

#63-F-72

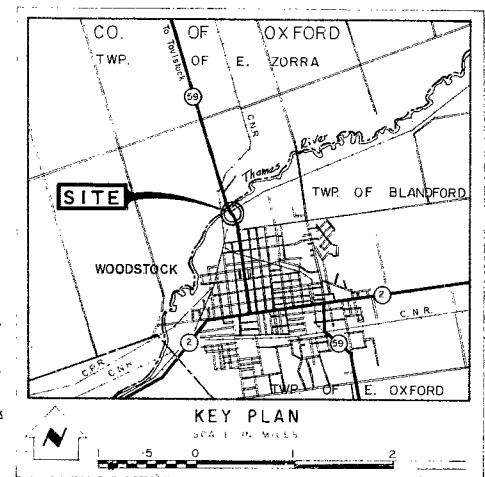
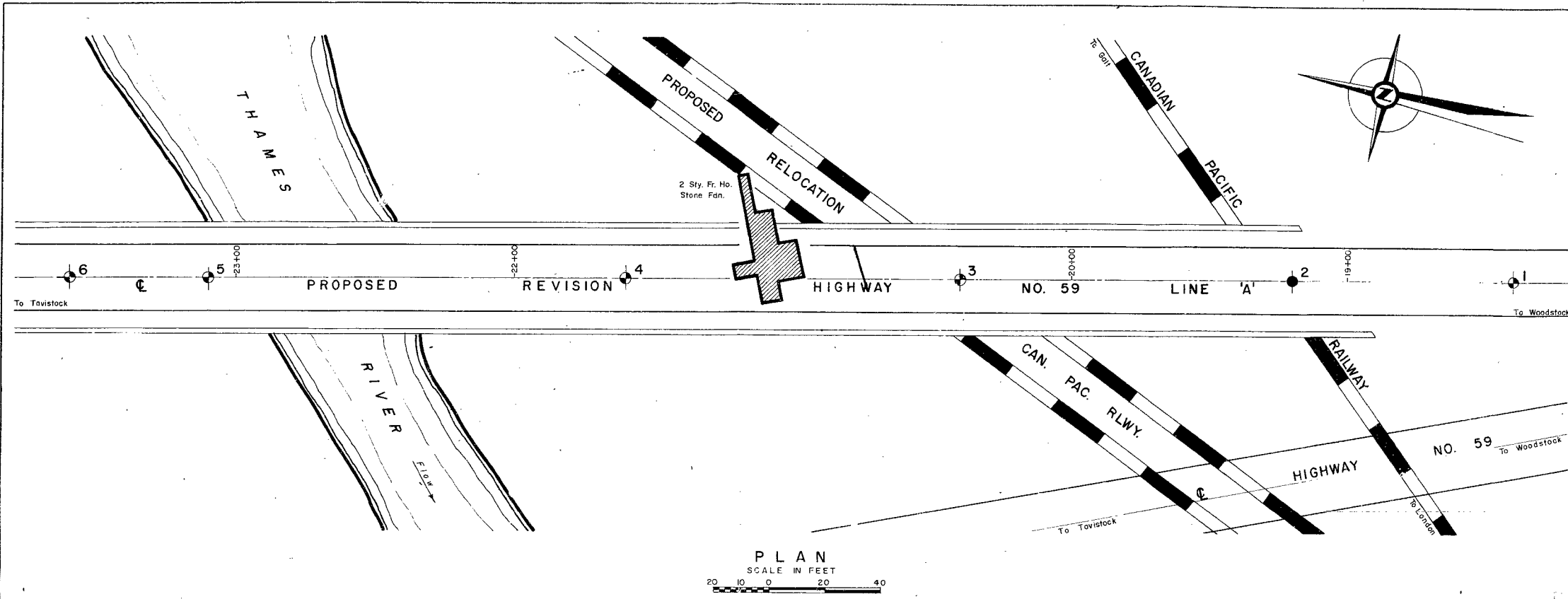
W.P. #231-63

Hwy. #59

THAMES RIVER &

C.P.R. RELOCATION

WOODSTOCK



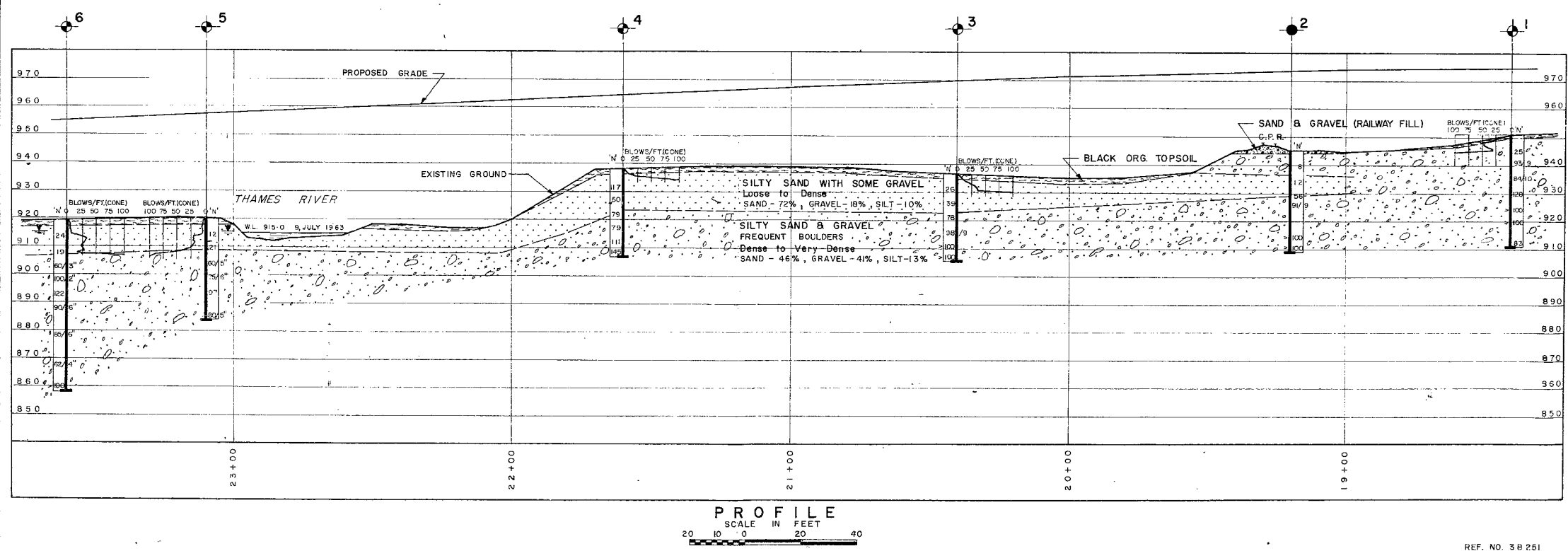
LEGEND

- Bore Hole
- ⊕ Core Penetration Hole
- ⊗ Bore & Core Penetration Hole
- Water Levels established at time of field investigation (July 1963)

NO.	ELEVATION	STATION	DEPTH
1	951.1	18+40	£
2	945.5	19+20	£
3	936.8	20+40	£
4	938.4	21+60	£
5	920.1	23+10	£
6	919.8	23+60	£

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.



REVISIONS

NO.	DATE	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION - REGIONAL OFFICE

THAMES RIVER & PROP. C.P.R. RELOCATION

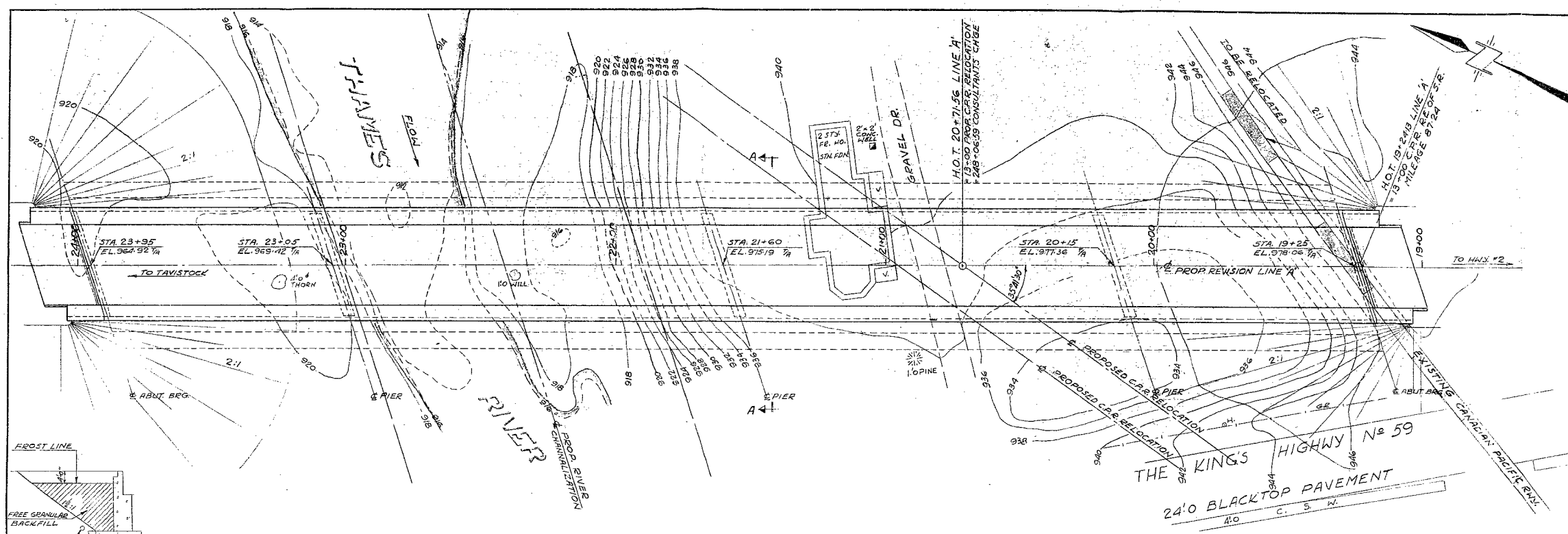
KING'S HIGHWAY NO. 59 PROP. REV'N. LINE 'A' DIST NO. 2
CO. OXFORD CITY OF WOODSTOCK
TWP. BLANDFORD LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

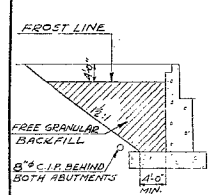
SUBMITTAL NO.	CHECKED	DATE	W.P. NO. 231-63	DATE
26	26	26	26	26
DATE	26	JULY 1963	SITE NO.	63-F-72 A
APPROVED	APPROVED	DATE	CONT. NO.	

PRINT RECORD

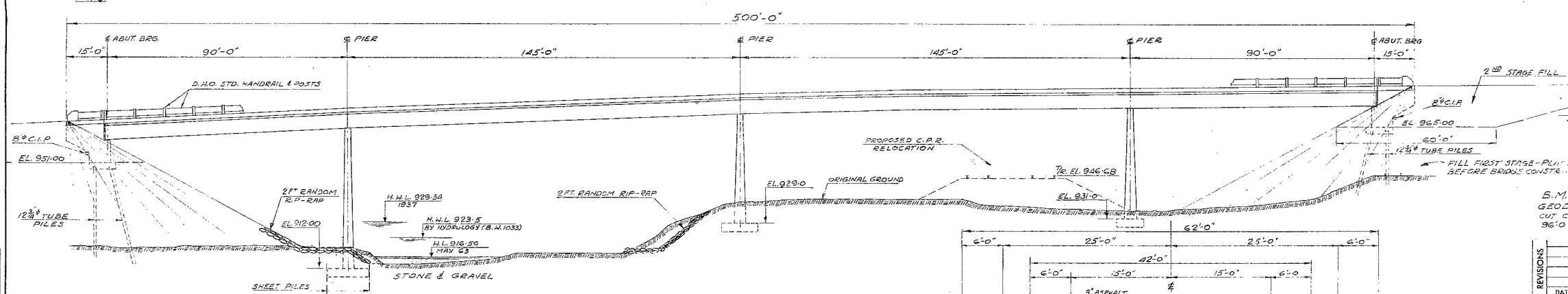
NO.	FOR	DATE



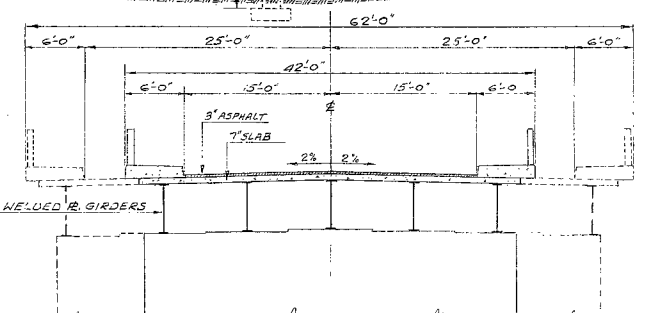
PLAN
SCALE: 1"=20'-0"



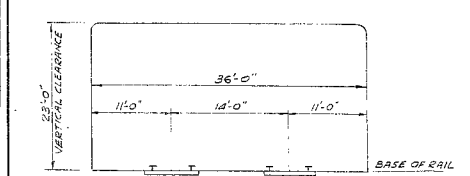
GRANULAR BACKFILL
N.T.S.



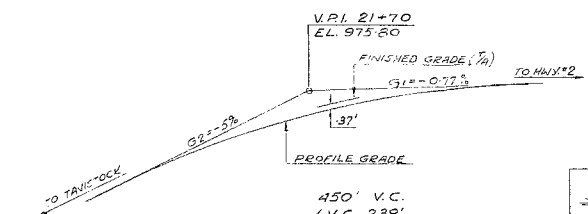
WEST ELEVATION
SCALE: 1"=20'-0"



SECTION A-A
SCALE: 1/4"=1'-0"



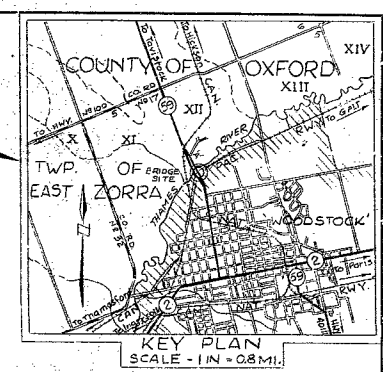
CROSS SECTION-C.P.R. UNDER HWY. #59
N.T.S.



VERTICAL ALIGNMENT
N.T.S.

SEEN ANGLE: 18°00'

SIN.	.30902
COS.	.95106
TAN.	.32492
COT.	3.07768



S.M. EL. 955.33
GEODEIC DATUM
CUT CROSS ON S.W. CORNER OF CONC. WALK ON BRIDGE
96'0" LT. OF STA. 21+50 REVN. LINE 'A'

REVISIONS

NO.	DATE	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
THAMES RIVER BRIDGE & C.P.R. O'HEAD AT WOODSTOCK			
KING'S HIGHWAY No. 59		DIST. No. 2	
CO. OXFORD		TWP. ZORRA	
LOT 3		CON.	
PRELIMINARY			
APPROVED		SITE No. 24-297 W.P. No. 231-53	
DESIGN		CONTRACT	
CHECK		No.	
D.C.		D-5356-P	
DATE AUG. 1960		LOADING 1420316	

PRINT RECORD

No.	FOR	DATE

Mr. A. M. Toye,
Bridge Engineer,
Bridge Division.

Attention: Mr. S. McCombie

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.

August 16, 1963

D.H.O. FOUNDATION INVESTIGATION REPORT --
Realigned Hwy. #59, Line 'A' and Thames River,
County of Oxford, Township of West Oxford, Ont.
W.J. 63-F-72 -- District #2 -- W.P. 231-63.

Attached, we are forwarding to you, our detailed
foundation investigation report on the subsoil conditions
existing at the above structure site.

We believe that you will find the factual data and
recommendations contained therein, adequate for your future
design work. Should additional information be required,
please do not hesitate to contact our Office.

KYL/MdeF
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
A. Gater
H. C. Dernier
J. Roy
A. Watt

Foundations Office ✓
Gen. Files

K. Y. Lo.
K. Y. Lo,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

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FOUNDATION INVESTIGATION

For

Realigned Hwy. #59, Line 'A' and Thames River,
County of Oxford, Twp. of West Oxford, Ontario.
W.J. 63-F-72 -- District #2 -- W.P. 231-63.

1. INTRODUCTION:

A request to carry out a foundation investigation at the realigned Hwy. #59, Line 'A' and Thames River, was received from the Bridge Planning Engineer, Mr. S. McCombie, dated June 19, 1963.

It is proposed to erect a new bridge to carry realigned Hwy. #59, Line 'A', over the C.P.R. and Thames River. The site of the proposed bridge is located approx. 1.5 miles Northwest of the Town of Woodstock, County of Oxford, Twp. of West Oxford. At this location, the chainage of the realigned Hwy. #59, Line 'A', is from 18+40 to 23+60.

In order to determine the soil properties and decide on the type of foundations, an investigation was carried out by this Section. Results and the discussion of the field and laboratory investigations, as well as conclusions and recommendations for the future design work, are contained in the following paragraphs of this report.

2. DESCRIPTION OF SITE:

The site of the proposed bridge is located approx. 1.5 miles Northwest of the Town of Woodstock. The surrounding area is hilly. The width of the Thames River at the proposed crossing is about 30 feet, and the depth of water, approx. 2'-0" to 3'-0".

Physiographically, the site is located in the so-called Oxford Till Plains.

cont'd. /2 ...

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, six sampled boreholes and five dynamic cone penetration tests were carried out at this site.

Split-spoon samples were taken at various depth intervals. Samples recovered in the split-spoon sampler were used to determine the following physical properties:

1. Natural Moisture Content.
2. Grain Size Distribution.

Results of these laboratory tests are summarized in Appendix I of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

The stratigraphy of the soil at the site, was found to be generally uniform. A detailed description of various soil types encountered during the investigation, is shown in Appendix I of this report, and is also given in subsequent paragraphs. The estimated stratigraphical profile shown on Dwg. No. 63-F-72A, is based upon this information.

4.2) Silty Sand with Some Gravel - Loose to Dense:

This layer, which was found immediately below the topsoil, has a general slope of 5% from South towards North. It was encountered in all boreholes except B.H. #1. At the South end, the top and bottom elevations of this layer are 944.0 and 929.3, while at the North end, 917.3 and 907.3, respectively. The percentage of

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.2) Silty Sand with Some Gravel - Loose to Dense: (cont'd.) ... sand in this layer is 72%; gravel forms 18%, and the rest of 10%, is silt. Moisture content determinations for this layer averaged about 12.4%. The overall layer was found in a loose to dense state with an average 'N' value of 25 blows/foot.

4.3) Silty Sand and Gravel - Dense to Very Dense - Frequent Boulders:

Following the layer of silty sand with some gravel is a stratum of silty sand and gravel with frequent boulders. The boulders in this stratum vary in size from 6" to 18" Ø and are tightly packed.

Moisture content determinations for this stratum varied from 6.2% to 13.6%. Grain size distribution curves indicated that the percentage of sand in this stratum is 46%; gravel forms 41%, and the rest of 13%, is silt. The overall stratum is in a dense to very dense condition, with an average 'N' value in excess of 150 blows/foot.

5. GROUND WATER CONDITIONS:

The ground water level, at the time of the investigation, was found at approx. El. 915.0, about 5' below existing ground level in B.H. #5 and B.H. #6, only. It may be assumed that the water level will vary with the seasons of the year.

No artesian water conditions were encountered.

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new bridge at this location to carry realigned Hwy. #59 over the C.P.R. (also to be realigned)

cont'd. /4 ...

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

and the existing Thames River. The total length of the new bridge will be in the order of 500', and the height of the fill at the North and South abutments will be approximately 35' and 25', respectively.

Subsoil conditions at the site are generally favourable for spread footing type foundations, at relatively shallow depths except at the locations of the piers spanning the waterway of the Thames River, where the depth to firm material is somewhat greater than elsewhere. Recommendations as to type of footings and design loads, are as follows:

Abutment Footings -

The proposed abutments should be supported on piled foundations. For this purpose, the most suitable piles would be 12 $\frac{1}{2}$ " at 33 lbs./ft. steel tubes driven through the approach fill. It is estimated that a design load of 60 tons will be achieved if the piles are driven to approximate elevations 907.0 and 944.0 at the North and South abutments, respectively. In any event, the design loads should be checked in the field by means of the Hiley Formula according to D.H.O. Standards DD-1218 and DD-1219.

Pier Footings (North of Sta. 22+00) -

At the locations of the piers spanning the waterway of the Thames River, relatively loose conditions were encountered to about elevation 908.0 (12.0' below ground level).

According to the Bridge Hydrology Section, it will be necessary to provide scour protection to an elevation some 10' below

cont'd. /5 ...

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

Pier Footings (North of Sta. 22+00) - (cont'd.) ...

river bottom. A dewatering scheme will be necessary as the subsoil material consists of silty sand which is likely to become 'quick' when subjected to unbalanced hydrostatic heads. In view of the above facts, it is recommended that the pier footings in question, be completely encased in interlocking steel sheet piling driven down to the elevation necessary for scour protection, and the footings constructed at an elevation some 5' below the lowest established river water level. The excavations can be dewatered in safety within the sheeting. A design load of 2 t.s.f. may be used in this case.

Pier Footings (South of Sta. 22+00) -

All other pier footings may be founded 5' or more, below the existing ground levels prevailing at the particular locations. No dewatering problems are anticipated. A design load of 2.5 t.s.f. is recommended.

Approach Fills -

No stability problems are anticipated for the proposed approaches in the immediate vicinity of the bridge abutments, provided that standard 2:1 side slopes are constructed. Rip-rap should be provided at the North abutment to protect the slopes against scour action by the river.

cont'd. /6 ...

7. SUMMARY:

A foundation investigation at the site of the proposed Hwy. #59 and Thames River crossing is reported.

Subsoil consists of loose to very dense deposits of silt, sand, gravel and boulders.

Spread footings are recommended for all piers. Piled foundations are recommended for the abutments. Details regarding design loads, foundation depths and dewatering, are given in Section 6 above.

No problems are anticipated with regard to the proposed approach fills in the immediate vicinity of the abutments.

8. MISCELLANEOUS:

The field work, performed during the period from June 27 to July 10, 1963, together with the preparation of this report, was undertaken by Mr. W. W. Kulmatickas, Project Foundation Engineer. The investigation was carried out under the general supervision of Mr. K. G. Selby, Senior Foundation Engineer.

August 1963.

APPENDIX 1.

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - 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 :-

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>c LB. / SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H.	SAMPLE ADVANCED HYDRAULICALLY	
	P.M.	SAMPLE ADVANCED MANUALLY	

SOIL TESTS

Q _u	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Q _{cu}	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q _d	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS 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
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
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	$= 3.1416$
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ 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 (YOUNG'S 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_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

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

SLOPES

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

FOUNDATION SECTION

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— w _L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	PLASTIC LIMIT ——— w _P	WATER CONTENT ——— w		
951.1	Ground Elevation					950						
950.1	Black org. topsoil											
1.0												
	Silty sand and gravel.		1	SS	25							
	Dense to very dense.		2	SS	93	940						
	Frequent boulders.											
			3	SS	84							
			4	SS	128	930						
			5	SS	>100							
			6	SS	-100	920						
911.6			7	SS	83							
39.5	End of borehole.					910						
						900						

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 2	FOUNDATION SECTION
JOB <u>63-F-72</u>	LOCATION <u>Hwy. #59 Line "A" Ch. 19+20 on E</u>	ORIGINATED BY <u>W.W.K.</u>	
W.P. <u>231-63</u>	BORING DATE <u>July 3 to July 5, 1963.</u>	COMPILED BY <u>W.W.K.</u>	
DATUM <u>945.2</u>	BOREHOLE TYPE <u>BX Casing (Run)</u>	CHECKED BY <u>B.K.</u>	

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— W _L	PLASTIC LIMIT ——— W _P	WATER CONTENT ——— W	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOVS / FOOT		SHEAR STRENGTH P.S.F.	W _P	W	W _L		
945.5	Ground Elevation											
944.0	Sand & Gravel R.W.Fill											
1.5	Silty sand & gravel Loose Some boulders.	0.0-0.0	1	SS	8	940						
936.7		0.0-0.0										
8.8	Silty sand with some gravel.	0.0-0.0	2	SS	12							
929.3	Loose to dense.	0.0-0.0	3	SS	56	930						
16.3	Silty sand and gravel. Dense to very dense. Frequent boulders.	0.0-0.0	4	SS	91							
						for 9"						
			5	SS	>100							
909.0		0.0-0.0	6	SS	100	910						
36.5	End of borehole.											
						900						

JOB 63-F-72

LOCATION Hwy. #59 Line "A" Ch. 20/40 on E

ORIGINATED BY W.W.K.

W. P. 231-63

BORING DATE July 5 to July 9, 1963.

COMPILED BY W.W.K.

DATUM 936.8

BOREHOLE TYPE EX Casing (Run)

CHECKED BY B.K.

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F.	LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W WP ——— W ——— WL WATER CONTENT % 5 10 15	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
936.8	Ground Elevation					940				
934.8	Black org. topsoil									
2.0	Silty sand with some gravel.		1	SS	26	930				
			2	SS	39					
22.8	Loose to dense.		3	SS	78	920				
14.0	Silty sand and gravel.		4	SS	98					
	Dense to very dense.				for 9"					
	Frequent boulders.		5	SS	>100	910				
905.3			6	SS	>100					
31.5	End of borehole.					900				

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 4		FOUNDATION SECTION	
JOB <u>63-F-72</u>		LOCATION <u>Hwy. #59 Line "A" Ch. 21/60 on E</u>		ORIGINATED BY <u>W.W.K.</u>	
W.P. <u>231-63</u>		BORING DATE <u>July 5 to July 9, 1963.</u>		COMPILED BY <u>W.W.K.</u>	
DATUM <u>938.4</u>		BOREHOLE TYPE <u>BX Casing (Run)</u>		CHECKED BY <u>B.K.</u>	

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WP	W	WL		
938.4	Ground Elevation					940										
936.2	Black org. topsoil	[Hand-drawn soil profile sketch]														
2.2	Silty sand with some gravel.		1	SS	117	930							○			
			2	SS	50								○			
923.7	Loose to dense.															
14.7	Silty sand and gravel.		3	SS	79	920							○			
	Dense to very dense.		4	SS	79								○			
	Frequent boulders.		5	SS	111	910							○			
906.8			6	SS	145									○		
31.5	End of borehole.					900										

100 blows for 3"

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 5

FOUNDATION SECTION

JOB 63-F-72 LOCATION Hwy. #59 Line "A" Ch. 23+10 on E ORIGINATED BY W.W.K.
W.P. 231-63 BORING DATE July 9 to 11, 1963. COMPILED BY W.W.K.
DATUM 920.1 BOREHOLE TYPE BX Casing Run CHECKED BY B.K.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WP	W	WL		
920.1	Ground Elevation					920										
917.9	Black org. topsoil															
2.2	Silty sand with some gravel.		1	SS	12											
908.9	Loose to dense.		2	SS	21	910										
11.2	Silty sand and gravel		3	SS	60											
	Dense to very dense.				for 5"	900										
	Frequent boulders.		4	SS	75											
					for 6"											
			5	SS	97	890										
883.6			6	SS	80											
36.5	End of borehole.				for 5"	880										

W.L. Elev.
915.3
Observed in
Auger Hole

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

JOB 63-F-72

LOCATION Hwy. #59 Line "A" Ch. 23/60 on E

ORIGINATED BY W.W.K.

W.P. 231-63

BORING DATE July 9 to July 11, 1963.

COMPILED BY W.W.K.

DATUM 919.8

BOREHOLE TYPE BX Casing (Run)

CHECKED BY B.K.

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — WL			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					PLASTIC LIMIT — WP				
							20	40	60	80	100	WATER CONTENT — W				
							SHEAR STRENGTH P.S.F.					WP	W	WL		
												WATER CONTENT %				
919.8	Ground Elevation					920										
917.3	Black org. topsoil															
2.5	Silty sand with some gravel.		1	SS	24											
			2	SS	19	910										
907.3	Loose to dense.															
12.5			3	SS	60											
					for 3"											
			4	SS	100	900										
					for 2"											
	Silty sand and gravel.		5	SS	122											
	Dense to very dense.		6	SS	90	890										
					for 6"											
	Frequent boulders.		7	SS	85	880										
					for 6"											
			8	SS	62	870										
					for 4"											
858.2			9	SS	>100	860										
61.5	End of borehole.															
						850										

W.L. Elev.
915.1
Observed in
Auger Hole

56 Blows for 6"

Thomas Diver

C.P.R. Relocation

Trwy to 59 line, A

Woodstock, Ont. District 2

W.P. 231-63 63-F-72

Note on meeting in Foundation Office
March 4, 1965

Chester Gubski B.O., Tim Buller, Phil Jacquot (2)
Fence, Needles, Buriganoff and Smith. 468

It was agreed that an allowable load of 3.5 T/psf be used for all footings provided they are founded on the dense to v. dense till stratum of silty sand with gravel and frequent boulders. The previous recommendations were for slightly lower bearing values. The 3.5 T/psf recommendation was arrived at in view of the possibility to have all footings placed on the dense till stratum which being primarily of granular nature and of very dense packing should provide good bearing.

March 4, 1965

agreed

MEMORANDUM

63-F-72
Start 27th June 63
W.W.K.

To: Mr. A. G. Stermac
Principal Foundations
Engineer,
Lab. Bldg.

From: S. McCombie

Date: June 19, 1963.

Our File Ref.

IN REPLY TO

SUBJECT:

W.P. 231-63 (63-F-72)
Thames River & C.P.R.
Hwy, 59, District #2
Site 24-297.

Enclosed is a portion of plan 3B251 and a
print of profile (scheme 1A) showing the location
and grade for the above structure.

The approximate location of piers and abut-
ments is shown in red.

Would you please arrange for a foundation
investigation to be carried out by October 2, 1963.

S. McCombie

SM/ew
c.c. R. Fitzgibbon
W. D. Smith.

S. McCombie,
Bridge Planning Engineer.

Driller - P. V. K. meet at point of 401 & 2 June 27th 63 10.00 am
Maintenance Eng. re. informed by teletype. June 27th 63
Regional Soil Engineer " " " " " "

Permission to enter property other than C.P.R. not yet obtained.
Utilities must be checked by Engineer in field

Permission to enter C.P.R. property obtained from
Mr. FALLON C.P.R. LONDON Tel. GE 8-4061 but no drilling on
C.P.R. property until underground cables have been located.
C.P.R. inspector will meet D.M.C. G-quincey at 11.00 pm
on site 27th June '63 to check cables.
When flagging is required for drilling near tracks
call MR FALLON and give 24 hours notice
A.C.S. 11

Mr. W. Kinnear
Engineer-London
Regional Functional Planning
Materials & Research-London

63.T.72
February 25, 1964

Re: W.P. 231-63, Highway 59,
Thames River and C.P.R. Grade
Separations at Woodstock.

Attn: Mr. L. Schwabl

Further to our recent telephone conversation re the above project, the Foundation Section was contacted to determine whether any problems would arise with future widening of the above structures and approaches to 4 lanes. Mr. A. Stermac, Foundation Engineer, indicated after reviewing the foundation report that no difficulties are anticipated and that the widening construction could be carried out in the future satisfactorily provided that proper construction practices were employed.

JF/jb
cc: A. Stermac/
D. Suzuki
file

J. Forster
J. Forster
for: J.R. Roy
Regional Materials Engineer

72
Mr. N. Zoltay,
Regional Bridge Location Engr.,
Bridge Division.

4/23/72
Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

September 15, 1964.

Your Memo - Sept. 8, 1964.

63
W.P. 231-62,
Bridge Site 24-297,
Thames River Bridge & C.P.R. Overhead,
Hwy. #59, District #2.

63-72
A design load of 3 tons/sq.ft. at the North Pier (location North of Chainage 22+00), can be achieved at approximately El. 907. South of Chainage 22+00, net bearing pressure may be increased to 3 tons/sq.ft. at the depth shown on Dwg. No. D-5356-P.

It should be noted that considerable difficulty may be encountered in driving the sheeting at the North Pier due to the presence of boulders. It is therefore suggested that the sheeting should be of the heavy type.

KCS/MdeF

cc: Foundations Office. ✓
Gen. Files.

for H. G. Sternac,
PRINCIPAL FOUNDATION ENGINEER

John Forster - Soils Engineer London Region
asked if any problems or difficulties are
expected in connection with a future highway
widening to four lanes.

On Feb 25, 1964 he was advised that if
the approach fills are well compacted no
future problems can be foreseen

Feb 25, 1964

Atkinson

X

LCNR DOWN 1 JUN 27/63 8:45A VR

MR J ROY REG MATLS ENGR

FOR YOUR INFORMATION ONLY, FOUNDATION SECTION WILL COMMENCE
FIELD INVESTIGATION FOR PROPOSED HWY. 59 THAMES RIVER AND CPR
CROSSING, W P 231-63 WOODSTOCK ON JUNE 27TH 63.

K G SELBY MAT & RES DIV

L

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1963 JUN 27 AM 8:45A

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LONG DOWN 2 JUN 27/63 8:45A VR,

DIST ENGR M C DENNIER

ATTN MAINT ENGR R A SHANNON.

FOR YOUR INFORMATION ONLY, FOUNDATION SECTION WILL COMMENCE
FIELD INVESTIGATION FOR PROPOSED HWY. 59 THAMES RIVER AND CPR
CROSSING V P 231-63 WOODSTOCK ON JUNE 27TH 63.

K B SELBY M & R DIV (SR FOUNDN ENGR)

L

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Building.

FROM: Bridge Division,
Downsview, Ontario.

DATE: September 8, 1964.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 231-63
Bridge Site 24-297
Thames River Bridge
and C.P.R. Overhead,
Highway #59 District #2.

We are sending to you herewith two prints of
Preliminary Plan D-5356-P of the above structure.

Would you please let us have your written
comments.



NZ/kd

c.c. S. McCombie
G. Scott
N.D. Smith
R. Fitzgibbon

N. Zoltay,
for G. Scott
Regional Bridge Location Engineer.