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GEOCRES No. 30M12-66

DIST 6 REGION Central

W.P. No. 127-66-24

CONT. No. 78-60

W. O. No.

STR. SITE No. 24-126

HWY. No.

LOCATION Structure #43, Ramp E-S Over Hwy. 410 N.B. Core and Collector

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS: documents to be unfolded before microfilming

FOUNDATION INVESTIGATION REPORT
For
The Proposed Structure No. 43
Ramp 'E-S'
Over Hwy. 410 N.B. core and collector
Town of Mississauga
County of Peel
Site No. 24-326
District No. 6 (Toronto)
W.O. 73-11074 - W.P. 127-66-01 24

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1. *INTRODUCTION:*

In conjunction with the proposed Hwy. 401/403/410 interchange complex, it is proposed to construct a structure (Structure No. 43) to carry Ramp 'E-S' over Hwy. 410 N.B. core and collector in the Town of Mississauga, County of Peel, District No. 6, Toronto.

The Foundations Office was requested to carry out a sub surface investigation at the site of the above mentioned structure. The request was contained in a memo from Mr. G.C.E. Burkhardt, Regional Structural Planning Engineer, Central Region, dated August 22, 1973.

Subsequently, an investigation was carried out by this office to determine the subsoil, bedrock and groundwater conditions at this site. This report contains all the factual data obtained from this investigation, together with recommendations pertaining to the design of the proposed structure foundations and the stability of the approach cuts.

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2. *DESCRIPTION OF THE SITE AND GEOLOGY:*

The site of the proposed structure is about 1/2 mile west of Heart Lake Road and some 1,000 feet south of Hwy. 401 in the Town of Mississauga. The topography of the area is flat to undulating. The land is utilized for farming purposes.

Physiographically, the site is located in the region referred to as the "Peel Plain". Across this plain, rivers and streams have cut deep valleys and consequently there are no large undrained depressions, swamps or bogs, although in many of the interstream areas the drainage is imperfect.

The characteristic deposit in the area is composed of a cohesive glacial till underlain by shale bedrock.

3. *FIELD INVESTIGATION AND LABORATORY WORK:*

Three sampled boreholes were put down in the vicinity of the proposed structure site. In addition, one borehole (No. 1) from a previous investigation (73-11072) was included because of its close proximity to the proposed structure.

The borings were advanced by means of a C.M.E.-750 auger machine adapted for soil sampling purposes.

At required depths 2 inch O.D. Split-Spoon samples were recovered. The sampling was done in accordance with the specifications for the Standard Penetration Test. The bedrock was proven by obtaining BXL size core samples.

The locations and elevations of all the borings were surveyed in the field by construction personnel from the District Office in Toronto, and are shown on Drawing No. 73-11074A together with an inferred stratigraphical profile. Across the site, all elevations in the report are referenced to a Geodetic Datum.

All samples were visually examined and identified in the field and subsequently in the laboratory. Following this examination, laboratory testing was carried out on selected

representative samples to determine the physical properties of the overburden, namely:

Natural Moisture Contents
Atterberg Limits
Grain-Size Distributions

The results of this testing are plotted on the Record of Borehole sheets and summarized on Figure Nos. 1 and 2, all of which are contained in the Appendix to this report.

4. *SUBSOIL AND BEDROCK CONDITIONS:*

4.1) General:

The predominant stratum across the site is a heterogeneous mixture of silty clay, sand and gravel (glacial till) up to 8 feet thick, which is underlain by shale bedrock.

The boundaries of the various strata are shown on the Record of Borehole sheets appended to this report.

From ground level downward, the various strata are described in detail with regard to soil types and physical properties as follows:

4.2) Heterogeneous Mixture of Silty Clay, Sand and Gravel (Glacial Till):

This deposit was intersected in all boreholes. It extends from immediately below a thin layer of topsoil down to the bedrock surface. The thickness of this stratum varies from 7.5 feet (B orehole No. 1) to 8 feet (Borehole No. 2, No. 3 and No. 4).

This deposit consists of a heterogeneous mixture of silty clay, sand and gravel of glacial origin.

Results of Atterberg Limits tests carried out on selected samples within this deposit are summarized on the Plasticity Chart (Figure No. 1) and also tabulated below:

		Range	Average
Liquid Limit (W_L)	(%)	36-43	39
Plastic Limit (W_P)	(%)	19-25	23
N atural Moisture Content (W)	(%)	10-16	13

Based on these values it is estimated that the cohesive deposit has a matrix which is inorganic and of intermediate plasticity.

Typical grain-size distribution curves are included in an envelope form (Figure No. 2) in the appendix.

Standard Penetration tests, carried out within this glacial deposit, are plotted on the Record of Borehole sheets. The testing gave 'N ' values ranging from 27 blows per foot to in excess of 100 blows per foot, generally increasing with depth. It is estimated that the consistency of the overall deposit is very stiff to hard.

4.3) Shale Bedrock:

The glacial till is underlain by bedrock which was proven at all of the boring locations by obtaining BXL size core samples. Across the site, the bedrock surface was found to vary between elevations 586.7 and 587.9.

The bedrock is a dark grey shale with occasional limestone bands. The upper 0.5 feet to 1.0 feet of the bedrock was found to be in a weathered condition.

5. *GROUNDWATER CONDITIONS:*

Groundwater level observations were carried out during the period of the field investigation (September, 1973), in open boreholes. The observed water levels are presented on the individual Record of Borehole sheets as well as on Drawing No. 73-11074A. The results indicate that the groundwater level varies between elevations 589.4 and 590.9, i.e. 4.5 feet to 5.5 feet below existing ground surface.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct a three-span overpass structure (Structure No. 43) which will carry Ramp 'E-S' over Hwy. 410 N.B. core and collector.

Structure No. 43 will be part of the proposed Hwy. 401/403/410 interchange complex.

The proposed profile grade of Ramp 'E-S' in the vicinity of the structure will vary between elevations 587 and 590. The proposed profile grades of Hwy. 410 N.B. core and collector will be at elevations 560.5 and 562.5 respectively. The existing ground level at the site ranges from elevations 594 to 596. In order to reach these grades, cuts up to 35 feet will be required.

As described in the previous paragraphs of this report, the subsoil at the site consists of a relatively shallow (± 8 ft.) deposit of cohesive glacial till, followed by shale bedrock.

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

6.2) Structure Foundations:

It is recommended that the piers and abutments be supported on spread footing type of foundation located within the shale bedrock. A minimum of 4 feet earth cover should be provided to the underside of the footings, since the shale is considered susceptible to frost action. Therefore, the footings should be founded at or below the elevations given in the following table.

Location	Recommended Founding Elevation	Refer to B.H. #
East Abutment	586	1
East Pier	558	2
West Pier	557	3
West Abutment	582	4

....6

An allowable bearing value of up to 10 t.s.f. may be used in designing the footings, founded as recommended. The horizontal resistance of the footing may be computed using a coefficient of friction of 1.0 between rough concrete surface and shale.

In order to simplify dewatering for the footing excavations, it is recommended that the approach cuts be completed to profile grades prior to the construction of the structure foundations. If this procedure is followed, the resulting depth of excavation for the footings will be in the order of 4 feet below the finished grade. Any minor groundwater seepage or surface runoff into the excavations can be handled by ordinary pumping methods.

The settlement of the footings will be negligible in magnitude, provided that measures are exercised 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 foundation level, by covering it with a lean concrete working slab immediately after the completion of the excavation.

6.3) Approach Cuts:

As mentioned previously (Section 6.1), cuts of up to 35 ft. deep will be required in the vicinity of the structure in order to reach the proposed grades of Hwy. 410. This cut will be made through the cohesive glacial till and into the shale bedrock.

According to experience gained by District Construction personnel from the construction of the 427-Q.E.W. interchange, the shale, once it was 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.

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The groundwater level established during the period of field investigation, is some 30 feet above the bottom of the proposed approach cut. Some seepage through, and consequently local sloughing of the shale can, therefore, be expected. However, this problem will be temporary in duration and minor in nature, since the excavation will result in a general lowering of the groundwater level across the site.

7. *MISCELLANEOUS:*

The field investigation was carried out during the period of September 15, 1973, under the supervision of Mr. V. Korlu, Project Foundations Engineer, who also prepared this report.

Equipment was owned and operated by Dominion Soils Company of Toronto.

The entire project was under the general supervision of Mr. M. Devata, Supervising Foundations Engineer, who also reviewed this report.

V. Korlu, P. Eng.

REGISTERED PROFESSIONAL ENGINEER
CIVIL
V. KORLU
PROVINCE OF ONTARIO

M. Devata, P. Eng.

VK/zh
Sept. 26, 1973.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFIC

RECORD OF BOREHOLE Nº 1 (1., 73-11072)

JOB 73-11074 — LOCATION Co-ords. 15,855,930 N; 958,588 E. — ORIGINATED BY VK

W.P. 127-66-24 — BORING DATE Sept. 7, 1973 — COMPILED BY VK

DATUM Geodetic — BOREHOLE TYPE Auger & Core with CME 750 — CHECKED BY

SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
594.2	Ground Level					
0.0	Het.mix.of silty clay, sand & gravel. (Glacial Till)		1	SS	52	590
			2	SS	47	
586.7	Hard					
7.5	~~weathered~~					
582.7	Shale Bedrock with occ. interbedded limestone layers.		3	BXL	90%	
11.5	End of Borehole					580

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT

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

LIQUID LIMIT w_L
PLASTIC LIMIT w_P
WATER CONTENT w
WATER CONTENT % 15 30 45

BULK DENSITY γ P.C.F.

REMARK GR.SA.SI.

▼589.4
7 10 57

15 20 10 5 % STRAIN AT FAILURE

OFFICE REPORT SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 2

JOB 73-1107h — LOCATION Co-ords. 15,855,763 N; 958,655 E. — ORIGINATED BY VK

W.P. 127-66-24 — BORING DATE Sept. 15, 1973 — COMPILED BY VK

DATUM Geodetic — BOREHOLE TYPE Auger and Core with CME 750 — CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
595.4	Ground Level					
0.0	Het.mix.of silty clay, sand and gravel. (Glacial Till)		1	SS	46	
			2	SS	39	590
587.4	Hard		3	SS	73	
8.0	weathered		4	BXL	50%	
	sound		5	BXL	90%	
	Shale Bedrock		6	BXL	100%	580
			7	BXL	100%	
			8	BXL	100%	570
			9	BXL	100%	
555.4			10	BXL	100%	560
40.0	End of Borehole					550

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT

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

LIQUID LIMIT W_L
PLASTIC LIMIT W_P
WATER CONTENT W
W_P W W_L
WATER CONTENT % 15 30 45

BULK DENSITY γ P.C.F.

REMARKS

GR. SA. SI. CL.

14 11 49 26
▼590.9
0 7 69 24

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 3

JOB 73-11074 — LOCATION Co-ords. 15,855,665 N; 958,680 E. — ORIGINATED BY VK

W.P. 127-66-24 — BORING DATE Sept. 15, 1973 — COMPILED BY VK

DATUM Geodetic — BOREHOLE TYPE Auger and core with CME 750 — CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
595.9	Ground Level					
0.0	Het.mix.of silty clay, sand and gravel. (Glacial Till) Very Stiff to Hard		1	SS	28	
			2	SS	48	
587.9			3	SS	175	590
	weathered		4	BXL	60%	
8.0	sound		5	BXL	100%	
	Shale Bedrock		6	BXL	100%	580
			7	BXL	100%	
			8	BXL	100%	570
			9	BXL	100%	
			10	BXL	100%	560
555.9						
40.0	End of Borehole					550

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT

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

LIQUID LIMIT w_L
PLASTIC LIMIT w_P
WATER CONTENT w
w_P w w_L
WATER CONTENT % 15 30 45

BULK DENSITY γ P.C.F.

REMARKS	GR.	SA.	SI.	CL.
	4	21	50	25
▼ 590.6	0	17	63	20

15 20 5 10 % STRAIN AT FAILURE

OFFICE REPORT — SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 4

JOB 73-1107L — LOCATION Co-ords. 15,855,596 N; 958,711 E. — ORIGINATED BY VK

W.P. 127-66-24 — BORING DATE Sept. 15, 1973 — COMPILED BY VK

DATUM Geodetic — BOREHOLE TYPE Auger and core with CME 750 — CHECKED BY

SOIL PROFILE ELEV./DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w — WATER CONTENT % 15 30 45	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
595.9	Ground Level										
0.0	Het.mix.of silty clay, sand and gravel. (Glacial Till)		1	SS	58						1 24 53 22
			2	SS	43	590					▼590.4
587.9	Very Stiff to Hard		3	SS	27						0 12 67 21
8.0	Sound Shale Bedrock		4	BXL	100%						
			5	BXL	100%	580					
575.9			6	BXL	100%						
20.0	End of Borehole					570					

OFFICE REPORT — SOIL EXPLORATION

20 / 15 ◇ S / 10 % STRAIN AT FAILURE

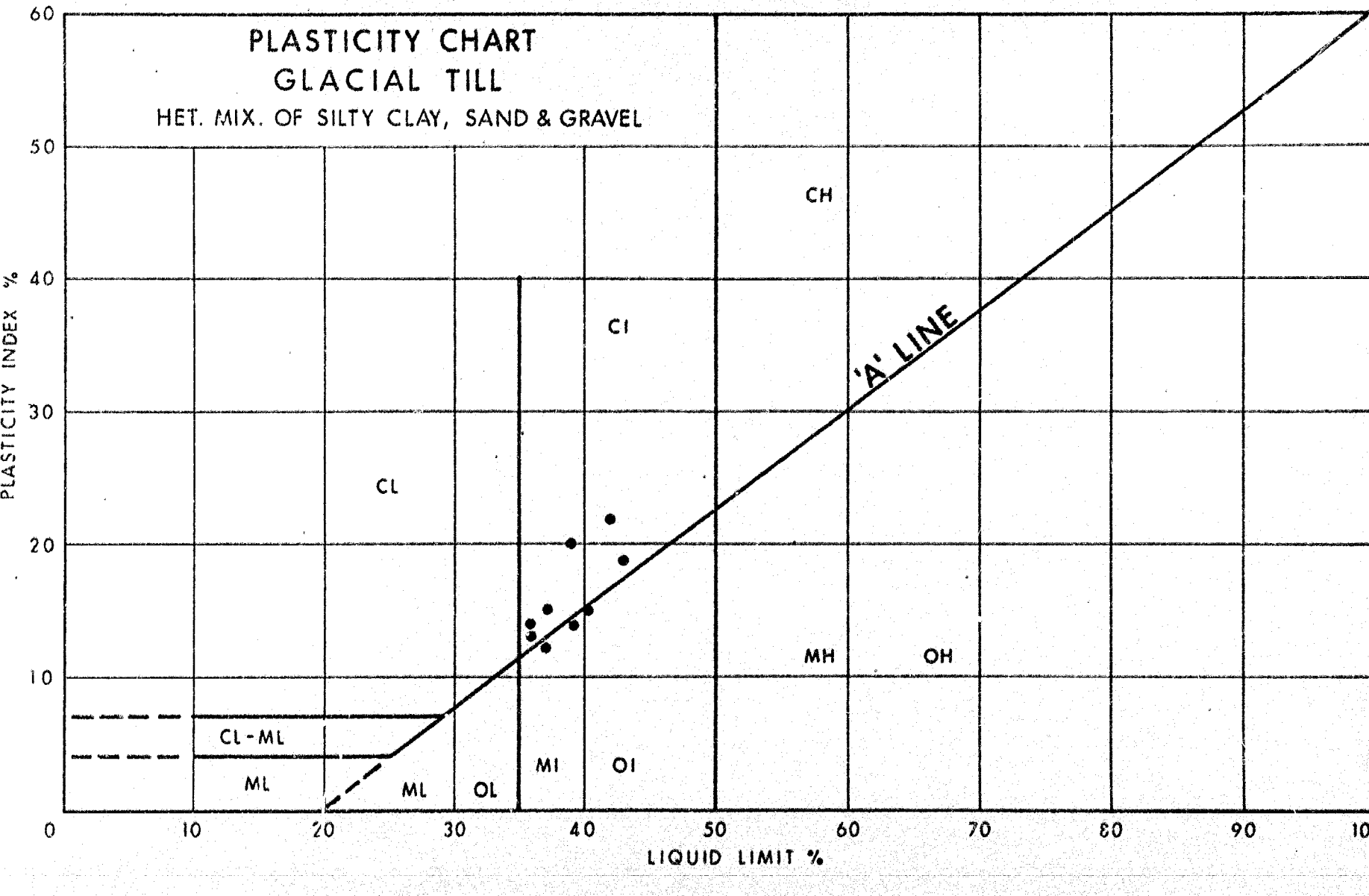
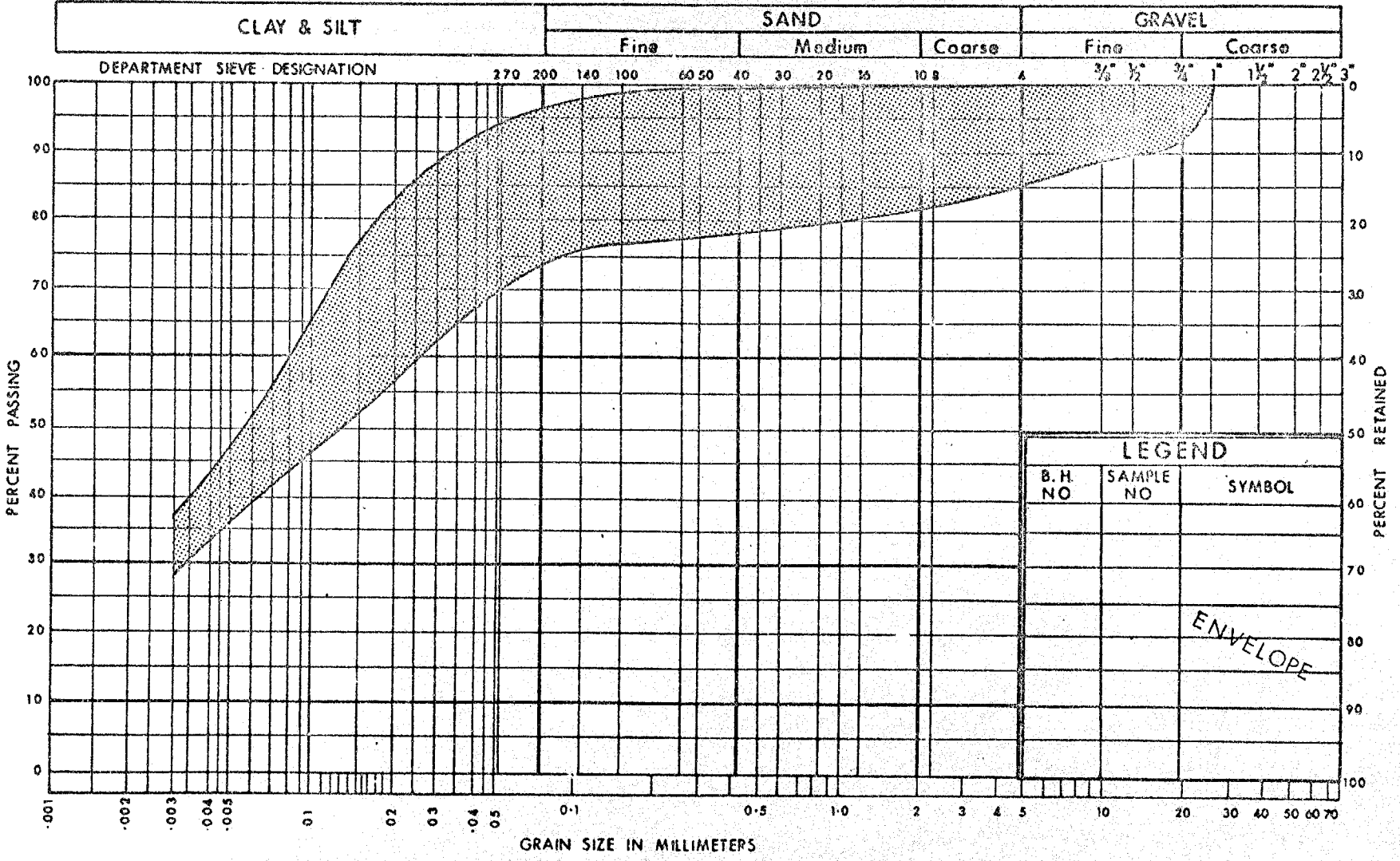


FIG. 1

W.O. 73-11074

FORM CD-MT-17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION

GLACIAL TILL

HET. MIX. OF SILTY CLAY, SAND & GRAVEL

W.P. No. 127 - 66 - 01

JOB No. 73 - 11074

FIG. 2

FD-9 (Rev. Jan. 73)

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 SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

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

DESCRIPTION OF SOIL

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

CONSISTENCY	c LB./SQ.FT.	DENSENESS	'N' BLOWS/FT.
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 "		

FD-9b (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
	IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan \phi'$
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan \phi$
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

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

STRESS AND STRAIN

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

EARTH PRESSURE

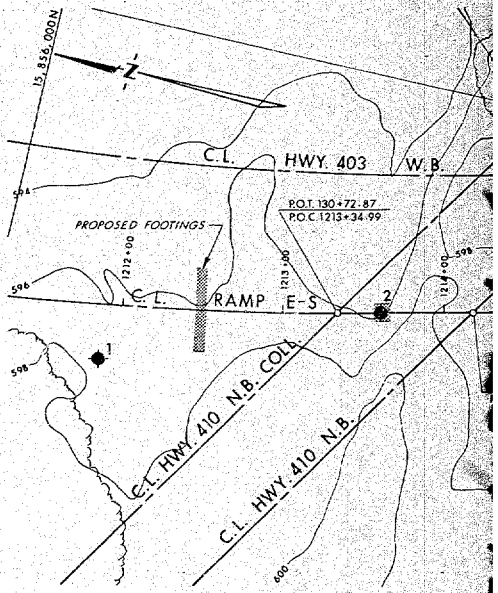
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

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

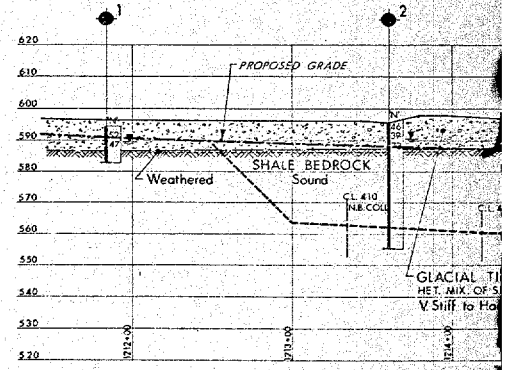
SLOPES

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



PLAN

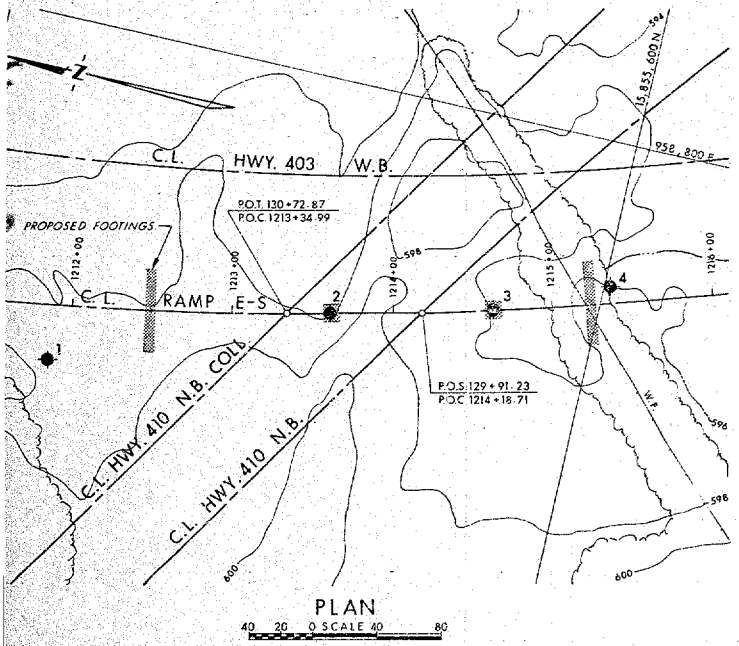
40 20 0 SCALE 40



PROFILE - RAMP E

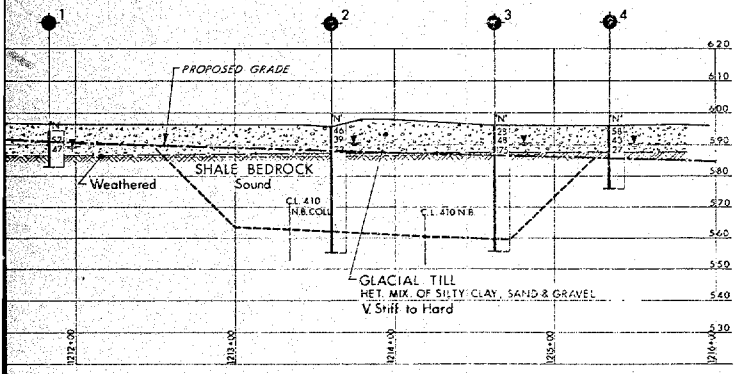
HORIZ. 40 20 0 SCALE 40

VERT. 20 10 0 20



PLAN

40 20 0 SCALE 40 80

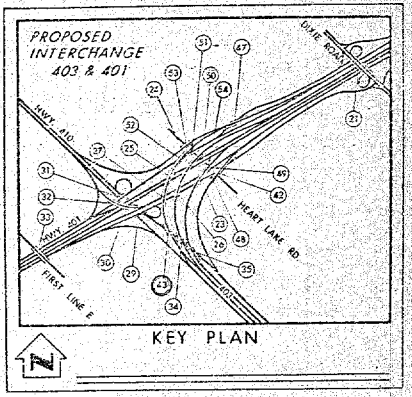


PROFILE - RAMP E-S

HORIZ. 40 20 0 SCALE 40 80 FT

VERT. 20 10 0 20 40 FT

REF. No. 3983-3K-10



KEY PLAN

LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, Sept. 1973

NO.	ELEVATION	CO-ORDINATES NORTH	CO-ORDINATES EAST
1	594.2	15,855,930	958,588
2	595.4	15,855,763	958,655
3	595.9	15,855,665	958,680
4	595.9	15,855,596	958,711

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.

— 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
DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

BRIDGE No. 43

RAMP E-S OVER HWY. 410 N.B. & HWY. 410 N.B. COLL.

HIGHWAY NO. 410 DIST. NO. 6

CO. PEEL

TOWN OF MISSISSAUGA LOT CON

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD V.K.	CHECKED	W.P. NO. 127-66-01	DRAWING NO. 73-11074 A
DRAWN S.R.	CHECKED	W.O. NO. 73-11074	
DATE SEPT. 27 1973		SITE NO.	BRIDGE DRAWING NO.
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT. NO.	

REGISTERED PROFESSIONAL ENGINEER V. K. PROVINCE OF ONTARIO

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. C. S. Grebski,
Structural Design Engineer,
Structural Office.

FROM: Geotechnical Office.

ATTENTION:

DATE: February 22, 1974.

OUR FILE REF.

IN REPLY TO

SUBJECT:

Preliminary Drawing
Ramp E-S over Hwy. 410 NB Core and Coll.
(Bridge #43) Site #24-324
Hwy. 401 District #6 (Toronto)
W.O. 73-11-074 - W.P. 127-66-24

We have reviewed the preliminary drawing for the above structure and submit the following comment.

The foundation investigation was carried out for a three spanned structure which has been changed to a four spanned. As a result of this, none of the boreholes put down were at pier #1. This pier will however be founded some 25 feet below the inferred bedrock surface. The recommendations regarding footings on sound shale bedrock given in our Foundation Report W.O. 73-11-074 are considered to be applicable and it appears to us that these recommendations were followed in the design.

C. S. Poon
Project Foundations Engineer.

(per) M. Devata,
Supervising Foundations Engineer.

CSP/sh

C.C. Files
Documents

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 30M12-66

DIST. 6 REGION CENTRAL

W.P. No. 127-66-24

CONT. No. 78-60

W. O. No.

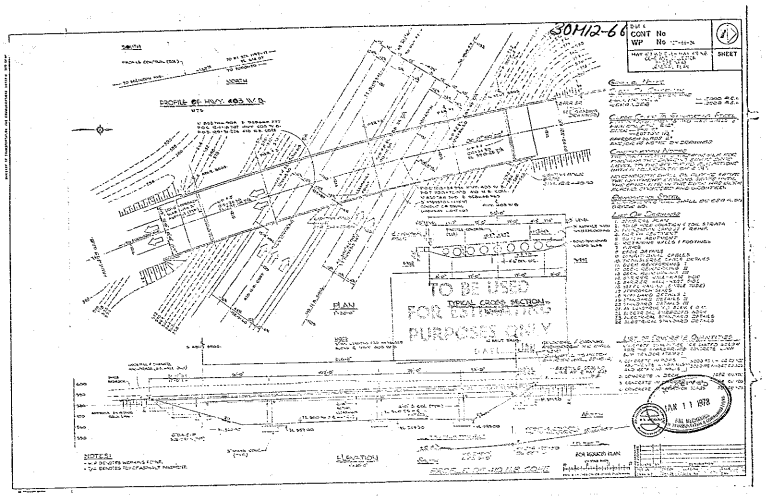
STR. SITE No. 24-326

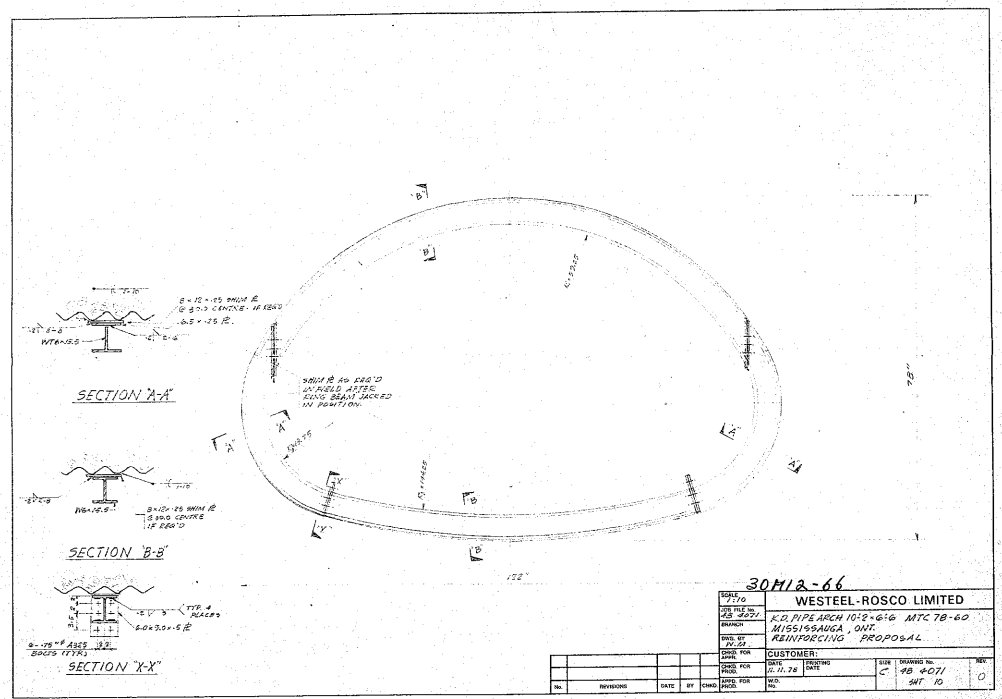
HWY. No.

LOCATION STRUCTURE # 43, RAMP E-S OVER HWY 410 N.B CORE AND COLLECTOR.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS:


30M12-66
PROFILE OF HWY. 403 W.B.
TO BE USED
FOR ESTIMATING
PURPOSES ONLY
PLAN
TYPICAL CROSS SECTION
ELEVATION
JAN 11 1978



30M12-66

SCALE	1"=1'0
JOB TITLE No.	98 4071
BRANCH	
DWG. BY	
CHKD. FOR ISSUE	
CHKD. FOR PROD.	
APPD. FOR PROD.	

WESTEEL-ROSCO LIMITED

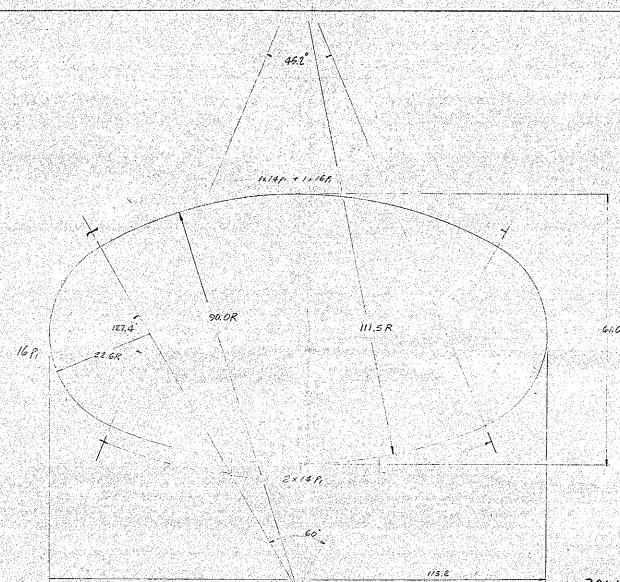
K.D. PIPE ARCH 10'-2"x6'-6" MTC 78-60
MISSISSAUGA, ONT.
REINFORCING PROPOSAL

CUSTOMER:

DATE	PRINTING DATE	SIZE	DRAWING No.	REV.
11.11.78		C	98 4071 SHT 10	0

W.O. No.

No.	REVISIONS	DATE	BY	CHKD



ALL DIMS. TO N.A.

30H12-66

SCALE 1/10	WESTEEL-ROSCO LIMITED				
JOB FILE No. 48 4071	L-18 TUNNEL LINER 113.0 x 64.5				
BRANCH					
DWG. BY C. MC					
CHKD. BY APPR. BY	CUSTOMER:				
PRINT FOR PROD.	DATE MAY 1/72	PRINTING DATE	SIZE C	DRAWING No. 48 4071 SK-11	REV. 0
ISSUED FOR PROD.	W.O. No.				

No.	REVISIONS	DATE	BY	CHKD