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55-F-216C

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Hwy 401

THURLOW Twp.

B9415

RACEY, MacCALLUM AND ASSOCIATES LIMITED

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A COMPANY OWNED, DIRECTED AND OPERATED BY

Consulting Engineers AND ASSOCIATED STAFF



MONTREAL: 4123 SHERBROOKE STREET WEST, FITZROY 5261
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Alliances:

THE E. B. ALLEN INSPECTION COMPANY
ISOTOPE PRODUCTS LIMITED,
RADIOGRAPHERS
IRVING P. KRICK, PH.D.,
METEOROLOGIST
JACQUES POULIN,
QUEBEC LAND SURVEYOR
THE VIBRATION ENGINEERING COMPANY

REPORT NO. S-500-501/55/T-61-1

Toronto, Ontario,
March 17, 1955.

Ontario Department of Highways,
c/o Messrs. T. O. Lazarides, Lount & Partners,
79 Scollard Street,
TORONTO 5, Ontario.

RE: FOUNDATION INVESTIGATION
THURLOW TOWNSHIP, BRIDGE NO. 2

Dear Sirs:

In accordance with your instructions we have carried out a foundation investigation at the subject site and we are now pleased to report as follows:

LOCATION OF THE SITE AND THE BOREHOLES (Enclosures Nos. 1 and 2)

The site of the proposed Thurlow Township Bridge No. 2 is situated approximately one and one-half ($1\frac{1}{2}$) miles N.N.W. of Belleville, Ont., at the intersection of the proposed Highway No. 401 and Highway No. 14. The location of the four boreholes, as shown on client's Drawing No. D3552-P1, was spotted by our engineer on the site. The elevations of the boreholes were determined by means of levelling, referring to data received from the Trenton DHO Survey Dept.

DRILLING WORK

The equipment consisting of a diamond core drill, manufactured by Boyles Bros., with screw feed head, operated with AXT-size diamond core bits, was brought to the site and set up on February 7, 1955. Drilling was begun the same day and the field work was completed on February 17, 1955. A 3" I.D. extra heavy duty drive pipe was driven to refusal on bedrock by a 350 lb. drive hammer, dropping 20". Diamond core drilling in bedrock was performed to a depth which ascertained satisfactory properties for the subject foundation project. The rock samples will be kept for a period of six months after completion of this report and shall then be destroyed if no instructions are received to the contrary. As the rock proved to be shaly in many places, the walls of the boreholes

REPORT NO. S-500-501/55/T-61-1

- 2 -

March 17, 1955.

tended to cave. However, though loss of core could not be avoided in many cases, this does not imply any exceptional softness or unfavourable property of the bedrock.

DISCUSSION OF RESULTS (See attached Engineering Data Sheets)

The soil encountered on top of bedrock was found to be a sandy clay with gravel, recovered in a split spoon sampler from five to six feet depth in borehole No. 1. The thickness of the soil stratum ranges from three to six feet from the surface. The surface of bedrock was met at:

EL. 303.7	in borehole	No. 1
EL. 304.8	" "	No. 2
EL. 306.3	" "	No. 3
EL. 306.0	" "	No. 4

The rock formation consisted in all four boreholes mainly of a grey, fossiliferous, argillaceous limestone. This rock was bedded almost horizontally, the thickness of these beds varied but did not exceed about eight inches. Medium to dark grey, calcareous, shaly claystone interbeds subdivided the sequence of limestone slabs. The shaly claystone proved to be less resistant to the diamond bit and will be more easily ground than the very solid limestone. However, the hardness of both is considerable from a structural point of view. A photograph taken in a quarry about half a mile north of the site is attached to enclosure No. 2 to show the bedding of the rock in this area.

No mud seams have been noticed in the upper rock layers. The rock is to be considered sound and solid though laminated horizontally.

Ground water observations in the boreholes proved that the ground water level developed at shallow depth, varying from 1.5 to 3.8 feet depth or between EL. 306 to about EL. 307.7. The measurements were made when the boreholes were already put down into rock.

CONCLUSIONS

The rock formation at the site being sound and solid, we feel that no problem regarding the bearing capacity can arise regarding the proposed bridge structure. It will be advisable to excavate to a depth of at least about two feet into rock to avoid the more fractured superficial rock layers of bedrock and to increase the lateral resistance against shear. It will furthermore be advantageous to design a stepped foundation, as suggested by the client, to increase the lateral resistance additionally if lateral thrust by the structure is to be expected.

REPORT NO. S-500-501/55/T-61-1

- 3 -

March 17, 1955.

We trust that the above statement will be satisfactory. We shall be pleased to consult further with you if you so desire.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LIMITED

K. Tubbesing

K. Tubbesing, P. Eng.

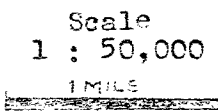
KT/FB

Original and

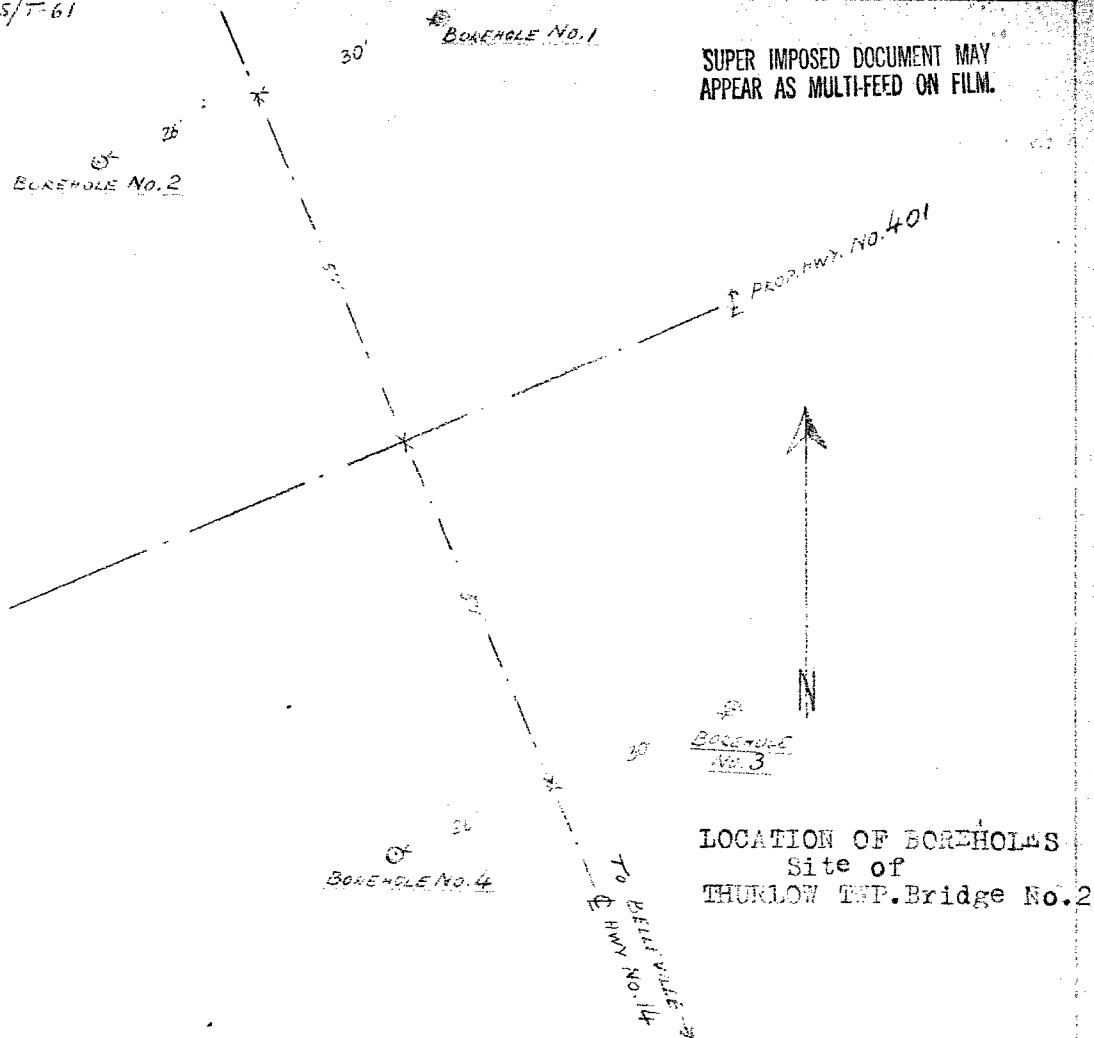
cc.'s 2 - T. O. Lazarides, Lount and Partners, Toronto, Ont.
 3 - Racey, MacCallum and Associates Ltd., Montreal.
 1 - Inspector

Enclosures

FILED & DRAWN: K.T.



Sketch plan showing the location of the site.



Bedding of Bedrock
shown in wall of an
abandoned quarry,
about 1/2 mile north
of the bridge site.

30°

Borehole No. 1

SUPER IMPOSED DOCUMENT MAY
APPEAR AS MULTI-FEED ON FILM.

Borehole No. 2

Borehole No. 401

N

Borehole No. 4

LOCATION OF BOREHOLES
Site of
THURLOW TWP. Bridge No. 2

TO HILLSVILLE



Bedding of bedrock
shown in wall of an
abandoned quarry,
about 1/2 mile north
of the bridge site.

Order No. S-500-504/55/T-61 TRACEY, MACCALLUM AND ASSOCIATES

A. McCadden

Dated

Limited

Driller

Day Month Year

Foundation Engineering Division

Hole Begun 7/2/55

D. McCurdy

Hole Ended 9/2/55

Engineering Data Sheet for Borehole: 1

Helper

Job Name: THURLOW BRIDGE NO. 2

K. TUBBESING

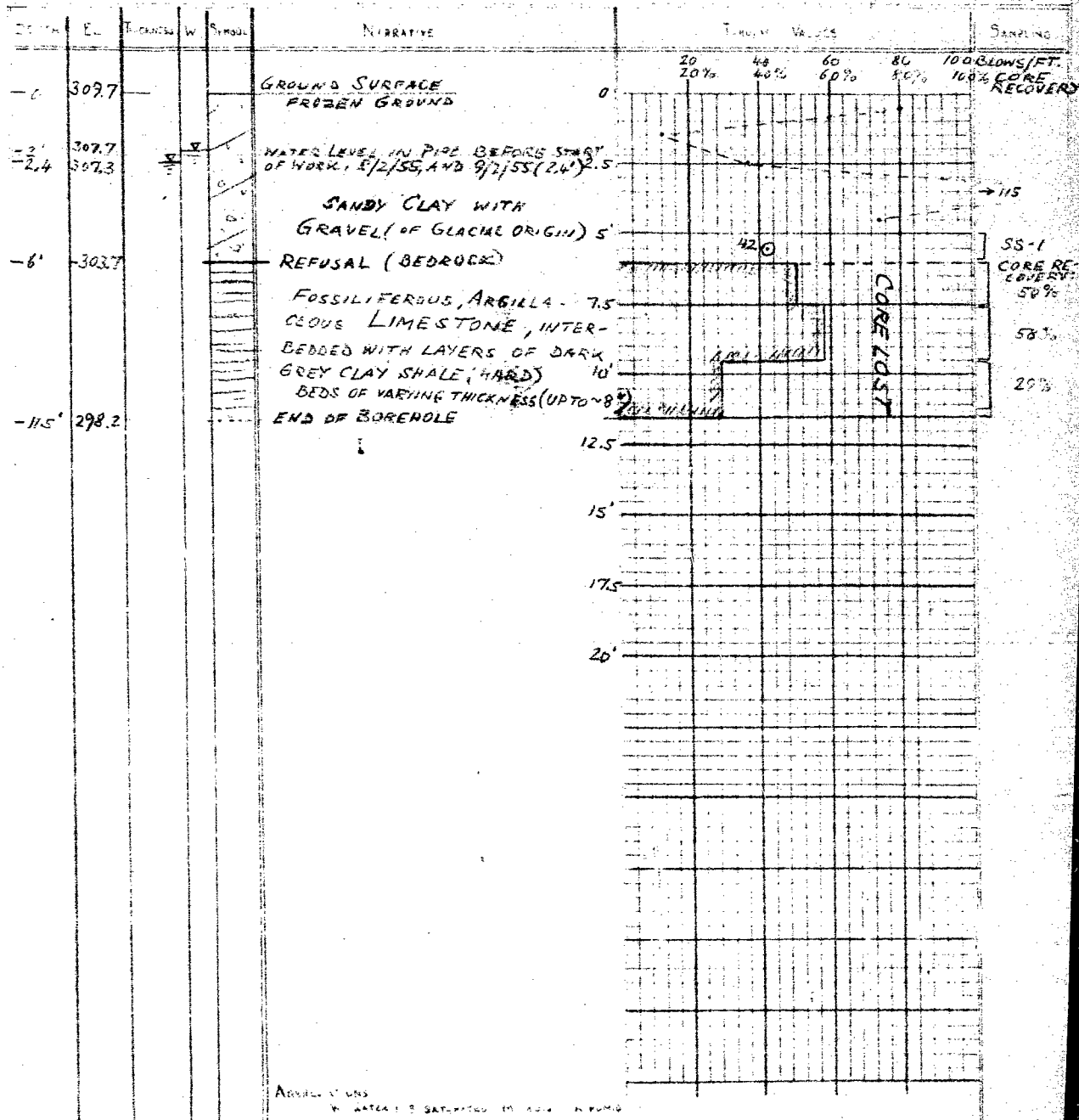
Job Located: INTERSECTION OF HWY. NO. 14 AND PROP. HWY. NO. 401, ~2 MILES

Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN, NNN OF BELLEVILLE, ILL.

Hole Elevation: 309.7 Datum: M.S.L.

15/2/55

Day Month Year



Order No.: S-500-501/55/T-61 RACEY, MacCALLUM AND ASSOCIATES

Dated: Limited

A. McCadden

Day Month Year

Foundation Engineering Division

Driller

Hole Began 10/2/55

D. McCurdy

Hole Ended 15/2/55

Engineering Data Sheet for Borehole: 2

Helper

Job Name: THURLOW BRIDGE NO. 2

K. TUBBESING

Job Location: INTERSECTION OF HWY. NO. 14 AND ROAD, HWY. NO. 401, ~2 MILES

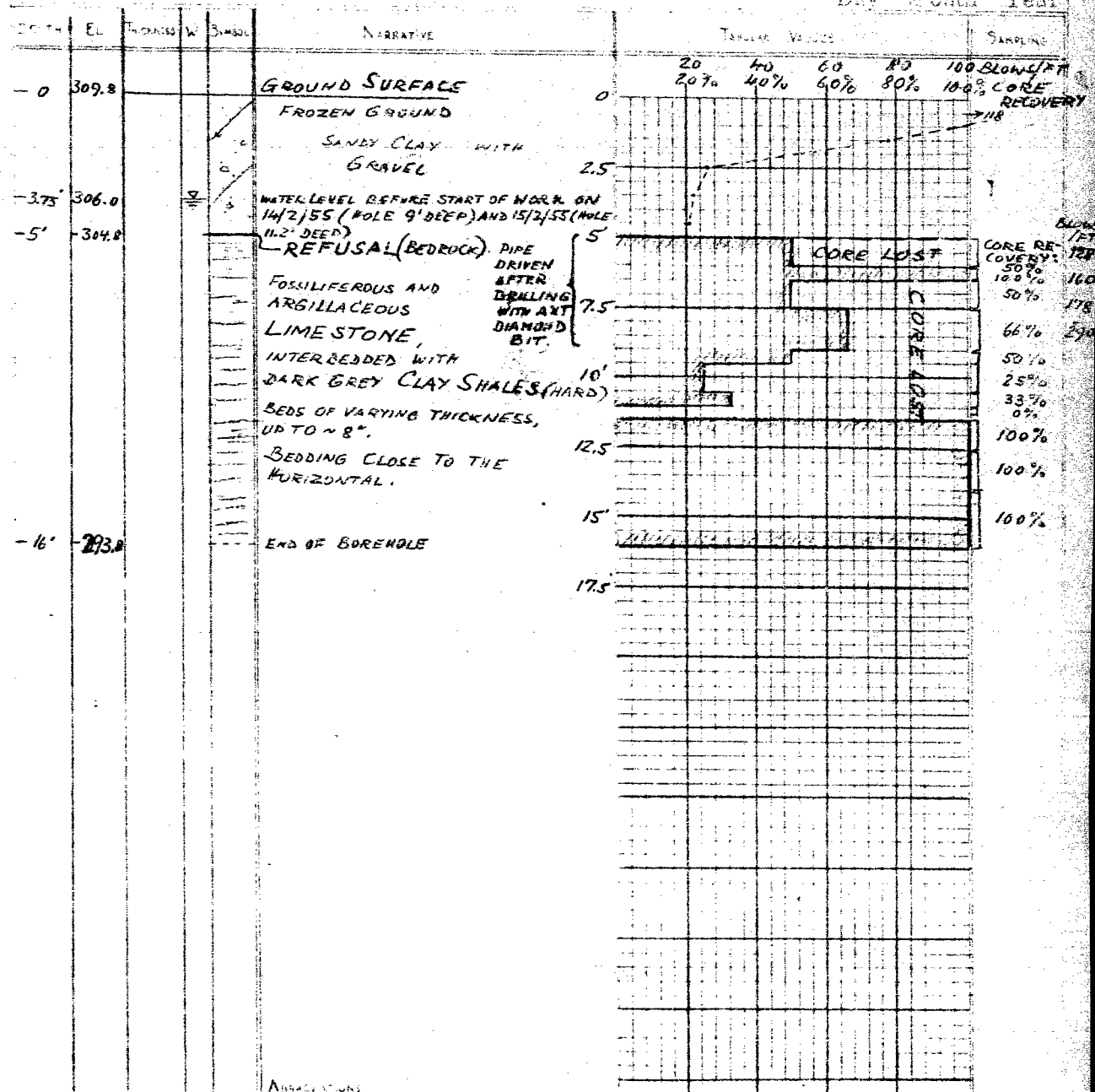
Checked by

Hole Location: AS SHOWN ON ATTACHED SKETCH PLAN NNW OF BELLEVILLE, ILL.

Hole Elevation: 309.8 Datum: M.S.L.

15/2/55

Day Month Year

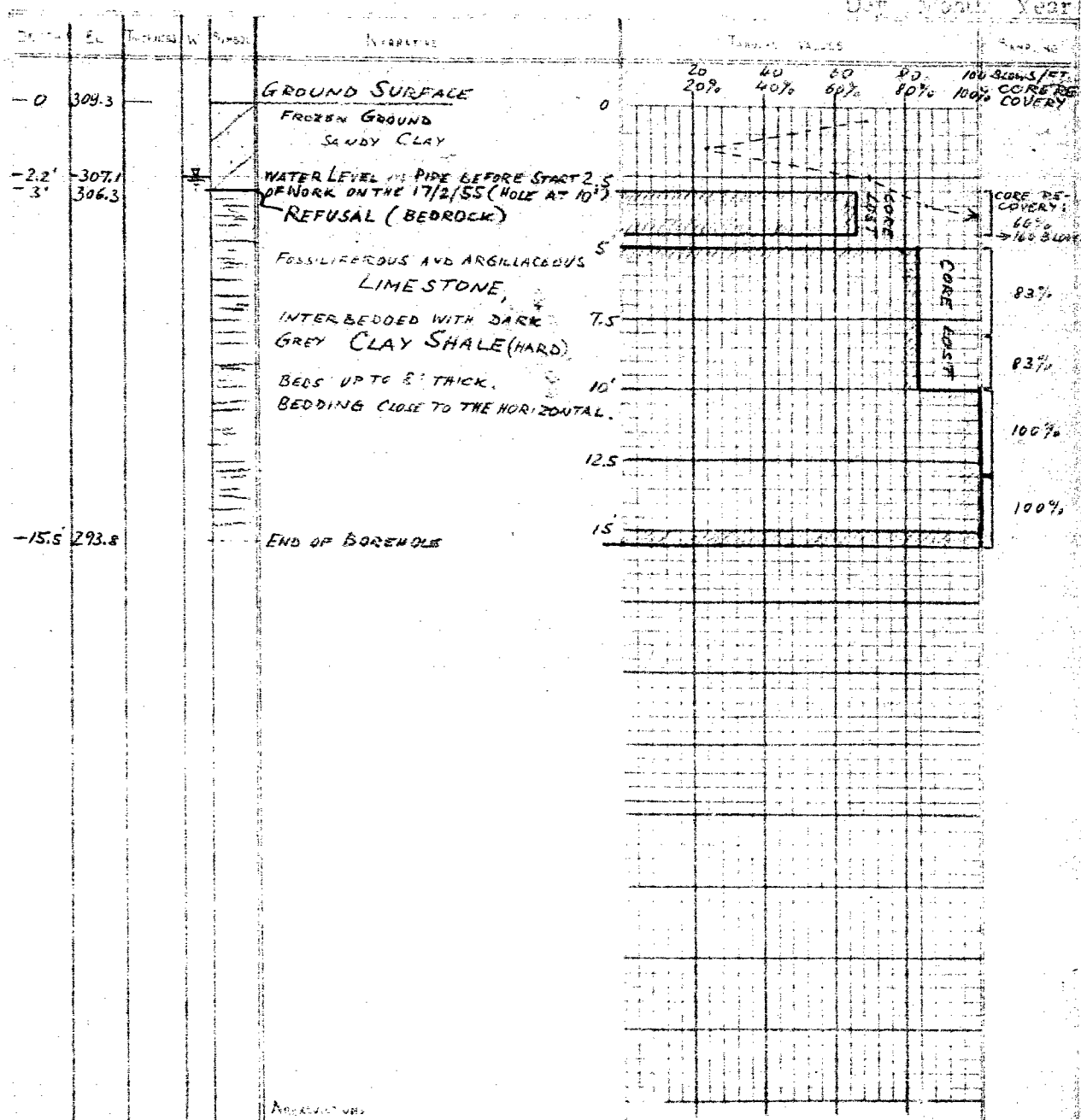


Abbreviations

W. WATER, S. SATURATED, M. MUD, D. DRY

Dated: 16/2/55 17/2/55 17/2/55 17/2/55 17/2/55 17/2/55 17/2/55 17/2/55 17/2/55 17/2/55
 Day: 16 Month: 2 Year: 55 Foundation Engineering Division
 Hole Begun: 16/2/55 Engineering Data Sheet for Borehole: 3
 Hole Ended: 17/2/55 Driller: D. McCURDY
 Helper:

Job Name: THURLOW BRIDGE NO. 2 Checked by: K. TUBGESING
 Job Located: INTERSECTION OF HWY. NO. 14 AND PROP. HWY. NO. 401, ~ 2 MILES NNW
 Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN. OF BELLEVILLE, ONT.
 Hole Elevation: 309.3 Date: 20/2/55
 Dater: M.S.L.



Order No. S-500-501/55/T-61 RACEY, MACCORMACK AND ASSOCIATES A. MACCORMACK
 Dated Limited Driller
 Day Month Year Foundation Engineering Division
 Hole begun 9/2/55 Hole Ended 10/2/55 Engineering Data Sheet for Borehole: 4 D. McCURDY
 Helper

Job Name: THURLOW BRIDGE NO. 2 K. TUBBESING
 Job Located: INTERSECTION OF HWY. NO. 14 AND PROP. HWY. NO. 401, ~ 2 MILES NNW Checked by
 Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN. OF BELLEVILLE, ONT.
 Hole Elevation: 310.0 Datum: M.S.L. 20/2/55
 Day Month Year

