

SAMPLE DISPOSITION NOTICE		
TYPE	DISCARD AFTER	RECOMM. BY
JARS	80-01-15	Wes
TUBES	80-01-15	Wes
ROCK CORES	After Approval	Wes

ENGINEERING MATERIALS OFFICE
PAVEMENT & FOUNDATION DESIGN SECTION

WP 151-73-06 DIST 2
HWY 7169 STR SITE 23-147
Thames River Bridge

DISTRIBUTION

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FOUNDATION INVESTIGATION REPORT

For

Thames River Bridge
W.P. 151-73-06, Site 23-147
Hwy. 7169, District 2, London

INTRODUCTION

This report contains the results of a foundation investigation for the above listed project. Fieldwork consisted of 5 sampled boreholes of which 3 were advanced on the river banks with a skid mounted diamond drill and B size casing. A CME 750 equipped with hollow stem augers was employed for the other 2 boreholes. This work was carried out in the period November 7th to 20th, 1979.

SITE DESCRIPTION

The site is located 3 kilometres east of Ingersol where proposed Hwy. 7169 crosses the Thames River. In this area the Thames River has been realigned to flow parallel to and 50 metres to the north of the C.P.R. track which in turn parallels County Road 9. County Road 6 crosses the Thames on a 3 span steel beam structure some 25 metres east of the new alignment.

The Thames River was realigned and dyked to allow development of 3 large limestone quarries on its flood plain in this area. A private road referred to locally as the dyke road runs along this dyke on the north side of the Thames. Behind it are the limestone quarries which in the immediate vicinity of the crossing have been backfilled with overburden stripped from new areas to be mined. This has created a relatively flat area sloping gently to the north. The Thames channel has a bottom width of about 20 metres with slopes 8 to 10 metres in height. These slopes were designed to be 1.5 horizontal to 1 vertical but have been locally altered by erosion. Repairs have been made with waste rock from the quarry.

SUBSURFACE CONDITIONS

Subsoil

Two subsoil types are found in the area of the structure. At the north abutment there is about 7.7 metres of compact to very dense sand containing silty and gravelly layers. Typical grain-size curves are shown in Figure 1 of the Appendix. This is a water laid deposit produced by the Thames River and its post glacial ancestor when the valley acted as a spillway for glacial meltwater. Standard Penetration 'N' values range from 12 to 59 with the low values found in the upper 3 metres which was repositioned during the realignment of the Thames Channel. The shallow depth of soil in the area of the piers and the 12.5 metres of material at the south abutment consists of compact to very dense silty sand with gravel and is of glacial origin. Standard Penetration 'N' values ranged from 10 to 20 for the upper 3 to 4 metres and then increase to greater than 100 blows per 0.3 metres. Grain-size distribution for this deposit is shown as an envelope in Figure 2. Reference should be made to the Record of Borehole Sheets which are contained in the Report Appendix. They show the different soil types, as well as a summary of all field and laboratory tests performed. Reference should also be made to drawing # 1517306-A which shows the location and elevation of the borings, together with a profile showing inferred subsoil stratigraphy.

Bedrock

Limestone bedrock underlies the site varying in elevation from 266 at the south abutment to 268 at the north abutment. Frequent horizontal joints are present and in some cases are open or sand filled. This resulted in frequent jamming during coring operations and the complete loss of water in one borehole. However, no large voids were encountered in the 4 boreholes from which rockcore was recovered.

Groundwater

In the area south of the Thames, groundwater was encountered at about elevation 270 some 3 metres above the bedrock surface. In contrast, no groundwater was encountered above the bedrock surface in the area north of the river even though the bedrock is below the river level. This may be explained by downward drainage through fissures in the bedrock toward the large drained quarry located north of the river.

RECOMMENDATIONS

Piers

It is recommended that the piers be supported by spread footings on the limestone bedrock with a design load of up to 2 MPa. The north pier should be founded at approximately elevation 267 and the south pier at 266.5. Resistance to sliding may be calculated employing a coefficient of friction of 0.5. Any requirement to resist greater lateral loads should be satisfied by dowels grouted in the bedrock.

Abutments

The abutments should be supported on spread footings with a design loading of up to 300 kPa at or below elevation 273 for the north abutment and 276 for the south abutment. Resistance to sliding may be calculated employing a coefficient of friction of 0.5. Settlement under this loading will not exceed 25 mm. The lower front edge of the footing must be at least 3 metres horizontally from the slope face.

Alternatively the abutments may be supported on steel H-piles driven to bedrock at elevation 268 for the north abutment and 266 for the south abutment. Loads equal to the allowable structural capacity of the section chosen may be employed. Typically the load on a 310 x 110 section may be up to 1070 kN. The pile tips should be reinforced with standard flange plates to prevent damage due to boulders and to increase the contact area with the bedrock.

Dewatering

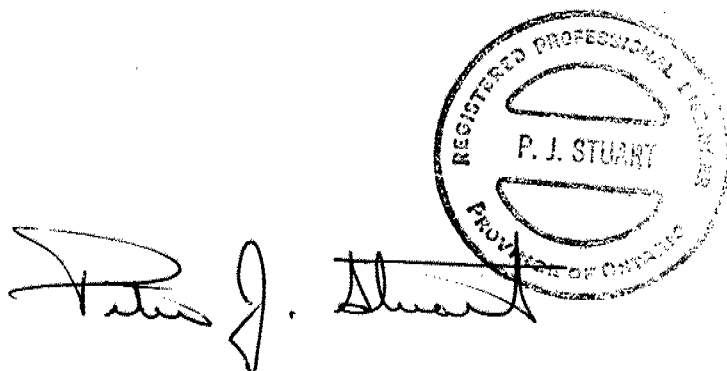
Considerable seepage will enter the excavations for the pier footings due to the pervious nature of the soil and the fissured nature of the bedrock. It will however be possible to remove this water by pumping from sumps.

Frost Protection

The base of the abutment footings should be protected from frost action by a minimum of 1.2 metres of cover.

Forward Slopes

The forward slopes should be trimmed to 2 horizontal to 1 vertical and protected to the high water line by rip-rap.



P. J. Stuart, P. Eng.
Foundations Engineer.

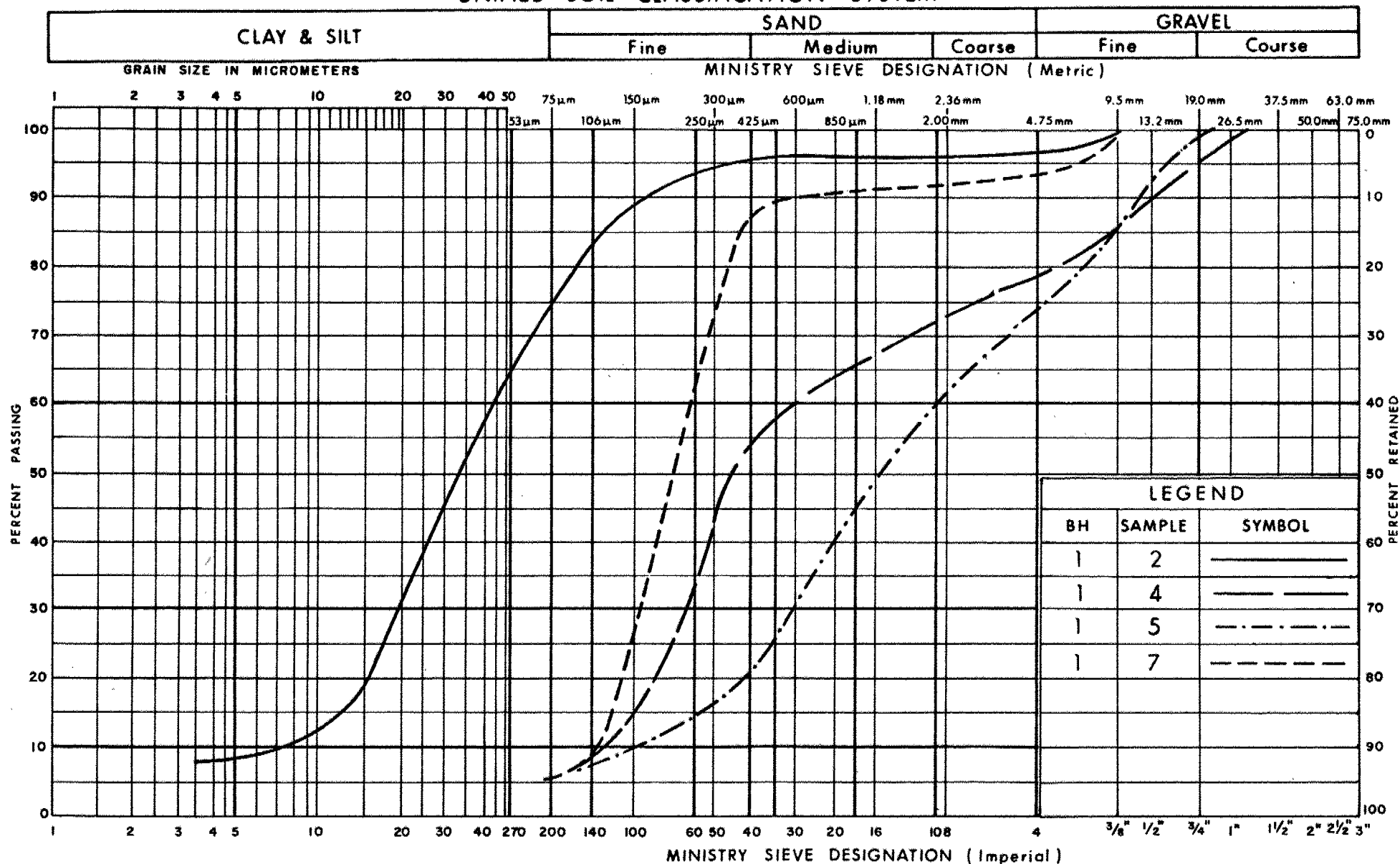


K. G. Selby, P. Eng.
Senior Foundations Engineer.

January, 1980.

APPENDIX

UNIFIED SOIL CLASSIFICATION SYSTEM



Ontario

 Ministry of
Transportation and
Communications

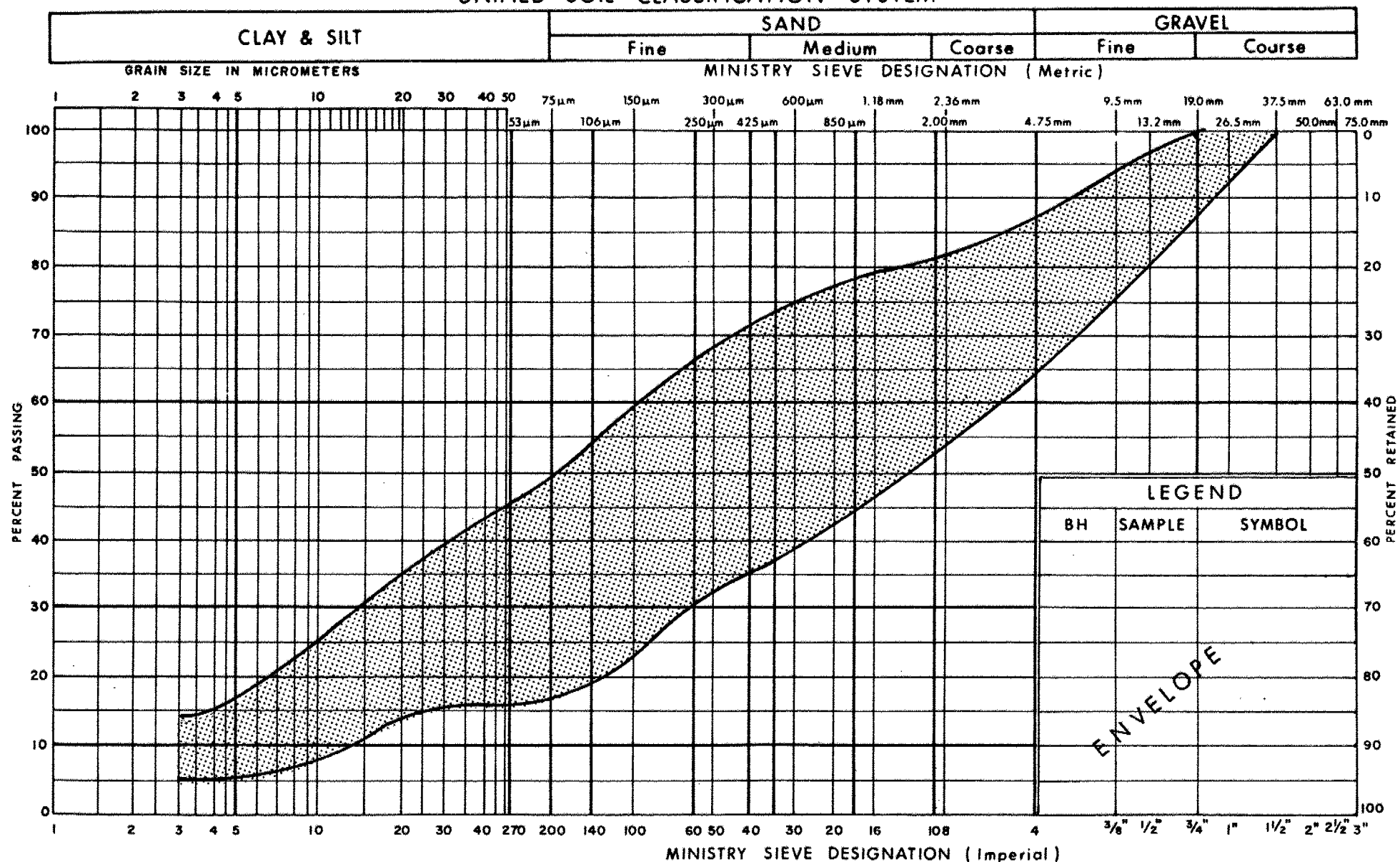
 GRAIN SIZE DISTRIBUTION
SAND

SOME GRAVEL OCCASIONAL SILTY LAYERS

FIG No 1

W P 151-73-06

UNIFIED SOIL CLASSIFICATION SYSTEM

Ministry of
Transportation and
Communications

GRAIN SIZE DISTRIBUTION SILTY SAND

SOME GRAVEL TRACE OF CLAY (GLACIAL TILL)





FIG No 2

W P 151-73-06

RECORD OF BOREHOLE No 1

METRIC

W P 151-73-06 LOCATION Co-ords. N 4 770 635.0; E 194 855.5 ORIGINATED BY PJS
DIST 2 HWY 7169 BOREHOLE TYPE Hollow Stem Auger COMPILED BY PJS
DATUM Geodetic DATE 1979 11 07 CHECKED BY _____

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
276.0	Ground Level																
0.0	Sand, Some gravel, Occasional silty layers Compact to very dense		1	SS	12		274										3 23 68 6
			2	SS	12												
			3	SS	28		272										21 71 (8)
			4	SS	37												25 69 (6)
			5	SS	30												
			6	SS	44		270										
			7	SS	59												7 87 (6)
268.3	Boulder		8	BXL	40%												
7.7	Limestone bedrock		9	BXL	100%		268										
267.3			10	BXL	RC												
8.7	End of Borehole Note: Borehole dry to rock surface																

RECORD OF BOREHOLE No 2

METRIC

W P 151-73-06 LOCATION Co-ords. N 4 770 623.6; E 194 868.8 ORIGINATED BY PJS
DIST 2 HWY 7169 BOREHOLE TYPE B Casing COMPILED BY PJS
DATUM Geodetic DATE 1979 11 13 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
269.6	Ground Level		1	SS	10												
0.0	Silty sand, with gravel, Trace of clay, Very dense (Glacial till)		2	SS	100/	254 mm										33 39 24 4	
267.3			3	SS	100/	279 mm											
2.3	Limestone bedrock		4	BXL	83% REC											RQD 55%	
			5	BXL	90% REC												
265.6			6	BXL	95% REC												
4.0	End of Borehole																
	Note: Water level not established																

RECORD OF BOREHOLE No 3

METRIC

W P 151-73-06 LOCATION Co-ords. N 4 770 635.4; E 194 874.0 ORIGINATED BY PJS
 DIST 2 HWY 7169 BOREHOLE TYPE B Casing COMPILED BY PJS
 DATUM Geodetic DATE 1979 11 14 CHECKED BY _____

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
269.8	Ground Level																
0.0	Silty sand with gravel Trace of clay Very dense (Glacial till)		1	SS	15		268										25 42 29 4
267.1			2	SS	56												
			3	SS	100	305 mm											
2.7	Limestone bedrock		4	BXL	70%		266										
			5	BXL	80%												
265.5			6	BXL RC	85% REC												
4.3	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 4

METRIC

W P 151-73-06 LOCATION Co-ords. N 4 770 618.0; E 194 892.5 ORIGINATED BY PJS
DIST 2 HWY 7169 BOREHOLE TYPE B Casing COMPILED BY PJS
DATUM Geodetic DATE 1979 11 16 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
269.4	Ground Level																
0.0	Silty sand with gravel Trace of clay Compact to dense (Glacial till)		1	SS	11		268										20 42 36 2
			2	SS	8												35 44 17 4
266.5			3	SS	42												
2.9	Limestone bedrock		4	BXL RC	100% REC		266										ROD 60%
265.1																	
4.3	End of Borehole																
	Note: Water level not established																

*3, *5: Numbers refer to
Sensitivity

20
15 \div 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 5

METRIC

W P 151-73-06 LOCATION Co-ords. N 4 770 604.8; E 194 910.6 ORIGINATED BY PJS
DIST 2 HWY 7169 BOREHOLE TYPE Hollow Stem Auger COMPILED BY PJS
DATUM Geodetic DATE 1979 11 19 CHECKED BY _____

[illegible]

⁺³, ^{x5} : Numbers refer to Sensitivity

20
15 ϕ 5 (%) STRAIN AT FAILURE
10

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS \bar{N} .

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

c_u (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE

STRESS AND STRAIN

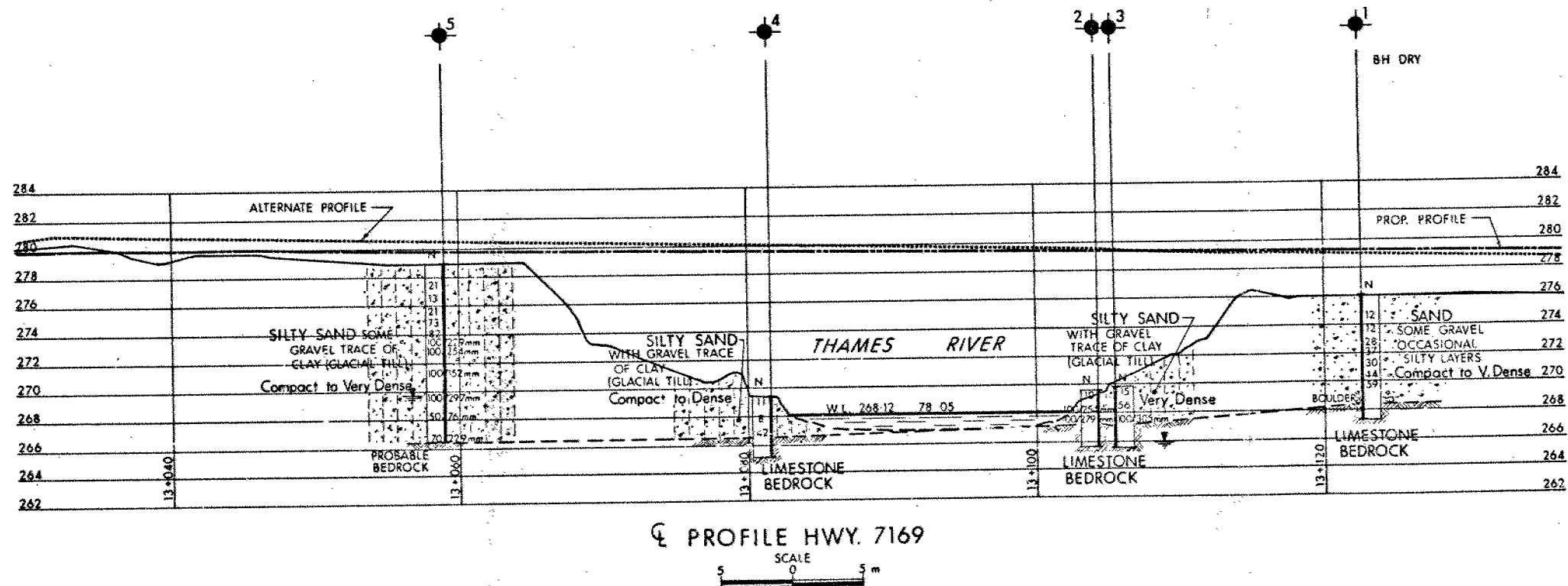
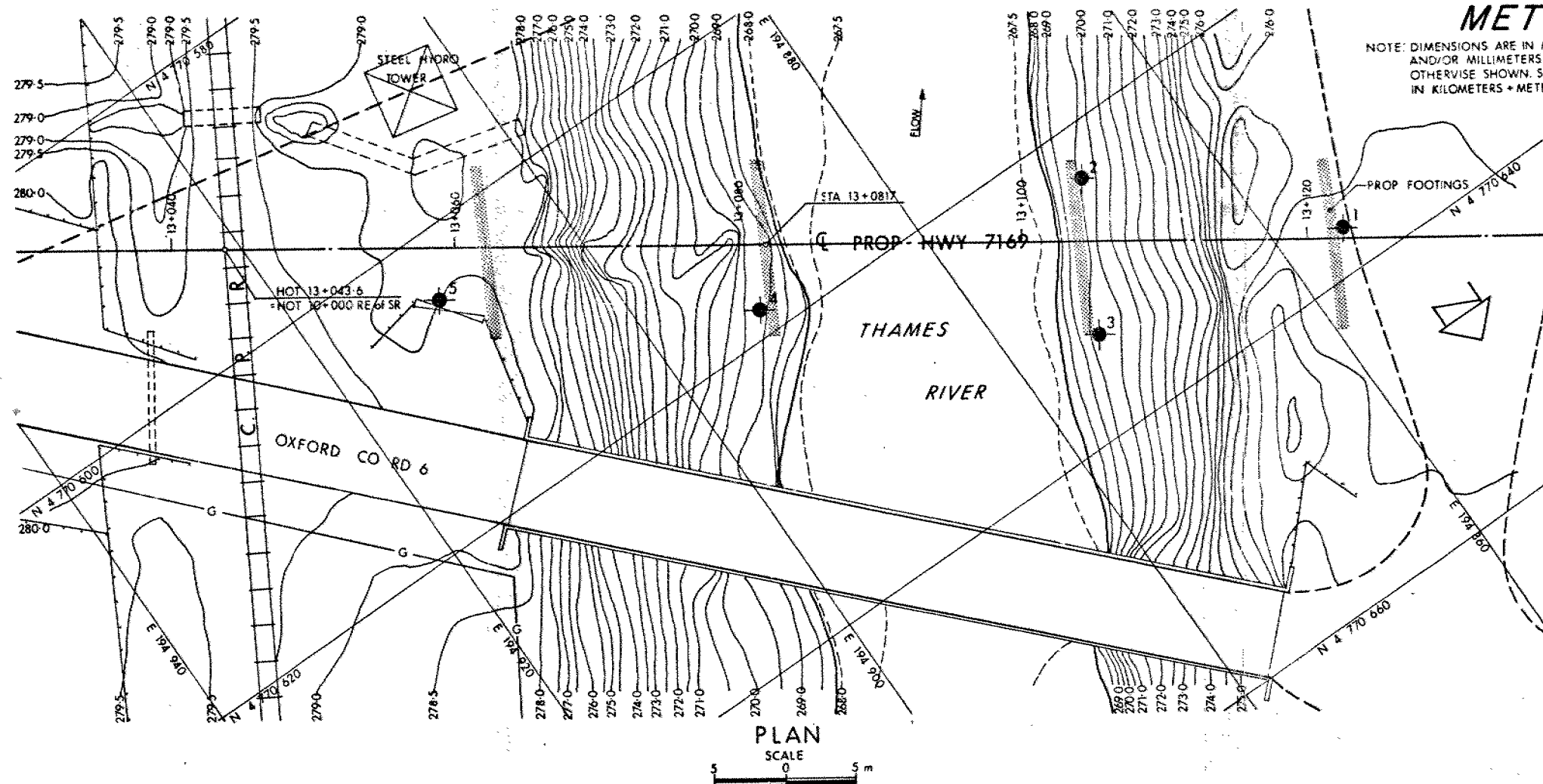
u_w	kPa	PORE WATER PRESSURE
r_u	1	PORE PRESSURE RATIO
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ϵ	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

m_v	kPa ⁻¹	COEFFICIENT OF VOLUME CHANGE
C_c	1	COMPRESSION INDEX
C_s	1	SWELLING INDEX
C_α	1	RATE OF SECONDARY CONSOLIDATION
C_v	m ² /s	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
T_v	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
σ'_{v0}	kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p	kPa	PRECONSOLIDATION PRESSURE
τ_f	kPa	SHEAR STRENGTH
c'	kPa	EFFECTIVE COHESION INTERCEPT
ϕ'	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u	kPa	APPARENT COHESION INTERCEPT
ϕ_u	-°	APPARENT ANGLE OF INTERNAL FRICTION
τ_R	kPa	RESIDUAL SHEAR STRENGTH
τ_r	kPa	REMOULDED SHEAR STRENGTH
S_f	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

ρ_s	kg/m ³	DENSITY OF SOLID PARTICLES	e	1, %	VOID RATIO	e_{min}	1, %	VOID RATIO IN DENSEST STATE
γ_s	kN/m ³	UNIT WEIGHT OF SOLID PARTICLES	n	1, %	POROSITY	I_D	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
ρ_w	kg/m ³	DENSITY OF WATER	w	1, %	WATER CONTENT	D	mm	GRAIN DIAMETER
γ_w	kN/m ³	UNIT WEIGHT OF WATER	S_r	%	DEGREE OF SATURATION	D_n	mm	n PERCENT - DIAMETER
ρ	kg/m ³	DENSITY OF SOIL	w_L	%	LIQUID LIMIT	C_u	1	UNIFORMITY COEFFICIENT
γ	kN/m ³	UNIT WEIGHT OF SOIL	w_p	%	PLASTIC LIMIT	h	m	HYDRAULIC HEAD OR POTENTIAL
ρ_d	kg/m ³	DENSITY OF DRY SOIL	w_s	%	SHRINKAGE LIMIT	q	m ³ /s	RATE OF DISCHARGE
γ_d	kN/m ³	UNIT WEIGHT OF DRY SOIL	I_p	%	PLASTICITY INDEX = $w_L - w_p$	v	m/s	DISCHARGE VELOCITY
ρ_{sat}	kg/m ³	DENSITY OF SATURATED SOIL	I_L	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	i	1	HYDRAULIC GRADIENT
γ_{sat}	kN/m ³	UNIT WEIGHT OF SATURATED SOIL	I_C	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	k	m/s	HYDRAULIC CONDUCTIVITY
ρ'	kg/m ³	DENSITY OF SUBMERGED SOIL	e_{max}	1, %	VOID RATIO IN LOOSEST STATE	j	kN/m ³	SEEPAGE FORCE
γ'	kN/m ³	UNIT WEIGHT OF SUBMERGED SOIL						



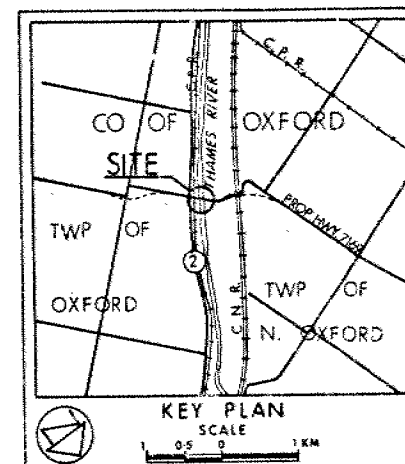
CONT No
WP No 151-73-06

HWY 7169 & THAMES RIVER
CROSSING

BORE HOLE LOCATIONS & SOIL STRATA



SHEET



LEGEND

- ◆ Bore Hole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ⊕ Bore Hole & Cone
- N Blows/0.3m (Std Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- W.L. at time of investigation 79 11 14
- BH No 1 Dry to Bedrock Surface
- WL NOT Established in BH No 2 & 4

No	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	276.0	4 770 635.0	194 855.5
2	269.6	4 770 623.6	194 868.8
3	269.8	4 770 635.4	194 874.0
4	269.4	4 770 618.0	194 892.5
5	279.0	4 770 604.8	194 910.6

NOTE

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

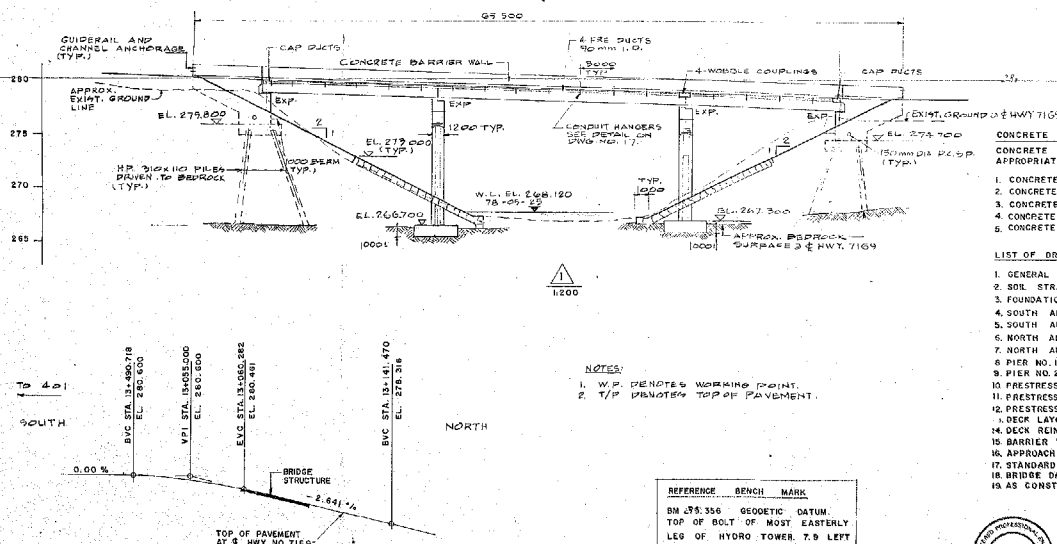
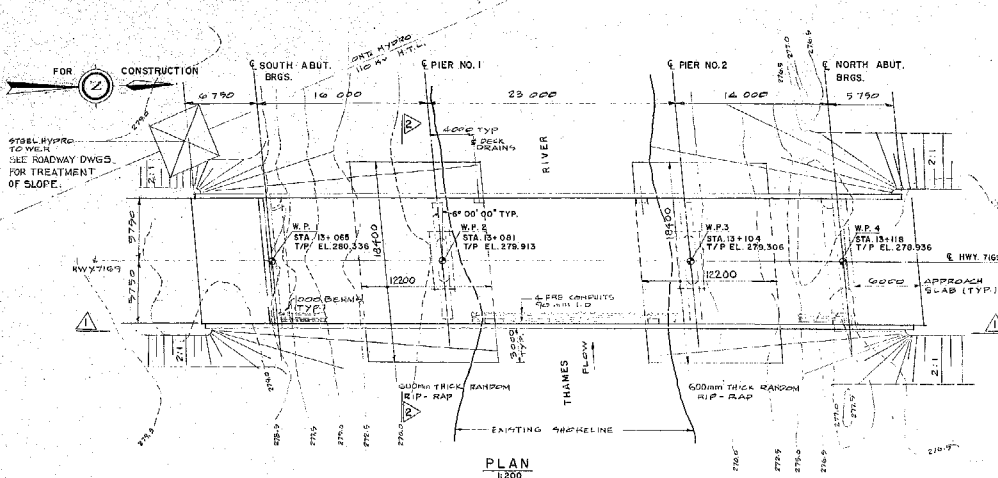
REVISIONS	DATE	BY	DESCRIPTION

Geocres No 40P2-37

HWY No 7169

SUBMITTAL CHECKED DATE 79 12 12 (STR 23-37)

DRAWING CHECKED APPROVES DWS 157315-A



PROFILE OF HIGHWAY NO. 7169

METRIC

DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE SHOWN
ELEVATIONS, COORDINATES, CURVE
AND ALIGNMENT DATA ARE IN METRES
STATIONS ARE IN KILOMETRES + METRES

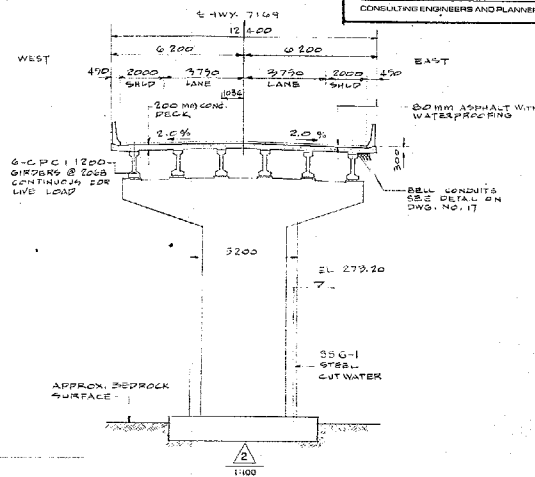
DISTRICT 2 LONDON
CONT No
WP No 151-73-06

THAMES RIVER BRIDGE
0.13 KM NORTH OF OXFORD
COUNTY ROAD 9
GENERAL ARRANGEMENT

DeLCan
CONSULTING ENGINEERS AND PLANNERS



SHEET



CONCRETE QUANTITIES:
CONCRETE QUANTITIES ARE LISTED BELOW FOR THE
APPROPRIATE CONCRETE LUMP SUM TENDER ITEMS.

1. CONCRETE IN PIERS 153 M³
2. CONCRETE IN ABUTMENTS & WINGWALLS 151 M³
3. CONCRETE IN DECK AND DIAPHRAGMS 165 M³
4. CONCRETE IN BARRIER WALLS 34 M³
5. CONCRETE IN APPROACH SLABS 38 M³

LIST OF DRAWINGS

1. GENERAL ARRANGEMENT
2. SOIL STRATA AND BOREHOLE LOCATIONS
3. FOUNDATION LAYOUT AND DETAILS
4. SOUTH ABUTMENT LAYOUT
5. SOUTH ABUTMENT REINFORCEMENT
6. NORTH ABUTMENT LAYOUT
7. NORTH ABUTMENT REINFORCEMENT
8. PIER NO. 1 LAYOUT AND REINFORCEMENT
9. PIER NO. 2 LAYOUT AND REINFORCEMENT
10. PRESTRESSED GIRDERS 'A' AND BEARINGS
11. PRESTRESSED GIRDERS 'B' AND BEARINGS
12. PRESTRESSED GIRDERS 'C' AND BEARINGS
13. DECK LAYOUT
14. DECK REINFORCEMENT
15. BARRIER WALLS
16. APPROACH SLABS
17. STANDARD DETAILS
18. BRIDGE DATA & SITE NUMBER DATA
19. AS CONSTRUCTED ELEVATIONS & DIMENSIONS

NOTES:

- CLASS OF CONCRETE
- DECK 30 MPa
PIER AND BARRIER WALL 30 MPa
REMAINDER OR AS NOTED ON DWG. 20 MPa
- CLEAR COVER TO REINFORCING STEEL
- DECK: TOP 80 mm
BOTTOM 40 mm
ABUTMENTS 75 mm
PIERS 75 mm
POSTINGS 50 mm
BARRIER WALLS 50 mm
APPROACH SLABS 50 mm
OR AS NOTED ON THE DRAWINGS.
- TO ACHIEVE THE MINIMUM CLEAR COVER OF 50 mm SPECIFIED AT THE TOP OF THE DECK, THE TOP LAYER OF REINFORCEMENT SHALL BE PLACED PRIOR TO CONCRETING, WITH A CLEAR COVER OF 65 (50 mm) TOLERANCE.
- REINFORCING STEEL GRADE
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CSA - G30.12 - M 1977 GRADE 400. REINFORCING BARS WITH DESIGNATION 'C' AT END OF BAR MARK SHALL BE EPOXY COATED BARS.

CONSTRUCTION NOTES:

- THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 3 mm.
- NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED.

REFERENCE BENCH MARK
ON 375.356 G. GEODETIC DATUM
TOP OF BOLT OF MOST EASTERLY
LEG OF HYDRO TOWER, 7.9 LEFT
STA. 13+055.5



DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
1	01-03	W.P.	CHECK N.Y.A. LENDING 0800-4790
2	01-03	J.L.	CHECK N.Y.A. SITE NO 23-147 DWG 1