

#61-F-252 m

NEW BRIDGE

LOT. <sup>#</sup>15 CON. <sup>#</sup>8. <sup>#</sup>9

MORNINGTON

TWP.

BA 1341

# RACEY, MacCALLUM AND ASSOCIATES LIMITED

A COMPANY OWNED, DIRECTED AND OPERATED BY

**Consulting Engineers**  
AND ASSOCIATED STAFF

MONTREAL



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TORONTO DIVISION

~~27 GARDEN STREET~~  
59 CURLEW DRIVE  
DON MILLS, ONT.

Reference: S-880/T-3467  
- Report -

December 7, 1961

Mr. B. M. Ross, P.Eng.,  
Consulting Engineer,  
P.O. Box 699,  
Goderich, Ontario.

61-F 252M

RE: SOIL INVESTIGATION FOR PROPOSED NEW BRIDGE  
AT LOT 15, CON. 8 - 9, TOWNSHIP OF MORNINGTON,  
COUNTY OF BRUCE, PERTH

Dear Sir:

Following receipt of your letter of November 24, 1961, we have proceeded with two borings at the location of the two abutments of the proposed new bridge. The results of our investigation and our recommendations are presented in the following paragraphs.

## FIELD WORK AND RESULTS

Drilling was started on November 20th and completed on November 21st, 1961. A standard diamond drill was used, equipped for soil sampling by means of a standard split spoon sampler. The number of blows of a 140 lb. hammer, required to drive the sampler one foot into the soil, is recorded as the standard penetration resistance. It bears an empirically established relationship to the relative density of the soil.

Adjacent to each boring a 2-inch diameter cone was driven, employing the same driving energy as for the split spoon. This method provides a continuous picture of the soil density changes with depth.

Reference: S-580/T-3467

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December 7, 1961

FIELD WORK AND RESULTS - Cont'd

The boring locations were tied in with the existing bridge, as can be seen from the site plan, Enclosure No. 1. The elevations of ground level at the borehole locations were referred to the existing bridge deck, which was assigned at El. 100.00 ft.

The results of the borings are presented on the engineering data sheets, Enclosures Nos. 2 and 3. Basically, two principal strata were encountered at each of the borings:

- (a) A loose mixture of silty sand with some fine gravel. Considering the low density and the location of the road, much of this deposit must be fill. It extends to about 8-10 feet below existing grade.
- (b) A compact soil containing gravel, sand, silt and clay. This is generally called a glacial till. It contains much clay in the top six feet at borehole No. 1, but below this depth the gravel content becomes quite high.

Some cave-in of boreholes took place upon withdrawal of the drill rods, but in general the gravel-sand-silt-clay mixture was quite well graded and stable, and water seepage was relatively slow. At borehole No. 2 ground water was established at 7.6 feet below grade, or roughly 2.5 feet above stream level. This can be considered quite normal in a deposit of low permeability some 60 feet removed from the creek.

RECOMMENDATIONS

The new bridge will be located some 44 feet West of the existing bridge, and the stream will be relocated accordingly. It may be assumed however that the new stream bed elevation will not be very different from the existing, or El. 86 ft. The span of the new bridge not being longer than that of the existing structure, the abutments no doubt will be located in the new stream bed. Consequently the footing elevations for the new bridge abutments must be taken down to at least four feet below this level, or El. 82 feet, unless scour protection requires deeper footings. The existing bridge does not reveal typical scour damage (the abutments show signs of damage by ice), and if the existing bridge footings are at or near El. 82 feet, there is no reason to increase the depth for the new structure.

At or below El. 86 feet, the allowable bearing capacity for spread footings can be taken at 8,000 psf without any reservations regarding size or shape.

Reference: E-880/T-3467

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December 7, 1961

RECOMMENDATIONS - Cont'd

Excavation below ground surface will present only minor difficulties concerning dewatering. Seepage may be expected from gravel pockets, but the high density of the till will resist any deterioration of the excavation bottom. No sheeting will be required, and below the fill level excavation can be done almost vertically. Occasional boulders may slow down excavation. In the borings no boulders over 1 ft. in size were encountered.

CONCLUSIONS

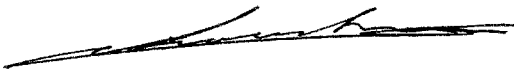
The results of our investigation may be summarized as follows:

1. The site is covered with up to 10 feet of sandy fill of very low density, underlain by a dense glacial till, the top 4 - 6 feet of which contains much clay.
2. Ground water at the time of the borings was 2.5 feet above stream level.
3. Foundation pressures of up to 8,000 psf can be allowed at any depth below El. 86 feet.
4. Excavation and dewatering will not cause serious difficulties. Some seepage from gravel pockets must be expected.

We hope the above information will be adequate for your requirements. Kindly contact the writer if you have any questions.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LIMITED



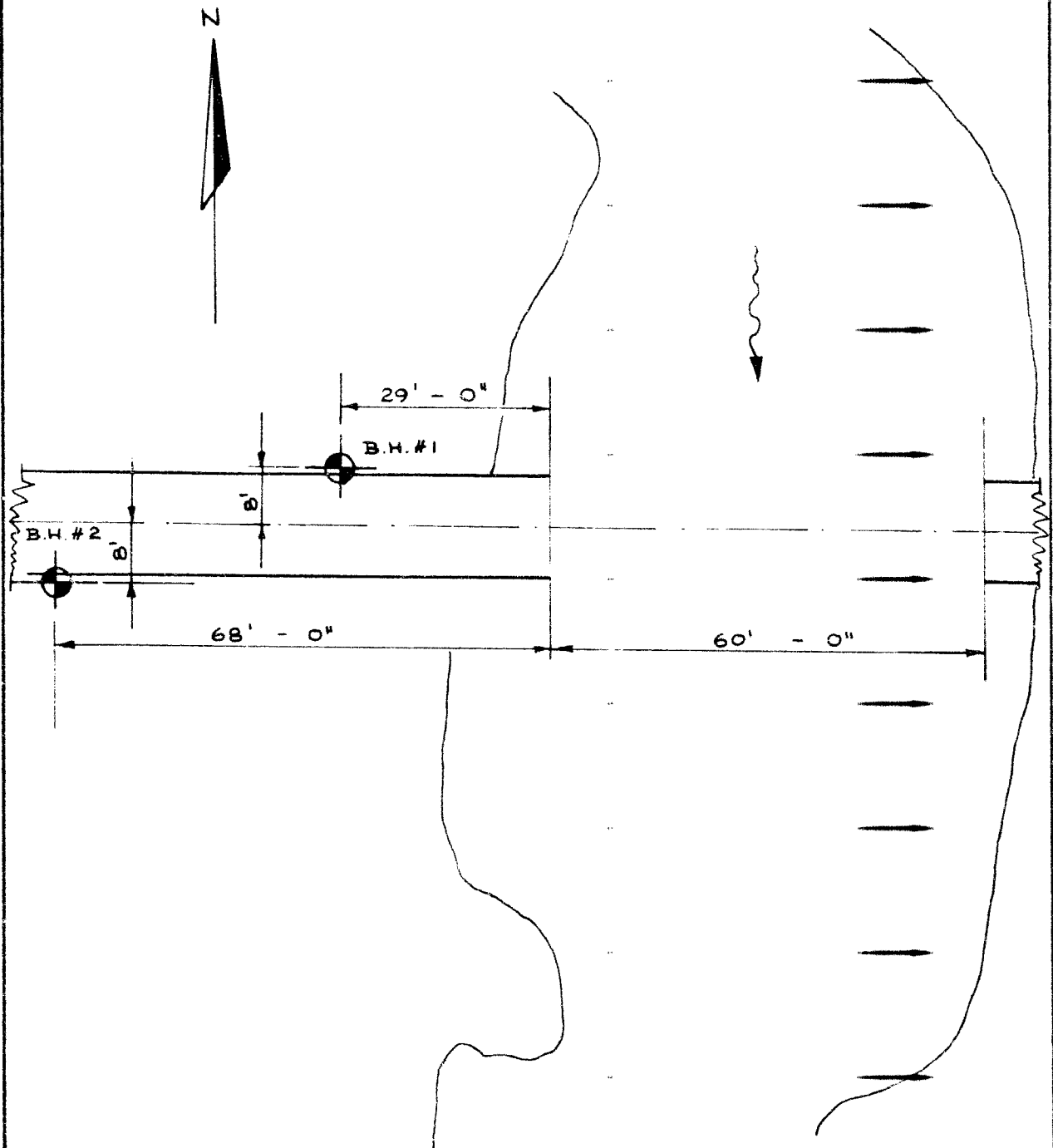
J. J. Schoustra, P.Eng.,  
Divisional Soil Engineer.

JJS/KA  
Enclosures.

Order No. 5-880/T-3467

Enclosure No. 1

Prep. By H.K.



BRIDGE RELOCATION,  
LOT 15, CONC. 8 & 9,  
TWP. OF MORNINGTON, PERTH COUNTY,  
Location of Boreholes.

**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for Borehole: 1

Project: FOUNDATION INVESTIGATION, BRIDGE RELOCATION  
 Location: LOT 15, CONC. VIII & IX, TWP OF MORNINGTON,  
 Hole Location: See Enclosure No. 1, Co. of Perth,  
 Hole Elevation and Datum: 100.00 - existing bridge deck  
 Field Supervisor: J. McG. Prep.: I.G.B.  
 Driller: R.R. Checked: J.J.S. Date: 20/11/'61.

**LEGEND**

Shear Strength (C)

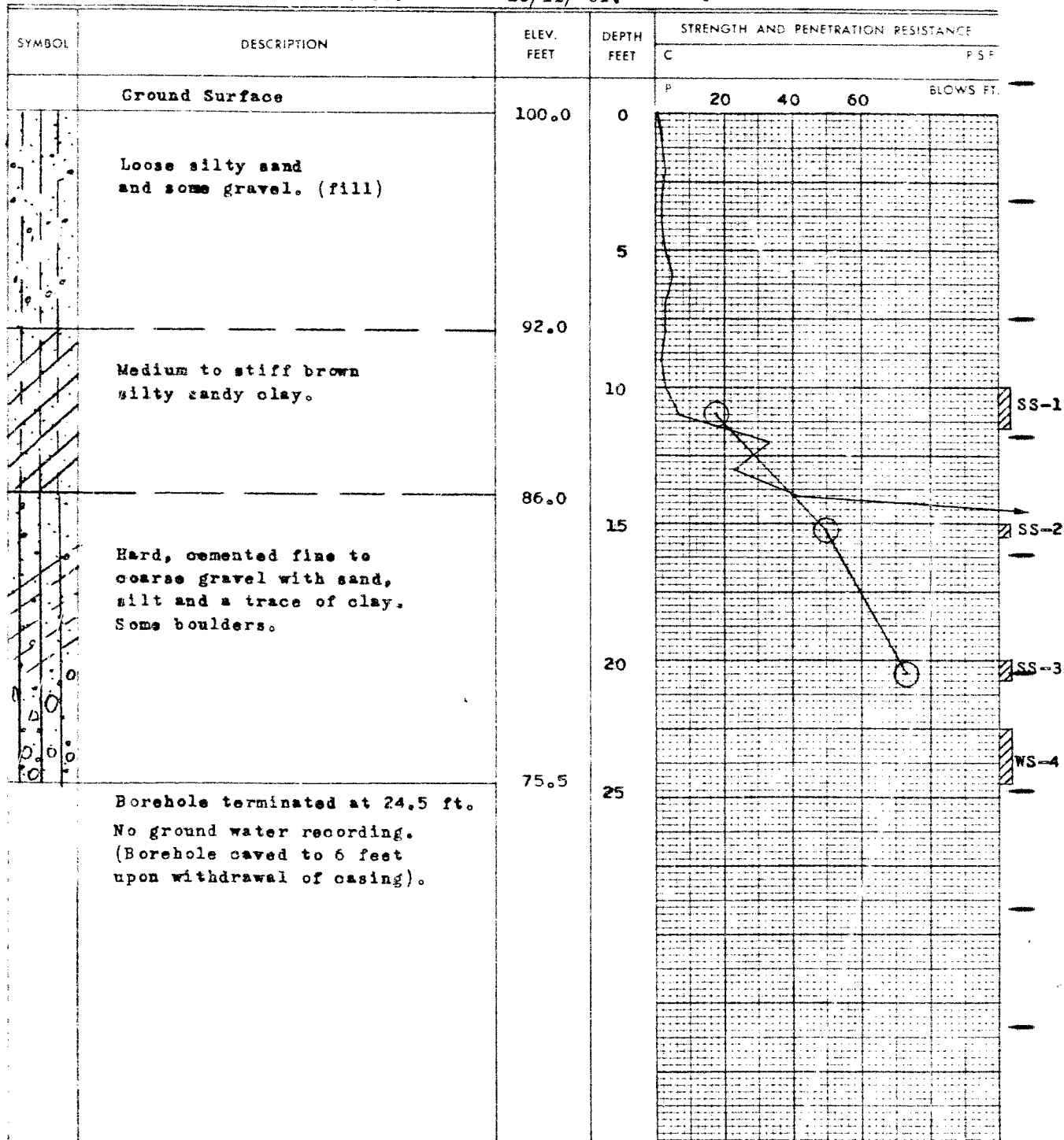
Unconfined compression  
Vane test and sensitivity (S)

Penetration Resistance (P)

2" Split tube

2" Dia. Cone

Casing



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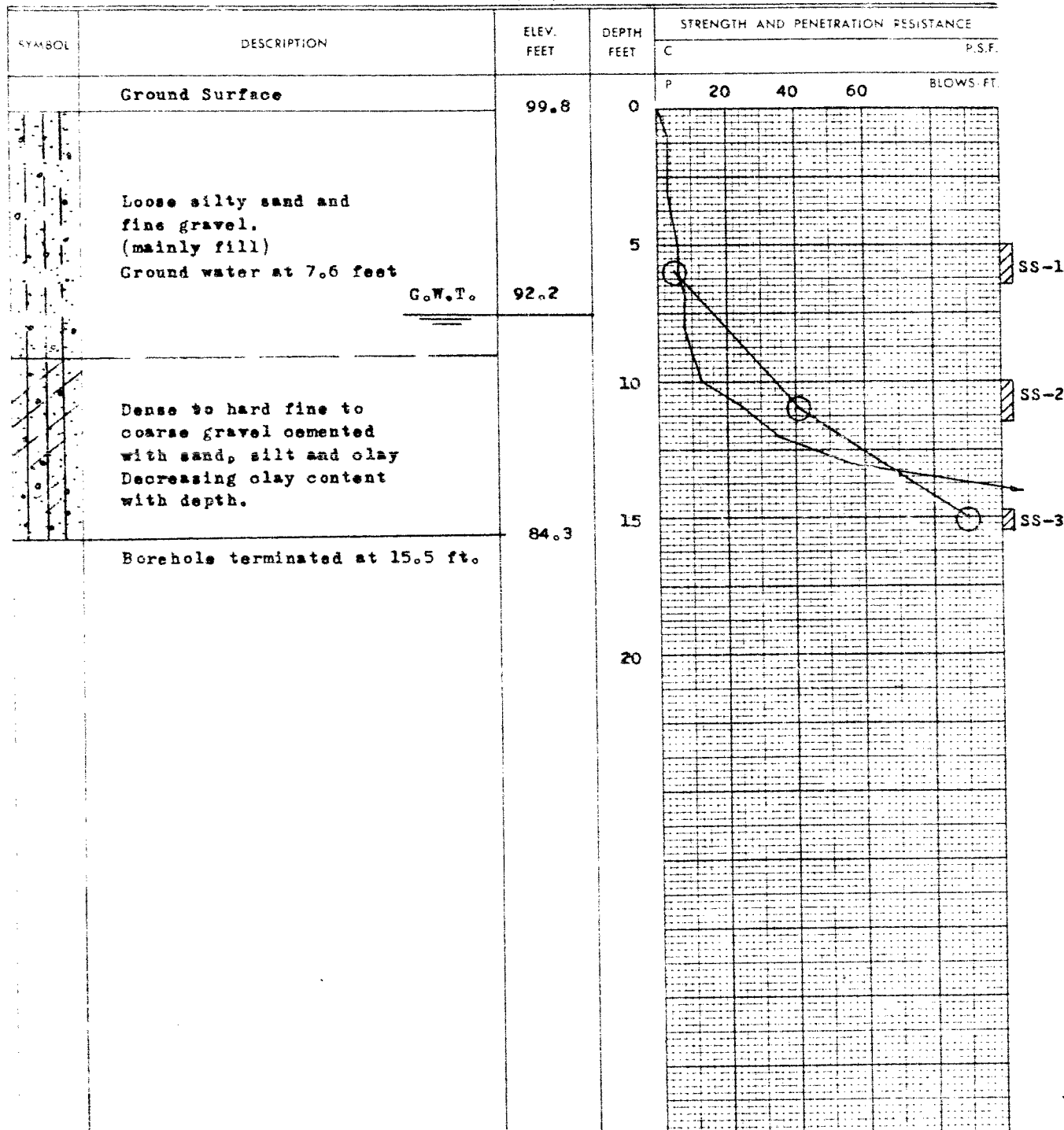
Foundation Engineering Division

Engineering Data Sheet for Borehole: 2

Project: FOUNDATION INVESTIGATION, BRIDGE RELOCATION,  
 Location: LOT 15, CONC. VIII & IX, TWP. OF MORNINGTON,  
 Hole Location: See Enclosure No. 1 Co. of Perth  
 Hole Elevation and Datum: 99.75; existing bridge deck-100.0  
 Field Supervisor: J. McG. Prep.: I.G.B.  
 Driller: R.R. Checked: J.J.S. Date: 21/11/'61.

**LEGEND**

Shear Strength: C  
 Unconfined compression  
 Vane test and sensitivity: S  
 Penetration Resistance: P  
 2" Split tube  
 2" Dia. Cone  
 Casing

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+3⊕  
⊕

OFFICE LOCATION -  
DOWNSVIEW AVE.,  
KEELE ST. - HIGHWAY 401  
TORONTO, ONTARIO.



ONTARIO  
DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS -  
DEPARTMENT OF HIGHWAYS  
PARLIAMENT BUILDINGS,  
TORONTO 5, ONTARIO.

Bridge Division,  
January 29, 1962.

REPORT OK.  
NO COMMENTS

MEMORANDUM TO: RELATED BY TELEPHONE

JAN 29, 1962

AGS

Mr. A. Stermac,  
Principal Foundation Engineer,  
Department of Highways,  
Room 107, Lab. Building,  
DOWNSVIEW, Ontario.


RE: Twp. of Mornington  
Nith River Bridge  
Lot 15, Con. VIII/IX  
County of Perth  
Report File #BA1341

We are enclosing herewith, a copy of the  
Foundation Report, by Racey, MacCallum and Associates,  
for your information.

We have approved the Preliminary Design by  
B. M. Ross, December 20, 1961, which is a single 50  
foot span concrete rigid frame. The structure will  
be founded on spread footings at Elevation 80.50.

We intend to approve the final plans by the  
middle of February.

CCBB/ea

  
G. C. E. Burkhardt  
for K. L. Kleinsteinber,  
Municipal Bridge Liaison Engineer.