

MEMORANDUM

To: Mr. K. Y. Lo,
Supervising Foundation Eng.,
Lab. Bldg.

From: Bridge Division,
Downsview, Ontario.

Date: May 6, 1965.

Our File Ref.

In Reply To

SUBJECT: W.P. 255-62 Site 29-13
Sherwood River Bridge
6.0 miles south of north Jct. Hwy. 62,
Secondary Hwy. 521,
District #10.

Would you kindly arrange to have a foundation investigation conducted at the above location. I have enclosed two copies of the site plan number E-4603-1 with the probable footing locations marked in red. Would you also have an additional boring made at the point indicated by a red circle, so that we may get some idea of the scour that has taken place in the past.

The nearest Motel is located at Killaloe Station. Bedrock will not likely be encountered in any of the holes.

APW

APW/eb
c.c. N.D. Smith
R. Fitzgibbon

A. P. Watt,
Regional Bridge Location Engineer.

Recd May 11 1965

June 2/65 added to Program
July 7/65
ms

MEMORANDUM

To: Mr. A. G. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Bldg.

From: Bridge Division,
Downsview, Ontario.

Date: October 19, 1965.

Our File Ref.

In Reply To

Subject: W.P. 255-62, Site No. 29-13,
Sherwood River Bridge,
6 miles south of north Jct. Hwy. 62,
Sec. Hwy. 521, District No. 10.

Enclosed please find one copy of the preliminary
plan D 5777-P1 for the above structure.

Would you kindly review the bridge foundations
proposed and inform us if they are satisfactory.



APW/ag

A. P. Watt,
Regional Bridge Location Engineer.

*Filed by Mark
Reviewed by [unclear]*

Mr. S. McCombie,
Bridge Planning Engr.,
Bridge Division.

Attention: Mr. A. Watt

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

October 28, 1965

Sherwood River Bridge, Hwy. 521, District #10,
W.P. 255-62 - Site #29-13 - W.J. 65-F-55

We have reviewed Preliminary Plan
No. D-5777-P1 for the above-mentioned structure.
The foundation design appears to comply with
recommendations contained in our Foundation Report.

K. G. Selby

KG3/MdeF

cc: Foundations Office ✓
Gen. Files

K. G. Selby,
SENIOR FOUNDATION ENGINEER
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

Mr. S.J. Markiewica,
Reg. Design Engineer,
E.D.O., Downsview.

M.A.T. Division, Kingston.

ATTENTION: Mr. E. Barrie.

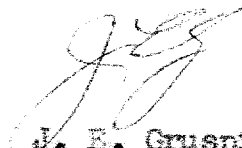
April 1, 1966.

65-P-55

Re: Hwy. 521. W.P. 255-62. Sherwood River Bridge.

Further to our discussion this morning, the following will summarize the treatment of the organic situated under the south approach fill and abutment.

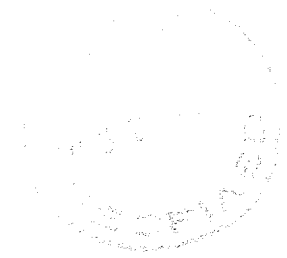
The organic should be excavated under the south abutment and to a distance of 10' south of the south limits of the wingwalls as indicated on the bridge plan. It is not considered necessary to excavate the relatively shallow depths of organic under the remainder of the south approach fill.



J. E. Gruspier
Regional Materials Engineer

c.c. A. Watt
K. Selby -

File



MEMORANDUM

W.P. 255-62

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.

From: Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

Date: July 6, 1965

Our File Ref.

In Reply To

Subject:

FOUNDATION INVESTIGATION REPORT

For

Secondary Hwy. #521, Line 'D' and
Sherwood River, County of Renfrew,
Twp. of Richards, Lot 26, Con. 3.
District #10

W.J. 65-F-55 -- W.P. 255-62

Attached, we are forwarding to you, our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that you will find the factual data and recommendations contained therein, adequate for your design requirements. Should you require additional information, please do not hesitate to contact our Office.

KYL/MdeF
Attach.

cc: Messrs. B. R. Davis (2)
H. A. Tregaskes
D. W. Farren
J. Ford
J. E. Callaghan
J. E. Gruspier
A. Watt

K.Y. Lo
K. Y. Lo,
SUPERVISING FOUNDATION ENGINEER

Foundations Office
Gen. Files

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FOUNDATION INVESTIGATION REPORT

For

Secondary Hwy. #521, Line 'D' and
Sherwood River, County of Renfrew,
Twp. of Richards, Lot 26, Con. 3.

District #10

W.J. 65-F-55 -- W.P. 255-62

1. INTRODUCTION:

A request to carry out a foundation investigation at Sec. Hwy. #521, Line 'D' and Sherwood River crossing, was received from Regional Bridge Location Engineer, Mr. A. P. Watt, dated May 6, 1965.

It is proposed to erect a new bridge to carry realigned Sec. Hwy. #521, Line 'D' over the Sherwood River. The site is located in the County of Renfrew, Twp. of Richards, Lot 26, Con. 3, approximately 3 miles east of the Village of Round Lake Centre. At the location the chainage of realigned Sec. Hwy. #521, Line 'D' is from 429+70 to 430+85.

In order to determine the soil properties and decide on the type of foundation, an investigation was carried out by this Section. Results and the discussion of the field and laboratory investigations, as well as conclusions and recommendations for the future design work, are contained in the following paragraphs of this report.

2. DESCRIPTION OF SITE:

The site of the future bridge is located in the County of Renfrew, Twp. of Richards, Lot 26, Con. 3, approximately 3 miles

2. DESCRIPTION OF SITE: (cont'd.) ...

east of the Village of Round Lake Centre.

Extensive marshes, with puddles of water, form the right bank of the Sherwood River. The left bank, which rises approximately 10 ft. above the river water level, is dry and covered with bush.

The steel girders of the existing bridge are supported on wooden abutments, which are in a poor state - badly damaged by weather and ice floes.

Physiographically, the site is located at the extreme outskirts of the so-called "Petawawa Sand Plains".

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, five sampled boreholes and five penetration tests were carried out at this site. Split-spoon samples were taken at various depth intervals; samples recovered in the split-spoon were used to determine the following physical properties:

1. Natural moisture content.
2. Grain size distribution.

Results of these laboratory tests are summarized in Appendix I of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

The stratigraphy of the soil at the site was found to be generally uniform. A detailed description of various soil types

cont'd. /3 ...

4. SUBSOIL CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

encountered during the investigation, is shown in the Appendix of this report and is also given in subsequent paragraphs. The estimated stratigraphical profile shown on Dwg. No. 65-F-55A, is based upon this information.

4.2) Soft Muck:

A layer of organic muck, approximately 4 to 5 feet thick was encountered in boreholes No. 3, 4 and 5. It exists in a very soft state with an average 'N' value of 1 to 2 blows/foot.

The moisture content in this material ranged as high as 65%.

4.3) Silty Sand with Traces of Gravel - Very Loose to Very Dense:

This stratum, which extends to the depth investigated, was found right at the surface in B.H. #1 & 2, and immediately below the soft muck in B.H. #3, 4 and 5. All the way down the material in the boreholes was more or less the same - except that with depth it became slightly siltier. Also, with depth, the relative density increased quite considerably. The whole stratum may be classified as very loose to very dense with an average 'N' value of 15 blows/foot. 'N' values varied from 1 blow/foot to 69 blows/foot.

Grain distribution curves indicated that this stratum is composed of 83% sand, 11% silt, and 6% gravel. The average moisture content in this layer was found to be 20.6%, ranging from 4.7% to 27%.

cont'd. /4 ...

5. GROUND WATER CONDITIONS:

The ground water level at the time of the investigation was found as follows:

In B.H. #1 at Elev. 561.7

In B.H. #2 at Elev. 561.2

In B.H. #4 at Elev. 559.0

The Sherwood River water elevation on May 28, 1965, was at El. 559.0.

It may be assumed that the ground and river water levels will vary with the seasons of the year.

No artesian water conditions were encountered.

6. DISCUSSION AND RECOMMENDATIONS:

As can be seen from the previously described soil stratigraphy, the soil consists of some soft muck, followed by silty sand with traces of gravel. The investigation has revealed that within the upper 20 feet of the deposit the properties are such that adequate support for spread footings could not be obtained; therefore, the future structure should be supported on displacement piles. 12 $\frac{1}{2}$ " x 0.25 steel tube piles, driven some 65 feet into the silty sand (to approximate El. 495.0) would be best suited for this purpose, and an allowable load of 60 tons per pile could be obtained. If pile caps are formed below the water level, it will be necessary to use sheet piling in a dewatering scheme. These should be driven to a depth below the pile cap bottom equal to the height of water above it. Soffits of

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

concrete pier caps, should be formed either on a granular pad or a suitable concrete working slab. All materials of organic nature should be removed below the pier caps.

The D.H.C. Hydrological Section indicated that very little scour may be anticipated; this, however, should be checked with them when their study is completed.

7. SUMMARY:

The stratification of the subsoil at the site is relatively uniform; some muck, followed by silty sand with traces of gravel.

A three-span structure is proposed for the Sherwood River and Sec. Hwy. #521, Line 'D'. It is recommended to support the abutments and piers on 12 $\frac{3}{4}$ " x 0.25 steel tube displacement piles. It is estimated that the piles will reach practical refusal at or below El. 495.0, within two or three feet. A design load of 60 tons/pile may be used. If a dewatering scheme is necessary, recommendations in the body of the report should be followed. Organic material should be removed at pile cap locations, prior to construction and replaced with suitable fill if necessary.

8. MISCELLANEOUS:

The field work, performed during the period from May 25 to June 2, 1965, together with the preparation of this report, was undertaken by Mr. W. W. Kulmatickas, Project Foundation Engineer. The investigation was carried out under the general supervision of Mr. K. G. Selby, Senior Foundation Engineer, who also reviewed the report.

July 1965

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

MATERIALS & TESTING DIVISION

JOB 65-F-55 LOCATION Sec Hwy #521 Line "D" & Sherwood River Ch 430+85 on E ORIGINATED BY W.W.K.
W.P. 255-62 BORING DATE May 26 & 27, 1965. COMPILED BY W.W.K.
DATUM 569.0 BOREHOLE TYPE Washboring BX Casing. CHECKED BY K.G.S. KR

| SOIL PROFILE | | STRAT. PLOT | SAMPLES | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE | | LIQUID LIMIT — WL PLASTIC LIMIT — WP | | BULK DENSITY P.C.F. | REMARKS |
|----------------|-----------------------------------|-------------|---------|------|-------------|--------------------------------|--------------|---|-----------------|---------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | | NUMBER | TYPE | | BLOWS / FOOT | BLOWS / FOOT | WATER CONTENT — W | WATER CONTENT % | | |
| 569.0 | Groundlevel | | | | | | | | | | |
| 568.0 | Topsoil | | | | | | | | | | |
| 1.0 | | | | | | | | | | | |
| | Silty sand with traces of gravel. | | 1 | SS | 7 | | | | | | |
| | | | 2 | SS | 8 | | | | | | |
| | | | 3 | SS | 14 | | | | | | |
| | Very loose to very dense. | | 4 | SS | 15 | | | | | | |
| | | | 5 | SS | 6 | | | | | | |
| | | | 6 | SS | 35 | | | | | | |
| | | | 7 | SS | 33 | | | | | | |
| | | | 8 | SS | 36 | | | | | | |
| | | | | SS | 59 | | | | | | |
| 97.5 | | | | | | | | | | | |
| 71.5 | End of borehole. | | | | | | | | | | |

WL Elev 561.7
Observed in casing.

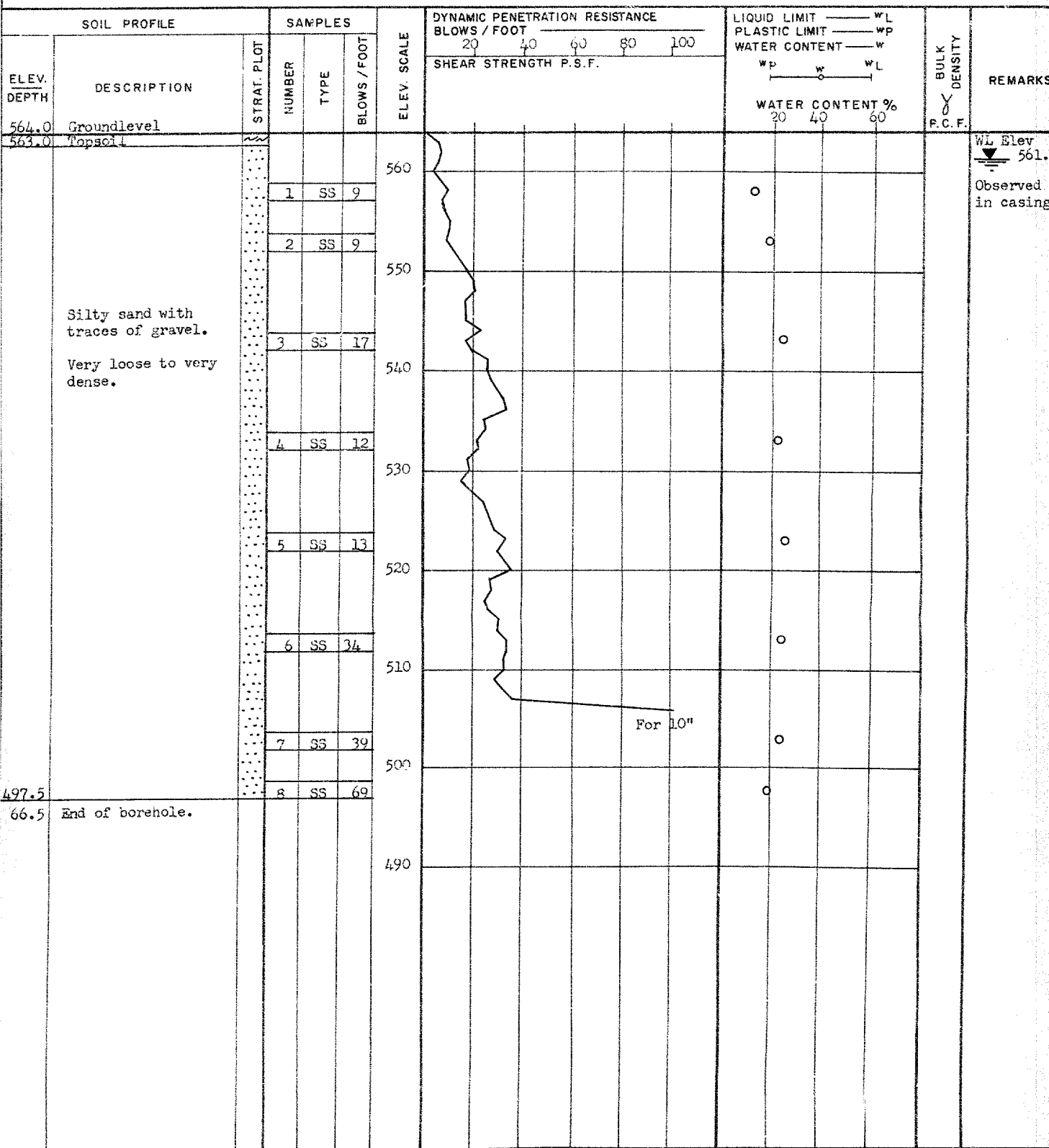
DEPARTMENT OF HIGHWAYS - ONTARIO

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

MATERIALS & TESTING DIVISION

JOB 65-E-55 LOCATION Sec Hwy 521 Line "D" & Sherwood River Ch 430/55 on E ORIGINATED BY W.W.K.
W.P. 255-62 BORING DATE May 27, 1965. COMPILED BY W.W.K.
DATUM 564.0 BOREHOLE TYPE Washboring BX Casing CHECKED BY K.G.S. *AK*



DEPARTMENT OF HIGHWAYS - ONTARIO

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

MATERIALS & TESTING DIVISION

JOB 65-F-55

LOCATION. Sec Hwy 521 Line "D" & Sherwood River Ch 430+00 on E

ORIGINATED BY W.W.K.

W.P. 255-62

BORING DATE May 28 & 29, 1965.

COMPILED BY W.W.K.

DATUM 559.0

BOREHOLE TYPE Washboring BX Casing.

CHECKED BY K.G.S.

| SOIL PROFILE | | STRAT. PLOT | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT | | LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W | | BULK DENSITY P.C.F. | REMARKS |
|----------------|------------------|-------------|---------|------|--------------|-------------|--|-----------------------|--|-----------------------------|------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | | NUMBER | TYPE | BLOWS / FOOT | | 20 40 60 80 100 | SHEAR STRENGTH P.S.F. | WP WL | WATER CONTENT % 20 40 60 | | |
| 559.0 | Waterlevel | | | | | | | | | | | |
| 556.7 | Water | | | | | | | | | | | |
| 2.3 | Soft | | | | | | | | | | | |
| 552.7 | Muck | | | | | | | | | | | |
| 6.3 | | | 1 | SS | 3 | 550 | | | | | | |
| | | | 2 | SS | 9 | | | | | | | |
| | | | 3 | SS | 9 | 540 | | | | | | |
| | | | 4 | SS | 10 | | | | | | | |
| | | | 5 | SS | 4 | 530 | | | | | | |
| | | | 6 | SS | 4 | 520 | | | | | | |
| | | | 7 | SS | 5 | 510 | | | | | | |
| | | | 8 | SS | 54 | 500 | | | | | | |
| 495.2 | | | | | | | | | | | | |
| 63.8 | End of borehole. | | | | | 490 | | | | | | |

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 65-F-55 LOCATION Sec Hwy 521 Line "D" & Sherwood River Ch 429+70 on E ORIGINATED BY W.W.K.
W.P. 255-62 BORING DATE May 31, 1965. COMPILED BY W.W.K.
DATUM 559.5 BOREHOLE TYPE Washboring BX Casing. CHECKED BY K.G.S. *dk*

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. | LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W WP — W — WL WATER CONTENT % 20 40 60 | BULK DENSITY P.C.F. X | REMARKS |
|--------------|-----------------------------------|-------------|---------|------|--------------|-------------|--|--|--------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS / FOOT | | | | | |
| 559.5 | Groundlevel | | | | | | | | | |
| 554.5 | Soft Muck | | 1 | SS | 23 | | | | | |
| 5.0 | | | 2 | SS | 1 | | | | | |
| | | | 3 | SS | 5 | | | | | |
| | | | 4 | SS | 6 | | | | | |
| | | | 5 | SS | 5 | | | | | |
| | Silty sand with traces of gravel. | | 6 | SS | 1 | | | | | |
| | Very loose to very dense. | | 7 | SS | 1 | | | | | |
| | | | 8 | SS | 7 | | | | | |
| | | | 9 | SS | 10 | | | | | |
| 488.0 | | | 10 | SS | 55 | | | | | |
| 71.5 | End of borehole. | | | | | | | | | |

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-F-55

LOCATION Sec Hwy 521 Line "D" & Sherwood River On 429+95 75'-0"

At

ORIGINATED BY W.H.K.

W.P. 255-62

BORING DATE June 1 & 2, 1965.

COMPILED BY W.W.K.

DATUM 559.0

BOREHOLE TYPE Washboring EX Casing.

CHECKED BY K.G.S.

[illegible]

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' : - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE : - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

| <u>CONSISTENCY</u> | <u>'N' BLOWS / FT.</u> | <u>c LB. / SQ. FT.</u> | <u>DENSENESS</u> | <u>'N' BLOWS / FT.</u> |
|--------------------|------------------------|------------------------|------------------|------------------------|
| VERY SOFT | 0 - 2 | 0 - 250 | VERY LOOSE | 0 - 4 |
| SOFT | 2 - 4 | 250 - 500 | LOOSE | 4 - 10 |
| FIRM | 4 - 8 | 500 - 1000 | COMPACT | 10 - 30 |
| STIFF | 8 - 15 | 1000 - 2000 | DENSE | 30 - 50 |
| VERY STIFF | 15 - 30 | 2000 - 4000 | VERY DENSE | > 50 |
| HARD | > 30 | > 4000 | | |

TYPE OF SAMPLE

| | | | |
|------|-----------------------|-------------------------------|-------------------|
| S.S | SPLIT SPOON | T.W. | THINWALL OPEN |
| W.S | WASHED SAMPLE | T.P. | THINWALL PISTON |
| S.B | SCRAPER BUCKET SAMPLE | O.S. | OESTERBERG SAMPLE |
| A.S. | AUGER SAMPLE | F.S. | FOIL SAMPLE |
| C.S. | CHUNK SAMPLE | R.C. | ROCK CORE |
| S.T. | SLOTTED TUBE SAMPLE | | |
| | P.H. | SAMPLE ADVANCED HYDRAULICALLY | |
| | P.M. | SAMPLE ADVANCED MANUALLY | |

SOIL TESTS

| | | | |
|-----|---------------------------------|------|-----------------|
| Qu | UNCONFINED COMPRESSION | L.V. | LABORATORY VANE |
| Q | UNDRAINED TRIAXIAL | F.V. | FIELD VANE |
| Qcu | CONSOLIDATED UNDRAINED TRIAXIAL | C | CONSOLIDATION |
| Qd | DRAINED TRIAXIAL | S | SENSITIVITY |

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

| | |
|------------|--|
| γ | UNIT WEIGHT OF SOIL (BULK DENSITY) |
| γ_s | UNIT WEIGHT OF SOLID PARTICLES |
| γ_w | UNIT WEIGHT OF WATER |
| γ_d | UNIT DRY WEIGHT OF SOIL (DRY DENSITY) |
| γ' | UNIT WEIGHT OF SUBMERGED SOIL |
| G | SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$ |
| e | VOID RATIO |
| n | POROSITY |
| w | WATER CONTENT |
| S_r | DEGREE OF SATURATION |
| w_L | LIQUID LIMIT |
| w_p | PLASTIC LIMIT |
| I_p | PLASTICITY INDEX |
| s | SHRINKAGE LIMIT |
| I_L | LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$ |
| I_C | CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$ |
| e_{max} | VOID RATIO IN LOOSEST STATE |
| e_{min} | VOID RATIO IN DENSEST STATE |
| I_D | DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$ |
| | RELATIVE DENSITY D_r IS ALSO USED |
| h | HYDRAULIC HEAD OR POTENTIAL |
| q | RATE OF DISCHARGE |
| v | VELOCITY OF FLOW |
| i | HYDRAULIC GRADIENT |
| k | COEFFICIENT OF PERMEABILITY |
| j | SEEPAGE FORCE PER UNIT VOLUME |
| m_v | COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$ |
| C_v | COEFFICIENT OF CONSOLIDATION |
| C_c | COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$ |
| T_v | TIME FACTOR = $\frac{C_v t}{d^2}$ (d, DRAINAGE PATH) |
| U | DEGREE OF CONSOLIDATION |
| τ_f | SHEAR STRENGTH |
| c' | EFFECTIVE COHESION INTERCEPT |
| ϕ' | EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| c_u | APPARENT COHESION |
| ϕ_u | APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| μ | COEFFICIENT OF FRICTION |
| S_r | SENSITIVITY |

GENERAL

| | |
|-------------------------------------|-----------------------------------|
| π | = 3.1416 |
| e | BASE OF NATURAL LOGARITHMS 2.7183 |
| $\log_e \sigma$ OR $\ln \sigma$ | NATURAL LOGARITHM OF σ |
| $\log_{10} \sigma$ OR $\log \sigma$ | LOGARITHM OF σ TO BASE 10 |
| t | TIME |
| g | ACCELERATION DUE TO GRAVITY |
| V | VOLUME |
| W | WEIGHT |
| M | MOMENT |
| F | FACTOR OF SAFETY |

STRESS AND STRAIN

| | |
|------------|--|
| u | PORE PRESSURE |
| σ | NORMAL STRESS |
| σ' | NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED) |
| τ | SHEAR STRESS |
| ϵ | LINEAR STRAIN |
| γ | SHEAR STRAIN |
| ν | POISSON'S RATIO (μ IS ALSO USED) |
| E | MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS) |
| G | MODULUS OF SHEAR DEFORMATION |
| K | MODULUS OF COMPRESSIBILITY |
| η | COEFFICIENT OF VISCOSITY |

EARTH PRESSURE

| | |
|----------|---|
| d | DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE |
| δ | ANGLE OF WALL FRICTION |
| K | DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS |
| K_0 | COEFFICIENT OF EARTH PRESSURE AT REST |

FOUNDATIONS

| | |
|-------|--|
| B | BREADTH OF FOUNDATION |
| L | LENGTH OF FOUNDATION |
| D | DEPTH OF FOUNDATION BENEATH GROUND |
| N | DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY |
| k_s | MODULUS OF SUBGRADE REACTION |

SLOPES

| | |
|---------|--|
| H | VERTICAL HEIGHT OF SLOPE |
| D | DEPTH BELOW TOE OF SLOPE TO HARD STRATUM |
| β | ANGLE OF SLOPE TO HORIZONTAL |

#65-F-55

W.P. #255-62

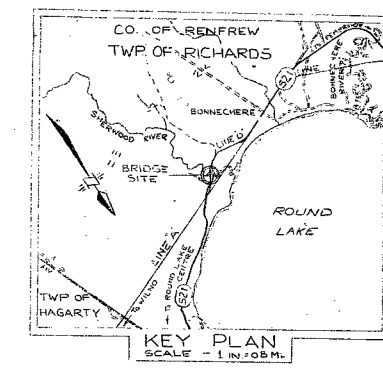
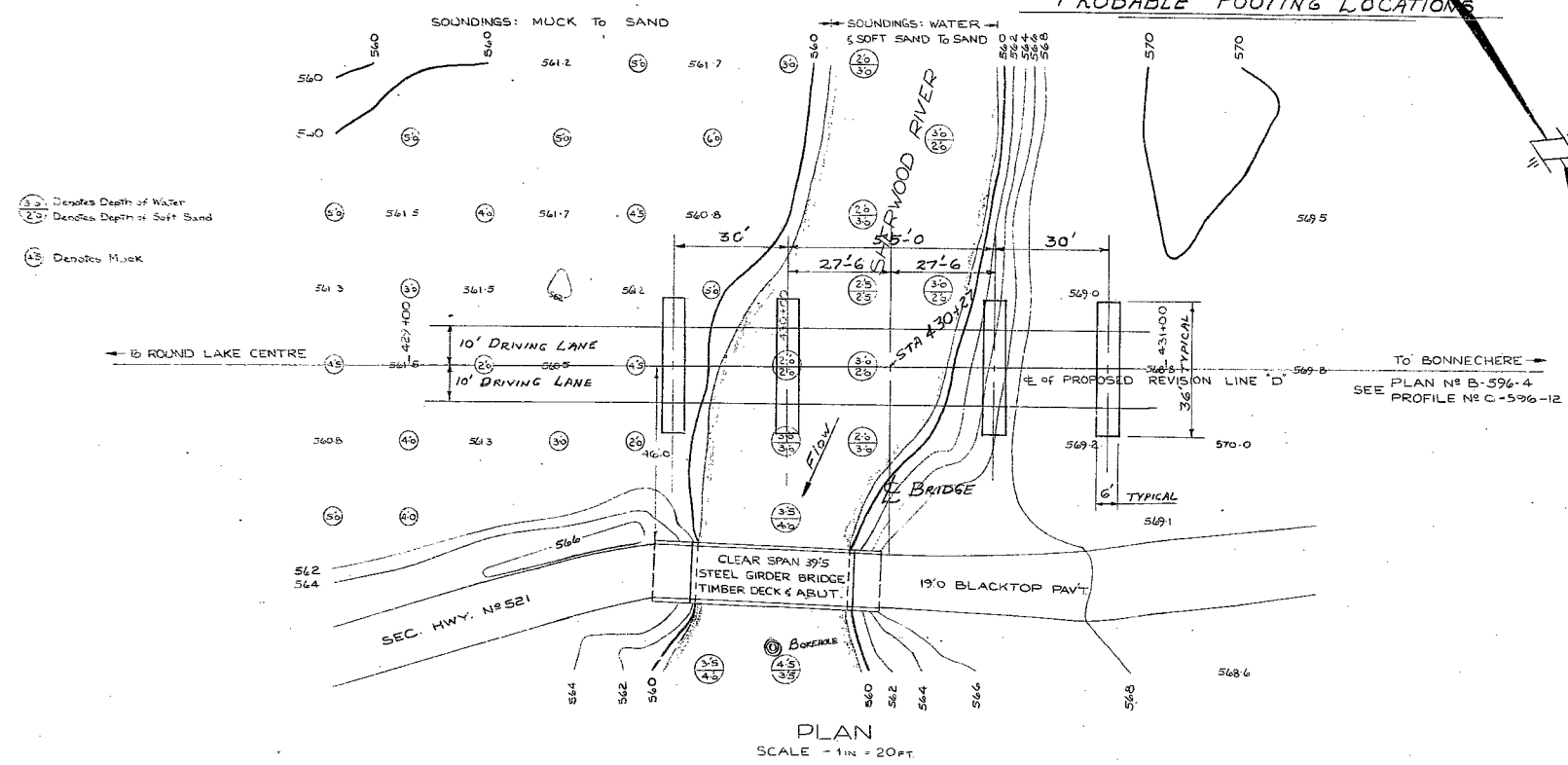
HWY. #521

& SHERWOOD

RIVER BRIDGE

COUNTY of RENFREW
TOWNSHIP of RICHARDS
CON. III
LOT 26

PROBABLE FOOTING LOCATIONS



G.B.M. No 520 Elev. 664.963
 Rock out on C.N.R. 2 1/2 mi. S.W. of station and at mileage
 75.8 from Ottawa, 1/25 ft. N. of a road crossing and 110 ft.
 E. of a private crossing, S. side of cut, near centre.
 Bait set horizontally.
 PUBLICATION No 19 "KILLALOE"

STRUCT. W.P. 255-62

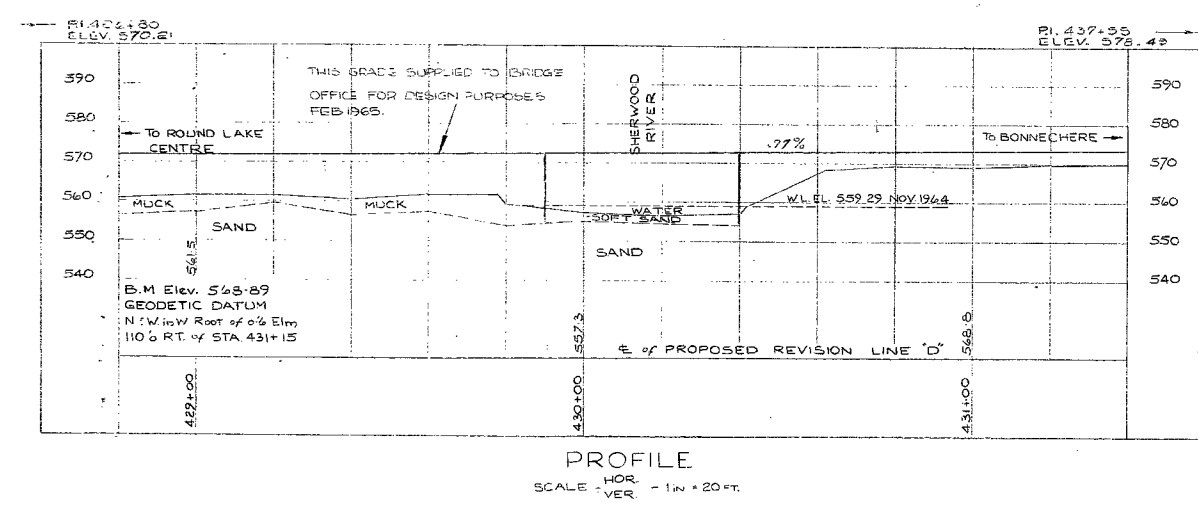
| DATE | REVISIONS & ADDITIONS | BY | CHK'D |
|------|-----------------------|----|-------|
| | | | |

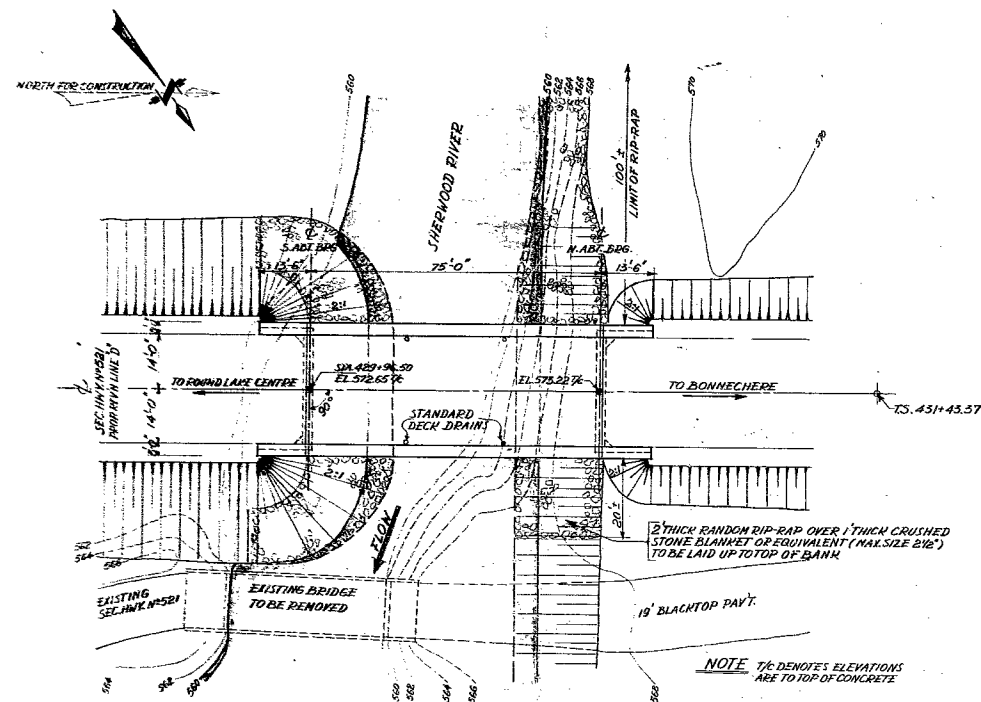
DEPARTMENT OF HIGHWAYS ONTARIO
 DESIGN BRANCH
 ENGINEERING SURVEYS DIVISION

BRIDGE SITE
 PROPOSED CROSSING
 AT
 SHERWOOD RIVER
 AND
 SEC. HWY. No 521 - PROP. REV'N. LINED

LOT 26
 TOWNSHIP OF RICHARDS - COUNTY OF RENFREW

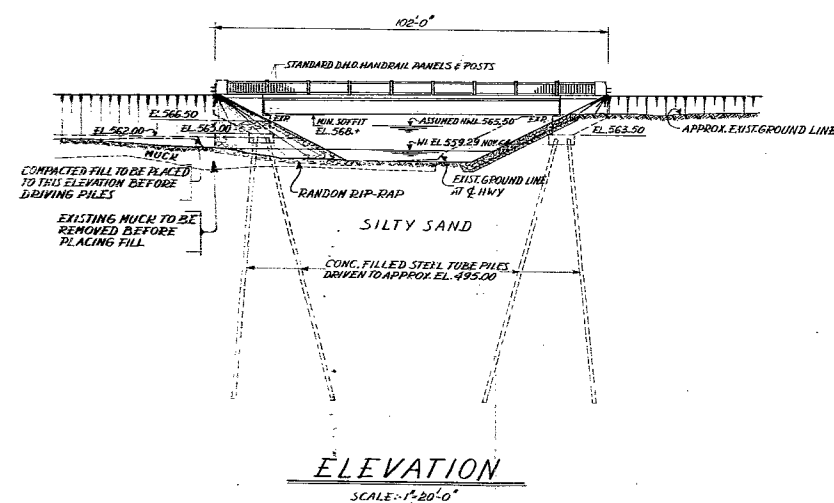
| | | |
|---|--|-----------------------|
| SCALE AS SHOWN | DISTRICT BANCROFT | REGION EASTERN |
| W.O. 9393-64-78 | Date of Survey NOV. 1964 | SITE No |
| SURVEY BY Chief of Party - D. DOWDALL Supervisor - C. BAKER | DRAWN BY Draftsman - G. MARTIN Supervisor - G. BROWN | PLAN No - E-4603-1 |



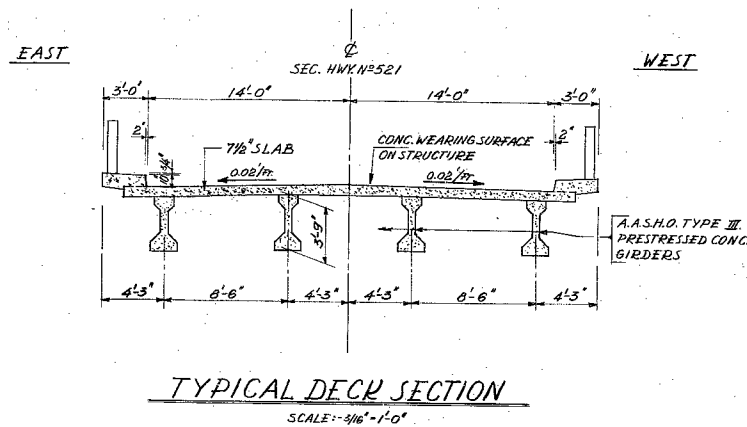


NOTE
RANDOM RIP-RAP ON SOUTH APPROACH
FILL SHALL BE PLACED ON 1'-0" THICK
CRUSHED STONE BLANKET OR EQUIVALENT
IF SAND FILL IS USED

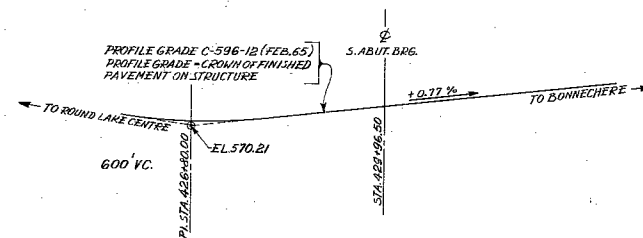
PLAN
SCALE: 1" = 20'-0"



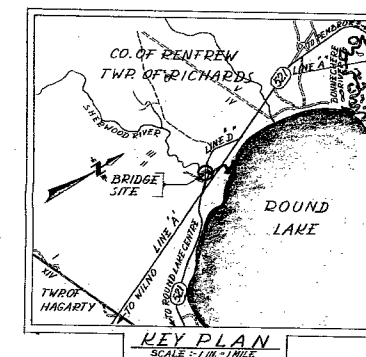
ELEVATION
SCALE: 1" = 20'-0"



TYPICAL DECK SECTION
SCALE: 1/4" = 1'-0"



PROFILE OF SECONDARY HWY. NO. 521
N.T.S.



KEY PLAN
SCALE: 1" = 1 MILE

ALL ELEVATIONS SHOWN HEREON ARE REFERRED TO G.B.M. NO. 520
HAVING A RECORDED ELEVATION OF 664.963 FT. AND LOCATED
IN ROCK CUT ON C.N.R., 2.50 MILES S.W. OF STATION AT MILEAGE
95.80 FROM OTTAWA, 1,125'-FT. N. OF A ROAD CROSSING AND
110'-FT. E. OF A PRIVATE CROSSING, S. SIDE OF CUT NEAR
CENTRE BOLT SET HORIZONTAL LY.
PUBLICATION NO. 19 "KILLALOE"

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
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| DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION | | | |
| SHERWOOD RIVER BRIDGE 6 MILES SOUTH OF NORTH JCT. HWY. 62 | | | |
| SECONDARY HIGHWAY NO. 521 | | DIST. No. 10 | |
| CO. OF RENTFREW | | TWP. OF RICHARDS | |
| LOT 26 | | CON. III. | |
| PRELIMINARY PLAN | | | |
| APPROVED | | SITE No. 29-13 W.P. No. 255-62 | |
| DESIGN H.G.B. CHECK | | CONTRACT No. | |
| DRAWING J.S. CHECK | | DRAWING No. | |
| DATE OCT. 1965 | | LOADING H20-S16 | |
| D-5777-P1 | | | |

