

#60-F-255C

W.P. #954-59

NICHOLAS ST.

(OTTAWA)

BRIDGE #38

OTTAWA

QUEENSWAY

OFFICE LOCATION—

DOWNSVIEW AVE.,

KEELE ST. — HIGHWAY 401

TORONTO, ONTARIO.



ONTARIO

DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS—

DEPARTMENT OF HIGHWAYS,

PARLIAMENT BUILDINGS,

TORONTO 5, ONTARIO.

Bridge Division,  
January 30, 1961.

MEMORANDUM TO:

Mr. L. Soderman,  
Principal Soils &  
Foundations Engr.,  
Department of Highways,  
Room 107, Lab. Bldg.,  
Downsview, Ontario.

RE: W.P. 954-59,  
Nicholas St. Underpass,  
Ottawa Queensway Br. #28,  
District #9.

Herewith one copy of the preliminary foundation  
investigation report B.A. 1175 for the above structure.

*Joseph F. Hewson*

JFW:go

*1/p*

F. I. Hewson,  
Consultant Liaison Engineer.

23-62-10

# MCROSTIE & ASSOCIATES LTD.

CONSULTING ENGINEERS

OTTAWA 1

CANADA

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.  
ASSOCIATES  
A. SETO, B. ENG., P. ENG., M.E.I.C.  
G. L. GENEST, B. ENG., M. ENG., P. ENG., M.E.I.C.  
W. J. MACLEAN, B.A., D.L.S., O.L.S.

393 BELL STREET  
TELEPHONE CE. 2-5394

## PRELIMINARY STAGE OF THE REPORT ON THE FOUNDATION INVESTIGATION AT NICHOLAS STREET EASTBOUND AND THE QUEENSWAY

### 1. TERMS OF REFERENCE

We were requested by the Ottawa Office of De Leuw, Cather & Company of Canada to make a preliminary stage investigation of the subsoil at the site of the bridge which is to carry an extension of Nicholas Street over the Queensway. A preliminary stage of the report of foundation conditions at this overpass was to include recommendations on the type of foundation most suitable for the subsoil conditions.

### 2. RECOMMENDATIONS

#### 2.1 Foundation Type

Since the Queensway elevation at this site is to be approximately 190, a footing foundation appears to be the most suitable. The footings could rest on medium dense glacial till at about elevation 180, if the pilot hole is typical of the site.

#### 2.2 Soil Strength

For preliminary design purposes a bearing capacity of 4000 pounds per square foot could be assumed at about elevation 180. This assumption would, of course, require detailed confirmation. The subsoil used as foundation of the approach fills would also need to be investigated.

### 2.3 Soil Compressibilities

The pilot hole revealed that the soils below the probable foundation support level are basically granular. If this is confirmed by additional boreholes then consolidation settlements would not be expected to occur.

### 2.4 Groundwater Control

Water can be expected to flow through the slightly pervious till layers in the excavations and therefore suitable control measures will need to be developed on the basis of more complete information.

### 3. SITE INVESTIGATION

#### 3.1 Field Work

A pilot hole was made at the site with our test drilling rig in the location shown on Plate No. 1. Eight 2-inch split barrel samples were recovered from granular soil layers and visually classified. Standard penetration resistance tests were performed at five-foot intervals down to bedrock. The results of these tests supplied an indication of the relative densities of the strata encountered. Groundwater level was observed and recorded during the pilot hole drilling.

Rock, encountered at elevation 160.9, was diamond drilled and cores recovered for inspection and logging. To assist in evaluating the structural properties of the rock core recovery percentages were determined. Careful watch for drops of drill rods was kept during the drilling to detect the presence of seams in the rock formation.

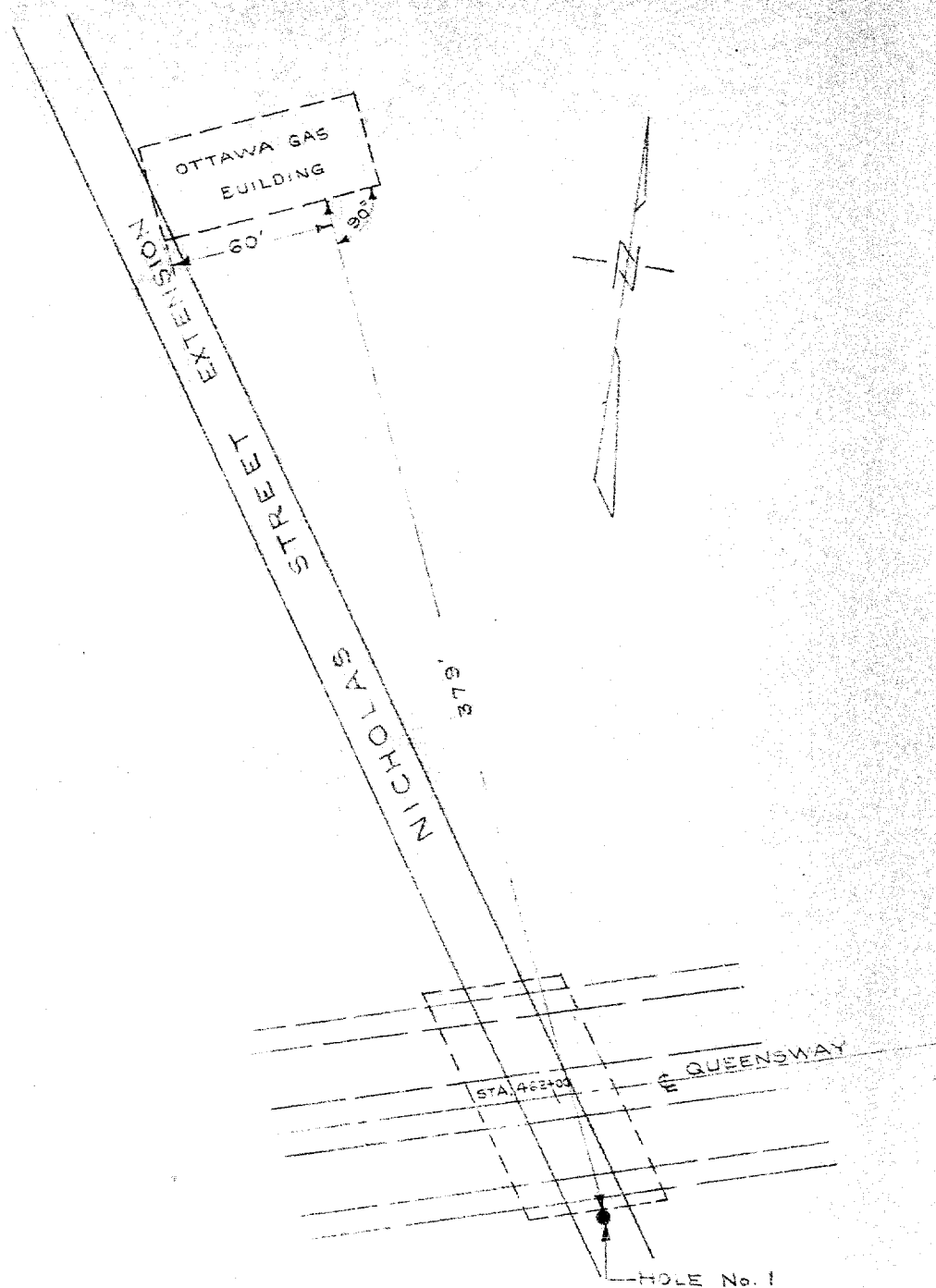
#### 3.2 Observations

Details of the soils and rock encountered in the pilot hole are shown on the accompanying plate No. 2. The subsoil can be generalized as consisting of approximately 20 feet of fill underlain by some 23 feet of medium dense glacial till. The fill is in part of a result of snow dumping and consists primarily of sand and cinders. Bedrock underlying the till soils was encountered at elevation 160.9. It consists of a dark grey to black shale and the high percentage of core recovery would indicate bedrock to be structurally sound.

An overnight groundwater level reading showed that the groundwater in this pilot hole was near the surface. However, at the time the groundwater level was recorded the site had recently been a snow dumping

area and consequently the groundwater table in other seasons might be greatly different. In fact, topographical features of the site would indicate that the groundwater level could drop 10 to 20 feet below the present ground surface if the fill is all of pervious nature. Additional subsoil investigations will reveal further the extent and nature of the fill and consequently appropriate groundwater levels could be established for design purposes.

All the recommendations given in this preliminary stage of the report are based on one test boring and additional boreholes are required at this site before generalizing these recommendations to the entire structure and approach fills.



McROSTIE & ASSOCIATES LTD.  
CONSULTING ENGINEERS

BOREHOLE LOCATIONS  
NICHOLAS ST. EXTENSION &  
QUEENSWAY

SCALE 1" = 60'

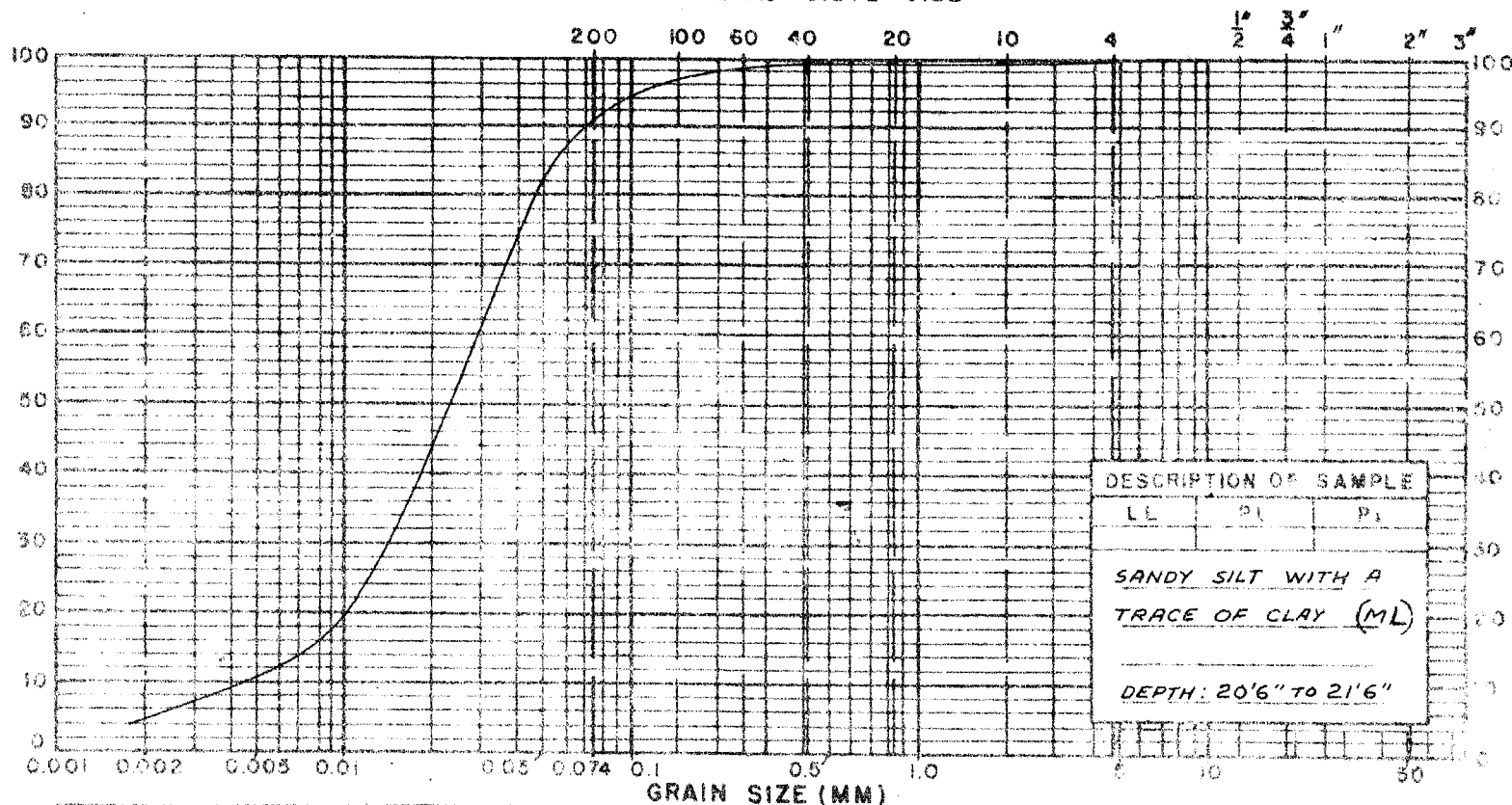
PLATE 1





UNIFIED SOIL CLASSIFICATION  
MECHANICAL ANALYSIS OF SOILS  
U. S. STANDARD SIEVE SIZE

PERCENT FINER BY WEIGHT



DESCRIPTION OF SAMPLE  
LL      PL      PI  
SANDY SILT WITH A  
TRACE OF CLAY (ML)  
DEPTH: 20'6" TO 21'6"

CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
	91%			9%		

CRITERIA		
SOIL TYPE	C <sub>u</sub>	C <sub>c</sub>
SW	> 4	1-3
SW	> 6	1-3

PROJECT NICHOLAS EASTBOUND

E-441

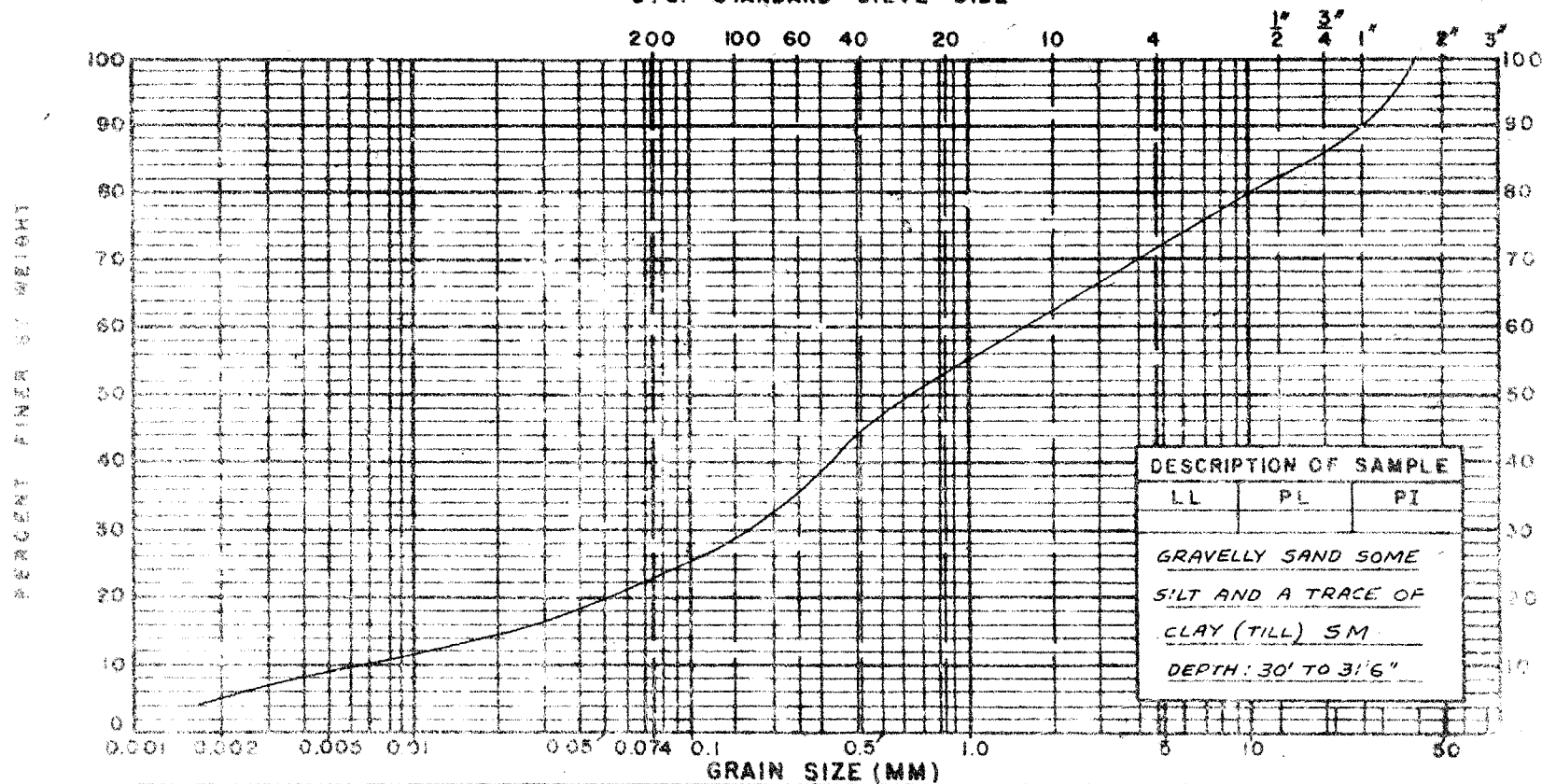
SAMPLE NO. 1-4B

PLOTTED A.G. DATE APRIL 25, 1960  
CHECKED G.B. DATE APRIL 25, 1960

REMARKS

McROSTIE & ASSOCIATES LTD.  
CONSULTING ENGINEERS  
OTTAWA, CANADA

**UNIFIED SOIL CLASSIFICATION  
MECHANICAL ANALYSIS OF SOILS  
U.S. STANDARD SIEVE SIZE**



CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
23%		49%			28%	

CRITERIA		
SOIL TYPE	Cu	Cc
GW	>4	1-3
SW	>6	1-3

PROJECT *NICHOLAS EASTBOUND E-441*

SAMPLE No. *1-6*

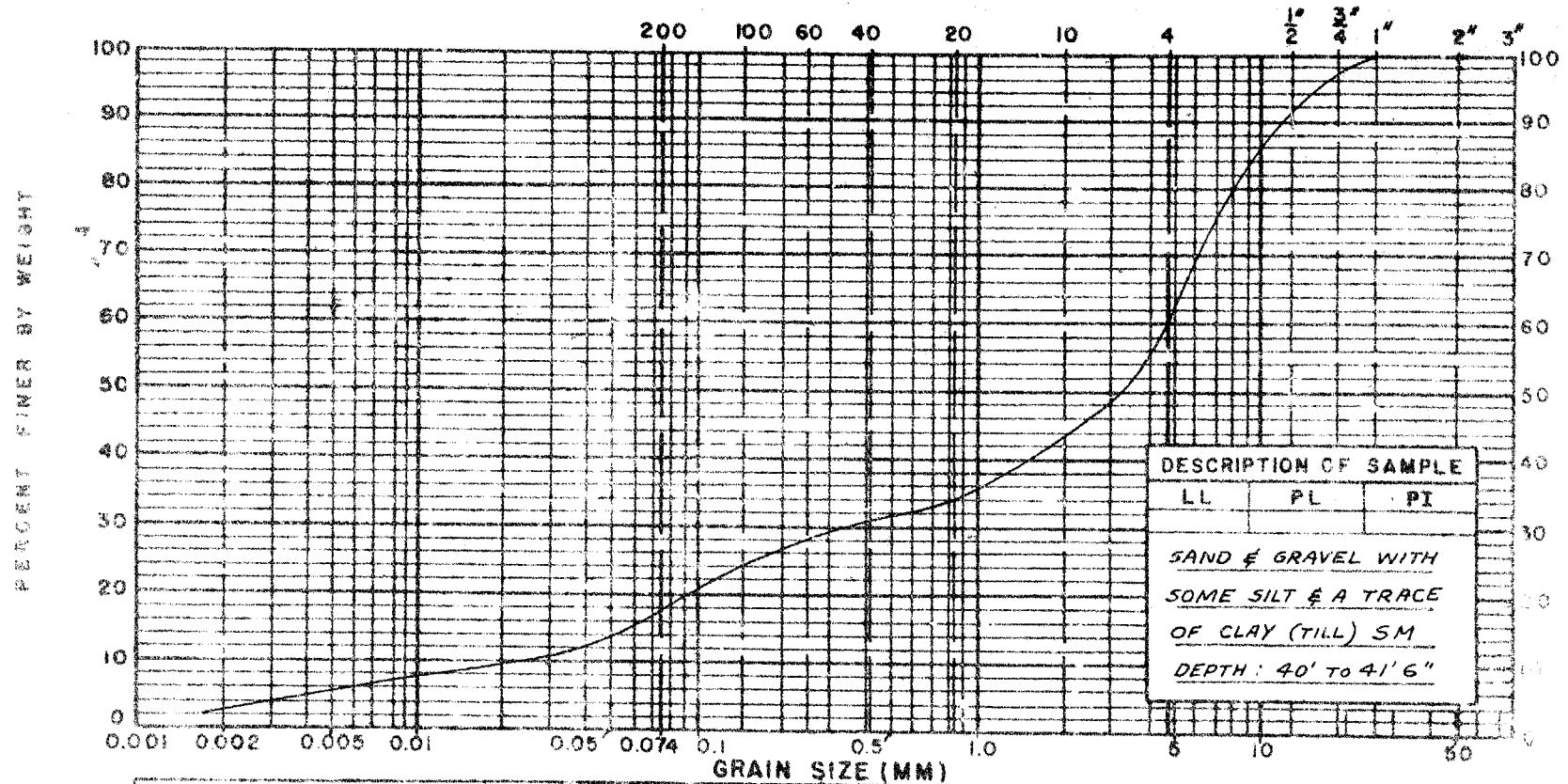
PLOTTED *A.G.* DATE *25 APRIL 1960*

REMARKS

CHECKED *G.B.* DATE *25 APRIL 1960*

**MCROSTIE & ASSOCIATES LTD.**  
CONSULTING ENGINEERS  
OTTAWA, CANADA

UNIFIED SOIL CLASSIFICATION  
MECHANICAL ANALYSIS OF SOILS  
U. S. STANDARD SIEVE SIZE



CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
	17%		43%			40%

CRITERIA		
SOIL TYPE	Cu	Cc
GW	> 4	1-3
SW	> 6	1-3

PROJECT NICHOLAS EASTBOUND E.441

SAMPLE No. 1-8

PLOTTED A.G. DATE APRIL 25, 1960

REMARKS

CHECKED G.B. DATE APRIL 25, 1960

McROSTIE & ASSOCIATES LTD.  
CONSULTING ENGINEERS  
OTTAWA, CANADA