

90-03

PH-M-180

MINISTRY OF TRANSPORTATION - ONTARIO

Page 1 of 1		QUANTITIES - TEMPORARY INSTALLATION														W.P. No. 145-88-00 Contract No. 2000-0222		SHEET 30	
Location	Structure/Equipment No.	Offset (m) to CL of Structure/Equip't (Note 1)	Signal Head Facing Direction	From - To OR Station	Distance (m)	Temporary Electrical Work													
Sub - Totals Brought Forward:																			
Hwy. 11 at Lost River						1													
Sub - Totals Carried Forward:																			
TOTALS						100 %													
UNIT						LS													
ITEM No.						38													
Remarks:														Note: 1 When shown without *, offset is from centre or control line of roadway. When shown with *, offset is from edge of travelled pavement (EP).				CHKD. _____ APPR. _____ DATE _____	

Temporary Electrical Work - Hwy. 11 at Lost River

**W.P. No. 145-88-00**  
**Contract No. 2000-0222**

SHEET  
12

[illegible]

# INDEX

**W.P. No. 145-88-00**

**Contract No. 2000-0222**

[illegible][illegible]

[illegible]



[illegible]

Remarks:

CHKD. \_\_\_\_\_  
APPR. \_\_\_\_\_  
DATE \_\_\_\_\_

[illegible]

## Lost River Bridge

[illegible]

PH-D-502

Traffic Control / SBGR Temp Conc Barrier

CHKD. \_\_\_\_\_  
APPR. \_\_\_\_\_  
DATE \_\_\_\_\_

QUANTITIES - MISCELLANEOUS 1

W.P. No. 145-88-00  
Contract No. 2000-0222

SHEET  
20

90-02

PH-D-502

MINISTRY OF TRANSPORTATION - ONTARIO

Location and Position	Pavement Marking [Solid] [White 10cm]	Pavement Marking [3 - 3] [White 10cm]	Pavement Marking [Double Solid] [Yellow, 10cm]		Pavement Marking, Durable [Solid White 10 cm]		Pavement Marking, Temporary [Solid White 10cm]	Pavement Marking, Temporary [3-3 White 10cm]	Pavement Marking, Temporary [Solid Double Yellow]				References
Sub - Totals Brought Forward:													
Highway 11													
15+500 - 16+175 Rt EP	675												
15+500 - 15+564 CL			128										
15+582 - 16+175 CL			1186										
15+500 Lt - Side Road EP	80												
15+592 - 15+655 Lt Right Hand Turn Lane	610												
Side Road - 16+175 Lt EP		32											
Side Road CL			24										
Side Road Stop Bar ( 60cm )					48								
Highway 11 Detour													
9+997 - 10+308 Rt EP							311						
9+997 - 10+257 CL									520				
10+257 Rt Stop Bar (60cm)					21								
9+997 - Side Road EP							80						
Side Road CL									24				
Side Road - 10+308 Lt EP							356						
Side Road Stop Bar (60cm)					48								
10+088 - 10+140 Lt Right Turn Lane								26					
Sub - Totals Carried Forward:	1365	32	1338		117		747	26	544				
	(P)	(M)	(P)		(P)		(P)	(M)	(P)				
TOTALS													
UNIT	m	m	m		m		m	m	m				
ITEM No.		23			24			25					
Reference													

CHKD. \_\_\_\_\_  
APPR. \_\_\_\_\_  
DATE \_\_\_\_\_

Pavement Markings

Contract No. 2000-0222												SHEET 19		
Station to Station Location and Position		Removal of Pipe Culverts and Sewers [Culverts]		Removal of Steel Beam Guide Rail [Single Rail] [Without Channel]		References	Station to Station Location and Position		Rip Rap	(+ Geotextile) [Class II], [Non Woven], [75um], [1 mm]		Rock Protection [600mm]	References	
Sub - Totals Brought Forward:						Sub - Totals Brought Forward:								
Highway 11						Highway 11								
15+738 Ent. Rt						15+800 - 15+825								
15+748 Ent. Lt						15+860 - 15+900								
10+238 Ent. Rt (with Detour Removal)						15+900 Lt								
10+240 Ent. Lt (with Detour Removal)						15+900 Lt								
15+748 - 15+814 Rt						15+900 Rt								
15+770 - 15+814 Lt						15+900 Rt								
15+882 - 16+020 Lt						Detour								
15+882 - 15+925 Rt						10+303 Rt								
						10+303 Rt								
						10+305 Lt								
						10+305 Lt								
						10+380 Lt								
						10+380 Lt								
						10+380 Rt								
						10+380 Rt								



[illegible]

[illegible]

### Pipe Culverts

1. CSP Pipe Subdrain Outlets to include Rodent Gates

CHKD. \_\_\_\_\_  
APPR. \_\_\_\_\_  
DATE \_\_\_\_\_

QUANTITIES - MISCELLANEOUS 1

W.P. No. 145-88-00  
Contract No. 2000-0222

SHEET  
15

90-02

PH-D-502

MINISTRY OF TRANSPORTATION - ONTARIO

Location and Position	Asphalt Curb and Gutter [601.01] [Straight]	Asphalt Curb and Gutter [601.010 A] [Straight]	Concrete Curb and Gutter [600.01] [Straight]	Concrete Curb and Gutter [608.01] [Straight]				Asphalt Gutter Outlets	Concrete Gutter Outlets [605.03]				References
Sub - Totals Brought Forward:													
Highway 11													
Temporary													
15+789 - 15+793 Lt		4											
15+789 - 15+793 Rt		4											
15+793 - 15+803 Lt	10												
15+793 - 15+803 Rt	10												
15+889 - 15+899 Lt	10												
15+889 - 15+899 Rt	10												
15+900 Lt							1						
15+900 Rt							1						
Permanent (After August 6, 2002)													
15+789 - 15+793 Lt				4									
15+789 - 15+793 Rt				4									
15+793 - 15+803 Lt			10										
15+793 - 15+803 Rt			10										
15+889 - 15+899 Lt			10										
15+889 - 15+899 Rt			10										
15+900 Lt								1					
15+900 Rt								1					
Sub - Totals Carried Forward:													
TOTALS	(P) 40	(M) 8	(P) 40	(M) 8				(P) 2	(P) 2				
UNIT	m	m	m	m				each	each				
ITEM No.		5		11				6	12				
Reference													

CHKD. \_\_\_\_\_  
APPR. \_\_\_\_\_  
DATE \_\_\_\_\_

Curb and Gutter

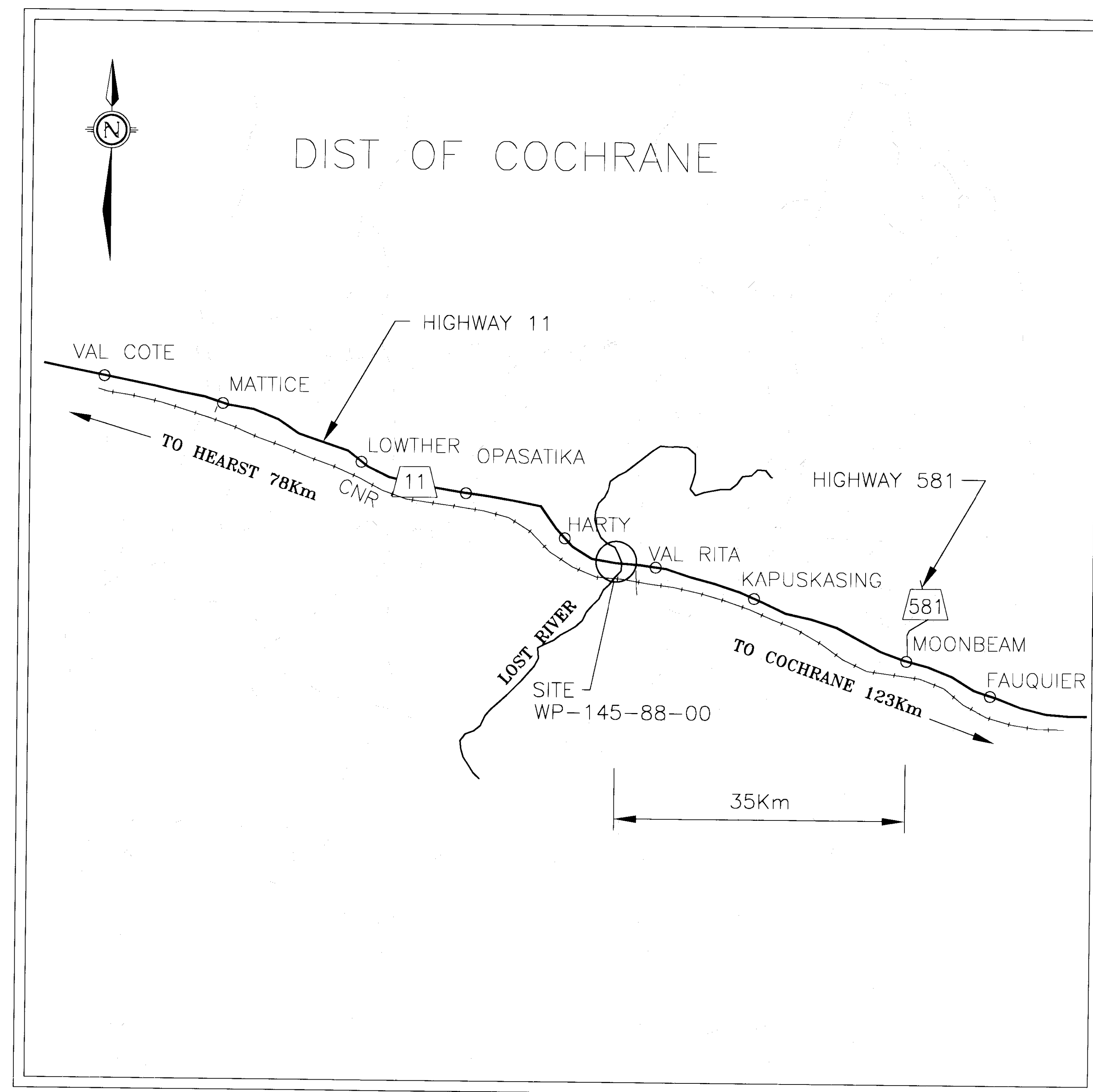
**W.P. No. 145-88-00**  
**Contract No. 2000-0222**

Description	Hot Mix HL 3 [40mm Surface]	Hot Mix HL 3 [40mm Upper Binder]	Hot Mix HL 3 [50mm Lower Binder]		Hot Mix HL 4 [Surface]	Hot Mix HL 4 [Padding]					Granular A [Base]	Granular A [Shouldering]		Granular B, Type 1 [Sub Base]			References
Sub - Totals Brought Forward:																	
Highway 11																	
15+500 - 16+175	458	458	568								1626			4451			
Shoulders	38	38										973					
Backfill														6914			
Private Entrances											299			412			
Lost River Structure	99	99									2665						
Detour	392	502									2051	276		3138			
Paved Shoulders	211	211															
Private Entrances											91			202			
Detour Backfill														13196			
Detour Sping 2001 Regrading to Final Profile Grade											350						
Granular B for Rock Protection														901			
Repaving for Settlement (Sept 2002)					80	98						30					
Sub - Totals Carried Forward:																	
TOTALS	1198	1308	568		80	98					7082	1279					
UNIT	t	t	t		t	t					t	t		t			
ITEM No.		7				8						9		10			
Reference																	
Remarks:																	

CHKD. \_\_\_\_\_  
 APPR. \_\_\_\_\_  
 DATE \_\_\_\_/\_\_\_\_/\_\_\_\_

Hot Mix and Granular

### Annular Sealing



Key Plan

WP No 310-85-02  
145-88-00 Contract No 2000-0222

Work of GRADING, DRAINAGE, GRANULAR BASE, HOT MIX PAVING, DETOUR  
PARTIAL ILLUMINATION, SIGNALS, NEW BRIDGE STRUCTURE AND  
TEMPORARY ACROW BRIDGE.

Hwy No 11 District NEW LISKEARD / COCHRANE

Location: BETWEEN HARTY AND VAL RITA GEOGRAPHIC TWP. OF WILLIAMSON  
35Km WEST OF HWY 581

Length 0.7 km.

Reference Plans \_\_\_\_\_

April 20, 2000  
 Date

[Signature]  
 Manager, Engineering P. Eng.

April 20, 2000  
 Date

[Signature]  
 Regional Director P. Eng.

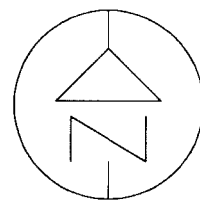
**W.P. No. 145-88-00**  
**Contract No. 2000-0222**

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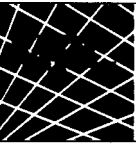
METRIC

PLATE No PLATE  
CONT No2000-0222  
WP No 145-88-00



REMOVAL  
STA 15+000 TO STA 16+200  
Survey Revised

SHEET  
1

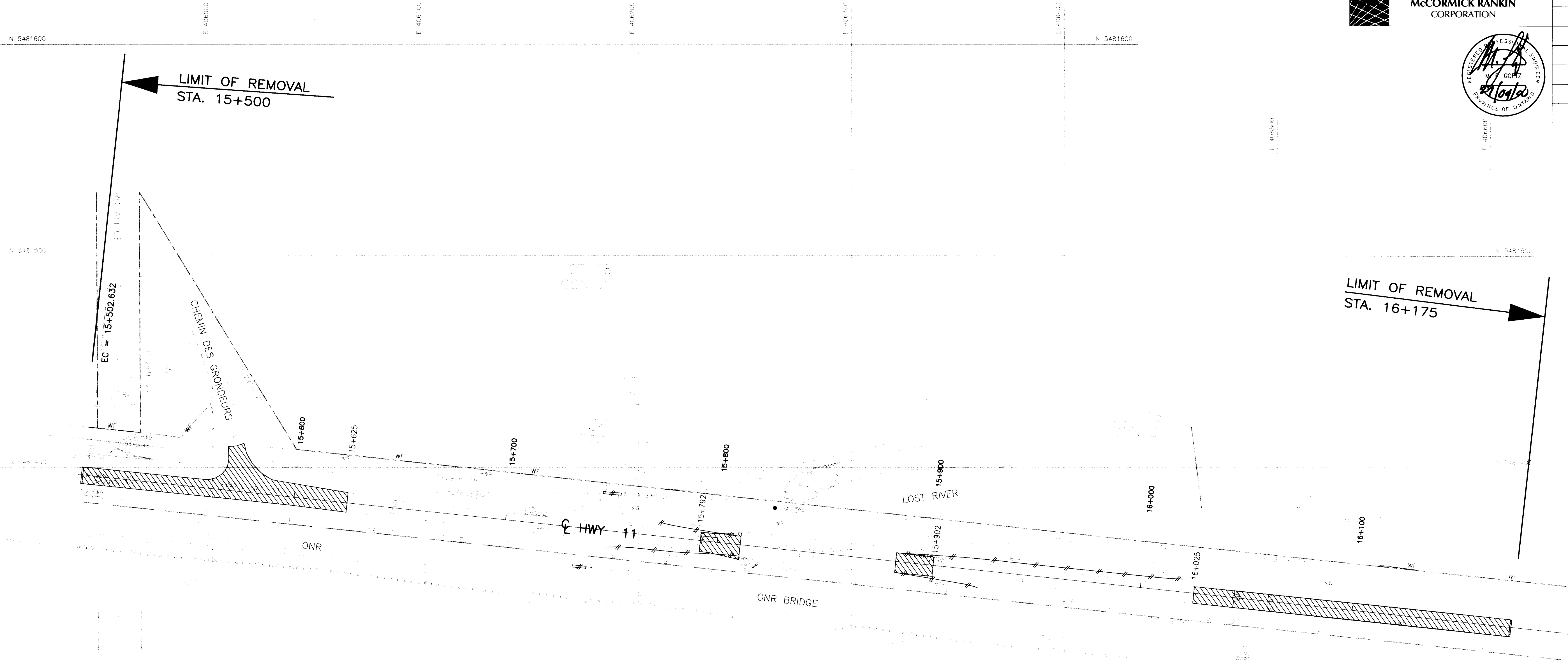


MCCORMICK RANKIN  
CORPORATION



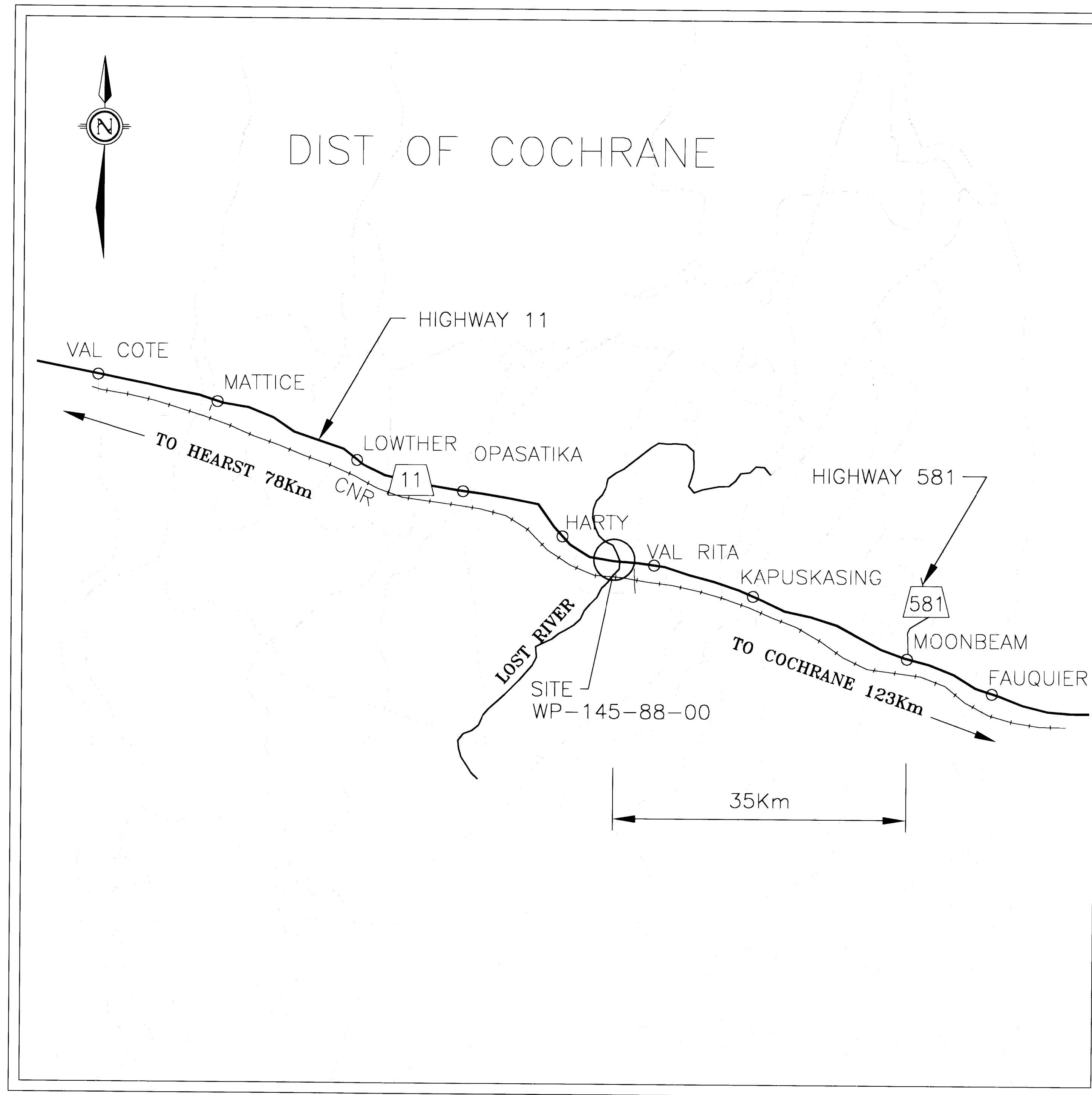
REMOVAL OF ASPHALT FULL DEPTH

DIST COCHRANE  
GEOG TWP WILLIAMSON



SCALE





Key Plan

WP No 310-85-02 Contract No 2000-0222  
145-88-00  
 Work of GRADING, DRAINAGE, GRANULAR BASE, HOT MIX PAVING, DETOUR  
PARTIAL ILLUMINATION, SIGNALS, NEW BRIDGE STRUCTURE AND  
TEMPORARY ACROW BRIDGE.  
 Hwy No 11 District NEW LISKEARD / COCHRANE  
 Location: BETWEEN HARTY AND VAL RITA GEOGRAPHIC TWP. OF WILLIAMSON  
35Km WEST OF HWY 581  
 Length 0.7 km.  
 Reference Plans \_\_\_\_\_

April 20, 2000  
Date

R. J. A. P. Eng.  
Manager, Engineering

April 20, 2000  
Date

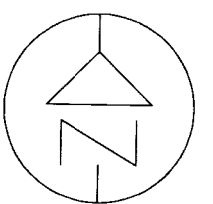
D. E. V. C. P. Eng.  
Regional Director

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DRAWN BY: S.C. MODIFIED: 00/04/27 12:25:23  
MINISTRY OF TRANSPORTATION, ONTARIO  
PR-D-707 89-05

DIST COCHRANE  
GEOG TWP WILLIAMSON

METRIC

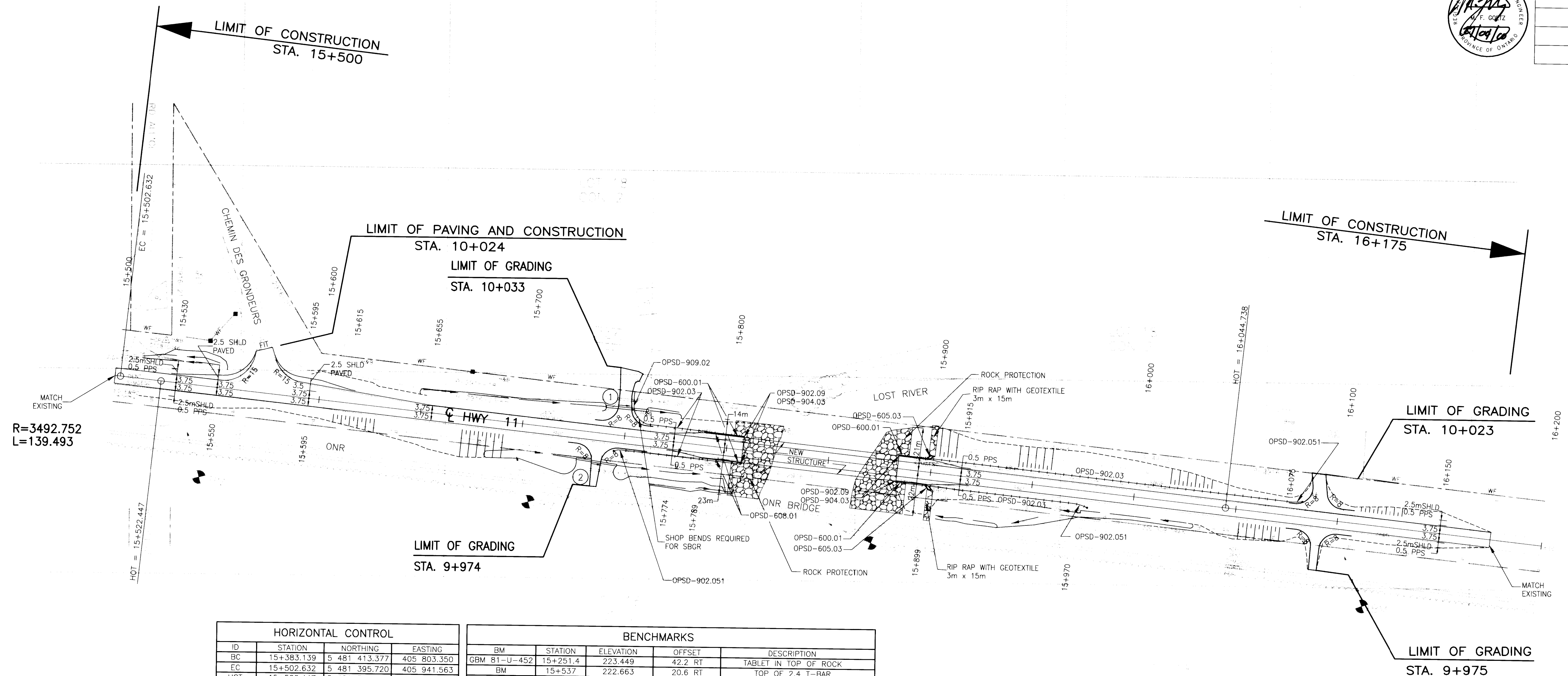
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CONT No2000-0222  
WP No 145-88-00



NEW CONSTRUCTION  
STA 15+500 TO STA 16+200  
Survey SURVEYED Revised REVISED

SHEET  
2

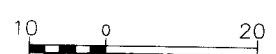
McCORMICK RANKIN  
CORPORATION



HORIZONTAL CONTROL			
ID	STATION	NORTHING	EASTING
BC	15+383.139	5 481 413.377	405 803.350
EC	15+502.632	5 481 395.720	405 941.563
HOT	15+522.447	5 481 393.604	405 981.265
HOT	16+044.738	5 481 337.845	406 480.571
BC	16+256.126	5 481 315.277	406 690.751

BENCHMARKS				
BM	STATION	ELEVATION	OFFSET	DESCRIPTION
GBM 81-U-452	15+251.4	223.449	42.2 RT	TABLET IN TOP OF ROCK
BM	15+537	222.663	20.6 RT	TOP OF 2.4 T-BAR
BM	15+697.8	221.651	13.7 RT	TOP OF 2.4 T-BAR
GBM 1185	15+850.758	221.209	29.87 RT	BOLT IN E. CONC. ABUT. CNR BRIDGE
BM	16+104	222.418	14.1	TOP OF 2.4 T-BAR

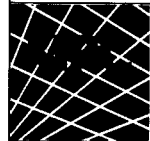
SCALE



METRIC

PLATE No PLATE  
CONT No2000-0222  
WP No 145-88-00

PROFILE  
STA 15+510 TO STA 16+150  
Survey 1995/11 Revised REVISED

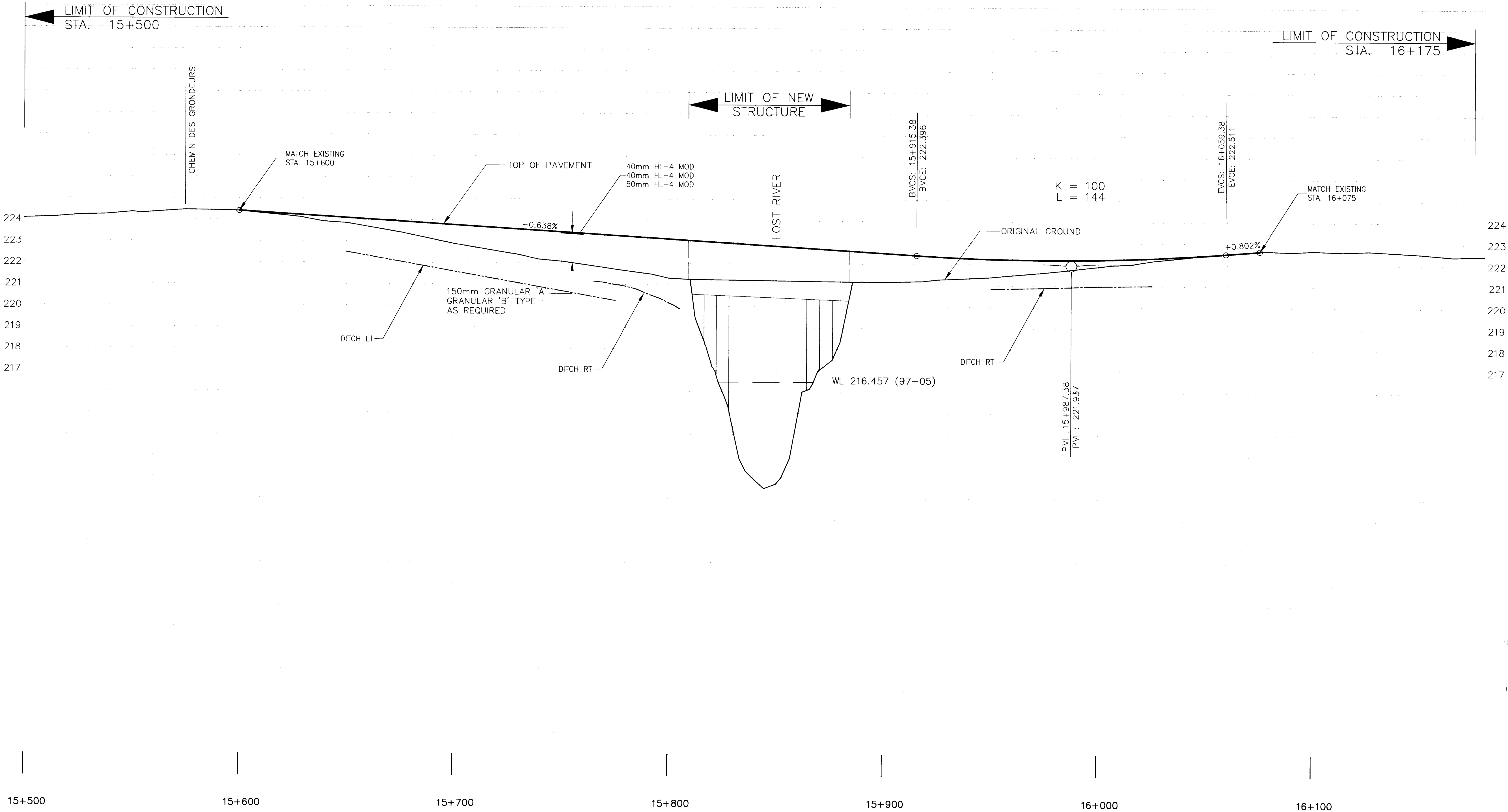


McCORMICK RANKIN  
CORPORATION

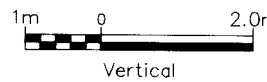


SHEET  
3

McCormick Rankin Corporation



SCALES



- LEGEND
- TEMPORARY CONCRETE BARRIER OPSD 920.012
  - CONSTRUCTION ACCESS
  - TEMPORARY BIDIRECTIONAL C.A.T.T. M.T.O.D. 951.210
  - NEW PAVEMENT FOR DETOUR
  - CROSS FALL CORRECTION FOR DETOUR SUPERELEVATION
  - STRAW BALE FLOW CHECK
  - SILT FENCE BARRIER

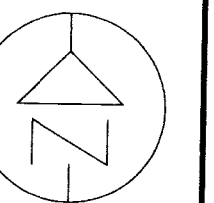
DIST COCHRANE  
GEOG TWP WILLIAMSON

METRIC

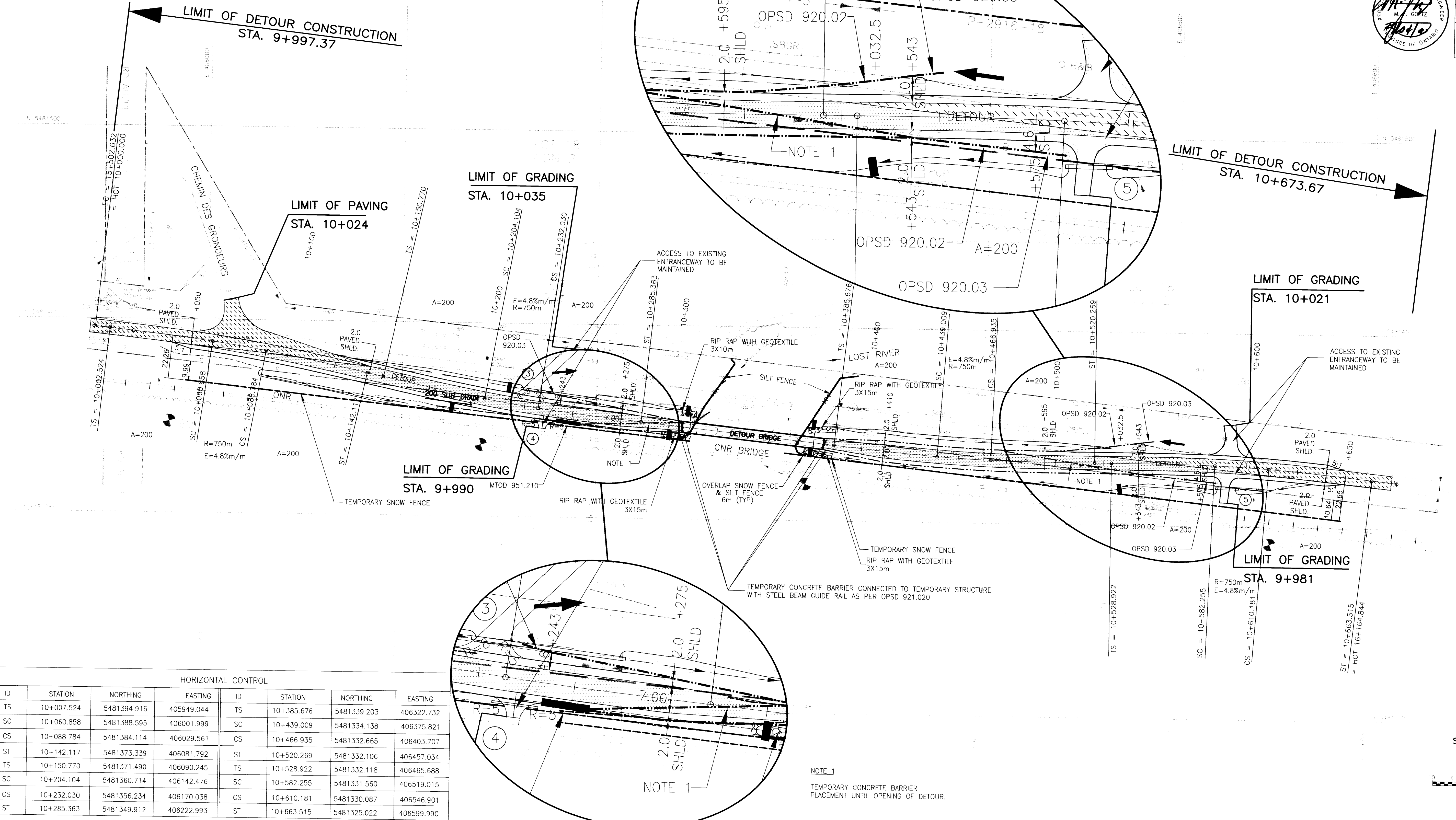
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CONT No2000-0222  
WP No 145-88-00

DETOUR  
STA 9+997.37 TO STA 10+673.67  
Survey Revised

McCORMICK RANKIN  
CORPORATION



SHEET  
4



SCALE

10 0 20



METRIC

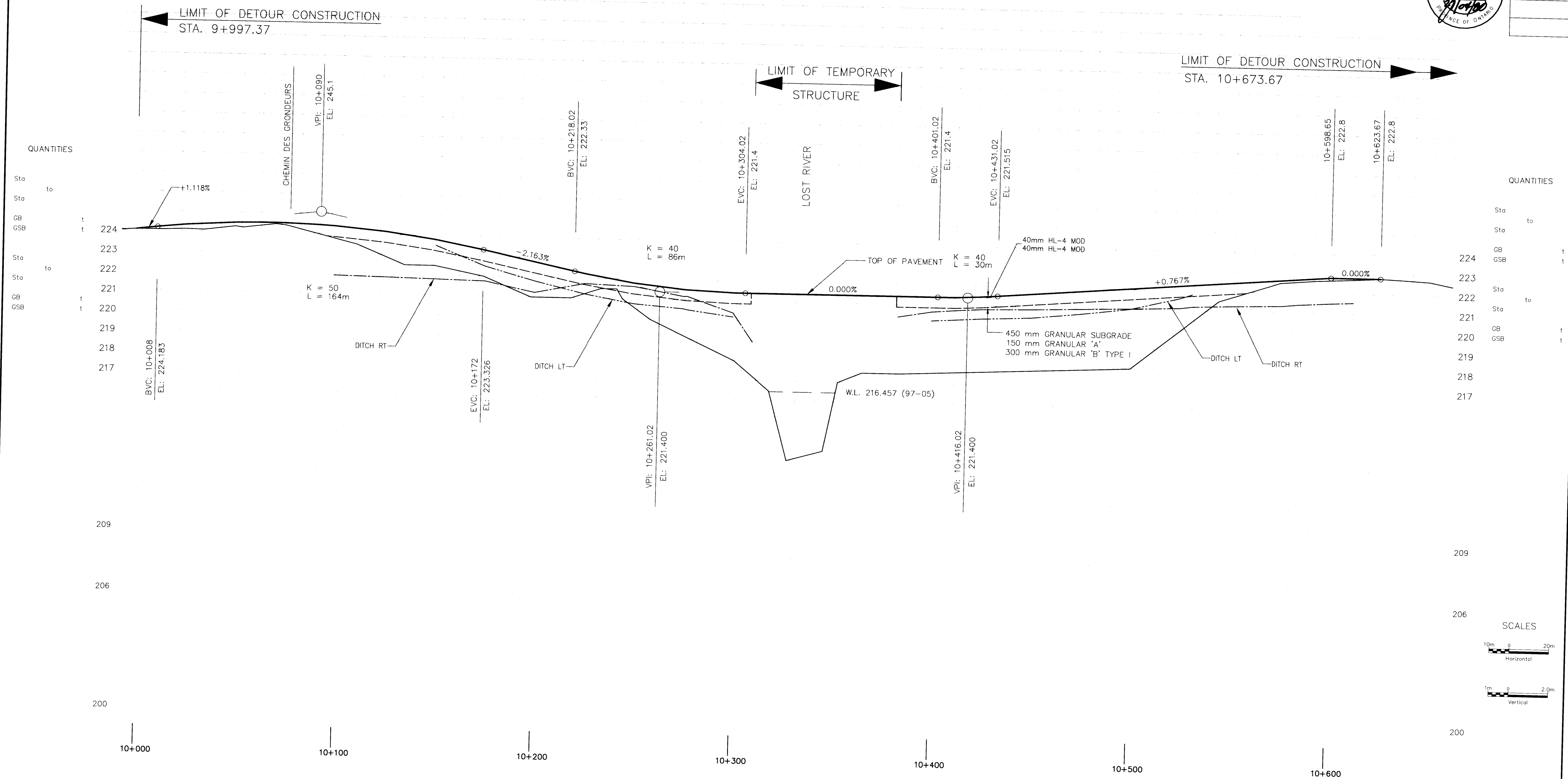
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CONT No 2000-0222  
WP No 145-88-00

DETOUR-PROFILE

STA 9+997.37 TO STA 10+697.37

Survey 1995/11 Revised REVISED

**McCORMICK RANKIN**  
CORPORATION



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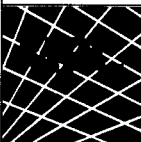
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PR-C-107 08-05  
MINISTRY OF TRANSPORTATION, ONTARIO

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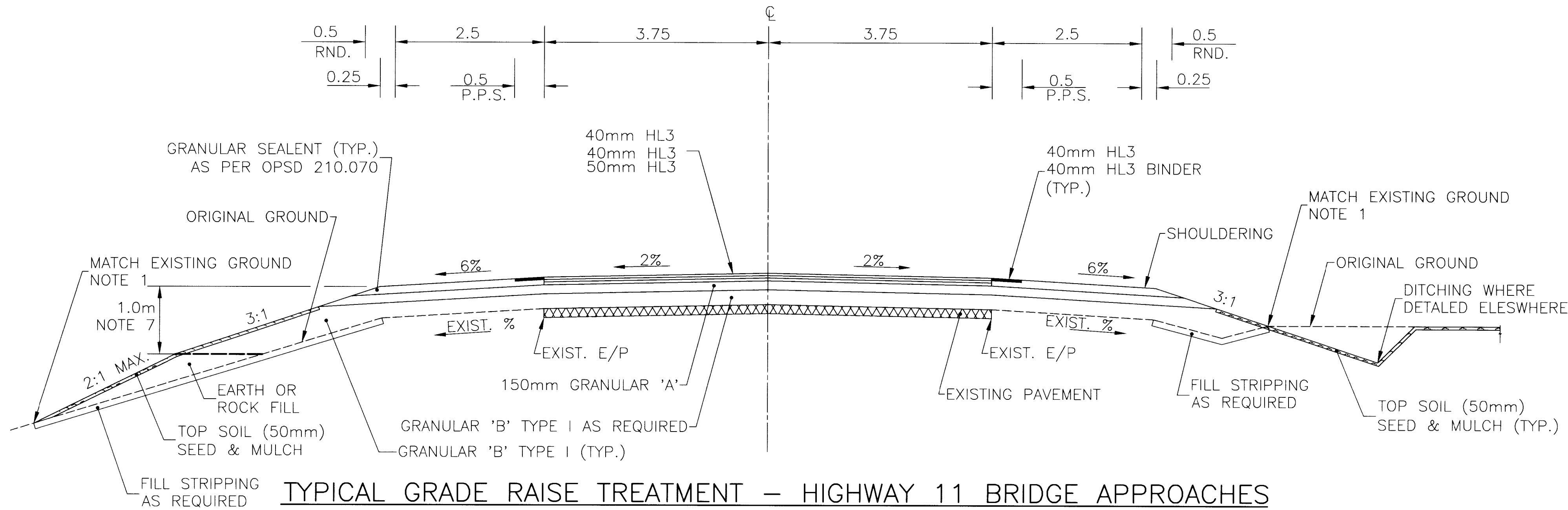
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CONT. No2000-0222  
WP No 145-88-00

PAVEMENT DETAILS  
STA TO STA  
Survey Revised



MCCORMICK RANKIN  
CORPORATION

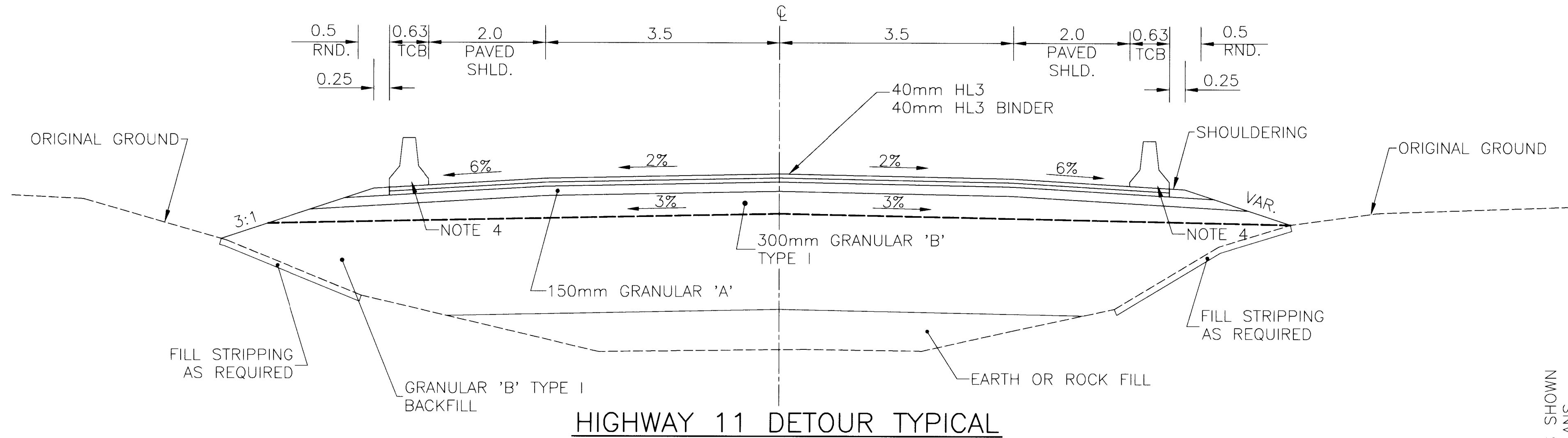
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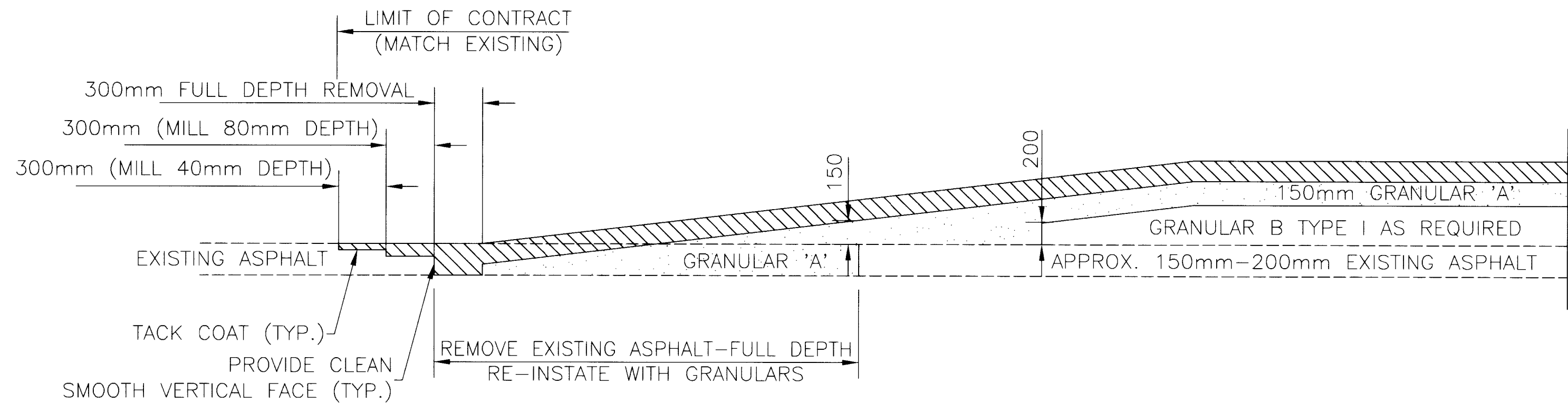
TYPICAL GRADE RAISE TREATMENT - HIGHWAY 11 BRIDGE APPROACHES

NOTES:

1. REINSTATE FORESLOPE AND DITCH WITH TOPSOIL 50mm AND SEED/MULCH
2. REFER TO DESIGN CROSS SECTIONS FOR HORIZONTAL CURVE TREATMENTS.
3. CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE.
4. ENSURE DRAINAGE UNDER PRECAST CONCRETE BARRIER IS MAINTAINABLE.
5. DETOUR TO BE GRADED WITH TOP SOIL AND SEED & MULCH AFTER REMOVAL.
6. ALL MILLED SURFACES ARE TO BE TACK COATED.
7. 1.0m TO BREAK POINT OF 3:1 TO 2:1 MEASURED FROM ROUNDING.

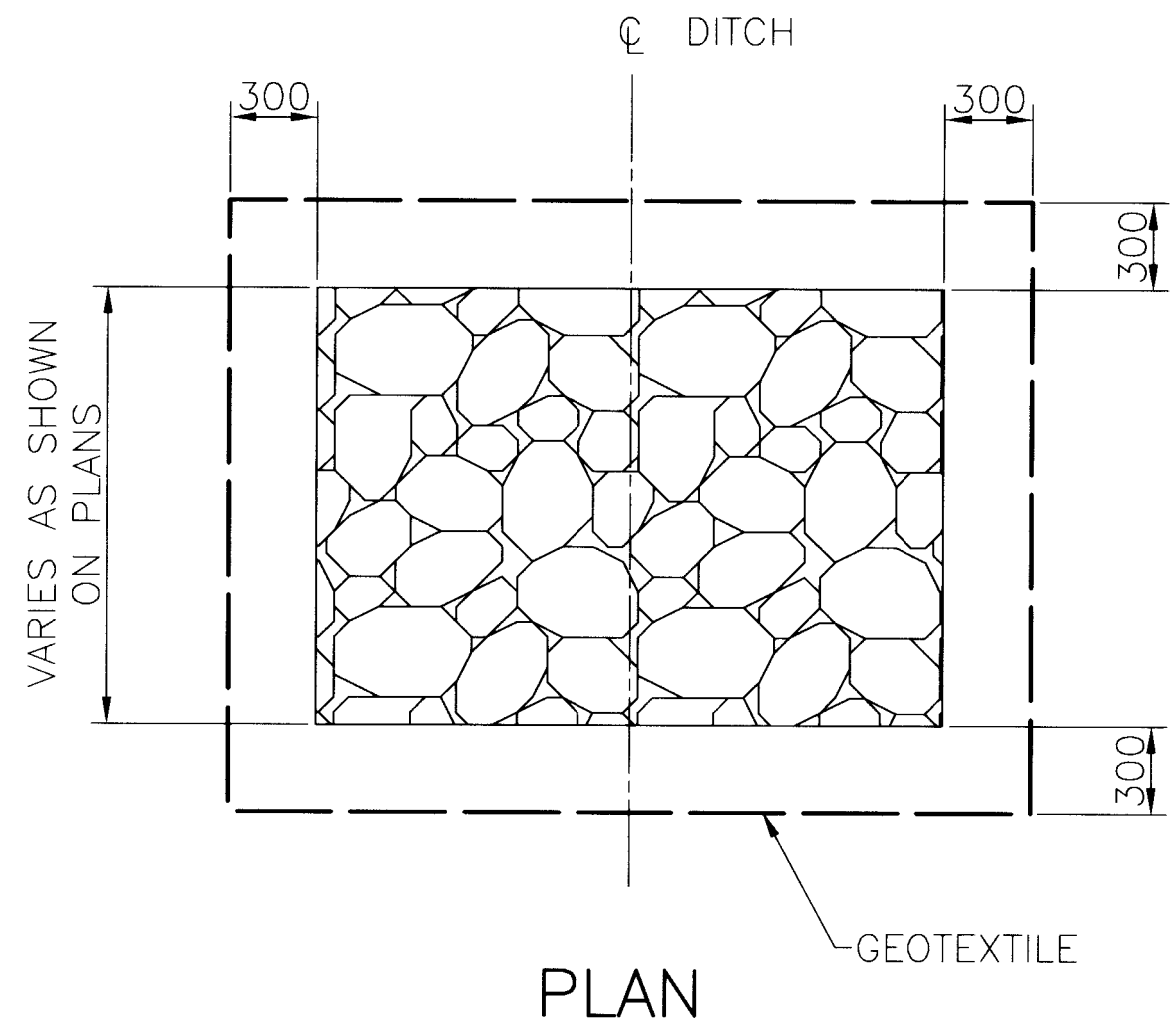


HIGHWAY 11 DETOUR TYPICAL

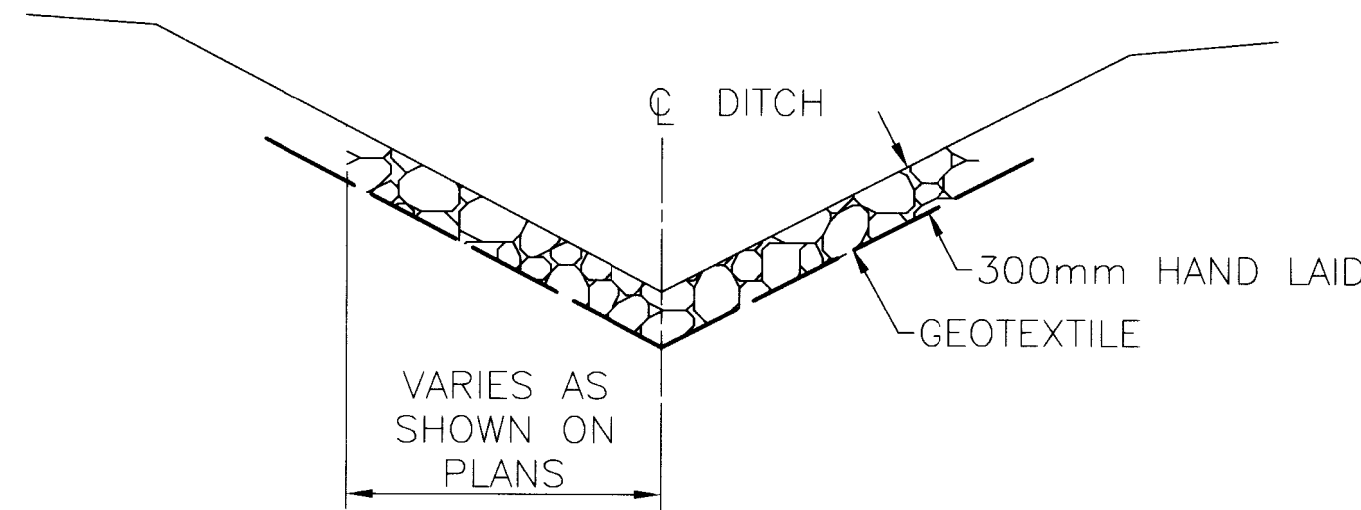


TYPICAL TRANSITION DETAIL AT EAST AND WEST CONTRACT LIMITS

N.T.S.



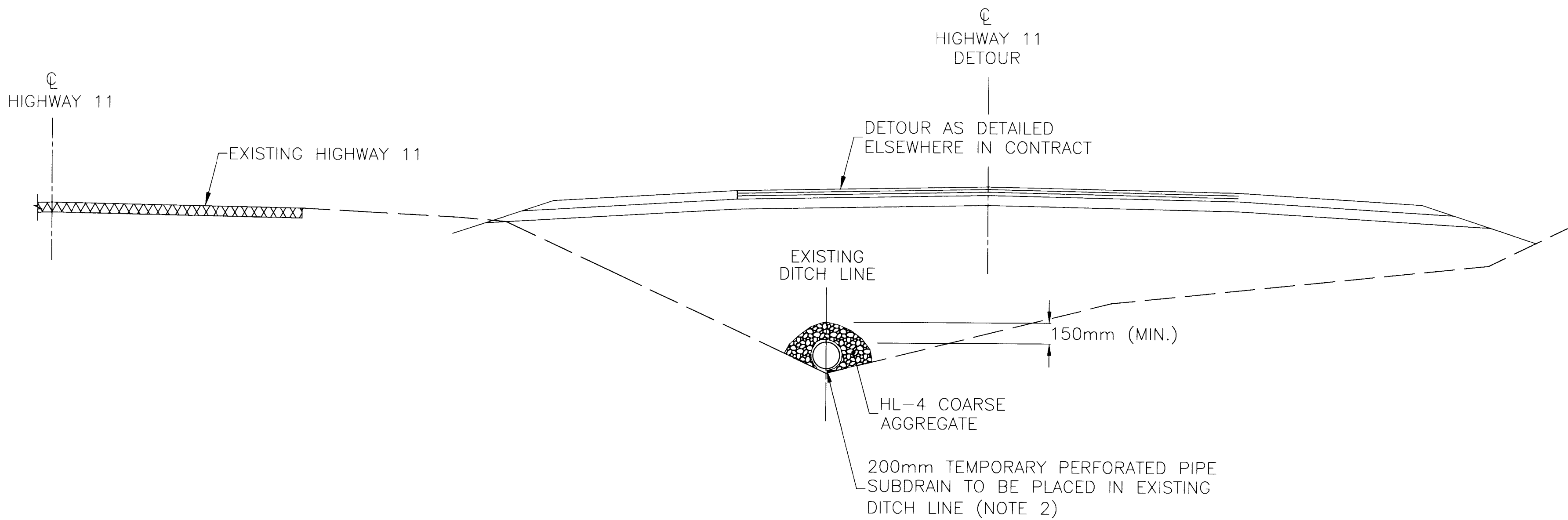
PLAN



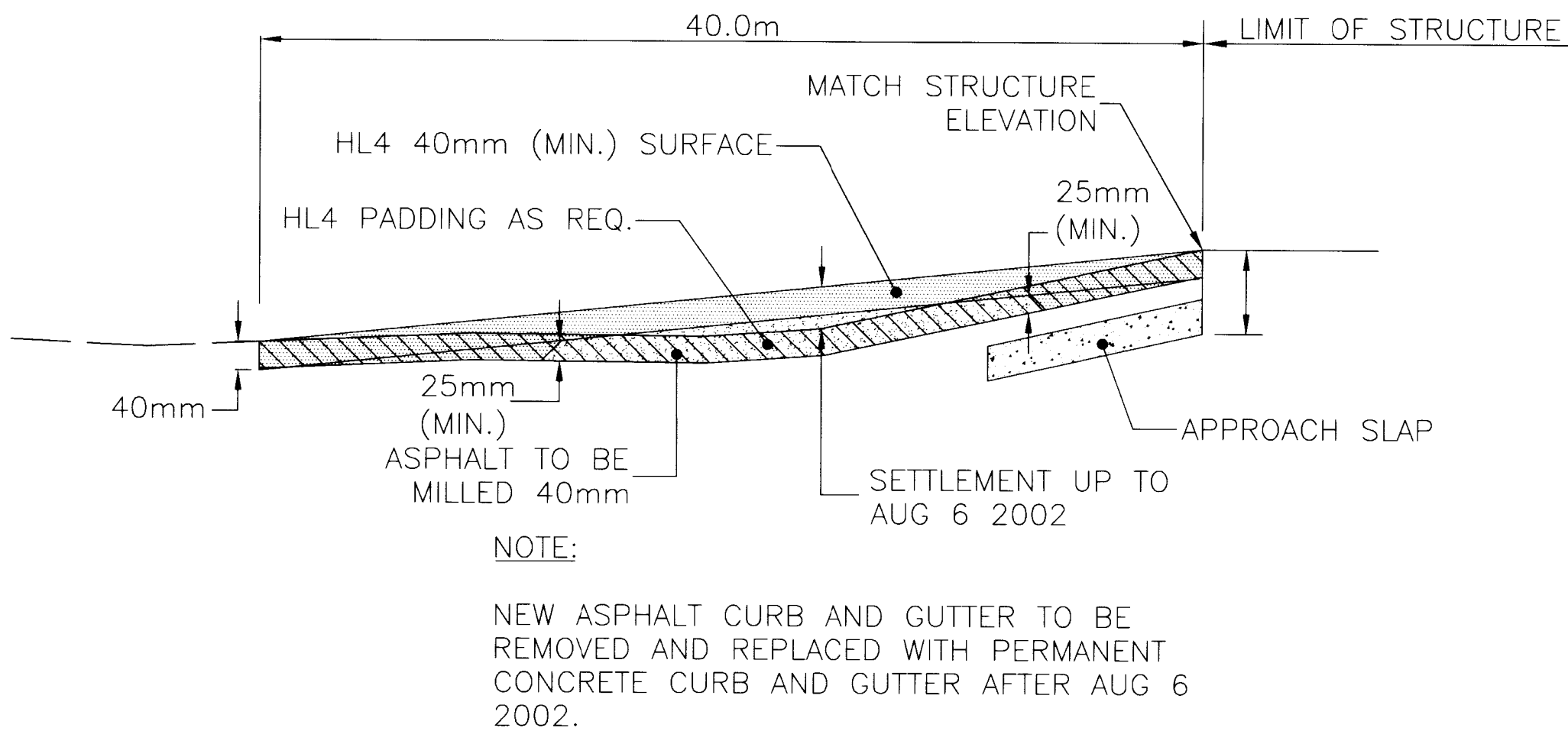
TYP. RIP RAP TREATMENT



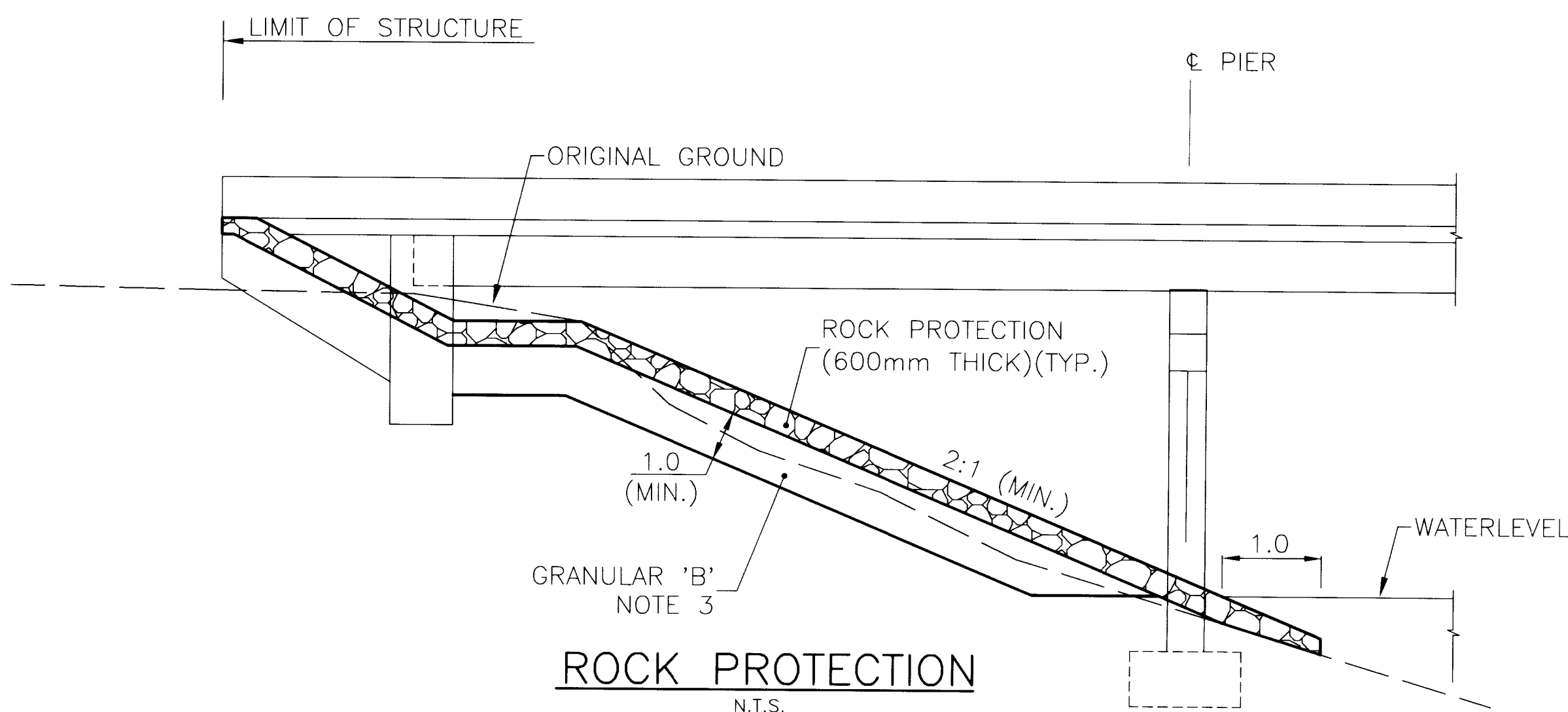
- NOTES:
- 1. NEW CONSTRUCTION WITHIN LIMITS SHOWN SHALL NOT BE CONSTRUCTED MORE THAN 14 CALENDAR DAYS PRIOR TO TRANSFERRING TRAFFIC FROM THE DETOUR BACK ONTO THE HIGHWAY 11 FINAL ALIGNMENT.
  - 2. SUBDRAIN TO BE REMOVED WITH FINAL GRADING OF HIGHWAY 11.
  - 3. TO BE PLACED BELOW ROCK PROTECTION IN FRONT OF ABUTMENTS WITHIN LIMITS OF ABUTMENTS ONLY.



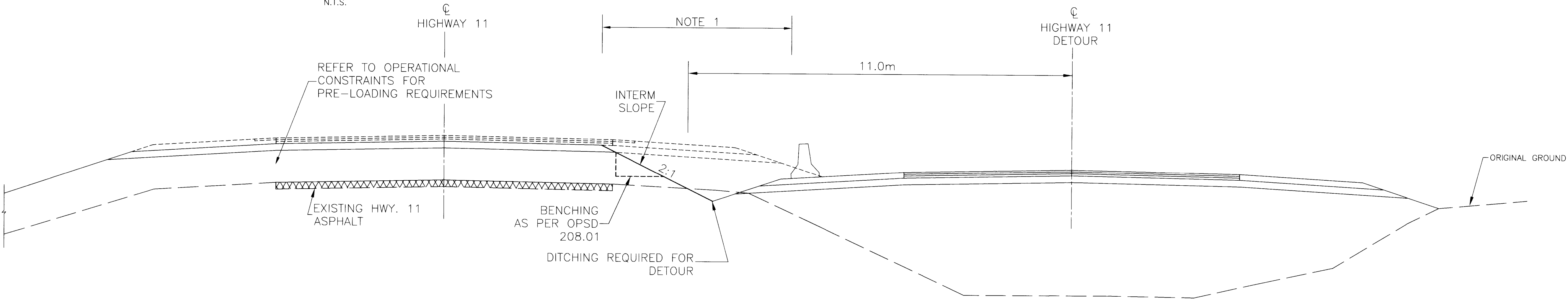
TEMPORARY SUBDRAIN  
STA. 10+180 TO STA. 10+310  
N.T.S.



STRUCTURE APPROACH PAVEMENT  
SETTLEMENT DETAIL  
N.T.S.



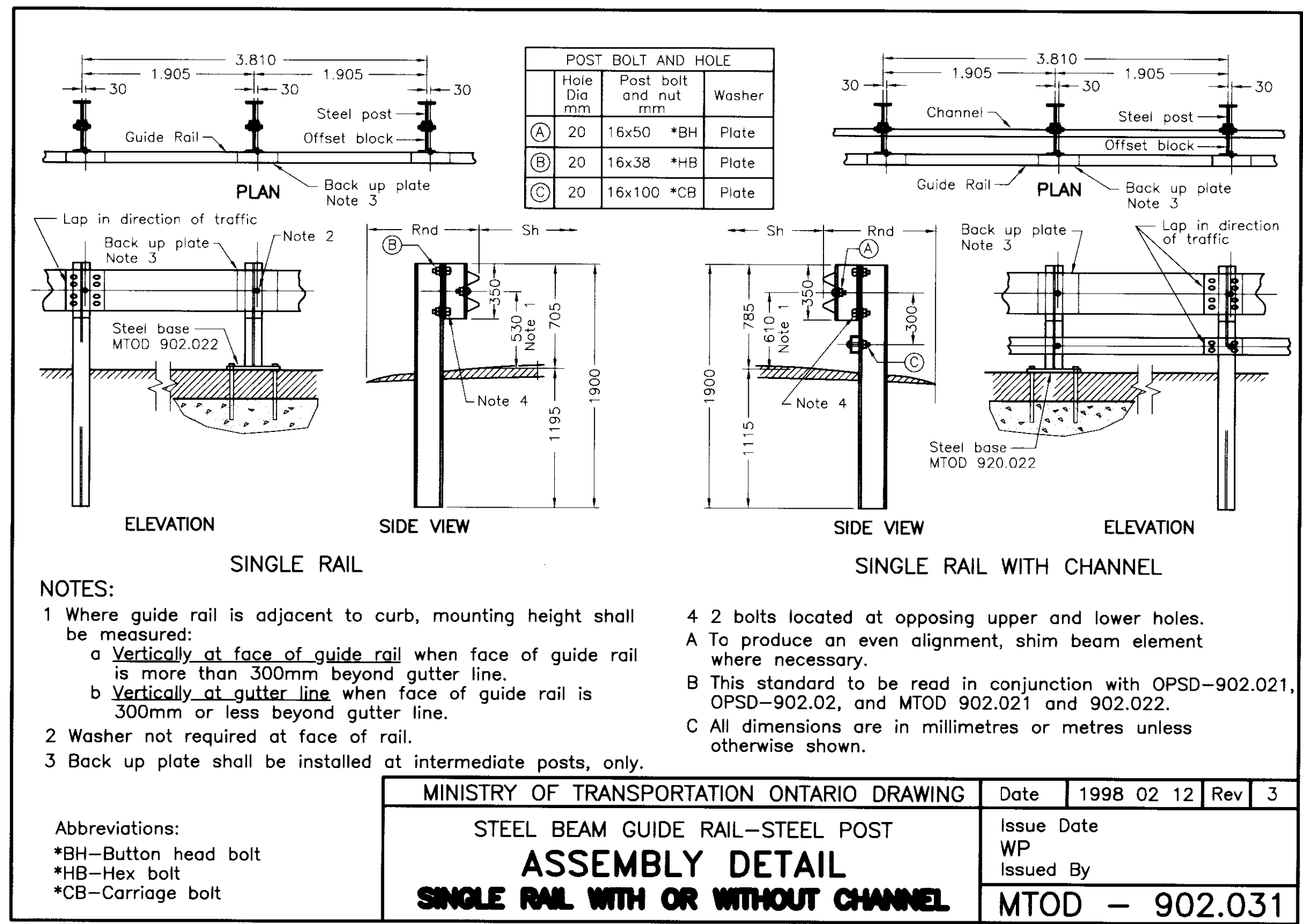
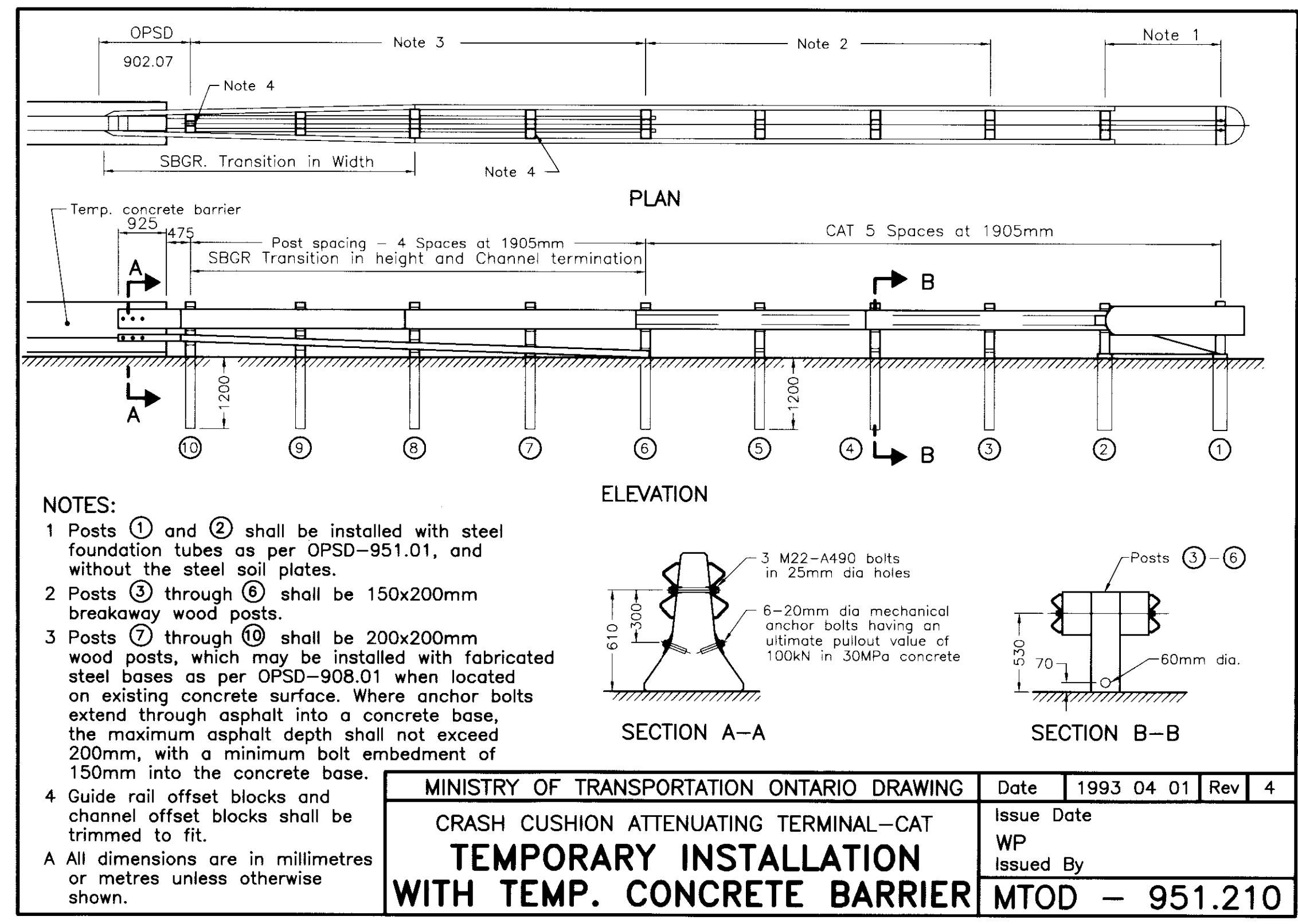
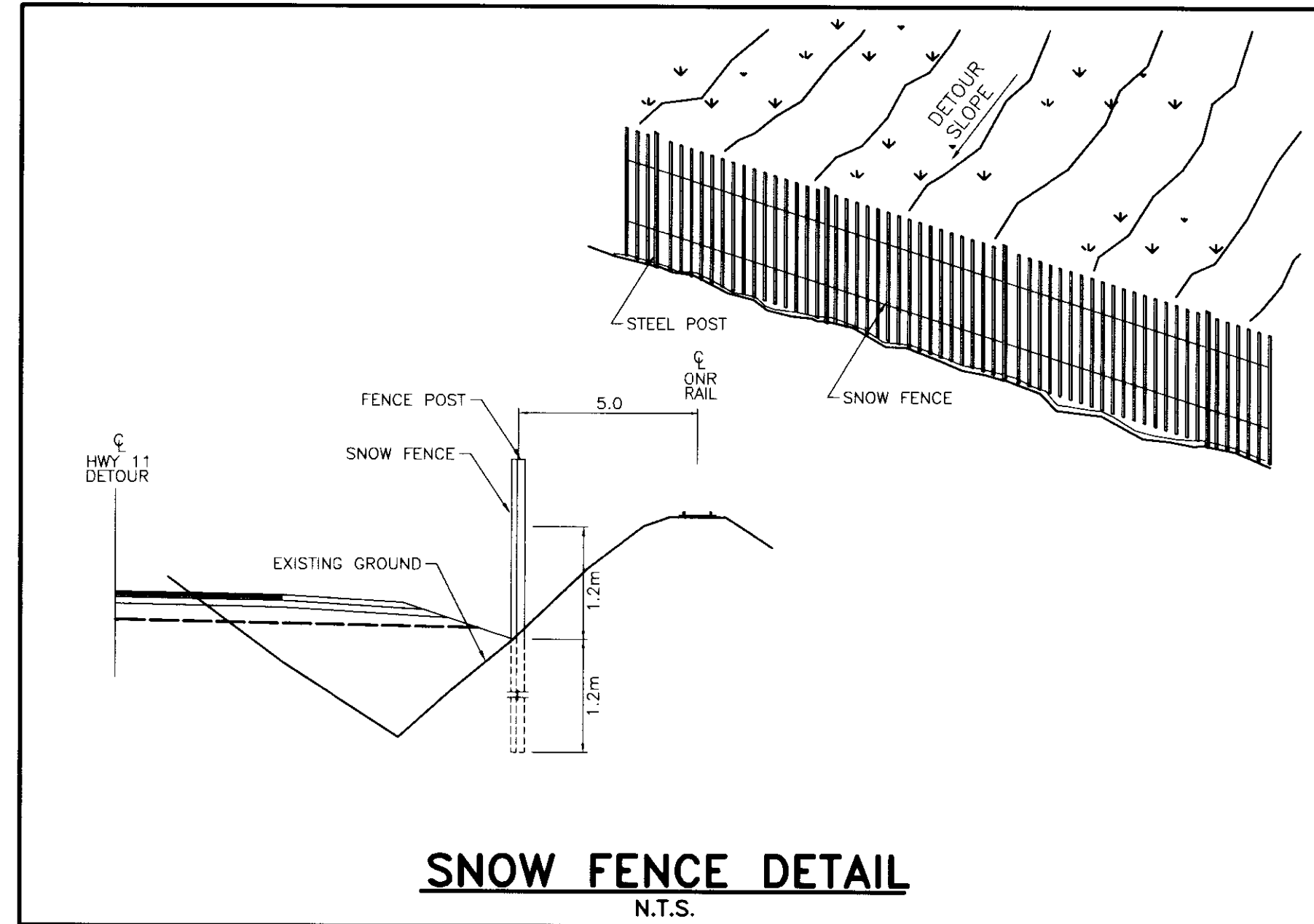
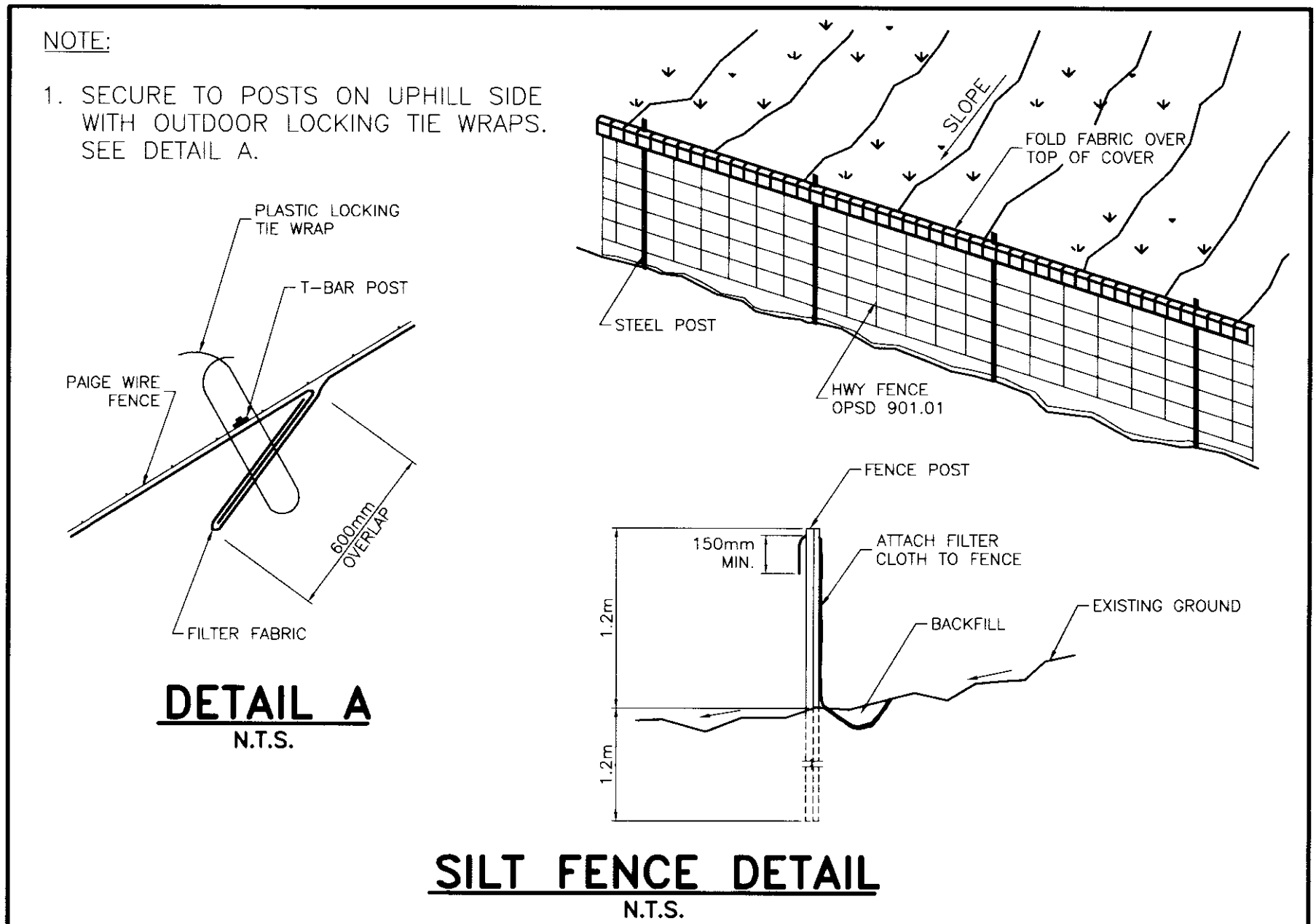
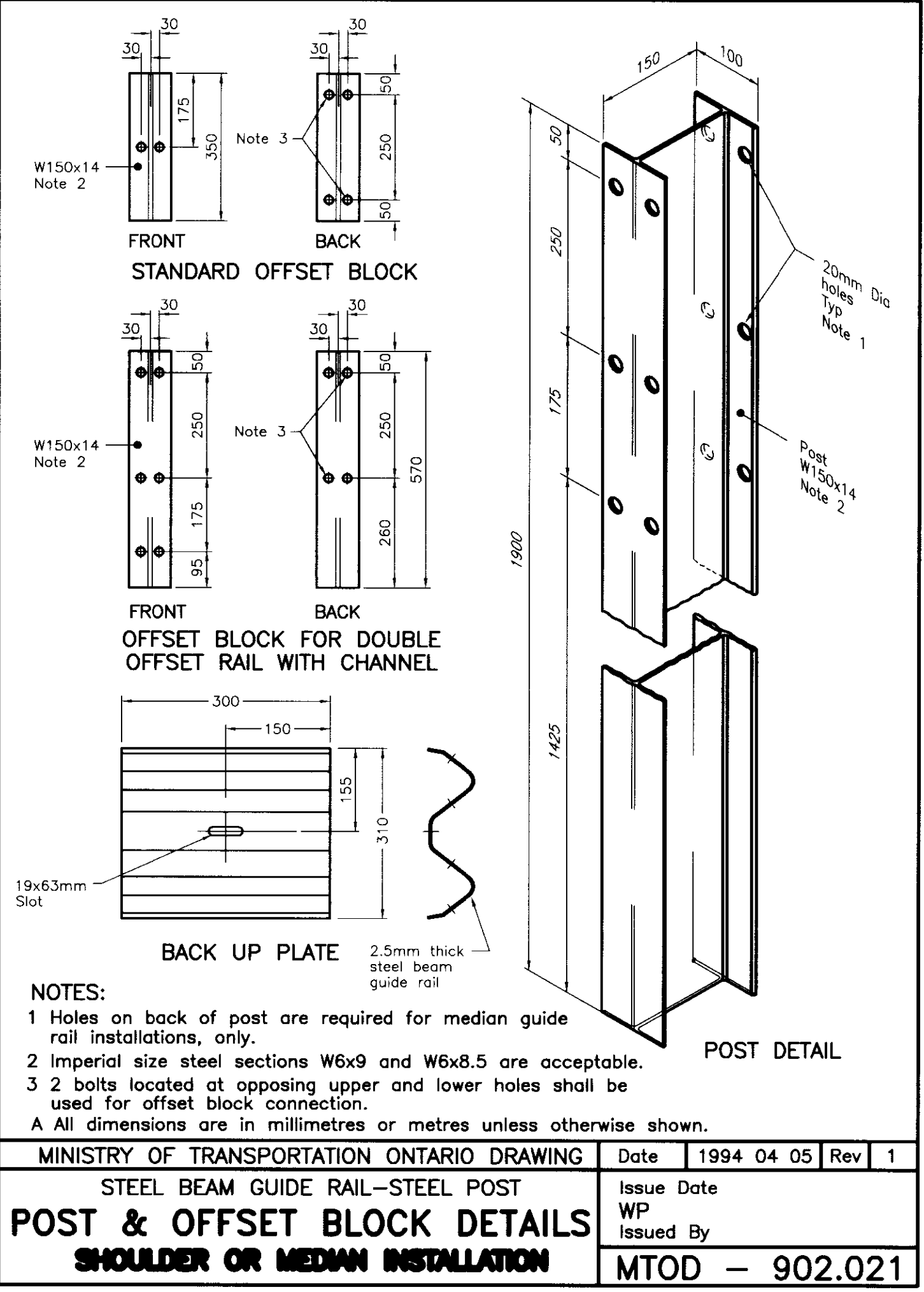
ROCK PROTECTION  
N.T.S.



HIGHWAY 11 STAGED CONSTRUCTION  
N.T.S.



METRIC





W.P. 145-88-00

Township of Williamson

Lost River / Hwy. 11

15+550 3.8 Lt C/L

0 - 150 Asph  
150 - 310 Cr Gr  
310 - 850 Sa So Si Tr Gr & Cl  
Gr = 10 %  
Sa = 60 %  
Si = 20 %  
Cl = 10 %

850 NFP ShRk/BR

15+550 6.8 Lt C/L D-600

0 - 500 Si w Sa Tr Gr

15+550 9.0 Lt C/L D-1.2

0 - 500 Si w sa Tr Gr Tr Cl

15+600 3.5 Rt C/L

0 - 280 Asph  
280 - 510 Cr Gr  
510 - 850 F-Med Sa w Gr  
850 - 1.8 Si w Sa & Gr  
18 - 2.5 Si Tr Gr Tr Cl

15+600 10.0 Rt C/L D-2.0

0 - 500 Cl w Si Tr Gr

15+650 7.0 Rt C/L D-500

0 - 500 Cl w Si Tr Gr

15+650 11.0 Lt C/L D-1.4

0 - 500 Cl w Si Tr Gr

15+700 3.8 Rt C/L

0 - 150 Asph  
150 - 320 Cr Gr  
Gr = 25 %  
Sa = 65 %  
Si = 10 %  
320 - 1.4 F-Med Sa Tr Gr Tr Si  
1.4 - 2.5 Cl w Si Tr Gr

15+700 8.0 Rt C/L D-600

0 - 500 Cl w Si Tr Gr

15+750 4.1 Lt C/L

0 - 140 Asph  
140 - 310 Cr Gr  
310 - 490 F-Med Sa w Si Tr Gr  
490 - 1.3 Cl w Si Tr Gr  
1.3 - 2.5 Si w F Sa

15+800 3.2 Rt C/L

0 - 230 Asph  
230 - 350 Cr Gr  
350 - 640 F-Med sa w Gr  
640 - 1.2 Si w Sa Tr Gr  
1.2 - 2.5 Cl w Si Tr Gr

15+800 15.0 Rt C/L D-3.2

0 - 500 Cl w Si

15+805 1.2 Rt C/L

0 - 220 Asph  
220 - 360 Cr Gr  
360 - 520 F-Med Sa Tr Gr  
520 - 950 Si w Sa Tr Gr  
950 - 2.5 Cl w Si Tr Gr

15+895 4.0 Lt C/L

0 - 150 Asph  
150 - 310 Cr Gr  
310 - 680 F-Med Sa w Gr  
Gr = 20 %  
Sa = 60 %  
Si = 17 %  
Cl = 3 %

680 - 1.8 Si w Sa Tr Gr  
1.8 - 2.5 Si w Cl Tr Gr

15+900 14.0 Rt C/L D-3.6

0 - 500 Cl w Si

15+950 18.0 Lt C/L D-4.5

0 - 500 Cl w Si

15+975 4.0 Rt C/L  
0 - 140 Asph  
140 - 260 Cr Gr  
260 - 640 F-Med Sa w Gr  
640 - 2.5 Si w Cl Tr Gr

16+000 13.0 Rt C/L/ D-3.1

0 - 100 Org M  
100 - 500 Cl W Si

16+049 5.3 Lt C/L

0 - 560 Cr Gr  
560 - 1.2 F-Med Sa w Gr  
1.2 - 2.5 Si Tr CL Tr

16+050 7.0 Rt C/L D-400

0 -500 Cl w Si Tr Gr

16+050 9.0 Lt C/L D-1.0

0 - 100 Tps  
100 - 500 Cl w Si

16+100 3.7 Rt C/L

0 - 150 Asph  
150 - 580 Cr Gr  
580 - 620 PSty  
580 - 1.2 F-Med Sa w GR  
1.2 - 2.5 Si Tr Cl TR Sa & Gr

16+100 10.0 Rt C/L D-1.2

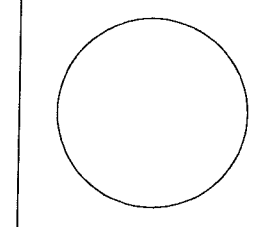
0 - 500 Cl w Si Tr Gr

16+150 3.9 m Lt C/L

0 - 150 asph  
150 - 210 Cr Gr  
210 - 1.2 F-Med Sa w Gr  
1.2 - 2.5 F Sa w Si & Cl Wet

METRIC

PLATE No  
CONT No2000-0222  
WP No 145-88-00



SOILS DATA  
STA TO STA  
Survey Revised

SHEET  
10

McCORMICK RANKIN  
CORPORATION


SCALE

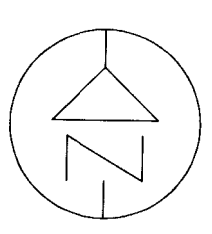
NOTES:

- 1. MINOR ADJUSTMENT OF SIGN POSITIONS MAY BE REQUIRED TO SUIT FIELD CONDITIONS.
- 2. SIGNS TO BE ERECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
- 3. ALL ADDITIONAL SIGNS TO BE PLACED IN ACCORD WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

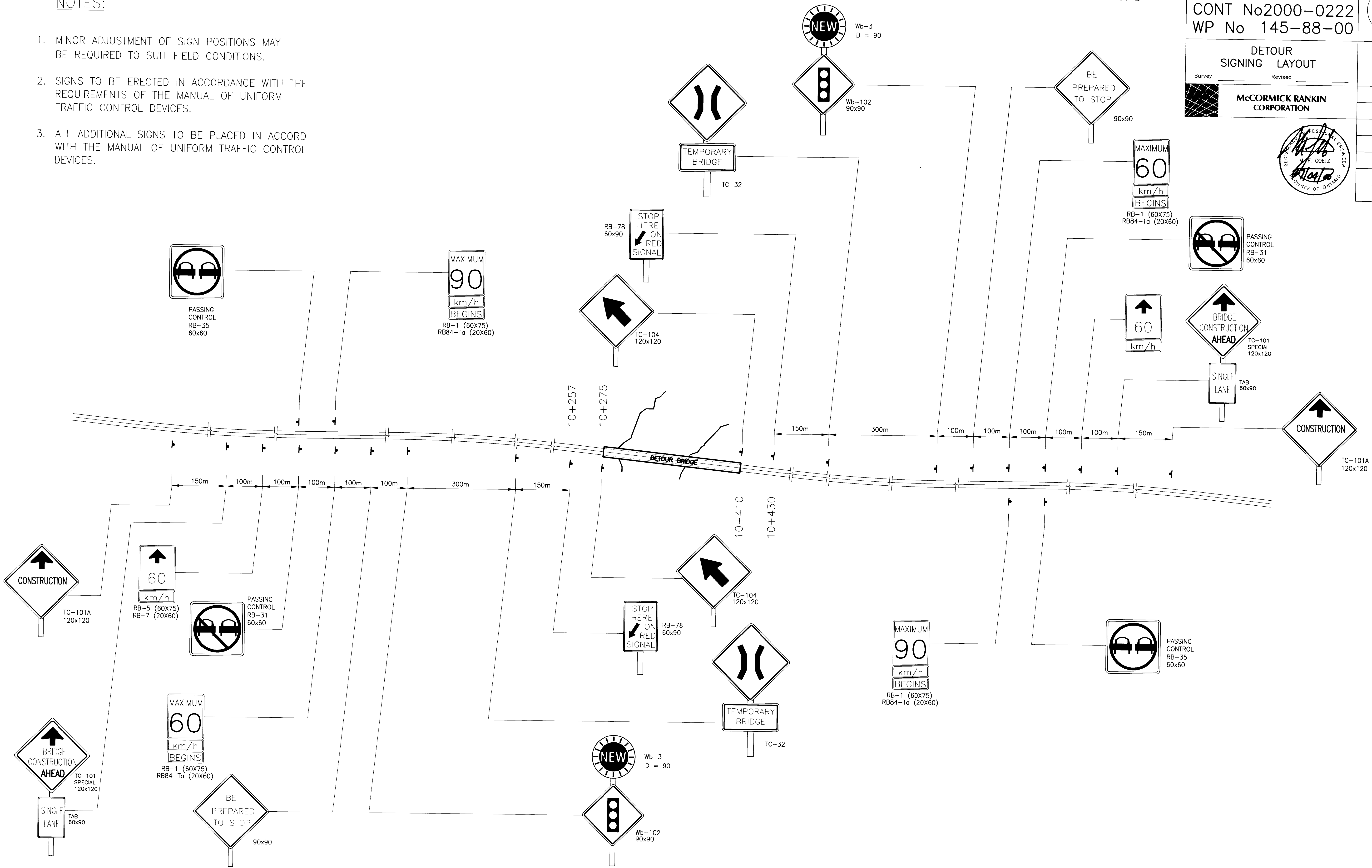
METRIC

PLATE No PLATE  
CONT No2000-0222  
WP No 145-88-00

DETOUR  
SIGNING LAYOUT  
Survey Revised  
McCORMICK RANKIN CORPORATION



SHEET  
11



SIGNING LAYOUT — TEMPORARY TRAFFIC SIGNALS

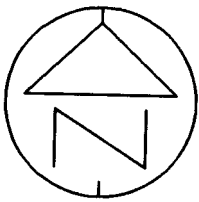




DIST COCHRANE  
GEOG TWP WILLIAMSON

METRIC

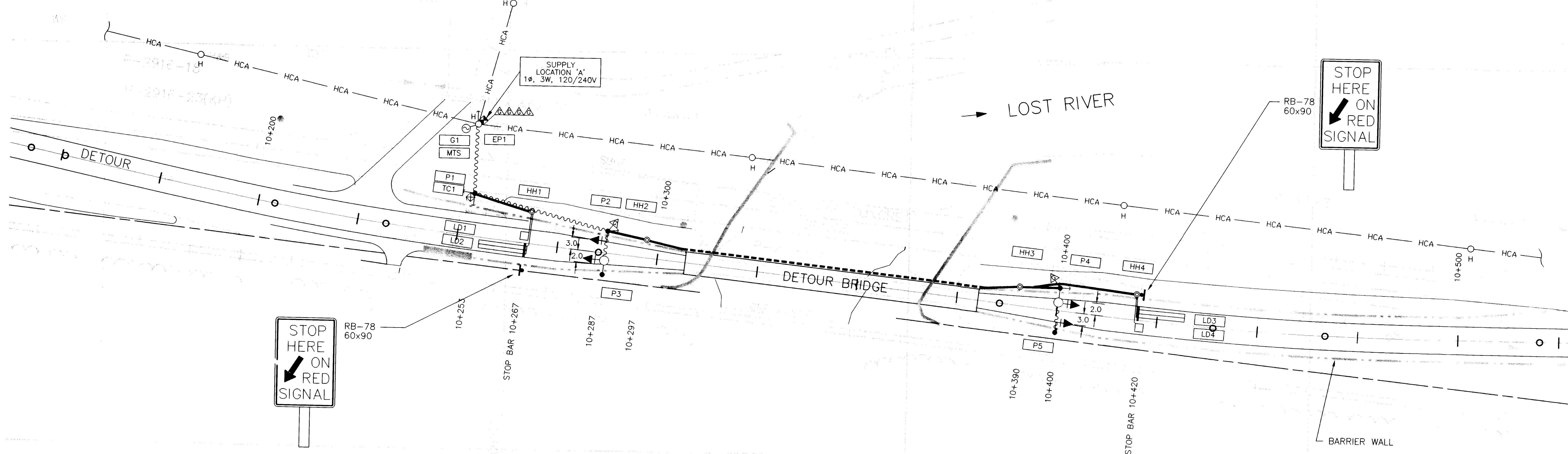
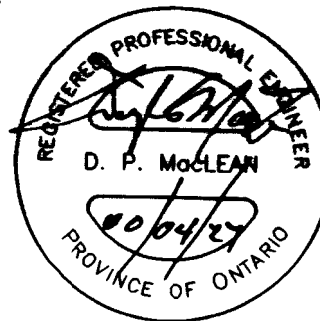
PLATE No  
CONT No2000-0222  
WP No 145-88-00



ELECTRICAL LAYOUT  
HWY 11 AT LOST RIVER  
STA FROMSTA TO STA TOSTA  
Survey Revised

SHEET  
26

MRC  
McCORMICK RANKIN  
CORPORATION



HIGHWAY 11 AT LOST RIVER BRIDGE			
STRUCTURE #	OFFSET	STATION	MATERIALS
TC1	9.6m	10+253	NEMA TS1/TS2 SIGNAL CONTROLLER
P1	9.6m	10+253	CLASS 4, 12.5m WOOD POLE
P2	6.0m	10+287	CLASS 4, 12.5m WOOD POLE, 3.0 SMA
P3	6.0m	10+287	CLASS 4, 12.5m WOOD POLE, 3.7 SMA, 400W LUMINAIRES, 250W HPS LAMP AND 2.4m ELLIPTICAL BRACKET
P4	6.0m	10+400	CLASS 4, 12.5m WOOD POLE, 3.7 SMA, 400W LUMINAIRES, 250W HPS LAMP AND 2.4m ELLIPTICAL BRACKET
P5	6.0m	10+400	CLASS 4, 12.5m WOOD POLE, 3.0 SMA
HH1	7.5m	10+267	460mm PRECAST HANDHOLE OPSD 2112.02
HH2	4.5m	10+297	460mm PRECAST HANDHOLE OPSD 2112.02
HH3	4.5m	10+390	460mm PRECAST HANDHOLE OPSD 2112.02
HH4	6.5m	10+420	460mm PRECAST HANDHOLE OPSD 2112.02

DETECTION LOOPS					
STRUCTURE No.	STATION	DIMENSION	LOAD TYPE	INDUCTANCE	No. TURNS
LD1	10+267	2.0m x 2.0m	SIMPLE	131	4
LD2	10+267	2.0m x 12.0m	DUPLEX	276	2-4-2
LD3	10+420	2.0m x 12.0m	DUPLEX	276	2-4-2
LD4	10+420	2.0m x 2.0m	SIMPLE	131	4

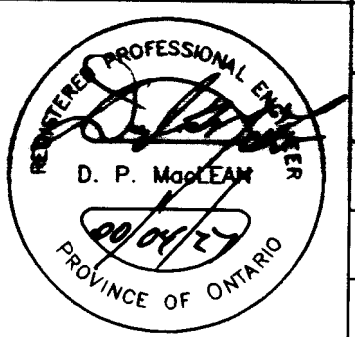
5m 0m 10m  
SCALE

METRIC

PLATE No  
CONT No 2000-0222  
WP No 145-88-00

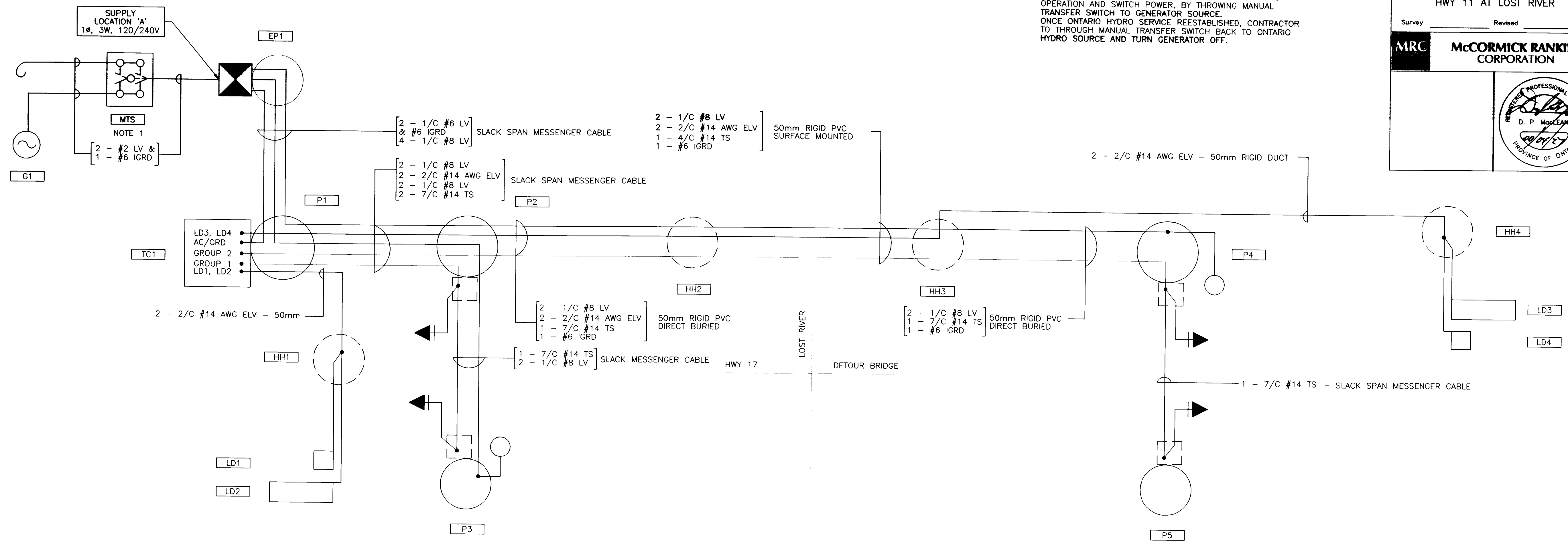
PLATE  
WIRING DIAGRAM AND DETAIL  
HWY 11 AT LOST RIVER  
Survey \_\_\_\_\_ Revised \_\_\_\_\_

MRC  
McCORMICK RANKIN  
CORPORATION

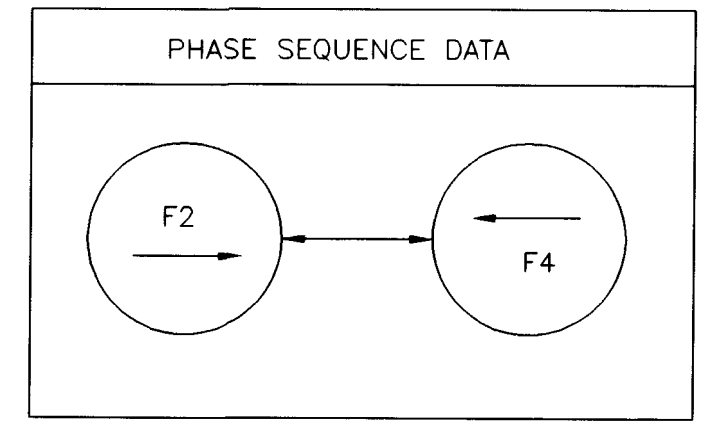


SHEET  
27

NOTE:  
1. DURING PERIODS OF ONTARIO HYDRO POWER SOURCES  
INTERRUPTIONS CONTRACTOR TO PLACE GENERATOR INTO  
OPERATION AND SWITCH POWER, BY THROWING MANUAL  
TRANSFER SWITCH TO GENERATOR SOURCE.  
ONCE ONTARIO HYDRO SERVICE REESTABLISHED, CONTRACTOR  
TO THROUGH MANUAL TRANSFER SWITCH BACK TO ONTARIO  
HYDRO SOURCE AND TURN GENERATOR OFF.

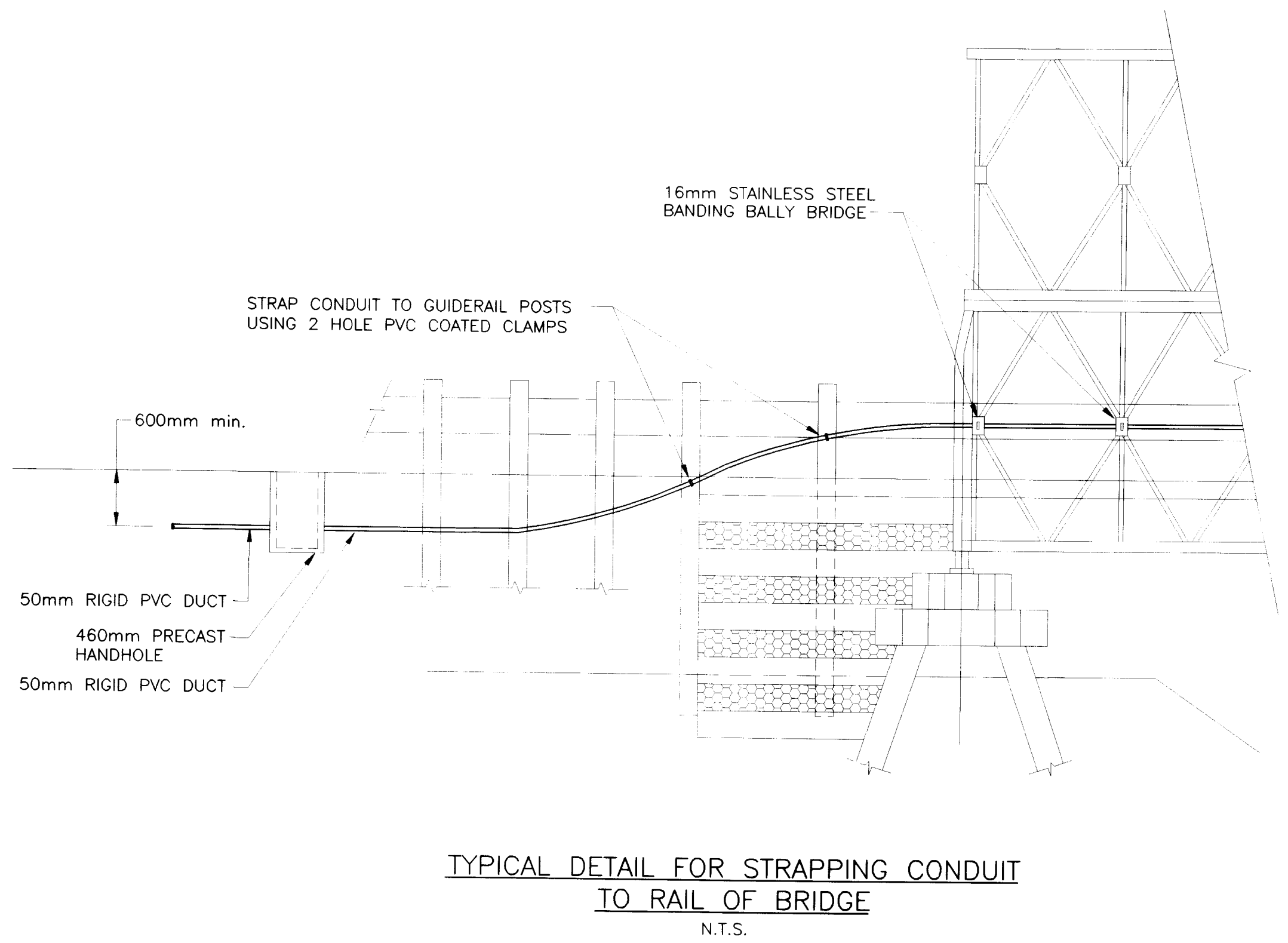
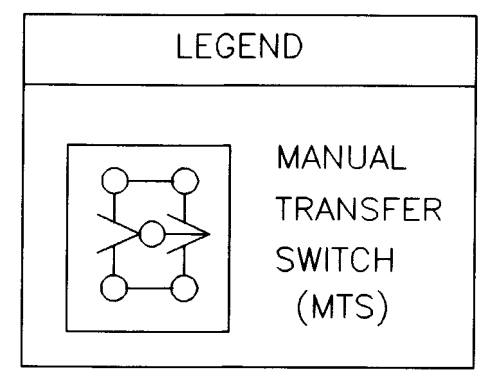


Cond #	Colour / Mark	Cable Group # 1	Cable Group # 2
1	White	Main St. Neutral	Main St. Neutral
2	Red	Main St. Red	Main St. Red
3	Yellow	Main St. Amber	Main St. Amber
4	Blue	Main St. Green	Main St. Green



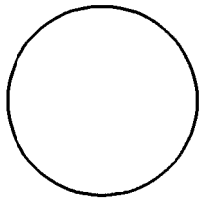
LOAD TABLE SUPPLY 'A' BY ONTARIO HYDRO		
CIRCUIT #	AMPERAGE	LOAD WATTAGE
A BLACK	60 Amps	1200 Watts Signal Heads (4 x 150W) Controller (1 x 600W)
B BLACK	30 Amps	310 Watts * Streetlights P3 (250W + 60W)
B RED	30 Amps	310 Watts * Streetlights P6 (250W + 60W)
TOTAL A BLACK LOAD		1200 WATTS
TOTAL B BLACK LOAD		310 WATTS
TOTAL B RED LOAD		310 WATTS
TOTAL LOAD		1820 WATTS

\* BALLAST LOSS OR 60 WATTS PER ILLUMINAIRE IS INCLUDED  
FOR 250W HPS LUMINAIRES.



METRIC

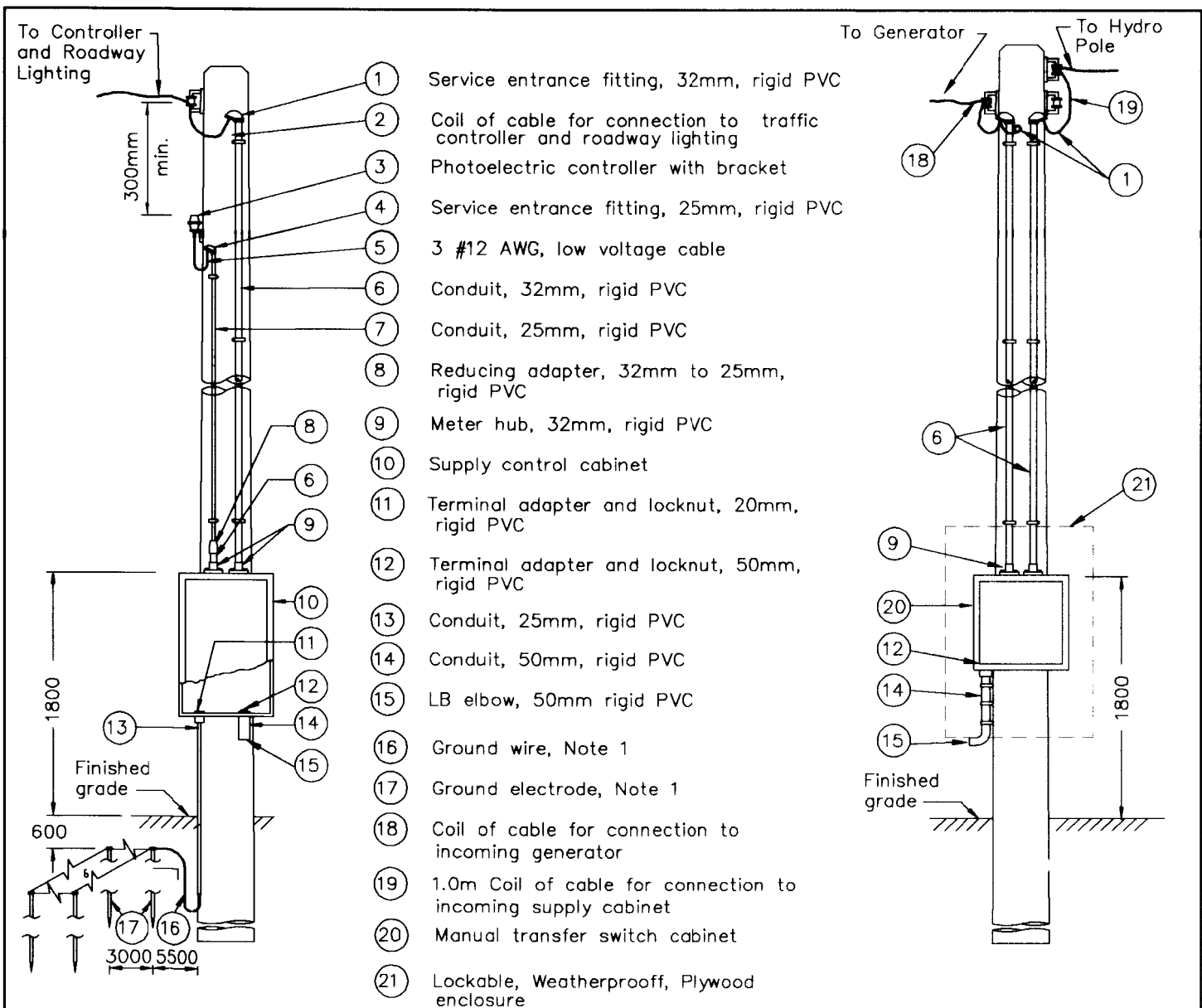
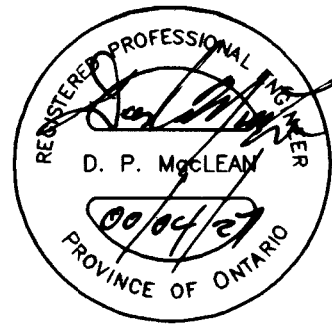
PLATE No PLATE  
CONT No 2000-0222  
WP No 145-88-00



ELECTRICAL DETAILS - 1  
HWY 11 AT LOST RIVER  
Survey Revised

SHEET  
28

MRC McCORMICK RANKIN  
CORPORATION



- 1 Service entrance fitting, 32mm, rigid PVC
- 2 Coil of cable for connection to traffic controller and roadway lighting
- 3 Photoelectric controller with bracket
- 4 Service entrance fitting, 25mm, rigid PVC
- 5 3 #12 AWG, low voltage cable
- 6 Conduit, 32mm, rigid PVC
- 7 Conduit, 25mm, rigid PVC
- 8 Reducing adapter, 32mm to 25mm, rigid PVC
- 9 Meter hub, 32mm, rigid PVC
- 10 Supply control cabinet
- 11 Terminal adapter and locknut, 20mm, rigid PVC
- 12 Terminal adapter and locknut, 50mm, rigid PVC
- 13 Conduit, 25mm, rigid PVC
- 14 Conduit, 50mm, rigid PVC
- 15 LB elbow, 50mm rigid PVC
- 16 Ground wire, Note 1
- 17 Ground electrode, Note 1
- 18 Coil of cable for connection to incoming generator
- 19 1.0m Coil of cable for connection to incoming supply cabinet
- 20 Manual transfer switch cabinet
- 21 Lockable, Weatherproof, Plywood enclosure

- NOTES
- Number & type of ground electrodes and size of ground wire shall be as indicated elsewhere in the contract.
  - Supply cabinet and manual transfer switch are located opposite each other on the same pole.
- A All dimensions are in millimetres or metres unless otherwise shown.

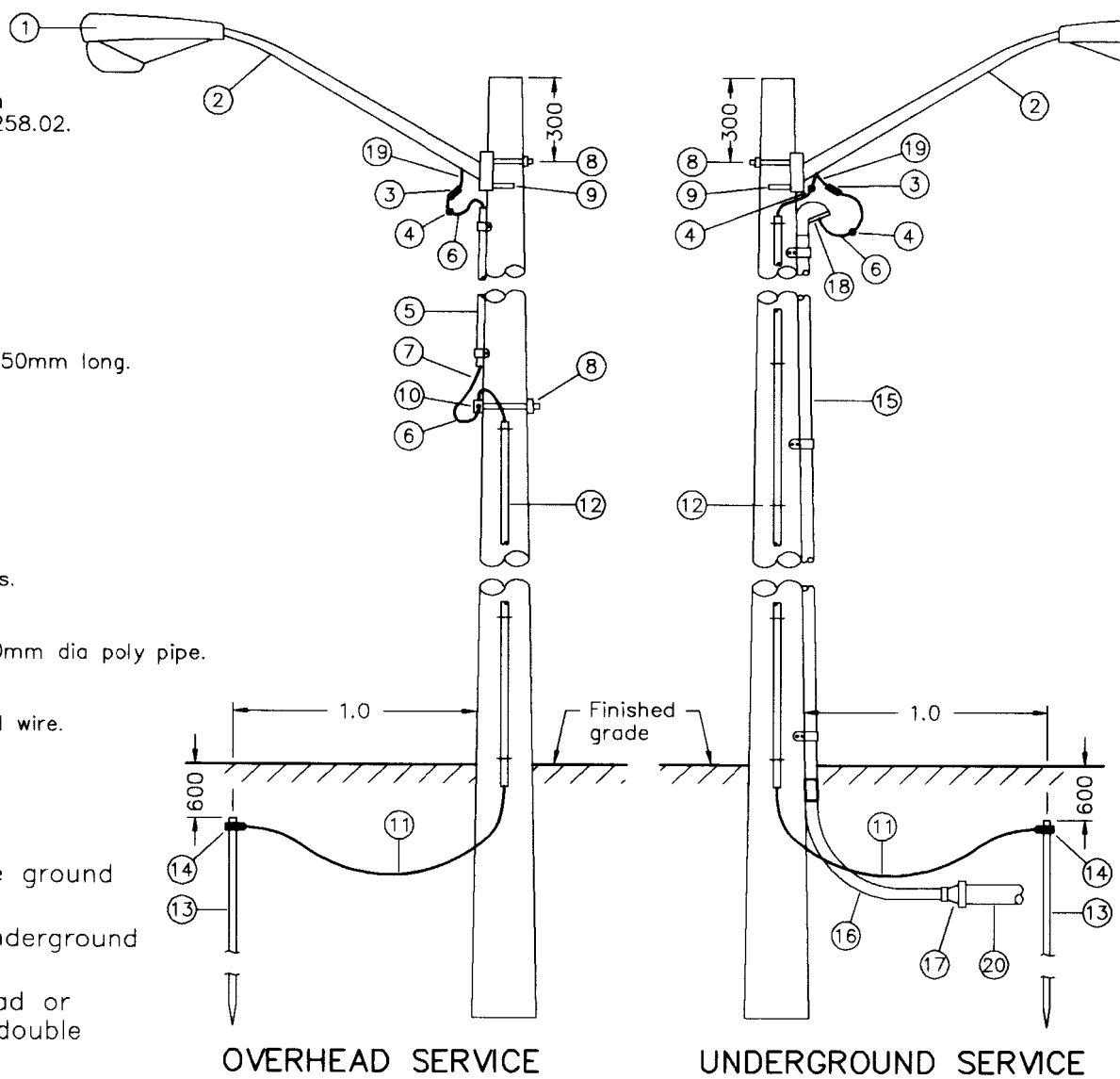
SUPPLY CONTROL CABINET AND  
MANUAL TRANSFER SWITCH INSTALLATION

MATERIALS

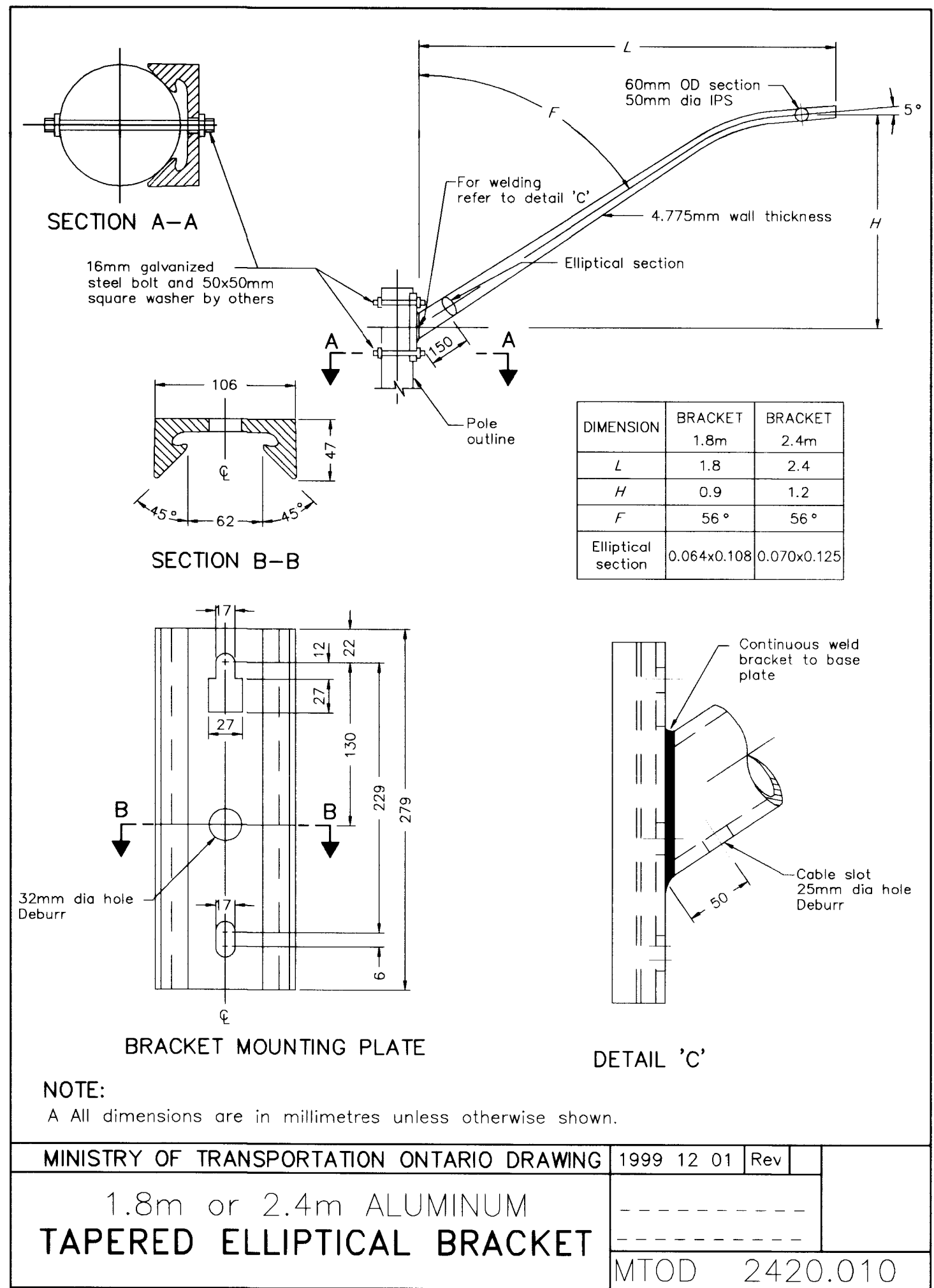
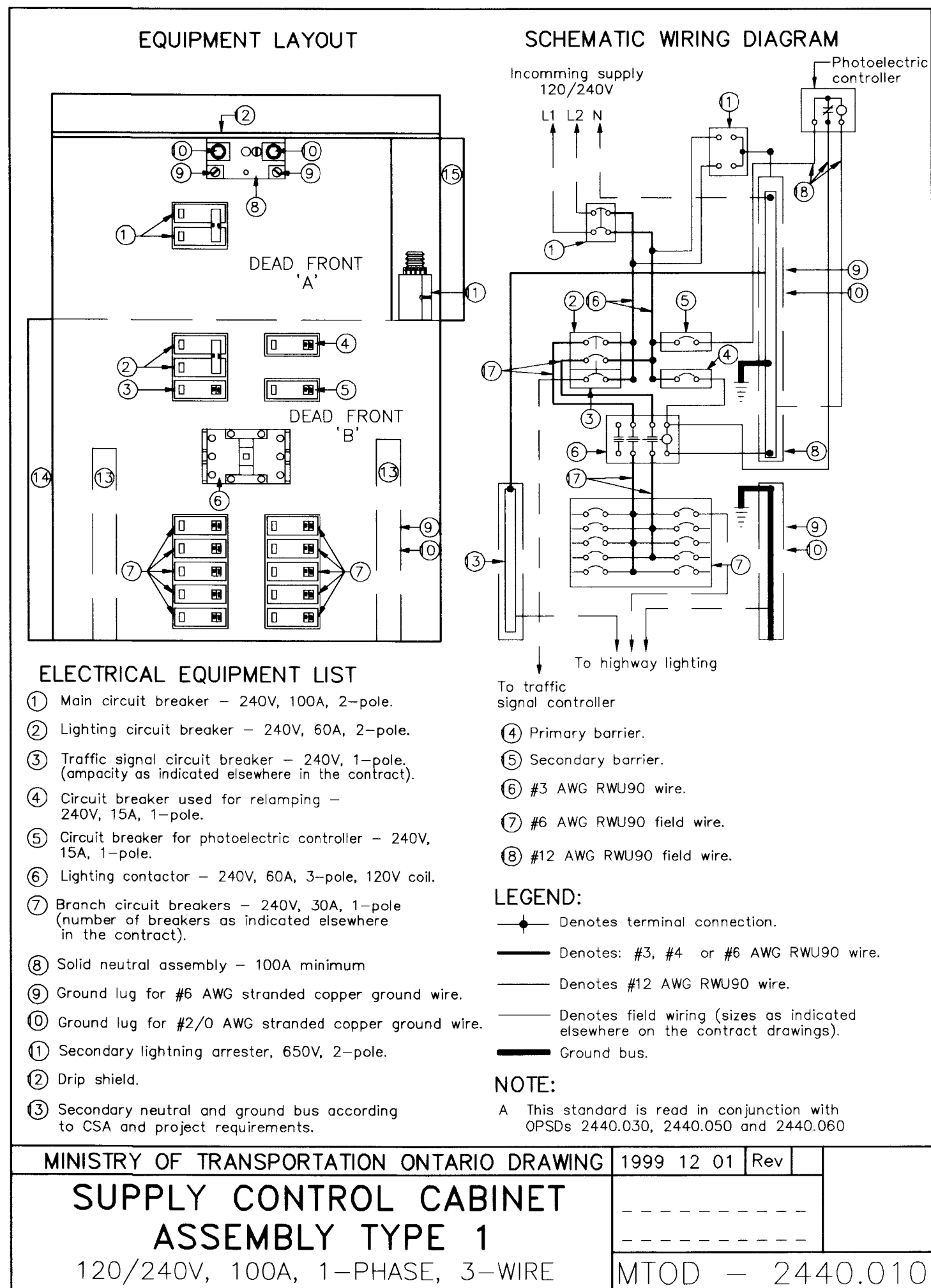
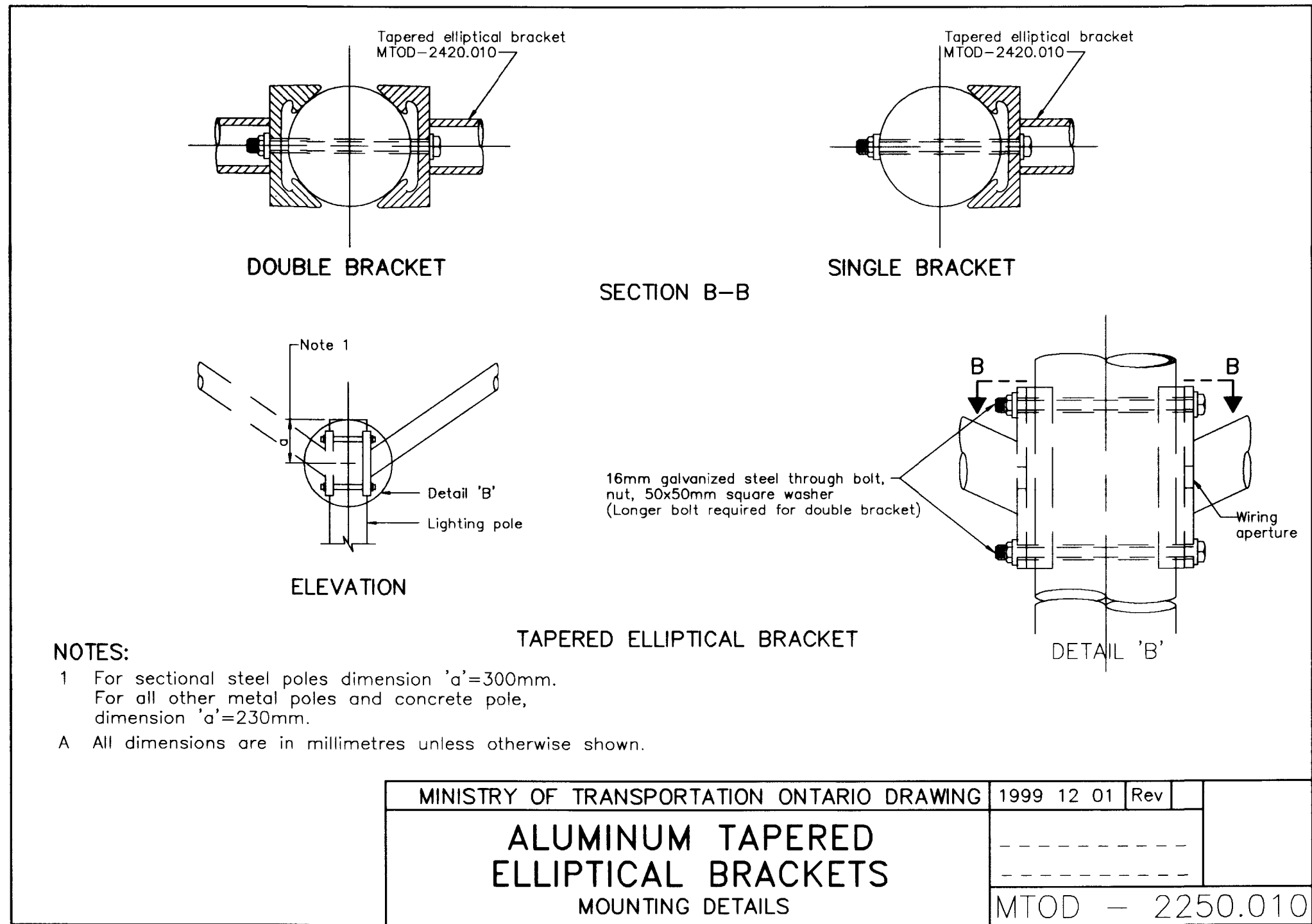
- 1 Luminaire
- 2 Elliptical bracket
- 3 Fuse holder in line type 600V, 15A complete with insulating boots. Fuse size as shown in OPSD-2258.02.
- 4 Compression connectors with insulating covers.
- 5 25mm rigid PVC conduit with PVC pipe straps.
- 6 150mm drip loop
- 7 Secondary aerial bus-2-#12 AWG low voltage cables and #12 AWG ground wire.
- 8 Galvanized through bolt 16mm dia, complete with 50x50mm washer and nut.
- 9 Galvanized square head lag bolt 12mm dia and 150mm long.
- 10 Spool and clevis with secondary aerial cable.
- 11 #6 AWG ground wire
- 12 Protective moulding stapled to pole.
- 13 Ground rod
- 14 Ground rod connection
- 15 32mm dia rigid PVC conduit with PVC pipe straps.
- 16 32mm dia rigid PVC 90° bend.
- 17 Coupling from 32mm dia rigid PVC conduit to 50mm dia poly pipe.
- 18 Entrance fitting
- 19 #12 AWG low voltage cables and #12 AWG ground wire.
- 20 50mm dia poly pipe

NOTES:

- A Connect #12 AWG ground wire to luminaire ground stud and secondary aerial bus.
- B For locations of poles and overhead or underground circuits, see layout drawings.
- C This drawing to be used for either overhead or underground circuits with either single or double luminaires and brackets.
- D Length of wood pole and pole setting depth as indicated.
- E All dimensions are in millimetres or metres unless otherwise shown.



MINISTRY OF TRANSPORTATION ONTARIO DRAWING	96 02 07	Rev	
WOOD POLE WITH ELLIPTICAL BRACKET OVERHEAD AND UNDERGROUND SERVICES	Date		
	MTOD	-	2240.01



METRIC

PLATE No PLATE  
CONT No 2000-0222  
WP No 145-88-00

ELECTRICAL DETAILS - II  
HWY 11 AT LOST RIVER

Survey Revised

MRC McCORMICK RANKIN  
CORPORATION

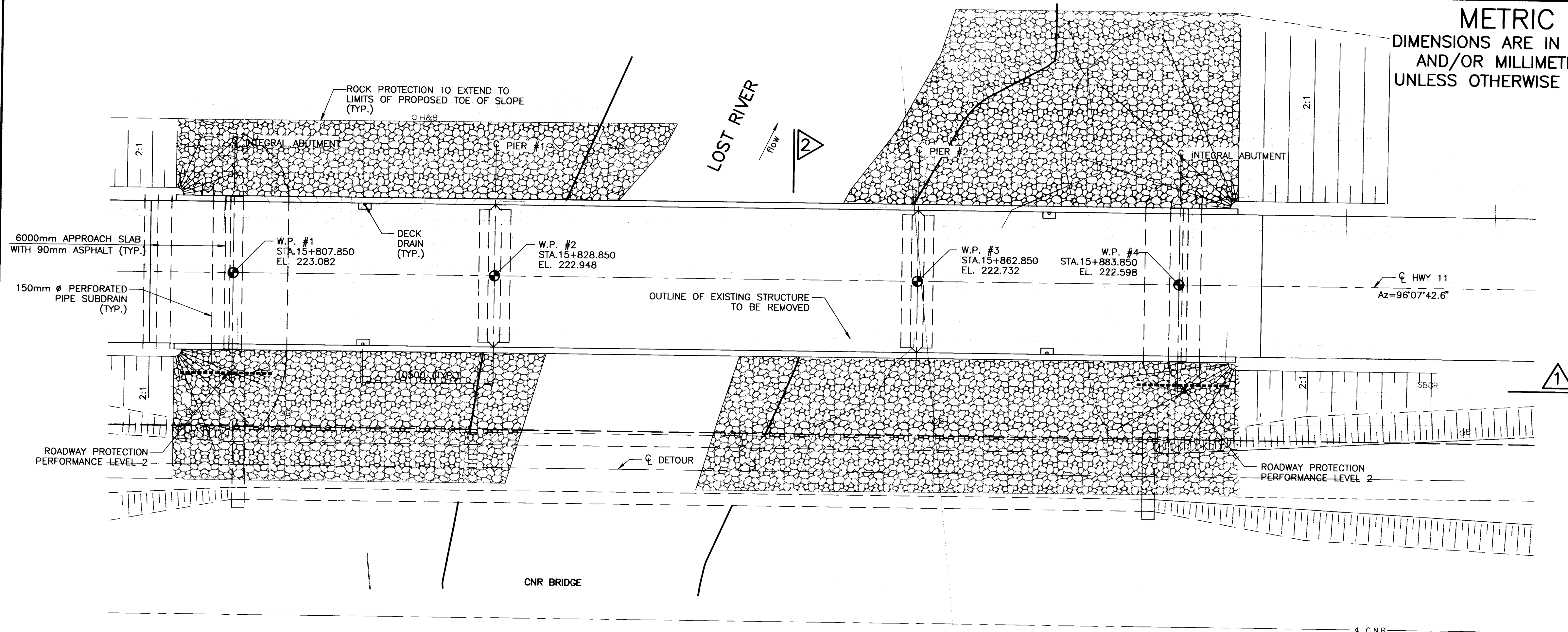


SHEET  
29

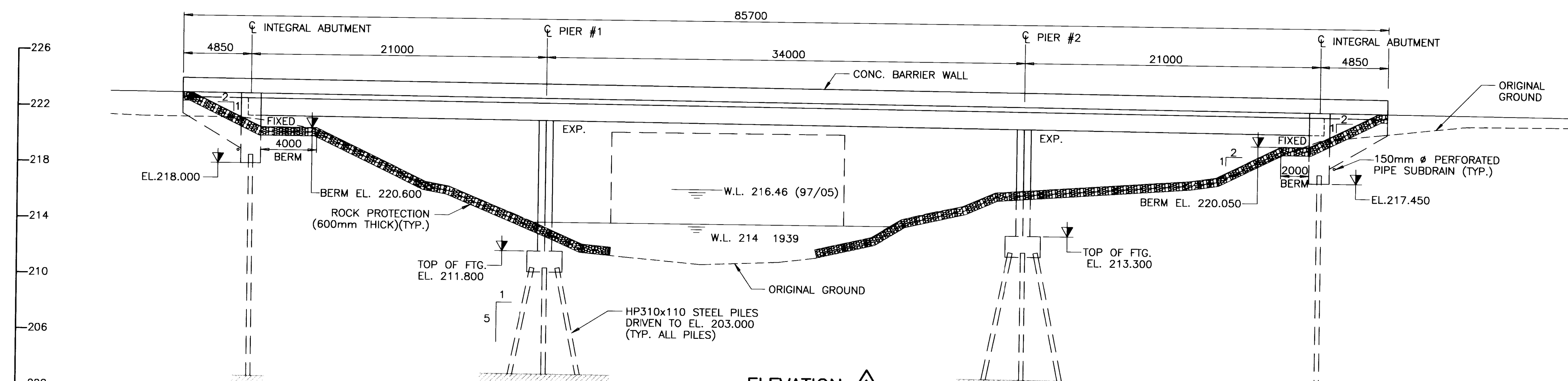


AutoCAD Drawing: D:\Cad Drawings\lost river\ga\c.dwg updated: Apr. 26/2000 07:17 AM

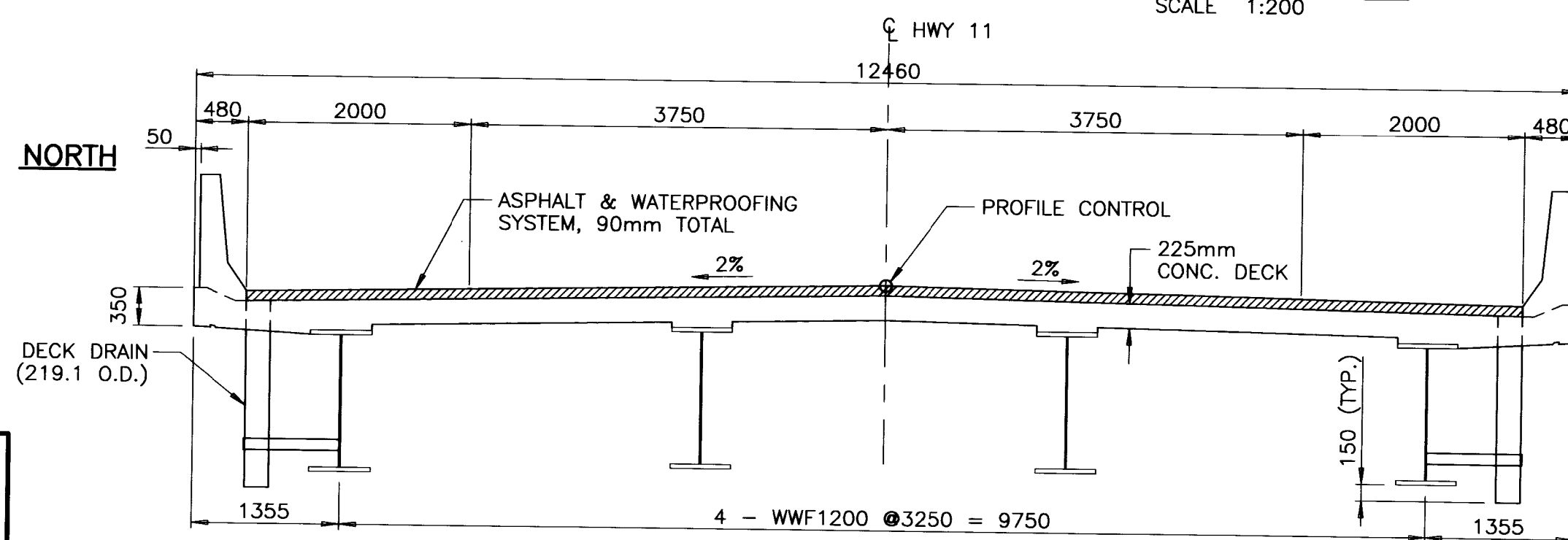
GBM 1185  
221.209  
BOLT IN EAST CONC. ABUTMENT  
OF CNR BRIDGE  
15+850.8 29.9 Rt



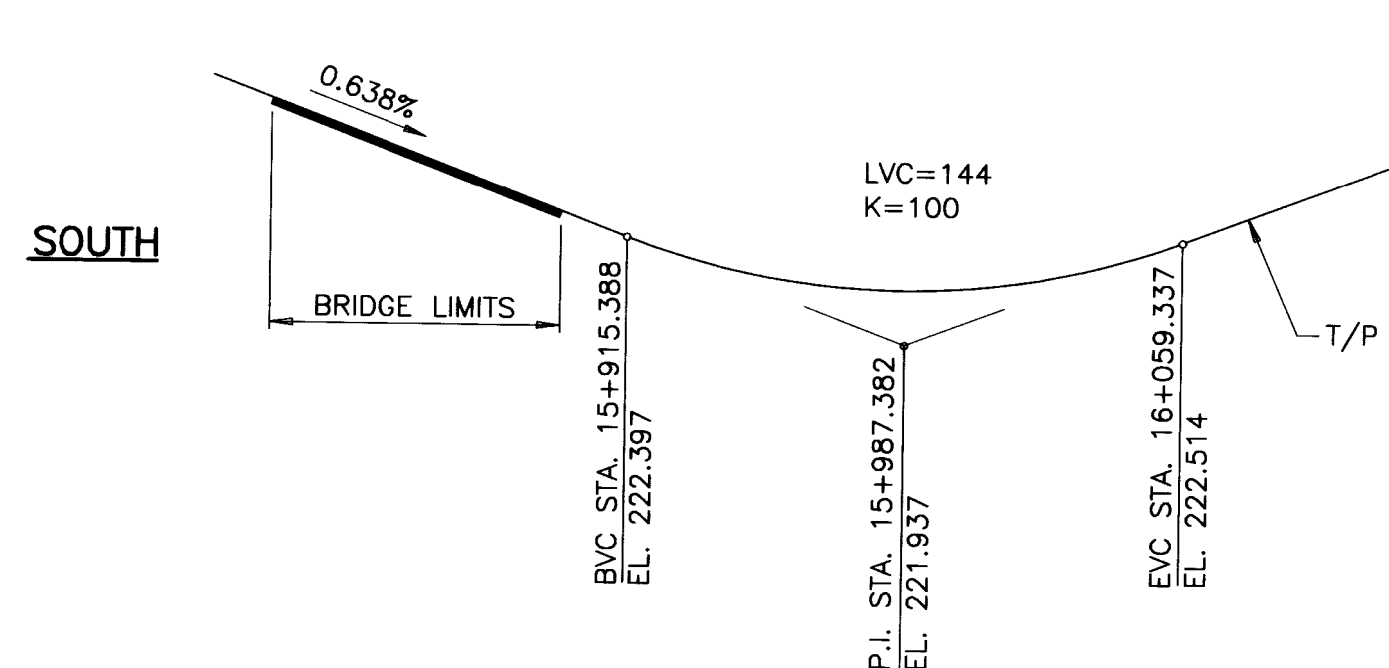
PLAN  
SCALE 1:200



ELEVATION  
SCALE 1:200



TYPICAL DECK SECTION  
SCALE 1:50



PROFILE OF HWY 11  
N. T. S.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

DIST 53  
CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
GENERAL ARRANGEMENT

SHEET  
31

### GENERAL NOTES

#### CLASS OF CONCRETE

PIER FOOTINGS.....30 MPa  
REMAINDER.....50 MPa (HPC)

#### CLEAR COVER TO REINFORCING STEEL

FOOTINGS.....100±25  
DECK TOP.....60±15  
BOTTOM.....50±10  
REMAINDER (UNLESS OTHERWISE NOTED).....70±20

#### REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH PREFIX 'C' DENOTE COATED BARS.

UNLESS SHOWN OTHERWISE, TENSION LAP LENGTH NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS 'B'.

BAR HOOKS SHALL BE MINIMUM LENGTH AND STIRRUPS SHALL HAVE MINIMUM HOOKS, UNLESS INDICATED OTHERWISE. MINIMUM LENGTHS AND HOOKS SHALL BE AS SPECIFIED IN DWG. #16.

#### CONSTRUCTION NOTES

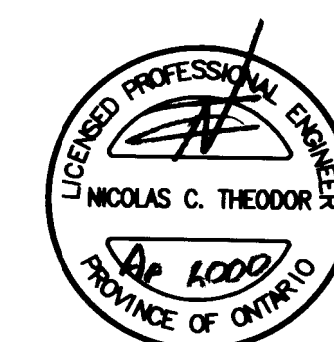
THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATION BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS. IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.

NO BACKFILL SHALL BE PLACED UNTIL DECK CONCRETE HAS REACHED 75% OF ITS SPECIFIED STRENGTH.

BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME.

### LIST OF DRAWINGS

1. GENERAL ARRANGEMENT
- 2A. BOREHOLE LOCATIONS AND SOIL STRATA I
- 2B. BOREHOLE LOCATIONS AND SOIL STRATA II
3. FOUNDATION LAYOUT AND FOOTING REINFORCEMENT
4. ABUTMENTS
5. WINGWALLS
6. PIERS AND BEARINGS
7. STRUCTURAL STEEL I
8. STRUCTURAL STEEL II
9. DECK DETAILS
11. DECK REINFORCEMENT
12. BARRIER WALL w/o RAILING
13. 6000mm APPROACH SLAB
14. AS CONSTRUCTED ELEVATIONS AND DIMENSIONS
15. PILE DRIVING-STEAM & DIESEL HAMMERS
16. STANDARD DETAILS
17. QUANTITIES - STRUCTURE I
18. QUANTITIES - STRUCTURE II



### APPLICABLE STANDARD DRAWINGS

OPSD 918.01 TRANSITION TO STRUCTURES.  
OPSD 3902.020 DECK DRAIN DETAILS.  
OPSD 4601.000 LOCATION OF SITE NUMBER AND DATE FIGURES.  
OPSD 4670.000 TYPICAL JOINT DETAILS.

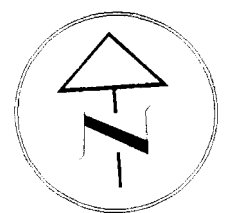
REVISIONS	DESCRIPTION
DESIGN N.C.T.	CHK M.D.
DRAWN T.P.	CHK N.C.T.
DATE DEC., 1998	SCHEME DWG 1



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT. No. 2000-2222  
WP No. 145-88-00

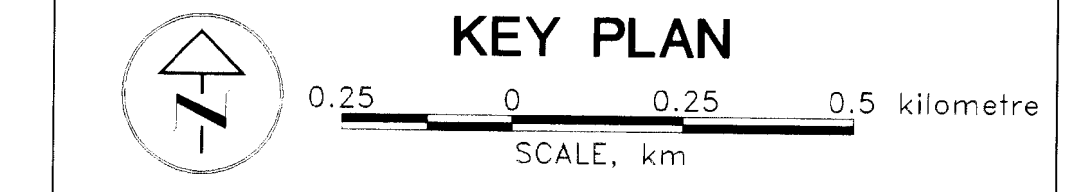
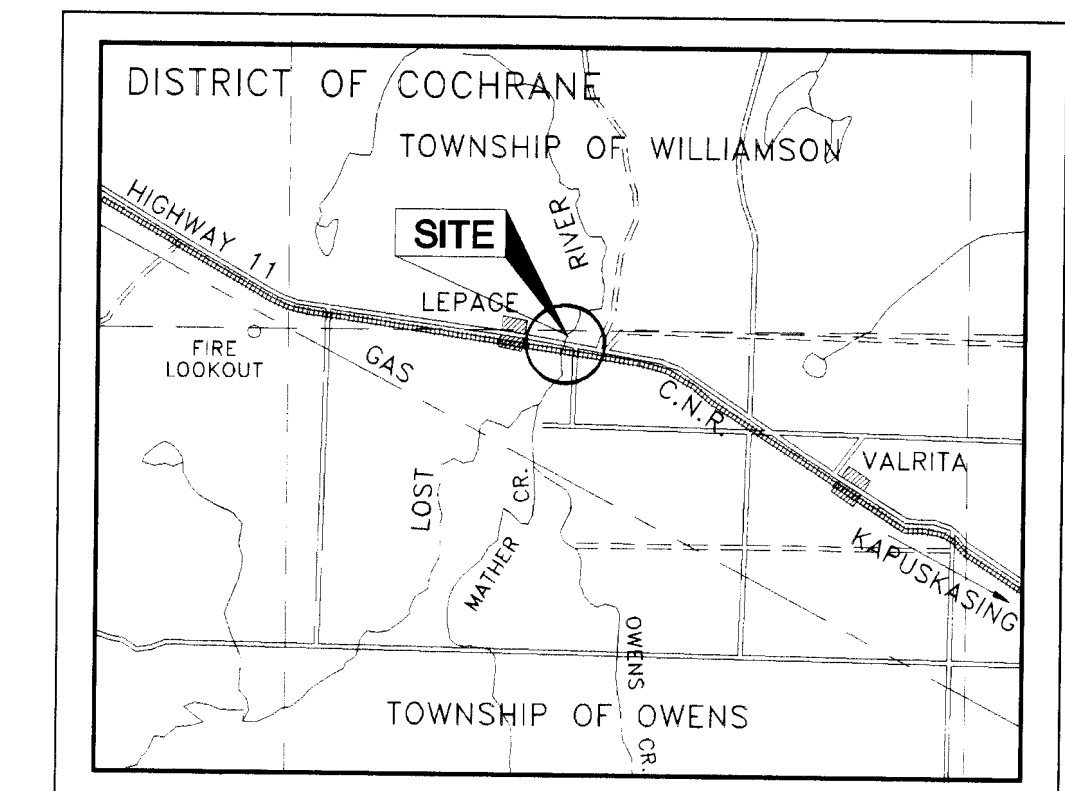
HIGHWAY 11 CROSSING  
OF LOST RIVER  
BORE HOLE LOCATIONS & SOIL STRATA



SHEET  
32



Golder Associates Ltd.  
MISSISSAUGA, ONTARIO, CANADA



- LEGEND
- Bore Hole
  - ⊕ Dynamic Cone Penetration Test (Cone)
  - ⊕ Bore Hole & Cone
  - N Standard Penetration Test value (475 j/blow)
  - Cone Blows/0.3m (60° Cone, 475 j/blow)
  - 100% Rock Quality Designation (RQD)
  - WL in piezometer
  - WL at time of investigation

No.	ELEVATION	LOCATION	
		NORTHING	EASTING
78-10	220.64	5,481,370 *	406,249 *
78-11	221.28	5,481,359 *	406,327 *
97-1	221.09	5,481,350.15	406,324.35
97-1A	221.10	5,481,350.96	406,321.42
97-2	215.82	5,481,353.77	406,261.78
97-2A	216.01	5,481,353.88	406,260.79
97-3	217.28	5,481,349.85	406,298.65
97-3A	217.21	5,481,349.75	406,299.64
97-4	217.29	5,481,349.59	406,301.13
99-1	221.30	5,481,359.09	406,229.68
99-2	221.10	5,481,359.27	406,322.77
99-3	217.28	5,481,340.84	406,302.05

\* APPROXIMATE BOREHOLE COORDINATES

NOTES

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

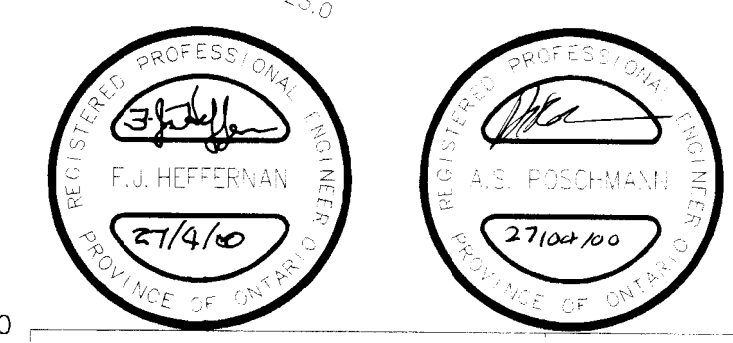
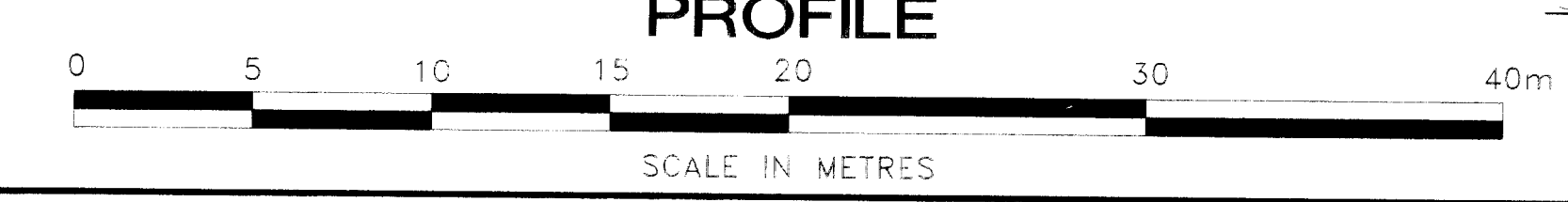
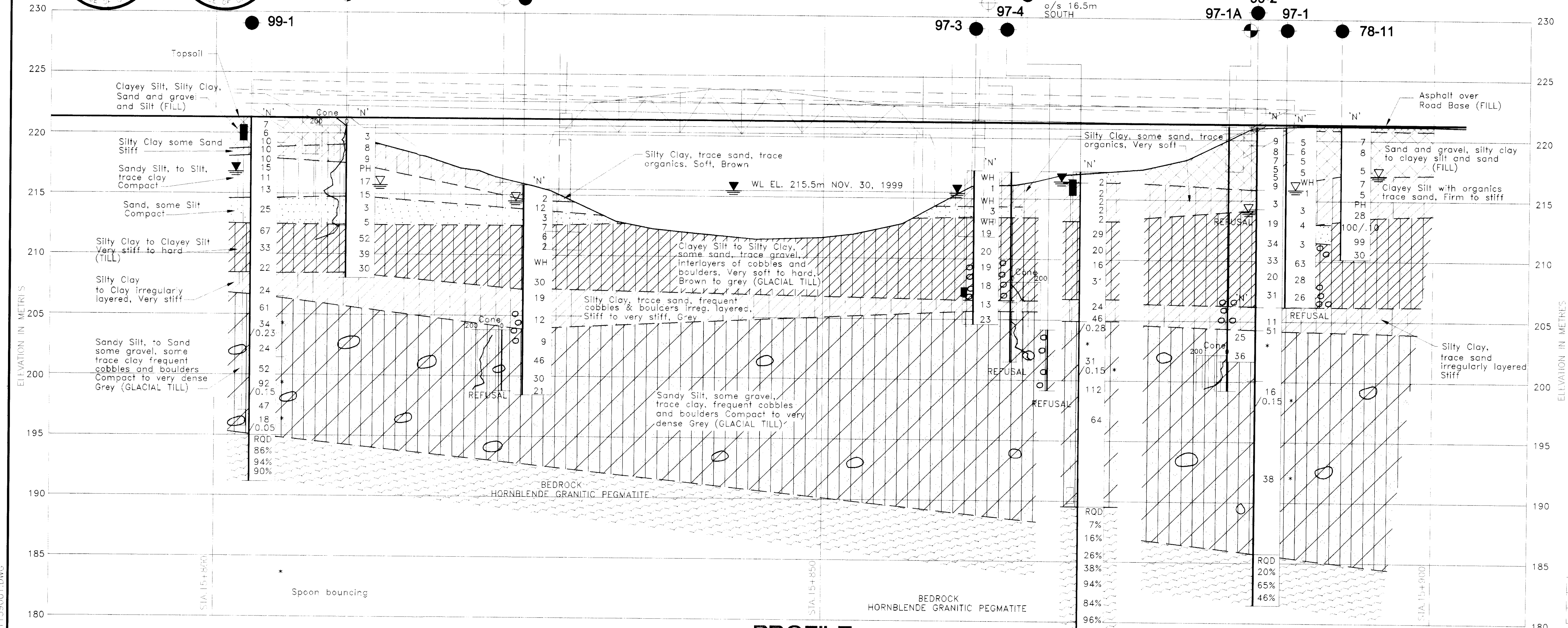
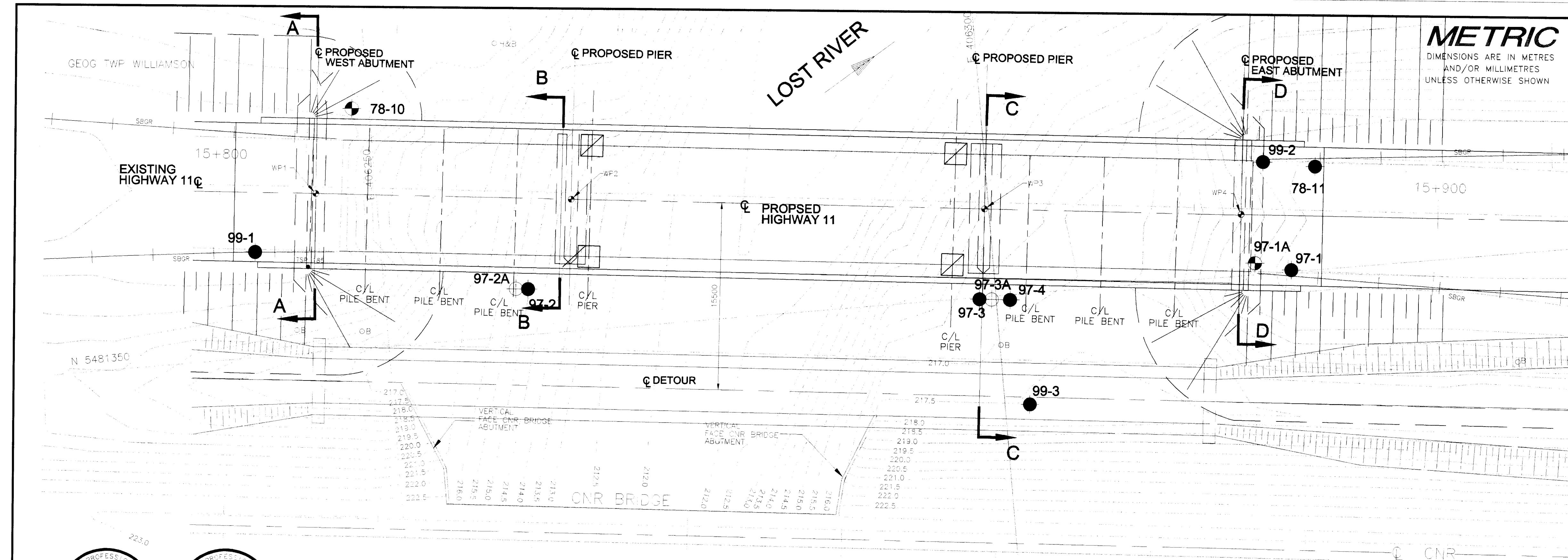
The foundation locations are shown for reference only and may differ from those on the structural drawings.

Base drawing provided by McCormick Rankin in digital format, ref. 04050011022.

NO.	DATE	BY	REVISION

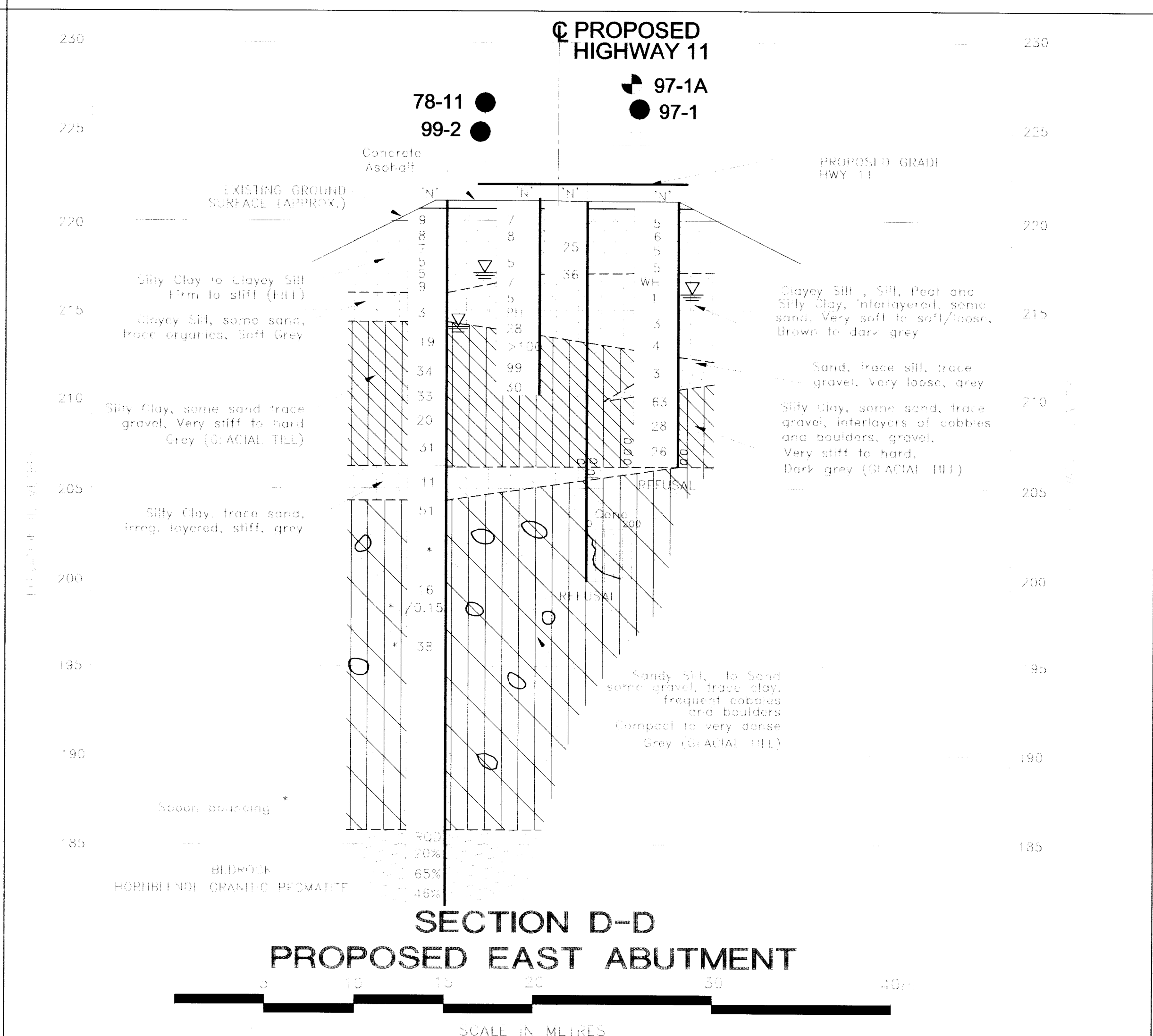
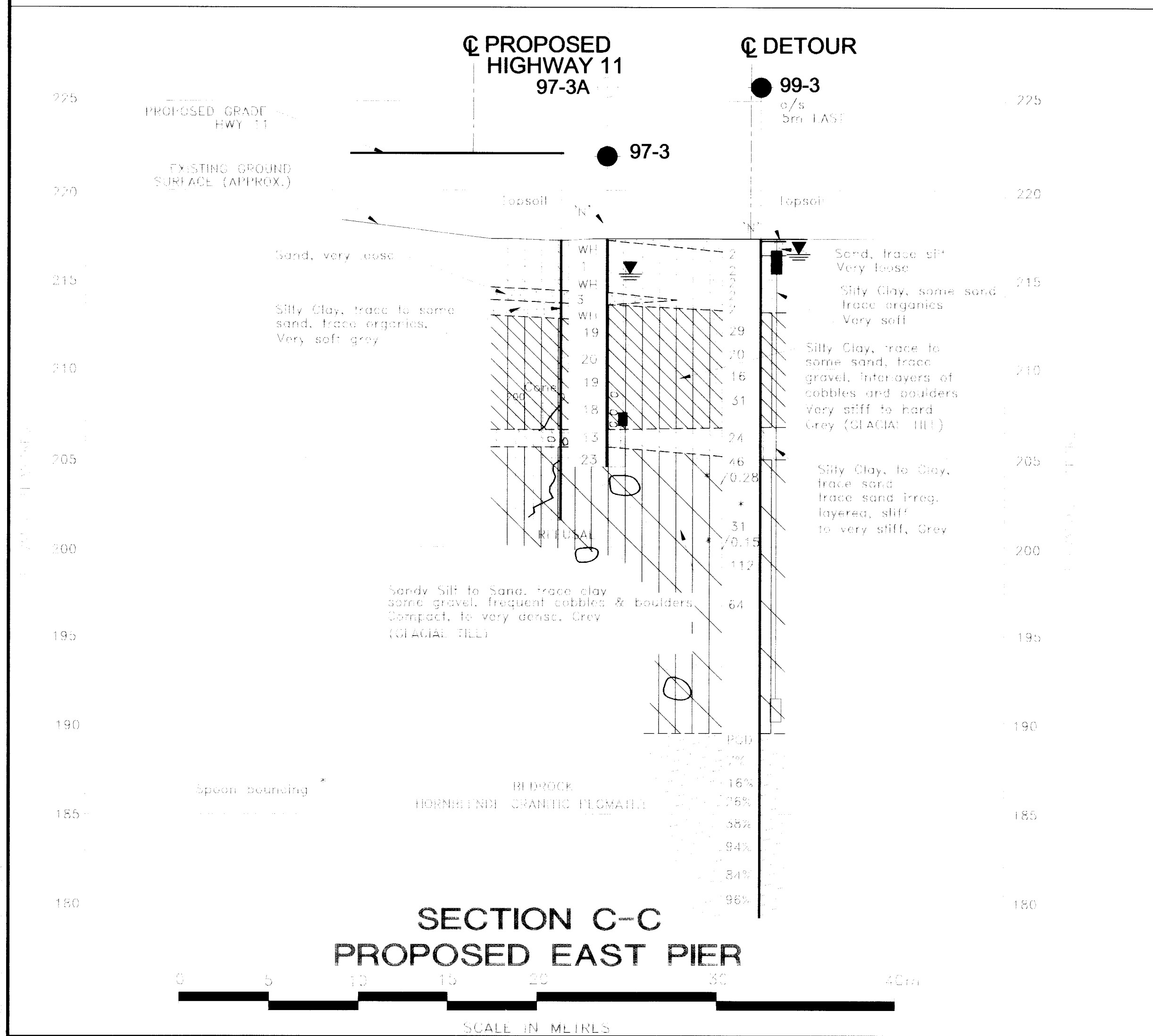
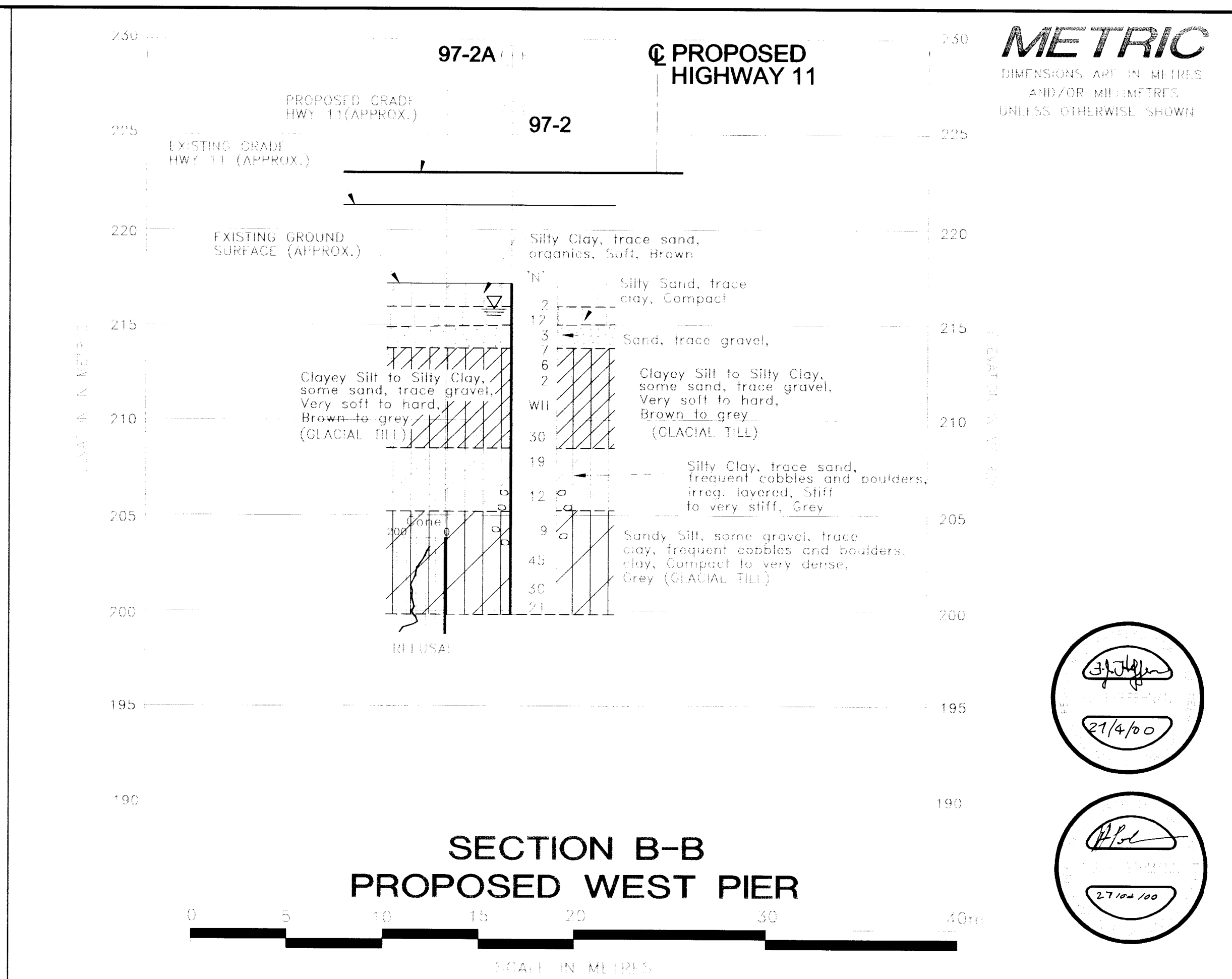
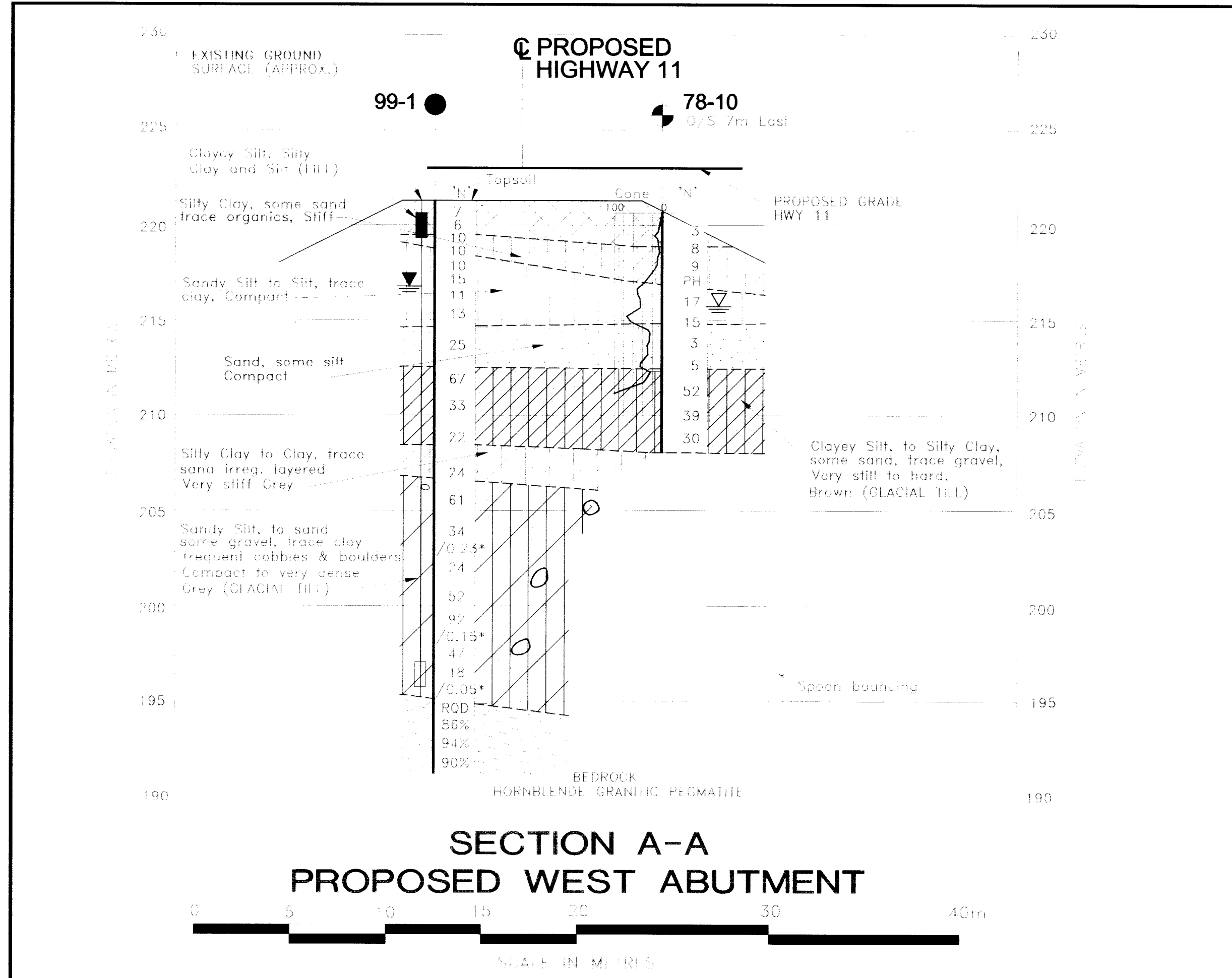
Geocres No.

HWY. No. 11	PROJECT NO.: 991-1159	DIST. 53
SUBM'D. AMP	CHKD: AMP	DATE: DEC. 1999
DRAWN: MHW/JFC	CHKD: APPD.	SITE 39W-064
		DWG. 01159001



1" = 1" (1:400MS)

ACAD FILE 01159001.DWG



**CONT. No. 2000-2222**  
**WP No. 145-88-00**

**HIGHWAY 11 CROSSING**  
**CROSS-SECTIONS**  
**BORE HOLE LOCATIONS & SOIL STRATA**

**Golder Associates Ltd.**  
MISSISSAUGA, ONTARIO, CANADA

**SHEET**  
**33**

**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

**KEY PLAN**  
0 0.25 0.5 Kilometre  
SCALE: 1:25,000

**LEGEND**

- Bore Hole
- Dynamic Cone Penetration Test (Cone)
- ⊕ Bore Hole & Cone
- N Standard Penetration Test value (47.5 lb/blow)
- Cone blows/0.3m (60" Cone, 4.75 lb/blow)
- 100% Rock Quality Designation (RQD)
- W.L. in piezometer
- W.L. at time of investigation

**TABLE**

No.	ELEVATION	NORTHING	EASTING
78-10	220.64	5,481,370.7	406,749.7
78-11	221.28	5,481,359.7	406,377.7
97-1	221.09	5,481,350.15	406,324.35
97-1A	221.10	5,481,350.96	406,321.40
97-2	215.82	5,481,355.77	406,761.78
97-2A	216.01	5,481,355.88	406,760.79
97-3	217.28	5,481,349.85	406,798.65
97-3A	217.21	5,481,349.75	406,799.64
97-4	217.29	5,481,349.59	406,301.13
99-1	221.30	5,481,359.09	406,779.68
99-2	221.10	5,481,359.27	406,322.77
99-3	217.28	5,481,340.84	406,302.05

**NOTES**

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

The foundation locations are shown for reference only and may differ from those on the structural drawings.

Base drawing provided by Metronix Rankin in digital format, ref. 9405001002.

NO. DATE BY REVISION

DESIGNER: [Signature]

DATE: 1999

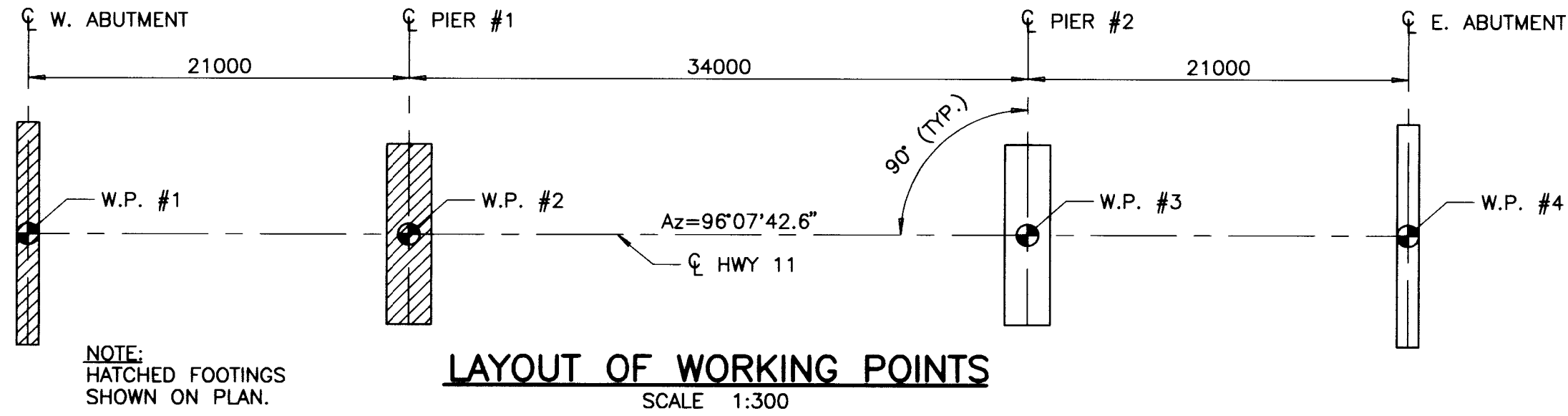
CHKD: [Signature]

APPD: [Signature]

DWG: 01159002



WORKING POINT DATA			
W. P.	STATION	CO-ORDINATES	
		NORTH	EAST
1	15+807.850	5481363135	406245037
2	15+828.850	5481360893	406265917
3	15+862.850	5481357263	406299723
4	15+883.850	5481355021	406320603



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

DIST  
CONT No 2000-0222  
WP No 145-88-00

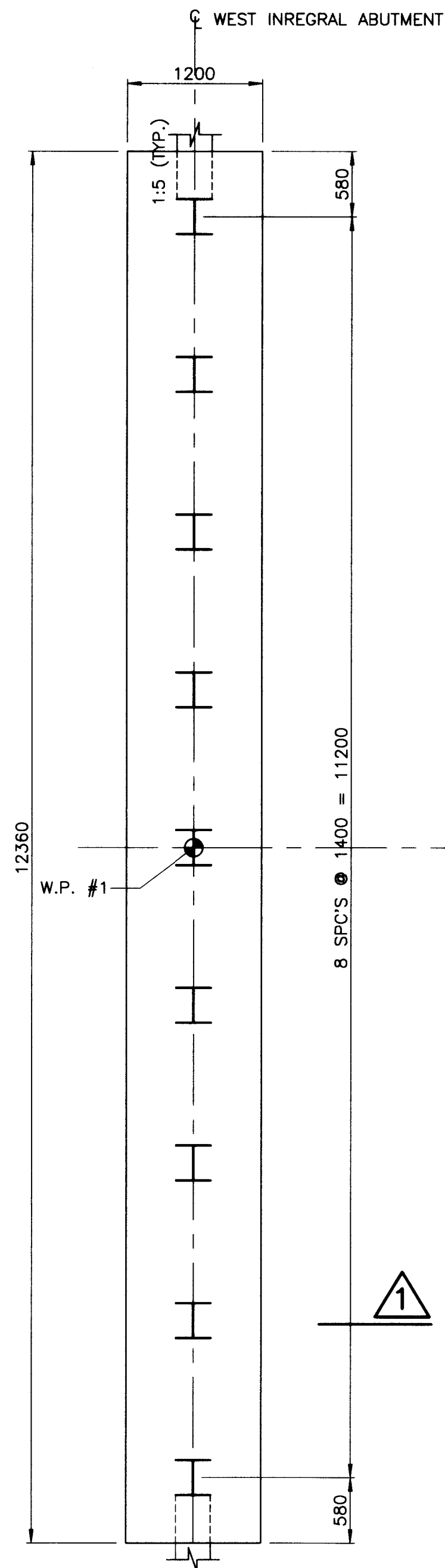
LOST RIVER  
BRIDGE  
FOUNDATION LAYOUT  
AND FOOTING REINFORCEMENT

SHEET  
34

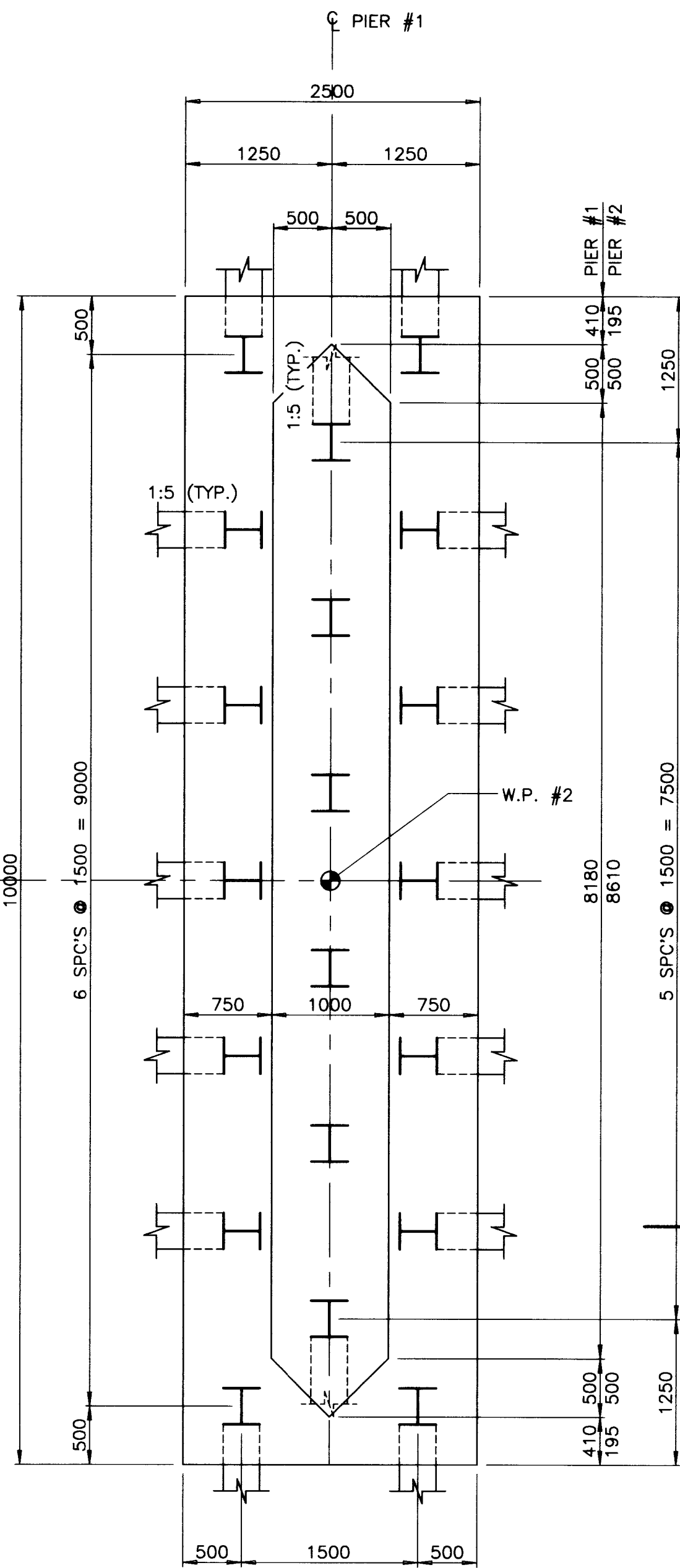
HP310x110 PILE DATA				
LOCATION	BATTER	No. REQ'D	LENGTH (m)	PILE CUT-OFF ELEVATION
W. ABUT.	VERT.	7	16.0	218.600
	1:5	2	16.0	218.600
PIER #1	VERT.	4	8.0	210.600
	1:5	16	8.0	210.600
PIER #2	VERT.	4	9.5	212.100
	1:5	16	9.5	212.100
E. ABUT.	VERT.	7	15.5	218.100
	1:5	2	15.5	218.100

#### PILE NOTES

- PILE SPACING IS MEASURED AT THE UNDERSIDE OF FOOTINGS.
- PILE LENGTHS SHOWN ARE THE THEORETICAL LENGTHS BELOW CUT-OFF.
- PILE SHALL HAVE DRIVING SHOES.
- PILES TO BE DRIVEN IN ACCORDANCE WITH STANDARD SS103-11 USING AN ULTIMATE CAPACITY OF 2800 kN/PILE AT THE ABUTMENTS AND AN ULTIMATE CAPACITY OF 1800 kN/PILE AT THE PIERS.
- THE PILE DRIVING EQUIPMENT SHALL BE CAPABLE OF DELIVERING A MINIMUM SPECIFIED HAMMER ENERGY OF 48 kJ.



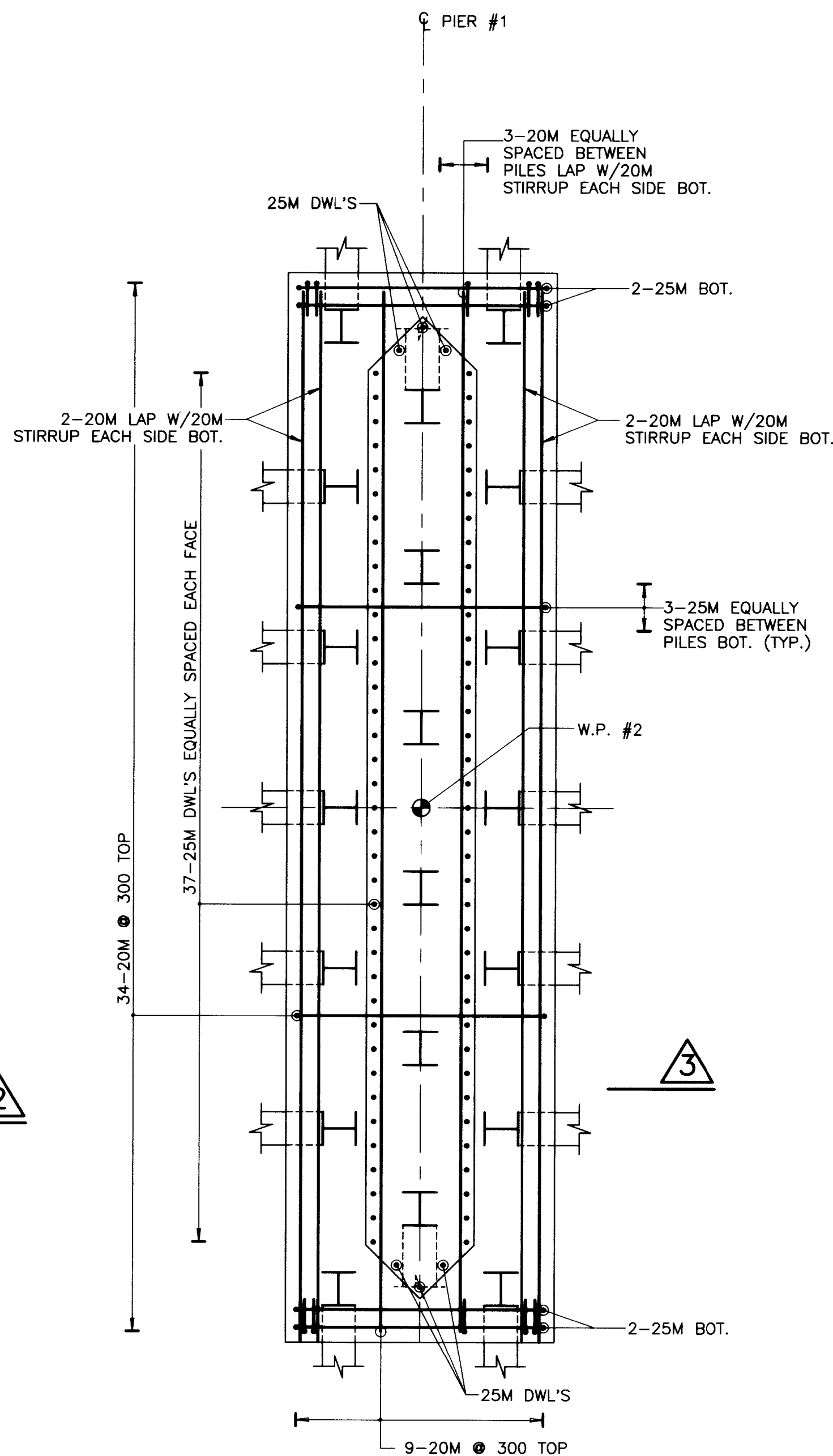
DIMENSIONS (ONLY)  
(FOR REINFORCEMENT SEE DWG. 4)



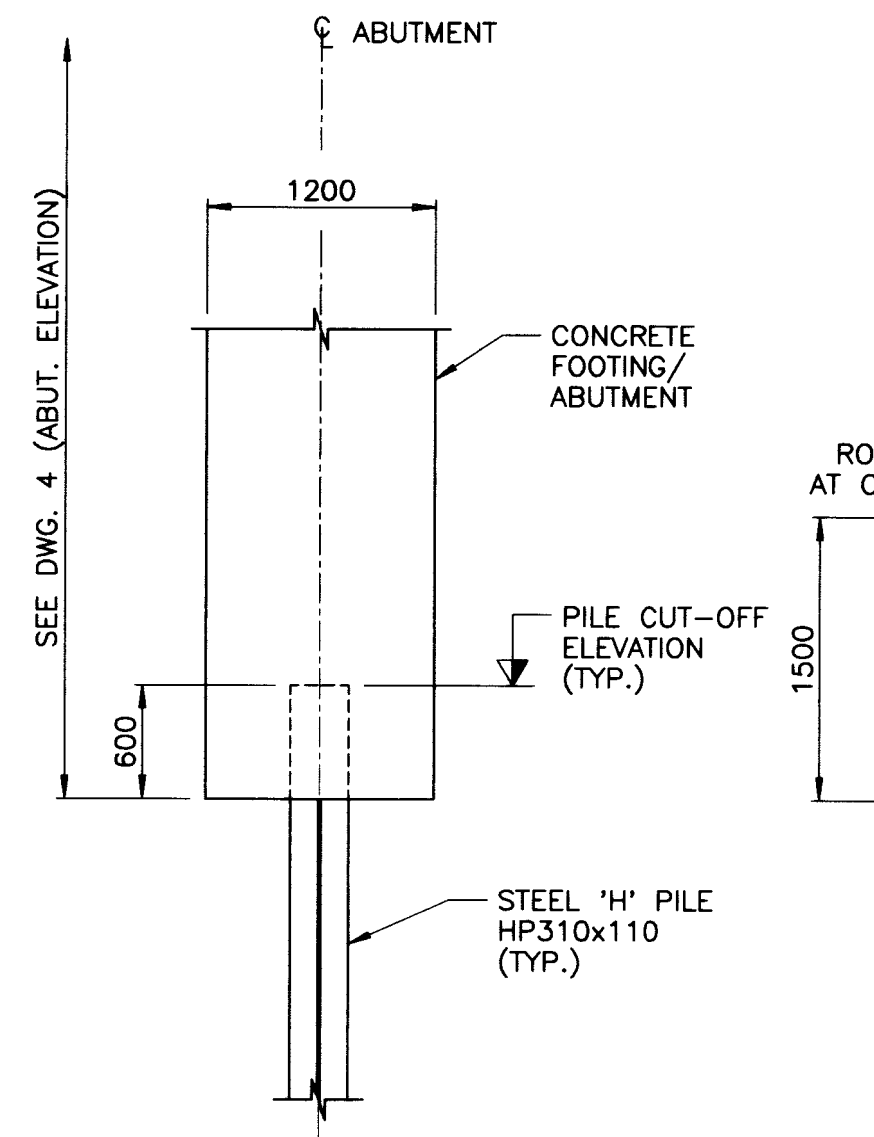
DIMENSIONS

PLAN  
SCALE 1:40

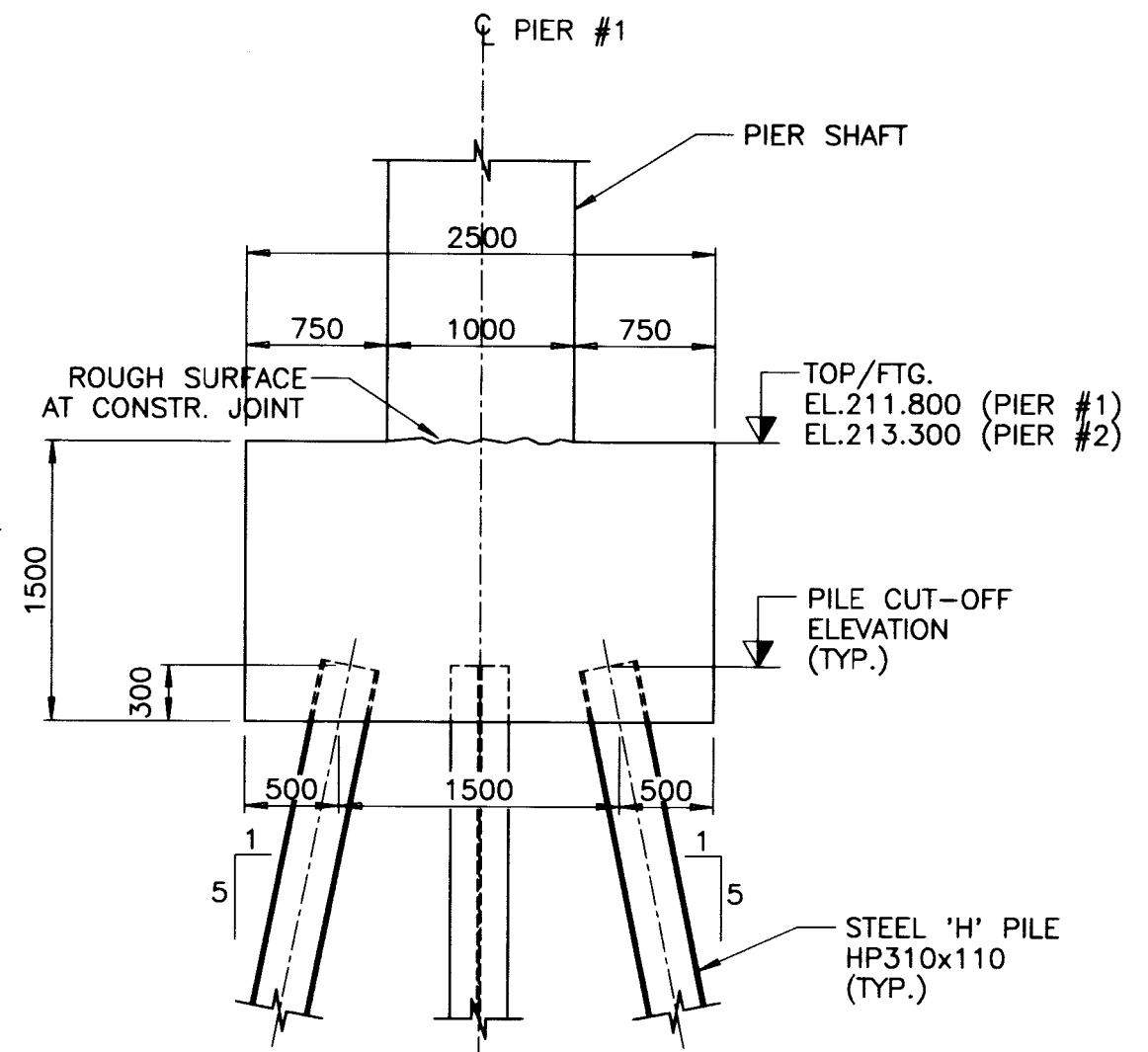
NOTE:  
PIERS #1 AND #2  
SIMILAR EXCEPT AS  
NOTED.



REINFORCEMENT

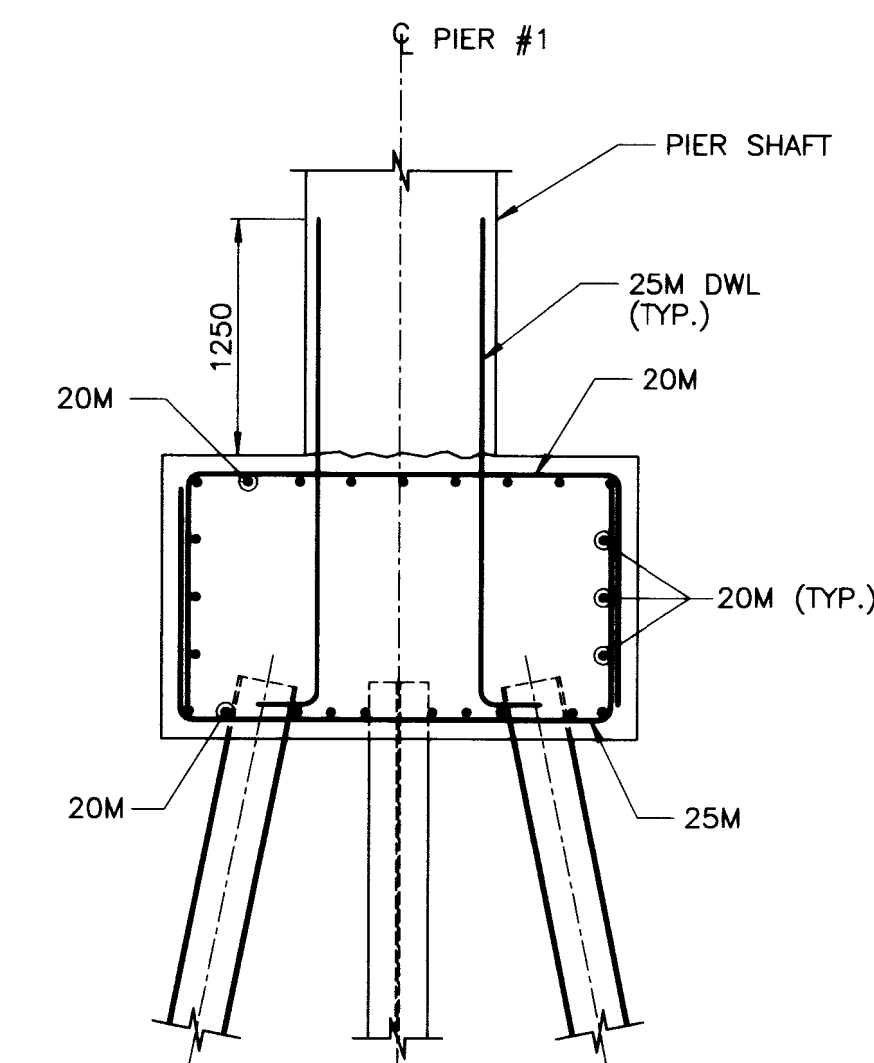


SECTION 1  
SCALE 1:40



SECTION 2  
SCALE 1:40

PILE DESIGN DATA		
LOCATION	FACTORED LOAD SLS (kN)	FACTORED LOAD ULS (kN)
ABUTMENTS	600	1400
PIERS	800	900



SECTION 3  
SCALE 1:40

#### APPLICABLE STANDARD DRAWINGS

- OPSD 3301 SPLICE AND DRIVING SHOE DETAILS FOR STEEL 'H' PILES



REVISIONS		DESCRIPTION	
DESIGN	N.C.T. CHK M.D.	CODE	OHBCD'91
DRAWN	T.P. CHK N.C.T.	SITE	39W-064
STRUCT		SCHEME	
DWG	3		

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



AutoCAD Drawing: D:\Cad drawings\lost river\wingwalls.dwg updated: Apr 26/2000 07:24 AM

METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

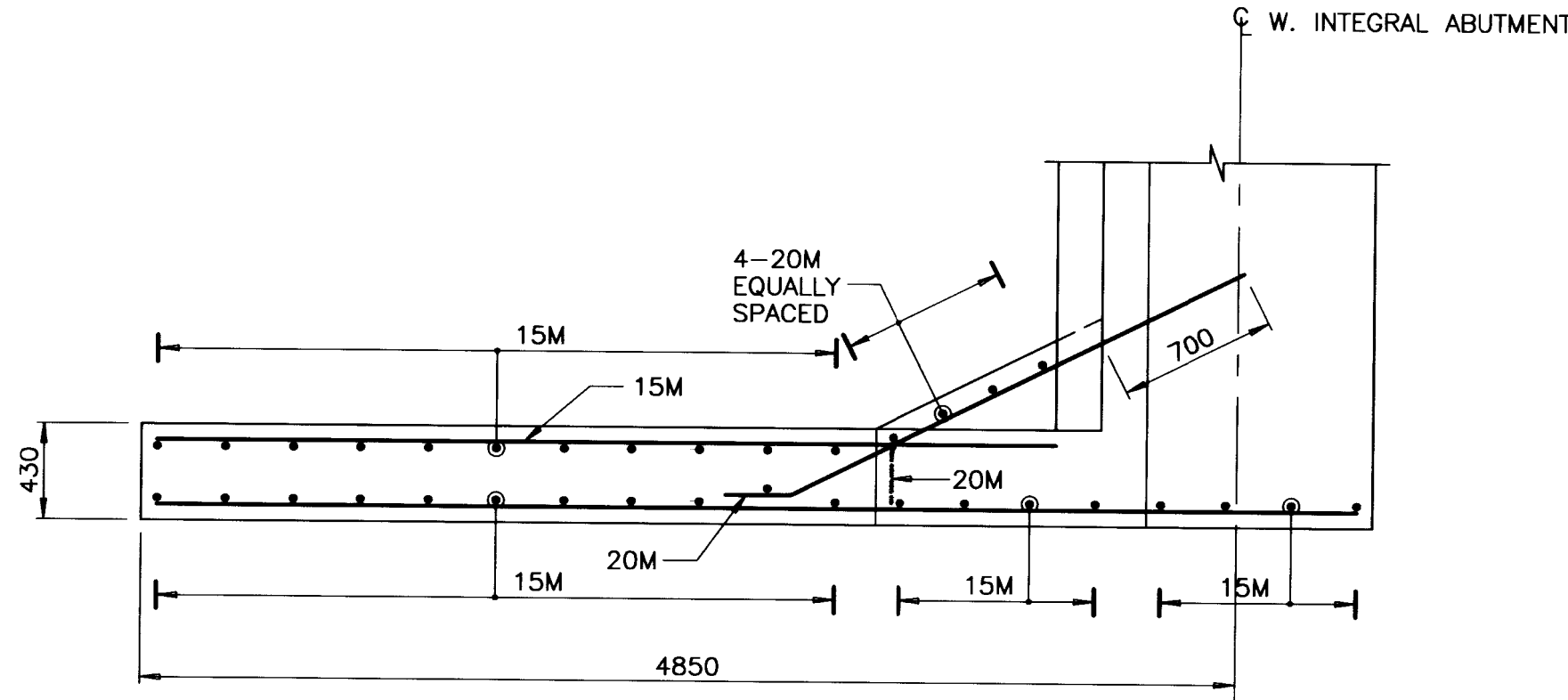
DIST  
CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
WINGWALLS

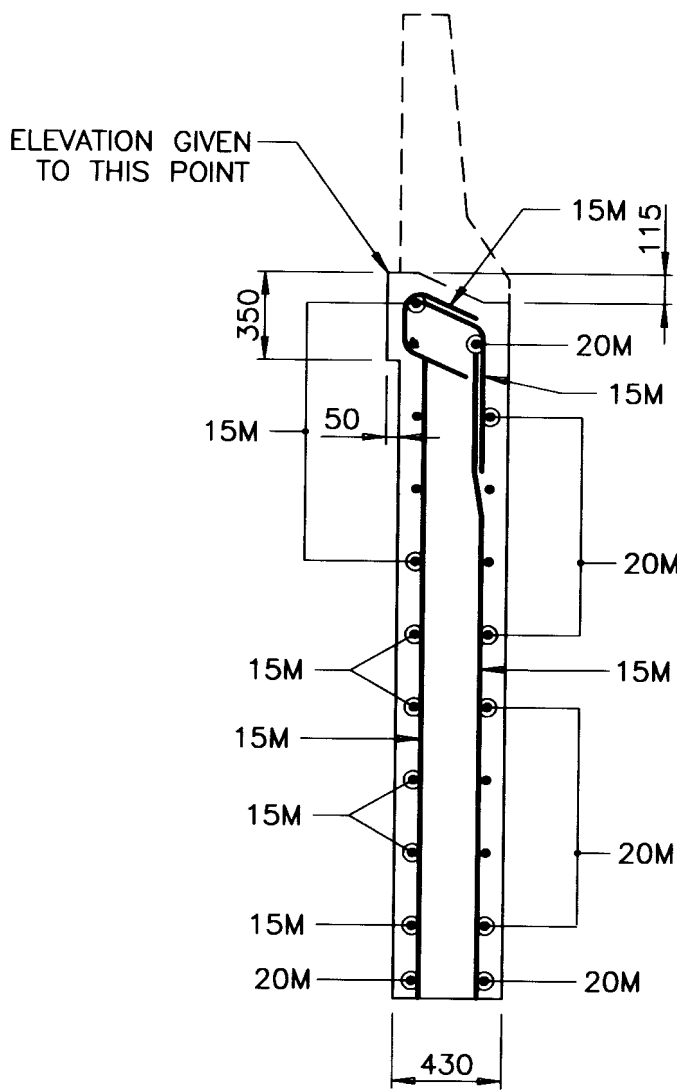
SHEET  
36

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWGS. ##4 & 11.
2. ALL WINGWALLS ARE SIMILAR EXCEPT AS NOTED.

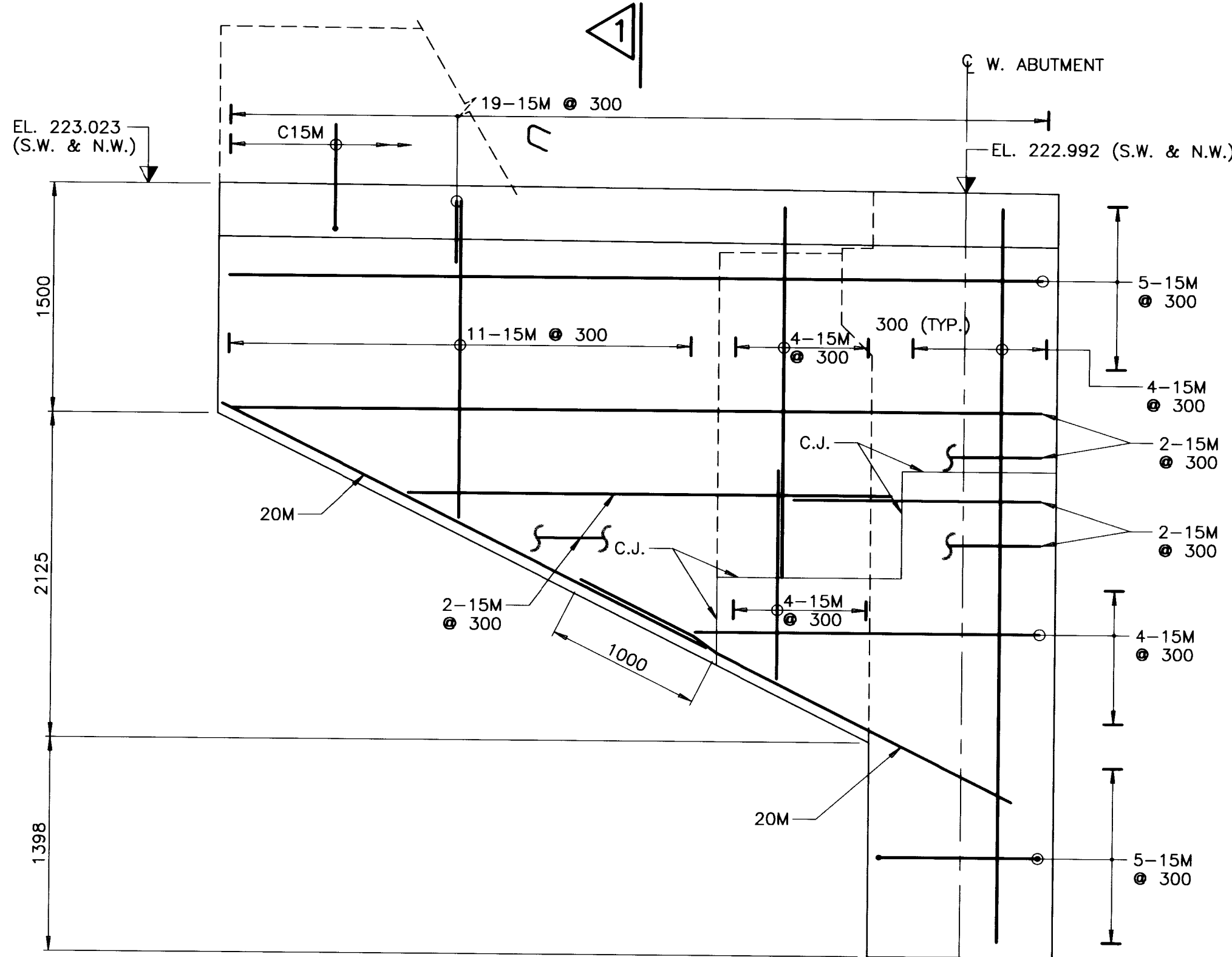


S.W. WINGWALL - PLAN  
SCALE 1:30

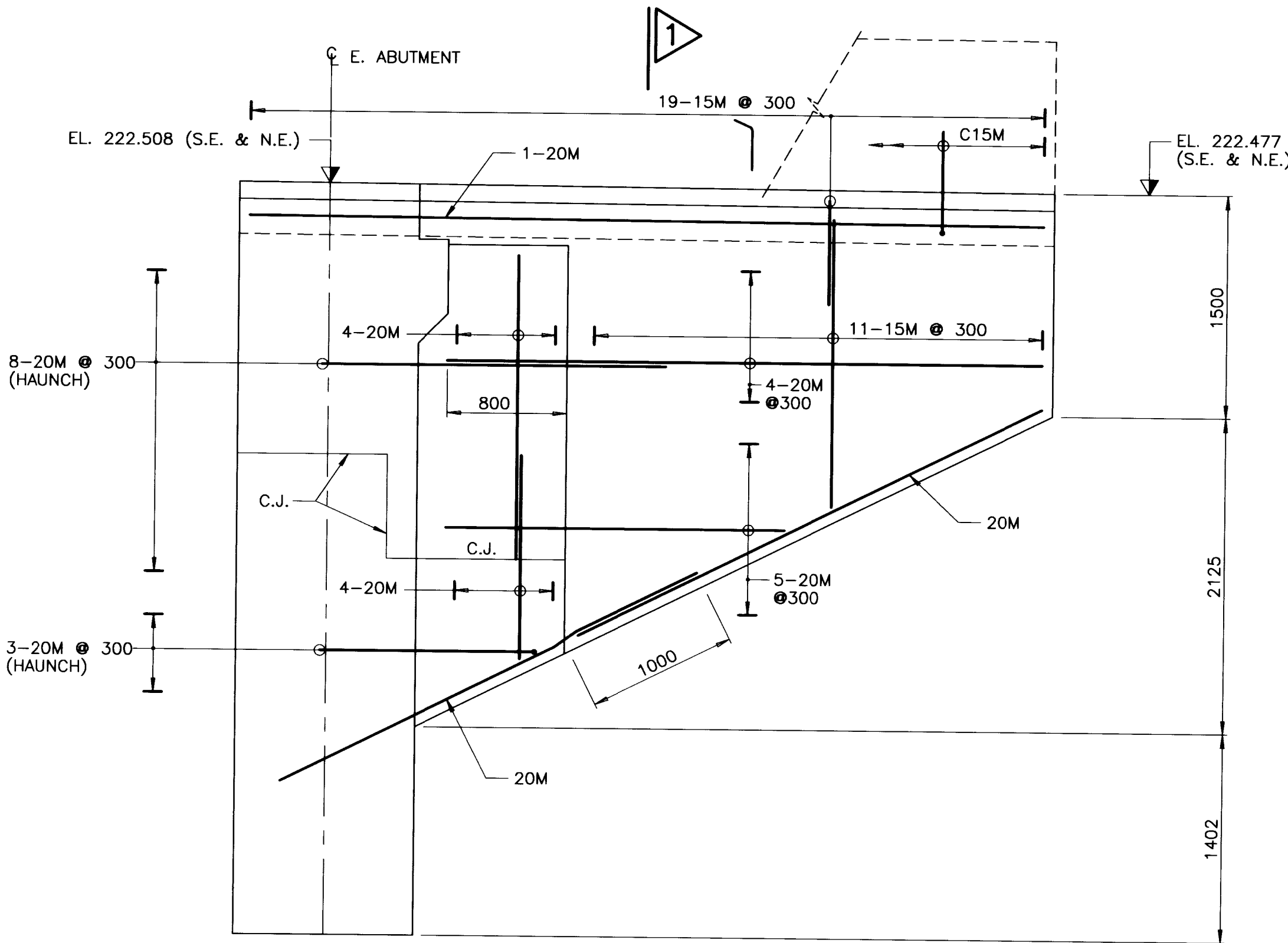


SECTION 1  
SCALE 1:30

NOTE:  
DOWELS TO BARRIER WALL  
NOT SHOWN FOR CLARITY.



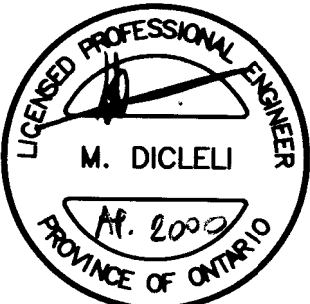
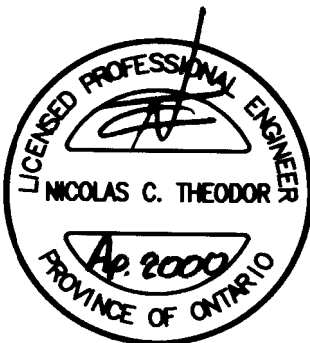
S.W. WINGWALL - OUTSIDE FACE  
SCALE 1:30



N.E. WINGWALL - INSIDE FACE  
SCALE 1:30

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DESCRIPTION	
DESIGN	N.C.T.	CHK.M.D.	CODE OHBDC'91
DRAWN	T.P.	CHK N.C.T.	SITE 39W-064 STRUCT
DATE	FEB., 1999	LOAD CL.-A	SCHEME
DWG	5		







AutoCAD Drawing: D:\Cad drawings\lost river\STRSTEEL\_1.dwg updated: Apr 26/2000 07:26 AM

METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

DIST  
CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
STRUCTURAL STEEL I

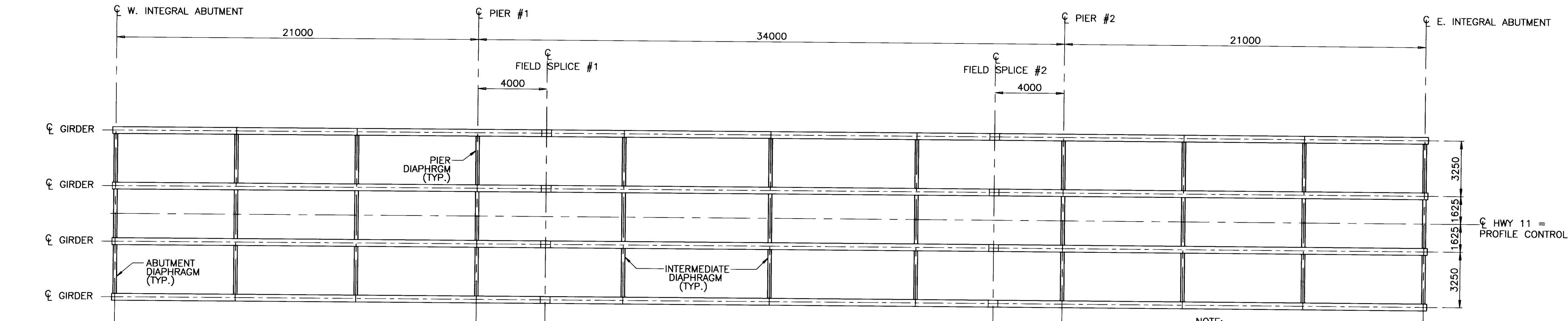
SHEET  
38

GENERAL NOTES

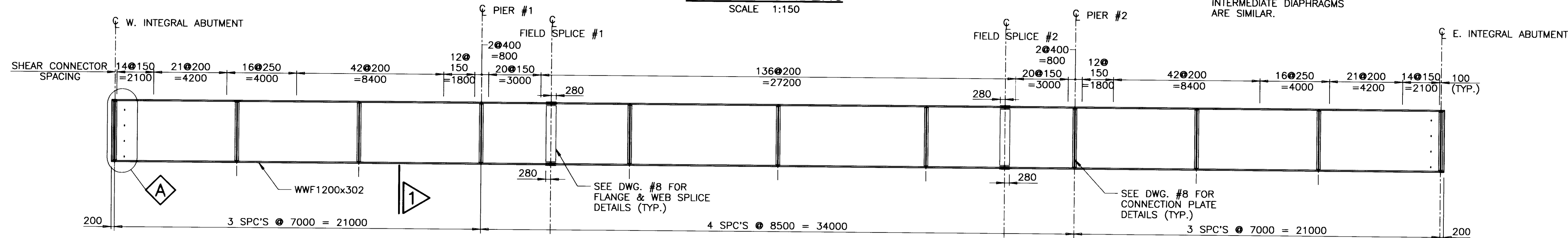
1. ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.21-M92. ROLLED SECTIONS SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.21-M92 OR ASTM SPECIFICATION A588. ALL WWF GIRDERS AND CONNECTION PLATES SHALL BE GRADE 350AT CATEGORY 2. ALL OTHER STRUCTURAL STEEL SHALL BE GRADE 350A.
2. BOLTS SHALL BE ASTM A325M TYPE 3, M22. BOLTS THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANES.
3. STUD SHEAR CONNECTORS SHALL BE 22mm DIAMETER.
4. ALL LENGTHS SHOWN ARE IN THE HORIZONTAL PLANE AND MEASURED AT 20°C.
5. GIRDERS SHALL BE CAMBERED TO VALUES SHOWN IN THE RELAXED CAMBER DIAGRAM.
6. RELAXED CAMBER ORDINATES INCLUDE AN ALLOWANCE FOR GIRDER SELF-WEIGHT, CONCRETE DECK, SUPERIMPOSED DEAD LOADS AND PROFILE OF HIGHWAY.
7. THE ENDS OF GIRDERS, AND BEARING STIFFENERS SHALL BE TRULY VERTICAL UNDER FULL DEAD LOAD.
8. ALL BUTT WELDS IN FLANGE AND WEB SHOP SPLICES SHALL BE FINISHED FLUSH OR SMOOTH AS INDICATED, BY GRINDING WHERE NECESSARY IN THE DIRECTION OF APPLIED STRESSES. IF RELOCATION OR ADDITIONAL SHOP SPLICES ARE REQUIRED, THEIR LOCATION SHALL BE APPROVED BY THE ENGINEER.
9. UNLESS OTHERWISE NOTED, MINIMUM FILLET WELD SHALL BE AS FOLLOWS:

MATERIAL THICKNESS OF THICKER PART JOINED (mm)	MINIMUM SIZE OF FILLET WELD (mm)
TO 12 INCLUSIVE	5
OVER 12 TO 20	6
OVER 20 TO 40	8
OVER 40 TO 60	10
OVER 60 TO 120	12

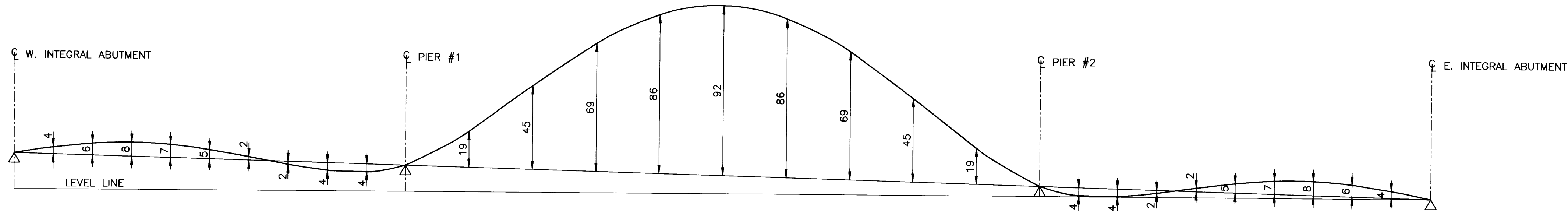
10. THE CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION AND ERECTION UNTIL THE STRUCTURAL STEEL IS IN ITS FINAL LOCATION WITH ALL PERMANENT BRACING, CONNECTIONS AND SUPPORTS IN PLACE AND THE CONCRETE IN THE DECK HAS REACHED 75% OF ITS SPECIFIED STRENGTH.



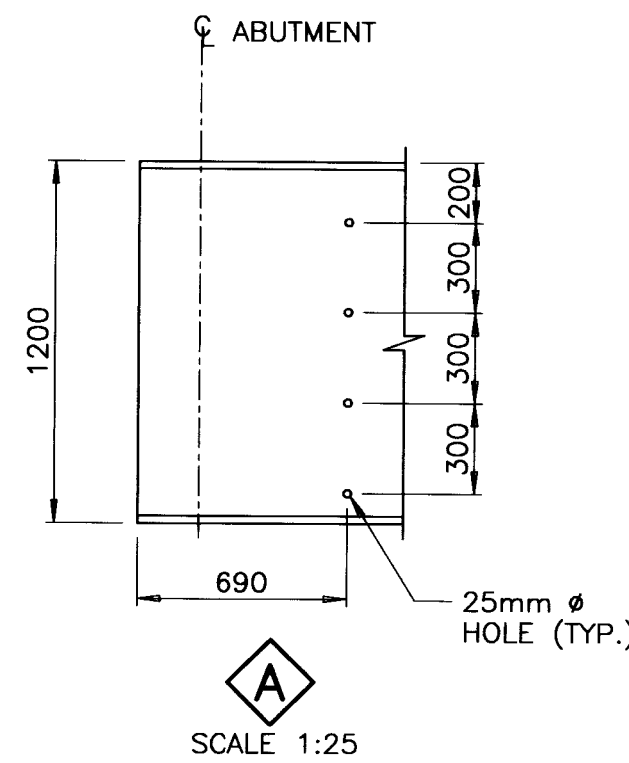
PLAN - GIRDERS  
SCALE 1:150



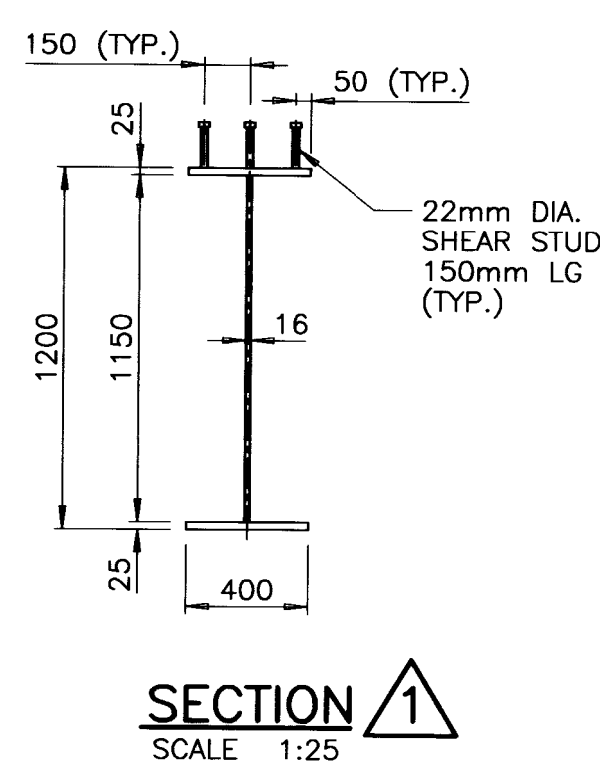
GIRDER ELEVATION  
SCALE 1:150 HORIZ.  
1:50 VERT.



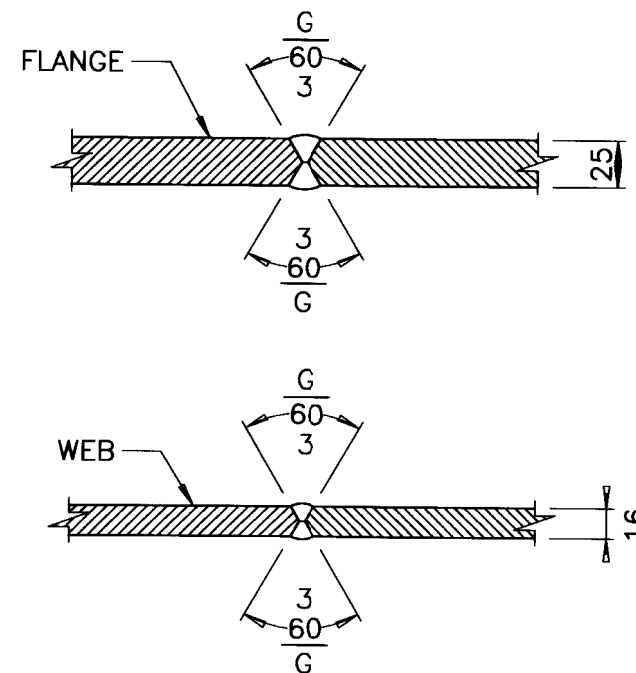
RELAXED CAMBER DIAGRAM  
N.T.S.



SCALE 1:25



SECTION 1  
SCALE 1:25



TYPICAL SHOP SPLICE DETAILS  
N.T.S.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS	DESCRIPTION
DESIGN N.C.T. CHK M.D. CODE OHBDC'91 LOAD CL-A DATE MARCH, 1999	
DRAWN T.P. CHK N.C.T. SITE 39W-064 STRUCT SCHEME DWG 7	





METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

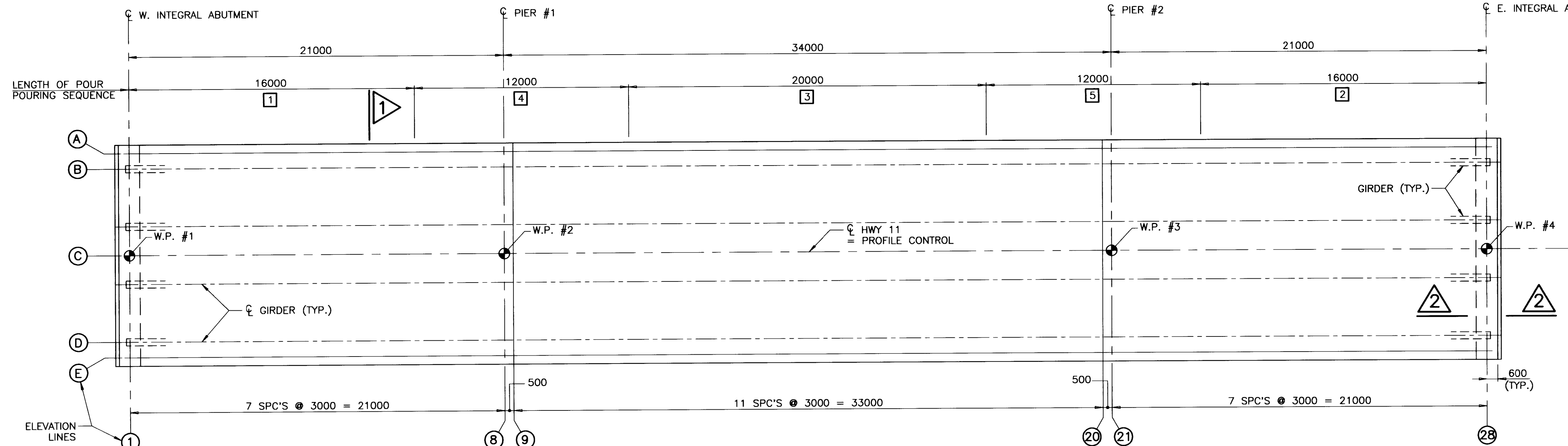
DIST  
CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
DECK DETAILS

SHEET  
40

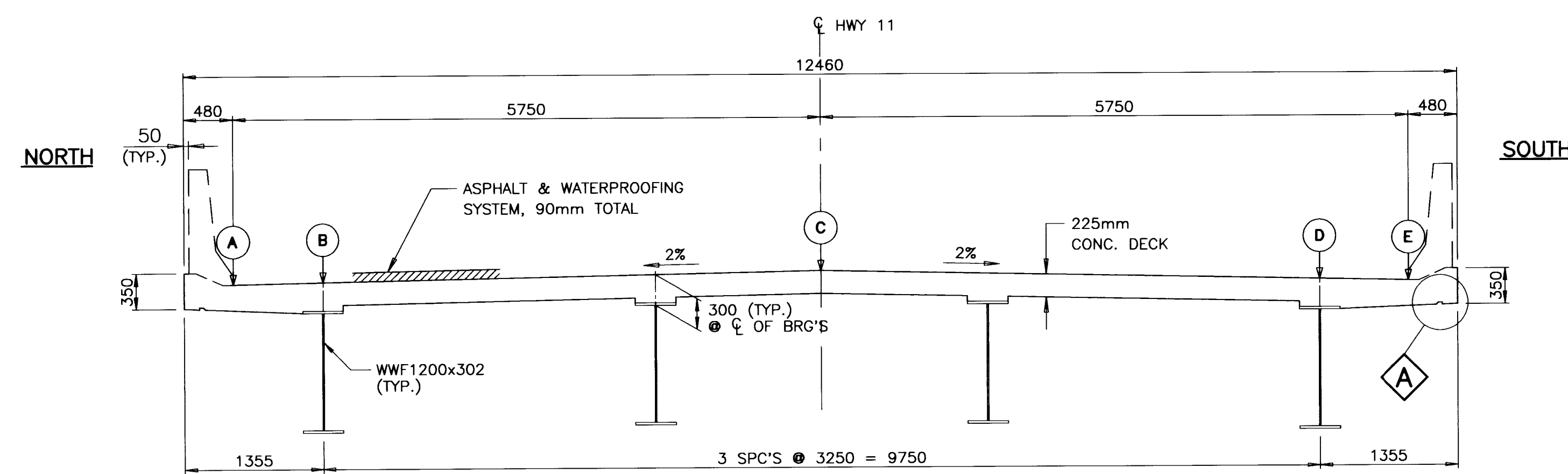
### NOTES

- SCREED ELEVATIONS ARE TO TOP OF CONCRETE.
- POURS 1, 2 AND 3 MAY BE POURED SIMULTANEOUSLY.
- SCREED ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR ROADWAY PROFILE, WEIGHT OF DECK SLAB AND SUPERIMPOSED DEAD LOAD.
- CONCRETE IN DECK SLAB SHALL BE RETARDED USING A TYPE 'R<sub>x</sub>' RETARDER FOR THE DURATION OF THE POUR.
- CONCRETE SHALL REMAIN PLASTIC IN POURING OF SEGMENTS WITH THE SAME SEQUENCE NUMBER.
- MINIMUM CONCRETE STRENGTH OF PREVIOUS DECK POUR SHALL BE 20 MPa BEFORE PROCEEDING WITH THE POUR.
- CONCRETE IN BARRIER WALLS SHALL NOT BE PLACED UNTIL ALL CONCRETE IN DECK SLAB HAS REACHED A STRENGTH OF 20 MPa.

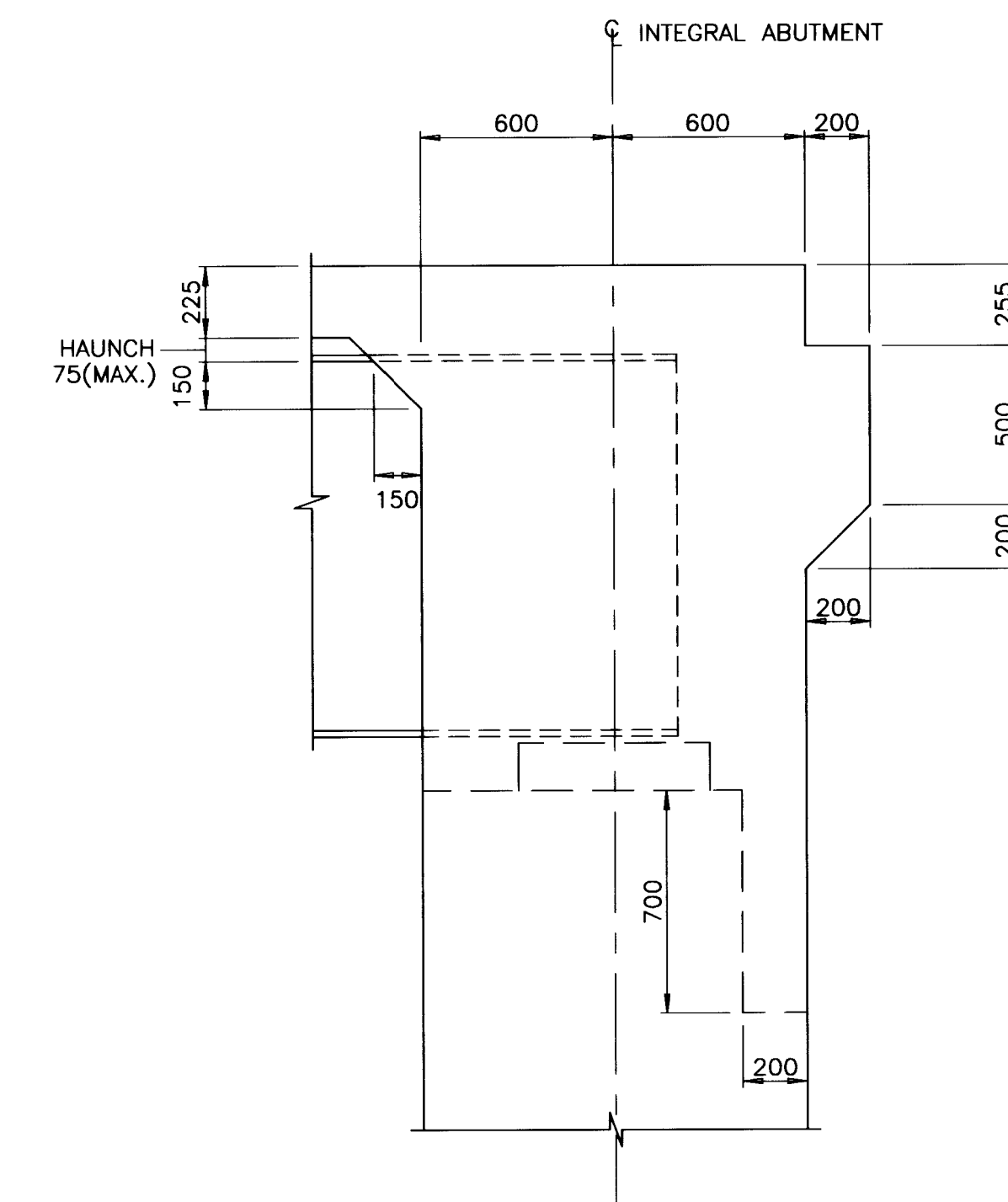


PLAN  
SCALE 1:150

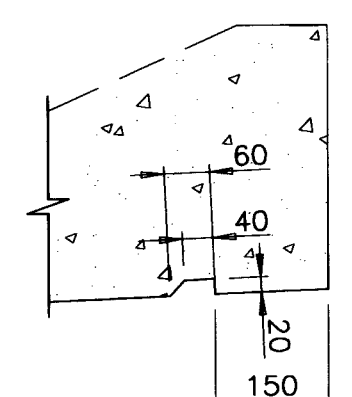
SCREED ELEVATIONS					
LINE	(A)	(B)	(C)	(D)	(E)
1	222.877	222.894	222.992	222.894	222.877
2	222.862	222.879	222.977	222.879	222.862
3	222.845	222.862	222.960	222.862	222.845
4	222.825	222.842	222.940	222.842	222.825
5	222.803	222.820	222.918	222.820	222.803
6	222.780	222.797	222.895	222.797	222.780
7	222.759	222.776	222.874	222.776	222.759
8	222.743	222.760	222.858	222.760	222.743
9	222.742	222.759	222.857	222.759	222.742
10	222.738	222.755	222.853	222.755	222.738
11	222.739	222.756	222.854	222.756	222.739
12	222.739	222.756	222.854	222.756	222.739
13	222.734	222.751	222.849	222.751	222.734
14	222.722	222.739	222.837	222.739	222.722
15	222.702	222.719	222.817	222.719	222.702
16	222.676	222.693	222.791	222.693	222.676
17	222.643	222.660	222.758	222.660	222.643
18	222.605	222.622	222.720	222.622	222.605
19	222.566	222.583	222.681	222.583	222.566
20	222.532	222.549	222.647	222.549	222.532
21	222.527	222.544	222.642	222.544	222.527
22	222.503	222.520	222.618	222.520	222.503
23	222.486	222.503	222.601	222.503	222.486
24	222.471	222.488	222.586	222.488	222.471
25	222.455	222.472	222.570	222.472	222.455
26	222.437	222.454	222.552	222.454	222.437
27	222.416	222.433	222.531	222.433	222.416
28	222.393	222.410	222.508	222.410	222.393



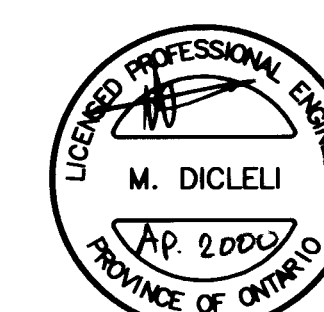
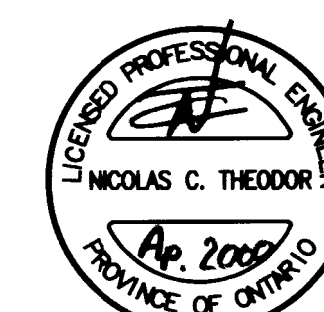
TYPICAL DECK SECTION 1  
SCALE 1:40



SECTION 2  
SCALE 1:20



DETAIL A  
SCALE 1:10



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

### APPLICABLE STANDARD DRAWINGS

- OPSD 3930.00 METHOD OF OBTAINING SCREED ELEVATIONS - STEEL GIRDERS.
- OPSD 3950.00 DRAINAGE OF ASPHALT WEARING SURFACE ON NEW DECKS.
- OPSD 3906.02 BRIDGE DECK WATERPROOFING.

REVISIONS		DESCRIPTION				
DESIGN	N.C.T.	CHK	M.D.	CODE	OHBC'91	LOAD CL.-A
DRAWN	T.P.	CHK	N.C.T.	SITE	39W-064	STRUCT
						SCHEME
						DWG 9

DIST  
CONT No 2000-0222  
WP No 145-88-00

SHEET  
41

FOR DOWEL BARS TO BARRIER WALLS SEE DWG. #11.



NOTE:  
DECK REINFORCEMENT  
NOT SHOWN FOR  
CLARITY.

**SECTION**  
**SCALE 1:25**



- OPSD 3923.00 SUPPORTS FOR REINFORCING STEEL.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

TYPICAL DECK SECTION  
SCALE 1:25

AutoCAD Drawing: D:\Cad drawings\lost river\deck\_r.dwg updated: Apr 26/2000 07:31 AM

AutoCAD Drawing: D:\Cad drawings\lost\_river\ss110-60p.dwg updated: Apr 26/2000 07:32 AM

# METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No2000-0222  
WP No 145-88-00

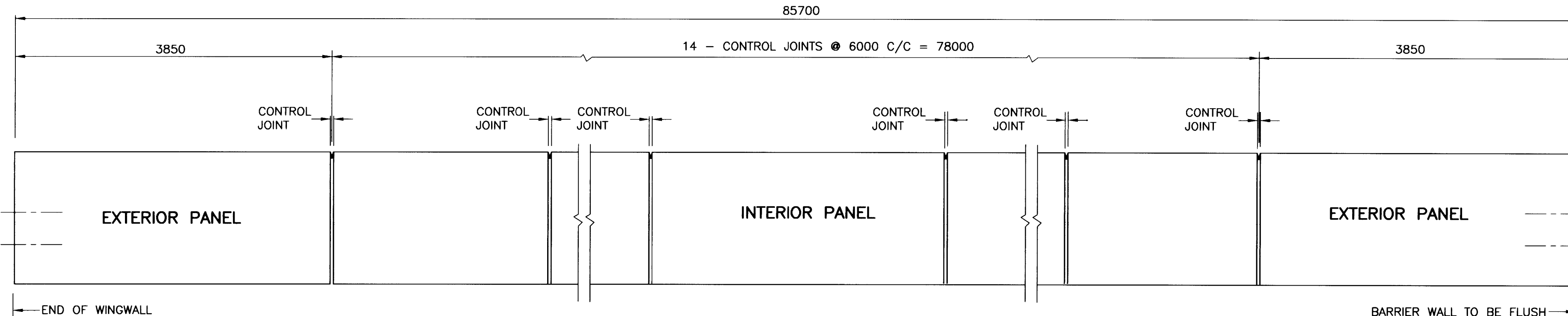
LOST RIVER  
BRIDGE  
BARRIER WALL W/O RAILING  
PERFORMANCE LEVEL 3

SHEET  
42

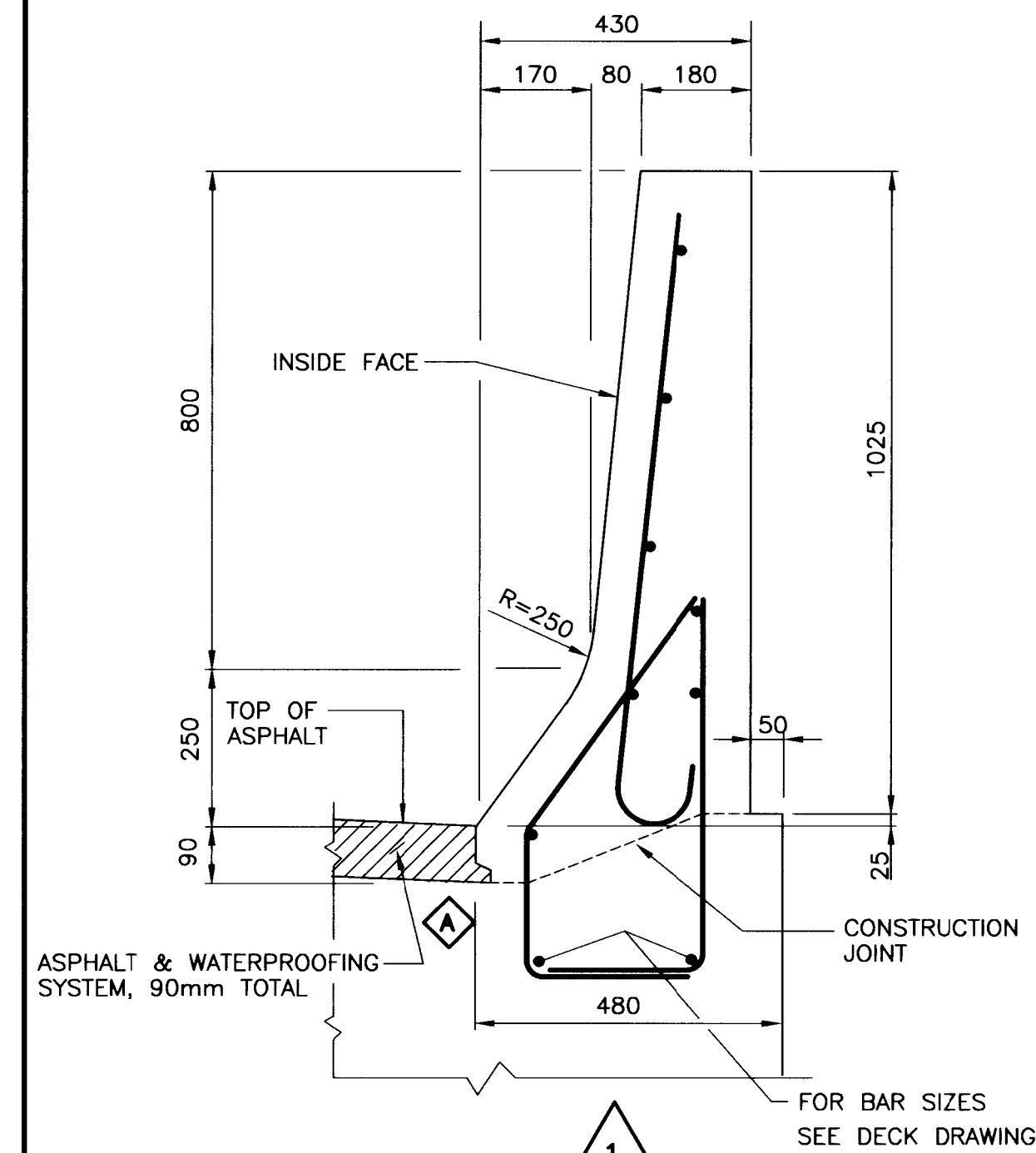
## NOTES:

- CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL
- CONCRETE COVER TO REINFORCING STEEL 70 ±20mm.
- BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
- MINIMUM BAR LAP SPLICE TO BE 550mm.
- LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
- CONTROL JOINT TO BE FORMED.
- SAWCUTS NOT PERMITTED.
- CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
- OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL
- LEGEND  
EF DENOTES EACH FACE  
IF DENOTES INSIDE FACE  
OF DENOTES OUTSIDE FACE

BAR MARK	SIZE	SHAPE
①	C15M	
②	C15M	
③	C15M	
④	C15M	
⑤	C15M	
⑥	C15M	STRAIGHT

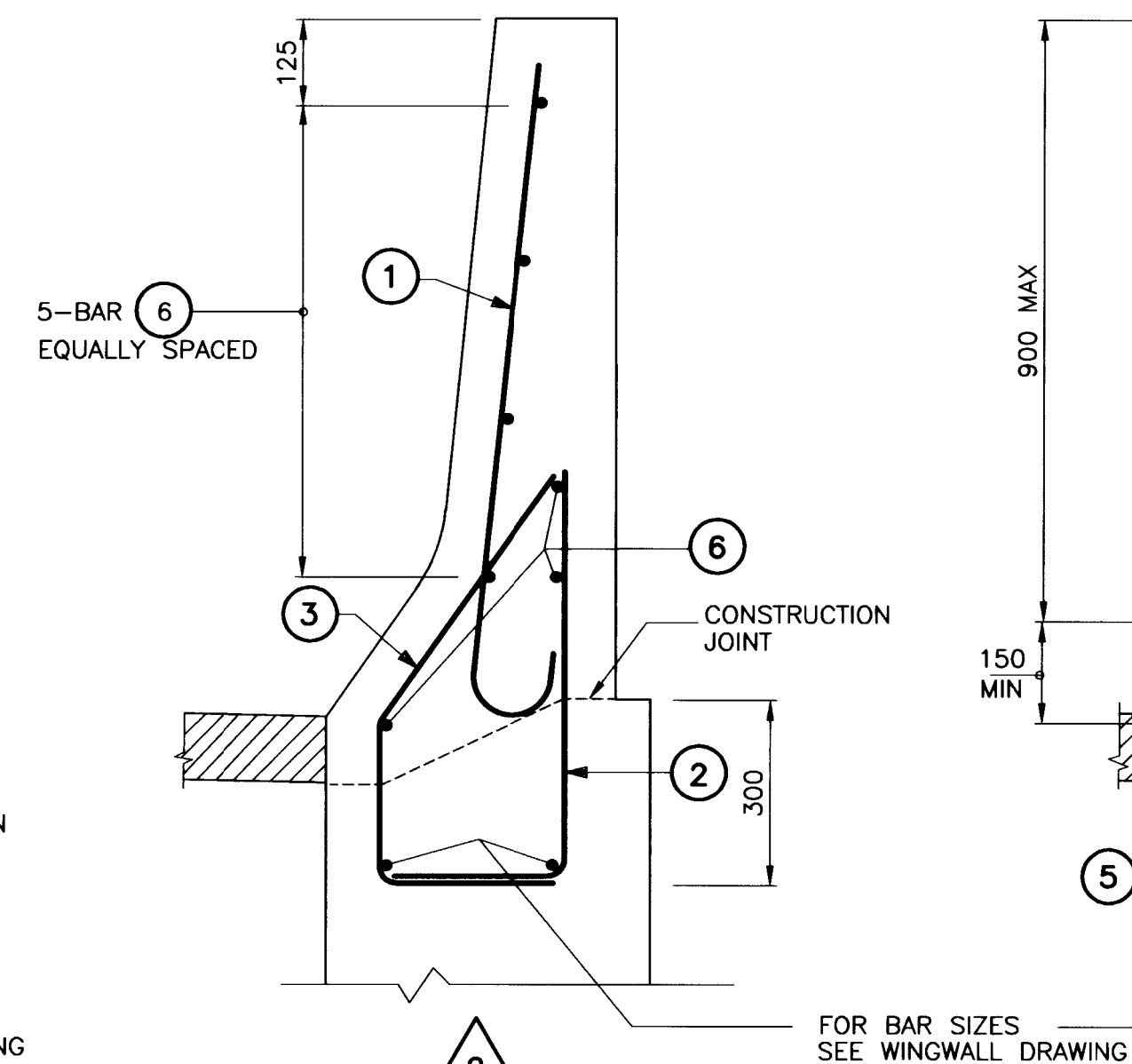


ELEVATION



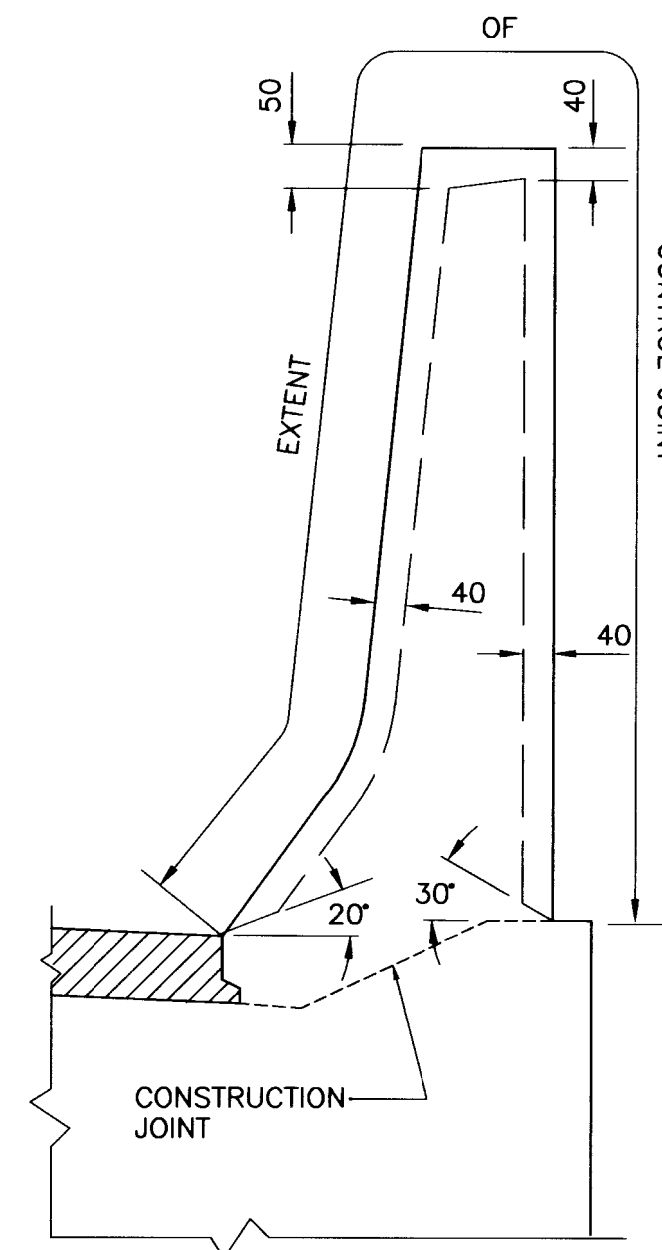
BARRIER WALL ON DECK

TYPICAL DIMENSIONS (FOR BAR NUMBERS SEE 2)

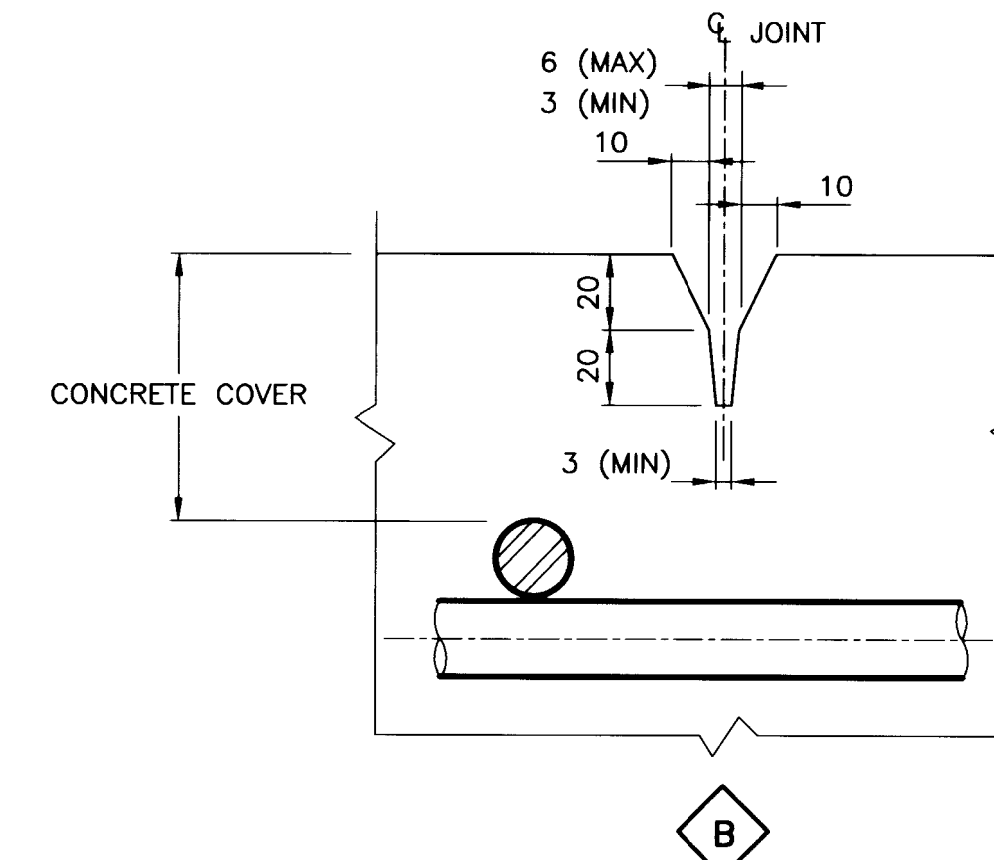


BARRIER WALL ON WINGWALL

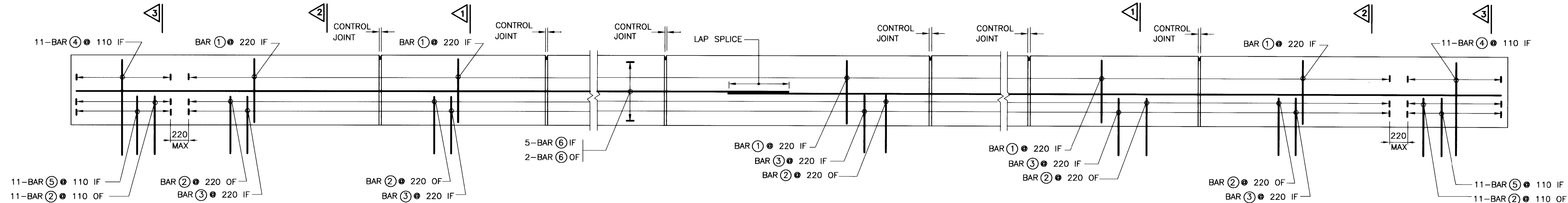
TYPICAL REINFORCING



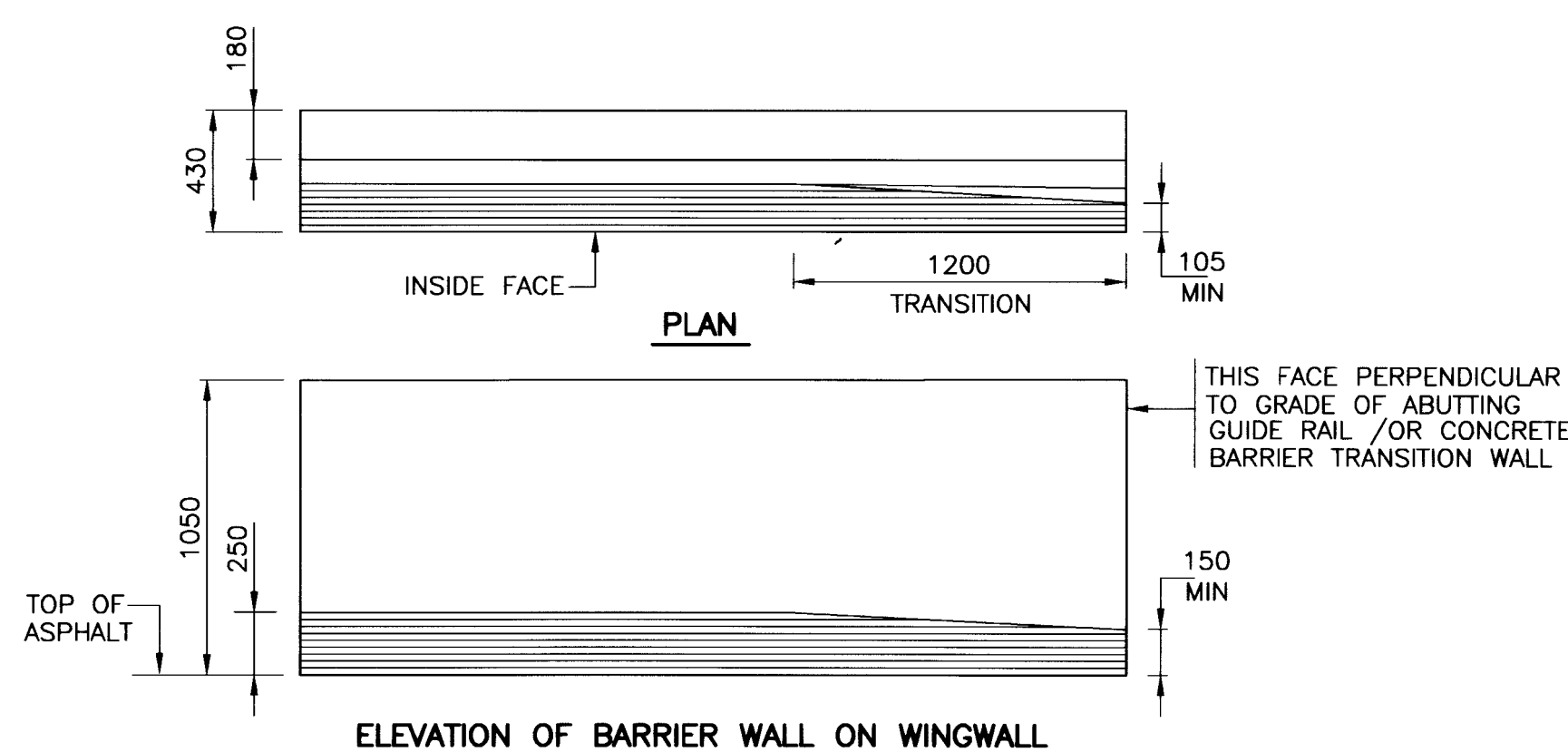
EXTENT OF CONTROL JOINT IN BARRIER WALL



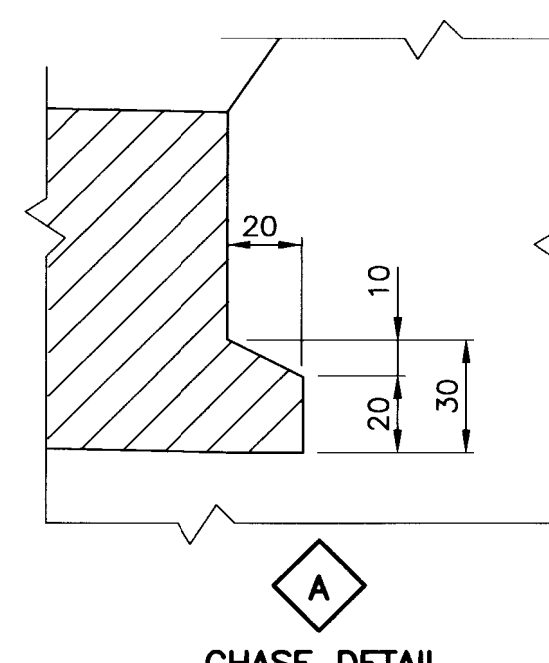
CONTROL JOINT DETAIL



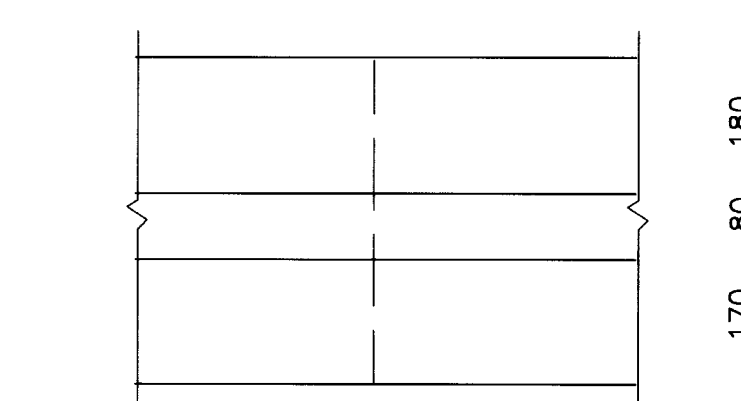
TYPICAL REINFORCING ARRANGEMENT



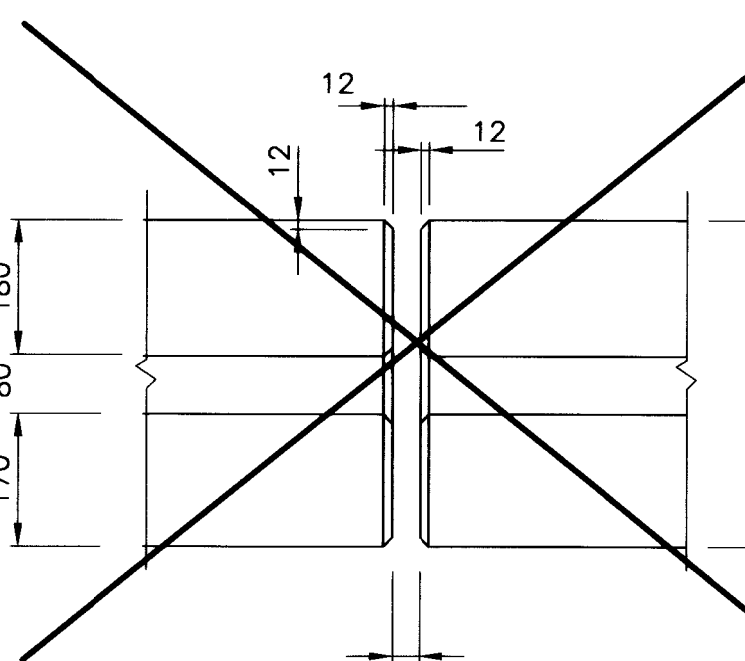
ELEVATION OF BARRIER WALL ON WINGWALL



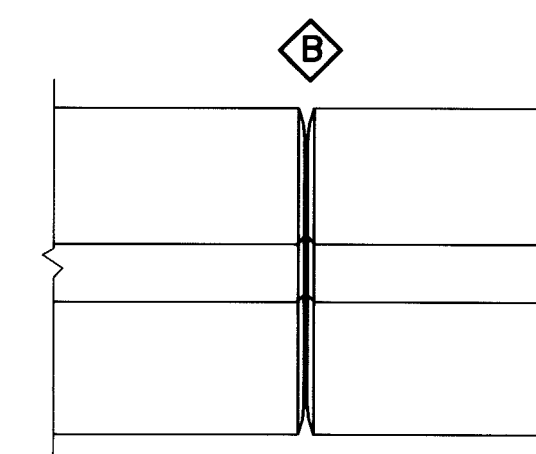
CHASE DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

## MODIFIED

STANDARD DRAWING  
MARCH 1997

SS110-60

BARRIER WALL W/O RAILING  
PERFORMANCE LEVEL 3

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	STD	CHK	CODE OHBDC '91
DRAWN	A.P.	CHK N.C.T.	SITE 39W-064
DATE	DEC., 1998	DWG	11



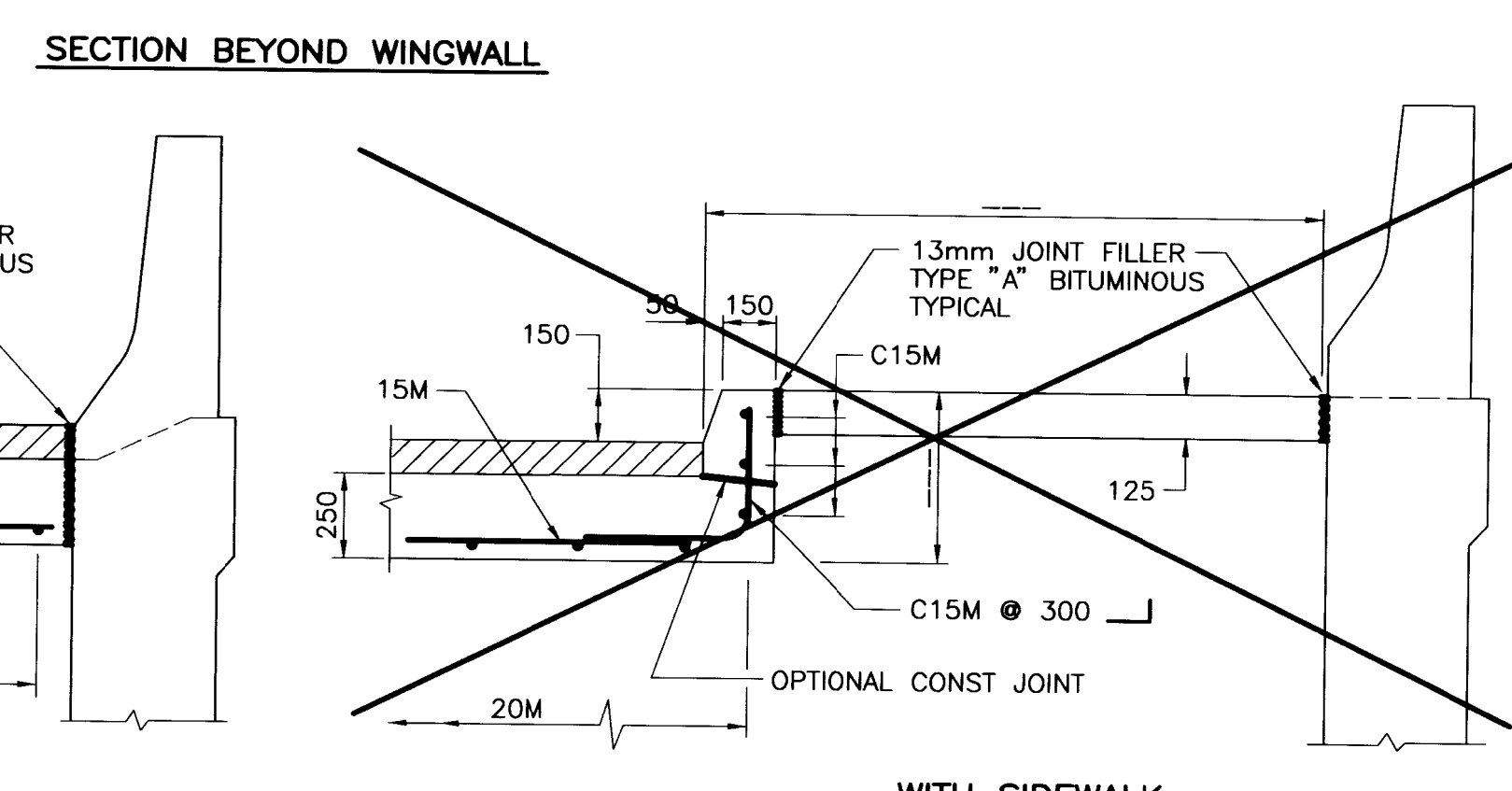
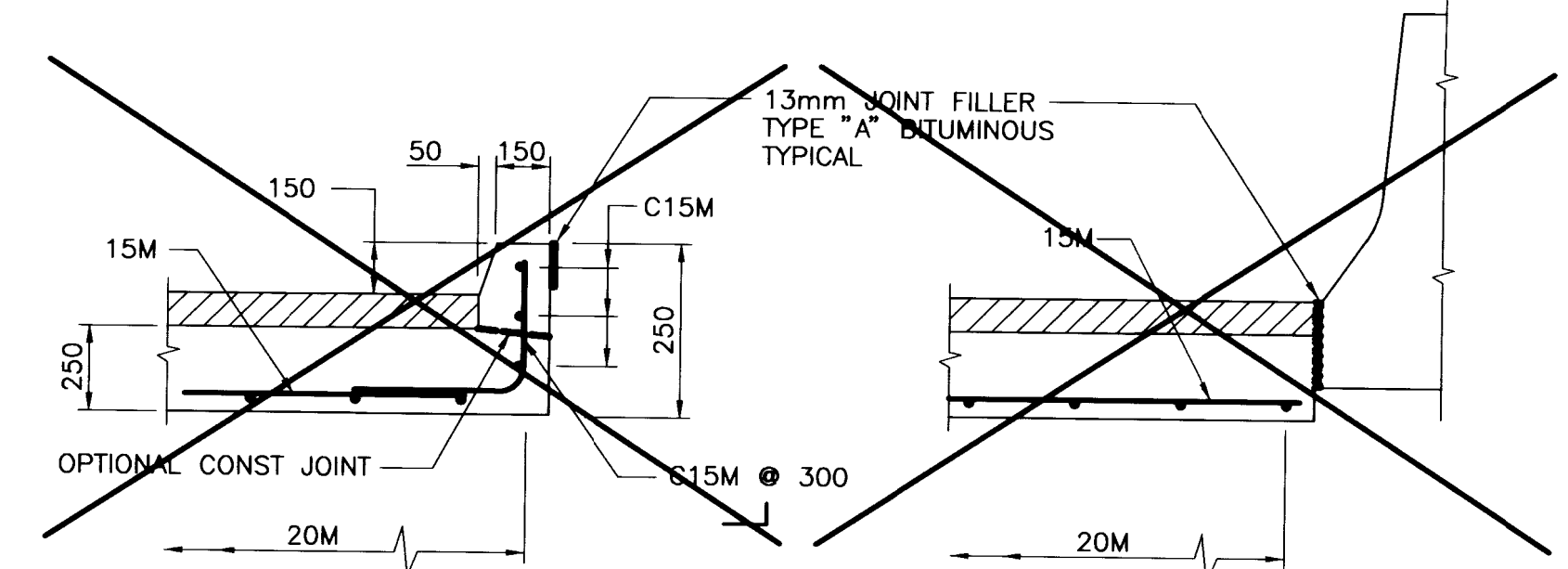
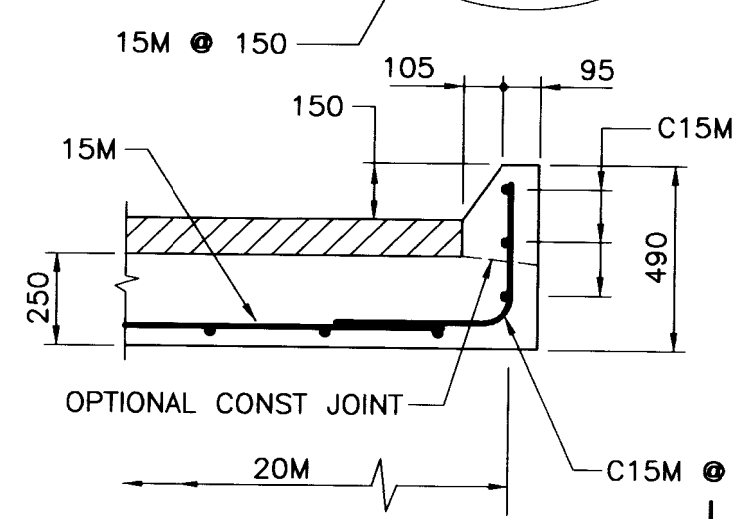
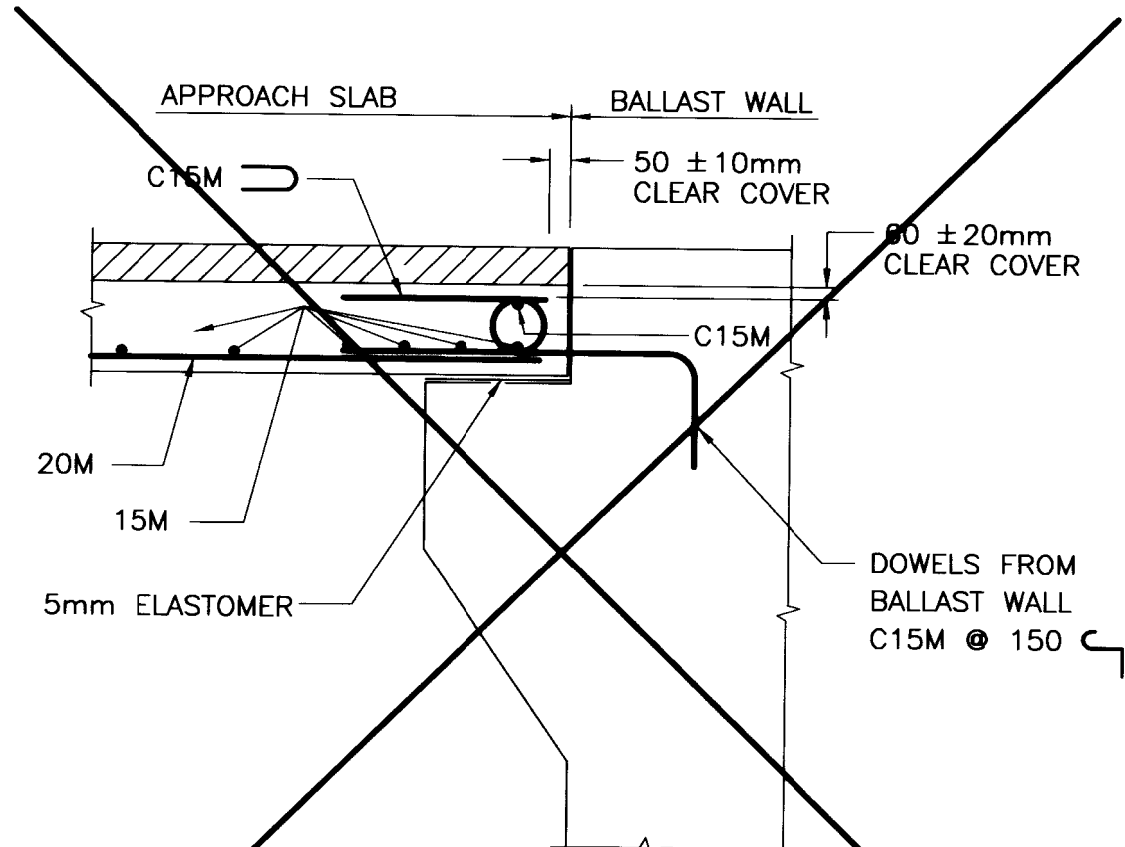
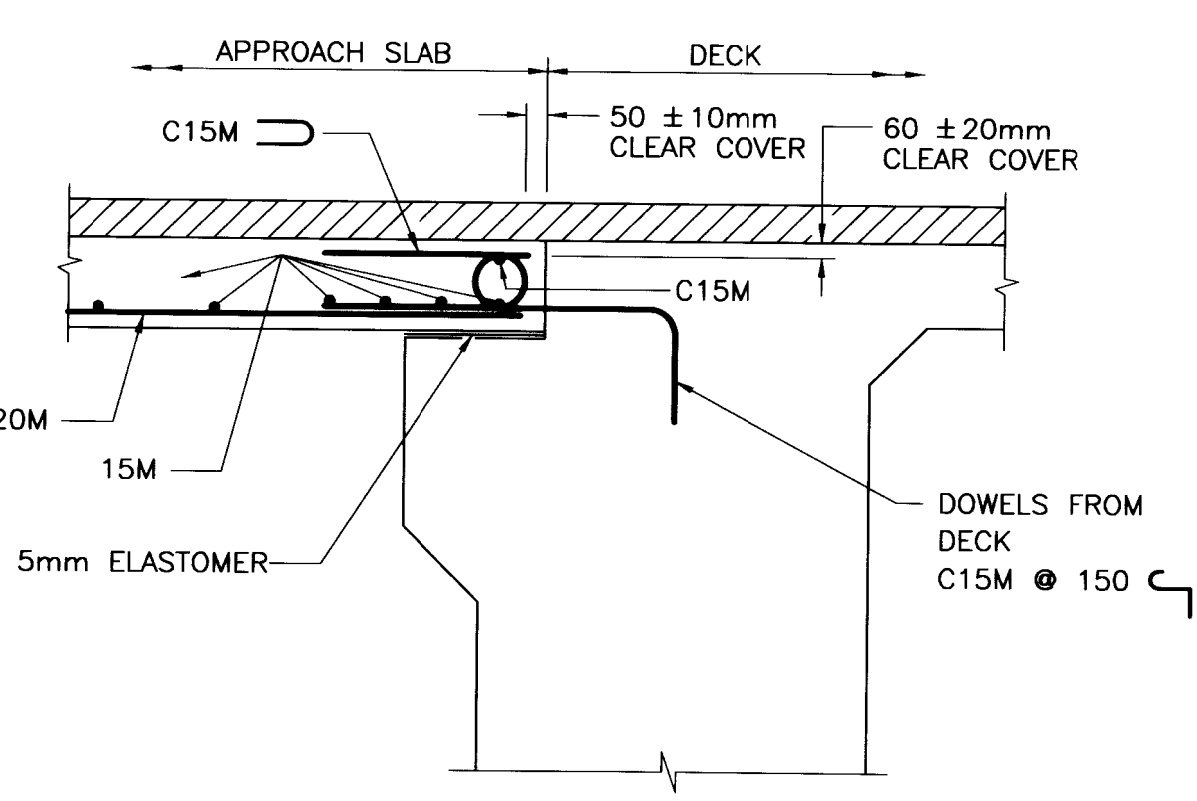
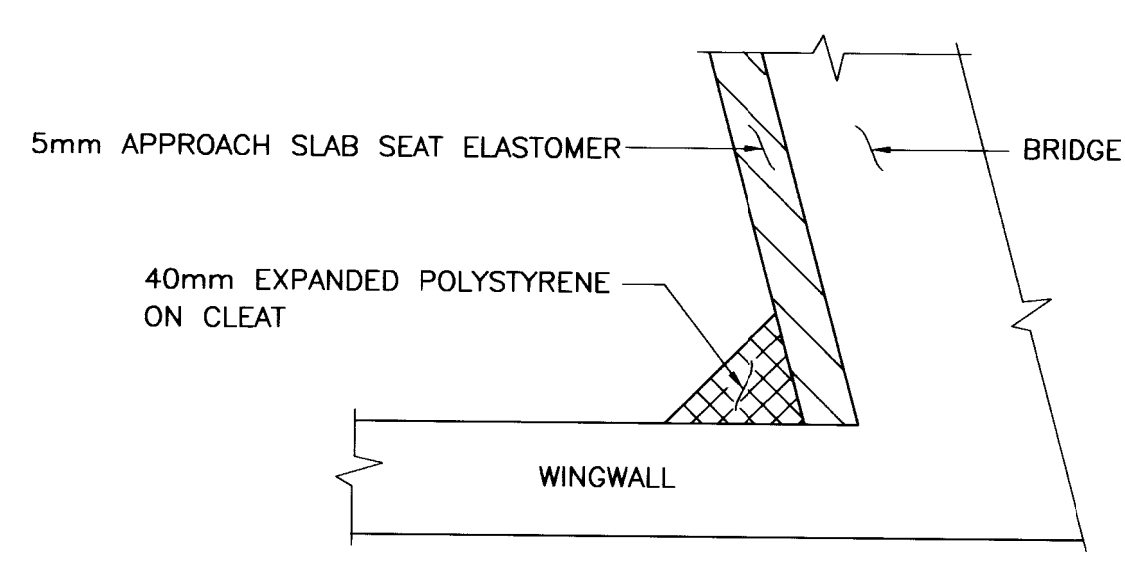
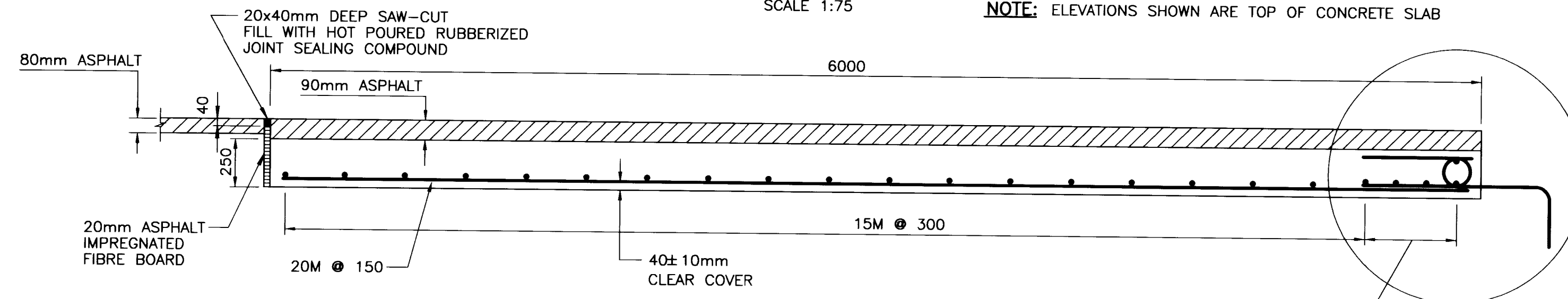
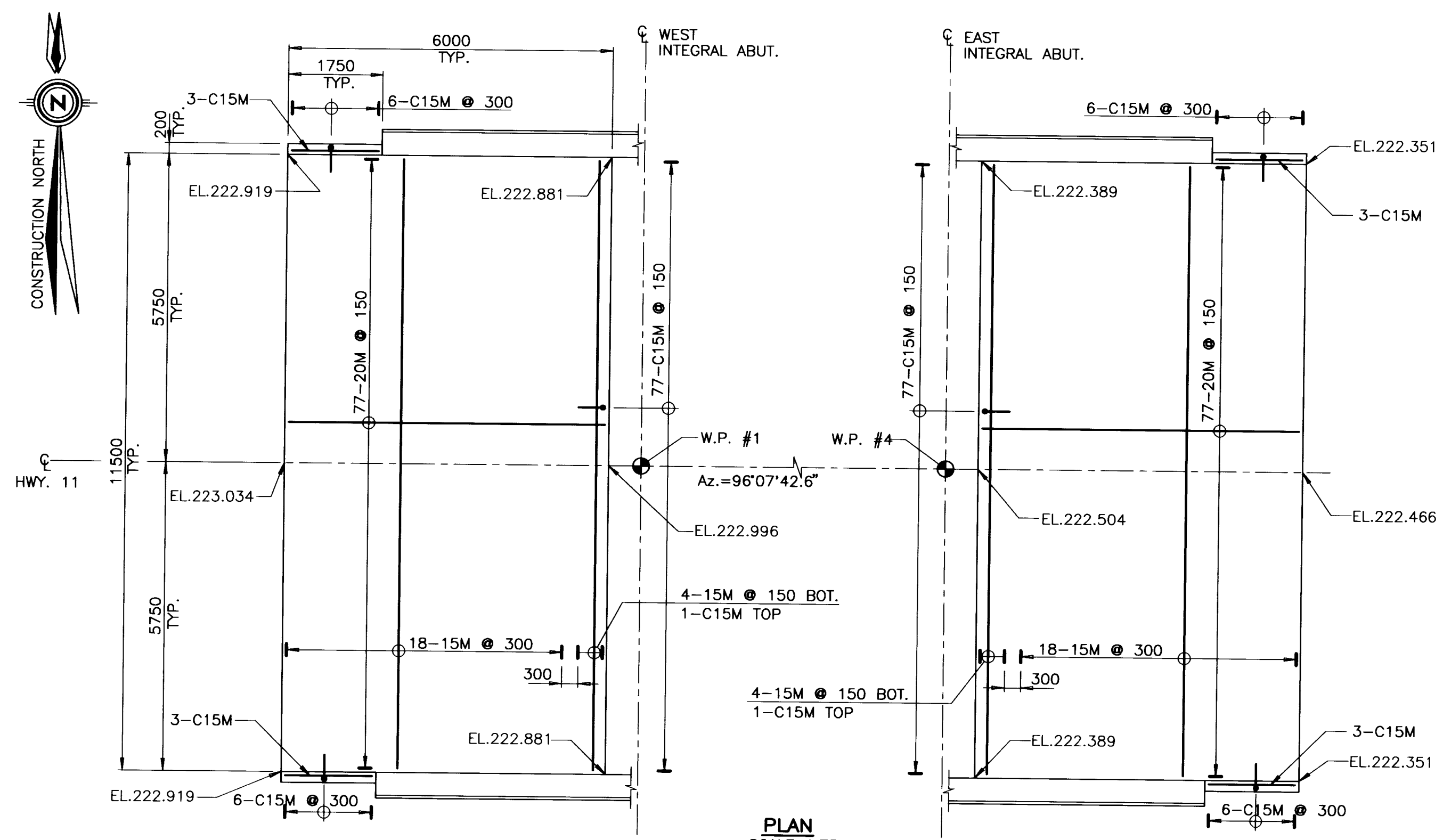
METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
6000 mm APPROACH SLAB

SHEET  
43

- NOTES:
1. CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
  2. LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT-HAND AND ZERO-DEGREE SKEW.
  3. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD-3906.02.
  4. WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD-3906.03.



APPLICABLE STANDARD DRAWINGS

OPSD-3906.02 BRIDGE DECK WATERPROOFING - HOT APPLIED ASPHALT MEMBRANE WITH ASPHALT IMPREGNATED PROTECTION BOARD

OPSD-3906.03 BRIDGE DECK WATERPROOFING DETAILS AT ACTIVE WIDE CRACKS (GREATER THAN 2 mm) AND CONSTRUCTION JOINTS

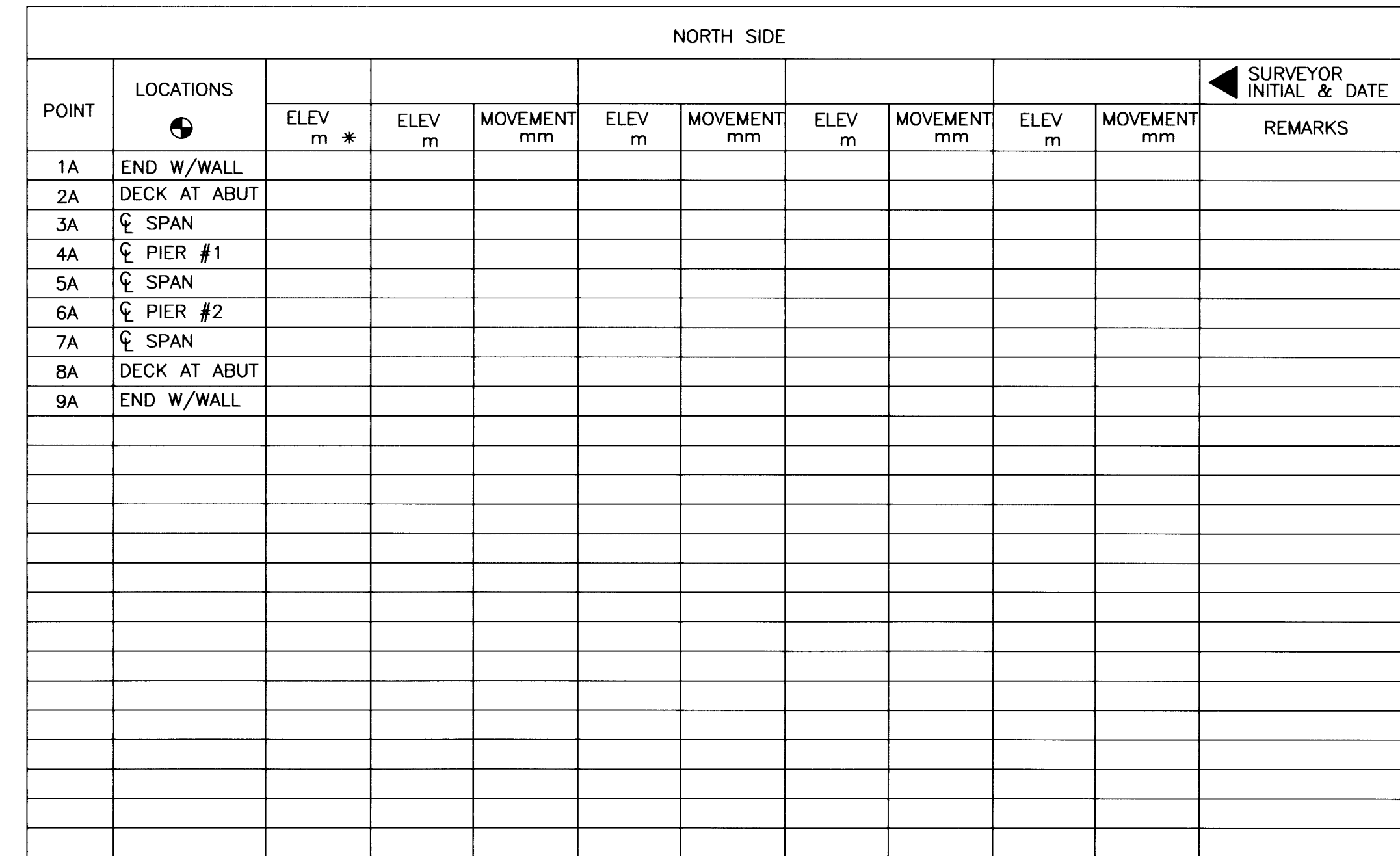
MODIFIED  
STANDARD DRAWING  
MARCH 1997  
SS116-1  
6000 mm APPROACH SLAB

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	STD	CHK	CODE OHBDC '91 LOAD CL.-A
DRAWN	A.P.	CHK N.C.T.	SITE 39W-064
DATE	DEC., 1998	DWG	12


DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

AutoCAD Drawing: D:\Cod drawings\lost river\ss116-1p.dwg updated: Apr 26/2000 07:32 AM

DIMENSION 'X' & 'Y' TABLE FOR EXPANSION JOINT GAPS



### LOCATION & ELEVATION TABLE

DIST CONT No 2000-0222 WP No 145-88-00	
LOST RIVER BRIDGE AS CONSTRUCTED ELEV. & DIM.	SHEET 44



### LOCATION OF PINS FOR BARRIER WALL

[illegible]

1. HIGH AND LOW TEMPERATURES, AND TEMPERATURES FOR THE PRECEDING 2 DAYS ARE TO BE RECORDED AT THE TIME PINS ARE INSTALLED IN CURB OR BARRIER/PARAPET WALL. PINS SHALL BE INSTALLED BEFORE CONCRETE HAS SET.
2. AS CONSTRUCTED ELEVATIONS (TIED TO PERMANENT REF GBM) TO BE TAKEN BY OWNER AND RECORDED ON THE DRAWING IMMEDIATELY BEFORE OPENING BRIDGE TO TRAFFIC
3. FURTHER READINGS TO BE TAKEN AS REQUESTED.
4. STAINLESS STEEL PINS TO BE M10 x 80mm LONG CARRIAGE BOLT TYPE SUPPLIED BY CONTRACTOR.
5. PINS TO BE PLACED AT CENTRE LINE OF SPAN, AT CENTRE LINE OF SUPPORTS AND AT END OF WINGWALLS ALONG EACH SIDE OF BRIDGE.

AS CONSTRUCTED ELEV. & DIM'N

REVISIONS								
				DESCRIPTION				
DESIGN	N.C.T.	CHK		CODE	0HBDC'91	LOAD	CL-A	DATE MARCH, 1999
DRAWN	T.P.	CHK	N.C.T.	SITE	39W-064	STRUCT	SCHEME	DWG. 13

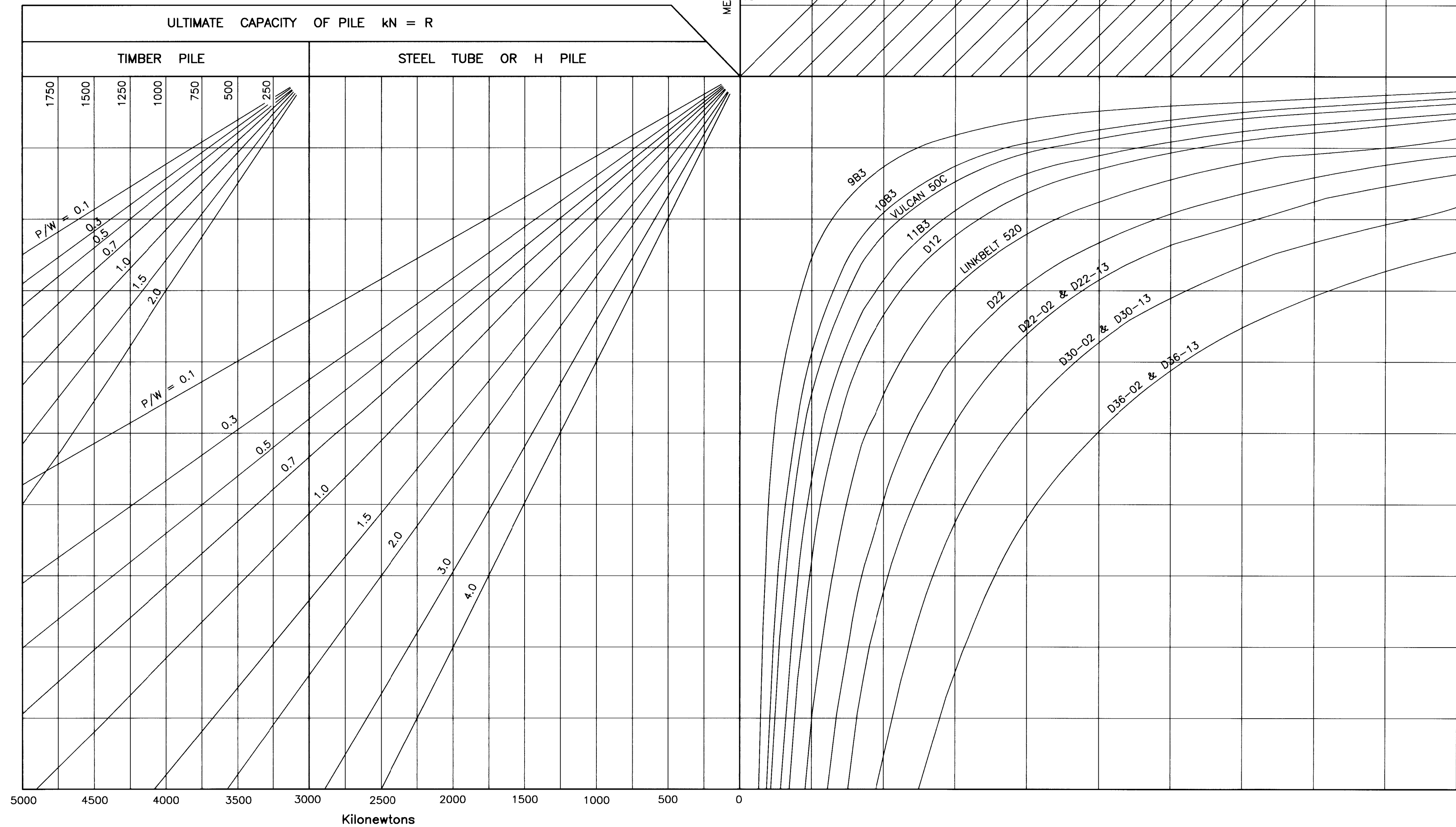
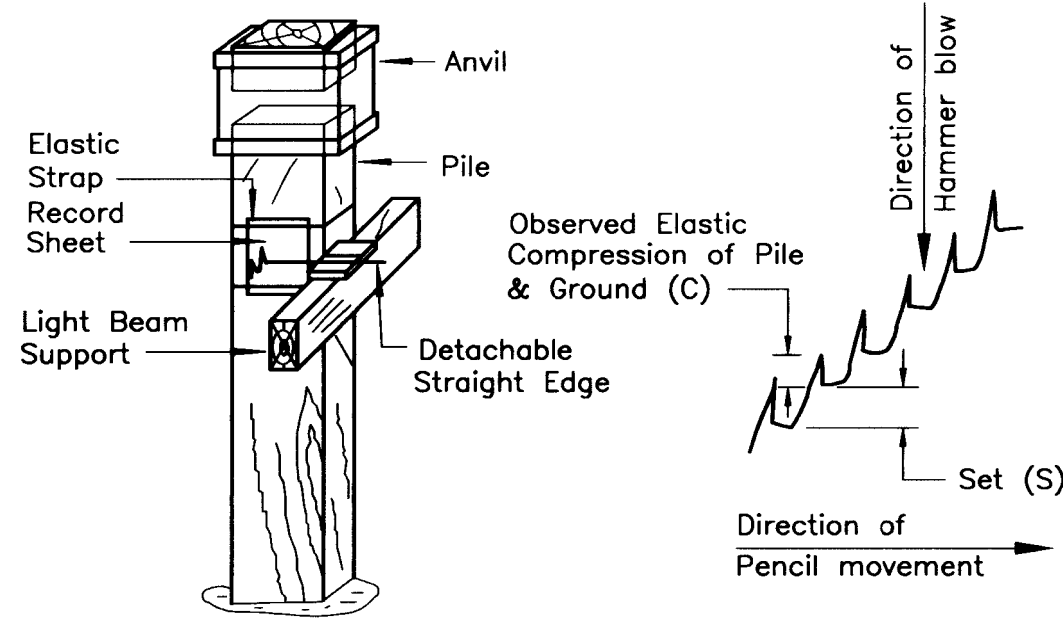
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

AutoCAD Drawing: D:\Cad drawings\lost\_river\st103-Q-1.dwg updated: Apr 26/2000 07:34 AM

HAMMERS		
TYPE	MASS OF RAM W Kilograms	MAXIMUM ENERGY Joules/blow
9B3	726	12419
10B3	1361	16948
50C	2268	20337
11B3	2268	26005
D12	1250	30506
B225	1360	39300
LB520	2300	40675
B300	1700	46100
D22	2200	53826
B400	2268	62400
D22-02	2200	67000
D22-13	2200	67000
D30-02	3000	91000
D30-13	3000	91000
B500	3129	107100
D36-02	3600	115000
D36-13	3600	115000

NOTE:

Ram may also be referred to as Piston



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No2000-0222  
WP No 145-88-00

LOST RIVER  
BRIDGE  
PILE DRIVING-STEAM & DIESEL HAMMERS

SHEET  
45

METHOD OF APPLYING THE HILEY FORMULA

$$R = \frac{nWgh}{S + c/2} \quad (\text{Hiley Formula}) \quad g = 9.80665 \text{ m/s}$$

Where  $R$  = Ultimate pile capacity in kilonewtons  
 $S$  = Measured penetration of pile per hammer blow in millimetres  
 $C$  = Measured rebound of pile per hammer blow in millimetres  
 $Wgh$  = Energy of hammer blow in joules

$$n = \text{Efficiency of blow} = \frac{W + Pe^2}{W + P}$$

where  $e = 0.32$  for steel (These values of  $e$  have been determined by experiment)  
 $e = 0.25$  for timber

$P$  = Mass of pile + anvil in kilograms

$W$  = Mass of ram (piston) in kilograms

The  $P/W$  curves form the required reduction of total energy of the hammer blow according to the value of  $P/W$

$L = R/Q$  kilonewtons

Where  $L$  = Design capacity of pile

$Q$  = Factor of safety

Use  $Q = 3$  unless otherwise authorized by the Engineer

EXAMPLE 1:

Steel tube pile,  $O D = 323.90\text{mm}$  linear density =  $49.73 \text{ kg/m}$ ,  
20m long plus anvil of mass 600 kg, giving  $P = 994.6 + 600 = 1594.6 \text{ kg}$

$$\text{Delmag D12 hammer } W = 1250 \text{ kg } P/W = \frac{1594.6}{1250} = 1.28$$

Observed measured rebound  $C = 10 \text{ mm}$

Observed measured penetration  $S = 5 \text{ mm}$

USING CHART: With  $C = 10$  proceed horizontally to right

to cut line  $S = 5$  then vertically down to cut curve D12 then  
horizontally to left to cut  $P/W = 1.28$  then vertically down to

$$\text{read ultimate capacity } R = 1512 \text{ kN } L = \frac{1512}{3} = 504 \text{ kN}$$

EXAMPLE 2:

HP 310x110, 50 m long plus anvil of mass 600 kg giving  
 $P = 5500 + 600 = 6100 \text{ kg}$ . The hammer is Delmag D22-13

$$W = 2200 \text{ kg}, n = \frac{W + Pe^2}{W + P} = \frac{2200 + (6100 \times 0.32 \times 0.32)}{2200 + 6100} = \frac{2824}{8300} = 0.34$$

Energy of hammer ( $Wgh$ ) =  $67000 \text{ J/blow}$

Observed measured rebound  $C = 10 \text{ mm}$

Observed measured penetration  $S = 5 \text{ mm}$

USING HILEY FORMULA:

$$\text{Ultimate capacity } R = \frac{nWgh}{S + c/2} \text{ kN} = \frac{0.34 \times 67000}{10} = 2278 \text{ kN}$$

$$\text{Design capacity } L = \frac{2278}{3} = 759 \text{ kN}$$

NOTE 1:

These charts are designed to cover most cases which will be encountered on normal construction projects. Occasionally it will be found that  $R$  cannot be obtained from the charts, for instance when  $C = 5 \text{ mm}$  and  $S = 2 \text{ mm}$  using a Delmag D22 hammer. In such cases it will be necessary to calculate  $R$  using the original equation  $R = \frac{nWgh}{S + c/2}$

In cases where the energy of the hammer being used is slightly different from the hammer energy for which curves are drawn the curves may still be used but the result should be reduced or increased according to the energy ratios. Example use Linkbelt 520 curve (Energy 40675 J) for Berminghammer 225 (Energy 39300 J) but reduce result by multiplying by  $\frac{39300}{40675}$

NOTE 2:

For Projects designed to the OHBDC, the ultimate capacity ( $R$ ) is shown on the contract drawings and  $L$  and  $Q$  are not required.

STANDARD DRAWING  
JULY 1981

SS 103-11

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DATE		BY		DESCRIPTION	
DESIGN	STD	CHK	CHK	CODE	OHBDC-91	DATE	DEC., 1998
DRAWN	A.P.	CHK	XX	SITE	39W-064	STRUCT	SCHEME
						DWG	14

AutoCAD Drawing: D:\Cad drawings\test\_river\stdets.dwg updated: Apr. 26/2000 07:34 AM

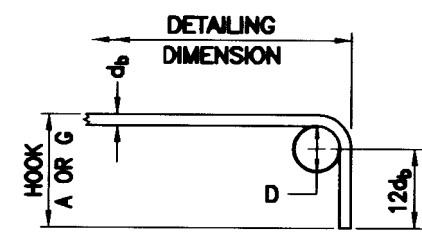
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AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

DIST  
CONT No 2000-0222  
WP No 145-88-00

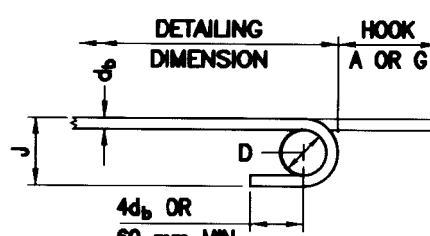
LOST RIVER  
BRIDGE  
STANDARD DETAILS

SHEET  
46

#### HOOK DIMENSIONS FOR UNCOATED BARS



MINIMUM 90° HOOK



MINIMUM 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm (from RSC)

BAR SIZE	STEEL GRADE	
	400R	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.

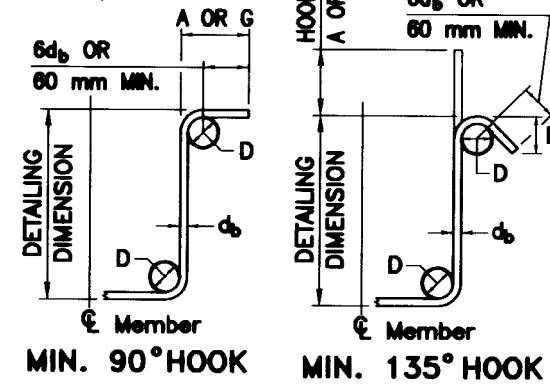
#### MINIMUM HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)	400R	400W	400R	400W	J (mm)
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

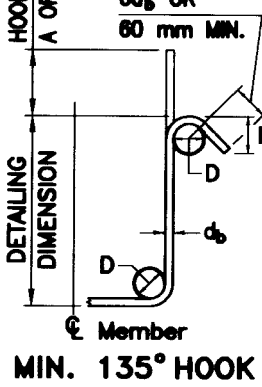
#### MINIMUM STIRRUP AND TIE HOOK DIMENSIONS (from RSC)

BAR SIZE	BAR DIAM. $d_b$ (mm)	PIN DIAM. D (mm)	90°		135°
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	80	180	175	115

25M AND LARGER  
SAME AS MINIMUM 180° HOOKS

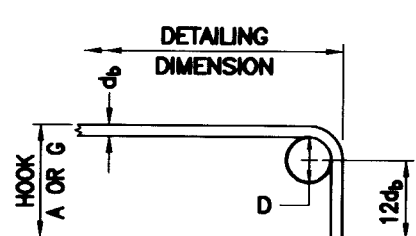


MIN. 90° HOOK

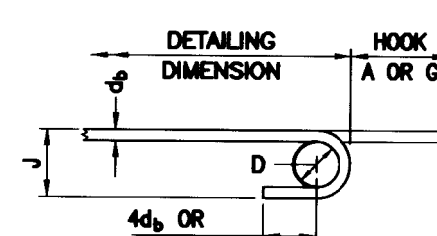


MIN. 135° HOOK

#### HOOK DIMENSIONS FOR COATED BARS



MINIMUM 90° HOOK



MINIMUM 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm (from RSC)

BAR SIZE	STEEL GRADE	
	400	
10M	80	
15M	120	
20M	160	
25M	200	
30M	240	
35M	350	
45M	450	
55M	550	

#### MINIMUM HOOK DIMENSIONS

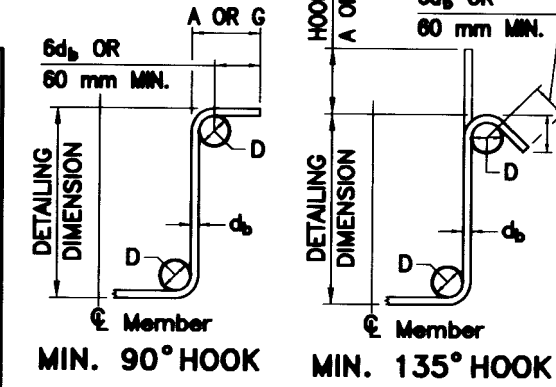
BAR SIZE	90° HOOKS		180° HOOKS	
	A OR G (mm)		A OR G (mm)	J (mm)
10M	190	210	110	
15M	270	260	160	
20M	330	300	200	
25M	430	330	250	
30M	510	460	300	
35M	640	700	430	
45M	790	850	540	
55M	1010	1050	680	

NOTE: Tabulated values for Minimum Hook Dimensions are the larger of calculated and Reinforcing Steel Institute of Canada (RSC) requirements.

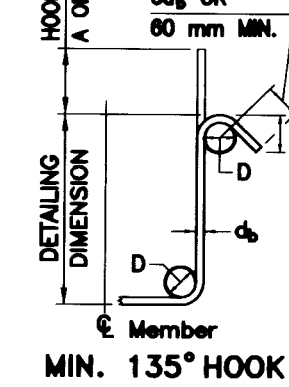
#### MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. $d_b$ (mm)	PIN DIAM. D (mm)	90°		135°
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)
10M	11.3	80	180	190	120
15M	16.0	120	190	220	130
20M	19.5	160	230	260	150

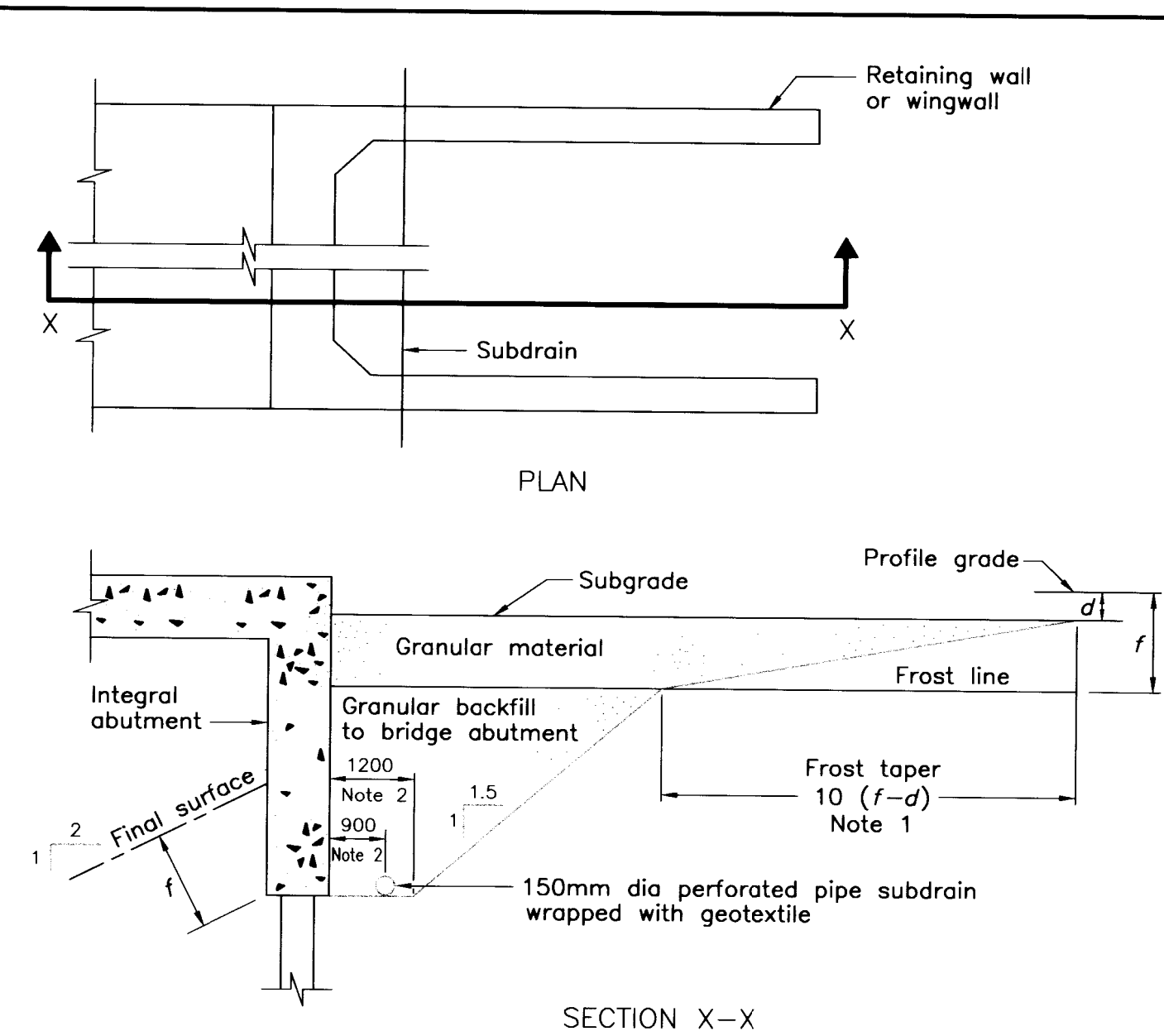
25M AND LARGER  
SAME AS MINIMUM HOOK



MIN. 90° HOOK



MIN. 135° HOOK



#### NOTES:

- $d$  = depth of combined base and subbase courses.
- $f$  = approximate depth of frost penetration.
- Dimensions perpendicular to back face of abutment.
- A Refer to the Owner's soils and design data for depth of frost penetration.
- B Lateral limits of granular backfill to bridge abutment to be inside face to inside face of retaining wall or wingwall. Frost taper shall extend from ditch line to ditch line unless interrupted by the retaining wall or wingwall.
- C Section X-X parallel to  $\phi$  roadway.
- D Positive drainage of subdrain as specified in the contract.
- E Subdrain to be installed with a 2% gradient behind wall.
- F All dimensions are in millimetres or metres unless otherwise shown.

#### GRANULAR BACKFILL REQUIREMENTS INTEGRAL ABUTMENTS

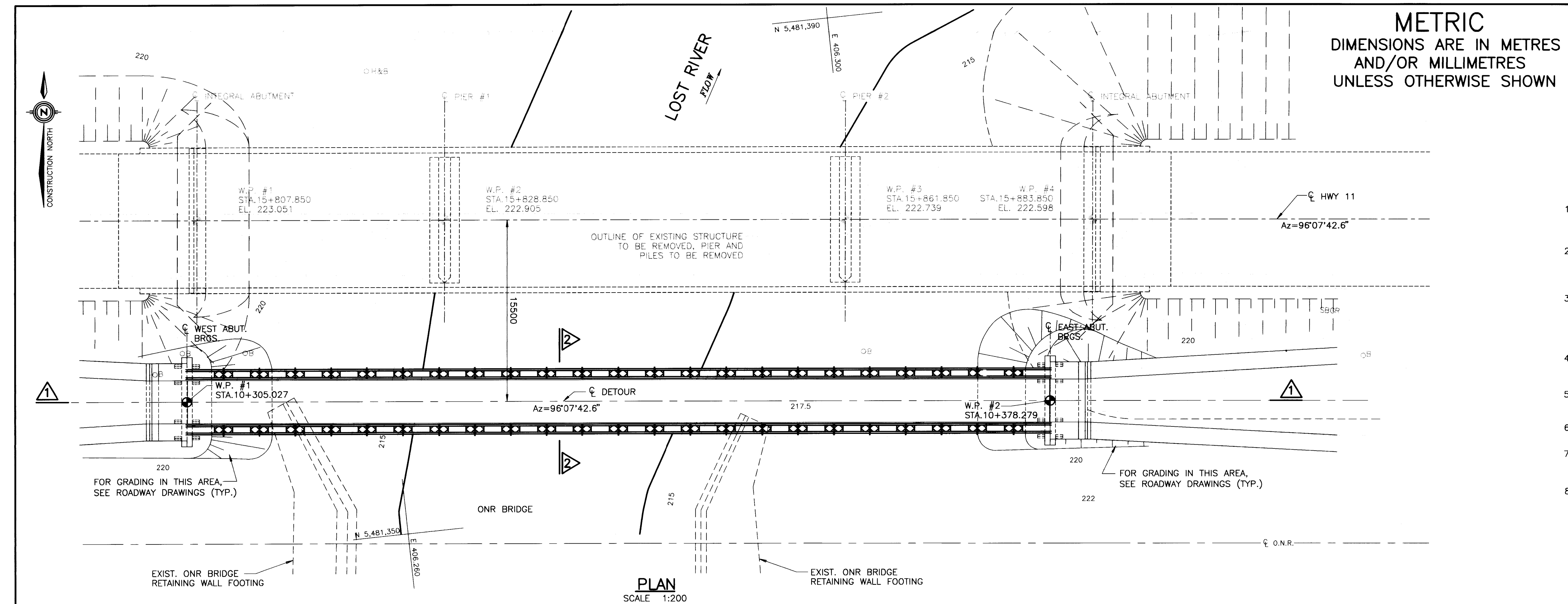
Date MARCH 1997 Rev

SS5-1

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DESCRIPTION	
DESIGN	STD	CHK	CODE OHBDC-91
DRAWN	A.P.	CHK N.C.T.	SITE 36W-084
		LOAD CLASS "A"	DATE DEC., 1998
		STRUCT	SCHEME
		DWG	16





DIST 53	
CONT No 2000-0222	
WP No 145-88-00	
LOST RIVER ACROW BRIDGE DETOUR GENERAL ARRANGEMENT	SHEET 49

- GENERAL NOTES**
- THE TEMPORARY DETOUR STRUCTURE SHALL BE A 700 XS ACROW PANEL BRIDGE AS MANUFACTURED BY ACROW LIMITED IN CONFORMANCE WITH OHBDC.
  - THE BRIDGE SHALL CONSIST OF DOUBLE-DOUBLE REINFORCED (2H) TRUSS CONSTRUCTION, SINGLE ROADWAY WIDTH (3676mm BETWEEN CURBS), HEAVY STEEL DECK WITH ANTI-SKID COATING.
  - BRIDGE STEEL SPECIFICATIONS ARE AS FOLLOWS:
    - PANELS, REINFORCING CHORDS - AASHTO M223, GRADE 65 (450 MPa)
    - DECK UNITS, TRANSOMS - AASHTO M223, GRADE 50 (350 MPa)
  - THE ACROW BRIDGE DETOUR STRUCTURE SHALL BE SUPPLIED BY THE CONTRACTOR AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR.
  - THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING THE DIFFERENT COMPONENTS OF THE ACROW BRIDGE BEFORE USING THEM IN THE STRUCTURE.
  - GUIDE RAIL SHALL BE INSTALLED AS SHOWN ON STANDARD SS16-41.
  - THE TOP 500mm GRANULAR LAYER DIRECTLY UNDER TIMBER CRIBS AT BOTH ABUTMENTS SHALL BE GRANULAR 'A'. IT SHALL EXTEND 1.0m BEYOND CRIBS AND SLOPE UPWARD 1.5 : 1.
  - THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR OF ANY CIRCUMSTANCES THAT MAY INFLUENCE THE STABILITY OF THE EXISTING ONR RAILWAY RETAINING WALLS.

- ERECTION, LAUNCHING AND DELAUNCHING**
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ERECTION, LAUNCHING AND DELAUNCHING OF THE STRUCTURE AND SHALL SUBMIT TO THE MINISTRY WORKING DRAWINGS AS PER THE SPECIAL PROVISION SHOWING ALL THE NECESSARY DETAILS AND REQUIREMENTS TO CARRY OUT THESE OPERATIONS. THIS WILL INCLUDE THE CONSTRUCTION SEQUENCE OF THE GRADING, PILE BENTS AND TIMBER CRIBS TO FACILITATE THE ERECTION AND LAUNCHING OF THE BRIDGE.
  - THE BRIDGE SHALL BE LAUNCHED AND DELAUNCHED FROM THE EAST ABUTMENT SIDE.
  - THE MAXIMUM HORIZONTAL TOTAL LOAD ON THE ABUTMENT PILE BENT DUE TO LAUNCHING SHOULD NOT EXCEED 240 kN.

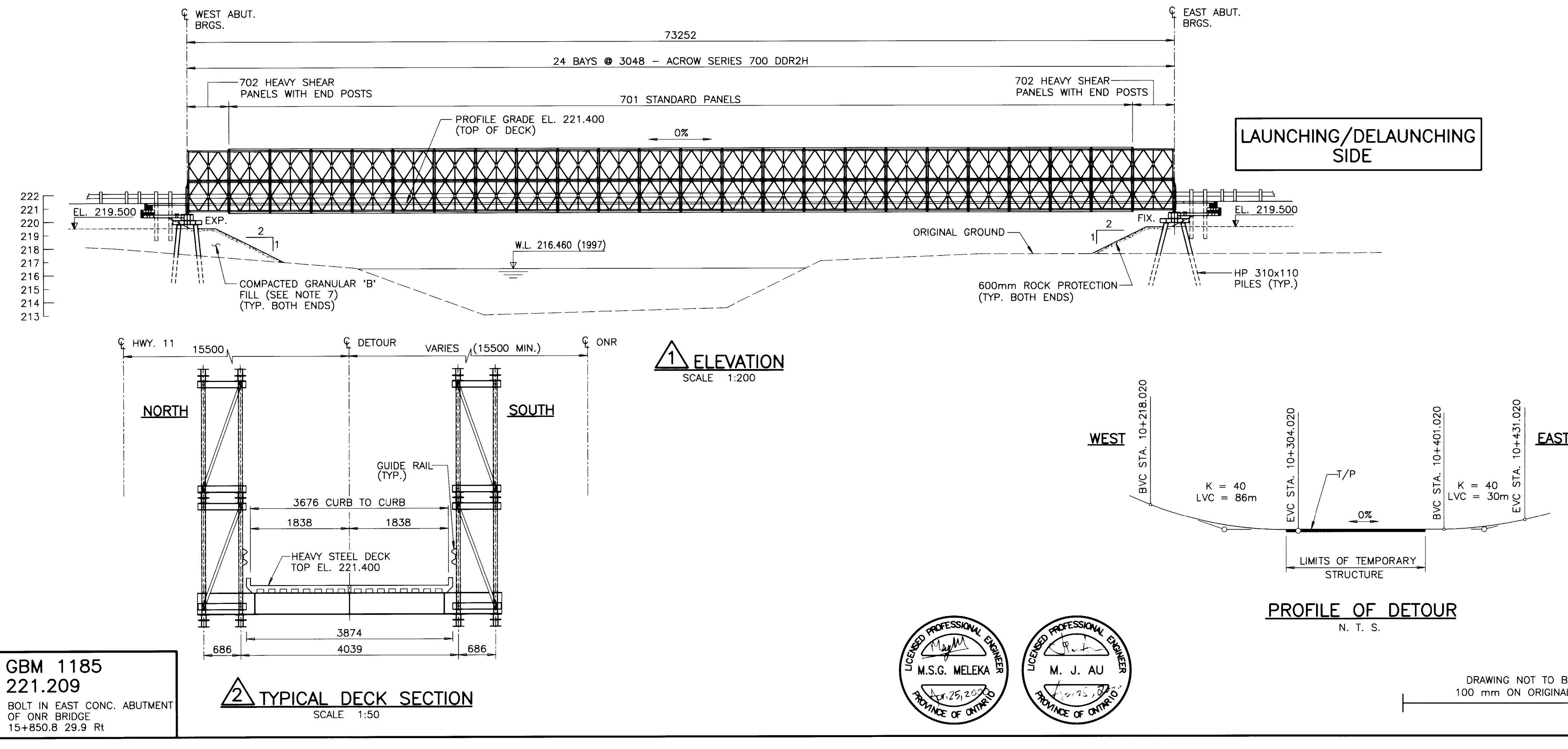
- MAINTENANCE**
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE STRUCTURE AND APPROACHES INCLUDING THE FOLLOWING:
- CHECK THAT ALL ASSEMBLED COMPONENTS INCLUDING BRACING BOLTS AND CHORD BOLTS ARE AND REMAIN FULLY TIGHTENED
  - KEEP BASEPLATES AND BEARINGS FREE OF DEBRIS
  - INSPECT PILE BENTS, TIMBER CRIBS AND EMBANKMENTS PERIODICALLY AND CORRECT ANY UNEVEN SETTLEMENT TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR
  - THE CONTRACT ADMINISTRATOR IS TO BE NOTIFIED IMMEDIATELY OF ANY DAMAGE TO THE BRIDGE OR ITS SUPPORTS

- LIST OF DRAWINGS**
- GENERAL ARRANGEMENT
  - PILE LAYOUT
  - ABUTMENT DETAILS
  - TIMBER CRIB DETAILS
  - MISCELLANEOUS DETAILS
  - PILE DRIVING STEAM AND DIESEL HAMMERS
  - QUANTITIES-STRUCTURE

**APPLICABLE STANDARD DRAWINGS**

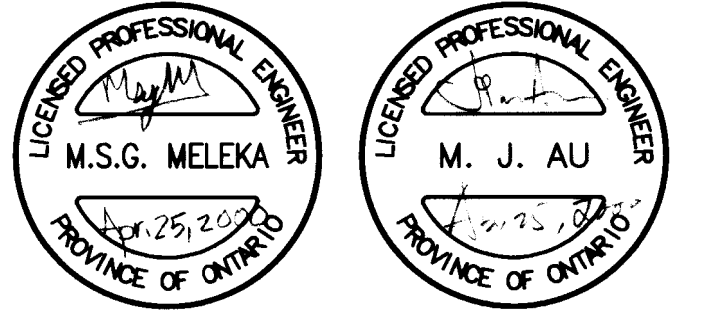
OPSD-902.01 STEEL BEAM GUIDE RAIL

REVISIONS	DESCRIPTION
DESIGN M.M.	CHK J.A. CODE OHBDC'91
DRAWN A.P.	CHK M.M. SITE 39W-064
	STRUCT
	SCHEME
	DWG B1

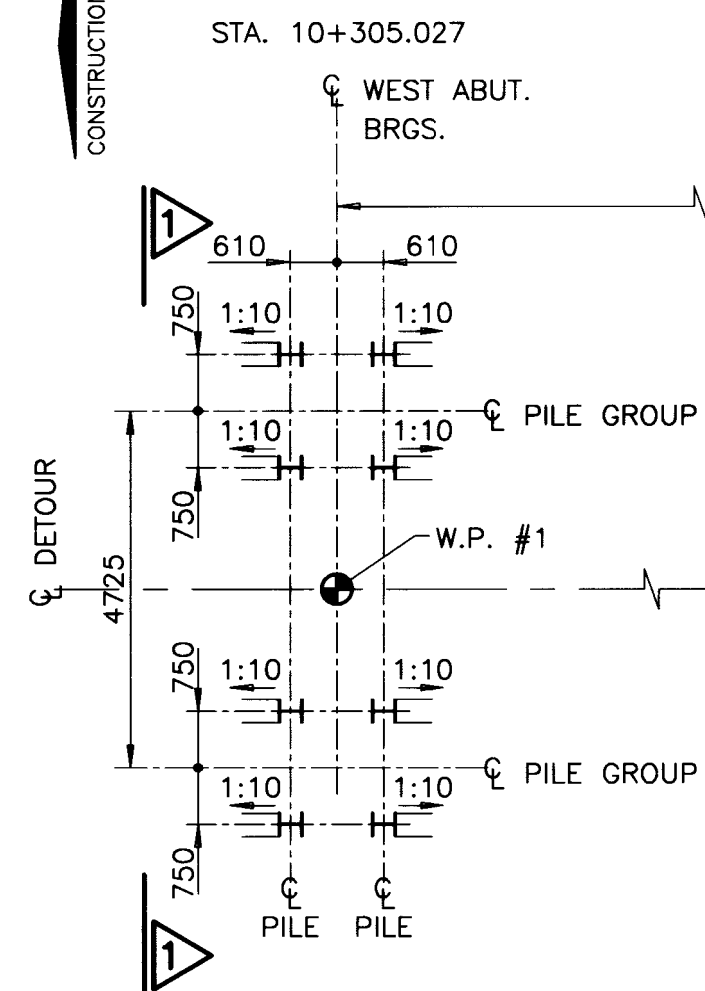
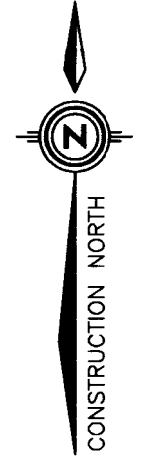


AutoCAD Drawing: D:\Drawings\WP1458800 Lost River\Agenor.dwg updated: Apr 20/2000 2:22 PM

GBM 1185  
221.209  
BOLT IN EAST CONC. ABUTMENT  
OF ONR BRIDGE  
15+850.8 29.9 Rt



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

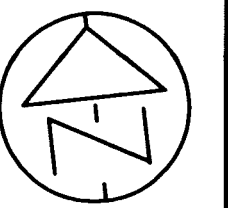


LOST RIVER  
FLOW

PLAN OF PILE LAYOUT  
SCALE 1:100

METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

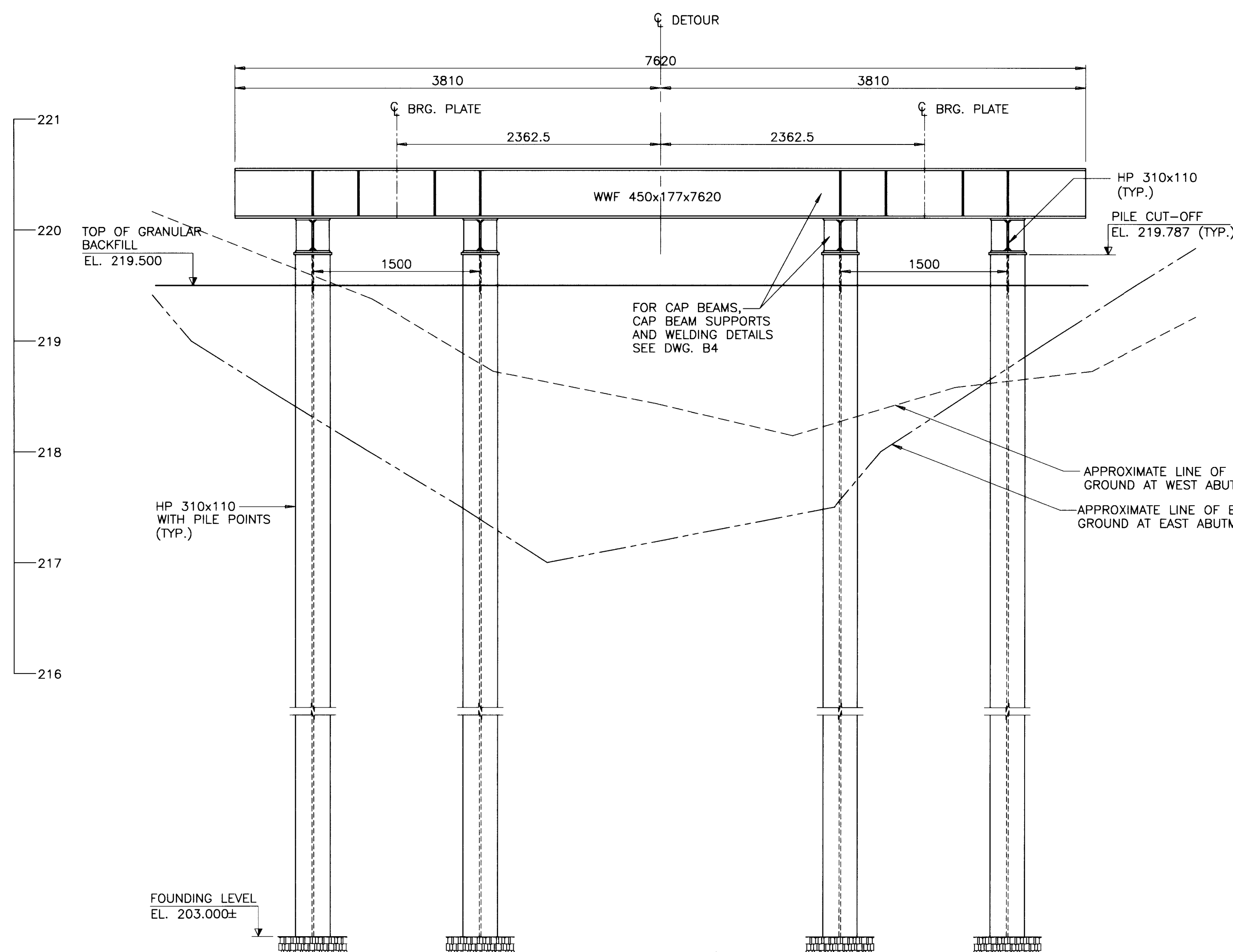
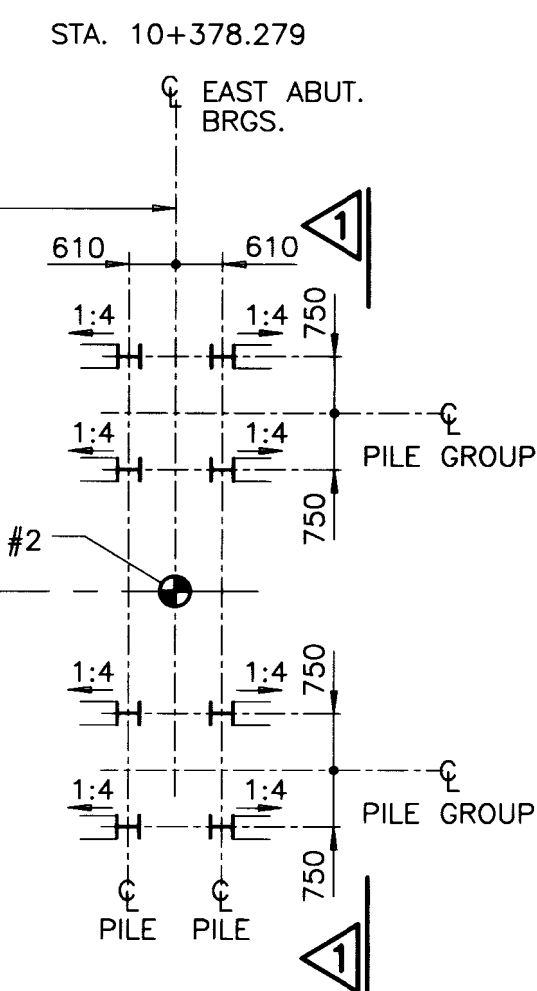
CONT No 2000-0222  
WP No 145-88-00



SHEET  
50

NOTES

1. SOIL INVESTIGATION AT THIS SITE SHOWED THE PRESENCE OF NUMEROUS BOULDERS, ESPECIALLY BELOW EL. 210.00 (SEE FOUNDATION REPORT).
2. AFTER SURVEYING THE SITE AND BEFORE STARTING ANY PILE DRIVING, THE CONTRACTOR SHALL TAKE FIELD MEASUREMENT OF THE DISTANCE BETWEEN THE INTENDED LOCATION OF THE CENTRE LINE OF THE WEST ABUTMENT AND THE CLOSEST POINT OF THE RETAINING WALL FOOTING OF THE EXISTING ONR BRIDGE. IF THIS DISTANCE IS SMALLER THAN 7.10m, THE CONTRACT ADMINISTRATOR SHALL BE NOTIFIED.
3. THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR OF ANY CIRCUMSTANCES THAT MAY INFLUENCE THE STABILITY OF THE EXISTING ONR RAILWAY RETAINING WALLS.
4. ALL STRUCTURAL STEEL INCLUDING HP 310x110 PILES SHALL CONFORM TO CSA STANDARD G40.21 M GRADE 300W.
5. PILES SPACING TO BE MEASURED AT PILE CUT-OFF ELEVATION.
6. PILE LENGTH SHOWN ON THE DRAWING IS THE THEORETICAL PILE LENGTH BELOW PILE CUT-OFF.
7. PILES TO BE DRIVEN IN ACCORDANCE WITH STANDARD SS103-11 USING AN ULTIMATE CAPACITY OF :  
AT EAST ABUTMENT : 2800 kN/PILE  
AT WEST ABUTMENT : 1600 kN/PILE
8. HAMMER ENERGY SHALL NOT BE LESS THAN 48 KJ.
9. PILES TO BE DRIVEN TO AT LEAST ELEVATION 203.00 .
10. PILES WILL BE EQUIPPED WITH PILE POINTS AS MANUFACTURED BY TITUS STEEL COMPANY OR EQUIVALENT.
11. FACTORED AXIAL PILE CAPACITIES ARE :  
AT EAST ABUTMENT  
AT SLS 900 kN  
AT ULS 1400 kN  
AT WEST ABUTMENT  
AT SLS 400 kN  
AT ULS 800 kN
12. THE CONTRACTOR SHALL MONITOR THE VIBRATION AND VERTICAL, HORIZONTAL AND INCLINATION MOVEMENTS OF THE WEST ABUTMENT OF THE EXISTING ONR STRUCTURE.



W.P. No.	NORTHING	EASTING
1	5,481,347.813	406,242.544
2	5,481,339.966	406,315.368

PILE DATA				
PILE LOCATION	No.	LENGTH (mm)	SIZE	BATTER
EAST ABUTMENT	8	17 500	HP 310x110	1:4
WEST ABUTMENT	8	17 000	HP 310x110	1:10

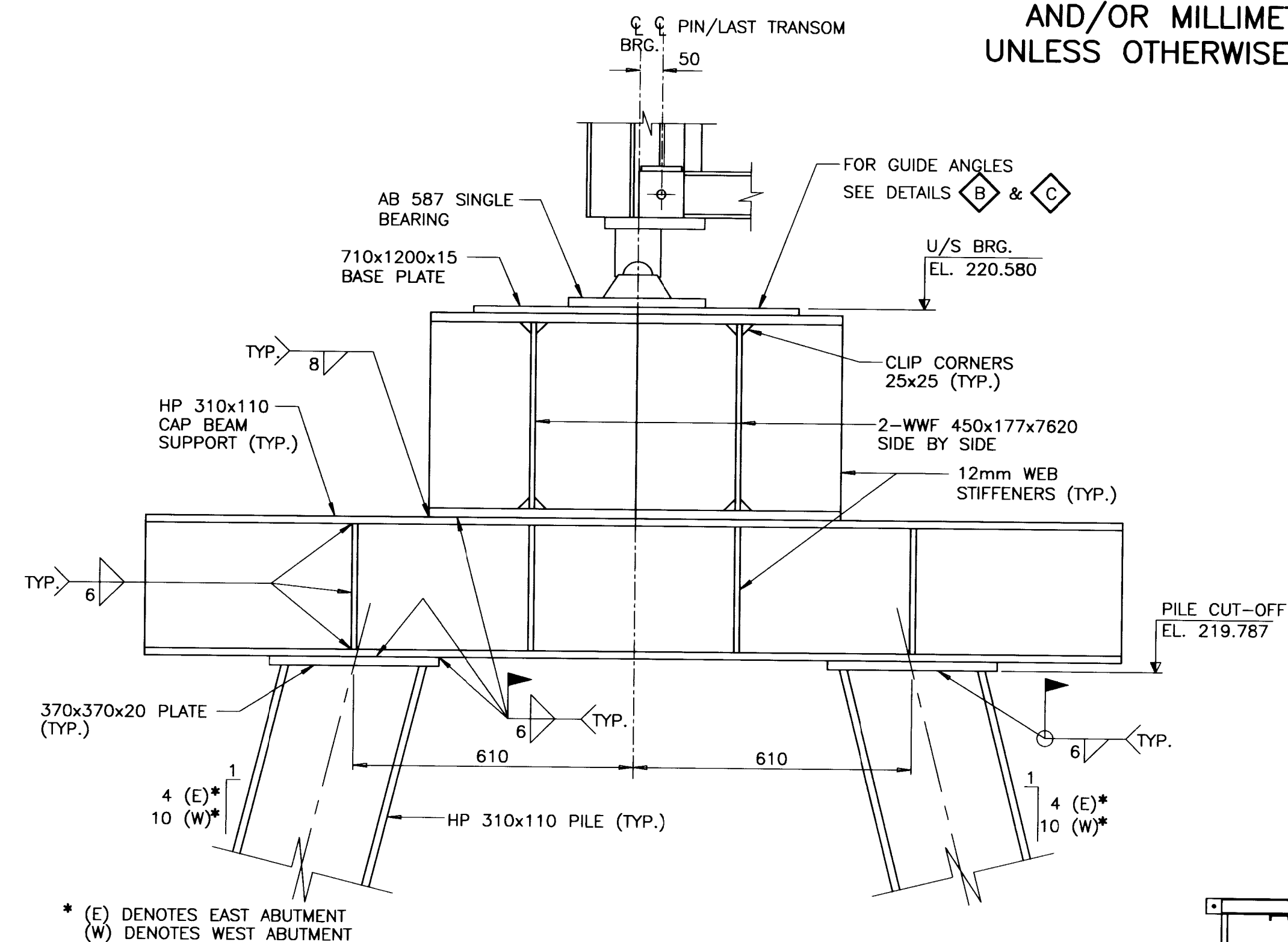


DRAWING NOT TO BE SCALED  
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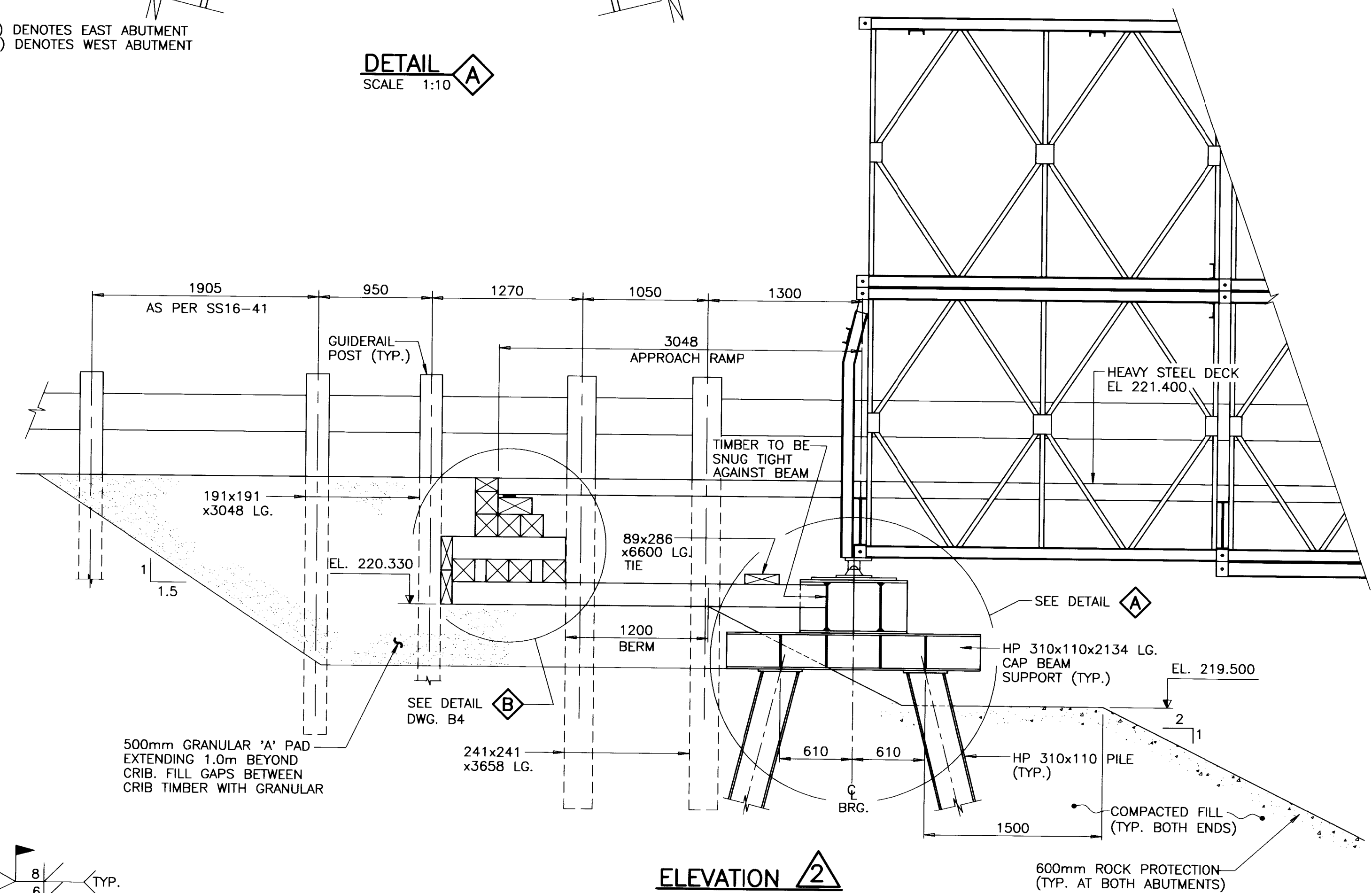
APPLICABLE STANDARD DRAWING:

SS103-11 PILE DRIVING-STEAM &amp; DIESEL HAMMERS

REVISIONS									
DESCRIPTION									
DESIGN	M.M.	CHK	J.A.	CODE	0HBD C 91	LOAD	DATE	DEC., 1999	
DRAWN	A.P.	CHK	M.M.	SITE	39W-064	ISTRUCT	ISCHEM	DWG. R2	



DETAIL  
SCALE 1:10

[illegible]

**B** PLAN AT WEST ABUTMENT  
(EXPANSION END)

**C PLAN AT EAST ABUTMENT  
(FIXED END)**

**BEARING DETAILS**  
SCALE 1:25

- NOTES:**
1. GUIDE ANGLES TO BE INSTALLED RIGHT BEFORE LOWERING THE BRIDGE FROM THE ROLLERS TO THE BEARINGS.
  2. PROVIDE 8mm CLEARANCE BETWEEN GUIDE ANGLES AND BEARING SIDES.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



REVISIONS							
DESCRIPTION							
DESIGN	M.M.	CHK	J.A.	CODE	0HBDC'91	LOAD	DATE DEC., 1999
DRAWN	A.P.	CHK	M.M.	SITE	39W-064	STRUCT	ISCFMF DWG. R3

AutoCAD Drawing: D:\Drawings\WP1458800 Lost River\Aftgdet.dwg updated: Apr 19/2000 1:08 PM



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

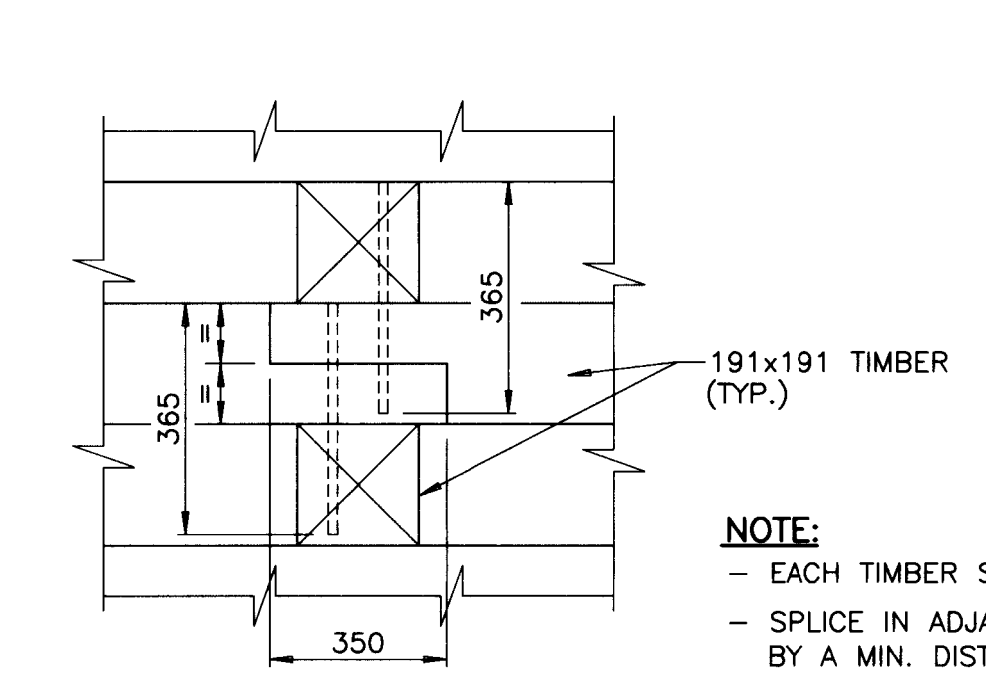
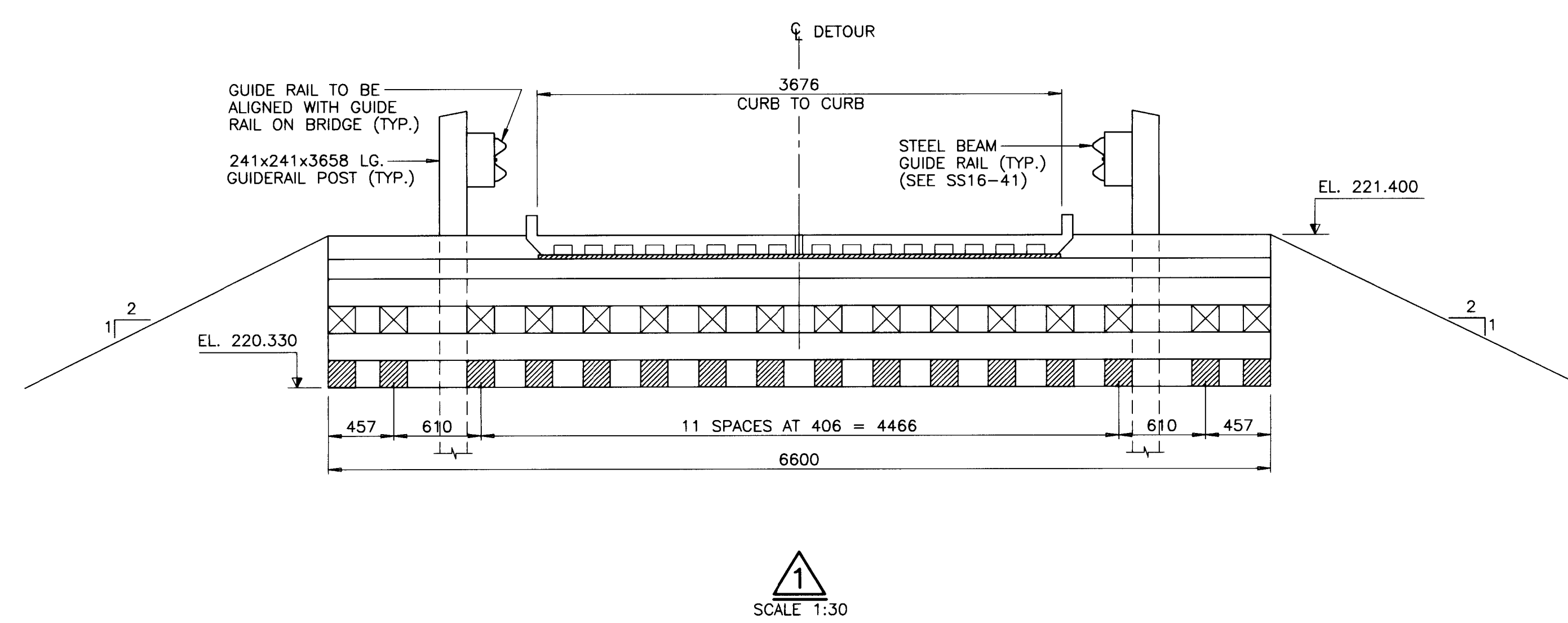
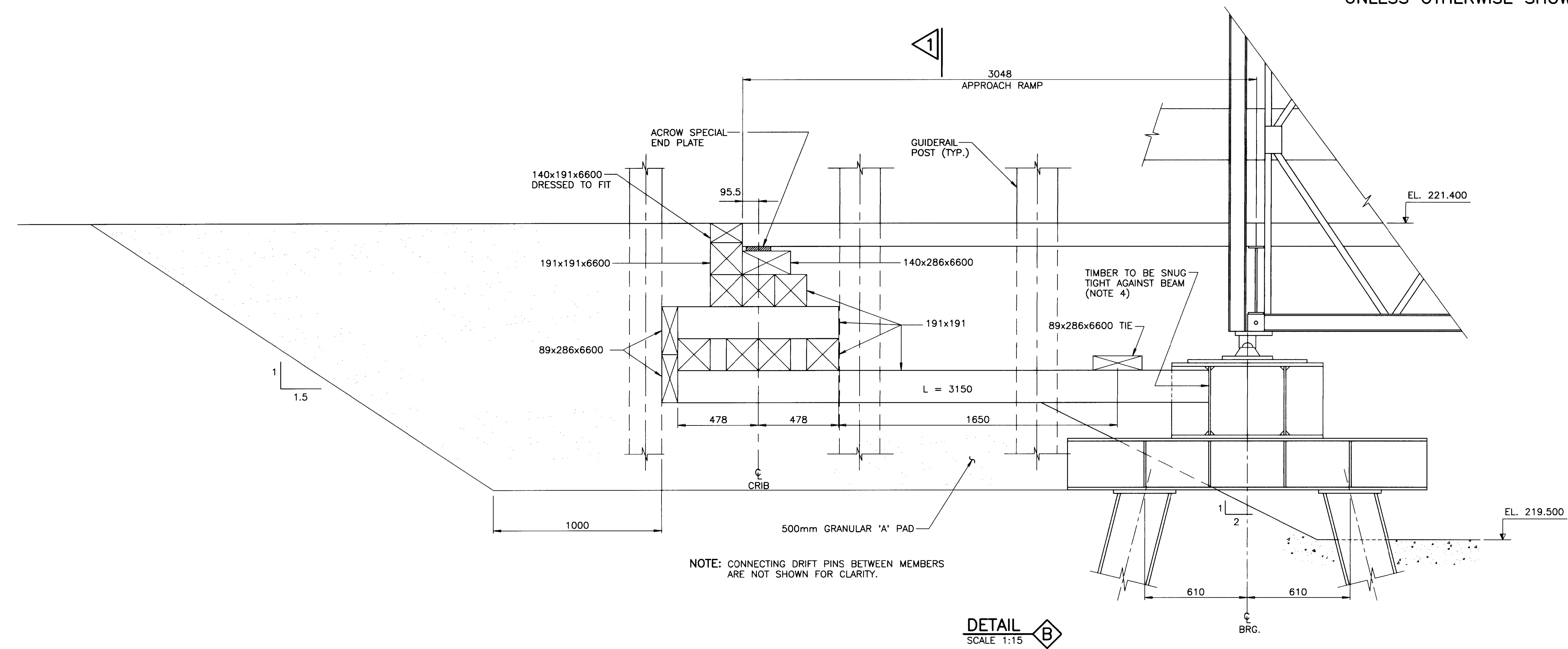
CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
ACROW BRIDGE DETOUR  
TIMBER CRIB DETAILS

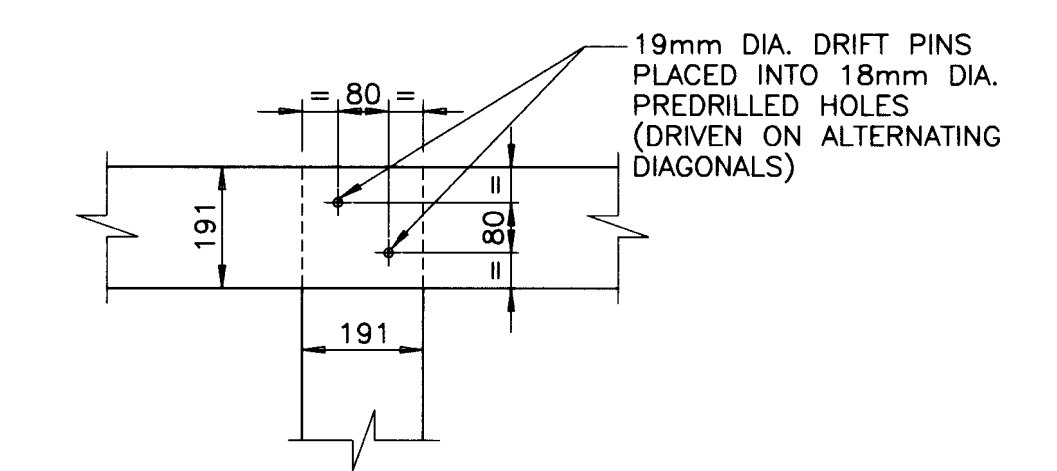
SHEET  
52

NOTES

1. ALL TIMBER SHALL BE S.P.F. No. 2 OR BETTER AND SHALL CONFORM TO REQUIREMENTS OF CAN/CSA 0.86.1-M AND ITS REFERENCE SPECIFICATIONS.
2. STEEL DRIFT PINS SHALL BE 19mm DIA. CONFORMING TO CSA G40.21M GRADE 300.
3. LENGTH OF DRIFT PINS SHALL BE EQUAL TO THE SUM OF THE DEPTHS OF THE TWO MEMBERS TO BE CONNECTED LESS 15mm.
4. FIRST ROW OF THE 191x191 MEMBERS OF THE TIMBER CRIB TO BE PLACED SNUG TIGHT RIGHT AGAINST THE WEB OF THE WWF 450x177 CAP BEAM.



TIMBER SPLICE DETAIL  
N.T.S.



TYPICAL DRIFT PINS DETAIL  
AT EVERY OTHER INTERSECTION  
N.T.S.

- NOTE:
- EACH TIMBER SHALL HAVE A MAX. OF ONE SPLICE
  - SPLICE IN ADJACENT TIMBER SHALL BE STAGGERED BY A MIN. DISTANCE OF 1624mm



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

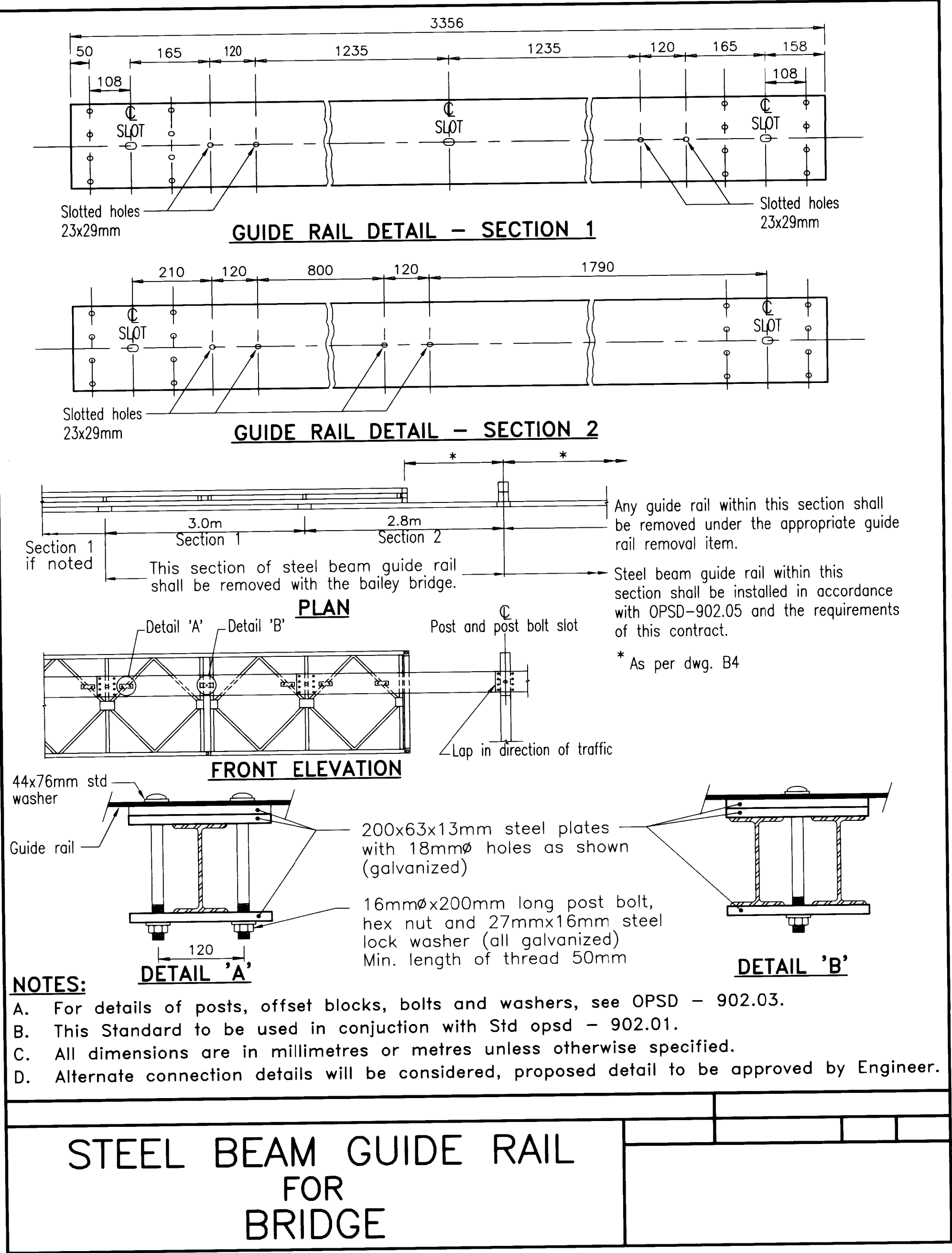
REVISIONS		DESCRIPTION			
DESIGN	M.M.	CHK	J.A.	CODE	0HBDC'91
DRAWN	A.P.	CHK	M.M.	SITE	39W-064
		STRUCT		SCHEME	DWG B4
		DATE		DEC., 1999	

METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
ACROW BRIDGE DETOUR  
MISCELLANEOUS DETAILS

SHEET  
53



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

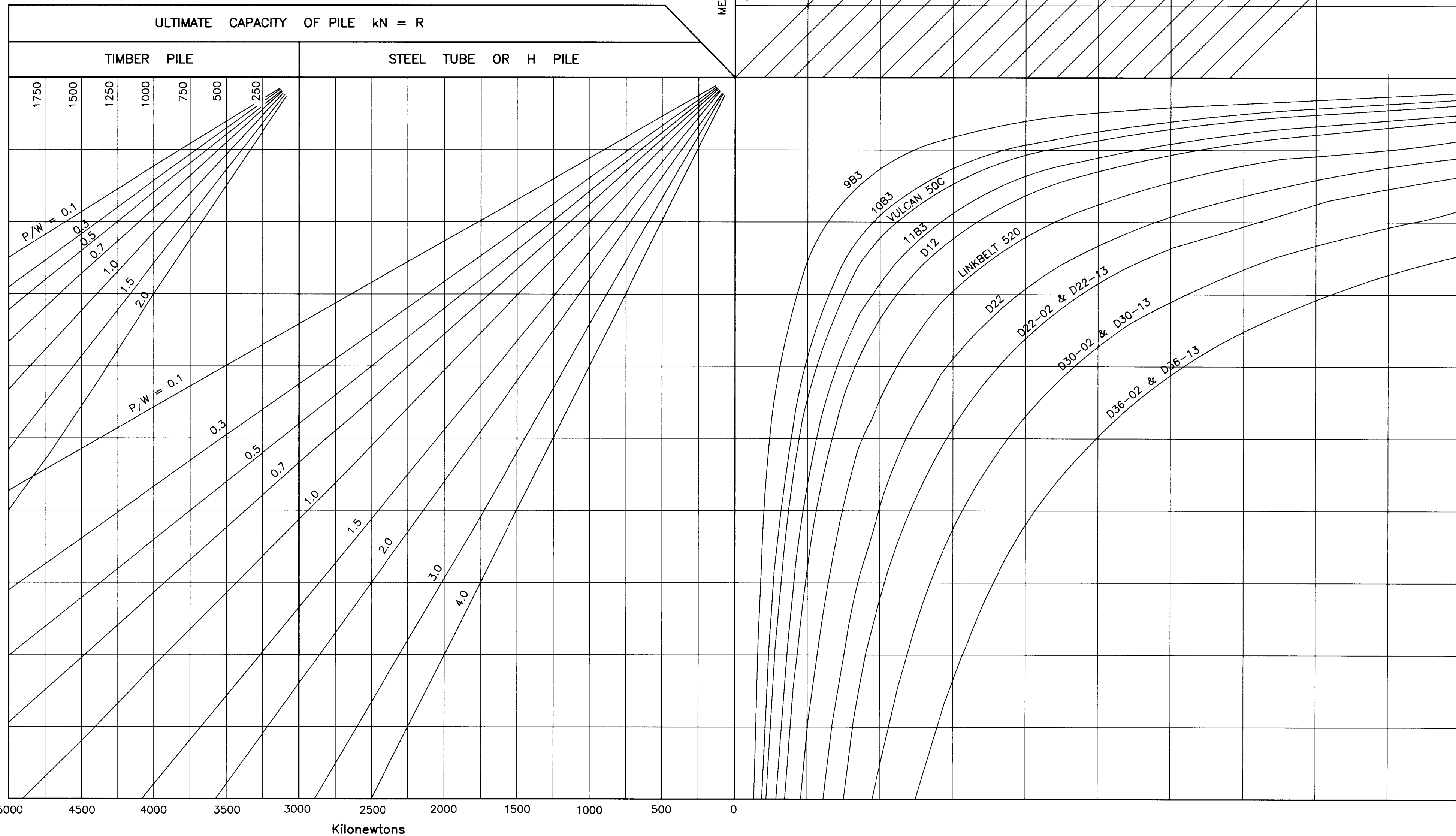
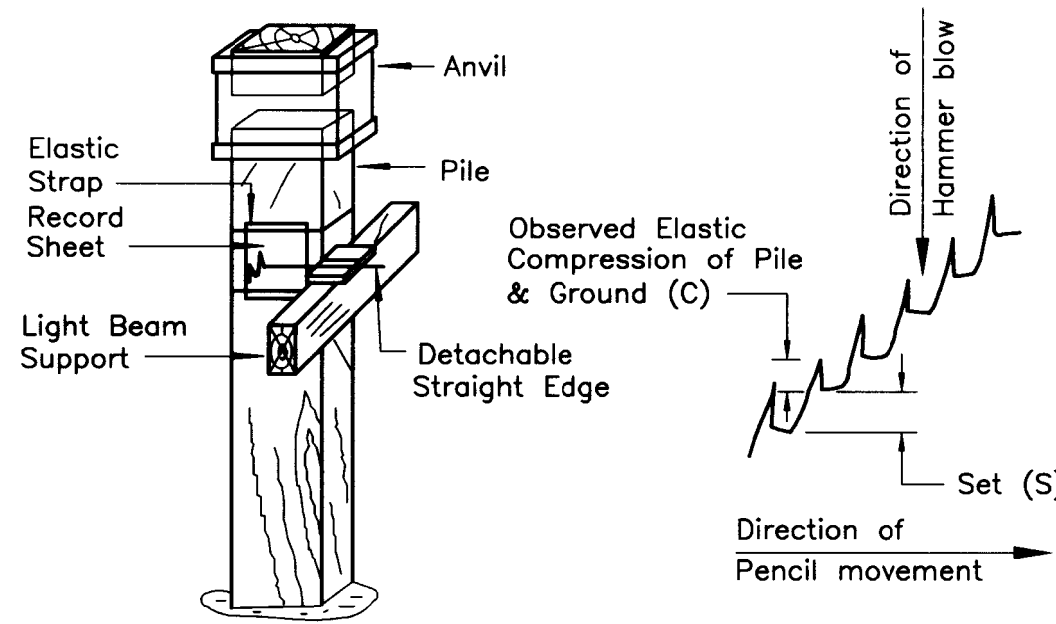
REVISIONS				DESCRIPTION			
DESIGN	STD	CHK		CODE OHBDC-91	DATE	DEC., 1999	
DRAWN	A.P.	CHK	M.M.	SITE 39W-064B	STRUCT	SCHEME	DWG B5

AutoCAD Drawing: D:\Drawings\WP1458800 Lost River\As103-011.dwg updated: Apr 19/2000 12:48 PM

HAMMERS		
TYPE	MASS OF RAM W Kilograms	MAXIMUM ENERGY Joules/blow
9B3	726	12419
10B3	1361	16948
50C	2268	20337
11B3	2268	26005
D12	1250	30506
B225	1360	39300
LB520	2300	40675
B300	1700	46100
D22	2200	53826
B400	2268	62400
D22-02	2200	67000
D22-13	2200	67000
D30-02	3000	91000
D30-13	3000	91000
B500	3129	107100
D36-02	3600	115000
D36-13	3600	115000

NOTE:

Ram may also be referred to as Piston



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No 2000-0222  
WP No 145-88-00

LOST RIVER  
ACROW BRIDGE DETOUR  
PILE DRIVING-STEAM & DIESEL HAMMERS

SHEET  
54

METHOD OF APPLYING THE HILEY FORMULA

$$R = \frac{nWgh}{S + c/2} \quad (\text{Hiley Formula}) \quad g = 9.80665 \text{ m/s}$$

Where  $R$  = Ultimate pile capacity in kilonewtons  
 $S$  = Measured penetration of pile per hammer blow in millimetres  
 $C$  = Measured rebound of pile per hammer blow in millimetres  
 $Wgh$  = Energy of hammer blow in joules

$$n = \text{Efficiency of blow} = \frac{W + Pe^2}{W + P}$$

where  $e = 0.32$  for steel (These values of  $e$  have been  
 $= 0.25$  for timber determined by experiment)

$P$  = Mass of pile + anvil in kilograms

$W$  = Mass of ram (piston) in kilograms

The  $P/W$  curves form the required reduction of total  
energy of the hammer blow according to the value of  $P/W$

$L = R/Q$  kilonewtons

Where  $L$  = Design capacity of pile

$Q$  = Factor of safety

Use  $Q = 3$  unless otherwise authorized by the Engineer

EXAMPLE 1:

Steel tube pile,  $O D = 323.90 \text{ mm}$  linear density =  $49.73 \text{ kg/m}$ ,  
 $20 \text{ m}$  long plus anvil of mass  $600 \text{ kg}$ , giving  $P = 994.6 + 600 = 1594.6 \text{ kg}$

$$\text{Delmag D12 hammer } W = 1250 \text{ kg } P/W = \frac{1594.6}{1250} = 1.28$$

Observed measured rebound  $C = 10 \text{ mm}$

Observed measured penetration  $S = 5 \text{ mm}$

USING CHART: With  $C = 10$  proceed horizontally to right

to cut line  $S = 5$  then vertically down to cut curve D12 then

horizontally to left to cut  $P/W = 1.28$  then vertically down to

$$\text{read ultimate capacity } R = 1512 \text{ kN } L = \frac{1512}{3} = 504 \text{ kN}$$

EXAMPLE 2:

HP 310x110,  $50 \text{ m}$  long plus anvil of mass  $600 \text{ kg}$  giving

$P = 5500 + 600 = 6100 \text{ kg}$ . The hammer is Delmag D22-13

$$W = 2200 \text{ kg}, n = \frac{W + Pe^2}{W + P} = \frac{2200 + (6100 \times 0.32 \times 0.32)}{2200 + 6100} = \frac{2824}{8300} = 0.34$$

Energy of hammer ( $Wgh$ ) =  $67000 \text{ J/blow}$

Observed measured rebound  $C = 10 \text{ mm}$

Observed measured penetration  $S = 5 \text{ mm}$

USING HILEY FORMULA:

$$\text{Ultimate capacity } R = \frac{nWgh}{S + c/2} \text{ kN} = \frac{0.34 \times 67000}{10} = 2278 \text{ kN}$$

$$\text{Design capacity } L = \frac{2278}{3} = 759 \text{ kN}$$

NOTE 1:

These charts are designed to cover most cases which will be  
encountered on normal construction projects. Occasionally it  
will be found that  $R$  cannot be obtained from the charts, for  
instance when  $C = 5 \text{ mm}$  and  $S = 2 \text{ mm}$  using a Delmag D22  
hammer. In such cases it will be necessary to calculate  $R$  using  
the original equation  $R = \frac{nWgh}{S + c/2}$

In cases where the energy of the hammer being used is slightly  
different from the hammer energy for which curves are drawn  
the curves may still be used but the result should be reduced or  
increased according to the energy ratios. Example use Linkbelt 520  
curve (Energy  $40675 \text{ J}$ ) for Berminghammer 225 (Energy  $39300 \text{ J}$ )  
but reduce result by multiplying by  $\frac{39300}{40675}$

NOTE 2:

For Projects designed to the OHBDC, the ultimate capacity ( $R$ ) is shown on the  
contract drawings and  $L$  and  $Q$  are not required.

STANDARD DRAWING  
JULY 1981

SS 103-11

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS					
DATE	BY	DESCRIPTION			
DESIGN STD	CHK	CODE OHBDC-91	DATE DEC., 1999		
DRAWN A.P.	CHK M.M.	SITE 39W-064	STRUCT	SCHEME	DWG B6