

DOCUMENT WITH REMARKS FOR INFORMATION

GEOCRES No. 40 J 16-44

DIST. 1 REGION SOUTHWESTERN

W.P. No. 43-65-10/11

CONT. No. 72-65

W. O. No. 70-11113

STR. SITE No. _____

HWY. No. 40

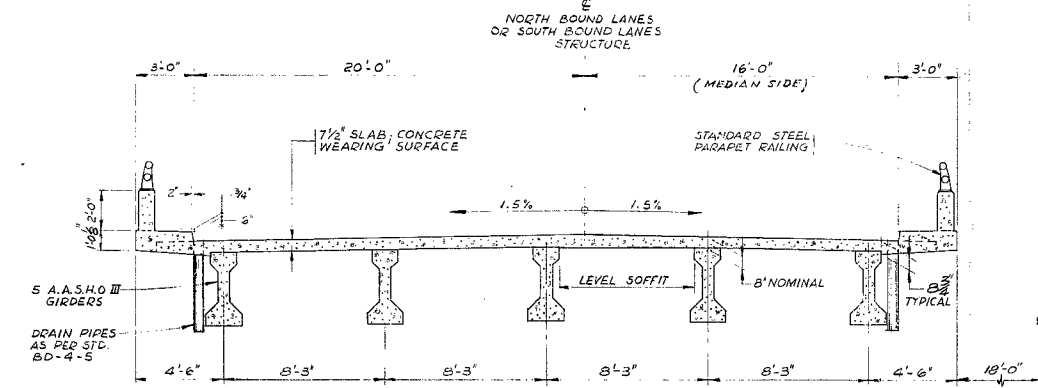
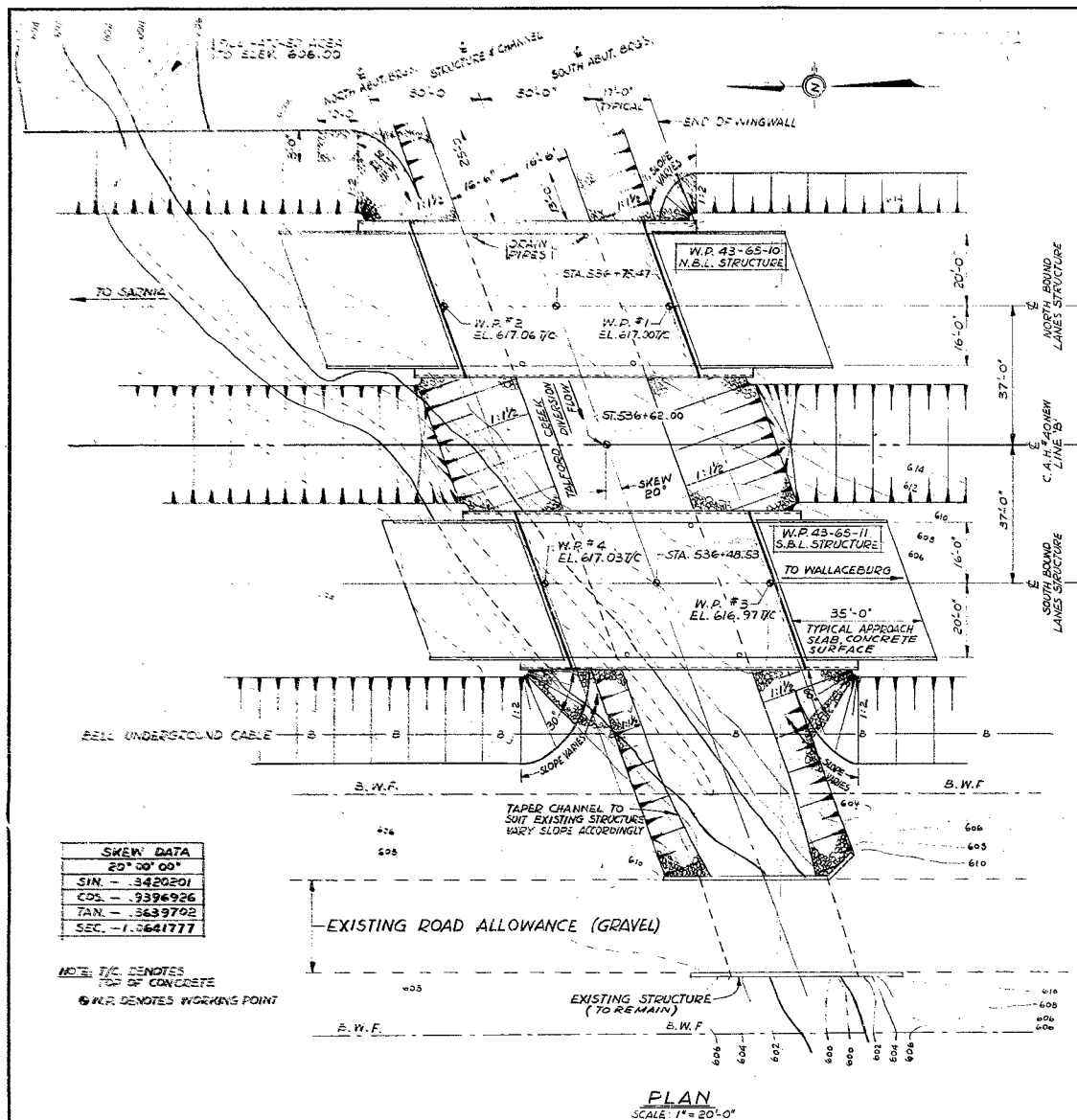
LOCATION PROPOSED CROSSING AT

TALFORD CR. + PROPOSED KINGS HWY #40

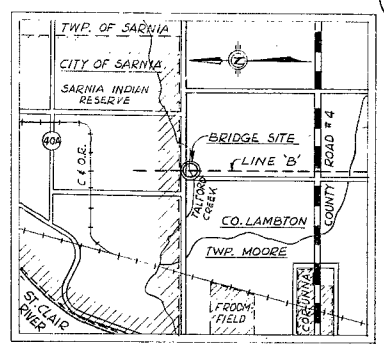
LINE B.

OVERSEAS DRINKING WATER BE PROVIDED WITH THE PROJECT 4

REMARKS: _____



- LIST OF DRAWINGS**
- D-7002-1 GENERAL PLAN
 - 2 BORE HOLE LOCATION & SOIL STRATA
 - 3 FOOTING LAYOUT & REINFORCING
 - 4 ABUTMENT DETAILS
 - 5 ABUTMENT REINFORCING
 - 6 PRESTRESSED GIRDERS & BEARINGS
 - 7 DECK
 - 8 PARAPET WALL DETAILS
 - 9 STANDARD STEEL PARAPET RAIL
 - 10 35' FOOT APPROACH SLAB
 - 11 STANDARD DETAILS



NOTES

CLASS OF CONCRETE

PRESTRESSED GIRDERS & APPR. SLABS 5,000 P.S.I.
DECK & PARAPET WALLS & CURBS 4,000 P.S.I.
REMAINDER 3,000 P.S.I.

CLEAR COVER TO REINFORCING STEEL

FOOTINGS & ABUTMENTS 3"
DECK 1 1/4" TOP, 1" BOT.
CURBS & APPR. SLABS 2"
PARAPET WALLS 1 1/2"

CONSTRUCTION NOTES

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

G.B.M. No. MMMCCI ELEV. 600369
INTERNATIONAL BOUNDARY COMMISSION'S CONCRETE REFERENCE MONUMENT NEAR EDGE OF RIVER ROAD AT POINT WHERE TRAVELLED ROUTE JOINS SHORE OF ST. CLAIR RIVER, 0.9 MILES NORTHWEST OF RAILWAY CROSSING AND 1.6 MILES SOUTHWEST OF POLYMER CORPORATION ADMINISTRATION BUILDING. MONUMENT IS A SQUARE CONCRETE BLOCK BOX 6' 6" BOLT SET HORIZONTALLY FACING EAST.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE OFFICE

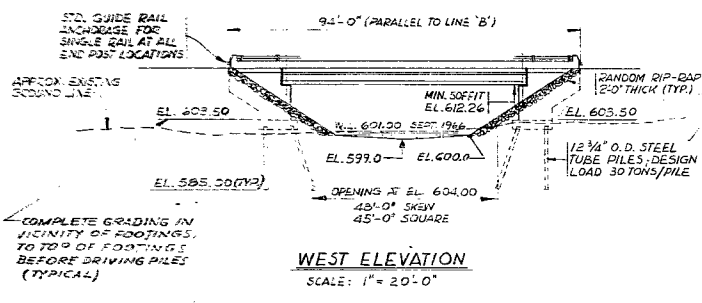
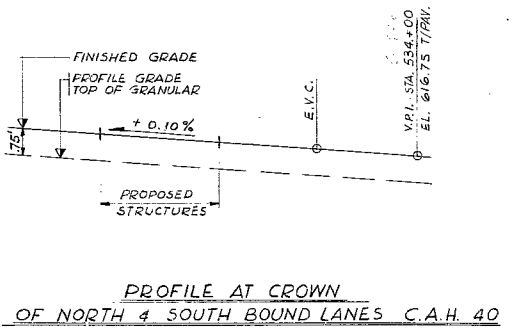
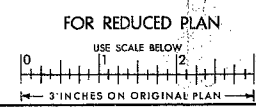
10-11-13

TALFORD CREEK BRIDGES
1.8 MILES SOUTH OF SARINIA BYPASS

KING'S HIGHWAY No. 40 (NEW) LINE 'B' DIST. No. 1
CO. OF LAMBTON
TWP. OF MOORE LOT 24 CON. 12

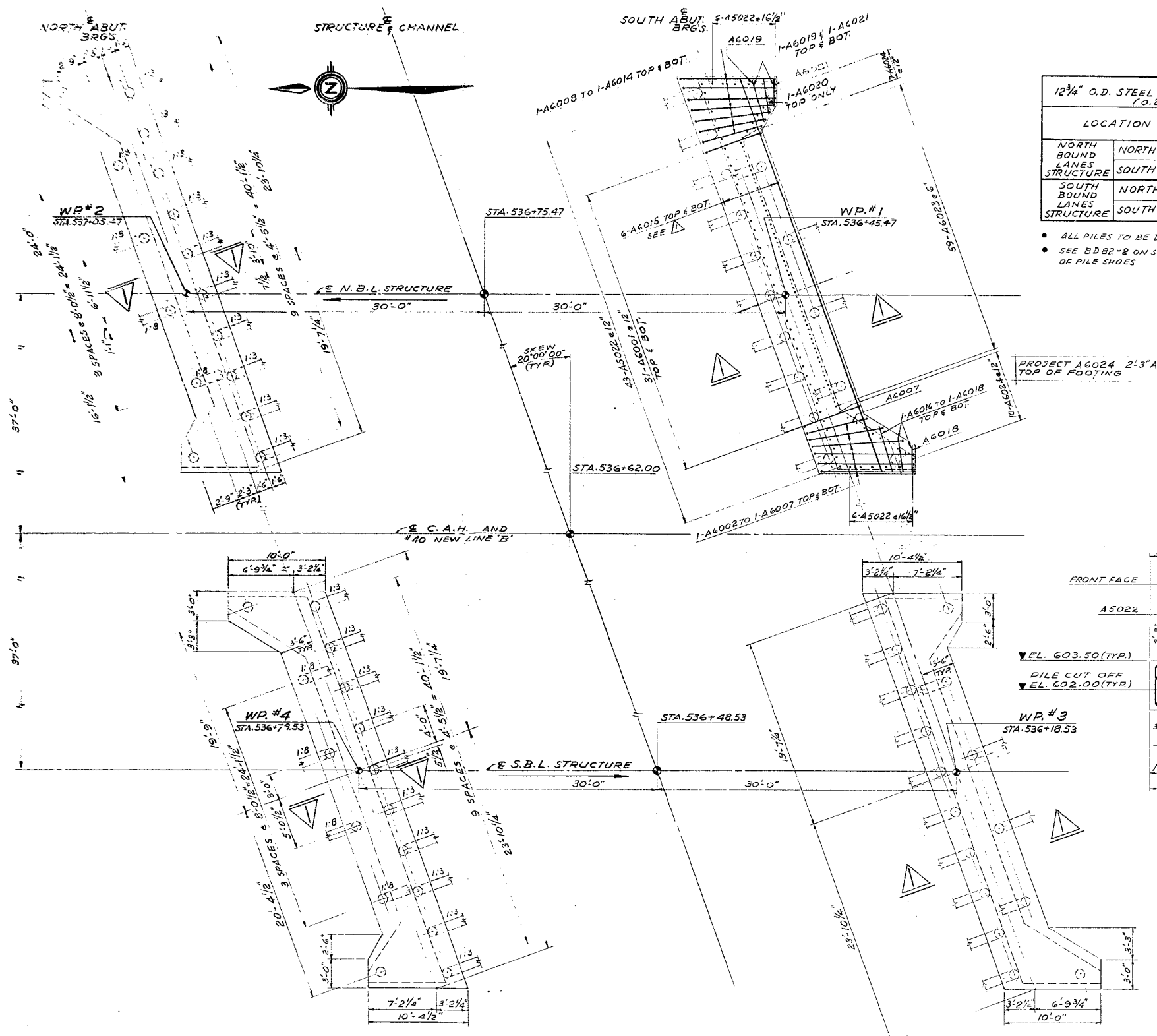
GENERAL PLAN

APPROVED: [Signature] SITE No. 14-365 W.P. No. 43-65-10#11
DESIGN: H.H. CHECK: J.L.K. CONTRACT No. [Blank]
DRAWING: H.H. CHECK: J.L.K. DRAWING No. D-7002-1
DATE: JUNE, 71 LOADING: HS 20-44



PRINT RECORD	No.	FOR	DATE

40316-44



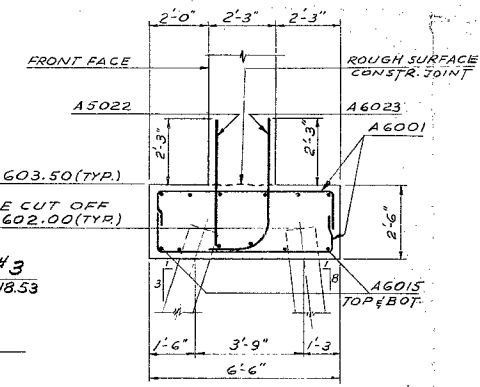
PILE DATA

12 3/4" O.D. STEEL TUBE PILES, DESIGN LOAD 30 TONS/PILE
(0.25" WALL THICKNESS)

LOCATION	NO. OF PILES		LENGTH OF PILES	
	FRONT	BACK	FRONT	BACK
NORTH ABUT. STRUCTURE	10	6	19'-0"	18'-0"
SOUTH ABUT. STRUCTURE	10	6	19'-0"	18'-0"
NORTH ABUT. STRUCTURE	10	6	19'-0"	18'-0"
SOUTH ABUT. STRUCTURE	10	6	19'-0"	18'-0"

- ALL PILES TO BE DRIVEN TO TIP ELEVATION 585.0
- SEE BD 82-2 ON STANDARD DETAIL DRAWING FOR DETAILS OF PILE SHOES

- NOTES:**
- SIZE OF ALL FOOTINGS IS IDENTICAL
 - LAYOUT:**
 - NORTH ABUT. FTG. OF N.B.L. STRUCTURE SIMILAR TO SOUTH ABUT. FTG. OF S.B.L. STRUCTURE BY ROTATION OF 180°
 - SOUTH ABUT. FTG. OF N.B.L. STRUCTURE SIMILAR TO NORTH ABUT. FTG. OF S.B.L. STRUCTURE BY ROTATION OF 180°
 - REINFORCING SHOWN IS TYPICAL FOR ALL FOOTINGS
 - PILES TO BE FILLED WITH 3000 P.S.I. CONCRETE IN ACCORDANCE WITH FORM 9



PLAN
3/16" = 1'-0"



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

REVISIONS

NO.	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE OFFICE

70-11-13

TALFORD CREEK BRIDGES

KING'S HIGHWAY No. 40 (NEW) LINE 'B' DIST. No. 1
CO. OF LAMBERTON
TWP. OF MOORE LOT 24 CON. 12

FOOTING LAYOUT & REINFORCING

APPROVED: **14-365** W.P. No. **23-65-10 & 11**

DESIGN	CHECK	CONTRACT
DESIGN: A.S.	CHECK: D.C.	CONTRACT: D-7002-3
DATE: JUNE '71	LOADING: 1/5-20-44	

40316-44

E-4391-1

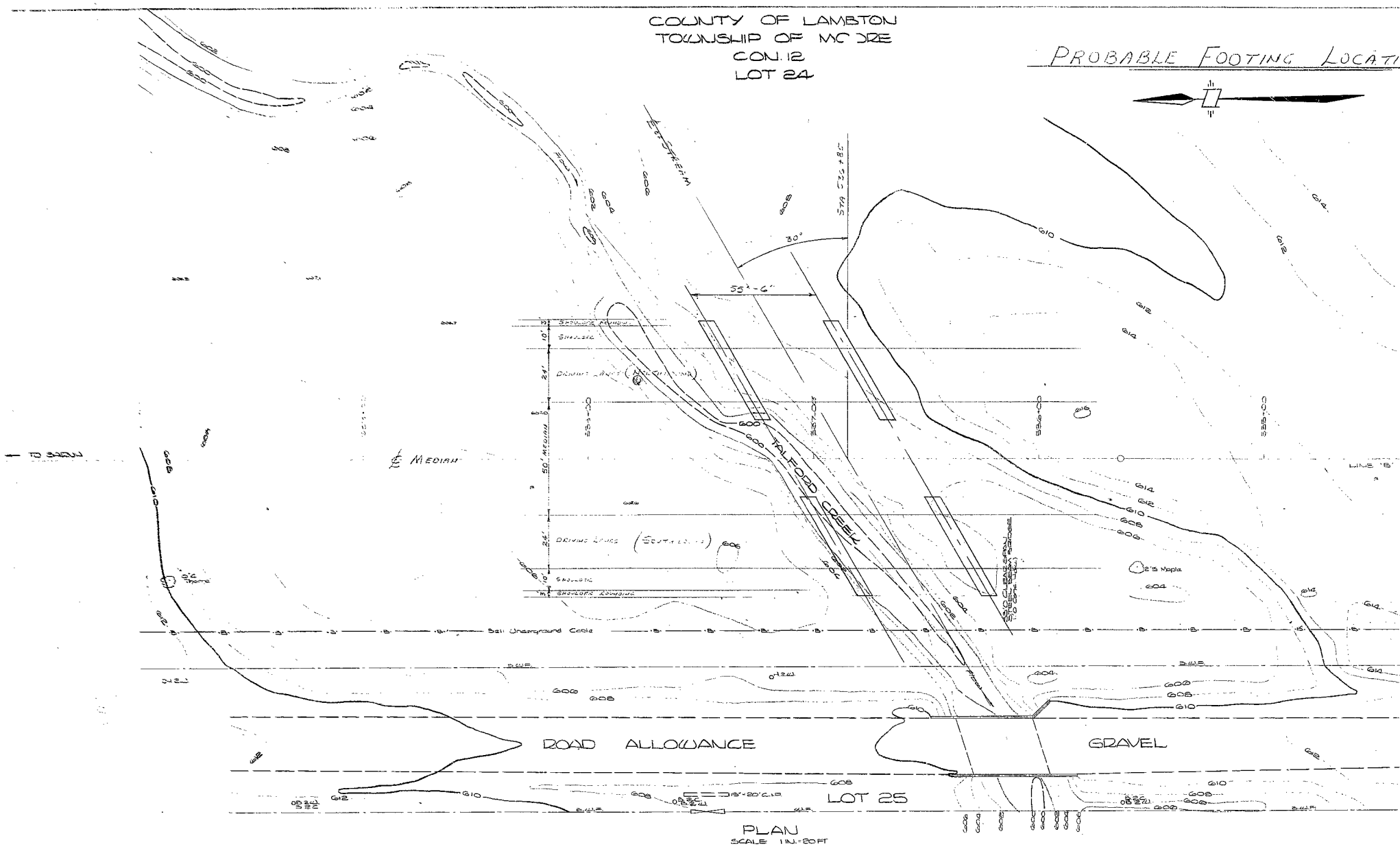
E-4391-1

E-4391-1

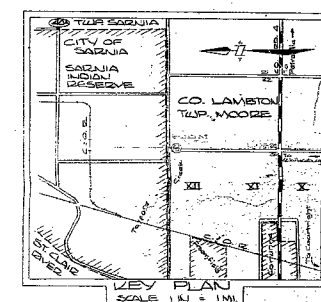
E-4391-1

COUNTY OF LAMBTON
TOWNSHIP OF MOOSE
CON. 12
LOT 24

PROBABLE FOOTING LOCATIONS



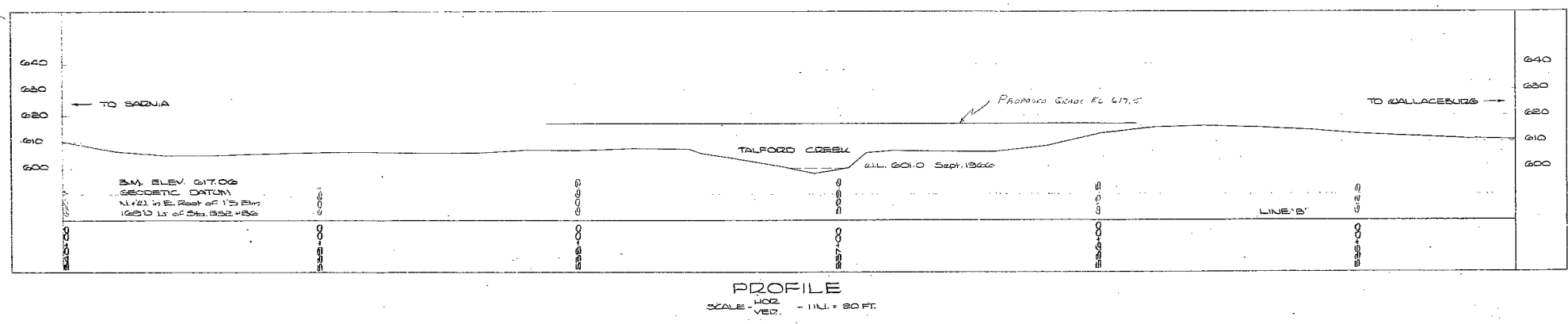
TO WALLACEBURG
PLAN B-274-9
PROP C-274-9



G.B.M. No MMCCCL ELEV. 600369
International Boundary Commission's concrete reference monument
N.T. 50, at west edge of bridge at point where travelled route turns
sharp of St. Clair River, 0.15 mile northwest of railway crossing and
1.5 miles southwest of Polymer Corporation Administration Building.
Monument is a square concrete block, 10" x 10" x 10", set
horizontally facing east.

2011-11-17

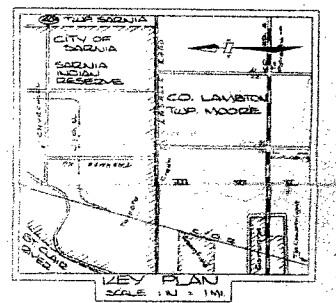
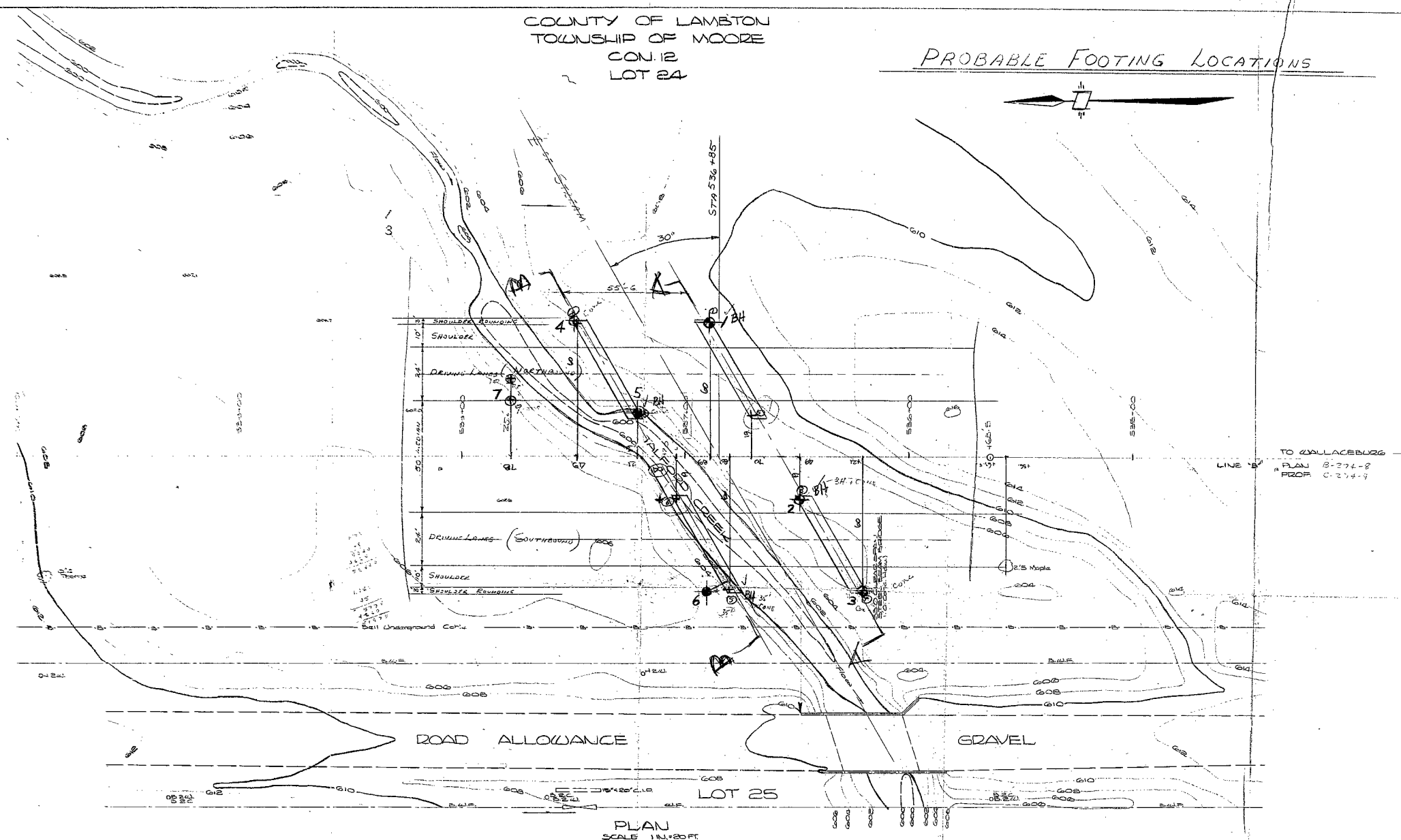
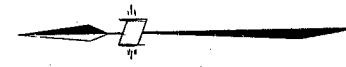
DATE	REVISIONS & ADDITIONS	BY	CHKD.
DEPARTMENT OF HIGHWAYS ONTARIO DESIGN BRANCH ENGINEERING SURVEYS DIVISION			
BRIDGE SITE			
PROPOSED CROSSING AT TALFORD CREEK AND PROP KING'S HWY. 40 LINE 'B'			
LOT 24 CON. 12 TOWNSHIP OF MOOSE COUNTY OF LAMBTON			
SCALE AS SHOWN	DISTRICT 1 CHATHAM	REGION SOUTH (WEST)	
410 5552-66-62 Date of Survey Sept. 86 Plan Oct. '86	SITE No.		
SURVEY BY Chief of Party J. Crow Supervisor J. Smyth	DRAWN BY Draftsman J. Thompson Supervisor J. Campbell		
CHECKED BY Draftsman P. Dymnarska Supervisor J. Campbell	PLAN No. E-4391-1		



PROFILE
SCALE 1/4" = 20 FT.
VER. 1/8" = 20 FT.

COUNTY OF LAMBTON
TOWNSHIP OF MOORE
CON. 12
LOT 24

PROBABLE FOOTING LOCATIONS

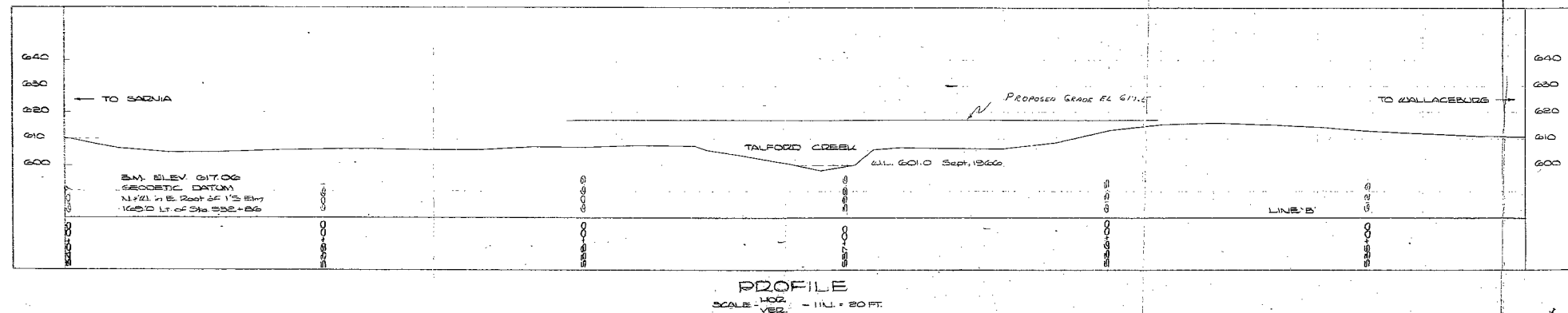


G.B.M. N° MMCCLI ELEV. 600368
International Boundary Commission's Canada reference monument
US 80 at west edge of Oak Island at point where travelled route joins
shore of St. Clair River, 0.5 mile northwest of railway crossing and
1.6 miles southwest of Plymouth Corporation Administration Building.
Monument is a square concrete block base 6" x 6" built set
permanently facing east.

70-11113

DATE	REVISIONS & ADDITIONS	BY	CHKD
DEPARTMENT OF HIGHWAYS ONTARIO DESIGN BRANCH ENGINEERING SURVEYS DIVISION			
BRIDGE SITE			
PROPOSED CROSSING AT TALFORD CREEK AND PROP KING'S HWY. 40 LINE 'B'			
LOT 24 CON. 12 TOWNSHIP OF MOORE COUNTY OF LAMBTON			
SCALE AS SHOWN	DISTRICT 1 CHATHAM	DESIGN SOUTH WESTERN	
W.O. 8522-66-85	Date of Survey Sept. 26, 1961	SITE OCT. 1961	
SURVEY BY Chief of Party A. Crow Supervisor B. Smyth		DRAWN BY Draftsman J. Thompson Supervisor J. Corbett	
CHECKED BY Draftsman P. Dwyer Supervisor J. Corbett		PLAN N° E-4391-1	

40316-44



DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40 J 16-44
DIST. 1 REGION Southwestern
W.P. No. 43-65-10/11
CONT. No. 72-65
W. O. No. 70-11113
STR. SITE No. _____
HWY. No. 40

LOCATION Proposed Crossing at Telford
Cr. & Proposed King's Hwy #40,
Line B

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: ① documents to be unfolded
before microfilming

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at Talford Creek
And
Proposed King's Hwy. #40, Line 'B'
District No. 1 (Chatham)
W.O. 70-11113 - { W.P. 43-65-10 (N.B.L.)
 { W.P. 43-65-11 (S.B.L.)

1. INTRODUCTION:

In a memo dated November 16, 1970, a request was submitted by Mr. A. P. Watt, Regional Bridge Planning Engineer, Southwestern Region, for a foundation investigation at the location of the above structure.

The present proposal calls for the construction of the Northbound lane structure only; the investigation, however, was extended to the future Southbound structure as well, for economical and engineering reasons.

The investigation was carried out by the Foundation Section. Presented in this report are the results of this investigation, together with the recommendations regarding the structure and the stability of the approach embankments.

2. DESCRIPTION OF THE SITE:

The proposed crossing is located 1.8 miles south of Sarnia Bypass and just east of Twp. Rd. #25. The Talford Creek at the proposed crossing is roughly 20 ft. wide with a rather slow current. The average depth of the water during the time of the investigation was 1 to 2 ft.

The topography is flat and the land is used mainly for pasturing purposes.

Physiographically the site is located in the region referred to as the St. Clair Clay Plain.

3. FIELD AND LABORATORY INVESTIGATION:

A total of 4 sampled boreholes and 7 dynamic cone penetration tests was carried out during the course of the field investigation, using a diamond drill adapted for soil sampling purposes.

Disturbed samples were obtained using a 2" O.D. split-spoon sampler; the energy used for driving, conformed to the requirements of the Standard Penetration Test.

Undisturbed samples were obtained by means of 2" I.D. Shelby tubes pushed manually into the subsoil.

Vane tests were carried out, where possible, 1-1/2 ft. below the sample depths.

The samples were visually examined in the field and subsequently in the laboratory. Following this examination, laboratory tests were carried out on selected samples to determine the various physical properties of the subsoil, namely:

- Atterberg Limits
- Moisture Contents
- Bulk Density
- Grain-Size Distributions
- Undrained Shear Strength

The results of field and laboratory tests are summarized on the Record of Borehole sheets.

Plots of Plasticity Index vs. Liquid Limit and typical grain-size distribution curves are shown in Figs. 1 to 3 of the report Appendix.

The locations and elevations of all boreholes were surveyed by personnel from London Region and are shown on Dwg. 70-11113A, which accompanies this report.

4. SUBSOIL CONDITIONS:

4.1) General:

Generally uniform conditions were found to prevail over the site area. The subsoil consists of a deep deposit of clayey silt to silty clay with traces of sand and gravel. All four boreholes were terminated within this stratum. Detailed descriptions of soil encountered in each borehole are given on the Record of Borehole sheets. The estimated stratigraphical profile of Drawing No. 70-11113A is based upon this information. The deposit is described in more detail as follows:

4.2) Clayey Silt to Silty Clay with Traces of Sand and Gravel:

Underlying 8" of topsoil a deposit of clayey silt to silty clay with traces of sand and gravel was encountered. The thickness of the deposit extends to at least 73 ft., which was the maximum depth tested.

The properties of the deposit are summarized below:

		<u>Clayey Silt</u>	<u>Silty Clay</u>
Moisture Content %	:	13.3 to 26.4	24.4 to 31.1
Liquid Limit %	:	25.8 to 34.6	36.2 to 44.5
Plastic Limit %	:	16.1 to 21.0	16.9 to 22.1
Bulk Density p.c.f.	:	127 to 132	119 to 128

Vane tests throughout the whole deposit gave shear strength ranging from 1,200 p.s.f. to over 2,000 p.s.f., and sensitivity values from 1.7 to 4.3. Unconfined compression tests performed in the laboratory, resulted in shear strengths from 831 p.s.f. to 3,360 p.s.f.

The 'N' values throughout the whole deposit ranged from 9 to 55 blows/ft., indicating a stiff to hard consistency.

5. GROUNDWATER CONDITIONS:

Groundwater elevations, observed in the open boreholes at the close of operations, were found to be as follows:

<u>Borehole</u> <u>No.</u>		<u>Elev.</u>
1	:	598.0
2	:	602.6
5	:	596.9
6	:	590.7

The above water levels may not represent the true groundwater levels due to the relatively impermeable nature of the subsoil and the short duration of the field work.

The water level in the creek at the time of the field investigation, was at elev. 602.0. It should be assumed that the groundwater level will be at or slightly higher than the prevailing creek water level.

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to build a structure to carry the proposed Hwy. #40, Line 'B' over Talford Creek. Present proposals call for twin parallel single-span bridges to be built in stages with the Northbound lanes being built first due to low projected traffic volumes.

A slight diversion of the creek some 50 ft. south is planned.

Subsoil at the site consists of a deep deposit of stiff to hard clayey silt to silty clay which has adequate strength to provide spread footing support. Spread footing type foundations are therefore recommended at or below elevation 593.0 assuming a safe net bearing pressure of 2-1/2 tons sq. ft. A minimum cover of 4 ft. is required for the footings to give the necessary frost protection.

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

The approach fills will have a height of about 15 ft. and no stability or settlement problems are anticipated, provided standard 2:1 slopes are constructed. From a foundation point of view, no particular advantage will be gained by constructing the Southbound lane approach embankments at present, without detriment to existing construction. These may be constructed at a later date.

No major dewatering problems are anticipated due to the relatively low permeability of the subsoil. It is recommended, however, that suitable working slabs be constructed as soon as possible after the excavations are completed, in order to protect the foundation soil from surface water.

Rip-rap will be required to protect slopes against erosion, according to hydrological requirements.

7. MISCELLANEOUS:

The field work, performed during the period from November 18 to 27, 1970, together with preparation of this report, was undertaken by Mr. H. Szymanski.

Equipment used was owned and operated by P.V.K. & Sons Drilling Co.

The report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

January, 1971

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

 JOB 70-11113 LOCATION Sta. 536 + 89 60' Rt. 8 Hwy. 40
 W.P. 43-65-10 & 11 BORING DATE November 18, 1970
 DATUM Geodetic BOREHOLE TYPE Washboring NX Casing

 ORIGINATED BY HS
 COMPILED BY HS
 CHECKED BY HS

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WATER CONTENT % w_p — w — w_L 15 30 45				
608.9	Ground Level															
			1	SS	55											
			2	SS	38											
			3	SS	32	600										
			4	SS	23											
			5	SS	26											
			6	TW	PM	590										
			7	SS	16											
			8	SS	25	580										
			9	TW	PM											
			10	TW	PM	570										
			11	TW	PM											
			12	TW	PM	560										
			13	TW	PM											
			14	TW	PM	550										
			15	TW	PM	540										
535.9																
73.0	End of Borehole					530										

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB 70-11113 LOCATION Sta. 536 + 49 19' Lt. Ø Hwy. 40 ORIGINATED BY HS
 W.P. 43-65-10 & 11 BORING DATE November 23, 1970 COMPILED BY HS
 DATUM Geodetic BOREHOLE TYPE Washboring NX Casing CHECKED BY ll

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE				
605.9	Ground Level Topsoil															
	Clayey silt to silty clay with traces of sand & gravel Stiff to Very Stiff		1	SS	13											
			2	SS	18											
			3	TW	PM											
			4	TW	PM											
			5	SS	15											
			6	TW	PM											
			7	SS	19											
			8	TW	PM											
576.1 29.8	End of Borehole															

In open BH
 1 12 45 42
 127
 128
 1 2 63 34
 3 6 52 39
 125

600
 590
 580
 570

> +
 > +
 + 2.0
 +
 > +
 + 1.9
 > +
 + 2.1
 > +

15 30 45
 15 30 45
 15 30 45
 15 30 45
 15 30 45
 15 30 45
 15 30 45

FOUNDATION SECTION

JOB	70-11113	LOCATION	Sta. 537 + 49 60' Rt. Ø Hwy. 40	ORIGINATED BY	HS
W.P.	43-65-10 & 11	BORING DATE	November 24, 1970	COMPILED BY	HS
DATUM	Geodetic	BOREHOLE TYPE	Cone Test Only	CHECKED BY	

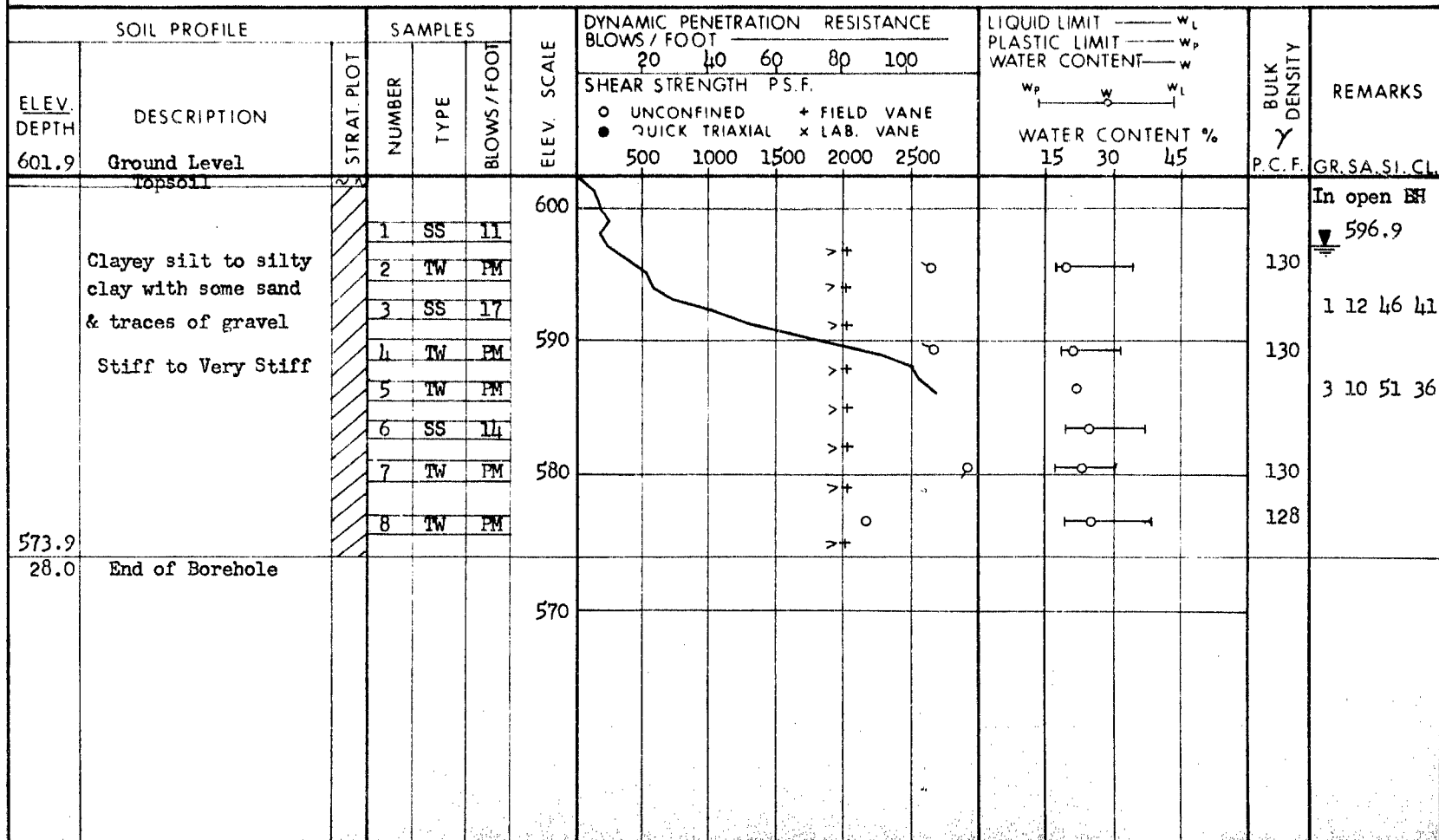
SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w w_p ——— w ——— w_L WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
606.1	Ground Level									
582.1										
24.0	End of Cone Test					580				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

JOB 70-11113 LOCATION Sta. 537 + 21 19' Rt. 2 Hwy. 40 ORIGINATED BY HS
W.P. 43-65-10 & 11 BORING DATE November 25, 1970 COMPILED BY HS
DATUM Geodetic BOREHOLE TYPE Washboring NX Casing CHECKED BY



DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 70-11113 LOCATION Sta. 536 + 90 60' Lt. Ø Hwy. 40

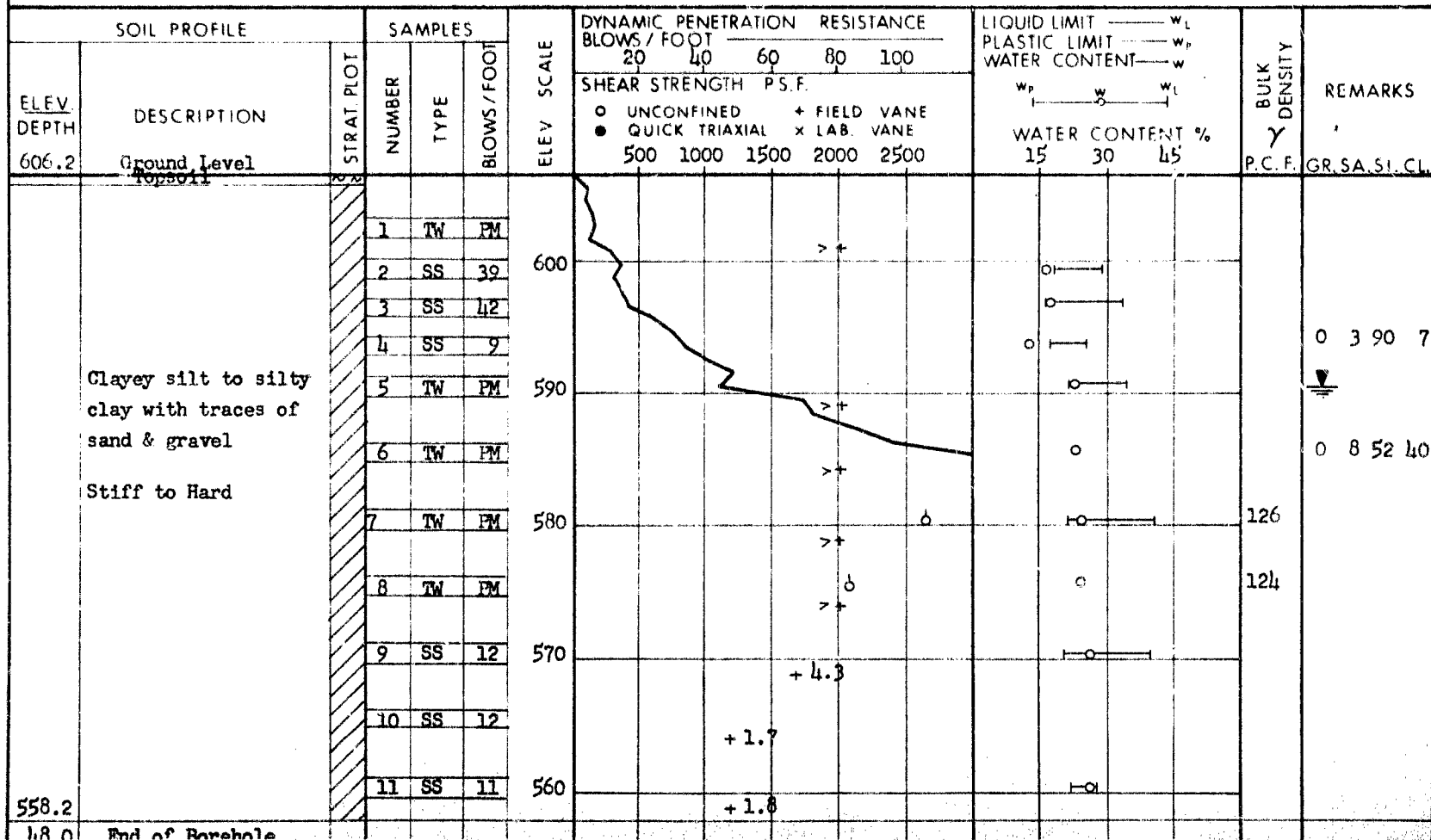
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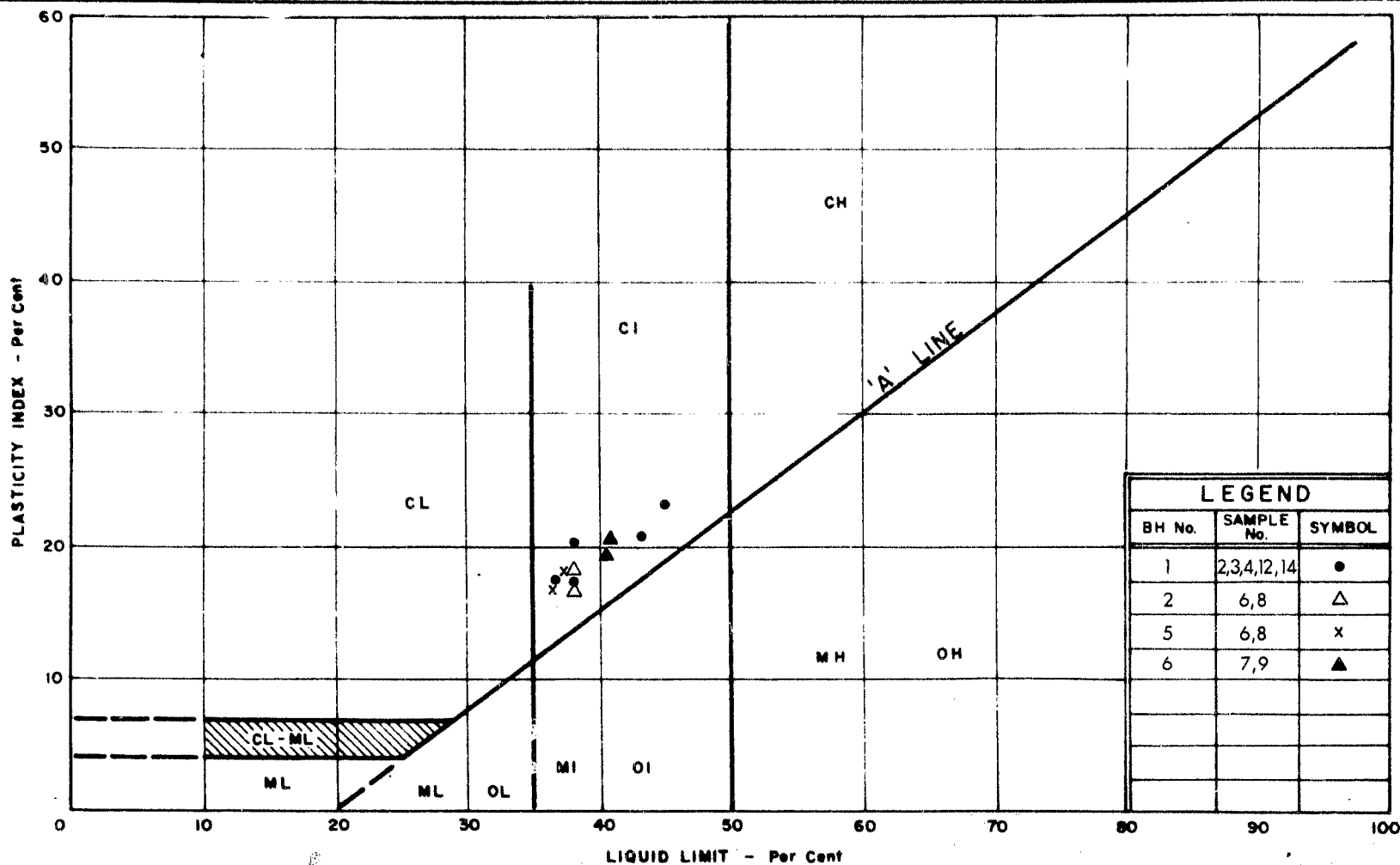
W.P. 43-65-10 & 11 BORING DATE November 26, 1970

COMPILED BY HS

DATUM Geodetic BOREHOLE TYPE Washboring NX Casing

CHECKED BY





DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

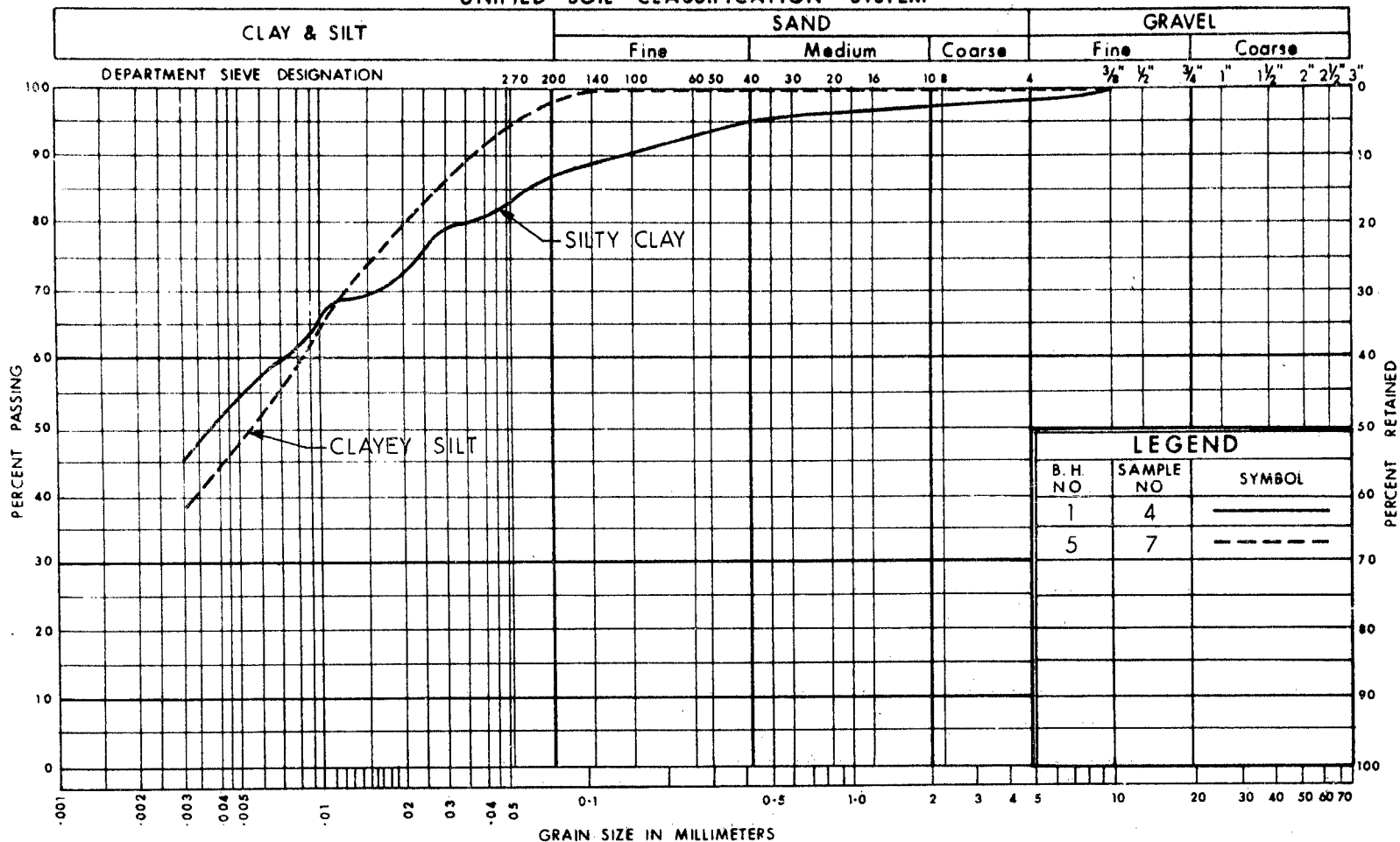
PLASTICITY CHART SILTY CLAY

WP No. 43 - 65 - 10 & 11

JOB No. 70 - 11113

FIG. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



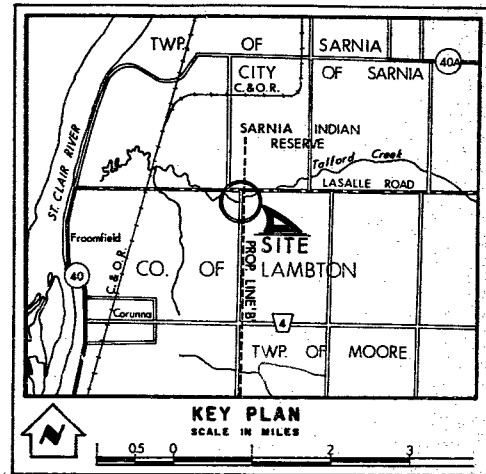
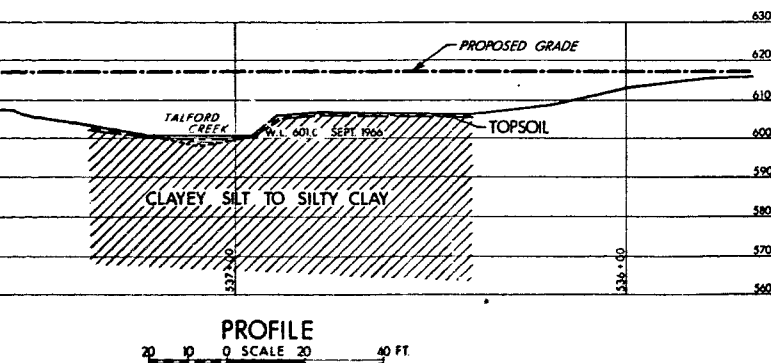
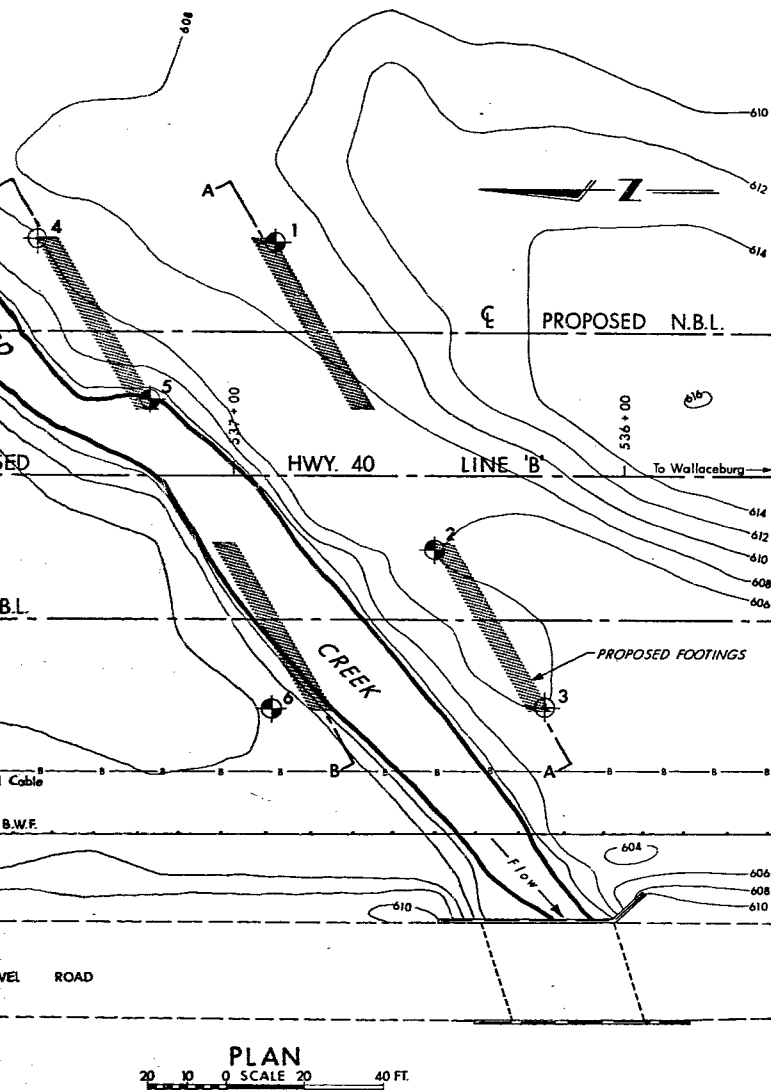
DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

GRAIN SIZE DISTRIBUTION TYPICAL CURVES

W.P. No. 43 - 65 - 10 & 11

JOB No. 70 - 11113

FIG. 3



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation. NOV. 1970		
NO.	ELEVATION	STATION	OFFSET
1	608.9	536+89	60'RT.
2	605.9	536+49	19'LT.
3	606.0	536+21	60'LT.
4	606.1	537+49	60'RT.
5	601.9	537+21	19'RT.
6	606.2	536+90	60'LT.
7	607.0	537+78	25'RT.

- NOTE -

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & TESTING OFFICE - FOUNDATION SECTION			
TALFORD CREEK			
KING'S HIGHWAY NO. 40 LINE 'B'		DIST. NO. 1	
CO. LAMBTON			
TWP. MOORE		LOT 24 CON. 12	
BORE HOLE LOCATIONS & SOIL STRATA			
SUBMITTED BY H. S.	CHECKED BY <i>[Signature]</i>	W.P. NO. 43 - 65 - 10811	M.B.T. DRAWING NO.
DRAWN BY S. R.	CHECKED BY <i>[Signature]</i>	JOB NO. 70 - 11113	70 - 11113 A
DATE JAN. 19, 1970	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>[Signature]</i>	CONT. NO.		

REF. No: E 4391 - 1