

60-F-319C

W.P. 200-60

Hwy. 403 $\frac{1}{2}$, 6



ONTARIO

DEPARTMENT OF HIGHWAYS

3A 1057

Memo to Mr. A. M. Toye, *Date* June 2, 1960.
Bridge Engineer. *Subject* FOUNDATION INVESTIGATION -- by
From Materials & Research Section. Geocon, Limited.

Attention: Mr. S. McCombie.

Re: Chedoke Expressway - (Wolfe Island Area)
Proposed Crossing - Hwy. 403 & Hwy. 6,
District No. 4 - W.P. 200-60.

This memo accompanies two copies of the foundation report submitted by Geocon, Ltd., in connection with the Wolfe Island Interchange.

Preliminary drawings showing the subsoil type and bedrock contact, have been provided to C. C. Parker and Associates, and discussed with them. We are forwarding them, directly, a copy of this final report.

LGS/MdeF
Attach.


L. G. Soderman,
PRINCIPAL FOUNDATIONS ENGR.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
D. G. Ramsay
I. Campbell
R. E. Richardson
P. F. Weber
C. C. Parker & Associates
Foundations Office
Gen. Files.

GEOCON LTD

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Rexdale, Ontario,
May 25th, 1960.

Department of Highways, Ontario,
Materials and Research Section,
Downsview, Ontario.

60-F-319C

Attention: Mr. L. G. Soderman, P. Eng.,
Principal Soils and Foundation Engineer.

Re: Soil Investigation,
Proposed Chedoke Expressway,
Wolfe Island Area,
Hamilton, Ontario.

Dear Sirs:

This letter accompanies our detailed report on the above investigation.

The soil conditions encountered at the site are described in detail in the report, and the foundation and cut slope design are discussed.

We believe that this report gives the information at present required for the design of the foundations of structures and the slopes of cuts. If we can be of any further assistance, please call us.

Yours very truly,

GEOCON LTD

V. Milligan
V. Milligan, P. Eng.,
Assistant Chief Engineer.

VM/dw
S7033

S7033
REPORT
TO
DEPARTMENT OF HIGHWAYS, ONTARIO
ON
SOIL CONDITIONS
PROPOSED CHEDOKE EXPRESSWAY
WOLFE ISLAND AREA
HAMILTON ONTARIO

Distribution:

14 copies - Department of Highways, Ontario,
Downsview, Ontario.
2 copies - Geocon Ltd,
Rexdale, Ontario.

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Ramp 'R' over Ramp 'Q'

- Procedure
- Soil Conditions
- Water Conditions
- Drawing S7033-1 Boring Plan and Soil Stratigraphy
- Office Reports on Soil Exploration
- Figure 1 - Figure on Laboratory Testing

Appendix II

Ramp 'R' over Chedoke West-Bound Lane

- Procedure
- Soil Conditions
- Water Conditions
- Drawing S7033-2 Boring Plan and Soil Stratigraphy
- Office Reports on Soil Exploration

Appendix III

Highway 6 over Chedoke East-and West-Bound Lanes

- Procedure
- Soil Conditions
- Water Conditions
- Drawing S7033-3 Boring Plan and Soil Stratigraphy
- Office Reports on Soil Exploration

Appendix IV

Ramp 'Q' over Chedoke West-Bound Lane

- Procedure
- Soil Conditions
- Water Conditions
- Drawing S7033-4 Boring Plan and Soil Stratigraphy
- Office Reports on Soil Exploration

INTRODUCTION

Geocon Ltd has been retained by the Department of Highways, Ontario by letter dated January 15th, 1960, to investigate and report on the soil conditions at the site of 4 proposed underpass structures as part of the proposed Chedoke Expressway in Hamilton, Ontario.

The main object of the investigation was to determine and interpret the soil and rock conditions at the sites as they affect excavations to grade level and the foundation design of the proposed structures. Since considerable quantities of material to be excavated to accommodate the structures will be involved, it was further decided to study the properties of this material in relation to its suitability as material for high fills to be incorporated in the Expressway. The laboratory testing for this phase of the investigation is now in progress and the results will be discussed and submitted in a separate report, S7050.

SITE AND GEOLOGY

The site is located in what is known as the Wolf Island area in the Township of West Flamboro, just north of Hamilton near the intersection of Highways 2 and 6. The topography at the site is hilly and several ravines provide drainage into Hamilton Harbour, which is approximately 150 feet below the average ground level at the site.

From available geological information and previous experience in the area, it is known that recent bedrock at the site consists of red shale of the Queenston formation of Ordovician age. The bedrock is overlain by glacial drift of variable thickness.

GENERAL PROCEDURE

2.

The field work was commenced on January 15th, 1960 and completed on February 26th, 1960. Twenty-seven boreholes were put down at pre-determined locations, using mobile power auger equipment. These borings were put down in 4 inch size and closely spaced intermittent samples were taken in each hole in 2 inch size to the depth where practical refusal to sampling was encountered. Nine additional holes were put down in BX size to a depth well below grade at each site, using a standard machine drillrig supplied by the Department of Highways. Continuous core was taken in these holes in BXL size.

Drawing S7033-0 located at the rear of this report shows the general area of investigation and the location of the 4 proposed underpasses.

Detailed accounts of procedure, soil and water conditions, together with detailed borehole logs for each site are given in separate appendices as follows:

- Appendix I: Ramp 'R' over Ramp 'Q'; Boreholes 1 to 7
- Appendix II: Ramp 'R' over Chedoke West-Bound Lane; Boreholes 8 to 13
- Appendix III: Highway 6 over Chedoke East-and West-Bound Lanes; Boreholes 14 to 21
- Appendix IV: Ramp 'Q' over Chedoke West-Bound Lane; Boreholes 22 to 27

Drawing S7033-1 to 4 located in Appendices I to IV respectively show the individual sites in detail, together with the locations of the boreholes and the inferred soil stratigraphy.

Figures relating to laboratory testing are given in Appendix I. The samples obtained in this investigation will be stored until November 1st, 1960, at which time you will be notified regarding their disposal.

GEOCON

Elevations referred to in this report are Geodetic. The elevations of ground level at the borehole locations were determined and supplied by the Department of Highways.

SUMMARIZED SOIL CONDITIONS

I. Ramp 'R' over Ramp 'Q'

Beneath 1 to 2 feet of silty topsoil is a stratum of very stiff to hard reddish-brown clayey silt till increasing in thickness from 8 feet to over 37 feet from east to west. The upper 6 to 10 feet of the till, west of borehole 3 are discoloured to grey-brown and mottled grey and brown by various degrees of oxidation. The till is underlain by soft reddish-brown shale bedrock in sound condition except for the upper 2 to 5 feet which are weathered.

II. Ramp 'R' over Chedoke West-Bound Lane

Beneath 1 to 2 feet of silty topsoil is a thin layer of stiff to hard reddish-brown clayey silt till about 2 feet in thickness. The till is underlain by soft reddish-brown shale bedrock which is weathered in the upper 2 to 3 feet.

III. Highway 6 over Chedoke East-and West-Bound Lanes

The road fill is underlain by hard reddish-brown till, above elevation 370 in the northern part of the site. The till and the road fill elsewhere is underlain by soft sound reddish-brown bedrock, which in places is weathered for a few feet. The hill to the west of the roadway consists of shale bedrock, weathered in the upper few feet and covered with about 2 feet of topsoil.

IV. Ramp 'Q' over Chedoke West-Bound Lane

About 2 to 3 feet of silty topsoil overlies shale bedrock. The upper 2 to 4 feet of the shale are weathered, the next 7 feet are in a semi-weathered condition while the remainder is sound.

DISCUSSION

At the present time no detailed information is available concerning structures or embankments, but from the proposed grade line of the Chedoke Expressway and the access and exit ramps, it is known that for the underpass structures, deep cuts ranging from 20 to 60 feet in depth will be required.

General considerations in foundation design and construction procedures are discussed in the following paragraphs.

1) Foundations

The type of structure for the proposed underpasses is at present not known and the foundation elevations are therefore also unknown. It is assumed however, that a rigid frame type structure may be adopted, thus the approximate foundation elevations can be determined from the proposed grade lines.

The proposed grade of Ramp 'Q' where it passes under Ramp 'R' is within the till stratum. The proposed grade lines at the other 3 underpass structures are all within the sound shale bedrock. It is considered that the foundations would therefore be spread footings.

It is recommended that spread footing foundations in the till stratum be designed under an allowable bearing pressure of 4 tons per square foot. This value is based on the standard penetration values obtained in the till and on experience with this material. For foundations within the sound shale bedrock an allowable bearing pressure of

i) Foundations (continued)

10 to 15 tons per square foot may be used in design. Under the recommended bearing pressures foundation settlement should be negligible.

Since this investigation has shown that both the till and shale have a tendency to disintegrate upon exposure to the atmosphere, especially under the influence of water, it is recommended that foundation surfaces, when exposed, immediately be covered by lean concrete and that measures be taken to prevent water from seeping in between the foundation surface and the protective cover.

ii) Excavations

Temporary steep slopes will be stable in the till as well as in the shale and it is therefore recommended that the temporary cut slopes at the structure locations be trimmed to a slope of 1 horizontal to 2 vertical. It is further recommended that the duration of exposure of the steep slopes be minimized by backfilling behind walls as construction progresses. Adequate drainage behind walls should be provided. The excavated till and shale bedrock may be used as backfill and should be well compacted. The compaction properties and engineering characteristics of the sound and weathered shale bedrock will be discussed in a separate report, Geocon No. S7050. For design of the wall, it is recommended that a coefficient of earth pressure at rest of 0.5 be used. This value assumes adequate drainage behind the wall and compaction of the fill to at least 90 percent of the optimum dry density.

iii) Cut Slopes

Permanent slopes in till and shale will be subject to deterioration in time. Local failures may be caused by weathering and

iii) Cut Slopes (continued)

erosion; overall failures could be caused by the build-up of pore water pressures along horizontal planes. Weathering and erosion will generally increase proportionally with a decrease in slope, overall stability will generally increase by flattening the slope.

It is considered that the most economical form of protection against surface erosion is a grass cover; this normally requires a slope not steeper than 2 horizontal to 1 vertical. It is recommended that a uniform slope of 2:1 be used for cut slopes where the vertical height does not exceed 20 feet. The turf should be placed on a few inches of topsoil and attached to the slope to aid its growth. Where the vertical height of the cut slope is in excess of 20 feet, the possible occurrence of weathered zones or planes of high pore water pressure where they intersect the slope may induce local failures. It is therefore recommended that such slopes be benched at vertical height intervals of 20 feet. Benches should be of the order of 10 to 20 feet in width and should be graded away from the road at a slope of about 15 horizontal to 1 vertical. A graded interceptor drain should be installed at the inner end of each bench. In order to decrease the total width of the cut, it is further recommended that the slopes in between benches be cut to not flatter than a 1 to 1 slope. The benches should be grass covered and will serve to decrease erosion by intercepting run-off and to catch possible debris from the steep faces.

iv) Construction

During the period of the investigation, the water levels in the boreholes were influenced by surface water. Due to the very low permeability of the till and shale, accurate information regarding groundwater could not be obtained. More information might be obtained

iv) Construction (continued)

by long term observations of piezometers, installed at various elevations across the site, but it is considered that the information thus obtained would still be local and inconclusive.

However, it is considered that during construction, water will not cause major difficulties, provided that adequate drainage is maintained throughout. It is therefore recommended that excavation, where feasible, be started at locations where the proposed grade is at minimum elevation and that the slope of the proposed grade be maintained in the excavation. Drains could be installed as excavation progresses and incorporated in the final overall drainage system.

CONCLUSIONS AND RECOMMENDATIONS

1. The site is part of the Queenston shale formation, in places overlain by glacial till.
2. The groundwater pattern at the site is probably complex and could not be determined during the period of the investigation.
3. Allowable bearing pressures under spread footings founded in the till and in the shale bedrock, are given in the report.
4. Under the allowable foundation pressures, settlement should be negligible.
5. Measures to avoid deterioration of foundation surfaces upon exposure are suggested in the report.
6. Recommended slope angles together with slope protection and construction procedures are discussed in the report.

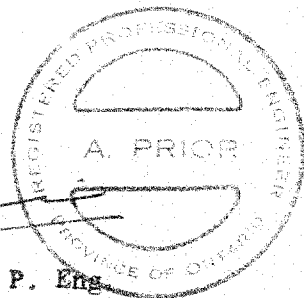
PERSONNEL

8.

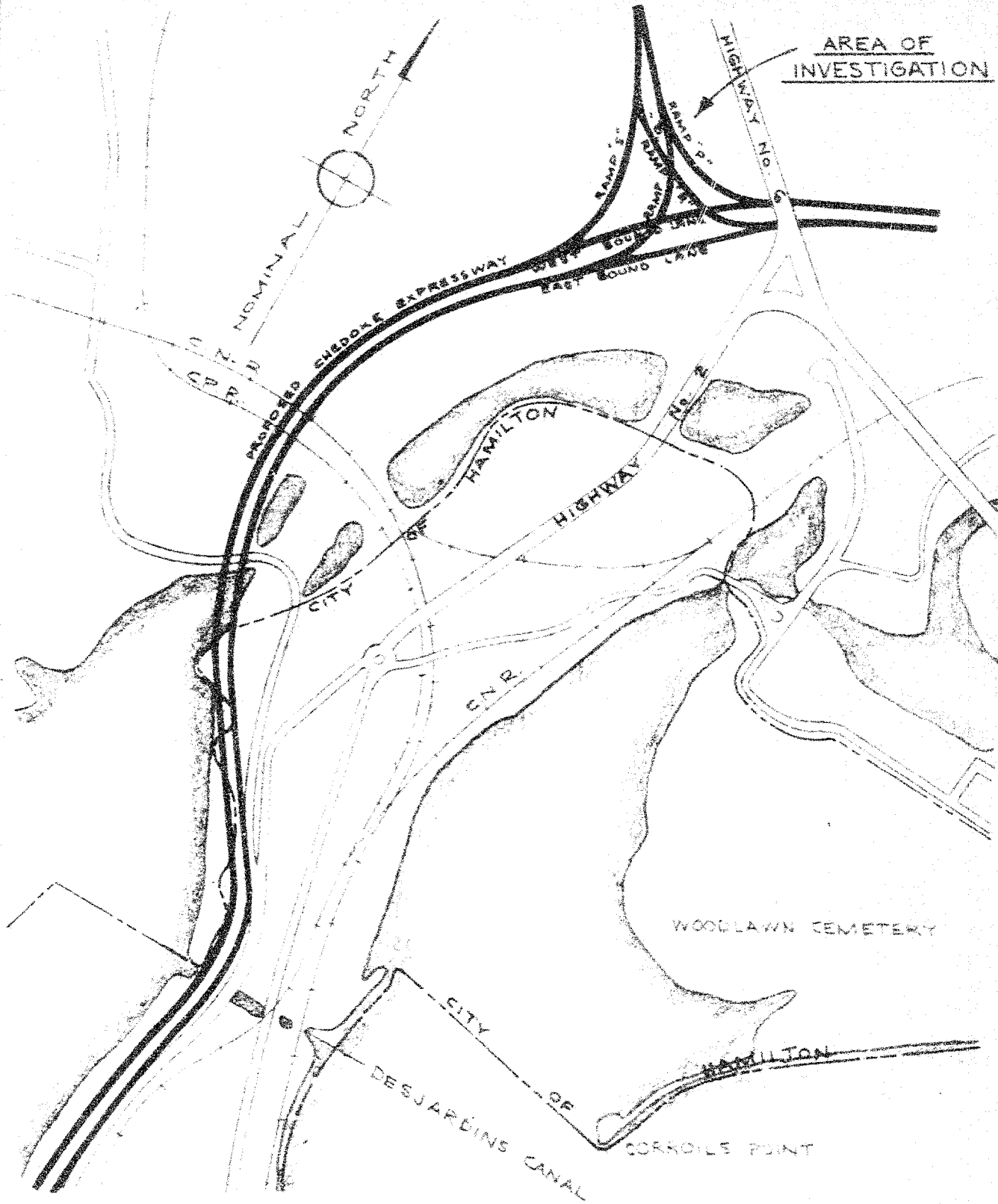
The field work was carried out under the supervision of Mr. A. Prior, assisted by Mr. A. H. Tilk. The report was written by Mr. Prior and reviewed by Mr. V. Milligan.

AP/dw
S7033


A. Prior, P. Eng.
Senior Soils Engineer.



GEOCON



DEPARTMENT OF HIGHWAYS, ONTARIO
TORONTO ONTARIO

PROPOSED CHEDOKE EXPRESSWAY
HAMILTON ONTARIO

KEY PLAN

GEOCON LTD

DATE APRIL 29, 1960 SCALE 1:5000 (APPROX)

MADE M.W.	CHKD. R.P.	APPD. M	No. 57033-0
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APPENDIX I

RAMP 'R' OVER RAMP 'Q'

Procedure

Soil Conditions

Water Conditions

Drawing S7033-1 Boring Plan and Soil Stratigraphy

Office Reports on Soil Exploration

Figure 1 - Figure on Laboratory Testing

PROCEDURE

The site includes boreholes 1 to 7 inclusive. Boreholes 2 to 6 were put down between January 21st and January 26th, 1960, and borehole 7 on February 1st, 1960, using mobile power auger equipment. Closely spaced intermittent samples were taken in each hole and the holes were generally stopped when practical refusal to sampling was encountered. On February 2nd and 3rd, 1960, borehole 1 was put down using a standard machine drillrig and continuous core in BXL size was taken to a depth of about 12 feet below the proposed grade of Ramp 'Q'. Additional core drill holes 6A and 7A were put down adjacent to boreholes 6 and 7 between February 4th and February 10th, 1960.

The locations of the boreholes together with the inferred soil stratigraphy are shown on Drawing S7033-1 in this Appendix. Detailed logs of the boreholes are given on the Office Reports on Soil Exploration and the results of laboratory testing on samples obtained are shown on Figure 1 of this Appendix.

SOIL CONDITIONS

The main soil strata encountered by the borings are as follows:

Topsoil

The site is covered by about 2 feet of grey-brown silty topsoil.

Very Stiff to Hard Grey-Brown Clayey Silt Till

Beneath the topsoil in boreholes 1, 2, 4, 5 and 6 is a stratum of grey-brown to olive-brown clayey silt till about 7 feet in thickness. This material is probably part of the under-

Very Stiff to Hard Grey-Brown Clayey Silt Till (continued)

lying stratum, but has been influenced by weathering and oxidation. The till stratum is generally composed of sand, gravel and rock fragments in a matrix of clayey silt to silt. However, in boreholes 1, 5, and 6 sand and gravel sizes were practically absent in the samples obtained and the colour of the material was generally lighter and more uniform than elsewhere. A typical grainsize distribution curve for the latter material is given on Figure 1 in this Appendix.

Standard penetration values obtained in samples of the stratum ranged from 29 to well over 100 blows per foot with a median value of about 70 blows per foot, indicating that the consistency of the stratum is very stiff to hard and generally hard. Core drilling in BXL size gave core recoveries of 50 and 100 percent, confirming the generally hard consistency of the till. Based on the results of the standard penetration tests, and experience with this material, it is considered that the compressive strength of the till would not be less than 4 tons per square foot.

Hard Reddish-Brown Clayey Silt Till

Underlying the grey-brown till and beneath the topsoil, in boreholes 3 and 7 is a stratum of reddish-brown clayey silt till. The till consists of a heterogeneous mixture of sand, gravel and rock fragments in a matrix of clayey silt to silt. The thickness of the stratum ranges from 8 feet in borehole 7 to at least 28 feet in borehole 4. A typical grainsize distribution for this material is illustrated on Figure 1 in this Appendix.

Standard penetration tests carried out within the stratum generally met immediate refusal, indicating the hard nature of the till.

Hard Reddish-Brown Clayey Silt Till (continued)

Core recoveries obtained from drilling in BXL size were erratic and indicated no pattern with depth. The core recoveries ranged from 10 to 90 percent with a median value of 30 percent, indicating the heterogeneous composition of the till. On exposure to the atmosphere the matrix of the till tends to crumble within a few weeks' time.

Bedrock

The reddish-brown till rests on reddish-brown shale bedrock of the Queenston formation of Ordovician age. The shale is horizontally bedded and is weathered in the upper portion for a depth of about 2 to 5 feet. The shale is highly fissile and breaks parallel to the bedding planes. Bands of limestone varying in thickness between about 2 and 6 inches, and occasional thin layers of shattered shale and soft clay were encountered. Core recovery was generally good. The core obtained started to disintegrate superficially almost immediately upon exposure to the atmosphere.

Experience with Queenston shale bedrock in the area has shown that the compressive strength of the weathered portion, depending upon the degree of weathering, ranges from about 0.5 to 6 tons per square foot. Sound shale of this formation generally has compressive strengths ranging to over 200 tons per square foot.

WATER CONDITIONS

Daily groundwater level observations were carried out between February 1st and February 26th, 1960. During this period frequent rains and thaws influenced the water level in the completed holes and in all holes the water level remained at or close to ground level throughout. A last attempt to obtain groundwater level information

WATER CONDITIONS (continued)

IV.1

was made on April 20th, 1960, and it was found that the water levels were close to ground level and still influenced by surface water.

Water level observations obtained in the holes put down dry by auger equipment and not directly resulting from surface conditions are given below.

Borehole 2 Water level at 10.5 feet at end of boring

Borehole 3 Water level at 14 feet at end of boring

Borehole 4 Hole dry at end of boring

Borehole 5 Hole dry at end of boring

Borehole 6 Indication of water entering hole at 12.5 feet

Borehole 7 Hole dry at end of boring

All holes were subsequently influenced by surface water. Full recovery of drilling water in the cored holes was obtained during drilling.

EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

The object of this form is to enable a comprehensive study of the soil to be made by combining on one sheet all of the information obtained from the boring. An explanation of the various columns of the report follows.

ELEVATION AND DEPTH

This column gives the elevation and depth of boundaries between the various soil strata. The elevation is referred to the datum shown in the general heading.

WATER CONDITIONS

In this column the water level in the casing at the time of boring or the water table in the ground, determined by a series of observations in a piezometer or standpipe, is indicated to scale by a horizontal line with the symbol W.L. or W.T. above the line. A notation of any complicated groundwater conditions will be made in this column.

DESCRIPTION

A description of the soil, using standard terminology, is contained in this column. The consistency of cohesive soils and the relative density of non-cohesive soils are described by the following terms:

<u>Consistency</u>	<u>U-Strength Tons/sq. ft.</u>	<u>Relative Density</u>	<u>Standard Penetration Resistance, Blows/ft.</u>
Very soft	0.03 to 0.25	Very loose	0 to 4
Soft	0.25 to 0.5	Loose	4 to 10
Firm	0.5 to 1.0	Compact	10 to 30
Stiff	1.0 to 2.0	Dense	30 to 50
Very stiff	2.0 to 4.0	Very dense	over 50
Hard	over 4.0		

STRATIGRAPHIC PLOT

The stratigraphic plot follows the standard symbols of the National Research Council, Canada.

ELEVATION SCALE

The information in all columns is plotted to a true elevation scale which is shown in this column.

GRAPHS

The main body of the report forms a graph which is used to plot to correct elevation the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted on the above graph.

SAMPLES

The first three columns describe the condition, type and number of each sample obtained from the boring. The location and extent of each sample is plotted to scale.

In the last column is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. When a 2 inch Drive Sampler is used the result obtained is termed the "Standard Penetration Resistance".

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OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

CONTRACT 57033 BORING # 1 DATUM GEODETIC CASING BX 7
 BORING DATE FEB. 2, 1960 REPORT DATE FEB. 11, 1960 COMPILED BY J.A. M.W. CHECKED BY
 SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION



SAMPLE TYPES

A.S. AUGER SAMPLE
 S.T. SLOTTED TUBE
 W.S. WASHED SAMPLE
 D.O. DRIVE-OPEN
 D.F. DRIVE-FOOT VALVE
 C.S. CHUNK SAMPLE

F.S. FOIL SAMPLE
 S.O. SLEEVE-OPEN
 S.F. SLEEVE-FOOT VALVE
 T.O. THIN WALLED OPEN
 R.C. ROCK CORE

ABBREVIATIONS

V. IN-SITU VANE TEST
 M. MECHANICAL ANALYSIS
 U. UNCONFINED COMPRESSION
 Qc. TRIAXIAL CONSOLIDATED QUICK
 Q. TRIAXIAL QUICK
 S. TRIAXIAL SLOW

γ. WET UNIT WEIGHT
 K. PERMEABILITY
 C. CONSOLIDATION

WL. WATER LEVEL IN CASING
 WT. WATER TABLE IN SOIL

SOIL PROFILE

SAMPLES

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT WT. %										OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
					DYNAMIC PENETRATION TEST BLOWS PER FOOT														
389.5		GROUND LEVEL		390															
0.0		SILTY TOPSOIL																	
388.0																			
1.5																			
		HARD GREY-BROWN SILTY TILL		385															
380.0				380															
9.0																			
		HARD REDDISH - BROWN CLAYEY SILT TILL		375															
				370															
				365															
360.0				360															
23.5		WEATHERED REDDISH - BROWN SHALES																	
356.5																			
33.0		SOFT SOUND REDDISH - BROWN SHALE BEDROCK		355															
354.7																			
34.8		END OF HOLE		350															

M CORE RECOVERY 50%

BXL CORE

1

M 20%

BXL CORE

2

20%

BXL CORE

3

11%

BXL CORE

4

10%

BXL CORE

5

R.C. RECOVERY 73%

BXL RC

6

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS

<input type="checkbox"/>	DISTURBED
<input type="checkbox"/>	FAIR
<input type="checkbox"/>	GOOD
<input checked="" type="checkbox"/>	LOST

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE-OPEN
D.F. - DRIVE FOOT VALVE
C.S. - CHUNK SAMPLE

FS - FOIL SAMPLE
SO - SLEEVE-OPEN
SF - SLEEVE-FOOT VALVE
TO - THIN WALLED OPEN
RC - ROCK CORE

V - IN-SITU VANE TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
QC - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW

A. WET UNIT WEIGHT
 X. PERMEABILITY
 C. CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEVATION
DEPTH

WATER CONDITIONS

DESCRIPTION

INTERVIEW

LEVATION
SCALE

WATER CONTENT Wt. %

ONAT 12W 12W 12W

OTHER
TESTS

SAMPLES

CONCLUSION

344.1.

UNSAFE

PENETRATION
RESISTANCE
BLOWS/ST

187.6

5. 2000年10月1日起，凡在我国境内销售货物的单位和个人，均应按销售额的一定比例缴纳增值税。其税率分别为：基本税率17%，低税率13%。出口货物除另有规定外，税率为0%。纳税人出口货物，除国家限制出口的货物外，退还增值税。

2050

GROUND LEVEL

$\frac{1}{2} \times 10^{-3}$

VERY STIFF TO HARD
GREY-BROWN AND
REDISH-BROWN
CLAYEY SILT
TILL

3801

7.5

MAKES REDDISH-BROWN
CLAYEY SILT T-CL

367 4

20. 2

END OF HOLE

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT 57033 BORING # 717EX-1 DATUM GEODETIC CASING
BORING DATE JAN. 25, 1960 REPORT DATE FEB. 11, 1960 COMPILED BY J.A. CHECKED BY A.
SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION



DISTURBED
FAIR
GOOD
LOST

SAMPLE TYPES

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE OPEN
D.F. - DRIVE FOOT VALVE
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F.S. FOIL SAMPLE

S.O. - SLEEVE OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
QU - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW

7 - WET UNIT WEIGHT
K - PERMEABILITY
C - CONSOLIDATION

WL - WATER LEVEL IN CASIN
WT - WATER TABLE IN SOIL

SOIL PROFILE

SOIL PROFILE				WATER CONTENT WS				O NAT. FLW A Pw				OTHER TESTS	SAMPLES			
ELEVN. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLT	ELEVATION SCALE	DYNAMIC PENETRATION TEST BLOWS PER FOOT								CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT
386.5		GROUND LEVEL		390												
0.0		SILTY TOPSOIL		385												
384.5				380												
2.0				375												
		HARD REDDISH-BROWN CLAYEY SILT TILL		370												
				365												
368.4		END OF HOLE														
18.1																

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX - I

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS

<input type="checkbox"/>	DISTURBED
<input type="checkbox"/>	FAIR
<input type="checkbox"/>	GOOD
<input checked="" type="checkbox"/>	LOST

A.S. AUGER SAMPLE
S.T. SLOTTED TUBE
W.S. WASHED SAMPLE
D.O. DRIVE-OPEN
D.F. DRIVE-FOOT VALVE
C.S. CHUNK SAMPLE

F.S. - FOIL SAMPLE
S.O. - SLEEVE OPEN
S.F. - SLEEVE FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

- V - IN SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
- QC - TRIAXIAL CONSOLIDATED QUICK
- Q - TRIAXIAL QUICK
- S - TRIAXIAL SLOW

G. WET UNIT WEIGHT
K. PERMEABILITY
C. CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W ₂			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
					NAT	LW	Δ Pw					
					DYNAMIC PENETRATION TEST BLOWS PER FOOT							
352.9		GROUND LEVEL		355								
351.9		SILTY TOPSOIL		360								
351.4				365								
351.0				370								
		HARD GREY BROWN AND REDDISH-BROWN CLAYEY SILT TILL		375								
				380								
351.9				385								
351.0				390								
				395								
				400								
				405								
				410								
				415								
				420								
				425								
				430								
				435								
				440								
				445								
				450								
				455								
				460								
				465								
				470								
				475								
				480								
				485								
				490								
				495								
				500								
				505								
				510								
				515								
				520								
				525								
				530								
				535								
				540								
				545								
				550								
				555								
				560								
				565								
				570								
				575								
				580								
				585								
				590								
				595								
				600								

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS

	DISTURBED
	FAIR
	GOOD
	LOST

A.S. - AUGER SAMPLE
ST. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
C.S. - CHUNK SAMPLE

F.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

- V - IN-SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
- QC - TRIAXIAL CONSOLIDATED QUICK
- Q - TRIAXIAL QUICK
- S - TRIAXIAL SLOW

- 7. WET UNIT WEIGHT
- K. PERMEABILITY
- C. CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

[illegible]

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT ST033 BORING # APPEX. I DATUM GEODETIC CASING BX
 BORING DATE FEB. 4, 1960 REPORT DATE FEB. 12, 1960 COMPILED BY J.A. CHECKED BY A.
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION



A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE

SAMPLE TYPES

F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 QC - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

SAMPLES

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLT	ELEVATION SCALE	WATER CONTENT W %			O NAT			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
					DYNAMIC PENETRATION TEST BLOWS PER FOOT										

CORE RECOVERY 100%

50%

35%

10%

36%

R.C. RECOVERY 70%

B.X.L. CORE

B.X.L. CORE

B.X.L. CORE

B.X.L. CORE

B.X.L. CORE

B.X.L. RC

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX 2

CONTRACT NO. S7032 BORING # 7 AND 7A DATUM GEODETIC CASING BX
 BORING DATE FEB 1, 1960 REPORT DATE FEB 12, 1960 COMPILED BY J.A. CHECKED BY
 SAMPLER HAMMER WT 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION

DISTURBED
 FAIR
 GOOD
 LOST

SAMPLE TYPES

A.S. AUGER SAMPLE
 ST. SLOTTED TUBE
 W.S. WASHED SAMPLE
 D.O. DRIVE OPEN
 D.F. DRIVE-FOOT VALVE
 C.S. CHUNK SAMPLE

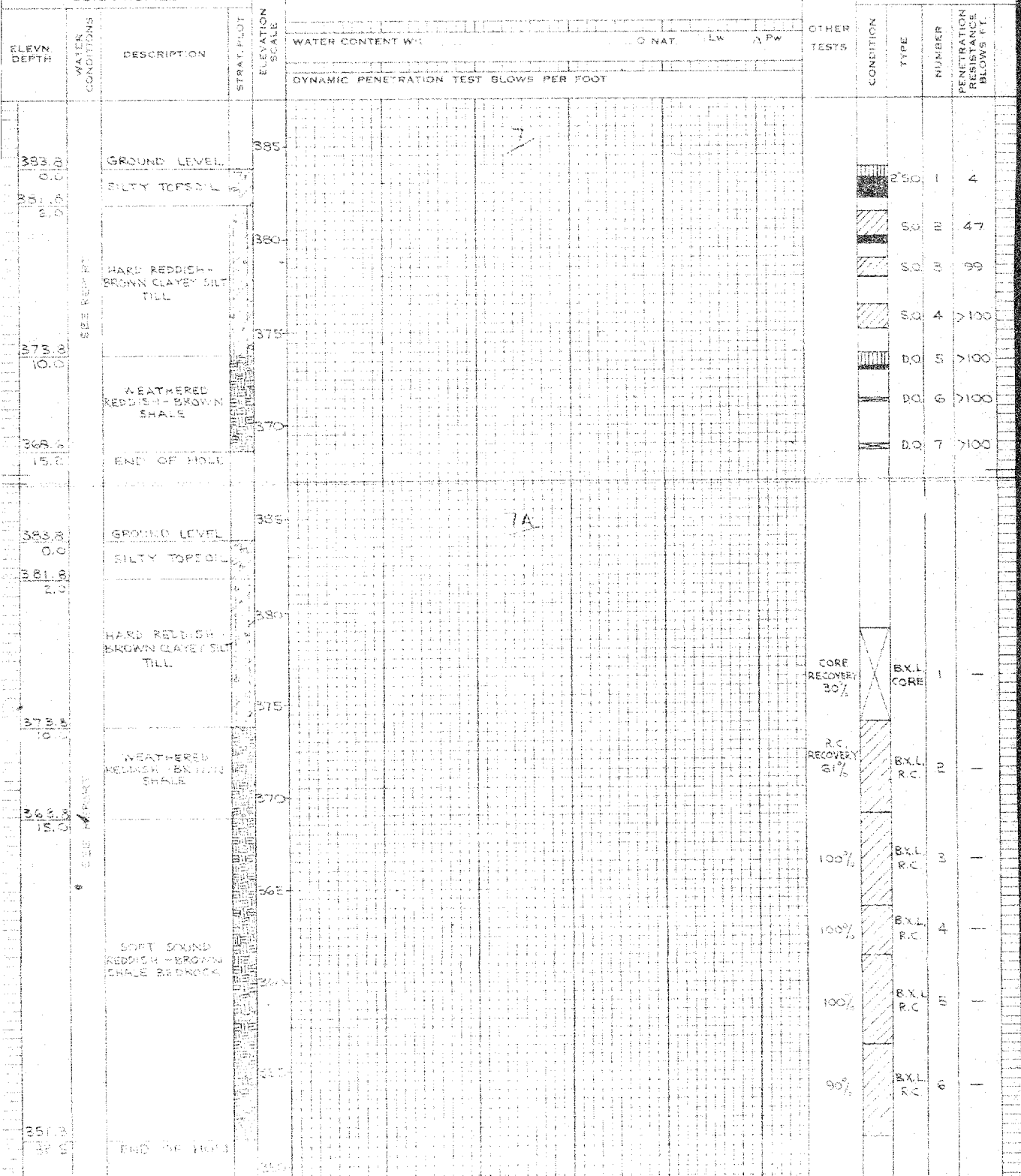
F.S. FOIL SAMPLE
 S.O. SLEEVE-OPEN
 S.F. SLEEVE-FOOT VALVE
 T.O. THIN WALLED OPEN
 R.C. ROCK CORE

V. IN-SITU VANE TEST
 M. MECHANICAL ANALYSIS
 U. UNCONFINED COMPRESSION
 Q. TRIAXIAL CONSOLIDATED QUICK
 Q. TRIAXIAL QUICK
 S. TRIAXIAL SLOW

ABBREVIATIONS

W.U. WET UNIT WEIGHT
 K. PERMEABILITY
 C. CONSOLIDATION
 W.L. WATER LEVEL IN CASING
 W.T. WATER TABLE IN SOIL

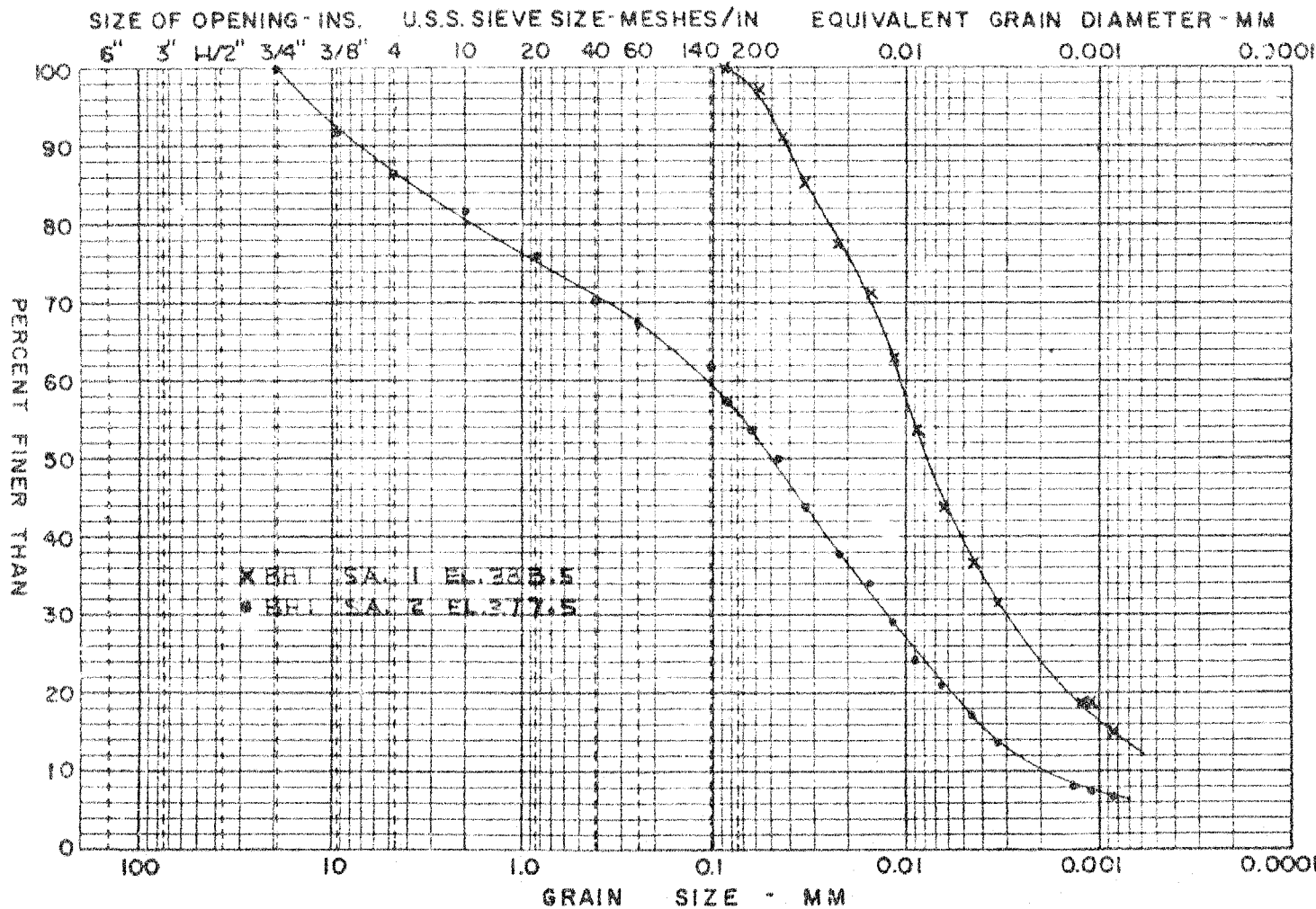
SOIL PROFILE



GRAIN SIZE DISTRIBUTION

APPENDIX I
FIGURE 1
PROJECT S7053

COBBLE		GRAVEL SIZE			SAND SIZE			FINE GRAINED	
SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		SILT SIZE	CLAY SIZE

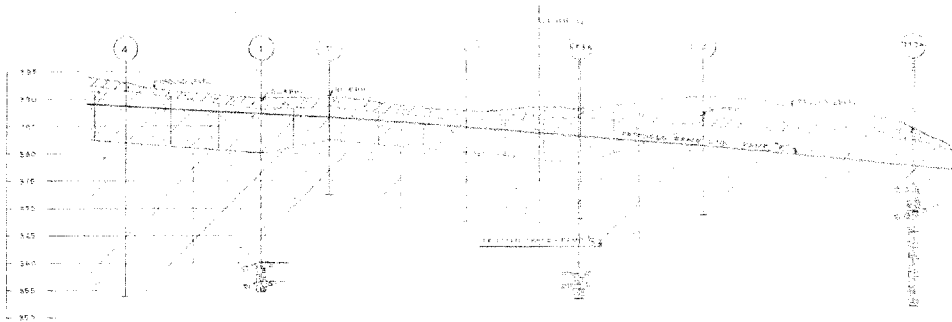


M.I.T. GRAIN SIZE SCALE

GEOCON



PLAN
SCALE 1"=100'-0"



- BOREHOLE WITH INTERMITTENT SAMPLING IN PLAN
- BOREHOLE WITH CONTINUOUS CORE SAMPLING IN PLAN
- BOREHOLE WITH INTERMITTENT SAMPLING AND ADVANCE COMPENSATE CORE SAMPLING IN PLAN
- BOREHOLE WITH INTERMITTENT SAMPLING IN ELEVATION
- BOREHOLE WITH CONTINUOUS CORE SAMPLING IN ELEVATION

5. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b}$ 和 $\vec{a} \cdot \vec{c}$.
 6. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b} \cdot \vec{c}$.
 7. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b} \cdot \vec{c}$.
 8. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b} \cdot \vec{c}$.
 9. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b} \cdot \vec{c}$.
 10. 已知 $\vec{a} = (1, 2, 3)$, $\vec{b} = (2, 3, 4)$, $\vec{c} = (3, 4, 5)$, 求 $\vec{a} \cdot \vec{b} \cdot \vec{c}$.

EXPOSED LIFE-SIZE EXPRESSWAY
RAMP "R" OVER RAMP "Q"

MADE MEX	CHRD 2	APFD 157	No. 57035
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APPENDIX II

RAMP 'R' OVER CHEDOCKE WEST-BOUND LANE

Procedure

Soil Conditions

Water Conditions

Drawing S7033-2 Boring Plan and Soil Stratigraphy

Office Reports on Soil Exploration

GEOCON

PROCEDURE

The site includes boreholes 8 to 13 inclusive. These boreholes were put down between February 1st and February 4th, 1960 using mobile power auger equipment. Closely spaced intermittent samples were taken in each hole to a depth where practical refusal to sampling was encountered. Additional core drill holes 10A and 13A were put down adjacent to boreholes 10 and 13 between February 23rd and February 26th, 1960 using a standard machine drillrig. Continuous core in BXL size was taken in these holes to a depth of about 6 feet below the proposed grade of the Chedoke West-Bound Lane.

The locations of the boreholes together with the inferred soil stratigraphy are shown on Drawing S7033-2 in this Appendix. Detailed logs of the borings are given on the Office Reports on Soil Exploration in this Appendix.

SOIL CONDITIONS

The main soil strata encountered by the borings are as follows:

Topsoil

The site is covered by 1 to 2 feet of grey-brown silty topsoil.

Stiff to Hard Reddish-Brown Clayey Silt Till

Beneath the topsoil in all holes except borehole 10 is a stratum of reddish-brown clayey silt till, about 2 feet in thickness and composed of sand, gravel and rock fragments in a matrix of clayey silt to silt. This stratum is similar to that discussed in Appendix I.

Stiff to Hard Reddish-Brown Clayey Silt Till (continued)

Standard penetration tests gave penetration values ranging between 15 and 41 blows per foot, indicating that the till is of stiff to hard consistency and with a probable minimum compressive strength of about 2 tons per square foot.

Bedrock

The till rests on reddish-brown shale bedrock of which the upper 2 to 3 feet are weathered. The remainder of the bedrock is sound and soft and contains limestone bands up to about 6 inches in thickness. Core recovery was generally close to 100 percent but disintegration of the shale upon exposure to the atmosphere starts almost immediately.

WATER CONDITIONS

As discussed in Appendix I, water levels in the completed holes were influenced by surface water throughout the period of investigation.

Water level observations obtained in the holes put down dry by auger equipment and not directly resulting from surface conditions are given below.

- Borehole 8 Water came up rapidly to 5 feet from ground level when the hole was advanced to 13 feet.
- Borehole 9 Water came up rapidly to 3 feet from ground level when the hole was advanced to 12.5 feet.
- Borehole 10 Hole dry at end of boring.

WATER CONDITIONS (continued)

III.2

Borehole 11 Water at 12.5 feet at end of boring
Borehole 12 Hole dry at end of boring
Borehole 13 Water at 16.5 feet at end of boring

All holes were subsequently influenced by surface water.

Complete recovery of drilling water in the cored holes
was obtained during drilling.

EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

The object of this form is to enable a comprehensive study of the soil to be made by combining on one sheet all of the information obtained from the boring. An explanation of the various columns of the report follows.

ELEVATION AND DEPTH

This column gives the elevation and depth of boundaries between the various soil strata. The elevation is referred to the datum shown in the general heading.

WATER CONDITIONS

In this column the water level in the casing at the time of boring or the water table in the ground, determined by a series of observations in a piezometer or standpipe, is indicated to scale by a horizontal line with the symbol W.L. or W.T. above the line. A notation of any complicated groundwater conditions will be made in this column.

DESCRIPTION

A description of the soil, using standard terminology, is contained in this column. The consistency of cohesive soils and the relative density of non-cohesive soils are described by the following terms:

<u>Consistency</u>	<u>U-Strength Tons/sq. ft.</u>	<u>Relative Density</u>	<u>Standard Penetration Resistance, Blows/ft.</u>
Very soft	0.03 to 0.25	Very loose	0 to 4
Soft	0.25 to 0.5	Loose	4 to 10
Firm	0.5 to 1.0	Compact	10 to 30
Stiff	1.0 to 2.0	Dense	30 to 50
Very stiff	2.0 to 4.0	Very dense	over 50
Hard	over 4.0		

STRATIGRAPHIC PLOT

The stratigraphic plot follows the standard symbols of the National Research Council, Canada.

ELEVATION SCALE

The information in all columns is plotted to a true elevation scale which is shown in this column.

GRAPHS

The main body of the report forms a graph which is used to plot to correct elevation the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted on the above graph.

SAMPLES

The first three columns describe the condition, type and number of each sample obtained from the boring. The location and extent of each sample is plotted to scale.

In the last column is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. When a 2 inch Drive Sampler is used the result obtained is termed the "Standard Penetration Resistance".

GEOCON

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPEX-I

CONTRACT 57033 BORING # B AND C DATUM GEODETIC CASING
 BORING DATE FEB. 1, 1960 REPORT DATE FEB. 12, 1960 COMPILED BY J.A. CHECKED BY
 SAMPLER HAMMER WT 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION

☐ DISTURBED
☐ FAIR
☐ GOOD
☐ LOST

SAMPLE TYPES

A.S. AUGER SAMPLE
 S.T. SLOTTED TUBE
 W.S. WASHED SAMPLE
 D.O. DRIVE OPEN
 D.F. DRIVE FOOT VALVE
 C.S. CHUNK SAMPLE
 F.S. FOIL SAMPLE
 S.O. SLEEVE OPEN
 S.F. SLEEVE FOOT VALVE
 T.O. THIN WALLED OPEN
 R.C. ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 Qc - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 W - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE


ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W%			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.	
					NAT	LW	PW						
					DYNAMIC PENETRATION TEST BLOWS PER FOOT								
366.8 0.0	SEE REPORT	GROUND LEVEL			100								
364.0 2.8		SILTY TOPSOIL		365						250	1	5	
362.3 4.5		STIFF REDDISH-BROWN CLAYEY SILT TILL								S.O.	2	15	
359.8 7.0		WEATHERED REDDISH-BROWN SHALE		360						S.O.	3	45	
										S.O.	4	>100	
			SOFT SOUND REDDISH-BROWN SHALE BEDROCK		355						D.O.	5	>100
											D.O.	6	86
											D.O.	7	>100
349.2 17.6			END OF HOLE		350						D.O.	8	>100
					345								
363.0 0.0	SEE REPORT	GROUND LEVEL			10								
360.4 2.6		SILTY ORGANIC TOPSOIL		360						250	1	3	
358.0 5.0		VERY STIFF REDDISH-BROWN CLAYEY SILT TILL								S.O.	2	16	
356.0 7.0		WEATHERED REDDISH-BROWN SHALE		355						S.O.	3	40	
										S.O.	4	>100	
			SOFT SOUND REDDISH-BROWN SHALE BEDROCK		350						D.O.	5	>100
											D.O.	6	>100
											D.O.	7	>100
345.4 17.0		END OF HOLE		340						D.O.	8	>100	

APPENDIX I

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS

	DISTURBED
	FAIR
	GOOD
	LOST

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
C.S. - CHUNK SAMPLE

F.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

V - IN-SITU VANE TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
QC - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW

J. WET UNIT WEIGHT
 K. PERMEABILITY
 C. CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

SOIL PROFILE										OTHER TESTS		SAMPLES			
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W _n NAT. LW PW					CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.		
					DYNAMIC PENETRATION TEST BLOWS PER FOOT										
366.9 0.0 1.0	SEE REPORT	GROUND LEVEL SILTY TOPSOIL										1	5		
361.3 5.0		WEATHERED REDDISH-BROWN SHALE													
354.3 12.6		SOFT SOUND REDDISH-BROWN SHALE BEDROCK													
		END OF HOLE													
365.5 0.0 1.0 362.5 3.0 361.0 4.5	SEE REPORT	GROUND LEVEL SILTY TOPSOIL FIRM TO STIFF REDDISH-BROWN CLAYEY SILT TILL WEATHERED REDDISH-BROWN SHALE										1	6		
362.5 3.0		FIRM TO STIFF REDDISH-BROWN CLAYEY SILT TILL													
361.0 4.5		WEATHERED REDDISH-BROWN SHALE													
		SOFT SOUND REDDISH-BROWN SHALE BEDROCK													
351.8 13.7		END OF HOLE													

APPENDIX I

SAMPLE CONDITION

	DISTURBED
	FAIR
	GOOD
	LOST

SAMPLE TYPES

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE-OPEN
D.F. - DRIVE FOOT VALVE
C.S. - CHUNK SAMPLE

E.S. FOIL SAMPLE

P.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
QC - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW

WET UNIT WEIGHT
PERMEABILITY
CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

SOIL PROFILE

SOIL PROFILE				SAMPLES						
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W _t	OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
				DYNAMIC PENETRATION TEST BLOWS PER FOOT						
366.9 0.0 1.0		GROUND LEVEL SILTY TOPSOIL		360						
361.9 5.0		WEATHERED REDDISH-BROWN SHALE		350						
				340						
				330						
				320						
				310						
				300						
				290						
				280						
				270						
				260						
				250						
				240						
				230						
				220						
				210						
				200						
				190						
				180						
				170						
				160						
				150						
				140						
				130						
				120						
				110						
				100						
				90						
				80						
				70						
				60						
				50						
				40						
				30						
				20						
				10						
				0						
336.9 30.0		END OF HOLE		335						

APPEND. I.

SAMPLE CONDITION


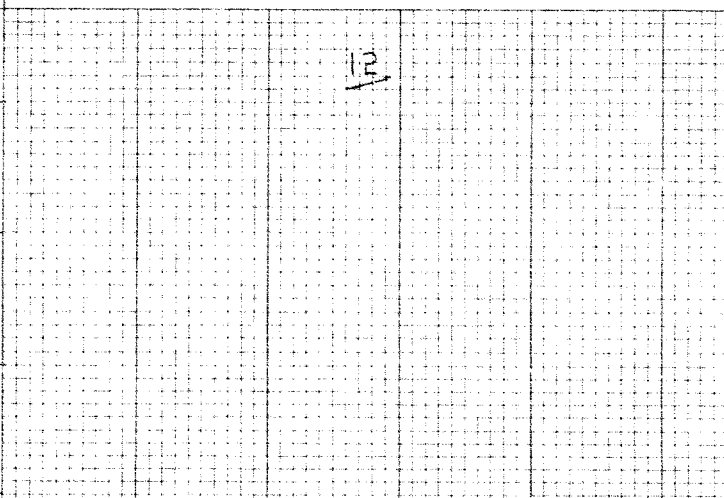

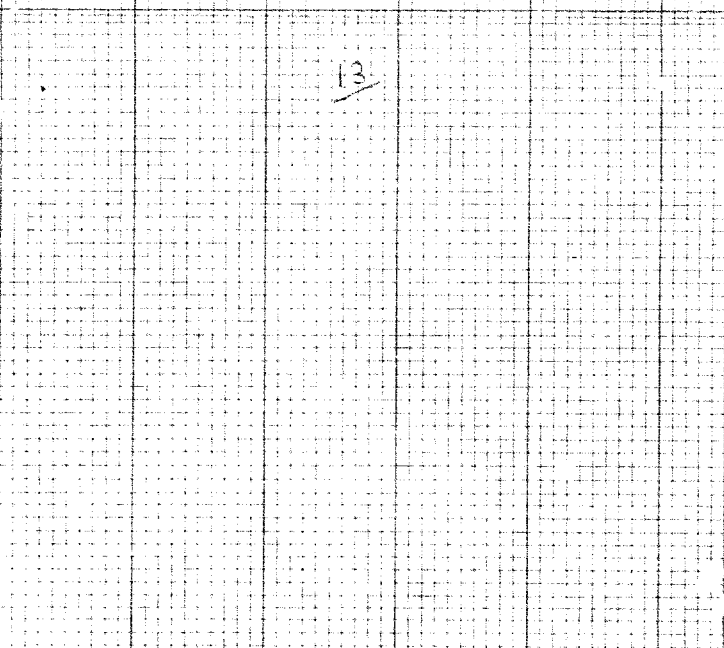

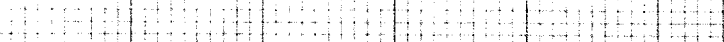
SAMPLE TYPES

F.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

- V - IN-SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
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C - CONSOLIDATION

WL - WATER LEVEL IN CASING
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SOIL PROFILE														OTHER TESTS		SAMPLES																		
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W _p O NAT. TLW Δ PW										CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.																
					DYNAMIC PENETRATION TEST BLOWS PER FOOT																													
360.7	SEE REPORT	GROUND LEVEL		360												2\"/>	1	3																
0.0		SILTY TOPSOIL																	355		SO	2	35											
357.7		FIRM REDDISH-BROWN CLAYEY SILT TILL																						350		DO	5	>100						
5.0		WEATHERED REDDISH-BROWN SHALE																											345		DO	6	>100	
355.7		SOFT SOUND REDDISH-BROWN SHALE BEDROCK																																340
5.0	END OF HOLE	345																																
347.6	SEE REPORT	END OF HOLE		370												2\"/>	1	3																
0.0																			GROUND LEVEL	365		SO	2	41										
368.6																			SILTY TOPSOIL						360		SO	3	>100					
1.6																			HARD REDDISH-BROWN CLAYEY SILT TILL											355		SO	4	>100
364.6																			SOFT SOUND REDDISH-BROWN SHALE BEDROCK															
6.0	END OF HOLE	350																																
350.1		END OF HOLE		350												AS	7	—																
18.0																																		

APPENDIX.

SAMPLE CONDITION

SAMPLE TYPES

ABBREVIATIONS

	DISTURBED
	FAIR
	GOOD
	LOST

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
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D.F. - DRIVE-FOOT VALVE
C.S. - CHUNK SAMPLE

F.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

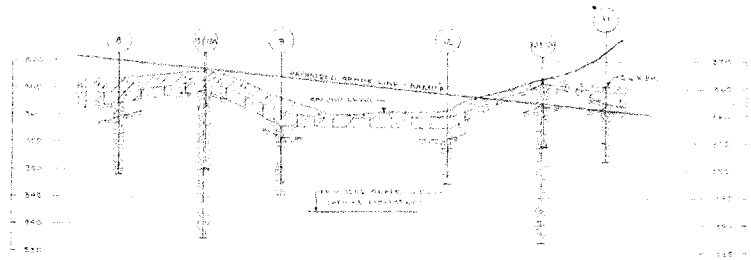
- V - IN-SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
- QC - TRIAXIAL CONSOLIDATED QUICK
- Q - TRIAXIAL QUICK
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W - WET UNIT WEIGHT
K - PERMEABILITY
C - CONSOLIDATION

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

SOIL PROFILE

[illegible]



SECTION 4-1
 4-1.1 4-1.2 4-1.3
 4-1.4 4-1.5 4-1.6

- ### LEGEND
- ◆ BOREHOLE WITH INTERMITTENT SAMPLING IN PLAN
 - ◆ BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING IN PLAN
 - ⑫ BOREHOLE WITH INTERMITTENT SAMPLING & ELEVATION
 - ⑫/3108 BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING & ELEVATION
 - ◆ BOREHOLE "INTERMITTENT SAMPLING"
 - ◆ BOREHOLE "CONTINUOUS CORE SAMPLING"

543-3344

1. 2019年12月31日，甲公司“应付账款”科目贷方余额为100万元，其中明细科目贷方余额为80万元，借方余额为20万元；“预付账款”科目借方余额为20万元，其中明细科目借方余额为30万元，贷方余额为10万元。不考虑其他因素，甲公司2019年12月31日资产负债表“应付账款”项目应填列的金额为（ ）万元。
 A. 80
 B. 100
 C. 120
 D. 110

2013年12月10日，本公司与控股股东、实际控制人签署了《关于减少和规范关联交易的承诺函》，承诺如下：

DEPARTMENT OF HIGHWAYS, ONTARIO
 PROJECT: 1711 ONE EXPRESSWAY
 ROAD 47 OVER CROFTON W.D.
 WARD 47121 ONTARIO
 BORING PLAN AND SOIL STRATIGRAPHY

GEOCON LTD

DATE APRIL 5, 1940 SCALE AS SHOWN

NAME N.W.	CHRD. N	APPD. (1-1)	No. 57088-2
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APPENDIX III

HIGHWAY 6 OVER CHEDOKE EAST-AND WEST-BOUND LANES

Procedure

Soil Conditions

Water Conditions

Drawing S7033-3 Boring Plan and Soil Stratigraphy

Office Reports on Soil Exploration

PROCEDURE

The site includes boreholes 14 to 21 inclusive. These boreholes were put down between January 15th and January 21st, 1960, using mobile power auger equipment. Closely spaced intermittent samples were taken in each hole to a depth where practical refusal to sampling was encountered. Additional core drill holes 18A, 19A and 21A were put down adjacent to boreholes 18, 19 and 21 between January 25th and January 29th, 1960, using a standard machine drillrig. Continuous core in BXL size was taken in these holes to a depth of about 8 feet below the proposed grade of the Chedoke West-Bound Lane and about 4 feet below the proposed grade of the Chedoke East-Bound Lane.

The locations of the boreholes together with the inferred soil stratigraphy are shown on Drawing S7033-3 in this Appendix. Detailed logs of the borings are given on the Office Reports on Soil Exploration in this Appendix.

SOIL CONDITIONS

The main soil strata encountered by the borings are as follows:

Topsoil

In borehole 17, located on the hill at the west side of Highway 6, about 2 feet of grey-brown silty topsoil was encountered.

Fill

In all boreholes but borehole 17, a layer of granular fill was encountered to a depth of between 6 inches and 3 feet. This fill forms part of the road fill for Highway 6.

Hard Reddish-Brown Clayey Silt Till

In boreholes 14 and 21 a stratum of reddish-brown clayey silt till was encountered. This stratum is about 7 feet in thickness in borehole 14 and is at the surface between boreholes 21 and 15. The till is composed of a heterogeneous mixture of sand and gravel and rock fragments in a matrix of clayey silt

The consistency of the till is hard as indicated by the sampling which met almost immediate refusal within the stratum. BXL core recovery in the till was close to 100 percent.

Bedrock

The till in boreholes 14 and 21, the topsoil in borehole 17 and the road fill elsewhere are underlain by reddish-brown shale bedrock. Evidence of weathering was noticed in boreholes 17, 18, and 19 to a depth of about 2 to 3 feet. The remainder of the bedrock is sound and soft. Core recovery in the bedrock was practically 100 percent across the site. When exposed to the atmosphere, the shale had no tendency to disintegrate in contrast to the shale discussed in Appendices I and II.

WATER CONDITIONS

As discussed in Appendix I water levels in the completed boreholes were influenced by surface water throughout the period of investigation.

Water level observations obtained in the holes put down dry by auger equipment and not directly resulting from surface conditions are given below.

WATER CONDITIONS (continued)

III.3

Borehole 14 Hole dry at end of boring
Borehole 15 Water seeping in from fill
Borehole 16 Hole dry at end of boring
Borehole 17 Hole dry at end of boring, then remaining at
13 feet for 2 weeks
Borehole 18 Water seeping in from fill
Borehole 19 Hole dry at end of boring
Borehole 20 Hole dry at end of boring
Borehole 21 Water seeping in from fill

All holes were subsequently influenced by surface water.

Complete recovery of drilling water in the cored holes was obtained during drilling.

EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

The object of this form is to enable a comprehensive study of the soil to be made by combining on one sheet all of the information obtained from the boring. An explanation of the various columns of the report follows.

ELEVATION AND DEPTH

This column gives the elevation and depth of boundaries between the various soil strata. The elevation is referred to the datum shown in the general heading.

WATER CONDITIONS

In this column the water level in the casing at the time of boring or the water table in the ground, determined by a series of observations in a piezometer or standpipe, is indicated to scale by a horizontal line with the symbol W.L. or W.T. above the line. A notation of any complicated groundwater conditions will be made in this column.

DESCRIPTION

A description of the soil, using standard terminology, is contained in this column. The consistency of cohesive soils and the relative density of non-cohesive soils are described by the following terms:

Consistency	U-Strength Tons/sq. ft.	Relative Density	Standard Penetration Resistance, Blows/ft.
Very soft	0.03 to 0.25	Very loose	0 to 4
Soft	0.25 to 0.5	Loose	4 to 10
Firm	0.5 to 1.0	Compact	10 to 30
Stiff	1.0 to 2.0	Dense	30 to 50
Very stiff	2.0 to 4.0	Very dense	over 50
Hard	over 4.0		

STRATIGRAPHIC PLOT

The stratigraphic plot follows the standard symbols of the National Research Council, Canada.

ELEVATION SCALE

The information in all columns is plotted to a true elevation scale which is shown in this column.

GRAPHS

The main body of the report forms a graph which is used to plot to correct elevation the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted on the above graph.

SAMPLES

The first three columns describe the condition, type and number of each sample obtained from the boring. The location and extent of each sample is plotted to scale.

In the last column is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. When a 2 inch Drive Sampler is used the result obtained is termed the "Standard Penetration Resistance".

GEOCON

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OFFICE REPORT ON SOIL EXPLORATION

APPEX. III

CONTRACT S7033 BORING # 14 AND 15 DATUM GEODETIC CASING
 BORING DATE JAN. 18 & 19, 1960 REPORT DATE FEB. 15, 1960 COMPILED BY J.A. CHECKED BY F.
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION



A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE

SAMPLE TYPES

F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V. - IN-SITU VANE TEST
 M. - MECHANICAL ANALYSIS
 U. - UNCONFINED COMPRESSION
 QC. - TRIAXIAL CONSOLIDATED QUICK
 Q. - TRIAXIAL QUICK
 S. - TRIAXIAL SLOW
 γ. - WET UNIT WEIGHT
 K. - PERMEABILITY
 C. - CONSOLIDATION
 WL. - WATER LEVEL IN CASING
 WT. - WATER TABLE IN SOIL

SOIL PROFILE

SAMPLER										OTHER TESTS				CONDITION				TYPE				NUMBER				PENETRATION RESISTANCE BLOWS FT.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PL. OT	ELEVATION SCALE	WATER CONTENT W _t										DYNAMIC PENETRATION TEST BLOWS PER FOOT				OTHER TESTS				CONDITION				TYPE				NUMBER				PENETRATION RESISTANCE BLOWS FT.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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379.5 0.0	SEE REPORT	GROUND LEVEL		380	14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT 57033 BORING # APPEX III 16 AND 17 DATUM GEODETIC CASING
 BORING DATE JAN. 18, 1960 REPORT DATE FEB 15, 1960 COMPILED BY J. A. CHECKED BY 7
 SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN LBS. ENERGY)

SAMPLE CONDITION

☐ DISTURBED
☐ FAIR
☐ GOOD
☐ LOST

SAMPLE TYPES

AS AUGER SAMPLE
 ST SLOTTED TUBE
 WS WASHED SAMPLE
 DO DRIVE-OPEN
 DF DRIVE-FOOT VALVE
 CS CHUNK SAMPLE
 FS FOIL SAMPLE
 SO SLEEVE-OPEN
 SF SLEEVE FOOT VALVE
 TO THIN WALLED OPEN
 RC ROCK CORE

ABBREVIATIONS

V IN-SITU VANE TEST
 M MECHANICAL ANALYSIS
 U UNCONFINED COMPRESSION
 Q TRIAXIAL CONSOLIDATED QUICK
 Q TRIAXIAL QUICK
 S TRIAXIAL SLOW
 W WET UNIT WEIGHT
 K PERMEABILITY
 C CONSOLIDATION
 WL WATER LEVEL IN CASING
 WT WATER TABLE IN SOIL

SOIL PROFILE

TEST RESULTS					OTHER TESTS					SAMPLES			
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W _n			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.	
					DYNAMIC PENETRATION TEST BLOWS PER FOOT								
367.3 0.0		GROUND LEVEL		370	16								
364.1 3.0		GRANULAR ROAD FILL		365									
	SEE REPORT	SOFT SOUND REDDISH-BROWN SHALE BEDROCK		360									
351.3 16.0		END OF HOLE		350									
372.8 0.0		GROUND LEVEL		375	17								
370.8 2.0		SILTY TOPSOIL		370									
367.8 3.0		WEATHERED REDDISH-BROWN SHALE		365									
	SEE REPORT	SOFT SOUND REDDISH-BROWN SHALE BEDROCK		360									
357.8 15.0		END OF HOLE		350									

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX III

CONTRACT S7033 BORING # 18 AND 18A DATUM GEODETIC CASING EX
 BORING DATE JAN. 15 & 25, 1960 REPORT DATE FEB. 12, 1960 COMPILED BY M.V.V. CHECKED BY ---
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION



A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE FOOT VALVE
 C.S. - CHUNK SAMPLE

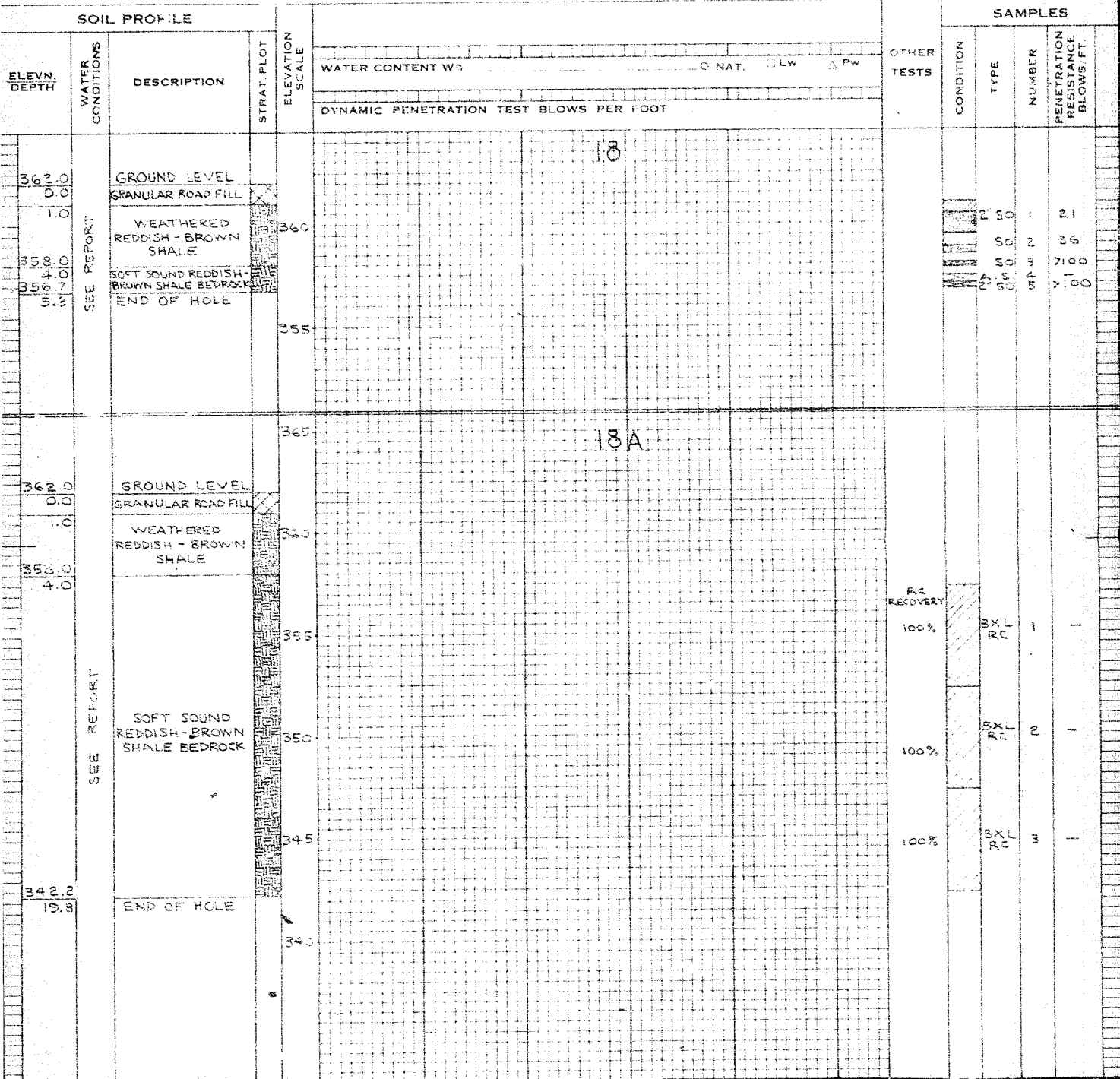
SAMPLE TYPES

F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 QC - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 T - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE



GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPEX. III

CONTRACT ST-53 BORING # 19 E 12A DATUM GEODETIC CASING BA
 BORING DATE JAN. 12, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.M. CHECKED BY
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION

☐ DISTURBED
☐ FAIR
☐ GOOD
☐ LOST

SAMPLE TYPES

A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE OPEN
 D.F. - DRIVE FOOT VALVE
 C.S. - CHUNK SAMPLE
 F.S. - FOIL SAMPLE
 S.O. - SLEEVE OPEN
 S.F. - SLEEVE FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 Q - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 W - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W _n			OTHER TESTS	SAMPLES			
					NAT.	LL	PL		CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
36.9 0.0 36.9		GROUND LEVEL GRANULAR ROAD FILL		36.9								
36.9 0.0 36.9		WEATHERED REDDISH-BROWN SHALE		36.9								
36.9 0.0 36.9		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		36.9								
36.9 0.0 36.9		END OF HOLE		36.9								
36.9 0.0 36.9		GROUND LEVEL GRANULAR ROAD FILL		36.9								
36.9 0.0 36.9		WEATHERED REDDISH-BROWN SHALE		36.9								
36.9 0.0 36.9		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		36.9								
36.9 0.0 36.9		END OF HOLE		36.9								

APPENDIX III

WL - WATER LEVEL IN CASING
WT - WATER TABLE IN SOIL

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLT	ELEVATION SCALE	WATER CONTENT W%			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT
					NAT	LLW	PW					
					DYNAMIC PENETRATION TEST BLOWS PER FOOT							
372.5 0.0 371.4 1.1		GROUND LEVEL GRANULAR ROAD FILL		375								
		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		370								
				365								
362.5 10.0		END OF HOLE		360								

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPEX-III

CONTRACT S 7038 BORING # 21 & 21A DATUM GEODETIC CASING BX
 BORING DATE JAN. 21, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.W. CHECKED BY
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION

☐ DISTURBED
☐ FAIR
☐ GOOD
☐ LOST

SAMPLE TYPES

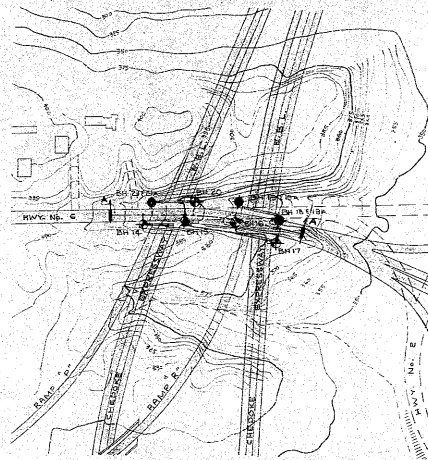
A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE
 F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

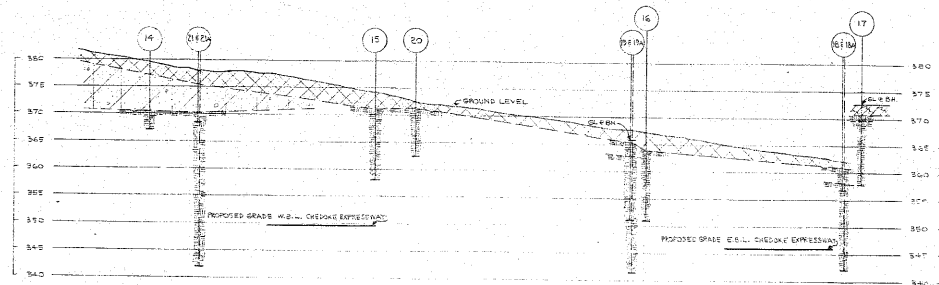
V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 Q - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W _c			OTHER TESTS	SAMPLES			
						NAT	LW	PW	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT
378.1 0.0		GROUND LEVEL		380								
375.2 2.9		GRANULAR ROAD FILL		375								
370.1 8.0		HARD REDDISH-BROWN CLAYEY SILT TILL		370								
368.5 9.6		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		365								
		END OF HOLE										
378.1 0.0		GROUND LEVEL		380								
375.2 2.9		GRANULAR ROAD FILL		375								
370.1 8.0		HARD REDDISH-BROWN CLAYEY SILT TILL		370								
		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		365								
		END OF HOLE										
342.1 36.0				340								



PLAN
SCALE 1" = 100'-0"



SECTION A-A

HORIZ. SCALE 1" = 20'-0"
VERT. SCALE 1" = 10'-0"

LEGEND

- BOREHOLE WITH INTERMITTENT SAMPLING IN PLAN
- BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING IN PLAN
- 17 BOREHOLE WITH INTERMITTENT SAMPLING IN ELEVATION
- 1618A BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING IN ELEVATION
- END OF HOLE "INTERMITTENT SAMPLING"
- END OF HOLE "CONTINUOUS CORE SAMPLING"

STRATIGRAPHY

- SILTY TOPSOIL
- GRANULAR ROAD FILL
- HARD REDDISH-BROWN CLAYEY SILT TILL
- WEATHERED REDDISH-BROWN SHALE
- SOFT SOUND REDDISH-BROWN SHALE BEDROCK

REFERENCE: L.C. PARKER & PARTNERS, BRIDGEMANHOFF LTD.
DRAWING OF CHEDOK EXPRESSWAY TEST BOREHOLE LOCATIONS
DATED: JAN. 8, 1960

DEPARTMENT OF HIGHWAYS, ONTARIO
TORONTO
PROPOSED CHEDOK EXPRESSWAY
HIGHWAY 6 OVER CHEDOK E.W.B.L.
HAMILTON
BORING PLAN AND SOIL STRATIGRAPHY

GEOCON LTD

DATE APRIL 4, 1960 SCALE AS SHOWN

MADE M.V. CHAD. APPD. No. 57035-3

APPENDIX IV

RAMP 'Q' OVER CHEDOKE WEST-BOUND LANE

Procedure

Soil Conditions

Water Conditions

Drawing S7033-4 Boring Plan and Soil Stratigraphy

Office Reports on Soil Exploration

GEOCON

PROCEDURE

The site includes boreholes 22 to 27 inclusive. These holes were put down between January 26th and January 29th, 1960, using mobile power auger equipment. Closely spaced intermittent samples were taken in each hole to a depth where practical refusal to sampling and augering was encountered. Additional core drill holes 24A and 27A were put down adjacent to boreholes 24 and 27, using a standard machine drillrig. Continuous core in BXL size was taken in these holes to a depth of 2 to 8 feet below the proposed grade of the Chedoke West-Bound Lane.

The locations of the boreholes together with the inferred soil stratigraphy are shown on Drawing S7033-4 in this Appendix. Detailed logs of the borings are given on the Office Reports on Soil Exploration in this Appendix.

SOIL CONDITIONS

The main soil strata encountered by the borings are as follows:

Topsoil

The site is covered by about 2 to 3 feet of grey-brown silty topsoil.

Bedrock

Beneath the topsoil reddish-brown shale bedrock was encountered. Based on visual examination of the shale and the results of standard penetration tests, it is considered that the upper 2 to 4 feet of the shale are weathered, followed by a semi-weathered zone, about 7 feet in thickness. The remainder of the shale is soft and sound and tends to disintegrate soon after exposure to the atmosphere.

WATER CONDITIONS

II.4

As discussed in Appendix I, water levels in the completed holes were influenced by surface water throughout the period of investigation.

Water level observations obtained in the holes put down dry by auger equipment and not directly resulting from surface conditions, are given below.

Borehole 22 Hole dry at end of boring, then water at about 11.5 feet for 1 week.

Borehole 23 Hole dry at end of boring, then water at about 12 feet for 1 week.

Borehole 24 Hole dry at end of boring, then water at about 8.5 feet for 1 week.

Borehole 25 Hole dry at end of boring, then water at about 7.5 feet for 1 week.

Borehole 26 Hole dry at end of boring.

Borehole 27 Hole dry at end of boring, then water at about 15.5 feet for 1 week.

All holes were subsequently influenced by surface water.

In drill hole 24A, there was an indication of partial water loss throughout drilling.

In drill hole 27A, sudden water losses occurred at depths of 44 feet and 50 feet.

EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

The object of this form is to enable a comprehensive study of the soil to be made by combining on one sheet all of the information obtained from the boring. An explanation of the various columns of the report follows.

ELEVATION AND DEPTH

This column gives the elevation and depth of boundaries between the various soil strata. The elevation is referred to the datum shown in the general heading.

WATER CONDITIONS

In this column the water level in the casing at the time of boring or the water table in the ground, determined by a series of observations in a piezometer or standpipe, is indicated to scale by a horizontal line with the symbol W.L. or W.T. above the line. A notation of any complicated groundwater conditions will be made in this column.

DESCRIPTION

A description of the soil, using standard terminology, is contained in this column. The consistency of cohesive soils and the relative density of non-cohesive soils are described by the following terms:

<u>Consistency</u>	<u>U-Strength Tons/sq. ft.</u>	<u>Relative Density</u>	<u>Standard Penetration Resistance, blows/ft.</u>
Very soft	0.03 to 0.25	Very loose	0 to 4
Soft	0.25 to 0.5	Loose	4 to 10
Firm	0.5 to 1.0	Compact	10 to 30
Stiff	1.0 to 2.0	Dense	30 to 50
Very stiff	2.0 to 4.0	Very dense	over 50
Hard	over 4.0		

STRATIGRAPHIC PLOT

The stratigraphic plot follows the standard symbols of the National Research Council, Canada.

ELEVATION SCALE

The information in all columns is plotted to a true elevation scale which is shown in this column.

GRAPHS

The main body of the report forms a graph which is used to plot to correct elevation the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted on the above graph.

SAMPLES

The first three columns describe the condition, type and number of each sample obtained from the boring. The location and extent of each sample is plotted to scale.

In the last column is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. When a 2 inch Drive Sampler is used the result obtained is termed the "Standard Penetration Resistance".

GEOCON

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX IV

CONTRACT 57032 BORING # 22 DATUM GEODETIC CASING
 BORING DATE JAN. 28, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.W. CHECKED BY
 SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION

 DISTURBED
 FAIR
 GOOD
 LOST

SAMPLE TYPES


A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE
 F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 Qc - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

SAMPLES

SOIL PROFILE															OTHER TESTS	SAMPLES					
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W _t										Q NAT.	BLW	Δ Pw	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
					DYNAMIC PENETRATION TEST BLOWS PER FOOT																
394.0 0.0	SEE REPORT	GROUND LEVEL		394.0																	
391.5 2.5		SILTY TOPSOIL		391.5																	
389.0 5.0		WEATHERED REDDISH-BROWN SHALE		389.0																	
		SEMI-WEATHERED REDDISH-BROWN SHALE		386.5																	
382.0 12.0		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		380																	
376.1 17.9		END OF HOLE		375																	

SEE REPORT

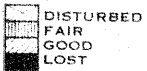
GEOCON

OFFICE REPORT ON SOIL EXPLORATION

APPENDIX IV

CONTRACT 57035 BORING # 24 DATUM GEODETIC CASING
 BORING DATE JAN. 26, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY MW CHECKED BY JK
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION



A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE

SAMPLE TYPES

F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 QC - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 W - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

SAMPLES

SOIL PROFILE											SAMPLES			
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W:			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.		
					NAT	LW	Pw							
					DYNAMIC PENETRATION TEST BLOWS PER FOOT									
393.5 0.0		GROUND LEVEL		395										
390.6 2.9		SILTY TOPSOIL												
383.2 7.3		WEATHERED REDDISH BROWN SHALE		390										
		SEMI-WEATHERED REDDISH-BROWN SHALE		385										
382.0 11.5	SEE REPORT			380										
		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		375										
373.2 20.3		END OF HOLE		370										

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7023 BORING # 24-A DATUM SEQUETIC CASING EX 100
 BORING DATE FEB 11 1960 REPORT DATE FEB 18 1960 COMPILED BY MV CHECKED BY 100
 SAMPLER HAMMER WT 140 LBS DROP 30 INCHES PENETRATION RESISTANCES CONVERTED TO BLOWS OF 1400 IN LBS ENERGY

SAMPLE TYPES

A.S. - AUGER SAMPLE
S.T. - SLOTTED TUBE
W.S. - WASHED SAMPLE
D.O. - DRIVE-OPEN
D.F. - DRIVE-FOOT VALVE
C.S. - CHUNK SAMPLE

F.S. - FOIL SAMPLE
S.O. - SLEEVE-OPEN
S.F. - SLEEVE-FOOT VALVE
T.O. - THIN WALLED OPEN
R.C. - ROCK CORE

ABBREVIATION

V - IN-SITU VANE TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
QC - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW

1. WET UNIT WEIGHT
 K. PERMEABILITY
 C. CONSOLIDATION
 WL. WATER LEVEL IN CASING
 WT. WATER TABLE IN SOIL

SOIL PROFILE

SOIL PROFILE				SAMPLES							
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT ELEVATION SCALE	WATER CONTENT W _t			OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
				NAT.	LIQ.	PL					
				DYNAMIC PENETRATION TEST BLOWS PER FOOT							
323.5 0.0		GROUND LEVEL	0								
320.6 2.9		SILTY TOPSOIL	1								
319.2 4.3		WEATHERED REDDISH BROWN SHALE	2				PC RECOVERY 100%	EXL RC		1	
		SEMI-WEATHERED REDDISH-BROWN SHALE	3				85%	EXL RC		2	
315.0 8.5			4				60%	EXL RC		3	
			5				40%	EXL RC		4	
			6				30%	EXL RC		5	
			7				20%	EXL RC		6	
			8				100%	EXL RC		7	
			9				100%	EXL RC		8	
			10				100%	EXL RC		9	
			11				85%	EXL RC		10	
			12				60%	EXL RC		11	
			13				50%	EXL RC		12	
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OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S 7033 BORING # APPEX-IV 25 DATUM GEODETIC CASING
 BORING DATE JAN. 29, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.W. CHECKED BY
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

SAMPLE CONDITION



SAMPLE TYPES

A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE
 F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 QC - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
392.5 0.0		GROUND LEVEL		395
389.5 3.3		SILTY TOPSOIL		390
382.2 10.3	SEE REPORT	SEMI-WEATHERED REDDISH-BROWN SHALE		385
		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		380
374.7 17.8		END OF HOLE		375
				370

WATER CONTENT W% ○ NAT. □ LW ▲ Pw
 DYNAMIC PENETRATION TEST BLOWS PER FOOT

OTHER TESTS

SAMPLES

CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT
	SO	1	4
	SO	2	40
	SO	3	66
	SO	4	>100
	DO	5	>100
	DO	6	>100
	DO	7	>100
	DO	8	>100

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OFFICE REPORT ON SOIL EXPLORATION

Appendix IV

CONTRACT S7033 BORING # 26 DATUM GEODETTIC CASING 7
 BORING DATE JAN. 27, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.W. CHECKED BY 7
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION



A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE

SAMPLE TYPES

F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
 M - MECHANICAL ANALYSIS
 U - UNCONFINED COMPRESSION
 Qc - TRIAXIAL CONSOLIDATED QUICK
 Q - TRIAXIAL QUICK
 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
394.2 0.0		GROUND LEVEL		395
391.3 2.9		SILTY TOPSOIL		
389.2 5.0		WEATHERED REDDISH-BROWN SHALE		390
		SEMI-WEATHERED REDDISH-BROWN SHALE		385
382.2 12.0		SOFT SOUND REDDISH-BROWN SHALE BEDROCK		380
376.5 17.7		END OF HOLE		375

SEE REPORT

WATER CONTENT W% O NAT. ☐ LW ☐ Pw ☐
 DYNAMIC PENETRATION TEST BLOWS PER FOOT

OTHER TESTS

SAMPLES

CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
	SO	1	5
	SO	2	47
	SO	3	93
	SO	4	>100
	DO	5	>100
	DO	6	>100
	DO	7	>100
	DO	8	>100

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OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S 7033 BORING # APPEX IV 27 DATUM GEODETIC CASING 5
 BORING D. 7.0 JAN. 28, 1960 REPORT DATE FEB. 18, 1960 COMPILED BY M.W. CHECKED BY 5/8
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

SAMPLE CONDITION



SAMPLE TYPES

A.S. - AUGER SAMPLE
 S.T. - SLOTTED TUBE
 W.S. - WASHED SAMPLE
 D.O. - DRIVE-OPEN
 D.F. - DRIVE-FOOT VALVE
 C.S. - CHUNK SAMPLE
 F.S. - FOIL SAMPLE
 S.O. - SLEEVE-OPEN
 S.F. - SLEEVE-FOOT VALVE
 T.O. - THIN WALLED OPEN
 R.C. - ROCK CORE

ABBREVIATIONS

V - IN-SITU VANE TEST
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 QC - TRIAXIAL CONSOLIDATED QUICK
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 S - TRIAXIAL SLOW
 γ - WET UNIT WEIGHT
 K - PERMEABILITY
 C - CONSOLIDATION
 WL - WATER LEVEL IN CASING
 WT - WATER TABLE IN SOIL

SOIL PROFILE				SAMPLES			
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT ELEVATION SCALE	WATER CONTENT W _p	OTHER TESTS	CONDITION	PENETRATION RESISTANCE BLOWS/FT.
395.0		GROUND LEVEL	395				
0.0							
393.0		SILTY TOPSOIL					
2.0							
389.0		WEATHERED REDDISH-BROWN SHALE	390				
6.0							
382.0		SEMI-WEATHERED REDDISH-BROWN SHALE	385				
13.0							
377.2		SOFT SOUND REDDISH-BROWN SHALE BEDROCK	380				
17.8		END OF HOLE	375				

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OFFICE REPORT ON SOIL EXPLORATION

APPENDIX IV

CONTRACT: 570 53 BORING #: 27 A DATUM: GEODETIC CASING: 34
 BORING DATE: FEB. 17, 1960 REPORT DATE: MARCH 20, 1960 COMPILED BY: MAM. CHECKED BY: /
 SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN LBS ENERGY)

SAMPLE CONDITION

☐ DISTURBED
☐ FAIR
☐ GOOD
☐ LOST

SAMPLE TYPES

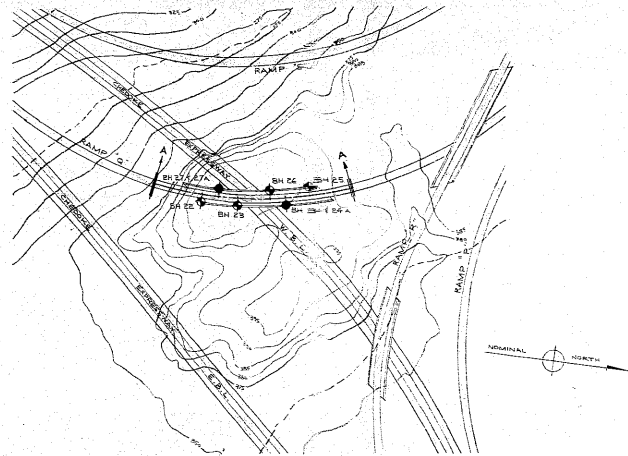
AS AUGER SAMPLE FS SOIL SAMPLE
 ST SLOTTED TUBE SO SLEEVE-OPEN
 WS WASHED SAMPLE SF SLEEVE FOOT VALVE
 DO DRIVE-OPEN TO THIN WALLED OPEN
 DF DRIVE-FOOT VALVE RC ROCK CORE
 CS CHUCK SAMPLE

ABBREVIATIONS

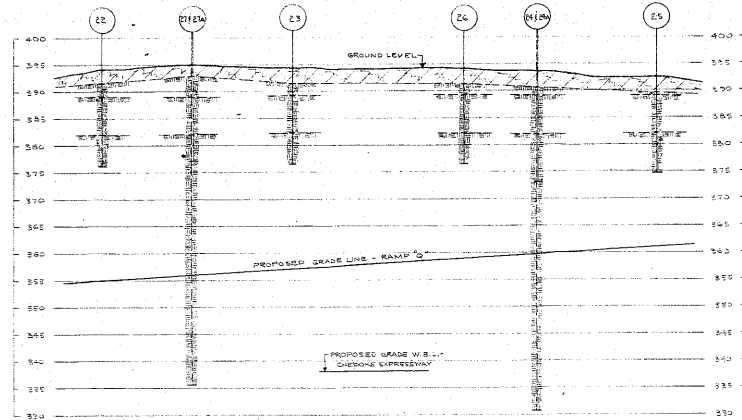
V IN-SITU VANE TEST
 M MECHANICAL ANALYSIS
 U UNCONFINED COMPRESSION
 QC TRIAXIAL CONSOLIDATED QUICK
 Q TRIAXIAL QUICK
 S TRIAXIAL SLOW
 WU WET UNIT WEIGHT
 K PERMEABILITY
 C CONSOLIDATION
 WL WATER LEVEL IN CASING
 WT WATER TABLE IN SOIL

SOIL PROFILE

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W:				OTHER TESTS	SAMPLES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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345.0 340.0 335.0 330.0		GROUND LEVEL SILTY TO COAR. WEATHERED REDDISH-BROWN SHALE SEMI-WEATHERED REDDISH-BROWN SHALE SOFT SOONER REDDISH-BROWN SHALE BELOW.		345 340 335 330 325 320 315 310 305 300 295 290 285 280 275 270 265 260 255 250 245 240 235 230 225 220 215 210 205 200 195 190 185 180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								



PLAN
SCALE 1"=100'-0"



SECTION A-A
HORIZ. SCALE 1"=20'-0"
VERT. SCALE 1"=10'-0"

REFERENCE: C. C. PARKER & PARSONS, BRIDGEWORK LTD.
DRAWING OF CHEDOK EXPRESSWAY TEST BOREHOLE LOCATIONS
DATED: JAN. 9, 1950

LEGEND

- BOREHOLE WITH INTERMITTENT SAMPLING IN PLAN
- BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING IN PLAN
- BOREHOLE WITH INTERMITTENT SAMPLING IN ELEVATION
- BOREHOLE WITH INTERMITTENT SAMPLING AND ADJACENT CONTINUOUS CORE SAMPLING IN ELEVATION
- END OF HOLE INTERMITTENT SAMPLING
- END OF HOLE CONTINUOUS CORE SAMPLING

STRATIGRAPHY

- SILTY TOPSOIL
- WEATHERED REDDISH-BROWN SHALE
- SEMI-WEATHERED REDDISH-BROWN SHALE
- SOFT SOUND REDDISH-BROWN SHALE BEDROCK

DEPARTMENT OF HIGHWAYS, ONTARIO
TORONTO
PROPOSED CHEDOK EXPRESSWAY
RAMP Q OVER CHEDOK W.B.L.
HAMILTON
BORING PLAN AND SOIL STRATIGRAPHY

GEOCON LTD
DATE APRIL 8, 1950 SCALE AS SHOWN
MADE BY M.W. CHKD BY S.P. APPD BY J.P.
No. S 7033-4