33-69-26

29-2

MR. A. BUTKA, P. ENG.
CHIEF MATERIALS & TESTING ENGINEER
DEPARTMENT OF HIGHWAYS OF ONTARIO
MCDONALD CARTIER FREEWAY AND KEELE STREET
DOWNSVIEW, ONTARIO

FOUNDATION INVESTIGATION
WP-142-63
DEUX RIVIERES CREEK BRIDGE
HIGHWAY NO. 17
DEUX RIVIERES, ONTARIO

Project: J3370

January, 1967

William Trow Associates Limited

90 Milvan Drive
Weston, Ontario
749-1290

William Trow Associates Ltd.

Project: 13370

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

Mr. A. Kutka, P.Eng.,
Chief Materials & Testing Engineer,
Department of Highways of Ontario,
McDonald Cartier Freeway and Keele Street,
Downsview, Ontario.

January 23, 1967

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

Foundation Investigation
WP 112-63
Deux Rivieres Creek Bridge
Highway No. 17
Deux Rivieres, Ontario

Dear Sirs:

Following your letter of authorization dated December 7, 1966, we have completed a foundation study at the above site. The field work was carried out in the period of December 12, 1966 to January 10, 1967. Our findings and recommendations are outlined briefly in the following paragraphs.

1) The subsoil at this site was found to consist of a variable depth of densely packed sand and gravel, with boulders of various sizes, overlying a granite bedrock. The ground water level exists at or just above river level.

2) It is recommended that the bridge or barrel arch be supported by spread footings on the bedrock wherever practicable. The exception will be in the vicinity of Borehole 2, the west abutment,

where the bedrock dips sharply and footings may be placed on the dense sand, gravel and boulders at El 490 feet. Footings on the sand and gravel can be designed to a safe net bearing pressure of up to 6000 psf., providing construction procedures do not disturb the founding soil. Footings on rock car designed for 20,000 psf.

3) The sand, gravel and boulders are thought to be relatively free draining. Because of the numerous boulders, ringing the excavations with sheet piling will be difficult. Consideration should be given to diverting the stream to one side of its channel, with a dyke, and digging oversize footing excavations on the other side. Excavations large enough to accomodate drainage ditches will be required. It is recommended that digging be carried out underwater until the excavation is down to about final grade (See Dwg. 7). The water can then be pumped out gradually, allowing the water to drain from the side slopes so they will remain stable.

4) No embankment stability problem exists.

The above recommendations and conclusions derive from the following detail.

PROJECT:

It is proposed to replace an existing single span concrete bridge over Deux Rivieres Creek with a 3 span bridge at the same location. There is a possibility that a barrel arch type of structure could be used as an alternative. Both possibilities have been considered when carrying out the field investigation.

THE SITE:

Deux Rivieres Creek is approximately 40 feet wide and it flows in a north westerly direction towards the Ottawa River at this site. The river flow was swift and erratic because of large boulders on the stream bed. Present water depths vary up to $3\frac{1}{2}$ feet under the bridge.

FIELDWORK AND SUBSOIL STRATIGRAPY

The fieldwork at this site consisted of 6 borings located as shown on the site plan drawing. All holes were advanced cased by washboring techniques to the depth where diamond drilling was necessary to proceed through boulders or to prove bedrock. Bedrock samples were obtained in all boreholes using AXT coring equipment. Two holes, Nos. 4 and 4A, were necessary at one location because the casing in the first hole became too crooked among the boulders to proceed below a depth of 15 feet.

The subsoil encountered is shown in detail on the borehole logs Dwgs. 1 to 6 and in summary form on the site plan drawing. In general, the natural subsoil consists of sand, gravel and boulders in a dense state above a granite bedrock. From visual examinations of the site, boulders in excess of 2 feet in diameter can be expected. Thin sand seams were found in the bedrock at some locations.

Water levels in the boreholes were generally found to be 2 or 3 feet above river elevation. No artesian conditions were encountered.

We trust that the information contained in this brief report is sufficient for your purposes. Should any question come to mind, or should any part of this report require enlarging upon, we would appreciate your call. Thank you for this opportunity to be of service to you.

Yours very truly,

D.Y. Larmour

D.Y. Larmour, M.Sc..

D.H. Shields

D.H. Shields, P.Eng.

DYL/gh
Encls.
Dist: - Department of Highways (12)

(1)
J3370

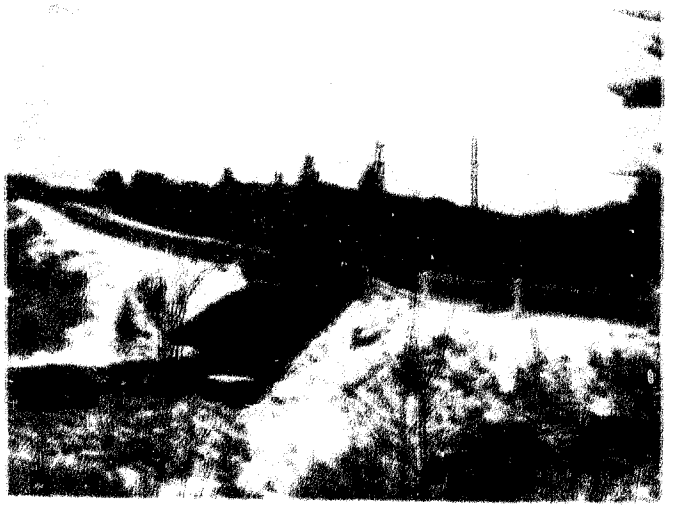
Looking North-West

Looking South-West

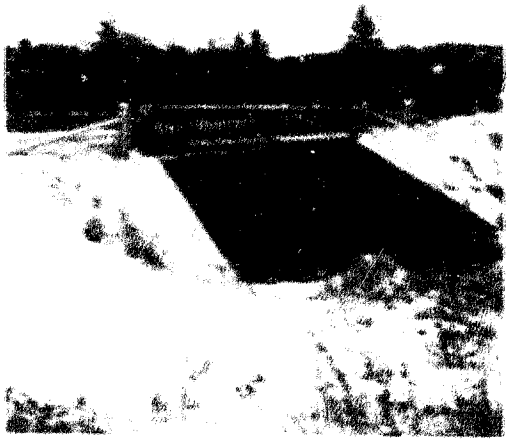
Looking South-East

DEUX RIVIERES CREEK BRIDGE

(1)
J3370



Looking North-West



Looking South-West

Looking South-East

DEUX RIVIERES CREEK BRIDGE

WILLIAM DROW ASSOCIATES LTD.

SOIL MECHANICS CONSULTATION

BORING NO. 1

PROJECT NO. J3370

LEGEND

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE

3" O.D. SHELBY TUBE

2" DIA. CORE

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

3" O.D. SHELBY TUBE

2" O.D. SHELBY TUBE

BORING NO. 1

PROJECT: P.N.O. Bridge, W.P. 142-63

LOCATION: Pcy. 17, Deux Rivieres Creek

BORE LOCATION: 11.5 feet left of Sta. 326 + 16

BORE ELEVATION: 510.7 feet

DATUM: See Site Plan Dwg.

Symbol	Soil Description	Elev. (Feet)	Depth (Feet)	Penetration Resistance (Blows per 12 inches)	Natural Moisture Content and Liquidity Index	Sample Type	Sample Recovery
	SAND FILL-compact, medium to coarse gravel mixes, grey, moist.	510.7	0				
	SAND-very dense, mainly coarse grey, very moist, becoming wet below 7 feet depth. small boulders below 9 feet depth.	505.7 / 504.2	10			1 2 3 4	
	BEDROCK-granite	494.2	20			5	100% Recov
	End of Hole	484.2					98% Recovery

NOTES: 1) Hole advanced cased by washboring techniques to 16½ feet depth. AX core barrel used to drill bedrock.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING NO. 2

PROJECT NO. 13370

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. 2

PROJECT D.H.O. Bridge, W.P. 142-63

LOCATION Hwy. 17, Deux Rivieres Creek

HOLE LOCATION 10 feet right of 325 + 21.

HOLE ELEVATION 512.6 feet

DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT P.C.F.
	~~3 inches pavement~~	512.6	0		
	SAND FILL-loose to compact, well graded, moist. Becoming wet below 8 feet depth.	504.8		1	
		502.	10	2	
				3	
				4	
	SAND-dense to very dense, fine to coarse, layered, grey, numerous gravel sizes, occasional boulders below 15 feet depth, wet.			5	
		491.9	20	6	
	BOULDERS-large (up to 16 inches thick) bedded in grey sand and gravel.			33% Recovery	
	-rock from 29' to 31.5 feet depth.			16% Recovery	
	-sand from 31.5' to 32.5 feet depth.		30	60% Recovery	
		480.1		80% Recovery	
	BEDROCK-granite-			33% Recovery	
				97% Recovery	
	End of Hole	472.1	40		

PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT. 20 40 60 80

SHEAR STRENGTH P.S.F.

NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT

NOTES:

1) Hole advanced by washboring techniques to 20.5 feet then by diamond drilling.

2) Water levels: -
on completion: W.L. 7.6 feet. Hole open 10.3 feet depth.

after 24 hours: W.L. 7.8 feet. Hole open 7.8 feet depth.

After 3 days: Hole open 7.8 feet depth, dry.

50 60 70 80 90 100 110

WILLIAM TROW ASSOCIATES LTD.

DRAWING No. 3
PROJECT No. J3370

LEGEND

PENETRATION RESISTANCE
2" O.D. SPLIT TUBE
2" O.D. SOLID TUBE
2" DIA. CONE

SHEAR STRENGTH
UNDRAINED TRIAXIAL
AS DETERMINED PENETROMETER
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT

SAMPLE TYPE
2" O.D. SPLIT TUBE
2" O.D. SOLID TUBE
2" O.D. SHELBY TUBE

HOLE No. 3
PROJECT: D.H.O. Bridge, W.P. 142-63
LOCATION: Hwy. 17, Deux Rivieres Creek
HORIZONTAL: 10 feet right of Sta. 325 + 99
ELEVATION: 511.0 feet
DATUM: See Site Plan Dwg.

Symbol	Soil Description	Elev. Feet	Depth Feet	Penetration Resistance	Natural Moisture Content and Liquidity Index	Sample Type and Number	Recovery
	3 inches Pavement. SAND FILL-compact to dense, mainly medium and coarse, moist, brown.	511.0	0			1	
	Boulders, Gravel & Sand,-dense, packed, wet.	503.	10			2 3 4	
	BEDROCK-granite. One 6 inch sand seam at 19.0 feet depth, otherwise sound rock -	496.0	20				66% Recovery 95% Recovery
	End of Hole	487.0	30				

NOTES: 1) hole advanced by washboring technique, to 9 feet depth, then to 24.0 feet depth using diamond drilling.

2) Water levels: -
on completion: W.L. 5.0 feet depth open to 7.3 feet depth.
after 1 hour and 24 hours: W.L. - open and dry at 7.3 feet depth.

WILLIAM TROW ASSOCIATES LTD.

SOIL INVESTIGATIONS — SOIL MECHANICS CONSULTATION

DRILLING No. 4

PROJECT No. J3370

LEGEND

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

2" DIA. CONE

SHEAR STRENGTH

UNDRAINED TRIAXIAL

AT COMPRESSION FAILURE

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY

NATURAL MOISTURE CONTENT AND LIMITS

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

2" I.D. SHELBY TUBE

BOREHOLE No. 4 & 4A

PROJECT D.L.D. Bridge, W.P. 142-63

LOCATION Hwy. 17, Deux Rivieres, Creek

HOLE LOCATION 4-12.5 feet left 325+47, 4A-16 ft. left of 325 +40.

HOLE ELEVATION 4A-511.9 feet

DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	PENETRATION RESISTANCE (BLOWS/FOOT) 20 40 60 80	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY
	SAND FILL-compact to dense, mainly medium to coarse gravel sizes. Moist. Becoming wet at 10 ft depth.	511.9	0			1	
	-boulders at 12-15 feet depth.	502.2	10			2	
						3	
						4	
	SAND-all grades, numerous gravel sizes. Grey.	498.					
	BEDROCK-GRANITE-1 thin sand seam at 21 feet depth. Otherwise sound rock - (18 inch core left in hole).	492.9	20				100% Recovery
							100% Recovery
							100% Recovery
			30				62% Recovery
	End of Hole	479.9					
			40				

NOTES: 1) Hole advanced cased by washboring techniques to 19 feet depth then by diamond drilling.

2) Water level:
on completion hole open 10.8 feet depth water level 9.7 feet depth.
After 24 hours water level 9.7 feet depth.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING No. 2

PROJECT No. 13370

LEGEND

PENETRATION RESISTANCE
1st 6" (WALL TUBE)
2nd 6" (WALL TUBE)
3rd 6" (DRIVE CONE)
SHEAR STRENGTH
UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY

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

BORING No. 2
PROJECT D.E.C. Bridge M.P. 112-63
LOCATION Pcr. 17, Deux Rivieres Creek
HOLE LOCATION 62 feet left of 325+90
ELEVATION 504.0 feet
DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	PENETRATION RESISTANCE 2nd 6" 3rd 6" (BLOWS/FT)	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NUMBER	RETURNED WATER %
	BOULDERS, GRAVEL & SAND-boulders tightly packed to 3 feet depth. Sand well graded, moist. Becoming wet below 5 feet depth.	504.0 499.	0			1 2 3	
	BEDROCK-GRANITE-4 thin (1-3 inches) sand seams 14-19.0 feet depth, otherwise round rock -	494.0	10				100% Recovery 100% Recovery 100% Recovery 3% Recovery
	End of Hole	485.0	20				
			30				
			40				

NOTES: 1) Hole advanced by washboring techniques to 9 feet depth then to 19.0 feet depth by diamond drilling.

2) Water level on completion and after 2 hours - zero feet depth (surface run-off).

WILLIAM TROW ASSOCIATES LTD.

SOIL INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING No. 6

PROJECT No. J3370

BOREHOLE No. 6

PROJECT D.F.C. Bridge W.P. 142-63

LOCATION Km. 17, Deux Rivieres Creek

HOLE LOCATION 77 feet right of Sta. 326+33

HOLE ELEVATION 507.0 feet

DATUM See Site Plan Dwg.

LEGEND

PENETRATION RESISTANCE

2" OD SPLIT TUBE

2" ID SHELBY TUBE

2" DIA CONE

SHEAR STRENGTH

UNDRAINED TORVAN AT OVERBURDEN REGOUND

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" OD SPLIT TUBE

2" ID SHELBY TUBE

2" OD SHELBY TUBE

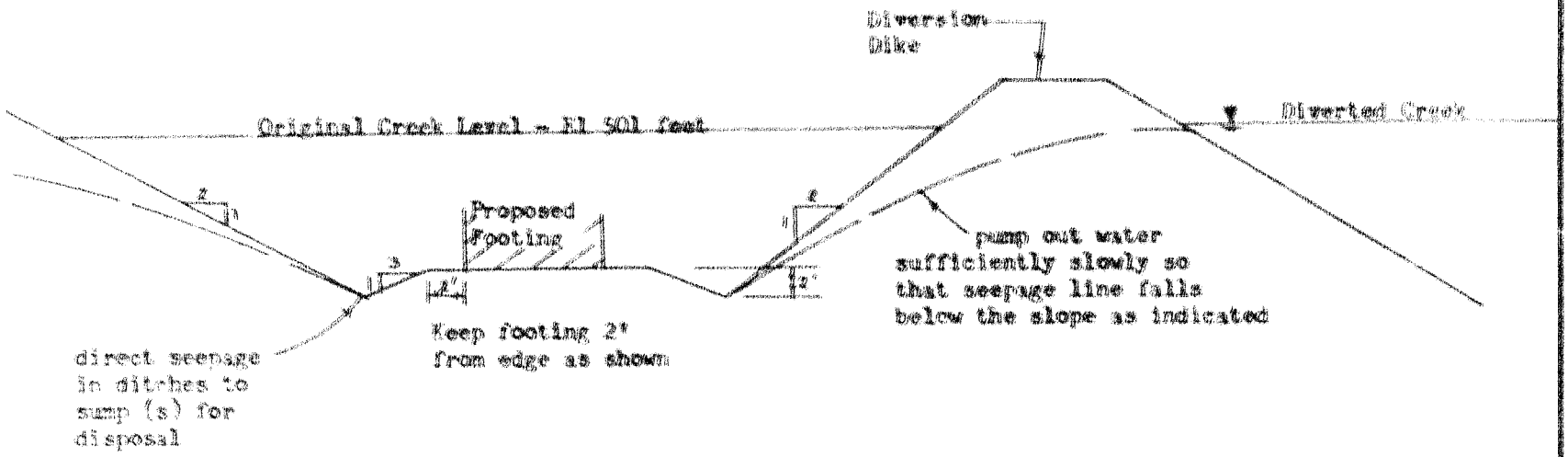
STRATA	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT PCF
	SAND-compact becoming dense with depth. Medium and coarse becoming finer with depth. Fine gravel also numerous boulders 0-2 feet depth.	507.0	0			1	
	BEDROCK-GRANITE- 6 thin (3 inch) sand seams in the rock between 9 and 17 feet depth, otherwise sand.	498.5	10			2 3 92% Recovery 92% Recovery	
	End of Hole	486.0	20			67% Recov	
			30				
			40				

NOTES: 1) Hole advanced cased to 9 feet depth by standard washboring techniques then by diamond drilling.

2) Water level on completion and after 2 days, 2.0 feet depth.

PROJECT NO. 13170

SKETCH SHOWING SUGGESTED METHOD OF EXCAVATING FOR BRIDGE OR ARCH FOUNDATIONS



PROCEDURE:- 1) Divert Creek

2) Excavate below water level to approximate dimensions shown

3) Pump out water

4) Prepare footing bed and install footing

5) Backfill with sand and gravel and cover with rip rap

DRAWING NO. 7

WILLIAM MOW ASSOCIATES LTD.

cc: Gen. Files

03-68-25

Mr. B. E. Davis,
Bridge Engineer,
Bridge Division,
Main. Bldg.

Attention: Mr. R. LaFemble

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

March 20, 1968

FOUNDATION INVESTIGATION REPORT III:
William A. Trow Associates Ltd. - For D.E.O.
W.O. 142-63,
Lower Riviere Creek Bridge,
Hwy. No. 17, Lower Riviere, Ontario,
District No. 13 (North Bay).

(Report distributed February 5, 1968)

ADDITIONAL LOGS and REVISED SITE PLAN DRAWING (showing log information)

Enclosed, please find explanatory letter by the consultant, together with additional logs and revised site plan drawing.

Could you kindly delete existing drawing(s) from your copy(s) of the above report and replace with the attached.

Thank you.

A. C. Stermac,
CONSULTING FOUNDATION ENGINEER

MCM/ldf
Attach.

cc: Messrs. B. G. Davis (2)
B. A. Fragassou
J. W. Farrow
G. Robertson
G. E. French
J. E. Turtle
E. R. Saint
D. A. Slagh

Foundations Files
Gen. Files

Project: J3370

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

Associates Ltd.

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

March 17, 1967

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

Re: Foundation Investigation
W.P. 142-63
Deux Rivieres Creek Bridge
Highway No. 17
Deux Rivieres, Ontario

Dear Sirs:

We enclose the logs for five additional boreholes at the above noted site. The information in the logs has been plotted on the Site Plan Drawing.

The purpose of these additional borings was to outline in more detail the bedrock elevation at this site.

Should you have any questions, please call.

Yours very truly,

D.H. Shields, P.Eng.

DHS/ss
Encls.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 8

PROJECT No. J3370

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) 1.8

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. 7

PROJECT D.H.O. Bridge, W.P. 142-63

LOCATION Hwy. 17, Deux Rivieres Creek

HOLE LOCATION 40 ft. left of 324+90

HOLE ELEVATION 502.7 ft.

DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE 350 FT LB BLOWS/FT 20 40 60 80 / SHEAR STRENGTH PSF	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND No	NATURAL UNIT WEIGHT P.C.F
		502.7	0				
	6" TOPSOIL SAND and BOULDERS- topsoil-stained to 3 ft, sand - dense to very dense, fine to coarse.	500.3	10			1	
	BEDROCK- numerous sand seams above 18 ft.depth, sound below 17 ft.depth. -Granite	487.7	20			33% Core Recovery 100% Core Recovery	
	End of Borehole	474.7	30				
			40				
			50				
			60				
			70				
			80				
			90				
			100				
			110				

Notes: 1) Hole cased with BX flush joint casing and advanced by conventional washboring techniques to 3 ft. depth.
From 3 ft. to 15 ft.depth drilled BX casing to bedrock contact at 15 ft.depth. Casing cleaned out with AXT core barrel.
Bedrock drilled with AXT core barrel.

2) Water level:- Hole dry and open to 28 ft.depth on completion of borehole. Water level at 2.4 ft depth after 2 days.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING No. 9

PROJECT No. J3370

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. 8
PROJECT D.H.O. Bridge, W.P. 142-63
LOCATION Hwy. 17, Dax Rivieres Creek
HOLE LOCATION 20 ft. left of 325+08
HOLE ELEVATION 503.2 ft.
DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE 350 FT LB BLOWS/FT 20 40 60 80 / SHEAR STRENGTH PSF	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND No	NATURAL UNIT WEIGHT P.C.F.
		503.2	0				
	SAND and BOULDERS- sand dense to very dense, fine to coarse, occasional gravel sizes.	500.5				1	
			10			2	
		490.4					
	BEDROCK- granite sound.		20			100% Core Recovery	
	End of Borehole	480.2					
			30				
			40				
			50				
			60				
			70				
			80				
			90				
			100				
			110				

Notes: 1) Hole advanced by drilling HX flush joint casing and cleaned out with AXT core barrel. Bedrock drilled with AXT core barrel.
2) Water level at 3.5 ft. depth in casing, hole open to full depth, on completion of boring. Water level at 2.7 ft. depth after 4 days.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING NO 10

PROJECT NO J3370

BOREHOLE NO. 9

PROJECT D.H.O. Bridge, W.P. 142-63

LOCATION Hwy. 17, Deux Rivieres Creek

HOLE LOCATION 45 ft. right of 235 + 30

HOLE ELEVATION 506.3 ft.

DATUM See Site Plan Dwg.

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
2" O.D. SHELBY TUBE

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE 350 FT LB BLOWS FT 20 40 60 80 / SHEAR STRENGTH PSF	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO	NATURAL UNIT WEIGHT P.C.F.
		506.3	0				
	SAND and BOULDERS- sand dense to very dense, fine to coarse, boulders and cobbles start at 2 ft.depth.		10				
	-2 ft.thick boulders at 17 ft.depth and 21 ft.depth.		20				
	BEDROCK- granite -numerous sand seams above 26 ft. depth.	483.3	30			67% Core Recovery 67% Core Recovery 100% Core Recovery	
	End of Borehole	473.3	40				
			50				
			60				
			70				
			80				
			90				
			100				
			110				

Notes: 1) Hole advanced by drilling BX flush joint casing and cleaned out with AXT core barrel. Bedrock drilled with AXT core barrel.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING NO 11
PROJECT NO J3370

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. 10
PROJECT D.H.O. Bridge, W.P. 142-63
LOCATION Hwy. 17, Deux Rivieres Creek
HOLE LOCATION 76 ft. right of 325+33
HOLE ELEVATION 507.7 ft.
DATUM See Site Plan Dwg.

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE 350 P.S.F. LB BLOWS FT (20, 40, 60, 80) / SHEAR STRENGTH P.S.F.	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO	NATURAL UNIT WEIGHT P.C.F.
		507.7	0				
	SAND- very dense, fine to coarse, few gravel sizes - few silty layers above 5 ft.depth.	502.3				1	
						2	
	-few boulders below 10½ ft.depth.		10			3	
						4	
						5	
			20			62% Core Recovery	
	BEDROCK- granite	484.7				85% Core Recovery	
			30			100% Core Recovery	
	End of Borehole	475.2					
			40				
			50				
			60				
			70				
			80				
			90				
			100				
			110				

Notes: 1) Hole cased with BX flush joint casing and advanced by conventional wash boring techniques to 9 ft. depth.
From 9 ft. to 23 ft.depth casing drilled through boulders to bedrock and cleaned out by drilling AX casing.
Bedrock drilled with AXT core barrel.

WILLIAM TROW ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

DRAWING No. 12

PROJECT No. J3370

BOREHOLE No. 11

PROJECT D.H.O. Bridge, W.P. 142-63

LOCATION Hwy. 17, Deux Rivieres Creek

HOLE LOCATION 10 ft. right of 325+40

HOLE ELEVATION 512.3 ft.

DATUM See Site Plan Dwg.

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_t)

NATURAL MOISTURE CONTENT AND CONSISTENCY 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. 20 40 60 80 / SHEAR STRENGTH PSF	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND No.	NATURAL UNIT WEIGHT P.C.F.
	3" Asphalt SAND FILL- (not sampled)	512.3	0				
	SAND and BOULDERS- sand dense to very dense, fine to coarse. (not sampled)	501.3	10				
	BEDROCK- numerous sand seams up to 3 inch width above 28 ft.depth. -Granite	489.3	20			100% Core Recovery 42% Core Recovery	
			30			97% Core Recovery	
	End of Borehole	476.3					
			40				
			50				
			60				
			70				
			80				
			90				
			100				
			110				

Notes: 1) Hole advanced by drilling AX casing and cleaned out with AXT core barrel.
Bedrock drilled with AXT core barrel.

Mr. R. E. Davis,
Bridge Engineer,
Bridge Division.

Attention: Mr. R. McCombie

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

February 3, 1967

FEB - 8 1967

FOUNDATION INVESTIGATION REPORT BY:
William A. Trow Associates Ltd. - For S.E.O.
A.F. 1041-6).
Dear Riviere Creek Bridge,
Hwy. No. 17, Dear Riviere, Ontario.
District No. 1) (North Bay).

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

After having reviewed the report, we have discussed the findings with the consultant, and it was agreed that additional field work would be required at the west bank of the river where a pronounced drop in bedrock surface was revealed.

The additional work is intended to disclose whether the bedrock surface is more even at the south end of the existing west abutment.

The available information was discussed with both the Bridge Planning Engineer, Mr. S. McCombie, and the Regional Bridge Location Engineer, Mr. J. Curtis, and the consensus of opinion was that a single-span structure, moved slightly towards the east, seems at present, to be the best solution for this crossing.

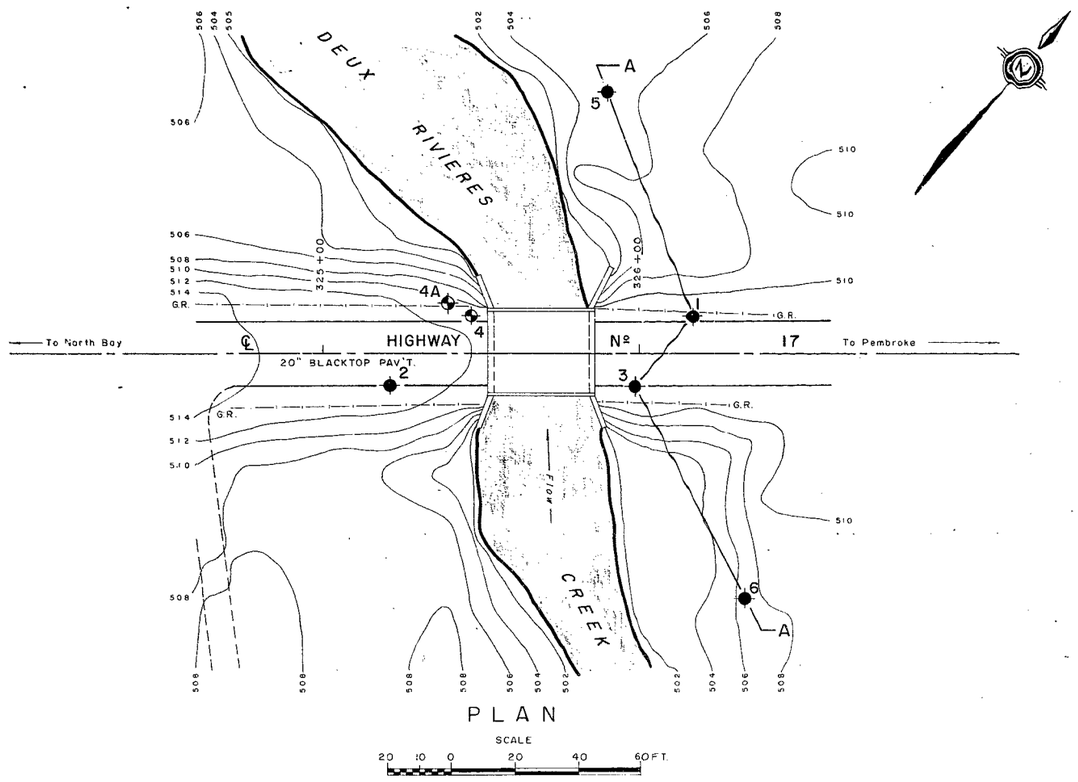
The consultant will also attempt to obtain information on bedrock elevations in the vicinity of possible future wing walls.

As soon as this additional information becomes available, it will be forwarded to you, to be incorporated into this report.

A. E. Sterne
PROVINCIAL FOUNDATION ENGINEER

AES/ctcf
Attach.
cc: Messrs. R. E. Davis (2)
A. A. Tregunna
E. W. Farren
R. Gardiner
J. E. Veach
J. D. Curtis
E. F. Saier
R. A. Clegg
Foundations Files
Gen. Files

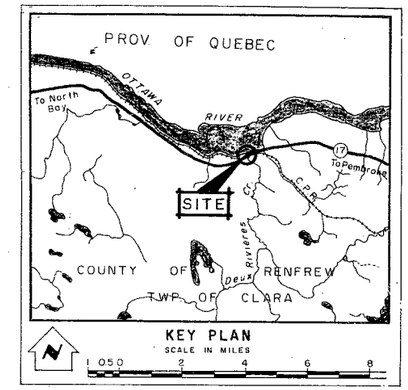
67-F-217
W.P. # 142-63
HWY. # 17
DEUX RIVIERES
CREEK BRIDGE



PLAN

SCALE

20 10 0 20 40 60 FT.



KEY PLAN

SCALE IN MILES

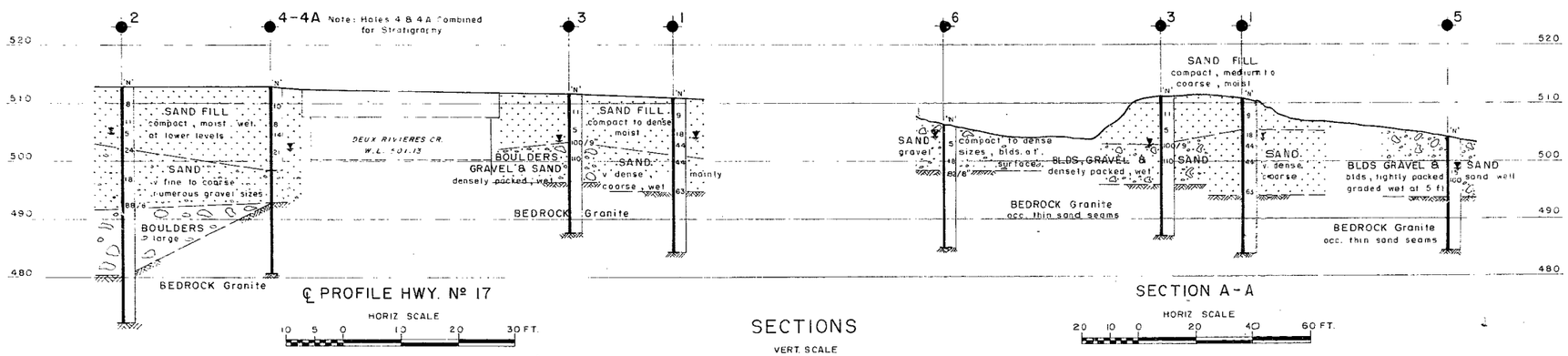
LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation.

NO.	ELEVATION	STATION	OFFSET
1	510.72	326+17	11.5' LT.
2	512.62	325+21	10.0' RT.
3	511.01	325+99	10.0' RT.
4	512.05	325+47	11.5' LT.
5	504.03	325+90	82.0' LT.
6	507.01	326+33	77.0' RT.
4A	511.90	325+40	16.0' 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.



℄ PROFILE HWY. Nº 17

HORIZ SCALE

10 5 0 10 20 30 FT.

SECTIONS

VERT. SCALE

10 5 0 10 20 30 FT.

SECTION A-A

HORIZ SCALE

20 10 0 20 40 60 FT.

PRINT RECORD		
NO	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION

WILLIAM TROW ASSOCIATES LIMITED

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION - FOUNDATION SECTION

DEUX RIVIERES CREEK

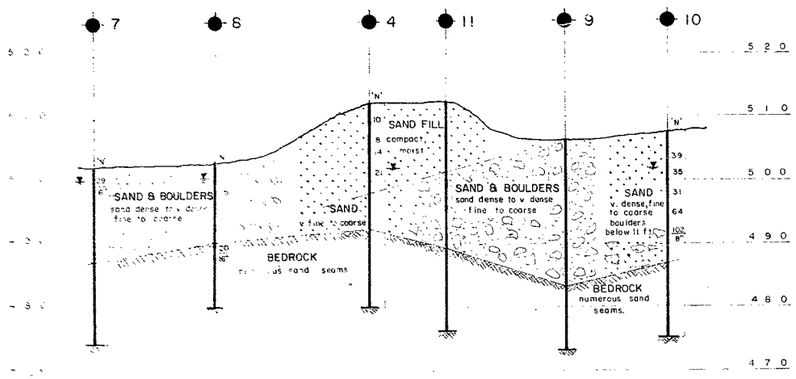
KING'S HIGHWAY NO. 17 DIST. NO. 13

CO. RENFREW

TWP. CLARA LOT 18 & 19 CON. B

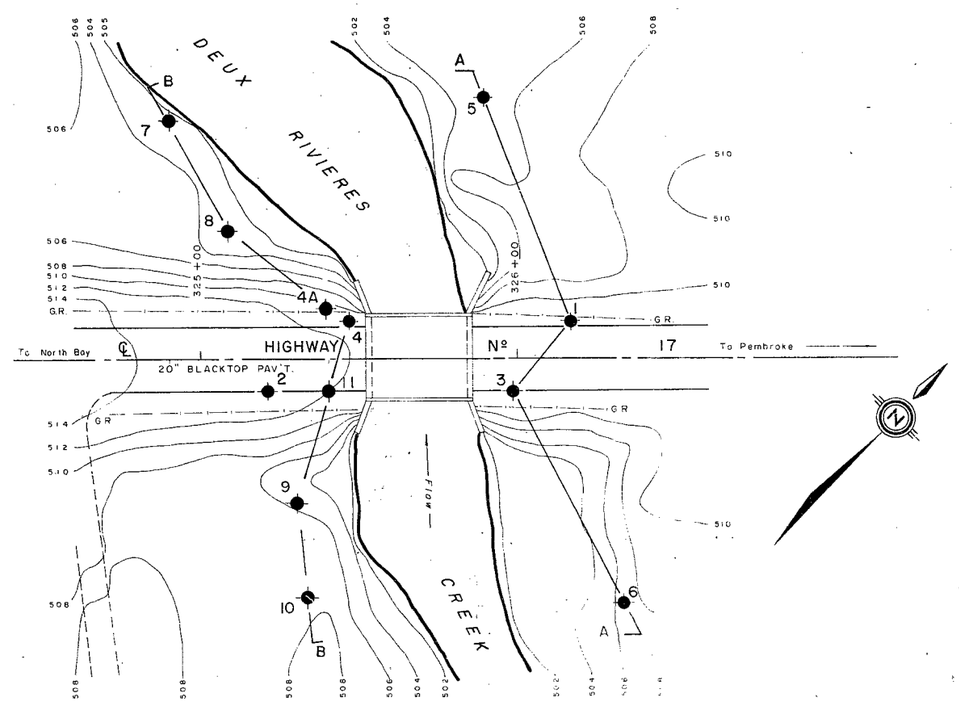
BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D.	CHECKED	W.P. NO. 142-63	3370
DRAWN G.T.	CHECKED	JOB NO.	
DATE DEC 1966		SITE NO.	BRIDGE DRAWING NO.
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT. NO.	



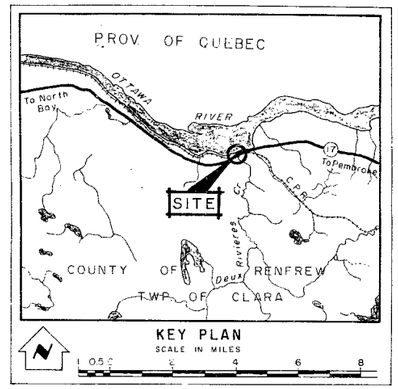
SECTION P-B.

HORIZ SCALE 20 0 20 40 60 FT



PLAN

SCALE 20 10 0 20 40 60 FT



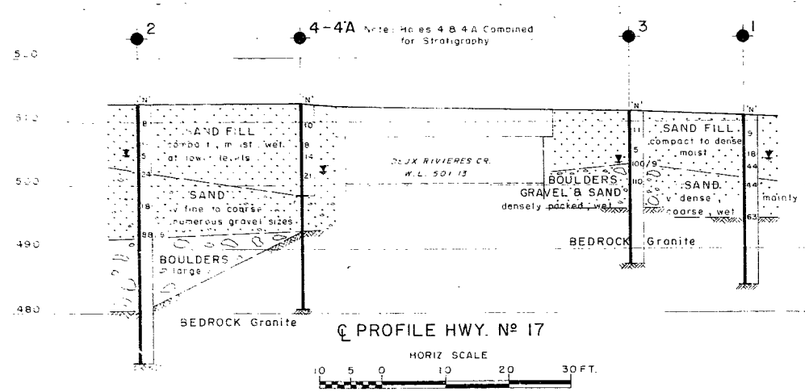
LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation.

NO.	ELEVATION	STATION	OFFSET
1	510.72	326+[illegible]	11.5' LT.
2	512.62	32[illegible]	0.0' RT.
3	511.01	325+[illegible]	0.0' RT.
4	512.05	325	11.5' LT.
5	504.03	325	82.0' LT.
6	507.01	326+33	77.0' RT.
4A	511.90	325+40	16.0' LT.
7	502.7	324+90	75.0' LT.
8	503.2	325+08	40.0' LT.
9	506.4	325+30	45.0 RT.
10	507.7	325+33	75.0 RT.
11	512.3	325+40	10.0 RT.

– 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.

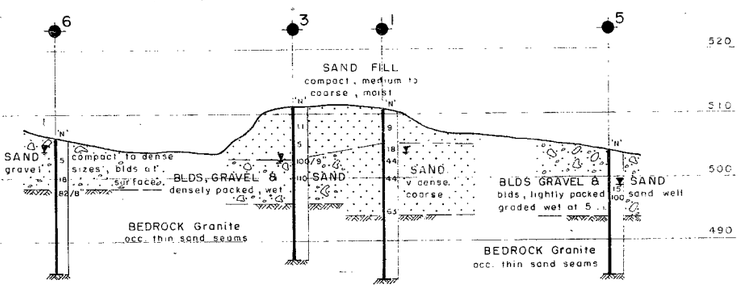


℄ PROFILE HWY. Nº 17

HORIZ SCALE 10 5 0 10 20 30 FT.

SECTIONS

VERT. SCALE 10 5 0 10 20 30 FT.



SECTION A-A

HORIZ SCALE 20 10 0 20 40 60 FT.

PRINT RECORD		
NO.	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION
MAR 67	E.F.K.	HOLES 7, 8, 9, 10 & 11 ADDED ALSO SECTION B-B

WILLIAM TROW ASSOCIATES LIMITED

DEPARTMENT OF HIGHWAYS – ONTARIO

MATERIALS & TESTING DIVISION – FOUNDATION SECTION

DEUX RIVIERES CREEK

KING'S HIGHWAY NO. 17 DIST. NO. 13

CO. RENFREW

TWP. CLARA LOT 18 & 19 CON. B

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D.	CHECKED	W.P. NO. 142-63	3370
DRAWN G.T.	CHECKED	JOB NO	
DATE DEC 1966		SITE NO 29-2	BRIDGE DRAWING NO. D6177-2
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT NO.	