

#67-F-221

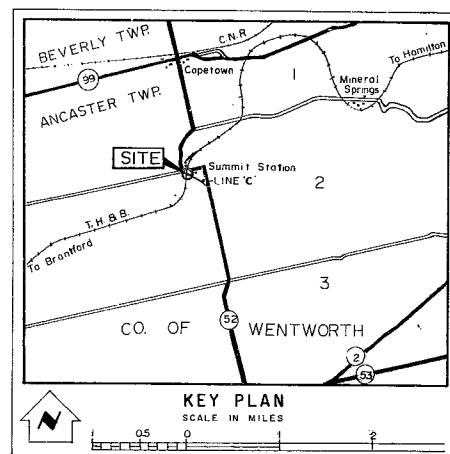
W.P. # 99-66

Hwy. # 52 E


T.H. E B.

RAILWAY


BRIDGE




**LEGEND**




Bore Hole



Cone Penetration Hole



Bore & Cone Penetration Hole

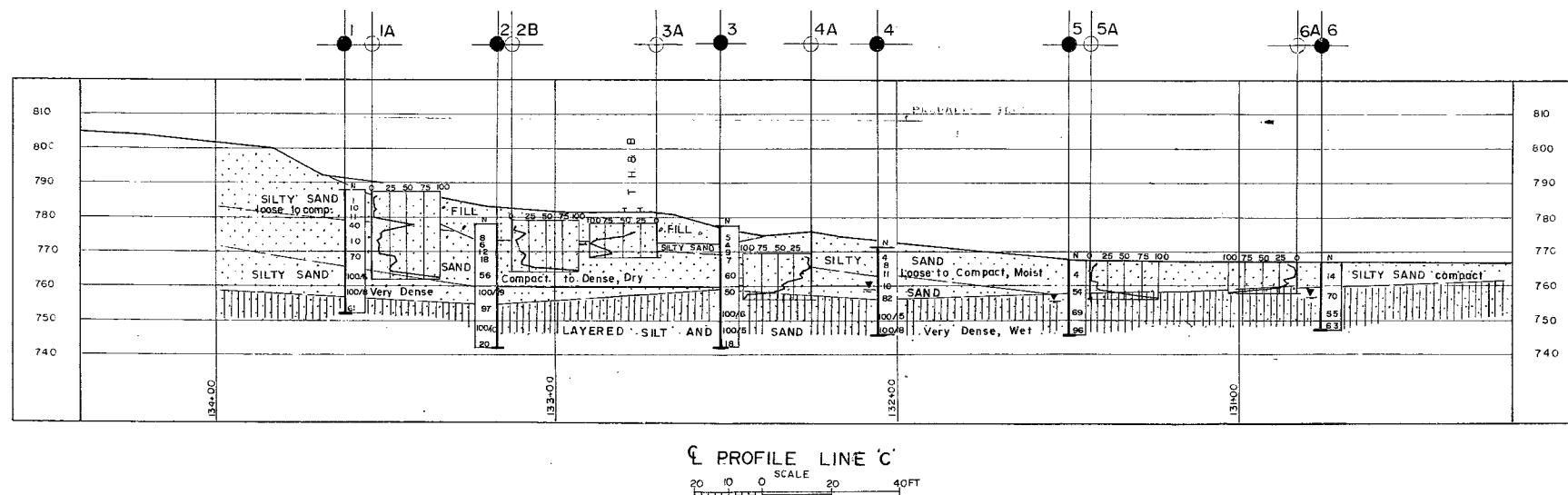

 Water Levels established at time of field investigation. (FEB. 1967)

NO.	ELEVATION	STATION	OFFSET
1	7 8 8.2	133+62	14' RT
1A	7 6 7.5	133+54	2' RT
2	7 7 8.2	133+17	14' RT
2A	7 7 9.0	133+02	11' LT
2B	7 7 8.2	133+13	8' RT
3	7 7 7.5	132+52	12' LT
3A	7 7 7.9	132+68	10' RT
4	7 7 1.1	132+06	16' LT
4A	7 6 9.4	132+25	15' RT
5	7 6 6.8	131+50	5' RT
5A	7 6 6.8	131+44	5' LT
6	7 5 7.2	130+75	6' LT
6A	7 6 7.2	130+83	3' LT

- 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.

[illegible]




WILLIAM TROW ASSOCIATES LTD.

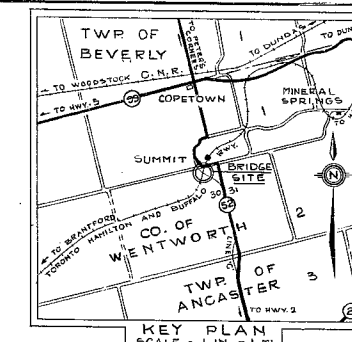
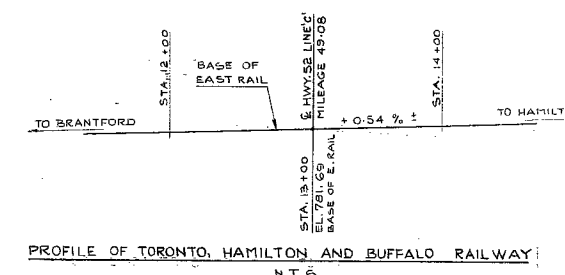
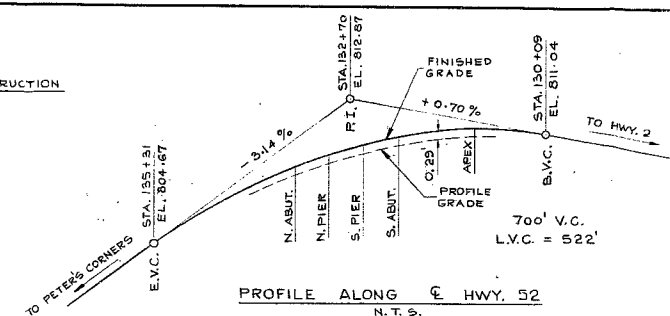
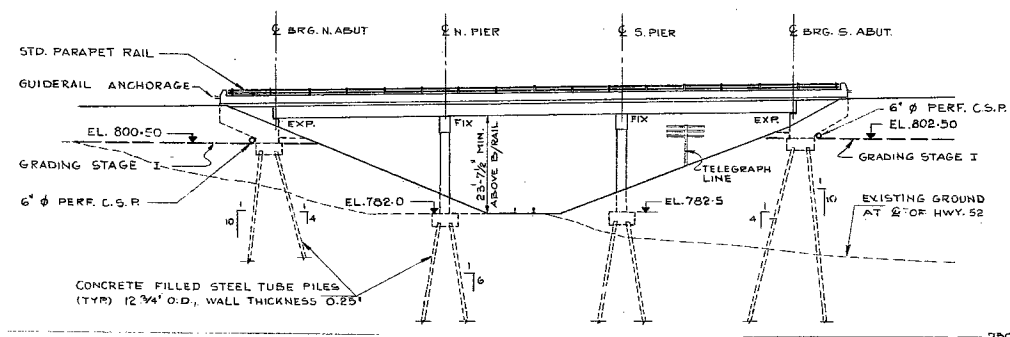
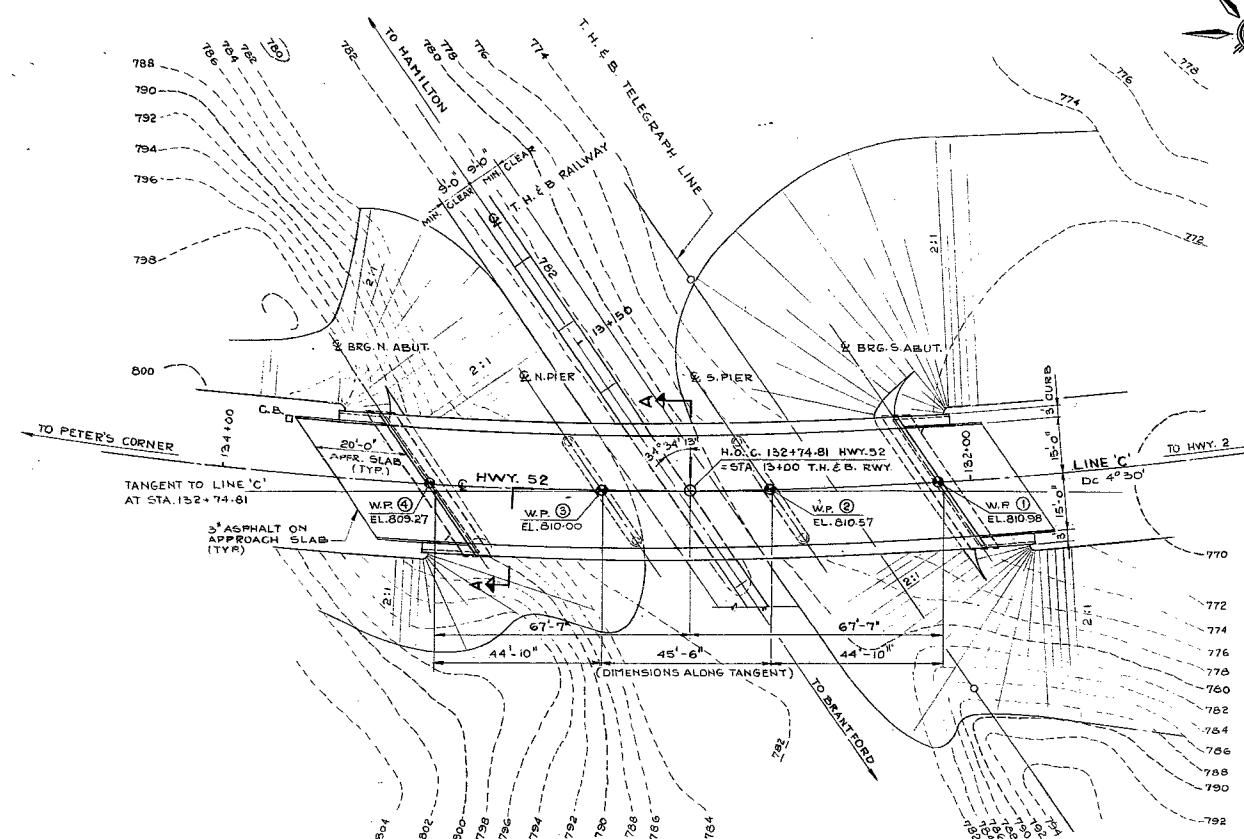
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & TESTING DIVISION - FOUNDATION SECTION

BRIDGE OVER T.H.&B. RAILWAY  
SUMMIT (NEAR COPETOWN)

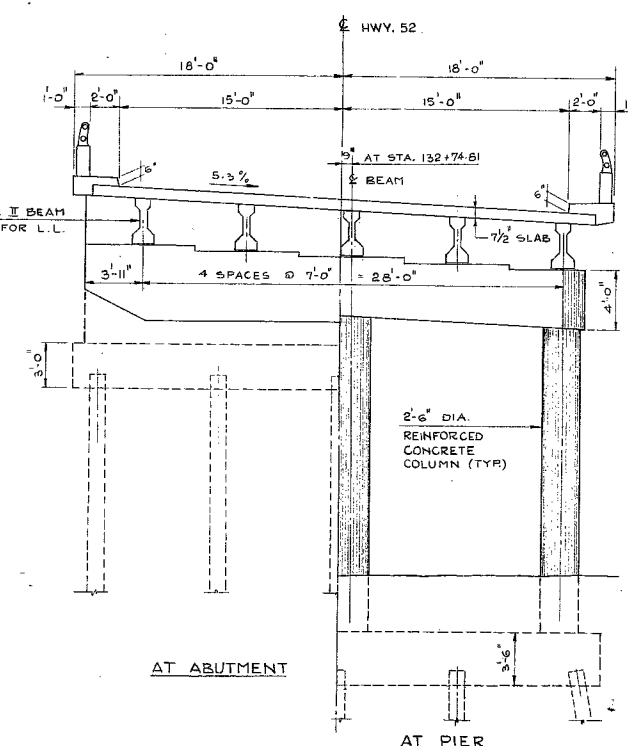
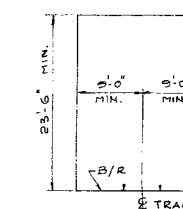
KING'S HIGHWAY NO. 52 LINE C DIST. NO. 4  
CO. WENTWORTH  
TWP. ANCASTER LOT 30 CON. 2

BOREHOLE LOCATIONS &amp; SOIL STRATIGRAPHY

SUBM'D J.D.M.	CHECKED 	W.P. NO. 99-66	DRAWING NO. <b>H 652</b>
DRAWN MK	CHECKED 	JOB NO.	
DATE 21 MAR. 1967		SITE NO 36-216	
APPROVED 		CONT. NO.	



ANGLE OF SKEW - $34^{\circ}34' - 3$
SIN. - 0.56741667
COS. - 0.82343083
TAN. - 0.68908844
SEC. - 1.21443109



B.M. ELEV. 782.98 GEODETIC DATUM  
TOP OF N.W. BOLT IN CONCRETE SLAB  
284' RT. OF STA. 135 + 45

PRINT RECORD		
No.	FOR	DAT

[illegible]

<b>DEPARTMENT OF HIGHWAYS</b> <b>ONTARIO</b> BRIDGE DIVISION	
<b>ASSOCIATES LIMITED</b>	
<h1 style="margin: 0;">T.H. 8 B. RAILWAY OVERHEAD</h1>	
1.30 MILES SOUTH OF COPETOWN	
<b>KING'S HIGHWAY NO. 52 LINE 'C'</b>	<b>DIST. NO. 4</b>
<b>CO. WENTWORTH</b>	<b>MILEAGE 49.1 WATERFORD SUBDIVISION</b>
<b>TWP. ANCASTER</b>	<b>LOT 30 CON. 2</b>
<h2 style="margin: 0;">PRELIMINARY</h2>	

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 5px;"> <b>APPROVED</b> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> <b>DESIGN</b> </td> <td style="width: 50%; padding: 5px;"> <b>BRIDGE ENGINEER</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>R. T. M.</b> </td> <td style="padding: 5px;"> <b>CHECK</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>DRAWING</b> </td> <td style="padding: 5px;"> <b>I. H.</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>DATE</b> </td> <td style="padding: 5px;"> <b>LOADING</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>10/1/74</b> </td> <td style="padding: 5px;"> <b>CR. 14</b> </td> </tr> </table>	<b>APPROVED</b>		<b>DESIGN</b>	<b>BRIDGE ENGINEER</b>	<b>R. T. M.</b>	<b>CHECK</b>	<b>DRAWING</b>	<b>I. H.</b>	<b>DATE</b>	<b>LOADING</b>	<b>10/1/74</b>	<b>CR. 14</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <b>SITE No.</b>  <b>36-218</b> </td> <td style="width: 50%; padding: 5px;"> <b>W.P. No.</b>  <b>09-0</b> </td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <b>CONTRACT</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>No.</b> </td> <td style="padding: 5px;"> <b>No.</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>DRAWING</b> </td> <td style="padding: 5px;"> <b>No.</b> </td> </tr> <tr> <td style="padding: 5px;"> <b>D-6218-PI</b> </td> <td style="padding: 5px;"> <b>PI</b> </td> </tr> </table>	<b>SITE No.</b> <b>36-218</b>	<b>W.P. No.</b> <b>09-0</b>	<b>CONTRACT</b>		<b>No.</b>	<b>No.</b>	<b>DRAWING</b>	<b>No.</b>	<b>D-6218-PI</b>	<b>PI</b>
<b>APPROVED</b>																							
<b>DESIGN</b>	<b>BRIDGE ENGINEER</b>																						
<b>R. T. M.</b>	<b>CHECK</b>																						
<b>DRAWING</b>	<b>I. H.</b>																						
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<b>No.</b>	<b>No.</b>																						
<b>DRAWING</b>	<b>No.</b>																						
<b>D-6218-PI</b>	<b>PI</b>																						

BA 2547



36-218

MR. A. HUTKA, P.ENG.,  
MATERIALS AND TESTING ENGINEER  
DEPARTMENT OF HIGHWAYS  
HIGHWAY 401 AND KEELE STREET,  
DOWNSVIEW, ONTARIO.

FOUNDATION INVESTIGATION  
SITE NO. 36-218, T.H. AND B. BRIDGE  
HWY. 52, LINE C, W.P. 99-66, DISTRICT #4  
(HAMILTON)

Project: H652

William Trow Associates Limited

March 1967

Project: H652

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



Associates Ltd.

March 21, 1967

Mr. A. Rutka, P.Eng.,  
Materials and Testing Engineer,  
Department of Highways,  
Highway 401 and Keele St.,  
Downsview, Ont.

Attention: Mr. A.G. Stermac, P.Eng.

Foundation Investigation  
Site No.36-218, T.H. and B. Bridge  
Hwy. 52, Line C, W.P.99-66, Dist, #4  
(Hamilton)

Dear Sirs:

With reference to your authorization dated February 15, 1967, we enclose the results of our completed foundation investigation of the above site. A skewed three-span bridge about 135 feet long is proposed, with spill-through type abutments. The toe of each approach fill is to slope down from the abutment face to the pier at approximately 2 horizontal to 1 vertical. The height of the approach fills is approximately 10 feet and 35 feet for the west and east abutments respectively.

For your convenience our findings and recommendations are briefly summarized:

1. The proposed bridge is to be located a short distance south from the present Hwy. 52 grade crossing of the Toronto, Hamilton and Buffalo Railway's Brantford to Hamilton line, at Summit Station, Ancaster.

2. Subsoils were found to consist of a layered series of variably dense sands and silty sands. Some minor cutting and filling has been involved in construction of the railway.

3. Foundations for the abutments and piers can be established at relatively shallow depths as spread footings, bored caissons or Franki-type compaction piles.

4. No settlement or stability problem exists for either the bridge or the approach fills.

5. Granular borrow materials for the approach fills is readily available within a few hundred feet of the site.

Our expanded comments follow:

1. SITE

The proposed crossing of the Toronto, Hamilton and Buffalo Railway Company Limited rail line from Hamilton to Brantford, by Proposed Revision Line C of Highway 52, is located two to three hundred yards south of Summit Station, in the Township of Ancaster, County Wentworth, Ontario. Bridge centreline is to be about 300 ft. south from the existing grade crossing.

Summit Station is situated at the southeast end of a deep muskeg swamp, which does not, however, extend to the proposed bridge site.

## 2. INVESTIGATION

### 2.1 Field Work

The field investigation comprised 6 sampled power auger borings and 7 dynamic cone tests. Locations are shown on the site plan, Dwg. 1. A muskeg tractor equipped with a 'dozer blade was used to facilitate moving and setting up of the trailer-mounted auger drill.

Sampling was performed at regular depth intervals of 5 feet or less, using a conventional 2 inch O.D. split spoon sampler. Penetration values were recorded. Ground elevations at the boreholes and cone locations were referred to the level of the top of the west rail at proposed bridge centreline, in view of the covering up of the project bench mark by a borrow pit access road.

Individual borehole records are attached as Dwgs. 2 to 7 inclusive.

### 2.2 Subsoils and Geology

Subsoils at the site consist of a layered irregular sequence of variably compact to extremely dense silty sands and sands. The uppermost loose to compact silty sand stratum appears to thicken into the higher ground to the west of the site. A small amount of cut and fill is involved adjacent to the existing railway tracks. No deep peat deposits were encountered.

Bedrock is understood from local well records to underlie the site at a depth well in excess of 300 feet.

### 2.3 Groundwater

Groundwater was encountered in all six borings, with the general water table appearing to be at about El.760 (west side) to El.756 (east side). However, long-term observations could not be performed due to the rapid cave-in of the sides of the holes once augering and sampling had been completed.

The uppermost cohesive and silty sand stratum tends to be moist, but is not sufficiently impervious to create a perched water condition.

### 2.4 Laboratory Testing

No laboratory testing of samples has been performed, in view of the general granular character of the subsoils. All samples have been thoroughly examined visually.

## 3. ENGINEERING CONSIDERATIONS

### 3.1 Foundations, West Abutment

The following alternative foundation procedures appear feasible for this abutment:

- a) Spread footings on dense sand at El.760. A safe net bearing pressure of 2 tsf (4 ksf, 4000 psf) may be applied, provided the footing beds are thoroughly worked over with a vibratory plate or small roller compactor.
- b) Spread footings on dense sand at El.770. A safe net bearing pressure of 4 tsf (8 ksf, 8000 psf) can be applied. Again, the footing pads should be compacted to eliminate possible pockets of looser sand.



c) Spread footings, bored caissons or Franki-type compaction piles at El. 765. In the first two cases, the depth of cover above footing level will be at least 10 times the footing width or caisson diameter, and a safe net bearing pressure of 10 tsf (20 ksf, 20,000 psf) can be utilized. In the case of a Franki pile, the safe net working capacity will be at least 150 tons.

No groundwater will be encountered during excavation.

### 3.2 Foundations, West Pier

Spread footings for this pier can be considered, set at El. 770 and utilizing an allowable bearing pressure of 2 tsf (4 ksf, 4000 psf). The footing beds will be in compact to moderately dense dry sand, and should be thoroughly compacted with vibratory plate or roller equipment to eliminate possible looser or loosened pockets. The excavation will be dry.

Alternatively, deeper spread footings, bored caissons or Franki piles, bearing at El. 763-764, can be considered. A safe net bearing pressure of 10 tsf can again be considered, in view of the extreme denseness of the founding subsoil. Franki piles will also be capable of supporting a 150 tons safe working load.

### 3.3 Foundations, East Pier

Due to the sloping nature of the ground at this pier location, a marked difference in denseness of the upper soil at any specific elevation was recorded. However, the sand subsoil does

appear to be uniformly very dense below about El. 763, and use of spread footings, caissons or Franki piles at this founding level is suggested. The loadings outlined in Sections 3.1 and 3.2 will again apply, since depth of cover at end of construction is expected to exceed 15 to 16 feet.

Footings at shallower depth will not be possible, see the penetration resistance values in borehole 3.

Foundation excavations to El. 763 will be dry.

### 3.4 Foundations, East Abutment

Footings, caissons or compaction piles should be founded at El. 760 approximately, using the bearing pressures and pile capacities already outlined in the foregoing. No reduction in capacity due to the close proximity of the water table appears warranted, in view of the extreme denseness of the sand below suggested founding level.

### 3.5 Settlement

Settlements occurring beneath the suggested foundation loads will be of a small order and almost certainly considerably less than an inch. The movement will occur entirely as the structure is being built.

### 3.6 Approach Fills

No construction, settlement, or stability problem exists for either proposed approach embankment. Foundation soils are entirely granular in character. Minor consolidation of the loose

to compact upper silty sand stratum beneath the higher east approach fill will occur as the fill is being constructed. The total movement will be small, and almost certainly less than that attributable to consolidation of the fill itself.

We thank you for this opportunity to be of service, and trust you will find this investigation and report in order. Should you have any further queries, please do not hesitate to call.

Yours very truly,

WILLIAM TROW ASSOCIATES LIMITED

*J. Morton*

John D. Morton, P.Eng.

JDM/yg

*W. A. Trow*

Wm. A. Trow, P.Eng.

Encls.

Dist: Dept. Highways of Ontario (11)

# WILLIAM TROW ASSOCIATES LTD.








SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

## LEGEND

DRAWING No. 1  
PROJECT No. H652


BOREHOLE and Cone/1A  
PROJECT Line C Bridge over T.H. and B Hwy.  
LOCATION Hwy. 52, Co. Kentworth, Ont.  
HOLE LOCATION West abutment (see Dwg.1)  
HOLE ELEVATION 788.2, Cone Elevation 787.5  
WATER Geodetic, as provided by D.H.O.

### 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  15  5

### NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

### ATTERBERG LIMITS

LIQUID LIMIT 

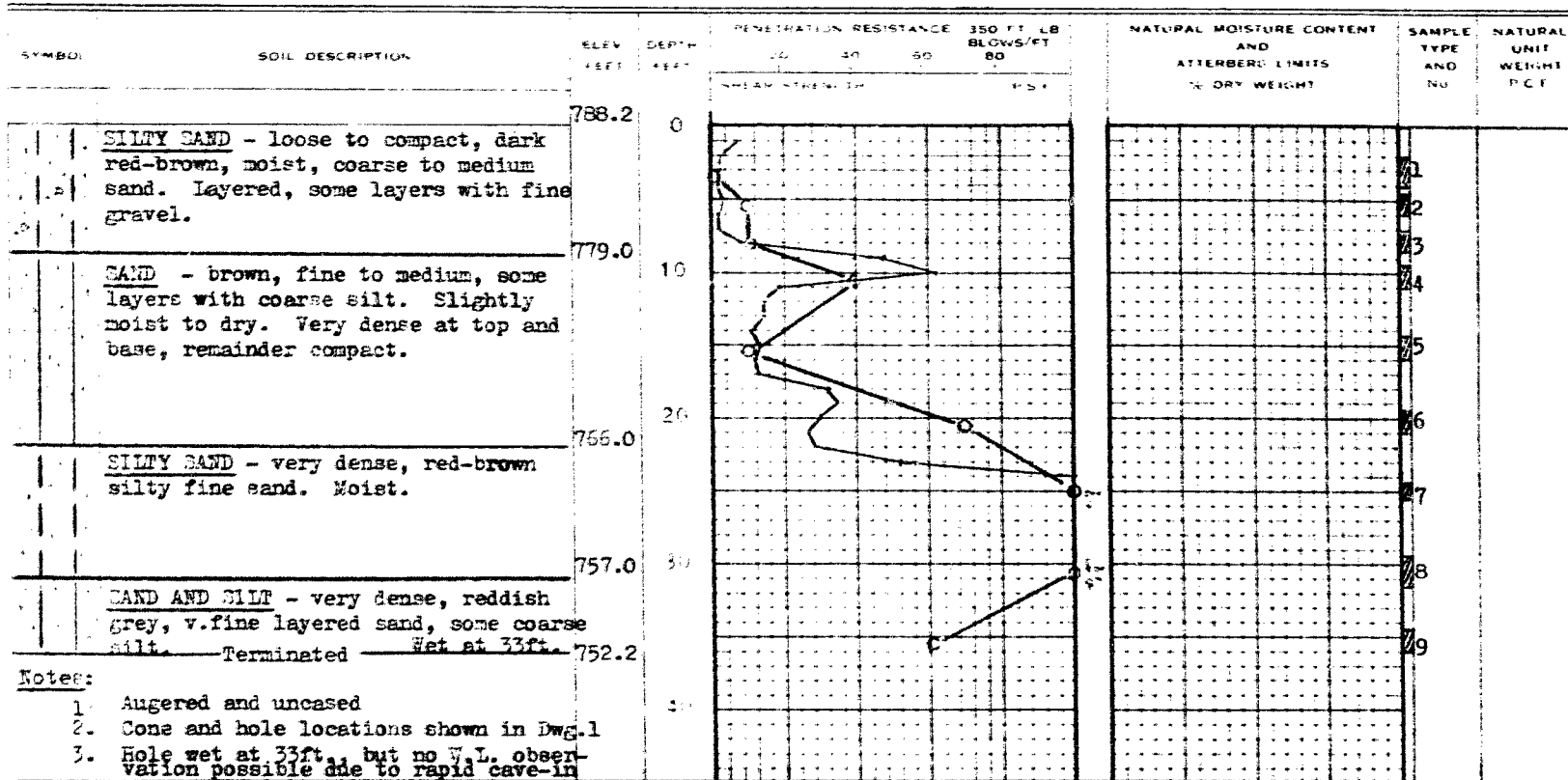
PLASTIC LIMIT 

### SAMPLE TYPE

2" O.D. SPLIT TUBE 

2" I.D. SHELBY TUBE 

3" O.D. SHELBY TUBE 



# WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING NO. 2  
PROJECT NO. H652

## LEGEND

### PENETRATION RESISTANCE

2" O.D. SPLIT TUBE —○—○—  
2" I.D. SHELBY TUBE —x—x—x—  
2" DIA. CONE ————

### SHEAR STRENGTH

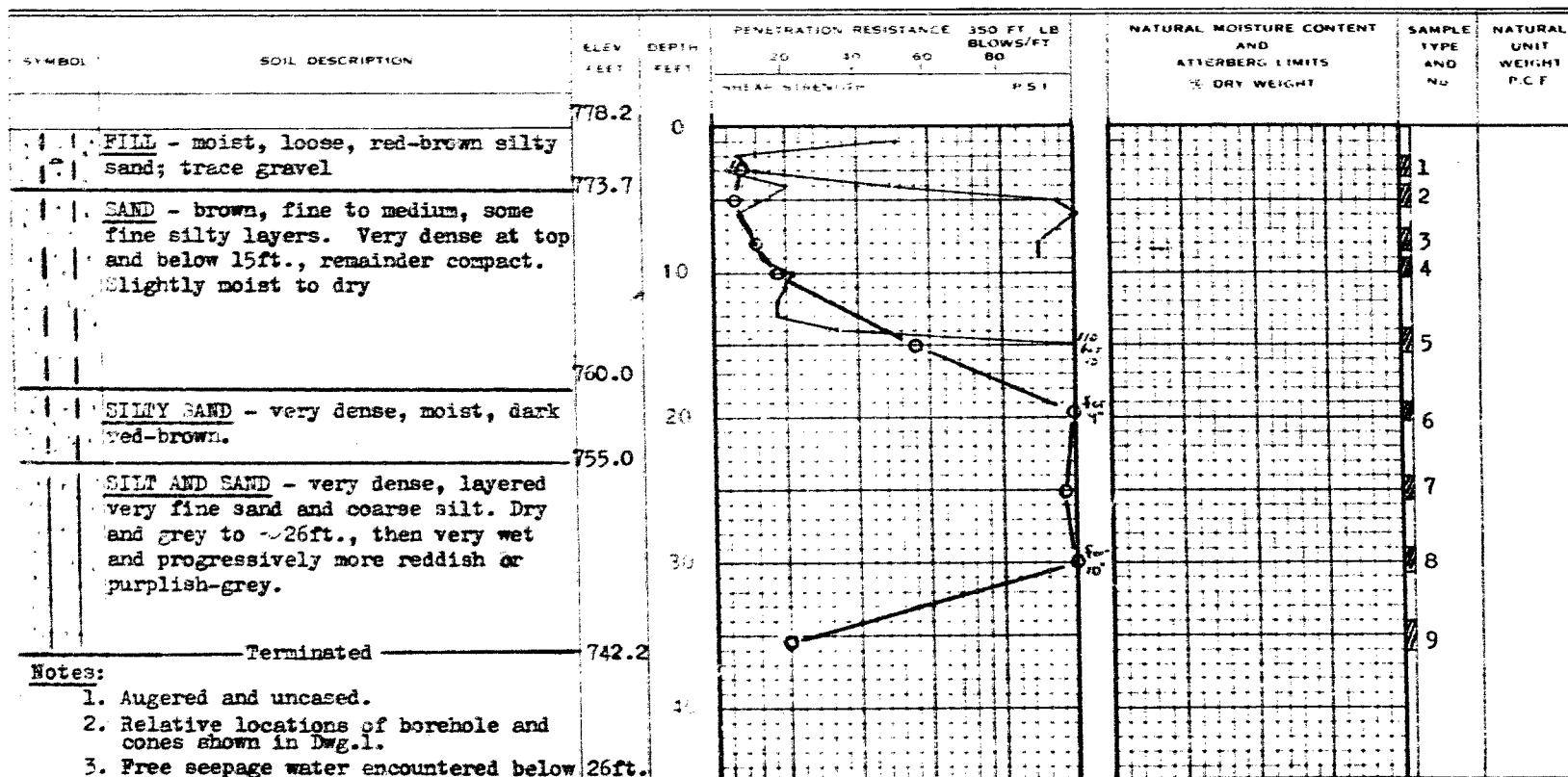
UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕  
UNCONFINED COMPRESSION ⊗  
VANE TEST AND SENSITIVITY  $\frac{1}{2} \frac{1}{s}$  †

### 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 ⊢

BOREHOLE and Cones # 2/2A/2B  
PROJECT Line C Bridge over T.H. and B. Rlwy.  
LOCATION Hwy.52, Co. Wentworth, Ont.  
HOLE LOCATION West Pier (See Dwg.1)  
HOLE ELEVATION 778.2, Cone Elevation 779.0  
DATUM Geodetic, as provided by D.H.O.



### Notes:

1. Augered and uncased.
2. Relative locations of borehole and cones shown in Dwg.1.
3. Free seepage water encountered below 26ft.

Base of hole piping in severely before and after sampling at 34ft. Caved in and wet at 15ft., 1 hr. after completion.

Borehole and Cones 2

# WILLIAM TROW ASSOCIATES LTD.


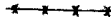

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

## LEGEND




DRAWING NO. 3  
PROJECT NO. H652

BOREHOLE and Cone 3/3A  
PROJECT Line C Bridge over T.H. and B. Hwy.  
LOCATION Hwy. 52, Co. Wentworth, Ont.  
HOLE LOCATION East Pier (see Dwg. 1)  
HOLE ELEVATION 777.5, Cone Elevation 777.9  
DATUM Geodetic, as provided by D.H.O.

### 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 (SI) 

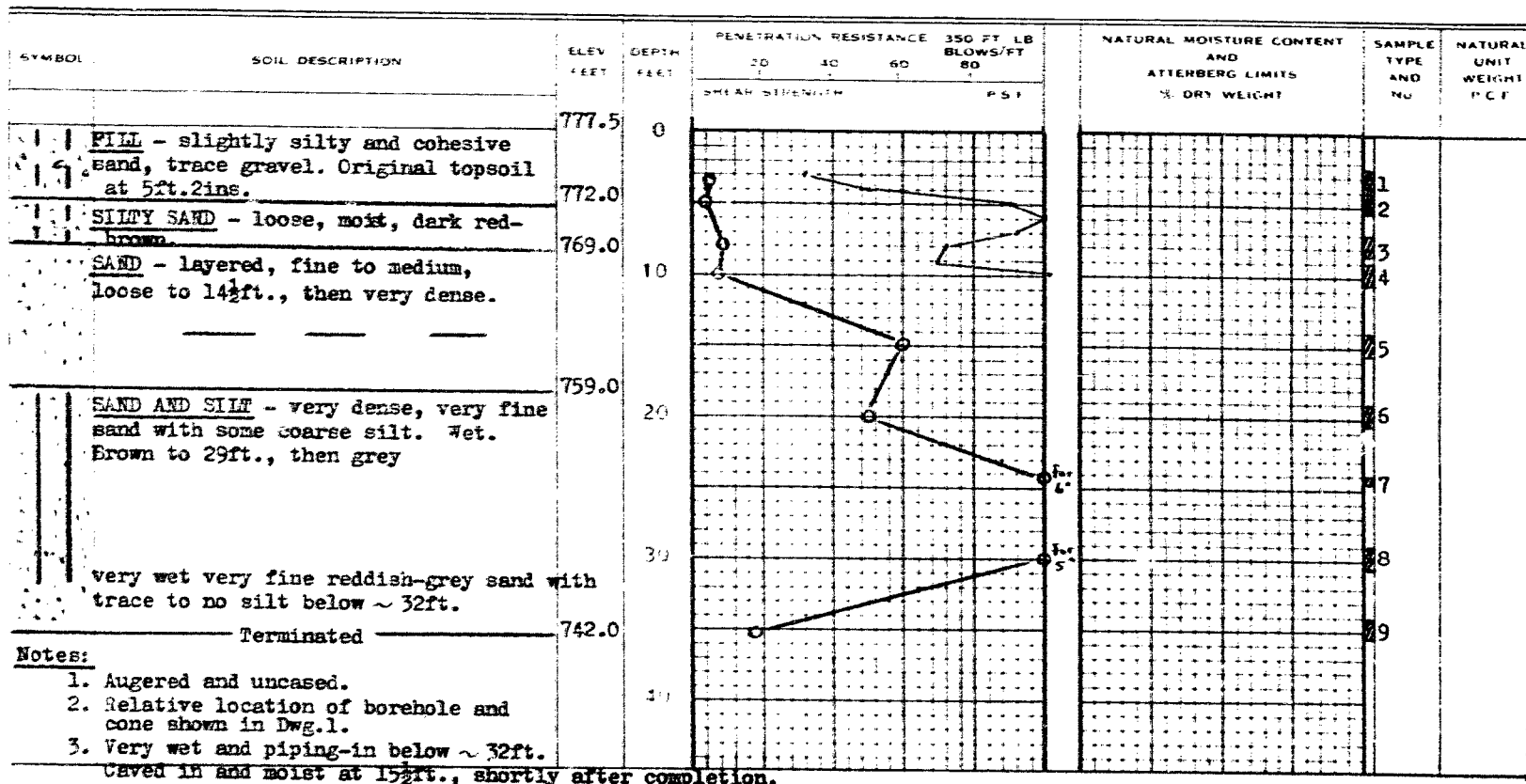
### NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

#### ATTERBERG LIMITS

LIQUID LIMIT   
PLASTIC LIMIT 

#### SAMPLE TYPE

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









# WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION

DRAWING No 4  
PROJECT No B652

## 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   $\pm$

### NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

#### ATTERBERG LIMITS


LIQUID LIMIT 

PLASTIC LIMIT 

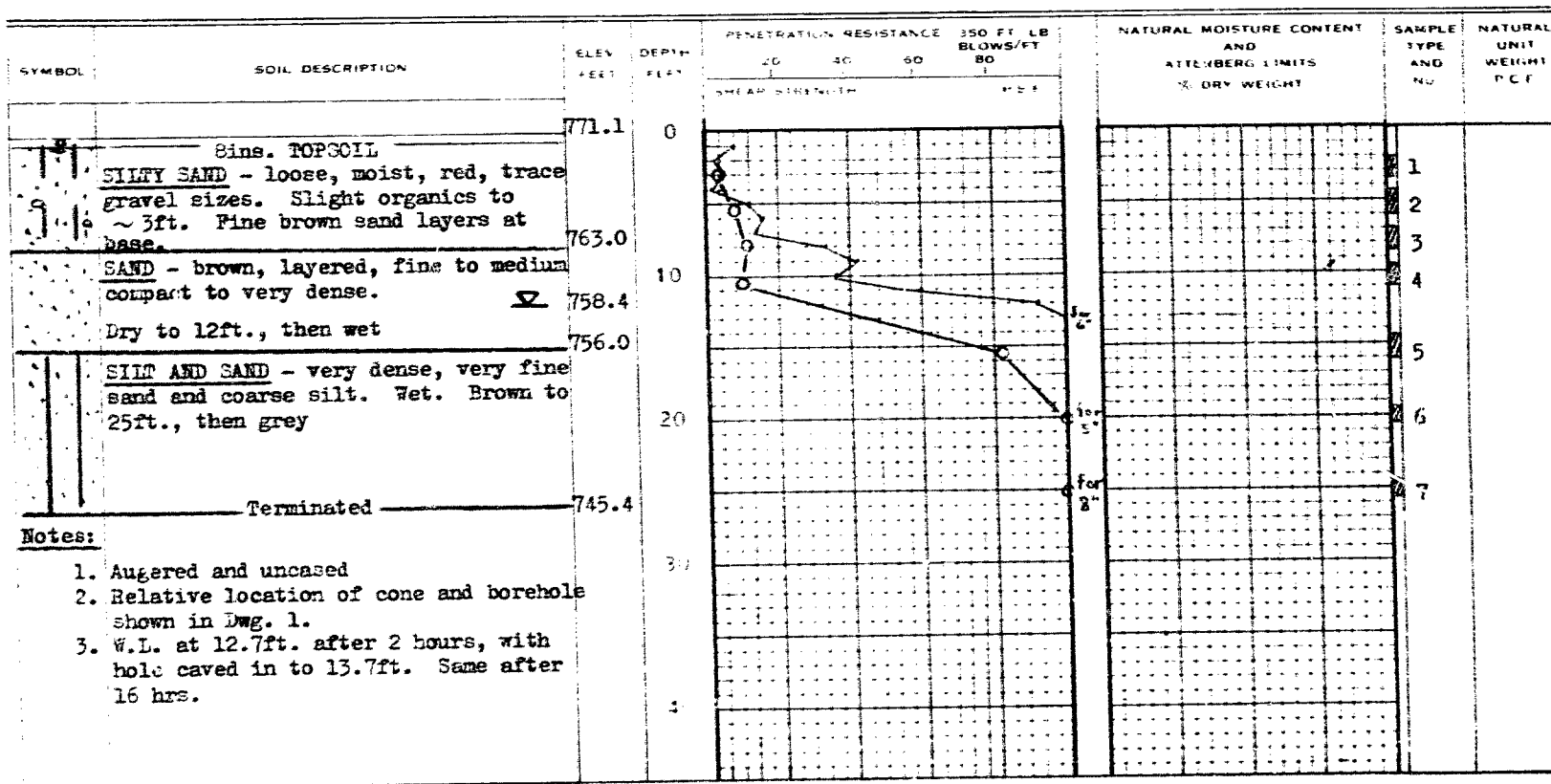
#### SAMPLE TYPE

2" O.D. SPLIT TUBE 

2" I.D. SHELBY TUBE 

3" O.D. SHELBY TUBE 

BOREHOLE and Cone #4/4A  
PROJECT Line C Bridge over T.H. and B. Rlwy.  
LOCATION Hwy-52, Co. Wentworth, Ont.  
HOLE LOCATION East Abutment (see Dwg.1)  
HOLE ELEVATION 771.1, Cone Elevation 769.4  
DATUM Geodetic, as provided by D.H.O.




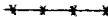

# WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION




## LEGEND

DRAWING No. 5  
PROJECT No. H652

### 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 IS. 

### 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 

LI  
X

—○

—

○

×

×

BOREHOLE and Cone 5/84

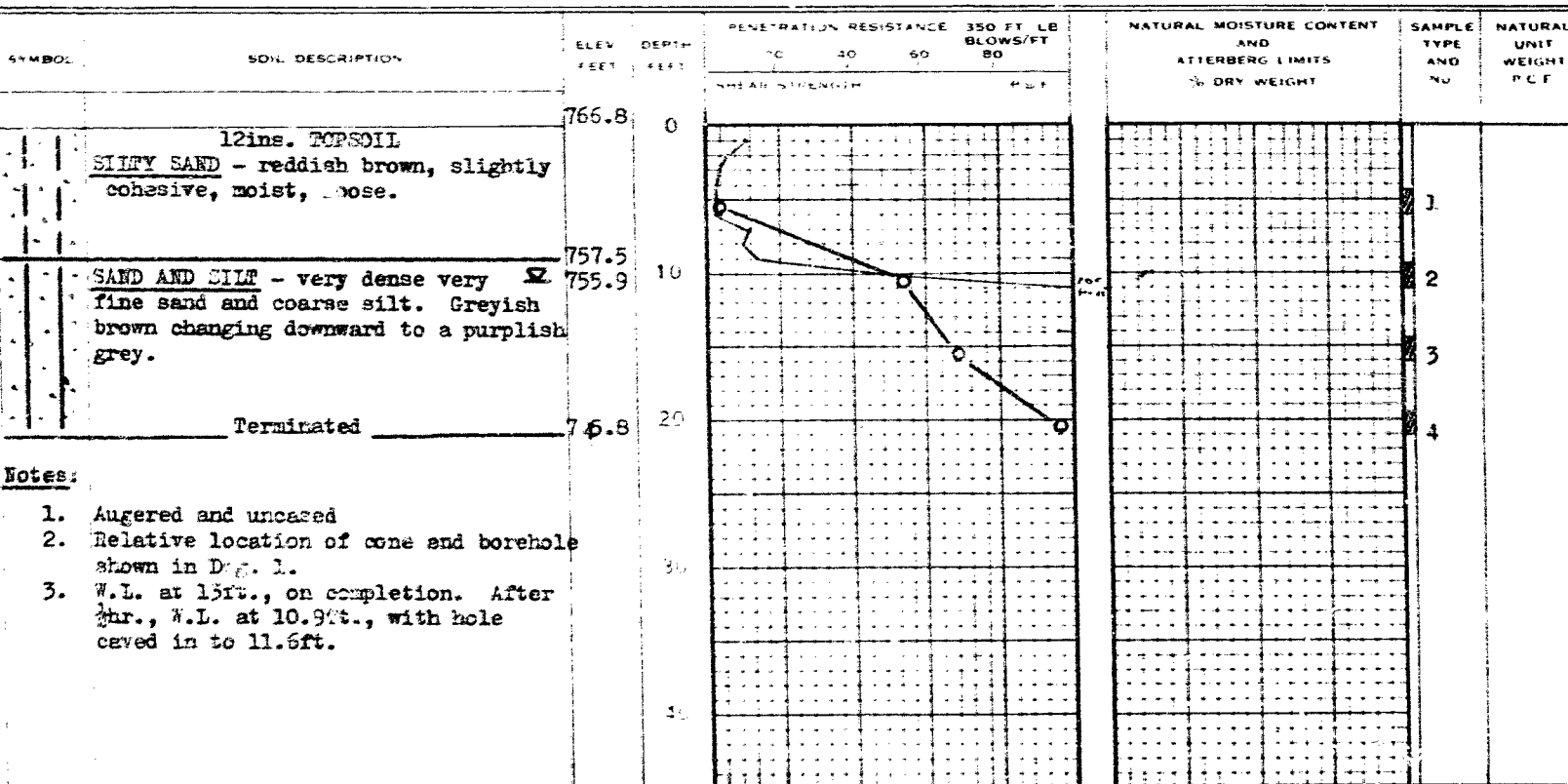
PROJECT Line C Bridge over T.H. and B. Rlwy.

LOCATION Hwy. 52, Co. Wentworth, Ont.

HOLE LOCATION East Approach Fill (see Dwg. 1)

HOLE ELEVATION 766.8

DATUM Geodetic, as provided by D.H.O.



### Notes:

1. Augered and uncased
2. Relative location of cone and borehole shown in Dwg. 1.
3. W.L. at 13ft., on completion. After 4 hr., W.L. at 10.9ft., with hole caved in to 11.6ft.

Borehole and Cone 5




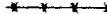




# WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

## LEGEND

DRAWING No. 6  
PROJECT No. 8652

### 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 

X<sup>LI</sup>

—○—

—■—

—■—

BOREHOLE and Cone 6/6A  
PROJECT Line C Bridge over T.H. and B. Rlwy.  
LOCATION Hwy. 52, Co. Wentworth, Ont.  
HOLE LOCATION East Approach Fill (see Dwg. 1)  
HOLE ELEVATION 767.2  
DATUM Geodetic, as provided by D.H.O.

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	100 FT. LB BLOWS/FT			
	10ins. TOPSOIL	767.2	0							
	SILTY SAND - compact, mottled brown, moist.	760.0								
	SAND AND SILT - very dense, grey, very fine sand and coarse silt. Wet at 12ft., and purplish grey.	757.0	10							
	fine silt-free sand below 20ft.									
	Terminated	746.7	20							
Notes:										
1. Augered and uncased.										
2. Relative location of cone and borehole shown in Dwg. 1.										
3. Caved in and wet @ 18ft., on completion and rising slowly. W.L. @ 10.3 after 24 hours, with hole caved to 11ft.										

Borehole and Cone 6

## MEMORANDUM

To: Mr. B. R. Davis,  
Bridge Engineer,  
Bridge Division, Admin. Bldg.  
Attention: Mr. S. McCombie

From: Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Date: March 30, 1967

Our File Ref.

In Reply To:

MAR 30 1967

SUBJECT: FOUNDATION INVESTIGATION REPORT FOR D.H.O.  
BY: WILLIAM TROW ASSOCIATES LIMITED --  
Site No. 36-218, T.H. and B. Bridge,  
Hwy. 52, Line 'C', District #4 (Hamilton).  
W.P. 99-66

Attached, please find the report for the above mentioned site, prepared and submitted by William A. Trow Associates Ltd.

We have reviewed the report and found the factual information adequate and well presented.

Three alternatives are proposed for the foundations of the structure. Apart from economic considerations, the following should also be given consideration:

The proximity of the railway tracks to the pier foundations will require adequate protection of the foundation excavations. For the same reason, care will have to be exerted if piles are driven because of the possibility of the tracks being lifted by the displacing of the material due to pile penetration.

Should you wish to discuss any foundation aspects of this structure, please feel free to contact this Office.

AGS/MdeF  
Attach.

cc: Messrs. B. R. Davis (2)  
H. A. Tregaskes  
D. W. Farren  
G. K. Hunter (2)  
H. Greenland  
W. S. Melnyshyn  
T. J. Kovich  
B. A. Singh  
  
Foundations Files  
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*A. G. Stermac*  
A. G. Stermac  
PRINCIPAL FOUNDATION ENGINEER

Mr. C. S. Grebski,  
Bridge Design Engineer,  
Bridge Division,  
Admin. Bldg.

285  
Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

July 18, 1967

T.H. & B. Railway Overhead,  
1.30 miles South of Copstown,  
A.P. 99-66, Site No. 36-218,  
Highway 52, District No. 4.

We have reviewed the Preliminary Bridge  
Plan Drawing D-6167-F1 for the above mentioned  
structure.

We have no comments pertaining to the  
structure foundations.

MD/YAeF

*M. Devata*  
M. Devata,  
SUPERVISING FOUNDATION ENGR.  
For:  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.

cc: Messrs. S. McCombie  
W. S. Melnyshyn

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Department of Highways Ontario

Copy for the information of

Mr. A. Stermac,  
Principal Foundation Engineer

Mr. W. Melingshyn,  
Reg. Bridge Location Engineer,  
Central Region,  
Administration Building

Bridge Division,  
Downsview, Ontario

July 17, 1967

T.H.&B. Railway Overhead  
1.30 Miles South of Copetown  
W.P. 99-66, Site No. 35-218  
Highway 52, District No. 4

Attached herewith are prints of the Preliminary Bridge  
Plan Drawing B-6218-21 for the above-mentioned structure.

The estimated cost of the proposed structure is \$83,500.  
This cost includes tender, materials, engineering and sundry  
construction.

Any comments or revisions you may have should be submitted  
within three weeks.

CSG:rd

C.S. Grebski,  
Bridge Design Engineer

Attach.

c.c. A. Stermac  
S. McCombie  
R. Forrest  
E. Cross

July 7th 1967. Snow/67

Q: Can tube piles be used (12 inch) and can a safe load of 85 tons be applied (like Gylden)?

A: Yes! In principle this question or part of it was answered to Chester Gylden on June 2/67.

It is believed that refusal to driving will be met around elevation 750. The pile capacity should be checked by the Hiley formula. The results should be reasonably reliable because it is basically a granular deposit.

Careful observation should be made on the railway tracks during pile driving. If any displacement, horizontal or vertical is observed driving should be halted and either jacking or predrilling should be resorted to. Preference should be given to predrilling.

Special provision should cover the above

afternoon

Note:

June 8. 1967

Q: Can tube piles or even H-piles be used at this crossing? (C. Grebski)

A: Yes, but preference should be given to tube piles. It is basically a granular deposit and a displacement piles would be more appropriate. H piles may penetrate deeper and make the project more expensive.

Strangely, but two borholes (No 2 & 3), stop with a rather small blow count  $N=26$  &  $18$ . It is believed that the borhole bottom was disturbed rather than the deposit becoming so much looser.

Care should be taken that the railway tracks be not lifted while the piles for the cut piers are being driven.

WJ

D.F. No 99-66

T.H. & B. BRIDGE

Report by W.A. Frow Assoc.

Box. 451 - Apple St.  
Downsview, Ontario.  
Tel. No. 264-3432

Materials and Testing Division

February 13, 1967

William A. Brown Associates Ltd.,  
20 Silver Drive,  
Markham, Ontario.

Foundation Investigation

Re: Foundation Investigation -- Letter of Authority  
W.A.B. 17-66 -- Site No. 36-213,  
Box. No. 52 -- District No. 4 (Hamilton).

Dear Sir:

Please consider this your authority to carry out the necessary foundation investigation at the above mentioned site.

The necessary plans were given to your representative on February 13, 1967.

You are requested to proceed with the investigation as soon as possible and submit twelve (12) copies of your final report to the Department by not later than April 1, 1967.

Should you encounter any problems which you would like to discuss, please contact the Foundation Section. In cases you require any clarification regarding the location or alignment, please contact Mr. W. A. Selwyn, Regional Bridge Location Engineer, Toronto (Tel. No. 293-3406).

We understand that this investigation will be done out of your Hamilton Office.

The field work should, at all times, be supervised by a qualified Civil Engineer. Any deviation from this agreement has to meet our prior approval.

cont'd. /2 ...

William A. Trow Assoc.  
Attn: Dr. D. Shields

- 2 -

February 15, 1967

Previous requirements as to preliminary borehole information and laboratory testing program, should be followed.

Since the drawing accompanying the foundation report, showing the location of borings, the inferred subsoil conditions, etc., is to become a contract drawing, you are requested to prepare it in accordance with the U.S.C. standards. To enable you to do this, we are supplying you with a sample drawing with all the necessary explanations, together with linen sheet for your drawing. You are also requested to provide us with a carbonless copy of the drawing.

Charges for the work performed will be in accordance with your schedule of rates, dated January 1, 1966, and invoice to be addressed to the attention of the undersigned.

Yours very truly,

*A. Rutka*

A. Rutka

MATERIALS & TESTING ENGINEER

WRH/127  
Atlanta.

cc: Messrs. B. McCombie  
G. A. Hunter  
H. Greenland  
W. B. Melinyan  
T. J. Kovich  
H. Konings  
Mrs. I. Steinberg  
H. Gyzmansel (2) ✓  
A. Crowley  
Foundations Files  
Gen. Files



7  
WP 99-66  
66-F-95

Materials & Testing Division,  
Central Region,  
Room 134, Lab. Bldg.,  
Downsview, Ontario,  
March 14, 1967.

Telephone: 248-3252

C. C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers,  
688 Queensdale Avenue East  
at Upper Sherman,  
Hamilton, Ontario.

Attention: Mr. D. Patterson

Dear Sir:

Re: Contract 65-71, Hwy. 403,  
T.H. & B. Aly. to Mohawk Road  
Hamilton District

This will confirm the recommendations made at the meeting on the above contract with Mr. A. G. Stermac, Mr. D. Patterson, and the undersigned, on Friday March 10, 1967.

These are detailed below:

(1) The firm of C. C. Parker will provide cross-sectional data of the existing conditions through the middle of the slide area, to the right of station 598 approximately. They are to install observation stakes at various points in the failure zone, and provide vertical and horizontal measurements of these at least twice weekly.

A decision on the recommended treatment of this failure area will be made after the above information is obtained and analysed.

continued:-

C. C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers.

March 14, 1967.

(2) There is definite evidence of an impending failure of the top portion of the rock fill in the northwest corner of the existing fill opposite station 588 approximately. Since this is apparently caused by the presence of a considerable quantity of shaley material, this material must be removed to its full depth, and wasted on the side slopes. Mr. Patterson indicated that this could extend to a depth of 10' - 15'.

(3) No shaley material is to be used in the deep fills to the west of station 570 approximately, particularly in view of the impending failure detailed in recommendation (2) above.

(4) The ditch at grade leading from the cascade at station 584+00 to the east is to be improved immediately to intercept all drainage water before it can enter the existing fill.

(5) The clay pocket near the centreline at station 584 approximately is to be subexcavated as discussed with you on the site.

(6) A ditch is to be dug at the feet of the side slope to the left of station 559 to 565 approximately, and to be extended across the roadway and down the northern side slope. Pipes are to be used as required.

(7) Water seeping from one area of the limestone face opposite station 553 approximately should be intercepted and drained by metal pipes over the old disposal area and allowed to drain down the slope to the bench below. The surface runoff conditions in this area must also be corrected so that all such water would follow one channel to the lower bench. Water ponding in the existing ditches on the various benches in this area must be drained off by temporary methods if it is not possible to correct the grade of the ditches at this time. These grades must be corrected as soon as possible, in any case, to provide adequate drainage.

(8) There is a fairly bad seepage zone in the lower portion of the side slope opposite station 552+50 approximately. This area must be subexcavated, the seepage zone intercepted with perforated pipe if possible, and the area backfilled with good granular material. The extent of the required subexcavation was discussed at the site with yourself, and although the general limits were agreed upon it will be necessary to finalize

continued:-

C. C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers.

March 14, 1967.

these as the actual work progresses. This corrective treatment must be undertaken as soon as possible.

As stated again at this meeting, we cannot overemphasize the importance of adequate drainage throughout this contract, and particularly during the forthcoming wet period. Any ponding of water must be prevented, or immediately corrected, if it does occur. Poor drainage conditions could definitely result in additional failures.

Yours truly,



M. D. Smith.

for

T. J. Kovich,

REGIONAL MATERIALS ENGINEER.

NDS/js.

cc: H. A. Tregaskes  
H. Greenland  
R. C. Minaker  
A. G. Stermac ✓  
G. A. Wrong

Mr. E. E. Davis,  
Bridge Engineer,  
Bridge Division, Admin. Bldg.

Foundation Section,  
Materials & Testing Div.,  
Rm. 107, Lab. Bldg.

attention: Mr. E. E. Davis

March 30, 1967

MAR 30 1967

FOUNDATION INVESTIGATION REPORT FOR D.H.C.  
BY: WILLIAM TROW ASSOCIATES LIMITED --  
Site No. 36-218, T.A. and S. Bridge,  
Hwy. 92, Line 'C', District #4 (Hamilton).  
W.F. 99-66

Attached, please find the report for the above mentioned site, prepared and submitted by William A. Trow Associates Ltd.

We have reviewed the report and found the factual information adequate and well presented.

Three alternatives are proposed for the foundations of the structure. Apart from economic considerations, the following should also be given consideration:

The proximity of the railway tracks to the pier foundations will require adequate protection of the foundation excavations. For the same reason, care will have to be exerted if piles are driven because of the possibility of the tracks being lifted by the displacing of the material due to pile penetration.

Should you wish to discuss any foundation aspects of this structure, please feel free to contact this Office.

WAT/467

attach.

cc: Messrs. E. E. Davis (2)  
E. A. Trow  
D. A. Foster  
G. L. Hunter (2)  
H. Greenfield  
J. S. Melnychuk  
T. J. Kovach  
B. A. Singh

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Gen. Files

*Rept. 1000*  
A. S. Starnes  
PRINCIPAL FOUNDATION ENGINEER