

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31C-110

DIST. 8 REGION EASTERN

W.P. No. 187-64-2

CONT. No. 74-98

W. O. No. 72-11078

STR. SITE No. 11-99

HWY. No. 14

LOCATION HWY. 14, PROP. SQUIRE

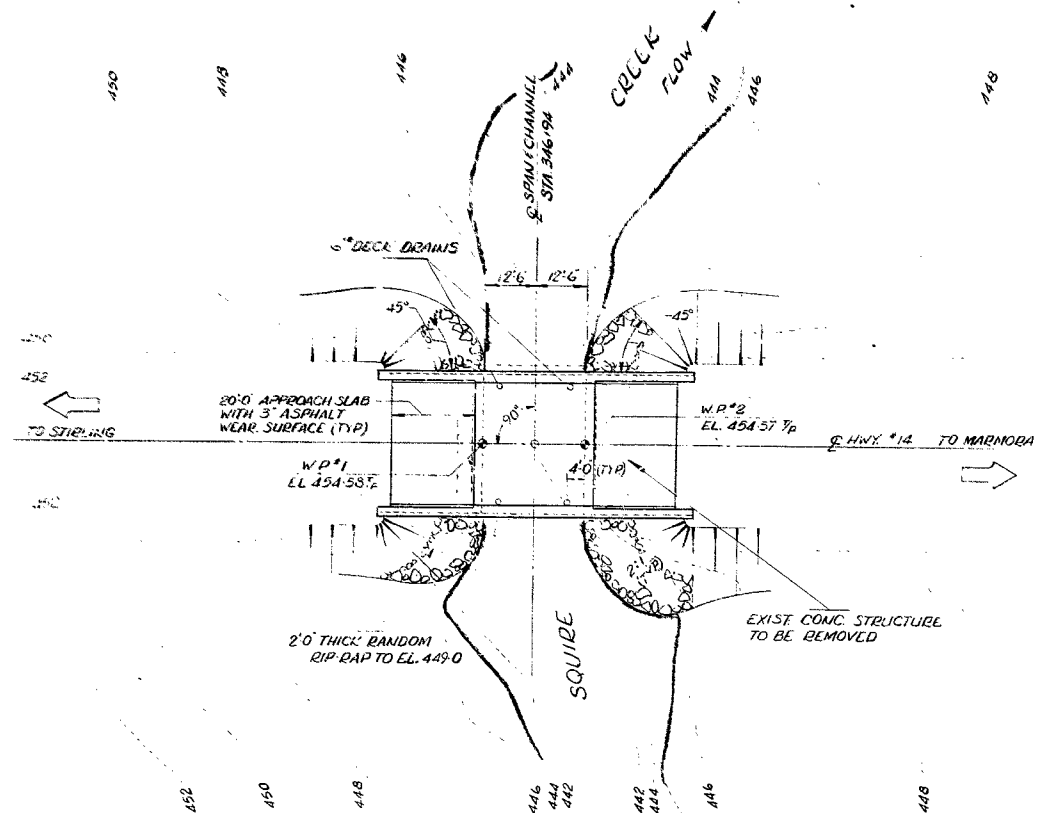
CREEK BRIDGE RECONSTRUCTION

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: DOCUMENTS TO BE UNFOLDED BEFORE

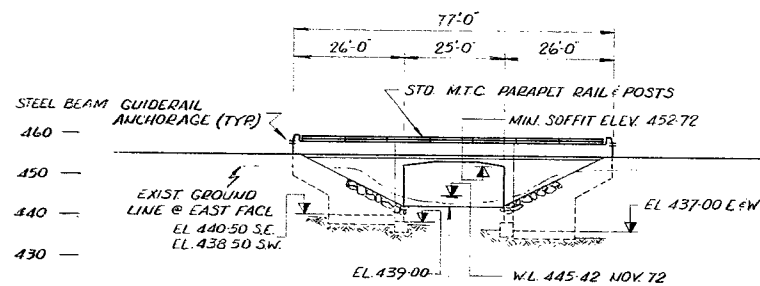
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G.I.F. 30 SEPT. 1974



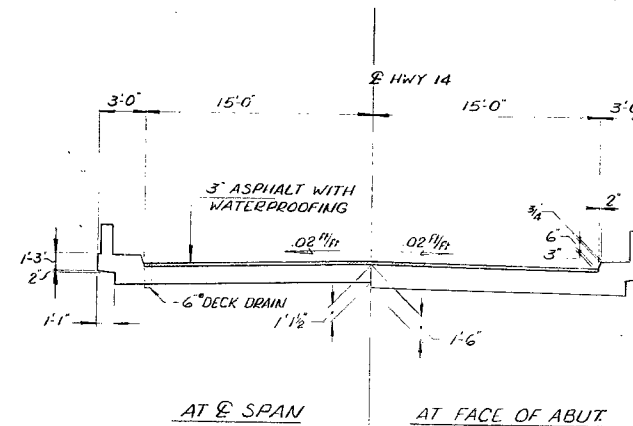
PLAN
SCALE 1 in. = 20' 1 in.

NOTE: - $\frac{3}{4}$ denotes TOP OF FINISHED PAVEMENT
- W.P. denotes WORKING POINT

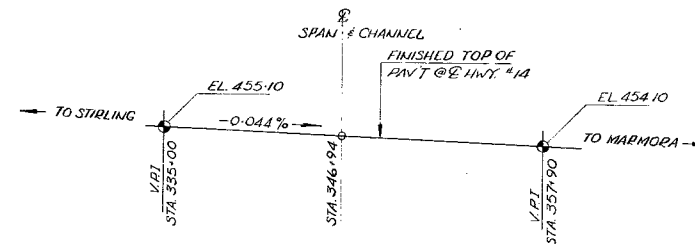


ELEVATION
SCALE 1 in. = 20' 1 in.

NOTE: - CREEK BED TO BE EXCAVATED WITHIN LIMITS OF WIDTH OF EMBANKMENT, CREEK BED WIDTH 25' AT EL. 443.0. (FOR DETAILS SEE GRADING DRAWINGS)

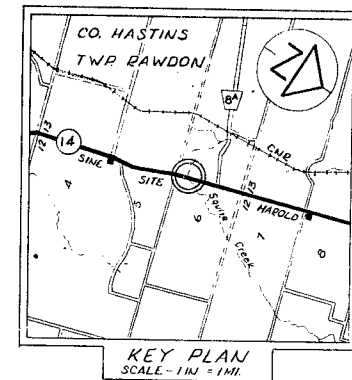


TYP. DECK SECTION
SCALE 3/16 in. = 1 ft.



PROFILE OF HWY 14
N. T. S.

- LIST OF DRAWINGS
- 11-99-1 GENERAL LAYOUT
 - 2 BOREHOLE LOCATIONS & SOIL STRATA
 - 3 FOOTINGS & RETAINING WALLS
 - 4 RIGID FRAME
 - 5 PARAPET WALL DETAILS
 - 6 STD. STEEL PARAPET RAIL
 - 7 20'0" APPROACH SLABS
 - 11-99-8 STANDARD DETAILS



GBM N°189-G 580-310

CONC. BENCH-MARK PIER, 10.7 MILES SOUTHEAST OF STATION, 5 FEET SOUTHWEST OF NORTHEAST LIMIT OF C.P.R. RIGHT OF WAY AND AT MILEAGE 79.8 FROM GLEN TAY, 750 FEET SOUTHEAST OF CROSSING OF PICTON MARMORA HIGHWAY. BOLT SET HORIZONTALLY IN NORTH SIDE OF PIER. QUAD N° 44077 LINE 4B.

GENERAL NOTES

- CLASS OF CONCRETE - FOOTINGS & APPROX. SLABS - 3000 P.S.I. REMAINDER - 4000 P.S.I.
- CLEAR COVER ON REINFORCING STEEL - DECK SLAB - 2" TOP 1 1/2" BOTTOM CURES & APPROX. SLABS - 2" REMAINDER - 3"
- GRANULAR BACKFILL BEHIND THE FRAME SHALL BE PLACED SIMULTANEOUSLY IN LIFTS NOT EXCEEDING A DIFFERENCE OF 2'0" IN ELEVATION FROM ONE SIDE TO THE OTHER.

31C-110

REVISIONS	BY	DATE	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

72-11078

SQUIRE CREEK BRIDGE
(1.7 MILES NORTH OF HWY. NO. 33)

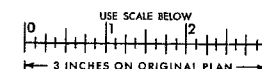
KING'S HIGHWAY No. 14 DIST. No. 6
CO. HASTINGS
TWP. RAWDON LOT 12 CON. VI

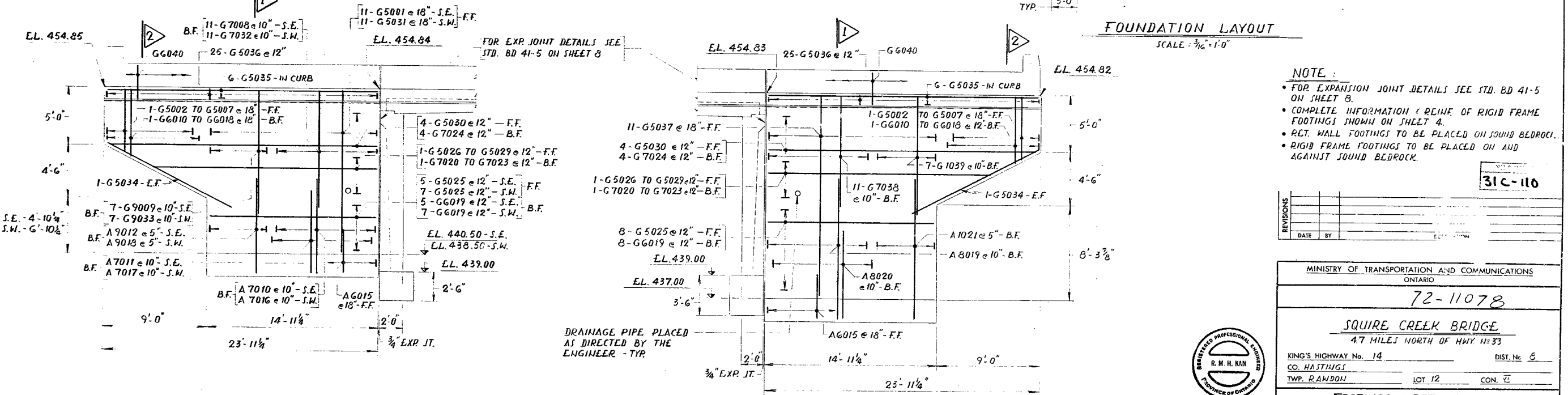
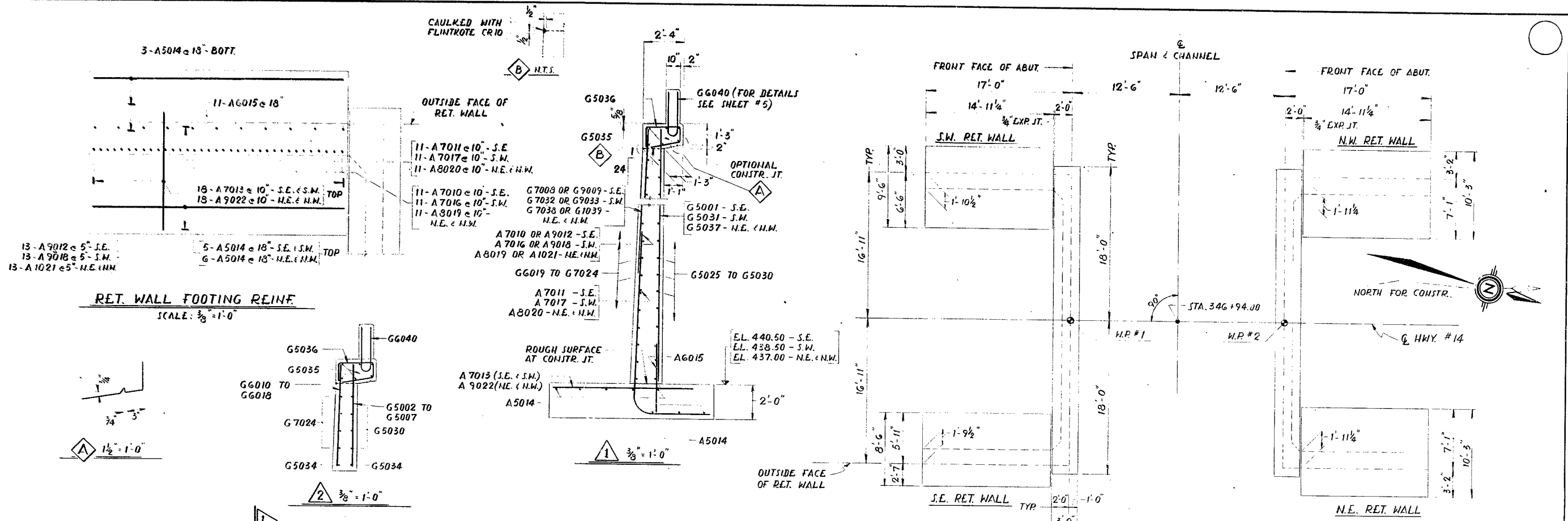
GENERAL LAYOUT

APPROVED	CONTRACT No.
DESIGN	W.P. No.
DRAWING	187-64-02
DATE	SITE No. 11-99 SHEET 1



FOR REDUCED PLAN



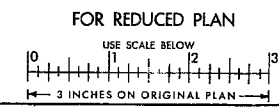


NOTE:

- FOR EXPANSION JOINT DETAILS SEE STD. BD 41-5 ON SHEET 8.
- COMPLETE INFORMATION & REIN. OF RIGID FRAME FOOTINGS SHOWN ON SHEET 4.
- RET. WALL FOOTINGS TO BE PLACED ON SOUND BEDROCK.
- RIGID FRAME FOOTINGS TO BE PLACED ON AND AGAINST SOUND BEDROCK.

REVISIONS	DATE	BY

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO			
72-11078			
SQUIRE CREEK BRIDGE 4.7 MILES NORTH OF HWY. 11#33			
KING'S HIGHWAY No. 14	DIST. No. 6		
CO. HASTINGS	TWP. RAWDON		
LOT 12		CON. VI	
FOOTINGS & RET. WALLS			
APPROVED	STRUCTURAL ENGINEER	CONTRACT No.	W.P. No.
DESIGN	R.K.	CHECK	M.I.O.
DRAWING	A.A.	CHECK	M.I.O.
DATE	OCT. '73	LOADING	HJ20-44
SITE No. 11-99		SHEET 3	



72-11078
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: June 20, 1972.

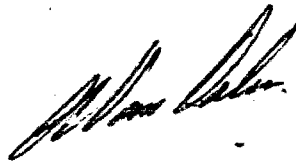
OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 187-64-02, Site 11-99,
Squire Creek Bridge,
(4.7 Miles North of Hwy. 33),
Highway 14, District 8 - Kingston

We are sending you herewith two prints of Bridge Site Plan E-4641-1 on which we have marked the proposed location of the above structure. Also enclosed are two copies of your Field Reconnaissance Report.

We would be pleased if you will make arrangements for the necessary foundation investigation and to have your report, the scheduled date for which is August 30, 1972.



A. Van Dalen

For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encls.

c.c. J. Anderson
R. Forrest
C. S. Grebski (encl.)



FIELD INSPECTION REPORT
REQUIRED BY FOUNDATION SECTION
FOR

FE-69
SEPT. 1968

W.P. NO. 187-64-02 HIGHWAY NO. 14 DISTRICT 8 SITE PLAN NO. E-4641-1 PROFILE NO. C-223-7
RIVER CROSSING ☒ GRADE SEPERATION ☐ R.R.X. ☐ OTHER (SPECIFY) _____
ALTERNATE SCHEME (IF ANY.) None

EXISTING SITE CONDITIONS

DESCRIPTION:

TOPOGRAPHY: HILLY ☐ ROLLING ☐ VALLEY ☐ GULLIED ☐ FLAT ☒
VEGETATION: TREES ☒ BRUSH ☐ GRASS ☒ SWAMP ☐ FARM CROPS ☐ CLEARED ☐
SNOW COVER: 0"-6" ☒ 6"-12" ☐ >12" ☐
ROCK OUTCROP (SPECIFY LOCATIONS) None visible

UNDERGROUND UTILITIES: UTILITY COMPANY TELEPHONE NO. FOR DEFINITE LOCATION
Aerial Wires 1 Bell Canada West side of Highway
2 Hydro East side of Highway
3 No indication of underground utilities
4 _____
5 _____

EXISTING STRUCTURE(S):

No information as to foundations known

FOUNDATIONS: SPREAD FOUNDATIONS ☒ SIZE _____ ELEVATION(S) _____
PILES ☐ TYPE _____ LENGTH(S) _____
DESIGN LOAD _____ T.S.F. _____ TONS/PILE _____
CONDITION OF STRUCTURE Fair to poor

APPROACHES: CUT ☐ FILL ☐ SIDE SLOPES N/A
BERMS YES ☐ NO ☐

OTHER OBSERVATIONS (USE BACK OF SHEET TO DESCRIBE ANY FAILURES IN AREA, PAST PERFORMANCE OF EXISTING APPROACHES & STRUCTURE, ETC.)

ACCESSIBILITY

IS STRUCTURE LOCATED ON D.H.O. RIGHT OF WAY? YES ☒ NO ☐ IF NO,
HAS PERMISSION BEEN OBTAINED TO ENTER PROPERTY? YES ☐ NO ☐ IF NO,
PROPERTY OWNER(S):

NAME ADDRESS TELEPHONE NO.

1 _____
2 _____
3 _____
4 _____

WHO WILL OBTAIN NECESSARY PERMISSION? N/A

HAS SITE BEEN SURVEYED & STAKED? YES ☐ NO ☒ IF YES, DATE OF MOST RECENT SURVEY _____

WILL CLEARING BE NECESSARY TO ENTER SITE AREA? YES ☐ NO ☒

IS SITE ACCESSIBLE TO WHEELED VEHICLES? YES ☒ NO ☐

IF RIVER CROSSING:

WILL A RAFT BE NECESSARY? YES ☐ NO ☒ IF YES, GIVE MAX. DEPTH OF WATER _____ FT.

CURRENT: SWIFT ☐ MODERATE ☐ SLOW ☒

DRILLING OPERATIONS

NEAREST SOURCE OF WATER (GIVE HAULING DISTANCE, IF KNOWN) At site

ADDITIONAL INVESTIGATION REQUIRED FOR THE FOLLOWING PURPOSES:

ALTERNATE SCHEME: YES ☐ NO ☒ IF YES, SPECIFY _____

HYDROLOGIC REASONS: YES ☐ NO ☒ IF YES, SPECIFY (SCOUR, ETC.) _____

REMARKS

NEAREST AVAILABLE ACCOMODATION: _____

OTHER COMMENTS: _____

DATE June 20, 1972

T. C. Kingsland

Per: A. Van Dalen

Gordon N. Garton, C.E.

Design Services Branch,
Downsview 464, Ontario.
July 5, 1972

Telephone: 248-3282

Master Soil Investigation,
104 Kenhar Drive,
WOODBRIDGE, Ontario.

Dear Sirs:

This letter confirms our request of June 22, 1972 for the supply of a diamond drill, together with all necessary equipment, as specified under the terms of our Contract Agreement, at Stirling, on June 23, 1972.

Mobilization will be from Toronto.

Our Project Number is P.O. 72-11078.

Yours truly,

K.G. Selby

KGS/ht

K.G. Selby,
Supervising Foundations Eng.,
For: A.G. Sternas,
Principal Foundations Eng.

cc. Mr. W.W. Fry
(Attn: Mrs. M. Andrews)

Foundations Files
Documents

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 72-1107B SITE _____ BOREHOLE No. 4 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	1.0-1.5	1/2"	ang.	50	35	5	no	hell	quite	no	earthy	grey	strong		Poorly graded gravel-sand mixtures, little fines (CL)	GP
2	3.0-3.5	1/2"	ang.	80	15	5	no	hell	quite	no	earthy	grey	strong		Poorly graded gravel-sand mixtures, little fines (CL)	GP
													</			

NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 72-11078 SITE _____ BOREHOLE No. 1 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	51-4	3/4"	subang	10	5	75	high	duff	no	med.	earthy	brown-grey	strong		brown-grey clayey silt, some sh. lenticles	CL
1B	51-5	1/2"	subang	30	40	10	high	duff	fine	no	earthy	grey	strong		light graded sand-silt mixture, little fine (cl)	SW
2	60-5	1"	subang	20	15	10	high	duff	fine	mod.	earthy	grey	strong		medium sand mixture with some of fines (clay silt)	ST

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 72-11078 SITE _____ BOREHOLE No. 2 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION			PERCENTAGE	DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE												
1	3.0-4.0	—	—	—	100%	light	dull	light	low	none	dark	no		Organic clay of medium to high plasticity	OH
1B	4.0-5.0	—	—	—	100%	light	dull	no	high	none	grey	neg		Over clayed to silty clay	CL to MI
2	5.0-6.0	avg.	—	—	100%	light	dull	no	low	none	grey	strong		grey silty clay, traces of gravel	CL MI
3	6.0-7.0	avg.	55	35	10	no	dull	none	no	none	grey	strong		Fine gravel, sand and silt with little fines (CL)	GP

NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 72-11078 SITE _____ BOREHOLE No. 3 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	—															
2	—															
3	21-25 1/2"	ang.	ang.	70	35	15	no	dull	grit	no	earthy	gray	slip		poorly graded gravel-sand mixtures, little fines (CL)	GP
4	21-25 1/2"	subang	subang	75	35	10	no	dull	grit	no	earthy	gray	slip		poorly graded gravel-sand mixtures, little fines (CL)	GP

NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.
REMARKS:—

MEMORANDUM

TO: Mr. T. C. Kingsland, (2)
Reg. Structural Planning Engineer,
Eastern Region,
KINGSTON, Ontario.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: August 10, 1972

OUR FILE REF.

IN REPLY TO AUG 30 1972

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
The Proposed Squire Creek Bridge
Reconstruction, Hwy. #14
Lot 12, Con. 6
Twp. of Rawdon; Co. of Hastings
District #8 (Kingston) Ontario)
W.O. 72-11078 - W.P. 187-64-2

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

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

AGS/ht
Attch.

c.c. Messrs. D. W. Farren
B. R. Davis
A. Rutka
S. J. Markiewicz
V. A. Snell
B. J. Giroux
E. R. Saint
G. A. Wrong
B. A. Singh

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

Foundations Files
Documents

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 - 4.4) Gravelly Sand with Boulders.
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FOUNDATION INVESTIGATION REPORT
For
The Proposed Squire Creek Bridge
Reconstruction, Hwy. #14
Lot 12, Con. 6
Twp. of Rawdon; Co. of Hastings
District #8 (Kingston, Ontario)
W.O. 72-11078 -- W.P. 187-64-2

1. INTRODUCTION:

A request for a foundation investigation at the crossing of Squire Creek and Hwy. #14 was received from Mr. T.C. Kingsland, Regional Structural Planning Engineer, in a memorandum dated June 20, 1972.

Following this request a field investigation was carried out by the Foundations Office to determine the subsoil conditions existing at the site.

This report contains the results of this investigation together with our recommendations pertaining to the design of the proposed new structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed single span reconstructed structure is situated approximately 4.7 miles north of Hwy. #33 at Squire Creek on Hwy. #14.

The surrounding terrain with the exception of the creek bed is flat and in part cultivated farm land. The creek is some 24 ft. wide and 3 ft. deep. Fluctuation of water level was observed during the investigation.

Physiographically the site is situated in the region referred to as the Peterborough Drumlin Field.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of four sampled boreholes and one dynamic cone penetration test was carried out during the course of the field work. Boring was achieved by means of a conventional diamond drilling equipment adapted for soil sampling purposes. During the field work, disturbed samples were obtained by means of a standard split spoon sampler; the energy used in driving it conformed to the requirements of the Standard Penetration Test.

Dynamic Cone Penetration Test was carried out adjacent to one borehole. Driving energy to advance to the cone was 350 ft. - lbs. per blow.

The bedrock was proved at all borehole locations, using AXT rock coring equipment.

The locations and elevations are shown on Drawing No. 72-11078A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory.

Following this inspection laboratory tests were carried out on selected samples to determine the following physical properties:

Atterberg Limits

Natural Moisture Content

Grain-Size Distribution

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

The subsoil at the site, apart from the existing roadway fill, consists of a shallow deposit of overburden, followed by limestone bedrock. The boundaries between different deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing

No. 72-11078A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows.

4.2) Fill Material:

This deposit was intersected in Boreholes #3 and #4 from ground level to a minimum depth of 8.5 (elevation 443.6). The material in the deposit consists mainly of sand and gravel with frequent boulder concentrations. Due to the presence of the boulders it was rather difficult to carry out proper sampling.

Based on a limited number (2) of Standard Penetration Tests, the relative density of the overall stratum may be described as loose to dense.

4.3) Muskeg:

In Borehole #2, an approximately 4 ft. thick deposit was encountered at ground level. The material consists of decayed and undecayed organic substances mixed with fine sand. The consistency of this black coloured deposit is very soft.

4.4) Gravelly Sand with Boulders:

This shallow, surficial layer was discovered in Borehole #1 only. The thickness is in the order of 2 ft. The basic components were found to be gravel, sand and boulders.

4.5) Clayey Silt to Silty Clay - Traces of Sand:

Immediately below the gravelly sand and muskeg deposits an approximately 3 ft. ± thick cohesive type of stratum was encountered in B.H. #1 and #2, respectively. The material in this zone consists mainly of Clay - 46%, Silt - 52%, and traces of Sand - 2%. The consistency is estimated to range from firm to very stiff.

The natural moisture content is in the order of 31%.

4.6) Sand and Gravel with Clay and Silt:

This stratum underlies the above described deposits at all borehole locations. The upper boundary was found to be between elevation 441+ and elevation 443+, and extends down to the limestone bedrock.

The material consists mainly of sand and gravel mixed with clayey silt matrix. Standard Penetration Tests carried out within this zone indicated that relative density varies from dense to very dense; the obtained 'N' values ranged from 43 to 80 blows/ft. The average natural moisture content is in the order of 6%. Grain-size distribution curves are plotted on Figure #1 in the Appendix.

4.7) Bedrock:

Bedrock at this site was found to consist of generally sound limestone between elevation 435+ and elevation 439+.

5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed during the field investigation:

B.H. #1:	At G.L.	El. 445.2
B.H. #2:	At G.L.	El. 445.6
B.H. #3:		El. 445.0
B.H. #4:	Not Established	

The creek water level was found to fluctuate between elevation 445.2 and 445.6 during the field investigation.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to replace the existing Squire Creek Bridge on Hwy. #14 with a single-span (30 ft. in length from

Q to Q of bearings) structure. The existing approximately 30 years old concrete bridge is in fair to poor condition. The proposed profile grade ~~of Revision Line 'A'~~ is approximately 2 feet higher (El. 554.5) than the existing one.

As described in the previous paragraphs of this report, the subsoil at the site consists of bouldery approach fills, (B.H.'s #3 and #4); muskeg, gravelly sand followed by silty clay to clayey silt (B.H.'s #1 and #2), followed by a granular type deposit, followed by limestone bedrock at all borehole locations.

The bottom of the creek bed is at approximate elevation 442.5.

6.2) Foundations:

To provide the required 6 ft. frost protection of the foundations, the footings should not be placed above elevation 436.5. According to the borehole information the subsoil at this elevation consists partly of dense to very dense sand and gravel and partly of limestone. This condition is considered to be unacceptable due to the possible differential settlement within the individual footings.

In view of the foregoing, it is recommended, that the entire structure be founded on spread footings placed directly on the sound portion of the limestone bedrock. The rock surface should be carefully inspected to ensure that all the probable weathered and fractured part of the bedrock is removed. If this procedure is followed, safe loads of up to 20 t.s.f. may be used for design purposes.

6.3) Approach Embankments:

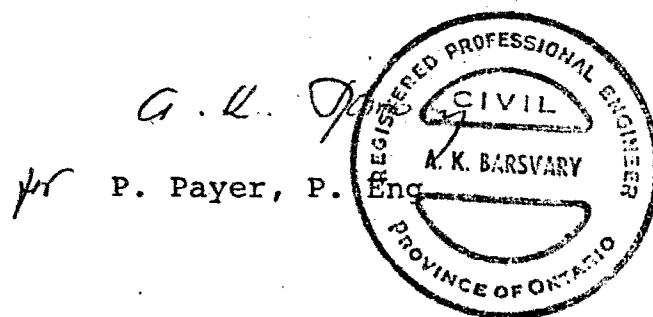
No stability problems are anticipated for the 2 ft. of grade rise provided with 2:1 standard slopes. The topsoil and the surficial, soft organic material should be removed in accordance with the pertinent standards within the construction area.

7. MISCELLANEOUS:+

The field investigation was carried out during the period of June 26 to July 6, 1972, under the supervision of Mr. P. Payer, Project Foundations Engineer, and Mr. P. Martin, Student Technician.

Equipment used, was owned and operated by Masters Soil Investigation Ltd.

This report was written by Mr. P. Payer, and reviewed by Mr. K.G. Selby, Supervising Foundations Engineer.



PP/ht

K. G. Selby
K. G. Selby, P. Eng.

August 8, 1972

APPENDIX I

FOUNDATION SECTION

CHECKED BY

[illegible]

FOUNDATION SECTION

CHECKED BY

0 2 52 46

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 72-11078 LOCATION Sta. 346 + 72 15' Rt. ORIGINATED BY PP
W.P. 187-64-2 BORING DATE July 4, 5, 1972 COMPILED BY PP
DATUM Geodetic BOREHOLE TYPE Washbore - BX Casing CHECKED BY [Signature]

SOIL PROFILE			* SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.					w_p — w — w_L WATER CONTENT % 15 30 45				
452.2	Ground Level															
0.0	Sand & gravel with boulders.		1	SS	5	450										
443.7	Fill Material		2	SS	49											
8.5	Sand & gravel with clayey silt matrix.		3	SS	43											
439.0			4	SS	25/1	440										
13.2	Limestone Bedrock		5	AXT	94%											
433.2			6	AXT	100%											
19.0	End of Borehole					430										

445.0

58 31 (11)
60 28 (12)

FOUNDATION SECTION

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	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.	WATER CONTENT %		
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	w _p ————— w ————— w _L 15 30 45		
452.1	Ground Level									
0.0	Sand & gravel with boulders.					450				
443.6	Fill Material									
8.5	Sand & gravel with clayey silt matrix.		1	SS	80	440			o	
435.6	Dense to Very Dense		2	SS	47				o	
16.5	Limestone Bedrock		3	AXT	70%					
432.1										
20.0	End of Borehole					430				

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT

SAND

GRAVEL

Fine

Medium

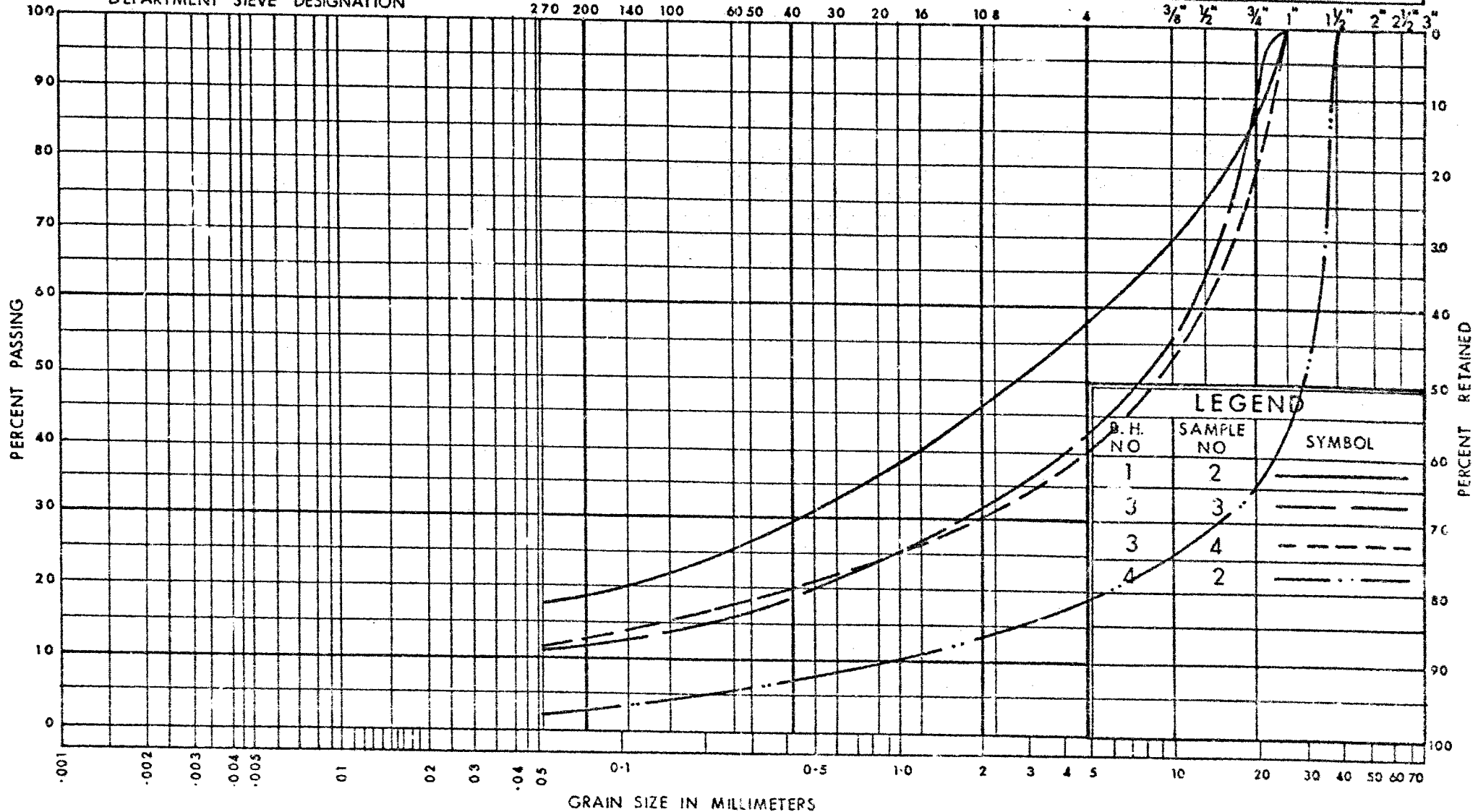
Coarse

Fine

Coarse

DEPARTMENT SIEVE DESIGNATION

270 200 140 100 60 50 40 30 20 16 10 8 4 3/8 1/2 3/4 1 1 1/2 2 2 1/2 3



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES
BRANCH

GRAIN SIZE DISTRIBUTION
SAND & GRAVEL

W.P. No. 187-64-2

JOB No. 72-11078

Fig. No 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

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Ccu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	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_i	SENSITIVITY

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a 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

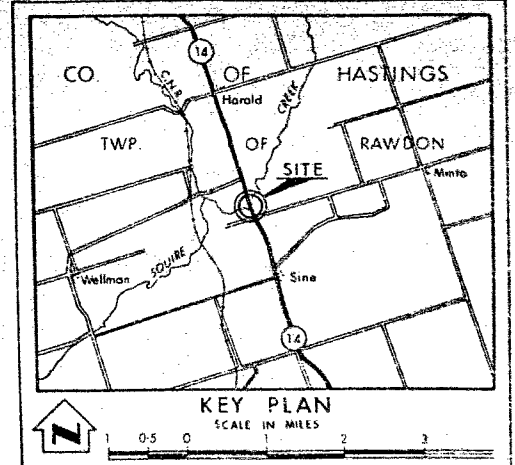
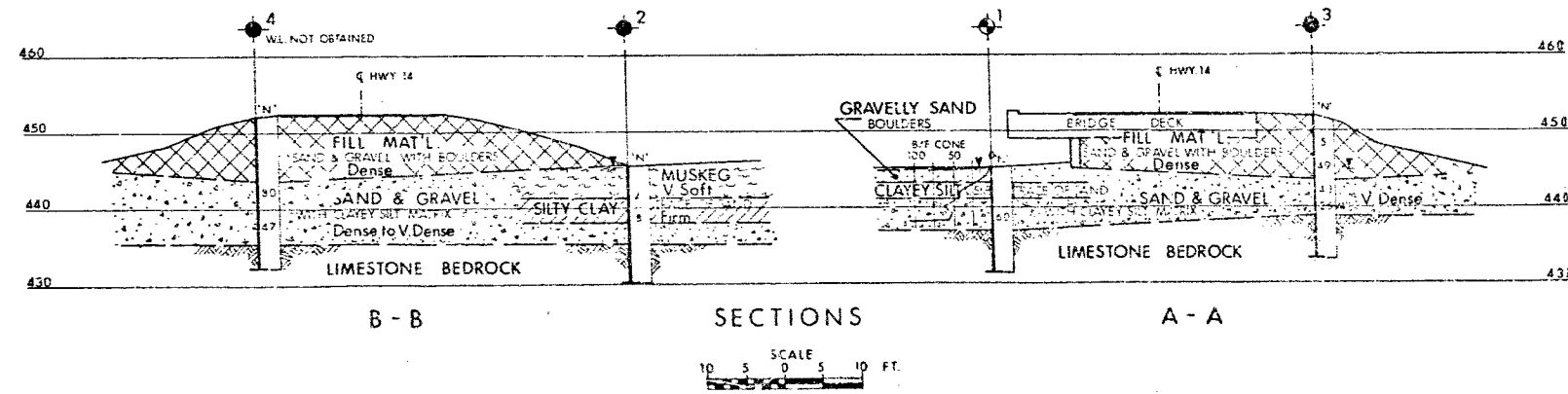
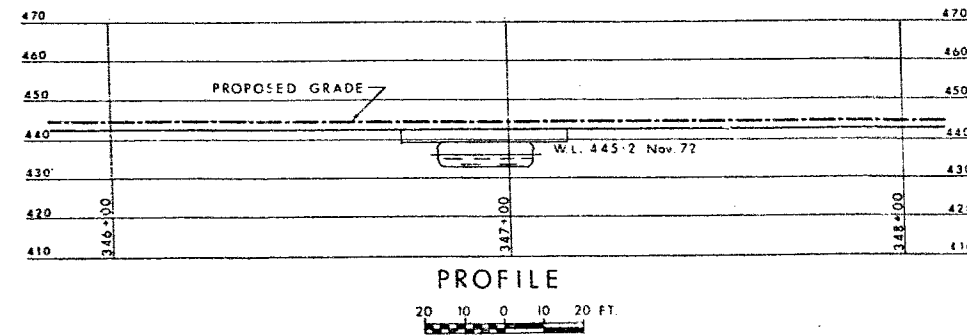
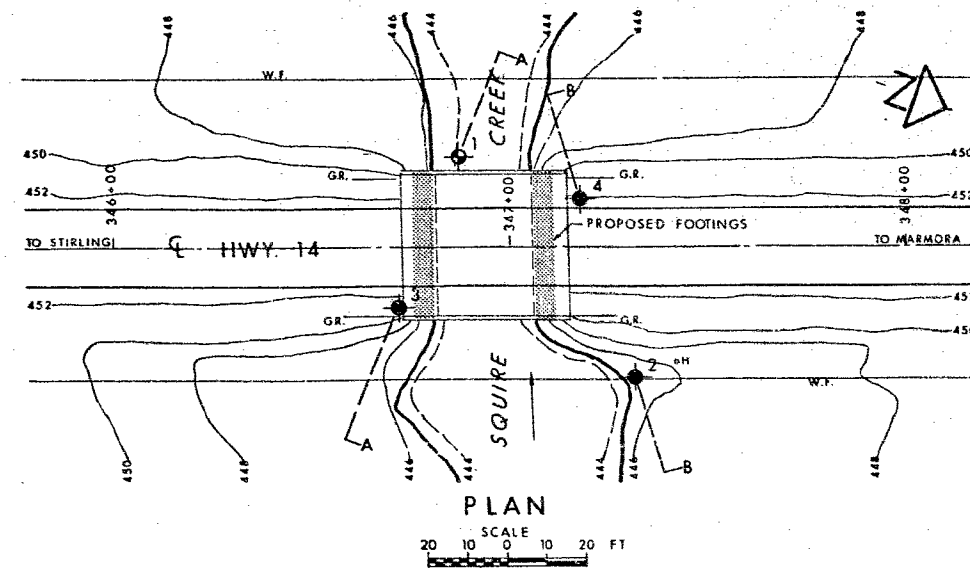
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

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



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation.		
	JUNE & JULY 1972		
NO.	ELEVATION	STATION	OFFSET
1	445.2	346+88	23.5' LT
2	445.6	347+31	34.5' RT
3	452.2	346+72	15' RT
4	452.1	347+23	12' LT

NOTE

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

REVISIONS	DATE	BY	DESCRIPTION
1	SEPT 73	DLJ	NEW STATIONS USED, LINE A REMOVED

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO
DESIGN SERVICES BRANCH - FOUNDATIONS OFFICE

SQUIRE CREEK

HIGHWAY NO. 14 DIST. NO. 8
CO. HASTINGS
TWP. RAWDON LOT 12 CON. 5

BORE HOLE LOCATIONS & SOIL STRATA

SURV'D P.F. CHECKED	W.P. NO. 187-68-02	DRAWING NO.
DRAWN S.C. CHECKED	W.D. NO. 72-11078	72-11078A
DATE 28 AUG 1972	SITE NO.	BRIDGE DRAWING NO.
APPROVED	DESIGN NO.	

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

72-11078

TO: Mr. A. G. Stermac,
Principal Foundations Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: 18 April 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 187-64-02, Site 11-99,
Squires Creek Bridge,
Highway 14, District 8 - Kingston

Enclosed herewith are two copies of Bridge Site Plan E-5247-1 for the above structure.

This drawing replaces Site Plan E-4641-1 issued to you with our foundation request on June 20, 1972. The Bore Hole Location and Soil Strata Drawing 72-11078A should be revised to show the revised stations and profile grade.

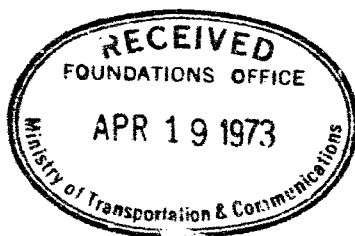


A. Van Dalen

For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encl.

c.c. C. S. Grebski - Att. K. Bassi



Note: Present Report
need not be changed,
as final line etc
will be shown on
Drawing provided for
Contract Documents
K. S. L.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac, FROM: Structural Planning Office,
Principal Foundations Engineer, Kingston, Ontario.
Downsview, Ontario.

ATTENTION: Mr. M. Devata. DATE: August 23, 1973.

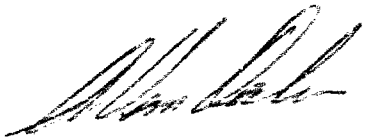
OUR FILE REF. IN REPLY TO

SUBJECT: W.P. 187-64-02, Site 11-99
Squires Creek Bridge
Highway 14, District 8, Kingston

I refer to my memo dated 18th April 1973 at which time we forwarded two prints of E-plan #5247-1 replacing E-plan #4641-1

Structural Office informs us that to date the Bore Hole location and Soil Strata drawing 72-11078A still show stations referred to on E-4641-1 rather than E-5247-1.

We shall be glad if you would revise the Bore Hole location and Soil Strata drawing and distribute copies in the usual manner.



A. Van Dalen
For: T. C. Kingsland
REGIONAL STRUCTURAL
PLANNING ENGINEER.

AVD/TCK/dk
c.c. C. S. Grebski, Att. K. Bassi.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. T. Kingsland,
Reg. Structural Planning Eng.,
Kingston Regional Office.

FROM: Structural Office,
West Building, DOWNSVIEW.

ATTENTION:

DATE: August 31, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: Squire Creek Bridge,
4.7 Miles North of Hwy. #33,
W.P. 187-64-02, Site #11-99,
Hwy. #14, Dist. #8.

72-11-078

Attached herewith are prints of the Preliminary Bridge
Plan Drawing 11-99-P1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$60,000.00
which includes tender, materials, engineering, and sundry
construction.

Any comments or revisions you may have should be submitted
within four weeks.

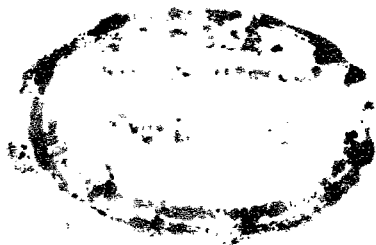
CSG/at
Attach.

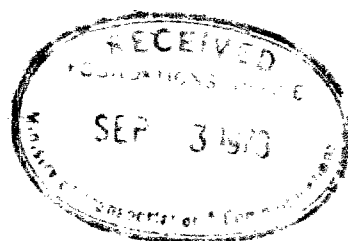
C. S. Grebski,
Structural Design Engineer.

cc. B. R. Davis
W. D. Birch
A. E. McKim
W. McFarlane
M. Stoyanoff
A. Stermac ✓
J. Anderson
J. Harris

No comments

AR 3/10/73





FF-78

FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS:

W.P. 187-69-02

W.O. 72-11078

Foundation Report By:

Review of Design Drawings By:

Design Drawing No.'s:

..... P. PAYER

..... E. A. W.

..... 11-99-P1

1. Does footing design comply with our report or subsequent memos? YES

2. If answer to 1. is No, is present design acceptable? YES

3. Has sufficient field work been done? YES

4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. N/A

5. If excavation of unsuitable soil is recommended, is this shown on Drawings? YES

6. Are approaches designed in accordance with our report? Check slopes and berm lengths. YES

7. Do you anticipate any construction problems? i.e., dewatering, stability of temporary slopes or excavations. Dewatering

8. Summarize your comments; on separate sheet if necessary.

Drawings Received 3-9-72 19.....

Reviewed 24-9-72 19.....

Signed E. A. W.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. Stermac
Principal Foundation Engineer
Rm. 107, West Bldg

FROM: C.S. Grebski
Structural Design Engineer
v Structural Office
West Bldg., Downsview
DATE: October 19th, 1973

ATTENTION:

OUR FILE REF.

IN REPLY TO

SUBJECT:

Squire Creek Bridge
4.7 miles north of Hwy. #33
Hwy. #14, District #8
W.P. 187-64-02, Site #11-99

72-11-07P

Attached herewith we are submitting the final
bridge drawings which show the foundation design for this structure.

Kindly give us your comments at your earliest con-
venience.

for

W. Lin

W. Lin
C.S. Grebski
Structural Design Engineer

CSG:BMF

Attached

C.C.

No comments

APR 1974

22/11/73

12/11/73



FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS:

W.P. 187-64-02
W.O. 72-11078

Foundation Report By:

Review of Design Drawings By:

Design Drawing No.'s

..... P. Payer
..... A. Prakash
..... 187-64-02-123

1. Does footing design comply with our report or subsequent memos? Yes
2. If answer to 1. is No, is present design acceptable? —
3. Has sufficient field work been done? Yes
4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. —
5. If excavation of unsuitable soil is recommended, is this shown on Drawings? Yes
6. Are approaches designed in accordance with our report? Check slopes and berm lengths. Yes
7. Do you anticipate any construction problems? i.e., dewatering, stability of temporary slopes or excavations. NO.
8. Summarize your comments; on separate sheet if necessary.

Stations changed.

Foundation Plan

is inside down

— Fdn. Drawing is being changed. 12/4/73

No.

Drawings Received Oct. 25 1973.
Reviewed Nov. 19 1973.

Signed A. Prakash

Aug 72-11078 A
Finalized & sent to
Structure Office
6 Dec 73 JH

FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS:

W.P. 187-64-02
W.O. 72-11078

Foundation Report By:

Review of Design Drawings By:

Design Drawing No.'s

..... P. Payer
..... A. Prakash
..... 187-64-02-123

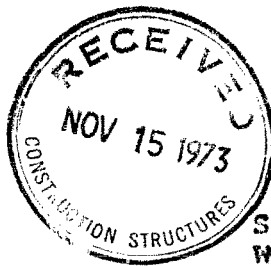
1. Does footing design comply with our report or subsequent memos? Yes
2. If answer to 1. is No, is present design acceptable? —
3. Has sufficient field work been done? Yes
4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. —
5. If excavation of unsuitable soil is recommended, is this shown on Drawings? Yes
6. Are approaches designed in accordance with our report? Check slopes and berm lengths. Yes
7. Do you anticipate any construction problems? i.e., dewatering, stability of temporary slopes or excavations. NO.
8. Summarize your comments; on separate sheet if necessary.

Station changed. Foundation Plan
is inside down — Foundation Drawing is
being changed. 12/9/73.
No

Drawings Received Oct 25 19.73..
Reviewed Nov 19 19.73..

Signed A. Prakash

Aug 72-11078 A
Finalized & sent to
Structure Office
6 Dec 73 JH.



A.J. Percy,
Regional Manager,
Systems Design,
Kingston Regional Office.

Structural Office,
West Building,
Downsview, Ontario.

November 14, 1973.

W.P. 187-64-02, Site #11-99,
Squire Creek Bridge,
Hwy. #14, District #8

Please find enclosed one copy of the D4 and Special Provisions for your use.

One copy of the D4 and Special Provisions is also being forwarded to the following:

- (a) District
- (b) Systems Design Project Review
- (c) Structural Material Section
- (d) Structural Design
- (e) Estimating Office
- (f) Assistant Construction Engineer (Structures)

One copy of the E.C.B. output for reinforcing steel and one copy for the approach slabs and one copy of the E.C.B. output for concrete quantities for the structural and one copy for the approach slabs and a removal quantity calculation for the existing structure is being forwarded to the Estimating Section.

Prints of the plans will follow.

NZ/cd
Encl.

N. Zoltay,
Contract Specifications Engineer

c.c. K. Bassi
J. Wear
V.A. Snell
K.C. Howe
B. Giroux
A.E. McKim ✓
T. Kingsland
R. Forrest
J. Anderson.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

31C-110

TO: Mr. T. C. Kingsland, (2)
Regional Structural Planning Engineer,
Eastern Region,
Kingston, Ontario.

FROM: Geotechnical Office,
Engineering Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: January 16, 1974.

OUR FILE REF.

IN REPLY TO JAN 17 1974

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
The Proposed Squire Creek Bridge
Reconstruction, Hwy. #14
Lot 12, Con. 6
Twp. of Rawdon; Co. of Hastings
District #8 (Kingston, Ontario)
W.O. 72-11078 -- W.P. 187-64-2
CONT. 74-98

Attached please find your copy of Foundation Report
#72-11078. As you know we recently recalled all copies of these
reports in order to make certain revisions to the drawing so as
to conform with the revised E Plan #5247-1.

K. G. Selby

KGS/ao
Attch.

K. G. Selby,
SUPERVISING FOUNDATIONS ENGINEER.

C.C. E. J. Orr
B. R. Davis
A. Rutka
A. J. Percy
V. A. Snell
B. J. Giroux
E. R. Saint
G. A. Wrong
B. A. Singh

M. Devata

REGIONAL REVIEW
W. P. 187-64-01 (02) 03
From Stirling North Limits Nly to
Springbrook
7.3 Miles;
District #8 - Kingston

72-11-078

The Regional Review for the above project was held on Thursday, March 28, 1974, in the M. T. C. Boardrooms on Counter Street.

Those present were:--

E. Pigeau	Engineering Audit
V. Snell	District
J. Burleigh	District
J. Reid	District
A. M. Batten	Materials & Testing
J. Kuipers	Critical Path
A. VanDalen	Structural Planning
D. B. Thomas	Systems Design
D. E. Swain	Systems Design

Following are the comments received regarding the drawings and documents.

Bridge Drawings:

Mr. Batten recommended that a note be added stating that organic material under the roadbed adjacent to structure or creek bed be excavated. After discussion it was agreed that Systems Design will add the note to the Structure Detail Sheet #38. Structural Planning are to check on the reason the word "foundation" is crossed off the Special Provision "Rock Excavation for Structure and Retaining Wall Foundations".

Systems Design Drawings:

Sheet 1

M & T asked whether the soils profile number is required to be shown. M & T recommended that the title on Removal sheets should read "Removals and Soils Data".

Sheet 4

M & T recommended that the Pavement Removal be extended to culvert #8.

Sheet 5

M & T recommended that a note 'boxed' be shown giving a summary of pavement depths.

District requested that drainage be investigated in the area of culvert #5 to determine if culvert is required.

Sheet 6

District agreed to check on the drainage problem at the Patrol Yard re salt being washed onto adjacent owners field.

District recommended that the pavement on the existing Patrol Yard entrance be removed and repaved to obtain a better grade. District advised they will check into the pavement condition of the Patrol Yard to determine if paving is required.

Sheet 7

District recommended that a standard taper be applied to the Patrol Yard entrance.

At this point Mr. Thomas outlined to the meeting the method used for selecting the grade ie: that the grade was a splined grade based on a computer analysis of the existing pavement. The splined grade data was not shown on the drawings as Systems Design felt it to be superfluous since the District would receive an E. C. B. pavement elevation report with sufficient data for setting grade at 50 ft. stations.

The actual splined grade provided by the computer was presented to the meeting and the District agreed that subject to a few isolated adjustments the grade was adequate.

M & T stated their reservations regarding this method, their objections being based mainly on the fact that it was a break with tradition.

3

Materials & Testing recommended that granular backfill to culverts be shown up to the original ground.

District are in disagreement with the pavement widening on curves. It is their opinion that the 2' minimum should be 1'.

Sheet 8

District pointed out that the concrete steps are shown as a removal which is not the case.

Sheet 9

District requested that the drainage be investigated in the vicinity of the cattle pass so that if possible water does not run through it.

District pointed out that fencing to the cattle pass should be undertaken for cattle control.

M & T recommended that the note on profile "grade point treatment" be removed.

M & T requested that Systems Design review the method used to show granular backfill to culverts throughout the contract.

Sheet 10

District are to check with Property on the status of the plastic pipe through culvert. Systems Design are to check agreement and signs and the building permit inspector is to ascertain whether the owner has a permit.

Sheet 11

District requested that the drainage at culvert #66 be reviewed to determine if it is required.

M & T recommended the note "Frost heave treatment" be removed.

Sheet 13

Structural Planning Office requested Systems Design to check into the possibility of skewing the concrete culvert to obtain better flow characteristics.

M & T requested the note "frost heave treatment" be deleted where applicable throughout the contract.

Sheet 15

District recommended that the sub-drain section be extended s'ly from the cemetery to try and save the two trees in front of the residence if possible.

Sheet 17

District requested that the curbing be extended southerly to culvert #125. After discussion it was felt that curbing should be extended farther s'ly to allow access to the barn.

Audit brought to attention the fact that the note "earth fill" on culvert #140 should read "granular backfill".

Mr. Batten requested that Systems Design show pavement depth details in box for urban area. Binder $1\frac{1}{2}$ " H.L. 4, Binder - 1" S.A.B., Surface $1\frac{1}{2}$ " H.L. 4.

District recommended that the owner of the commercial entrance be contacted showing him our proposed design.

Systems Design are to check on the property requirements as shown at Sta. 292+ right.

District requested that culvert #133 be eliminated if possible by draining to the next culvert. Systems Design are to investigate this possibility.

Sheet 18

District's investigations show a frost heave area between Stations 322+ & 330+. M & T agreed to check into this area.

District recommended that fencing be provided across small parcels outside the right-of-way owned by M. T. C.

M & T requested we check on the standard for twin culverts and show it in the contract.

Sheet 38

District recommended that the item 'pipe salvage' be removed as the contractor will be supplying the pipe.

Audit pointed out that the width of the detour disagrees with the width as shown on the standard.

M & T suggested that the 90" pipes as shown on the profile are shown incorrectly.

Sheet 21

District requested that Systems Design check the drainage pattern on the sideroad at Station 367+66 to see if the drainage could be extended to the west to drain into the existing culvert.

Audit recommended a note be added to refer the concrete steps to Standard SD 20-1.

Sheet 25

District recommends that rip-rap be placed on the ends of interceptor ditch.

It was also recommended by District that a pipe be installed in front of barn at Station 427+ Lt. to provide access to the barn for property owner.

District pointed out that an entrance is required for the house at Station 430+ Left.

Sheet 27

M & T advised that the depth of granular at the cut starting at Station 430+ should show 21" granular.

Sheet 29

It was pointed out by District that the entrance to the house at Station 489+ left should be on the north side of the house.

M & T requested that we review with their office the grade point treatment at Station 488+ .

Sheet 30

Audit requested we investigate the limits of pavement removal as shown on the drawings.

Sheet 31

M & T requested the depth of granular as shown be checked. District requested that culverts 253 and 254 be investigated further to determine if they are required.

Sheet 32

M & T pointed out that removal of pavement is required at end of job.

Sheet 37

Bridge Office recommended that this sheet be reviewed in its entirety for number of bars, weight of steel, etc. as shown.

General Comments

District recommends that all sideroad radii be curbed to prevent granular from being strewn onto the pavement. Mr. Kuipers recommended that 140 working days be allotted for the contract.

District recommends that where rip-rap at culvert ends is not provided that sodding be placed.

Standards

M & T requested that the appropriate standards show depth of H. L. and note completed "Depth of Granular 'C' as recommended by the Engineer".

Mr. Batten recommended that a note be added possibly to the appropriate sheet in the urban area "that 1" sand asphalt is between surface course and $1\frac{1}{2}$ H. L. binder course".

M & T recommended that standard DD-411-D be included in the contract.

Breakdown of Main Items

M & T recommended that the 0.5% for rock cut be provided for in calculations in the larger till cut areas. District recommended that the 29,410 c. y. of material available outside the 1:1 slope be eliminated or the note changed to read "may be used"

giving the contractor the option to use the material or as there is a surplus of material, it could be wasted in its entirety.

M & T recommended the normal practise of using 75% of stripping be reduced to 65% available.

Mr. Pigeau brought to attention that 520 ton of granular 'C' for detour is shown under item 6 when in fact it is also included in Granular 'C' backfill to culverts and detour Item 7.

D-4

District requested that Item 35, pipe salvage, be removed from the contract.

District advised that because the contract has been brought forward the clearing cannot be completed by their forces, therefore, a clearing item will have to be included for this contract.

After discussion of this item, it was agreed that District will supply to Systems Design the amount of clearing to be included in the contract.

Special Provisions

It was recommended by Audit that S. P. be removed on D-4 for items 8, 39, 40 and 41.


Mr. Pigeau requested Systems Design review Item 51 for the inclusion of a special provision re doweling in the rock for concrete steps.

District requested Systems Design to include a copy of Special 7028 in the documents.

It was pointed out by District that S. P. 7020 is not required.

Audit requested that special 7042 be included.

District requested that the item Clean up of Boulder Strewn Areas be a lump sum item and special 8103 be included.


D. Swain

DS/ss

SPECIAL PROVISIONS

SQUIRE CREEK BRIDGE

4.7 MI. NORTH OF HWY. #33

HIGHWAY #14

DISTRICT #8

W.P. 187-64-02

1. LUMP SUM CONCRETE ITEMS

Should the estimated quantities of concrete as shown in the tendering information for any specific lump sum concrete item, differ by more than 5 percent from the theoretical quantities as determined from the design dimensions of the structure component and where such discrepancy in quantities does not result from a change in design made in accordance with subsection 103-2 of MTC Form 100, then either party to the contract upon the written request of the other, shall as soon as reasonably possible, negotiate upward or downward, the compensation for that portion of the concrete which is in excess of or less than the estimated quantity plus or minus the 5 percent increase or decrease.

Where a change in quantity results from a change in design made in accordance with subsection 103-2 of MTC Form 100, then either party to the contract upon the written request of the other, shall as soon as reasonably possible, negotiate a new lump sum price for the tender item in question.

2. FALSEWORK -

The Contractor shall prepare and submit drawings of all falsework to the Department for approval.

All falsework drawings shall bear the seal or signature of a Professional Engineer who is a member of or is licensed by, The Association of Professional Engineers of Ontario, who shall be responsible for the entire falsework design and drawings of a structure. The falsework shall be constructed in accordance with the approved drawings and at least one approved copy of all falsework drawings shall be kept at the site at all times while the falsework is being constructed or used.

The grades of materials and unit stresses used for falsework shall be in accordance with the applicable Canadian Standards Association standards. Patented accessories, fabricated shoring or scaffolding units may be used provided the manufacturer's recommendations as to load-carrying capacities and bracing are followed. These recommended capacities must be supported by test reports from qualified and recognized testing laboratories.

The falsework drawings shall show the values of longitudinal and vertical live and impact loads used in the design. Sequence, method and rate of concrete placement, type and weight of moving equipment which will be supported on the falsework shall also be shown. Foundation bearing pressures, maximum column loads and camber diagrams shall be given where applicable. They shall also show the type, size, grade and spacing of all members, details of load bearing connections and splices and locations of supports for moving equipment.

Drawings not meeting these requirements will be returned marked "Not Approved".

3. USE OF INTERNAL TIES

Section 9.04.13 of M.T.C. Form 9 is amended to permit the use of plastic cone type snap ties, wherever internal ties are permitted and to permit the use of internal ties (bolts and inner rods or plastic cone type snap ties) in the bottom three inches of concrete barrier walls. Where cone type snap ties are used through exposed surfaces, cones shall have a minimum diameter of one inch at the large end.

4. NAVIGABLE WATERS PROTECTION

At all times the Contractor must conform to the regulation embodied in the Navigable Waters Protection Act, and shall maintain any construction clearances which may be required.

5. REMOVAL OF STRUCTURE

ITEM NO. 1

Under this item and for the lump sum bid the contractor shall remove the existing structure in its entirety.

6. EARTH EXCAVATION FOR STRUCTURE AND RETAINING WALL FOUNDATIONS
ITEM NO. 3

ROCK EXCAVATION FOR STRUCTURE AND RETAINING WALL FOUNDATIONS
ITEM NO. 4

Sub-section 0.02.13 of M.T.C. Form 0 shall be amended by deleting the first paragraph and substituting the following:

Unless otherwise authorized by the Engineer, measurement for excavation for structure and retaining wall foundations will include only those quantities as measured within the theoretical lines of the foundations below the tops of the footings as shown on the plans. Subject to the contract requirements for excavation necessary to place granular backfill to structure and retaining wall ~~foundations~~, the contract price for the applicable structure and retaining walls items will be full compensation for all other excavation which may be required for the structure and retaining wall ~~foundations~~. However, when such excavation overlaps excavation required for other work, then payment will be made for such other work, as though no excavation were required for the structure and retaining wall foundations.

7. MECHANICAL FINISHING OF BRIDGE DECKS

ITEM NO. 8

Bridge deck surfaces shall be formed by means of a mechanical self-propelled bridge deck finishing machine, capable of producing the required surface on concrete deposited at a minimum rate of 45 cubic yards per hour or alternatively which will produce the required surface while the screed is maintaining a rate of forward progress of 30 linear feet per hour. Longitudinal construction joints will be permitted only where shown on the plans.

8. PLACE CONCRETE IN PARAPET WALLS

ITEM NO. 10

The supply and installation of guiderail and channel anchors shall be included in the contract lump sum for this item.

9. ERECT AND CLEAN STEEL PARAPET RAIL INCLUDING STEEL POSTS

ITEM NO. 11

The contract lump sum for this item shall be compensation in full for the supply of all material, equipment, and labour required to complete the steel parapet rail including anchors and posts all as shown on the drawings and as described herein.

All welding shall conform to C.S.A. Specification W59 and shall be done by a welder qualified under C.S.A. Specification W47.

Structural steel tubing shall be fabricated by the continuous weld process or the electric resistance weld process.

Posts shall be smooth and true to dimensions and shot blast cleaned prior to galvanizing. The zinc coating shall present a smooth finish free of imperfections.

Erection, cleaning, and repair of damaged surfaces shall be carried out in accordance with Section 9.03 of MTC Form 9.

10. PLACE CONCRETE IN APPROACH SLABS

ITEM NO. 12

When the following is called for in the contract drawings it shall be deemed to be included in the contract lump sum for this item:

- (a) curbs and medians on the approach slabs
- (b) elastomer seating pads for the approach slabs. The seating pads shall conform to Section 25, Elastomer Bearings. Tables A and B of the A.A.S.H.O. Standard Specification for Highway Bridges, and shall be supplied and installed by the contractor.
- (c) supplying and applying asphalt paint
- (d) the unreinforced slabs adjacent to the approach slabs

11. CONCRETE QUANTITIES

Concrete quantities are listed below for the appropriate concrete tender items:

- | | |
|--------------------------------------|---------|
| a) Place Concrete in Structure | 99 C.Y. |
| b) Place Concrete in Retaining Walls | 75 C.Y. |
| c) Place Concrete in Parapet Walls | 10 C.Y. |
| d) Place Concrete in Approach Slabs | 40 C.Y. |

12. SUPPLY AND PLACE GRANULAR "C" (SAND CUSHION) AS GRANULAR
BACKFILL TO BRIDGE ITEM NO. 14

Section 9.02 of M.T.C. Form 9 shall apply to this work, with the following provisions:

The extent of the lump sum item for supplying, and placing granular backfill to bridges shall be as shown on the drawings. Where, however, the Contractor has excavated beyond these limits, or has failed to place earth fill up to the lower limits, he shall supply, place and compact, to the satisfaction of the Engineer, either earth or granular material, whichever the Engineer shall direct, as required to fill the resulting excess volume. All costs of supplying placing and compacting such additional material shall be deemed to be included in the lump sum price bid.

The Contractor shall advise the Engineer, not less than 3 weeks before starting any granular backfill to bridges, of the equipment, and all details of the operation which he proposes to use, and the Engineer may make such changes as he may deem necessary, both at this time and during the progress of the work.

The placing and compaction operations shall proceed in strict accordance with the method approved by the Engineer. The material shall be compacted throughout to a minimum dry density of 100% of the maximum dry density as determined by the current Ministry procedures, or to such greater density as may be required by the Engineer.

The Contractor shall supply and use such hand-operated mechanical tamping equipment, or towed or self-propelled roller, or combination thereof as will compact the material in accordance with Ministry requirements. The type and quantity of compacting equipment, and all details of the placing and compaction operation, including the rate, method and sequence, and the lift thickness, shall be subject to the approval of the Engineer.

Water shall be applied to the material to assist compaction, as directed by the Engineer, and shall be measured in units of one thousand gallons. Payment for Water for Compaction shall be made at the contract unit price per thousand gallons.

13. NOTE TO REGIONAL SYSTEMS DESIGN OFFICE:

The following items are to be checked and/or completed by the Regional Systems Design Office:

- a) Detours and maintenance of traffic
- b) Stream Bed ~~Correc~~tion
- c) Earth excavation required for placing Granular Backfill
- d) Water for Compaction of Granular Backfill. (The approximate quantity of Granular Backfill is 350 C.Y.)
- e) Supply and Place Perforated C.S. Pipe
- f) Supply and Place Random Rip-Rap
- g) Add the special provision item "Supply of Portland Cement" and list the following applicable items:
 - (i) Place Concrete in Structure and Retaining Wall Foundations
 - (ii) Place Concrete in Structure
 - (iii) Place Concrete in Retaining Walls
 - (iv) Place Concrete in Parapet Walls
 - (v) Place Concrete in Approach Slabs
- h) Completion dates for Structure contract are to be discussed and ascertained at the Regional Pre-Contract Review Meeting
- i) The special provision "Amendment to Section 9.04 of H.P.C. Form 2" will be included by Systems Design Review Group until such time the Region is requested to do so.
- j) Please note that this project has been prepared in accordance with SDB-73-12.
- k) Add S.P. 8925 (SDB-73-18)

Date May 15, 1974

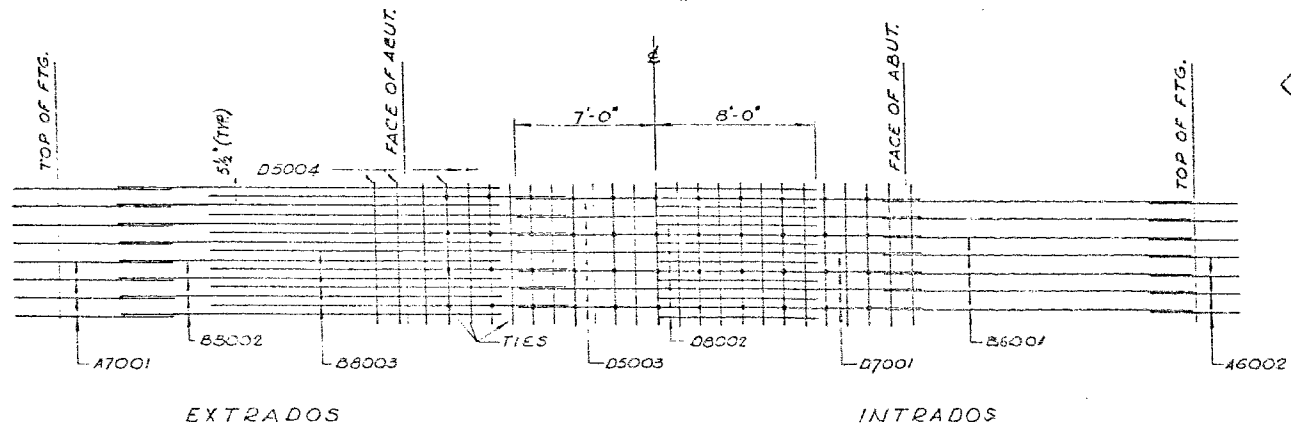
APPROVED SCHEDULE FOR 1974 - 75

Page 4 of 9

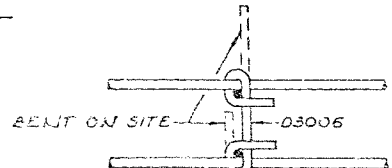
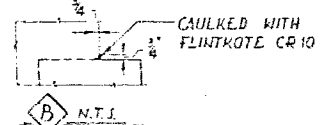
PROGRAM OF CONSTRUCTION

DISTRICT No. 8, KINGSTON

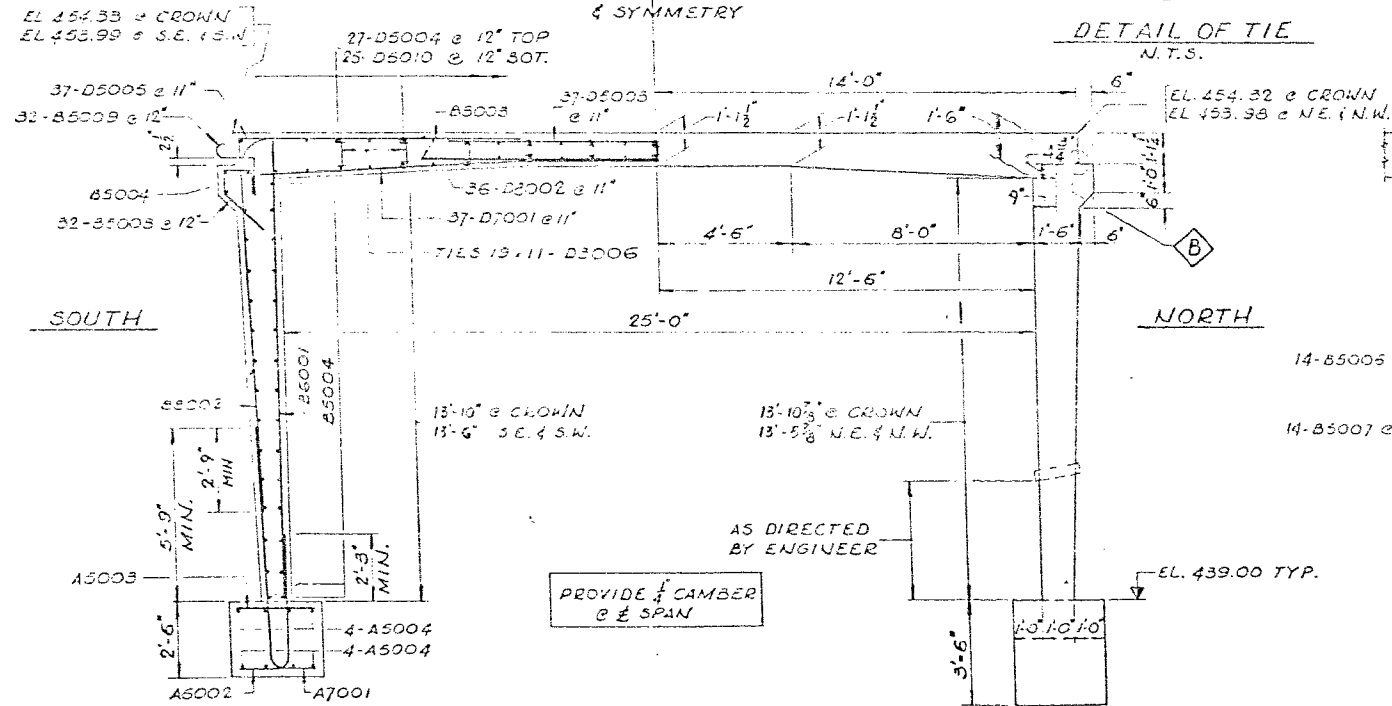
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				Advert.	Award.		
187-64-01 187-64-02	14	G.D. GB. B.C. Pav. & Str.	Stirling North Limits N'ly to Springbrook 7.2 Mi. Incl. Squire Creek Bridge.	July 3/74	Aug. 7/74	19	74-98



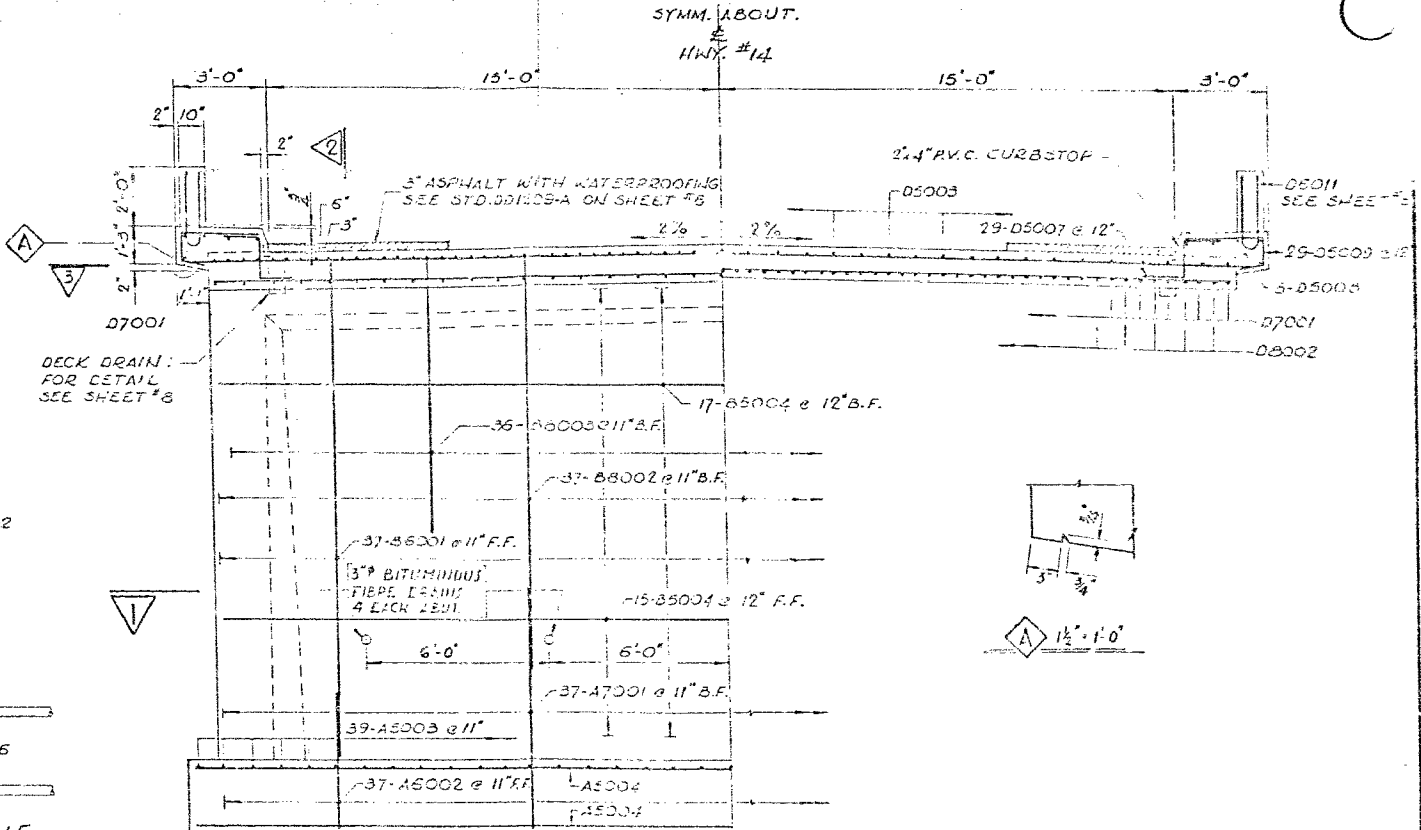
PART PLAN OF REINFORCEMENT



DETAIL OF TIE

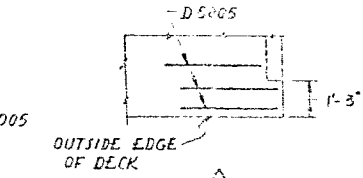
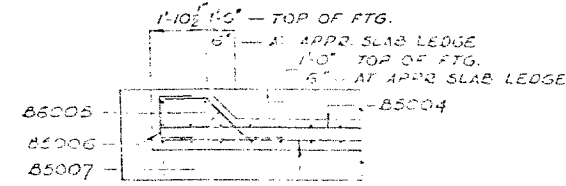


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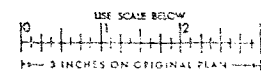


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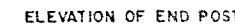
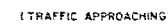
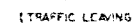
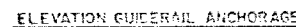
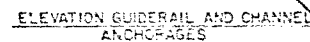
- NOTES:
- F.F. DENOTES FRONT FACE.
 - B.F. DENOTES BACK FACE.
 - SCALE 3/4" = 1'-0" UNLESS OTHERWISE NOTED.



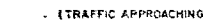
FOR REDUCED PLAN



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO			
SQUIRE CREEK BRIDGE 47 MILES NORTH OF HWY. #33			
KING'S HIGHWAY No. 14		DIST. No. 5	
CO. HASTINGS		TWP. SANDON	
LOT 12		CCN. 37	
RIGID FRAME			
APPROVED [Signature]		CONTRACT No.	
DESIGN [Signature]		WF. No. 187-64-02	
CHECK [Signature]		DATE 11-59	
DATE 11-59		SHEET 1	



NOTES:
FOR SPACING OF PARAPET RAIL POSTS SEE PARAPET RAIL
DRAWING BO 40-3.
REINFORCING STEEL NOT CONTIGUOUS THROUGH JOINTS.
COVER TO REINFORCING STEEL $1\frac{1}{2}$ OR AS NOTED
EF DENOTES EACH FACE.

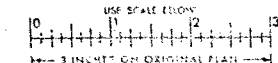


DETAIL OF TYPICAL
STIRRUP AND DOWEL

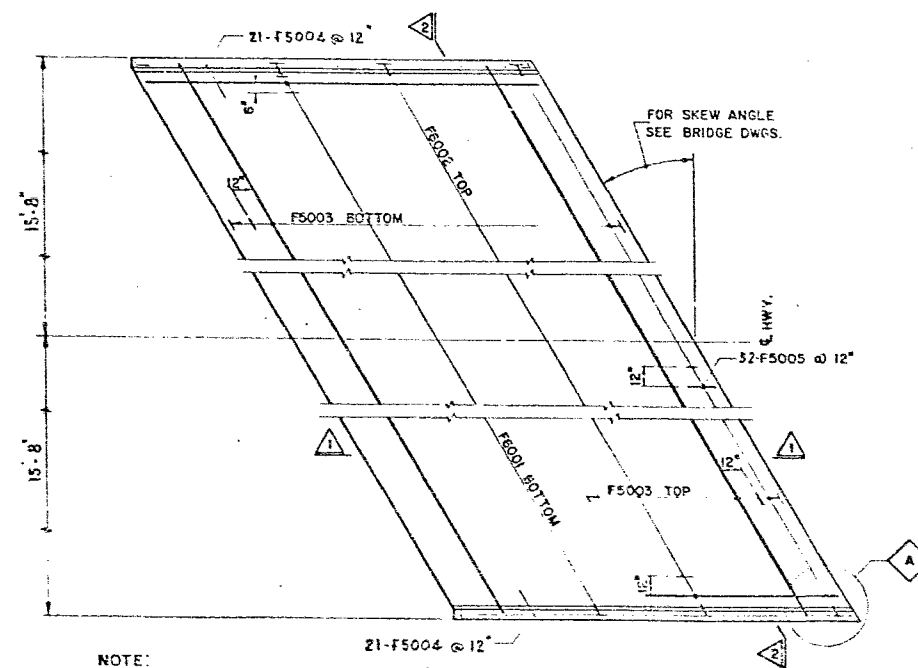
E4005
TYPE T1
C = 7" = E
B = 1-1" = 0
A = 4 1/2" = G

21003	G5040 D601
TYPE 17	TYPE 10
C = 7"	O = 7"
B = 1'-3" x 0	A = 2'-4" x C

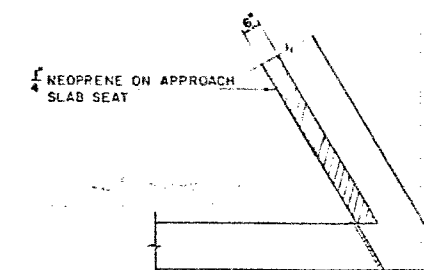
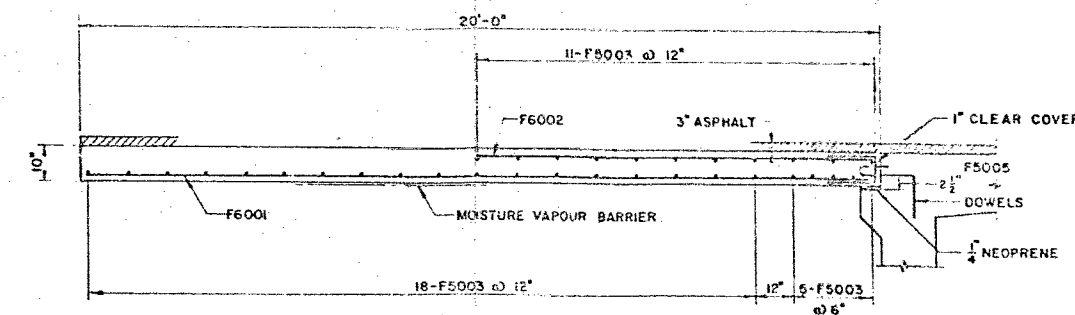
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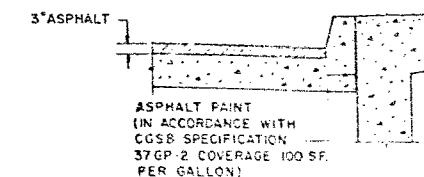
REVISIONS				
DATE	BY	PROJECT NO.		
STANDARD DRAWING		BD 39-6		
MAR. 1972				
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO				
SQUIRE CREEK BRIDGE				
4.7 MILES NORTH OF HWY. #35				
KING'S HIGHWAY NO. 15		DIST. NO. 8		
CO. HASTING				
TWP. RAMBOUR		LOT 12		CON. VI
PIER AND WALL DETAILS				
APPROV. <i>[Signature]</i>		CONTRACT NO.		
DESIGN	11-59	W.P. NO.	187-54-2	
DRAWN BY	11-59	DATE	11-59	
CHECKED BY	11-59	SHEET NO.	SHEET 5	



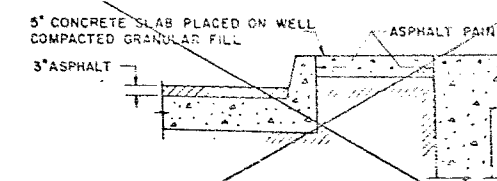
PLAN



(BELOW APPROACH SLAB)



TYPICAL CURB DETAIL

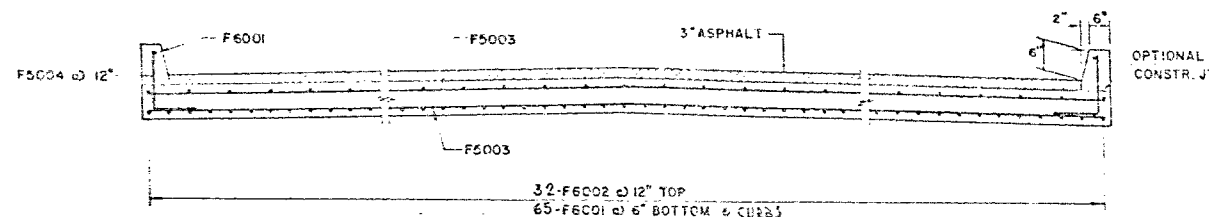


TYPICAL SIDEWALK DETAIL

NOTES:

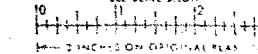
CLASS OF CONCRETE 3000 P.S.I.
CLEAR COVER TO REINFORCING 2" EXCEPT AS NOTED.
LAYOUT OF REINFORCING STEEL WILL
BE SIMILAR FOR RIGHT HAND AND
ZERO DEGREE SKEWS.

DRAWING NOT TO BE SCALED.



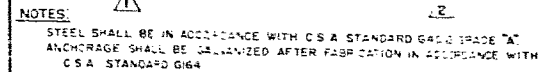
FOR REDUCED PLAN

USE SCALE BELOW

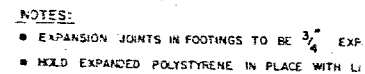


REVISIONS		DATE		BY		REVISION	
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MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO							
SQUIRE CREEK BRIDGE							
4.7 MILES NORTH OF HWY. 33							
KING'S HIGHWAY No. 14		DUL. No. 2					
CO. HASTINGS							
TWP. PAVION		LOT 12		CON. VI			
20 FOOT APPROACH SLAB							
APPROVED		CONTRACT No.		W.P. No.		187-64-02	
DESIGN		CHECKED		DATE		SITE No. 11-99 SHEET 7	

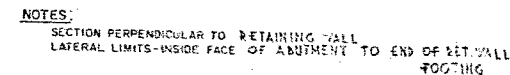
APR 197



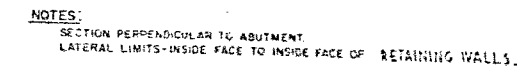
FEB 197



MODIFIED



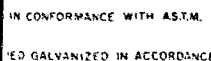
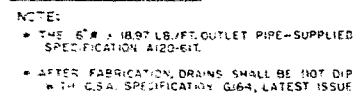
REV. 3-20-54



APRIL-1970



REV MAY 1970



USE SCALE BELOW

0 1 2

2 INCHES ON ORIGINAL PLAN

[illegible]

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

SQUIRE CREEK BRIDGE
4.7 MILES NORTH OF HWY. #33

KING'S HIGHWAY No. 14
CO. HASTINGS
TWP. RAYDON

STANDARD DETAILS

APPROVED 	CONTRACT NO.
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DESIGN	1. PROJECT	CHG	W.P. No	107-64-0
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DRAWING	STD/G-1	CHG	M.I.O.	
DATE	SEPT/75	LOADING	UNLOADING	SITE NO. 11-99 SHEET