

59-F-219C

BRIDGE # 15

PRESTON ST.

OTTAWA

QUEENSWAY

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS AND SURVEYORS

OTTAWA 1
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FOUNDATION INVESTIGATION, PRESTON STREET

1. TERMS OF REFERENCE

We were requested by the Ottawa Office of De Leuw Cather & Company to conduct a foundation investigation at the above site and to prepare a report on the investigation. Information regarding the structure was supplied, namely that the Queensway would pass over Preston Street on a Portal Frame bridge structure, and preferred elevations for foundation support were also given.

2. RECOMMENDATIONS

2.1 Foundation Type

Footing foundations supported on the sound underlying rock appear to be the most suitable type of support for a rigid structure at this site. Although quite dense soil overlies the rock in places, the differential deflections under live loads between the rock supported sections of the abutments and the soil supported sections would likely create problems in design. The differences in rock elevations are not sufficiently great that they cannot be allowed for in the abutment and footing designs.

2.2 Rock Strengths

Bearing capacities for the rocks encountered can be recommended as follows:

Footings on sound rock
occurring at elevation 192
to elevation 185

30,000 POUNDS PER
SQUARE FOOT

Higher values might be confirmed if necessary by means of additional study and test drilling.

It should also be noted that the upper rock surface is in places weathered and the removal of about one foot of weathered rock, where observed during construction, should be specified. Footings at the southwest corner of the west abutment should be taken below the "drop" observed during drilling at elevation 191.9.

2.3 Groundwater

During dry seasons, little if any groundwater is to be expected. During wet seasons, a flow of groundwater along the upper rock surface is also to be expected in those areas where the rock surface is below the level of adjacent municipal sewers. The sides of construction excavations would be affected by such a flow and sheating or enlargement of the excavation would be required.

3. SITE INVESTIGATION

Six boreholes were made at the site with our test drilling rig in the locations shown on Plate 1. Two of the boreholes were located on the existing railway embankments and involved special access problems and work interruptions. Two inch split barrel samples were taken in the non-cohesive soil layers and the samples visually classified. Standard penetration tests were performed in the boreholes and the groundwater levels were observed during the test drilling program. Rock at the site was diamond drilled, and cores were recovered for inspection and logging by our engineering staff. Detailed measurements of core recovery percentages were made to aid in evaluating the rock structure, and a careful watch was kept for drops encountered during the drilling to detect the presence of seams.

Water content tests were made in our laboratory on all soil samples to aid in judging their density in place and their behaviour during construction.

Soil and rock conditions are shown in detail on Plates 2 to 7 but can be generalized as consisting of a few feet of fill underlain by a few feet of sands, gravels or till, under which is limestone rock of the Ottawa Formation. The upper rock surface is slightly weathered.

Two railway embankments cover part of the site and these embankments were found to be non-uniform in composition, varying from sandy fill to clayey fill with the upper sections of the fill being more sandy.

Groundwater levels were observed to be below most of the boreholes. The one hole (No. 3) in which groundwater was observed may represent only a local condition controlled by impervious soils. The low groundwater conditions should be considered as representing the seasonal low point and higher levels up to the elevation of adjacent municipal sewers should be expected during the wet seasons.

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BOREHOLE LOCATIONS
BRIDGE No. 15 AT PRESTON ST.
SCALE 1" = 40'
PLATE 1

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SOIL PROFILE AND SUMMARY

OF FIELD AND LABORATORY TESTS

PRESTON / QUEENSWAY

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 220.7 DATE July 13th 1959HOLE NO. 1REMARKS B.M. PEG UNDER C.N.R. BRIDGE AT PRESTONELEV. 197.9, GEODETIC DATUM

UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ²	SMALL SCALE PENETROMETER KIPS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST	
							LB. HAMMER	NO CASING
							INCH DROP	INCH DIA. ROD
							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
				GROUND SURFACE →	0.0	220.7		
		12	1-1	FILL			○	○
		4	1-2				○	
		6	1-3				○	
		2	1-4			200.7		○
		2	1-5					○
		2	1-6					○
		5	1-7					○
		4	1-8			200.7		○
		13	1-9					○
		54	1-10					○
				LIMESTONE	27.7	193.0		
				CORE RECOVERY 91%	33.1	191.9		
				LIMESTONE				
				CORE RECOVERY 95%				
				BOTTOM OF HOLE →	38.7	192.0		

1" DROP →

OVERIGHT Water Level (D-1)

0 10 20 30 40 50

% WATER CONTENT
NATURAL ○
LIQUID LIMIT □
PLASTIC LIMIT △

PLATE
2

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SOIL PROFILE AND SUMMARY
OF FIELD AND LABORATORY TESTS

PRESTON / QUEENSWAY

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 213.5 DATE July 10th 1959

REMARKS See Plate #2

HOLE NO.

6

UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ²	SMALL SCALE PENETROMETER KIPS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	• DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST					
						LB. HAMMER	NO CASING				
						INCH DROPINCH DIA. ROD				
							BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²					
				GROUND SURFACE								
					0.0	213.5	HOLE DRY OVERNIGHT					
		6	6-1									
		12	6-2									
		7	6-3	FILL								
		9	6-4		1.0	202.5						
		8	6-5									
		103	6-6		6.1	197.4						
			6-7	BOULDERS IN FILL								
		72	6-8		21.5	192.0						
		82	6-9	DENSE SAND & GRAVEL	24.2	189.3						
				LIMESTONE								
				CORE RECOVERY 76%	29.0							
				LIMESTONE								
				CORE RECOVERY 87%								
				Bottom of Hole	34.7	178.8						
							0	10	20	30	40	50
							% WATER CONTENT				PLATE	
							NATURAL	○				7
							LIQUID LIMIT	□				
							PLASTIC LIMIT	△				