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55-F-209C

#

Hwy 401

WESTMINSTER

TWP

15.7.441

# RACEY, MACCALLUM AND ASSOCIATES LIMITED

A COMPANY OWNED, DIRECTED AND OPERATED BY

## Directors:

DONALD C. MACCALLUM, B.ENG., M.E.I.C., P.ENG.

R. JOHN RACEY, B.SC., M.E.I.C., P.ENG.

JOHN S. LOCHHEAD, B.ENG., M.E.I.C., P.ENG.

JOHN A. NORLIN, B.A., M.SC.

ROBERT H. QUINTAL, M.A.SC., M.E.I.C., P.ENG.

A. ERIC RANKINE, B.SC., A.M.I.E.E., M.E.I.C., P.ENG.

L. B. CHALLIES, D.ENG., LL.D., M.E.I.C., P.ENG.

## Consulting Engineers AND ASSOCIATED STAFF



MONTREAL: 4123 SHERBROOKE STREET WEST, FITZROY 5261  
TORONTO: 33 BLOOR STREET EAST, WALNUT 2-9071

## Affiliations:

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-74/55/T-123-1

310 Odeon Building,  
20 Carlton Street,  
Toronto, Ontario.

55F2090

July 15th, 1955.

Franki Compressed Pile Co. of Canada Ltd.,  
1835 Yonge Street,  
TORONTO, Ontario.

Attention: Mr. W. H. T. Wilson

RE: TEST BOREHOLE - STATION 378 + 30  
ON CENTRE LINE OF PROPOSED  
HIGHWAY NO. 401 SOUTH OF LONDON, ONT.

Dear Sirs:

In accordance with your instructions we carried out the drilling of one (1) borehole at the above site. After the completion of some laboratory tests we are now in the position to report as follows:-

The drilling equipment was brought to the site on June 22nd, 1955. The borehole was brought down to 15.5 ft. depth on the same day and a depth of 40.5 ft. was reached on June 23rd. The borehole was completed on 24th June, the final depth being 45.5 ft. The equipment was loaded, removed from the site and returned to the warehouse the same day.

The drilling was carried out with a standard diamond core drill and three-inch extra heavy duty pipe driven by a 350 lb. drive-hammer, dropped 20 inches.

REPORT NO. 8-74/55/T-123-1 Cont'd

Samples were taken with a standard two-inch split-barrel sampler at 5 ft. intervals. The sampler was driven with a 140 lb. sampler hammer with an energy equalling 4200 in. lbs. The number of blows per foot of penetration of the sampler as well as of the drive-pipe was counted and plotted in the diagram on the attached Engineering Data Sheet.

The soil was found to be an extremely stiff silty clay of medium plasticity, containing a small amount of sand and some very fine gravel at a depth of five feet where the first sample was taken. The liquid limit of this clay was 30.7%, the plastic limit 13.4% and the natural water content amounted to 15.3%. At 10 ft. depth the soil proved to be very stiff, with a water content of 17.1%.

Below this depth the stiffness of the soil decreases to medium consistency and a sample taken at 20 ft. depth showed a clay of low plasticity with a liquid limit at 26.5%, plastic limit 12.5% and a natural water content of 19.1%. The soil composition appeared to be approximately the same with increasing depth. The water content at 25 ft. depth was determined to be 25.9% (this being a slightly disturbed sample), at 30 ft. depth 23.3%, at 35 ft. depth 21.8%, and at 45 ft. depth 25.0%.

With respect to the bearing capacity of the soil, the penetration values of the standard 2" split-barrel sampler, obtained at 5 ft. intervals when taking a sample, permit us to give the following data.

REPORT NO. S-74/55/T-123-1 Cont'd

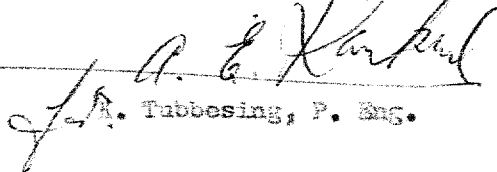
The bearing capacity with a factor of safety of three is at 5 ft. depth of the order of four tons per square foot, at 10 ft. depth of the order of 2.5 tons per square foot and decreases to between 1 and 1-1/4 ton per square foot below 10 ft. depth down to the final depth of the borehole at 45 ft. depth.

The above data, however, refer only to the results obtained from this one borehole. From experience in the area, we know that there is a certain scatter with regard to the penetration resistance of the 2" split-barrel sampler in different boreholes at the same depth. We therefore wish to point out that the above bearing values may not be considered to be permissible for the whole site. The possibility of variations in the soil conditions involves that there may well be the danger of differential settlement. The stiffness of the overlying 10 ft. of soil is certainly caused by desiccation and must not necessarily extend over the whole bridge site.

We trust that the above information will be satisfactory.

Yours very truly,

RACEY, MACCALLUM AND ASSOCIATES LIMITED

  
A. E. Karkkainen, P. Eng.

KT/TW

Original and  
three copies

- Franki Compressed Pile Co. of Canada Ltd., Toronto, Ont.,  
Attention: Mr. W. H. T. Wilson

c.c.'s: 2 - Racey, MacCallum and Associates Ltd., Montreal, P. Q.  
1 - Soils Engineer

Order No.: S-500-74/55/ TT-123 RACEY, MACCALLUM AND ASSOCIATES  
LIMITED

J. MARYKUCHA  
Driller

Hole Begun 22/6/55 Foundation Engineering Division

Hole Ended 24/6/55 Engineering Data Sheet for Borehole: #1

S. SCOTT  
Helper

Job Name: ONE TESTHOLE SOUTH OF LONDON, ONT. - HWY. NO. 401

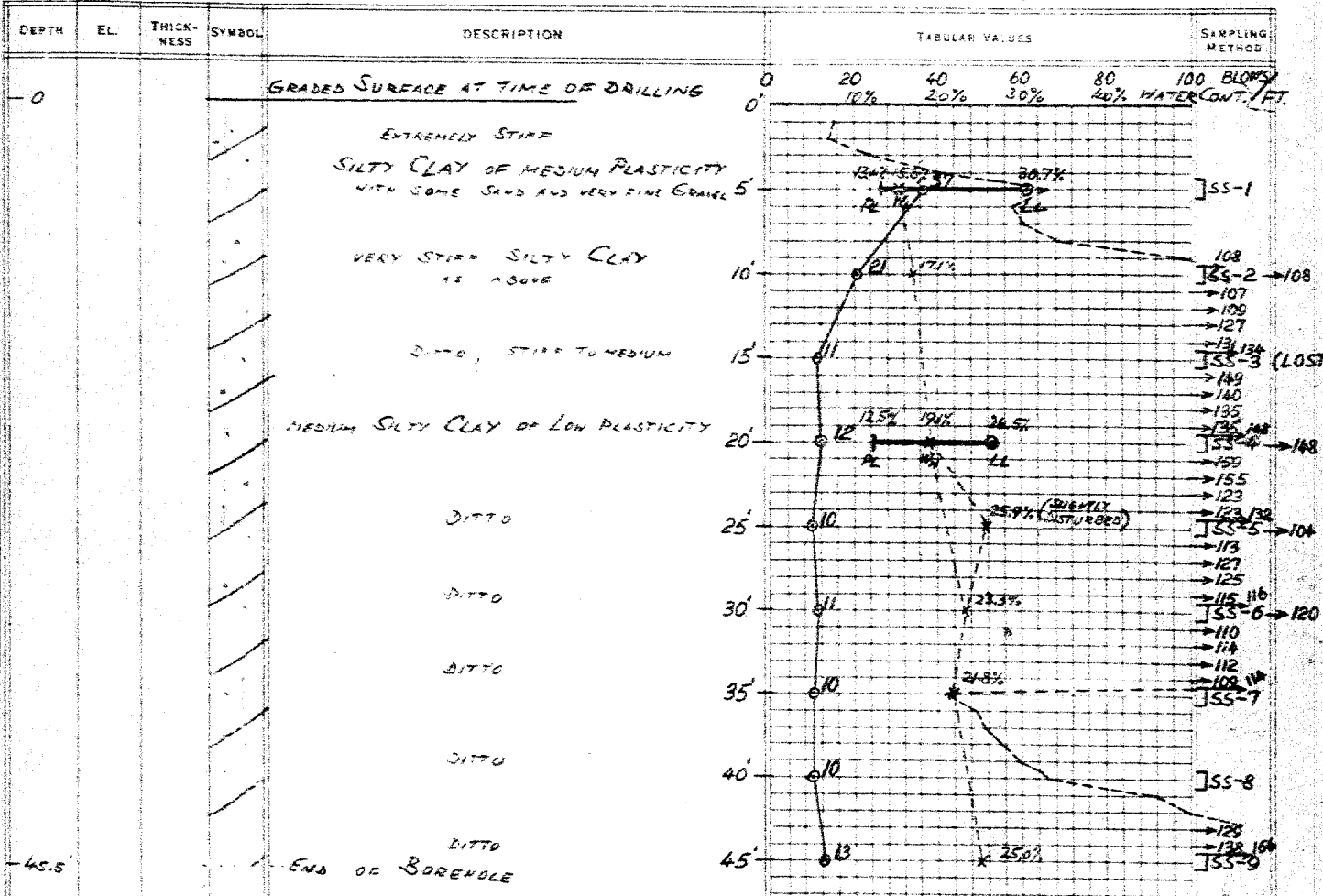
C.O. & K.T.  
Checked by

Job Located: SOUTH OF LONDON, ONT.

Hole Located: STATION 378+30 OF E OF PROPOSED HWY. NO. 401

Hole Elevation: - Datum: -

11/7/55  
Day Month Year



LEGEND:  
○ — NUMBER OF BLOWS/FT. ON THE  
2" SPLIT BARREL SAMPLER  
----- DITTO, ON THE 3" DRIVE PIPE

BA 941



"Franki Piles carry more tons per Pile"

CABLEGRAMS:  
"FRANKIPILE"

# FRANKI

## COMPRESSED PILE COMPANY OF CANADA LIMITED

1835 YONGE STREET

TELEPHONE:  
HUDSON 8-9009

TORONTO 7, ONT.

OP 7655  
PC 386

July 19th, 1955

55F 209-C

SOIL INVESTIGATION REPORT  
for  
DEPARTMENT OF HIGHWAYS OF ONTARIO  
(Consulting Engineers, M.M. Dillon & Co.)  
at  
THE CROSSING OF DINGMAN CREEK & HWY. 401  
WESTMINSTER # 10

As requested, we carried out a soil investigation at the site of the proposed box culvert, the crossing of Dingman Creek & Hwy. 401, Westminster # 10.

REPORT OF INVESTIGATION

Five percussion tests were made at the location shown on the location sketch. The results are shown on the accompanying diagrams and are summarized as follows.

S U M M A R Y

Hole No.	Ground Surface	2,000 lbs. per sq. ft.	4,000 lbs. per sq. ft.	Refusal
1	845.4	841	840	835
2	844.0	844	839	834
3	845.7	842	840	834
4	845.5	841	839	835
5	845.2	842	839	833

Owing to the high elevation at which refusal was obtained arrangements were made to bring in Diamond Drill Equipment to put down one deep hole. The report on this hole is attached hereto.

July 19, 1955

- 2 -

PC 386

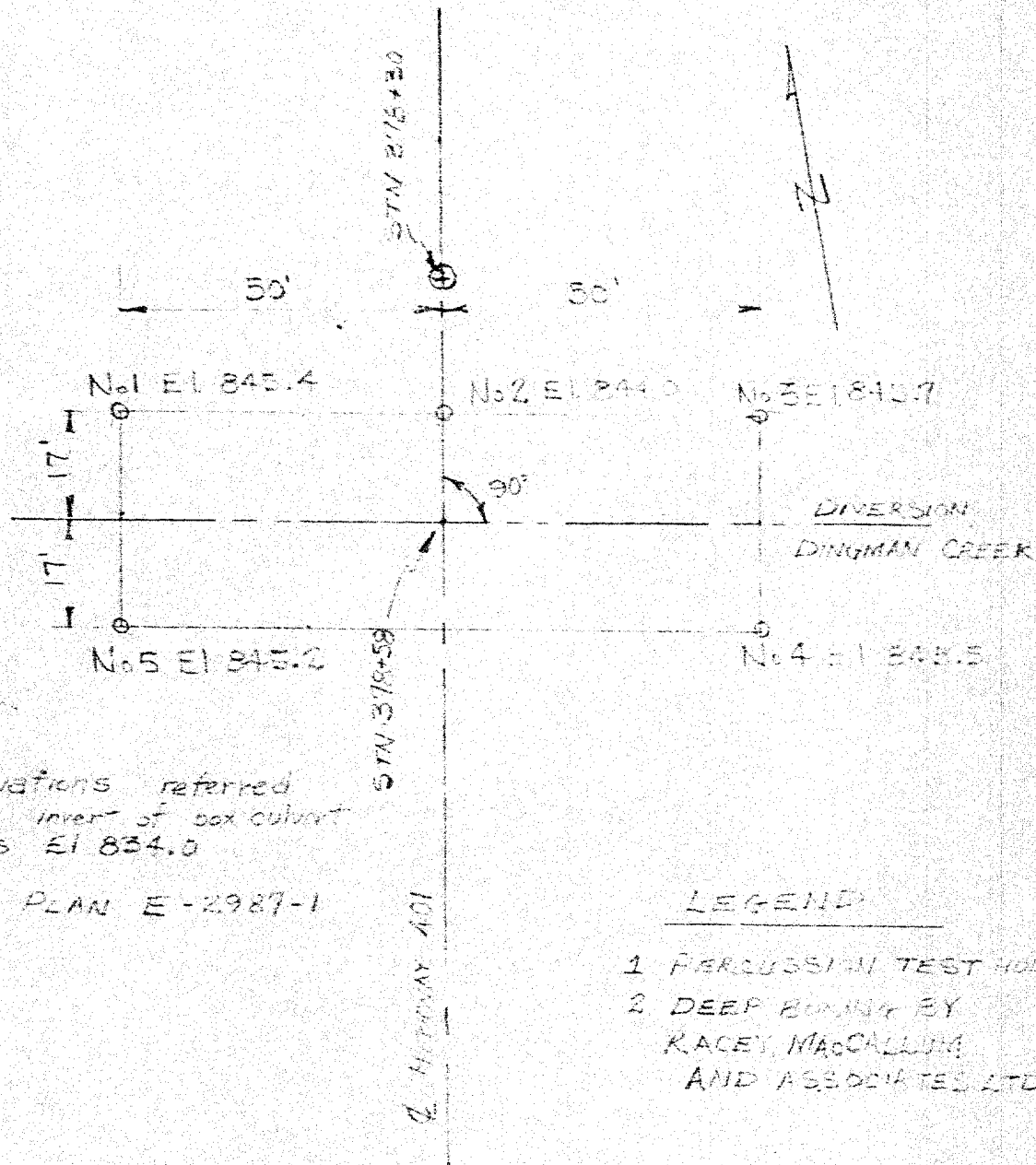
DISCUSSION

The results of the laboratory test carried out on the samples taken from the bore hole indicate that the soil bearing values given on the above summary sheet are conservative. The percussion tests indicate that the conditions are uniform over the entire site and provided care is taken to ensure that the soil loading pressures at depth do not exceed those given in the attached report, no difficulty should be encountered using the soil bearing values given in the above summary.

W H T Wilson

W. H. T. Wilson, P. Eng.

# LOCATION SKETCH



FRANKI COMPRESSED FILE COMPANY OF CANADA  
 For  
 DEPARTMENT OF HIGHWAYS OF ONTARIO  
 (M.M. Dillon Consulting Engineers  
 at  
 WINCHESTER # 10

FRANKI  
COMPRESSED PILE COMPANY  
OF CANADA LIMITED

PERCUSSION TEST DIAGRAM

FOR: D. H. C. BRIDGE

AT: WESTMINSTER # 10

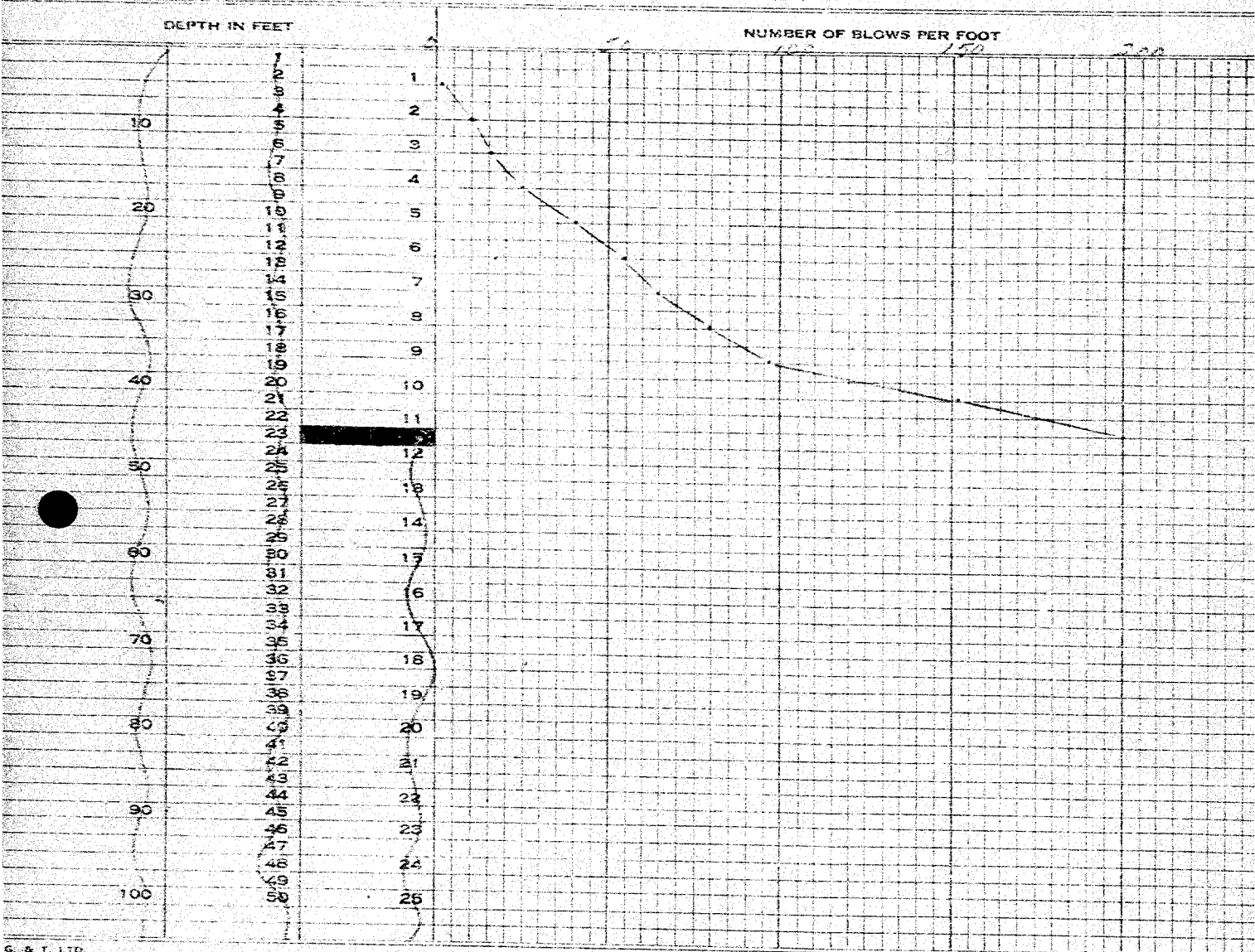
DATE: May 24th, 1955.

TEST NO.: 1

JOB NO. FC 366

WEIGHT OF HAMMER 225#

DROP: 3 FT.



Ground Surface Elevation 845.4  
Refusal Elevation 835  
Number of Blows 200 for

SIGNED

WHT

# FRANKI

COMPRESSED PILE COMPANY  
OF CANADA LIMITED

## PERCUSSION TEST DIAGRAM

FOR: D. F. C. BRIDGE

AT: WESTMINSTER # 10

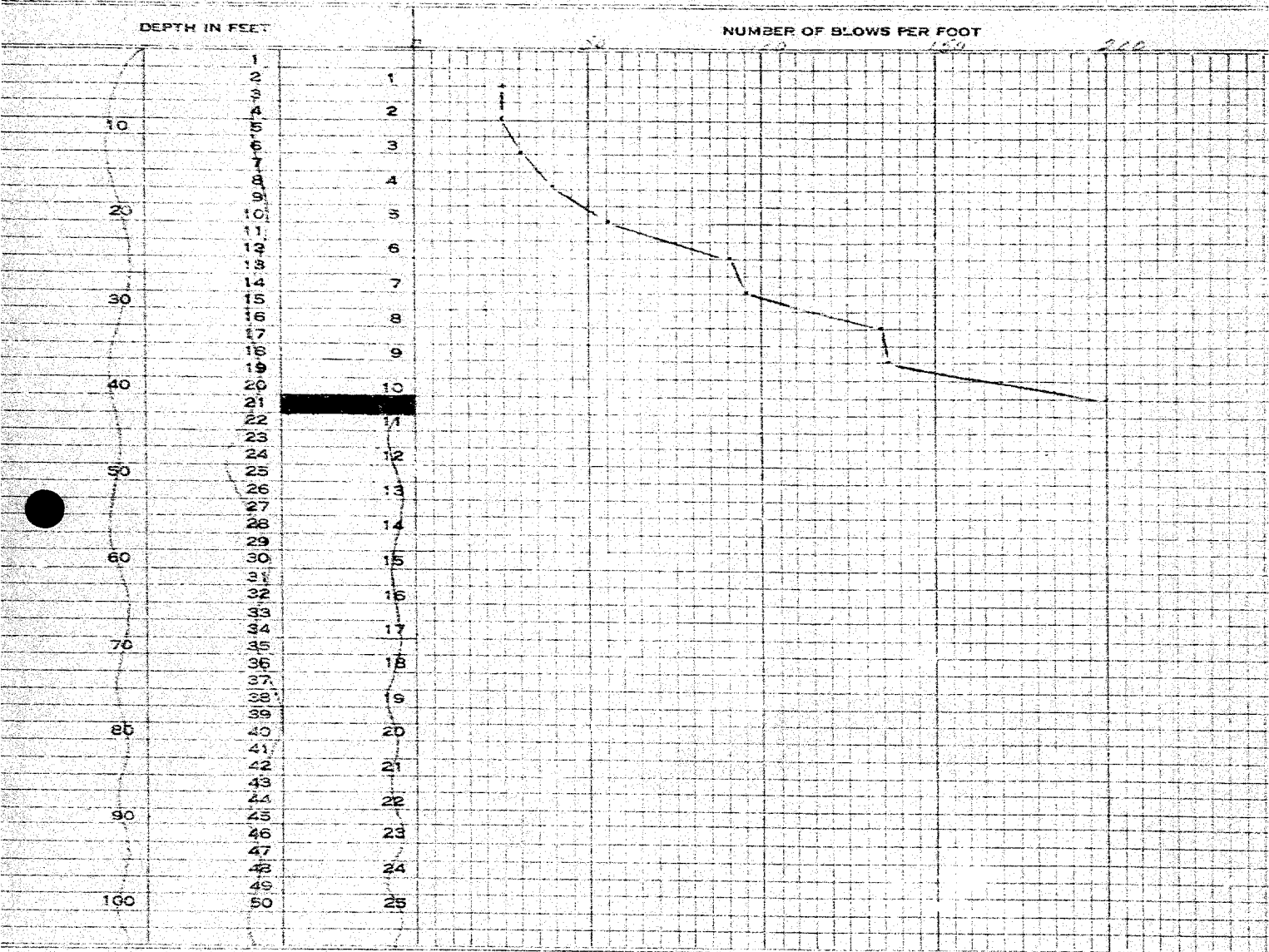
JOB NO. PC 386

DATE: May 21st, 1955.

TEST NO.: 3

WEIGHT OF HAMMER 225#

DROP 3 FT.



Ground Surface Elevation 844.0  
 Refusal Elevation 834  
 Number of Blows 200 for 30"

SIGNED \_\_\_\_\_

# FRANKI

COMPRESSED PILE COMPANY  
OF CANADA LIMITED

## PERCUSSION TEST DIAGRAM

FOR: D. H. C. BRIDGE

AT: WESTMINSTER # 10

DATE: May 25th, 1955.

TEST NO.: 3

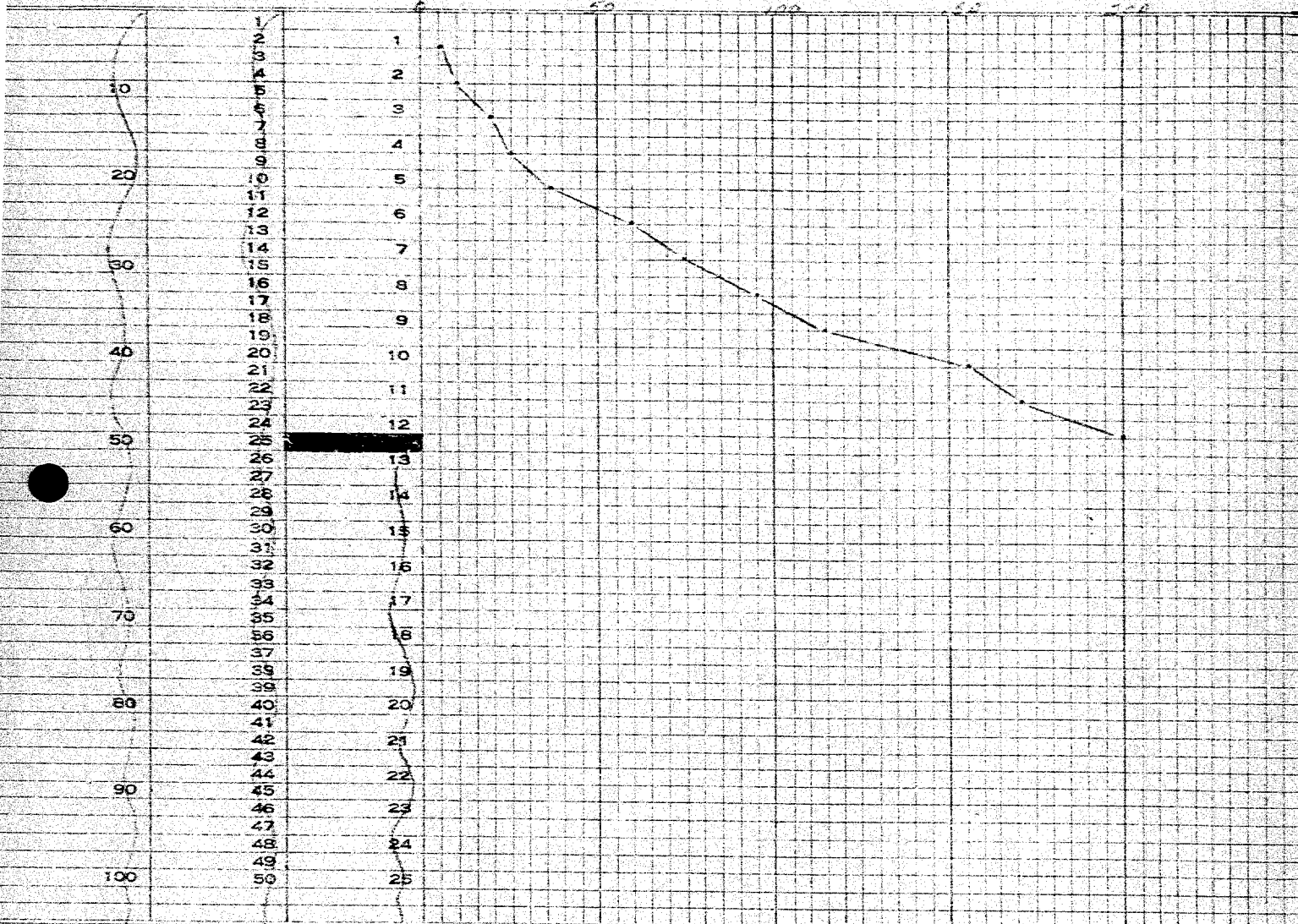
JOB NO. PC 386

WEIGHT OF HAMMER 225#

DROP, 3 FT.

DEPTH IN FEET

NUMBER OF BLOWS PER FOOT



A. T. LTD.

Ground Surface Elevation 845.7  
Refusal Elevation 834  
Number of Blows 200 for 10"

SIGNED

FRANKI  
COMPRESSED PILE COMPANY  
OF CANADA LIMITED

PERCUSSION TEST DIAGRAM

FOR: D. E. O. BRIDGE

AT: WILLOW CREEK BRIDGE

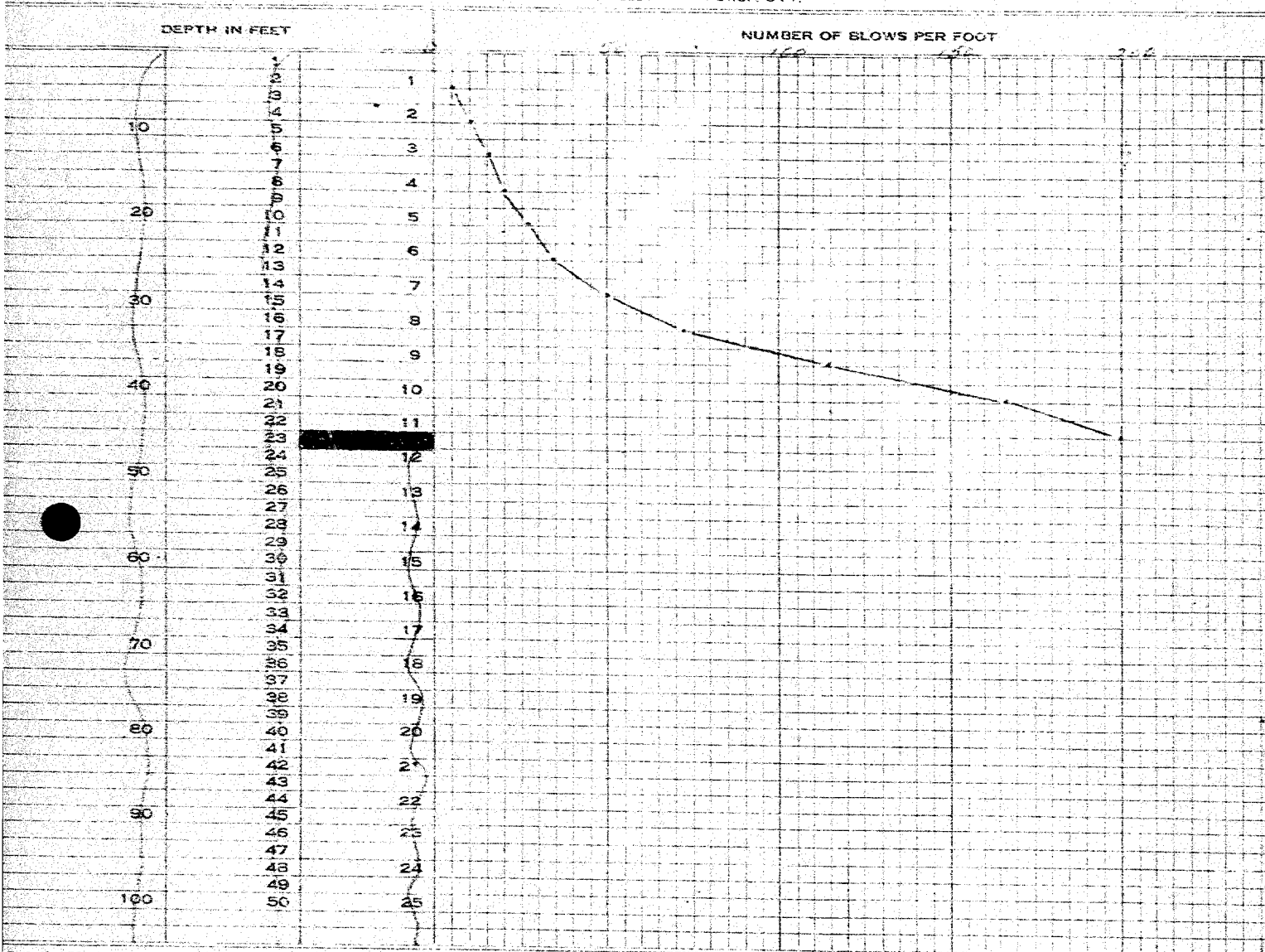
JOB NO. 12 326

DATE: May 20th, 1955

TEST NO.: 1

WEIGHT OF HAMMER 225\*

DROP 3 FT.



G. & T. LTD.

Ground Surface Elevation 845.5  
Refusal Elevation 835  
Number of Blows 200 for 10"

SIGNED

# FRANKI

COMPRESSED PILE COMPANY  
OF CANADA LIMITED

## PERCUSSION TEST DIAGRAM

FOR: D. H. C. BRIDGE

AT: WESTMINSTER # 10

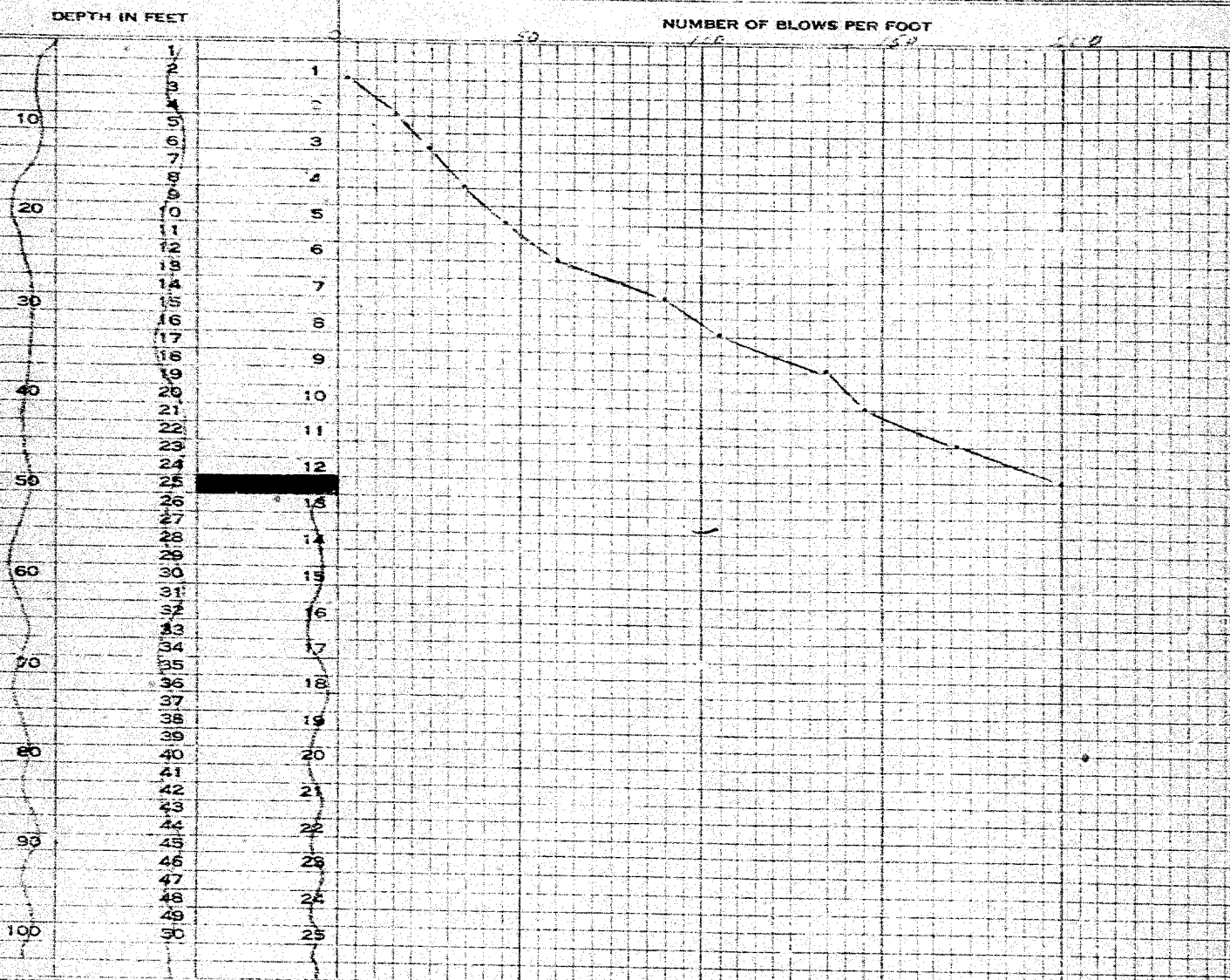
DATE: May 26th, 1955.

TEST NO.: 5

JOB NO. PC 386

WEIGHT OF HAMMER 225#

DROP, 3 FT.



Ground Surface Elevation 845.2  
Refusal Elevation 833  
Number of Blows 200 for 11"

SIGNED