

# 64-F-288 m

BRIDGE

REPLACEMENT

MIDDLE BRANCH

THAMES RIVER

LOT 6. CON 14 11

WEST ZORRA

1850 Jane Street  
Weston, Ontario  
241-4644

**William A. Trow**

*B.A. 1917*



**Associates Ltd.**

Project: J1484

Soil Mechanics  
Consultants  
W. A. Trow  
MSc. MEIC. P. Eng.  
K. Peaker  
PhD. MEIC. P. Eng.  
D. H. Shields  
PhD. MEIC. P. Eng.

Ure and Smith,  
Engineers and Surveyors,  
35 Springbank Avenue,  
Woodstock, Ontario

August 4, 1964

Re: Foundation Investigation - Proposed Bridge Replacement  
Middle Branch, Thames River  
Lot 6 - Between Con. 1 and 11 - West Zorra

Dear Sirs:

In conformance with your authorization, given early in June, we have made an investigation of foundation conditions for the proposed replacement of the existing bridge structure at this site.

The field work consisted of two borings taken to a maximum of 32 feet below the surface. This work was done during the period June 8 and 10 of this year.

Our observations and recommendations arising out of this study briefly are as follows:

SITE

The existing ancient bridge over the Thames River is about 60 feet long and 14 feet wide. The river flows under it in a westerly direction through a broad flood plain about 800 feet wide. About 200 feet to the north the ground rises about 50 feet to the crest of a glacial drumlin. The higher land about 600 feet to the south also rises to this level.

The flow of the river was measured to be about 110 feet a minute on April 30, when the site was first visited. During the time of the field work, the flow was sluggish.

The bridge truss is in poor condition and the concrete abutments are badly spalled. There was no noticeable undercutting of the abutments.

Some pieces of rock were noted in the river and at the base of the abutments. They are believed to originate from the fill, used to construct the approaches to the bridge.

#### SUBSOIL

The subsoil is described in detail in the borehole logs and in more general form in the stratigraphical profile of Dwg. 1. Since this information is self-explanatory, it is not proposed to repeat it in this report. It is noted that the upper levels of soil are loose and granular.

#### FOUNDATIONS

In view of the loose condition of the upper materials below the river bed level, it is recommended that the replacement bridge be supported on piles end-bearing in the dense till about 20 to 23 feet below river surface level. Any type of cylindrical pile of wood or steel is satisfactory for this purpose. Care must be taken, when driving timber piles to avoid damage to the tips. The permissible loading on piles driven into the gravel will equal their safe structural capacity when considered as short columns. Batter piles will be required to resist the lateral loads from traffic and approach fill. It will be necessary to drive sheeting in front of each abutment to protect the piles from erosion damage.

The earth pressure acting at any depth,  $h$ , below surface level behind the abutments will be given by the expression:

$$p = 0.35 \gamma h$$

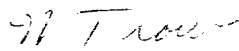
where: 0.35 is an earth pressure coefficient considered to be appropriate for the rigid walls and loose fill expected

$\gamma = 125$  pcf is the anticipated unit weight of granular fill behind the walls

No embankment stability problem is expected in the widening of the existing road.

If you have any queries after having reviewed the foregoing remarks, please do not hesitate to call us.

Yours very truly,



WAT/gc  
Encls.

William A. Trow, P.Eng.



Bridge Looking East



Bridge Looking West, Drill on BH 1



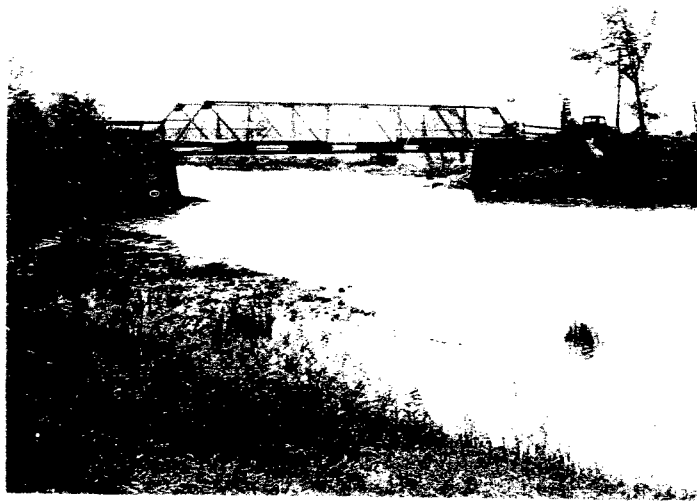
Bridge Looking East



Bridge Looking West, Drill on BH 1



Bridge Looking East, Drill on BH 1



river looking east, from on bridge





Bridge Looking East, Drill on RR 1



Bridge Looking North



Bridge Looking South

SUPER IMPOSED DOCUMENT MAY  
APPEAR AS MULTI-FEED ON FILM.

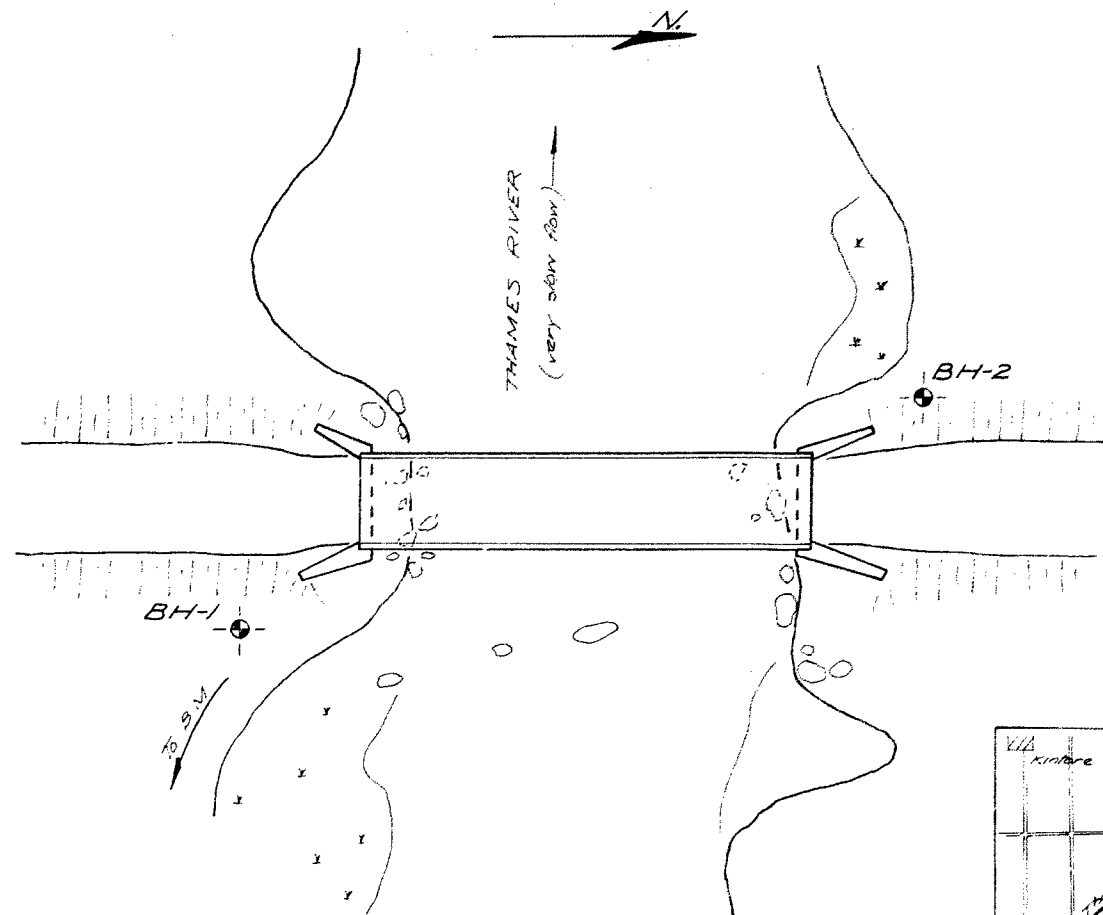


Gravel Road Looking North

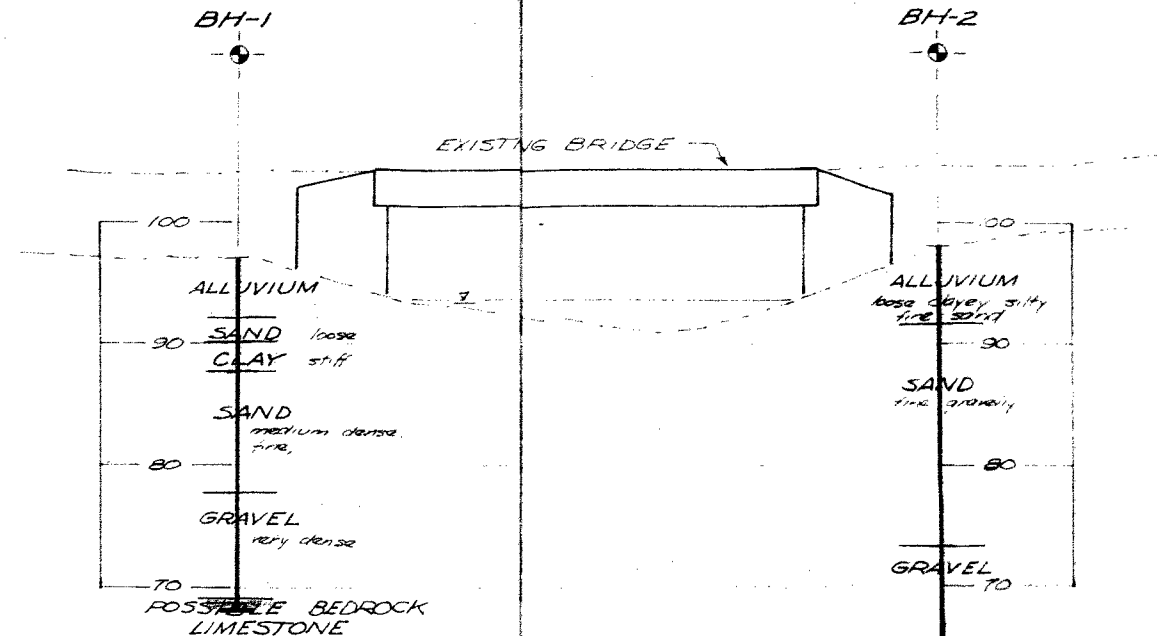


Gravel Road Looking South

Gravel Road Looking South

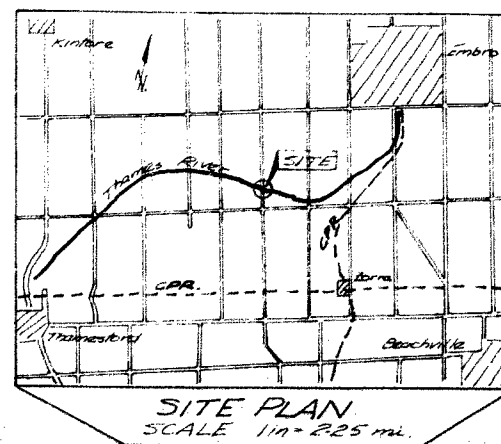


**BOREHOLE LOCATION PLAN**  
SCALE 1/2" = 20 ft.



**INTERPRETED SUBSOIL STRATIGRAPHY**

SCALE: HOR. 1/4" = 20 ft.  
VERT. 1/4" = 10 ft.



**SITE PLAN**  
SCALE 1/4" = 225 mi.

NOTE:  
BM Bolt driven in west root of  
big tree ~ 490 ft east of south abutment  
Elev top of bolt assumed 100.00 ft

WILLIAM A TROW & ASSOC'S. LTD.  
FOUNDATION INVESTIGATION

**PROPOSED BRIDGE  
REPLACEMENT**

LOT-6 THAMES RIVER  
CONC 1411 WEST ZORRA

PROJ 1484 DATE AUG. 1964 DWG No 1.

# WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 2  
PROJECT No. J1484

## LEGEND

### 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

X<sup>LI</sup>

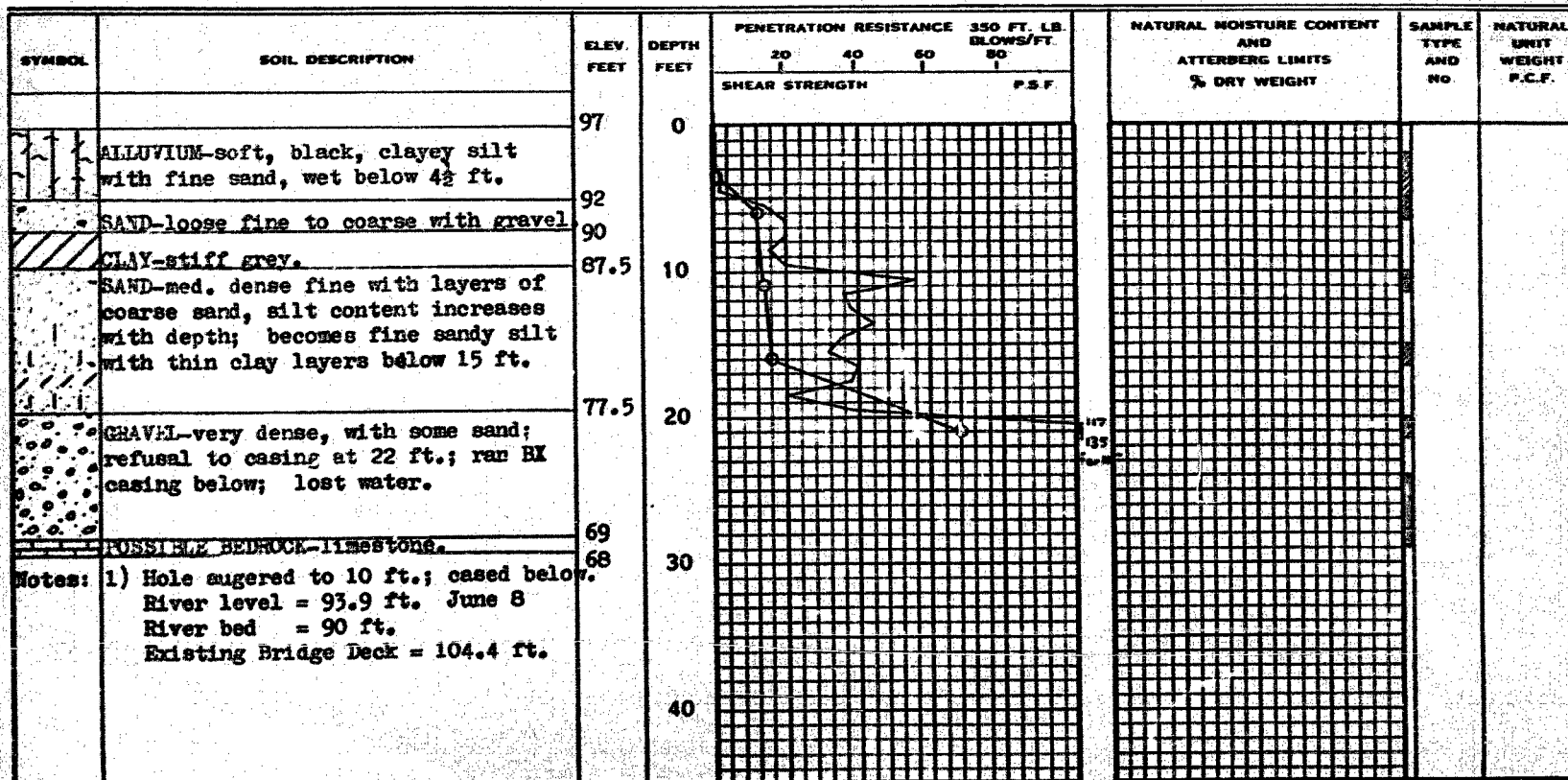
### ATTERBERG LIMITS

LIQUID LIMIT —○—  
PLASTIC LIMIT —+—

### SAMPLE TYPE

2" O.D. SPLIT TUBE —■—  
2" I.D. SHELBY TUBE —■—  
2" O.D. SHELBY TUBE —■—




BOREHOLE NO. 1  
PROJECT Propose. Bridge Replacement - Thames River  
LOCATION Lot 6 - Conc. 1 & 11 - West Zorra  
HOLE LOCATION See DWG. 1.  
HOLE ELEVATION 97.0 ft.  
DATUM \_\_\_\_\_



**SITE INVESTIGATIONS      SOIL MECHANICS CONSULTATION**

DRAWING NO. 3  
PROJECT NO. J1484

### PENETRATION RESISTANCE

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

### SHEAR STRENGTH

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

### NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

x<sup>2</sup>

## ATTERBERG LIMITS

LIQUID LIMIT	_____
PLASTIC LIMIT	_____

**SAMPLE TYPE**

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

BOREHOLE NO. 2  
PROJECT Proposed Bridge Replacement - Thames River  
LOCATION Lot 6 - Conc. 1 & 11 - West Zorra  
HOLE LOCATION See DWG. 1.  
HOLE ELEVATION 98.0 ft.  
DATUM \_\_\_\_\_

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT P.C.F.
				20 40 60 80 SHEAR STRENGTH P.S.F.			
	ALLUVIUM—organic stained silty fine sand; some pcs of wood, soft.	98.0	0				
	SAND—fine, gravelly brown, 1 seam of clay at 10 ft.; thin silt layers below.  Refusal to split spoon and casing at 24.9 ft.	91.5	10				
	GRAVEL—ran BX casing; recovered limestone gravel in core barrel.	73.1	30				
	Notes: 1) Hole cased to full depth.	65.5	40				