

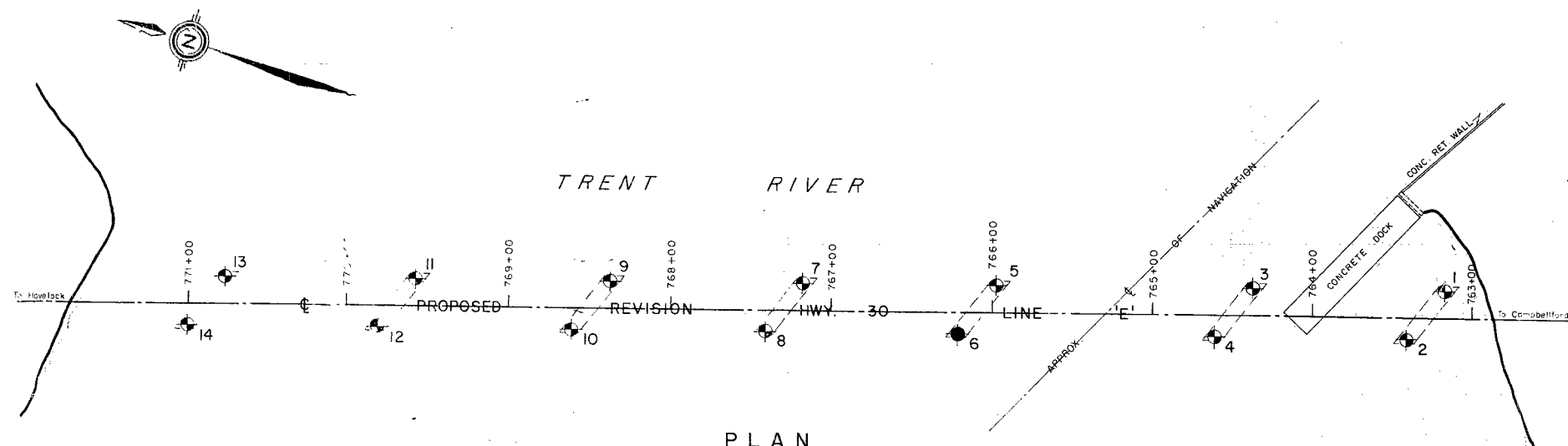
65-F-254

W.P. # 87-65

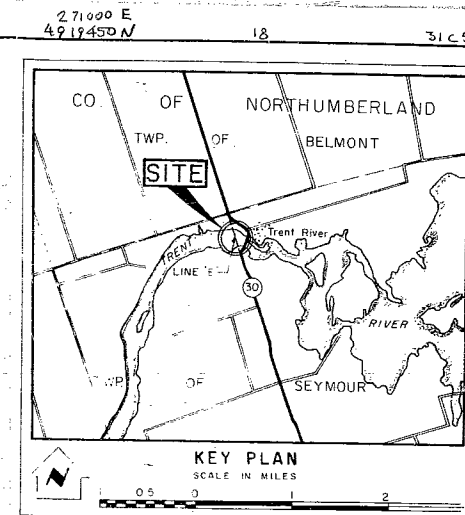
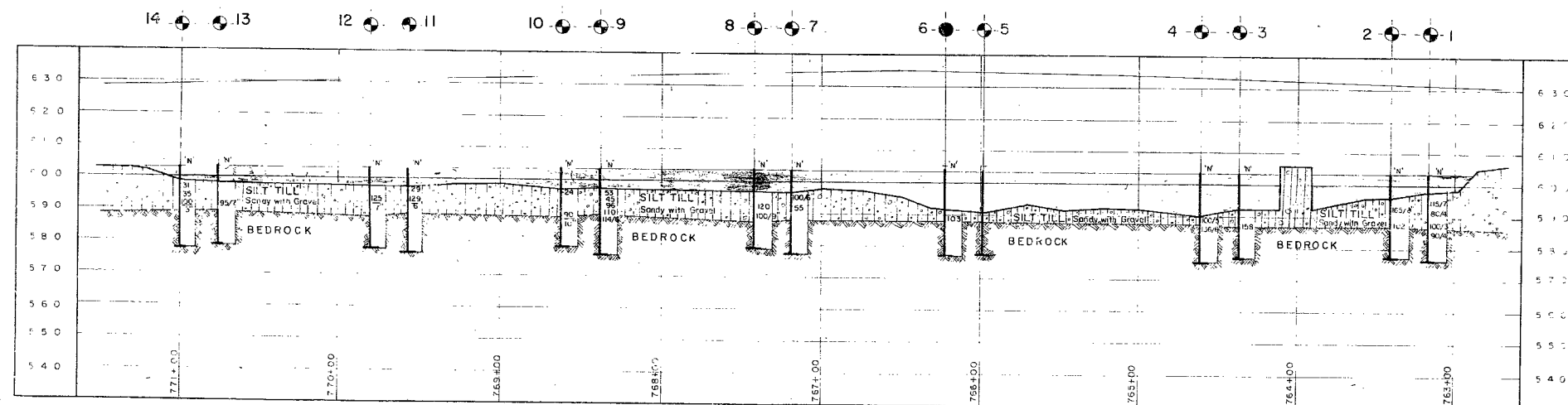
HWY. # 30

& TRENT

RIVER



B.M. ELEV. 609.61
227' ft. of sta. 771+98
inside of southern bridge abutment



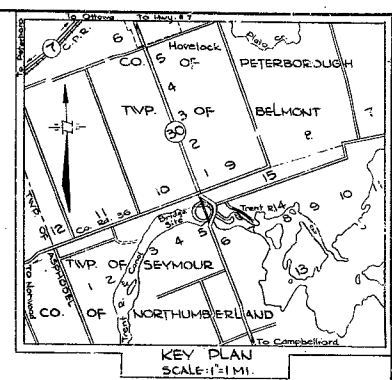
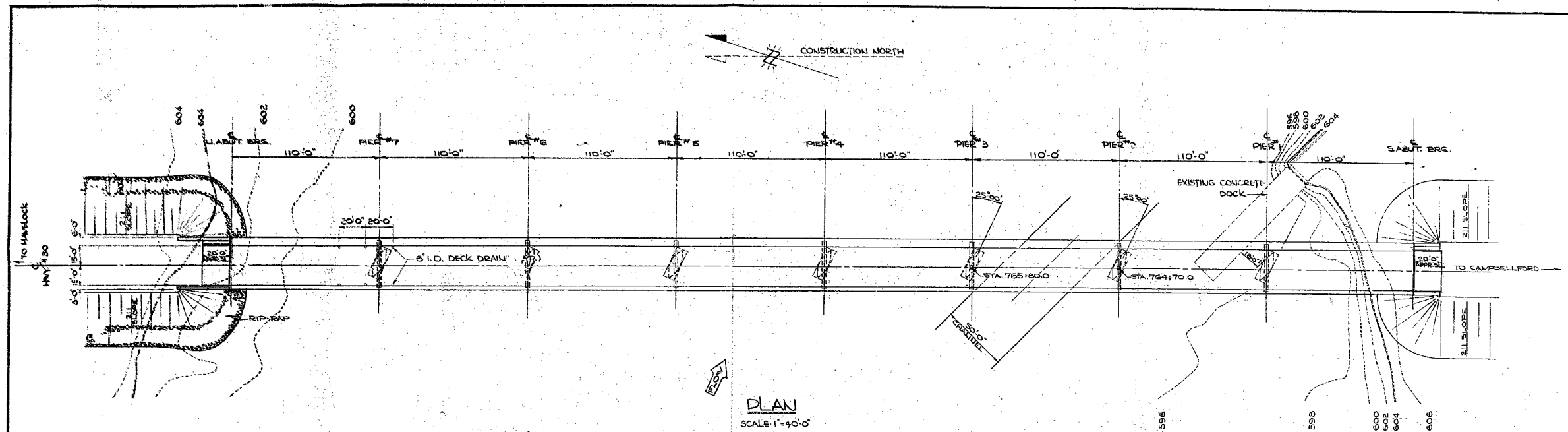
LEGEND			
●	Bore Hole		
⊙	Cone Penetration Hole		
⊙	Bore & Cone Penetration Hole		
—	Water Levels established at time of field investigation.		
NO.	ELEVATION	STATION	OFFSET
1	603.5	763+20	14' Lt.
2	603.9	763+40	14' Lt.
3	603.3	764+20	14' Lt.
4	603.4	764+20	14' Lt.
5	603.7	764+20	14' Lt.
6	603.7	766+20	13' Lt.
7	603.6	767+17	17' Rt.
8	604.0	767+17	14' Lt.
9	603.8	768+20	17' Rt.
10	602.9	768+60	14' Lt.
11	603.8	769+55	17' Rt.
12	603.7	769+80	14' Lt.
13	603.6	770+77	17' Rt.
14	603.7	771+100	14' 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.

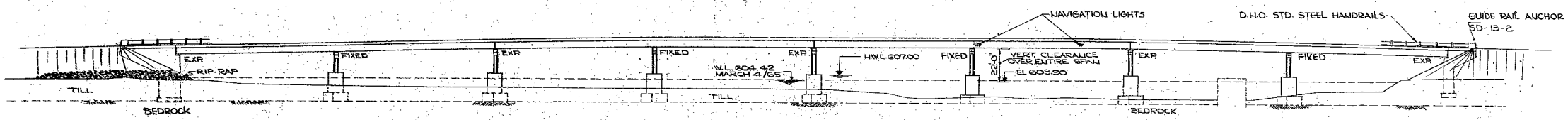
WILLIAM TROW ASSOCIATES LIMITED	
DEPARTMENT OF HIGHWAYS - ONTARIO	
MATERIALS & TESTING DIVISION - FOUNDATION SECTION	
TRENT RIVER	
KING'S HIGHWAY NO. 30	REV'N. LINE 'E' DIST. NO. 7
CO. NORTHUMBERLAND	TWP. SEYMOUR LOT 5 & 6 CON. 14 & 15
BORE HOLE LOCATIONS & SOIL STRATA	
SUB'D	CHECKED
DRAWN	CHECKED
DATE	JULY 6, 1975
APPROVED	CONT. NO.
DRAWING NO.	2070
JOB NO.	
SITE NO.	
BRIDGE DRAWING NO.	

SOME DEFECTS IN NEGATIVE DUE

TO CONDITION OF ORIGINAL DOCUMENTS



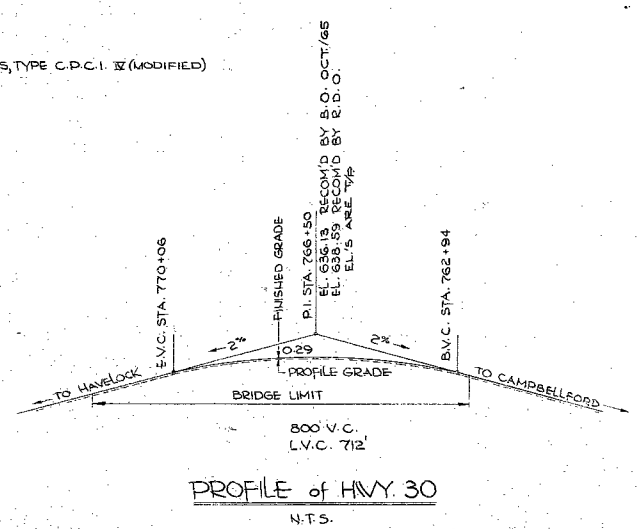
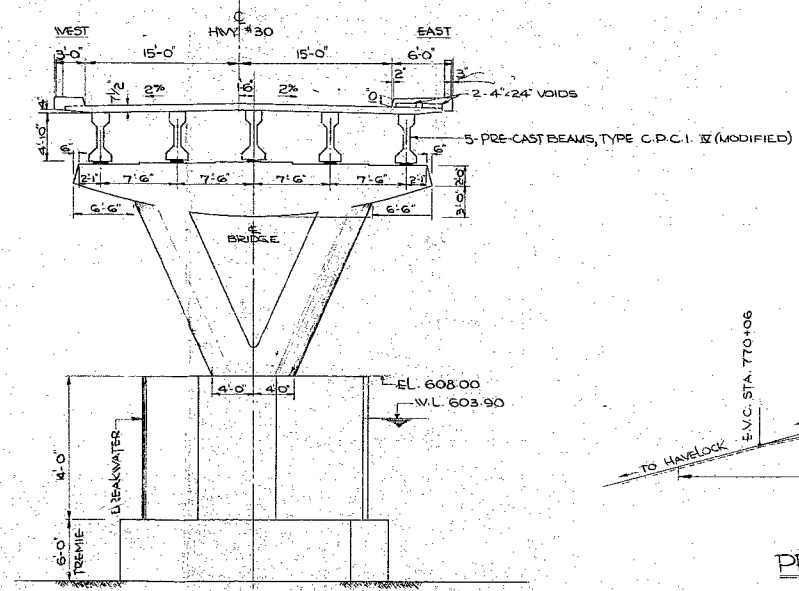
B.M. ELE. 609.86
GEODETIC DATUM
N. & W. IN W. ROOT OF 10 ELM
105' RT. OF STA. 777+40



- NOTES**
1. CLASS OF CONCRETE
PRE-CAST MEMBERS 5000 P.S.I.
REMAINDER 3000 P.S.I.
 2. CLEAR COVER ON REINFORCING STEEL
FOOTINGS, ABUTMENTS & PIERS 3"
PRE-CAST MEMBERS 1"
CURBS 2"
 3. CONSTRUCTION NOTES
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING
THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED
ELEVATIONS WITH A TOLERANCE OF $\pm 1/8"$.

LIST OF DRAWINGS

1. GENERAL PLAN
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.



PRINT RECORD		
No.	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
TRENT RIVER & TRENT CANAL BRIDGE (IN HAMLET OF TRENT RIVER)			
HWY. No. 30	LINE "E"	DIST. No. 7	
CO. NORTHUMBERLAND	LOT 5 & 6	CON. 14 & 15	
PRELIMINARY			
APPROVED		SITE No. 21-240	W.P. No. 87-65
DESIGN: W. L. L.	CHECK	CONTRACT No.	
DRAWING: R. M.	CHECK	DRAWING No.	D-5811-P
DATE: OCT/65	LOADING: 1420-516		

MR. A. RUTKA, P.ENG.
MATERIAL AND TESTING ENGINEER
DEPARTMENT OF HIGHWAYS OF ONTARIO
McDONALD CARTIER FREEWAY AND KEELE STREET
DOWNSVIEW, ONTARIO

FOUNDATION INVESTIGATION
PROPOSED CROSSING AT TRENT RIVER, ONTARIO
HIGHWAY 30; LINE E
W.P. 87-65

Project: J2070

August 1965

William Trow Associates Limited

80 Milvan Drive
Weston, Ontario
749-1290

William Trow

Project: J2070

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.

Mr. A. Rutka, P.Eng.
Material and Testing Engineer,
Department of Highways of Ontario,
McDonald Cartier Freeway and Keele Street,
Downsview, Ontario.

August 6, 1965

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

Foundation Investigation
Proposed Crossing at Trent River, Ontario,
Highway 30; Line E,
W.P. 87-65

Dear Sirs:

In conformance with your authorization dated June 15, 1965,
a foundation investigation was completed at the above site. Our
findings and recommendations follow.

SUMMARY

1) The site is underlain by up to 10 feet of silt till
followed by limestone bedrock. The silt till contains a large
percentage of gravel, as well as boulder and cobble sizes.

2) Foundations for the proposed piers and abutments can
consist of simple spread footings placed 4 feet below river bed
level and designed for a safe net bearing value of 5 tsf. If
spread footings are carried down to sound limestone bedrock a
safe net bearing value of 15 tsf can be used.



3) Excavations to footing level can be effected by diverting the river from the excavation area and dewatering.

4) No problems associated with settlement of the structure, or embankment stability are present at this site.

FIELD WORK AND SUBSOIL STRATIGRAPHY

A total of 14 borings comprise the field work at this site. Each borehole was advanced using standard drilling procedures in both overburden and bedrock. In many cases it was necessary to core through cobbles and boulders before reaching bedrock. The location of the boreholes is shown on the site plan drawing. All borehole elevations are referenced to the bench mark located on this drawing. A detailed breakdown of the subsoil encountered in each borehole is shown on the borehole logs Dwgs. 1 to 14.

The subsoil over the area of the proposed crossing consists of up to 10 feet of silt till overlying a sound limestone bedrock. The description 'silt till' more closely applies to the matrix material found between, and in shallow bands around the gravel, cobble and boulder size material.

FOUNDATIONS

It is recommended that the bridge piers and abutments be supported by simple spread footings. Piles are not considered because of the problems associated with driving into the stoney overburden.



Spread footings should be placed 4 feet below river bed level or at a suitable depth to satisfy hydrological requirements, and be designed using a safe net bearing pressure of 5 tsf. If it is considered advantageous to excavate to sound bedrock and to place the footings on this rock a design value of 15 tsf can be used as the safe net bearing value.

No problems of settlement of the structure exists at this site.

CONSTRUCTION

Excavations for the abutments and piers will be up to 15 feet below present river level. It is suggested that before construction of the footings begins an attempt be made to lower the river level using the upstream check dams which exist in the Trent River System.

Prior to dewatering the area, the excavation should be made and the material which is removed should be placed on the river side of the excavation to form a dyke. In this manner the river can be diverted around the excavation. The excavation can then be pumped out gradually. Continuous pumping will be required to keep the water table depressed in the working area.

The foregoing proposal will require an excavation which is much larger than that which would normally be needed for a bridge footing. In addition, because the soil is fairly permeable, a considerable inflow of water can be expected. The flow can be minimized by directing the river well clear of the work. The silt till at the base of the excavation is

expected to remain stable as the dewatering program progresses, provided that the perimeter walls of the excavation are sloped at a minimum of 2 horizontal to 1 vertical, and shallow perimeter ditches are used to remove the water from the base of the excavation. A 4 inch layer of crushed stone will help improve the stability of the base, if required.

APPROACH EMBANKMENTS

No problems associated with the stability of the approach embankments exist at this site.

SCOUR PROTECTION

Positive measures against possible scour and erosion must be provided. Once footings are placed, the excavation should be backfilled with the natural material and covered with the coarser rock at creek bed level. In addition, rip rap should be placed on the ground in front of the abutment and wing walls and on the adjacent sections of the road fill, up to the highest anticipated flood level.

EARTH PRESSURES

If abutments and wing walls are used on this project, i.e. the approach fill does not spill through the abutments, they must be designed to withstand the lateral earth pressure exerted by the retained soils. The earth pressure that will act on the walls can be estimated using a value of earth pressure coefficient equal to 0.35 for a non yielding abutment. The earth pressure, p , on the walls at any depth, h , can be found from the expression:

$$p = k (\gamma (h - h_1) + \gamma_s h_1 + q)$$

where: $k = 0.35$, the recommended earth pressure coefficient assuming the walls to be rigid. This value may be reduced to 0.25 if a slight inward yield of the abutment is possible.

$\gamma = 130$ pcf, the estimated unit weight of the retained soil

$\gamma_s = 70$ pcf, the estimated submerged weight of the retained soil

$h_1 =$ height of water table above the point being considered

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

Should any queries arise concerning the contents of this report we will be pleased to discuss them with you.

Yours very truly,

K. Peaker.

K.R. Peaker, P.Eng.

KRP/gh
Encls.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING No. 1
PROJECT No. J2070

LEGEND

PENETRATION RESISTANCE

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

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕
UNCONFINED COMPRESSION ⊗
VANE TEST AND SENSITIVITY (S) ⊕^s

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

X^{LI}

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. 1
PROJECT Trent River Bridge
LOCATION Highway No. 30
HOLE LOCATION See Site Plan Drawing
HOLE ELEVATION 604.08 ft. River El 603.9 ft.
DATUM Raft 0.8 ft. above river level.

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			
	River Surface	603.9	0	SHEAR STRENGTH P.S.F.						
	Water	598.1								
	SILT TILL-sandy with large quantities of gravel, cobble sizes.	586.3	10							
	BEDROCK-grey limestone. Cored Ax: recovered 95%		20							
	End of Borehole	577.4	30							
Notes: 1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven 16' right of station, 763 + 18; results show 7' of water and refusal on boulders at 8'.										




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SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION




DRAWING NO. 2
PROJECT NO. J2070

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




LI
X

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 Trent River Bridge
LOCATION Highway No. 3

HOLE LOCATION See Site Plan Dwg.

RAFT 604.85; River El 603.8 feet

DATUM Raft 1.0 above river level

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			
	River level	603.8	0	SHEAR STRENGTH				
	Water							
		596.3						
	SILT TILL-very sandy with large quantities of gravel, cobbles and some boulders, some indication of layering.		10					
		587.5						
	BEDROCK-grey limestone, Cored Ax; recovery 100%		20					
	End of Borehole	578.5						
NOTE:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven thru 7' of water to refusal at 8', located 14' left of station 763 + 40.		30					
			40					

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING NO. 3
PROJECT NO. J2070

LEGEND

BOREHOLE NO. 3

PROJECT Trent River Bridge

LOCATION Highway No. 3

HOLE LOCATION See Site Plan Dwg.

RAFT ELEVATION 604.5 feet; River El 603.7

DATUM Raft 0.8' above river level.

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			
	River surface	603.7	0	350 FT. LB. BLOWS/FT.				
	Water			SHEAR STRENGTH				
		592.9	10					
	SILT TILL-very sandy with large quantities of gravel, cobbles and some boulders, some indication of layering	586.9						
	BEDROCK-grey limestone, Cored Ax; recovery 100%		20					
	End of Borehole	577.9						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment.		30					
	2) Drove dynamic cone thru 11' water to refusal at 13'; located 2' north-east of Borehole 3.		40					




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SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION




DRAWING NO. 4
PROJECT NO. J2070

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 

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. 4
PROJECT Trent River Bridge
LOCATION Highway No. 30
HOLE LOCATION See Site Plan Dwg.
Raft
ELEVATION 604.8 feet; River El 603.8
DATUM Raft 0.1 feet above river level

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			
	River surface.	603.8	0	SHEAR STRENGTH P.S.F.				
	Water							
		596.8	10					
	SILT TILL-very sandy with large quantities of gravel, cobbles and some boulders, some indication of layering	586.8	8					
	BEDROCK-grey limestone, Cored Ax; recovered 98%		20					
	End of Borehole	576.8						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven thru 12' of water to refusal at 13 1/2 feet.		30					
			40					


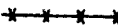

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SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION




DRAWING NO. 5
PROJECT NO. 12070

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




LI
X

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. 5
PROJECT Trent River Bridge
LOCATION Highway No. 30
HOLE LOCATION See Site Plan Drawing
RAFT ELEVATION 604.8 ft. River elevation 603. ft.
DATUM Raft 0.8 ft. above water level.

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			
	River Surface	603.8	0	SHEAR STRENGTH			P.S.F.		
	Water								
		596.8	10						
	SILT TILL-very sandy with large quantities of gravel, etc.(see Hole 2)	586.8							
	BEDROCK-grey limestone. Cored AX, recovery 100%.		20						
	End of Borehole	576.8							
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment.		30						
	2) Dynamic cones driven thru 11.8 ft. of water to refusal at 12.8 ft.; location: 3' north of B.H. 5.		40						

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SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 6
PROJECT No. J2070

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) ⊕^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 No. 6

PROJECT Trent River Bridge

LOCATION Highway No. 30

HOLE LOCATION See Site Plan Drawing

RAFT ELEVATION 604.7 feet River Elevation 603.7 feet

DATUM Raft 1.0 ft. above water level.

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			
	River Surface	603.7	0	SHEAR STRENGTH P.S.F.				
	Water							
		592.5	10					
	SILT TILL-sandy with large quantities of gravel, cobblesizes.	588.7						
	BEDROCK-grey limestone, cored AX; recovery 99%.		20					
		578.7						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional diamond drilling equipment.		30					
	End of Borehole		40					

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING No. 7
PROJECT No. 12070

PENETRATION RESISTANCE

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

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕
UNCONFINED COMPRESSION ⊗
VANE TEST AND SENSITIVITY (S) ⊕¹

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 NO. 7
PROJECT Trent River Bridge
LOCATION Highway No. 30
HOLE LOCATION See Site Plan Drawing
RAFT ELEVATION 604.4 ft; river elevation 603.6 ft
DATUM Raft 0.8 ft. above water level.

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				
	River Surface	603.6	0						
	Water								
	SILT TILL-very sandy with large quantities of gravel,cobbles and some boulders,some indication of layering.	597.4	10	for 3"		36			
	BEDROCK-grey limestone, cored AX recovery 95%.	588.4	20						
	End of Hole	578.6	30						
Notes:	1)Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2)Dynamic cone driven through 6' of water to refusal at 8.3 ft.; located 5' east of B.H. 7.		40						

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

LEGEND

HOLE LOCATION See Site Plan Dwg.
 Raft
 HOLE ELEVATION 604.8 ft; River El-604.0 feet
 DATUM Raft 0.8 feet above water level

UNDRAINED TRIAXIAL ⊕
AT OVERBURDEN PRESSURE

UNCONFINED COMPRESSION ⊗

VANE TEST AND SENSITIVITY (%) ⊕⁺

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				
	River Surface	604.0	0						
	Water	597.8							
	SILT TILL-sandy with large quantities of gravel, cobble sizes.	587.8	10						
	BEDROCK-grey limestone cored Ax; recovery 100%		20						
	End of Borehole	580.3							
Notes: 1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment.									
2) Dynamic cone driven thin 6 feet of water to refusal at 7.7 feet, located 5' west of Borehole 8.									
			40						

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION


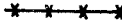

LEGEND

DRAWING No. 9
PROJECT No. J2070




BOREHOLE No. 9
PROJECT Trent River Bridge
LOCATION Highway No. 30

HOLE LOCATION See Site Plan Drawing
Raft
HOLE ELEVATION 604.8 feet; River El 603.8 feet
DATUM Raft 1.0 feet above water level

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 

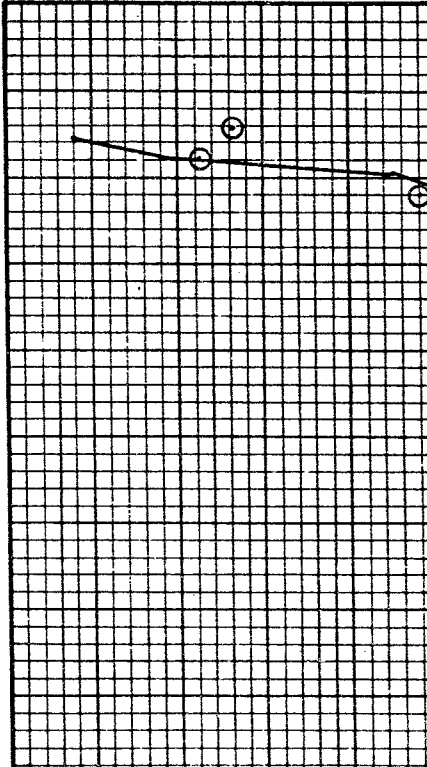
PLASTIC LIMIT 

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		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				
	River Surface	603.8	0	SHEAR STRENGTH					
	Water	698.5							
	<u>SILT TILL</u> -sandy with large quantities of gravel, cobble sizes.	589.3	10						
	<u>BEDROCK</u> -grey limestone, cored Ax; recovery 100%	577.9	20						
End of Borehole									
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven thru 6½ feet of water to refusal at 9'9" located 5' east of Borehole 9								
			30						
			40						

SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION

DRAWING No. 10
PROJECT No. J2070

PENETRATION RESISTANCE

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

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

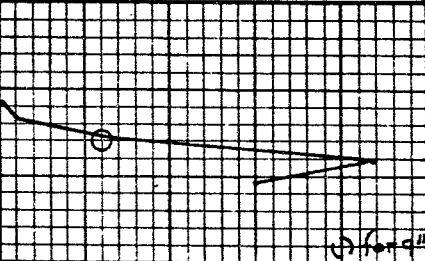
2" O.D. SPLIT TUBE_____

2" I.D. SHELBY TUBE_____

3" O.D. SHELBY TUBE_____

BOREHOLE NO. 10
PROJECT Trent River Bridge
LOCATION Highway No. 30

HOLE LOCATION See Site Plan Drawing
~~HOLE~~ ELEVATION 604.8 feet River Level 603.8
 DATUM Raft 1 foot above water level.

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
	River surface	603.8	0	SHEAR STRENGTH P.S.F.					
	Water	598.0							
	SILT TILL-sandy with large quantities of gravel, cobble sizes.	588.8	10						
	BEDROCK -grey limestone, Cored Ax; recovery 100%	580.0	20						
	End of Borehole	580.0	20						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Drove dynamic cone thru 5.8 feet; water to refusal at 9.3 feet; located 5' east of Borehole 10.								

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING No. 11
PROJECT No. J2070

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 LI

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. 11
PROJECT Trent River Bridge
LOCATION Highway No. 30.
HOLE LOCATION See Site Plan Dwg.
Raft
HOLE ELEVATION 604.8 feet; River Level 603.8 feet
DATUM Raft 1.0 feet above river level

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			
	River Surface	603.8	0	SHEAR STRENGTH P.S.F.				
	Water	698.3						
	SILT TILL—sandy with large quantities of gravel, cobble sizes.	689.3	10					
	BEDROCK—grey limestone, cored Ax; recovered 96%	678.3	20					
	End of Borehole	678.3	30					
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone of water to r located 5' eas		40					

SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING No. 12
PROJECT No. J2070

PENETRATION RESISTANCE

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

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 TUB

3" O.D. SHELBY TUBE

BOREHOLE NO. 12
PROJECT Trent River Bridge
LOCATION Highway No. 30
HOLE LOCATION See Site Plan Drawing
Raft
HOLE ELEVATION 604.5 feet; River level 603.7 feet
DATUM _____

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				
	River surface	603.7	0						
	Water	598.7							
	<u>SILT TILL</u> -Sandy with large quantities of gravel, cobble sizes.	588.7	10	125/7"					
	<u>BEDROCK</u> -grey limestone, Cored Ax; recovered 100%	579.5	20						
	End of Borehole	579.5							
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven to refusal at 8 feet; located 5 feet west of Borehole 12.		30						
			40						




SITE INVESTIGATIONS - SOIL MECHANICS CONSULTATION

DRAWING No. 13
PROJECT No. J2070

LEGEND

BOREHOLE NO. 13
PROJECT Trent River Bridge
LOCATION Highway 30
HOLE LOCATION See Site Plan Drawing
Raft
HOLE ELEVATION 604.4 feet; River level 603.6 feet
DATUM Raft 0.8 feet above river.

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

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ATTERBERG LIMITS

LIQUID LIMIT

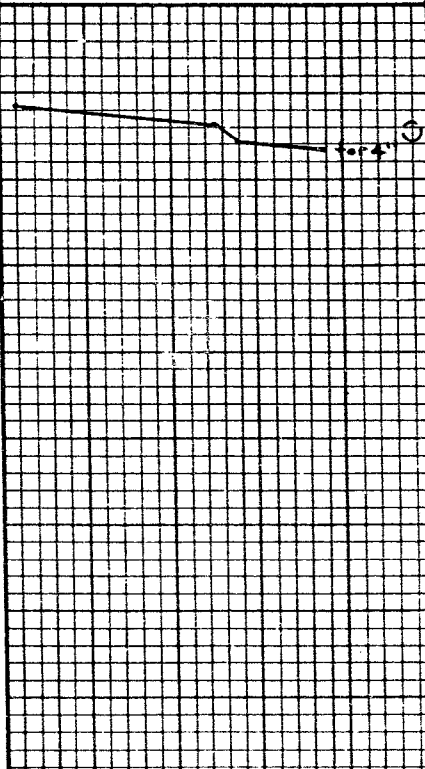
PLASTIC LIMIT

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.		NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT P.C.F.
				20	40			
				SHEAR STRENGTH P.S.F.				
	River Surface	603.6	0					
	Water	599.6						
	<u>SILT TILL</u> -sandy with large quantities of gravel, cobble sizes.	589.6	10					
	<u>BEDROCK</u> -silty limestone, Cored Ax: recovered 98%		20					
	End of Borehole	580.1						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven to refusal at 7½ feet; located 3 feet east of Borehole 13.			30				
			40					


SITE INVESTIGATIONS • SOIL MECHANICS CONSULTATION

DRAWING No. 34
PROJECT No. J2070

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

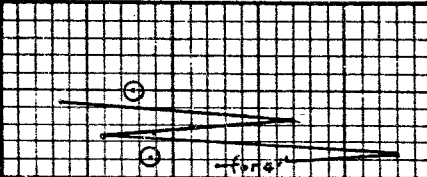
2" O.D. SPLIT TUBE _____
2" I.D. SHELBY TUBE _____
3" O.D. SHELBY TUBE _____

BOREHOLE NO. 14
PROJECT Trent River Bridge
LOCATION Hwy No. 30

HOLE LOCATION See Site Plan Drawing

MOLE ELEVATION 604.7 feet; River level 603.7 feet

DATUM Raft 1.0 feet above river level

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
	River Surface	603.7	0	SHEAR STRENGTH P.S.F.					
	Water	599.9							
	SILT TILL-sandy with large quantities of gravel, cobble sizes.	589.7	10						
	Bedrock-grey limestone, Cored Ax; recovered 95%	589.7	20						
	End of Borehole	579.3	30						
Notes:	1) Borehole advanced by driving and drilling thru overburden using conventional drilling equipment. 2) Dynamic cone driven to refusal at 8½ feet; located 3' east of Borehole 14								

Mr. B. B. Davis,
Bridge Engineer,
Bridge Division.

Foundation Section,
Materials and Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. S. McCoshia

August 10, 1965

FOUNDATION INVESTIGATION REPORT BY:
William A. Trow & Associates Limited.
Proposed Crossing at Trent River, Ontario,
Highway 30, Line E, District 7 (Port Hope)
W.P. 57-65

Attached, please find the report for the above-mentioned structure, submitted by the Consultant, Wm. A. Trow and Associates Ltd.

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

The conclusions and recommendations are all straightforward and we believe, adequate for your further design work.

Should there be any additional questions that you would like to discuss, please feel free to call on office.

AGS/Mief
Attach.

cc: Messrs. B. B. Davis (2)
H. A. Tregaskes
D. W. Farren
C. E. Hunter (2)
B. P. Collins
T. J. Kovich
A. Watt

Foundations Office
Gen. Files

A. Q. Sterns
A. Q. Sterns,
PRINCIPAL FOUNDATION ENGINEER

W.P. 87-65.
23-67-15.

DEPARTMENT OF HIGHWAYS ONTARIO

ROAD DESIGN DIVISION

FIELD INSPECTION REPORT

LOCATION

Highway 30, Trent River and Canal Bridge
in Trent River

W.P. 87-65 Hwy. 30 District 7

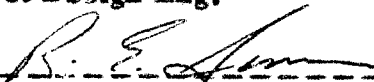
Type of Work: G. D. G.B. P. and S.

Miles 1.20

Township: Seymour and Belmont

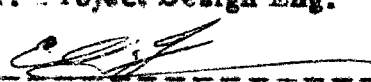
WORK SCHEDULE NO.

R. E. Sims
Project Design Eng.

Signed 

March 30, 1966.
Date

E. A. Fletcher
Sr. Project Design Eng.

Signed 

Date

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FIELD INSPECTION REPORT

TO: G. K. Hunter,
Regional Road Design Engineer,
Toronto Regional Road Design Office,
Ontario Department of Highways,
Downsview, Ontario.

FROM: Totten, Sims & Assoc. Ltd.
Consulting Engineers
519 Dundas Street East,
Whitby, Ontario.

SUBJECT: W.P. 87-65, Highway 30, Trent River and Canal Bridge
in Trent River

REFERENCE PLANS, PROFILES AND REPORTS:

- | | |
|------------------------------------|--|
| 1. Functional Planning Report | May 26, 1965 |
| 2. Plan | B240-10 (old 9-B-239) |
| 3. Profile | C-239-11 |
| 4. Soils Design Report | August 23, 1965 |
| 5. Soils Profile | 30T7-1 |
| 6. Bridge Planning Report | September 21, 1965 |
| 7. Foundation Investigation Report | William Trow Assoc. Ltd.
August, 1965 |
| 8. Preliminary Bridge Plan | D-5811-P |

GENERAL:

This project is scheduled for the purpose of providing a new crossing of the Trent River and canal at the Hamlet of Trent River.

The execution of this project will permit the abandonment and removal of the old swing bridge over the canal which is presently limited to a safe loading of 5 tons.

Originally it was proposed to construct a new bridge adjacent to the existing bridge and continue to use the present route of Highway 30 through the hamlet. That proposal was revised in favour of a by-pass line which will carry the traffic by means of a new high level bridge over the river and canal, by-passing most of the built up section of the Hamlet.

The following is a summary of the work proposed under W.P. 67-65.

1. Construction of a new high level bridge over the river and canal.
2. Construction of the approaches to the new structure.
3. Provide access by means of a service road from the new roadway into the urban section of the Hamlet.
4. Provide access to the wharf area and cottage development on the south side of the river.
5. Removal of the existing swing bridge over the canal portion of the river.

TERRAIN:

The southerly one third of the project runs through a gently undulating terrain which consists mainly of pasture and agricultural land. The land formation then descends in elevation at a rate of approximately 3% to the bank of the Trent River. Adjacent to the river, the area is quite heavily developed with cottages and some permanent residences. The river at the point of crossing is about 800 feet wide. The canal route crosses the proposed line 300 feet from the south shore at about a 60 degree angle. From the northern shore, the land remains relatively flat for several hundred feet then rises at an average rate of 2% to the point of intersection of the new line with the old highway. Some low lying swampy areas are encountered along the north shore of the river and also on the east side of the old highway near the north end of the project.

DESIGN CRITERIA:

The design standards established for the new Highway 30 portion of this project are based on an anticipated 1984 average annual daily traffic volume of 2200 V.P.D. and provide for a design speed of 60 m.p.h.

The criteria as outlined by the Functional Planning Report are as follows:

Highway Class No.	R. C. 60
Min. Vertical Curvature	800' V.C.
Max. Gradient	8%
Max. Horizontal Curvature	4° 30'
Pavement Width	22 feet
Shoulder Width	10 feet (incl. 2' rounding)
R.O.W. Width	100 feet

The widths proposed for the service road to connect the new by-pass line to the old highway and provide access to the hamlet are:

Pavement Width	22 feet
Shoulder Width	8 feet (incl. 2' rounding)

The widths proposed for access roads to the wharf and cottage areas are:

Pavement Width	20 feet
Shoulder Width	3 feet (plus 2 feet where guide rail is required)

ALIGNMENT:

The original proposal as mentioned above was to construct a new bridge parallel and adjacent to the existing bridge on an alignment noted as Line 'D' on Plan No. B240-10.

The approved line, Line 'E', has been adopted to provide a by-pass of the Hamlet. Line 'E' provides an almost straight alignment joining the old Highway 30 on the south side of the river to the old Highway 30 north of the river and north of the Hamlet. The new proposal permits a substantially better design, i. e. a 60 m. p. h. design as compared to a 30 m. p. h. design on the old line through the Hamlet.

Approval has been received for revision of the alignment of the proposed access roads at Sta 738+15.49 ('E'). The original alignment to the left traversed around the cottage on the north west corner of the intersection then continued northerly parallel to Line 'E' across the front of the cottage lots adjacent to the right-of-way. It is proposed to construct the access road across the front of the cottage near the intersection, thus eliminating two right angle turns which otherwise would have been necessary.

The alignment of the access road to the wharf has been shifted slightly to reduce property requirements along the branch of the road that parallels the river.

GRADE:

Several proposals for grade revisions were submitted and received the approval of the Planning Branch.

The grade line between Sta 728+00 and Sta 743+00 has been revised to a line which coincides with the grade of the existing pavement. This change will eliminat/ the necessity of excavation of the

existing pavement or of granular lifts over the pavement which is in very good condition. The present vertical alignment of this section exceeds that required by the design criteria.

A 1000 ft visibility curve has been inserted between Sta 743+00 and Sta 757+00 to replace the original 1200 ft visibility curve. The resulting higher grade line will improve the relationship between the road level and the level of existing private entrances and will also reduce the amount of required rock excavation.

During the execution of the bridge design, it was determined that the grade line over the river could be lowered and still maintain the required 22 feet minimum clearance over the canal route. It was possible to lower the elevation of the vertex at Sta 766+50 from the original elevation 638.59 to elevation 636.13 (top of pavement elevation). The effect of the lower grade was significant at the south approach where lateral clearance is critical, particularly in the vicinity of the war memorial.

LIMITS:

The south limit of the project will be at the intersection of Highway 30 and the road allowance between Concessions XIII and XIV of Seymour Township. The north limit will be approximately 500 feet north of the road allowance between Seymour and Belmont Townships. Construction of the service road which will provide service to the Hamlet after construction will end at Sta 778+00 (old Highway 30 chainage).

SOILS RECOMMENDATIONS:

A soils design report was presented by Mr. T.J. Kovich, Regional Materials Engineer, August 23, 1965. The following recommendations are contained in that report:

TYPE OF CONTRACT: G.B.C. Class 'A' and Sand Cushion

DEPTH OF GRANULAR BASE COURSES:

Highway 30 a) New Construction - Fill Sections 18"
- Cut Sections 21"
(consisting of 6" of G.B.C. 'A' and the remainder sand cushion).

b) Over Existing Road - Less than 9"-all G.B.C. 'A'
- Over 9"-6" G.B.C. 'A'
and the remainder sand cushion

c) Widening - excavate per DD-239 to provide for 21" of granular material

Service Roads - cut and fill sections - 6" of G.B.C. 'A'
12" of sand cushion

Granular to be placed full width.

HOT MIX PAVEMENT

Highway 30 1 - 1 1/4" layer of H.L.#1
1 - 1 1/2" layer of H.L.#4
1 - 3/4" layer of Hot Mix Sand Asphalt

Service Roads 1 - 1 1/2" layer of H.L.#1

The soils report indicates that borrow material will be available within a one mile radius of the project and that sand cushion and Granular 'A' materials will be available within two miles and six miles respectively.

A further recommendation contained in the soils design

report was that the original grade should be revised between Sta 735+50 and Sta 738+50 to avoid excavation of the existing pavement. Subsequent to the preparation of that report, the grade line has been adjusted to coincide with the existing pavement from the beginning of the project at Sta 728+00 and Sta 743+00. The pavement within this section is in very good condition and it is therefore proposed to perform widening and resurfacing only. The widening portion will be paved with a binder course of one layer of H.L.#4, 1 1/2" in depth placed flush with the surface of the existing pavement. The existing pavement and widening will be surfaced with one layer of H.L.#1, 1 1/4" in depth.

The estimated average depth of topsoil is 9".

The apportionment of compaction equipment rental shall be on the ratio of 40% for sheepfoot roller and 60% for wobble wheel roller.

DRAINAGE:

The general drainage pattern is towards the Trent River.

The cross culverts at Sta 731+66 and Sta 743+35 will require extensions to accommodate the wider road width.

New cross culverts 30" dia. will be required at Sta 752+60 and Sta 729+10 in order to restore the original drainage pattern.

The drainage within the loop formed by the new access road to the wharf and cottages will cross the access road at Sta 1+50. A new 24" dia. culvert will accommodate the runoff from this area. A small amount of surface water will be picked up in the north ditch of

this access road which should be directed across the road before approaching the Department of Transport lands. An 18" dia. pipe culvert will be adequate at this location.

An open ditch is considered to be undesirable across the D.O.T. land, therefore drainage should be carried by a pipe culvert, 18" dia. from the left ditch of the access road at the D.O.T. property limit to outlet into the river. It will be necessary to run this culvert slightly under the toe of the approach fill to obtain suitable cover and to avoid outletting close to the wharf.

Under the service road to the right of Sta 781+01.90, the existing culvert at Sta 1+30 should be replaced. An additional crossing will be required at Sta 4+50. Pipes of 24" dia. will be adequate at these locations. To the left of Sta 781+01.90, the existing culvert at Sta 1+50 should be replaced by a new 24" dia. pipe culvert.

A 24" dia. culvert will be required in the west ditch line of Highway 30 under the side road to the left of Sta 758+15.49.

Water collected by the west ditch of the access road in front of the cottages on the left between Sta 758+50 and Sta 762+00 will be picked up by a catch basin and directed into the proposed storm sewer.

Drainage on the new bridge will split at Sta 766+50 which is the midpoint of the structure. Curbs and gutters, and storm sewers will be constructed on both approaches to collect the runoff from the bridge. No deck drains are proposed in the structure.

Because of the limited available space for ditching on the west side of the south approach, the storm sewer will continue northerly along the toe of the embankment. The sewer will outlet into the left ditch line at Sta 762+00. Grouted rip rap will be placed from the sewer outlet to the river bank.

The sewer on the north approach will outlet into the left ditch at Sta 775+00.

PROPERTY REQUIREMENTS:

A plan showing the final property requirements for this project was submitted on January 14, 1966. A meeting was subsequently held at the site with representatives from the District, Road Design and Property Branches on January 28, 1966.

The following is a summary of the locations of problems that were noted and discussed and the subsequent decisions and conclusions:

1. Sta 787+85 to 788+30 on the right.
The request for additional property at this location will be deleted. There will be no ditching across the frontage of this property. The drainage will be split approximately opposite the centre of the building and will be graded to run northerly and southerly from this point.
2. Sta 780+00 on the left.
The property request will be revised to show the widening at 55 feet from centreline across this parcel and the standard 50 feet daylight triangle at the south west corner of the intersection with County Road 36.
3. Sta 6+00 (approx.) on the right of the proposed service road into Trent River.
The driveways at this location will be extended to provide access directly onto the new roadway.

4. Sta 758+15.49 (proposed access road to the right to the wharf and cottages).

There was some discussion concerning the proposed alignment of this road, however no changes were recommended.

5. Sta 758+15.49 (proposed access road to the left to cottages).

The possibility of constructing a turn-around was considered. It was agreed that there would not be sufficient area available to accomplish this. There is some uncertainty regarding the future responsibility for this section of road. It is assumed that it will be the responsibility of the Township.

6. Sta 756+00 to 757+00 on the right.

It was noted that the centreline being shifted closer to the houses will create a slightly less desirable private entrance condition even though there will be no change in the height of the grade line. It was suggested that the relationship between the roadway and the adjacent properties could be improved by raising the level of lawns, etc. This should be considered during negotiations with the affected property owners.

7. Sta 753+15 on the right.

It will be necessary to provide compensation for the loss of the well.

8. Sta 754+93 on the right.

It will be necessary to obtain permission to enter the Owners property beyond the proposed new property line to construct a standard entrance.

9. Sta 752+75 on the right.

The property agreement should provide for the elimination of the field entrance.

10. Sta 751+00 on the right.

Permission to enter the owners property to construct a standard entrance will be required.

The following additional details should be noted:

The house now located on the north west corner of the intersection of Highway 30 and the sideroad at Sta 781+01.90 (E) must be removed prior to construction.

Provision must be made for the loss of the septic disposal bed on the right at Sta 777+00.

Two frame cottages located on the alignment of the access road to the wharf must be removed.

The sign for the Trent River Cheese Factory, which is located within the existing right-of-way, will have to be relocated.

UTILITIES:

Sets of preliminary construction plans showing the location of utilities poles, marked up to indicate the required relocations, have been submitted.

The District is obtaining estimates from the utility companies involved.

STRUCTURES:

A bridge planning report was prepared by Mr. J. B. Curtis, dated September 21, 1965, which outlines the pertinent data concerning the bridge design.

A foundation report prepared by Wm. Trow Assoc. Ltd. August 1965 is available.

The proposed bridge cross section is as follows:

West	2' clear curb
	3' clearance
	12' south bound land
	12' north bound land
	3' clearance
East	5' clear sidewalk

As stated previously, during the execution of the bridge design, it was determined that the original grade line set by the planning Branch provided excessive clearance over the 22' clearance above Navigation Water Level of 603.9. The grade line was subsequently lowered by 2.46 feet which improves the condition of side clearances at the toe of slopes of the south approach fill.

A preliminary plan is available, (D-5811-P) dated October 1, 1965, which illustrates the proposed structure to be:

8 spans at 110', concrete deck on pre-cast concrete beams on concrete abutments and piers; with abutment and pier footings taken into the bedrock.

The Bridge Office is preparing the final contract drawings for the structure which, it is understood, will be available early in April, 1966.

The Bridge Office will also provide the appropriate special provisions concerning the bridge construction and for the removal of the existing swing bridge over the canal.

The times that the 50' navigation channel must be kept clear have been confirmed by the Department of Transport Canals as follows:

TRENT CANAL SYSTEM

Open May 13 - Close October 16

Hours of Operation

Open (a.m.) Close (p.m.)

Monday to Thursday (incl.)

May 16 to June 23	9:00	5:00
June 27 to Sept. 5	8:30	8:30
Sept. 6 to Oct. 13	9:00	5:00

Week-Ends

May 13 to June 5 (Fri. Sat. Sun.)	9:00	5:00
June 10 to Sept. 4 (Fri. Sat. Sun.)	8:30	8:30
Sept. 9 to Oct. 2 (Fri. Sat. Sun.)	9:00	6:00
Oct. 7 to Oct. 16 (Fri. Sat. Sun.)	9:00	5:00

A Special Provision to this effect will be included in the Tender to ensure that the contractor is made aware that the channel cannot be blocked during these times.

DETOURS:

Uninterrupted movement of traffic through the job site for the duration of the work will be accomplished by utilizing the existing Highway 30 and the existing bridges and new grade.

The sequence of the work as pertains to road construction will be as follows:

The new roadway between Sta 743+00 and Sta 758+50, the access road to the wharf area and the service road from the north end of the Hamlet will be constructed first, to the top of

granular stage. Traffic will then be detoured over this route during the removal of the existing road embankment and construction of the new bridge approaches.

When the new structure has been completed and the approaches have been constructed to the top of granular stage, the new grade can then be opened to traffic.

The old bridge can then be removed and the remainder of the work completed.

CONTRACT ITEMS:

a) Earth and Rock Excavation

A very short shallow section of rock cut is anticipated at Sta 747+00. Because of the small volume and the soft type of rock involved, the earth grading section will be continued through this cut.

After construction of the new grade between Sta 743+00 and Sta 758+50 to the top of granular stage, the old road embankment on the left will be removed and placed in the south approach fill. This will provide several thousand cubic yards of fill material and will permit the construction of improved drainage facilities.

After completion of the service road at the north end of the Hamlet to the top of granular stage, the old road embankment on the right between Sta 777+00 and Sta 780+00 will be removed. This will provide required fill material for the

north approach and will permit drainage of the swampy area east of the present road.

b) Random Rip Rap

An item will be provided for random rip rap to be placed around the toe of the north approach fill where it encroaches into the river. The rip rap will extend to approximately Sta 774+00 and to a height of 2 feet above Normal Water Level. (Elevation 606.00)

c) Grouted Rip Rap

An item will be provided for hand laid grouted rip rap to be placed from the sewer outlet left of Sta 762+00 to the river bank.

Grouted rip rap should also be placed at the outlet of the pipe at the riverbank approximately 50 feet left of Sta 763+00.

SPECIAL PROVISIONS:

Special Provisions will be included in the Tender concerning the following conditions that are peculiar to this project.

1. To specify the sequence of roadway construction and the provision of detours for traffic.
2. To ensure that the navigational channel will be kept clear in compliance with the times specified by the Department of Transport.
3. To specify the timing of the removal of the existing swing bridge, after the new grade and structure is open to traffic.

4. To advise the contractor of the present loading restrictions on the existing bridges, and to indicate that strengthening of the bridges to take loading in excess of the present signed safe loading will be at the contractors expense and subject to approval of the Department of Transport.

SUNDRY CONSTRUCTION:

Funds should be provided under Sundry Construction for:

1. Relocation of Utilities
2. Seeding and Mulching
3. Signs and Sign Painting
4. Zone Painting
5. Painting Guide Rail Posts
6. Painting Steel Beam Guide Rail
7. Electrical and Lighting
8. Force Account Contingencies

WKF/jb


R. E. Sims, P. Eng.