

G.I.-30 SEPT. 1976

GEOCRES No. 40I13-40
DIST. 2 REGION Southwestern
W.P. No. 41-66-29
CONT. No. 76-122
W. O. No. _____
STR. SITE No. 19-519
HWY. No. 402

LOCATION Middlesex County Road
6 Bridge, Twp. of Adelaide

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: documents to be unfolded
before microfilming
→ photos enclosed

FOUNDATION INVESTIGATION REPORT

For

County Road 6 Interchange Underpass
5.8 Miles West of Hwy. 81 (North of Strathroy)
Hwy. 402, District 2, London
W.P. 41-66-29

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project. Field work was done during the period June 25th to 27th, 1975, utilizing a continuous flight auger machine equipped with 3¼ inch I.D. hollow stem augers.

SITE DESCRIPTION

The site is located some 5.8 miles west of Hwy. 81 in Lots 6 and 7, Con. 1 and 2, Township of Adelaide, County of Middlesex, at the intersection of Hwy. 402 Line 'A', and existing Middlesex County Road 6 which is a surface treated gravel road. The surrounding area is gently rolling arable land engaged in mixed farming. In the immediate vicinity of the site the terrain slopes gently to the north towards a shallow watercourse.

SUBSURFACE CONDITIONS

General

Subsoil at the site consists of about 40 feet of stiff to hard clayey silt followed by about 15 to 20 feet of very dense silt to sandy silt followed by a deposit of hard clayey silt in which the borings penetrated only 3.5 feet before being terminated. Reference should be made to the Record of Borehole sheets contained in the report Appendix on which are shown the boundaries between the different soil types and summarized results of all field and laboratory testing carried out during the investigation. Reference should also be made to Drawing 19-519-2 of the Contract Drawings on which is shown the locations and elevations of all borings, together with the inferred subsoil stratigraphy. A detailed description of the soil types and conditions in order of occurrence from ground level downward is as follows.

Clayey Silt

This material occurs everywhere below the topsoil and the existing road and extends for about 40 feet below ground level to approximate elev. 756. On the basis of Atterberg Limit tests the soil is classified as clayey silt, the average liquid limit and plastic limit being about 35 and 16 percent respectively. The natural moisture content ranges from about 15 to about 21 percent, with a weighted average of about 20%. The undrained shear strength of the deposit based on Standard Penetration Test 'N' values is estimated to range from about 10,000 p.s.f. in a desiccated 7 to 10 foot thick upper zone (below elev. 794 and above elev. 778) to about 3500 p.s.f. at the base of the deposit, generally decreasing with depth. In borehole No. 1 a 6 foot thick deposit of essentially the same clayey silt material appeared to be fill material with a much lower undrained shear strength (1000 to 1500 p.s.f.) than elsewhere.

Silt to Sandy Silt

This material underlies the clayey silt and extends for further depths of 15 to 19 feet. On the basis of grain size distribution tests the soil is classified as silt to sandy silt. The natural moisture content ranges from 18 to about 20 percent. Standard Penetration test 'N' values were everywhere in excess of 100 blows/foot and on this basis the soil is classified as 'very dense'.

Clayey Silt

This deposit underlies the silt to sandy silt and was penetrated only 3.5 feet. The material is similar to the upper clayey silt deposit and the undrained shear strength is estimated to be about 4000 p.s.f.

Groundwater

Groundwater was observed in two borings only at elevations 788 and 778. Because of the low permeability of the subsoil the duration of the field work was too short to permit stabilization of the groundwater in the borings. It is believed that groundwater would have stabilized eventually at about 7 to 10 feet below the ground surface.

K. G. Selby

K.G. Selby, P. Eng.
Supervising Engineer

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 1

W.P. 41-66-29

LOCATION Co-ords. 15,621,674 N; 1,202,292 E.

ORIGINATED BY RD

DIST. 2 HWY. 402

BORING DATE June 25, 1975

COMPILED BY PJS

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger, Tricone & Cone Test

CHECKED BY 10

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 P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
795.6	Ground Level															GR SA. SI. CL.
0.0	Clayey Silt Fill, loose to compact		1	SS	6											
789.6			2	SS	12											
6.0	Clayey Silt very stiff to hard		3	SS	16											
			4	SS	53											
			5	SS	82											
			6	SS	54											
			7	SS	31											
			8	SS	35											
			9	SS	31											
756.6																
39.0	Silt to sandy silt trace of clay compact to very dense		10	SS	24											
			11	SS	100/4"											
			12	SS	100/4"											
737.6																
58.0	Clayey Silt															
734.1	Very Stiff		13	SS	28											
61.5	End of Borehole															

20
15 \diamond 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 2

W.P. 41-66-29 LOCATION Co-ords. 15,621,545 N; 1,202,296 E. ORIGINATED BY SD
 DIST. 2 HWY. 402 BORING DATE June 26, 1975 COMPILED BY PJS
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger, Tricone & Cone Test CHECKED BY SD

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 P.C.F.	REMARKS % GR. SA SI. CL.
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
797.5	Ground Level															
0.0	Clayey Silt															
	Very Stiff to Hard		1	SS	19											
			2	SS	50											
			3	SS	45											
			4	SS	32											
			5	SS	20											
			6	SS	24											
			7	SS	29											
			8	SS	29											
756.5			9	SS	58											
41.0	Silt to Sandy Silt															
	Trace of clay		10	SS	135											
	Very Dense		11	SS	100/4"											
741.6			12	SS	100/4"											
55.9	End of Borehole															

20
15 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH - GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 3

W.P. 41-66-29

LOCATION Co-ords. 15,621,387 N; 1,202,329 E.

ORIGINATED BY RD

DIST. 2 HWY. 402

BORING DATE June 27, 1975

COMPILED BY PJB

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger, Tricone & Cone Test

CHECKED BY *De*

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		
799.0	Ground Level															GR. SA. SI. CL.
0.0	Clayey Silt															
	Very stiff to Hard		1	SS	32											0 0 67 33
			2	SS	52											
			3	SS	46											
			4	SS	28											
			5	SS	26											
			6	SS	27											0 0 58 42
			7	SS	32											
			8	SS	33											0 0 56 44
756.0																
43.0	Silt to Sandy Silt		9	SS	148											
	trace of clay															
	very dense		10	SS	110	6"										
			11	SS	150	6"										0 32 65 3
741.0																
58.0	Clayey Silt															
737.5	Hard		12	SS	33											0 3 65 32
61.5	End of Borehole															
	Note:- Water Level															
	not recorded															

20
15 \diamond 5 % STRAIN AT FAILURE
10

FOUNDATION INVESTIGATION REPORT

For

Middlesex County Road 6 Bridge, Hwy. 402
Twp. of Adelaide, Dist. 2, London
W.P. 41-66-29, Site 19-519

1. INTRODUCTION

A request for a foundation investigation at the above site was received from Mr. A.P. Watt, Regional Structural Planning Engineer, Southwestern Region, London.

A field investigation was subsequently carried out by the Soil Mechanics Section to determine the subsoil conditions existing at the site. This report contains the results of our field and laboratory investigations, together with our recommendations relating to the design of the proposed structure foundations.

2. DESCRIPTION OF THE SITE

The proposed underpass is located 5.8 miles west of Hwy. 81 and approximately 1 mile south of Hwy. 22. The surrounding area is gently rolling arable land engaged in mixed farming. In the immediate vicinity of the site the land slopes gently to the north toward a shallow watercourse.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES

Field work consisted of three sampled boreholes advanced employing hollow stem augers, as well as three dynamic cone penetration tests.

Disturbed samples were obtained using a 2-inch O.D. split spoon sampler driven according to the specifications for the Standard Penetration Test.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the boreholes are shown on Drawing No. 416629-A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected representative samples to determine the following physical properties:

Atterberg Limits
Natural Moisture Content
Grain-size Distribution

The test results are summarized on the Record of Borehole Sheets contained in the Appendix of this report.

4. SUBSOIL CONDITIONS

Subsoil at this site consists of approximately 40 feet of very stiff to hard clayey silt with Standard Penetration 'N' values ranging from 12 to 82. Underlying this stratum 15 to 20 feet of very dense silt to sandy silt is found. Standard Penetration 'N' values for this layer are generally in excess of 100. Beneath this is a deposit of very stiff clayey silt.

5. DISCUSSION AND RECOMMENDATIONS

5.1 General

An underpass is proposed to carry Middlesex County Road 6 over Hwy. 402. This will involve the construction of embankments approximately 28 feet in height and a bridge of two spans each of which will be 140 feet in length.

5.2 Center Pier

It is recommended that the center pier be supported on spread footings at approximate elevation 790.0. A net safe bearing pressure of 4 tons per sq. ft. may be used for design purposes. Resistance to sliding may be determined using an adhesion design value of 2000 p.s.f.

5.3 Perched Abutments

The abutments may be constructed within the approach fills supported on well compacted granular 'A'. A net safe design load of 2.5 t.s.f. may be assumed. For calculations of sliding resistance, a friction coefficient of .55 may be assumed to apply between the footing and granular 'A'. A detailed construction scheme is outlined in Fig. 1 of the Appendix.

As an alternative, the abutments may be supported on steel tube piles (12-3/4" X 1/4") driven into the dessicated crust. These piles should be driven to elevation 792 for the south abutment and 784 for the north abutment. The piles must not be driven below these elevations as undrained shear strength decreases with depth. A safe design load of 25 tons per pile should be assumed for design purposes. Any horizontal loading should be resisted by battered piles.

5.4 Settlements

Total short and long term settlements of approximately 2 inches at the abutments and 1-1/2 inches at the center pier are anticipated.

5.5 Dewatering

No dewatering problems are anticipated due to the relatively impervious nature of the upper layers of the subsoil.

5.6 Approach Embankments

No stability problems are anticipated with embankment fills (28 ft.) if 2:1 slopes are employed. Cobbles exceeding 3" diameter should be removed from fill placed at locations through which piles have to be driven.


5.7 Frost Protection

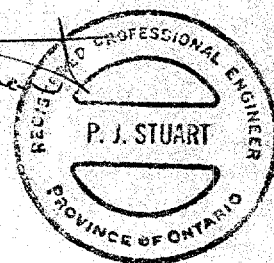
All pile caps or spread footings should be protected against frost action by a minimum 4 feet of cover.

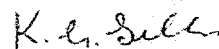
6. MISCELLANEOUS

The field work on this project was carried out June 25, 26 and 27, 1975 under the supervision of Mr. R. Donnelly, Student Technician. This report was written by Mr. P.J. Stuart, Project Engineer and reviewed by Mr. K.G. Selby, Supervising Engineer.

The equipment used was owned and operated by Master Soils Investigation Limited.


P.J. STUART
Project Engineer




K.G. SELBY
Supervising Engineer

July 1975

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

RECORD OF BOREHOLE NO 1

W.P. 41-66-29 LOCATION Co-ords. 15,621,674 N; 1,202,292 E. ORIGINATED BY RD
 DIST. 2 HWY. 402 BORING DATE June 25, 1975 COMPILED BY PJS
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger & Tricone 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		
795.6	Ground Level															
0.0	Clayey Silt Fill, loose to compact		1	SS	6											
789.6			2	SS	12	790										
6.0	Clayey Silt very stiff to hard		3	SS	16											
			4	SS	53											
			5	SS	82											
			6	SS	54	790										
			7	SS	31											
			8	SS	35	770										
			9	SS	31											
756.6						760										
39.0	Silt to sandy silt trace of clay compact to very dense		10	SS	24											
			11	SS	100/4"											
			12	SS	100/4"	740										
737.6																
58.0	Clayey Silt															
734.1	Very Stiff		13	SS	28											
61.5	End of Borehole															

20
15 ϕ 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE NO 2

W.P. 41-66-29 LOCATION Co-ords. 15,621,545 N; 1,202,296 E. ORIGINATED BY RD
 DIST. 2 HWY. 402 BORING DATE June 26, 1975 COMPILED BY PJS
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger & Tricone CHECKED BY LD

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		
797.5	Ground Level															
0.0	Clayey Silt															
	Very Stiff to Hard		1	SS	19											
			2	SS	50	790										1 5 55 39
			3	SS	45											
			4	SS	32											
			5	SS	20											
			6	SS	24	780										
			7	SS	29	770										
			8	SS	29											0 0 59 41
756.5			9	SS	58	760										
41.0	Silt to Sandy Silt															
	Trace of clay		10	SS	135											
	Very Dense		11	SS	100/4"	750										
741.6			12	SS	100/4"											0 5 91 4
55.9	End of Borehole															

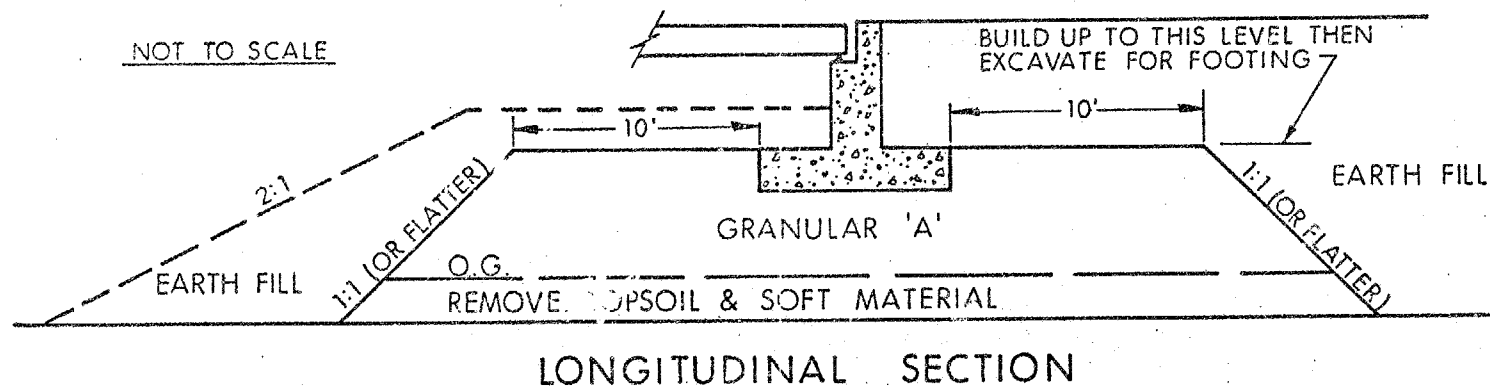
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 3

W.P. 41-66-29 LOCATION Co-ords. 15,621,387 N; 1,232,329 E. ORIGINATED BY RD
DIST. 2 HWY. 402 BORING DATE June 27, 1975 COMPILED BY PJS
DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger & Tricone CHECKED BY

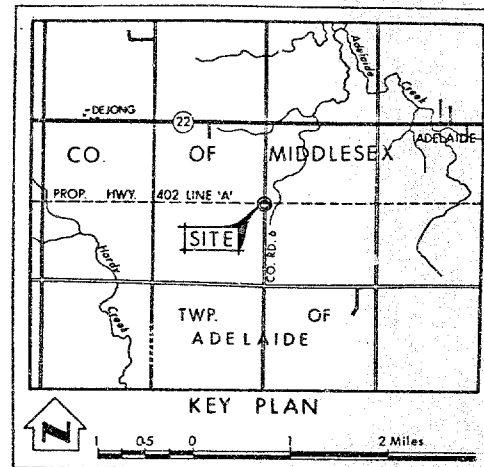
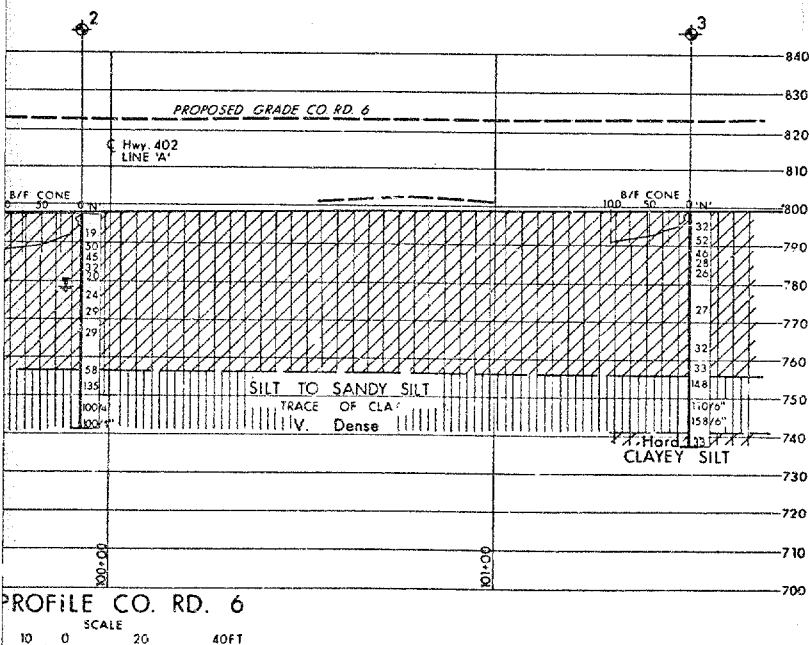
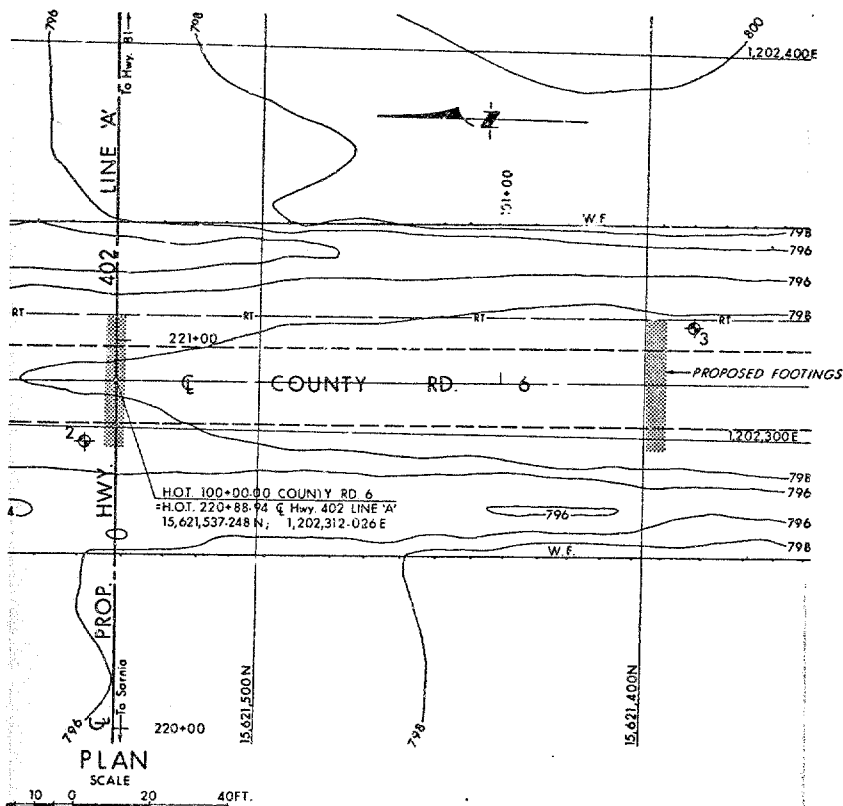
SOIL PROFILE			SAMPLES			GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w WATER CONTENT % w_P w w_L	UNIT WEIGHT γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100			
799.0	Ground Level													
0.0	Clayey Silt													
	Very stiff to Hard		1	SS	32									
			2	SS	52									
			3	SS	46									
			4	SS	28									
			5	SS	26									
			6	SS	27									
			7	SS	32									
			8	SS	33									
756.0			9	SS	148									
43.0	Silt to Sand Silt		10	SS	110.6"									
	trace of clay		11	SS	150.6"									
	very dense													
741.0														
58.0	Clayey Silt		12	SS	33									
737.5	Hard													
61.5	End of Borehole													
	Note:- Water Level													
	not recorded													

Figure 1 is a cross-section diagram of a road embankment. The embankment is symmetrical with a central rectangular core of 'GRANULAR A' material. The core has a width of 10' on each side of its center. The embankment slopes are labeled '2:1' and 'EARTH FILL'. The entire structure is labeled 'X - SECTION' at the bottom.



- 1 - REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'.
- 2 - PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT M.T.C. STANDARDS.
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING.

W. P. 41-66-29



LEGEND			
	Bore Hole		
	Dynamic Cone Penetration Resistance Test B/F CONE - Blow/Ft. Cone Test (300 lbs. energy/blow)		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation, June 1975 W.L. in Borehole 3 not established		
NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	795.6	15,621,674	1,202,292
2	797.5	15,621,545	1,202,296
3	799.0	15,621,387	1,202,329

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 LONDON 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
ENGINEERING SERVICES BRANCH—GEOTECHNICAL OFFICE—SOIL MECHANICS SECTION

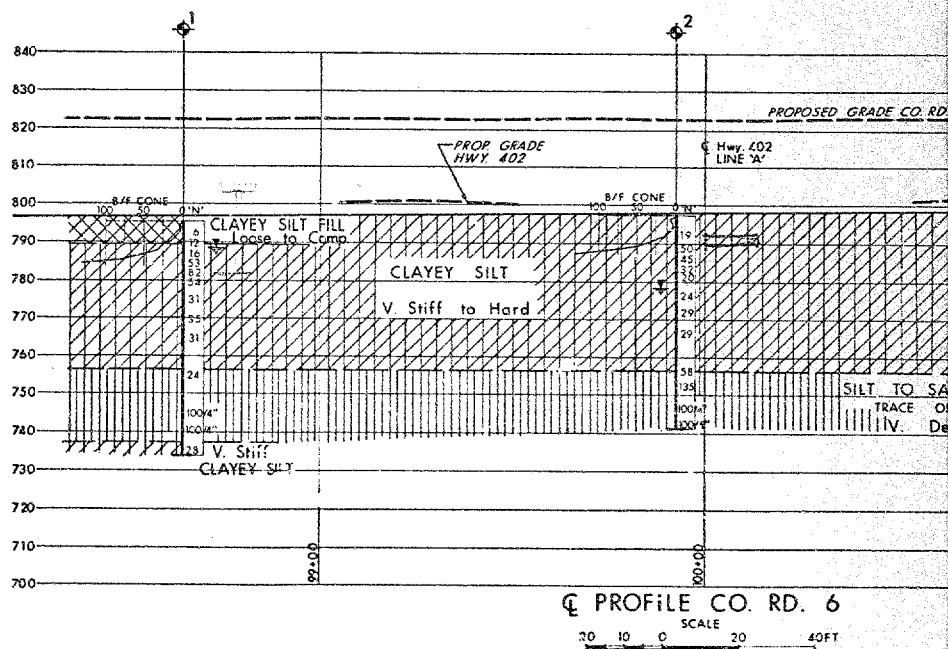
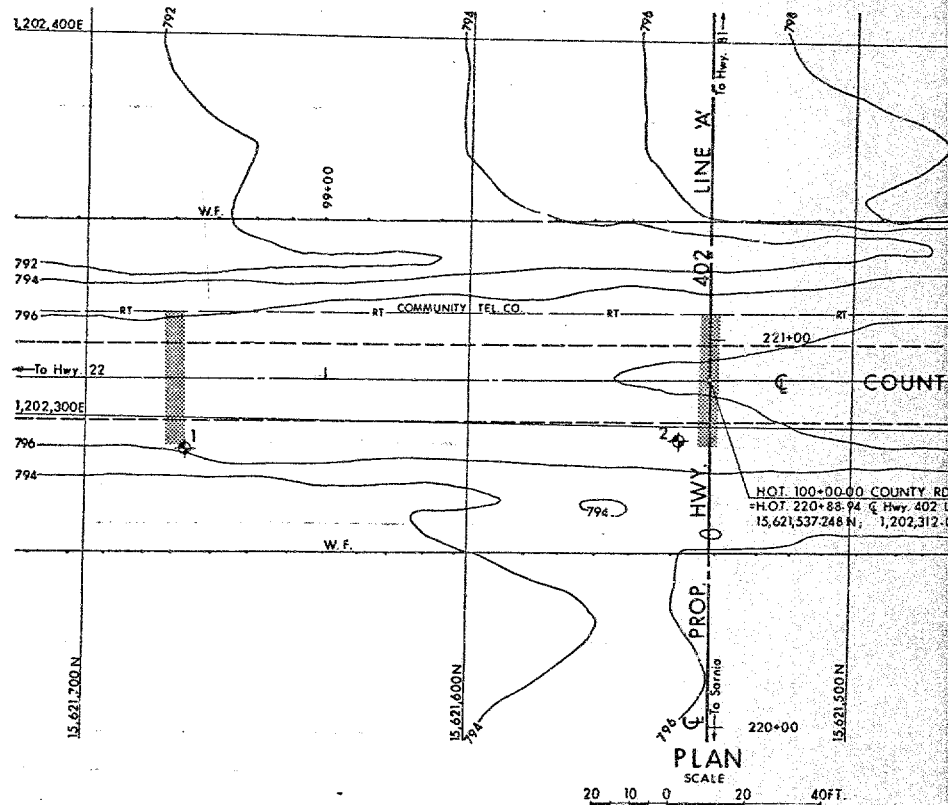
COUNTY ROAD 6

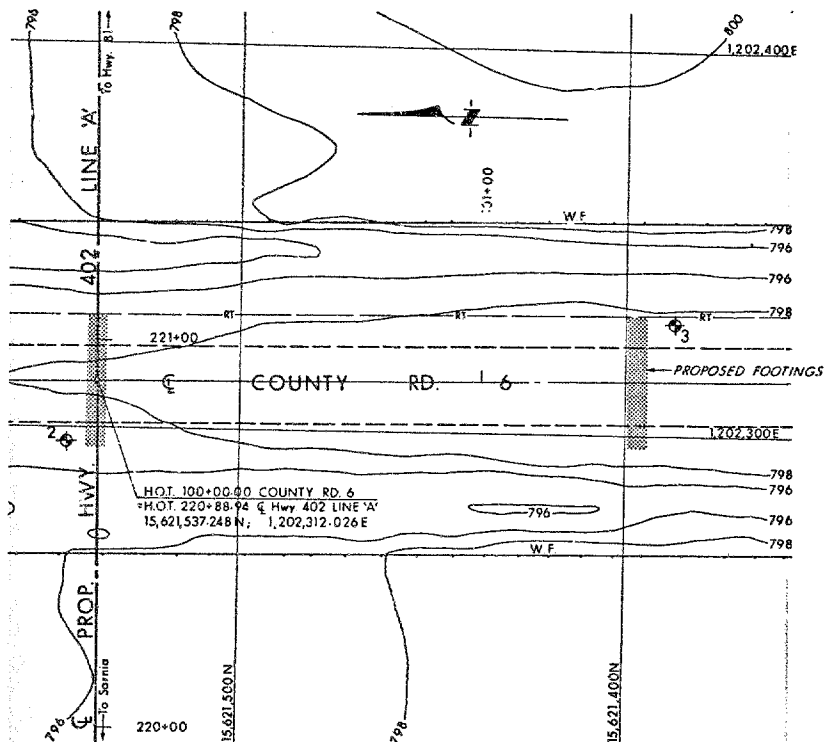
HIGHWAY NO. Prop. 402 LINE 'A' DIST. NO. 2
CO. MIDDLESEX
TWP. ADELAIDE LOT 6 & 7 CON. I & II

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD PJS	CHECKED	WP NO 41-66-29	DRAWING NO
DRAWN	CHECKED	W.O. NO	416629-A
DATE	JULY 24, 1975	SITE NO 19-519	BRIDGE DRAWING NO
APPROVED		CONT NO	

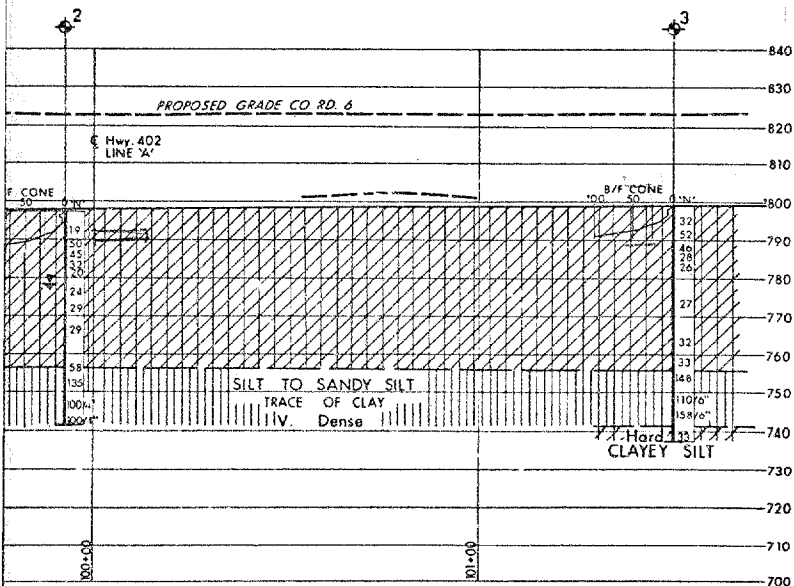
REF. NO. E-5377-1; April 1975





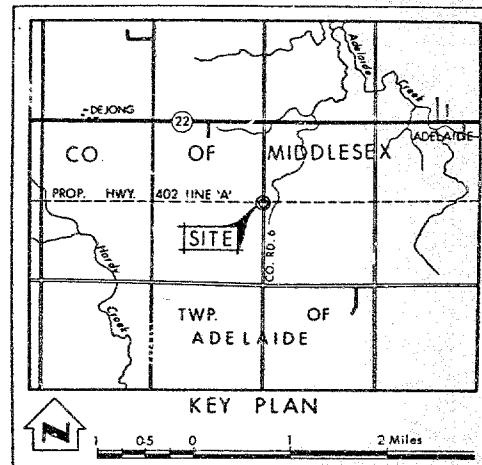
PLAN

SCALE
10 0 20 40FT.



PROFILE CO. RD. 6

SCALE
10 0 20 40FT.



LEGEND

- Bore Hole
- Dynamic Cone Penetration Resistance Test
B/F CONE - Blows/Ft. Cone Test (350 ft. lbs. energy/blow)
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, June 1975
W.L. in Borehole 3 not established

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	795.6	15,621,674	1,202,292
2	797.5	15,621,545	1,202,296
3	799.0	15,621,387	1,202,329

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 LONDON 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
ENGINEERING SERVICES BRANCH—GEOTECHNICAL OFFICE—SOIL MECHANICS SECTION

COUNTY ROAD 6

HIGHWAY NO Prop. 402 LINE 'A' DIST NO 2
CO MIDDLESEX
TWP ADELAIDE LOT 6 & 7 CON I & II

BORE HOLE LOCATIONS & SOIL STRATA

SUBMIT P.J.S.	CHECKED	W.P. NO 41-66-29	DRAWING NO
DRAWN	CHECKED	W.O. NO	416629-A
DATE	JULY 24, 1975	SITE NO 19-519	BRIDGE DRAWING NO
APPROVED		CONT NO	



Memorandum

To: Mr. K. G. Selby, Head
Soil Mechanics Section
Geotechnical Office
West Bldg., Downsview

From: Structural Planning Office
Southwestern Region

Attention:

Date: May 16, 1975

Our File Ref.

In Reply to

Subject: W.P. 41-66-29, Bridge Site 19-519
County Road 6 Interchange Underpass
5.8 miles west of Hwy. 81 north of Strathroy
Highway 402
District 2, London

Would you kindly arrange to have a foundation investigation conducted at the above location.

Enclosed please find 2 prints of the bridge site plan E-5377-1 with the probable footing locations marked in red. Also enclosed is the Field Reconnaissance Report and pictures for the above location.

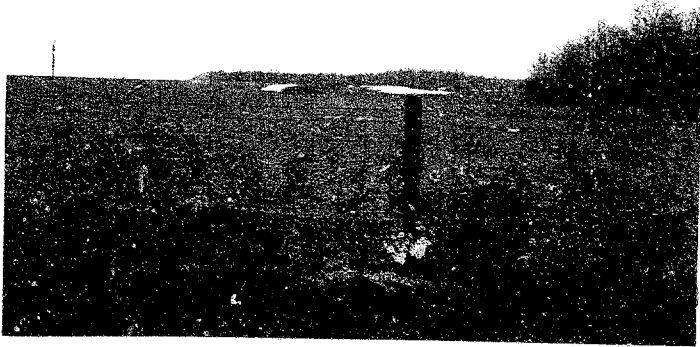
S. Jants

S. Jants
Structural Planning Supervisor

SJ:sm
Enc.

cc J. Anderson
A. Crowley
J. Forster





looking west



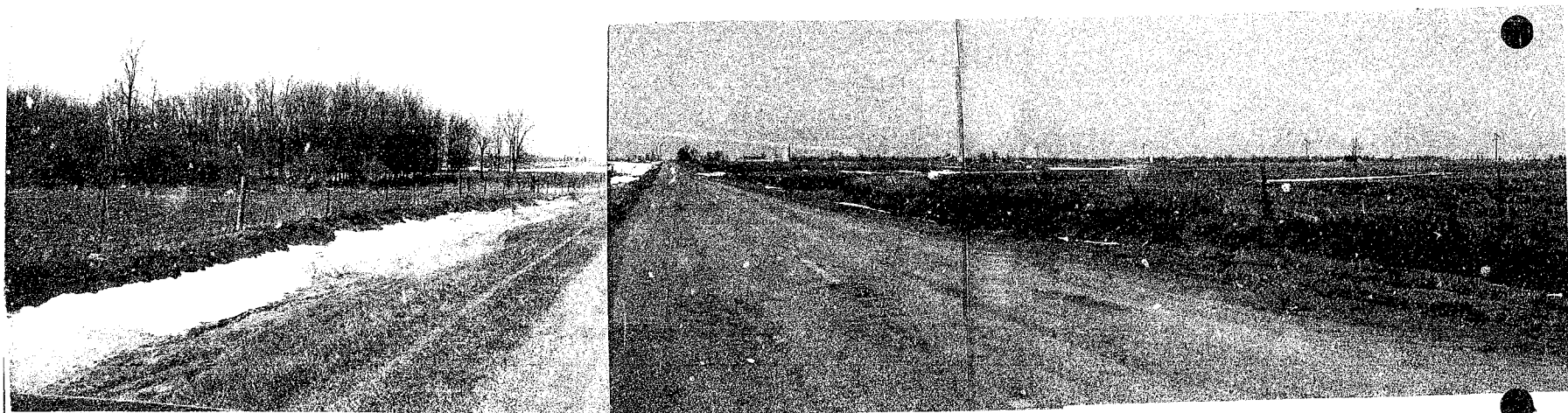
looking east

W.P. 41-66-29

Co. Rd. 6 Interchange U'Pass

Hwy. 402

Bridge Site 19-519



General view looking north

17/4/75

DOCUMENT TYPE DATE OF SUBMITTAL IN

GEOCRES No. 40 T 13-40

DIST. 2 REGION SOUTHWESTERN

W.P. No. 41-46-29

CONT. No. 76-122

W. O. No. _____

STR. SITE No. 17-519

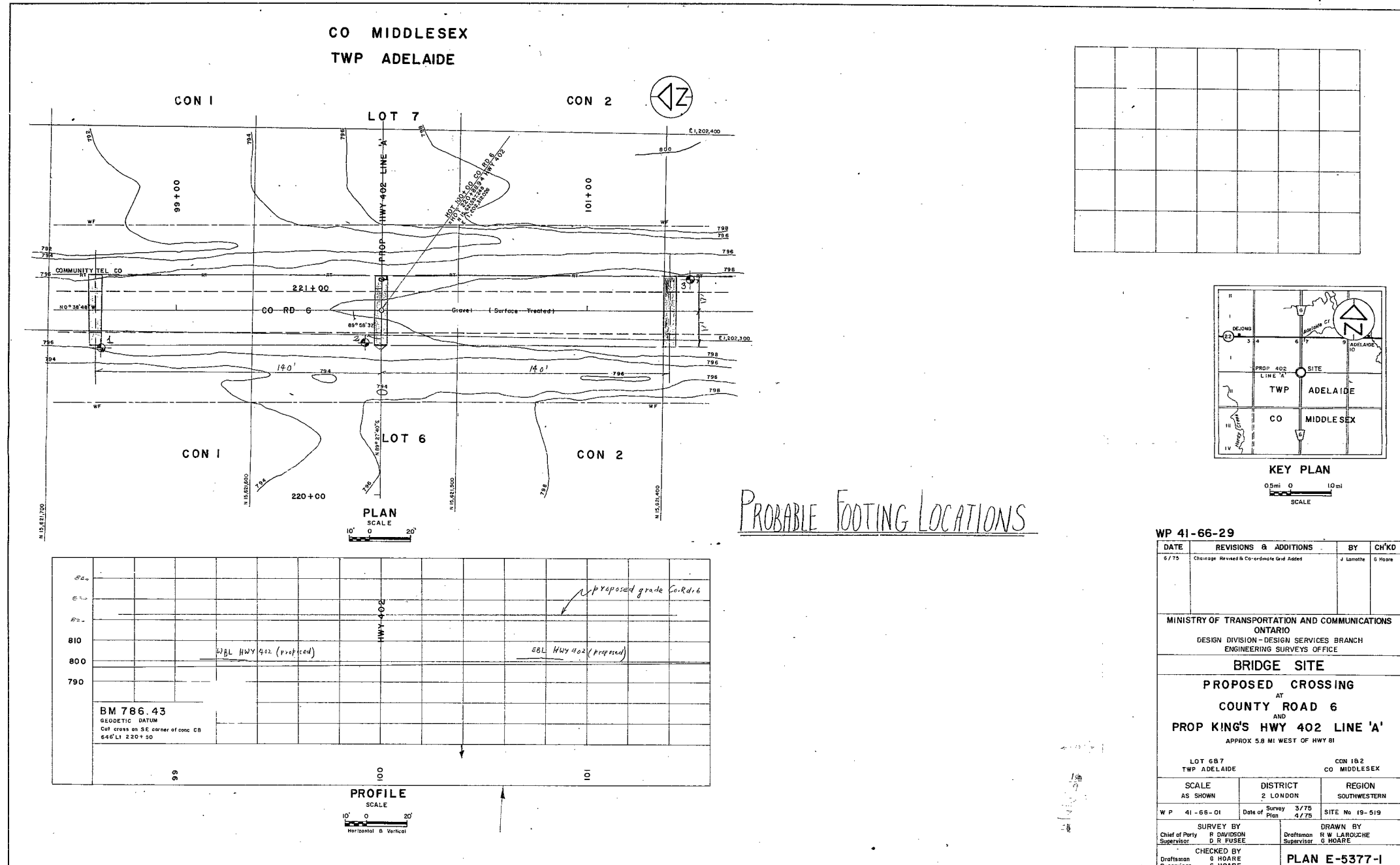
HWY. No. 402

LOCATION MIDDLESEX COUNTY ROAD

6 BRIDGE, TWP. OF ADELAIDE.

CHECKED BY _____ DATE OF CHECK _____

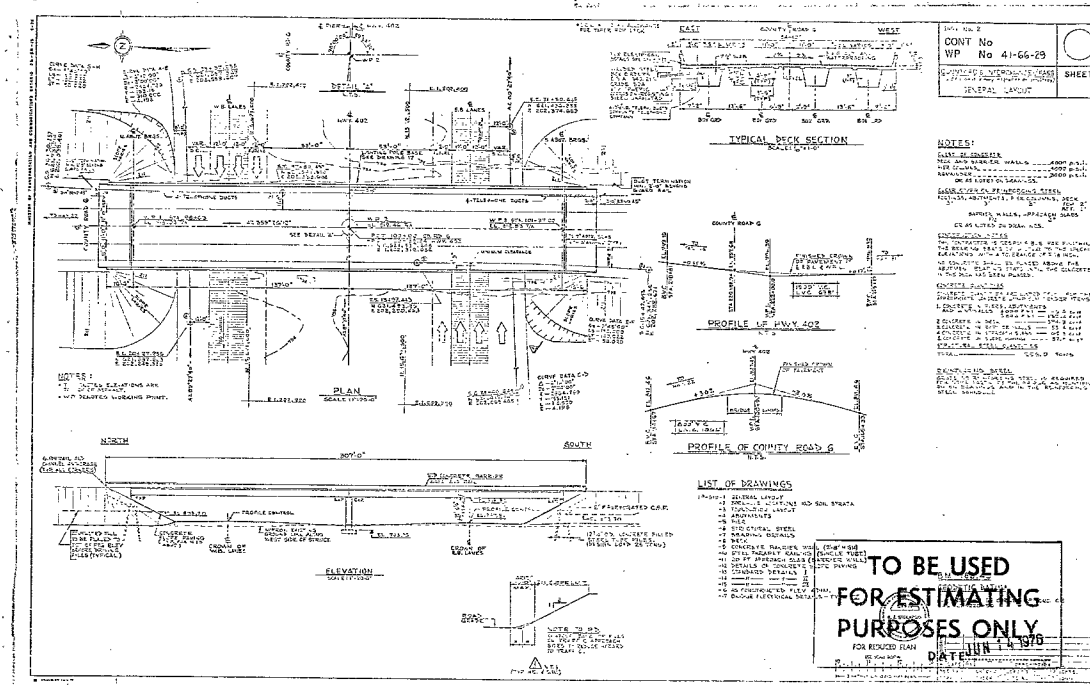
REMARKS: _____

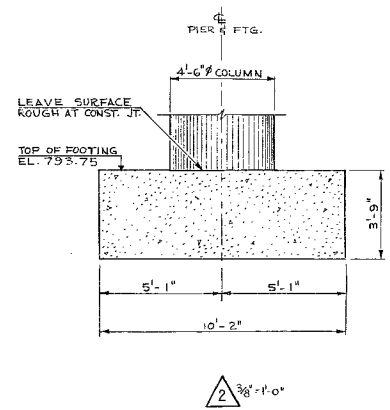
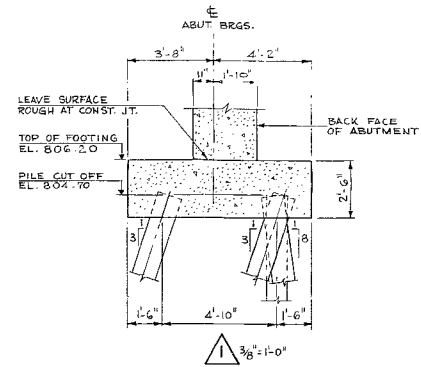
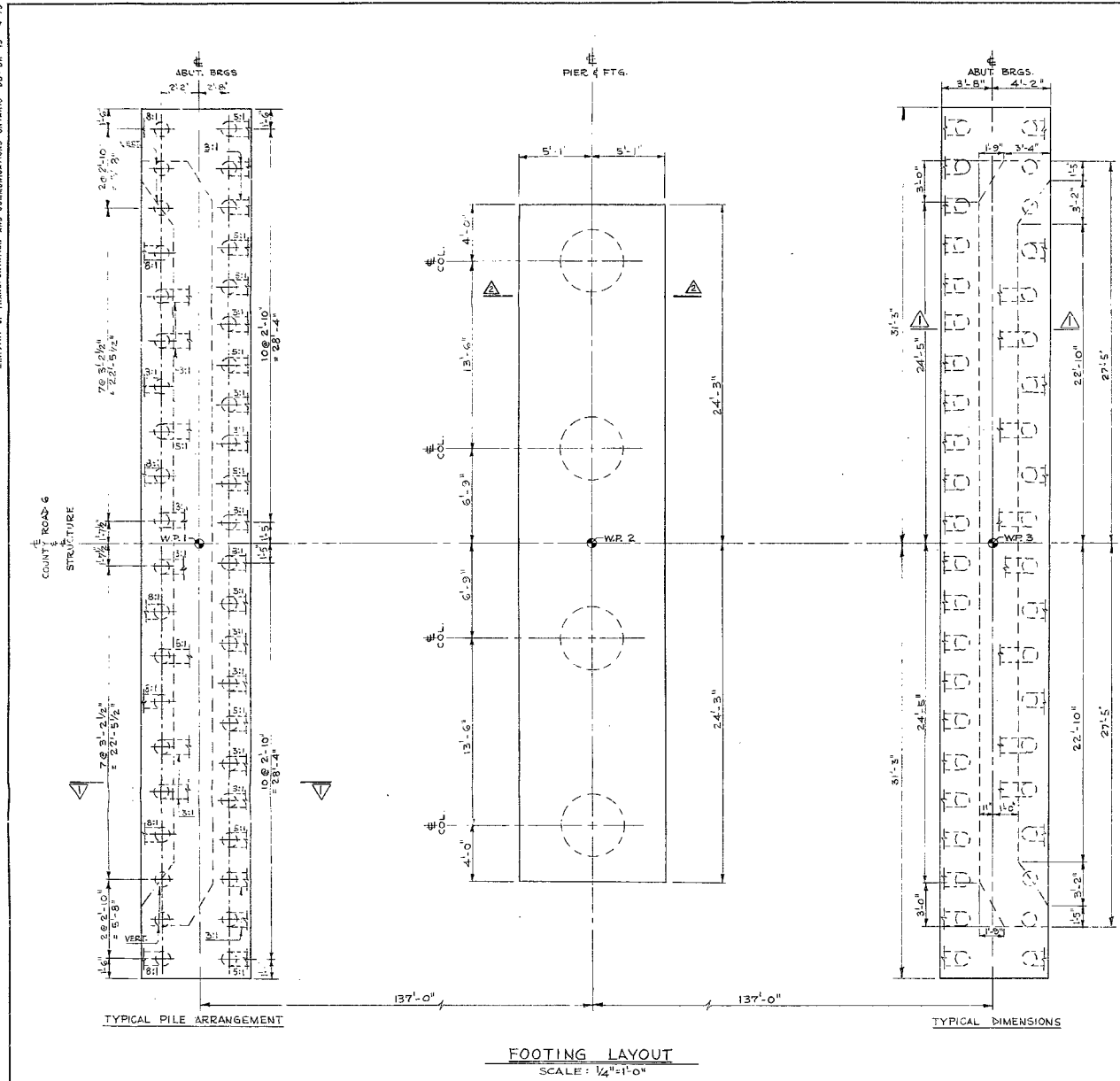


W.P. 41-66-01



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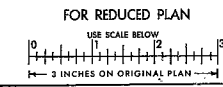
DIST. No. 2	
CONT No	
WP No 41-66-29	
COUNTY RD. 6 INTERCHANGE UPASS	SHEET
FOOTING LAYOUT	

PILE DATA TABLE				
LOCATION	NO.	LENGTH	BATTER	
NORTH ABUTMENT	20	23'-0"	3:1	
	10	22'-0"	5:1	
	8	22'-0"	5:1	
	4	21'-0"		
SOUTH ABUTMENT	20	16'-0"	3:1	
	10	16'-0"	5:1	
	8	16'-0"	5:1	
	4	15'-0"		

- NOTES:
- ALL PILES ARE 12 3/4" O.D. x 0.25" WALL STEEL TUBE PILES.
 - TUBE PILES TO BE FILLED WITH 3000 P.S.I. CONCRETE AFTER INSTALLATION AND INSPECTION.
 - PILES SHALL BE DRIVEN IN ACCORDANCE WITH S53-11, USING A DESIGN LOAD OF 25 TONS/PILE, BUT NOT BELOW EL. 790.00 S. ABUT. FOOTING AND EL. 784.00 N. ABUT. FOOTING WITHOUT APPROVAL OF THE ENGINEER.
 - PILE LAYOUT GIVEN AT UNDERSIDE OF ABUTMENT FOOTINGS. DIMENSIONS AND PILE LAYOUT SIMILAR FOR BOTH ABUTMENTS.

CONCRETE QUANTITIES

CONCRETE IN TUBE PILES 49 cu.yd.



REVISIONS	DATE	BY	DESCRIPTION
1	JAN 06 1977		DESIGN K.Z.S. CHECK A.K. LOADING HS 20-44 DATE 10/2/76
2			DRAWING CHECK 1/3 SITE No 19-519 DWG. 3

40113-40

