

**PRELIMINARY
BASIC ENVIRONMENTAL DATA**

**WILLOWLAKE RIVER
BRIDGE**

REFERENCE MILE 395 MACKENZIE HIGHWAY

**DEPARTMENT OF PUBLIC WORKS
EDMONTON, CANADA**



January , 1973



**F. F. SLANEY & COMPANY LIMITED
Vancouver, Canada**

BASIC ENVIRONMENTAL DATA
WILLOWLAKE RIVER BRIDGE
REFERENCE MILE 395

MACKENZIE HIGHWAY
NORTHWEST TERRITORIES

DEPARTMENT OF PUBLIC WORKS
EDMONTON, CANADA

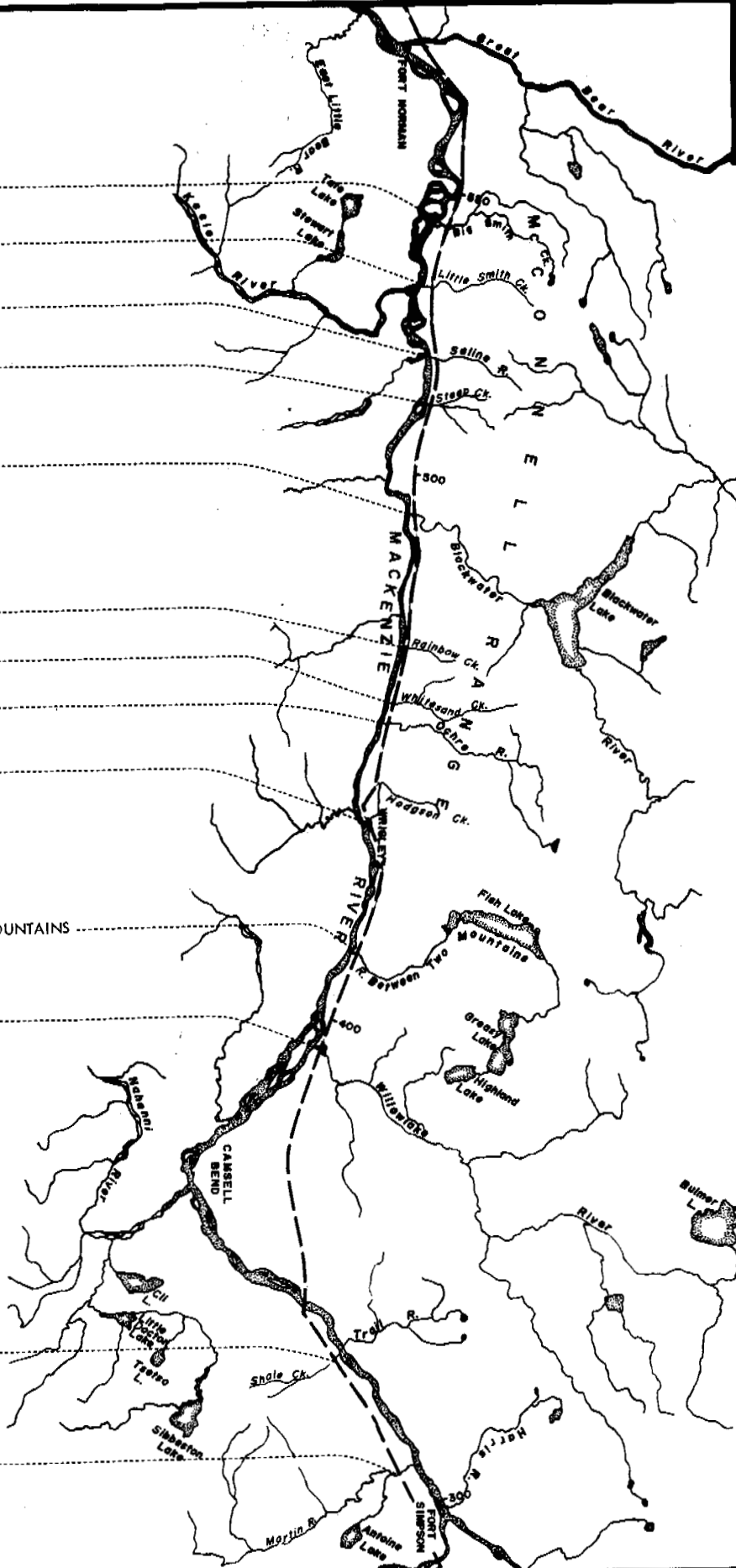
JANUARY 1973

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BRIDGE SITES

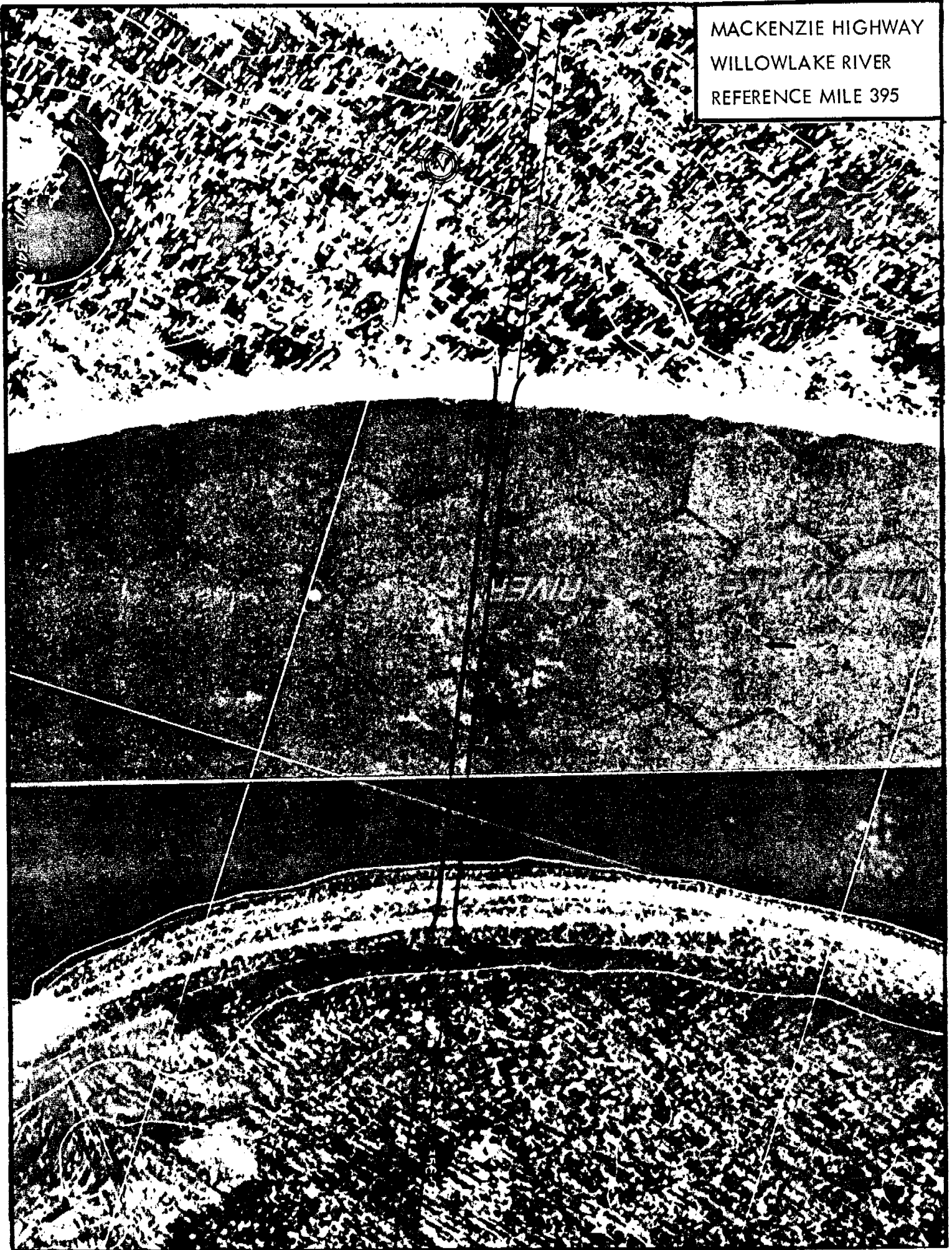
KEY MAP
BRIDGES
MACKENZIE HIGHWAY
MILE 300 TO 550

BIG SMITH CREEK
LITTLE SMITH CREEK
SALINE RIVER
STEEP CREEK
BLACKWATER RIVER
RAINBOW CREEK
WHITESAND CREEK
OCHRE RIVER
HODGSON CREEK
RIVER BETWEEN TWO MOUNTAINS
WILLOWLAKE RIVER
SHALE CREEK
MARTIN RIVER



SCALE
0 10 25
MILES

MACKENZIE HIGHWAY
WILLOWLAKE RIVER
REFERENCE MILE 395



PART 1

BASIC ENVIRONMENTAL DATA

1.1 SURFICIAL GEOLOGY

The channel at the crossing site is a broadly curved part of a thalweg with minor erosion on the north bank.

Slumping may occur at the scarp on the southern approach to the bridge. The alluvial terrace is marked by organic thermokarst features.

1.2 SOIL

No particular problem with soils are evident. Top soil should be saved where possible and used to recover fills for rapid regeneration of plant cover.

1.3 VEGETATION

The north bank of the Willowlake River crossing supports a thrifty stand of white spruce and aspen with maximum heights to 60 feet. The north bank is lined with a fringe of tall white spruce with a semi-open stand of 30 foot tall black spruce extending back along the approach.

Willowlake River is an interesting site from several aspects and disturbance of vegetation in the vicinity should be kept to an absolute minimum. The flat terraces are a temptation to construction contractors who have a preference for ample operating and storage space.

1.4 WILDLIFE

The construction activities and camp associated with construction of the bridge is the primary concern of impact on wildlife. The broad valley floor offers many alternate routes for animals that normally travel along the shore of the river. The area of riparian vegetation affected by the bridge is minimal. A trap line is located in this area and the location of traps should be ascertained. Trap sets should not be disturbed or tampered with.

1.5 FISH

The designs prepared for the Willowlake River are the most satisfactory of the 13 site plans, from the aspect of fish habitat preservation. No significant encroachment of approach fill into the stream bed is apparent hence little reduction in cross-sectional area is incurred at any stream levels.

The use of steel cofferdams for pier construction is noted with approval. To minimize activity in the stream bed, the four-span alternatives would be preferred.

Rigorous testing of ice conditions should be conducted before heavy equipment is moved onto the river, especially if reinforced with logs or other material. Any equipment or structures which collapsed would prove difficult to remove, and may form a barrier to fish movement.

The Willowlake River, in the lower 32 miles, contains an estimated 2,684,000 square yards of potential spawning gravel. Fish species reported include grayling, pike, longnose sucker, walleye and burbot. Aquatic insects sampled at the bridge site include caddisfly larvae, and stonefly and mayfly nymphs. The substrate consists of large gravels and boulders.

Migration periods for the above fish species are as follows: early June to mid July, most species; month of September, grayling. Spawning takes place from mid-June to mid-July, and eggs remain in the gravel until early August, most species, and till late October for walleye. Fry of all species remain in streams until October.

Though none were reported, the Willowlake River possibly contains a population of whitefish; these migrate from mid-August to late October and spawn in October and November. Eggs remain in the gravel over winter until mid-May, then fry remain until the following September.

The most serious hazard to fish at this site is the presence of a fuel cache and camp below known high water levels. These should be moved to higher ground. The next most serious hazard would be the uncontrolled angling of several hundred on-site personnel during migration periods. Prevention of over-fishing should be included as a clause in the construction contracts.

1.6 ARCHAEOLOGY

The Willowlake River bridge site is in close proximity to known recent and historic known archaeological sites. The location of access roads and campsites should be checked by an archaeologist prior to development.

1.7 LANDSCAPE - RECREATION

Widening of the approach fills to provide pull-out space near the bridge abutments would be advantageous to recreationalists who attempt to stop near the bridge.

The Willowlake crossing site has maximum potential for recreational development and the bridge should be designed to accommodate foot traffic that arises from camping and fishing.

Construction campsites should be developed with the intent of utilizing the sites for recreational grounds after the project is completed.

1.8 AESTHETICS

The proposed designs of the Willowlake River bridge are all reasonably attractive. The preferred design is alternate No. 8 with the 250 foot spans.

1.9 SOCIO-ECONOMIC

A few local people utilize the environs of the proposed bridge site. The impact of the inevitable disturbance that would develop with construction of the bridge is a function of the personalities of the residents involved. This aspect should be investigated.

1.10 CONSTRUCTION

Mid-winter construction is recommended for pier work in the river channel. Borrow pits required for approach fills should be designed to be left as recreational sites where possible. Barge landing sites should be located as near the bridge as possible to minimize the construction of access roads.

The location and management of the camp are primary environmental concerns.

PART 2

ASSESSMENT

Willowlake River is a prime recreation and fishery resource and extra precautions to preserve the integrity of the natural resources of this region are warranted. North of the bridge site the warm springs area is of particular geologic interest.

Bridge design No. 8 with three piers most effectively meets the aesthetic and fish protection requirements of the site.

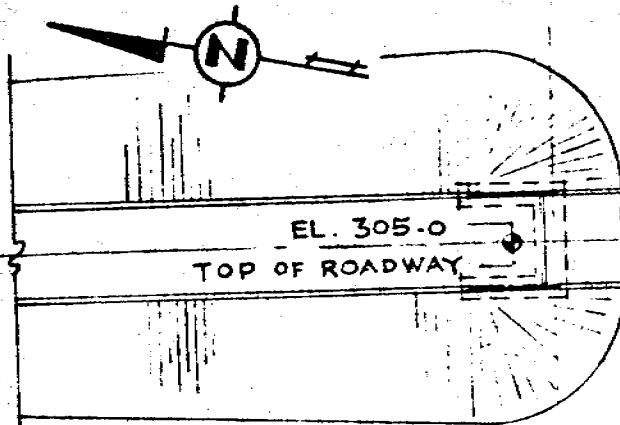


26.10.72. North bank of the Willowlake River. Stand of spruce and aspen on brunisolic soils. Land form is abandoned alluvial terrace or meltwater channel.



26.10.72. Willowlake River. Bridge site and road centerline looking south. Unstable areas are found on the opposite bank. Channel is straight part of thalweg, possibly more erosion on north side than south side.



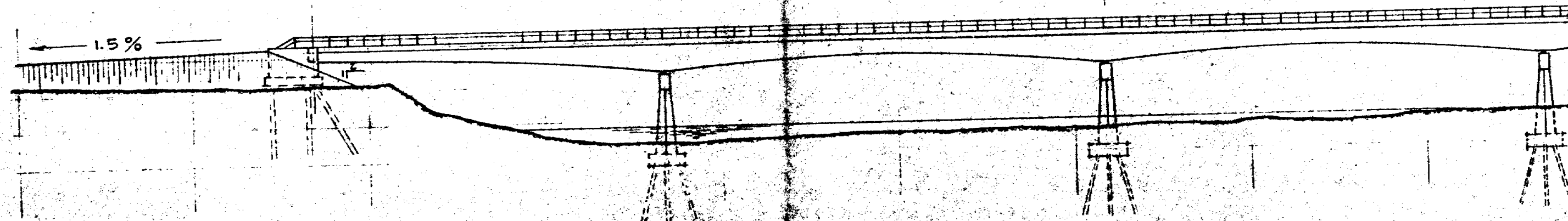


WILLOWLAKE
RIVER

PLAN OF BRIDGE

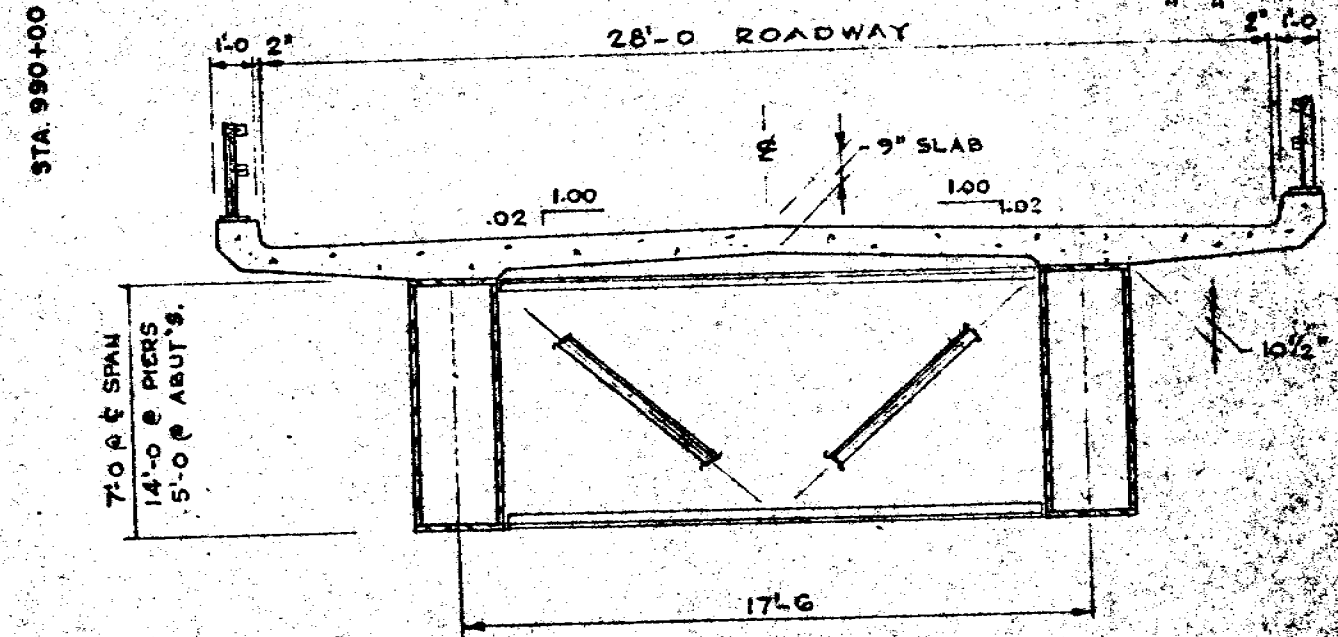
SCALE: 1" = 60'-0"

900'-0" 250'-0" 250'-0" 200'-0"



ELEVATION OF BRIDGE

SCALE: 1" = 60'-0"



CROSS - SECTION

SCALE: 3/16" = 1'-0"

7'-0" @ 5' SPAN
14'-0" @ PIERS
5'-0" @ ABUT'S.

TLE: ALTERNATE NO. 8
 STEEL BOX GIRDER-4 SPAN
 V.O. BY: R.M.W. DATE: DEC. 1/72 FILE NO.: 72-152
 DWG. NO. 5

MACKENZIE HIGHWAY
 WILLOWLAKE RIVER BRIDGE MILE 395.0

T. LAMB, McMANUS & ASSOCIATES LTD.
 CONSULTING ENGINEERS
 EDMONTON CALGARY WINNIPEG

GOVERNMENT OF CANADA
 DEPARTMENT OF PUBLIC WORKS
 WESTERN REGION

