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DIST. 6 REGION _____

W.P. No. 36-74-02/03

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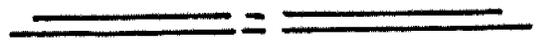
W. O. No. _____

STR. SITE No. 24-354

HWY. No. 403

LOCATION Matheson Blvd.

No of PAGES -



OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: _____



Memorandum

30M12-115
GEOCREC No.

Mr. G.C.E. Burkhardt (3)
Regional Structural Planning Engineer
Central Region
3501 Dufferin Street, Downsview
Attention:

From: Soil Mechanics Section
Geotechnical Office
West Building, Downsview

Date: April 22, 1976

MAY 04 1976

Our File Ref. W.P. 36-74-02/03

In Reply to

Subject:

FOUNDATION INVESTIGATION REPORT

For

W.P. 36-74-02/03

Site No. 24-354

Matheson Blvd. SB Overpass Bridge No. 60

Matheson Blvd. NB Overpass Bridge No. 59

Hwy. 403, District 6, Toronto

Attached we are forwarding to you our detailed Foundation Investigation Report on the subsoil conditions existing at the above mentioned site.

We believe that the factual data and recommendations contained therein will prove adequate for your requirements. Should additional information be required, please do not hesitate to contact our Office.

M. Devata, P. Eng.
Supervising Engineer

- cc: R.S. Pillar
- C.S. Grebski
- B.J. Giroux
- G.A. Wrong
- M.R. Ernesaks
- D. Gunter
- H. Greenland
- R. Hore
- J. Anderson)
- R. Fitzgibbon) memo only
- G. Sloan)
- Files ↓

FOUNDATION INVESTIGATION REPORT

for

W.P. 36-74-02/03

Site No. 24-354

Matheson Blvd. SB Overpass Bridge No. 60

Matheson Blvd. NB Overpass Bridge No. 59

Hwy. 403, District 6, Toronto

1. INTRODUCTION

This report contains results of foundation investigations carried out at the following sites:

W.P. 36-74-02 Matheson Blvd., West Bound Lanes Collector
Overpass (Bridge #60), Hwy. 403

W.P. 36-74-03 Matheson Blvd., East Bound Lanes Collector
Overpass (Bridge #59), Hwy. 403

Recommendations pertaining to the foundation design of the above mentioned two structures and the associated stability requirements of the approaches are also included in this report.

2. DESCRIPTION OF THE SITE AND GEOLOGY

The site is located between First Line East and Second Line East, 3/4 of a mile north of Eglinton Avenue West. The West Branch of the Little Etobicoke Creek passes approximately 1000 feet south of the site.

The topography of the area is flat to undulating. Physiographically, this area is known as the "Peel Plain". The characteristic deposit in the area under investigation is a shallow cohesive glacial till overburden underlain by shale bedrock.

3. FIELD AND LABORATORY WORK

During the course of investigation four sampled boreholes for each structure were carried out. The borings were carried out by means of a bombardier mounted hollow stem auger machine, adapted for soil sampling purposes.

Sampling in the overburden, where present, was done by driving a 2" O.D. split-spoon sampler at required depths in accordance with the specifications for

the Standard Penetration Test. In addition, BXL rock core samples were obtained of the bedrock.

Groundwater level observations were made in the open boreholes during the period of the investigation.

The soil and groundwater conditions encountered at the boring locations are presented in the Record of Borehole Sheets. The location and ground elevation of the various boreholes were surveyed in the field by personnel from Engineering Surveys of the Central Region, Toronto.

All the samples were subjected to a careful examination in the field and subsequently, in the laboratory. Following this examination, laboratory testing was carried out on selected representative samples to determine the various physical properties, namely:

- Atterberg Limits
- Natural Moisture Content
- Grain-Size Distribution

The results of the laboratory testing are presented on the Record of Borehole Sheets and summarized on Fig. 1-2 in the Appendix of this Report.

4. SUBSURFACE CONDITIONS

4.1 General

Borings carried out at the two structure sites indicates generally uniform subsurface conditions. The overburden consists of a thin layer of topsoil or a shallow deposit of cohesive glacial till. Underlying this is shale bedrock. The upper portion of the shale was found to be weathered. Boundaries between different deposits are shown on the Record of Borehole Sheets which are contained in the Appendix of this report. The location and elevations of the borings are shown on Drawing No. 367402 and 03-A. Estimated stratigraphical sections are shown also. A description of the soil types encountered at the site is as follows:

4.2 Overburden (Topsoil or Glacial Till)

The surficial deposit at the site consists of a thin layer of topsoil or a thin blanket of glacial till ranging in thickness from 1.5 feet to 6.0 feet. Generally, the glacial till stratum is a heterogeneous mixture of hard clayey silt, sand and gravel, with shale fragments.

4.2 Shale Bedrock

The shale bedrock was encountered immediately underneath the topsoil/glacial till across the site. The bedrock encountered at the boreholes is a dark grey thin bedded shale with minor thin limestone bands. The upper 4 to 10 feet of the bedrock is in a weathered condition. The bedrock surface varies between elevations 533 and 545.

The rock core samples were carefully examined by B. Glassford, Geologist, and the core logs are included in the Appendix of this report.

5. GROUNDWATER CONDITIONS

Groundwater level observations have been carried out during and after the period of investigation by recording the water level in the open boreholes. The results indicated that there was no water in the open boreholes.

6. DISCUSSION AND RECOMMENDATIONS

6.1 General

The planned eastwest extension of Matheson Blvd. will intersect the new Hwy. 403 in the City of Mississauga, Regional Municipality of Peel. At this intersection, Hwy. 403 will overpass Matheson Blvd. by means of four separate single span structures for the ultimate scheme. This report primarily concerns the following two structures.

<u>Structure & No.</u>	<u>Proposed Grade Matheson Blvd.</u>	<u>Proposed Grade Hwy. 403</u>	<u>Existing Grnd. Elevation</u>	<u>Max. Depth of Cut</u>
West Bound Lane Collector No. 60	525	546.5	544-548	21
East Bound Lane Collector No. 59	522	543.0	539-542	20

The subsoil at the site consists of a thin layer of topsoil or a shallow cover of glacial till ranging in thickness from 1.5 to 6.0 feet. The overburden is underlain by shale bedrock at approximate elevation 533 and elevation 545. The upper 4 to 10 feet is generally in a weathered condition.

In the subsections to follow the foundation support for the overpass structures will be discussed. In addition, the stability considerations associated with the approach cuts will be presented.

6.2 Structure Foundations

According to available information, the proposed structures will be single span rigid frame, with closed type abutments. The pertinent grades and other related information is mentioned elsewhere in this report.

The abutments for these two structures may be supported on spread footings located within the weathered shale or within the sound shale bedrock. For footings constructed on weathered shale an allowable bearing value of up to 5.0 t.s.f. may be used in designing the footings. If the footings are located within the sound shale bedrock, an allowable load of up to 10 t.s.f. may be used. A minimum of earth cover of 4 feet should be provided to the underside of the footings, since the shale is considered susceptible to frost action. The horizontal resistance of the footing may be computed using a coefficient of friction of 0.8 between the rough surface and the weathered or sound shale bedrock.

No dewatering problems are anticipated for the construction of abutment footings. Any minor seepage or surface runoff into the excavations can be handled by ordinary pumping methods. In order to minimize the depth of excavations for the abutment footings, it may be advantageous to carry out the cuts for Matheson Blvd. in this area prior to the construction of the structure foundations.

The settlement of the footings will be negligible in magnitude, provided that measures are taken to prevent the shale from being softened by groundwater seepage or uncontrolled surface runoff. It may be advantageous to protect the shale at the footing founding level by covering it with a lean concrete working slab immediately after the completion of the excavation.

As mentioned elsewhere, the structures at this location will be single span rigid frame type. A coefficient of earth pressure at rest (K_0) of 0.5 should be assumed for the granular back fill placed behind the wall when designing the abutments. In order to relieve the building of excess hydrostatic pressure behind the walls, suitable drainage measures should be provided. This can be accomplished by providing suitable weep holes sloping down from the open face of the abutment wall in accordance with current M.T.C. Standards.

6.3 Approaches

The approach cuts for the structures at Matheson Blvd. and new Hwy. 403 up to 21 ft. deep, will be made through the cohesive glacial till overburden and into the weathered and sound shale bedrock.

According to experience gained by District Construction personnel from the construction of the 427-Q.E.W. interchange, the shale, once it is exposed to the atmosphere, appeared to be susceptible to weathering and erosion. The shale bedrock encountered at the proposed structure site is of the same formation as that of the shale existing at the 427-Q.E.W. interchange. Therefore, it is recommended that the cuts through the shale bedrock be treated as earth cuts and be constructed with 2:1 slopes. It is further recommended that the cut slopes be protected with an adequate cover of topsoil and sodded.

7. MISCELLANEOUS

The field investigation was carried out during November 27, 1975 to December 4, 1975 under the supervision of Mr. V. Korlu, Project Engineer, who also prepared this report.

The equipment was provided and operated by Johnston Drilling Company of Toronto.

This report was reviewed by Mr. M. Devata, Supervising Engineer.

V. Korlu
V. Korlu, P. Eng.
Project Engineer

M. Devata
M. Devata, P. Eng.
Supervising Engineer



April, 1976

APPENDIX

RECORD OF BOREHOLE NO 1

WP 36-74-02/03 LOCATION Co-ords. 15,852,964 N; 960,697 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE November 27, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY MJ

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_p	W	W_L		
544.2	Ground Level															
1.5	Topsoil															
	Weathered		1	SS	100%	540										
533.2				2	SS	100%	533.2									
11.0	Sound		3	BXL	Rec 80%	530										
				4	BXL	Rec 40%										
	Shale Bedrock with limestone bands		5	BXL	Rec 100%	520										
516.2				6	BXL	Rec 100%										
28.0	End of Borehole					510										

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 36-74-02/03 LOCATION Co-ords. 15,853,020 N; 960,640 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE November 28, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY W.D.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_P	W	W_L		
548.1	Ground Level															
	Topsoil	[Hatched Box]														
1.5	Weathered	[Hatched Box]	1	SS	100	1"										
539.0	Shale	[Hatched Box]	2	SS	100	1"										
9.1	End of Borehole															
						530										

20
15 \diamond 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 3

WP 36-74-02/03 LOCATION Co-ords. 15,853,023 N; 960,775 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY M.T.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT W_L PLASTIC LIMIT W_p WATER CONTENT W			UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_p	W	W_L		
544.5	Ground Level															
	Topsoil															
1.5	Weathered															
539.5	Shale Sound		1	SS	102											
5.0																
536.4			2	SS	100, 1"											
8.1	End of Borehole															
						540										
						530										

OFFICE REPORT ON SOIL EXPLORATION

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

RECORD OF BOREHOLE NO 4

WP 36-74-02/03 LOCATION Co-ords. 15,853,080 N; 960,723 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE November 28, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY M.S.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS		
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L			WATER CONTENT %	% GR SA SI CL
546.1	Ground Level																	
	Topsoil																	
1.5	Weathered		1	SS	100%	540												
537.1																		
9.0	Sound Shale Bedrock with limestone bands		2	BXL	Rec 100%	530												
					3	BXL	Rec 100%	530										
					4	BXL	Rec 100%	520										
517.1			5	BXL	Rec 100%	520												
29.0	End of Borehole					510												

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 5

WP 36-74-02/03 LOCATION Co-ords. 15,853,174 N; 960,970 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY M.S.

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS	
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L			10
540.4	Ground Level					540											
	Topsoil																
1.5	Weathered		1	SS	91												
530.4			2	SS	100	1"	530										
10.0	Sound		3	BXL	Rec 100%												
			4	BXL	Rec 80%												
	Shale Bedrock with limestone bands		5	BXL	Rec 80%	520											
			6	BXL	Rec 95%												
510.4	End of Borehole					510											
30.0																	

OFFICE REPORT ON OIL EXPLORATION

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 6

WP 36-74-02/03 LOCATION Co-ords. 15,853,030 N; 960,930 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY U.S.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	W% VALUES		20	40	60	80	100	W_P	W	W_L		
542.0	Ground Level															
	Topsoil															
1.5	Weathered Shale					540										
537.0																
5.0	End of Borehole					530										

OFFICE REPORT ON SOIL EXPLORATION

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 8

WP 36-74-02/03 LOCATION Co-ords. 15,853,280 N; 960,997 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY H.T.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_P	W		
541.9	Ground Level														
540.4	Topsoil														
1.5	Het. mix. of clayey silts sa. & grav., with shale frags. Glac. Till. Hard		1	SS	67										
536.4			2	SS	100										
533.9	weathered														
8.0	Sound		3	BXL	Rec 70%										
	Shale Bedrock with limestone bands		4	BXL	Rec 65%										
		5	BXL	Rec 70%											
		6	BXL	Rec 100%											
		7	BXL	Rec 100%											
513.9															
28.0	End of Borehole														

OFFICE REPORT ON SOIL EXPLORATION



Ministry of
Transportation and
Communications

DIAMOND DRILL RECORD

HOLE NO. _____ SHEET NO. _____

PROPERTY LOCATION W.P. 36-74-03

 LATITUDE _____
 DEPARTURE _____
 BEARING _____

DIP
90°

 TOTAL FOOTAGE _____

ELEV. COLLAR _____
 DATUM _____
 DATE STARTED _____
 DATE COMPLETED _____
 DRILLED BY _____
 LOGGED BY _____

FOOTAGE		FORMATION	SAMPLE NUMBER	% Shale	REMARKS
FROM	TO				
		HOLE #5			
10'0"	20'0"	Shale, dark grey colour, fine texture, soft, fissile		75%	6" limestone @ 13'2" med. hard 3" limestone @ 14'6" med. hard 2" limestone @ 15'0" med. hard 2" limestone @ 19'0" med. hard
		HOLE #5			
20'0"	30'0"	Shale, dark grey colour, fine texture, soft, fissile		90%	3" limestone @ 29'9" med. hard
		HOLE #8			
8'0"	28'8"	Shale, dark grey colour, fine texture, soft, fissile		70%	6" limestone @ 8'0" med. hard 6" limestone @ 9'6" med. hard 4" limestone @ 10'4" med. hard 5" limestone @ 18'6" med. hard 3" limestone @ 19'8" med. hard 2" limestone @ 25'0" med. hard

DATE OF EXAMINATION April 14/76

B. K. Glässford, Geologist.

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTPENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TERMS TO BE USED IN DESCRIBING SOILS :-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.T.	SLOTTED TUBE SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE

P.H. SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V.	FIELD VANE
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

ABBREVIATIONS & SYMBOLS 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
w_s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_c	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
T_v	TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

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

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

GENERAL

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

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

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

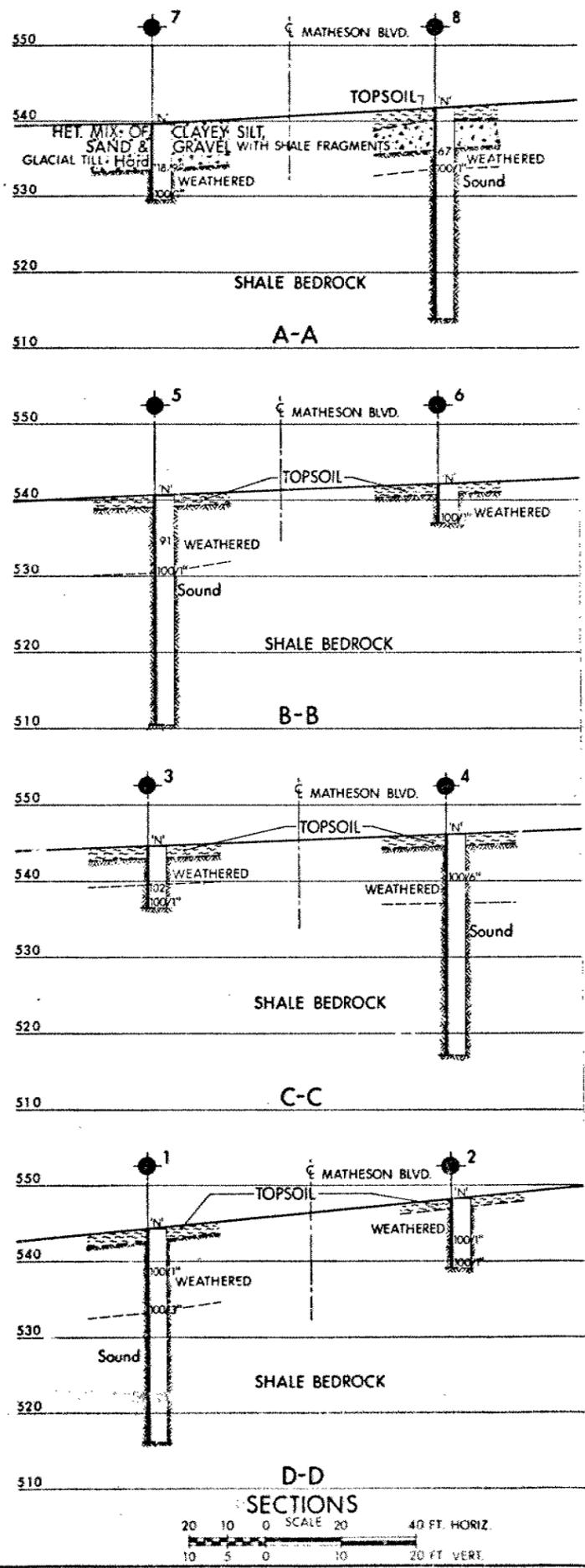
FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

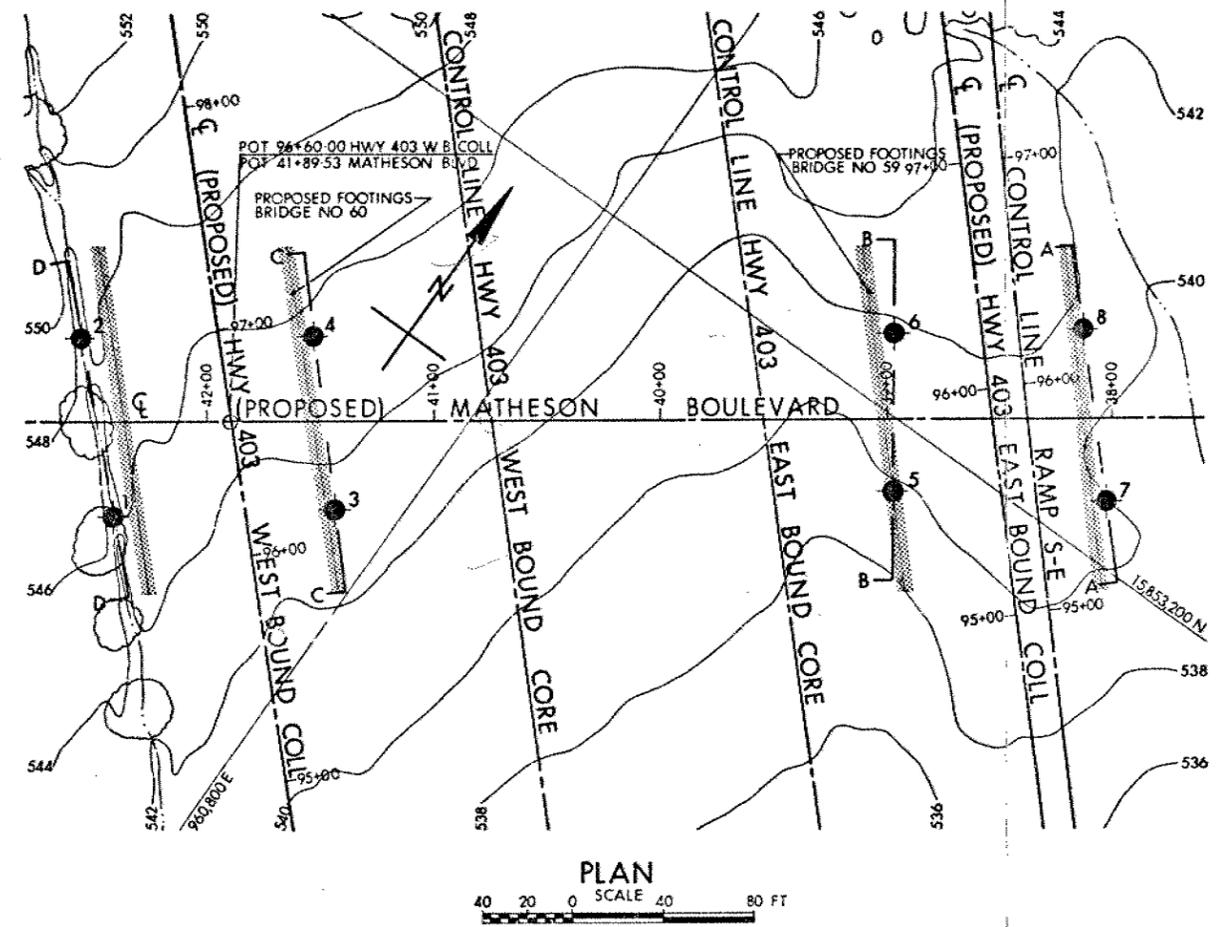
SLOPES

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

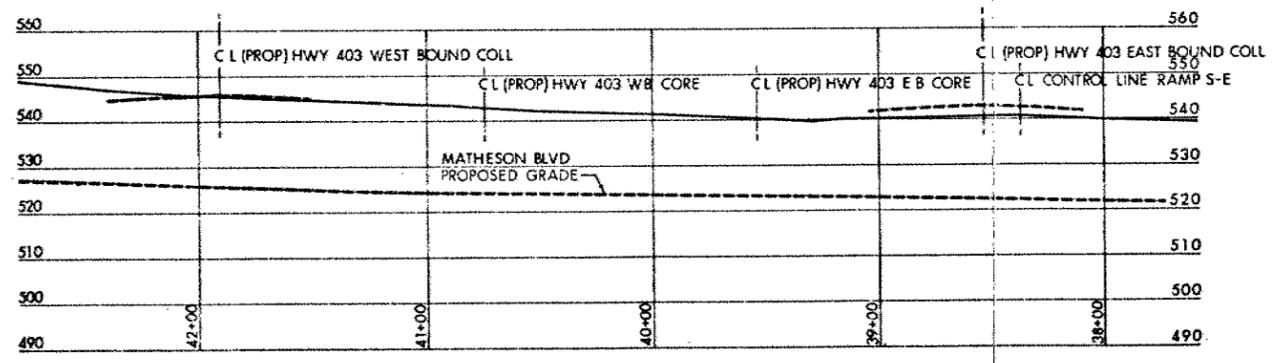
FF-A-24(b) (Rev Jan 73)



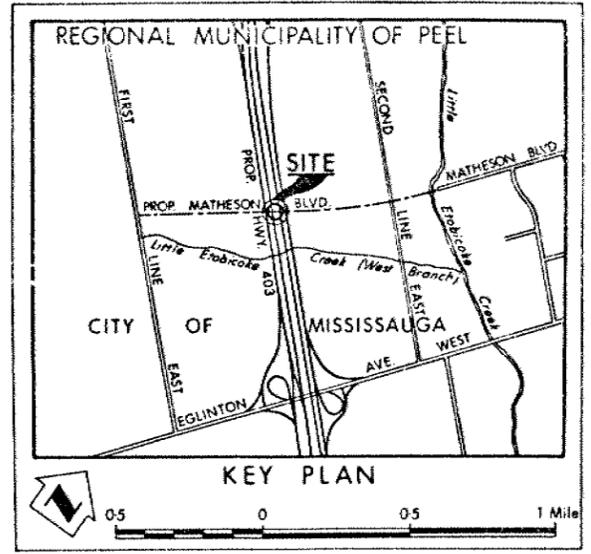
SECTIONS
SCALE 40 FT. HORIZ
20 10 0 20
10 5 0 10 20 FT. VERT.



PLAN
SCALE 40 80 FT



PROFILE - MATHESON BLVD
SCALE 40 80 FT HORIZ
20 10 0 20 40 FT VERT



LEGEND

- Bore Hole
- ⊕ Dynamic Cone Penetration Resistance Test
B/F CONE - Blows/Ft. Cone Test (350 lbs energy/blow)
- ⊕ Bore Hole & Cone Test
- ⊕ Water Levels established at time
of field investigation, NOV. 27, 28 &
DEC. 1, 1975

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	544.2	15,852,964	960,697'
2	548.1	15,853,020	960,640
3	544.5	15,853,023	960,775
4	546.1	15,853,080	960,723
5	540.4	15,853,174	960,970
6	542.0	15,853,230	960,930
7	539.6	15,853,225	961,050
8	541.9	15,853,280	960,997

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

REVISIONS	DATE	BY	DESCRIPTION

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

MATHESON BOULEVARD
(STRUCTURES NO. 59 AND NO. 60)

HIGHWAY NO. PROP. 403 DIST. NO. 6
REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA LOT _____ CON _____

BORE HOLE LOCATIONS & SOIL STRATA

SUBMITTED BY: V.K. [CHECKED] WP NO. 36-74-02 & 03
DRAWN BY: N.T. [CHECKED] WE NO. 367402 & 03-A
DATE: April 21, 1976 SITE NO. 24-354 BRIDGE DRAWING NO. _____
APPROVED: _____ CONF. NO. _____



REF. ENCO NO. 6536-18T

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

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

July 20, 1976

#W.P. 36-74-02/03

Re: Hwy. 403 EB/WB at Matheson Blvd.
Bridge No's. 61 and 62
W.P. 36-74-02/03, Site 24-354C/D
District 6, Toronto

We reviewed the preliminary bridge plan drawings 24-354C/D-P1 for the above mentioned structures and herebelow are our comments.

It should be noted that previously eight boreholes were carried out at this site for the location of the footings of structures No. 59 and 60 which are about 50 ft. east and west from the designated location of structures No. 61 and 62. The subsoil observations in this vicinity indicate that the bedrock surface is about 1.5 ft. to 6 ft. below the ground level. We believe that the subsoil information obtained from these boreholes is sufficient and pertinent to the foundation of the new structure footing. Otherwise, we have no comments for the present.

V. Korlu
Project Engineer

For: M. Devata
Supervising Engineer

cc: Files
Record Services ✓

INDEX

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	W.P. 36-74-03 Hwy. 403 E.B. at Matheson Blvd. Bridge #61
	W.P. 36-74-02 Hwy. 403 W.B. at Matheson Blvd. Bridge #62
	W.P. 36-74-04 Little Etobicoke Creek Culvert (West Branch)

NOTE For purposes of the contract these reports supercede all other foundation reports prepared by or for the Ministry in connection with the above mentioned projects.



ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TERMS TO BE USED IN DESCRIBING SOILS:-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC

TYPE OF SAMPLE

S.S	SPLIT SPOON	T.W	THINWALL OPEN
W.S	WASHED SAMPLE	T.P	THINWALL PISTON
S.T	SLOTTED TUBE SAMPLE	O.S	OESTERBERG SAMPLE
A.S	AUGER SAMPLE	F.S	FOIL SAMPLE
C.S	CHUNK SAMPLE	R.C	ROCK CORE

P.H SAMPLE ADVANCED HYDRAULICALLY

P.M SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V	FIELD VANE
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

FF-A-24(b) (Rev. Jan. 73)

ABBREVIATIONS & SYMBOLS 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
- w_s SHRINKAGE LIMIT
- I_L LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
- I_c CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
- e_{max} VOID RATIO IN LOOSEST STATE
- e_{min} VOID RATIO IN DENSEST STATE
- I_D DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
RELATIVE DENSITY D_r IS ALSO USED
- h HYDRAULIC HEAD OR POTENTIAL
- q RATE OF DISCHARGE
- v VELOCITY OF FLOW
- i HYDRAULIC GRADIENT
- k COEFFICIENT OF PERMEABILITY
- j SEEPAGE FORCE PER UNIT VOLUME
- m_v COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
- c_v COEFFICIENT OF CONSOLIDATION
- C_c COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
- T_v TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
- U DEGREE OF CONSOLIDATION
- τ_f SHEAR STRENGTH
- c' EFFECTIVE COHESION INTERCEPT
- ϕ' EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
- c_u APPARENT COHESION
- ϕ_u APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
- μ COEFFICIENT OF FRICTION
- S_f SENSITIVITY

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

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

GENERAL

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

STRESS AND STRAIN

- u PORE PRESSURE
- σ NORMAL STRESS
- σ' NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
- τ SHEAR STRESS
- ϵ LINEAR STRAIN
- γ SHEAR STRAIN
- ν POISSON'S RATIO (μ IS ALSO USED)
- E MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
- G MODULUS OF SHEAR DEFORMATION
- K MODULUS OF COMPRESSIBILITY
- η COEFFICIENT OF VISCOSITY

EARTH PRESSURE

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

FOUNDATIONS

- B BREADTH OF FOUNDATION
- L LENGTH OF FOUNDATION
- D DEPTH OF FOUNDATION BENEATH GROUND
- N DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
- k_s MODULUS OF SUBGRADE REACTION

SLOPES

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

FOUNDATION INVESTIGATION REPORT

For

Hwy. 403 E.B. at Matheson Blvd., Bridge #61
W.P. 36-74-03, Site 24-354C

Hwy. 403 W.B. at Matheson Blvd., Bridge #62
W.P. 36-74-02, Site 24-354D
District 6, Toronto

INTRODUCTION

This report contains the results of a foundation investigation carried out at the sites of the above mentioned projects. The fieldwork was carried out during the period of November 27 to December 4, 1975, utilizing a track mounted auger machine equipped with hollow stem augers. The field investigation consisted of a total of eight sampled boreholes to depths ranging from 5 to 30 feet below the ground surface. BXL size rock core samples were obtained to prove bedrock.

DESCRIPTION OF THE SITE AND GEOLOGY

The site is located between First Line East and Second Line East, 3/4 of a mile north of Eglinton Avenue West. The West Branch of the Little Etobicoke Creek passes approximately 1000 feet south of the site.

The topography of the area is flat to undulating. Physiographically, this area is known as the "Peel Plain". The characteristic deposit in the area under investigation is a shallow cohesive glacial till overburden underlain by shale bedrock.

SUBSURFACE CONDITIONS

General

The overburden at the sites consists of a thin layer of topsoil or a shallow deposit of cohesive glacial till. Underlying this is shale bedrock. The estimated stratigraphical sections, together with locations and elevations of the borings are shown on Drawing No's. 24-354C-2 and 24-354D-2 of the Contract Drawings. A description of the soil types and bedrock encountered at the site is as follows.

Overburden (Topsoil or Glacial Till)

The surficial deposit at the site consists of a thin layer of topsoil or a thin blanket of glacial till ranging in thickness from 1.5 feet to 6.0 feet.

Generally, the glacial till stratum is a heterogeneous mixture of hard clayey silt, sand and gravel, with shale fragments.

Shale Bedrock

The shale bedrock was encountered immediately underneath the topsoil/glacial till across the site. The bedrock encountered is a dark grey thin bedded shale with limestone bands. The upper 4 to 10 feet of the bedrock is in a weathered condition. The bedrock surface varies between elevations 533 and 545.

GROUNDWATER CONDITIONS

Groundwater level observations have been carried out during and after the period of investigation by recording the water level in the open boreholes. The results indicated that there was no water in the open boreholes.

B. Ly
B. Ly, P. Eng.
Senior Engineer



M. Devata
M. Devata, P. Eng.
Supervising Engineer

MD/BL/gs
February, 1977

APPENDIX

RECORD OF BOREHOLE NO 2

WP 36-74-02/03 LOCATION Co-ords. 15,853,020 N; 960,640 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE November 28, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY P.S.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p		UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	WATER CONTENT w		
548.1	Ground Level													
1.5	Topsoil													
	Weathered													
539.0	Shale		1	SS	100, 1"									
			2	SS	100, 1"	540								
9.1	End of Borehole													
						530								

20
15 ϕ 5 % STRAIN AT FAILURE
10

SOURCE: MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

RECORD OF BOREHOLE No 3

WP 36-74-02/03 LOCATION Co-ords. 15,853,023 N; 960,775 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY J.T.

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w		UNIT WEIGHT γ	REMARKS	
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p			w
544.5	Ground Level														
	Topsoil														
1.5	Weathered														
539.5						540									
3.0	Shale Sound		1	SS	102										
536.4			2	SS	100, 1"										
8.1	End of Borehole														
						530									

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 4

WP 36-74-02/03 LOCATION Co-ords. 15,853,080 N: 960,723 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE November 28, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY H.T.

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w		UNIT WEIGHT γ	REMARKS	
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	WATER CONTENT % w_p — w — w_L				
546.1	Ground Level															
	Topsoil															
1.5	Weathered	[Hatched Pattern]	1	SS	100	540										
537.1																
9.0	Sound Shale Bedrock with limestone bands	[Hatched Pattern]	2	BXL	Rec 100%											
			3	BXL	Rec 100%	530										
			4	BXL	Rec 100%											
			5	BXL	Rec 100%	520										
517.1	End of Borehole															
29.0						510										

20
15 ϕ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 5

WP 36-74-02/03 LOCATION Co-ords. 15,853,174 N; 960,970 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY HT

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			UNIT WEIGHT γ	REMARKS	
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		VALUES	20	40	60	80	100	w_p			w
540.4	Ground Level														
1.5	Topsoil														
530.4	Weathered	[Hatched]	1	SS	91										
10.0			2	SS	100	1"									
	Sound	[Hatched]		BXL	100%										
			3	BXL	100%										
	Shale Bedrock with limestone bands	[Hatched]	4	BXL	80%										
			5	BXL	80%										
510.4	End of Borehole	[Hatched]													
30.0			6	BXL	95%										

20
15 ϕ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 7

WP 36-74-02/03 LOCATION Co-ords. 15,853,225 N; 961,050 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY LL

SOIL PROFILE		STRAT. PLCT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	SHEAR STRENGTH w_p w w_L WATER CONTENT %				
0.0	Ground Level															
533.6	Her. mix. of clayey silt, sand & gravel Glacial Till Hard with shale fragments		1		SS 118.9"											
6.0 529.5	Weathered Shale		2		SS 106.1"											
10.1	End of Borehole															

20
15 \diamond 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 8

WP 36-74-02/03 LOCATION Co-ords. 15,853,280 N; 960,997 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 1, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME (5.1) M.V.H.S. CHECKED BY J.T.

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT PLASTIC LIMIT			UNIT WEIGHT γ	REMARKS
			NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W _L	W _P	W		
541.9	Ground Level															
540.4	Topsoil					540										
1.5	Het. mix. of clayey silts, sa. & gray, with shale frags. Glac. Till. Hard		1	SS	67											
536.4			2	SS	100											
533.9	weathered		3	BXL	70%	530										
8.0	Sound		4	BXL	Rec 65%											
	Shale Bedrock with limestone bands		5	BXL	Rec 70%											
			6	BXL	Rec 100%	520										
			7	BXL	Rec 100%											
513.9																
28.0	End of Borehole					510										

OFFICE REPORT ON SOIL EXPLORATION

20
15 ϕ 5 % STRAIN AT FAILURE
10

FOUNDATION INVESTIGATION REPORT

For

Little Etobicoke Creek Culvert (West Branch)
W.P. 36-74-04, Hwy. 403
District 6, Toronto

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project. The fieldwork was carried out during the period of December 4 to December 5, 1975, utilizing a track mounted auger machine equipped with hollow stem augers. The field investigation consisted of a total of five sampled boreholes to depths ranging from 11.5 to 16.5 feet below the ground surface.

DESCRIPTION OF THE SITE AND GEOLOGY

The site is located between the First and Second Line East, about $\frac{1}{2}$ miles north of Eglinton Avenue West in the City of Mississauga, Regional Municipality of Peel.

The topography of the area is flat to undulating. Physiographically, the area is known as the "Peel Plain". The characteristic deposit in the area under investigation is a cohesive glacial till of variable thickness. Often the till deposit is underlain by a granular deposit. The underlying bedrock in this area is known to be shale.

SUBSURFACE CONDITIONS

General

The predominant stratum across the site is a deposit of glacial till consisting of a heterogeneous mixture of clayey silt, sand and gravel. The cohesive glacial till is underlain by a granular deposit of silt to silty sand. The overburden was investigated to a depth of 16.5 feet below the ground level.

The inferred stratigraphical profile, together with elevations and locations of the borings, are shown on Drawing No. 367404-A of the Contract Drawings. From ground surface downward, the various soil types encountered are as follows.

Heterogeneous Mixture of Clayey Silt, Sand and Gravel - (Glacial Till)

This is the predominant stratum across the site. The material is mainly a heterogeneous mixture of clayey silt, sand and gravel of glacial origin. The soil samples were tested for Atterberg Limits and Natural Moisture Contents. The results which are shown on the Record of Borehole Sheets and on the Plasticity Chart (Fig. 1) are tabulated below.

	<u>Range</u>
Liquid Limit (W_L) %	16-28
Plastic Limit (W_P) %	10-16
Natural Moisture Content (W) %	6-13

Based on the above values it is estimated that the matrix of the glacial till is inorganic and of low plasticity.

The grain size distribution curves for samples of the cohesive deposit are shown in an envelope form on Fig. 2 in the Appendix.

The results of Standard Penetration Tests gave 'N' values ranging from 15 to 93 blows per foot, generally increasing with depth. It is estimated that the cohesive glacial till deposit has a consistency ranging from very stiff to hard.

Silt to Silty Sand

This granular deposit was found underlying the glacial till stratum. The composition of the granular deposit varied from silt to silty sand. The grain size distribution curves for samples of this granular deposit are shown on Fig. 3 in the Appendix.

The 'N' values obtained from Standard Penetration Tests ranged from 42 to over 100 blows per foot. The relative density of this deposit is estimated to be dense to very dense.

GROUNDWATER CONDITIONS

Groundwater level observations were carried out during the period of the field investigation by measuring the water levels in the open boreholes. The results are summarized as follows.

<u>B.H. No.</u>	<u>Ground Elevation</u>	<u>Groundwater Elevation</u>
1	499.2	499.2
2	500.0	494.0
3	496.0	494.0
4	495.0	495.0
5	493.5	493.5

Bim Ly

B. Ly, P. Eng.
Senior Engineer



M. Devata
M. Devata, P. Eng.
Supervising Engineer

MD/BL/gs
February, 1977

APPENDIX

RECORD OF BOREHOLE NO 1

WP 36-74-04 LOCATION Co-ords. 15,851,390 N; 962, 116 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 4, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME M.V.H.S. CHECKED BY [Signature]

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
499.2	Ground Level															
0.0	Het. mix of clayey silt, sand and gravel Glacial Till	[Strat. Plot]	1	SS	15											6 39 42 13
487.7	Very Stiff to Hard		2	SS	43	490										3 30 61 6
11.5	End of Borehole															

20
15 \diamond 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 2

WP 36-74-04 LOCATION Co-ords. 15,851,508 N; 962,186 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 4, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME M.V.H.S. CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS				
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		'N' VALUES	20	40	60	80	100	w_p	w			w_L	GR	SA	SI
500.0	Ground Level																		
0.0	Het. mix. of clayey silt, sand & gravel Glacial Till		1	SS	49													9 24 45 22	
	Hard																		
488.0				2	SS	81													21 30 37 12
12.0	Silty Sand																		
483.5	Very Dense		3	SS	56													0 61 35 4	
16.5	End of Borehole																		

20
15 ϕ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 3

WP 36-74-04 LOCATION Co-ords. 15,851,638 N; 962,259 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 5, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME M.V.H.S. CHECKED BY [Signature]

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES		20	40	60	80	100	SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			
496.0	Ground Level														
0.0	Het. mix. of clayey silt, sand & gravel Glacial Till	[Pattern]	1	SS	20	490									4 30 48 18
484.0	Very Stiff to Hard	[Pattern]	2	SS	93										
12.0	Silty Sand	[Pattern]													
479.5	Very Dense	[Pattern]	3	SS	165/8"	480									0 88 (12)
16.5	End of Borehole														

OFFICE REPORT ON SOIL EXPLORATION

20
15 \diamond 5 % STRAIN AT FAILURE
10

RECORD OF BOREHOLE NO 4

W.P. 36-74-04 LOCATION Co-ords. 15,851,769 N; 962,334 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE December 5, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE CME M.V.H.S. CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			GROUND WATER LEVEL	DYNAMIC CONE PENETRATION RESISTANCE PLOT		LIQUID LIMIT w_L		UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		'N' VALUES	20 40 60 80 100	PLASTIC LIMIT w_p	WATER CONTENT w		
							SHEAR STRENGTH		WATER CONTENT %		
							○ UNCONFINED + FIELD VANE	w_p — w — w_L	10 20 30		% GR SA SI CL
							● QUICK TRIAXIAL x LAB VANE				
495.0	Ground Level										
0.0	Het. mix. of clayey silt, sand & gravel										
	Glacial Till		1	SS	27	490					4 31 50 15
	Very Stiff to Hard										
483.0			2	SS	61						5 20 69 6
12.0	Silt to sandy silt										
478.5	Very Dense		3	SS	133	480					0 10 88 2
16.5	End of Borehole										

20
 15 \diamond 5 % STRAIN AT FAILURE
 10

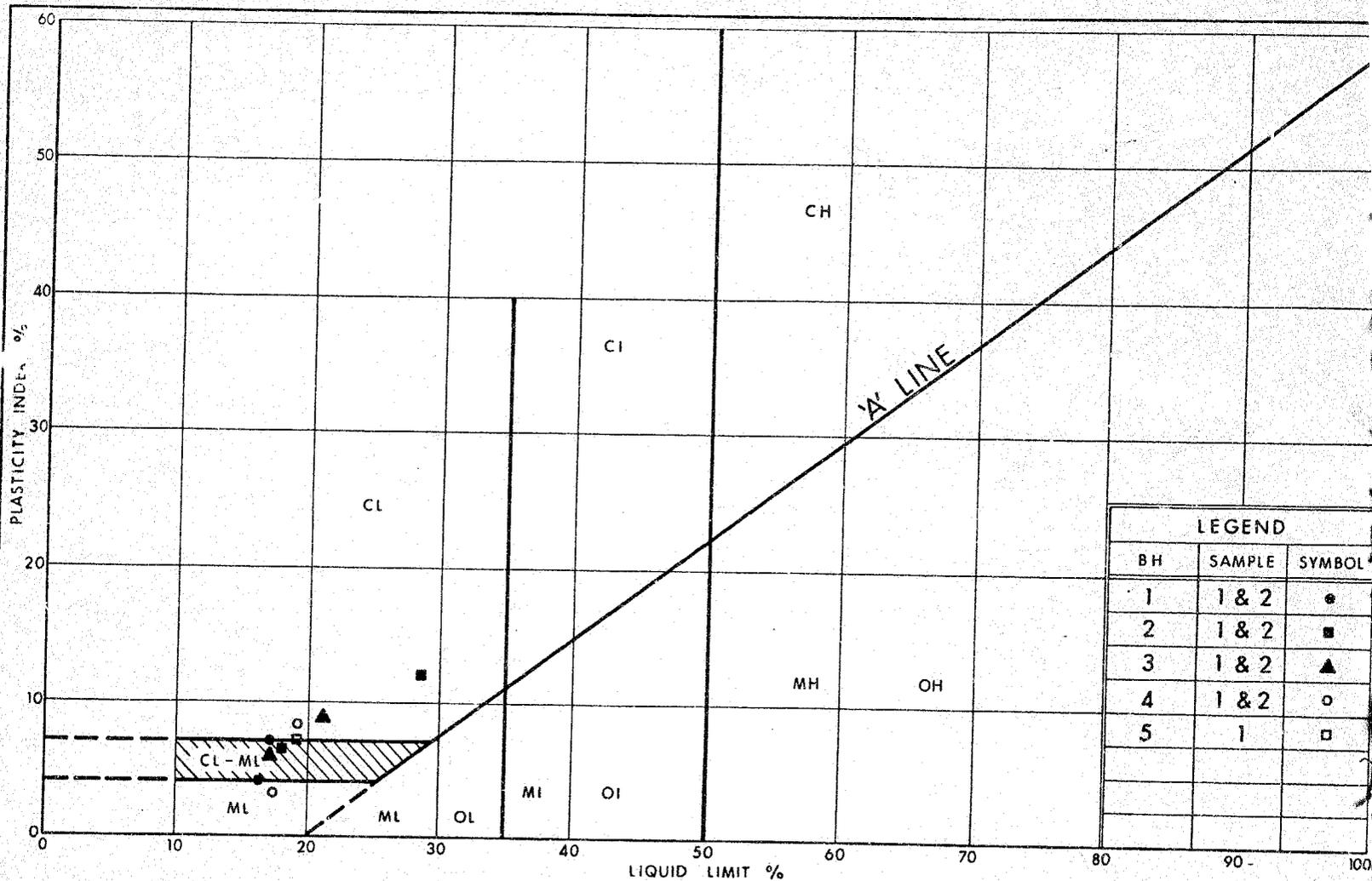
MINISTRY OF TRANSPORT AND COMMUNICATIONS-ONTARIO

RECORD OF BOREHOLE NO 5

WP 36-74-04 LOCATION Co-ords. 15,851,902 N; 962,412 E. ORIGINATED BY VK
 DIST 6 H.VY 403 BORING DATE December 5, 1975 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE OME M.V.H.S. CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		N' VALUES	20	40	60	80	100	w_p	w		
493.5	Ground Level														
0.0	Het. mix. of clayey silt, sand & gravel Glacial Till Very Stiff	[Strat. Plot]	1	SS	19										3 35 50 12
484.5															
9.0	Silty sand, some gravel Dense	[Strat. Plot]	2	SS	42										
482.0															
11.5	End of Borehole														

20
15 \diamond 5 % STRAIN AT FAILURE
10



LEGEND		
BH	SAMPLE	SYMBOL
1	1 & 2	●
2	1 & 2	■
3	1 & 2	▲
4	1 & 2	○
5	1	□

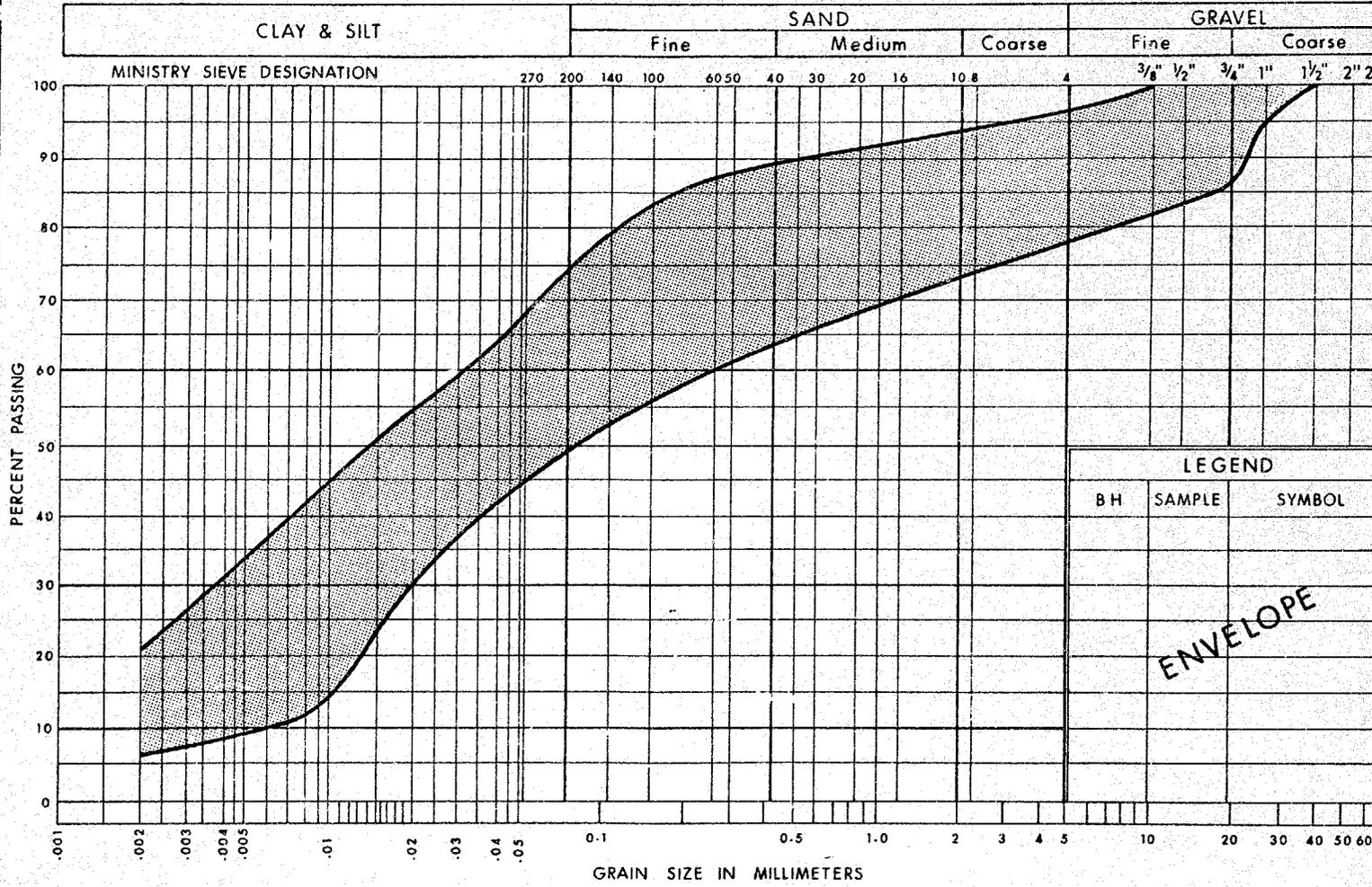


Ministry of
Transportation and
Communications

PLASTICITY CHART
HET. MIXTURE OF
CLAYEY SILT, SAND & GRAVEL (Glacial Till)

FIG No 1
WP 36-74-04

UNIFIED SOIL CLASSIFICATION SYSTEM



LEGEND

BH	SAMPLE	SYMBOL

ENVELOPE

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT

SAND

GRAVEL

Fine

Medium

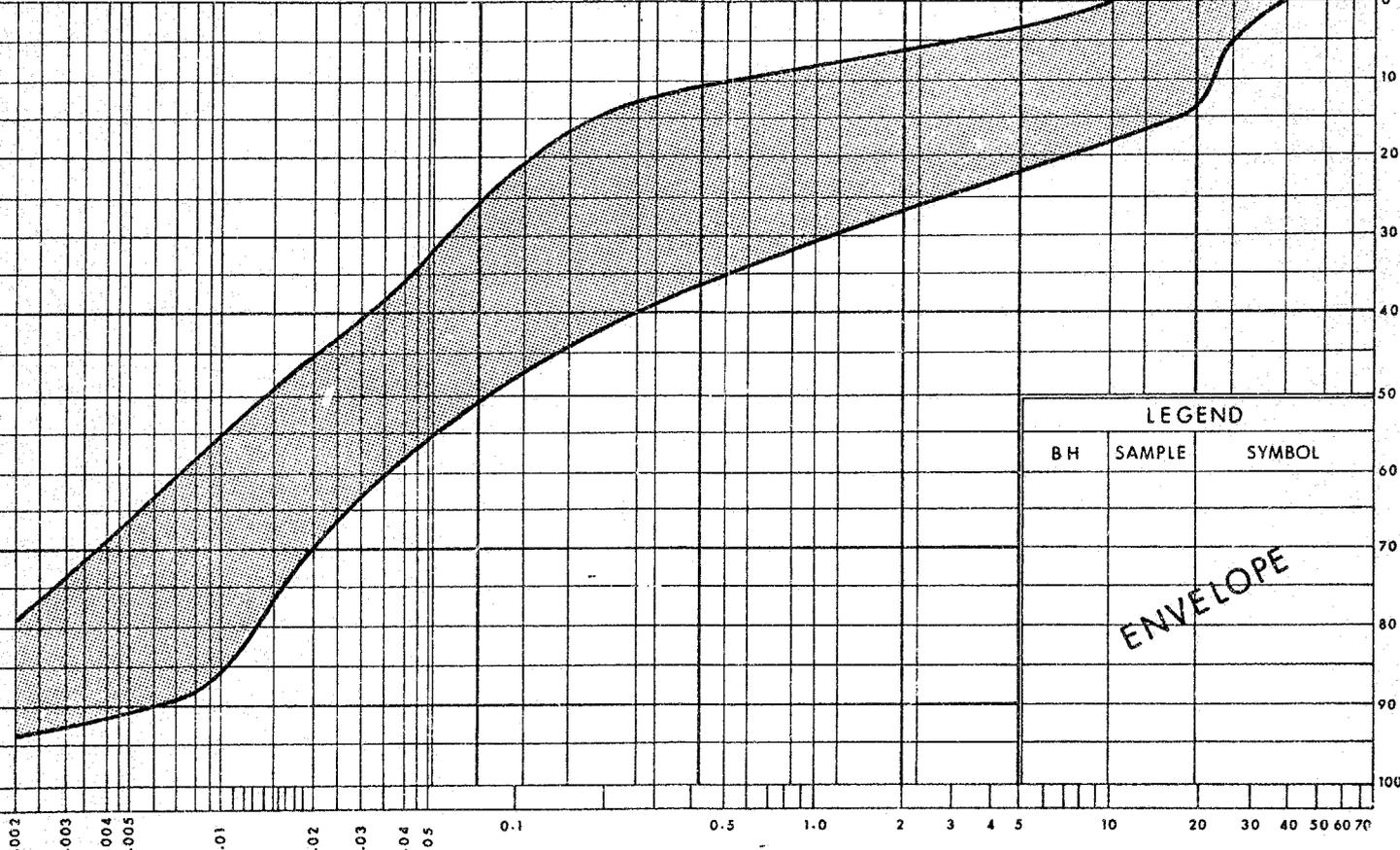
Coarse

Fine

Coarse

MINISTRY SIEVE DESIGNATION

270 200 140 100 60 50 40 30 20 16 10 8 4 3/8" 1/2" 3/4" 1" 1 1/2" 2" 2 1/2" 3"



PERCENT RETAINED

LEGEND

BH	SAMPLE	SYMBOL

ENVELOPE

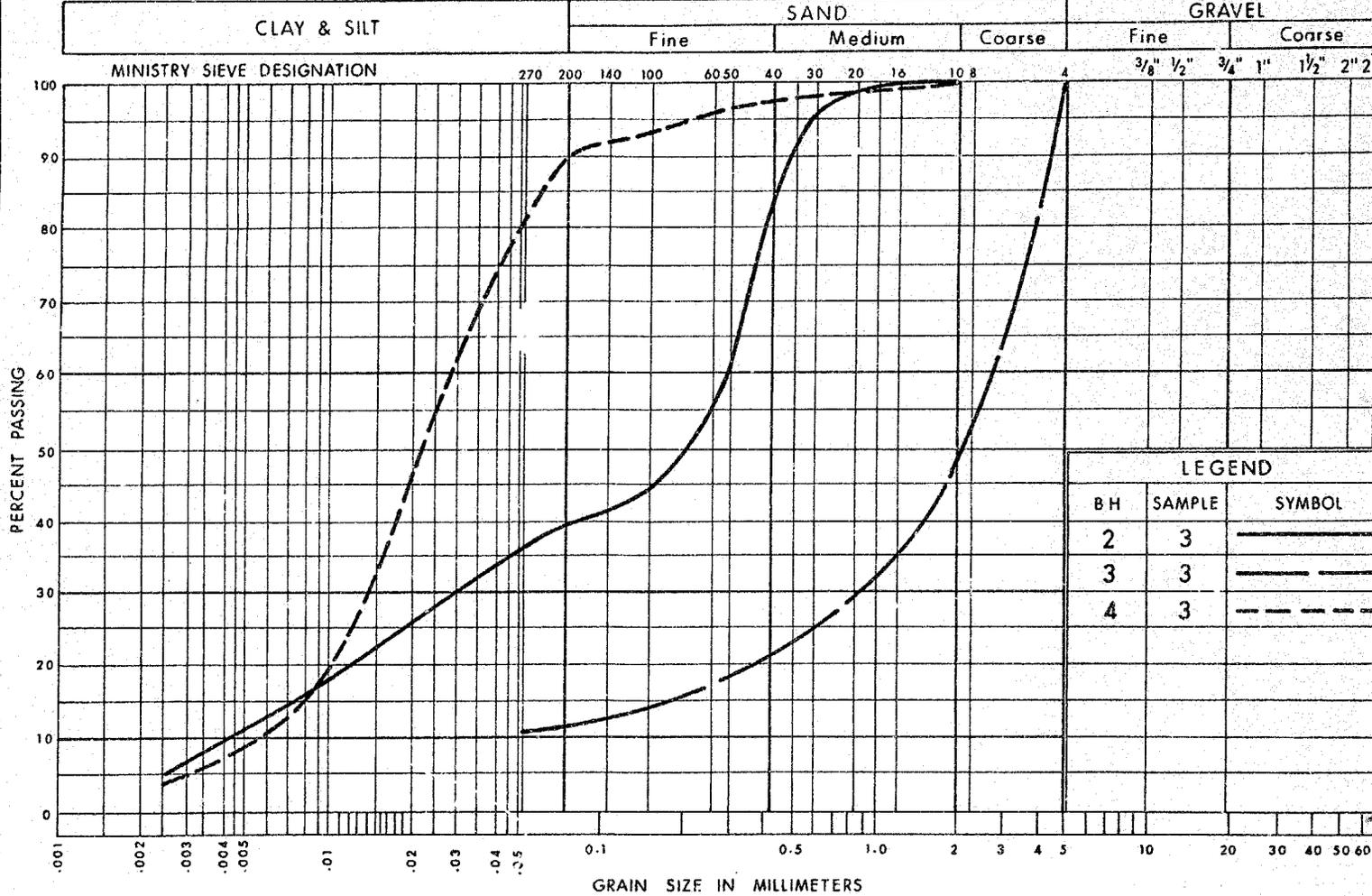
GRAIN SIZE IN MILLIMETERS

Ministry of
Transportation and
Communications

GRAIN SIZE DISTRIBUTION
HET. MIXTURE OF
CLAYEY SILT, SAND & GRAVEL (Glacial Till)

FIG No 2
W P 36-74-04

UNIFIED SOIL CLASSIFICATION SYSTEM



UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT

SAND

GRAVEL

Fine

Medium

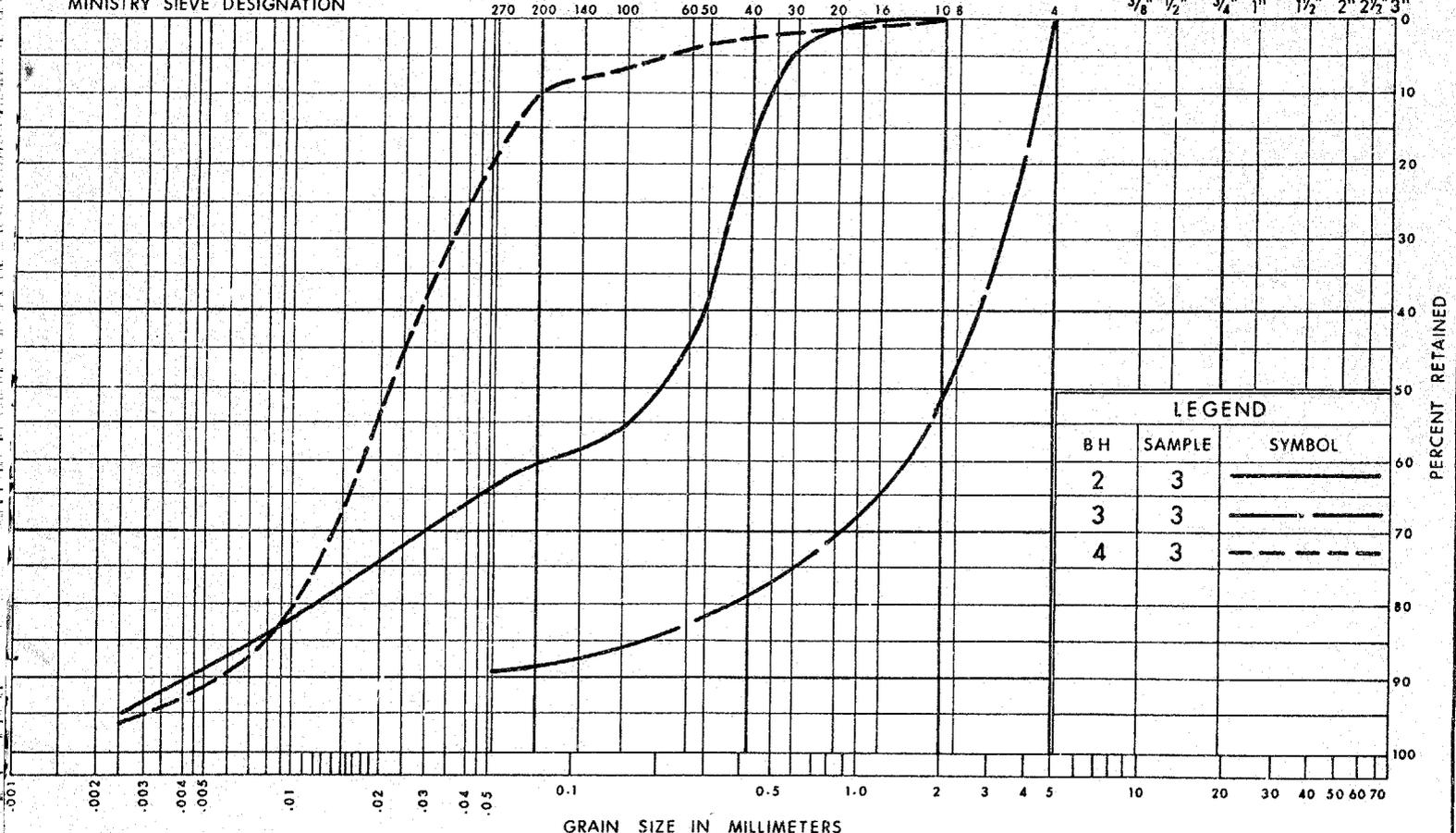
Coarse

Fine

Coarse

MINISTRY SIEVE DESIGNATION

270 200 140 100 60 50 40 30 20 16 10 8 4 3/8" 1/2" 3/4" 1" 1 1/2" 2" 2 1/2" 3"



LEGEND		
BH	SAMPLE	SYMBOL
2	3	—————
3	3	- · - · - · -
4	3	- - - - -

Ministry of
Transportation and
Communications

GRAIN SIZE DISTRIBUTION SILT TO SILTY SAND

FIG No 3
W P 36-74-04

MEMORANDUM

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

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

ATTENTION:

DATE: February 24, 1975.

OUR FILE REF.

IN REPLY TO

SUBJECT: Matheson Blvd. Structures at
Hwy. 403 N.B. - Structure #59, W.P. 36-74-03,
Hwy. 403 S.B. - Structure #60, W.P. 36-74-02,
District 6, Toronto.

This is the foundation investigation request for the above two structures. Would you please issue a separate report for each. The due dates are: ← NOTE.

Structure #59 - May 21, 1975
Structure #60 - May 14, 1975.

Attached are two copies of the plan indicating the location of structures. The location of footings is tight to the Matheson Blvd. centreline determined by the co-ordinated point A and azimuth of 54° 16' 40". Attached also are two prints of the tentative Matheson Blvd. profile.

According to our information there are no underground utilities in the subject area.

Structure Site Numbers have not been assigned yet but will be supplied to you as soon as they are available.

MAA:lm
Attach.

M. A. Almer
M. A. Almer,
STRUCTURAL PLANNING ENGINEER,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

c.c. W. Roters
J. Barclay
R. Fitzgibbon
J. Anderson



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

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

July 20, 1976

#W.P. 36-74-02/03

Re: Hwy. 403 EB/WB at Matheson Blvd.
Bridge No's. 61 and 62
W.P. 36-74-02/03, Site 24-354C/D
District 6, Toronto

We reviewed the preliminary bridge plan drawings 24-354C/D-P1 for the above mentioned structures and herebelow are our comments.

It should be noted that previously eight boreholes were carried out at this site for the location of the footings of structures No. 59 and 60 which are about 50 ft. east and west from the designated location of structures No. 61 and 62. The subsoil observations in this vicinity indicate that the bedrock surface is about 1.5 ft. to 6 ft. below the ground level. We believe that the subsoil information obtained from these boreholes is sufficient and pertinent to the foundation of the new structure footing. Otherwise, we have no comments for the present.

V. Korlu
Project Engineer

For: M. Devata
Supervising Engineer

cc: Files ↓
Record Services

JUL 22 1976



Memorandum

To: Mr. G. Burkhardt,
Reg. Structural Planning Engineer,
Central Region,
3501 Dufferin Street, Toronto.

From: Structural Office,
West Building, Downsview.

Attention:

Date: July 12, 1976.

Our File Ref.

In Reply to

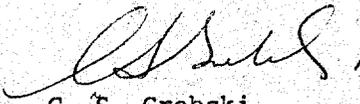
Subject: Hwy. 403 W.B. at Matheson Blvd.,
Bridge #62,
W.P. 36-74-02, Site 24-354D
District #6

Attached herewith are prints of the Preliminary Bridge Plan Drawing 24-354D-P1 for the above mentioned structure.

The estimated cost of the proposed structure is \$168,000 which includes tender, materials, engineering and sundry construction.

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

CSG/cf
Atch


C. S. Grebski,
Structural Design Engineer.

c.c. R. A. Dorton
A. E. McKim
E. Van Beilen
W. Lin
M. Stoyanoff
C. Mirza
J. Anderson
R. Fitzgibbon
S. Edwards

*Our letter dated
July 20/76.*





Memorandum

To: Mr. G. Burkhardt,
Reg. Structural Planning Engineer,
Central Region, Toronto.

From: Structural Office,
West Building, Downsview.

Attention:

Date: July 12, 1976.

Our File Ref.

In Reply to

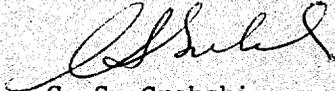
Subject: Hwy. 403 E.B. at Matheson Blvd.,
Bridge #61,
W.P. 36-74-03, Site 24-354C,
District #6.

Attached herewith are prints of the Preliminary Bridge
Plan Drawing 24-354C-P1 for the above mentioned
structure.

The estimated cost of the proposed structure is \$ 168,000
which includes tender, materials, engineering and sundry
construction.

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

CSG/cf
Atch.


C. S. Grebski,
Structural Design Engineer.

C.C. R. A. Dorton
A. E. McKim
E. Van Beilen
W. Lin
M. Stoyanoff
C. Mirza
J. Anderson
R. Fitzgibbon
S. Edwards

*Our letter dated
July 20/76.*



Mr. C.S. Grebski
Structural Design Engineer
Structural Design Section
West Building, Downsview

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

November 10, 1976

Bridge #62
Hwy. 403 WB at Matheson Blvd.
Hwy. 403, District 6, Toronto
W.P. 36-74-02, Site 24-354D

We have reviewed the final bridge drawings 24-354-D1 and 24-354-D3
and found the foundation design satisfactory from our point of view.

We have no other comments.

B. Ly
Senior Engineer

For: M. Devata
Supervising Engineer

MD/BL/g

cc: Files
Record Services

Mr. C.S. Grebski
Structural Design Section
West Building, Downsview

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

November 10, 1976

Bridge #61
Hwy. 403 EB at Matheson Blvd.
Hwy. 403, District 6, Toronto
W.P. 36-74-03, Site 24-354C

We have reviewed the final bridge drawings 24-354-C1 and 24-354-C3 and found the foundation design satisfactory from our point of view.

We have no other comments.

B. Ly
Senior Engineer

For: M. Devata
Supervising Engineer

MD/BL/gs

cc: Files
Record Services



Memorandum

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

From: Structural Office,
West Building, Downsview.

Attention:

Date: September 28, 1976.

C. r. File Ref.

In Reply to

Subject:

Bridge #61,
Hwy. 403 E.B. at Matheson Blvd.,
W.P. # 36-74-03 Site # 24-354C
Highway # 403 District # 6

Attached herewith we are submitting the final bridge drawings which show the foundation design for this structure. Kindly give us your comments at your earliest convenience.

CSG/cf
Attch.

CSG
C. S. Grebski,
Structural Design Engineer.

Finalized 21 Oct 76

No comments. Bly Nov. 9, '76





Memorandum

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

From: Structural Office,
West Building, Downsview.

Attention:

Date: September 28, 1976.

Our File Ref.

In Reply to

Subject:

Bridge #62,
Hwy. 403 W.B. at Matheson Blvd.,
W.P. # 36-74-02 Site # 24-354D
Highway # 403 District # 6

Attached herewith we are submitting the final bridge drawings which show the foundation design for this structure. Kindly give us your comments at your earliest convenience.

CSG/cf
Attch.

C. S. Grebski
C. S. Grebski,
Structural Design Engineer.

Franklin 21 Oct 76
to

No comments, B Ly
Nov. 9, '76



DOCUMENT MICROFILMING IDENTIFICATION

GEOCRÉS No. 80-77-118

DIST. 6 REGION CENTRAL

W.P. No. 80-77-02/03

CONT. No. 71-21

W. O. No. _____

STR. SITE No. 29-3590/8590

HWY. No. 403

LOCATION Highway 403 AT MARTELSON

B.V.13 PROSES # 61, 62

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT 24

REMARKS: _____

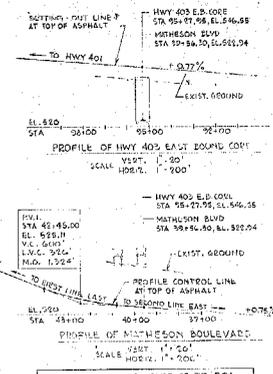
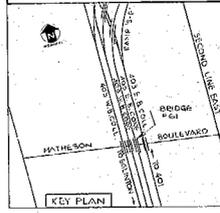
61-21-77-80

DISTRICT No. 6
CONT No
WP No 36-74-05

SHEET

HWY. 403 E.B. AT MATHEWSON BLVD.
 (BRIDGE # 61)
 GENERAL ASSIGNMENT

FENCO
 FENCO CONSULTANTS LTD.



* THE VERTICAL ALIGNMENTS OF THE P.C.L. IN THE SETTING OUT LINE HAVE BEEN ASSUMED TO BE THE SAME.

- NOTES:**
- CLASS OF CONCRETE**
- PRESTRESSED CONCRETE = 4000 P.S.I.
 - DECK, CURB & PARAPET WALL = 3000 P.S.I.
 - ALL OTHERS = 3000 P.S.I.
- GRADE OF REINFORCING STEEL**
- REINFORCING STEEL TO BE HWY 60 LAGERS WITH A MINIMUM YIELD STRENGTH OF 50,000 P.S.I.
- LEAD COVER TO REIN. STEEL**
- FOUNDATIONS & SUBGRACELS IN CONTACT WITH BENTH = 2" (6)
 - DECK SLAB, TOP & BOTTOM = 1 1/2" (3)
 - CURBS, PARAPET WALLS & DIMENSIONS = 1 1/2" (3)
 - ALL OTHERS = 1" (2)
- * TO ACHIEVE THE MINIMUM CLEAR COVER IN * SPECIFIED THE TOP LAYER SHALL BE PLACED FIRST TO CONCRETE WITH A CLEAR COVER OF 3/8" TO 1/2" THEREAFTER.
- REINFORCING NOTES:**
- FOR PRESTRESSING WORKING SEE CIVIL No. 6.
- CONSTRUCTION NOTES:**
- THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXISTING SURFACE AND LEVELS TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 1/8".
 - NO CONCRETE SHALL BE PLACED ABOVE THE REINFORCING STEEL UNLESS THE REINFORCING STEEL HAS BEEN PLACED IN THE DECK AND BEEN PLACED.

LIST OF DRAWINGS

1. GENERAL ASSIGNMENT
2. BORE HOLE LOCATIONS & SOIL STRATA
3. FOUNDATION LAYOUT
4. ADJUSTMENTS
5. RETAINING WALLS
6. PRESTRESSED CURBS & BEARINGS
7. SINKS
8. CONCRETE PARAPET WALL (2' x 6" HIGH)
9. DECK (PARAPET WORKING (PARALLEL TUBES)
10. 10' FT. APPROACH SLAB & BANKING WALL
11. WALL CONSTRUCTED GLEY & TANK
12. MISCELLANEOUS DETAILS
13. ELECTRICAL PRESTRESS WORK
14. ELECTRICAL CONSTRUCTION STANDARDIZED
15. ELECTRICAL CONSTRUCTION STANDARDIZED

CONCRETE FINISHES

SMOOTH AND BEARING WALL FOUNDATIONS, ANCHORAGE AND BEARING WALL, DECK AND DIMENSIONAL DIMENSIONAL WALLS

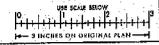
- 400 CYLDS (3000 P.S.I.)
- 440 CYLDS (3000 P.S.I.)
- 51 CU. YDS (3000 P.S.I.)
- 35.11 YDS (4000 P.S.I.)



30 1/2" x 110" COORDINATE

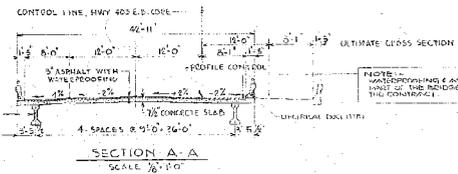
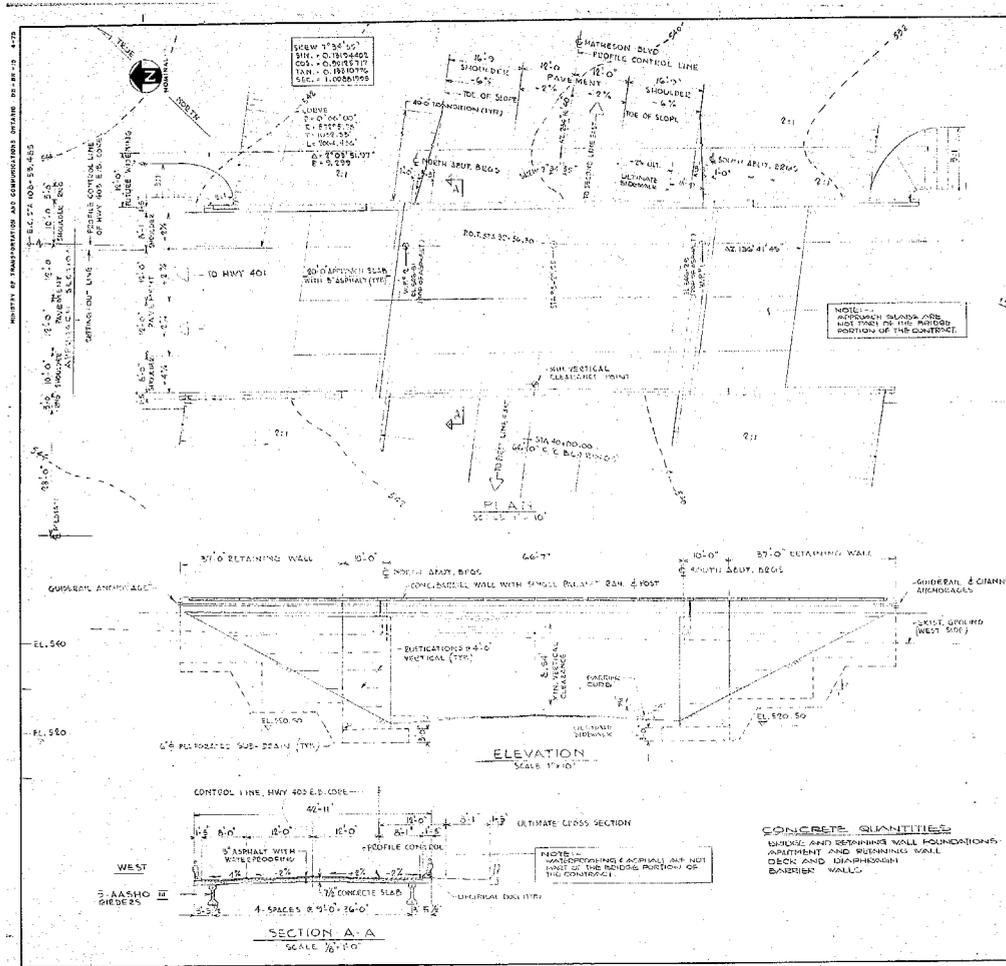


FOR REDUCED PLAN



DATE	DESCRIPTION

FENCO No. 6110-1K-1

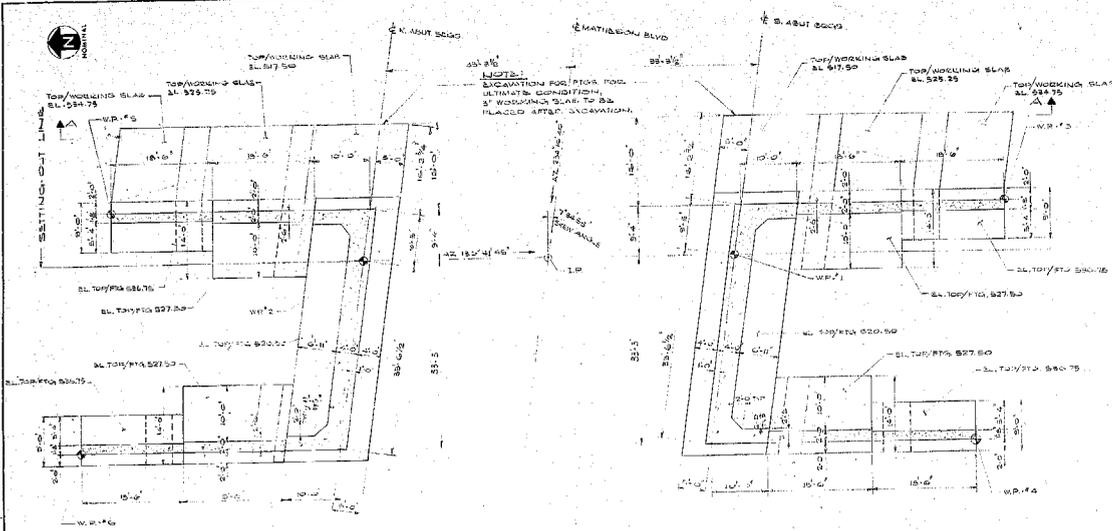


ELEVATION
 SCALE 1" = 10'

SECTION A-A
 SCALE 3/8" = 1'-0"

UNIVERSITY OF TORONTO LIBRARY AND COMMUNICATIONS DIVISION 483-281-713

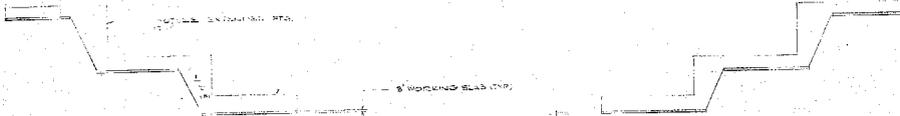
DISTRICT No 6	○
CONT. No	
WP No 36-74-03	
HWY 403 BRAT MATHEWS BLVD (BRIDGE # 61)	SHEET
FOUNDATION LAYOUT	
FENCO FENCO CONSULTANTS LTD	



FOUNDATION PLAN
SCALE 1/8" = 1'-0"

DESCRIPTION	STATION	CO-ORDINATES	
		NORTH	EAST
P. 1	555 145.180	560 504.225	
W.P. #1	555 142.581	560 521.125	
W.P. #2	555 142.115	560 531.451	
W.P. #3	555 142.456	560 552.515	
W.P. #4	555 087.174	560 552.154	
W.P. #5	555 122.115	560 556.541	
W.P. #6	555 104.225	560 571.524	

NOTES:
1. THIS DRAWING IS FOR THE BRIDGE OVER
2. THIS DRAWING IS FOR THE BRIDGE OVER
3. THIS DRAWING IS FOR THE BRIDGE OVER
4. THIS DRAWING IS FOR THE BRIDGE OVER



SECTION A-A
SCALE 1/8" = 1'-0"

FOR REDUCED PLAN

1" = 100' SCALE

0 1 2 3 4 5 6 7 8 9 10

1" = 100' SCALE

NO. 1 IMPERIAL OR DECAH PLAN

100-112-117
CORRECTED

REGISTERED
JAN 12 1977

NO.	DATE	BY	DESCRIPTION

FENCO CONSULTANTS LTD

DISTRICT No 6
 CONT No
 WP No 86-74-02

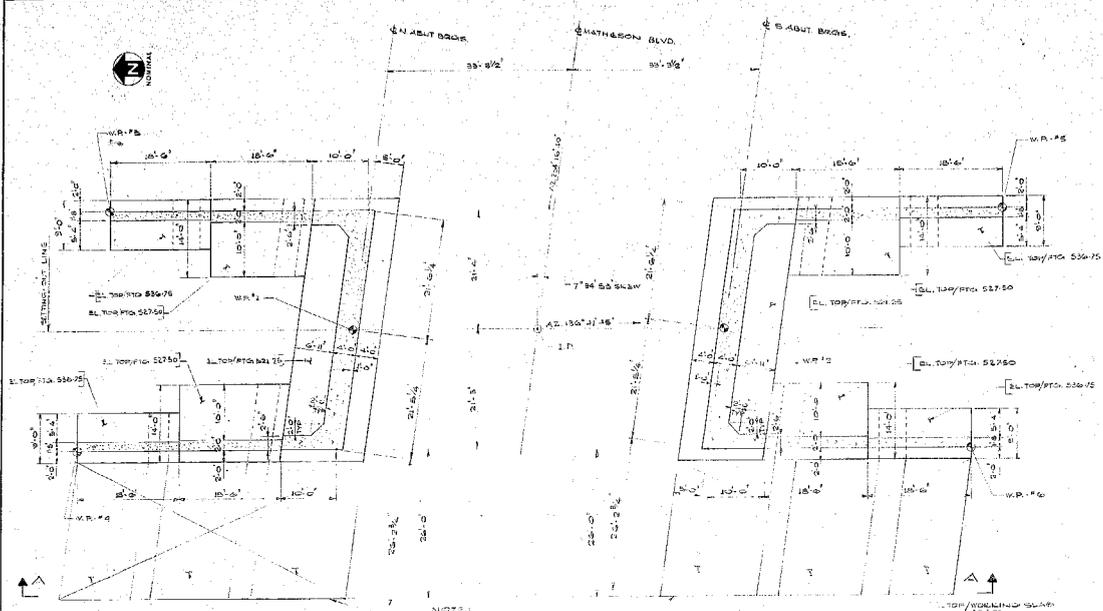


HWY 408 IRL MATTHEW BLVD.
 (SOUTH SIDE - 02)
 FOUNDATION LAYOUT

SHEET

FENCO
 FENCO CONSULTANTS LTD.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS CANADA 28-11-12-12 479



DESCRIPTION	STATION	CO-ORDINATES	
Z.P.	J. TRANSVERSE	EAST	NORTH
WR #1	555 025 600	550 805 670	550 765 782
WR #2	555 071 441	550 870 460	
WR #3	555 150 605	550 770 025	
WR #4	555 141 582	550 735 152	
WR #5	555 048 605	550 880 165	
WR #6	555 024 722	550 845 282	

NOTE:
 ELEVATION FOR FOUNDATION
 FROM FINISHED SURFACE
 UNLESS OTHERWISE NOTED
 ALL DIMENSIONS IN METERS

FOUNDATION PLAN
 SCALE 1/8" = 1'-0"



SECTION A-A
 SCALE 1/8" = 1'-0"



SOFT COPY
 COPIES: 10



FOR REDUCED PLAN
 1/8" = 1'-0"

DATE BY DESCRIPTION

NO.	DATE	BY	DESCRIPTION

1" = 3" ON ORIGINAL PLAN

FENCO CONSULTANTS LTD.