

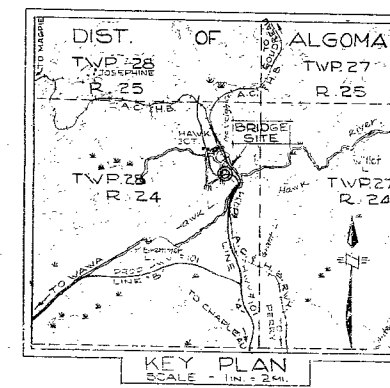
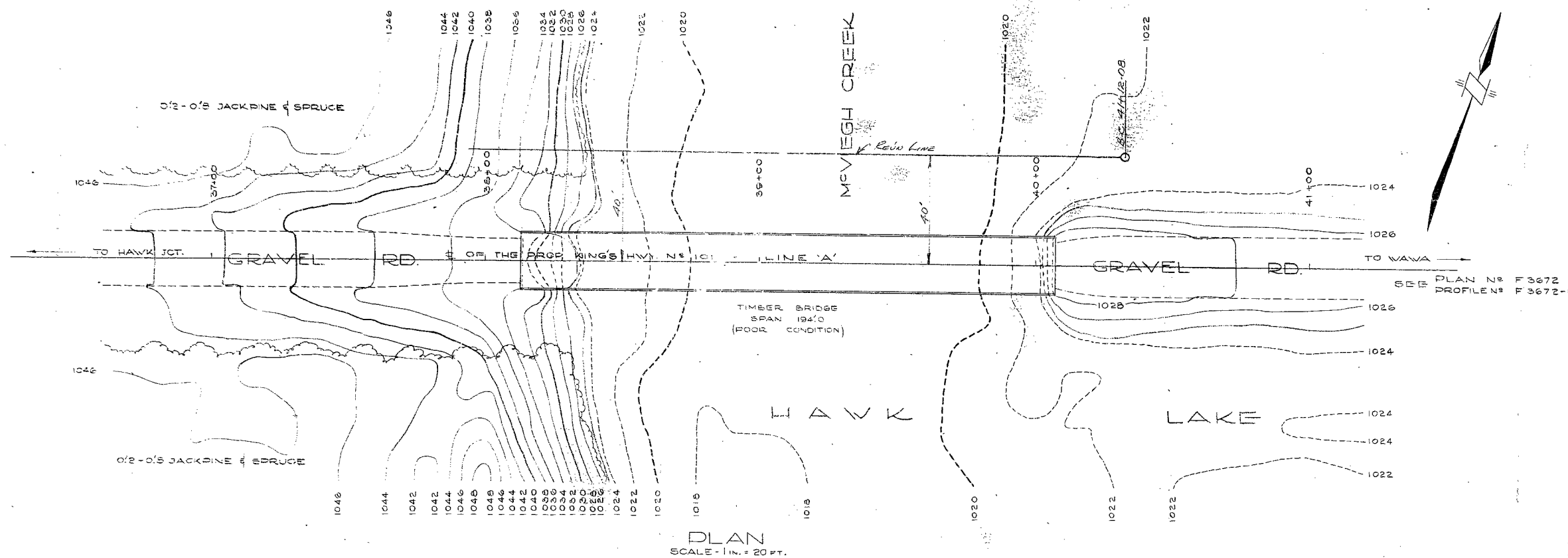
61-F-119

W.P. # 145-61

HWY. # 101 +

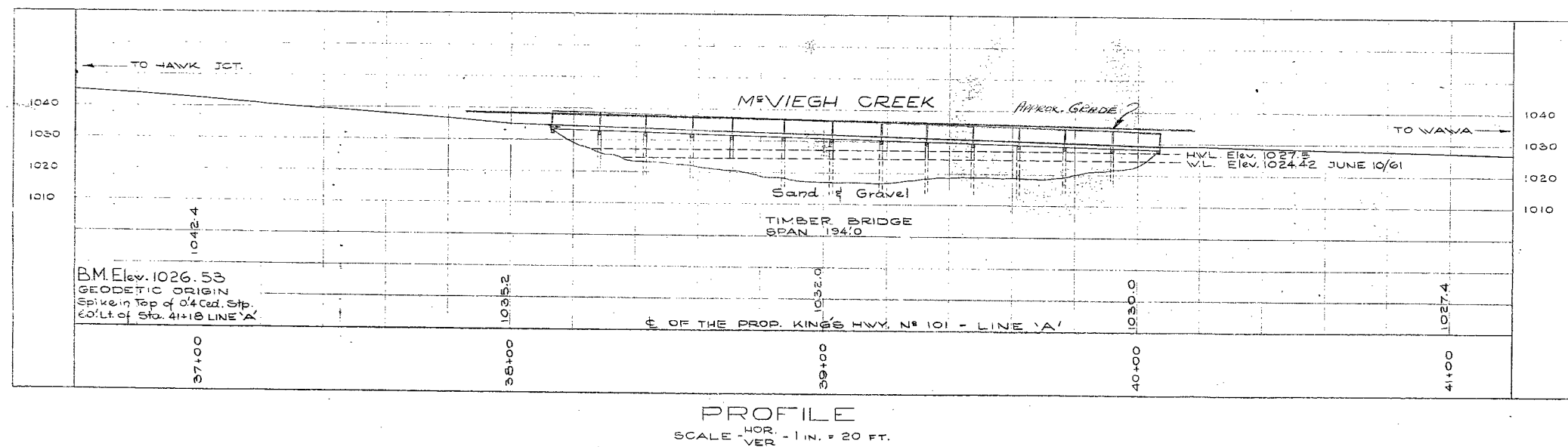
MCVIEGH CREEK

DISTRICT of ALGOMA
TOWNSHIP N° 28
RANGE N° XXIV



HAWK JUNCTION
GBM. N° 689. ELEV. 1080.660 ('15)
ROCK FACE, 1 1/4 MILES SOUTH OF STATION,
27 FT. EAST OF A CRVY. TRACK AND AT
EIGHTH POLE SOUTH OF MILE POST 163
FROM SAULT STE. MARIE, NEAR THE SOUTH
END OF A SHARPLY CURVED CUT WEST
FACE OF ROCK AT TRACK LEVEL BOLT
SET HORIZONTALLY.

61-K-119



ADDITIONS AND REVISIONS		
DATE	REMARKS	BY

DEPARTMENT OF HIGHWAYS - ONTARIO
PLANNING & DESIGN BRANCH
DISTRICT N° 18

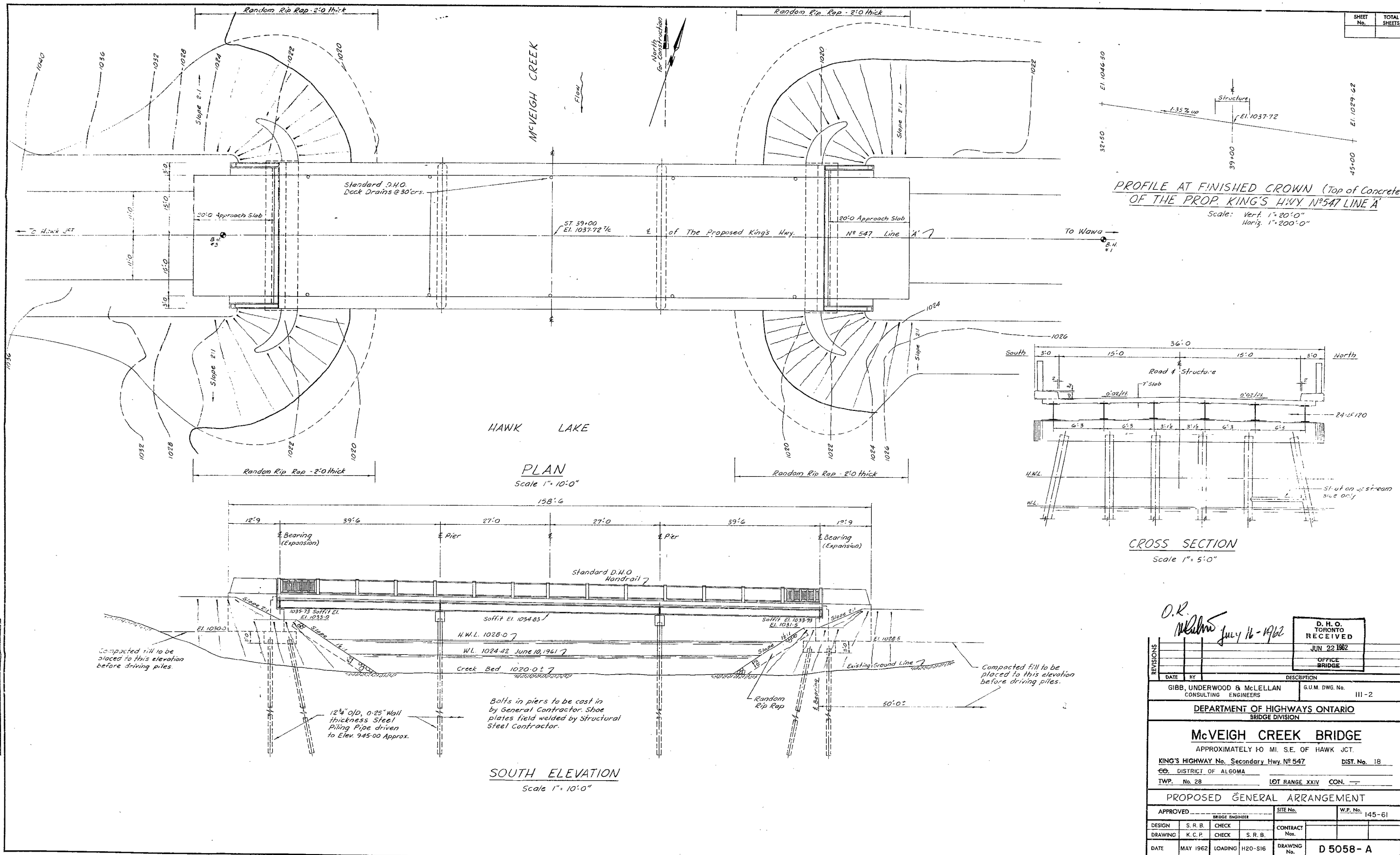
RIVER CROSSING
AT
McVIEGH CREEK
AND
THE PROP. KING'S HWY. N° 101
LINE 'A'
(APPROX. 1 MI. EAST OF HAWK JUNCTION)
RANGE N° XXIV
TOWNSHIP N° 28
DIST. OF ALGOMA

BRIDGE SITE

SURVEY BY CHIEF OF PARTY: K. WHITELOCK SUPERVISOR: W. SAWYER DRAWN BY DRAFTSMAN: A. KRASTIN SUPERVISOR: J. UNDERDOWN CHECKED BY DRAFTSMAN: A. KRASTIN SUPERVISOR: J. UNDERDOWN	APPROVED Director of Planning & Design SCALE - AS SHOWN DATE OF SURVEY - JUNE 1961 DATE OF PLAN - JUNE 1961 WON 54-61-902 X-115 N° PLAN-E-4004-1
--	--

SOME DEFECTS IN NEGATIVE DUE

TO CONDITION OF ORIGINAL DOCUMENTS



SHEET No.	TOTAL SHEETS
1	1

PROFILE AT FINISHED CROWN (Top of Concrete)
OF THE PROP. KING'S HWY. N° 547 LINE 'A'

Scale: Vert. 1" = 20' 0"
HORIZ. 1" = 200' 0"

O.R.
M. R. W. July 16 - 1962

D. H. O.
TORONTO
RECEIVED
JUN 22 1962
OFFICE
BRIDGE

REVISIONS
DATE BY DESCRIPTION
GIBB, UNDERWOOD & McLELLAN CONSULTING ENGINEERS G.U.M. DWG. No. III-2

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

McVEIGH CREEK BRIDGE
APPROXIMATELY 10 MI. S.E. OF HAWK JCT.
KING'S HIGHWAY No. Secondary Hwy. No. 547 DIST. No. 18
CO. DISTRICT OF ALGOMA
TWP. No. 28 LOT RANGE XXIV CON. —

PROPOSED GENERAL ARRANGEMENT

DESIGN	S. R. B.	CHECK	CONTRACT
DRAWING	K. C. P.	CHECK	S. R. B.
DATE	MAY 1962	LOADING	H20-S16
DRAWING No.			

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Division,
(Foundation Section).
Attention: Mr. S. McComble.

February 14, 1962.

D.H.O. FOUNDATION INVESTIGATION
REPORT.
W.J. 61-F-119 -- W.P. 145-61.

Re: Proposed New Bridge, Hwy. #101, Line 'A'
and McVeigh Creek, 1.2 Mi. South of Hawk
Junction, Twp. No. 28, Range No. XXIV,
District of Algoma, District #18.

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

We believe the factual data and recommendations
contained therein, should prove adequate for your future
design work. If further assistance is required in regard
to this project, please do not hesitate to contact our Office.

AGS/MdeP
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
G. K. Hunter
D. P. Collins
E. R. Saint
T. J. Kovich
J. Roy
J. E. Gruspier
F. Norman
A. Watt
Foundations Office✓
Gen. Files.

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

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 7. DISCUSSION AND RECOMMENDATIONS.
 8. SUMMARY.
 9. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION

For

Proposed New Bridge - Hwy. #101, Line 'A' and
McVeigh Creek
1.2 Mile South of Hawk Junction, Twp. No. 28,
Range No. XXIV, District of Algoma,
District #18.
W.J. 61-F-119 -- W.P. 145-61.

1. INTRODUCTION:

It is proposed to erect a new bridge, to carry Hwy. #101, Line 'A' over McVeigh Creek. The site of the proposed bridge is located in Twp. No. 28, District of Algoma. At this location, the chainage of Hwy. #101, Line 'A' is from 37+00 to 41+00.

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 area in which the structure is located, is generally flat terrain. During the time of investigation, the whole surrounding area was flooded to a depth of 1 to 3 feet.

cont'd. /2 ...

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, two sampled boreholes, and three dynamic cone penetration tests, were carried out at this site.

Split spoon samples were taken at various depth intervals. Because of the granular nature of the soil, it was not possible to obtain undisturbed samples. Samples recovered in the split spoon sampler were used to determine the following physical properties:-

1. Natural Moisture Content.
2. Grain Size Distributions.
3. "N" Values.

Results of these 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 encountered during the investigation, is shown in Appendix I of this report, and is also given in subsequent paragraphs. The estimated stratigraphical profile, shown on Dwg. No. 61-F-119A is based on this information.

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

4.2) Very Loose Fine to Coarse Sand:

This layer, approx. 10'-0" - 18'-0" thick, was found at the surface. It exists in a very loose state, with an average 'N' value of 2 blows/foot.

The average moisture content is about 20%.

4.3) Loose to Very Dense Silt:

Following the stratum of very loose coarse silty sand, is a stratum of loose to very dense silt containing small fractions of clay and fine sand. It extends for depths ranging from at least 40 to 50 feet. The relative density of this layer increases with depth, from loose to very dense.

The 'N' value varies from 6 blows/foot at the upper part, to 50 blows/foot at a depth of 60'-0" below ground elevation.

The percentage of silt in this layer is 95%; sand forms 2%, and the rest of 3%, is formed by clay.

5. GROUND WATER CONDITIONS:

At the time of the investigation, the ground water table was found to be 3'-0" above ground level in B.H. #1, and 14'-0" below ground elevation in B.H. #3. No artesian water conditions were encountered.

6. EXISTING STRUCTURE:

The existing wooden bridge which carries Hwy. #101 over McVeigh Creek, is founded on wooden piles approx. 10" to 12"

6. EXISTING STRUCTURE: (cont'd.) ...

butt diameter. The piles are arranged in 26 rows at 5 piles to a row. From the information gathered at the County Office, it seems that the piles are 45'-0" long and are driven 33'-0" into the ground.

7. DISCUSSION AND RECOMMENDATIONS:

As can be seen from the previously described soil stratigraphy, the soil consists of very loose fine to coarse sand, underlain by loose to very dense silt. The upper layers can not provide adequate support for spread footings. Therefore, the future structure should be supported on displacement piles.

Depending on the type of bridge desired, steel or timber piles may be used. If long open spans are preferred, steel displacement piles should be used. It is estimated that 12" Ø tube piles driven to approx. El. 945.0 will support a safe load of 50 tons/pile.

If an alternative method utilizing shorter spans is satisfactory, a cheaper system of timber trestles may be substituted. In this case, the timber piles driven down to approx. El. 970.0, should support a design load of 15 tons per pile. Timber piles should be treated if not completely below the lowest established water table. In this type of subsoil which is largely fine grained, pile driving may be controlled by means of the Hiley Formula, but it is recommended that a loading test be carried out to establish more definitely, a suitable design load.

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

Depending on the type of bridge selected (long spans) dewatering scheme will be necessary as excavations may be carried out below creek or ground water table levels. If sheeting is used for this, it may be incorporated into a scour protection scheme.

The ground at the site has such inferior properties that it can not provide adequate support for the falsework footings.

8. SUMMARY:

1. The stratification of the soil is quite uniform. The relative density of the material encountered varies from very loose to very dense.
2. Because of the loose density of the upper layers, a structure supported on piles is recommended.
3. Two different types of bridges are recommended:

3A. Long Spans -- Concrete Bridge:

For this type of bridge, steel displacement piles driven approximately to El. 945.0, should support a design load of 50 tons per pile. The bottom elevation of abutments should be at approx. El. 1015.0.

Protection against scour will be necessary for the abutments. If sheeting is used for this, it may be incorporated into a dewatering scheme.

cont'd. /6 ...

8. SUMMARY: (cont'd.) ...

3B. Short Spans -- Timber Trestle Bridge:

This type of bridge may be supported on timber piles, driven down to El. 970.0. A design load of 15 tons per pile may be used.

4. Driving of piles should be controlled by the Hiley Formula. A load test should be carried out to establish more definitely, a suitable design load.

5. The ground at the site has such inferior properties that it can not provide adequate support for the falsework footings.

6. No stability problems for approach fills are anticipated, as the expected settlements will take place during the construction.

9. MISCELLANEOUS:

The field work was carried out during the period of December 18, 1961 to December 22, 1961, by the Boyles Bros. Core Drill, adapted for soil sampling, under the supervision of Mr. W. W. Kulmatickas.

February 1962. REPORT PREPARED BY:

.....
W. W. Kulmatickas,
PROJECT FOUNDATION ENGR.

REPORT APPROVED BY:

.....
K. G. Selby,
SR. PROJECT FOUNDATION ENGR.

APPENDIX I.

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-119

W.P. 145-61

HOLE NO	SAMP. NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETIN RESIST. BLOWS/FT.	MOIST CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psf	UNIT WEIGHT pcf. EL.	REMARKS
1	S1	10.0-11.5	Fine to coarse sand.	1	-	-	-	-	100.5	1022.5
	S2	20.0-21.5	Silt with small quantity of clay and fine sand.	1	-	-	-	-	100.5	
	S3	30.0-31.5	"	2	-	-	-	-	99.5	
	S4	40.0-41.5	"	4	-	-	-	-	98.5	
	S5	50.0-51.5	"	6	16.6	-	-	-	97.5	
	S6	60.0-61.5	Fine to med. sand.	17	19.4	-	-	-	96.5	
	S7	70.0-71.5	Silt with small quantity of clay and fine sand.	31	19.4	-	-	-	95.5	
3	S1	10.0-11.5	Fine to coarse sand.	1	16.7	-	-	-	102.8	EL: 1022.5 FT
	S2	20.0-21.5	Silt with small quantity of clay and fine sand.	5	26.7	-	-	-	101.8	
	S3	30.0-31.5	"	3	-	-	-	-	100.8	
	S5	50.0-51.5	"	12	27.1	-	-	-	98.8	
	S6	60.0-61.5	"	14	22.5	-	-	-	97.8	
	S7	70.0-71.5	"	21	23.3	-	-	-	96.8	
	S8	80.0-81.5	"	79	-	-	-	-	95.8	

DEPARTMENT OF HIGHWAYS - ONTARIO

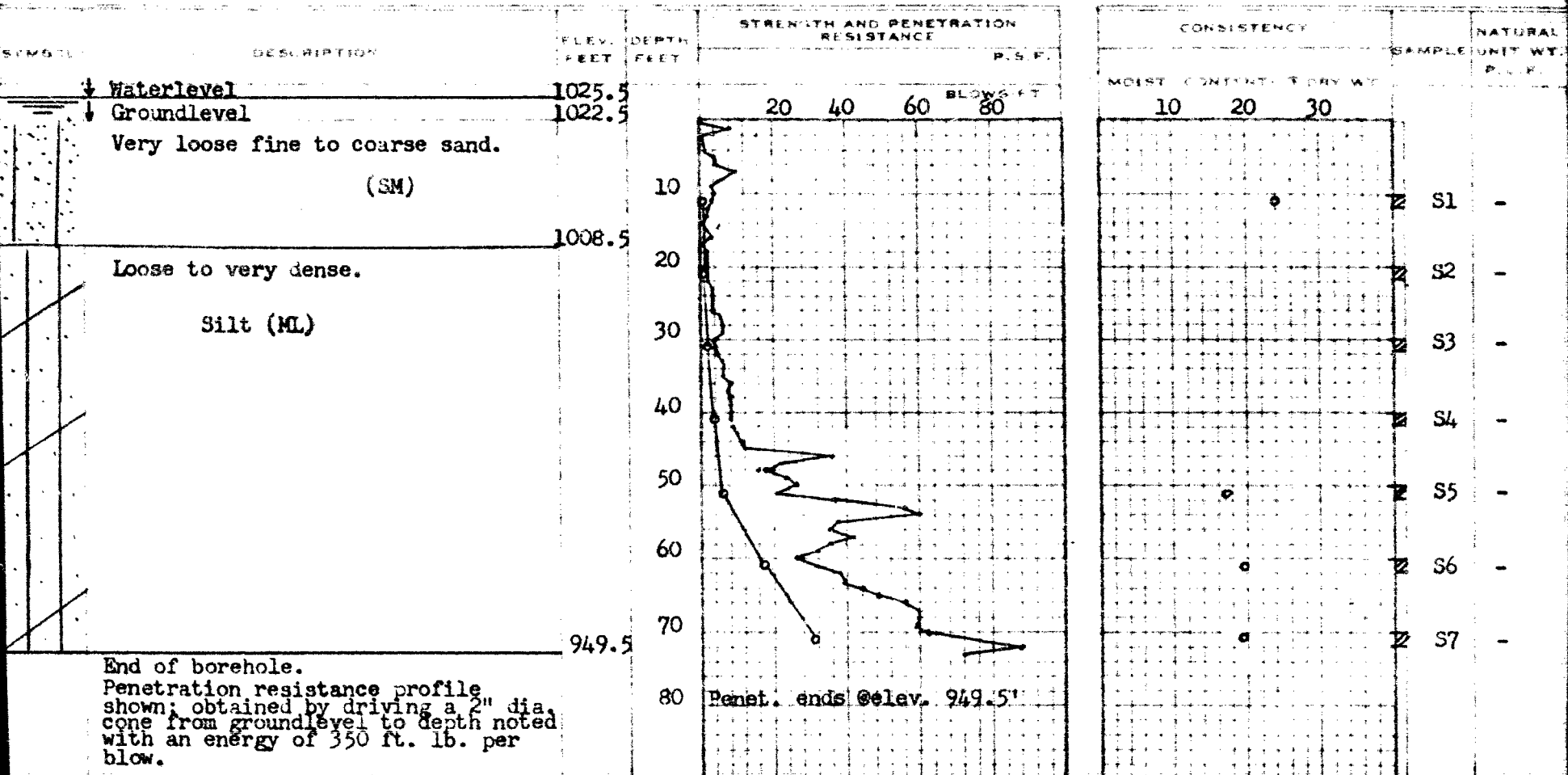
MATERIALS AND RESEARCH SECTION

W.P. 145-61 BORE HOLE NO. 1
 JOB 61-F-119 STATION 40+36
 DATUM 1022.5 COMPILED BY H.S.
 BORING DATE Dec. 17/61. CHECKED BY W.W.K.

2" DIA. SPLIT TUBE
 2" SHELBY TUBE
 2" SPLIT TUBE
 2" DIA. CONE
 2" SHELBY
 CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu)
 VANE TEST (C) AND SENSITIVITY (S)
 NATURAL MOISTURE AND LIQUIDITY INDEX
 LIQUID LIMIT
 PLASTIC LIMIT



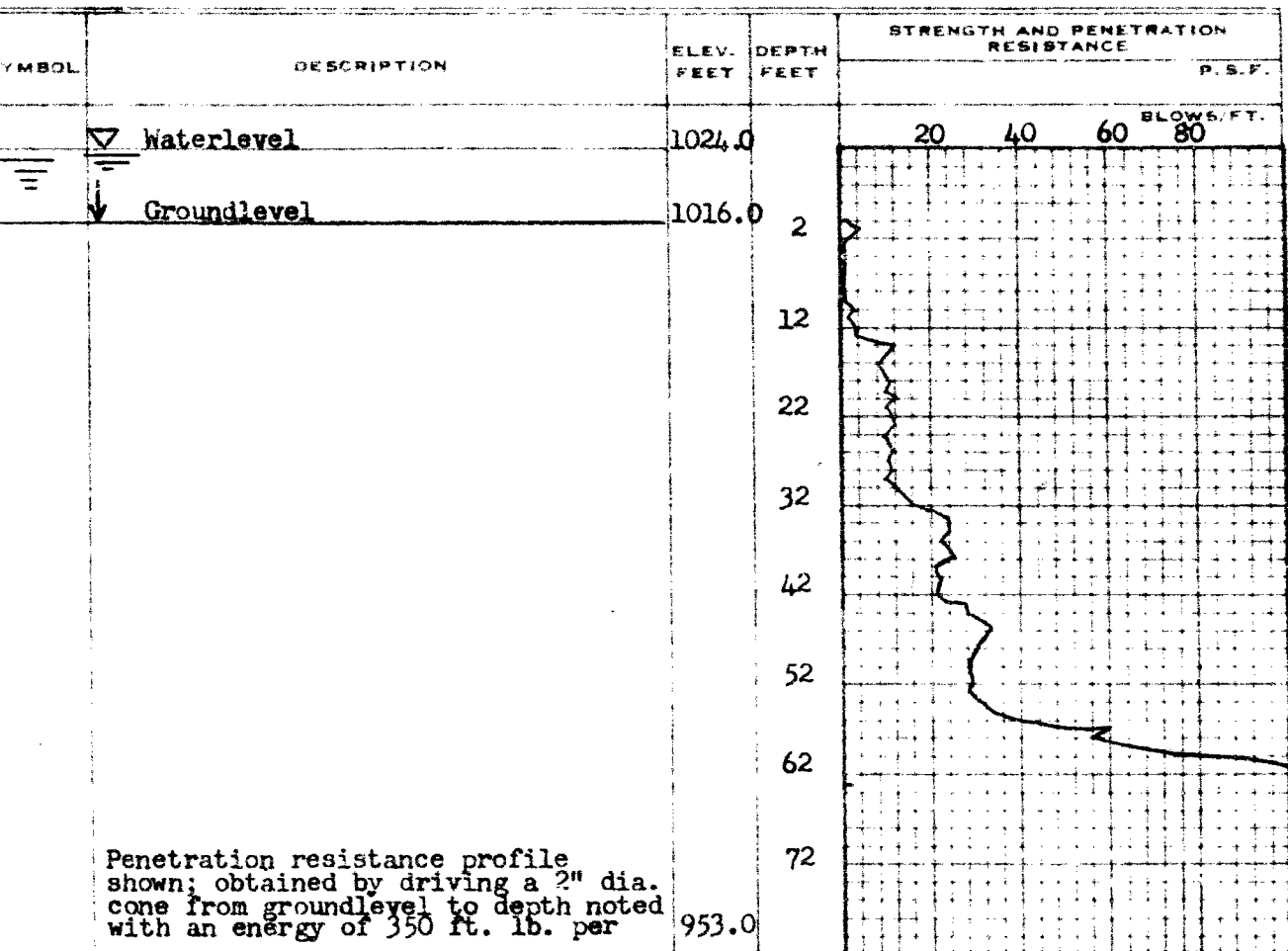
MATERIALS AND RESEARCH SECTION

W.P. 145-61 BORE HOLE NO. 2
JOB 61-F-119 STATION 394 11
ELEVATION 1016.0 COMPILED BY H.S.
BORING DATE Dec. 19/61. CHECKED BY W.W.K.

2" DIA. SPLIT TUBE _____
2" SHELBY TUBE _____
2" SPLIT TUBE _____
2" DIA. CONE _____
2" SHELBY _____
CASING _____

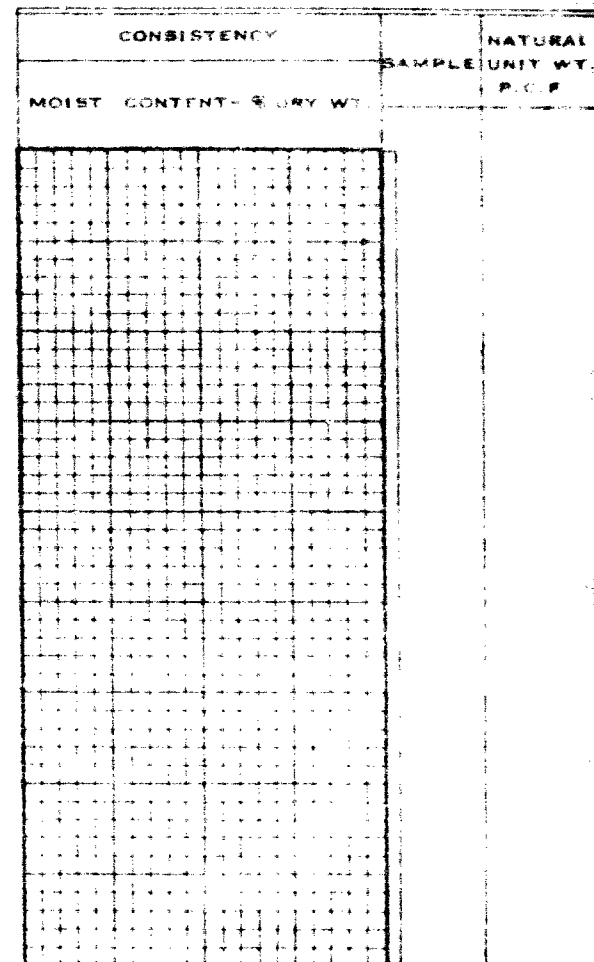
LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	O
VANE TEST (C) AND SENSITIVITY (S) -----	+c
NATURAL MOISTURE AND LIQUIDITY INDEX -----	LI
LIQUID LIMIT -----	X
PLASTIC LIMIT -----	



Penetration resistance profile
shown; obtained by driving a 2" dia.
cone from groundlevel to depth noted
with an energy of 350 ft. lb. per

blow.



DEPARTMENT OF HIGHWAYS - ONTARIO

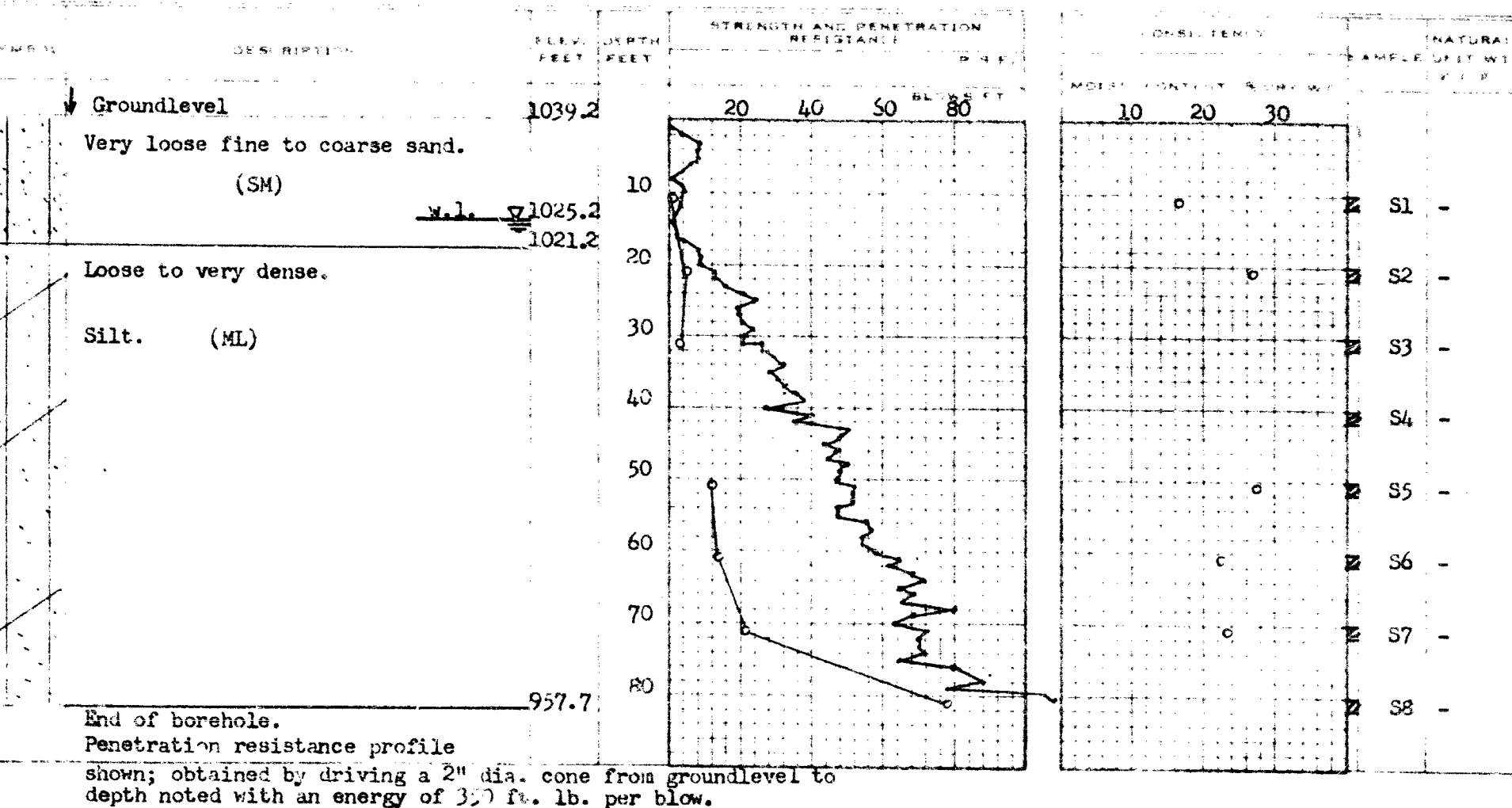
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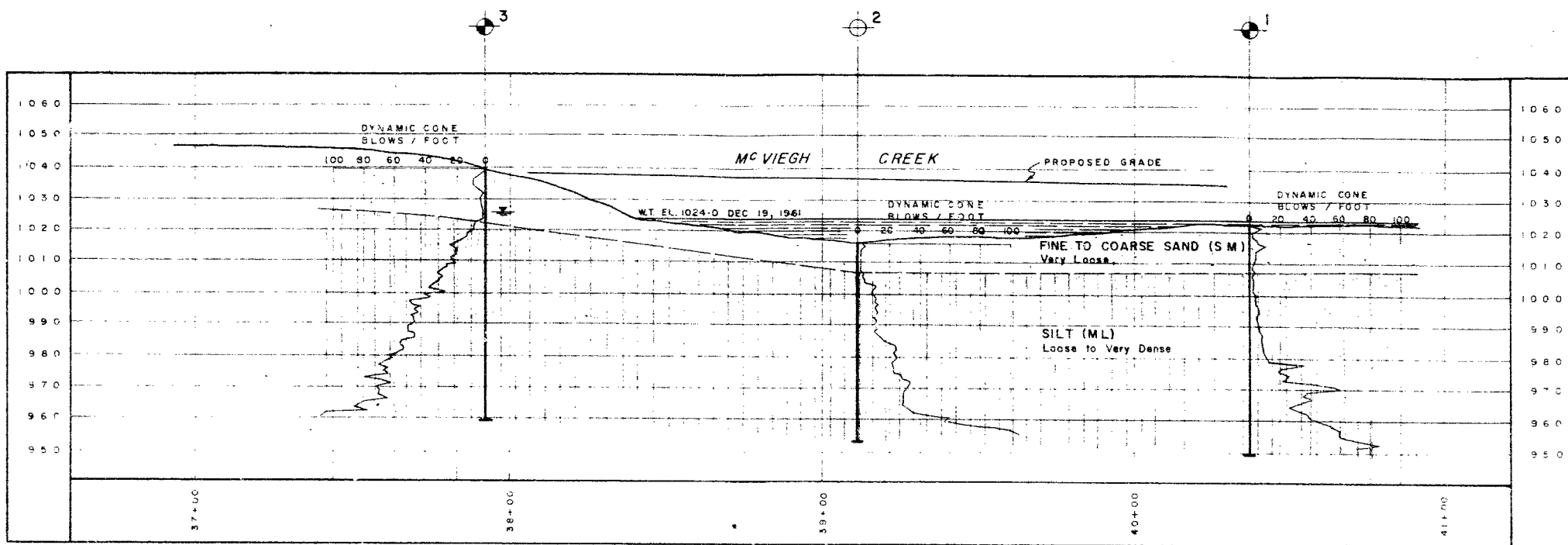
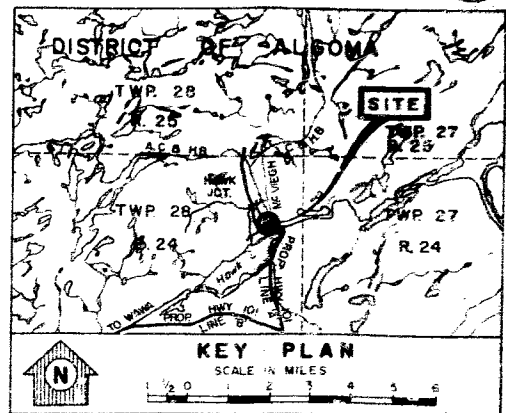
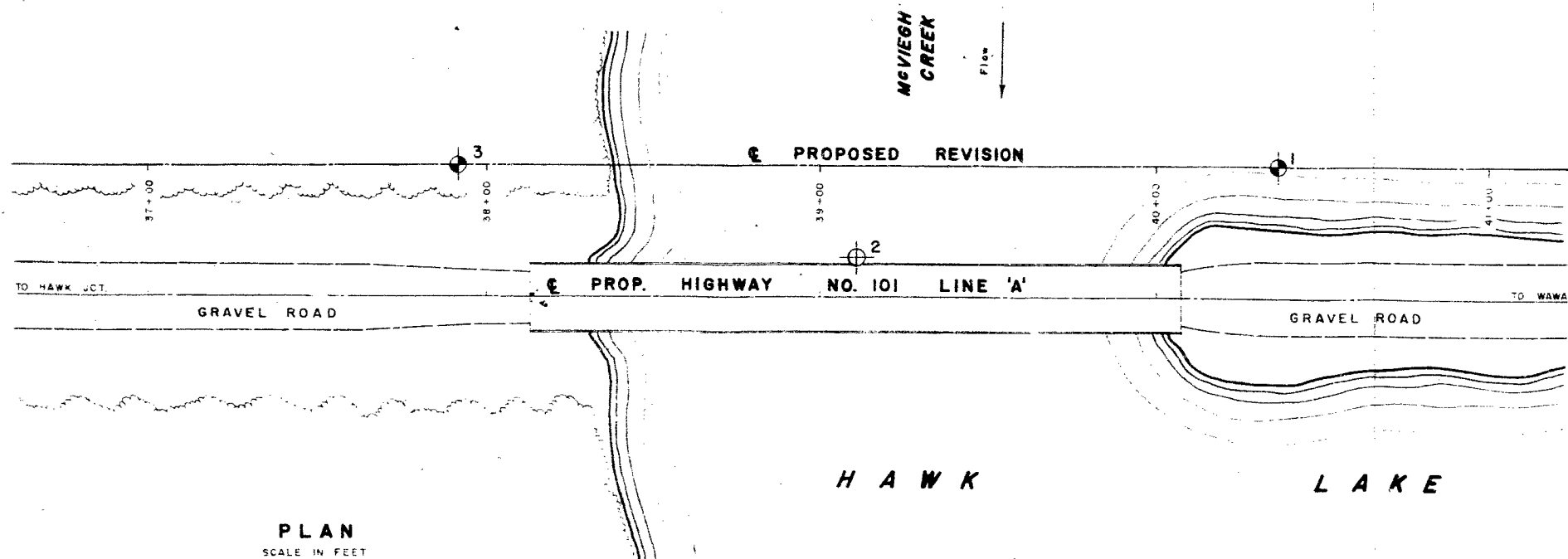
H.P. 145-61 BORE HOLE NO. 3
 OB 61-F-119 STATION 37/91
 ATUM 1039.2 COMPILED BY H.S.
 DRING DATE Dec. 19/61. CHECKED BY W.W.K.

2" DIA SPLIT TUBE
 2" SHELBY TUBE
 2" SPLIT TUBE
 2" DIA CONE
 2" SHELBY
 CASING

LEGEND

1/2 UNCONFINED COMPRESSION (QU)
 VANE TEST (C) AND SENSITIVITY (S)
 NATURAL MOISTURE AND
 LIQUIDITY INDEX
 LIQUID LIMIT
 PLASTIC LIMIT





LEGEND			
	BORE & PENETRATION HOLE		
	PENETRATION HOLE		
	WATER LEVELS established at time of Field Investigation (DEC 1961)		
HOLE	ELEVATION	STATION	OFFSET
1	1022.5	40+36	±
2	1016.0	39+11	27' RT
3	1039.2	37+91	±

NOTE

THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE BOUNDARIES ARE ASSUMED FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE ERROR.

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION		
McVIEGH CREEK AND PROPOSED KING'S HIGHWAY NO. 101 REVISION		
ORIGINATED W. KULMATICAS	DISTRICT NO. 27	DATE: 5 FEB. 1962
DRAWN: D. MUMFORD	W. R. NO. 145-61	JOB NO. 61-F-119
CHECKED: <i>[Signature]</i>	CONTRACT NO.	DRAWING NO.
APPROVED: <i>[Signature]</i>		61-F-119 A