60-F-20

W.P. 104-59

Hwy. 401
McConnell Ave.
Lots 6 & 7, Con. III

BA 1015

ONTARIO
DEPARTMENT OF HIGHWAYS

Memo to Mr. A. Toye, *Date* March 11, 1960.

Bridge Engineer. *Subject*

From Materials & Research Section.

Attention: Mr. S. McCombie.

Re: Preliminary Subsoil Investigation at -
Hwy. 401 and Road crossing between
Lots 6 & 7 (Con. III), Twp. of Cornwall,
District 9.
W.P. 104-59 (Profile 401-J-56, Sta. 49+67)
W.J. 60-F-20.

A preliminary subsoil investigation was carried out at the above mentioned site by means of a power auger.

The investigation revealed the following stratification at the site:-

0 - 1.5'	-- Topsoil.
1.5'- 7'	-- Brown, desiccated, pebbly, sandy clay till.
7'- 8.5'	-- Grey, pebbly, silty clay till.

Only in one hole (South-west corner) could this depth be attained. In the other three corners, boring stopped at 3'- 5' depth. It is believed the refusal is either due to large boulders or bedrock.

A safe bearing pressure of 3 t.s.f. to support spread footings, is recommended. Any soft or loose pockets of material encountered below the proposed footings should be removed and replaced with well-compacted granular material.

The nature of the boulders or bedrock can be proven by operating a coredrill at the site. This will be done at your request.

VK/MdeF

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
D. G. Ramsay
H. J. Ford
L. E. Walker
J. E. Gruspier
Foundations Office.
Gen. Files.

L. G. Soderman,
PRINCIPAL SOILS & FOUNDATIONS ENGR.
per:

(V. Korlu,
Project Foundation Engr.)

Mr. A. Toye, March 11, 1960.

Bridge Engineer.

Materials & Research Section.

Attention: Mr. S. McCombie.

Re: Preliminary Subsoil Investigation at -
Hwy. 401 and Road crossing between
Lots 6 & 7 (Con. III), Twp. of Cornwall,
District 9.
W.P. 104-59 (Profile 401-J-56, Sta. 49+67)
W.J. 60-F-20.

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VK/MdeF

cc: Messrs. A. M. Toye (2)
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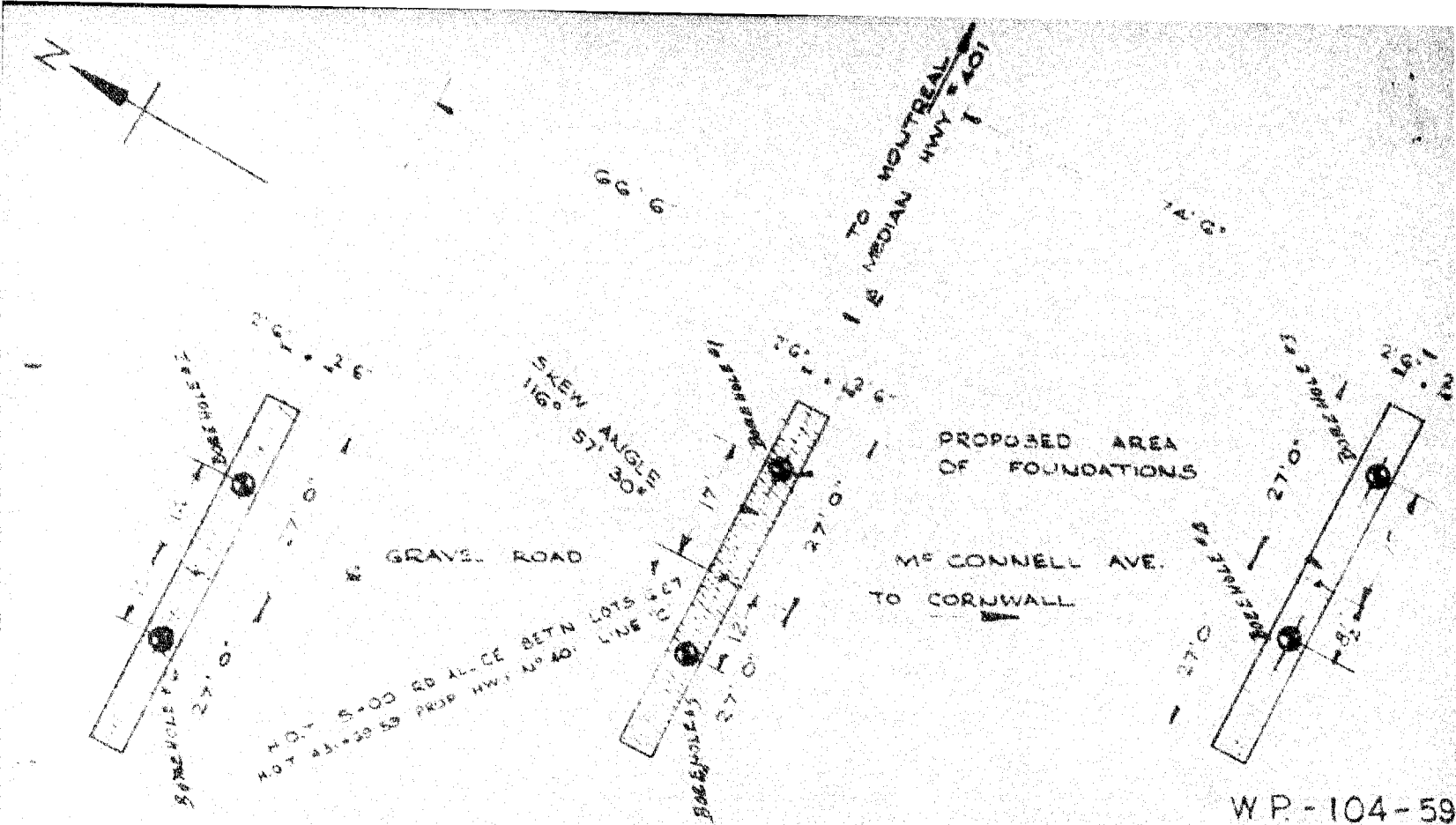
Foundations Office.
Gen. Files.

L. G. Soderman,
PRINCIPAL SOILS & FOUNDATIONS ENGR.
per:

(V. Korlu,
Project Foundation Engr.)



W.P. - 104 - 59

DEPARTMENT OF HIGHWAYS - ONTARIO
BRIDGE OFFICE - TORONTO

HWY * 401 OVERPASS AT Mc CONNELL AVE.

SCALE - 1" = 20' ✓ DATE - FEBRUARY 6

PROCTOR & REDFERN
CONSULTING ENGINEERS TORONTO

DRAWN R.S.M.
TRACED
CHECKED A.P.

DRG Nº E 59257-41

BA 1015A

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section.

June 8, 1960.
SOIL INVESTIGATION -- by
Proctor & Redfern.

Attention: Mr. S. McCombie.

Re: Proposed Underpass - Hwy. #401
and McConnel Ave., District #9,
W.P. 104-59.

At the request of the Foundation Section, Proctor & Redfern carried out borings at the above site. The results of these borings and the bore hole locations accompany this memo.

A review of the field information, results in the following recommendations:-

1. The subsoil material - essentially a dense, sandy till - will provide excellent support for spread footings. These spread footings should be designed for a net bearing pressure of 3 1/2 tons per square foot, and be founded at or below elevation 198.0'.

2. Differential settlements associated with this bearing pressure, will be in the order of 1 inch, or less.

3. During the time of the foundation investigation, the water table was found to be approx. 2 feet below ground surface. It is possible that during dry periods of the year, this water table may exist at a lower elevation. If the water table exists near ground surface, some problems associated with dewatering of excavations may exist. These problems can be overcome by the use of steel sheet piles driven approx. 5 feet below the bottom of the pile cap. Difficult driving conditions for steel sheet piles will exist, below elevation 188.0'.

cont'd. /2 ...

Recommendations: (cont'd.) ...

4. No problems associated with approach fill stability, exist at this site.

If we can be of further assistance in connection with the foundations of this structure, please contact the Foundation Section.

L. G. Soderman,
PRINCIPAL FOUNDATIONS ENGR.

Per:

(K. Peaker,
FOUNDATIONS FIELD SUPERVISING ENGR.)

KP/MdeP
Attach.

cc: Messrs. A. M. Ioye (2)
H. A. Tregaskes
D. C. Ramsay
J. Ford
L. E. Walker
J. B. Gruspier

Foundations Office
Gen. Files.

PROCTOR & REDFERN
CIVIL AND CONSULTING ENGINEERS
TORONTO 12, CANADA

May 24th, 1960.

Mr. L. G. Soderman,
Principal Soils & Foundation Engineer,
Materials and Research Section,
Department of Highways of Ontario,
East Block, Parliament Buildings,
Toronto 2, Ontario.

Re: Soil Investigation for the Underpass at the Intersection of Hwy. #401 and McConnel Ave., Cornwall Township, Ontario.
W.P. 104-59
Our Project: No. E.O. 59257.

Dear Sir:

In accordance with instructions received from the soils branch of the Department of Highways of Ontario, a soil investigation was carried out at the site of underpass structure, at Highway #401 and McConnel Avenue, between the 4th of April and the 14th of April, 1960. The purpose of this investigation was to determine the nature of the sub-soil, on which the structure is to be built.

Six boreholes were drilled on the site, two at each pier. Six cone penetration cones were driven to refusal, adjacent to the boreholes. The locations of the boreholes are shown on the enclosed site plan and a detailed description of the site shown on the Department of Highways Plan #DM 4839-2 for W.P. 104-59.

FIELD WORK

A standard Long Year Junior Diamond Drill rig was used for soil sampling, equipped with a 2 inch outside diameter splitspoon sampler and thin walled Shelby tubes, to obtain disturbed and undisturbed samples, and a 60-degree point cone for penetration resistance tests. The driving energy for both splitspoon sampling and cone penetration tests was provided by a 140 pound hammer falling 30 inches.

Splitspoon samples were taken for test purposes. No thin wall Shelby samples were taken at this site as the soil was so stoney and bouldery that representative samples could not be obtained. Results are plotted on the attached Engineering Data Sheets.

.... 2.

Mr. L. G. Soderman.

GEOLOGY OF THE SITE

The site is situated in an area generally known as the St.Lawrence-Ottawa lowland, which was once partly covered by the Champlain Sea, after the retreat of the last glacier, which formed the present clay plains. At the site investigated, there is no evidence of sedimentary silts and clays left by the Champlain Sea. All of the soils encountered were glacial tills, which range from bouldery to stoney fine sandy loam tills.

SUB-SOIL CONDITIONS

The sub-soil on this site is made up of fine sandy loam till with varying amounts of stones and boulders. The top 6 to 8 feet of material is brownish in colour; below this layer the soil is grayish in colour.

At elevation 189.0 there is an extremely hard bouldery layer of soil. It is recommended that the footing of the structure be placed at this level. The soil above this elevation is unconsolidated and unsatisfactory for foundation material.

After the casing was left in the boreholes for 24 hours, the water table was found to be 20 inches below ground level. It should be kept in mind that these borings were carried out when the snow was melting and the ground water table was at its maximum height.

BEARING CAPACITY

We have not made an attempt to analyse the bearing of the material at the various borehole locations, as we feel that you have a much more competent staff to do this work than we have.

Yours very truly,

PROCTOR & REDFERN,

Gordon E. Smith

Gordon E. Smith, P.Eng.

GES/vas

PROCTOR & REDFERN

CONSULTING ENGINEERS

BOREHOLE LOG SHEET FOR **Borehole #1**

PROJECT W.P.104-58 (E.O. 59257)

LOCATION Hwy.401 McConnell Overpass

HOLE LOCATION Centre Pier 17' East of Centre Line of McConnell Ave.

HOLE ELEVATION AND DATUM 194.0 Geodetic

FIELD SUPERVISOR C.E. Smith

DRILLER M.Gibbons CHECKED DATE April 7,1960

LEGEND

SHEAR STRENGTH (S)

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY (S)

PENETRATION RESISTANCE

2" SPLIT TUBE

2" DIA. CONE

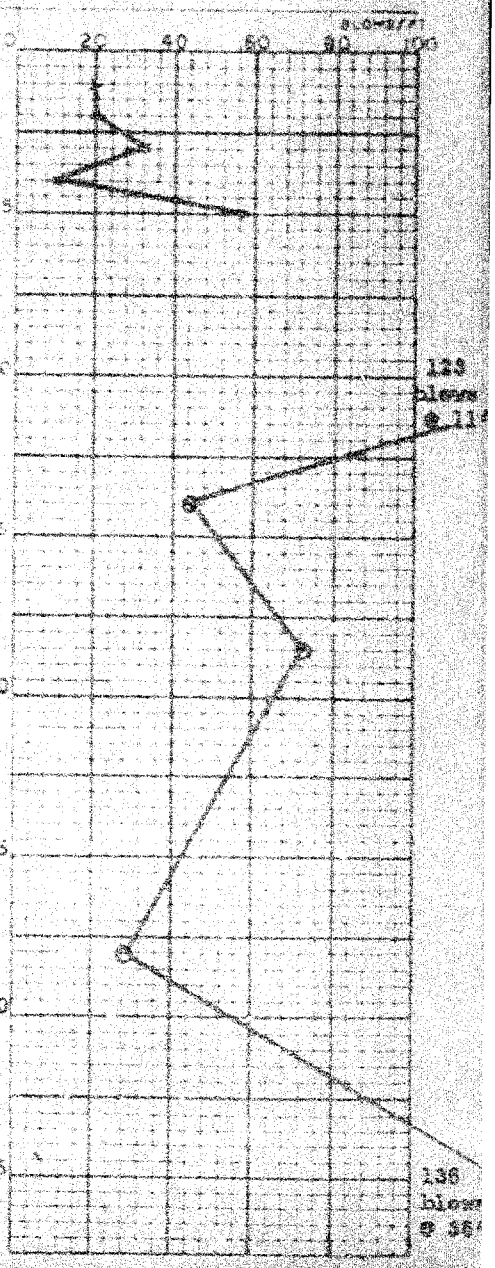
CASING

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	GROUND LEVEL	194.0	
	Frozen		
	Standard Cone Penetration Test from 0' to 5' Refusal @ 5'	189.0	5
	Very dense Fine Sa Le Till	184.0	10
	Very dense Fine Sa Le Till	179.0	15
	Fine Sa Le Till	174.0	20
		169.0	25
	Very Bouldery Fine Sa Le Till		
	Small flow of artesian wat (?84')		
		164.0	30
	Note: Sa. Le. Till for the entire depth investigated		
	Bore Hole stopped at 36½'	159.0	35

STRENGTH AND PENETRATION RESISTANCE

BLOWS/FT.

0 20 40 60 80 100



PROCTOR & REDFERN

CONSULTING ENGINEERS

Borehole #2

PROJECT WP 104-59 (E.O. 59257)

LOCATION Hwy. 401 McConnell Overpass

HOLE LOCATION N.Pier, 14' East of Centre Line McConnell Ave.

HOLE ELEVATION AND DATUM 193.5 Geodetic

FIELD SUPERVISOR G.E. Smith

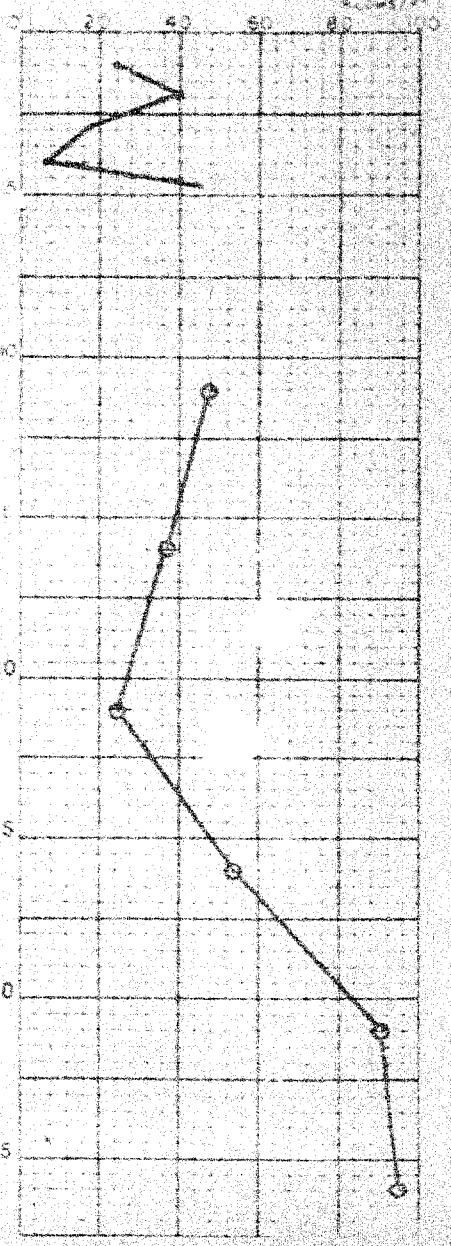
DRILLER M.Gibbons CHECKED April 8, 1960

LEGEND

DESCRIPTION	ELEV. FEET	DEPTH FEET
	193.5	0
Standard cone penetration test from 0' to 4'-9" Refusal @ 4'-9"		
R.F.P. - Boulder (4'-9")	188.5	5
Fine Sa. Lo. Till	183.5	10
Fine Sa. Lo. Till	178.5	15
Small Flow of Artesian Water @ (20')	173.5	20
Fine S. Lo. Till		
Numerous Boulders (24-25')	168.5	25
Dense Fine Sa. Lo. Till		
	163.5	30
Dense Fine Sa. Lo. Till		
	158.5	35

At 40' depth, 3" penetration for 100 blows. Material very dense and stoney. Large boulders 40-43' depth. Borehole stopped at 43'.

STRENGTH AND PENETRATION RESISTANCE



PROCTOR & REDFERN
CONSULTING ENGINEERS

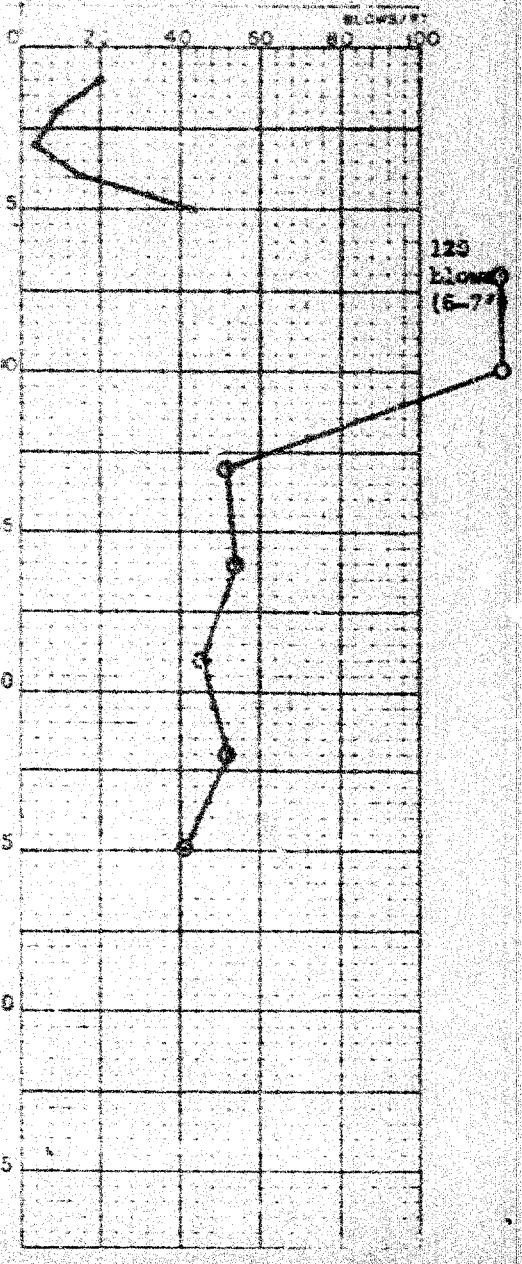
ENGINEERING DATA SHEET FOR **Borehole #3**

PROJECT WP 104-59 (E.O. 59297)
LOCATION Hwy.401, McConnell Overpass
HOLE LOCATION South Pier, 17' East of centre line of Mc Connell Ave.
HOLE ELEVATION AND DATUM 194.5 Geodetic
FIELD SUPERVISOR G.E. Smith
DRILLER M. Gibbons CHECKED DATE April 12,1960

LEGEND
SHEAR STRENGTH (S)
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY (S)
PENETRATION RESISTANCE
2" SPLIT TUBE
2" DIA. CONE
CASING

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	GROUND SURFACE	194.5	0
	Standard cone penetration test from 0' to 5'-6" Refusal @ 5'-6"		
	Boulders (5'-6")	189.5	5
	Dense Fine Sa. Lo. Till		
	Dense Fine Sa. Lo. Till	184.5	10
	Fine Sa. Lo. Till		
	Fine Sa. Lo. Till	179.5	15
	Fine Sa. Lo. Till	174.5	20
	Fine Sa. Lo. Till	169.5	25
	Bore Hole stopped at 25'-6"	164.5	30
			35

STRENGTH AND PENETRATION RESISTANCE



PROCTOR & REDFERN.

CONSULTING ENGINEERS

ENGINEERING DATA SHEET FOR **Borehole #4**

PROJECT **W.P. 106-59 (E.O.59257)**

LOCATION **Hwy.401, McConnell Ave. Overpass**

HOLE LOCATION **South Pier, 8'-5 East of McConnell Ave.**

HOLE ELEVATION AND DATUM **185.0 Geodetic**

FIELD SUPERVISOR **G.E. Smith**

DRILLER **M.Gibbons** CHECKED DATE **April 13/60**

LEGEND

SHEAR STRENGTH (C)

UNCONFINED COMPRESSIVE ⊕

VANE TEST AND SENSITIVITY (S) ⊕

PENETRATION RESISTANCE

2" SPLIT TUBE -⊖-⊖-

2" DIA. CONE

CASING

SYMBOL	DESCRIPTION	ELEV FEET	DEPTH FEET
	GROUND LEVEL	185.0	0
	Standard Cone Penetration Test from 1'-8' Hard Layer @ 6'-0"		
		180.0	5
	Fine Sa.Le. Till		
	Wet & Soft Fine Sa.Le. Till	175.0	10
	Wet & Soft Fine Sa.Le. Till		
		170.0	15
	Fine Sa.Le. Till		
	Bore Hole Stopped at 16½ ft.	165.0	20
		160.0	25
		155.0	30
			35

STRENGTH AND PENETRATION RESISTANCE

BLOWS/FT. 0 20 40 60 80 100

138 blows (6'-8')

PROCTOR & REDFERN
CONSULTING ENGINEERS

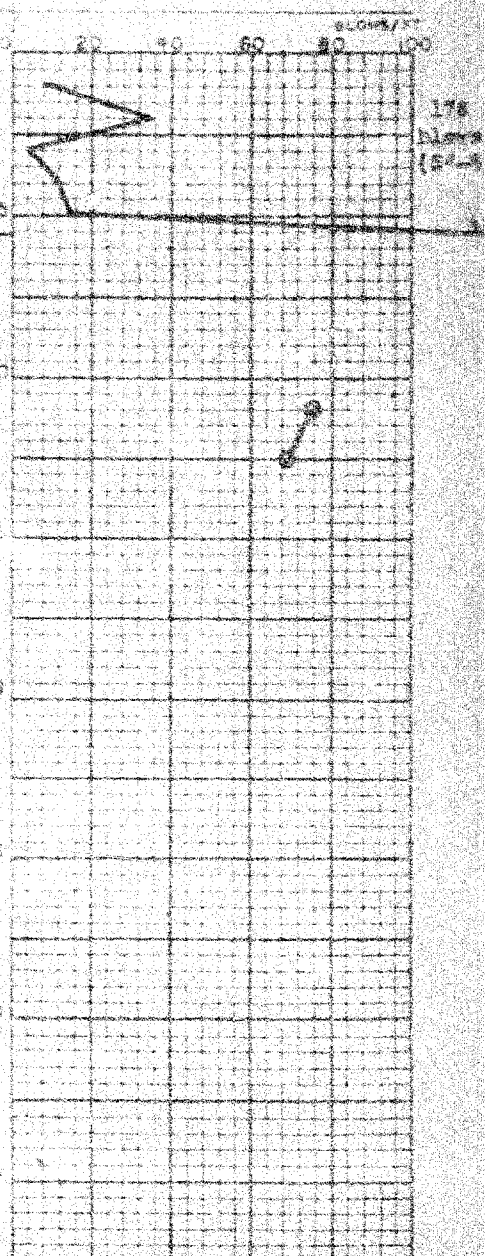
ENGINEERING DATA SHEET FOR **Borehole #5**

PROJECT W.P. 104-58 (E.C. 59257)
LOCATION Hwy. 401, McConnell Ave. Overpass
HOLE LOCATION Centre Pier 12' West of McConnell Ave.
HOLE ELEVATION AND DATUM 194.0 Geodetic
FIELD SUPERVISOR G.E. Smith
DRILLER M. Gibbons CHECKED DATE April 13/60

LEGEND
SHEAR STRENGTH
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY (S)
PENETRATION RESISTANCE
2" SPLIT TUBE
2" OD CONE
CASING

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	GROUND LEVEL	194.0	0
	Standard Cone Penetration Test from 1'-6' Proussi at 6'		
		189.0	5
	Fine Sa. Lo. Till	184.0	10
	Fine Sa. Lo. Till		
	Bore Hole Stopped at 15 feet	179.0	15
		174.0	20
			25
			30
			35

STRENGTH AND PENETRATION RESISTANCE



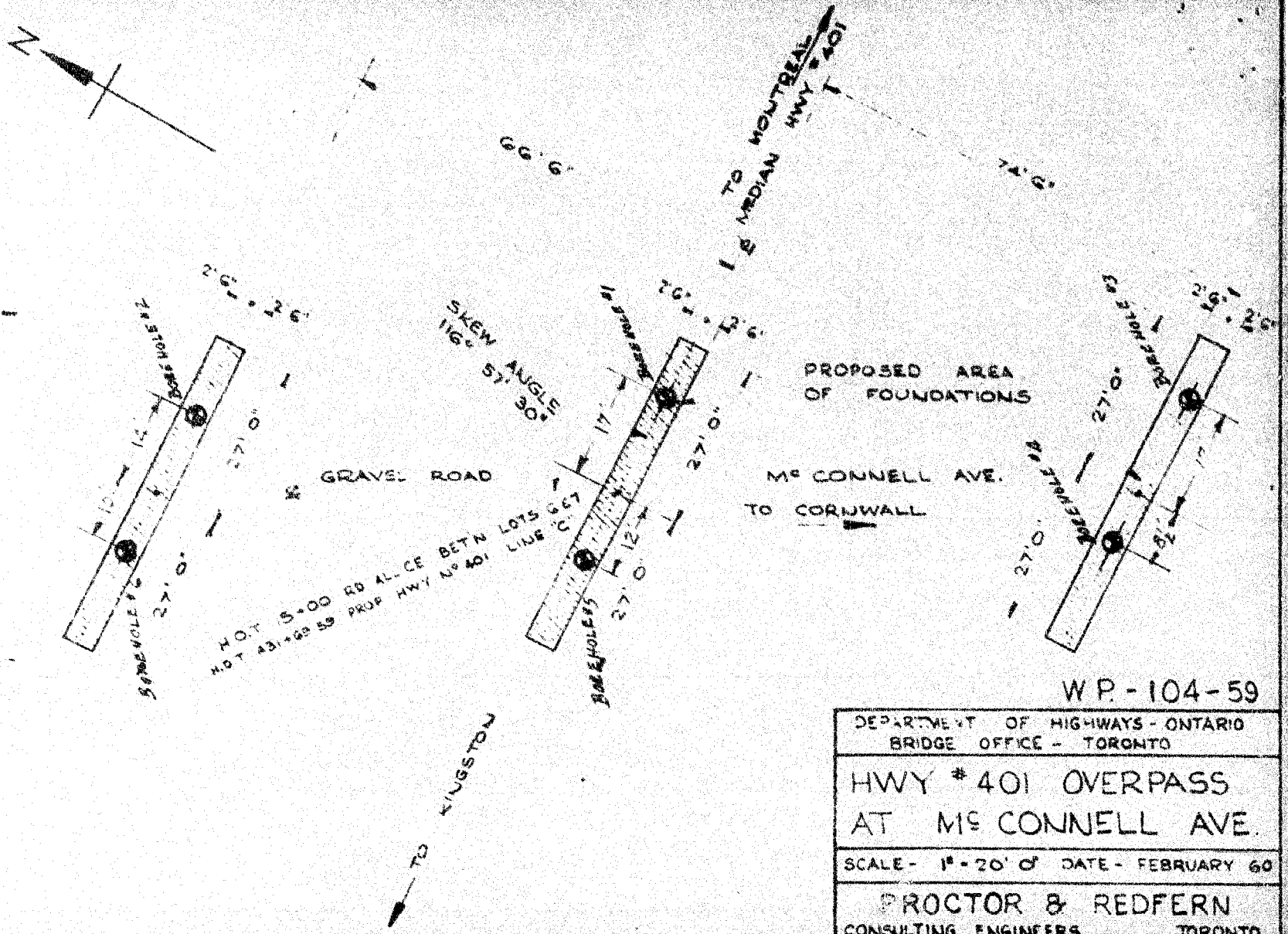
PROCTOR & REDFERN
CONSULTING ENGINEERS

ENGINEERING DATA SHEET FOR **Borehole #6**

PROJECT W.P. 184-59
LOCATION Hwy. 401, MacConnell Overpass
HOLE LOCATION North Pier 10' West of Centre Line MacConnell Ave.
HOLE ELEVATION AND DATUM
FIELD SUPERVISOR G. E. Smith
DRILLER M.Gibbons CHECKED DATE April 14, 1960

LEGEND
SHEAR STRENGTH (C)
UNCONFINED COMPRESSION ●
VANE TEST AND SENSITIVITY (S) ×
PENETRATION RESISTANCE
1" SPLIT TUBE
2" DIA. CONE
CASING

SYMBOL	DESCRIPTION	ELEV FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE
	GROUND LEVEL	194.0	0	BLOWS/FT. 0 20 40 60 80 100
	Standard Cone Penetration from 1' to 8'			
		189.9	5	147 blows (7")
	Fine Sa. Le. Till	184.0	10	
	Fine Sa. Le. Till			
	Bore Hole stopped at 13 feet	179.0	15	
		174.0	20	
			25	
			30	
			35	



W.P. - 104 - 59

DEPARTMENT OF HIGHWAYS - ONTARIO
BRIDGE OFFICE - TORONTO

HWY # 401 OVERPASS AT Mc CONNELL AVE.

SCALE - 1" = 20' 0" DATE - FEBRUARY 60

PROCTOR & REDFERN
CONSULTING ENGINEERS TORONTO

DRAWN R.E.M.
TRACED
DRG No E 59257-41

BA 1915A

ONTARIO
DEPARTMENT OF HIGHWAYS

Memo to Mr. A. M. Toye, Bridge Engineer. *Date* June 8, 1960.

From Materials & Research Section. *Subject* SOIL INVESTIGATION -- by Proctor & Redfern.

Attention: Mr. S. McCombie.

Re: Proposed Underpass - Hwy. #401 and McConnel Ave., District #9, W.P. 104-59.

At the request of the Foundation Section, Proctor & Redfern carried out borings at the above site. The results of these borings and the bore hole locations accompany this memo.

A review of the field information, results in the following recommendations:-

1. The subsoil material - essentially a dense, sandy till - will provide excellent support for spread footings. These spread footings should be designed for a net bearing pressure of 3 1/2 tons per square foot, and be founded at or below elevation 198.0'.

2. Differential settlements associated with this bearing pressure, will be in the order of 1 inch, or less.

3. During the time of the foundation investigation, the water table was found to be approx. 2 feet below ground surface. It is possible that during dry periods of the year, this water table may exist at a lower elevation. If the water table exists near ground surface, some problems associated with dewatering of excavations may exist. These problems can be overcome by the use of steel sheet piles driven approx. 5 feet below the bottom of the pile cap. Difficult driving conditions for steel sheet piles will exist, below elevation 188.0'.

cont'd. /2 ...

Recommendations: (cont'd.) ...

4. No problems associated with approach fill stability, exist at this site.

If we can be of further assistance in connection with the foundations of this structure, please contact the Foundation Section.

L. G. Soderman,
PRINCIPAL FOUNDATIONS ENGR.

Per:

K Peaker

(K. Peaker,
FOUNDATIONS FIELD SUPERVISING ENGR.)

KP/MdeF
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
D. G. Ramsay
J. Ford
L. B. Walker
J. B. Gruspier

Foundations Office
Gen. Files.

EDWARD M. PROCTOR
W. BLAINE REDFERN
G. E. M. PROCTOR
DONALD B. REDFERN
R. G. TREGGETT

G. U. PROCTOR
N. A. COUSE
C. D. DUTTON
F. A. HERTZBERG
G. J. MCMULKIN
A. E. READ
W. T. ROBINSON

J. R. BOUSFIELD
(PLANNING DIRECTOR)

PROCTOR & REDFERN

FOUNDED BY E. A. JAMES, O.B.E.

CIVIL AND CONSULTING ENGINEERS

75 EGLINTON AVENUE EAST

TORONTO 12, CANADA

TELEPHONE HU. 7-1171

BRANCH OFFICES

HAMILTON

KITCHENER

SAULT STE. MARIE

ST. JOHN'S, NFLD.

May 26th, 1960.

Mr. L. G. Soderman,
Principal Soils & Foundation Engineer,
Materials and Research Section,
Department of Highways of Ontario,
East Block, Parliament Buildings,
Toronto 2, Ontario.

Re: Soil Investigation for the Underpass at the Intersection of Hwy. #401 and McConnel Ave., Cormwall Township, Ontario.
W.P. 104-59
Our Project: No. E.O. 58257.

Dear Sir:

In accordance with instructions received from the soils branch of the Department of Highways of Ontario, a soil investigation was carried out at the site of underpass structure, at Highway #401 and McConnel Avenue, between the 4th of April and the 14th of April, 1960. The purpose of this investigation was to determine the nature of the sub-soil, on which the structure is to be built.

Six boreholes were drilled on the site, two at each pier. Six cone penetration cones were driven to refusal, adjacent to the boreholes. The locations of the boreholes are shown on the enclosed site plan and a detailed description of the site shown on the Department of Highways Plan #DM 4839-2 for W.P. 104-59.

FIELD WORK

A standard Long Year Junior Diamond Drill rig was used for soil sampling, equipped with a 2 inch outside diameter splitspoon sampler and thin walled Shelby tubes, to obtain disturbed and undisturbed samples, and a 60-degree point cone for penetration resistance tests. The driving energy for both splitspoon sampling and cone penetration tests was provided by a 140 pound hammer falling 30 inches.

Splitspoon samples were taken for test purposes. No thin wall Shelby samples were taken at this site as the soil was so stoney and bouldery that representative samples could not be obtained. Results are plotted on the attached Engineering Data Sheets.

.... 2.

Mr. L. S. Soderman.

GEOLOGY OF THE SITE

The site is situated in an area generally known as the St.Lawrence-Ottawa lowland, which was once partly covered by the Champlain Sea, after the retreat of the last glacier, which formed the present clay plains. At the site investigated, there is no evidence of sedimentary silts and clays left by the Champlain Sea. All of the soils encountered were glacial tills, which range from bouldery to stoney fine sandy loam tills.

SUB-SOIL CONDITIONS

The sub-soil on this site is made up of fine sandy loam till with varying amounts of stones and boulders. The top 6 to 8 feet of material is brownish in colour; below this layer the soil is grayish in colour.

At elevation 100.0 there is an extremely hard bouldery layer of soil. It is recommended that the footing of the structure be placed at this level. The soil above this elevation is unconsolidated and unsatisfactory for foundation material.

After the casing was left in the boreholes for 24 hours, the water table was found to be 20 inches below ground level. It should be kept in mind that these borings were carried out when the snow was melting and the ground water table was at its maximum height.

BEARING CAPACITY

We have not made an attempt to analyse the bearing of the material at the various borehole locations, as we feel [illegible] a much more competent staff to do this work than we have.

Yours very truly,

PROCTOR & REDFERN,

Gordon E. Smith

Gordon E. Smith, P.Eng.

GES/vms

PROCTOR & REDFERN,
CONSULTING ENGINEERS

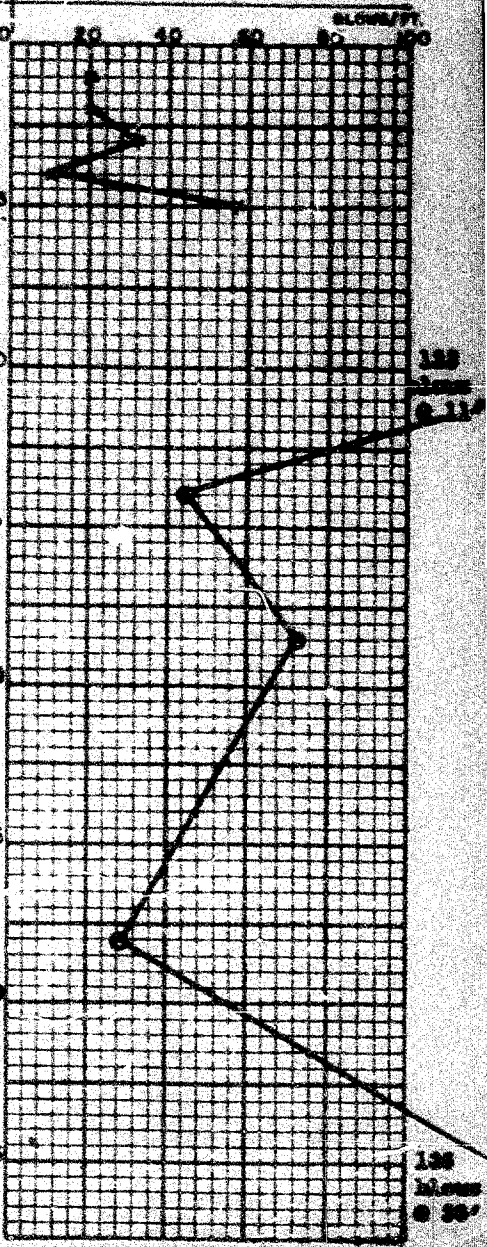
ENGINEERING DATA SHEET FOR **Borehole #1**

PROJECT W.P.194-59 (E.O. 50257)
LOCATION Hwy.401 McConnell Overpass
HOLE LOCATION Centre Pier 17' East of Centre Line of McConnell
HOLE ELEVATION AND DATUM 184.8 Geodetic
FIELD SUPERVISOR G.E. Smith
DRILLER M.Gibbons CHECKED DATE April 7,1960

LEGEND
SHEAR STRENGTH (C)
UNCONFINED COMPRESSION TEST AND SENSITIVITY (S)
PENETRATION RESISTANCE
2" SPLIT TUBE
2" DIA. CORE
CASING

SYMBOL	DESCRIPTION	ELEV FEET	DEPTH FEET
	GROUND LEVEL	184.8	0'
	Frozen		
	Standard Cone Penetration Test from 0' to 5' Refusal @ 5'	180.0	5
		184.0	10
	Very dense Fine Sa Le Till		
	Very dense Fine Sa Le Till	179.8	15
	Fine Sa Le Till	174.8	20
		169.8	25
	Very bouldery Fine Sa Le Till		
	Small flow of artesian water (20')		
		164.3	30
	Note: Sa. Le. Till for the entire depth investigated		
	Bore Hole stopped at 30½'	159.0	35

STRENGTH AND PENETRATION RESISTANCE



PROCTOR & REDFERN

CONSULTING ENGINEERS

Borehole #2

PROJECT WP 104-59 (E.O. 58257)

LOCATION Hwy. 401 McConnell Overpass

HOLE LOCATION N.Pier, 14' East of Centre Line McConnell Ave.

HOLE ELEVATION AND DATUM 193.5 Geodetic

FIELD SUPERVISOR G.E. Smith

DRILLER M.Gibbons DATE April 6, 1960

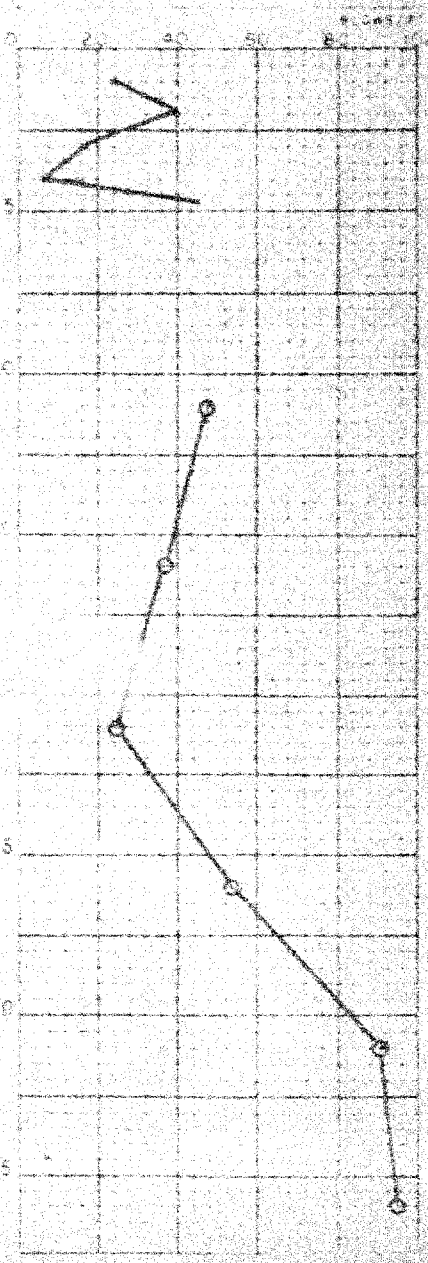
SYMBOL	DESCRIPTION	ELEV. (FEET)	DEPTH (FEET)
GROUND LEVEL		193.5	0
	Standard cone penetration test from 0' to 4'-9" Refusal @ 4'-9"		
	R.F.P. - Boulder (4'-9")	188.5	5
	Fine Sa. Lo. Till	183.5	
	Fine Sa. Lo. Till	178.5	
	Small Flow of Artesian Water @ (20')	173.	
	Fine S. Lo. Till		
	Numerous Boulders (24-25')	168.5	25
	Dense Fine Sa. Lo. Till		
		163.5	30
	Dense Fine Sa. Lo. Till		
		158.5	35

At 40' depth, 3" penetration for 100 blows. Material very dense and stoney. Large boulders 40-43' depth. Borehole stopped at 43'.

STANDARD PENETRATION RESISTANCE

BLOWS/FT.

0 20 40 60 80



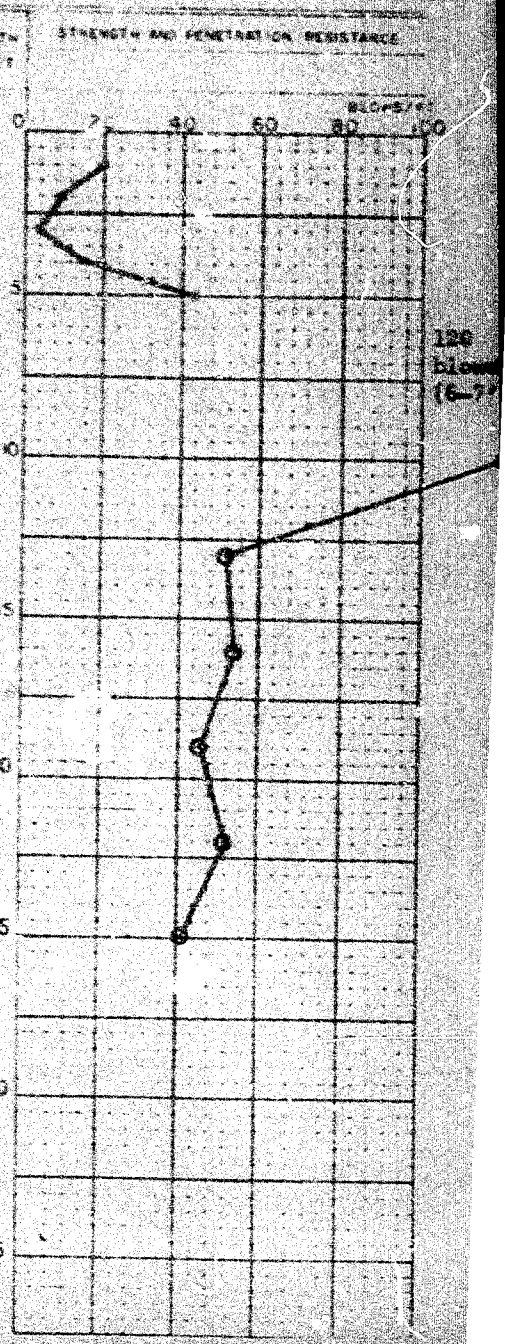
PROCTOR & REDFERN
CONSULTING ENGINEERS

ENGINEERING DATA SHEET NO. **Borehole #3**

PROJECT WP 104-59 (E.O. 59257)
LOCATION Hwy.401, McConnell Overpass
HOLE LOCATION South Pier, 17' East of centre line of Mc Connell Ave.
HOLE ELEVATION AND DATUM 194.5 Geodetic
FIELD SUPERVISOR G.E. Smith
DRILLER M. Gibbons CHECKED DATE April 12,1960

LEGEND
SHEAR STRENGTH
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY
PENETRATION RESISTANCE
2" SPLIT TUBE
2 3/8" CONE
CASING

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	GROUND LEVEL	194.5	
	Standard cone penetration test from 0' to 5'-6" Refusal @ 5'-6"		
	Boulders (5'-6")	189.5	
	Dense Fine Sa. Lo. Till		
	Dense Fine Sa. Lo. Till	184.5	
	Fine Sa. Lo. Till		
	Fine Sa. Lo. Till	179.5	
	Fine Sa. Lo. Till	174.5	
	Fine Sa. Lo. Till	169.5	
	Bore Hole stopped at 25'-6"	164.5	



PROCTOR & REDFERN.

CONSULTING ENGINEERS

ENGINEERING DATA SHEET FOR Borehole #4

PROJECT W.P. 196-59 (E.O.58237)

LOCATION Hwy.401, McConnell Ave. Overpass

HOLE LOCATION South Pier, 8'-5 West of McConnell Ave.

HOLE ELEVATION AND DATUM 195.0 Geodetic

FIELD SUPERVISOR G.E. Smith

DRILLER M.Gibbons CHECKED DATE April 13/60

LEGEND

SHEAR STRENGTH (C)

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY (S)

PENETRATION RESISTANCE

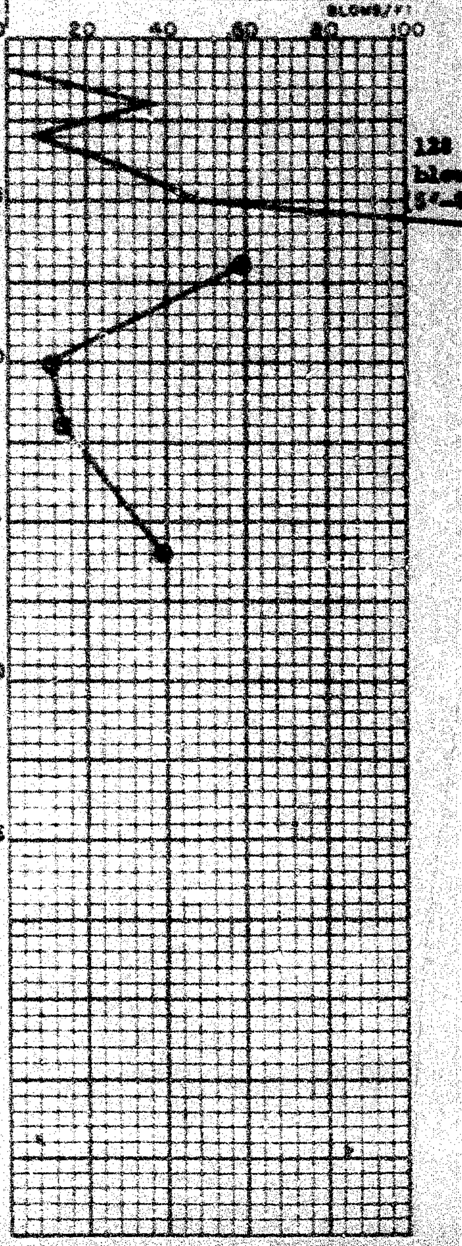
2" SPLIT TUBE

2" DIA. CONE

CASING

SYMBOL	DESCRIPTION	ELEV FEET	DEPTH FEET
	GROUND LEVEL	195.0	0
	Standard Cone Penevtration Test ...m 1'-8" ... 1 Layer @ 6'-3"		
		190.0	5
	Fine Sa.Lo. Till		
	Wet & Soft Fine Sa.Lo. Till Wet & Soft Fine Sa.Lo. Till	185.0	10
	Fine Sa.Lo. Till	180.0	15
	Bore Hole Stopped at 18½ ft.	175.0	20
		170.0	25
		165.0	30
			35

STRENGTH AND PENETRATION RESISTANCE



PROCTOR & REDFERN

CONSULTING ENGINEERS

[illegible] DATA SHEET No. Borehole #5

PROJECT W.P. 104-59 (E.O. 59257)

LOCATION Hwy. 401, McConnell Ave. Overpass

HOLE LOCATION Centre Pier 12' West of McConnell Ave.

HOLE ELEVATION AND DATUM 194.0 Geodetic

FIELD SUPERVISOR G.R. Smith

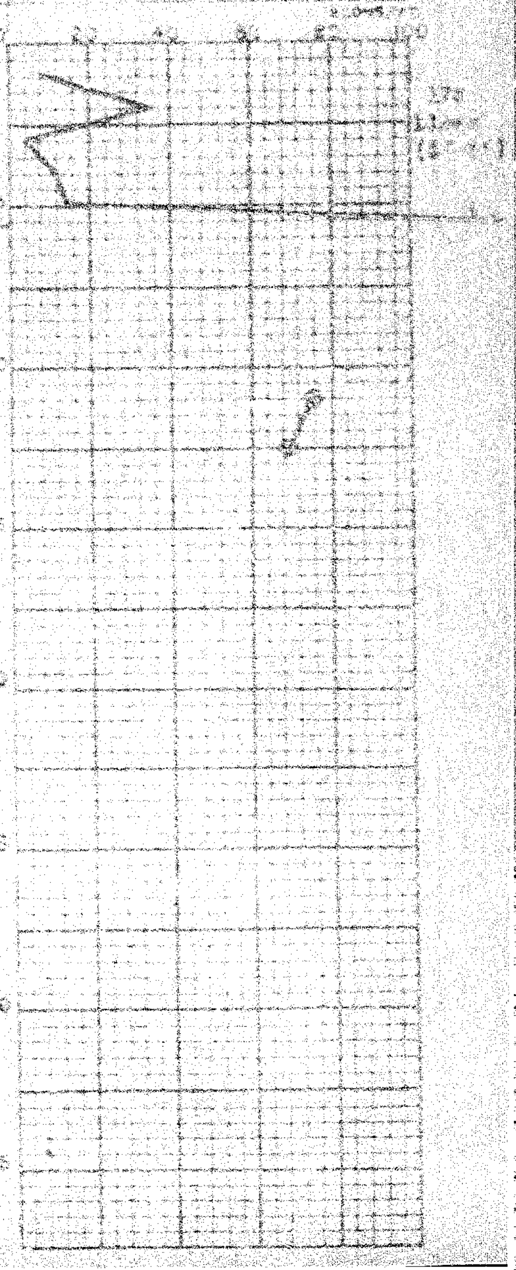
DRAWN BY M. Gibbons CHECKED DATE April 13/60

LEGEND

[illegible]

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	GROUND LEVEL	194.0	0
	Standard Cone Penetration Test from 1'-8' Refusal at 8'		
		189.0	5
	Fine Sa. Le. Till	184.0	10
	Fine Sa. Le. Till		
		179.0	15
	Bore Hole Stopped at 18 feet		
		174.0	20
			25
			30
			35

STRENGTH AND PENETRATION RESISTANCE



PROCTOR & REDFERN
CONSULTING ENGINEERS

ENGINEERING DATA SHEET FOR **Borehole #6**

PROJECT W.P. 194-59
LOCATION Hwy. 401, McConnell Overpass
HOLE LOCATION North Pier 10' West of Centre Line McConnell Ave.
HOLE ELEVATION AND DATUM
FIELD SUPERVISOR G. E. Smith
DRILLER M.Gibbons CHECKED DATE April 14, 1960

LEGEND
SHEAR STRENGTH (C)
UNCONFINED COMPRESSION ⊗
VANE TEST AND SENSITIVITY (S) #
PENETRATION RESISTANCE
2" SPLIT TUBE
2" DIA. CORE
CASING

SYMBOL	DESCRIPTION	ELEV FEET	DEPTH FEET
	GROUND LEVEL	194.0	0
	Standard Cone Penetration from 1' to 8'		
		189.0	5
		184.0	10
	Fine Sa. Lo. Till		
	Fine Sa. Lo. Till		
	Bore Hole stopped at 13 feet	179.0	15
		174.0	20
			25
			30
			35

STRENGTH AND PENETRATION RESISTANCE