

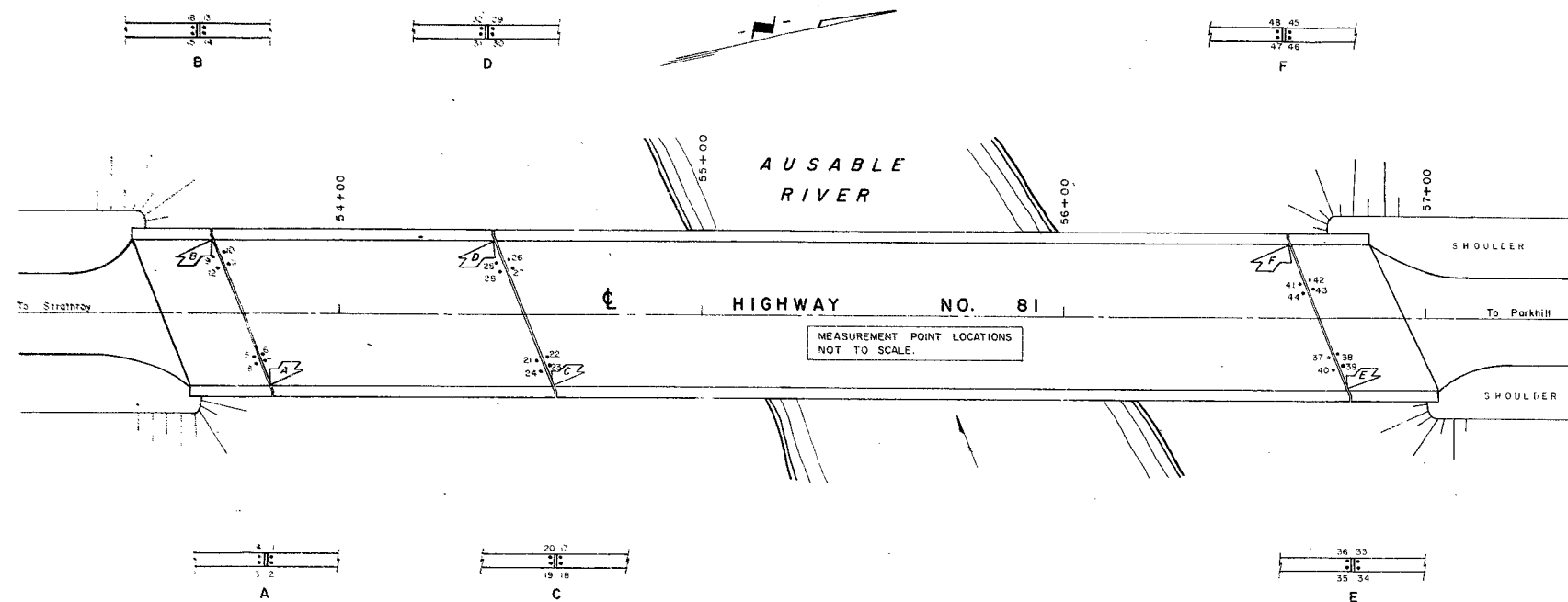
#63-F-64

W.P.#6-61

HWY. #81 &

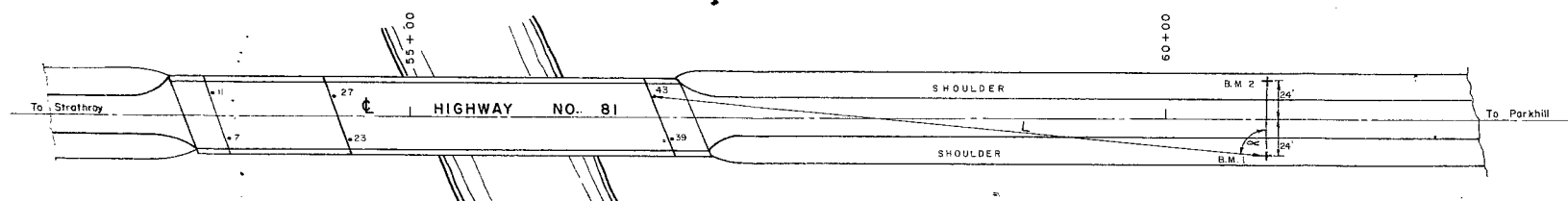
AUSABLE

RIVER



PLAN  
SCALE IN FEET  
20 40 60

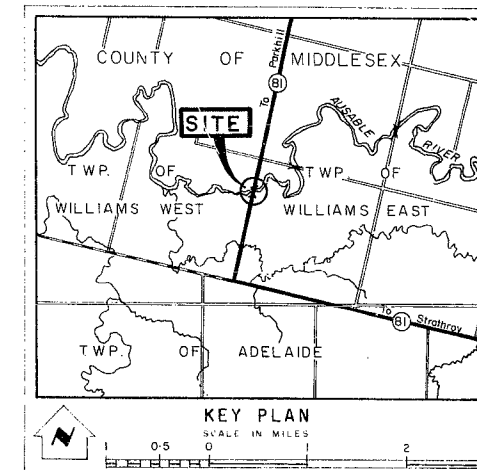
NOTE: VIEWS A, B, C, D, E & F INDICATE  
INSIDE EDGE OF CURBS.



PLAN  
SCALE IN FEET  
50 100 150

PT.	ANGLE (°)	LENGTH (FEET)
7	89°17'00"	601.41
11	86°29'20"	617.39
23	89°09'40"	519.30
27	85°58'00"	535.02
39	88°34'40"	304.67
43	84°04'40"	318.86

PT.	ELEV.
B.M. 1	10.000 (ASSUMED)
B.M. 2	10.365
PT. 5	25.352
7	25.323
9	25.800
11	25.781
21	22.676
23	22.660
25	23.108
27	23.107
37	15.985
39	15.952
41	16.497
43	16.486



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation: June 12, 1963		
	Measurement Point		
NO.	ELEVATION	STATION	OFFSET

NOTE  
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION			
AUSABLE RIVER			
KING'S HIGHWAY NO. 81		DIST. NO. 2	
CO. MIDDLESEX			
TWP. WILLIAMS E. & W.		LOT 1 & 2, CON. E.C.R. & W.C.R.	
MEASUREMENT POINT LOCATIONS			
SUBM'D G.C.	CHECKED	W.P. NO. 6-61	M.B.R. DRAWING NO.
DRAWN To	CHECKED	JOB NO. 63-F-64	63-F-64A
DATE JULY 4, 1963	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>A. J. Thomas</i>	CONT. NO.		

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. H. C. Dernier,  
District Engineer,  
London, Ontario.

FROM: Mr. A. G. Stermac,  
Principal Foundation Engr.,  
Foundation Section,  
Materials & Research Division.

DATE: December 19, 1963

OUR FILE REF.

IN REPLY TO

SUBJECT:

INSTRUMENTATION INVESTIGATION

For

Ausable River Bridge on Hwy. No. 81,  
Dist. No. 2, W.J. 63-F-64, W.P. 6-61.  
Contract 61-92 & 61-118

(Refer to D.H.O. Report W.J. 60-F-47  
and Report by Geocon Limited, 1960)

Attached, you will find the report describing the instrumentation carried out on the above-mentioned structure, the findings and our present conclusions concerning the observed movements. We are also sending you a book containing all the data sheets for recording subsequent readings. It is suggested that the readings be made by the person already well acquainted with the job, namely, Mr. Don Pyatt from your office.

You are also kindly requested to send us the readings as soon as they are completed so as to enable us to keep track of the possible movements and make the necessary conclusions. Your co-operation will be appreciated. Should there be reasons preventing you from continuing the readings, please advise this office so that we can make other arrangements.

AGS/MdeF

Attach.

cc: Messrs. A. M. Toye (2) ✓

H. A. Tregaskes

H. D. McMillan

A. Gater

H. C. Dernier

J. Roy

A. Watt

Foundations Office

Gen. Files

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

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# INSTRUMENTATION INVESTIGATION

For

Ausable River Bridge on Hwy. No. 81,  
Dist. No. 2, W.J. 63-F-64, W.P. 6-61.  
Contract 61-92 & 61-118  
(Refer to D.H.O. Report W.J. 60-F-47  
and Report by Geocon Limited, 1960)

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## 1. INTRODUCTION:

A field instrumentation programme was carried out by this Section at the above-noted site from June 10 to June 12, 1963. The purpose of this instrumentation programme was to determine the magnitude and extent of any bridge movements, with the main emphasis on accurate determination of movements in a horizontal plane.

## 2. BACKGROUND:

The reason for the instrumentation can be explained by referring to the history of this structure.

The bridge is a continuous 3-span structure supported on 12" Ø monotube steel piles. It was built between January 1956 and October 1957. Evidence of structural distress at the South abutment was first noted in June 1957, and a detailed investigation revealed an instability of the South bank of the Ausable River due to excess hydrostatic pressure in a silt layer at a depth of 50 ft.

The remedial work which consisted of cutting back the South bank, and adding an extra 80-foot simply supported span to the South end of the bridge, was completed under Contract 61-118 in January 1962.

cont'd. /2 ...

2. BACKGROUND: (cont'd.) ...

In the Spring of 1963, cracking of the asphalt was observed across the expansion joints at the North and South abutments and at the North end of the newly constructed Southernmost span. It was also noted that the North end of the bridge had moved out approximately one inch in an Easterly direction, with respect to the North abutment.

Consequently, it was decided to initiate an instrumentation programme to determine if any abnormal movements were now occurring.

3. PROCEDURE:

The instrumentation consisted of 12 groups of measurement points with each group consisting of 4 steel bolts set in the asphalt in a rectangular grid. The grids were positioned to straddle the expansion joints with two points on each side, parallel to and equidistant from the joint. The steel bolts were #10 - 24 Hexagonal Head screws set flush with the surface. The bolts were placed by drilling holes into the concrete, inserting a star Tampin #10 - 24 (3/8" Ø), then screwing the bolt down into the Tampin. Six measurements which related each bolt to the other three in the group were then taken in order to determine relative movement, and entered on data sheets. Measurements were taken to the nearest 1/50 in. with a plastic engineer's scale. Distances between fixed points - i.e., 31 - 32, were recorded as well as between points which could move in order to check the accuracy of the readings. The average error in readings was 0.013 in., with a maximum error of 0.06 in.

cont'd. /3 ...

3. PROCEDURE: (cont'd.) ...

In addition, a permanent base line was installed on Hwy. #81 approx. 300 ft. North of the structure. The base line consisted of two deep benchmarks, one placed on each shoulder so that a line connecting the two benchmarks would be at approximate right angles to the Hwy. #81 centreline.

The angle, distance and elevation of one point in every group was then related to the permanent base line (benchmarks 1 & 2), in order to determine absolute as well as relative movement.

4. RESULTS:

On November 25, 1963, the instrumentation was checked and the following results were noted:

- a) The crack at the North abutment had opened out approx. 0.10 in.
- b) The crack at the South abutment had opened out approx. 0.16 in.
- c) The crack at the North end of the Southernmost span had opened approx. 0.24 in.
- d) All movements appeared to occur in a North-South direction.

Visual examination of the structure, with particular reference to the Easterly movement of the North end of the North span, showed no indication of any additional movements since the date of the initial instrumentation (June 12, 1963).

5. CONCLUSIONS:

The data obtained to date, indicate no serious movements of the structure.

It would appear that the movements recorded to date, are

cont'd. /4 ...

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

due to expansion and/or contraction of the bridge spans due to temperature fluctuations between June 12, 1963 (51°F) and November 25, 1963 (40°F).

It would be wise, however, to continue readings on a monthly or bi-monthly basis for another 6 months to a year, in order to draw definite conclusions.

In this respect, London District is requested to continue these readings for this Section.

In order to have continuity of results, it is recommended that Mr. Ron Pyatt (London District), who is familiar with the procedure to be followed, be asked to obtain all future readings at the site.

6. MISCELLANEOUS:

The field instrumentation and preparation of this report were carried out by Mr. G. G. Cherrington, Project Foundation Engineer, under the general supervision of Mr. A. G. Stermac, Principal Foundation Engineer.

December 1963



APPENDIX I.