

CONTRACT DRAWINGS

CONTRACT NO. 2018-4008

BOOK 4 OF 4

# EASTERN REGION

Ministry Of Transportation



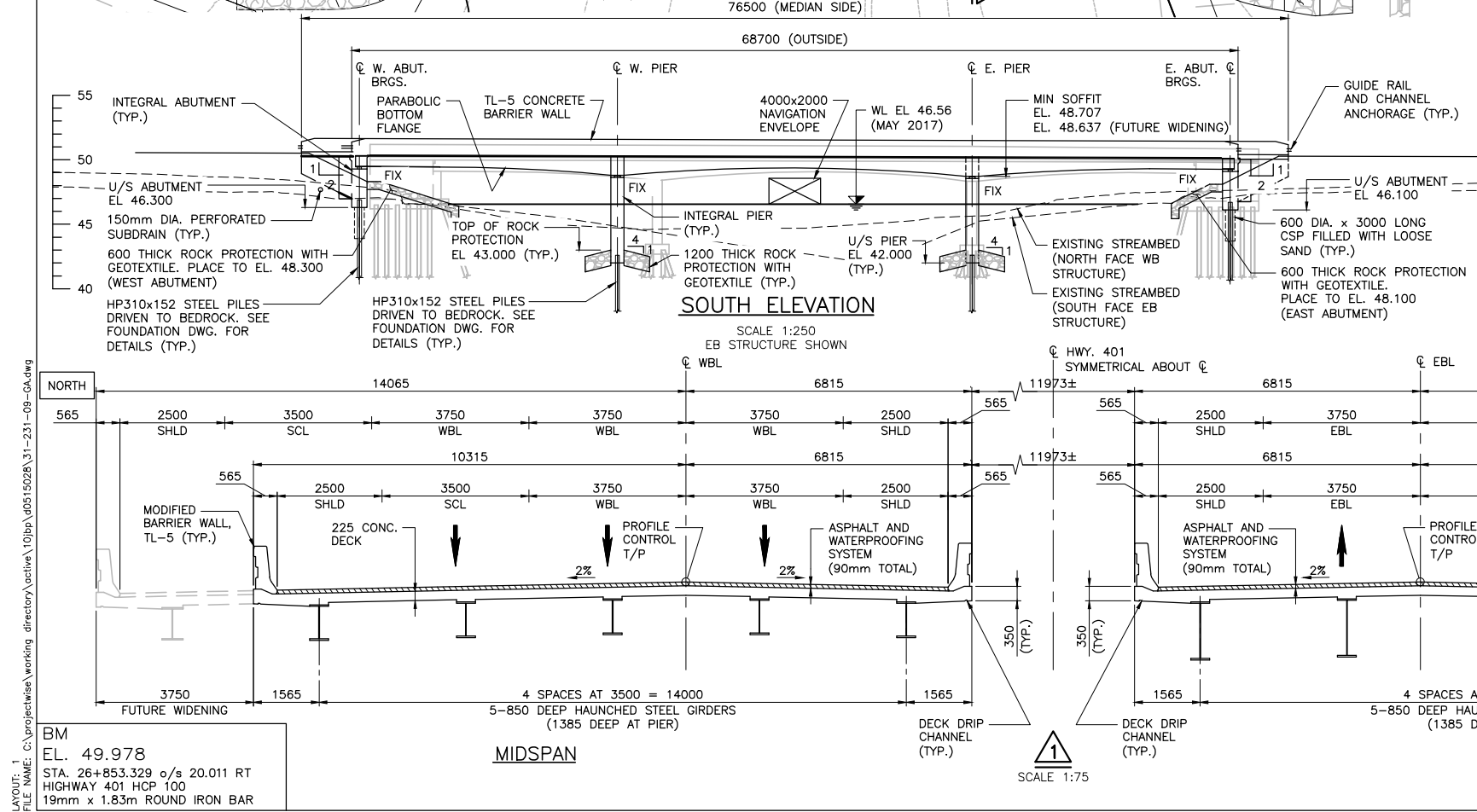
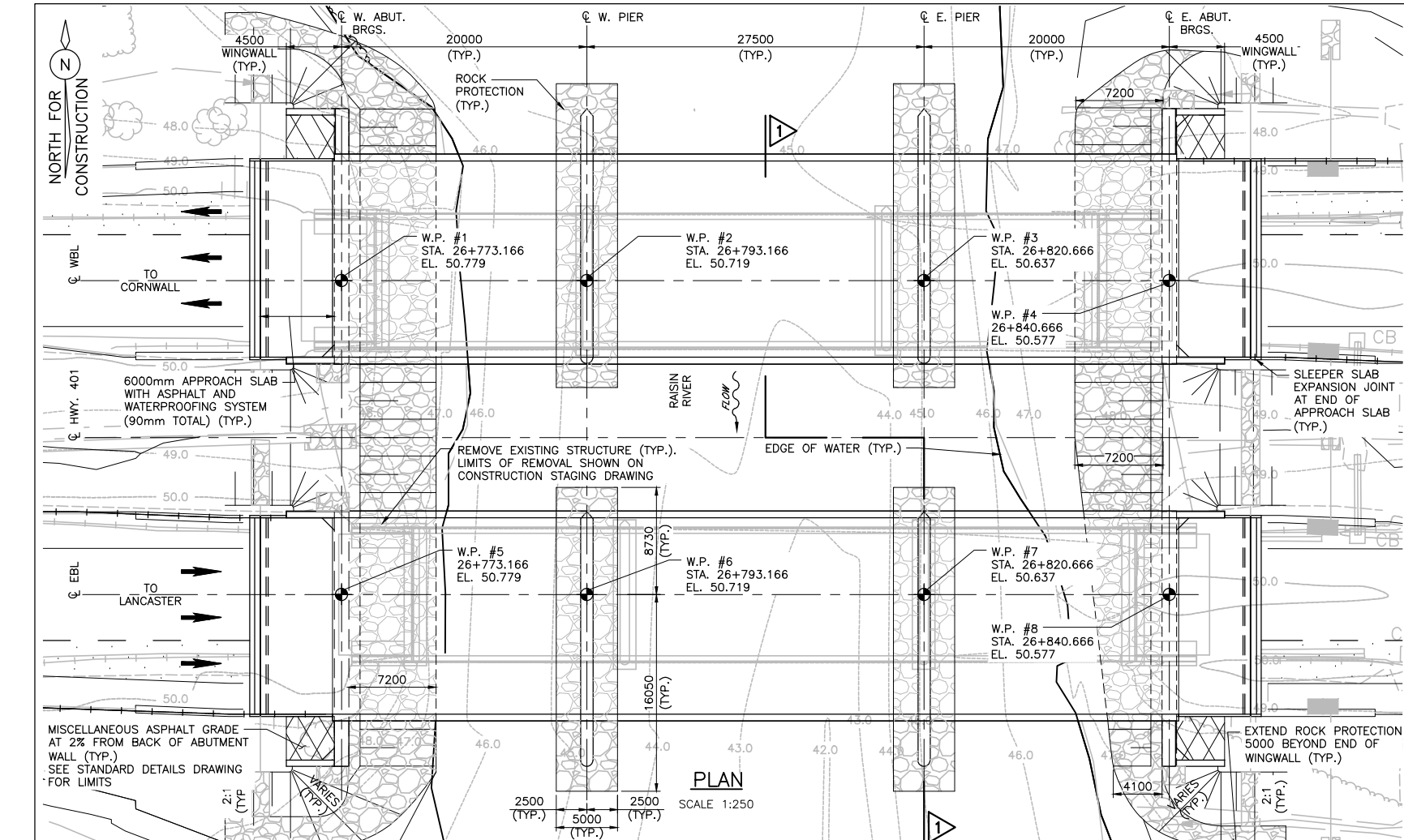
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**W.P. No. 4013-11-00**

**Contract No. 2018-4008**

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METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

DRAWING LIST

1. GENERAL ARRANGEMENT

2. BOREHOLE LOCATIONS AND SOIL STRATA WBL I

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35. AS CONSTRUCTED ELEVATIONS AND DIMENSIONS

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HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

GENERAL ARRANGEMENT

SHEET 198

DILLON CONSULTING

PROFESSIONAL ENGINEER

A. W. KHAN

10023847

18 JAN 2019

PROVINCE OF ONTARIO

PROFESSIONAL ENGINEER

B.R. CRAIG

10023847

18 JAN 2019

PROVINCE OF ONTARIO

GENERAL NOTES

1. CLASS OF CONCRETE

30MPa UNLESS OTHERWISE NOTED

2. CLEAR COVER TO REINFORCING STEEL

FOOTINGS 100 ± 25

DECK TOP 70 ± 20

BOTTOM 40 ± 10

REMAINDER 70 ± 20 UNLESS OTHERWISE NOTED

3. REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR REINFORCING STEEL BARS SHALL BE CLASS B.

STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa UNLESS OTHERWISE SPECIFIED.

BARS MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.

4. CONSTRUCTION NOTES

THE CONTRACTOR SHALL ESTABLISH THE BEARING PEDESTAL ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESS 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.

BACKFILL SHALL NOT BE PLACED BEHIND THE ABUTMENTS UNTIL THE DECK SLAB IS IN PLACE AND HAS REACHED A STRENGTH OF 25 MPa

BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHT OF THE BACKFILL AT THE ABUTMENTS APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION OF THE ABUTMENT BACKFILL BE GREATER THAN 500mm.

BACKFILL SHALL BE PLACED SIMULTANEOUSLY ON EACH FACE OF EACH PIER KEEPING THE HEIGHT OF THE BACKFILL AT THE PIERS APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION OF THE PIER BACKFILL BE GREATER THAN 500mm.

CONSTRUCT ABUTMENTS WINGWALLS, AND PIERS TO THE BEARING SEAT ELEVATION. SUPPLY AND INSTALL TEMPORARY LATERAL BRACING FOR THE ABUTMENTS AND PIERS. FORMWORK AND LATERAL BRACING AT ABUTMENTS SHALL NOT BE REMOVED UNTIL CONCRETE HAS REACHED A STRENGTH OF 25 MPa.

FORMWORK AND LATERAL BRACING AT PIERS SHALL NOT BE REMOVED UNTIL: STEEL GIRDERS HAVE BEEN ERECTED, ANCHOR RODS INSTALLED AND NON-SHRINK GROUT HAS REACHED A STRENGTH OF 20 MPa OR THE ROCK PROTECTION HAS BEEN INSTALLED AND THE PIERS HAVE BEEN BACKFILLED TO RIVER BED ELEVATION (APPROXIMATELY EL. 45.0).

THE CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION, ERECTION AND CONSTRUCTION.

LAYOUT: 1  
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BM  
EL. 49.978  
STA. 26+853.329 o/s 20.011 RT  
HIGHWAY 401 HCP 100  
19mm x 1.83m ROUND IRON BAR

MIDSPAN

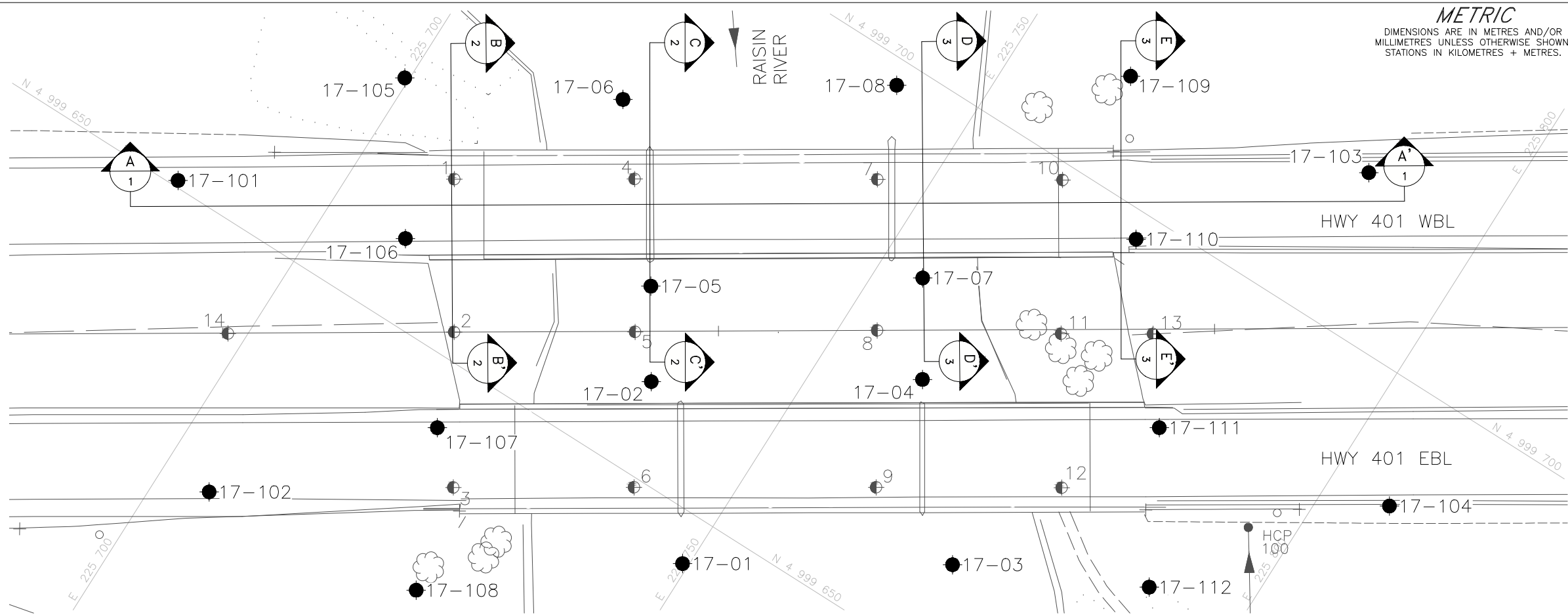
PIER

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

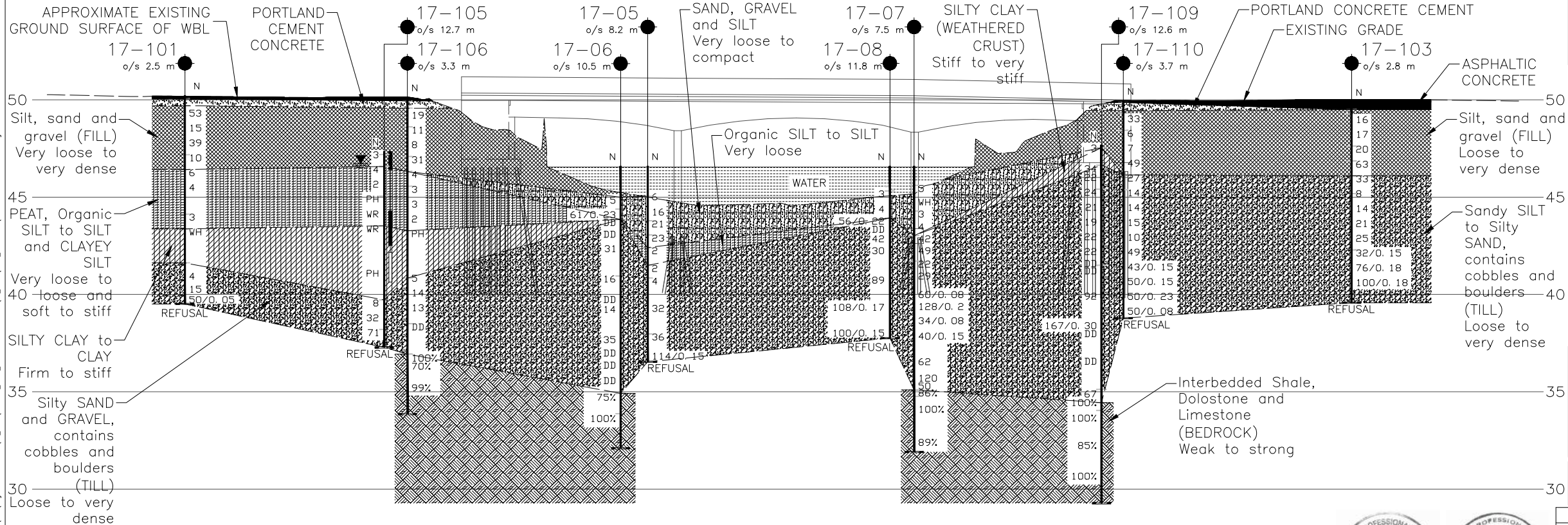
REVISIONS

DATE	BY	DESCRIPTION
DESIGN	AWK	CHK BRC
DRAWN	SJM	CHK AWK

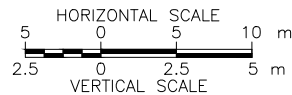
DATE Jan-19  
DWG 1



PLAN



PROFILE A-A'



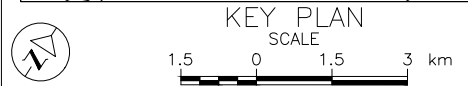
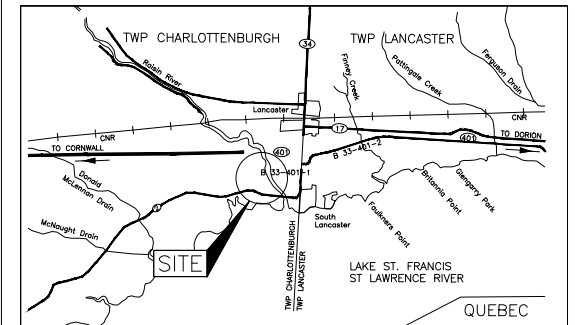
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STATIONS IN KILOMETRES + METRES.

CONT No.  
GWP No. 4084-11-00

RAISIN RIVER BRIDGE WBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061



SHEET  
199



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigation  
Geocres No. 31G-143
- ⊥ Seal
- ⊥ Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated  
(Std. Pen. Test, 475 j/blow)
- DD Diamond Drilling
- 100% Rock Quality Designation (RQD)
- WL in piezometer, measured on MAY 26, 2017
- WL upon completion of drilling

BOREHOLE CO-ORDINATES (MTM ZONE 8)

No.	ELEVATION	NORTHING	EASTING
17-01	46.6	4999645.2	225749.4
17-02	46.6	4999659.0	225736.9
17-03	46.6	4999659.7	225772.5
17-04	46.6	4999673.8	225759.9
17-05	46.6	4999667.1	225731.8
17-06	46.6	4999681.5	225719.3
17-07	46.6	4999682.5	225754.5
17-08	46.6	4999697.5	225741.9
17-101	50.2	4999650.6	225685.8
17-102	50.2	4999625.8	225705.2
17-103	49.9	4999715.5	225786.8
17-104	49.9	4999688.3	225806.5
17-105	47.3	4999671.6	225699.6
17-106	50.1	4999658.0	225708.3
17-107	50.1	4999643.6	225721.2
17-108	48.2	4999628.6	225728.2
17-109	47.7	4999710.9	225761.3
17-110	50.0	4999697.3	225770.6
17-111	50.0	4999682.5	225782.7
17-112	47.5	4999668.4	225790.4

NOTES

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The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

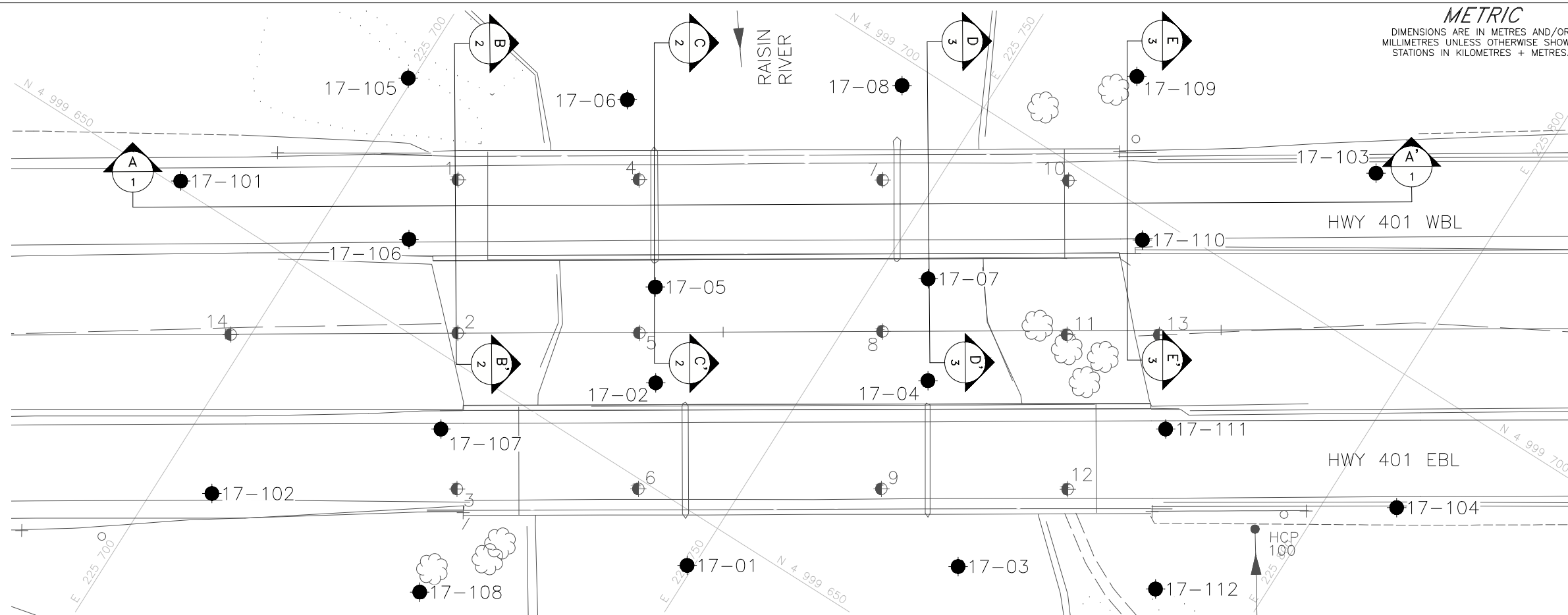
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NO.	DATE	BY	REVISION
Geocres No. 31G-261			
HWY. 401		PROJECT NO. 1772182	
SUBM'D. KSL		DATE: 01/17/2019	
DRAWN: JM		SITE: 31-231/1&2	
CHKD. MJK		DWG. 2	
APPD. FJH		DIST. EASTERN	







PLAN

SCALE



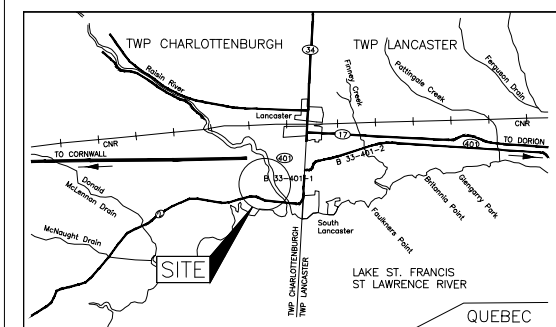
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CONT No.  
GWP No. 4084-11-00

RAISIN RIVER BRIDGE WBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061



SHEET  
200



KEY PLAN

SCALE



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigation  
Geocres No. 31G-143
- ⊥ Seal
- ⊥ Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated  
(Std. Pen. Test, 475 j/blow)
- DD Diamond Drilling
- 100% Rock Quality Designation (RQD)
- ≡ WL in piezometer, measured on MAY 26, 2017
- ≡ WL upon completion of drilling

BOREHOLE CO-ORDINATES (MTM ZONE 8)

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17-06	46.6	4999681.5	225719.3
17-07	46.6	4999682.5	225754.5
17-08	46.6	4999697.5	225741.9
17-101	50.2	4999650.6	225685.8
17-102	50.2	4999625.8	225705.2
17-103	49.9	4999715.5	225786.8
17-104	49.9	4999688.3	225806.5
17-105	47.3	4999671.6	225699.6
17-106	50.1	4999658.0	225708.3
17-107	50.1	4999643.6	225721.2
17-108	48.2	4999628.6	225728.2
17-109	47.7	4999710.9	225761.3
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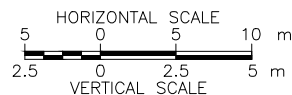
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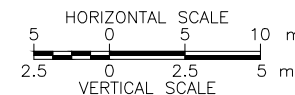
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Geocres No. 31G-261			
HWY. 401		PROJECT NO. 1772182	
SUBM'D. KSL	CHKD. KSL	DATE: 11/13/2018	SITE: 31-231/1&2
DRAWN: JM	CHKD. MJK	APPD. FJH	DWG. 3

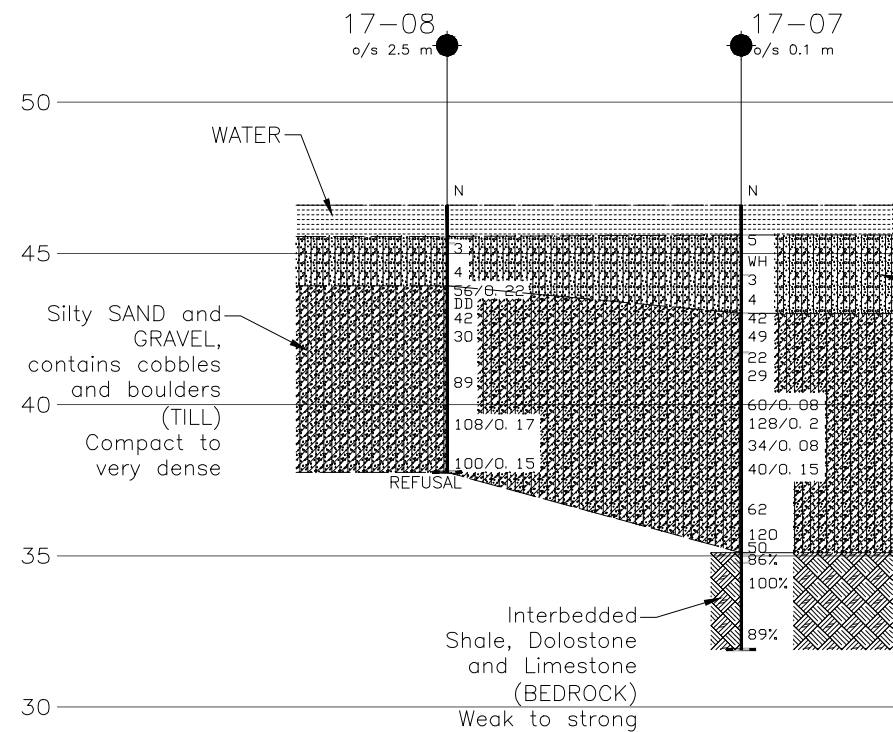
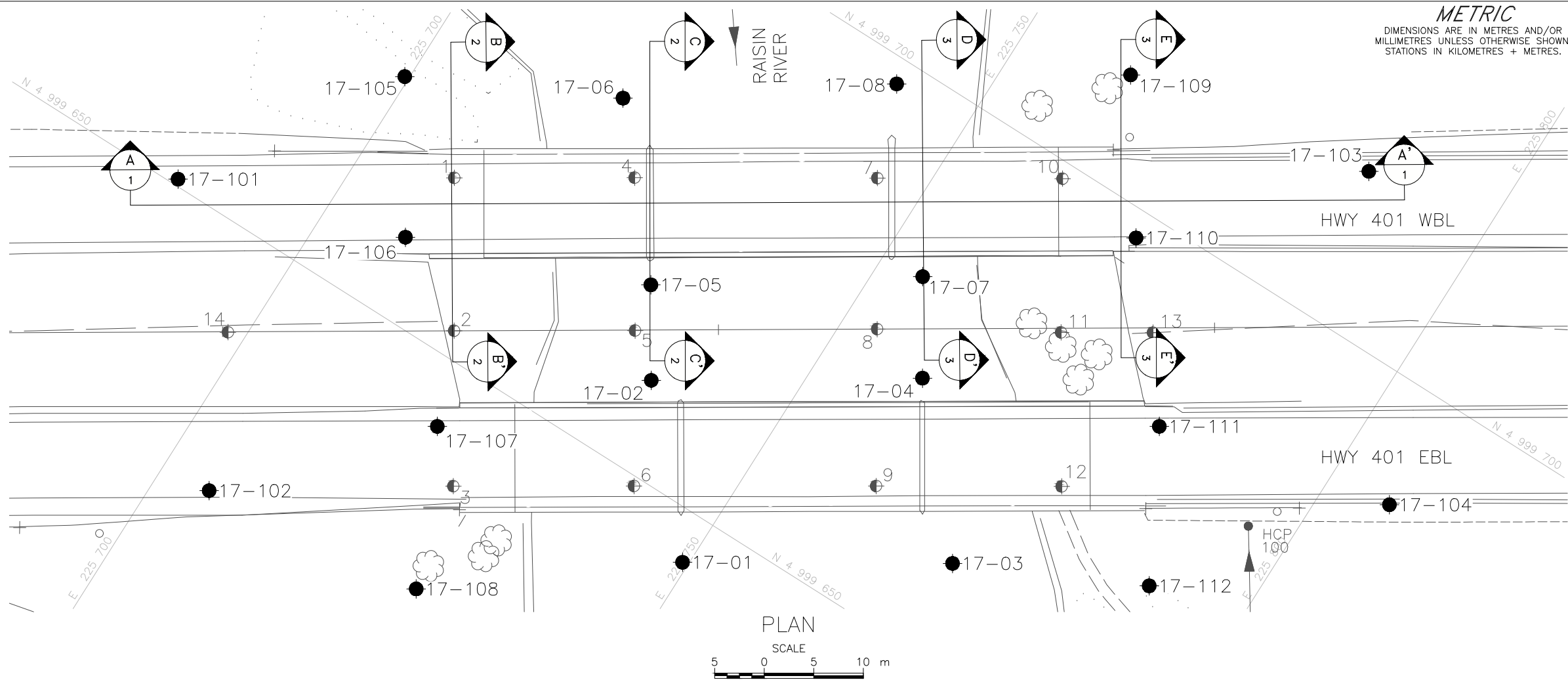


CROSS-SECTION B-B'

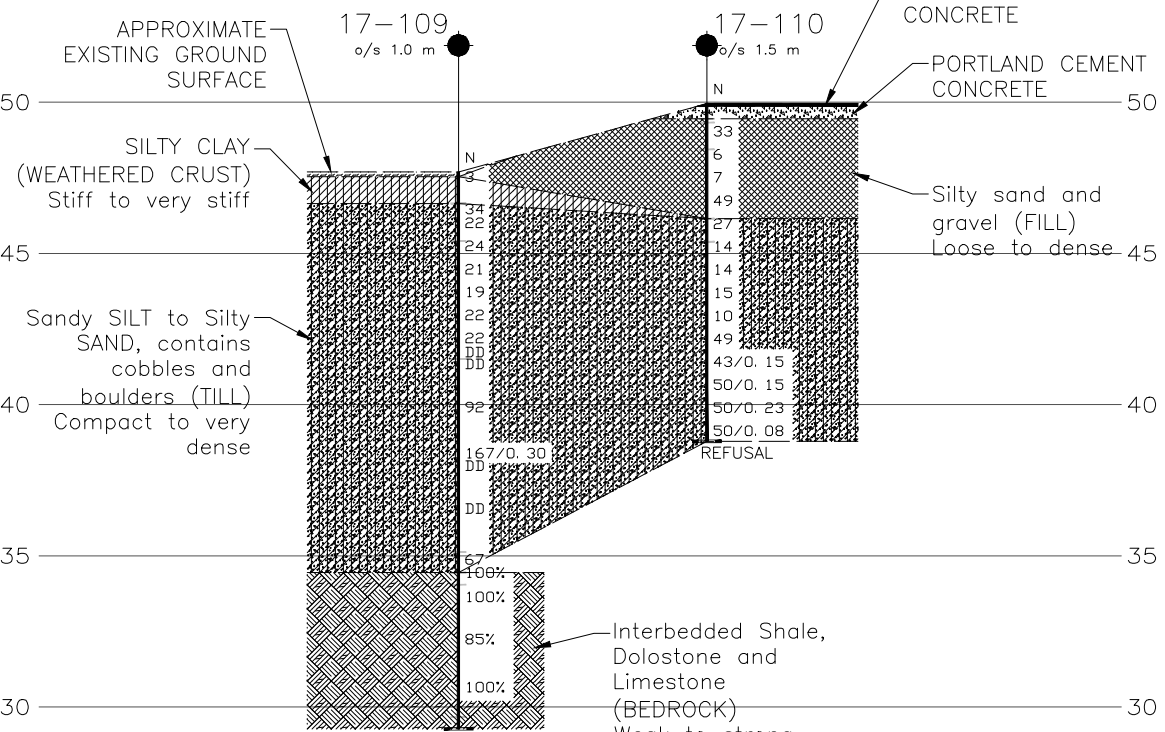


CROSS-SECTION C-C'





CROSS-SECTION D-D'

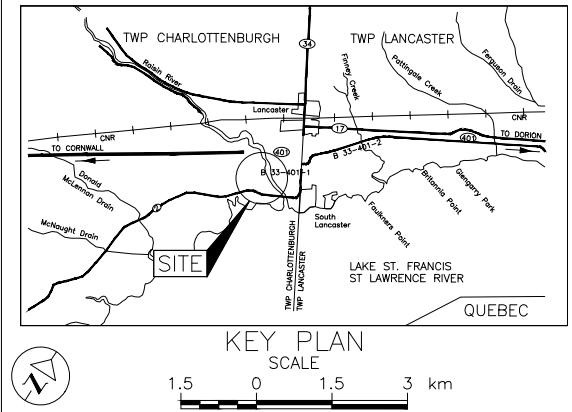


CROSS-SECTION E-E'

CONT No.  
GWP No4084-11-00

RAISIN RIVER BRIDGE WBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061

SHEET  
201



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigation Geocres No. 31G-143
- Seal
- Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- DD Diamond Drilling
- 100% Rock Quality Designation (RQD)
- WL in piezometer, measured on MAY 26, 2017
- WL upon completion of drilling

BOREHOLE CO-ORDINATES (MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
17-01	46.6	4999645.2	225749.4
17-02	46.6	4999659.0	225736.9
17-03	46.6	4999659.7	225772.5
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17-06	46.6	4999681.5	225719.3
17-07	46.6	4999682.5	225754.5
17-08	46.6	4999697.5	225741.9
17-101	50.2	4999650.6	225685.8
17-102	50.2	4999625.8	225705.2
17-103	49.9	4999715.5	225786.8
17-104	49.9	4999688.3	225806.5
17-105	47.3	4999671.6	225699.6
17-106	50.1	4999658.0	225708.3
17-107	50.1	4999643.6	225721.2
17-108	48.2	4999628.6	225728.2
17-109	47.7	4999710.9	225761.3
17-110	50.0	4999697.3	225770.6
17-111	50.0	4999682.5	225782.7
17-112	47.5	4999668.4	225790.4

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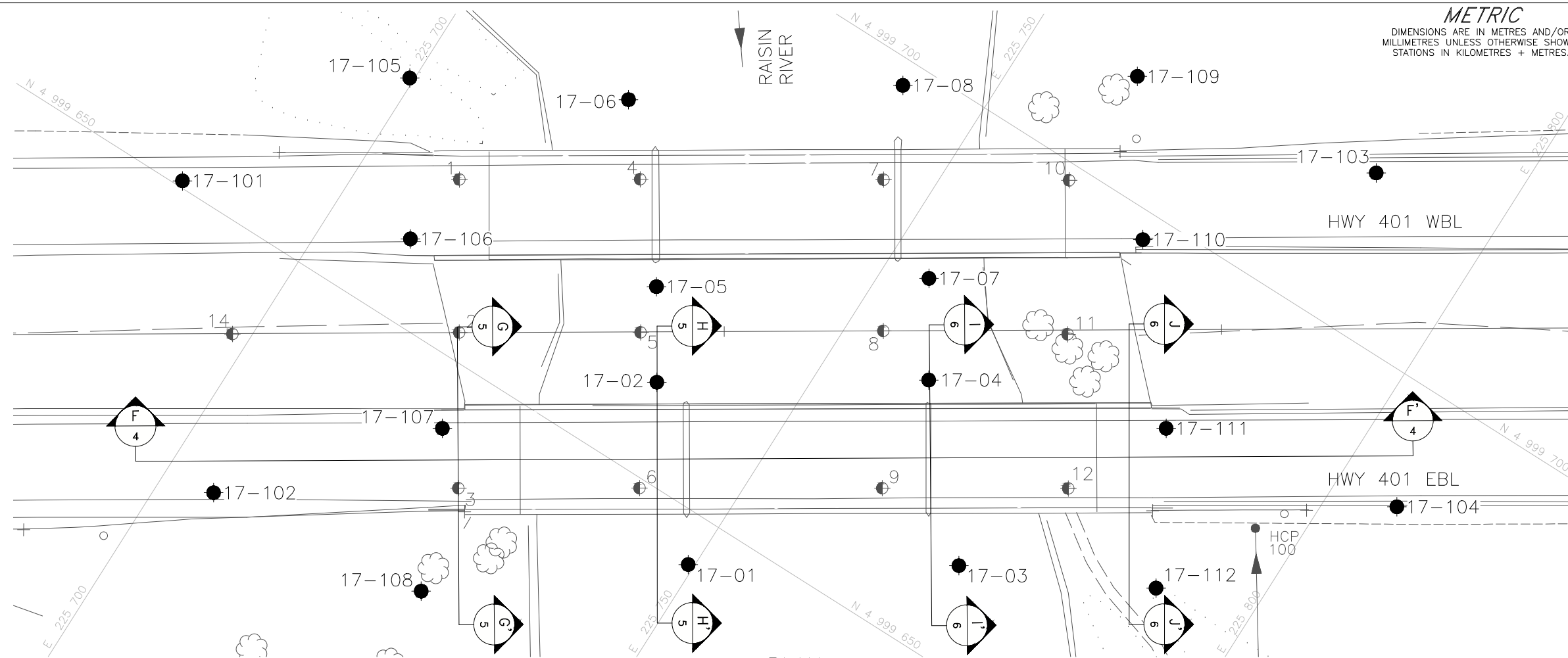
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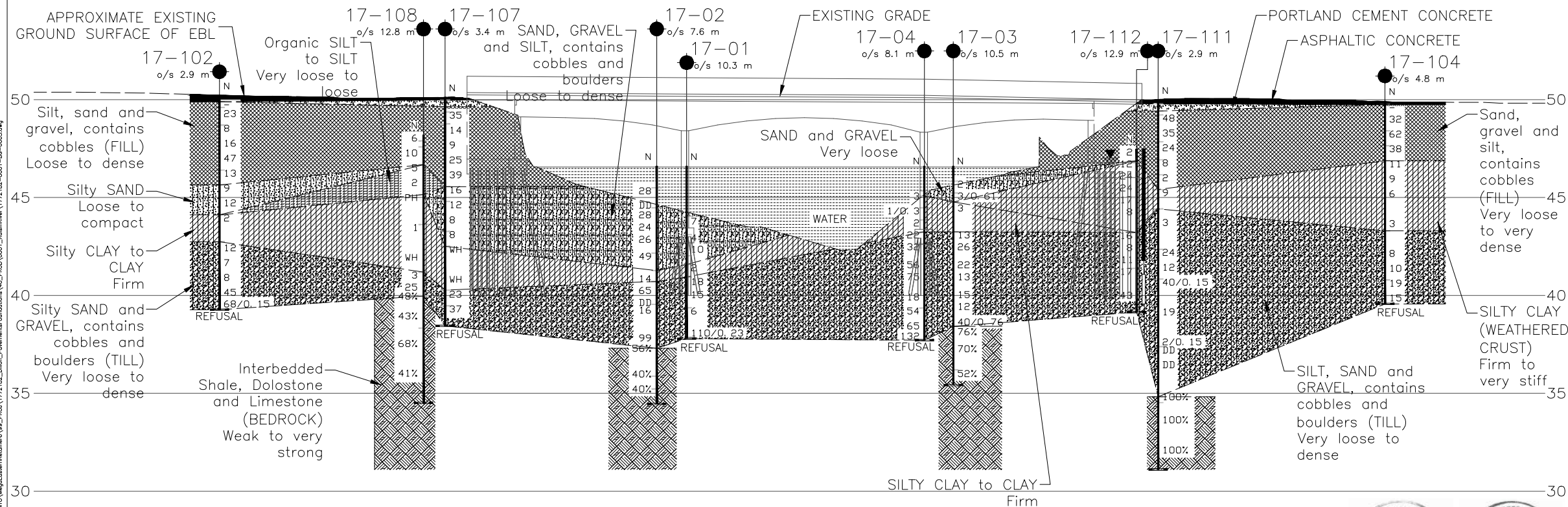
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A			
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SUBM'D. KSL	CHKD. KSL	DATE: 11/13/2018	SITE: 31-231/1&2
DRAWN: JM	CHKD. MJK	APPD. FJH	DWG. 4

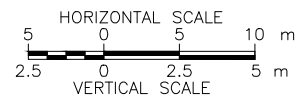




PLAN



CROSS-SECTION F-F'



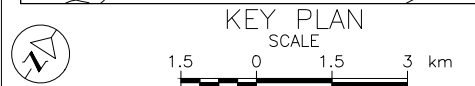
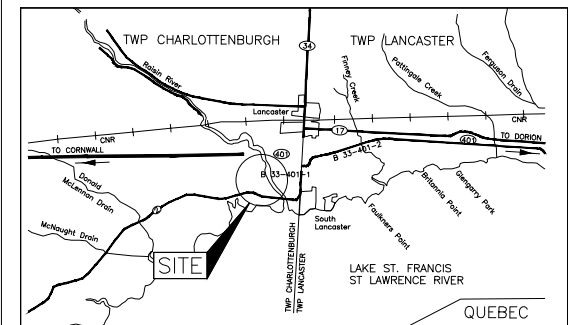
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CONT No.  
GWP No. 4084-11-00

RAISIN RIVER BRIDGE EBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061



SHEET  
202



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigation  
Geocres No. 31G-143
- ⊥ Seal
- ⊥ Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated  
(Std. Pen. Test, 475 j/blow)
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- ≡ WL in piezometer, measured on MAY 26, 2017
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BOREHOLE CO-ORDINATES (MTM ZONE 8)

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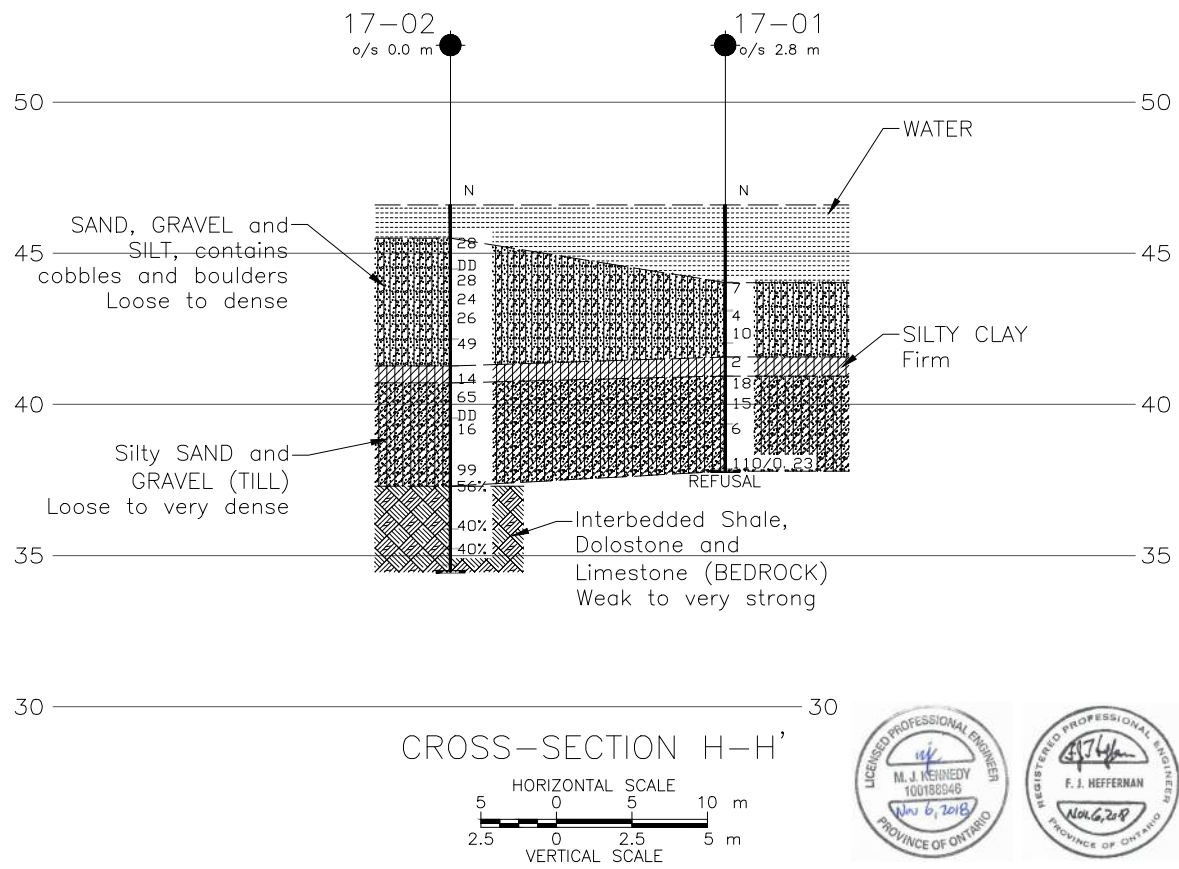
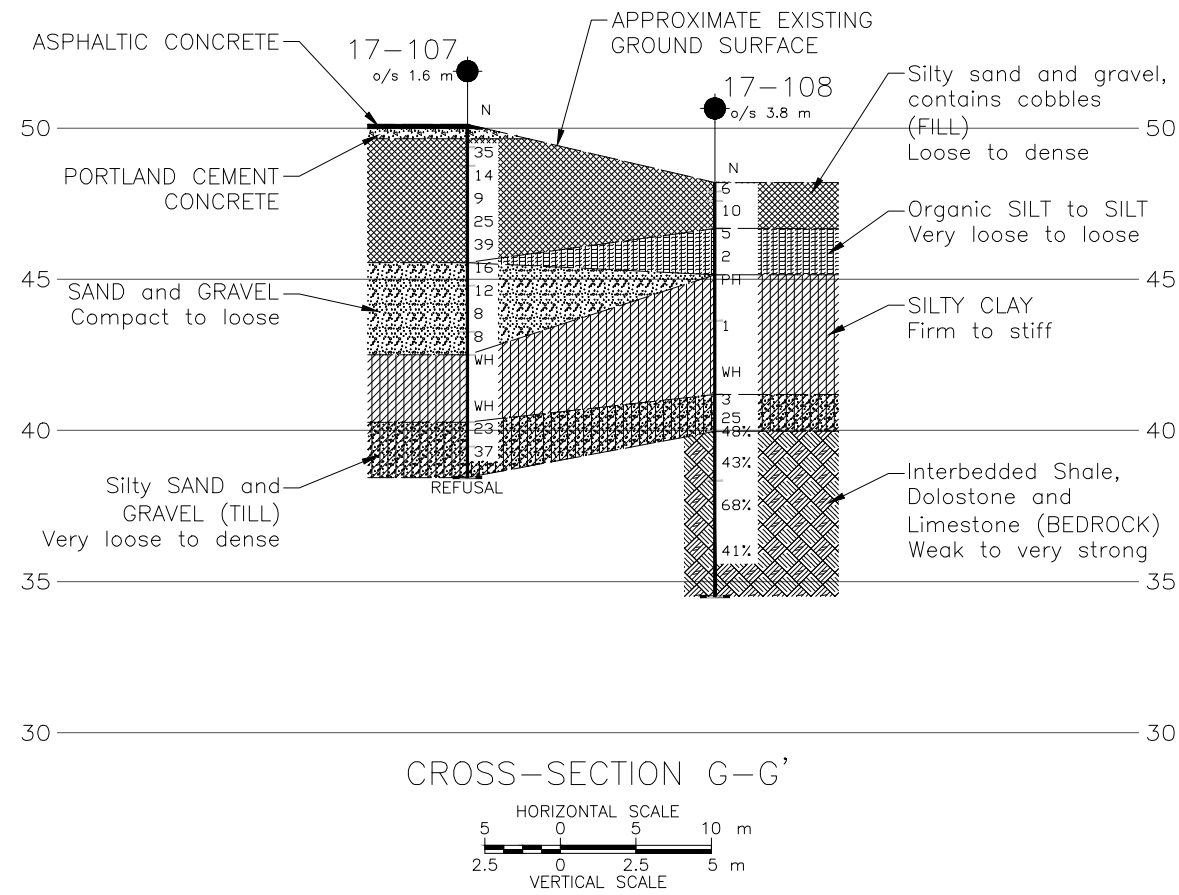
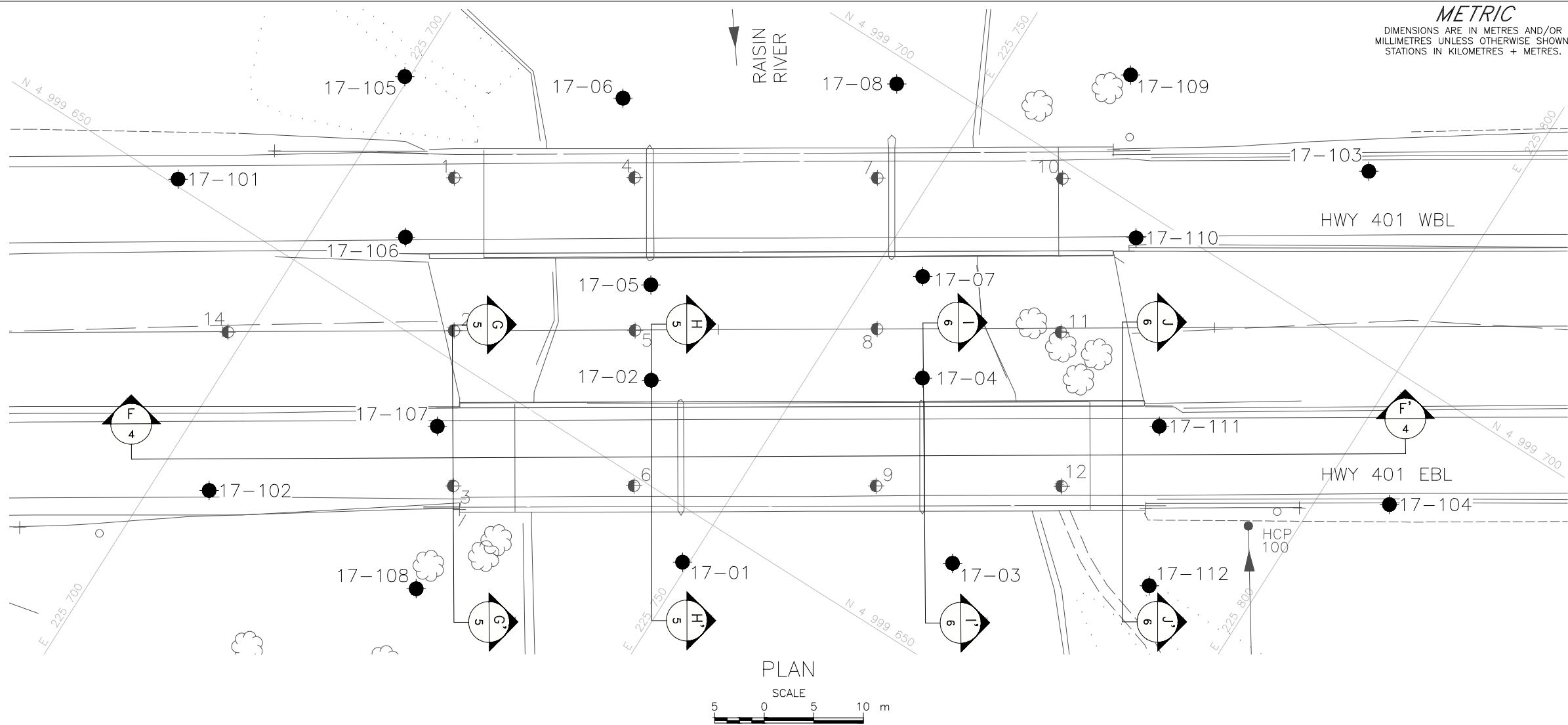
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HWY. 401		PROJECT NO. 1772182	
SUBM'D. KSL		DATE: 11/13/2018	
DRAWN: JM		SITE: 31-231/1&2	
CHKD. MJK		DWG. 5	
APPD. FJH			



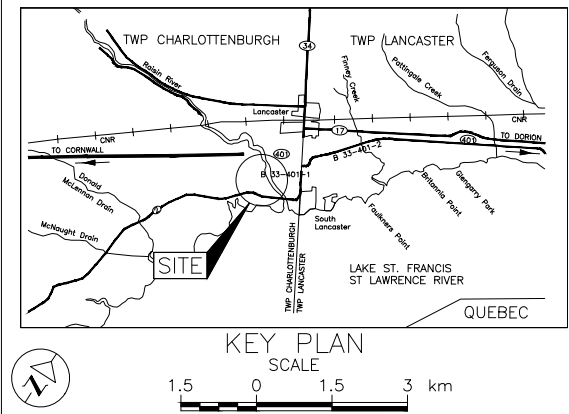




CONT No.  
GWP No. 4084-11-00

RAISIN RIVER BRIDGE EBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061

SHEET  
203



- LEGEND**
- Borehole - Current Investigation
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Geocres No. 31G-143
  - ⊞ Seal
  - ⊞ Piezometer
  - N Standard Penetration Test Value
  - 16 Blows/0.3m unless otherwise stated  
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17-03	46.6	4999659.7	225772.5
17-04	46.6	4999673.8	225759.9
17-05	46.6	4999667.1	225731.8
17-06	46.6	4999681.5	225719.3
17-07	46.6	4999682.5	225754.5
17-08	46.6	4999697.5	225741.9
17-101	50.2	4999650.6	225685.8
17-102	50.2	4999625.8	225705.2
17-103	49.9	4999715.5	225786.8
17-104	49.9	4999688.3	225806.5
17-105	47.3	4999671.6	225699.6
17-106	50.1	4999658.0	225708.3
17-107	50.1	4999643.6	225721.2
17-108	48.2	4999628.6	225728.2
17-109	47.7	4999710.9	225761.3
17-110	50.0	4999697.3	225770.6
17-111	50.0	4999682.5	225782.7
17-112	47.5	4999668.4	225790.4

**NOTES**

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

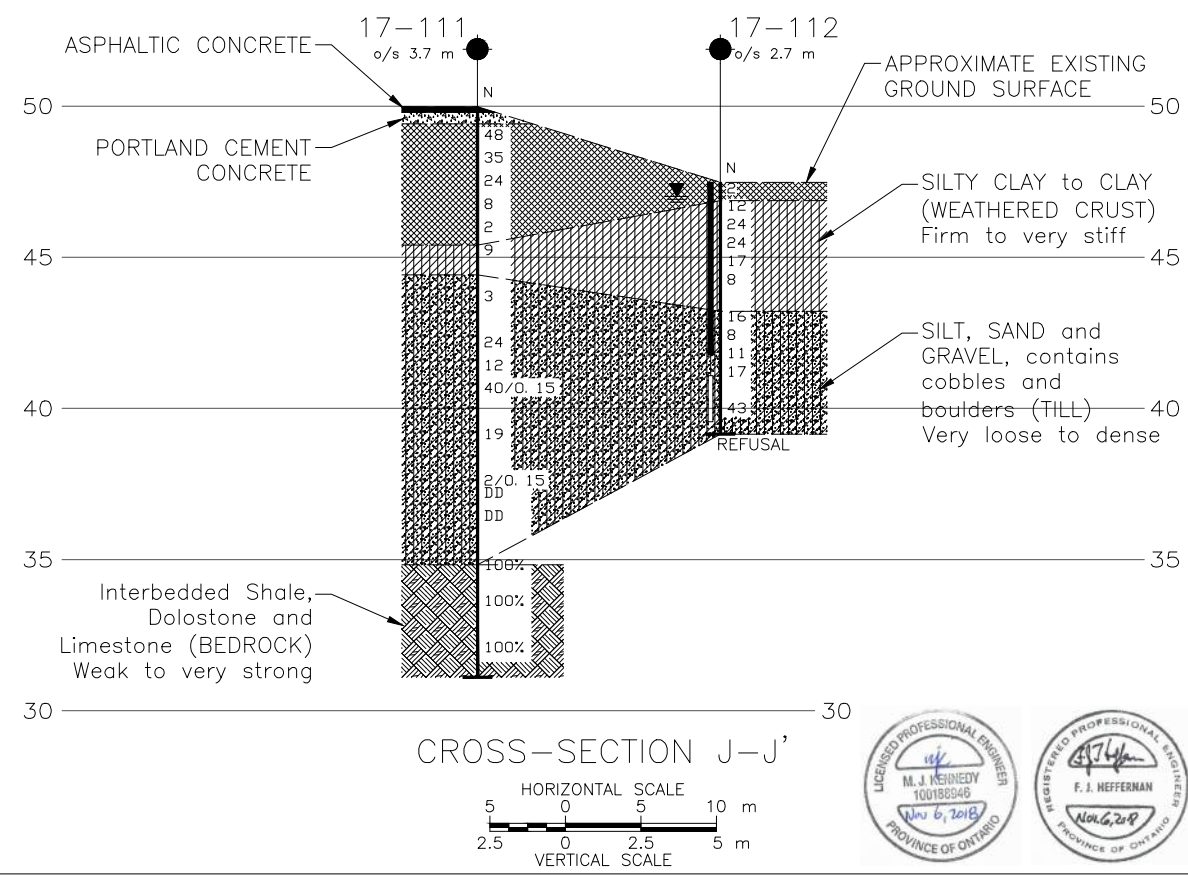
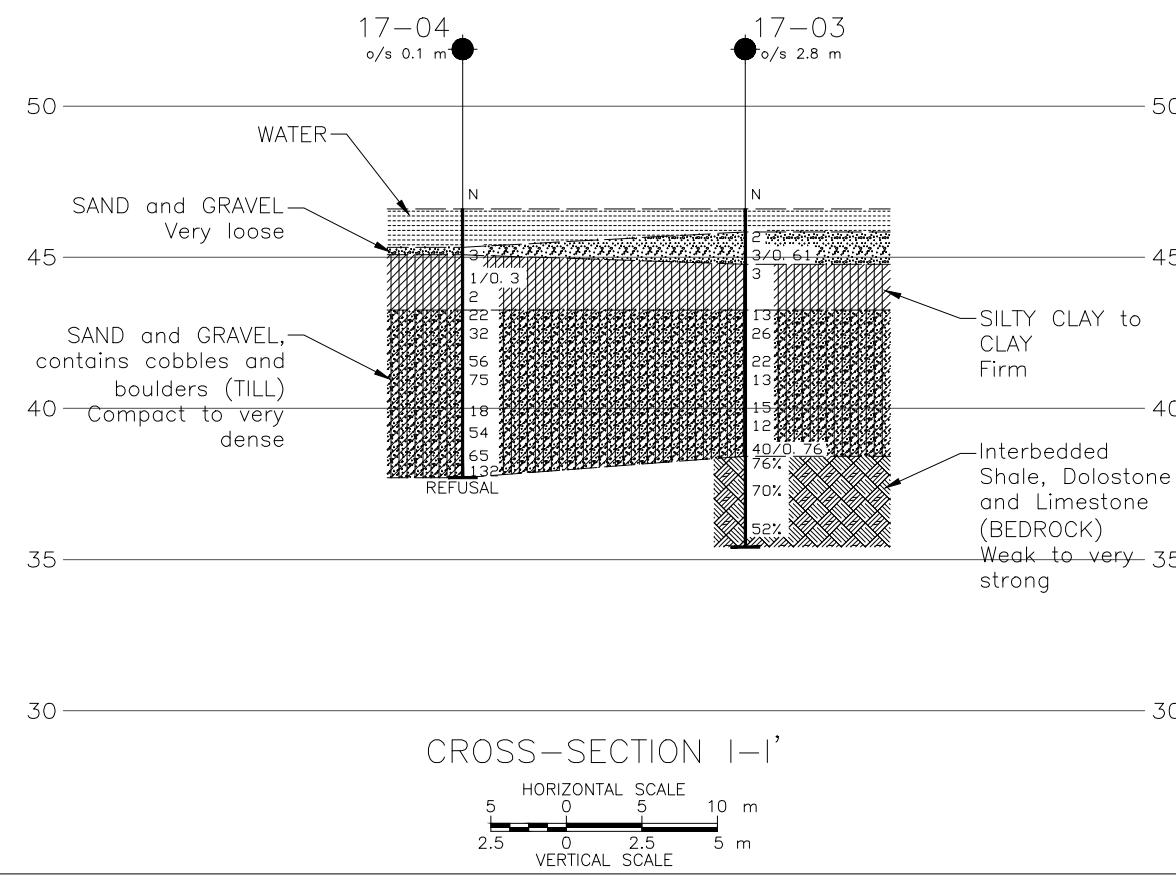
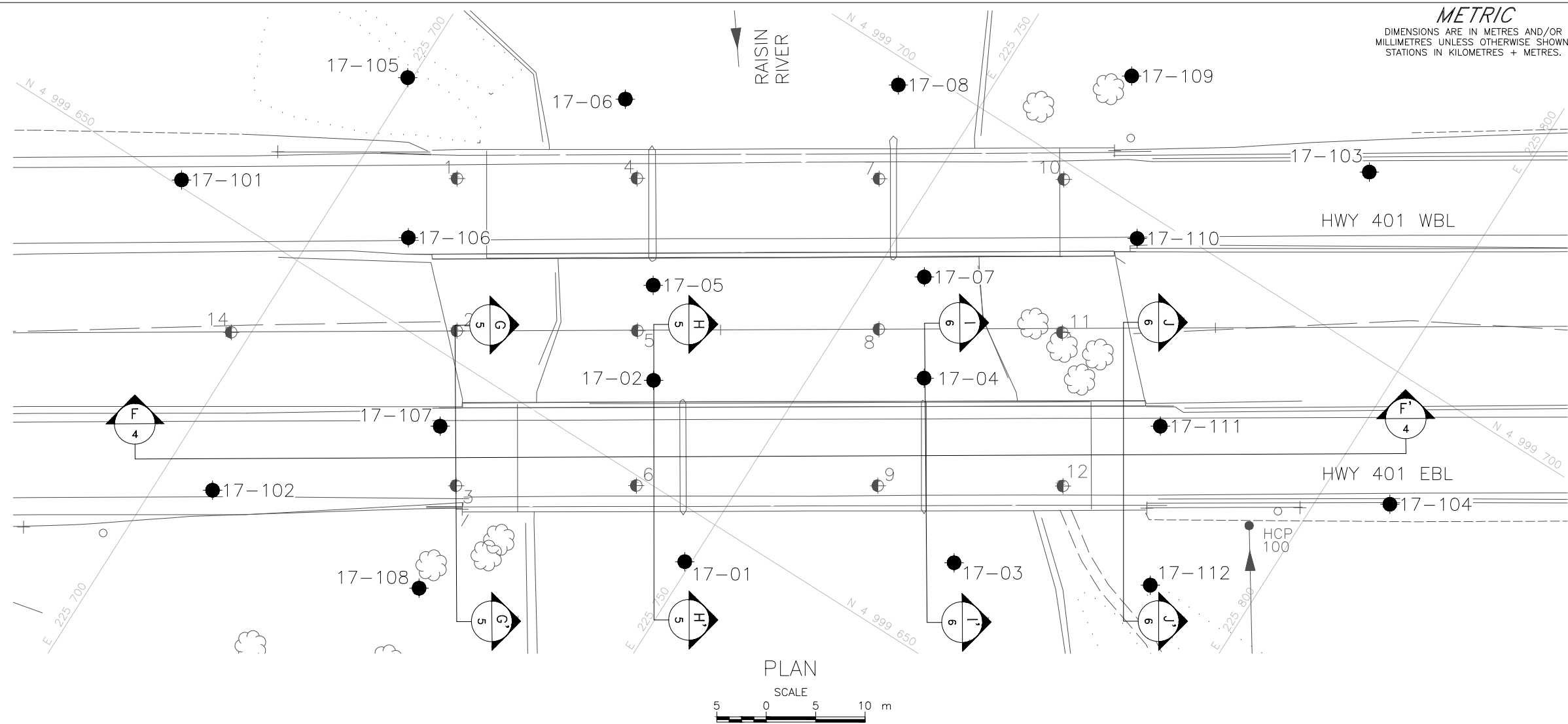
The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

**REFERENCE**

Base plans provided in digital format by Dillon, drawing file nos. Base.dwg and 31-231-09-GA.dwg, received SEPTEMBER 19, 2017.

A			
NO.	DATE	BY	REVISION
Geocres No. 31G-261			
HWY. 401	PROJECT NO. 1772182		DIST. EASTERN
SUBM'D. KSL	CHKD. KSL	DATE: 11/13/2018	SITE: 31-231/1&2
DRAWN: JM	CHKD. MJK	APPD. FJH	DWG. 6





CONT No.  
GWP No. 4084-11-00

RAISIN RIVER BRIDGE EBL  
HIGHWAY 401  
BOREHOLE LOCATIONS AND SOIL STRATA  
LAT. 45.132590 LONG. -74.505061

SHEET  
204

KEY PLAN  
SCALE  
0 1.5 3 km

**LEGEND**

- Borehole - Current Investigation
- Borehole - Previous Investigation  
Geocres No. 31G-143
- Seal
- Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated  
(Std. Pen. Test, 475 j/blow)
- DD Diamond Drilling
- 100% Rock Quality Designation (RQD)
- WL in piezometer, measured on MAY 26, 2017
- WL upon completion of drilling

BOREHOLE CO-ORDINATES (MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
17-01	46.6	4999645.2	225749.4
17-02	46.6	4999659.0	225736.9
17-03	46.6	4999659.7	225772.5
17-04	46.6	4999673.8	225759.9
17-05	46.6	4999667.1	225731.8
17-06	46.6	4999681.5	225719.3
17-07	46.6	4999682.5	225754.5
17-08	46.6	4999697.5	225741.9
17-101	50.2	4999650.6	225685.8
17-102	50.2	4999625.8	225705.2
17-103	49.9	4999715.5	225786.8
17-104	49.9	4999688.3	225806.5
17-105	47.3	4999671.6	225699.6
17-106	50.1	4999658.0	225708.3
17-107	50.1	4999643.6	225721.2
17-108	48.2	4999628.6	225728.2
17-109	47.7	4999710.9	225761.3
17-110	50.0	4999697.3	225770.6
17-111	50.0	4999682.5	225782.7
17-112	47.5	4999668.4	225790.4

**NOTES**

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

**REFERENCE**

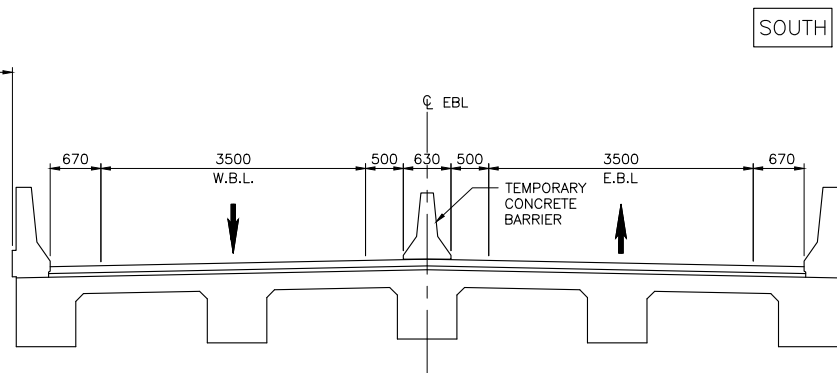
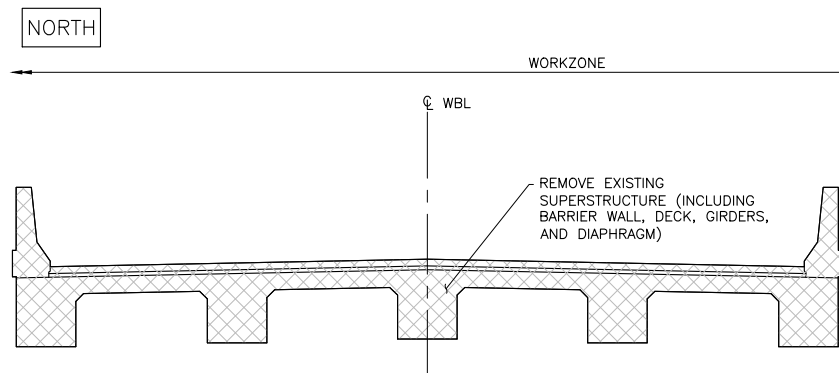
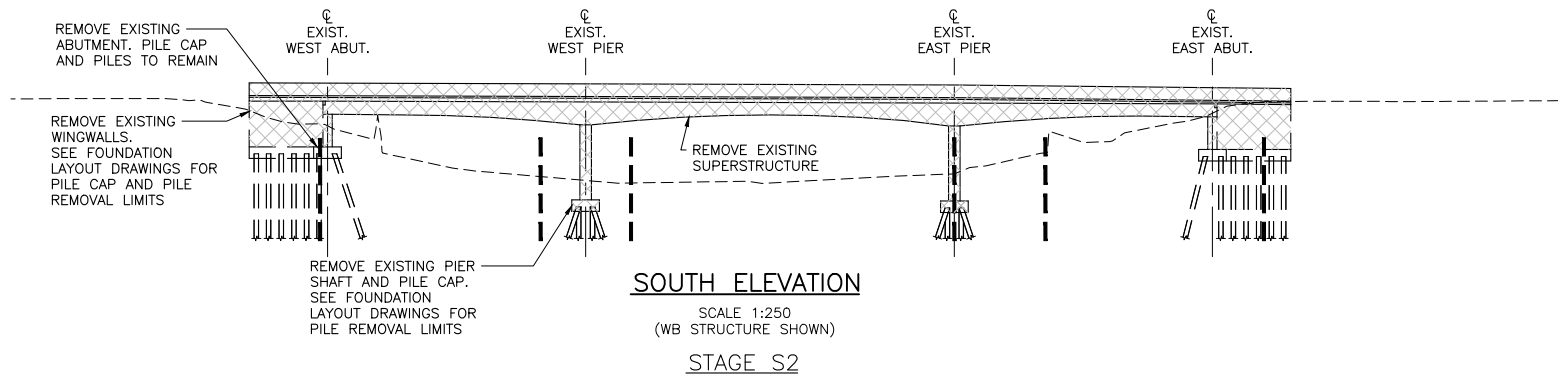
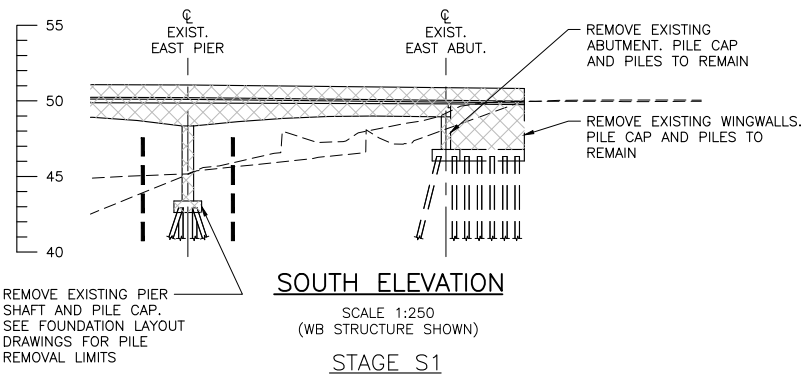
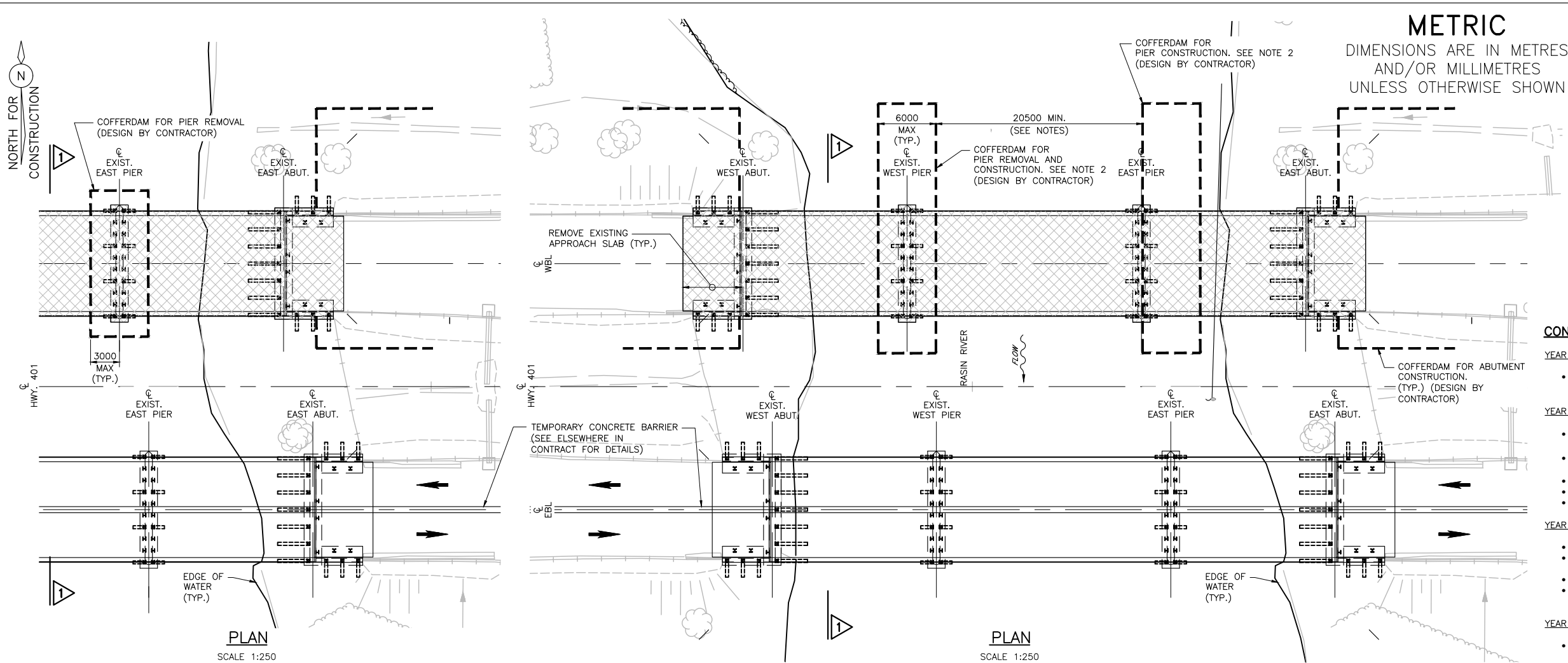
Base plans provided in digital format by Dillon, drawing file nos. Base.dwg and 31-231-09-GA.dwg, received SEPTEMBER 19, 2017.

REVISION			
NO.	DATE	BY	REVISION
A			

Geocres No. 31G-261

HWY. 401		PROJECT NO. 1772182		DIST. EASTERN	
SUBM'D. KSL	CHKD. KSL	DATE: 11/13/2018	SITE: 31-231/1&2		
DRAWN: JM	CHKD. MJK	APPD. FJH	DWG. 7		

LAYOUT: Construction and Staging 1  
FILE NAME: c:\project\wise\working\_directory\active\10bp\0515028\31-231-09-Removals-Staging-Sequencing\abutments.dwg



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE  
CONSTRUCTION STAGING AND  
REMOVALS I

SHEET  
205

**DILLON**  
CONSULTING

LICENSED PROFESSIONAL ENGINEER  
A.W. KHAN  
1006847  
18 JAN 2019  
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER  
B.R. CRAIG  
1006847  
18 JAN 2019  
PROVINCE OF ONTARIO

### CONSTRUCTION SEQUENCING NOTES

- YEAR 1 - HIGHWAY STAGE A1**
- CONSTRUCT HIGHWAY 401 MEDIAN CROSSOVERS AND COUNTY ROAD 2/34 TEMPORARY INTERCHANGE RAMPS
- YEAR 2 - STAGE S1 (HIGHWAY STAGE A2)**
- COMPLETE HIGHWAY 401 MEDIAN CROSSOVER TIE-INS (PRIOR TO STAGE A2) FOR WESTBOUND BRIDGE CONSTRUCTION.
  - DIRECT TRAFFIC TO HIGHWAY 401 EASTBOUND LANES (ONE LANE EACH DIRECTION)
  - REMOVE EXISTING WESTBOUND SUPERSTRUCTURE
  - INITIATE WESTBOUND ABUTMENT CONSTRUCTION
  - REMOVE EXISTING WESTBOUND EAST PIER
- YEAR 2 - STAGE S2 (HIGHWAY STAGE A2)**
- REMOVE WESTBOUND WEST PIER
  - COMPLETE WESTBOUND ABUTMENT CONSTRUCTION AND CONSTRUCT WESTBOUND PIERS AND SUPERSTRUCTURE
  - REMOVE TEMPORARY WORKS
  - REDIRECT TRAFFIC TO HIGHWAY 401 EASTBOUND AND WESTBOUND LANES (TWO LANES EACH DIRECTION)
- YEAR 3 - HIGHWAY STAGE A3**
- COMPLETE HIGHWAY 401 MEDIAN CROSSOVER TIE-INS AND COUNTY ROAD 2/34 TEMPORARY INTERCHANGE RAMPS FOR EASTBOUND BRIDGE CONSTRUCTION
- YEAR 3 - STAGE S3 (HIGHWAY STAGE A4)**
- DIRECT TRAFFIC TO HIGHWAY 401 WESTBOUND LANES (ONE LANE EACH DIRECTION)
  - REMOVE EXISTING EASTBOUND SUPERSTRUCTURE
  - INITIATE EASTBOUND ABUTMENT CONSTRUCTION
  - REMOVE EXISTING EASTBOUND WEST PIER
- YEAR 3 - STAGE S4 (HIGHWAY STAGE A4)**
- REMOVE EASTBOUND EAST PIER
  - COMPLETE EASTBOUND ABUTMENT CONSTRUCTION AND CONSTRUCT EASTBOUND PIERS AND SUPERSTRUCTURE
  - REMOVE TEMPORARY WORKS
  - REDIRECT TRAFFIC TO HIGHWAY 401 EASTBOUND AND WESTBOUND LANES (TWO LANES EACH DIRECTION)
- YEAR 4 - HIGHWAY STAGE A5**
- REMOVE HIGHWAY 401 MEDIAN CROSSOVERS

### NOTES:

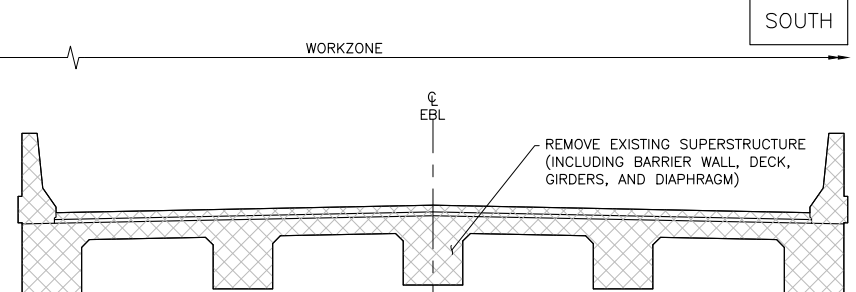
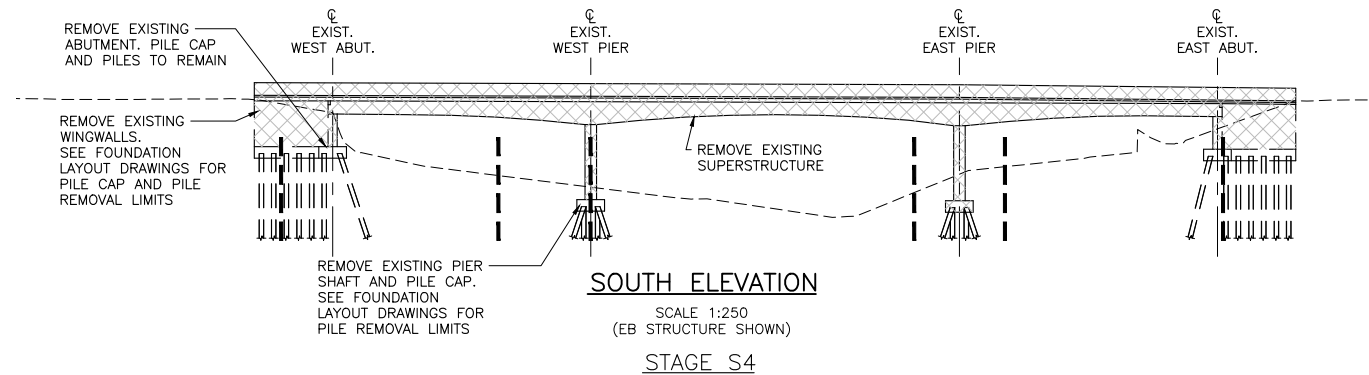
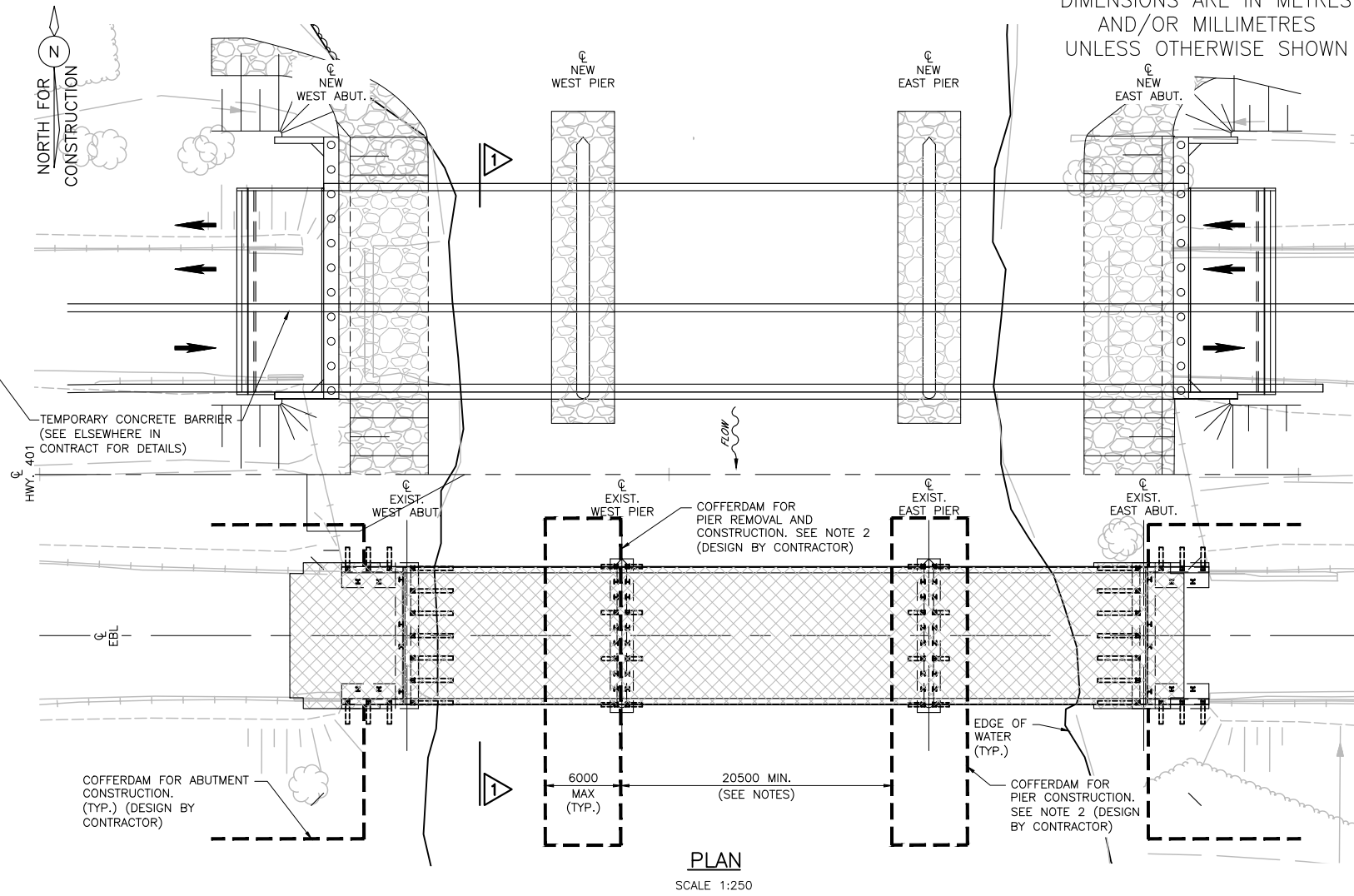
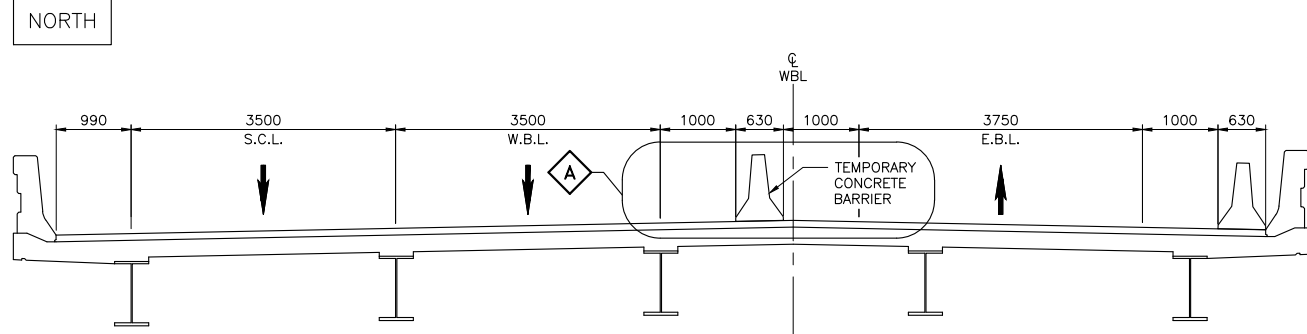
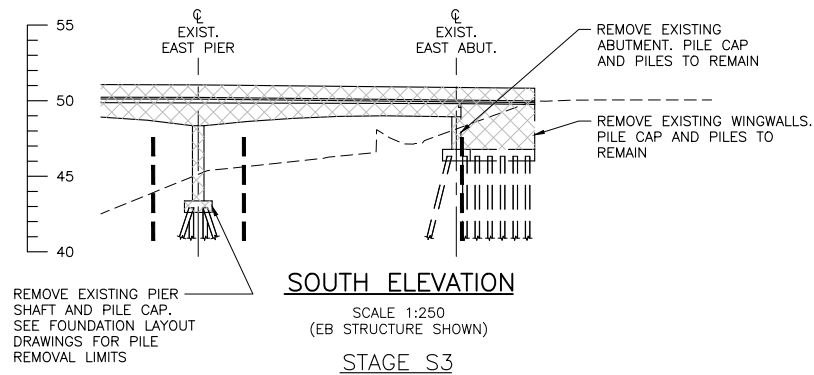
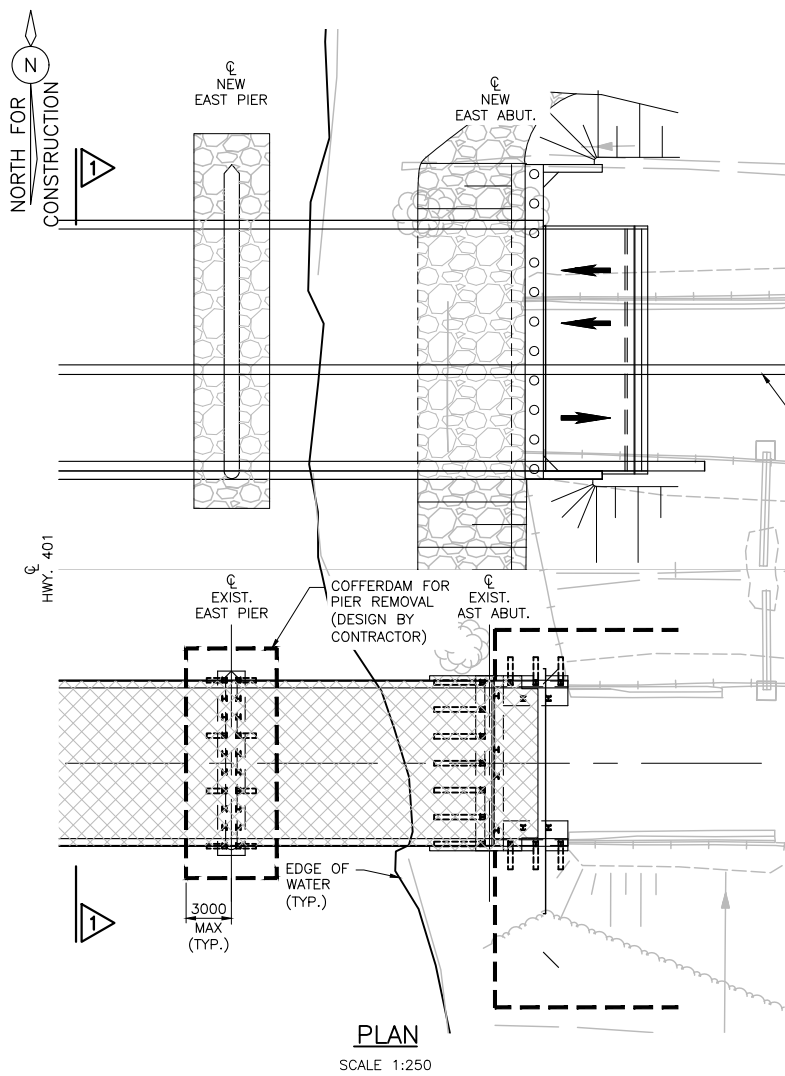
- SEE ROAD DRAWINGS FOR STAGING DETAILS ON HIGHWAY 401.
- DURING CONSTRUCTION, THE MINIMUM CLEAR SPAN IN THE MAIN CHANNEL BETWEEN HYDRAULIC OBSTRUCTIONS SHALL BE 20.5m.
- COFFERDAMS SHALL NOT BE IN-PLACE DURING WINTER SHUTDOWN. COFFERDAMS FOR WESTBOUND BRIDGE SHALL NOT BE IN-PLACE AT THE SAME TIME AS COFFERDAMS FOR THE EASTBOUND BRIDGE.
- SEE FOUNDATION LAYOUT DRAWINGS FOR EXISTING PILE CAP AND H-PILE REMOVAL LIMITS.

### LEGEND

- REMOVAL

REVISIONS	DATE	BY	DESCRIPTION
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LAYOUT: Construction and Staging II  
FILE NAME: c:\project\wise\working\_directory\active\10bp\0515028\31-231-09-Removals-Staging-Sequencing\aburments.dwg



1  
SCALE 1:50

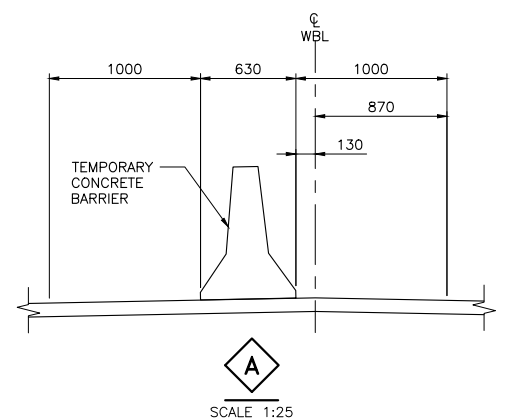
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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

HWY 401		
CONT No	2018-4008	
WP No	4083-13-01 (WBL) 4084-13-01 (EBL)	
RAISIN RIVER BRIDGE		SHEET
CONSTRUCTION STAGING AND REMOVALS II		206

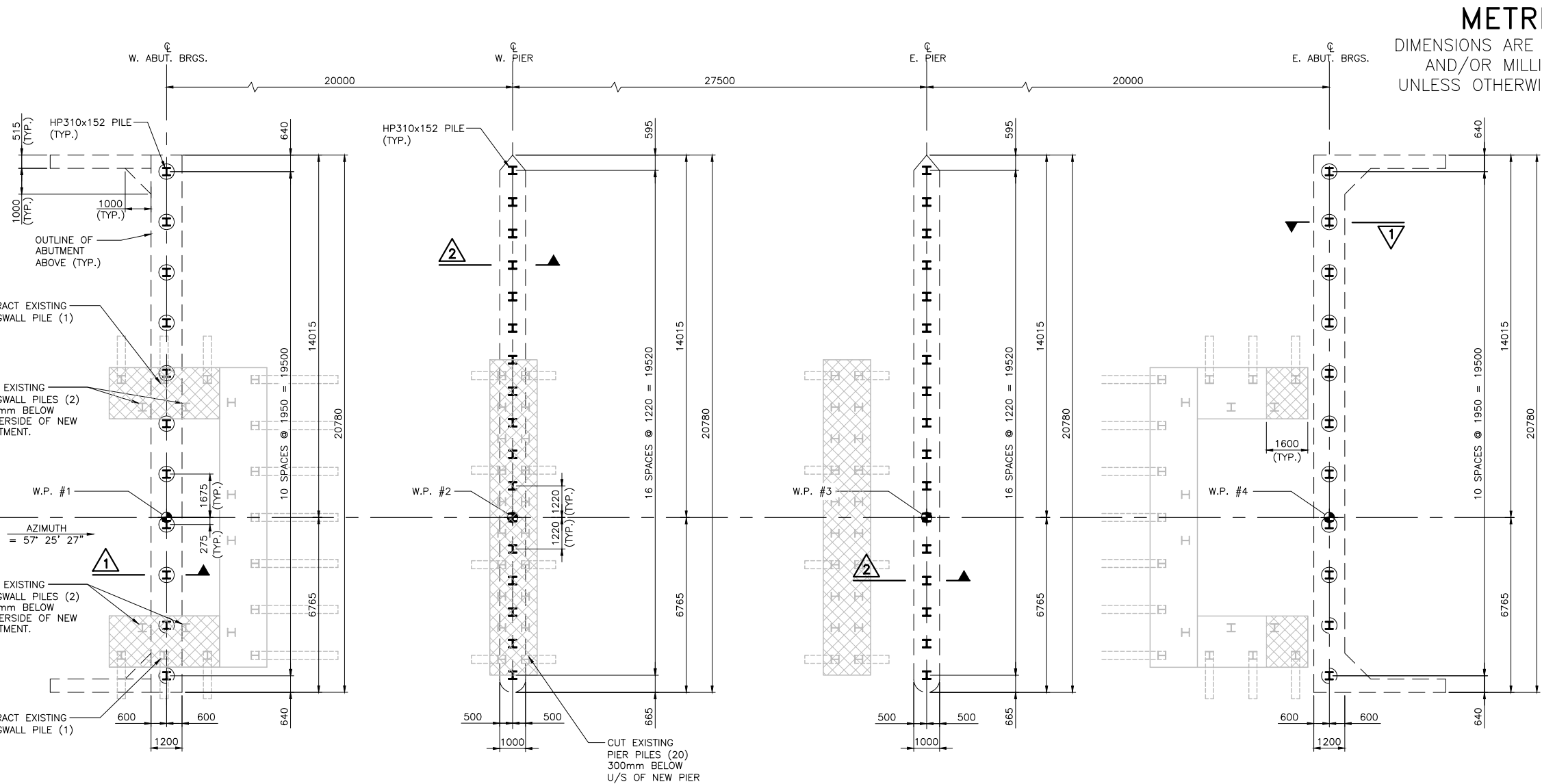
**NOTES**  
1. SEE NOTES ON DWG. 8.

**LEGEND**  
 - REMOVAL



REVISIONS		DATE	BY	DESCRIPTION
DESIGN	AWK	CHK	BRG	CODE CSA-S6-14
DRAWN	SJM	CHK	AWK	SITE 31-231.1/2
LOAD	CL6250NT	DATE	Jan-19	DWG 9





SCALE 1:100

PIER

PIER

TOP OF ROCK PROTECTION

EL. 43.0

PILE CUT-OFF

EL. 42.600 (W. PIER)

EL. 42.600 (E. PIER)

U/S W. PIER EL. 42.000

U/S E. PIER EL. 42.000

600

1200

2000

HP310x152 PILE

BEDROCK

2

SCALE 1:40

NOTE: EXISTING PILE CAP AND PILES NOT SHOWN.

GRADATION FOR SAND FILL		
MTO SIEVE DESIGNATION		% PASSING BY MASS
2 mm	#10	100
600 $\mu\text{m}$	#30	80–100
425 $\mu\text{m}$	#40	40–80
250 $\mu\text{m}$	#60	5–25
150 $\mu\text{m}$	#100	0–6

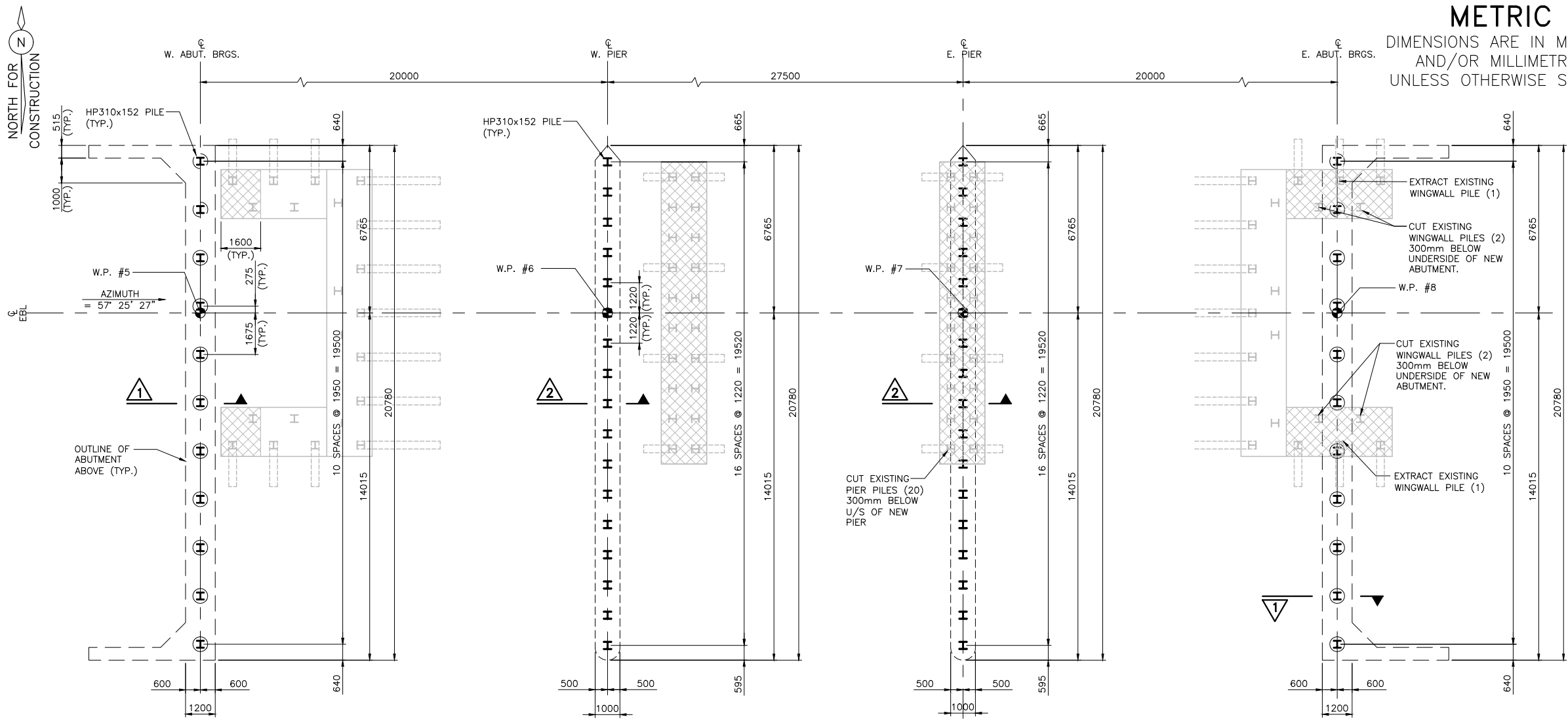
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS	*	*			*				
	*	*			*				
	*	*			*				
	*	*			*				
	*	*			*				
	*	*			*				
	DATE	BY	DESCRIPTION						
DESIGN	AWK	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	AWK	SITE	31-231.1/2			DWG	10

LAYOUT: FOUNDATION LAYOUT  
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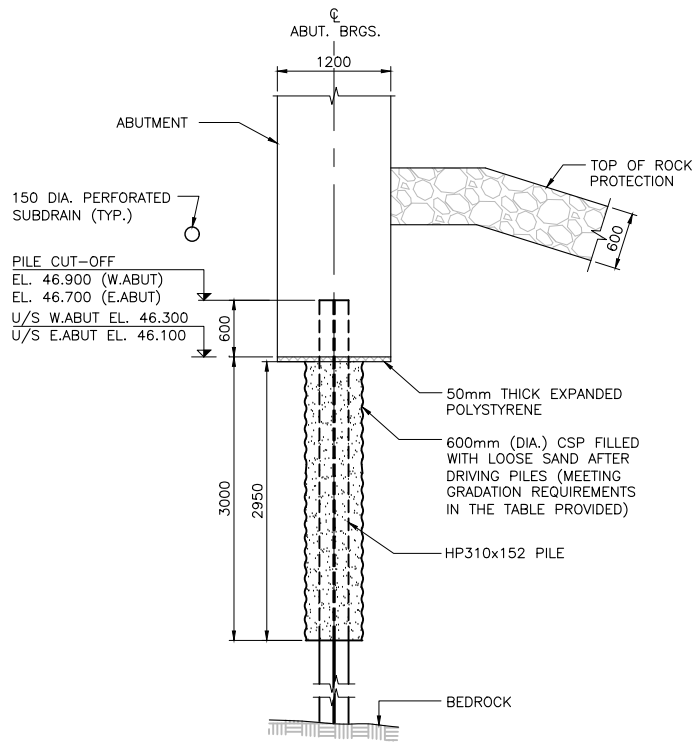


LAYOUT: EB FOUNDATION LAYOUT  
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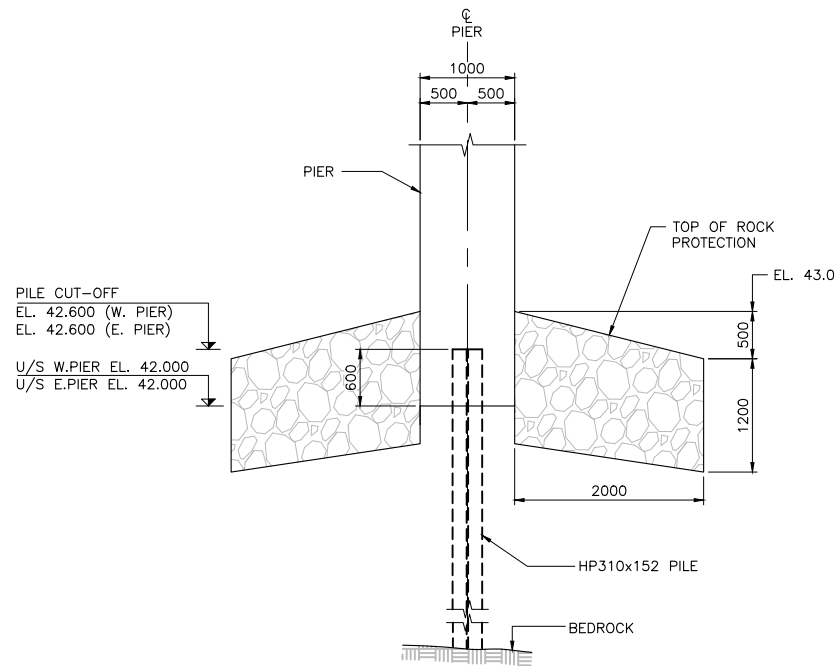
**PLAN**

SCALE 1:100



**1**  
SCALE 1:40

NOTE: EXISTING PILE CAP  
AND PILES NOT SHOWN.

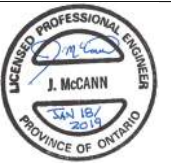
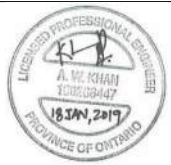


**2**  
SCALE 1:40

NOTE: EXISTING PILE CAP  
AND PILES NOT SHOWN.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

HWY 401	
CONT No 2018-4008	
WP No 4083-13-01 (WBL) 4084-13-01 (EBL)	
RAISIN RIVER BRIDGE	SHEET
EASTBOUND FOUNDATION LAYOUT	208



**NOTES**

- SEE NOTES ON DWG. 10.

**LEGEND**

- DENOTES REMOVAL OF EXISTING WINGWALL/PIER  
CONCRETE PILE CAP FULL DEPTH

**APPLICABLE STANDARDS**

OPSD-3000.150 FOUNDATION PILES STEEL H-PILE SPLICE

WORKING POINT DATA		
LOCATION	N	E
W.P. #5	4 999 641.740	225 724.221
W.P. #6	4 999 652.508	225 741.075
W.P. #7	4 999 667.315	225 764.249
W.P. #8	4 999 678.083	225 781.102

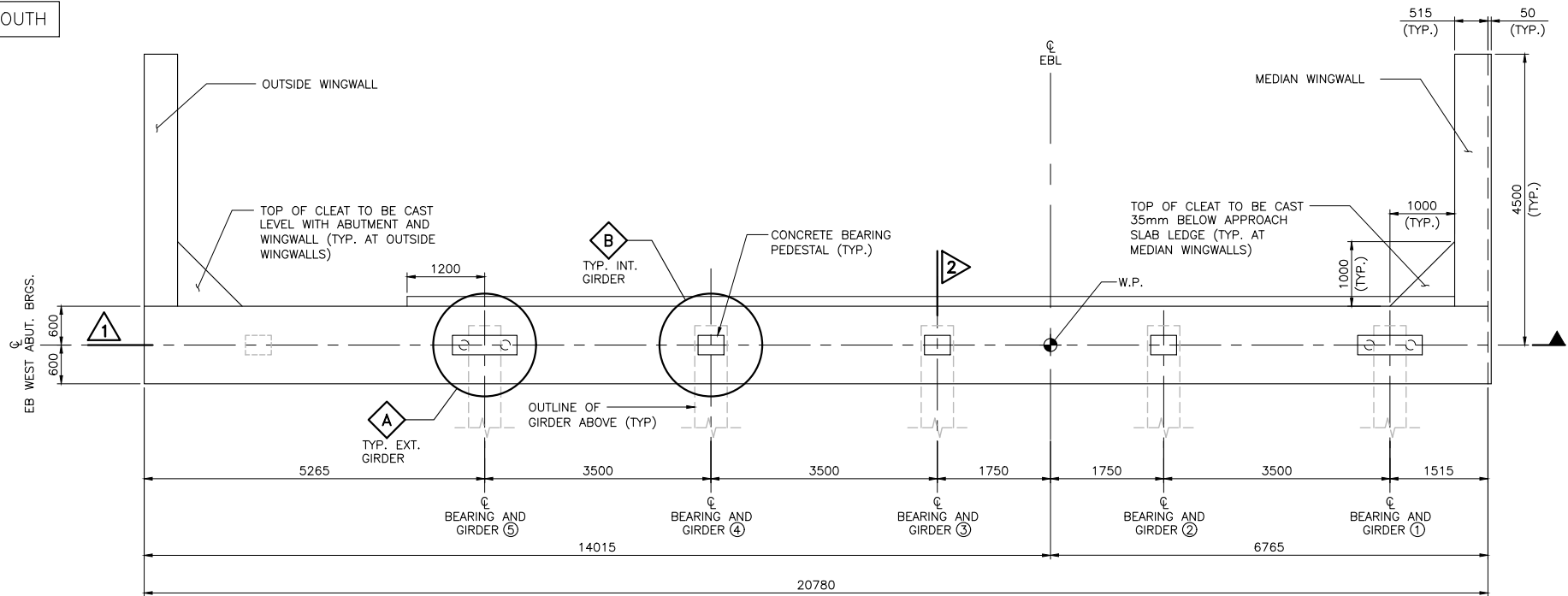
H-PILE DATA			
LOCATION	No. REQUIRED	LENGTH (m)	BATTER
WEST ABUTMENT	11	7.0 TO 10.0	VERTICAL
WEST PIER	17	4.0 TO 5.5	VERTICAL
EAST PIER	17	4.5 TO 6.5	VERTICAL
EAST ABUTMENT	11	12.0	VERTICAL

REVISIONS	DATE	BY	DESCRIPTION			
	DATE	BY	DESIGN	CHK	CODE	LOAD
			AWK	JM	CSA-S6-14	CL6250NT
			SJM	AWK	SITE 31-231.1/2	DWG 11

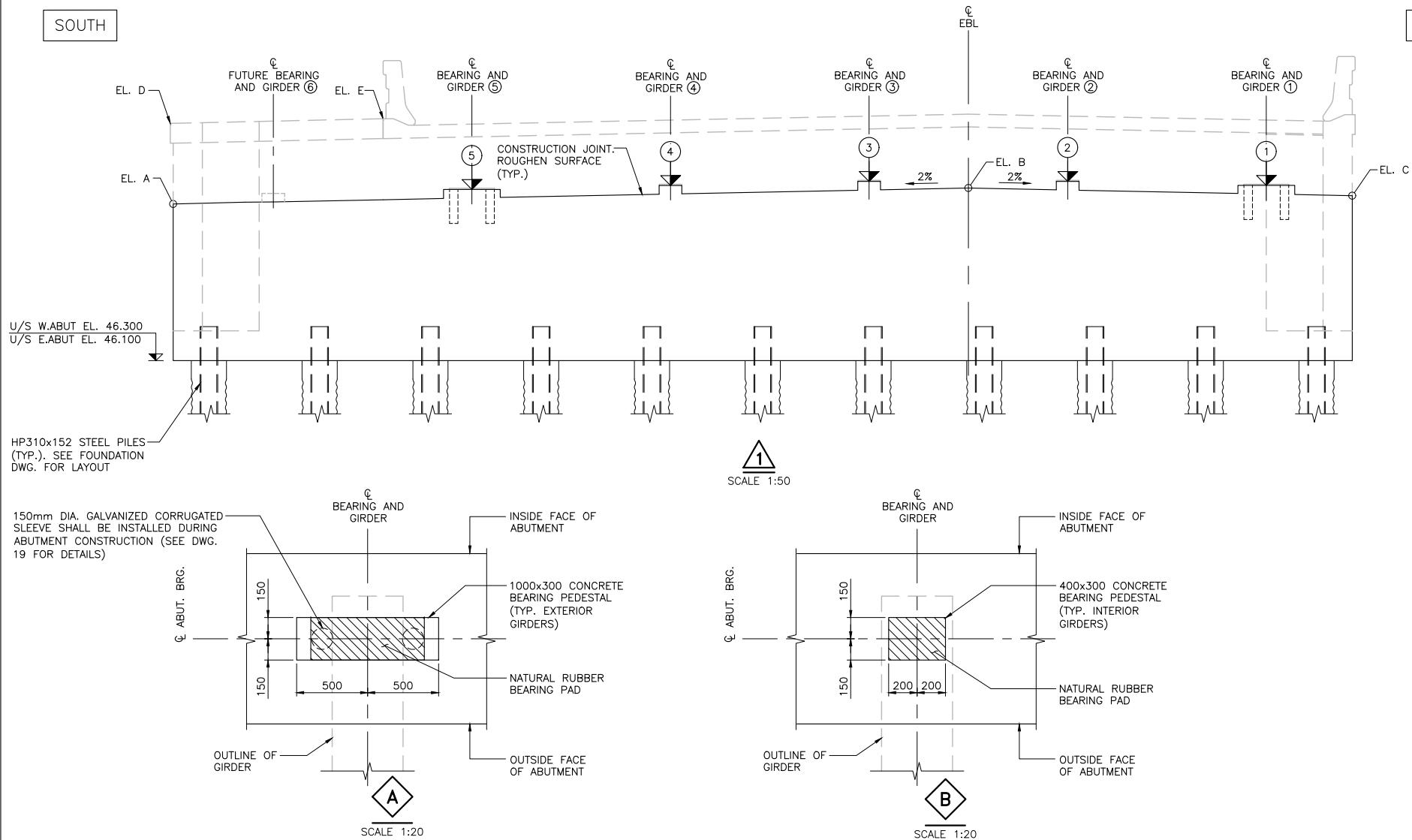
LAYOUT: ABUTMENT LAYOUT  
FILE NAME: c:\project\wse\working\_directory\active\10bpd\0515028\31-231-09-Abutments.dwg

NORTH FOR  
CONSTRUCTION

SOUTH



SOUTH



NORTH

METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

TOP OF BEARING ELEVATIONS *				
NO.	ELEVATION			
	EB STRUCTURE		WB STRUCTURE	
	W. ABUT.	E. ABUT.	W. ABUT.	E. ABUT.
1	49.429	49.227	49.429	49.227
2	49.529	49.327	49.529	49.327
3	49.529	49.327	49.529	49.327
4	49.459	49.257	49.459	49.257
5	49.359	49.157	49.359	49.157

\* ELEVATIONS ARE TO TOP OF BEARING.  
SEE CONSTRUCTION NOTES ON DRAWING NO. 1.

TOP OF CONCRETE ELEVATIONS				
NO	ELEVATION			
	EB STRUCTURE		WB STRUCTURE	
	W. ABUT.	E. ABUT.	W. ABUT.	E. ABUT.
A	49.104	48.901	49.104	48.901
B	49.384	49.182	49.384	49.182
C	49.249	49.046	49.249	49.046
D	50.523	50.320	50.523	50.320
E	50.598	50.395	50.598	50.395

ABUTMENT BEARING DATA			
LOCATION	BEARING SIZE	NUMBER REQUIRED	BEARING TYPE
INTERIOR GIRDERS	400x300x20	12	NATURAL RUBBER
EXTERIOR GIRDERS	800x300x20	8	

HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

ABUTMENT LAYOUT

SHEET 209



#### NOTES:

- CONTRACTOR SHALL SUPPLY TEMPORARY LATERAL BRACING FOR THE ABUTMENTS TO PROVIDE STABILITY DURING CONSTRUCTION.
- FORMWORK AND LATERAL BRACING SHALL NOT BE REMOVED UNTIL ABUTMENT DIAPHRAGM AND DECK CONCRETE HAS REACHED A STRENGTH OF 25MPa.
- STABILITY AND INTEGRITY OF THE STRUCTURE SHALL BE MAINTAINED AT ALL STAGES OF CONSTRUCTION.

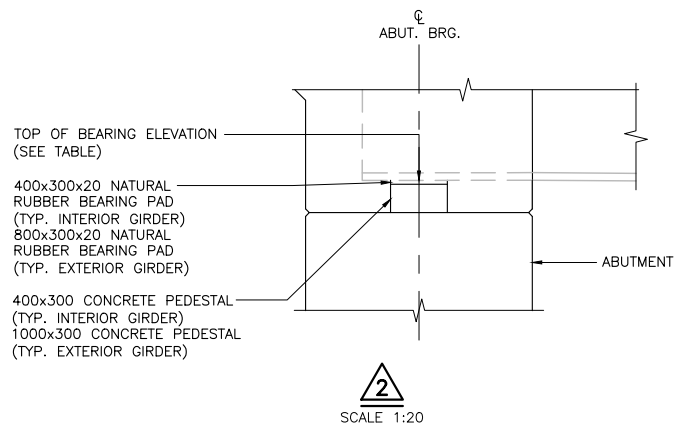
#### CONSTRUCTION SEQUENCE:

- CONSTRUCT ABUTMENTS AND WINGWALLS TO UNDERSIDE OF BEARING PEDESTAL ELEVATION.
- CONSTRUCT BEARING PEDESTALS.
- PLACE BEARINGS AND ERECT GIRDERS.
- ABUTMENT DIAPHRAGM (PORTION ABOVE THE BEARING SEAT ELEVATION) SHALL BE CAST MONOLITHICALLY WITH THE DECK.

#### APPLICABLE STANDARD DRAWINGS

OPSD-3190.100 WALLS RETAINING AND ABUTMENT WALL DRAIN JOINTS - CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

OPSD-3950.100



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

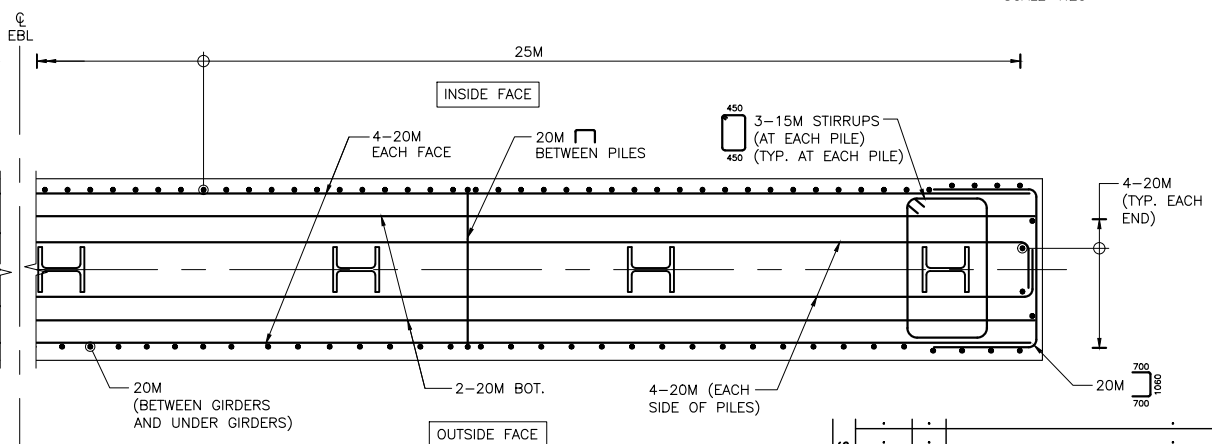
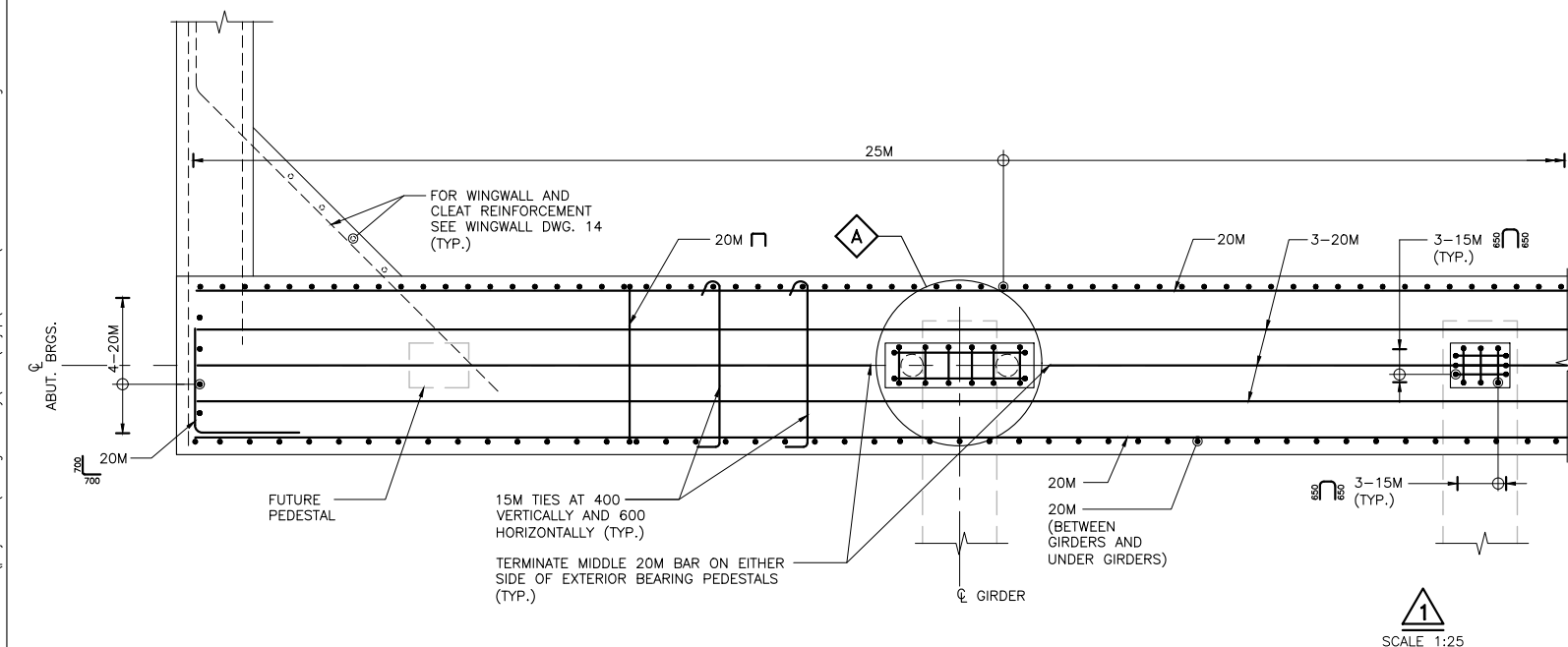
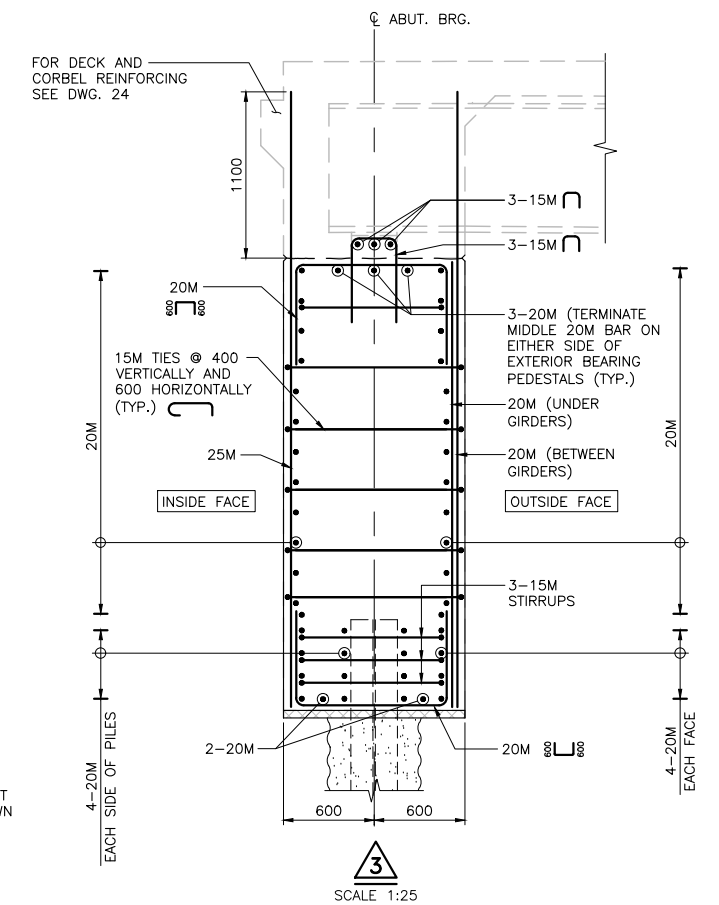
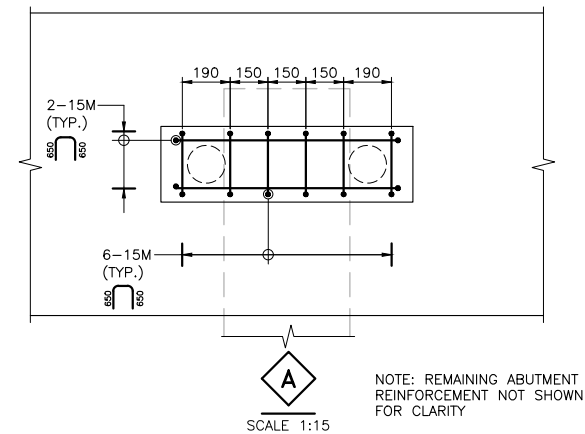
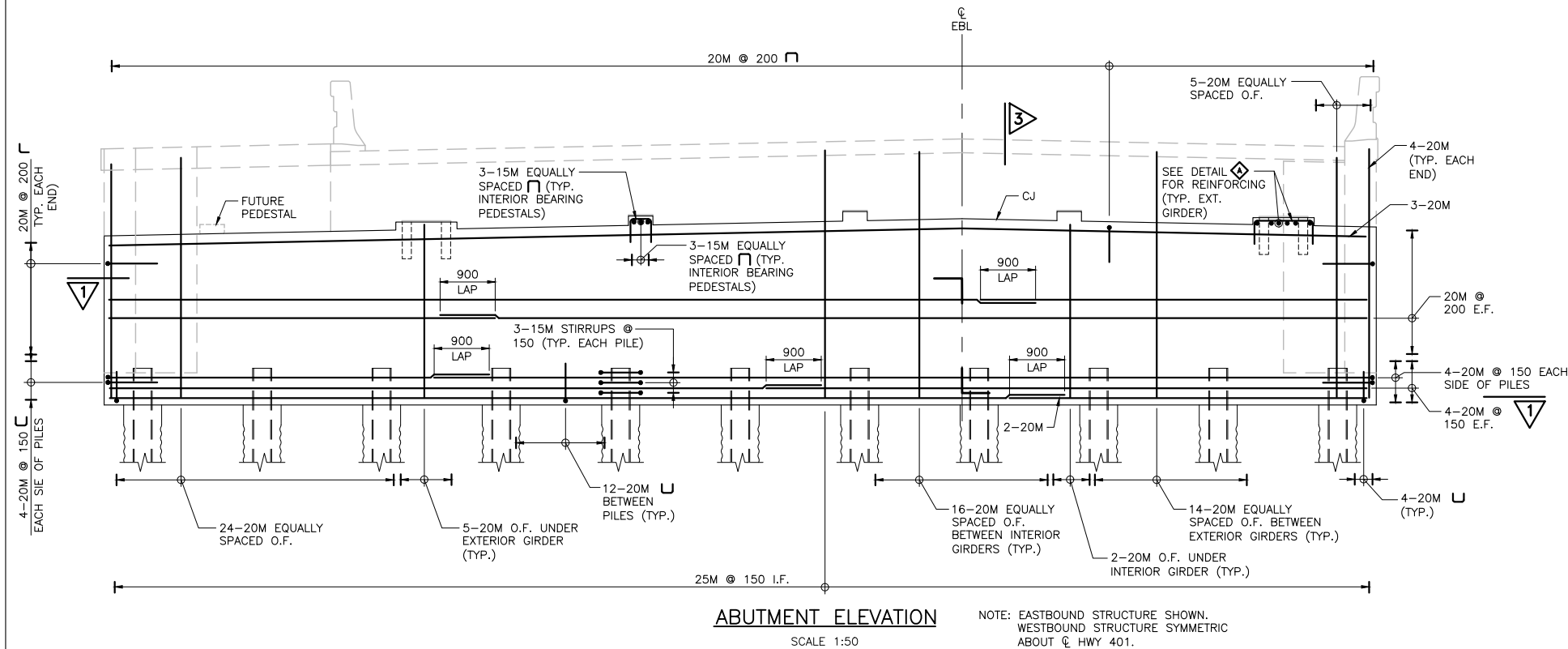
REVISIONS	DATE		BY		DESCRIPTION		DATE		DWG	
	DESIGN	AWK	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250N	DATE	Jan-19
	DRAWN	JBP	CHK	AWK	SITE	31-231.1/2			DWG	12

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

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE  
ABUTMENT REINFORCEMENT

SHEET  
210



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	AWK	CHK	JM	CODE CSA-S6-14
DRAWN	JBP	CHK	AWK	SITE 31-231.1/2
DATE	Jan-19	DATE	Jan-19	DWG 13

METRIC

CONT No 2018-4008

4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

SHEET



NOTES:

1. TO MAINTAIN STABILITY AND INTEGRITY OF THE STRUCTURE DURING CONSTRUCTION, CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING TO THE WINGWALLS. THE SHORING AND BRACING SHALL NOT BE REMOVED UNTIL DECK CONCRETE HAS REACHED 25MPa STRENGTH.

APPLICABLE STANDARD DRAWINGS

OPSD-3950.100	JOINTS - CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE
OPSD-3101.150	WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENT
MTOD-3941.210	FIGURES IN CONCRETE SITE NUMBER AND DATE LAYOUT

WINGWALL ELEVATIONS

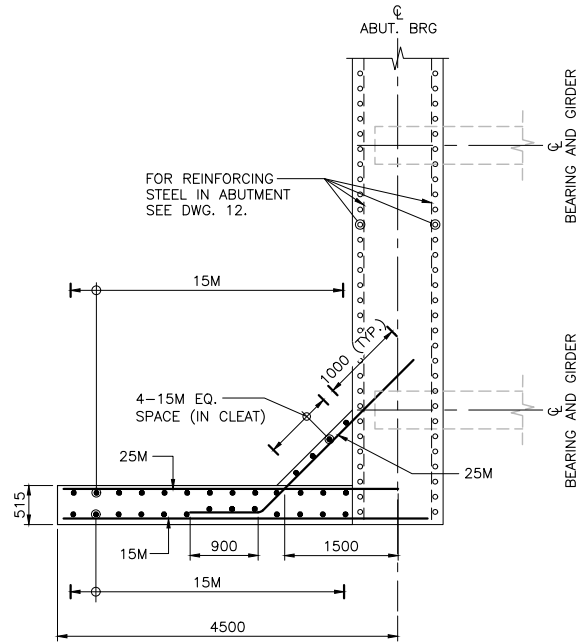
LOCATION	EB STRUCTURE		WB STRUCTURE	
	NW	NE	SW	SE
A	50.693	50.463	50.693	50.463
B	50.679	50.477	50.679	50.477

## MODIFIED

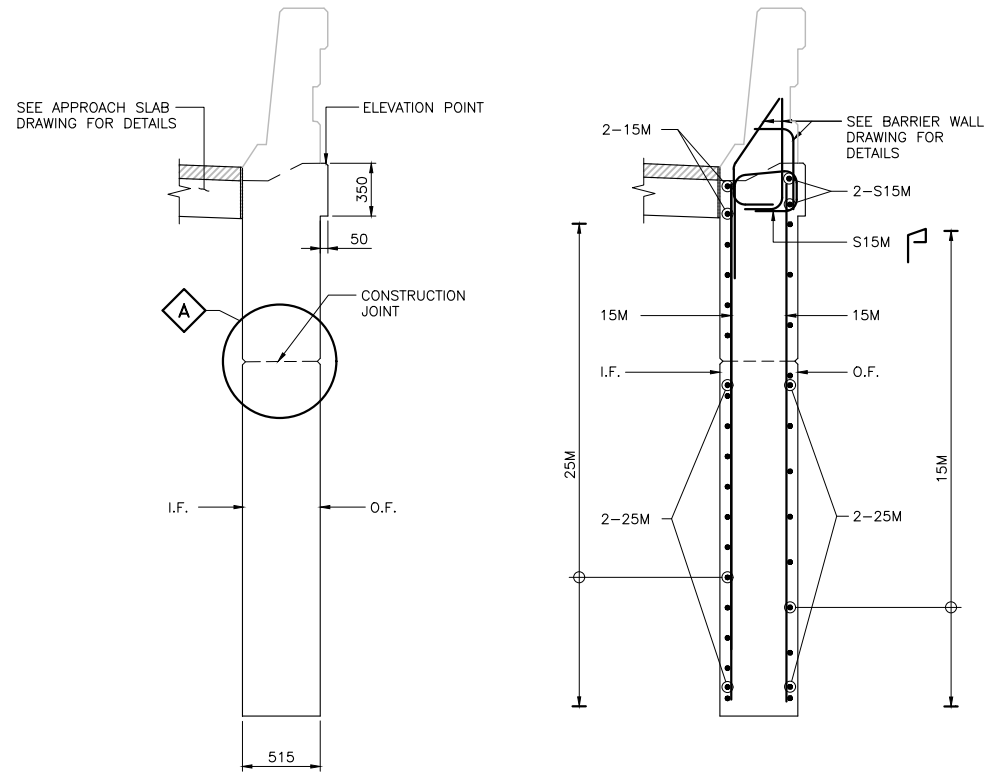
STANDARD DRAWING  
JAN 2013

SS105-2

## WINGWALL DETAILS FOR BRIDGES

[illegible]

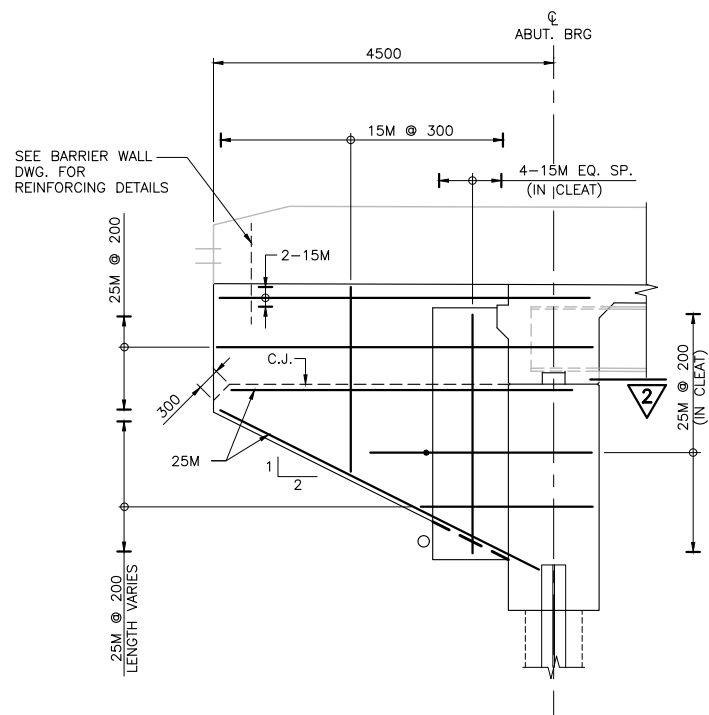
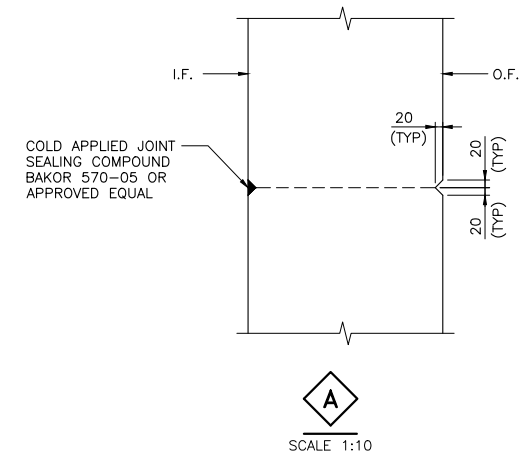
NOTE: WESTBOUND, SOUTHWEST WINGWALL SHOWN, OTHERS SIMILAR.



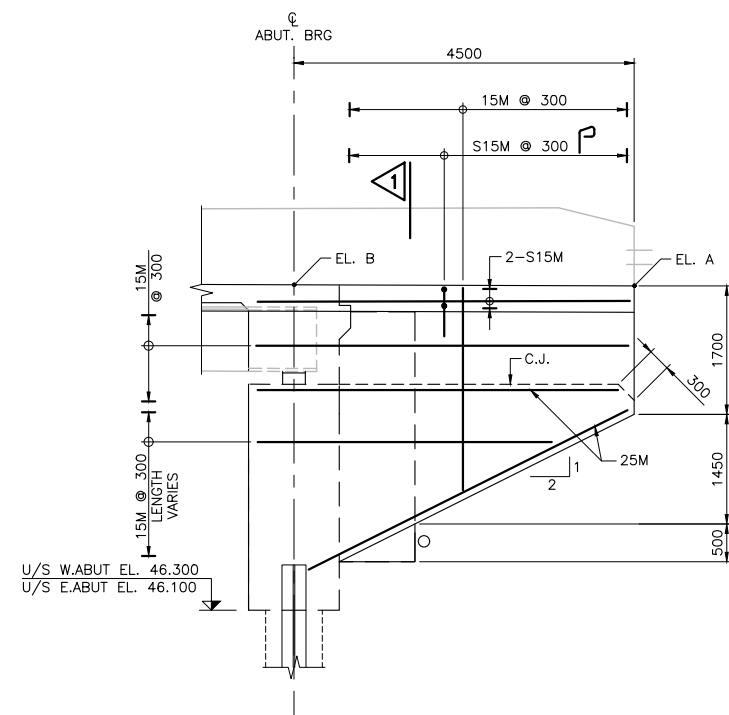
## DIMENSIONS



## REINFORCEMENT



INSIDE FACE

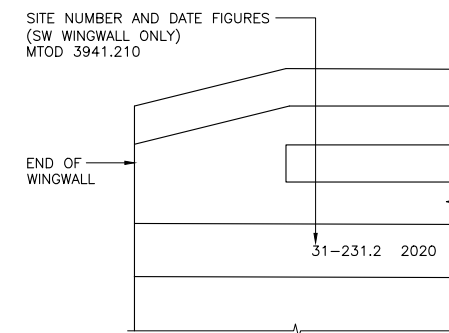


OUTSIDE FACE

### TYPICAL WINGWALL ELEVATIONS

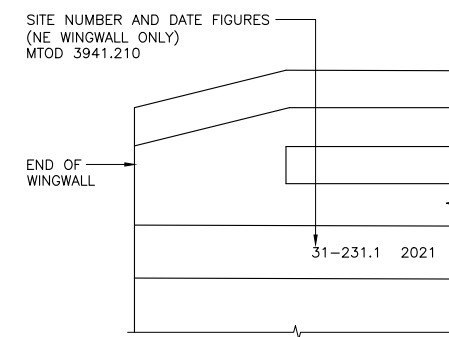
SCALE 1:50

NOTE: WESTBOUND, SOUTHWEST WINGWALL SHOWN, OTHERS SIMILAR.



FIGURES IN CONCRETE (WB STRUCTURE)

SCALE 1:25



FIGURES IN CONCRETE (EB STRUCTURE)

SCALE 1:25

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



METRIC

CONT No 2018-4008

4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

212



1. TO MAINTAIN STABILITY AND INTEGRITY OF THE STRUCTURE DURING CONSTRUCTION, CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING TO THE WINGWALLS. THE SHORING AND BRACING SHALL NOT BE REMOVED UNTIL DECK CONCRETE HAS REACHED 25MPa STRENGTH.

OPSD-3950.100	JOINTS - CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE
OPSD-3101.150	WALLS - ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENT
MTOD-3941.210	FIGURES IN CONCRETE SITE NUMBER AND DATE LAYOUT

WINGWALL ELEVATIONS

EB STRUCTURE		WB STRUCTURE	
SW	SE	NW	NE
50.433	50.203	50.433	50.203
50.421	50.215	50.421	50.215

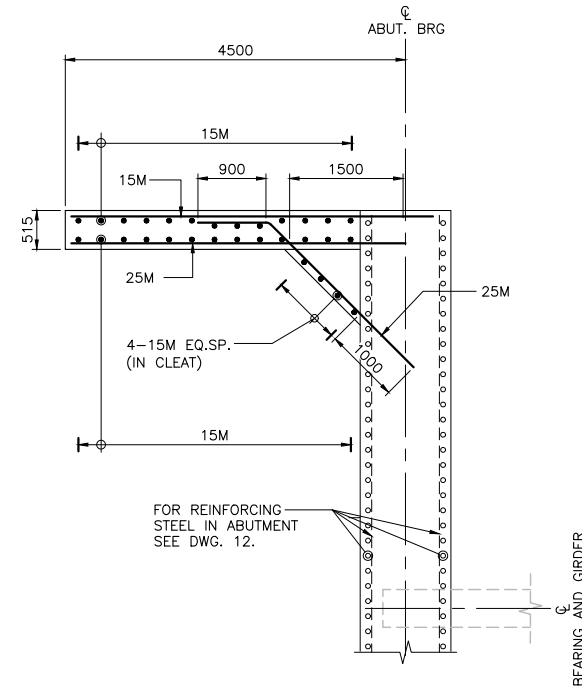
## MODIFIED

STANDARD DRAWING  
JAN 2013

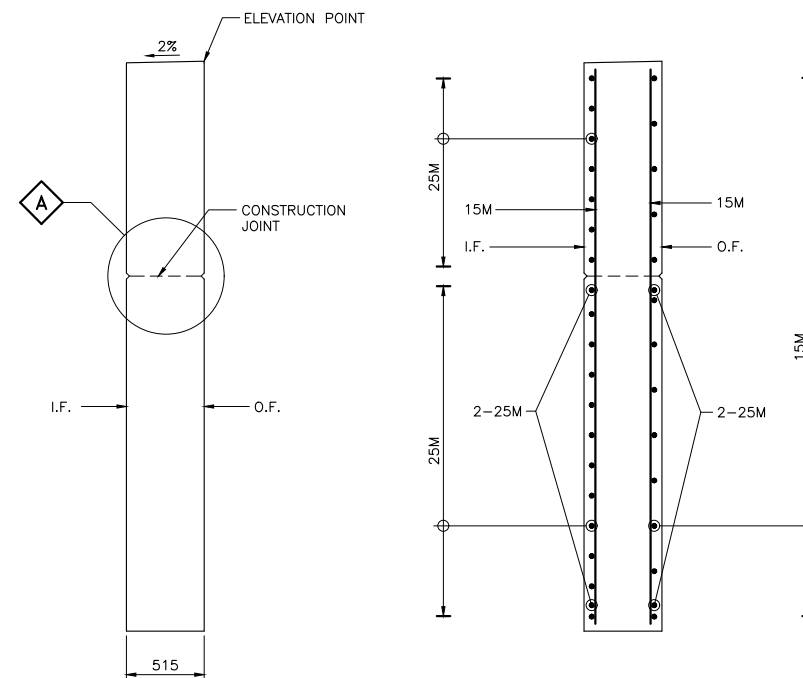
SS105-2

## WINGWALL DETAILS FOR BRIDGES

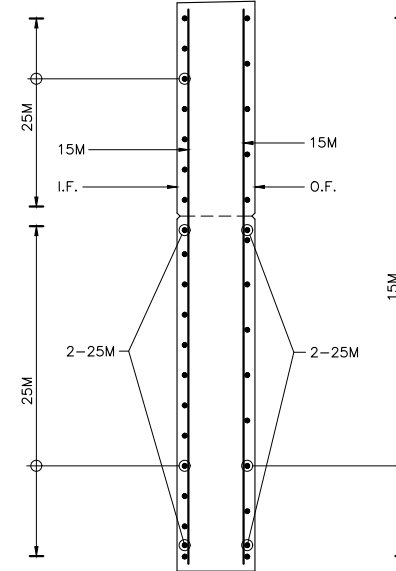
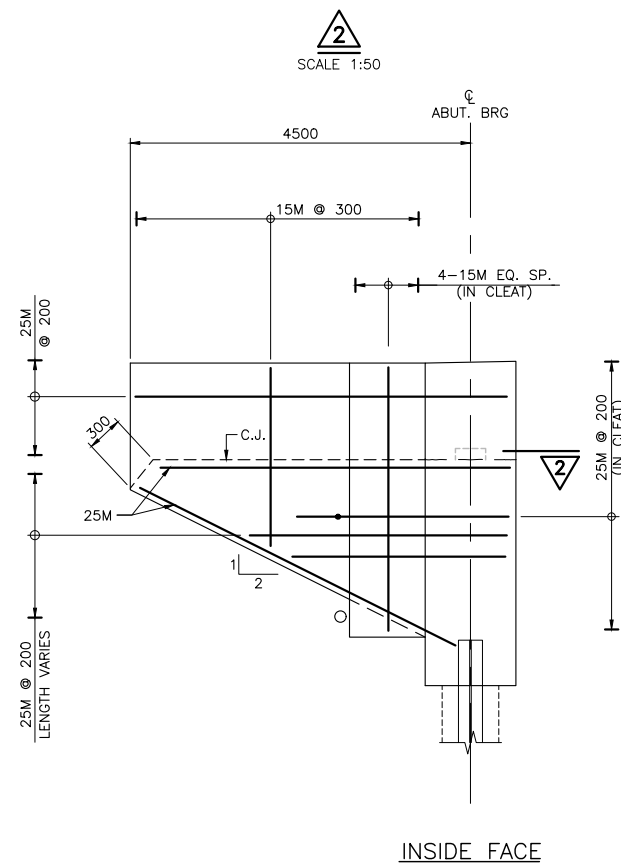
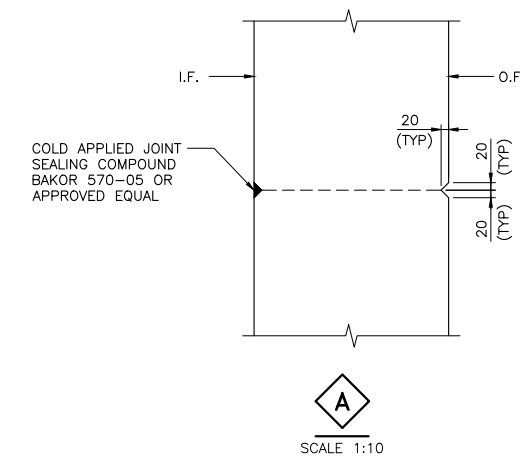
REVISIONS	.	.	.	.	.	.	.	.	.
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	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
DATE	BY	DESCRIPTION							
DESIGN	AWK	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	JBP	CHK	AWK	SITE	31-231.1/2			DWG	15



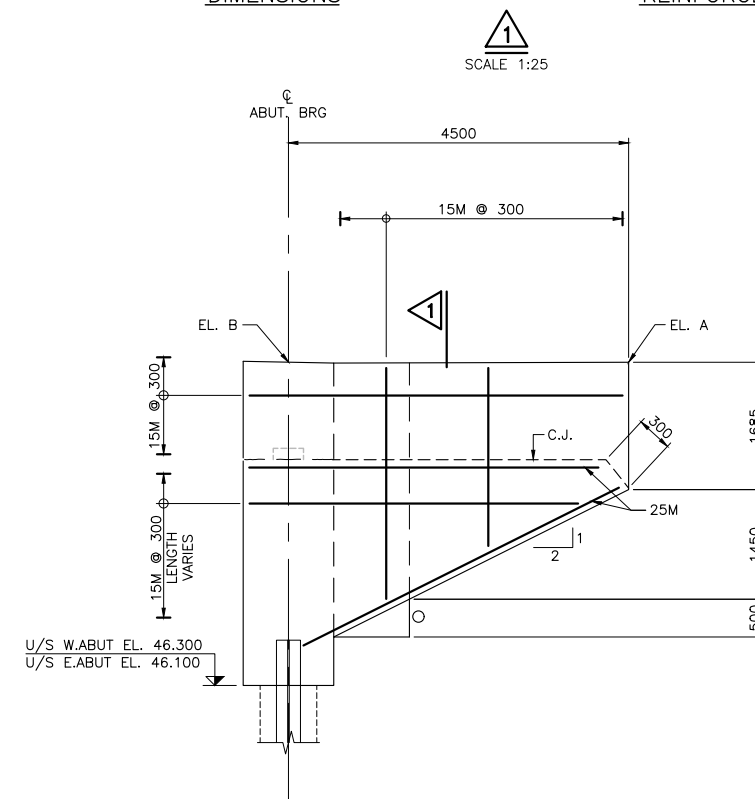
NOTE: WESTBOUND, NORTHWEST WINGWALL SHOWN, OTHERS SIMILAR.



## DIMENSIONS

REINFORCEMENT

INSIDE FACE

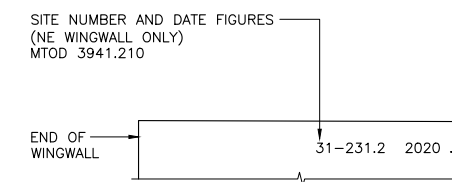


OUTSIDE FACE

### TYPICAL WINGWALL ELEVATIONS

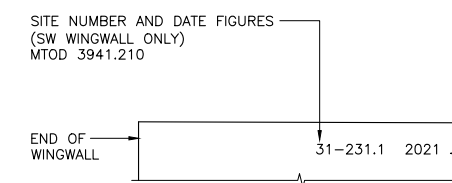
SCALE 1:50

NOTE: WESTBOUND, NORTHWEST WINGWALL SHOWN, OTHERS SIMILAR.



FIGURES IN CONCRETE (WB STRUCTURE)

SCALE 1:25



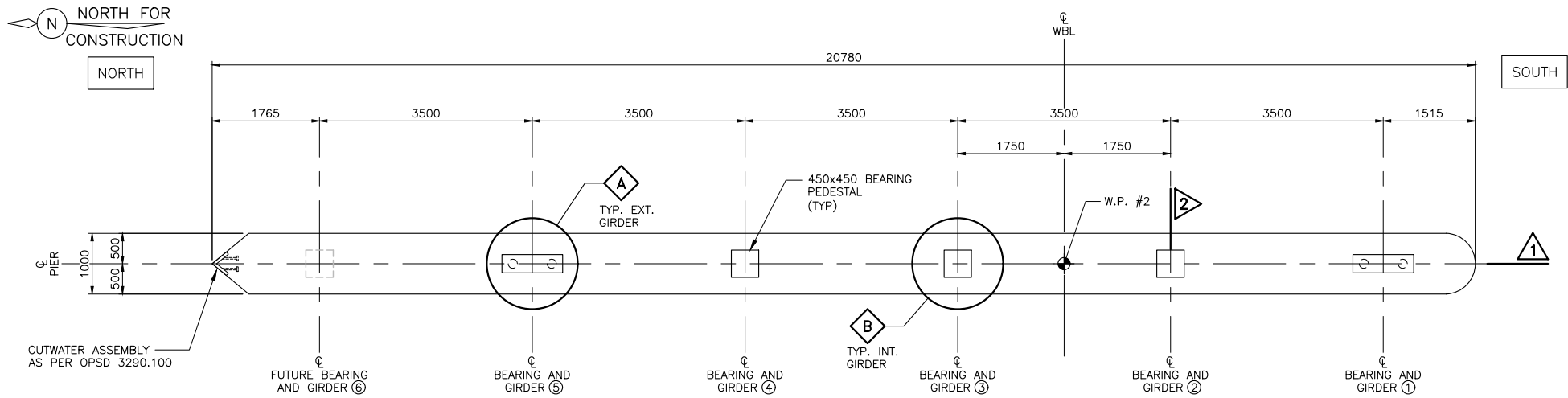
FIGURES IN CONCRETE (EB STRUCTURE)

SCALE 1:25

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

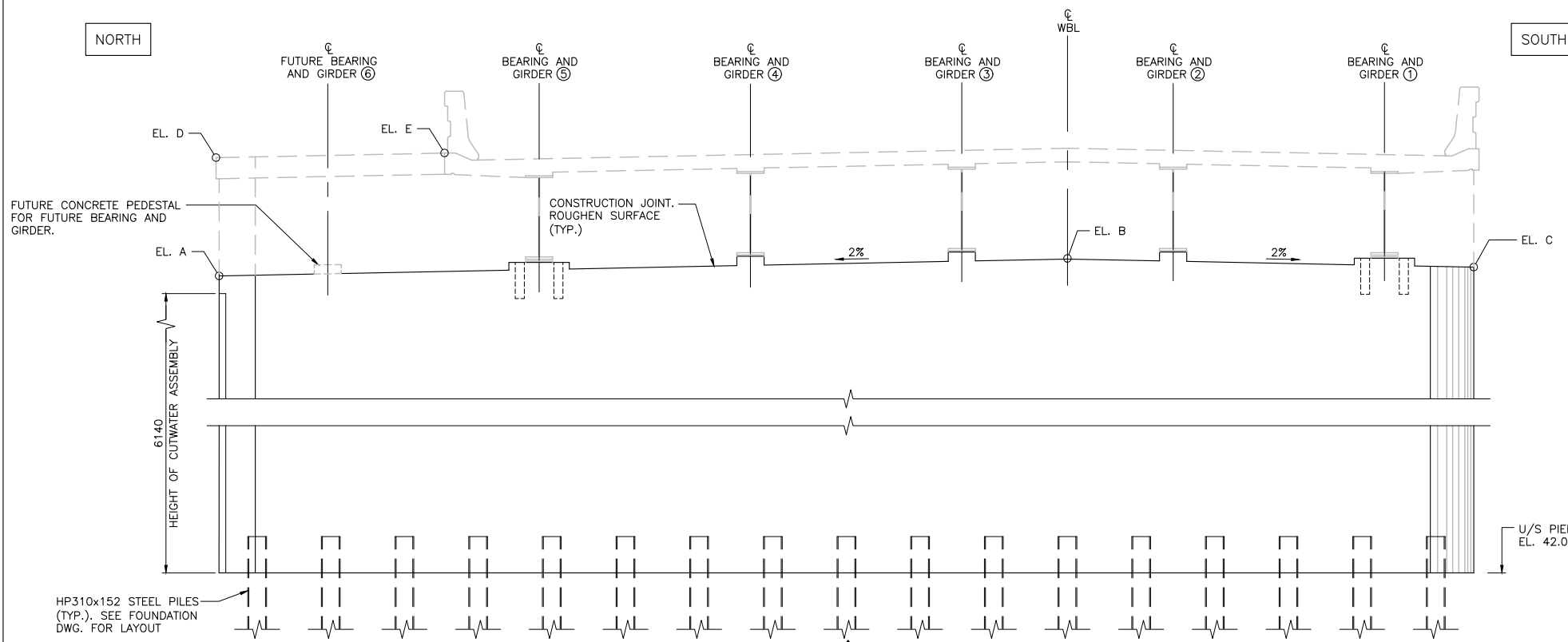
LAYOUT: WINGWALL LAYOUT EXTERIOR  
FILE NAME: c:\projectwise\working\_directory\active\101bp\d0515028\31-231-09-Abutments.dwg

LAYOUT: WB Pier Layout  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515028\31-231-09-Pier.dwg



### PLAN

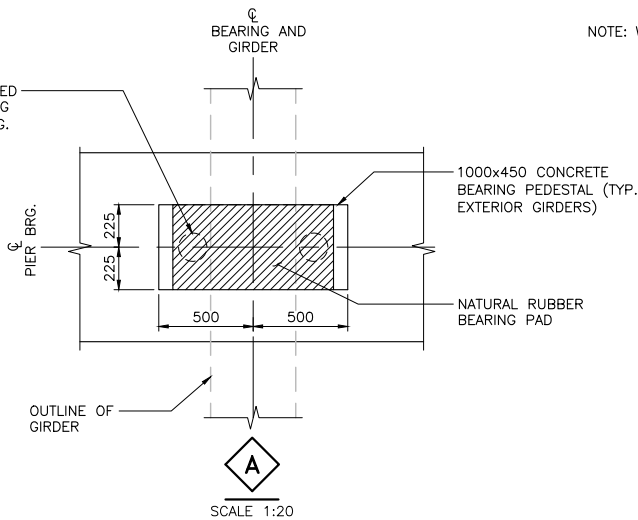
SCALE 1:50  
NOTE: WEST PIER SHOWN, EAST PIER SIMILAR



### 1

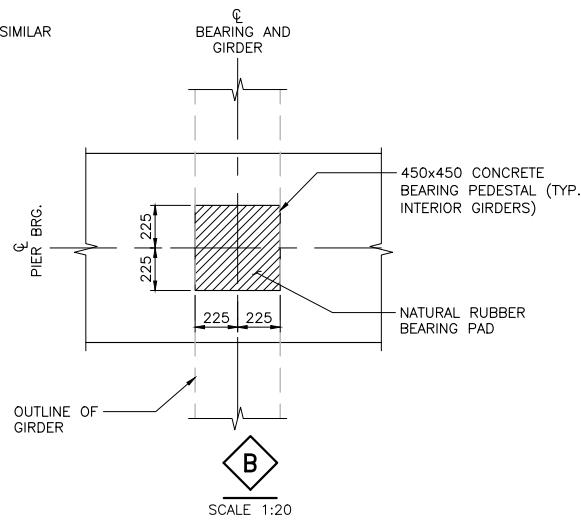
SCALE 1:50  
NOTE: WEST PIER SHOWN, EAST PIER SIMILAR

150mm DIA. GALVANIZED CORRUGATED SLEEVE SHALL BE INSTALLED DURING ABUTMENT CONSTRUCTION (SEE DWG. 19 FOR DETAILS)



### A

SCALE 1:20



### B

SCALE 1:20

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

TOP OF CONCRETE ELEVATIONS		
NO.	W. PIER	E. PIER
A	48.509	48.426
B	48.789	48.707
C	48.654	48.571
D	50.463	50.380
E	50.538	50.455

TOP OF BEARING ELEVATIONS*		
NO.	W. PIER	E. PIER
1	48.834	48.752
2	48.934	48.852
3	48.934	48.852
4	48.864	48.782
5	48.764	48.682

\*ELEVATIONS ARE TO TOP OF BEARING.  
SEE CONSTRUCTION NOTES ON DRAWING NO. 1.

PIER BEARING DATA			
LOCATION	BEARING SIZE	NUMBER REQUIRED	BEARING TYPE
INTERIOR GIRDERS	450x450x20	6	NATURAL RUBBER
EXTERIOR GIRDERS	800x450x20	4	

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE  
WESTBOUND PIER LAYOUT

SHEET  
213

DILLON CONSULTING

A. M. KHAN  
PROFESSIONAL ENGINEER  
PROVINCE OF ONTARIO

J. McCANN  
PROFESSIONAL ENGINEER  
PROVINCE OF ONTARIO

### NOTES

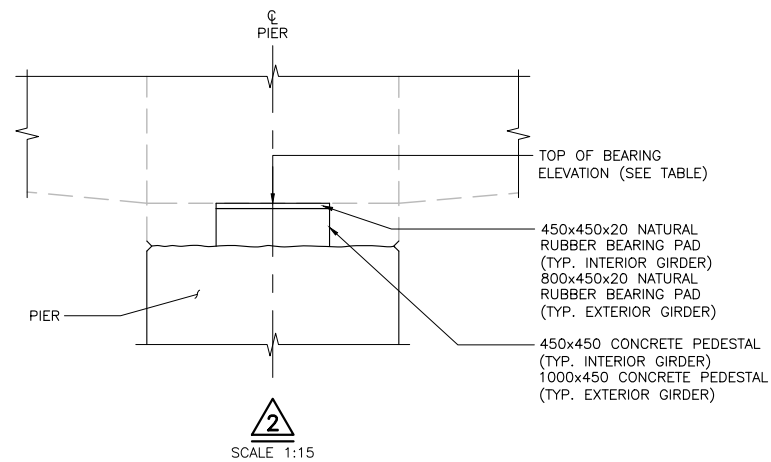
- CONTRACTOR SHALL SUPPLY TEMPORARY LATERAL BRACING FOR THE PIERS TO PROVIDE STABILITY DURING CONSTRUCTION.
- FORMWORK AND LATERAL BRACING AT PIERS SHALL NOT BE REMOVED UNTIL: STEEL GIRDERS HAVE BEEN ERECTED, ANCHOR RODS INSTALLED AND NON-SHRINK GROUT HAS REACHED A STRENGTH OF 20 MPa OR THE ROCK PROTECTION HAVE BEEN INSTALLED AND THE PIERS HAVE BEEN BACKFILLED TO RIVER BED ELEVATION (APPROXIMATELY EL. 45.0).
- STABILITY AND INTEGRITY OF THE STRUCTURE SHALL BE MAINTAINED AT ALL STATES OF CONSTRUCTION.

### CONSTRUCTION SEQUENCE

- CONSTRUCT PIERS TO UNDERSIDE OF BEARING PEDESTAL ELEVATION.
- CONSTRUCT BEARING PEDESTALS.
- PLACE BEARINGS AND ERECT GIRDERS.
- THE PIER DIAPHRAGMS, ABOVE THE BEARING SEAT ELEVATION, SHALL BE CAST MONOLITHICALLY WITH THE DECK.

### APPLICABLE STANDARD DRAWINGS

OPSD-3290.100 PIERS CUTWATER ASSEMBLY



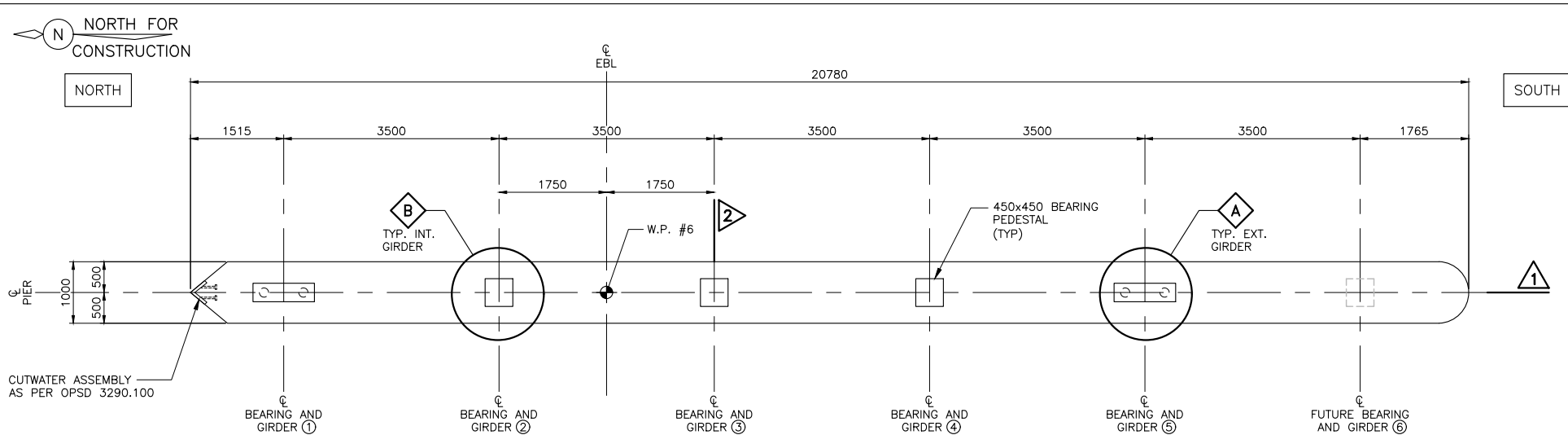
### 2

SCALE 1:15

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS									
DATE	BY	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	KBS	CHK	AWK	SITE	31-231.1/2			DWG	16

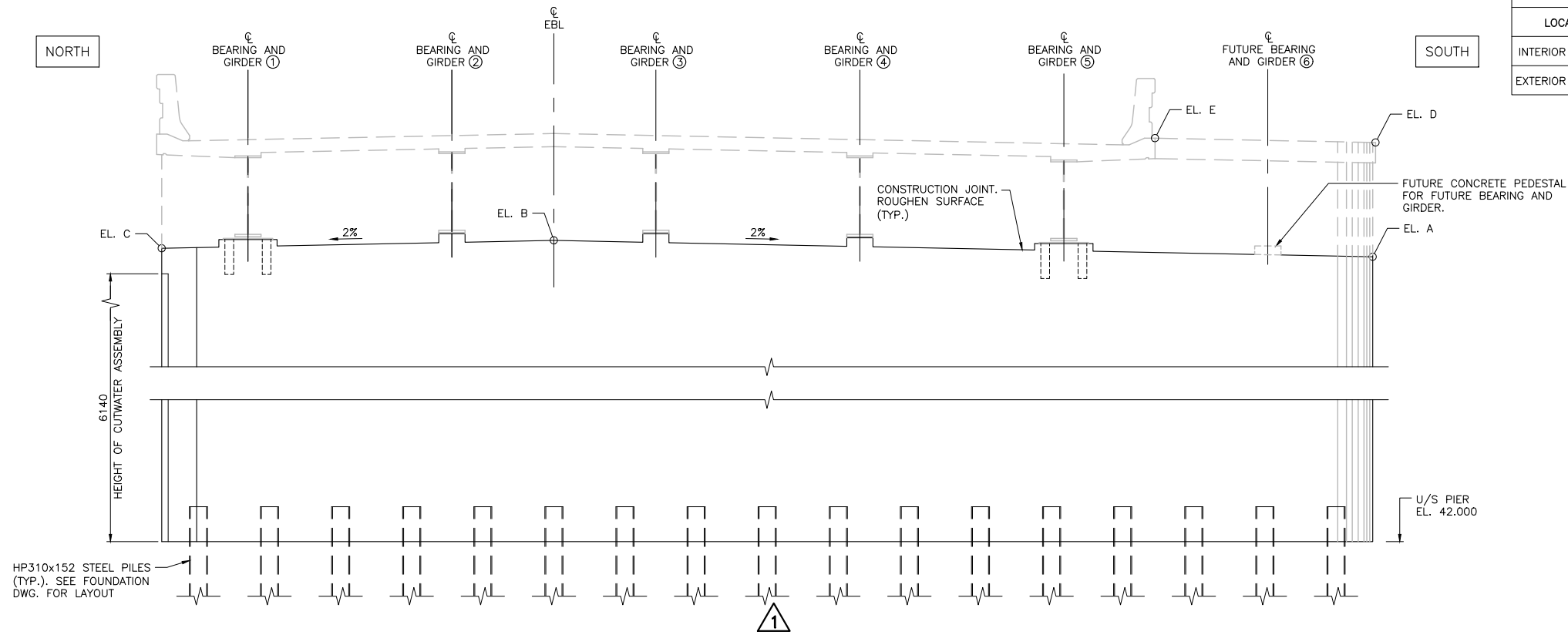
LAYOUT: EB Pier Layout  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515028\31-231-09-Pier.dwg



### PLAN

SCALE 1:50

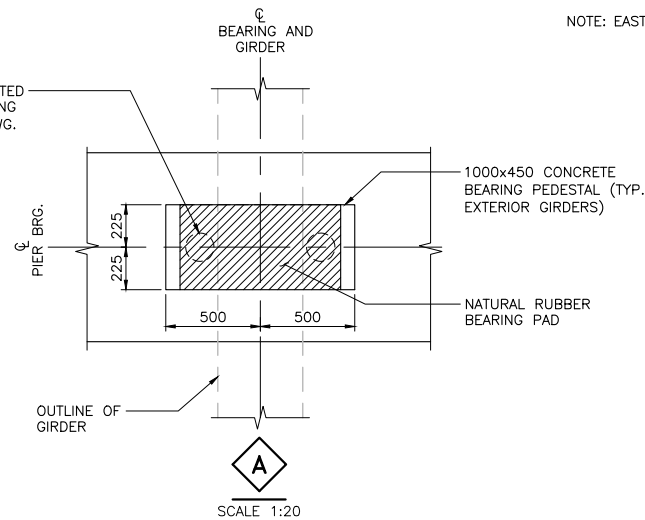
NOTE: WEST PIER SHOWN, EAST PIER SIMILAR



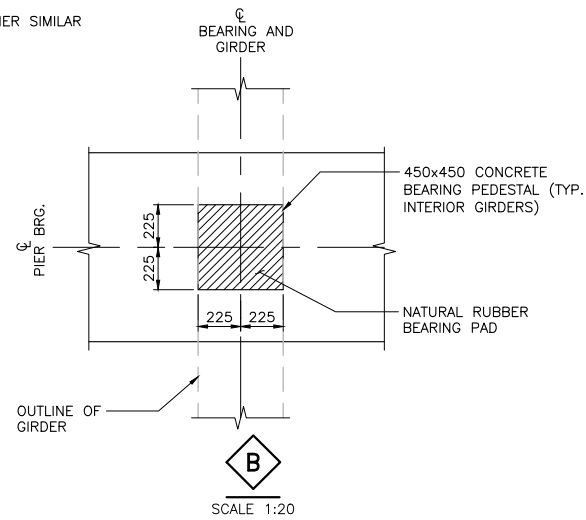
SCALE 1:50

NOTE: EAST PIER SHOWN, WEST PIER SIMILAR

150mm DIA. GALVANIZED CORRUGATED SLEEVE SHALL BE INSTALLED DURING ABUTMENT CONSTRUCTION (SEE DWG. 19 FOR DETAILS)



SCALE 1:20



SCALE 1:20

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

TOP OF CONCRETE ELEVATIONS		
NO.	ELEVATION	
	W. PIER	E. PIER
A	48.509	48.426
B	48.789	48.707
C	48.654	48.571
D	50.463	50.380
E	50.538	50.455

TOP OF BEARING ELEVATIONS*		
NO.	ELEVATION	
	W. PIER	E. PIER
1	48.834	48.752
2	48.934	48.852
3	48.934	48.852
4	48.864	48.782
5	48.764	48.682

\*ELEVATIONS ARE TO TOP OF BEARING.  
SEE CONSTRUCTION NOTES ON DRAWING NO. 1.

PIER BEARING DATA			
LOCATION	BEARING SIZE	NUMBER REQUIRED	BEARING TYPE
INTERIOR GIRDERS	450x450x20	6	NATURAL RUBBER
EXTERIOR GIRDERS	800x450x20	4	

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

EASTBOUND PIER LAYOUT

SHEET  
214

### NOTES

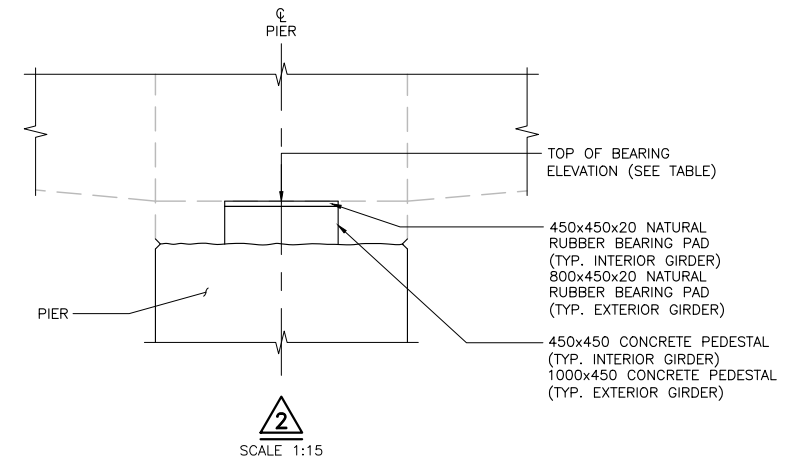
1. FOR GENERAL NOTES SEE DWG. 16.

### CONSTRUCTION SEQUENCE

1. FOR SEQUENCE NOTES SEE DWG. 16.

### APPLICABLE STANDARD DRAWINGS




OPSD-3290.100 PIERS CUTWATER ASSEMBLY

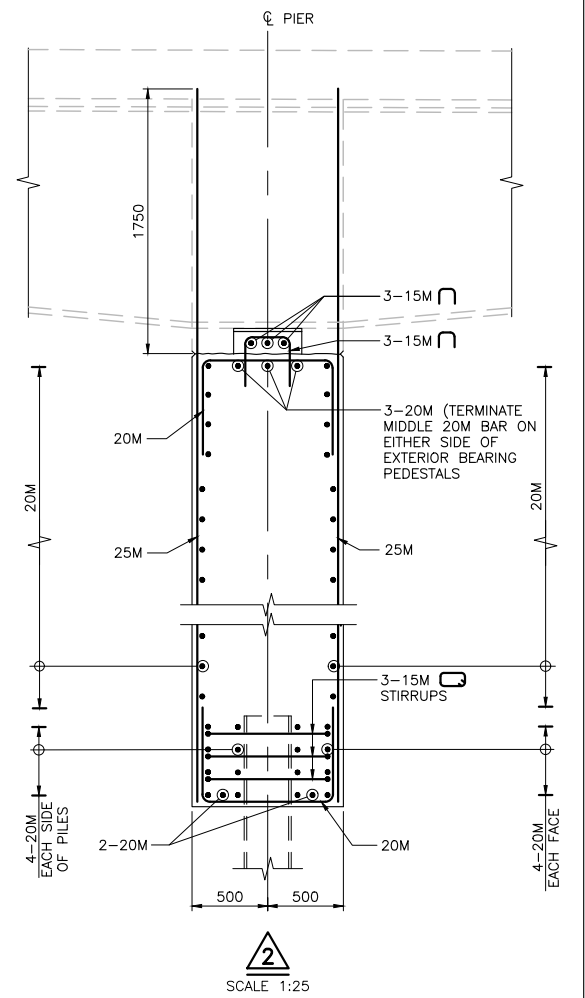
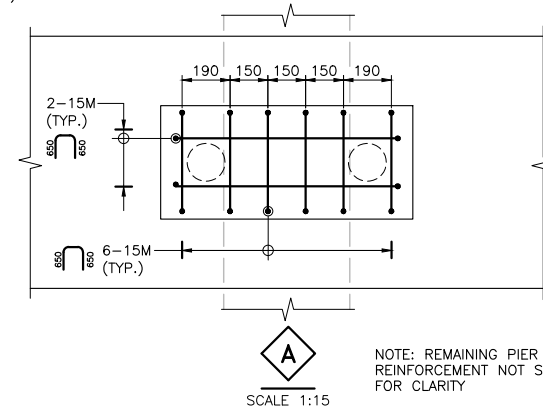


SCALE 1:15

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS							
DATE	BY	DESCRIPTION		DATE	BY	DESCRIPTION	
DESIGN	AWK	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250NT
DRAWN	SJM	CHK	AWK	SITE	31-231.1/2	DWG	17

HWY 401 CONT No 2018-4008 WP No 4083-13-01 (WBL) 4084-13-01 (EBL)		
RAISIN RIVER BRIDGE		SHEET  215
PIER REINFORCEMENT		
		
		

[illegible]



LAYOUT: 1  
FILE NAME: C:\projectwise\working\_directory\active\10bp\0515028\31-231-09-Bearings.dwg


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



HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

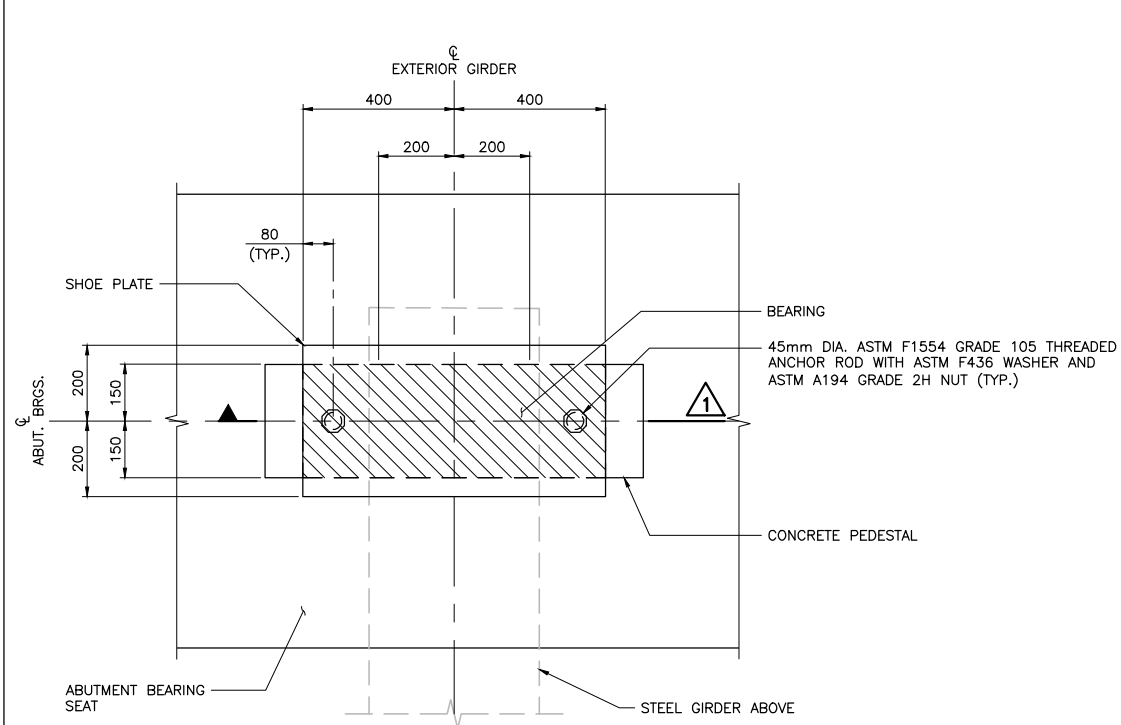
BEARING DETAILS

SHEET  
216



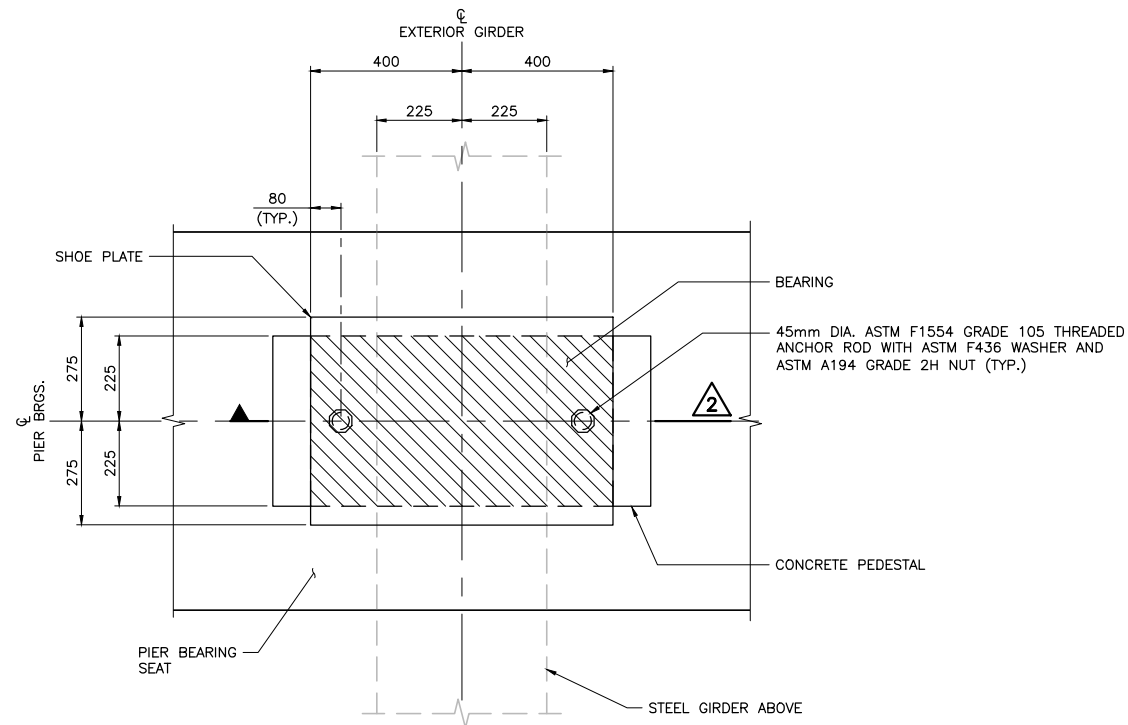


- NOTES
- FOR STRUCTURAL STEEL NOTES SEE DWG. 20.
  - THREADED ANCHOR RODS SHALL BE 45mm DIA. ASTM F1554 GRADE 105 (724 MPa) WITH ASTM F436 TYPE 1 WASHERS AND ASTM A194 GRADE 2H HEAVY HEX NUTS.
  - CONTRACTOR SHALL PREVENT DAMAGE TO NATURAL RUBBER BEARINGS DURING FIELD WELDING.
  - 150mm GALVANIZED CORRUGATED STEEL SLEEVE SHALL BE INSTALLED DURING ABUTMENT/PIER CONSTRUCTION.
  - SHOE PLATES SHALL CONFORM TO CSA STANDARD CAN/CSA G40.20-04/G40.21-04 (REAFFIRMED 2009) GRADE 350WT.
  - FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR APPLICATION OF NON-SHRINK GROUT.
  - CUT HOLES IN THE NATURAL RUBBER BEARINGS FOR EXTERIOR GIRDERS TO ACCOMMODATE ANCHOR RODS.

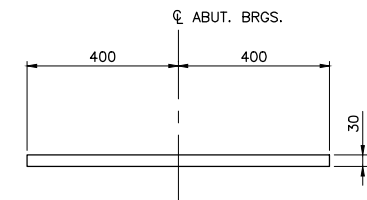


ABUTMENT BEARING AT  
EXTERIOR GIRDERS  
SCALE 1:10  
(GIRDERS 1 & 5 ONLY)

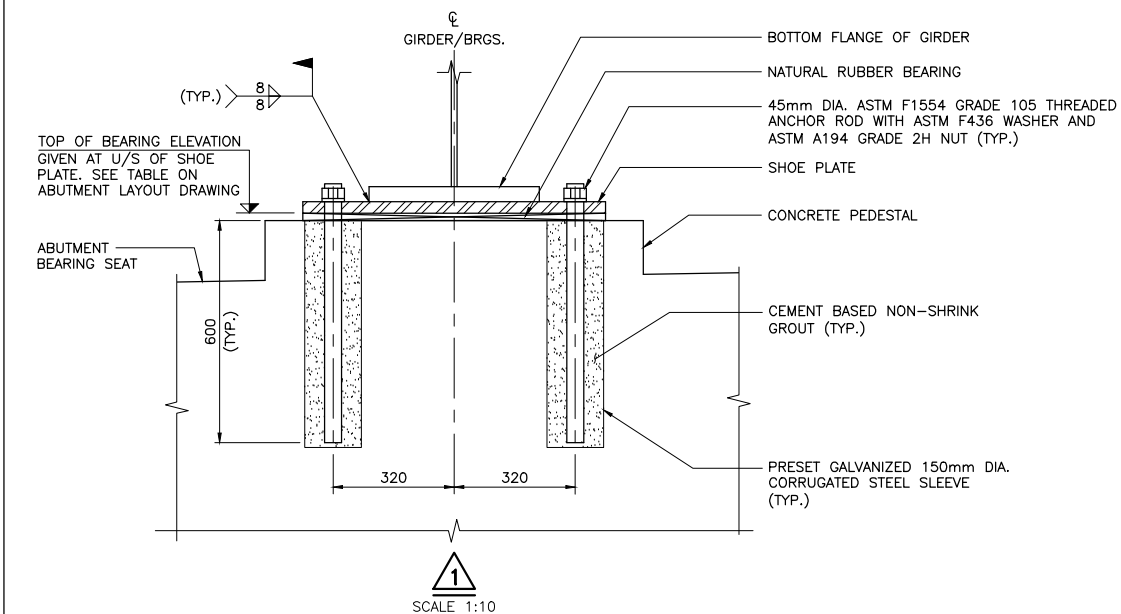
NOTE: WEST ABUTMENT SHOWN,  
EAST ABUTMENT SIMILAR.



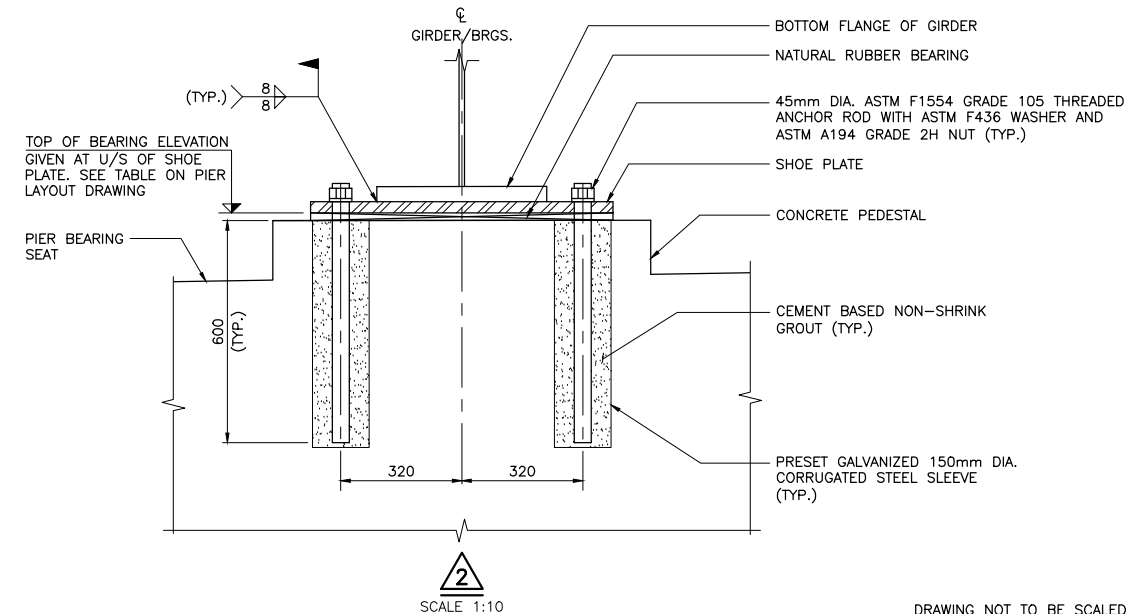
PIER BEARING AT  
EXTERIOR GIRDERS  
SCALE 1:10  
(GIRDERS 1 & 5 ONLY)



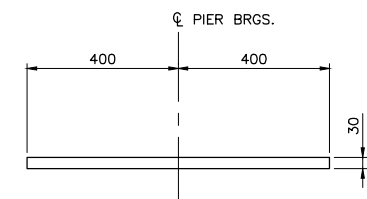
ABUTMENT SHOE PLATE  
SCALE 1:10  
(PL. 800x400x30 - 4 REQUIRED)



SCALE 1:10



SCALE 1:10

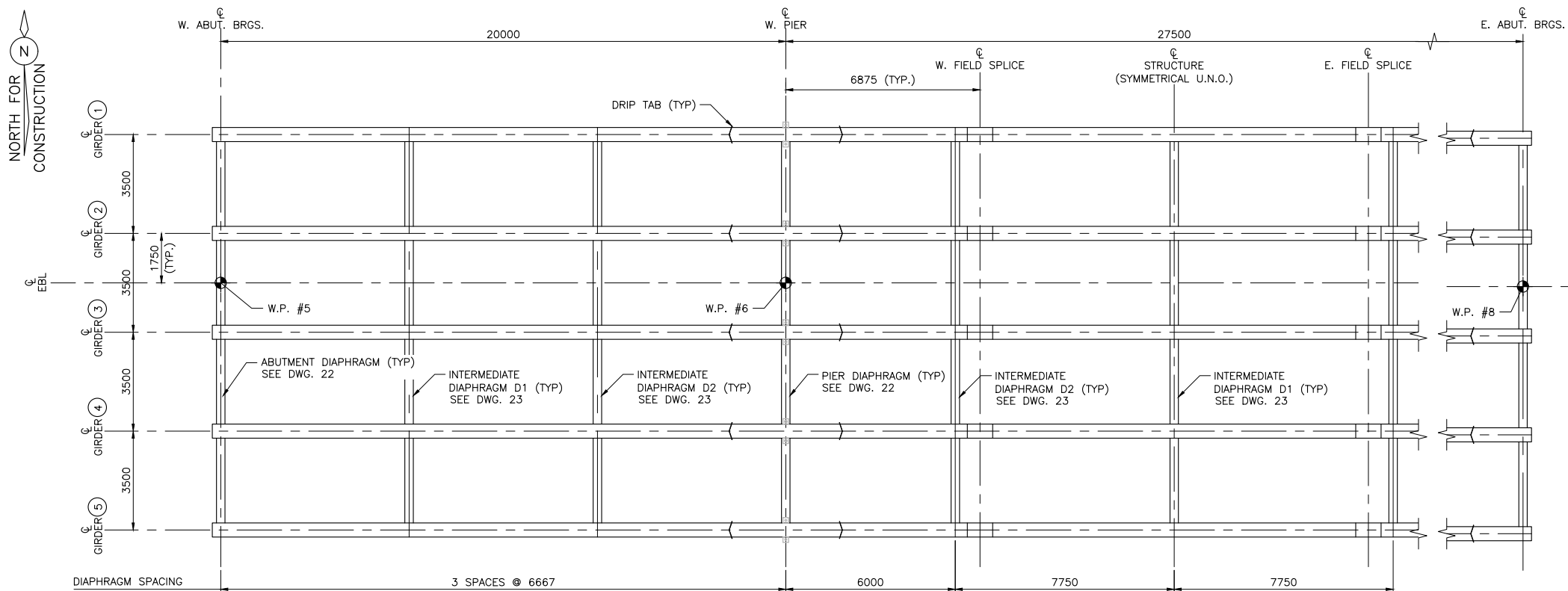


PIER SHOE PLATE  
SCALE 1:10  
(PL. 800x550x30 - 4 REQUIRED)

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

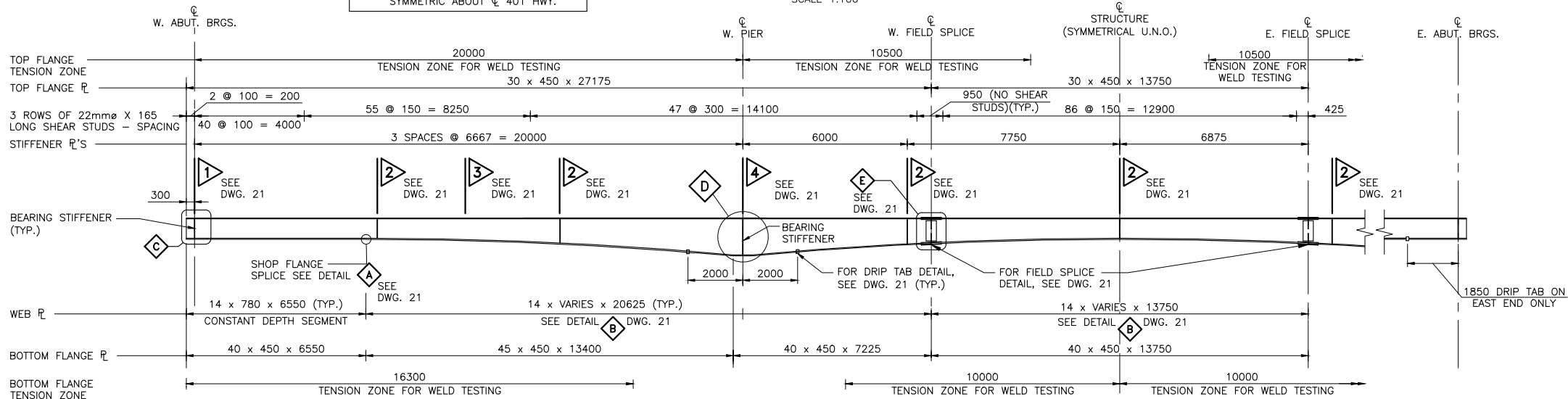
REVISIONS	DATE	BY	DESCRIPTION			
	DATE	BY	DESIGN	CHK	CODE	LOAD
			AWK	JM	CL625ONT	CL625ONT
			SJM	JRH	SITE	31-231.1/2
						DWG

LAYOUT: SS LAYOUT  
FILE NAME: c:\project\ss\working\_directory\active\10bpb\0515028\31-231-09-Structural Steel.dwg

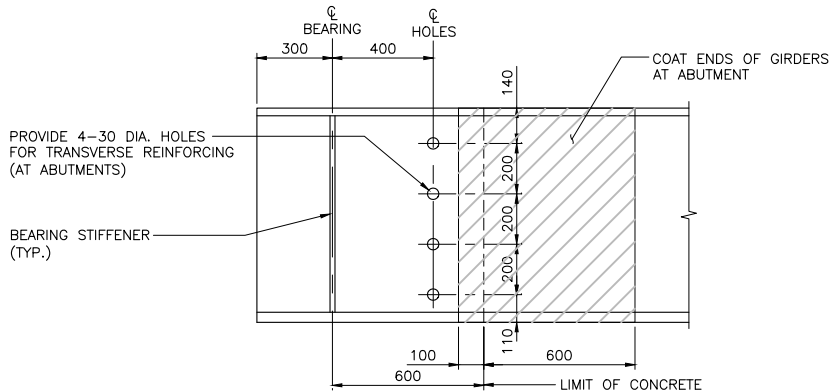


NOTE: EASTBOUND STRUCTURE SHOWN. WESTBOUND STRUCTURE SYMMETRIC ABOUT 401 HWY.

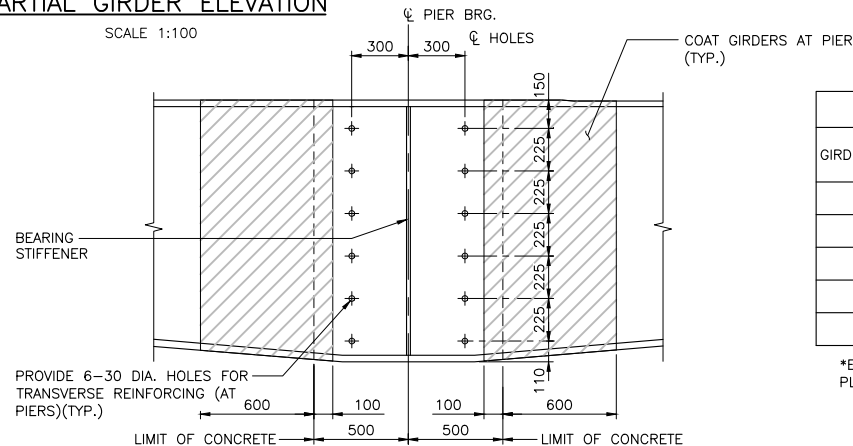
PLAN  
SCALE 1:100



PARTIAL GIRDER ELEVATION  
SCALE 1:100



C  
SCALE 1:15



D  
SCALE 1:20

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

HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

STRUCTURAL STEEL LAYOUT

SHEET 217

STRUCTURAL STEEL NOTES

- STRUCTURAL STEEL GIRDERS AND STIFFENERS SHALL CONFORM TO CSA STANDARD G40.20/G40.21 GRADE 350AT. THE CHARPY IMPACT ENERGY REQUIREMENTS FOR GRADE 350AT STEEL SHALL BE 27 JOULES AND THE TEST TEMPERATURE SHALL BE -20°C. STEEL DIAPHRAGMS SHALL CONFORM TO CSA STANDARD G40.20/G40.21 GRADE 350A. ROLLED SECTIONS SHALL CONFORM TO CSA STANDARD G40.20/G40.21 OR ASTM SPECIFICATION A588.
- ALL WELD MATERIAL SHALL CONFORM TO CSA STANDARD CAN/CSA W48. THE CHARPY IMPACT ENERGY REQUIREMENTS SHALL BE 27 JOULES AND THE TEST TEMPERATURE SHALL BE -30°C.
- BOLTS ON ATMOSPHERIC CORROSION RESISTANT STEEL SHALL BE ASTM A325 TYPE 3, M22. BOLTS ON COATED STEEL SHALL BE GALVANIZED ASTM A325 TYPE 1, M22. BOLT THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANES.
- STUD SHEAR CONNECTORS SHALL BE 22 mm DIA., AND CONFORM TO ASTM STANDARD A108 AND CSA W59.
- ALL LENGTHS SHOWN ARE IN THE HORIZONTAL PLANE AND MEASURED AT 20°C.
- GIRDERS SHALL BE CAMBERED TO VALUES SHOWN IN THE RELAXED CAMBER DIAGRAM.
- RELAXED CAMBER ORDINATES INCLUDE AN ALLOWANCE FOR DEFLECTION DUE TO SELF-WEIGHT OF STRUCTURAL STEEL, CONCRETE DECK, BARRIER WALLS, AND WEARING SURFACE, AND FOR THE PROFILE OF HIGHWAY.
- THE ENDS OF GIRDERS AND BEARING STIFFENERS SHALL BE TRULY VERTICAL UNDER FULL DEAD LOAD.
- 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 SHOP SPLICES ARE REQUIRED IN LOCATIONS OTHER THAN THOSE WHERE PLATE SIZES HAVE TRANSITIONS, THEIR LOCATION SHALL BE APPROVED BY THE ENGINEER.
- UNLESS OTHERWISE NOTED THE MINIMUM FILLET WELD SHALL BE AS FOLLOWS:

MATERIAL THICKNESS OF MINIMUM SIZE OF SINGLE THICKER PART JOINED (mm) PASS FILLET WELD (mm)

MATERIAL THICKNESS OF THICKER PART JOINED (mm) MINIMUM SIZE OF SINGLE PASS 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

- ALL STRUCTURAL STEEL SURFACES SHALL BE COATED FOR A DISTANCE OF 700 mm AS FOLLOWS: FROM THE FRONT FACE OF THE ABUTMENT AND BOTH FACES OF PIER TO 100 mm TOWARDS THE BEARING AND 600 mm TOWARDS THE CENTRE OF THE GIRDER. THE COLOUR OF THE TOP COAT SHALL BE 10045 BROWN ACCORDING TO FEDERAL STANDARD 595C COLOURS.
- ALL STRUCTURAL STEEL SURFACES OF EXTERIOR GIRDERS, INCLUDING SPLICE PLATES, BUT EXCLUDING SURFACES IN CONTACT WITH CONCRETE AND THE CONTACT SURFACES OF BOLTED JOINTS SHALL BE COATED FOR A DISTANCE OF 2000mm ON EITHER SIDE OF THE CENTRELINE OF A FIELD SPLICE.
- THE CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION AND ERECTION AND 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 A STRENGTH OF 25 MPa.

GIRDER ERECTION ELEVATIONS*									
GIRDER LINE	W. ABUT. BRGS.	W. SPAN	W. PIER	W. SPLICE	C. MID SPAN	E. SPLICE	E. PIER	E. SPAN	E. ABUT. BRGS.
1	50.309	50.291	50.249	50.264	50.237	50.223	50.167	50.149	50.107
2	50.379	50.361	50.319	50.334	50.307	50.293	50.237	50.219	50.177
3	50.379	50.361	50.319	50.334	50.307	50.293	50.237	50.219	50.177
4	50.309	50.291	50.249	50.264	50.237	50.223	50.167	50.149	50.107
5	50.239	50.221	50.179	50.194	50.167	50.153	50.097	50.079	50.037

\*ELEVATIONS ARE TO TOP OF GIRDER AT TOP OF FLANGE OR TO TOP OF TOP SPLICE PLATE AT FIELD SPLICES, ALONG C/L OF GIRDER.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

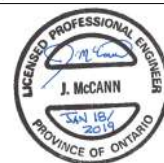
REVISIONS		DATE		BY		DESCRIPTION	
DESIGN	AWK	CHK	JM	CODE	CSA-S6-14	LOAD	CL6250NT
DRAWN	KBS	CHK	JRH	SITE	31-231.1/2	DATE	Jan-19
						DWG	20

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

SHEET

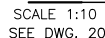
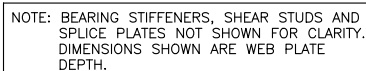
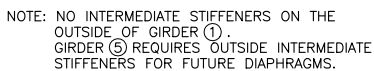
218



SCALE 1:10



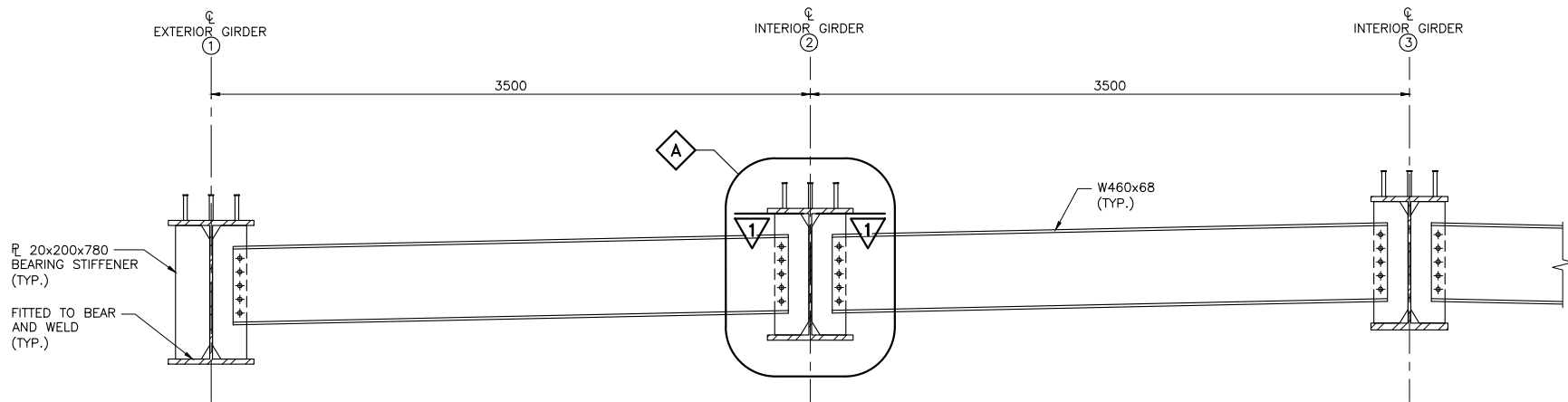
SEE  
DWG. 20

[illegible]

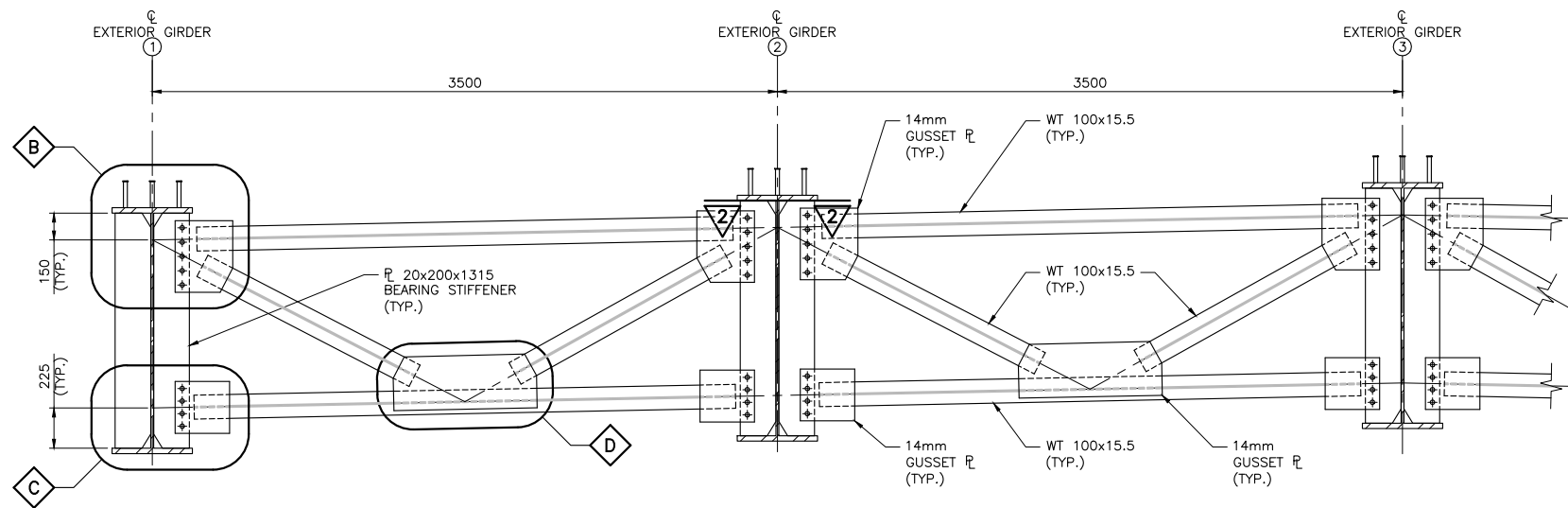
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

LAYOUT: SS 1  
FILE NAME: c:\projectwise\working\_directory\active\10\bp\d0515028\31-231-09-Structural Steel.dwg

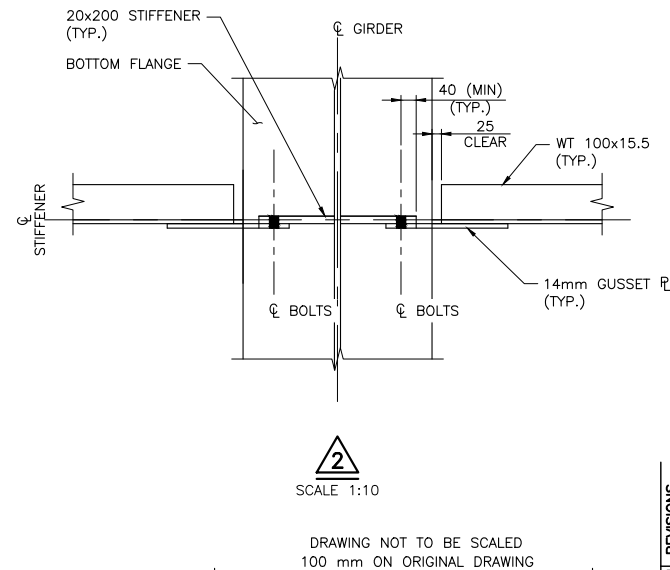
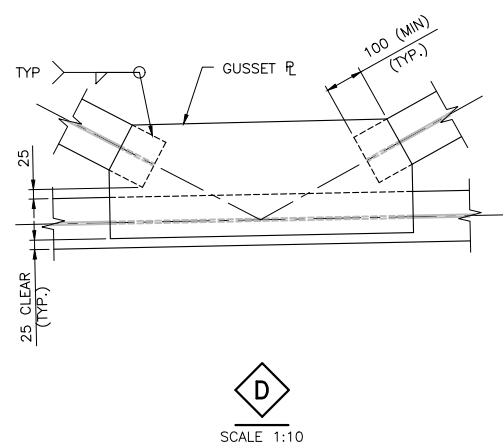
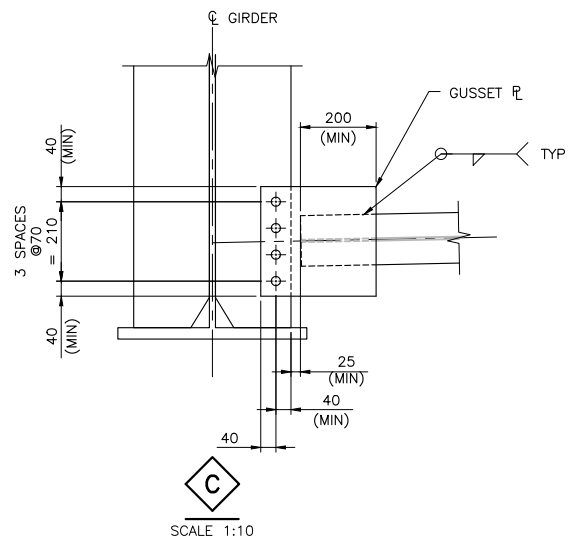
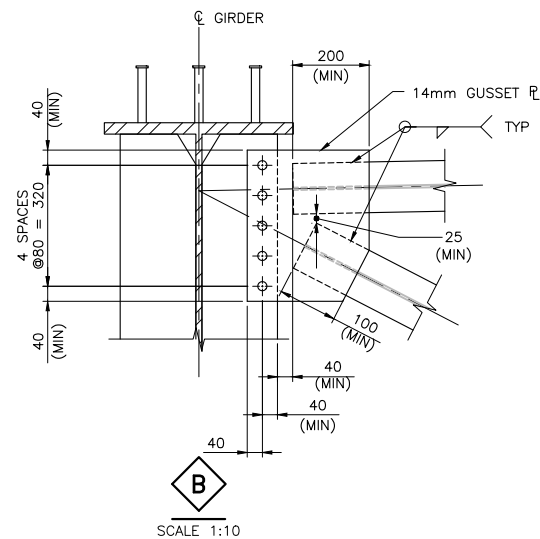
LAYOUT: SS 2  
FILE NAME: c:\projectwise\working\_directory\active\10bp\40515028\31-231-09-Structural Steel.dwg



NOTE: DIAPHRAGMS FOLLOW DECK CROSS FALL.  
**ABUTMENT DIAPHRAGM ELEVATION**  
SCALE 1:20



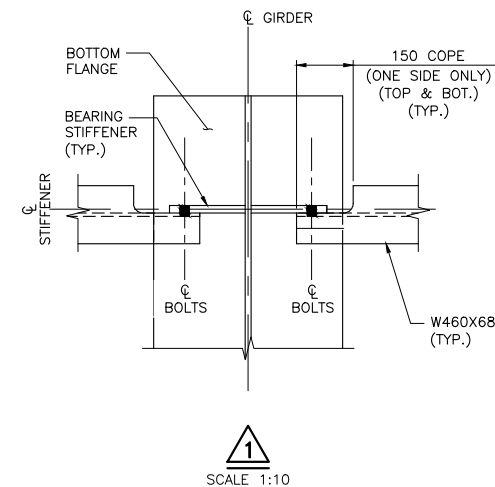
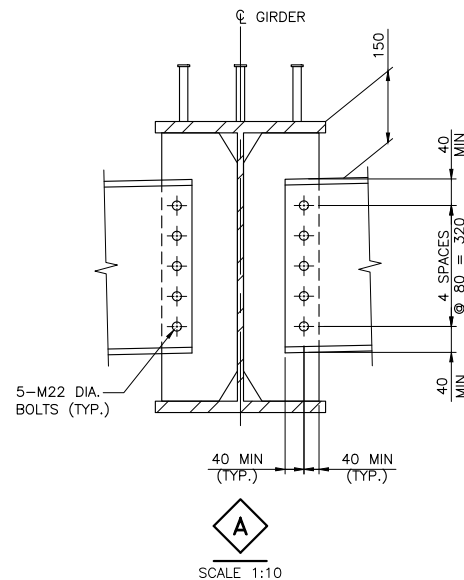
NOTE: DIAPHRAGMS FOLLOW DECK CROSS FALL.  
**PIER DIAPHRAGM ELEVATION**  
SCALE 1:20



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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

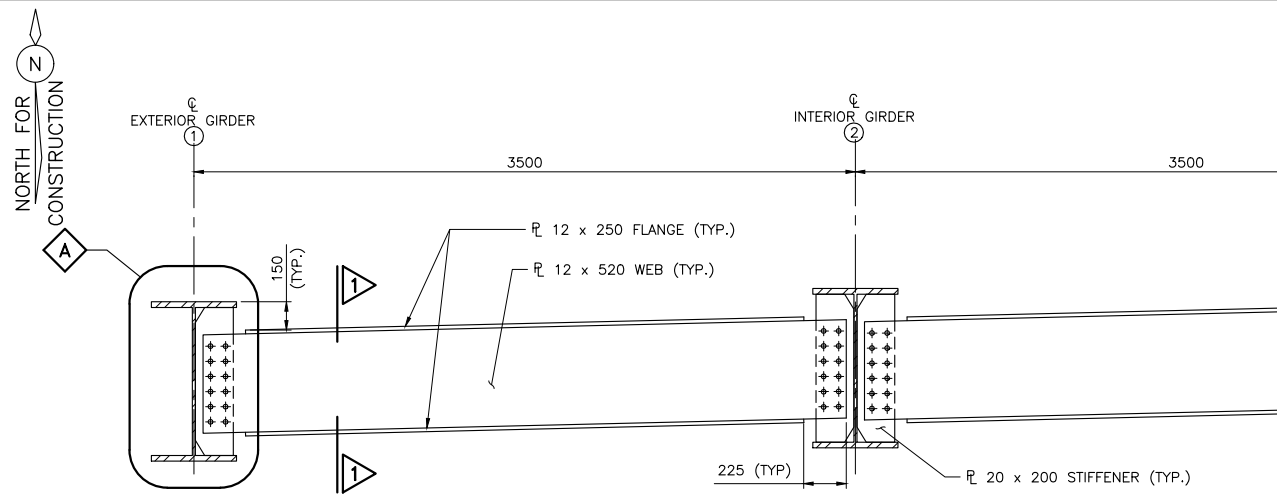
HWY 401		SHEET 219
CONT No	2018-4008	
WP No	4083-13-01 (WBL) 4084-13-01 (EBL)	
RAISIN RIVER BRIDGE		
STRUCTURAL STEEL DETAILS II		



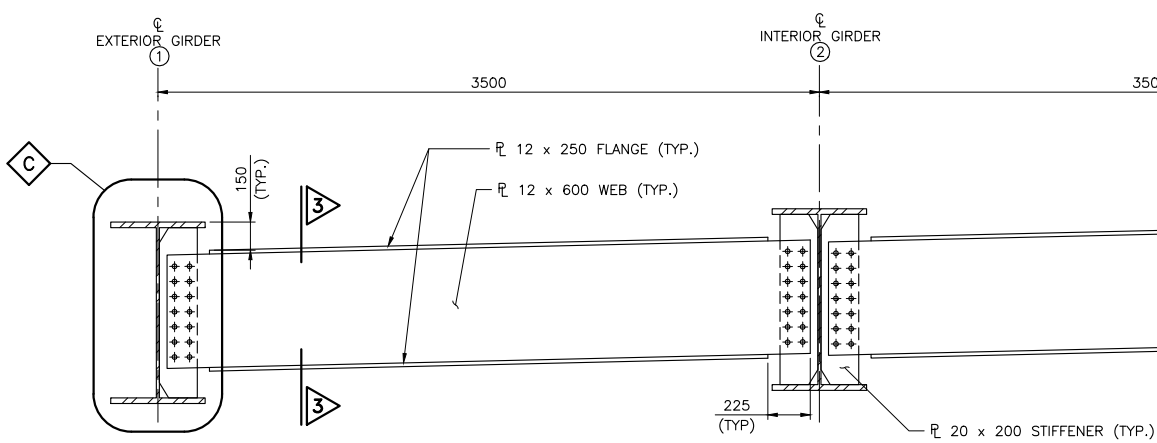
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	AWK	CHK JM	CODE CSA-S6-14
DRAWN	KBS	CHK JRH	SITE 31-231.1/2
LOAD	CL6250NT	DATE	Jan-19
DWG	22		



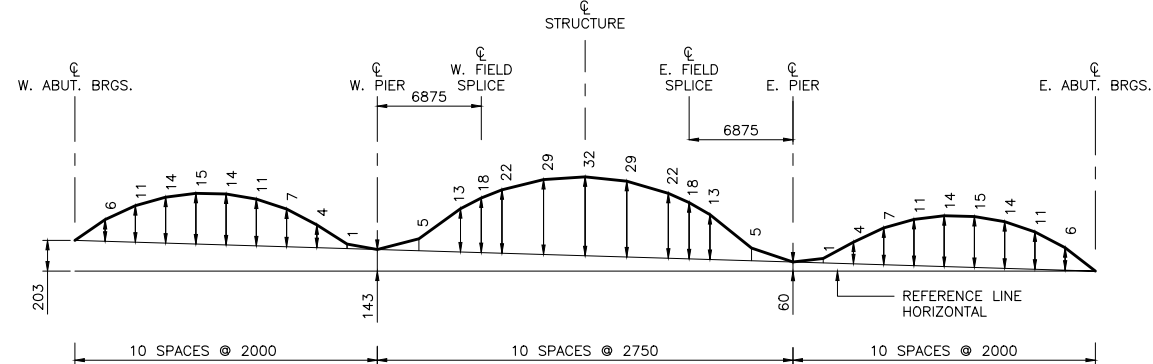
LAYOUT: SS\_3  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515028\31-231-09-Structural Steel.dwg



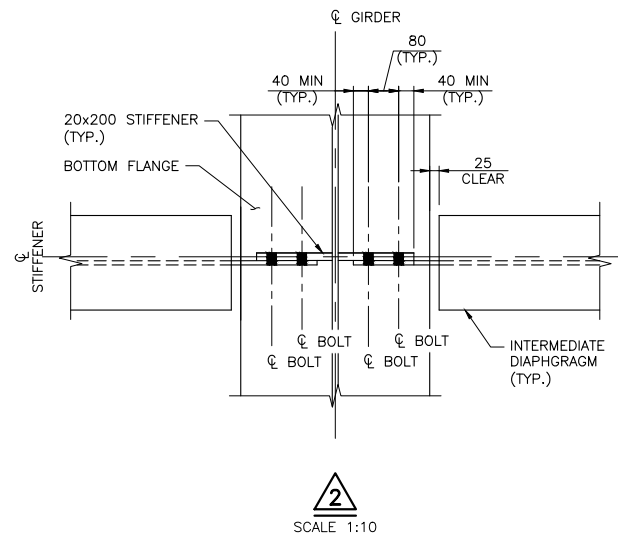
NOTE: DIAPHRAGMS FOLLOW DECK CROSS FALL.  
**INTERMEDIATE DIAPHRAGM 'D1'**  
SCALE 1:20



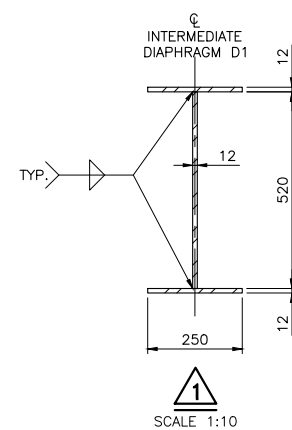
NOTE: DIAPHRAGMS FOLLOW DECK CROSS FALL.  
**INTERMEDIATE DIAPHRAGM 'D2'**  
SCALE 1:20



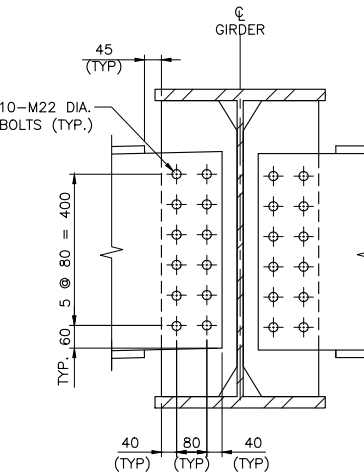
**RELAXED CAMBER DIAGRAM**  
SCALE N.T.S.



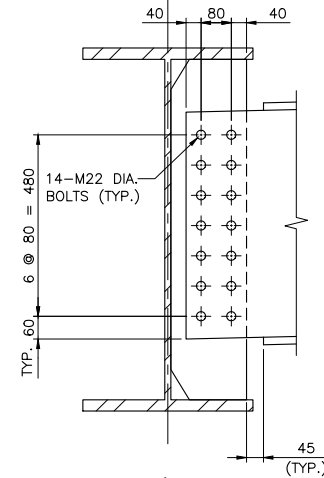
**2**  
SCALE 1:10



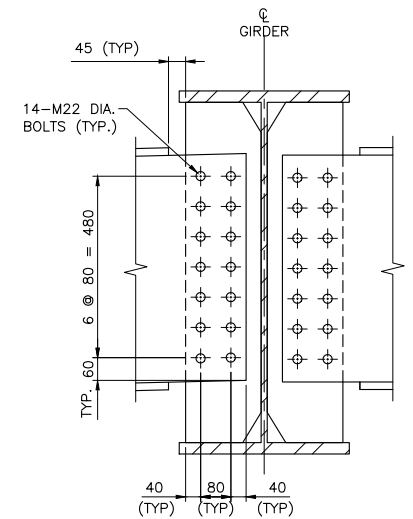
**1**  
SCALE 1:10



**B**  
SCALE 1:10



**C**  
SCALE 1:10



**D**  
SCALE 1:10  
NOTE: PROVIDE HOLES IN EXTERIOR CONNECTION PLATE AT GIRDER (5)

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	AWK	CHK	JM	CODE CSA-S6-14
DRAWN	KBS	CHK	JRH	SITE 31-231.1/2
LOAD	CL6250N	DATE	Jan-19	DWG 23

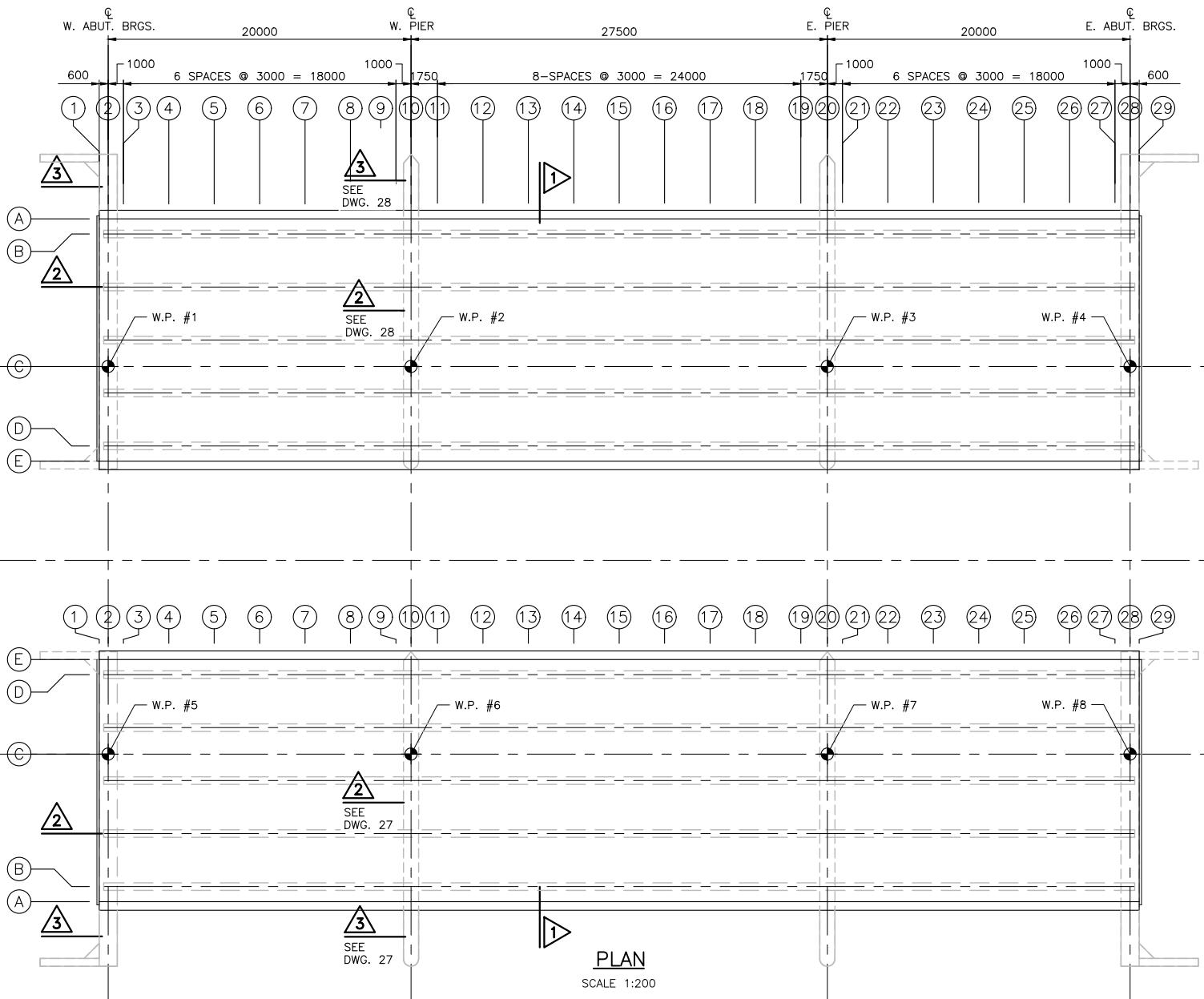
**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE  
STRUCTURAL STEEL DETAILS III

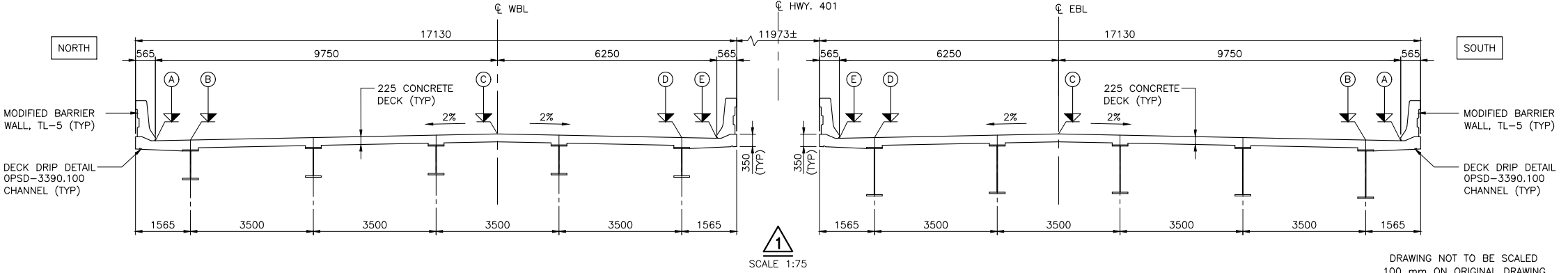
SHEET  
220





PLAN  
SCALE 1:200

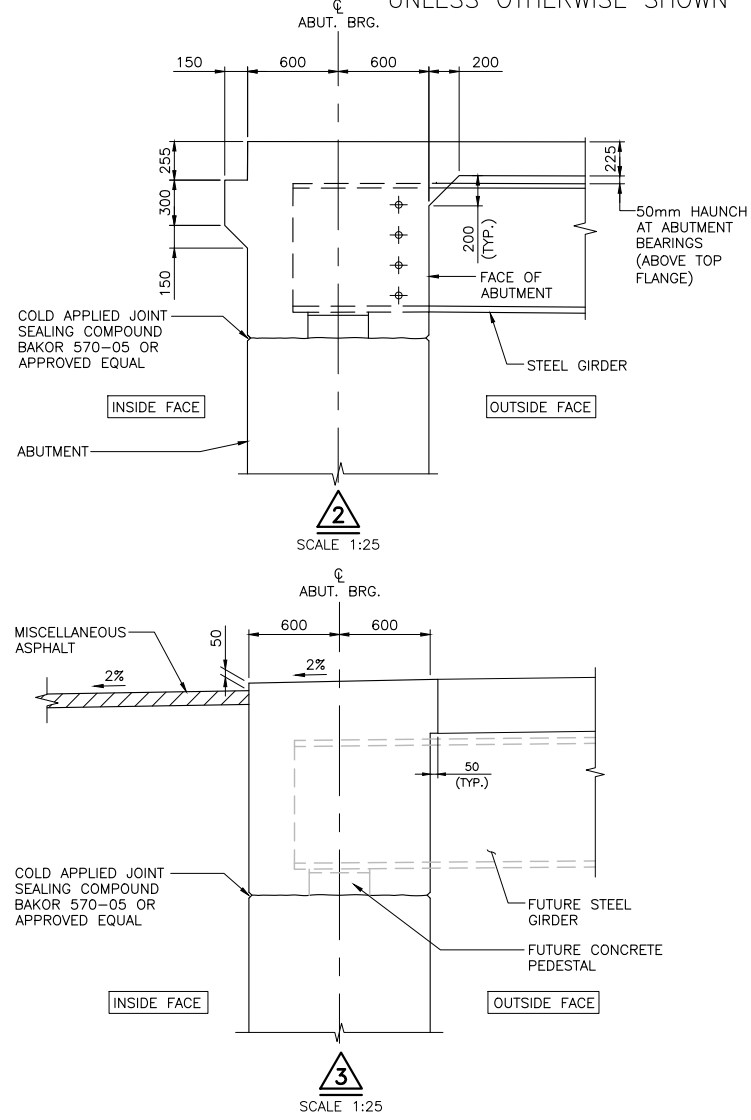
SCREED ELEVATIONS																													
GRID LINE		℄ W. ABUT.								℄ W. PIER										℄ E. PIER								℄ E. ABUT.	
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙
Ⓐ	50.496	50.494	50.494	50.492	50.486	50.476	50.463	50.449	50.438	50.434	50.432	50.430	50.429	50.428	50.422	50.410	50.393	50.376	50.360	50.352	50.349	50.343	50.339	50.334	50.325	50.313	50.297	50.292	50.290
Ⓑ	50.516	50.514	50.514	50.512	50.506	50.496	50.483	50.469	50.458	50.454	50.452	50.450	50.449	50.448	50.442	50.430	50.413	50.396	50.380	50.372	50.369	50.363	50.359	50.354	50.345	50.333	50.317	50.312	50.310
Ⓒ	50.691	50.689	50.689	50.687	50.681	50.671	50.658	50.644	50.633	50.629	50.627	50.625	50.624	50.623	50.617	50.605	50.588	50.571	50.555	50.547	50.544	50.538	50.534	50.529	50.520	50.508	50.492	50.487	50.485
Ⓓ	50.586	50.584	50.584	50.582	50.576	50.566	50.553	50.539	50.528	50.524	50.522	50.520	50.519	50.518	50.512	50.500	50.483	50.466	50.450	50.442	50.439	50.433	50.429	50.424	50.415	50.403	50.387	50.382	50.380
Ⓔ	50.566	50.564	50.564	50.562	50.556	50.546	50.533	50.519	50.508	50.504	50.502	50.500	50.499	50.498	50.492	50.480	50.463	50.446	50.430	50.422	50.419	50.413	50.409	50.404	50.395	50.383	50.367	50.362	50.360



SCALE 1:75

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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



HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

DECK LAYOUT

SHEET 221

- NOTES**
- SCREED ELEVATIONS ARE TO TOP OF CONCRETE DECK.
  - ABUTMENT AND PIER DIAPHRAGMS TO BE CAST MONOLITHICALLY WITH THE DECK SLAB.
  - SCREED ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR ROADWAY PROFILE AND DEAD LOAD DEFLECTIONS DUE TO DECK, ASPHALT, AND BARRIERS.
  - CONCRETE IN DECK SLAB SHALL BE RETARDED USING TYPE "B" OR "D" ADMIXTURE TO ENSURE THAT THE CONCRETE REMAINS PLASTIC FOR THE DURATION OF THE DECK PLACEMENT.
  - DECK SHALL BE CAST IN A SINGLE SEQUENCE
  - CONCRETE IN BARRIER SHALL NOT BE PLACED UNTIL ALL CONCRETE IN DECK SLAB HAS REACHED A STRENGTH OF 25 MPa.
  - DECK FORMWORK SHALL NOT BE REMOVED UNTIL DECK, ABUTMENT DIAPHRAGM AND PIER DIAPHRAGM CONCRETE HAS REACHED A STRENGTH OF 25 MPa.
- APPLICABLE STANDARD DRAWINGS**
- |               |   |
|---------------|---|
| OPSD-3311.100 | DECK GIRDERS, STEEL, METHOD OF OBTAINING SCREED ELEVATIONS  |
| OPSD-3370.100 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD  |
| OPSD-3370.101 | DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS |
| OPSD-3390.100 | DECK DRIP CHANNEL   |
| OPSD-3950.100 | JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE  |

LAYOUT: 1  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515028\31-231-09-Deck.dwg



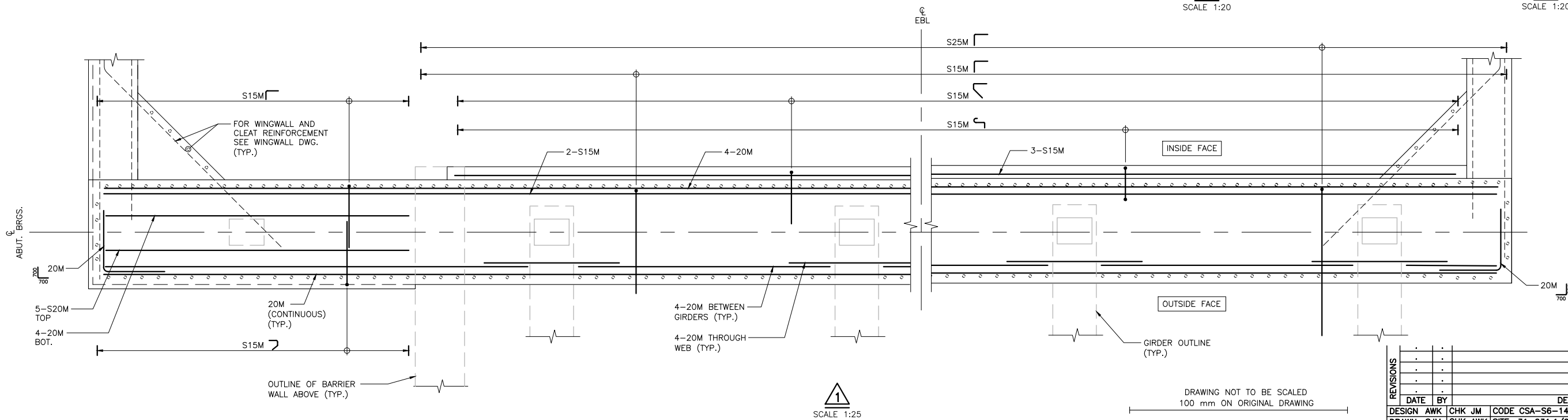
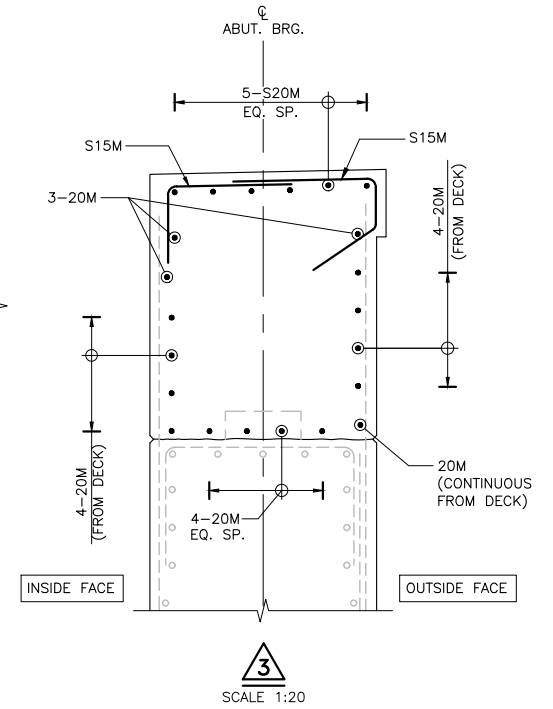
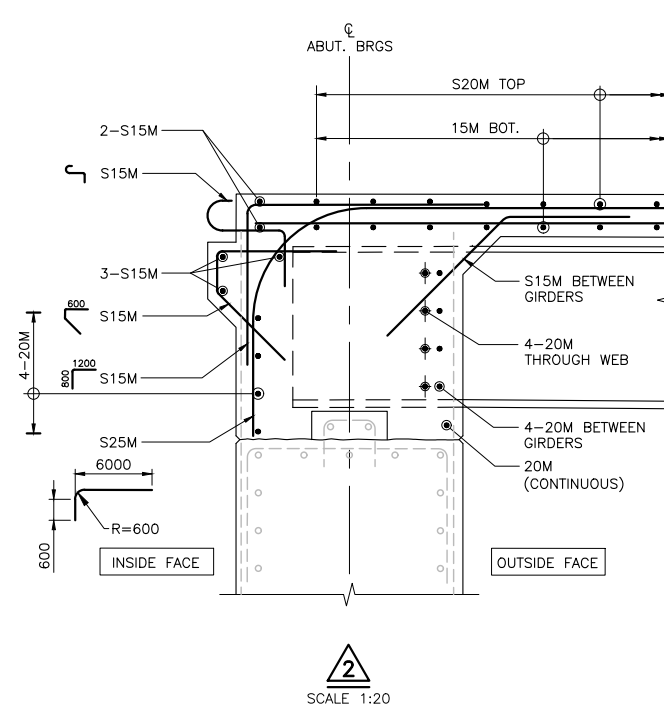
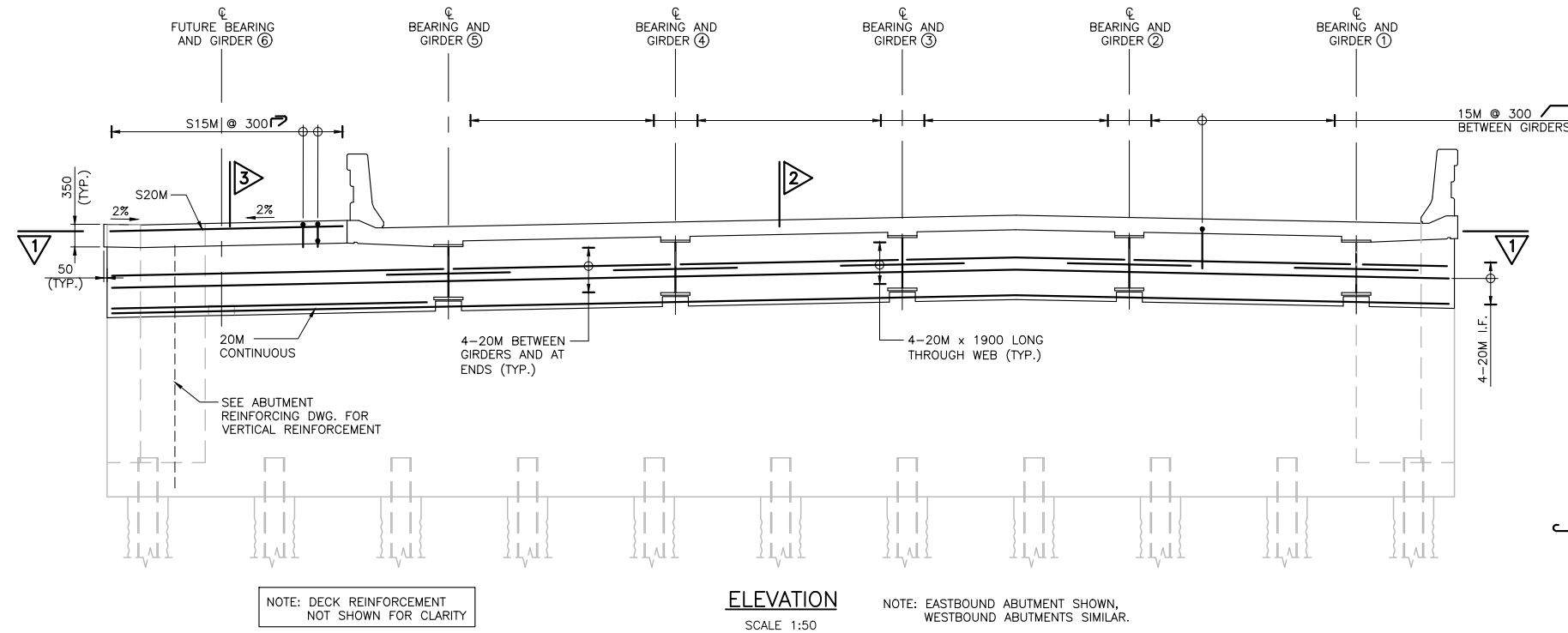


**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE  
ABUTMENT DIAPHRAGM  
REINFORCEMENT

SHEET  
223



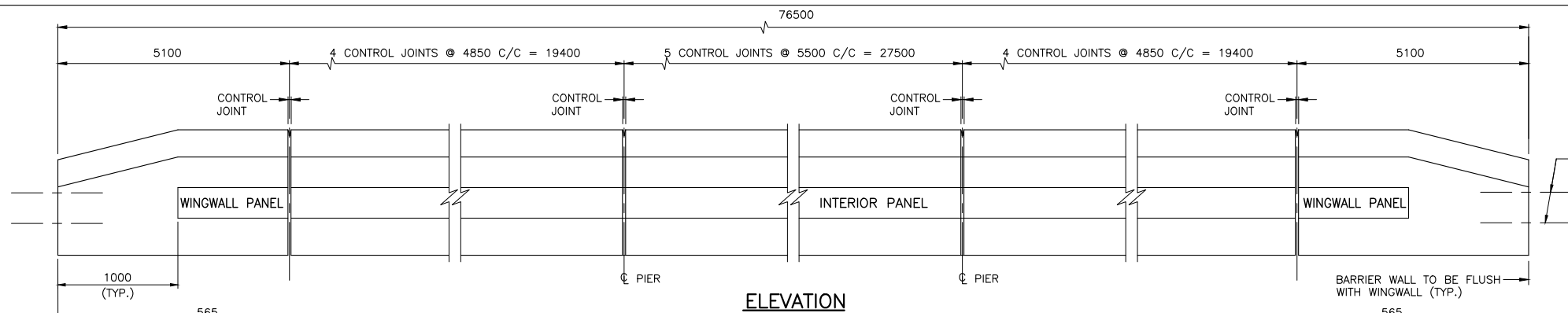
REVISIONS		DATE	BY	DESCRIPTION
DESIGN	AWK	CHK	JM	CODE CSA-S6-14   LOAD CL6250N   DATE Jan-19
DRAWN	SJM	CHK	AWK	SITE 31-231.1/2   DWG 26



REVISIONS	.	.							
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	DATE	BY	DESCRIPTION						
DESIGN	AWK	CHK JM	CODE CSA-S6-14	LOAD GL6250NT	DATE	Jan-19			
DRAWN	JBP	CHK AWK	SITE 31-231.1/2		DWG	27			



LAYOUT: BARRIER WALL  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515028\31-231-09-BARRIER-Rail.dwg



ELEVATION

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

FOR ANCHORAGE DETAILS SEE  
GENERAL ARRANGEMENT DRAWING

BAR MARK	SIZE	SHAPE
①	S15M	
②	S10M	
③	S15M	
④	S15M	
⑤	S15M	
⑥	S10M	STRAIGHT
⑦	S15M	STRAIGHT
⑧	S10M	
⑨	S10M	STRAIGHT LENGTH VARIES
⑩	S15M	
⑪	S15M	STRAIGHT
⑫	S10M	
⑬	S10M	

**NOTES:**

- SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
- CONCRETE COVER TO REINFORCING STEEL 60±10mm EXCEPT AS NOTED.
- REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
- BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
- MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
- 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.
- CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
- LEGEND: EF- DENOTES EACH FACE  
IF - DENOTES INSIDE FACE  
OF - DENOTES OUTSIDE FACE  
CJ - CONSTRUCTION JOINT

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

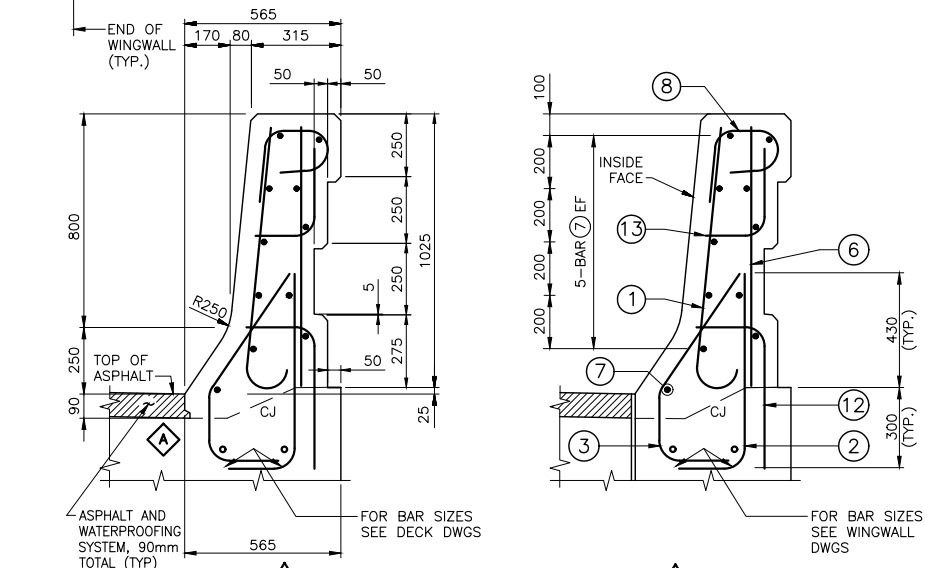
RAISIN RIVER BRIDGE  
MEDIAN BARRIER WALLS

SHEET  
226

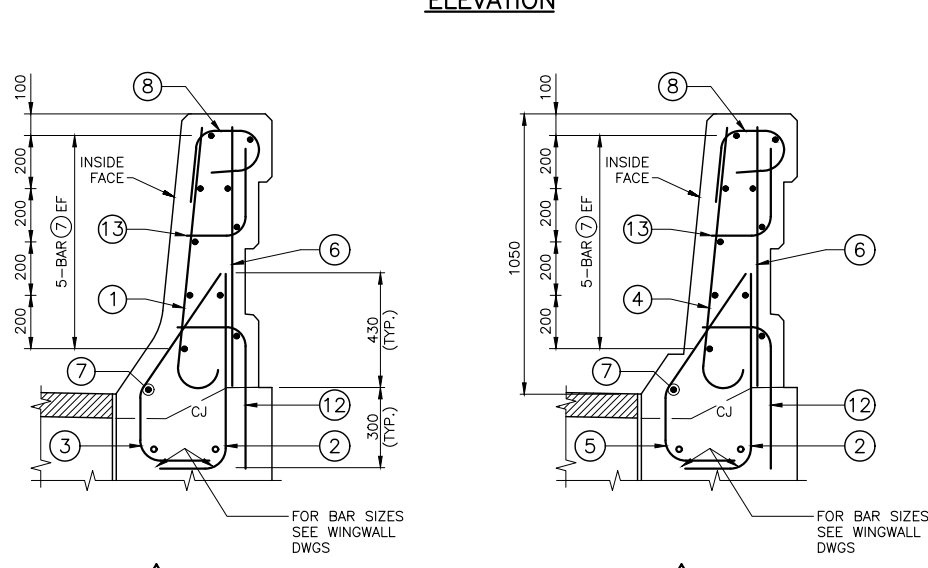
DILLON CONSULTING

A. V. KHAN  
1003647  
18 JAN 2019  
PROVINCE OF ONTARIO

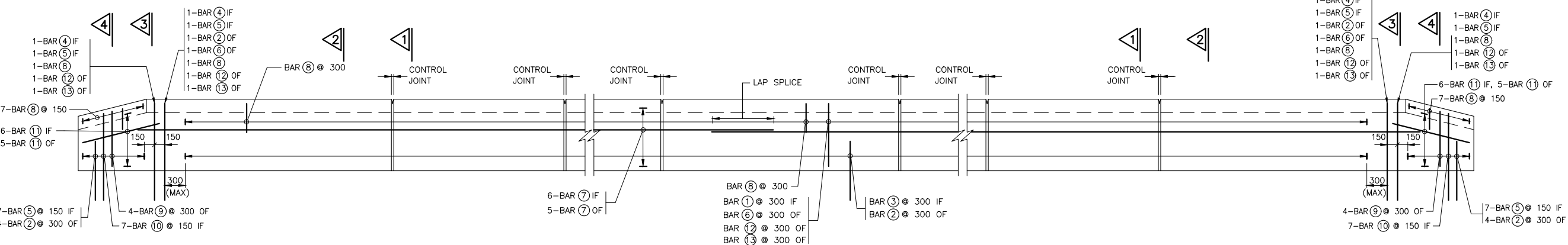
B.R. CRAIG  
1003647  
18 JAN 2019  
PROVINCE OF ONTARIO



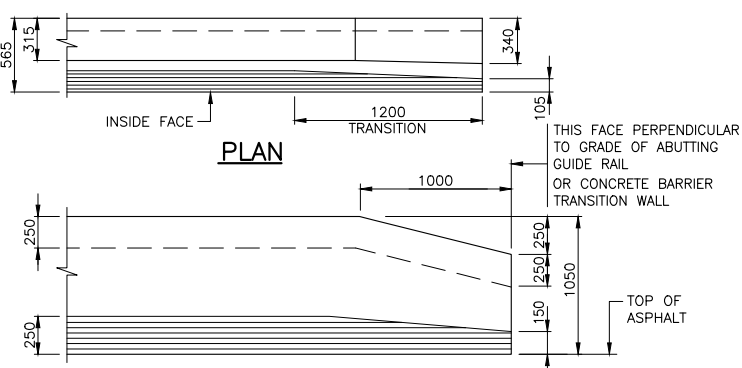
**1**  
BARRIER WALL ON DECK  
TYPICAL DIMENSIONS  
(FOR BAR NUMBERS SEE 2)



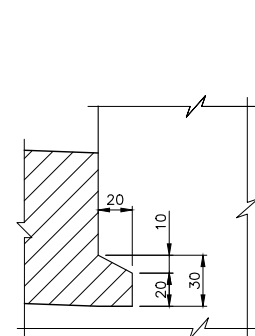
**3**  
BARRIER WALL ON WINGWALL  
TYPICAL REINFORCING



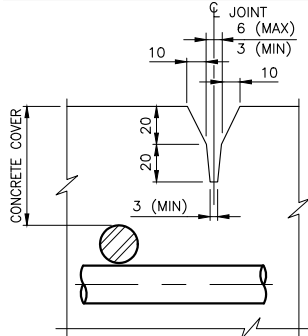
TYPICAL REINFORCING ARRANGEMENT



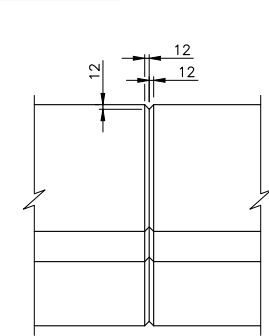
ELEVATION OF BARRIER WALL END TREATMENT



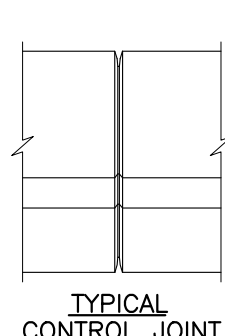
**A** CHASE DETAIL



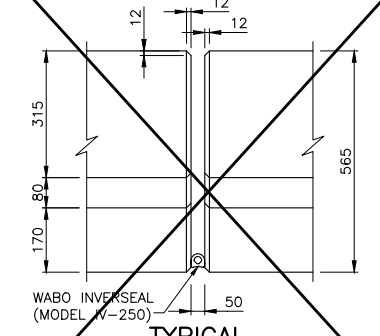
**B** CONTROL JOINT DETAIL



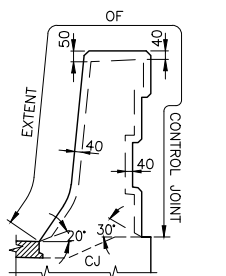
TYPICAL OPTIONAL  
CONSTRUCTION JOINT



TYPICAL  
CONTROL JOINT



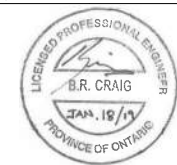
TYPICAL  
EXPANSION JOINT  
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



EXTENT OF  
CONTROL JOINT IN  
BARRIER WALL

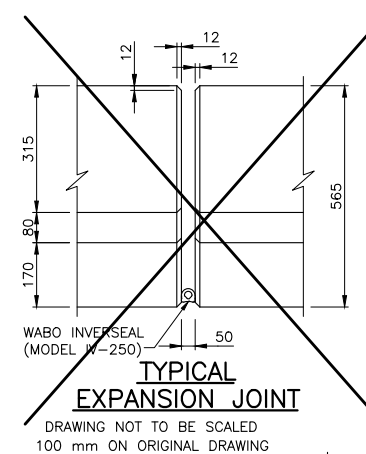
MODIFIED	
STANDARD DRAWING DECEMBER 2017	SS110-70
BARRIER WALL WITH ARCHITECTURAL FINISH TL-5 (STAINLESS STEEL REBAR)	

REVISIONS	DATE	BY	DESCRIPTION
1	18 JAN 2019	AWK	DESIGN
2	18 JAN 2019	CHK	CHK
3	18 JAN 2019	BRC	BRC
4	18 JAN 2019	CODE	CODE
5	18 JAN 2019	CSA-S6-14	CSA-S6-14
6	18 JAN 2019	LOAD	LOAD
7	18 JAN 2019	CL6250NT	CL6250NT
8	18 JAN 2019	DATE	DATE
9	18 JAN 2019	Jan-19	Jan-19
10	18 JAN 2019	DWG	DWG
11	18 JAN 2019	29	29



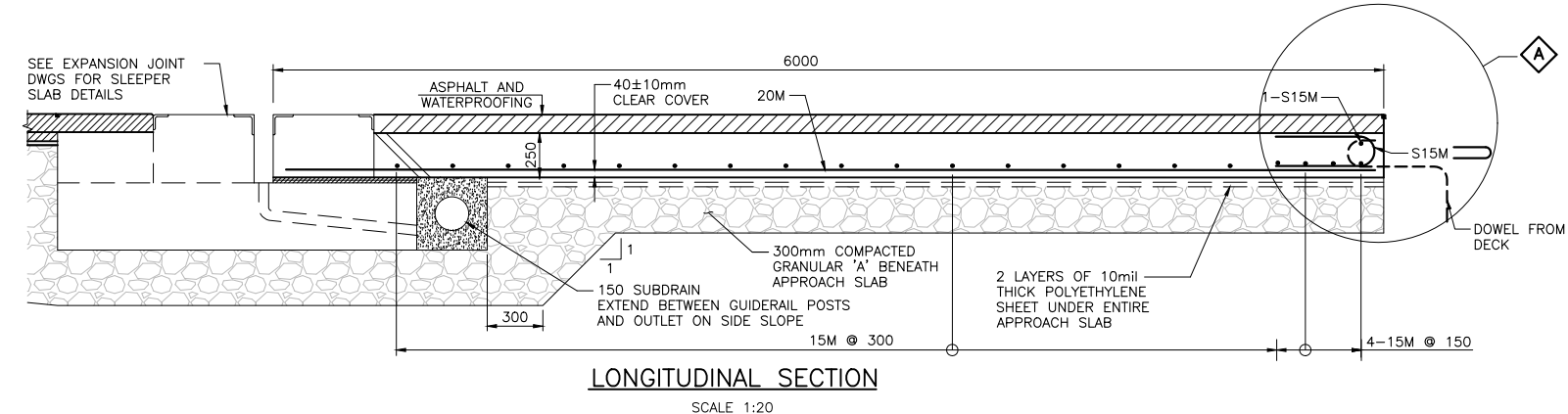
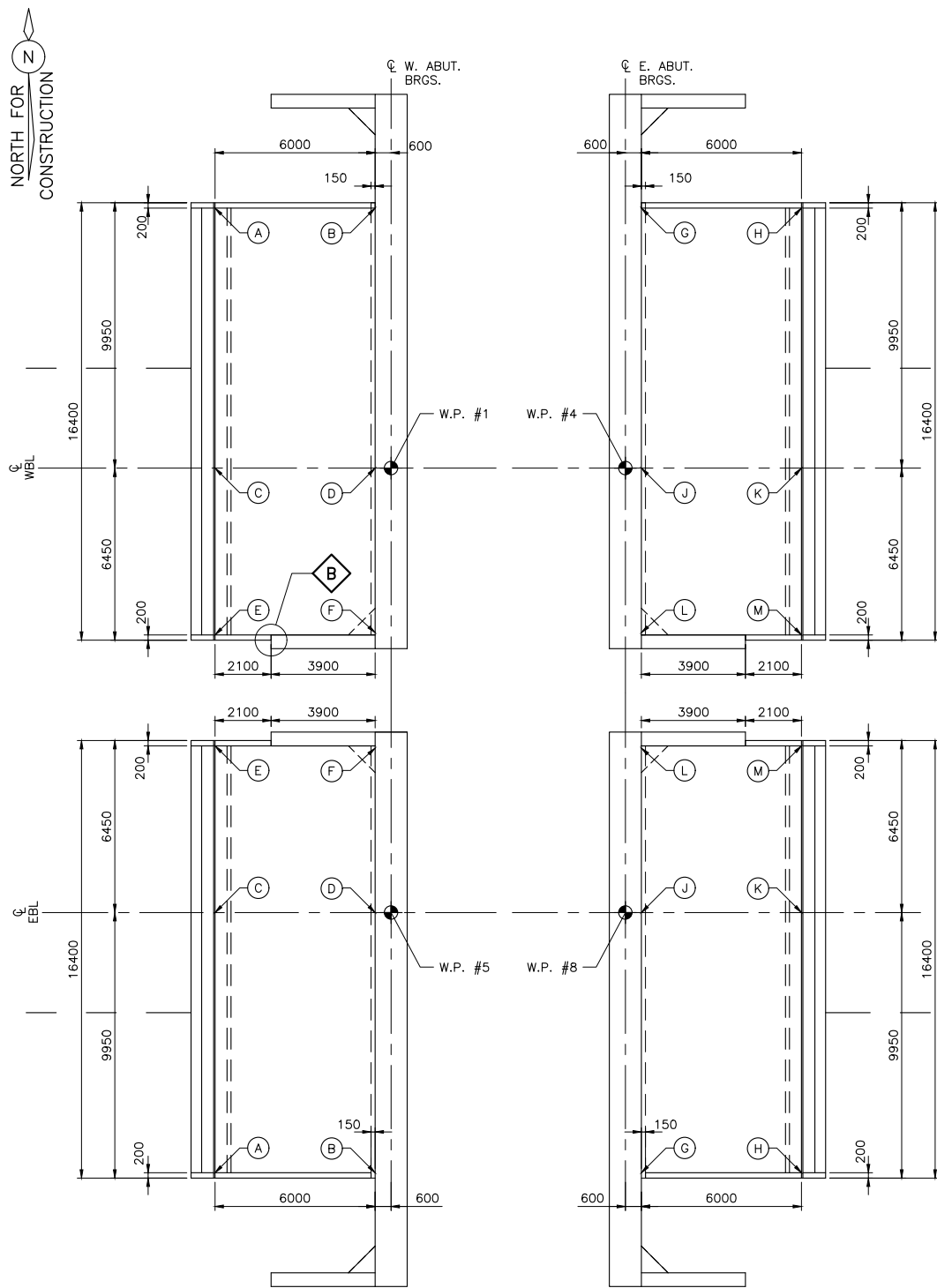
### EXTENT OF CONTROL JOINT IN BARRIER WALL

REVISIONS	.	.	.	.	.	.	.	.
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DATE	BY	DESCRIPTION						
DESIGN	AWK	CHK	BRC	CODE	CSA-56-14	LOAD	CL6250NT	DATE Jan-19
DRAWN	SJM	CHK	AWK	SITE	31-231.1/2		DWG	30

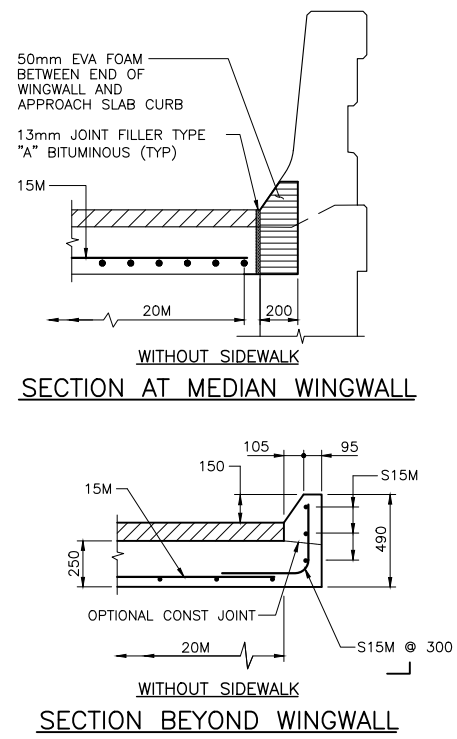




LAYOUT: 1  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515028\31-231-09-Approach Slab.dwg



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



HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

6000MM APPROACH SLAB

SHEET 228

**DILLON**  
CONSULTING

- NOTES:**
- CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
  - STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa. REINFORCING STEEL SHALL BE GRADE 400W.
  - WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD-3370.1000.
  - WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD 3370.1010.
  - BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
- APPLICABLE STANDARD DRAWINGS**
- OPSD-3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD-3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAT 2mm WIDE AND CONSTRUCTION JOINTS

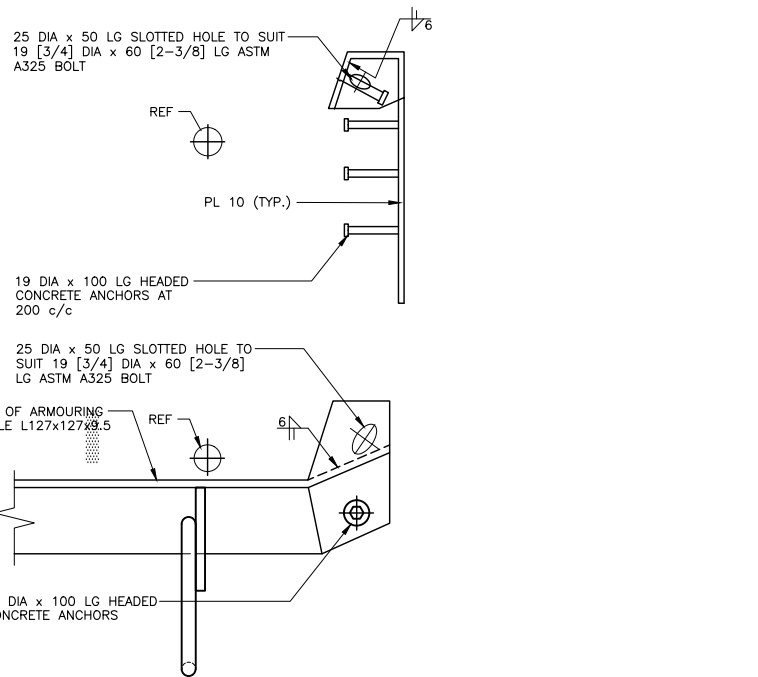
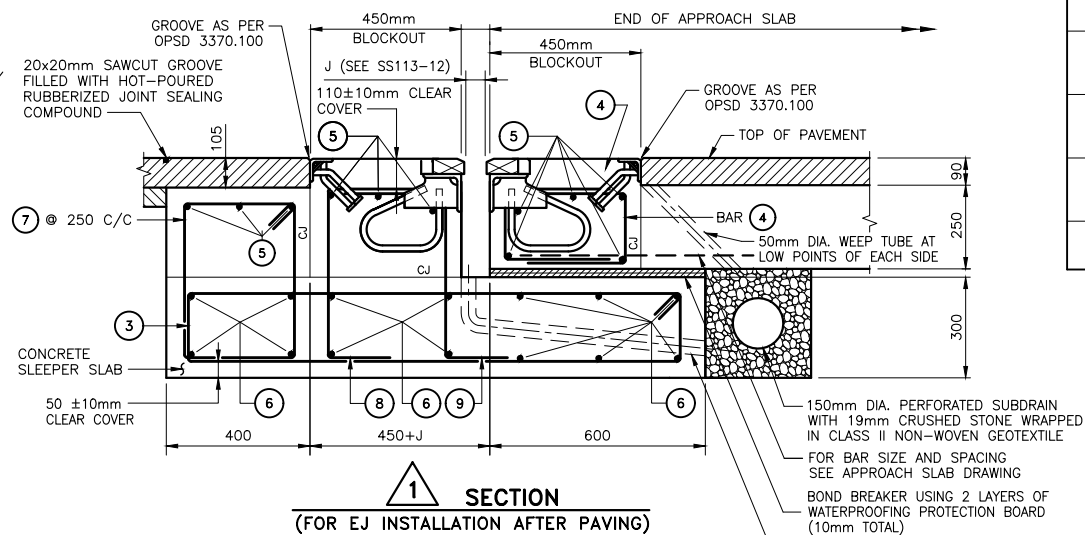
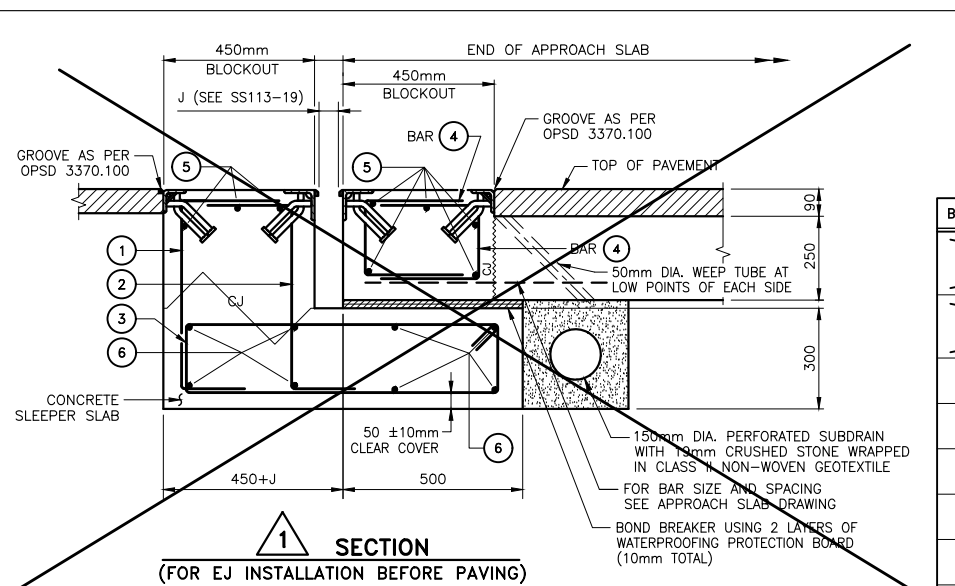
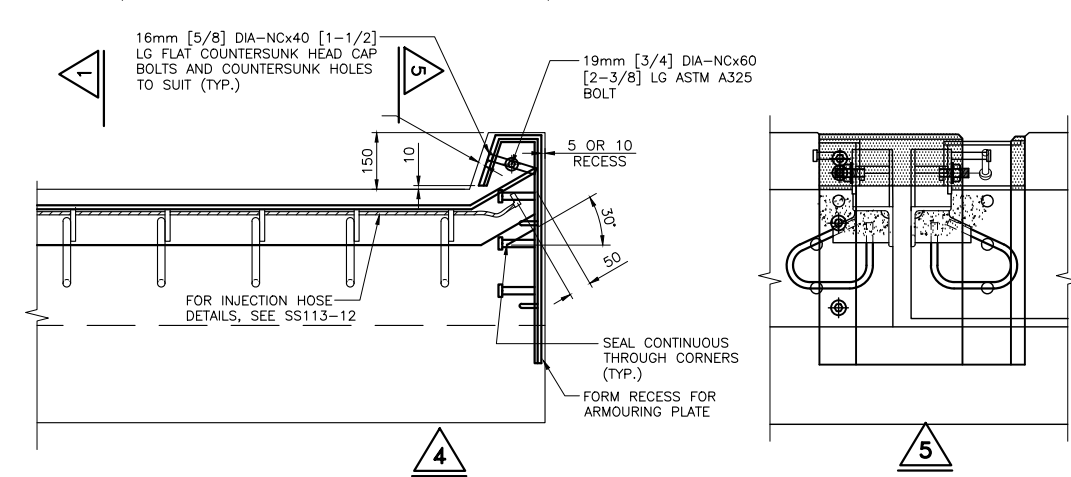
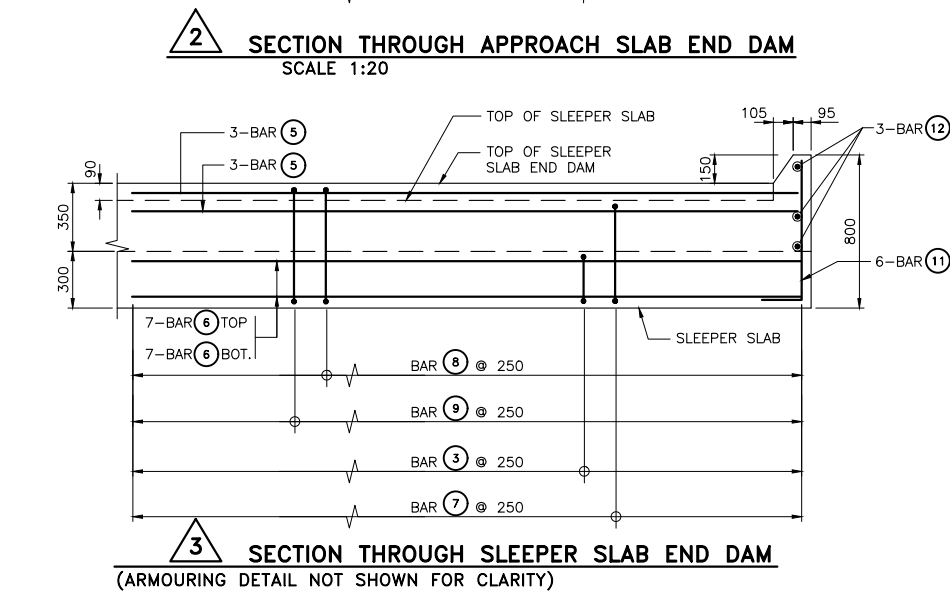
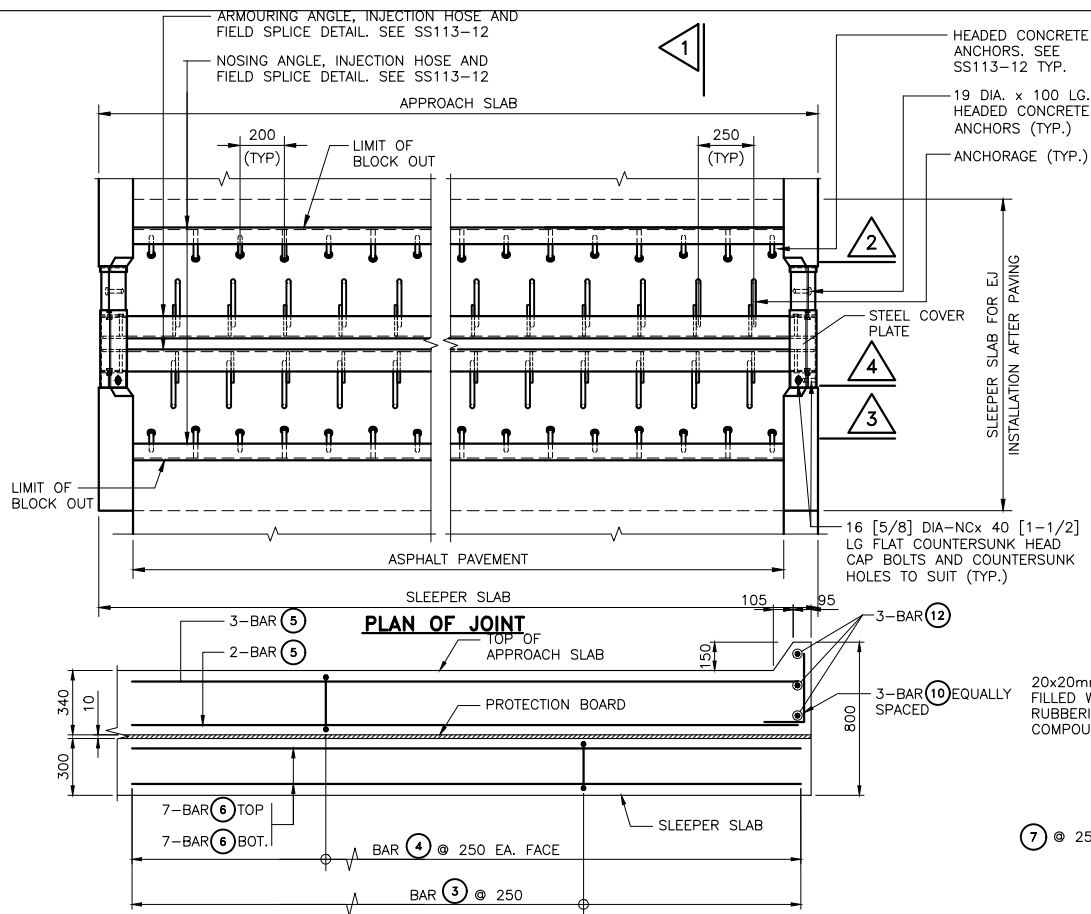
TOP OF CONCRETE ELEVATIONS								
	WEST APPROACH SLAB				EAST APPROACH SLAB			
WB STRUCTURE	A	50.514	B	50.496	G	50.290	H	50.272
	C	50.709	D	50.691	J	50.485	K	50.467
	E	50.584	F	50.566	L	50.360	M	50.342
EB STRUCTURE	A	50.514	B	50.496	G	50.290	H	50.272
	C	50.709	D	50.691	J	50.485	K	50.467
	E	50.584	F	50.566	L	50.360	M	50.342

**NOTE:** TOP OF CONCRETE ELEVATIONS PROVIDED AT THE EXPANSION JOINT/SLEEPER SLAB ARE THEORETICAL VALUES 90mm BELOW THE TOP OF THE CONCRETE END DAM

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116-1
6000 mm APPROACH SLAB	

REVISIONS	.	.	.					.	
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DATE		BY		DESCRIPTION					
DESIGN	AWK	CHK	BRC	CODE CSA-56-14		LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	JRH	SITE 31-231.1/2				DWG	31

LAYOUT: 1  
FILE NAME: c:\project\working\_directory\active\10bp\0515028\31-231-09-Expansion Joints.dwg



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

BAR MARK	SIZE	SHAPE
1	S15M	530 310 180
2	S15M	530 300 180
3	S15M	180
4	S15M	200 310
5	S15M	STRAIGHT
6	15M	STRAIGHT
7	S15M	260 440
8	S15M	310 490 180
9	S15M	300 490 180
10	S15M	180 350
11	S15M	180 670
12	S15M	STRAIGHT

**NOTES:**

- THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40mm.
- CLASS OF CONCRETE 30 MPa.
- REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
- COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-12.
- EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURES LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'A' STRIP SEAL EXPANSION JOINT.
- EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
- JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
  - FOR CONCRETE STRUCTURES - 48 HOURS
  - FOR STEEL STRUCTURES - 24 HOURS
- FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
- IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
- SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
- AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
- PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
- ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
- PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
- HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
- PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
- FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.
- ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.
- ALL CONSTRUCTIONS JOINTS (CJ) SURFACES SHALL BE INTENTIONALLY ROUGHENED BEFORE NEW CONCRETE IS PLACED AGAINST THEM.
- SEQUENCE OF EXPANSION JOINT INSTALLATION SHALL BE AS PER DRAWING SS113-38.

**LEGEND:**

[ ] DENOTES FASTENER SIZE IN INCHES  
CJ DENOTES CONSTRUCTION JOINT  
EJ DENOTES EXPANSION JOINT

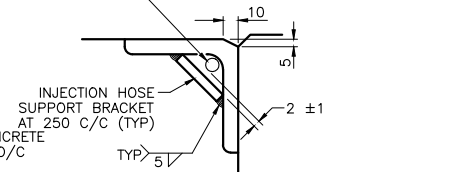
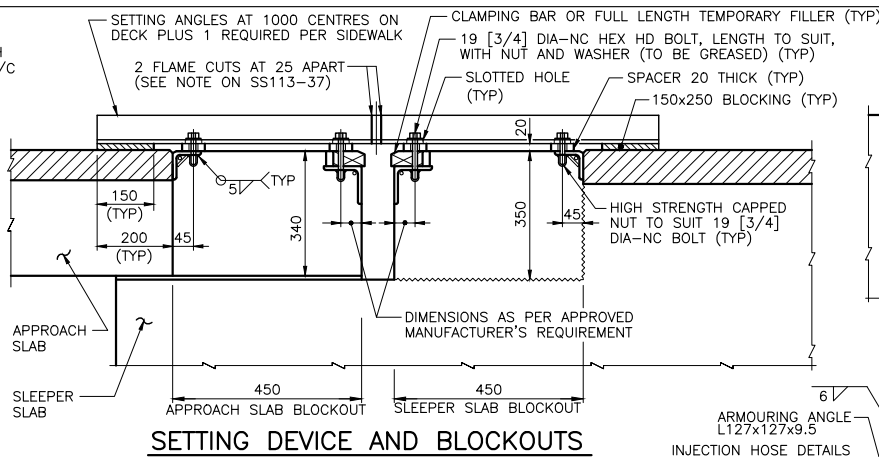
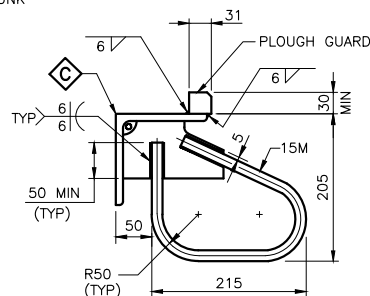
MODIFIED	
STANDARD DRAWING MAY 2017	SS113-37
EXPANSION JOINT AND SLEEPER SLAB (10mm<MOVEMENT≤40mm)	

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DATE		BY	DESCRIPTION	DATE	BY
DESIGN	AWK	CHK	BRC	CODE	CSA-S6-14	LOAD	CL6250NT
DRAWN	SJM	CHK	AWK	SITE	31-231.1/2	DWG	32

HWY 401	CONT No 2018-4008	4083-13-01 (WBL)	4084-13-01 (EBL)
RAISIN RIVER BRIDGE	EXPANSION JOINTS I	SHEET	229

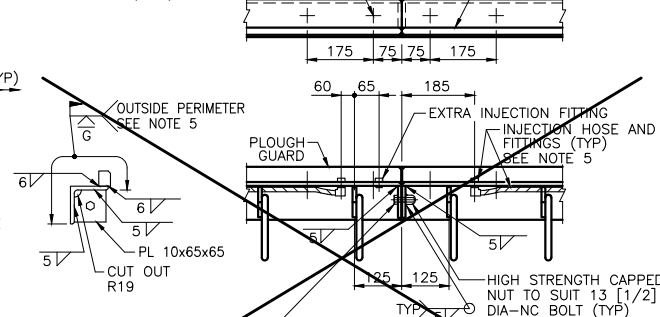


[illegible]

Technical drawing of a bolted connection for a door frame. The drawing shows a cross-section of a door frame assembly. A bolt is used to secure a nut at the bottom of the frame. The nut is 19mm (3/4") in diameter and is made of stainless steel (SUS 304). The bolt is 60mm in diameter and has a counterbore of 21mm. The frame has a chamfer of 5x5 and a seal profile. The drawing includes dimensions for the bolt, nut, and frame, as well as material specifications.

Labels and dimensions in the drawing:

- BOLT
- COUNTERBORE 21mm
- 60mm DIA x 16mm
- R (TYP)
- CHAMFER 5x5
- SEAL PROFILE
- L127x127x9.5
- 19mm (3/4")
- NUT AT 250 C
- (LENGTH TO SU)
- SILICON BASED
- Dimensions: 12, 30, 30, 12, 31, 6, 30 MIN, 6, 5



(TYP)

$\frac{G}{6}$

OUTSIDE PERIMETER  
SEE NOTE 5

95 40 135

EXTRA INJECTION FITTING

INJECTION HOSE AND FITTINGS (TYP)  
SEE NOTE 5

PL 10x65x65

CUT OUT R19

5' 5'

75 75

5' 5' (TYP)

13 [1/2] DIA-NC x 60 [2-3/8] LG  
HEX HD BOLT WITH WASHER (TYP)

HIGH STRENGTH CAPPE  
NUT TO SUIT 13 [1/2]  
DIA-NC BOLT (TYP)

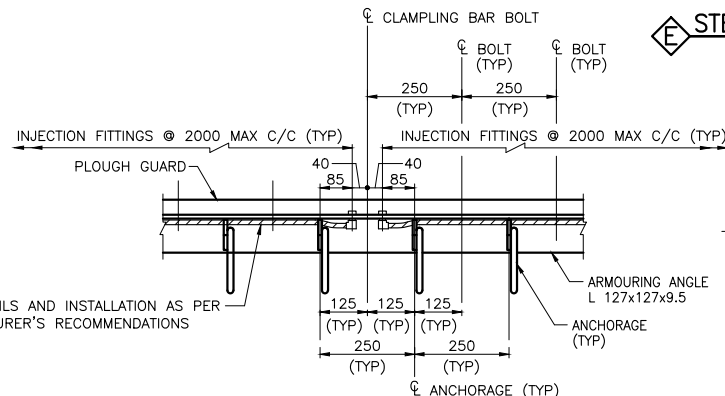
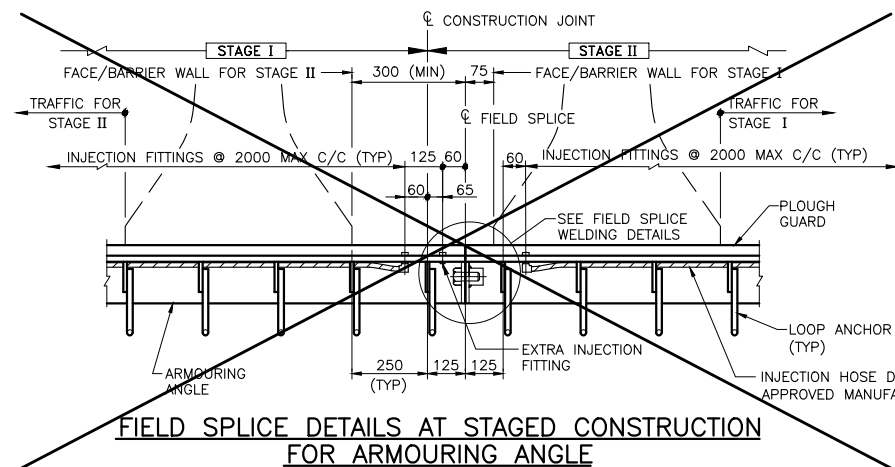
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

\* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINER OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

\*\*\* MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STEEL CLAMPING BAR, IS TAKEN FROM DSM 9.40.24, TYPE "A".

\*\*\* CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION.  
(MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)

1. STEEL CLAMPING BAR SEGMENTS SHALL BE 1.3m to 2.0m LONG. FOR STAGED EXPANSION JOINT CONSTRUCTION, STEEL CLAMPING BAR SHALL TERMINATE A MINIMUM OF 100mm FROM EXPOSED END OF STEEL ARMOURING. GAP BETWEEN ADJACENT CLAMPING BARS SHALL NOT EXCEED 3mm.
2. ALL CLAMPING BARS SHALL PREFERABLY BE ONE PIECE THROUGH ANY CHANGE IN DIRECTION, BUT AT CURB AND CURB-TO-SIDEWALK SLIDER PLATE THEY MAY BE OF MORE THAN ONE PIECE. EACH SUCH PIECE SHALL HAVE A MINIMUM OF 2 CLAMPING BOLTS.
3. FOR DETAILS OF REINFORCING IN EXPANSION JOINT BLOCKOUT, SEE APPROACH SLAB AND EXPANSION JOINTS I.
4. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75 mm OF EITHER SIDE OF FIELD SPLICES.
5. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-37.
7. LEGEND:  
[ ] - DENOTES FASTENER SIZE IN INCHES.



INJECTION FITTINGS @ 2000 MAX C/C (TYP)

NOSING ANGLE  
L 75x75x10

25 MAX CLEAR  
BETWEEN FITTINGS  
(TYP)

200 C/C  
(TYP)

HEADED CONCRETE ANCHORS (TYP)

INJECTION HOSE  
SUPPORT BRACKET (TYP)

INSTALLATION AS PER  
RECOMMENDATIONS

13 [HE

STAGE I

STAGE II

CONSTRUCTION JOINT

FACE/BARRIER WALL FOR STAGE II

300 (MIN)

75

FACE/BARRIER WALL FOR STAGE I

TRAFFIC FOR STAGE II

TRAFFIC FOR STAGE I

FIELD SPICE

INJECTION FITTINGS @ 2000 MAX C/C (TYP)

250 C/C (TYP)

35

60

40

SEE FIELD SPICE WELDING DETAILS

NOSING ANGLE

PL 10x65x65

STUD ANCHORS (TYP)

200 (TYP)

75

75

EXTRA INJECTION FITTING

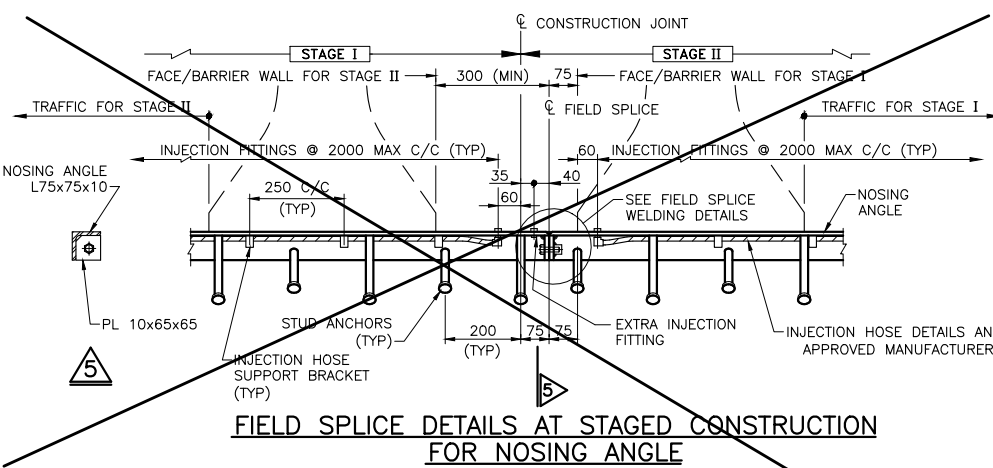
INJECTION HOSE DETAILS AND APPROVED MANUFACTURER

NOSING ANGLE L75x75x10

5

5

**FIELD SPICE DETAILS AT STAGED CONSTRUCTION FOR NOSING ANGLE**



STANDARD DRAWING APRIL 2016	SS113-12
STRIP SEAL EXPANSION JOINT - TYPE "A" DETAILS	

[illegible]



LAYOUT: 3  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515028\31-231-09-Expansion Joints.dwg

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

HWY 401  
CONT No 2018-4008  
WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)



RAISIN RIVER BRIDGE

SHEET

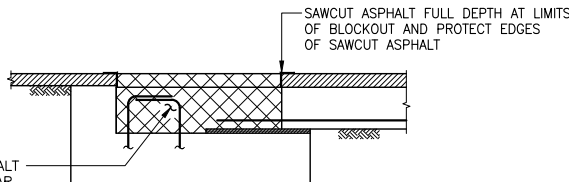
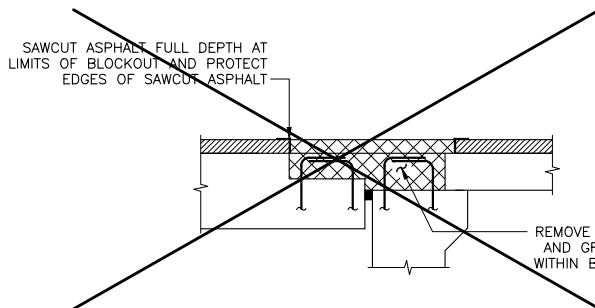
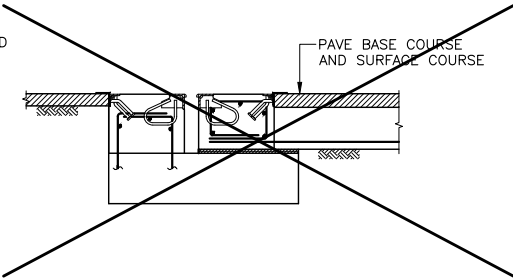
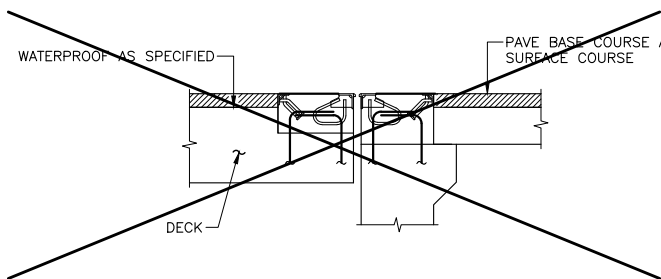
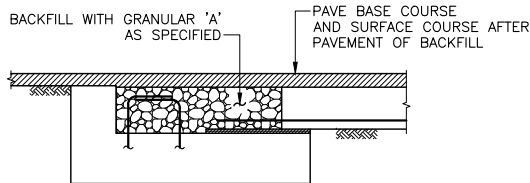
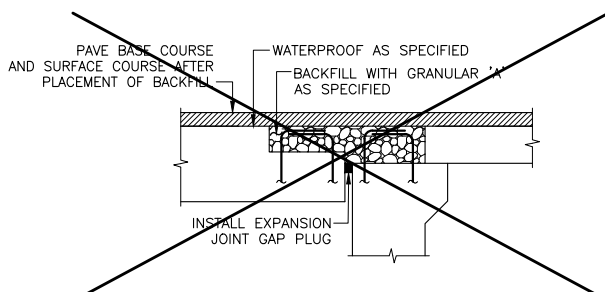
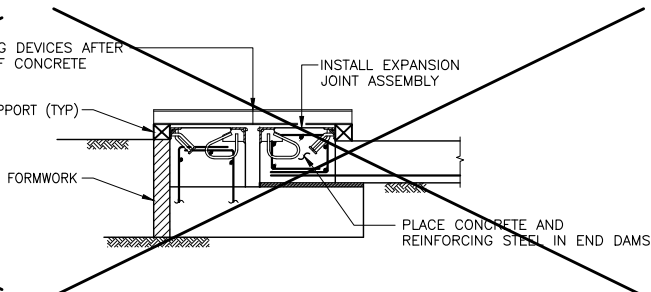
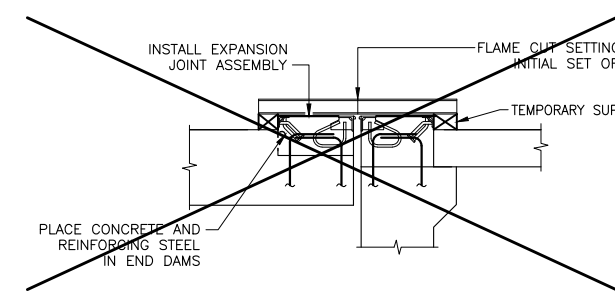
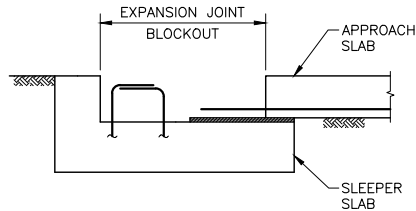
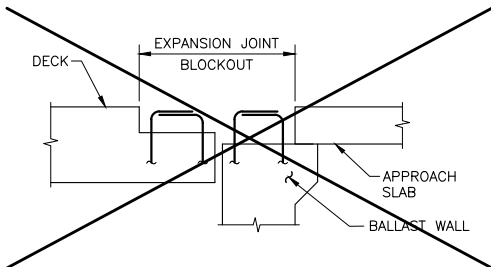
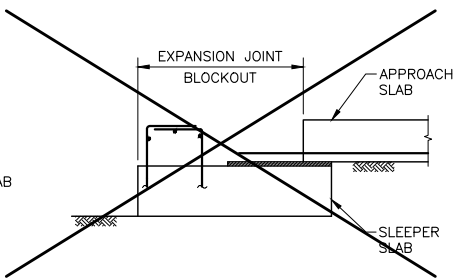
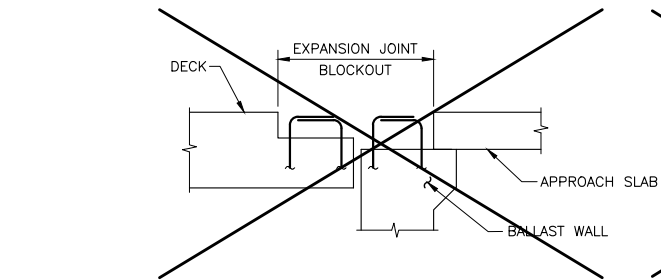
EXPANSION JOINTS III

231



NOTES:

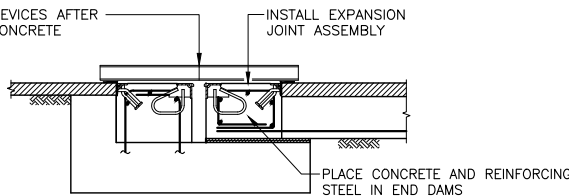
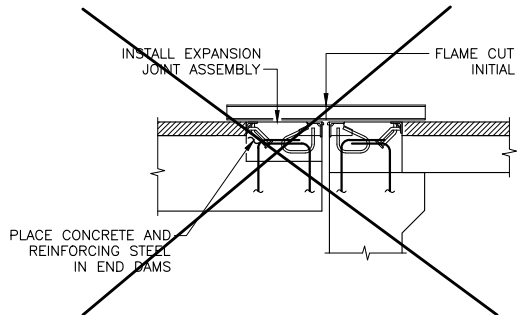
1. THE PURPOSE OF THIS DRAWING IS TO SHOW SCHEMATICALLY THE EXPANSION JOINT CONSTRUCTION SEQUENCE.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE EXPANSION JOINT DRAWINGS AND SPECIFICATIONS.
3. REINFORCING STEEL AND JOINT HARDWARE SHOWN ARE SCHEMATIC ONLY AND ARE AS SPECIFIED ELSEWHERE.
4. CONTRACTOR SHALL ENSURE THAT ALL REINFORCEMENT IN THE BLOCKOUT IS NOT DAMAGED.



AT BRIDGE DECK

AT SLEEPER SLAB

INSTALLATION BEFORE PAVING



AT BRIDGE DECK

AT SLEEPER SLAB

INSTALLATION AFTER PAVING

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

STANDARD DRAWING MAY 2018	SS113-38
SEQUENCE OF EXPANSION JOINT INSTALLATION	

REVISIONS	DATE		BY		DESCRIPTION	
	DATE	BY	DATE	BY	DESCRIPTION	
DESIGN	AWK	CHK	BRC	CODE	CL625ONT	LOAD CL625ONT
DRAWN	SJM	CHK	AWK	SITE	31-231.1/2	DWG 34



75 ± 15

75 ± 15

PIN A

PIN B

225 ± 15

75 ± 15

PIN A



WITHOUT SIDEWALK

SIDEWALK

LOCATION AT END OF WINGWALLS

TYPICAL CROSS-SECTIONS

LOCATION OF PINS ON PARAPET WALL

HWY 401 CONT No 2018-4008 WP No 4083-13-01 (WBL) 4084-13-01 (EBL)		
RAISIN RIVER BRIDGE AS CONSTRUCTED ELEVATIONS AND DIMENSIONS		SHEET 232
		

POINTS

OR

'X'

EXPANSION JOINT

150  $\pm$ 15 FROM EXPANSION JOINT ASSEMBLY OUTER LIMITS

1000 SEE NOTES

FACE OF SIDEWALK OR BARRIER WALL

EXPANSION JOINT ASSEMBLY OUTER LIMITS

'Y' EXPANSION JOINT GAP MEASUREMENT

STAINLESS STEEL PINS TO BE SET BY CONTRACTOR

ELEVATION

TOP OF CONCRETE

EXPANSION JOINT GAP MEASUREMENT AT INSTALLATION

INSTALLATION TEMPERATURE AT \_\_\_\_\_ °C

5 mm REF

15°

**A**

**B**

**SCHMATIC PLAN**

DETAILS AT EXPANSION JOINT SHOWING LOCATION OF PIN RELATIVE TO BRIDGE EXPANSION JOINT

LOCATION AT END OF WINGWALLS

TYPICAL CROSS-SECTIONS

WITHOUT SIDEWALK

SIDEWALK

LOCATION OF PINS ON BARRIER WALL

**NOTES:**

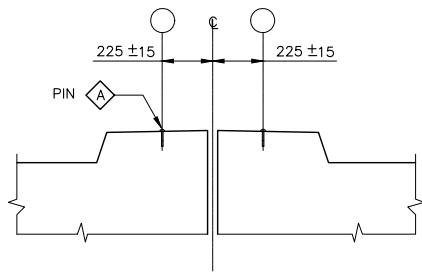
1. EXPANSION JOINT GAP DIMENSION 'Y' AND INSTALLATION TEMPERATURE ARE TO BE RECORDED AT THE TIME OF INSTALLATION OF JOINT.
2. HIGH AND LOW TEMPERATURES, DIMENSIONS 'X' AND 'Y' AND TEMPERATURES FOR THE PRECEDING 2 DAYS ARE TO BE RECORDED AT THE TIME PINS ARE INSTALLED IN CURB OR BARRIER/PARAPET WALL. PINS SHALL BE INSTALLED BEFORE CONCRETE HAS SET.
3. AS CONSTRUCTED ELEVATIONS (TIED TO PERMANENT REF GBM) AND DIMENSIONS AT EXPANSION JOINT GAPS TO BE TAKEN BY OWNER AND RECORDED ON THIS DRAWING IMMEDIATELY BEFORE OPENING BRIDGE TO TRAFFIC.
4. FURTHER READINGS TO BE TAKEN AS REQUESTED.
5. JOINT GAP 'Y' TO BE MEASURED AT A POINT 1000 mm FROM SIDEWALK FACE OR BARRIER/PARAPET WALL FACE AT DECK LEVEL.
6. STAINLESS STEEL PINS TO BE M10 x 80mm LONG CARRIAGE BOLT TYPE SUPPLIED BY CONTRACTOR.
7. PINS TO BE PLACED AT EACH SIDE OF EXPANSION JOINTS, AT CENTRE LINE OF SPAN, AT CENTRE LINE OF SUPPORTS AND AT END OF WINGWALLS ALONG EACH SIDE OF BRIDGE.

[illegible]

\* TAKEN IMMEDIATELY BEFORE OPENING BRIDGE TO TRAFFIC

[illegible]

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



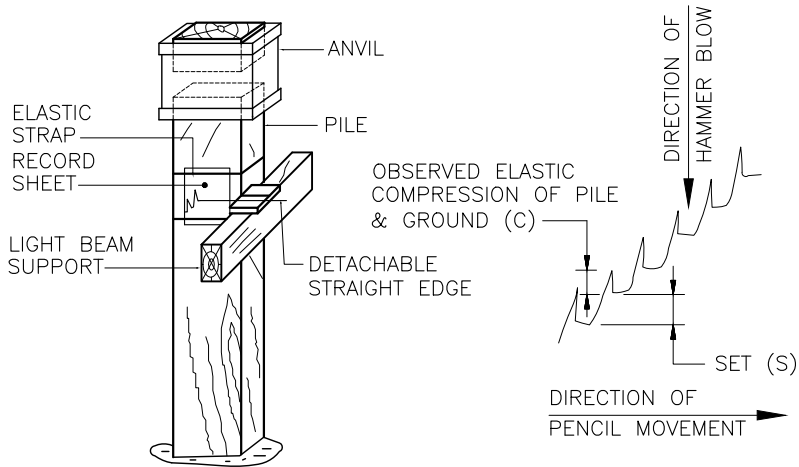
### LOCATION OF PINS ON MEDIAN

SITE No: 31-231.1 AND 31-231.2	
STANDARD DRAWING JUNE 2002	SS116-40
AS CONSTRUCTED ELEV. & DIM'N	

REVISIONS	.	.	.	.	.	.
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DATE	BY	DESCRIPTION				
DESIGN		CHK	CODE	CSA-S6-14	LOAD	DATE Jan-19
DRAWN	SJM	CHK	SITE	31-231.1/2		DWG 35

LAYOUT: AS CONSTRUCTED ELEVATIONS AND DIMENSIONS  
FILE NAME: c:\projectwise\working directory\active\10\bp\d0515028\31-231-09-Standards.dwg

LAYOUT: PILE CONTROL  
FILE NAME: c:\projectwise\working\_directory\active\10bp\00515028\31-231-09-standards.dwg



### FIELD MEASUREMENT TECHNIQUE DURING PILE DRIVING

HAMMERS*		
TYPE	MASS OF RAM W (Kilograms)	RATED ENERGY E (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  
\* See General Notes 5) and 6).

### METHOD OF APPLYING THE HILEY FORMULA

The Hiley Formula for:

(a) Double-acting, differential-acting Steam and Diesel Hammers,

$$R = \frac{n e_f E}{S + C/2} \quad \begin{array}{l} e_f = 0.6 \text{ to } 0.8 \text{ for steam hammers} \\ e_f = 1.0 \text{ for diesel hammers} \end{array}$$

(b) Drop Hammers and single-acting Steam Hammers,

$$R = \frac{n e_f WgH}{S + C/2} \quad \begin{array}{l} e_f = 0.75 \text{ for drop hammers} \\ H = \text{height of free fall of mass in metres} \end{array}$$

Where  $R$  = Ultimate pile resistance in kilonewtons  
 $S$  = Measured penetration of pile per hammer blow in millimetres  
 $C$  = Measured rebound of pile per hammer blow in millimetres  
 $E$  = Rated Energy of hammer blow in joules  
 $e_f$  = efficiency based on manufacturer's gross rated energy (typ. 0.6 to 0.8)  
 $n$  = efficiency of blow  
 $e$  = coefficient of restitution  
 $g$  = 9.80665 m/s<sup>2</sup>  
 $n = \frac{W + Pe^2}{W + P}$   
where  $e$  = 0.32 for steel (or  $e$  = 0.55. See Note 1 below.)  
= 0.25 for timber  
 $P$  = Mass of pile + anvil or helmet in kilograms (See Note 2 below)  
 $W$  = Mass of ram (piston) in kilograms

#### NOTE 1:

It is assumed that piles are driven with a pile cushion. Where Steel H-Piles are driven without a cushion, the ultimate pile capacity  $R$  should be calculated assuming a coefficient of Restitution  $e$  = 0.55.

#### NOTE 2:

Assume mass of anvil = 600 kg unless otherwise noted.

#### NOTE 3:

The resulting Ultimate Pile Resistance,  $R$ , as calculated by Hiley Formula must exceed the Ultimate Geotechnical Resistance given in the Pile Driving Notes on the Contract Drawings.

#### EXAMPLE FOR DIESEL HAMMERS

Given: Pile HP 310x110, length = 50m  
Mass of anvil = 600 kg  
Pile driven without a cushion  
Hammer is Delmag D22-13  
From the Pile Driving Notes on the Contract Drawings,  
Ultimate Geotechnical Resistance = 3000 kN

Observations: measured penetration =  $S$  = 5mm  
measured rebound =  $C$  = 10mm

#### Hiley Formula Calculations

$$P = 50(110) + 600 = 6100 \text{ kg}$$
$$W = 2200 \text{ kg} \quad e = 0.55$$

$$n = \frac{W + Pe^2}{W + P} = \frac{2200 + 6100 (0.55)^2}{2200 + 6100} = 0.49$$

$$E = 67,000 \text{ Joules/blow}$$

$$R = \frac{n e_f E}{S + C/2} = \frac{0.49 (1.0) (67,000)}{5 + (10/2)} = \underline{3283 \text{ kN}} > 3000 \text{ kN} \quad \text{O.K.}$$

## METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401

CONT No 2018-4008

WP No 4083-13-01 (WBL)  
4084-13-01 (EBL)

RAISIN RIVER BRIDGE

PILE DRIVING CONTROL

SHEET

233



#### NOTES:

1. THIS STANDARD DRAWING IS FOR THE CONTROL OF PILE INSTALLATIONS BY VALIDATING DESIGN ASSUMPTIONS.
2. THE HILEY FORMULA SHALL BE USED TO CONFIRM PILE RESISTANCE FOR FRICTION-TYPE PILES IN NON-COHESIVE SOILS. FOR USE IN COHESIVE SOILS, THE GEOTECHNICAL ENGINEER WILL HAVE TO BE CONSULTED.
3. DURING PILE DRIVING, THE HAMMER HAS TO REBOUND ENOUGH TO MAINTAIN ITS ENERGY PER BLOW. ACCORDINGLY, THE SOIL MUST PROVIDE SUFFICIENT REBOUND FOR THE HILEY FORMULA TO BE EFFECTIVE.
4. IF THE ULTIMATE PILE RESISTANCE, AS CALCULATED BY THE HILEY FORMULA, IS NOT REACHED WHEN REFERENCED TO A PRESCRIBED PILE TIP ELEVATION OR RANGE OF ELEVATIONS, THE ADVICE AND RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER SHALL BE SOUGHT.
5. THE CONTRACTOR SHALL SUBMIT THE PERTINENT HAMMER PROPERTIES, AS REQUIRED BY OPSS 903.
6. THE TABLE OF HAMMERS GIVEN ON THIS STANDARD DRAWING CAN BE USED FOR COMPARING THE SUBMITTED HAMMER PROPERTIES. IT IS APPROXIMATE AND MAY NOT INCLUDE ALL HAMMERS. THE CONTRACTOR SHALL CONTACT THE MANUFACTURER FOR RATED AND ACTUAL HAMMER ENERGIES.
7. WHEN APPLYING THE HILEY FORMULA, THE HAMMER SHALL BE OPERATED AT FULL CAPACITY.

STANDARD DRAWING  
APRIL 2008

SS103-11

PILE DRIVING CONTROL

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

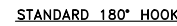
REVISIONS	DATE	BY	DESCRIPTION			
	DATE	BY	DESIGN	CHK	CODE	DATE
			AWK	CHK	BRC	CSA-S6-14
			LOAD	CL6250MT	DATE	Jan-19
			DRAWN	SJM	CHK	AWK
			SITE	31-231.1/2	DWG	36

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN



SHEET

234



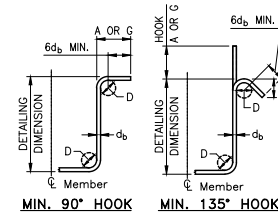
BAR SIZE	STEEL GRADE	
	400R <sup>(2)</sup>	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 <sup>(1)</sup>	400
55M	600 <sup>(1)</sup>	550

### STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A O R G (mm)		A O R G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
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

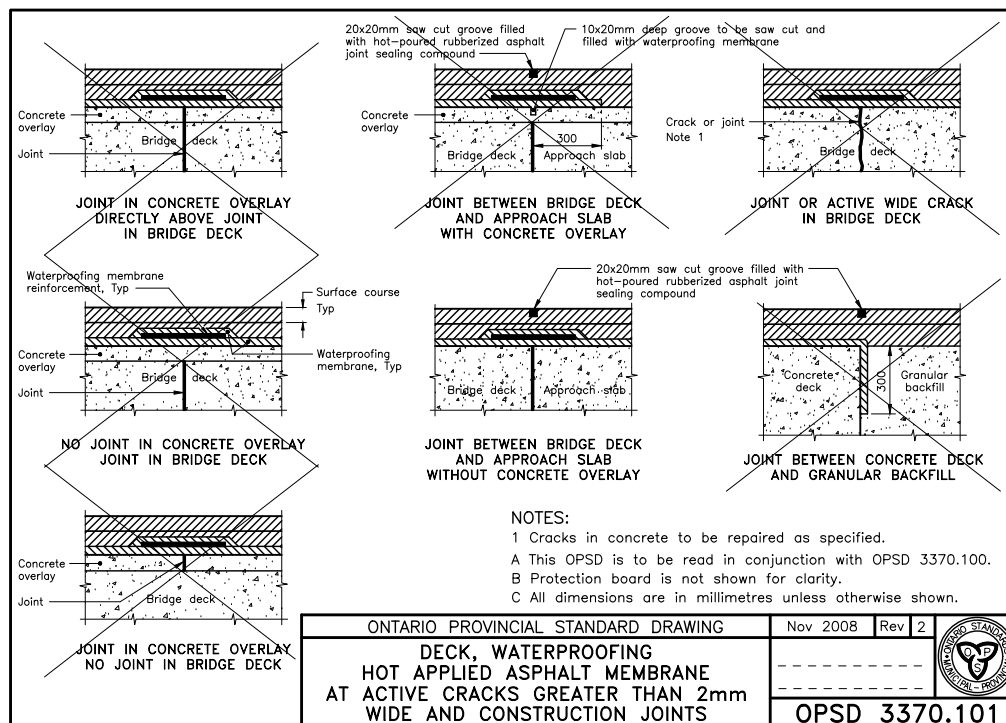
BAR SIZE	BAR DIAM. d <sub>B</sub> (mm)	PIN DIAM. D(mm)	90°	135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	80	180	175	115
25M	25.2	100	230		



MIN. 90° HOOK      MIN. 135° HOOK

Date	Sept. 2016	Rev	
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SS12-1



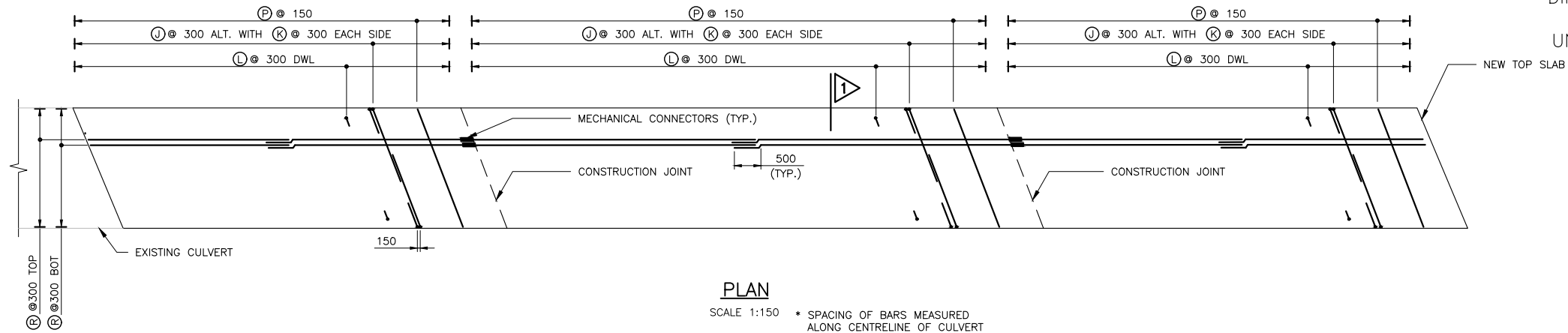
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS	.	.					.
	.	.					.
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	DATE	BY	DESCRIPTION				
DESIGN	AWK	CHK BRC	CODE CSA-S6-14	LOAD CL6250NT	DATE	Jan-19	
DRAWN	SJM	CHK AWK	SITE 31-231.1/2	DWG 37			



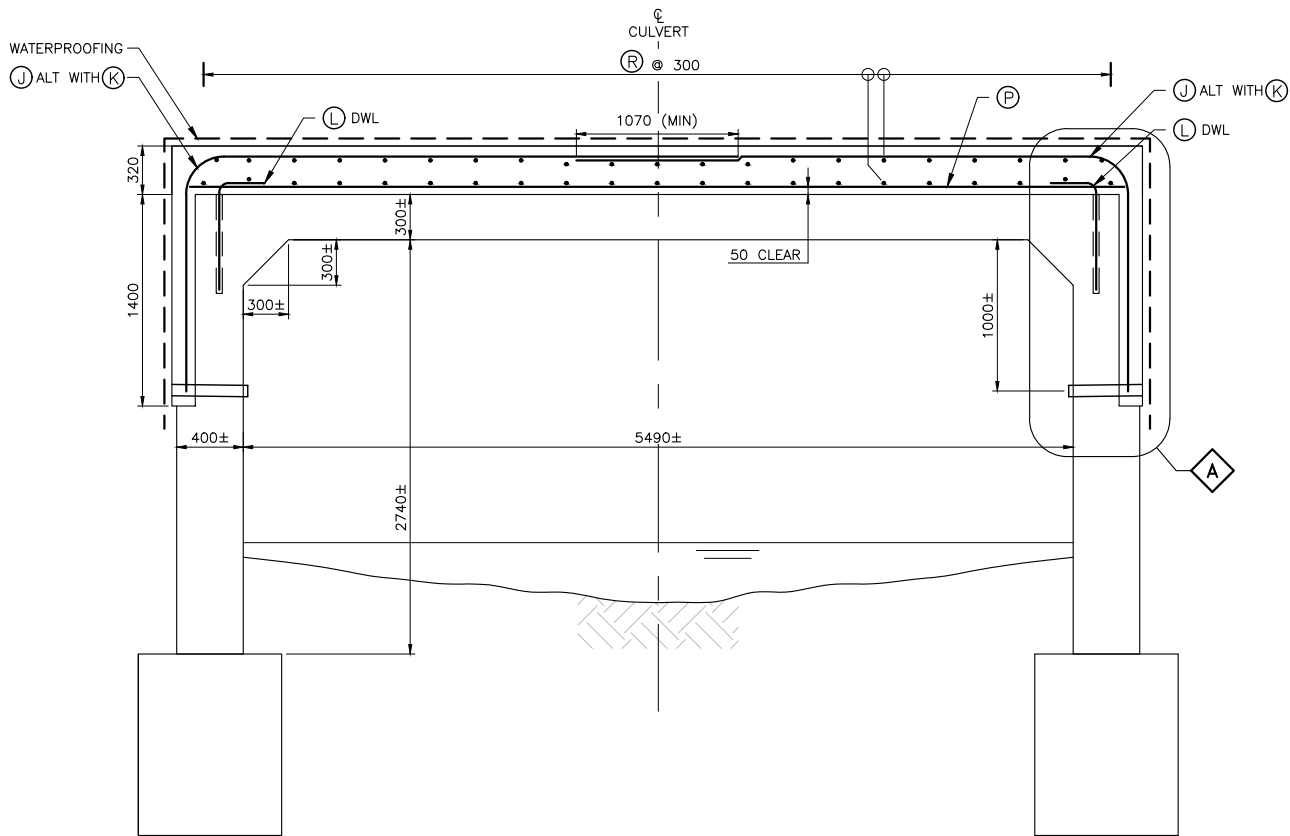


LAYOUT: TYPICAL DETAILS  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0571023\31-260C-09-GA.dwg

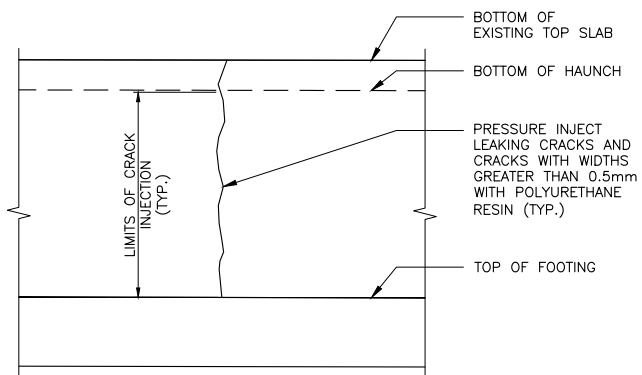


PLAN

SCALE 1:150 \* SPACING OF BARS MEASURED ALONG CENTRELINE OF CULVERT

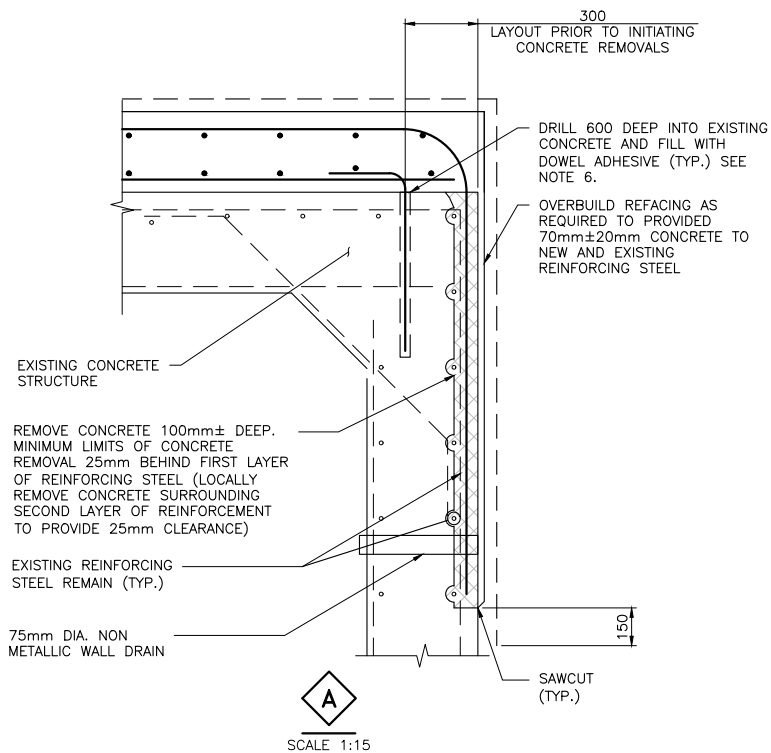


SCALE 1:25

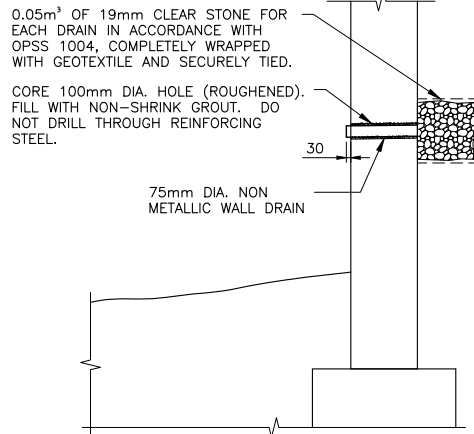


DETAIL OF WALL CRACK INJECTION

SCALE 1:50



SCALE 1:15



WALL DRAIN RETROFIT

SCALE N.T.S.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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

HWY 401  
CONT No 2018-4008  
WP No 4138-11-01



FINNEY CREEK CULVERT  
TYPICAL DETAILS I

SHEET  
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GENERAL NOTES

- SAWCUTS SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.
- ALL CONCRETE SURFACES TO BE ABRASIVE BLAST CLEANED BEFORE CASTING NEW CONCRETE.
- ABRASIVE BLAST CLEAN ALL REINFORCING STEEL THAT IS TO BE RETAINED.
- IN ADDITION TO THE REMOVAL OF DETERIORATED CONCRETE SOUND CONCRETE REMOVALS MAY BE REQUIRED TO ACHIEVE DEPTH AND SURFACE AREA MINIMUMS, AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
- IF DETERIORATED CONCRETE EXTENDS BEYOND THE SPECIFIED DEPTH OF REMOVAL THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR PRIOR TO PROCEEDING WITH FURTHER REMOVAL.
- HOLE SIZE AND INSTALLATION OF DOWELS SHALL BE IN ACCORDANCE WITH DOWEL ADHESIVE MANUFACTURER'S RECOMMENDATIONS

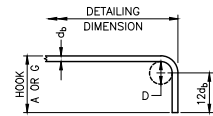
WALL DRAIN NOTES

- GEOTEXTILE SHALL BE NON-WOVEN, CLASS II, WITH A FOS OF 125-250  $\mu$ m.

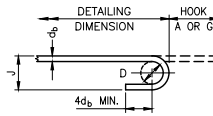
MARK	BAR SIZE	C/C	DETAILS	REMARKS
J	25M	300		J BARS ALTERNATE WITH K BARS
K	25M	300		K BARS ALTERNATE WITH J BARS
L	15M	300		DOWEL
P	25M	150	STRAIGHT	BOTTOM OF TOP SLAB
R	15M	300	STRAIGHT	LONGITUDINAL MIN. LAP SPLICE = 500

NOTES: - ALL DIMENSIONS SHOWN TO CENTRE LINE OF BAR  
- \* REPRESENTS VERTICAL DIMENSION

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	BRC	CHK MJH	CODE CSA-S6-14
DRAWN	JAA	CHK JRH	SITE 31-260/C
LOAD	CL6250N	DATE	Jan-19
DWG	R2-2		



### STANDARD 90° HOOK



### STANDARD 180° HOOK

BAR SIZE	STEEL GRADE	
	400R <sup>(2)</sup>	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 <sup>(1)</sup>	400
55M	600 <sup>(1)</sup>	550

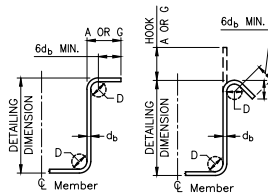
(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.

(2) For stainless steel, with  $F_y = 500$ ,  
use the same  $D$  as for 400R.

STANDARD HOOK DIMENSIONS						
BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)	J (mm)		
	400R	400W	400R	400W	400R	400W
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	280
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC-2014.

BAR SIZE	BAR DIAM. d <sub>b</sub> (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	25.2	100	230		

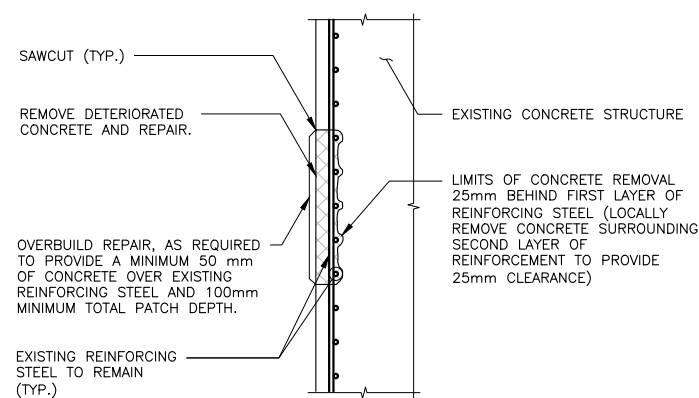


MIN. 90° HOOK      MIN. 135° HOOK

Date	Sept. 2016	Rev	
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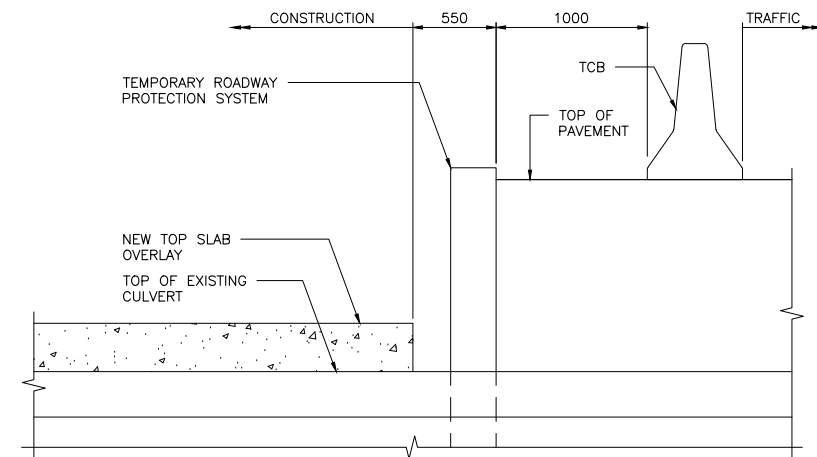
## HOOK DIMENSIONS FOR REINFORCING STEEL BARS

SS12-1

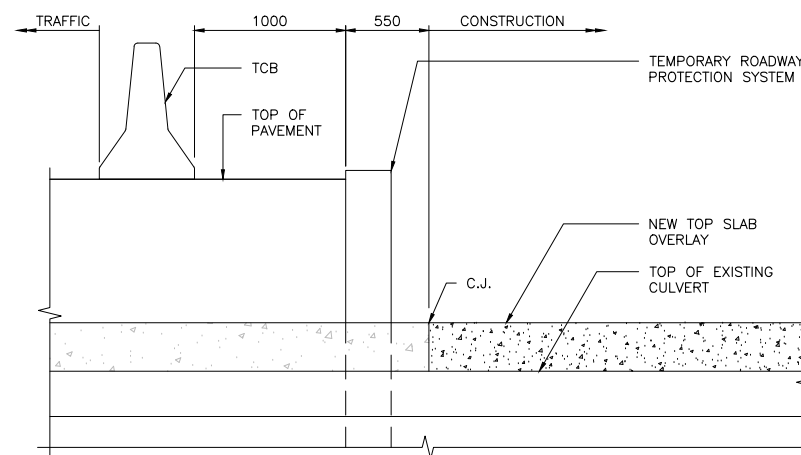


TYPICAL INTERIOR CULVERT WALL  
REPAIR DETAIL

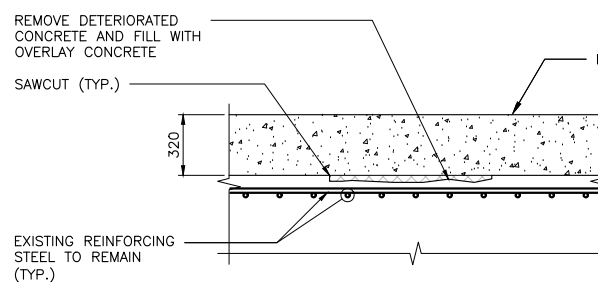
SCALE: NTS



 DWG R2-1  
SCALE 1:25  
STAGE S1



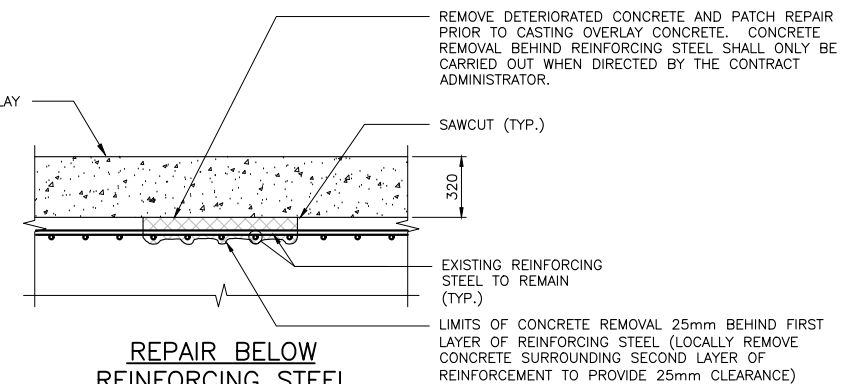
 DWG R2-1  
SCALE 1:25  
STAGE S2



REPAIR ABOVE  
REINFORCING STEEL

### TYPICAL CULVERT TOP SLAB REPAIR DETAIL

SCALE: NTS



REPAIR BELOW  
REINFORCING STEEL

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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

HWY 401  
CONT No 2018-4008  
WP No 4138-11-01

FINNEY CREEK CULVERT

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TYPICAL DETAILS II

SHEET  
237

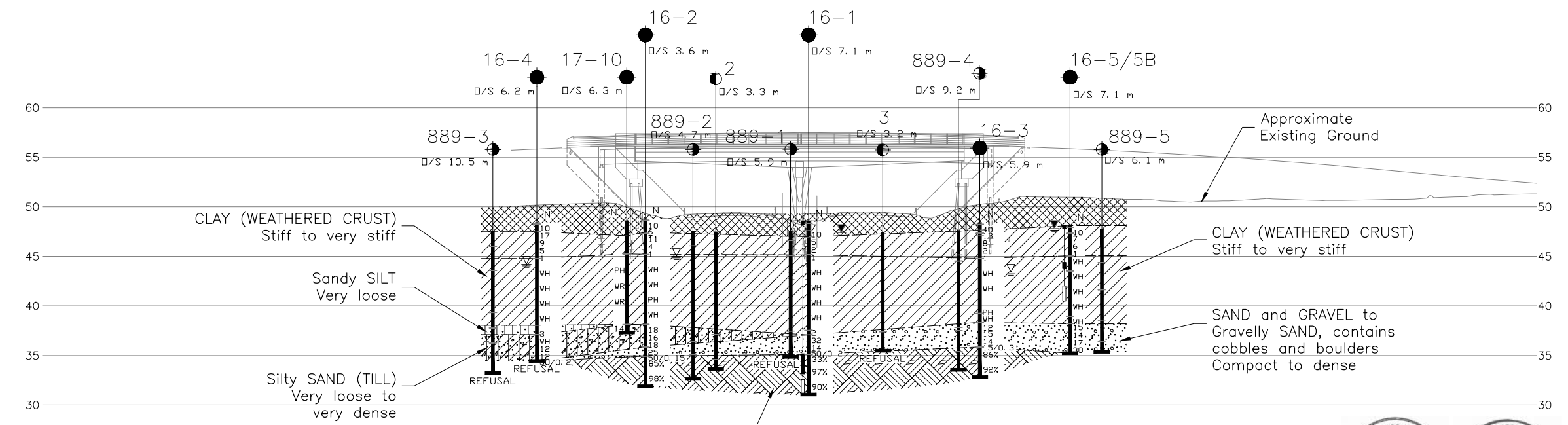
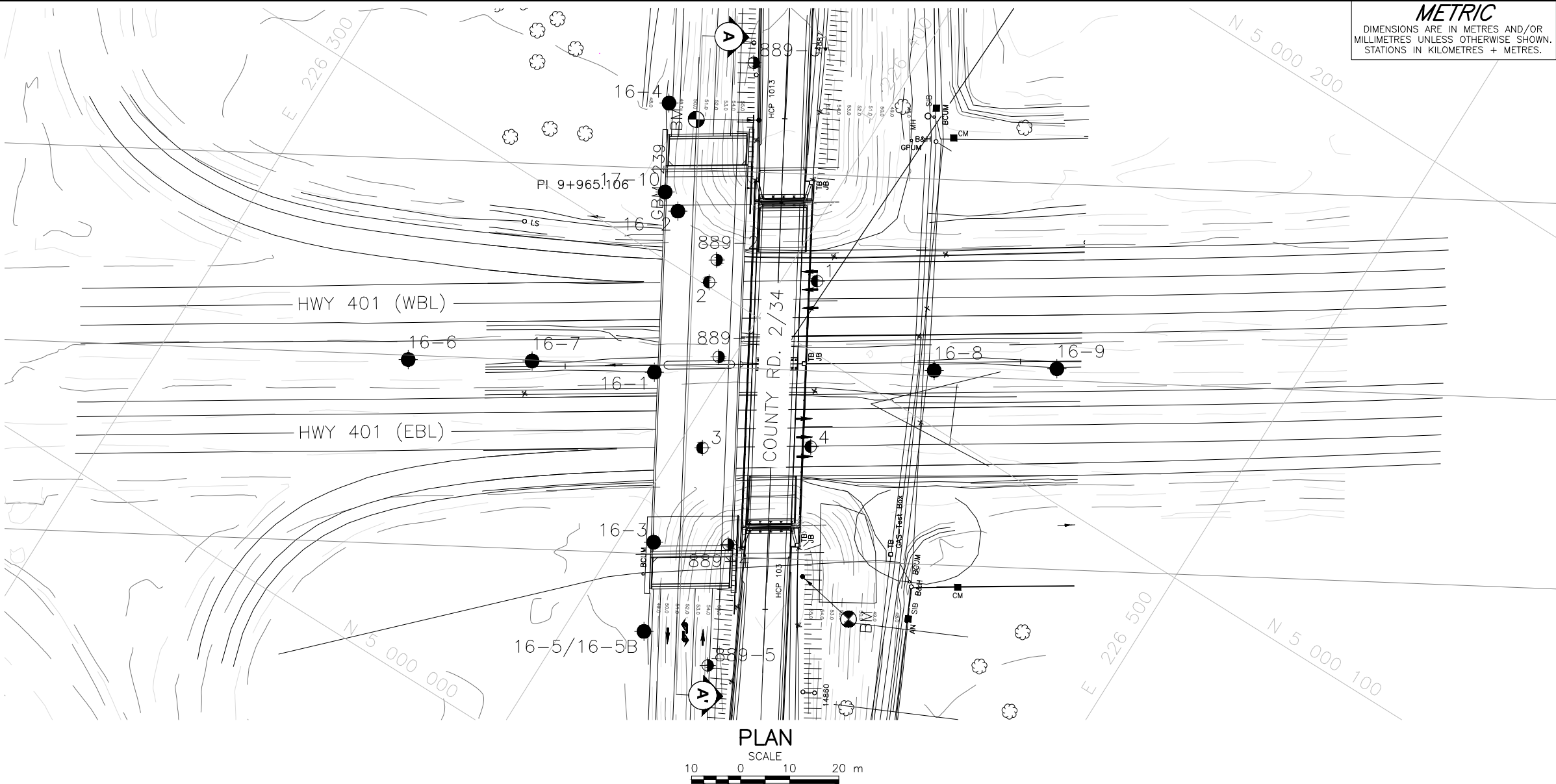


### GENERAL NOTES

1. SEE NOTES ON DWG. R2-1 AND R2-2.

REVISIONS	.	.			.				
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	DATE	BY	DESCRIPTION						
DESIGN	BRC	CHK	MJH	CODE	CSA-S6-14	LOAD	GL6250NT	DATE	Jan-19
DRAWN	JAA	CHK	JRH	SITE	31-260/C			DWG	R2-3





**REFERENCE**  
Base plan provided in digital format by Dillon, drawing file no. 4013-09-GA.dwg, received August 15, 2017.

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

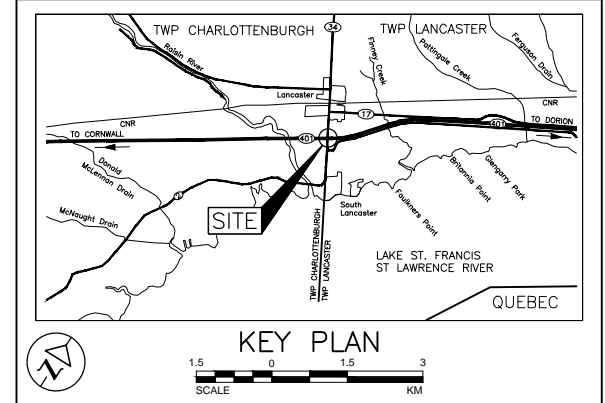
CONT No.  
WP No.4013-11-01

STRUCTURE REPLACEMENT  
COUNTY ROAD 2/34 UNDERPASS

BOREHOLE LOCATIONS AND SOIL STRATA

Golder Associates Ltd.  
OTTAWA ONTARIO, CANADA

SHEET  
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**LEGEND**

- Borehole - Current Investigation
- Borehole - Previous Investigation (Geocres No. 31G00-144)
- Borehole - Previous Investigation (Geocres No. 31G00-145)
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% Rock Quality Designation (RQD)
- WL upon completion of drilling
- WL in piezometer, measured on July 29, 2017
- Seal
- Piezometer

BOREHOLE CO-ORDINATES			
No.	ELEVATION	NORTHING	EASTING
16-1	48.5	5000079.4	226388.0
16-2	48.8	5000109.7	226374.7
16-3	48.4	5000049.9	226406.2
16-4	48.4	5000127.4	226361.5
16-5	48.1	5000033.5	226414.2
16-5B	48.1	5000033.5	226414.2
16-6	48.6	5000055.0	226344.1
16-7	48.4	5000068.1	226365.7
16-8	48.5	5000109.9	226436.1
16-9	48.4	5000123.4	226457.1
17-10	48.6	5000111.7	226370.4
889-1	47.5	5000088.9	226397.4
889-2	47.6	5000105.5	226386.6
889-3	47.5	5000143.5	226371.8
889-4	47.6	5000057.6	226419.4
889-5	47.7	5000034.5	226428.9
BH-1	47.5	5000112.7	226406.3
BH-2	47.5	5000100.8	226387.7
BH-3	47.5	5000071.5	226404.5
BH-4	47.5	5000083.4	226423.0

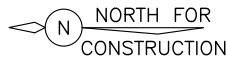
**NOTES**

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Preliminary Design Report.

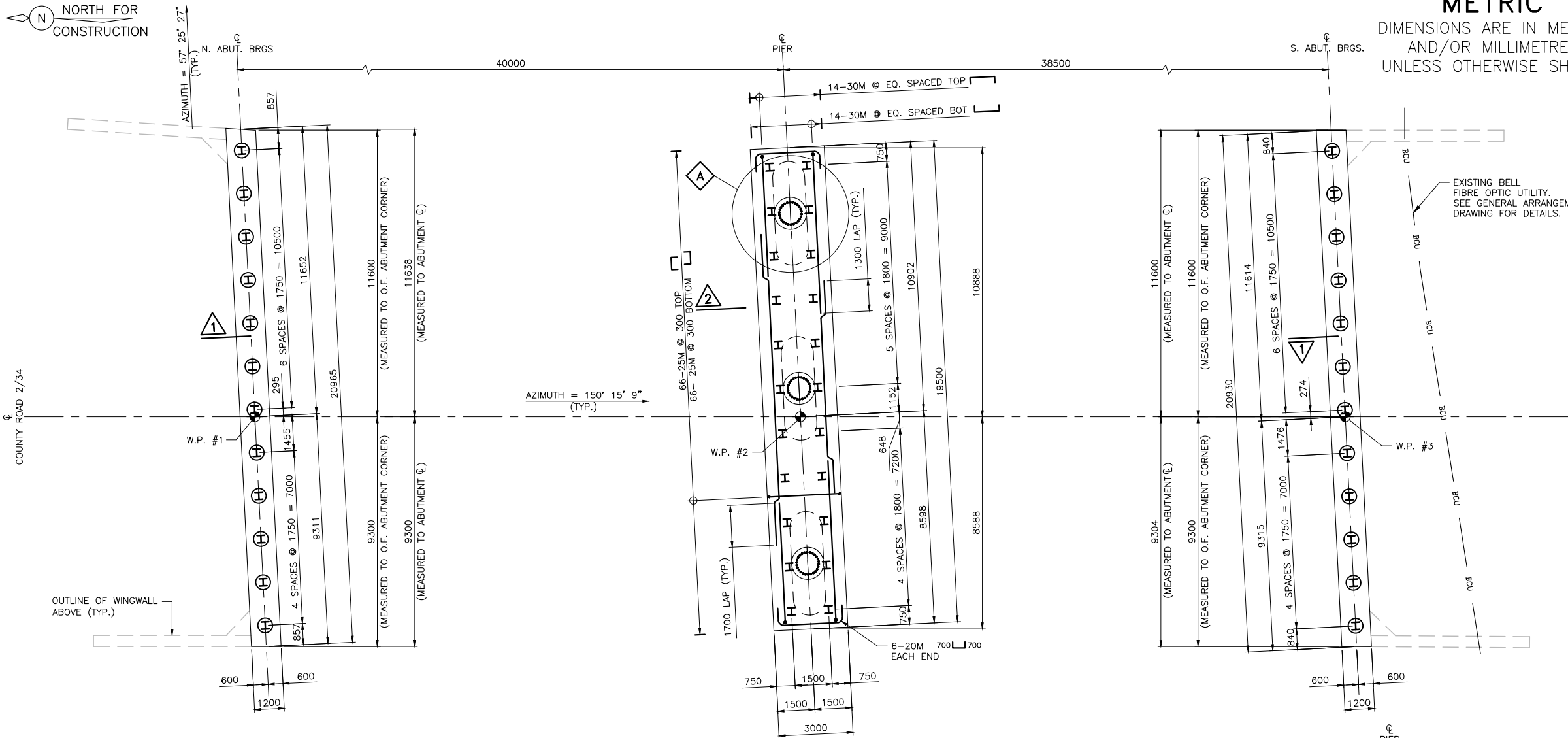
The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

NO.	DATE	BY	REVISION
Geocres No. 31G-259			
HWY. 401	PROJECT NO. 12-1121-0193-1140		DIST. EASTERN
SUBM'D. KSL	CHKD. KSL	DATE: 9/19/2017	SITE: 31-232
DRAWN: JM	CHKD. KSL	APPD. FJH	DWG. 2



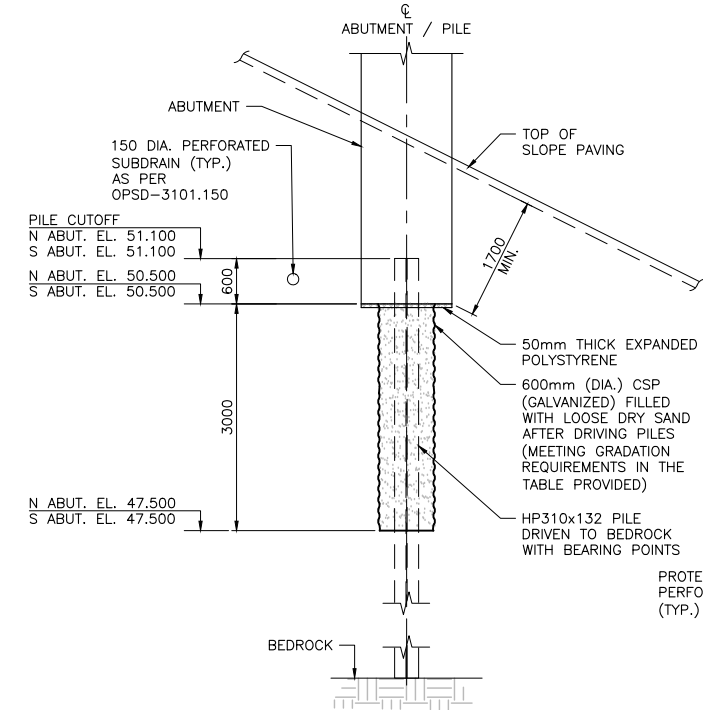


COUNTY ROAD 2/34

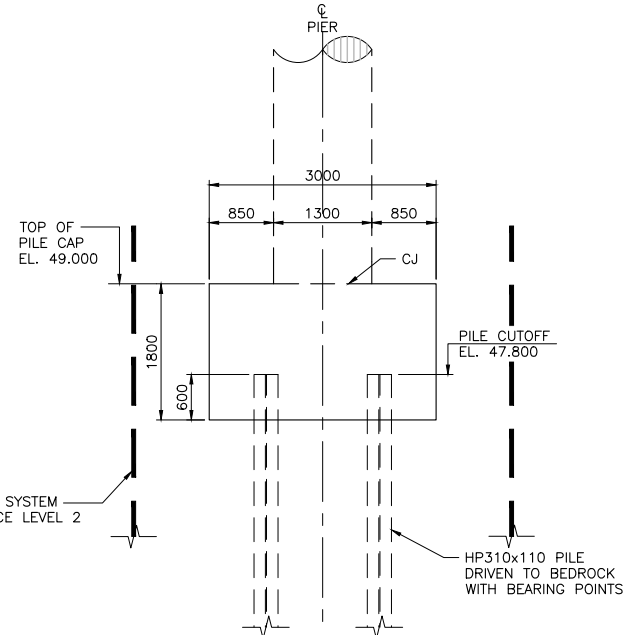


PLAN

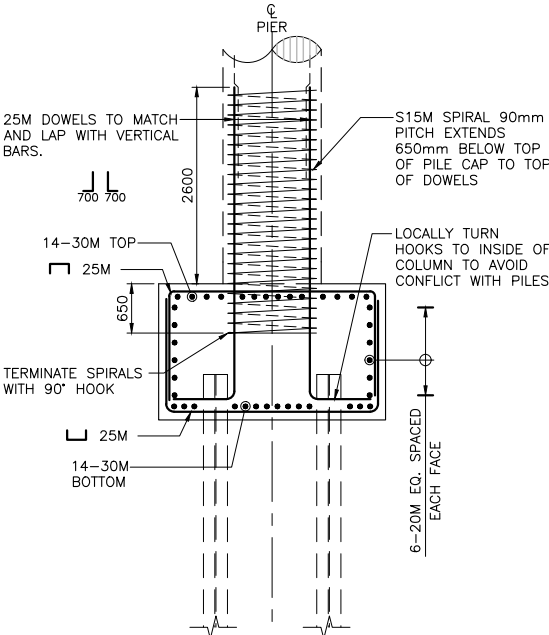
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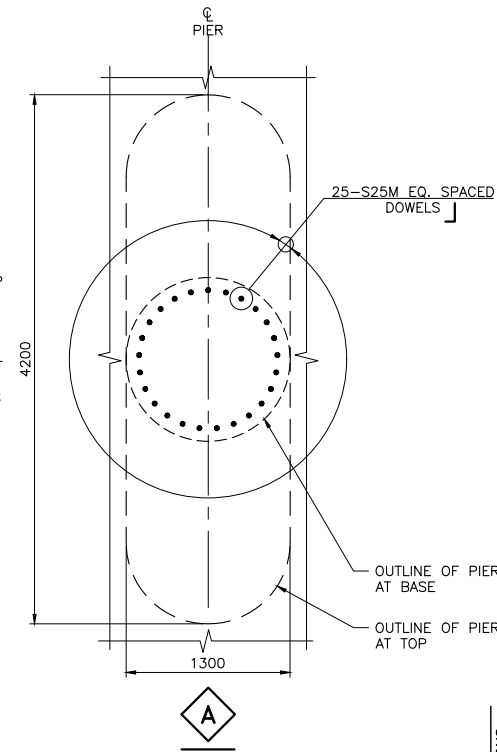
SCALE 1:50



SCALE 1:50



REINFORCING



SCALE 1:30

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

## METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01



COUNTY ROAD 2/34  
UNDERPASS  
FOUNDATION LAYOUT AND  
DETAILS

SHEET  
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### NOTES

- FOR GENERAL NOTES SEE GENERAL ARRANGEMENT DWG.

### PILE NOTES

- PILE SPACING IS MEASURED AT THE UNDERSIDE OF ABUTMENT OR PIER PILE CAP.
- PILE LENGTHS SHOWN IN THE PILE DATA TABLE ARE THE THEORETICAL LENGTH BELOW CUT-OFF, AND ARE BASED ON ESTIMATED TIP EVALUATIONS. FINAL LENGTHS SHALL BE DETERMINED FROM ON-SITE DRIVING RECORDS.
- THE PILE DRIVING EQUIPMENT SHALL BE APPROPRIATE TO THE DRIVING CONDITIONS.
- PILES SHALL BE FITTED WITH TITUS STANDARD 'H' POINTS OR EQUIVALENT.
- PILE SPLICES SHALL BE AS PER OPSD 3000.150.
- CSP DENOTES GALVANIZED CORRUGATED STEEL PIPE WITH SQUARE ENDS, 1.6mm MINIMUM WALL THICKNESS WITH A CORRUGATION PROFILE OF 68x13mm.
- PILES TO BE DRIVEN TO BEDROCK.
- PILE DESIGN DATA MAXIMUM LOADS  
HP310x110 ULS-3500 kN/PILE  
HP310x132 ULS-3500 kN/PILE

### APPLICABLE STANDARD DRAWINGS

- OPSD-3000.100 FOUNDATION, PILES, STEEL H-PILE DRIVING SHOE  
OPSD-3000.150 FOUNDATION, PILES, STEEL H-PILE SPLICE

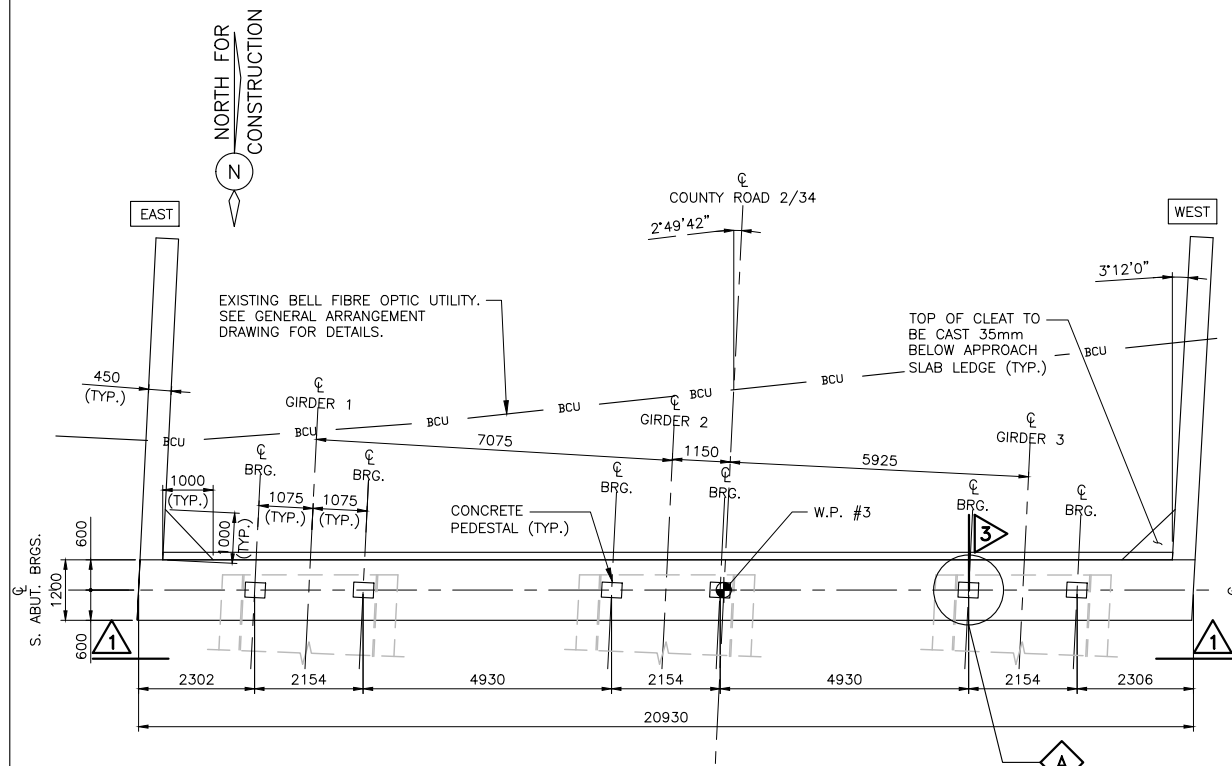
PILE DATA				
LOCATION	PILE SIZE	No. REQUIRED	LENGTH (m)	BATTER
NORTH ABUTMENT	HP310x132	12	16.5	VERTICAL
PIER	HP310x110	22	12.5	VERTICAL
SOUTH ABUTMENT	HP310x132	12	15.5	VERTICAL

GRADATION FOR SAND FILL		
MTS SIEVE DESIGNATION		% PASSING BY MASS
2 mm	#10	100
600 µm	#30	80-100
425 µm	#40	40-80
250 µm	#60	5-25
150 µm	#100	0-6

WORKING POINT DATA		
LOCATION	N	E
W.P. #1	5 000 117.745	226 371.244
W.P. #2	5 000 083.016	226 391.091
W.P. #3	5 000 049.589	226 410.194

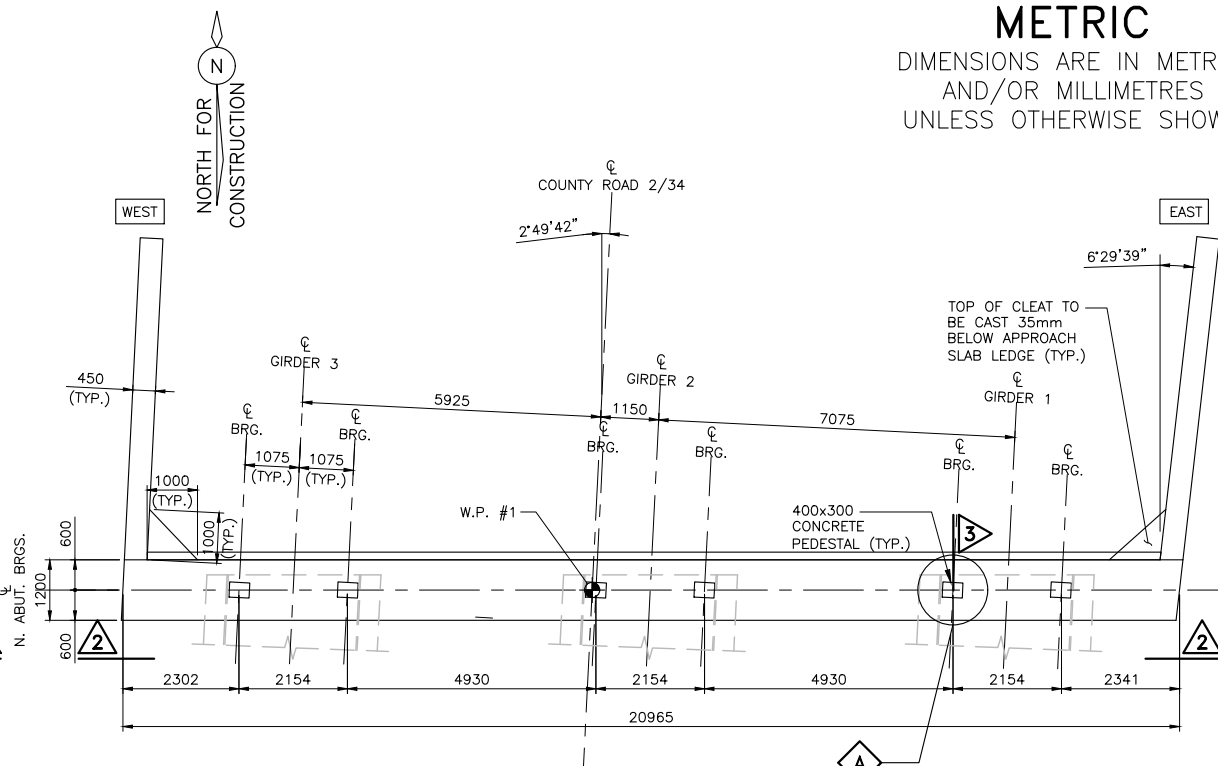
REVISIONS									
DATE	BY	DESCRIPTION							
DESIGN	BTW	CHK	ARK	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG	3

LAYOUT: ABUT. LAYOUT  
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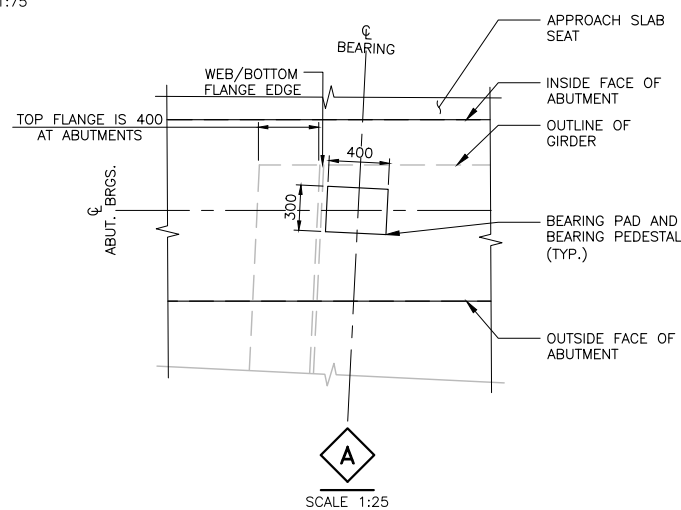
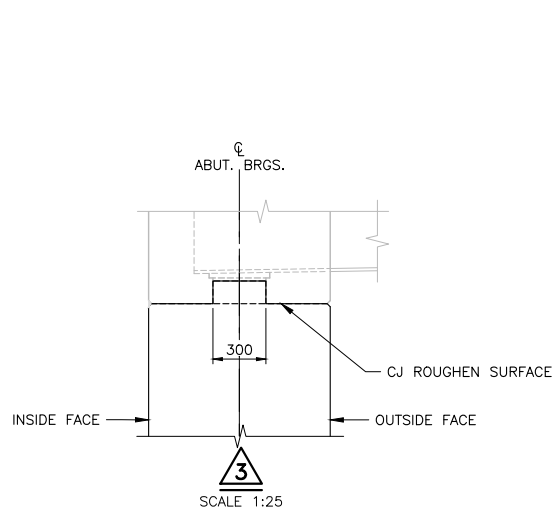
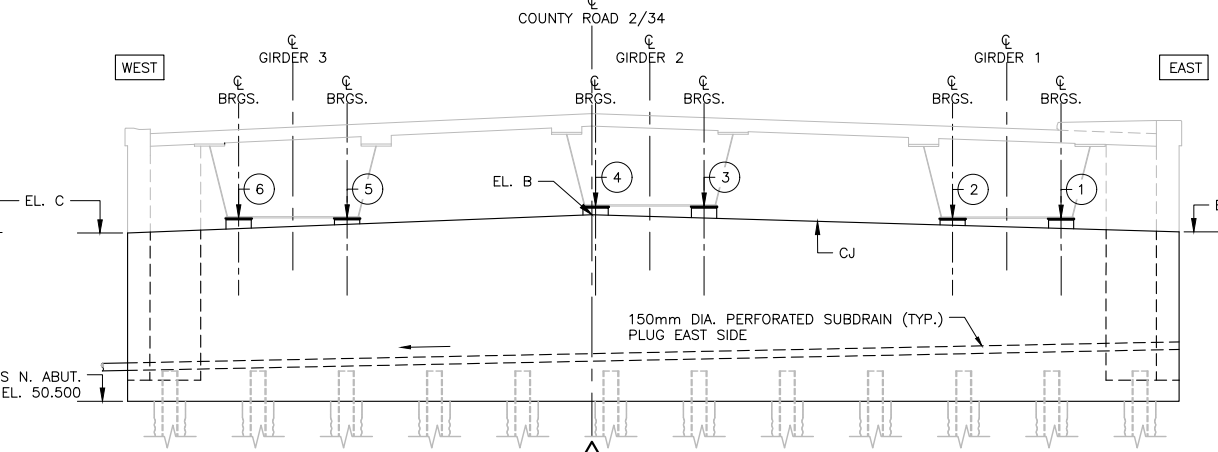
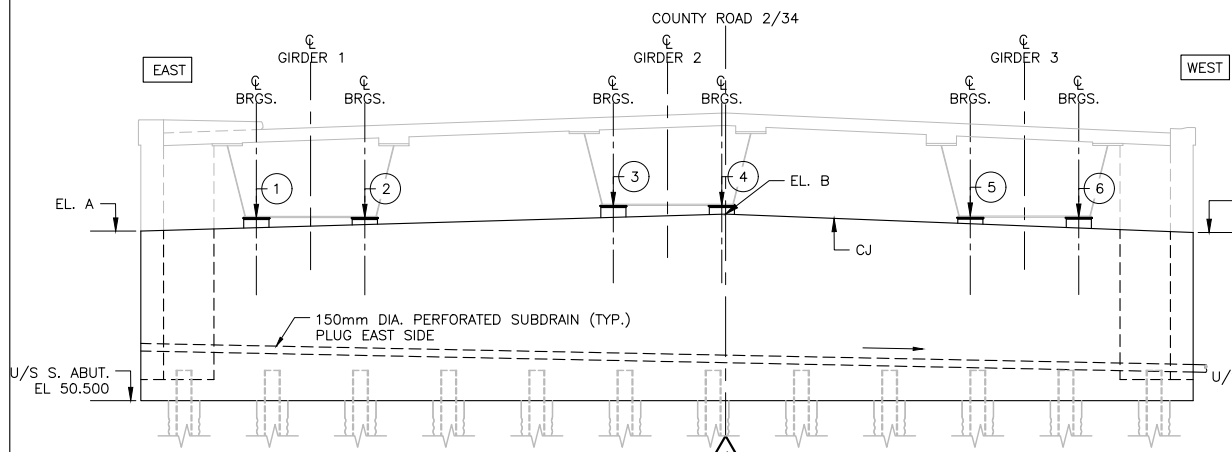
**SOUTH ABUTMENT PLAN**

SCALE 1:75




**NORTH ABUTMENT PLAN**

SCALE 1:75



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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

HWY 401		
CONT No	2018-4008	
WP No	4013-11-01	
COUNTY ROAD 2/34 UNDERPASS		SHEET 241
ABUTMENT LAYOUT		



**NOTES**

- CONTRACTOR SHALL SUPPLY TEMPORARY BRACING FOR THE ABUTMENTS TO PROVIDE STABILITY DURING CONSTRUCTION.
- STABILITY AND THE INTEGRITY OF THE STRUCTURE SHALL BE MAINTAINED AT ALL STAGES OF THE CONSTRUCTION.

**CONSTRUCTION SEQUENCE**

- ABUTMENTS AND WINGWALLS SHALL BE CONSTRUCTED FIRST TO UNDERSIDE OF BEARING PEDESTAL ELEVATION.
- CONSTRUCT BEARING PEDESTALS.
- PLACE BEARINGS AND ERECT GIRDERS, UNCOATED SURFACES OF THE GIRDER EMBEDDED IN THE ABUTMENT SHALL BE ABRASIVE BLAST CLEANED.
- THE TOP SECTION OF THE ABUTMENTS ABOVE THE BEARING SEAT ELEVATION SHALL BE CAST IN THE SAME POUR AS THE DECK.
- FORMWORK AND LATERAL BRACING FOR ABUTMENTS SHALL NOT BE REMOVED UNTIL TOP OF ABUTMENT AND DECK CONCRETE HAS REACHED 25 MPa STRENGTH.

**APPLICABLE STANDARD DRAWINGS**

OPSD-3190.100	WALLS, RETAINING AND ABUTMENT, WALL DRAIN
OPSD-3950.100	JOINTS, CONCRETE EXPANSION AND CONSTRUCTION, ON STRUCTURE

TOP OF BEARING ELEVATIONS *		
NO.	ELEVATION	
	N. ABUT.	S. ABUT
①	54.225	54.296
②	54.227	54.293
③	54.372	54.432
④	54.374	54.431
⑤	54.283	54.331
⑥	54.284	54.329

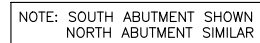
\* ELEVATIONS ARE TO TOP OF BEARING.  
SEE CONSTRUCTION NOTES ON  
GENERAL ARRANGEMENT DWG.

TOP OF CONCRETE ELEVATIONS		
LOCATION	ELEVATION	
	N. ABUT.	S. ABUT
A	53.964	54.038
B	54.206	54.261
C	54.027	54.068

REVISIONS	DATE		BY		DESCRIPTION		DATE		DWG	
DESIGN	BTV	CHK	ARK	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19	
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG	4	

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

SHEET  
242

ABUTMENT ELEVATION

SCALE 1:50

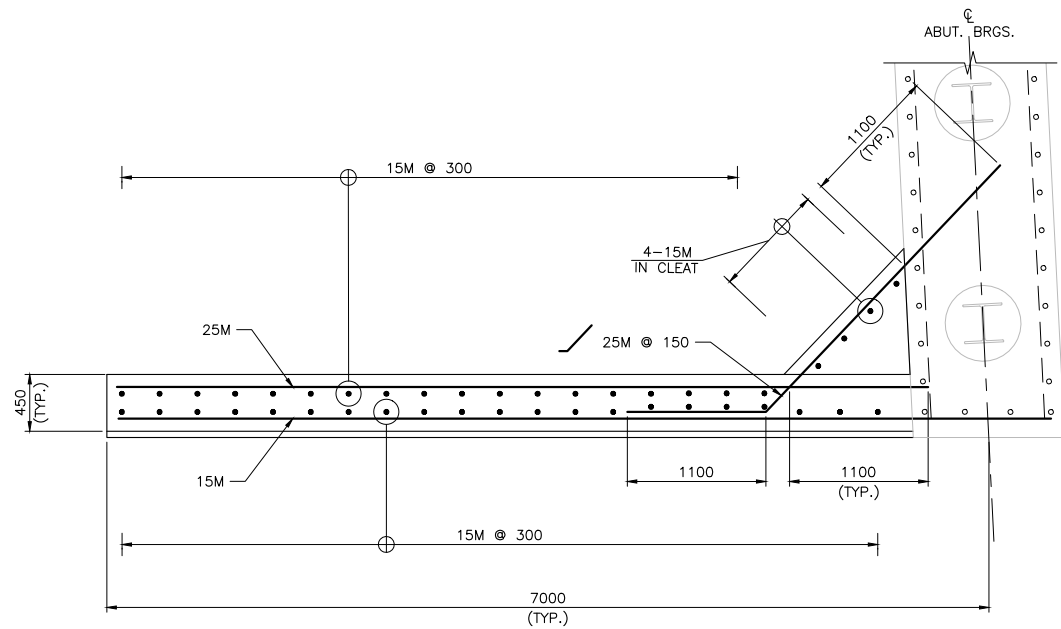


DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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DATE		BY		DESCRIPTION			
DESIGN	BTW	CHK	ARK	CODE	CSA-S6-14	LOAD CL6250NT	DATE Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232	DWG	5

LAYOUT: ABUT-REINF  
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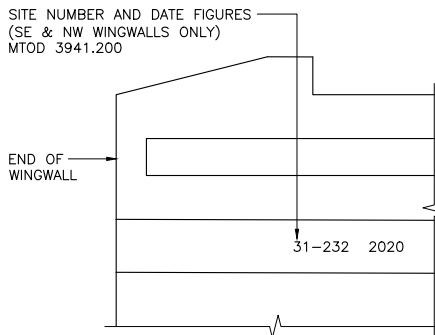
LAYOUT: WINGWALLS LAYOUT AND REINFORCEMENT  
FILE NAME: c:\project\wse\working directory\active\10bpd\0515027\4013-09-Abutments.dwg



NOTE: NORTHWEST WINGWALL SHOWN, OTHERS SIMILAR

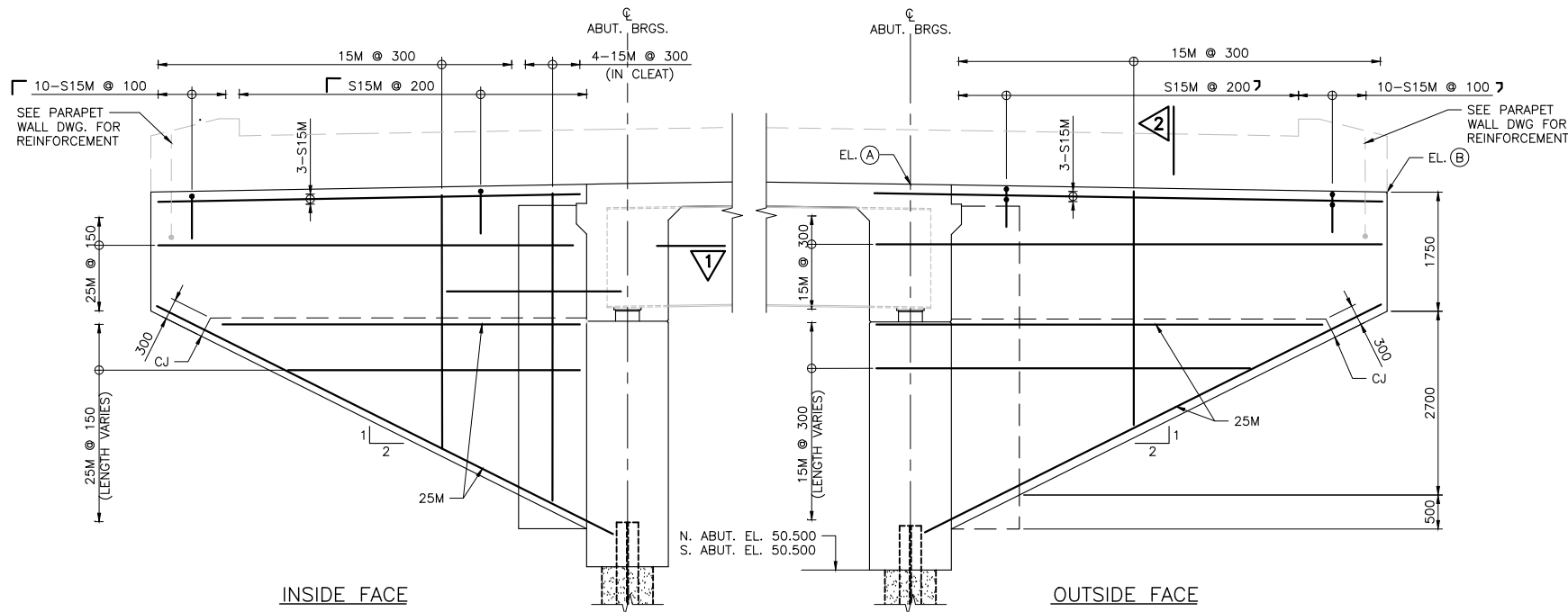
SCALE 1:50

WINGWALL ELEVATIONS		
LOCATION	ELEVATION	
	A	B
NORTHEAST	56.272	56.135
NORTHWEST	56.131	56.007
SOUTHEAST	56.346	56.233
SOUTHWEST	56.171	56.054



FIGURES IN CONCRETE

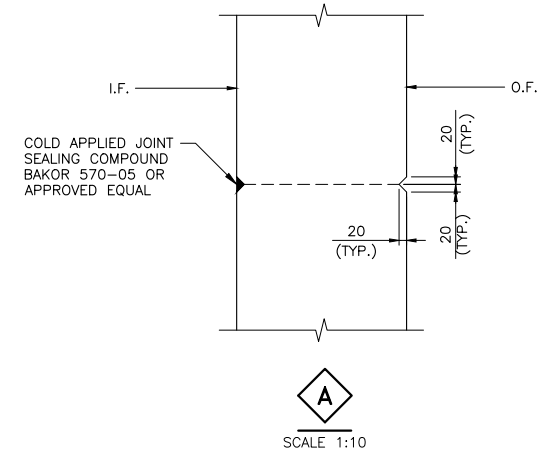
SCALE 1:25



TYPICAL WINGWALL ELEVATIONS

SCALE 1:50

NOTE: NORTHWEST WINGWALL SHOWN, OTHERS SIMILAR



SCALE 1:10

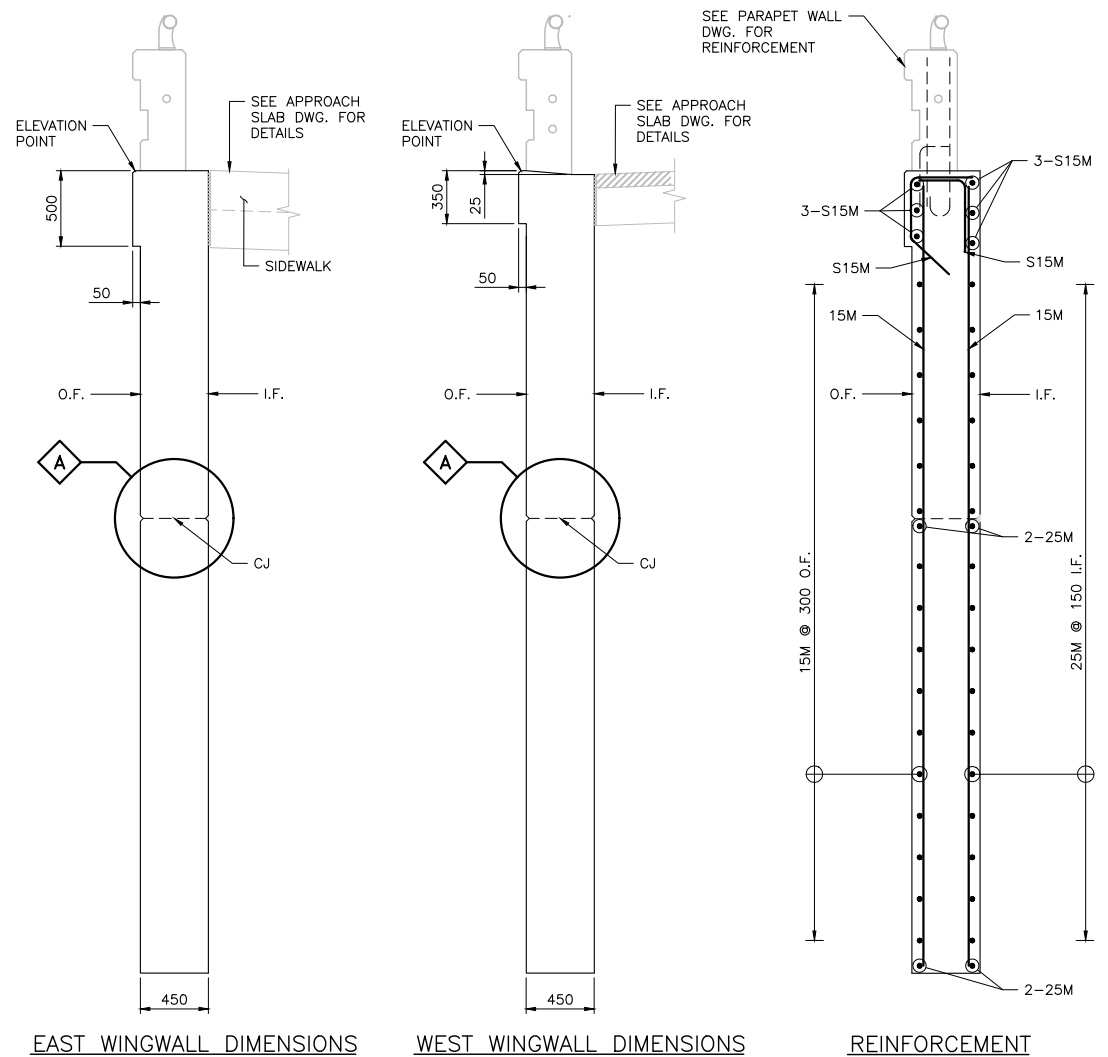
**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

#### NOTES

- TOP OF CLEAT TO BE CAST 35mm BELOW APPROACH SLAB LEDGE.
- TO MAINTAIN STABILITY AND INTEGRITY OF THE STRUCTURE DURING CONSTRUCTION, CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING TO THE WINGWALLS. THE SHORING AND BRACING SHALL NOT BE REMOVED UNTIL DECK CONCRETE HAS REACHED 25MPa STRENGTH.
- CONCRETE ABOVE ABUTMENT BEARING SEAT/CONSTRUCTION JOINT LEVEL SHALL BE CAST MONOLITHICALLY WITH THE DECK.
- LIST OF ABBREVIATIONS  
O.F. DENOTES OUTSIDE FACE  
I.F. DENOTES INSIDE FACE

#### APPLICABLE STANDARD DRAWINGS

MTOD-3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION, ON STRUCTURE



EAST WINGWALL DIMENSIONS

WEST WINGWALL DIMENSIONS

REINFORCEMENT

SCALE 1:25

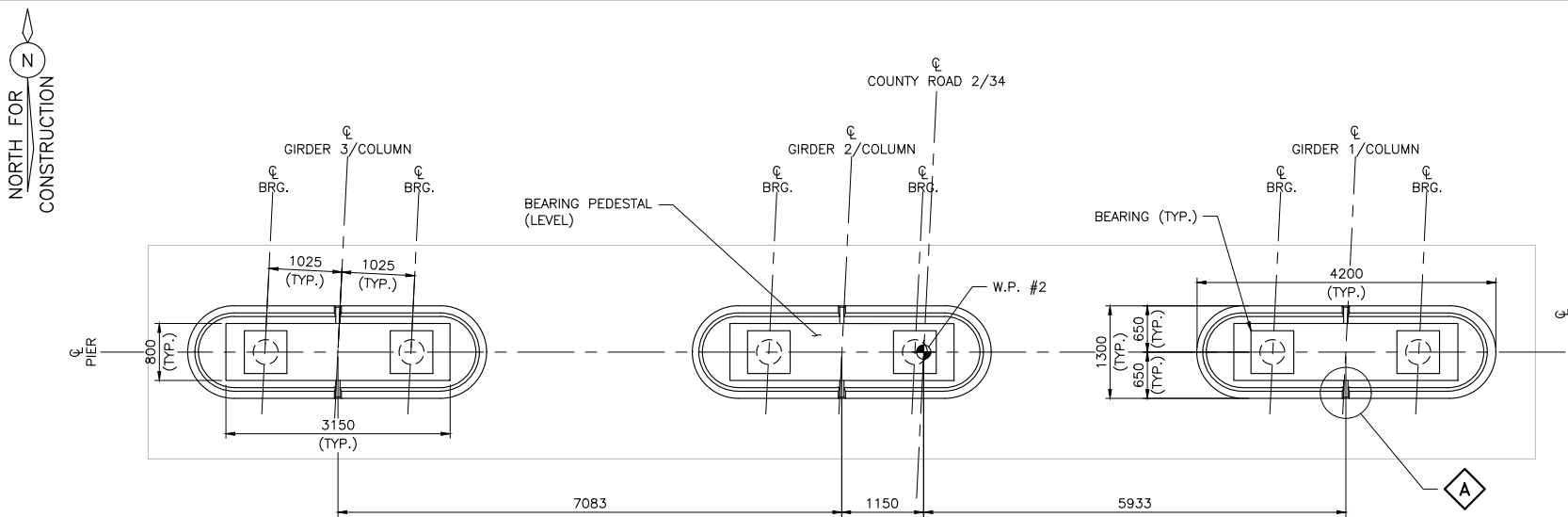
MODIFIED	
STANDARD DRAWING JAN 2013	SS105-2
WINGWALL DETAILS FOR BRIDGES	

REVISIONS		DATE		BY		DESCRIPTION	
DESIGN	BTJ	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250N
DRAWN	SJM	CHK	BRC	SITE	31-232	DATE	Jan-19
						DWG	6

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

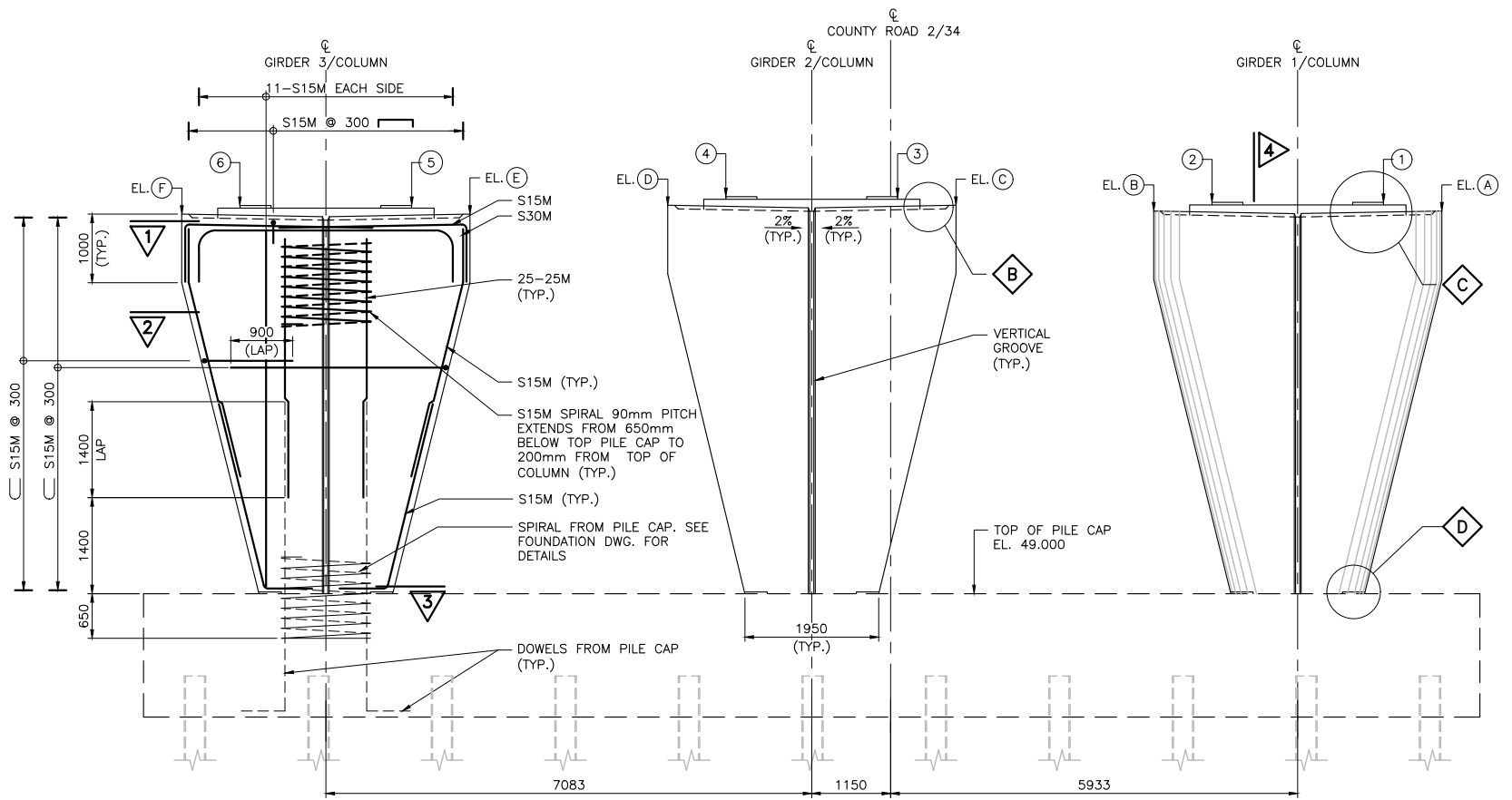


LAYOUT: Pier  
FILE NAME: c:\projectwise\working\_directory\active\10bpb\0515027\4013-09-Pier.dwg



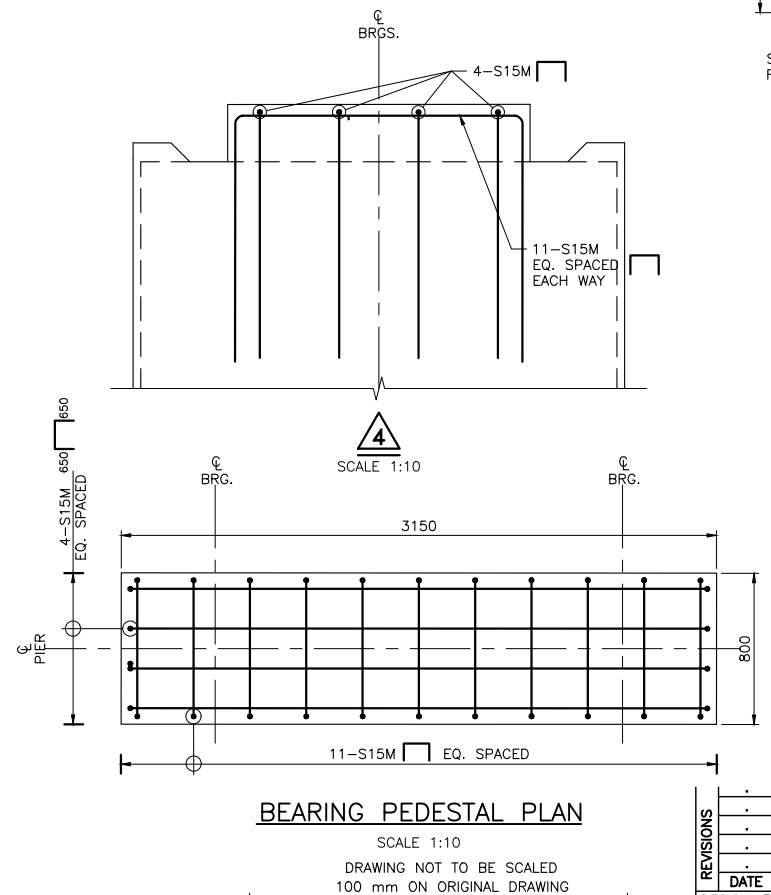
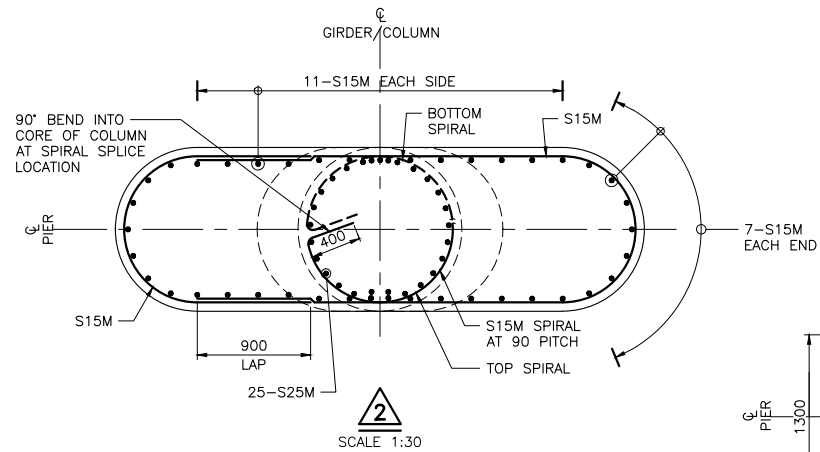
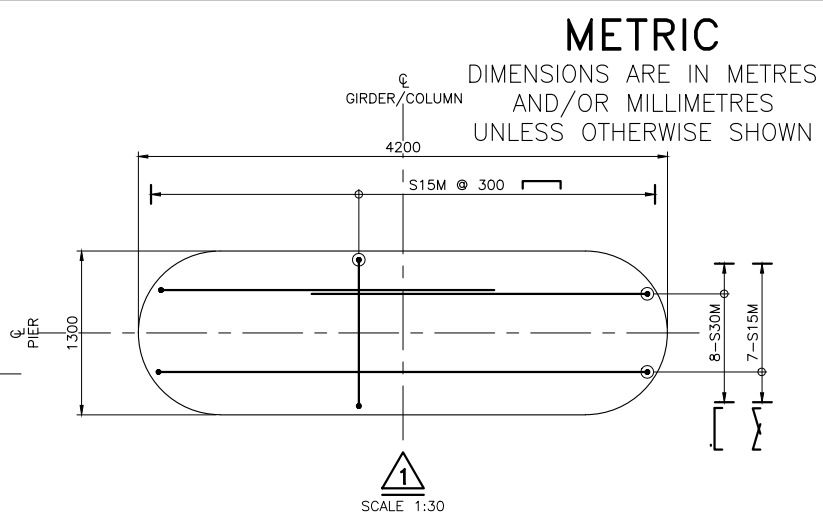
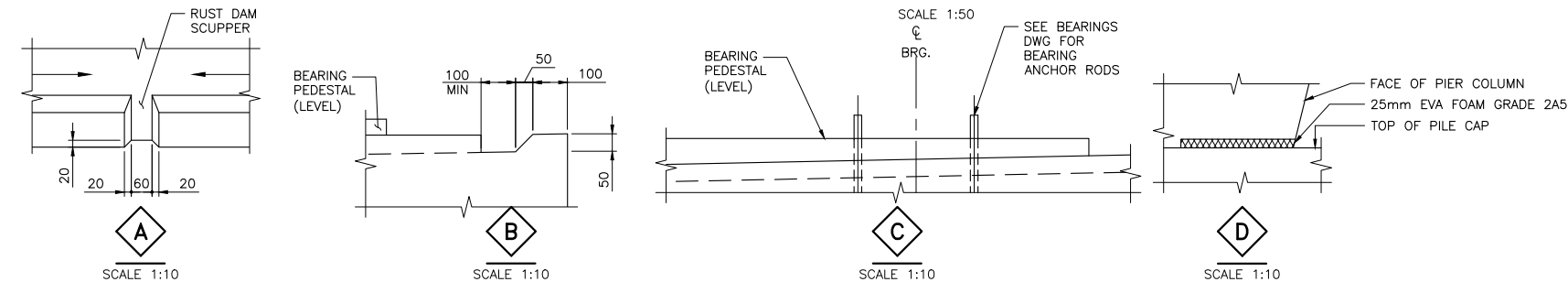
TOP OF PIER PLAN

SCALE 1:50



PIER ELEVATION

SCALE 1:50



BEARING PEDESTAL PLAN

SCALE 1:10

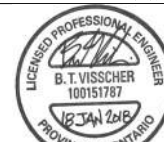
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS  
PIER LAYOUT AND  
REINFORCEMENT

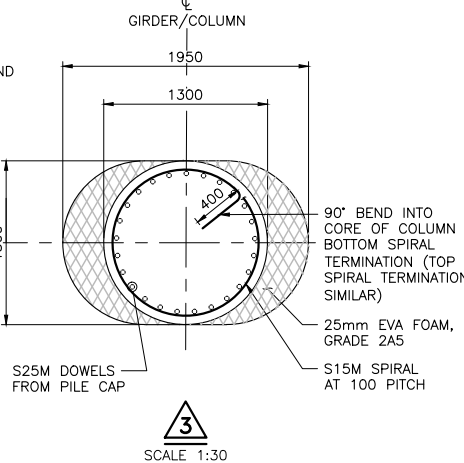


SHEET  
244



NOTES

1. COLUMN SPIRAL TO EXTEND FROM 650mm BELOW TOP OF PILE CAP TO 200mm FROM TOP OF COLUMN. ANCHOR EACH END OF SPIRAL BY PROVIDING 90° BEND INTO CORE OF COLUMN AS SHOWN IN SECTIONS.

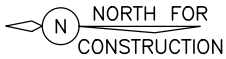


TOP OF BEARING ELEVATIONS*	
NO.	ELEVATION
1	54.552
2	54.552
3	54.694
4	54.694
5	54.598
6	54.598

TOP OF CONCRETE ELEVATIONS	
LOCATION	ELEVATION
A	54.252
B	54.252
C	54.394
D	54.394
E	54.298
F	54.298

\* ELEVATIONS ARE TO TOP OF BEARING.  
SEE CONSTRUCTION NOTES ON GENERAL  
ARRANGEMENT DWG.

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	BTJ	CHK	TJM	CODE CSA-S6-14
DRAWN	SJM	CHK	BRC	SITE 31-232
LOAD	CL6250MT	DATE	Jan-19	DWG 7



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

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
BEARINGS



SHEET  
245

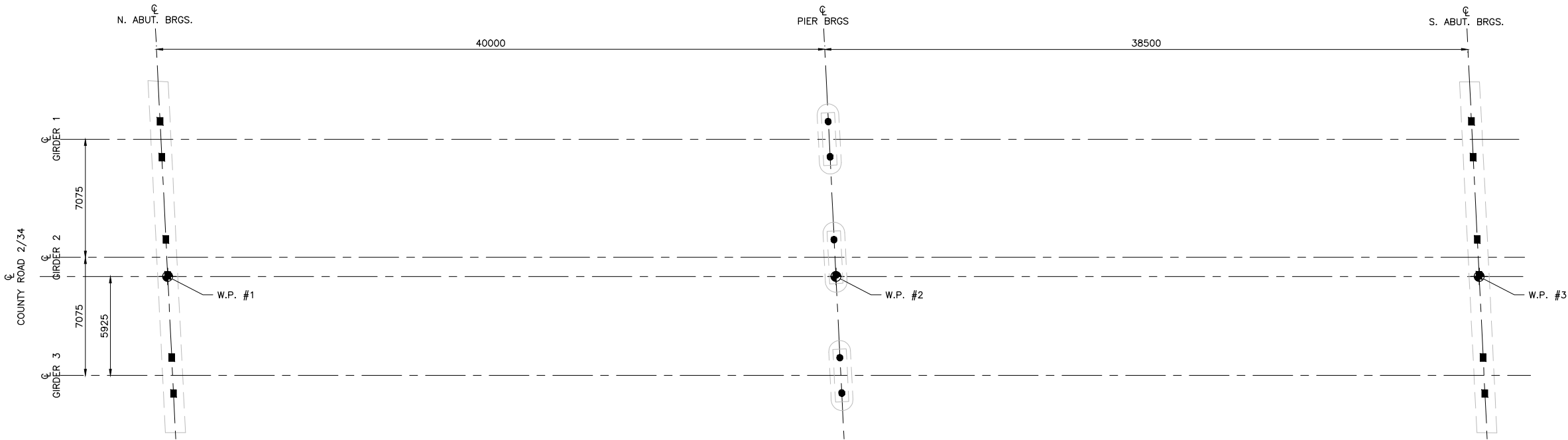


NOTES

- ROTATIONAL BEARINGS SHALL BE CLASSES LISTED IN DSM LIST 9.15.71 OR 9.15.75 UNDER THE HEADING "BEARINGS, BRIDGE ROTATIONAL".
- FOR ROTATIONAL BEARINGS, THE CONTRACTOR SHALL ESTABLISH BEARING SIZES SUCH THAT THE CONTACT PRESSURE UNDER PERMANENT LOADS AT SLS IS NOT LESS THAN 25MPa.
- BEARINGS SHALL BE ORIENTED IN LINE WITH THE CENTERLINE OF GIRDERS.
- THE CONTRACTOR SHALL PROVIDE ANCHORAGE OF THE BEARING TO THE SUBSTRUCTURE TO SUIT THE LOADS GIVEN IN THE BEARING DESIGN TABLES.
- THE CONTRACTOR SHALL ADJUST BEARING PEDESTAL ELEVATIONS AND REINFORCING STEEL TO SUIT ACTUAL HEIGHTS OF BEARINGS AND MAINTAIN A MINIMUM 200mm CLEAR DISTANCE BETWEEN TOP OF BEARING PEDESTAL AND UNDERSIDE OF JACKING PLATES.
- BEARING DESIGN TO ALLOW FOR FUTURE JACKING OF BRIDGE AND BEARING REPLACEMENT.
- TOP AND BASE PLATES TO BE DESIGNED TO SUIT THE BEARINGS, BUT SHALL NOT EXCEED THE BEARING DIMENSIONS BY MORE THAN 100mm IN ANY DIRECTION.
- ROTATIONAL BEARING SUPPLIERS ARE REQUIRED TO PROVIDE ADDITIONAL ROTATIONAL CAPACITY OF 1.2° ABOUT THE HORIZONTAL AXIS AND 1° ABOUT THE VERTICAL AXIS IN ACCORDANCE WITH OPSS 1203 AND AS REQUIRED BY CHBDC.

ELASTOMERIC BEARING DESIGN DATA

BEARING DATA	ABUTMENTS
BEARING SIZE (mm)	400x300x20
NUMBER REQUIRED	12
BEARING TYPE	NATURAL RUBBER



PLAN — BEARINGS

SCALE 1:150

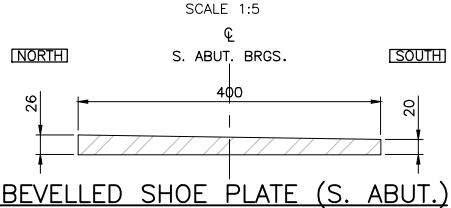
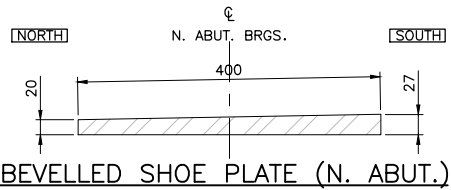
ROTATIONAL BEARING DESIGN DATA

LOCATION	TYPE	LIMIT STATE	COMBINATION	AXIAL LOAD (kN)	MAX. HORIZ. LOAD		MAX. ROTATION		MAX. TRANSLATION (mm)	
					LONGT.	TRANS.	ABOUT HOR. AXIS	ABOUT HOR. AXIS	LONGT.	TRANS.
PIER	FIXED *	SLS	PERMANENT	2130	220	220	±1°	±1°	0	0
			PERMANENT + TRANSITORY MIN.	2130	220	220				
			PERMANENT + TRANSITORY MAX.	2930	300	300				
		ULS	PERMANENT	2610	270	270	±1°	±1°	0	0
			PERMANENT + TRANSITORY MIN.	2610	270	270				
			PERMANENT + TRANSITORY MAX.	4110	420	420				
			PERMANENT + EXCEPTIONAL MIN.	1710	550	550				
			PERMANENT + EXCEPTIONAL MAX.	2660	550	550				

\* 'D' = 200mm CONTRACTOR TO ADJUST PEDESTAL HEIGHT FOR ACTUAL BEARING SIZE, INCLUDING BASE PLATES AND 10mm BEDDING GROUT

LEGEND

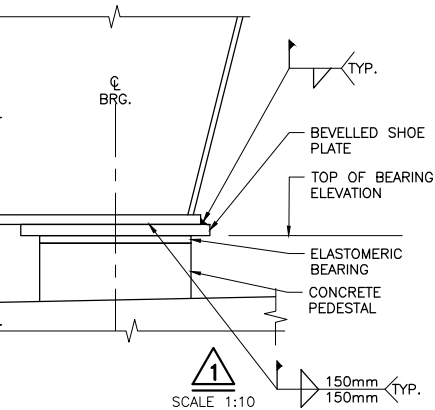
ROTATIONAL	NO. REQ'D
●	6
X, Y DIRECTION TRANSLATION = 0	
ELASTOMERIC	
■	12
PLAIN ELASTOMERIC	



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

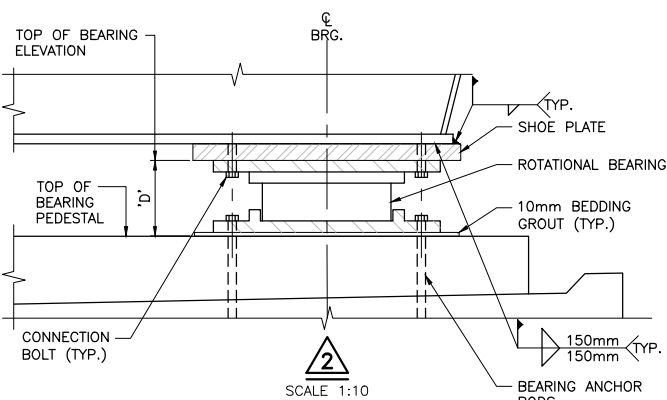
ABUTMENT BEARING DETAILS

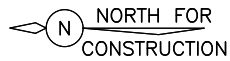
SCALE 1:30



PIER BEARING DETAILS

SCALE 1:30





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

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01



COUNTY ROAD 2/34  
UNDERPASS

SHEET  
246

STRUCTURAL STEEL LAYOUT



#### NOTES

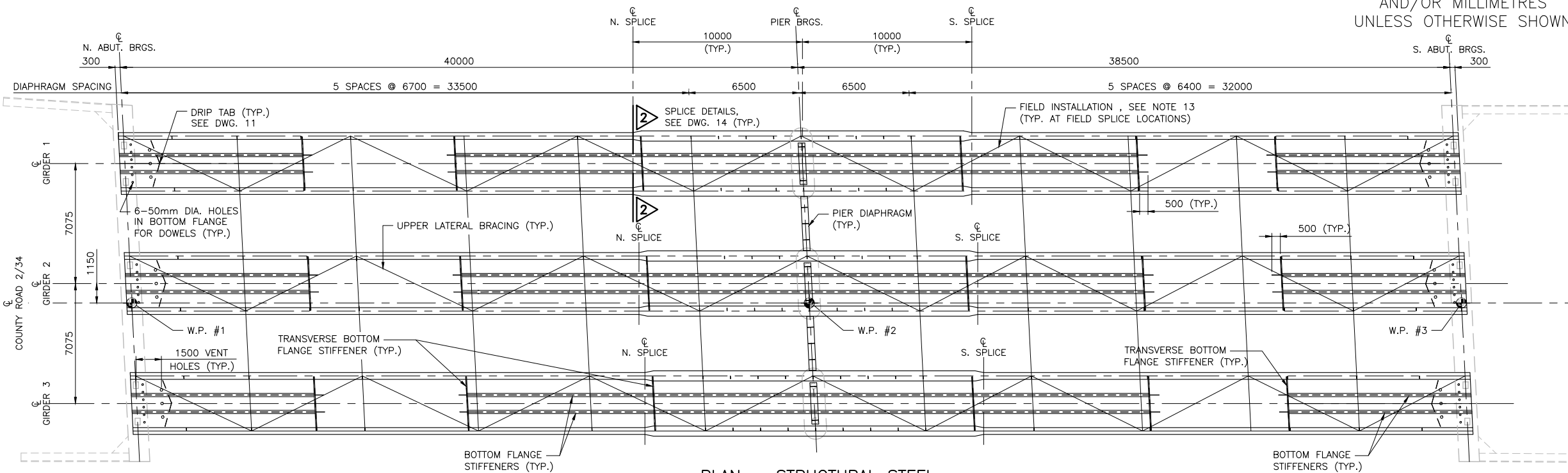
- ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.21-M92. STEEL MARKED 'AT' SHALL BE GRADE 350AT CATEGORY 2. THE CHARPY IMPACT ENERGY REQUIREMENTS SHALL BE 27 JOULES AND THE TEST TEMPERATURE SHALL BE -20° C. ALL OTHER STRUCTURAL STEEL SHALL BE GRADE 350A. ROLLED SECTIONS SHALL CONFORM TO CSA STANDARD CAN/CSA-G40.20/G40.21 OR ASTM STANDARD A588.
- MEMBERS OR COMPONENTS OF MEMBERS FOR WHICH 'AT' STEEL IS SPECIFIED ARE PRIMARY TENSION MEMBERS. STIFFENERS ATTACHED TO 'AT' GIRDER PLATES SHALL BE 'AT' STEEL.
- BOLTS SHALL BE ASTM A325 TYPE 3, M22. BOLT THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANES. BOLTS ON COATED STEEL SHALL BE GALVANIZED ASTM A325M TYPE 1, M22.
- SHEAR STUD CONNECTORS SHALL BE 22 mm DIA. AND SHALL CONFORM TO ASTM STANDARD A108 AND CSA W59.
- ALL LENGTHS SHOWN ARE IN THE HORIZONTAL PLANE MEASURED AT 20° C.
- THE ENDS OF GIRDERS AND BEARING STIFFENERS SHALL BE TRULY VERTICAL UNDER FULL DEAD LOAD.
- ALL BUTT WELDS IN FLANGE AND WEB SPLICES SHALL BE FINISHED FLUSH OR SMOOTH AS INDICATED, BY GRINDING WHERE NECESSARY IN THE DIRECTION OF APPLIED STRESS. SHOP SPLICE LOCATIONS SHALL BE APPROVED BY THE ENGINEER.
- UNLESS OTHERWISE NOTED, THE MINIMUM FILLET WELD SHALL BE AS FOLLOWS:

MATERIAL THICKNESS OF THICKER PART JOINED (mm)	MINIMUM SIZE OF SINGLE PASS 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
- THE CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION AND ERECTION AND 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 A MINIMUM STRENGTH OF 25 MPa.
- ALL STRUCTURAL STEEL SURFACES SHALL BE COATED FOR A DISTANCE OF 700 mm AS FOLLOWS: FROM THE FRONT FACE OF THE ABUTMENT 100 mm TOWARD THE END OF THE GIRDER AND 600 mm TOWARDS THE CENTRE OF THE GIRDER. THE COLOUR OF THE TOP COAT SHALL BE 10045 BROWN ACCORDING TO FEDERAL STANDARD 595C COLOURS.

- ALL STRUCTURAL STEEL SURFACES OF EXTERIOR BOX GIRDERS, INCLUDING SPLICE PLATES, BUT EXCLUDING SURFACES IN CONTACT WITH CONCRETE AND THE CONTACT SURFACES OF BOLTED JOINTS SHALL BE COATED FOR A DISTANCE OF 2000mm ON EITHER SIDE OF THE CENTRELINE OF A FIELD SPLICE.
- BOLT HEADS IN FIELD SPLICES FOR BOX GIRDERS SHALL BE LOCATED ON THE EXTERIOR SURFACES.
- LATERAL BRACING AT FIELD SPLICE LOCATIONS SHALL BE INSTALLED IN THE FIELD.

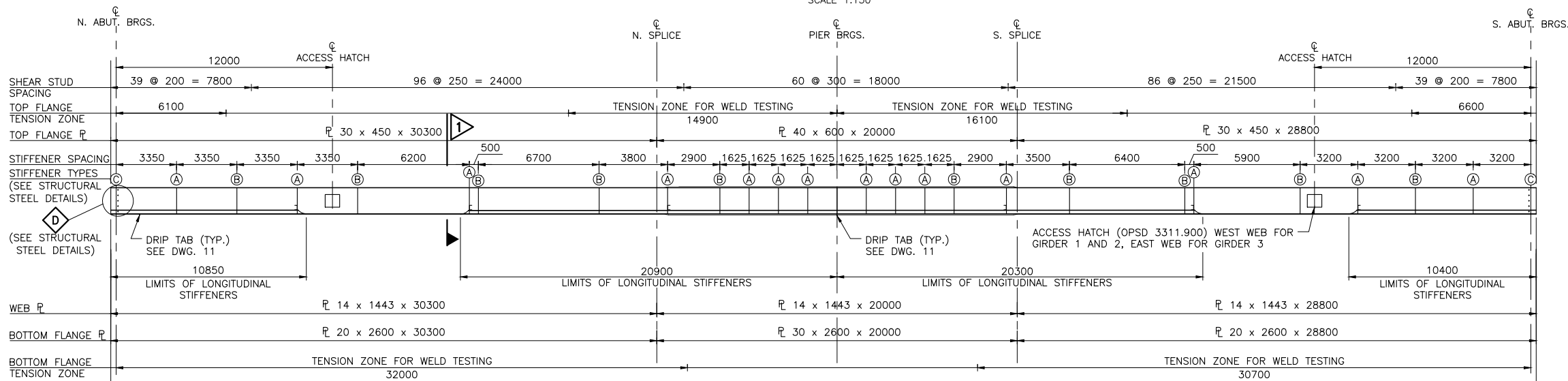
#### APPLICABLE STANDARD DRAWINGS

OPSD 3311.900 DECK GIRDERS, STEEL BOX ACCESS HATCH



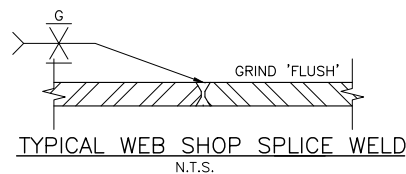
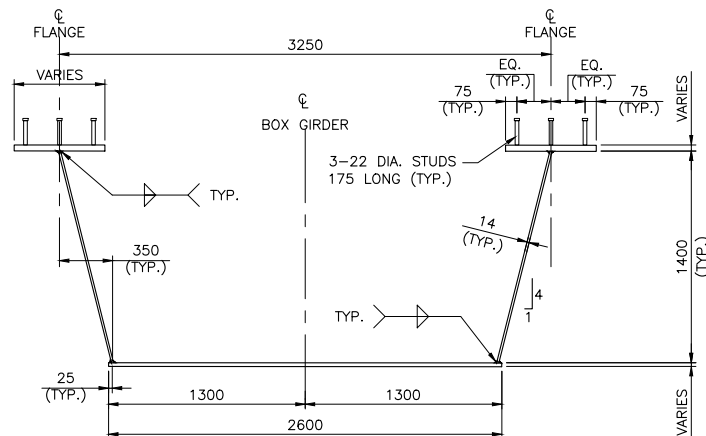
#### PLAN - STRUCTURAL STEEL

SCALE 1:150



#### ELEVATION

SCALE 1:150



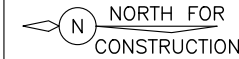
TYPICAL WEB SHOP SPLICE WELD  
N.T.S.

GIRDER ERECTION ELEVATIONS								
FLANGE LINE		CL N. ABUT. BRGS.	CL N. SPAN	CL N. SPLICE	CL PIER	CL S. SPLICE	CL S. SPAN	CL S. ABUT. BRGS.
GIRDER 1	EAST FLANGE	55.698	56.026	56.077	56.052	56.077	56.036	55.769
	WEST FLANGE	55.701	56.028	56.078	56.052	56.077	56.035	55.766
GIRDER 2	EAST FLANGE	55.846	56.171	56.220	56.194	56.218	56.175	55.905
	WEST FLANGE	55.848	56.172	56.221	56.194	56.217	56.174	55.903
GIRDER 3	EAST FLANGE	55.756	56.078	56.126	56.099	56.121	56.077	55.804
	WEST FLANGE	55.759	56.080	56.127	56.099	56.120	56.076	55.802

\*ELEVATIONS ARE TO TOP OF GIRDER AT TOP OF FLANGE OR TO TOP OF TOP SPLICE PLATE AT FIELD SPLICES, ALONG CL OF GIRDER.

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	BTJ	CHK	TJM	CODE CSA-S6-14   LOAD CL6250NT   DATE Jan-19
DRAWN	SJM	CHK	BRC	SITE 31-232   DWG 9




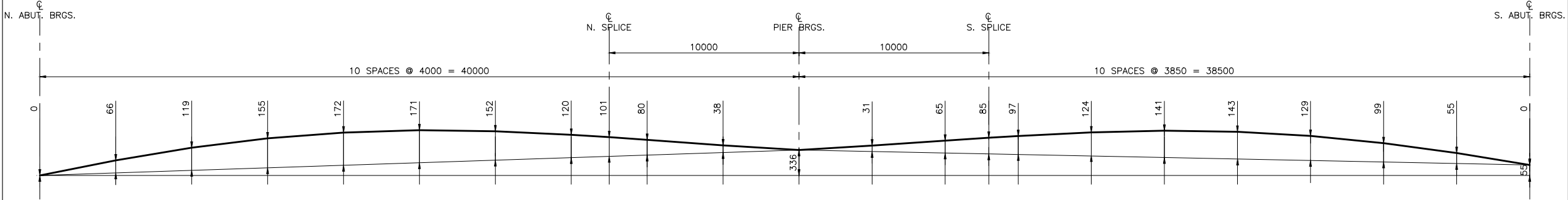
METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS

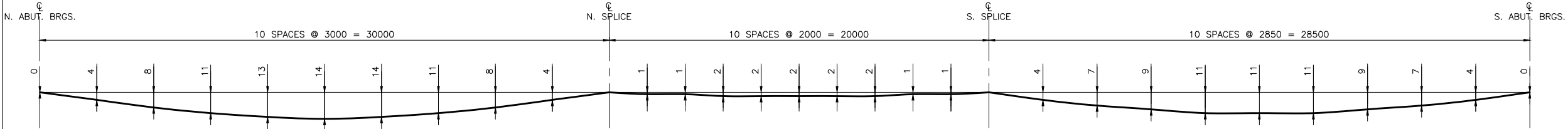
STRUCTURAL STEEL CAMBER  
AND DEFLECTION DIAGRAM

  
SHEET  
247



RELAXED CAMBER DIAGRAM  
SCALE 1:125

- NOTES
- GIRDERS SHALL BE CAMBERED TO VALUES SHOWN IN THE RELAXED CAMBER DIAGRAM.
  - RELAXED CAMBER ORDINATES INCLUDE AN ALLOWANCE FOR GIRDER SELF-WEIGHT, CONCRETE DECK, SUPERIMPOSED DEAD LOADS AND PROFILE OF ROAD. ADJUSTMENTS SHALL BE MADE TO THE RELAXED CAMBER DIAGRAM TO COMPENSATE FOR THE DEFLECTION OF THE INDIVIDUAL GIRDER SEGMENTS.



DEFLECTIONS FOR GIRDER SEGMENTS  
SCALE 1:125

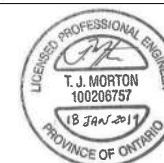
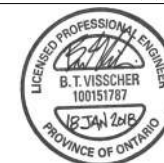
DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE		BY		DESCRIPTION			
	DATE	BY	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250NT
DESIGN	BTJ	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG





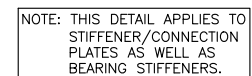
C  
SHEET  
248



SCALE 1:20



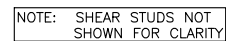
SCALE 1:5



SCALE 1:5



SCALE 1:5



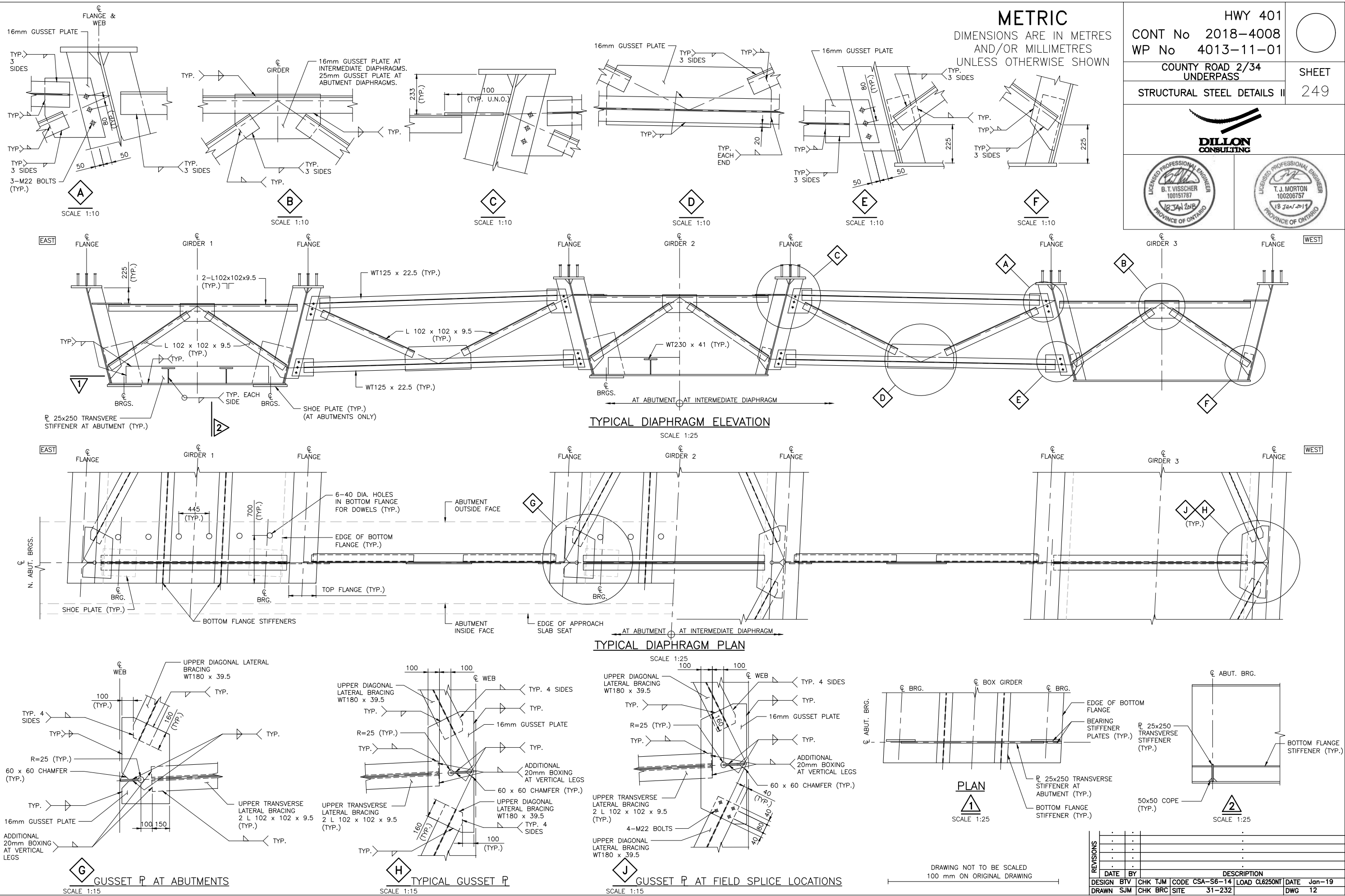
**D** SEE STRUCTURAL  
STEEL LAYOUT DWG.

SCALE 1:20

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

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	DATE	BY	DESCRIPTION								
DESIGN	BTV	CHK	TJM	CODE	CSA-S6-14			LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232					DWG	11

LAYOUT: SS-2  
FILE NAME: c:\project\ss\working\_directory\active\10bpd\0515027\4013-09-Structural Steel.dwg





LAYOUT: SS-4  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515027\4013-09-Structural Steel.dwg

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

HWY 401

CONT No 2018-4008

WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS

STRUCTURAL STEEL DETAILS IV

SHEET

251

DILLON  
CONSULTING

LICENSED PROFESSIONAL ENGINEER  
B. T. VISSCHER  
100151787  
PROVINCE OF ONTARIO  
18 JAN 2018

LICENSED PROFESSIONAL ENGINEER  
T. J. MORTON  
100206757  
PROVINCE OF ONTARIO  
18 JAN 2018

Diagram 1: WEB/TOP FLANGE FIELD SPICE DETAILS (SCALE 1:10). This detail shows the connection between the web and top flange of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of 3 x R 16 x 660 x 535 TOP and 3 x R 10 x 660 x 260 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF EACH WEB. The bottom flange is composed of 3 x R 16 x 660 x 535 BOTTOM. The diagram also shows 42-M22 DIA. BOLTS PER SIDE, 24 DIA. HOLES (TYP. EACH WEB) and 6-M22 DIA. BOLTS PER SIDE, 24 DIA. HOLES (TYP. EACH WEB). Dimensions are measured along the face of the web.

WEB/TOP FLANGE FIELD SPICE DETAILS

Diagram 4: TOP FLANGE FIELD SPICE DETAILS (SCALE 1:10). This detail shows the connection between the top flange and the web of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of R 16 x 450 x 695 TOP FLANGE and R 16 x 180 x 695 BELOW FLANGE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 16-M22 DIA. BOLTS EACH SIDE and R 40 x 600 TOP FLANGE. Dimensions are measured along the face of the web.

TOP FLANGE FIELD SPICE DETAILS

Diagram 3: BOTTOM FLANGE FIELD SPICE DETAILS (SCALE 1:10). This detail shows the connection between the bottom flange and the web of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The bottom flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 66-M22 DIA. BOLTS PER SIDE, 24 DIA. HOLES and 6-M22 DIA. BOLTS PER SIDE, 24 DIA. HOLES. Dimensions are measured along the face of the web.

BOTTOM FLANGE FIELD SPICE DETAILS

Diagram 2: FIELD SPICE (SCALE 1:10). This detail shows the connection between the top and bottom flanges of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The bottom flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 16-M22 DIA. BOLTS EACH SIDE and R 40 x 600 TOP FLANGE. Dimensions are measured along the face of the web.

FIELD SPICE

Diagram 5: PLAN (SCALE 1:10). This detail shows the connection between the top and bottom flanges of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The bottom flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 16-M22 DIA. BOLTS EACH SIDE and R 40 x 600 TOP FLANGE. Dimensions are measured along the face of the web.

PLAN

Diagram 6: DETAIL 6 (SCALE 1:10). This detail shows the connection between the top and bottom flanges of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The bottom flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 16-M22 DIA. BOLTS EACH SIDE and R 40 x 600 TOP FLANGE. Dimensions are measured along the face of the web.

DETAIL 6

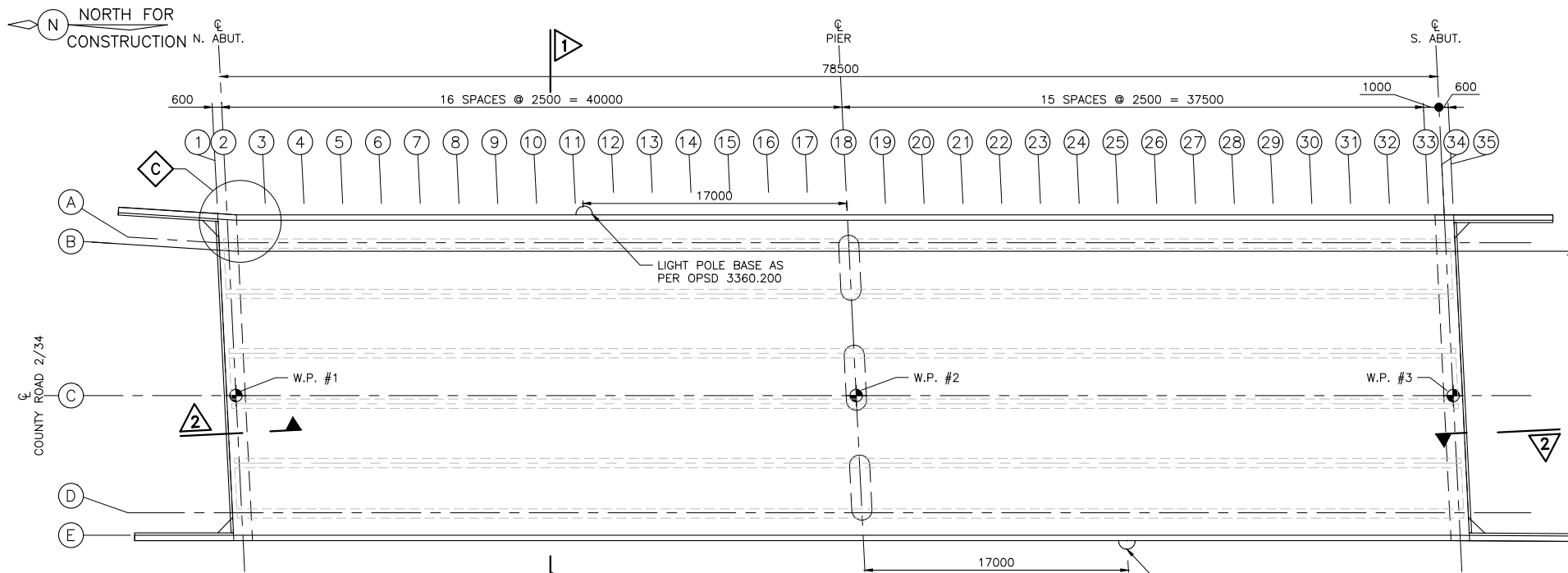
Diagram 6: DETAIL 6 (SCALE 1:10). This detail shows the connection between the top and bottom flanges of a box girder. It includes a 15 ERECTION GAP (TYP.) and 15 SPACES @ 80 = 1200. The top flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The bottom flange is composed of R 16 x 450 x 695 (TYP.) and R 10 x 450 x 340 FILLER PLATE. The web is composed of R 16 x 1300 x 535 EACH SIDE OF WEB (TYP.). The diagram also shows 16-M22 DIA. BOLTS EACH SIDE and R 40 x 600 TOP FLANGE. Dimensions are measured along the face of the web.

DETAIL 6

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

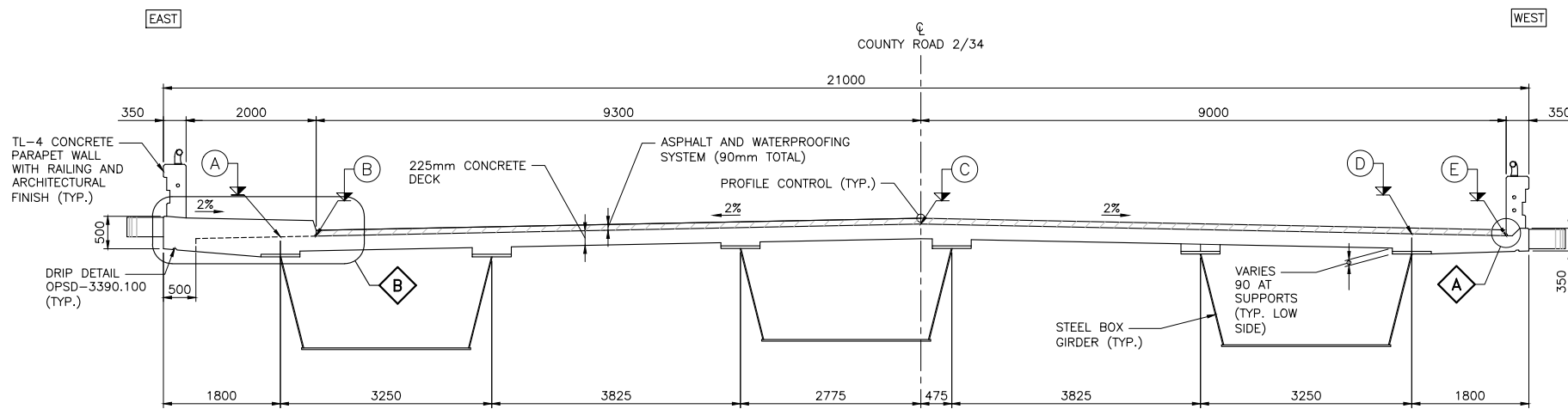
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DESIGN	BTJ	CHK	TJM	CODE CSA-S6-14
DRAWN	SJM	CHK	BRC	SITE 31-232
DATE	Jan-19	DATE	Jan-19	DWG 14





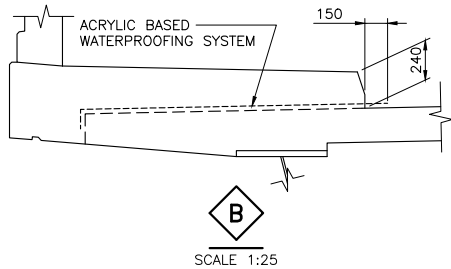
PLAN

SCALE 1:200



1

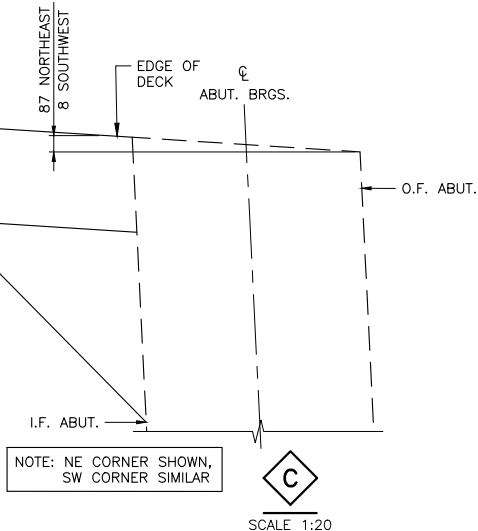
SCALE 1:50



B

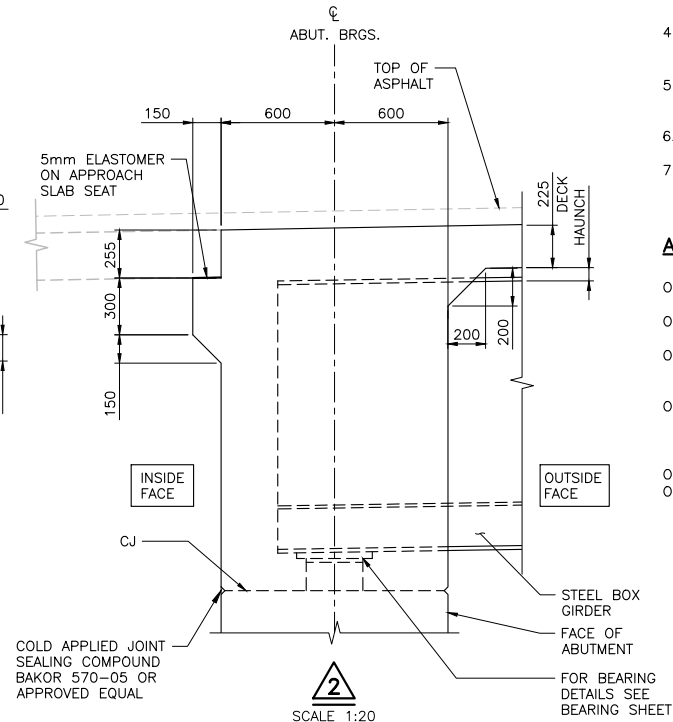
SCALE 1:25

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



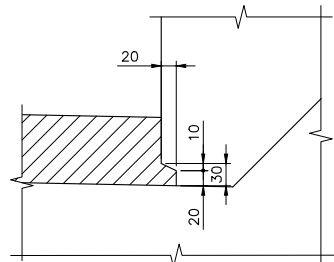
C

SCALE 1:20



2

SCALE 1:20



CHASE DETAIL

A

SCALE 1:5

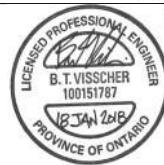
SCREED ELEVATIONS																																						
GRID LINE		℄ N. ABUT.																℄ PIER																			℄ S. ABUT.	
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝	㉞	㉟			
Ⓐ	55.973	55.983	56.043	56.099	56.150	56.194	56.234	56.266	56.291	56.312	56.324	56.332	56.335	56.336	56.334	56.331	56.330	56.327	56.330	56.332	56.335	56.337	56.337	56.335	56.328	56.316	56.299	56.276	56.247	56.212	56.170	56.125	56.075	56.054	56.045			
Ⓑ	55.983	55.994	56.054	56.110	56.161	56.206	56.245	56.277	56.303	56.323	56.335	56.343	56.346	56.347	56.345	56.343	56.341	56.338	56.341	56.343	56.346	56.348	56.348	56.345	56.338	56.327	56.310	56.286	56.258	56.222	56.181	56.136	56.085	56.064	56.055			
Ⓒ	56.179	56.188	56.247	56.303	56.354	56.398	56.437	56.468	56.493	56.513	56.524	56.532	56.535	56.535	56.533	56.530	56.527	56.525	56.527	56.528	56.530	56.532	56.532	56.529	56.521	56.510	56.492	56.468	56.439	56.403	56.361	56.315	56.265	56.244	56.235			
Ⓓ	56.034	56.044	56.102	56.157	56.208	56.251	56.290	56.321	56.345	56.365	56.376	56.383	56.386	56.385	56.383	56.380	56.377	56.374	56.375	56.377	56.378	56.380	56.379	56.376	56.368	56.356	56.338	56.313	56.284	56.248	56.206	56.159	56.108	56.087	56.078			
Ⓔ	56.006	56.016	56.074	56.129	56.179	56.223	56.262	56.293	56.317	56.336	56.347	56.355	56.357	56.357	56.354	56.351	56.348	56.345	56.346	56.348	56.349	56.351	56.350	56.346	56.338	56.326	56.308	56.284	56.254	56.218	56.176	56.129	56.078	56.057	56.048			

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
DECK LAYOUT



SHEET  
252



NOTES

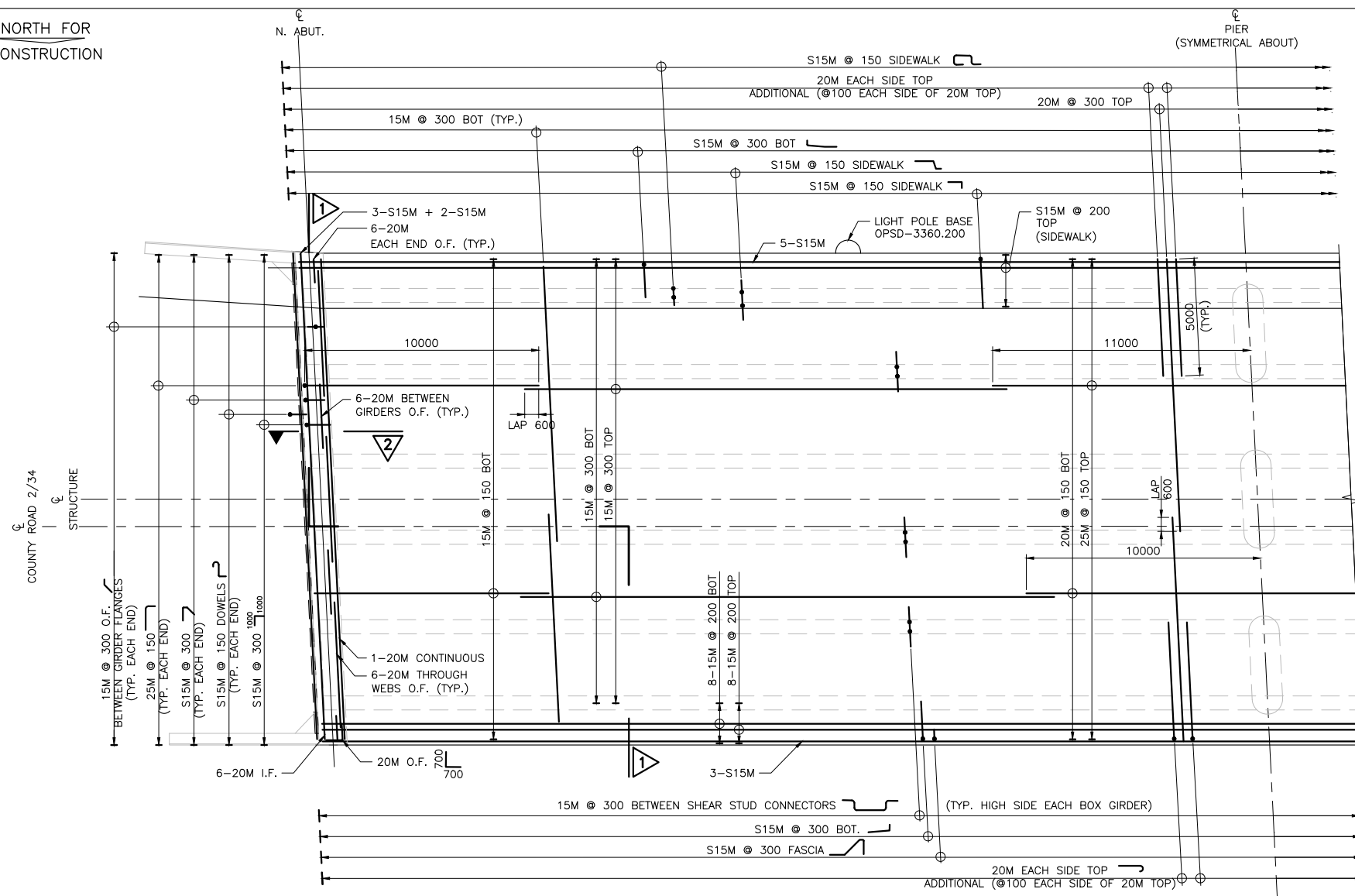
- SCREED ELEVATIONS ARE TO TOP OF CONCRETE DECK.
- SCREED ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR ROADWAY PROFILE AND DEAD LOAD DEFLECTIONS DUE TO DECK, ASPHALT, SIDEWALK, PARAPETS AND RAILINGS.
- CONCRETE IN DECK SLAB SHALL BE RETARDED USING TYPE "B" OR "D" ADMIXTURE TO ENSURE THAT THE CONCRETE REMAINS PLASTIC FOR THE DURATION OF THE DECK PLACEMENT.
- CONCRETE IN ABUTMENT AND WINGWALLS ABOVE ABUTMENT BEARING SEAT/CONSTRUCTION JOINT SHALL BE CAST MONOLITHICALLY WITH THE DECK.
- CONCRETE IN PARAPET AND SIDEWALK SHALL NOT BE PLACED UNTIL ALL CONCRETE IN DECK SLAB HAS REACHED A STRENGTH OF 20 MPa.
- DECK FORMWORK SHALL NOT BE REMOVED UNTIL DECK CONCRETE REACHES A MINIMUM STRENGTH OF 25 MPa.
- TOP AND VERTICAL SURFACE OF DECK CONSTRUCTION JOINT UNDER SIDEWALK SHALL BE COATED WITH AN ACRYLIC BASED WATERPROOFING SYSTEM.

APPLICABLE STANDARD DRAWINGS

OPSD-3311.100	DECK GIRDERS, STEEL, METHOD OF OBTAINING SCREED ELEVATIONS
OPSD-3360.200	DECK, LIGHT POLE BASES, STRUCTURES WITH PARAPET WALLS
OPSD-3370.100	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
OPSD-3370.101	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
OPSD-3390.100	DECK DRIP CHANNEL
OPSD-3950.100	JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

REVISIONS		DATE		BY		DESCRIPTION	
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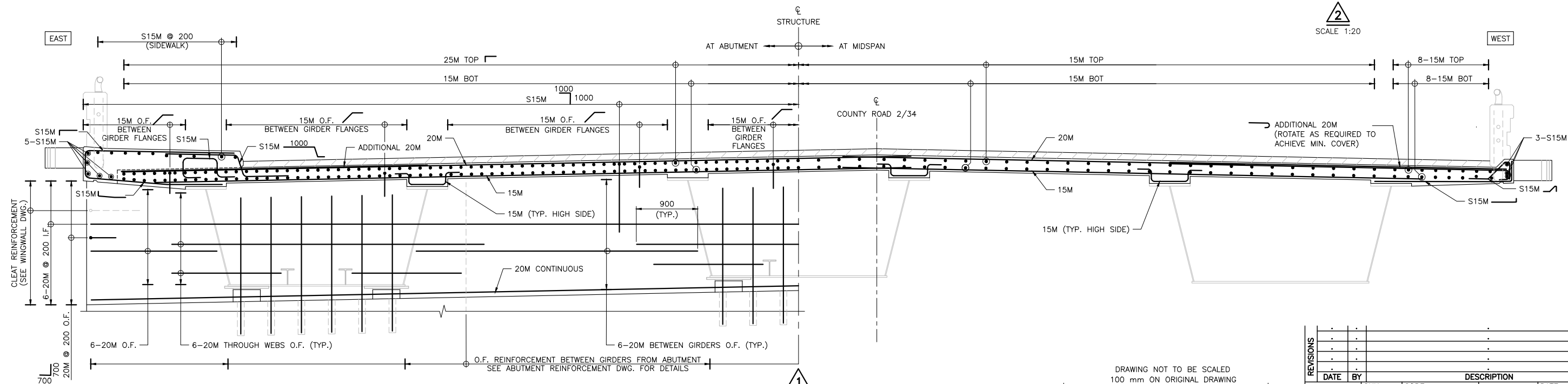
DESIGN	BTJ	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG	15



NOTE: NORTH SPAN SHOWN,  
SOUTH SPAN SIMILAR

PARTIAL DECK PLAN

SCALE 1:125



SCALE 1:30

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

NOTES:

1. HOLE SIZE AND INSTALLATION OF DOWELS SHALL BE IN ACCORDANCE WITH DOWEL ADHESIVE MANUFACTURER'S RECOMMENDATIONS.

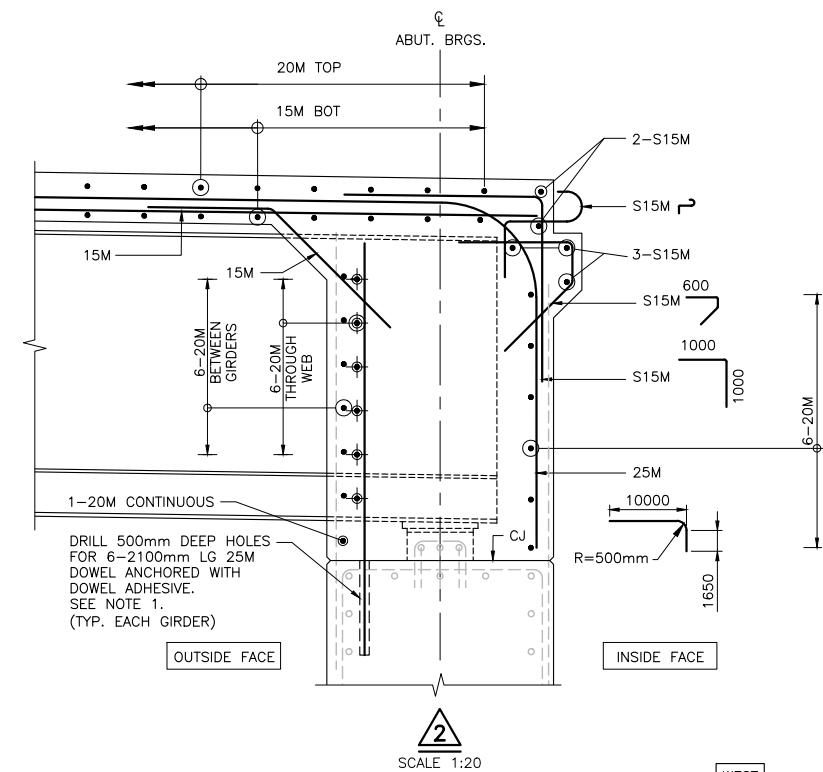
APPLICABLE STANDARD DRAWINGS

OPSD-3329.100

DECK, REINFORCEMENT, SUPPORTS FOR  
REINFORCING STEEL FOR SLAB DEPTHS  
300mm OR LESS.

OPSD-2215.020

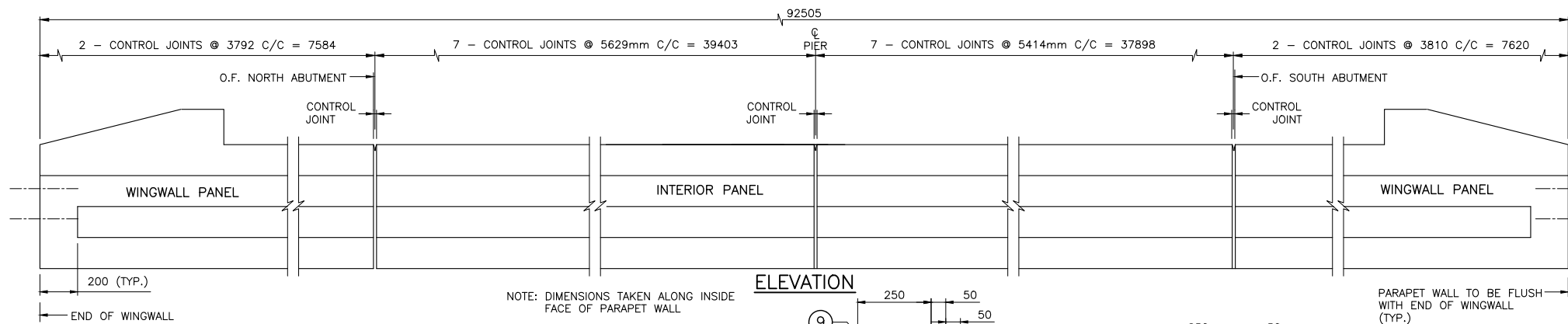
ANCHORAGE ASSEMBLY FOR LIGHTING  
AND SIGNAL POLES



SCALE 1:20

[illegible]

LAYOUT: BARRIER  
FILE NAME: c:\projectwise\working\_directory\active\10bpd\0515027\4013-09-Barrier-Rail.dwg



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

FOR ANCHORAGE DETAILS SEE  
GENERAL ARRANGEMENT DRAWING (TYP.)

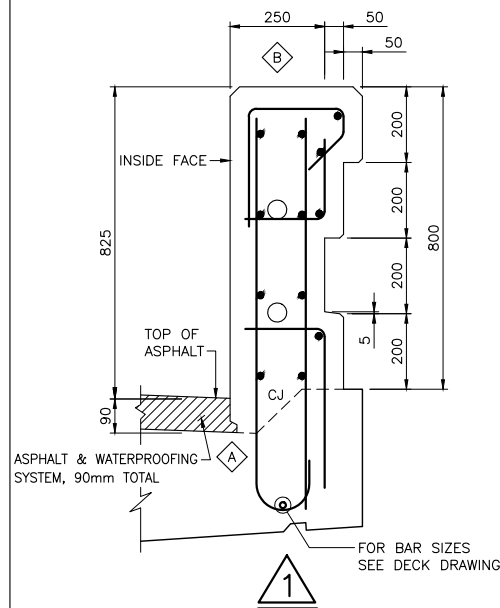
BAR MARK	SIZE	SHAPE
①	S15M	
②	S15M	STRAIGHT
③	S15M	
④	S15M	
⑤	S10M	STRAIGHT
⑥	S10M	STRAIGHT
⑦	S15M	
⑧	S10M	STRAIGHT, LENGTH VARIES
⑨	S15M	
⑩	S15M	
⑪	S15M	

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
PARAPET WALL WITHOUT  
SIDEWALK  
SHEET  
254

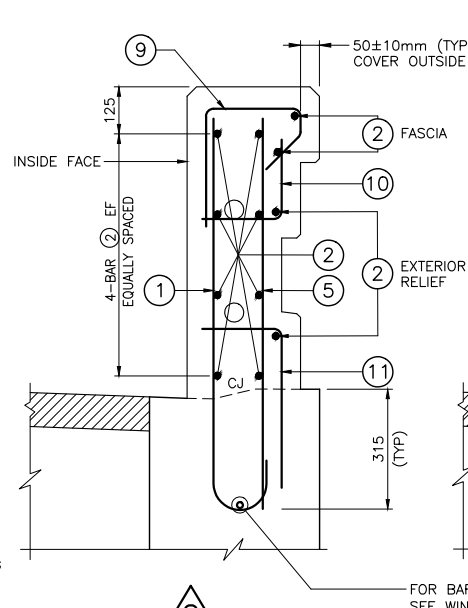


**NOTES:**

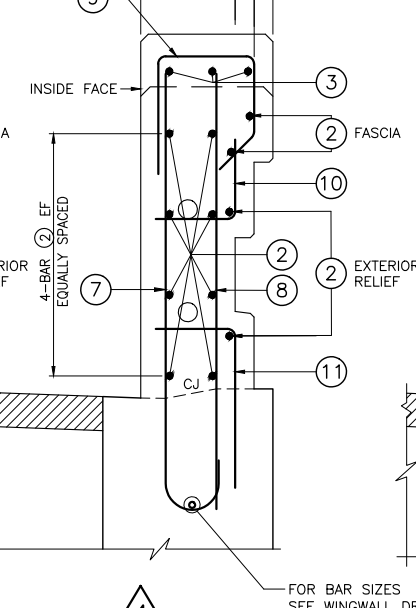
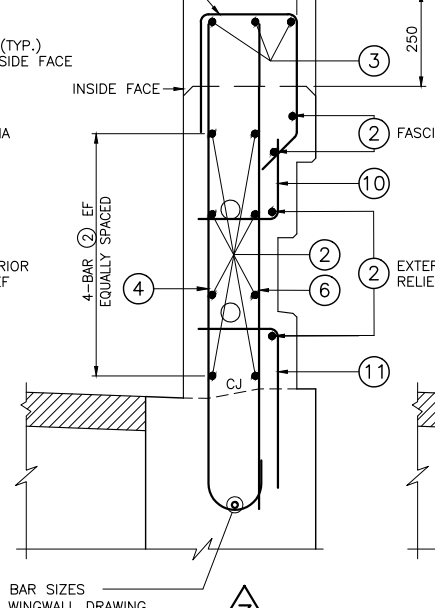
- SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
- CONCRETE COVER TO REINFORCING STEEL 60±10mm EXCEPT AS NOTED.
- REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR BUXLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
- BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
- MINIMUM BAR LAP SPLICE TO BE 550mm.
- LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS.
- 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 BALLEST WALL.
- CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL
- LEGEND: EF - DENOTES EACH FACE  
IF - DENOTES INSIDE FACE  
OF - DENOTES OUTSIDE FACE  
CJ - CONSTRUCTION JOINT



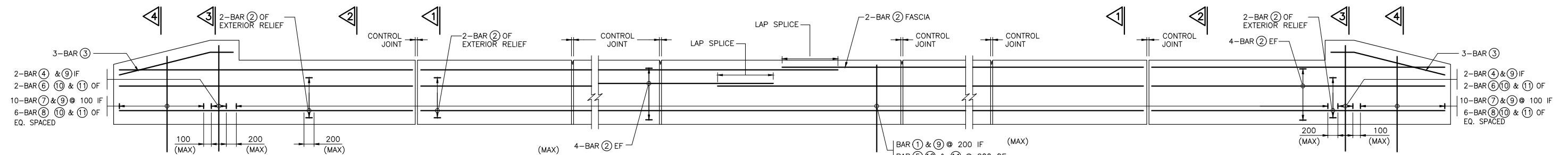
**CONCRETE PARAPET ON DECK**  
TYPICAL DIMENSIONS  
(FOR BAR NUMBERS SEE 2)



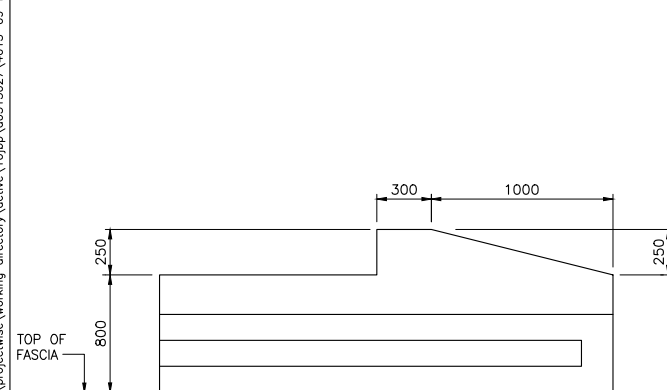
**CONCRETE PARAPET ON WINGWALL**  
TYPICAL REINFORCEMENT



**EXTENT OF CONTROL JOINT IN PARAPET WALL**

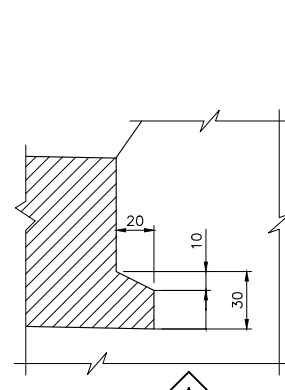


**TYPICAL REINFORCING ARRANGEMENT**

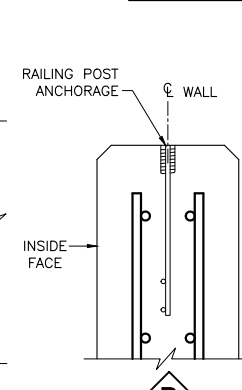


**ELEVATION OF PARAPET ON WINGWALL**

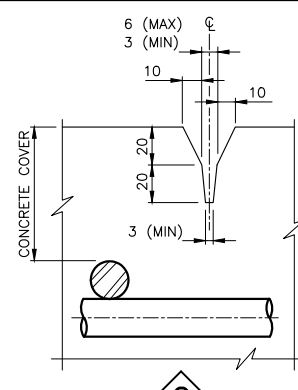
THIS FACE PERPENDICULAR  
TO GRADE OF ABUTTING  
GUIDE RAIL



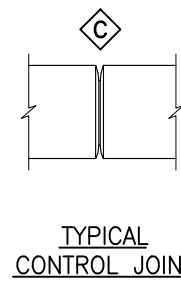
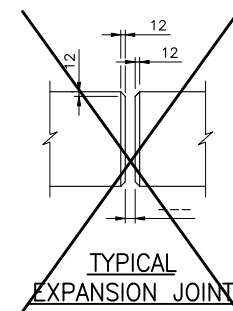
**CHASE DETAIL**



**POST ANCHORAGE DETAIL**



**CONTROL JOINT DETAIL**



DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

**APPLICABLE STANDARD DRAWINGS**

SS110-21 RAILING FOR BARRIER/PARAPET WALL

**MODIFIED**

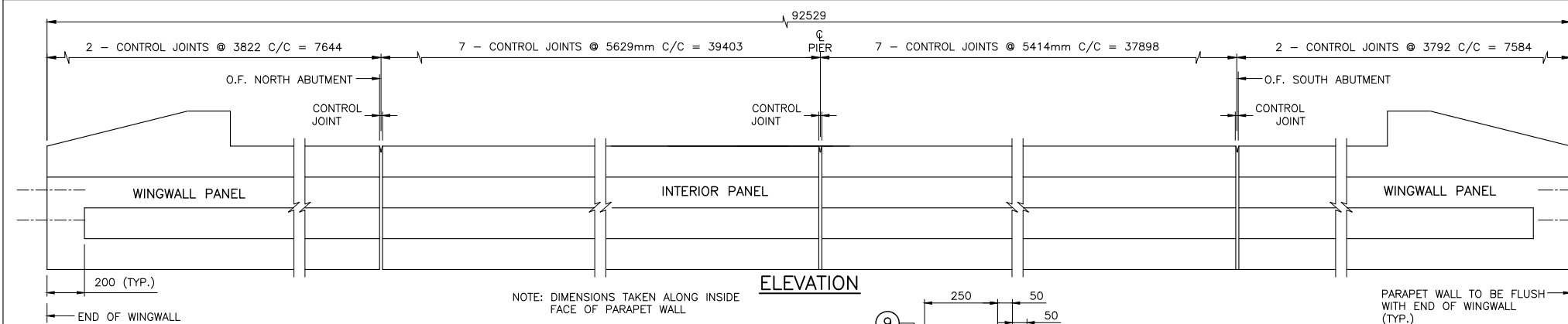
STANDARD DRAWING  
SEPTEMBER 2016

**SS110-56**

**PARAPET WALL WITH RAILING, TL-4  
(STAINLESS STEEL REBAR)**

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	BTJ	CHK	TJM
DRAWN	SJM	CHK	BRC
CODE	CSA-S6-14	LOAD	CL6250NT
DATE	Jan-19	DWG	17

LAYOUT: BARRIER-S-W  
FILE NAME: c:\project\working directory\active\10bp\0515027\4013-09-Barrier-Rail.dwg



**METRIC**

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

FOR ANCHORAGE DETAILS SEE  
GENERAL ARRANGEMENT DRAWING (TYP.)

BAR MARK	SIZE	SHAPE
①	S15M	
②	S15M	STRAIGHT
③	S15M	
④	S15M	
⑤	S10M	STRAIGHT
⑥	S10M	STRAIGHT
⑦	S15M	
⑧	S10M	STRAIGHT, LENGTH VARIES
⑨	S15M	
⑩	S15M	
⑪	S15M	

HWY 401

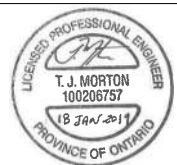
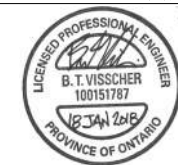
CONT No 2018-4008

WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS

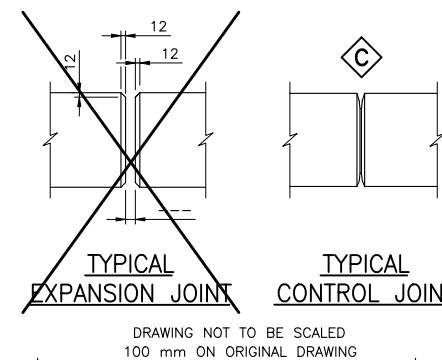
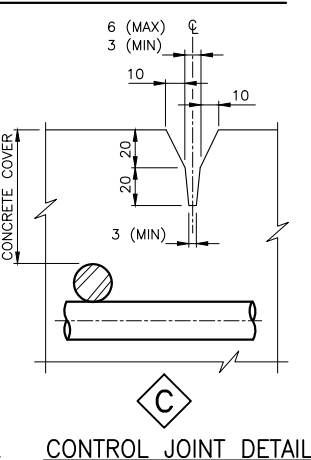
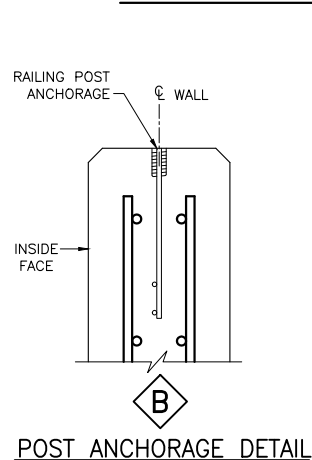
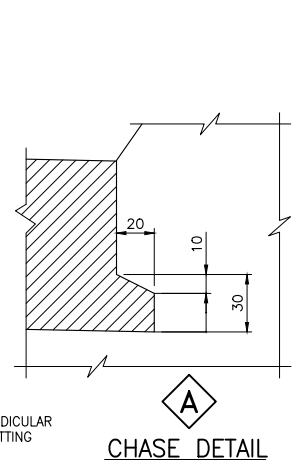
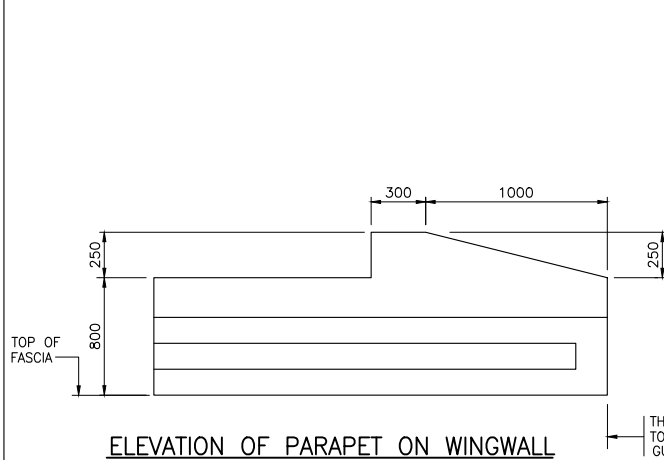
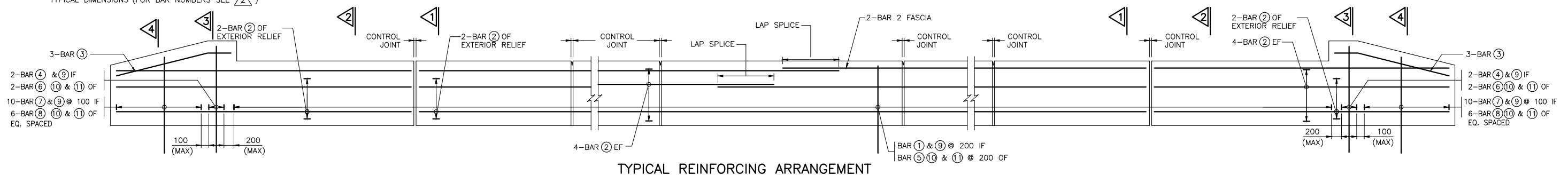
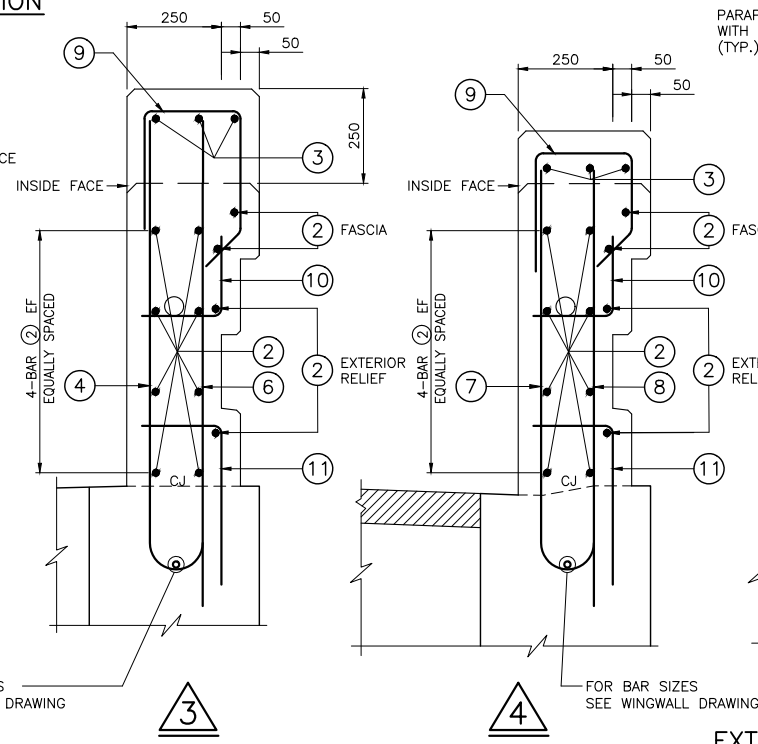
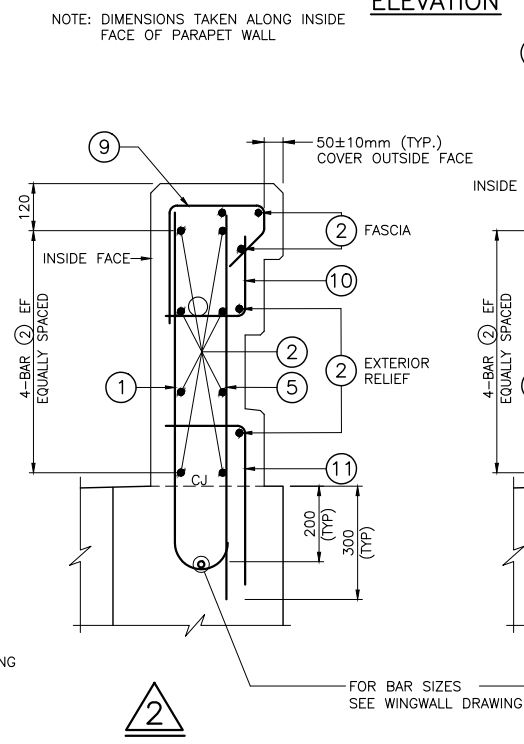
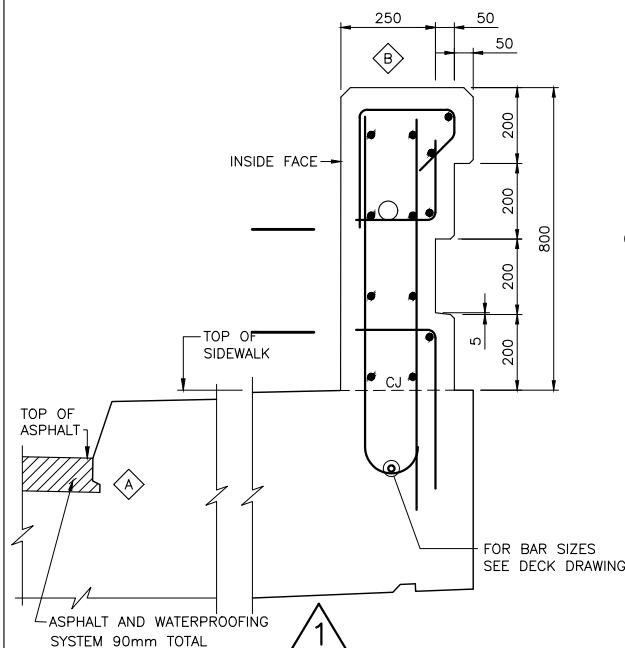
PARAPET WALL ON SIDEWALK

SHEET  
255



**NOTES:**

- SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
- CONCRETE COVER TO REINFORCING STEEL 60±10mm EXCEPT AS NOTED.
- REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR BUXLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
- 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.
- 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 BALLEST WALL.
- CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL
- LEGEND: EF - DENOTES EACH FACE  
IF - DENOTES INSIDE FACE  
OF - DENOTES OUTSIDE FACE  
CJ - CONSTRUCTION JOINT



**APPLICABLE STANDARD DRAWINGS**

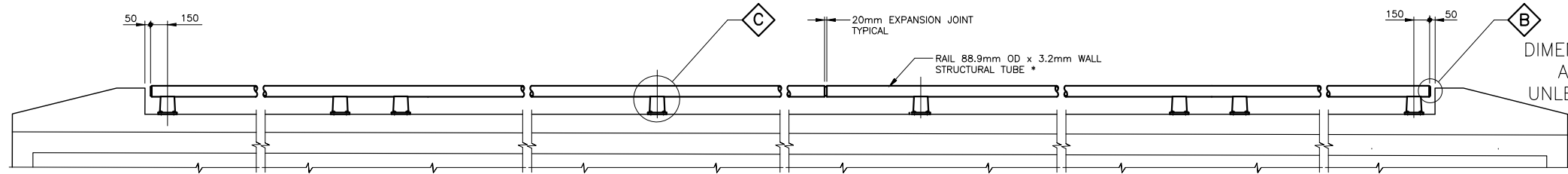
SS110-21 RAILING FOR BARRIER/PARAPET WALL

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110-57
PARAPET WALL WITH RAILING ON SIDEWALK, TL-4 (STAINLESS STEEL REBAR)	

REVISIONS	.	.					.		
	.	.					.		
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	.	.					.		
	.	.					.		
	DATE	BY	DESCRIPTION						
DESIGN	BTJ	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE	Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG	18



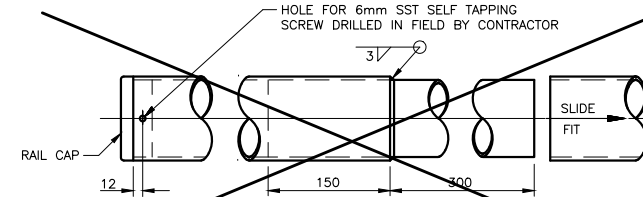
LAYOUT: RAIL  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515027\4013-09-Barrier-Rail.dwg



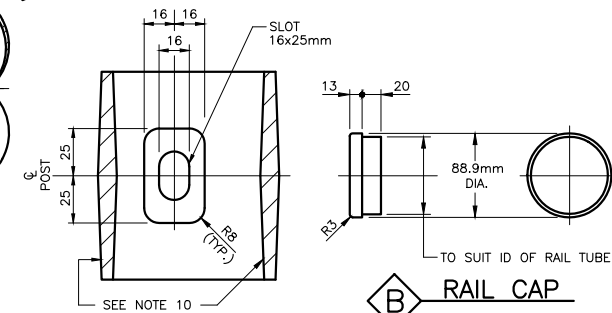
ELEVATION  
INSIDE FACE SHOWN

\* WALL THICKNESS SHALL  
BE 4.78mm FOR  
WELDED STUD OPTION

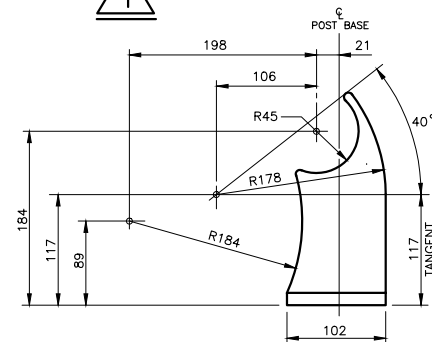
**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN



DETAIL  
A



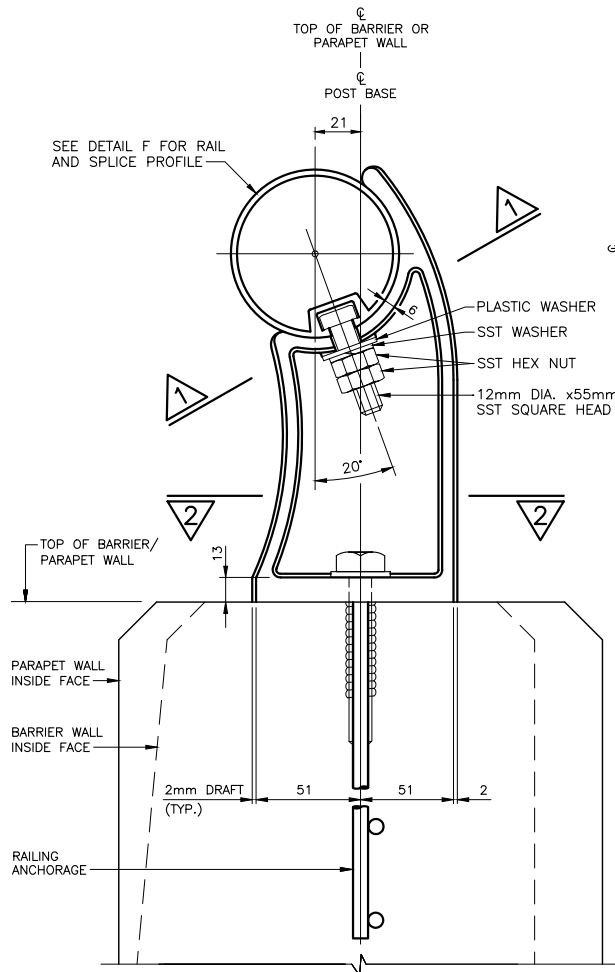
DETAIL  
B RAIL CAP



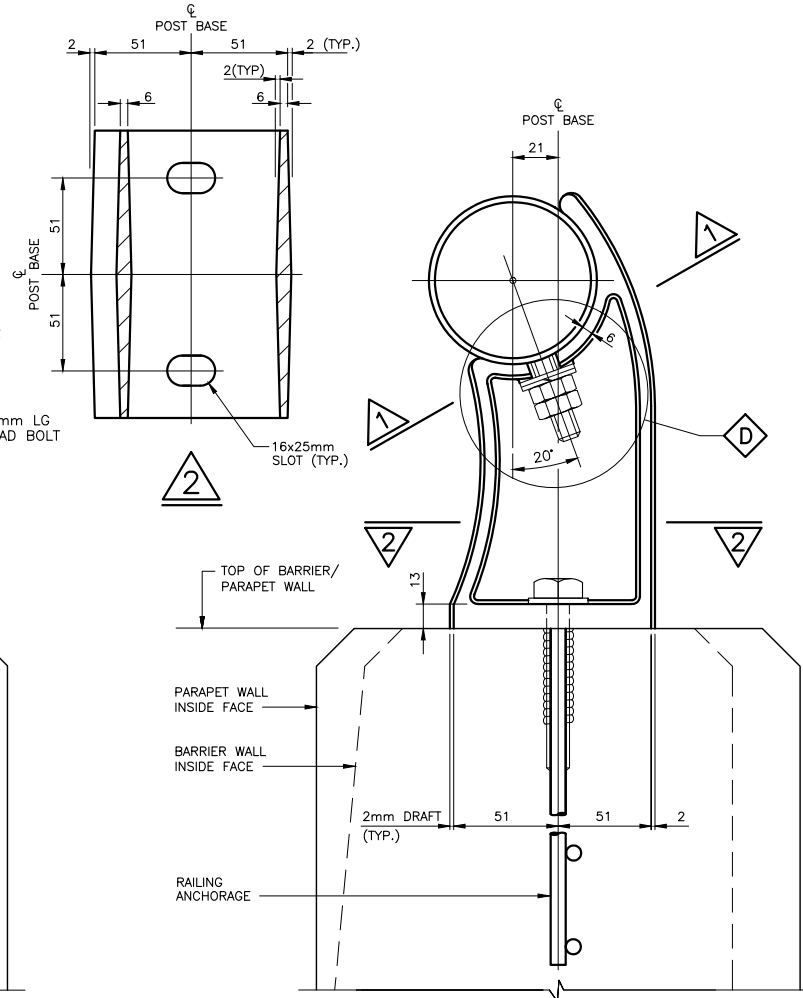
POST DETAILS

	MAXIMUM
POST* SPACING FOR STEEL RAIL	3500mm
POST* SPACING FOR ALUMINUM RAIL	2500mm

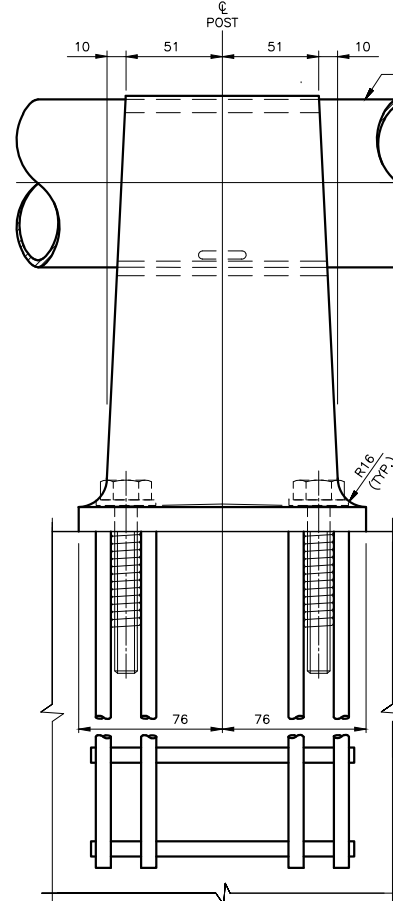
\* POSTS MAY BE STEEL OR ALUMINUM



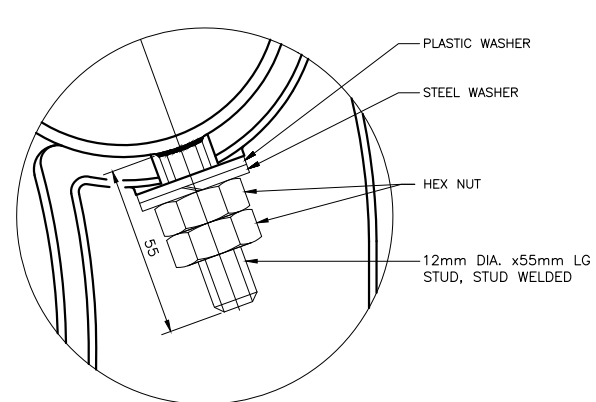
TYPICAL CROSS SECTION  
ALUMINUM RAIL OPTION



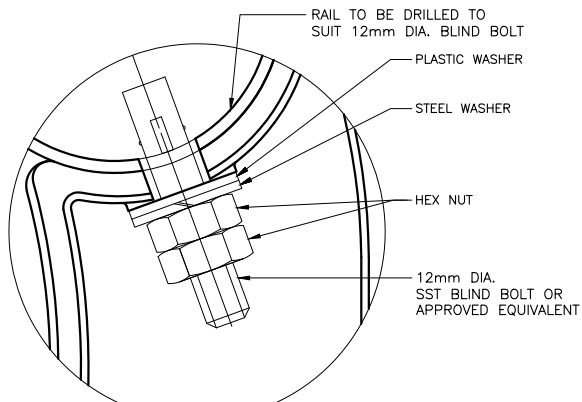
TYPICAL CROSS SECTION  
STEEL RAIL OPTION



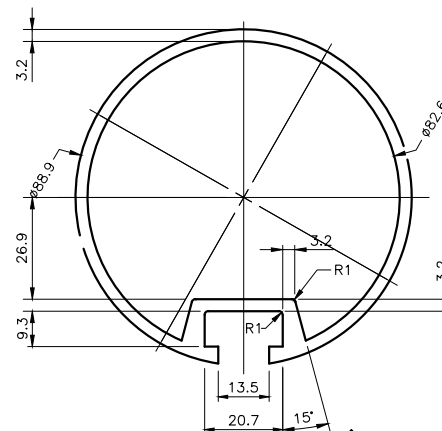
BACK VIEW  
C



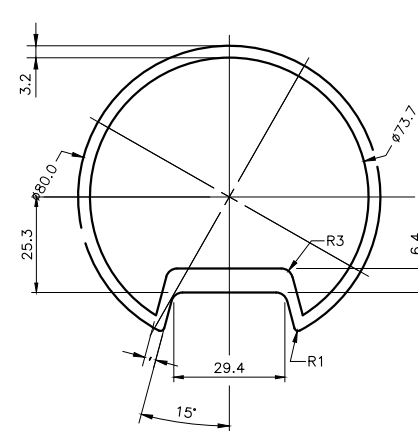
DETAIL  
D FULL-THREADED WELDED STUD  
(FOR ALTERNATIVE SEE E)



DETAIL  
E BLIND BOLT



RAIL PROFILE  
F

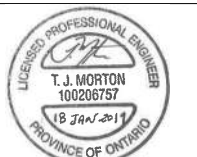
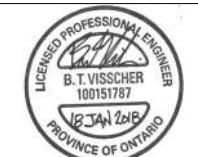


DETAIL  
EXTRUDED ALUMINUM RAIL SPLICE PROFILE

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

STANDARD DRAWING MARCH 2015	SS110-21
RAILING FOR BARRIER/PARAPET WALL	

HWY 401	SHEET 256
CONT No 2018-4008	
WP No 4013-11-01	
COUNTY ROAD 2/34 UNDERPASS	
RAILING FOR PARAPET WALL	



NOTES:

- ALL NON-STAINLESS STEEL BOLT, NUT AND WASHER FOR FASTENING STEEL RAIL TO POSTS SHALL BE HOT-DIP GALVANIZED.
- ALL WELDED STUDS OR BLIND BOLTS OR SQUARE HEAD BOLTS SHALL BE INSTALLED AT THE MIDDLE OF THE SLOT AND SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
- RAILS SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH CAN BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
- POST AND ANCHORAGES TO INCLUDE ALL BOLTS AND WASHERS.
- RAILING ANCHORAGE TO BE PLACED PRIOR TO CONCRETING.
- RAIL SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150m.
- RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE
- WHERE LAYOUT OF POSTS IS NOT SHOWN, POST LOCATION SHALL BE DETERMINED BY THE CONTRACTOR. POST LOCATION SHALL NOT COINCIDE WITH PARAPET CONTROL JOINTS
- WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
- THE COMBINATION OF STEEL RAIL AND ALUMINUM POSTS IS PERMITTED.  
-WHEN AN EXTRUDED POST IS USED, THE ALLOY SHALL BE 6061 ALLOY T-6 HEAT TREATED. THE POST DIMENSIONS SHALL NOT BE SMALLER THAN THE DETAILS SHOWN IN THE DRAWING. WALLS OF EXTRUDED POST ARE NOT TAPERED AND SHALL HAVE A UNIFORM THICKNESS OF 8mm MINIMUM.  
-WHEN A CAST POST IS USED THE ALLOY SHALL BE A444.0-T4.
- RAIL CAP MATERIAL SHALL BE STEEL OR ALUMINUM. RAIL CAP CAN BE SAND CAST 356 ALUMINUM ALLOY. RAIL CAP TO INCLUDE SST SELF TAPPING FASTENERS.

NOTES FOR STEEL RAIL OPTION:

- RAIL SHALL BE STRUCTURAL TUBING GRADE 350W.
- STEEL IN POST SHALL BE CAST STEEL SUPPLIED IN ACCORDANCE WITH ASTM A27/A27M-08 GRADE 65-35.
- GALVANIZE RAIL TUBING MATING SURFACES TO HAVE A 2 ±0.5mm GAP ALL ROUND TO ENSURE A SLIDE FIT.
- FULL THREAD STUDS, WASHERS AND NUTS FOR FASTENING RAIL TO POST SHALL CONFORM TO ASTM A108.
- POSTS AND RAILS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- RAIL MAY BE CUT AS REQUIRED IN FIELD WITH PIPE CUTTERS. CUT TO BE REPAIRED AS SPECIFIED IN OPSS 908.

NOTES FOR ALUMINUM RAIL OPTION:

- ALUMINUM RAIL SHALL BE 6061 ALLOY T-6 HEAT TREATED.
- STAINLESS STEEL BOLTS, WASHERS AND LOCK NUTS SHALL BE TYPE 304 ACCORDING TO ASTM A314.

LEGEND:

SST - STAINLESS STEEL

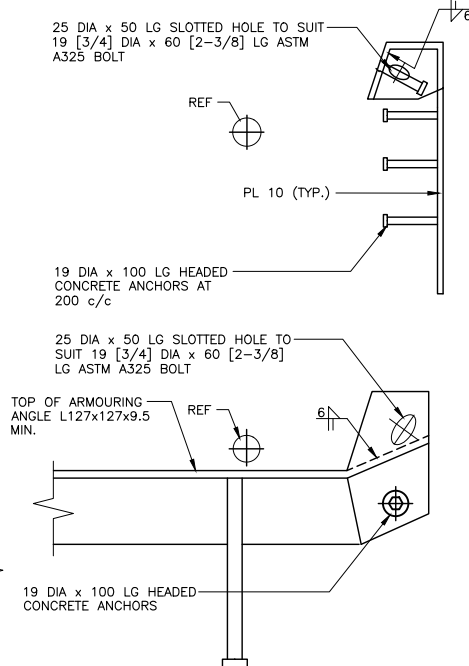
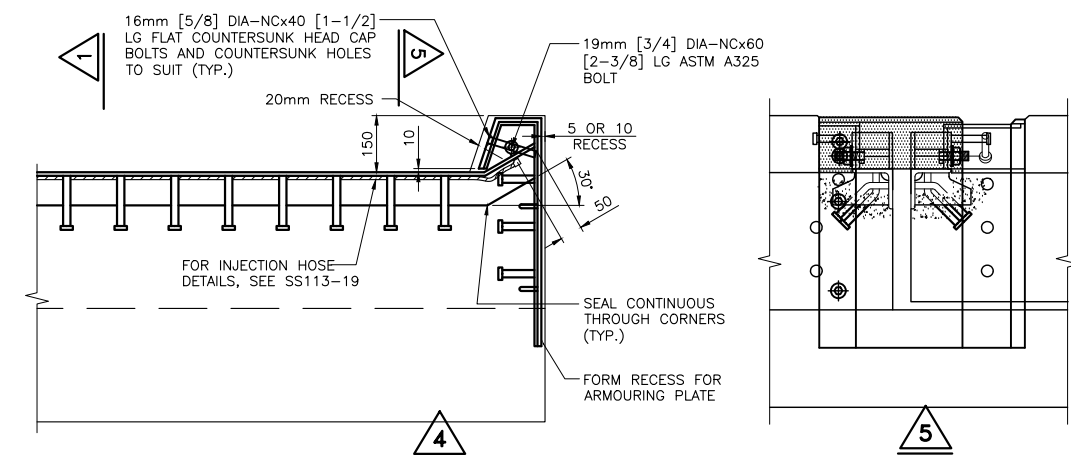
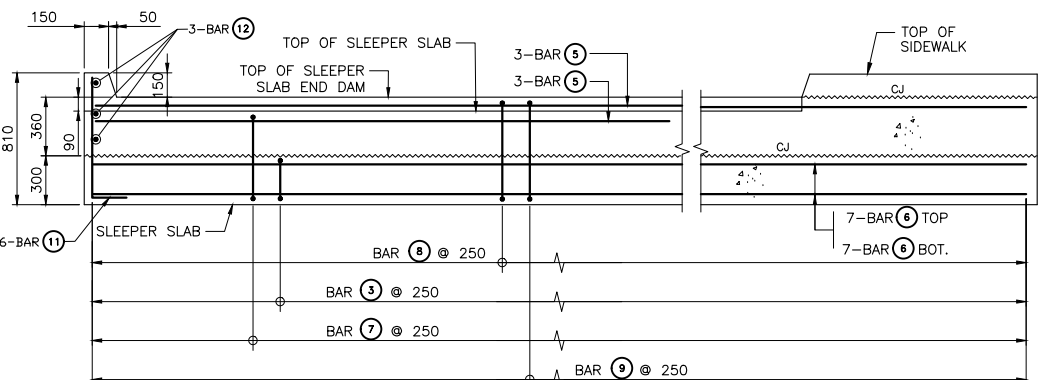
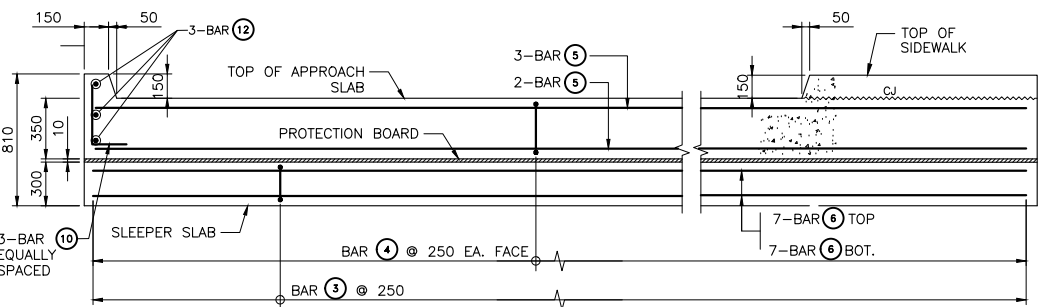
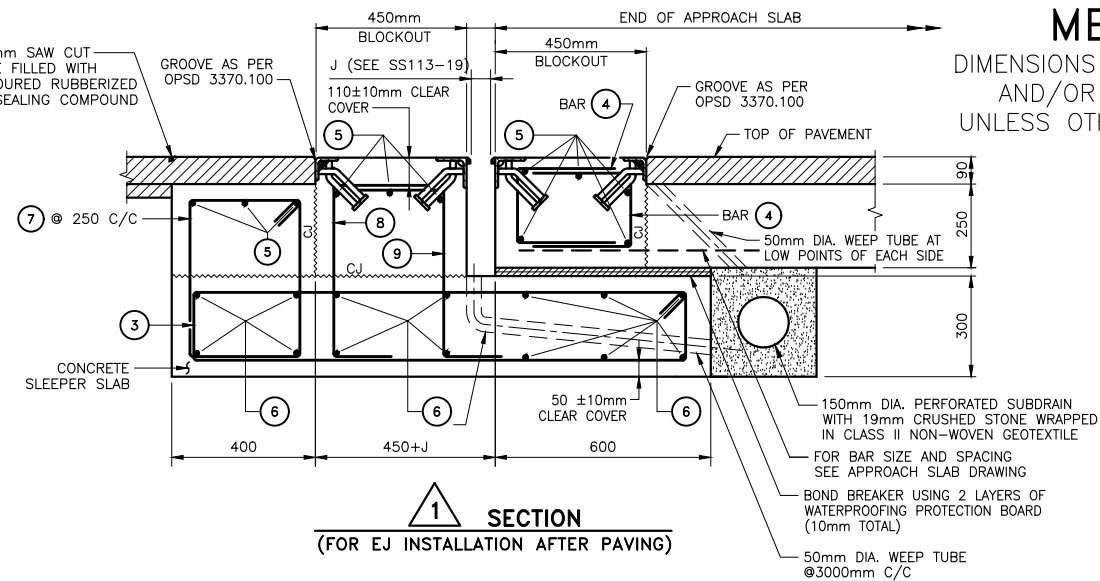
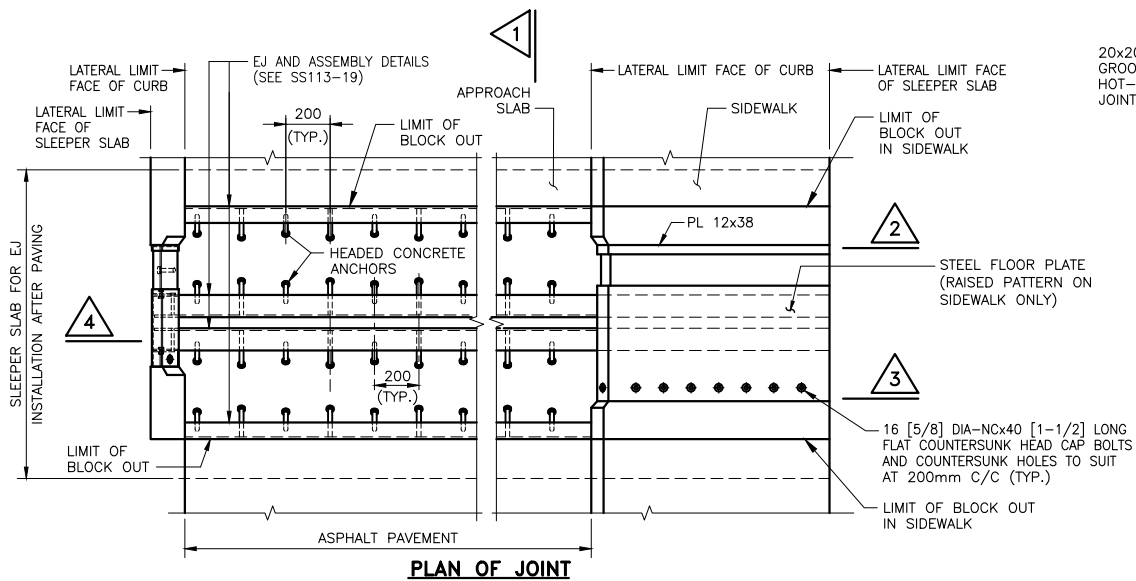
APPLICABLE STANDARD DRAWINGS

OPSD 3419.150 BARRIERS AND RAILINGS - STEEL SINGLE RAILING ANCHORAGE

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	BTJ	CHK	TJM
DRAWN	SJM	CHK	BRC
DATE	Jan-19	DWG	19

SCALE 1

LAYOUT: EXPANSION JOINT AND SLEEPER SLAB  
FILE NAME: c:\project\ss113-37\expansion\_joints.dwg



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

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
EXPANSION JOINTS I

SHEET  
258

DILLON  
CONSULTING

LICENSED PROFESSIONAL ENGINEER  
B. T. VISSCHER  
100151787  
PROVINCE OF ONTARIO

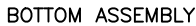
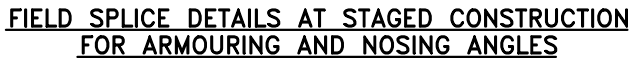
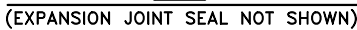
LICENSED PROFESSIONAL ENGINEER  
T. J. MORTON  
100206757  
PROVINCE OF ONTARIO

- NOTES:**
- THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40mm.
  - CLASS OF CONCRETE 30 MPa.
  - REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
  - COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
  - THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING SS113-19.
  - EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURES LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'C' STRIP SEAL EXPANSION JOINT.
  - EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
  - JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
  - JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
    - FOR CONCRETE STRUCTURES - 48 HOURS
    - FOR STEEL STRUCTURES - 24 HOURS
  - FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
  - IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
  - SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
  - AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
  - PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
  - ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
  - PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
  - HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
  - PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
  - FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.
  - ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.
  - ALL CONSTRUCTIONS JOINTS (CJ) SURFACES SHALL BE INTENTIONALLY ROUGHENED BEFORE NEW CONCRETE IS PLACED AGAINST THEM.
  - SEQUENCE OF EXPANSION JOINT INSTALLATION SHALL BE AS PER DRAWING SS113-38.

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	BTW	CHK	TJM	CODE CSA-S6-14
DRAWN	SJM	CHK	BRC	SITE 31-232
DATE	Jan-19	DATE	Jan-19	DWG 21

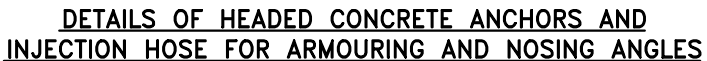
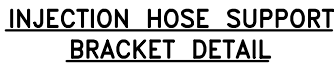
MODIFIED	
STANDARD DRAWING MAY 2017	SS113-37
EXPANSION JOINT AND SLEEPER SLAB (10mm<MOVEMENT≤40mm)	

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



### DETAIL OF ARMOURING WITHOUT SIDEWALK

### DETAIL OF ARMOURING AT SIDEWALK



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

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS

## EXPANSION JOINTS II

SHEET

259



**NOTES:**

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH SS113-37.

**LEGEND:**

- [ ] DENOTES FASTENER SIZE IN INCHES  
CJ DENOTES CONSTRUCTION JOINT  
EJ DENOTES EXPENSION JOINT

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZED WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
4. ALL BOLTS SHALL BE TENSIONED USING THE TURN-OF-NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S6-14.

## TABLE OF DESIGN REQUIREMENTS

EXP. JOINT LOCATION	MTO GAP ** RATING (mm)		DESIGN *** MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C) (mm)								
	MIN	MAX		-5°	0°	5°	10°	15°	20°	25°	30°	
SLEEPER SLAB	50	100	34	81	79	77	74	72	70	67	65	
			14									EXP
			20									CONT

\* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELIN OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST-TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

\*\* MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STOP BAR, IS TAKEN FROM DSM 9.40.27, TYPE "C".

\*\*\*  
CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION.  
(MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)



STANDARD DRAWING MAY 2018	SS113-19
STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (10mm<MOVEMENT≤40mm)	

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

REVISIONS	.	.				.		
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	DATE	BY	DESCRIPTION					
DESIGN	BTW	CHK	TJM	CODE	CSA-S6-14	LOAD	CL6250NT	DATE Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232			DWG 22

LAYOUT: STRIP SEAL EXPANSION JOINT  
FILE NAME: c:\projectwise\working\_directory\active\101bp\d0515027\4013-09-Expansion Joints.dwg



LAYOUT: III  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515027\4013-09-Expansion Joints.dwg

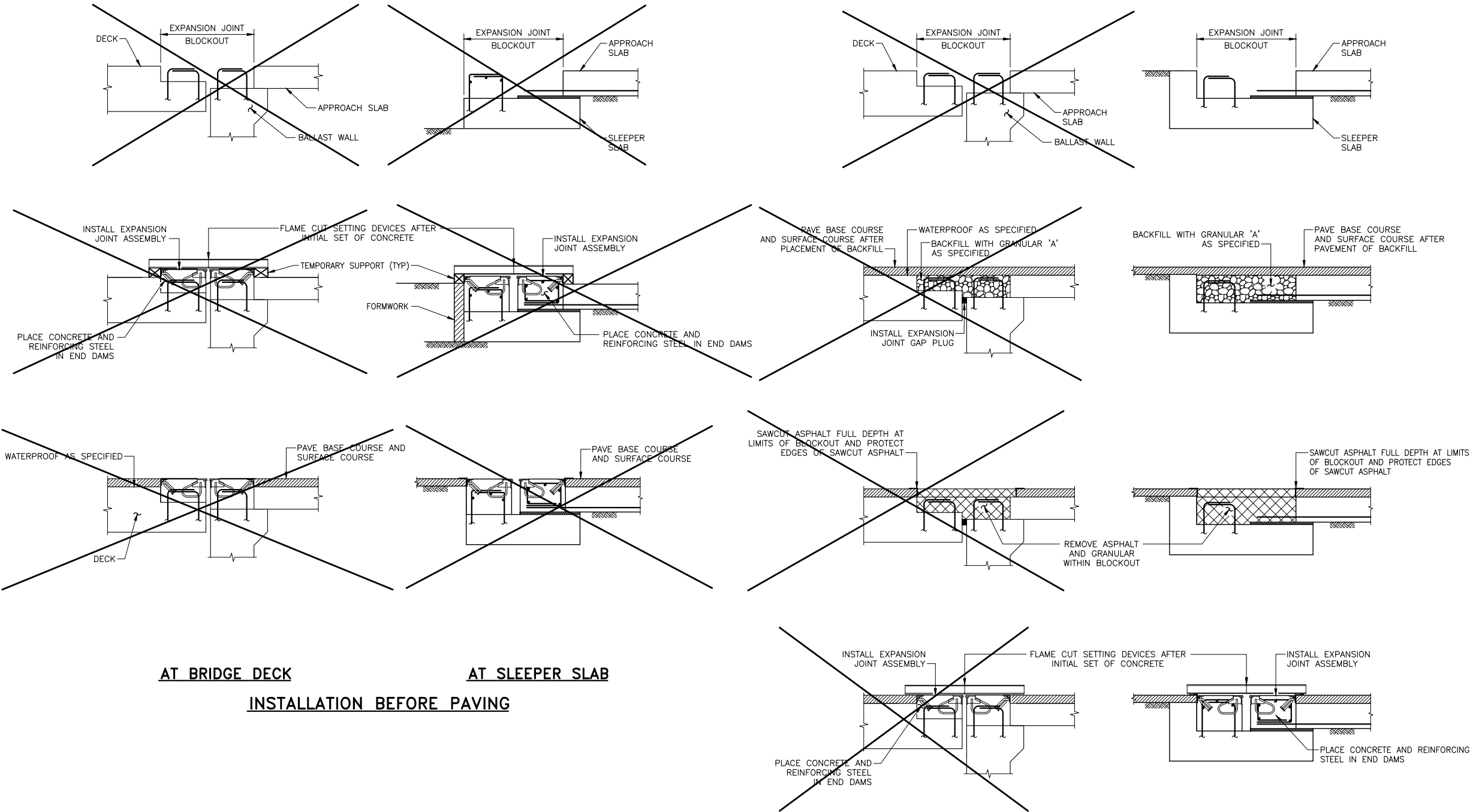
METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
EXPANSION JOINTS III

SHEET  
260



- NOTES:
1. THE PURPOSE OF THIS DRAWING IS TO SHOW SCHEMATICALLY THE EXPANSION JOINT CONSTRUCTION SEQUENCE.
  2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE EXPANSION JOINT DRAWINGS AND SPECIFICATIONS.
  3. REINFORCING STEEL AND JOINT HARDWARE SHOWN ARE SCHEMATIC ONLY AND ARE AS SPECIFIED ELSEWHERE.
  4. CONTRACTOR SHALL ENSURE THAT ALL REINFORCEMENT IN THE BLOCKOUT IS NOT DAMAGED.



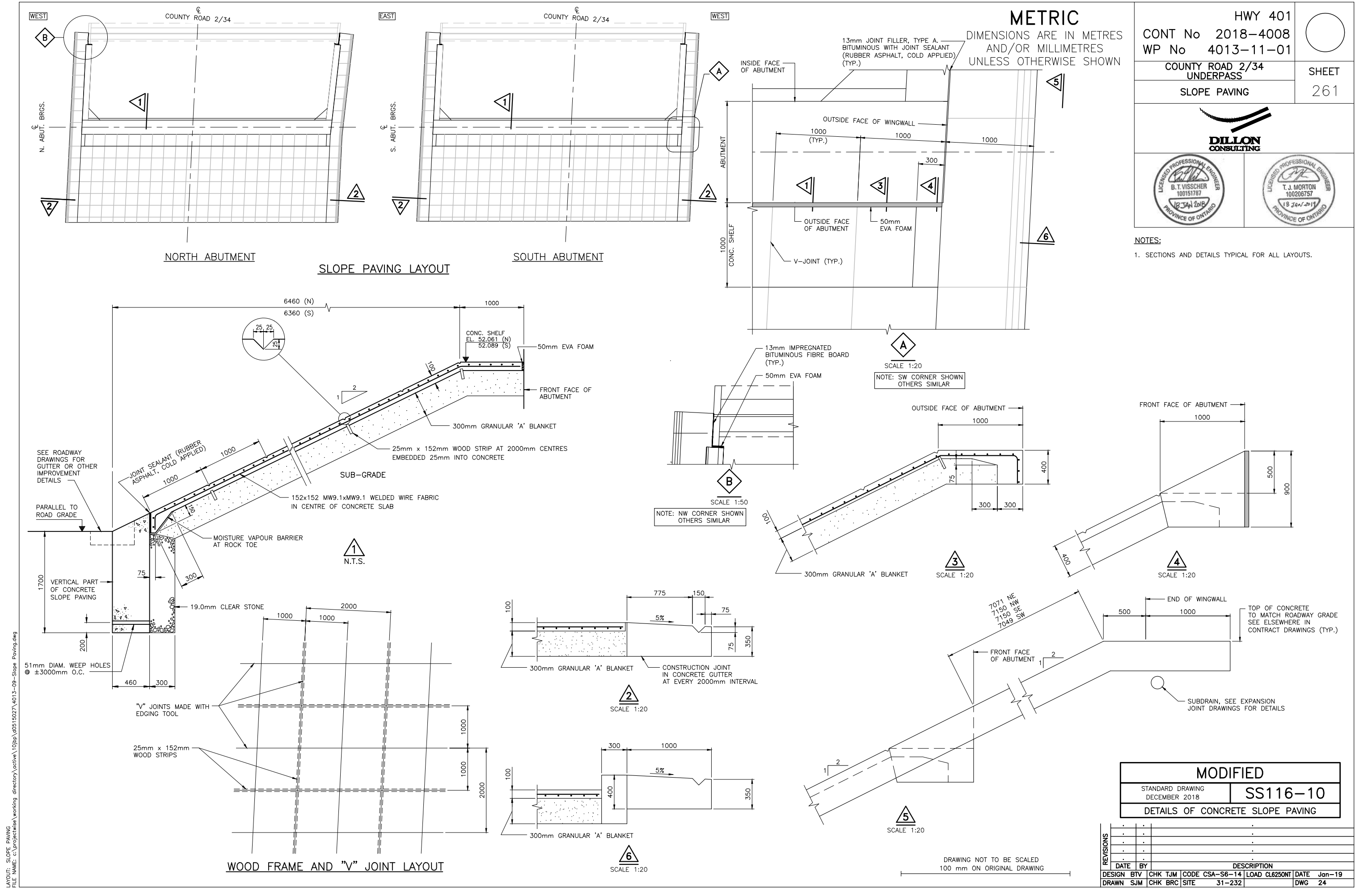
AT BRIDGE DECK  
AT SLEEPER SLAB  
INSTALLATION BEFORE PAVING

AT BRIDGE DECK  
AT SLEEPER SLAB  
INSTALLATION AFTER PAVING

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

STANDARD DRAWING MAY 2018	SS113-38
SEQUENCE OF EXPANSION JOINT INSTALLATION	

REVISIONS		DATE	BY	DESCRIPTION
DESIGN	BTM	CHK	TJM	CODE CSA-S6-14
DRAWN	SJM	CHK	BRC	SITE 31-232
LOAD	CL6250N	DATE	Jan-19	DWG 23



METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01  
COUNTY ROAD 2/34  
UNDERPASS  
SLOPE PAVING

SHEET  
261



NOTES:  
1. SECTIONS AND DETAILS TYPICAL FOR ALL LAYOUTS.

MODIFIED  
STANDARD DRAWING  
DECEMBER 2018  
SS116-10  
DETAILS OF CONCRETE SLOPE PAVING

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	BTJ	CHK	TJM
DRAWN	SJM	CHK	BRC
CODE	CSA-S6-14	LOAD	CL6250NT
DATE	Jan-19	DWG	24



LAYOUT: STANDARDS  
FILE NAME: c:\projectwise\working\_directory\active\10bp\0515027\4013-09-Standards.dwg

STANDARD 90° HOOK

STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	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.  
(2) For stainless steel, with F<sub>y</sub> = 500, use the same D as for 400R.

STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
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

NOTE: All Hook Dimensions are according to the CHBDC-2014.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d <sub>b</sub> (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	25.2	100	230			

MIN. 90° HOOK

MIN. 135° HOOK

HOOK DIMENSIONS  
FOR REINFORCING STEEL BARS

Date

Sept. 2016

Rev

SS12-1

PLAN

Parapet wall not shown

SECTION A-A

This surface to be steel float finished level

NOTES:

A Reinforcing steel for deck and barrier wall not shown.  
B Cover to reinforcing steel 70mm ±20mm, except as noted.  
C Stainless steel bars shall be Type 316LN or Duplex 2205 with a minimum yield strength of 500 MPa.  
D Read in conjunction with bridge electrical details.  
E Anchorage based on 4-32mm dia studs on 406mm bolt circle diameter.  
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Apr 2016

Rev

2

DECK  
LIGHT POLE BASES  
STRUCTURES WITH PARAPET WALLS

OPSD 3360.200  
MODIFIED

JOINT IN CONCRETE OVERLAY DIRECTLY ABOVE JOINT IN BRIDGE DECK

JOINT BETWEEN BRIDGE DECK AND APPROACH SLAB WITH CONCRETE OVERLAY

JOINT OR ACTIVE WIDE CRACK IN BRIDGE DECK

JOINT BETWEEN BRIDGE DECK AND APPROACH SLAB WITHOUT CONCRETE OVERLAY

JOINT BETWEEN CONCRETE DECK AND GRANULAR BACKFILL

NO JOINT IN CONCRETE OVERLAY  
NO JOINT IN BRIDGE DECK

NOTES:

1 Cracks in concrete to be repaired as specified.  
A This OPSD is to be read in conjunction with OPSD 3370.100.  
B Protection board is not shown for clarity.  
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2008

Rev

2

DECK, WATERPROOFING  
HOT APPLIED ASPHALT MEMBRANE  
AT ACTIVE CRACKS GREATER THAN 2mm  
WIDE AND CONSTRUCTION JOINTS

OPSD 3370.101

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

HWY 401

CONT No 2018-4008

WP No 4013-11-01

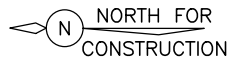
COUNTY ROAD 2/34  
UNDERPASS

STANDARD DETAILS

SHEET  
263

REVISIONS	DATE	BY	DESCRIPTION
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DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING



# METRIC

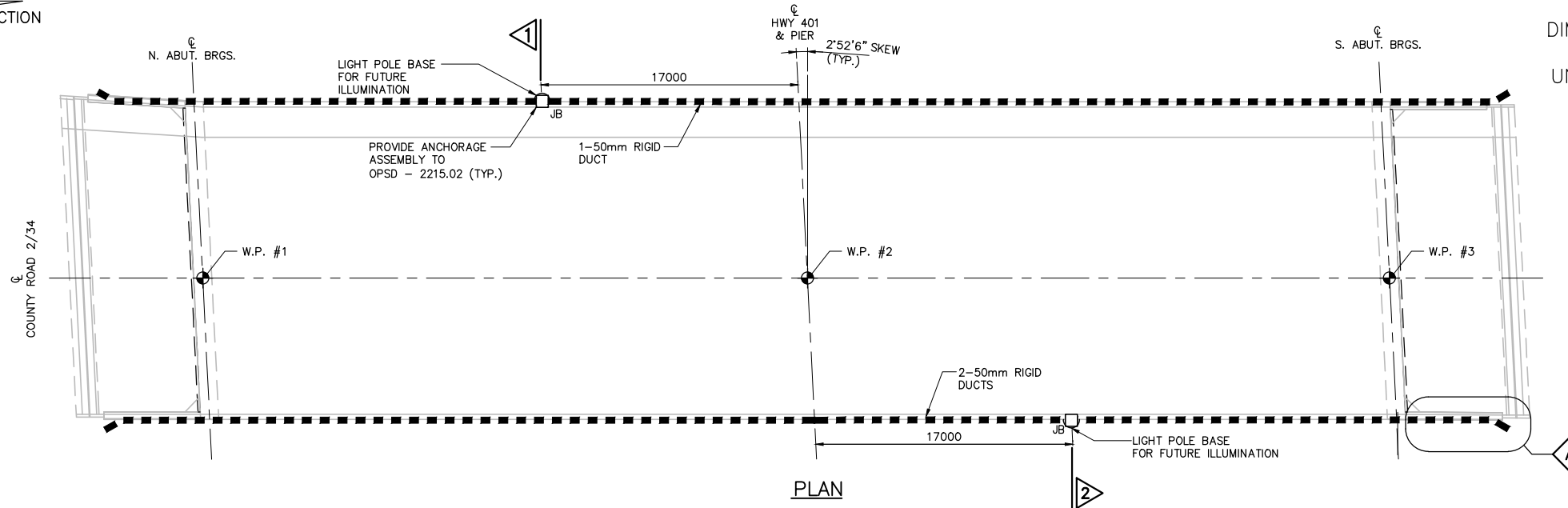
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

HWY 401  
CONT No 2018-4008  
WP No 4013-11-01

COUNTY ROAD 2/34  
UNDERPASS

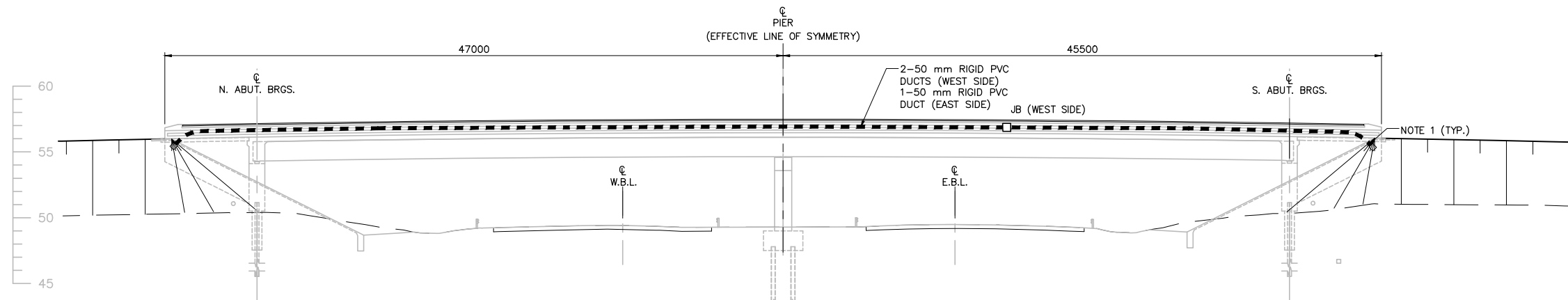
ELECTRICAL EMBEDDED WORKS

SHEET  
264



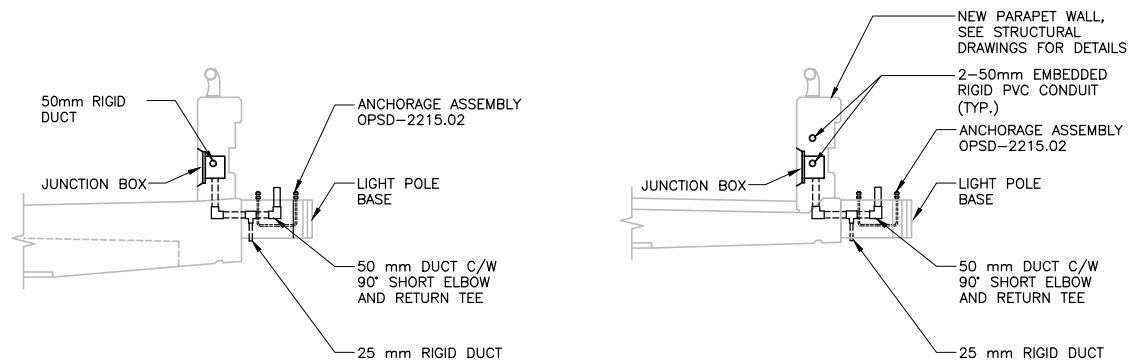
PLAN

SCALE 1:200



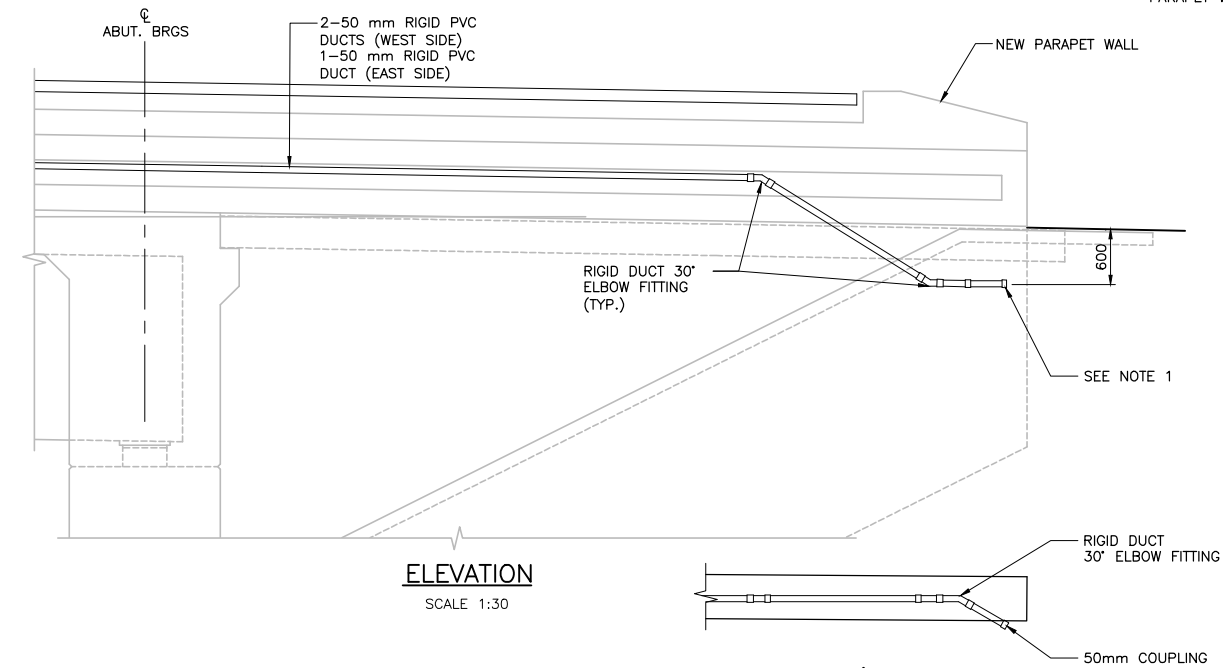
ELEVATION

SCALE 1:200



1  
SCALE 1:30

2  
SCALE 1:30



ELEVATION

SCALE 1:30

A  
SCALE 1:30

DRAWING NOT TO BE SCALED  
100 mm ON ORIGINAL DRAWING

## LEGEND

- 50 mm RIGID PVC CONDUITS EMBEDDED IN PARAPET WALLS, WINGWALLS AND ABUTMENT WALLS.
- RIGID PVC JUNCTION BOX TYPE P1-4 EMBEDDED IN PARAPET WALL.

## NOTES

- TERMINATE THE EMBEDDED RIGID DUCT AT THE SIDE OF THE WALL WITH REGULAR 50 mm COUPLING.

## APPLICABLE STANDARD DRAWINGS

- |               |   |
|---------------|---|
| OPSD-2102.01  | UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE |
| OPSD-2215.02  | ANCHORAGE ASSEMBLY                                      |
| OPSD-2300.01  | RIGID PVC JUNCTION BOX - TYPE P1                        |
| OPSD-2302.02  | EXPANSION AND DEFLECTION FITTING ASSEMBLY               |
| OPSD-2302.045 | EMBEDDED WORK IN STRUCTURE PARAPET WALL                 |

REVISIONS		DATE	BY	DESCRIPTION	LOAD	DATE
DESIGN	DRV	CHK	MG	CODE		Jan-19
DRAWN	SJM	CHK	BRC	SITE	31-232	DWG 27