64-F-248 M

CARP RIVER

MARCH & HUNTLEY

TOWN LINE

BRIDGE

B.H. 1795

McROSTIE & ASSOCIATES LTD.

CONSULTING ENGINEERS
OTTAWA 1
CANADA

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64-F-248 M

1. TERMS OF REFERENCE

We were requested by Mr. Kearney of M. M. Dillon and Company Limited to conduct a subsurface investigation at the site of the new bridge or culvert structure crossing the Carp River. Preliminary study had indicated that the total span of about 40 feet could be divided into two or three bays and that the bottom of the bridge footings were desired at about 5 feet below the stream bottom; the bottom of a box culvert structure could be about 3 feet below the stream bottom. The elevation of the stream bottom had been determined by M. M. Dillon Company Limited as about elevation 92.

2. RECOMMENDATIONS

2.1 Foundation Type

Either a bridge structure using footings on the clay soils at about elevation 87 or a box culvert structure with a slab on the clay soil at about elevation 89 would be technically feasible. The choice between these two types of foundation can therefore be made on which provides the most economical overall structure.

Foundation conditions at the location of centre piers will need to be confirmed by inspection during construction as being similar to those at the abutments near the River edges where the test borings were carried out.

2.2 Soil Bearing Values

A bearing value of 2,000 pounds per square foot can be recommended for use with footings or box culvert slab at elevation 89 or elevation 87 provided the natural clay soils are used and are not disturbed by construction operations.

2.2 Soil Bearing Values

Since soil strengths decrease below elevation 87, foundations of the structure should not be lowered without discussing revised bearing values.

2.3 Construction Precautions

Since the clay soils are sensitive to disturbance, that is they lose almost all their strength when reworked or remoulded, it will be necessary to specify protection of these soils at footing level. This protection can be provided by requiring hand excavation of the last 6 inches of soil followed immediately by the placing of about 3 inches of lean concrete as a working surface slab. The protection slab can be placed in small increments if necessary.

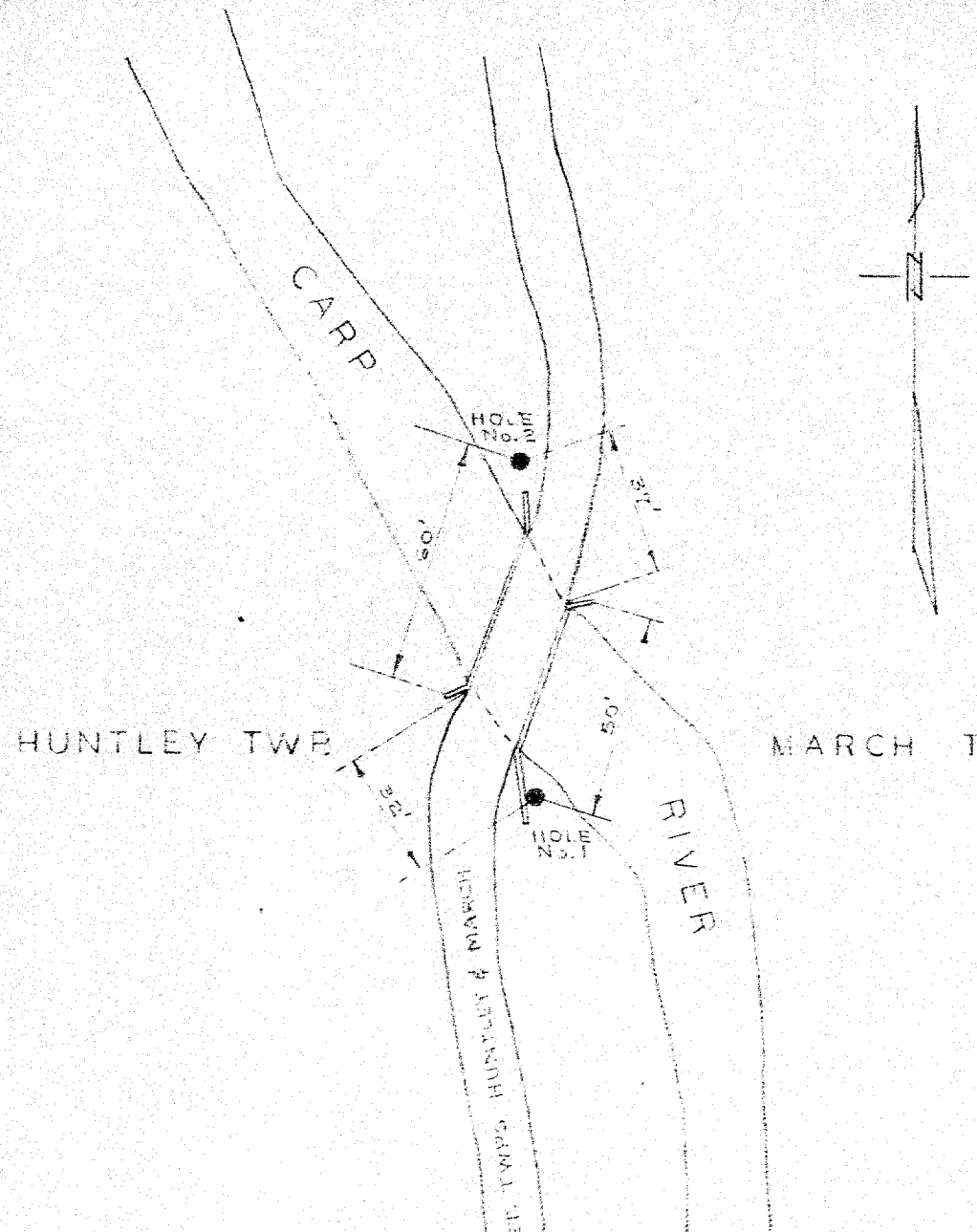
During construction it will also be necessary for the Supervising Authority to examine subsurface conditions carefully to guard against variations in subsoil conditions from those encountered at the locations tested by boreholes. This requirement is particularly important if any piers are to be placed in the river bed and where the erosion of the clay and subsequent deposition of loose alluvial soils could be possible.

3. FIELD INVESTIGATION

Two boreholes were made on the River banks in the locations shown on plate 1. Two inch thin walled tube samples were recovered in the cohesive soil layers and borehole vane tests were performed between the sample intervals to aid in estimating the soil shear strength. Ground water levels were observed during the field program.

All samples were visually reclassified at our laboratory and water content tests performed to aid in estimating the construction behaviour of the materials. A group of small scale penetrometer tests were made in the undisturbed and the remoulded state for each tube sample, the appearance of one sample (2-6) leads us to believe that the penetrometer results on the sample should not be considered representative due to the possibility of sample disturbance.

The findings in the test holes are shown in detail on plates 2 and 3 but can be generalized as consisting of about 6 feet of fill soils underlain by stiff clay to a depth of about 15 feet then underlain by medium to soft sensitive clay to a depth of at least 29 feet. Groundwater levels were within a few feet of the existing surface at the time of the investigation and these can be expected to rise to the ground surface during wet seasons of the year. Surface flooding of the future bridge area is also to be expected from the appearance of the site.



NOTE:- TRACED FROM
M. M. DILLON CO. LTD.
SITE PLAN FOR
MARCH - HUNTLEY BRIDGE

BENCH MARK —
NAIL IN TREE
150'± SOUTH OF BRIDGE
ELEV. 100.0' ASSUMED

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BOREHOLE LOCATIONS
HUNTLEY & MARCH TOWNSHIP
BRIDGE

SCALE 1" = 40'

PLATE 1

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

HUNTLEY, MARCH TOWNLINE
CARP RIVER BRIDGE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 101.0' DATE MARCH 4 1964

REMARKS B.M. (EL. 100.0') ASSUMED - NAIL IN TREE ON EAST SIDE OF ROAD 150'± SOUTH OF BRIDGE.

HOLE NO. 1

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
	6.0 6.6 6.6 6.6 5.4 5.2 5.5 5.5 6.2 6.8 6.6 6.8 6.6 6.5 6.6 6.6 R-2.8		1-1	FILL VERY STIFF BROWNISH GRAY CLAY	0'	101.0'
		TOPSOIL			6"	95.0'
	4.4 4.6 5.4 5.4 5.2 5.5 6.5 6.2 5.0 5.2 5.5 5.8 R-2.2		1-2		6.1'	
				VERY STIFF SILTY GRAY CLAY		
	6.6 7.3 7.0 6.4 6.0 6.2 4.2 4.4 4.3 4.6 4.4 4.6 3.5 4.0 3.8 R-1.0		1-3		12'	
				STIFF SILTY GRAY CLAY		
	2.4 2.2 1.8 2.8 2.3 2.6 1.2 1.2 1.5 1.4 1.5 1.5 1.4 1.2 1.4 1.6 1.5 1.8 R-0.0		1-4		16'	85.0'
				MEDIUM SOFT SILTY GRAY CLAY WITH A FEW 1/2" LAYERS OF VERY FINE SAND		
	1.6 1.4 1.8 1.0 1.0 1.0 1.6 1.4 1.8 1.4 1.8 1.6 2.0 2.2 1.6 R-0.0		1-5		20'	
				MEDIUM SOFT SILTY GRAY CLAY		
	1.0 1.0 1.0 1.8 1.6 1.4 1.4 1.4 1.4 1.4 1.6 1.4 1.6 1.6 1.6 R-0.0		1-6		29'	72.0'
				BOTTOM OF HOLE		

PROBING OR VANE TEST

..... LB. HAMMER
..... INCH DROP
NO CASING
..... INCH DIA. ROD

BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT.²

0 1·5 3·0 4·5 6·0 7·5

OVER-NIGHT WATER LEVEL 96.6'

WATER CONTENT

VANE TEST

SILT — CLAY

REMOULDED

UNDISTURBED

0 20 40 60 80 100

% WATER CONTENT
NATURAL ⊙
LIQUID LIMIT □
PLASTIC LIMIT △

R=REMOULDED

PLATE 2

FORM S-10-4

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

HUNTLEY, MARCH TOWNLINE
CARP RIVER BRIDGE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 100.9' DATE MARCH 5, 1964

REMARKS SEE PLATE No. 2

HOLE NO. 2

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'	100.9'
	9.0 9.0 9.0+ 8.2 8.0 8.2+ 7.8 8.5 8.5+ R-1.4.0		2-1	FILL HARD TO VERY STIFF BROWNISH GRAY CLAY WITH SOME TOPSOIL		
	5.6 5.3 4.4 5.2 5.0 4.9 4.4 5.5 5.8 5.0 4.9 5.1+ R-1.6			TOPSOIL	5.5'	95.4'
			2-2	SILT WITH SOME CLAY & VERY FINE SAND	6.5' 7.5'	93.4'
	7.2 7.8 7.4 7.0 7.4 7.4 6.8 7.5 8.2 4.9 5.3 5.2 R-2.4		2-3	VERY STIFF SILTY BROWNISH GRAY CLAY		
	5.4 5.5 5.6 5.0 5.0 5.0 4.6 4.6 4.4 2.8 3.6 3.4 R-1.6		2-4		12.5'	88.4
	1.8 1.6 1.6 1.6 2.0 1.8 2.2 1.6 2.0 R-0.0		2-5	MEDIUM SOFT SILTY GRAY CLAY MOTTLED WITH FINE SAND & A 1" LAYER OF FINE SAND		
TUBE SAMPLE POORLY DISTURBED	0.2 0.4 0.4 0.2 0.4 0.2 0.4 0.6 0.6 0.4 0.6 0.6 0.2 0.2 0.2 R-0.0		2-6	VERY SOFT TO MEDIUM SOFT SILTY GRAY CLAY	20'	80.9'
	1.5 1.0 1.0 1.2 1.0 1.2 0.6 0.8 0.6 1.0 1.0 1.0 1.5 1.4 1.5 R-0.0		2-7	MEDIUM SOFT TO SOFT SILTY GRAY CLAY	25'	
				BOTTOM OF HOLE	29'	71.9'

R = REMOULDED

PROBING OR VANE TEST

..... LB. HAMMER ..... INCH DROP — NO CASING ..... INCH DIA. ROD

BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT.²

0 1.5 3.0 4.5 6.0 7

WATER CONTENT

WATER LEVEL AFTER 1 HR 96.4'

VANE TEST

CLAY

SAND

REMOULDED

UNDISTURBED

0 2.0 4.0 6.0 8.0 10

% WATER CONTENT
NATURAL ⊙
LIQUID LIMIT □
PLASTIC LIMIT △

PLATE 3

B.A. 1795

SITE No. 3-31M

31G5-100
GEOCRES No.

REPORT ON SUBSURFACE INVESTIGATION

AT

BRIDGE SITE

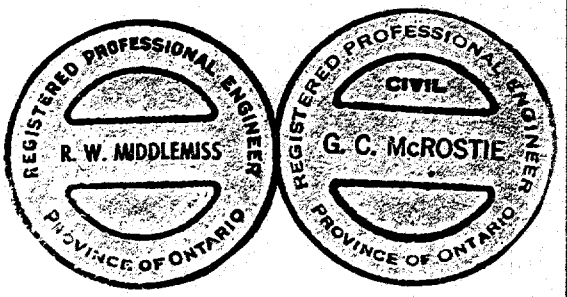
CROSSING CARP RIVER

MARCH AND HUNTLEY TOWNSHIP LINE

TO

M. M. DILLON AND COMPANY LIMITED

CONSULTING ENGINEERS



Report No. SF-733

March 12, 1964.

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