DOCUMENT IDENTIFICATION

GEOCRES No. 30 M 11 - 168

DIST. 6 REGION CENTRAL

W.P. No. 144-77-02

CONT. No. 78-83

W. O. No.

STR. SITE No. 24 - 191

HWY. No.

LOCATION PROPOSED UNDERPASS STRUCTURE AT THE CROSSING OF RELOCATED CANTHIRA RD AND CPR

OVERLAY DRAWINGS TO BE INCLUDED WITH THIS REPORT 3

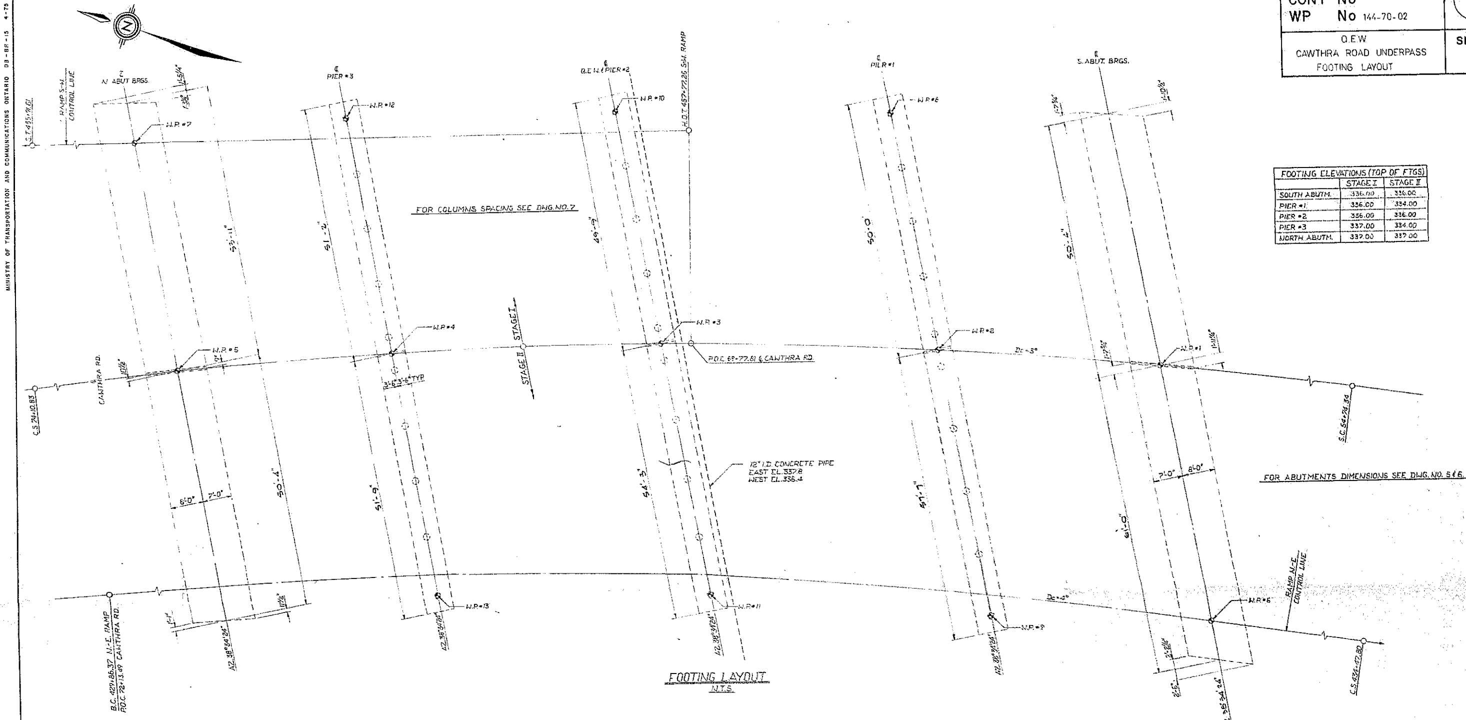
REMARKS:

30M11-168

DIST. NO. 6
CONT No
WP No 144-70-02

O.E.W.
CAWTHRA ROAD UNDERPASS
FOOTING LAYOUT

SHEET



FOOTING LAYOUT
N.T.S.

W.P.	STATION	COORDINATES NORTH	COORDINATES EAST
1	68+65.28	36020.74	78001.16
2	69+18.62	36062.43	77957.89
3	69+84.85	36112.88	77924.99
4	70+50.68	36161.53	77880.64
5	71+03.10	36199.15	77844.14
6	433+39.05	35980.77	77969.28
7	456+44.16	36235.20	77871.77
8		36098.32	77996.52
9		36020.63	77934.55
10		36148.58	77953.46
11		36073.69	77893.75
12		36198.32	77909.98
13		36124.27	77850.92

CURVE DATA ℄ CAWTHRA RD.

POINT	STATION	COORDINATES NORTH	COORDINATES EAST
S.C.	64+74.34	35699.49	78207.50
P.O.C.	69+77.81	36107.59	77929.64
C.S.	74+10.83	36398.64	77610.28

CURVE DATA ℄ CAWTHRA RD.	
Δ	28°05'40"
D	3°00'00"
R	1910.86'
T	477.854'
L	936.481'

CURVE DATA N-E RAMP

POINT	STATION	CORDINATES NORTH	CORDINATES EAST
B.C.	429+86.37	36245.55	77737.67
C.S.	434+47.80	35888.51	78026.81

CURVE DATA N-E RAMP	
Δ	18°39'24"
D	4°00'00"
R	1432.39'
T	235.29'
L	466.42'

DATA S-W. RAMP

POINT	STATION	COORDINATES NORTH	COORDINATES EAST
S.T.	455+91.61	36275.36	77837.19
H.O.T.	457+72.26	36155.58	77959.35

FOOTING ELEVATIONS (TOP OF FTGS)	STAGE I	STAGE II
SOUTH ABUTM.	336.00	336.00
PIER #1	336.00	334.00
PIER #2	336.00	336.00
PIER #3	337.00	334.00
NORTH ABUTM.	337.00	337.00

D. R. GLUPPE

RECEIVED
GEOTECHNICAL OFFICE
JAN 14 1977
SOIL MECHANICS
MINISTRY OF TRANSPORTATION & COMMUNICATIONS

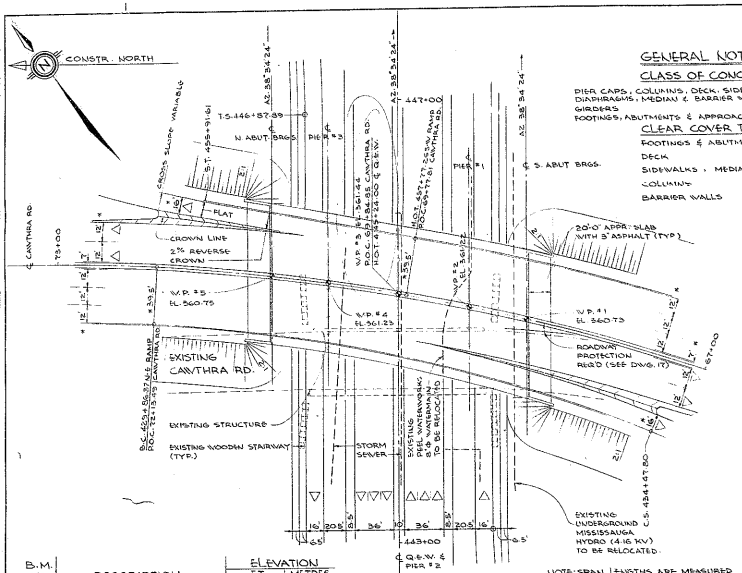
FOR REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

REVISIONS DATE	BY	DESCRIPTION	
DESIGN D.R.G.	CHECK G.A.	LOADING HS 20-44	DATE
DRAWING J.O.	CHECK R.W.	SITE No 24-191	DWG 3

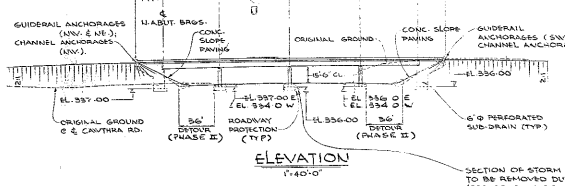
30411-168

DIST No 6	
CONT No	
WP No 144-70-02	
D.E.W.	SHEET
CAWTHRA ROAD UNDERPASS	
GENERAL PLAN	

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO 09-28-15 4-75



PLAN
1"=40'-0"



ELEVATION
1"=40'-0"

SECTION OF STORM SEWER AT PIER # 2 TO BE REMOVED DURING CONSTRUCTION. (SEE GRADING DRAWINGS)

B.M. NO.	DESCRIPTION	ELEVATION FT.	ELEVATION METRES
76	ON THE N. FACE AT THE E. CORNER OF A RED BRICK BUNGALOW; N/P 1572, ON THE W. SIDE OF CAWTHRA RD.; 700' MORE OR LESS N. OF ARBOR RD.	322.582	98.308

NOTE: SPAN LENGTHS ARE MEASURED ALONG ℄ CAWTHRA RD.

GENERAL NOTES

CLASS OF CONCRETE

PIER CAPS, COLUMNS, DECK, SIDEWALKS DIAPHRAGMS, MEDIAN & BARRIER WALLS	: 4000 P.S.I.
GIRDERS	: 5000 P.S.I.
FOOTINGS, ABUTMENTS & APPROACH SLABS	: 3000 P.S.I.

CLEAR COVER TO REINFORCING STEEL

FOOTINGS & ABUTMENTS	: 3"
DECK	: 2" TOP, 1" BOTTOM
SIDEWALKS, MEDIANS & PIER CAPS	: 2"
COLUMNS	: 2½"
BARRIER WALLS	: 1½"

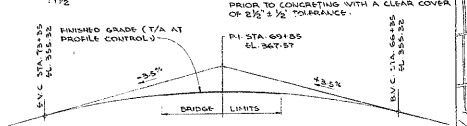
GRADE OF REINFORCING STEEL

COLUMN SPIRALS & BEAM STIRRUPS : G 40
REMAINDER : G 50

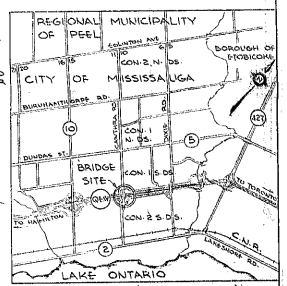
CONSTRUCTION NOTES

THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 1/8".
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED.
THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF FORMWORK FROM THE SITE.

TO ACHIEVE THE MIN. CLEAR COVER OF 2" SPECIFIED, THE TOP LAYER SHALL BE PLACED PRIOR TO CONCRETING WITH A CLEAR COVER OF 2 1/2" ± 1/2" TOLERANCE.



PROFILE OF CAWTHRA RD.
N.T.S.



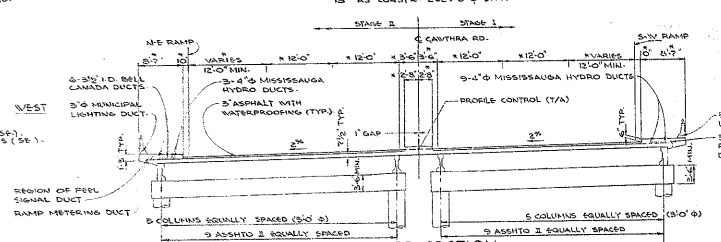
KEY PLAN
1"=1.25 MI.

LIST OF DRAWINGS

1. GENERAL PLAN
2. BORE HOLE LOCATIONS & SOIL STRATA
3. FOOTING LAYOUT
4. FOOTING REINFORCING
5. NORTH ABUTMENT
6. SOUTH ABUTMENT
7. PIER DETAILS
8. PRESTRESSED GIRDERS & BEARINGS
9. DECK DETAILS & ELEVATIONS
10. DECK REINFORCING
11. 30 FOOT APPROACH SLABS
12. CONCRETE BARRIER WALL (2'-8" HIGH)
13. STEEL PARAPET RAILING (SINGLE TUBE)
14. DETAILS OF CONCRETE SLOPE PAVINGS
15. STANDARD DETAILS I
16. STANDARD DETAILS II
17. SUGGESTED ROADWAY PROTECTION
18. AS CONST'D ELEV'S & DIM.

CONCRETE QUANTITIES

PIERS	315 C.Y.
ABUTMENTS & WINGWALLS	745 C.Y.
DECK & DIAPHRAGMS	1015 C.Y.
BARRIER WALLS	32 C.Y.
SLOPE PAVINGS	96 C.Y.
APPROACH SLABS	151 C.Y.



CROSS SECTION
1/8"=1'-0"

STAGE II STAGE I

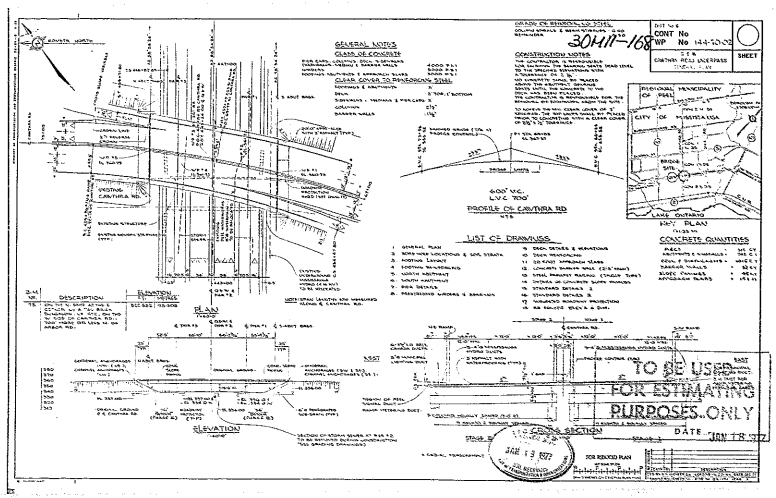
* RADIAL MEASUREMENT

FOR REDUCED PLAN USE SCALE BELOW
0 1 2 3
← 3 INCHES ON ORIGINAL PLAN →

REVISIONS	DATE	BY	DESCRIPTION

DESIGN D.A.C.	CHECK G.A.	LOADING HS 20-44	DATE DEC. 75
DRAWING R.W.	CHECK G.J.	SITE No 24-191	DWG 1

REGISTERED PROFESSIONAL ENGINEER JAN 14 1977 PROVINCE OF ONTARIO


30411-168
GENERAL NOTES
CLASS OF CONCRETE
CONSTRUCTION NOTES
LIST OF DRAWINGS
CONCRETE QUANTITIES
600' V.C.
L.V.C. 100'
PROFILE OF CENTRA RD
PLAN
ELEVATION
TO BE USED
FOR ESTIMATING
PURPOSES ONLY
DATE JAN 18 1977
JAN 13 1977

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 30M11-168

DIST 6 REGION Central

W.P. No. 144-70-02

CONT. No. 78-83

W.O. No.

STR. SITE No 24-191

HWY. No.

LOCATION Proposed Underpass Structure at the crossing of Relocated Cawthra Road and QEW

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS ① documents to be unfolded before microfilming

② photos enclosed

FOUNDATION INVESTIGATION REPORT

for

PROPOSED UNDERPASS STRUCTURE
AT THE CROSSING OF RELOCATED
CAWTHRA ROAD AND Q.E.W. SITE #24-191
CITY OF MISSISSAUGA, COUNTY OF PEEL,
DISTRICT #6, TORONTO
W.P. 144-70-02

****

I. INTRODUCTION

A new interchange has been proposed for the intersection of relocated Cawthra Road and Q.E.W. Accordingly, the existing structure will be replaced by a new structure. The Soil Mechanics Section was requested to carry out a sub-surface investigation for the above-mentioned structure in the City of Mississauga, County of Peel. The request was contained in a memo from Mr. G.C.E. Burkhardt, Regional Structural Planning Engineer, Central Region dated November 14, 1974. Subsequently, a foundation investigation was carried out by this section, to determine the subsoil, bedrock and groundwater conditions at the site.

The results of the investigation are presented in this report, together with our recommendations pertaining to design and construction of the structure foundations as well as the stability considerations associated with the approach fills.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site is located about one mile West of Q.E.W. and Dixie Road crossing in the City of Mississauga, County of Peel. The area in the vicinity of the site is flat and has been developed for commercial as well as for dwelling purposes.

Physiographically, the site is located in the region of "Iroquois Plain". This region borders the shoreline of Lake Ontario.

In this region, the subsoil is mainly glacial till with interbedded layers of silt or silty sand deposits. The underlying bedrock is shale of the Meaford-Dundas formation, Ordovician period.

3. FIELD INVESTIGATION AND LABORATORY WORK:

Eight sampled boreholes, each accompanied by a dynamic cone penetration test, were put down during the course of the field investigation. The borings were advanced by means of a C.M.E.-55 (M.V. Mounted) auger machine adapted for soil sampling purposes.

Samples of the glacial till and the granular deposits were obtained in a 2" O.D. split-spoon sampler, which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The dynamic cone penetration tests were advanced using the same method. Bedrock was proven at seven of the boring locations by obtaining BXL rock core samples.

The groundwater conditions across the site were determined by recording the water level in the open boreholes during the course of the investigation.

The locations and elevations of all the boreholes are shown on Drawing No. 1447002A. Estimated stratigraphical sections are also presented on respective drawings. The surveying was carried out by personnel from the Central Region, Engineering Surveys office. All elevations are referenced to Geodetic datum.

All the samples were subjected to careful visual examination both in the field and in the laboratory. Laboratory tests were performed on selected samples to determine the engineering properties of the various soil types; namely,

Natural Moisture Content
Atterberg Limits
Grain size distribution

The results of the laboratory testing are plotted on the "Record of Borehole" sheets and summarized on Figures No. 1 to 5, all contained in Appendix I of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General

Immediately below a thin layer of topsoil is a deposit of silty sand underlain by a stratum of cohesive glacial till which in turn is underlain by a further deposit of silty sand with gravel and trace of clay. The overburden is underlain by shale bedrock. At the existing embankment locations, fill material up to 21 ft. was encountered immediately above the natural ground. The fill material mainly consists of silty sand with traces of gravel and clay.

4.2) Fill Material (Silty Sand)

The material used for the existing approach embankment fills was investigated in boreholes No. 6 and 10. Borehole No. 6 was located at the north approach of the existing structure and Borehole No. 10 on the south approach.

The fill material is about 21 ft. deep in both boreholes and is made up of silty sand and traces of gravel and clay. The "N" values in the granular fill material ranged from 11 blows to 47 blows per foot, indicating that the fill material has been subjected to moderate to very good compaction.

4.3) Upper Granular Deposit (Silty Sand with trace of clay)

Below a thin topsoil, the upper granular deposit is made up of silty sand with trace of clay.

The thickness of this upper granular deposit varies from 7.5 ft. (B.H.4) to 12.5 ft. (B.H. 2). Standard Penetration Tests carried out within this layer gave "N" values randomly ranging from 7 blows to 63 blows per foot. Based on these results, it is estimated that the relative density of the upper granular deposit varies from loose to very dense.

Grain-size distribution testing was carried out on samples of the granular deposit. The results are plotted in an envelope form on Figure No. 3, attached in the Appendix.

4.4) Glacial Till (Clayey silt, sand and gravel)

This stratum was found below the upper granular deposit and consists of a heterogeneous mixture of clayey silt, sand and gravel. The thickness of the glacial till stratum varies from 4.5 ft. in Borehole No.2 to 11 ft. in Borehole No.9.

The grain size distribution testing was carried out on samples of the glacial till. The results are plotted on Figure No. 4.

Atterberg Limit tests were carried out on samples from this deposit. The results are shown below:

	Range	Average
Liquid Limit (W_L) %	25-32	28.5
Plastic Limit(W_p) %	16-17	16.5
Natural Moisture content (w)%	8.5-11.5	10.0

The material is basically cohesive and has a low plasticity.

Standard Penetration Tests were carried out within this deposit. The results indicate that the "N" values range from 26 blows to 140 blows per foot. It is estimated that the consistency of the glacial till is very stiff to hard.

4.5) Lower Granular Deposit (silty sand with gravel and traces of clay)

Underlying the glacial till stratum is another layer of granular deposit. The material in this deposit is silty sand with gravel and traces of clay. The thickness of this lower granular stratum varies from 7.5 ft. in Borehole #5 to a maximum of 27 ft. in Borehole #1. This deposit was not encountered in B.H. #6 and #9.

Standard Penetration Tests carried out within this layer, gave "N" values ranging from 9 blows to 144 blows per foot generally increasing with depth. Based on these results, it is estimated that the relative density of the granular deposit varies from loose to very dense with depth.

Grain-size distribution testing was carried out on samples of the granular deposit. The results are plotted on Figure No. 5, attached in the appendix.

4.6) Shale Bedrock

Underlying the overburden is shale bedrock. The bedrock was proven in seven boring locations by obtaining BXL size core samples. The bedrock surface, as well as the weathered portion of the bedrock, is presented in the following table:-

BOREHOLE NO.	WEATHERED SHALE ELEVATION	SOUND SHALE ELEVATION
1	------	294.7 ft.
2	------	304.0 ft.
4	314.8 ft.	313.3 ft.
5	317.3 ft.	314.8 ft.
6	328.5 ft.	316.5 ft.
9	322.4 ft.	321.0 ft.
10	314.8 ft.	305.8 ft.

The bedrock is identified as shale of Meaford-Dundas formation, Ordovician Period.

5. GROUNDWATER CONDITIONS:

Groundwater level observations were carried out during the course of the field investigation by recording the water level in the open boreholes. The observations are recorded on the Record of Borehole sheets and summarized on Drawing No. 1447002. The results of the observation indicate that the groundwater level ranges from 5 to 24 ft. below the existing ground or road surface which corresponds to elevations from 334.5 to 339.8.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General

It is proposed to improve the present interchange facilities at the crossing of Q.E.W. and Cawthra Road. As a result, a revision for Cawthra Road has been planned and a new underpass structure will be required at adjacent and east of the existing structure. The new structure will be four span (52'-65'-65'-52')having a total width of 120 ft.

The new centerline is slightly north-eastward oriented causing an eastward shift of 42 ft. of the north abutment. Due to the presence of the traffic problems on the existing Q.E.W., it was not possible to place any boreholes for the center pier which will be situated exactly at the existing center boulevard.

The subsoil at the site consists of a 7.5 ft. to 12.5 ft. thick, loose to very dense upper granular deposit underlain by 4.5 ft. to 12 ft. thick, very stiff to hard cohesive glacial till, which in turn is underlain by a lower 7 ft. to 27 ft. thick loose to very dense granular deposit. The overburden is underlain by shale bedrock. The sound bedrock surface ranges from elev. 321.0 to elev. 294.7.

6.2) Foundations

6.2.1) Pier Footings

The grade of the existing Q.E.W. at this crossing is about elevation 340 ft. and this grade will be maintained in this area.

The subsoil at this site is competent for spread footing type foundations. The piers, therefore, can be founded on spread footings located within the upper granular deposit at or below the following elevations:

		Elevation
South Pier (Pier No. 1) Boreholes No. 2 and 9	-	333.0
Center Pier (Pier No. 2) (see comments below)	-	333.0
North Pier (Pier No. 3) Boreholes No. 4 and 7	-	334.0

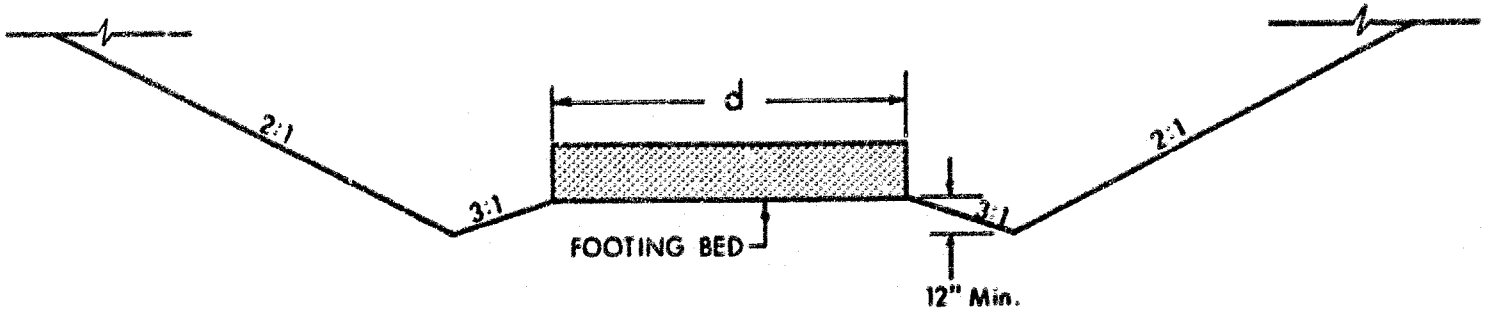
In all cases, a minimum of four feet of earth cover should be provided to the underside of the footings for frost protection purposes.

With regard to Center Pier, at the time of foundation investigation, borings were not carried out in the vicinity of Center Pier location in view of the presence of the Boulevard fence rails and traffic situation. It is believed that the subsoil conditions will be similar to those encountered in the general area. For design purposes, a bearing pressure value of 3 t.s.f. may be used. Prior to the construction, after the removal of fence rails, etc., this office will carry out additional borings in order to provide positive recommendations. It is suggested that District personnel should advise this office prior to four weeks before commencement of the construction in order to carry out the borings at this location.

Spread footings meeting the above mentioned requirements, can be designed using a safe bearing pressure of 3 t.s.f.

Footings will probably be located at or below the ground water level recorded during the period of the investigations. Construction for footings in the granular deposit can be carried out below the prevailing water level with an oversize excavation as illustrated on the sketch on the following page. The method would involve an initial gradual pumping, with final pumping confined to the shallow ditches around the bottom of excavation. The rate of pumping should be maintained in such a manner that the sides of the excavation do not slough in.

Settlement of the foundation subsoil will take place due to induced footing pressure. For footings of the size contemplated, inducing the aforementioned bearing pressure, the settlement will be negligible. Further, this settlement will be elastic



PERIMETER DITCHES MUST BE PUMPED AT ALL TIMES UNTIL FOOTING PLACED

(d = WIDTH OF THE PIER FOOTING)

in nature; i.e. will take place during or immediately following the construction period.

6.2.2) Abutment Foundations

The proposed abutments may be "perched" within the approach fills. Due to the re-alignment along Cawthra Road, the west portion of the abutment footings will be located within the existing fill, while the eastern portion will be within newly placed fill. If a spread footing scheme will be employed, the integrity of the abutments may be adversely affected, due to the differential settlements induced within the existing and newly placed fill, under the applied footing pressure. Based on this consideration, it is recommended that the abutments for the new structure be supported on end-bearing piles driven to shale bedrock (see bedrock elevations under heading 4.6 above).

The allowable loads will depend on the pile section chosen; for example, 12 BP 74 steel H-piles may be designed for 95 tons per pile. No rock or bouldery fill should be placed within the planned limits of the piles.

6.3) Approach Embankments

As discussed previously, the existing embankments will be widened in an easterly direction (total width of widening approximately 60 ft. on the south side and 100 ft. on the north side). The maximum height of the proposed fills will be at the same elevation as the existing one; i.e. 361 ft. No stability problems are anticipated for embankments with standard 2:1 slopes, provided the additional fill required is: 1) properly keyed into the existing embankment in accordance with current M.T.C. specifications; and 2) it is properly compacted.

7. MISCELLANEOUS

The field work was carried out during November 29th to December 16th, 1974, under the supervision of Mr. V. Korlu, Project Engineer, who also prepared this report.

The equipment was owned and operated by Atcost Drilling Co. of Toronto.

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

V. Korlu
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
CIVIL
V. KORLU
PROFESSIONAL ENGINEER ONTARIO

VK/sah
March 5, 1975
March 20, 1975

M. Devata
Supervising Engineer

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 1

WP 144-70-02 LOCATION 40-0KEM; 15,836,072 N; 378,046 E ORIGINATED BY ZZ

DIST 6 HWY Q.E.W. BORING DATE DECEMBER 9, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME 55 CHECKED BY

SOIL PROFILE ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	N VALUES	GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	LIQUID LIMIT PLASTIC LIMIT WATER CONTENT WATER CONTENT % 10 20 30	UNIT WEIGHT γ	REMARKS % GR SA SI CL
340.7	GROUND LEVEL					340				
0.0	SILTY SAND TRACE OF CLAY		1	SS	33					
			2	SS	16				.132	0 94 (6)
330.2	COMPACT TO DENSE		3	SS	55					
10.3	BET. MIX OF CLAYEY SILT, SAND & GRAVEL - GLACIAL TILL		4	SS	44	330				4 27 45 19
			5	SS	140					
321.7	HARD		6	SS	52					
19.0	SILTY SAND WITH GRAVEL AND TRACE OF CLAY		7	SS	45	320				27 67 (6)
			8	SS	79	310				
	COMPACT TO DENSE		9	SS	45					26 76 (8)
			10	SS	19	300				
294.7										
46.0	BEDROCK		11	SSL	100% Rec.					
289.7	SOUND SHALE					290				
51.0	END OF BOREHOLE									
						280				

20
15 ○-5 % STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 2

WP 144-70-02 LOCATION CO-ORDS: 13,836,111N; 978,010 E. ORIGINATED BY K.F.

DIST 6 HWY Q.E.W. BORING DATE December 11, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SANDLE WITH CME 55 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES N VALUES	GROUND WATER ELEV
340.0	GROUND LEVEL					
0.0	Silty Sand, trace of clay		1	SS	14	
			2	SS	7	
			3	SS	31	
327.5	Loose to Dense					330
12.5	Ret. mix of clayey silt sand & gravel		4	SS	56	
323.0	glacial till HARD		5	SS	50	
17.0	Silty Sand traces of gravel and clay		6	SS	63	320
			7	SS	139	
	Very Dense		8	SS	80	310
304.0						
36.0	Bedrock		9	REC	100%	
299.0	Sound Shale					300
41.0						290

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100
SHEAR STRENGTH
○ 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

UNIT WEIGHT γ

REMARKS

% GR	SA	SI	CL
0	92	(8)	
7	47	41	5

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 4

W/P 144-70-02 LOCATION CO-ORDS: 15,936,207 N; 977,920 E ORIGINATED BY V.R.

DIST 6 HWY Q.E.W. BORING DATE DECEMBER 4, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME 55 CHECKED BY

SOIL PROFILE ELEV/DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	'N' VALUES	GROUND WATER ELEV.
338.3	GROUND LEVEL					
0.0	Silty Sand with gravel, trace of clay		1	SS	12	
330.8	compact to dense		2	SS	47	
7.5	Wet.mix of clayey silty sand and gravel-glacial till		3	SS	48	
324.3	Hard		4	SS	49	
14.0	silty sand, trace of clay		5	SS	19	
			6	SS	144	
314.8	Compact to V. Dense		7	SS	148	
23.5	WEATHERED					
25.0	SOUND		8	BXL	100% Rec.	
306.3	Shale bedrock		9	BXL	100% Rec.	
32.0	END OF BOREHOLE					

DYNAMIC CONE PENETRATION RESISTANCE PLOT — 20 40 60 80 100

SHEAR STRENGTH ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE

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

WATER CONTENT % 10 20 30

UNIT WEIGHT γ

REMARKS	% GR	SA	SI.	CL
	33	60	(7)	
	9	26	41	24
	0	73	(27)	

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 5

W.P. 144-70-02 LOCATION CO-ORDS: 15,856,246N; 977,880E ORIGINATED BY V. K.

DIST. 6 HWY. Q.E.W. BORING DATE DECEMBER 4, 1974 COMPILED BY V. K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME 55 CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT (10 20 30 40 50 60 100) / SHEAR STRENGTH (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	LIQUID LIMIT w_L / PLASTIC LIMIT w_p / WATER CONTENT w / WATER CONTENT % (10 20 30)	UNIT WEIGHT γ	REMARKS	% GR SA SI CL
339.8	GROUND LEVEL										
0.0	Silty sand, trace of clay		1	SS	9			○			0 96 (4)
			2	SS	14						
330.8	Loose to compact										
9.0	Wet.mix of clayey silty sand & gravel, glacial till		3	SS	50	330		○			9 33 43 15
			4	SS	51			○			13 43 40 4
324.8	Hard										
15.0	Silty sand, some gravel trace of clay.		5	SS	72						
			6	SS	9	320					
317.3	Loose to V. Dense		7	SS	116			○			
314.8	Weathered										
25.0	Sound		8	BXL	80% Rec.						
308.8	Shale Bedrock		9	BXL	100% Rec.	310					
31.0	END OF BOREHOLE										
						300					

20
15 ◇ S % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

ENGINEERING SERVICES BRANCH – GEOTECHNICAL OFFICE – SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 6

W.P. 144-70-02 LOCATION CO-ORDS: 15,836,152 N; 977,829 E. ORIGINATED BY V.K.

DIST. 6 HWY. Q.E.W. BORING DATE NOVEMBER 29, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME 55 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	'N' VALUES	GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w (w_P — w — w_L) / WATER CONTENT % (10 20 30)	UNIT WEIGHT γ	REMARKS	% GR. SA. SI. CL.
361.0	GROUND LEVEL										
0.0	FILL MATERIAL		1	SS	12	360					
	SILTY SAND TRACES OF GRAVEL AND CLAY		2	SS	20			o			9 49 36 5
			3	SS	26	350					
	COMPACT TO DENSE		4	SS	33			o			6 38 45 11
240.0											
21.0	SILTY SAND TRACES OF CLAY		5	SS	11	340					
			6	SS	28			o			0 89 (11)
333.0	COMP.										
29.0	WET MIX OF CLAYEY SILT SAND & GRAVEL-GLACIAL		7	SS	51						
328.5	TILL HARD		8	SS	85	330		o			9 23 49 19
32.5	WEATHERED		9	RXL	50% Rec.						
			10	RXL	25%	320					
316.5			11	RXL	80%						
44.5	SOUND				100%						
312.5	SHALE BEDROCK		12	RXL	Rec.						
48.5	END OF BOREHOLE					310					

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 7

W.P. 144-70-02 LOCATION CO-ORDS: 15,836,173N; 977,879 E. ORIGINATED BY V.K.

DIST. 6 HWY. Q.E.W. BORING DATE DECEMBER 9, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME-55 CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_P, WATER CONTENT w, WATER CONTENT %	UNIT WEIGHT γ	REMARKS / % GR SA SI CL
339.5	GROUND LEVEL									
0.0	SILT SAND, TRACE OF CLAY		1	SS	42					
			2	SS	36					0 55 42 3
330.0	DENSE					330				
9.5	Het. Mix of clayey silt, sand & gravel - Glacial till		3	SS	30					
			4	SS	41					4 27 43 16
324.5	HARD									
15.0	SILTY SAND TRACE OF CLAY		5	SS	63					
			6	SS	32	320				0 65 (35)
	DENSE TO V. DENSE									
314.0			7	SS	100/3"					
25.5	END OF BOREHOLE					310				

OFFICE REPORT ON SOIL EXPLORATION

20
15 ◇ 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

ENGINEERING SERVICES BRANCH – GEOTECHNICAL OFFICE – SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 9

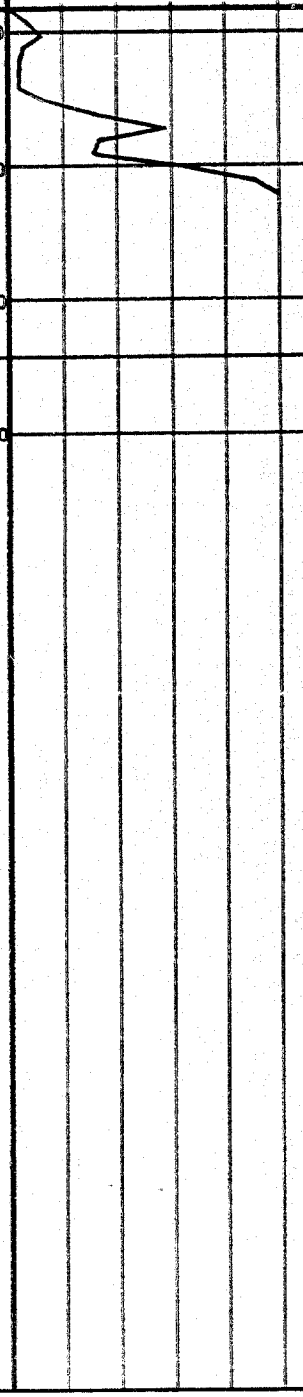
W.P. 144-70-02 LOCATION CO-ORDS: 15,835,987N 977,898 E. ORIGINATED BY VK

DIST. 6 HWY. Q.E.W. BORING DATE DECEMBER 16, 1974 COMPILED BY VK

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH CME-55 CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER ELEV.
341.9	GROUND LEVEL					
0.0	SILTY SAND, TRACE OF CLAY		1	SS	12	
333.4	COMPACT		2	SS	15	
8.5	HET.NIX OF CLAYEY SILT, SAND AND GRAVEL - GLACIAL TILL		3	SS	26	
			4	SS	61	
	V. STIFF TO HARD		5	SS	34	
322.4						
19.5	WEATHERED		6	SS	150/ 6"	
21.0	SOUND SHALE BEDROCK		7	BXL	100% Rec.	
315.9						
26.0	END OF BOREHOLE					

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100
SHEAR STRENGTH
○ 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

UNIT WEIGHT γ

REMARKS

% GR.	SA.	SI.	CL.
0	88		(12)
5	29	46	20

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 10

W.P. 144-70-02 LOCATION CO-ORDS 15,835,964N; 977,962 E. ORIGINATED BY V.K.

DIST. 6 HWY. Q.E.W. BORING DATE DECEMBER 12, 1974 COMPILED BY V.K.

DATUM GEODETIC BOREHOLE TYPE AUGER AND SAMPLE WITH C.M.E.-55 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_P, WATER CONTENT w / WATER CONTENT %	UNIT WEIGHT γ	REMARKS / % GR SA SI CL
359.8	GROUND LEVEL									
0.0	FILL MATERIAL									
	SILTY SAND, TRACES OF GRAVEL AND CLAY		1	SS	20					
			2	SS	20	350				7 54 29 10
	COMPACT TO DENSE		3	SS	47					
338.3	BROWN		4	SS	31	340				2 67 (21)
21.5	GREY		5	SS	23					
	SILTY SAND, TRACES OF CLAY		6	SS	35					
327.8	COMP. TO V. DENSE		7	SS	63	330				0 91 (9)
32.0	HET. MIX OF CLAYEY SILT, SAND & GRAVEL GLACIAL TILL		8	SS	60					
321.8	HARD		9	SS	59					7 31 44 18
38.0	SILTY SAND WITH GRAVEL & TRACE OF CLAY		10	SS	110	320				47 30 17 6
314.8	V. DENSE		11	SS	130/ 4"					
45.0	WEATHERED					310				
305.8										
54.0	SOUND SHALE									
300.8	BEDROCK		12	BXL	100% Rec.					
59.0	END OF BOREHOLE					300				

% STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

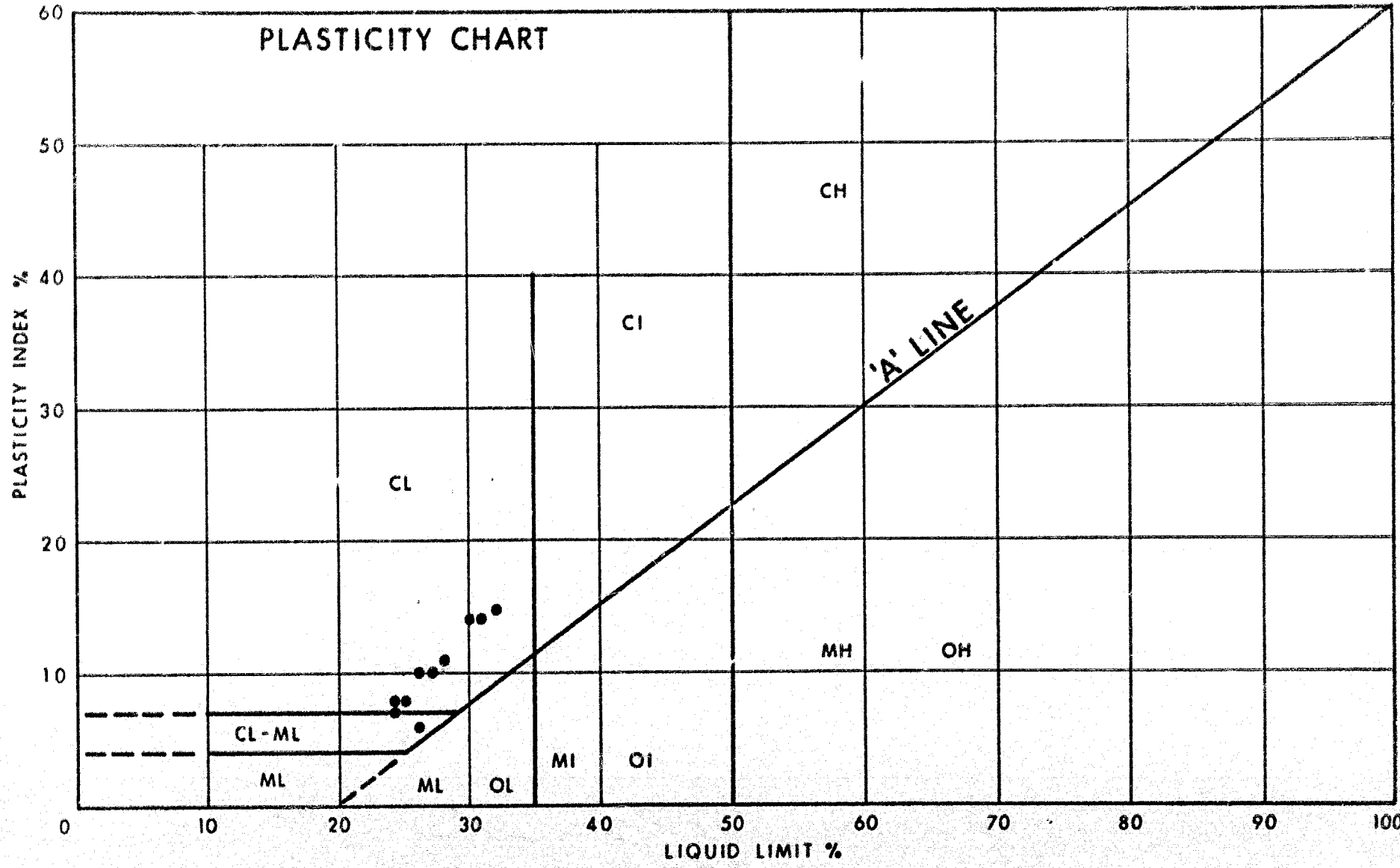


FIG. 1

WP. 144-70-02

GRAIN SIZE DISTRIBUTION

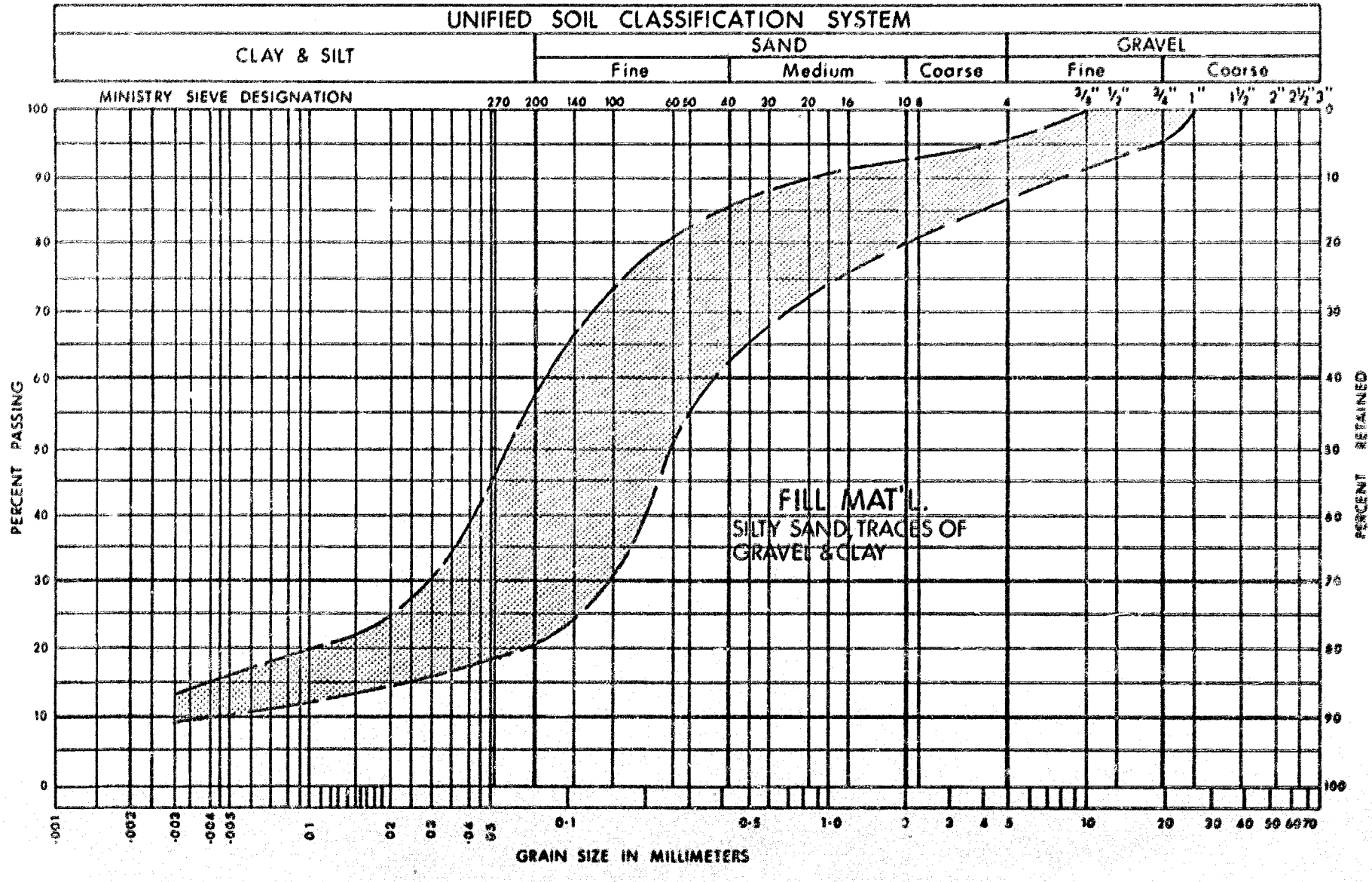


FIG. 2

W.P. 144-70-02

GRAIN SIZE DISTRIBUTION

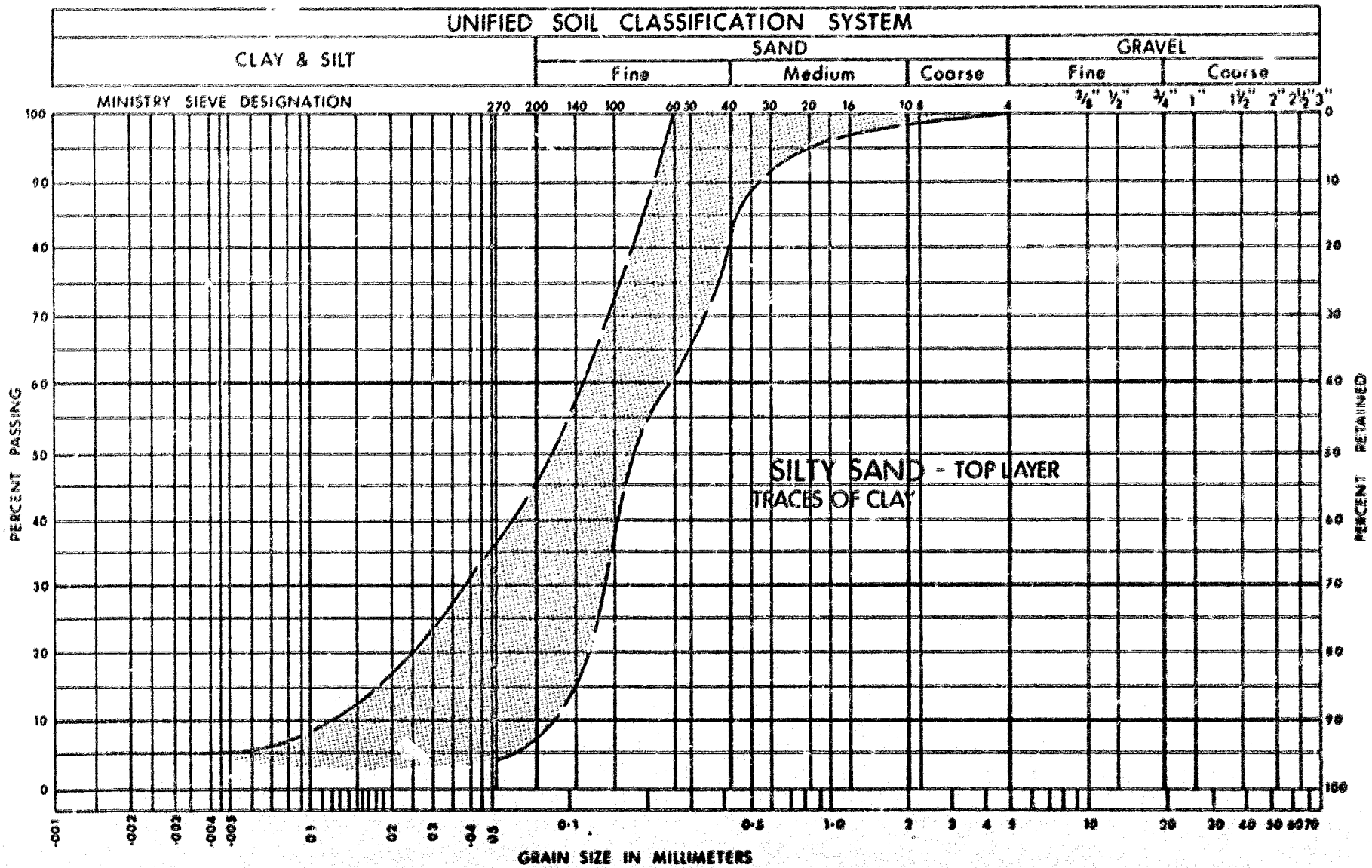


FIG. 3

WP. 144-70-02

GRAIN SIZE DISTRIBUTION

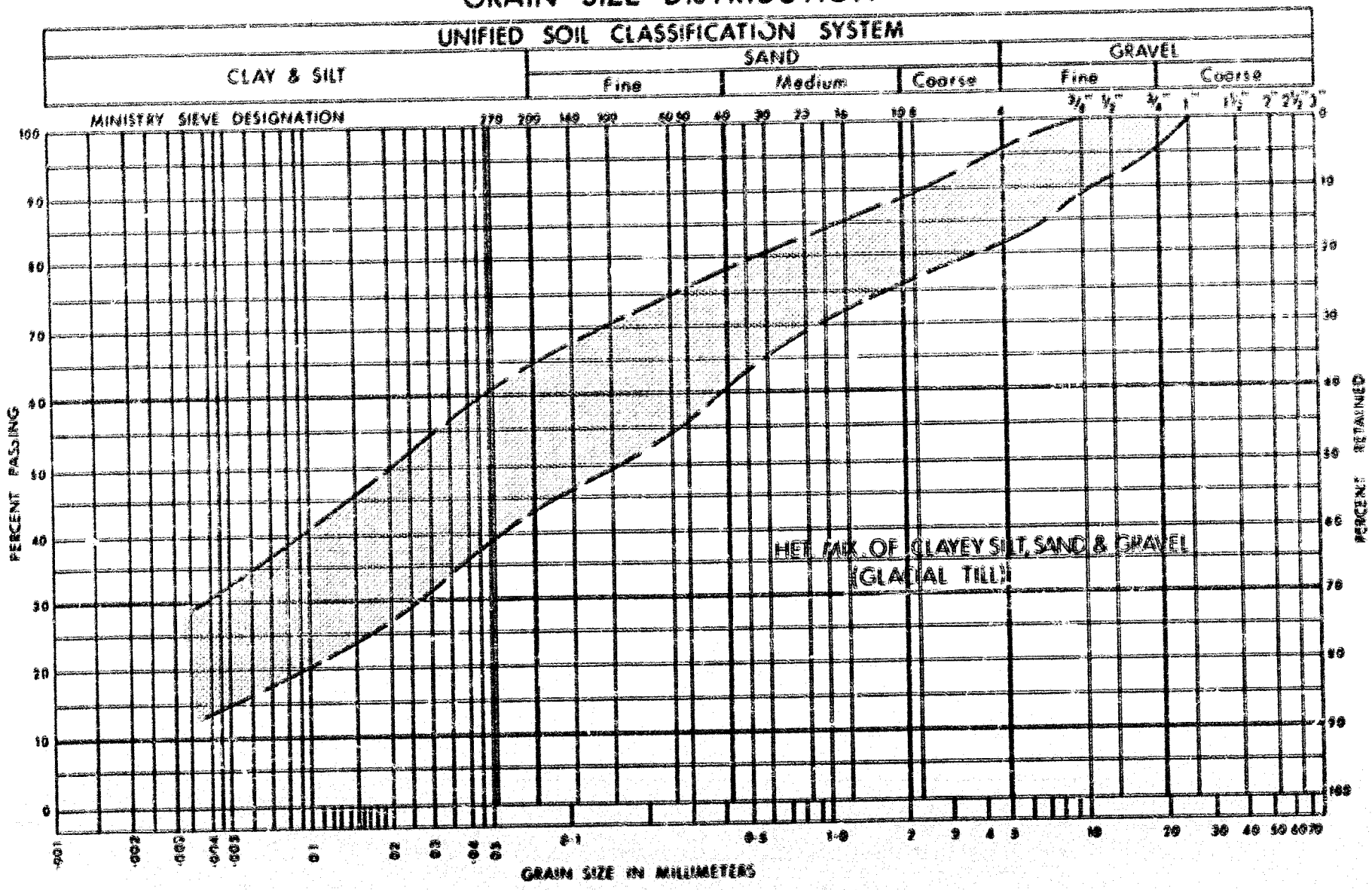


FIG. 4

W.P. 144-70-02

GRAIN SIZE DISTRIBUTION

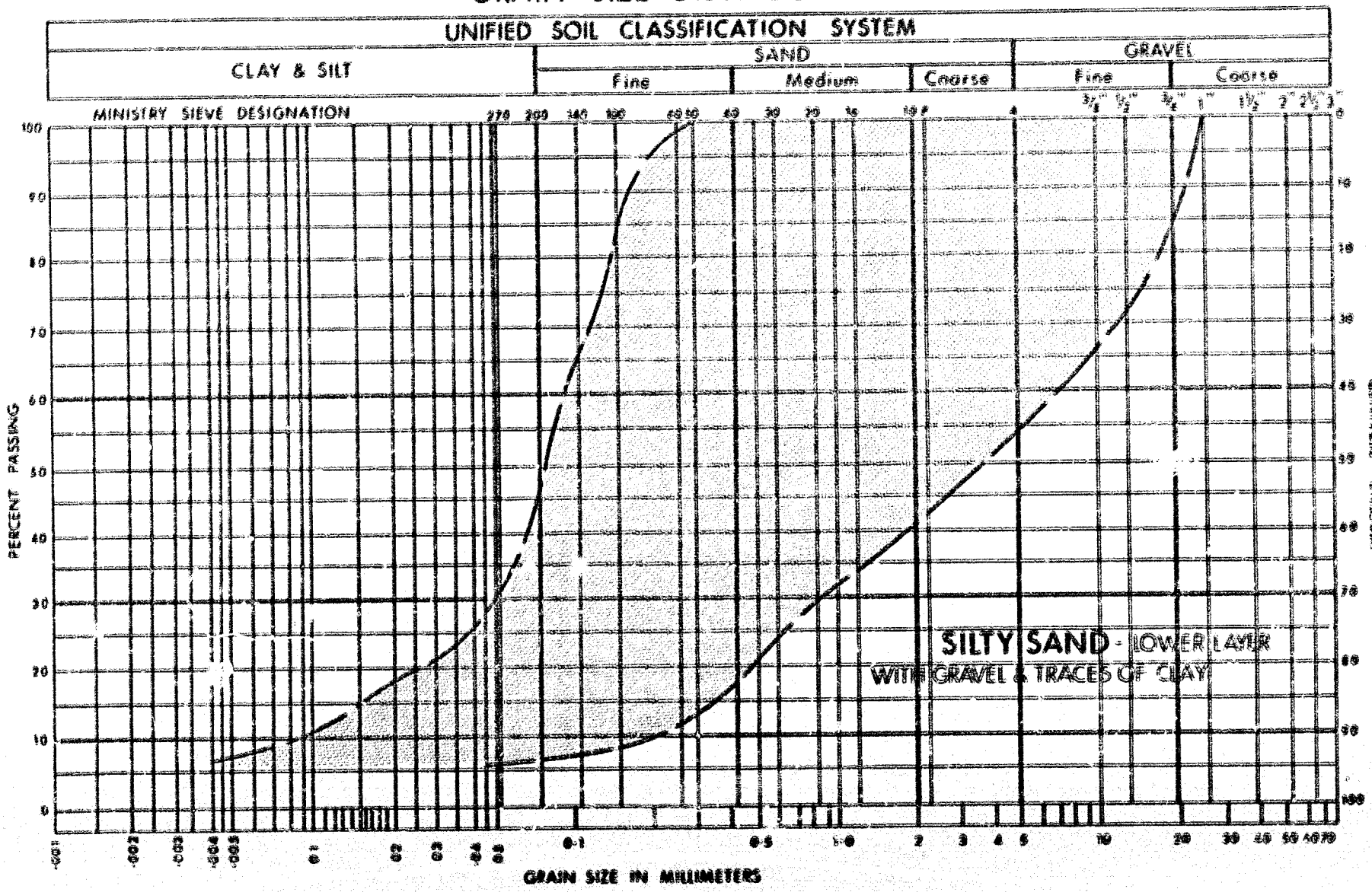
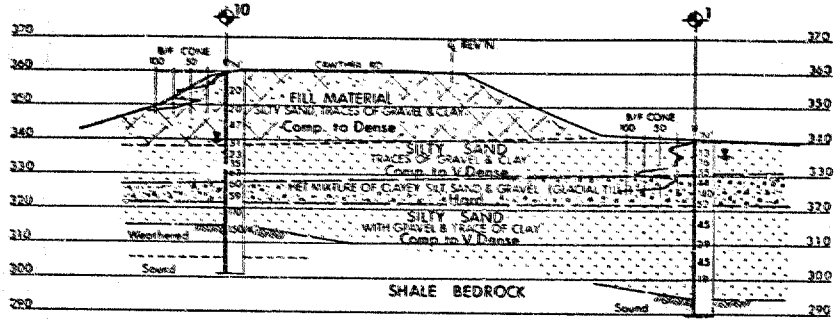
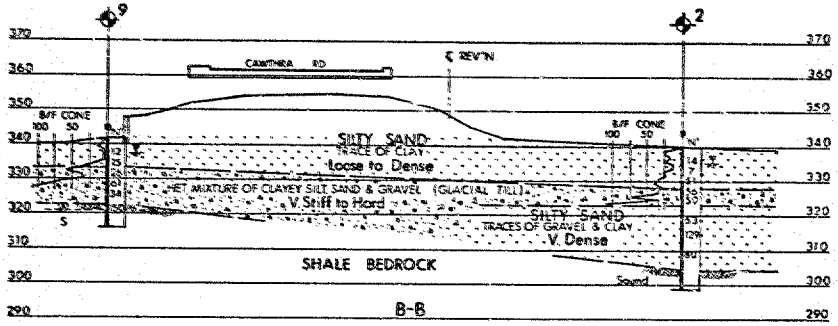
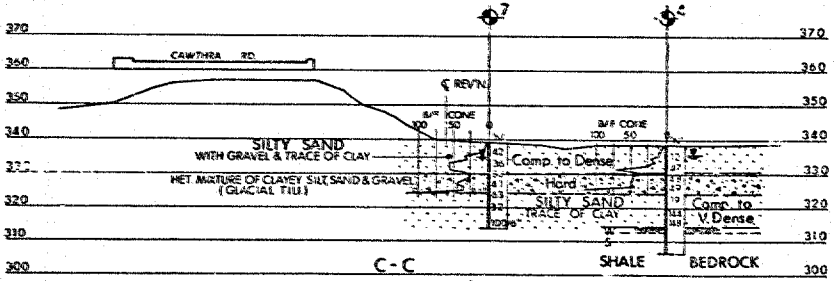


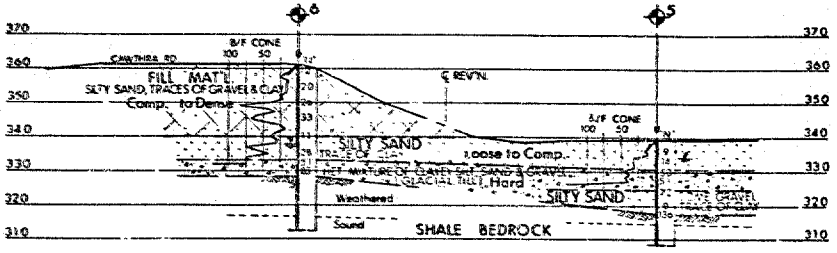
FIG. 5

WP. 144-70-02



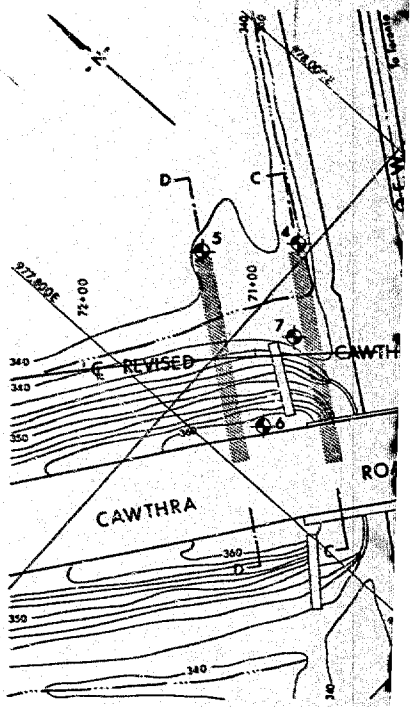


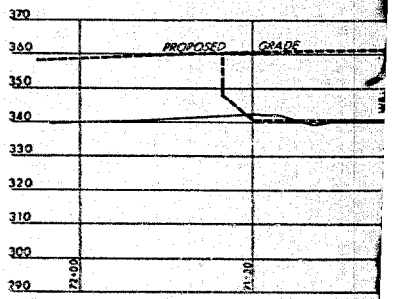




SECTIONS

SCALE 20 10 0 20 40 FT

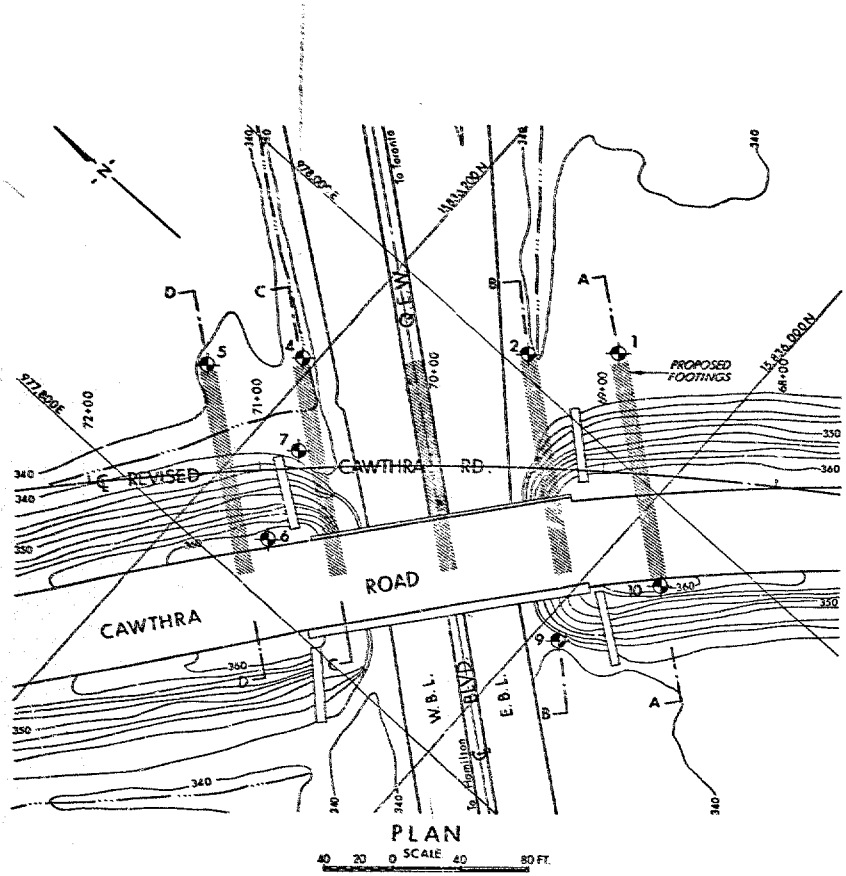


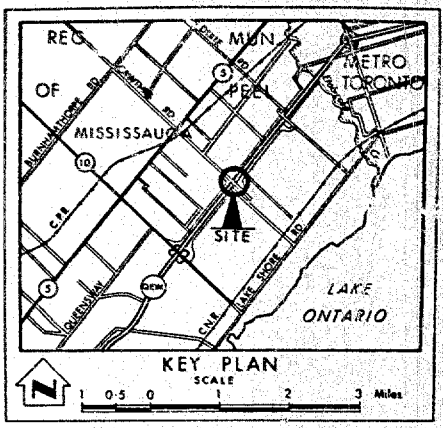


℄ PROFILE -

VERT 20 10

HORIZ 40 20

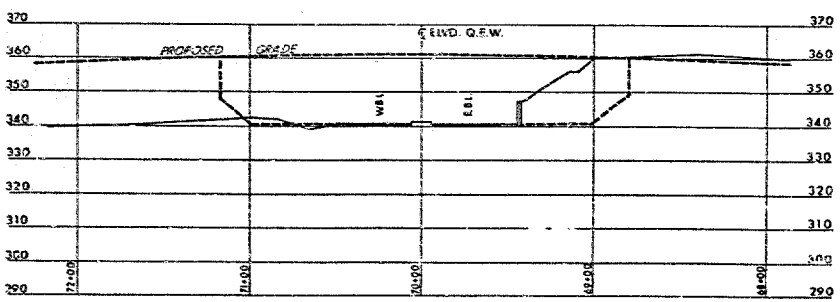




LEGEND

- Bore Hole
- Dynamic Cone Penetration Resistance Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, DEC. 1974

NO.	ELEVATION	CO-ORDINATES NORTH	CO-ORDINATES EAST
1	340·7	15,836,072	978,046
2	340·0	15,836,111	978,010
4	338·3	15,836,207	977,920
5	339·8	15,836,246	977,880
6	361·0	15,836,152	977,829
7	339·5	15,836,173	977,879
9	341·9	15,835,987	977,898
10	359·8	15,835,964	977,962



℄ PROFILE - REVISED CAWTHRA RD.

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

— NOTE —

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

NOTE FOR CONTRACT DOCUMENT

The complete foundation investigation report for this structure may be examined at the Structural Office and Foundations Office, Downsview, and at the TORONTO District Office.

REVISIONS			
	DATE	BY	DESCRIPTION

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

CAWTHRA ROAD

HIGHWAY NO Q.E.W. DIST NO 6
REG. MUN. OF PEEL
MISSISSAUGA LOT CON

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD V.K	CHECKED	W.P. NO 144-70-02	DRAWING NO
DRAWN S.O.	CHECKED	W.O. NO	1447002-A
DATE 18 MAR 1975	SITE NO 24-191		BRIDGE DRAWING NO
APPROVED	CONT NO		

REF NO 880-110

Mr. R. Northwood
Area Construction Engineer
Central Region
3501 Dufferin Street, Downsview

Mr. I. Tremain

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

79 06 11

Re: Cawthra Road, Regional Road 17
Interchange Underpass
W.P. 144-70-02, Contract 78-83

Because of the difficulties encountered in unwatering Pier 3, Stage I construction at the above mentioned structure, our office was requested to advise on and observe the construction of the south abutment and Pier 1, Stage I. Initially, it was proposed to drive the timber lagging into the glacial till and carry out the excavation below the water level within the timber cofferdam. Driving of the timber sheeting proved to be too difficult to advance the timber lagging sufficiently far enough ahead of the excavation operation to adequately control groundwater. In view of this, alternate methods of construction were agreed upon by members of our office, M.T.C. construction personnel and the contractor. These methods are as follows:

- South Abutment, Stage I. Unwater by construction of perimeter drains

- Pier 1, Stage I. Unwater by excavating "deep wells" within the area of the footing down to the glacial till. Two deep wells were recommended in addition to the "deep well" located at the existing key adjacent to the Stage I-Stage 2 joint. These "deep wells" are to be three to four feet wide carried down to the glacial till and serve as sump holes. Water flowing into the wells will be pumped out at all times until the footing is brought up to above the groundwater level. The deep wells are to be brought up to footing formation level by means of mass concrete. (A sketch illustrating this scheme was given to Mr. B. Gaston on 79 06 05 at the project site)

- Pier 2, Stage I. Locate the footing on the glacial till and bring up to the footing formation level by means of mass concrete.

cont'd.....

- Finally, periodic observations are to be carried out by this office to determine if alternate methods are required for the Stage II construction.

M MacLean

M. MacLean
Project Engineer

For: M. Devata
Supervising Engineer

cc: C.S. Grebski, Attn: W. Lin
Files

Ministry of Transportation and Communications
Ontario

Memorandum

To: Mr. D. MacDonald
Area Construction Engineer
Central Region
3501 Dufferin St., Downsview

From: Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

Attention:

Date: 79 04 23

Our File Ref.

In Reply to

Subject: Re: Cawthra Road (Reg. Road 17)
Interchange Underpass
Contract 78-83, W.P. 144-70-02
Site 24-191, District 6, Toronto

It was agreed earlier that the subsurface conditions at the proposed center pier location would be investigated during construction prior to commencement of excavation. This investigation is intended to ascertain the soundness of the footing design which was based on the subsurface information in the adjacent area. We have now completed the necessary investigation. Our findings and recommendations are as follows.

Two boreholes were put down about five feet south of the center line of QEW close to W.P. #10 and W.P. #3 of the proposed center pier. Underneath about 3 1/2 feet of sandy roadway fill material, subsoil consists of approximately 5 1/2 feet to 6 1/2 feet of compact uniform lacustrine fine sand with occasional layers of medium dense sand, overlying a 3 1/2 foot to 10 foot thick stratum of competent glacial till which is composed of a heterogeneous mixture of clayey silt, sand and gravel. The glacial till is underlain by probable shale bedrock (inferred from the augering operation) at a location close to the existing underpass and by a layer of very dense sand with angular gravel and shale fragments in the eastern portion of the proposed center pier footing.

Groundwater level was found to exist at elevation 337.5±, corresponding to a depth of about three feet below ground surface.

Factual field data is contained in the Record of Borehole Sheets and the location of the boreholes is shown in a drawing, both being attached to this memorandum.

The center pier can be supported on spread footings founded in the granular stratum at elevation 333.0 and designed for an allowable pressure of up to 3 tsf as recommended previously in our foundation report. Since the cohesionless foundation soil is likely to 'boil' under unbalanced hydrostatic head, a positive dewatering scheme will be required for the footing excavation. Such a scheme may be composed of interlocking steel sheeting driven at least one foot into the underlying cohesive glacial till.

cont'd.....

Alternatively, to minimize the cost of the sheeting, the sandy subsoil between the underside of the footings and the glacial till can be subexcavated and replaced with mass concrete. In this case, timber sheeting can be used and they need to be driven only six inches into the glacial till stratum.

Because excavation will be carried out very close to the existing pavement of QEW, a roadway protection scheme will be required. The Roadway Protection 'C' specified for the center pier footing as shown in Contract Drawing No. 17 appears to be satisfactory. In view of the hard consistency of the glacial till, it is felt that an embedment of six inches for the timber sheeting would be quite adequate. This sheeting, however, should be properly braced against inward movements as excavation proceeds so as to avoid any loss of ground.

It should be noted that the roadway protection scheme can be incorporated with the dewatering scheme.

The information contained in this memorandum should be read in conjunction with other contract documents of this project. If we can be of any further help, please feel free to contact us.

B. Ly

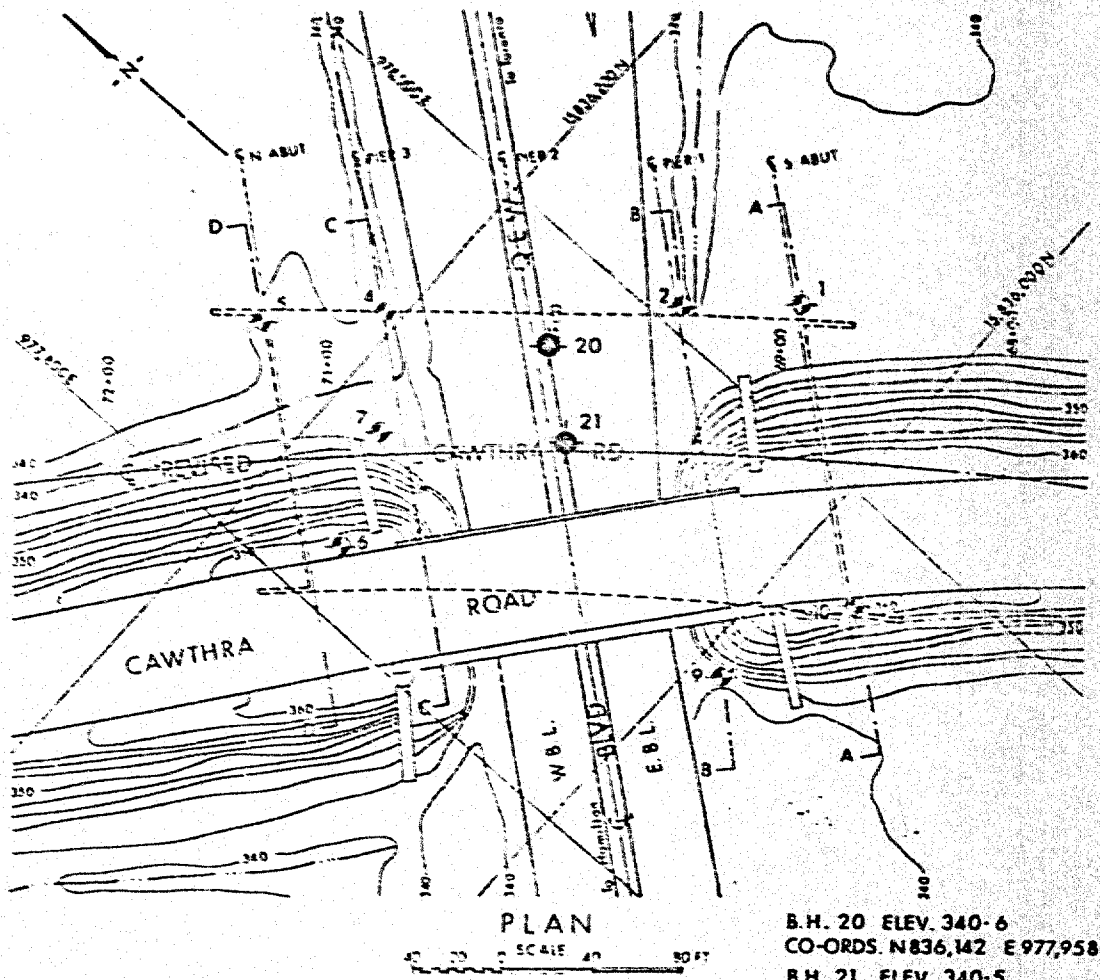
B. Ly
Senior Engineer

For: M. Devata
Supervising Engineer

BL/MD/gs

Attach.

cc: C.S. Grebski
G.C. Burkhardt
Files



PLAN

SCALE 40 80 FT

B.H. 20 ELEV. 340-6
CO-ORDS. N836,142 E977,958

B.H. 21 ELEV. 340-5
CO-ORDS. N836,107 E977,930

Ministry of Transportation and Communications
Ontario

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 20

W P 144-70-02 LOCATION Coords. N 836 142; E 977 958 (close to W.P. #10) ORIGINATED BY EL

DIST 6 HWY QEW BOREHOLE TYPE April 18, 1979 COMPILED BY EL

DATUM Geodetic DATE 3¼" I.D. Hollow Stem Augers CHECKED BY

SOIL PROFILE ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT Wp — NATURAL MOISTURE CONTENT W — LIQUID LIMIT WL / WATER CONTENT (%)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
340.6	Pavement Surface										
0.0 / 337.1	Asphalt Pavement and Sandy Roadway Fill					▼	340				
3.5 / 332.6	Uniform Fine Sand Brown, Compact		1	SS	10						
8.0 / 330.6	Medium Sand Grey, Dense		2	SS	35						
10.0	Glacial Till Heterogeneous Mixture of Clayey Silt, Sand and Gravel, Grey Hard		3	SS	51		330				
			4	SS	52						
			5	SS	36						
319.6			6	SS	60/ 5"		320				
21.0 / 314.1	Sand With Angular Gravel and Shale Fragments, Very Dense		7	SS	60/ 4"						
26.5	End of Hole										

+3, ×5 : Numbers refer to Sensitivity

20
15 ◇ 5 (%) STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

Ministry of Transportation and Communications
Ontario

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 21

W P 144-70-02 LOCATION Coords. N 836 107; E 977 930 (close to W.P. #3) ORIGINATED BY EL

DIST 6 HWY QEW BOREHOLE TYPE 3¼" I.D. Hollow Stem Augers COMPILED BY EL

DATUM Geodetic DATE April 18, 1979 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
340.5	Pavement Surface										
0.0 / 337.0	Asphalt Pavement & Sandy Roadway Fill					▼	340				
3.5 / 331.5	Uniform Fine Sand Brown, Compact		1	SS	24						
9.0 / 328.0	Glacial Till Grey, Hard		2	SS	39		330				
12.5	End of Hole Note: Refusal to Augering at a Depth of 12.5 Feet on Probable Shale Bedrock										

+3, ×5 : Numbers refer to Sensitivity

20
15 ◇ 5 (%) STRAIN AT FAILURE
10

C. REPORT ON SOIL EXPLORATION

Mr. C. Rayman
Planning & Design
Central Region
3501 Dufferin St. Downsview

Soil Mechanics Section
Engineering Materials Office
3rd Floor, Central Building

79 04 19

Re: Cawthra Road Interchange at Q.E.W.
W.P. 144-70-03, Site 24-191
District 6, Toronto

Further to the minutes of the Technical Review Meeting #3 we submit the following comments with regard to the unwatering requirements:

1) The roadway protection can also be incorporated in the dewatering scheme for the pier foundations provided the sheeting extends at least two feet into the cohesive glagial till stratum. In such a case any inflow into the excavation can be readily removed by ordinary pumping methods.

2) A special provision should be included in the contract document for unwatering of the abutment foundations. This SP should be as follows:

> "The contractor shall exercise extreme care during construction to prevent 'boiling' of the base of the foundation excavation in the fine grained silty sand below the prevailing groundwater level".

This SP together with an item for unwatering will cover our needs.

M. Devata
Supervising Engineer

MD/ig

cc: G.C.E. Burkhardt
W. Lin
D. MacDonald
G. Pearce
Files

Mr. C.S. Grebski
Structural Office
West Building, Downsview

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

December 23, 1975

your memo of Dec. 8/75

C.E.W. Cawthra Rd. U'pass
W.P. 144-70-02 Site 24-191
Highway # C.E.W. District 6

We have reviewed the final bridge drawings submitted by your office for the above mentioned structure and submit the following comments. It should be noted that in our Foundation Report on Page 7 we had indicated "prior to the construction, after the removal of the fence rails, etc., this office will carry out additional borings in order to provide positive recommendations."

In view of this we cannot provide any comments at present for this particular pier location. However, we have no comments with regard to foundations of other structural elements or approach embankments.

Comments related to dewatering during the foundation construction as discussed in our Foundation Report are applicable.

V. Korlu
Project Engineer

For: M. Devata
Supervising Engineer

cc: Mr. G.C. Burkhardt
Files
Record Services

Mr. C. S. Grabski,
Structural Design Engineer,
West Building.

Mr. W. Lin

G. C. E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street.

June 20, 1975.

Cawthra Road Underpass,
Site 24-191, W.P. 144-70-02,
Highway Q.E.W., District 6.

At the monthly progress meeting of June 11, 1975, considerable discussion took place concerning the use of caisson type foundations at the piers. The use of caissons was suggested due to the very restricted construction area at the centre pier.

The Consultant, McCormick, Rankin Associates has also suggested that due to the fact that the Q.E.W. will not be resurfaced at this stage, this type of construction would minimize damage to the existing pavement and therefore reduce or even eliminate the need for pavement patching in the high speed lanes.

We would appreciate your office giving some study to this method of construction in the event that it might have some merit at this particular site.

Mr. M. Devata of the Soils Mechanics Section, earlier, verbally expressed some support for utilizing this type of foundation as being a possible alternative to the conventional footing design. He indicated that the matter should be discussed at the preliminary design stage and a more definite recommendation could be made.

If this foundation type does have some merit would you please inform this office before it is incorporated in the design of the structure.

If a conventional footing proves to be a more viable solution we would like to indicate that the footing should be kept to the very minimum width possible in order that the excavation can be kept to a minimum.

DHBye

DHB:lm

D. H. Bye,
STRUCTURAL PLANNING SUPERVISOR,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

c.c. G. Calmins
C. P. Korzeniowski
M. Devata

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

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

From: G. C. E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street.

Attention:

Date: November 14, 1974.

Our File Ref.

In Reply To

Subject: Proposed Cawthra Road Underpass,
Site 24-191, W.P. 144-70-02,
Q.E.W., District 6.

An interchange has been proposed for the intersection of existing Cawthra Road and Q.E.W. Because of the interchange being constructed, the existing Cawthra Road Underpass structure will be replaced.

Preliminary details of the proposed structure and roadway alignment are indicated on the enclosed plans. These plans include:

Preliminary Site Plan (2 copies)
Preliminary Alignment Drawing (2 copies)
Proposed Profile - Cawthra Road (2 copies)
Site Photographs.

Existing structure drawings are available through the Structural Records Section under Site 24-191 or D-3609. These drawings detail the original soils investigation carried out in August 1955.

The new alignments have not been co-ordinated as yet, therefore the proposed footings are located in relation to the outside edge of the west sidewalk of the existing structure. As soon as the required data is available the boreholes can be co-ordinated.

Could you please prepare a Foundation Investigation Report of sufficient scope to facilitate the design of the proposed structure.

The current schedule calls for a completed Foundation Investigation by April 1, 1975.

The exact location of existing services at the site has not been determined as yet. There are however some existing services known to be in the vicinity. One is an 8"Ø watermain running parallel to the Q.E.W., 80 to 110 ft. south of the Q.E.W. centreline. The other services are on the west side of the existing structure; one being a watermain crossing the Q.E.W. approx. 80' west of the structure and

..... 2

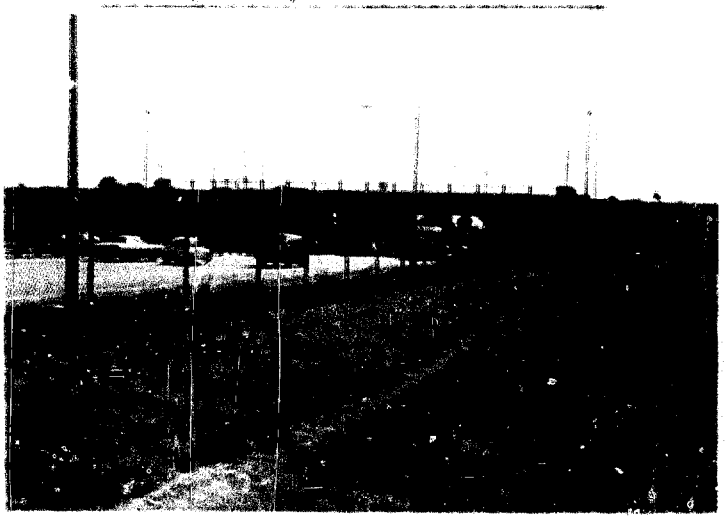
the other a gas main coming from the west, then turning north, 50 feet west of the structure. The exact location of these services should be established with the proper authority before drilling.

D. H. Bye,
STRUCTURAL PLANNING SUPERVISOR,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

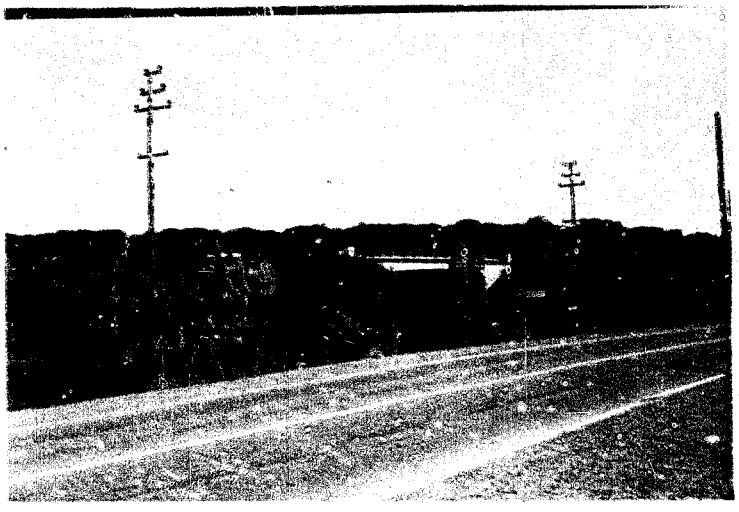
DHB:lm
Encl.

c.c. G. Celmins
R. Fitzgibbon
J. Anderson
J. Barclay

PROPOSED CANTERRA RD. UNDERPASS
SITE 24-191; W.P. 144-70-02
O.E.M., DISTRICT 6.



LOOKING WEST
TOWARDS EXISTING STRUCTURE



LOOKING SOUTH EAST
FROM NORTH SERVICE RD.

LOOKING NORTH EAST
FROM SOUTH SERVICE RD.