

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 31F-12

DIST. 10 REGION

W.P. No. 169-79-03

CONT. No.

W. O. No.

STR. SITE No. 29-636-220C

HWY. No. 515

LOCATION EWEAS CREEK CULVERT

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

memorandum



To: Structural Section
Eastern Region
Kingston

Date: 1988 12 02

Atten: S.N. Chen, P. Eng.

From: Foundation Design Section
Room 315, Central Building

RE: Eneas Creek Culvert
District #10, Bancroft
W.P. 169-79-03, Highway 515

Further to your telephone discussion on 88 11 30, we have reviewed the subsurface details provided by the Geotechnical Section of Eastern Region. Our comments and recommendations were already provided to you verbally by telephone on 88 12 01 and this memo summarizes the details.

Subsoil generally consists of an extensive deposit of silty sand with gravel and cobbles changing to sandy silt with depth. Within the sand stratum a thin layer of organic material was observed below elevation 293.0. The creek water level as per your drawings estimated to be at Elev. 291.0.

It is understood a new concrete box culvert (5.485 m span and 2.13m height) is proposed as a replacement structure. In order to facilitate the construction of the new structure, a temporary stream diversion by means of two 800 mm diameter C.S.P.S. at Sta. 15 + 850 will be carried out as per the construction sequence outlined on Page 12 of the contract documents. The new box culvert will be found at Elev. 291.50.

The subsoil essentially consists of granular type of material and the construction will require a positive dewatering scheme in order to ensure the in-situ strength of the foundation base. If proper measures are not incorporated, the foundation excavation below the groundwater level will be subjected to 'boiling' due to unbalanced hydrostatic head. This can be prevented by driving sheeting to a depth below the water level at least twice the depth of the prevailing hydrostatic head. Alternatively be constructing oversize excavations with perimeter drains with provision of water being pumped out from sumps collecting the water from drains to the creek.

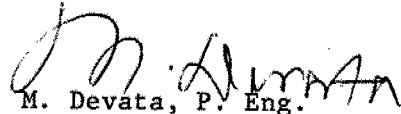
Temporary excavations may be achieved with slopes of $1\frac{1}{2}:1$ above water level and $2:1$ below water level. Bedding shall have a minimum depth of 0.6 m Granular 'A' well compacted with backfill consisting of Granular 'B'. The earth pressures behind the wall should be computed as per current O.H.B.D.C. methods. For sliding resistance an unfactored value of 0.57 may be used.

.....2

Any localized organic materials shall be excavated to its full depth and replaced with well compacted granular material.

Should you require any other details please contact our office.

MD/mmj


M. Devata, P. Eng.
Chief Foundation Engineer

c.c. - T.W. Murphy, Head
Geotechnical Section



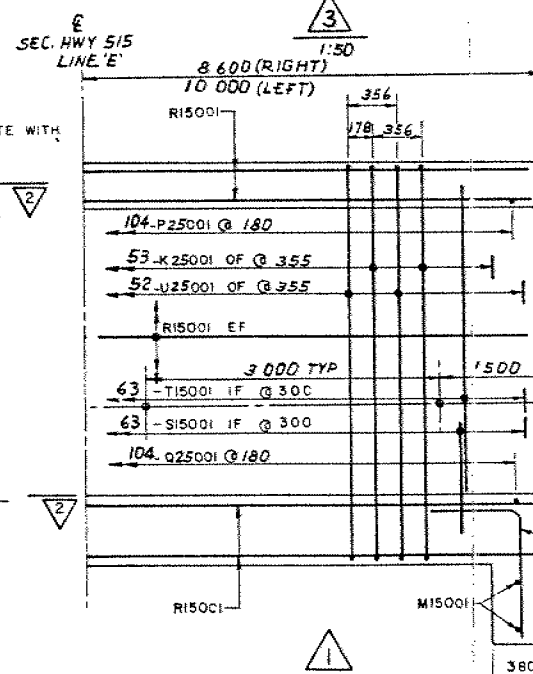
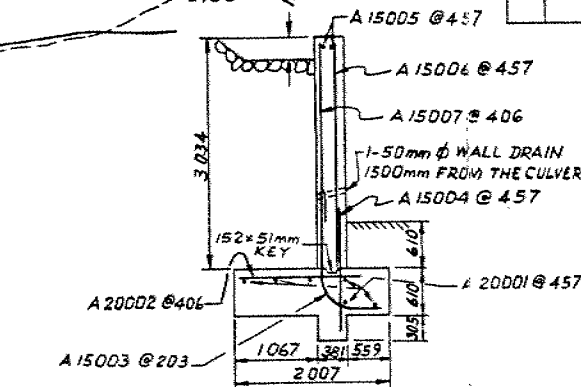
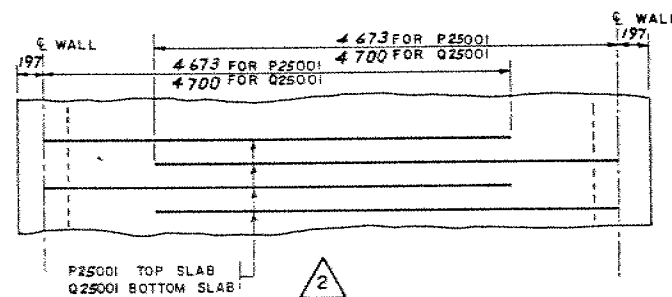
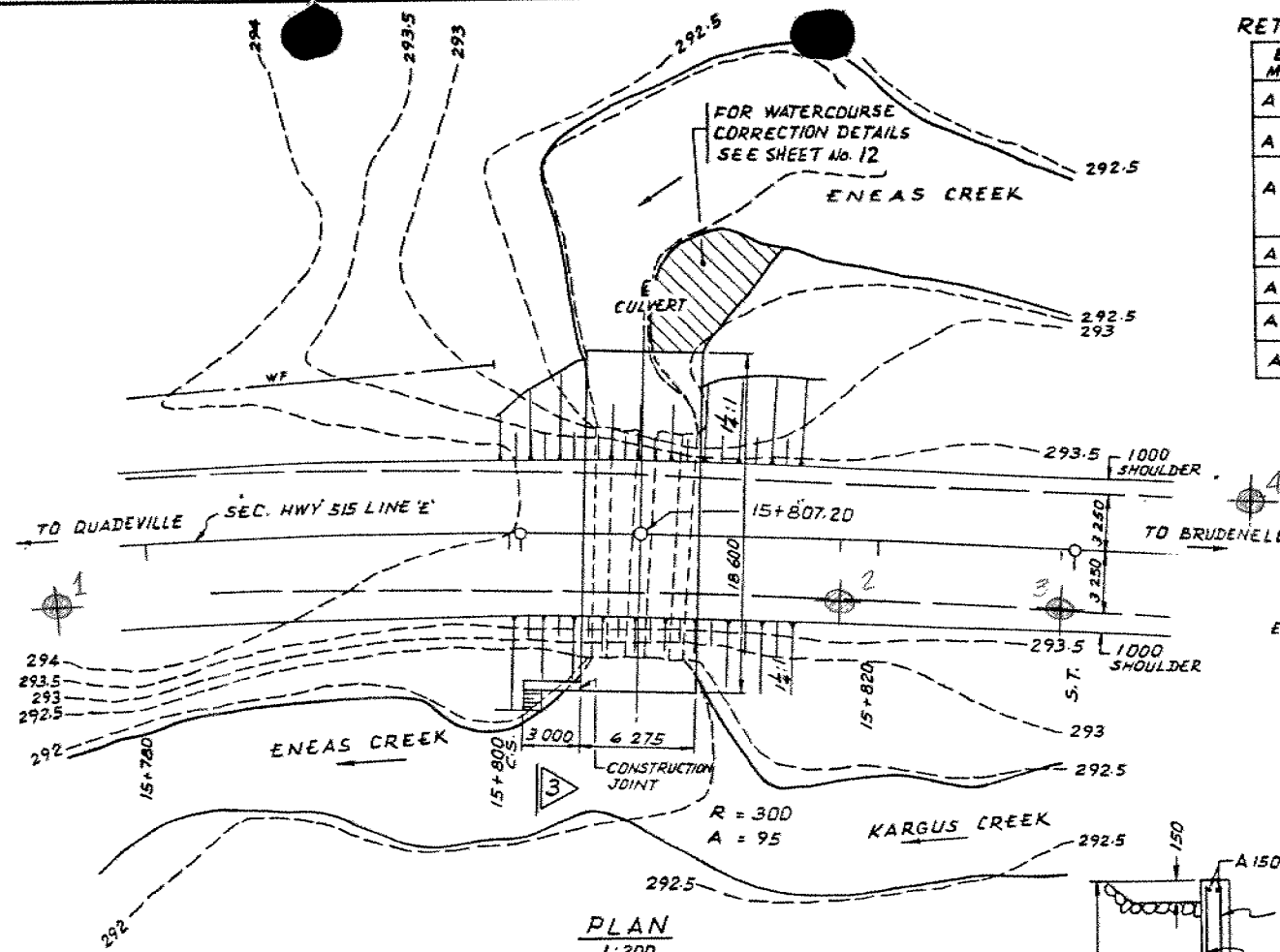
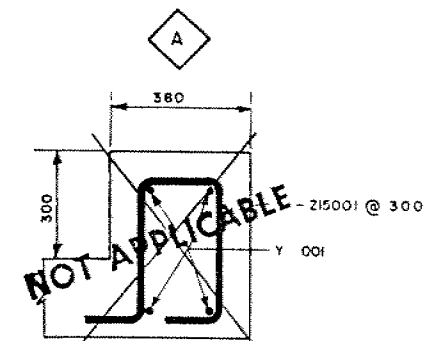
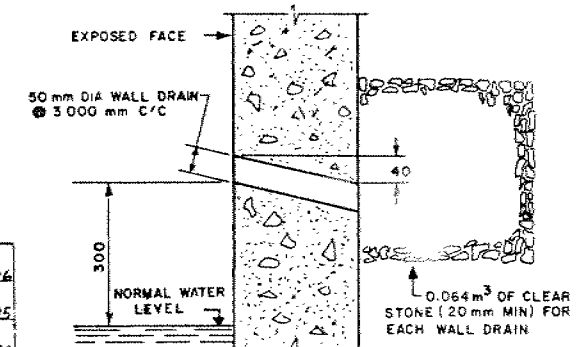
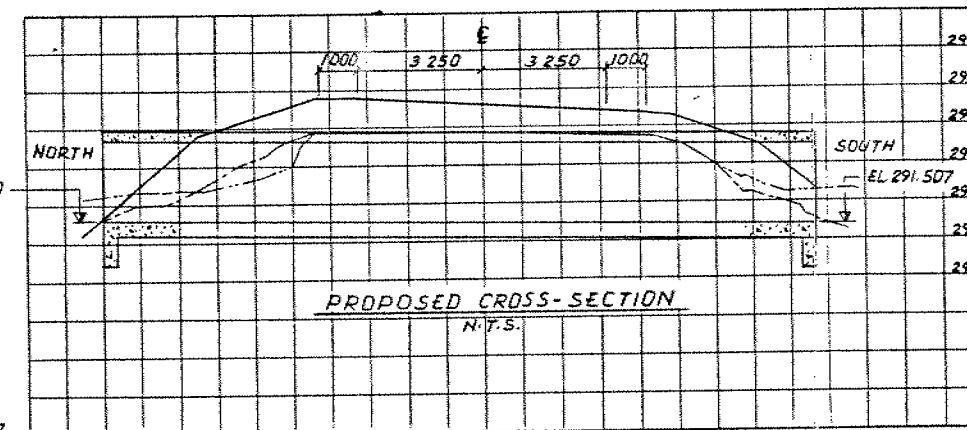
METRIC

DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE SHOWN.
ELEVATIONS, COORDINATES, CURVE
AND ALIGNMENT DATA ARE IN METRES.
STATIONS ARE IN KILOMETRES + METRES.

PREPARED BY : T.M. NADAVALLIL
CHECKED BY : S.H. CHEN

RETAINING WALL - REINFORCING

BAR MARK	NO. REQ'D	C/C	LENGTH	DETAILS
A20001	6	457	2 860	STRAIGHT
A20002	8	406	1 499	STRAIGHT
A15003	15	203	2 260	STRAIGHT
A15004	7	457	1 168	STRAIGHT
A15005	14	457	2 860	STRAIGHT
A15006	7	457	2 964	STRAIGHT
A15007	8	406	2 286	STRAIGHT



MARK	NO. REQ'D	C/C	LENGTH	DETAILS	REMARKS
P25001	104	180	4 673	STRAIGHT	BOTTOM OF TOP SLAB STAGGERED
Q25001	104	180	4 700	STRAIGHT	TOP OF BOTTOM SLAB STAGGERED
K25001	106	355	6 020	STRAIGHT	K BARS ALTERNATE WITH U BARS
U25001	104		6 020	STRAIGHT	
S15001	126	300	737	STRAIGHT	INSIDE FACE OF WALLS (AT BOTTOM HAUNCH)
T15001	126	300	2 436	STRAIGHT	INSIDE FACE OF WALLS
R15001	213	SEE REMARKS	6 453	STRAIGHT	LONGITUDINAL STEEL (LAP 450) @ 450 IN TOP SLAB AND WALLS @ 300 IN BOTTOM SLAB
L15001	42	300	1700	STRAIGHT	APRON
M15001	4	450	6 135	STRAIGHT	APRON
Y 001				STRAIGHT	HEADER WALL
Z15001				STRAIGHT	HEADER WALL

GENERAL NOTES

- CLASS OF CONCRETE 20 MPa
- CLEAR COVER TO REINFORCING STEEL 70±20mm EXCEPT AS
- ALL EXPOSED CORNERS TO BE CHAMFERED 20mm
- NO CONCRETE SHALL BE PLACED IN BOTTOM SLABS, THE DEPTH OF THE EXCAVATION AND CHARACTER OF FOUNDATION MATERIAL HAVE BEEN APPROVED BY THE ENGINEER
- FILL SHALL BE PLACED AT BOTH SIDES OF CULVERT SIMULTANEOUSLY
- CULVERTS AND RETAINING WALLS (WHERE APPLICABLE) SHALL BE BUILT IN ACCORDANCE WITH MTC FORM 904
- REINFORCING STEEL SHALL BE GRADE 400
- STEEL FOR EACH CULVERT (INCLUDING RETAINING WALLS WHERE APPLICABLE) SHALL BE BUNDLED SEPARATELY AND MARKED WITH STATION NUMBER
- WALL DRAIN OPENINGS TO BE FORMED USING NON-METALLIC MATERIALS
- VERTICAL LOCATION OF WALL DRAINS SHALL BE DETERMINED IN FIELD BY THE ENGINEER
- IF DENOTES INSIDE FACE
- OF DENOTES OUTSIDE FACE
- EF DENOTES EACH FACE

ITEM	WALLS & SLABS	RETAINING WALL	TOTAL
MASS OF REINF STL tonnes	11.7	0.250	12.0
VOL OF CONCRETE cubic metres	115.5	7.5	123.0

MODIFIED

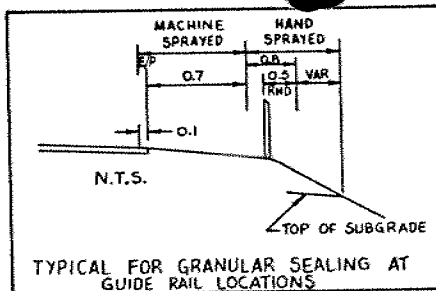
STANDARD DRAWING MARCH 1982 SS 114-5

STD RIGID FRAME BOX CULVERT
AT STATION 15+807.20

SPAN 5.485 HEIGHT 2.134 LENGTH 18.600 FILL HEIGHT 6.10

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

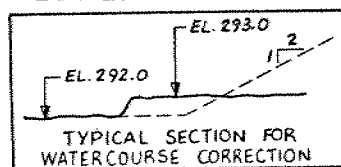
DATE	BY	DESCRIPTION
DESIGN	STD.	CHECK
DRAWING	7MN	CHECK SNC
DATE	6/86	
SITE	No 25-436-220C	DWG P1



PI 15+753.344

TWP LYNDOK

CON 13
LOT 21



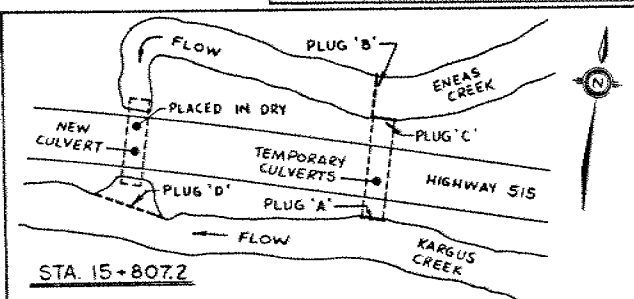
S' = 0.048 m/m
R = 450
A = 110

LIMIT OF CONTRACT
STA. 15+950

METRIC
NOTE - DIMENSIONS ARE IN
METRES AND/OR
MILLIMETRES UNLESS
OTHERWISE SHOWN.

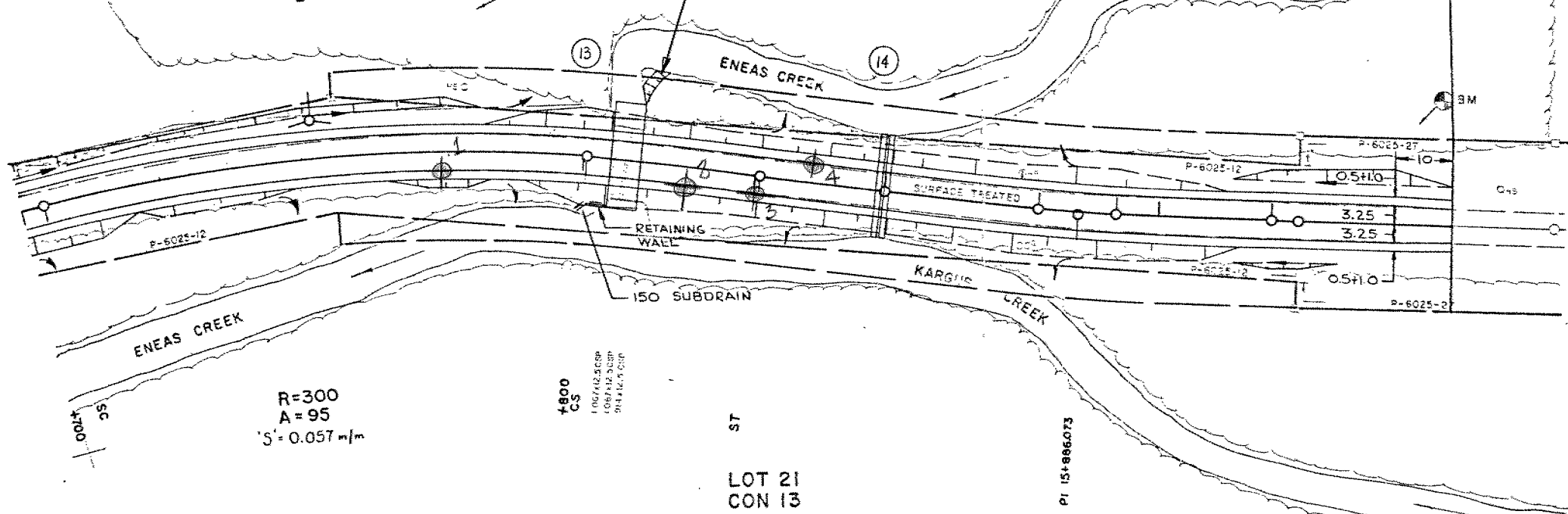
PLATE No 636-515/105
CONT No
WP No 169-79-03
NEW CONSTRUCTION
STA 15+700 TO STA 15+970
Survey OCT/85 Revised

SHEET
12



CONSTRUCTION SEQUENCE

1. PLACE PLUGS 'A' AND 'C'
2. PLACE TEMPORARY CULVERTS
3. REMOVE PLUG 'C' AND ALLOW 24 HOUR SETTLING TIME WITHIN THE TEMPORARY CULVERT, THEN GRADUALLY REMOVE PLUG 'A'
4. PLACE PLUGS 'B' AND 'D' (SAND BAGS) ALLOWING AS MUCH WATER AS POSSIBLE TO DRAIN FROM THE ORIGINAL CHANNEL
5. REMOVE EXISTING CULVERTS AND CONSTRUCT NEW CULVERT IN DRY
6. REMOVE PLUG 'B' GRADUALLY AND ALLOW WATER TO STAND FOR 24 HOURS BEFORE REMOVAL OF PLUG 'D'
7. REPLACE PLUG 'C' AND THEN 'A' AND REMOVE TEMPORARY CULVERT AND BACKFILL



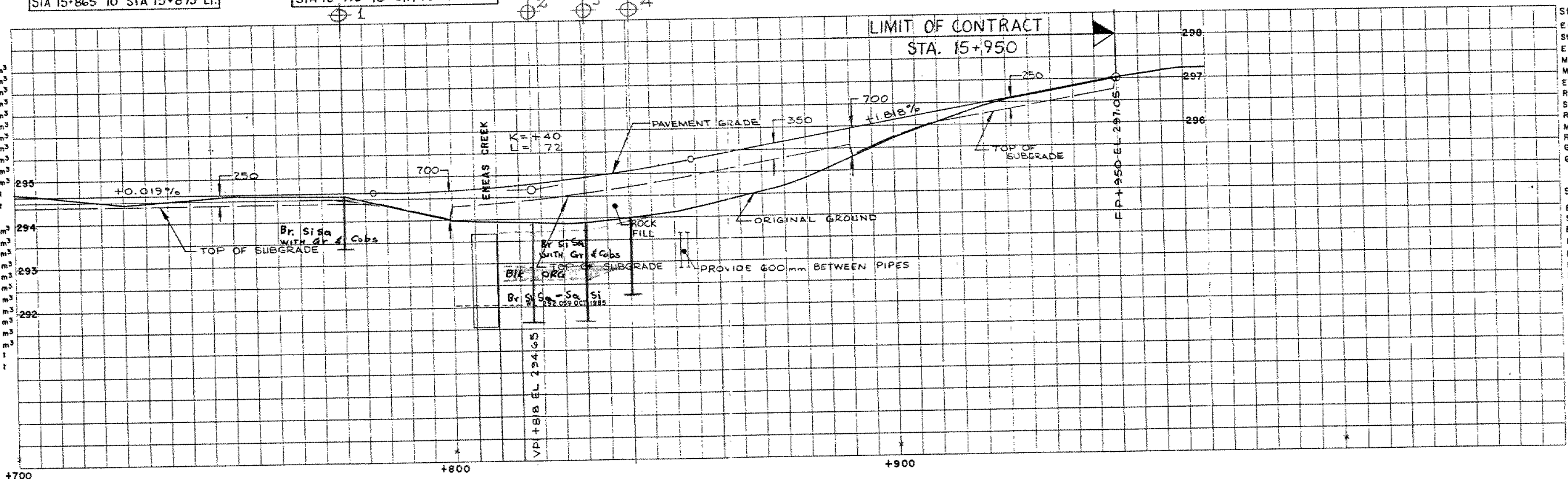
BENCHING OF EARTH SLOPES
"OPSD-208.01"
STA 15+787 TO STA 15+865 RT.
STA 15+865 TO STA 15+895 LT.

NON STANDARD DITCHING
STA 15+700 TO STA 15+787 LT.
STA 15+915 TO STA 15+930 RT.

FOR CONCRETE CULVERT DETAILS
SEE SHEET No. 33

QUANTITIES

EC
SI
ED
ME
MBE
EF
RC
SH
RD
MBR
RF
GB
GSB

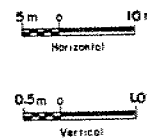


QUANTITIES

Sta	Sta
15+700	15+950
EC	3.00
SI	3.00
ED	3.00
ME	3.00
MBE	3.00
EF	3.00
RC	3.00
SH	3.00
RD	3.00
MBR	3.00
RF	3.00
GB	1245
GSB	1392

Sta	Sta
15+700	15+950
EC	3.00
SI	3.00
ED	3.00
ME	3.00
MBE	3.00
EF	3.00
RC	3.00
SH	3.00
RD	3.00
MBR	3.00
RF	3.00
GB	1245
GSB	1392

SCALES



#61-F-32

ENEAS Cr. Br.
AT QUADEVILLE

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section,

(Foundations Office).

Attention: Mr. K. L. Kleinsteinber.

June 8, 1961.

D.H.C. FOUNDATION INVESTIGATION
REPORT.

(Municipal Job)

Re: Eneas Creek Bridge at Quadeville,
Twps. of Brudenell and Lyndoch,
Lots 22 and 23, Con. XIII,
County of Renfrew, District No. 10,
W.J. 61-F-32 - Mun. W.O. 60-34751.

This memo accompanies our detailed foundation
report on the subsoil conditions existing at the above site.

We believe that the conclusions and recommendations
contained in this report are self-explanatory and should prove
adequate for your future design work.

However, should you require further assistance,
please feel free to contact our Office.

AGS/Mdof
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
J. Ford
J. H. Cook (Dist. Mun. Eng.)
J. E. Grusnier
A. Watt
Foundations Office
Gen. File

L. C. Soderman,
PRINCIPAL FOUNDATION ENGR.
Per:

A. G. Stermac
(A. G. Stermac,
SUPERVISING FOUNDATION ENGR.)

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 6. DISCUSSION AND RECOMMENDATIONS.
 7. SUMMARY.
 8. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION

For

Eneas Creek Bridge at Quadeville,
Twps. of Brudenell and Lyndoch,
Lots 22 and 23, Con. XIII,
County of Renfrew, District No. 10,
W.J. 61-P-32 - Mun. W.O. 60-34751.

1. INTRODUCTION:

A soils investigation was carried out to determine the subsoil conditions where Highway 515 crosses Eneas Creek at Quadeville. At present, the creek is bridged by a 36.0 ft. span, single lane, timber structure which is supported by two timber crib abutments and four stringers which rest on the stream bottom. This structure is to be replaced by a timber bridge of 36.0 ft. span, 40.0 ft. wide, and with its centre line some 10.0 ft. east of the present structure.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The undulating topography at the site is composed of sand and gravel with surface boulders. This is a glacio-fluvial deposit and part of an old outwash plain of the Mattawaska River. At the bridge site the Eneas Creek is some 40.0 ft. wide and 1.0 to 2.0' in depth. The creek bed is covered with large boulders, many of which have been worn down from a broken rock dam located some 50.0 ft. upstream.

3. FIELD AND LABORATORY INVESTIGATION:

The field work consisted of three dynamic cone penetration tests and three boreholes taken down to the dense till stratum. Disturbed samples and 'N' values were obtained in the granular subsoil by using a standard split spoon sampler. These samples were visually

3. FIELD AND LABORATORY INVESTIGATION: (cont'd.) ...

identified in the field and transferred to the laboratory where particle size distribution tests were carried out.

4. SUBSOIL CONDITIONS:

4.1) General:

The subsoil conditions vary at the site. A layer of coarse sand and gravel is found overlying a layer of fine silty sand. Beneath this, the coarse sand and gravel is again found overriding a very dense till layer. The strata dip from east to west.

4.2) Medium to Coarse Sand and Fine to Coarse Gravel:

This stratum is found in B.H. 1 between elevations 84.0 and 72.0, in B.H. 2 between 86.0 and 79.0, and in B.H. 3 between 86.0 and 80.0. Its relative density varies, and for calculation purposes, an 'N' value of 10 has been assumed.

4.3) Silty Fine to Medium Sand:

This stratum, varying in thickness from 5.0' in B.H. 2 to 20.0' in B.H. 3, has also, a widely varying relative density and again, an 'N' value of 10 has been selected as representative.

4.4) Very Dense Well-graded Sand and Gravel:

Sand and gravel as in 4.2 above, is found below the silty fine to medium sand. Beneath this, is a very dense well-graded sand and gravel stratum found at elevations 62.0 on the east, and 58.0 on the west side of the present structure.

cont'd. /3 ...

5. GROUND WATER CONDITIONS:

The water table was measured at an elevation of 88.0' in B.M. 1, and 85.0' in B.M.'s 2 and 3.

6. RECOMMENDATIONS AND DISCUSSION:

Two solutions may be applied to this problem. Either spread footings with a maximum safe bearing pressure of 1.0 T/sq.ft., or wooden displacement piles driven into the very dense sand and gravel layer, may be used.

Spread footings should be placed at an elevation of 79.0, As they will be in the river bed, the coarse gravel and boulders should be removed to expose the coarse sand and gravel, through which sheet-piling should be driven to an elevation of 70.0 to prevent piping during the dewatering of the excavation. If it is found that it is impossible to keep the excavation dry and in good condition by pumping, then the excavation should be taken down under water to the required grade and a tremie concrete seal poured. Further work can then be continued in the dry.

Wooden displacement piles should be driven down into the very dense sand and gravel layer which is found at an elevation of 62.0 on the east side of the structure, and 58.0 on the west side. Before driving the wooden piles, the coarse gravel and boulders should first be removed from the stream bed to expose the coarse sand and gravel.

cont'd. /4 ...

7. SUMMARY:

7.1) The medium to coarse sand and fine to coarse gravel are capable of supporting spread footings placed at an elevation of 79.0, with a safe bearing capacity of 1.0 T/sq.ft.

7.2) As an alternative to the above, wooden displacement piles can be used and driven to the dense till layer varying in elevation from 63.0' on the east side, to 58.0' on the west side.

7.3) The excavation for spread footings must be kept dry and in good condition by over-driving sheet piling to an elevation of 70.0.

8. MISCELLANEOUS:

The drilling operations were carried out from Monday, April 24th to Tuesday, May 2nd, 1961, by the Johnston Drilling Co., Ltd., using a diamond core drill converted for soil sampling purposes. The work was supervised for the Department of Highways by T. F. Widdis.

June 1961. REPORT PREPARED BY: *T. F. Widdis*
.....
T. F. Widdis,
PROJECT FOUNDATION ENGR.

REPORT APPROVED BY: *A. G. Starnes*
.....
A. G. Starnes,
SUPERVISING FOUNDATION ENGR.

APPENDIX I.

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-32

W.P. -

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	3'-4.5'	Fine to coarse sand and fine to coarse gravel with boulders.	62	-	-	-	-	-	
	S2	6'-7.5'	Fine to coarse sand and fine to coarse gravel. Medium dense.	11	-	-	-	-	-	
	S3	9'-10.5'	Fine to coarse gravel and fine to coarse sand.	23	-	-	-	-	-	
	S4	12'-13.5'	Medium to coarse sand with fine gravel. Medium dense.	12	-	-	-	-	-	
	S5	15'-16.5'	Medium to coarse sand with fine gravel. Medium dense.	11	-	-	-	-	-	
	S6	18'-19.5'	Medium to coarse and with fine gravel. Medium dense.	21	-	-	-	-	-	
	S7A	21'-22'	Medium to coarse sand with fine to coarse gravel. Medium dense.	11	-	-	-	-	-	
	S7B	22'-23'	Fine silty sand. Grey. Loose	6	-	-	-	-	-	
	S8	24'-26'	Fine to medium silty sand.	25	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-32W.P. -

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
2	S1	Refusal		-	-	-	-	-	-	
	S2	4'-6'	Medium to coarse sand with fine to coarse gravel. Dense.	46						
	S3	7'-9'	Medium to coarse sand with fine gravel. Loose.	7						
	S4	10'-12'	Medium to coarse sand with fine to coarse gravel. Loose.	10						
	S5	13'-15'	Medium to coarse sand with fine to coarse gravel. Medium	32						
	S6	16'-17'	Medium to coarse sand with fine to coarse gravel. Loose.	7						
		17'-18'	Fine silty sand. Loose. Grey.							
	S7	19'-21'	Fine silty sand. Loose. Grey.	5						
	S8	22'-24'	Medium to coarse sand with fine to coarse gravel.	29						
	S9	25'-27'	Same as above.	44						
	S10	Refusal		-	-	-	-	-	-	
	S11	31'-31.8'	Medium to coarse sand with fine to coarse gravel. Very dense.	145-9"						

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-32W.P. -

HOLE NO	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
3	S1	5'-6.5'	Medium to coarse sand with fine to coarse gravel.	17						
	S2	8'-10'	Fine to medium silty sand. Medium dense.	18						
	S3	12'-14'	Fine to coarse sand with fine gravel. Loose.	11						
	S4	16'-18'	Fine to medium silty sand. Loose.	6						
	S5	20'-22'	Fine to medium silty sand. Medium dense.	16						
	S6	24'-26'	Fine to medium silty sand. Very dense.	140						
	S7	27'-27.1'	Medium to coarse sand with fine gravel. Very dense.	10-1"	-	-	-	-	-	
	S8	-	Lost.	-	-	-	-	-	-	
	S9	35'-36.5'	Lost.	109						
4	cone penetration only.									
	S denotes split spoon sample.									

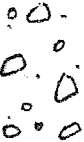


DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. - - - - - BORE HOLE NO. 1
JOB 61-F-32 STATION 455 (37' Lt)
DATUM 94.0' COMPILED BY B.K.
BORING DATE Mar. 24/61 CHECKED BY T.F.W.

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	O
VANE TEST (C) AND SENSITIVITY (S) -----	+ ^s
NATURAL MOISTURE AND	
LIQUIDITY INDEX -----	L
LIQUID LIMIT -----	X
PLASTIC LIMIT -----	—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	↓ Groundlevel	94.0	0	25 50 75 100 BLOWS/FT.	
	Fine to coarse sand with fine to coarse gravel and boulders.				
		85.0	10	Penetration refusal below 85.0	
	Medium to coarse sand with fine to coarse gravel. Medium dense.				
		72.0	20		
	Fine silty sand. Loose.				
		58.0	30		
	End of borehole.				
	Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350ft. lb. per blow.		40		

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT - % DRY WT.			UNIT WT. P.C.F.
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	-
		S7A	-
		S7B	-
		S8	-

W.P. - - - - - BORE HOLE NO. 2
JOB 61-F-32 STATION 433 (33' Rt)
DATUM 86.0' COMPILED BY B.K.
BORING DATE 27.4.61 CHECKED BY T.F.W.

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING







1/2 UNCONFINED COMPRESSION (Qu) -----	O
VANE TEST (C) AND SENSITIVITY (S) -----	+ S
NATURAL MOISTURE AND LIQUIDITY INDEX -----	LI
LIQUID LIMIT -----	X
PLASTIC LIMIT -----	—

[illegible]






CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	-
		S7	-
		S8	-
		S9	-
		S10	-
		S11	-

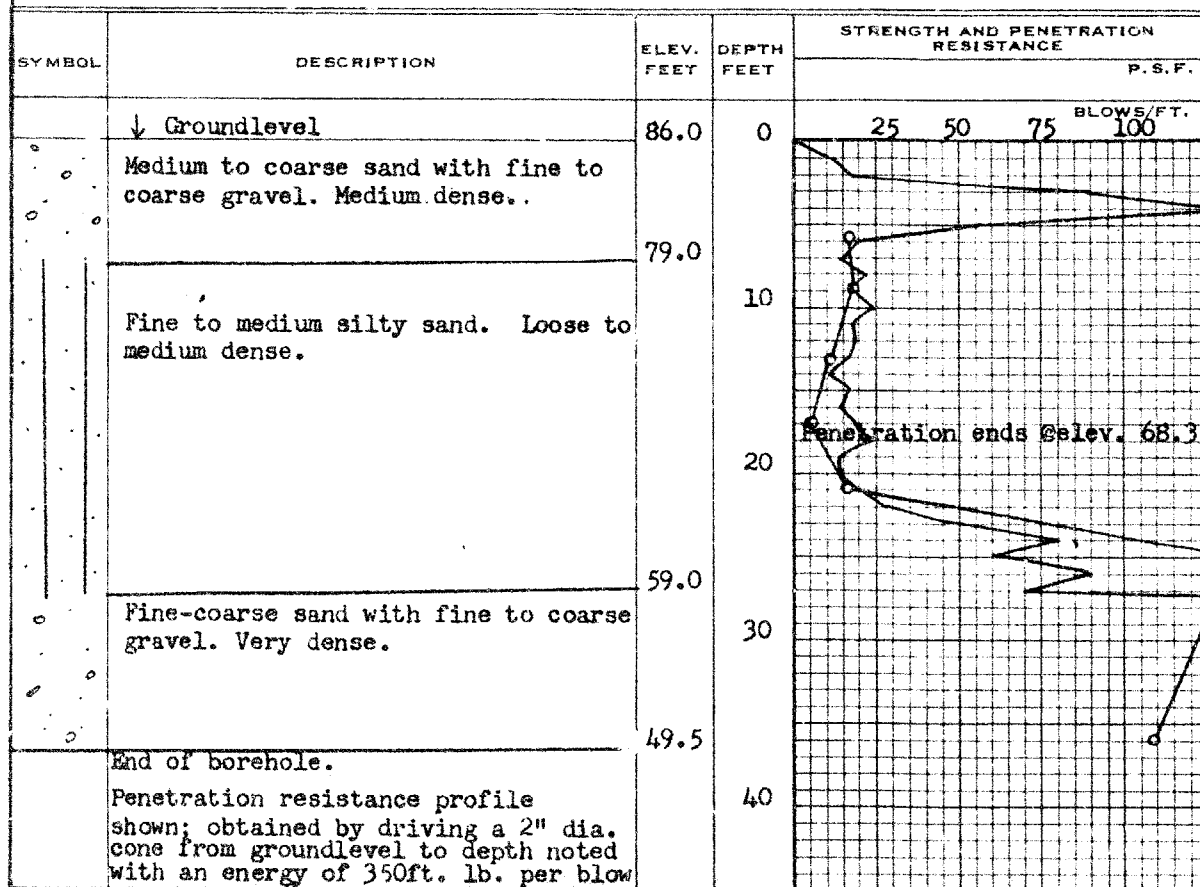
DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. _____ BORE HOLE NO. 3
 JOB 61-F-32 STATION 3+67 (24' Rt)
 DATUM 86.0' COMPILED BY B.K.
 BORING DATE Apr. 28/61 CHECKED BY T.F.W.

2" DIA. SPLIT TUBE _____ 
 2" SHELBY TUBE _____ 
 2" SPLIT TUBE _____ 
 2" DIA. CONE _____ 
 2" SHELBY _____ 
 CASING _____ 

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) _____ 
 VANE TEST (C) AND SENSITIVITY (S) _____ 
 NATURAL MOISTURE AND LIQUIDITY INDEX _____ 
 LIQUID LIMIT _____ 
 PLASTIC LIMIT _____ 



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT- % DRY WT.		
	S1	-
	S2	-
	S3	-
	S4	-
	S5	-
	S6	-
	S7	-
	S8	-
	S9	-

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W. P. _____ BORE HOLE NO. 4 _____

JOB 61-F-32 STATION 3747 (15' Lt)

DATUM 95.0' COMPILED BY B.K.

BORING DATE May 2/61. CHECKED BY T.F.W.

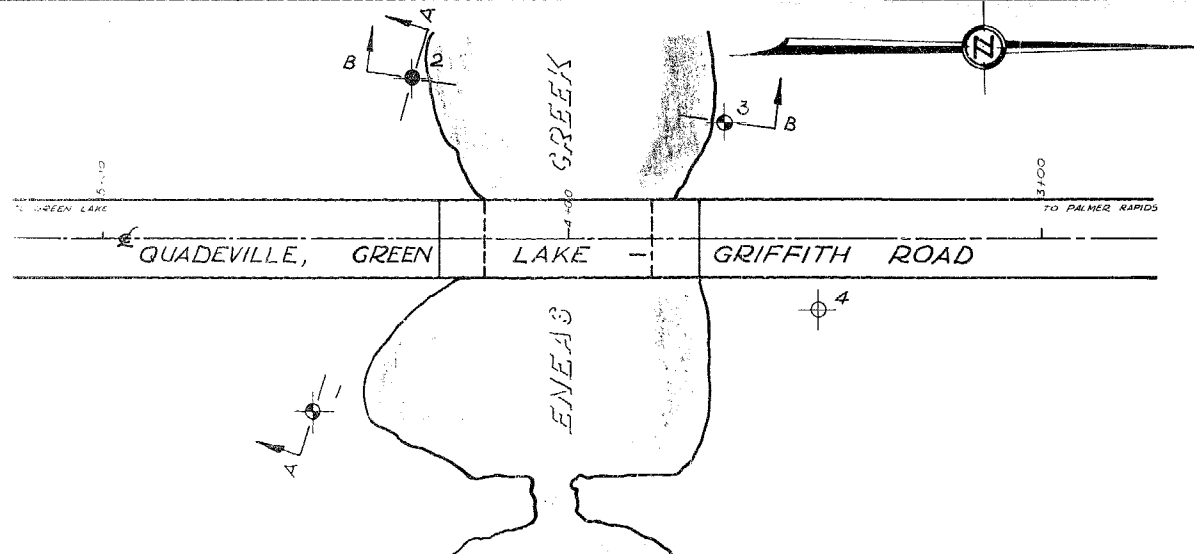
2" DIA. SPLIT TUBE -----
2" SHELBY TUBE -----
2" SPLIT TUBE -----
2" DIA. CONE -----
2" SHELBY -----
CASING -----

LEGEND

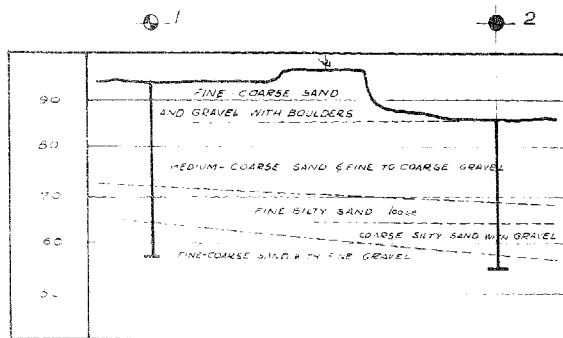
1/2 UNCONFINED COMPRESSION (Qu) _____	O
VANE TEST (C) AND SENSITIVITY (S) _____	+S
NATURAL MOISTURE AND	
LIQUIDITY INDEX _____	LI
LIQUID LIMIT _____	X
PLASTIC LIMIT _____	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	↓ Groundlevel	95.0	0	<div style="display: flex; justify-content: space-between; width: 100%;"> 25 50 75 100 </div> <div style="text-align: right; font-size: small;">BLOWS/FT.</div>	
Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350 ft. lb. per blow.			40	Penetration ends @elev. 64.7	

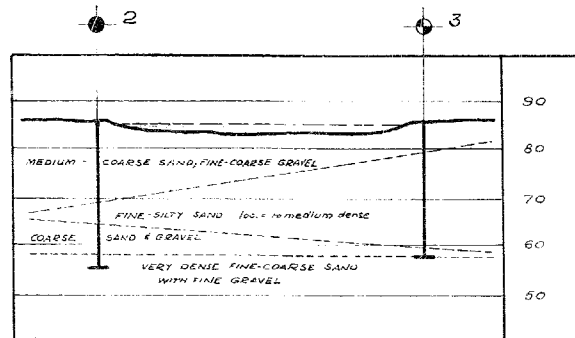
[illegible]



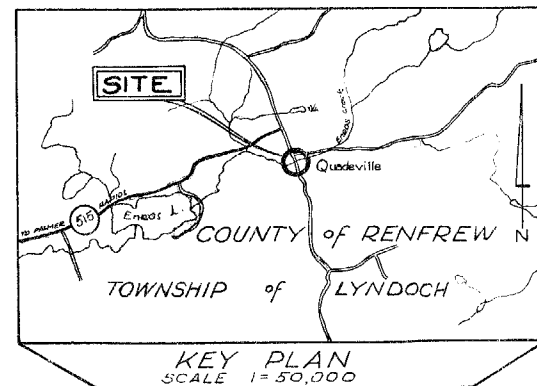
PLAN
SCALE 1"=20'



A - A
SCALE 1"=20'



B - B
SCALE 1"=20'



LEGEND

- BORE HOLE
- ⊕ PENETRATION HOLE
- ⊙ BORE & PENETRATION HOLE

HOLE	ELEVATION	STATION	OFFSET
1	94.00	4 + 55	37' 0" LT
2	86.00	4 + 33	33' 0" RT
3	86.00	3 + 67	24' 0" RT
4	95.00	3 + 47	15' 0" LT

ORIGINATED T. WOODS
DRAWN T. J. Gregory
CHECKED C. J. [Signature]
APPROVED [Signature]
DATE 13 JUNE 1961

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS & RESEARCH SECTION
BRIDGE OVER ENEAS CREEK
AT QUADEVILLE

SCALE 1"=20'
W. F. NO.
JOB NO. 61-F-32
INV. NO. 61-F-32 A