

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40P7-47

DIST. 3 REGION

W.P. No. 352-85-01

CONT. No. 88-12

W. O. No.

STR. SITE No. 33-165-350

HWY. No. 7/8

LOCATION Nith River
(Pedestrian Bridge)

No. of PAGES -

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

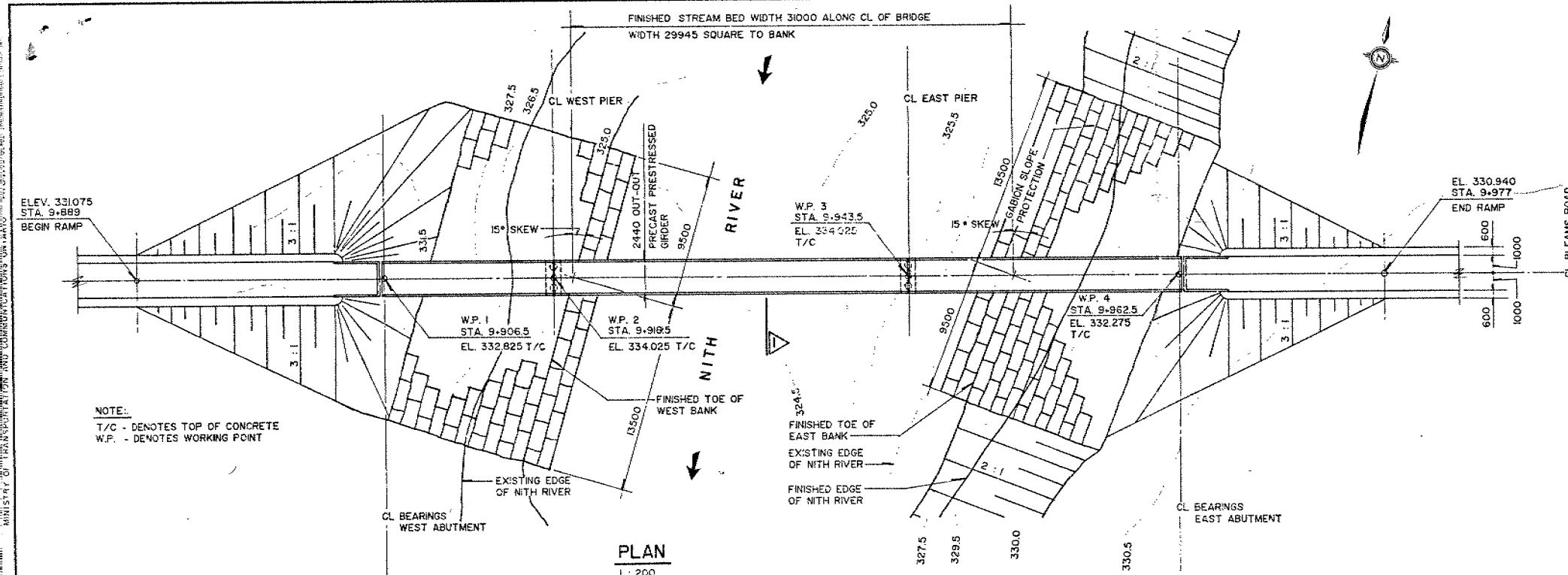
METRIC
DIMENSIONS ARE IN METRES
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UNLESS OTHERWISE SHOWN

DIST No 3
CONT No
WP No 352-85-01

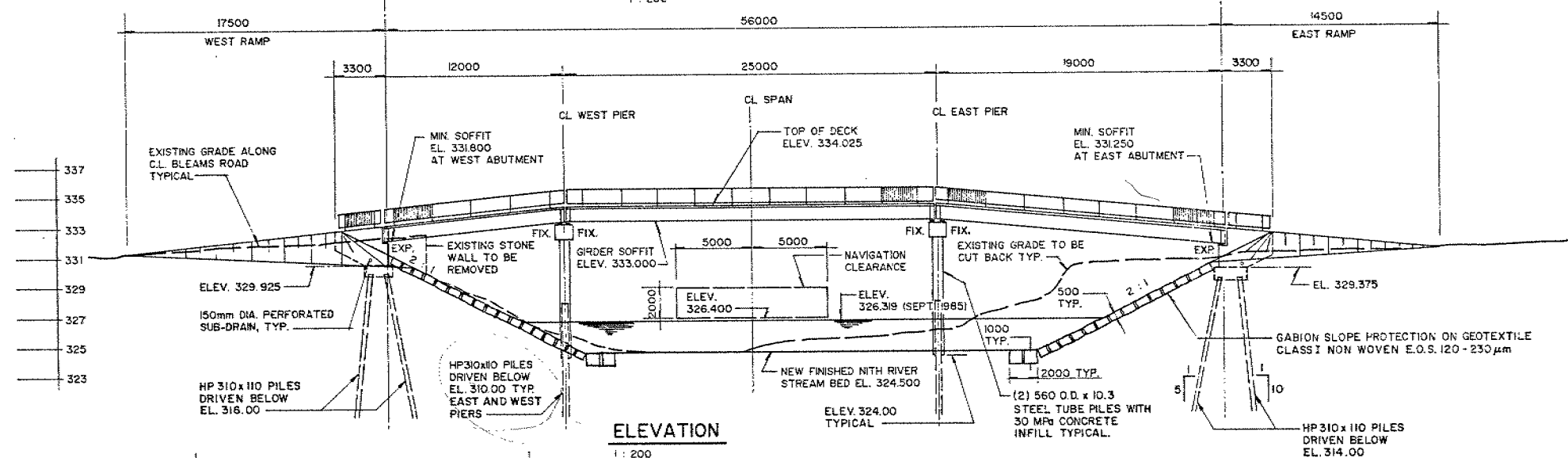
NITH RIVER PEDESTRIAN
BRIDGE AT NEW HAMBURG
GENERAL ARRANGEMENT

SHEET

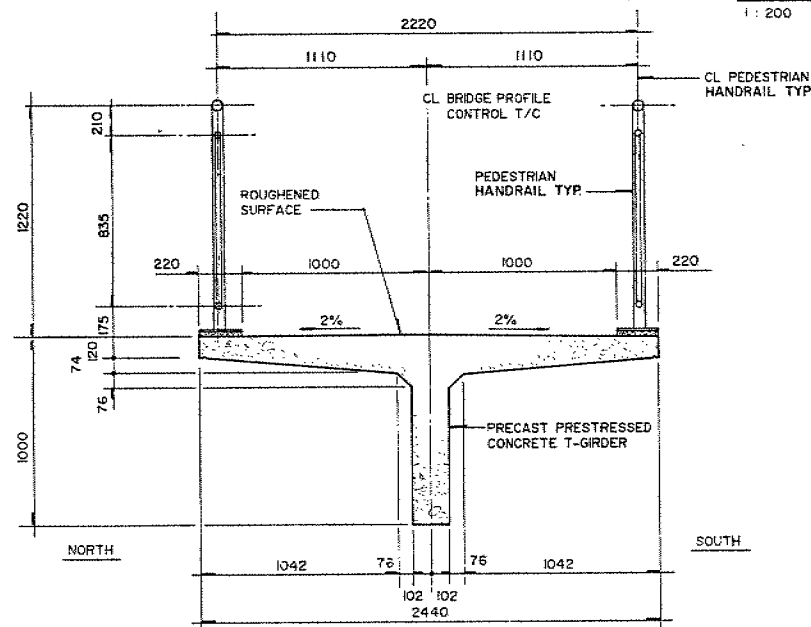
Morrison Hershfield Limited
Consulting Engineers



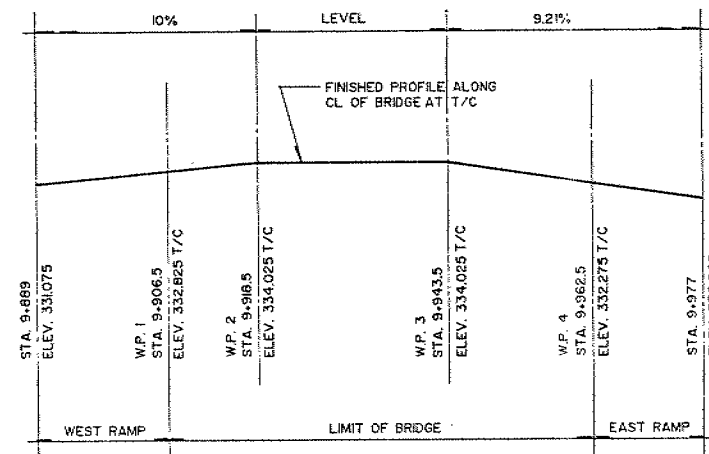
PLAN
1:200



ELEVATION
1:200



TYPICAL SECTION
1:20



BRIDGE PROFILE
N.T.S.

GENERAL NOTES:

- CLASS OF CONCRETE:
 - PRECAST PRESTRESSED GIRDERS AND DIAPHRAGMS - 35 MPa.
 - PIER CAPS, PIER INFILL, ABUTMENTS AND WINGWALLS - 30 MPa.
 - FOOTINGS - 20 MPa.
- CLEAR COVER TO REINFORCING STEEL:
 - FOOTINGS 100 mm ± 25 mm.
 - PIER CAPS, FRONT SURFACES OF ABUTMENTS AND WINGWALLS 80 mm ± 20 mm.
 - BACK SURFACES OF ABUTMENTS AND WINGWALLS 70 mm ± 20 mm.
- PRECAST GIRDERS
FLANGE TOP REINFORCEMENT 70 mm ± 20 mm.
ALL OTHER REINFORCEMENT 25 mm ± 5 mm, - 3 mm.
 - GIRDER DIAPHRAGMS 70 mm ± 20 mm.
 - ALL OTHER REINFORCEMENT: AS NOTED ON THE DRAWINGS.
- REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED.
 - BAR MARKS WITH THE SUFFIX "C" DENOTE COATED BARS. ALL REINFORCEMENT IN THE PRECAST PRESTRESSED GIRDERS SHALL BE COATED BARS.
- UNLESS OTHERWISE NOTED, MINIMUM LAP LENGTHS FOR REINFORCING BARS SHALL BE:

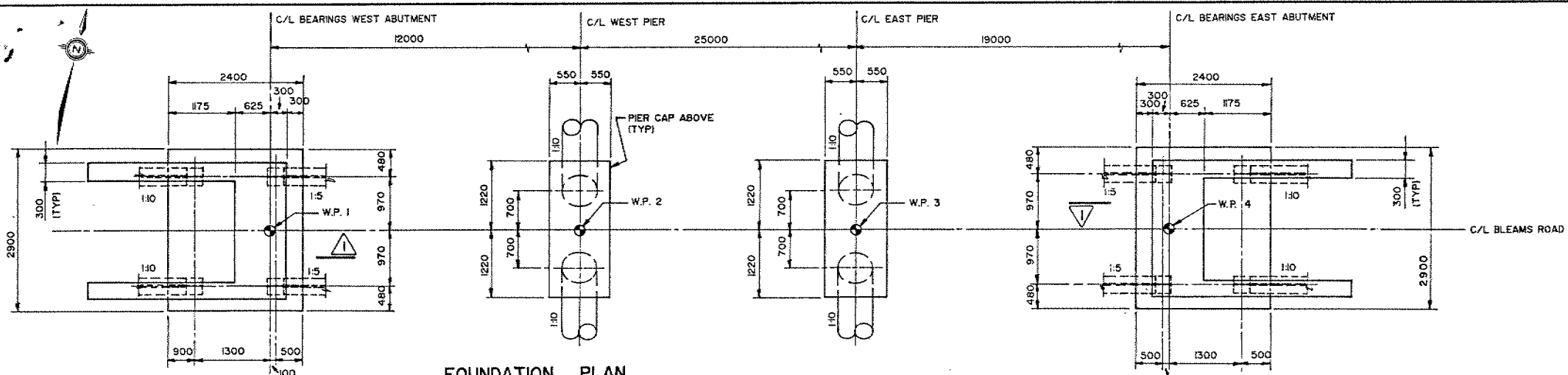
SIZE 15	=	650 mm
SIZE 20	=	800 mm
SIZE 25	=	1200 mm
SIZE 30	=	1700 mm
- CONSTRUCTION NOTES:
 - THE CONTRACTOR SHALL FINISH THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS TO A TOLERANCE OF ± 3 mm.
 - THE NAVIGATIONAL CLEARANCE SHOWN ON THIS DRAWING SHALL NOT APPLY DURING CONSTRUCTION.
- E.F. DENOTES EACH FACE.
I.F. DENOTES INSIDE FACE.
O.F. DENOTES OUTSIDE FACE.
T.U.L. DENOTES TOP UPPER LAYER.
T.L.L. DENOTES TOP LOWER LAYER.
B.U.L. DENOTES BOTTOM UPPER LAYER.
B.L.L. DENOTES BOTTOM LOWER LAYER.

LIST OF DRAWINGS

33-165-350-1	GENERAL ARRANGEMENT
-2	BORE HOLE LOCATIONS AND SOIL STRATA
-3	FOUNDATIONS AND PIERS
-4	ABUTMENTS AND WINGWALLS
-5	PRESTRESSED GIRDERS
-6	PEDESTRIAN HANDRAIL
-7	BEARINGS, EXPANSION JOINTS, AND GABIONS
-8	BRIDGE DATE AND SITE NUMBER DATA
-9	PILE DRIVING - STEAM AND DIESEL HAMMERS
-10	QUANTITIES - STRUCTURE I
-11	QUANTITIES - STRUCTURE II

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	P.G.	CHECK	A.T.C.
DRAWING	M.B.	CHECK	M.H.M.
LOADING	Q.H.B.C.	63	
SITE No	33-165-350		
DATE	MAR 17/86		
DWG	1		



METRIC
DIMENSIONS ARE IN METRES
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UNLESS OTHERWISE SHOWN

DIST No 3
CONT No
WP No 352-85-01

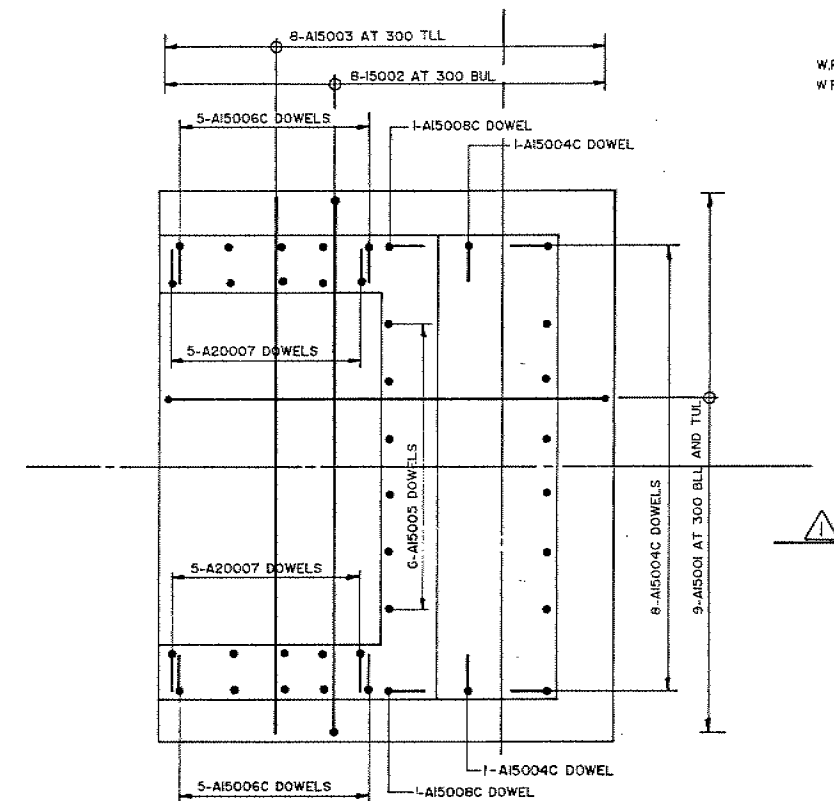
NITH RIVER PEDESTRIAN
BRIDGE AT NEW HAMBURG
FOUNDATIONS AND PIERS

SHEET

Morrison Hershfield Limited
Consulting Engineers

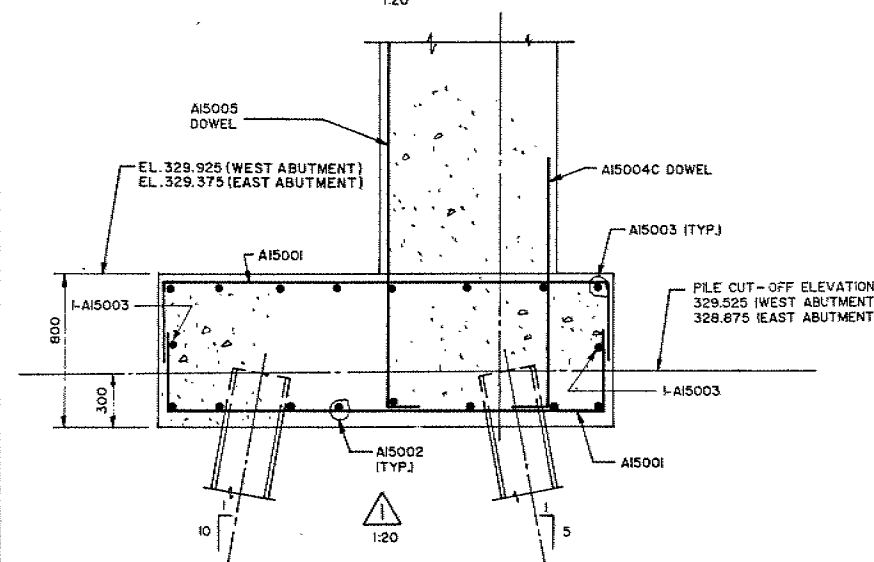


FOUNDATION PLAN

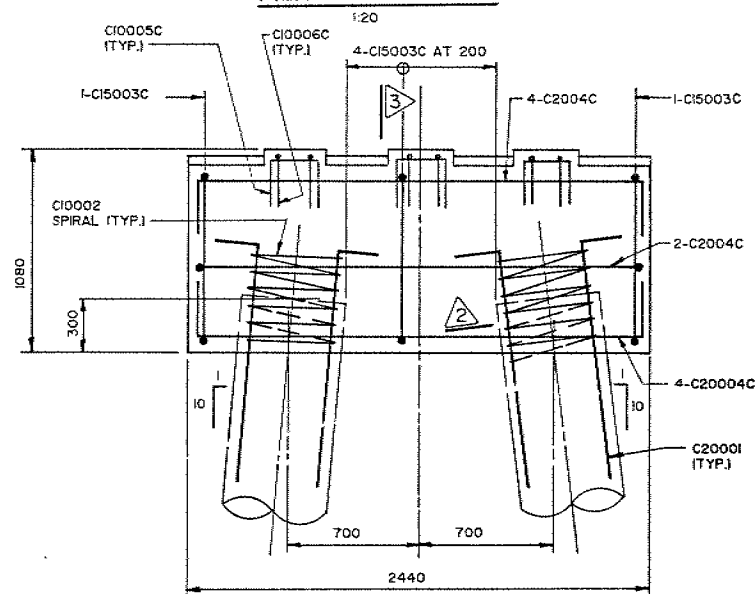
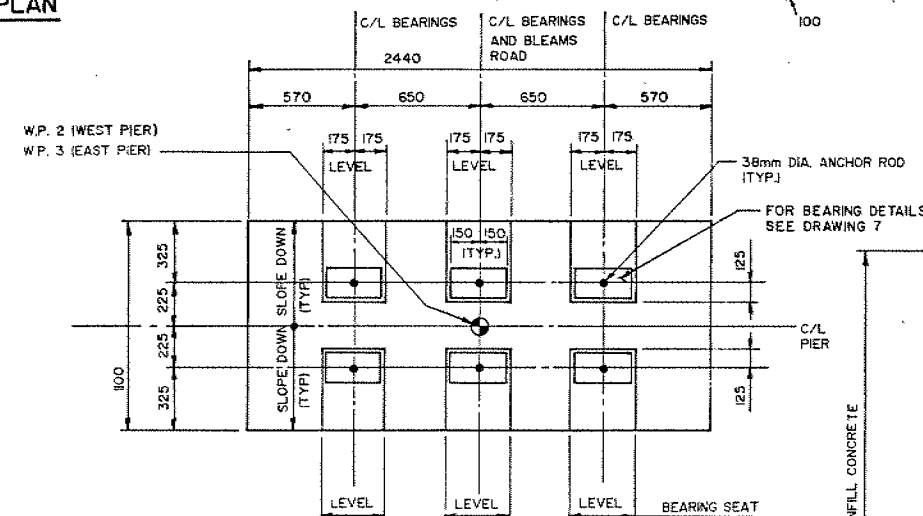


ABUTMENT FOOTING PLAN

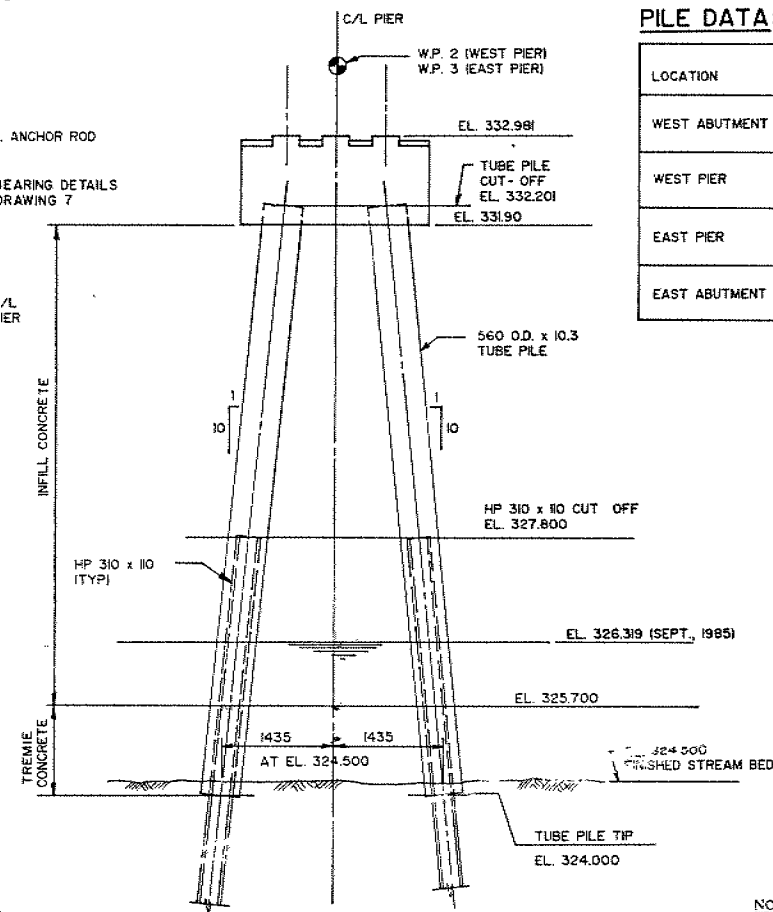
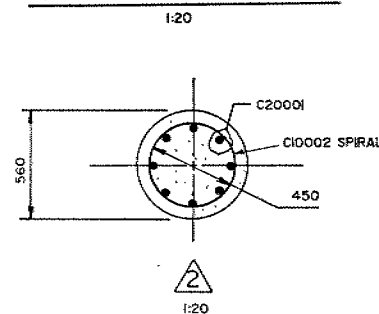
WEST ABUTMENT AS SHOWN, EAST ABUTMENT OPPOSITE HAND



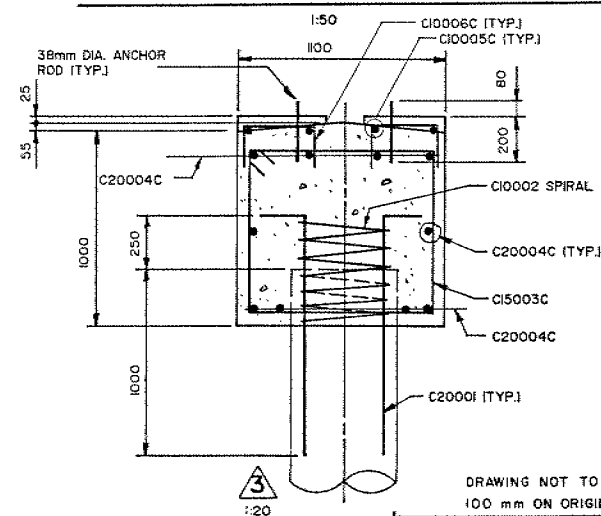
PIER CAP PLAN



PIER CAP ELEVATION



ELEVATION OF EAST AND WEST PIER



DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

FILE DATA:

LOCATION	NO. REQ'D	APPROX. LENGTH	BATTER	TYPE
WEST ABUTMENT	2	19900	1:5	HP 310 x 110
	2	19600	1:10	HP 310 x 110
WEST PIER	2	17800	1:10	HP 310 x 110
	2	8300	1:10	560 O.D. x 10.3
EAST PIER	2	17800	1:10	HP 310 x 110
	2	8300	1:10	560 O.D. x 10.3
EAST ABUTMENT	2	19900	1:5	HP 310 x 110
	2	19600	1:10	HP 310 x 110

NOTES

1. LAYOUT DIMENSIONS FOR PILES ARE GIVEN AT THE UNDERSIDE OF PIER CAPS AND ABUTMENT FOOTINGS.
2. BOTTOM FOOTING REINFORCEMENT MAY BE MOVED OUT OF SPACING TO CLEAR PILES.
3. ALL HP310x110 PILES SHALL BE FITTED WITH DRIVING SHOES IN ACCORDANCE WITH DD-3301. COBBLES AND BOULDERS ARE PRESENT BELOW ELEVATION 319.00.
4. PILES SHALL BE DRIVEN IN ACCORDANCE WITH SS 103-10 OR SS 103-11. PILES SHALL BE DRIVEN BELOW ELEVATION 316.00 AT THE WEST ABUTMENT, BELOW ELEVATION 310.00 AT THE EAST AND WEST PIERS, AND BELOW ELEVATION 314.00 AT THE EAST ABUTMENT.
5. PILE DESIGN DATA:

CAPACITY AT SLS TYPE II = 850 kN
FACTORED CAPACITY AT ULS = 1200 kN
ULTIMATE CAPACITY = 2530 kN
6. ANCHOR RODS FOR BEARINGS SHALL BE SUPPLIED IN ACCORDANCE WITH CSA STANDARD CAN3.G40.21-M81 GRADE 300W, AND SHALL BE GALVANIZED IN ACCORDANCE WITH CSA STANDARD G164-M.

REVISIONS					
	DATE	BY	DESCRIPTION		
	DESIGN P.G.	CHECK A.T.C.	LOADING OHBDC - 83		DATE MAR 17/86
	DRAWING R.B.	CHECK M.H.M.	SITE No 33-165-350		DWG 3

ENGINEERING MATERIALS OFFICE
FOUNDATION DESIGN SECTION

WP 352-85-01

DIST #3

HWY Bleams Road

STR SITE 33-165-350

NITH RIVER PEDESTRIAN BRIDGE
AT NEW HAMBURG

DISTRIBUTION

V. F. BOEHNKE (2)

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D. A. WALLER (2)

K. BASSI (2)

J. H. PEER

T. YAKUTCHUK

A. CROWLEY (Cover Only)

M. MacLEAN (Cover Only)

FILES

FOUNDATION INVESTIGATION REPORT
For
Nith River Pedestrian Bridge
At New Hamburg
Bleams Road
W.P. 352-85-01, SITE 33-165-350
District 3, Stratford

INTRODUCTION

This report contains the results of the Foundation Investigation carried out at the above-noted site between 85 10 25 and 85 10 30. The fieldwork consisted of two sampled boreholes both accompanied with dynamic cone penetration tests. The depth of the borings was 18.4 m and 18.8 m in boreholes 1 and 2 respectively and both borings were advanced utilizing a track-mounted auger machine.

SITE DESCRIPTION

The site is located approximately 120 m north of the existing Nith River Bridge on Hwy. 7 and 8 in the Township of Wilmot, Regional Municipality of Waterloo.

It is proposed to construct a four (24 m) span pedestrian crossing of the Nith River along the unopened road allowance for Bleam's Road. The west approach is located at the terminus of Bleam's Road in a residential and light industrial area. The east approach is located in a small park. Physiographically the site is located in a glacial spillway in a region referred to as the Stratford Till Plain.

SUBSURFACE CONDITIONS

The field investigation carried out at this site revealed the presence of glacio-fluvial deposits such as gravels, sands, silts as well as a silty clay stratum near the ground surface. Occasional cobbles and/or boulders were encountered below elevation ± 318 m. Diamond drilling techniques were required to advance the boreholes beyond this depth.

Owing to the complexity of the various deposits encountered (i.e. elevation, thickness, composition etc), it is not practical to give detailed descriptions here for each individual stratum. Reference should be made to the Record of Borehole Sheets located in the Appendix for details of the stratification at each borehole location. These sheets also contain the results of all field and laboratory tests performed.

GROUNDWATER CONDITIONS

The groundwater level was established at elevations 329.1 m and 327.6 m at boreholes 1 and 2 respectively by taking overnight readings in the open boreholes. However, owing to the fairly pervious nature of the soils, and the proximity of the Nith River, it is likely that these levels are subject to seasonal fluctuations.

DISCUSSION AND RECOMMENDATIONS

It is proposed to construct a four span (24 m/span) pedestrian crossing across the Nith River approximately 120 m north of the existing Hwy. 7 and 8 Nith River Bridge. The proposed grade (85 9 27) of 334 m will necessitate approach fills of 2-3 m for the west approach and 3-4 m for the east approach.

STRUCTURE FOUNDATIONS

It is recommended that the new structure be founded on end bearing steel 'H' piles (HP 310 x 110) driven into the slightly cemented glacial till, using a safe load of 850 kN (HP 310 x 110) per pile. The pile tips should be re-inforced with pile driving shoes.

The piles should be driven in accordance with Standards SS103-10 or SS103-11 using an ultimate capacity of 2550 kN per pile but must be driven below elevations ± 316 for the west abutment and piers located in the river bed, and ± 314 m for the east pier and east abutment.

The pile driving hammer should have a minimum energy of 50,000 J/blow.

For purposes of the O.H.B.D.C. the following values are recommended:

Factored Capacity at U.L.S.	1200 kN
Capacity at S.L.S. Type II	850 kN

Total and differential settlements should not exceed 25 mm for footings designed in accordance with the recommendations given in this report.

OTHER CONSIDERATIONS

Backfill to the structures should consist of Granular 'A' or 'B' in accordance with Standard Special Provision No.121 dated October 1983. Earth pressures should be computed in accordance with Section 6.6.1.2.1 of the O.H.B.D.C. The recommended foundations for the abutments are considered to be non-yielding and the at-rest condition (K_0) applies.

For design purposes, the physical properties of the backfill material are as follows:

<u>Material</u>	<u>ϕ</u>	<u>Unit Weight (γ)</u>
Granular 'A'	35	22.8 kN/m ³
Granular 'B'	30	21.2 kN/m ³

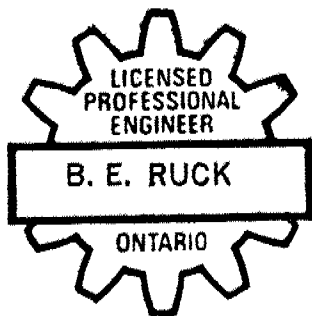
No stability problems are anticipated for the required approach fills constructed with standard side slopes of 2 horizontal to 1 vertical.

The minimum cover requirements for frost protection is 1.2 m. The abutments may be perched within the approach embankments.

The pile caps should be formed "in the dry". Therefore, excavations carried out below the prevailing groundwater will require unwatering.

MISCELLANEOUS

The fieldwork for this investigation was carried out under the supervision of Mr. B. Ruck and Mr. J. Young, Student Engineer, utilizing equipment owned and operated by Archer Drilling Ltd., Barrie. This report was written by Mr. B. Ruck, Project Foundations Engineer and reviewed by Mr. K. Selby, Chief Foundations Engineer (West).



A handwritten signature in cursive script that reads "Brian Ruck".

B. E. Ruck, P.Eng.
Project Foundations Engineer

A handwritten signature in cursive script that reads "K. G. Selby".

K. G. Selby, P.Eng.
Chief Foundations Engineer (West)

A P P E N D I X

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:

R Q D (%)	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'_{v0}	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_f	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

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



RECORD OF BOREHOLE No 1

METRIC

W P 352-85-01 LOCATION Sta: 9 + 905.3 °/s 3.9 m Lt. ORIGINATED BY B.R.
DIST 3 HWY Bleams Rd BOREHOLE TYPE Hollow Stem Auger and Washboring COMPILED BY B.R.
DATUM Geodetic DATE 85 10 25 / 28 CHECKED BY *so*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100							WATER CONTENT (%)
								SHEAR STRENGTH							
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						GR SA SI CL	
331.8	Ground Surface														
0.0	Fill														
	Silty Clay with Gravel		1	SS	6										
	Firm to Stiff		2	SS	15										
	Silty Sand		3	SS	7										
	trace Gravel														
328.2	Loose *		4	SS	6									10 44 35 11	
3.6	Silty Sand													0 53 39 8	
	Very Loose														
	trace Clay		5	SS	4										
326.0															
5.8	Sand and Gravel with seams of fine to medium Sand		6	SS	22										
323.2	Compact		7	SS	18										
8.6	Mixture of Silt, Sand and Gravel **														
322.4			8	SS	92										
9.4	Silty Sand to Sand														
	Dense to Very Dense		9	SS	63									0 73 24 2	
	*														
			10	SS	32									0 94 4 2	
318.6															
13.2	Heterogeneous mixture of Sand, Gravel, Silt and Clay		11	SS	77										
	- slightly cemented		12	SS	100									18 37 39 6	
	Very Dense														
	(Glacial Till)		13	SS	100 / 13cm										
313.4	*														
18.4	End of Borehole		14	SS	100 / 13cm										
	* Occasional cobbles and/or boulders														
	** Very Dense (Glacial Till)														

+³, x⁵: Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10



RECORD OF BOREHOLE No 2

METRIC

W P 352-85-01

LOCATION

STA: 9 + 978.8 °/s 0.8 m Rt.

ORIGINATED BY J.Y.

DIST 3

HWY Bleams Rd

BOREHOLE TYPE

Hollow Stem Auger - Washboring

COMPILED BY B.R.

DATUM Geodetic

DATE

85 10 29 / 30

CHECKED BY

SOIL PROFILE

SAMPLES

GROUND WATER
CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

20 40 60 80 100

SHEAR STRENGTH

○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL x LAB VANE

PLASTIC
LIMIT
W_p

NATURAL
MOISTURE
CONTENT
W

LIQUID
LIMIT
W_L

WATER CONTENT (%)

10 20 30

UNIT
WEIGHT
γ

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)
GR SA SI CL

330.7 Ground Surface

0.0 Sandy Silt to
Silty Clay
Trace Organics
Firm to Stiff
(slightly cohesive)

1 SS 11

2 SS 7

328.1 Sand Compact

3 SS 12

327.4 Sand and Gravel
with seams of Fine to
Medium
Sand
Dense

4 SS 22

5 SS 38

324.0 Mixture of Silt
Sand and Gravel
Very Dense
(Glacial Till)

6 SS 33

7 SS 90

322.1 Silty Sand to
Sandy Silt
Dense to
Very Dense

8 SS 71

9 SS 45

10 SS 83

11 SS 72

316.1 Heterogeneous
mixture of Silty Sand,
Gravel and Clay
Very Dense
(Glacial Till)

12 SS 70

13 SS 130 / 15cm

311.9 *
18.8 End of Borehole

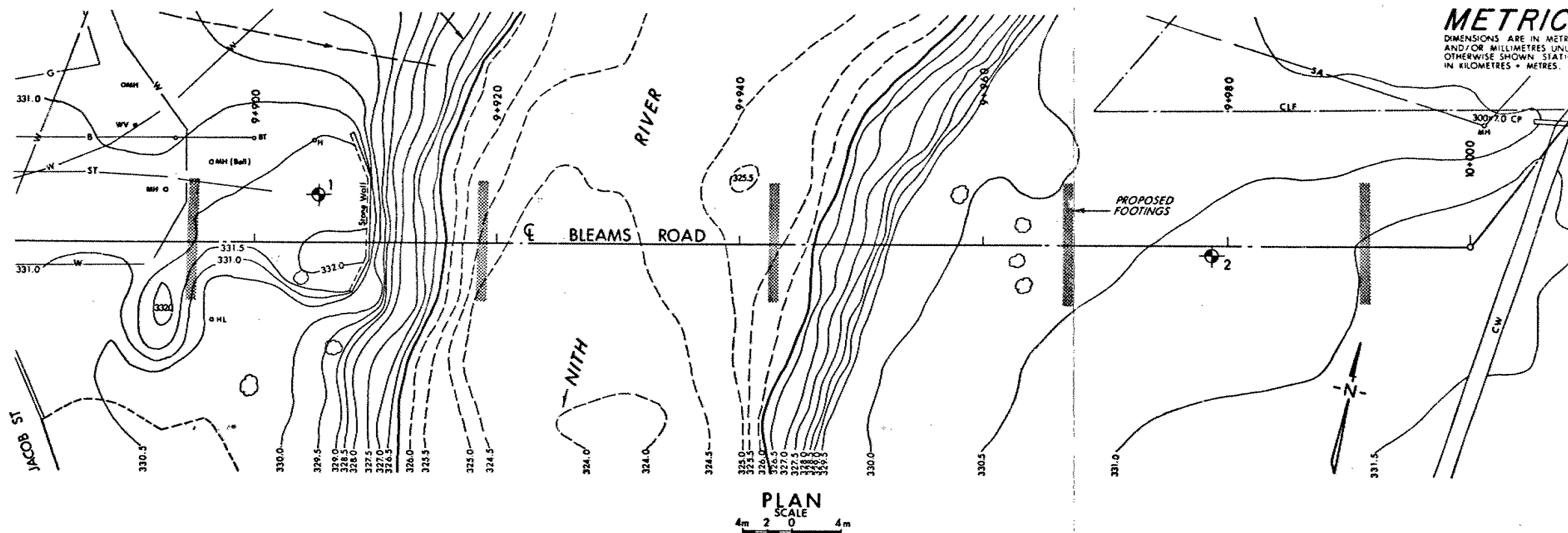
14 SS 160 / 15cm

Boulders
* Occasional Cobbles
and/or Boulders

+3, x5: Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION



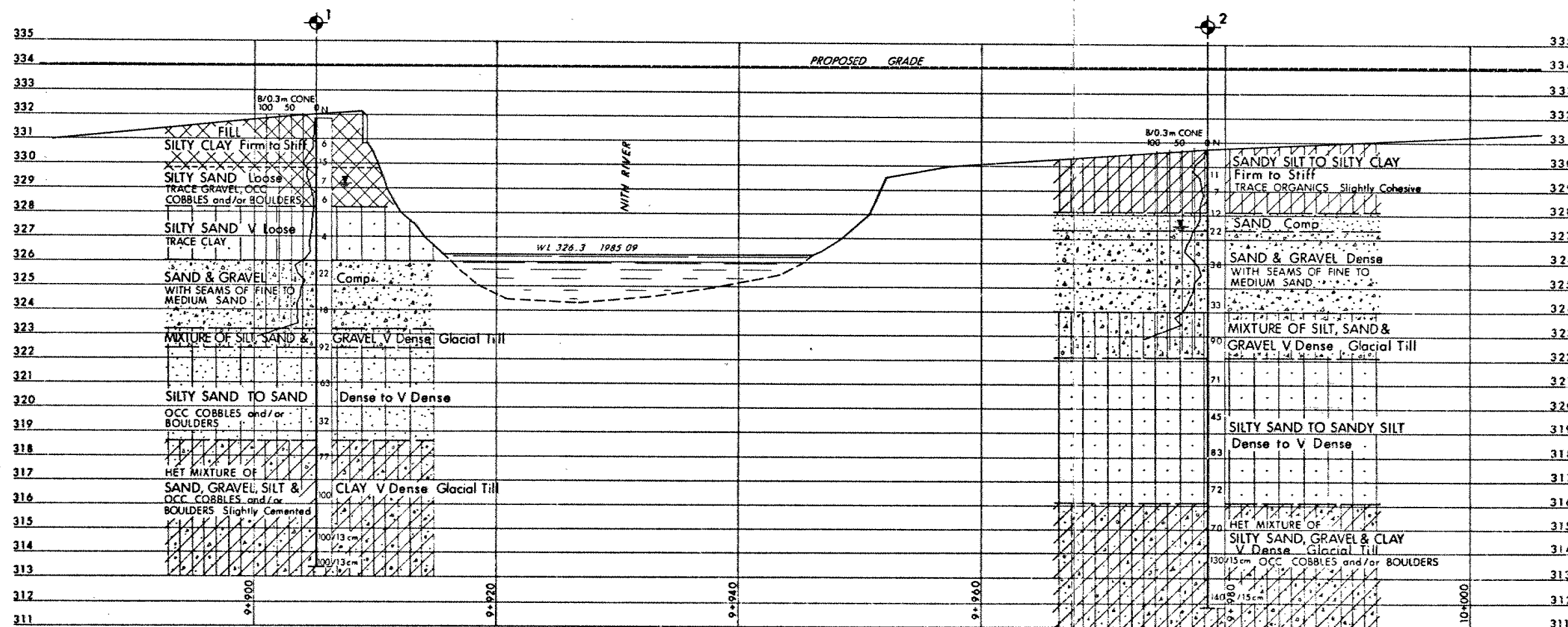
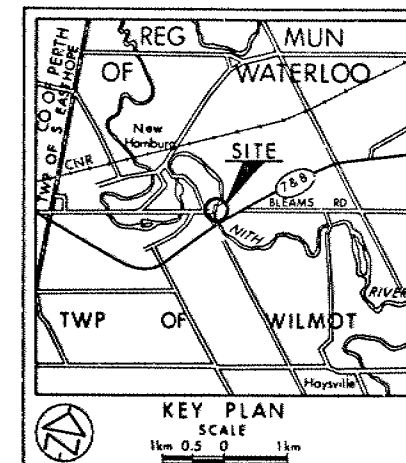
CONT No
WP No 352-85-01

NITH RIVER

BORE HOLE LOCATIONS & SOIL STRATA



SHEET



LEGEND

- ◆ Bore Hole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ⊕ Bore Hole & Cone
- N Blows/0.3m (Std Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- W.L. at time of investigation 85 10

No	ELEVATION	STATION	OFFSET
1	331.8	9+905.3	3.9 m Lt
2	330.7	9+978.8	0.8 m 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.

NOTE: The complete foundation investigation and design report for this project and other related documents may be examined at the Engineering Materials Office, Downsview. Information contained in this report and related documents is specifically excluded in accordance with the conditions of Section 102-2 of Form 100.

REV	DATE	BY	DESCRIPTION
1			

Geocres No 40P7-47

HWY No BLEAMS RD	DIST 3
SUBNO BR	CHECKED DATE 85 12 16 SITE 33-165-350
DRAWN 5/3	CHECKED DATE 85 12 16 DWG 3528501-A

REF NO E-10022-1 85 09