

28-9

Mr. F. B. Cavell,

July 3, 1959.

Superintendent of Buildings.

Materials & Research Section.

Re: Foundation Investigation
Office, Storage & Paint Shop
Building Site, St. Laurent Blvd.
& Tremblay Rd., Ottawa, Ontario

Attention: Mr. J. Hamilton.

This memorandum accompanies our report on the subsoil conditions, as determined by a foundation investigation recently carried out at the above noted site. This report was prepared by our Mr. Ian Johnston who supervised the field work.

Reference to the contents of this report shows that the subsoil conditions at this site consist of a shallow deposit of overburden overlying limestone bedrock. Spread footings for the proposed structure can be founded at a depth varying between 4 to 6 feet below existing ground surface. At this depth, a stratum of dense, dark grey clay till was encountered in each of the borings carried out.

Your attention is drawn to the fact that in the northwest corner of the proposed office building area, a water-bearing sand seam was encountered. Seepage into the footing excavations in this location can be expected, and dewatering with low-capacity sump pumps can be undertaken in order to place the footings at the recommended elevation.

Information obtained on the site indicates that short-end bearing piles have been used to support one structure in existence in this area. This footing design was chosen, presumably to bypass recent fluvial deposits resulting from an old stream which traverses the vicinity. No evidence of this stream was found in the borings carried out during this investigation.

If we can be of further assistance in connection with the design of the above structure, please contact our office.

LGS/LdeP

L. G. Soderman

L. G. Soderman,

PRINCIPAL SOILS & FOUNDATIONS ENGINEER.

cc: Messrs. F.B. Cavell
H.A. Tregaskes
H.D. McMillan
C. Tackaberry
G.F. Wetherall
J.E. Gruspier
Foundation Section ✓
Gen. Files.

FOUNDATION INVESTIGATION

OFFICE, STORAGE AND PAINT SHOP BUILDING SITE
ST. LAURENT BLVD., 2 TREMBLAY ROAD, OTTAWA,
ONTARIO.

Presented in this report are the results of an investigation carried out at the site of the proposed unheated storage building, Paint Shop and Office Building located at the intersection of St. Laurent Boulevard and Tremblay Road, south east of Ottawa.

The investigation was carried out on May 21st and May 22nd, 1959.

DESCRIPTION OF SITE AND GEOLOGY:

The site is located on the south east outskirts of Ottawa and physiographically is located in the Ottawa Valley Clay Plains. The Ottawa Valley, between Pembroke and Hawkesbury, consists of clay plains interrupted by ridges of rock or sand. In Ontario, the slope is gradual although it presents some prominent scarps. Within the valley the bedrocks are broken so that some of the raised pieces appear above the clay beds. The surface of the beds is level in all but a few areas, but swamps are scarce.

The site under investigation is located in an area where bedrock is within 12 feet of ground surface.

DESCRIPTION OF FIELD & LABORATORY WORK:

The field work was carried out by a continuous flight auger, mounted on a trailer. Conventional auger boring procedures were followed and samples were recovered at depths required. The samples were recovered by means of a 2" O.D. split spoon sampler. The dimensions of this split spoon sampler and the energy used in driving it, conform to the requirements of the standard penetration test.

Nine boreholes and five dynamic cone penetration tests were made. Samples were visually examined in the field and classified. These samples were later classified in the laboratory.

The location plan and subsoil profile are presented in Drawing No. F-59-54A.

SUBSOIL CONDITIONS:

The borings and penetration tests carried out in this investigation were terminated at a depth below the existing surface varying from 8 to 10 feet. Refusal to auger and cone advance has been interpreted as bedrock content.

The soil types overlying bedrock consist of an upper stratum of loose sandy till which is underlain by a dense dark grey layer of shaley till. The shale fragments are black in colour and very angular.

Penetration tests average 15 for the upper till zone and 30 for the lower till.

FOUNDATION CONSIDERATIONS:

Some clay fill has been placed over the proposed site and also some excavations have been made for foundations. One structure already constructed has been founded on short end bearing piles. In a previous investigation, an old stream bed was encountered and this investigation was carried out, to determine if any of the proposed buildings were located over this stream bed. This investigation shows that adequate support for spread footings can be obtained at an elevation coincident with the upper horizon of the dense dark grey till stratum. If short end bearing piles are used, refusal will be reached at a maximum depth of 12' below ground surface.

PAINT SHOP:

The stratigraphy of the earth in the area of the Paint Shop is as follows:-

One foot of granular fill.

Four feet of water bearing sand.

Dark grey dense clay till.

Spread footings would be suitable in this area and a suitable foundation can be obtained at elevation 22'.

UNHEATED STORAGE BUILDING:

The stratigraphy in the vicinity of the unheated Storage Building is as follows:

3 feet of sandy clay to clay till.

Then dark grey dense clay till.

A suitable foundation for spread footings will be available in this dense clay till at elevation 21'0".

OFFICE BUILDINGS:

The stratigraphy in this area is as follows:-

3' of sandy clay to clay till under which there is a dark grey dense bouldery clay till. However, in the north west corner at borehole #6, a pocket of water bearing sand was encountered. If this is excavated, a suitable foundation can be obtained for spread footings at elevation 17'. Provision should be made to dewater the water bearing sand by pumping with low capacity sump pumps.

If short end bearing piles are preferred, they will meet refusal on bedrock, approximately 10 feet below ground surface if small displacement piles are used. However, if large displacement piles are used, they may meet refusal in the dark grey dense bouldery till layer.

RECOMMENDATIONS AND CONCLUSIONS:

(1) Adequate footing support can be obtained at this site founding spread footings directly on the dense dark grey bouldery till stratum or by using short end bearing piles.

(2) A load of 2½ to 3 tons will safely be carried by the dense clay stratum. The settlement will be within tolerable limits.

(3) The floor slabs in the buildings, should have 18" of well compacted good quality material beneath them, to reduce the effects of settlement and cracking

due to non uniform subsoil conditions that may exist.

(4) For areas which it is proposed to pave or which may be paved at a later date, 18" of granular material G.B.C. "B" and 6" of G.B.C. "A" will be necessary

This should be well compacted before laying asphalt. A 4 inch thickness of H. L. 4 is recommended.

(5) If short end bearing piles are used, the design load will be limited only by the structural strength of the pile itself.

(6) It is understood that underground services are located in the area of the proposed office building. These services will have to either be removed or provided with protective cover prior to placing spread footings.

Ian J. Johnston,
Project Foundation Engineer.

May 29th 1959.

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 1
JOB F-59-54 STATION see sketch
DATUM Geodetic COMPILED BY I.J.J.
BORING DATE May 21/50 CHECKED BY B.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE
				P.S.F. BLOWS/FT.
	↓ Ground level	27.0'	0	50 100 150 200
Granular Fill		26.0'		
Very fine to fine sand (wet)		22.5'		
Dense dark grey bouldery clay till		16.5'	10	
End of borehole Probable bedrock			15	REFUSAL 10" H"
			25	

CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
	S1	-
	S2	-

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 2
 JOB F-52-54 STATION see sketch
 DATUM Geodetic COMPILED BY I.J.J.
 BORING DATE May 22/59 CHECKED BY B.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLows/FT.
	↓ Ground Level	24.5	0	50 100 150 200	
	Soft clayey fine sand (wet)	21.0'	5		
	Dense dark grey bouldery clay till	15.5'	10		
	End of borehole Bedrock (not proven)	9.0'	15		
			20		

CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
	SS1	-
	SS2	-

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 3
 JOB F-59-54 STATION see sketch
 DATUM Geodetic COMPILED BY I.J.J.
 BORING DATE May 22/59 CHECKED BY B.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE
				P. S. F.
	↓ Ground Level	24.5		BLOWS/FT.
	Sandy clay moist	21.5		
	Dense dark grey Bouldery clay till			
	End of borehole Boulders over bedrock or bedrock (not proven)	17.0 7.5'		

CONSISTENCY	SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT - % DRY WT.		
	SS1	-

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 1
 JOB F-59-54 STATION see sketch
 DATUM Geodetic COMPILED BY I.J.J.
 BORING DATE May 22/59 CHECKED BY B.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLOWS/FT.
	↓ Ground Level	24.5	0	50 100 150 200	
	Dense brown bouldery clay till	21.5			
	Dense and gray bouldery clay till	16.0	5		
	End of borehole Bedrock (probable)	8.5'	10		
			15		
			20		

CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
	SS1	
	SS2	

DEPARTMENT OF HIGHWAYS - ONTARIO

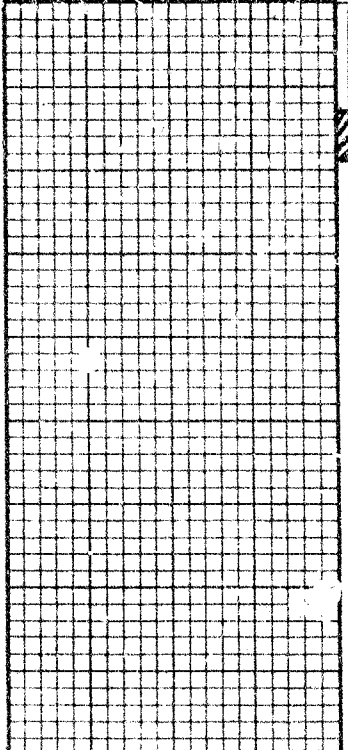
MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 5
 JOB F-59-54 STATION see sketch
 DATUM Geodetic COMPILED BY I.J.J.
 BORING DATE May 21/59 CHECKED BY B.K.

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	↓ Ground Level	22.0'		50 100 150 200	BLOWS/FT.
	Sandy clay till	18.8			
	Dense bouldery clay till	14.7'	5		
	End of borehole Probable bedrock	7.7'	10		
			15		

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.			
		SS1	

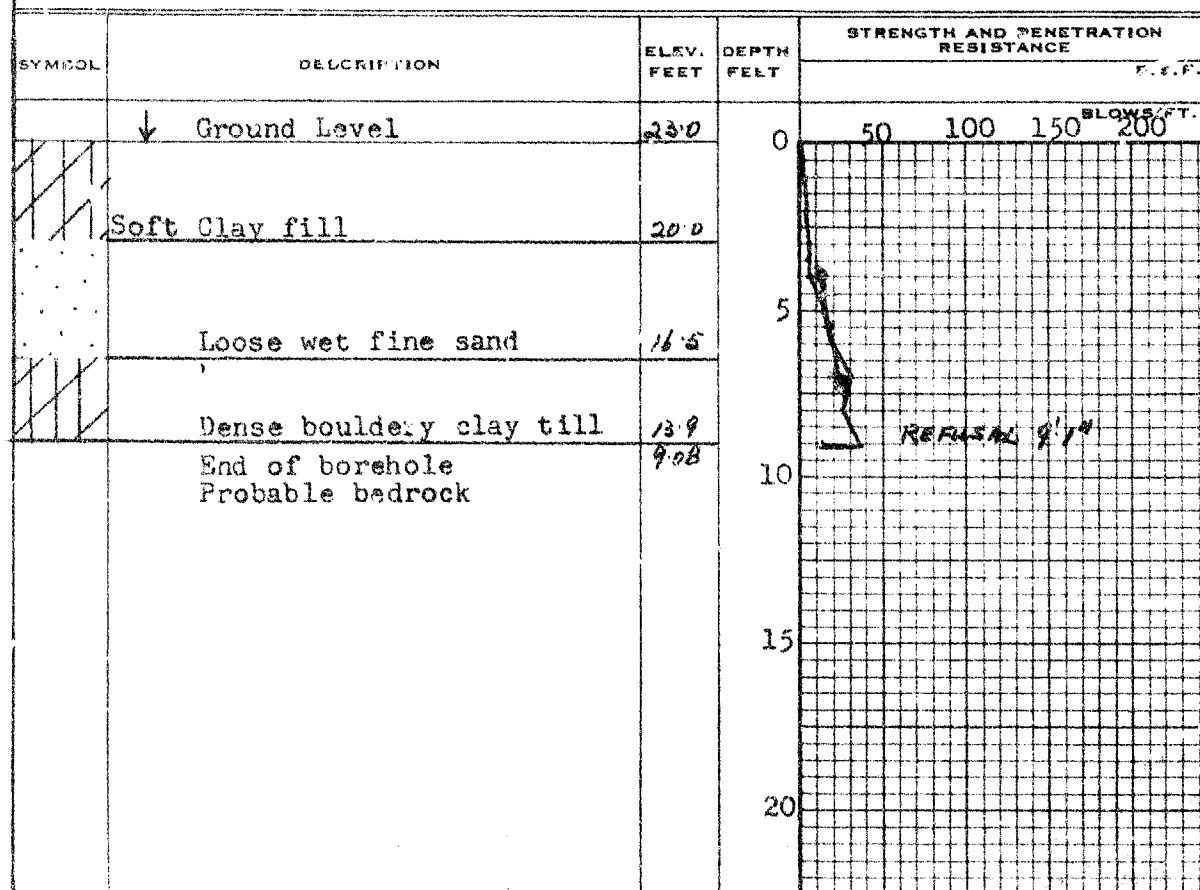
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 6
 JOB F-59-54 STATION see sketch
 DATUM Geodetic COMPILED BY I.J.J.
 BORING DATE May 22/59 CHECKED BY B.K.

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

LEGEND

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



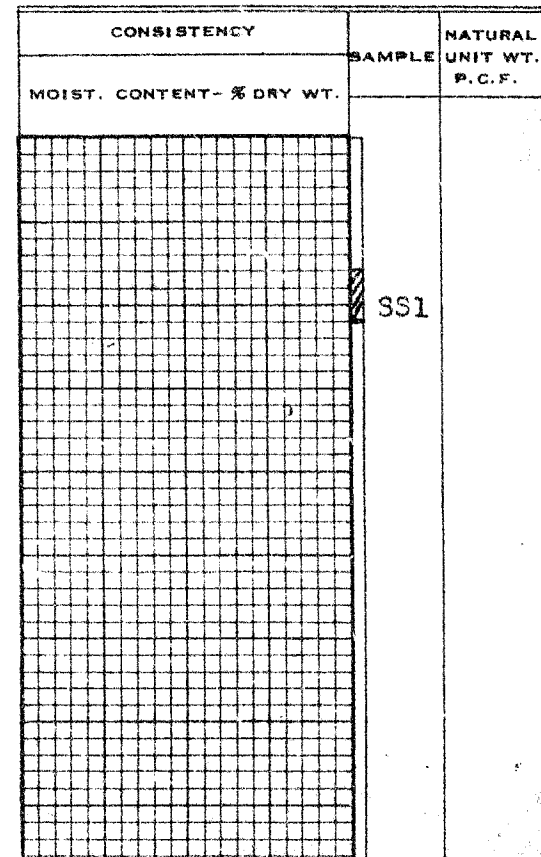
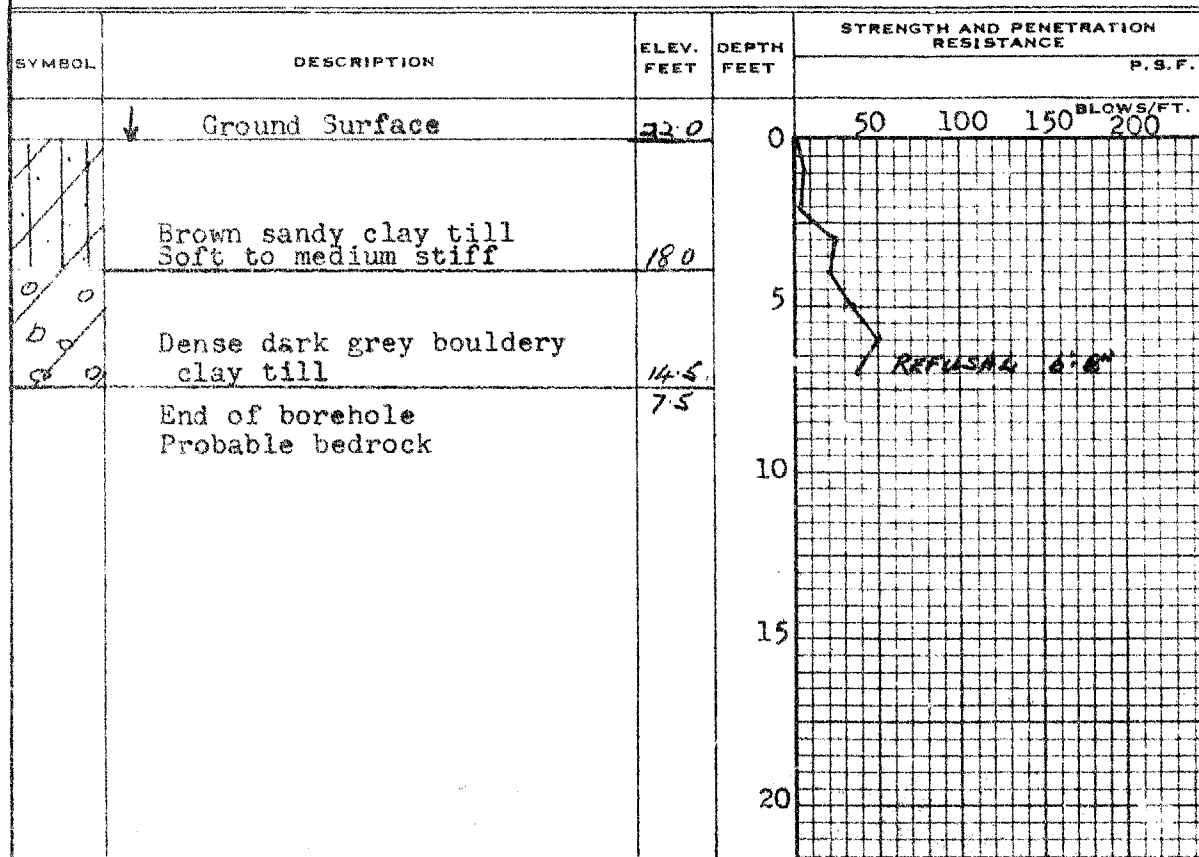
CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
10	20	30		
			X	SS1 123.7
			X	SS2 -

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. 7
 JOB F-59-54 STATION see sketch
 DATUM Elevation 22' COMPILED BY I.J.J.
 BORING DATE May 21/59 CHECKED BY B.K.

LEGEND

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





DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. None BORE HOLE NO. A
JOB F-59-54 STATION see sketch
DATUM Elevation 22' COMPILED BY I.J.J.
BORING DATE May 22/59 CHECKED BY B.K.

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

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) --- 0
VANE TEST (C) AND SENSITIVITY (S) --- +
NATURAL MOISTURE AND LIQUIDITY INDEX --- LI
LIQUID LIMIT --- X
PLASTIC LIMIT ---

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F. BLOWS/FT.	
	Ground Surface	22.0			
	Dense bouldery clay till	17.0			
	Brown silty till	14.35			
	End of borehole Probable bedrock	7.75			

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MATERIALS AND RESEARCH SECTION

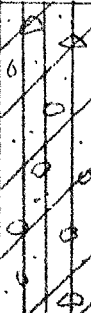
BORING DATE May 21/59 CHECKED BY B.K.

2 SHEETS

CASING

LEGEND

LIQUID LIMIT _____
PLASTIC LIMIT _____

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE
				P.S.F. BLOWS/FT.
	↓ Ground Surface	23.0		
	Dense bouldery clay till	13.5 12.8		
	Probable bedrock	10.2		

[illegible]

59-F-54

OFFICE, STORAGE

& PAINT SHOP

BUILDING SITE

ST. LAURENT BLVD.

OTTAWA

