

MEMORANDUM

40114-108  
GEOCRES No.

To: Mr. A. P. Watt, (2)  
Regional Structural Planning  
Eng.  
Southwestern Region,  
London, Ont.

FROM: Soil Mechanics Section  
Geotechnical Office  
Downsview, Ontario

ATTENTION:

DATE: December 17, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT:

CONT. 76-36

FOUNDATION INVESTIGATION REPORT  
For  
Thames River Bridge,  
London East Industrial Access Rd.  
City of London  
Township of Westminster, District #2  
London  
W.P. - 32-73-03 Site - 19-516

Attached we are forwarding to you our detailed foundation investigation report on the subsoil conditions existing at the above-mentioned 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:jw

CC: E. J. Orr  
B. R. Davis  
A. Wittenberg  
L. E. Walker  
B. J. Giroux  
J. R. Roy  
G. A. Wrong  
P. Lewycky

Files  
Documents

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- - - - -

FOUNDATION INVESTIGATION REPORT

FOR

THAMES RIVER BRIDGE,

London East Industrial Access Road

City of London

Township of Westminster, District 2, London

W. P. - 32-73-03 Site - 19-516

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1. INTRODUCTION:

A request for a foundation investigation for a structure at the above-mentioned site was received from Mr. A. P. Watt, Regional Structural Planning Engineer, South-Western Region, London.

A field investigation was subsequently carried out by the soil mechanics section to determine the subsoil conditions existing at the site. This report contains the results of our field and laboratory investigations, together with our recommendations relating to the design of the proposed structure foundations.

2. DESCRIPTION OF THE SITE:

The site of the proposed crossing is located approximately 800 feet south west of the junction of Crumlin and River Roads. At this location the Thames River is approximately 100 feet wide and up to 5 feet in depth, its bottom covered by a layer of cobbles and boulders. The flood plane land north of the river is relatively flat and covered with brush and occasional groves of trees. The bank at the southern shore rises 10 feet at approximately 2:1 slope to a step behind which the land slopes up more gently to level farm land. This area immediately south of the river is pastured and is dotted with occasional large hardwoods.

Physiographically, this site is located in the region referred to as the Mount Elgin Ridges.

### 3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of ten sampled boreholes were advanced using a hollow stem auger mounted on a bombardier.

Disturbed samples were obtained using a 2-inch O.D. split-spoon sampler driven according to the specifications for the Standard Penetration Test.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing # 327303-A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected representative samples to determine the following physical properties:

Atterberg Limits

Natural Moisture Content

Grain-size Distribution

The test results are summarized on the Record of Borehole sheets contained in the appendix of this report.

### 4. SUBSOIL CONDITIONS:

#### 4.1) General:

The subsoil, in general consists of a granular layer underlain by a deep glacial till deposit of hard silt to clayey silt with sand and traces of gravel. Beneath this some 35 feet below the river bed is shale bedrock.

The granular layer on the south bank is about 23 feet in depth and consists of compact to very dense layers of sand, gravel and silt. The granular layer on the flood plane to the north of the river consists of a shallow loose alluvial deposit of fine sand and silt. Further from the river a compact layer of sand and gravel is encountered overlying the hard glacial till deposit.

The boundaries between the different deposits are shown on the attached Record of Borehole sheets. The estimated

stratigraphical profile shown on Drawing # 327303-A is based upon this information. From ground level downwards, the different soil deposits are described as follows:

4.2) Sand with Gravel

This stratum was encountered on the south bank and at some distance from the river on the north bank. It appears to have been removed through erosion within and immediately to the north of the river where it has been replaced by a shallow deposit of loose fine sand and silt.

The sand and gravel stratum consists of layers of sand and varying amounts of gravel and silt. It has a relative density of compact to very dense and a moisture content varying from 3 to 18 percent.

4.3) Silt to Clayey Silt

This is the predominant soil deposit at this site. It was encountered in all boreholes. The material in the deposit consists of a heterogeneous mixture of clayey silt, sand and gravel of glacial origin.

Plots of Plasticity Index versus Liquid Limit of the overall stratum, fall within the ML & CL - ML range and are shown on Fig. 1 of the Appendix.

Grain-size analysis are plotted in an envelope form in Fig. 2.

Standard Penetration Test N values range from 75 to 100 blows for 3". The natural moisture content is low ranging from 5 to 8 percent.

4.4) Shale

Shale bedrock was encountered beneath the till layer in two deep boreholes.

4.5) Groundwater

Groundwater was encountered in the granular layer at a level equal to or slightly higher than the water level in the river.

5. RECOMMENDATIONS

5.1) General

It is proposed to construct the western bridge of

a high level twin structure for the London East Industrial Access Road to cross the Thames River. The total length of the proposed bridge is approximately 250 feet and consists of three spans which from the south are 82 feet, 100 feet and 71 feet in length. The grade of the bridge is approximately elevation 820 some 25 feet above normal water level. Recommendations pertaining to the structure foundations and approaches are discussed below.

## 5.2) Structure Foundations

### Abutments

The abutments may be constructed within the approach fills supported on end bearing steel piles driven through the fill into the hard stratum to practical refusal. Either steel H - piles or 12-3/4 x 1/4 steel tube piles may be used. The maximum allowable design load for the particular section chosen may be used for design purposes. It is estimated that the piles for the South Abutment will achieve the required design load at approximately elevation 780± and that the piles for the north abutment will achieve the design load at approximately elevation 785±.

### Piers

The piers may be supported on spread footing type foundations. The footing for the South Pier should be placed at or below elevation 787 and the footing for the North Pier at or below elevation 792. The exact depth of the footings will be determined by the Hydrology Section to provide adequate protection against scour. A safe bearing pressure of 3.5 tons-sq. ft. may be used for design purposes.

### Dewatering

The pier foundations will be founded below the ground water level or river water level. A dewatering scheme will therefore be required. It is suggested that excavations for pier footings should be carried out within sheet piles driven into the very dense glacial till deposit. It is anticipated that no heaving or boiling problems will be encountered in excavating for these footings due to the

impervious and slightly cohesive nature of the silt to clayey silt stratum in which they will be placed.

Settlements

Under the recommended loading settlements of the subsoil are anticipated to be of a negligible order, i.e. less than 1/2 inch.

5.3) Approach Embankment

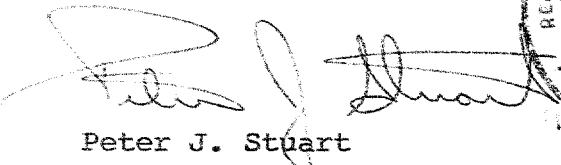
- (a) No stability problems are anticipated with the 20 foot high embankments required.
- (b) Rip-rap should be placed on embankments to the high water level.
- (c) An 18-inch blanket of granular A should be placed under the Rip-rap over fine sand and silt stratum on the south bank.

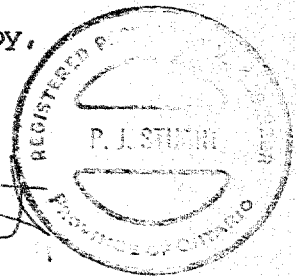
6. MISCELLANEOUS:

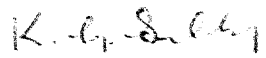
The field work on this project was carried out during the period November 8 to November 21, 1974 under the supervision of Mr. Peter Stuart, Project Foundation Engineer, who also prepared this report.

The equipment used was owned and operated by Atcost Drilling.

This report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

  
Peter J. Stuart  
Project Foundation Engineer



  
K. G. Selby  
Supervising Engineer

PJS:jw  
Dec 16/74

APPENDIX 1



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 1

W.P. 32-73-03 LOCATION Co-ords. 15,617,885 N; 1,365,992 E. ORIGINATED BY PJS  
DIST 2 HWY. Local BORING DATE November 18, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger 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 Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
806.3	Ground Level															% GR SA SI CL
0.0	Layers of sand, some gravel and silt.		1	SS		800						o				22 69 (9)
			2	SS												
	Very Dense		3	SS	60								o			0 89 (11)
			4	SS	75											
			5	SS	80	700							o			9 64 (27)
			6	SS	100 5"											
783.0			7	SS	100 3"	780							o			
23.3	Silt to clayey silt with sand, trace of gravel.		8	SS	96 1/2"											
	(Glacial Till)		9	SS	100 1/4"	770							o			5 40 49 6
	Hard		10	SS	100 1/6"											
			11	SS	85 1/2"	760							o			43 38 15 4
754.3			12	SS	100 1/4"											
52.0	Shale Bedrock		13	SS	760 5"											
751.6																
54.4	End of Borehole															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 2

W.P. 32-73-03 LOCATION Co-ords. 15,617,900 N: 1,366,019 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 10, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger 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	$w_p$	$w$	$w_L$		
806.4	Ground Level															
0.0	Layers of sand, some gravel and silt.		1	SS	15											
			2	SS	11	800										24 62 (14)
			3	SS	24											
			4	SS	95											2 85 (13)
	Compact to Very Dense		5	SS	94											
			6	SS	55	790										17 54 (29)
			7	SS												
782.9	Silt to clayey silt with sa. trace grav.		8	SS	100 5"											9 40 42 9
781.0																
25.4	End of Borehole															
	Note: Water Level not established.															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 3

W.P. 32-73-03 LOCATION Co-ords. 15,617,960 N: 1,365,969 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 19, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY

SOIL PROFILE		STRAT PLOT	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		NUMBER	TYPE		'N' VALUES	20	40	60	80	100	WATER CONTENT %				
							SHEAR STRENGTH					WATER CONTENT %				
							O UNCONFINED + FIELD VANE X QUICK TRIAXIAL X LAB VANE					10 20 30				
794.2	Water Level															
792.3	River Bottom														GR SA S: CL	
1.9	Silt to clayey silt with sand, trace of gravel.  (Glacial Till)  Hard		1	SS	60	790									9 53 36 2	
			2	SS	100	5"										
			3	SS	100	8"										
			4	SS	100	5"									9 37 47 7	
768.6			5	SS	100	8"	770									
25.6	End of Borehole															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 5

W.P. 32-73-03 LOCATION Co-ords. 15,618,062 N; 1,365,937 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 12, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY 72

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	$w_p$	$w$	$w_L$		
797.6	Ground Level															
0.0	Fine sand and silt															
793.1																
4.5	Silt to clayey silt		1	SS	100	5"										
	with sand, trace of		2	SS	105	6"										27 38 29 6
	gravel.		3	SS	100	2"										
	(Glacial Till)		4	SS	111	6"										
	Hard		5	SS	85	4"										9 41 40 10
767.1			6	SS	130	6"										
30.5	End of Borehole															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 6

W.P. 32-73-03 LOCATION Co-ords. 15,618,079 N; 1,365,978 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 12, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY PJS

SOIL PROFILE		SAMPLES			GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT <u>W<sub>L</sub></u> PLASTIC LIMIT <u>W<sub>P</sub></u> WATER CONTENT <u>W</u>			UNIT WEIGHT $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	VALUES	20	40	60	80	100	<u>W<sub>P</sub></u>	<u>W</u>	<u>W<sub>L</sub></u>		
796.2	Ground Level														
0.0	Fine sand and silt														
791.7															
4.5	Silt to clayey silt with sand, trace of gravel.  (Glacial Till)  Hard		1	SS	03/6"	790					o				6 41 46 7
			2	SS	11/6"	6"									
			3	SS	11/6"	6"					o				9 42 39 10
			4	SS	10/6"	6"									
			5	SS	10/6"	6"					o				12 37 41 10
765.8			6	SS	10/6"	6"					o				
30.4	End of Borehole														

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 7

W.P. 32-73-03 LOCATION Co-ords. 15,618,125 N; 1,365,917 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 8, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY E.P.

SOIL PROFILE		STRAT. PLOT	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		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
798.4	Ground Level															GR SA. SI. CL.
0.0	Fine sand and silt															
793.4																
5.0	Silt to clayey silt with sand, some gravel.  (Glacial Till)  Hard		1	SS	134											16 37 37 10
			2	SS	100.5"	790										
			3	SS	100.5"											
			4	SS	100.5"											
			5	SS	100.7"	780										16 38 38 10
			6	SS	100.8"											
			7	SS	75.6"	770										18 37 34 11
			8	SS	100.7"											
			9	SS	100.3"	760										
			10	SS	100.3"											3 77 (20)
751.4																
47.0	Shale Bedrock					750										
748.1																
50.3	End of Borehole															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 8

W.P. 32-73-03 LOCATION Co-ords. 15,618,145 N; 1,365,957 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 14, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Sam Auger 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	$w_p$	$w$	$w_L$		
796.1	Ground Level															
0.0	Fine sand and silt															
793.3																
2.8	Silt to clayey silt with sand, some gravel. (Glacial Till)  Hard		1	SS	100.5"	790										
			2	SS	100.7"											
			3	SS	102.6"	780										15 35 40 10
			4	SS	100.5"											
770.1			5	SS	102.6"											17 35 39 9
26.0	End of Borehole															

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 9

W.P. 32-73-03 LOCATION Cor-ords. 15,618,261 N; 1,365,899 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 14, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY AC

SOIL PROFILE		STRAT. PLOT	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		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
796.5	Ground Level															GR SA. SI. CL.
0.0	Fine sand & silt															
1.5	Silt to clayey silt with sand, trace of gravel.  (Glacial Till)  Hard		1	SS	74	6"						0				
			2	SS	109	6"										
			3	SS	114	6"						0				7 36 46 11
			4	SS	161	10"										
770.5			5	SS	71	6"						0				6 30 47 17
26.0	End of Borehole															



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 10

W.P. 32-73-03 LOCATION Co-ords. 15,618,356 N; 1,365,868 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 15, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger 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 $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$	
799.2	Ground Level														
0.0	Sand, some gravel. Very Dense		1	SS	100.5"	790									21 73 (6)
791.7			2	SS	78.7"										
7.5	Silt to Clayey silt with sand, some grav. (Glacial Till) hard		3	SS	100.5"	780									19 32 38 11
			4	SS	92.7"										
772.7			5	SS	73"										9 31 41 19
26.5	End of Borehole														

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 11

W.P. 32-73-03 LOCATION Co-ords. 15,618,450 N; 1,365,934 E. ORIGINATED BY PJS  
DIST. 2 HWY. Local BORING DATE November 15, 1974 COMPILED BY PJS  
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY P.D.

SOIL PROFILE		STRAT. PLOT	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		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
800.5	Ground Level															GR. SA. SI. CL.
0.0	Sand, some gravel.		1	SS	14	780										3 93 (4)
	Compact		2	SS	20	790										
783.5			3	SS	28											20 75 (5)
17.0	Silt to clayey silt with sand, trace of gravel. (Glacial Till)		4	SS	75/8"	780										
			5	SS	81											
770.0	Hard		6	SS	120/6"											5 43 42 10
30.5	End of Borehole															

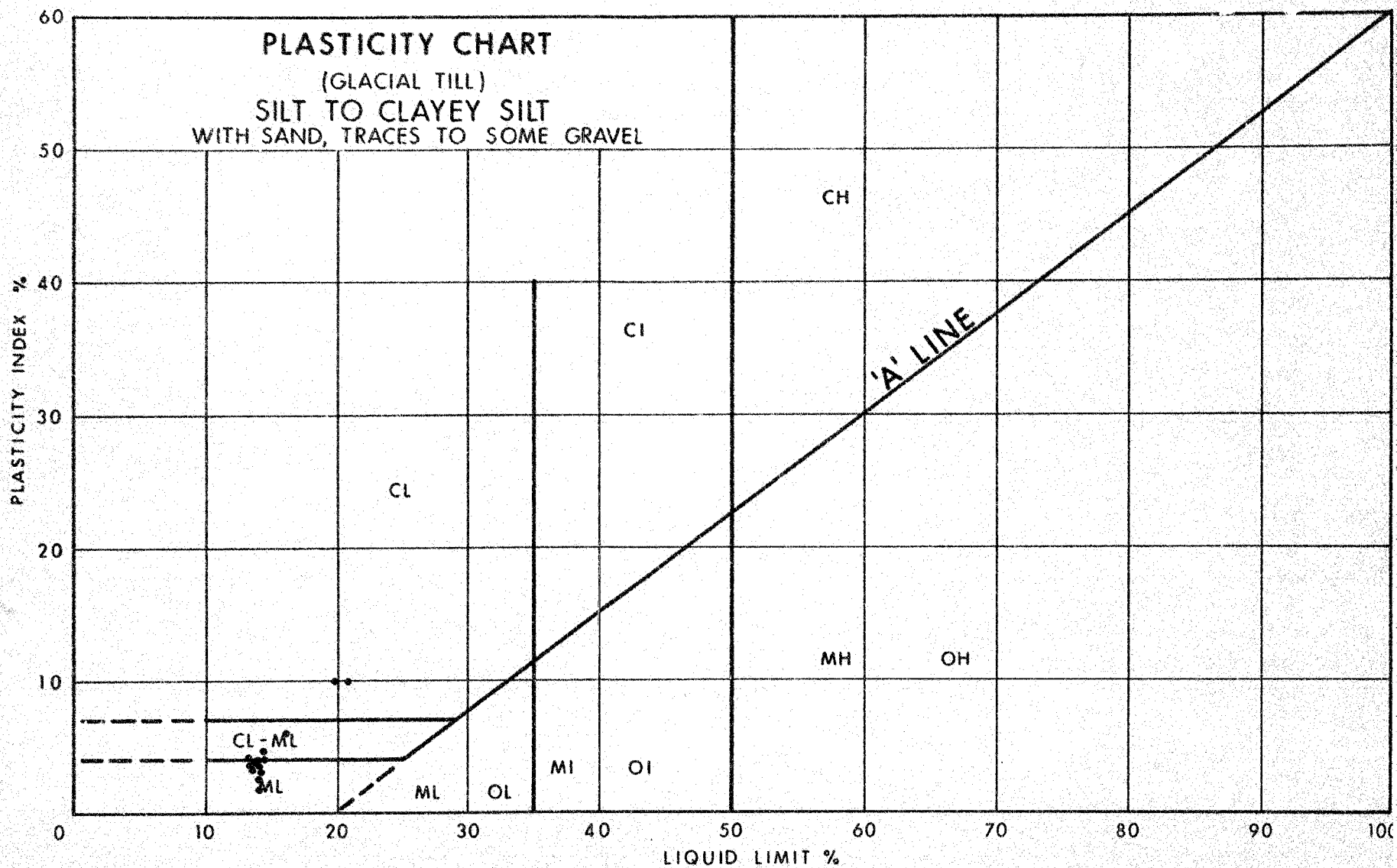


FIG. 1

# GRAIN SIZE DISTRIBUTION

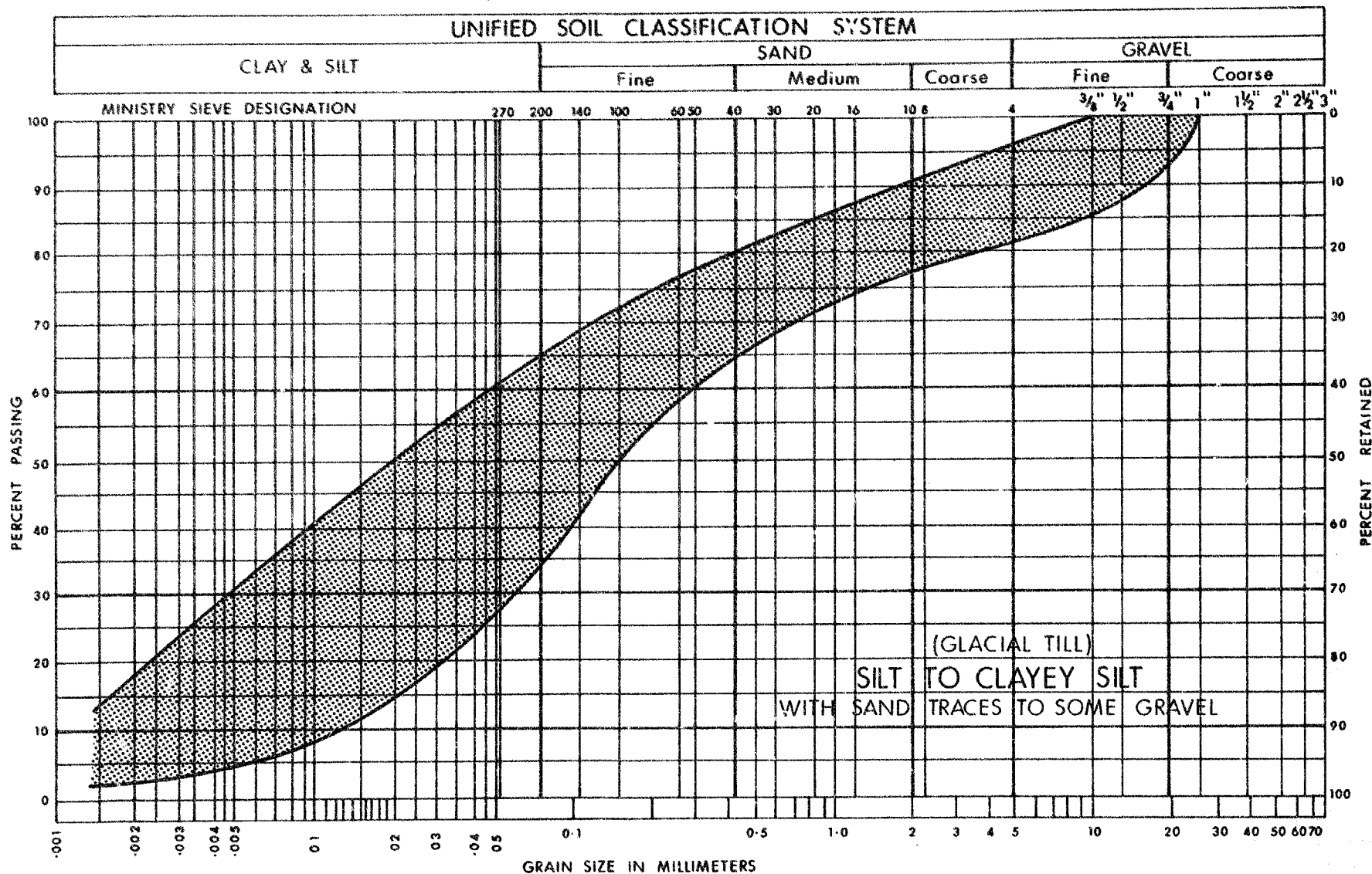


FIG. 2

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
CU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" " ANISOTROPIC UNDRAINED "		
CAO	" " DRAINED "		

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTSOIL 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
$S_t$	SENSITIVITY

IN TERMS OF  
EFFECTIVE STRESS  
 $\tau_f = c' + \sigma' \tan \phi'$

IN TERMS OF  
TOTAL STRESS  
 $\tau_f = c_u + \sigma \tan \phi$

GENERAL

$\pi$	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF $\sigma$
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF $\sigma$ 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









# BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 2 CONTRACT NO. 76-36 STRUCTURE W.P. NO. 32-73-03  
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 95T.  
HAMMER DETAILS: TYPE B225 WEIGHT        HEIGHT OF FALL OR ENERGY 39,000  
TYPE OF ANVIL OR CAP        WEIGHT OF ANVIL OR CAP 1100  
PILE DETAILS HP 12x74 BATTER:         
PILE NO. 10 LOCATION SOUTH ABUTMENT DATE DRIVEN AUG 18/76

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.
44.0	1	2		26	428		51			76	
	2	2		27			52			77	
	3	2		28			53			78	
	4	2		29			54			79	
	5	10		30			55			80	
	6	11		31			56			81	
	7	20		32			57			82	
	8	28		33			58			83	
	9	32		34			59			84	
	10	40		35			60			85	
	11	57		36			61			86	
	12	60		37			62			87	
	13	35		38			63			88	
	14	34		39			64			89	
	15	43		40			65			90	
	16	46		41			66			91	
	17	62		42			67			92	
	18	64		43			68			93	
	19	74		44			69			94	
	20	76		45			70			95	
	21	96		46			71			96	
	22	143		47			72			97	
	23	200		48			73			98	
	24	190		49			74			99	
	25	185		50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	46	46	46	50	50	60
MEASURED REBOUND IN INCHES	1/4	1/4	1/4	1/4	1/4	1/4
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION <u>730.00</u>					

REPORT TO BE SENT TO:-

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

SIGNED [Signature]  
NAME (PRINT) T.G. WATERS  
DATE AUG 18/76  
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

DISTRICT NO. 2 CONTRACT NO. 76-36 STRUCTURE 'P. NO. 32-73-03  
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 95T  
HAMMER DETAILS: TYPE B225 WEIGHT \_\_\_\_\_ HEIGHT OF FALL OR ENERGY 29,00  
TYPE OF ANVIL OR CAP \_\_\_\_\_ WEIGHT OF ANVIL OR CAP 1100  
PILE DETAILS HP 12x74 BATTER: \_\_\_\_\_  
PILE NO. 17 LOCATION NORTH ABUTMENT DATE DRIVEN AUG 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.
27 1/2	1			26			51			76	
	2			27			52			77	
	3			28			53			78	
	4	6		29			54			79	
	5	8		30			55			80	
	6	11		31			56			81	
	7	23		32			57			82	
	8	60		33			58			83	
	9	110		34			59			84	
	10	162		35			60			85	
	11	201		36			61			86	
	12	244		37			62			87	
	13	244		38			63			88	
	14	224		39			64			89	
	15	238		40			65			90	
	16			41			66			91	
	17			42			67			92	
	18			43			68			93	
	19			44			69			94	
	20			45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	20	20	20	20	20	20
MEASURED REBOUND IN INCHES	1/4	1/4	1/4	1/4	1/4	1/4
FINAL LENGTH OF PILE	FINAL CUT OFF ELEVATION <u>785.00</u>					

REPORT TO BE SENT TO: -

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

SIGNED T. G. WATERS  
NAME (PRINT) T. G. WATERS  
DATE AUG 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.

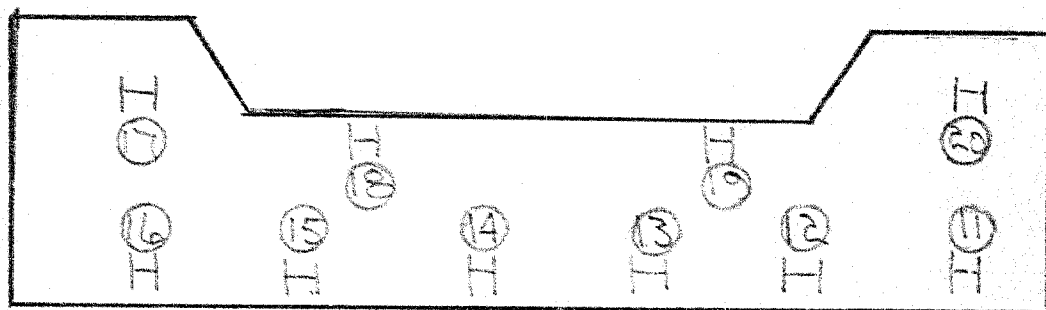
The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

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

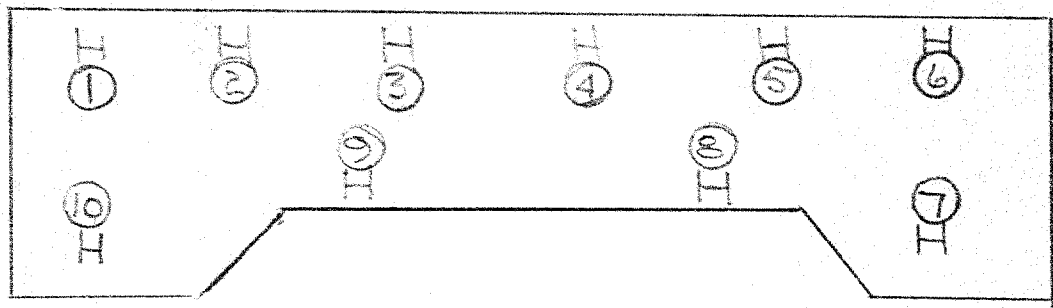
Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.



NORTH ABUT FIG.



SOUTH ABUT FIG.



MEMORANDUM

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

FROM: Structural Planning Office  
Southwestern Region

ATTENTION:

DATE: September 11, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 32-73-03, Bridge Site 19-516  
Thames River Bridge  
London East Industrial Access Road  
District 2, London

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

I have enclosed two copies of the bridge site plan E-5353-1 with the probably footing locations marked in red. Also enclosed is a Field Reconnaissance Report.

In addition we should have boreholes located at Stations 226 + 40, 227 + 40, 228 + 40, 229 + 40 and 230 + 40 to cover possible Ministry of Natural Resources requirements (Regional Flood Design).

*Consult  
M.N.R. prior  
to doing this  
work - it  
may be  
recoverable!*

*S. Jants*

S. Jants  
Structural Planning Supervisor

SJ:sm  
Enc.

cc A. Crowley

P.S. I would like to bring to your attention that a Foundation Investigation Report W.O. 73-11089 has been prepared for the London East Industrial Access Road.

*C.C. J. Anderson*



Telephone: (416) 248-3282

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

October 29th, 1974.

Atcost Drilling Inc.,  
2160 Hwy. 7,  
CONCORD, Ontario. L4K 1B6

Dear Sirs:

This letter confirms our request by telephone of October 28th, 1974 for the supply of an Auger Machine, Mustang Vehicle Mounted, (Item No. 5.2(1) ), together with all necessary equipment, as per your Tender for Supply Contract S-74-2110, at London, Ontario, on November 7th, 1974.

Mobilization will be from London, Ontario.

Our Project Number is W.P. 32-73-03.

Yours truly,

M. Devata,  
Supervising Engineer.

MD/mj  
c.c. W.W. Fry  
(ATTN: Mrs. M. Porter)

Files (2)  
Documents

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

Copy for the information of K. Selby Attn. P. Stewart

Mr. F. E. Loscombe,  
Regional Super't. of Eng. Surveys,  
Southwestern Region - London

Mr. W. R. Agnew,  
Field Supervisor, Eng. Surveys,  
Southwestern Region - London.

F. J. Rule

November 20th, 1974.

W.P. 32-73-02 & 03, JOB #90-74,  
LONDON INDUSTRIAL ACCESS ROAD,  
TOWNSHIP OF WESTMINSTER, COUNTY OF MIDDLESEX,  
DISTRICT NO. 2 - LONDON,  
PARTY CHIEF: W. E. FISCHER

Please be advised that a request received from P. Stewart of Soil Mechanics Section, dated Nov. 1974 was begun and completed on November 14th, 1974, and field notes are now in Engineering Surveys drafting section.

Alignment: -

As shown on E.T.R. sheets.

Boreholes: -

The boreholes were established on sites by P. Stewart and tied into the  $\pm$  of L.I.A.R. by plus and offsets.

Elevations were taken at these boreholes using information shown on E.T.R. sheets.

These notes were reduced and checked and a copy left with P. Stewart.

I am turning over to you the following field information: -

- 1 book borehole location notes.



W. R. Agnew,  
Field Supervisor, Eng. Surveys,  
Southwestern Region - London.

C.C. Messrs. A. Wittenberg  
Attn. M. Duckett  
K. Selby  
Attn. P. Stewart ✓  
A. Crowley

WRA:beo



Mr. A.P. Watt,  
Reg. Structural Planning Engineer,  
Southwestern Region, London.

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

December 3rd, 1974.

RE: Thames River Bridge, EHL and WBL,  
London East Industrial Access Road,  
District #2, London,  
W.P. 12-73-03, Site 19-516.

A foundation investigation was recently completed at the abovementioned site. Due to the urgency of this project we are sending you in summary form a brief description of the subsoil conditions at the site and our recommendations on footing design.

It is proposed to construct at this time, one bridge of a high level twin structure where the London East Industrial Access Road crosses the Thames River. The total length of the bridge is approximately 150 feet and its grade is about elev. 620, some twenty-five feet above normal water level. This will necessitate approach fills of about 20 feet at the north and south abutments. The three spans from the south are 82 feet, 100 feet and 71 feet.

#### Subsoil Conditions:

The subsail, in general consists of a granular layer underlain by a deep hard glacial till deposit consisting of silt to clayey silt some sand and a trace of gravel. Beneath this, some 35 feet below the bed of the river is shale bedrock.

The granular layer on the south bank is about 23 feet in depth and consists of compact to very dense layers of sand, gravel and silt. The granular layer on the flood plane to the north of the river consists of a shallow loose aluvial deposit of fine sand and silt. Further from the river a compact layer of sand and gravel is encountered overlying the hard till deposit.

#### Recommendations:

##### 1. Abutments:

The abutments may be constructed within the approach fills supported on end bearing steel piles driven through the fill into the hard silt to clayey silt stratum to practical refusal. It is estimated that the piles for the south Abutment will meet refusal at approximately elevation 780± and that the piles for the north abutment will meet refusal at approximately 785±. Either steel H-piles or

December 3rd, 1974.

or 12-3/4 x 1/4 steel tube piles may be used. The maximum allowable design load for the particular section chosen may be used for design purposes. During construction of the approach fills material greater than 3 inches in diameter must not be placed where it will interfere with the driving of piles.

2. Piers.

The piers may be supported on spread footing type of foundations placed at or below the following elevations. Footing for the South Pier at or below elevation 787. Footing for the North Pier at or below elevation 792. The exact depth of the footings will be determined by the Hydrology Section to provide adequate protection against scour. A safe bearing pressure of 3.5 tons/sq. ft. may be used for design purposes. It is anticipated that no heaving or bailing problems will be encountered in excavating for these footings which are below the ground water level.

3. Approaches.

- (a) No stability problems are anticipated with the 20-ft. high embankments required.
- (b) Rip-rap should be placed on embankments to the high water level.
- (c) An 18-inch blanket of granular A should be placed under the rip-rap over fine sand and silt strata on the south bank.

4. Settlements.

Under the recommended loading settlements of the subsoil are anticipated to be of a negligible order, i.e. less than 1/4 inch.

The complete report will be forwarded to you as soon as possible. Please do not hesitate to call us if you have any questions on the above recommendations.

Peter Stuart,  
Project Engineer,  
For: K.G. Selby,  
Supervising Engineer.

PS/mj  
C.C. A. Crowley  
J. Anderson  
J. Keen  
A. Wittenberg



Ministry of  
Transportation and  
Communications

## Memorandum

To: A. P. Watt,  
Regional Structural Planning Eng.,  
Southwestern Region, London.

From: Structural Office,  
West Building, Downsview.

Attention:

Date: April 23, 1975.

Our File Ref.

In Reply to

Subject: Thames River Bridge (South Branch)  
W.P. 32-75-03, Site 19-516  
Highway L.E.I.A.R., District 2.

Attached herewith are prints of the Preliminary Bridge Plan Drawing 19-516-P1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$377,000.00 which includes tender, materials, engineering and sundry construction.

We have sent a copy of the Preliminary Plan to the Hydrology Office for their comments.

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

CSG/cf  
Attn.

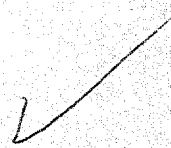
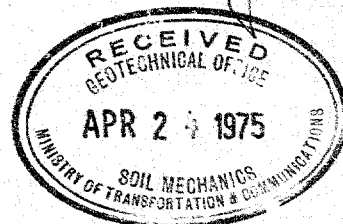
C. S. Grebski,  
Structural Design Engineer.

c.c. B. R. Davis  
W. D. Birch  
A. E. McKim  
J. L. Keen  
M. Stoyanoff  
C. Mirza  
J. Harris  
J. Anderson  
A. Crowley  
S. Edwards

*No Comment*

*May 26/75*

*John J. Stuart*





Ministry of  
Transportation and  
Communications

## Memorandum

To: Mr. C. Mirza,  
Head, Soil Mechanics Section,  
West Building, Downsview.

From: Structural Office,  
West Building, Downsview.

Attention:

Date: August 25th, 1975.

Our File Ref.

In Reply to

Subject:

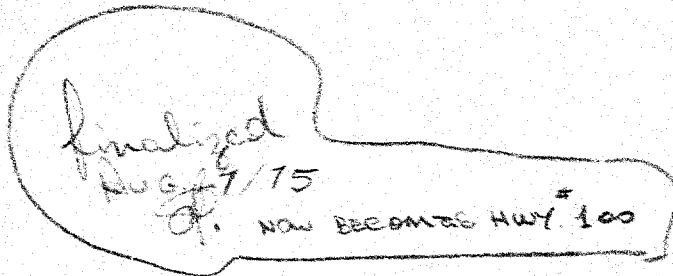
Thames River Bridge,  
W.P. # 32-73-03 Site # 19-516  
Highway # L.E.I.A. District # 2



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.

CSG/cf  
Attch.

C. S. Grebski,  
Structural Design Engineer.



No comments



## Memorandum

To: SEE BELOW

From: Structural Office,  
Structural Review Committee.  
West Building, Downsview.

Attention:

Date: October 23, 1975.

Our File Ref.

In Reply to

Subject:

Highway 401 Underpass,  
Site 19-515, W.P. 32-73-02

Thames River Bridge,  
Site 19-516, W.P. 32-73-02#3  
Highway 100, District 2

*W.P. 133-70-2*

Please be advised that a meeting of the Structural Review Committee is to be held on November 12th, 1975, at 9:30 A.M. in Boardroom "B" of the West Building to review the above mentioned structures.

Would you please arrange for yourself or your representative to attend.

MS/cf

*M. Stoyanoff*

M. Stoyanoff,  
Structural Contract Engineer.

TO: A. E. McKim  
C. Mirza  
W. Birch  
J. Harris  
C. Grebski  
W. McFarlane



DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40 I-14-108

DIST. 2 REGION SOUTH WESTERN

W.P. No. 32-73-03

CONT. No. 76-36

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

STR. SITE No. 19-516

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

LOCATION Thames River Bridge on

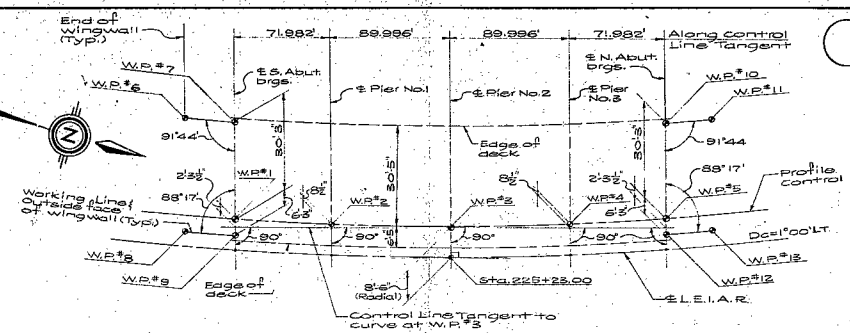
London west Industrial Access Rd.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: (2) documents to be included  
before microfilming







W.P.'s	Station	Coordinates		W.P.'s	Station	Coordinates	
		North	East			North	East
WP#1	223+60.76	15617993.53	13659913.96	WP#8	223+41.43	15617875.97	13660024.8
WP#2	224+52.86	15617069.27	1365974.88	WP#9	223+60.94	15617894.95	13660930.06
WP#3	225+28.00	15618050.39	1365962.20	WP#10	226+86.10	15618199.48	1366878.98
WP#4	226+13.15	15618317.15	1365928.35	WP#11	227+05.73	15618217.15	1366873.37
WP#5	226+85.24	15618226.27	1365980.21	WP#12	227+85.06	15618207.89	1366914.25
WP#6	223+40.26	15617866.53	1365967.20	WP#13	227+04.57	15618226.57	1366908.65
WP#7	223+59.89	15617885.51	13659621.73				

All stations given are in reference to § LEI.A.6

# SITE LAYOUT PLAN

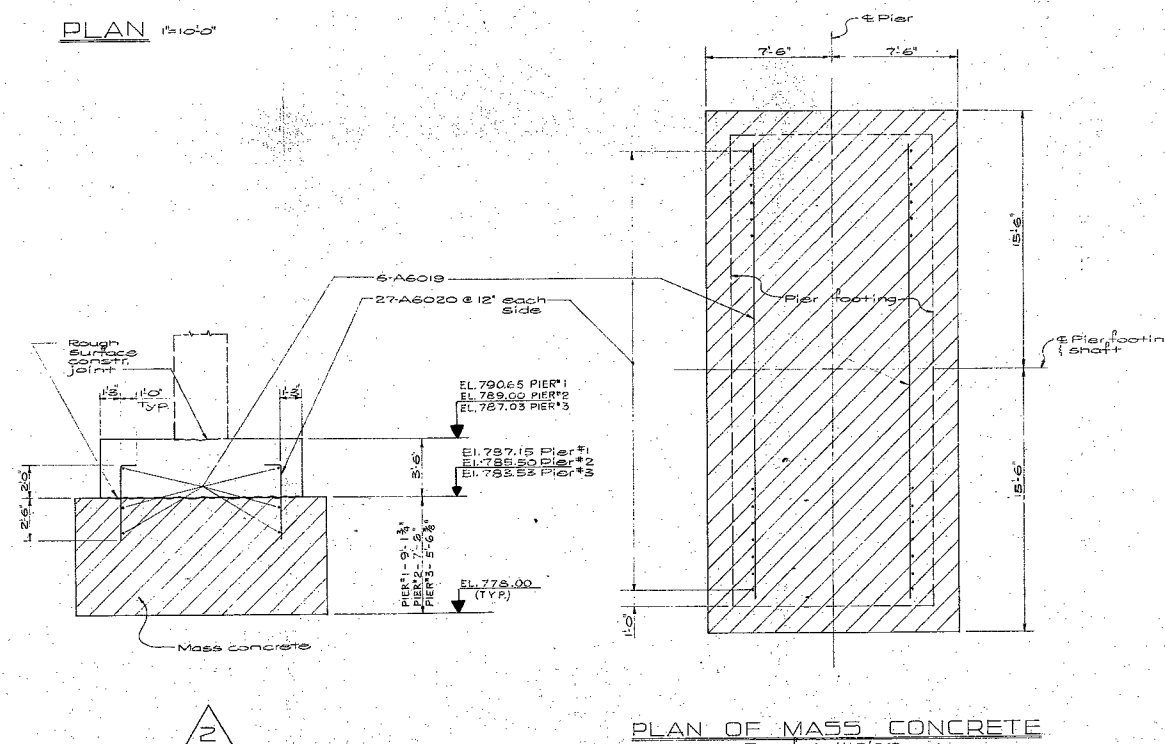
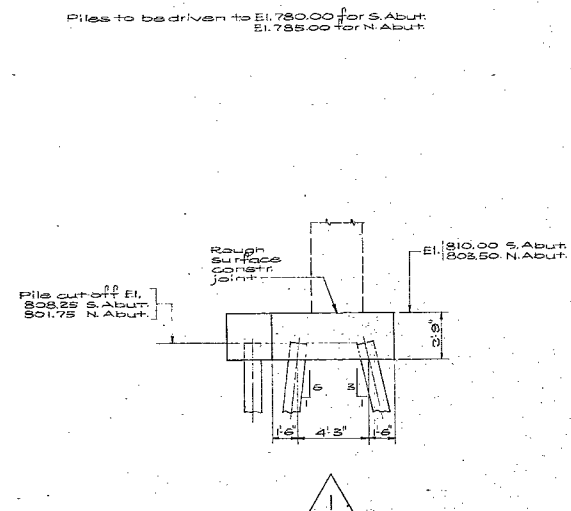
## NOTE

S. & N. Abutment footings similar  
S. footing showing typ. pile layout.  
N. footing showing typ. dimensions.  
Dimensions shown for Pier No. 2  
footings are typical for all other  
pier footings.  
For full details of abut. & pier  
reinf. see Dwg. 19-516-4 & 5 respectively.

PLAN 1"=10'-0"

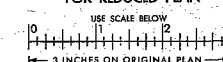
PILE DATA		
HP 12x74 piles		
Location	No. of piles	Pile length
South Abut. Front	6	52'-0"
Back	4	30'-0"
North Abut. Front	6	20'-0"
Back	4	18'-0"

Piles to be driven to El. 780.00 for S. Abut.  
El. 785.00 for N. Abut.



PLAN OF MASS CONCRETE  
Typ. for all piers

FOR REDUCED PLAN



### CONSTRUCTION NOTES

The Contractor's proposed method of excavation for mass concrete and dewatering of pier footings shall be approved by the engineer.

REVISIONS				
	DATE	BY	DESCRIPTION	

Cont-16-36

COX-76-34

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS  
ONTARIO

## THAMES RIVER BRIDGE

KING'S HIGHWAY No. 100 (L.E.I.A.R.) S.E. LINES DIST. No. 2  
CO. of Middlesex  
TWP. of Westchester LOT 4 CON. I. B. F.

## FOOTING LAYOUT &amp; SITE LAYOUT PLAN

APPROVED _____				CONTRACT No. _____	
STRUCTURAL ENGINEER					
DESIGN	A.K.	CHECK	J.L.R.	W.P. No.	32-73-03
DRAWING	D.C.	CHECK	A.K.		
DATE	10-20-44			SITE No. 19-516	SHEET 3