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58-F-226-C

W.P. 930-58

OTTAWA,

QUEENSWAY &

MAITLAND AVE.

3 A 764

58-F-226

Toronto 5,
July 17, 1958.

MEMORANDUM TO:

Mr. A. Rutka,
Acting Materials & Research Engineer,
Downsview, Ontario.

RE: BA764 - Maitland Rd. Br. #3
Ottawa Queensway, Dist. #9

Attached please find soil report
BA764 for your file.

JCNca/mw

J. C. McAllister,
for S. McCombie,
Bridge Planning Engineer.

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

226 SPARKS STREET
OTTAWA 4, ONTARIO
CENTRAL 3-9663

July 15th, 1958.

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

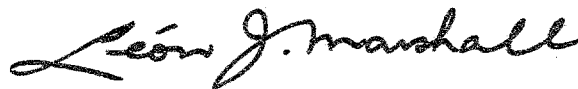
Dear Sir:

Re: Bridge No. 4 at Maitland Ave. W.P. No. 930-58
Queensway Ottawa, District 9

We enclose herewith 3 copies of McRostie and
Associates soils foundation report No. S345 for the above
structure.

Yours sincerely,

DE LEUW, CATHER & CO. OF CANADA LIMITED,



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

LJM/PM

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS AND SURVEYORS

OTTAWA 1
CANADA

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
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393 BELL STREET
TELEPHONE CE. 2-5334

FOUNDATION REPORT - STRUCTURE NO.31. FIELD WORK

Six boreholes were completed at 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.

Ground water levels were observed during the programme.

2. OBSERVATIONS

The surface elevation at boreholes does not differ by more than two feet and there is a uniform depth of one foot of top soil. Below this is $3\frac{1}{2}$ feet of hard fissured silty clay; underlying this is 5 to 7 feet of stiff to very stiff fissured silty clay except at borehole No. 2 where the depth of this material is only $2\frac{1}{2}$ feet. Below this there is from $2\frac{1}{2}$ to $4\frac{1}{2}$ feet of loose to dense till except that at borehole No.5 there is a two foot layer of soft silty clay. The limestone varies from 12 to 16 feet below the surface (EL.254 to EL.260). Core recoveries below 75 percent are indicative of depths where the limestone is weathered. A

drop of ½ inch was recorded at 15½ feet depth in borehole No.2 and one inch at depth of 17½ feet in borehole No.5 with a loss of water in both instances. Vertical seams were noted in the core for borehole No.4 between the 16 and 20 foot depths and in borehole No.5 there is an 80 degree joint in the strata of the limestone core at 23 foot depth.

The ground water level is uniform at approximately 3 feet below surface. This can be considered to be near the seasonal high value and in dry seasons this level would likely drop by a few feet.

3. LABORATORY TESTS

Tests were made in our Laboratory on the cohesive soil samples including small penetrometer tests, unconfined compression tests on natural and remoulded samples, and natural water content all of which are shown on plates numbered 3 to 7.

4. RECOMMENDATIONS

4.1 Foundation Type

Piers or piles to rock are likely type of suitable foundation at this site, particularly for rigid frame structures. For simply supported structures, footings resting on the upper clay soils could be considered.

4.2 Soil and Rock Strengths

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

Clay at EL. 269 to EL. 266	- 4000 pounds per square foot
EL. 266 to EL 262	- reduces from 4000 pounds per square foot at upper boundary to 1500 pounds per square foot at lower boundary.

EL. 262 to Rock - difficult to make suitable foundations in this range.

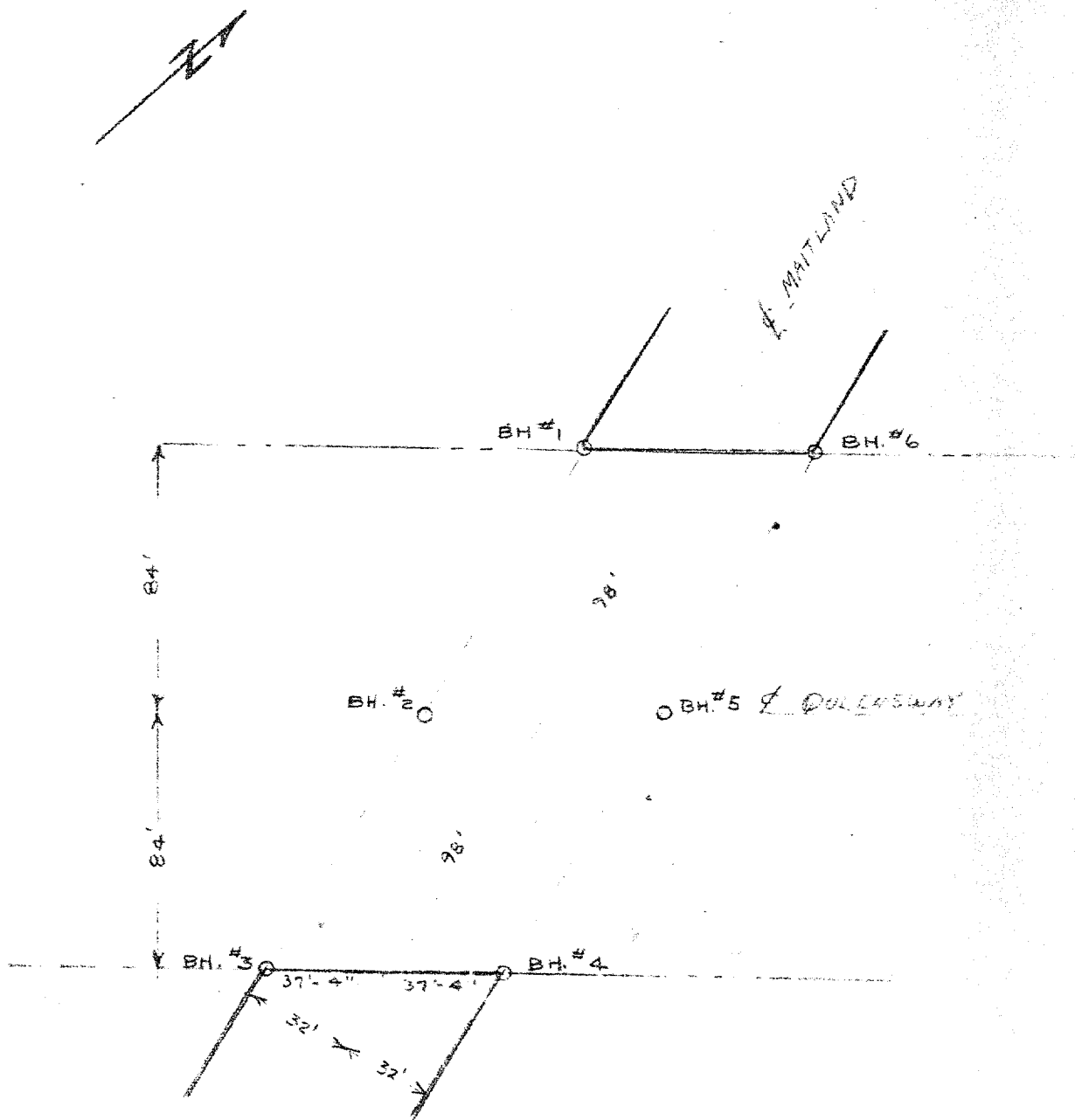
Rock at EL. 260
to EL. 254 2,000 pounds per square foot below
the upper weathered layer of approximately one foot.

4.3 Soil Compressibility

Preconsolidation loads of 2000 to 4000 pounds per square foot are to be expected in the clays. If footings are used, consolidation settlements would need to be calculated based on the actual footing sizes chosen and the actual depths.

5. CONSTRUCTION PRECAUTIONS

Excavation of piers to rock would not be difficult through the clay, but the sandy till soils beneath the clays will soften and yield under ground water pressures. Suitable shoring should be prepared to prevent collapse of the excavation sides or else the area of the excavation should be enlarged to allow suitable slopes.



McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

BOREHOLE LOCATIONS
QUEENSWAY AT MAITLAND AVE.
BRIDGE No.3

SCALE 1" = 50'

PLATE 1

McROSTIE & ASSOCIATES

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SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT MAITLAND AVE.
BRIDGE No 3

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 271.8 - GEODETIC
REMARKS SEE PLATE 2

HOLE NO.

4

DATE MAY 12 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	CORRECTIONS			
							TEMPERATURE	WATER CONTENT	SHRINKAGE	PLATE
				GROUND SURFACE			STANDARD PENETRATION TEST			
				TOP SOIL	0	271.8				
					1.0	270.8				
				HARD FISSURED, SILTY BROWNISH-GRAY CLAY	2					
1.1	76 80 52		4		4.5	267.3				
	20 20 20									
	20 20 20									
2.6	56 80 44		1-3	VERY STIFF SILTY, FISSURED BROWNISH-GRAY CLAY	7.0	264.8				
	70 50 30									
	30 44 45									
2.0	30 15 30		4-6	STIFF SILTY, FISSURED	9					
	20 30 20									
	40 40 30									
	30 25 25		4-4	BROWNISH-GRAY CLAY	10					
			4-5		11.5	260.3				
					12					
			4-5	LOOSE TILL	14					
					15.0	256.8				
				DENSE TILL	15.8	256.0				
				LIMESTONE (DRILLED)	18					
				CORE RECOVERY 81%						
				BEDDING THICKNESS 2"						
				SOME VERTICAL SEAMS	20.5	251.3				
				LIMESTONE (DRILLED)	22	249.3				
				CORE RECOVERY 60%						
				BEDDING THICKNESS 2"	22.5					
				LIMESTONE (DRILLED)	24					
				CORE RECOVERY 30%						
				BEDDING THICKNESS 2"	24.5	245.3				
					26.5					
				BOTTOM OF HOLE						
							NATURAL % WATER CONTENT SHOWN THUS ①			
							PLATE 5			

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SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT MAITLAND AVE.
BRIDGE NO. 3

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 271.3 GEODETIC
REMARKS SEE PLATE 2

HOLE NO.

5

DATE MAY 14-1958

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	WATER CONTENT (%)			
				GROUND SURFACE						
				TOP SOIL	0	271.3				
				HARD, FISSURED, SILTY	2	270.3				
				BROWNISH-GRAY CLAY	4	269.3				
				VERY STIFF	6	268.3				
				FISSURED, SILTY	8	267.3				
				BROWNISH-GRAY CLAY	10	266.3				
				STIFF, FISSURED, SILTY	12	265.3				
				BROWNISH-GRAY CLAY	14	264.3				
				SOFT, VERY SILTY GRAY CLAY	16	263.3				
				DENSE TILL	18	262.3				
				LIMESTONE (DRILLED) CORE RECOVERY 60%	20	261.3				
				LIMESTONE (DRILLED) CORE RECOVERY 83%	22	260.3				
				BEDDING THICKNESS 3"	24	259.3				
				LIMESTONE (DRILLED) CORE RECOVERY 87%	26	258.3				
				BEDDING THICKNESS 3"	28	257.3				
				ONE 60 cent in core break	30	256.3				
				LIMESTONE (DRILLED) CORE RECOVERY 100%	32	255.3				
				BEDDING THICKNESS 3"	34	254.3				
				BOTTOM OF HOLE	36	253.3				

R INDICATES REMOVED VALUE

NATURAL
% WATER CONTENT
SHOWN THUS ○

PLATE

6

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SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QUEENSWAY AT MAITLAND AVE.
BRIDGE No. 3

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 270.0 - GEODETIC

REMARKS SEE PLATE 2

HOLE No. 6

DATE MAY 13-14, 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			
					GROUND SURFACE			NO. OF		INCHES	
								BLOWN PER FOOT			
					TOP SOIL	0	270.0				
						1.0	269.0				
2.5	8478.74			6-1	HARD, FISSURED, SILTY BROWNISH-GRAY CLAY	2					
	9030.00					4	268.5				
4.7	6272.80			6-2	VERY STIFF, FISSURED SILTY BROWNISH-GRAY CLAY	6					
	7476.70					7.0	263.0				
	808.00										
1.6	3434.32			6-3	STIFF, FISSURED, SILTY	8					
	323.538										
	403.734										
2.0	34363.4			6-4	BROWNISH-GRAY CLAY	10					
	369.03					11.5	258.5				
			7		LOOSE TILL	12					
			33 for 6"	6-5		13.5	256.5				
			44 for 5'	6-6	DENSE TILL	14					
						16.2	253.8				
					LIMESTONE (DRILLED)	18					
					CORE RECOVERY 93%						
					BEDDING THICKNESS 2"	12.7	250.3				
					LIMESTONE (DRILLED)	22					
					CORE RECOVERY 94%						
					BEDDING THICKNESS 3"	24.2	245.8				
					LIMESTONE (DRILLED)	26	243.8				
					CORE RECOVERY 95%						
					BEDDING THICKNESS 3"						
					BOTTOM OF HOLE						
								NATURAL % WATER CONTENT SHOWN THUS ①			
								PLATE 7			