58-F-225-C

W.P. # 929-58

OTTAWA,

QUEENSWAY &

WOODROFFE AVE.

BA 771

58F225c

DE LEUW, CATHER & COMPANY
OF CANADA LIMITED
CONSULTING ENGINEERS
TORONTO OTTAWA

226 SPARKS STREET
OTTAWA 4, ONTARIO
CENTRAL 3-9663

July 29, 1958.

Mr. F.I. Hewson,
Consultant Liaison Engineer,
Bridge Design Office,
Department of Highways,
280 Davenport Road,
Toronto 2, Ontario.

Dear Sir:

Re: Bridge No. 2 at Woodroffe Ave. W.P. No. 929-58
Queensway Ottawa, District 9

We enclose herewith 3 copies of McRostie and Associates soils foundation report No. SF347 for the above structure.

Yours truly,

DE LEUW, CATHER & CO. OF CANADA LIMITED.

Léon J Marshall

Leon J. Marshall, P. Eng.,
Senior Structural Engineer.

LJM/pr

BA 771

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS AND SURVEYORS
OTTAWA 1
CANADA

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393 BELL STREET
TELEPHONE CE. 2-5334

FOUNDATION REPORT BRIDGE NO.2

1. Field Work

Six boreholes were completed on the site in the locations shown on plate one. Two inch split barrel samples were recovered for visual classification and standard penetration tests were performed in the boreholes. Two inch thin walled tube samples were taken in the cohesive soil layers and small penetrometer tests were made. The underlying limestone was diamond drilled, cores recovered for inspection and a record kept of core recovery percentages. A careful watch was kept for drops or discontinuities and for loss of water during drilling operations.

Groundwater levels were observed during the programme.

2. Observations

The surface elevations at boreholes are uniform except that those at the Northerly limit of the Queensway are from 1 to 2 feet lower. There is a uniform depth of 1 foot of top soil over the site. The limestone occurs at approximately elevation 236 at all boreholes except in the case of borehole No.4 at the Southwest corner of the site where it is 5 feet lower. Below the top soil stiff to hard silty fissured clay 1½ to 5½ feet in depth is found. Below the clay and overlying the limestone there is from 4 to 10 feet of loose to dense till. The underlying rock is shaly limestone of the Ottawa formation. In two of the boreholes, namely numbers 2 and 6, a drop of about one inch was noted. The bedding thickness of the shaly limestone averaged from 2 to 4 inches in thickness.

At boreholes 1 and 5 at the West side of Woodroffe Avenue there was no overnight groundwater whereas at the remaining boreholes the ground water was approximately 11 feet below the ground surface. This level can be considered as near the seasonal high except for seasons of heavy precipitation during which the level would be nearer to the ground surface.

3. Recommendations

3.1 Foundation Type

With rock nine feet from the surface at hole No.1 (Northwest corner) and only thin layers of dense soils of above the rock, it appears that the structure must be on rock at this corner. For any but special structures and certainly for rigid frame structures, if one corner is supported on rock the remainder of the structure should be also on rock. For these reasons it would appear that piers or short piles to rock are the most likely suitable types of foundation for the proposed structure.

3.2 Rock and Soil Strengths

Bearing capacities can be assigned to the materials encountered as below:

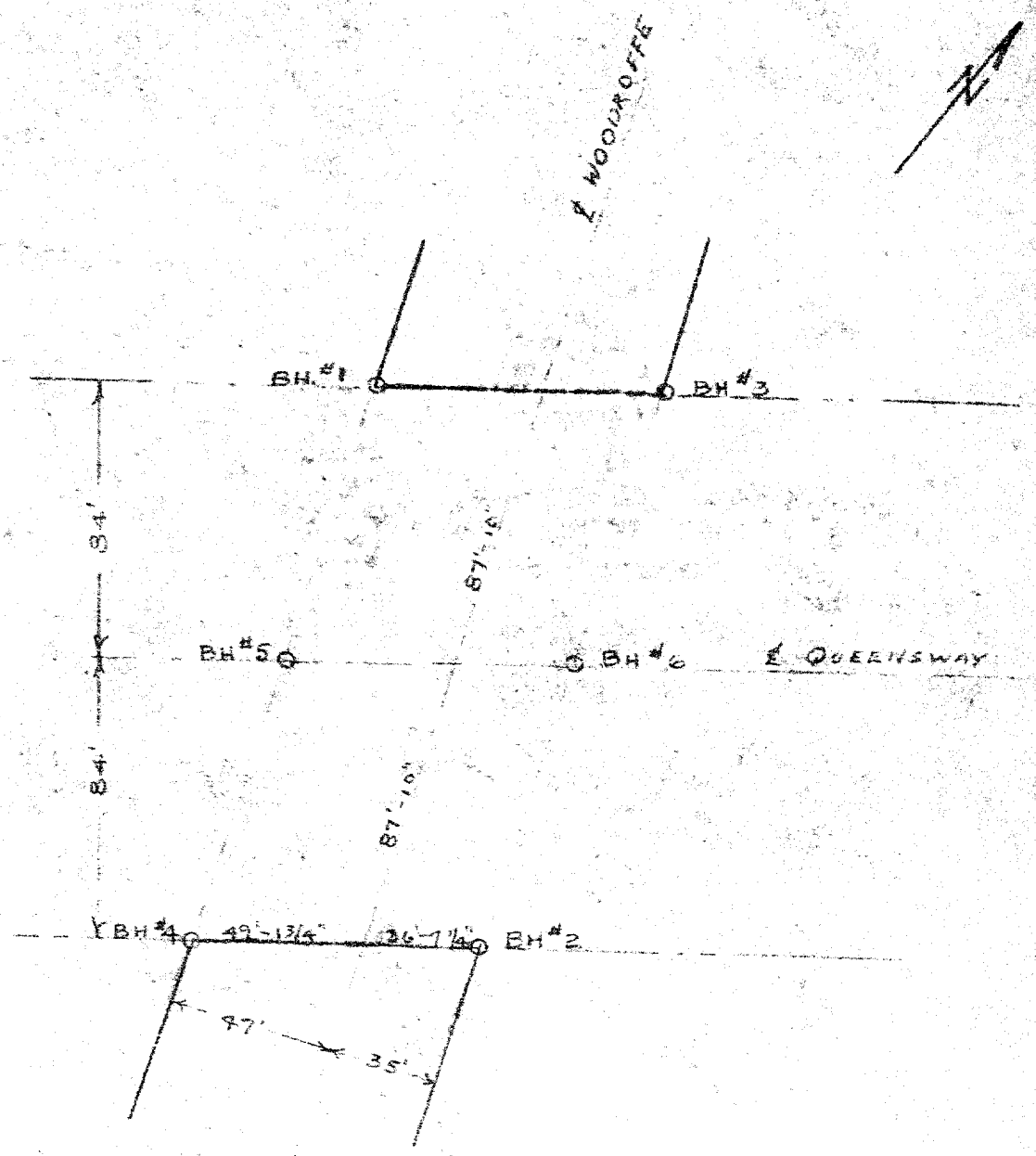
Till below elevation 258	-	4,000 pounds per sq. ft. except at hole six. Also see recommendations concerning foundation type.
Rock at elevation 236 to elevation 231	-	30,000 pounds per sq. ft. but confirmation of lack of seams or drops required.

4. Construction Precautions

The occurance of drops or discontinuities in the drilling program indicates the possibility of the existence of seams of unconsolidated material imbedded between layers of shaly limestone. If these are 5 feet or more below the footing levels, they are not a cause

for concern.

A program of construction drilling to check that drops do not occur in the first five feet below heavily loaded piers or columns should be considered. If drops are detected a decision to grout the possible open spaces in these drops or to lower the excavation below them can be made pending upon the conditions existing at the time.



See SK-II-36

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

BOREHOLE LOCATIONS
QUEENSWAY AT WOODROFFE
BRIDGE No. 2

SCALE 1" = 50' | PLATE 1

FORM S-1-0-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 245.7 - GEODETIC

REMARKS REF. B.M. No. II-G El. 252.3

HOLE No. 1

DATE MAY 16, 1958

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	PENETRATION TEST (..... LB. HAMMER, ... INCH DROP; NO CASING, ... INCH DIA. ROD; BLOWS PER FOOT)
				GROUND SURFACE	0	245.7	NO OVERNIGHT WATER
				TOP SOIL 1.0		244.7	
				CLAY 3.3	2	242.2	
			1-1	LOOSE TILL	4		
		8	1-2	6.5	6	239.2	
		50	1-3	DENSE TILL	8		
				10.0		235.7	
				SHALY LIMESTONE (DRILLED)	10		
				CORE RECOVERY 25%	12		
				BEDDING THICKNESS 2"			
				14.0 (DRILLED)	14	231.7	
				SHALY LIMESTONE CORE RECOVERY 70%			
				16.5	16	229.2	
				LIMESTONE (DRILLED) CORE RECOVERY 96%	18		
				BEDDING THICKNESS 4" 19.0		226.7	
				BOTTOM OF HOLE	20		

% WATER CONTENT

PLATE 2

FORM S-10-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE
BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 248.3 - GEODETIC

REMARKS SEE PLATE 2

DATE MAY 20 1958

HOLE No. 2

PENETRATION TEST
..... LB. HAMMER | NO CASING
..... INCH DROP | ..... INCH DIA. ROD
BLOWS PER FOOT

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
				GROUND SURFACE	0	248.3
				TOP SOIL 1.0		247.3
	9.0			HARD, FISSURED SILTY	2	
	9.0	7	2-1	BROWNISH-GRAY CLAY		
	9.0			4.5	4	243.8
		22	2-2	MEDIUM DENSE	6	
				TILL		
		29	2-3		8	
				9.0		239.3
		89	2-4	DENSE TILL	10	
				12.0	12	236.3
				SHALY LIMESTONE		
				(DRILLED - CORE RECOVERY 100%)	14	
				BEDDING THICKNESS 3"		
					16	
				17.3		231.0
				LIMESTONE (DRILLED)	18	
				CORE RECOVERY 97%	20	
				BEDDING THICKNESS 3"		
				1/2" DROP & WATER LOST AT 17'-10" 22.4	22	225.9
				BOTTOM OF HOLE		

OVERNIGHT WATER LEVEL 11.7 FT.

% WATER CONTENT

PLATE 3

FORM S-10-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 247.0 - GEODETIC

REMARKS SEE PLATE 2

DATE MAY 21, 1958

HOLE No. 3

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	PENETRATION TEST (.....LB. HAMMER, ...INCH DROP; NO CASING, ...INCH DIA. ROD; BLOWS PER FOOT)
				GROUND SURFACE			
				TOP SOIL 1.0	0	247.0	
						246.0	
	60			VERY STIFF, FISSURED SILTY BROWNISH-GRAY CLAY	2		
	5.3	5	3-1		4		
	4.6						
		1 for 6"	3-2A				
		4	3-2B	5.5	6	241.5	
				LOOSE TILL			
		8			8		
		10 for 6"	3-3	8.5		238.5	
				MEDIUM DENSE TILL			
		37 for 6"		10.0	10	237.0	OVERNIGHT WATER LEVEL 10.6 FT.
		35 for 4"		DENSE TILL		236.2	
				10.8			
				SHALY LIMESTONE (DRILLED)	12		
				CORE RECOVERY 86%			
				BEDDING THICKNESS 2"	14		
				14.5		232.5	
				SHALY LIMESTONE	16		
				CORE RECOVERY 98%			
				BEDDING THICKNESS 3"	18		
				19.7			
				LIMESTONE (DRILLED) - CORE RECOVERY 100% - BEDDING 3"	20	227.3	
				21.1		225.9	
				BOTTOM OF HOLE	22		

% WATER CONTENT

PLATE 4

FORM S-10-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE
BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 247.9 - GEODETIC
REMARKS SEE PLATE 2

HOLE No. 4

DATE MAY 21-22, 1958

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	Penetration Test (..... lb. hammer, ... inch drop; No Casing, ... inch dia. rod; Blows per Foot)
				GROUND SURFACE			
				TOP SOIL 1.0	0	247.9	
						246.9	
	6.0			VERY STIFF FISSURED SILTY	2		
	5.3	5	4-1	BROWNISH-GRAY CLAY			
	4.8			4.0	4	243.9	
				STIFF, FISSURED, SILTY			
	2.4			BROWNISH-GRAY CLAY	6		
	2.2	3	4-2	6.5		241.4	
	2.0						
		8	4-3	LOOSE TILL	8		
				10.0	10	237.9	
		19		MEDIUM DENSE TILL			
		20 for 6"	4-4	11.0			
				11.7	12		← OVERNIGHT WATER LEVEL 11.8 FT.
				DENSE			
				SANDY TILL	14		
		50	4-5		16		
				16.7		231.2	
				LIMESTONE (DRILLED)	18		
				CORE RECOVERY 95%			
				BEDDING THICKNESS 3"	20		
				25.8	22	226.1	
				SHALY LIMESTONE			
				DRILLED - CORE RECOVERY 68%	24		
				PORTION OF CORE COULD NOT BE RETRIEVED)			
				BEDDING THICKNESS 2"	26		
				27.9		220.9	
				BOTTOM OF HOLE	28		

% WATER CONTENT

PLATE 5

L.-M. CO.—A26553

FORM S-10-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE
BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 247.8

REMARKS SEE PLATE 2

HOLE NO. 5

DATE MAY 22-25, 1958

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	PENETRATION TEST: ..... LB. HAMMER, ... INCH DROP, NO CASING, ... INCH DIA. ROD, BLOWS PER FOOT
				GROUND SURFACE			NO OVERNIGHT WATER
				TOP SOIL 1.0	0	247.8	
						246.8	
	6.0			VERY STIFF, FISSURED	2		
	5.6	6	5-1	SILTY			
	5.4				4		
				BROWNISH-GRAY CLAY			
	4.8						
	4.4	4	5-2				
	4.2			6.5	6	241.3	
		204	5-3	DENSE	8		
				SANDY TILL			
		115		10.5	10	237.3	
				SHALY LIMESTONE (DRILLED)	12		
				CORE RECOVERY 93%			
				BEDDING THICKNESS 2"	14		
				15.8	16	232.0	
				LIMESTONE (DRILLED)			
				CORE RECOVERY 91%	18		
				BEDDING THICKNESS 4"	20		
				21.2	22	226.1	
				BOTTOM OF HOLE			

% WATER CONTENT

PLATE 6

L.-M. CO.—A26853

FORM 3-10-2

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT WOODROFFE
BRIDGE No. 2

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 247.7 - GEODETIC

REMARKS SEE PLATE 2

HOLE NO. 6

DATE MAY 20-21-1958

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	Penetration Test: ..... lb. hammer, ... inch drop; No Casing, ... inch dia. rod; Blows per Foot
				GROUND SURFACE			
				TOP SOIL 1.0	0	247.7	
	6.4				1	246.7	
	6.3			VERY STIFF, FISSURED SILTY BROWNISH-GRAY CLAY			
	6.0	6	6-1	4.0	4	243.7	
		14	6-2	MEDIUM DENSE	6		
		13	6-3	TILL	8		
		15			10		
		3 for 2	64	11.2		236.5	← OVERNIGHT WATER LEVEL 11.2 FT.
				SHALY LIMESTONE (DRILLED) CORE RECOVERY 78% BEDDING THICKNESS 2"	12		
				15.2	14	232.4	
				SHALY LIMESTONE 1" drop - WATER LOST AT 16'-4" BEDDING THICKNESS 2"	16		
				DRILLED CORE RECOVERY 88%	18		
				LIMESTONE BEDDING THICKNESS 2"	20		
				20.5		226.9	
				BOTTOM OF HOLE	22		

% WATER CONTENT

PLATE 7

L.-M. CO.—A26558