

# 59-F-267C

W.P. # 252-60

Hwy. # 11

Poolton

CREEK

CROSSING

Mr. A. E. Toye,  
Bridge Engineer.  
Materials & Research Section.

November 10, 1959.

FOUNDATION REPORT - by  
Racey, MacCallum & Associates.

Attention: Mr. S. McCombie.

Re: Foundation Investigation at Poolton  
Creek Crossing, Hwy. #11, Kapuskasing.

Please find attached, a copy of a report on a foundation investigation recently carried out at the above structure site, by Racey, MacCallum & Associates.

It has come to my attention that there was some consideration being given to the use of an arch culvert at this creek crossing. A review of the soil conditions at this site, as reported by the Consultants, indicate that an arch culvert is not compatible with the existing soil conditions at this location.

The data presented in the attached foundation report, lead us to conclude that the most suitable type of structure for this creek crossing would be a treated timber pile bent trestle. The refusal depth for timber piling is estimated at or slightly above Elev. 69.0'. This corresponds to a maximum depth of 20 ft. below ground surface.

Stripping of the topsoil underlying the approach embankments is recommended, and if the stratus of soft organic clay encountered in Borehole No. 1 at the East side of the creek is found to underlie the topsoil, this should be removed prior to placing the backfill approach material.

If there are any queries with respect to the contents of this report, or our foregoing comments, please contact our office.

LG8/MGF

Attach.

cc: Messrs. -

*L. G. Soderman*

L. G. Soderman,

PRINCIPAL CIVIL & FOUNDATIONS ENGINEER.

A. E. Toye (2)  
H. A. Fregaskes  
D. G. Ramsay  
G. E. Hunter  
B. H. Jones  
C. H. Saint  
A. Watt

Foundation Section -- Gen. Files.

W.P. 252

# RACEY, MacCALLUM AND ASSOCIATES LIMITED

A COMPANY OWNED, DIRECTED AND OPERATED BY

**Consulting Engineers**  
AND ASSOCIATED STAFF

MONTREAL  VANCOUVER

TORONTO

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

H. JOHN RACEY, B.Sc., M.E.I.C., P.ENG.

GEORGE L. HOUGH, A.M.I. MECH.E., M.E.I.C., P.ENG

TORONTO DIVISION  
27 CARLTON STREET

Reference: S-500/T-1920  
- Report -

59-F-267 C

19th October, 1959

Department of Highways for Ontario,  
Materials and Research Section,  
C/o Parliament Buildings,  
TORONTO - Ontario.

Attention: Mr. Ken Peaker.

RE: FOUNDATION INVESTIGATION AT POOLTON  
CREEK CROSSING, HWY # 11, KAPUSKASING.


Dear Sir,

The enclosed report presents the results of our  
foundation investigation at the above location.

We hope the report is satisfactory to you; if you  
have any questions about it please do not hesitate to get in touch  
with us.

Thank you for this opportunity of being of service to  
you.

Yours very truly,  
RACEY, MacCALLUM AND ASSOCIATES LIMITED,

  
J. J. Schoustra, P. Eng.,  
Divisional Soil Engineer.

JJS/YDP

Department of Highways for Ontario,  
Materials and Research Section,  
C/o Parliament Buildings,  
Toronto - Ontario.

FOUNDATION INVESTIGATION AT POOLTON CREEK  
CROSSING, HWY # 11, KAPUSKASING.

Reference: S-500/T-1920  
- Report -

Racey, MacCallum and Associates  
Limited.

19th October, 1959.

# RACEY, MACCALLUM AND ASSOCIATES LIMITED

A COMPANY OWNED, DIRECTED AND OPERATED BY

Consulting Engineers  
AND ASSOCIATED STAFF

MONTREAL  VANCOUVER

TORONTO

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

H. JOHN RACEY, B.Sc., M.E.I.C., P.ENG.

GEORGE L. HOUGHTON, A.M.I. MECH.E., M.E.I.C., P.ENG.

TORONTO DIVISION  
27 CARLTON STREET

Reference: S-500/T-1920  
- Report -

19th October, 1959

## FOUNDATION INVESTIGATION AT POOLTON CREEK CROSSING, HWY # 11, KAPUSKASING.

### INTRODUCTION :

The field investigation to determine the subsoil conditions at the site was carried out from 28th to 30th September, 1959.

This report presents a detailed description of the field investigation and subsequent results, together with recommendations regarding a suitable type of foundation for the proposed bridge.

### FIELD INVESTIGATION :

The field work consisted of one boring with adjacent cone penetration test at both locations No 1 and 2, and cone penetration tests at locations No 3 and 4. The locations of the boreholes and cone tests are shown on Enclosure No 1, and the results on Enclosures No 2, 3, 4 and 5.

Borings were carried out using a standard diamond drilling rig. Boreholes were advanced by running BX casing, with split spoon samples and penetration readings being taken at regular intervals. The driving energy for both the split spoon and cone penetrations was a 140 lbs hammer at a 30 inch drop.

Once bedrock was reached, coring continued using an AX core bit. However, as can be seen from the results, core recovery was very poor as the top few feet of the bedrock was quite decomposed. As such, it was completely ground up by the core bit.

### SUBSOIL CONDITIONS :

Numerous sampling in both boreholes revealed an overburden of varying materials with varying densities and thicknesses. It

Reference: S-500/T-1920  
- Report - Continued.

19th October, 1959

consisted of soft grey clay, medium-dense silt, loose to medium-dense sand and gravels and medium-dense sand till.

The underlying bedrock is mainly granitic with the top few feet a decomposed gneiss.

#### WATER CONDITIONS :

The creek level at the time of the field investigation was approximately 86.8 feet. Water under pressure was encountered in both boreholes; this data is presented in the following table :

<u>Borehole No.</u>	<u>Ground Level (feet)</u>	<u>Hydrostatic Head</u>	<u>Depth Intercepted</u>
1	89.2	90.3	69 <sup>±</sup>
2	87.5	88.3	74 <sup>±</sup>

Before abandoning the site, these boreholes were plugged to stop the artesian flow.

#### DISCUSSION OF RESULTS :

The subsoil profile indicates that the overburden material is quite varied in both type and density. It is reasonable to assume that the overburden contains quite a few lenses and pockets not revealed by borings. This is borne out by the inconsistencies found in the borings and by the fact that water under pressure was found at varying depths and with varying head.

On the basis of the foregoing considerations an ordinary footing type of foundation may be disregarded. As refusal is met at a relatively shallow depth, the most practical type of foundation would be piles. The following table gives the refusal depth, i.e. surface of the decomposed bedrock, at the various locations :

<u>Location</u>	<u>Refusal Elevation</u>
1	69 to 71
2	72 to 73
3	70 to 71
4	71 to 72

As can be seen from the foregoing table, the bedrock surface is relatively flat. However, it is doubtful that it would be necessary to drive the piles down to this decomposed bedrock surface, as in most of the locations bedrock is covered by a thin layer of reasonably dense sandy till. The refusal required would depend on the type and loading

Reference: S-500/T-1920  
- Report - Continued.

19th October, 1959

of the pile. Under the circumstances the most suitable would probably be a 12 inch diameter wooden pile into the sand till immediately over the bedrock surface.

It is understood that the road is to be widened from its present width. In the immediate vicinity of the bridge the present embankment seems to be of adequate width, i.e. it is doubtful that any embankment widening will be necessary. However, if such is necessary, care should be taken so as to remove the shallow peat deposit on the south side. This would ensure a stable bank with no appreciable differential settlement between the existing embankment and its addition.

CONCLUSIONS AND RECOMMENDATIONS :

Summarising the foregoing results and considerations, the following conclusions and recommendations seem warranted :

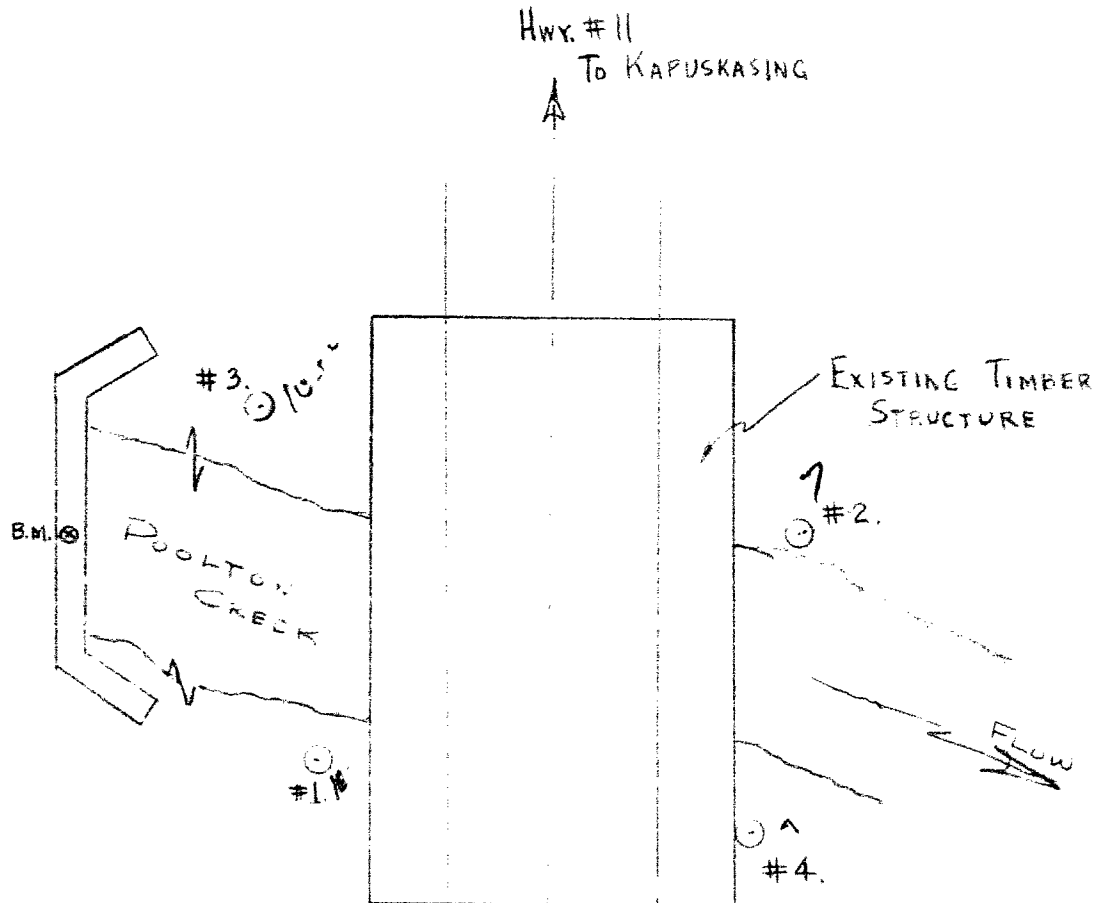
1. The overburden is quite shallow and consists of various soils of varying densities and layering. It consists mainly of soft grey clay and loose to medium-dense sands and gravels and sand till. The bedrock is mainly granitic, the top few feet of which is a decomposed gneiss.
2. Water with varying head was found to exist at varying depths in the overburden.
3. As the overburden consists mainly of soft clay and relatively loose granular material, an ordinary footing foundation would not be feasible. The most practical type would be short wooden piles driven to refusal either into the decomposed gneiss rock, or the dense till immediately overlying. The refusal depth i.e. the decomposed rock boundary, is given in a foregoing table. On the average it is approximately 15 feet below stream level.



*L. P. Winters*

Lorne P. Winters, P.Eng.,  
Project Engineer.

Prep. By L.P.W.



BORE-HOLE LOCATIONS AT POOLTON  
CREEK CROSSING — HWY. #11

• SCALE 1" = 20'

• BENCH MARK — CUT-CROSS TOP OF HEADWALL  
 ADJACENT R.W.Y. ARCH CULVERT (MARKED B.M.-R.M.A.)

— ELEV. 100.0



## RACEY MacCALLUM AND ASSOCIATES LTD.

Foundation Engineering Division

Engineering Data Sheet for Borehole: No 1

Project: POOLTON CREEK BRIDGE  
 Location: HIGHWAY NO 11, KAPUSKASING, ONTARIO.  
 Hole Location: See Enclosure No 1.  
 Hole Elevation and Datum: 89.2 Feet.  
 Field Supervisor: L.P.W. Prep.: L.P.W.  
 Driller: J.P. Checked: Date:

## LEGEND

Shear Strength C'

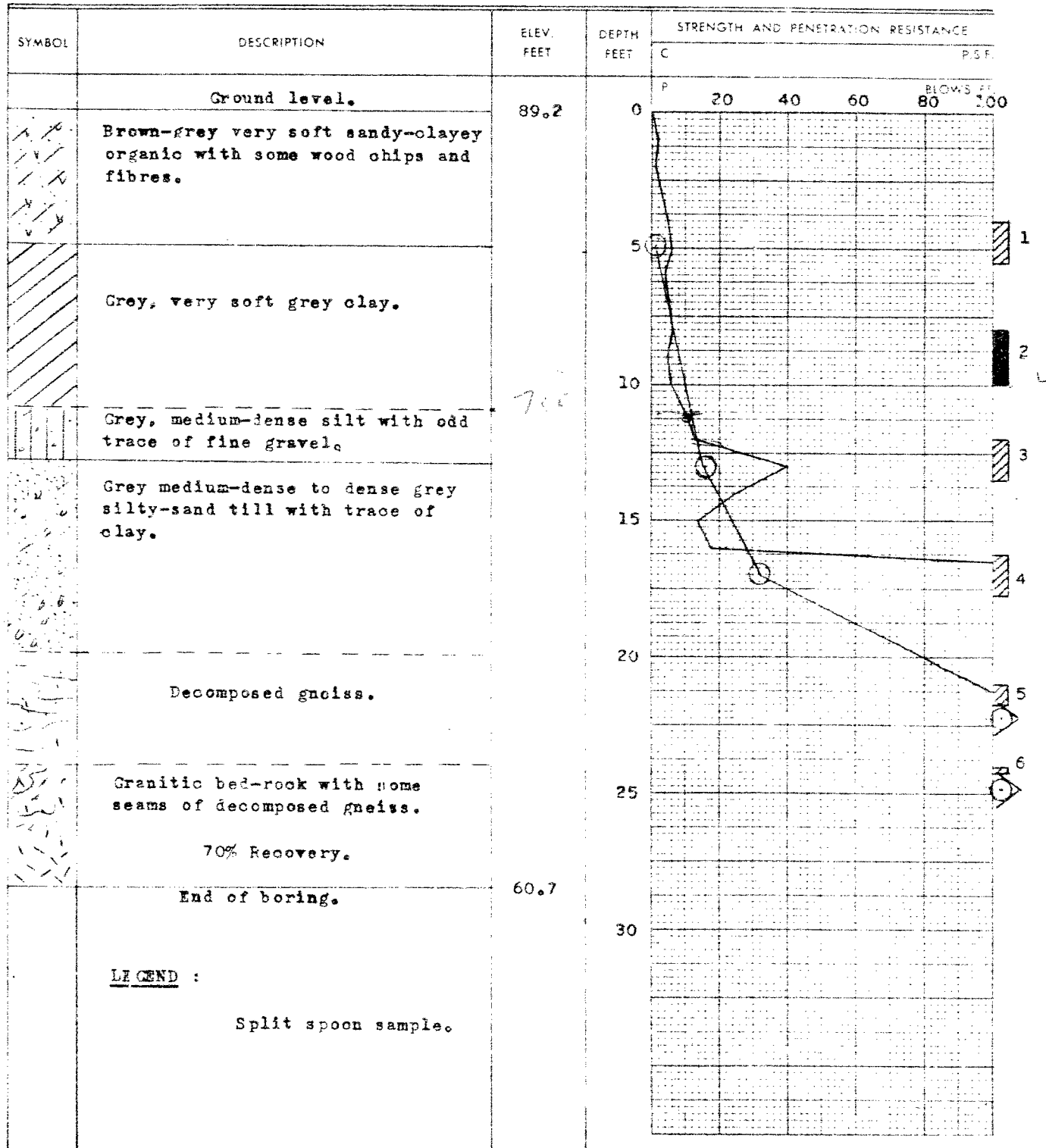
 Unconfined compression  
 Vane test and sensitivity  $1.5$ 

Penetration Resistance - P.

2" Split tube

2" Dia. Cone

Casing

⊕  
4.5⊕  
⊕

**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for Borehole: No 2

Project: POOLTON CREEK BRIDGE  
 Location: HIGHWAY NO 11, KAFUSKASING, ONTARIO.  
 Hole Location: See Enclosure No 1.  
 Hole Elevation and Datum: 87.5 Feet.  
 Field Supervisor: L.P.W. Prep.: L.P.W.  
 Driller: J.P. Checked: Date:

**LEGEND**

Shear Strength C

Unconfined compression  
Vane test and resistivity S.

Penetration Resistance P

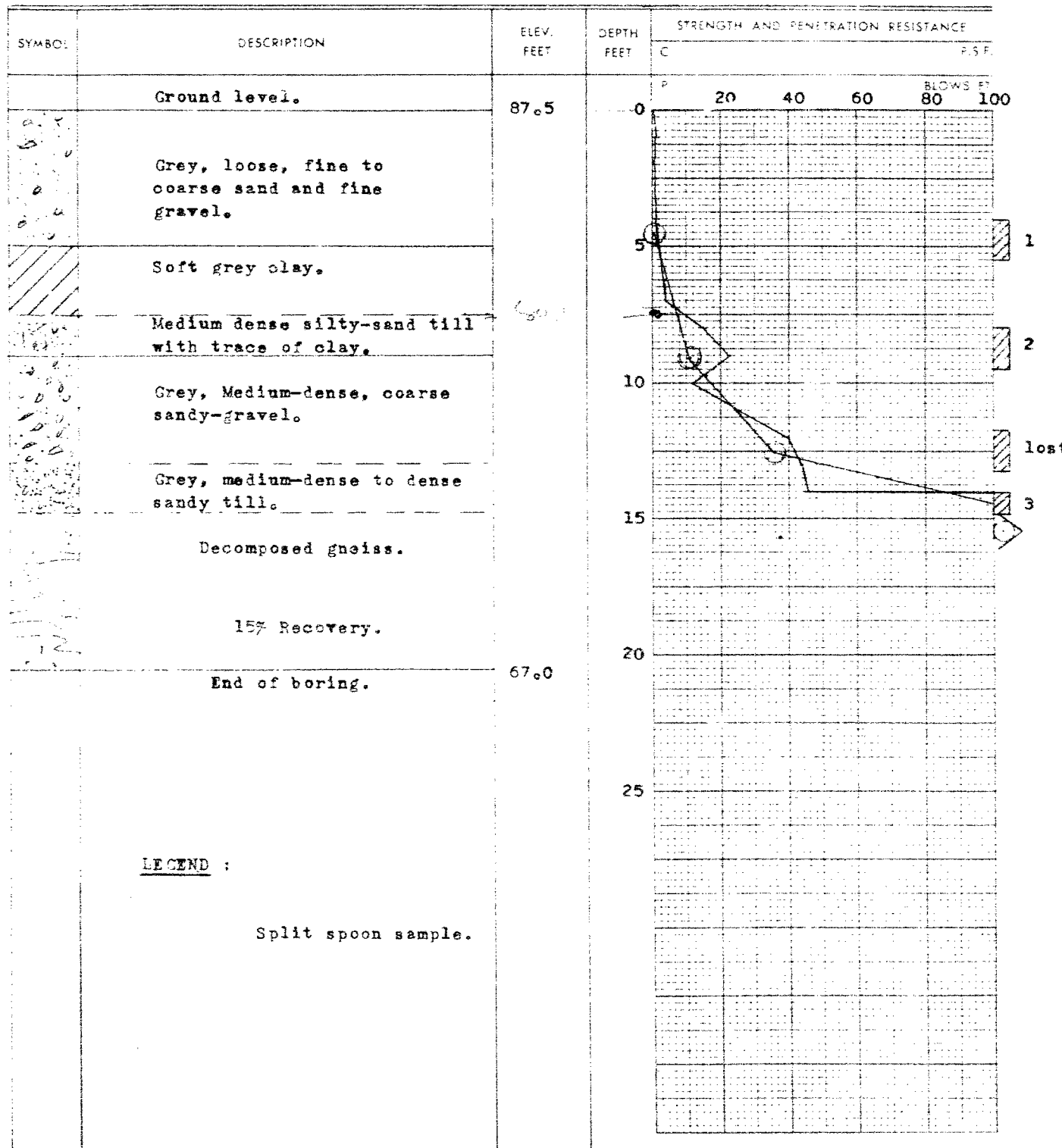
2" Split tube

2" Dia. Cone

Casing

⊕  
+5

⊕ ⊕



**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for ~~2513506~~ Cone No 3

Project: POOLTON CREEK BRIDGE  
 Location: HIGHWAY NO 11, KAPUSKASING, ONTARIO.  
 Hole Location: See Enclosure No 1.  
 Hole Elevation and Datum: 90.3 Feet.  
 Field Supervisor: L.P.W. Prep.: L.P.W.  
 Driller: J.P. Checked: \_\_\_\_\_ Date: \_\_\_\_\_

**LEGEND**

Shear Strength (C)

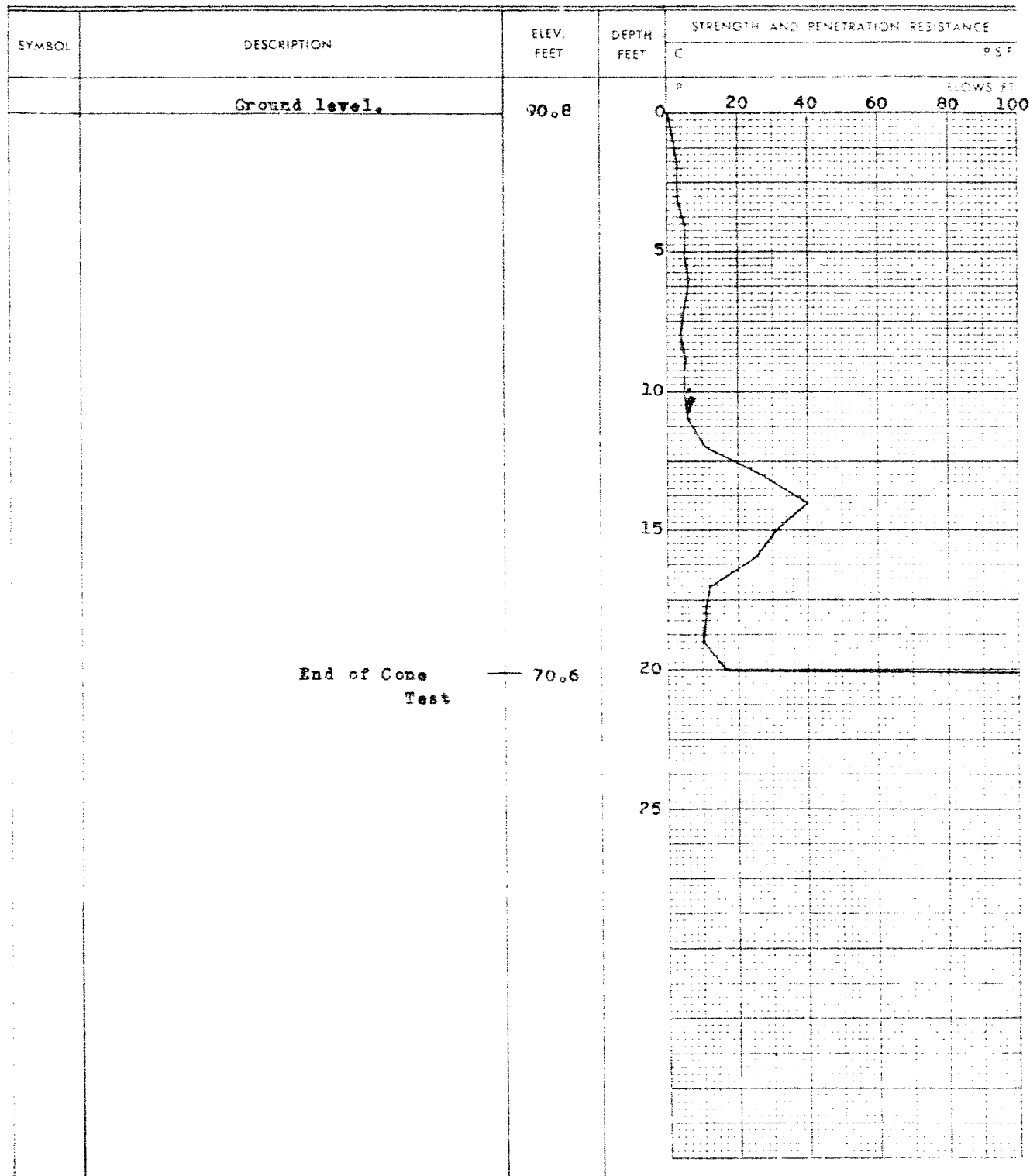
 Unconfined compression  $\oplus$   
 Vane test and sensitivity (S)  $\oplus$ 

Penetration Resistance (P)

2" Split tube

2" D/a Cone

Casing



**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for ~~Rockwell~~ Cone No 4

Project: POOLTON CREEK BRIDGE  
 Location: HIGHWAY NO 11, KAPUSKATING, ONTARIO.  
 Hole Location: See Enclosure No 1.  
 Hole Elevation and Datum: 93.7 Feet  
 Field Supervisor: L.P.W. Prep: L.P.W.  
 Driller: J.P. Checked: Date:

**LEGEND**

Shear Strength C.

Unconfined compression

Vane test and sensitivity S<sub>t</sub>

Penetration Resistance P.

2" Split tube

2" Dia. Cone

Casing

⊕  
+<sup>2</sup>