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W.P. No. 218-65-01

CONT. No. 74-64

W. O. No. 72-11100

STR. SITE No. _____

HWY. No. 409

LOCATION TRUNK STORM SEWER

ALONG HWY 409 FROM MARTIN GROVE

TO MIMICO CREEK

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 0

REMARKS Documents to be unfolded before

microfilmed

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

30M11-116

CEOCRES No.

ATTENTION: Mr. W. C. Friedman, (2)
Senior Expressway Design Engineer,
Systems Design,
Central Region.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

DATE: November 15, 1972.

OUR FILE REF.

IN REPLY TO NOV 24 1972

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For The

Proposed Trunk Storm Sewer Along Hwy. #409
From Martin Grove Road Westerly to Mimico Creek
Borough of Etobicoke, Metropolitan Toronto
District #6 (Toronto)

W.O. 72-11100 -- W.P. 218-65-01

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.

A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

AGS/ao
Attach.

cc: E. J. Orr
B. R. Davis
A. Rutka
R. S. Pillar
H. Greenland
B. J. Giroux
C. Mirza
G. A. Wrong
B. A. Singh
G.C.E. Burkhardt
Foundations Files
Documents

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FOUNDATION INVESTIGATION REPORT

For The

Proposed Trunk Storm Sewer Along Hwy. #409
From Martin Grove Road Westerly to Mimico Creek
Borough of Etobicoke, Metropolitan Toronto
District #6 (Toronto)

W.O. 72-11100 -- W.P. 218-65-01

1. INTRODUCTION:

The Foundations Office was requested to carry out a subsurface investigation at the site of the above-mentioned proposed trunk sewer. The request was contained in a memorandum from Mr. W. C. Friedmann, Senior Expressway Design Engineer, Systems Design, Central Region, dated August 16, 1972. Subsequently, an investigation was carried out by this Office to determine the subsoil, bedrock and groundwater conditions existing at the site.

This report contains the results of our field and laboratory investigation, together with our recommendations pertaining to the excavation for and the installation of the storm sewer.

2. SITE AND GEOLOGY:

The site is located some 400 to 1,000 feet south of Belfield Road between Martin Grove Road on the east and Mimico Creek on the west, in the Borough of Etobicoke, Metropolitan Toronto. The terrain is gently undulating in relief with the ground surface varying between elevations 525 and 553. In the vicinity of the site, the land is vacant and grass covered. Twin north-south trending C.N.R. spur lines traverse the area between existing Hwy. #27 and Iron Street.

The site is located in the physiographical region known as the "Peel Plain." The characteristic deposit in this region is a ground moraine laid down during the Wisconsin Glacial Age.

In the vicinity of the area under investigation, this moraine is primarily composed of a glacial till whose thickness typically ranges from 50 to 80 feet. In this region, the Humber River and Etobicoke Creek have cut deep valleys into the overburden. There is, therefore, no large undrained depression, swamp or bog, although, in many of the interstream areas drainage is still imperfect.

The overburden is underlain by grey shale bedrock of the Meaford-Dundas formation, Ordovician Period.

3. FIELD AND LABORATORY WORK:

The field work along the proposed route of the trunk sewer consisted of putting down 30 sampled borings, each accompanied by a dynamic cone penetration test. In addition, six boreholes put down during previous investigations in this area are included because of their close proximity to the proposed alignment of the trunk sewer. The borings were advanced by means of two continuous flight auger machines adapted for soil sampling purposes (C.M.E. machines).

Samples of the overburden were obtained by means of a standard 2 inch O.D. split spoon sampler driven into the soil with an energy of 350 ft.lb. per blow according to the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests. BX size rock core samples were obtained at three boring locations to prove bedrock.

All samples were subjected to a careful visual examination in the field and subsequently in the laboratory. Following these examinations, the following laboratory testing was carried out on selected representative samples to determine the engineering properties of the overburden.

Natural Moisture Contents

Atterberg Limits

Grain-Size Distribution

The field and laboratory test results are summarized on the Record of Borehole sheets contained in the Appendix to this report.

The location and elevation of the boreholes are shown on

Drawing No. 72-11100A, together with stratigraphical profiles along the route of the proposed trunk sewer. The surveying at the site was carried out by personnel from the Central Region Engineering Surveys Section. The elevations appearing in this report are referenced to a geodetic datum.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The predominant stratum across the site is a competent glacial till. The upper portion of the glacial till is cohesive in nature, whereas the lower portion is generally granular. At certain locations the glacial till is overlain by as much as 20 feet of fill material. The overburden is underlain by grey shale bedrock.

The boundaries of various deposits, as determined in the boreholes, as shown on the accompanying Record of Borehole sheets. The stratigraphical section, shown on Drawing No. 72-11100A, has been inferred from this data.

A brief description of the subsoil and bedrock types encountered are presented in the subsections to follow.

4.2) Fill Material:

Fill material was found in Boreholes #101, 121, 123 and 129. It consists of a mixture of clayey silt, sand, gravel and trace of organics. The thickness of this stratum is from 6 to 20 feet. Standard Penetration testing carried out within this stratum gave 'N' values ranging from 5 to 11 blows per foot. Based on these values, it is estimated that the fill has been subjected to a moderate degree of compaction.

4.3) Glacial Till:

The glacial till stratum is present immediately beneath a thin top soil cover, except in those locations where fill is present. The glacial till stratum was fully penetrated at B.H.'s # 107, 113 and 134 only. At these locations it was found to be 59 to 79 feet thick. The glacial till stratum is generally cohesive; it is composed of a heterogeneous mixture of clayey silt, some sand

and a trace of gravel. In certain locations, the cohesive zone of the glacial till is followed by a lower area in which the till is granular consisting of a heterogeneous mixture of silty sand, gravel and clay. In addition, isolated layers of silty sand to sandy silt were present throughout the glacial till stratum. The thickness of these layers ranges from 2 to 9 feet. Grain-size distribution curves for samples obtained within the two distinct zones are plotted in envelope form on the figures listed below.

Figure 1 - Upper Cohesive Glacial Till

Figure 2 - Lower Granular Glacial Till

These figures are contained in Appendix 1 of this report.

Atterberg limit testing results are plotted on the Record of Borehole sheets and are summarized on the Plasticity Chart, Fig. No. 3. The results are also tabulated below.

		<u>Cohesive Glacial Till</u>	
		<u>Range</u>	<u>Average</u>
Liquid Limit	(W _L) %	15 - 34	(22)
Plastic Limit	(W _p) %	11 - 22	(14)
Natural Moisture Content	(W) %	5.5 - 18.5	(12)

Referring to the Table, it can be seen that the cohesive portion of the glacial till is inorganic with a plasticity in the low range.

Standard Penetration testing was performed within this stratum; the values are plotted on the Record of Borehole sheets. In the upper cohesive portion of the glacial till the 'N' values range from 10 blows/ft. to more than 100 blows/ft. Based on these results it is estimated that the consistency of the cohesive glacial till varies from stiff to hard. The 'N' values in the granular portion vary between 16 blows/ft. and 70 blows for 1 inch, indicating that the relative density ranges from compact to very dense.

4.4) Bedrock:

Bedrock was proven at three of the boring locations (B.H.'s #107, 113 and 134) by obtaining 3 to 13 feet of EXL size rock core samples. The surface of the bedrock at these locations, was found

to be between elevations 472 and 478.

The bedrock is composed of a dark grey shale. The upper 2 to 7 feet of the bedrock is often in a weathered and fractured condition. Below this zone the bedrock is reasonably sound as evidenced by the high percentage of rock core recovered.

5. GROUNDWATER CONDITIONS:

Groundwater level observations were carried out, during and after the period of the investigation, by recording the water levels in the open borings. The observations are recorded on the Record of Borehole sheets and on Drawing No. 72-11100A.

The results of the observations indicate that the groundwater level within the overburden varies between elevations 491 and 546. These elevations correspond to depths of from 2 to 14 feet below the existing ground surface.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct an east-west expressway in the vicinity of Belfield Road which will connect Hwy. #401 in the Islington/Kipling area with the Toronto International Airport. The new Belfield Expressway (Hwy. #409) will be 3.3 miles long and will require a number of interchanges and structures, as well as a storm trunk sewer.

This discussion deals with the proposed 6,500 feet long trunk sewer which runs from Martin Grove Road to Mimico Creek; it will be located some 400 to 1,000 feet south of the existing Belfield Rd. The size of the sewer is to vary from 60 inches to 84 inches in diameter.

The invert elevation of the sewer will range from elevation 523, at Martin Grove Road to elevation 493 at its outfall at Mimico Creek. At this grade it will be located from 12 to 43 feet below the existing ground surface. Further, between Station 10+00

and 49+00 (Trunk Sewer chainage), the proposed grade of Hwy. #409 will range from elevation 530 to 518.5; i.e., corresponding to depths of from 6 to 24 feet below the existing ground surface. In this area the invert level of the sewer will be located from 12 to 26 feet below the profile grade of Hwy. #409. The sewer excavation will extend well below the piezometric groundwater level recorded in the overburden during the period of the investigation. The proposed profile grade of the sewer and the highway are plotted on Drawing No. W.O. 72-11100A.

The predominant stratum across the site is an extensive deposit of glacial till, which is up to 79 feet thick. The major portion of the till is cohesive in nature. Between Stations 4+00 and 30+00, however, the lower portion of the till has a granular matrix. The overburden is underlain by weathered to sound shale bedrock.

The invert of the sewer will be located in the glacial till stratum. The various alternative methods of constructing the sewer together with considerations regarding i) the stability of temporary cuts and ii) dewatering, will be discussed separately in the following subsections.

6.2) Hwy. #409 Cut Section (Station 10+00 to Station 49+00, Trunk Sewer Chainage):

As discussed previously, the proposed grade of Hwy. #409 will be some 6 to 24 feet below the existing ground surface. Temporary cuts of these heights will be stable against deep-seated rotational type of failure, provided that the cuts are constructed with 1:1 slopes. No major dewatering problems are anticipated, in view of the relatively impervious nature of the subsoil.

6.3) Sewers Constructed by Open-Cut Methods:

The excavations for the storm sewers will generally be carried out within the cohesive glacial till stratum. Between Station 10+00 and Station 49+00, Hwy. #409 will be in a cut section. It is our opinion that it is desirable to carry out the roadway excavations prior to constructing the trunk sewer. If such is the

case, the maximum depth of excavation in this area will be reduced from 43 to 26 feet. Temporary cuts up to 31 feet high will be stable against a deep-seated rotational type of failure, provided that the cuts are constructed with 1:1 slopes. If due to space restrictions, slopes steeper than those specified above or vertical cuts are desired, the excavations should be properly sheeted and braced. In all cases, the provisions adopted in the designated working areas should comply with the Trench Excavator's Act.

The prevailing groundwater level, as recorded during the course of the field investigation, is well above the invert elevations of the trunk sewer. Although the sewer is completely within the cohesive glacial till stratum, the possibility of ground heave exists when the bottom of the trench is reasonably close to the water bearing granular glacial till stratum; this is particularly true between Station 23+00 and Station 30+00. Calculations have been carried out to determine the safe hydrostatic groundwater head in the granular glacial till stratum for various distances between the sewer invert and the surface of the granular till. These results are plotted on Figure #4. To ensure safety, therefore, it will be essential, during construction, to maintain the hydrostatic groundwater head existing in the granular stratum at the required safe level by means of a suitable dewatering scheme until the backfilling of the trench is completed. However, it is believed that if excavations are carried out in a relatively short period of time and are backfilled immediately after the completion of sewer construction, major dewatering problems can be eliminated.

Where the invert of the sewer is within the water-bearing silty sand or sandy silt layer which exists randomly within the cohesive glacial till stratum, a danger of 'boiling' of the trench base exists. In order to prevent this, and to achieve dry safe working conditions, the hydrostatic pressure within the granular strata must be lowered to a level at least 2 feet below the trench base, and be maintained at this level until backfilling is completed. Alternatively, the isolated granular pocket which may boil should be completely removed and be backfilled with either well-graded granular material or mass concrete.

As discussed elsewhere, the majority of the sewer excavations will be carried out within the relatively impervious glacial till stratum. The groundwater seepage into the excavations will be negligible in quantity. However, where the excavations intercept the water bearing granular strata, excess seepage into the excavations can be anticipated. In all cases, it is believed that any groundwater seepage into the excavations or surface runoff can be handled by employing standard techniques, such as pumping from sumps.

The future performance of the sewer pipe depends to a great extent on the type and quality of the bedding used. It is, therefore, recommended that the pipe bedding adhere to standards currently being used by the Ministry, specifically for Class 'B' bedding on a Yielding Foundations (Standard No. DD-823), and be placed in a dry trench. In addition, particular attention should be paid to the compaction and shaping of the bedding material. Backfill for the sewer excavations should comply with Standard No. DD-813-B currently used by the Ministry. The cover material should meet the specifications for Granular 'B'.

6.4) Sewers Constructed by Tunnelling Through the Overburden:

An alternate scheme for sewer installation is to utilize tunnelling methods. Because of the high groundwater level, it will be necessary to lower the water level below the tunnel base, or to construct the tunnel using air pressure greater than the prevailing hydrostatic pressure to achieve safe, dry working conditions. Contractors, who consider using air pressure, should be advised that they will be responsible for determining the air pressure to be used and also be responsible for preventing leakage through the boreholes that have been drilled at the site insofar as it affects their operations.

6.5) Other Considerations:

Comments and recommendations relating to dewatering and stability of excavations mentioned in the foregoing paragraphs, are based on the assumption that the groundwater conditions, as determined during the course of the field investigation, will

apply during construction. However, it will be the responsibility of the contractor to determine exactly the conditions which prevail during construction, and to take such steps as are necessary to ensure safe and dry working conditions. It is believed that, if the sewer is constructed continuously from the outfall end, drainage in the critical zones will occur thus alleviating the situation considerably. In addition, permanent drainage of the sewer trenches into each manhole is recommended by providing a short length (20 feet) of 6" diameter perforated pipe surrounded with a suitable filter and discharging into the manhole.

7. MISCELLANEOUS:

The field investigation was carried out during the period of Aug. 23 to Sept. 11, 1972, under the supervision of Messrs. V. Korlu and C.S. Poon, Project Foundations Engineers.

The drilling equipment used was owned and operated by Master Soil Investigation Ltd., Toronto.

This report was prepared by Mr. C. S. Poon, Project Foundations Engineer. This project was carried out under the general supervision of Mr. M. Devata, Supervising Foundations Engineer, who also reviewed this report.

C.S. Poon
C. S. Poon, P. Eng.



M. Devata
M. Devata, P. Eng.

CSP/ao.
Nov. 13, 1972.

APPENDIX I

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 101

JOB 72-11100 LOCATION Co-ords. 879,231 N; 980,027 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE Sept. 11, 1972 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Auger and Cone Test CHECKED BY *[Signature]*

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT — w _L PLASTIC LIMIT — w _p WATER CONTENT — w			BULK DENSITY γ	REMARKS
			NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	w _p	w		
535.0	Ground Level														
0.0	Fill Material														
528.5	Clayey silt, with some sand & gravel, trace of organics. Firm to stiff		1	SS	9										531.0
6.5			2	SS	14										
			3	SS	77										
	Brown Grey		4	SS	60/90										
	Het. mix. of clayey silt, some sand & trace of gravel		5	SS	76										
	(Glacial Till)		6	SS	61										
			7	SS	45										
	Very stiff to Hard		8	SS	39										
505.0															
503.5	Silty sand, Very Dense		9	SS	67										7 42 40 11
31.5	End of Borehole														

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 102

JOB 72-11100

LOCATION Co-ords. 879,094 N; 980,064 E.

ORIGINATED BY VK

W.P. 218-55-01

BORING DATE Sept. 8, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY

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				
						20	40	60	80	100	WATER CONTENT — W					
						SHEAR STRENGTH P.S.F.					W _P — W — W _L					
						○ UNCONFINED + FIELD VANE					WATER CONTENT %					
						● QUICK TRIAXIAL × LAB VANE					10 20 30					
535.0	Ground Level															
0.0																
			1	SS	41										531.2	
			2	SS	39											
			3	SS	65											
	Brown Grey		4	SS	38											
	Het. mix. of clayey silt, some sand and trace of gravel.		5	SS	44											
	(Glacial Till)		6	SS	60/64											
			7	SS	40											
			8	SS	71											
	Hard															
503.5			9	SS	72											
31.5	End of Borehole															

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 103

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION Co-rds. 878,900 N; 980,129 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 7, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

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 20 40 60 80 100					PLASTIC LIMIT W_P				
						SHEAR STRENGTH P.S.F.					W_p W W_L					
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					WATER CONTENT %			P.C.F.	GR.SA.SI.CL.	
											10 20 30					
534.7	Ground Level															
0.0																
			1	SS	59											
			2	SS	48											
			3	SS	44											
			4	SS	30											
			5	SS	43											
			6	SS	37											
			7	SS	37											
			8	SS	30											
			9	SS	77											
503.2																
31.5	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 107

JOB 72-11100

LOCATION Co-ords. 878,305 N; 980,012 E.

ORIGINATED BY GSP

W.P. 218-65-01

BORING DATE Aug. 23, 1972

COMPILED BY VX

DATUM Geodetic

BOREHOLE TYPE Auger and Conc Test

CHECKED BY 20

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT — W _L PLASTIC LIMIT — W _p WATER CONTENT — W			BULK DENSITY γ	REMARKS	
			NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	W _p	W			W _L
536.9	Ground Level															
0.0	Brown Grey Het. mixture of clayey silt, some sand and trace of gravel. (Glacial Till)		1	SS	18											
			2	SS	38	530										▼ 529.6
			3	SS	47											
			4	SS	68											
			5	SS	38	520										
			6	SS	38											
			7	SS	79											
			8	SS	38	510										
			9	SS	32											
501.9	Het. mix. of silty sand, gravel & clay. Grey		10	SS	69	500									9 44 42 5	
35.0			11	SS	100	5"										
488.9	Very Dense with shale fragments below El. 487.					490										
48.0			12	SS	125											
478.0	Bedrock - Shale with limestone layers. Dark Grey					480										
58.9			13	RC BXL	60%											
474.9	End of Borehole															
62.0							470									

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 108

JOB 72-11100

LOCATION Co-ords. 878,958 N; 979,817 E.

ORIGINATED BY CST

W.P. 218-65-01

BORING DATE August 24, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT w	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT % W_p w W_L	BULK DENSITY γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS/FOOT							
538.7	Ground Level											
0.0	Brown Grey Het. mix. of clayey silt, some sand and trace of gravel (Glacial Till) Very Stiff to Hard		1	SS	50							532.0
			2	SS	48							
			3	SS	95							
			4	SS	44							
			5	SS	25							
			6	SS	32							
			7	SS	26							
			8	SS	30							
			9	SS	11							
503.7	Het. mix. of silty sand gravel and clay (with shale fragments below el. 489.) Grey Very Dense		10	SS	90							9 39 37 15
35.0			11	SS	70							
			12	SS	50							
483.7	End of Borehole					480						

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 110

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION Co-ords. 878,117 N; 979,358 E.

ORIGINATED BY CSP

W.P. 218-65-01

BORING DATE August 21, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT w_L			BULK DENSITY γ	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	PLASTIC LIMIT w_p	WATER CONTENT w			P.C.F.
							SHEAR STRENGTH P.S.F.				w_p — w — w_L					
							O UNCONFINED + FIELD VANE				WATER CONTENT %					
							e QUICK TRIAXIAL x LAB VANE				10	20	30			
545.8	Ground Level															
0.0	Brown Grey Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		1	SS	36											
			2	SS	37											
			3	SS	61											
			4	SS	15											
			5	SS	11											
			6	SS	18											
			7	SS	17											
520.8	Sandy silt		8	SS	34											
518.8			9	SS	16											
27.0			10	SS	32											
	Very Stiff to Hard		11	SS	25											
504.8			12	SS	35											
41.0	Het. mix. of silty sand, gravel and clay (with shale fragments below el. 490.)		13	SS	66											
			14	SS	118											
	Grey Very Dense															
480.3	End of Borehole		15	SS	100											
65.5																

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 111

JOB 72-11100

LOCATION Co-ords. 878,099 N; 979,165 E.

ORIGINATED BY CSP

W.P. 18-65-01

BORING DATE August 25, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT			BULK DENSITY	REMARKS				
			NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	W _L	W _p	W			W _L	W _p	W	W _L
547.4	Ground Level																			
0.0	Brown Grey Het. mix. of clayey silty some sand and trace of gravel. (Glacial Till) Very Stiff to Hard		1	SS	36															
			2	SS	81	540														
			3	SS	73															
			4	SS	71 1/2"															
			5	SS	31	530														
			6	SS	51															
			7	SS	74															
			8	SS	71	520														
			9	SS	60															
			10	SS	33															
			11	SS	30															
			12	SS	19	510														
506.4			Het. mix. of silty sand, gravel & clay. Grey Very Dense		13	SS	61													
41.0					14	SS	50 1/2"	500												
					15	SS	60 1/2"													
477.4	End of Borehole					490														
70.0						480														
						470														

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 112

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION co-ords. 878,089 N; 976,970 E.

ORIGINATED BY CSP

W.P. 218-65-01

BORING DATE Aug. 25, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

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			
						20	40	60	80	100	SHEAR STRENGTH P.S.F.					
											○ UNCONFINED	+ FIELD VANE	WATER CONTENT %			
											● QUICK TRIAXIAL	× LAB VANE	w_p	w	w_L	
550.3	Ground Level															
0.0			1	SS	12											
			2	SS	14											
	Brown Grey		3	SS	67											
			4	SS	32											
	Het. mix. of clayey silty some sand and trace of gravel.		5	SS	33											
			6	SS	23											
	(Glacial Till)		7	SS	29											
			8	SS	31											
	Stiff to Hard		9	SS	21											
			10	SS	23											
			11	SS	36											
			12	SS	31											
			13	SS	40											
503.3			14	SS	143											
47.0	Het. mix. of silty sand, gravel & clay.		15	SS	160											
	Grey															
	Very Dense		16	SS	95											
479.8			17	SS	100											
70.5	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 113

JOB 72-11100

LOCATION Co-ords. 878,079N; 978,772 E.

ORIGINATED BY GSP

W.P. 218-65-01

BORING DATE Aug. 28, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — W _L PLASTIC LIMIT — W _P			BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	WATER CONTENT — W		P.C.F.		
552.0	Ground Level															
0.0			1	SS	24											
			2	SS	38											
	Brown Grey		3	SS	39											
	Het. mix. of clayey silt, some sand and trace of gravel.		4	SS	35										541.6	
	(Glacial Till)		5	SS	27											
			6	SS	32											
	Very Stiff to Hard		7	SS	36											
			8	SS	20											
			9	SS	32											
521.0			10	SS	31										0 34 47 19	
519.0	Silty sand		11	SS	26											
33.0			12	SS	16											
			13	SS	27											
			14	SS	31											
507.0			15	SS	25										0 28 42 30	
45.0			16	SS	100	5"										
	Het. mix. of sandy silt clay and gravel.		17	SS	75	4"										
	Grey															
	Compact to Very Dens		18	SS	147											
473.2																
78.8	Bedrock - Shale with limestone layers.		19	RC HXL	95%											
468.2	Dark Grey		20	RC B.L.	100%											
83.8	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 114

JOB 72-11100

LOCATION Co-ords. 878,012 N; 978,438 E.

ORIGINATED BY CSP

W.P. 218-65-01

BORING DATE Aug. 28, 1972

COMPILED BY VK

DATUM Geodetic

- BOREHOLE TYPE Auger and Cone Test

CHECKED BY Lo

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ	REMARKS		
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	W_P			W	W_L
552.2	Ground Level														
0.0					550										
		1	SS	29											
		2	SS	27											
		3	SS	41											
	Brown Grey	4	SS	23	540										
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)	5	SS	20											
		6	SS	16											
		7	SS	17	530										
		8	SS	13											
		9	SS	13											
	Stiff to Hard	10	SS	16	520										
		11	SS	26											
		12	SS	31											
		13	SS	22											
		14	SS	22	510										
505.2		15	SS	20											
47.0	Het. mix. of silty sand, gravel and clay.	16	SS	80	500										
		17	SS	97											
	Grey				490										
	Very Dense	18	SS	100/5"											
477.2					480										
75.0	End of Borehole				470										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 116

JOB 72-11100

LOCATION Co-ords. 878,015 N; 977,779 E.

ORIGINATED BY CSP

W.P. 218-65-01

BORING DATE Aug. 29, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *Lo*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT — W _L PLASTIC LIMIT — W _p WATER CONTENT — W	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT % W _p — W — W _L 10 20 30	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE							
545.5	Ground Level										
0.0			1	SS	29						540.1
	Brown Grey		2	SS	34						
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		3	SS	60						
			4	SS	17						3 26 47 24
			5	SS	24						
			6	SS	13						
	Stiff to Hard		7	SS	10						
			8	SS	13						
			9	SS	14						
			10	SS	23						
500.5			11	SS	13						
45.0	Het. mix. of silty sand, gravel and clay. Grey		12	SS	16						
			13	SS	50						
490.0	Compact to Very Dense		14	SS	100/6"						
55.5	End of Borehole										

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 117

JOB 72-11100

LOCATION Co-ords. 577,983 N; 977,580 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE August 30, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W			BULK DENSITY γ	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		FOOT	20	40	60	80			100	W _p
542.9	Ground Level													
0.0			1	SS	28									
			2	SS	25									
	Brown Grey		3	SS	37									
	Het. mix. of clayey silt, some sand and trace of gravel (Glacial Till)		4	SS	40									
			5	SS	26									
			6	SS	22									
			7	SS	27									
			8	SS	15									
	Stiff to Hard		9	SS	19									
			10	SS	24									
499.9			11	SS	12									
43.0	Silty sand.		12	SS	87									
493.9	Very Dense													
49.0			13	SS	106									
487.4			14	SS	100 1/4"									
55.5	End of Borehole													

OFFICE REPORT OF SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 119

JOB 72-11100

LOCATION Co-ords. 877,766 N; 976,738 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Aug. 31, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		20	40	60	80	100	W _p	W		
536.5	Ground Level													
0.0			1	SS	25									
			2	SS	28									
			3	SS	29									
			4	SS	17									
		Brown	5	SS	26									
		Grey	6	SS	30									
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		7	SS	19									
			8	SS	18									
			9	SS	11									
			10	SS	55/6"									
	Stiff to Hard		11	SS	70/6"									
			12	SS	73/4"									
			13	SS	75/6"									
480.0			14	SS	69									
56.5	End of Borehole													

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 120

JOB 72-11109

LOCATION Co-ords. S77,652 N; 976,398 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE August 31, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY 22

SOIL PROFILE		SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L	BULK DENSITY Y P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE					
532.5	Ground Level								
0.0	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)	Brown Grey	1	SS	25	530			522.2
			2	SS	29				
			3	SS	22				
			4	SS	18				
			5	SS	13				
			6	SS	18				
			7	SS	30				
508.5						510			
24.0	Layered clayey silt and silty sand		8	SS	38				
			9	SS	23				
499.5						500			
33.0			10	SS	24				
			11	SS	43	490			
			12	SS	74				
482.5						480			
50.0	Silty sand		13	SS	20				9 45 40 6
480.5						180			
52.0									
476.0			14	SS	100/5"				
56.5	End of Borehole					170			

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 121

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION Co-ords. 877,578 N; 976,184 E

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 1, 1972

COMPILED BY VK

DAYUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY JK

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FOOT	BLOWS / FOOT					PLASTIC LIMIT	WATER CONTENT		
						20	40	60	80	100	W _p	W	W _L		
						SHEAR STRENGTH P.S.F.					WATER CONTENT %				
						O UNCONFINED + FIELD VANE					10 20 30			P.C.F.	GR SA. SI. CL.
						X QUICK TRIAXIAL X LAB VANE									
525.0	Ground Level														
0.0	Fill Material														
519.0	Clayey silt, some sand & trace of organics.		1	SS	8										V 523.4
6.0			2	SS	33										
			3	SS	50										
	Brown Grey		4	SS	46										
	Het. mix. of clayey silt, some sand and trace of gravel.		5	SS	36										
	(Glacial Till)		6	SS	36										
			7	SS	50										
497.0			8	SS	56										
28.0	Silty sand		9	SS	17										
489.5			10	SS	23										
35.5															
483.5	Stiff to Hard														
41.5	End of Borehole														

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 122

JOB 72-11100

LOCATION Co-ords. 877,658 N; 976,030 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 5, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY

SOIL PROFILE		SAMPLES		ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W $W_p \leftarrow W \leftarrow W_L$	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE BLOWS/FOOT					
508.0	Ground Level							
0.0			1 SS 69					
			2 SS 39					
			3 SS 9					
			4 SS 31					
	Brown Grey		5 SS 23					
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		6 SS 76					
			7 SS 107					
			8 SS 84					
476.5	Stiff to Hard		9 SS 103					
31.5	End of Borehole							
				470				

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 123

JOB 72-11100

LOCATION Co-ords. 877,015 N; 975,837 E.

ORIGINATED BY VR

W.P. 218-65-01

BORING DATE Sept. 1, 1972

COMPILED BY VR

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE * QUICK TRIAXIAL * LAB VANE	WATER CONTENT % w_1 w w_2	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE							
524.0	Ground Level										
0.0	Fill Material										
	Clayey silt with trace of gravel & organics.		1	SS	9						
			2	SS	5						
			3	SS	11						
			4	SS	10						
			5	SS	6						
	Soft to Stiff		6	SS	11						
504.0	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till) (with silty sand layers throughout)		7	SS	100						
			8	SS	36						
			9	SS	65						
			10	SS	120						
484.0	Grey Hard										
40.0	Het. mix. of sandy silt, gravel and clay.		11	SS	105						8 39 46 7
477.5	Grey Very Dense		12	SS	112						
46.5	End of Borehole										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 125

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION Co-ords. 877,501 N; 975,280 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 5, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

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				
525.5	Ground Level					20	40	60	80	100	WATER CONTENT — W					
						SHEAR STRENGTH P.S.F.					W _p — W — W _L					
						○ UNCONFINED + FIELD VANE					WATER CONTENT %					
						● QUICK TRIAXIAL × LAB VANE					10 20 30					
0.0	Brown Grey Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till) Very Stiff to Hard		1	SS	23											
			2	SS	29											
			3	SS	19											
			4	SS	22											
			5	SS	26											
			6	SS	24											
			7	SS	20											
			8	SS	46											
			9	SS	60/5"											
			10	SS	60/4"											
486.5	Silty sand		11	SS	11											
39.0			12	SS	58											
481.5			13	SS	101											
44.0																
474.0	End of Borehole															
51.5																

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 126

FOUNDATIONS OFFICE

JOB 72-11100

LOCATION Co-ords. 877,510 N; 975,078 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 5, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					W _L	W _p	W		
						20	40	60	80	100	W _p — W — W _L					
						SHEAR STRENGTH P.S.F.					WATER CONTENT %					
						○ UNCONFINED + FIELD VANE					10 20 30					
						● QUICK TRIAXIAL x LAB VANE										
517.7	Ground Level															
0.0																
			1	SS	43											
			2	SS	53	510										
			3	SS	52											
	Brown Grey		4	SS	38											
			5	SS	46											
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		6	SS	68	500										
			7	SS	60/8"											
			8	SS	60/1"	490										
	Hard		9	SS	87											
483.7																
34.0			10	SS	21	480									23 54 18 5	
	Silty sand															
475.7			11	SS	95											
42.0																
471.2			12	SS	97											
46.5	End of Borehole					470										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 127

JOB 72-11100 LOCATION Co-ords. 877,522 N; 974,836 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE Sept. 5, 1972 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Auger and Cone Test CHECKED BY [Signature]

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	20	40	60	80			100
498.0	Ground Level													
0.0														
	Brown Grey		1	SS	7									
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		2	SS	34									
			3	SS	60/71"	490								
			4	SS	38									
480.5	Firm to Hard		5	SS	46	480								
17.5	Het. mix. of silty sand gravel and clay. Grey		6	SS	40									
			7	SS	72									
471.5	Dense to Very Dense		8	SS	60/74"									
26.5	End of Borehole					470								

OFFICE REPORT IN SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 128

JOB 72-11100

LOCATION Co-ords. 877,479 N; 974,784 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE Sept. 6, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger and Cone Test

CHECKED BY *[Signature]*

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ	REMARKS
			NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	10	20	30		
497.7	Ground Level															
0.0																
	Brown		1	SS	7											
	Grey		2	SS	106	490										491.1
	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till)		3	SS	34											
182.7	Firm to Hard		4	SS	32											
15.0	Het. mix. of silty sand, gravel and clay. Grey		5	SS	28	180										
			6	SS	74											
175.7	Comp. t to Very Dense		7	SS	607											
22.0	End of Borehole					170										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 129

JOB 72-11100 LOCATION Co-ords. 877,621 N; 974,955 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE Sept. 6, 1972 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Auger and Cone Test CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY Y	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	Wp	W	Wl		
496.5	Ground Level															
0.0	Fill Material															494.5
	Silty sand and trace of clay and organics.		1	SS	2											
489.5	Very Loose to Loose		2	SS	15											
7.0	Het. mix. of clayey silty sand and trace of gravel.		3	SS	35											
	(Glacial Till)		4	SS	57											
	Grey		5	SS	34											
	Hard		6	SS	56											6 36 43 15
474.0	End of Borehole		7	SS	92											
22.5																

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 130

JOB 72-11100 LOCATION Co-ords. 877,700 N; 975,052 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE Sept. 6, 1972 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Auger and Cone Test CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLT.	NUMBER	TYPE		BLOWS/FOOT	BLOWS / FOOT					PLASTIC LIMIT	WATER CONTENT			
						20	40	60	80	100	W _L	W _P	W			
						SHEAR STRENGTH P.S.F.					W _P — W — W _L					
						○ UNCONFINED + FIELD VANE					WATER CONTENT %			γ		
						● QUICK TRIAXIAL × LAB VANE					10 20 30			P.C.F.	GR. SA. SI. CL.	
510.2	Ground Level															
0.0	Het. mix. of clayey silt, some sand and trace of gravel. (Glacial Till) Brown Grey Very Stiff to Hard	[Strat. Plot]	1	SS	16											
			2	SS	25											
			3	SS	42											
			4	SS	89											
			5	SS	60/6"											
			6	SS	70											
			7	SS	98											
			8	SS	104											
481.2	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 131 (B.H. 6, 71-11039)

JOB 72-11100 LOCATION Co-ords. 877,506 N; 975,474 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE May 6, 1971 COMPILED BY WA
 DATUM Geodetic BOREHOLE TYPE Diamond Drill, washboring, BX Casing CHECKED BY [Signature]

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					P.C.F.		
525.0	Ground Level															
0.0	Het. mix. of clayey silt with sand and trace of gravel. (Glacial Till) Very Stiff to Hard Brown Grey		1	SS	47	520										
			2	SS	33											
			3	SS	26											
			4	SS	57											
			5	SS	39			510								
			6	SS	22											
			7	SS	24											
			8	SS	41			500								
493.0					9	SS	150	6"								
32.0			Het. mix. of silt, sand and gravel, trace of clay.		10	SS	175	11"	490							
					11	SS	62									
					12	SS	182	11"								
465.0						480										
60.0	End of Borehole					470										
						460										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 132 (B.H. 4, 71-11038)

JOB 72-11100

LOCATION Co-ords. 877,735 N; 976,534 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE May 13, 1971

COMPILED BY HS

DATUM Geodetic

BOREHOLE TYPE Power Auger (Penndrill); Cone Test

CHECKED BY /o

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					WATER CONTENT w			
						20	40	60	80	100	w_p				
						SHEAR STRENGTH P.S.F.					w_2 w w_1				
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT %			γ	
											10	20	30	P.C.F.	GR SA SI CL
533.0	Ground Level														
0.0	Het. mixture of clayey silt with some sand and traces of gravel.		1	SS	41										
			2	SS	37										
			3	SS	60										
			4	SS	30										
			5	SS	40										
	Very Stiff to Hard (Glacial Till)		6	SS	29										
			7	SS	35										
			8	SS	63										
			9	SS	91										
			10	SS	51										
			11	SS	114										
			12	SS	100.5"										
			13	SS	146										
			14	SS	175.5"										
464.3	Fragments of shale		15	SS	150.14"										
68.7	End of Borehole														

OFFICE REPOSITON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 133 (B.H.11, 71-11038)

JOB 72-11100 LOCATION Co-ords. 877,663 N; 977,005 E. ORIGINATED BY VK
 W.P. 218-65-01 BORING DATE May 21, 1971 COMPILED BY HS
 DATUM Geodetic BOREHOLE TYPE Power Auger (Pendril); Cone Test CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80 100	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	WATER CONTENT % 10 20 30	BULK DENSITY γ	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE								BLOWS/FOOT
535.5	Ground Level											
	Het. mixture of clayey silt with some sand and traces of gravel. Stiff to Hard (Glacial Till)		1	SS	11						533.0 in open BH May 21/71 4 28 40 28 8.39 49 4	
			2	SS	41	530						
			3	SS	45							
			4	SS	25							
			5	SS	20	520						
			6	SS	21							
			7	SS	26							
			8	SS	29	510						
			9	SS	19							
			10	SS	156	8" 500						
			11	SS	100	3"						
			12	SS	300	5" 490						
			13	SS	80							
481.0												
54.5	Sandy silt with traces of clay and gravel.		14	SS	74	480						
474.0	Very Dense		15	SS	100	3"						
61.5	End of borehole					470						

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 134 (B.H. 7, 71-11036)

JOB 72-11100

LOCATION Co-ords. 878,031 N; 977,940 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE May 31 and June 1, 1971

COMPILED BY HS

DATUM Geodetic

BOREHOLE TYPE Power Auger-Washboring-BX Casing-BX Rock Core

CHECKED BY *HS*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W	SHEAR STRENGTH P.S.F. o UNCONFINED + FIELD VANE e QUICK TRIAXIAL x LAB VANE	WATER CONTENT % W_P W W_L	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE							
547.8	Ground Level										
	Het. mixture of clayey silt with some sand and traces of gravel.		1	SS	14						
			2	SS	40						
			3	SS	51						
			4	SS	50						
	Stiff to Hard.		5	SS	31						
	(Glacial Till)		6	SS	37						
			7	SS	16						
			8	SS	18						
			9	SS	19						
			10	SS	25						
			11	SS	13						
			12	SS	15						
			13	SS	91						
			14	SS	85						
			15	SS	112						
	silty sand with some gravel		16	SS	91						
			17	SS	178						
472.3			18	SS	130 1/3"						
75.5	Bedrock - Shale		19	BXL RC	50%						
	Weathered		20	BXL RC	51%						
			21	BXL RC	75%						
159.3	Sound										
88.5	End of Borehole										

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 135 (B.H.13, 71-11036)

JOB 72-11100

LOCATION Co-ords. 878,030 N; 978,119 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE June 3 and 4, 1971

COMPILED BY HS

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger; Cone Test

CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT w			BULK DENSITY γ	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FOOT	20	40	60	80	100	W_p	w			W_L
552.2	Ground Level															
0.0	Het. mixture of clayey silt with some sand and traces of gravel. (Glacial Till) Very Stiff to Hard Occasional seams of silt up to 1/2" thick throughout.	[Strat. Plot]	1	SS	12							10-1				5h.5
			2	SS	15											
			3	SS	59											
			4	SS	58											
			5	SS	36											
			6	SS	27											
			7	SS	31											
			8	SS	28							0-1				
			9	SS	12											
			10	SS	36											
			11	SS	30											
			12	SS	21											
502.0																
50.2	Het. mixture of silty sand to sandy silt with traces of gravel. Compact to Very Dense	[Strat. Plot]	13	SS	25											7.65 (30)
			14	SS	109											
			15	SS	109							0-1				
			16	SS	125	6"										
			17	SS	160	6"										
479.7																
72.5	Clayey silt with pockets of silty sa. & fragments of shale	[Strat. Plot]	18	SS	155	6"										
476.7																
75.5	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 136 (B.H.2, 71-11037)

JOB 72-11100

LOCATION Co-ords. 877,992 N; 978,701 E.

ORIGINATED BY VK

W.P. 218-65-01

BORING DATE April 27, 1971

COMPILED BY SO

DATUM Geodetic

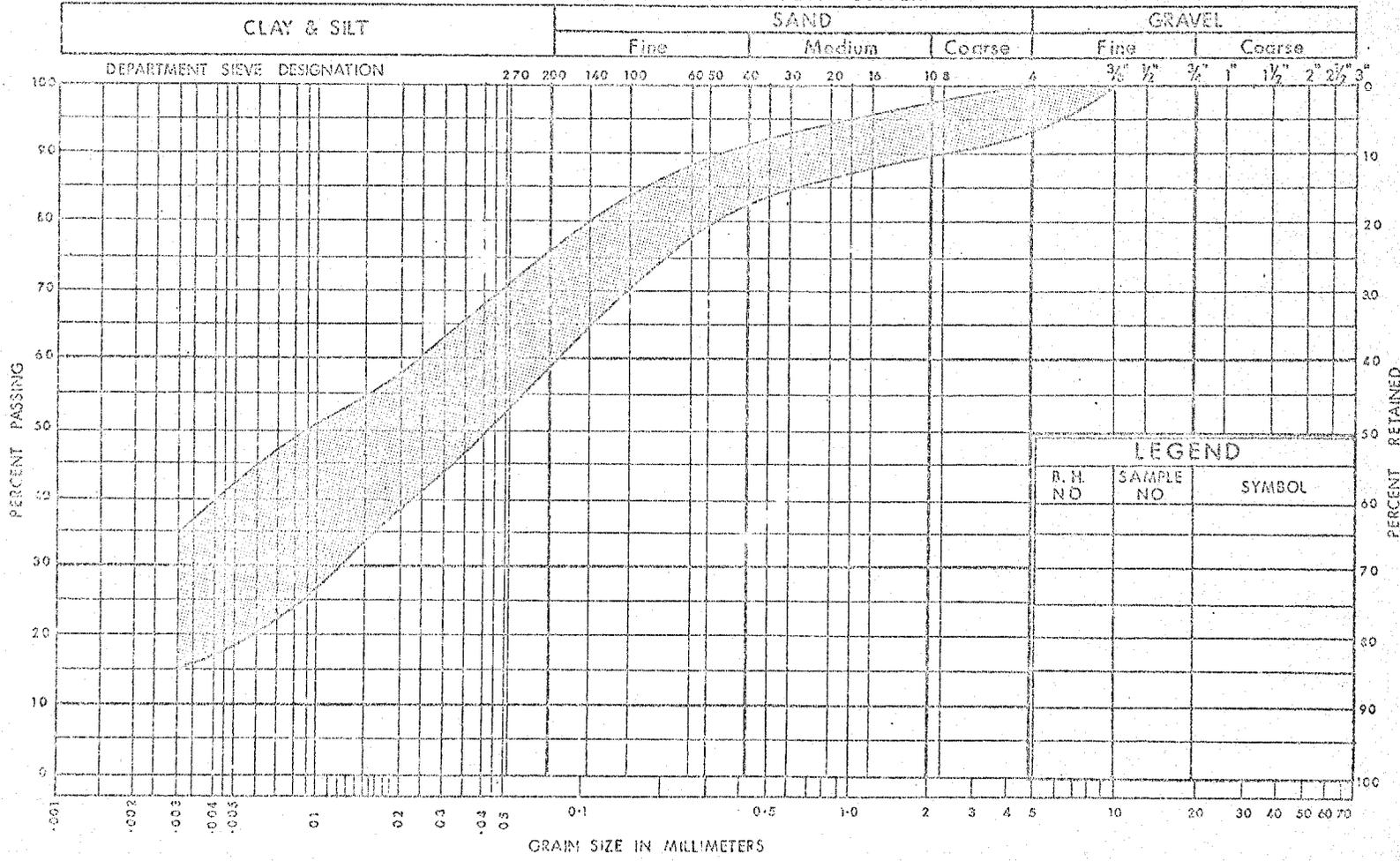
BOREHOLE TYPE Pendrill

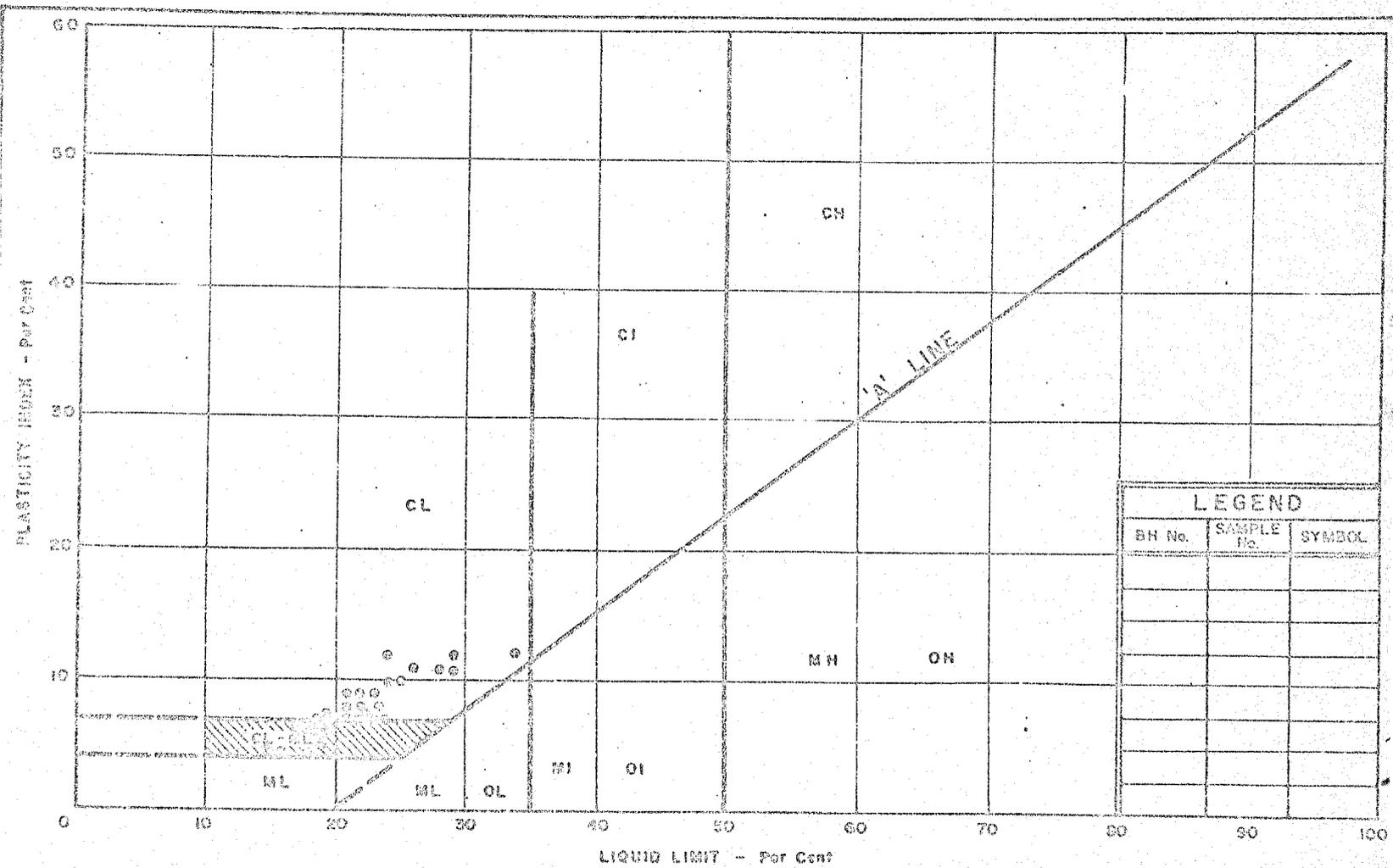
CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					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	20	40	60	80	100	w_p	w			w_L
552.5	Ground Level															
0.0	Het. mix. of clayey silt, sand and trace of gravel.		1	SS	36											
			2	SS	46											
	Very Stiff - Hard		3	SS	63											
	Brown		4	SS	40											
	Grey		5	SS	32											4 28 52 16
			6	SS	30											
	(Glacial Till)		7	SS	34											3 23 56 18
			8	SS	44											
			9	SS	22											
			10	SS	68											
			11	SS	25											
505.5			12	SS	33											
47.0	Het. mix. of silt, sand and trace of gravel and clay.			13	SS	100/5"										7 42 42 9
	Very Dense			14	SS	100/5"										
481.5				15	SS	100/2"										9 56 24 11
71.0	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

UNIFIED SOIL CLASSIFICATION SYSTEM






 DEPARTMENT OF HIGHWAYS
 MATERIALS and
 TESTING
 DIVISION

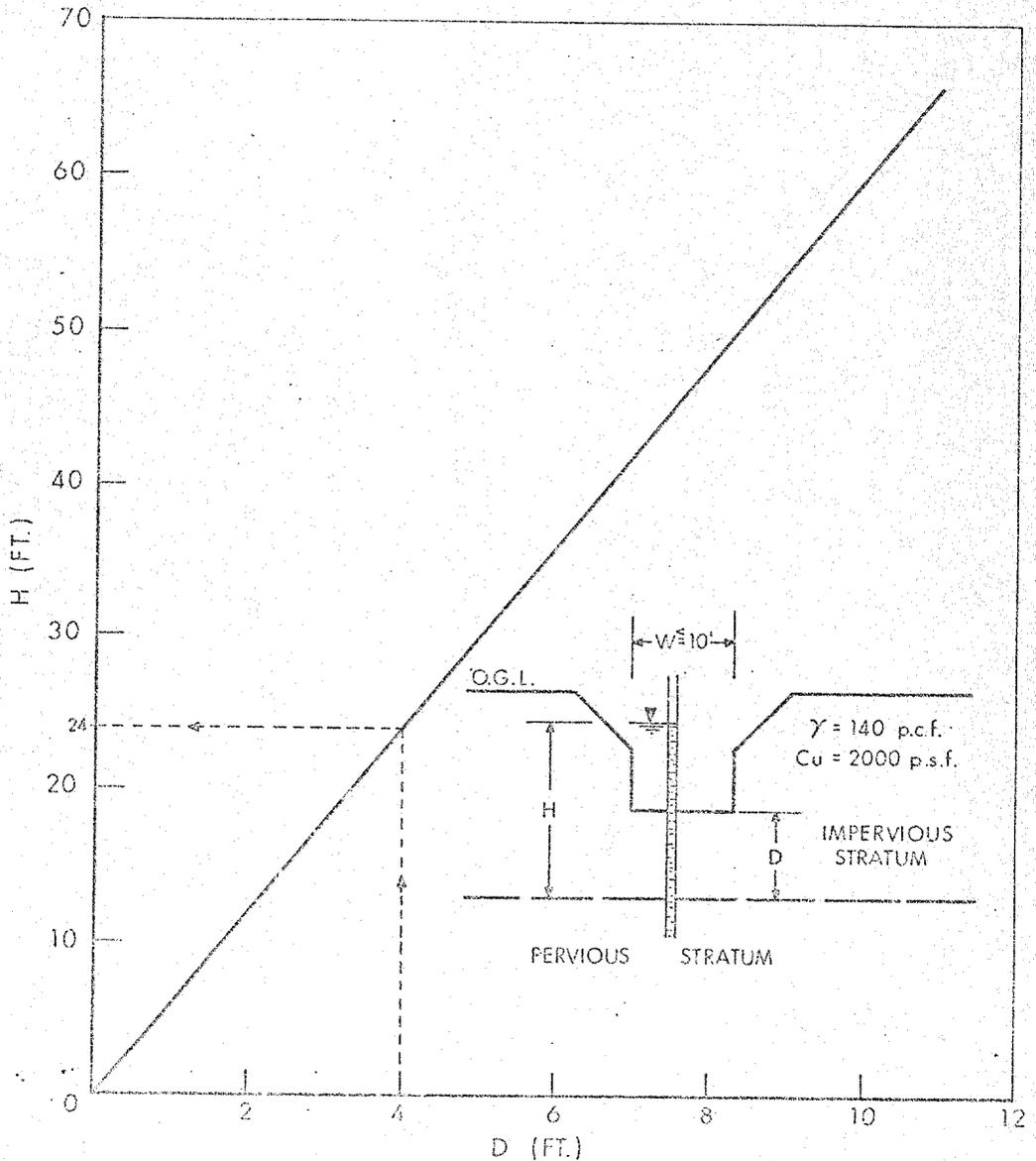
PLASTICITY CHART
GLACIAL TILL
 HET. MIXTURE OF CLAYEY SILT, SAND & GRAVEL

WR No. 218 - 65 - 01

JOE No. 72 - 11100

FIG. 3

GRAPH RELATING SAFE HYDROSTATIC WATER HEAD (H) TO DISTANCE (D) BETWEEN TRENCH BOTTOM & PERVIOUS STRATUM SURFACE



ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TYPE OF SAMPLE

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

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Gcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	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_t	SENSITIVITY

GENERAL

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

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	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

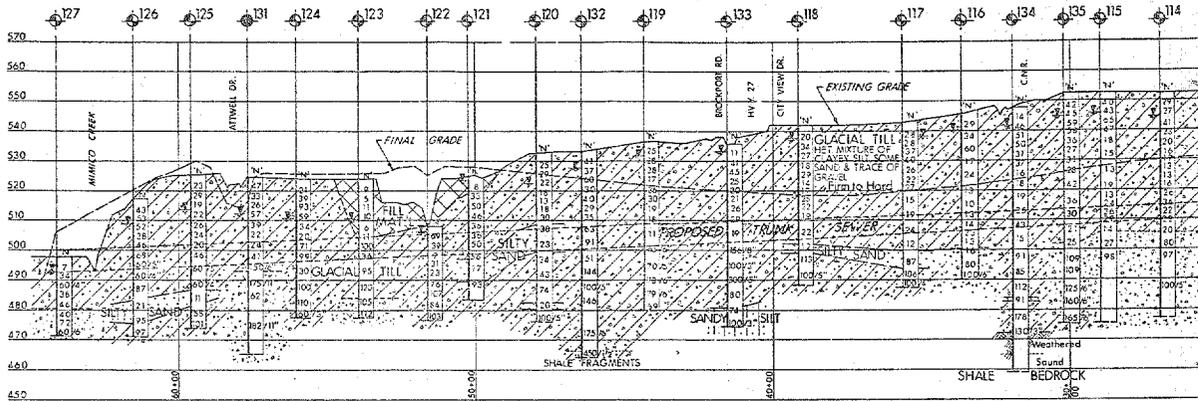
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

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

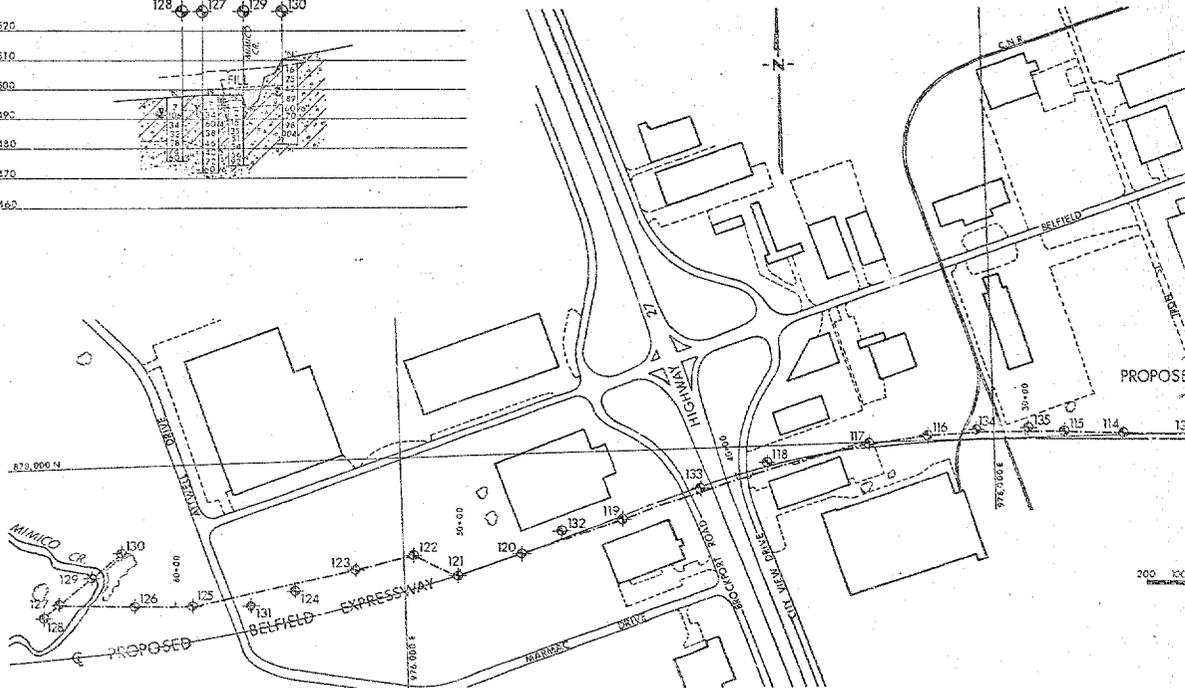
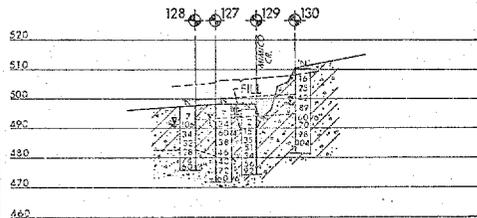
H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL

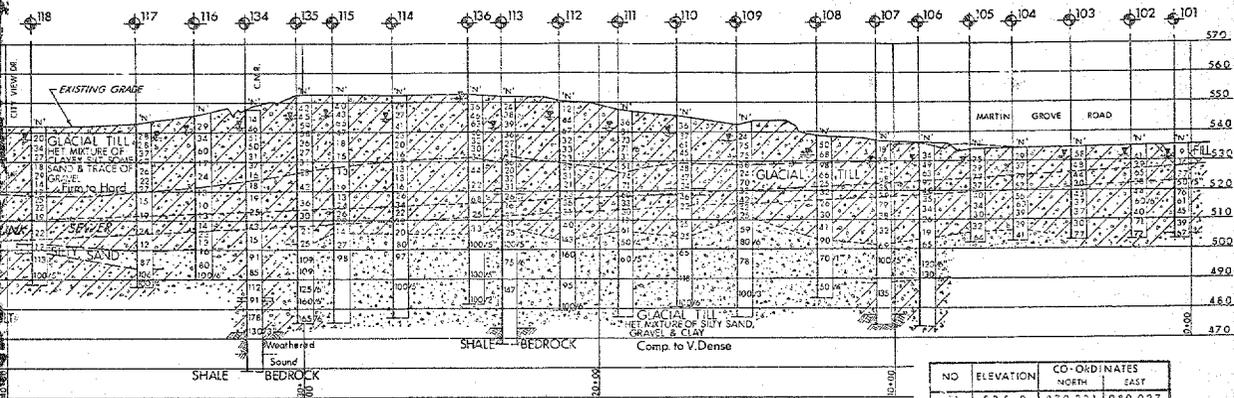


NOTE
SEE RECORD OF BORE HOLE SHEETS
FOR CONE PENETRATION TESTS

PROFILE ALONG PROPOSED TRUNK SEWER

VERT 20 10 0 SCALE 20 40 FT.
HORIZ. 200 100 0 200 400

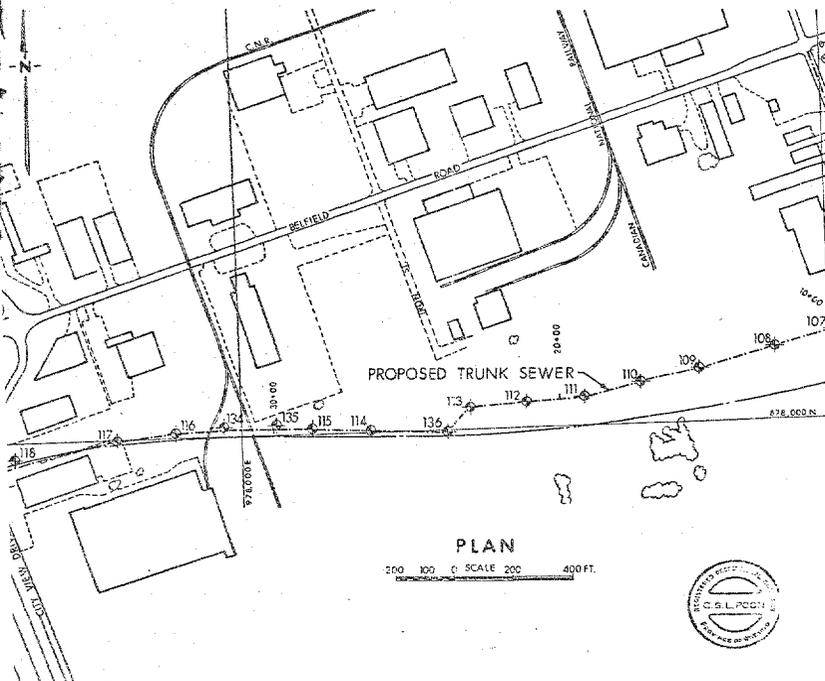




ALONG PROPOSED TRUNK SEWER

VERT. 20 10 0 SCALE 20 40 FT.
 HORIZ. 200 100 0 200 400

⊕ Bore Hole & Comp. Test
 ⊙ Bore Hole



PLAN

200 100 0 SCALE 200 400 FT.



NO	ELEVATION	CO-ORDINATES	
		NORTH	EAST
101	53.5	879.221	980.027
102	53.5	879.002	980.064
103	54.7	878.900	980.129
104	54.7	878.710	980.181
105	53.8	878.573	980.232
106	54.8	878.418	980.301
107	54.8	878.255	980.372
108	54.7	878.255	979.817
109	54.8	878.192	979.554
110	54.6	878.066	979.388
111	54.7	878.092	979.165
112	54.8	878.089	978.970
113	54.8	878.070	978.772
114	54.8	878.032	978.438
115	54.8	878.032	978.092
116	54.6	878.035	977.779
117	54.4	877.983	977.550
118	54.4	877.983	977.319
119	54.7	877.766	976.738
120	54.7	877.692	976.398
121	54.7	877.558	976.030
122	54.7	877.558	975.837
123	54.7	877.552	975.624
124	54.7	877.551	975.280
125	54.7	877.510	975.078
126	54.9	877.522	974.630
127	54.9	877.479	974.284
128	54.6	877.405	974.000
129	54.6	877.621	974.955
130	54.7	877.700	975.092
131	54.7	877.586	975.474
132	54.7	877.725	976.534
133	54.8	877.863	977.000
134	54.8	877.800	977.400
135	54.8	877.800	978.119
136	54.8	877.592	978.701

— NOTE —

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISION	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
 DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

PROPOSED TRUNK SEWER (MARTIN GROVE ROAD TO MIMICO CREEK)

HIGHWAY NO. PROPOSED 409 DIST. NO. 6
 CO. YORK METRO TORONTO
 TWP. ETOBICOKE LOT. CON.

BORE HOLE LOCATIONS & SOIL STRATA

DESIGNED BY	CHECKED BY	WF NO.	218-62-01	DRAWING NO.
DRAWN BY	CHECKED BY	WF NO.	72-11102	72-11100A
DATE	10 NOV 1972	SITE NO.		BRIDGE DRAWING NO.
APPROVED	<i>[Signature]</i>	CONT. NO.		
REVISION				

72-11-100
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: D.M. Hopper
Manager
Contract Control Office

FROM: Systems Design Branch
East Building

ATTENTION:

DATE: June 6, 1973

OUR FILE REF.

IN REPLY TO

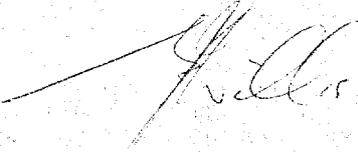
SUBJECT: Contract 73-20, W.P. 218-65-06, District 6, Hwy. 409
Location: Belfield Expressway

Please be advised that due to a misunderstanding between Regional Systems Design and Foundations Office, Bore Hole Locations and Soils Strata Drawing was not inserted in the Contract Drawings forwarded to your office for distribution purposes.

As this drawing is now part of the Contract it should be listed on index sheet 'F' as No. 99 presently marked "Not part of this Contract" and should be issued as an addendum to the bidders.

Sufficient number of copies were forwarded to your office under separate cover at an earlier date.

EJW/cs


E.J. Willis
Project Review Supervisor

for

c.c. H. Greenland
R.S. Pillar
B.J. Giroux
M. Devata ✓

Project Review Engineer

Discussed with Ted Willis and he agreed the fault was by systems design not foundation office and in future they will not repeat such a mistake.

On-2
June 11/73

Materials & Testing Office,
Central Region,
3501 Dufferin Street,
Downsview, Ontario,
M3K 1N6.

(Telephone: 248-3252)

June 13, 1973.

Mr. R. J. A. Barr, P. Eng.,
Project Manager,
DeLeuw, Cather & Company of Canada Ltd.,
Consulting Engineers,
133 Wynford Drive,
Don Mills, Ontario,
M3C 1K1.

Attention: Mr. A. C. Teoh, P. Eng.
Project Engineer

72-11-100

Dear Al:

Re: W.P. 218-65-01
Highway 409, Belfield Expressway
Minutes of Meeting No. 108
Toronto District

Item 7 of the minutes mentions soil profiles in the contract. I believe the "soil profile" refers to data on soil stratigraphy and physical properties as determined by the Foundation Office, Design Services Branch, this Ministry.

In deference to established connotative implication and semantic idiosyncrasy exclusive to this Ministry, may I suggest

continued:-

DeLuw, Cather.

June 13, 1973.

Re: W.P. 218-65-01

that the term soil profile be henceforth reserved for an engineering grade line profile on which subsoil information has been added at the instigation of or by the Regional Materials & Testing Office.

Yours truly,

Original Signed by
C. MIRZA

C. Mirza, P. Eng.,
Regional Materials Engineer.

CM/js.

cc: M. S. Devata ✓
R. P. Northwood



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. R.G. Gascoyne
Regional Director
Central Region

FROM: W.G. Porter
Regional Systems Design

ATTENTION:

DATE: June 18, 1974.

OUR FILE REF.

IN REPLY TO

SUBJECT: RE: Highway 409
Hwy. 401 to Carlingview Drive
W.P. 218-65-C1
District 6, Toronto.

Dear Sir:

Enclosed is a copy of the Design Synopsis Report for the above project. Copies of this report are being distributed to other applicable offices.

WGP:JGC:hcs
Encl.



W.G. Porter
for:
J.G. Celmins,
Sr. Project Design Engineer.

c.c.—See Attached Page.

