c.i GEN. FILES

W.P. 18-64-1

32-67-177.

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

Attention: Mr. S. McCombie

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

Date: November 25, 1965

Our File Ref.

In reply to NOV 30 1965

Subject:

FOUNDATION INVESTIGATION REPORT
For
Proposed New Structure at Hwy. #2,
(Line 'B') and Soper Creek,
East Branch, Co. of Durham, Town of
Bowmanville, Dist. 17 (Port Hope),
W.P. 65-F-138 -- K.P. 14-6-1

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.

A. O. Sturmie,
PRINCIPAL FOUNDATION ENGINEER

ASS/ydcP
Attach.
cc: Messrs. E. R. Davis (2)
H. A. Gregaskes
D. W. Farren
G. K. Hunter (2)
D. P. Collins
T. J. Kovich
A. Watt

Foundations Office
Gen. Files

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FOUNDATION INVESTIGATION REPORT

For

Proposed New Structure at Hwy. #2, (Line 'B') and Soper Creek, East Branch, Co. of Durham, Town of Bowmanville, Dist. #7 (Port Hope).

W.J. 65-7-108 -- W.P. 14-64-1

1. INTRODUCTION:

A request was received from Mr. J. B. Curtis, Regional Bridge Location Engineer, in a memo dated September 22, 1965, for a foundation investigation to be carried out at the new structure site where Hwy. #2 (line 'B') crosses Soper Creek - East Branch.

In order to determine the soil properties and decide on the type of foundations, an investigation was carried out by this Section. Results of this investigation, together with discussion and recommendations for the foundation design, are reported herein.

2. DESCRIPTION OF SITE AND GEOLOGY:

The above site is located at the West limits of Bowmanville in the County of Durham, Town of Bowmanville. At this location the Soper Creek flows in a north to south direction. At the time of the investigation, the creek level was very low and the volume of flow was small. In general, the surrounding area is under cultivation with field crops. Physiographically, the site is located in the "Iroquois Plain".

cont'd. /2 ...

3. DESCRIPTION OF FIELD AND LABORATORY WORK:

Field work consisted of 5 sampled boreholes and 5 dynamic cone penetration tests. The borings were carried out by means of conventional diamond drilling equipment adapted for soil sampling purposes.

Samples were recovered by means of a 2" O.D. split-spoon sampler at required depths. The dimensions of the split-spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration test. A dynamic cone penetration test was carried out adjacent to each borehole. Driving energy to advance the 2-inch cone was 350 ft.-lbs. per blow.

The locations and elevations of all boreholes are shown on Dwg. No. 65-P-108A, which accompanies this report.

Samples were visually examined and identified in the field as well as in the laboratory. Tests were carried out in the laboratory, on a selection of samples to determine:

i) Natural Moisture Contents

ii) Atterberg Limits

iii) Organic Contents

iv) Grain Size Distributions

Laboratory and field test results have been summarized and are included under Appendix I of this report.

All elevations in the report are referred to the geodetic datum and were supplied by Department Engineering Surveys (Central Region).

cont'd. /3 ...

4. SUBSOIL CONDITIONS:

4.1) General:

Subsoil at the site consists of fill material, clayey silt and glacial till overlying limestone bedrock. Detailed descriptions of the various soil types encountered are given on the borelog sheets contained in the Appendix of this report. The estimated stratigraphical profile on Dwg. No. 65-P-1084, is based on this information. From ground level downward, the description of soil types are as follows:

4.2) Silt to Clayey Silt:

This deposit was observed in all the boreholes immediately below 6" of topsoil, except in B.H. #4, where the deposit is overlain by 7.5 ft. thick loose road fill (mixture of sand and clayey silt). The maximum observed depth was some 16 ft. in B.H. #4, the minimum being 9 ft. in B.H. #2. The lower boundary was established between elev. 256 and elev. 252. The deposit contains traces of organics in the upper 3 ft. 'N' values determined from Standard Penetration tests, gave values ranging from 3 to 15 blows/ft., indicating a firm to stiff consistency.

Physical properties of the clayey silt portion of the deposit, as determined from laboratory tests, are summarized below:

Liquid Limit	(W_L%)	=	13% - 34%
Plastic Limit	(W_p%)	=	9% - 22%
Moisture Content	(W %)	=	8% - 27%

cont'd. /- ...

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

4.3) Glacial Till (Clay, Silt, Sand and Gravel):

This stratum underlies the clayey silt over the entire site area, and was found to extend down to limestone bedrock. The upper boundary was established between approx. elev. 252 and elev. 256. The material consists of a heterogeneous mixture of clay, silt, sand and gravel, in varied proportions. The deposit consists of boulders up to 18" ø below elev. 249 and elev. 250, respectively, in B.H. #2 and B.H. #4. 'N' values, as determined from Standard Penetration tests, ranged from 19 to 53, indicating the deposit to be stiff to hard.

4.4) Bedrock:

Limestone bedrock was proved in all boreholes by drilling 2 to 7 ft. core samples. In B.H. #2 and #4, the upper one foot has been subjected to considerable weathering and is extremely porous and extensively fissured.

The bedrock was contacted between elev. 250 and elev. 247.

5. GROUND WATER CONDITIONS:

Observations carried out during the time of field investigation, indicate that the ground water level is approximately the same elevation as the water level in the creek. Artesian water conditions were not observed in any of the boreholes during the time of the field investigation.

The water level of Soper Creek (East Branch) was at elev. 260 during the time of field investigation.

cont'd. /5 ...

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new three-span (30' - 45' - 30') structure at this site to replace the existing single-span bridge over Soper Creek (East Branch). The new centre line will be approximately the same as the existing one, and the new profile grade will be some 4 to 5 ft. higher.

Subsoil at the site generally consists of some 6 to 15 ft. of silt to clayey silt followed by 4 to 9 ft. of glacial till deposit, underlain by limestone bedrock.

Recommendations for the proposals are as follows:

Structure Foundations -

The proposed piers should be founded either within the glacial till deposit at approximate ± elev. 253 or on sound limestone bedrock. In the case of foundations resting on the till, a design load of 3 t.s.f. may be used. In the case of foundations resting on sound bedrock, a design load of up to 20 t.s.f. may be used. The higher design pressure achieved by excavating to rock may offset the additional excavation cost involved.

A dewatering scheme will be necessary since excavations for pier footings will be carried out below creek water level.

The proposed abutments may be constructed within the approach fills and supported on steel H-piles driven to bedrock. Design loads to be used are dependent on the pile section selected.

As an alternative, the pier and abutment footings of the structure may be supported on bored-in concrete caissons founded on sound limestone bedrock. For example, a 30" ϕ concrete

cont'd. /6 ...

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

Structure Foundations - (cont'd.) ...

caisson could provide a design load of 150 tons.

Approach Fills -

The proposed grade of Hwy. #2 (Revision, Line 'B'), will be at approximate elev. 982. In most cases, the fill height will be some 4 to 5 ft. above the existing grade. No stability problems are anticipated for standard 2:1 side slopes.

Precautions should be taken to protect the creek banks and approach fills from scour action of the creek. This may be achieved by suitably placed rip-rap.

7. SUMMARY:

A three-span structure is proposed to replace the existing one at the crossing of Hwy. #2 (Line 'B') and Soper Creek - East Branch.

The subsoil at the site generally consists of deposits of fill material, clayey silt, glacial till and limestone bedrock.

Structure foundation recommendations are as follows:

1) Spread footings for piers in the glacial till stratum or sound bedrock with safe bearing pressures of 3 t.s.f. and 20 t.s.f., respectively.

2) Abutments on end-bearing steel H-piles driven to bedrock.

3) As an alternative, the entire structure founded on 30" Ø concrete bored-in caissons with design loads up to 150 tons.

cont'd. /7 ...

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

No stability problems are anticipated for approach fills with standard 2:1 slopes.

8. MISCELLANEOUS:

The field work, performed during the period October 1 to October 12, 1965, was undertaken by Mr. V. Korlu, Project Foundation Engineer. The investigation was carried out under the supervision of Mr. K. Devata, Senior Foundation Engineer, who also prepared this report.

Equipment used, was owned and operated by Canadian Longyear, Ltd.

November 1965

APPENDIX I.

FORM CB-MT-126 (FORMERLY CB-ML-126)
65-1931

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 65-F-102 LOCATION Hwy 2 & Soper Crk (E. Branch) Sta. 401+47, 40' Lt. ORIGINATED BY V.K.
W.P. 14-64-1 BORING DATE Oct. 1, 1965. COMPILED BY L.I. & N.D.
DATUM Geodetic BOREHOLE TYPE Cash-boring. CHECKED BY N.D.

SOIL PROFILE ELEV / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 / SHEAR STRENGTH P.S.F.	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w / WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS
266.9 0.0	Silt to clayey silt with sand and fine gravel (traces of organics in the upper portion) Loose or firm.		1	SS	5	260				Organic content 1.7%
			2	SS	3					
253.9 13.0	Glacial Till (Heterogeneous mixt. of clayey silt sand & gravel.)		3	SS	3					
			4	SS	37	250				
244.9 22.0	Sound limestone bedrock (Ax.) End of borehole.		5	RC	100% Recovery					
						240				

FORM DB-MT-126 (FORMERLY DB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

JOB 65-F-10P
W P 14-64-1
DATUM Geodetic

LOCATION Hwy 2 & Soper Crk Sta. 401+80, 19' Rt.
BORING DATE Oct. 5, 1965.
BOREHOLE TYPE Rath-boring.

ORIGINATED BY V.K.
COMPILED BY L.P. & M.P.
CHECKED BY M.D.

ELEV / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F.	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w / WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS
262.1										
0.0	Clayey silt with sand and fine gravel.					260				
			1	SS	3					
252.6	Firm to stiff.									
			2	SS	11					
P.5	Glacial Till(clayey silt sand & gravel)- with boulders up to 1[illegible] below El 249.1		3	SS	53	250				
14.0	[Weathered] Limestone Bedrock (Sound)		4	RC	35%	Recovery				
248.1			5	RC	100%	Recovery				
19.0	End of borehole.					240				

FORM CS-MT-124 (FORMERLY CS-ML-124)
67-831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 65-F-109
W.P. 14-64-1
DATUM Geodetic

LOCATION Hwy 2 & Soper Crk (E. Branch) Sta. 401+09, 30' Rt.
BORING DATE Oct. 6, 1965.
BOREHOLE TYPE Wash-boring.

ORIGINATED BY V.K.
COMPILED BY L.P. & N.D.
CHECKED BY N.D.

ELEV / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE
268.5						
0.0	Clayey silt with sand & gravel-(layer of silty sand & gravel between elev 263.0 & elev. 261.0) Firm to stiff.		1	SS	11	
			2	SS	15	260
			3	SS	3	
254.5						
14.0	Glacial Till (Heterogeneous mixt. of clayey silt, sand & gravel)		4	SS	19	
						250
19.5	Sound Limestone Bedrock.		5	RC	100% Recovery	
244.0						
24.5	End of borehole.					240

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT
20 40 60 80 100
SHEAR STRENGTH P.S.F.

LIQUID LIMIT ——— W_L
PLASTIC LIMIT ——— W_P
WATER CONTENT ——— W
W_P W W_L
WATER CONTENT %
10 20 30

BULK DENSITY γ P.C.F.

REMARKS

FORM DB-MT-12c (FORMERLY DB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 65-F-102 LOCATION Hwy 2 & Soper Crk Sta. 402+31, 26' Lt. ORIGINATED BY V.K.

W P 14-64-1 BORING DATE Oct. 7, 1965. COMPILED BY L.P. & M.D.

DATUM _____ BOREHOLE TYPE Wash-boring. CHECKED BY M.D.

SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE
273.5						
0.0	Fill material (Mixture of sand and clayey silt).		1	SS	3	
			2	SS	9	
7.5	Clayey silt to silt with sand and occasional fine gravel. Stiff.		3	SS	12	270
			4	SS	8	
			5	SS	9	260
22.0	Glacial till (Clayey silt with sand & gravel)-with boulders up to 1'-0"Ø below elev. 250.0		6	SS	55	
						250
31.0	Inselberg? Limestone Bedrock (Sound)		7	RC	No recovery	
241.5			8	RC	100% Recovery	
32.0	End of borehole.					240

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT
20 40 60 80 100
SHEAR STRENGTH P.S.F.

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT %
10 20 30

BULK DENSITY γ P.C.F.

REMARKS

Organic Content 1.10%

FORM DB-MT-126 (FORMERLY DB-ML-126)
65-1931

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 5

FOUNDATION SECTION

JOB 65-F-108
W.P. 11-64-2
DATUM

LOCATION Hwy 2 & Sager Crk Sta. 402+39, 60' Lt.
BORING DATE Oct. 12, 1965.
BOREHOLE TYPE Wash-boring.

ORIGINATED BY V.K.
COMPILED BY L.F. & M.D.
CHECKED BY M.D.

ELEV / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV SCALE
260.7						
0.0	Clayey silt with sand and gravel. Firm to stiff.		1	SS	9	
			2	SS	7	260
			3	SS	3	
13.0	Glacial till (clayey silt with sand and gravel).		4	SS	93	
						250
19.0 / 241.7	Sound limestone bedrock.		5	RC	100% recovery	
21.0	End of borehole.					
						240

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT
20 40 60 80 100
SHEAR STRENGTH P.S.F.

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P — w — w_L
WATER CONTENT %
10 20 30

BULK DENSITY
P.C.F.

REMARKS

Organic Content 1.50%

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 - -

CONSISTENCY	'N' BLOWS/FT.	q LB./SQ FT	DENSENESS	'N' BLOWS/FT
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	OSTERBERG 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
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
$\log_e x$ OR $\ln x$	NATURAL LOGARITHM OF x
$\log_{10} x$ OR $\log x$	LOGARITHM OF x 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

a	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_o	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

cc: Foundations Office (2 of 2)

Mr. W. S. Kallnyshyn,
Regional Bridge Location Engr.,
Central Region (Toronto),
Admin. Bldg.

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

September 1, 1966

1) Soper Creek Bridge (West Branch) -
Hwy. #2, Dist. #7, W.P. 14-64-2, W.J. 65-F-102.

2) Soper Creek Bridge (East Branch) -
Hwy. #2, Dist. #7, W.P. 14-64-1, W.J. 65-F-103.

We have reviewed the preliminary drawings (D-5366-F1 and D-5367-F1) for the above mentioned structures and submit the following comments:

1) The footing formation level appears to be somewhat higher than the upper boundary of the glacial till stratum. Our foundation report indicates that the proposed footings should be founded within the glacial till stratum.

2) Borings were put down at either end of the footing locations, and some slight variations in elevation of the upper boundary of the glacial till stratum can be anticipated during construction. In view of this, it would be advisable whenever some doubt exists, to have the footing excavations inspected by the Foundation Section prior to pouring the concrete. Provision should also be made in the contract for deepening the foundations slightly, should this prove to be necessary.

3) A dewatering scheme will be necessary since excavations for the footings will be carried out below creek water level.

M. Devata,
SUPERVISING FOUNDATION ENGR.
For:
A. C. Sternac,
PRINCIPAL FOUNDATION ENGR.

MD/MdeF

cc: Foundations Office
Gen. Files

65-F-108

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

From: Bridge Division,
Downsview, Ontario.

Date: August 26, 1966.

Our File Ref.

In reply to

Subject: W.P. 14-64-1,
Site 21-171,
Soper Creek Bridge,
(East Branch)
Highway No. 2 District No. 7.

We are sending to you herewith one print of Preliminary Plan D-5867 Pl of the above structure.

Would you please let us have your written comments.

N. Zoltay.

NZ/aw

N. Zoltay,
for W. Melinyshyn,
Regional Bridge Location Engineer.

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

65-F-108

TO: Mr. A. Sternac, Principal Foundation Engineer, Room 107, Lab. Bldg. Atten: Mr. M. Devata	FROM: Bridge Division, Downsview, Ontario. DATE: September 22, 1965.
OUR FILE REF.	IN REPLY TO

SUBJECT:

W.P. 14-64-1, Site 21-171,
Soper Creek East Branch,
Hwy. 2, District 7.

Herewith one print of drawing E 4284-1 showing the proposed location of the footings for the above structure.

Please arrange to have a foundation investigation carried out at this location.

Joseph F Walshe

JFW/ag
c.c. R. Forrest

J. F. Walshe,
for J. B. Curtis,
Regional Bridge Location Engineer.

#65-F-108

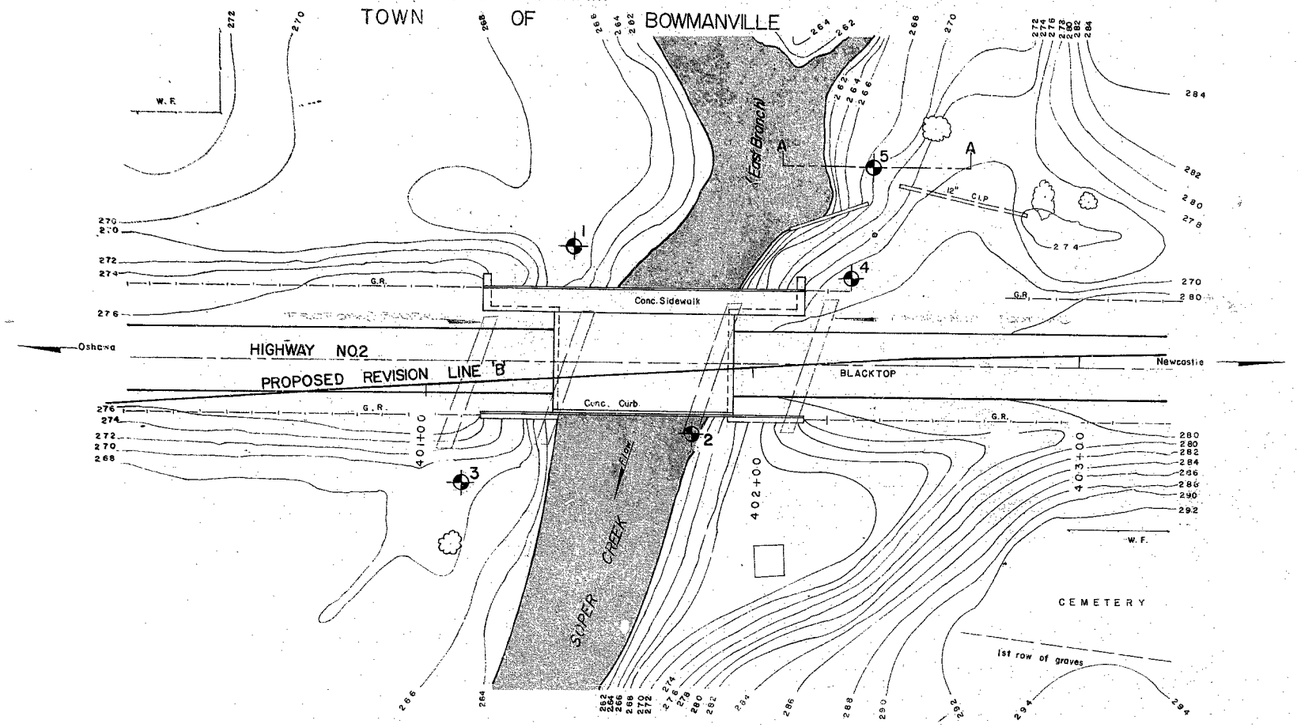
W.P. #14-64-1

Hwy. #2

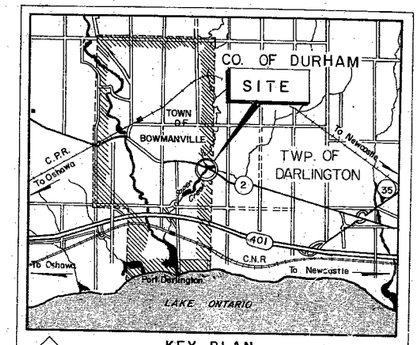
SOPER CREEK

(EAST BRANCH)

THE COUNTY OF DURHAM
TOWN OF BOWMANVILLE



PLAN
SCALE 20 10 20 40 FT.



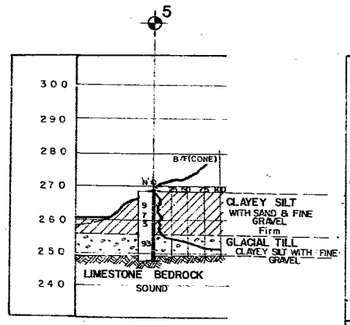
KEY PLAN
SCALE IN MILES
0 1 2 3 MILES

E 687400
N 4864600
ZONE 17

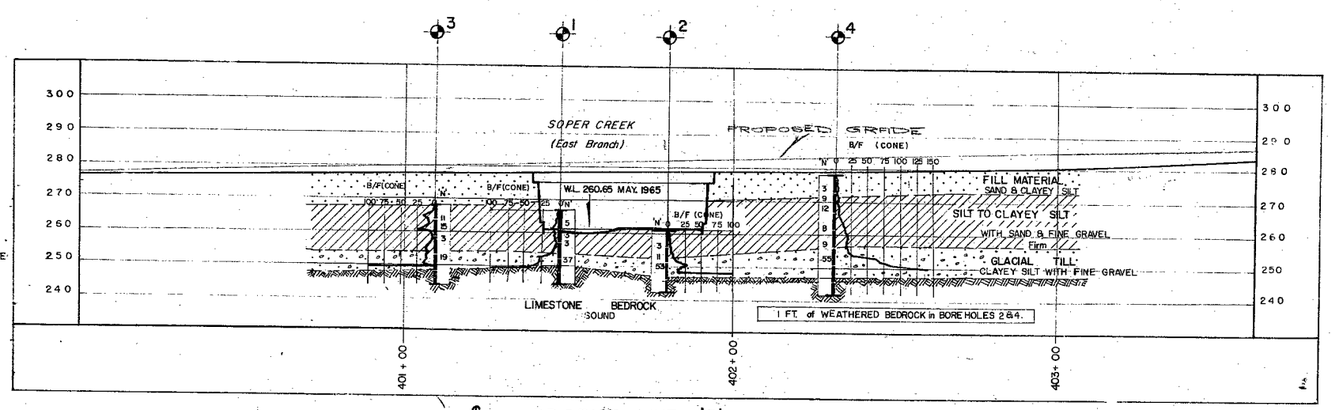
LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation. OCT. 1965.

NO.	ELEVATION	STATION	OFFSET
1	266.9	401+47	40' LT
2	261.1	401+80	19' RT
3	268.5	401+09	30' RT
4	278.5	402+31	26' LT
5	268.7	402+39	60' LT



SECTION A–A



℄ PROFILE LINE 'B'
SCALE
20 10 0 20 40 FT.

– 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.

PRINT RECORD		
	FOR	DATE

REVISIONS		
DATE	BY	

DEPARTMENT OF HIGHWAYS – ONTARIO
MATERIALS & TESTING DIVISION – FOUNDATION SECTION

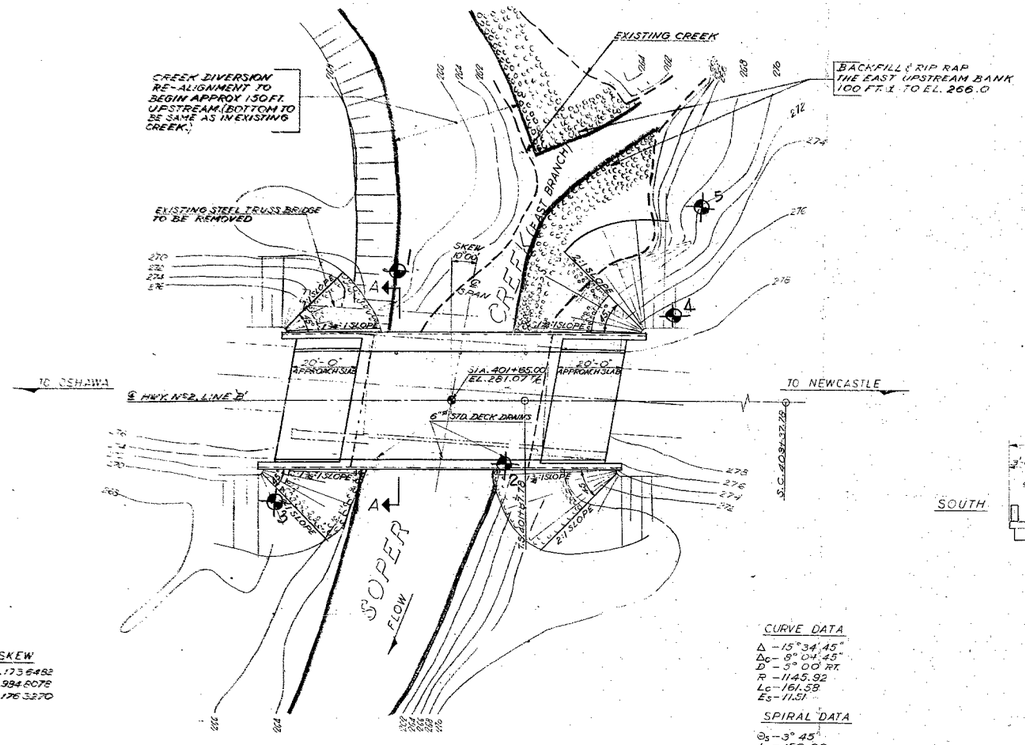
SOPER CREEK (EAST BRANCH)

KING'S HIGHWAY NO. 2 LINE 'B' REVISION DIST. NO. 7
CO. DURHAM TOWN OF BOWMANVILLE
TWP. LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

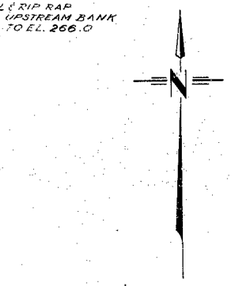
SUBM'D. V. K.	CHECKED	W.P. NO. 14-64-1	M.B.T. DRAWING NO. 65-F-108A
DRAWN J. N.	CHECKED	JOB NO. 65-F-108	
DATE 18 NOV. 1965		SITE NO.	BRIDGE DRAWING NO.
APPROVED (PRINCIPAL FOUNDATION ENGINEER)		CONT. NO.	

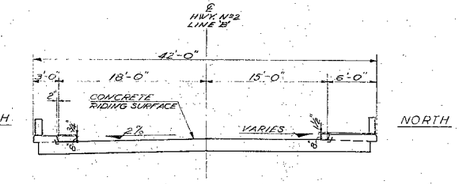
REF. NO. E-4284-1



PLAN

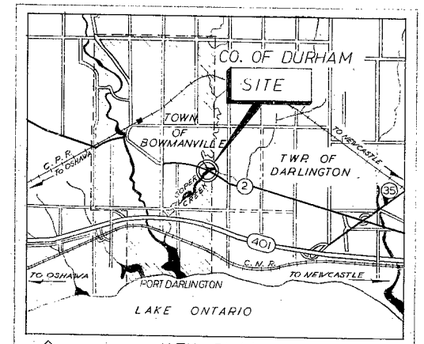
SCALE: 1 IN. = 20 FT.





SECTION A–A

SCALE: 1/8 IN. = 1 FT.



KEY PLAN

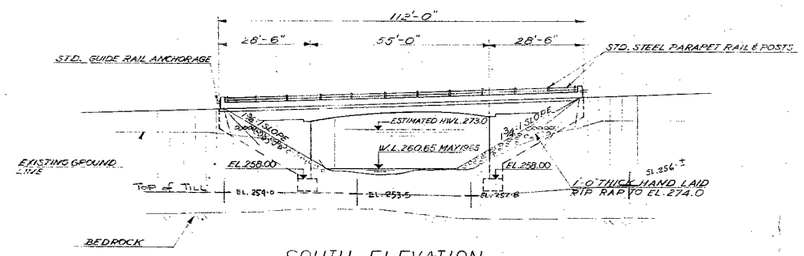
SCALE IN MILES 0 1 2 3 MILES

CURVE DATA

Δ - 15°34'45"
Δc - 6° 04'45"
D - 3° 00' PT.
R - 1145.92
Lc - 161.58
Es - 11.51

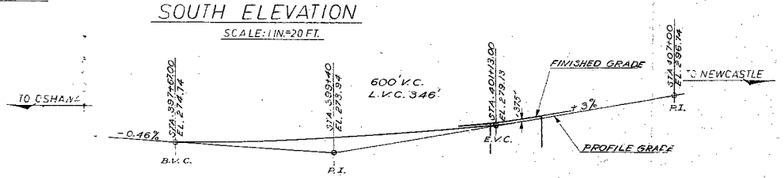
SPIRAL DATA

Θs - 3° 45'
Ls - 150.00
Ts - 237.86



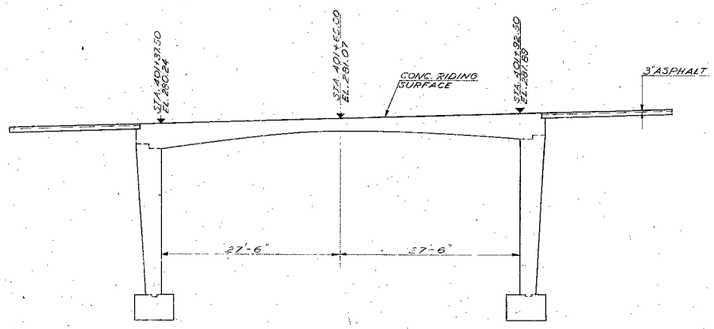
SOUTH ELEVATION

SCALE: 1 IN. = 20 FT.



PROFILE OF ℄ HWY. Nº2 LINE 'B'

N.T.S.



LONGIT. SECTION ℄ HWY. Nº2 LINE 'B'

SCALE: 1 IN. = 10 FT.

B.M. ELEV. 270.69

GEODETIC DATUM

N.E.W. IN 2" WILLOW, 3' OFF GROUND 52' RT. OF STA. 401+11

PRINT RECORD		
No.	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

SOPER CREEK BRIDGE
– EAST BRANCH –

(C.I. MI. WEST OF BOWMANVILLE EAST LIMITS)

KING'S HIGHWAY No. 2 DIST. No. 7

CO. DURHAM

TOWN OF BOWMANVILLE LOT CON.

PRELIMINARY PLAN

APPROVED		SITE No. 21-171	W.P. No. 14-64-1
BRIDGE ENGINEER		CONTRACT Nos.	
DESIGN	CHECK	DRAWING No.	D-5867-P1
DRAWING P. SCH.	CHECK P.O.L.		
DATE AUG. 1966	LOAD H 20-S 20-44		