

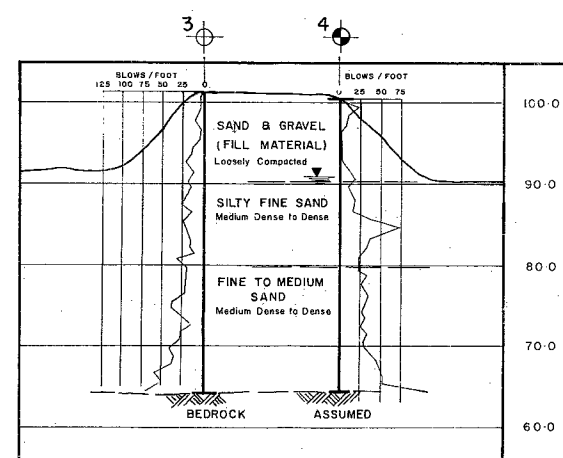
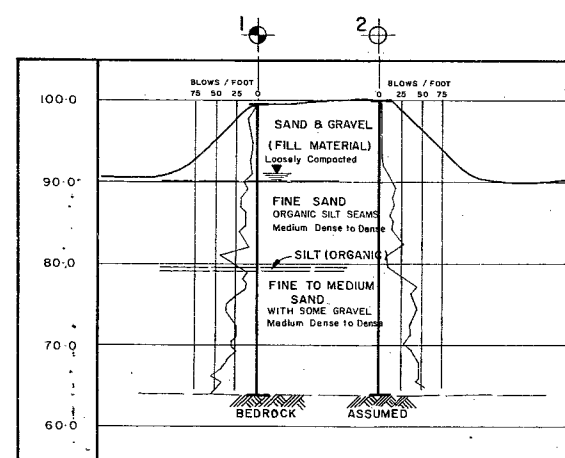
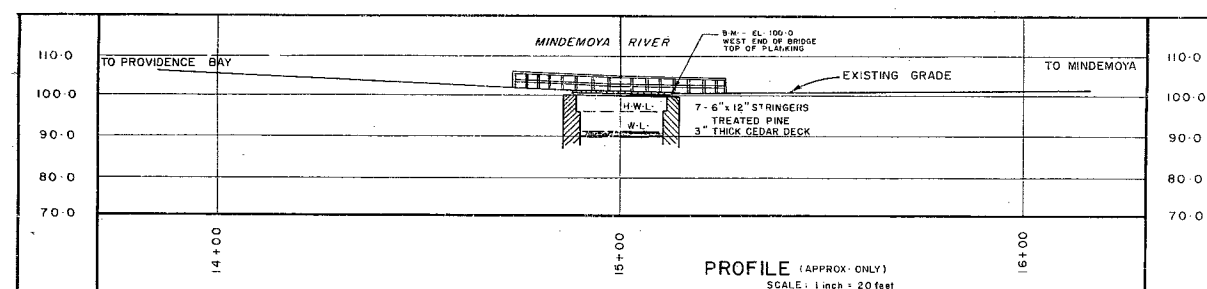
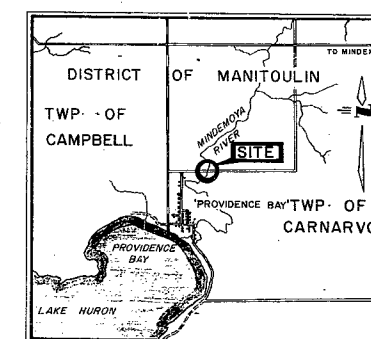
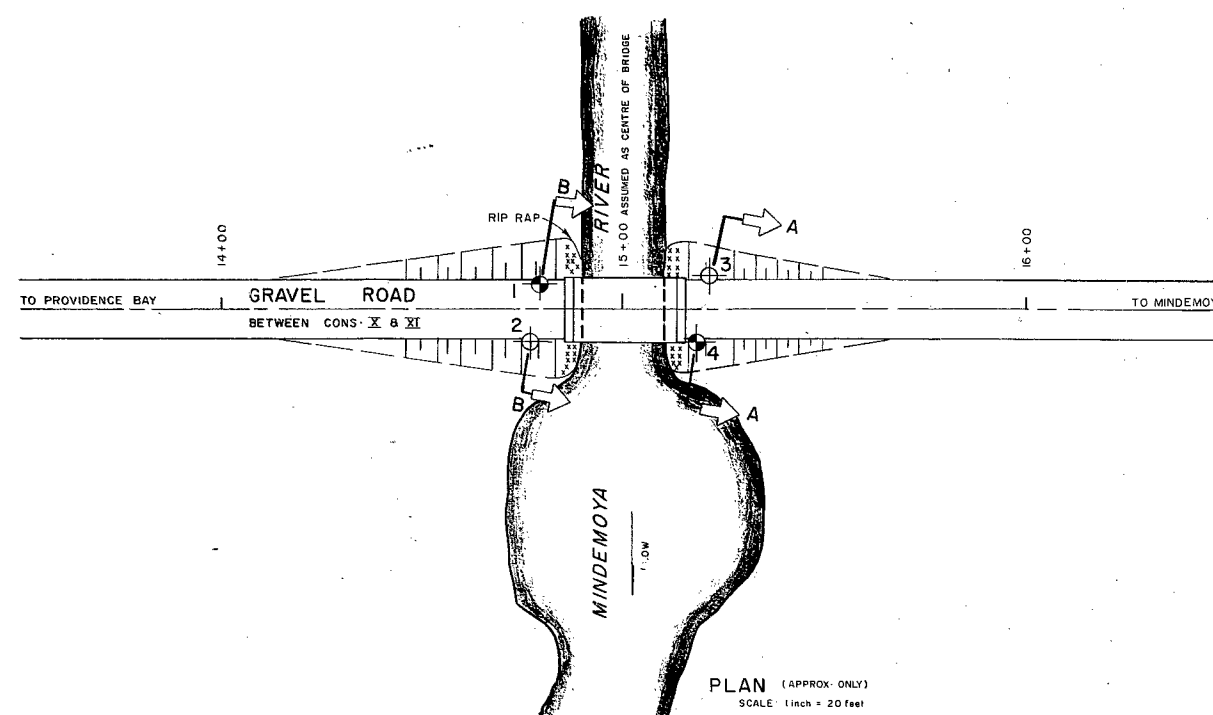
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61-F-97

MINDEMAYA

RIVER

GRAVEL ROAD



LEGEND			
	BORE & PENETRATION HOLE		
	PENETRATION HOLE (CONE)		
	WATER LEVELS established at the Time of Field Investigation 20 Sept. 1961		
HOLE	ELEVATION	STATION	OFFSET
1	99.5	14+79	6' LT.
2	100.0	14+76.5	8.5' RT.
3	101.2	15+21	8.5' LT.
4	100.7	15+18	8.5' RT.

401600
5058750
4169
17

DEPARTMENT OF HIGHWAYS - ONTARIO		
MATERIALS & RESEARCH SECTION		
MINDEMOYA RIVER AND GRAVEL ROAD BETWEEN CON'S X & XI CARNARVON TWP.		
ORIGINATED K. SELBY	DISTRICT NO. 17	DATE OCT. 18, 1961
DRAWN F. CLARK	W.P. NO. —	JOB NO. 61-F-97
CHECKED <i>HK</i>	SCALE	DRAWING NO.
APPROVED <i>HK</i>	AS SHOWN	61-F-97 A

Mr. J.E. Wice,

November 7th, 1961.

Dist. Municipal Engineer.

Foundation Report for Proposed
Structure Site near Mindemoya in Twp.
of Carnarvan on Manitoulin Island.

T.J. Kovich.

Re: M.O. 61-10816

Pursuant to your request, a foundation investigation has been carried out at the above-noted site. The report from our Foundation Sub-Section is self-explanatory and is attached herewith.

TJK/hl
Attach.


T.J. Kovich,
Mun. Mat. & Res. Liaison Engr.

c. M. Kleinstelber,
B. Heavysege,
T.J. Kovich,
Foundations Office,
Gen. Files. ✓

FOUNDATION INVESTIGATION

28-17

For

Proposed New Bridge over the
Mindemoya River at Providence Bay
Road Allowance between Cons. X & VI,
Twp. of Carnarvan, Dist. of Manitoulin.
W.J. 61-F-97 -- W.O. #61-10816

1. INTRODUCTION:

At this location, it is proposed to erect a new bridge to replace the existing one. The existing structure was built in 1911 and consists of a 26' long wooden deck, 15' wide, supported on concrete abutments with spread footings. A year after this bridge was built, it was observed that the abutments had tilted forward about two to three feet at the top, due (it was thought) to undercutting by the river, and to the pressure of the fill (about 10.0') behind them. The abutments were then jacked back and timber props placed to hold them in position. Nothing further has been done to this date, apart from minor repairs to the deck.

At the time of the investigation, no survey of the area, or plan of the road and bridge was available. A rough survey was done in the field by the field engineer, the result of which is presented on Drawing #61-F-974.

2. DESCRIPTION OF THE SITE:

The site is located on the south shore of Manitoulin Island. The surrounding area is mostly flat bush country with cleared areas near the road. The Mindemoya River flows from Lake Mindemoya south to Lake Huron at Providence Bay.

cont'd. /2 ...

3. FIELD PROCEDURES:

Two boreholes and four dynamic cone penetration tests were carried out at the site. Samples were recovered in the disturbed state by means of a 2" O.D. split spoon. Relative densities of the subsoil were obtained by means of the Standard Penetration Test carried out using the split spoon sampler, with a driving energy of 350 ft. lbs. per blow. Boreholes were located in the field by the field engineer. Elevations are referred to an assumed datum 100.00, 4 of bridge deck at the west end. Locations and elevations of all boreholes are shown on Plan #61-F-97A, together with the estimated stratigraphical profile.

4. SOIL TYPES:

Subsoil at the site consists of about 10' of fill material, sand and gravel, followed by about 10' of silty fine sand, followed by about 16' of fine to medium sand, followed by bedrock. The fill material is, in general, loosely compacted. The silty fine sand deposit varies from medium dense to dense as does the lower deposit of fine to medium sand. No rock cores were taken, but bedrock was assumed at refusal of the casing and the dynamic cones, all of which occurred at approximately the same elevation. Bedrock is assumed to be limestone dolomite.

Ground water in the boreholes was found to be at the same elevation as the water in the river.

cont'd. /3 ...

5. RECOMMENDATIONS:

Bridge:- Regarding the footings for the proposed structure three alternatives are proposed:-

(1) Piled Footing Placed in the Fill -

It is understood that the grade will be raised some two to three feet and the approaches widened to 28.0'. The structure may be supported on piles driven through the fill down to bedrock. Treated timber piles will be necessary. A design load of 20 tons per pile, may be used. The disadvantage of this method is that a longer span will be required. Protection in the form of rip-rap must be provided for the slopes adjacent to the river, to a level above the H.W.L. The design of the piles must be such that lateral support for the abutments is provided.

(2) Piled Footing Placed Below the Fill -

The properties of the subsoil are such that only a low bearing capacity can be obtained. Hence, it may be economically advantageous to found the footings at about elev. 85.00 on untreated timber piles driven to bedrock. A design load of 20 tons per pile, may be used. The design of the piles must take into account the lateral thrust on the abutments due to the weight of the fill. The shortest possible span may be achieved in this case. Protection of the abutments against scour will be necessary. This may be in the form of steel sheeting around the front and sides of the footings. A dewatering scheme will be necessary. If sheeting is used for this, it should be driven to beyond elev. 80.00 to prevent running sand conditions from occurring in the excavations.

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

Bridge:- (cont'd.) ...

(3) Spread Footings Placed Below the Fill -

Spread footings may be placed at about elev. 85.00 as in (2). A design load of 1.00 ton per sq. ft. may be used. The remarks pertaining to scour protection and dewatering in (2) are applicable in this case. It is pointed out that if running sand conditions develop, the bearing capacity of the subsoil will be seriously reduced.

Approaches:-

For the approaches, the following construction procedure is recommended:-

The existing fill should be reduced in height to provide the material for the proposed widening. Compaction should be carried out where possible, in 6" lifts. New fill should then be placed over the full width of the embankment and brought up to grade and compacted also in 6" lifts. No stability problems are anticipated with regard to the fill.

Rip-rap should be provided to protect the slopes from scouring action. The H.W.L. from local sources is given as elev. 94.00.

September 1961. REPORT PREPARED BY:

..... *K. G. Selby*
K. G. Selby,
SR. PROJECT FOUNDATION ENGINEER

REPORT APPROVED BY:

..... *A. G. Stermac*
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER.