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GEOCRES No. 30M15-7

DIST 6 REGION Central

W.P. No. 44-71-06

CONT. No. 77-133

W. O. No. 72-11149

STR. SITE No. 22-173

HWY. No.

LOCATION Park Road and Hwy. 401

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: documents to be unfolded before microfilming

FOUNDATION INVESTIGATION REPORT
For
Proposed Overpass Structure Extension
At the Crossing of
Park Rd. and Hwy. 401
Township of E. Whitby, County of Ontario
Site No. 22-173
W.O. 72-11149 -- W.P. 44-71-06

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1. *INTRODUCTION:*

The Foundations Office was requested to carry out a subsurface investigation at the crossing of Hwy. #401 and Park Road Overpass in Ontario County. This investigation is concerned with the widening of the Park Road Overpass to accommodate six lane traffic on Hwy. #401. The request was contained in a memo from the Regional Structural Office (Mr. G.C.E. Burkhardt, Regional Structural Planning Engineer) dated November 29, 1972. Subsequently, an investigation was carried out by this Office to determine the subsoil and groundwater conditions at the site.

The results of the investigation are presented in the report, together with our recommendations for the design of the structure foundation extensions as well as the stability and settlement considerations associated with the widening of the existing approach fills.

2. *SITE DESCRIPTION AND GEOLOGY:*

The area under investigation is located at the intersection of Hwy. #401 and Park Road in the Township of East Whitby, Ontario County. Topographically, the area can best be described as a broad plain surrounded by higher grounds to the immediate north. The latter contains a portion of the residential area of the City of Oshawa. The remaining area has been developed for

....2

industrial and commercial purposes.

Physiographically, the site may be considered to be part of the "Iroquois Plain." In this area, the subsoil is a mosaic of till plains, drumlins, and areas of silty lacustrine deposits.

3. *FIELD AND LABORATORY WORK:*

3.1) *Field Investigation:*

Four sampled boreholes, one accompanied by a dynamic cone penetration test, were put down at the structure site. The borings were advanced by means of a conventional diamond drill rig, adapted for soil sampling purposes.

Samples of the glacial till were recovered by means of a standard 2 inch O.D. split-spoon sampler driven into the soil with an energy of 350 ft.-lb. per blow according to the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration test. Groundwater level observations were carried out during the period of the investigation by recording the water levels in the open boreholes.

The locations and elevations of all the borings were surveyed in the field by personnel from this Office; they are shown on Drawing No. 72-11149A, together with inferred stratigraphic sections. All elevations in the report are referenced to a geodetic datum.

3.2) *Laboratory Procedures:*

All the samples were subjected to careful visual examination in the field and subsequently in the laboratory. Following the examination, laboratory tests were carried out on selected representative samples to determine the engineering properties of the various soil types encountered; namely,

Atterberg Limits
Natural Moisture Contents
Grain-Size Distributions

4. *SUBSOIL CONDITIONS:*

Beneath a thin topsoil cover (1 foot or less) is the predominant stratum across the site, which is composed of a glacial till. This stratum was not fully penetrated at any of the borings, it was proven, however, to extend to a depth in excess of 53 feet below existing ground surface at B.H. #2. The upper 25 to 30 feet of the stratum is primarily granular in nature being composed of a heterogeneous mixture of sand, silt, gravel and a trace of clay. The lower zone is primarily cohesive in nature being composed of a clayey silt binding sand and gravel. Grain-size distribution testing, for samples of the till obtained with 2 inch O.D. sampling equipment, are plotted in envelope form on Figure #1 in Appendix I.

Atterberg limit testing was carried out on samples of the till, the results are plotted on the borelog sheets, as well as on the Plasticity Chart, Figure 2. This testing indicates that the upper granular zone of the glacial till is basically non-plastic, while the lower cohesive zone has a plasticity in the low range. The natural moisture content is typically below the plastic limit.

Standard penetration testing was carried out within the glacial till. The testing gave 'N' values which ranged from 15 blows/ft. to 100 blows for 3 inches. Based on these results it is estimated that the relative density of the upper granular zone varies from compact to very dense, with the consistency of the lower cohesive zone ranging from very stiff to hard.

At B.H. #4, a very dense sand and gravel layer is present within the glacial till deposit; the surface of this layer was encountered at elevation 332. This boring was terminated within this layer after penetrating it to a depth of more than 7.5 feet.

5. *GROUNDWATER CONDITIONS:*

The groundwater level conditions across the site, during the period of the investigation (January 1973), were observed by taking readings in the open boreholes. The results of the observations are shown on the borelog sheets, as well as on Drawing W.O. 72-11149A.

The observations indicate that the water level in the open boreholes is located between about elevations 342.5 and 349, corresponding to depths which range from ground surface to 7.5 feet below existing ground surface.

6. *DISCUSSION AND RECOMMENDATIONS:*

6.1) *General:*

It is proposed to widen the existing overpass structure at the crossing of Hwy. 401 and Park Rd., in the City of Oshawa as part of the planned widening of Hwy. No. 401 in this area. This construction will require that the existing overpass be extended by 19 feet on each side of the structure.

The existing structure is founded on spread footings located at elevation 343.5. This would place them within the upper granular zone of the glacial till. The profile grade of Hwy. 401, in the vicinity of the crossing, is about elevation 365 - i.e., the approach fills extend approximately 15 feet above the original surface in this area. Visual observations reveal that the structure and approaches are performing satisfactorily.

Recommendations will be presented for north and south sides separately.

6.2) *Structure Foundations:*

6.2.1) *North Abutment Extension:*

It is recommended that the proposed north extensions, will settle due to the imposed foundation footing pressure. These settlements will be elastic in nature; i.e., take place during or immediately following placement of the full structural load. It is estimated that the magnitude of these settlements should not exceed 1/2 inch provided the foundation subsoil is not loosened during the construction period. However, it is recommended that a construction joint should be provided between the existing abutment foundation and the extension in order to accommodate any possible differential settlement.

The excavations for the extensions will be carried out below the prevailing groundwater level. In view of the relatively low permeability of the glacial till no major dewatering problems are anticipated; any minor seepage or surface runoff into the excavations could be readily handled by pumping from sumps.

6.2.2) South Abutment Extensions:

It is recommended that the proposed south extensions of the structure be founded on spread footing. Located at the aforementioned elevation (343.5 ft.). At these locations, however, a "reworked" zone exists in the glacial till deposit below about elevation 332. In order to ensure that this reworked zone is not overstressed, it is recommended that the footing extensions be designed using an allowable bearing pressure of no more than 3 t.s.f.

The subsoil beneath this extension is of the same nature as for the north abutments. The discussions relating to settlement and dewatering, mentioned previously will be applicable for these extensions also.

6.3) Widening of Approach Fill Embankments:

The existing embankments will be extended approximately 19 feet on each side of the structure.

These extensions will require that up to 12 feet of fill be placed on the north side and up to 17 feet on the south side.

In order to maintain a smooth transition from the existing to the new fill sections; it is recommended that:

a) All topsoil and organic material be stripped from the existing fill sections,
b) The new fill "keyed" into the existing approach fills in accordance with current M.T.C. practices, and
c) The new embankments be constructed with a standard 2:1 slopes.

If these measures are adopted, no stability problems are anticipated for the extensions. It would be desirable to construct the fill extensions a few months prior to paving in order to minimize the post-construction differential settlements between

the existing and the extended portions of the approach embankments.

7. *MISCELLANEOUS:*

The field work, carried out during the period of January 22 to January 23, 1973, was supervised by Mr. J. T. Bangs, Project Foundations Engineer, who also prepared this report.

The equipment used was owned and operated by Canadian Longyear Ltd. of Toronto.

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

J. T. Bangs

J. T. Bangs, P. Eng.

M. Devata

M. Devata, P. Eng.

JTB/ao
March 21, 1973.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 1

JOB 72-1119 — LOCATION Co-ordinates 984,345 N. - 166,376 E. — ORIGINATED BY J.B.

W.P. 44-73-06 — BORING DATE January 22, 1973 — COMPILED BY J.B.

DATUM Geodetic — BOREHOLE TYPE B.W. Casing — 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 PLASTIC LIMIT WATER CONTENT w WATER CONTENT % 5 10 15	BULK DENSITY γ	REMARKS
349.1	Ground Level										
0.0	Hetrogeneous mixture of Sand, Silt, Gravel and Clay Brown to Grey		1	SS	87						
341.1			2	SS	100/4"	340			○		
8.0	Grey Very Dense		3	SS	100/4"						
			4	SS	81				○		
			5	SS	100/3"						
	Glacial Till					330					
325.3			6	SS	100/5"				○		
			7	SS	100/1"						
23.8	End of Borehole										
						320					

Sieves: 349.0 — 10 — 40 — 80 — 200

GR SA SI CL

20 / 15 / 10 — % STRAIN AT FAILURE

OFFICE REPORT — SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 2

JOB 73-2206 — LOCATION Co-ordinates Ch. 185 N. - 166, 91 E. — ORIGINATED BY J.B.

W.P. No. 73-02 — BORING DATE January 23, 1973 — COMPILED BY J.B.

DATUM Geodetic — BOREHOLE TYPE B.W. Casing — CHECKED BY DE

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 — SHEAR STRENGTH P.S.F. UNCONFINED, QUICK TRIAXIAL, FIELD VANE, VANE	LIQUID LIMIT W_L, PLASTIC LIMIT W_P, WATER CONTENT W — WATER CONTENT % 5 10 15	BULK DENSITY γ P.C.F.	REMARKS GR CA SL CL
347.6	Ground Level									
0.0	Heterogeneous Mixture of Silt, Sand, Gravel and Clay. Very Dense, Glacial Till		1	SS	100/4"					Elev. Bas. P
			2	SS	100/4"	340				3 43 44 10
336.6	Down to Grey		3	SS	100/4"					
11.0	Grey		4	SS	14					
	Heterogeneous Mixture of Clayey Silt, Sand and Gravel.		5	SS	18	330				9 30 39 20
			6	SS	15					
	Very Stiff to Hard		7	SS	23	320				
	Glacial Till		8	SS	17					24 36 30 10
	Reworked Zone		9	SS	15					
	Between Elev. 311-332		10	SS	17	310				
			11a	SS	11					
			11b	SS	100					
			12	SS	101/11"	300				5 38 39 18
294.1			13	SS	100/4"					
53.3	End of Borehole					290				

20
15 ⊕ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No3

JOB 72-11149 — LOCATION Co-ordinates 944,194 N. - 166,437 E. — ORIGINATED BY J.B.

W.P. 44-7?-06 — BORING DATE January 25, 1973 — COMPILED BY J.B.

DATUM Geodetic — BOREHOLE TYPE B.W. Casing — CHECKED BY [illegible]

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT; SHEAR STRENGTH P.S.F. (o UNCONFINED, • QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_P, WATER CONTENT w (WATER CONTENT % 5 10 15)	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
347.9	Ground Level									
0.0	Hetrogeneous Mixture of Silt, Sand, Gravel and Clay. Dense to Very Dense Glacial Till Brown to Grey		1	SS	31				Elev. 343.4	9 36 41 14
			2	SS	100/9"	340				
			3	SS	89			o		
333.9			4	SS	60					4 44 38 14
14.0	Grey Hetrogeneous Mixture of Clayey Silt, Sand and Gravel Very Stiff to Hard Re-worked Zone Between Elev. 308-334		5	SS	16	330				
			6	SS	19			o		
			7	SS	39					14 41 35 10
			8	SS	30	320				
			9	SS	28					
	Glacial Till		10	SS	100/9"	310				
			11	SS	100/6"			o		1 40 37 22
297.3			12	SS	100/7"	300				
50.6	End of Borehole					290				

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH | FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 4

JOB 72-11149 | LOCATION Co-ordinates 944,351 N. – 166,303 E. | ORIGINATED BY J.B.

W.P. 44-76-01 | BORING DATE January 26, 1973 | COMPILED BY J.B.

DATUM Geodetic | BOREHOLE TYPE B.W. Casing | CHECKED BY [illegible]

ELEV. / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
353.8	Ground Level						
0.0	Hetrogeneous Mixture of Sand, Silt, Gravel and Clay	1	SS	19	350		
	Compact to Very Dense	2	SS	100			17 37 34 12
	Brown to Grey	3	SS	100/8"		Elev. 346.2 (water level)	
	Grey	4	SS	75	340		
		5	SS	64			8 40 37 15
332.0	Glacial Till	6	SS	28			
21.8	Sand and Gravel	7	SS	100/8"	330		
323.3	Very Dense	8	SS	100/6"			50 47 (3)
30.5	End of Borehole				320		

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT

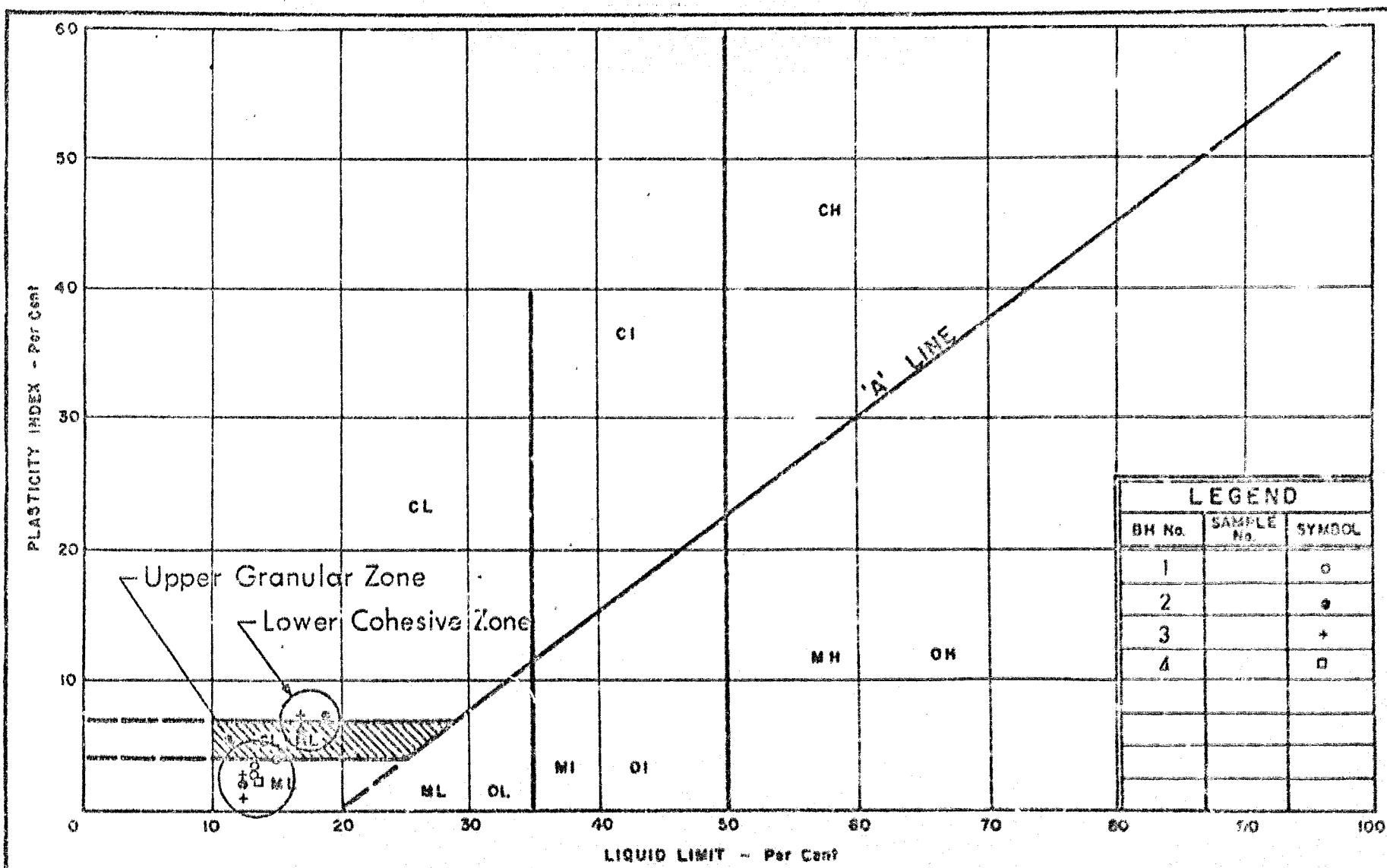
SHEAR STRENGTH P.S.F.: ○ UNCONFINED; + FIELD VANE; ● QUICK TRIAXIAL; × LAB VANE

LIQUID LIMIT W_L; PLASTIC LIMIT W_P; WATER CONTENT W — WATER CONTENT % 5 10 15

20 / 15 ◇ 5 / 10 % STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

FORM 08-MT-252
REVISED JUL[illegible] 1966



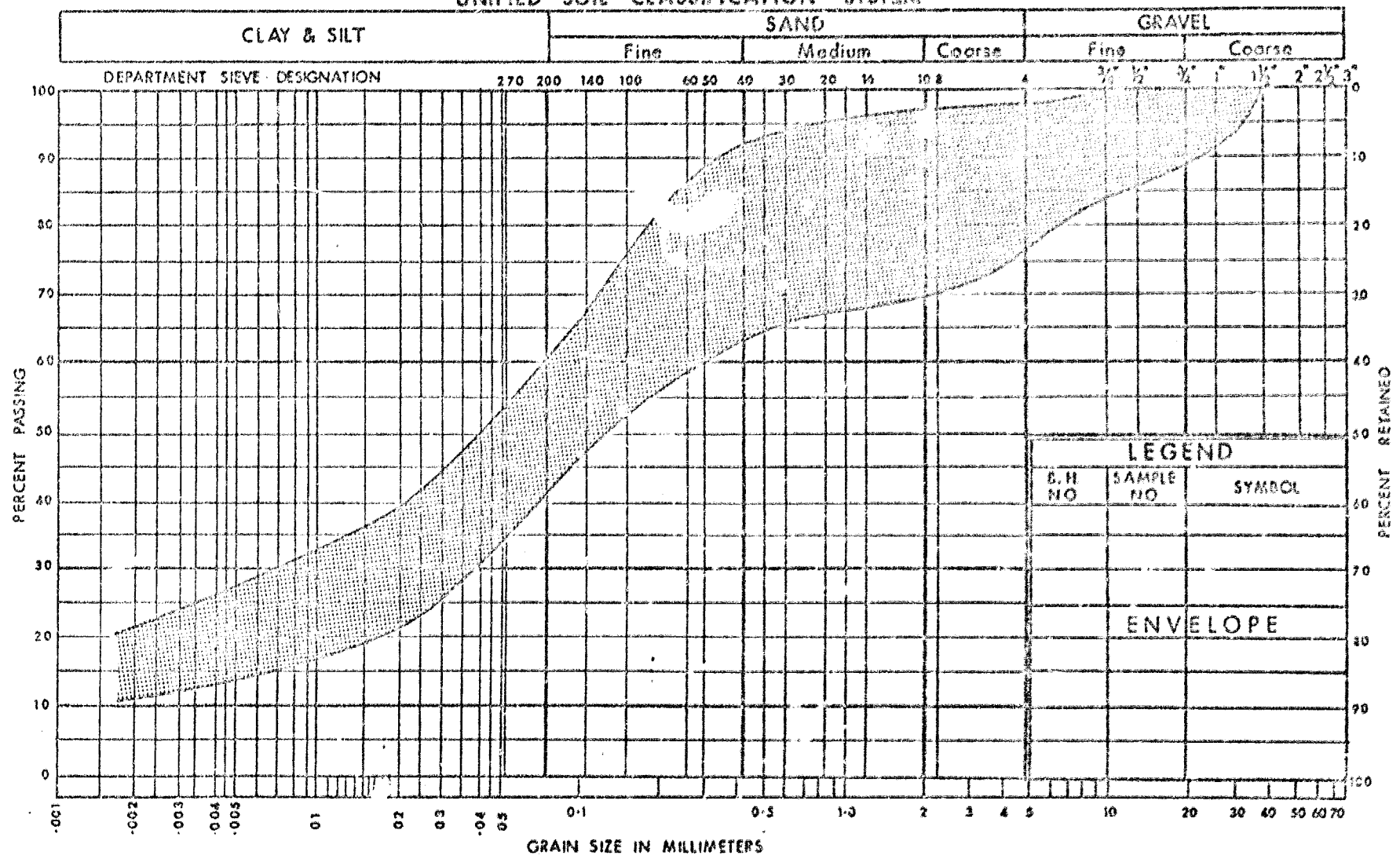
DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION

PLASTICITY CHART
GLACIAL TILL

WP No. 44-71-06
JOB No. 72-11149
FIG. Nº 1

FORM OD-MT-17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

W.P. No. 44-71-06
JOB No. 72-11149
FIG. Nº 2

FD-9a (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

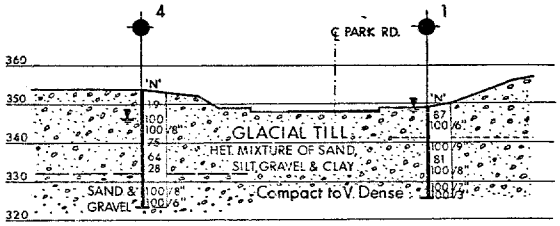
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

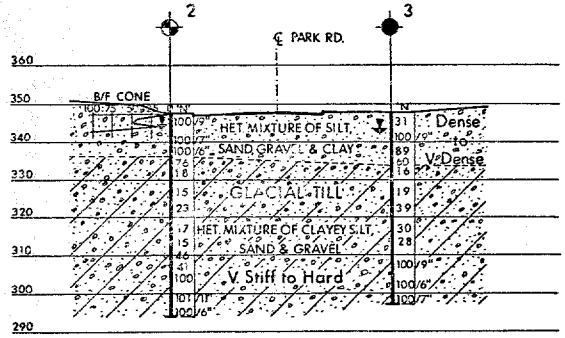
B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

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



A–A

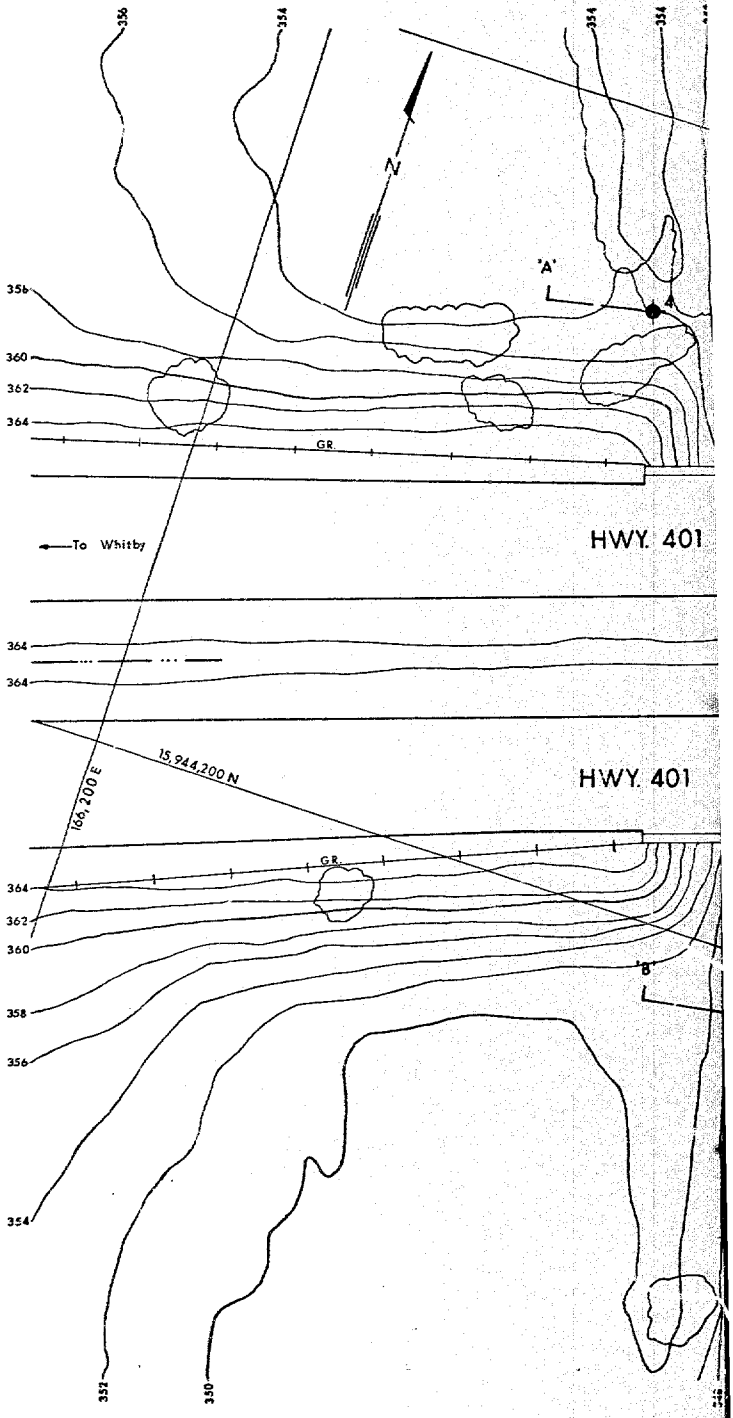


B–B

SECTIONS

SCALE

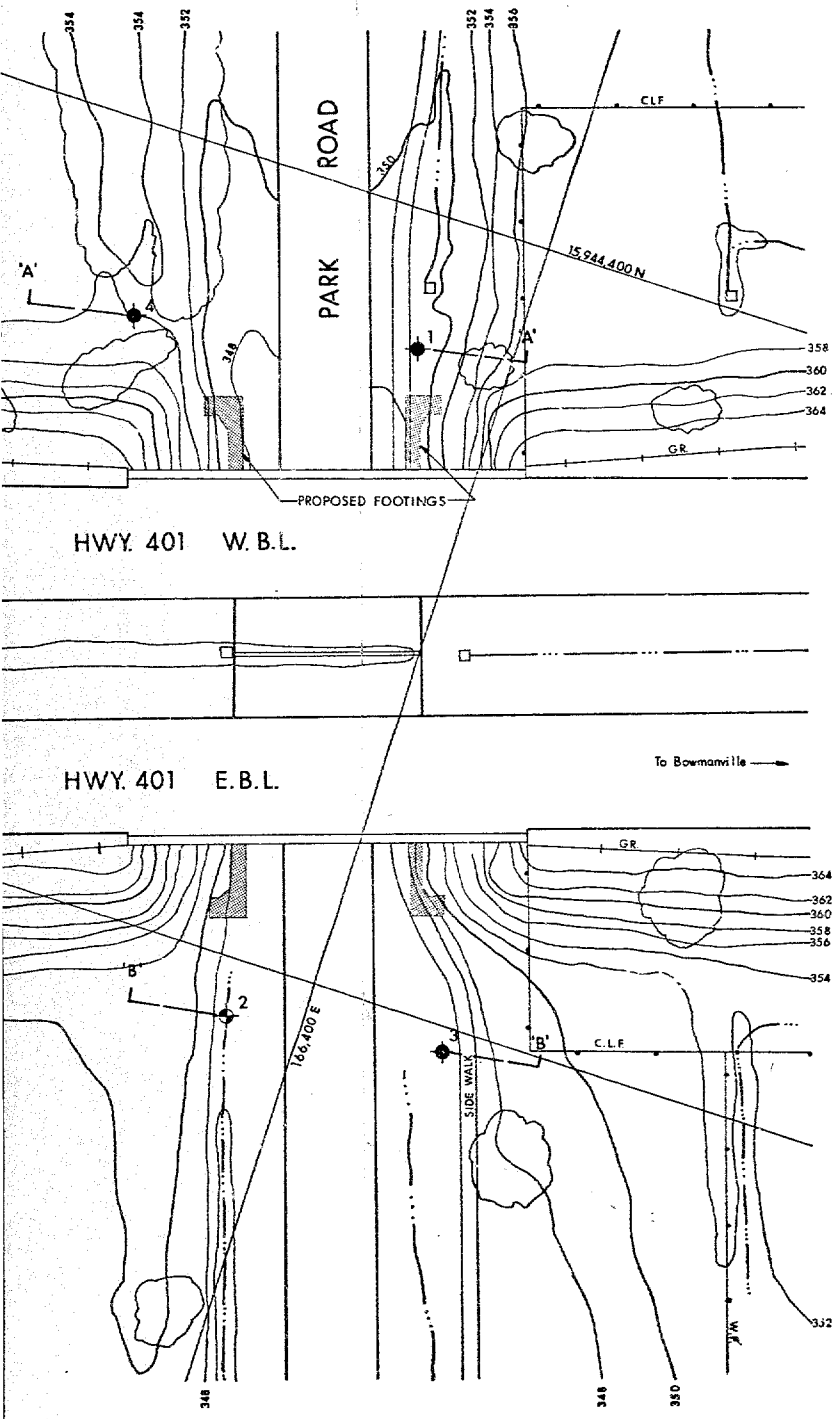
20 10 0 20 40 FT.



PLAN

SCALE

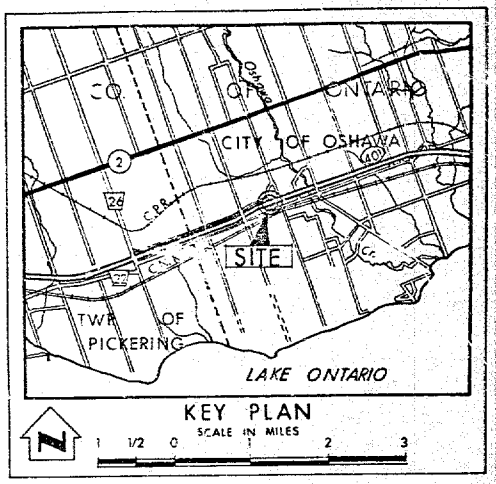
20 10 0 20



PLAN

SCALE 20 10 0 20 40 FT.

REF. No. B-4-17



KEY PLAN

SCALE IN MILES 1 1/2 0 1 2 3

LEGEND

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

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	349·1	944,365	166,376
2	347·6	944,185	166,381
3	347·9	944,194	166,437
4	353·8	944,351	166,303

— 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

PARK ROAD

HIGHWAY NO. 401 DIST. NO. 6

CO. ONTARIO CITY OF OSHAWA

TWP. LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D J.B.	CHECKED	WP NO. 44-71-06	DRAWING NO. 72-11149A
DRAWN F.L.	CHECKED	W.O. NO. 72-11149	
DATE FEB 26, 1973		SITE NO.	BRIDGE DRAWING NO.
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT. NO.	

memorandum

Ontario

To: Mr. A. McKillop
Area Construction Engineer
Port Hope

Date: 1979 05 11

Contract 77-133
Park Road Pedestrian Tunnel
Site #22-173
Deformation of Steel Tunnel Liner

During the grouting of the tunnel liner last year, the steel lin[illegible] developed a local deformation.

Recommendations made by the Structural Office and Soil Mechanics Sections were carried out. The deformation has been monitored and shows no measurable changes.

Based on recent discussions with Mr. Lin and Mr. G. Jewell it is recommended to raise the concrete floor of the tunnel approximately 6" to provide rigidity and cover to the reinforcement. The resulting reduction in vertical clearance is not considered important.

ECL:ja

E.C. Lane
Asst. Regional
Quality Assurance Engineer

For: R.P. Northwood
Head, Quality Assurance
Central Region

c.c. M. Devata
C.S. Grebski
K.C. Carter
C.F. Farrell

Ministry of Transportation and Communications
Ontario

Memorandum

To: Mr. A. McKillop
Area Construction Engineer
Port Hope

From: Quality Assurance Section
Construction Office
Central Region

Attention:

Date: 1978 07 20

Our File Ref.

In Reply to

Subject:

Contract 77-133
Park Road Overpass Widening
Culvert Relocation at abutment footing

A 21" concrete storm sewer, previously placed under this contract passes under the N.E. abutment of the above structure widening. The invert of the pipe is approximately 1' below the base elevation of the footing. The bedding material extends 6" below this level.

It is necessary to realign the storm sewer outside the limits of the footing.

The problem has been discussed with M. Devata of the Soil Mechanics Section and the following action is proposed.

The pipe and bedding should be completely removed and backfilled with mass concrete through the length of the N.E. widening. The back of the excavation s ould be sloped at 1 to 1. The mass concrete should be placed within 12 hours after excavating to prevent softening ~~of the softening~~ of the foundation material.

At the time of the excavation it should be determined if the existing foundation has been undermind or disturbed and if so, repaired with mass concrete. The pipe may be relocated immediately beyond the footing limits.

Yours sincerely,

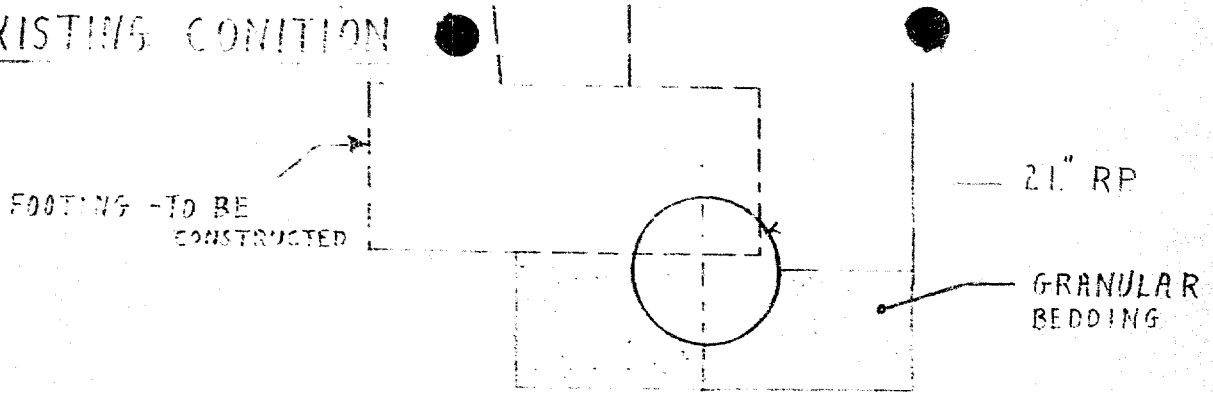
ECL:ja

E.C. Lane
Assistant Quality Assurance Engineer

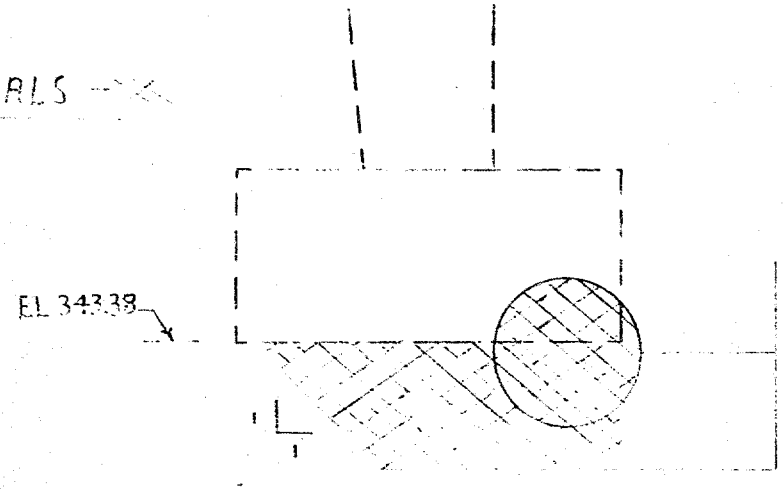
For: R.P. Northwood
Head, Quality Assurance

c.c. C. Grebski
M. Devata ✓
K. Carter

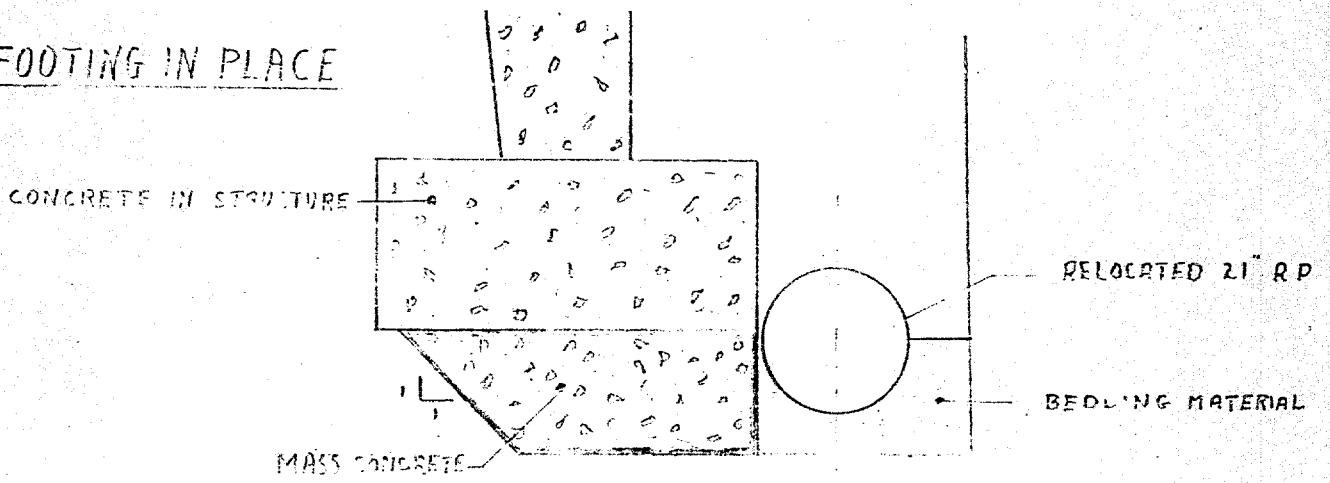
EXISTING CONDITION



REMOVALS



FOOTING IN PLACE



CONTRACT 77-133

PARK ROAD OVERPASS WIDENING

DOCUMENT PREPARED FOR IDENTIFICATION

GEOCRES No. 30M15-7

DIST. 6 REGION Central

W.P. No. 44-71-06

CONT. No. 77-133

W. O No. 72-11149

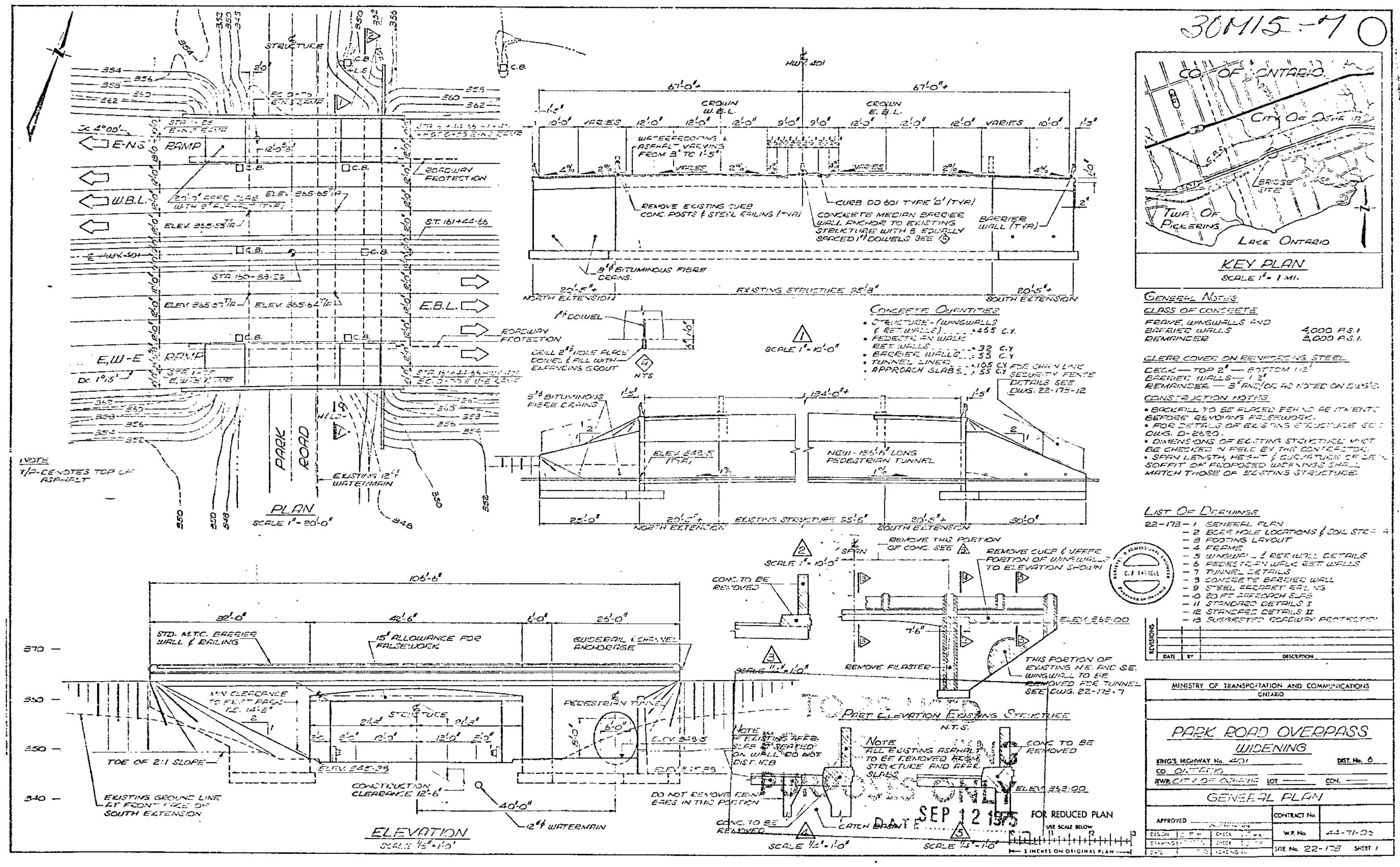
STR. SITE No 22-173

HWY. No.

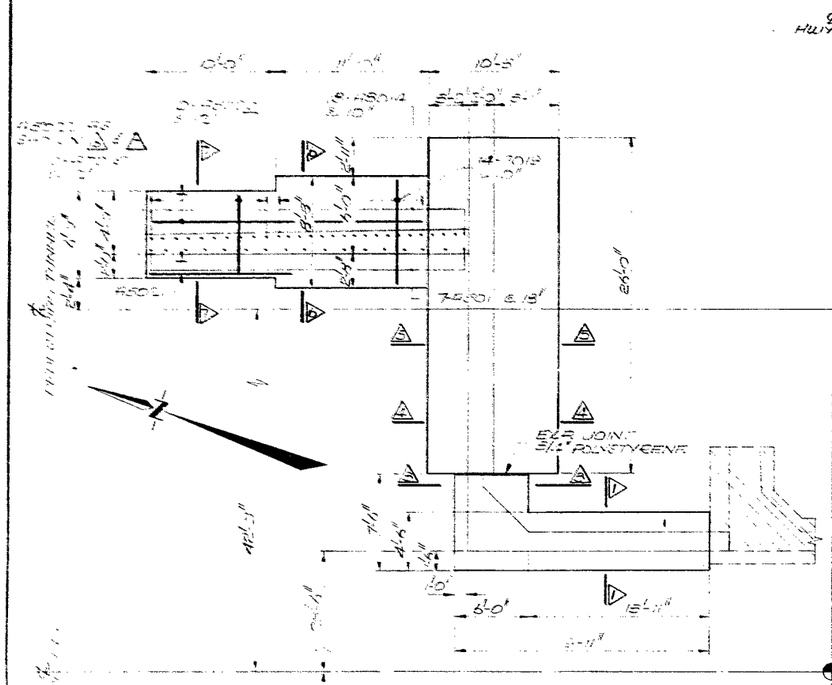
LOCATION Park Rd & Hwy. 401

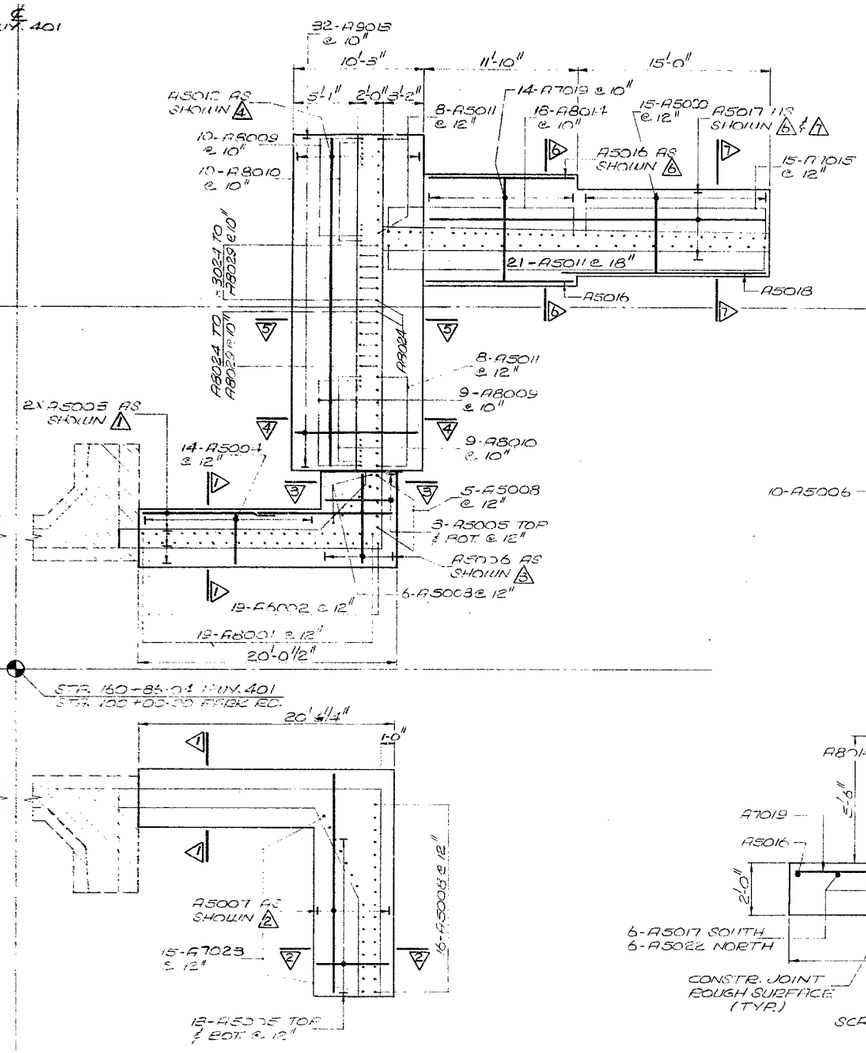
OVERLAY DRAWINGS TO BE INSERTED AFTER THIS REPORT 4

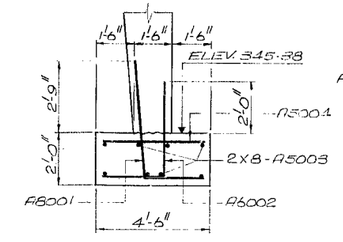
REMARKS:



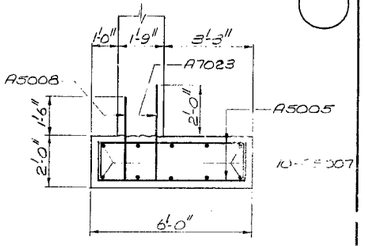
30M15-7
KEY PLAN
SCALE 1" = 1 MI.
LAKE ONTARIO
PLAN
SCALE 1" = 20'-0"
PARK ROAD
ELEVATION
HWY 401
EXISTING STRUCTURE
NORTH EXTENSION
SOUTH EXTENSION
CONCRETE QUANTITIES
GENERAL NOTES
LIST OF DRAWINGS
PART ELEVATION EXISTING STRUCTURE
FOR REDUCED PLAN
SEP 12 1975
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
PARK ROAD OVERPASS
WIDENING
KING'S HIGHWAY No. 401
DIST. No. 6
GENERAL PLAN
APPROVED
CONTRACT No.
W.P. No. 44-71-05
SITE No. 22-178 SHEET 1



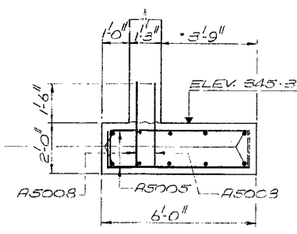




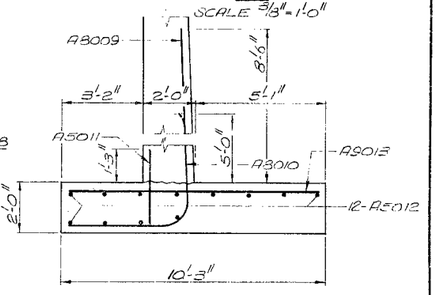
1 SCALE 3/8" = 1'-0"



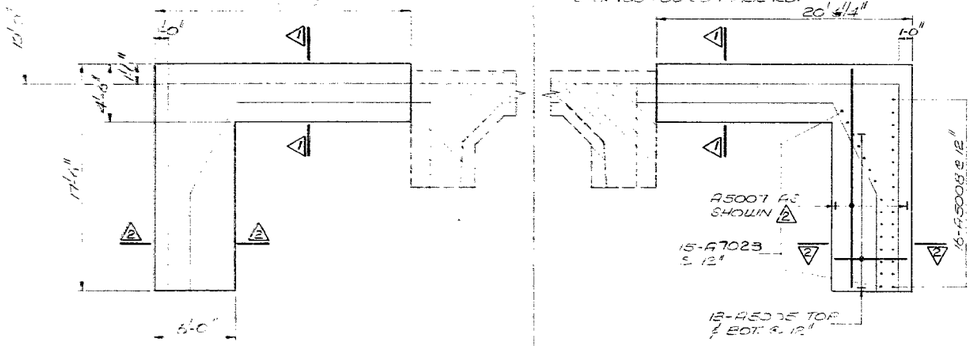
2 SCALE 3/8" = 1'-0"



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

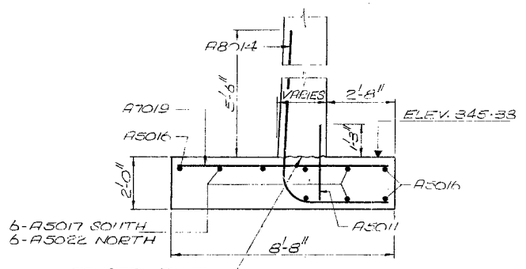


4 SCALE 3/8" = 1'-0"

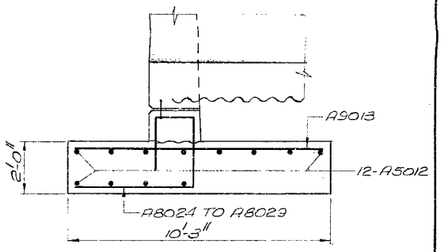


PLAN
SCALE 3/16" = 1'-0"

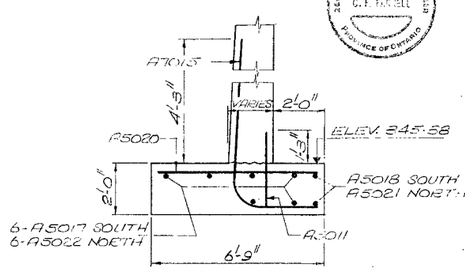
NOTE:
TOP OF FOOTING ELEVATION 345.38



6 SCALE 3/8" = 1'-0"



5 SCALE 3/16" = 1'-0"



7 SCALE 3/8" = 1'-0"

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

C. F. FARRELL — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

REVISIONS			
DATE	BY	DESCRIPTION	

RECEIVED GEOTECHNICAL BRANCH SEP 15 1975 SOIL MECHANICS SECTION MINISTRY OF TRANSPORTATION & COMMUNICATIONS

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

30M15-7

PARK ROAD OVERPASS
WIDENING

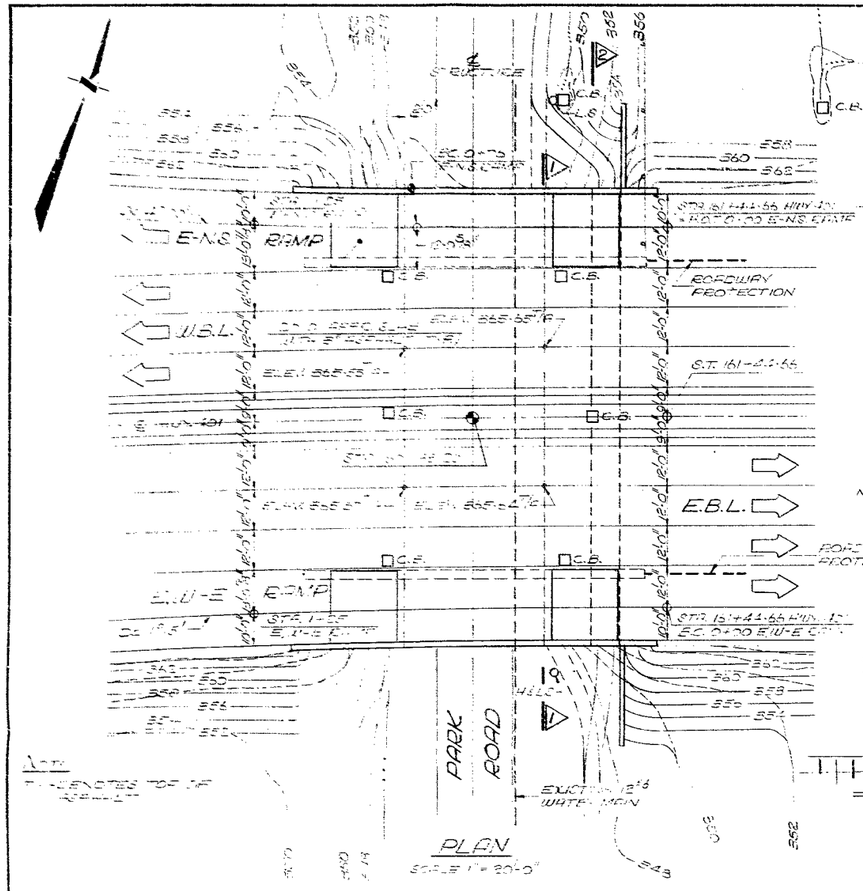
KING'S HIGHWAY No. 401 — DIST. No. 6
CO. ONTARIO
TWP. CITY OF OSHAWA LOT —— CON. ——

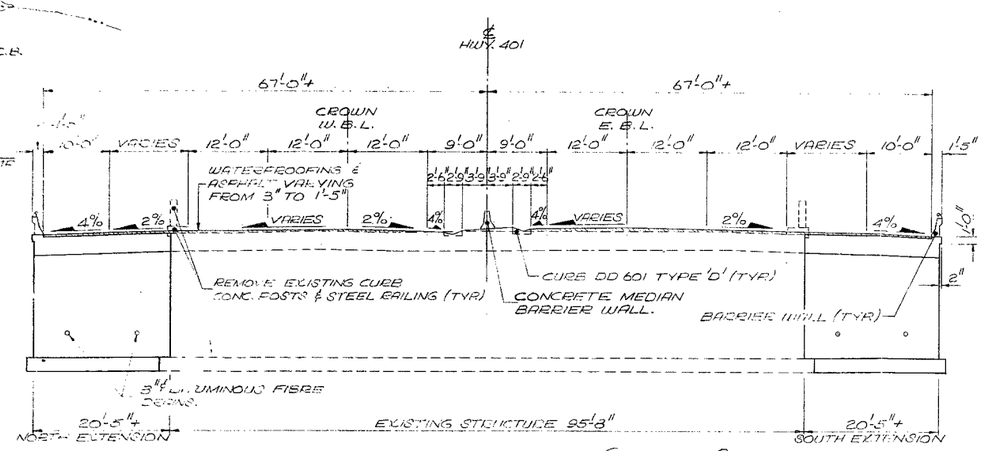
FOOTING LAYOUT

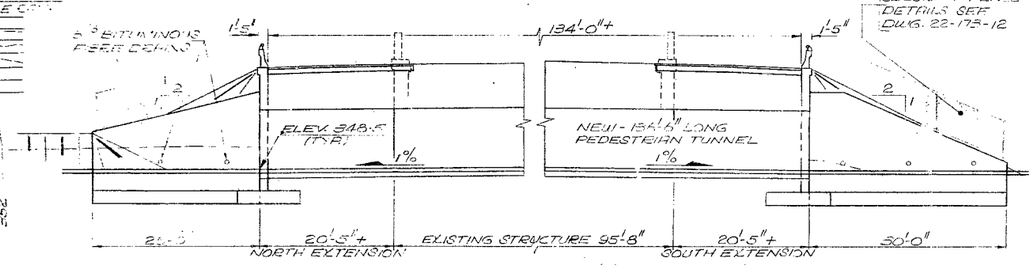
APPROVED ..... STRUCTURAL ENGINEER

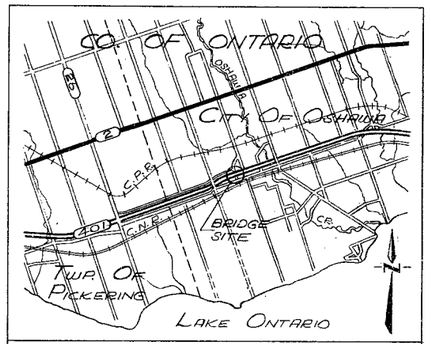
DESIGN	C.F.F.	CHECK	J.P.	CONTRACT No.	
DRAWING	E.O'N.	CHECK	C.F.F.	W.P. No.	44-71-06
DATE	JUNE 75	LOADING	MS-20-44	SITE No. 22-173	SHEET 3

ENT RECORD
NO. DATE









KEY PLAN
SCALE 1" = 1 MI.

General Notes

CLASS OF CONCRETE

FRAME, WINGWALLS, REINFORCED CONCRETE	
TUNNEL & BARRIER WALLS	4,000 P.S.I.
BORED TUNNEL	3,000 P.S.I.
REMAINDER	3,000 P.S.I.

CLEAR COVER ON REINFORCING STEEL

DECK — TOP 2" — BOTTOM 1½"
BARRIER WALLS — 1½"
REMAINDER — 3" AND/OR AS NOTED ON DWG'S.

CONSTRUCTION NOTES

- BACKFILL TO BE PLACED BEHIND ABUTMENTS BEFORE REMOVING FALSEWORK.
- FOR DETAILS OF EXISTING STRUCTURE SEE DWG. D-2620.
- DIMENSIONS OF EXISTING STRUCTURE MUST BE CHECKED IN FIELD BY THE CONTRACTOR.
- SPAN LENGTH, HEIGHT & CURVATURE OF DECK SOFFIT OF PROPOSED WIDENINGS SHALL MATCH THOSE OF EXISTING STRUCTURE.

Concrete Quantities

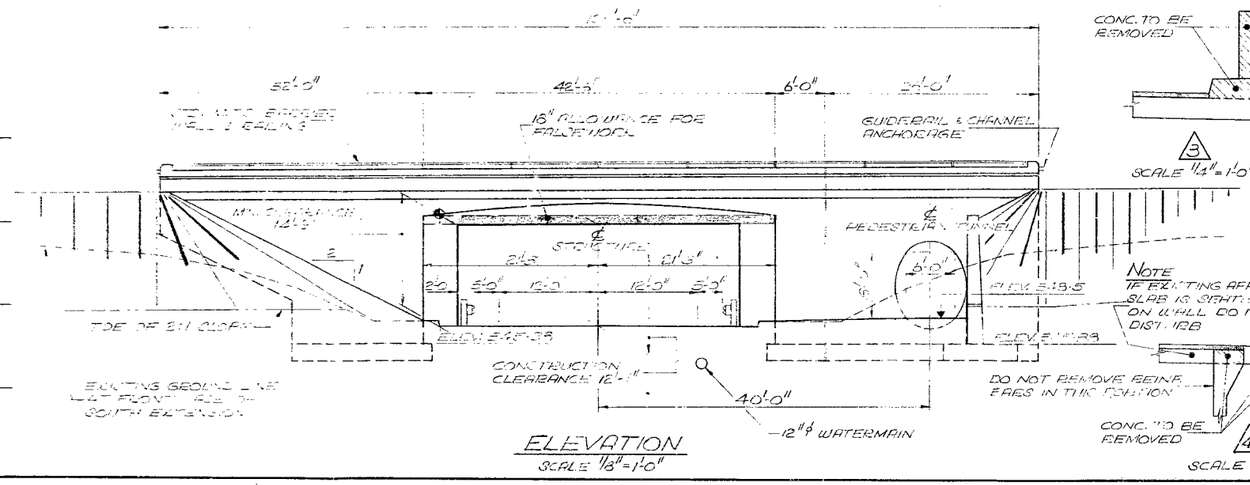
- STRUCTURE - (WINGWALLS & RET. WALLS) = 455 C.Y.
- PEDESTRIAN WALK RET. WALLS = 32 C.Y.
- BARRIER WALLS = 55 C.Y.
- TUNNEL LINER = 105 C.Y.
- APPROACH SLABS = 55 C.Y.

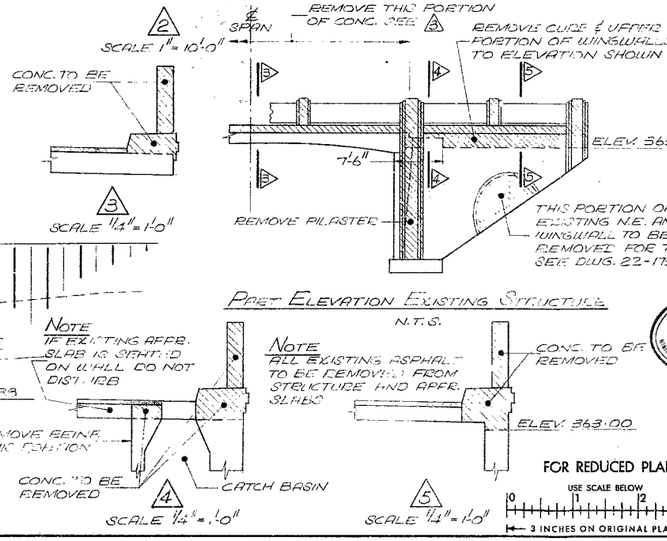
FOR CHAIN LINK SECURITY FENCE DETAILS SEE DWG. 22-178-12

List Of Drawings

22-178 — 1 GENERAL PLAN
— 2 BORE HOLE LOCATIONS & SOIL STRATA
— 3 FOOTING LAYOUT
— 4 FRAME
— 5 WINGWALL & RET. WALL DETAILS
— 6 PEDESTRIAN WALK, RET. WALLS
— 7 TUNNEL DETAILS
— 8 CONCRETE BARRIER WALL
— 9 STEEL PARAPET RAILING
— 10 20 FT. APPROACH SLAB
— 11 STANDARD DETAILS I
— 12 STANDARD DETAILS II
— 13 SUGGESTED ROADWAY PROTECTION

REVISIONS		
DATE	BY	DESCRIPTION





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

PRINT RECORD

NO.	FOR	DATE

RECEIVED GEOTECHNICAL OFFICE SEP 5 1975 SOIL MECHANICS & FOUNDATIONS

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

30M15-7

PARK ROAD OVERPASS WIDENING

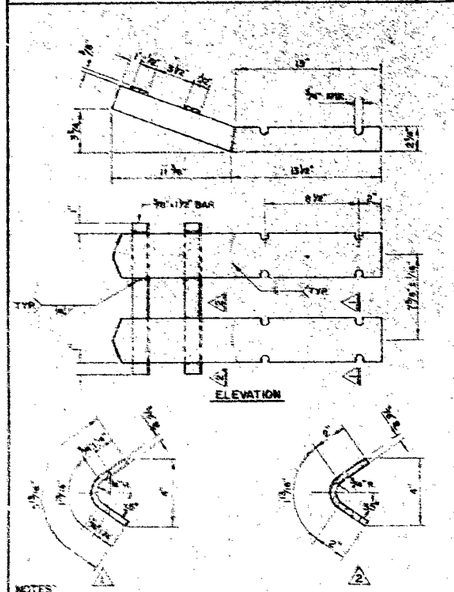
KING'S HIGHWAY No. 401 DIST. No. 6
CO. ONTARIO
TWP. CITY OF OSHAWA LOT CON.

GENERAL PLAN

APPROVED ____ STRUCTURAL ENGINEER		CONTRACT No.	
DESIGN	C.F.F.	CHECK	J.S.
DRAWING	E.O'N.	CHECK	C.F.F.
DATE	JUNE '75	LOADING	HS-20-44
		W.P. No.	44-71-06
		SITE No.	22-178 SHEET 1

GUIDE RAIL ANCHORAGE

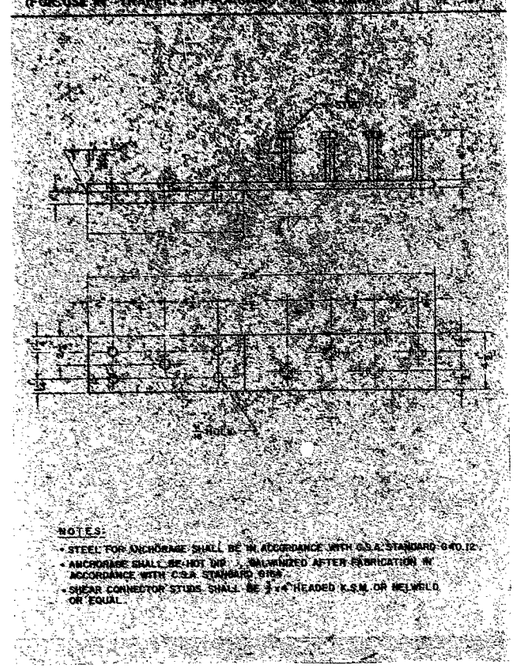
SS 10-10 DEC. 1971



NOTES:
- STEEL SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD G40.12 GRADE "A"
- ANCHORAGE SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH C.S.A. STANDARD G164

GUIDE RAIL CHANNEL ANCHORAGE (FOR USE IN "TRAFFIC APPROACHING" SITUATIONS)

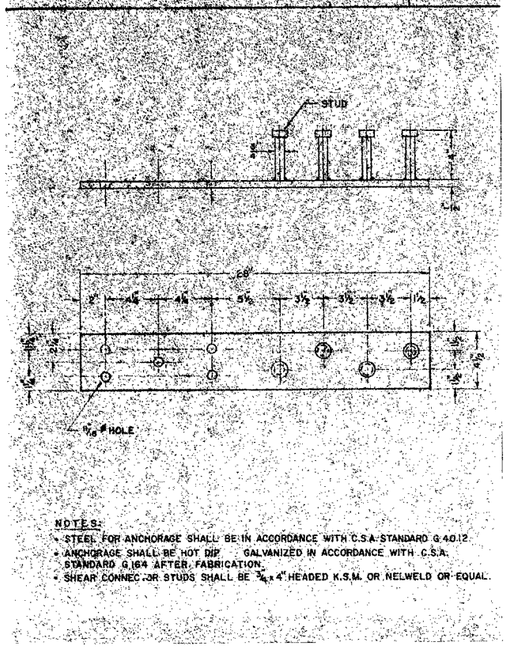
SS 10-11 DEC. 1971



NOTES:
- STEEL FOR ANCHORAGE SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD G 40.12.
- ANCHORAGE SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH C.S.A. STANDARD G 164 AFTER FABRICATION.
- SHEAR CONNECTOR STUDS SHALL BE 3/4" x 4" HEADED K.S.M. OR NELWELD OR EQUAL.

GUIDE RAIL CHANNEL ANCHORAGE (FOR USE IN "TRAFFIC LEAVING" SITUATIONS)

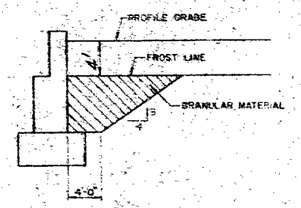
SS 10-12 DEC. 1971



NOTES:
- STEEL FOR ANCHORAGE SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD G 40.12
- ANCHORAGE SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH C.S.A. STANDARD G 164 AFTER FABRICATION.
- SHEAR CONNECTOR STUDS SHALL BE 3/4" x 4" HEADED K.S.M. OR NELWELD OR EQUAL.

DETAILS OF MINIMUM GRANULAR BACKFILL TO ABUTMENTS ONLY

SS 5-1 DEC. 1971



DISTRICT NO.	APPROX. FROST PENETRATION
1 TO 7	4 FT.
8 TO 11	5 FT.
15, 16, 17 AND 18	6 FT.
16, 19 AND 20	7 FT.

NOTES:
- SECTION PERPENDICULAR TO ABUTMENT.
- LATERAL LIMITS INSIDE FACE TO INSIDE FACE OF WINGWALL.

PRINT RECORD

NO.	DATE	BY

REVISIONS

DATE	BY	DESCRIPTION

RECEIVED SEP 1 1975

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

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

C-74115-4

DARK ROAD OVERPASS
WIDENING

KING'S HIGHWAY No. 40 DIST. No. 9
CO. ONTARIO
TWP. CITY OF OSHAWA LOT ____ CON. ____

STANDARD DETAILS I

APPROVED ..... STRUCTURAL ENGINEER
CONTRACT No.
W.P. No. 74-77-05

DESIGN	S.L.C.	CHECK	
DRAWING	E.O.N.	CHECK	S.F.F.
DATE	JUNE '75	LOADING	MS 20 M

SITE No. 22-175 SHEET 11