

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40P9-23

DIST. 3 REGION Southwestern

W.P. No. \_\_\_\_\_

CONT. No. \_\_\_\_\_

W. O. No. \_\_\_\_\_

STR. SITE No. \_\_\_\_\_

HWY. No. \_\_\_\_\_

LOCATION ARMSTRONG BRIDGE,

SPEED RIVER, WELLINGTON CO

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 1

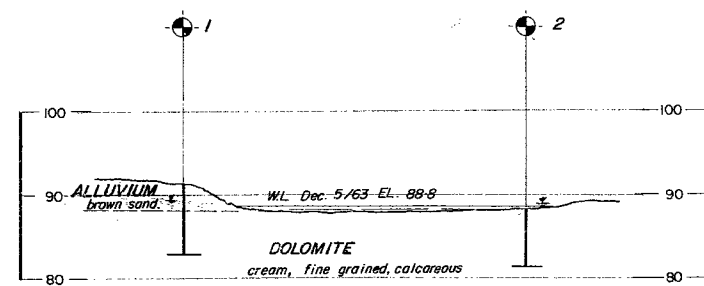
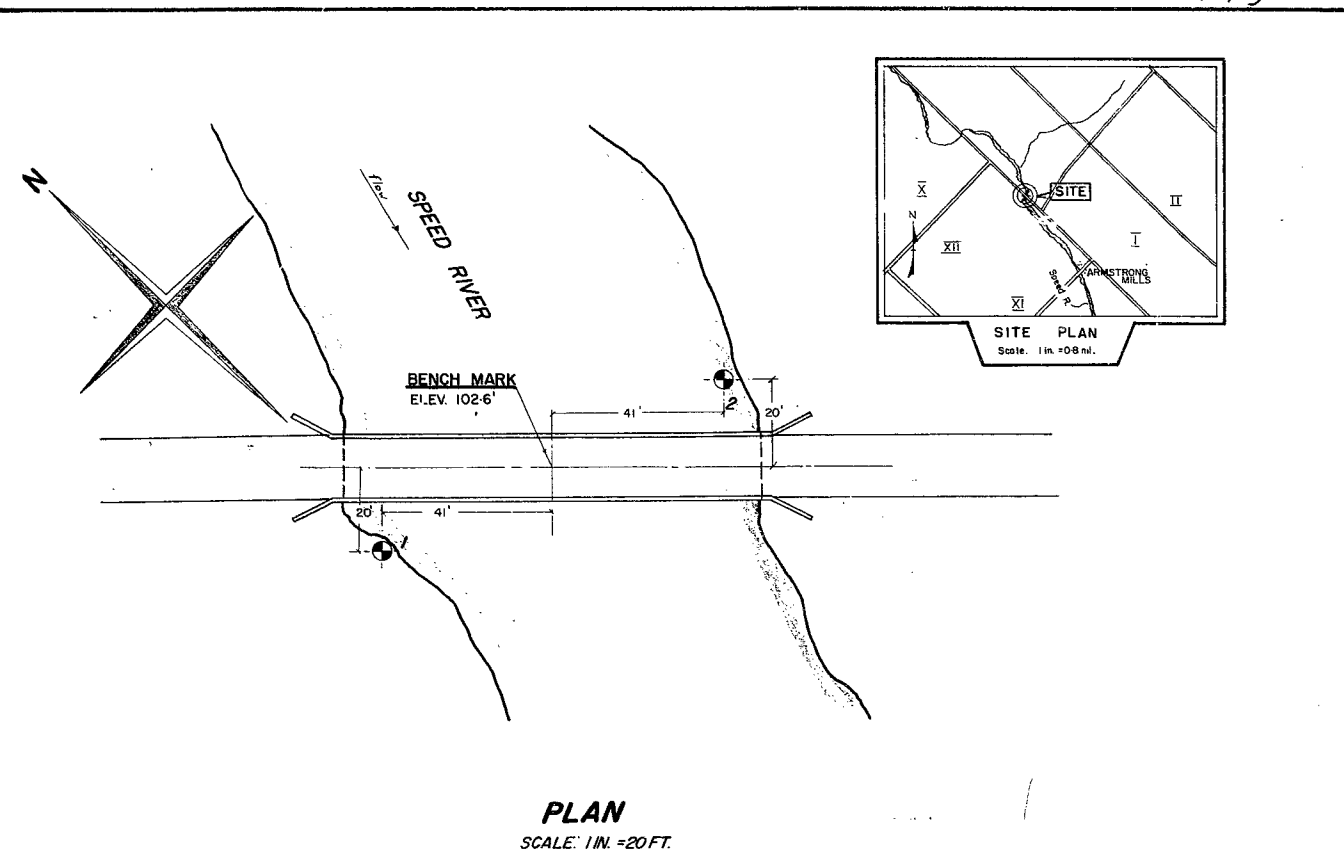
REMARKS: \_\_\_\_\_

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40P9



GEORGS No.  
40P9-23

WILLIAM A. TROW AND ASSOCIATES LIMITED		
FOUNDATION INVESTIGATION		
<b>ARMSTRONG BRIDGE</b>		
<b>OVER SPEED RIVER</b>		
TWR. GUELPH & ERAMOSA		ONTARIO
PROJ. 1332	DATE FEB. 1964	DWG. No. 1

*Plot on 40P9*

WILLIAM A. TROW AND ASSOCIATES LTD.

SITE INVESTIGATIONS  
LABORATORY TESTING  
SOIL MECHANICS CONSULTATION

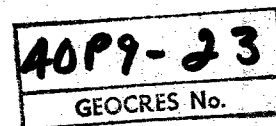
W. A. TROW, M.A.Sc., M.E.I.C., P.ENG.

1850 JANE ST.,  
WESTON, ONT.  
CH. 1-4644

Project: J1332

March 3, 1964

V.R. Astrop, Esq., P.Eng.,  
Consulting Engineer,  
4 Hughson Street South,  
Hamilton, Ontario



Re: Soil Conditions  
Armstrong Bridge over Speed River  
Wellington County, Ontario

Dear Sir:

In conformance with your authorization of January 17th, 1964, we have carried out a soil investigation at Armstrong Bridge over the Speed River in Wellington County, Ontario. This work consisted of two borings taken to depths of 5 feet into bedrock. Briefly, the findings of this investigation are as follows:

1. Weathered dolomite, believed to belong to the Guelph - Lockport formation, was encountered below approximately elevation 88.0 feet at stream bed level. A thin alluvium and topsoil cover was encountered by one boring, while the other, which was drilled from the ice cover over the stream, encountered the dolomite from the stream bed level.
2. Footings, taken down at least 1 foot into the dolomite and into relatively intact dolomite, may be safely loaded to at least 10 tsf.
3. The abutment and wing walls should be designed for an earth pressure as given by the coefficient  $K = 0.35$ .

Descriptions of the site, field work carried out, and brief comments on the soil conditions as they affect foundation design and construction are given in the following sections.

#### THE SITE

Armstrong Bridge spans the Speed River between Concession XIII in the Township of Guelph, and Concession I in the Township of Eramosa, Wellington County. It is approximately 1 mile north-west of Armstrong Mills, (see Key Plan, Dwg. 1).

The existing bridge is a single span wooden deck structure supported by overhead trusses. Single lane traffic operates across the bridge.

On the south-east side of the bridge the roadway is 6 - 8 feet above the adjacent ground, while at the north-west end of the bridge it is about 3 feet above the adjacent ground. To the north of the bridge there are a number of large trees with a grass and shrub cover along the south side.

#### FIELD WORK AND SUBSOIL

Two boreholes were put down at the positions indicated on the site plan, Dwg. 1. Borehole 2 was drilled from the ice cover and encountered dolomite from stream bed level. Borehole 1, which was drilled from the side of the stream bank, encountered the same rock beneath a 3 foot alluvium cover. Both borings were advanced using rotary core drilling methods.

Borehole records, which include the depths drilled, strata encountered and samples recovered are compiled in Dwgs. 2 and 3.

The dolomite core was recovered in lengths up to 5 inches long, although the average length was about 2 inches. The dolomite effervesced on addition of dilute hydrochloric acid. It is cream white in colour which suggests that its colour has been bleached by weathering. It is understood that these rocks belong to the Guelph - Lockport formation and may be described as dolomitic limestone.

The elevations of the boreholes were referred to a bench mark on the centre line of the top of the bridge deck, Dwg. 1. The level of this was taken as 102.6 feet.

#### FOUNDATION CONSIDERATIONS

The foundations for this bridge present no problems. The abutment and wing walls should be taken down and founded in this very competent dolomite. It is recommended that the footings be taken at least 1 foot into the dolomite. If very softened or shattered areas of rock are encountered, the rock should be excavated down until a dense unweathered material is exposed. For such a condition it is recommended that footings may be safely loaded to 20 ksf. Since the dolomite is almost incompressible for this range of loading, settlements will be of a very small order and will be of no consequence.

During construction work it will be necessary to form a small cofferdam around the abutment excavation. This can be accomplished by normal methods and requires no soil mechanics consideration.

#### EARTH RETAINING WALLS

Well compacted granular fill should be placed behind the abutment and wing walls. In order to allow for the rigidity of the walls, it is recommended that an earth pressure coefficient  $K = 0.35$  be

assumed for design purposes. The earth pressure acting at any depth,  $h$ , below the top of the wall may be estimated from the expression:

$$P = K \{ \gamma (h-h_1) + \gamma^1 h_1 + q \}$$

where:  $\gamma$  and  $\gamma^1$  are the bulk and submerged natural densities of the backfill soil (assumed = 130 and 70 pcf)

$K_1$  is the height of the water table above the point being considered.

$q$  is the surcharge, if any, acting at the top of the wall.

In the above expression no allowance has been made for water collecting behind the wall above the water level in the stream. Provision should be made, by weeper drains, to draw off any water which collects behind the wall.

If you have any queries after you have examined the results of this investigation we shall be pleased to discuss them with you.

Yours very truly,

*J. H. Hanna*

T.H. Hanna, P.Eng.

THH/go  
Encls.



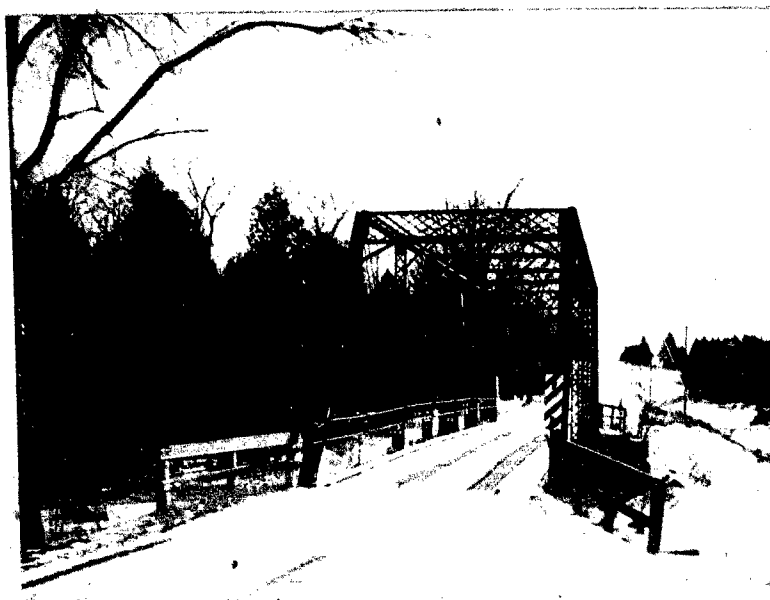
View Looking East



View Looking West



View Looking North



View Looking North



# WILLIAM A. TROW & ASSOCIATES LTD.




SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING No. 2  
PROJECT No. J1332




## LEGEND


BOREHOLE NO. 1  
PROJECT Armstrong Bridge over Speed River  
LOCATION Concession XII, Township of Guelph and Eramosa  
HOLE LOCATION See Dwg. 1.  
HOLE ELEVATION 91.3 ft.  
DATUM See Dwg. 1.

### PENETRATION RESISTANCE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
2" DIA. CONE 

### SHEAR STRENGTH




UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE   
UNCONFINED COMPRESSION   
VANE TEST AND SENSITIVITY (S) 


NATURAL MOISTURE CONTENT AND LIQUID INDEX 

### ATTERBERG LIMITS

LIQUID LIMIT   
PLASTIC LIMIT 

### SAMPLE TYPE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
3" O.D. SHELBY TUBE 

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE		350 FT. LB BLOWS/FT 80	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO	NATURAL UNIT WEIGHT P.C.F.
				20	40	60			
				SHEAR STRENGTH					
				P S F					
		91.3	0						
	TOPSOIL	91.0							
	ALLUVIUM-br.sand, gravel & cobbles. 	89.3							
		88.3							
	DOLOMITE-cream, fine-grained, calcareous. Drill under full pressure during coring.								
	End of Bore	80.3	10						
Notes:	1) Hole advanced by rotary core drilling methods.								
	2) On completion, W.L. = 2 ft.								
			20						
			30						
			40						

Recovery

AX  
78%

# WILLIAM A. TROW & ASSOCIATES LTD.




SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION

DRAWING No. 3  
PROJECT No. JL332




## LEGEND

BOREHOLE No. 2  
PROJECT Armstrong Bridge over Speed River  
LOCATION Concession XII,  
HOLE LOCATION See Dwg. 1.  
HOLE ELEVATION 90.1 ft.  
DATUM See Dwg. 1.

### PENETRATION RESISTANCE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
2" DIA. CONE 

### SHEAR STRENGTH

UNDRAINED TRIAXIAL  
AT OVERBURDEN PRESSURE   
UNCONFINED COMPRESSION   
VANE TEST AND SENSITIVITY (S) 




NATURAL MOISTURE CONTENT  
AND LIQUIDITY INDEX 

### ATTERBERG LIMITS

LIQUID LIMIT 

PLASTIC LIMIT 

### SAMPLE TYPE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
3" O.D. SHELBY TUBE 

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE				NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO	NATURAL UNIT WEIGHT P.C.F.
				20	40	60	350 FT. LB BLOWS/FT 80			
	Top of ice.	90.1	0							
	Stream bed level.	89.1								
	DOLomite-cream, fine-grained, calcareous. Drill under full pressure during coring.	88.1								
	End of Bore	81.6								
Notes:	1) Hole advanced by rotary core drilling methods. 2) Borehole located over stream. Water depth approx. 1 foot.		10							
			20							
			30							
			40							

Recovery

AX  
77%