



ONTARIO

DEPARTMENT OF HIGHWAYS

Bridge Division.

Memo to Mr. A. Stermac, Date March 20, 1962.
Principal Foundation Eng.,
Materials & Research Section, Subject Twp. of Nepean
DOWNSVIEW, Ontario. Bridge over the Jock R.
From G. C. E. Burkhardt Lot 12, Con. 11 R. F.
County of Carleton
Our file #BA 1373

Attached please find a copy of the Foundation Report, by John D. Paterson Consulting Engineers and Geologists, and a copy of preliminary Plans for your information.

We would like to approve the Preliminary Design as soon as possible and would appreciate it very much if you could give us your comments at your earliest convenience.

GOEB/ea

G. C. E. Burkhardt
G. C. E. Burkhardt
for A. L. Kleinsteinber,
Municipal Bridge Liaison Engineer.

In agreement,

March 21, 1962.

260

BA 1373

61-F-259

REPORT OF SOIL INVESTIGATION

PROPOSED NEW BRIDGE

OVER

JOCK RIVER

LOT 12, CONCESSION 2 (R.C.)

FOR

TOWNSHIP OF NEPEAN

RAYMOND C. GAUTHIER

CONSULTING DESIGN ENGINEER

REPORT NO. S 228-61

OTTAWA, NOVEMBER 15, 1961.

DEFECTS IN REPRODUCTION OF
CONDITION OF ORIGINAL DOCUMENT

Introduction:

At the request of Mr. R. C. Gauthier, Consulting Engineer, and on behalf of Nepesin Township, a soil investigation was conducted at the site of a proposed new bridge over the Jock River on Lot 12, Concession 2 (R.F.) Township of Nepesin.

The bridge is to replace one that failed structurally when overloaded.

The present abutments are located on rather steep escarpments which continue both up and down the river. To avoid a sharp turn at the south approach to the bridge the centre line of the new bridge is to be realigned slightly to the south. A complete topographical map has been completed of the bridge site by J. F. Clarke, O. L. S.

Fieldwork Procedure:

Three test holes were put down at the locations shown on the Test Boring Plan. At Hole No. 1 a cone probe was driven to refusal, casing driven, and the soils sampled to 20.3 feet. Because of the boulders encountered at Hole locations 2 and 3, cone probes could not be driven and the casing had to be drilled. Soil samples, however, were taken at regular intervals and core samples were recovered from bedrock.

The firm of F. E. Johnston Drilling Company was employed for all drilling operations and their work was supervised at all times by an engineer member of our staff.

The equipment consisted of a standard drilling rig fully equipped for soil testing and mounted on a trailer.

Sampling and Testing:

Samples of the granular soils encountered at Holes 1, 2 and 3 were taken by means of the split spoon sampler. Samples of boulders and bedrock were recovered by diamond drilling. The granular samples recovered were retained in plastic bags. At the time the split spoon samples were taken the standard penetration test was conducted. All core samples of boulders and bedrock were examined, classified and retained in core boxes.

Observations:

(a) Soil Types.

In Hole No. 1 the following soil profile occurs:

- 0 - 3' Weathered, brown, glacial till (gravel-like). At higher water levels this surface is the river bed.
- 3' - 11' Medium dense, grey, sandy, glacial till.
- 11' - 21' Very dense, sandy to stony, grey, glacial till.
- 21' Probably bedrock.

In Hole No. 2

In Hole No. 2 the following soil profile occurs:

- 0 - 0.5' Sandy topsoil.
- 0.5'- 13' Dense, weathered, brown, stony glacial till with boulders.
- 13' - 19' Very dense to medium dense, stony, grey glacial till.
- 19' - 35' Very dense, sandy to stony, grey glacial till with boulders.
- 35' - 40' Bedrock - good quality limestone with a minor shale band.

In Hole No. 3 the following soil profile occurs:

- 0 - 2' Gravel fill (temporary road built across the river).
- 2' - 13' Dense, weathered, brown, stony, glacial till with boulders.
- 13' - 36.5' Dense to very dense, sandy to stony, grey glacial till with boulders.
- 36.5'- 41.5' Bedrock - good quality limestone.

Details of borings and test holes are shown on the Soil Profile and Laboratory Test Sheets which form part of this report.

The material encountered at this site is glacial till overlying bedrock. The upper 13 feet is weathered brown and has some of the finer particles removed. Below this upper layer minor oxidation has taken place and the till is grey in colour. Boulders appear to be dispersed in a random manner.

(b) Groundwater.

Because of the granular nature of the soil the holes collapsed before significant water levels could be obtained. However, the high water level is reported to be at approximately Elevation 88.

Conclusions & Recommendations:

The soil conditions underlying this bridge site have been found to be quite consistent. Both banks of the river and the stream bed consist of a dense glacial till overlying bedrock. The glacial till is considered to be quite suitable to take the load of the bridge and spread footings are recommended.

The safe loading of the till has been calculated from the results of the standard penetration test and the maximum recommended soil loading is 5,500 pounds per square foot. This loading will apply to the soil from Elevation 75 and below. Settlement at the above recommended loading is expected to be negligible providing

the following

the following precautions are observed:

1. The till at the footing level should not be allowed to become saturated and all loosened or saturated till should be removed prior to the placing of concrete.
2. The soil at the footing level should be protected from frost if winter construction is contemplated.

It is finally recommended that a field inspection be made of the till at the footing level when the excavations have been opened.



J. D. Paterson, P. Eng.

JDP/MAC.

B.M. = 100.0' →
Bottom step S.E.
Corner Home of
C. Rogers.

10.3
93.4

22

14

Top edge of
Escarpment

Old Abutment

47

NQ1
80.0

25

JOCK

RIVER →

Old Abutment

Top edge of
Escarpment

13

NQ2
93.1

9

Center of Existing
Bridge

Proposed Center
of New Bridge

TEST BORING PLAN
PROPOSED BRIDGE
JOCK RIVER
LOCATION

LOT 12 CON 2 (R.F.)
TWP OF NEPEAN
COUNTY OF CARLETON

SCALE 1"=20'

NOV. 1961

Jockvale, Nepean Township,
Carleton County, Ontario.

80.0.
Cone Probe and Test Boring.

Sheet No.
1 of 3

F.E. Johnston Drilling Company, Ltd. Nov. 7, 1961.

1

Cone	Ground Surface						
15	Weathered, brown, glacial till (gravel-like).				0	80.0	
14							Stream El.
26							79 - Nov. 10/61.
8	3						
17							
31	Medium dense, grey, sandy, glacial till.	SS	1	N = 27	5	75.0	
41							
46							
25							
26							
28							
51							
57							
57	Very dense, sandy to stony, grey, glacial till.	SS	3	N = 210 for 0.5'	15	65.0	
59							
75							
67							
35							
32							
89							
150	21.0	SS	4	N = 55	20	60.0	
	Probably bedrock.						

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CONDITION OF ORIGINAL DOCUMENT

Jockvale, Nepean Township,
Carleton County, Ontario.

Test Boring only.

2 of 3

F.R. Johnston Drilling Company, Ltd.

Nov. 7, 8 & 9/61

2

DEPTH Feet	SOIL DESCRIPTION	SPT Blows	Grain Size Analysis	Moisture Content %	Liquid Limit %	Plastic Limit %	Shrinkage Value %
0	Ground Surface						
0.5	Sandy Topsoil			93.1			
5	Dense, weathered, brown, stony, glacial till with boulders.						
		SS 5	N = 40				
10		SS 6	N = 30	83.1			
13							
15	Very dense to medium dense, stony, grey glacial till.	SS 7	N = 59				
		SS 8	N = 18				
19							
20	Very dense, sandy to stony, grey glacial till with boulders.			73.1			
		SS 9	N = 112				
25							
		SS 10	N = 72				
30				63.1			
		SS 11	N = 47				
35.0							
40.0	Bedrock - good quality limestone with a 5" shale band.						
		Core					

Hole plugged and
dry at 5 Feet.

Stream Level

DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

Jocelyn, Veneen Township,
Carleton County, Ontario

Test Boring only.

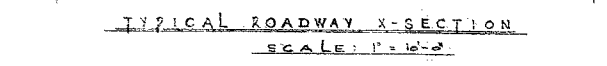
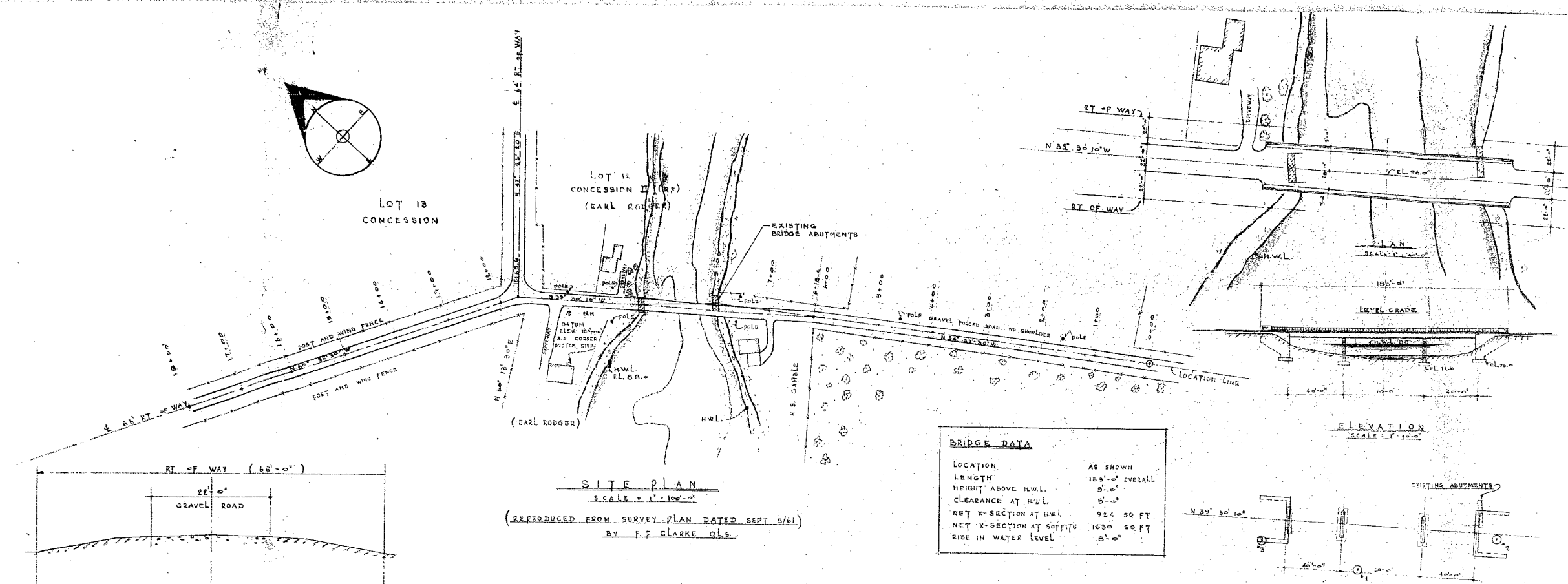
of 3

F.E. Johnston Drilling Company, Ltd. Nov. 9 & 10, 1961

1

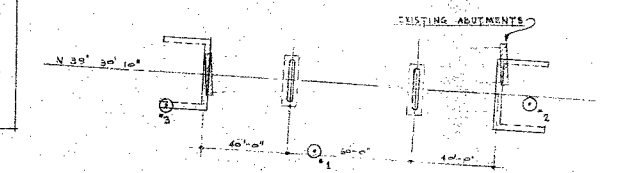
HOWS PER FOOT	SOIL DESCRIPTION	Samples in this Core	Moisture Content	DEPTH	Notes
	Ground Surface			0	
	Gravel Fill	2		5	
	Dense, weathered, brown, stony glacial till with boulders.			10	83.4
		SS 12 N = 57		13	
				15	
	Dense to very dense, sandy to stony, grey glacial till with boulders.	SS 13 N = 47		20	73.4
		SS 14 N = 45		25	
		SS 15 N = 59		30	63.4
				35	
				36.5	
	Bedrock - good quality limestone.	Core			

#61-F-259M
BRIDGE OVER
JOCK RIVER
LOT#12 CON#2
(R.F.)

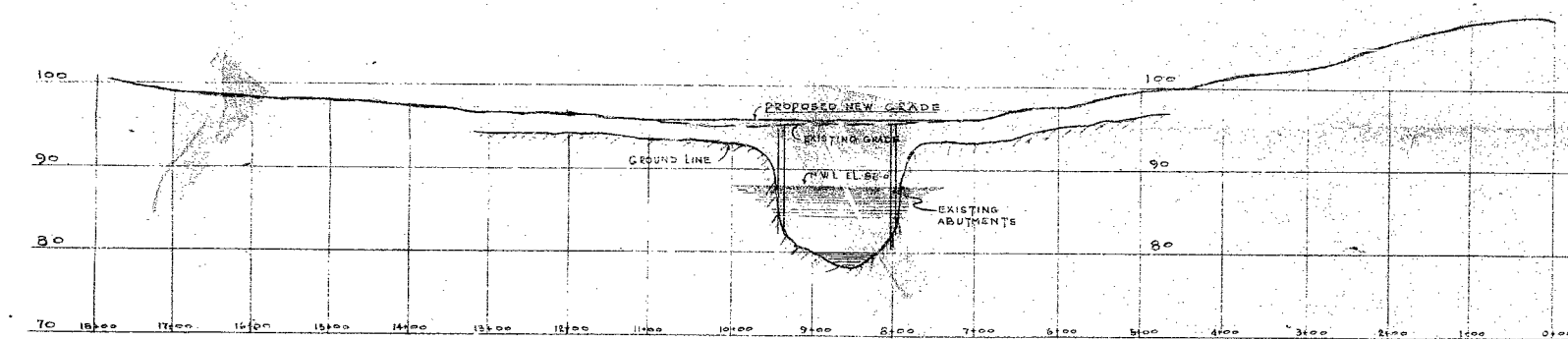


SITE PLAN
SCALE: 1" = 100'-0"
(REPRODUCED FROM SURVEY PLAN DATED SEPT. 5/61)
BY F.F. CLARKE Q.L.S.

BRIDGE DATA	
LOCATION	AS SHOWN
LENGTH	183'-0" OVERALL
HEIGHT ABOVE H.W.L.	5'-0"
CLEARANCE AT H.W.L.	5'-0"
NET X-SECTION AT H.W.L.	924 SQ. FT.
NET X-SECTION AT SOFFITS	1630 SQ. FT.
RISE IN WATER LEVEL	8'-0"

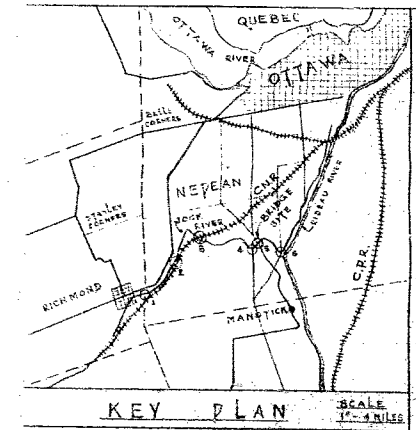


LOCATION PLAN
LAYOUT OF BORE HOLES
SCALE: 1" = 40'-0"



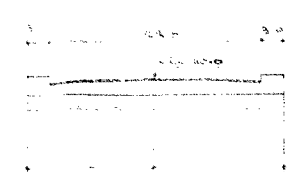
CENTER LINE PROFILE
SCALE: 1" = 100'-0" HORIZONTAL
1" = 10'-0" VERTICAL

BORE HOLE DATA		
1	2	3
H.W.L.	H.W.L.	H.W.L.
WEATHERED BROWN GLACIAL TILL GRAVEL LIKE	VERY DENSE TO MEDIUM DENSE BROWN STONY GLACIAL TILL	DENSE WEATHERED BROWN STONY GLACIAL TILL WITH BOULDERS
MEDIUM DENSE GREY SANDY GLACIAL TILL	VERY DENSE SANDY TO STONY GREY GLACIAL TILL	DENSE TO VERY DENSE SANDY TO STONY GREY GLACIAL TILL
VERY DENSE SANDY TO STONY GREY GLACIAL TILL	VERY DENSE SANDY TO STONY GREY GLACIAL TILL	VERY DENSE SANDY TO STONY GREY GLACIAL TILL
PROBABLY BEDROCK	BEDROCK	BEDROCK
	GOOD QUALITY LIMESTONE WITH A 5" SHALE BAND	

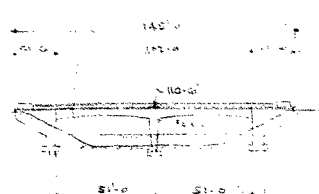


KEY PLAN
SCALE: 1" = 4 MILES

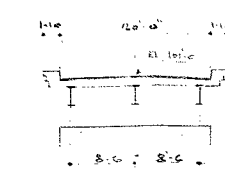
DATA		DATA		STRUCTURAL DATA		RAYMOND C. GAUTHIER P. ENG. CONSULTING ENGINEER	
1. SPECIAL FEATURES: WATERFALLS, DAMS, EXCEPTIONAL FLOODS, ICE, DRIFTWOOD, SLIDING BANKS, ETC. PROPOSED BRIDGE PROVIDES 5'-0" CLEARANCE AT INDICATED H.W.L. AND A MAXIMUM WATERWAY AREA OF 1630 SQ. FT. THE CLEARANCE AND WATERWAY AREA ARE PRESUMED TO BE MORE THAN ADEQUATE PROVISION AGAINST EXCEPTIONAL FLOODS, ICE, DRIFTWOOD, SLIDING BANKS, ETC.		5. NAVIGATION CLEARANCES REQUIRED, IF ANY: NOT APPLICABLE		1. NET SPAN LENGTH & TYPE OF BRIDGE: 183'-0" 4" x 4" CONTINUOUS STEEL GIRDER BRIDGE		OTTAWA ONTARIO	
2. (A) UPSTREAM & DOWNSTREAM BRIDGE: (GIVE LOCATION, LENGTH, HEIGHT ABOVE H.W.L., NET CROSS SECTIONAL AREA AT HIGH WATER, & ESTIMATED AGE) DATA ON EXISTING BRIDGES NOS. 1, 2, 3 & 5, 6, LOCATED ON KEY PLAN IS SHOWN ON DRAWING P. 2. DATA WAS OBTAINED FROM EXISTING BRIDGE PLANS AND FROM SITE SURVEY FOR BRIDGE NO. 5. (B) REASONS WHY THESE BRIDGES ARE CRACK NOT FAIR AND SIZE OF PROPOSED BRIDGE: THESE BRIDGES APPEAR TO BE FAIR INDICATION OF SIZE OF PROPOSED BRIDGE. HALF MOON BAY BRIDGE WOULD APPEAR INADEQUATE BUT NO FLOOD DAMAGE REPORTED SINCE IT WAS BUILT IN 1950.		6. RAILWAY CLEARANCE REQUIRED, IF ANY: NOT APPLICABLE		2. ROADWAY WIDTH ON BRIDGE: 28'-0"		OWNER: TWP OF NEPEAN MUNICIPAL DIST. NO.	
3. REASONS FOR CHANGES IN HEIGHT OR LENGTH FROM THAT OF OLD BRIDGES: THE PROPOSED BRIDGE WILL HAVE APPROXIMATELY THE SAME HEIGHT AND PROVIDE SUBSTANTIALLY THE SAME WATERWAY AREA AS THE EXISTING BRIDGE.		7. IF STRUCTURE IS OVER OR UNDER A RAILWAY HAS APPROVAL BEEN OBTAINED: (A) FROM RAILWAY CO.: NOT APPLICABLE (B) FROM BOARD OF TRANSPORT COMMISSIONERS: NOT APPLICABLE		3. NUMBER (WIDTH) OF SIDEWALKS: 2'-0"		CO: CARRINGTON TWP: NEPEAN LOT 12 CONCESSION II (RF)	
4. IS DITCH, STREAM, OR RIVER GRADIENT LIABLE TO BE INCREASED? NO		8. HAS APPROVAL BEEN OBTAINED UNDER NAVIGABLE WATER PROTECTION ACT: NO		4. SKEW ANGLE: 0°		SITE PLAN	
		9. IS A TEMPORARY DETOUR REQUIRED: YES TOWNSHIP OF NEPEAN TOWNSHIP OF NEPEAN WHO WILL BUILD IT: TOWNSHIP OF NEPEAN WHO WILL MAINTAIN IT: TOWNSHIP OF NEPEAN		5. TOTAL LENGTH & TYPE OF PILING: 300' 4" x 4" CONTINUOUS STEEL GIRDER		DECEMBER 1961 DATE	
		10. INFORMATION AND EVIDENCE OF EXTENSIVE FLOODING WAS OBTAINED FROM: ESTIMATED HIGH WATER ELEVATION IS INDICATED ON TOPOGRAPHY OF BRIDGE SITE AND WAS OBTAINED BY OBSERVATION OF RIVER BANKS.		6. APPROX. VOLUME OF CONCRETE: 300 cu yd		RAYMOND C. GAUTHIER DESIGN ENGINEER	
		11. ROAD DESIGN INFORMATION: ESTIMATED A.D.T. STOPPING RIGHT DISTANCE: DESIGN SPEED:		7. APPROX. WEIGHT OF STR. STEEL: 40,000 LB		LOADING BRIDGE DWG NO. P1	
				8. APPROX. WEIGHT OF REINFORCEMENT: 10,000 LB			
				9. APPROX. VOLUME OF APPROACH FILL: 10,000 cu yd			
				10. DRAINAGE AREA: 300 SQUARE MILES			
				FIELD INVESTIGATION MADE SEPTEMBER 1961 BY F.F. CLARKE Q.L.S. FOR R.C. GAUTHIER			



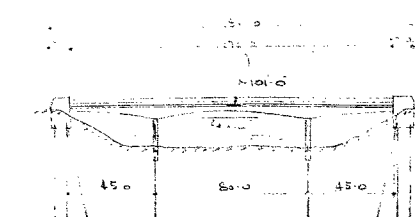
SECTION
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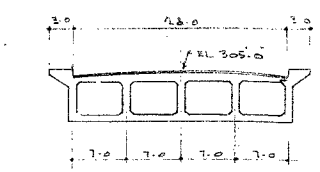
JOCK RIVER BRIDGE
H 20-S16
SCALE 1"=40'-0"



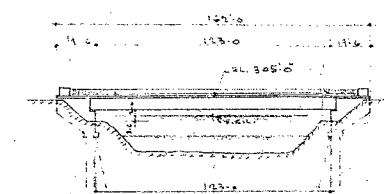
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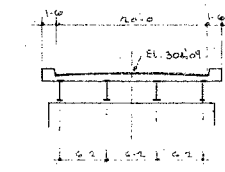
TWIN ELM BRIDGE
H 20
SCALE 1"=40'-0"



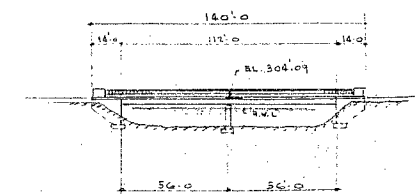
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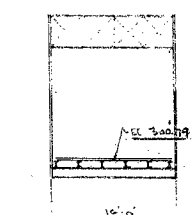
ROLLOS BRIDGE
H 20-S16
SCALE 1"=40'-0"



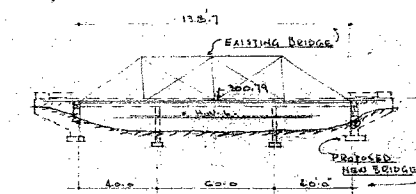
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SCALE 1"=10'-0"



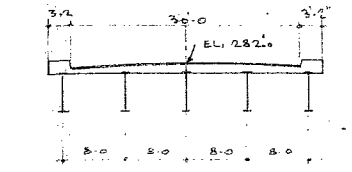
HALF MOON BAY BRIDGE
H 15
SCALE 1"=40'-0"



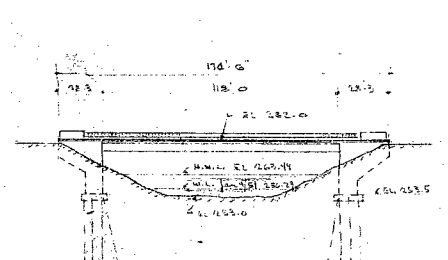
SECTION
SCALE 1"=10'-0"



EXISTING BRIDGE
PROPOSED NEW BRIDGE
H 20-S16
SCALE 1"=40'-0"



SECTION
SCALE 1"=10'-0"



JOCK RIVER BRIDGE - HIGHWAY 16
H 20-S16
SCALE 1"=40'-0"

LOCATION	Approx. 0.5 miles upstream	Approx. 0.5 miles upstream	Approx. 0.5 miles upstream	Approx. 0.5 miles upstream	DATUM	DATUM	Approx. 1.5 miles downstream
LENGTH	TOTAL 145'-0" (NET 122'-0")	TOTAL 184'-0" (NET 170'-0")	TOTAL 162'-0" (NET 128'-0")	TOTAL 160'-0" (NET 112'-0")	TOTAL 187'-3" (NET 138'-7")	TOTAL 183'-0" (NET 137'-0")	TOTAL 174'-6" (NET 118'-0")
ELEVATION H.W.L.	106'-0" (ASSUMED)	46'-0" (ASSUMED)	296'-0" (AROMATIC)	297.49 (GEODETIC)	293.49 (AROMATIC)	293.49 (AROMATIC)	263.99 (GEODETIC)
DECK HEIGHT ABOVE H.W.L.	4'-0" (110'-0")	4'-0" (101'-0")	9'-0" (308'-0")	6'-0" (304'-09")	7'-3" (300'-19")	8'-0" (301'-49")	18'-0" (282'-0")
CLEARANCE AT H.W.L.	1'-0"	2'-0"	3'-0"	3'-0"	5'-0"	5'-0"	12'-0"
NET X-SECTION AT H.W.L.	1300 SQ. FT.	2150 SQ. FT.	1660 SQ. FT.	832 SQ. FT.	1110 3/4' 6"	924 3/4' 6"	737 SQ. FT.
NET X-SECTION AT SOFFITS	1500 SQ. FT.	2150 SQ. FT.	2020 SQ. FT.	1046 SQ. FT.	1600 3/4' 6"	1630 3/4' 6"	2030 SQ. FT.
RISE IN W.L.	10'-0"	10'-0"	10'-0"	8'-0"	8'-0"	8'-0"	7'-7"
AGE	1920-1961	1949	1960-1961	1950	1902	1962 (PROPOSED)	1920-1961

1

2

3

4

5

BRIDGE SITE LOCATION
ON MAP OF THE AREA
DRAWING P1

NOTE
(1) - DATA ON BRIDGES No 1-2-3-4-6 OBTAINED FROM
EXISTING BRIDGE PLANS.
(4) - DATA ON BRIDGE No. 5 OBTAINED FROM SITE SURVEY.

RAYMOND C. GAUTHIER P. ENG
CONSULTING ENGINEER
OTTAWA ONTARIO

PROPOSED NEW BRIDGE

DATA ON EXISTING UPSTREAM AND
DOWNSTREAM BRIDGES

BRIDGES OVER THE JOCK RIVER

SEPT 25/61
DATE

RAYMOND C. GAUTHIER
DESIGN ENGINEER
DWA
No. P2

