

BRIDGE REHABILITATION

YOHO NATIONAL PARK, BRITISH COLUMBIA

KM 107.2 TRANS-CANADA HIGHWAY

OTTERTAIL RIVER BRIDGE

DRAWING LIST:

1077-01-001	COVER SHEET, DRAWING LIST AND LOCATION MAP
1077-01-002	GENERAL ARRANGEMENT EXISTING CONDITION
1077-01-003	GENERAL ARRANGEMENT FINAL CONDITION
1077-01-004	ABUTMENT AND RETURN WALL MODIFICATIONS
1077-01-005	PIER MODIFICATIONS
1077-01-006	BEARING DETAILS
1077-01-007	DECK MODIFICATIONS
1077-01-008	DECK JOINT REPLACEMENT
1077-01-009	CAST-IN-PLACE BARRIER LAYOUT AND REINFORCEMENT
1077-01-010	BICYCLE RAILING
1077-01-011	PRECAST TRANSITION BARRIER
1077-01-012	PRECAST DRAINAGE BARRIER AND SPILLWAY DETAILS

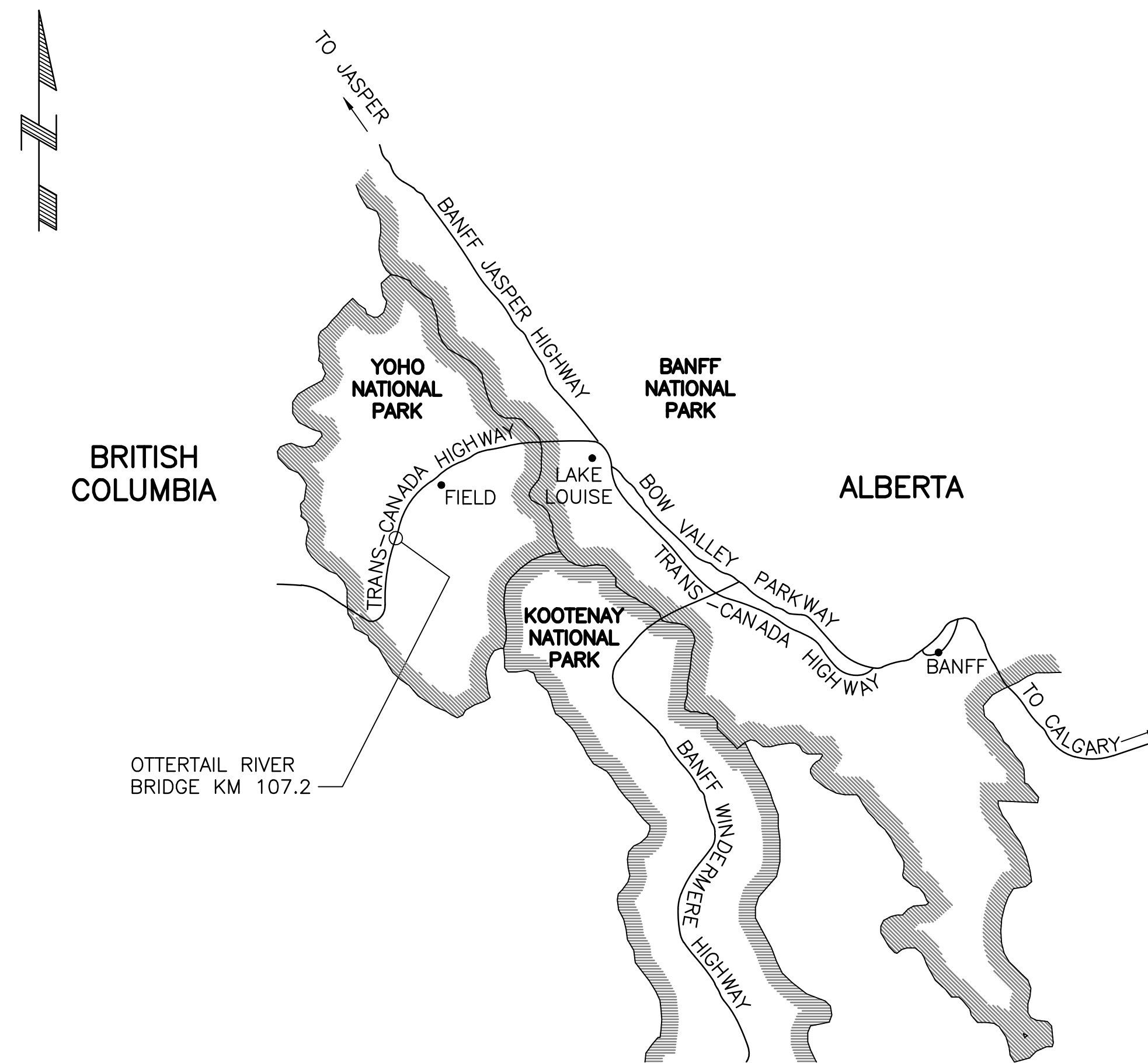
REFERENCE DRAWINGS

1956 ORIGINAL DESIGN, OTTERTAIL RIVER BRIDGE, YOHO NATIONAL PARK B.C. M.12.9, DEPARTMENT OF PUBLIC WORKS CANADA.

1 OF 6	PLAN & ELEVATION
2 OF 6	ABUTMENTS NORTH & SOUTH
3 OF 6	ABUTMENTS REINFORCING
4 OF 6	PIERS NORTH & SOUTH
5C OF 6	DECK PRESTRESSED CONCRETE ALTERNATIVE 'C'
6 OF 6	STANDARD HANDRAIL DETAIL

2008 DECK JOINT REPLACEMENT, OTTERTAIL RIVER BRIDGE ON HWY 1 NEAR FIELD, YOHO NATIONAL PARK, MOST ENGINEERING LTD.

S1-704	DECK JOINT REPLACEMENT - SHEET 1
S2-704	DECK JOINT REPLACEMENT - SHEET 2



LOCATION MAP


N.T.S.

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Revision/ Révision	Description/Description	Date/Date

Client/client	
 Parks Canada Agency	L'Agence Parcs Canada

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Project title/Titre du projet
**BRIDGE REHABILITATION
YOHO NATIONAL PARK, BRITISH COLUMBIA**
**KM 107.2 TRANS-CANADA HIGHWAY
OTTERTAIL RIVER BRIDGE**

Approved by/Approuvé par
DAWO

Designed by/Concept par
CHID

Drawn by/Dessiné par
JAET

PWOSC Project Manager/Administrateur de Projets TPSCG

PWOSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

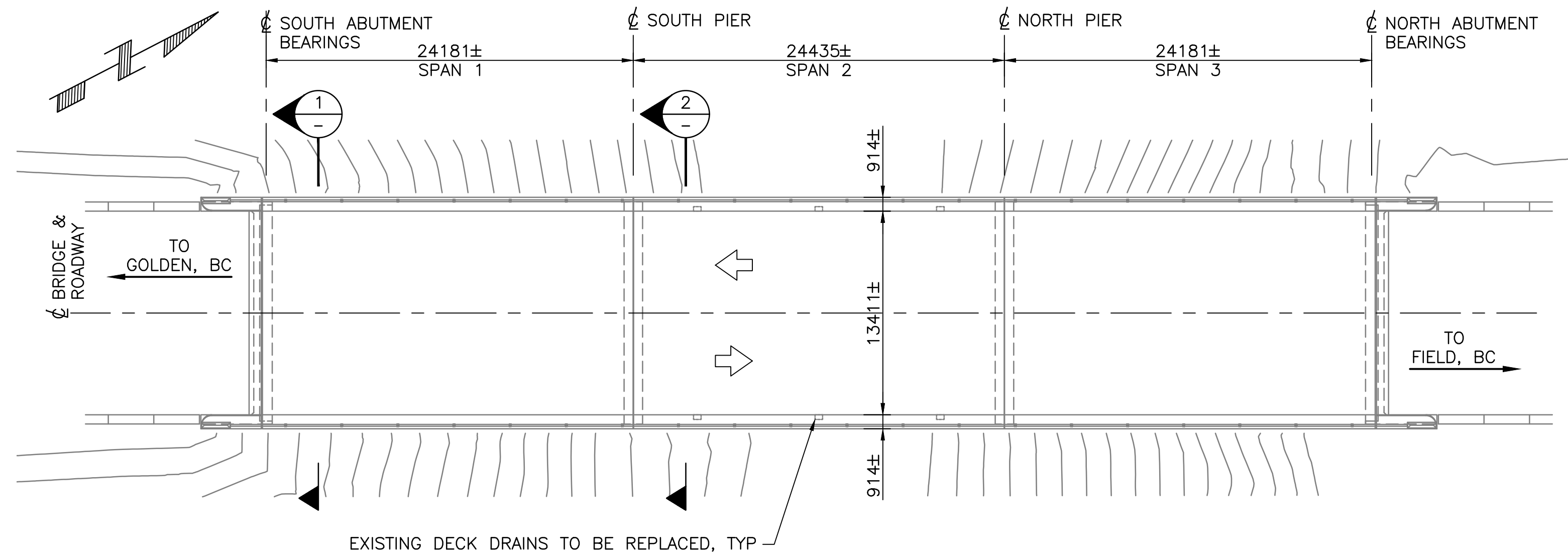
Client/client
PCA

Drawing title/Titre du dessin
**COVER SHEET
DRAWING LIST AND
LOCATION MAP**

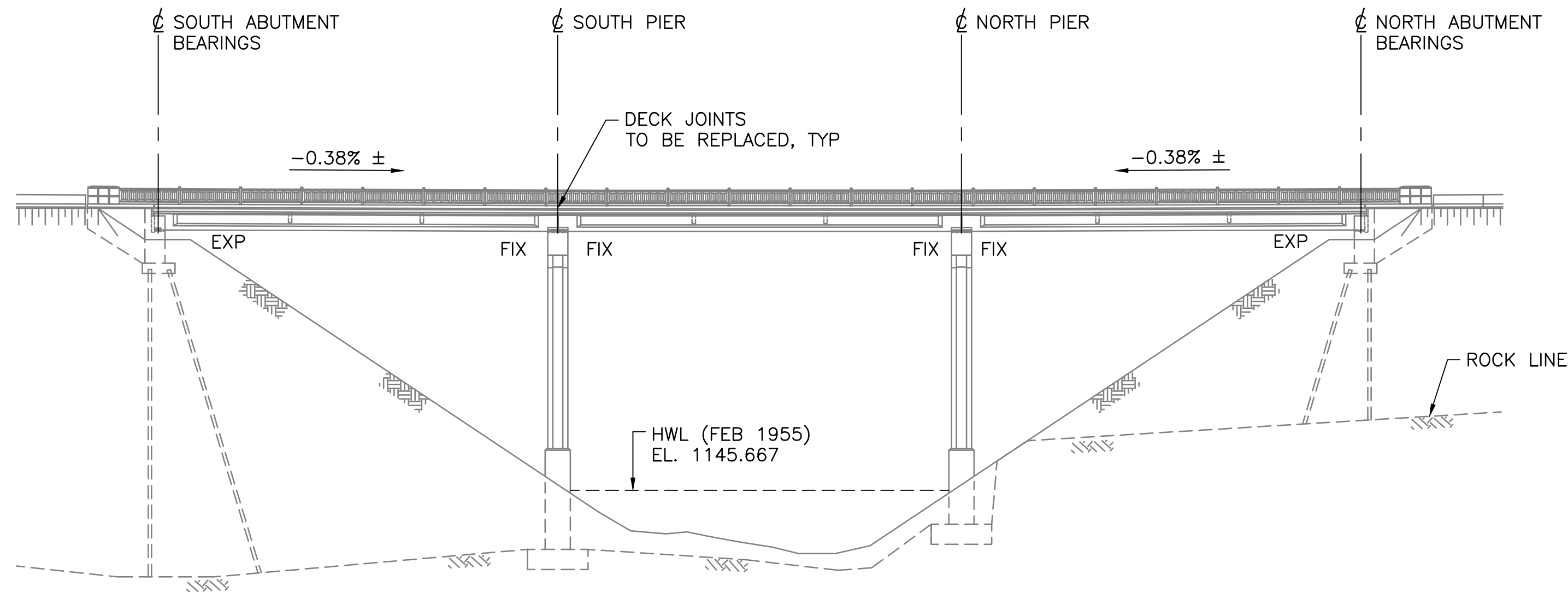
Project No./No. du projet 1077-01	Sheet/Feuille 001 OF	Revision no./ La Révision no. 0
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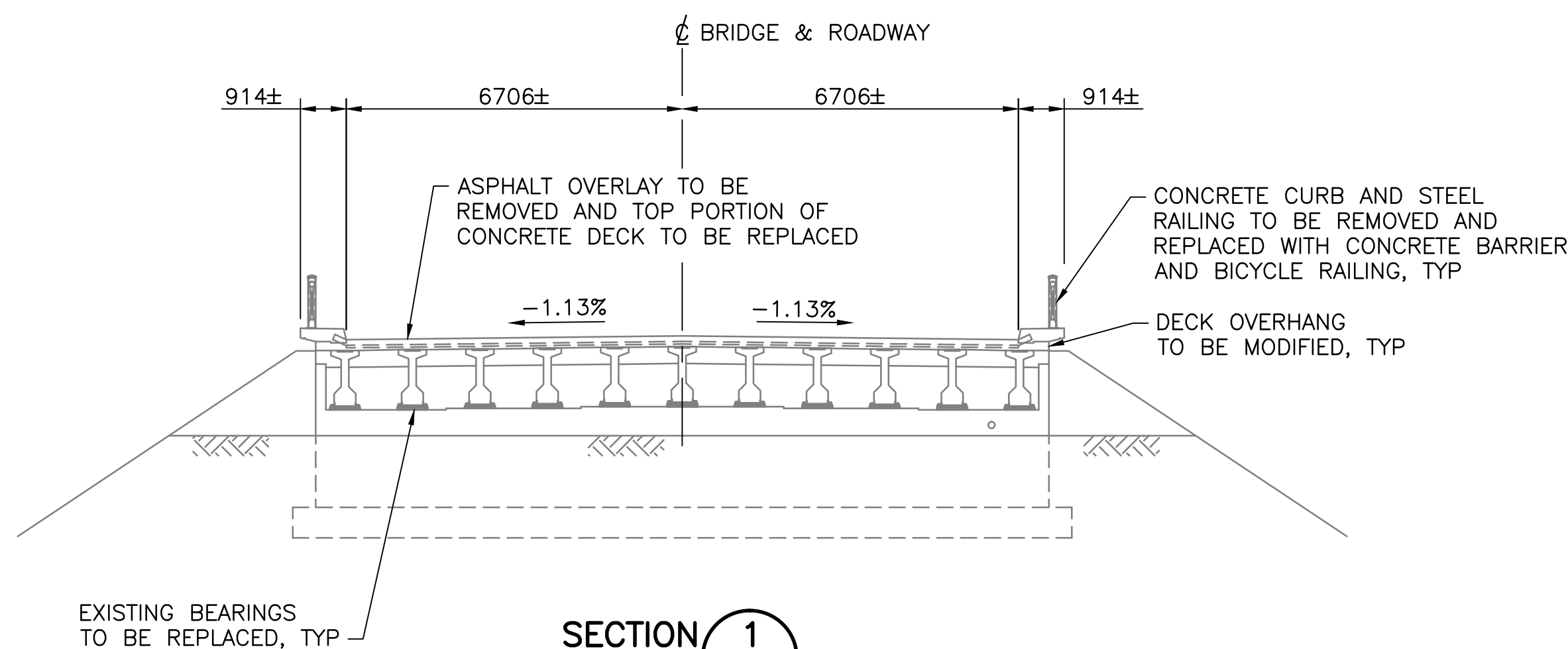
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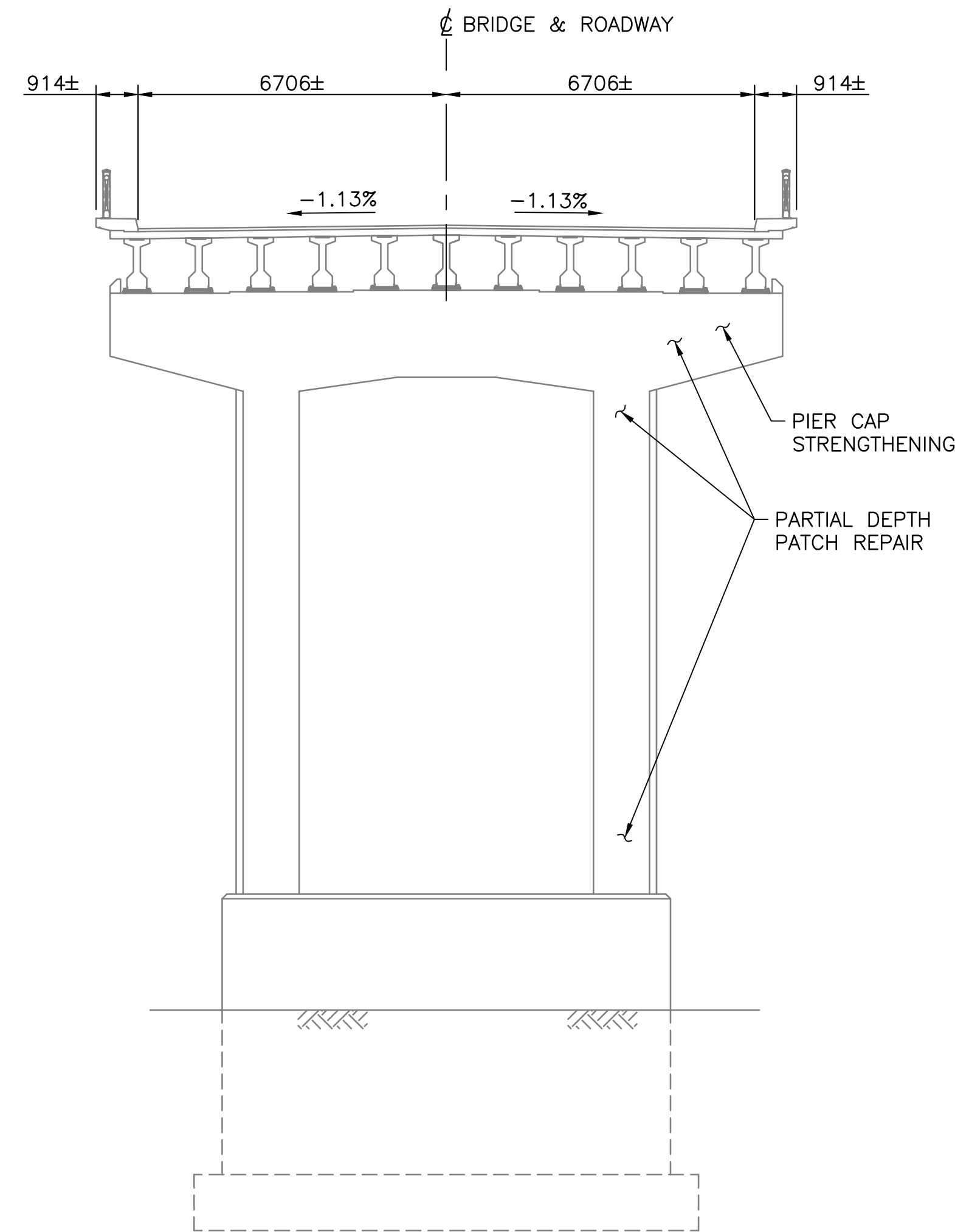
PLAN
1:250



ELEVATION
1:250



SECTION 1
1:100



SECTION 2
1:100

SCOPE OF WORK:

1. REMOVAL AND DISPOSAL OF EXISTING BRIDGE RAILINGS, CONCRETE CURBS, DECK DRAINS, DECK OVERHANGS, ASPHALT WEARING SURFACE, DECK JOINTS, AND BEARINGS IN THREE STAGES.
2. COLD MILLING OF CONCRETE DECK.
3. PARTIAL DEPTH CONCRETE DECK REPAIRS WHEN AUTHORIZED BY DEPARTMENTAL REPRESENTATIVE.
4. SUPPLY, FABRICATION AND INSTALLATION OF NEW ELASTOMERIC BEARINGS.
5. SUPPLY AND CONSTRUCTION OF NEW CONCRETE DECK OVERHANGS AND CONCRETE OVERLAY.
6. SUPPLY, FABRICATION AND INSTALLATION OF NEW DECK DRAINS.
7. MODIFICATION OF ABUTMENT BACKWALL AND RETURN WALL.
8. SUPPLY, FABRICATION, INSTALLATION AND POST-TENSIONING OF HIGH STRENGTH BARS AT PIER CAP.
9. SUPPLY, FABRICATION AND INSTALLATION OF NEW DECK JOINTS.
10. SUPPLY AND CONSTRUCTION OF NEW CAST-IN-PLACE BARRIERS.
11. SUPPLY, FABRICATION AND INSTALLATION OF NEW PRECAST TRANSITION AND DRAINAGE BARRIERS.
12. SUPPLY, FABRICATION AND INSTALLATION OF NEW BICYCLE RAILINGS.
13. PARTIAL DEPTH CONCRETE REPAIRS AT PIERS AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE.
14. MODIFICATION OF APPROACH ROADWAY.
15. APPLICATION OF LANE MARKINGS ON NEW FINISHED ROAD SURFACE.
16. SUPPLY AND CONSTRUCTION OF DRAINAGE SPILLWAYS AT EMBANKMENTS.

NOTES:

1. DIMENSIONS PROVIDED FOR REFERENCE ONLY. CONTRACTOR TO VERIFY ACCURACY OF SUCH INFORMATION BY FIELD MEASUREMENT.
2. DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.

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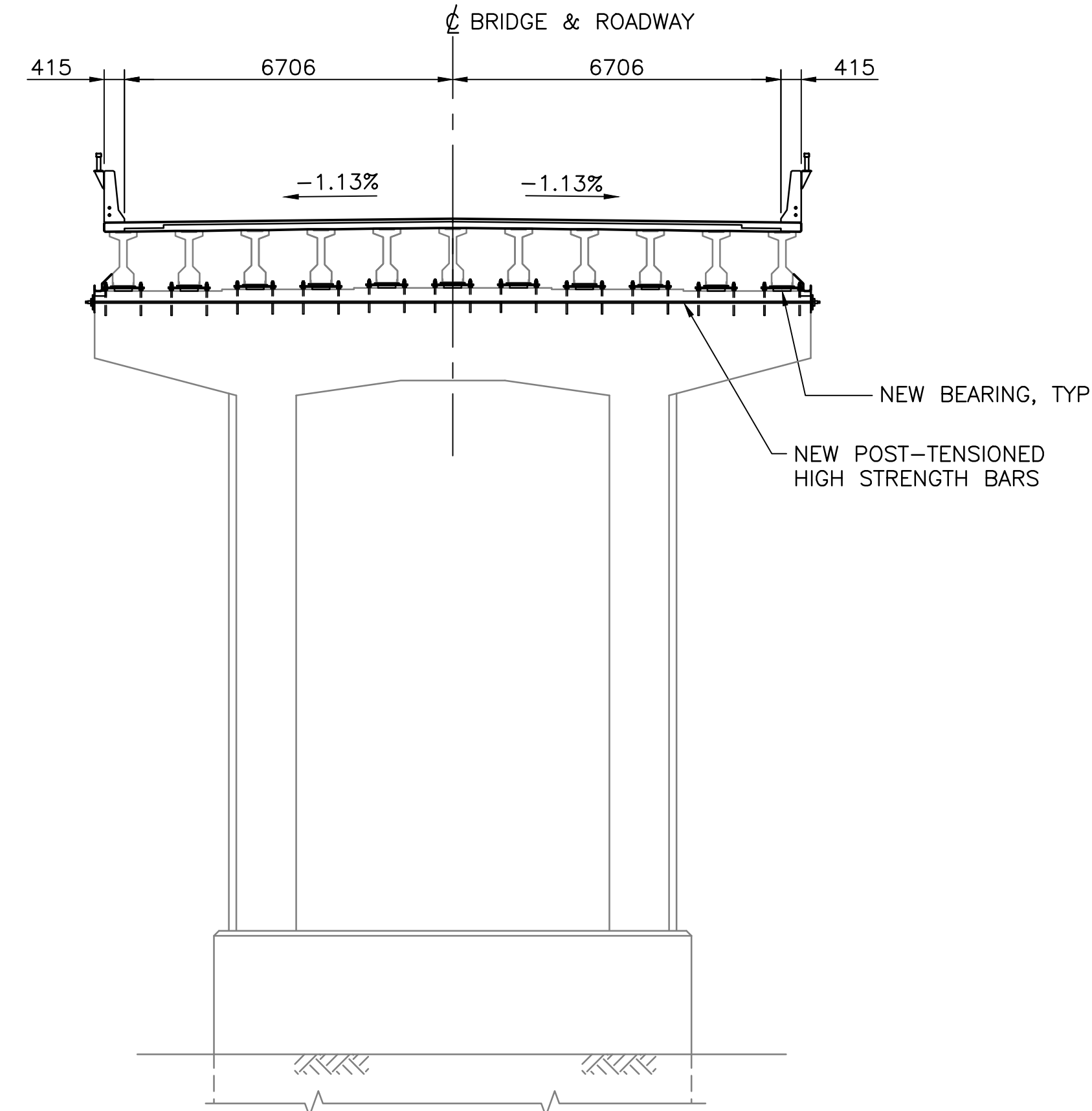
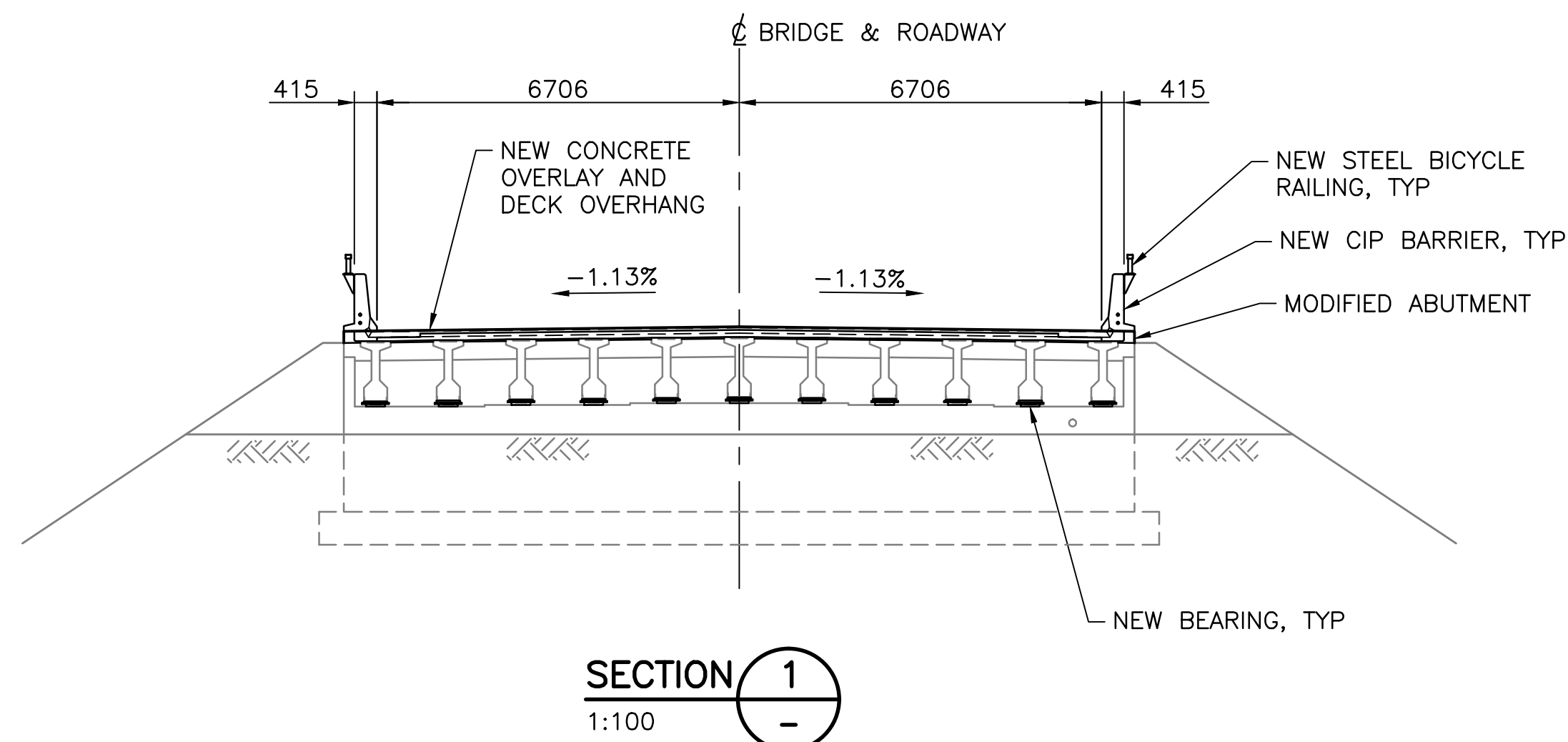
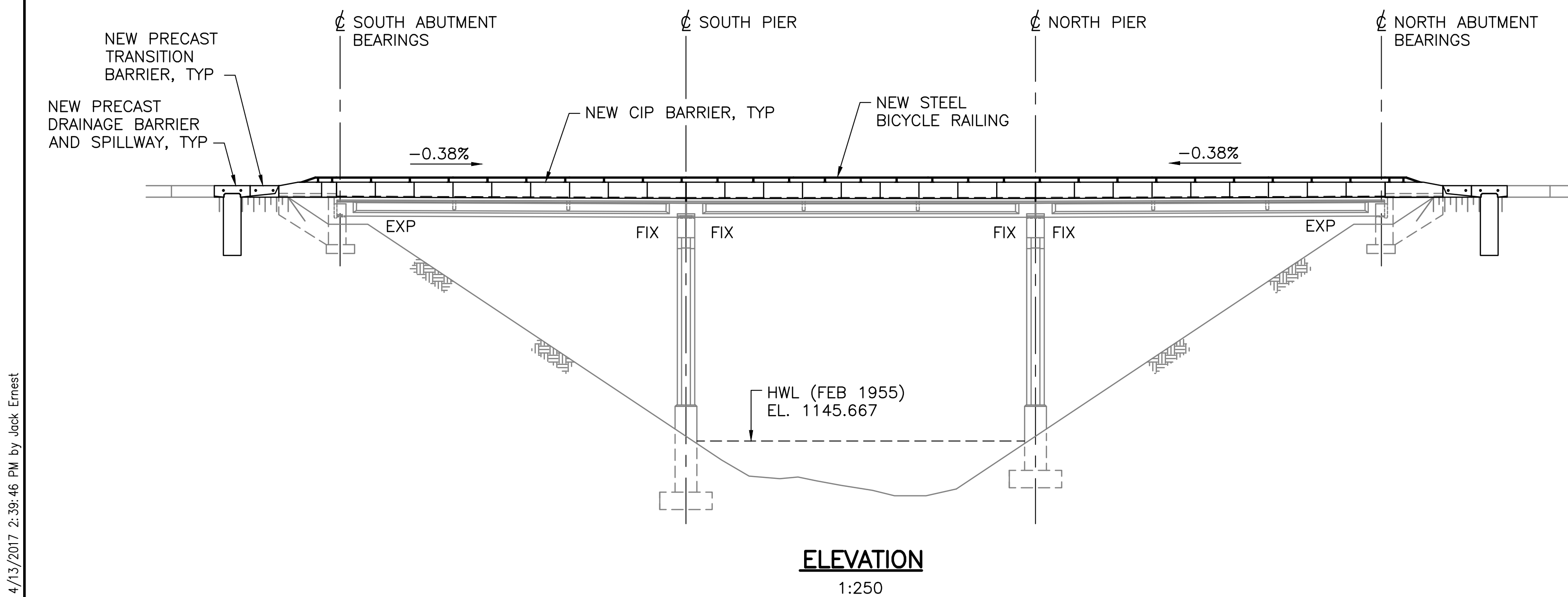
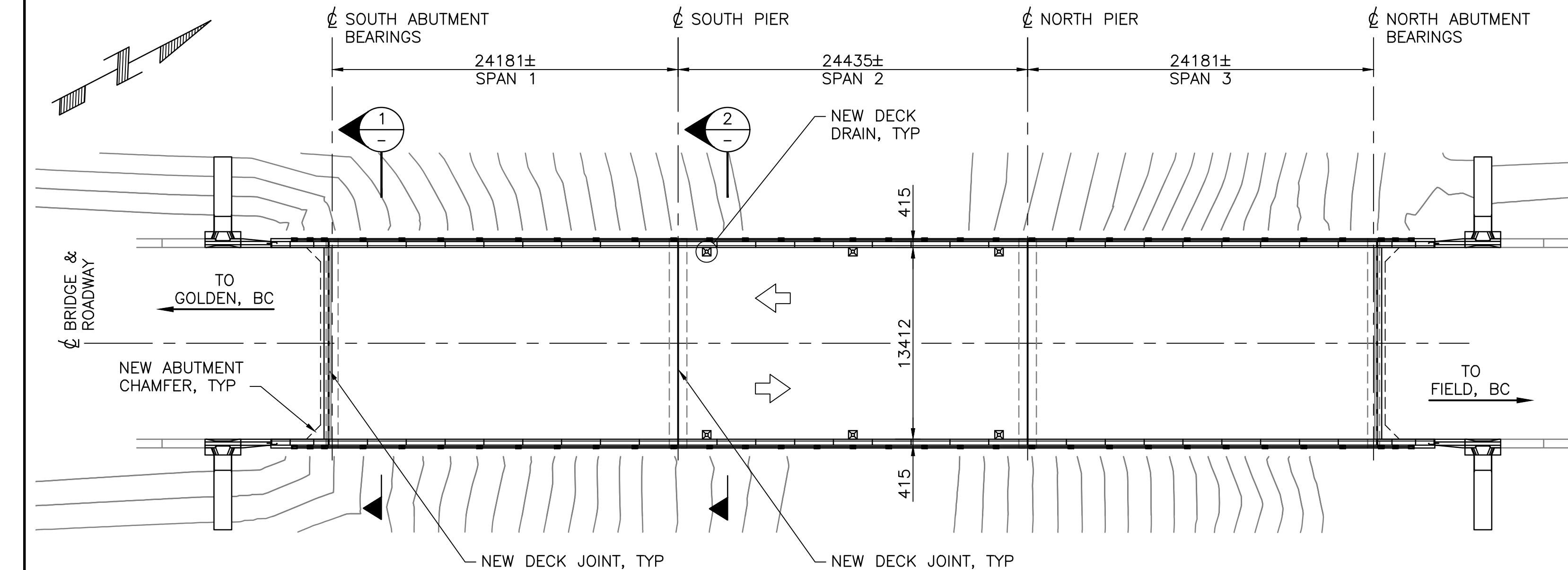
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GENERAL ARRANGEMENT
EXISTING CONDITION

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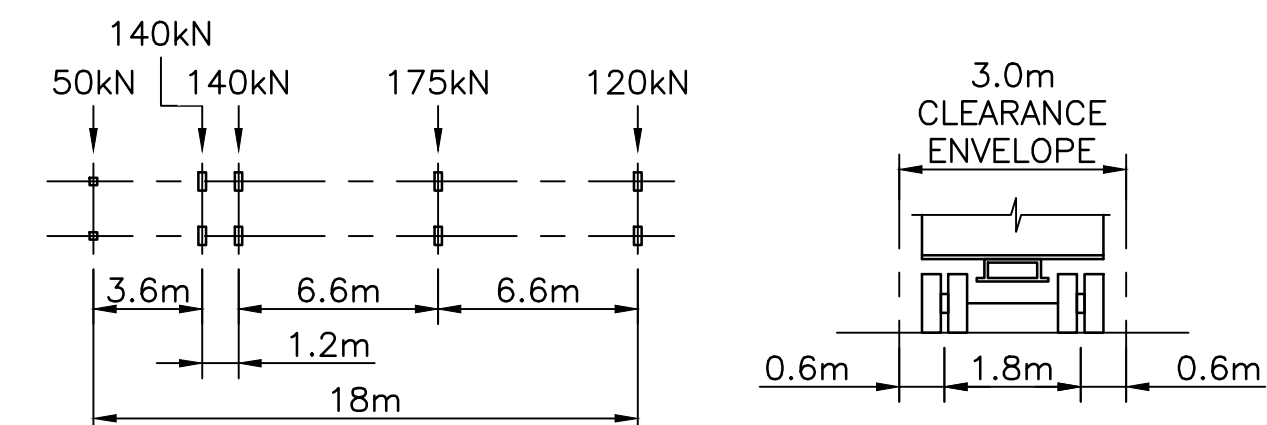
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PWGSC - A1 - 841X594



DESIGN DATA:

- DESIGN STANDARDS: CAN/CSA S6-14
- DESIGN LIFE: 35 YEARS
- DESIGN LOADS:
 - UNIT MATERIAL WEIGHTS
 - REINFORCED CONCRETE: 24.0 kN/m³
 - PRESTRESSED CONCRETE: 24.5 kN/m³
 - STEEL: 77.0 kN/m³
 - LIVE LOADS
 - BCL-625 TRUCK AND LANE LOADING
 - DYNAMIC LOAD ALLOWANCE PER S6-14



3.3 SEISMIC DESIGN PARAMETERS

- SITE CLASS B
- LIFELINE BRIDGE
- REGULAR BRIDGE
- SEISMIC PERFORMANCE CATEGORY 2
- SITE-SPECIFIC SPECTRAL ACCELERATION FOR A RETURN PERIOD OF 2475 YEARS AND FUNDAMENTAL PERIOD OF THE BRIDGE $S(0.79) = 0.086$

3.4 TEMPERATURE DATA

- EFFECTIVE CONSTRUCTION TEMPERATURE: 15°C
- MAXIMUM MEAN DAILY TEMPERATURE: 28°C
- MINIMUM MEAN DAILY TEMPERATURE: -36°C
- ANNUAL MEAN RELATIVE HUMIDITY: 60%

3.5 HOURLY MEAN WIND PRESSURE (50 YEARS): 520 Pa

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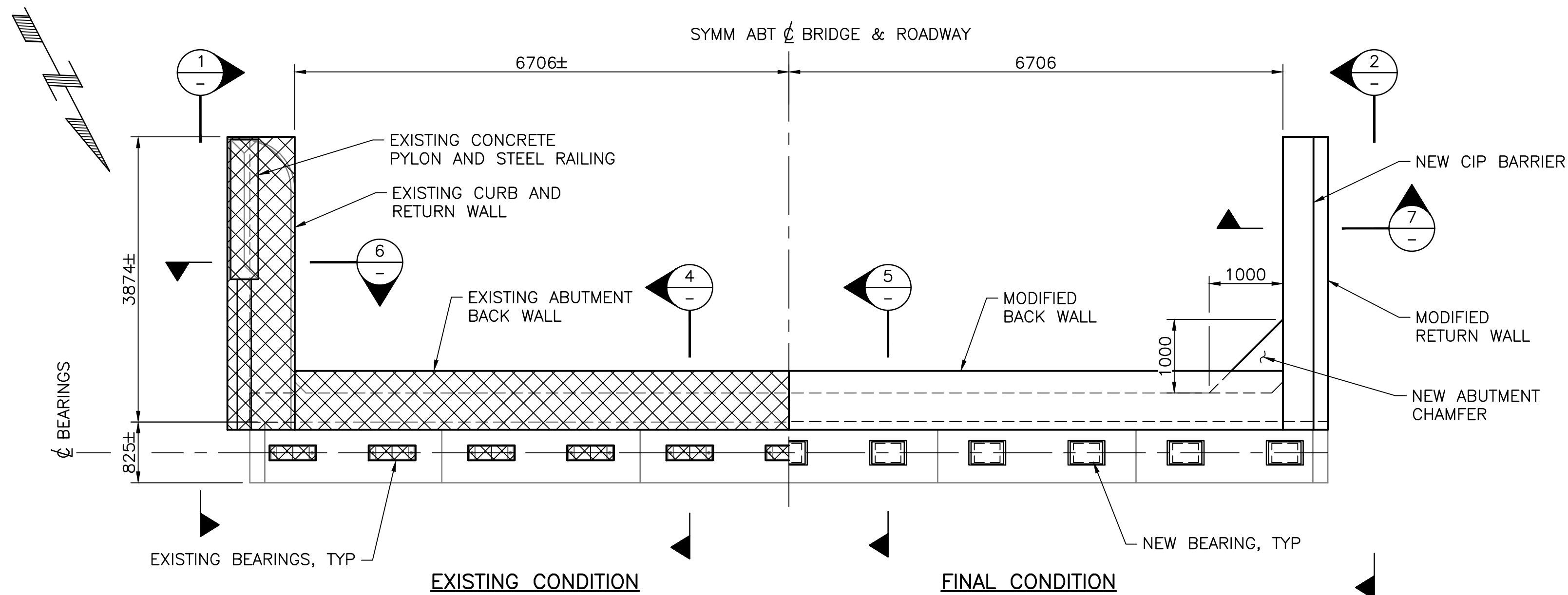
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GENERAL ARRANGEMENT
FINAL CONDITION

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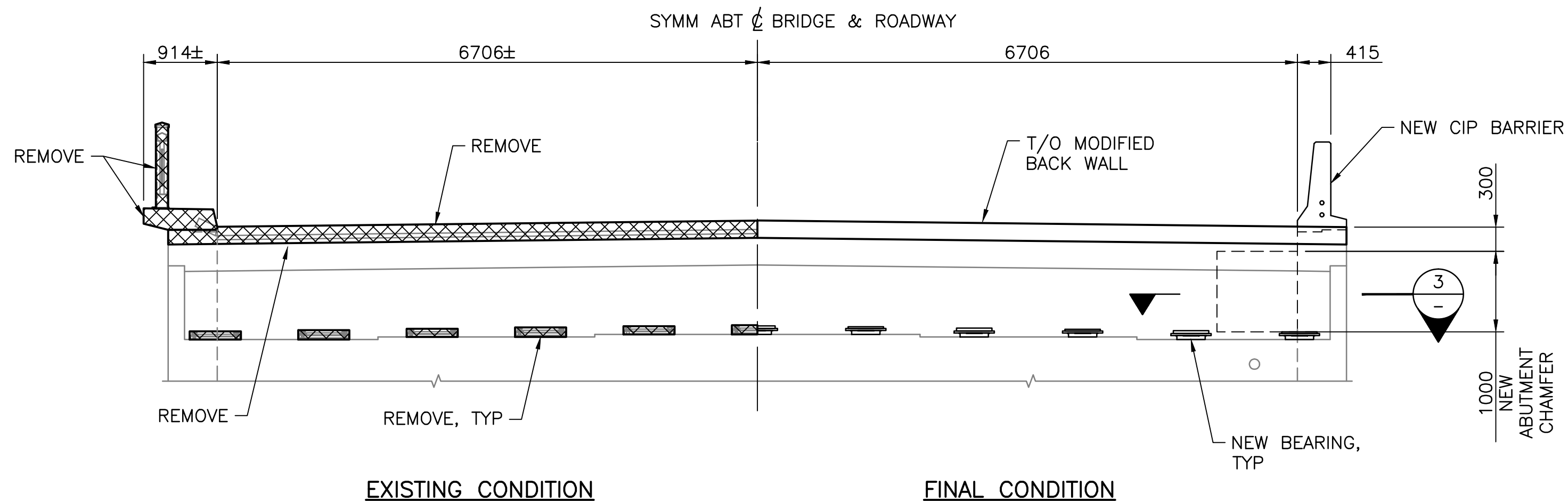
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ABUTMENT PLAN

1:50

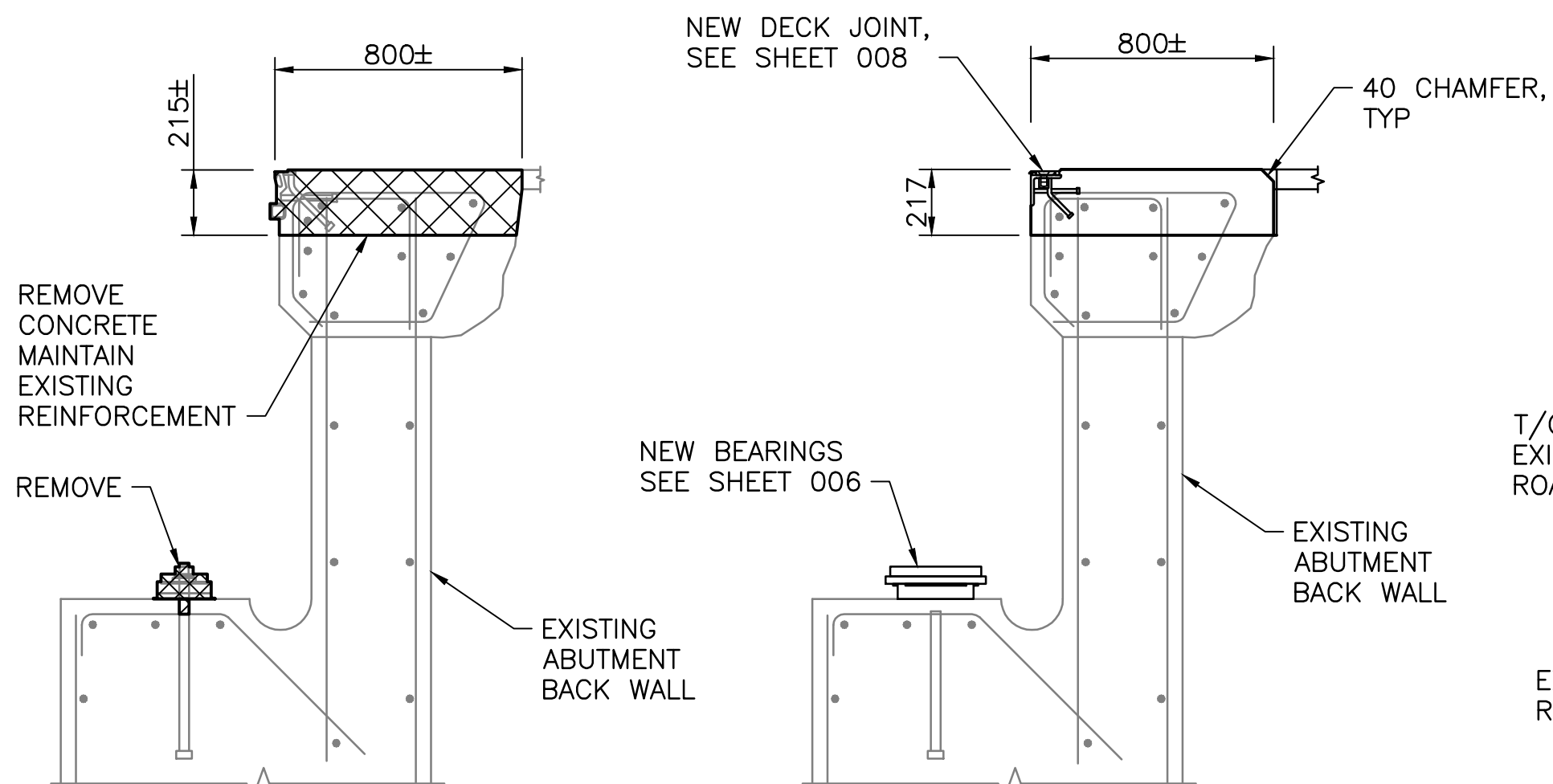
(SOUTH ABUTMENT SHOWN - NORTH ABUTMENT SIMILAR)



ABUTMENT ELEVATION

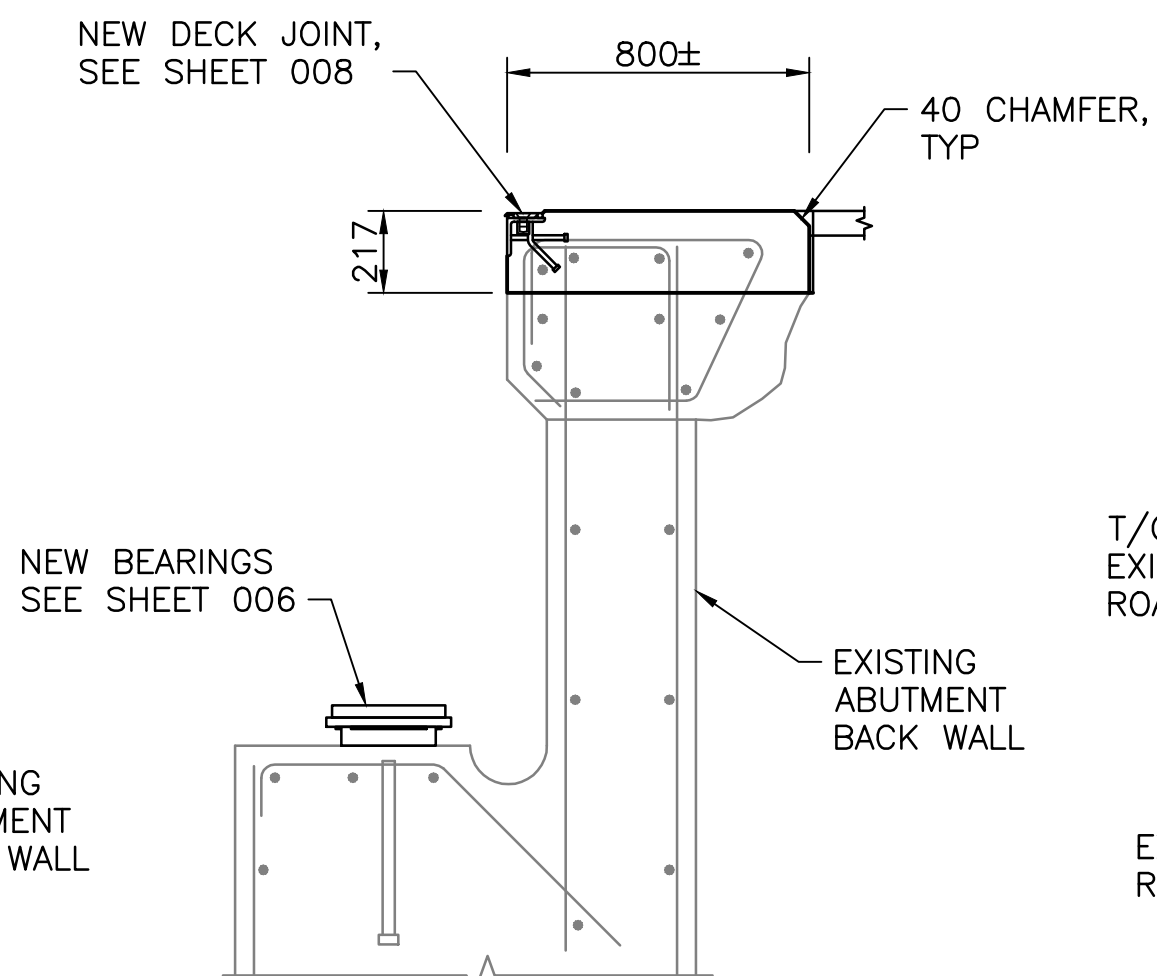
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(SOUTH ABUTMENT SHOWN - NORTH ABUTMENT SIMILAR)



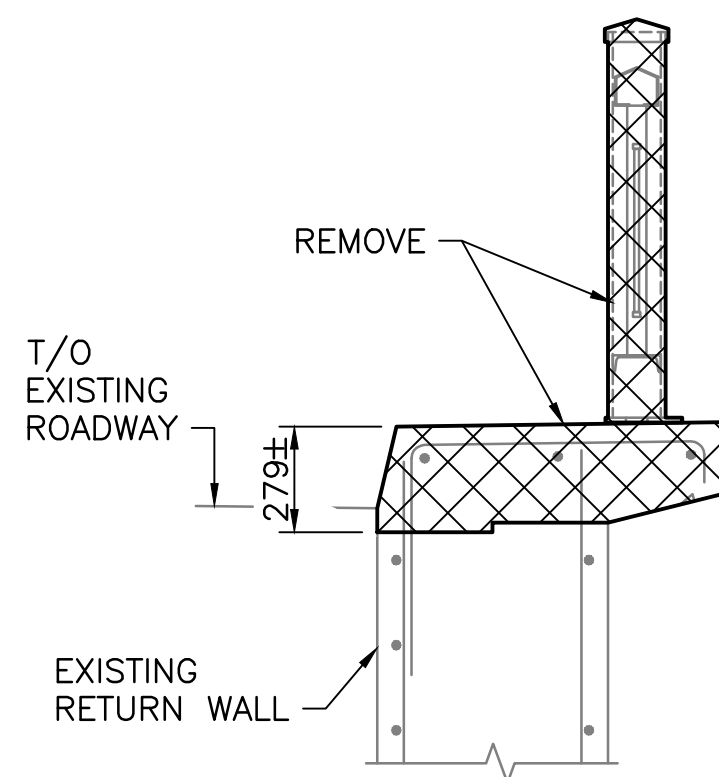
SECTION 4

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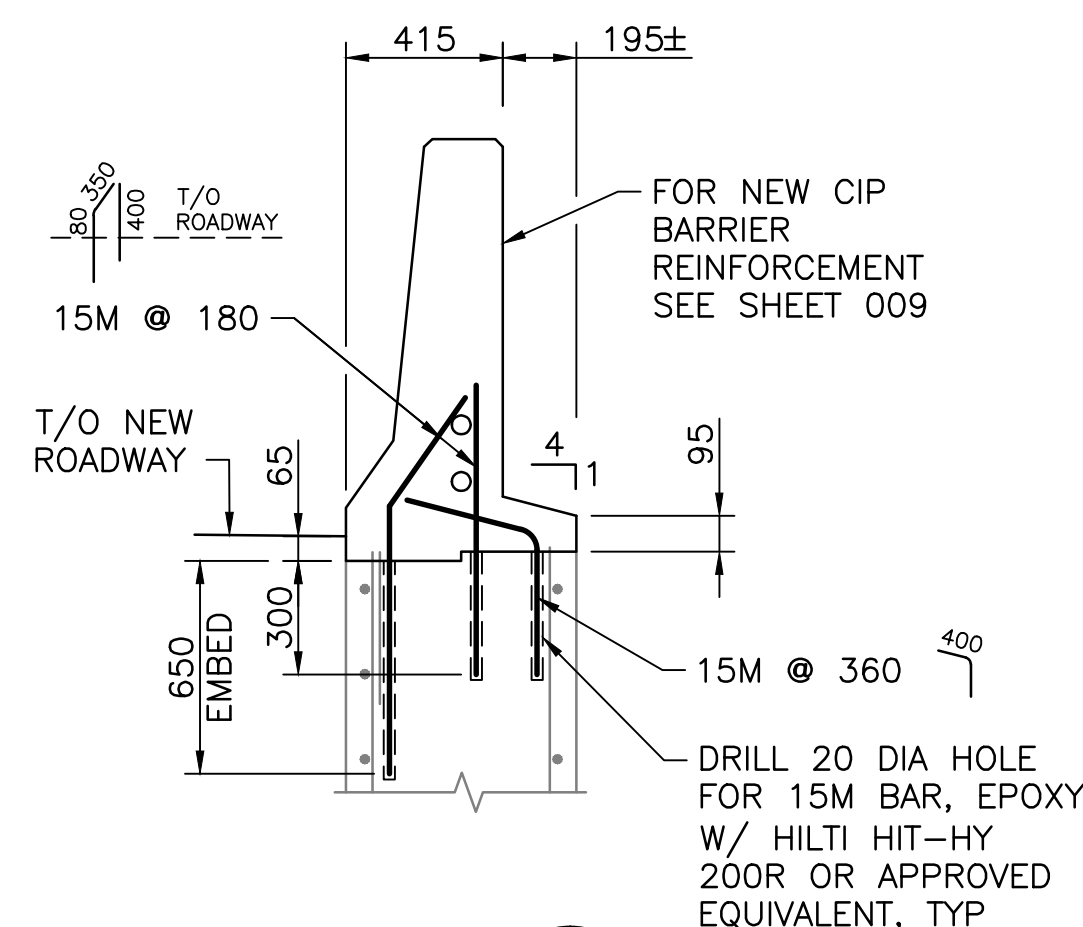
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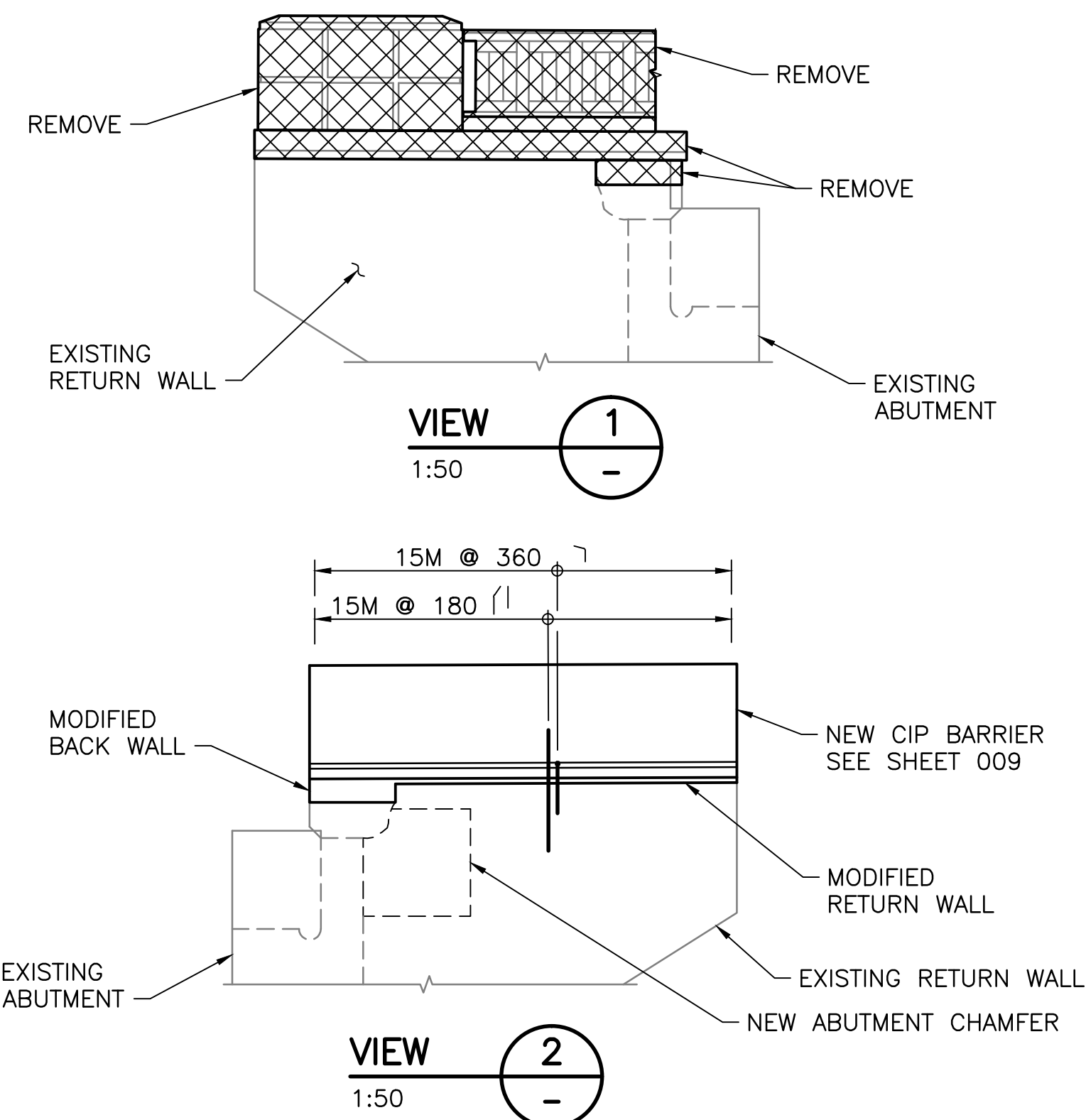
SECTION 6

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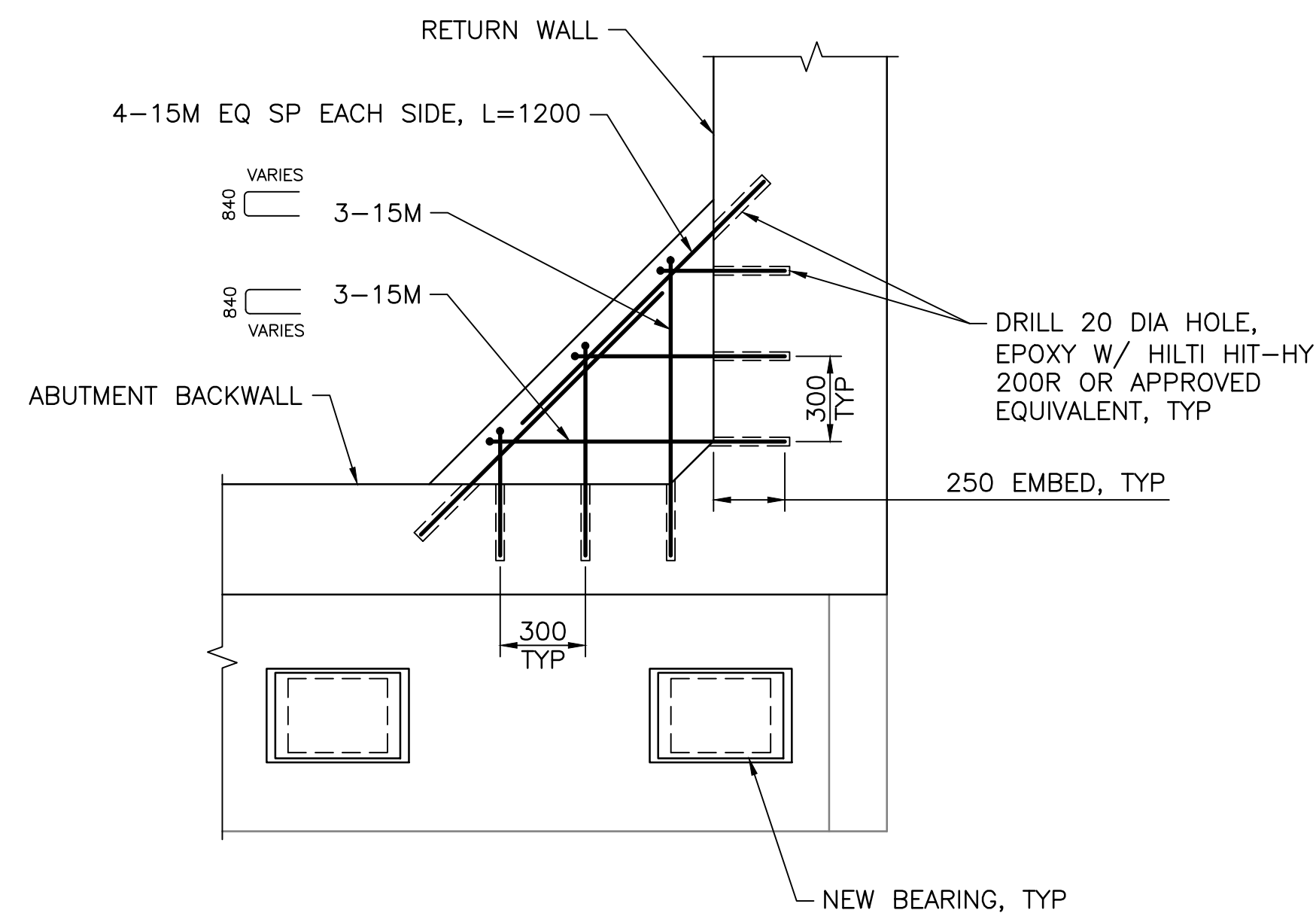


SECTION 7

1:20



(ONLY BARRIER ANCHORAGE REINFORCEMENT SHOWN FOR CLARITY)



SECTION 3

1:20

(ONLY NEW ABUTMENT CHAMFER REINFORCEMENT SHOWN FOR CLARITY)

LEGEND:

REMOVE

NOTES:

1. ABUTMENT MODIFICATION TO OCCUR IN THREE STAGES IN ACCORDANCE WITH SPECIFICATIONS.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
3. REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
4. SAWCUT 25 DEPTH ALONG EDGE OF CONCRETE REMOVALS.
5. CHAMFER EXPOSED EDGES 20 UNO.
6. MINIMUM COVER: 50 FOR BARRIERS, 70 FOR ALL OTHER.
7. MINIMUM LAP: 500 UNO. LAP SPLICES NOT SHOWN.
8. SEE SHEET 005 FOR PARTIAL DEPTH CONCRETE PATCH REPAIR DETAIL.
9. TOP OF RETURN WALL TO BE CAST WITH BARRIER.

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ABUTMENT AND RETURN WALL
MODIFICATIONS

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1077-01	004 OF	0

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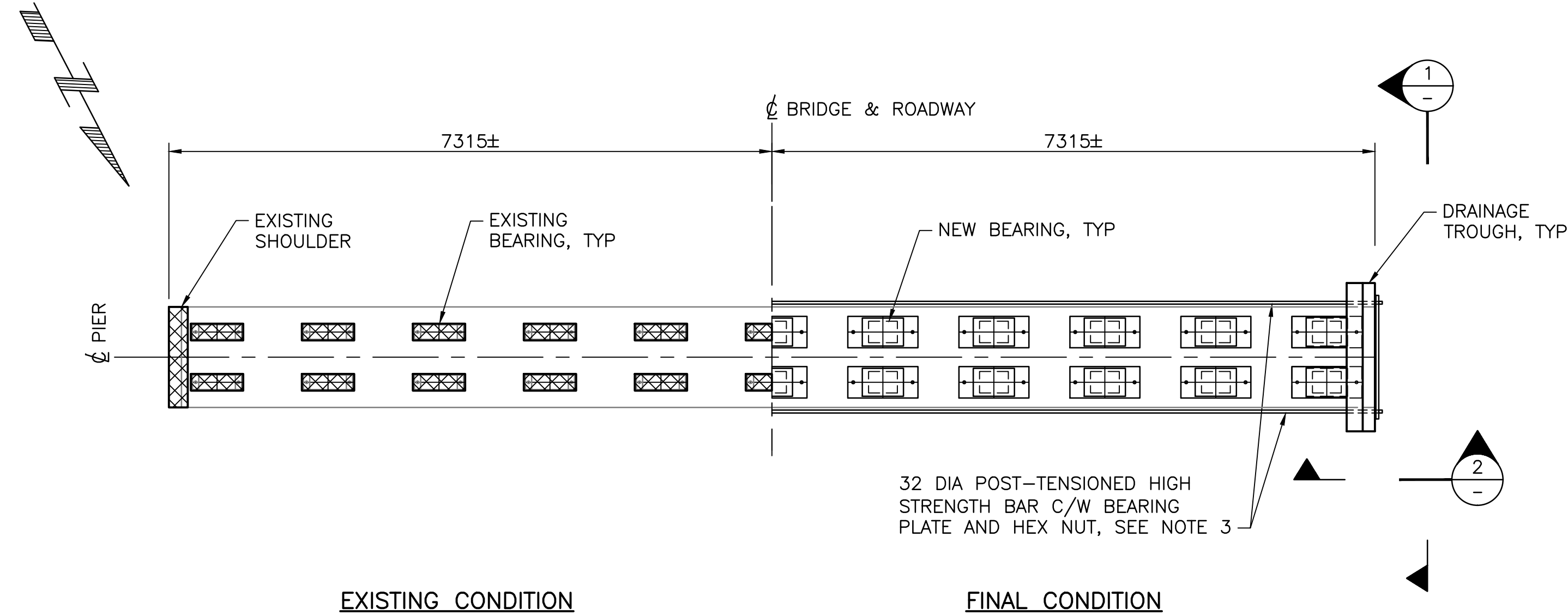
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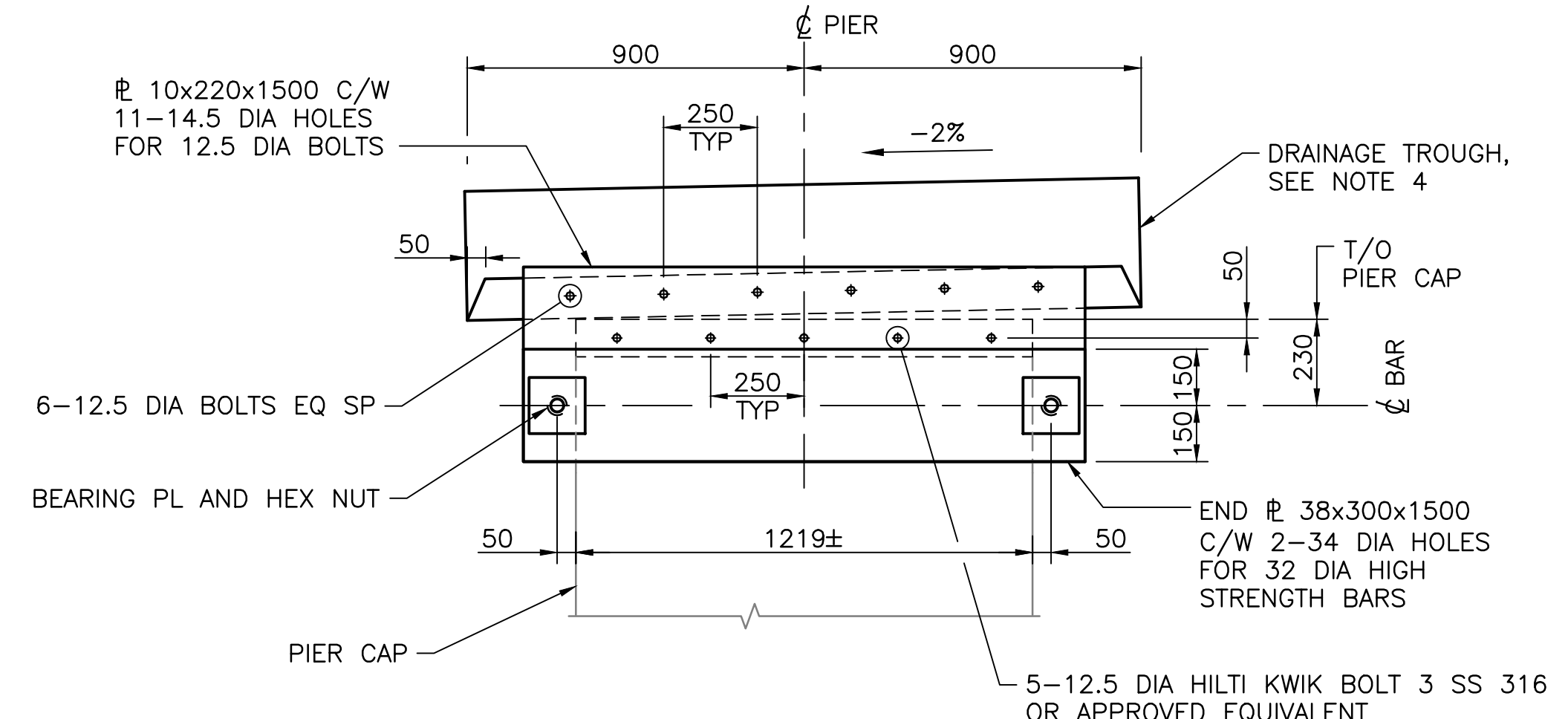
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PIER MODIFICATIONS

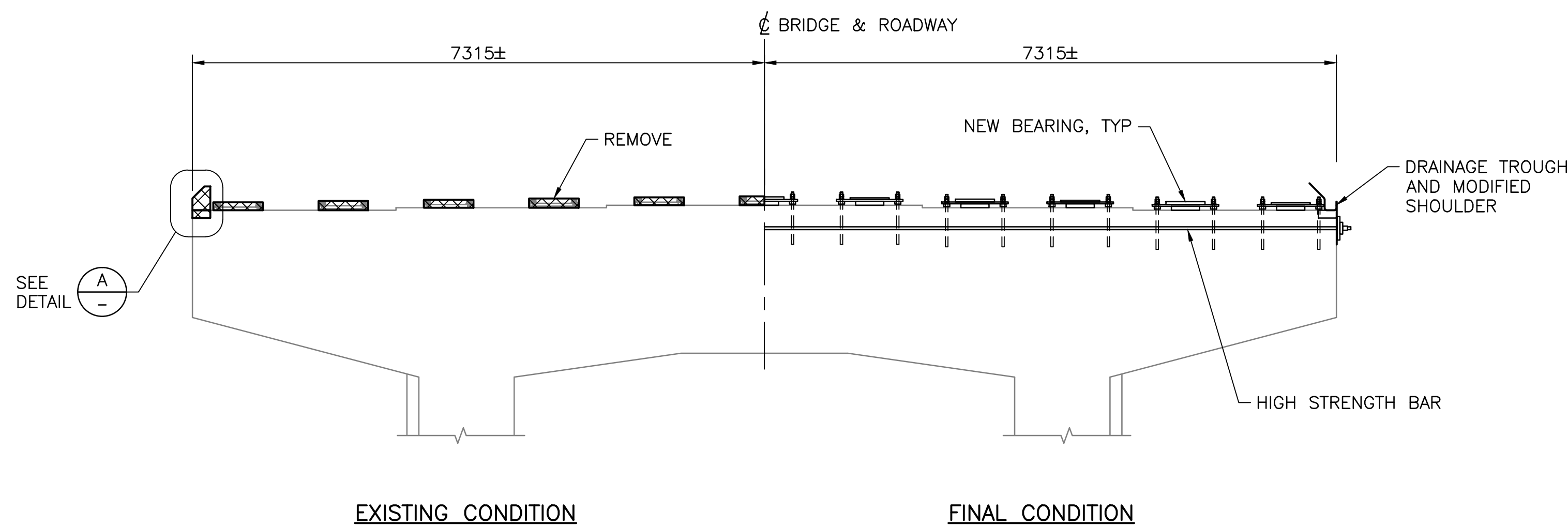
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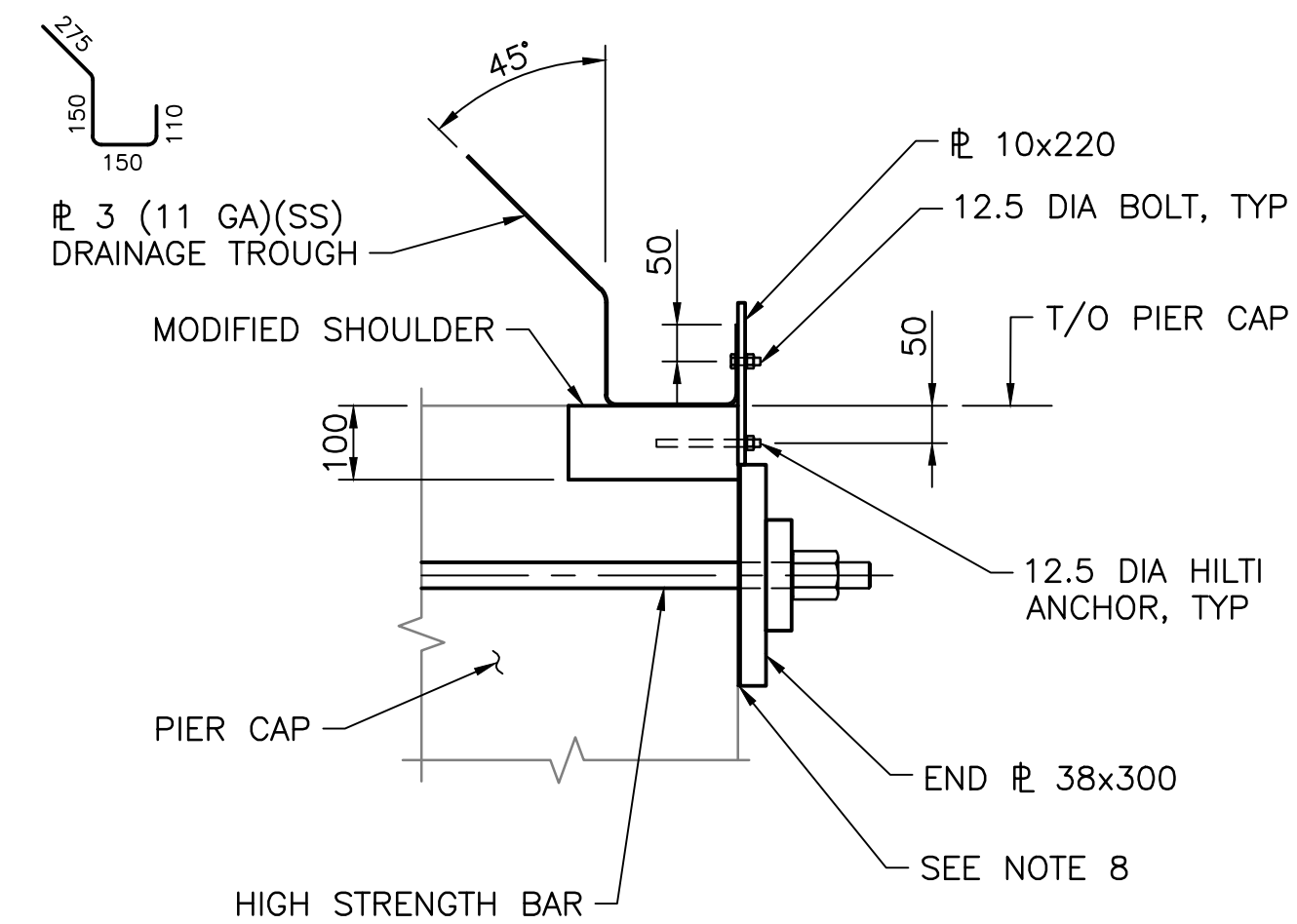
PIER PLAN
1:50



VIEW 1
1:15



PIER ELEVATION
1:50



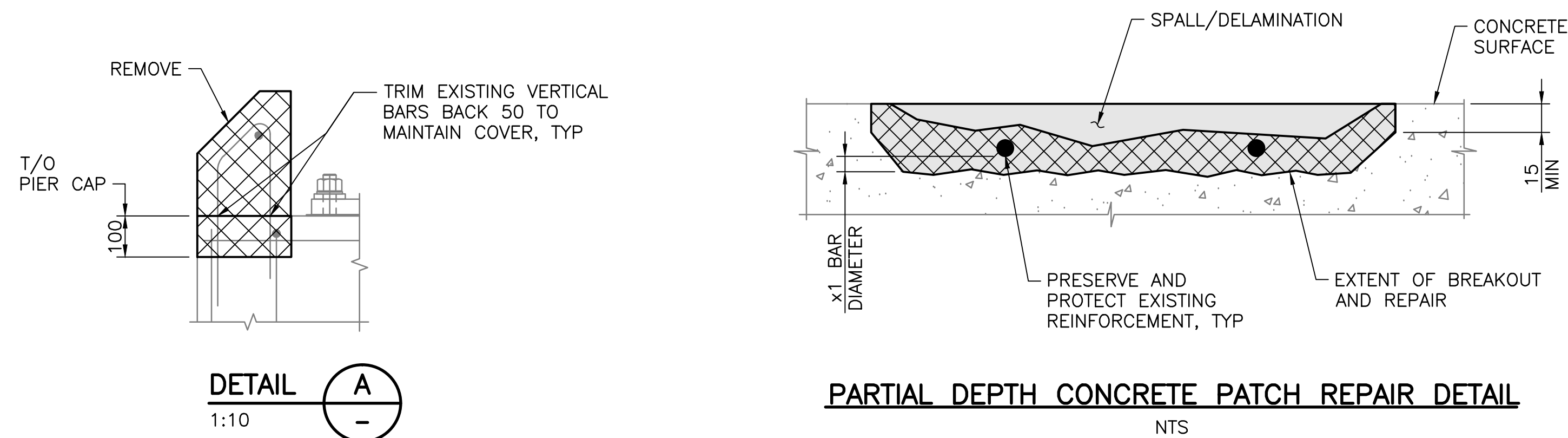
VIEW 2
1:10

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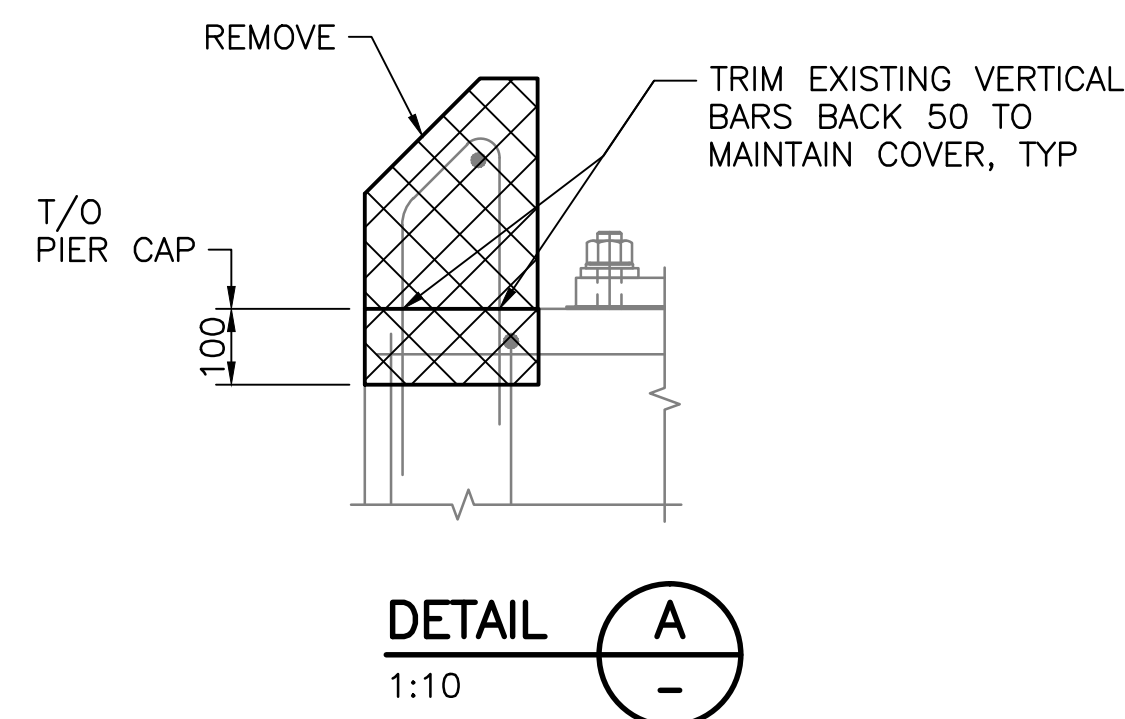
- PIER MODIFICATIONS TO OCCUR IN THREE STAGES, IN ACCORDANCE WITH SPECIFICATIONS.
- PARTIAL DEPTH CONCRETE PATCH REPAIRS AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE IN ACCORDANCE WITH SPECIFICATIONS.
- POST-TENSIONED HIGH STRENGTH BAR: WILLIAMS 150 KSI ($F_{pu}=1037$ MPa), ASTM A722-07, HOT DIPPED GALVANIZED.
 - MAX JACKING FORCE OF 500 kN PER BAR TO ACHIEVE MIN TARGET INSTALLATION TENSION OF 450 kN PER BAR. TENSION IN ACCORDANCE WITH SPECIFICATIONS.
- INSTALL DRAINAGE TROUGH ON 2% SLOPE.
- STEEL:
 - STEEL MARKED SS: ASTM A240 GRADE 316
 - OTHER: CAN/CSA-G40.21 GRADE 300W, GALVANIZED AFTER FABRICATION.
- BOLTS: ASTM F593 GRADE 316.
- ALL WELDING SHALL CONFORM TO CSA W59.
- END PLATE BEARING SURFACE PREPARATION: IN ACCORDANCE WITH SPECIFICATIONS.

LEGEND:

REMOVALS

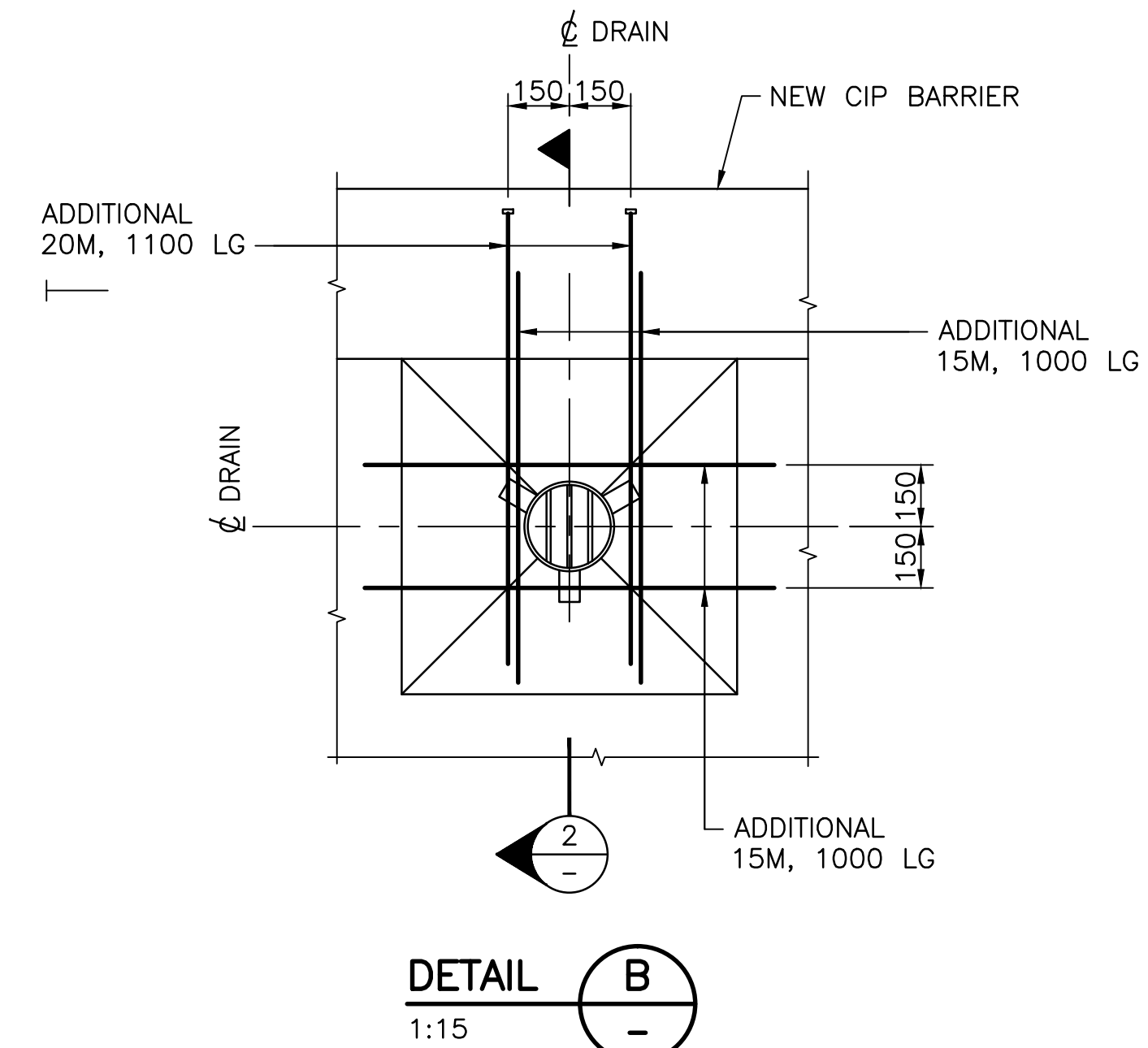
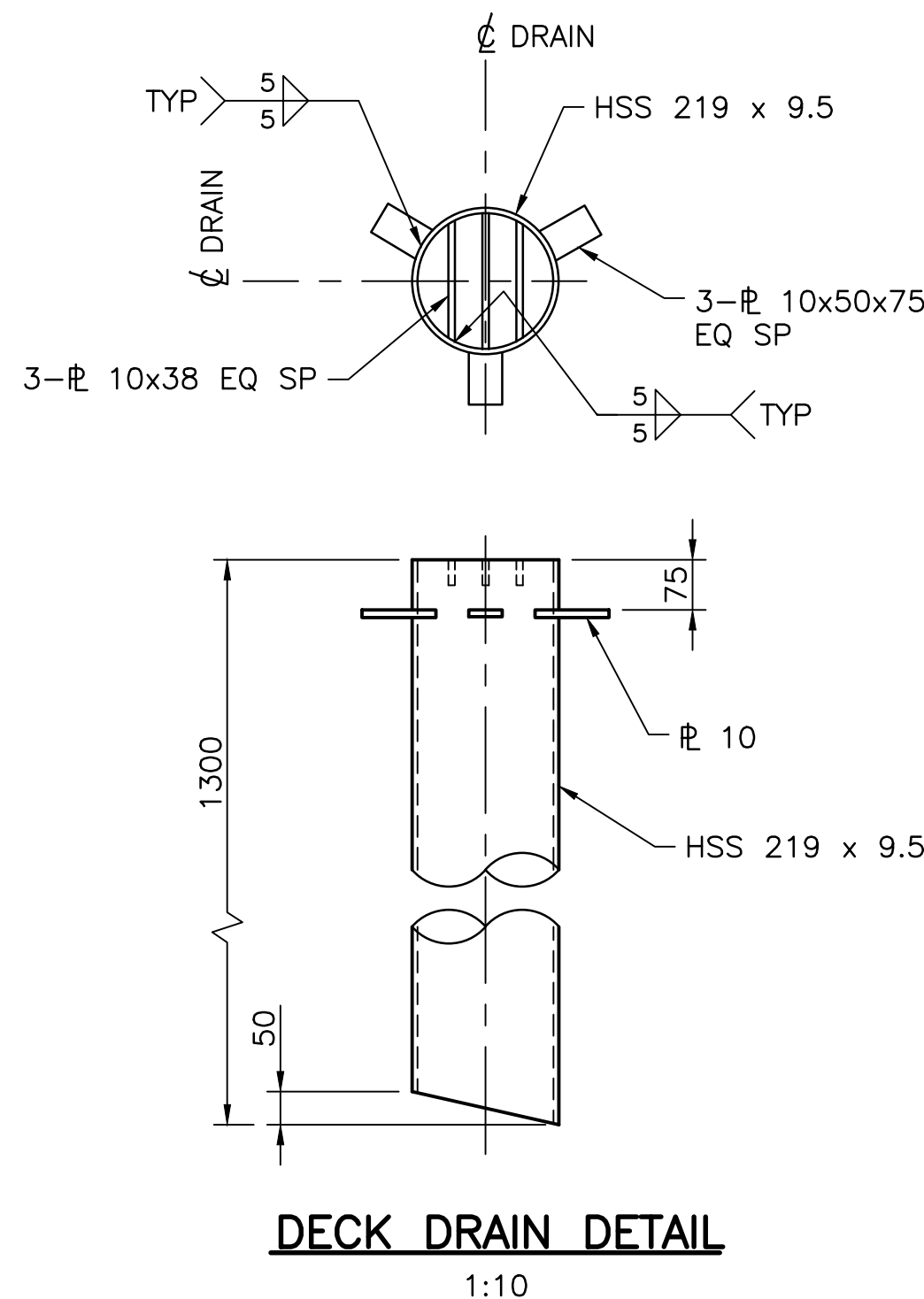
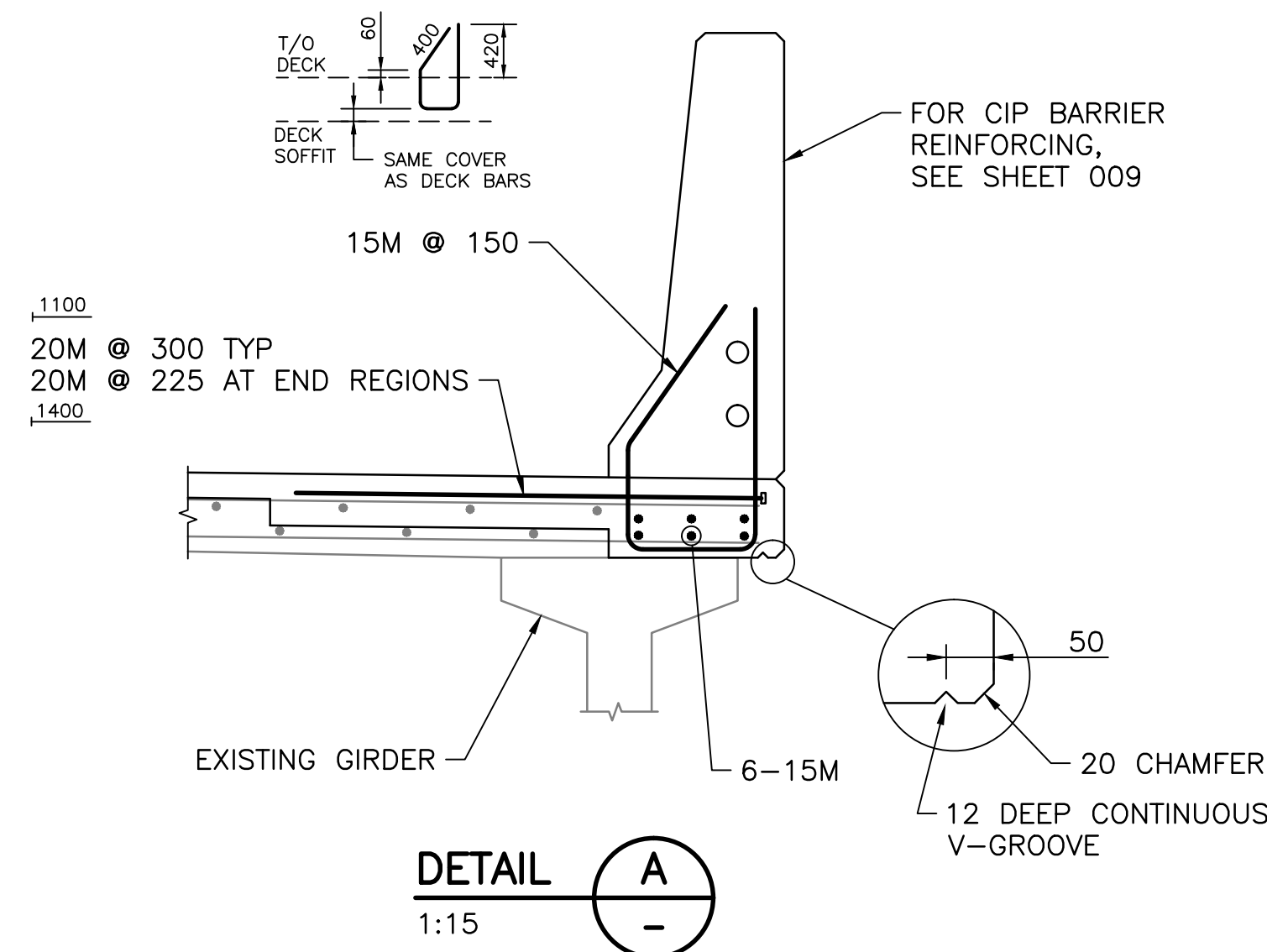
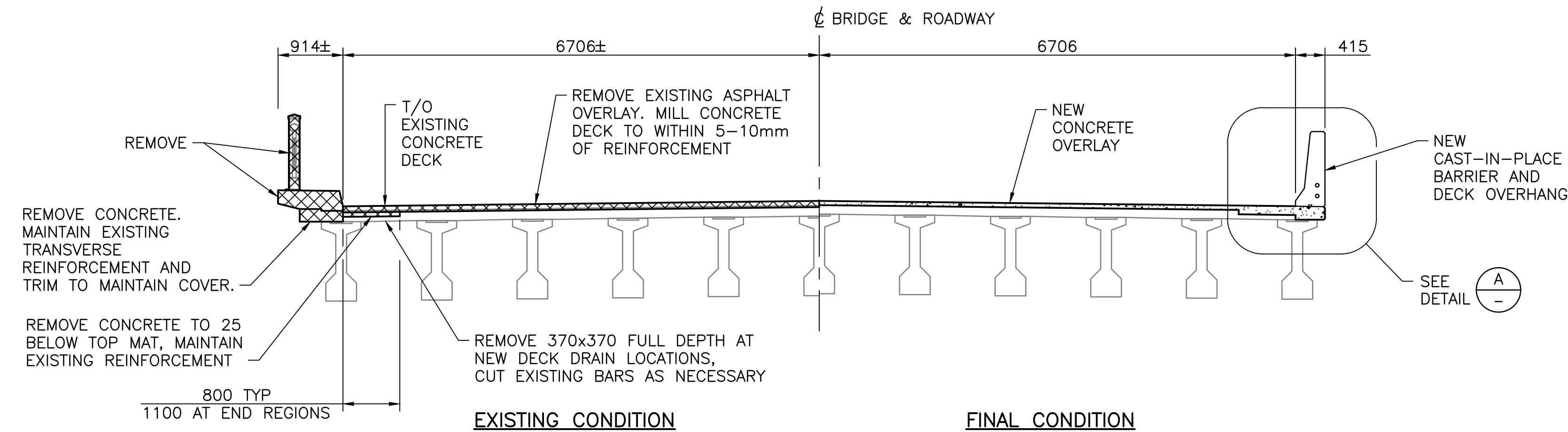
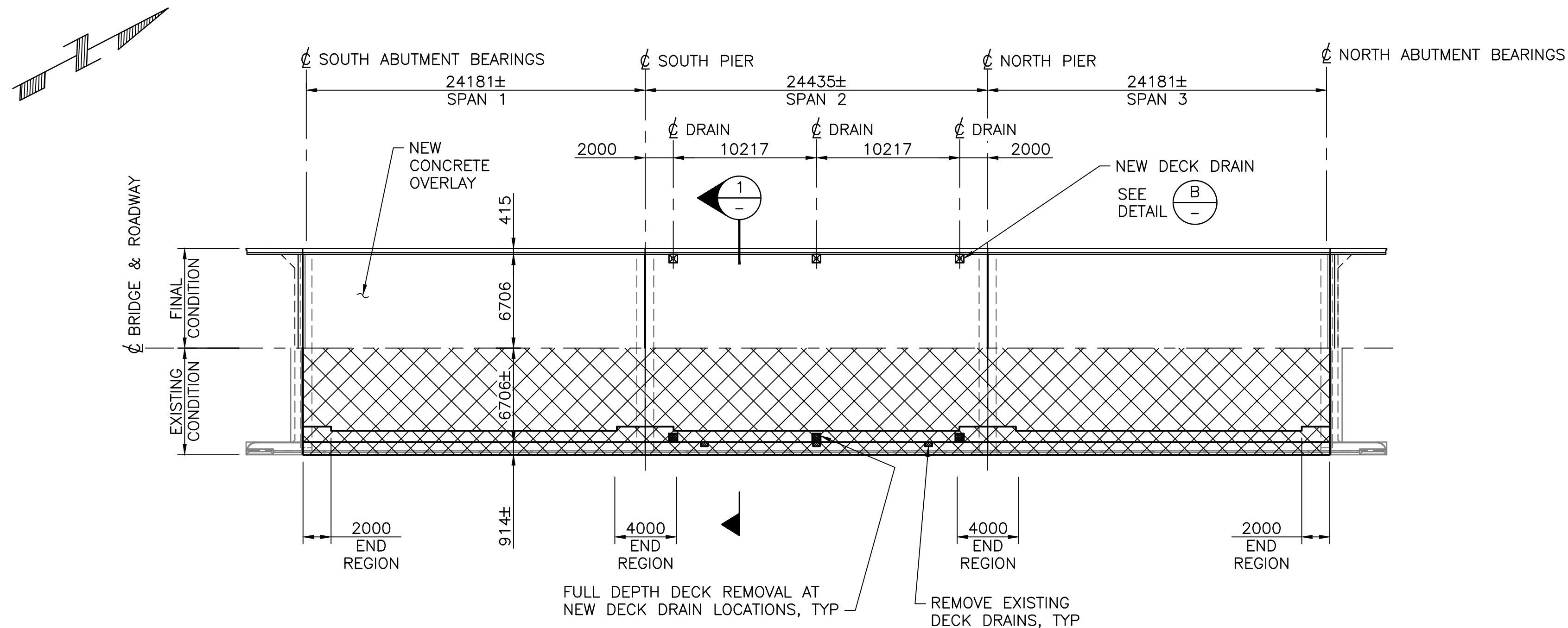


PARTIAL DEPTH CONCRETE PATCH REPAIR DETAIL
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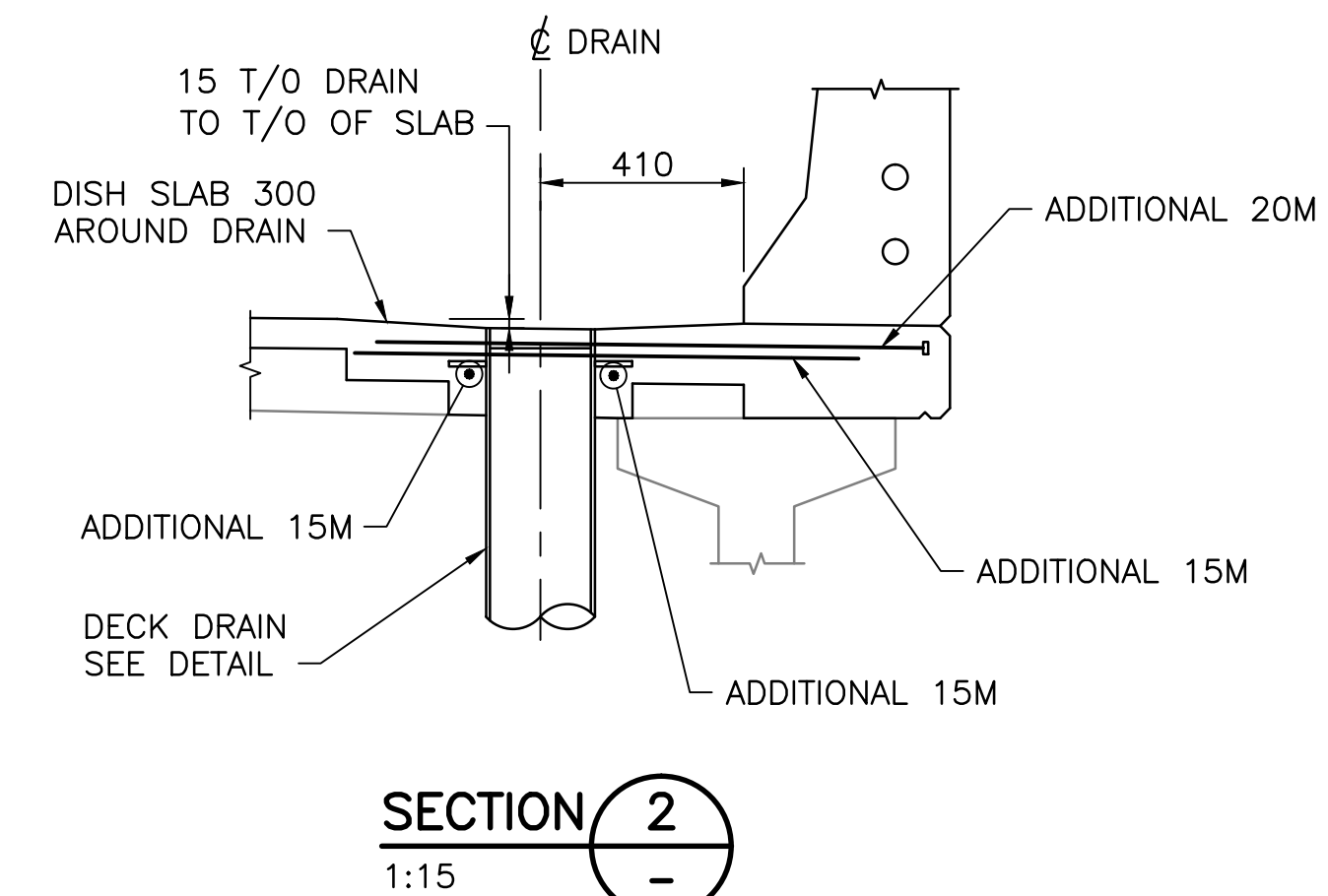


DETAIL A
1:10

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(EXISTING AND TYPICAL NEW DECK REINFORCING NOT SHOWN FOR CLARITY)



(EXISTING AND TYPICAL NEW DECK REINFORCING NOT SHOWN FOR CLARITY)

LEGEND:

REMOVALS

NOTES:

- DECK MODIFICATIONS TO OCCUR IN THREE STAGES IN ACCORDANCE WITH SPECIFICATIONS.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPA AT 28 DAYS.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
- CHAMFER EXPOSED EDGES 20, UNO.
- MINIMUM COVER:
 - 70 TO TOP OF SLAB
 - 30 TO SOFFIT OF SLAB
 - 50 ALL OTHER
- MINIMUM LAP 500 UNO. LAP SPLICES NOT SHOWN.
- STEEL:
 - HSS: CAN/CSA-G40.21 GRADE 350W CLASS C, GALVANIZE AFTER FABRICATION
 - OTHER: CAN/CSA-G40.21 GRADE 300W, GALVANIZE AFTER FABRICATION
- WELDING TO CAN/CSA W59.

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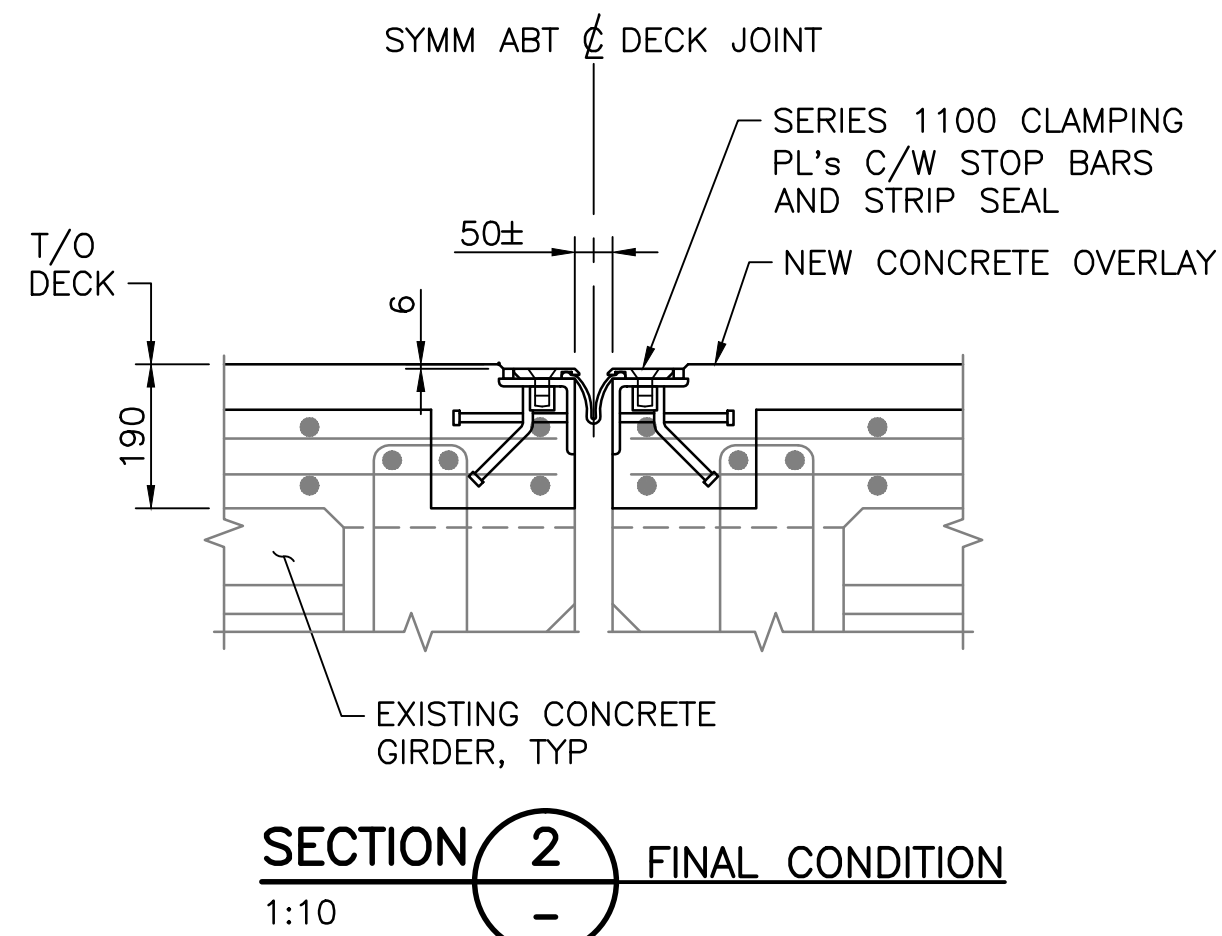
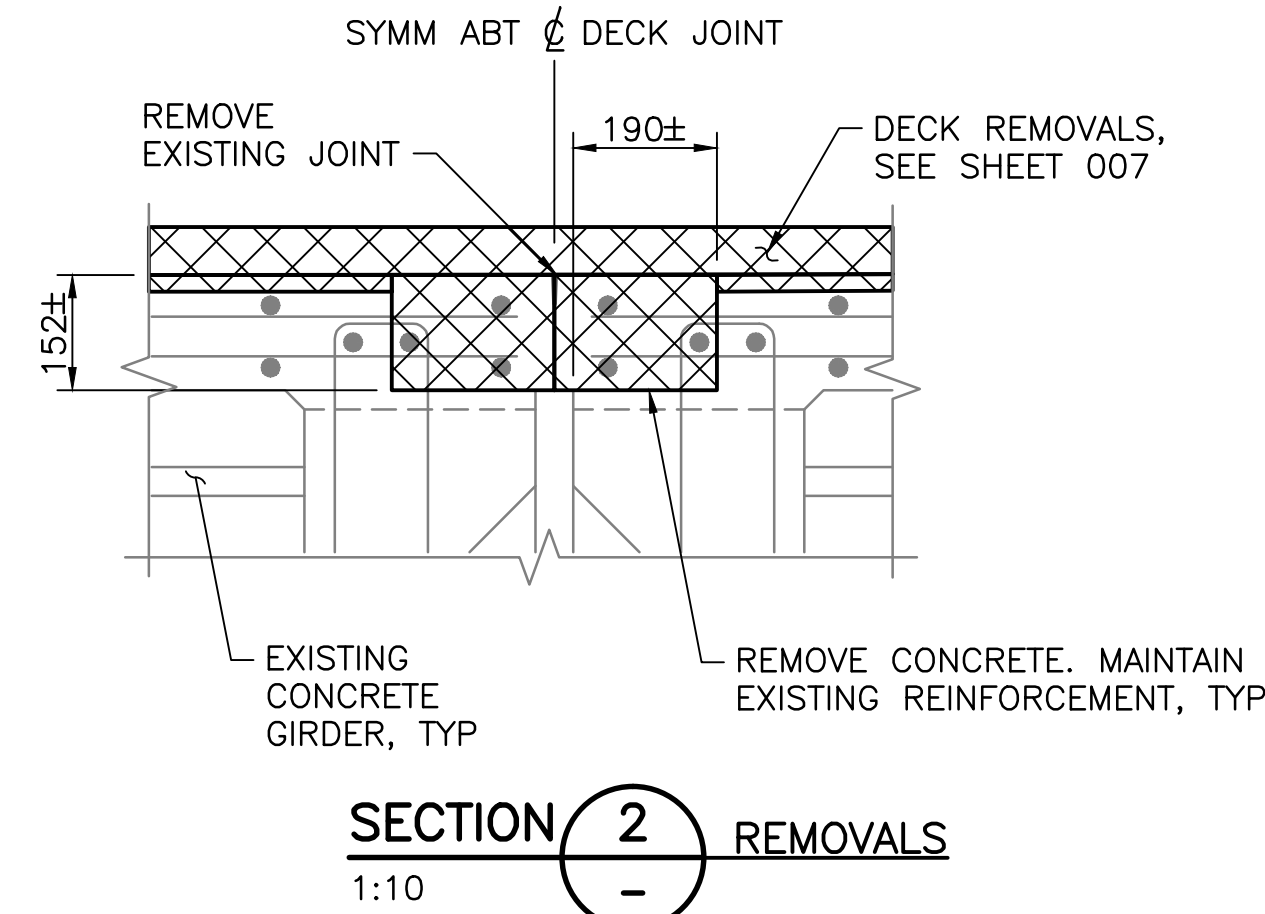
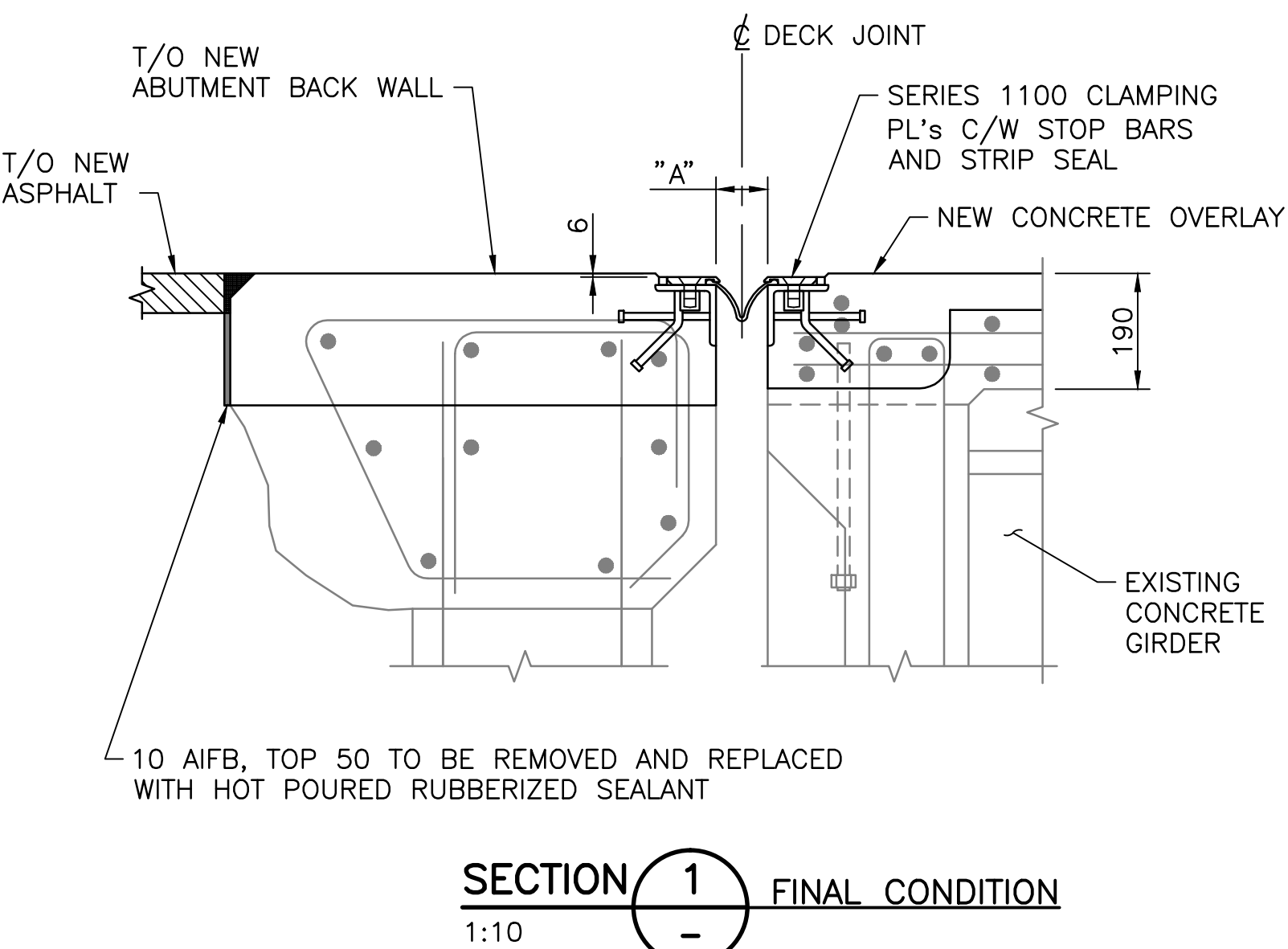
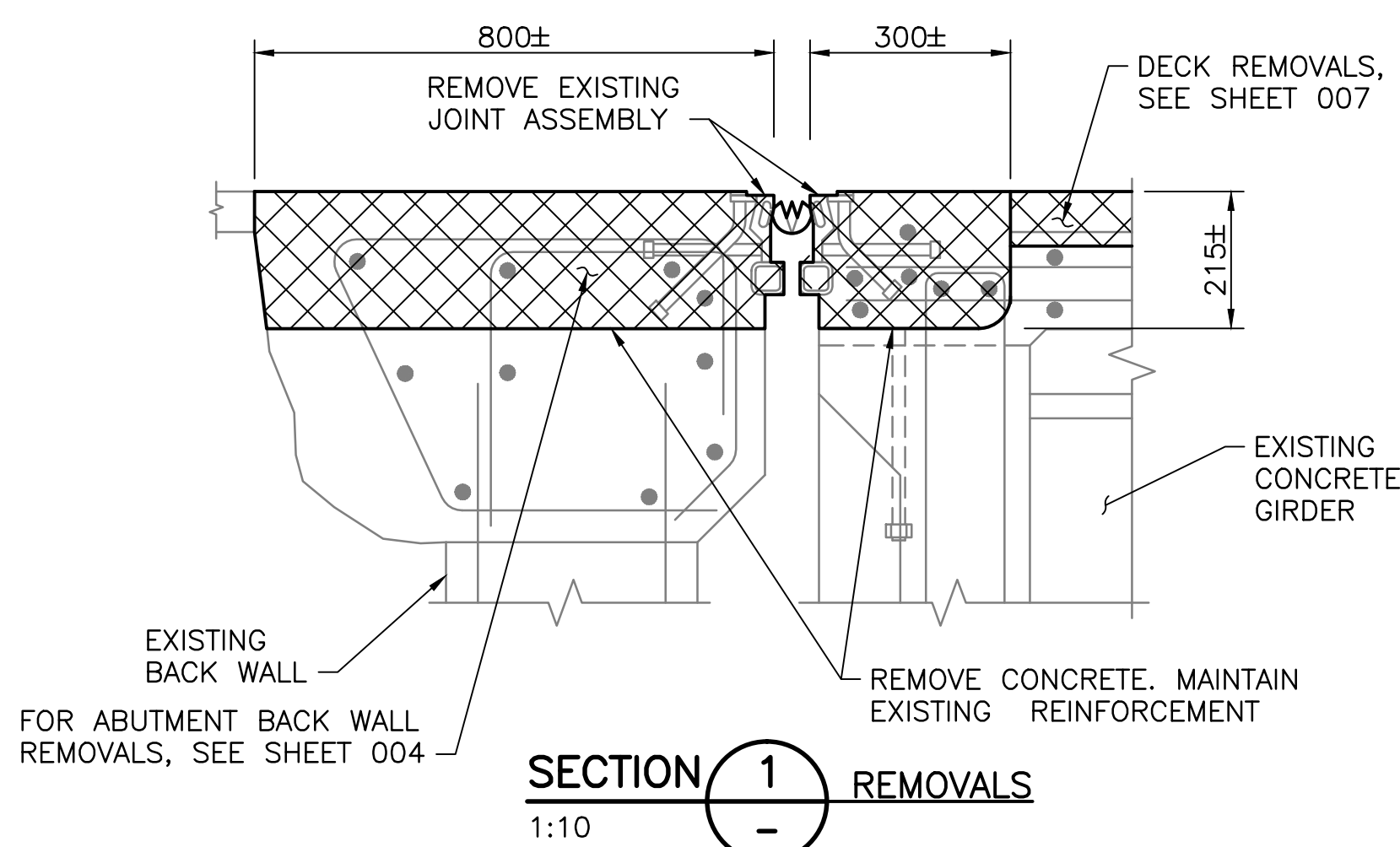
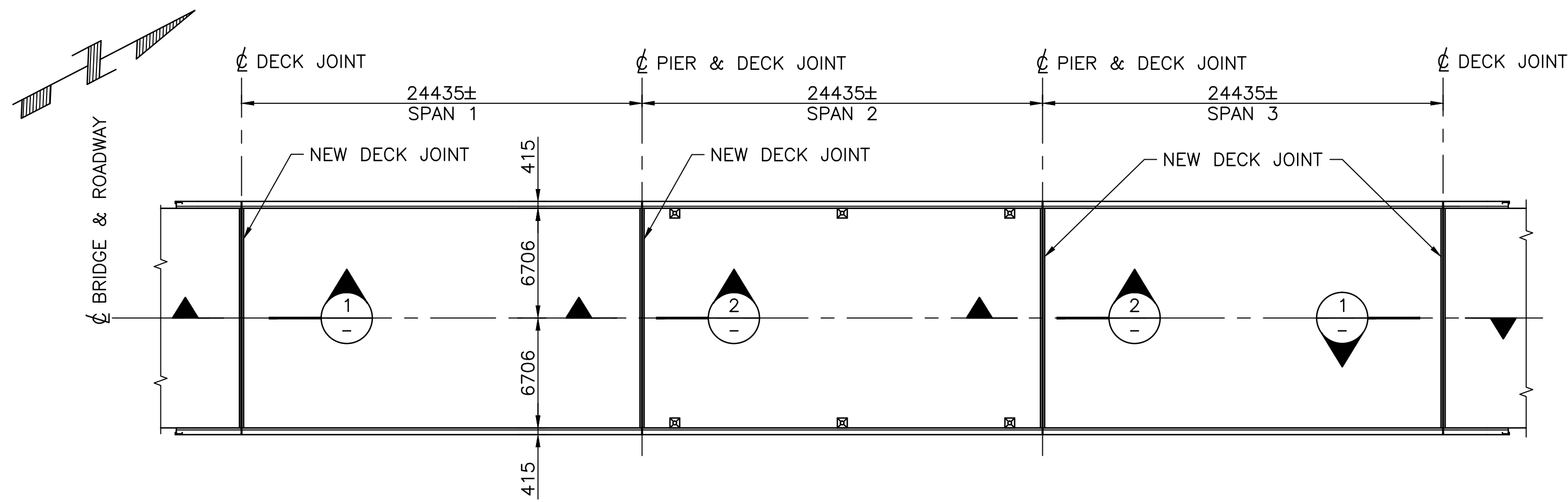
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Drawing title/Titre du dessin

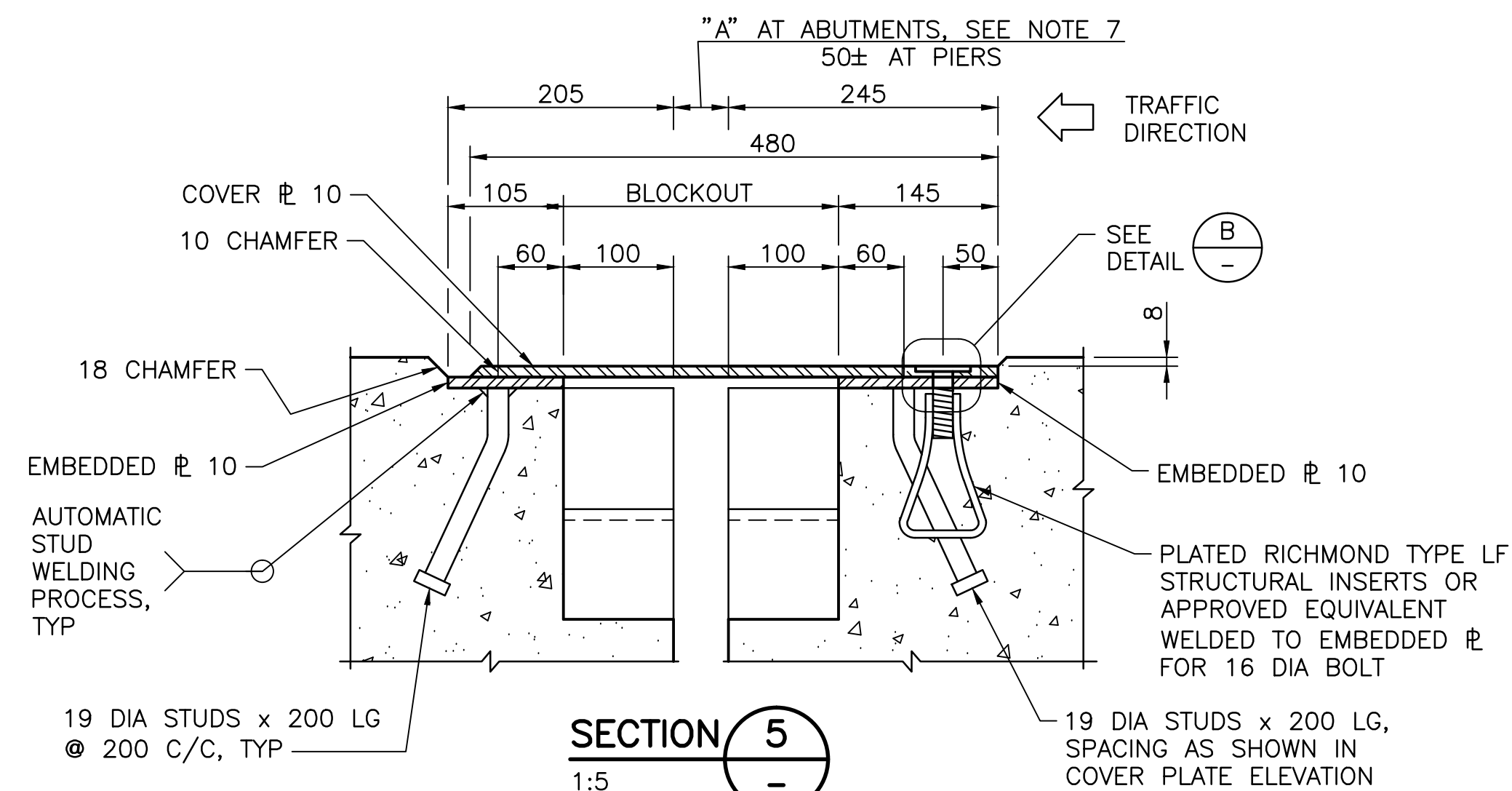
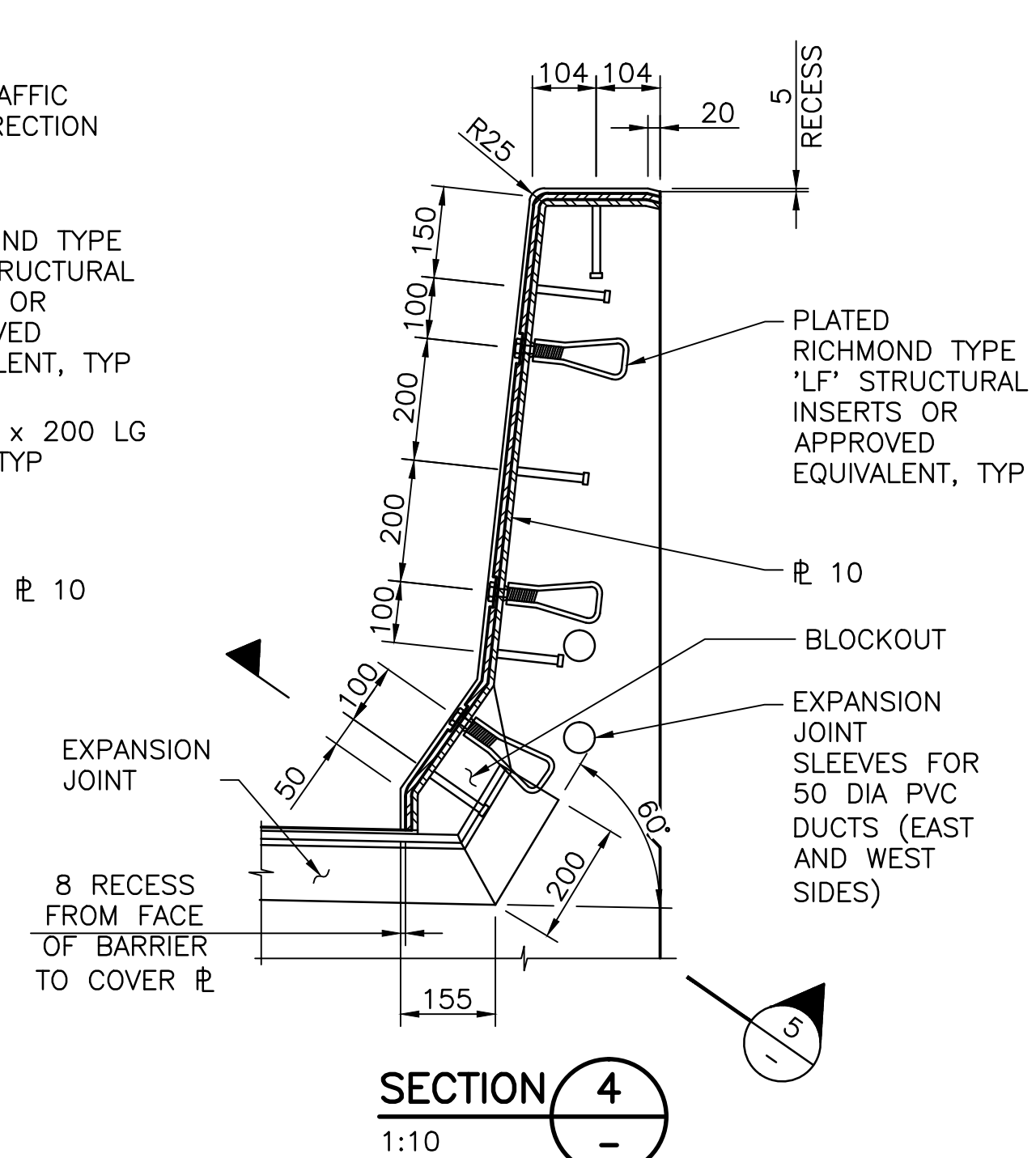
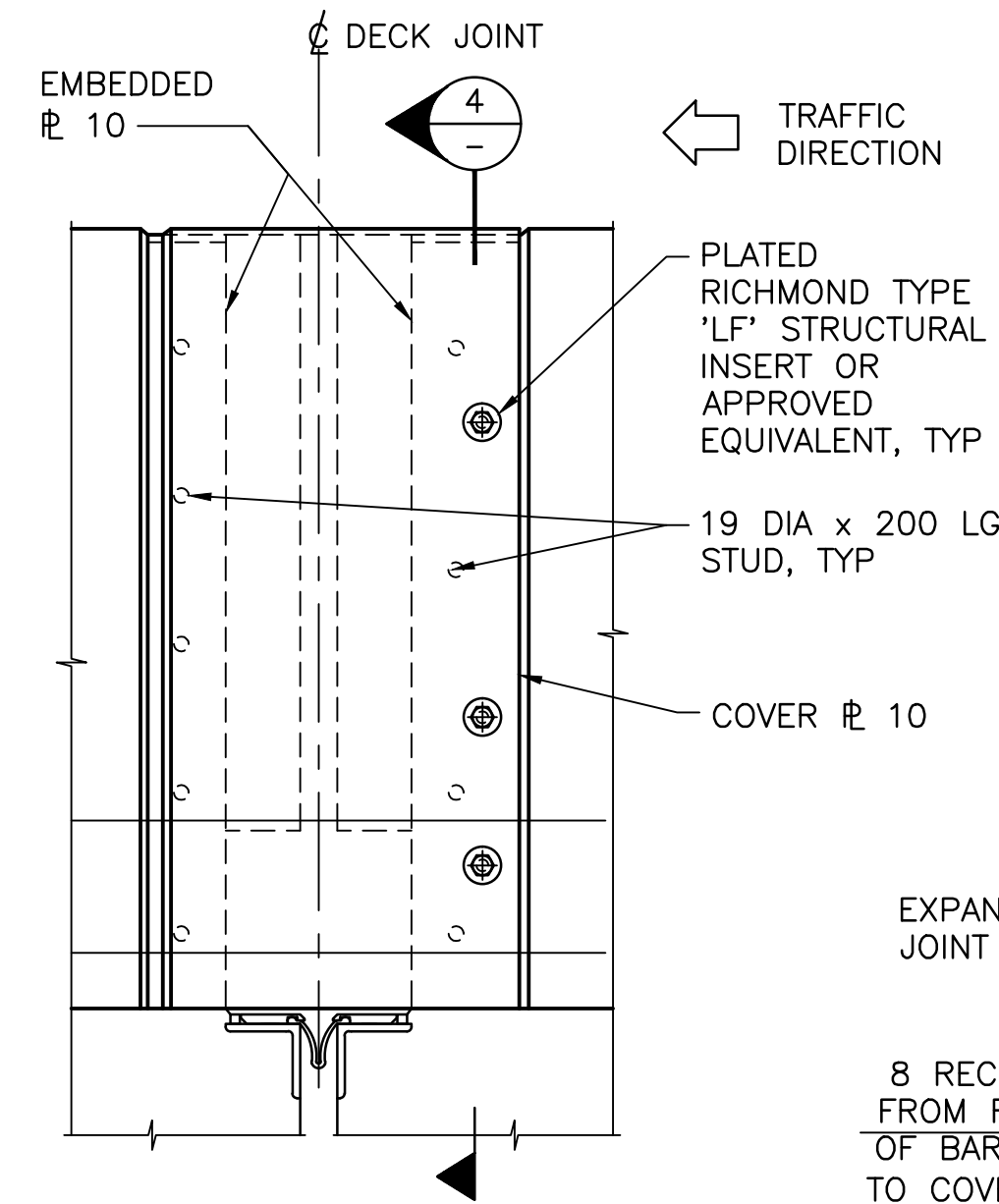
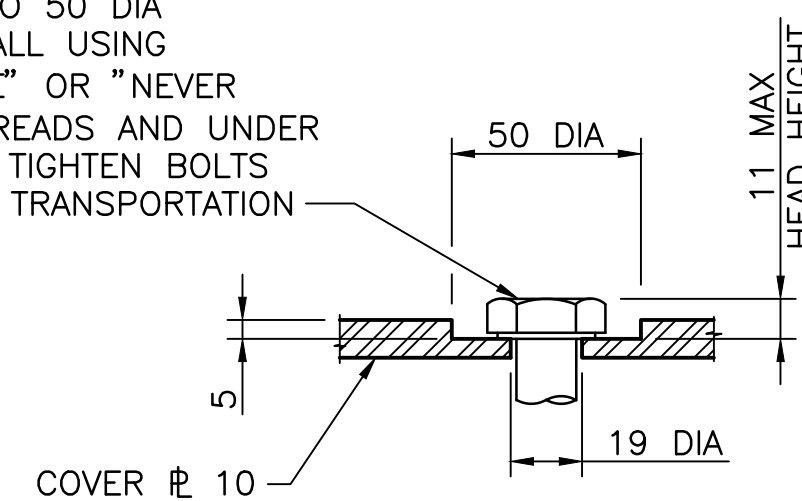
DECK MODIFICATIONS

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16 DIA TYPE 304 STAINLESS STEEL HEXAGONAL HEAD BOLT RECESSED INTO 50 DIA RECESS. INSTALL USING "KOP-R-KOTE" OR "NEVER SEEZ" ON THREADS AND UNDER HEADS. SNUG TIGHTEN BOLTS IN SHOP FOR TRANSPORTATION



NOTES:

- NEW DECK JOINTS "GOODFLEX SERIES 1100 BY GOODCO Z-TECH" AND NEW JOINT NEOPRENE SEAL "GOODCO FL-75" OR APPROVED EQUIVALENT, INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPA AT 28 DAYS.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
- STEEL: CAN/CSA G40.21 GRADE 300W, GALVANIZE AFTER FABRICATION.
- STUDS: CAN/CSA W59 APPENDIX H, TYPE B, GALVANIZE AFTER FABRICATION.
- WELDING TO CAN/CSA W59.
- INSTALL GAP "A" AT ABUTMENTS IN ACCORDANCE WITH THE TABLE BELOW:

INSTALLATION TEMPERATURE	-15°C	-5°C	5°C	15°C	25°C	35°C
GAP "A" (mm)	88	85	81	78	74	70

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Revision/	Description/Description	Date/Date
0	ISSUED FOR CONSTRUCTION	2017/04/13

Client/client	Parks Canada Agency	L'Agence Parcs Canada
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COWI

Project title/Titre du projet
BRIDGE REHABILITATION
YOHO NATIONAL PARK, BRITISH COLUMBIA
KM 107.2 TRANS-CANADA HIGHWAY
OTTERTAIL RIVER BRIDGE

Approved by/Approuvé par
DAWO

Designed by/Concept par
CHID

Drawn by/Dessiné par
JAET

PWGC Project Manager/Administrateur de Projets TPSCG

PWGC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

Client/client
PCA

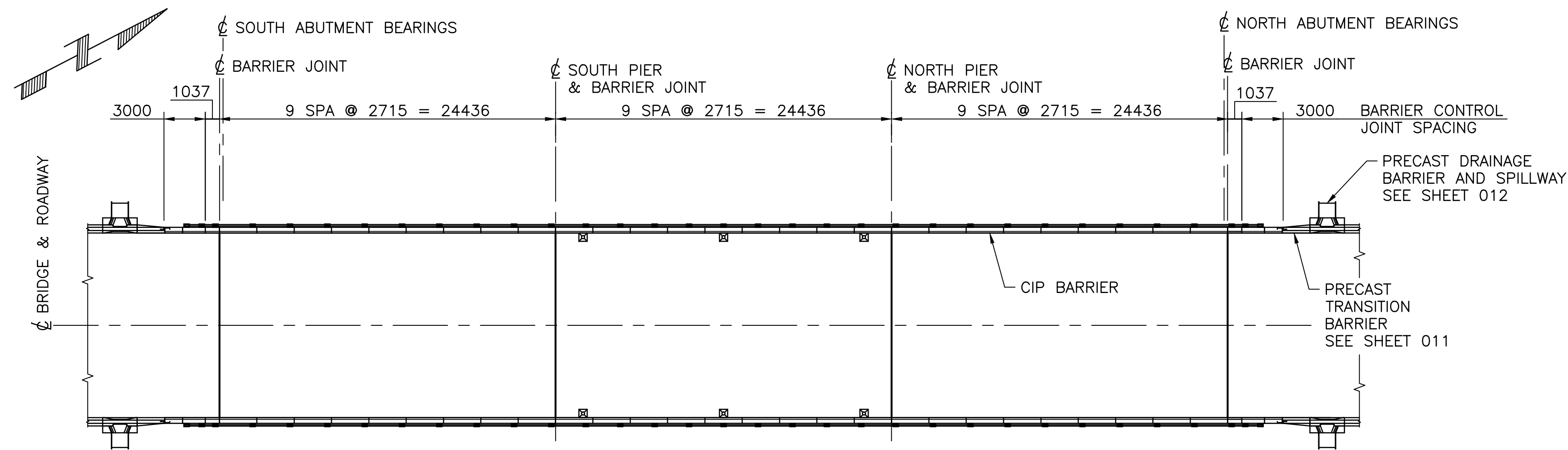
Drawing title/Titre du dessin

DECK JOINT REPLACEMENT

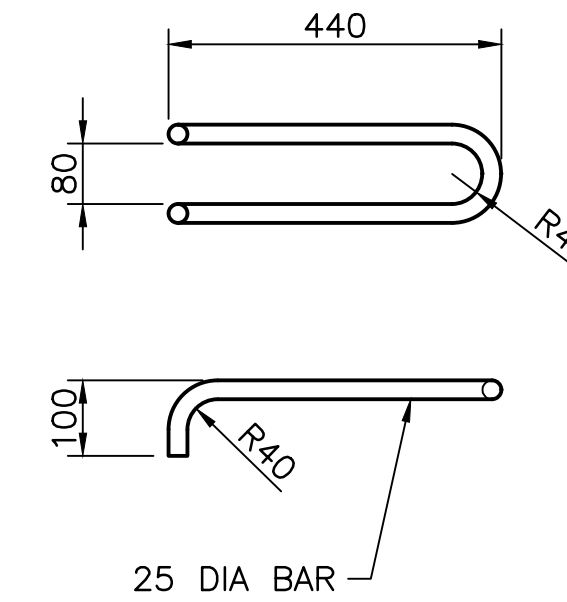
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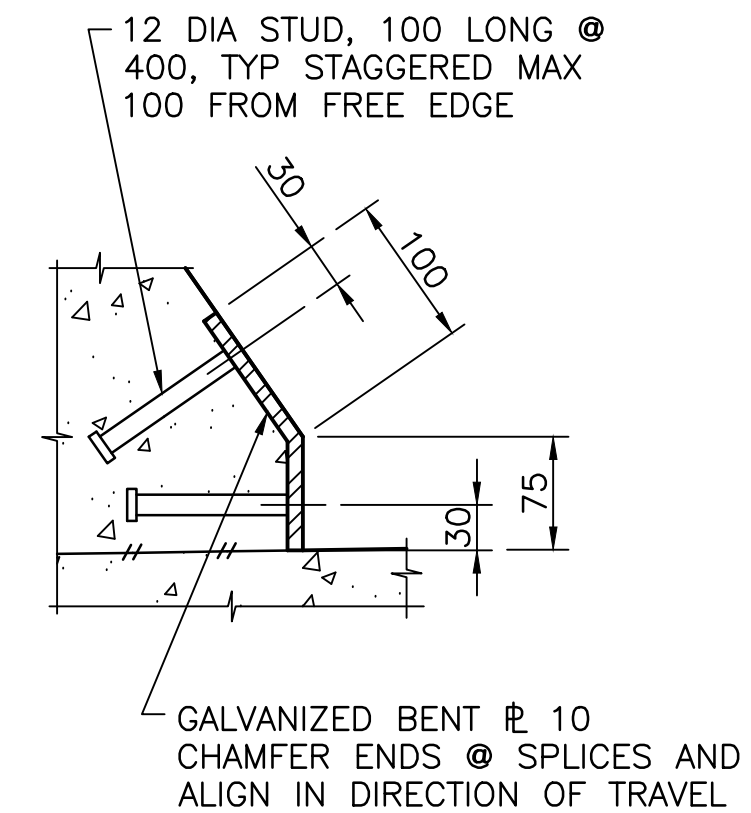
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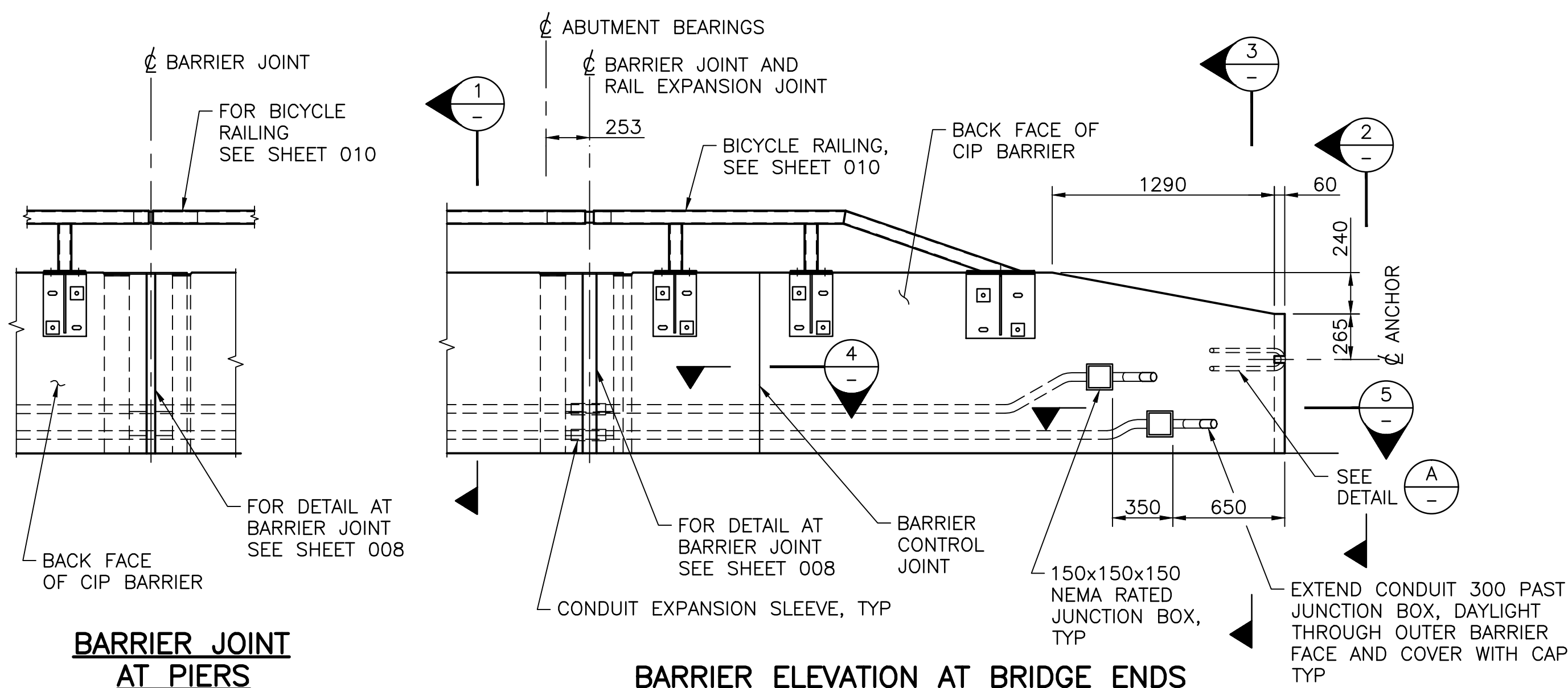
PLAN
1:250



DETAIL A
1:10

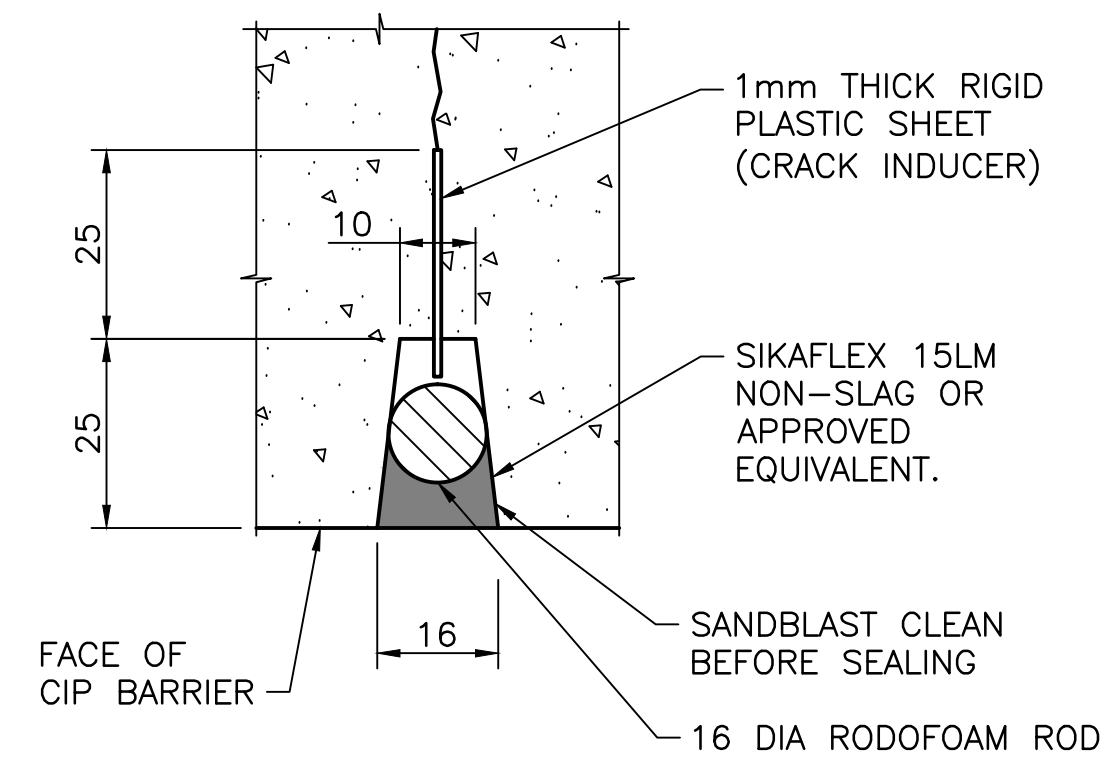


DETAIL B
1:5

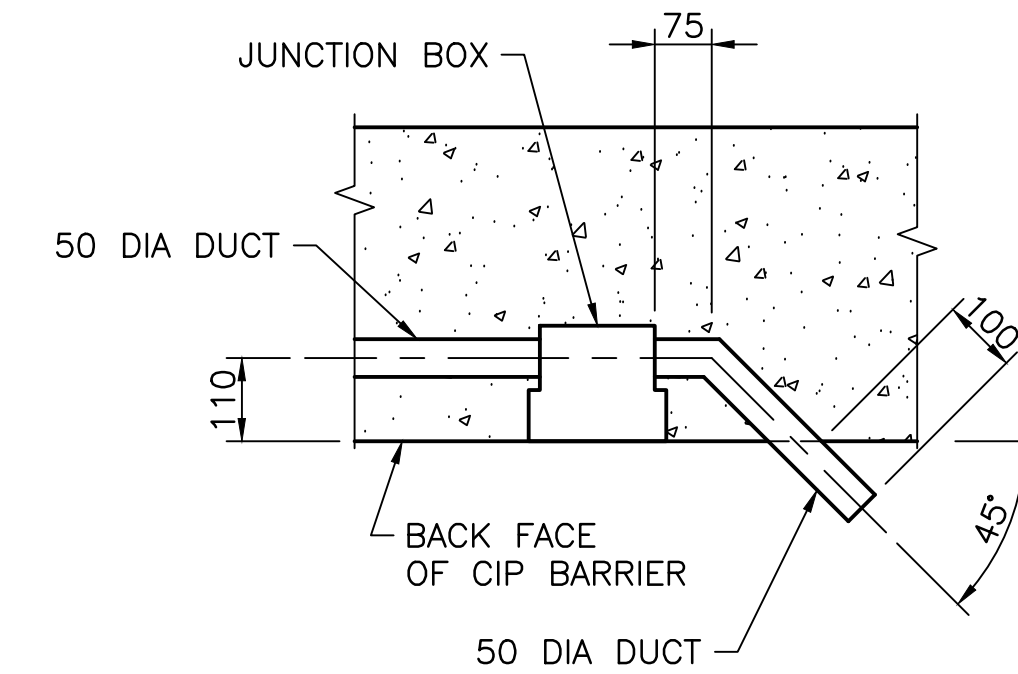


BARRIER JOINT
AT PIERS
1:25

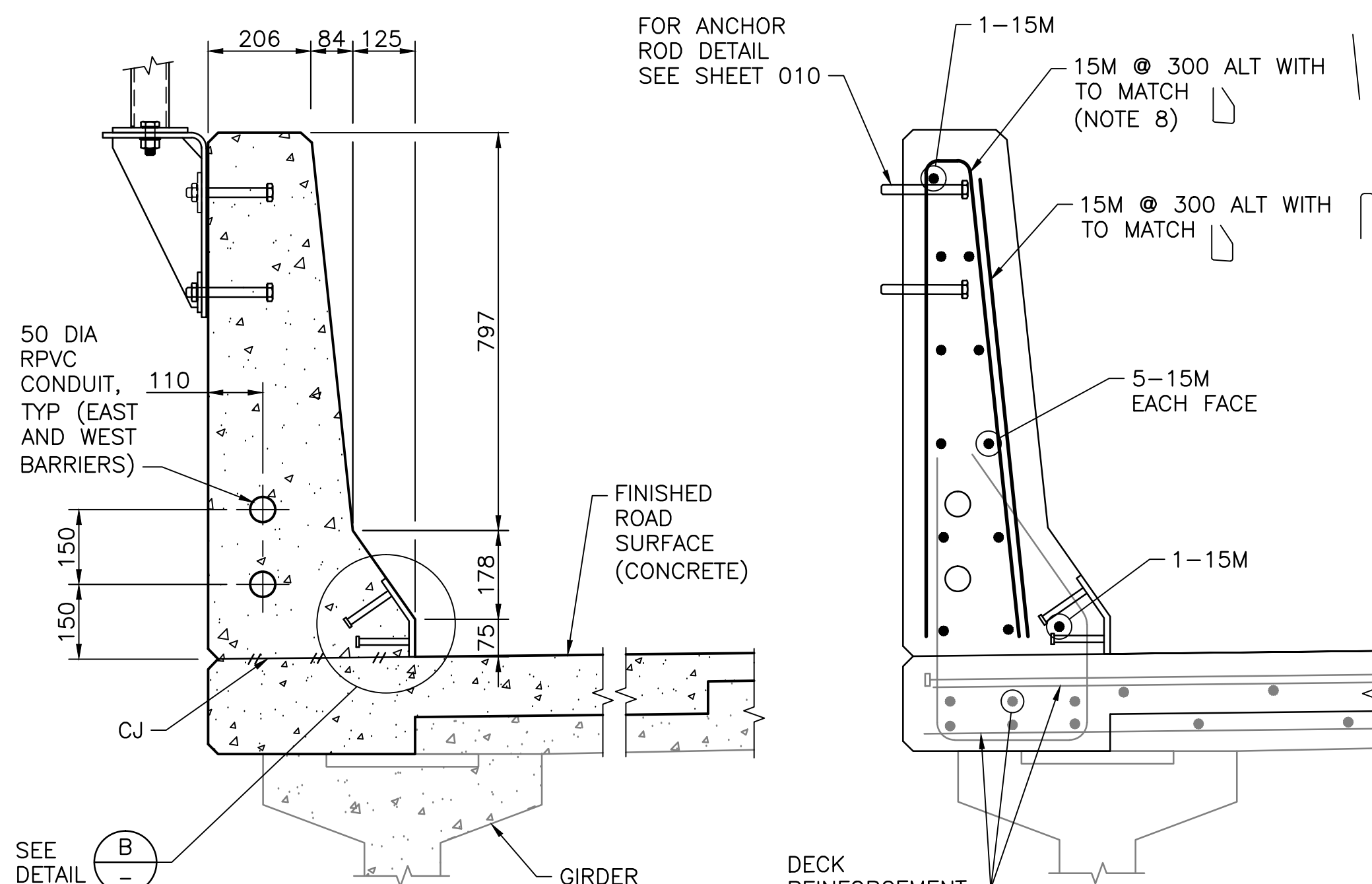
BARRIER ELEVATION AT BRIDGE ENDS
1:25



TYPICAL BARRIER CONTROL JOINT
SECTION 4
1:1

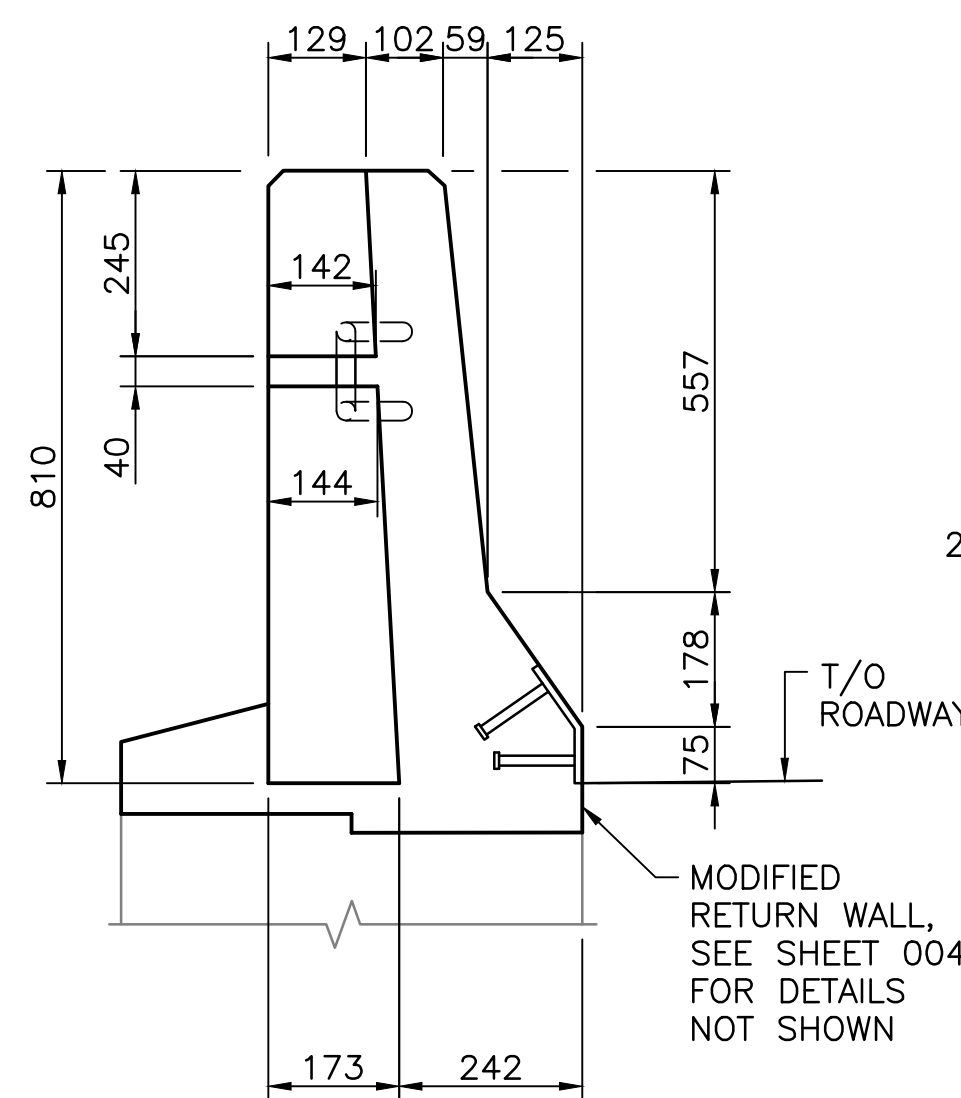


SECTION 5
1:10

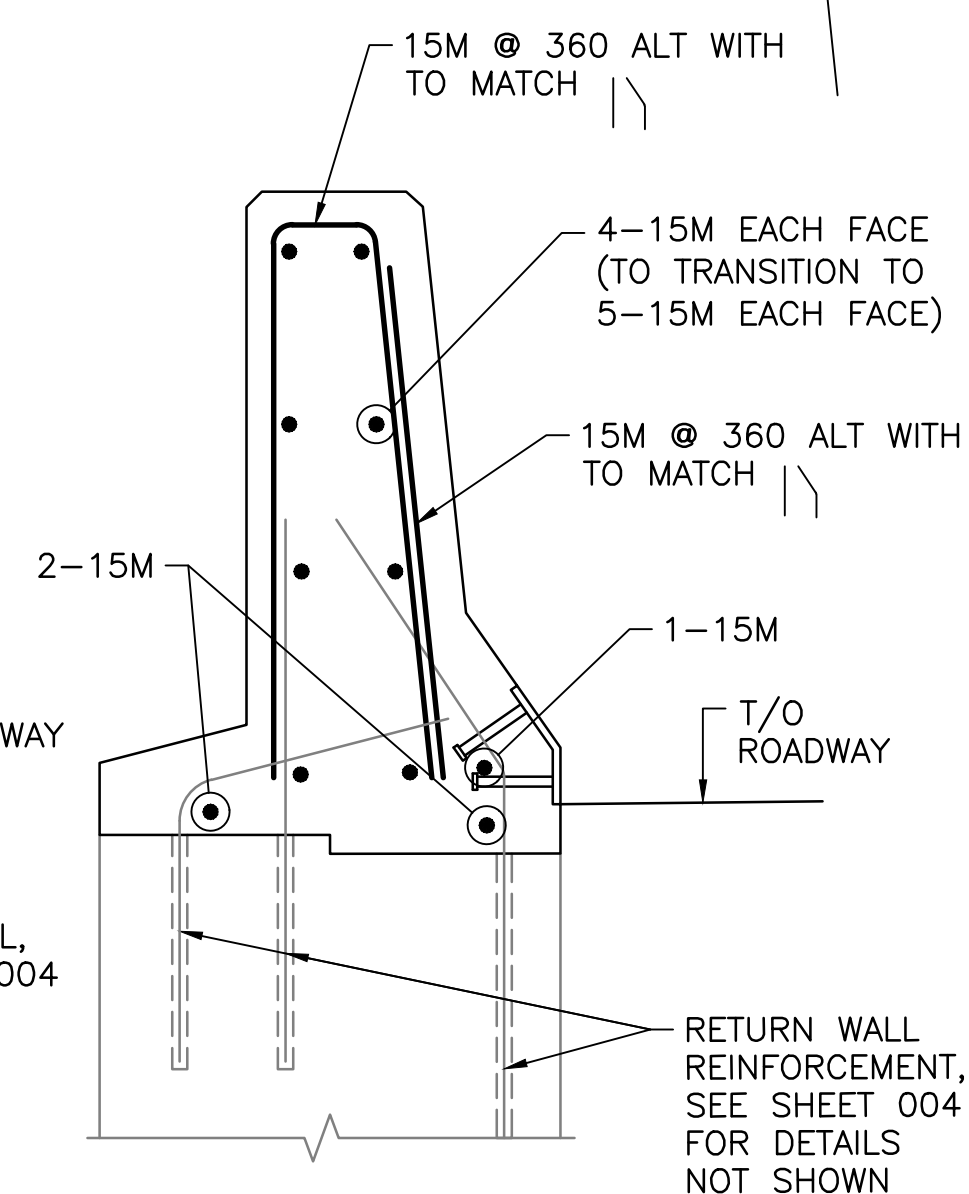


SECTION 1 OUTLINE
1:10

SECTION 1 REINFORCEMENT
1:10



VIEW 2 OUTLINE
1:10



SECTION 3 REINFORCEMENT
1:10

NOTES:

1. MINIMUM COMPRESSING STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
2. CHAMFER EXPOSED EDGES 20.
3. REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
4. MINIMUM COVER: 50 UNO.
5. MINIMUM LAP: 500 UNO.
6. STEEL: CAN/CSA G40.21M GRADE 300W, GALVANIZE AFTER FABRICATION.
7. STUDS: CSA W59 APPENDIX H, TYPE B, GALVANIZE AFTER FABRICATION.
8. PROVIDE REDUCED BEND DIAMETER OF 81 (MEASURED ON THE INSIDE OF THE BAR) AND PLACE BAR ON SKEW TO SATISFY COVER REQUIREMENTS.
9. REPLACE BARRIER REINFORCEMENT CUT FOR JUNCTION BOX WITH ADDITIONAL EQUIVALENT BARS ADJACENT TO THE BOX.
10. CONDUIT ELBOWS NOT TO EXCEED 22.5 DEGREES UNLESS NOTED OTHERWISE.

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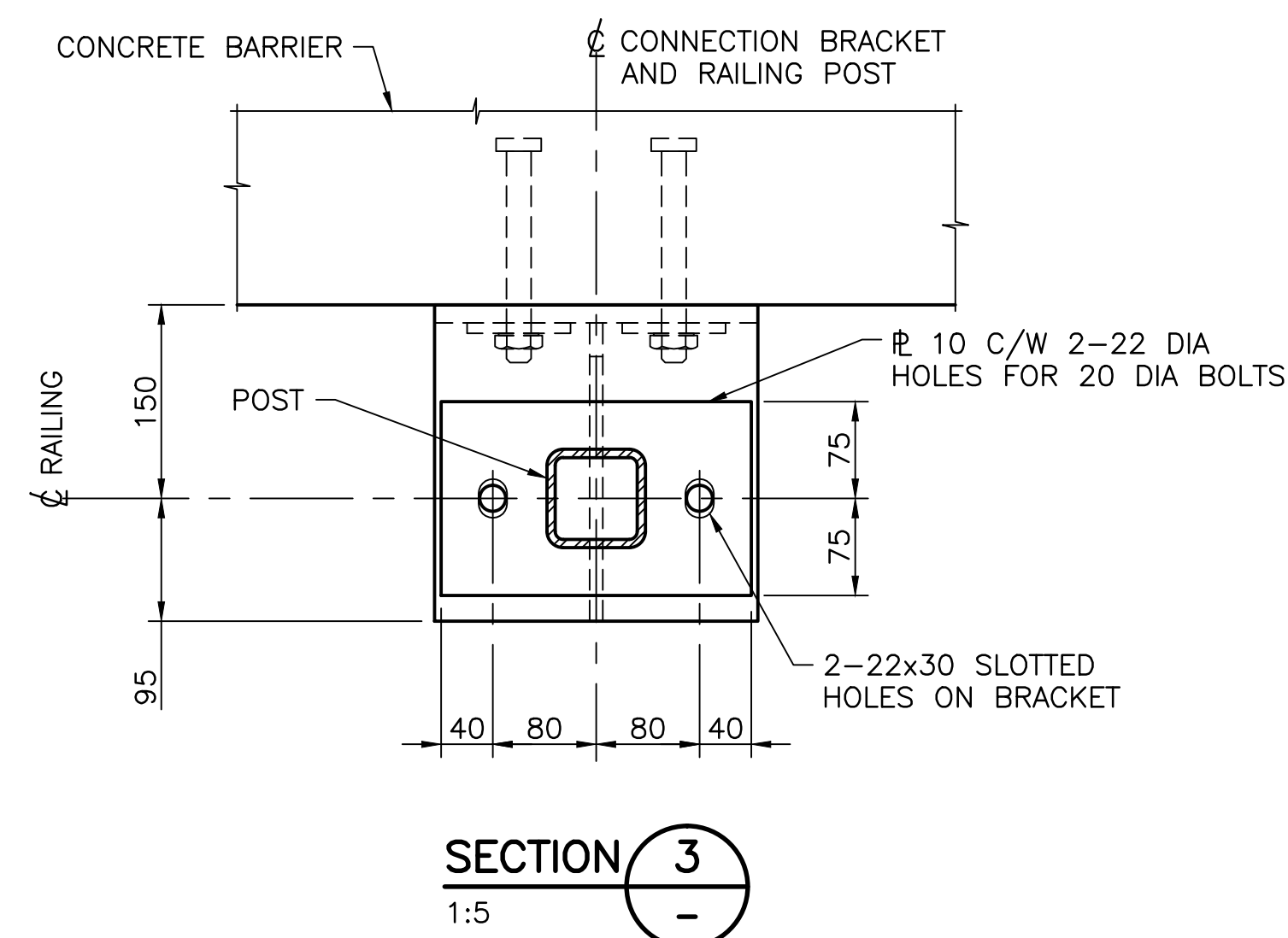
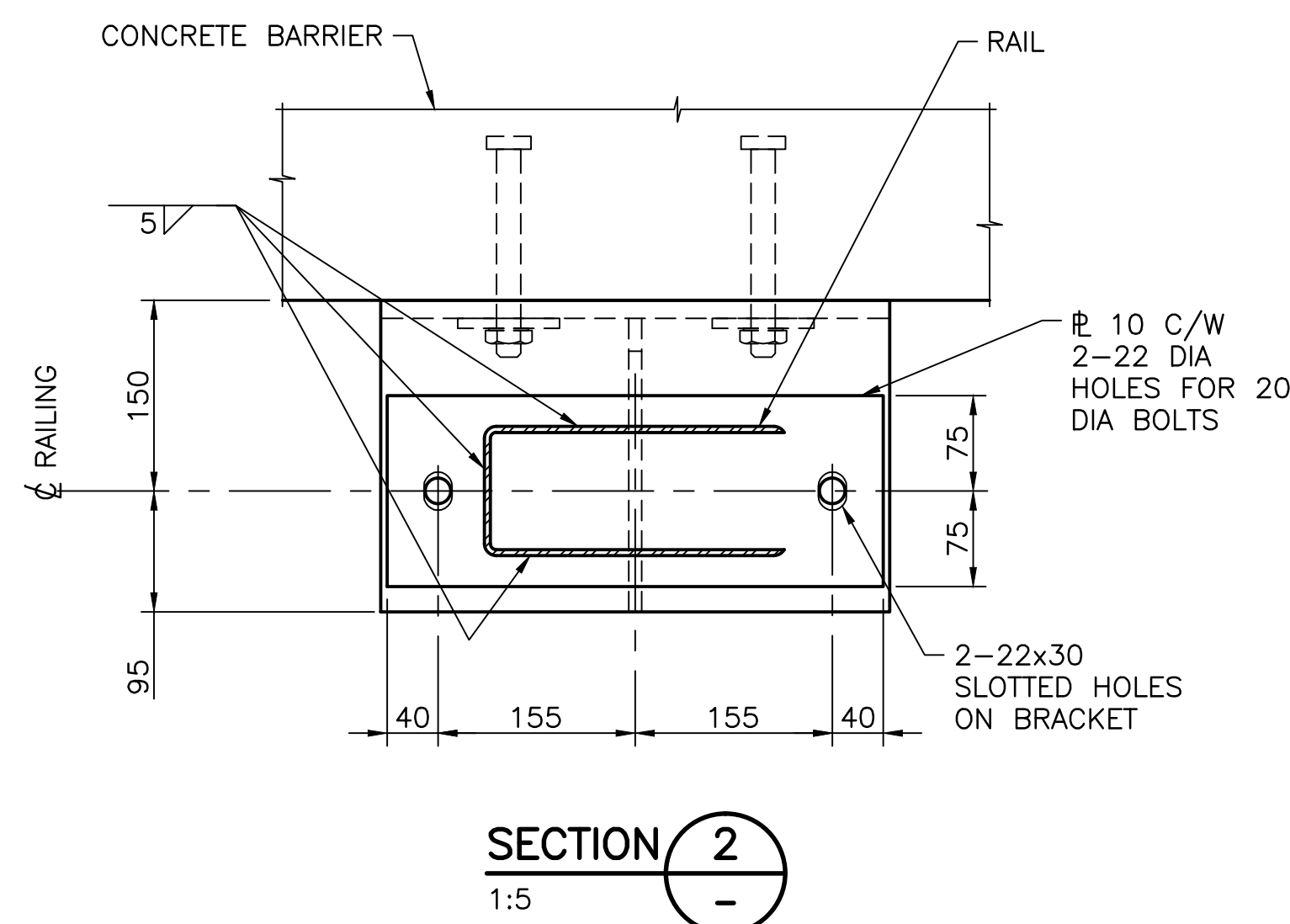
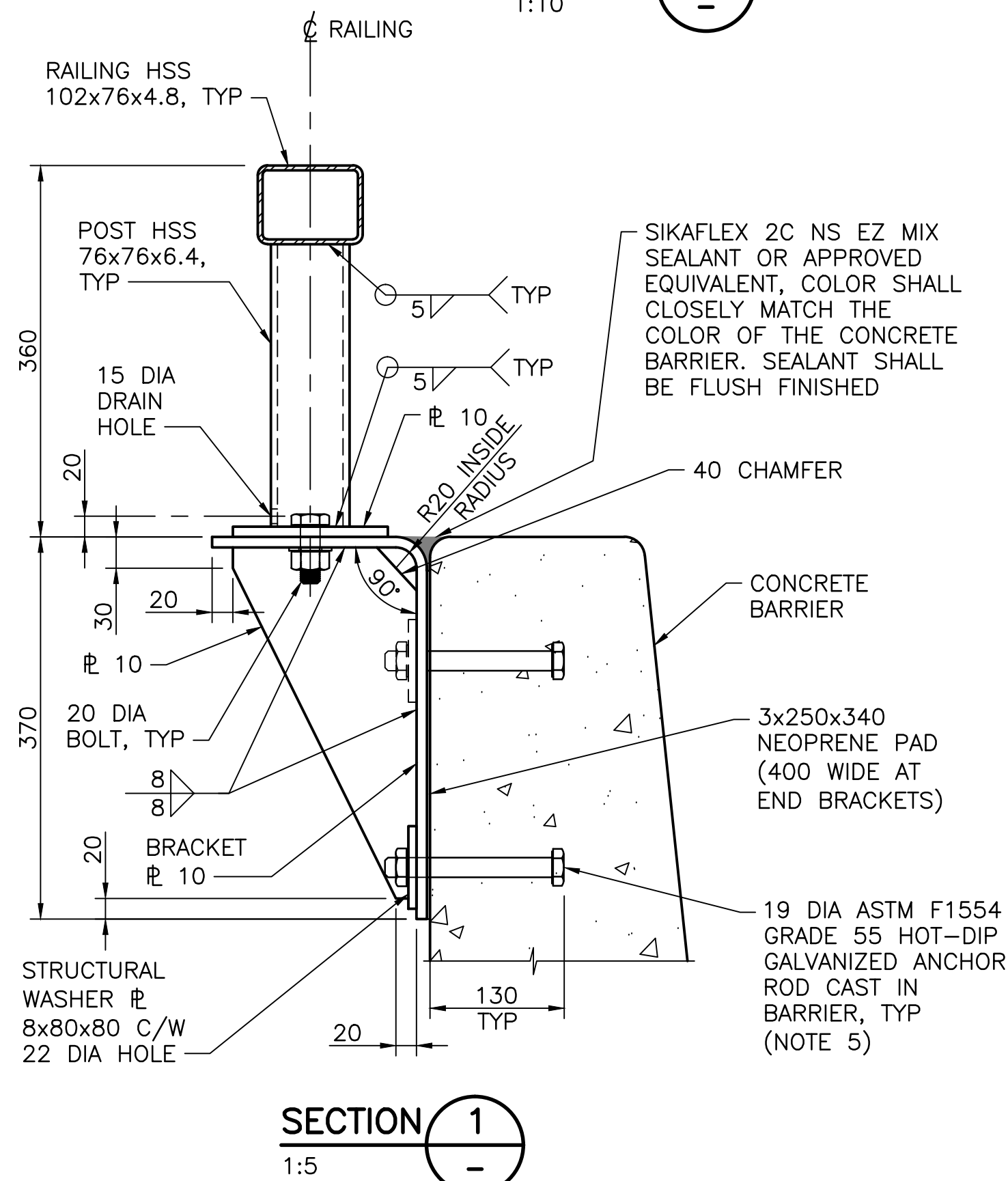
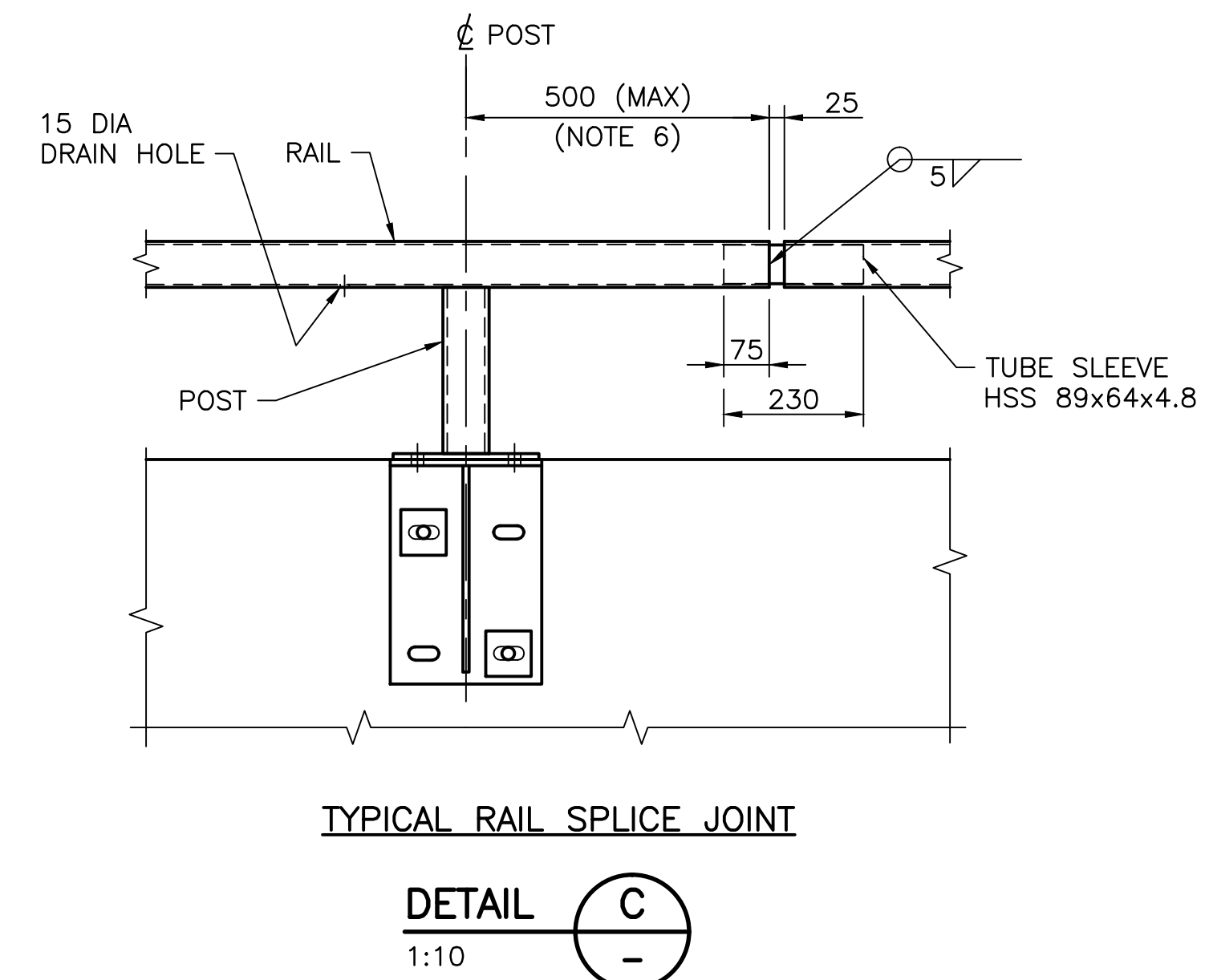
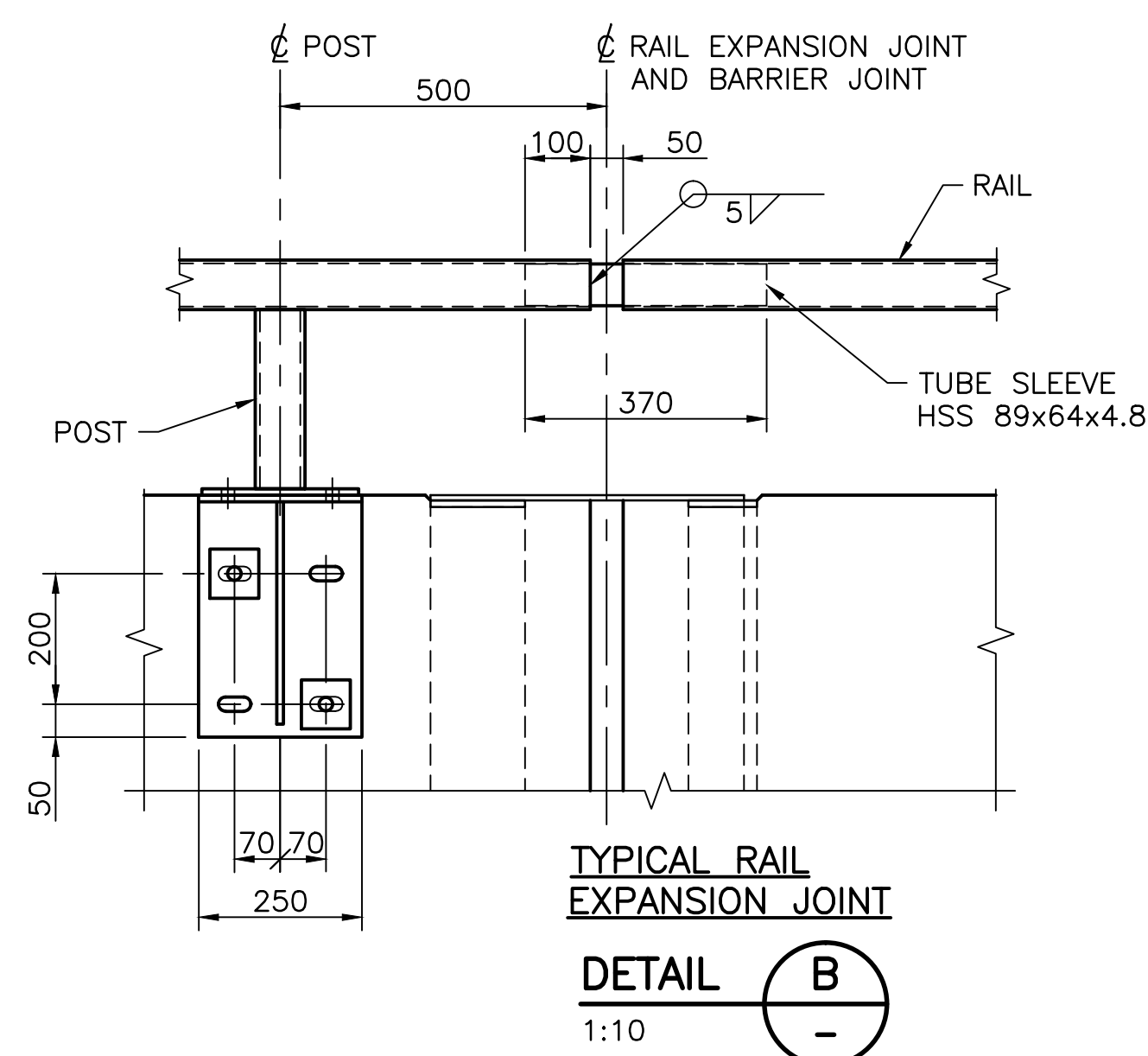
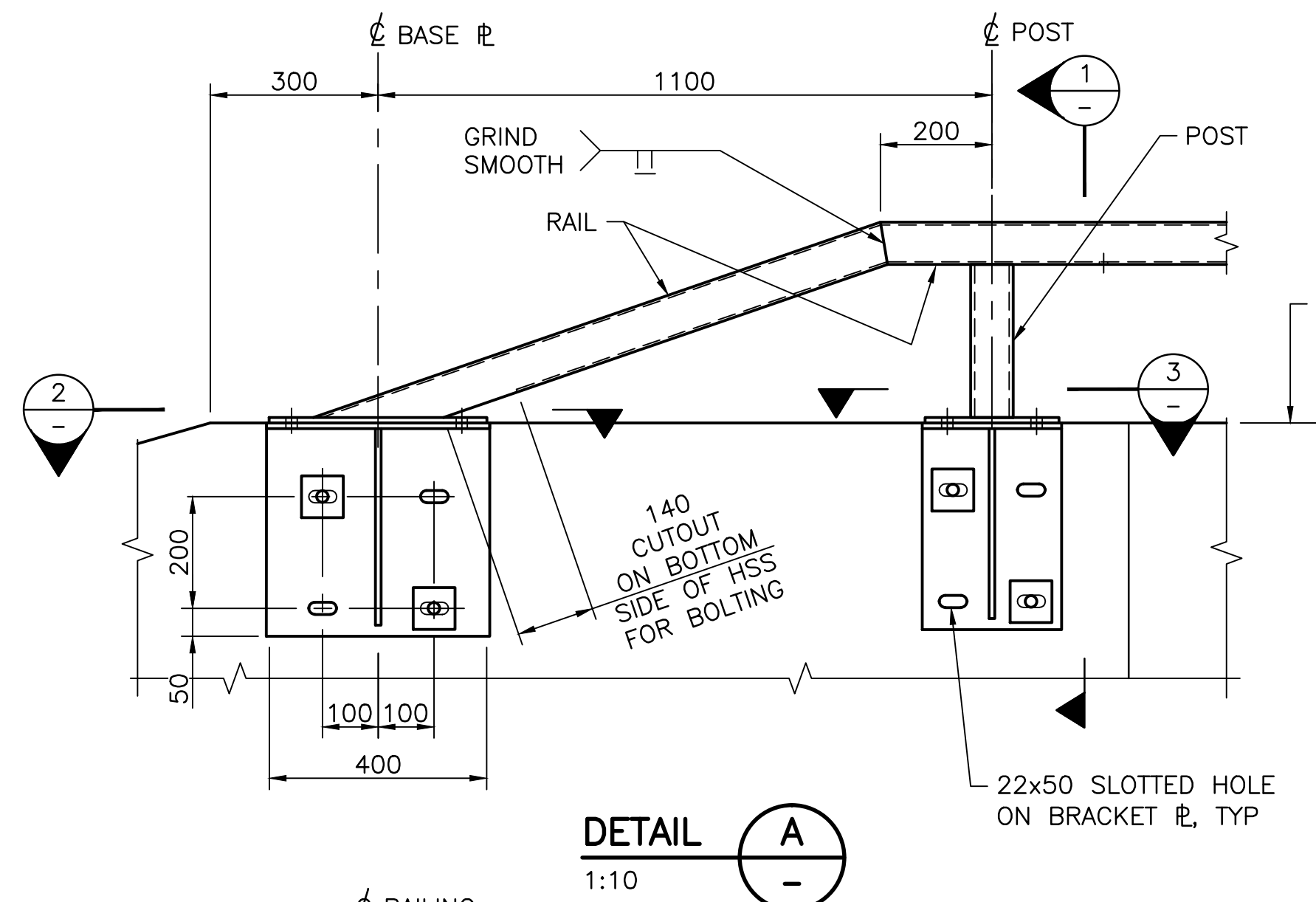
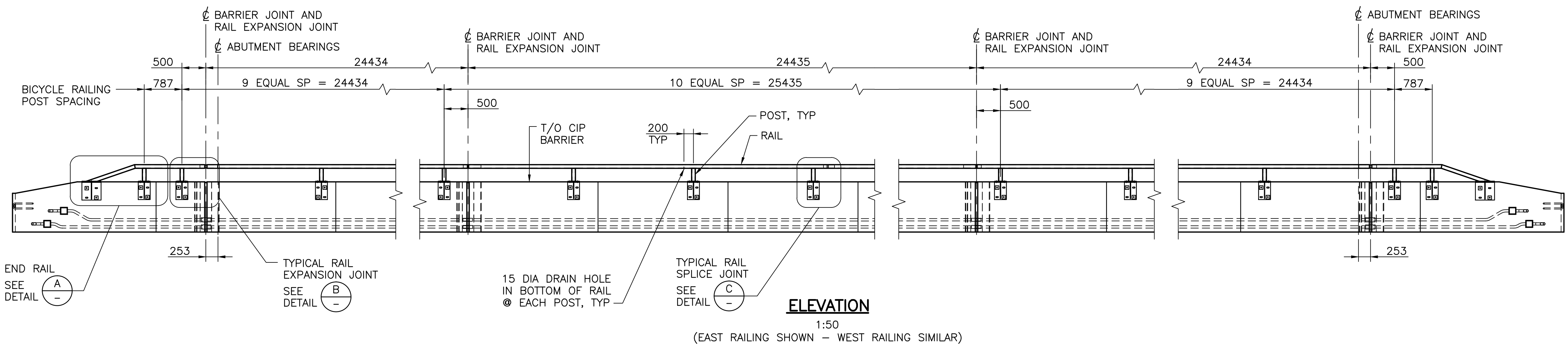
Project title/Titre du projet
BRIDGE REHABILITATION
YOHO NATIONAL PARK, BRITISH COLUMBIA
KM 107.2 TRANS-CANADA HIGHWAY
OTTERTAIL RIVER BRIDGE

Approved by/Approuvé par DAWO
Designed by/Concept par CHID
Drawn by/Dessiné par JAET
PWOSC Project Manager/Administrateur de Projets TPSCG
PWOSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie, TPSCG
Client/client PCA
Drawing title/Titre du dessin CAST-IN-PLACE BARRIER LAYOUT AND REINFORCEMENT

Project No./No. du projet 1077-01	Sheet/Feuille 009 OF	Revision no./ La Révision no. 0
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NOTES:

- STEEL: HSS: CAN/CSA-G40.21 GRADE 350W, CLASS C.
OTHER: CAN/CSA-G40.21 GRADE 300W.
BOLTS: ASTM A325.
- WELDING TO CAN/CSA W59.
- HOT DIP GALVANIZE ALL STEEL AFTER FABRICATION TO ASTM A123.
- NEOPRENE PAD SHALL BE 50 DUROMETER HARDNESS IN ACCORDANCE WITH ASTM D 2240.
- TWO ANCHOR RODS REQUIRED AT EACH BRACKET, ONE TOP AND ONE BOTTOM, EITHER SIDE OF STIFFENER PLATE.
- NOT ALL SPLICE JOINTS SHOWN. RAIL SEGMENTS MUST SPAN 2 POSTS MINIMUM AND 3 POSTS WHERE POSSIBLE. RAIL SPLICES TO BE LOCATED 500 MAXIMUM FROM POST.

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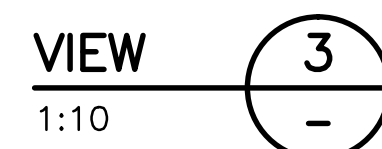
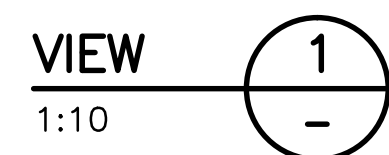
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BICYCLE RAILING

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1. SOUTH EAST AND NORTH WEST TRANSITION BARRIER SHOWN, SOUTH WEST AND NORTH EAST TRANSITION BARRIER SIMILAR BUT OPPOSITE HAND.
2. FOR MATERIAL, QUALITY OF WORK AND OTHER DETAILS OF NEW PRECAST BARRIER TRANSITION, REFER TO SECTION 941 OF BC MOT 2016 SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, WITH THE FOLLOWING EXCEPTION: SYNTHETIC FIBRE REINFORCEMENT SHALL BE ADDED TO THE PRECAST BARRIERS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

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PWGSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSGC

Client/client PCA	
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Drawing title/Titre du dessin

PRECAST TRANSITION BARRIER

Project No./No. de
projeto

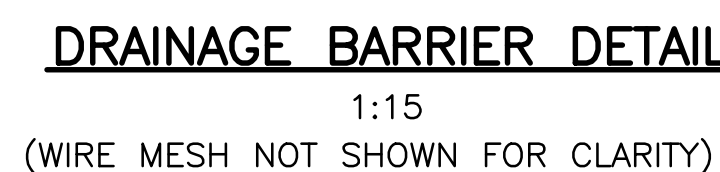
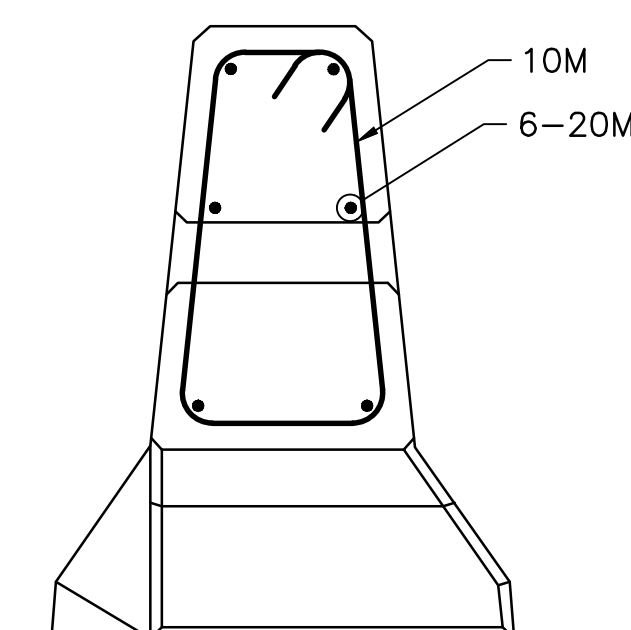
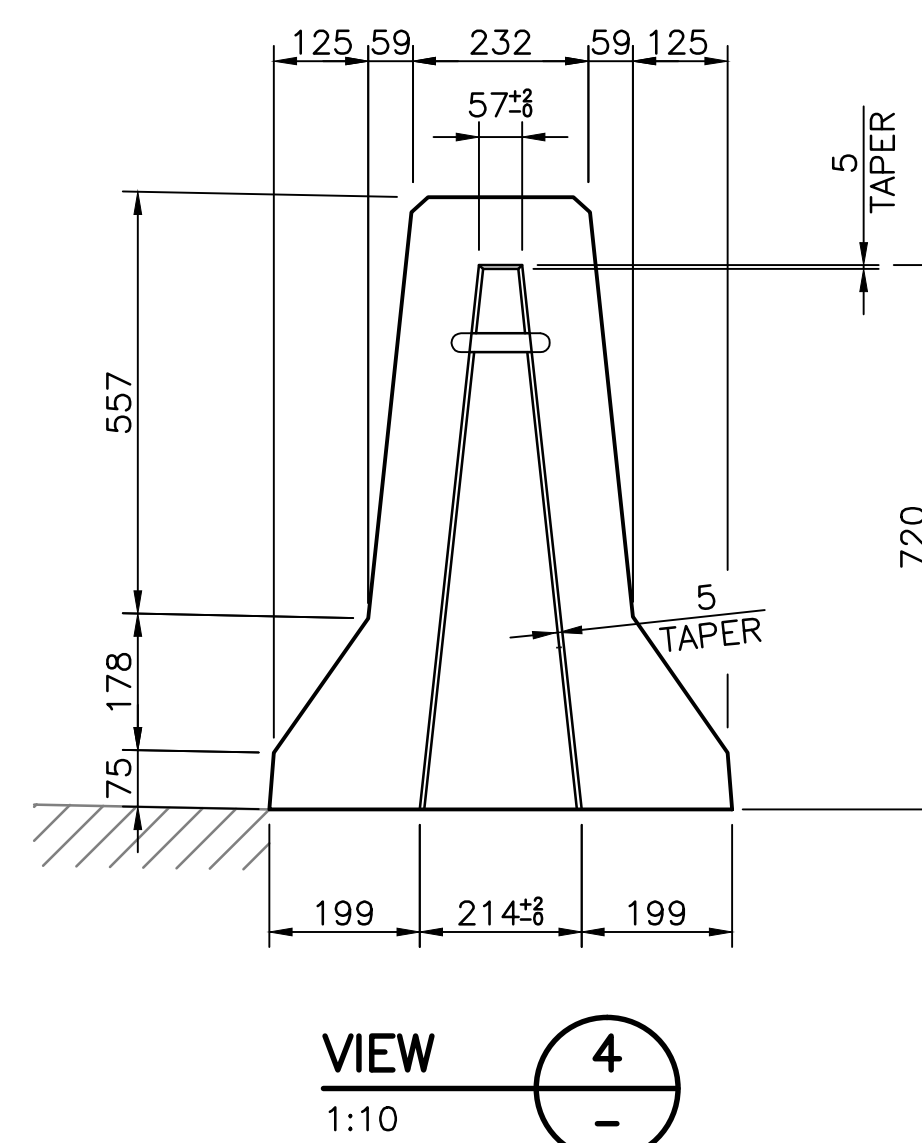
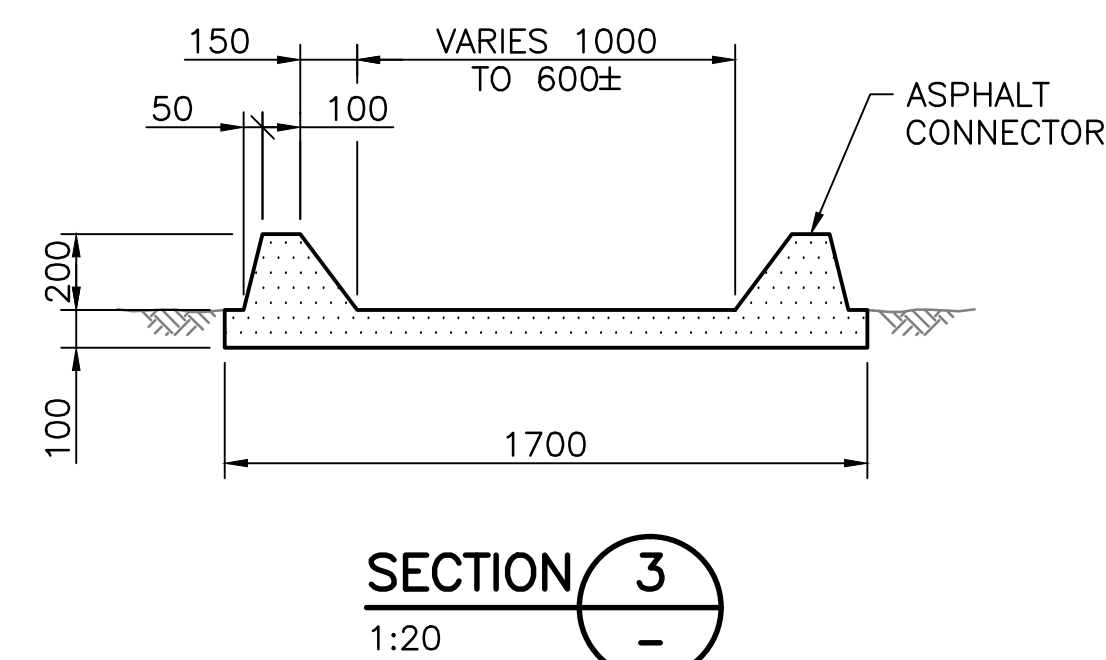
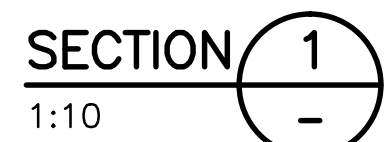
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OF

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La Révision
no.



- ## **NOTES:**
1. FIELD FIT ASPHALT CONNECTOR TO CONNECT TOP OF EMBANKMENT TO EDGE OF ROADWAY PAVEMENT.
 2. ANCHOR SCOURSTOP TRANSITION MAT WITH STAKES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 3. EXTEND EROSION CONTROL BLANKET TO BASE OF EMBANKMENT, AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE, AND STAPLED IN PLACE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 4. FOR MATERIAL, QUALITY OF WORK AND OTHER DETAILS OF NEW PRECAST DRAINAGE BARRIER, REFER TO SECTION 941 OF BC MOT 2016 SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. MODIFIED AS NOTED IN ACCORDANCE WITH SPECIFICATIONS, WITH THE FOLLOWING EXCEPTION: SYNTHETIC FIBRE REINFORCEMENT SHALL BE ADDED TO THE PRECAST BARRIERS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.