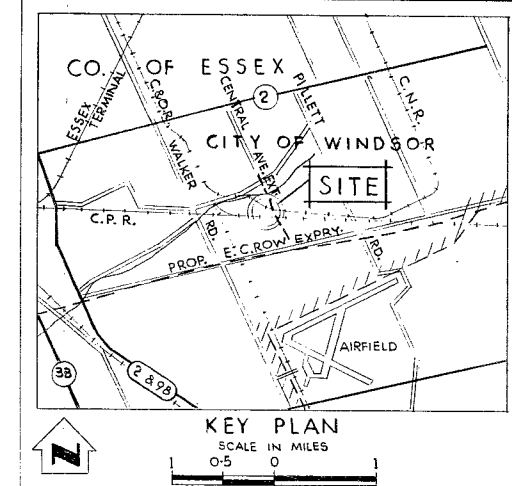
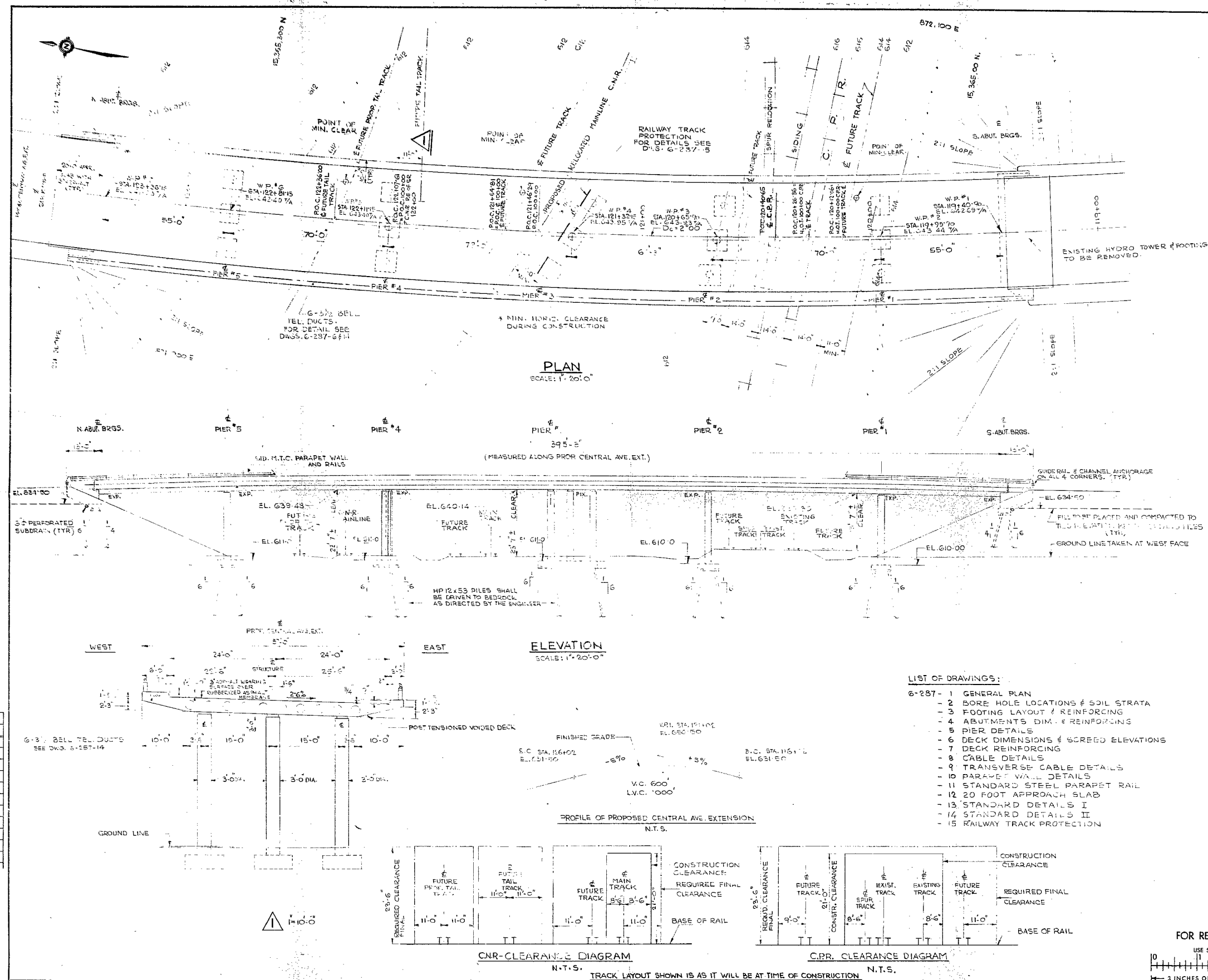


DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 4057-10
DIST. 1 REGION SOUTHWESTERN
W.P. No. 257-66-09
CONT. No. 75-082
W.O. No. 71-11118
STR. SITE No. 6-287
HWY. No. ERE
LOCATION CPR + CNR CROSSING

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: 2 documents to be unfolded
before microfilming



GENERAL NOTES:
CLASS OF CONCRETE:
DECK, CURBS ON DECK & PIERS - 5000 P.S.I.
PARAPET WALLS - 4000 P.S.I., REMAINDER - 3000 P.S.I.

CLEAR COVER TO REINFORCING STEEL :
DECK: TOP 1 1/2" BTM. 1"
CURBS 2"
PARAPET WALLS 1 1/2" REMAINDER 3"

CONSTRUCTION NOTES:
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS
DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF $\pm 1/8"$.
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT
BEARING SEATS UNTIL THE DECK HAS BEEN PLACED, STRESSED
AND GROUTED.

DHO B-M:5330-66 G17-972
TWO AND ONE HALF STOREY FRAME HOUSE (MASONIC TEMPLE)
ON THE SOUTH SIDE OF E.C. ROW AVENUE EAST, BEING
1 MILE EAST OF THE INTERSECTION OF WALKER ROAD AND
E.C. ROW AVENUE EAST AND 313 FEET SOUTH OF CENTRELNE
OF PAVEMENT. TABLET IS SET HORIZONTALLY IN WEST
FACE OF 5/6" CONCRETE FOUNDATION, BEING 5/6 FEET SOUTH
OF THE NORTH FACE OF CONCRETE AND 1 FEET BELOW TOP
OF FOUNDATION. ROUTE 13 WINDSOR.

40J7-10
GEOCRES No.

REVISIONS			
	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

71-11-118

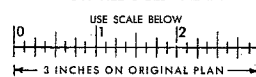
C.N.R. & C.P.R. O'HEAD
CENTRAL AVE. EXTENSION

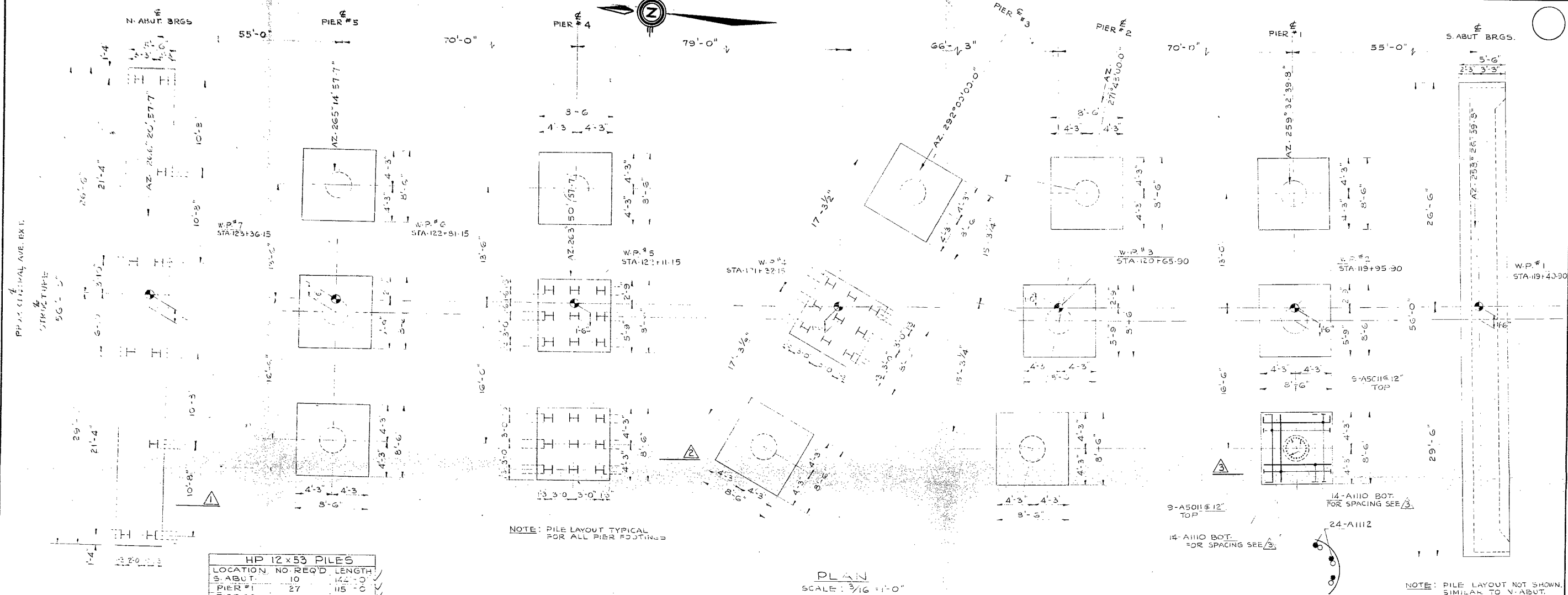
KING'S HIGHWAY No. E.C. ROW EXPSWY. DIST. No. 1
CO. OF ESSEX
CITY OF WINDSOR LOT 102 CON. 2

GENERAL PLAN

APPROVED			CONTRACT No. 71-11-118	
STRUCTURAL ENGINEER				
DESIGN	J. G.	CHECK	W.P. No.	257-66-09
DRAWING	太	CHECK		
		D. G.		
DATE	SEPT. 1973	LOADING	SITE No. 6-287	SHEET 1
		HS 20-44		

FOR REDUCED PLAN





HP 12x53 PILES

LOCATION	NO. REQ'D	LENGTH
S. ABUT.	10	142'-0"
PIER #1	27	115'-0"
PIER #2	27	115'-0"
PIER #3	27	117'-0"
PIER #4	27	117'-0"
PIER #5	27	117'-0"
N. ABUT.	10	144'-0"

PLAN
SCALE: 3/16" = 1'-0"

LOCATION OF WORKING POINTS

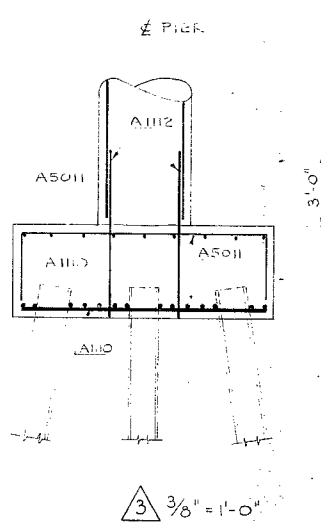
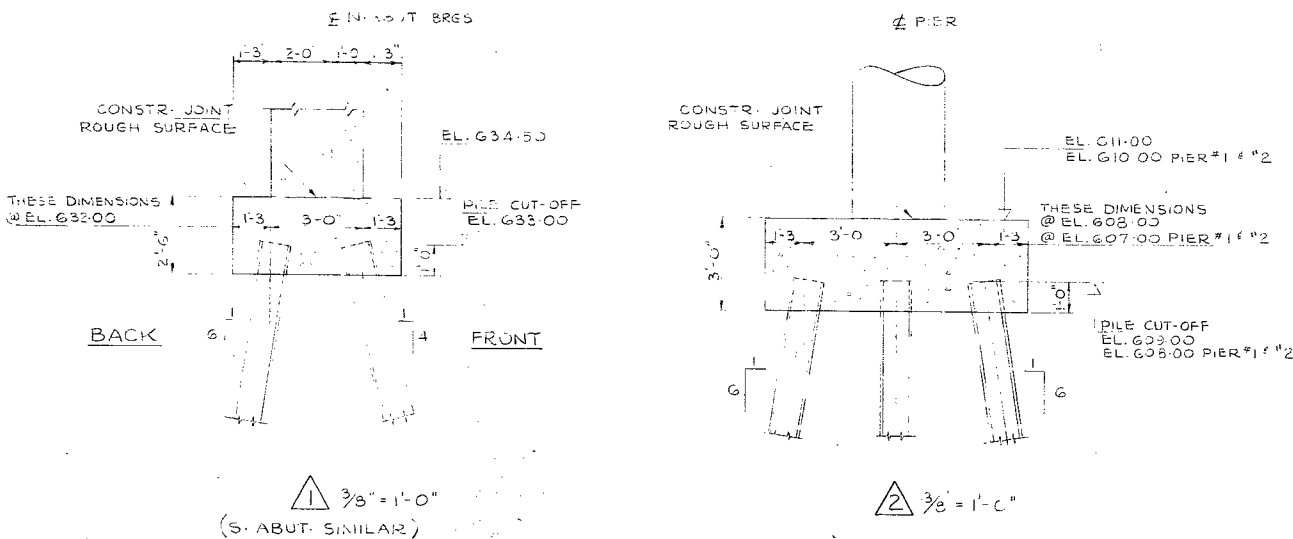
BRIDGE POINTS DESCRIPTION	CO-ORDINATES	
	N	E
W.P. #1	364 973.74	372 015.68
W.P. #2	365 027.73	372 005.18
W.P. #3	365 036.72	371 993.32
W.P. #4	365 162.26	371 983.65
W.P. #5	365 240.63	371 974.11
W.P. #6	365 310.36	371 967.46
W.P. #7	365 365.21	371 963.43

NOTE: PILE LAYOUT NOT SHOWN.
SIMILAR TO V. ABUT.

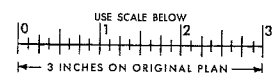
4017-10
GEOLOGICAL

PRINT RECORD

No.	FOR	DATE



FOR REDUCED PLAN



REVISIONS

DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

71-11-118

C.N.R. & C.P.R. O'HEAD
CENTRAL AVE. EXTENSION

KING'S HIGHWAY No. E.C. ROW EXP. SWY. DIST. No. 1

CO. OF ESSEX

CITY OF WINDSOR LOT 102 CON. 2

FOOTING LAYOUT & REINFORCING

APPROVED _____ CONTRACT No. 11-11-118

DESIGN _____ CHECK _____ W.P. No. 257-66-09

DRAWING D.G. CHECK _____

DATE SEPT. 1973 LOADING HS 20-44 SITE No. 6-287 SHEET 3

Department of Transportation and Communications

~~XXXXXXXXXXXXXXXXXXXX~~

MEMORANDUM

TO: Mr. A. P. Watt, (2) FROM: Foundations Office,
Regional Bridge Planning Engineer, Design Services Branch,
Southwestern Region, Central Bldg., Downsview.
London, Ontario.

ATTENTION: DATE: January 3, 1972.

OUR FILE REF. IN REPLY TO JAN 6 1972

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For

Proposed Central Ave. Extension
And C.P.R. & C.N.R. Railway Crossing
Lot 103, Con. 2
City of Windsor - County of Essex
District #1 (Chatham)
W.J. 71-11118 --- W.P. 257-66-09



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

AGS/ao
Attach.

cc: Messrs. D. W. Parren
B. R. Davis
A. Rutka
V. A. Zonnenberg
R. C. Brown
B. J. Giroux
J. R. Roy
G. A. Wrong
B. A. Singh

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

Foundations Files ✓
Documents

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 - 4.2) Clayey Silt with Sand and Traces of Gravel
 - 4.3) Limestone Bedrock
5. GROUNDWATER CONDITIONS
6. DISCUSSION AND RECOMMENDATIONS
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 - 6.3) Approach Embankments
7. MISCELLANEOUS

FOUNDATION INVESTIGATION REPORT
For
Proposed Central Ave. Extension
and C.P.R. & C.N.R. Railway Crossing
Lot 103 -- Con. 2
City of Windsor - County of Essex
District #1 - (Chatham)
W.J. 71-11118 -- W.P. 257-66-09

1. INTRODUCTION:

A request for a foundation investigation at the crossing of the Proposed Central Ave. Extension and Canadian Pacific and Canadian National Railway, was received from Mr. A. P. Watt, Regional Bridge Planning Engineer, in a memorandum dated October 12, 1971.

A preliminary foundation investigation covering this area. was carried out in April 1968 (68-11015-3). A more detailed field investigation was subsequently carried out to determine the subsoil conditions existing at the site.

This report contains the results of both investigations and our recommendations pertaining to the design of the proposed structure(s) foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed overpass structure is situated in the eastern part of the City of Windsor.

The surrounding terrain is flat and cultivated farm land.

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

3. FIELD AND LABORATORY INVESTIGATION PROCEDURE:

A total of 6 sampled boreholes and 11 dynamic cone penetration tests was carried out during the course of the field work. Boring was achieved by means of bombardier mounted continuous flight auger machines and conventional diamond drilling equipment adapted for soil sampling purposes. During the field work disturbed samples were obtained by means of a standard split-spoon sampler; the energy used in driving it conformed to the requirements of the Standard Penetration Test. "Undisturbed" samples

were recovered using 2 inch I.D. shelly tubes which were pushed into the soil hydraulically or by hand. Where possible field vane tests were carried out at elevations generally 12 inches below sampler depths.

Dynamic cone penetration tests were carried out adjacent to each borehole, with the exception of B.H.#79, and also at 6 other locations. Driving energy to advance the cone was 350 ft.-lbs. per blow.

The bedrock was proved at one borehole location using XT rock coring equipment.

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 No. 71-11118A 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 samples to determine the following physical properties:

- Atterberg Limits
- 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.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

Generally uniform subsoil conditions were found to prevail over the site area. The subsoil consisted of a deep deposit of cohesive soil, followed by a very dense silty sand (BH#78 only), 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 71-11118A 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:

4.2) 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 113 feet. In BH #78 an approx. 10 ft. thick very dense silty sand zone was found to overlie the limestone bedrock. 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 and silty clay layers were found to occur within the main deposit.

A highly overconsolidated zone, due to desiccation and/or weathering, with a thickness ranging from 9 to 16, 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 4 to 6 ft. (frost affected zone) has a very stiff to hard consistency: 'N' Values ranged from 20 to 75 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 undrained shear strength values are suggested:

From Ground Level - El. 606	2,000
606 - 597	5,000 PSF
597 - 590	2,500 PSF
590 - 560	1,700 PSF
560 - 500 ±	1,500 PSF

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

Natural Moisture Content: (%)	10.3 - 18.3
Liquid Limit: (%)	23.0 - 31.2
Plastic Limit: (%)	13.5 - 16.6
Bulk Density: (PCF)	131 - 137
Unconfined Shear Strength: (PSF)	841 - 3295
Field Vane Test: (PSF)	1280 - 2000+
Sensitivity:	1.3 - 3.9
'N' Value: (Blows/Ft.)	6 - 75

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

4.3) Limestone Bedrock:

Bedrock at this site was found to consist of generally sound limestone at El. 500. (BH #79).

5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed during the field investigation:

B.H.# 78	Not Established
79	Not Established
80	Not Established
161	Dry
164	Dry
170	Dry

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 field work.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

At the time of the report writing, two proposals are being considered:

a) Three-Span (90'-225'-90') Over-Pass Structure.

b) Four-Span (52'-103'-93'-48') Over-Pass Structure.

The proposed grade (deck) level of proposal a) is approx. 2 ft. higher (El. 646.5) than proposal b).

As described in the previous paragraphs of this report, the subsoil at the site consists of a deep deposit of clayey silt with sand and traces of gravel, underlain by limestone bedrock. The upper portion of the deposit contains a 9 to 16 ft. thick very stiff to hard desiccated zone. Below this depth the undrained shear strength of the material decreases. The desiccated surface crust appears to be suitable for spread footing type foundations.

Because of the compressible nature of the subsoil, it is inevitable that consolidation settlements will occur over a long-term period due to the imposed loads of structure and embankment. Past experience, however, indicates that these settlements will be of a minor nature.

6.2) Foundations:

a) Spread Footings in Original Ground:

The entire structure may be supported on spread footings placed within the very stiff to hard desiccated zone of the subsoil between El. 606. and El. 599. A safe net pressure of 3.5 TSP may be assumed for design purposes.

The desiccated zone is susceptible to softening on contact with water, therefore, it is recommended that the base of the footing excavations be protected by a concrete working slab, immediately on exposure.

All foundations should be protected against frost action by at least 4 feet of earth cover. No dewatering problems are anticipated.

The estimated maximum settlement will be in the order of 1.0 and 1.5 inches under the pier footings.

b) Spread Footings on Compacted Fill:

As an alternative, the abutments may be supported on spread footings placed on well compacted, suitable granular material within the approach fills. A safe design load of 2.0 TSF may be assumed. The granular material should consist of G.B.C. Class 'A' and should be fully compacted according to the current Standards. A detailed construction scheme is outlined on Figure 3 of the Appendix.

c) Perched Abutments on Short Piles:

As a second alternative, the abutments may be constructed within the approach fills and supported on short piles driven through the fill and some 10.0 ft. into original ground. In the case of 12-3/4" O.D. and 1/4" thick wall steel tube piles, a safe design load of 25 tons per pile may be used.

It should be pointed out, that this latter proposal is based on experience with similar structures and similar subsoil conditions in the general area.

Regardless of which method is adopted, the structure should be built to accommodate the 3 to 3.5 inches differential settlement between the abutments and piers.

d) End-Bearing Piles:

As another alternative, the abutments and piers may be supported on steel H-piles driven to bedrock. The maximum allowable load for the particular steel sections may be assumed for design purposes.

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 30-32 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, and it is recommended that this portion of the fill contain no larger grain sizes than 3 inches.

Based on performance of structures and embankments built in the same general area and under somewhat similar subsoil conditions, it is estimated that a maximum settlement of 4 to 5 inches will take place over a long period of time under the fill at the abutment location.

To minimize the effect of differential settlements between the abutments and pier footings, it is recommended that the approach embankments be built in advance of the structure for as long a period as possible. The topsoil and the soft surficial material should be removed in accordance with the pertinent Standards within the construction area.

7. MISCELLANEOUS:

The field investigations were carried out during the period April 4 to April 9, 1968 and November 23-24, 1971, under the supervision of Mr. A. Prakash and Mr. P. Payer, Project Foundation Engineers.

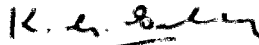
Equipment was owned and operated by Dominion Soil Investigation Limited and Master Soil Investigation Limited.

This report was written by Mr. P. Payer and reviewed by Mr. K. G. Selby, Supervising Foundation Engineer

December 1971


P. Payer, P. Eng.




K. G. Selby, P. Eng.

APPENDIX

JOB 71-11118 LOCATION Co-ords. 101, 365 N; 80, 468E. ORIGINATED BY G.E.H.
W.P. 257-66-02 BORING DATE April 4 and 5, 1968 COMPILED BY A.M.S.
DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger CHECKED BY [Signature]

[illegible]

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS					
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	20	40	60	80	100	SHEAR STRENGTH P.S.F.				WATER CONTENT % 10 20 30				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE 500 1000 1500 2000 2500													
613.2 0.0	Ground Level																			
Clayey silt, with sand, traces of gravel.	Hard to Very Stiff Stiff		1	SS	11	610														
			2	SS	68															
			3	SS	75															
			4	SS	35	600														4 30 42 2
			5	SS	28															
			6	SS	18	590														
			7	TW	PH															
			8	SS	10	580														
			9	TW	PH															
			10	SS	11	570														
			11	TW	PH	560														
			12	TW	PH	550														
			13	TW	PH	540														
			14	TW	PH	530														
513.2 100.0	Silty sand Very Dense		15	SS	153	510														
503.9 109.3	Probable Bedrock End of Borehole					500														

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 79 (68-11015-3) FOUNDATION SECTION

JOB 71-11118

LOCATION Co-ords. 101, 665N; 80, 373 E.

ORIGINATED BY GEH

W.P. 257-66-09

BORING DATE April 5 & 8, 1968

COMPILED BY AMS

DATUM Geodetic

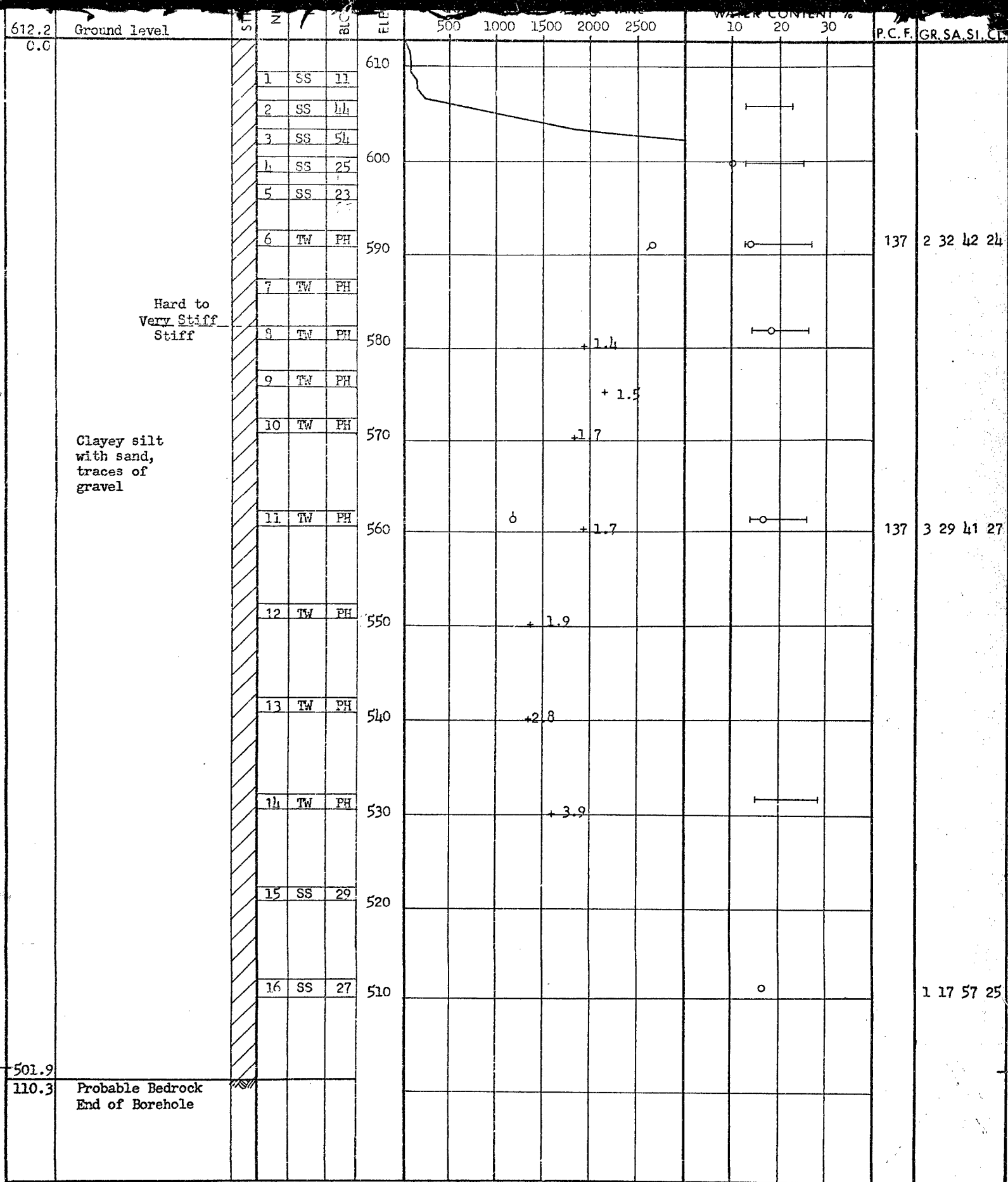
BOREHOLE TYPE Continuous Flight Auger

CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.	WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE 500 1000 1500 2000 2500	10	20	30		
613.1	Ground Level											
	Firm		1	SS	6	610						
			2	SS	40							
			3	SS	55							
			4	SS	72	600						
			5	SS	35							
	Hard to Very Stiff		6	SS	28	590						
			7	TW	PH							
			8	TW	PH	580						
			9	TW	PH							
	Clayey silt with sand, traces of gravel		10	TW	PH	570						
			11	TW	PH	560						
			12	TW	PH	550						
			13	TW	PH	540						
			14	TW	PH	530						
	sand seams		15	TW	PH	520						
						510						

613.1	Ground Level	STR	NO	SS	PH	ELE	500	1000	1500	2000	2500	WATER CONTENT %			P.C.F.	GR.	SA.	SI.	CL.
	Firm		1	SS	6	610													
			2	SS	40														
			3	SS	55														
			4	SS	72	600													
			5	SS	35														
	Hard to Very Stiff Stiff		6	SS	28	590													
			7	TW	PH														
			8	TW	PH														
			9	TW	PH	580													
	Clayey silt with sand, traces of gravel		10	TW	PH														
			11	TW	PH	570													
			12	TW	PH	560													
			13	TW	PH	550													
			14	TW	PH	540													
			15	TW	PH	530													
	sand seams					520													
						510													
						500													
500.1																			
113.0	Limestone Bedrock																		
495.1																			
118.0	End of Borehole																		

20
15-5 % STRAIN AT FAILURE
10



20
15-5 % STRAIN AT FAILURE
10

FOUNDATION SECTION

ORIGINATED BY P.F.

COMPILED BY D.P.

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LQUID LIMIT ——— w _L PLASTIC LIMIT ——— w _p WATER CONTENT —— w	BULK DENSITY 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		
612.6	Ground level									
0.0	Clayey silt with sand and trace of gravel Stiff To Hard	/	1	SS	14	610		o		
		/	2	SS	36			o		
		/	3	SS	61			o		
		/	4	SS	32	600		o		
		/	5	SS	19			o		
		/	6	SS	20			o		
590.1		/	7	SS	16	590		o		
22.5	End of Borehole				(18)					

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 162

FOUNDATION SECTION

JOB 71-11118 LOCATION Co-ords. 101, 517N; 80, 406E. ORIGINATED BY P.P.
W.P. 257-66-09 BORING DATE Nov. 23, 1971 COMPILED BY P.P.
DATUM Geodetic BOREHOLE TYPE Cone Test Only CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w w_p — w — w_L WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
612.8	Ground level									
0.0	Probable clayey silt with sand, Traces of gravel					610				
601.8										
11.0	End of Conehole					600				

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	BLOWS / FOOT	PLASTIC LIMIT — w_p	WATER CONTENT — w		
612.6	Ground level											
0.0	Probable clayey silt with sand Traces of gravel					610						
601.6												
11.0	End of Conehole					600						

FOUNDATION SECTION

JOB 71-11128 LOCATION Co-ords. 101, 537N; 80, 435E ORIGINATED BY P.P.
W.P. 257-66-09 BORING DATE Nov. 24, 1971 COMPILED BY P.P.
DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger CHECKED BY AK

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	Liquid Limit ——— w_L Plastic Limit ——— w_p Water Content ——— w	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F.		WATER CONTENT % $w_p \quad w \quad w_L$
612.4 0.0	Ground level								
590.9 21.5	Clayey silt with sand and trace of gravel Very Stiff to Hard		1	SS	17	610			
			2	SS	20				
			3	SS	34				
			4	SS	61				
			5	SS	111	600			
			6	SS	33				
			7	SS	26				
			8	SS	26				
			9	SS	24				
			10	SS	16	590			
21.5	End of Borehole								

DEPARTMENT OF HIGHWAYS- ONTARIO

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 165

FOUNDATION SECTION

JOB 71-11118

LOCATION

Co-ords. 101, 859N; 80, 341E.

ORIGINATED BY P.P.

W.P. 257-66-09

BORING DATE

Nov. 24, 1971

COMPILED BY P.P.

DATUM Gendetic

BOREHOLE TYPE

Cone Test Only

CHECKED BY

P.P.

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	RESISTANCE	PLASTIC LIMIT — w_p	WATER CONTENT — w		
611.8	Ground level											
0.0	Probable clayey silt with sand, Traces of gravel					610						
522.8						600						
12.0	End of Conehole					590						

FOUNDATION SECTION

JOB	71-11118	LOCATION	Co-ords. 101, 832N; 60, 410E	ORIGINATED BY	P.P.
W.P.	257-66-09	BORING DATE	Nov. 24, 1971	COMPILED BY	P.P.
DATUM	Geodetic	BOREHOLE TYPE	Cone Test Only	CHECKED BY	<i>MR.</i>

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— w_L		BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT	PLASTIC LIMIT ——— w_p		
							20 40 60 80 100	WATER CONTENT ——— w		
							SHEAR STRENGTH P.S.F.		w_p ——— w ——— w_L WATER CONTENT %	
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE			
611.9	Ground Level									
0.0	Probable clayey silt with sand, Traces of gravel					610				
599.9										
12.0	End of Conehole					600				

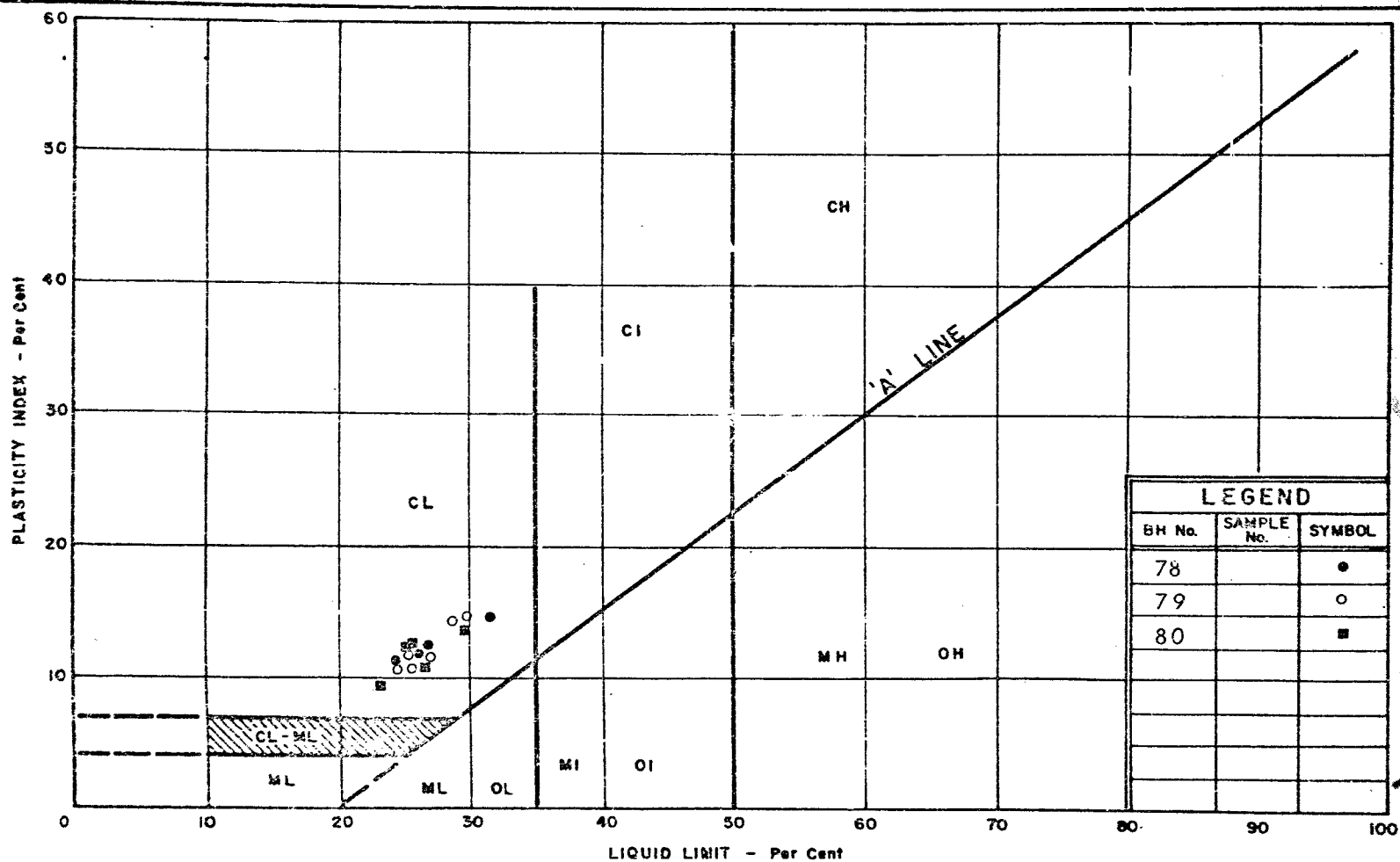
DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No.169

FOUNDATION SECTION

JOB 72-11118 LOCATION Co-ords. 101. 806N; 80, 351E. ORIGINATED BY P.P.
 W.P. 257-66-09 BORING DATE Nov. 24, 1971 COMPILED BY P.P.
 DATUM Geodetic BOREHOLE TYPE Cone Test Only CHECKED BY JK

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	WATER CONTENT — W		
612.4	Ground Level										
0.0	Probable clayey silt with sand traces of gravel				610						
600.4											
12.0	End of Conehole				600						



LEGEND		
BH No.	SAMPLE No.	SYMBOL
78		●
79		○
80		■



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

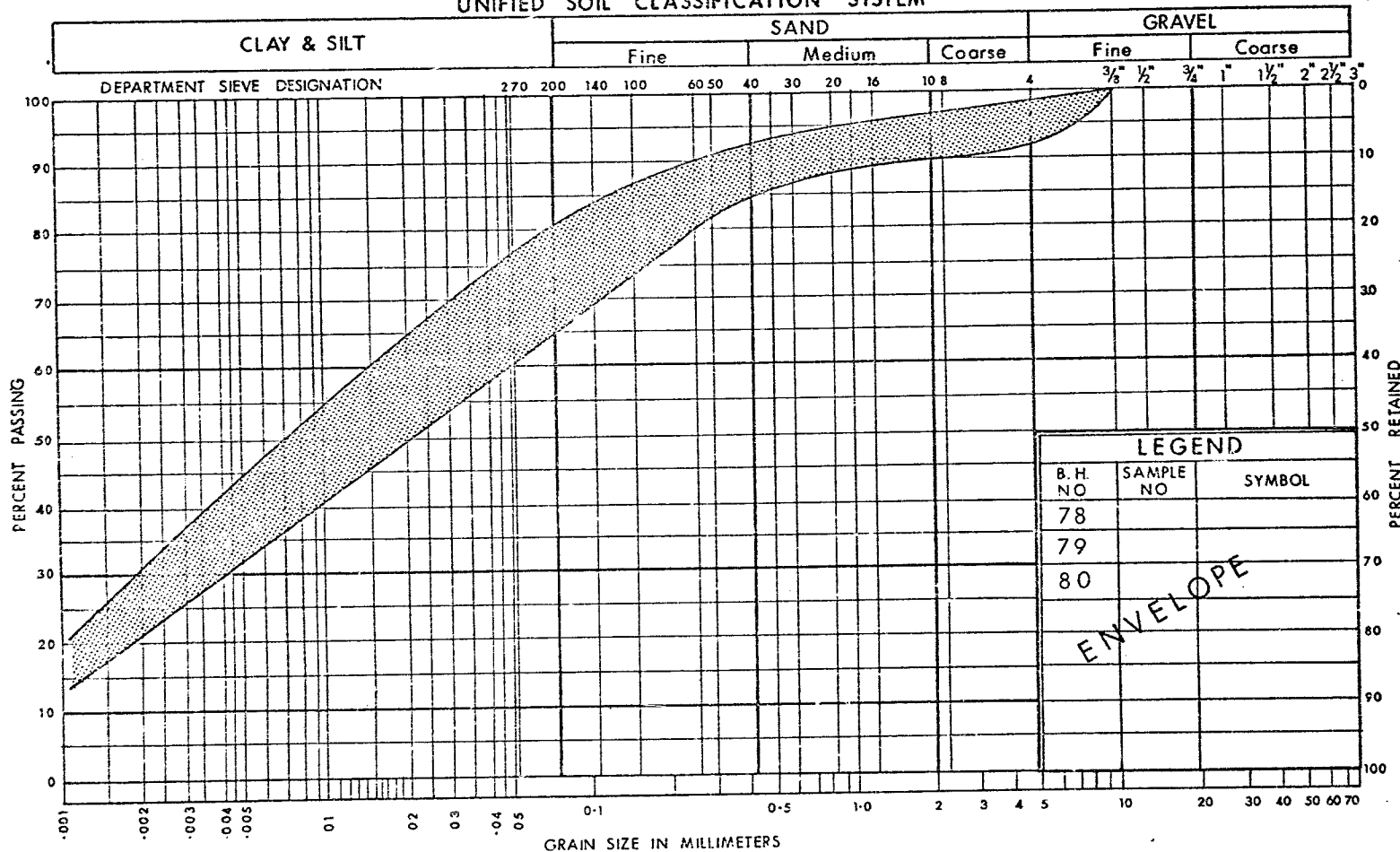
PLASTICITY CHART CLAYEY SILT

W.P. No. 257-66-09

JOB No. 71-11118

FIG. NO. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES
BRANCH

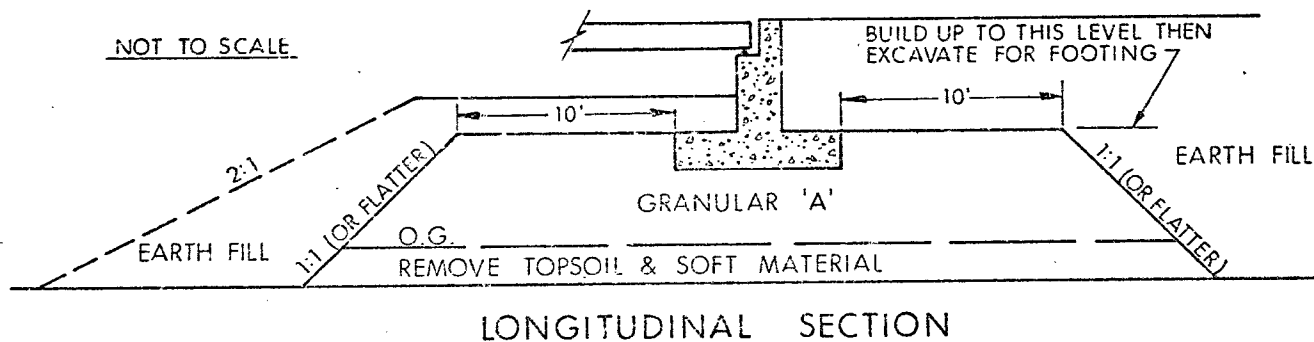
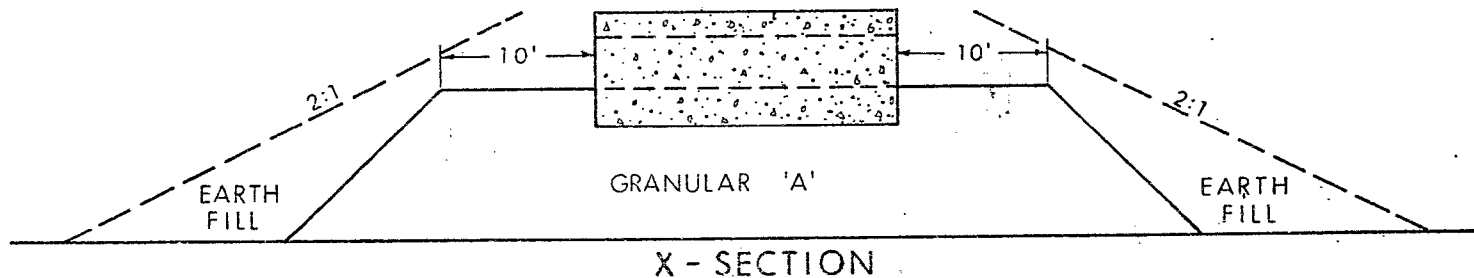
GRAIN SIZE DISTRIBUTION
CLAYEY SILT

W.P. No. 257-66-09

JOB No. 71-11118

FIG. NO. 2

ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



NOTES

- 1 - REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'.
- 2 - PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT D.T.C. STANDARDS.
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING.

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TYPE OF SAMPLE

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

SOIL TESTS

Q _u	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Q _{cv}	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q _d	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

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

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ 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
σ	NORMAL STRESS
$\bar{\sigma}$	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

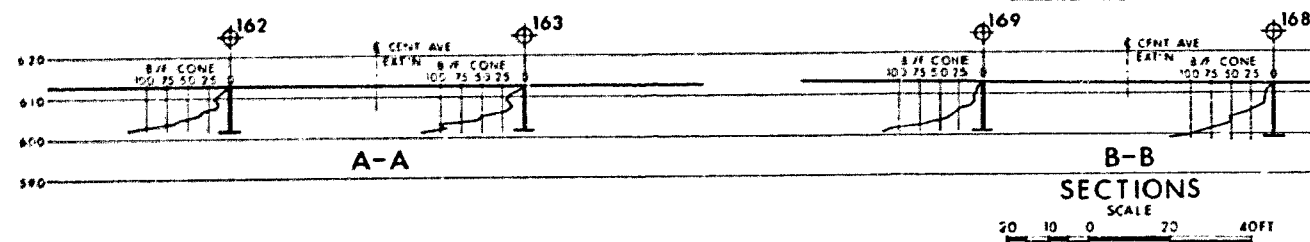
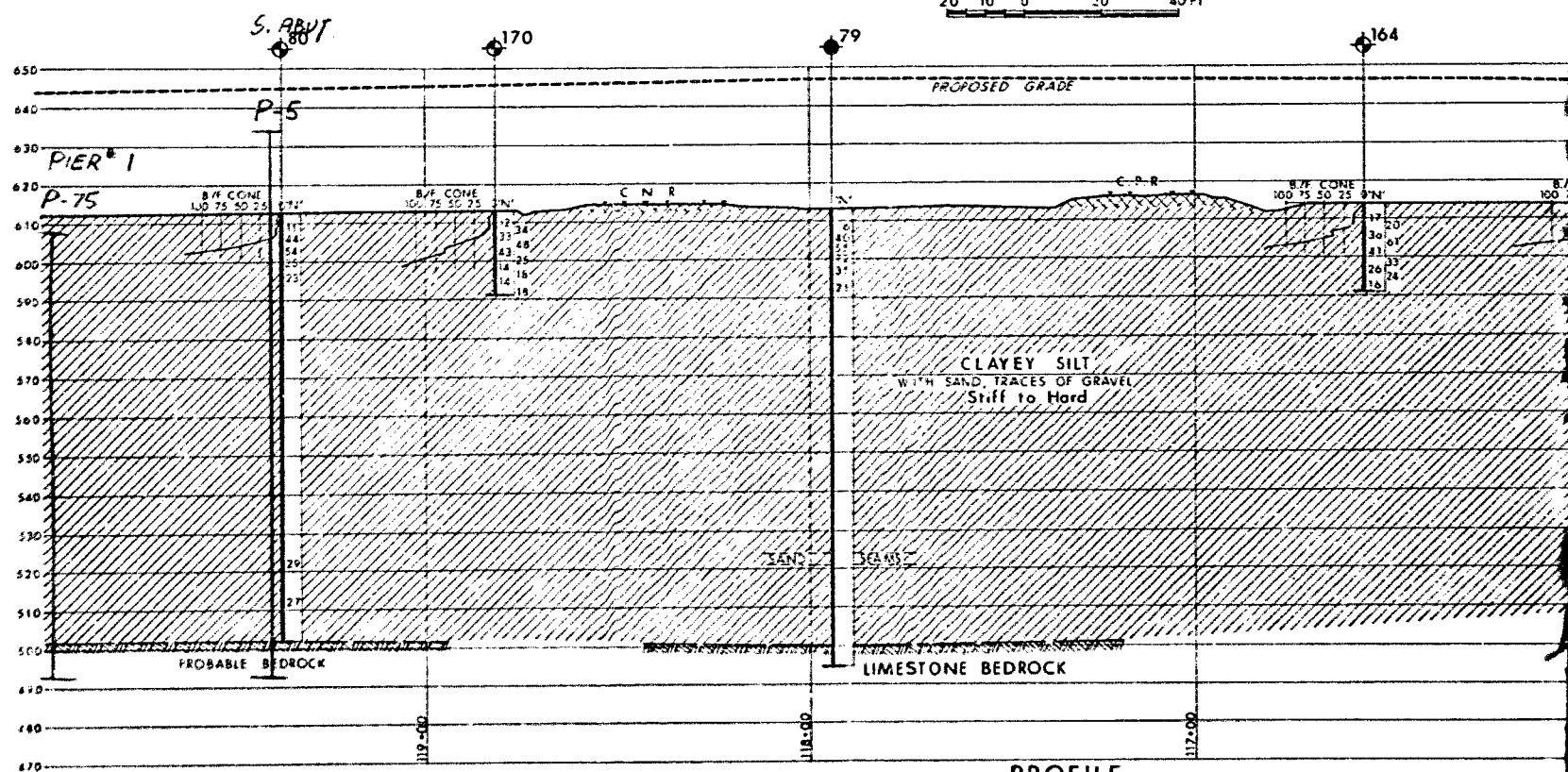
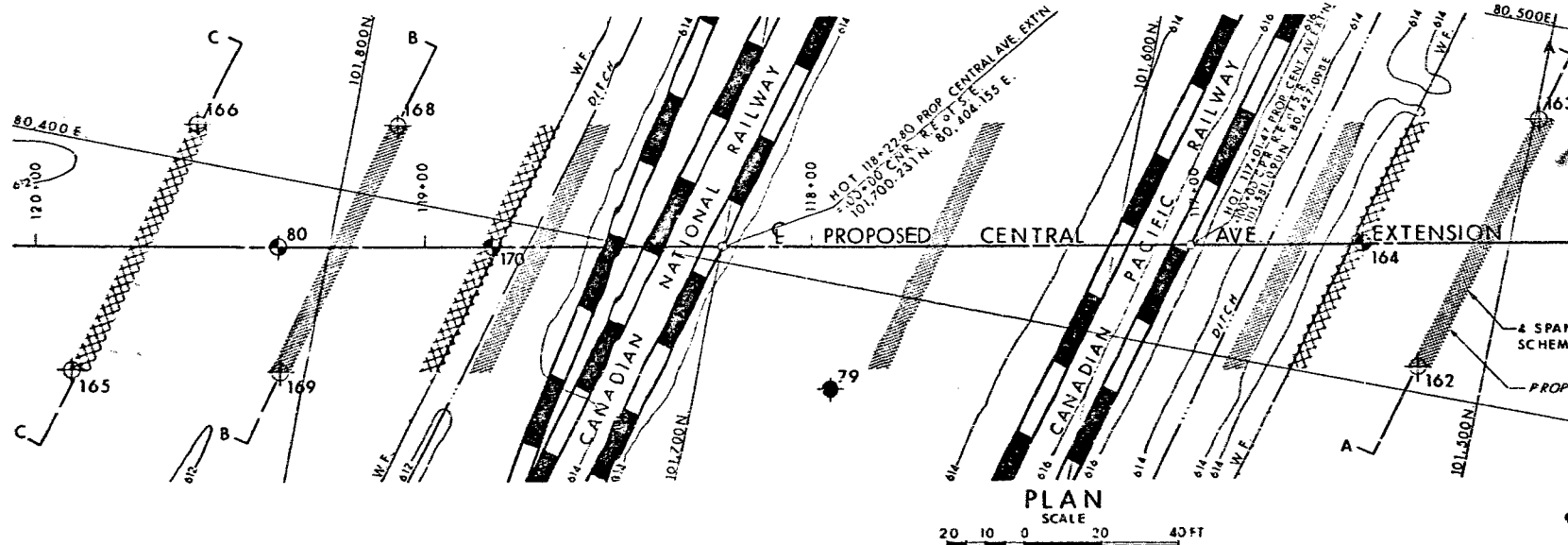
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

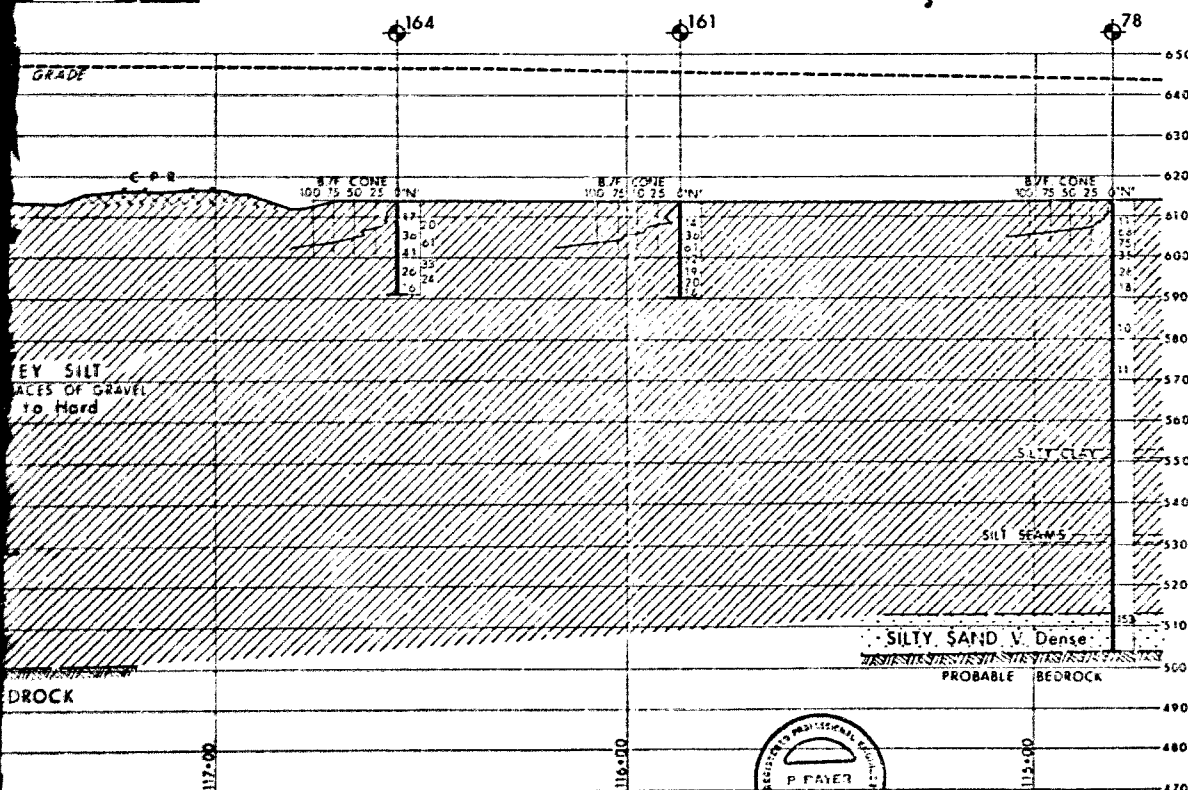
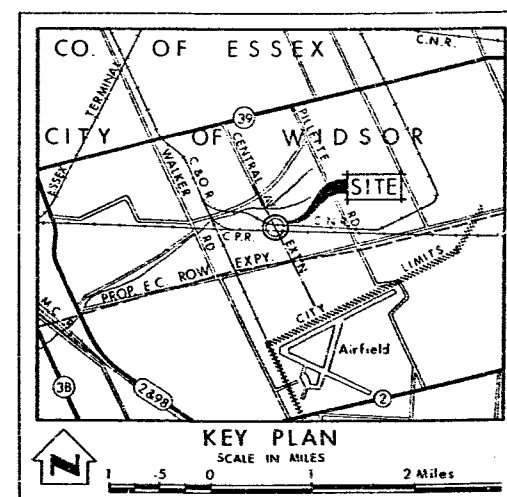
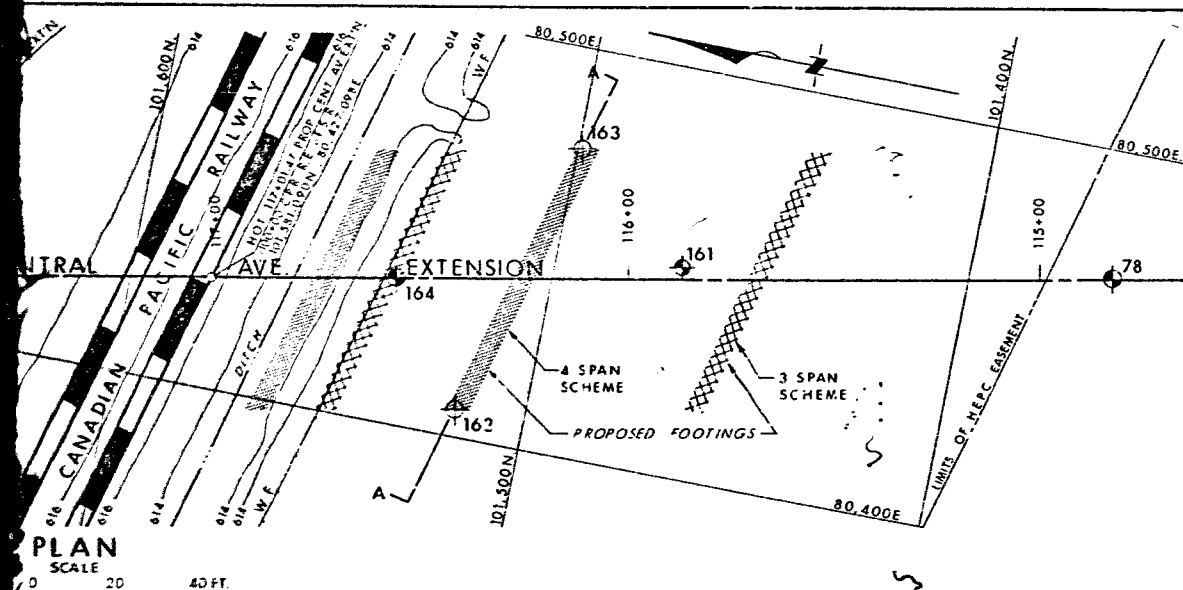
FOUNDATIONS

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
β	ANGLE OF SLOPE TO HORIZONTAL





PROFILE
SCALE 0 20 40 FT.

B-B
SCALE 0 20 40 FT.

C-C

LEGEND

- ◆ Bore Hole
- ⊕ Cone Penetration Test
- ◆ Bore Hole & Cone Test
- ⬆ Water Levels established at time of field investigation. NOT ESTABLISHED

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
78	613.2	101,365	80,468
79	613.1	101,665	80,373
80	612.2	101,813	80,382
161	612.6	101,469	80,451
162	612.8	101,517	80,406
163	612.6	101,499	80,475
164	612.4	101,537	80,435
165	611.8	101,859	80,341
166	611.9	101,839	80,410
168	612.1	101,789	80,419
169	612.4	101,806	80,351
170	612.6	101,759	80,393

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH - FOUNDATION OFFICE

**CAN. NAT. & CAN. PAC. RAILWAYS
AND
CENTRAL AVE. EXTENSION**

HIGHWAY NO. _____ DIST. NO. 1
CO. ESSEX _____ City of WINDSOR
TWP _____ LOT 103 CON. II

BORE HOLE LOCATIONS & SOIL STRATA

SUBMIT P.P.	CHECKED	WP NO. 357-66-09	DRAWING NO.
DRAWN	CHECKED	JOB NO. 71-1118A	71-1118A
DATE DEC 22, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	CONT. NO.		

REF NO E-4661-1

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-C9
CONTRACTOR BIRMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS.
PILE DETAILS STEEL Tube piles 12 3/4" X 0.25" BATTER: NIL
PILE NO. 20 LOCATION PIER FOOTING #1 DATE DRIVEN OCT. 16/75

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.
40'	1	5		26	27		51	26		76	49
	2	7		27	26		52	28	115'	77	39
	3	9		28	25		53	29	SPLICE @	78	42
	4	11		29	27		54	30	77'	79	35
	5	13		30	29		55	31	55' LENGTH	80	36
	6	14		31	29		56	32		81	37
	7	14		32	28		57	34		82	37
	8	14		33	27		58	34		83	37
	9	13		34	28		59	33		84	35
	10	13		35	29		60	39		85	34
	11	13		36	29		61	36		86	36
	12	14	80'	37	27		62	35		87	31
	13	15	SPLICE @ 37'	38	16		63	34		88	32
	14	16	40' LENGTH	39	17		64	41		89	31
	15	15		40	19		65	39		90	33
	16	16		41	19		66	39		91	38
	17	17		42	22		67	43		92	38
	18	17		43	24		68	39		93	39
	19	18		44	25		69	45		94	41
	20	19		45	27		70	45		95	41
	21	22		46	27		71	47		96	48
		22		47	24		72	47		97	48
	23	24		48	24		73	47		98	48
	24	26		49	25		74	46		99	52
	25	26		50	26		75	46		100	54

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 [Signature]
NAME (PRINT) FREDERICK R. MERRITT
DATE OCT. 16, 1975
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BIRMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAL DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS.
PILE DETAILS STEEL TUBE 12 1/2" X 0.25" BATTER: N/A
PILE NO. 20 LOCATION PIER FOOTING #1 DATE DRIVEN OCT. 16/75

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.
115	101	51		26			51			76	
	102	53		27			52			77	
	103	49		28			53			78	
	104	51		29			54			79	
	105	54		30			55			80	
	106	55		31			56			81	
	107	51		32			57			82	
	108	54		33			58			83	
	109	54		34			59			84	
	110	129		35			60			85	
	111	162		36			61			86	
	112	163		37			62			87	
	113	146		38			63			88	
DRIVEN	114.1	104		39			64			89	
To Re-	15			40			65			90	
Fus. Pl.	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						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE <u>114.1'</u>	FINAL CUT OFF ELEVATION <u>608.00</u>					

REPORT TO BE SENT TO: -

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

SIGNED [Signature]
NAME (PRINT) THOMAS R. McARDL
DATE OCT 16/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELTA DIESEL 22 WEIGHT 4950 HEIGHT OF FALL OR ENERGY 39,800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12" X 0.25 BATTER: NIL
PILE NO. 75 LOCATION PIER FOOTING #5 DATE DRIVEN OCT. 30/75

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.
117	101	55		26			51			76	
	102	57		27			52			77	
	103	59		28			53			78	
	104	60		29			54			79	
	105	61		30			55			80	
	106	60		31			56			81	
	107	54		32			57			82	
	108	55		33			58			83	
	109	55		34			59			84	
	110	59		35			60			85	
	111	54		36			61			86	
	112	56		37			62			87	
	113	54		38			63			88	
	114	104		39			64			89	
	115			40			65			90	
	116			41			66			91	
	117			42			67			92	
	118			43			68			93	
	119			44			69			94	
	120			45			70			95	
	121			46			71			96	
	122			47			72			97	
	123			48			73			98	
	124			49			74			99	
	125			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	114'					
FINAL CUT OFF ELEVATION	609					

REPORT TO BE SENT TO:-

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

SIGNED Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE OCT. 30/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,800
TYPE OF ANVIL OR CAP O-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12 3/4" X 0.25" BATTER: NIL
PILE NO. 75 LOCATION PIER FOOTING #5 DATE DRIVEN OCT. 30/75

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.
40'	1	3		26	23		51	17		76	35
	2	5		27	23		52	18	117'	77	27
	3	5		28	23		53	18	SPLICE	78	27
	4	8		29	23		54	19	R 77'	79	26
	5	9		30	24		55	19	37'	80	26
	6	10		31	24		56	19	LENGTH	81	25
	7	11		32	25		57	20		82	24
	8	11		33	25		58	22		83	31
	9	12		34	27		59	22		84	25
	10	13		35	26		60	23		85	26
	11	14		36	25		61	25		86	29
	12	15	80'	37	28		62	24		87	28
	13	13	SPLICE	38	34		63	25		88	28
	14	14	R 37'	39	16		64	25		89	30
	15	15	40'	40	17		65	26		90	31
	16	15	LENGTH	41	16		66	25		91	33
	17	15		42	14		67	25		92	36
	18	15		43	15		68	25		93	40
	19	16		44	15		69	27		94	40
	20	18		45	14		70	27		95	42
	21	18		46	15		71	28		96	44
	22	19		47	15		72	30		97	47
	23	21		48	15		73	30		98	47
	24	24		49	15		74	30		99	51
	25	22		50	16		75	32		100	52

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 Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE OCT 30/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERNARD HAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAR DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12 1/4" X 0.25" BATTER: 4:1
PILE NO. 5 LOCATION SOUTH ABUTMENT DATE DRIVEN Nov. 6/75

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

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 [Signature]
NAME (PRINT) THOMAS R. MERRITT
DATE Nov. 6/75
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. 1 CONTRACT NO. 75 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINKHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAL DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,000
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBES PILES 12 1/2" x 0.25" BATTER: NIL
PILE NO. 5 LOCATION SOUTH ABUTMENT DATE DRIVEN Nov 6/75

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.
146'	101	35		126	48		51			76	
	102	37		127	49		52			77	
	103	31		128	53		53			78	
	104	32		129	55		54			79	
	105	33		130	57		55			80	
	106	33		131	56		56			81	
	107	34		132	56		57			82	
	108	38		133	62		58			83	
	109	33		134	63		59			84	
	110	34		135	62		60			85	
	111	32		136	64		61			86	
	112	35		137	68		62			87	
	113	37		138	65		63			88	
	114	33		139	73		64			89	
	115	32		140	120		65			90	
	116	34		141	130		66			91	
	117	36		142	130		67			92	
	118	36		142.1	184		68			93	
	119	35		44			69			94	
	120	38		45			70			95	
	121	37		46			71			96	
	122	41		47			72			97	
	123	45		48			73			98	
	124	43		49			74			99	
	125	47		50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE <u>142.1'</u>	FINAL CUT OFF ELEVATION <u>634.2</u>					

REPORT TO BE SENT TO:-

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

SIGNED [Signature]
NAME (PRINT) TIMOTHY R. MERRITT
DATE Nov 6/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
 CONTRACTOR BIRMINGHAM DESIGN LOAD OF PILE N/A
 HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39800
 TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS.
 PILE DETAILS STEEL TUBE PILES 12 3/4" x 0.25" BATTER: NIL
 PILE NO. 60 LOCATION PIER FOOTING #4 DATE DRIVEN NOV 6/75

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.
118'	101	51		26			51			76	
	102	47		27			52			77	
	103	46		28			53			78	
	104	43		29			54			79	
	105	47		30			55			80	
	106	48		31			56			81	
	107	52		32			57			82	
	108	50		33			58			83	
	109	50		34			59			84	
	110	56		35			60			85	
	111	59		36			61			86	
	112	61		37			62			87	
	113	57		38			63			88	
	114	145		39			64			89	
DRIVEN	115.3	150		40			65			90	
TO	16			41			66			91	
REFUSAL	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						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE <u>115.3</u>	FINAL CUT OFF ELEVATION <u>609.00</u>					

REPORT TO BE SENT TO:-

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

SIGNED [Signature]
 NAME (PRINT) TIMOTHY P. MERRITT
 DATE NOV 6, 1975
 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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BIRMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12 3/4" X 0.25" BATTER: NIL
PILE NO. 60 LOCATION PIER FOOTING #4 DATE DRIVEN NOV 6/75

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.
40'	1	2		26	18		51	17		76	50
	2	2		27	18		52	18	118'	77	37
	3	6		28	18		53	18	SPLICE	78	35
	4	9		29	20		54	20	@ 77'	79	46
	5	9		30	19		55	25	38' LENGTH	80	41
	6	10		31	20		56	24		81	43
	7	11		32	22		57	26		82	44
	8	10		33	20		58	28		83	48
	9	10		34	22		59	26		84	48
	10	9		35	22		60	26		85	49
	11	9		36	23		61	30		86	44
	12	10	80'	37	18		62	28		87	39
	13	10	SPLICE	38	16		63	30		88	39
	14	9	@ 37'	39	17		64	31		89	43
	15	10	40' length	40	18		65	31		90	48
	16	10		41	16		66	34		91	56
	17	12		42	15		67	33		92	64
	18	13		43	16		68	35		93	75
	19	14		44	15		69	36		94	73
	20	15		45	17		70	39		95	60
	21	16		46	15		71	36		96	71
	22	16		47	16		72	36		97	69
	23	16		48	16		73	42		98	68
	24	17		49	17		74	44		99	64
	25	17		50	16		75	47		100	52

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 [Signature]
NAME (PRINT) TIMOTHY R. MERTENS
DATE NOV 6/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,000
TYPE OF ANVIL OR CAP O-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12 1/2" x 0.25" BATTER: 1 to 6
PILE NO. 47 LOCATION PIER #3 Column "H" DATE DRIVEN Nov 18/75

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.
117'	101	56		26			51			76	
	102	56		27			52			77	
	103	60		28			53			78	
	104	63		29			54			79	
	105	63		30			55			80	
	106	68		31			56			81	
	107	66		32			57			82	
	108	58		33			58			83	
	109	68		34			59			84	
	110	66		35			60			85	
	111	64		36			61			86	
	112	64		37			62			87	
	113	105		38			63			88	
	114	168		39			64			89	
	115.1	178		40			65			90	
	116			41			66			91	
	117			42			67			92	
	118			43			68			93	
	119			44			69			94	
	120			45			70			95	
	121			46			71			96	
	122			47			72			97	
	123			48			73			98	
	124			49			74			99	
	125			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	DRIVEN TO BEDROCK					
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	115.1'			FINAL CUT OFF ELEVATION 609		

REPORT TO BE SENT TO: -

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

SIGNED Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE Nov 18/75
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

DISTRICT NO. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINKHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAC DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 59800
TYPE OF ANVIL OR CAP 0-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILES 12" X 0.25" BATTER: 1 TO 6
PILE NO. 47 LOCATION PIER #3 COLUMN "H" DATE DRIVEN Nov 18/75

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.
40'	1	1		26	25		51	37	117'	76	70
	2	4		27	25		52	40	splice @	77	32
	3	9		28	25		53	42	76'	78	38
	4	9		29	27		54	46		79	42
	5	9		30	26		55	52		80	43
	6	10		31	26		56	53		81	43
	7	10		32	27		57	53		82	44
	8	11		33	28		58	63		83	50
	9	10		34	30		59	61		84	48
	10	12		35	32		60	61		85	45
	11	13		36	30		61	58		86	40
	12	14	80'	37	28		62	62		87	41
	13	14	splice @	38	23		63	66		88	40
	14	15	37'	39	25		64	70		89	40
	15	15		40	26		65	70		90	41
	16	16		41	23		66	70		91	42
	17	16		42	25		67	65		92	48
	18	17		43	25		68	61		93	44
	19	19		44	25		69	68		94	45
	20	19		45	30		70	64		95	48
	21	19		46	30		71	64		96	49
	22	22		47	32		72	68		97	49
	23	23		48	32		73	70		98	52
	24	23		49	36		74	70		99	51
	25	23		50	38		75	67		100	57

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 Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE Nov 18/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS.
PILE DETAILS STEEL TUBE PILES 12 1/4" X 0.25" BATTER: 6 to 1
PILE NO. 23 LOCATION PIER #2 COLUMN DATE DRIVEN NOV. 25/75

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	57		26			51			76	
	102	69		27			52			77	
	103	68		28			53			78	
	104	69		29			54			79	
	105	66		30			55			80	
	106	75		31			56			81	
	107	70		32			57			82	
	108	71		33			58			83	
	109	71		34			59			84	
	110	72		35			60			85	
	111	69		36			61			86	
	112	68		37			62			87	
	113	70		38			63			88	
	114	75		39			64			89	
	115	160		40			65			90	
	116			41			66			91	
	117			42			67			92	
	118			43			68			93	
	119			44			69			94	
	120			45			70			95	
	121			46			71			96	
	122			47			72			97	
	123			48			73			98	
	124			49			74			99	
	125			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	119' 4"					
FINAL CUT OFF ELEVATION	608.00					

REPORT TO BE SENT TO:-

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

SIGNED William A. Jarrett
NAME (PRINT) WILLIAM A. JARRETT
DATE NOV 28/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N/A
HAMMER DETAILS: TYPE DELMAR 5 DIESEL 22 WEIGHT 4950 HEIGHT OF FALL OR ENERGY 39,800
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 LBS
PILE DETAILS STEEL TUBE PILE 12 1/4" x 0.25" BATTER: 6 to 1
PILE NO. 23 LOCATION PIER #2 COLUMN DATE DRIVEN NOV. 25/75

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

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE	117.4'					
FINAL CUT OFF ELEVATION	608.00					

REPORT TO BE SENT TO:-

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

SIGNED William A. Tariett
NAME (PRINT) William A. TARIETT
DATE NOV 28/75
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAG DIESEL P.P. WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,000
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 lbs.
PILE DETAILS STEEL TUBE PILES 12 1/2" x 0.25" BATTER: 6-1
PILE NO. 88 LOCATION NORTH ABUTMENT DATE DRIVEN DEC 2/75

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.
50'	1	1		26	24		51	52		76	33
	2	1		27	28		52	55		77	35
	3	1		28	30		53	50		78	33
	4	1		29	33		54	48		79	33
	5	2		30	35		55	47		80	34
	6	2		31	37		56	43		81	33
	7	2		32	37		57	39		82	30
	8	2		33	36		58	38		83	33
	9	3		34	35		59	34		84	33
	10	4		35	34		60	36		85	41
	11	4		36	36		61	35		86	35
	12	5		37	36		62	32		87	47
	13	5		38	36		63	32		88	49
	14	5		39	37		64	32		89	44
	15	6		40	36		65	31		90	41
	16	6		41	36		66	32		91	40
	17	7		42	38		67	31		92	40
	18	8		43	39		68	31		93	40
	19	7		44	37		69	32		94	38
	20	9		45	37		70	30		95	41
	21	11	100'	46	37		71	32		96	42
	22	12	splice	47	50		72	30	144'	97	46
	23	12	46'	48	58		73	33	splice	98	35
	24	13		49	53		74	32	97'	99	41
	25	17		50	54		75	32		100	32

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 Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE DEC 2 1975
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. 1 CONTRACT NO. 75-82 STRUCTURE W.P. NO. 257-66-09
CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE N.A.
HAMMER DETAILS: TYPE DELMAL DIESEL 22 WEIGHT 4850 HEIGHT OF FALL OR ENERGY 39,000
TYPE OF ANVIL OR CAP D-22 WEIGHT OF ANVIL OR CAP 1147 lbs.
PILE DETAILS STEEL TUBE PILES 12 1/4" X 0.25" BATTER: 6-1
PILE NO. 88 LOCATION NORTH ABUTMENT DATE DRIVEN DEC 2/75

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.
144'	101	39		126	59		51			76	
	102	37		127	76		52			77	
	103	34		128	78		53			78	
	104	36		129	64		54			79	
	105	35		130	60		55			80	
	106	34		131	60		56			81	
	107	35		132	66		57			82	
	108	35		133	70		58			83	
	109	38		134	76		59			84	
	110	36		135	83		60			85	
	111	40		136	76		61			86	
	112	44		137	74		62			87	
	113	44		138	73		63			88	
	114	45		139	80		64			89	
	115	44		140.2	153		65			90	
	116	43		41			66			91	
	117	47		42			67			92	
	118	47		43			68			93	
	119	50		44			69			94	
	120	51		45			70			95	
	121	51		46			71			96	
	122	53		47			72			97	
	123	54		48			73			98	
	124	57		49			74			99	
	125	55		50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH						
MEASURED REBOUND IN INCHES						
FINAL LENGTH OF PILE <u>140.2'</u>	FINAL CUT OFF ELEVATION <u>633.30</u>					

REPORT TO BE SENT TO: -

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

SIGNED Timothy R. Merritt
NAME (PRINT) TIMOTHY R. MERRITT
DATE DEC 2 1975
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.

SUMMARY OF PILE DRIVING RECORDS

W.O. 71-11118 W.P. 257-66-09 CONT. 75-82 DIST. 1

SITE C.NR & CPR O'NEAL CENTRAL AVE EXTENSION

DATE DRIVEN OCT 16 - DEC. 2 / 75 WEIGHT OF ANVIL 1147 lb

HAMMER TYPE D-22 WEIGHT 2.4257 ENERGY 39700

[illegible]

MEMORANDUM

71-11118

To: Mr. A. G. Stermac,
Principal Foundation Engineer,
Design Services Branch,
West Building, DOWNSVIEW, Ont.

FROM: Bridge Planning,
Southwestern Region,
London, Ontario

ATTENTION:

DATE: October 15, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 257-66-09, Bridge Site 6-287
C.N.R. & C.P.R. Overhead
at Central Ave. Extension
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 copies of bridge site plan E-4881-1 with the probable footing locations marked in red.

The grade of E. C. Row Expressway shown on the bridge site plan is shown for Deck 'A' and Deck 'B'. May we please have your comments on whether it makes any difference, from a foundation point of view, which grade is used.

Also enclosed is a list of utilities personnel and the field reconnaissance report.

I would like to point out that foundation report W.J.68-F-15-3, Walker Road to Burwell Road, containing factual information only, has been issued on July 10, 1969.

S. Jants

SJ/fs
Encls.

S. Jants,
Bridge Planning Technician,

For: A. P. Watt,
Regional Bridge Planning Engineer,
Southwestern Region.

cc: Mr. C. Grebski
Mr. A. Crowley

JAN 5th 1972

HOLD TILL FURTHER REQUEST
RECEIVED FROM A. P. WATT.
Oct 19th 1971

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

W.O. 71-11-118

TO: Mr. A. Stermac
Principal Foundation Engineer
Rm 107, West Bldg.

FROM: Structural Design Engineer
Structural Office
West Bldg.

ATTENTION:

DATE: September 27th, 1973

OUR FILE REF.

IN REPLY TO

SUBJECT:

C.N.R. & C.P.R. O'Head
Central Ave. Extension
W.P. 257-66-09, Site 6-287
Hwy. E.C. Row Expwy., 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.

C.S. Grebski
Structural Design Engineer

CSG:AMF

Attached

c.c. Foundation Office

No comments

AR

K. G. Grebski

12/10/73



Memorandum

To: Mr. D.M. Hopper,
Manager,
Contract Control Office,
Central Building, Downsview.

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

Attention:

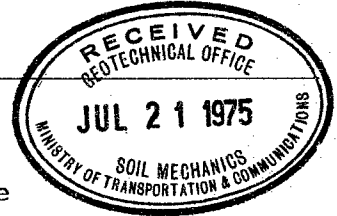
Date: July 18, 1975.

Our File Ref.

In Reply to

Subject:

Grading, Drainage, Granular Base,
H.M. Paving, and Structures
C.N.R. & C.P.R. Overhead Central Avenue
Contract 75-82



Because of site conditions, we find that the method of installation of the piling in the South abutment must be modified.

To cover this problem, we attach a revised special provision to replace the present special provision "Drive Steel Tube Piles (12 3/4" diameter) - Item No. 37" on page 16 of the tender form.

For your use, we also enclose prints of drawing 6-292-A-2B, which will now form part of the contract drawings.

Would you please make the necessary arrangements to inform the bidders accordingly.

M. Stoyanoff

M. Stoyanoff,
Structural Contract Engineer.

MS/ac

Enclosures

c.c. A.E. McKim
K. Selby ✓
J. Keen
J. Wear
D.P. Collins



Memorandum

To: File

From: Soil Mechanics Section
Geotechnical Office
West Building, Downsview

Attention:

Date: August 28, 1975

Our File Ref. Cont. 75-82

In Reply to

Subject:

ENQUIRY FROM CONTRACTOR - RE:
Cont. 75-82, E C Row Exwy., Dist. 1

A Mr. Harold Crumb of Bot Construction (telephone: Oakville 827-4167) called me this morning to find out if we (Soil Mechanics Section) knew anything about a John H. Wilson Construction Ltd. located in Concord, Ontario and their experience or ability in pile driving.

I suggested to Mr. Crumb that I would make some enquiries and then call him back as I personally had never before heard of this company or a Mr. R.E. Richman of that company (name given to me by Mr. Crumb). Mr. Crumb told me that he had already spoken to Al McKim and had been referred to me by the latter.

Subsequently, I telephoned District 1 and talked with Bill Katarynczuk and then with Lou Ruta both of whom admitted to never before having heard of the Wilson Company.

I then checked with Dave Hopper who informed me that the Wilson outfit was going to drive piles for the structure sub-contractor (Preston?) on the MacLeod Rd. Interchange contract in Dist. 4 (Bitulithic is the Prime Contractor).

I also talked with Bill Lardner of Deep Foundations who said that he had heard of the Wilson Company but only in association with shoring and concrete-coring work.

After lunch, I telephoned Mr. Crumb and advised him of my findings. Mr. Crumb seemed interested in the fact that the Wilson outfit had been approved by the Ministry. I advised him (rather emphatically) that, according to my conversation with Mr. D. Hopper, no Ministry approval of the Wilson Co. was implied or implicit in the MacLeod Rd. job since the company was not the "sub-contractor" to Bitulithic but rather a "sub-sub".

At this time I should also mention that Mr. Ruta expressed considerable concern over the telephone to learn that perhaps an unknown or inexperienced piling contractor may be used by Bot on this contract. In his opinion, this job calls for an experienced outfit to handle the somewhat unusual pile driving requirements.

C. Mirza

c.c. Messrs. J. Callaghan
D.P. Collins Attn: W. Katarynczuk
D. Hopper
A. McKim
C.R. Robertson Attn: D. Waller
Files Record Services