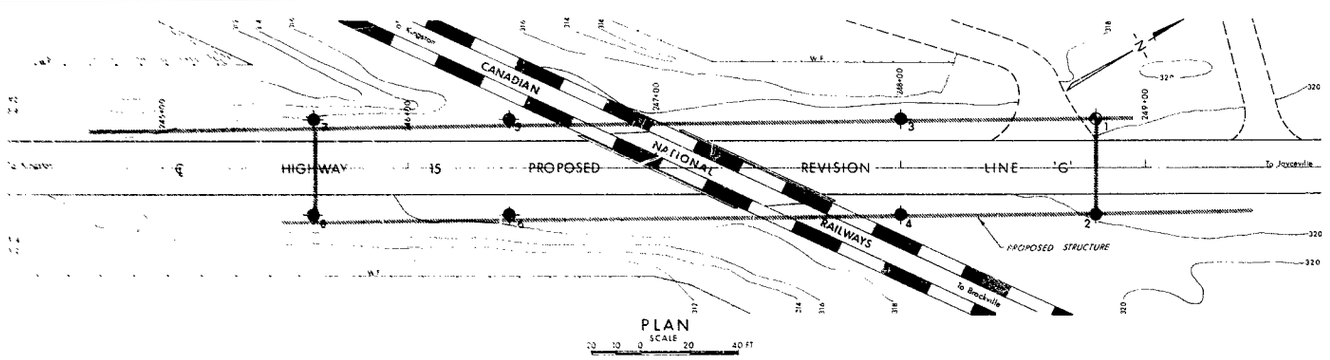
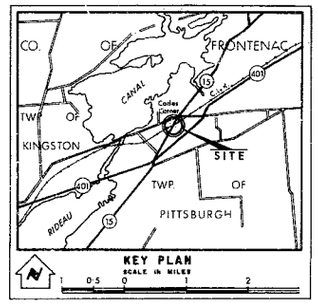
CONT. 72-52

HWY. 15

KINGSTON

31C-73



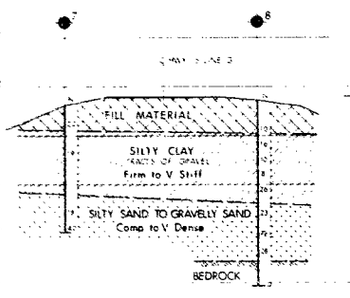


LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation.

NO WATER OBSERVED IN BORE HOLES

NO.	ELEVATION	STATION	OFFSET
1	319·6	248+79	20' LT.
2	320·0	248+79	19' RT.
3	318·9	248+00	20' LT.
4	319·1	248+00	19' RT.
5	318·0	246+41	20' LT.
6	318·3	246+41	19' RT.
7	316·2	245+61	20'
8	317·2	245+61	19' 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 OFFICE - FOUNDATION SECTION

CANADIAN NATIONAL RAILWAYS

KING'S HIGHWAY NO. 15 LINE 'G' DIST. NO. 8
CO. FRONTENAC
TWP. PITTSBURGH LOT 10 CON. 4 W.A.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D. A.B.	CHECKED PG	W.P. NO. 184-66	M.&T. DRAWING NO. 70-11067A
DRAWN S.O.	CHECKED	JOB NO. 70-11067	
DATE 11 SEPT. 1970		SITE NO.	BRIDGE DRAWING NO.
APPROVED		CONT. NO	

REF NO. E-4697-1

GEOCRES NO 31C-73

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

ATC-73

GEOCRES No.

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Office,
Admin. Bldg.

From: Foundation Section,
Materials & Testing Office,
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

Date: September 17, 1970

Our File Ref.:

In reply to: SEP 22 1970

Subject:

FOUNDATION INVESTIGATION REPORT
For
The Proposed C.N.R. Overhead
Of Highway #15
District No. 8 (Kingston)
W.O. 70-11067 -- W.P. 184-66-00

Cont. 72-52

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

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please feel free to contact our Office.

A. G. Sterrie,
A. G. Sterrie
PRINCIPAL FOUNDATION ENGINEER

AGS/MacP
Attach.

cc: Messrs. B. R. Davis
H. A. Tregaskes
D. W. Farren
S. J. Markiewicz
V. A. Snell
T. C. Kingsland (2)
J. E. Gruspier
B. A. Singh

Foundations Files
Gen. Files

TABLE OF CONTENTS

FOUNDATION INVESTIGATION REPORT
For
The Proposed C.N.R. Overhead
Of Highway #15
District No. 8 (Kingston)
W.O. 70-11067 -- W.P. 184-66-00

1. INTRODUCTION:

A foundation investigation was requested at the site of the proposed C.N.R. overhead of Hwy. #15, North of Hwy. #401, by Mr. T. C. Kingsland, Regional Bridge Planning Engineer, Eastern Region. The request was submitted in a memo, dated July 13, 1970.

Upon receipt of the memo, a field investigation was carried out by this Section with subsequent laboratory soil testings.

Presented in this report are the results of the investigation, as well as recommendations concerning foundations.

2. DESCRIPTION OF THE SITE:

The site is situated along Hwy. #15, some 1 - 1.3 miles North of Interchange No. 104 of Hwy. #401, at the existing level crossing of the C.N.R. tracks. The area East of the highway is a rolling terrain, occupied mainly by pastures. West of the road there is a small residential subdivision with a service road running parallel to the railway, with a dead end at the highway.

Geologically the site lies within the Napanee Plain physiographic region. While the overburden under the larger portion of this region is only a few inches deep, some deeper glacial till plains occur in the stream valleys, also a few scattered drumlins.

3. FIELD AND LABORATORY INVESTIGATIONS:

The field investigation consisted of some eight sampled boreholes and one dynamic cone penetration test. Two boreholes were placed at each abutment and pier location as shown on Drawing #70-11067A, appended to this report. A conventional diamond drill, adapted for soil sampling purposes, was employed for the borings. Soil samples were taken at regular intervals by means of split-spoon and Shelby tube samplers. Standard Penetration tests were carried out, when taking split-spoons, while the Shelby tubes were pushed 18" into the 'undisturbed' soil manually. Field vane tests were implemented with the cohesive strata, where possible.

Soil samples were examined and identified upon recovery and again in the laboratory. Laboratory testings were carried out for more refined identification of the soils and in order to determine undrained shear strength and consolidation characteristics. Field and laboratory test results are delineated on the attached borelog sheets.

4. SOIL CONDITIONS:

4.1) General:

Beneath a granular highway fill, silty clays with occasional sand and gravel were encountered in the boreholes. The silty clays were underlain by silty and gravelly sand deposits, extending to 32 - 39 ft. depth, at which elevation bedrock was hit. Following, is a brief description of the various strata.

4.2) Granular Fill:

The surficial deposit in the boreholes placed near the travelled section of the highway was found to be granular highway fill. The thickness of this layer was found to be 5 - 9 ft., with relative densities varying between loose and very dense.

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

4.3) Silty Clay with Traces of Gravel:

This material was found at ground elevation or immediately beneath the highway fill and had an overall thickness ranging from 4 ft. to 16 ft. Within its entire depth, the clays contain occasional grains of coarse sand and gravel up to a few inches in diameter. The deposit has medium plasticity; the average plastic limit may be taken to be 25% and the liquid limit 42%. Most of the undrained shear strengths determined by field vane tests yielded values in excess of 2,000 PSF; laboratory unconfined and quick triaxial tests, however, resulted in undrained shears between 500 PSF and 2,000 PSF. Based on above values, the consistency of the stratum is identified to be firm to very stiff. The bulk density of the samples averaged about 112 PCF.

4.4) Silty Sands and Gravelly Sands:

Around El. 296 - 307 ft. a granular deposit was observed to underlie the clays, having a thickness of 12 - 25 ft. The upper portion of the granular layer is mainly sand with 10 - 30% of silt size particles; farther down it becomes coarser containing up to 40% of gravels.

The relative density of this stratum was identified to range from compact to very dense as implied by the penetration 'N' values of 10 blows per ft. up to 100 blows per ft. and over.

4.5) Bedrock:

Bedrock was proved at three locations, in Boreholes #1, 4 and 8. The elevation of bedrock surface was established to be at 280.4 ft. in B.H. #1 and somewhat higher at El. 284.4 ft. in B.H.'s #4 and 8. Approx. 5 ft. depth was drilled at each location with AXT diamond core barrel, yielding recoveries of 90 - 100%.

The bedrock was identified to be metamorphic gneiss with portions still in the original precambrian state (Greywacke). A few seams and layers of pure arcose were also observed within the rock cores.

..... 4

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

4.6) Groundwater:

No groundwater was noticed in the boreholes at all, holes having stayed open and dry during the entire course of the field investigation.

5. DISCUSSION AND RECOMMENDATIONS:

5.1) General:

The proposal calls for a 3-span overhead structure for this crossing. The future grade of Hwy. #15 at the crossing, is planned to be around El. 348 ft., necessitating 29 - 30 ft. high approach fills. It is assumed that the abutments will spill through. The grade of the existing railway tracks will remain unchanged.

5.2) Structure Foundations:

The strength of the uppermost 10 - 15 ft. stratum does not lend itself economically to spread footing type foundations. It is estimated that maximum design loads of only 1.5 TSF could be applied on such footings, placed right below the zone of frost penetration. In view of the above, it is believed that end-bearing piles will be the most practical foundations for the structure. The use of steel H-piles are recommended, piles being driven to El. 280 - 285 ft., at which depths refusal will be reached on sound bedrock. Safe loads equal to the maximum allowable design load for the particular steel section used may be employed on the piles.

A minimum cover of 4 ft. should be provided for the pile caps for frost protection. At the locations of the spill-through abutments, pile caps may be formed within the approach fills, piles being driven through the embankments.

..... 5

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

5.3) Approach Embankments:

No stability problems are foreseen for embankments up to 30 ft. in height, provided that they are constructed with 2 horizontal to 1 vertical slopes. Some small settlements will likely take place under the approach fills, due to the consolidation of the cohesive portion of the overburden. It is estimated, however, that the magnitude of such settlements will not exceed 4 - 6 inches.

6. MISCELLANEOUS:

The field work was carried out during the period July 30 - August 12, 1970, under the supervision of Mr. T. Preston, Student Technician.

Equipment used was owned and operated by F. E. Johnston Drilling Company Ltd., Ottawa.

This report was prepared by Mr. A. K. Barsvary, Senior Foundation Engineer, and reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

September, 1970.

APPENDIX I

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 248 + 79 20' Lt. of ℄ ORIGINATED BY TP
W.P. 184-66-00 BORING DATE July 30 - August 4, 1970 COMPILED BY AKB
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT
319.6	Ground Level				
0.0	Silty clay occasional gravel Stiff to Very Stiff Brown		1	SS	12
			2	TW	PM
			3	SS	22
307.1			4	TW	PM/8"
12.5	Sand to gravelley sand traces of silt Compact to Dense Brown		5	SS	28
			6	SS	48
			7	SS	42
			8	SS	46
			9	SS	32
			10	SS	52
280.4			11	SS	44
39.2	Bedrock		12	RC	90%
			13	RC	100%
274.9			14	RC	90%
44.7	End of Borehole				

ELEV. SCALE: 310, 300, 290, 280

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F.
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB. VANE
1000 2000
+ => 2000

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 20 40 60

BULK DENSITY γ P.C.F.: 120

REMARKS: GR SA SI CL
0 92 (8)
16 74 (10)

FORM GE-MT-126 (REV. 1964) OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 248 + 79 19' Rt. of ℄ ORIGINATED BY TP
W.P. 184-66-00 BORING DATE Aug. 6, 1970 COMPILED BY AKB
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

SOIL PROFILE			SAMPLES				DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE)		LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w		BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	1000	2000	20	40 60	P.C.F.	GR, SA, SI, CL
320.0	Ground Level											
0.0	Silty clay, traces of sand & gravel		1	TW	PM		○				112	
	Stiff to Very Stiff		2	SS	13			+> 2000		○		
			3	TW	PM/4"	310		+> 2000		○		
306.8	Brown		4	SS	11					○		3 88 (9)
13.2	Sand, traces of silt		5	SS	45				○			
	Dense to Very Dense		6	SS	38	300						
295.7	Brown		7	SS	56				○			
24.3	End of Borehole					290						

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 248 + 00 20' Lt. of ℄ ORIGINATED BY TP
W.P. 184-66-00 BORING DATE Aug. 5, 1970 COMPILED BY AEB
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB. VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_p, WATER CONTENT w; WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
318.9	Ground Level						1000 2000	20 40 60		
0.0	Silty Clay Occasional Gravel Firm to Very Stiff Brown		1	TW	PM	310	+> 2000		113.5	
			2	TW	PM				111	
			3	TW	PM				113	
303.4			4	TW	PM				121	
15.5	Sand, traces of silt Compact to Very Dense Brown		5	SS	18					
			6	SS	22	300				0 90 (10)
			7	SS	27					
			8	SS	25	290				
282.4			9	SS	54/6"					
36.5	End of Borehole					280				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 4

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 248 + 00 19' Rt. of ℄ ORIGINATED BY TP
W.P. 184-66-00 BORING DATE August 10, 1970 COMPILED BY AKB
DATUM Geodetic BOREHOLE TYPE Washboring, HX Casing CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE	LIQUID LIMIT —— w_L PLASTIC LIMIT —— w_P WATER CONTENT —— w WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		1000 2000	20 40 60		GR. SA. SI. CL.
319.1	Ground Level									
0.0	Organic		1	SS	5			○		
	Silty clay, traces of gravel. Firm to Very Stiff		2	SS	10	310		○		
305.1	Brown		3	TW	PM		+> 2000	○		0 87 (13)
14.0	Silty Sand becoming gravelly sand with some silt		4	SS	16	300		○		
			5	SS	23			○		
	Compact Brown		6	SS	31	290		○		13 74 (13)
284.4			7	SS	28					
34.7	Bedrock		8	RC	97%	280				
279.2										
39.9	End of Borehole					270				

FORM OB-MT-126 (REV. 1969)

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 246 + 41 20' Lt. of ℄ ORIGINATED BY TP

W.P. 184-66-00 BORING DATE Aug. 11, 1970 COMPILED BY AKB

DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE)	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
318.0	Ground Level									
0.0	Granular Hwy. Base Material									
312.5										
5.5	Silty Clay Firm		1	SS	4	310		○		
309.0										
9.0	Silty sand becoming gravelly sand		2	SS	23			○		0 85 (15)
			3	SS	20	300		○		
	Compact		4	SS	17			○		40 56 (4
294.0	Brown		5	SS	65/6"			○		
24.0	End of Borehole					290				

WATER CONTENT % 20 40 60

1000 2000

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 246 + 41 19' Rt. of ℄ ORIGINATED BY TP
W.P. 184-66-00 BORING DATE Aug. 7 - 10, 1970 COMPILED BY AKB
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB. VANE 1000 2000	LIQUID LIMIT w_L PLASTIC LIMIT w_P WATER CONTENT w WATER CONTENT % 20 40 60	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
318.3	Ground Level									
0.0	Granular Hwy. Base Material		1	SS	65	310		○		
308.8			2	SS	13			○		
9.5	Silty clay, traces of gravel.									
303.3			3	SS	10	300		○		
15.0	Gravelly sand Compact to very Dense		4	SS	33			○		
292.3	Brown		5	SS	130			○		
26.0	End of Borehole					290				

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 7

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 245 + 61 20' Lt. of ℄ ORIGINATED BY TP

W.P. 184-66-00 BORING DATE August 11 & 12, 1970 COMPILED BY AKB

DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB. VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_p, WATER CONTENT w; WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
316.2	Ground Level						1000 2000	20 40 60		
0.0	Granular Hwy. Fill		1	SS	20		○			
311.2										
5.0	Silty Clay Fissured Firm to Very Stiff		2	TW	PM	310			109	
			3	SS	19		+> 2000	○		
			4	TW	PM		● +> 2000		110	
			5	TW	PM	300	● +> 2000		118	
298.2	Brown									
18.0	Silty sand to gravelly sand		6	TW	PM			○		0 64 (36)
			7	SS	18			○		
290.2	Compact to Dense		8	SS	40			○		0 80 (20)
26.0	End of Borehole					290				

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 8

FOUNDATION SECTION

JOB 70-11067 LOCATION Sta. 245 + 61 19' Rt. of ℄ ORIGINATED BY TP

W.P. 184-66-00 BORING DATE August 12, 1970 COMPILED BY AKB

DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT w_L / PLASTIC LIMIT w_p / WATER CONTENT w	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB. VANE	WATER CONTENT % 20 40 60		GR. SA. SI. CL.
317.2	Ground Level									
0.0	Granular Fill Material		1	SS	10	310		○		
310.2										
7.0	Silty clay, traces of gravel Firm to Very Stiff Brown		2	SS	16			⊢○⊣		
			3	SS	10			○		
			4	SS	8			○		
			5	SS	26	300		⊢○		
296.2										
21.0	Gravelly sand Compact to Very Dense Brown		6	SS	23			○		
			7	SS	72	290		○		37 54 (9)
284.4			8	SS	28					
32.8	Bedrock		9	RC	100%	280				
279.3										
37.9	End of Borehole					270				

SUMMARY OF PILE DRIVING RECORDS

W.O. 70-11067 W.P. 184-66-00 CONT. 72-52 DIST. 8

SITE ONE OVERHEAD 4 AWY "N"

DATE DRIVEN JULY 1972 WEIGHT OF ANVIL

HAMMER TYPE D-12 WEIGHT 1.38 T. ENERGY 22,500 FT.LBS.

LOCATION OF PILES	PILE				ESTIMATED TIP EL. (ft.)	DIFFERENCE Longer(+) Shorter(-) Than Estimated (ft.)	REMARKS
	TYPE	NO.	LENGTH (ft.)	TIP EL. (ft.)			
NORTH ABUTMENT	12-B-53	1	52.6	276.4	280-285	+3.6	
	"	2	51.9	277.1	"	+2.9	TO BE PULLED
	"	4	51.2	277.8	"	+2.2	
	"	7	51.1	277.9	"	+2.1	
	"	8	49.2	279.8	"	+0.2	DRIVEN
	"	10	48.3	280.7	"	~~-0.7~~	
	"	11	50.0	279.0	"	+1.0	
	"	12	48.3	280.7	"	~~-0.7~~	
ACTUAL	DRIVING		RECORDS		IN		
	FIELD		FILE.				

SUMMARY OF PILE DRIVING RECORDS

W.O. 70-11067 W.P. 184-66-00 CONT. 72-52 DIST. 4

SITE ONE OVERHEAD @ HWY 15

DATE DRIVEN July 72 WEIGHT OF ANVIL

HAMMER TYPE D-12 WEIGHT 1.38 T ENERGY 22,500 FT. LBS.

LOCATION OF PILES	PILE				ESTIMATED TIP EL. (ft.)	DIFFERENCE Longer(+) Shorter(-) Than Estimated (ft.)	REMARKS
	TYPE	NO.	LENGTH (ft.)	TIP EL. (ft.)			
NORTH PIER	12-BP-74		29'-35'		280 - 285		
			LENGTH			1 LONGER	TO BE
						3-2 WITHIN	
			DRIVEN	284'			DRIVEN
						PILES ESTIMATED	
				-			
				277		2 EAST	
			25 PILES				
SOUTH PIER	-2-						
			29-33'			THE	
			LENGTH			WITHIN	
				284'		ELEVATIONS	
			DRIVEN				
				-		ALL PILES	
				281		ESTIMATED	
			25 PILES				

SUMMARY OF PILE DRIVING RECORDS

W.O. 70-11067 W.P. 184-66-00 CONT. 72-52 DIST. 8

SITE CNR OVERHEAD @ HWY #15

DATE DRIVEN JULY 72 WEIGHT OF ANVIL

HAMMER TYPE D-12 WEIGHT 1.38 T ENERGY 22,500 FT. LBS

LOCATION OF PILES	PILE				ESTIMATED TIP EL. (ft.)	DIFFERENCE Longer(+) Shorter(–) Than Estimated (ft.)	REMARKS
	TYPE	NO.	LENGTH (ft.)	TIP EL. (ft.)			
SOUTH ABUTMENT	12-BP-53		15 PILES DRIVEN LENGTH - 38'-41'	288' - 284.5'	280 - 285	ALL WITHIN THE ESTIMATED ELEVATIONS	DRIVEN TO 38'

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

70-11067

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
Materials and Testing Office,
DOWNSVIEW, Ontario.

FROM: Systems Design Section,
KINGSTON, Ontario.

ATTENTION: K. Selby

DATE: July 7th, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 184-66-00 - Highway #15 - C.N.R. Overhead at Codes Corners - District #8 Kingston.

As you are aware, it has recently been decided that rock fill is to be used on the approaches to the above structure and as discussed with Mr. Kingsland, your comments on the proposals would be appreciated.

We trust that the enclosed sections and profile and the following pertinent information is sufficient for your appraisal.

1) An earth core is to be constructed to the bottom of footing elevation for a distance of approximately 60' back of the North abutment and 80' back of the south abutment to accommodate pile driving operations. This core will be placed in layers with a 2'-3' thick rock blanket being constructed at the end of each stage to retain the earth.

2) The embankment slopes are to be constructed at 1½:1.

3) It is assumed that the rock borrow will be quarried limestone (density 110 lbs./cu. ft.) and the earth a sandy fill.

Since the design of this project is in an advanced stage, your earliest consideration would be appreciated.

G. McMillan,
FOR: S. J. Markiewicz,
REGIONAL SYSTEMS DESIGN ENGINEER.

GM/SJM/mac

c.c. - P. D. Billings
E. Saint
T. Kingsland
V. Snell
J. Percy

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

W.O. 70-110 67

To: Mr. S. Markiewicz,
Regional Systems Design Engineer

From: K. G. Selby

Attention: Mr. G. McMillan,
Senior Project Design Engineer

Date: July 20, 1971

Our File Ref.

In reply to

Subject:

W.P. 184-66-00 - Hwy. 15 - C.N.R. Overhead
At Codes Corners - Dist. #8 (Kingston)

With regard to your proposals for placing rock fill approaches at the above-mentioned structure, our comments (which were given to you by phone on July 15, 1971) are as follows:

(1) For fills of not more than 30 ft. height, 1½:1 slopes are acceptable from the point of view of stability.

(2) The maximum height of fill is about 36 ft., and this occurs on the right side of the south approach. For fills of this height 2:1 slopes will be necessary to achieve a satisfactory safety factor. A suitable transition should be made from 2:1 to 1½:1 between slopes with heights ranging from 36 ft. to 30 ft.

If we can be of any further assistance in this matter, please contact this Office.

K. G. Selby,
Supervising Foundation Engineer

KGS/ht

cc: Messrs. P. D. Billings
C. Grebski
E. Saint
T. Kingsland
V. Snell
J. Percy

Foundations Files
Gen. Files