

#69-F-228M

SITE 13-21

OTTER CREEK

BRIDGE

McGEORGE AND BARRY LTD.

CONSULTING ENGINEERS

10 SECOND STREET

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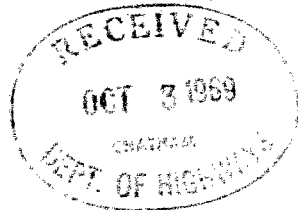
CHATHAM, ONTARIO

DONALD D. McGEORGE, E.A. Sc.

RALPH W. BARRY, E.Sc.

69-F-228M

Subsurface Investigation
Otter Creek Bridge
Chatham Gore Township



This report presents the findings of an investigation carried out at the site of Otter Creek Bridge at Lot Number 15, Concession 3, Chatham Gore Township. The purpose of the investigation was to determine the soil conditions at the site for the proper design of a foundation for the proposed new bridge.

GEOLOGY OF SITE

The physiographic region in which the site is situated is known as the St. Clair Clay Plains which generally consists of deep clay and silt deposits overlying shale bedrock.

The overburden originated as beds of sediments laid down by glacial lakes Whittesey and Warren overlying the clay till.

PROCEDURE

Two boreholes were put down on August 12 and 14, 1969 using a trailer mounted wash drillrig supplied and operated by the F.E. Johnston Drilling Company Ltd.

Standard split spoon samples were taken at intervals throughout the depth of the borehole. Field vane tests were carried out to measure the undrained shear strength of the various strata. Standard penetration tests were performed in all strata. The elevation of the ground surface at each borehole is referred to geodetic datum.

SOIL CONDITIONS

The detailed stratigraphy encountered in both boreholes is shown on the Record of Boreholes Sheets and the location of the borehole is shown on the site plan.

The soil conditions at the site of Borehole 1 consists of some nine feet (9') of firm to soft silty clay mixed with sand and clay. This is underlain by some three feet (3') of blue clay with dark brown sand with decayed wood particles. The clay is underlain by fifty-two feet (52') of soft grey silty clay which has a high water content and low shear strength. This in turn is underlain by a bedrock of black shale which is badly weathered at the top.

The soil conditions at the site of Borehole 2 consists of some seven and one-half feet ($7\frac{1}{2}'$) of loose sandy silt. The sandy silt is underlain by some thirteen feet of loose laminated gray and brown silt.

The silt in turn is underlain by some forty-five feet (45') of soft grey silty clay of high moisture content and low shearing strength. The silty clay is underlain by a thin layer of glacial till and black sand just above the bedrock of black shale.

DESIGN CRITERIA

The undrained shear strength of the silty clay layer ranging from twelve feet (12') to twenty-one feet (21') below the ground surface to a depth of sixty-four feet (64') to sixty-six feet (66') below the ground surface, ranges in value from two hundred and sixty (260) psf to six hundred and twenty (620) psf with an average of three hundred and eighty-seven (387) psf as determined by the vane test. Since the footings of the proposed bridge will be built in this layer, the only feasible type of foundation is a piled foundation to bedrock or refusal.

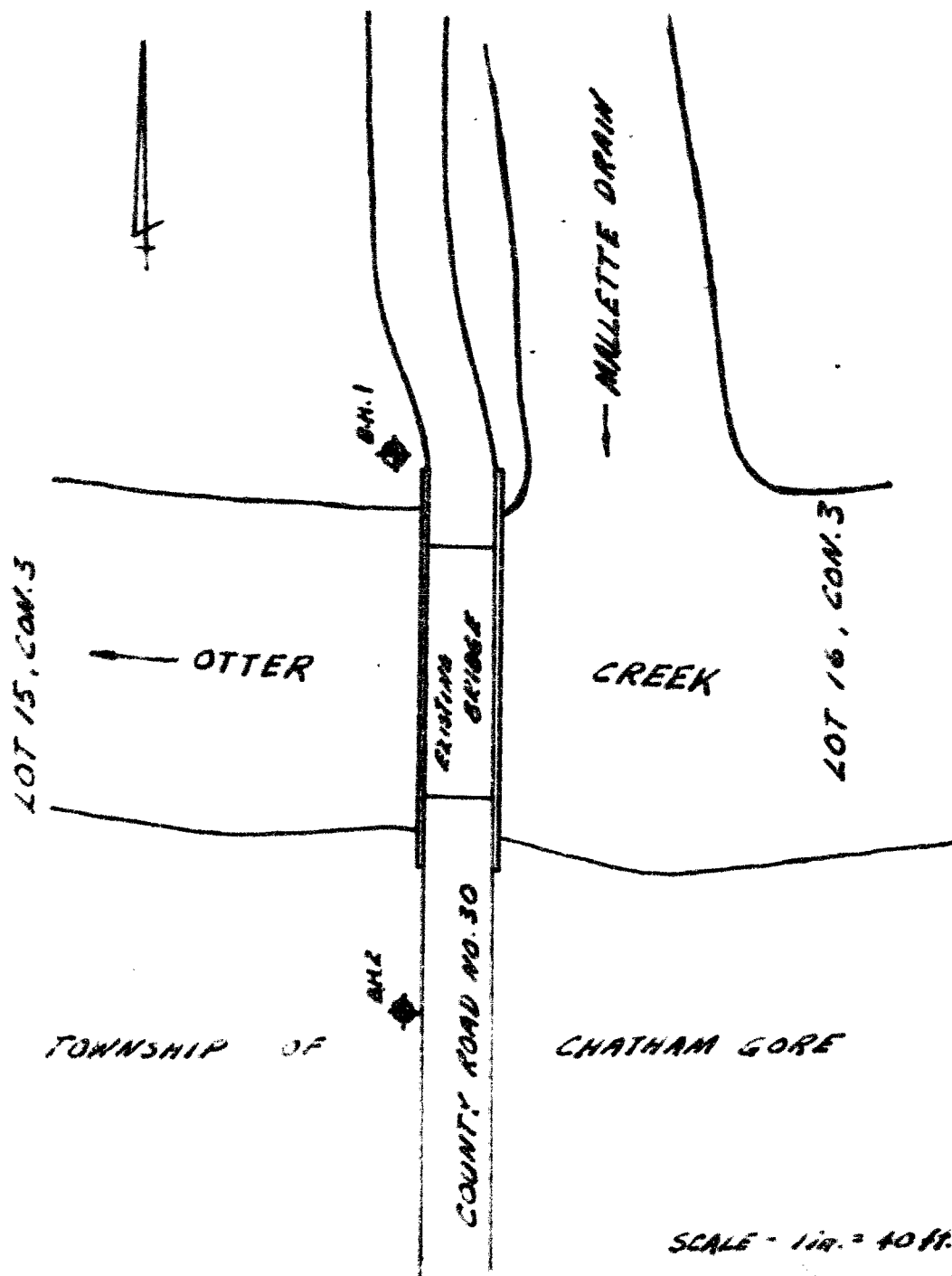


Ralph W. Barry, P. Eng.
McGEORGE AND BARRY LTD.



SITE PLAN

FIG. 1



RECORD OF BOREHOLE /

LOCATION OTTER CREEK BRIDGE

BORING DATE AUG. 12-13, 1969

DAYTON GEOTECH

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 4 1/2 INCHES

DEMPLEUR HAMMER WEIGHT 140 LB DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB DROP

VISION

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FT. -----					COEFFICIENT OF PERMEABILITY K, CM/SEC				PNEUMETER OR STANDPIPE INSTALLATION	
DEPTH FEET	DESCRIPTION	SPENT. PLAT	NUMBER		TYPE	SHEAR STRENGTH C _u LB/SQ.FT. + NAT VANE @ REM. VANE 200 400 600 800 1000					WATER CONTENT, PERCENT 10 20 30 40				
577.9 576.9	FIRM TO SOFT GREY SILTY CLAY AND CLAY WITH SOME BROWN SAND		1	2"	11										WATER LEVEL AT ELEV. 576.8 AUG. 19/69
			2	"	6										
	SOFT BLUE CLAY WITH DARK BROWN SAND		3	"	2										
			4	"	7										
			5	"	3										
			6	"	1										
			7	"	1										
	SOFT GREY SILTY CLAY		8	"	<1										
	SOME SMALL BLACK ANGULAR STONES		9	"	<1										
			10	"	<1										
			11	"	<1										
			12	"	PM										
			13	"	PM										
			14	"	3										
515.9 64.0	BLACK SHALE		15	"	70										
613.2 66.7	WEATHERED AT TOP END OF HOLE REFUSAL AT 66.7'		16	"	-										
					PERCENT AXIAL STRAIN AT FAILURE										

PERCENT AXIAL STRAIN AT FAILURE

VERTICAL SCALE
1 INCH TO

DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

RECORD OF BOREHOLE 2

LOCATION OTTERCREEK BRIDGE

BORING DATE AUG. 14-15, 1969

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 4 1/2 INCHES

SAMPLER HAMMER WEIGHT 140 LB DROP 20 INCHES

PEN. TEST HAMMER WEIGHT - LB DROP INCHES

SOIL PROFILE			SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FT. -----					COEFFICIENT OF PERMEABILITY K, CM./SEC.				ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
DEPTH FT.	DESCRIPTION	STRAT. PLT	NUMBER	TYPE		SHEAR STRENGTH C _u LB/50 FT + NAT. VANE • REM. VANE 200 400 600 800 1000					WATER CONTENT, PERCENT W _p W W _L 10 20 30 40					
580.2 580	LOOSE GRAY-BROWN- BLACK SANDY SILT SOME SAND/CLAY		1	50	9											WATER LEVEL AT ELEV. 576.5 AUG. 19/69
575.2 575			2	"	6											
	LOOSE LAMINATED GRAY TO BROWN SILT		3	"	4	570										
			4	"	6											
	SOFT GRAY SILTY CLAY SOME SMALL BLACK ANGULAR STONES		5	"	9	580										
			6	"	2											
			7	"	1											
			8	"	1	580										
			9	"	1											
			10	"	1											
			11	"	AN	540										
			12	"	AN											
			13	"	2	530										
			14	"	2											
	HARD CLAYEY SILT (TILL) LAYERS OF BLACK SHALE		15	"	2	520										
514.2			16	"	15											
510.0			17	"	99	510										
500.0 500	END OF HOLE		18	"	250											
										</						

WATER LEVEL
AT ELEV.
576.5
AUG. 19/69

PERCENT AXIAL STRAIN AT FAILURE