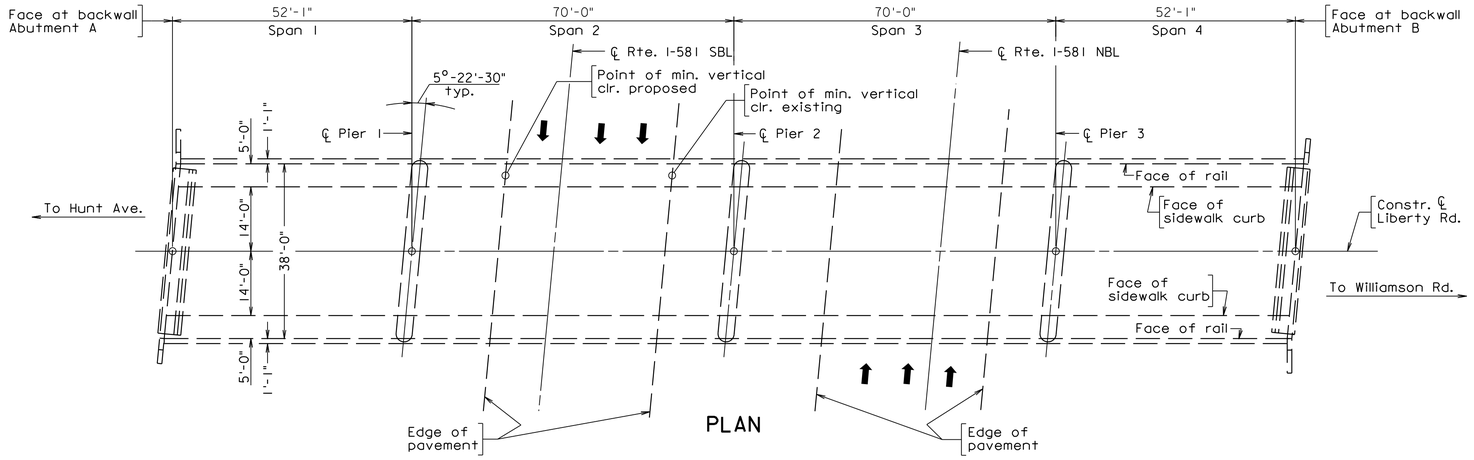
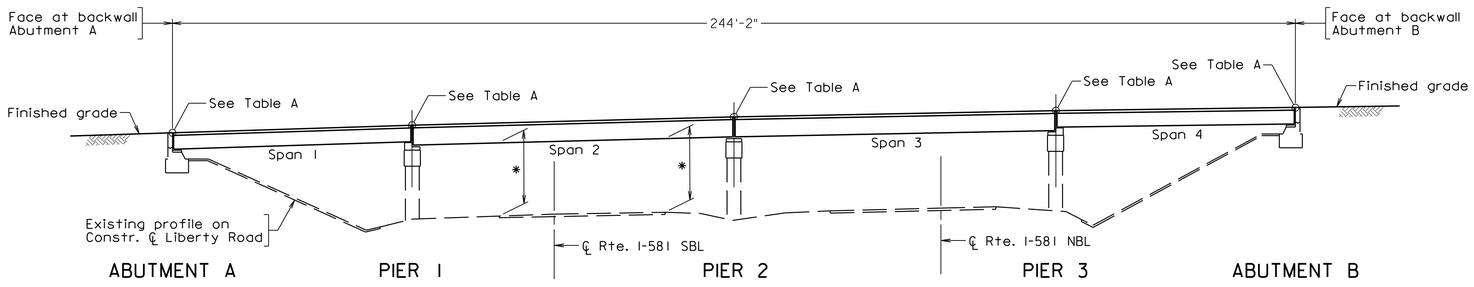
FHWA-534 DATA 3A114

No additional Right-of-Way required

STATE	FEDERAL AID ROUTE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
VA.	—	STP-BR02(393)	0000	0000-128-376, B630	1
NBIS Number: 000000000021594			UPC No. 106836		
Federal Oversight Code: NFO			FHWA Construction and Scour Code: X281-S9		



PLAN



DEVELOPED SECTION ALONG ℄

* Existing vertical clearance documented as 14'-4". Jacking operations are anticipated to increase the vertical clearance to approximately 15'-0".

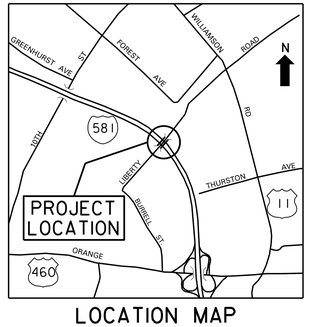
Suggested Sequence of Operations:

1. Demolish and reconstruct the concrete end diaphragms.
2. Demolish and reconstruct the pier stay blocks.
3. Complete concrete substructure surface repairs
4. Install jacks per approved jacking plan.
5. Disconnect water line, drain the line and cut the pipe.
6. Implement the detour plan and close bridge to vehicular and pedestrian traffic.
7. Remove joint seals in the deck and sidewalk at the abutments and piers.
8. Disconnect necessary elements of the fencing and aluminum railing to facilitate jacking operations.
9. Provide rail grounding wires at the locations specified in these plans.
10. Complete the superstructure jacking operations to achieve the required grade adjustment, and steel pedestal and bearing installation.
11. Remove jacking system.
12. Reconnect water line per the details specified in these plans and re-establish water service.
13. Install new joint seals in the deck and sidewalks
14. Complete the fencing and aluminum railing modifications.

Note:

The above sequence of operations is intended to provide a logical order to the anticipated work and what work is anticipated prior to the bridge being closed to vehicular and pedestrian traffic. The Contractor's sequence of construction may include re-establishing vehicular and or pedestrian traffic at intermediate times throughout the construction to satisfy the limitations on timing and duration of the bridge closure.

TABLE A: GRADE ADJUSTMENT	
Location	Adjustment (in.)
Abutment A	0"
Pier 1	+8"
Pier 2	+11"
Pier 3	+5.75"
Abutment B	0"



LOCATION MAP
Not to scale

Scale: 1/16" = 1'-0"

DESIGN EXCEPTION(S):

None.

GENERAL NOTES:

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Widths: 5'-0" sidewalk, 28'-0" roadway, 5'-0" sidewalk. Overall width is 38'-0" face-to-face of rails.

Span layout: 52'-70'-70'-52' simple spans, prestressed concrete beams.

Capacity: H20-44 and HS15-44 loading (original).

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2007.

Design: AASHO Standard Specifications for Highway Bridges. 1961 (original).

AASHTO Standard Specifications for Highway Bridges, 16th Edition, 1996; 1997 and 1998 Interim Specifications; and VDOT Modifications (new elements).

Standards: Virginia Department of Transportation Road and Bridge Standards, 2008.

These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the contract documents.

This project is to be constructed in accordance with the Virginia Department of Transportation Work Area Protection Manual 2011 Edition Revision - April 1, 2015 and Revision 1a - October 30, 2015.

All structural steel, in bearings, shall be ASTM A709 Grade 36 and shall be galvanized.

Concrete in substructure shall be Class A3.

All reinforcing steel shall be deformed and shall conform to ASTM A615, Grade 60 except for reinforcing steels noted as CRR (corrosion resistant reinforcing) which shall conform to applicable specifications noted in the special provisions. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Corrosion resistant reinforcing (CRR) steels shall conform to one or more of the three Classes listed in the special provision. The minimum yield strength shall be: 100 ksi for low carbon/chromium and 60 ksi for stainless clad steel or solid stainless steel. The Class(es) of CRR steel(s) required on this project is/are noted on the plan sheets and in the reinforcing steel schedule. Corrosion Resistant Reinforcing Steel, Class II or Class III may be substituted for Class I. Corrosion Resistant Reinforcing Steel, Class III, may be substituted for Class II. Dimensions of existing bridge are based on original plans. Contractor shall field verify all dimensions necessary to complete work.

Bridge No. of existing bridge is 8001. Plan No. is 164-06. Beams are numbered 1 to 6 from left to right looking from Abutment A to Abutment B.

VDOT

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF TRANSPORTATION

PROPOSED BRIDGE REPAIRS ON LIBERTY ROAD OVER RTE. 581 CITY OF ROANOKE - 0.6 MI. N. OF RTE. 460 PROJ. NO. 0000-128-376, B630

Recommended for Approval: Thelma L. Ingle 10/2/15
District Planning and Investment Manager Date

No.	Description	Date

REVISIONS

For Table of Revisions, see Sheet 2.

Recommended for Approval: T.W. DiGiulian 10/2/15
District Project Development Engineer Date

Approved: Kenneth H. King 10/2/15
District Administrator Date

164-06C

Date: July 10, 2015

COMMONWEALTH OF VIRGINIA
ROBERT T. PRINCE
Lic. No. 36980
PROFESSIONAL ENGINEER

AECOM TECH. SERV., INC.
ROANOKE, VA
STRUCTURAL ENGINEER

PLANS BY:	Consultant
COORDINATED:	Todd Marshall
SUPERVISED:	Robert Prince
DESIGNED:	Robert Prince
DRAWN:	Kevin Laxton
CHECKED:	Rob Dean

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STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	STP-BR02(393)	0000	0000-128-376, B630	2

ESTIMATED QUANTITIES - SUBSTRUCTURE ONLY

	Concrete Class A3 CY	Corrosion Resistant Reinf. Steel, Class I LB	Concrete Substructure Surface Repair SY
Abutment A	———	———	———
Pier 1	0.7	60	57
Pier 2	0.8	60	75
Pier 3	0.6	60	49
Abutment B	———	———	———
Total	2.1	180	181

ESTIMATED QUANTITIES - SUPERSTRUCTURE ONLY

Item	Units	Quantity
Preformed Elastomeric Joint Sealer 1¾" ⊗	LF	82
Preformed Elastomeric Joint Sealer 2½" ⊗	LF	41
Preformed Elastomeric Joint Sealer 3" ⊗	LF	82
NS Bridge-End Diaphragm Reconstruction	EA	8
Concrete Superstructure Surface Repair *	SY	5

⊗ Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications.

* Damage located on Beam 1 Span 2 above I-581 SBL.

NS Bridge - End Diaphragm Reconstruction

Bid item shall include all material, labor and incidentals necessary to complete the end diaphragm reconstruction as noted in these plans at locations directed by the Engineer. Bid item shall include removal and disposal of deteriorated concrete and providing and installing the headed expansion bolts and the BD06 series bars.

CONCRETE SUBSTRUCTURE SURFACE REPAIR

Pier	Cap SY	Column SY
Pier 1	43	14
Pier 2	46	29
Pier 3	29	20

LUMP SUM BID ITEMS

Mobilization	LS
Remove Portion of Existing Structure (Str. No. 8001)	LS
NS Bridge - Fencing Modifications	LS
NS Bridge - Aluminum Railing Modifications	LS
NS Bridge - Jacking	LS
NS Bridge - Steel Pedestals	LS
NS Bridge - Water Line Modifications	LS

Unit price bid for Concrete Substructure Surface Repairs shall include providing and installing galvanic anode units. The galvanic anodes shall be approved by the Engineer and be installed in accordance with Manufacturers recommendations. Minimum requirements of the units shall be as follows:

1. Embedded anodes shall be pre- manufactured, and containing metallic zinc in compliance with either ASTM B418 or ASTM B/6B/69 or better.
2. Zinc shall comply with the following limits of impurity:
   Copper (Cu) - 0.05% maximum
   Lead (Pb) - 0.005% maximum
   Iron (Fe) - 0.005% maximum
3. The anodes shall have a proven track record showing a minimum of five years of satisfactory performance in a similar field environment. Records shall demonstrate satisfactory flow of protective current throughout this five-year period.
4. Anodes shall have a capacity of 780 Amp-hr/Kg. Documentation shall be provided to confirm.
5. Anodes shall contain an amount of zinc sufficient to supply at least 0.20 milliamps of protective current per anode for a minimum of 10 years according to Faraday's Law. Calculations, including anode efficiency, shall be provided to confirm.

Approximate number of galvanic anode units to be installed is 800.

Remove Portion of Existing Structure (Str. No. 8001)

Bid item shall include the removal and disposal of the following:

1. Existing expansion joint seals in the deck slab and sidewalks.
2. Aluminum nuts and washers removed from the rail posts as designated in these plans.
3. Sections of the aluminum rails as designated in these plans
4. Miscellaneous pieces of fencing, rails, ties, etc. that are removed as part of the modifications to the fencing system.
5. Neoprene bearing pads beneath the concrete beams.
6. Pier stay blocks to the limits shown in these plans.
7. Miscellaneous sections of water line, valves, joints, supports, etc. that are removed as part of the modifications to the water line system.

The Contractor is advised of the following condition:

1. The bridge railing pads contain Category II Regulated Asbestos Containing Materials (ACM). The current contract scope of work does not include disturbance of the pads.
2. The joint sealer on the water line adjacent to both abutments contains trace (<1%) amounts of asbestos fibers.
3. The Asbestos Inspection Report for the structure is available for review by contacting the VDOT, Salem District Environmental Section.

NS Bridge - Fencing Modifications

Bid item shall include all material, labor and incidentals necessary to complete the fencing modifications noted in these plans.

NS Bridge - Aluminum Railing Modifications

Bid item shall include all material, labor and incidentals necessary to complete the aluminum railing modifications noted in these plans.

NS Bridge - Steel Pedestals

Bid item shall include all material, labor and incidentals necessary to fabricate, deliver, install, paint, and coat, per the details noted, to include all elastomeric pads required in these plans.

NS Bridge - Water Line Modifications

Bid item shall include all material, labor and incidentals necessary to complete the water line modifications noted in these plans. The pay item shall include submitting for review and approval a detailed sequence of operations related to the water line modifications to include but not limited to the plan for taking the water line out of service (maximum outage 14 consecutive days), modifying the water line and restoring service. The sequence of operations shall be coordinated with the superstructure jacking operations and shall clearly specify the anticipated outage time required for the process. The Contractor shall submit this sequence of operations for review and approval by VDOT and the Western Virginia Water Authority (WVWA) a minimum of 30 days prior to the anticipated start date of the water line outage. Point of contact for WVWA is Travis Lane (540-857-5772).

NS Bridge - Jacking

1. The price bid for this item shall include jacking and temporary support of the beams, to include preparation of the jacking plan for approval, modifications to the existing structure to permit jacking, all material, labor and incidentals needed to complete the jacking operations and implement the Contractor's jacking plan and removal of jacks and temporary supports required for jacking.
2. The Contractor's jacking plan, including jacking and temporary support design calculations and plan details shall be submitted to the Department for review and approval 30 days prior to Contractor installing the jacks. Details shall include the Contractor's plan for controlling operations to include a detailed sequence of construction addressing how the water line is affected, means of monitoring jacking pressures and strokes, anticipated modifications to the existing structure (if any) and associated repair details to the existing structure to accomodate the jacking scheme (if any). Calculations and plan details shall be sealed and signed by a Professional Engineer licensed in the Commonwealth of Virginia.
3. All jacking shall be done in a simultaneous manner with the jack stroke controlled to have each span reach its final jacked position at the same time. Jacking operations shall be controlled so as to limit no more than ¼" difference between the stroke achieved at each beam along a bearing line at the end of each span.
4. Any structural modifications to the existing structure approved for implementation as part of the approved jacking plan may be, left in place, if approved by the Department. In addition, should the structural modifications made to the structure be damaged during jacking operations the Contractor may be required to make repairs to the Department's satisfaction and final acceptance at no additional cost to the Department.
5. Traffic shall not be placed on the structure until the steel pedestals are in place.

INDEX OF SHEETS

Sheet No.	Description
1	Title sheet: Plan, profile, design exceptions and general notes
2	Estimated quantities and index of sheets
3	Pier stay block details
4	End diaphragm details
5	Steel pedestal and bearing details
6	Aluminum railing details
7	Fencing details
8	Joint details
9	Reinforcing steel schedule
10	Water line modifications
10A-10F	Maintenance of traffic

Rev. No.	Sheets Revised	Date

TABLE OF REVISIONS

COMMONWEALTH OF VIRGINIA
ROBERT T PRINCE
Lic. No.36980
PROFESSIONAL ENGINEER

AECOM TECH. SERV., INC.
ROANOKE, VA
STRUCTURAL ENGINEER

No.	Description	Date

Revisions

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

ESTIMATED QUANTITIES AND INDEX OF SHEETS

Designed: RTP
Drawn: FMP
Checked: DRG

Date	Plan No.	Sheet No.
July 2015	164-06G	2 of 10

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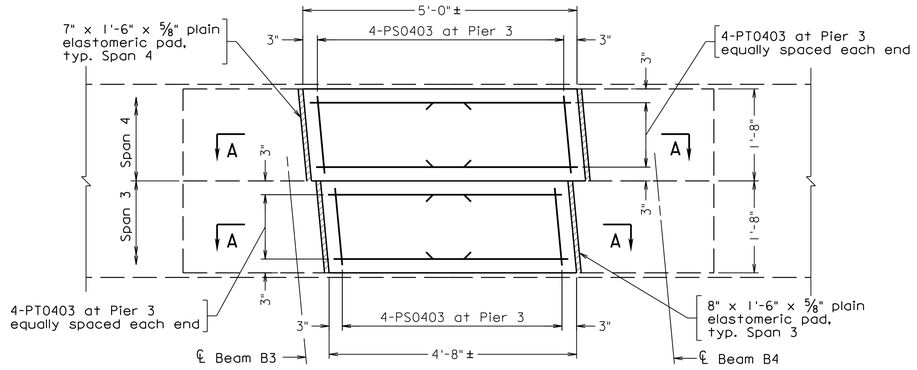
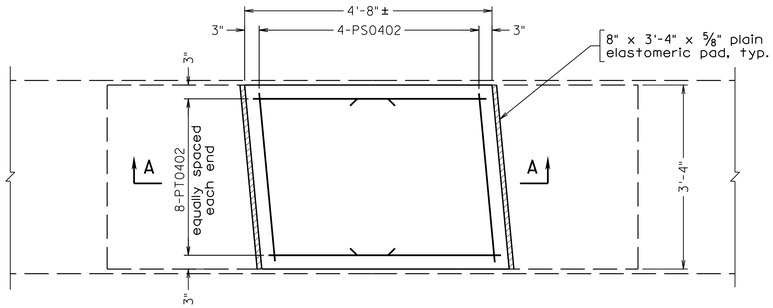
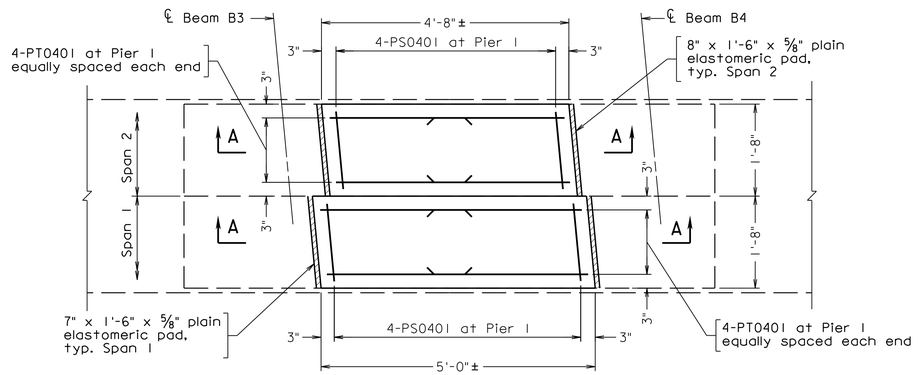


PLAN - STAY BLOCK PIER 3



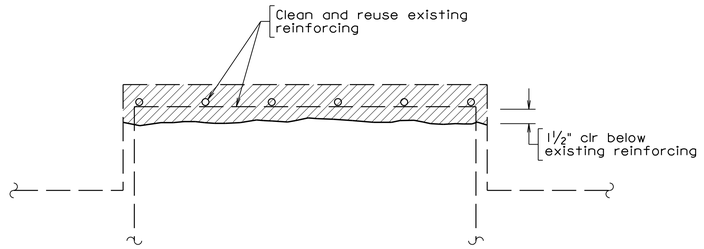
PLAN - STAY BLOCK PIER 2



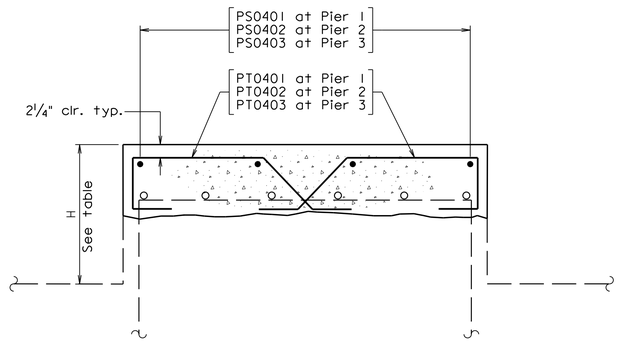
PLAN - STAY BLOCK PIER 1

Note:

Plain elastomeric pads shall be 70 durometer hardness. Elastomeric pads shall be adhered to the stay blocks with an approved adhesive prior to jacking the superstructure. Cost shall be included in price bid for NS Bridge - Steel Pedestals.



SECTION A-A - STAY BLOCK DEMOLITION



SECTION A-A - STAY BLOCK RECONSTRUCTION

Note: H dim. is height above seat for Beam B3.

STAY BLOCK	H
Pier 1 Span 1	1'-3"
Pier 1 Span 2	1'-4"
Pier 2	1'-7"
Pier 3 Span 3	1'-2"
Pier 3 Span 4	1'-1"

AECOM TECH. SERV., INC.
ROANOKE, VA
STRUCTURAL ENGINEER

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

PIER STAY BLOCK DETAILS

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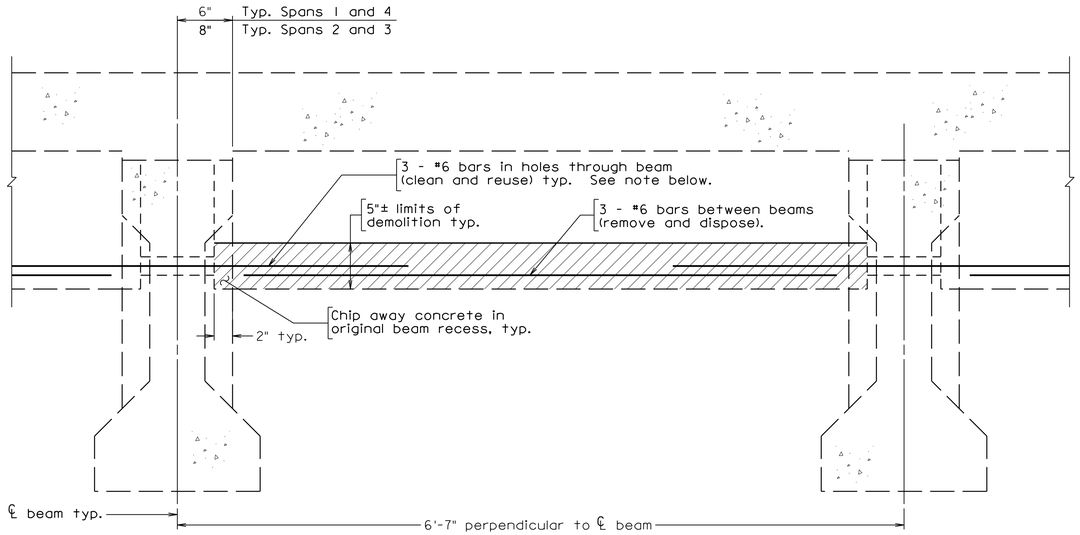
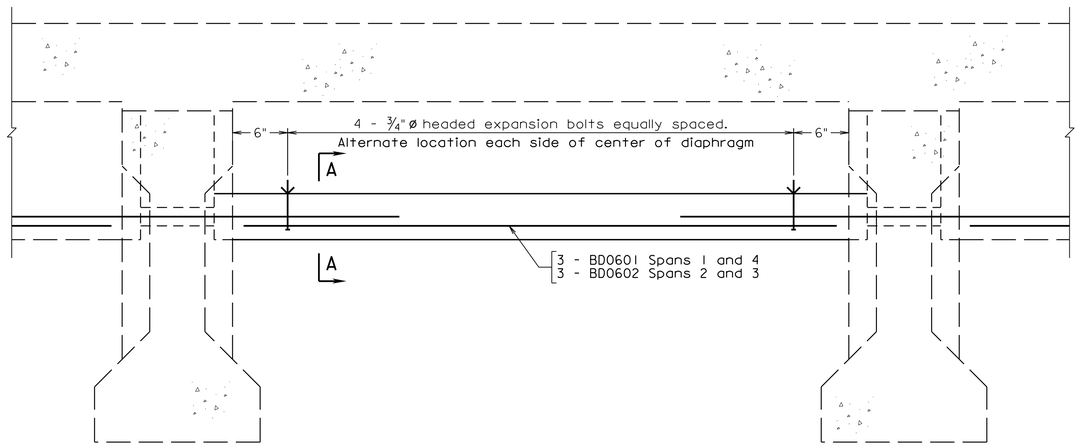


END DIAPHRAGM - DEMOLITION

Note:
Exterior beams have 7/8" ø threaded bolts in concrete inserts (clean and reuse).



END DIAPHRAGM - RECONSTRUCTION

Notes:

End diaphragms shall be reconstructed at locations directed by the Engineer. See sheet 2 for pay item description for NS Bridge - End Diaphragm Reconstruction.

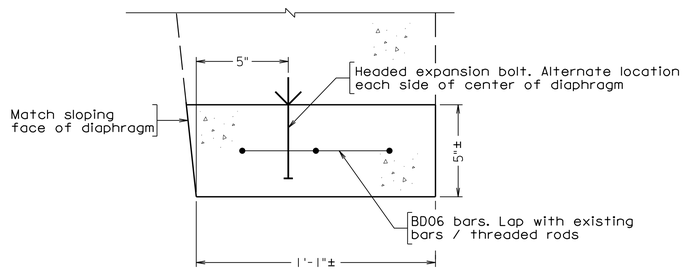
Existing beams have 2" recesses in the beam ends that match the end diaphragm depth. When demolishing the bottoms of the end diaphragms, these areas shall be chipped away to the original shape of the recess.

BD0601 shall be a straight bar 5'-3" in length and shall be Corrosion Resistant Reinforcing, Class I.

BD0602 shall be a straight bar 4'-9" in length and shall be Corrosion Resistant Reinforcing, Class I.

¾" diameter headed expansion bolts shall be installed in accordance with Sec. 412 of the Specifications and this sheet.

If water line support hangers at the end diaphragms are removed to allow for reconstruction, the hangers shall be cleaned and reinstalled with new embedded anchors and bolts to match the existing. Cost shall be included in price bid for NS Bridge - End Diaphragm Reconstruction.



SECTION A-A
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Scale: 1½" = 1'-0", unless otherwise shown

No.	Description	Date
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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

END DIAPHRAGM DETAILS

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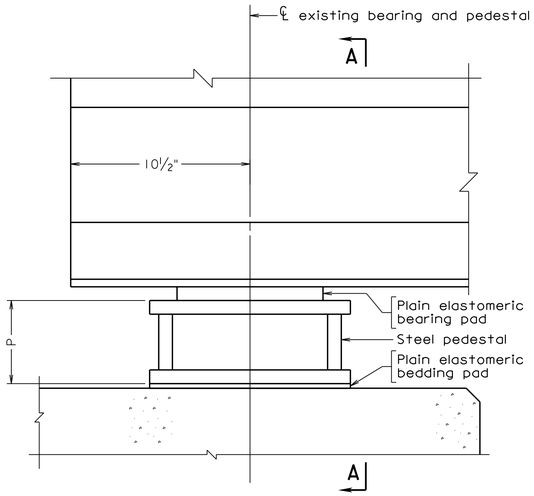
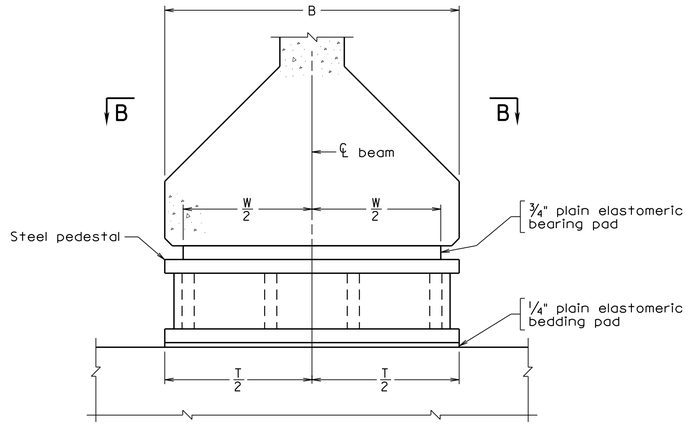
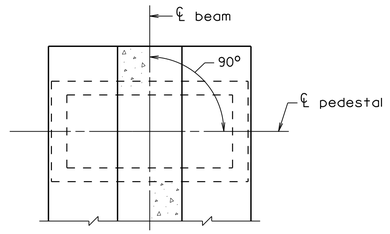


PIER BEARING ELEVATION



SECTION A-A



SECTION B-B

Notes:

All existing bearing pads at abutments and piers shall be replaced. Steel pedestals shall be installed at all pier bearing locations

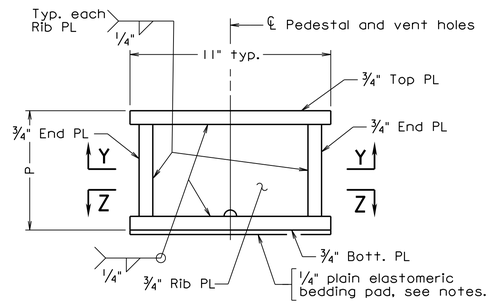
Material: Elastomer - 70 durometer hardness.

Elastomeric bedding pad located beneath the bottom plate of the steel pedestal shall match the plan size of the bottom plate and shall be epoxied to the bottom plate.

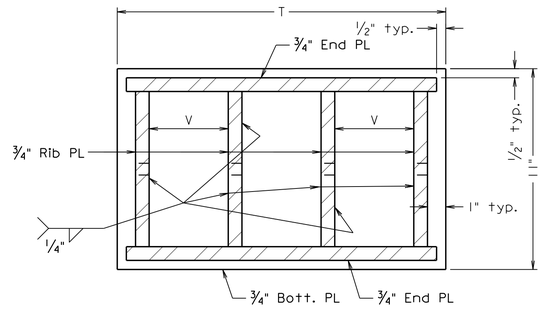
The top surface of the top plate of the steel pedestal that will be in contact with the elastomeric bearing shall be coated with an epoxy, Type EP-2, EP-4 or EP-5, and then surfaced with a No. 36 to No. 46 silicon carbide or aluminum oxide grit.

Steel pedestal may be galvanized after fabrication.

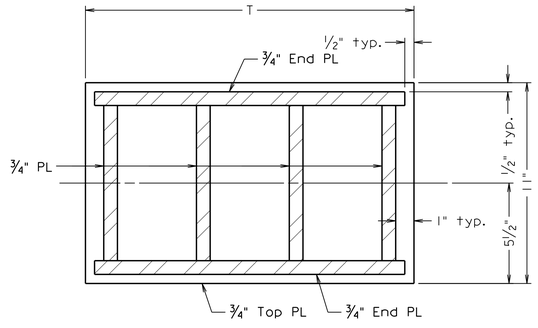
Cost of elastomeric bearing pads shall be included in the price bid for NS Bridge - Steel Pedestals.



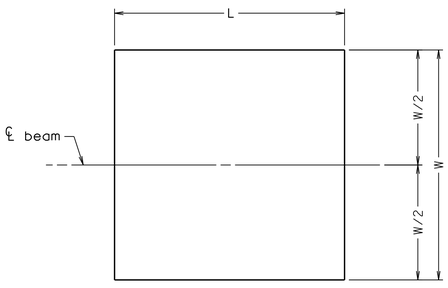
STEEL PEDESTAL



SECTION Z-Z



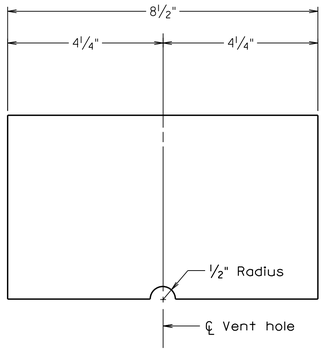
SECTION Y-Y



PLAIN ELASTOMERIC BEARING

Span	Abut.	Pier	Beam Type	B	¾" Plain Elastomeric Bearing		Steel Pedestal		
					W	L	P	T	V
1	A		11	18	16	6	No pedestal required		
1		1	11	18	16	6	7.75	18	4.25
2		1	111	22	20	7	7.75	22	5
2		2	111	22	20	7	10.75	22	5
3		2	111	22	20	7	10.75	22	5
3		3	111	22	20	7	5.50	22	5
4		3	11	18	16	6	5.50	18	4.25
4	B		11	18	16	6	No pedestal required		

All dimensions in table are in inches.



RIB PL DETAIL

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COMMONWEALTH OF VIRGINIA
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ROANOKE, VA
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No.	Description	Date
Revisions		

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

STEEL PEDESTAL AND BEARING DETAILS

Designed: RTP	Date	Plan No.	Sheet No.
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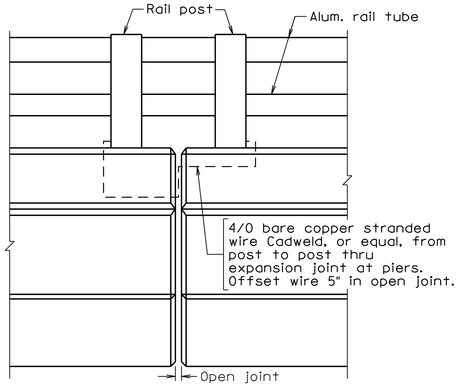
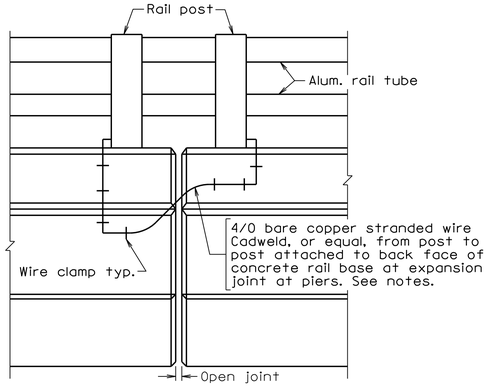


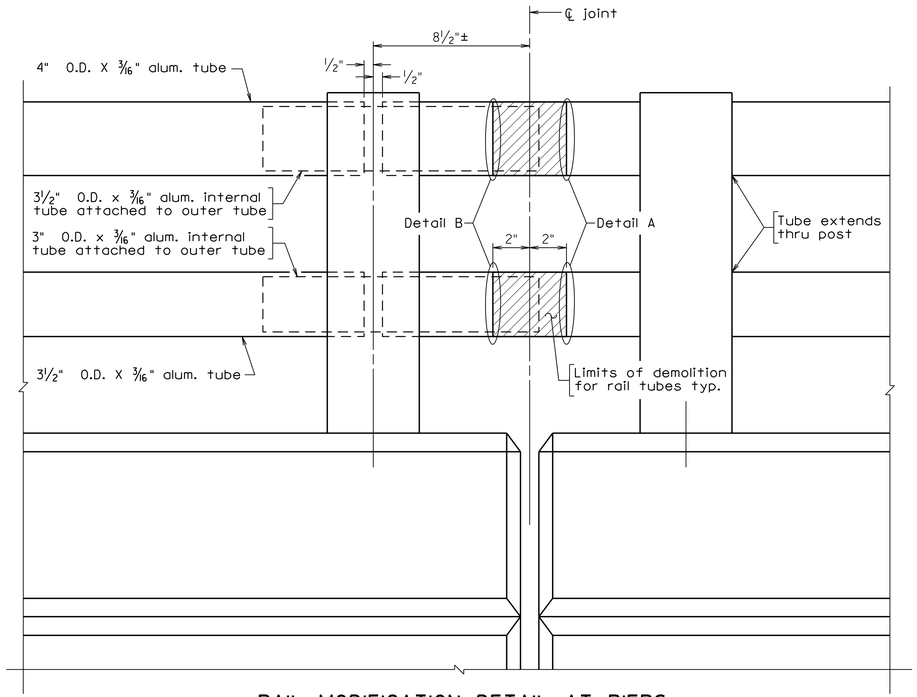
RAIL GROUNDING DETAILS AT PIERS - EXISTING

Note: Fencing not shown.



RAIL GROUNDING DETAILS AT PIERS - NEW

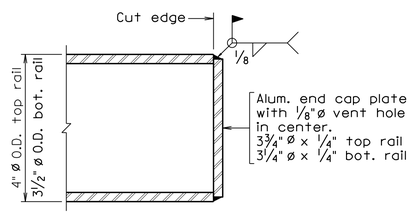
Note: Fencing not shown.



RAIL MODIFICATION DETAIL AT PIERS

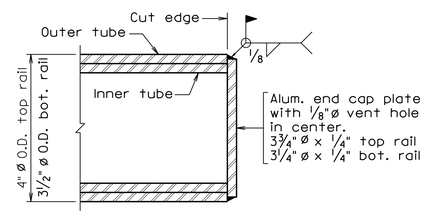
Scale: 3" = 1'-0"

Note: See Detail A and B for end cap details



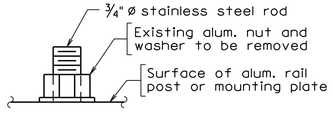
END CAP PLATE - DETAIL A

Scale: 6" = 1'-0"

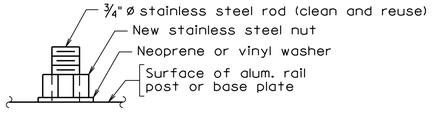


END CAP PLATE - DETAIL B

Scale: 6" = 1'-0"



EXISTING



NEW

ALUMINUM RAIL POST / PLATE ANCHORS

Not to scale

Note: See notes for additional guidance.

Notes:

1. The existing grounding wire between aluminum rail posts at Pier 1 Right, Pier 2 Right and Pier 3 Left does not need to be modified and should have enough slack to allow for the jacking operations. See Rail Grounding Detail at Piers - Existing.
2. The existing grounding wire between aluminum rail posts at Pier 1 Left, Pier 2 Left and Pier 3 Right is judged to be currently insufficient for grounding or is anticipated to be insufficient for grounding following jacking operations. These locations shall have a new external mounted grounding wire. See Rail Grounding Detail at Piers - New. The grounding wire shall be below the bottom limits of the fencing mesh. Wire clamps shall be attached via concrete anchors approved for outdoor use and compatible with copper wire. The existing end clamp attaching to each post shall be reused. The Contractor shall cut the existing grounding wire flush with the top of the concrete rail base and coat the exposed wire with at least 1/8" of epoxy mortar. After the mortar has cured, the area shall be coated with an epoxy, Type EP-3T, to a limit of 2" beyond area of mortar.
3. At each pier the aluminum rail tubes shall be cut to the limits shown. The ends of the outside tube shall be ground smooth and prepared for welding. The weld shall be ground smooth to remove surface burrs and irregularities.
4. End cap plates shall be aluminum alloy 6061-T6.
5. New stainless steel nuts and neoprene or vinyl washers are to be installed on all railing anchor rods in Span 1, Span 3, Span 4 and the right railing of Span 2. After removal of the aluminum nuts and washers, the anchor rods shall be wire brushed and cleaned prior to installing the new nuts.
6. The nuts on the rail posts on the left side of Span 2 are not aluminum. A neoprene or vinyl washer shall be installed beneath each existing nut.
7. Estimated quantity of stainless steel nuts is 256 nuts. Estimated quantity of neoprene or vinyl washers is 296 washers.

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Scale: 1" = 1'-0", unless otherwise shown

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	Revisions	

COMMONWEALTH OF VIRGINIA
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STRUCTURE AND BRIDGE DIVISION

ALUMINUM RAILING DETAILS

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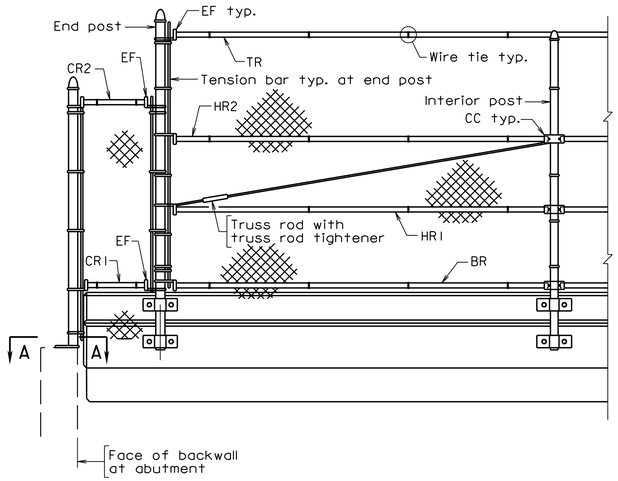
STATE	FEDERAL AID		STATE		SHEET
	ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.	—		0000	0000-128-376, B630	7



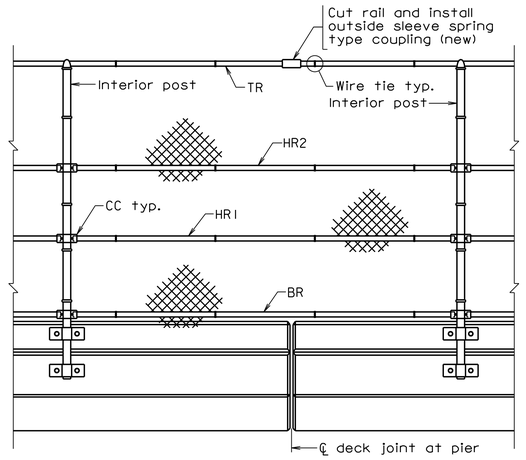
FENCING AT ABUTMENTS

Prior to jacking the superstructure, complete the following:

1. Remove the Closure Rails in the fencing closure panel at each abutment.
2. At Abutment A Left, clip the post base plate per details shown on this sheet. Paint the affected area with a VDOT approved Aluminum Epoxy Mastic Coating (System F).

After all jacking operations are complete, complete the following:

1. Cut Closure Rails to fit the new dimensions between the End Fittings.
2. Reinstall new tie wire between the fencing and the Closure Rails.



FENCING AT PIER - TYPE 1

This procedure is applicable to the fencing at Pier 1 Left, Pier 2 Left and Right, and Pier 3 Right.

Prior to jacking the superstructure, complete the following:

1. Loosening bolts in the Compression Couplings linking Horizontal Rails and Bottom Rails at each interior post in the panel spanning the deck joint.
2. Remove tie wires from the Top Rail in the panel spanning the deck joint.
3. Cut the Top Rail at a location directly above the deck joint.

After all jacking operations are complete, complete the following:

1. Install outside sleeve, spring type coupling on the Top Rail. Contractor to cut the Top Rail as needed to install the coupling.
2. Install new tie wire connecting the fencing to the Top Rail.
3. Adjust Horizontal Rails and Bottom Rail within the panel spanning the deck joint to provide for similar pipe extension into the existing Compression Couplings at each interior post. This may require loosening of the existing fencing tie wire at these rails. Loosened tie wires that are broken or damaged should be replaced with new tie wires.
4. Retighten the Compression Coupling bolts.

Note:

Existing fence rails and posts are noted in plan set 164-06A to be round aluminum alloy pipe conforming to ASTM B241, alloy 6063-T6, Schedule 40.

Existing fencing except in the abutment closure panels, is noted in plan set 164-06A as 1" mesh, 9 gauge green vinyl coated steel fabric.

Fencing in the abutment panels is visually observed to be standard galvanized steel fencing with a mesh size of approximately 2".

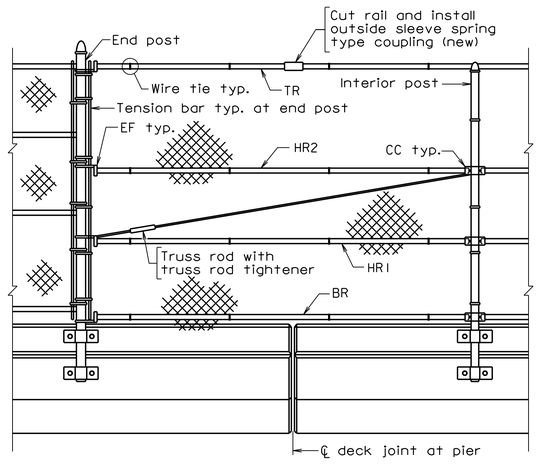
Existing Horizontal Rails, Bottom Rails and Top Rails for the main fencing spanning the pier joints are indicated in plan set 164-06A to be 1 5/8" O.D.

Existing abutment Closure Rails are visual observed to be standard galvanized steel pipe.

All new tie wire shall be #9 ga. wire compatible with the fencing type being fastened.

Ends of wire ties shall be turned to outside of fence to prevent injury to pedestrians.

New outside sleeve, spring type couplings for the Top Rails shall be compatible with the material type of the Top Rail.



FENCING AT PIER - TYPE 2

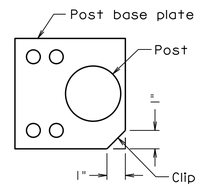
This procedure is applicable to the fencing at Pier 1 Right and Pier 3 Left.

Prior to jacking the superstructure, complete the following:

1. Loosening bolts in the Compression Couplings linking Horizontal Rails and Bottom Rails at the interior post adjacent to the deck joint.
2. Remove tie wires from the Top Rail in the panel spanning the deck joint.
3. Cut the Top Rail at a location directly above the deck joint.
4. Loosen the truss rod tightener to provide slack in the connection at each end.

After all jacking operations are complete, complete the following:

1. Install outside sleeve, spring type coupling on the Top Rail. Contractor to cut the Top Rail as needed to install the coupling. Top Rail shall extend into the existing End Fitting bottoming out the connection.
2. Install new tie wire connecting the fencing to the Top Rail.
3. Adjust Horizontal Rails and Bottom Rail within the panel spanning the deck joint to provide for similar pipe extension into the existing End Fitting and the Compression Coupling. This may require loosening of the existing fencing tie wire at these rails. Loosened tie wires that are broken or damaged should be replaced with new tie wires.
4. Retighten the Compression Coupling bolts.
5. Retighten the truss rod tightener.



SECTION A-A

Scale: 3" = 1'-0"

Note: Clip only required at Abutment A left side

Legend:

TR = Top rail
BR = Bottom rail
HR = Horizontal rail
CR = Closure rail
CC = Compression coupling (for horizontal rail)
EF = End fitting

Scale: 1/2" = 1'-0", unless otherwise shown

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FENCING DETAILS

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Drawn: KSS	July 2015	164-06G	7 of 10
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	ROUTE	PROJECT	ROUTE	PROJECT	
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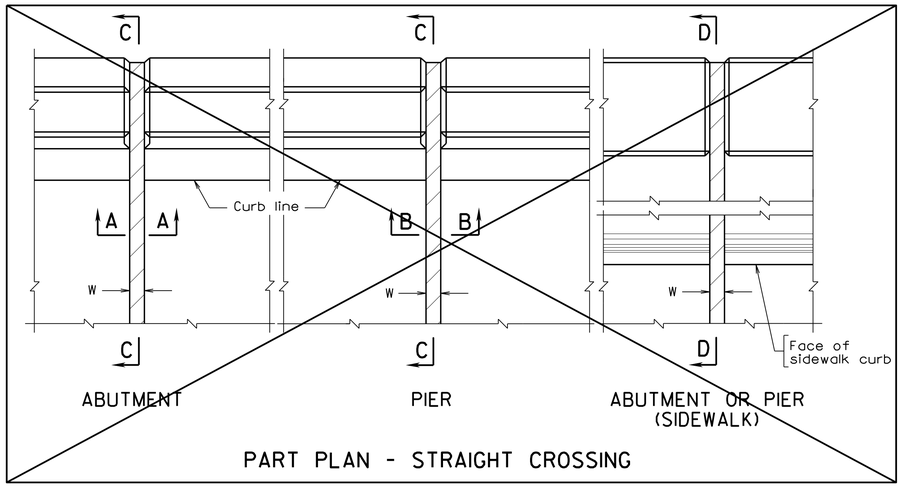
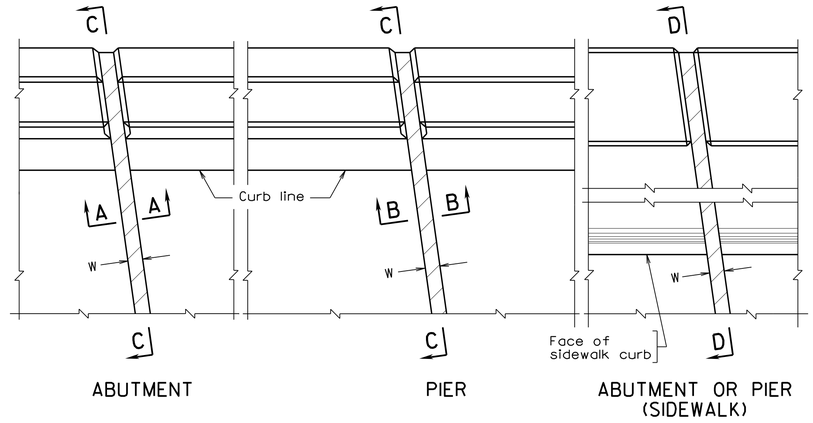
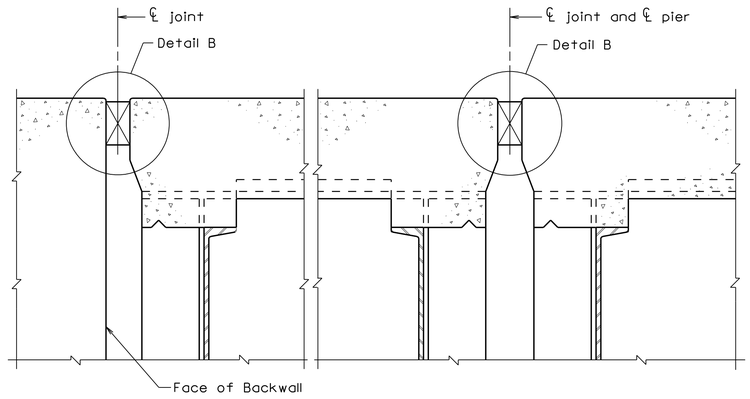


PART PLAN - STRAIGHT CROSSING

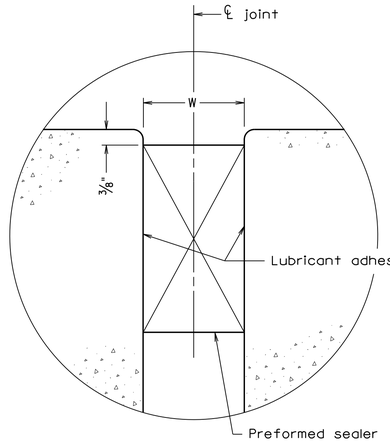


PART PLAN - SKEWED CROSSING

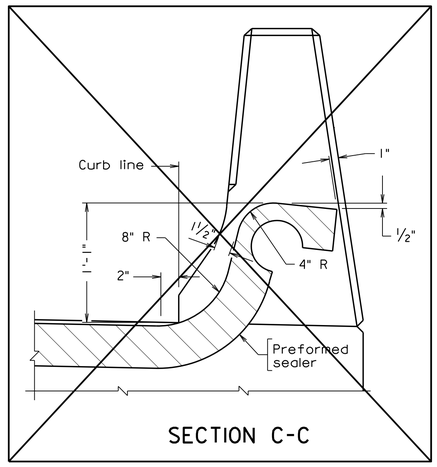


SECTION A-A

SECTION B-B



DETAIL B



SECTION C-C

Notes:

Section of sealer shown is heavy-duty structural type sealer and may vary slightly depending on manufacturer.

As nearly as possible, sides of joints shall be straight, vertical and parallel. The area of the installation shall be free from cracks and spalls.

Sealer shall be installed in one continuous piece except for sidewalk areas.

Joint width W is the final joint width of the cured concrete when placed at 60°F. The width W shall be increased or decreased for every 10°F temperature drop or rise respectively by t. When formed, joint width W shall be reduced by the amount Δ to compensate for the opening of the joint caused by the deflection of the beam when the deck concrete is placed. If the joint is formed so that the form material will not move and the joint will not open as the deck concrete is placed, then adjustment Δ shall not be made.

Fixed Bearing: $\Delta = \frac{4d\ \Delta's}{L}$

Expansion Bearing: $\Delta = \frac{d\ \Delta's}{L}$

d = Total rotation depth from top of slab to point of rotation on bearing.

Δ's = Deflection of beam at midspan from dead load of concrete deck slab and bolsters. (See Dead Load Delection Diagram.)

L = Length of span.

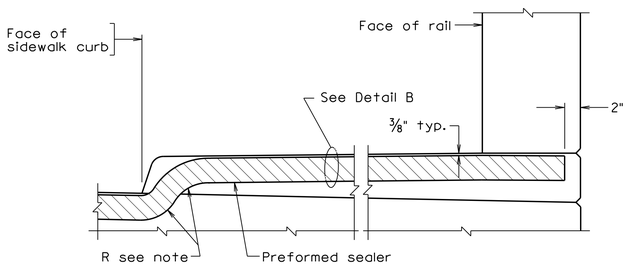
Δ = Compensation for joint opening due to deflection of beam during placement of concrete deck slab and bolsters for the last span placed adjacent to the joint.

All the dimensions are in the same units.

Joint width W is the anticipated joint width following jacking of the superstructure at 60°F.

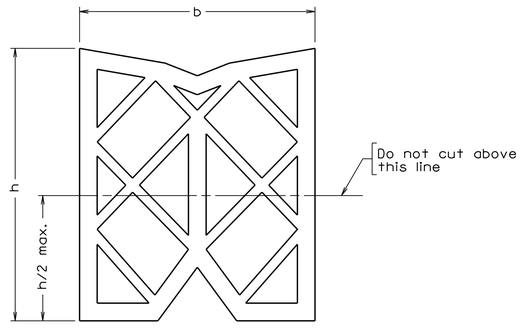
Price bid for Preformed Elastomeric Joint Sealer shall include removal of existing seals and preparation of existing joint openings.

Abutment	Pier	Sealer Size b	Sealer Depth h	Joint Width W	t
A		1¾"	2"	0.9"	NA
	1	3"	3"	1.9"	NA
	2	3"	3"	2.0"	NA
	3	2½"	2¾"	1.6"	NA
B		1¾"	2"	1.1"	NA



SECTION D-D

Note: Use bend radius R as necessary to minimize cutting underside of the sealer.



PREFORMED ELASTOMERIC JOINT SEALER
In uncompressed state

Not to scale

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STRUCTURE AND BRIDGE DIVISION

JOINT DETAILS

Designed: RTP
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	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—		0000	0000-128-376, B630	9

REINFORCING STEEL SCHEDULE

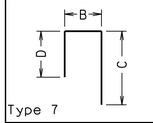
DIMENSION TABLE

MARK	NO.	BAR SIZE	PIN DIA. FT-IN	LENGTH FT-IN	WEIGHT (LBS.)	LOCATION	TYPE	A FT-IN	B FT-IN	C FT-IN	D FT-IN	E P FT-IN	F Q FT-IN	G R FT-IN	H FT-IN	I S FT-IN	J T FT-IN	K U FT-IN	L FT-IN	V FT-IN	N
			PIER 1 (CRR STEEL, CL. 1)																		
PS0401	8	4	2	2-08	14	Stay block Pier 1	7		1-04	9	9										
PT0401	16	4	2	4-03	46	Stay block Pier 1	99	6	9 1/2	1-06	9 1/2	9 1/2	1-01 1/2	6							
		TOTAL	WEIGHT IN PRECEDING GROUP OF BARS		60																
			PIER 2 (CRR STEEL, CL. 1)																		
PS0402	4	4	2	4-10	13	Stay block Pier 2	7		3-00	1-00	1-00										
PT0402	16	4	2	4-08	50	Stay block Pier 2	99	6	1-00 1/2	1-06	9 1/2	1-00 1/2	1-03 3/4	6							
		TOTAL	WEIGHT IN PRECEDING GROUP OF BARS		63																
			PIER 3 (CRR STEEL, CL. 1)																		
PS0403	8	4	2	2-04	13	Stay block Pier 3	7		1-04	7	7										
PT0403	16	4	2	4-00	43	Stay block Pier 3	99	6	7 1/2	1-06	9 1/2	7 1/2	1-00 1/8	6							
		TOTAL	WEIGHT IN PRECEDING GROUP OF BARS		56																

DIMENSION VARIATION TABLE

MARK	NO. EA. LEN.	DIMEN-SION	FROM FT-IN	TO FT-IN	VARY BY FT-IN	DIMEN-SION	FROM FT-IN	TO FT-IN	VARY BY FT-IN

BENDING DIAGRAM



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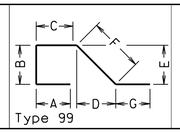

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NOTES:

Dimensions in Bending Diagram are out-to-out of bars.

Weights in schedule are based on density of 490 lb/ft^3.

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STRUCTURE AND BRIDGE DIVISION

REINFORCING STEEL SCHEDULE

Designed: RTP	Date	Plan No.	Sheet No.
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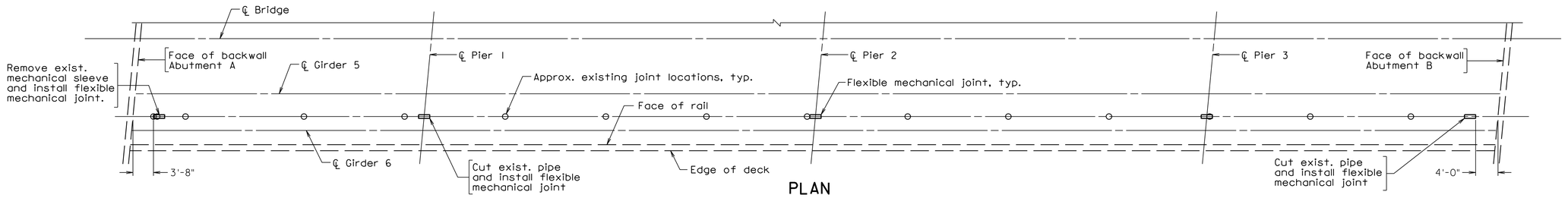
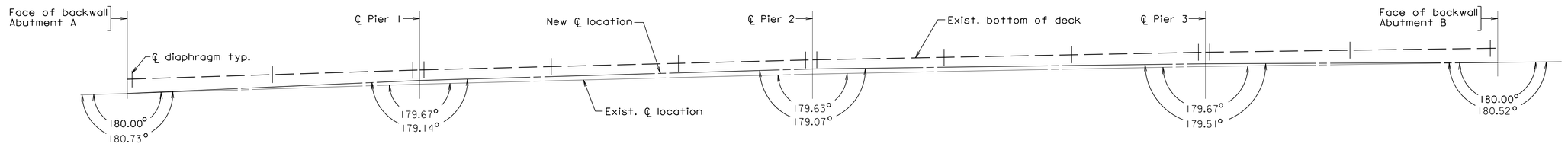
STATE	FEDERAL AID		STATE		SHEET
	ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.	—		0000	0000-128-376, B630	10

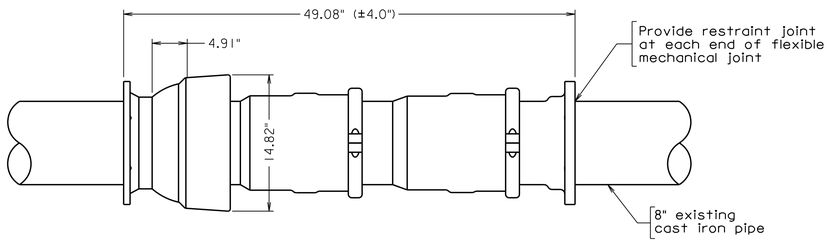


PLAN



PROFILE

Note: Clevis hangers and diaphragms to remain.



FLEXIBLE MECHANICAL JOINT

Not to scale

Notes:

1. Flexible mechanical joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53. Foundry certification of material shall be readily available upon request, and the mechanical joint shall conform to "Made in America" requirements.
2. Each flexible mechanical joint shall be pressure tested prior to shipment against its own restraint to a minimum of 350 psi. A minimum 2:1 safety factor, determined from the published pressure rating, shall apply.
3. Each flexible mechanical joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of 20° and 4-inches minimum expansion. Standardized mechanical joint end connections shall be available.
4. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating shall meet ANSI/NSF-61.
5. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.
6. Manufacturer's certification of compliance to the above standards and requirements shall be readily available upon request.
7. Install flexible mechanical joint where shown on the Plan View. If not at a joint, cut existing pipe to install. Connect flexible joint to existing pipe with mechanical restraint rings on each side of joint. Provide flange adapter at pipe cuts.
8. After installation, disinfect line using VDH approved method. Pressure test to 145 psi. (Western Virginia Water Authority standard).
9. Joint shall be EBBA Iron Flex-Tend 408F10 or approved equal.

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STRUCTURE AND BRIDGE DIVISION

WATER LINE MODIFICATIONS

Designed: RS
Drawn: KSS
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Date	Plan No.	Sheet No.
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