUMBERING SYSTEM

JAN-19  
11:35

NOTES:

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

# BRIDGE CONSTRUCTION - PILE DRIVING RECORD # 9

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 257-66-25  
 CONTRACTOR FRANKI CANADA DESIGN LOAD OF PILE 120 TONS  
 HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 HEIGHT OF FALL OR ENERGY 26,1300  
 TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 117916  
 PILE DETAILS 12" O.D. X 25' W.D. STEEL TUBE @ 23 1/2" / FT 13 1/2" / FT BATTER: 8:1  
 PILE NO. 11 LOCATION SOUTH PIER FOOTINGS DATE DRIVEN JAN 19-20-77

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1	42		26	360		51			76	
	2	44		27	380		52			77	
	3	46	10 1/2" AT	28	400		53			78	
	4	47		29			54			79	
	5	48		30			55			80	
	6	52		31			56			81	
	7	51		32			57			82	
	8	53		33			58			83	
	9	55		34			59			84	
	10	64		35			60			85	
	11	65		36			61			86	
	12	65		37			62			87	
	13	67		38			63			88	
	14	70		39			64			89	
	15	72		40			65			90	
	16	75		41			66			91	
	17	77		42			67			92	
	18	80		43			68			93	
	19	88		44			69			94	
	20	90		45			70			95	
	21	90		46			71			96	
	22	88		47			72			97	
	23	90		48			73			98	
	24	92		49			74			99	
	25	270		50			75			100	

HAMMER  
Blows  
Down  
+  
STOPPED  
2:55 AM  
START A.M.  
2:45:55  
NEXT DAY

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	110					290
MEASURED REBOUND IN INCHES						56"
FINAL LENGTH OF PILE	127'-4"					FINAL CUT OFF ELEVATION 614.50

REPORT TO BE SENT TO:-

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED John Batsacutsm  
 NAME (PRINT) JOHN BATSAUTSM  
 DATE JAN-20-77  
 ATTACH SKETCH OF PILE NUMBERING SYSTEM

**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

File Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #10

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 275-66-25  
CONTRACTOR FRANKI CANADA DESIGN LOAD OF PILE 120 TONS  
HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 HEIGHT OF FALL OR ENERGY 26,300  
TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1179  
PILE DETAILS 12" O.D. X 25.14' STEEL TUBE @ 33 LBS / FT 13 1/2" X 1 1/2" BATTER: 8° 1'  
PILE NO. 4 LOCATION NORTH PIER FOOT, WALKER RD STRUTHER DATE DRIVEN JAN 25 + 26-77

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1	8		26	20		51	25		76	75
	2	9		27	20		52	29		77	76
	3	16		28	20		53	28		78	75
	4	13		29	20		54	28		79	88
	5	12		30	20		55	27		80	85
	6	15		31	20		56	27		81	90
	7	15		32	20		57	27		82	85
	8	16		33	21		58	34		83	87
	9	16		34	21		59	32		84	80
	10	14		35	18		60	37		85	92
	11	14		36	18		61	42		86	94
	12	13		37	19		62	44		87	95
	13	13		38	23		63	43		88	80
	14	14		39	23		64	46		89	80
	15	16		40	22		65	48		90	84
	16	16		41	22		66	59		91	90
	17	18		42	21		67	60		92	90
	18	18		43	22		68	64		93	70
	19	17		44	22		69	67		94	80
	20	17		45	24		70	60		95	80
	21	18	32.5	46	25		71	70		96	80
	22	19	45.5	47	25		72	70		97	50
	23	20		48	24		73	74		98	51
	24	18		49	24		74	85		99	60
	25	14		50	26		75	78		100	61

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION					

REPORT TO BE SENT TO:-

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED \_\_\_\_\_

NAME (PRINT) \_\_\_\_\_

DATE \_\_\_\_\_

ATTACH SKETCH OF PILE NUMBERING SYSTEM



**NOTES:**

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter; e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.



# BRIDGE CONSTRUCTION - PILE DRIVING RECORD #10

DISTRICT NO. 1 CONTRACT NO. 76-75 STRUCTURE W.P. NO. 275-66-25  
CONTRACTOR FRANKI CANADA DESIGN LOAD OF PILE 120 TONS  
HAMMER DETAILS: TYPE L.B. 520 WEIGHT 5070 LB HEIGHT OF FALL OR ENERGY 26' 300  
TYPE OF ANVIL OR CAP L.B. WEIGHT OF ANVIL OR CAP 1178 LB  
PILE DETAILS 12 3/4" O.D. X 25' 11" STEEL TUBE @ 33 LB/FT 13 1/4" X 1 1/2" S&W BATTER: 8 1/2  
PILE NO. 4 LOCATION NORTH PIER FOOT. WALKER RD DATE DRIVEN JAN. 75  
25+26.6

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
	1	64		26	128		51			76	
	2	54		27	300		52			77	
	3	57	102.5	127.5			53			78	
	4	57		29			54			79	
	5	62		30			55			80	
	6	64		31		B2P	56			81	
	7	65		32		Rock	57			82	
	8	65		33			58			83	
	9	70		34			59			84	
	10	72		35			60			85	
	11	74		36			61			86	
	12	80		37			62			87	
	13	75		38			63			88	
Jan 2 64	14	80		39			64			89	
10-14	15	80		40			65			90	
	16	82		41			66			91	
	17	80		42			67			92	
	18	84		43			68			93	
	19	88		44			69			94	
	20	102		45			70			95	
	21	101		46			71			96	
	22	100		47			72			97	
	23	102		48			73			98	
	24	100		49			74			99	
	25	102		50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	90					240
MEASURED REBOUND IN INCHES	1"					
FINAL LENGTH OF PILE	127'-5"					FINAL CUT OFF ELEVATION 614.50

REPORT TO BE SENT TO:-

GEOTECHNICAL OFFICE  
ATTENTION: PRODUCT & PROCESS IMPROVEMENT SECTION,  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
DOWNSVIEW, ONTARIO

SIGNED John Bateman  
NAME (PRINT) J. BATACUT SAS  
DATE JAN 26 - 1977  
ATTACH SKETCH OF PILE NUMBERING SYSTEM

NOTES:

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 3/4" O.D. steel tube x 0.251" @ 33 lbs. per foot vertical. 12 3/4" x 1/2" steel plate shoe.

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The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

