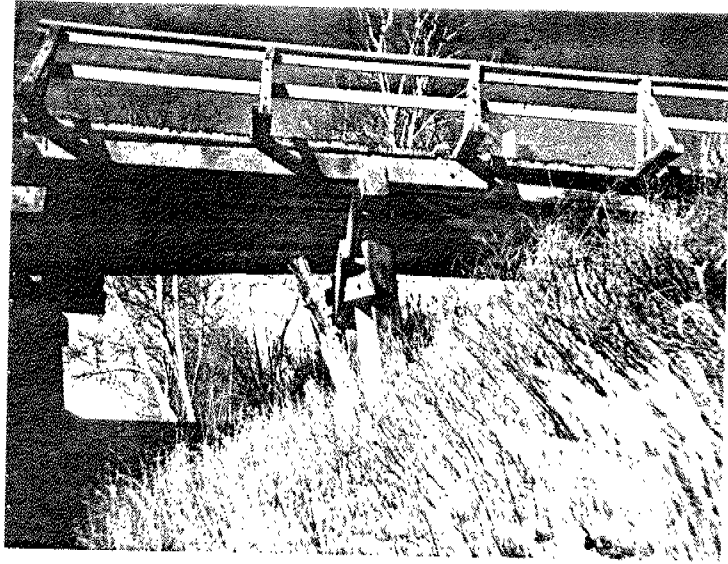


GEOCRES No. 31M-40DIST. 14 REGION W.P. No. CONT. No. MUNICIPALW. O. No. 73-11095STR. SITE No. 47-216HWY. No. LOCLOCATION BLANCHE RIVER BRIDGETWP. OF CASEYNo of PAGES - OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. REMARKS:

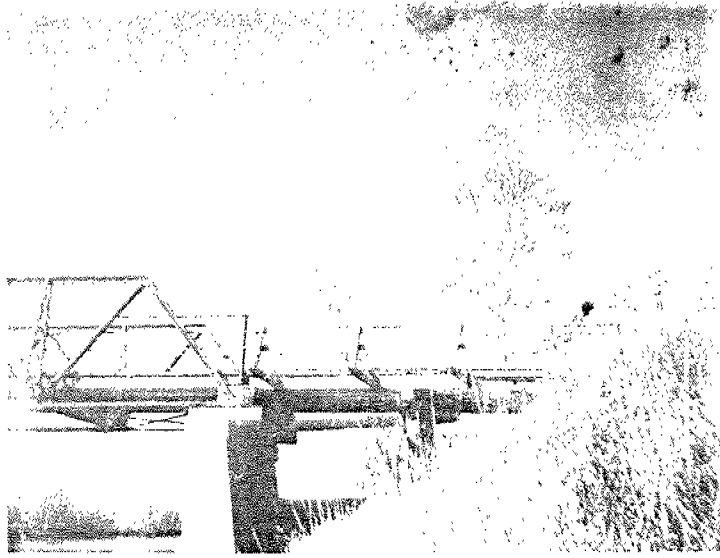


Blanche River Bridge
Lot 9, C 285
Twp. 12 N. 12 W.

East end of structure

28/73

12 N 12 W



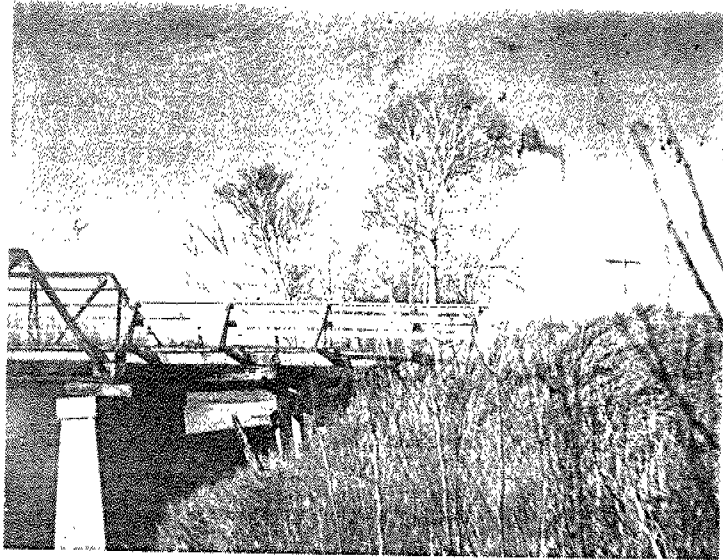
Blanche R. ...

At ...

Sup. of ...

2nd ... nature

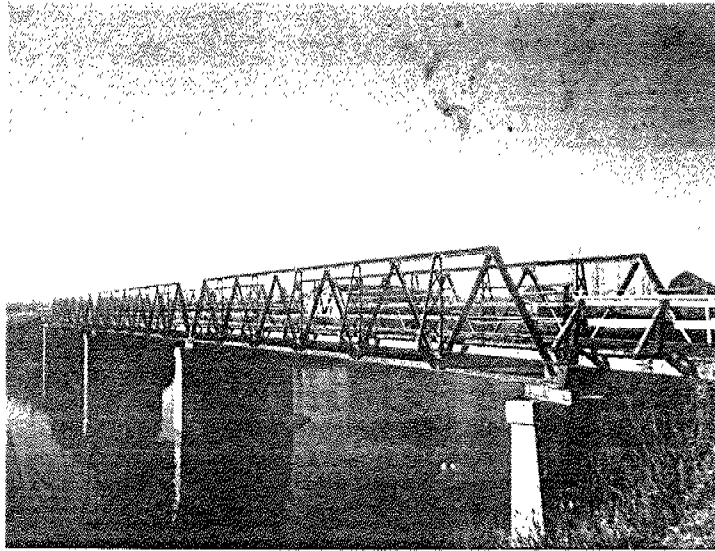
Nov 23/73



Blanché River Bridge
Lot 2, Con. 243
Twp of Cusey

East end of Structure

Nov 22/73



Blanche bridge
Lot 0, Com. 213
sup of 14

East side of West

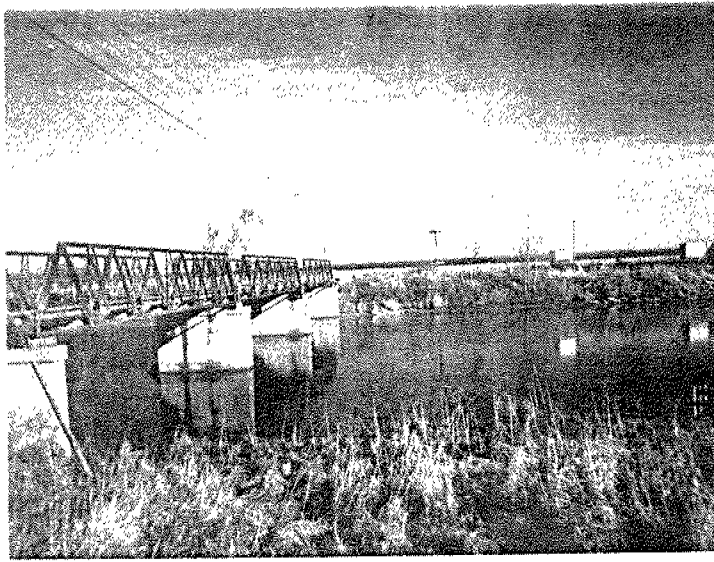
Nov 13/73



Branch 1000
at 1000
7.25 1000

East end of structure

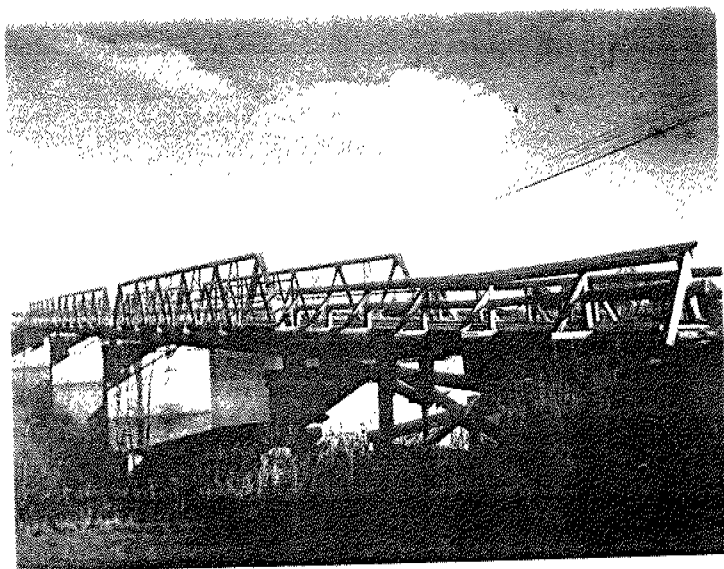
1000 1000



Blanche R. in Bridge
Lot 9, Sec 26S
Top of Carey

West side looking East

Ab. 92



~~Sanche River B.~~ 90
Lot 9, Co. 2nd
Twp of Casey

West side looking East

Nov 23/73

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. J. McAllister,
Regional Structural Planning
Supervisor,
Northern Region, North Bay.

FROM: Soil Mechanics Section,
Geotechnical Office,
West Building, Downsview.

ATTENTION:

DATE: February 18th, 1974.

OUR FILE REF.

IN REPLY TO

FEB 27 1974

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
The Proposed Remedial Measures
Of the East Approach of the
Blanche River Bridge
Site 47-216
Twp. of Casey, Dist. of Timiskaming
District #14, New Liskeard
W.O. 73-11095(R) W.P. Nil

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

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

MD/mj
Attach.

c.c. E.J. Orr,
B.R. Davis,
A. Rutka
H. McArthur
T.A. Sharpe
B.J. Giroux
J.E. Gruspier
G.A. Wrong
B.A. Singh
S. McCombie
Foundations Files ✓
Documents

M. Devata
M. Devata,
Supervising Foundations Engineer.

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1. INTRODUCTION.
2. DESCRIPTION OF SITE.
3. FIELD AND LABORATORY INVESTIGATION PROCEDURES.
4. SOIL TYPES AND SOIL CONDITIONS.
5. GROUNDWATER CONDITIONS.
6. DISCUSSION AND RECOMMENDATIONS:
7. MISCELLANEOUS.

FOUNDATION INVESTIGATION REPORT
For
The Proposed Remedial Measures
Of the East Approach of the
Blanche River Bridge
Site 47-216
Twp. of Casey, Dist. of Timiskaming
District #14, New Liskeard
W.O. 73-11095(R) W.P. Nil

1. INTRODUCTION:

The east approach and the end-span of the Blanche River bridge at the crossing of Twp. Rd. shows signs of instability. In order to remedy this condition and provide necessary recommendations, this Office was requested to carry out a foundation investigation by Mr. T.A. Sharpe, District Engineer, via "Internal Request" (No. 13991) dated November 5th, 1973.

Subsequently, the Foundations Office carried out a field investigation to determine the subsoil conditions existing at the site.

This report contains the results of this investigation together with our suggested remedial measures to ensure the long-term stability of the River Bank at the east approach of the structure.

2. DESCRIPTION OF SITE:

The site is located at the north edge of the Village of Belle Vallee on the Township Road. At this location the Township Road crosses Blanche River on a timber and steel structure having a total length of 340 ft. (111.3 m).

The Blanche River flows in a general north to south direction and follows a somewhat meandering course. The

surrounding area with the exception of the deep and wide river valley is flat and cultivated farmland. The existing river channel is about 272 ft. (83 m) wide.

Physiographically, the site is located on the New Liskeard Clay Plain. Here the subsoil consists of deep deposits of varved clay overlying glacial till and bedrock.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of two sampled boreholes was carried out during the course of the field work. Boring was achieved by means of a conventional diamond drilling equipment adapted for soil sampling purposes.

During the field work, disturbed samples were obtained by means of a standard split-spoon sampler; the energy used in driving it conformed to the requirements of the Standard Penetration Test (SPT). 'Undisturbed' samples were recovered using 2 inch I.D. Shelby Tubes, which were pushed into the soil hydraulically.

Where possible, the in-situ undrained shear strength of the cohesive deposits was determined using a standard field vane having dimensions such that the shear strength equals twenty times the applied torque at failure.

The boreholes were surveyed in the field by District Personnel, using temporary reference points for horizontal (chainage and offset) and vertical (elevation) measurements. The locations and elevations are shown on Drawing 73-11095(R) A which accompanies this Report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected samples to determine the following physical properties:

Atterberg Limits (W_L , W_P)

Natural Moisture Contents (W)

Apparent Cohesion in Terms of Total Stresses (C_u)

Shear Strength in Terms of Effective Stresses

Bulk Density (γ)

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this Report.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

The subsoil at the site consists of an extensive deposit of stratified clay. However, at the location of the east approach the cohesive deposit is overlain by a roadway fill material consisting of sandy silt.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties as follows:

4.2) Sandy Silt, Trace of Clay (Fill Material):

This deposit was encountered in Borehole #1 and extends to a depth of about 11 ft. (3.6 m). The material consists of sand (26%), silt (72%) and clay (2%). The obtained 'N' values indicate that the fill material is poorly compacted.

4.3) Clay (Stratified):

This is the predominant deposit at the site and was encountered in each boring. It extends from below the roadway fill or from the river bottom to at least 70 feet (21.3 m). The lower boundary of the deposit was not determined, since the borings were terminated in this zone.

The material consists mainly of highly plastic grey clay. Occasional layers and seams of sand and silt were also discovered within the main deposit. The maximum thickness of these layers is about 0.25 inches (6 - 7 mm). Below elevation 75 ft. (24.6 m) the stratum consists of alternate layers of dark grey clay and light grey silty clay. The thickness of clay layers varies between 0.1 and 2.0 in. (2.5 and 51.0 mm) and of the silty clay layers from 0.5 to 1.5 in. (12.7 to 38 mm).

Atterberg limit tests and natural moisture content tests gave the following results for the clay layers:

	<u>Min.</u>	<u>Max.</u>	<u>Average</u>
Liquid Limit (%)	47	74	64
Plastic Limit (%)	24	30	28
Moisture Content (%)	52	68	61

Typical grain-size distribution curves are included in the Appendix of this report (Fig. #1).

In Borehole #2 the material immediately below the river bottom is clayey silt, trace of sand. The thickness is about 10 ft. (3 m).

In order to determine the undrained shear strength of the overall deposit, tests were carried out in the field and in the laboratory. The results obtained from these tests are summarized below:

	<u>PSF</u>	<u>(kPa)</u>
Field Vane	160 - 960	(7.7 - 46.0)
Triaxial Comp. Test	110 - 710	(5.3 - 34.0)
Sensitivity	2.2 - 6.0	

A plot of all undrained shear strength measurements versus elevation is shown on Fig. 2.

The undrained shear strength of the overall deposit increases with depth, being in the range of 110 to 280 PSF (5.3 to 13.4 kPa) between elevation 90 and elevation 30 (27.4 and 24.4 m), increasing to 800 PSF (38.3 kPa) at about elevation 30 (9.1 m).

The bulk density of the overall deposit ranges from 95 to 111 PCF (1.5 to 1.8 T/m³)

5. GROUNDWATER CONDITIONS:

Groundwater level observations were carried out during the period of the field investigation. The observed groundwater level in borehole #1 (12 ft. below ground level) may not represent the true groundwater level due to the relatively impermeable nature of the subsoil and the short duration of the field work. However, in borehole #1, once the boring penetrated to elev. 31 (10.2 m) an artesian condition was encountered and the water level in the casing instantly reached to elev. 100.5' (33 m), which is approximately 0.5 ft. below the existing ground surface.

At the time of the field investigation, the water level in Blanche River was at elev. 84 (27.5 m).

6. DISCUSSION AND RECOMMENDATIONS:

6.1) Existing Conditions:

The structure at the crossing of Twp. Rd. and Blanche River consists of three 90 ft. (29.5 m) main spans and two end spans, the lengths being about 28 ft. (9.2 m) on the east side and about 50 ft. (16.4 m) on the west side. The main spans are supported on concrete piers and the end spans are supported on timber pile bents placed approximately 15 ft. (4.9 m) apart. The main structure consists of steel truss with timber laminated deck.

The maximum height of the embankment on the east side is about 42 ft. (13.8 m). The forward slopes are about 1.5 horizontal to 1 vertical at the east abutment location and 2.5 horizontal to 1 vertical.

It is observed that some earth movements have occurred at the east approach location, thus causing Pier #1 to tilt towards west, which in turn caused some of the deck supporting members to buckle. Soundings taken adjacent to Pier #1 indicate extensive erosion of the subsoil by the river immediately west of the pier.

6.2 Recommendations:

It is proposed to carry out remedial measures of the east approach of the Blanche River Bridge where signs of instability were observed.

As described elsewhere, the subsoil at the east end of the structure consists of an approximately 11 ft. (3.6 m) thick deposit of granular type fill material, followed by a deep deposit of stratified clay. The upper 10 ft. (3.3 m) portion of the clay stratum is in a general soft consistency.

In our opinion, the main reason for the unstable conditions was contributed to the movement of the fill material which was placed on the soft original ground.

Stability analyses in terms of total stresses were carried out using the following values:

	<u>Cu</u>	<u>γ</u>
Elev. 90'-Elev. 80'	200 PSF	99 PCF
(Elev. 27.4-Elev. 24.4 m)	9.6 kPa	1.60 T/m ³
Elev. 80' - Elev. 60'	400 PSF	101 PCF
(Elev. 24.4 - Elev. 18.3 m)	19.2 kPa	161 T/m ³
Elev. 60' - Elev. 20'	750 PSF	105 PCF
(Elev. 18.3 - Elev. 6.1 m)	35.9 kPa	1.70 T/m ³

The obtained results indicate unstable conditions.

In order to ensure the longterm stability of the east approach it will be necessary to remove the fill material which overlies the soft, stratified clay subsoil in the manner described on the enclosed drawing no. 73 - 11095(R)B. This will result in a longer structure. The new, additional 30 ft. long span may be supported on timber piles driven at least 25 ft. into the original ground. The safe load carrying capacity of the piles may be calculated using the following formula:

$$\text{Safe Load (Per Pile)} = L/3(\text{Tons})$$

where L = Embedded length in feet.

In addition, Pier #1 should be repositioned. Rip-Rap should be placed in front of the pier where erosion has been observed.

7. MISCELLANEOUS:

The boring programme was carried out during the period of December 5th to December 9th, 1973.

Equipment used on the site was owned and operated by Canadian Longyear Ltd.

The supervision of the field work together with the preparation of this Report was carried out by Mr. P. Payer, Senior Foundations Engineer. This Report was reviewed by Mr. M. Devata, Supervising Foundations Engineer.

PP/mj
February 14/74

P. Payer
P. Payer, P. Eng.



M. Devata
M. Devata, P. Eng.

APPENDIX I

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 1

JOB 73-11095 R

LOCATION STA: 4 + 25; 16' RT.

ORIGINATED BY PP

W.P. NIL

BORING DATE December 5, 6, 7, 8, 1973

COMPILED BY PP

DATUM Assumed

BOREHOLE TYPE Washbore - Nx casing

CHECKED BY

SOIL PROFILE				SAMPLES		ELEV. SCALE ft. / m.	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w		BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH ft.	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT (0.3 m)		SHEAR STRENGTH P.S.F.		WATER CONTENT % w_p w w_L				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
							200	600	1000	20	40	60	
30.8	101.0	Ground Level											
0.0	0.0	Fill Material				100						T/M3	head
		Sandy Silt				(30.5)							Artesian Water
		Trace of clay		1	SS	6				○			0 26 72 2
		Loose		2	SS	7				○			0 1 40 59
27.4	90.0			3	SS	1	90				○		
3.4	11.0	Clay		4	TW	PM	27.5	+ S = 4.0				99.5	
		Occ. layers and		5	TW	PM		+ S = 4.0				(1.60)	
		seams of silt		6	TW	PM	80	+ S = 4.0				98.5	
				7	TW	PM	24.4	+ S = 3.3				(1.58)	
		alternate layers		8	TW	PM	70	+ S = 2.7				99	0 0 30 70
		of clay and silty		9	TW	PM	21.4	+ S = 2.7				(1.59)	
		clay		10	TW	PM	60	+ S = 6.0				105	
		very soft					18.3	+ S = 5.3				(1.68)	
		to		11	TW	PM	50					98.	
		firm					15.2	+ S = 5.0				(1.70)	
				12	TW	PM	40					95.5	0 0 15 85
							12.2	+ S = 2.2				(1.53)	
				13	TW	PM	30					100.5	
							9.1	+ S = 4.8				(1.61)	
6.4	21.0					20						107	0 0 20 80
												(1.72)	
												111	
												(1.78)	
24.4	80.0	End of Borehole				6.1							End.

1020304050

KN / m²

20
15 5 % STRAIN AT FAILURE
10

KN / m²

OFFICE REPORT SOIL EXPLORATION

RECORD OF BOREHOLE № 2

FOUNDATIONS OFFICE

LOCATION STA: 3 + 64; 2' RT

ORIGINATED BY PP

BORING DATE December 9, 1973

COMPILED BY PP

BOREHOLE TYPE Washbore - Nx Casing

CHECKED BY

SOIL PROFILE				SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH ft.	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT (0.3 m.)	ELEV. SCALE ft. / m.	SHEAR STRENGTH P.S.F. O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 200 600 1000			WATER CONTENT % w_p w w_L 20 40 60				
m. 30.9 0.0	101.2 0.0	Bridge Deck				100 39.5								
25.9	84.7	Water (ice) level				90 27.5								
5.0	16.5					80								
24.1	78.9	Ground Level				80 24.4								
6.0	22.3	(Clayey Silt)		1	SS	7	24.4							
				2	SS	1/18"								
				3	TW	PM	70 21.4							
				4	TW	PM								
				5	TW	PM	60							
		Clay (Stratified) Very Soft To Firm					18.3							
15.2	49.7					50 15.3								
15.7	51.5	End of Borehole				40 12.2								

20
15 ϕ 5 % STRAIN AT FAILURE
10

GRAIN SIZE DISTRIBUTION

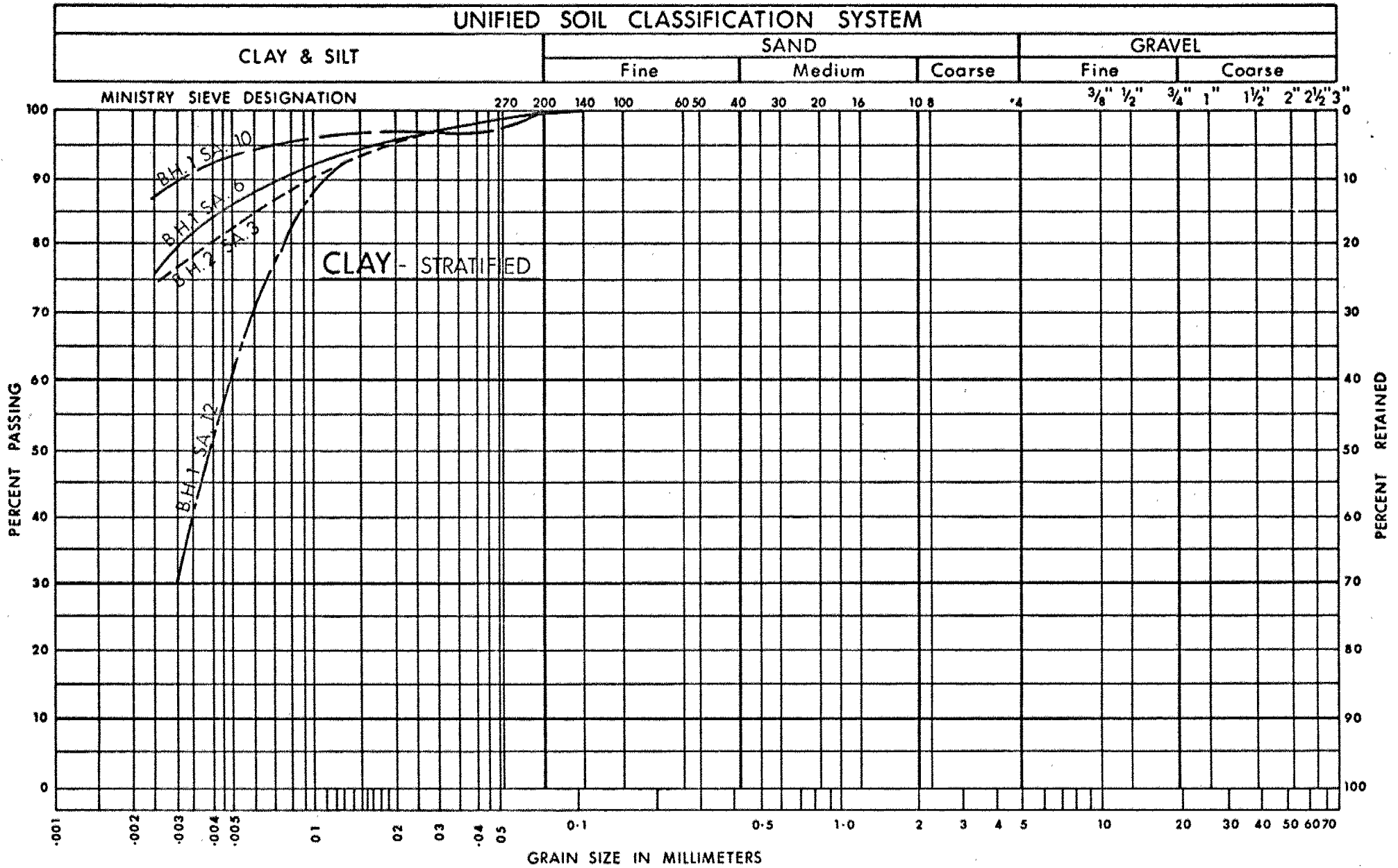
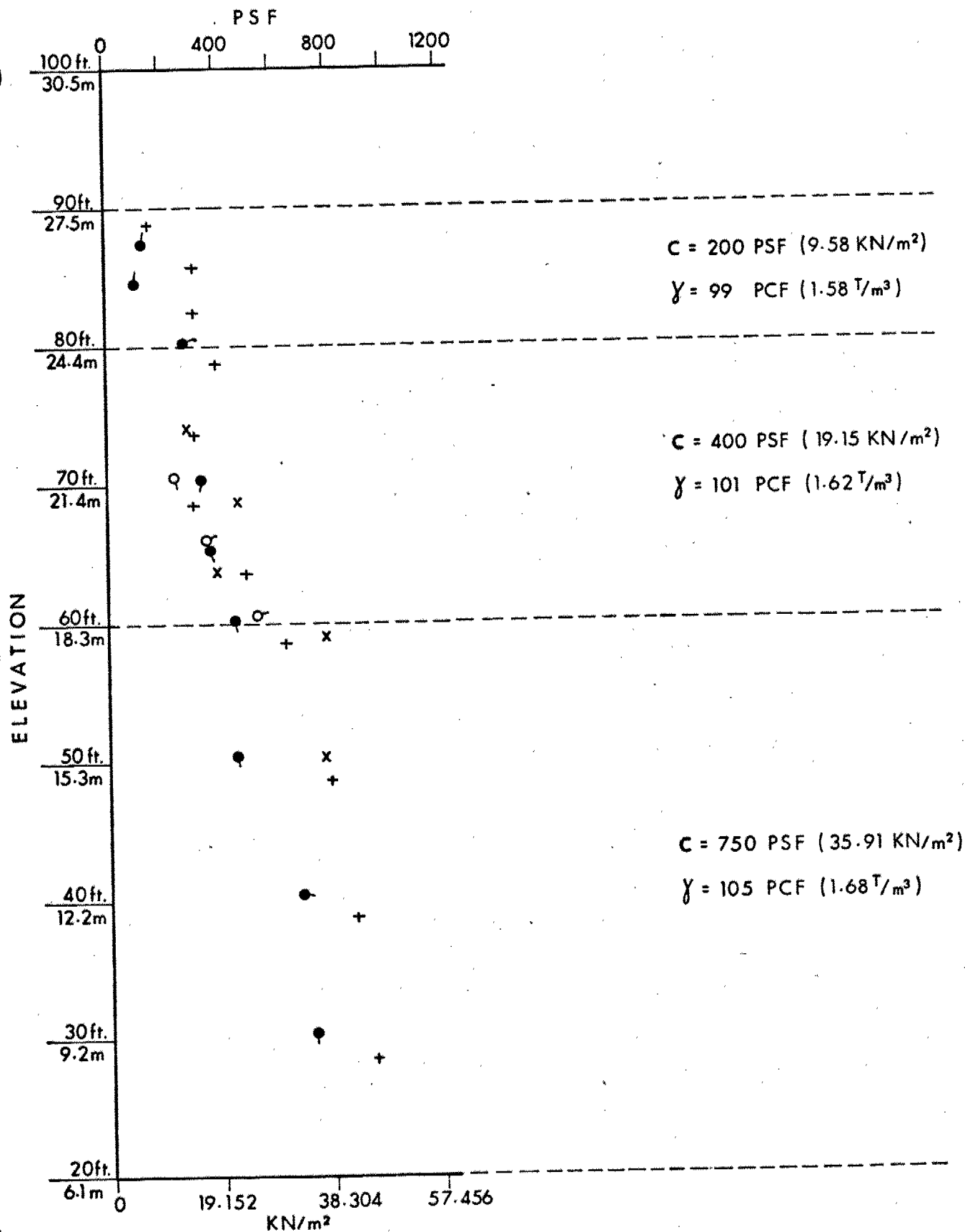


FIG. 1

UNDRAINED SHEAR STRENGTH Vs. ELEVATION



- - BORE HOLE No. 1 - QUICK TRIAXIAL
- - BORE HOLE No. 2
- + - BORE HOLE No. 1 - FIELD VANE
- x - BORE HOLE No. 2

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTPENETRATION RESISTANCE

'N'-STANDARD PENETRATION RESISTANCE : - 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>c LB./SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 250	VERY LOOSE	0 - 4
SOFT	250 - 500	LOOSE	4 - 10
FIRM	500 - 1000	COMPACT	10 - 30
STIFF	1000 - 2000	DENSE	30 - 50
VERY STIFF	2000 - 4000	VERY DENSE	> 50
HARD	> 4000		

TERMS TO BE USED IN DESCRIBING SOILS:-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.T.	SLOTTED TUBE SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE

P.H. SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V.	FIELD VANE
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" " ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTSOIL 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
w_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
	IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan \phi'$
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan \phi$
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a 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
$\bar{\sigma}$	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

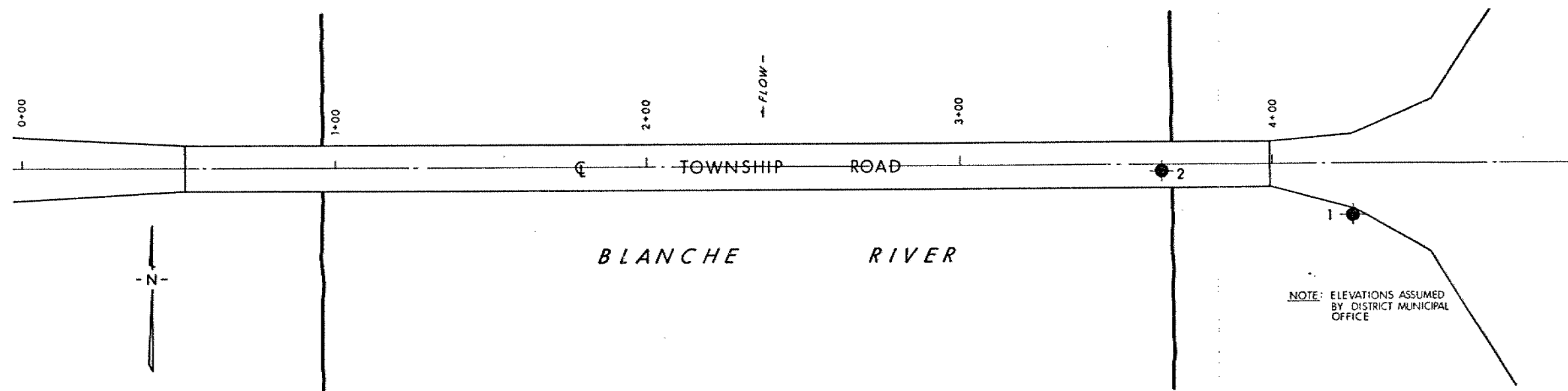
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

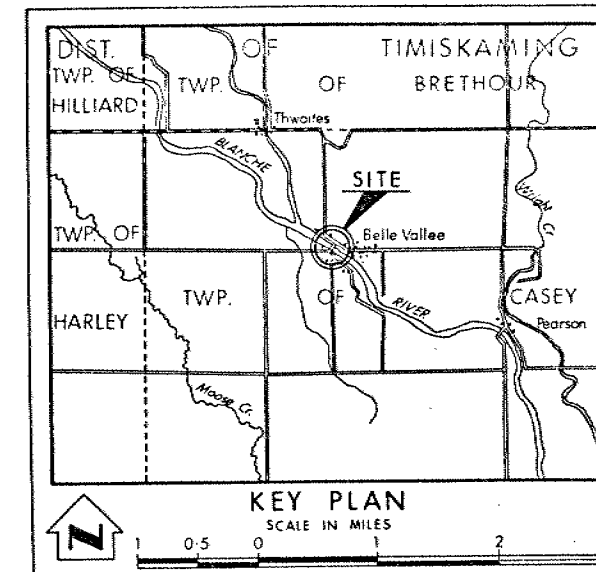
B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

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



PLAN
20 10 0 SCALE 20 40 FT.



LEGEND

- Bore Hole
- ⊕ Cone Penetration Test
- ⊕ Bore Hole & Cone Test
- ⊕ Water Levels established at time of field investigation, DEC. 1973
- ⊕ Head
- ⊕ Encountered
- ARTESIAN WATER

NO.	ELEVATION	STATION	OFFSET
1	101.0	4 + 25	16' RT.
2	101.2	3 + 64	2' RT.

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

DATE	BY	DESCRIPTION

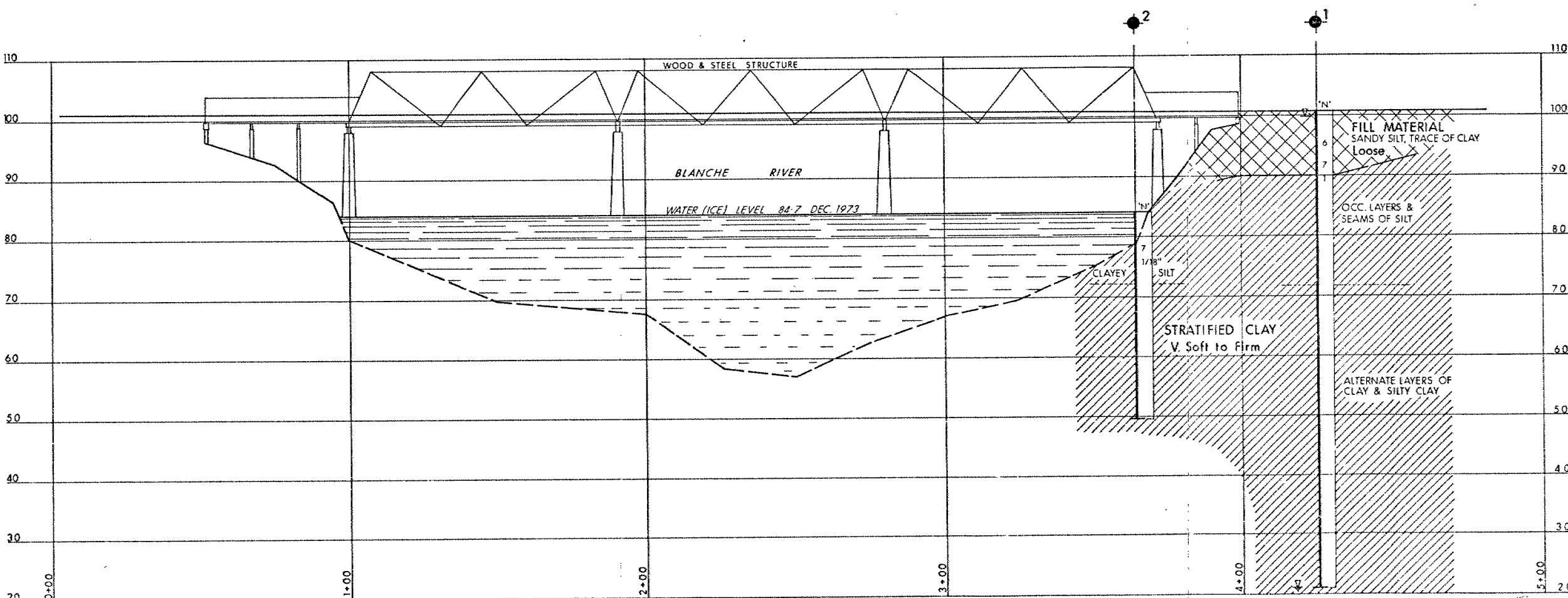
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
ENGINEERING SERVICES BRANCH—GEOTECHNICAL OFFICE

BLANCHE RIVER

HIGHWAY NO. TOWNSHIP ROAD DIST. NO. 14
DIST. OF TIMISKAMING
TWP. CASEY LOT 3&4 CON. 5&6

BORE HOLE LOCATIONS & SOIL STRATA

SUB'D P.P.	CHECKED	WP NO.	DRAWING NO.
DRAWN S.O.	CHECKED	WD NO. 73-11095R	73-11095A
DATE 24 JAN. 1974	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	CONT. NO.		



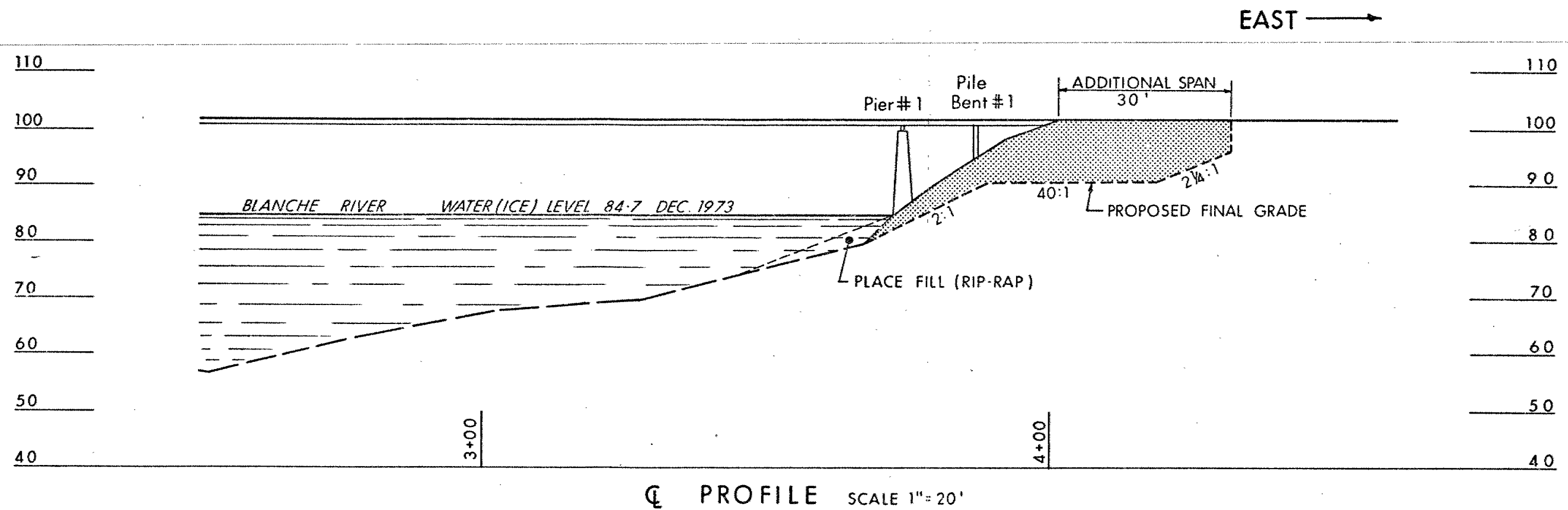
PROFILE

VERT. 10 5 0 SCALE 10 20 FT.
HORIZ 20 10 0 20 40

NOTE FOR CONTRACT DOCUMENT

The complete foundation investigation report for this structure may be examined at the Structural Office and Foundations Office, Downsview, and at the NEW LISKEARD District Office.

REF. PLAN: FROM DIST. MUNICIPAL OFFICE
NEW LISKEARD, ONT. DEC. 1973



RECOMMENDATIONS

- 1 - REMOVE EAST ABUTMENT, PILE BENT # 1 & BRIDGE DECK
- 2 - EXCAVATE SHADED AREA (AS SHOWN ON PROFILE) PROCEED FROM HIGHER LEVEL TO LOWER LEVEL
- 3 - DRIVE PILES, SAFE LOAD (PER PILE) = $L/3$ TONS (L=EMBEDDED LENGTH IN FT.)
MIN. EMBEDDED LENGTH 25'
- 4 - PLACE RIP-RAP ACCORDING TO HYDROLOGICAL REQUIREMENTS

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

ENGINEERING
SERVICES BRANCH
GEOTECHNICAL OFFICE

BLANCHE RIVER BRIDGE
PROPOSED REMEDIAL MEASURES TO STABILIZE
EAST END FORWARD SLOPE

DATE JAN. 25, 1974

W.O. NO. 73-11095R

DWG. NO. 73-11095 B

Mr. K.L. Kleinsteinber
Head, Approvals Section
West Building, Downsview
Structural Office

148
Soil Mechanics Section
Engineering Materials Office
West Building, Downsview

77 03 31

Re: Blanche River Bridge at Belle Vallee, Lot 4, Con. 5 & 6,
Twp. of Casey, Site #47-216, District #14, New Liskeard

We have reviewed the documents provided by you in connection with the proposed new structure over the Blanche River at Belle Vallee, Ontario. Our comments are as follows:

(1) This structure will replace an existing bridge known as Pierson's Bridge which was built in 1949 and which has experienced stability problems on the east approaches causing the most easterly pier to tilt forward at the top.

(2.) Subsoil at the site consists of deep deposits of soft to firm varved clay. A foundation report has been prepared by W. Trow Assoc. Ltd. This report quotes various safety factors in connection with river bank stability, but does not specifically state what the final cross section should be in order to be 'safe' and therefore acceptable.

(3) Because of the critical nature of the subsoil at this site the Bridge Consultant should be advised that the Ministry requires written confirmation of the following:

(a) That the stability of all critical sections on the final alignment (at right angles to the river bank) have been analysed for both short term and long term cases by an experienced foundation engineer and found to be 'acceptable' as well as economical, and

(b) That the interim conditions which will prevail during construction and which take into account the excavations for the piers and the effects of pile driving, have also been analysed and found to be acceptable.

(4) It should be noted that in determining critical sections the effects of future possible scour must be taken into account.

(5) We would suggest the use of 12 B.P. @ 102 steel H piles. These were driven at the Englehart River Bridge on Hwy. 11 (Contract 74-105). Design load was 130 tons per pile which would also apply to this site. Tips should be reinforced.

K.G. Selby
Supervising Engineer
Soil Mechanics Section

KGS/lf

cc: Files
Record Services

MINUTES OF MEETING

OUR REF: 2129

PROJECT: Blanche River Bridge at Belle Vallee
Site No. 47-216

TIME: 14.00, 12 April 1977

PLACE: MTC, West Bldg., Conference Room B

PRESENT: K. L. Kleinsteinber, MTC Structural Office
K. G. Selby, MTC Soil Mechanics Section
W. A. Trow, Trow Engineering Group Ltd.
M. D. H. Dickson, APD
I. Kolsi, APD

- | <u>Item</u> | <u>Description</u> |
|-------------|---|
| 1. | The purpose of the meeting was to review and agree upon method of handling the stability problems of river banks. |
| 2. | MTC will not approve this project until the stability of all critical sections of the final alignment have been analysed for short and long-term cases by an engineer, who is soils specialist. All conditions have to be acceptable. |
| 3. | MTC will permit the use and give access to their information pertinent to this project. |
| 4. | It was agreed, that it may be more economical to adjust the overall length of bridge instead of adding approach spans at ends. |
| 5. | Trow Engineering Group Ltd. will locate both abutments and piers from their bank stability analysis for final conditions. After locating the foundations, they will analyse the banks for interim conditions which will prevail during construction, pile driving, flooding, future scour etc. The analysis should provide for the embankment to taper up to within two feet of the underside of the bridge at the abutments. |
| 6. | The spans and design of structure will be |



based on the information received from
Trow Engineering Group Ltd.

7. Mr. Trow sated that two weeks would be
required to complete this work.

If there are any errors or omissions, please contact the under-
signed.

Yours truly,

ALBERY, PULLERTIS, DICKSON & ASSOCIATE LTD.

A handwritten signature in cursive script, appearing to read 'I. Kolsi', followed by a large, sweeping flourish.

I. Kolsi, P. Eng.

Distribution: K. L. Kleinsteinber
K. G. Selby ✓
W. A. Trow
D. Smith

IK:bl
2129