

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31 G - 171

W.P. No. _____

CONT. No. _____

W. O. No. _____

STR. SITE No. _____

HWY. No. _____

LOCATION SOUTH RAISIN Riv.
BRIDGE, CHARLOTTENBURG
TWP.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. NONE

REMARKS: _____

BA 1283

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SIG-171
GRAPHIC No.

REPORT ON FOUNDATION INVESTIGATION

AT

SOUTH RAISIN RIVER BRIDGE

IN

CHARLOTTENBURG TOWNSHIP

TO

DE LEUW CATHER AND COMPANY OF CANADA LIMITED

Report No. SF-561
September 5, 1961.



McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

BA 1283

MCROSTIE & ASSOCIATES LTD.

CONSULTING ENGINEERS

OTTAWA 1

CANADA

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316-171
GEOCREP No.

1. TERMS OF REFERENCE

We were requested by the Ottawa office of De Leuw Cather and Company of Canada to make a foundation investigation for a new bridge over the South Raisin River in Charlottenburg Township. A report was to be prepared on the investigation.

2. RECOMMENDATIONS

2.1 Foundation Type

Support of the bridge piers and abutments on a piled foundation is recommended. The shallow soil layers are not sufficiently dense nor resistant to scour to make pier footings desirable.

End bearing piles resting on rock beneath the site are the most likely type of suitable pile. Due to the presence of boulders, a type of pile with high penetration power is desirable and steel H-piles provide this. Precast concrete piles or cast in place steel shell piles are not likely to cope adequately with the boulder conditions.

The only alternative that might be studied would be the use of Franki caissons which could be shorter than H-piles and achieve support in the dense till and boulder layer. These caissons would however require a cap and pier system not needed in a H-pile bent.

2.2 Soil and Rock Strengths

Rock beneath the site is a quite competent limestone and with possibly a few feet of penetration through any upper weathered rock layers, it will support the end load of any pile type which can be driven to rock.

The clay soil strengths encountered are adequate to support the low approach fills (not more than 10 feet high) being considered for the structure.

2.3 Construction Precautions

The usual care in pile driving inspection should be exercised. This is particularly necessary where boulders exist and the possibility of piles stopping on boulders must be detected. Deflections of piles by boulders must also be guarded against.

Finally a watch should be kept for the possibility of variations in soil or rock conditions between the borehole locations. If the piers do not fall directly on the borehole locations, the possibility of variations should be kept even more in mind and any changes in conditions reported for appropriate action.

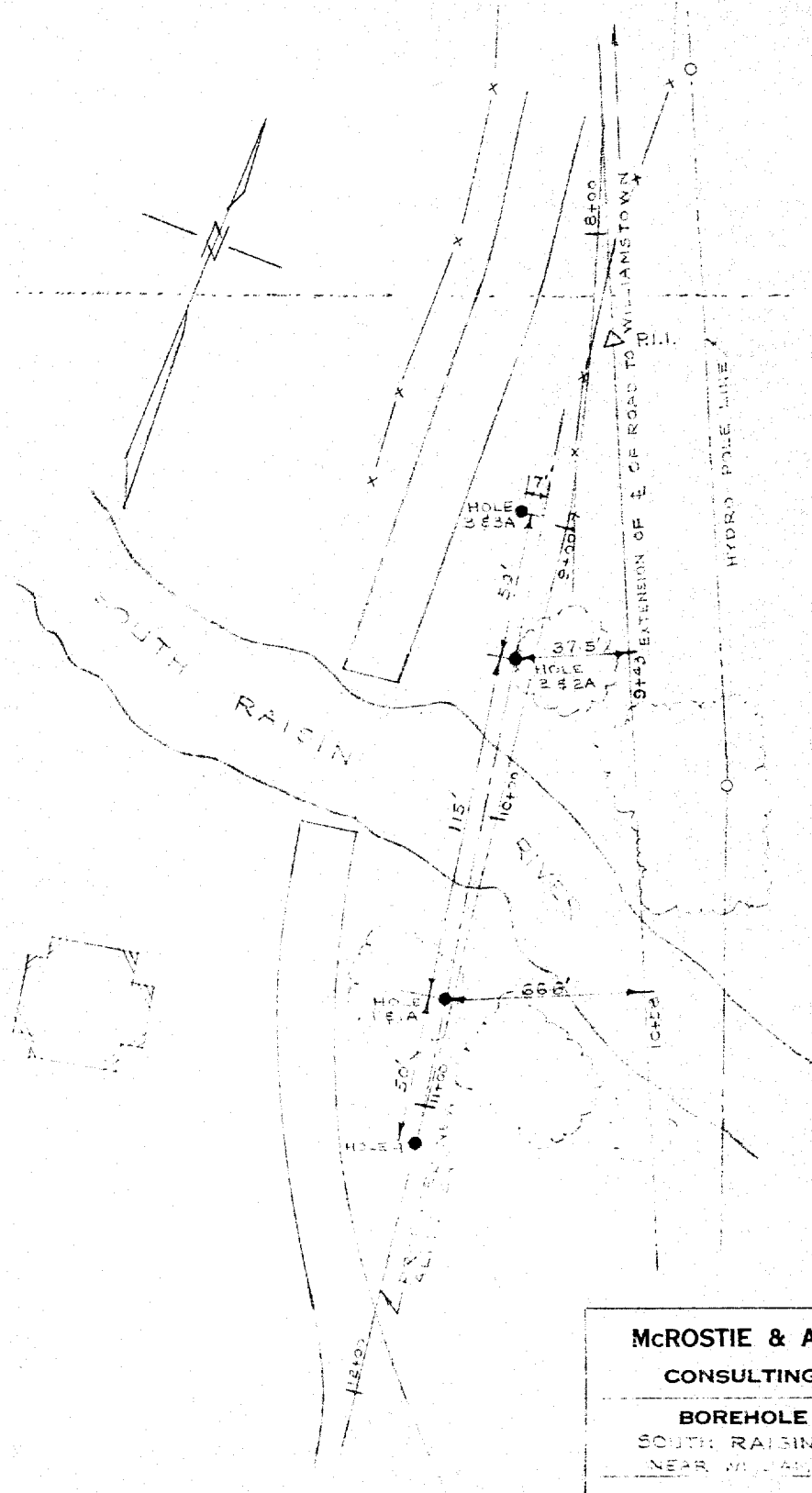
3. SITE INVESTIGATION

Two boreholes and four probings were made at the site with our test drilling equipment. Two inch tube or split barrel soil samples were taken and borehole standard penetration tests were made in addition to borehole vane tests in the cohesive soils. Rock beneath the site was diamond drilled and cores recovered for examination. During the drilling a careful watch was kept for drops or discontinuities so that the structure of the rock might be estimated. Probings were made beside two of the boreholes for correlation and two probings were made near possible abutment locations to give an inexpensive indication of the possible variations in driving conditions. It should be noted that the probings did not reach the rock and estimated pile lengths should not be based solely on probing refusals.

Laboratory testing included visual reclassification, water content tests to aid in assessing the construction behaviour of the soils, and a group of three mechanical analysis tests (plates 7 to 9). The mechanical analysis tests are of interest to anyone considering the feasibility of driven caisson piles where the percentage of silt in a soil near the caisson base is critical.

The soil and rock conditions encountered are shown in detail on the accompanying borehole summaries, plates 2 to 6, but can be generalized as consisting of 10 to 15 feet of clay underlain by about 10 feet of low density till (a mixture of clay, silt, sand, gravel and boulders). At 25 to 30 feet in depth the till changes to very dense and contains many boulders. Beneath the boulders at about 35 feet in depth is limestone rock, the upper few feet of which is weathered. Groundwater

was observed at about 4 feet below the surface at the bore-hole locations and this corresponds in general to the current river level. During high river level seasons, the groundwater levels can be expected to rise by several feet.



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BOREHOLE LOCATIONS
SOUTH RAISIN RIVER BRIDGE
NEAR WILLIAMSTOWN, ONTARIO

SCALE 1" = 50'

PLATE 1

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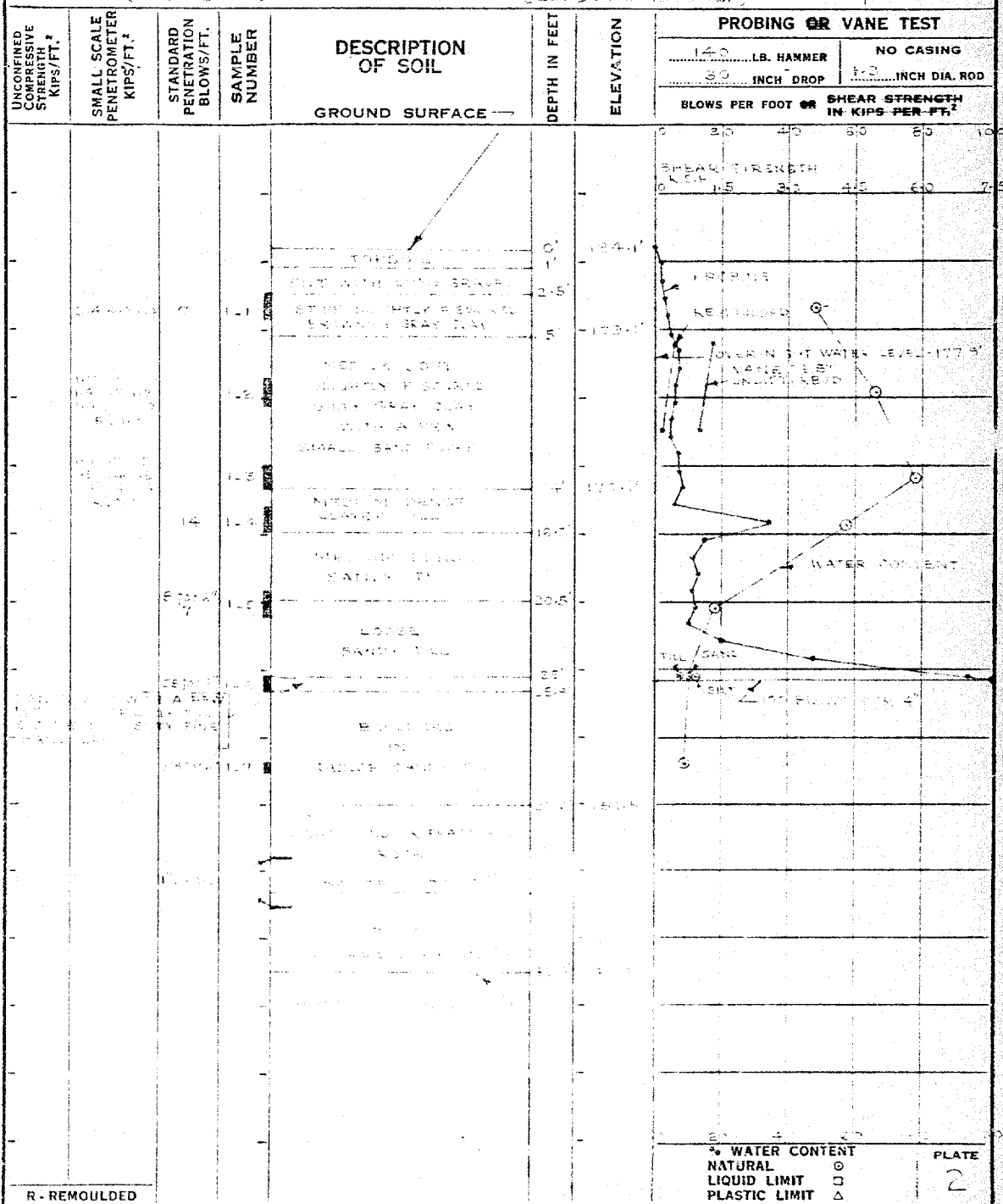
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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

SOUTH RAINIER RIVER BRIDGE
NEAR WILLIAMSTOWN, ONT.

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 184.1' DATE AUG 15, 1961
REMARKS P.M. SPIKE IN COLLAGE OF P.M. HYDRO PUMP FROM SOUTH RAINIER
RIVER ON ROAD TO WILLIAMSTOWN (E.L. 182.7' - 183.1')

HOLE NO. 151A



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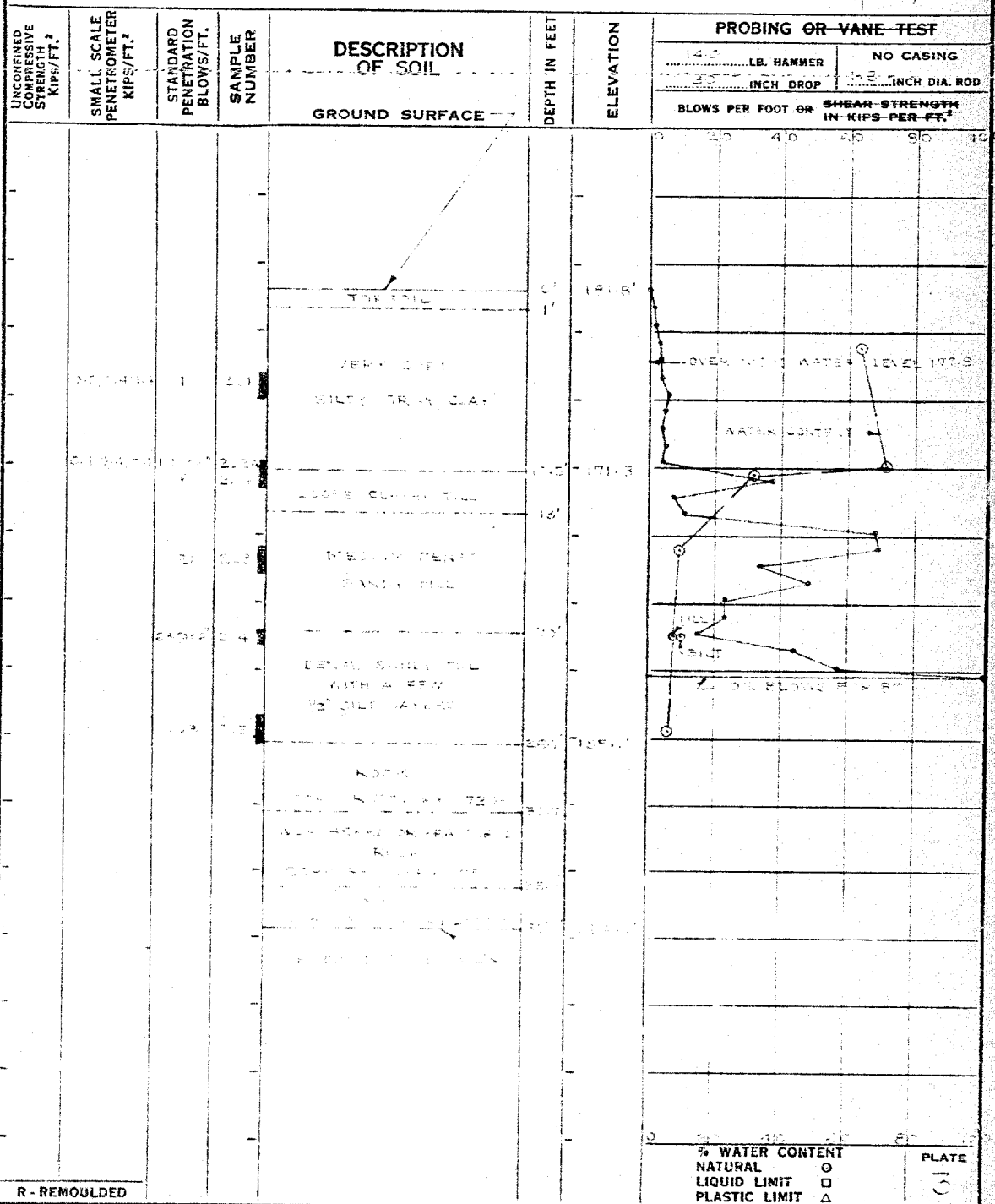
SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

SOUTH BRITISH RIVER BRIDGE
NEAR WILLIAMSTOWN, ONTARIO

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 161.3' DATE AUG. 17, 1961
REMARKS SEE PLATE No. 2

HOLE NO.

2 & 2A



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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

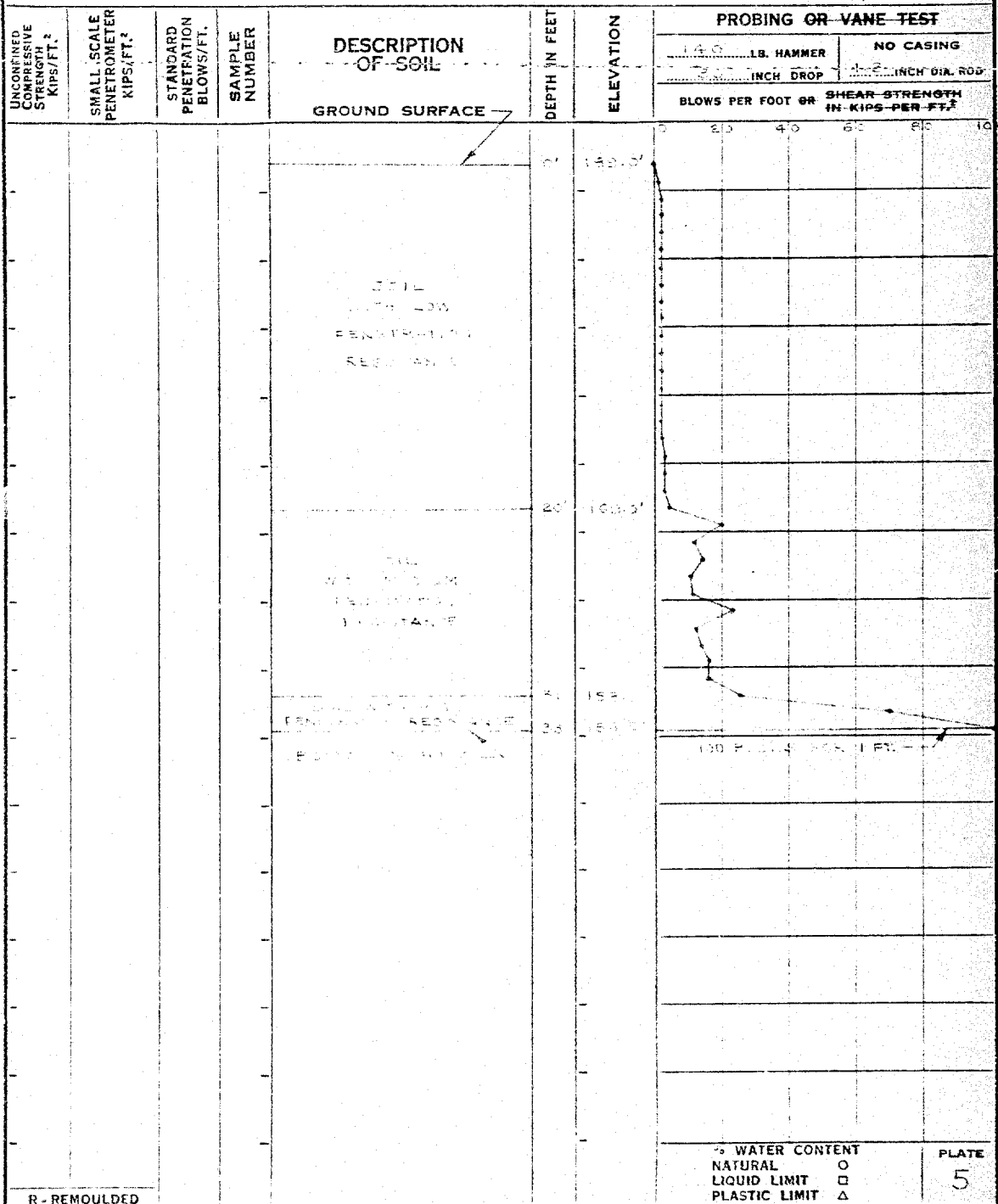
SOUTH BRIDGE, RIVER BRIDGE
NEW WILLIAMSTOWN, ONTARIO

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 100.00 DATE AUG 18 1957

REMARKS See field notes

HOLE No

3A



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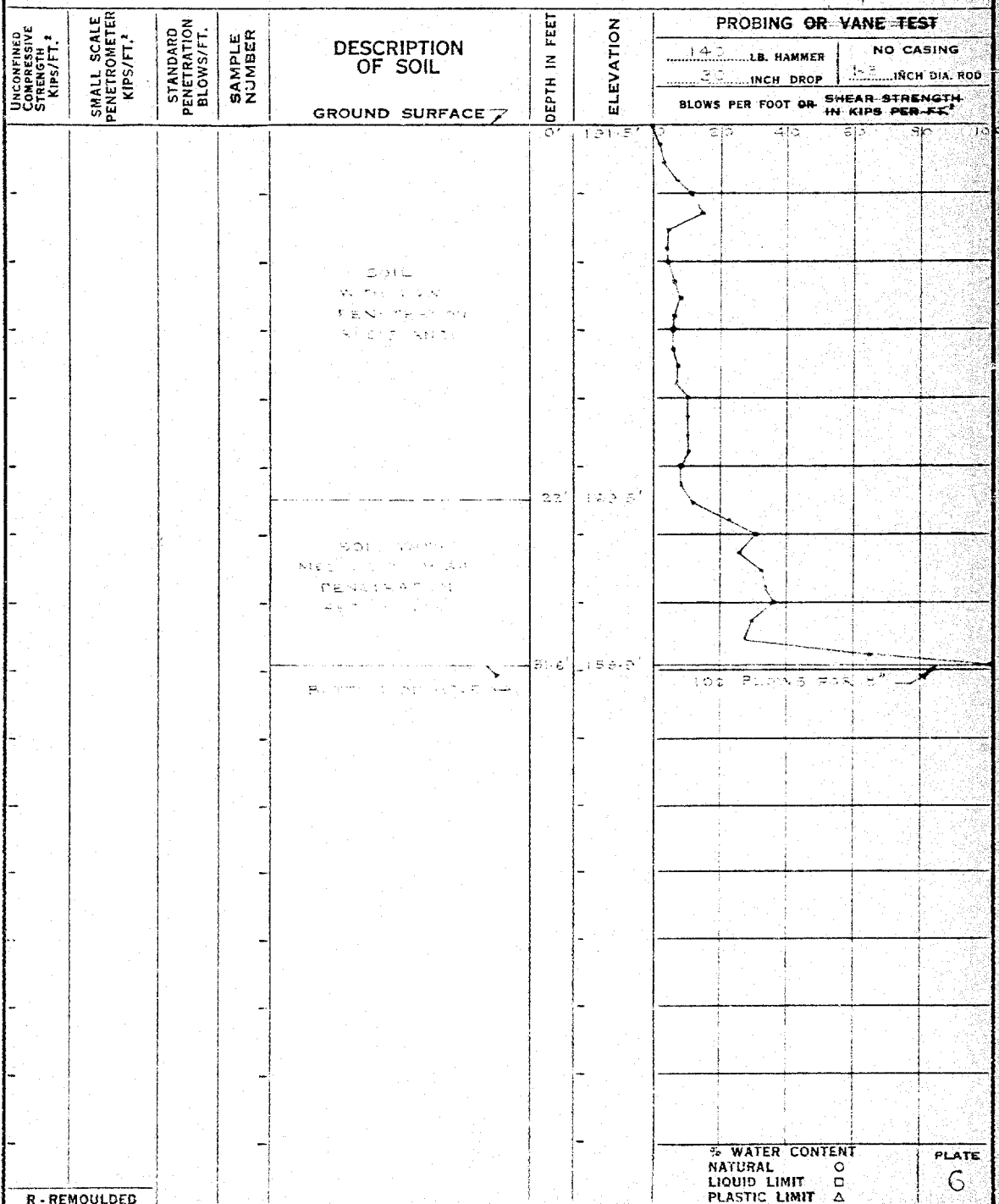
SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

3000' RAISON RIVER BRIDGE
NEAR WILLIAMSTOWN, ONTARIO

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 191.5' DATE AUG 18 1961
REMARKS 155 PLATE NO. 6

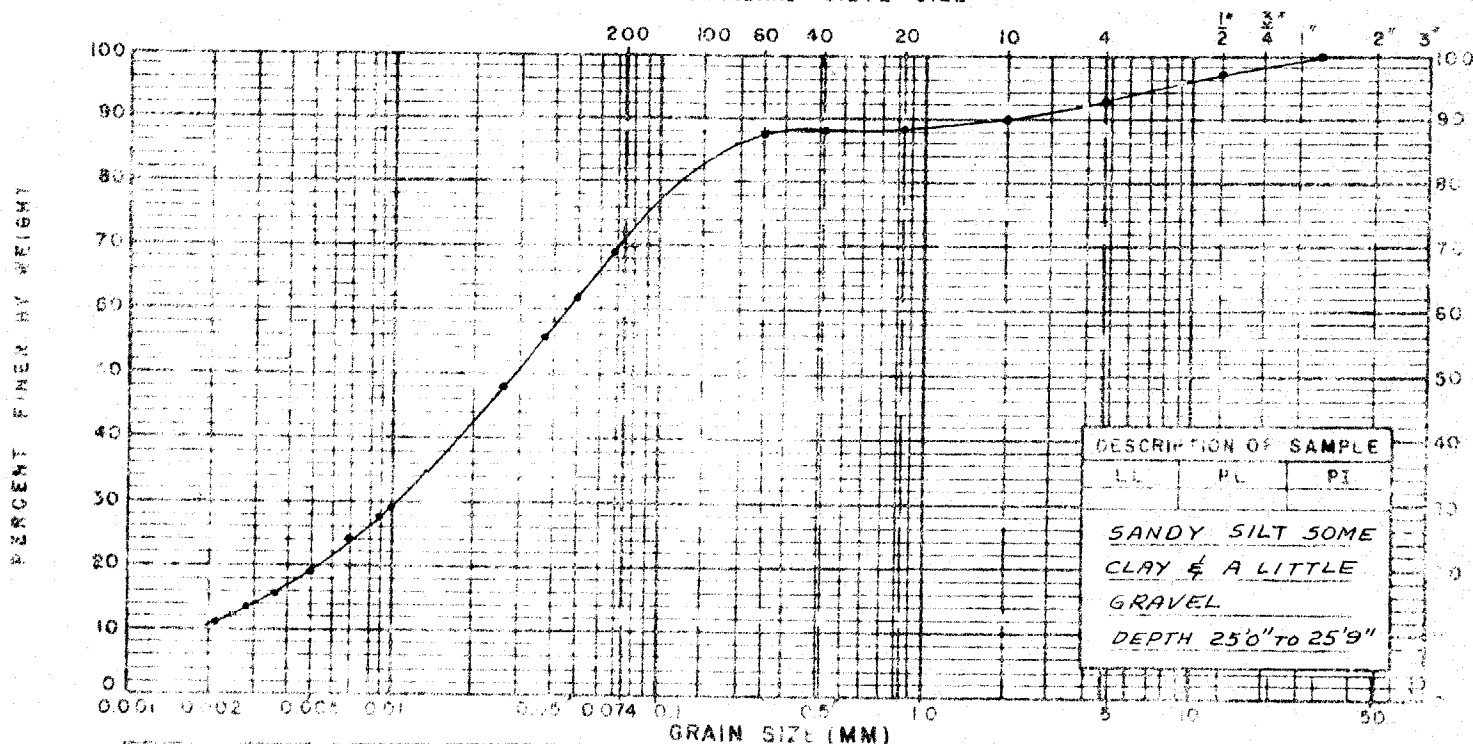
HOLE NO.

4



R - REMOULDED

UNIFIED SOIL CLASSIFICATION
MECHANICAL ANALYSIS OF SOILS
U.S. STANDARD SIEVE SIZE



CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
71%		21%			8%	

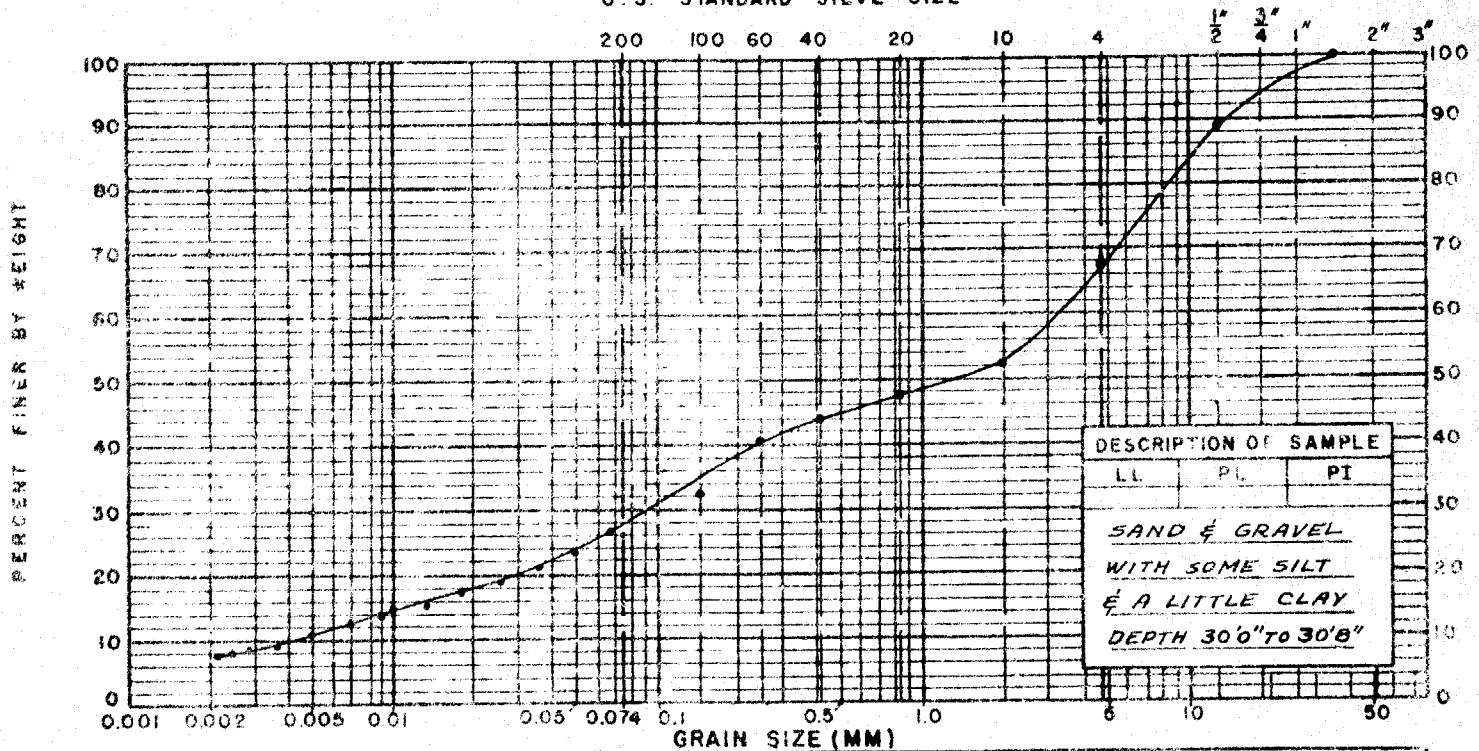
CRITERIA		
SOIL TYPE	Cu	Cc
GW	>4	1-3
SW	>6	1-3

PROJECT SOUTH RAISIN RIVER NEAR
WILLIAMSTOWN, ONT. SAMPLE No 1-G

PLOTTED A.G. DATE 30-8-61
CHECKED G.B. DATE 30-8-61
REMARKS SAMPLE WAS LAYERED
TEST DONE ON WHOLE SAMPLE

McROSTIE & ASSOCIATES LTD.
CONSULTING ENGINEERS
OTTAWA, CANADA

UNIFIED SOIL CLASSIFICATION
MECHANICAL ANALYSIS OF SOILS
U. S. STANDARD SIEVE SIZE



DESCRIPTION OF SAMPLE
LL PL PI
SAND & GRAVEL
WITH SOME SILT
& A LITTLE CLAY
DEPTH 30'0" TO 30'8"

CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
		40%			32%	

CRITERIA		
SOIL TYPE	Cu	Cc
GW	> 4	1-3
SW	> 6	1-3

PROJECT SOUTH RAISIN RIVER NEAR WILLIAMSTOWN, ONT. SAMPLE No. 1-7

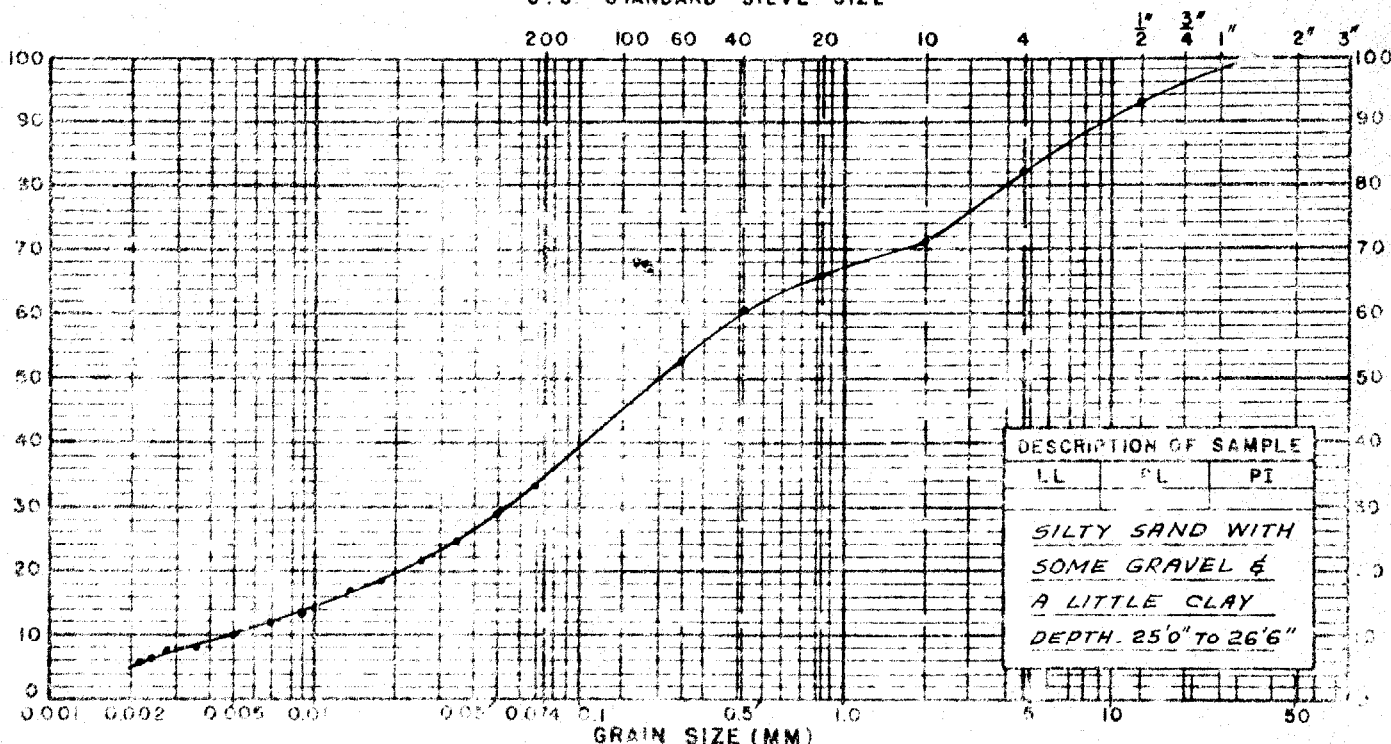
PLOTTED A.G. DATE 30-8-61
CHECKED G.B. DATE 30-8-61

REMARKS

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OTTAWA, CANADA

UNIFIED SOIL CLASSIFICATION
MECHANICAL ANALYSIS OF SOILS
U.S. STANDARD SIEVE SIZE

PERCENT FINER BY WEIGHT



DESCRIPTION OF SAMPLE

LL PL PI
SILTY SAND WITH
SOME GRAVEL &
A LITTLE CLAY
DEPTH. 25'0" TO 26'6"

CLAY OR SILT		SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE
34%		48%			18%	

CRITERIA		
SOIL TYPE	Cu	Cc
SW	>4	1-3
SW	>6	1-3

PROJECT SOUTH RAISIN RIVER NEAR WILLIAMSTOWN SAMPLE No 2-5

PLOTTED A.G. DATE 30-8-61 REMARKS
CHECKED G.B. DATE 30-8-61

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