cc: Bridge Office (2nd copy)

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section.

April 27, 1961.

REVIEW OF PRELIMINARY PLANS -

by: Foundations Office.

(Foundations Office)

Attention: Mr. F. De Visser.

Re: W.P. 254-60-1 and 2,
St. Davids Rd. Bridges over Q.E.W.
and Hwy. #8 -- District #4.

In reply to your memo, we have the following comments to make:-

1. W.P. 254-60-1:

The piles should be driven 15 feet into the ground - i.e., below the present ground level. A safe load of 15 tons can be applied to each of these piles.

It is our opinion that the use of piles for abutment footing support, is not the best solution. This applies especially to the North abutment where the depth of the fill below the footing will be in the order of 5 - 6 feet. Surely good compaction could be assured of such a fill layer. At the South abutment, the fill will be appreciably higher - i.e., about 15 feet, and the problem of assuring good compaction becomes more difficult. We would therefore, recommend that a portion of the approach fill be constructed of granular material. Compaction of such material should not present any difficulty and satisfactory results can easily be achieved. The above argument is even more valid if the fact is kept in mind that the structure is designed as a simply-supported one.

Good compaction of the approach fills is most important even if piles are used because otherwise, the fill will consolidate excessively and thus induce positive friction on the piles.

2. W.P. 254-60-2: (No Comments)

L. G. Soderman,
PRINCIPAL FOUNDATION ENGR.

Per: A G Stermac

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

AGS/MdeF
cc: Foundations Office
Gen. Files.

A. M. Toye

Mr. A. M. Toye,

Bridge Engineer.
Materials & Research Section.

November 7, 1960.

D.H.O. FOUNDATION REPORT
W.J. 60-F-74 -- W.P.254-60-1.

Attention: Mr. S. McCombie.

Re: St. David's Interchange
& (Q.E.W.), District 4

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

The conclusions and recommendations to be followed in your future design work, are summarized in the report, and are self-explanatory.

If we can be of further assistance in connection with this project, do not hesitate to contact our Office.

L. G. Soderman,
PRINCIPAL FOUNDATIONS ENGR.
Per:

A. Stermac

(A. Stermac,
FOUNDATIONS OFFICE ENGR.)

AS/MdeF
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
D. G. Ramsay
I. C. Campbell
R. E. Richardson
T. J. Kovich
A. Watt
Foundations Office
Gen. Files

FOUNDATION INVESTIGATION

For

St. David's Interchange & (Q.E.W.)
W.J. 60-F-74 -- W.P. 254-60-1
District 4.

1. INTRODUCTION:

It is proposed to build an underpass bridge to carry the new St. David's Road over the Q.E.W. The location of this site is about two miles west of St. David's town.

A soil investigation was carried out in order to determine the subsoil stratification, the soil properties and recommend the type of foundations at the site of the new proposed structure.

The results of this investigation together with the discussion and recommendations are given in this report.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site is located in the physiographic area referred to as the "Niagara Escarpment". The topography is mostly flat to undulating farmland and orchards.

It is believed that this area was covered by the late Iroquois Lake. The lake waters have leveled the undulating till terrain by eroding and by depositing the top clay.

The bedrock in this area is mainly Queenston Shale.

3. FIELD AND LABORATORY WORK:

The field investigations were carried out by means of a skid-mounted core-drill machine adapted for soil sampling.

In the course of explorations, six boreholes were made. Four holes correspond to the corners where the abutments will be placed and two holes for the south approach fill embankment stability analysis.

cont'd. /2 ...

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

The boreholes were made by the conventional wash boring method. In cohesive soils samples were extracted by means of a 2" I.D. thin-walled Shelby tube sampler. Also, supplementary shear measurements were obtained by means of in-situ vane tests. In non-cohesive soils, sampling was done by means of a 2" O.D. split-barrelled spoon sampler. The dimensions of the spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. A dynamic cone resistance profile was established by driving a 2" diameter cone from the existing ground surface to refusal depth. The split-spoon samples were visually examined and identified in the field. The Shelby samples were carefully sealed and taken to the laboratory where routine tests for index properties were carried out on selected representative samples.

Laboratory and field test results have been summarized in Table No. 1 and the location of the boreholes is shown on Drawing No. 60-F-74A, under Appendix I.

4. SUBSOIL CONDITIONS:

4.1) General:

The investigations at the site revealed the following subsoil stratification:-

The top layer is a hard brown grey clay. This is followed by medium to stiff grey clay. Under this material lies the very dense silty sandy clay till. The till material is underlain by shale bedrock.

4.2) Hard Brown Grey Clay:

The top 30 ft. material forms the crust of the clay layer. The material in this section is oxidized and desiccated, apparently from exposure, and is brown in colour. Some grey material in the

cont'd. /3 ...

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.2) Hard Brown Grey Clay: (cont'd.) ...

form of lenses or seams was also encountered. The textural analysis performed in the laboratory shows that about 95% of the material passes Tyler sieve no. 200 and of this, about 60% is smaller than 0.002 mm. The Atterberg limits range at 50% liquid limit, 22% plastic limit and moisture content 26%. The measured unit weight "γ" is about 125 p.c.f. Samples could only be extracted by means of a split-spoon sampler, so no direct shear measurements could be made. But judging from the Standard Penetration resistance blows (20 - 35 blows per foot) it can be assumed that the material is in a very stiff to hard state.

4.3) Medium-Stiff Grey Clay:

The upper brown clay below about 30 ft. depth changes to grey clay. The laboratory tests indicate that the textural composition and other index properties of this material are very much identical with the brown material on the top. The material in this section of the layer has not been exposed and kept its initial grey colour and also has retained higher moisture content (30 - 35%). Its measured unit weight "γ" is about 120 p.c.f.

Undisturbed Shelby samples were extracted and laboratory shear strength measurements (1000 - 1700 p.s.f.) made. These results show that the material in this layer is in a medium to stiff state of consistency.

4.4) Dense Brown-Grey Silty Sandy Clay Till:

The stratum of dense glacial till was intersected under the above mentioned grey clay layer. This layer starts at about elevation 325 ft. and reaches the bedrock shale at elevation 291 ft. The material is mainly silty sandy clay with pebbles and grits. At intervals, thin seams of sand were also encountered. The density of the layer was measured by Standard Penetration tests while attempting to extract split-spoon samples. The results of these

cont'd. /4 ...

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.4) Dense Brown-Grey Silty Sandy Clay Till: (cont'd.) ...

tests, (about 100 blows or more per foot) indicate that the layer is in a very dense state. The measured moisture content in the layer is not more than 10%.

4.5) Shale Bedrock:

The above discussed overburden material is underlain by shale bedrock. The shale was drilled by means of AXT diamond bit. Core samples indicate that the bedrock is solid red Queenston Shale.

5. GROUND WATER CONDITION:

During the explorations it was not possible to detect a defined ground water level. Calculations based on laboratory measurements of unit density and moisture content percentage, indicate that the silty clay layer is fully saturated.

6. DISCUSSION AND RECOMMENDATIONS:

The presence of shale bedrock overlain by a very dense till layer at about 60 ft. below ground level, indicates that the use of point bearing piles is possible. Steel 'H' piles driven to practical refusal could take a safe load of 60 tons per pile.

For economy reasons, the use of spread footings is considered. Taking an average shear strength value of 1.2 t.s.f. for the upper clay layer, a footing width of 8 ft., and a foundation depth of 6 ft., a safe (F.S. = 3) net bearing capacity of 2.6 t.s.f. is obtained. Because of the presence of a softer layer at greater depth, 2 t.s.f. is recommended.

It is estimated that settlements in the order of one inch would result under such spread footings.

cont'd. /5 ...

BACK OF PAGE 4

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

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

The maximum height of the approach embankment is 27 ft. and no stability problems are foreseen. However, due to the embankment load, settlements of the order of 3 inches are expected. This estimate is based on the results of the observation of the settlements of the Homer Bridge approach embankments. The two sites are quite close, and conditions similar.

In order to reduce or even eliminate the influence of the embankment settlements on the structure, it is recommended to build the approach embankments 2 - 3 months ahead of the structure.

7. SUMMARY:

The proposed structure is at Q.E.W. and new St. David's Road intersection.

The subsoil stratigraphy at this site is made up of a top clay layer which extends down to elevation 325 ft. The upper 30 ft. of this layer is brown desiccated hard material and forms the crust. The lower 30 ft. is grey material in a medium to stiff state of consistency. Below this material is a layer of very dense pebbly, silty, sandy clay till which extends down to elevation 291 ft. Underlying this till layer, is the bedrock which was proven to be red Queenston Shale.

Spread footings, placed 5 - 6 ft. below ground level and approx. 8 ft. wide are recommended. A net safe load of 2 t.s.f. can be used for design purposes. Settlements in the order of one inch are to be expected under this load.

No stability problems are foreseen for the approach embankments. However, due to the embankment load, settlements of about 3 inches are expected. To eliminate the influence of the embankment on the structure, it is recommended to build the embankments 2 - 3 months ahead of the structure.

No water problems are foreseen at this site.

cont'd. /6 ...

8. MISCELLANEOUS:

The field work was carried out during August 15, to August 31, 1960, under the supervision of Project Foundation Engineer, V. Korlu. All the laboratory testing was done in the Materials and Research Section.

November 1960 REPORT PREPARED BY:

V. Korlu,
PROJECT FOUNDATION ENGR.

REPORT APPROVED BY:

A. Stermac,
FOUNDATIONS OFFICE ENGR.

APPENDIX I.

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-74
W.P. 254-60-1

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'	Hard brown grey silty clay	34	20.8	-	-	-	-	
	S2	6'-7.5'	" " " "	31	-	-	-	-	-	Lost
	S3	10'-11.5'	" " " "	23	26.2	22.2	51.8	-	126	
	S4	15'-16.5'	" " " "	19	29.0	-	-	-	-	
	S5	20'-21.5'	" " " "	20	27.4	-	-	-	-	
	S6	25'-26.5'	" " " "	23	28.4	-	-	-	122	
	S7	30'-31.5'	" " " "	16	32.4	-	-	-	-	
	S8	35'-36.5'	Med. to stiff grey silty clay	5	35.0	-	-	-	-	
	VANE	37.5'		-	-	-	-	1440	-	Sens: 3.3
	T9	45'-46.5'	" " " "	P	16.6 26.2	17.9	37.6	1310	125	
	VANE	47.5'		-	-	-	-	1760	-	Sens: 1.9
	S10	53'-53.3'	Dense brown grey silty sandy clay till	26-4"	10.1	-	-	-	-	
	RC11	88'-91'		-	-	-	-	-	-	
	RC12	91'-97.5'	Queenston shale	-	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-74
W.P. 254-60-1

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	3'-4.5'	Hard brown grey silty clay	30	18.7	-	-	-	127	
	S2	8'-9.5'	" " " "	32	-	-	-	-	-	
	S3	15'-16.5'	" " " "	19	29.4	-	-	-	-	
	S4	20'-21.5'	" " " "	19	29.8	22.0	54.7	-	118	
	S5	25'-26.5'	" " " "	11	37.4	-	-	-	-	
	T6	30'-31.5'	Med. to stiff grey silty clay	P	33.2	19.6	42.9	1450	117	
	VANE	36.5'		-	-	-	-	>2000	-	
	T7	40'-41.5'	" " " "	8	25.3	15.6	29.0	1060	136	
	S8	45'-46.3'	Dense brown grey silty sandy clay till	51-10"	10.6	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-74
W.P. 254-60-1

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	3'-4.5'	Hard brown grey silty clay	12	23.4	-	-	-	125	
	S2	6'-7.5'	" " " "	23	28.0	23.7	51.4	-	-	
	S3	10'-11.5'	" " " "	22	29.4	-	-	-	-	
	S4	15'-16.5'	" " " "	18	27.4	-	-	-	-	
	T5	20'-21.5'	" " " "	13-6"	28.6	20.6	46.9	2300	122	
	S6	25'-26.5'	" " " "	11	32.3	-	-	-	-	
	VANE	27.5'		-	-	-	-	2000	-	Sens: 3.6
	T7	30'-31.5'	Med. to stiff grey silty clay	P	19.6	20.6	42.5	1230	121	
	VANE	36.5'		-	-	-	-	2000	-	Sens: 2.5
	T8	40'-41.5'	" " " " "	P	20.4	16.3	29.4	1370	132	
	S9	44'-44.5'	Dense brown grey silty sandy clay till	50-6"	9.8	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-74
W.P. 254-60-1

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
4	S1	3'-4.5'	Hard grey brown silty clay	14	24.3	-	-	-	124	
	S2	6'-7.5'	" " " "	25	27.0	-	-	-	-	
5	S1	5'-6.5'	Hard grey brown silty clay	29	23.2	-	-	-	123	
	S2	10'-11.5'	" " " "	40	23.6	-	-	-	-	
	S3	15'-16.5'	" " " "	28	24.8	-	-	-	-	
	S4	20'-21.5'	" " " "	26	24.6	20.9	50.4	-	118	
	S5	25'-26.5'	" " " "	20	28.8	-	-	-	-	
	S6	30'-31.5'	" " " "	20	26.8	-	-	-	-	
	S7	36.5'-38'	Med. to stiff grey silty clay	12	33.2	-	-	-	-	
	S8	45'-46.5'	" " " " "	7	35.8	-	-	-	-	
	VANE	48'		-	-	-	-	1440	-	Sens: 4.0
	T9	50'-51.5'	" " " " "	P	36.8	17.3	39.8	870	118	
	T10	53.5'-55'	" " " " "	P	20.8	16.5	29.8	1410	130	
	VANE	56'		-	-	-	-	2000	-	Sens: 1.7
	S11	60'-60.3'	Dense brown grey silty, sandy clay till	75-3"	8.3	-	-	-	-	
	S12	70'-70.5'	" " " "	45-6"	-	-	-	-	-	
	S13	80'-81'	" " " "	82-11"	-	-	-	-	-	
	S14	90'-90.5'	" " " "	50-6"	-	-	-	-	-	

FORM 08—1L—222
FEB 59
1M-58-5569

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-74
W.P. 254-60-1

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
5	RC15	92.5'-97.5'	Queenston shale	-	-	-	-	-	-	100% recovery
6	S1	5'-6.5'	Hard brown grey silty clay	39	20.1	-	-	-	126	
	S2	10'-11.5'	" " " "	33	21.2	22.6	49.0	-	-	
	S3	20'-21.5'	" " " "	25	24.9	-	-	-	-	
	S4	30'-31.5'	Med. to stiff grey silty clay	12	28.3	-	-	-	-	
	T5	35'-36.5'	" " " "	P	30.6	18.7	43.5	1790	121	
	VANE	41.5'		-	-	-	-	1920	-	Sens: 2.7
	T6	45'-46.5'	" " " "	P	30.8	20.3	44.4	1720	120	
	VANE	51.5'		-	-	-	-	1600	-	Sens: 3.3
	T7	55'-56.5'	" " " "	13-6"	14.9 34.0	16.9	27.2	915	128	
	S8	62'-62.5'	Dense brown grey silty, sandy clay till	68-6"	9.8	-	-	-	-	

S denotes split spoon

T " shelby tube

FORM OB-ML-126A 60-1015

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 BORE HOLE NO. 1

JOB 60-F-74 STATION 318/85 (65' Rt)

DATUM 379.5' COMPILED BY B.K.

BORING DATE Aug. 15/60 CHECKED BY V.K.

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

LEGEND

½ UNCONFINED COMPRESSION (Qu) Q
VANE TEST (C) AND SENSITIVITY (S) +S
NATURAL MOISTURE AND LIQUIDITY INDEX LI
LIQUID LIMIT
PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	379.5	0
	Hard brown grey silty clay	346.5	30
	Medium to stiff grey silty clay	326.5	50
	Dense brown grey silty, sandy clay till	291.5	90
	Bedrock (Queenston shale)	282.0	100
	End of borehole 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		

STRENGTH AND PENETRATION RESISTANCE
P.S.F.
500 1000 1500 2000
25 50 75 BLOWS/FT. 100

Penetration ends @ elev. 361.5'

S3
T9
26 for 4"

CONSISTENCY
MOIST. CONTENT - % DRY WT.
15 30 45

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	-
S2	-
S3	126
S4	-
S5	-
S6	122
S7	-
S8	-
T9	125
S10	-
RC11	-
RC12	-

FORM OB-ML-126A 60-1015

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 BORE HOLE NO. 2

JOB 60-F-74 STATION 318+05 (90' Rt)

DATUM 372.0' COMPILED BY B.K.

BORING DATE Aug. 18/60 CHECKED BY V.K.

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 X
LIQUID LIMIT —o
PLASTIC LIMIT |—

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	372.0	0
	Hard brown grey silty clay		
	Medium to stiff grey silty clay	346.0	26
	Dense brown grey silty sandy clay till	326.5	45.5
	End of borehole	324.5	47.5

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

STRENGTH AND PENETRATION RESISTANCE

P.S.F.
500 1000 1500 2000

BLOWS/FT.
25 50 75 100

10 20 30 40 50

Penetration ends @ elev. 350.0'

51 for 10"

CONSISTENCY

MOIST. CONTENT - % DRY WT.
15 30 45

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	127
S2	-
S3	-
S4	118
S5	-
T6	117
T7	136
S8	-

FORM OB-ML-126 (REV. 1959) - 59-5008

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 BORE HOLE NO. 3

JOB 60-F-74 STATION 318+45 (150' Rt)

DATUM 372.0' COMPILED BY B.K.

BORING DATE Aug. 15/60 CHECKED BY V.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	372.0	0
	Hard brown grey silty clay	346.5	25.5
	Medium to stiff grey silty clay	328.0	44.0
	Dense silty, sandy clay till	327.5	44.5

End of borehole

STRENGTH AND PENETRATION RESISTANCE

P.S.F. 500 1000 1500 2000

BLOWS/FT. 25 50 75 100

Penetration ends @ elev. 353.0'

3.4

2.5

50 for 6"

CONSISTENCY

MOIST. CONTENT - % DRY WT. 15 30 45

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	125
S2	-
S3	-
S4	-
T5	122
S6	-
T7	121
T8	132

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

FORM OB-ML-126 (REV. 1959.) - 59-5008

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 BORE HOLE NO. 4

JOB 60-F-74 STATION 318+45 (255'Rt)

DATUM 372.5' COMPILED BY B.K.

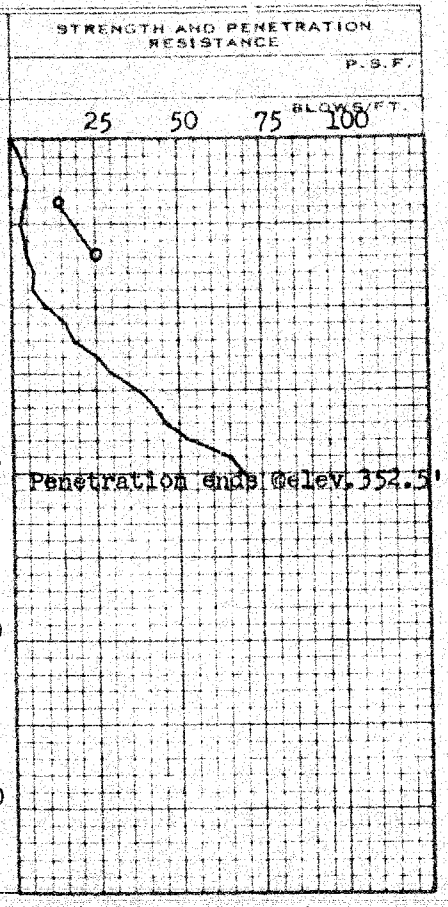
BORING DATE Aug. 24/60 CHECKED BY V.K.

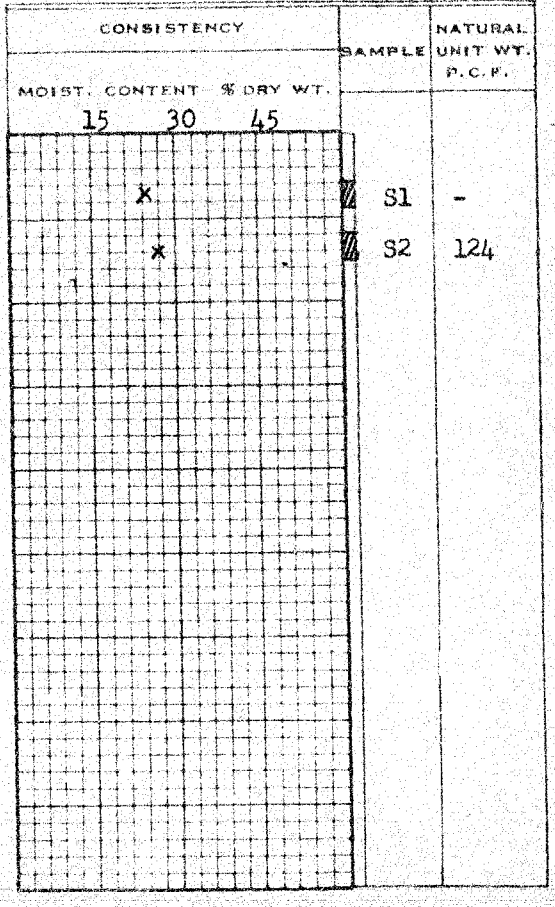
2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA CONE
2" SHELBY
CASING

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	372.5	0
	Hard brown grey silty clay	365.0	10
	End of borehole		20
	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		30
			40





SAMPLE	NATURAL UNIT WT. P.C.F.
S1	-
S2	124

FORM OB-ML-126A 60-1015

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 — BORE HOLE NO. 5

JOB 60-F-74 — STATION 318+05 (54' Lt)

DATUM 383.5' — COMPILED BY B.K.

BORING DATE Aug. 24/60 — CHECKED BY V.K.

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 — X
LIQUID LIMIT — —O
PLASTIC LIMIT — —|

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	383.5	0
	Hard brown grey silty clay		
		350.5	33
	Medium to stiff grey silty clay		
		324.5	59
	Dense brown grey silty, sandy clay till		
		291.0	92
	Bedrock (Queenston shale)	286.0	97
	End of borehole		100

STRENGTH AND PENETRATION RESISTANCE
P.S.F. 500 1000 1500 2000
BLOWS/FT. 25 50 75 100

40
17
75 for 3"
45 for 6"
80 for 11"
50 for 6"

CONSISTENCY
MOIST. CONTENT - % DRY WT. 15 30 45

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	123
S2	-
S3	-
S4	118
S5	-
S6	-
S7	-
S8	-
T9	118
T10	130
S11	-
S12	-
S13	-
S14	-
RC15	-

FORM OB-ML-126A 60-1015

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 254-60-1 BORE HOLE NO. 6

JOB 60-F-74 STATION 318/85 (62'Lt)

DATUM 387.5' COMPILED BY B.K.

BORING DATE Aug. 30/60 CHECKED BY V.K.

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

LEGEND

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

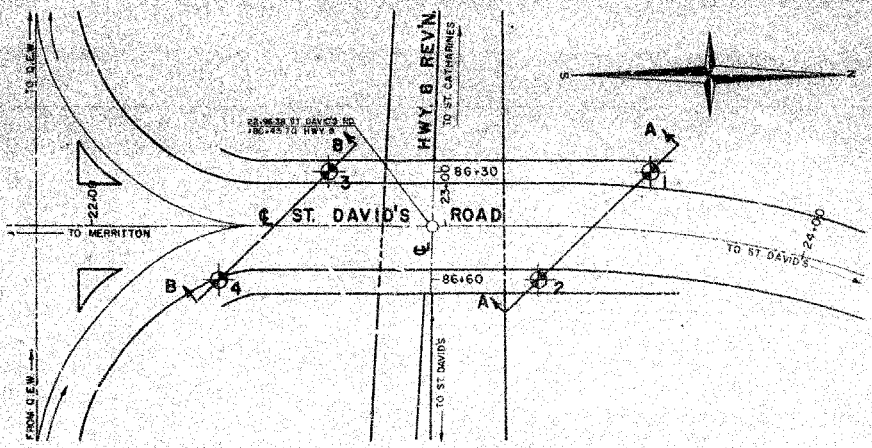
SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	Groundlevel	387.5	0
	Hard brown grey silty clay		10, 20
		359.5	30
	Medium to stiff grey silty clay		40, 50
		325.5	60
	Dense brown grey silty, sandy clay till		70

STRENGTH AND PENETRATION RESISTANCE
500 1000 1500 2000 P.S.F.
25 50 75 100 BLOWS/FT.

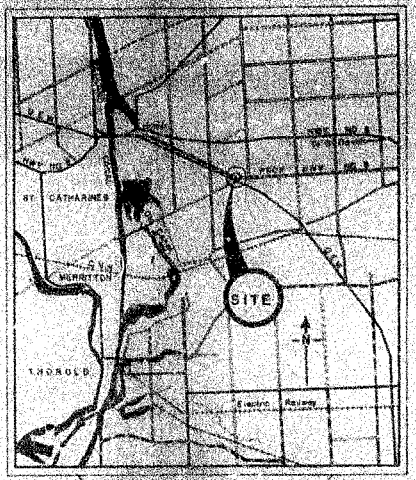
4.7
3.8
113 for 8"
68 for 6"

CONSISTENCY
MOIST. CONTENT - % DRY WT.
15 30 45

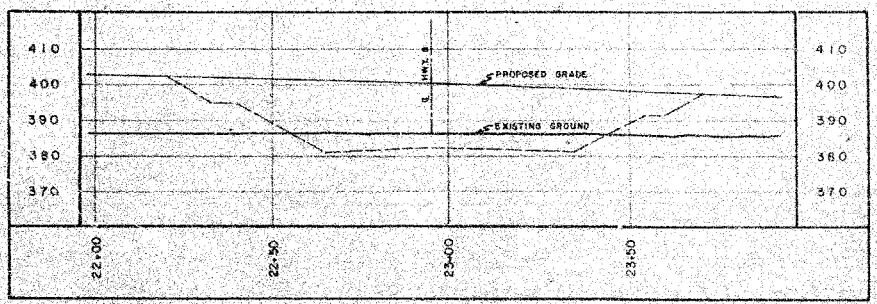
SAMPLE	NATURAL UNIT WT. P.C.F.
S1	126
S2	-
S3	-
S4	-
T5	121
T6	120
T7	128
S8	-



PLAN



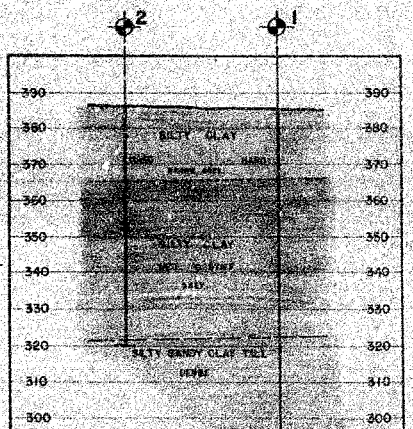
KEY PLAN
SCALE IN MILES



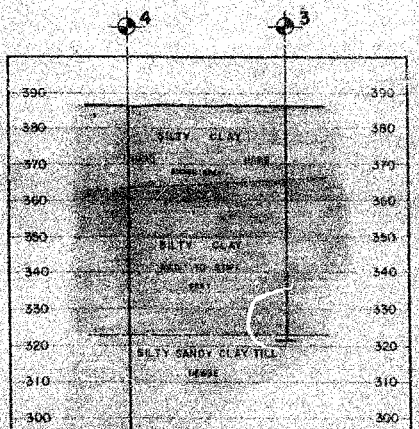
PROFILE

H-021-17-EC

LEGEND			
BORE & PENETRATION HOLE			
HOLE	ELEVATION	STATION	DISTANCE FROM ℄
1	385.5	86+30	60' LT.
2	386.0	86+60	30' LT.
3	386.0	86+30	30' RT.
4	386.0	86+60	60' RT.



A-A



B-B

NOTE

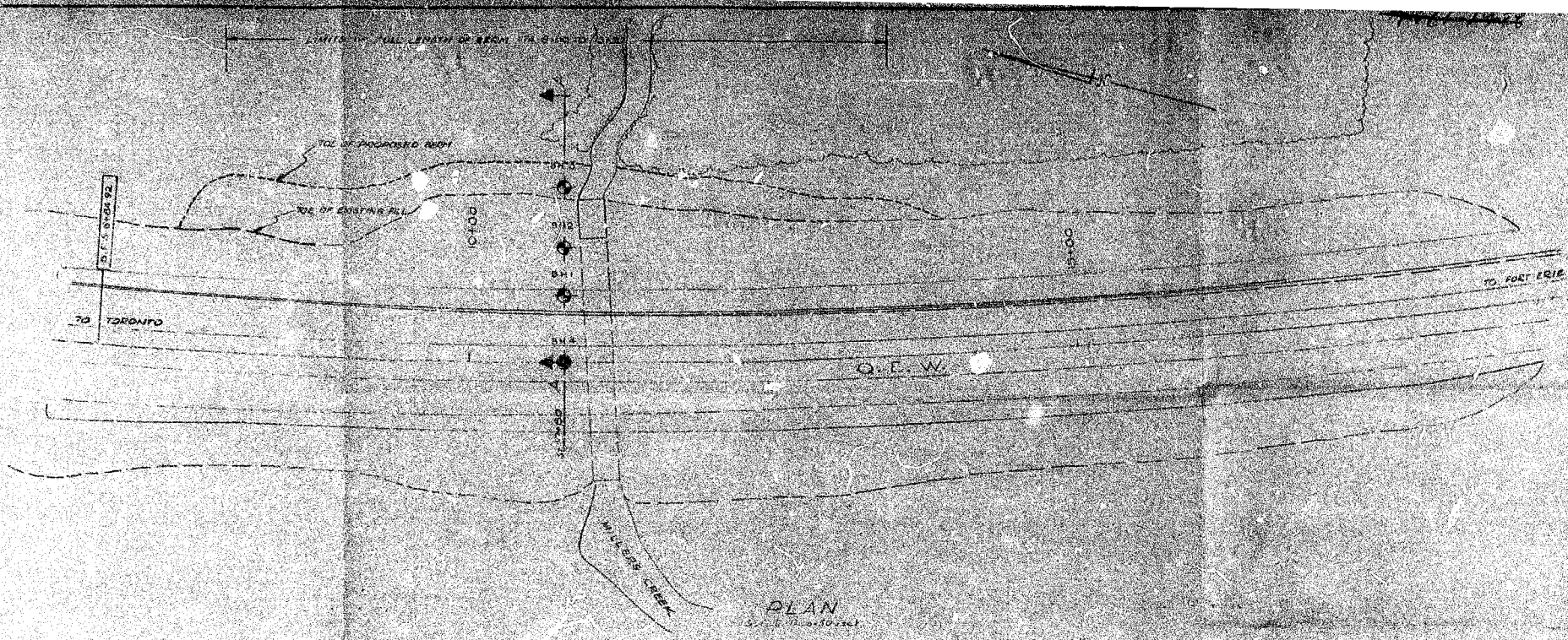
THE INFORMATION SHOWN ON THIS DRAWING WAS OBTAINED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE ENVIRONMENT MAY VARY FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE CHANGE.

DEPARTMENT OF HIGHWAYS - ONTARIO
SOILS & MATERIALS BRANCH

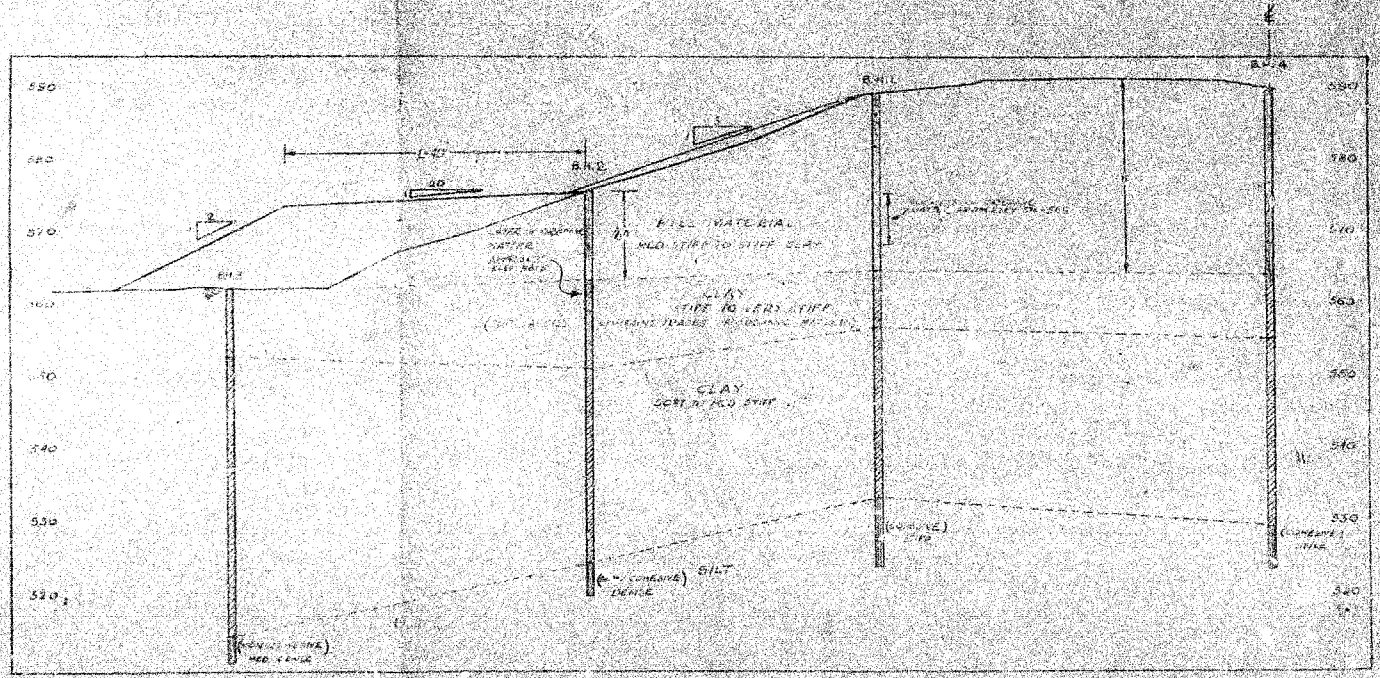
ST. DAVID'S ROAD OVERPASS

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY. 8 LOCATED DISTRICT 4 LOCATED BY L.LINCOLN
TOWNSHIP GRANTHAM LOT CON.
LOCATION 1.5 MILES EAST OF HOLLER
DRAWN BY D. MUNFORD CHECKED BY W.P. 254-60-5
DATE 25 OCT. 1960 APPROVED BY DRAWING NO.



PLAN



A — A

SCALE: 1 inch = 1 foot

DEFECTS IN NEGATIVE DUE TO CONDITION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

O.E.W. AT WELLAND RIVER BRIDGE APPROACH

ORIGINATED M. DEVATA	DISTRICT NO. 4	DATE 2nd JULY 1961
DRAWN [illegible]	W.P. NO. 3002-59-01	JOB NO. GI-F-70
CHECKED [illegible]	SCALE AS SHOWN	DRAWING NO. GI-F-70A
APPROVED [illegible]		

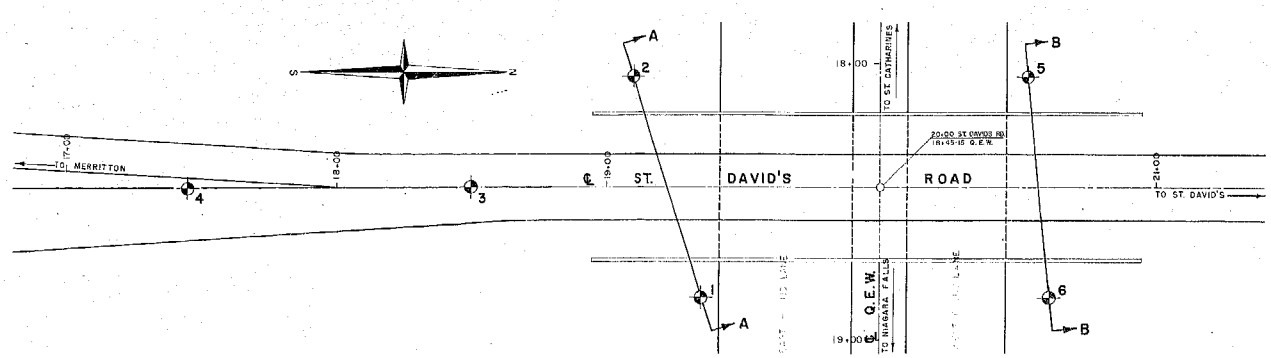
#60-F-74

W.P.# 254-60-1

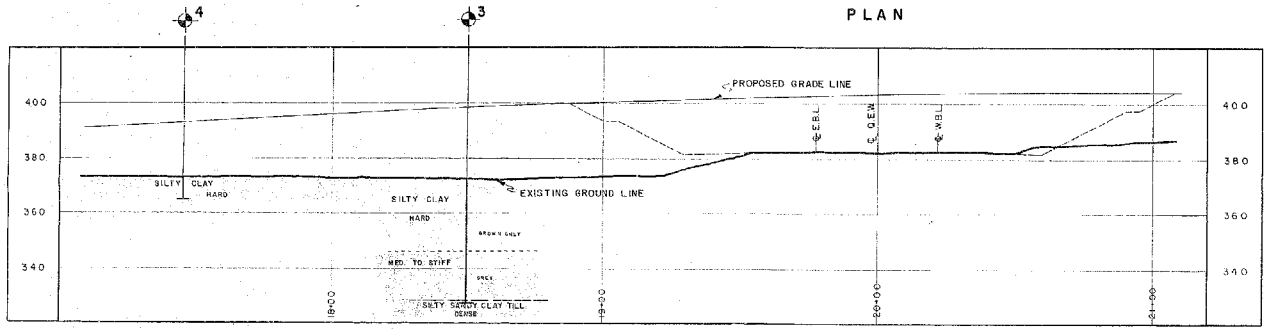
Q.E.W. &

St. Davids Rd.

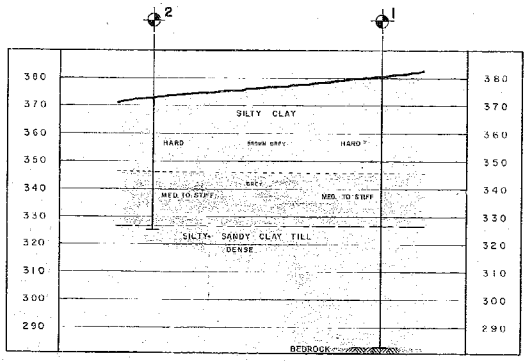
Interchange



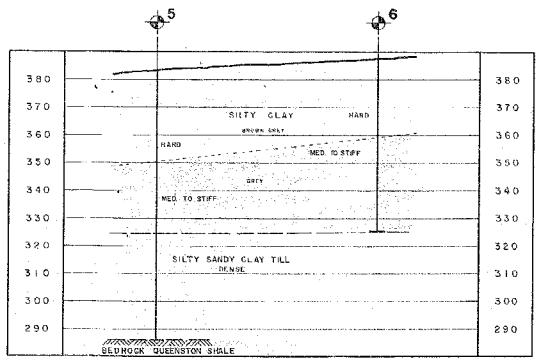
PLAN



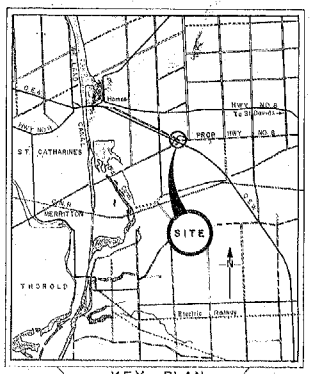
PROFILE



A-A



B-B



KEY PLAN
SCALE: 1 IN = 1 MI

LEGEND

BORE & PENETRATION HOLE

HOLE	ELEVATION	STATION	DISTANCE FROM ℄
1	379·5	318+85	65' RT.
2	372·0	318+05	90' RT.
3	372·0	318+45	150' RT.
4	372·5	318+45	255' RT.
5	383·5	318+05	54' LT.
6	387·5	318+85	62' LT.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

PROPOSED OVERPASS
ST. DAVID'S ROAD OVERPASS
AND
QUEEN ELIZABETH WAY

ORIGINATED: V. KORLU	DISTRICT NO: 4	DATE: 24 OCT 1960
DRAWN: D. MUMFORD	W.P. NO: 354-60-1	JOB NO: 60-F-74
CHECKED:	SCALE: 1 inch = 20 feet.	DRAWING NO: 60-F-74 A
APPROVED:		