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GEOCRES No. 30M11-106

DIST. 6 REGION CENTRAL

W.P. No. 218-65-5

CONT. No. 74-064

W.O. No. 71-11122

STR. SITE No.

HWY. No. ~~427~~ 409 BELFIELD EXPRESSWAY

LOCATION RETAINING WALLS No's. R-1, R-9, R-11, R-12, and, R-17, LOCATED BETWEEN HWY. #401 WESTERLY TO MARTIN GROVE RD.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 0

REMARKS: ② Documents to be unfolded before microfilmed

Department of Transportation and Communications

MEMORANDUM

TO: Mr. G. C. E. Burkhardt,
Regional Bridge Planning Engr.,
Central Region,
90 Floral Parkway, Downsview.

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

ATTENTION:

DATE: January 31, 1972.

OUR FILE REF.

IN REPLY TO APR 12 1972

SUBJECT:

30M11-106
CONTROL No.

FOUNDATION INVESTIGATION REPORT
For
Proposed Retaining Walls
No's. R-1, R- 9, R-11, R-12 and R-17
Located Between Hwy. #401 Westerly to
Martin Grove Rd.
Belfield Road Expressway Complex
Borough of Etobicoke, County of York
District #6 (Toronto)
W.O. 71-11122 -- W.P. 218-65-5

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.

for A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER.

AGS/ao
Attach.
cc: Messrs. D. W. Farren
B. R. Davis
A. Rutka
G. K. Hunter
H. Greenland
E. J. Circoux
T. J. Kovich
G. A. Wrong
B. A. Singh
De Leuw, Cather (S. Barr)

Foundations Files
Documents

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FOUNDATION INVESTIGATION REPORT
For
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W.O. 71-11122 -- W.P. 216-65-5

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1. INTRODUCTION:

A memo, dated October 19, 1971, requesting foundation investigations at the location of the above retaining walls, was received from Mr. G. C. E. Burkhardt, Regional Bridge Planning Engineer. Field investigations were subsequently carried out by the Foundation Office in order to determine the subsoil and groundwater conditions at the respective sites.

This report contains all the factual results obtained from these investigations, together with our recommendations pertaining to the design of foundations for the proposed retaining structures, as well as related considerations such as the expected earth pressures behind the walls and the dewatering measures for the required excavations.

2. DESCRIPTION OF THE SITE:

The site is located along the Belfield Rd. Expressway, between Martin Grove Rd. and Hwy. #401, in the Borough of Etobicoke, Metropolitan Toronto. The terrain is gently undulating in relief between about elevations 507 - 535. The area has been developed for light industrial developments; many one and two storey factories and warehouses are located here.

The site is located in the physiographic region known as the "Peel Plain". The characteristic deposit in this region

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is a ground moraine laid down during the Wisconsin Glacial Age. In the vicinity of the area under investigation, the moraine is primarily composed of a basically cohesive glacial till underlain by grey shale bedrock of the Meaford-Dundas Formation, Ordovician Period. Available geologic information indicates that the surface of the bedrock varies somewhere between elevations 470 and 475.

3. FIELD & LABORATORY WORK:

A total of 28 boreholes, 25 of which were accompanied by dynamic cone penetration tests, were carried out at the locations of the proposed retaining walls. The boreholes and the cone penetration tests were advanced by means of a continuous flight power auger machine adapted for soil sampling purposes.

Samples were obtained using a 2" O.D. split-spoon sampler; the energy used for driving, conformed to the requirements of the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests.

During sampling and drilling operations, detailed logs of the borings were made. These logs, which are located in Appendix I of this report, contain a record of the drilling and sampling techniques used, together with the soil types encountered.

Samples were visually examined in the field and subsequently in the laboratory. Following this examination, laboratory tests were carried out on selected samples to determine the following engineering properties of the soil:

1. Natural Moisture Content
2. Atterberg Limits
3. Grain-Size Distribution

The results of field and laboratory tests are shown on the Record of Borelog sheets. Plots of Plasticity Index vs. Liquid Limit and typical grain-size distribution curves are shown on Figures 1 to 3 in Appendix I.

The locations and elevations of all boreholes were surveyed by personnel from the Draughting Unit of the Foundation

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Office, Department of Transportation and Communications. The elevations given in this report are referenced to a Geodetic datum. The locations of the borings are shown in plan on Drawing No. 71-11122 A, B and C. Stratigraphical sections along the proposed retaining walls, which were inferred from the boring data, are plotted on the aforementioned drawings.

4. SUBSOIL CONDITIONS:

4.1) General:

The predominant stratum across the site is composed of a competent glacial till; this stratum was not fully penetrated at any of the boring locations. It was proven, however, to extend at least 60 feet below existing ground surface.

The gradational variations within the glacial till, as determined at the various borehole locations, are shown on the accompanying borelog sheets. The stratigraphical sections, shown on Drawings No. 71-11122 A to C, are based upon this information.

A brief description of the glacial till stratum is presented in the subsection to follow.

4.2) Glacial Till:

The glacial till is present immediately beneath a thin topsoil cover (6 inches), except in B.H. #15 where a layer of silty sand approximately 4 feet thick was found. The glacial till stratum was not fully penetrated, but was proven to a depth of 60 ft. The glacial till stratum is cohesive, in general, being composed of a matrix of clayey silt binding sand and gravel. In certain locations the cohesive zone of glacial till is underlain by granular type, consisting of a heterogeneous mixture of silt, sand and gravel with a trace of clay. In addition, isolated layers of sandy silt to silty sand were present throughout the glacial till. The thickness of these layers range from 2 to 8 feet. Grain-size distribution curves for samples obtained within the two distinct zones are plotted in envelope form on the figures listed below.

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Figure No. 1 - Cohesive Glacial Till
Figure No. 2 - Granular Glacial Till

These figures are located in Appendix I of this report.

Atterberg Limit tests are plotted on the borelog sheets and are summarized on the plasticity chart, Figure No. 3. The results are tabulated below:

	Upper Cohesive Zone Range	Upper Cohesive Zone Average	Lower Granular Zone Range	Lower Granular Zone Average
Liquid Limit % (W_L)	20 - 25	(22.5)	13 - 16	(14.5)
Plastic Limit % (W_p)	12 - 18	(15)	11 - 13	(12)
Natural Moisture Content % (W)	8 - 16	(12)	4 - 12	(8)

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. The limited number of tests carried out on the granular portion of the glacial till, however, indicate that this material is basically non-plastic.

Standard Penetration testing was performed within the stratum; the values are plotted on the Borelog sheets. In the upper cohesive portion of the glacial till the 'N' values range from 4 blows/ft. generally increasing with depth to 100 blows for 1 inch. Based on these results it is estimated that the consistency of this zone varies from firm to hard, being generally in the stiff to hard consistency. The 'N' values in the granular zone of the glacial till vary between 16 blows/ft. and 100 blows for 4 inches, indicating that the relative density ranges from compact to very dense.

5. GROUNDWATER CONDITIONS:

Groundwater level observations have been carried out during the period of this investigation by recording the levels

in the open boreholes. The results are shown on the Record of Borelog sheets and summarized on Drawings No. W.O. 71-11122 A, B and C. These observations indicate that the groundwater level varies between elevations 489 and 524 which corresponds to depths of from 2 to 23 feet below existing ground surface.

6. DISCUSSIONS 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; this project will be in the Borough of Etobicoke, Metropolitan Toronto. The new Belfield Expressway will be 3.3 miles long.

This project will necessitate the construction of a number of structures and associated retaining walls. Foundation reports have been submitted for all of the structures, as well as some of the retaining walls.

This discussion deals with the proposed retaining walls (No.'s R-1, R-9, R-11, R-12 & R-17) along the new Belfield Expressway, specifically between Hwy. #401 in the east and Martin Grove Rd. in the west. The location of, and preliminary design details for, these walls were shown on Drawing No. 271-107, 109 and 161 (undated); these drawings were provided by DeLeuw Cather of Canada Ltd., Consulting Engineers, Toronto.

The predominant stratum across the site is an extensive deposit of glacial till extending at least 60 ft. below existing ground surface.

Recommendations pertaining to the individual retaining walls will be discussed in the subsections to follow.

6.2) Retaining Wall Foundation Support:

Because of the competent nature of the subsoil the retaining walls can be supported on spread footings.

6.2.1) Retaining Walls R-1, R-9, R-11 and R-17:

These walls will retain fill placed to form the Belfield Road Expressway, with the exception of R-9 where it will retain the fill along ramp E.-N.S. The pertinent details for each wall are listed below.

Wall No.	Approx. Length	Profile Grade of Delfield Rd. (or Ramp)	Clear Height of Wall (Range)	Location (Refer to Drawing) No.
R-9	1,285 ft.	521 to 536	2' to 14'	71-11122 A
R-1	504 ft.	528 to 533	14' to 17.5'	71-11122 B
R-11	860 ft.	529 to 532	15' to 19'	71-11122 B
R-17	48 ft.	516	7' to 9'	71-11122 B

All of these walls can be supported on a spread footing located within the parent upper cohesive portion of the glacial till. In order to satisfy the frost protection requirements in the area it is recommended that at least 4 feet of earth cover be provided above the underside of the footing. A footing satisfying these requirements could be designed using an allowable bearing value of up to 3.5 t.s.f. in design.

In some areas the footing excavations will extend below the prevailing groundwater level. Since the excavations will primarily be carried out within the relatively impervious upper cohesive zone of the glacial till no major dewatering problems are envisaged. Occasional water bearing sand and silt seams and layers are present within the glacial till deposit. If these are encountered some seepage may occur in the excavations. Such seepage or any surface runoff could be handled using conventionsl techniques such as pumping from sumps.

The foundation subsoil will settle due to the imposed footing loading. The subsoil is composed of the competent cohesive glacial till, thus the settlement will be of a recompression nature. For a footing of the size contemplated, imposing the aforementioned pressure, it is estimated that the settlement will not exceed 1/2 inch, provided the subsoil is not softened by groundwater seepage or uncontrolled surface runoff. In this regard it is recommended that a lean concrete working slab be placed at the footing foundation level immediately after completion of the excavations.

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An exception to the pattern presented previously may occur in the eastern portion of retaining wall R-9. Here spill-through fill, approximately 17 feet high with 3:1 slopes, could be constructed. Such a fill would be inherently stable. If this fill is built then this portion of wall R-9 could be designed as a parapet wall founded on a spread footing located in the fill. This portion could be designed using an allowable bearing value of 1.5 t.s.f. The differential settlement between the parapet wall and the remaining western section would be within tolerable limits.

6.2.2) Retaining Wall R-12 (Refer to Drawing No. 71-11122 C):

In the vicinity of this proposed wall the Belfield Rd. Expressway will be in a cut section which will extend up to 15 feet below the existing ground surface (profile grade elevation 513.5 to 514). The wall, which will be approximately 605 feet long, will, therefore, retain the natural ground.

This wall could be supported on a spread footing located within the cohesive glacial till stratum. It should be founded at an elevation which satisfies the frost protection requirements in the area, as discussed in the previous subsection. This would place the footing at or below elevation 510. A footing founded as recommended could be designed using an allowable bearing value of 4.0 t.s.f.

The excavation will be carried out within the upper cohesive portion of the glacial till. Further, it will extend as much as 10 feet below the groundwater level recorded during the period of the investigation. Since the cohesive till is relatively impervious no major dewatering problems are anticipated. The cohesive till, however, has occasional water bearing granular seams and layers, if these are intersected some seepage may occur in the excavation. As discussed previously such inflow could be handled by employing sumps.

Any potential dewatering complications could be minimized by carrying out the excavation for the Belfield Road Expressway prior to the construction of this retaining wall.

This would facilitate drainage in the vicinity of the retaining wall.

The foundation subsoil will settle due to the induced footing pressure. Because of the competent nature of the cohesive till, however, this settle will be negligible in magnitude, providing the subsoil is not softened by groundwater seepage or uncontrolled surface runoff. A working slab of lean concrete should be poured once the footing foundation level is reached, in order to protect the subsoil.

6.3) Related Considerations:

All of the walls will be inherently stable with respect to a deep-seated rotational type of failure within the foundation subsoil.

In computing the sliding resistance between the base of the rough concrete footings and the cohesive glacial till an adhesion value of 3,000 p.s.f. ...ld be employed.

If the structures are designed as rigid frames, then a coefficient of earth pressure at rest (K_o) of 0.5 should be assumed for the granular fill m... ial placed behind the wall when designing the wall sections. However, if some movement of the top of the wall is permitted, then a coefficient of active earth pressure (K_a) of 0.33 can be used.

In order to relieve the buildup of excess hydrostatic pressure behind the retaining walls, suitable drainage measures should be provided. Backfill behind the retaining walls should be carried out in accordance with current D.T.C. practices, specifically Standard #S.D. 4-58.

7. MISCELLANEOUS:

The field work, performed during the period from November 15 to December 3, 1971, together with preparation of this report, was undertaken by Mr. H. Szymanski.

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Equipment used was owned and operated by Hester Soil Investigation Limited.

The investigation was carried out under the general supervision of Mr. M. Devata, Supervising Foundation Engineer, who also reviewed this report.

H. Szymenski.

H. Szymenski.

M. Devata

H. Devata, P. Eng.

MD/so
January 27, 1972.

APPENDIX I

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,456 N; 982,689 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Mar. 2, 1972 COMPILED BY SO
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE
512.6	Ground Level					
0.0	Het.mix.of clayey silt, sand & gravel		1	SS	4	510
	Firm to Hard		2	SS	24	
	Glacial Till		3	SS	73	
			4	SS	169/11"	
			5	SS	166	
491.6			6	SS	86	
21.0	Silt with sand, occas. pockets of clayey silt		7	SS	154/11"	490
486.1			8	SS	164/11"	
26.5			9	SS	115	480
			10	SS	97	
472.6						
471.1	Silt with some sand,		11	SS	40	470
			12	SS	110	
	changing to silt, sand & gravel below el.453.					460
451.8			13	SS	100/4"	
60.8	End of Borehole					450

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT
20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

w_P w w_L

WATER CONTENT %
10 20 30

BULK γ DENSITY
P.C.F.

REMARKS
GR. SA. SI. CL.

▽509.0

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,540 N; 982,718 E. ORIGINATED BY HS

W.P. 21E-65-05 BORING DATE November 23, 1971 COMPILED BY HS

DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
512.2	Ground Level					
	Topsoil					
	Het.mix.of clayey silt,sand & gravel Hard		1	SS	39	510
			2	SS	76	
			3	SS	54	
	Brown changing to Grey below el. 503.		4	SS	97	500
			5	SS	64	
493.7	Glacial Till					
18.5	Sandy silt with traces of gravel & clay.		6	SS	117/6"	
489.2	Very Dense					490
23.0			7	SS	61	
480.7			8	SS	124	
31.5	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT

SHEAR STRENGTH P.S.F.
o UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

WATER CONTENT %
10 20 30

BULK DENSITY γ P.C.F.

REMARKS

▼510.0

GR. SA. SI. CL.
7 30 60 3

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,611 N; 982,793 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 24, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY [illegible]

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT
513.9	Ground Level				
510.9	Silty sand with some gravel				
3.0	Het.mix.of clayey silt,sand & gravel		1	SS	23
			2	SS	15
	Very Stiff to Hard		3	SS	58
			4	SS	60
	Brown changing to		5	SS	57
	Grey below El. 504.		6	SS	56
	Glacial Till		7	SS	103/3"
			8	SS	136
477.9			9	SS	100/6"
36.0	End of Borehole				

ELEV. SCALE: 510, 500, 490, 480, 470

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
o UNCONFINED ◆ FIELD VANE
● Q.U. ▽ TRIAXIAL × LAB. VANE

LIQUID LIMIT —— W_L
PLASTIC LIMIT —— W_P
WATER CONTENT —— W

WATER CONTENT % — 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR. SA. SI. CL.

▽ 510.9 in open BH

2 34 52 12

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 4

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,515 N; 982,554 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Feb. 29, 1972 COMPILED BY SO
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE
514.7	Ground Level					
0.0	Het.mix.of clayey silt,sand & gravel Very Stiff to Hard Glacial Till		1	SS	25	510
			2	SS	40	
			3	SS	60	
			4	SS	92	500
			5	SS	115	
			6	SS	57	
			7	SS	84/6"	
489.7						490
488.2	Silt Dense		8	SS	42	
26.5	with occasional layers of silt below El.488.2		9	SS	114	
			10	SS	80	480
474.7						
473.2	Silt Dense		11	SS	50	
41.5						
469.7						470
45.0	End of Borehole					

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

w_P — w — w_L

WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR.SA.SI.CL.

▽ 510.7

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,629 N; 982,675 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 23, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
513.6	Ground Level					
	~~Topsoil~~					
	Het.mix.of clayey silt,sand & gravel		1	SS	11	510
	Stiff to Hard		2	SS	59	
			3	SS	27	
	Brown changing to Grey below El.504.5		4	SS	70	
			5	SS	56	500
	Glacial Till					
492.6			6	SS	132	
21.0	Het.mix.of silt,sand & gravel with trace of clay.		7	SS	33	490
483.1	Dense to Very Dense		~~8~~	~~SS~~	~~123/6"~~	
30.5	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
o UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

w_P — w — w_L

WATER CONTENT % — 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR.SA.SI.CL.

▽508.9
in open BH

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,719 N; 982,757 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 24, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F. (○ UNCONFINED ◉ QUICK TRIAXIAL + FIELD VANE × LAB. VANE)	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w / WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
514.8	Ground Level									
	Silty sand									
	Het.mix.of clayey silt,sand & gravel Hard Brown changing to Grey below El. 504.		1	SS	42					
			2	SS	61	510				▽508.6 in open BH
			3	SS	93					
			4	SS	47					3 27 58 12
			5	SS	61	500				
	Glacial Till		6	SS	39					
			7	SS	66	490				
483.8			8	SS	105/6"					
31.0	End of Borehole					480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 7

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,791 N; 982,838 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 25, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE
515.8	Ground Level					
	Topsoil					
	Het.mix.of clayey silt,sand & gravel Hard Brown changing to Grey below El. 503.8		1	SS	46	
			2	SS	68	510
			3	SS	106	
			4	SS	44	
			5	SS	87	500
	Glacial Till					
			6	SS	40	
492.8						
23.0	Silt with traces of clay and sand.		7	SS	92	490
487.8						
28.0			8	SS	124/6"	
480.0			9	SS	101/4"	480
35.8	End of Borehole					
						470

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
◉ QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT w_L
PLASTIC LIMIT w_P
WATER CONTENT w
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR. SA. SI. CL.

▽509.4 in open BH

0 4 95 1

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 8

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,334 N; 982,290 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 26, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) SHEAR STRENGTH P.S.F. ○ UNCONFINED ◉ QUICK TRIAXIAL + FIELD VANE × LAB. VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
509.0	Ground Level									
	Topsoil									
	Het.mix.of clayey silt sand & gravel		1	SS	31					▼505.0 in open BH
			2	SS	100/4"					
	Hard		3	SS	100/3"	500				
	Brown changing to Grey		4	SS	100/1"					
	Below El. 498.		5	SS	58					0 39 60 1
	Glacial Till									
489.0						490				
20.0										
486.0	Sandy Silt		6	SS	175/10"					
23.0			7	SS	116/6"					
478.7						480				
			8	SS	165/3"					
30.3	End of Borehole									
						470				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 9

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,299 N; 982,242 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 26, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
507.4	Ground Level					
	~~Topsoil~~					
	Het.mix.of clayey silt sand & gravel.Stiff to Hard. Brown changing to Grey below El.498.		1	SS	9	
			2	SS	20	500
498.4			3	SS	60	
9.0	Sandy silt to silty sand,traces of clay & gravel.		4	SS	63	
490.4	Dense to Very Dense		5	SS	41	
17.0						490
	Glacial Till		6	SS	100/3"	
			7	SS	100/3"	480
477.1			8	SS	100/3"	
30.3	End of Borehole					470

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT — 20 40 60 80 100
SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR.SA.SI.CL.

▽ 506.3 in open BH

1 25 73 1
1 92 (7)

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 10

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,280 N; 980,847 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 29, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80 100 / SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
528.9	Ground Level									
	Topsoil									
	Het.mix.of clayey silt,sand & gravel. Very Stiff to Hard Brown changing to Grey below El. 515. Glacial Till		1	SS	17	520		○		▽523.9 in open BH
			2	SS	54			○		
			3	SS	114			○		
			4	SS	123			○		
			5	SS	70	510		○		
			6	SS	34			○		
504.4										
24.5	Het.mix.of silt,sand & gravel,trace of clay. Very Dense		7	SS	52	500		○		9 47 43 1
498.1			8	SS	100/4"			○		
30.8	End of Borehole					490				

FORM OBM-[illegible]28 (REV 1967) OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 11

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,357 N; 980,978 E. ORIGINATED BY HG
W.P. 218-65-5 BORING DATE Nov. 29, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY [illegible]

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F. (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE)	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w — WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
524.6	Ground Level									
	Silty sand									
	Het.mix.of clayey silt , sand & gravel. Firm to Hard Brown changing to Grey below El. 511. Glacial Till		1	SS	9	520		o		
			2	SS	38			o		▼ 516.0
			3	SS	54			o		
			4	SS	67			o		
			5	SS	50	510		o		
504.6										
20.0	Het.mix.of silt,sand & gravel, trace of clay		6	SS	60			o		8 47 41 4
			7	SS	172/10"	500		o		
493.6			8	SS	100/6"			o		9 40 48 3
31.0										
488.1			9	SS	154	490		o		
36.5	End of Borehole									
						480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 12

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,426 N; 981,116 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 30, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100)	LIQUID LIMIT w_L / PLASTIC LIMIT w_p / WATER CONTENT w — WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
525.9	Ground Level									
	Fill									
	Het.mix.of clayey silt,sand & gravel Very Stiff to Hard Brown changing to Grey below El. 512.		1	SS	18					
			2	SS	65	520				
			3	SS	90					
			4	SS	120					▼ 513.9
	Glacial Till		5	SS	90	510				
			6	SS	48					3 32 48 10
500.2										
25.0	Het.mix.of silt,sand & gravel, trace of clay. Dense to Very Dense		7	SS	103/5"	500				
			8	SS	100/6"					
			9	SS	35	490				
484.4			10	SS	122					
41.5	End of Borehole					480				

SHEAR STRENGTH P.S.F.
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 13

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,495 N; 981,251 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 30, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
522.9	Ground Level					
	Topsoil					
	Het.mix.of clayey silt, sand & gravel. Stiff to Hard Brown changing to Grey below El. 508. Glacial Till		1	SS	9	520
			2	SS	27	
			3	SS	137	
			4	SS	141/6"	510
			5	SS	80	
			6	SS	110	
497.9						500
25.0	Het.mix.of silt, sand & gravel, trace of clay Compact to Very Dense		7	SS	16	
			8	SS	100/4"	
			9	SS	100/6"	490
481.4			10	SS	168	
41.5	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
o UNCONFINED + FIELD VANE
⊕ QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_p
WATER CONTENT —— w

WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS GR.SA.SI.CL.

5 33 50 12
▽ 510.9

0 4 94 2

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 14

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,566 N; 981,374 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 2, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F. (o UNCONFINED, • QUICK TRIAXIAL, + FIELD VANE, × LAB. VANE)	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w — WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
519.3	Ground Level									
	Het.mix.of clayey silt sand and gravel. Very Stiff to Hard Brown changing to Grey below El. 505. Glacial Till		1	SS	17					▼ 514.5 in open BH
			2	SS	64					
			3	SS	174	510				3 33 52 12
			4	SS	169					
			5	SS	112					
499.3						500				
20.0	Het.mix.of silt,sand, gravel & trace of clay. Dense to Very Dense		6	SS	100/6"					
			7	SS	119					
487.8			8	SS	49	490				13 44 38 5
31.5	End of Borehole					480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 15

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,536 N; 983,582 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 16, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT
518.2	Ground Level				
	Topsoil				
	Silty Sand				
514.2	Compact Brown		1	SS	26
4.0	Het.mix.of clayey silt		2	SS	36
	sand & gravel.		3	SS	59
	Hard		4	SS	116
	Brown changing to Grey		5	SS	103
	below El. 500.		6	SS	52
	Glacial Till		7	SS	63
			8	SS	126/6"
			9	SS	187
			10	SS	43
475.7					
42.5	Het.mix.of silt,sand & gravel,trace of clay.		11	SS	139
471.7	Very Dense				
46.5	End of Borehole				

ELEV. SCALE: 510, 500, 490, 480, 470

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

in open BH ▼514.2

4 29 49 18

30 33 31 6

GR.SA.SI.CL.

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 16

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,580 N; 983,723 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 16, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL ⊕ FIELD VANE × LAB. VANE	LIQUID LIMIT —— w_L PLASTIC LIMIT —— w_P WATER CONTENT —— w WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
517.3	Ground Level Topsoil									
	Het.mix.of clayey silt, sand & gravel. Very Stiff to Hard Brown changing to Grey below El. 504.		1	SS	28					in open BH ▼ 513.3
			2	SS	30	510				
			3	SS	77					
			4	SS	127					
			5	SS	47					
						500				
	Glacial Till		6	SS	57					8 30 45 17
			7	SS	161	490				
485.8			8	SS	131					
31.5	End of Borehole					480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 17

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,608 N; 983,863 E. ORIGINATED BY HS

W.P. 218-65-5 BORING DATE Nov. 17, 1971 COMPILED BY HS

DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
516.1	Ground Level					
	Topsoil					
	Het.mix.of clayey silt sand and gravel.		1	SS	32	
	Hard Brown changing to Grey below El. 503.		2	SS	67	510
			3	SS	95	
			4	SS	112	
	Glacial Till		5	SS	47	500
			6	SS	42	
			7	SS	117	490
484.6			8	SS	109	
31.5	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

w_P — w — w_L

WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR.SA.SI.CL.

▼ 513.8 in open BH

1 22 56 21

6 33 45 16

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 18

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,612 N; 984,024 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 17, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB. VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_P, WATER CONTENT w; WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS
516.5	Ground Level									GR.SA.SI.CL.
	Topsoil									▽ 515.5 in open BH
	Het.mix.of clayey silt,sand & gravel. Hard Brown changing to Grey below El. 502.5		1	SS	35			○		
			2	SS	62	510		○		
			3	SS	98			○		
			4	SS	101/4"			○		
			5	SS	73	500		○		
	Glacial Till		6	SS	51			○		9 27 40 24
			7	SS	69	490		○		
485.5			8	SS	110/6"			○		
31.0	End of Borehole					480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 19

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,612 N; 984,175 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 18, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
519.1	Ground Level					
	Topsoil					
	Het.mix.of clayey silt sand and gravel. Very Stiff to Hard Brown changing to Grey below El. 503.		1	SS	17	
			2	SS	50	
			3	SS	56	510
			4	SS	86	
			5	SS	103	
	Glacial Till		6	SS	119	500
			7	SS	47	
			8	SS	65	490
483.1			9	SS	107/6"	
36.0	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS GR.SA.SI.CL.

▼ 515.1 in open BH

5 29 49 17

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 20

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,617 N; 984,325 E. ORIGINATED BY HS
W.P. 216-65-5 BORING DATE Nov. 18, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
523.8	Ground Level					
	Topsoil					
	Het.mix.of clayey silt,sand & gravel. Stiff to Hard Brown shanging to Grey below El. 501.		1	SS	9	520
			2	SS	30	
			3	SS	49	
			4	SS	86	510
			5	SS	81	
	Glacial Till		6	SS	106/2"	
			7	SS	61	500
			8	SS	86	
487.3			9	SS	107	490
36.5	End of Borehole					480

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
◉ QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR.SA.SI.CL.

In open BH ▼ 514.8

9 31 43 17

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 21

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,649 N; 984,474 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 19, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
529.7	Ground Level (Topsoil)					
	Het.mix.of clayey silt sand and gravel. Hard Brown changing to Grey below El. 503. Glacial Till		1	SS	65	520
			2	SS	52	
			3	SS	76	
			4	SS	60	
			5	SS	103	510
			6	SS	159	
			7	SS	101	
498.2			8	SS	82	500
31.5	End of Borehole					490

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

520.7

3 22 55 20 GR.SA.SI.CL.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 22

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 880,718 N; 984,610 E. ORIGINATED BY HS
W.P. 210-65-5 BORING DATE Nov. 19, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) SHEAR STRENGTH P.S.F. ○ UNCONFINED ⊕ QUICK TRIAXIAL + FIELD VANE × LAB. VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
534.5	Ground Level Topsoil									
	Het.mix.of clayey silt sand and gravel. Very Stiff to Hard		1	SS	36	530				5 21 56 18
			2	SS	46					
	Brown changing to Grey below El. 507.5		3	SS	41					▼ 521.5
			4	SS	44					
			5	SS	19	520				
	Glacial Till		6	SS	37					
			7	SS	48	510				
503.0			8	SS	37					
31.5	End of Borehole					500				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 23

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords, 880,800 N; 984,696 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE Nov. 22, 1971 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT
534.5	Ground Level				
	Topsoil				
	Het.mix.of clayey silt sand and gravel. Very Stiff to Hard Brown changing to Grey below El.505.5.		1	SS	55
			2	SS	73
			3	SS	56
			4	SS	55
			5	SS	22
	Glacial Till		6	SS	30
			7	SS	69
			8	SS	40
498.0			9	SS	48
36.5	End of Borehole				

ELEV. SCALE: 530, 520, 510, 500, 490

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F.
o UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w

w_P w w_L

WATER CONTENT % — 10 20 30

BULK DENSITY γ P.C.F.

REMARKS

GR. SA. SI. CL.

3 23 57 17

▼ 513.5

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 24

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 878,644 N; 981,538 E. ORIGINATED BY HS
W.P. 216-65-5 BORING DATE Feb. 28, 1972 COMPILED BY SO
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
516.8	Ground Level					
0.0	Het.mix.of clayey silt sand & gravel. Very Stiff to Hard Glacial Till		1	SS	15	
			2	SS	34	510
			3	SS	90	
502.8			4	SS	40	
14.0	Het.mix.of silt,sand, gravel & trace of clay Very Dense		5	SS	72	
			6	SS	30/3"	500
			7	SS	60	
			8	SS	88	490
			9	SS	61	
			10	SS	134/4"	480
			11	SS	100/4"	
			12	SS	100/4"	470
466.8			13	SS	100/4"	
50.0	Clayey silt Fragments of Shale					
460.3						460
56.5	End of Borehole					

DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80 100

SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS
GR.SA.SI.C.
▼ 513.5

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 25

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,284 N; 982,452 E. ORIGINATED BY HS

W.P. 218-65-5 BORING DATE Mar. 3, 1972 COMPILED BY SO

DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
513.9	Ground Level					
0.0	Het.mix.of clayey silt,sand & gravel. Stiff to Hard Glacial Till		1	SS	10	510
			2	SS	24	
			3	SS	38	
			4	SS	180/9"	500
			5	SS	110	
492.9			6	SS	179/11"	
21.0	Silt, occ. pockets of clay. Hard		7	SS	100/4"	490
487.4			8	SS	108	
26.5			9	SS	100/6"	480
478.4			10	SS	100/4"	
35.5	End of Borehole					470

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F.
o UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

auger

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS GR.SA.SI.CL.

▽498.9

DEPARTMENT OF HIGHWAYS ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 26

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 872,207 N; 982,368 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE March 3, 1972 COMPILED BY SO
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE			SAMPLES				DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE	w_P — w — w_L WATER CONTENT % 10 20 30	P.C.F.	GR. SA. SI. CL.
509.0	Ground Level									
0.0	Het.mix.of clayey silt sand & gravel. Stiff to Hard. Glacial Till		1	SS	15					
			2	SS	12					
497.0			3	SS	18	9" 500				▼497.0
12.0	Silty sand to sandy silt. Very Dense		4	SS	119					
492.5			5	SS	127					
16.5			6	SS	100	4" 490				
486.0			7	SS	100	1"				
23.0	End of Borehole					480				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 27

FOUNDATION SECTION

JOB 71-11122 LOCATION Co-ords. 879,133 N; 982,261 E. ORIGINATED BY HS
W.P. 218-65-5 BORING DATE March 1, 1972 COMPILED BY SO
DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
509.7	Ground Level					
0.0			1	SS	45	
	Het.mix.of clayey silt		2	SS	97	
	sand and gravel		3	SS	68	500
			4	SS	70	
	Very Stiff to Hard		5	SS	100/6"	
			6	SS	100/2"	490
	Glacial Till		7	SS	100/4"	
			8	SS	100/3"	
						480
			9	SS	100/6"	
			10	SS	26	
						470
			11	SS	163/10"	
			12	SS	149/11"	
						460
			13	SS	100/2"	
454.7						
55.0	With fragments of highly weathered shale		14	SS	100/2"	
						450
445.7						
64.0	End of Borehole					
						440

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100
SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P — w — w_L
WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS
GR. SA. SI. CL.

494.7

20
15 ÷ 5 % STRAIN AT FAILURE
10

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 28

FOUNDATION SECTION

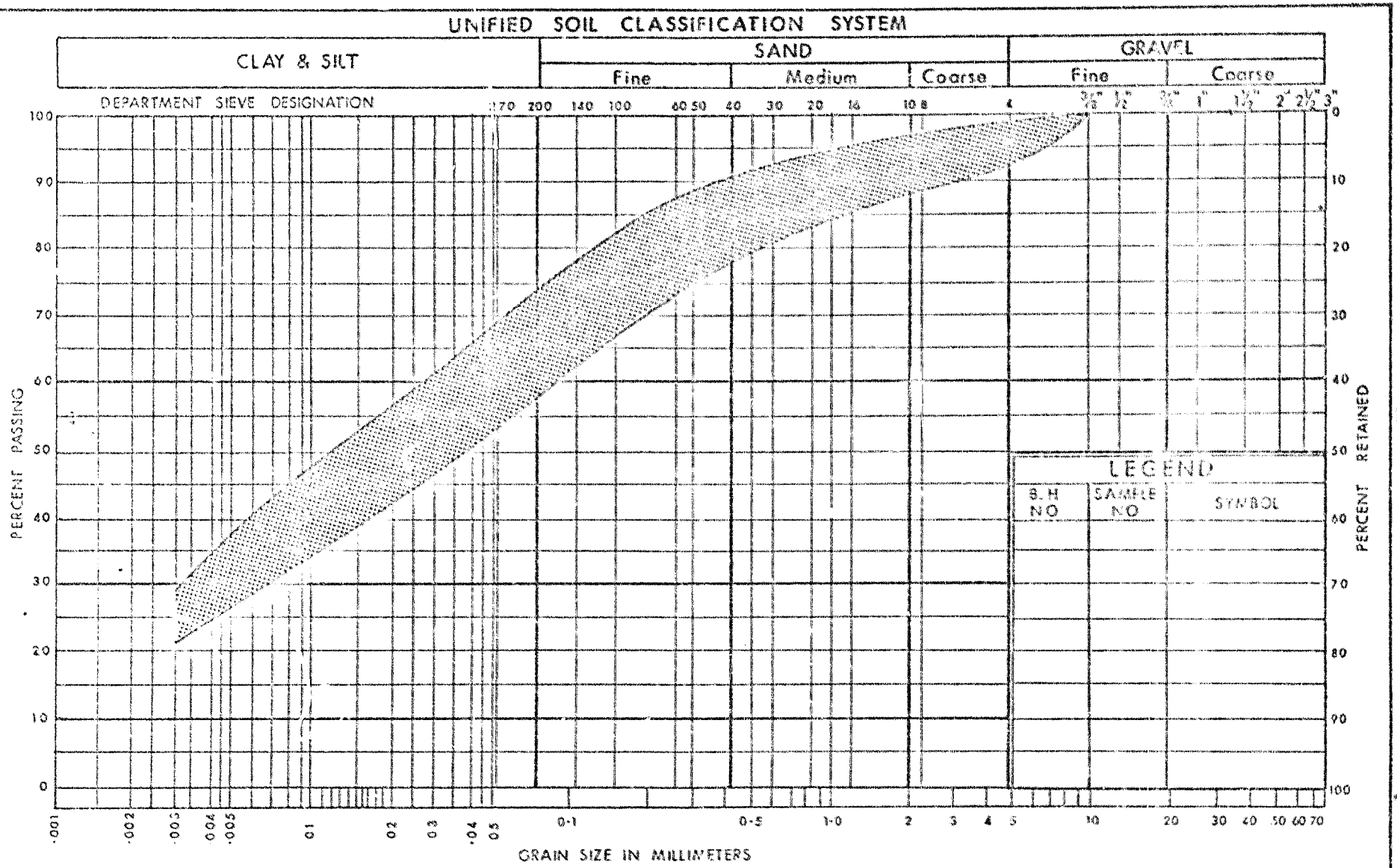
JOB 71-11122 LOCATION Co-ords. 879,070 N; 982,184 E. ORIGINATED BY HS

W.P. 210-65-5 BORING DATE Feb. 29, 1972 COMPILED BY SO

DATUM Geodetic BOREHOLE TYPE Pendrill CHECKED BY

SOIL PROFILE			SAMPLES				DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) SHEAR STRENGTH P.S.F. ○ UNCONFINED ⊕ FIELD VANE ◉ QUICK TRIAXIAL × LAB. VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE				GR. SA. SI. CL.
512.3	Ground Level									
0.0						510				
	Hwt. mix. of clayey silt, sand & gravel.		1	SS	53					
			2	SS	83					
			3	SS	186					
			4	SS	176/11"					
	Hard		5	SS	52					
			6	SS	63					
	Glacial Till		7	SS	186/10"	490				▽489.3
			8	SS	100/3"					
			9	SS	100/4"					
						480				
			10	SS	110/6"					
			11	SS	100/2"	470				

FORM CD-MT-17
REV. AUG. 1971



DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION

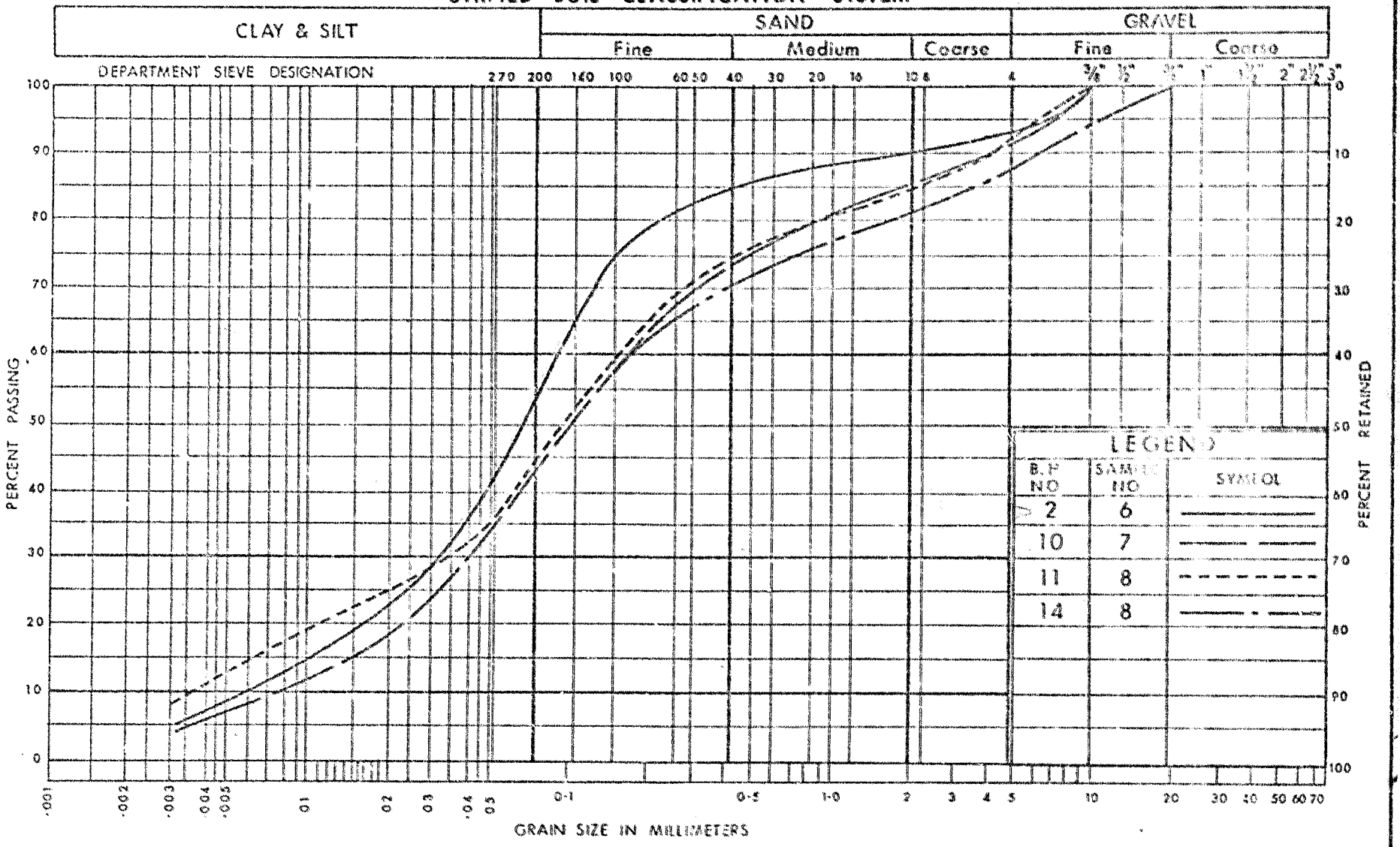
GLACIAL TILL

(COHESIVE)

W.P. No. 218-65-5
JOB No. 71-1122
FIG. 1

FORM OD-MT-17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM



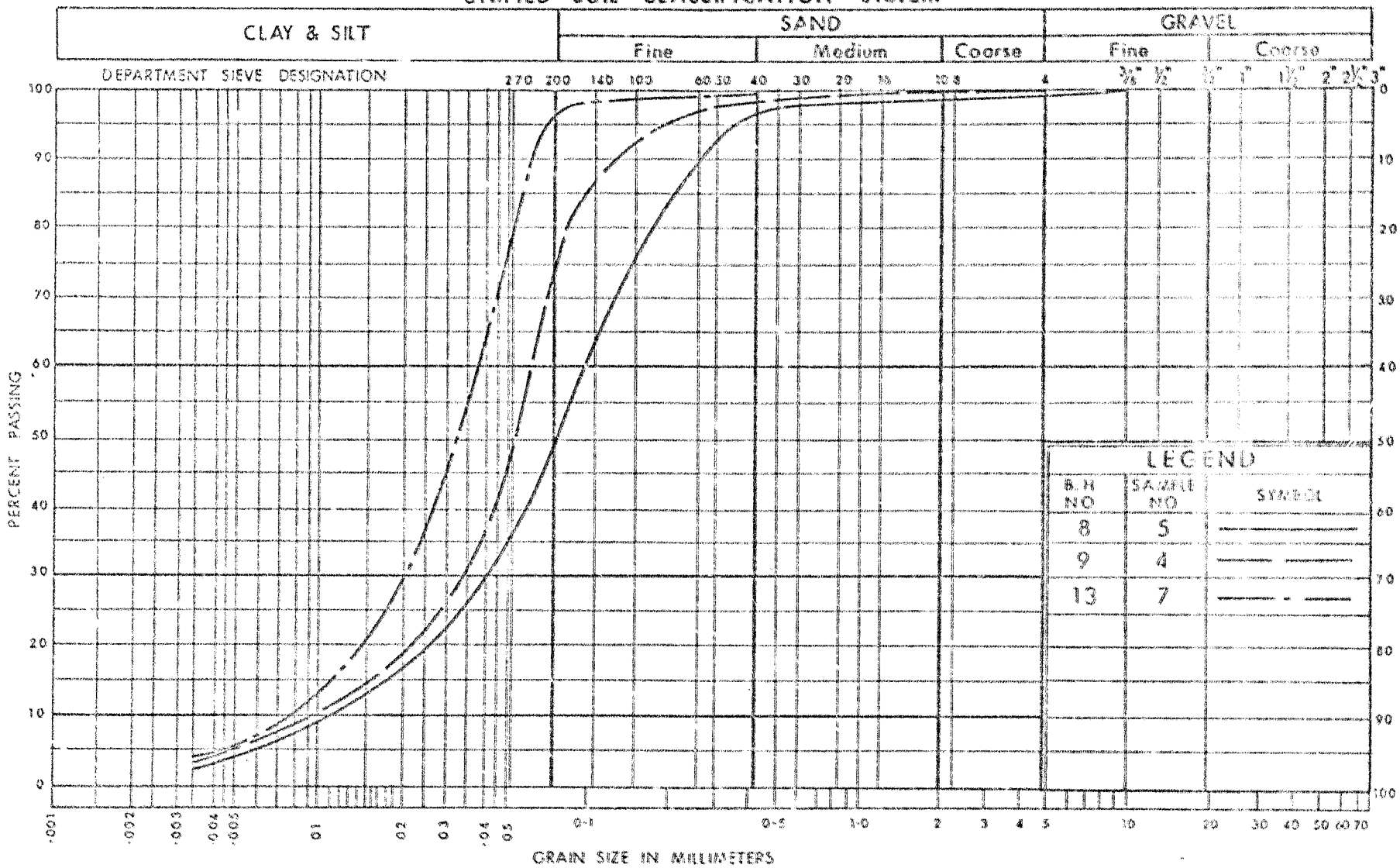
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
GLACIAL TILL
(GRANULAR)

W.P. No.	218-65-5
JOB No.	71-111-22
	FIG. 2

FORM OD-MT-17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM

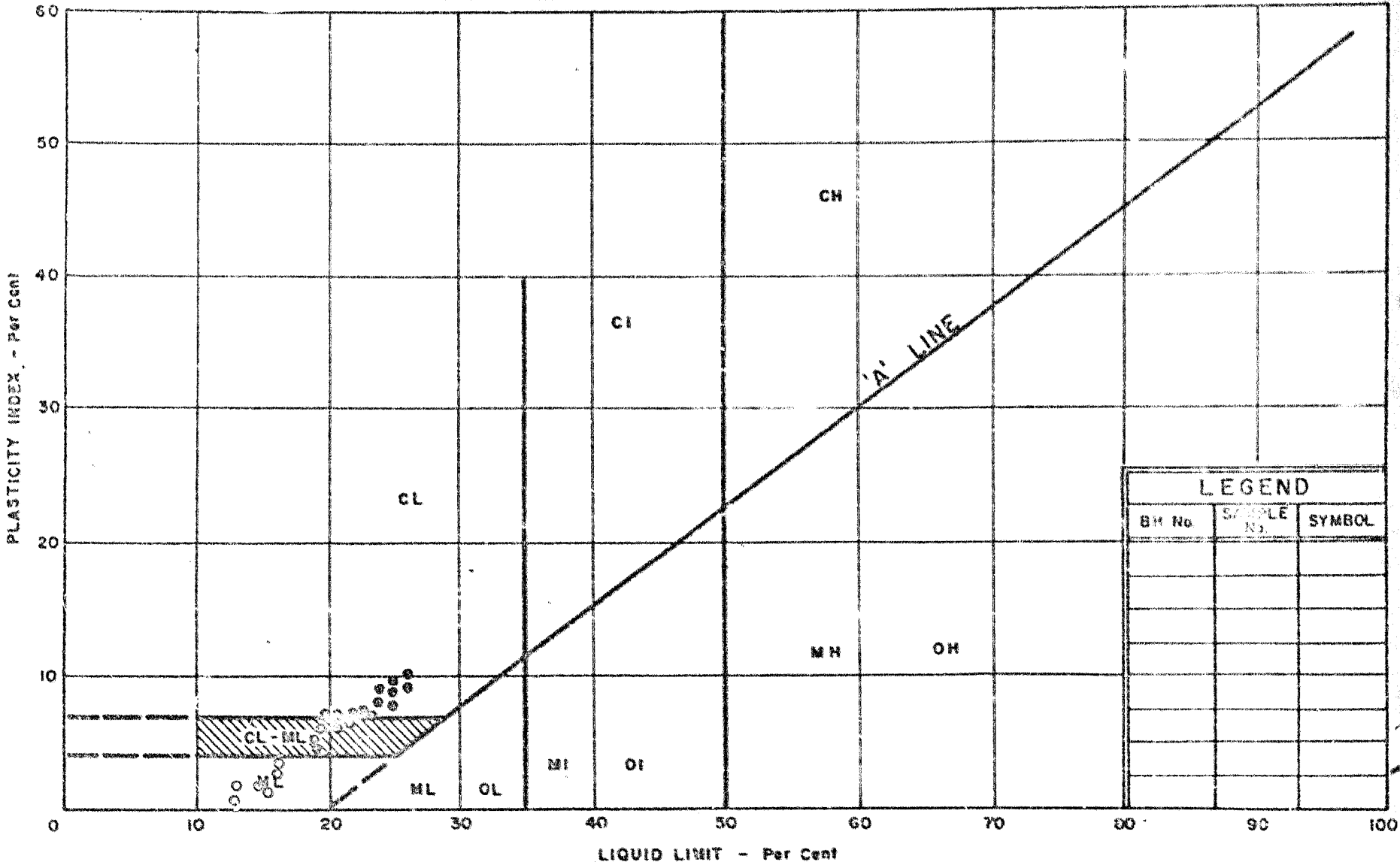


DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
SANDY SILT TO SILTY SAND LAYERS

W.P. No. 218-65-5
JOB No. 71-11122
FIG. 3

REVISED JUL 966



DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION

PLASTICITY CHART
GLACIAL TILL

● COHESIVE ○ GRANULAR

W.P. No. 218-65-5
JOB No. 71-11122
FIG. 4

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 :-

CONSISTENCY	'N' BLOWS / FT.	c LB. / SQ. FT.
VERY SOFT	0 - 2	0 - 250
SOFT	2 - 4	250 - 500
FIRM	4 - 8	500 - 1000
STIFF	8 - 15	1000 - 2000
VERY STIFF	15 - 30	2000 - 4000
HARD	> 30	> 4000

DENSENESS	'N' BLOWS / FT.
VERY LOOSE	0 - 4
LOOSE	4 - 10
COMPACT	10 - 30
DENSE	30 - 50
VERY DENSE	> 50

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
Qcu	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 — IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan\phi'$
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION — IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan\phi'$
c_u	APPARENT COHESION — IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan\phi$
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION — IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan\phi$
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 (YOUNGS MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

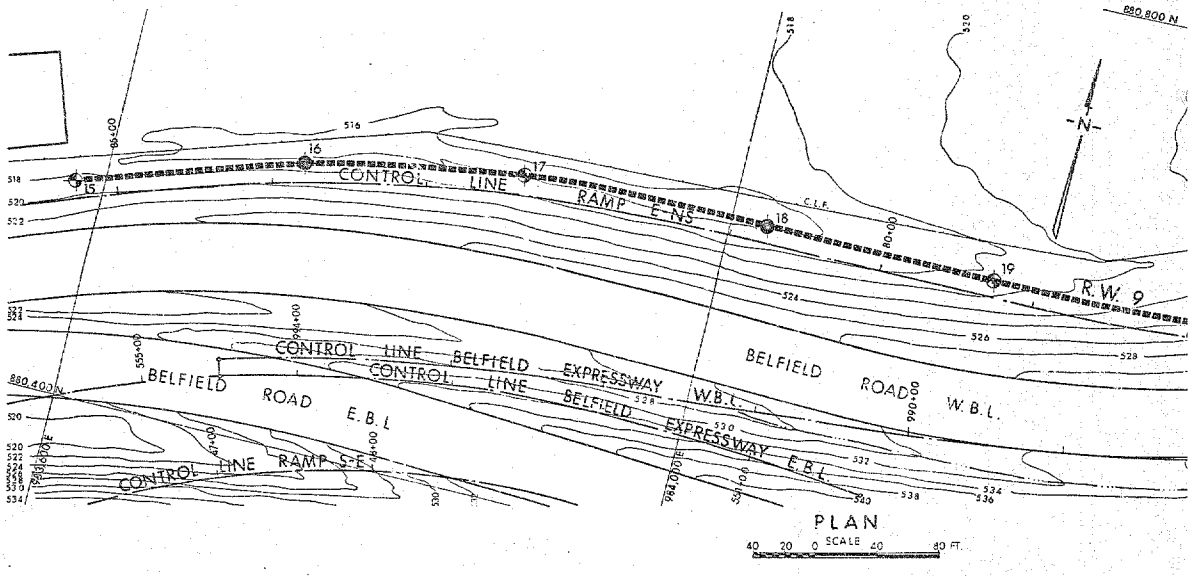
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

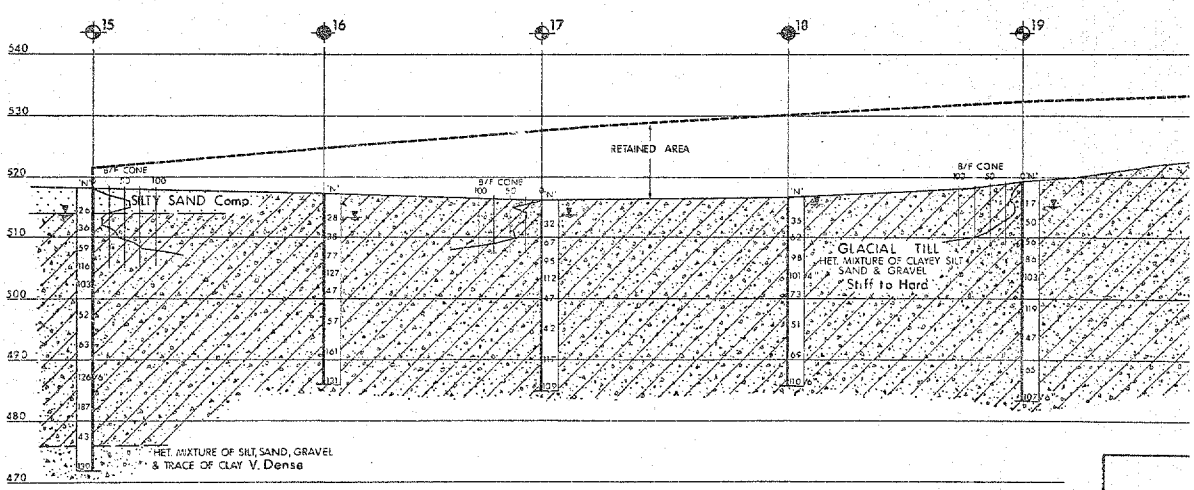
FOUNDATIONS

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





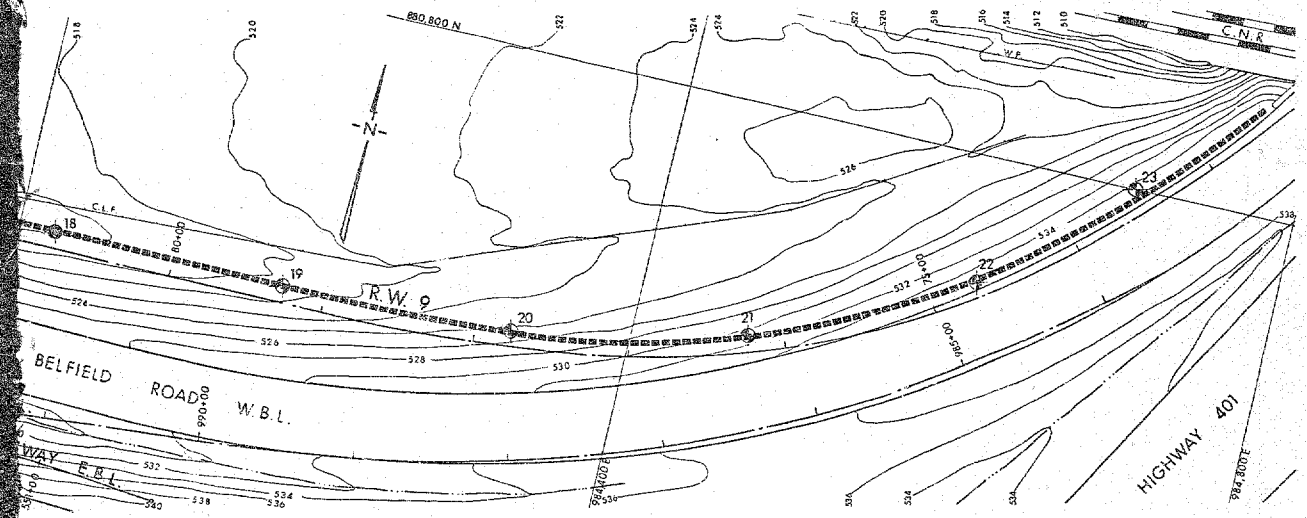
LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation NOV. & DEC 71

NO	ELEVATION	CO-ORDINATES	
		NORTH	EAST
15	518·2	880,536	983,582
16	517·3	880,580	983,723
17	516·1	880,608	983,863
18	516·5	880,612	984,024
19	519·1	880,612	984,175
20	523·8	880,617	984,325
21	529·7	880,649	984,474
22	534·5	880,718	984,610
23	534·5	880,800	984,696

PROFILE ALONG RETAINING WALL Nº 9

VERT. 10 5 0 SCALE 10 20 FT.
HORIZ. 40 20 0 40 80

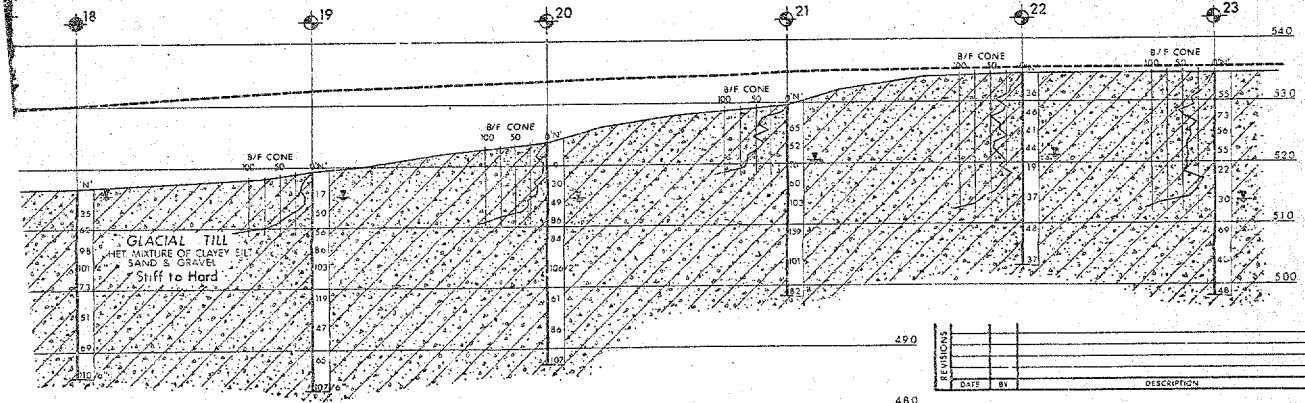


PLAN

SCALE 40 20 0 40 80 FT.

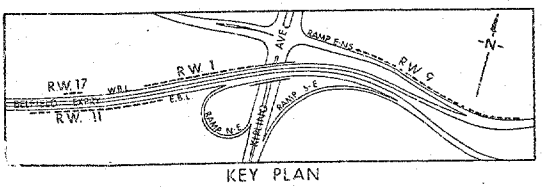
— NOTE —

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.



NG RETAINING WALL Nº 9

SCALE 20 0 10 0 20 40 20 40 80 FT.



KEY PLAN

400 200 0 SCALE 400 800 FT.

REF. FENCO DWG. NO. 271-068

REVISIONS		
DATE	BY	DESCRIPTION

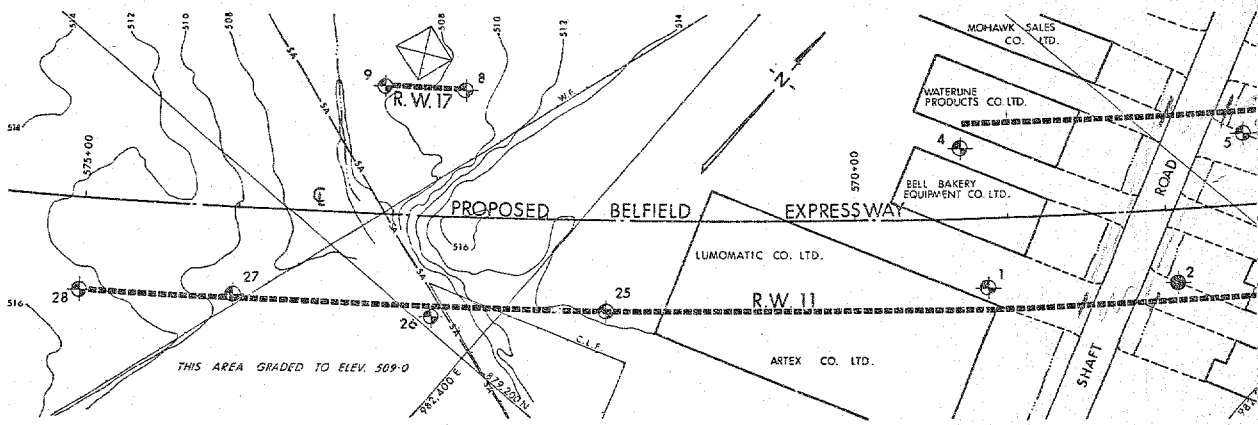
DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH — FOUNDATION OFFICE

RETAINING WALL Nº 9

HIGHWAY NO. BELFIELD EXPRESSWAY DIST. NO. 6
CO. YORK
TWP. ETOBICOKE LOT CON

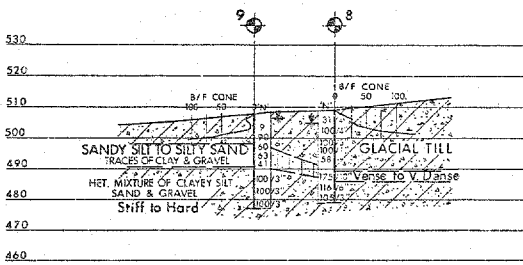
BORE HOLE LOCATIONS & SOIL STRATA

SUBMD H.S.	CHECKED A.T.	W.P. NO. 218-65-5	DRAWING NO. 71-11122A
DRAWN E.O.	CHECKED A.T.	JOB NO. 71-11122	
DATE 22 FEB. 1972		SITE NO.	BRIDGE DRAWING NO.
APPROVED (PRINCIPAL FOUNDATION ENGINEER)		CONT. NO.	

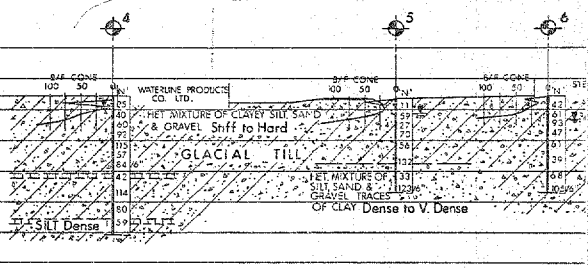


PLAN

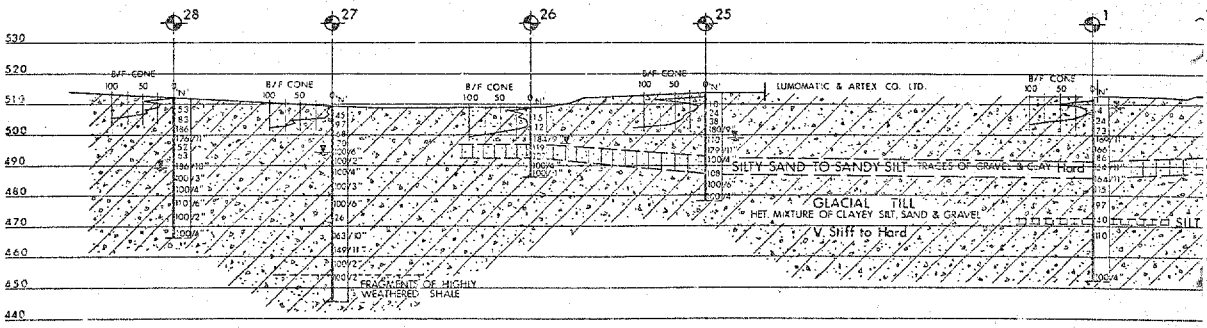
40 20 0 SCALE 40 80 FT.



PROFILE ALONG RETAINING WALL Nº 17

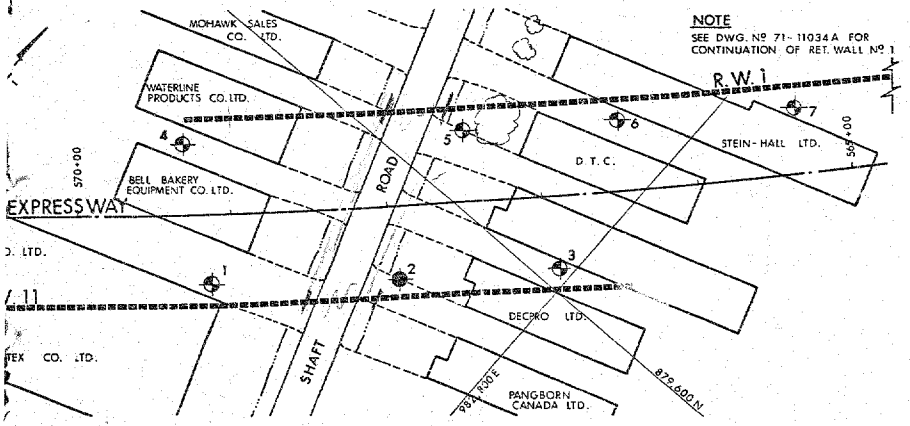


PROFILE ALONG RETAINING WALL N



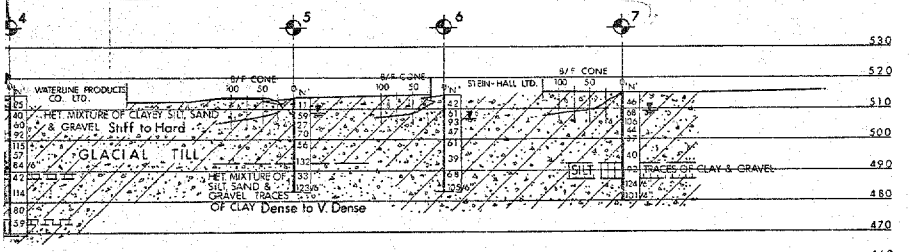
PROFILE ALONG RETAINING WALL Nº 11

VERT. 20 10 0 SCALE 20 40 FT.
HORIZ. 40 20 0 40 80

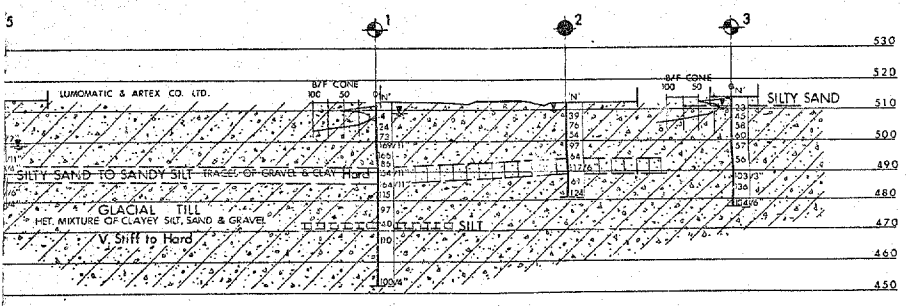


NOTE
SEE DWG. Nº 71-11034 A FOR CONTINUATION OF RET. WALL Nº 1

PLAN
SCALE 20 0 40 80 FT.

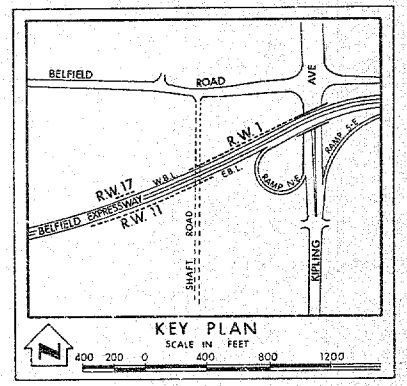


PROFILE ALONG RETAINING WALL Nº 1



ONG RETAINING WALL Nº 11
SCALE 10 0 20 40 FT.
20 0 40 80

REF. – DELEUW CATHER DWG. NO. 271-331 (2-21)



KEY PLAN
SCALE IN FEET

LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation. NOV. 1971 & FEB. & MAR. 1972

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	512·6	879,456	982,689
2	512·2	879,540	982,718
3	513·9	879,611	982,793
4	514·7	879,515	982,554
5	513·6	879,629	982,675
6	514·8	879,719	982,757
7	515·8	879,791	982,838
8	509·0	879,334	982,290
9	507·4	879,299	982,242
25	513·9	879,284	982,452
26	509·0	879,207	982,268
27	509·7	879,133	982,261
28	512·3	879,070	982,184

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.

REVISIONS		
DATE	BY	DESCRIPTION

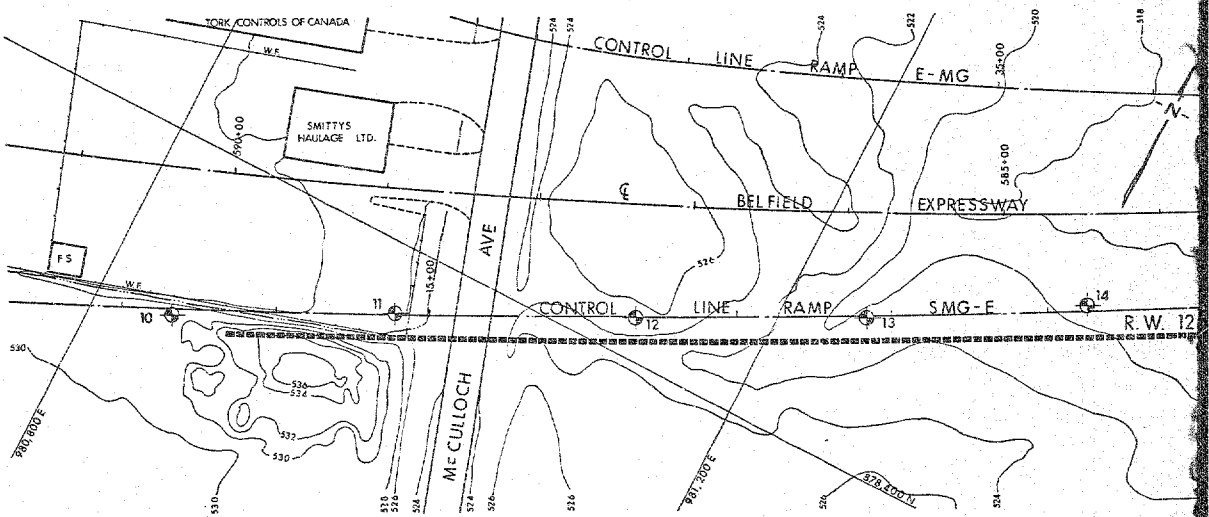
DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH – FOUNDATION OFFICE

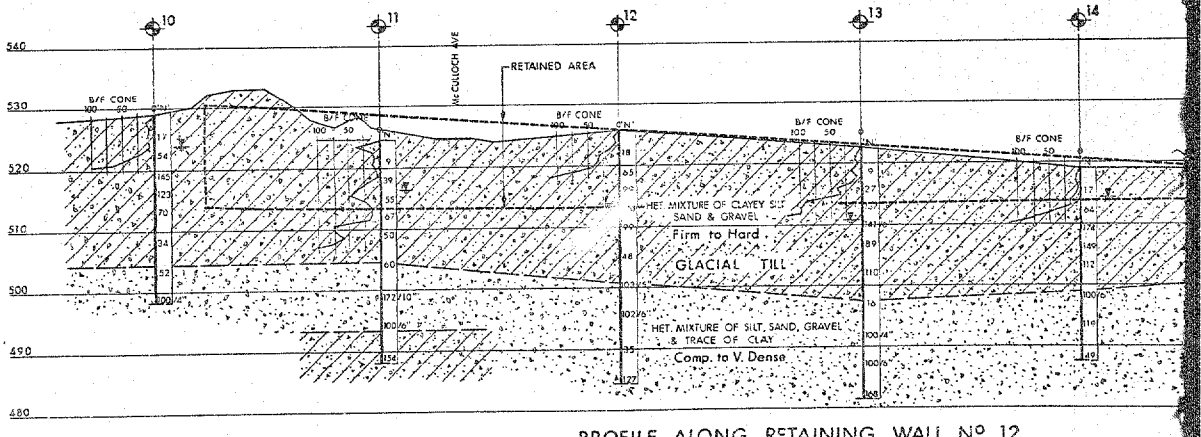
RETAINING WALLS Nº 1, 11 & 17

HIGHWAY NO. BELFIELD EXPRESSWAY DIST. NO. 6
CO. YORK
TWP. ETOBICOKE LOT CON.

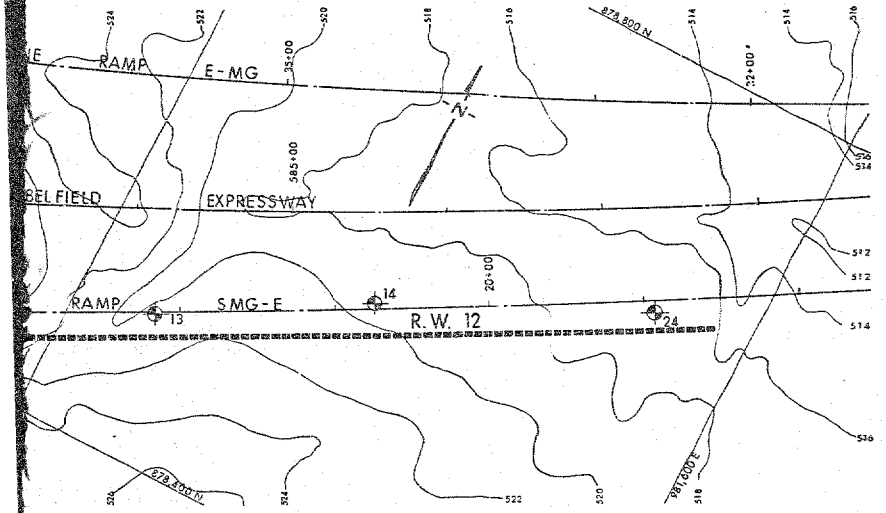
BORE HOLE LOCATIONS & SOIL STRATA

SUBMD. H.S.	CHECKED	W.P. NO. 216-65-2	DRAWING NO. 71-11122 B
DRAWN S.O.	CHECKED	JOB NO 71-11122	
DATE 29 MAR. 1972	SITE NO.		BRIDGE DRAWING NO.
APPROVED PRINCIPAL FOUNDATION ENGINEER	CONT. NO.		



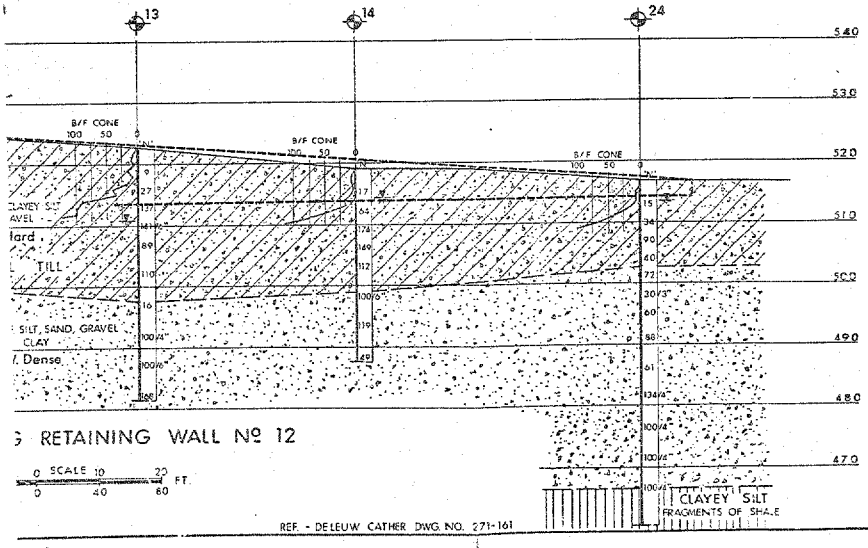


REF. - DELEUW CATHER DWG. N



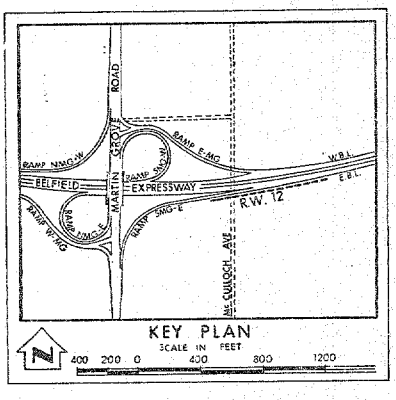
PLAN

0 SCALE 40 80 FT.



0 SCALE 10 20 FT.
0 40 60

REF. - DELEUW CATHER DWG. NO. 271-161



LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, NOV. 1971 & FEB. 1972

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
10	528·9	878,290	980,847
11	524·6	878,357	980,978
12	525·9	878,426	981,118
13	522·9	878,495	981,251
14	519·3	878,566	981,374
24	516·8	878,644	981,538

— 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.

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH - FOUNDATION OFFICE

RETAINING WALL Nº 12

HIGHWAY NO. BELFIELD EXPRESSWAY DIST. NO. 6
CO. YORK
TWP. ETOBICOKE LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D H.S.	CHECKED	W.P. NO. 216-65-5	DRAWING NO. 71 - 11122 C
DRAWN S.C.	CHECKED	JOB NO. 71-11122	
DATE 15 MAR 1972		SITE NO.	BRIDGE DRAWING NO.
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT. NO.	

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

71-11122

To: E. A. G. Stermac,
Principal Foundation Engineer,
West Building.

From: G. C. E. Burkhardt,
Bridge Planning Section,
99 Floral Parkway.

Attention:

Date: October 19, 1971.

Our File Ref.

In reply to

Subject: Retaining Walls on Belfield Expressway,
W.P. 218-65-5, Site 37,
Highway 409, District 6.

The attached marked up prints details the approximate location of the proposed footings for the above retaining walls (R-9, R-10, R-11, R-12 and R-17). The pavement elevations are given on the marked up prints.

Would you kindly arrange to have a foundation investigation of sufficient magnitude to allow the Structural Office to proceed with the design of the retaining walls.

As this project is considered urgent we would appreciate any priority you may be able to extend to it.

K. C. Carter,
for:
G. C. E. Burkhardt,
REG. BRIDGE PLANNING ENGINEER.

KCC:lc
Encl.

c.c. R. Fitzgibbon
J. Anderson

DEPARTMENT TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO:	Mr. G. C. E. Burkhardt, (2) Regional Structural Planning Eng., Central Region, 90 Floral Parkway, Downsview.	FROM:	Foundations Office, Design Services Branch, Central Bldg., Downsview.
ATTENTION:		DATE:	April 19, 1972.
OUR FILE REF.		IN REPLY TO	

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
Proposed Retaining Walls
No's. R-1, R-9, R-11, R-12 and R-17
Located Between Hwy. #401 Westerly to
Martin Grove Rd.
Belfield Road Expressway Complex
Borough of Etobicoke, County of York
District #6 (Toronto)
W.O. 71-11122 -- W.P. 218-65-5

Please change the W.P. number from 216-65-5 to read 218-65-5 on the following pages of the above-mentioned report, and enclose a copy of this memo with the report.

1. Memorandum
2. Page 2
3. Appendix I Record of Borehole Sheets No. 1 to 28
4. Figures 1 to 4
5. Drawings No. 71-11122A, B and C

M. Devata,
SUPERVISING FOUNDATION ENGINEER.

MD/ao
Attach.
cc: Messrs. D. W. Farren
B. R. Davis
A. Rutka
G. K. Hunter
H. Greenland
B. J. Giroux
T. J. Kovich
G. A. Wrong
B. A. Singh
DeLeuw Cather (R. Barr)
Foundations Files
Documents

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. M. Devata,
Room 107,
Central Building.

FROM: G. C. E. Burkhardt,
Structural Planning Office,
90 Floral Parkway.

ATTENTION:

DATE: June 16, 1972.

OUR FILE REF.

IN REPLY TO

SUBJECT: Retaining Wall #R21,
W.P. 218-65-5, Site 37-,
Highway 409 (Belfield Expressway), District 6.

71-11-122

This will confirm our conversation on your recommendations for foundation treatment for the above noted retaining wall. As this wall is 150' extension of the existing retaining wall #6, in the Highway 401 and Islington Avenue Interchange, the Foundation Investigation Report W.J. 64-F-99 should be sufficient to cover the extension.

The only exception to what was detailed in the report is the bearing capacity of the spread footings will be altered to 2.5 t.s.f. from 3.0 t.s.f.

It was agreed that if further boreholes would be required at a later date, this could be arranged through the normal procedures.

JSTR:lc

RECEIVED
FOUNDATIONS OFFICE
JUN 19 1972
Ministry of Transportation & Communications

J. S. T. Robertson,
STRUCTURAL PLANNING SUPERVISOR,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.