

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.

FROM: Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

DATE: December 28, 1965

OUR FILE REF.

IN REPLY TO

JAN 25 1966

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing of Hwy. #63, Line 'D' and
O.N.R., District of Nipissing, Township of
Widdifield, Lot 16, Con. 'C', District #13.

W.J. 65-F-111

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W.P. 36-64

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 design requirements.

Should additional information be required, please feel free to contact our Office.

AGS/MdeF

Attach.

cc: Messrs. B. R. Davis (2)

H. A. Tregaskes

D. W. Farren

H. McArthur

G. Martens

E. R. Saint

A. Watt

Foundations Office
Gen. Files

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

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FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing of Hwy. #63, Line 'D' and
O.N.R., District of Nipissing, Township of
Widdifield, Lot 16, Con. 'C', District #13.

W.J. 65-F-111

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W.F. 36-64

1. INTRODUCTION:

A request to carry out a foundation investigation at the crossing of Hwy. #63, Line 'D' and O.N.R., was received from the Regional Bridge Location Engineer, Mr. J. C. McAllister, dated September 22, 1965.

It is proposed to erect a new bridge to carry Hwy. #63, Line 'D' over the O.N.R. The site is located in the District of Nipissing, Twp. of Widdifield, Lot 16, Con. 'C', approximately $1\frac{3}{4}$ miles East of the intersection of Hwy's #63 and #11. At this location the chainage of Hwy. #63, Line 'D' is from 25+60 to 30+80.

In order to determine the soil properties and decide on the type of foundation an investigation was carried out by this Section. Results and discussion of the field and laboratory investigation, 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 future bridge is located in the District of Nipissing, Twp. of Widdifield, Lot 16, Con. 'C', approximately $1\frac{3}{4}$ miles East of the intersection of Hwy's #63 and #11. The surrounding area forms a natural ravine at the bottom of which flows a small creek (approximately 3 - 4 feet wide and 2 - 3 feet deep). Along the creek banks, between Wallace Road and the O.N.R., there is a swamp.

cont'd. /2

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, eleven sampled boreholes and one penetration test 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 Contents.
2. Grain Size Distributions.

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. 65-F-111A is based upon this information.

4.2) Silty Sand and Gravel with traces of Clay - Frequent Boulders - Dense to Very Dense:

This stratum, which extends to the depth investigated, or to bedrock, was found immediately below the topsoil.

The average percentage of sand in this stratum is 42%, gravel 39%, silt forms 16%, and the rest of 3%, is clay. Moisture content determination for this layer averaged about 12%, ranging from 3% to 33%. The overall stratum was found in a dense to very dense condition, with an average 'N' value in excess of 100 blows/foot. The 'N' values varied from 34 blows/foot to over 200 blows/foot.

Frequent boulders found in this stratum varied in size from 8" to 3'-6" in diameter.

cont'd. /3

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

4.3) Blue and Red Granite Bedrock:

Blue and red granite bedrock was encountered beneath the stratum of silty sand and gravel with traces of clay. Five to 10 feet of bedrock core taken in B.H.'s #1, 2, 3, 4, 11 and 12, shows sound blue and red granite bedrock.

The investigation has revealed that the surface of the bedrock is very uneven and may vary considerably a short distance away from the borehole.

5. GROUND WATER CONDITIONS:

The ground water level, at the time of the investigation, was found:

In B.H. # 3	at	El. 694.8
In B.H. # 4	at	El. 689.6
In B.H. # 5	at	El. 689.7
In B.H. # 6	at	El. 689.8
In B.H. # 7	at	El. 691.7
In B.H. # 8	at	El. 690.1
In B.H. # 9	at	El. 688.3
In B.H. #11	at	El. 694.1

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:

As can be seen from the previously described soil stratigraphy, the soil consists of black organic topsoil, followed by silty sand and gravel with traces of clay and frequent boulders, which in turn, is underlain by blue and

cont'd. /4

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

red granite bedrock. Spread footings placed 7'-0" below existing ground elevations are recommended for the structure. A net allowable pressure of 3 tons/sq.ft. may be assumed for design purposes. Where footings can be founded directly on bedrock (at the eastern end of the structure) a net allowable load of 20 tons/sq.ft. may be used.

If perched abutments are used, they should be founded on H-piles driven, if possible, 10 feet into the original ground. The design load on the pile should be the allowable maximum for the section used. Due to the presence of boulders, the pile driving may prove to be difficult and the pile penetration quite variable.

A dewatering scheme will be necessary in the vicinity of the creek, as the excavations for the pier footings will be below the established ground water levels. No stability problems are anticipated with the approach fills.

7. SUMMARY:

1) The stratigraphy of the soil which consists of topsoil, followed by silty sand and gravel with traces of clay and frequent boulders, is quite uniform. The density of the material encountered varied from dense to very dense.

2) Footings should be placed 7 feet below existing ground elevations on exposed bedrock. A net allowable load of 3 tons/sq.ft. and 20 tons/sq.ft. may be used, respectively.

3) Some dewatering problems may be anticipated in the vicinity of the creek.

cont'd. /5

7. SUMMARY: (cont'd.)

4) No stability problems with the approach fills are expected.

5) If perched abutments are used, they should be founded on H-piles driven through the fill, 10 feet into the original ground, if possible. The design load on the pile should be the allowable maximum for the section used.

8. MISCELLANEOUS:

The field work, performed during the period from October 13 to Oct. 21, 1965, 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.

The survey was carried out by a survey crew of the North Bay Planning Region, under the supervision of Mr. J. Walcomb.

December 1965

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO

RECORD OF BOREHOLE NO. 1

MATERIALS & TESTING DIVISION

FOUNDATION SECTION

JOB 65-P-111

LOCATION O.N.R. & Hwy. 63 Line 'D' Ch. 25+60 on E

ORIGINATED BY W.W.K.

W.P. 36-64

BORING DATE Oct. 21, 1965.

COMPILED BY W.W.K.

DATUM 708.9

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S. *HL*

SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W _c W _P — W — W _L WATER CONTENT % 10 20 30	BULK DENSITY γ _B P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE					
703.9	Ground level							
706.9	Org. matter rubble							
2.0	disintegrated concrete							
704.2	Silty sand & gravel	1	SS 24					
	Dense to very dense							
	frequent boulders							
4.7	Red and Blue Granite Bedrock		for 3"	700				
694.5				690				
14.4	End of borehole.							

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JCB 65-F-111

LOCATION O.N.R. & Hwy. 63 Line 'D' Ch. 26+00 25'-0" Lt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 21, 1965.

COMPILED BY W.W.K.

DATUM 707.6

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

SOIL PROFILE			SAMPLES	ELEV.	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	Liquid Limit ———— W _L Plastic Limit ———— W _P Water Content ———— W	BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT			
707.6	Groundlevel							
706.4	Blk Org. topsoil							
704.6	Silty sand & gravel							
3.0	Dense to very dense							
	Red and Blue Granite Bedrock							
694.6								
13.0	End of borehole.							

FOUNDATION SECTION

ORIGINATED BY W.W.K.

COMPILED BY W.W.K.

CHECKED BY K.G.S.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT _____	LIQUID LIMIT _____ WL PLASTIC LIMIT _____ wp WATER CONTENT _____ w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F. _____	$w_p \quad w \quad w_L$ WATER CONTENT % 10 20 30				
702.9	Groundlevel											
701.4	Black org. topsoil											
1.5	Silty sand & gravel. Frequent boulders. Dense to very dense.		1	SS	44	700						Observed in Casing. ▼ WL Elev 694.8 Sa 41% Si 17% Gr 42%
			2	SS	80							
			for 5"									
690.6			3	SS	80							
12.3	Red and Blue Granite					690						
685.6	Bedrock											
17.3	End of borehole.					680						

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 44

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch27+73 25'-0" Lt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 20, 1965.

COMPILED BY W.W.K.

DATUM 697.4

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 28/60 25' 0" Lt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 18, 1965.

COMPILED BY W.W.K.

DATUM 691.4

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

RECORD OF BOREHOLE NO. 5

FOUNDATION SECTION

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.			Wp W WL ----- 10 20 30 WATER CONTENT %				
691.4	Groundlevel													
0.0 688.9	Black org. topsoil (Swamp)					690								▼ 689.7
2.5	Silty sand and gravel with traces of clay. Frequent boulders. Compact to very dense.		1	SS	15	680							Observed in Casing.	Sa58% Gr 8% Si32% Cl 2% Sa36% Gr56% Si 8%
			2	SS	100									
				for 2"										
			3	SS	80									
				for 3"										
			4	SS	80									
						670								
			5	SS	75									
				for 4"										
			6	SS	154									
661.9	End of borehole.					660								
29.5														
						650								

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 29/60 25'-0" Lt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 16, 1965.

COMPILED BY W.W.K.

DATUM 693.5

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S. *AK*

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		SHEAR STRENGTH P.S.F.					WATER CONTENT % WP W WL 10 20 30				
693.5	Groundlevel															
0.0	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.		1	SS	55	690									Observed in Casing.	Sa 41% Gr 47% Si 10% Cl 2% WL Elev. ▼ 689.8
			2	SS	136											
			3	SS	80											
			for 3"													
			4	SS	100											
			for 5"													
	5	SS	150												Sa 44% Gr 42% Si 14%	
662.0			6	SS	180											
31.5	End of borehole.					660										
						650										

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 77

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch30/80 on E

ORIGINATED BY W.W.K.

W.P. 36-64

BORING DATE Oct. 13, 1965.

COMPILED BY W.W.K.

DATUM 700.0

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S. *AK*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT ——— WL PLASTIC LIMIT ——— wp WATER CONTENT ——— w wp ——— w ——— WL 10 20 30			BULK DENSITY X P.C.F.	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.				WATER CONTENT %						
700.0	Groundlevel																
0.0	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.		1	SS	80	690									Sa55% Gr10% Si30%Cl 5% WL Elev. ▼ 691.7		
					for 2"												
			2	SS	95												
					3	SS	148	680									Observed in casing. Sa52% Gr23% Si20% Cl 5%
						for 9"											
				4	SS	105											
					5	SS	131	670									
			6	SS	175												
				for 10"													
668.5			7	SS	159												
31.5	End of borehole.																

FOUNDATION SECTION

ORIGINATED BY W.W.K.

COMPILED BY W.W.K.

CHECKED BY K.G.S.

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		SHEAR STRENGTH P.S.F.				wp w WL 10 20 30				
693.3	Groundlevel														
662.9 30.4	Silty sand & gravel with traces of clay. Frequent boulders. Very dense. End of borehole.	0.0	1	SS	17	690								Observed in casing.	WL Elev. <u>690.1</u>
		0.0	for 3"												Sa61%
		0.0	2	SS	111										Gr35%
		0.0	3	SS	100										Si&Cl 4%
		0.0	for 2"			680									Sa38%
		0.0	4	SS	137										Gr33%
		0.0	for 9"												Si24%
		0.0	5	SS	93	670								Cl 5%	
		0.0	6	SS	157										
		0.0	7	SS	100										Sa53%
		0.0	for 5"			660									Gr 20%
															Si 25%
															Cl 2%
						650									

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 11

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 27+00 25'-0" Rt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 19, 1965.

COMPILED BY W.W.K.

DATUM 697.1

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

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		BLOWS / FOOT		WATER CONTENT % 10 20 30					
							SHEAR STRENGTH P.S.F.		wp ——— w ——— WL					
697.1	Groundlevel													
695.6	Black org. topsoil													
1.5	Silty sand and gravel with traces of clay. Frequent boulders. Very dense.		1	SS	64	690						Observed in casing.	W.L. Elev. ▼ 694.1 Sa 54% Gr 5% Si 39% Cl 2% Sa 41% Gr 31% Si 26% Cl 2% Sa 62% Gr 36% Si&Cl 2%	
			2	SS	145									
			3	SS	120									
			4	SS	80	680								
			for 4"											
			5	SS	146									
			for 10"											
		6	SS	172	670									
		for 11"												
668.9	Red and Blue Granite													
664.1	Bedrock													
33.0	End of borehole.					660								

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 12

FOUNDATION SECTION

JOB 65-F-111LOCATION O.N.R. & Hwy 63 Line 'D' Ch 26+00 25'-0" Rt.ORIGINATED BY W.W.K.W.P. 36-64BORING DATE Oct. 20, 1965.COMPILED BY W.W.K.DATUM 704.2BOREHOLE TYPE BX Casing RunCHECKED BY K.G.S. *KL*

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		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	WP	W	WL		
704.2	Groundlevel												
702.7	Black org. topsoil												
1.5	Silty sand & gravel with traces of clay.		1	SS	67	700							
696.9	Frequent boulders. Very dense.		2	SS	80								
7.3	Red and Blue Granite Bedrock				for 5"								
686.9						690							
17.3	End of borehole.					680							
						670							

Mr. P. Billings,
Reg. Functional Planning Engineer,
North Bay.

Mr. D. E. McFarlane,
Program Studies Engineer.

February 11, 1966.

W. P. 270-62 - North Bay City Limits easterly including
W. P. 36-64, O. N. R. Overhead 0.5 miles east of North
Bay City Limits, Highway 63, District 13

This is with reference to our meeting this morning with Mr. Stermac and others concerning the above project.

I have reviewed the project for this work and find that it would be rather difficult to advance the schedule significantly even if the section from Station 73 easterly were deleted.

As the bridge design will not be available until July there may be sufficient time for the Foundation Section to investigate the problems at Station 63. In any case, the road design would not be able to complete the project until September.

It would be our recommendation that the matter of splitting the contract be left in abeyance for the present and that the Foundation Section be asked to attempt to finalize their recommendations by July. This should give sufficient time for some field testing if it is required.

DEM/bc

c. c. W. Kinnear
A. Stermac
I. C. Campbell
E. Saint
H. McArthur
S. McCombie

D. E. McFarlane,
Program Studies Engineer,
For:
W. G. Wigle,
Program Engineer.

Mr. S. McCombie,
Bridge Planning Engr.,
Bridge Division.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. J. Curtis,
Regional Bridge
Location Engr.

June 8, 1966

W.P. 36-64,
Site No. 43-175,
O.N.R. Overhead,
Hwy. No. 63,
District No. 13 (North Bay)

65-F-111

The recommendations of the foundation
report have been followed, using spread footings
placed 7 ft. below the existing ground surface.

We have no further comments.

KGS/MdeF

cc: Foundations Office
Gen. Files

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

MEMORANDUM

To: Mr. A. Stermac
Principal Soils Eng.
Lab Building
Downsview, Ontario

From: Mr. C.G. Campbell
Regional Superintendent
Engineering Surveys Div.
Northern Region

DATE:

October 14, 1965

Att'n: Mr. W. Kulmattickus
OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 36-64 - O.N.R. O'Head
0.5 mi East of North Bay City Limits
Hwy. #63 - District #13, North Bay
W.O. 9394-65-502 Add.

65-f-111

Field work on above Work Project as per your request of October 12, 1965 was completed in the field, September 12, 1965.

Field work notes for request was issued to W. Kulmattickus in the field.

This completes all field work for this Work Project until a further request is received.



J.A. Lott
for: C.G. Campbell
Regional Superintendent

JAL/CGC/cd

c.c. D. Giometelo
T. Nodder
Files

MEMORANDUM

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

FROM: Bridge Division,
Downsview, Ontario.

DATE: September 22, 1965.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 36-64 O.N.R. Overhead at North Bay,
Highway #63 District #13.

The above structure will require a foundation investigation. Attached are two prints of site plan E-4433-1 showing the proposed alignment and grade and the location of test holes required for the design of the structure.

The present proposal calls for three spans of 100'/160'/100', however the test holes as laid out should be adequate for any design proposed.

JCMCA/kp

J.C. McAllister
J.C. McAllister,
for S. McCombie,
Bridge Planning Engineer.

JAN 26, 1966 COMPLETION DATE
(DEC. 15th, 1965 IF POSSIBLE)

#65-F-111

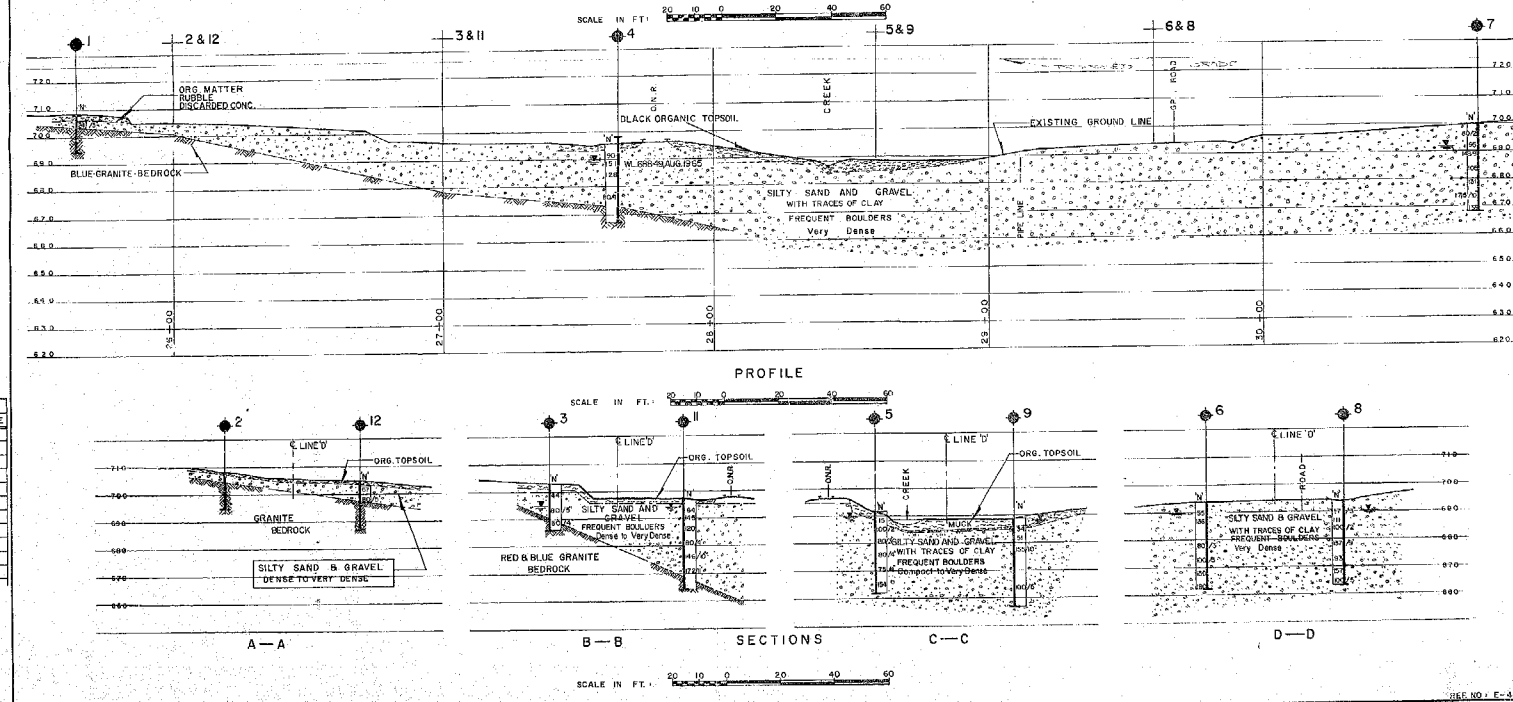
W.P. # 36-64

HWY #63

ONTARIO

NORTHLAND

RAILWAY



MEMORANDUM

CC: GEN. FILES 23 1624

W.P. 36-64

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.

FROM: Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

DATE: December 28, 1965

OUR FILE REF.

IN REPLY TO

JAN 25 1966

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing of Hwy. #63, Line 'D' and
O.N.R., District of Nipissing, Township of
Widdifield, Lot 16, Con. 'C', District #13.

N.J. 65-F-111

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W.P. 36-64

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 design requirements.

Should additional information be required, please feel free to contact our Office.

AGS/MdeF

Attach.

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PRINCIPAL FOUNDATION ENGINEER

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 - 4.3) Blue and Red Granite Bedrock.
 5. GROUND WATER CONDITIONS.
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FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing of Hwy. #63, Line 'D' and
O.N.R., District of Nipissing, Township of
Widdifield, Lot 16, Con. 'C', District #13.

W.J. 65-F-111

--

W.P. 36-64

1. INTRODUCTION:

A request to carry out a foundation investigation at the crossing of Hwy. #63, Line 'D' and O.N.R., was received from the Regional Bridge Location Engineer, Mr. J. C. McAllister, dated September 22, 1965.

It is proposed to erect a new bridge to carry Hwy. #63, Line 'D' over the O.N.R. The site is located in the District of Nipissing, Twp. of Widdifield, Lot 16, Con. 'C', approximately 1 $\frac{1}{2}$ miles East of the intersection of Hwy's #63 and #11. At this location the chainage of Hwy. #63, Line 'D' is from 25+60 to 30+80.

In order to determine the soil properties and decide on the type of foundations, an investigation was carried out by this Section. Results and discussion of the field and laboratory investigation, 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 future bridge is located in the District of Nipissing, Twp. of Widdifield, Lot 16, Con. 'C', approximately 1 $\frac{1}{2}$ miles East of the intersection of Hwy's #63 and #11. The surrounding area forms a natural ravine at the bottom of which flows a small creek (approximately 3 - 4 feet wide and 2 - 3 feet deep). Along the creek banks, between Wallace Road and the O.N.R., there is a swamp.

cont'd. /2

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, eleven sampled boreholes and one penetration test 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 Contents.
2. Grain Size Distributions.

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. 65-F-111A is based upon this information.

4.2) Silty Sand and Gravel with traces of Clay - Frequent Boulders - Dense to Very Dense:

This stratum, which extends to the depth investigated, or to bedrock, was found immediately below the topsoil.

The average percentage of sand in this stratum is 42%, grav silt forms 16%, and the rest of 3%, is clay. Moisture content determination for this layer averaged about 12%, ranging from 3% to 33%. The overall stratum was found in a dense to very dense condition, with an average 'N' value in excess of 100 blows/foot. The 'N' values varied from 34 blows/foot to over 200 blows/foot.

Frequent boulders found in this stratum varied in size from 8" to 3'-6" in diameter.

cont'd. /3

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

4.3) Blue and Red Granite Bedrock:

Blue and red granite bedrock was encountered beneath the stratum of silty sand and gravel with traces of clay. Five to 10 feet of bedrock core taken in B.H.'s #1, 2, 3, 4, 11 and 12, shows sound blue and red granite bedrock.

The investigation has revealed that the surface of the bedrock is very uneven and may vary considerably a short distance away from the borehole.

5. GROUND WATER CONDITIONS:

The ground water level, at the time of the investigation, was found:

In B.H. # 3 at El. 694.8

In B.H. # 4 at El. 689.6

In B.H. # 5 at El. 689.7

In B.H. # 6 at El. 689.8

In B.H. # 7 at El. 691.7

In B.H. # 8 at El. 690.1

In B.H. # 9 at El. 688.3

In B.H. #11 at El. 694.1

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:

As can be seen from the previously described soil stratigraphy, the soil consists of black organic topsoil, followed by silty sand and gravel with traces of clay and frequent boulders, which in turn, is underlain by blue and

cont'd. /4

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

red granite bedrock. Spread footings placed 7'-0" below existing ground elevations are recommended for the structure. A net allowable pressure of 3 tons/sq.ft. may be assumed for design purposes. Where footings can be founded directly on bedrock (at the eastern end of the structure) a net allowable load of 20 tons/sq.ft. may be used.

If perched abutments are used, they should be founded on H-piles driven, if possible, 10 feet into the original ground. The design load on the pile should be the allowable maximum for the section used. Due to the presence of boulders, the pile driving may prove to be difficult and the pile penetration quite variable.

A dewatering scheme will be necessary in the vicinity of the creek, as the excavations for the pier footings will be below the established ground water levels. No stability problems are anticipated with the approach fills.

7. SUMMARY:

1) The stratigraphy of the soil which consists of topsoil, followed by silty sand and gravel with traces of clay and frequent boulders, is quite uniform. The density of the material encountered varied from dense to very dense.

2) Footings should be placed 7 feet below existing ground elevations on exposed bedrock. A net allowable load of 3 tons/sq.ft. and 20 tons/sq.ft. may be used, respectively.

3) Some dewatering problems may be anticipated in the vicinity of the creek.

cont'd. /5

7. SUMMARY: (cont'd.)

4) No stability problems with the approach fills are expected.

5) If perched abutments are used, they should be founded on H-piles driven through the fill, 10 feet into the original ground, if possible. The design load on the pile should be the allowable maximum for the section used.

8. MISCELLANEOUS:

The field work, performed during the period from October 13 to Oct. 21, 1965, 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.

The survey was carried out by a survey crew of the North Bay Planning Region, under the supervision of Mr. J. Walcomb.

December 1965

APPENDIX 1.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 65-F-111LOCATION C.N.R. & Hwy. 63 Line 'D' Ch. 25460 on EORIGINATED BY W.W.K.W.P. 36-64BORING DATE Oct. 21, 1965.COMPILED BY W.W.K.DATUM 708.9BOREHOLE TYPE BX Casing RunCHECKED BY K.G.S. *AK*

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		BLOWS / FOOT		SHEAR STRENGTH P.S.F.				
708.9	Ground level												
706.9	Org. matter, rubble discarded concrete												
2.0	Silty sand & gravel												
704.2	Dense to very dense frequent boulders		1	SS	24								
4.7	Red and Blue Granite Bedrock				for 3"	700							
694.5													
14.4	End of borehole.					690							

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch. 27+00 25'-0" Lt.

ORIGINATED BY W.W.K.

W.P. 36-64

BORING DATE Oct. 20, 1965.

COMPILED BY W.W.K.

DATUM 702.9

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S. *ok*

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		SHEAR STRENGTH P.S.F.				WATER CONTENT % 10 20 30				
											wp ——— w ——— WL				
702.9	Groundlevel														
701.4	Black org. topsoil														
1.5	Silty sand & gravel. Frequent boulders. Dense to very dense.		1	SS	44	700									
			2	SS	80										
			for 5"												
690.6			3	SS	80										
12.3	Red and Blue Granite		for 4"			690									
685.6	Bedrock														
17.3	End of borehole.					680									

Observed in Casing.
▼ WL Elev
694.8
Sa 41%
Si 17%
Gr 42%

Observed in
Casing.
▼ WL Elev
694.8
Sa 41%
Si 17%
Gr 42%

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-F-111

LOCATION C.N.R. & Hwy 63 Line 'D' Ch27/73 25'-0" Lt.

ORIGINATED BY W.H.K.

W. P. 36-64

BORING DATE Oct. 20, 1965.

COMPILED BY W.N.R.

DATUM 697.4

BOREHOLE TYPE EX Casing Run

CHECKED BY K.G.S. *gk*

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		SHEAR STRENGTH P.S.F. _____	 WATER CONTENT %				
697.4	Groundlevel											
695.9	Black org. topsoil											
1.5	Silty sand and gravel, with traces of clay.		1	SS	90	690						WL Elev. ▼ 689.6
	Frequent boulders.		2	SS	151							Observed in Casing.
	Very dense.		3	SS	128	580						
			4	SS	80							5a 43% Si 9% Gr 47% Cl 1%
672.6			for 4"									
24.8	Red and Blue Granite					670						
667.6	Bedrock											
29.8												

RECORD OF BOREHOLE NO. 5

MATERIALS & TESTING DIVISION

FOUNDATION SECTION

JOB 65-E-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 28/60 25' @ Lt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 18, 1965.

COMPILED BY W.W.R.

DATUM 691.4

BOREHOLE TYPE B1 Casing Run

CHECKED BY R.G.S.

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		BLOWS / FOOT				SHEAR STRENGTH P.S.F.				WATER CONTENT % 10 20 30
691.4	Groundlevel														
0.0	Black org. topsoil					680								WL Elev.	
688.9	(Swamp)													689.7	
2.5	Silty sand and gravel with traces of clay. Frequent boulders. Compact to very dense.		1	SS	15									Observed in Casing.	
			2	SS	100										
					for 2"										
				3	SS	80	680								
					for 3"										
				4	SS	80									
					for 4"										
			5	SS	75	670									
					for 4"										
			6	SS	154										
6+1.9															
29.5	End of borehole.					660									
						650									

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 29/60 25'-0" Lt.

ORIGINATED BY W.N.K.

W. P. 36-614

BORING DATE Oct. 16, 1965.

COMPILED BY W.W.K.

DATUM 693.5


BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

SOIL PROFILL			SAMPLES			DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY γ P.C.F.	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.			WATER CONTENT % wp ——— w ——— WL 10 ——— 20 ——— 30					
693.5	Groundlevel													Sa 41% Gr 47% Si 10% Cl 2%	
0.0	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.		1	SS	55	690								Observed in Casing. Sa 44% Gr 42% Si 14%	
			2	SS	136										
							680								
			3	SS	80										
				for 3"											
			4	SS	100										
				for 5"			670								
			5	SS	150										
662.0			6	SS	180										
31.5	End of borehole.					660									
						650									

CHECKED BY K.G.S.

FOUNDATION SECTION

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT				WATER CONTENT %				
							SHEAR STRENGTH P.S.F.				WP	W	WL		
700.0	Groundlevel														
0.0	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.		1	SS	80	690									Sa55% Gr10% S:30%Cl 5% WL Elev. ▼ 691.7
				for 2"											
			2	SS	95										
			3	SS	148										
				for 9"											
			4	SS	105	680									
			5	SS	131										
			6	SS	175										
			for 10"												
668.5			7	SS	159	670									
31.5	End of borehole.														

CHECKED BY K.G.S.

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		BLOWS / FOOT		WATER CONTENT %			
693.3	Groundlevel											
	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.	0.0	1	SS	17	690						Observed in casing. WL Elev. 690.1 Sa61% Gr35% Si&Cl 4% Sa38% Gr33% Si24% Cl 5%
		0.0	for 9"									
		0.0	2	SS	111							
		0.0	3	SS	100							
		0.0	for 2"			680						
		0.0	4	SS	137							
		0.0	for 9"									
		0.0	5	SS	93	670						
		0.0	6	SS	157							
662.9		0.0	7	SS	100							
30.4	End of borehole.		for 5"			660						Sa53% Gr 20% Si 25% Cl 2%
						650						

RECORD OF BOREHOLE NO. 9

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 28/60 25'-0" Rt.

ORIGINATED BY W.W.K.

W. P. 36-64

BORING DATE Oct. 19, 1965.

COMPILED BY W.W.K.

DATUM 688.3

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-F-111

W. P. 36-64

DATUM 697.1

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 27+00 25'-0" Rt.

BORING DATE Oct. 19, 1965.

BOREHOLE TYPE BX Casing Run

FOUNDATION SECTION

ORIGINATED BY W.W.K.

COMPILED BY W.F.K.

CHECKED BY K.G.S.

RECORD OF BOREHOLE NO. 411

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W		BULK DENSITY X P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.		WATER CONTENT % 10 20 30				
697.1	Groundlevel												
695.6	Black org. topsoil												
1.5	Silty sand and gravel with traces of clay. Frequent boulders. Very dense.		1	SS	64	690					Observed in casing.	W.L. Elev. ▼ 694.1 Sa 54% Gr 5% Si 39% Cl 2% Sa 41% Gr 31% Si 26% Cl 2% Sa 62% Gr 36% Si&Cl 2%	
			2	SS	145								
			3	SS	120								
			4	SS	80	680							
			for 4"										
			5	SS	146								
			for 10"										
			6	SS	172	670							
		for 11"											
668.9	Red and Blue Granite												
664.1	Bedrock												
33.0	End of borehole.					660							

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 12

FOUNDATION SECTION

JOB 65-F-111

LOCATION O.N.R. & Hwy 63 Line 'D' Ch 26+00 25'-0" Rt.

ORIGINATED BY W.W.K.

W.P. 36-64

BORING DATE Oct. 20, 1965.

COMPILED BY W.W.K.

DATUM 704.2

BOREHOLE TYPE BX Casing Run

CHECKED BY K.G.S. *KL*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT — WL PLASTIC LIMIT — wp WATER CONTENT — w wp — w — WL WATER CONTENT % 10 20 30	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
704.2	Groundlevel									
702.7	Black org. topsoil									
1.5	Silty sand & gravel with traces of clay. Frequent boulders. Very dense.		1	SS	67	700				
686.9			2	SS	80					
7.3	Red and Blue Granite Bedrock			for 5"						
686.9						690				
17.3	End of borehole.					680				
						670				

Mr. P. Billings,
Reg. Functional Planning Engineer,
North Bay.

Mr. D. E. McFarlane,
Program Studies Engineer.

February 11, 1966.

W. P. 370-82 - North Bay City Limits easterly including
W. P. 38-64, O. N. R. Overhead 0.5 miles east of North
Bay City Limits, Highway 83, District 13

This is with reference to our meeting this morning with Mr. Stermac and others concerning the above project.

I have reviewed the project for this work and find that it would be rather difficult to advance the schedule significantly even if the section from Station 73 easterly were deleted.

As the bridge design will not be available until July there may be sufficient time for the Foundation Section to investigate the problems at Station 85. In any case, the road design would not be able to complete the project until September.

It would be our recommendation that the matter of splitting the contract be left in abeyance for the present and that the Foundation Section be asked to attempt to finalize their recommendations by July. This should give sufficient time for some field testing if it is required.

DEM/bc

c. c. W. Kinnear
A. Stermac
L. C. Campbell
E. Saint
H. McArthur
S. McCombie

D. E. McFarlane,
Program Studies Engineer,
For:
W. G. Wigle,
Program Engineer.

Mr. S. McCombie,
Bridge Planning Engr.,
Bridge Division.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. J. Curtis,
Regional Bridge
Location Engr.

June 8, 1966

W.P. 36-64,
Site No. 43-175,
O.N.R. Overhead,
Hwy. No. 63,
District No. 13 (North Bay)

The recommendations of the foundation
report have been followed, using spread footings
placed 7 ft. below the existing ground surface.

We have no further comments.

KGS/MdeF

cc: Foundations Office
Gen. Files

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

MEMORANDUM

To: Mr. A. Stermac
Principal Soils Eng.
Lab Building
Downsview, Ontario

FROM: Mr. C.G. Campbell
Regional Superintendent
Engineering Surveys Div.
Northern Region

DATE:

October 14, 1965

Att'n: Mr. W. Kulmattickus
OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 36-64 - O.N.R. O'Head
0.5 mi East of North Bay City Limits
Hwy. #63 - District #13, North Bay
W.O. 9394-65-502 Add.

65-f-111

Field work on above Work Project as per your request
on October 12, 1965 was completed in the field, September 12,
1965.

Field work notes for request was issued to
W. Kulmattickus in the field.

This completes all field work for this Work Project
until a further request is received.

J. Lott

J.A. Lott
for: C.G. Campbell
Regional Superintendent

JAL/CFC/cd

c.c. D. Giometelo
T. Nodder
Files

MEMORANDUM

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

From: Bridge Division,
Downsview, Ontario.

Date: September 22, 1965.

Our File Ref.

In Reply To

Subject: W.P. 36-64 O.N.R. Overhead at North Bay,
Highway #63 District #13.

The above structure will require a foundation investigation. Attached are two prints of site plan E-4433-1 showing the proposed alignment and grade and the location of test holes required for the design of the structure.

The present proposal calls for three spans of 100'/160'/100', however the test holes as laid out should be adequate for any design proposed.

JCMCA/kp

J.C. McAllister
J.C. McAllister,
for S. McCombie,
Bridge Planning Engineer.

JAN 26, 1966 COMPLETION DATE
(DEC. 1965 IF POSSIBLE)

#65-F-111

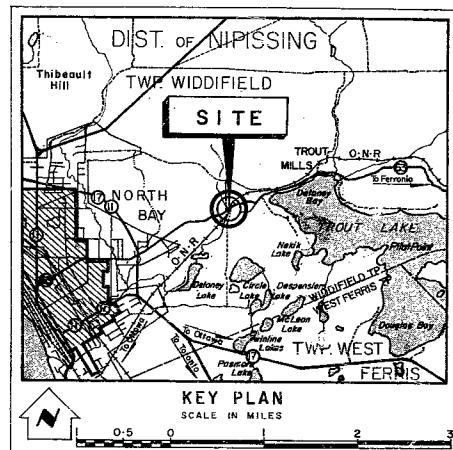
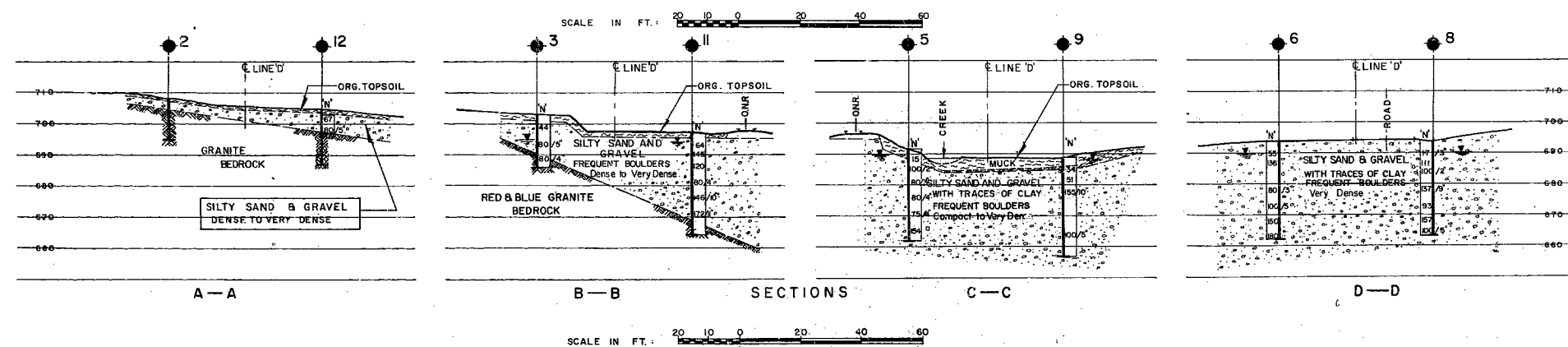
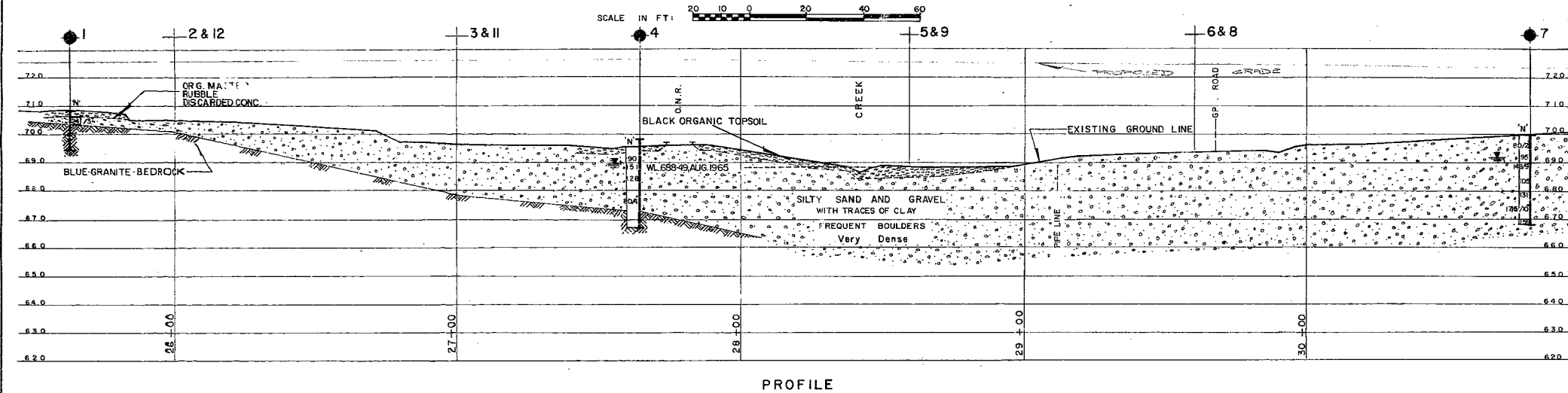
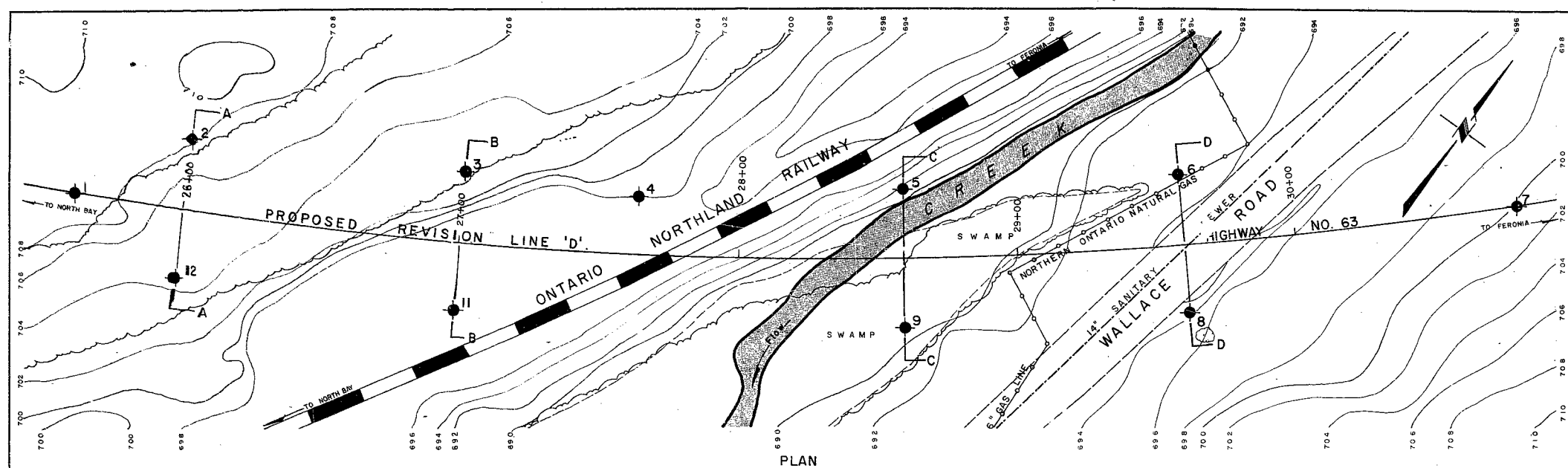
W.P. # 36-64

HWY #63





ONTARIO

NORTHLAND

RAILWAY



LEGEND

	Bore Hole
	Cone Penetration Hole
	Bore & Cone Penetration Hole
	Water Levels established at time of field investigation, Oct. 1965

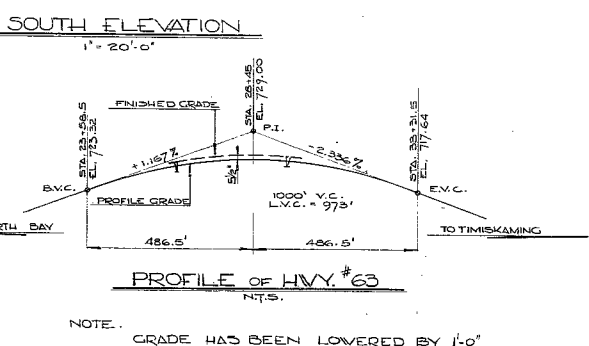
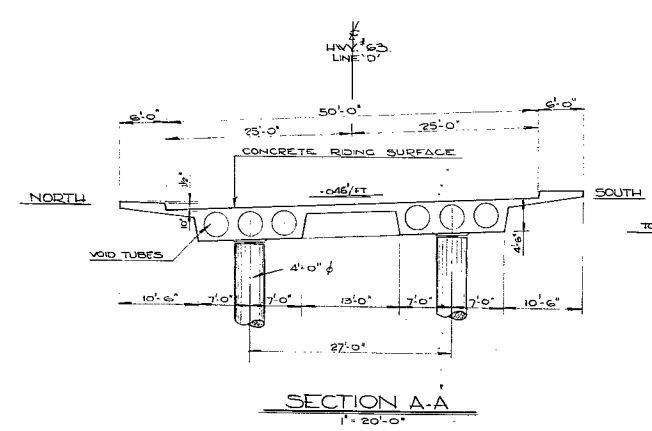
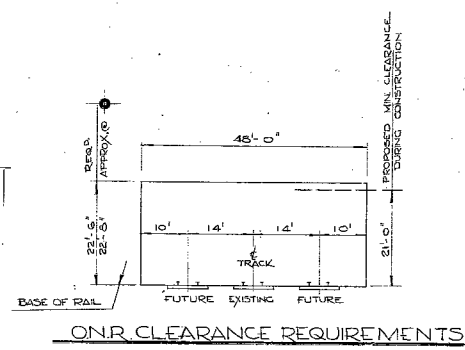
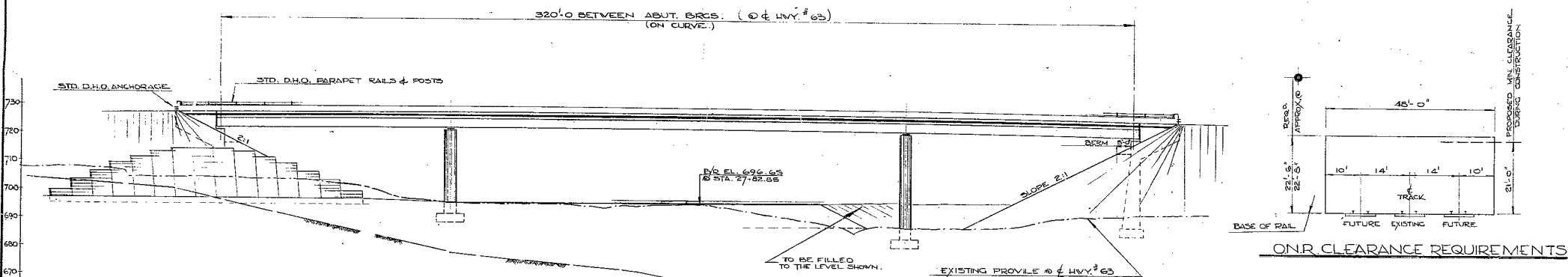
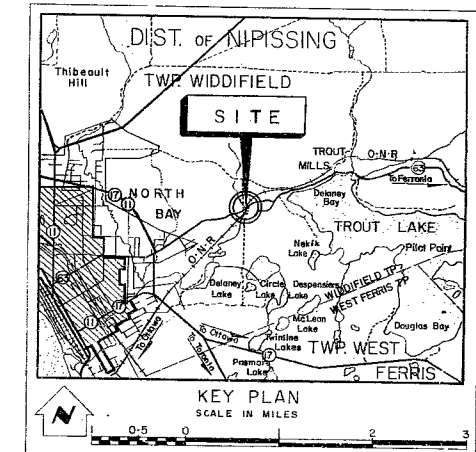
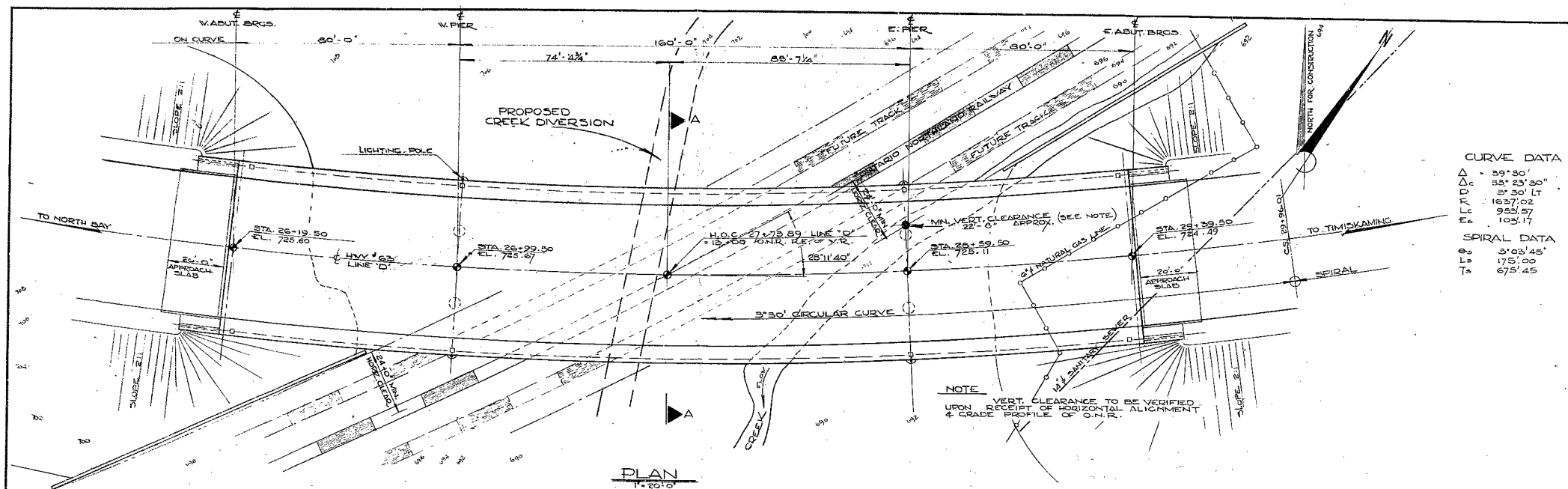
NO.	ELEVATION	STATION	OFFSET
1	7 0 8 . 9	25 + 60	℄
2	7 0 7 . 6	26 + 00	25' LT
3	7 0 2 . 9	27 + 00	25' LT
4	6 9 7 . 4	27 + 73	25' LT
5	6 9 1 . 4	28 + 60	25' LT
6	6 9 3 . 5	29 + 60	25' LT
7	7 0 0 . 0	30 + 80	℄
8	9 3 . 3	29 + 60	25' RT
9	6 8 8 . 3	28 + 60	25' RT
11	6 9 7 . 1	27 + 00	25' RT
12	7 0 4 . 2	26 + 00	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.

REVISIONS			
	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & TESTING DIVISION - FOUNDATION SECTION			
ONTARIO		NORTHLAND RAILWAY	
KING'S HIGHWAY NO. <u>63</u> PROPOSED REV'N LINE 'D' DIST. NO. <u>13</u> CO. <u>NIPISSING</u> TWP. <u>WIDDIFIELD</u> LOT <u>16</u> CON. <u>C</u>			
BORE HOLE LOCATIONS & SOIL STRATA			
SUBM'D. W.K.	CHECKED <u>W.H.</u>	W.P. NO. <u>36 - 64</u>	M.B.T. DRAWING NO.
DRAWN J.N.	CHECKED <u>W.H.</u>	JOB NO. <u>65-F-III</u>	65-F-III A
DATE <u>JAN 20, 1966</u>	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <u>A.B. Thomas</u>	CONT. NO.		



B.M. ELEV. 702.37
 GEODETIC DATUM
 CUT 'X' ON BOULDER
 106' LT. OF STA. 32+51

PRINT RECORD		
No.	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
ONTARIO NORTHLAND R.V. OVERHEAD 0.5 MI. EAST OF NORTH BAY CITY LIMITS			
KING'S HIGHWAY No. 63		DIST. No. 13	
DIST. OF NIPISSING		TWP. WIDDIFIELD	
LOT 16		CON. C	
PRELIMINARY PLAN			
APPROVED		SITE No. 43-175 W.P. No. 36-64	
DESIGN A.G. CHECK		CONTRACT No.	
DRAWING W.V. CHECK A.R.		DRAWING No.	
DATE APR. 1964		LOADING 1120-246	
D5890-P1			