DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 31E-98

DIST. 13 REGION

W.P. No.

CONT. No.

W. O. No. 7607-85-01
REF. No. 50-000-347

STR. SITE No. 44-104

HWY. No. LOC

LOCATION NORTH MAGNETAWAN RIVER
(JOLY TWP RD.)

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

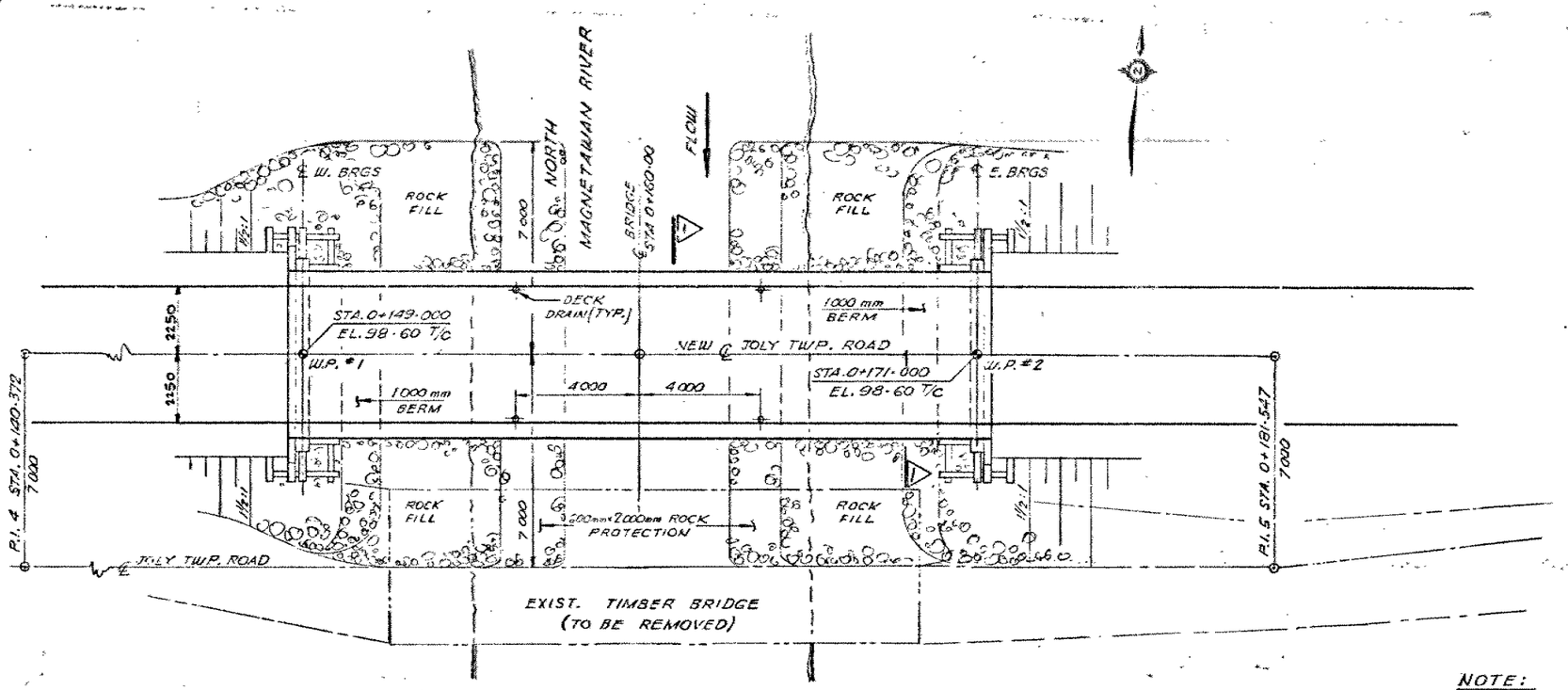
METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

DIST. 13
CONT No
W.O. No 7607-85-01

NORTH MAGNETAWAN RIVER BRIDGE
(JOLY TOWNSHIP ROAD)
GENERAL ARRANGEMENT

SHEET



PLAN
1:100

NOTE:
T/C DENOTES TOP OF CONCRETE
W.P. DENOTES WORKING POINT

GENERAL NOTES

REINFORCING STEEL

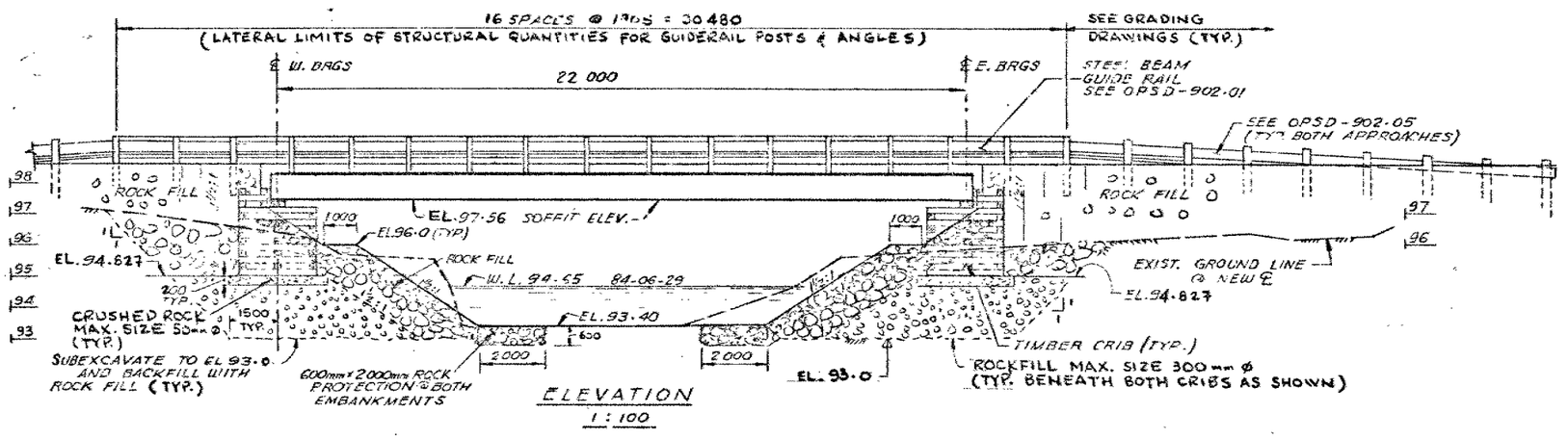
REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARK WITH SUFFIX 'C' SHALL BE COATED BARS.

CLASS OF CONCRETE

DECK ——— 30 MPa

CLEAR COVER TO REINFORCING STEEL

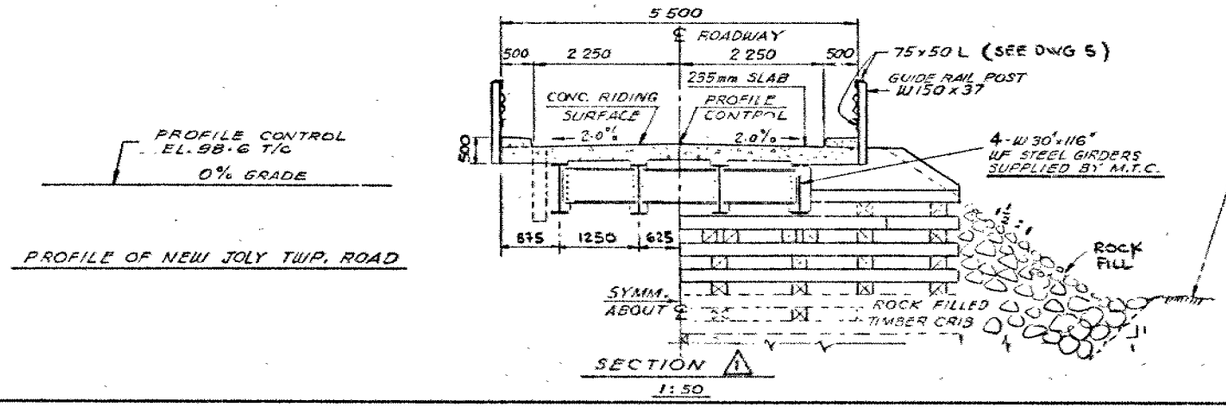
DECK:
TOP ——— 80 ± 20
BOTTOM & SIDES — 40 ± 10



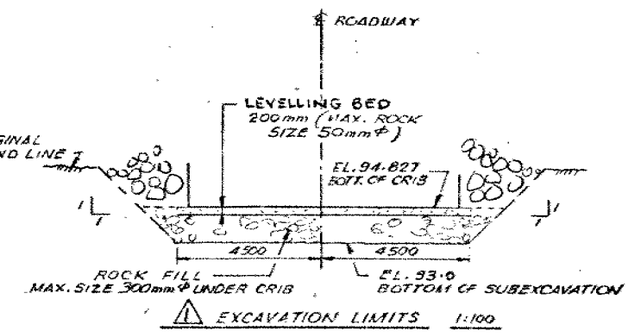
ELEVATION
1:100

LIST OF DRAWINGS

1. GENERAL ARRANGEMENT
2. CRIB DETAILS
3. STRUCTURAL STEEL
4. DECK
5. BILLS OF MATERIAL
6. BRIDGE DATE & SITE NUMBER DATA
7. AS CONSTRUCTED ELEV. & DIMENSIONS
8. STANDARD DETAILS
9. QUANTITIES - STRUCTURE



SECTION
1:50



EXCAVATION LIMITS 1:100

100 mm ON ORIGINAL DRAWING

J.T. BROWN
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN J.B.	CHECK	LOADING OHBDC-CL-83	DATE JULY 85
DRAWING L.S.	CHECK J.B.	SITE No 41-104	DWG 1

FILE COPY

Ontario

Ministry of
Transportation and
Communications

foundation investigation and design report

ENGINEERING MATERIALS OFFICE
FOUNDATION DESIGN SECTION

REFERENCE #50-000-347 DIST 13

HWY Joly Twp. Rd. STR SITE 44-104

North Magetawan River Structure

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GEOCRES 31E-98

DATE FEB 2 2 1985

FOUNDATION INVESTIGATION REPORT

For

North Magnetawan River Structure,

Joly Township Rd., Concession IV & V

Reference #50-000-347, Site 44-104

District 13, North Bay

INTRODUCTION

This report summarizes the factual information obtained from a foundation investigation carried out between 85 01 14 and 85 01 19 at the structure site mentioned above. The fieldwork consisted of 2 sampled boreholes advanced by means of hollow stem augers and washing BX casing. A probe hole to determine the bedrock surface was advanced by means of solid stem augers. The boreholes and probe hole ranged in depth from 7.5 to 11.8 m below the ground surface. Bedrock was sampled in 2 boreholes by obtaining 2.0 and 2.9 m of BX rock core.

SITE DESCRIPTION

The site is located at the existing crossing of Joly Township Concession Road IV & V over the North Magnetawan River in Joly Township.

The existing bridge over the North Magnetawan River is a single lane timber structure approximately 18 m long. The bridge is supported on 3 timber piers which have been supplemented this winter with additional supports. The existing approach fills up to 2 m above the general ground level and are constructed of rock fill.

Topographically the area is generally hilly with the North Magnetawan River located in a valley. The North Magnetawan River flows in a southerly direction at the site and was approximately 9 m wide and was up to 1.5 m deep at the time of the investigation. The river has a swift current which has resulted in extensive erosion of the river banks in the vicinity of the site. The subsoil in the stream bed and river banks consist of sands and silts with the occasional exposed boulder. Generally the area is forested.

SUBSURFACE CONDITIONS

General

The subsoil encountered across the site is a deposit of sand with varying portions of silt and gravel. The deposit varies in denseness from very loose generally at the surface to very dense at lower levels and extends to a maximum depth of 8.9 m. Underlying this granular deposit is Biotite Gneiss bedrock which is generally sound.

The boundaries between the soil types, in situ and laboratory test results are shown on the attached Record of Borehole Sheets. The elevations and locations of the boreholes along with a profile showing an estimated stratigraphical section based on borehole data are shown on Drawing No. 1.

The subsoil and bedrock encountered are described in the following paragraphs.

Sand with Gravel some Silt to Sand some Silt

This granular deposit encountered in all boreholes extends from the ground surface down to the bedrock surface. The deposit varies in thickness from 5.5 m on the west river bank to 8.9 m on the east river bank. Numberous boulders and cobbles were encountered in this deposit at depths ranging from 1.5 to 6.0 m and extended down to the bedrock surface. Augering was very difficult through the bouldery zones of the deposit.

Grain size distribution tests carried out on samples from this stratum are plotted on Fig. 1 and are summarized below.

	Range
Sand	50 - 91%
Gravel	0 - 34%
Silt and Clay	7 - 23%

The denseness of this stratum varies from very loose at the surface to very dense in the zone above the bedrock. This interpretation is based on 'N' values ranging from 2 to 123 blows per 0.3 m. Boulders may have influenced some of the higher 'N' values as the split spoon was driven through these zones.

Biotite Gneiss Bedrock

Bedrock was encountered in all boreholes at elevations varying from 87.1 m on the east river bank to 90.1 m on the west river bank.

The bedrock was proven by obtaining up to 2.9 m of BX size rock core and was found to be a black biotite gneiss. The upper 0.5 to 1.3 m of the bedrock is slightly weathered with the underlying material being unweathered. Rock core recovery rates varied from 75 to 100%. Based on rock quality designation (RQD) values ranging from 0 to 60%, the quality of the bedrock is assessed to be very poor to fair. This low rating appears to be a result of the near vertical jointing of the bedrock. For a detailed description of the bedrock see Descriptions of Rock Core in the Appendix.

Groundwater

The water level measured in the open boreholes varied between 94.2 to 94.4. This corresponds very closely to the river water level of 94.3 which indicates the river level probably controls the ground water level.

DISCUSSION AND RECOMMENDATIONS

General

The existing Joly Township Road bridge over the North Magnetawan River is to be replaced with a new structure. The proposed alignment is 7 m upstream from the centreline of the existing wooden bridge. The present proposals are for either a single span or a three span structure totalling ± 22 m. The profile grade on the new alignment is in the order of elevation 98.5 which will entail construction of approximately 3 m fills.

The subsurface conditions consist of very loose to very dense sand with varying amounts of silt and gravel. Numerous boulders and cobbles were encountered within this stratum at depths ranging from 1.5 to 6.1 m. This granular deposit was found to be a maximum of 8.9 m deep. Underlying this is sound biotite gneiss bedrock, encountered at an elevation varying from 87.1 to 90.1.

The following paragraphs outline our recommendations pertaining to the design and construction of the structure foundations and related earthworks.

Structure Foundations

The presence of numerous cobbles and boulders within the overburden present considerable problems to the installation of piles at this site. In view of this, consideration should be given to construction of spread footings on a rock pad. Some settlement of the very loose sands may be anticipated, however, a single span simply supported bridge could have sufficient tolerance.

The rock pad should be founded at an elevation of 94.0 which entails subexcavation of the existing ground. It may be required to carry out part of the subexcavation under water if the groundwater level is above elevation 94.0. The rock fill pad should be a minimum of 2 m thick, which may require a small grade raise or limit the height of the abutment wall. Design of the rock pad should be carried out as indicated on Fig. 1 in the Appendix with the rock limited to a maximum size of 300 mm. The rock fill should be covered with 300 mm of structural concrete aggregate, maximum grain size 37.5 mm to provide a suitable working platform for footing construction. Spread footings founded on the rock fill may be designed for a factored bearing capacity of 360 kPa at the U.L.S. and a bearing capacity of 200 kPa at the S.L.S. Type II.

The 1.8 m earth cover requirement for frost protection of the footing may be disregarded if necessary as the footings are founded on rock fill.

Alternative foundation schemes are available such as augering piles or caissons but would be much more complex to construct, and very costly due to the numberous boulders and cobbles encountered in the soils.

Settlement

The structure may experience differential settlement up to 50 mm as the subsoils at the west abutment are very loose. Provision for jacking of the structure should be made to allow for levelling if differential settlements exceed the allowable limits. An alternative to this would be to surcharge the area where the foundation will be founded with a soil or rock mass equivalent to the load the footings will apply. This surcharge should be left for a minimum of 2 months, at which time it can be removed and the footing constructed. This surcharge will reduce the differential settlements.

Settlement of the 3 m high approach fills will take place during construction as the subsoils are granular and long term settlement will be of a minimal nature.

Stability

The river banks should be flattened to 2:1 slopes and covered with geotextile and rip rap to prevent erosion in the area of the structure.

Rock fills in the order of 3 m in height will be stable if constructed with 1-1/4 to 1 side slopes. Earth fills of the same height constructed with 2:1 slopes will also be stable.

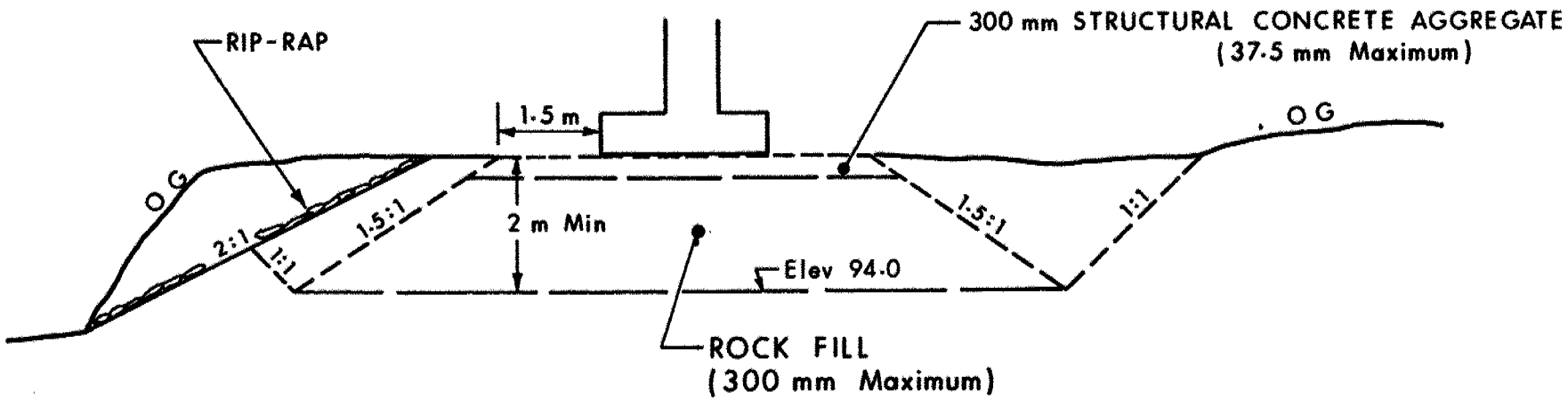
MISCELLANEOUS

The fieldwork for this investigation was carried out under the supervision of Mr. H. Sturm, Project Foundations Engineer, utilizing equipment owned and operated by Atcost Soil Investigation, Toronto. This report was written by Mr. H. Sturm and reviewed by Mr. M. Devata, Chief Foundations Engineer.

H. Sturm, P.Eng.
Project Foundations Engineer

M. Devata, P.Eng.
Chief Foundations Engineer (East)

APPENDIX

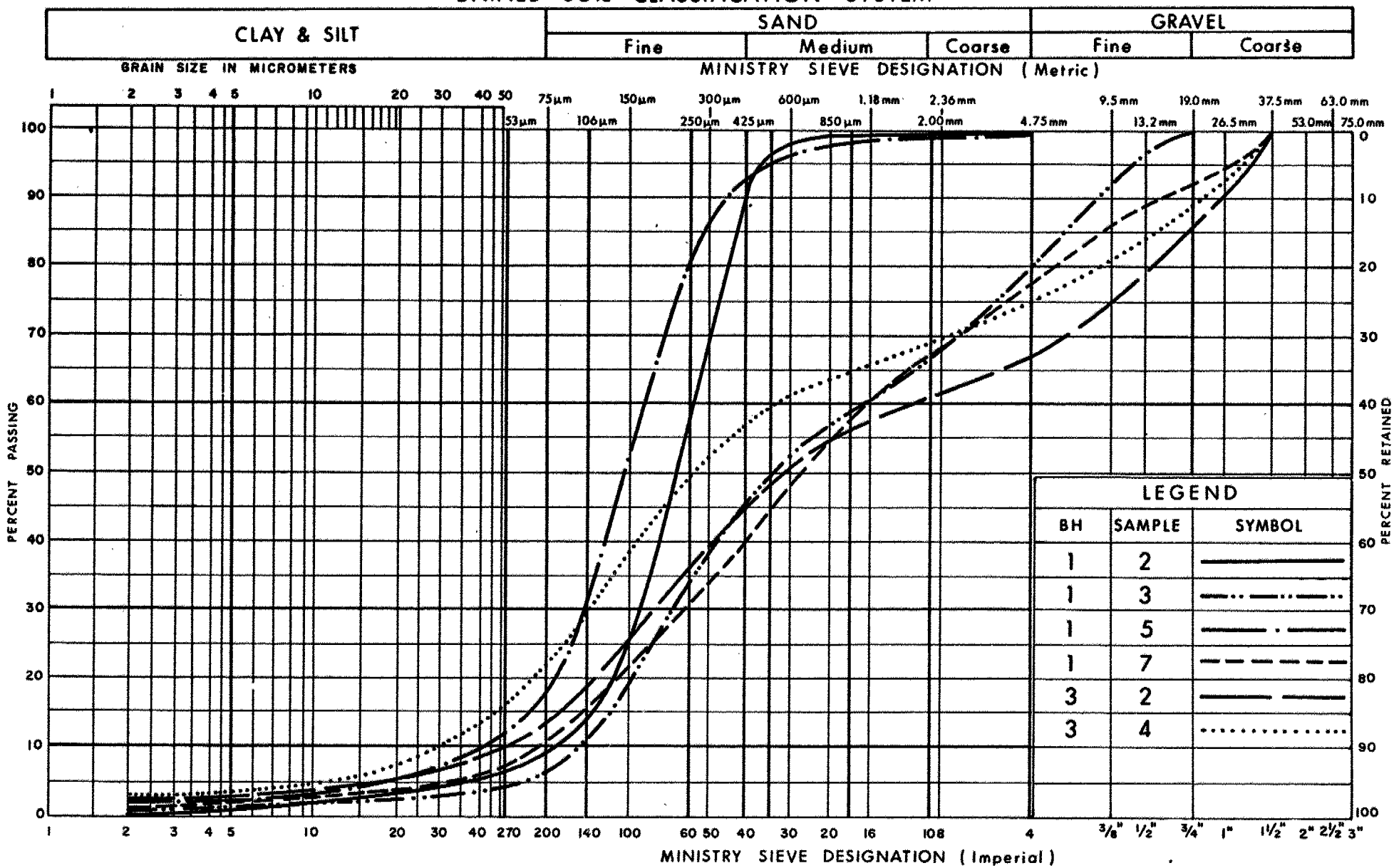


ROCK FILL PAD

Ref No 50-000-347

Fig No 1

UNIFIED SOIL CLASSIFICATION SYSTEM



Ministry of Transportation and Communications
Ontario

GRAIN SIZE DISTRIBUTION
SAND WITH GRAVEL SOME SILT TO SAND SOME SILT

FIG No 2
Ref No 50-000-347

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS $\bar{N}$.

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

c_u (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	>200
	VERY SOFT	*SOFT*	*FIRM*	*STIFF*	*VERY STIFF*	*HARD*

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	>50
	VERY LOOSE	*LOOSE*	*COMPACT*	*DENSE*	*VERY DENSE*

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (R Q D), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	*POOR*	*FAIR*	*GOOD*	*EXCELLENT*

JOINTING AND BEDDING:

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	>3m
JOINTING	*VERY CLOSE*	*CLOSE*	*MOD. CLOSE*	*WIDE*	*VERY WIDE*
BEDDING	*VERY THIN*	*THIN*	*MEDIUM*	*THICK*	*VERY THICK*

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE

STRESS AND STRAIN

u_w	kPa	PORE WATER PRESSURE
r_u	1	PORE PRESSURE RATIO
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ϵ	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

m_v	kPa^{-1}	COEFFICIENT OF VOLUME CHANGE
C_c	1	COMPRESSION INDEX
C_s	1	SWELLING INDEX
C_α	1	RATE OF SECONDARY CONSOLIDATION
c_v	m^2/s	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
T_v	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
σ'_{vo}	kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p	kPa	PRECONSOLIDATION PRESSURE
τ_f	kPa	SHEAR STRENGTH
c'	kPa	EFFECTIVE COHESION INTERCEPT
ϕ'	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u	kPa	APPARENT COHESION INTERCEPT
ϕ_u	-°	APPARENT ANGLE OF INTERNAL FRICTION
τ_R	kPa	RESIDUAL SHEAR STRENGTH
τ_r	kPa	REMOULDED SHEAR STRENGTH
S_t	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

ρ_s	kg/m^3	DENSITY OF SOLID PARTICLES
γ_s	kN/m^3	UNIT WEIGHT OF SOLID PARTICLES
ρ_w	kg/m^3	DENSITY OF WATER
γ_w	kN/m^3	UNIT WEIGHT OF WATER
ρ	kg/m^3	DENSITY OF SOIL
γ	kN/m^3	UNIT WEIGHT OF SOIL
ρ_d	kg/m^3	DENSITY OF DRY SOIL
γ_d	kN/m^3	UNIT WEIGHT OF DRY SOIL
ρ_{sat}	kg/m^3	DENSITY OF SATURATED SOIL
γ_{sat}	kN/m^3	UNIT WEIGHT OF SATURATED SOIL
ρ'	kg/m^3	DENSITY OF SUBMERGED SOIL
γ'	kN/m^3	UNIT WEIGHT OF SUBMERGED SOIL
e	1,%	VOID RATIO
n	1,%	POROSITY
w	1,%	WATER CONTENT
S_r	%	DEGREE OF SATURATION
w_L	%	LIQUID LIMIT
w_p	%	PLASTIC LIMIT
w_S	%	SHRINKAGE LIMIT
I_p	%	PLASTICITY INDEX = $w_L - w_p$
I_L	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_C	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
e_{max}	1,%	VOID RATIO IN LOOSEST STATE
e_{min}	1,%	VOID RATIO IN DENSEST STATE
I_D	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
D	mm	GRAIN DIAMETER
D_n	mm	n PERCENT - DIAMETER
C_U	1	UNIFORMITY COEFFICIENT
h	m	HYDRAULIC HEAD OR POTENTIAL
q	m^3/s	RATE OF DISCHARGE
v	m/s	DISCHARGE VELOCITY
i	1	HYDRAULIC GRADIENT
k	m/s	HYDRAULIC CONDUCTIVITY
j	kN/m^3	SEEPAGE FORCE

DESCRIPTION OF ROCK CORE - REF No 50-000-347

BOREHOLE NUMBER	DEPTH (m)	% CR*	% RQD*	CORE DESCRIPTION: DEPTH (m)	CORE DESCRIPTION: DESCRIPTION
1	8.87- 9.42	75	20	8.87-10.12	Biotite Gneiss, black mottled white and pink, slightly weathered, closely and very closely spaced joints
	- 9.83	82	0		
	-10.59	90	50	10.12-11.81	Biotite Gneiss, black mottled white and pink, unweathered, moderately to closely spaced joints
	-11.20	92	0		
	-11.81	100	21		
3	5.47- 7.00	93	60	5.47- 5.97	Biotite Gneiss, black, rich in biotite mica, slightly weathered, very closely spaced joints
	- 7.53	100	38	5.97- 7.53	Biotite Gneiss, black mottled white, unweathered, moderately spaced joints

* CR = CORE RECOVERY ; RQD = ROCK QUALITY DESIGNATION

Ministry of Transportation and Communications
Ontario

RECORD OF BOREHOLE No 1

METRIC

REF No 50-000-347 LOCATION Sta. 0 + 170.0; O/S 6.9 m Lt. ℄ Joly Twp. Rd. ORIGINATED BY HS

DIST 13 HWY Joly Twp.Rd. BOREHOLE TYPE Hollow Stem, BX Core and Cone Test COMPILED BY HS

DATUM Assumed DATE 85 01 14 to 16 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH: o UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
96.0	Ground Surface										
0.0	Sand some gravel trace silt to Sand some silt — Very Loose to Loose — Numerous Cobbles and Boulders — Occasional Pieces of Wood — Dense to Very Dense		1	SS	4						
			2	SS	2	▼	94		o		0 91 (9)
			3	SS	5				o		20 73 (7)
			4	SS	2		92				
			5	SS	8				o		0 82 (18)
			6	SS	39		90				
			7	SS	63		88		o		22 67 (11)
87.1											
8.9	Biotite Gneiss Bedrock — Sound		8	BX RC	75 % REC						RQD 20%
			9	BX RC	82 % REC	REC					RQD 0%
			10	BX RC	90% REC		86				RQD 50%
			11	BX RC	92% REC						RQD 0%
84.2			12	BX RC	100% REC						RQD 21%
11.8	End of Borehole										

$+^3$, $\times^5$: Numbers refer to Sensitivity

20
15 ◇ 5 (%) STRAIN AT FAILURE
10

Ministry of Transportation and Communications
Ontario

RECORD OF BOREHOLE No 2

METRIC

REF No 50-000-347 LOCATION Sta. 0 + 173.9; O/S 8.2 m Lt. ℄ Joly Twp. Rd. ORIGINATED BY HS

DIST 13 HWY Joly Twp. Rd. BOREHOLE TYPE Solid Stem Auger COMPILED BY HS

DATUM Assumed DATE 85 01 15 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES						
96.2	Ground Surface										
0.0	Probe Hole Auger to Refusal Probable Sand** some gravel					*	96 94 92 90 88				
87.8											
8.4	End of Borehole Refusal to Auger Probable Bedrock * Water Level Not Established ** Interpretation based on adjacent BH.#1										

$+^3$, $\times^5$: Numbers refer to Sensitivity

15 20/10 5 (%) STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

Ministry of Transportation and Communications
Ontario

RECORD OF BOREHOLE No 3

METRIC

REF No 50-000-347 LOCATION Sta. 0 + 151.7; O/S 8.5 m Lt. ℄ Joly Twp. Rd. ORIGINATED BY HS

DIST 13 HWY Joly Twp. Rd. BOREHOLE TYPE Hollow Stem, BX Casing, BX Core COMPILED BY HS

DATUM Assumed DATE 85 01 18 to 19 CHECKED BY

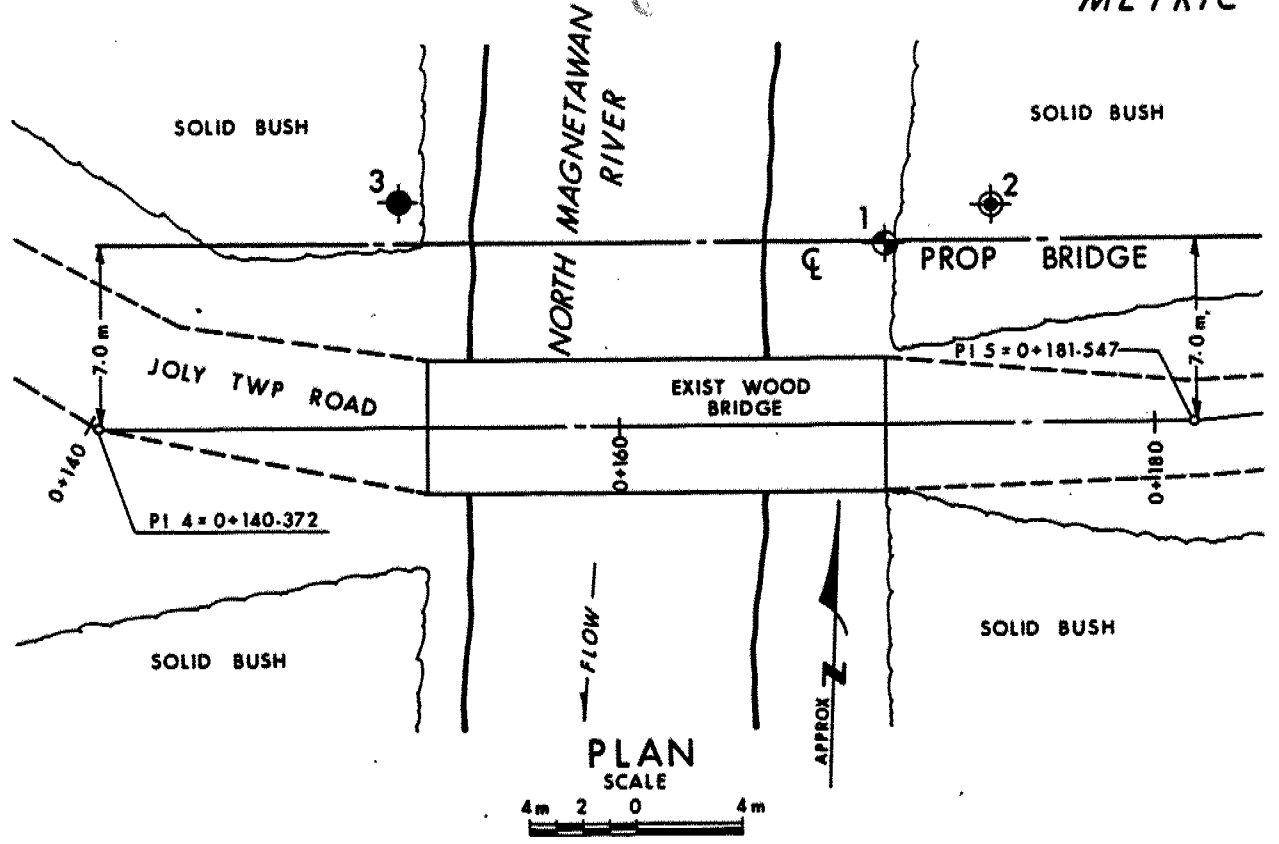
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L / WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
95.6	Ground Surface										
0.0	Sand some silt — Loose		1	SS	7						
	with gravel — Numerous Cobbles and Boulders		2	SS	123		94		o		34 50 (16)
			3	SS	20						
			4	SS	24				o		25 52 (23)
	Compact to Very Dense						92				
			5	SS	63						
90.1							90				
5.5	Biotite Gneiss Bedrock Sound		6	BX RC	REC 93%						RQD 60%
88.1			7	BX RC	REC 100%						RQD-38%
7.5	End of Borehole										

$+^3$, $\times^5$: Numbers refer to Sensitivity

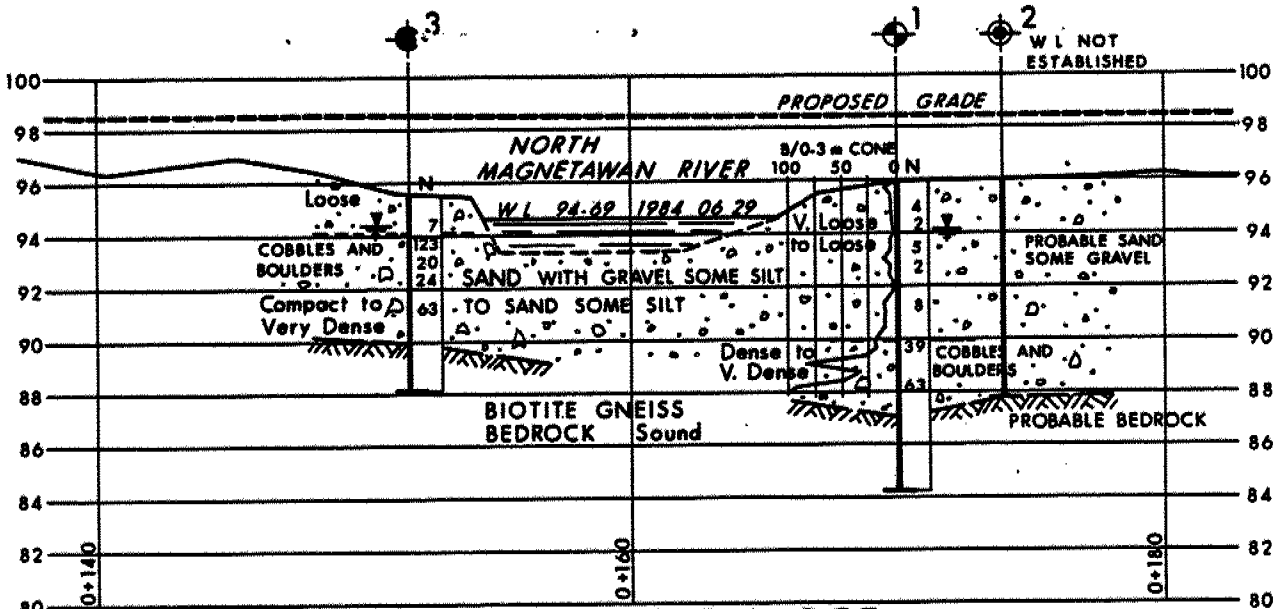
15 ⟡ 20/10 5 (%) STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

METRIC



PLAN
SCALE
4m 2 0 4m



℄ PROFILE PROP BRIDGE
SCALE
4m 2 0 4m

LEGEND

- Bore Hole
- Bore Hole and Cone Test
- Auger Hole
- Water Level at time of investigation 1985 01

No	ELEV. m	STATION	OFFSET
1	96.0	0+170.0	6.9 m Lt
2	96.2	0+173.9	8.2 m Lt
3	95.6	0+151.7	8.5 m Lt

Geocres No 31E-98

NORTH MAGNETAWAN RIVER AND JOLY TWP ROAD

CON IV & V LOT 4
DIST 13 ; SITE 44-104 ; TWP OF JOLY ; DIST PARRY SOUND

Date 1985 01 19 | Dwg No 1 | Ref No 50-000-347

memorandum

Ontario

To: A. Radkowski
Design Engineer
Structural Office
3501 Dufferin Street

Date: 1985 05 30

From: Foundation Design Section
Room 315, Central Building

RE: N. Magnetawan River Bridge
W.O. 7607-85-01, Site 44-104
District 13, North Bay

We have reviewed the preliminary General Arrangement Drawing 44-104-P1 dated May, 1985 and make the following comments:

1. It is recommended that the timber cribs which are now proposed do not extend down to Elev. 93. We recommend that the rock-fill extend from Elev. 93 (or Elev. 94 as stated in the Foundation Report) up to the high water level (Elev. 96.4). The timber cribs can then be founded directly on the rock-fill at this elevation.

2. The soil "triangle" which now appears in the "Elevation" view between the rock-fill around the timber cribs and the 600 mm rock protection should be eliminated and replaced with rock in order to facilitate construction.

   If the intent of the "triangle" was for it to act as a barrier against water seeping into the excavation, this will not be accomplished given the non-cohesive nature of the relatively loose soils.

   If the "triangle" is eliminated and replaced with rock, the forward slopes can be constructed at 1.5:1, otherwise the slope of the rock protection over the native soil will have to be flattened to 2:1.

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for

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