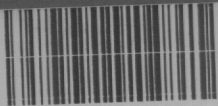


MACKENZIE HIGHWAY

preliminary engineering - phase 1B

CREEK BRIDGE

mile 419.2



D001625

Aeld, Crowther & Partners Limited



Reid, Crowther & Partners Limited

7410 Blackfoot Trail S.E., P.O. Box 5600, Postal Station "A", Calgary, Alberta, Canada T2H 1X9, Telex 038-22780, Telephone 253-3301, Area Code 403

PLEASE REFER TO FILE No. 9554-3

February 7, 1974

Department of Public Works
10th Floor, One Thornton Court
P.O. Box 488
Edmonton, Alberta
T5J 2K1

Attention Mr. F. E. Kimball
Project Manager NWT Roads
Western Region

Gentlemen:

Mackenzie Highway - Preliminary Engineering Phase 1B Report
Bridge Over Creek Mile 419.2

We are pleased to present herein our Phase 1B Report on the Bridge Over Creek at Mile 419.2 which has been prepared in accordance with Mr. Kimball's letter of October 3, 1973.

In reviewing the Report it will be noted that there has been no geotechnical investigation at this site since it was designated as a bridge after the geotech investigations had been completed. We understand that the Department is considering further geotechnical studies and if this is so we would recommend that at least one deep hole be drilled at the bridge site to provide a basis for foundation design. Also, there is no specific impact statement from the environmental consultant, however, it appears that the creek is of little consequence from a fisheries viewpoint and the impact of the proposed structure is not expected to be significant.

2 -

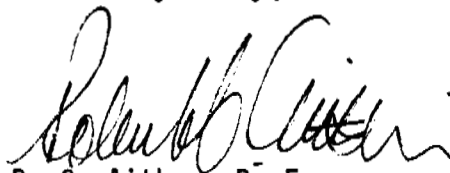
Department of Public Works
Edmonton, Alberta

February 7, 1974

It will be noted that we have not made an allowance for a temporary structure at this location, however, the precast units can be supported on timber cribs if a temporary crossing is required. This would of course require preordering of the precast concrete units.

We trust that the content of our Report provides a basis for approval in principle and authorization to proceed with final design.

Yours very truly,

A handwritten signature in dark ink, appearing to read 'R. C. Aitken', written in a cursive style.

R. C. Aitken, P. Eng.
Manager, Transportation Division

RCA/mm
Enclosure

MACKENZIE HIGHWAY
PRELIMINARY ENGINEERING PHASE 1B
BRIDGE OVER CREEK MILE 419.2

INDEX

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MACKENZIE HIGHWAY
PRELIMINARY ENGINEERING PHASE 1B
BRIDGE OVER CREEK MILE 419.2

INTRODUCTION:

The proposed structure has been designed on the basis of information obtained from the Mackenzie Highway - Final Design Submission, Environmental Data Mile 418.5 to 421.6 by F. F. Slaney & Company Limited and Dwg. 115-3-77 by Bolter, Parish & Trimble Ltd.

The creek drains a spruce forest and peat bog of approximately 7.7 square miles in area. The design discharge is estimated at 580 c.f.s. At the crossing, the stream channel is braided and ill-defined but immediately below the highway it is well-defined. The creek appears to flow between two lakes in either direction and the estimated duration of flow is from mid-May to freeze-up in late October. No fish were observed in the creek and the fishery potential is considered to be low.

One test hole on the highway centre line, approximately 300-feet north of the crossing shows 13-feet of clayey sand overlain by 2-feet of organic material. The soil was frozen and well bonded with no excess ice for the depth of the hole (15-feet). It is understood that the Department is considering

additional geotechnical investigations and it is suggested that at least one deep hole be drilled at this location to provide a more rational basis for foundation design.

PROPOSED STRUCTURE:

The proposed bridge is a single span structure consisting of precast concrete deck units spanning 50-feet between cast-in-place concrete abutments. The proposed layout is shown on Dwg. P401. The precast concrete units have been chosen to reduce the on-site labour requirements for this minor structure and also because they can be used as a temporary bridge if required at this site.

Abutments are conventional cast-in-place concrete supported by steel H-piles, however, it is possible that a precast concrete abutment could also be designed for this location. Piles have been designed as friction piles assuming steel H-piles and an allowable skin friction value of 400 p.s.f.

The hydrology consultant recommends that the creek channel be cleaned and shaped to a minimum bed width of 33-feet with 2:1 side slopes for a distance of 100-feet upstream and downstream from the crossing.

Design Criteria.

Specifications: C.S.A. S6 - Standard Specifications
for Highway Bridges
A.A.S.H.O. - Design of Highway Bridges
A.W.S. D1.1 - Structural Welding Code

Materials: Precast Concrete - $f'c$ - 5,000 p.s.i.
Substructure Concrete - $f'c$ - 3,000 p.s.i.
Reinforcing Steel - C.S.A. G30.12
60 Grade

Loading: Live Load - H.S. 25 + Impact
Future Wearing Surface - 30 p.s.f.

Piles 70 Ton Compression (Group I, C.S.A. S6)

SCHEDULING:

The following schedule assumes that highway construction will commence in the spring of 1975 and that all bridges on this section of the highway will be completed in the fall of 1976.

Allowing four months for precast deck unit delivery the tentative schedule will require bridge drawings and contract documents to be completed not later than June, 1975 and possibly sooner depending on the period of time required for approvals.

Schedule.

- Deliver concrete aggregates to the site via the River Between Two Mountains - Fall 1974.
- Start abutment construction - September, 1975.
- Erect precast deck units - November, 1975.

It would appear that completion of the four bridges between Mile 411.0 (River Between Two Mountains) and Mile 460 (Whitesand Creek) by late 1976 is impossible unless some of them are designated for winter construction and each phase of construction is carefully scheduled. We realize that these decisions will be made as part of an overall construction plan which will cover all aspects of the project; to assist the Department in this major undertaking we have prepared a

bar chart showing a possible construction schedule for these bridges. This schedule assumes that all bridges will be let as one contract.

**RIVER BETWEEN
TWO MOUNTAINS
Mi. 411.6**

ERECT TEMPORARY BRIDGE.
DRIVE PILES.
CONSTRUCT ABUTMENTS.
CONSTRUCT PIERS.
ERECT STEEL.
CONSTRUCT DECK.
ENVIRONMENTAL CONSTRAINT
ON RIVER WORK.

CREEK
Mi. 419.2

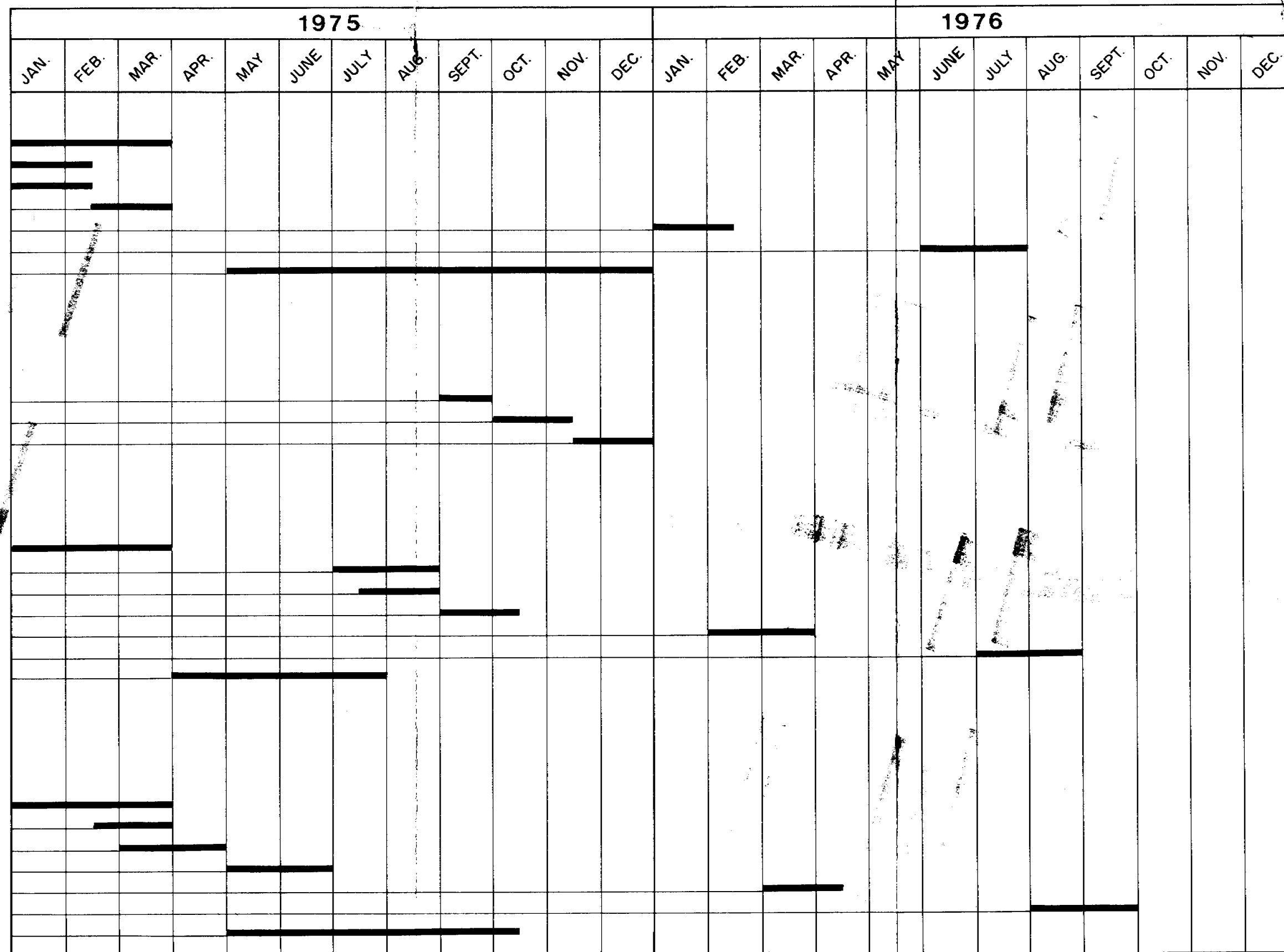
DRIVE PILES
CONSTRUCT ABUTMENTS
ERECT DECK

OCHRE RIVER
Mi. 454.6

ERECT TEMPORARY BRIDGE.
DRIVE PILES.
CONSTRUCT ABUTMENTS.
CONSTRUCT PIERS.
ERECT STEEL.
CONSTRUCT DECK.
ENVIRONMENTAL CONSTRAINT
ON RIVER WORK.

WHITESAND CREEK
Mi. 459.7

ERECT TEMPORARY BRIDGE.
DRIVE PILES.
CONSTRUCT PIERS.
CONSTRUCT ABUTMENTS.
ERECT STEEL.
CONSTRUCT DECK.
ENVIRONMENTAL CONSTRAINT
ON RIVER WORK.



NOTE: NAVIGATION SEASON ON MACKENZIE RIVER
JUNE 15th. TO OCTOBER 15th.

MACKENZIE HIGHWAY CONSTRUCTION SCHEDULE FOR BRIDGES BETWEEN Mi. 411 & Mi. 460

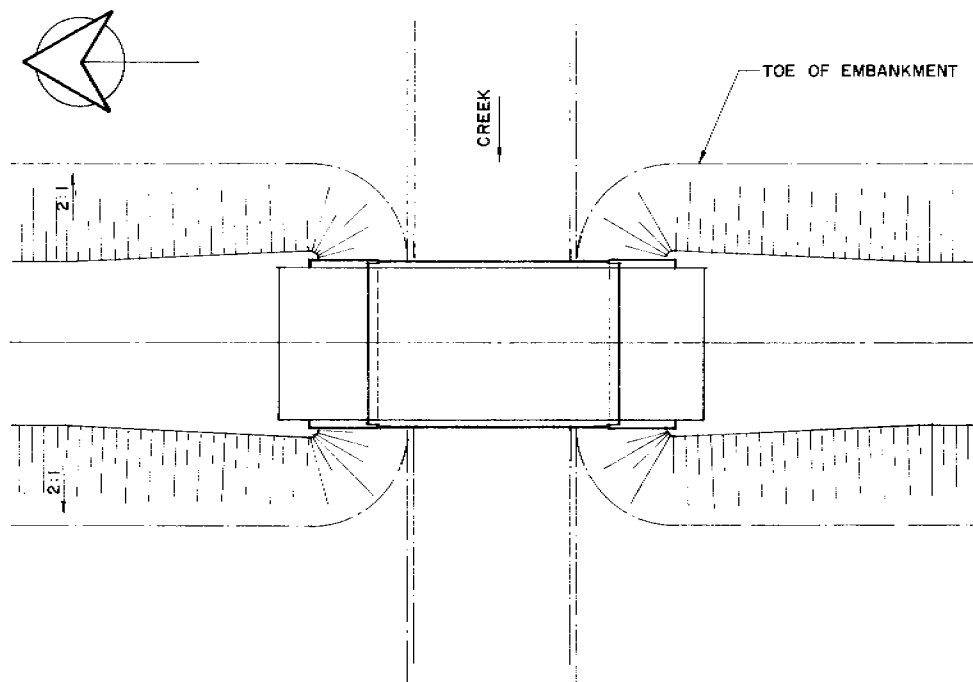
COST ESTIMATE:

Estimating costs at this stage of the project has proved to be even more difficult than it was one year ago, when the Interim Report was prepared, because of the unstable prices which are currently being experienced throughout the construction industry.

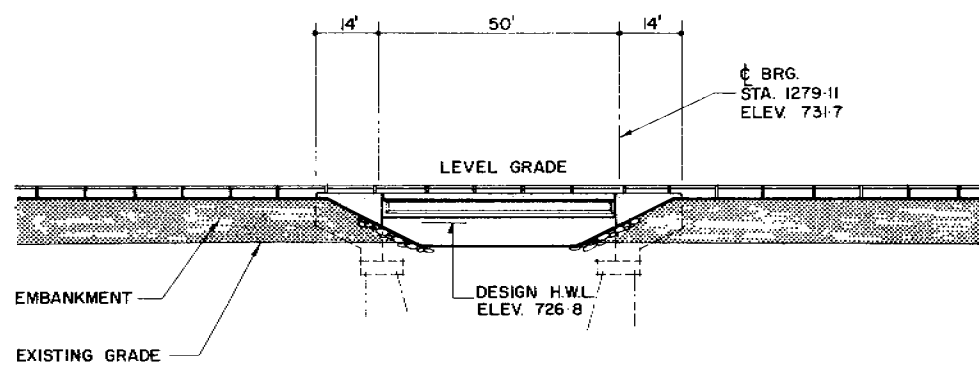
We have reviewed the unit prices which were developed for the Interim Report and, while some of the units now appear to have been on the low side, they were generally speaking quite realistic at that time. These unit prices have therefore been used as a basis for the present estimate but increased to reflect current prices (December, 1973). A detailed breakdown of the estimate is given on the following page.

BRIDGE OVER CREEK MILE 419.2
COST ESTIMATE - DECEMBER, 1973

<u>Item</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
Excavation & Backfill				
- Rock	--	--	\$ --	\$ --
- Gravel	200	cu.yd.	50.00	10,000
- Riprap	--	--	--	--
Piles	2,000	lin.ft.	30.00	60,000
Concrete				
- Foundations	60	cu.yd.	300.00	18,000
- Abutments	80	cu.yd.	300.00	24,000
- Approach Slab	50	cu.yd.	300.00	15,000
- Deck Units	1,700	sq.ft.	40.00	68,000
Reinforcing Steel	40,000	lb.	0.40	16,000
Handrail	160	lin.ft.	30.00	5,000
Expansion Joint	65	lin.ft.	100.00	6,500
Bearings	12	each	250.00	3,000
Sub-Total				\$225,500
15% Contingency				\$ 34,000
7% Engineering & Administration				\$ 17,500
TOTAL				<u>\$277,000</u>



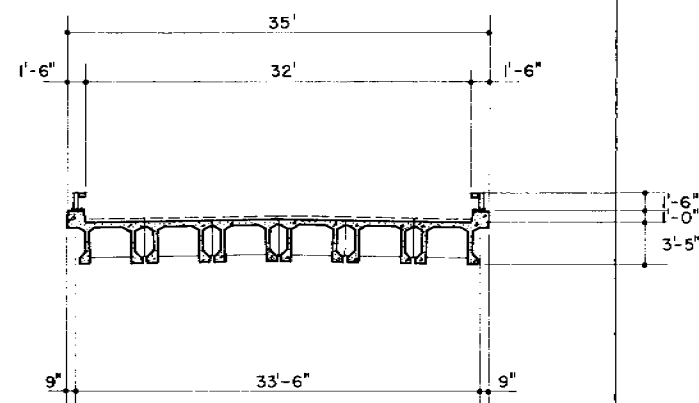
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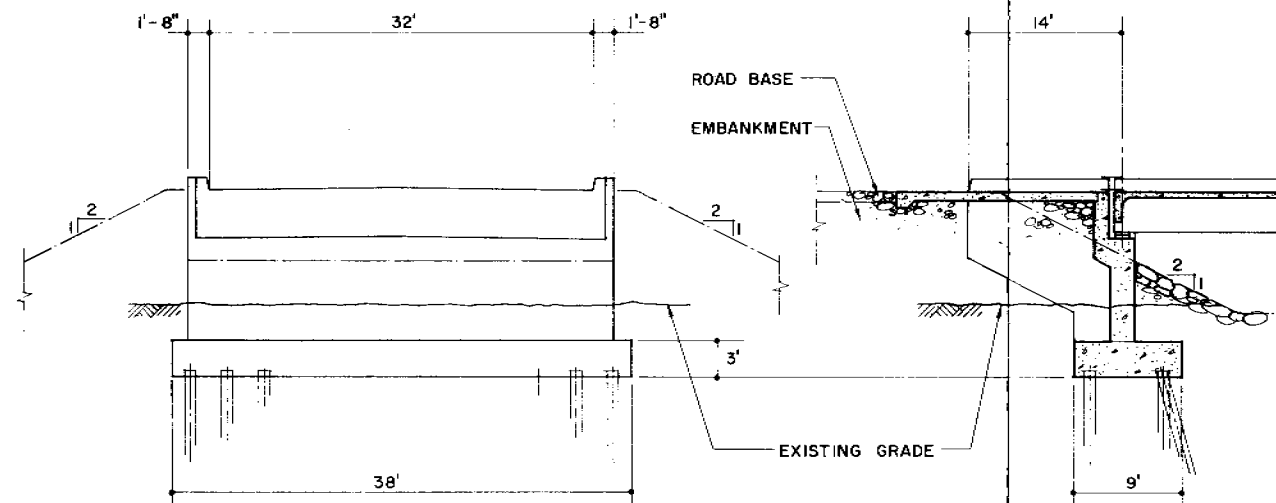
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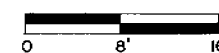
NOTE: ELEVATIONS TO D.P.W. DATUM



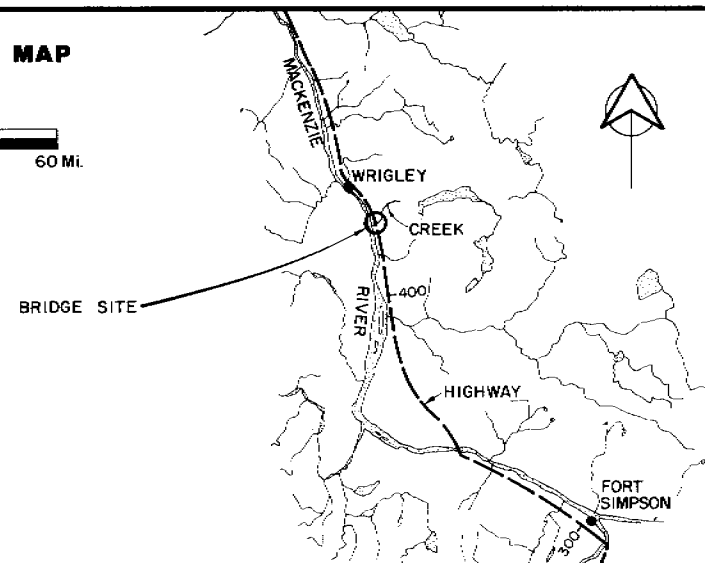
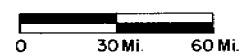
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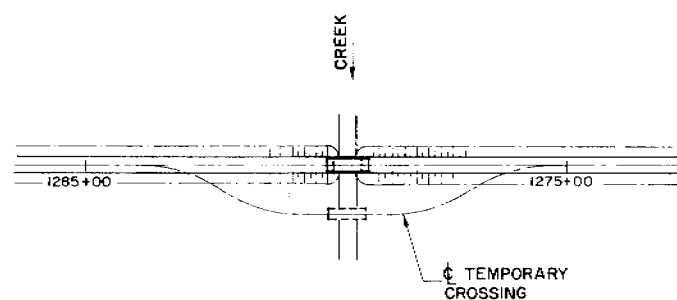
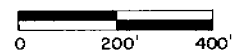
ABUTMENT



LOCATION MAP



SITE PLAN



Department of Public Works
Ministère des Travaux publics

WESTERN REGION
J.A. BROWN
REGIONAL DIRECTOR

Raid, Crowther & Partners Limited
CONSULTING ENGINEERS & PLANNERS
VANCOUVER, CALGARY, EDMONTON, REGINA, WINNIPEG, TORONTO

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C drawing no.	dessin no.
revisions	date

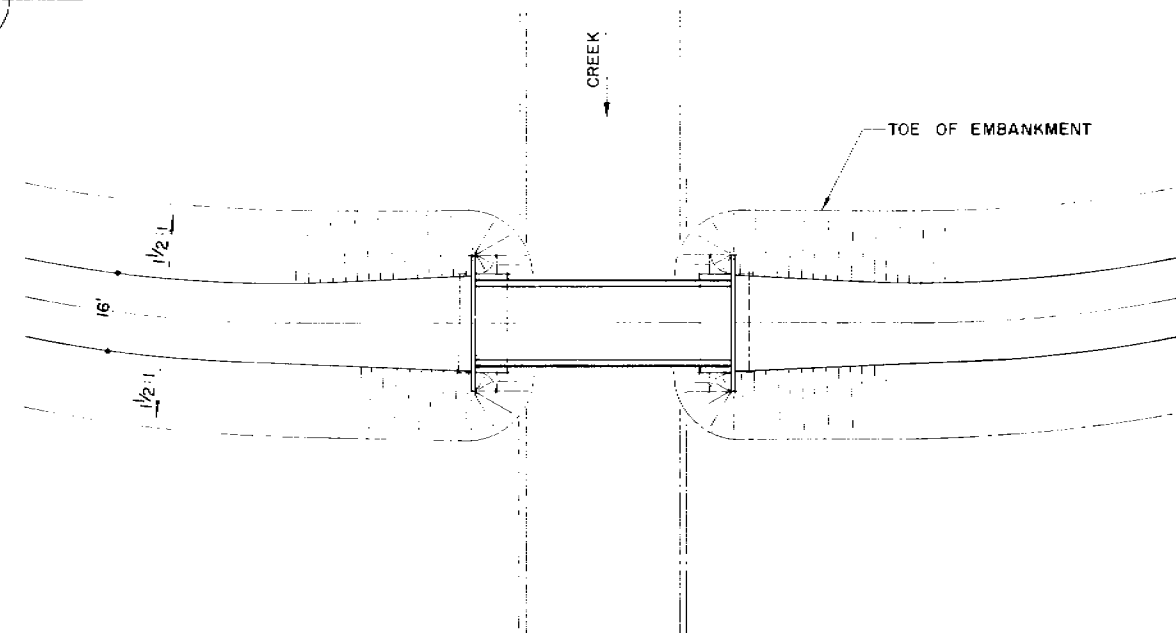
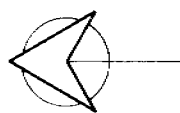
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MACKENZIE
HIGHWAY

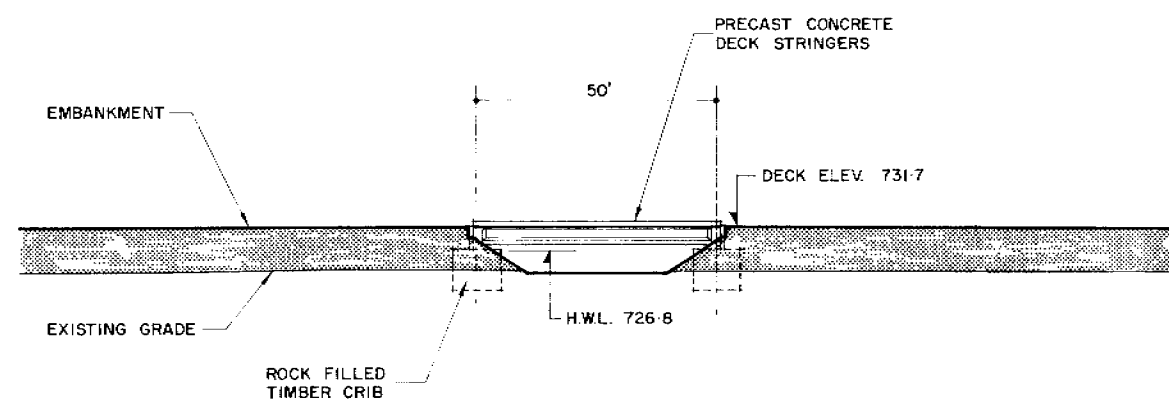
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CREEK
BRIDGE
Mile 419.2
LAYOUT and DETAILS

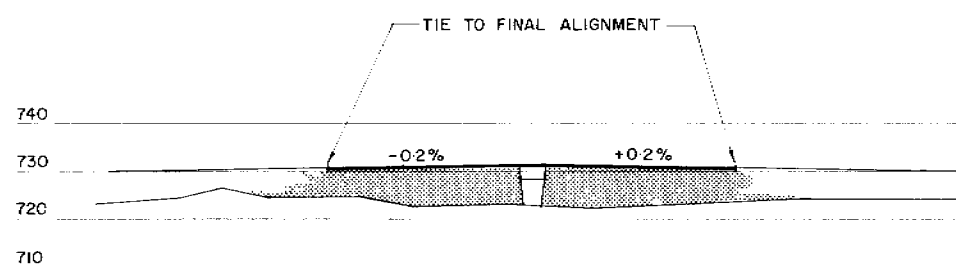
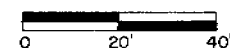
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D.P.W. Project Manager	Administrateur du projet M.T.P.
project number	no. du projet
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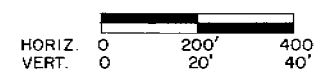
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ELEVATION

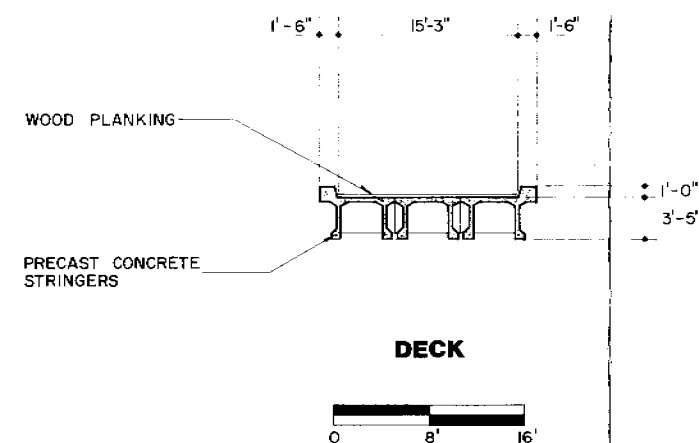


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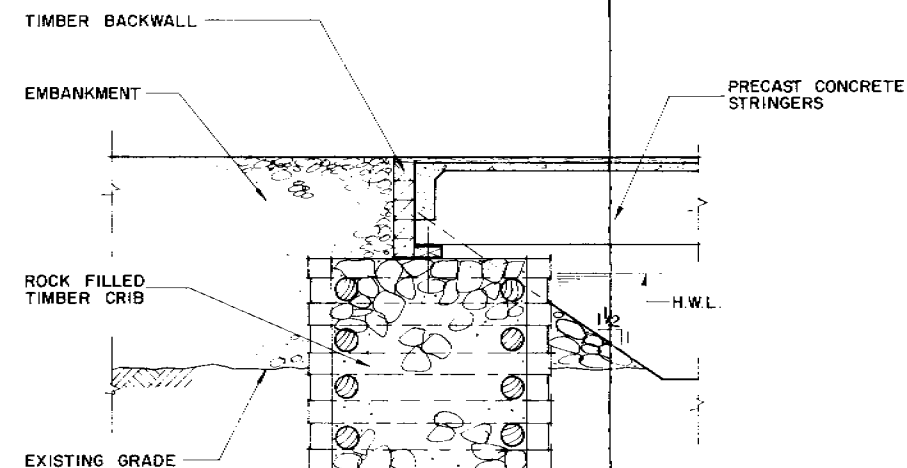
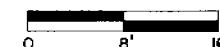


NOTE: ELEVATIONS ARE TO D.P.W. DATUM

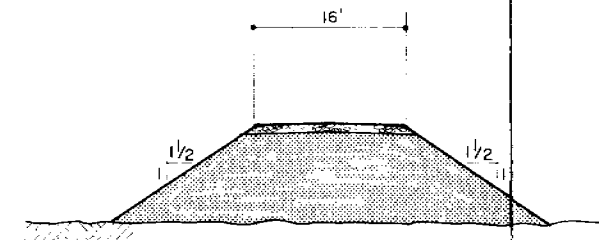
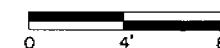
SEE DWG. No 9554 - P401
FOR LOCATION OF CROSSING



DECK



ABUTMENT



ROADWAY



Department of Public Works
Ministère des Travaux publics

WESTERN REGION
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VICTORIA, LONDON, TORONTO, WINDSOR, WYOMING, TORONTO

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C drawing no. dessin no.
revisions date

project title titre du projet
**MACKENZIE
HIGHWAY**

drawing title titre du dessin
**CREEK
BRIDGE
Mile 419.2
TEMPORARY
CROSSING**

designed by conçu par
date JANUARY 1974
drawn by dessiné par
date
reviewed by examiné par
date
approved by approuvé par
date

Tender Soumission
D.P.W. Project Manager Administrateur de projets M.T.P.
project number no. du projet

85032

drawing no. dessin no.
9554 - P 402