

MANUAL OF THE STRUCTURE AND BRIDGE DIVISION

PART 3

CURRENT DETAILS



VIRGINIA DEPARTMENT OF
TRANSPORTATION

VOID

VDOT GOVERNANCE DOCUMENT

**VDOT Manual of the Structure and Bridge Division: Part 03:
Current Details**

OWNING DIVISION: Structure and Bridge

DATE OF ISSUANCE: 10/15/2015



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Charles A. Kilpatrick, P.E.
COMMISSIONER

October 15, 2015

SUBJECT: Manual of the Structure and Bridge Division – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Manual

VOIDED:

BR27C-16-AT-1 and 16-AT-2	Voided BR27C Rail Connections and Notes with Architectural Treatment.
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NEW ISSUES:

BBD-4-1 and -4-2	Re-issued Bearing Details for low profile bearings.
BCR-1-1 and 1-2, 2 and 5	Re-issued 27" Kansas Corral with modified terminal wall.
BCR-2-1 and 2-2 and BCR-5-1, 5-2 and 5-3	
BR27C-17-1 and -17-2	Issued BR27C Rail Connections for BR27C-15 and BR27C-15- AT.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
All files	Revised date and number of sheets from all footer File No. Blocks.
TOC-5 thru -7, -14 thru -16, -23 and -27	Revised dates.
TOC-5	Added BBD-4-1 and -4-2
TOC-6	Added BCR-1-1 and -1-2, BCR-2-1 and -2-2 and BCR-5-1, -5-2 and -5-3.
TOC-16	Deleted BR27C-16-AT and added BR27C-17-1 and -17-2.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BBD-8-1 and -9-1	Increased dimension from ½” to 1” showing edge of laminated elastomeric bearing to edge of sole plate in all ELEVATIONS. Labeled “Centerline of beam” in all SECTIONS and in PLAN OF LAMINATED ELASTOMERIC BEARING. Added placement of steel dowel in PIER ELEVATION FIXED BEARING CONTINUOUS SPANS. Added “Bearing Type” column in Table, instructions to mark “Centerline of beam” on the top and bottom surfaces of the laminated elastomeric bearing, sheet no. fill-in for dowel and closure diaphragm details. Deleted sheet no. fill-in for designation of fixed or expansion bearings in Notes.
BBD-8-2 and -9-2	In Notes to Designer, deleted use of Lampad computer program and added note at fixed bearings.
BBD-9-2	Added table for minimum dimensions for “W” in Add the Following Notes, Dimensions, Details, Etc. to Standard.
BCR-3-1 and -4-1	Reduced concrete rail width from 1’-3” to 1’-2”. Increased rebar lap of RL04 series and RL0402 in TYPICAL SECTION AND PART ELEVATION, respectively. Changed placement of barrier delineator in TYPICAL SECTION BETWEEN POST, DECK SLABS AND SLAB SPANS. Added rebar RU0502 in SLAB SPANS. In Reinforcing Steel Schedule changed dimensions of rebars RU0502, RV0402 and RV0403.
BCR-3-2 and -4-2	In Notes to Designer, changed rail concrete pedestal width increased from 15” to 14”.
BCR-6-1 and -7-1	Reduced concrete terminal wall width from 1’-3” to 1’-2” in VIEW A-A. Reduced concrete terminal wall width and increased lap of rebar RW0403 in SECTION B-B. Changed dimension of rebar RW0401 in Reinforcing Steel Schedule.
BCR-8-1 and -9-1	Reduced concrete terminal wall width from 1’-3” to 1’-2” in SECTION A-A and SECTION B-B. Increased lap of rebar RL0402 in ELEVATION. In Reinforcing Steel Schedule, changed dimensions of rebar RV0402, revised rebar RV0405 and added rebars RV0406 and RS0401. Deleted SECTION C-C.
BCS-31A-1	In SECTION A-A, added notes to drain junction box.
BPF-4-1	Changed ASTM specification from F1080 to F1083, schedule 40 in Notes.
BPP-1-1	In Notes, changed “Seismic Performance Category B” to “Seismic Performance Zone 2”.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27C-15-1 and -15-AT-1	In SECTION B-B, replaced first rail from concrete pedestal on non-traffic side from HSS 4 x 3 x 1/4" steel tubing to HSS 4 x 2 x 1/4" steel tubing and relocated placement of barrier delineator from concrete pedestal to middle rail.
BR27C-15-AT-1	Added Bid price for architectural treatment note from BR27C-16-AT Notes (Cont'd.).
BR27C-12-1 thru -14-1	Relocated placement of barrier delineator from concrete pedestal to steel railing in SECTION B-B. In Notes, deleted placement of barrier delineator.
BR27C-12-AT-1 thru	In SECTION B-B, relocated placement of barrier delineator from and deleted placement of barrier delineator in Notes.
BR27C-14-AT-1	Added bid price for architectural treatment note to Notes from BR27C-16-AT Notes (Cont'd).
BR27C-12-2 thru -15-2	Revised figure showing placement of barrier delineator.
BR27C-12-AT-2 thru -15-AT-2	Revised figure showing placement of barrier delineator and reference to standard BR27C-16-AT for rail connections and notes.
BR27C-16-1	Deleted placement of barrier delineator in Notes.
BR27C-16-2	Edited use of standard to include BR27C-12-AT thru BR27C-15-AT.
BR411-2-1	Clarified dimensions in SECTION A-A and SECTION C-C.
BR411-3-1	Clarified dimensions in Window Types.
BWL-2-1	In TYPICAL SUPPORT DETAIL AT EXPANSION JOINT, changed steel L bar to match DETAIL A.

RETAIN THIS MEMO IN FRONT OF INDEX TO PART 3

/original signed/
Prasad Nallapaneni, P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Charles A. Kilpatrick, P.E.
COMMISSIONER

March 10, 2015

SUBJECT: Manual of the Structure and Bridge Division – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Manual

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, -6, -8 thru -21 and -25	Revised dates.
INSTR-1	Updated modification requirements and manual references.
BCS-28A and -29A	In Section B-B, revised rebars RV0502 and RV0401 and added additional longitudinal bars to match the changes to the BPB-3 series standards. Added new bars CT0401 in Section B-B, Plan view and Reinforcing Steel Schedule. Added a note for RT0401 bars under the Reinforcing Steel Schedule.
BIR-1-2, -2-2, -4-2 and -5-2	Updated test level.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BPB-3A and -3B	In Section A-A, revised rebars RV0502 and RV0401, revised concrete covers, added two more rows of RL04 series and removed RL04 bar at top of parapet. In Section A-A Alternate Reinforcing Steel, revised rebar RV0502, revised concrete covers and added dimension at bottom for welded wire fabric. In Section D-D, revised rebars RV0401 and RW0402, added one row of RL04, removed RL04 bar from top of parapet and changed embedment of bar RW0402 in wingwall. In Elevation view, added bars RV0404, added lap splice detail for RL04 series in U-Back Wing and revised minimum lap lengths. Revised Reinforcing Steel Schedule for rebars RV0401, RV0404, RV0502 and RW0402. Added a note for bar RT0401 under Reinforcing Steel Schedule.
BPB-3C and -3D	In Section A-A, revised rebars RV0502 and RV0401, revised concrete covers, added two more rows of RL04 series and removed RL04 bar at top of parapet. In Section A-A Alternate Reinforcing Steel, revised rebar RV0502, revised concrete covers and added dimension at bottom for welded wire fabric. In Section D-D, revised rebar RV0504, changed RV0401 to RV0405, added one row of RL04, deleted RL04 bar at top of parapet and added rebar RS0401. In Elevation view, added bars RS0401, added note for bar RL0602 and revised minimum lap lengths. In Terminal Wall elevation view, revised RV0401 to RV0405 in 1'-6" area from end of terminal wall. Revised Reinforcing Steel Schedule for rebars RV0401, RV0405, RV0502, RV0504 and RS0401. Added a note for bar RT0401 under Reinforcing Steel Schedule.
BPB-3A-AT thru -3D-AT	Added Detail A. Revised the diamond note under Section A-A by deleting the last sentence. Added a note for the gross concrete quantities under Reinforcing Steel Schedule to exclude the architectural treatment. Revised the last sentence in Notes to include coping. All other revisions are same as those noted for BPB-3A and -3B or BPB-3C and -3D.
BPB-3D-3 and BPB-3D-AT-3	Revised first sentence under Reinforcing Steel Schedule to include bar RS0401.
BPB-AT-1 thru -AT-12	In Section A-A, revised dimensions of the parapet shown in Inside Face, Outside Face and Both Faces, changed relief r shown on inside and outside faces to r1 and r2 respectively, revised the note for reliefs and deleted "Limit(s) of Architectural Treatment" under Section A-A. Added the table for reliefs.
BPB-AT-1-2 thru -AT-12-2	Updated manual references. Revised second paragraph on attachments. Added relief table instructions.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BPB-4A and -4B	In Section A-A, revised concrete cover callouts. In Section D-D, revised rebar RW0502 and added embedment of the bar in wingwall. In Elevation view, revised minimum lap lengths. Revised rebars RV0501, RV0502, RV0504 and RW0502 in Reinforcing Steel Schedule. Added a note for bar RT0401 under Reinforcing Steel Schedule.
BPB-4C and -4D	In Section A-A, revised concrete cover callouts. In Section D-D, revised rebar RV0505 and added rebar RS0401. In Elevation view, added bar RS0401, added note for bar RL0603 and revised minimum lap lengths. Revised rebars RV0501, RV0502, RV0504 and RV0505 and added rebar RS0401 in Reinforcing Steel Schedule. Added a note for bar RT0401 under Reinforcing Steel Schedule.
BPB-4A-AT thru -4D-AT	Added Detail A. Revised the diamond note under Section A-A by deleting the last sentence. Added a note for the gross concrete quantities under Reinforcing Steel Schedule to exclude the architectural treatment. Revised the last sentence in Notes to include coping. All other revisions are same as those noted for BPB-4A and -4B or BPB-4C and -4D.
BPB-4D-3 and BPB-4D-AT-3	Revised the second sentence under Reinforcing Steel Schedule to include bar RS0401.
BPB-AT-21 thru -AT-32	In Section A-A, revised dimensions of the parapet shown in Inside Face, Outside Face and Both Faces, changed relief r shown on inside and outside faces to r1 and r2 respectively, revised the note for reliefs and deleted "Limit(s) of Architectural Treatment" under Section A-A. Added the table for reliefs.
BPB-AT-21-2 thru -AT-32-2	Updated manual references. Revised second paragraph on attachments. Added relief table instructions.
BPF-3-1, -4-1 and -5-1	Replaced turnbuckles with truss rod tighteners.
BPPS-1-2 and -3-2	Clarified referenced line nomenclature.
BR27C-12 thru -15 BR27C-12-AT thru -15-AT	Revised position of RL04 bars, lap lengths and clear callouts. Revised bolt designation, showed reinforcement and added note to SECTION B-B. Used two bars in place of one RG04 series bar. Revised reinforcing steel dimensions.
BR27C-12-AT thru -15-AT	Added DETAIL A, revised diamond note and final note on architectural treatment bid price.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27C-12-2 thru -15-2 BR27C-12-AT-2 thru -15-AT-2	Updated manual references.
BR27C-12-3 thru -15-3 BR27C-12-AT-3 thru -15-AT-3	Revised instructions for Reinforcing Steel Schedule.
BR27C-16 and -16 AT	In RAIL EXPANSION JOINT DETAILS, changed Section C-C cut to A-A, added Section A-A cut to left side and removed slots from right side in ELEVATION VIEW. In RAIL EXPANSION JOINT DETAILS, revised hole diameter in SECTION D-D. Added note on alternate inner sleeve fabrication details.
BR27C-AT-1 thru -AT-12	In Section A-A, revised dimensions of the parapet shown in Inside Face, Outside Face and Both Faces, changed relief r shown on inside and outside faces to r1 and r2 respectively, revised the note for reliefs and deleted "Limit(s) of Architectural Treatment" under Section A-A. Added the table for reliefs.
BR27C-AT-1-2 thru -AT-12-2	Updated manual references. Revised second paragraph on attachments. Added relief table instructions.
BR27D-8 thru -10 and BR27D-8-AT thru -10-AT	Revised position of RL04 bars, lap lengths and clear callouts. Revised bolt designation, showed reinforcement and added note to SECTION B-B. Used two bars in place of one RG04 series bar. Revised reinforcing steel dimensions.
BR27D-8-AT thru -10-AT	Added DETAIL A, revised diamond note and final note on architectural treatment bid price.
BR27D-8-2 thru -10-2 BR27D-8-AT-2 thru -10-AT-2	Updated manual references.
BR27D-8-3 thru -10-3 BR27D-8-AT-3 thru -10-AT-3	Revised instructions for Reinforcing Steel Schedule.
BR27D-11 and -11-AT	In RAIL EXPANSION JOINT DETAILS, changed Section C-C cut to A-A, added Section A-A cut to left side and removed slots from right side in ELEVATION VIEW. In RAIL EXPANSION JOINT DETAILS, revised hole diameter in SECTION D-D. Added note on alternate inner sleeve fabrication details.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27D-AT-1 thru-AT-12	In Section A-A, revised dimensions of the parapet shown in Inside Face, Outside Face and Both Faces, changed relief shown on inside and outside faces to r1 and r2 respectively, revised the note for reliefs and deleted "Limit(s) of Architectural Treatment" under Section A-A. Add the table for reliefs.
BR27D-AT-1-2 thru -AT-12-2	Updated manual references. Revised second paragraph on attachments. Added relief table instructions.
BR27T-1 thru -10 and BR27T-1-AT thru -10-AT	Revised lap lengths, clear callouts and provided dimension for placement of RL04 bar in Section. Adjusted RL04 bar spacing in ELEVATION. Revised reinforcing steel dimensions.
BR27T-1-AT thru -10-AT	Added DETAIL A, revised diamond note and final note on architectural treatment bid price.
BTB-1	Revised PLATE WASHER D details.

RETAIN THIS MEMO IN FRONT OF INDEX TO PART 3

/original signed/
Prasad Nallapaneni, P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

December 30, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

BR412-1 thru -7, Standards and notes voided.
BR412-1-2 thru -7-2
and -1-3 thru -7-3

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
BR27T-10, -10-2, -10-3 -10-AT, -10-AT-2 and -10-AT-3	Added separate 54” BR27C/BR27D standards for terminal walls on approach slab with full integral or semi-integral abutments.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, -13 thru -17 and -19 thru -22	Revised dates, inserted new standards, revised titles for usage and moved content to next sheet where necessary.
BPF-3 thru -5	Revised bolt and hole size in PLAN view.
BR27C-12 thru -15 and -12-AT thru -16-AT	Miscellaneous drafting, nomenclature and/or spelling changes.
BR27C-15 and -15-AT	Added detail for SECTION A-A without sidewalk and revised callouts for top of deck slab or top of sidewalk in existing details.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27C-13-2 thru -15-2 and -13-AT-2 thru -15-AT-2	Revised usage of standards.
BR27C-15-2, -15-3, -15-AT-2 and -15-AT-3	Added detail for railing on deck slab, geometric reference and bituminous overlay note. Moved some content to next sheet.
BR27D-8 thru -10 and -8-AT thru -11-AT	Miscellaneous drafting, nomenclature and/or spelling changes.
BR27D-9-2, -9-AT-2, -10-2 and -10-AT-2	Revised usage of standards.
BR27T-1 thru -8 and -1-AT thru -8-AT	Miscellaneous drafting changes. Revised lap length and reinforcing steel dimensions.
BR27T-3, -3-AT, -7 and -7-AT	Revised details of bars connecting concrete slab extension and deck slab end bolster. Revised bar spacing of vertical reinforcement in TERMINAL WALL.
BR27T-4, -4-AT, -8 and -8-AT	Revised details of bars connecting concrete slab extension and deck slab end bolster and reduced depth shown in details. Revised bar spacing of vertical reinforcement in TERMINAL WALL.
BR27T-9 and -9-AT	Miscellaneous drafting and nomenclature changes. Revised reinforcing steel dimensions. Replaced steel railing extension on approach slab with concrete parapet.
BR27T-1-2 thru -9-2 And -1-AT-2 thru -9-AT-2	Revised paragraph on Contractor's responsibility.
BR27T-5-2 thru -9-2 and -5-AT-2 thru -9-AT-2	Revised usage of standards.
BR27T-1-3 thru -9-3 and -1-AT-3 thru -9-AT-3	Revised Reinforcing Steel Schedule note.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

November 1, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, -19 and -20	Revised dates.
BR27T-3-1, BR27T-3-AT-1, BR27T-4-1 and BR27T-4-AT-1	Revised length of bar RV0501 in Reinforcing Steel Schedule from 6'-6" to 7'-0".

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

October 24, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

None

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
BPB-4A-1 thru BPB-4D-1	Added 42" TL-5 crash tested parapet.
BPB-4A-2 thru BPB-4D-2 and BPB-4D-3	Added Notes to Designer .
BPB-4A-AT-1 thru BPB-4D-AT-1	Added details for architectural treatment for BPB-4 series parapets.
BPB-4A-AT-2, -3 thru BPB-4D-AT-2, -3	Added Notes to Designer.
BPB-AT-21-1 thru BPB-AT-32-1	Added architectural treatment for BPB-4 series parapets.
BPB-AT-21-2 thru BPB-AT-32-2	Added Notes to Designer.

NEW ISSUES:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BTB-2-1	Added Thrie-Beam Guardrail (Top Mount).
BTB-2-2	Added Notes to Designer for Thrie-Beam Guardrail.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1 thru -24	Revised dates and numbers of sheets and added two new sheets.
BMB-3A-1 and BMB-5A-1	Rearranged the notes for uniformity.
BMB-3A-2 and BMB-5A-2	Notes to Designer: Miscellaneous editorial changes.
BPB-3A-2, BPB-3B-2 BPB-3C-2, BPB-3D-2 and BPB-3D-3	Notes to Designer: Miscellaneous editorial changes.
BPB-3A-AT-1, BPB-3B-AT-1, BPB-3C-AT-1 and BPB-3D-AT-1	Miscellaneous editorial changes.
BPB-3A-AT-2,-3 BPB-3B-AT-2,-3 BPB-3C-AT-2, -3 and BPB-3D-AT-2, -3	Notes to Designer: Miscellaneous editorial changes.
BPPS-1-1 and BPPS-3-1	Rearranged the notes for uniformity.
BR27C-13-1 thru BR27C-15-1, BR27D-9-1, BR27D-10-1, BR27C-12-AT-1 thru BR27C-15-AT-1 and BR27D-8-AT-1 thru BR27D-11-AT-1	Revised the notes for uniformity.
BR411-3-1	Revised the notes for uniformity.

REVISIONS:(cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR412-3-1, BR412-6-1 and BR412-7-1	Revised the notes for uniformity.
BRCAS-2-1 thru BRCAS-6-1	Revised the notes for uniformity.
BRMA-3-1	Revised the notes for uniformity.
BRMA-4-1 thru BRMA-11-1	Rearranged the notes for uniformity.
BRGC8-2-1	Revised the notes for uniformity.
BRSBD-2-1	Revised the notes for uniformity.
BTB-1-1	Added (Side Mount) to title.
BTB-1-2	Added "BTB Series" to title and revised notes.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

October 1, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1 and 19 thru -22	Revised dates of sheets.
BR411-2-2	Removed language on FHWA.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
BR412-2-2	Removed language on FHWA.
BRCAS-1-1	Corrected anchor bolt information.
BRCAS-2-1	Added dimension on post.
BRMA-2-2	Removed language on FHWA.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

August 30, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

The railing standards are revised to show a uniform format for the notes. Six new rail standards added. Architectural treatment is added to the BPB-3-series, BR27C-series and BR27D-series parapets/railings.

VOIDED:

None

NEW ISSUES:

File Number

Description of change(s)

BPB-3A-AT-1,
BPB-3B-AT-1,
BPB-3C-AT-1, and
BPB-3D-AT-1

Added details for architectural treatment for BPB-3 series parapets.

NEW ISSUES: (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BPB-3A-AT-2, thru BPB-3C-AT-2, and BPB-3D-AT-3	Added Notes to Designer.
BPB-AT-1-1, thru BPB-AT-12-1	Added architectural treatment for BPB-3 series parapets.
BPB-AT-1-2, thru BPB-AT-12-2	Added Notes to Designer.
BR-27-ATM-1-1, and BR-27-ATM-2-1	Added architectural treatment (medallions) for BR27C-series and BR27D-series rails.
BR-27-ATM-1-2, and BR-27-ATM-2-2	Added Notes to Designer.
BR27C-12-AT-1, thru BR27C-16-AT-1	Added details for architectural treatment for BR27C-series railing.
BR27C-12-AT-2, -3, thru BR27C-15-AT-2, -3 and BR27C-16-AT-2	Added Notes to Designer.
BR27C-AT-1-1, thru BR27C-AT-12-1	Added details of architectural treatment for BR27C-series railing.
BR27C-AT-1-2, thru BR27C-AT-12-2	Added Notes to Designer.
BR27D-8-AT-1, thru BR27D-11-AT-1	Added details for architectural treatment for BR27D-series railing.
BR27D-8-AT-2, -3, thru BR27D-10-AT-2, -3, and BR27D-11-AT-2	Added Notes to Designer.
BR27D-AT-1-1, thru BR27D-AT-12-1	Added details of architectural treatment for BR27D-series railing.
BR27D-AT-1-2, thru BR27D-AT-12-2	Added Notes to Designer.

NEW ISSUES: (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27T-1-AT-1, thru BR27T-9-AT-1	Added details for architectural treatment for BR27C-series and BR27D-series terminal walls.
BR27T-1-AT-2, -3, thru BR27T-9-AT-2, -3	Added Notes to Designer.
BR411-1-1, thru BR411-7-1	Added concrete railing, Texas C411.
BR411-1-2, -3, BR411-2-2, -3, BR411-3-2, BR411-4-2, -3 BR411-5-2, BR411-6-2, -3, and BR411-7-2, -3	Added Notes to Designer.
BR412-1-1, thru BR412-7-1	Added concrete railing, Texas C412.
BR412-1-2, -3, BR412-2-2, -3, BR412-3-2, and BR412-4-2, -3, thru BR412-7-2, -3	Added Notes to Designer.
BRCAS-1-1, thru BRCAS-6-1	Added steel railing, California ST-20S.
BRCAS-1-2, BRCAS-2-2, and BRCAS-3-2, -3, thru BRCAS-6-2, -3	Added Notes to Designer.
BRMA-1-1, thru BRMA-11-1	Added steel railing, Massachusetts S3.

NEW ISSUES: (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BRMA-1-2, thru BRMA-5-2, BRMA-6-2, -3, BRMA-7-2, -3, BRMA-8-2, BRMA-9-2, BRMA-10-2, -3, and BRMA-11-2, -3	Added Notes to Designer.
BRGC8-1-1 thru BRGC8-3-1	Added timber railing, GC-8000.
BRGC8-1-2 thru BRGC8-3-2	Added Notes to Designer.
BRSBD-1-1 thru BRSBD-3-1	Added timber railing, SBD01D.
BRSBD-1-2 thru BRSBD-3-2	Added Notes to Designer.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1 thru -12	Revised dates of sheets and added new sheets.
BCR-3-1	Rearranged the notes for uniformity and revised 8 in. dimension to 1ft. - 3 in. for rebar RV0403.
BCR-4-1	Rearranged the notes for uniformity.
BCR-6-1 thru BCR-9-1	Rearranged the notes for uniformity and added dimension indicating cover on reinforcing steel.
BCR-3-2, BCR-4-2, BCR-6-2 thru BCR-9-2 and BCR-9-3	Revised the corrosion resistant reinforcing steel note. Title Block: Replace standard designation with plan number.
BIR-1-1	Revised 9 in. dimension to 1ft. - 3 in. for rebar RG0501 and added dimension indicating cover on reinforcing steel.

REVISIONS: (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BIR-1-2, BIR-1-3 BIR-2-2, BIR-2-3 BIR-4-2, BIR-4-3 BIR-5-2 and BIR-5-3	Reinforcing Steel Schedule: Deleted rebar modification for slab depth and cross slope. Title Block: Replace standard designation with plan number. Added requirement to show dimension for rebar RG0501.
BIR-2-1, BIR-4-1 and BIR-5-1	Revised 9 in. dimension to 1ft. - 3 in. for rebar RG0501.
BIR-3-1	Rearranged the notes for uniformity.
BIR-3-2	Revised the corrosion resistant reinforcing steel note. Title Block: Replace standard designation with plan number.
BPB-3A-1, BPB-3B-1 BPB-3C-1 and BPB-3D-1	Rearranged the notes for uniformity and revised 8 in. dimension to 1ft. - 3 in. for rebar RV0502.
BPB-3A-2, BPB-3B-2 BPB-3C-2, BPB-3D-2 and BPB-3D-3	Reinforcing Steel Schedule: Deleted rebar modification for slab depth and cross slope; Title Block: Replace standard designation with plan number. Revised the corrosion resistant reinforcing steel note and made miscellaneous editorial changes.
BR27C-12-1 thru BR27C-15-1 and BR27D-8-1 thru BR27D-10-1	Rearranged the notes for uniformity, revised 7 in. dimension to 6½ in. for rebar RG0401 and revised the clearance to rebar note.
BR27C-12-2,-3 thru BR27C-15-2, -3 and BR27D-8-2, -3 thru BR27D-10-2, -3	Revised the corrosion resistant reinforcing steel note and made miscellaneous editorial changes.
BR27C-16-1 and BR27D-11-1	Rearranged the notes for uniformity, revised the cap screw diameter from ¾ in. to ½ in. Section A-A and Section C-C and revised slot dimension and hole diameter in. in Section B-B.
BR27C-16-2 and BR27D-11-2	Title Block: Replace standard designation with plan number. Made miscellaneous editorial changes.
BR27T-1-1, BR27T-2-1, BR27T-5-1 and BR27T-6-1	Rearranged the notes for uniformity and added dimension indicating cover on reinforcing steel.
BR27T-3-1 and BR27T-7-1	Rearranged the notes for uniformity and added dimension indicating cover on reinforcing steel, revised 7 in. dimension to 6½ in. for rebar RV0501 and deleted vertical dimension from rebar RV0502 and RV0503.

REVISIONS: (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BR27T-4-1 and BR27T-8-1 BR27T-9-1	Rearranged the notes for uniformity and added dimension indicating cover on reinforcing steel, revised 7 in. dimension to 6½ in. for rebar RV0501 and deleted vertical dimension from rebar RV0502.
BR27T-1-2, -3, BR27T-2-2, -3, BR27T-5-2, -3 and BR27T-6-2, -3	Revised the corrosion resistant reinforcing steel note and made miscellaneous editorial changes.
BR27T-3-2, -3 and BR27T-7-3	Added note for requirement to show dimension and length for rebar RV0502 and RV0503. Revised the corrosion resistant reinforcing steel note and made miscellaneous editorial changes.
BR27T-4-2, -3, BR27T-8-2, -3 and BR27T-9-2, -3	Added note for requirement to show dimension and length for rebar RV0502. Revised the corrosion resistant reinforcing steel note and made miscellaneous editorial changes.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
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For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

May 3, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

The approach slab standards are revised due to concerns by bridge contractors as to grooving requirements for approach slabs (at grade, with asphalt overlay or buried) and whether the grooving should be in accordance with the *VDOT Road and Bridge Specifications*, Section 316 or Section 404. For simplicity, the standards are revised rather than the specifications. The payment for grooving on the approach slabs was previously addressed in the July 9, 2012 revision to the Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 3: Estimates quantities tables for superstructure. The note is added on the standard sheets for the Contractor's information.

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
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TOC-1 thru -4	Revised date of sheets.
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Page 2
May 3, 2013

BAS-11 thru 20AR

Added note for grooving requirements and quantities.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
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COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

March 27, 2013

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

<u>File Number</u>	<u>Description of change(s)</u>
BCF-1-1and BCF-1-2,	Contents of standard divided over two sheets.
BCF-2-1and BCF-2-2	Standard and notes deleted. General details for curved girder bridge cross frames are shown in Volume V – Part 2, Chapter 11.

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
BCF-4-1and BCF-5-1	Replaced BCF-1-1
BCF-4-2 and BCF-5-2	Notes to Designer for standard sheets.

REVISIONS:

TOC-1 and 2	Revised applicable names and dates.
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Page 2
March 27, 2012

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COMMONWEALTH of VIRGINIA

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1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

December 14, 2012

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

None

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
BPPS-1-1, BPPS-2-1, and BPPS-3-1	Added Pier Protection System standards. Supplemental information has been added to Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 15.
BPPS-1-2, BPPS-1-3, BPPS-2-2, BPPS-3-2, and BPPS-3-3	Notes to Designer for standard sheets.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, 5 and 8 thru 12	Revised date of sheet and updated to reflect the inclusion of new standards.
BCR-3-1 and BCR-4-1	Notes: Deleted reference to terminal walls; Revised the note to remove reference to dimensions and to omit reference to different cross slopes and slab depths; Reinforcing Steel: Deleted pin diameter for RU0502 rebar; PIERS: Revised detail to show 1'-7" depth of deflection joint.

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BCR-3-2 and BCR-4-2	Notes to Designer: Revised note defining Contractor's responsibility; Omitted requirement to add lengths for rebars in steel schedule.
BCR-6-1 and BCR-7-1	Notes: Added notes for bevels, Contractor's responsibility, class of concrete and bid item for terminal wall; ELEVATION: Added RW0403 to spacing; SECTION B-B: Added RW0403 rebar; Reinforcing steel Schedule: Added RW0403 bar.
BCR-6-2 and BCR-7-2	Notes to Designer: Revised note defining Contractor's responsibility and note pertaining to AW Series bars.
BCR-8-1 and BCR-9-1	Notes: Added notes for bevels, contractor responsibility, class of concrete and bid item for terminal wall.
BCR-8-2 and BCR-9-2	Notes to Designer: Revised note defining Contractor's responsibility.
BIR-1-1 and BIR-2-1	Notes: Omitted reference to BIR-1; SECTION B-B: Added 12 in. dimension to rebar RW0402; Reinforcing steel Schedule: Omitted 11 in. dimension and length for RG0501 rebar.
BIR-1-2 and BIR-2-2	Notes to Designer: Revised note defining Contractor's responsibility, added a note for AW series bars.
BIR-1-3 and BIR-2-3	Reinforcing steel Schedule: Replaced RL04 series with RG0501.
BIR-3-1	Notes: Revised the note to omit reference to different cross slopes and slab depths.
BIR-4-1 and BIR-5-1	Notes: Omitted reference to BIR-1; Reinforcing steel Schedule: Omitted 11 in. dimension and length for RG0501 rebar.
BIR-4-2 and BIR-5-2	Notes to Designer: Revised note defining Contractor's responsibility.
BIR-4-3 and BIR-5-3	Reinforcing steel Schedule: Replaced RL04 series with RG0501.
BMB-3A-1 and BMB-5A-1	Notes: Added note for class of concrete, revised the note to omit reference to different cross slopes and slab depths.
BMB-3A-2 and BMB-5A-2	Notes to Designer: Revised note defining Contractor's responsibility.

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BPB-3A-1 and BPB-3B-1	Notes: Revised the note to omit reference to different cross slopes and slab depths; SECTION D-D: Added 12 in. dimension to rebar RW0402.
BPB-3A-2	Notes to Designer: Revised note defining Contractor's responsibility, added a note for AW series bars.
BPB-3B-2	Notes to Designer: Revised note defining Contractor's responsibility, added a note for AW series bars; Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BPB-3C-1 and BPB-3D-1	Notes: Revised the note to omit reference to different cross slopes and slab depths.
BPB-3C-2	Notes to Designer: Revised note defining Contractor's responsibility; Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BPB-3D-2	Notes to Designer: Revised note defining Contractor's responsibility.
BPB-3D-3	Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BPF-3-1, BPF-4-1 and BPF-5-1	Revised the note pertaining to grounding framing posts and railing.
BR27C-12-1, BR27C-13-1 BR27C-14-1 and BR27C-15-1	Notes: Added note for rounded edges, revised the note to omit reference to different cross slopes and slab depths.
BR27C-12-2 and BR27C-15-2	Notes to Designer: Revised note defining Contractor's responsibility.
BR27C-14-2	Notes to Designer: Revised note pertaining to rail connections.
BR27C-12-3 and BR27C-15-3	Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BR27C-13-3 and BR27C-14-3	Notes to Designer: Revised note defining Contractor's responsibility; Reinforcing steel Schedule: Omitted the length for RL04 series bars.

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BR27D-8-1, BR27D-9-1 and BR27D-10-1	Notes: Added note for rounded edges, revised the note to omit reference to different cross slopes and slab depths.
BR27D-8-2	Notes to Designer: Revised note defining Contractor's responsibility.
BR27D-8-3	Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BR27D-9-3 and BR27D-10-3	Notes to Designer: Revised note defining Contractor's Responsibility; Reinforcing steel Schedule: Omitted the length for RL04 series bars.
BR27T-1-1 thru BR27T-9-1	Notes: Added notes for bevels, Contractor's responsibility, class of concrete and bid item for terminal wall; Title block: Added "C" and "D" to BR27 series.
BR27T-1-2, BR27T-2-2, BR27T-5-2, BR27T-6-2	Notes to Designer: Revised note defining Contractor's responsibility and note pertaining to AW Series bars.
BR27T-3-2, BR27T-4-2, BR27T-7-2, BR27T-8-2 BR27T-9-2	Notes to Designer: Revised note defining Contractor's responsibility.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

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COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

August 30, 2012

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

The revision is intended to clarify modifications to standards. Design waivers/exceptions are required when changes to the standards are made.

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1	Revised date of sheet.
INSTR-1	Revised modification policy; added instructions for completing the sheet.

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COMMONWEALTH of VIRGINIA

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Gregory A. Whirley
COMMISSIONER

August 7, 2012

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

NOTES:

Standards are revised for corrosion resistant reinforcing (CRR) steel designations (Class I, II or III) that will be effective with the March 2013 ad date. For projects going to ad prior to that date, CRR steels that are designated on the standards must be changed to one or more of the following:

- corrosion resistant reinforcing steel – low carbon chromium
- corrosion resistant reinforcing steel – stainless clad
- corrosion resistant reinforcing steel – solid stainless

For more information on CRR, see the current IIM-S&B-81.

VOIDED:

None

NEW ISSUES:

None

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, 4 thru 12	Revised date of applicable sheets.
BBD-8	Deleted Chamfer Detail and stud shear connector details in SECTIONS A-A and B-B. Under Notes, added sheet reference and deleted note for sole plate to be galvanized.
BCR-3-1 and BCR-4-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel; revised note for different cross slopes and slab depths.
BCR-6-1 thru BCR-9-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel.
BCR-3-2, BCR-4-2 and BCR-6-2 thru BCR-9-2	Notes: Replaced "type" with "Class I, II or III."
BCS-28A-1, BCS-30A-1 thru BCS-33A-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel.
BCS-28A-3 and BCS-30A-3 thru BCS-33A-3	Notes: Replaced "type" with "Class I, II or III."
BGL-1-1	Notes: Type of bolt to use with galvanized and unpainted angles.
BGL-2-1	Notes: H. S. bolts for angles to be galvanized.
BIR-1-2, BIR-2-2, BIR-4-2 and BIR-5-2	Notes to Designer: Deleted fourth note.
BIR-3-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel; added ASTM references for round head bolts, nuts and washers in fifth note; revised note for different cross slopes and slab depths.
BIR-3-2	Notes: Replaced "type" with "Class I, II or III."
BMB-3A-1 and BMB-5A-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel; revised note for different cross slopes and slab depths.
BMB-3A-2 and BMB-5A-2	Notes to Designer: Deleted second note and replaced "type" with "Class I, II or III."

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BPB-3A-1, BPB-3B-1, BPB-3C-1 and BPB-3D-1	Reinforcing Steel Schedule: Revised the dimensions and length of reinforcing bar RV0502; SECTION A-A: Added 2 in. dimension from reinforcing bar to face of curb; Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel; revised note for different cross slopes and slab depths.
BPB-3A-2, BPB-3B-2, BPB-3C-2, BPB-3D-2 and BPB-3D-3	Notes to Designer: Deleted note and replaced "type" with "Class I, II or III."
BPP-1-1	Added PROJECTING BAR CLIP DETAIL and revised clip note in PILE BUILD UP ELEVATION.
BR27C-12-1 thru BR27C-15-1 and BR27D-8-1 thru BR27D-10-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel; added ASTM references for round head bolts, nuts and washers; revised diameter of bolt and hole to 3/4" and 7/8" respectively in seventh note; deleted nut cover and revised bolt extensions; revised cross slopes and slab depths. BASE PLATE DETAIL: Added "Not to scale" and redrew slots to proper scale.
BR27C-16-1 and BR27D-11-1	Moved notes to this sheet.
BR27C-12-3 thru BR27C-15-3 and BR27D-8-3 thru BR27D-10-3	Notes: Replaced "type" with "Class I, II or III."
BR27T-1-1 thru BR27T-9-1	Notes: Added "Class ..." to Corrosion Resistant Reinforcing Steel.
BR27T-1-2, BR27T-2-2, BR27T-3-3, BR27T-4-3, BR27T-5-2, BR27T-6-2, BR27T-7-3, BR27T-8-3 and BR27T-9-2	Notes: Replaced "type" with "Class I, II or III."
BTB-1-1	SIDE ELEVATION: Corrected location of the 3" dimension from bolt to top of deck; PLAN VIEW: Revised to show corrected post at SECTION A-A; ELEVATION VIEW: Revised to show corrected posts and align the end of bridge in both views. Added "Not to Scale" to sheet.
BTC-4-1 thru BTC-7-1	Added payment note.

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BTC-4-1 and BTC-5-1	Notes: Added type of bolt to use with galvanized and unpainted angles.
BTC-6-1 and BTC-7-1	Notes: H. S. bolts for angles to be galvanized.
BWL-1-1	Notes: Added type of bolt to use with galvanized and unpainted angles.
BWL-2-1	Notes: H. S. bolts for angles to be galvanized.

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/original signed/
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COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

April 6, 2012

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

File Number

Description of change(s)

BCR-1-1; BCR-2-1;
and BCR-5-1

Replaced with series showing terminal wall shown either
on abutment wingwall or superstructure

BCR-1-2; BCR-2-2
and BCR-5-2

BR27C-1-1 thru

BR27C-11-1; BR27C-1-2

thru BR27C-11-2;

BR27C-1-3; BR27C-2-3;

BR27C-4-3 thru

BD27C-11-3

BR27D-1-1 thru BR27D-7-1;

BR27D-1-2 thru

BR27D-7-2; BR27D-1-3;

BR27D-2-3 and

BR27D-4-3 thru BR27D-7-3

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
BCR-7-1	Added new standard showing cast-in-place terminal wall on abutment U-back wingwall.
BCR-7-2	Added notes to designer.
BCR-8-1 and BCR-9-1	Added new standard showing cast-in-place terminal wall on superstructure.
BCR-8-2, BCR-9-2 and BCR-9-3	Added notes to designer.
BIR-1-3 and BIR-2-3	Added notes to designer.
BIR-4-1 and BIR-5-1	Added new standard showing cast-in-place terminal wall on superstructure.
BIR-4-2; BIR-4-3; BIR-5-2 and BIR-5-3	Added notes to designer.
BPB-3C-1 and BPB-3D-1	Added new standard showing cast-in-place terminal wall on superstructure.
BPB-3C-2, BPB-3D-2 and BPB-3D-3	Added notes to designer.
BR27C-12-1	Replaced BR27C-1. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Moved terminal wall and U back wing details to BR27T-1. Added reinforcing steel schedule for railing and sheet references.
BR27C-12-2	Replaced BR27C-1-2. Revised first note and miscellaneous details note. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required.
BR27C-12-3	Replaced BR27C-1-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.

NEW ISSUES (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27C-13-1	Replaced BR27C-6. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Deleted terminal wall and U back wing details. Added reinforcing steel schedule for railing and sheet references.
BR27C-13-2	Replaced BR27C-6-2. Revised miscellaneous details note.
BR27C-13-3	Replaced BR27C-6-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required. Added sheet references.
BR27C-14-1	Replaced BR27C-8. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Moved terminal wall and U back wing details to BR27T-5. Added reinforcing steel schedule for railing and sheet references.
BR27C-14-2	Replaced BR27C-8-2. Revised first note and miscellaneous details note.
BR27C-14-3	Replaced BR27C-8-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required. Added sheet references.
BR27C-15-1	Replaced BR27C-10-1. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Moved terminal wall and U back wing details to BR27T-5. Added reinforcing steel schedule for railing and sheet references.
BR27C-15-2	Replaced BR27C-10-2. Revised first note and miscellaneous details note. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required.

NEW ISSUES (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27C-15-3	Replaced BR27C-10-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.
BR27C-16-1	Replaced BR27C-3-1. Removed base plate detail and reinforcing steel schedule. Omitted all notes except fabricator notes. Added sheet references.
BR27C-16-2	Replaced BR27C-3-2. Revised first note. Omitted notes pertaining to reinforcing steel and the note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required.
BR27D-8-1	Replaced BR27D-1. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Moved terminal wall and U back wing details to BR27T-1. Added reinforcing steel schedule for railing and sheet references.
BR27D-8-2	Replaced BR27D-1-2. Revised first note and miscellaneous details note. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required.
BR27D-8-3	Replaced BR27D-1-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.
BR27D-9-1	Replaced BR27D-4. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Deleted terminal wall and U back wing details. Added reinforcing steel schedule for railing and sheet references.
BR27D-9-2	Replaced BR27D-4-2. Revised miscellaneous details note.
BR27D-9-3	Replaced BR27D-4-3. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required. Added sheet references.

NEW ISSUES (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27D-10-1	Replaced BR27D-6-1. Added notes referring to railing, base plate details and details showing continuity between railing and terminal wall on superstructure. Moved terminal wall and U back wing details to BR27T-5. Added reinforcing steel schedule for railing and sheet references.
BR27D-10-2	Replaced BR27D-6-2. Revised miscellaneous details note.
BR27D-10-3	Replaced BR27D-6-3. Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.
BR27D-11-1	Replaced BR27D-3-1. Removed base plate detail and reinforcing steel schedule. Omitted all notes except fabricator notes. Added sheet references.
BR27D-11-2	Replaced BR27D-3-2. Revised first note. Omitted notes pertaining to reinforcing steel and the note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required.
BR27T-1-1 and BR27T-5-1	Added new standard showing cast-in-place terminal wall on abutment U-back wingwall. Revised distance to bolts in View A-A.
BR27T-1-2; BR27T-1-3; BR27T-2-2; BR27T-2-3; BR27T-3-2; BR27T-3-3; BR27T-4-2; BR27T-4-3; BR27T-5-2; BR27T-5-3; BR27T-6-2; BR27T-6-3; BR27T-7-2; BR27T-7-3; BR27T-8-2; BR27T-8-3; BR27T-9-2 and BR27T-9-3	Added notes to designer. Revised distance to bolts in notes.
BR27T-2-1 and BR27T-6-1	Added new standard showing cast-in-place terminal wall on abutment wingwall. Revised distance to bolts in View A-A.

NEW ISSUES (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27T-3-1; BR27T-4-1; BR27T-7-1 and BR27T-8-1	Added new standard showing cast-in-place terminal wall on superstructure. Revised distance to bolts in View A-A.
BR27T-9-1	Added new standard showing cast-in-place terminal wall on approach slab. Revised distance to bolts in View A-A.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, 5 and 8 thru 11	Revised dates of applicable sheets.
BCR-3-1	Added notes referring to railing and details showing continuity between railing and terminal wall on superstructure. Omitted terminal wall reinforcing steel from schedule. Added sheet references.
BCR-3-2	Revised miscellaneous details note. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.
BCR-4-1	Added notes referring to railing and details showing continuity between railing and terminal wall on superstructure. Omitted terminal wall reinforcing steel from schedule. Added sheet references.
BCR-4-2	Revised miscellaneous details note. Added a note to complete the type of corrosion resistant reinforcing steel required and the dimensions and lengths of rebars in schedule. Added sheet references.
BCR-6-1	Added reinforcing steel schedule. Omitted notes referring to railing. Revised distance to bolts in View A-A. Added sheet references.
BCR-6-2	Added a note defining the Contractor's responsibility to determine the number of reinforcing bars and other details required. Under View A-A, revised distance to bolts. Added sheet references.

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BIR-1-1	Revised distance to bolts in View A-A.
BIR-1-2	Revised distance to bolts in notes.
BIR-2-1	Revised distance to bolts in View A-A.
BIR-2-2	Revised distance to bolts in notes.
BIR-3-1	Revised copyright date.
BIR-3-2	Revised usage of standard to include BIR-4 and BIR-5. Added sheet reference.
BPB-3A-1 and BPB-3B-1	Revised distance to bolts in Section D-D. Corrected misspelled word, "guardrail".
BPB-3A-2 and BPB-3B-2	Revised distance to bolts in notes. Added note to complete lengths of rebars in schedule and sheet references.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
COMMISSIONER

September 9, 2010

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1, TOC-9, TOC-10 and TOC-11	Revised dates of applicable sheets.
BR27C-1, BR27C-2 BR27C-6, BR27C-7 BR27C-8, BR27C-9 BR27C-10 and BR27C-11	Decreased clearance of RG04 series to face of rail from 2” to 1 ½” in Section E-E.
BR27C-3	Revised RG0401 and RG0402 dimension from 6½” to 7” in Reinforcing Steel Schedule.
BR27C-1-2 and BR27C-2-2	Revised section depiction header.
BR27C-2-3	Removed “and U-back Wing” from sheet header.
BR27C-6-2, BR27C-7-2, BR27C-8-2, BR27C-9-2, BR27C-10-2 and BR27C-11-2	Revised usage language to include all pedestrian and/or bicycle facilities.
BR27D-1 and BR27D-2	Decreased clearance of RG04 series to face of rail from 2” to 1 ½” in Section E-E and removed RG0402 callout from “PIERS – Continuous – without joint in slab” detail.

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27D-3	Revised RG0401 and RG0402 dimension from 6½” to 7” in Reinforcing Steel Schedule. Revised detail layout to look similar to standard BR27C-3.
BR27D-4 and BR27D-5 BR27D-6 and BR27D-7	Decreased clearance of RG04 series to face of rail from 2” to 1 ½” in Section E-E.
BR27D-1-2 and BR27D-2-2	Revised section depiction header.
BR27D-4-2 and BR27D-5-2	Revised usage language to include all pedestrian and/or bicycle facilities and revised 1’-6” to 1’-7” in final note regarding Section D-D.
BR27D-6-2 and BR27D-7-2	Revised usage language to include all pedestrian and/or bicycle facilities.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

Gregory A. Whirley
Acting COMMISSIONER

June 14, 2010

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED:

<u>File Number</u>	<u>Description of change(s)</u>
BPF-3-3	Contents moved to previous sheet. Omitted note pertaining to threaded inserts.
BPF-4-3 and BPF-5-3	Contents moved to previous sheet.
BR27C-4 and BR27C-5	These rails are no longer used for sidewalk (pedestrian) applications.
BR27C-4-2, BR27C-4-3, BR27C-5-2 and BR27C-5-3	Notes are no longer needed.

NEW ISSUES:

<u>File Number</u>	<u>Description of change(s)</u>
None	

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1 thru -12	Revised dates of applicable sheets.
BAS-11A thru BAS-20AR	Revised notes: Add "Cost included in select backfill" to third paragraph.
BBD-8-1	Added a note to call for the sole plate to be galvanized. Revise distance to stud from 5 in. to 6 in. in Section A-A and B-B. Corrected location of arrowhead in Section A-A.
BCR-1-1	Revised the detail at pier with continuous slab to add "Top of slab." Revised length of rebar AB0402 from 7'-9" to 7'-0" in the reinforcing steel schedule.
BCR-2-1	Revised the detail at pier with continuous slab to delete the curb and add "Top of slab." Revised length of rebar AB0402 from 7'-9" to 7'-0" in the reinforcing steel schedule.
BCR-3-1	Revised length of deflection joint from 1'-9" to 2'-2" and added "Top of slab" in detail at pier with continuous slab. Revised length of rebar AB0402 from 7'-9" to 7'-0" in the reinforcing steel schedule.
BCR-4-1	Revised the detail at pier with continuous slab to delete the curb, revise length of deflection joint from 1'-9" to 2'-2" and added "Top of slab." Revised length of rebar AB0402 from 7'-9" to 7'-0" in the reinforcing steel schedule.
BCR-5-1 and BCR-6-1	Revised terminal wall length from 8'-0" to 7'-3."
BCS-31A-1	Removed extra wording "the post clears" in last note.
BEJ-6-1 and BEJ-7-1	Revised first note to delete "Unless otherwise noted." Added clip in Part Section at Abutment.
BEJ-6/7/10/11/12-6	Revised excess temperature allowance from "25%" to "20%" in third note.
BGL-1 and BGL-2	Revised the note for galvanization of miscellaneous hardware and added a note for structural steel for angles.
BIR-1-1	Revised reinforcing steel schedule and the designation for steel rail tubing from "TS" to "HSS" in all locations. Modified 7'-3" and 6'-9" dimension lines in Terminal Wall View. Noted location of the RL04 series reinforcement in Elevation View.

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BIR-2-1	Revised reinforcing steel schedule and designation for steel rail tubing from "TS" to "HSS" in all locations. Noted location of the RL04 series reinforcement in Elevation View.
BIR-3-1	Revised designation for steel rail tubing from "TS" to "HSS" in all locations.
BPF-3-1	Modified Notes, PLAN, and Section A-A.
BPF-4-1	Modified Notes, and PLAN.
BPF-5-1	Revised misspelled word "welded" in tenth note. Modified Notes, and PLAN.
BPF-3-2, BPF-4-2 and BPF-5-2	Deleted the guidelines and considerations for placement of fence. Added a reference to new Volume V – Part 2, Chapter 30, Fencing (Pedestrian) for placement guidelines.
BR27C-1 and BR27C-2	Deleted "or top of sidewalk" from Section D-D and "without sidewalk" from Section E-E.
BR27C-1-2 and BR27C-2-2	Notes to Designer revised to delete the sidewalk (pedestrian) application for these rails and the modified detail for sidewalk applications. Railing standard is to be used only as a traffic barrier.
BR27C-3-1	Corrected misspelled word "Contractor" in eighteenth note. Revise designation for steel rail tubing from "TS" to "HSS" in all locations.
BR27C-3-2	Notes to Designer revised to delete reference to standards BR27C-4 and BR27C-5 which are voided.
BR27C-6-2, BR27C-7-2, BR27C-8-2, BR27C-9-2, BR27C-10-2 and BR27C-11-2	Notes to Designer revised to replace "multi-use" with "shared use."
BR27D-1 and BR27D-2	Deleted "or top of sidewalk" from Section D-D, "without sidewalk" from Section E-E (without sidewalk), Section E-E (with sidewalk) and reference to rebar RG0402 in Elevation View.
BR27D-1-2 and BR27D-2-2	Notes to Designer revised to delete the sidewalk (pedestrian) application for these rails and the detail for sidewalk applications.

REVISIONS (cont'd)

<u>File Number</u>	<u>Description of change(s)</u>
BR27D-3-1	Corrected misspelled word "Contractor" in eighteenth note. Revised designation for steel rail tubing from "TS" to "HSS" in Section A-A.
BR27D-4-2, BR27D-5-2, BR27D-6-2 and BR27D-7-2	Notes to Designer revised to replace "multi-use" to "shared use."
BTC-4	Revised the note for steel fittings/rods and the note for structural steel for angles.
BTC-5	Revised the note for steel fittings/rods and the note for structural steel for angles. Corrected misspelled word "positive" in fourth note.
BTC-6	Revised the note for structural steel for angles and moved the fifth note for threaded couplings to the fourth note position.
BTC-7	Revised the note for structural steel for angles.
BWL-1 and BWL-2	Revised the note for galvanization of miscellaneous hardware and added a note for structural steel for angles.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

David S. Ekern, P.E.
COMMISSIONER

January 7, 2010

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED STANDARDS:

None

NEW ISSUES:

<u>File Number</u>	<u>Description of changes(s)</u>
TOC-12	Added new sheet to Table of Contents.

REVISIONS:

<u>File Number</u>	<u>Description of changes(s)</u>
TOC-1 and TOC-11	Revised date.
BCF-2	Made miscellaneous drafting changes.
BCR-5 and BCR-6	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).
BCR-5-2 and BCR-6-2	Added instructions for the designer to specify the type of CRR.
BCS-28A, BCS-30A, BCS-31A, BCS-32A, and BCS-33A	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of changes(s)</u>
BCS-28A-3, BCS-30A-3, BCS-31A-3, BCS-32A-3, and BCS-33A-3	Added instructions for the designer to specify the type of CRR.
BIR-3	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).
BIR-3-2	Added instructions for the designer to specify the type of CRR.
BMB-3A and BMB-5A	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).
BMB-3A-2 and BMB-5A-2	Added instructions for the designer to specify the type of CRR.
BPB-3A and BPB-3B	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).
BPB-3A-2 and BPB-3B-2	Added instructions for the designer to specify the type of CRR.
BPP-1	Revised the ninth note to call for hot dip galvanized reinforcing steel in bridges where piles are exposed.
BR27C-3 and BR27D-3	Revised the reinforcing steel note to call for corrosion resistant reinforcing steel (CRR).
BR27C-3-2 and BR27D-3-2	Added instructions for the designer to specify the type of CRR.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
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For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, 23219-2000

David S. Ekern, P.E.
COMMISSIONER

November 2, 2009

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

VOIDED STANDARDS:

None

NEW ISSUES:

<u>File Number</u>	<u>Description of changes(s)</u>
TOC-12	Added page to Table of Contents.
BTB-1-1 and BTB-1-2	Thrie-Beam Guardrail added.

REVISIONS:

<u>File Number</u>	<u>Description of changes(s)</u>
TOC-1 to TOC-11	Updated to reflect the inclusion of new standard.

Page 2
November 2, 2009

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
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Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

David S. Ekern, P.E.
COMMISSIONER

May 29, 2009

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

NOTE: Effective with the December Advertisement, Standards shall be sealed and signed in accordance with Volume V – Part 2, File No. 01.16.1 thru 01.16.7.

VOIDED STANDARDS:

<u>File Number</u>	<u>Description</u>
BEJ-8-3 and BEJ-9-4 BEJ-6/7/8/9-5 thru -10	Replaced by new standards. NOTES TO DESIGNER: Replaced by new notes to designer.

NEW ISSUES:

<u>File Number</u>	<u>Description of changes(s)</u>
BEJ-10-3, BEJ-11-4 and BEJ-12-5 BEJ-6/7/10/11/12-6 thru -11	Added at grade details for sliding plates. Eliminated skewed bearing stiffener detail. Minor drafting corrections. NOTES TO DESIGNER: Sliding plate required at pedestrian and/or bicycle facilities regardless of tooth length. Added notes on use of computer program.

REVISIONS:

<u>File Number</u>	<u>Description of changes(s)</u>
All standard sheets	All standard sheets have been revised to reflect the border for sealing and signing of plans.

REVISIONS:

<u>File Number</u>	<u>Description of changes(s)</u>
BAS-11-1 thru BAS-20AR-1	Minor drafting corrections.
BBD-6-1, BBD-7A-2 and BBD-7B-3	Minor corrections to Notes.
BBD-8-1	Minor drafting corrections.
BBD-8-2	NOTES TO DESIGNER: Added note on use of computer program.
BBD-9-1	Modified Notes.
BBD-9-2	NOTES TO DESIGNER: Added note on use of computer program.
BCF-1-1 and BCF-2-1	Minor drafting corrections.
BCR-1-1 thru BCR-4-1	Added dimensions to detail for slab continuous over piers and minor corrections.
BCR-5-1 thru BCR-6-1	Modified terminal section.
BCS-21A-1 thru BCS-30A-1	Minor drafting corrections.
BCS-31A-1	Corrected rebar designation in PLAN and minor drafting corrections.
BCS-32A-1	Minor drafting corrections.
BCS-33A-1	Corrected rebar designation in PLAN and minor drafting corrections.
BEJ-1-1 thru BEJ-3-1	Minor drafting corrections.
BEJ-6-1 thru BEJ-7-2	Minor drafting corrections. Updated sheet references.
BGL-1-1	Minor drafting corrections.
BGL-1-2 and BGL-2-2	NOTES TO DESIGNER: Added note on location of utilities.
BIR-1-1 and BIR-2-1	Modified terminal section and minor drafting corrections.
BIR-3-1	Minor drafting correction.
BMB-3A-1	Deleted PART PLAN and minor correction.
BMB-5A-1	Deleted PART PLAN and minor corrections.
BPB-3A-1 thru BPB-3B-1	Modified terminal section, deleted PART PLAN and minor drafting corrections.
BPF-3-1 thru BPF-5-1	Modified details to reflect larger post size required. Added note for pipe material requirements. Minor drafting corrections.
BPF-3-2 thru BPF-5-2	NOTES TO DESIGNER: Modified weight of fence per foot for use in design.
BPP-1-1	Minor drafting corrections.

REVISIONS:

<u>File Number</u>	<u>Description of changes(s)</u>
BR27C-1-1 thru BR27C-2-1	Modified terminal wall and minor drafting corrections.
BR27C-3-1	Corrected BASE PLATE DETAIL and minor drafting correction.
BR27C-4-1 thru BR27C-11-1	Modified terminal wall and minor drafting corrections.
BR27D-1-1 thru BR27D-2-1	Modified terminal wall and minor drafting corrections.
BR27D-3-1	Corrected BASE PLATE DETAIL and minor drafting correction.
BR27D-4-1 thru BR27D-7-1	Modified terminal wall and minor drafting corrections.
BTC-4-1 thru BTC-7-1	Minor drafting corrections.
BTC-4-2 thru BTC-7-2	Added note on location of utilities.
BWL-1-1 and BWL-2-1	Minor drafting corrections.
BWL-1-2 and BWL-2-2	Added note on location of utilities.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

David S. Ekern, P.E.
COMMISSIONER

July 11, 2008

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3: Current Details (Standards)

All of the standard sheets in this series have been revised. Two blocks for the P.E. stamp have been added to the lower left hand corner and the copyright date has been changed to 2008. Some details have been rearranged to provide space for the P.E. stamps.

NOTE: Standard sheets are not required to be sealed and signed at this time.

VOIDED STANDARDS:

<u>File Number</u>	<u>Comments</u>
BBD-4	Not cost effective. Range of designs more economical with laminated bearing pads.
BBD-5	Not cost effective. Range of designs more economical with laminated bearing pads.
BPF-2	Standard replaced with standards BPF-4 and BPF-5.

NEW ISSUES:

<u>File Number</u>	<u>Description</u>
INSTR-2 and -3	Added instructions for external users for accessing Microstation (.dgn) files and for printing manual.

NEW ISSUES (cont'd):

<u>File Number</u>	<u>Description</u>
BCR-5	Adding the two blocks for the P.E. stamp to standards BCR-1 and BCR-2 required some of the details to be moved to another sheet. Therefore, the terminal wall details and notes were moved to this sheet. Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BCR-6	Adding the two blocks for the P.E. stamp to standards BCR-3 and BCR-4 required some of the details to be moved to another sheet. Therefore, the terminal wall details and notes were moved to this sheet. Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BCS-30A	Bridge conduit system for lighting for use with the BR27C-series without sidewalk
BCS-31A	Bridge conduit system for lighting for use with the BR27C-series with sidewalk.
BCS-32A	Bridge conduit system for lighting for use with the BR27D-series without sidewalk.
BCS-33A	Bridge conduit system for lighting for use with the BR27D-series with sidewalk.
BPF-4	Pedestrian fence details for use with the BR27C-series and BR27D-series rail without sidewalk.
BPF-5	Pedestrian fence details for use with the BR27C-series and BR27D-series rail with sidewalk.

REVISIONS:

<u>File Number</u>	<u>Description of change(s)</u>
TOC-1 thru -11 INSTR-1 BAS-series	Added -DGN link to each standard file. Table of contents updated. Falcon location changed. Deleted capacity note and note that approach slab is not included in bridge contract. Quantity items revised. Corners near abutments revised for skew for approach slabs with sidewalks (BAS-18L, -18R, -19L, -19R, -20L, -20R, -18AL, -18AR, -19AL, -19AR, -20AL and 20AR).
BCF-2-1	Changed DETAIL A to DETAIL C. Notes: Added note requiring Charpy V- Notch Impact Test. Misc. drafting corrections.
BCR-1-1	Added "Face of rail" to DECK SLABS, SLAB SPANS, and TYPICAL SECTION BETWEEN POSTS. Misc. drafting corrections. Moved some details to new standard BCR-5.

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BCR-1-2	NOTES TO DESIGNER: Some notes deleted and moved to BCR-5-2.
BCR-2-1	Added "Face of rail" to DECK SLABS, SLAB SPANS, and TYPICAL SECTION BETWEEN POSTS. Misc. drafting corrections. Moved some details to new standard BCR-5.
BCR-2-2	NOTES TO DESIGNER: Some notes deleted and moved to BCR-5-2.
BCR-3-1	Added "Face of rail" to DECK SLABS, SLAB SPANS, and TYPICAL SECTION BETWEEN POSTS. Misc. drafting corrections. Moved some details to new standard BCR-6.
BCR-3-2	NOTES TO DESIGNER: Some notes deleted and moved to BCR-6-2.
BCR-4-1	Added "Face of rail" to DECK SLABS, SLAB SPANS, and TYPICAL SECTION BETWEEN POSTS. Misc. drafting corrections. Moved some details to new standard BCR-6.
BCR-4-2	NOTES TO DESIGNER: Some notes deleted and moved to BCR-6-2.
BCS-21A-1	NOTES: Last note: Corrected "Section 705" to "Section 700." Circle with 8 under CONDUIT LAYOUT and SECTION A-A: Changed "metal conduit" to "galvanized steel pipe" and clarified details showing 2" conduit and 1" pipe.
BCS-22A-1	NOTES: Last note: Corrected "Section 705" to "Section 700." Circle with 8 under CONDUIT LAYOUT and SECTION A-A: Changed "metal conduit" to "galvanized steel pipe" and clarified details showing 2" conduit and 1" pipe.
BCS-28A-1	NOTES: Last note: Corrected "Section 705" to "Section 700." CONDUIT LAYOUT: Added 1" galvanized pipe.
BCS-29A-1	NOTES: Last note: Corrected "Section 705" to "Section 700." CONDUIT LAYOUT: Added 1" galvanized pipe.
BEJ-3-1	NOTES: "Section 105.02" to "Section 105.10." Deleted last note referencing Section 212 of the specifications.
BIR-1-1	Moved notes to standard BIR-3.
BIR-2-1	Moved notes to standard BIR-3.
BIR-3-1	Notes from BIR-1 and BIR-2 moved to this sheet. Deleted last sentence dealing with bid items. Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BMB-3A-1	SECTION A-A: Added "Face of median curb." Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.

REVISIONS (cont'd):

<u>File Number</u>	<u>Description of change(s)</u>
BMB-5A-1	SECTION A-A: Added "Face of median curb." Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BPB-3A-1	Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BPB-3B-1	Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient.
BPF-3-1	NOTES: Last note: "Section 705" changed to "Section 700."
BR27C-1-1 BR27C-2-1 BR27C-4-1 thru BR27C-11-1	Moved notes to standard BR27C-3. ELEVATION views: Revised post spacing(s) near abutment and at pier.
BR27C-3-1	Moved notes from BR27C-series. Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient. Misc. drafting corrections.
BR27D-1-1 BR27D-2-1 BR27D-4-1 thru BR27D-7-1	Moved notes to standard BR27D-3. ELEVATION views: Revised post spacing(s) near abutment and at pier. SECTION D-D: Plate size corrected to agree with standard BR27D-3.
BR27D-3-1	Moved notes from BR27C-series. Note added for Contractor to adjust reinforcing steel for horizontal slope and vertical gradient. Misc. drafting corrections.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3.

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

David S. Ekern, P.E.
COMMISSIONER

August 31, 2007

MEMORANDUM

TO: Holders of Manual

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details

All of the standards in the Manual of the Structure and Bridge Division Volume V – Part 3 have been revised including the NOTES TO DESIGNER. Major revisions include updating the standards to the drafting requirements of the office practice (Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 1) and conversion to MicroStation V8. Some standard sheets were congested and are now expanded to more sheets, etc. Due to the numerous changes, many editorial in nature, not all of the specific changes will be listed under REVISIONS. Only the major revisions will be noted.

NOTE: The three pipe aluminum rail standards used for sidewalk applications have been VOIDED. This rail was not crash tested. The standard may be used for projects through the April 2008 advertisement date. Thereafter, these standards may no longer be used. Two rails (BR27C-series and BR27D-series) that are crash tested have been developed for pedestrian/bicycle, multi-use and as traffic barriers.

VOIDED STANDARDS:

The following standards are VOIDED:

- BCF-3 Cross frame details for curved steel plate girders
- BCS-15A Bridge conduit system used with three-pipe aluminum rail (BMR-14 and -15)
- BEJ-4 and -5 Replaced with BEJ-6, -7, -8 and -9. Separated concrete and steel beams/girders. Separated details due to congestion of sheet.
- BMR-14 Three-pipe aluminum rail with terminal wall and U-back wingwall
- BMR-15 Three pipe aluminum rail with terminal wall

VOIDED STANDARDS (cont'd):

- BMR-18 Three pipe aluminum rail – miscellaneous details
- BTC-8 Telephone conduit system used with concrete T-beams

NEW ISSUES:

The following standards are new issues:

- BR27C-1 thru Steel tubular rail crash tested for TL-4 in various configurations for use as a
thru -11 traffic barrier and for sidewalk use (pedestrian/bicycle, multi-use).
- BR27D-1 Steel tubular rail crash tested for TL-2 in various configurations for use as a
thru -7 traffic barrier and for sidewalk use (pedestrian/bicycle, multi-use).
- BEJ-6 Tooth expansion joint for steel beams/girders (part of voided BEJ-4)
- BEJ-7 Tooth expansion joint for concrete beams. (part of voided BEJ-4)
- BEJ-8 and -9 Tooth expansion joint: miscellaneous details (previously BEJ-5)

REVISIONS:

As noted in the introduction, only the major changes are noted below:

- BAS-series Drainage apron note deleted. Since all projects require select backfill, the aggregate base material under the approach slab was deleted (SECTION B-B). For full width slabs, joint section revised.
- BBD-4 Data tables removed and added to NOTES TO DESIGNER. Table expanded requiring designer input.
- BBD-5 Data tables removed and added to NOTES TO DESIGNER. Table expanded requiring designer input.
- BBD-8 Updated sections to show Bulb-T.
- BBD-9 Alternate fixed assembly deleted. Details simplified.
- BCF-1 Added note on welding.

REVISIONS (cont'd):

- BCF-2 Deleted cross frames CF9, CF10, CF12 and CF13. Added note on welds. NOTES TO DESIGNER: Deleted details. Details will be placed in Chapter 11 of the office practice in the future.
- BCS-series Corrected longitudinal movement references on some sheets.
- BEJ-1 Deleted three-pipe aluminum rail from SECTION D-D. Modified section allowing for different rails/parapets.
and -2
- BGL-2 Replaced concrete beam with Bulb-T shape.
- BPF-2 Deleted 3-pipe aluminum rail from sections and changed dimensions in TYPICAL PART SECTION.
- BPP-1 Deleted 22" pile. Changed number of strands for several pile sizes.
- BTC-6 Replaced concrete beam with Bulb-T.
and -7
- BWL-2 Replaced concrete beam with Bulb-T.

**RETAIN THIS MEMO IN FRONT OF INDEX
TO VOLUME V – PART 3**

/original signed/
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Assistant State Structure and Bridge Engineer

For: Kendal R. Walus, P.E.
State Structure and Bridge Engineer



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, 23219-2000

GREGORY A. WHIRLEY
ACTING COMMISSIONER

December 19, 2005

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM:

TO: Holders of Volume V - Part 3: Current Details (Standards)

REVISIONS:

<u>File No.</u>	<u>Sheet No.</u>	<u>Description of change(s)</u>
TOC-1 and 3		Changed dates for BBD-6, -7A, -7B.
BBD-6	1 of 7	Added four design notes for disc bearings.
BBD-7A	2 of 7	Added four design notes for disc bearings.
BBD-7B	3 of 7	Added four design notes for disc bearings.

**RETAIN THIS MEMO IN FRONT OF TABLE OF CONTENTS
TO VOLUME V – PART 3.**

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: George M. Clendenin, P.E.
State Structure and Bridge Engineer

Attachments



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219-2000

GREGORY A. WHIRLEY
ACTING COMMISSIONER

September 26, 2005

SUBJECT: Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM:

TO: Holders of Volume V - Part 3: Current Details (Standards)

REVISIONS:

<u>File No.</u>	<u>Sheet No.</u>	<u>Description of change(s)</u>
TOC-3		Changed dates for BBD-6, -7A, -7B (previously there was only -7) as well as notes to designer – from 6 to 7 sheets in this section.
BBD-6	1 of 7	Notes revised. Section A-A, Fixed Disc Bearing, Type F-F added. Updated drafting/detailing with current office practice (S&B Volume V – Part 2).
BBD-7A	2 of 7	This sheet along with BBD-7B replaces BBD-7. Notes revised. Section A-A, Guided Disc Expansion Bearing, Type EF, and Detail B added. Updated drafting/detailing with current office practice (S&B Volume V – Part 2).
BBD-7B	3 of 7	This sheet along with BBD-7A replaces BBD-7. Notes revised. Section B-B, Non-Guided Disc Expansion Bearing, Type EE added. Updated drafting/detailing with current office practice (S&B Volume V – Part 2).
BBD-6/7A&7B	4 of 7	Note 1 changed.
	5 of 7	Note 8: Reference to Special Provisions deleted; now in specs. Note 14 changed.
	6 of 7	Changed sheet number/date.
	7 of 7	Changed sheet number/date.

**RETAIN THIS MEMO IN FRONT OF TABLE OF CONTENTS
TO VOLUME V – PART 3.**

Page 2
September 26, 2005

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: George M. Clendenin, P.E.
State Structure and Bridge Engineer

Attachments



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, 23219-2000

PHILIP A. SHUCET
COMMISSIONER

GEORGE M. CLENDENIN
STATE STRUCTURE AND BRIDGE ENGINEER

November 1, 2004

Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3 --- Current Details

REVISIONS:

The following sheets are revised:

- TOC** This sheet was previously named "INDEX." Sheets that are intended to be 11 x 17 are marked with an asterisk (*). Note added at the bottom of the sheet to explain asterisk symbol.
- INSTR** "Instructions" at top of sheet deleted. Added "GENERAL" to title at bottom of sheet.
- NOTE:** The borders on all 8 ½ x 11 sheets are now ½" except for the left which is 1". The font has been changed from Universe to Arial. In some instances the NOTES TO DESIGNER may have spilled over to additional sheet(s) due to the changes in the border and font. The 8 ½ x 11 sheets, except those revised above, have not been redistributed. They are available on the Internet..

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3.

/original signed/
Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: George M. Clendenin, P.E.
State Structure and Bridge Engineer

Attachments



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, 23219-2000

CHARLES D. NOTTINGHAM
COMMISSIONER

MALCOLM T. KERLEY
STATE STRUCTURE AND BRIDGE ENGINEER

July 2, 2001

Manual of the Structure and Bridge Division
Volume V – Part 3
Current Details (Standards)

MEMORANDUM

TO: Holders of Volume V – Part 3 --- Current Details

NEW ISSUE:

The Manual of the Structure and Bridge Division, Volume V – Part 3 --- Current Details includes standards for approach slabs; bearings; joints; parapets, rails and barriers; fencing details; utilities (gas and water lines, lighting and telephone conduits), etc. The whole set of standards is being reissued with the date of July 2, 2001 (07-02-01) with new border sizes for the plan sheets.

REVISIONS:

This reissue of the current details incorporates the new border sheet and includes an update on drafting and detailing corrections, specification updates, and numerous other corrections/revisions. Standards with a date previous to the July 2, 2001 (07-02-01) issue have been placed in a VOIDED file for archival purposes.

RETAIN THIS MEMO IN FRONT OF INDEX TO VOLUME V – PART 3.

Julius F. J. Völgyi, Jr., P.E.
Assistant State Structure and Bridge Engineer

For: Malcolm T. Kerley, P.E.
State Structure and Bridge Engineer

Attachments

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
TABLE OF CONTENTS & GENERAL INSTRUCTIONS		
TOC-1	Table of Contents.....	15Oct2015
TOC-2	Table of Contents.....	15Oct2015
TOC-3	Table of Contents.....	15Oct2015
TOC-4	Table of Contents.....	15Oct2015
TOC-5	Table of Contents.....	15Oct2015
TOC-6	Table of Contents.....	15Oct2015
TOC-7	Table of Contents.....	15Oct2015
TOC-8	Table of Contents.....	15Oct2015
TOC-9	Table of Contents.....	15Oct2015
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TOC-11	Table of Contents.....	15Oct2015
TOC-12	Table of Contents.....	15Oct2015
TOC-13	Table of Contents.....	15Oct2015
TOC-14	Table of Contents.....	15Oct2015
TOC-15	Table of Contents.....	15Oct2015
TOC-16	Table of Contents.....	15Oct2015
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TOC-24	Table of Contents.....	15Oct2015
TOC-25	Table of Contents.....	15Oct2015
TOC-26	Table of Contents.....	15Oct2015
TOC-27	Table of Contents.....	15Oct2015
INSTR-1	General Instructions.....	10Mar2015
INSTR-2	External Users: File Access Instructions	11Jul2008
INSTR-3	External Users: File Access Instructions	11Jul2008

**APPROACH SLABS –
APPROACH ROADWAY CONCRETE**

*BAS-11	-1	Straight Crossing	03May2013
	-2	Notes to Designer	31Aug2007
	-DGN	MicroStation Drawing File	
*BAS-12L	-1	Skew 20° or less, skew left	03May2013
	-2	Notes to Designer	31Aug2007
	-DGN	MicroStation Drawing File	
*BAS-12R	-1	Skew 20° or less, skew right.....	03May2013
	-2	Notes to Designer	31Aug2007
	-DGN	MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

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VOL. V - PART 3
DATE: 15Oct2015
SHEET 1 of 27
FILE NO. TOC-1

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FILE NO.	TITLE	DATE
APPROACH SLABS – APPROACH ROADWAY CONCRETE (cont'd)		
*BAS-13L	-1 Skew 20° to 35°, skew left	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-13R	-1 Skew 20° to 35°, skew right	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-14L	-1 Skew 35° to 45°, skew left	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-14R	-1 Skew 35° to 45°, skew right	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-15L	-1 Skew 45° to 50°, skew left	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-15R	-1 Skew 45° to 50°, skew right	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
APPROACH SLABS – STRUCTURE WITH SIDEWALKS APPROACH ROADWAY CONCRETE		
*BAS-16	-1 Straight Crossing	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-17L	-1 Skew 20° or less, skew left	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-17R	-1 Skew 20° or less, skew right	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-18L	-1 Skew 20° to 35°, skew left	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
*BAS-18R	-1 Skew 20° to 35°, skew right	03May2013
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

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CURRENT DETAILS**

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FILE NO.	TITLE	DATE
APPROACH SLABS – STRUCTURE WITH SIDEWALKS APPROACH ROADWAY CONCRETE (cont'd)		
*BAS-19L -1	Skew 35° to 45°, skew left1	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-19R -1	Skew 35° to 45°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-20L -1	Skew 45° to 50°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-20R -1	Skew 45° to 50°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	

**APPROACH SLABS –
WITH BITUMINOUS CONCRETE OVERLAY**

*BAS-11A -1	Straight Crossing	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-12AL -1	Skew 20° or less, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-12AR -1	Skew 20° or less, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-13AL -1	Skew 20° to 35°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-13AR -1	Skew 20° to 35°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-14AL -1	Skew 35° to 45°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-14AR -1	Skew 35° to 45°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	

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DATE: 15Oct2015
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FILE NO.	TITLE	DATE
APPROACH SLABS – WITH BITUMINOUS CONCRETE OVERLAY (cont'd)		
*BAS-15AL -1	Skew 45° to 50°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-15AR -1	Skew 45° to 50°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
APPROACH SLABS – STRUCTURE WITH SIDEWALKS WITH BITUMINOUS CONCRETE OVERLAY		
*BAS-16A -1	Straight Crossing	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-17AL -1	Skew 20° or less, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-17AR -1	Skew 20° or less, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-18AL -1	Skew 20° to 35°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-18AR -1	Skew 20° to 35°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-19AL -1	Skew 35° to 45°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-19AR -1	Skew 35° to 45°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-20AL -1	Skew 45° to 50°, skew left	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	
*BAS-20AR -1	Skew 45° to 50°, skew right	03May2013
-2	Notes to Designer	31Aug2007
-DGN	MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

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FILE NO.	TITLE	DATE
BEARING DETAILS		
*BBD-4	-1 Low Profile Bearings for Steel Beams or Girders	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BBD-6	-1 High Load Multi-Rotational Bearings – Fixed	14Jun2010
*BBD-7A	-2 High Load Multi-Rotational Bearings – Guided Exp	14Jun2010
*BBD-7B	-3 High Load Multi-Rotational Bearings – Non-Guided Exp.	14Jun2010
*BBD-6/7A/7B	-4 Notes to Designer	31Aug2007
	-5 Notes to Designer	31Aug2007
	-6 Notes to Designer	31Aug2007
	-7 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File (3 Drawing Files)	
*BBD-8	-1 Laminated Elastomeric Pad for Prestressed Beams	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BBD-9	-1 Laminated Elastomeric Pad for Steel Beams/Girders	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
CROSS FRAME DETAILS		
*BCF-4	-1 Cross Frame Details (for Straight Girders, V-Bracing)	27Mar2013
	-2 Notes to Designer	27Mar2013
	-DGN MicroStation Drawing File	
*BCF-5	-1 Cross Frame Details (for Straight Girders, X-Bracing)	27Mar2013
	-2 Notes to Designer	27Mar2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

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CONCRETE RAILING (KANSAS CORRAL)		
*BCR-1	-1 Railing With Curbing (2'-3" height)	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BCR-2	-1 Railing Without Curbing (2'-3" height)	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BCR-3	-1 Railing With Curbing (2'-8" height)	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BCR-4	-1 Railing Without Curbing (2'-8" height)	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BCR-5	-1 Cast-in-Place Terminal Wall on Wingwall (2'-8" height)	15Oct2015
	-2 Notes to Designer	15Oct2015
	-3 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BCR-6	-1 Cast-in-Place Terminal Wall on Wingwall (2'-8" height)	15Oct2015
	-2 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BCR-7	-1 Cast-in-Place Terminal Wall on U-Back Wingwall (2'-8" height)	15Oct2015
	-2 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BCR-8	-1 Cast-in-Place Terminal Wall on Superstructure (Integral and Semi-Integral) (2'-8" height)	15Oct2015
	-2 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BCR-9	-1 Cast-in-Place Terminal Wall on Superstructure (Deck Slab Extension) (2'-8" height)	15Oct2015
	-2 Notes to Designer	30Aug2013
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**CURRENT DETAILS
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DATE: 15Oct2015
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**VOLUME V – PART 3
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FILE NO.	TITLE	DATE
BRIDGE CONDUIT/FUTURE LIGHTING		
*BCS-21A	-1 Bridge Conduit System for Future Lighting with type KC(A) parapet (F-shape).....	14Jun2010
	-2 Notes to Designer.....	31Aug2007
	-3 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BCS-22A	-1 Bridge Conduit System other than bridge lighting for type KC(A)parapet (F-shape). Access to junction box from outside of parapet.....	14Jun2010
	-2 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BCS-28A	-1 Bridge Conduit System for Lighting with type KC(A) parapet (F-shape). Access to junction box from roadway.....	10Mar2015
	-2 Notes to Designer.....	31Aug2007
	-3 Notes to Designer.....	07Aug2012
	-DGN MicroStation Drawing File	
*BCS-29A	-1 Bridge Conduit System for other than bridge lighting. Access to junction box from roadway. Parapet F-shape.....	10Mar2015
	-2 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BCS-30A	-1 Bridge Conduit System for lighting with BR27C-series Railing without sidewalk.....	07Aug2012
	-2 Notes to Designer.....	11Jul2008
	-3 Notes to Designer.....	07Aug2012
	-DGN MicroStation Drawing File	
*BCS-31A	-1 Bridge Conduit System for lighting with BR27C-series Railing with sidewalk.....	15Oct2015
	-2 Notes to Designer.....	11Jul2008
	-3 Notes to Designer.....	07Aug2012
	-DGN MicroStation Drawing File	
*BCS-32A	-1 Bridge Conduit System for lighting with BR27D-series Railing without sidewalk.....	07Aug2012
	-2 Notes to Designer.....	11Jul2008
	-3 Notes to Designer.....	07Aug2012
	-DGN MicroStation Drawing File	
*BCS-33A	-1 Bridge Conduit System for lighting with BR27D-series Railing with sidewalk.....	07Aug2012
	-2 Notes to Designer.....	11Jul2008
	-3 Notes to Designer.....	07Aug2012
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
JOINTS		
*BEJ-1	-1 Elastomeric Joint Sealer, Straight Crossing and Skewed Crossing Under 20°	14Jun2010
	-2 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BEJ-2	-1 Elastomeric Joint Sealer, Skewed Crossing Over 20°	14Jun2010
	-2 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BEJ-3	-1 Elastomeric Expansion Dam	14Jun2010
	-2 Notes to Designer.....	31Aug2007
	-3 Notes to Designer.....	31Aug2007
	-4 Notes to Designer.....	31Aug2007
	-DGN MicroStation Drawing File	
*BEJ-6	-1 Tooth Expansion Joint, Steel Beams/Girders	14Jun2010
*BEJ-7	-2 Tooth Expansion Joint, Concrete Beams.....	14Jun2010
*BEJ-10	-3 Tooth Expansion Joint – Miscellaneous Details.....	14Jun2010
*BEJ-11	-4 Tooth Expansion Joint – Miscellaneous Details.....	14Jun2010
*BEJ-12	-5 Tooth Expansion Joint – Miscellaneous Details.....	14Jun2010
BEJ-6/7/10/11/12	-6 Notes to Designer.....	14Jun2010
	-7 Notes to Designer.....	29May2009
	-8 Notes to Designer.....	29May2009
	-9 Notes to Designer.....	29May2009
	-10 Notes to Designer.....	29May2009
	-11 Notes to Designer.....	29May2009
	-DGN MicroStation Drawing File (5 Drawing Files)	
GAS LINES		
*BGL-1	-1 For Use with Steel Beams/Girders.....	07Aug2012
	-2 Notes to Designer.....	29May2009
	-DGN MicroStation Drawing File	
*BGL-2	-1 For Use with Concrete Beams	07Aug2012
	-2 Notes to Designer.....	29May2009
	-DGN MicroStation Drawing File	

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STEEL RAILING (ILLINOIS 2399)		
*BIR-1	-1 Railing with Terminal Wall on U-Back Wingwall	30Aug2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BIR-2	-1 Railing with Terminal Wall on Wingwall	30Aug2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BIR-3	-1 Railing – Miscellaneous Details	30Aug2013
	-2 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BIR-4	-1 Railing with Terminal Wall on Superstructure (Integral and Semi-Integral)	30Aug2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BIR-5	-1 Railing with Terminal Wall on Superstructure (Deck Slab Extensions)	30Aug2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
MEDIAN BARRIER DETAILS		
*BMB-3A	-1 Cast-in-Place Concrete Median Barrier (F-Shape)	24Oct2013
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BMB-5A	-1 Cast-in-Place Concrete Median Barrier (F-Shape) (Split Barrier)	24Oct2013
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	

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*BPB-3A -1	F-Shape with Terminal Wall on U-Back Wingwall	10Mar2015
-2	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3A-AT-1	F-Shape with Terminal Wall on U-Back Wingwall, Architectural Treatment	10Mar2015
-2	Notes to Designer	24Oct2013
-3	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3B -1	F-Shape with Terminal Wall on Wingwall	10Mar2015
-2	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3B-AT-1	F-Shape with Terminal Wall on Wingwall, Architectural Treatment	10Mar2015
-2	Notes to Designer	24Oct2013
-3	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3C -1	F-Shape with Terminal Wall on Superstructure (Integral and Semi- Integral)	10Mar2015
-2	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3C-AT-1	F-Shape with Terminal Wall on Superstructure (Integral and Semi-Integral), Architectural Treatment	10Mar2015
-2	Notes to Designer	24Oct2013
-3	Notes to Designer	24Oct2013
-DGN	MicroStation Drawing File	
*BPB-3D -1	F-Shape with Terminal Wall on Superstructure (Deck Slab Extensions).	10Mar2015
-2	Notes to Designer	24Oct2013
-3	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File	
*BPB-3D-AT-1	F-Shape with Terminal Wall on Superstructure (Deck Slab Extensions), Architectural Treatment	10Mar2015
-2	Notes to Designer	24Oct2013
-3	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File	

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*BPB-AT-1 -1	Architectural Treatment with Chiseled Limestone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-2 -1	Architectural Treatment with Pea Gravel for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-3 -1	Architectural Treatment with Chiseled Sandstone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-4 -1	Architectural Treatment with Random Cobble for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-5 -1	Architectural Treatment with Vertical Fractured Stone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-6 -1	Architectural Treatment with 3-D Brick for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-7 -1	Architectural Treatment with Cedar Stake for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-8 -1	Architectural Treatment with Rustic Brick for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-9 -1	Architectural Treatment with Drystack for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-10-1	Architectural Treatment with Sculpted Dogwood for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-11-1	Architectural Treatment with Sculpted Oak Leaves for F-Shape ..	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-12-1	Architectural Treatment with Sculpted Fish for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	

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PARAPET DETAILS (F-SHAPE - 42" HEIGHT)		
*BPB-4A	-1 F-Shape with Terminal Wall on U-Back Wingwall	10Mar2015
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4A-AT-1	F-Shape with Terminal Wall on U-Back Wingwall, Architectural Treatment	10Mar2015
	-2 Notes to Designer	24Oct2013
	-3 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4B	-1 F-Shape with Terminal Wall on Wingwall	10Mar2015
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4B-AT-1	F-Shape with Terminal Wall on Wingwall, Architectural Treatment	10Mar2015
	-2 Notes to Designer	24Oct2013
	-3 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4C	-1 F-Shape with Terminal Wall on Superstructure (Integral and Semi- Integral)	10Mar2015
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4C-AT-1	F-Shape with Terminal Wall on Superstructure (Integral and Semi-Integral), Architectural Treatment	10Mar2015
	-2 Notes to Designer	24Oct2013
	-3 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	
*BPB-4D	-1 F-Shape with Terminal Wall on Superstructure (Deck Slab Extensions).	10Mar2015
	-2 Notes to Designer	24Oct2013
	-3 Notes to Designer	10Mar2015
	-DGN MicroStation Drawing File	
*BPB-4D-AT-1	F-Shape with Terminal Wall on Superstructure (Deck Slab Extensions), Architectural Treatment	10Mar2015
	-2 Notes to Designer	24Oct2013
	-3 Notes to Designer	10Mar2015
	-DGN MicroStation Drawing File	

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*BPB-AT-21-1	Architectural Treatment with Chiseled Limestone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-22-1	Architectural Treatment with Pea Gravel for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-23-1	Architectural Treatment with Chiseled Sandstone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-24-1	Architectural Treatment with Random Cobble for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-25-1	Architectural Treatment with Vertical Fractured Stone for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-26-1	Architectural Treatment with 3-D Brick for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-27-1	Architectural Treatment with Cedar Stake for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-28-1	Architectural Treatment with Rustic Brick for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-29-1	Architectural Treatment with Drystack for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-30-1	Architectural Treatment with Sculpted Dogwood for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-31-1	Architectural Treatment with Sculpted Oak Leaves for F-Shape ..	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BPB-AT-32-1	Architectural Treatment with Sculpted Fish for F-Shape	10Mar2015
-2	Notes to Designer	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	

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PEDESTRIAN FENCE DETAILS		
*BPF-3	-1 For Use with F-Shape Parapet (BPB-3A/3B)	10Mar2015
	-2 Notes to Designer	14Jun2010
	-DGN MicroStation Drawing File	
*BPF-4	-1 For Use with BR27C-series and BR27D-series Railing without sidewalk.....	15Oct2015
	-2 Notes to Designer	14Jun2010
	-DGN MicroStation Drawing File	
*BPF-5	-1 For Use with BR27C-series and BR27D-series Railing with sidewalk.....	10Mar2015
	-2 Notes to Designer	14Jun2010
	-DGN MicroStation Drawing File	
PRESTRESSED CONCRETE PILES		
*BPP-1	-1 Prestressed Square Concrete Piles: 10" to 24"	15Oct2015
	-2 Notes to Designer	31Aug2007
	-DGN MicroStation Drawing File	
PIER PROTECTION SYSTEM		
*BPPS-1	-1 Pier Protection System for Pier Column/Stem Clearances < 10'-0"	24Oct2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	14Dec2012
	-DGN MicroStation Drawing File	
*BPPS-2	-1 For Use with standard BPPS-1	14Dec2012
	-2 Notes to Designer	14Dec2012
	-DGN MicroStation Drawing File	
*BPPS-3	-1 Pier Protection System for Pier Column/Stem Clearances ≥ 10'-0" but ≤ 30'-0"	24Oct2013
	-2 Notes to Designer	10Mar2015
	-3 Notes to Designer	14Dec2012
	-DGN MicroStation Drawing File	

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*BR-27-ATM-1	-1 Architectural Treatment – Medallions for BR27C and BR27D	
	Rails.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR-27-ATM-2	-1 Architectural Treatment – Medallions for BR27C and BR27D	
	Rails.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
STEEL RAILING (BR27C-SERIES)		
*BR27C-12	-1 Railing (3'-6") as Traffic Barrier	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-12-AT	-1 Railing (3'-6") as Traffic Barrier, Architectural Treatment.....	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-13	-1 Railing (4'-6") on Traffic Side, Barrier Separated Pa/oBF.....	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-13-AT	-1 Railing (4'-6") on Traffic Side, Barrier Separated Pa/oBF, Architectural Treatment.....	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-14	-1 Railing (4'-6") on Outside, Barrier Separated Pa/oBF.....	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-14-AT	-1 Railing (4'-6") on Outside, Barrier Separated Pa/oBF, Architectural Treatment.....	15Oct2015
	-2 Notes to Designer.....	15Oct2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	

Pa/oBF = pedestrian and/or bicycle facility

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*BR27C-15	-1 Railing (4'-6") as Traffic Barrier, Pa/oBF on Deck Slab or Raised Sidewalk.....	15Oct2015
	-2 Notes to Designer	15Oct2015
	-3 Notes to Designer	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-15-AT-1	Railing (4'-6") as Traffic Barrier, Pa/oBF on Deck Slab or Raised Sidewalk, Architectural Treatment.....	15Oct2015
	-2 Notes to Designer	15Oct2015
	-3 Notes to Designer	10Mar2015
	-DGN MicroStation Drawing File	
*BR27C-16	-1 Railing Splice/Expansion Details.	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	
*BR27C-17	-1 Railing Splice/Expansion Details, Architectural Treatment.....	15Oct2015
	-2 Notes to Designer	15Oct2015
	-DGN MicroStation Drawing File	

Pa/oBF = pedestrian and/or bicycle facility

STEEL RAILING (BR27C-SERIES): ARCHITECTURAL TREATMENT

*BR27C-AT-1	-1 Architectural Treatment with Chiseled Limestone for BR27C-series Railing	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27C-AT-2	-1 Architectural Treatment with Pea Gravel for BR27C-series Railing.....	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27C-AT-3	-1 Architectural Treatment with Chiseled Sandstone for BR27C-series Railing	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-4	-1 Architectural Treatment with Random Cobble for BR27C-series Railing	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-5	-1 Architectural Treatment with Vertical Fractured Stone for BR27C-series Railing.....	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	

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STEEL RAILING (BR27C-SERIES): ARCHITECTURAL TREATMENT (cont'd)		
* BR27C-AT-6 -1	Architectural Treatment with 3-D Brick for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-7 -1	Architectural Treatment with Cedar Stake for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-8 -1	Architectural Treatment with Rustic Brick for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-9 -1	Architectural Treatment with Drystack for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-10-1	Architectural Treatment with Sculpted Dogwood for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-11-1	Architectural Treatment with Sculpted Oak Leaves for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
* BR27C-AT-12-1	Architectural Treatment with Sculpted Fish for BR27C-series Railing.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	

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STEEL RAILING (BR27D-SERIES)		
*BR27D-8	-1 Railing (3'-6") as Traffic Barrier	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-8-AT	-1 Railing (3'-6") as Traffic Barrier, Architectural Treatment	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-9	-1 Railing (4'-6") on Traffic Side, Barrier Separated Pa/oBF.....	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-9-AT	-1 Railing (4'-6") on Traffic Side, Barrier Separated Pa/oBF, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-10	-1 Railing (4'-6") on Outside, Pa/oBF on Deck Slab or Raised Sidewalk	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-10-AT-1	-1 Railing (4'-6") on Outside, Pa/oBF on Deck Slab or Raised Sidewalk, Architectural Treatment	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-3 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File	
*BR27D-11	-1 Railing Splice/Expansion Details.....	10Mar2015
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR27D-11-AT-1	-1 Railing Splice/Expansion Details, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	

Pa/oBF = pedestrian and/or bicycle facility

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*BR27D-AT-1	-1 Architectural Treatment with Chiseled Limestone for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-2	-1 Architectural Treatment with Pea Gravel for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-3	-1 Architectural Treatment with Chiseled Sandstone for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-4	-1 Architectural Treatment with Random Cobble for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-5	-1 Architectural Treatment with Vertical Fractured Stone for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-6	-1 Architectural Treatment with 3-D Brick for BR27D- series Rails..	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-7	-1 Architectural Treatment with Cedar Stake for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-8	-1 Architectural Treatment with Rustic Brick for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-9	-1 Architectural Treatment with Drystack for BR27D- series Rails ..	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-10-1	Architectural Treatment with Sculpted Dogwood for BR27D- series Rails	10Mar2015
	-2 Notes to Designer.....	10Mar2015
	-DGN MicroStation Drawing File and PDF Rendering File	

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*BR27D-AT-11-1	Architectural Treatment with Sculpted Oak Leaves for BR27D- series Rails.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
*BR27D-AT-12-1	Architectural Treatment with Sculpted Fish for BR27D- series Rails.....	10Mar2015
-2	Notes to Designer.....	10Mar2015
-DGN	MicroStation Drawing File and PDF Rendering File	
STEEL RAILING (BR27C/BR27D RAILS): TERMINAL WALL		
*BR27T-1	-1 Cast in Place Terminal Wall (3'-6") on U-Back Wingwall.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-1-AT	-1 Cast in Place Terminal Wall (3'-6") on U-Back Wingwall, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-2	-1 Cast in Place Terminal Wall (3'-6") on Wingwall.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-2-AT	-1 Cast in Place Terminal Wall (3'-6") on Wingwall, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-3	-1 Cast in Place Terminal Wall (3'-6") on Superstructure.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-3-AT	-1 Cast in Place Terminal Wall (3'-6") on Superstructure, Architectural Treatment.....	10Mar2015
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	-3 Notes to Designer.....	30Dec2013
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*BR27T-4	-1 Cast in Place Terminal Wall (3'-6") on Superstructure.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-4-AT	-1 Cast in Place Terminal Wall (3'-6") on Superstructure, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-5	-1 Cast in Place Terminal Wall (4'-6") on U-Back Wingwall.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-5-AT	-1 Cast in Place Terminal Wall (4'-6") on U-Back Wingwall, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-6	-1 Cast in Place Terminal Wall (4'-6") on U-Back Wingwall.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-6-AT	-1 Cast in Place Terminal Wall (4'-6") on U-Back Wingwall, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-7	-1 Cast in Place Terminal Wall (4'-6") on Superstructure.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-7-AT	-1 Cast in Place Terminal Wall (4'-6") on Superstructure, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-8	-1 Cast in Place Terminal Wall (4'-6") on Superstructure.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
STEEL RAILING (BR27C/BR27D RAILS): TERMINAL WALL (cont'd)		
*BR27T-8-AT	-1 Cast in Place Terminal Wall (4'-6") on Superstructure, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-9	-1 Cast in Place Terminal Wall (4'-6") on Approach Slab.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-9-AT	-1 Cast in Place Terminal Wall (4'-6") on Approach Slab, Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-10	-1 Cast in Place Terminal Wall (4'-6") on Approach Slab (Integral and Semi-Integral)	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	
*BR27T-10-AT	-1 Cast in Place Terminal Wall (4'-6") on Approach Slab (Integral and Semi-Integral), Architectural Treatment.....	10Mar2015
	-2 Notes to Designer.....	30Dec2013
	-3 Notes to Designer.....	30Dec2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
CONCRETE RAILING (TEXAS C411)		
*BR411-1	-1 Railing (3'-6").....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-2	-1 Railing (4'-6").....	15Oct2015
	-2 Notes to Designer	01Oct2013
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-3	-1 Texas C411 Railing Miscellaneous Details.....	15Oct2015
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-4	-1 Terminal Wall on U-Back Wingwall.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-5	-1 Terminal Wall on Wingwall.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-6	-1 Terminal Wall on Superstructure (Integral and Semi-Integral)	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BR411-7	-1 Terminal Wall on Superstructure (Deck Slab Extension).....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
STEEL RAILING (CALIFORNIA ST-20S)		
*BRCAS-1	-1 Railing	01Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRCAS-2	-1 Railing Miscellaneous Details	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRCAS-3	-1 Terminal Wall on U-back Wingwall	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRCAS-4	-1 Terminal Wall on Wingwall.....	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRCAS-5	-1 Terminal Wall on Superstructure (Integral and Semi-Integral)	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRCAS-6	-1 Terminal Wall On Superstructure (Deck Slab Extension)	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

TABLE OF CONTENTS

FILE NO.	TITLE	DATE
STEEL RAILING (MASSACHUSETTS S3)		
*BRMA-1	-1 Railing with curb (3'-6")	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-2	-1 Railing on sidewalk (4'-6").....	30Aug2013
	-2 Notes to Designer.....	01Oct2013
	-DGN MicroStation Drawing File	
*BRMA-3	-1 Railing Miscellaneous Details	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-4	-1 Terminal Wall (3'-6") on U-back Wingwall.....	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-5	-1 Terminal Wall (3'-6") on Wingwall	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-6	-1 Terminal Wall (3'-6") on Superstructure (Integral and Semi-Integral).....	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-7	-1 Terminal Wall (3'-6") on Superstructure (Deck Slab Extension) ..	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-8	-1 Terminal Wall (4'-6") on U-back Wingwall.....	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-9	-1 Terminal Wall (4'-6") on Wingwall	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-10	-1 Terminal Wall (4'-6") on Superstructure (Integral and Semi-Integral).....	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRMA-11	-1 Terminal Wall (4'-6") on Superstructure (Deck Slab Extension) ..	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-3 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

**VOLUME V – PART 3
CURRENT DETAILS**

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FILE NO.	TITLE	DATE
TIMBER RAILING (GC-8000)		
*BRGC8-1	-1 Railing	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRGC8-2	-1 Railing Transition Details	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRGC8-3	-1 Railing Thrie Beam Transition Details.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
TIMBER RAILING (SBD01D)		
*BRSBD-1	-1 Railing	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRSBD-2	-1 Railing Transition Details	24Oct2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
*BRSBD-3	-1 Railing Thrie Beam Transition Details.....	30Aug2013
	-2 Notes to Designer.....	30Aug2013
	-DGN MicroStation Drawing File	
THRIE-BEAM GUARDRAIL		
*BTB-1	-1 Thrie-Beam Guardrail.....	10Mar2015
	-2 Notes to Designer.....	24Oct2013
	-DGN MicroStation Drawing File	
*BTB-2	-1 Thrie-Beam Guardrail (Top Mounted).....	24Oct2013
	-2 Notes to Designer	24Oct2013
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

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CURRENT DETAILS**

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FILE NO.	TITLE	DATE
TELEPHONE CONDUITS		
*BTC-4	-1 PVC Conduit for Use With Steel Beams/Girders.....	07Aug2012
	-2 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	
*BTC-5	-1 FRE Conduit for Use With Steel Beams/Girders	07Aug2012
	-2 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	
*BTC-6	-1 PVC Conduit for Use With Concrete Beams	07Aug2012
	-2 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	
*BTC-7	-1 FRE Conduit for Use With Concrete Beams	07Aug2012
	-2 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	
WATER LINES		
*BWL-1	-1 For Use With Steel Beams/Girders.....	07Aug2012
	-2 Notes to Designer	29May2009
	-3 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	
*BWL-2	-1 For Use With Concrete Beams	15Oct2015
	-2 Notes to Designer	29May2009
	-3 Notes to Designer	29May2009
	-DGN MicroStation Drawing File	

*Indicates 11x17 sheet, all others are 8 ½ x 11.

MANUAL OF THE STRUCTURE AND BRIDGE DIVISION

VOLUME V – PART 3 CURRENT DETAILS

The current details include miscellaneous standards for approach slabs; bearings; joints; parapets, rails and barriers; fencing details, utilities (gas and water lines, lighting and telephone conduits), etc.

Refer to NOTES TO DESIGNER for specific comments on each standard sheet.

Completion of the project block, title block and lower left corner shall be in accordance with the requirements of File Nos. 04.04-1 thru -2 of Part 2 of this manual and as specified herein.

If a standard sheet is modified by the designer, the letters "MOD." (without quotes) shall be added behind the standard designation in the lower left portion of the border, e.g., BBD-4 MOD. Completing items on the standard that are indicated in the NOTES TO DESIGNER are not considered to be modifications. Minor modifications do not require approval (except for those proposed by Concessionaire/Design-Builder where emailed approval by the District Structure and Bridge Engineer documented to the project design file is required for any modification). See Part 1 of this manual, File No. Pre.02-6 for definition of minor modification.

Modifications not considered minor as defined in File No. Pre.02-6 require email approval by the District Structure and Bridge Engineer documented to the project design file unless a design exception is required.

In general, in the title block (lower right hand corner of sheet) Designed, Drawn and Checked are blank and need to be filled in with the appropriate initials. For standard sheets without any design or detailing requirements, Designed, Drawn and Checked are filled in with "S&B DIV." If the design or details are modified, these fields should be filled in with initials as appropriate.

The CADD standard detail sheets are located in Falcon [...\PROJECTS\br-stand\sbr\current] directory (central office environment). The drawing file name for the standard sheet corresponds with the file number (name of standard sheet) as listed in the Table of Contents (minus the dash). For example, standard BAS-11 is drawing bas11.dgn.

CURRENT DETAILS GENERAL INSTRUCTIONS

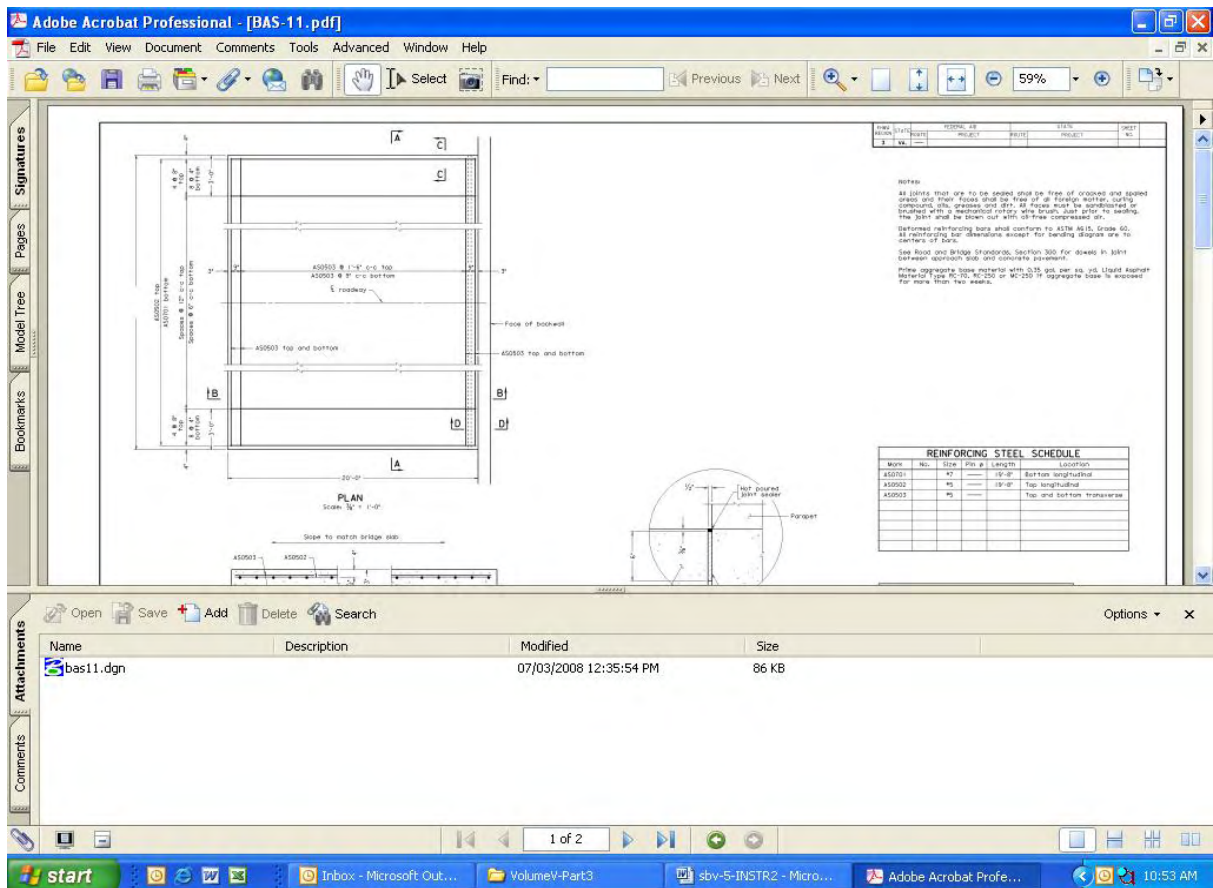
VOL. V - PART 3
DATE: 10Mar2015
SHEET 1of 3
FILE NO. INSTR-1

MANUAL OF THE STRUCTURE AND BRIDGE DIVISION

VOLUME V – PART 3 CURRENT DETAILS

For external users, the CADD standard detail sheets are attached to the PDF files for each drawing located on VDOT's Structure and Bridge Division website. The user will need Adobe Reader version 7.0 or higher to be able to access the files. Either click on the DGN link in the table of contents or click on the attachment tab in the PDF file for each standard sheet.

Using either method, the screen will appear similar to that shown below.



By left clicking on the icon(s), the following menu will appear:



Users may then save the file(s) to their computer.

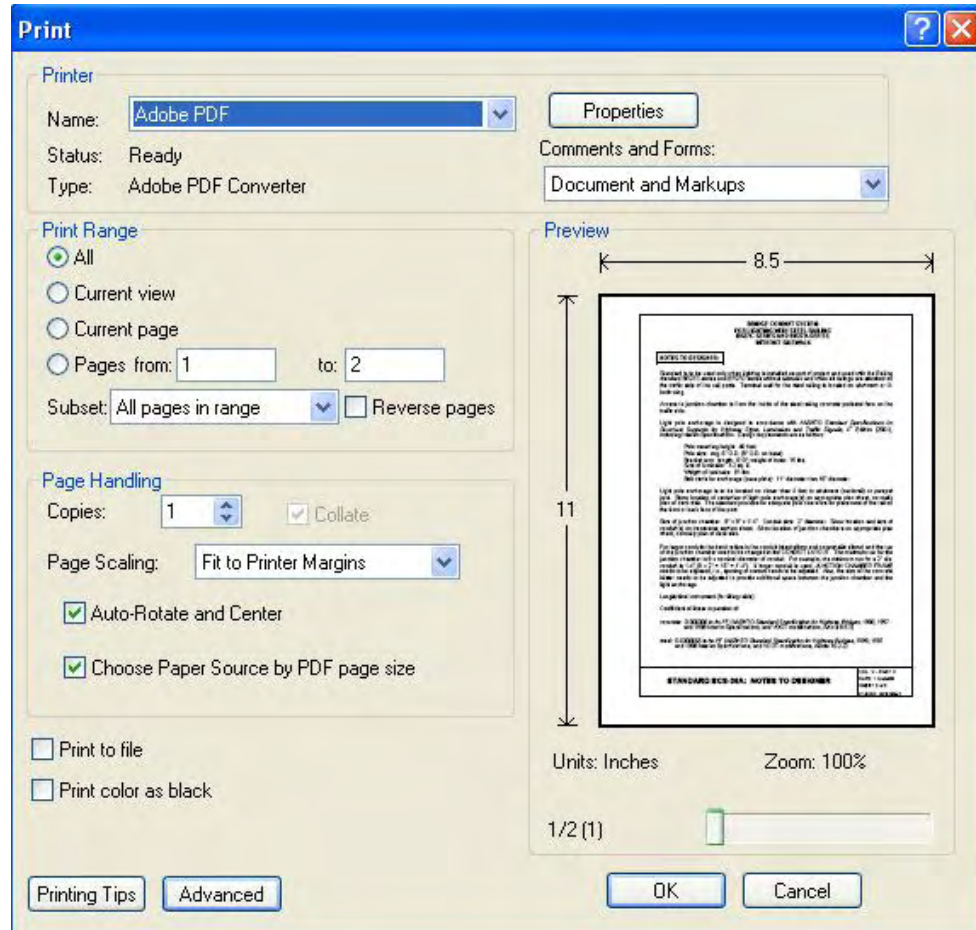
MANUAL OF THE STRUCTURE AND BRIDGE DIVISION

VOLUME V – PART 3 CURRENT DETAILS

To simplify printing of this manual, a PDF of the complete manual in one PDF file with no links may be accessed by clicking on the link below.

[Full manual no links](#)

If the printer has both 8 ½ x 11 and 11 x 17 paper sizes available, the drawings and notes to designer may be printed on the correct paper size by placing a check next to the item “Choose Paper Source by PDF page size” as shown in the dialog below:



If the printer only has 8 ½ x 11 paper, the drawings will default to the reduced paper size.

Depending on the printer margins, the 11 x 17 drawing(s) may not be true half-size drawing(s).

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE PROJECT	

Notes:

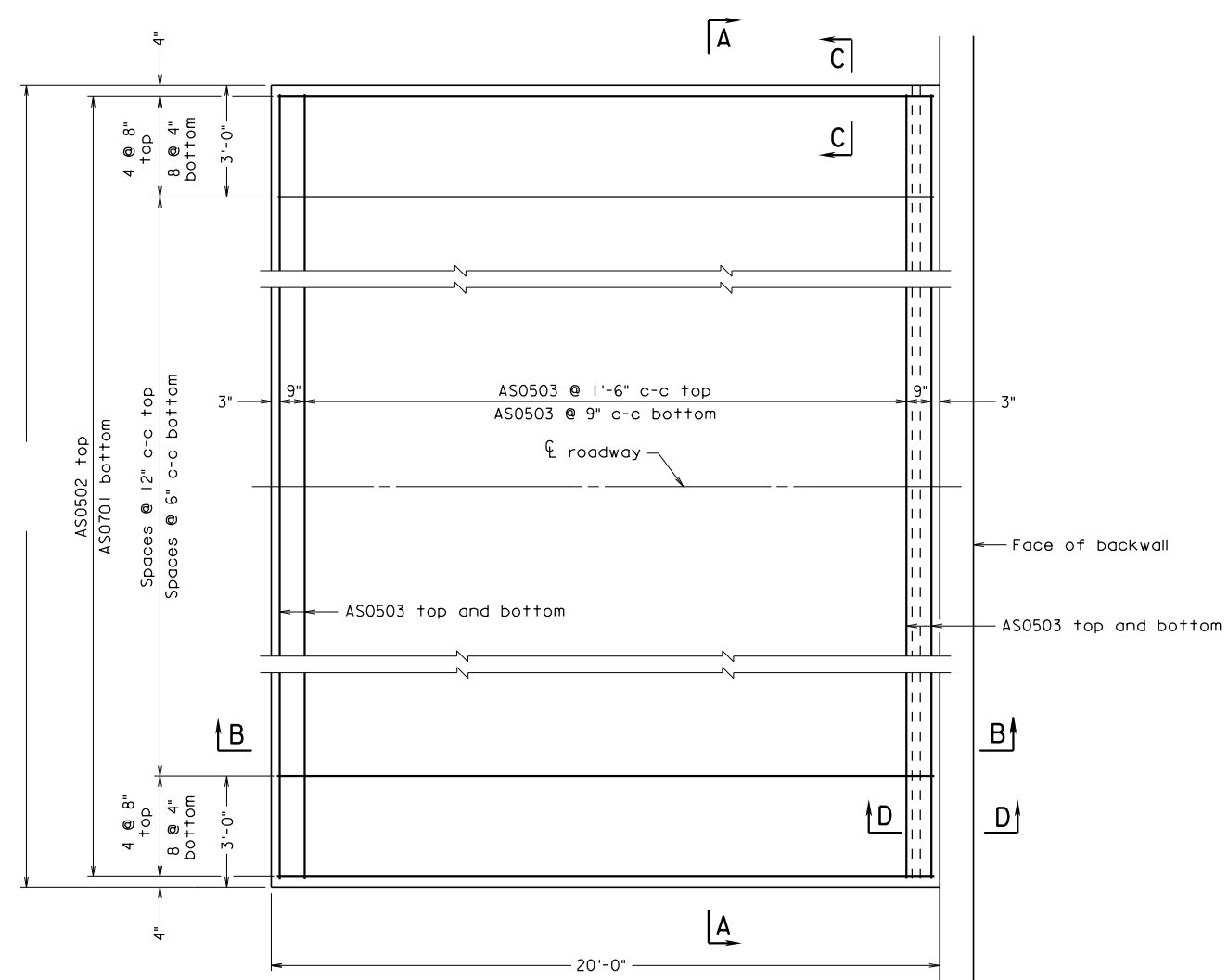
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

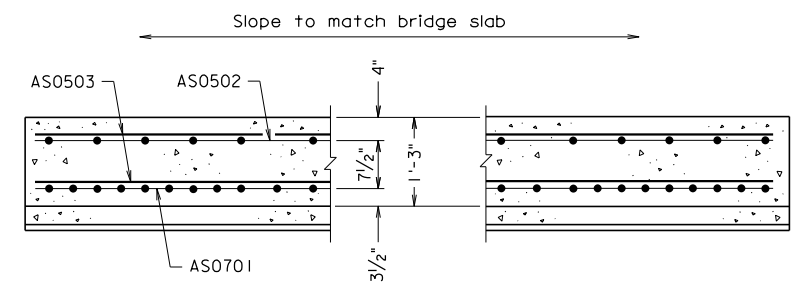
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

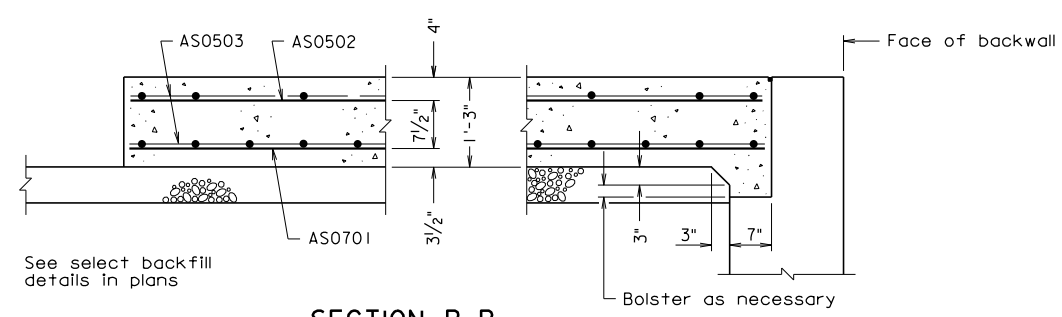
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



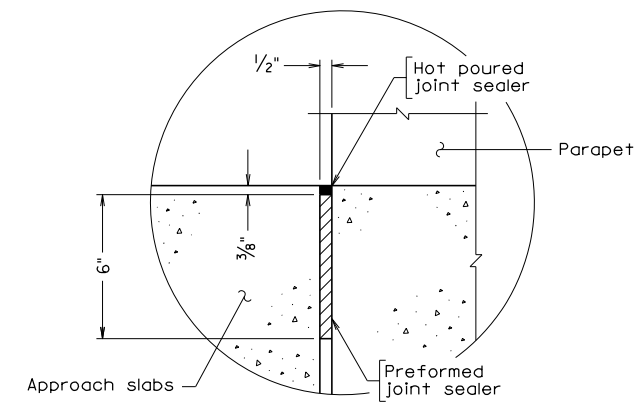
PLAN
Scale: 3/8" = 1'-0"



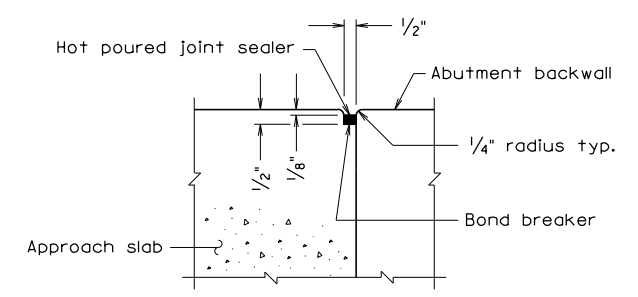
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions					
					BAS-11

BAS-11 05-03-2013 bas11.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB
STRAIGHT CROSSING;
APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: 0° Skew

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter width dimension and number of spaces for AS bars (top and bottom). Modify details as needed when using integral abutments, elephant ear wing walls, etc.

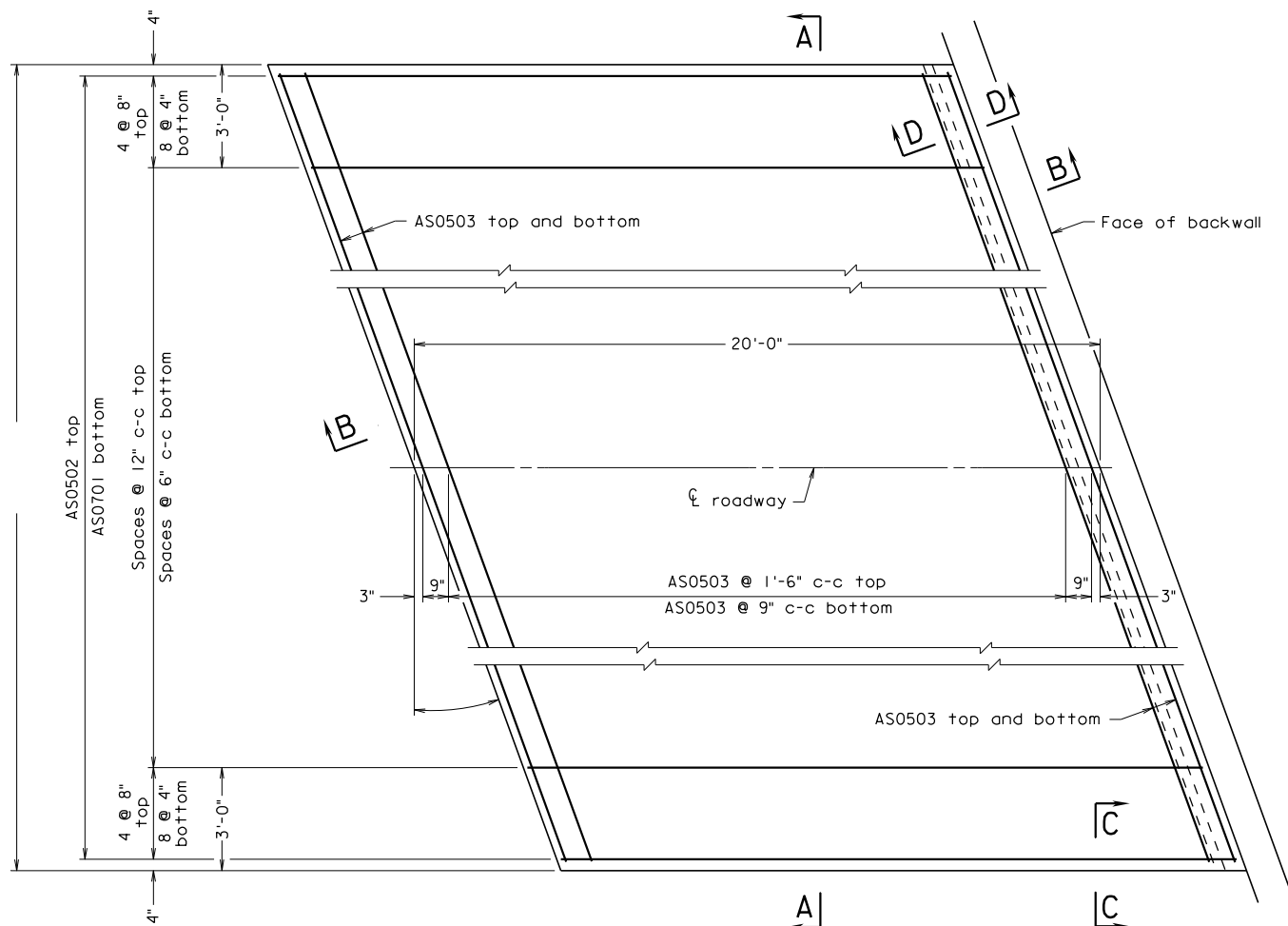
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

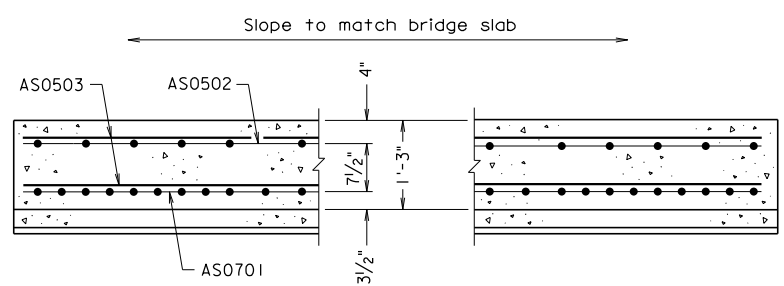
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

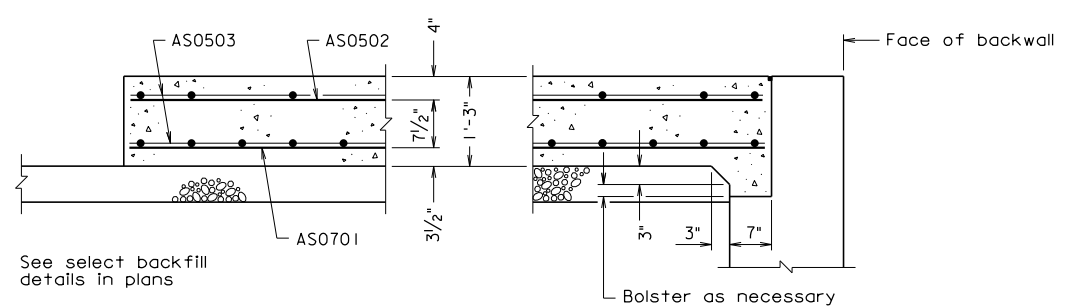
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



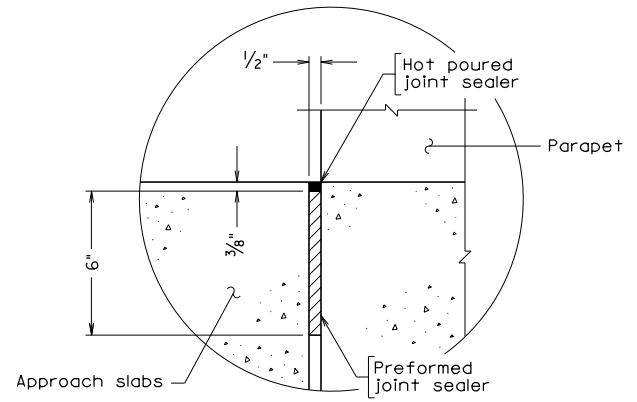
PLAN
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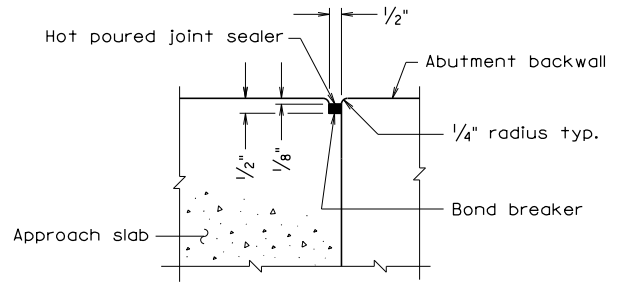
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-12L		

BAS-12L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW 20° OR LESS, SKEW LEFT; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° or less, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

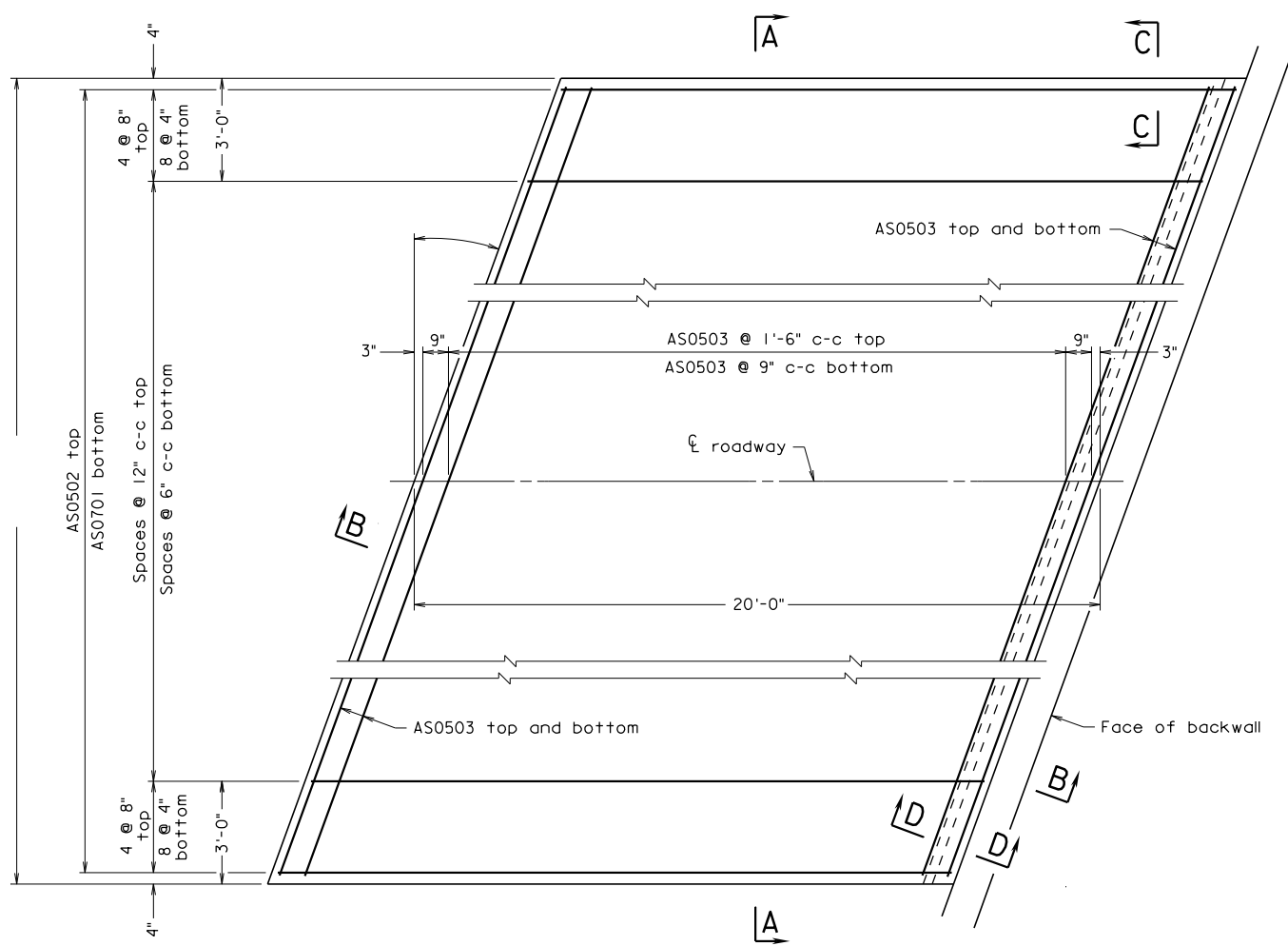
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

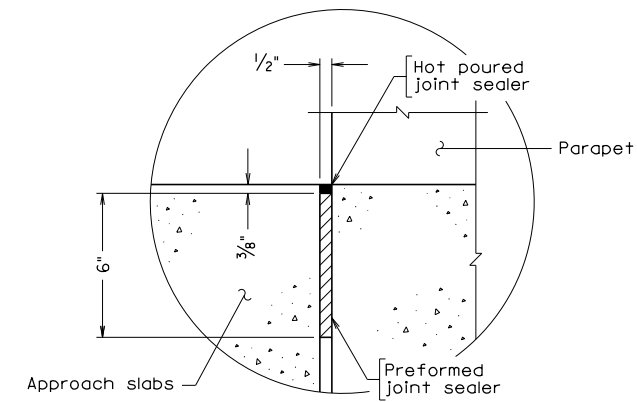
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

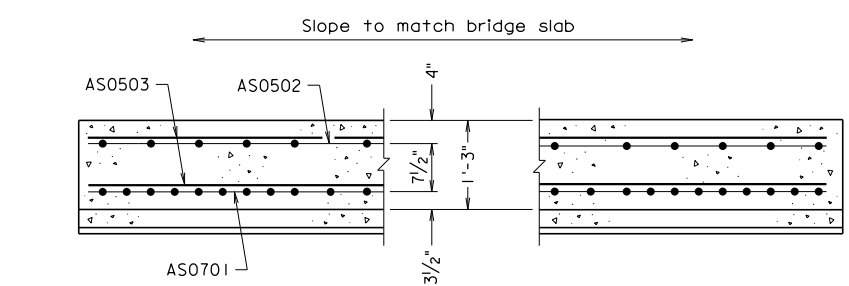
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



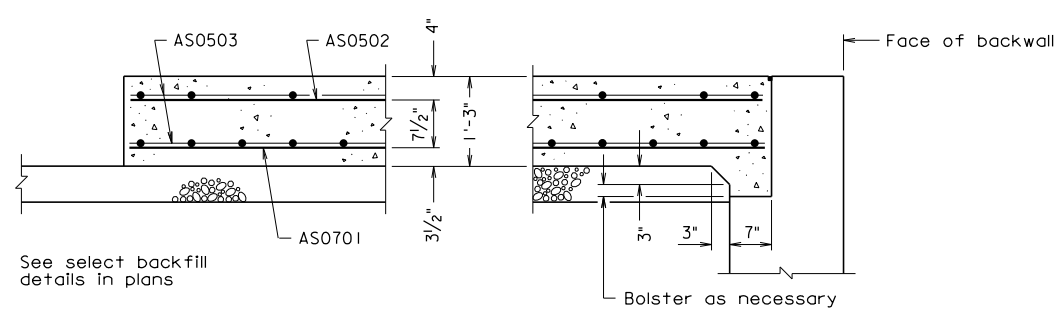
PLAN
Scale: $\frac{3}{8}'' = 1'-0''$



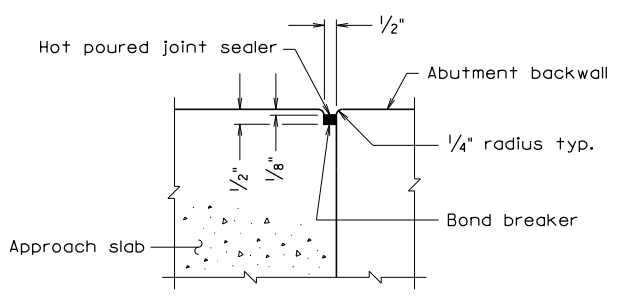
SECTION C-C
Scale: $3'' = 1'-0''$



SECTION A-A
Scale: $\frac{3}{4}'' = 1'-0''$



SECTION B-B
Scale: $\frac{3}{4}'' = 1'-0''$



SECTION D-D
Scale: $3'' = 1'-0''$

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BAS-12R		

bas12r.dgn

05-03-2013

BAS-12R

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW 20° OR LESS, SKEW RIGHT; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° or less, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

Notes:

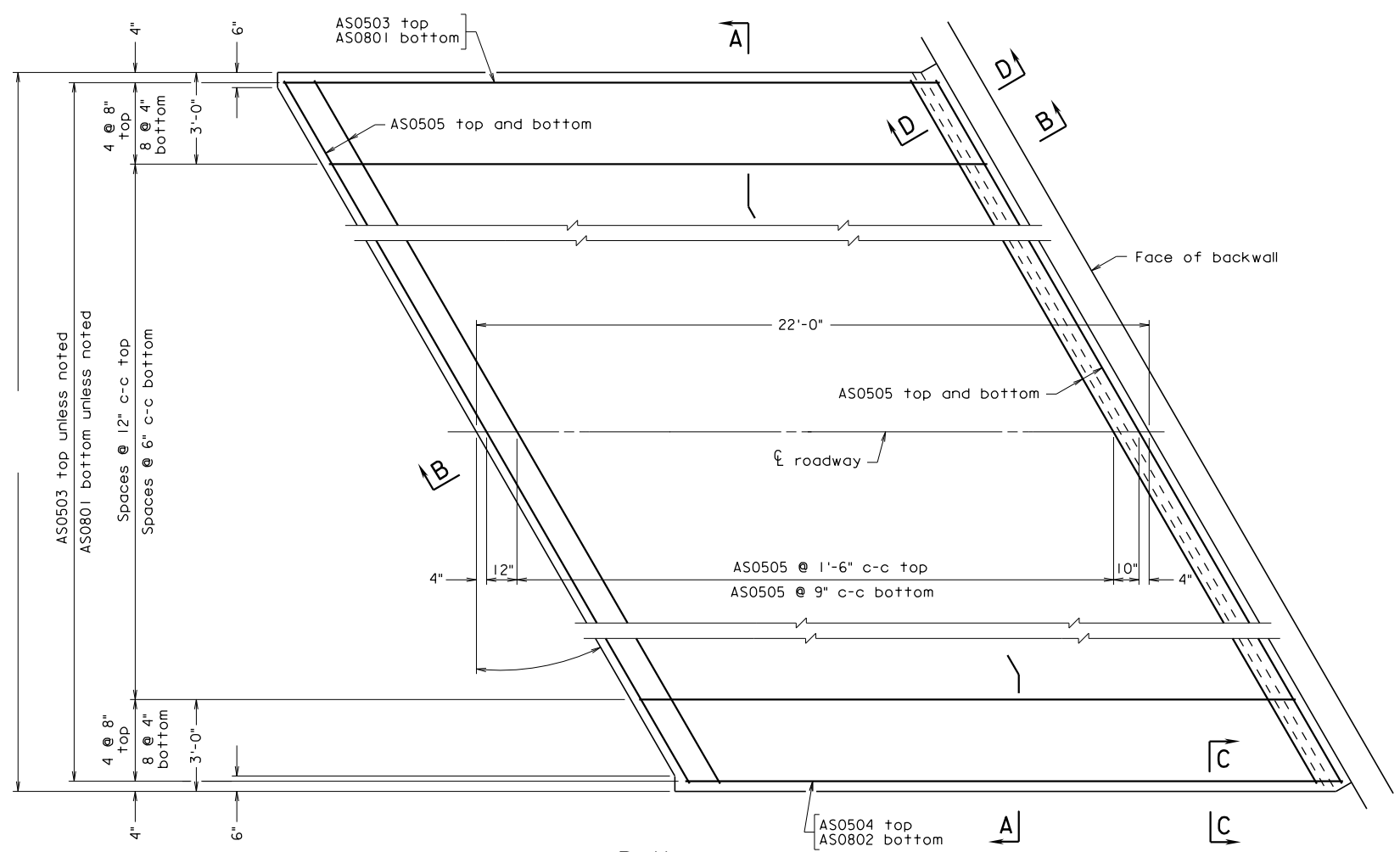
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

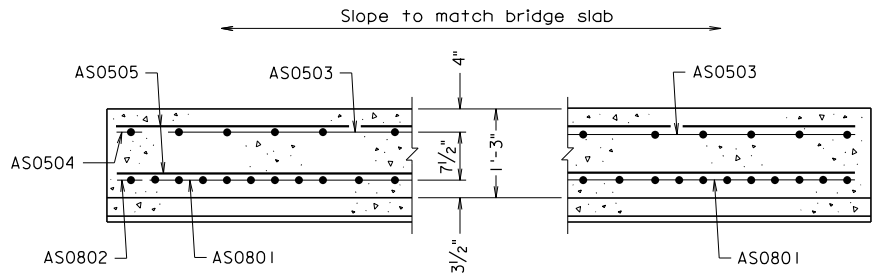
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

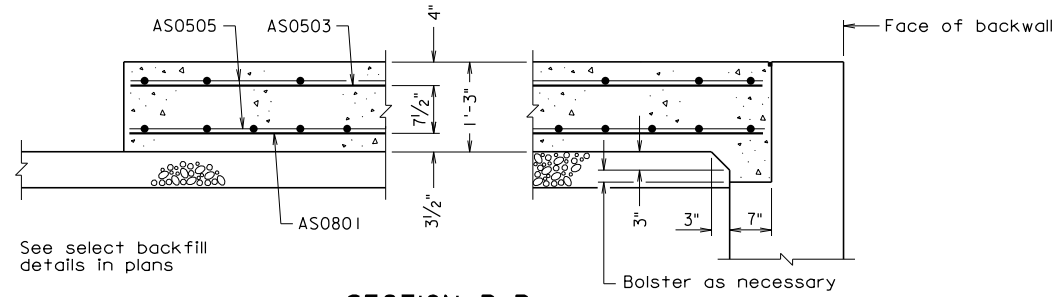
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



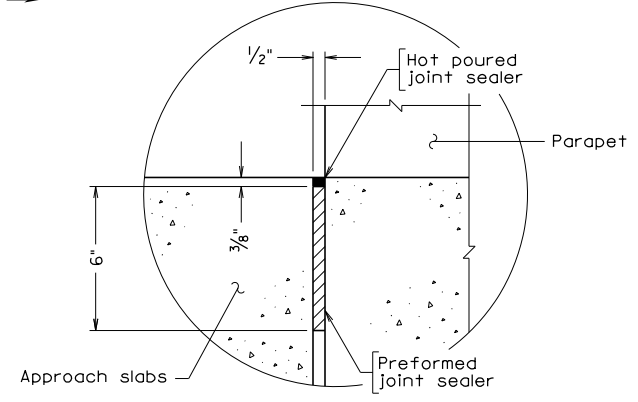
PLAN
Scale: 3/8" = 1'-0"



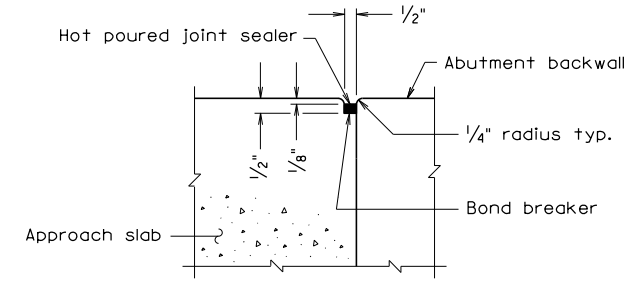
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0802	.	#8	—	21'-3"	Bottom longitudinal
AS0503	.	#5	—	21'-6"	Top longitudinal
AS0504	.	#5	—	21'-3"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
	Revisions		Checked: S&B...DIV		BAS-13L

bas13l.dgn

05-03-2013

BAS-13L

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 20° to 35°, SKEW LEFT; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° to 35°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

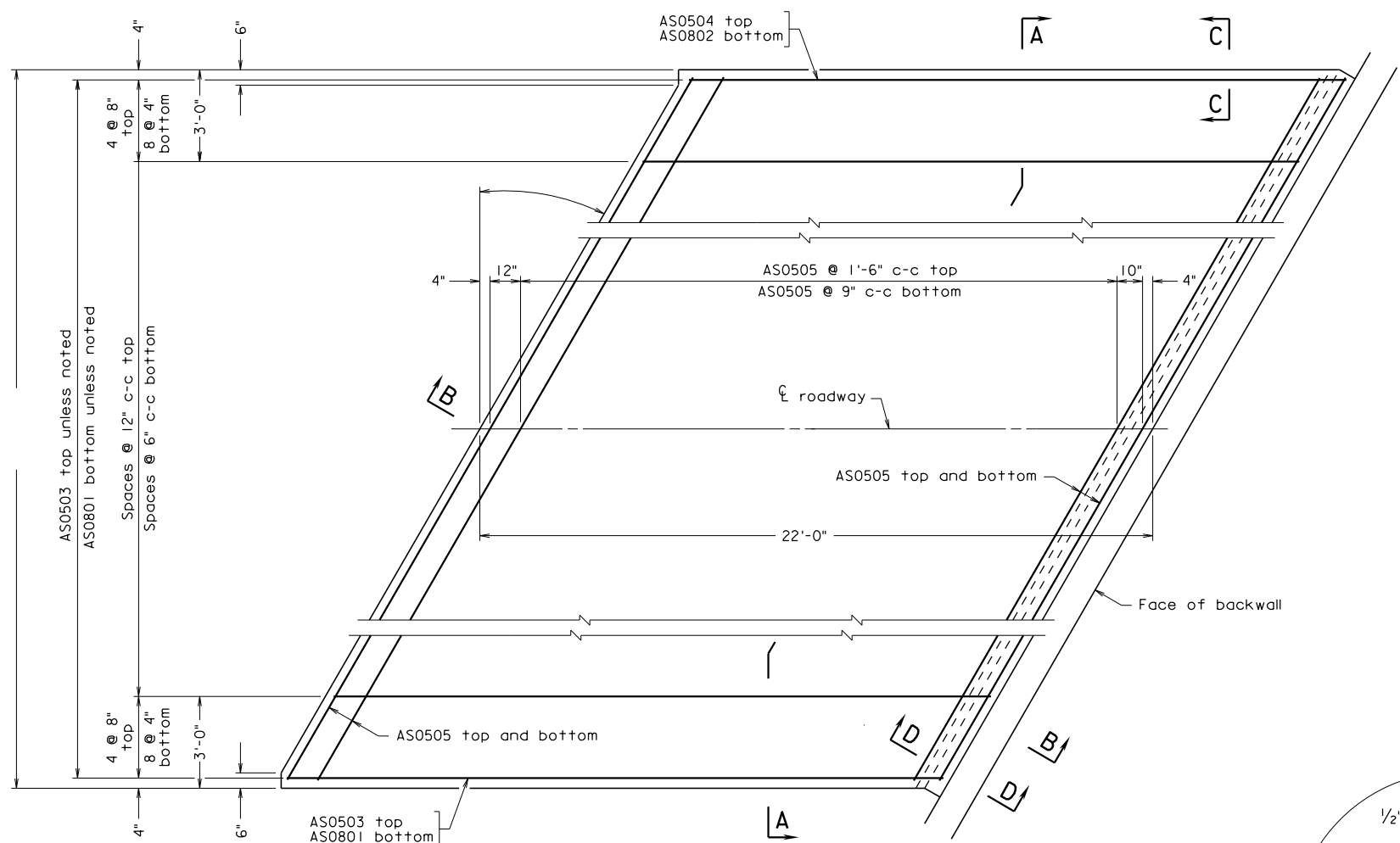
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

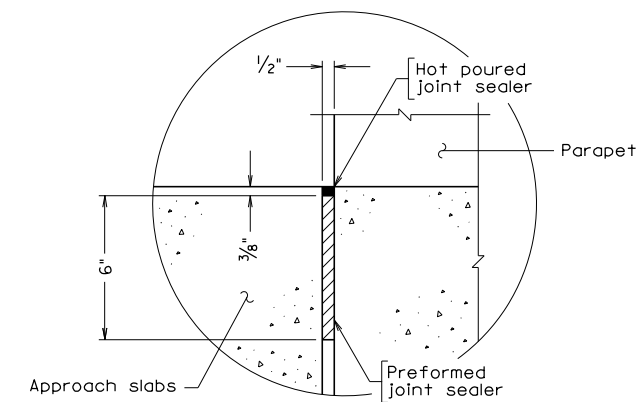
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

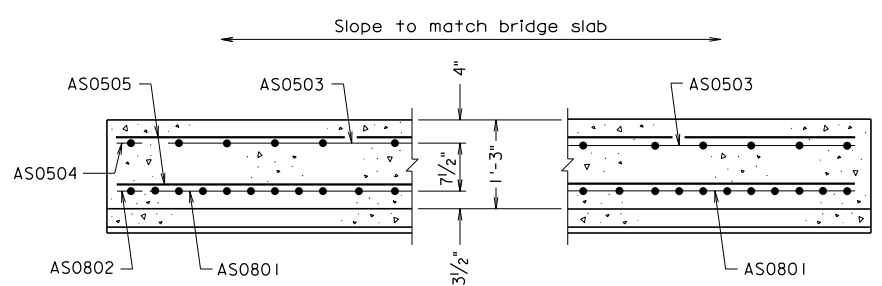
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



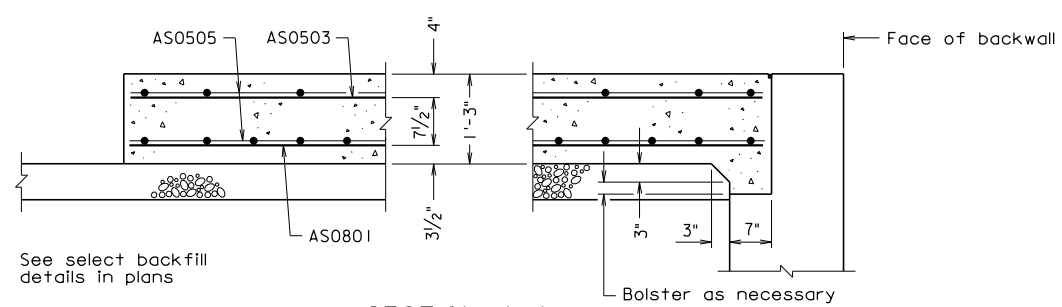
PLAN
Scale: 3/8" = 1'-0"



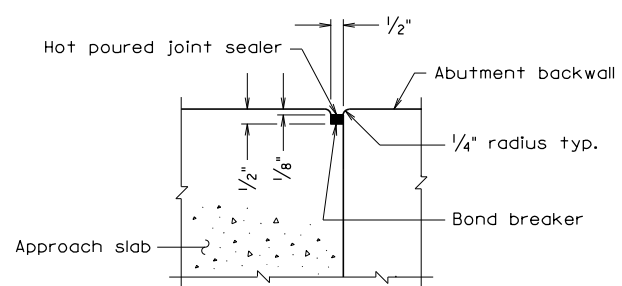
SECTION C-C
Scale: 3" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0802	.	#8	—	21'-3"	Bottom longitudinal
AS0503	.	#5	—	21'-6"	Top longitudinal
AS0504	.	#5	—	21'-3"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse
.
.
.
.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-13R		

bass13r.dgn

BAS-13R 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

**SKEW OVER 20° to 35°, SKEW RIGHT;
APPROACH ROADWAY CONCRETE**

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° to 35°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

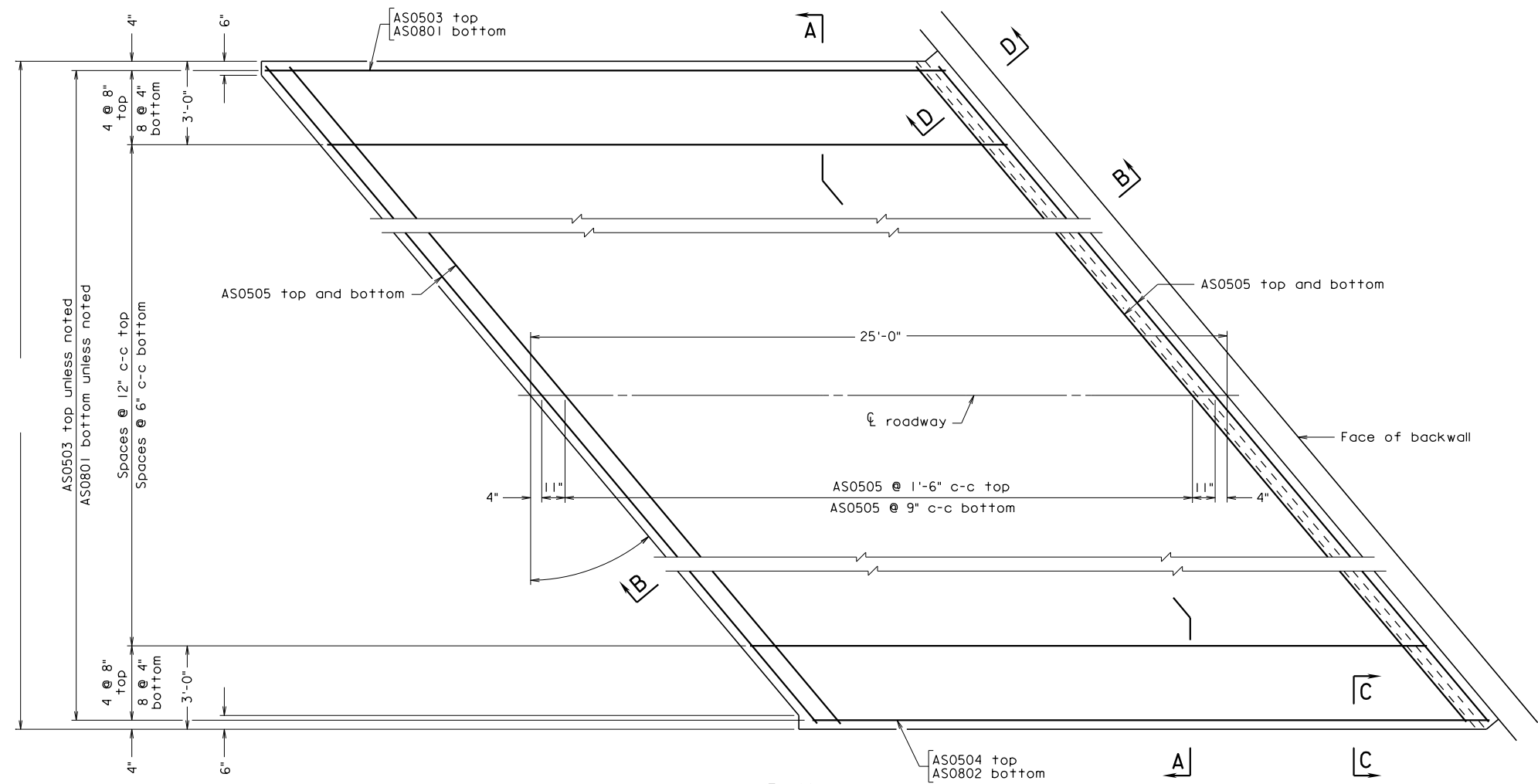
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

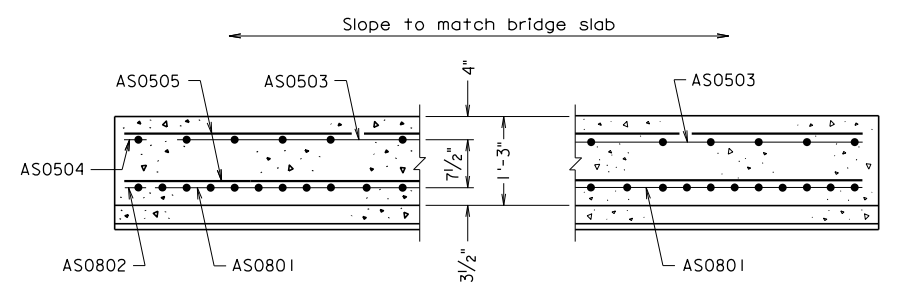
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

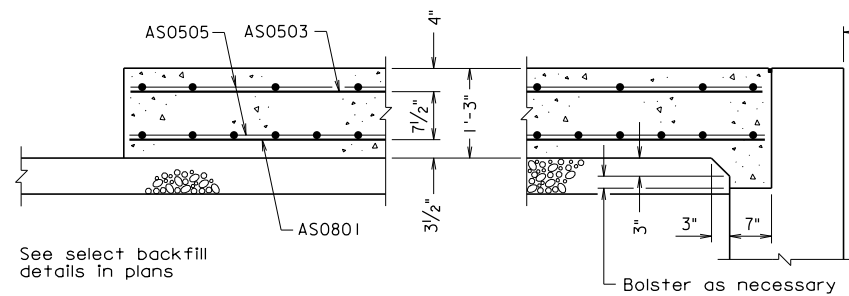
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



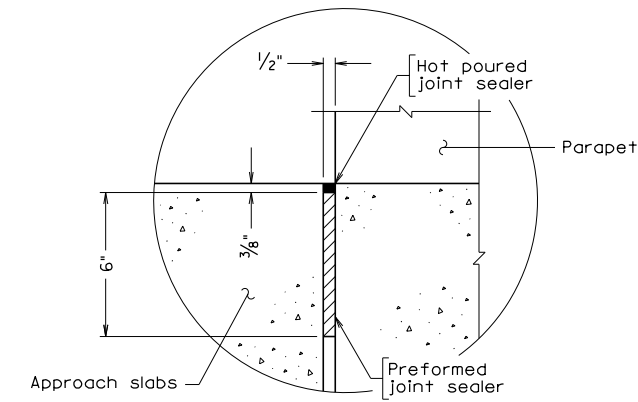
PLAN
Scale: 3/8" = 1'-0"



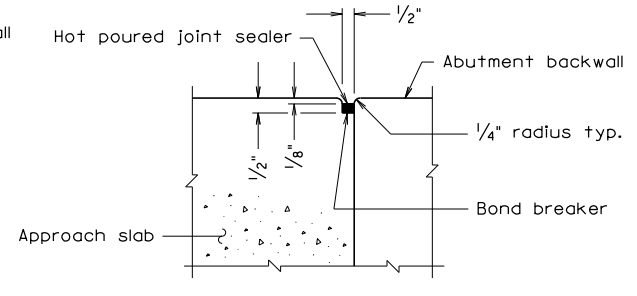
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0802	.	#8	—	24'-2"	Bottom longitudinal
AS0503	.	#5	—	24'-5"	Top longitudinal
AS0504	.	#5	—	24'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse
.
.
.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-14L		

BAS-14L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

**SKEW OVER 35° to 45°, SKEW LEFT;
APPROACH ROADWAY CONCRETE**

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 35° to 45°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

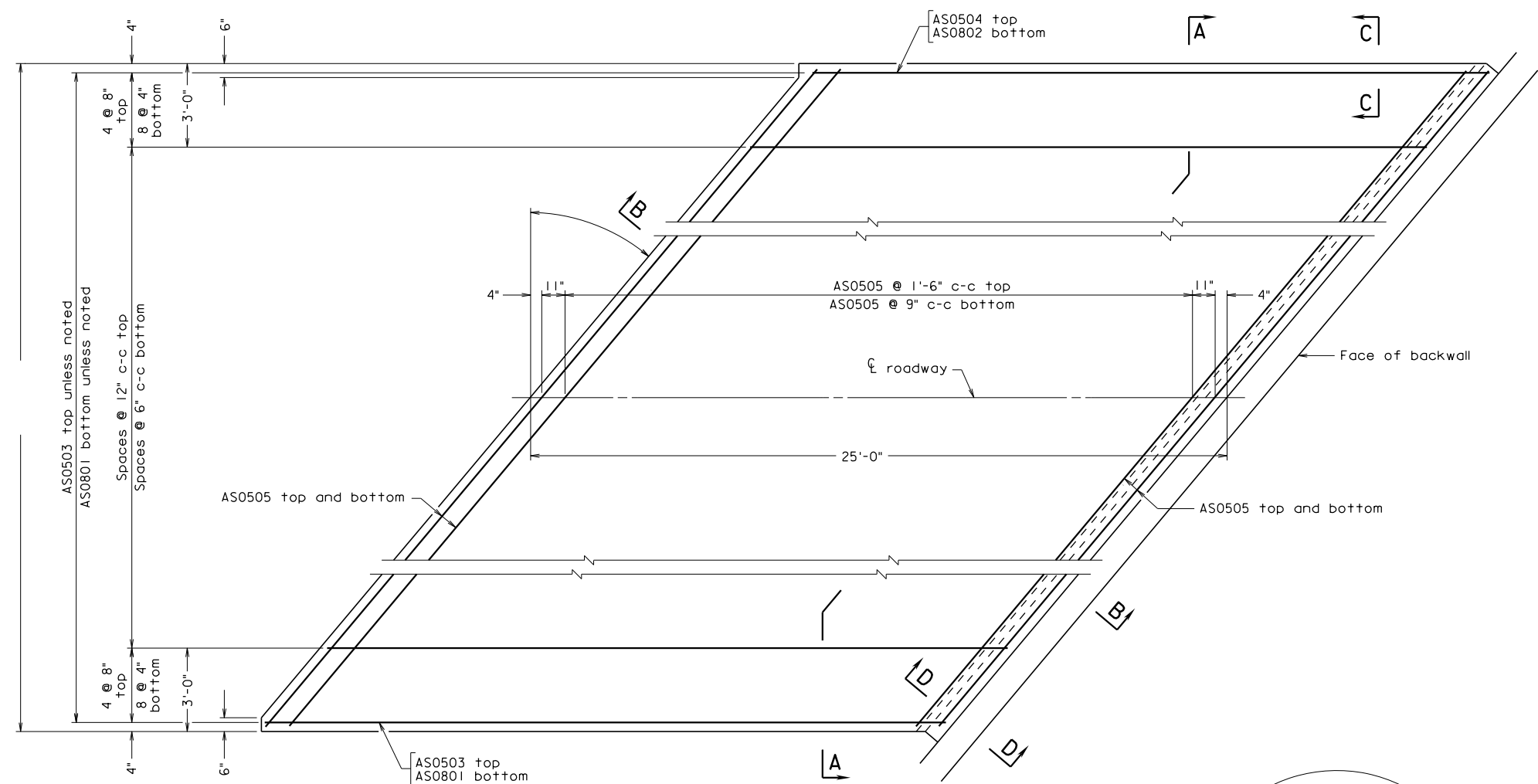
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

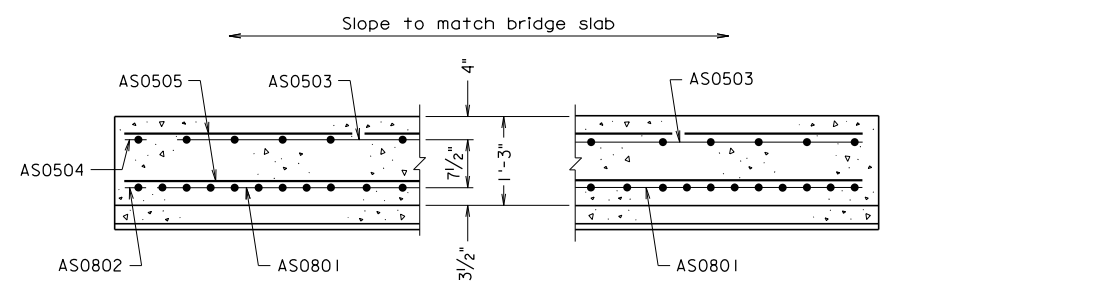
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

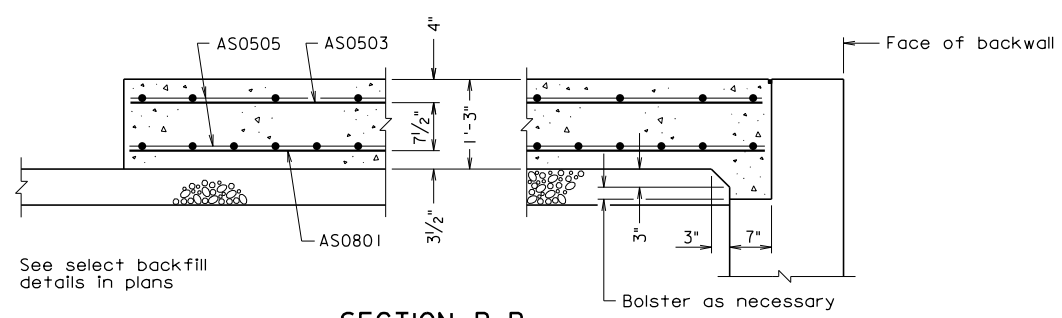
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



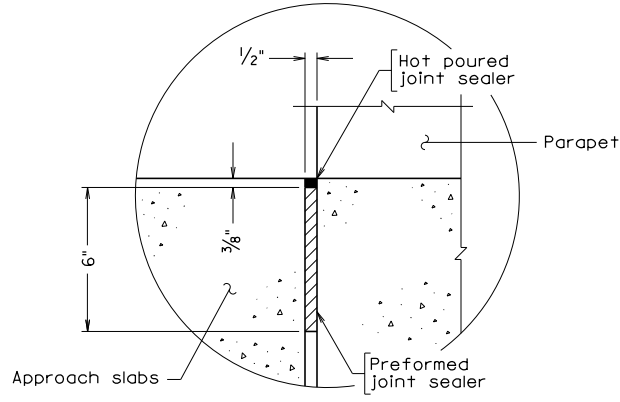
PLAN
Scale: 3/8" = 1'-0"



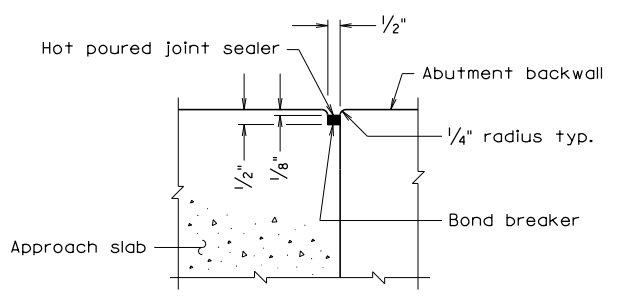
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0802	.	#8	—	24'-2"	Bottom longitudinal
AS0503	.	#5	—	24'-5"	Top longitudinal
AS0504	.	#5	—	24'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse
.
.
.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BAS-14R		

bos/4r.dgn

BAS-14R 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

**SKEW OVER 35° to 45°, SKEW RIGHT;
APPROACH ROADWAY CONCRETE**

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 35° to 45°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

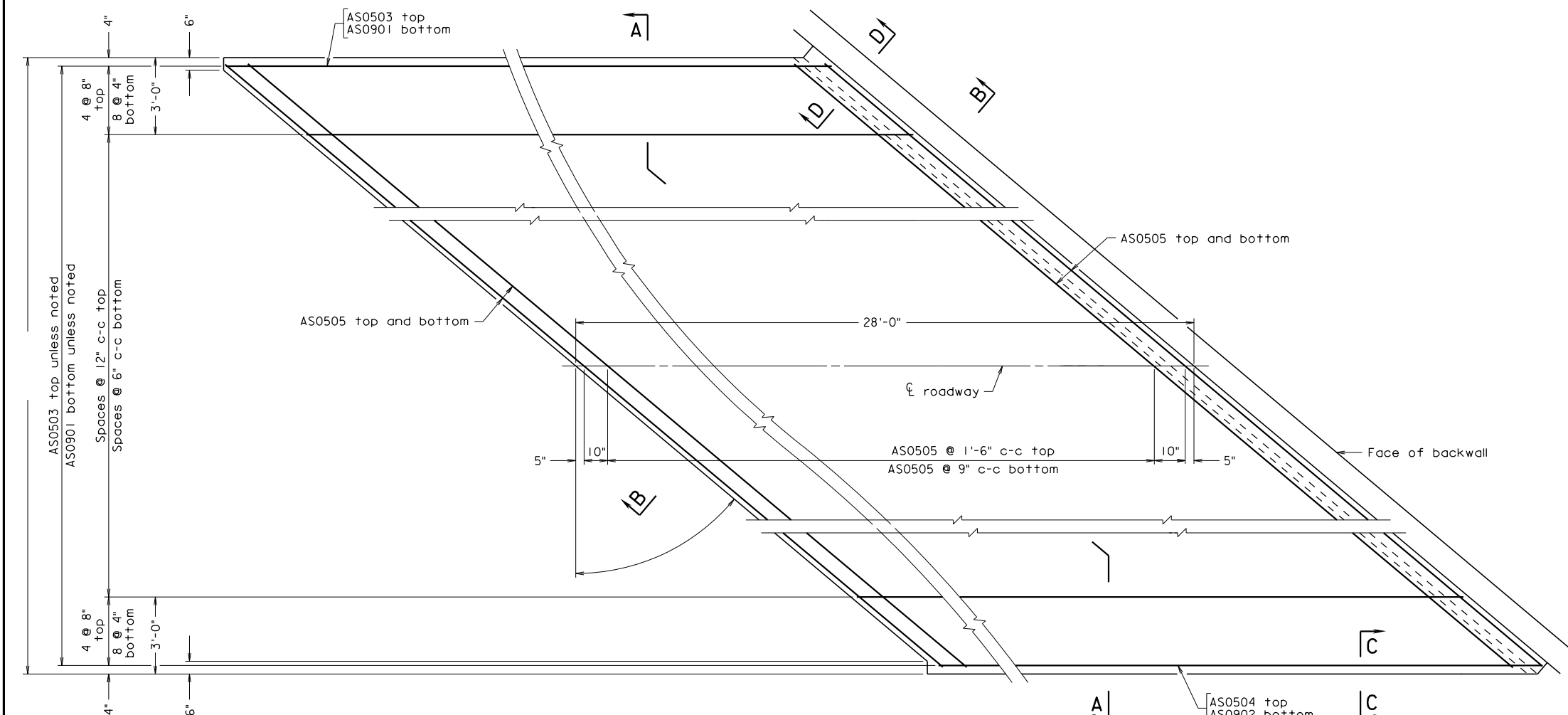
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

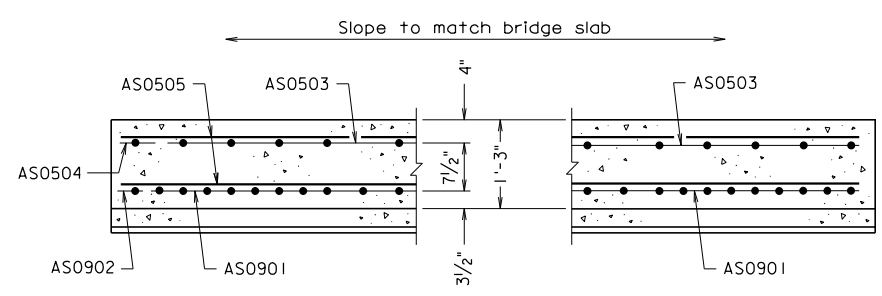
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

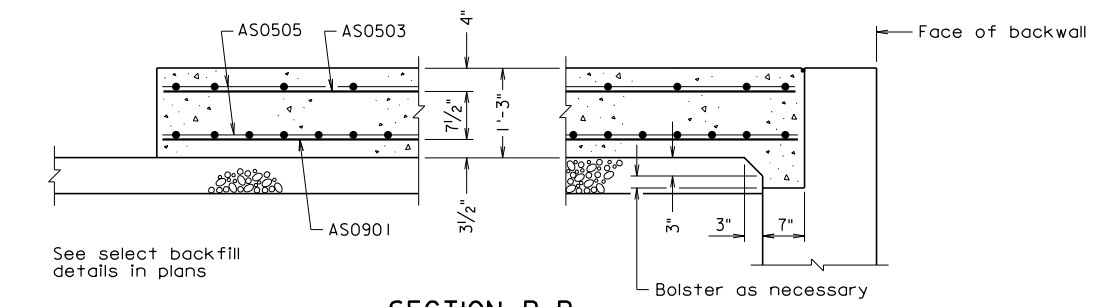
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



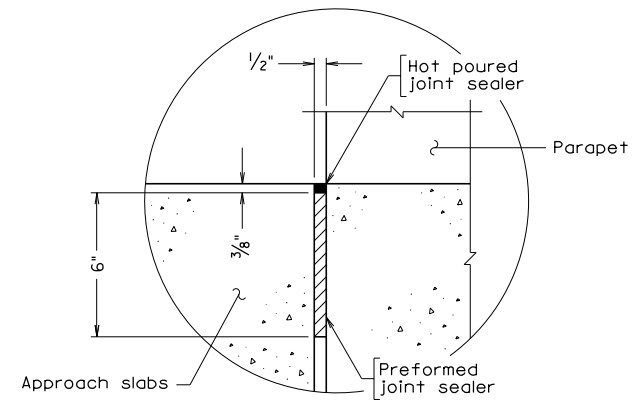
PLAN
Scale: 3/8" = 1'-0"



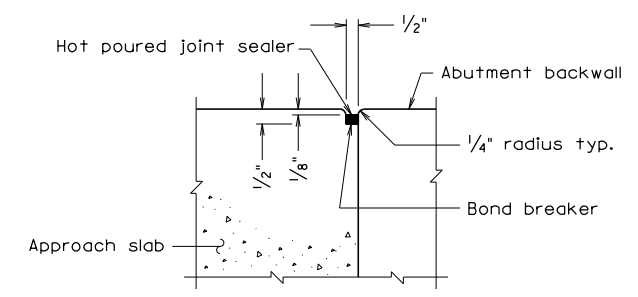
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901	.	#9	—	27'-5"	Bottom longitudinal
AS0902	.	#9	—	27'-2"	Bottom longitudinal
AS0503	.	#5	—	27'-5"	Top longitudinal
AS0504	.	#5	—	27'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse
.
.
.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BAS-15L
			Checked: S&B, DIV		
Revisions					

BAS-15L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

**SKEW OVER 45° to 50°, SKEW LEFT;
APPROACH ROADWAY CONCRETE**

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 45° to 50°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

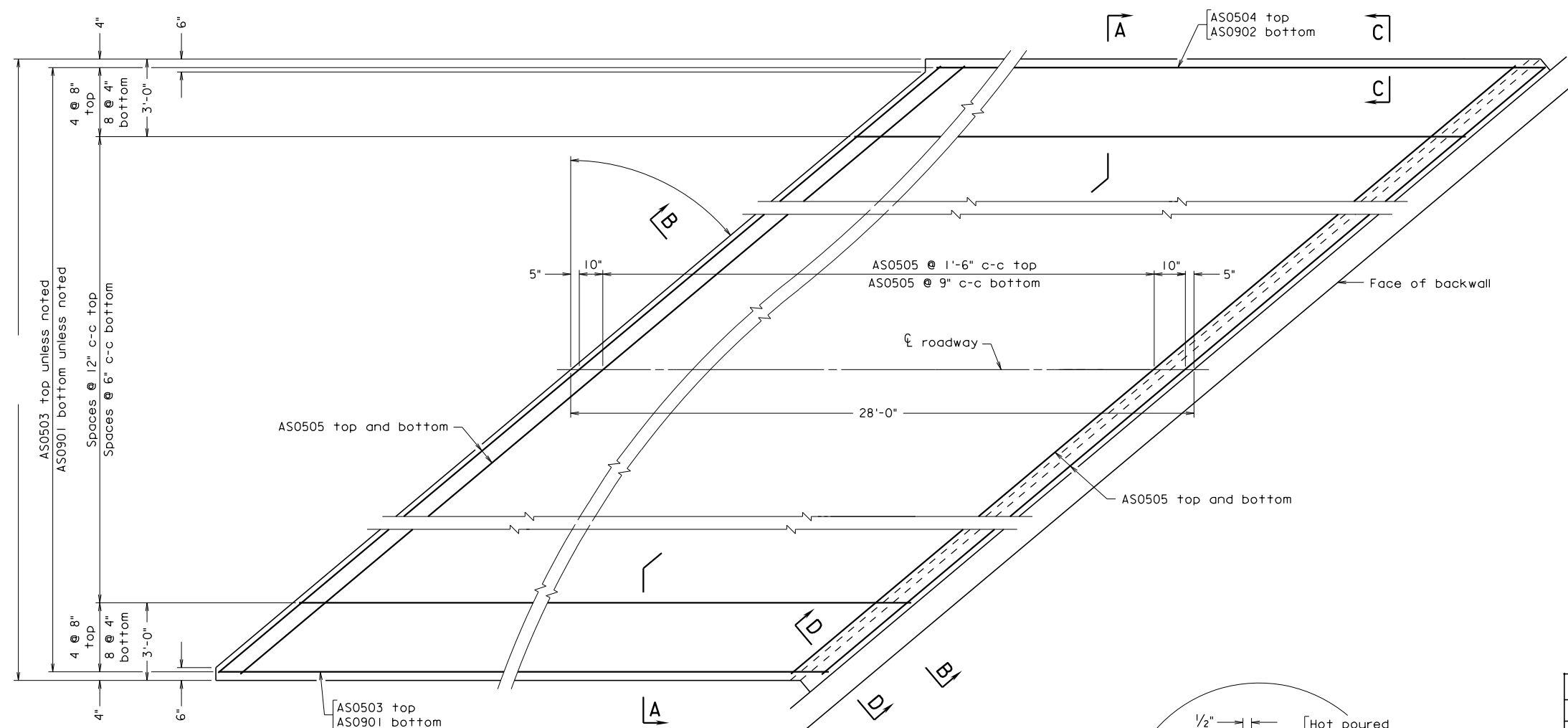
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE PROJECT	



PLAN
Scale: 3/8" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

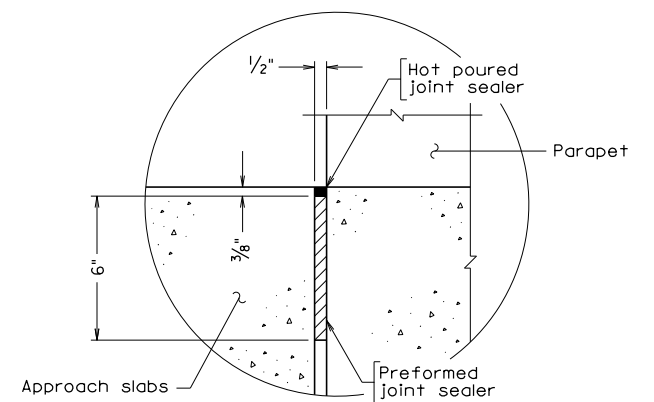
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

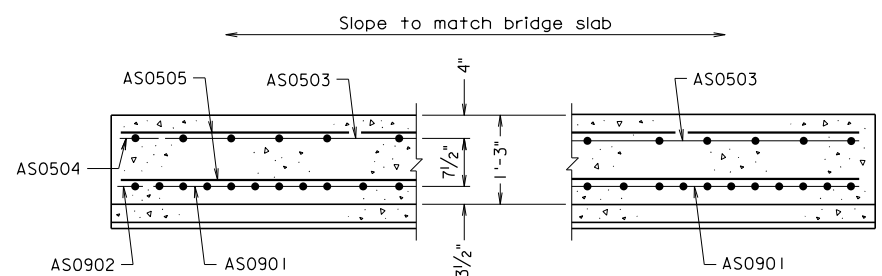
Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

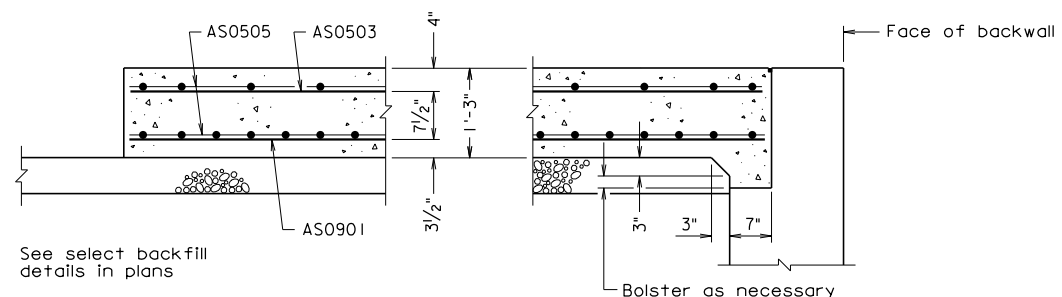
REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901	.	#9	—	27'-5"	Bottom longitudinal
AS0902	.	#9	—	27'-2"	Bottom longitudinal
AS0503	.	#5	—	27'-5"	Top longitudinal
AS0504	.	#5	—	27'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse



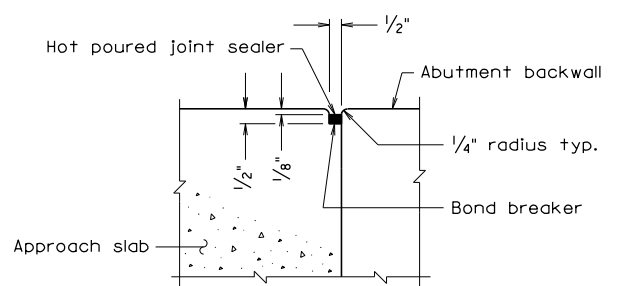
SECTION C-C
Scale: 3" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BAS-15R
			Checked: S&B, DIV		
Revisions					

bas15r.dgn

BAS-15R 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

**SKEW OVER 45° to 50°, SKEW RIGHT;
APPROACH ROADWAY CONCRETE**

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 45° to 50°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

Notes:

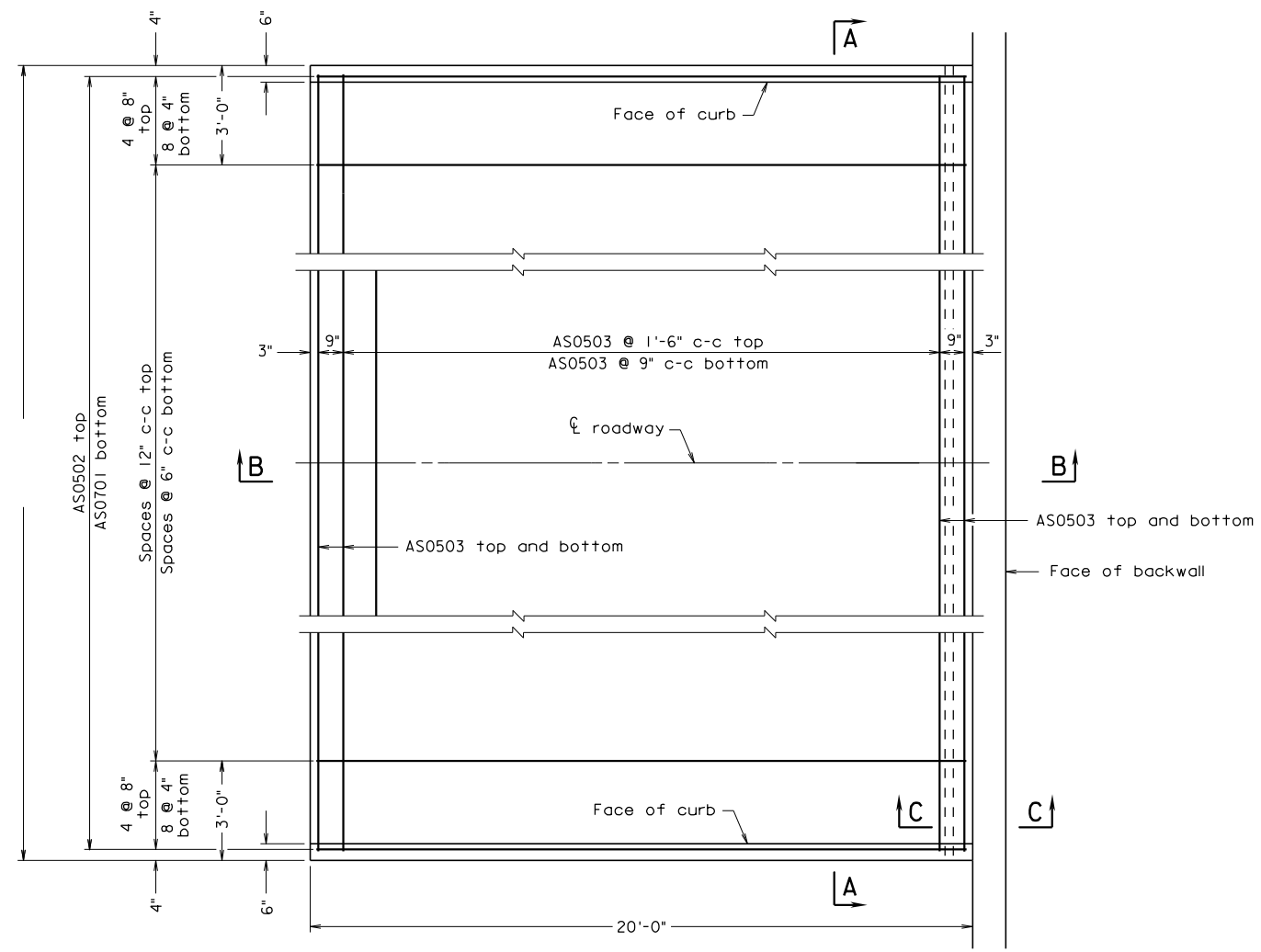
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

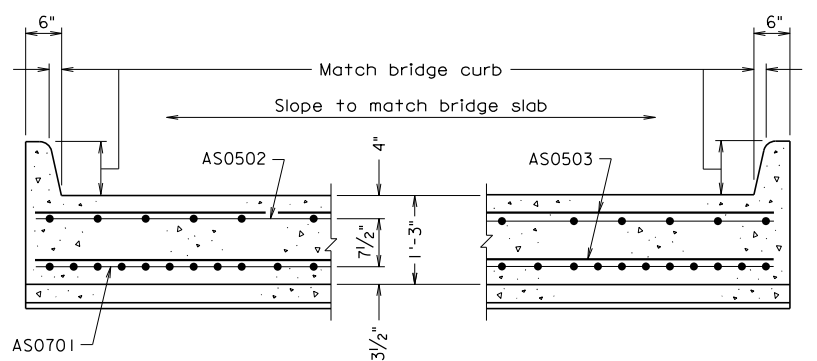
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

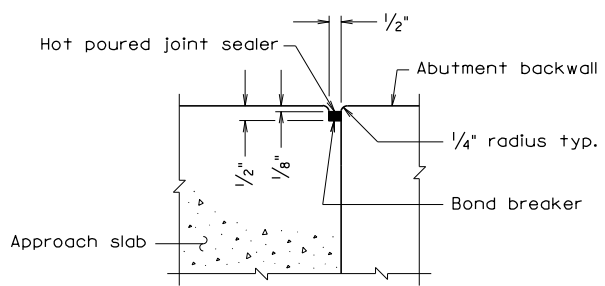
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



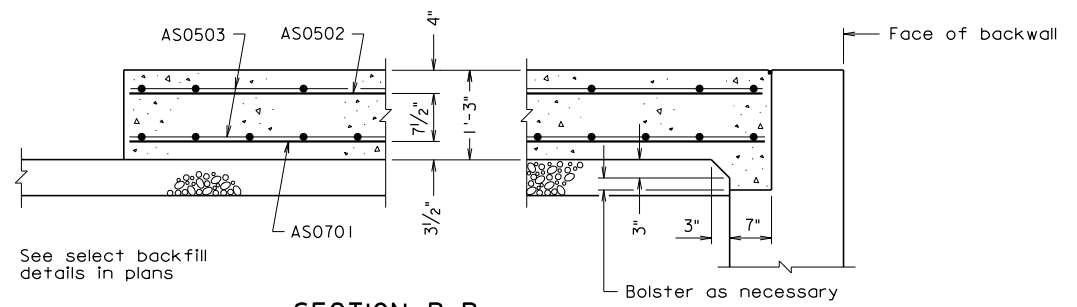
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BAS-16
			Checked: S&B, DIV		
Revisions					

BAS-16 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB
STRAIGHT CROSSING
STRUCTURE WITH SIDEWALKS;
APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: 0° Skew
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Modify details as needed when using integral abutments, elephant ears, etc. Modify when sidewalk is only on one side.

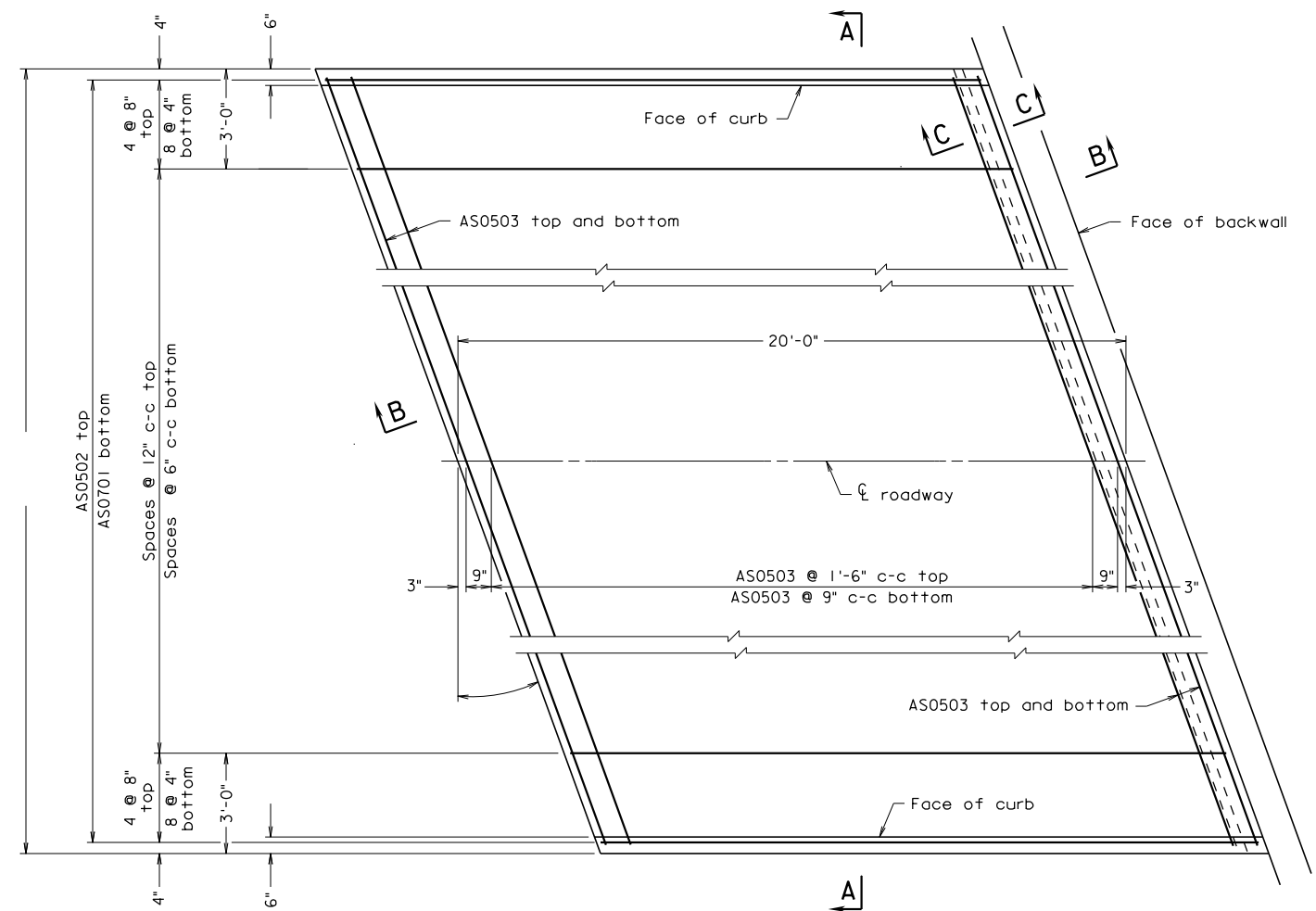
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

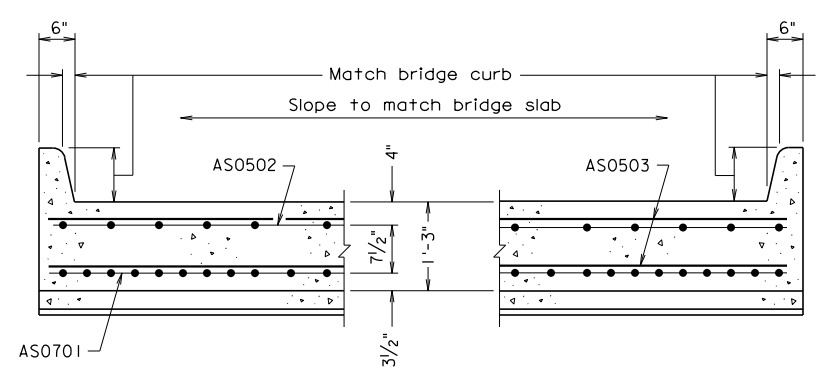
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

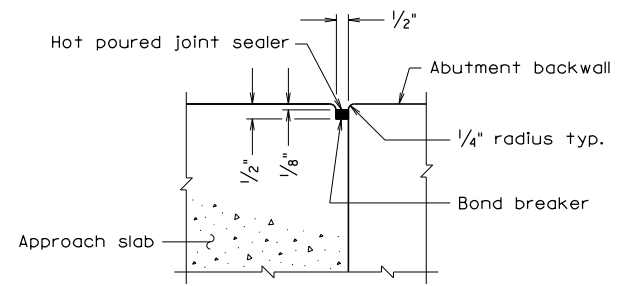
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



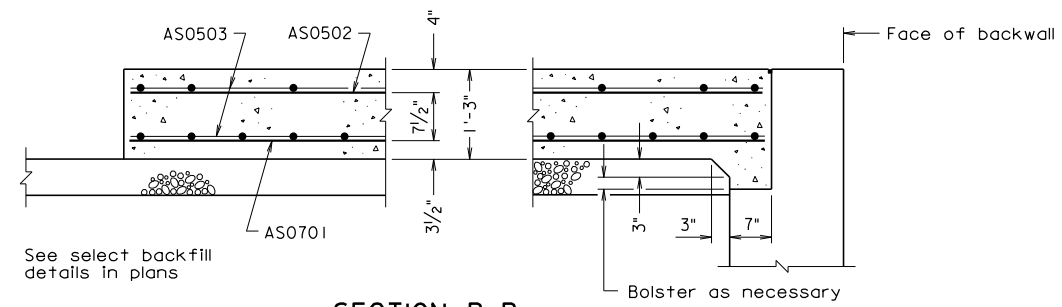
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

BAS-17L 05-03-2013 bas17l.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		
Revisions			BAS-17L		

APPROACH SLAB

SKEW 20° OR LESS, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° or less, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ears, etc. Modify when sidewalk is only on one side.

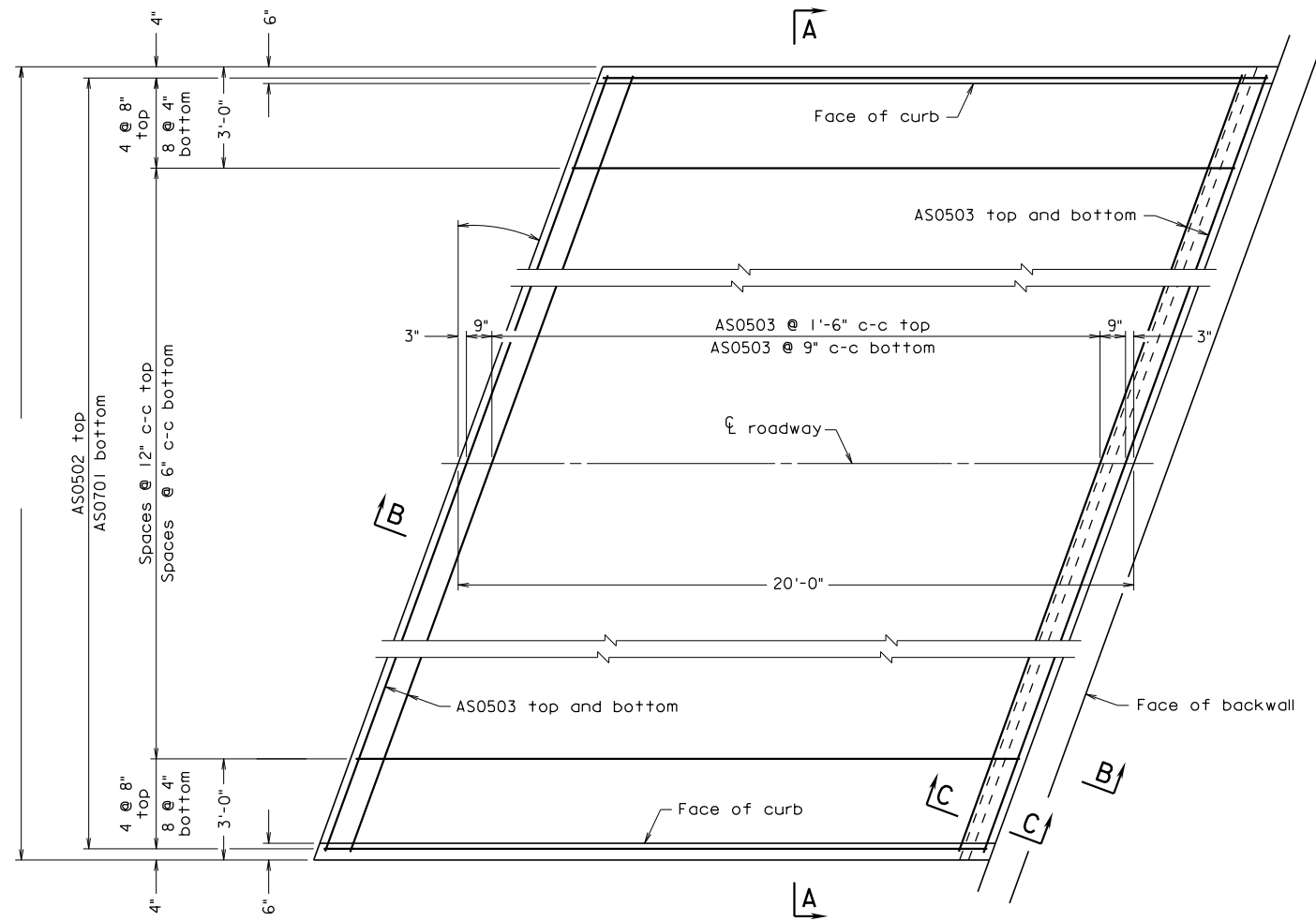
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

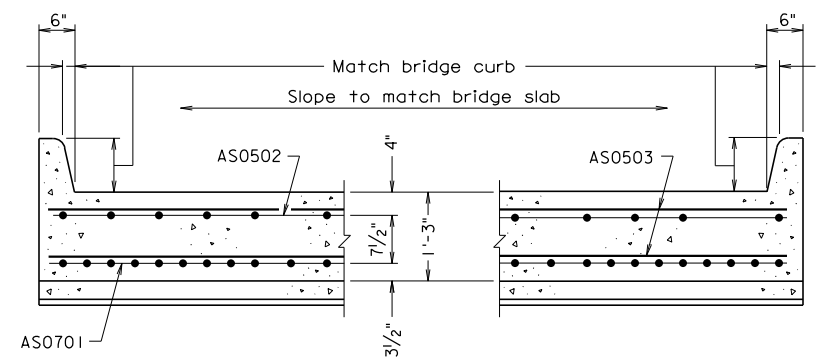
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

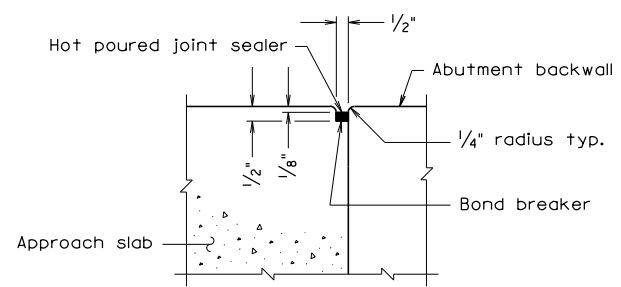
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



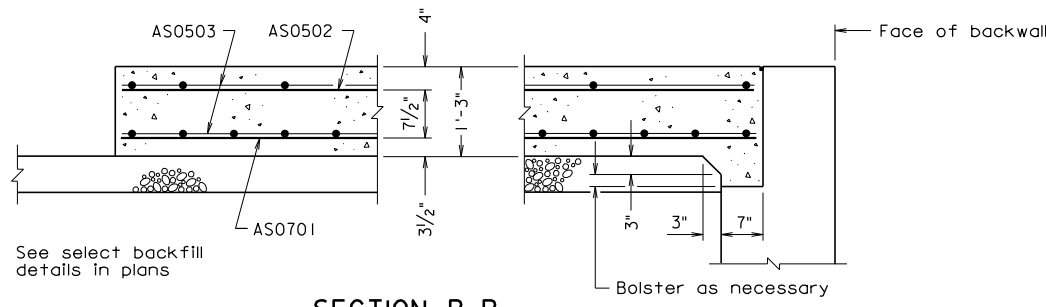
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

BAS-17R 05-03-2013 bas17r.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BAS-17R		

APPROACH SLAB

SKEW 20° OR LESS, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew 20° or less, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ears, etc. Modify when sidewalk is only on one side.

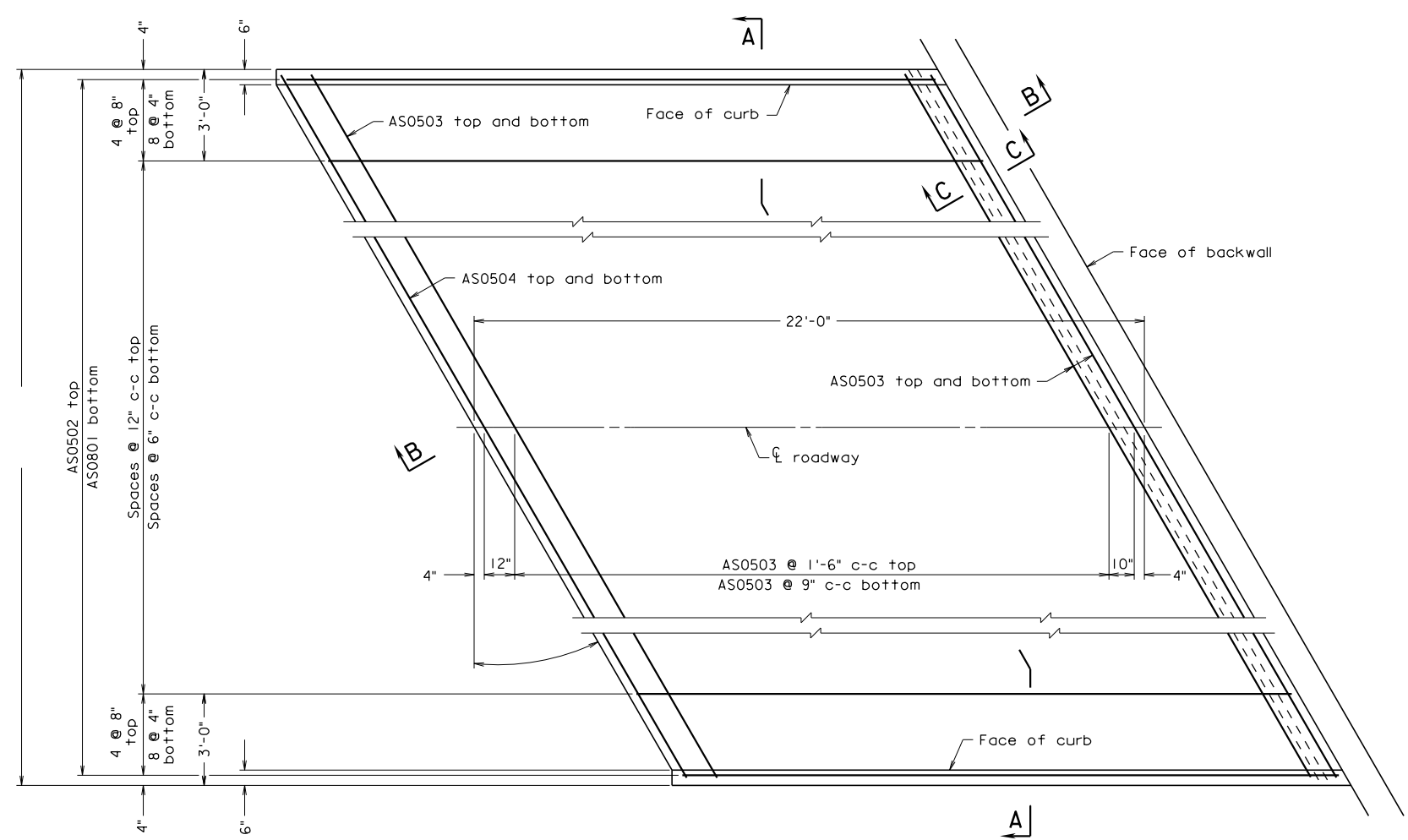
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

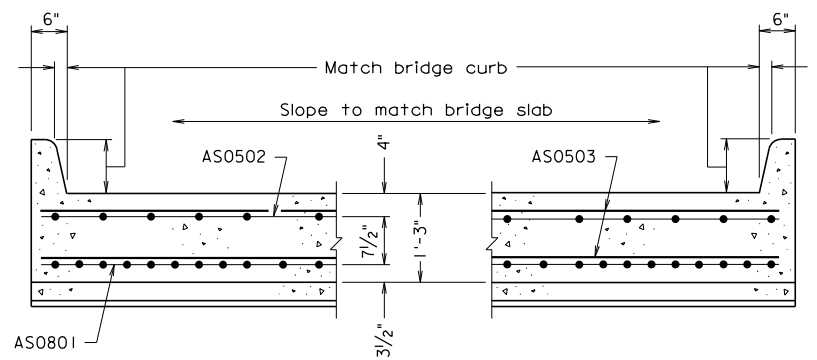
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

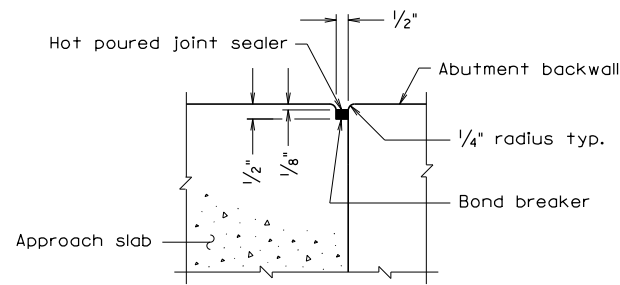
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



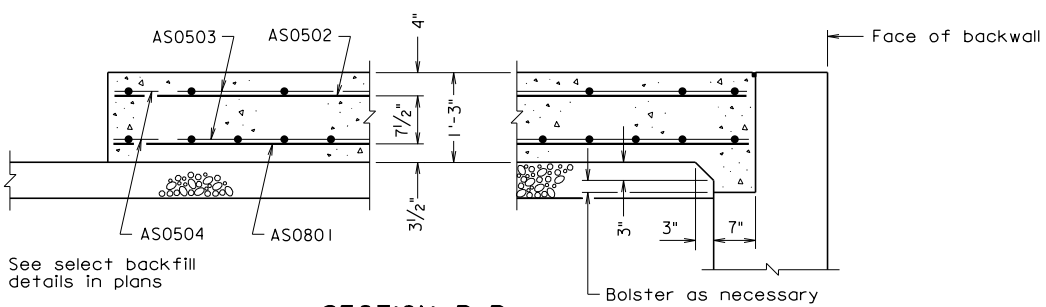
PLAN
Scale: $\frac{3}{8}'' = 1'-0''$



SECTION A-A
Scale: $\frac{3}{4}'' = 1'-0''$



SECTION C-C
Scale: $3'' = 1'-0''$



SECTION B-B
Scale: $\frac{3}{4}'' = 1'-0''$

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0502	.	#5	—	21'-6"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
.
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.
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

BAS-18L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-18L		

APPROACH SLAB

SKEW OVER 20° TO 35°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 20° to 35°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ears, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

Notes:

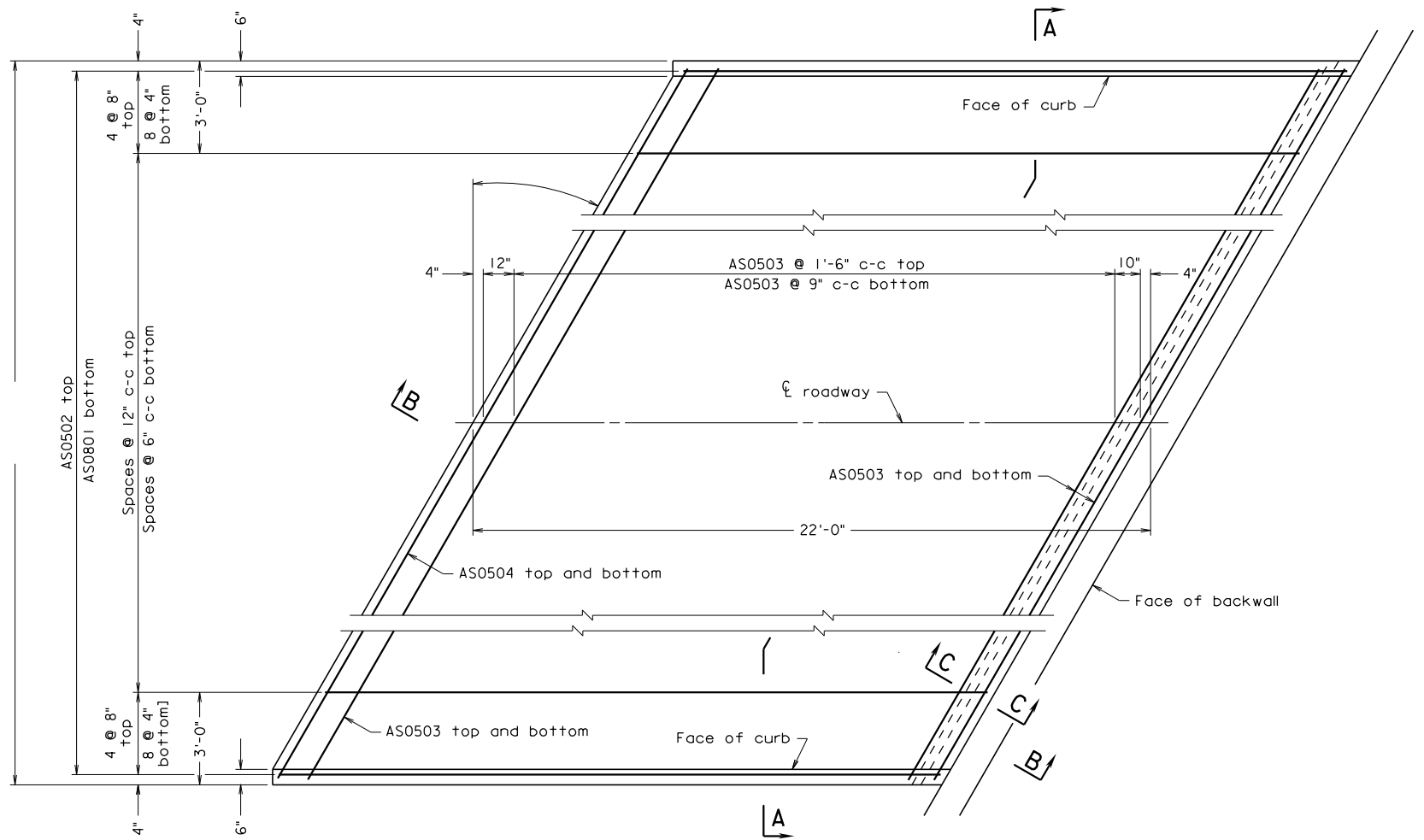
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

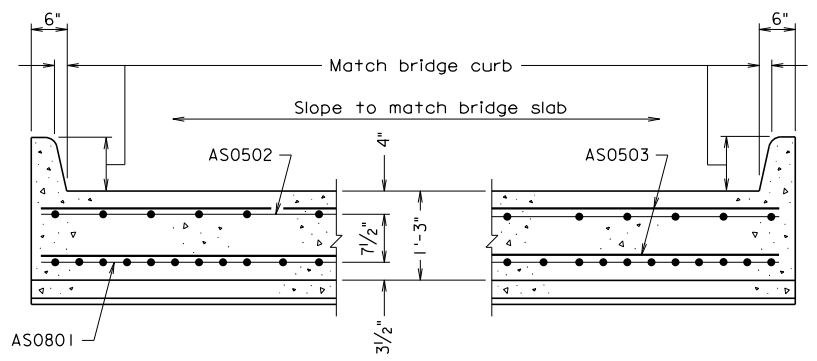
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

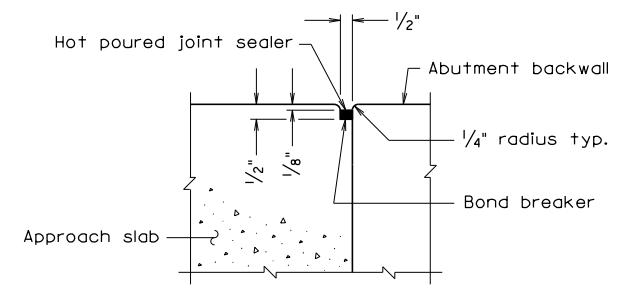
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



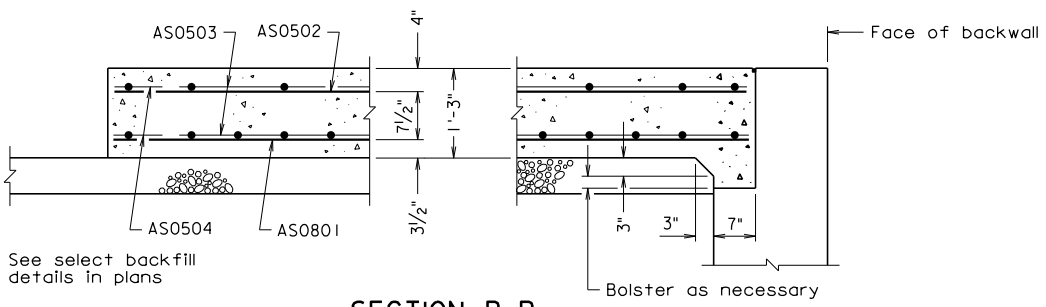
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0502	.	#5	—	21'-6"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
.
.
.
.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-18R		

BAS-18R 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 20° TO 35°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 20° to 35°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ears, etc. Modify when sidewalk is only on one side.

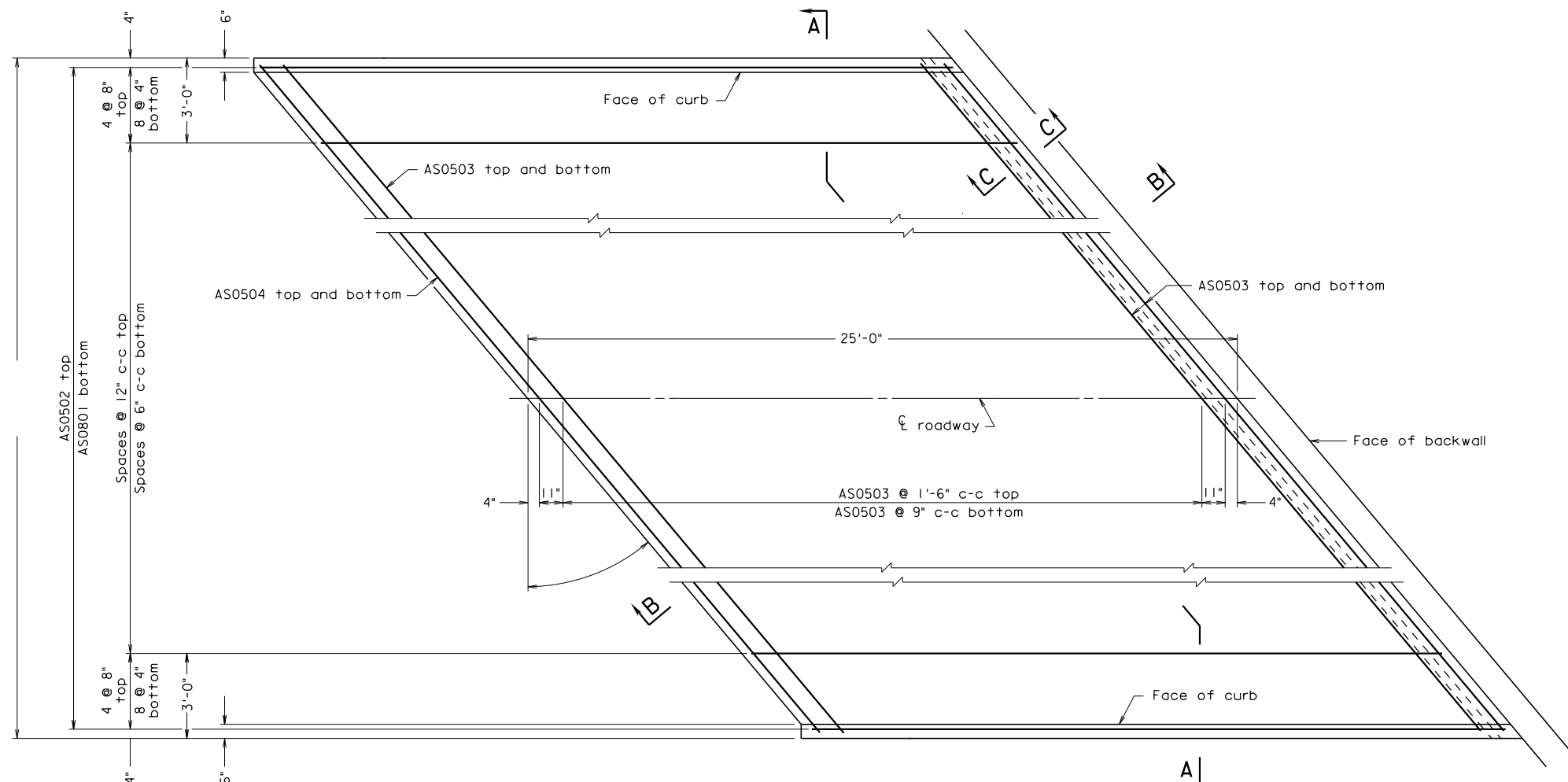
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

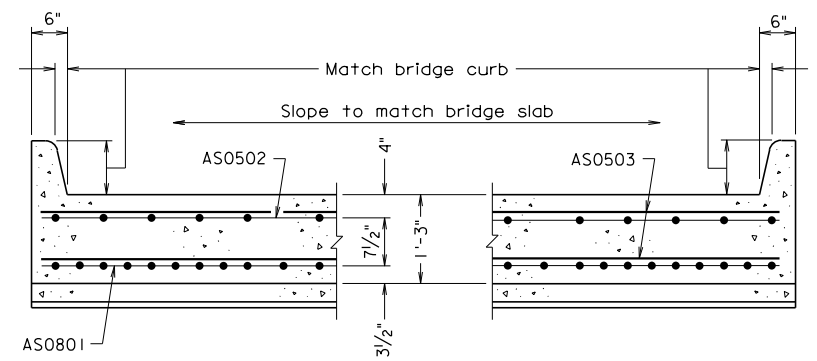
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

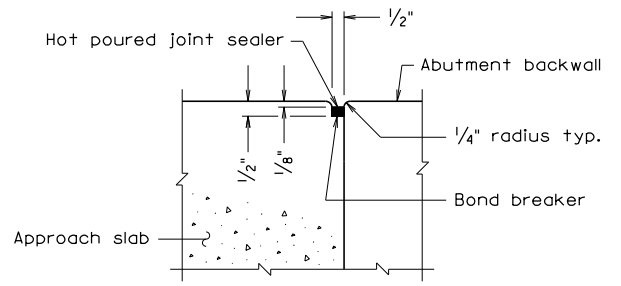
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



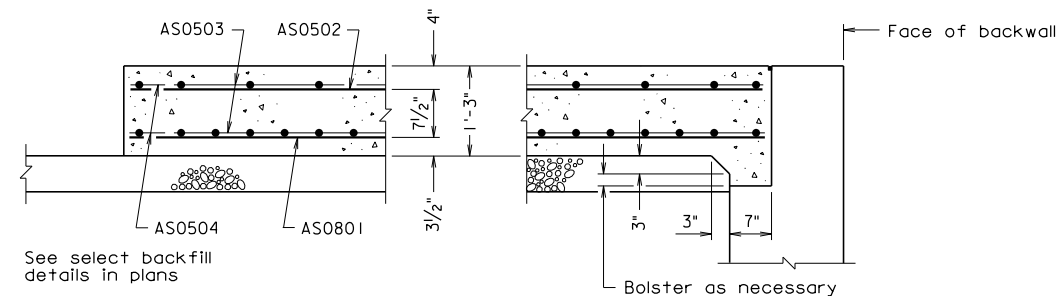
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0502	.	#5	—	24'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
.
.
.
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

BAS-19L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		
Revisions			BAS-19L		

APPROACH SLAB

SKEW OVER 35° TO 45°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 35° to 45°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ears, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

Notes:

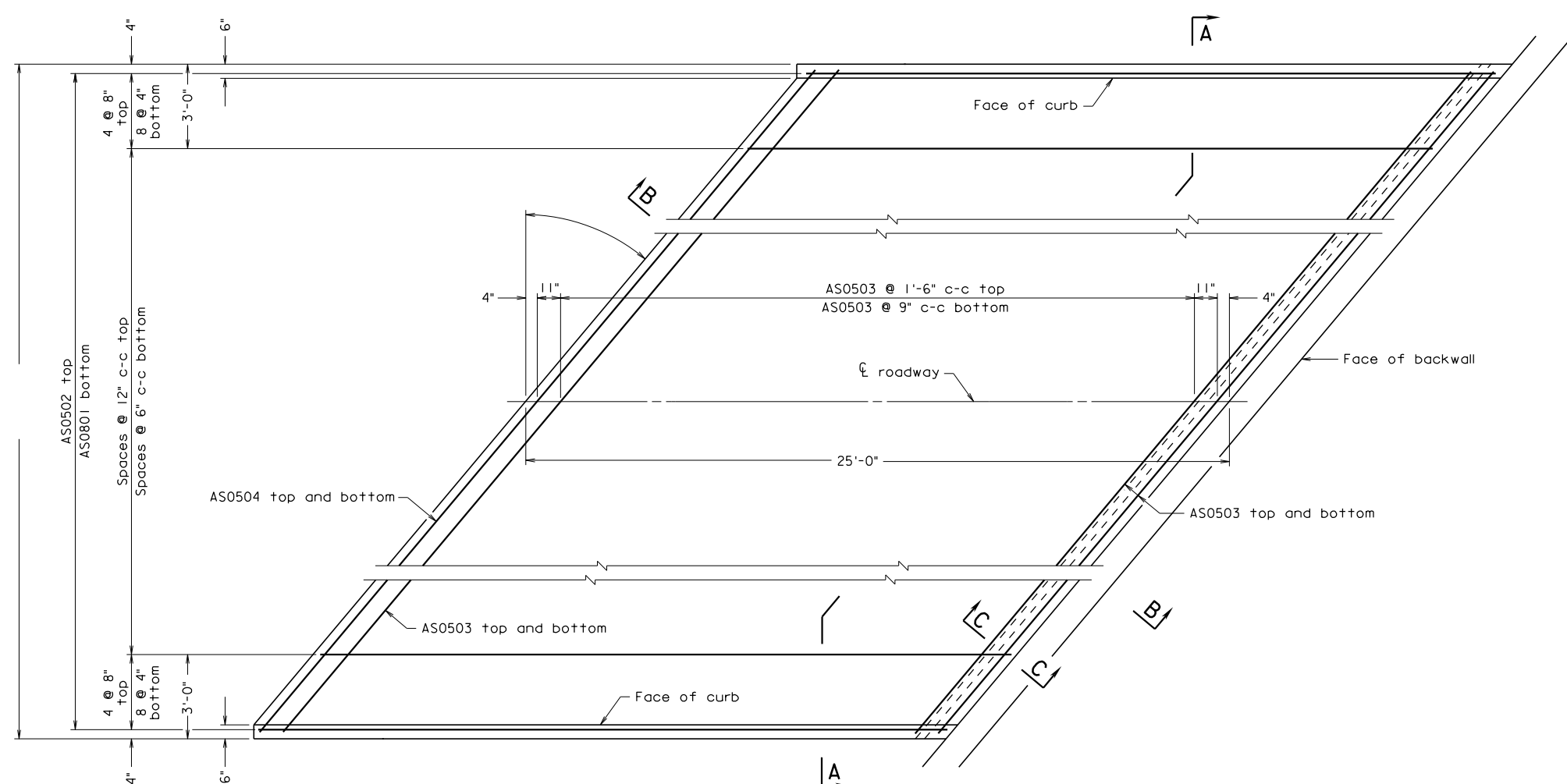
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

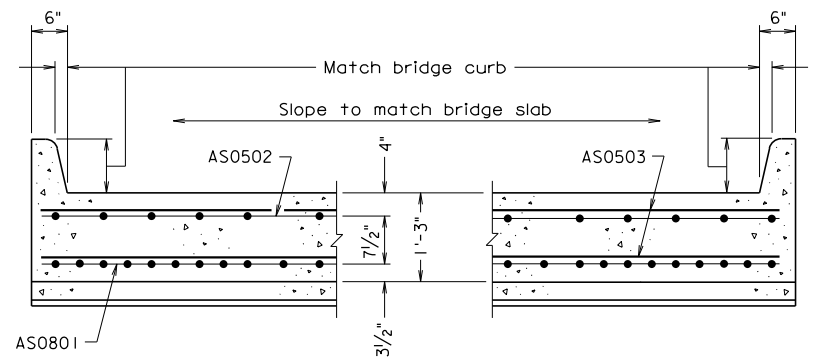
See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

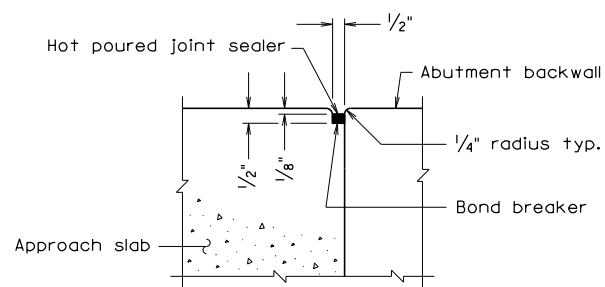
Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.



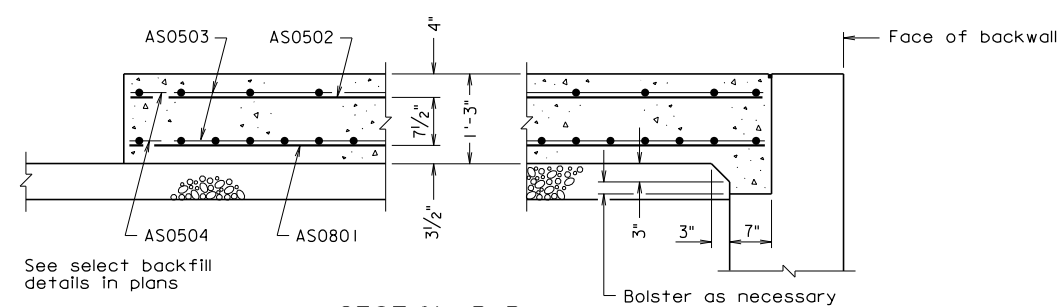
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0502	.	#5	—	24'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
.
.
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.

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BAS-19R		

BAS-19R 05-03-2013 bas19r.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 35° TO 45°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 35° to 45°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ears, etc. Modify when sidewalk is only on one side.

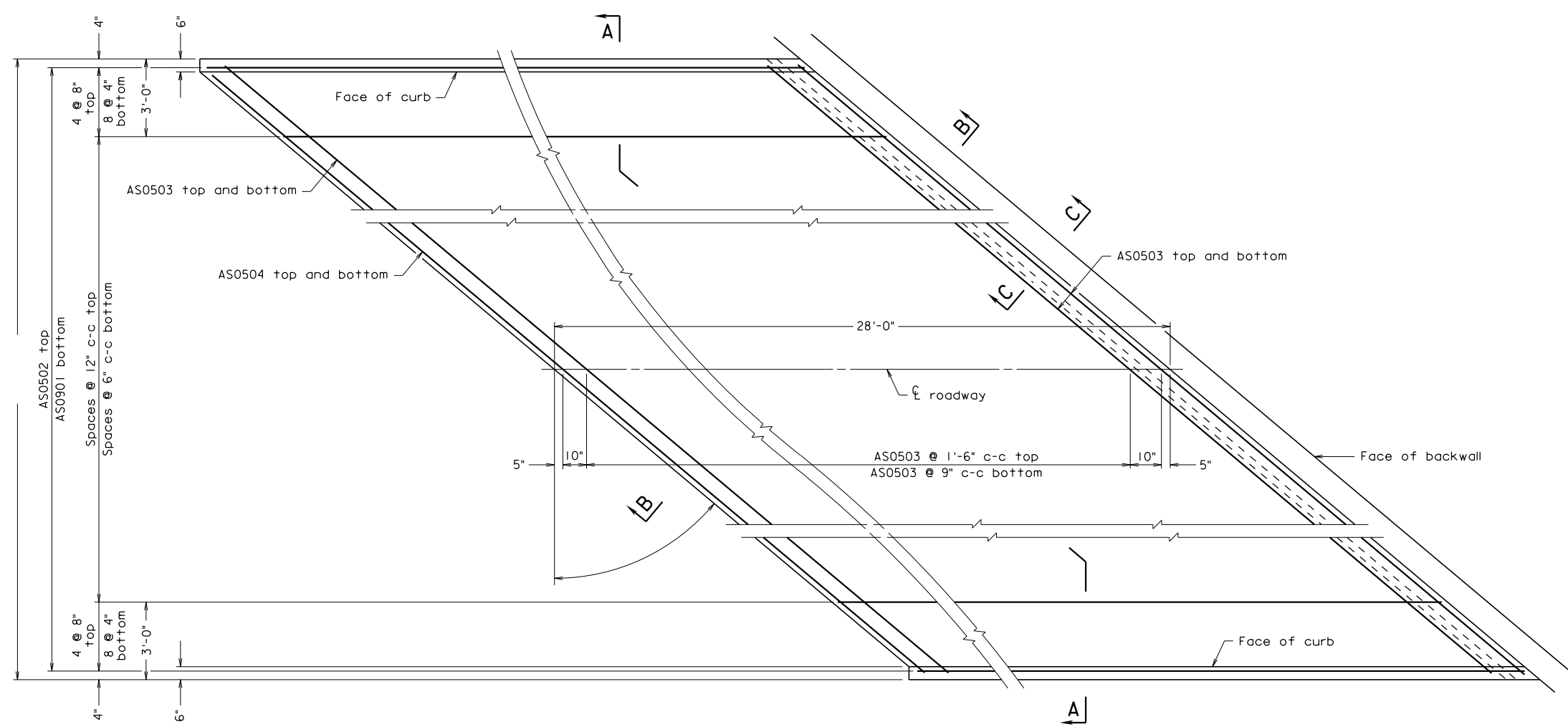
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



PLAN
Scale: 3/8" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

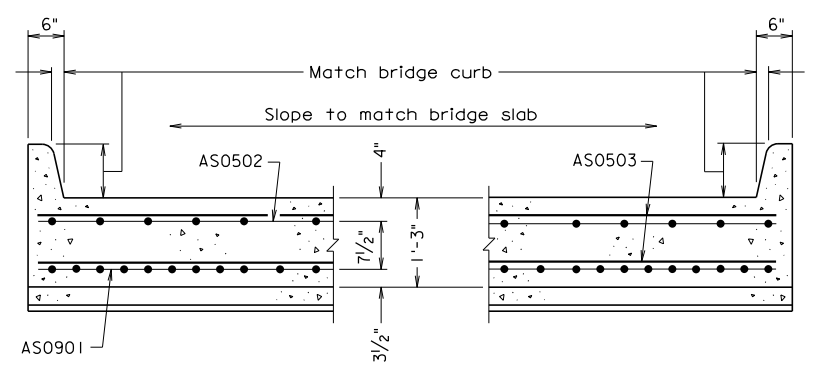
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

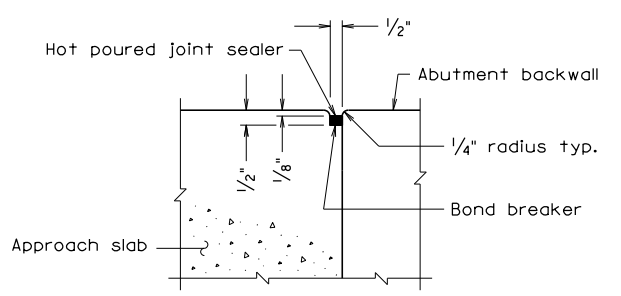
Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

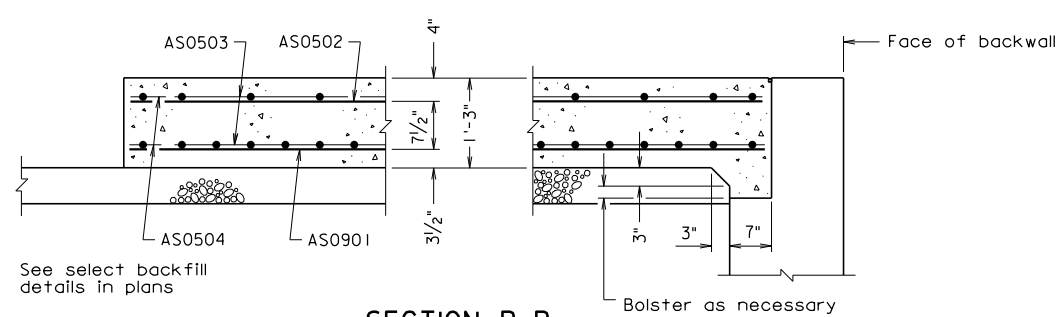
REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901		#9	—	27'-5"	Bottom longitudinal
AS0502		#5	—	27'-5"	Top longitudinal
AS0503		#5	—		Top and bottom transverse
AS0504		#5			Top and bottom transverse



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A		
Abutment B		
Totals		

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BAS-20L		

BAS-20L 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 45° TO 50°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 45° to 50°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ears, etc. Modify when sidewalk is only on one side.

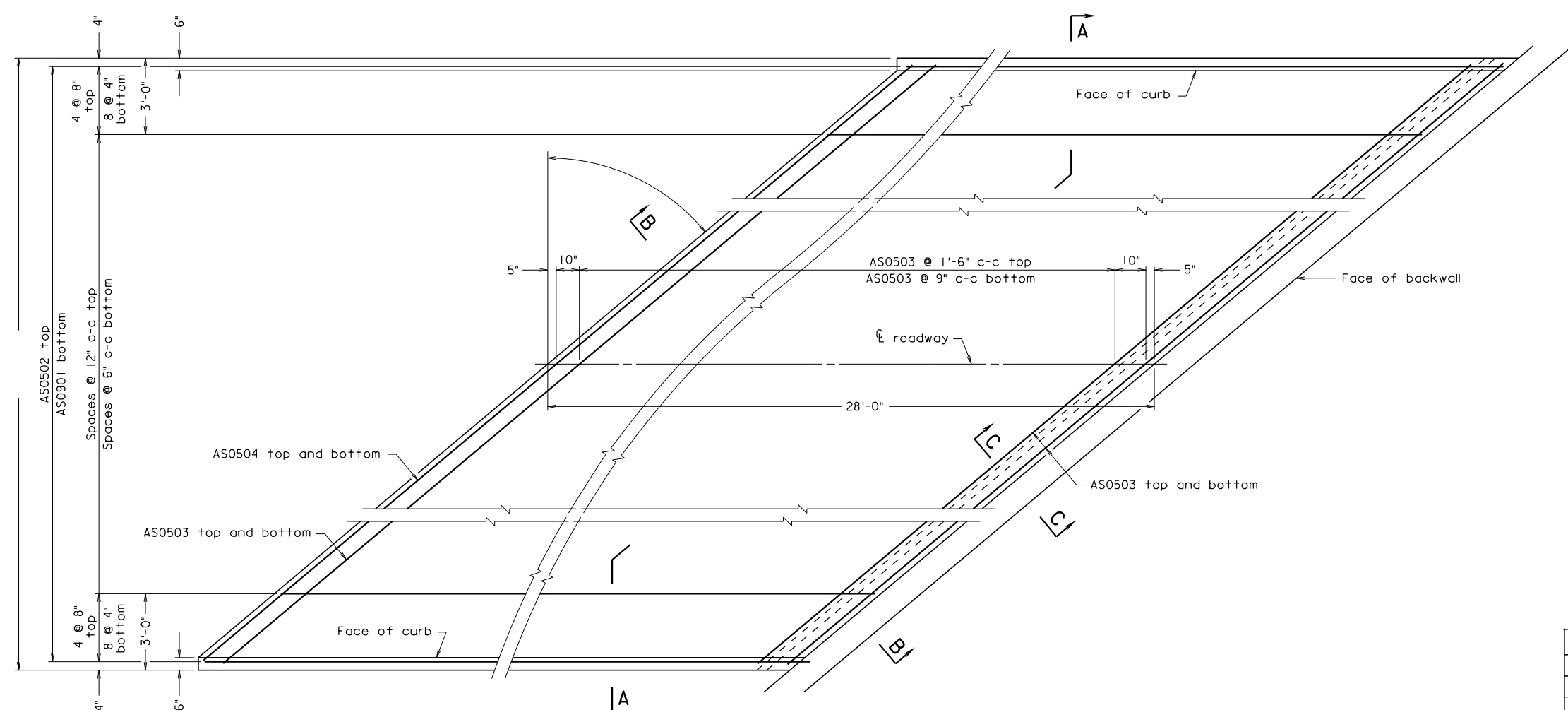
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

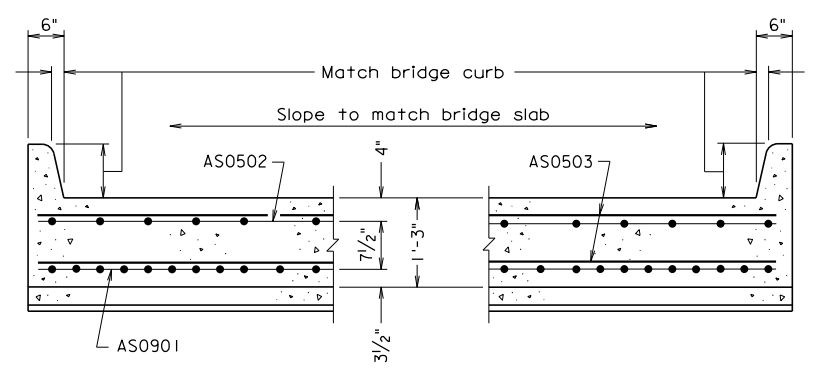
ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

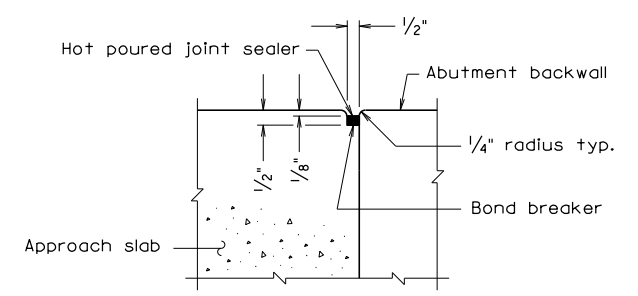
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



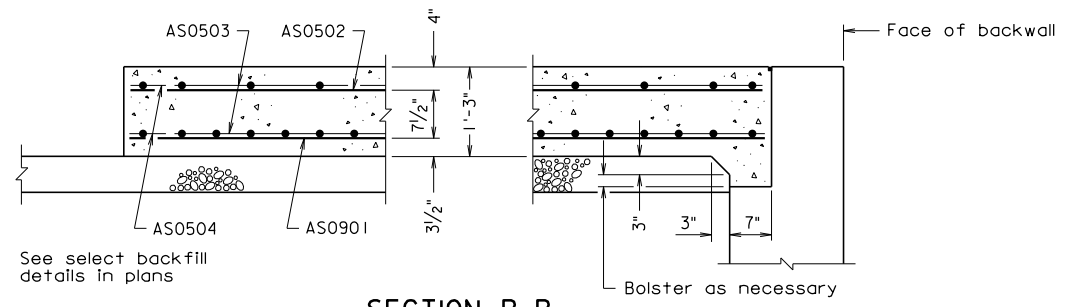
PLAN
Scale: $\frac{3}{8}" = 1'-0"$



SECTION A-A
Scale: $\frac{3}{4}" = 1'-0"$



SECTION C-C
Scale: $3" = 1'-0"$



SECTION B-B
Scale: $\frac{3}{4}" = 1'-0"$

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

See Road and Bridge Standards, Section 300 for dowels in joint between approach slab and concrete pavement.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks.

Grooving shall be in accordance with VDOT Road and Bridge Specifications, Section 404.07 (f), Class 6, Bridge Deck Finish. Payment for grooving is included in bridge deck grooving quantities.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901	.	#9	—	27'-5"	Bottom longitudinal
AS0502	.	#5	—	27'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	.	.	Top and bottom transverse
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ESTIMATED QUANTITIES		
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB
Abutment A	.	.
Abutment B	.	.
Totals	.	.

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

BAS-20R 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BAS-20R		

APPROACH SLAB

SKEW OVER 45° TO 50°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is concrete (not asphalt concrete).

Standard is for: Skew over 45° to 50°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ears, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Enter concrete and reinforcing steel quantities for Abutments A and B as well as Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

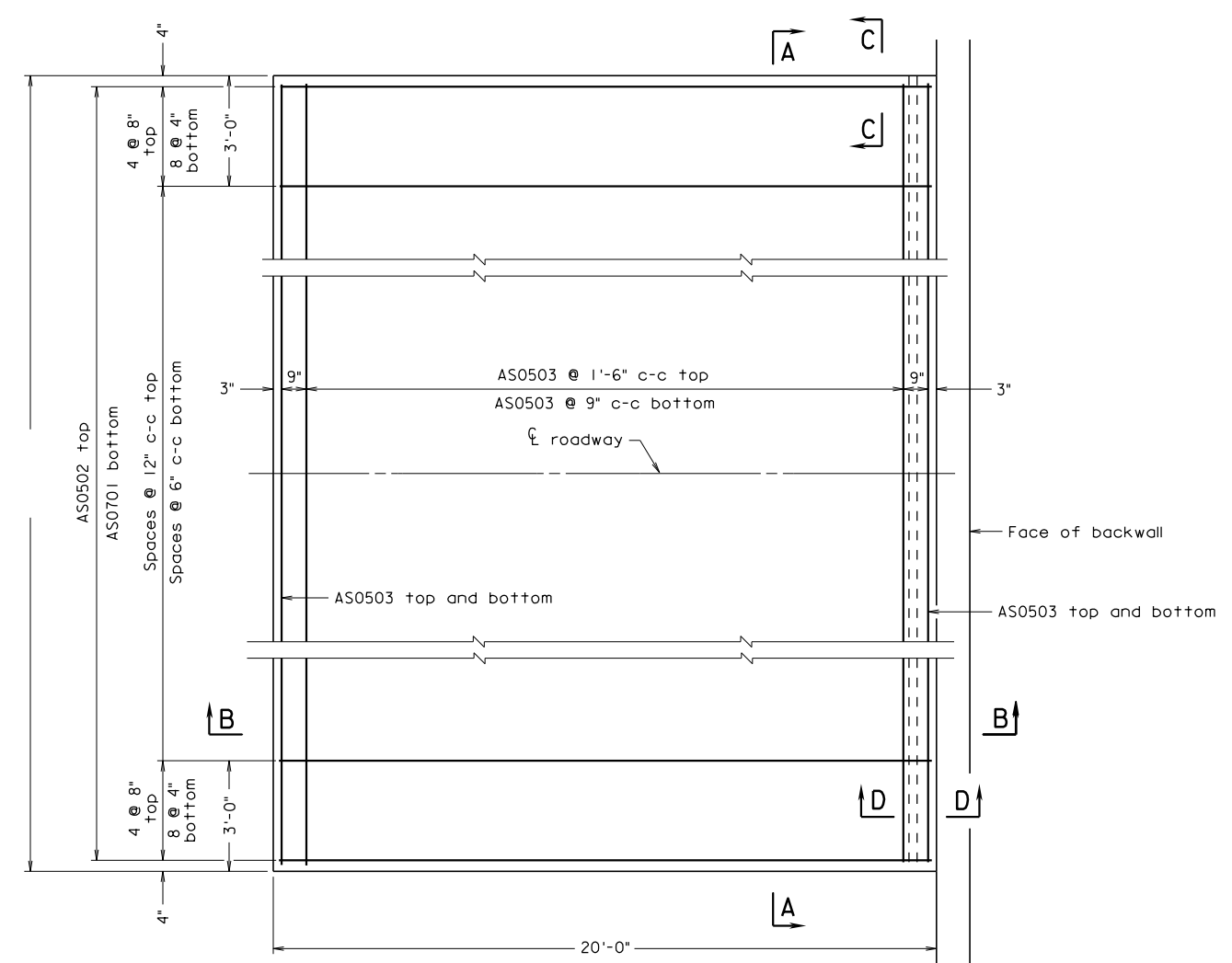
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

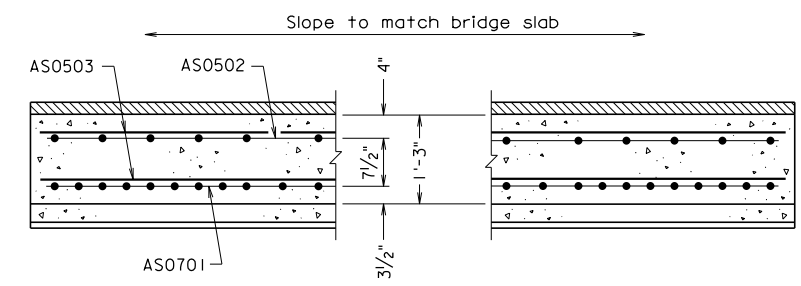
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

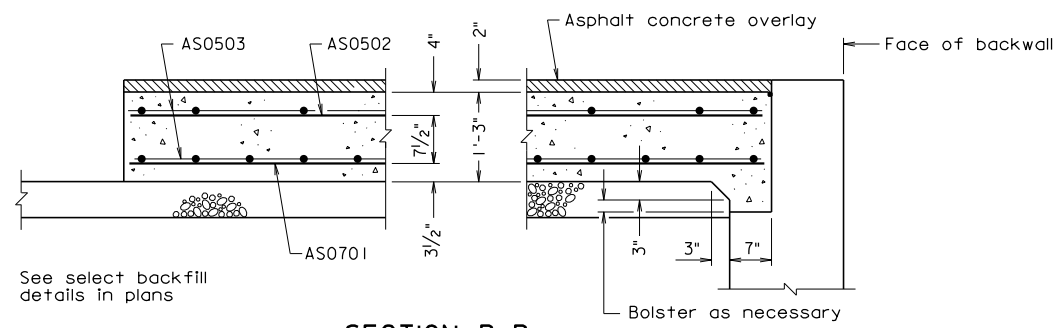
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



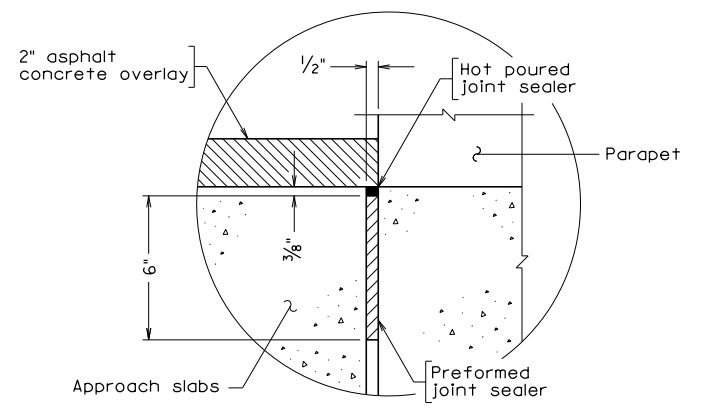
PLAN
Scale: 3/8" = 1'-0"



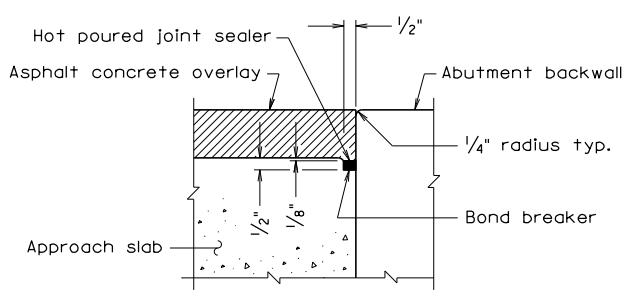
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701		#7		19'-8"	Bottom longitudinal
AS0502		#5		19'-8"	Top longitudinal
AS0503		#5			Top and bottom transverse

ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB	Asphalt Concrete Type Ton
Abutment A			
Abutment B			
Totals			

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Sheet No.
	Revisions		BAS-11A

BAS-11A 05-03-2013 bas11a.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB
STRAIGHT CROSSING;
APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: 0° Skew

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED Quantities:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

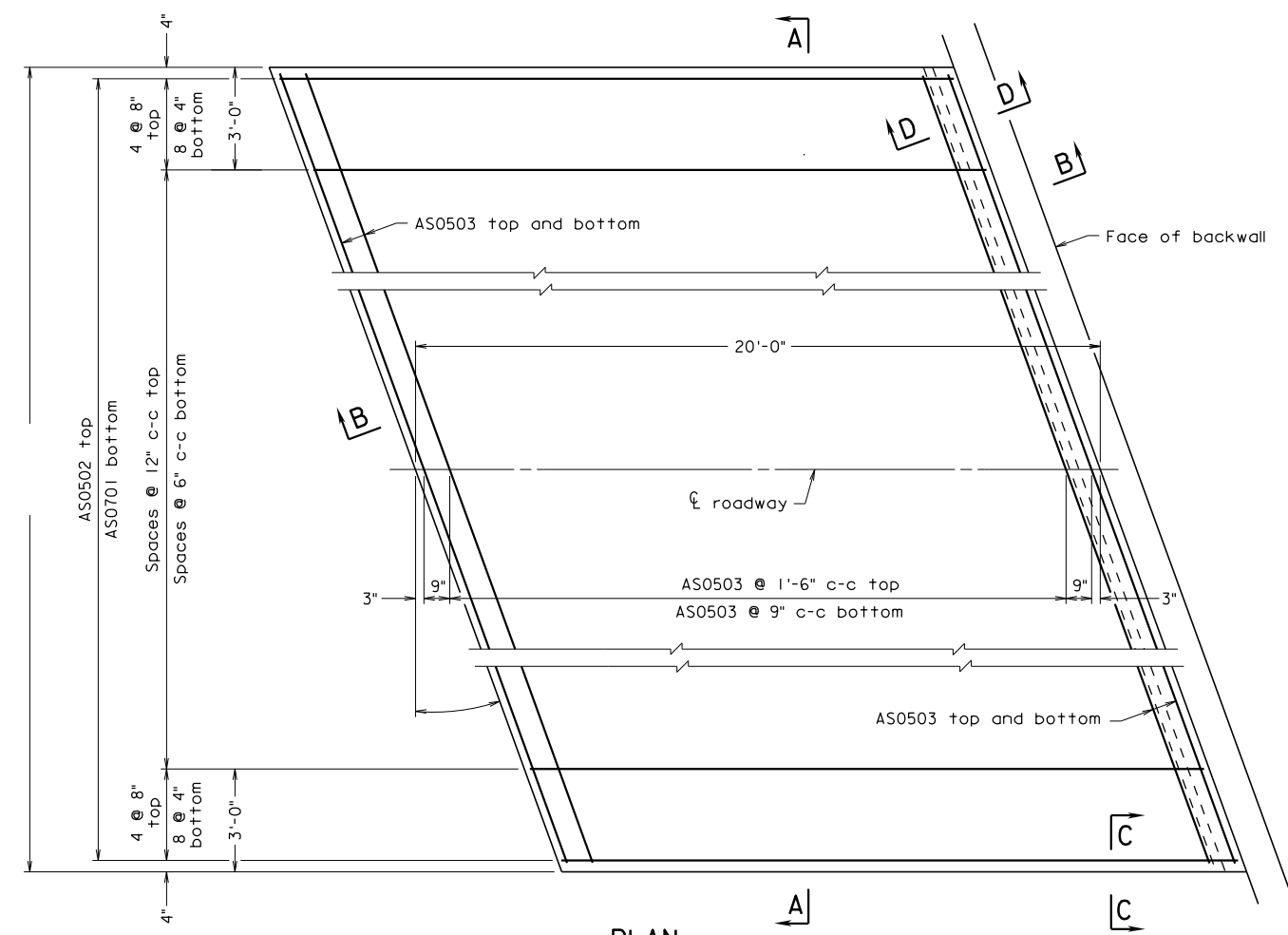
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

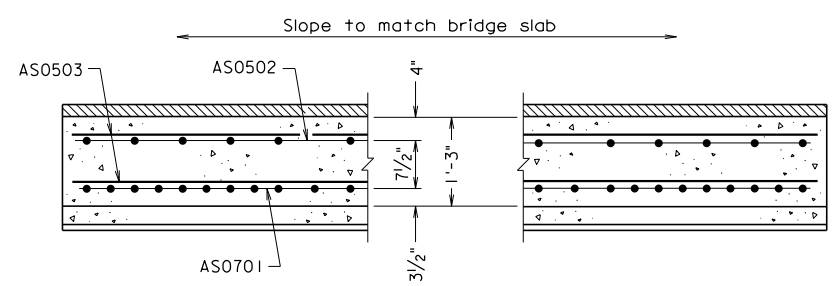
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

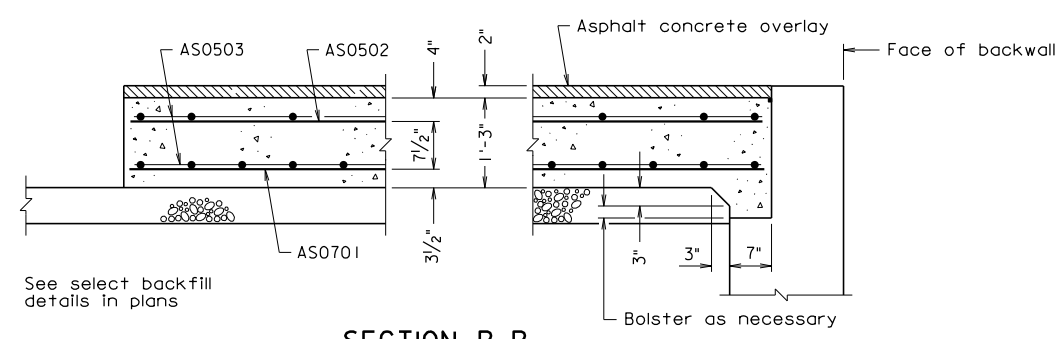
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



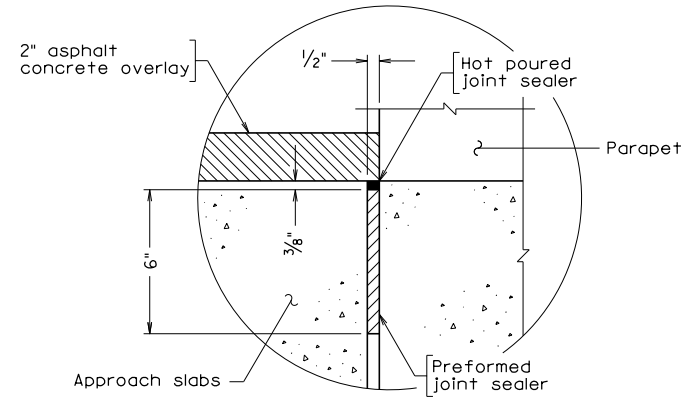
PLAN
Scale: 3/8" = 1'-0"



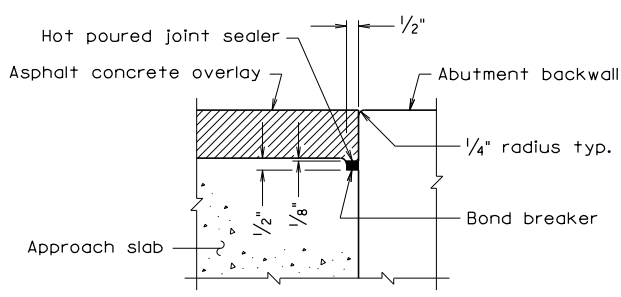
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Designed: S&B...DIV
			Drawn: ...S&B...DIV
			Checked: S&B...DIV
Revisions		Date	Plan No.
			Sheet No.
			BAS-12AL

bas12al.dgn

BAS-12AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW 20° OR LESS, SKEW LEFT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° or less, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

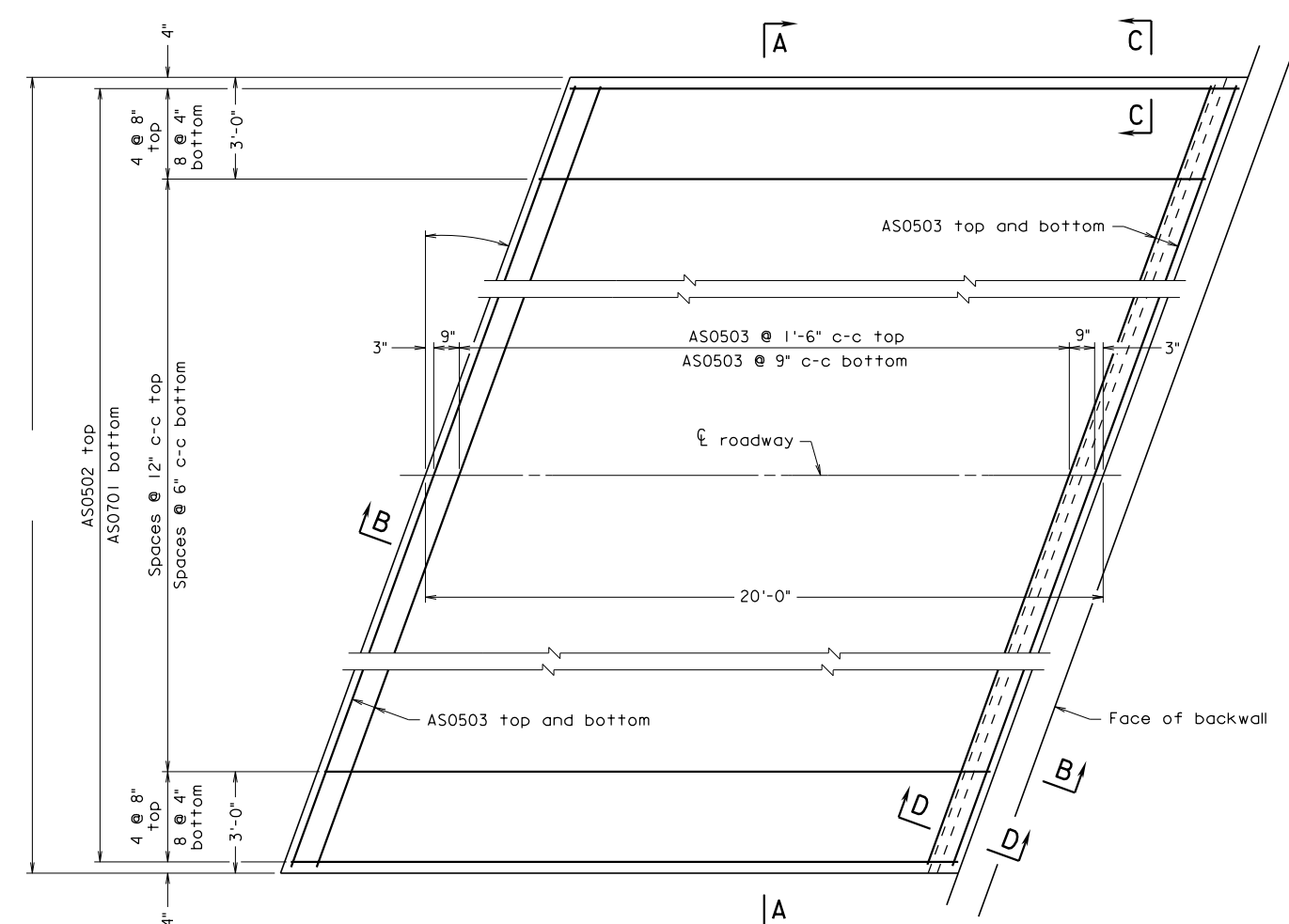
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

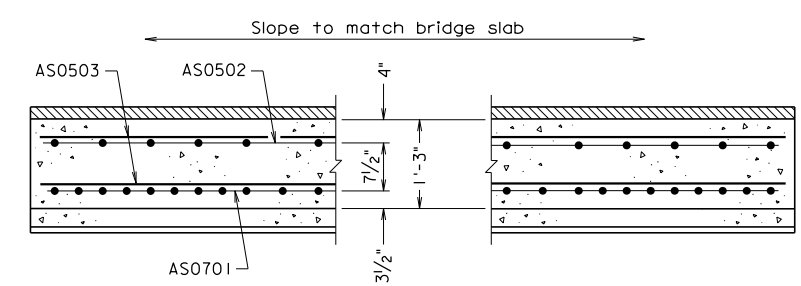
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

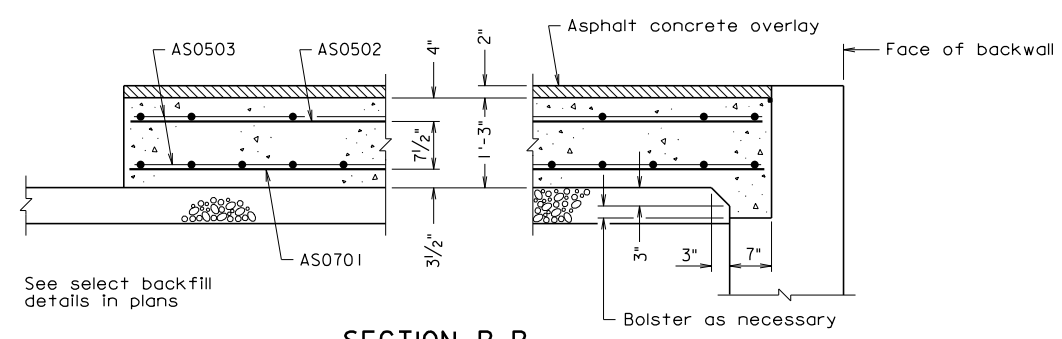
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



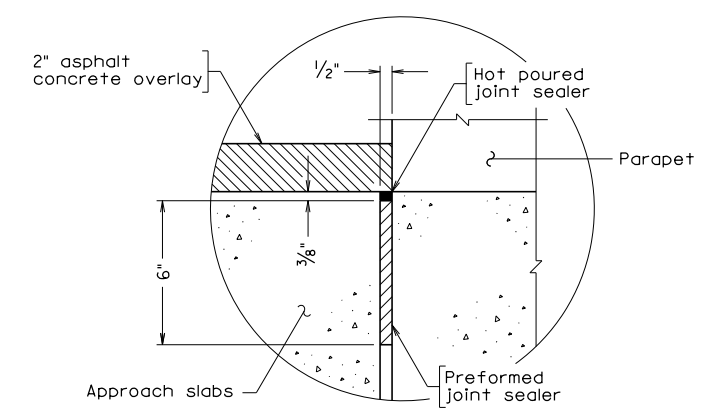
PLAN
Scale: 3/8" = 1'-0"



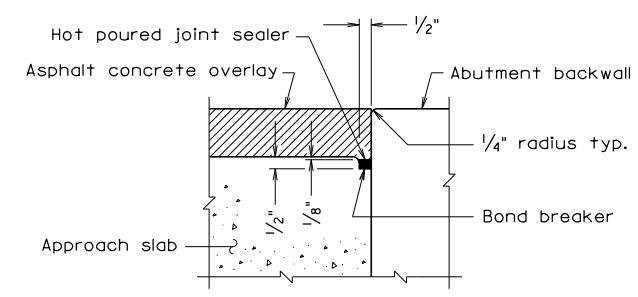
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
.
.
.
.
.
.
.

ESTIMATED QUANTITIES

	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-12AR		

BAS-12AR 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW 20° OR LESS, SKEW RIGHT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° or less, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

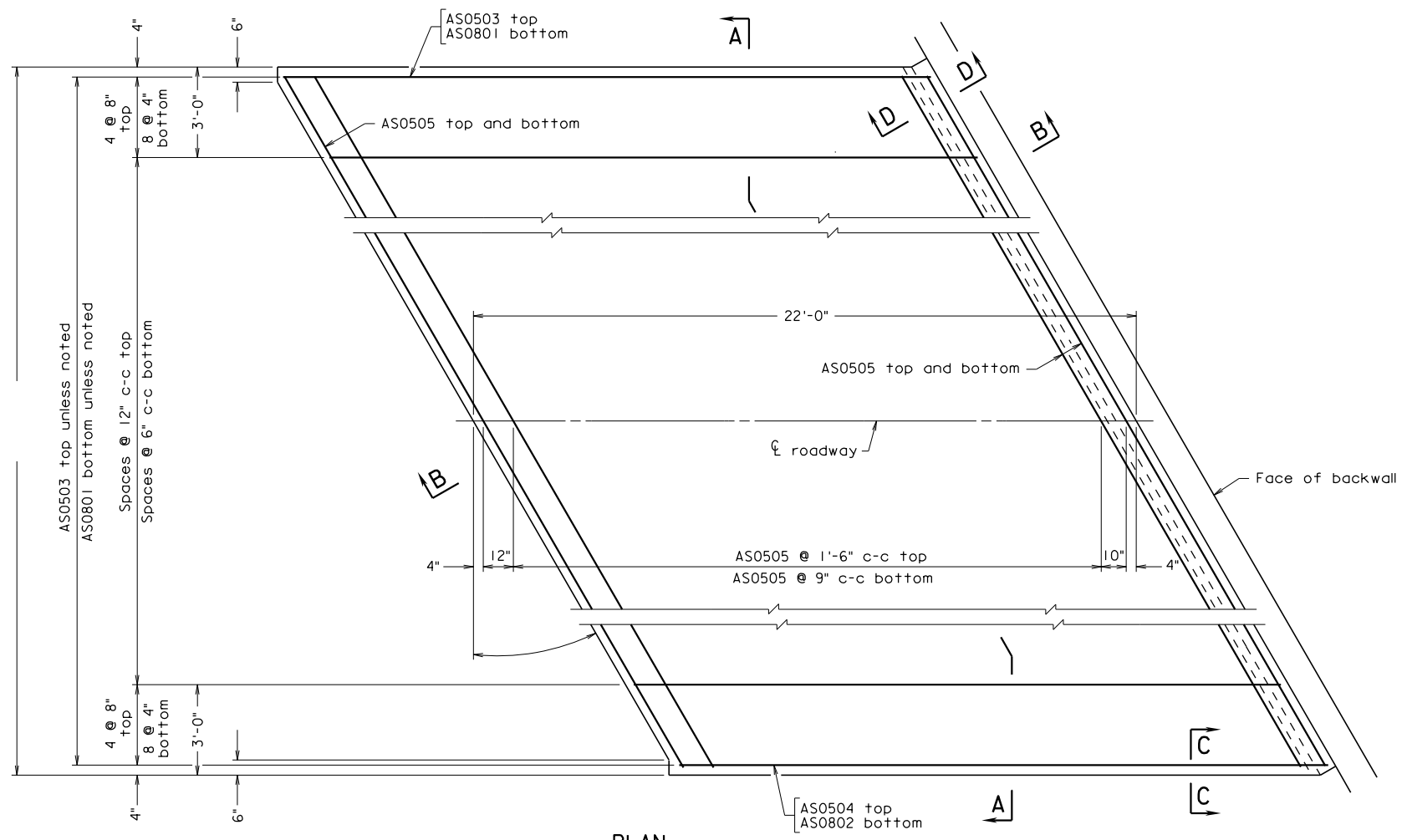
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

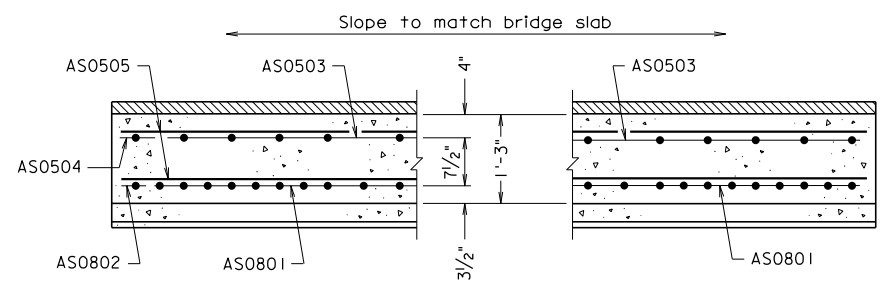
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

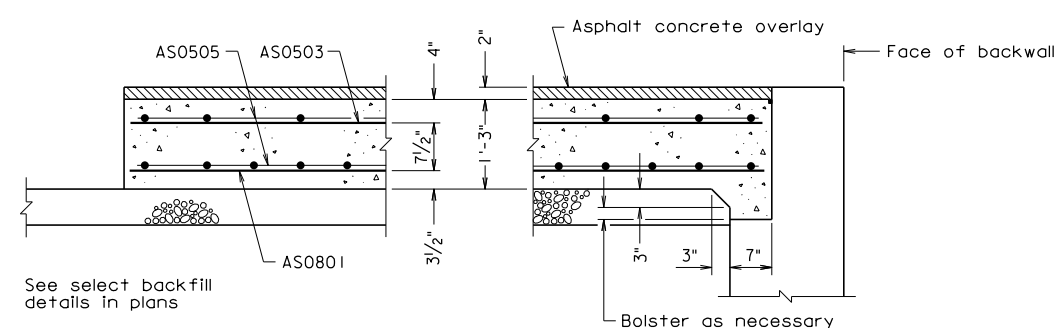
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



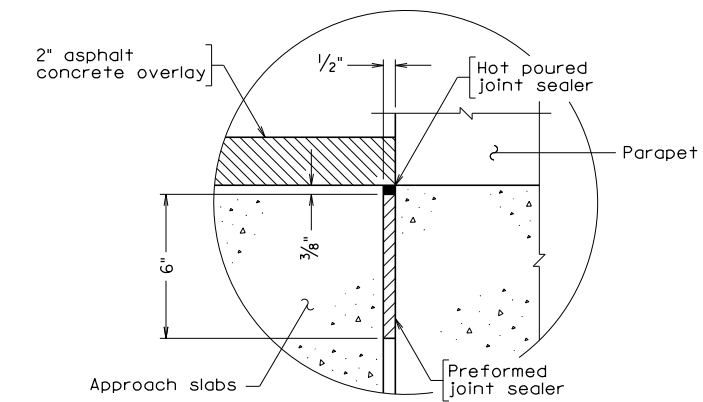
PLAN
Scale: 3/8" = 1'-0"



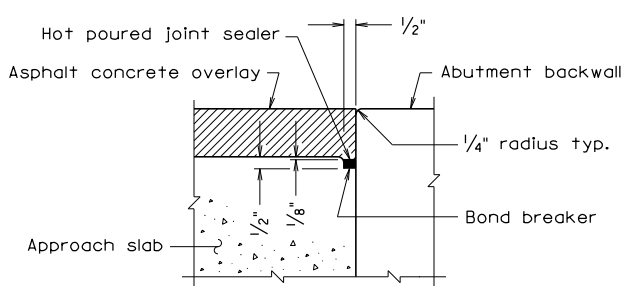
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0802	.	#8	—	21'-3"	Bottom longitudinal
AS0503	.	#5	—	21'-6"	Top longitudinal
AS0504	.	#5	—	21'-3"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse
.
.
.

ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BAS-13AL		

bass13al.dgn

BAS-13AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 20° TO 35°, SKEW LEFT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° to 35°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

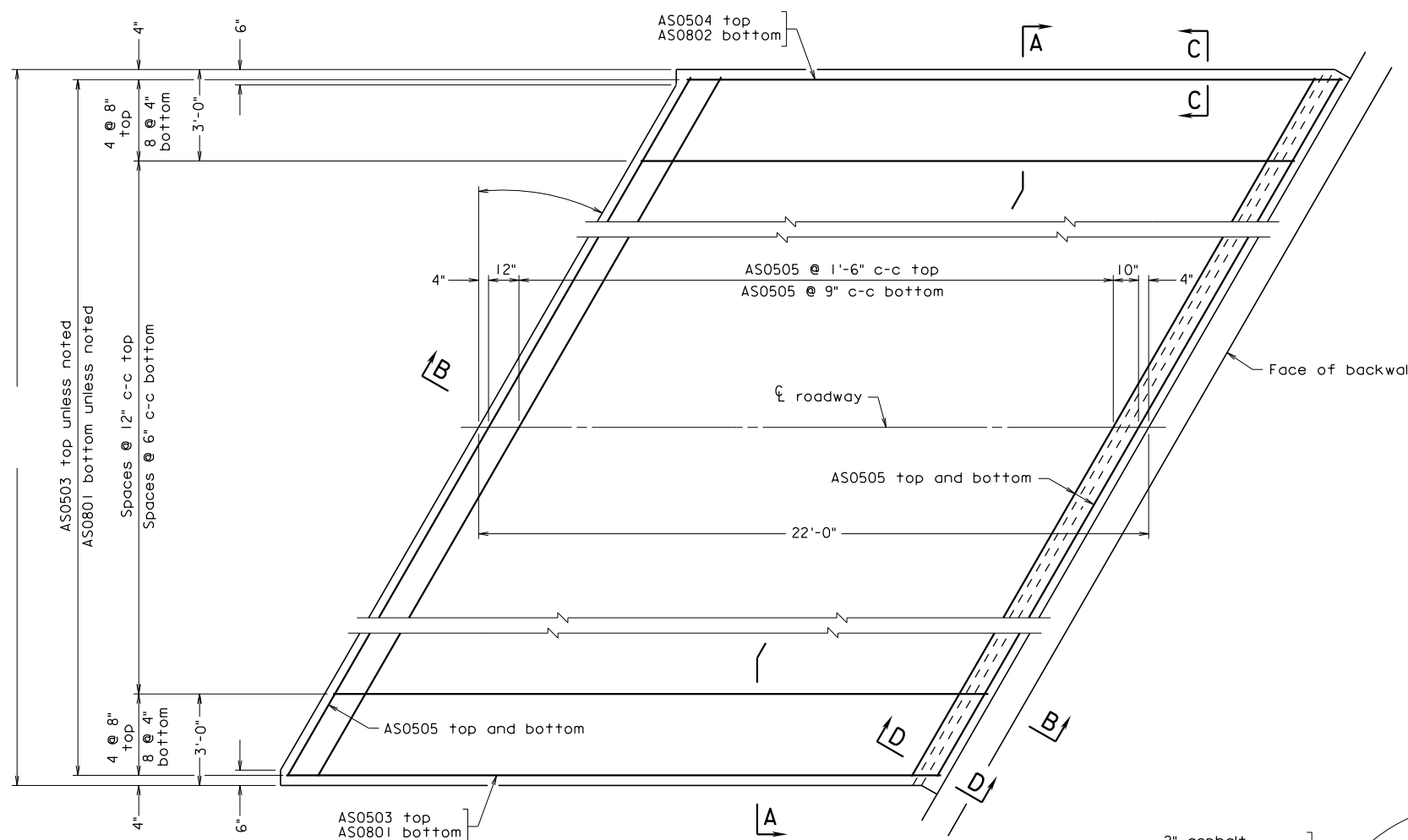
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

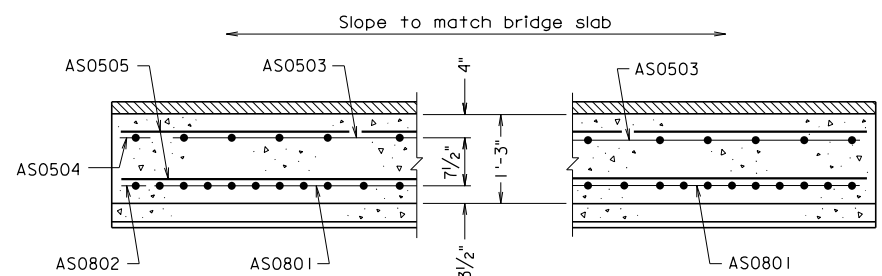
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

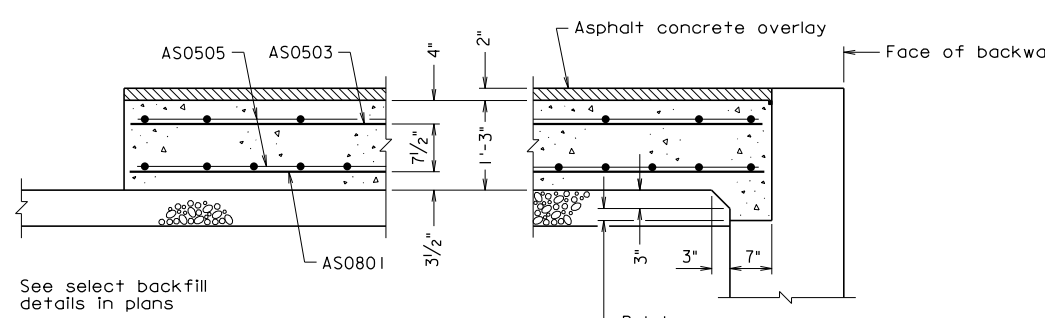
STATE	FEDERAL AID		STATE		SHEET
VA.	ROUTE	PROJECT	ROUTE	PROJECT	NO.



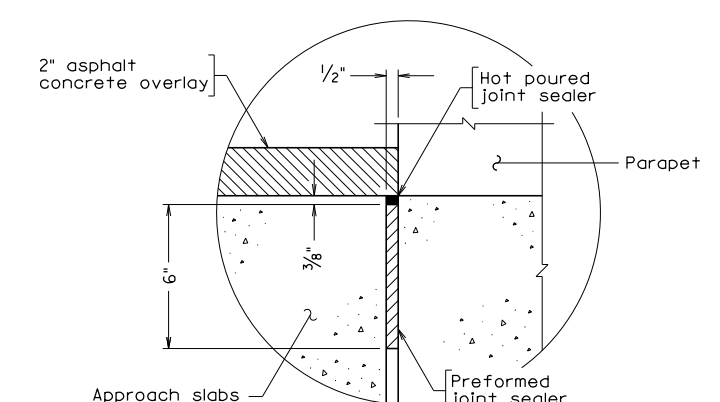
PLAN
Scale: 3/8" = 1'-0"



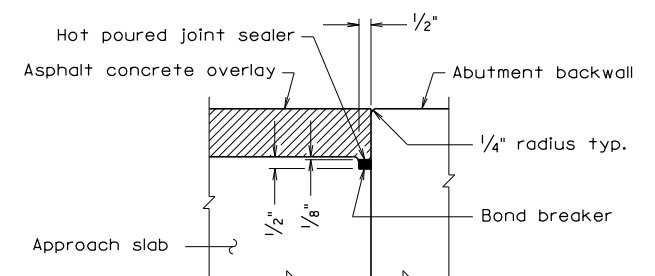
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
AS0801		#8		21'-6"	Bottom longitudinal
AS0802		#8		21'-3"	Bottom longitudinal
AS0503		#5		21'-6"	Top longitudinal
AS0504		#5		21'-3"	Top longitudinal
AS0505		#5			Top and bottom transverse

ESTIMATED QUANTITIES

	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB	Asphalt Concrete Type Ton
Abutment A			
Abutment B			
Totals			

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

bass 13ar.dgn

05-03-2013

BAS-13AR

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

APPROACH SLABS

No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: S&B...DIV			
			Checked: S&B...DIV			

BAS-13AR

APPROACH SLAB

SKEW OVER 20° TO 35°, SKEW RIGHT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° to 35°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc.

REINFORCING STEEL SCHEDULE:

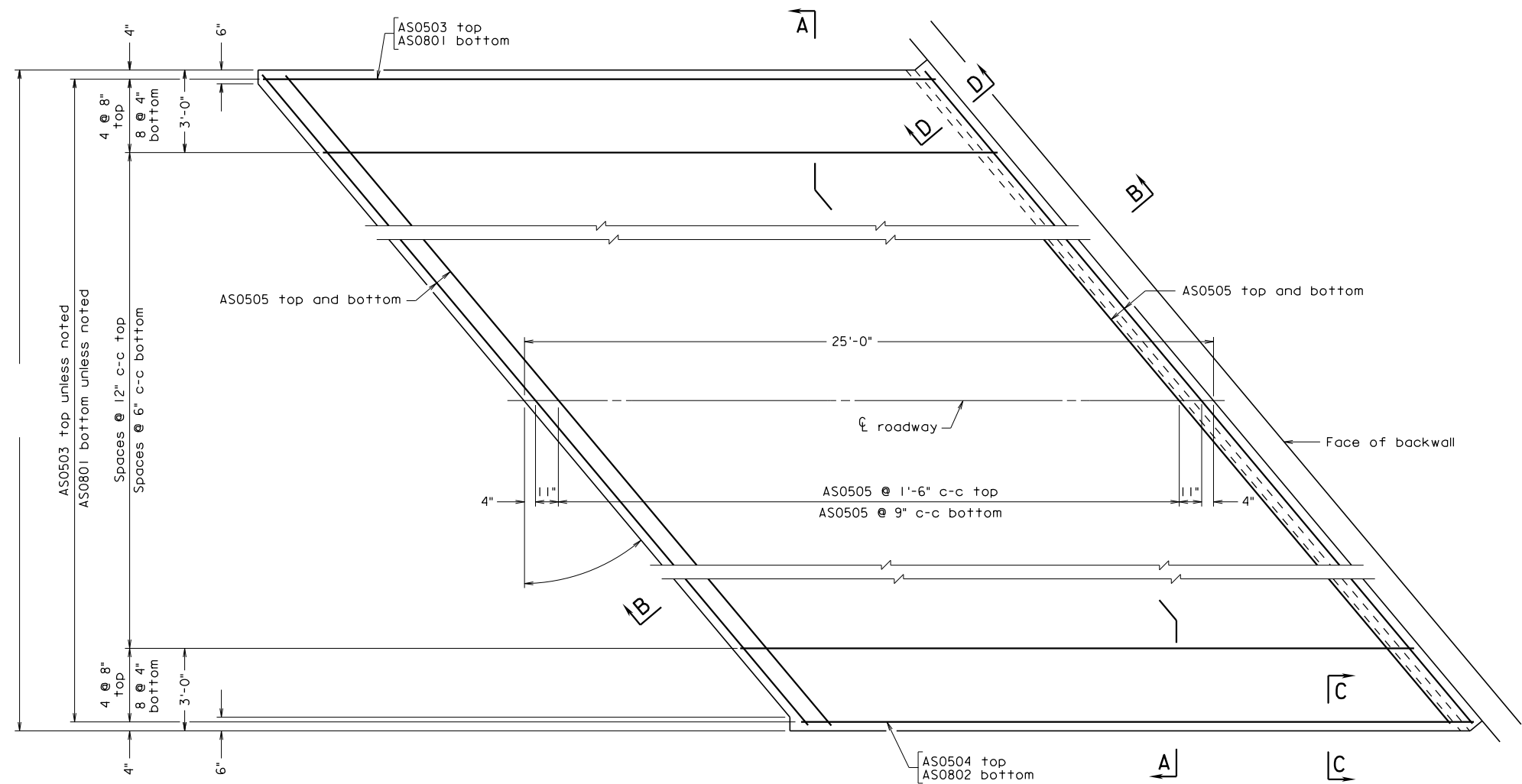
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

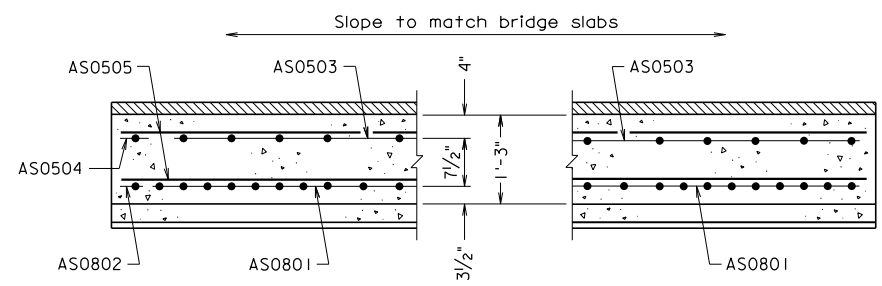
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

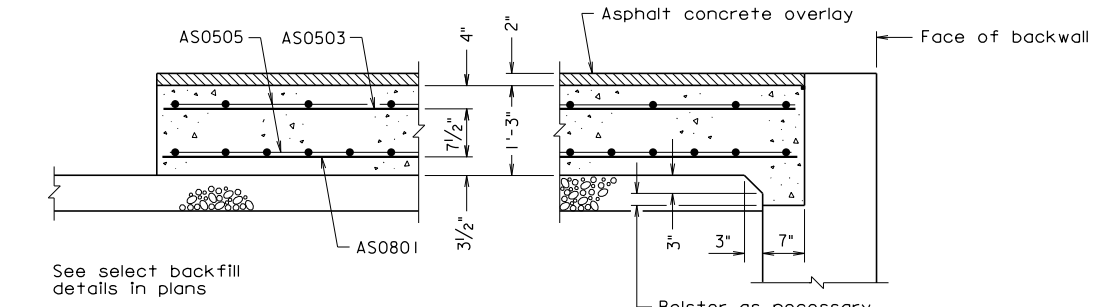
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



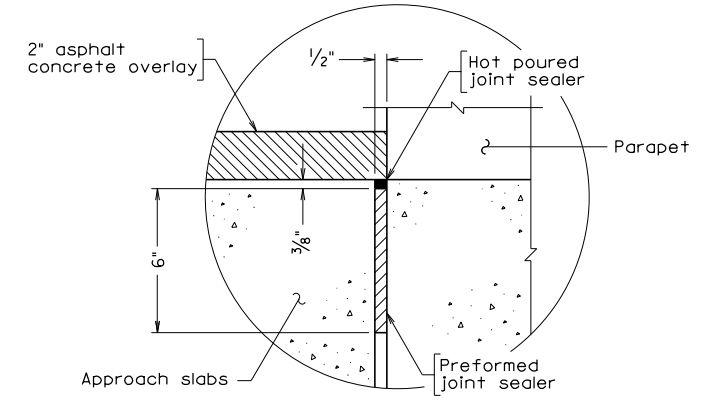
PLAN
Scale: 3/8" = 1'-0"



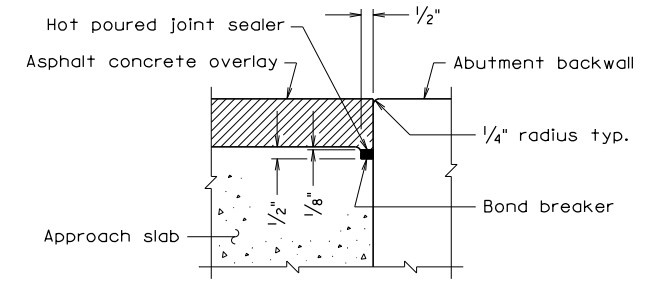
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Scale as noted

© 2013, Commonwealth of Virginia

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0802	.	#8	—	24'-2"	Bottom longitudinal
AS0503	.	#5	—	24'-5"	Top longitudinal
AS0504	.	#5	—	24'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse

ESTIMATED QUANTITIES

	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

bass (4).dgn

BAS-14AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

APPROACH SLABS

No.	Description	Date	Designed: S&B, DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: S&B, DIV			
			Checked: S&B, DIV			

BAS-14AL

APPROACH SLAB

SKEW OVER 35° TO 45°, SKEW LEFT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 35° to 45°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

REINFORCING STEEL SCHEDULE:

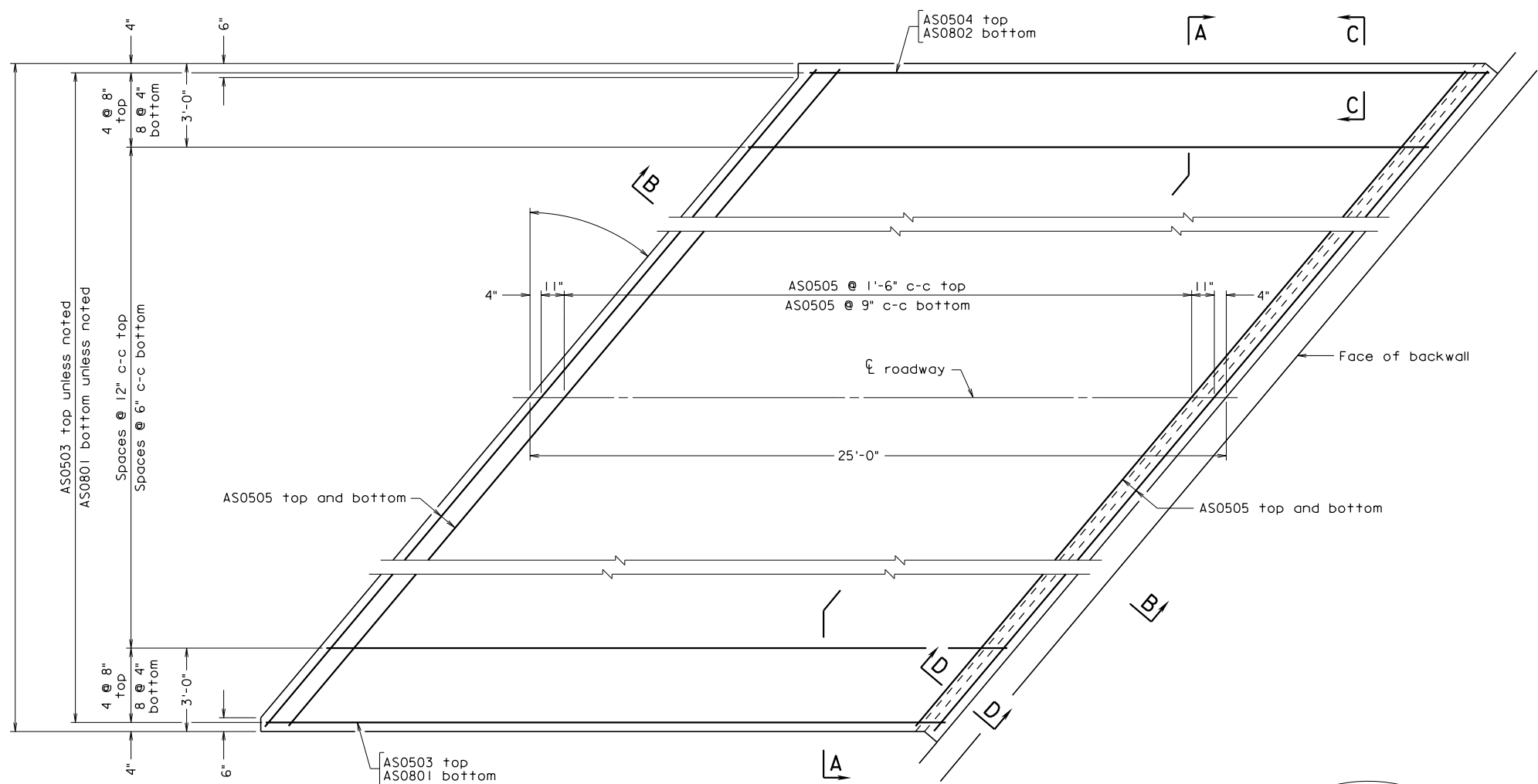
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

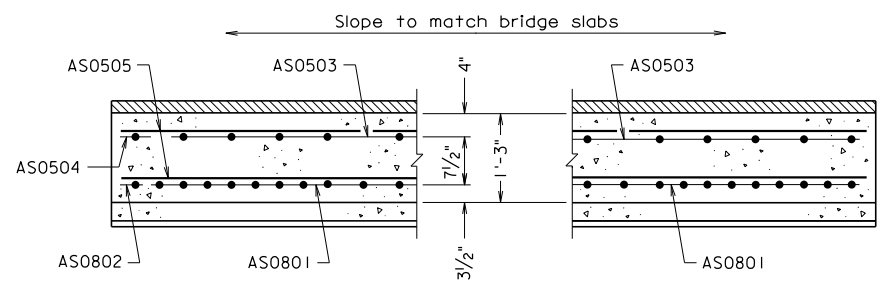
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

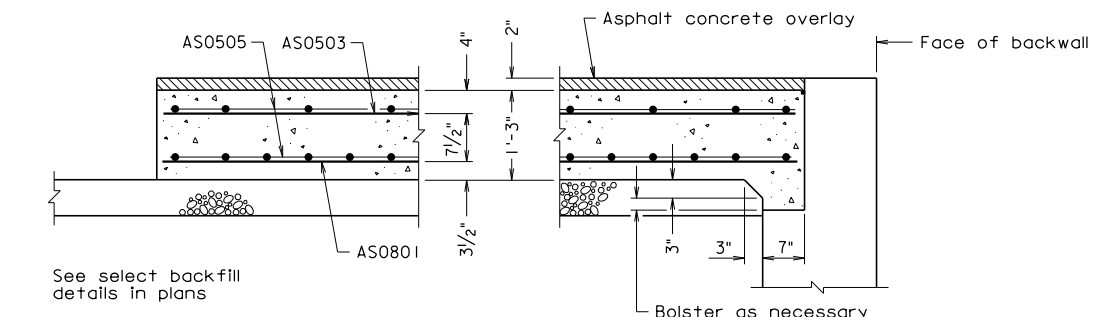
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



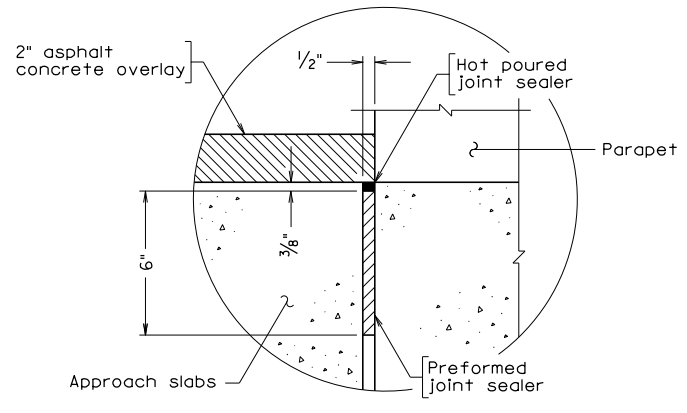
PLAN
Scale: 3/8" = 1'-0"



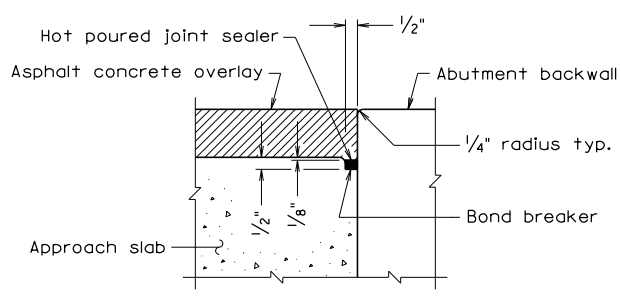
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0802	.	#8	—	24'-2"	Bottom longitudinal
AS0503	.	#5	—	24'-5"	Top longitudinal
AS0504	.	#5	—	24'-2"	Top longitudinal
AS0505	.	#5	—	.	Top and bottom transverse

ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BAS-14AR		

bas 14ar.dgn

05-03-2013

BAS-14AR

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 35° TO 45°, SKEW RIGHT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 35° to 45°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

REINFORCING STEEL SCHEDULE:

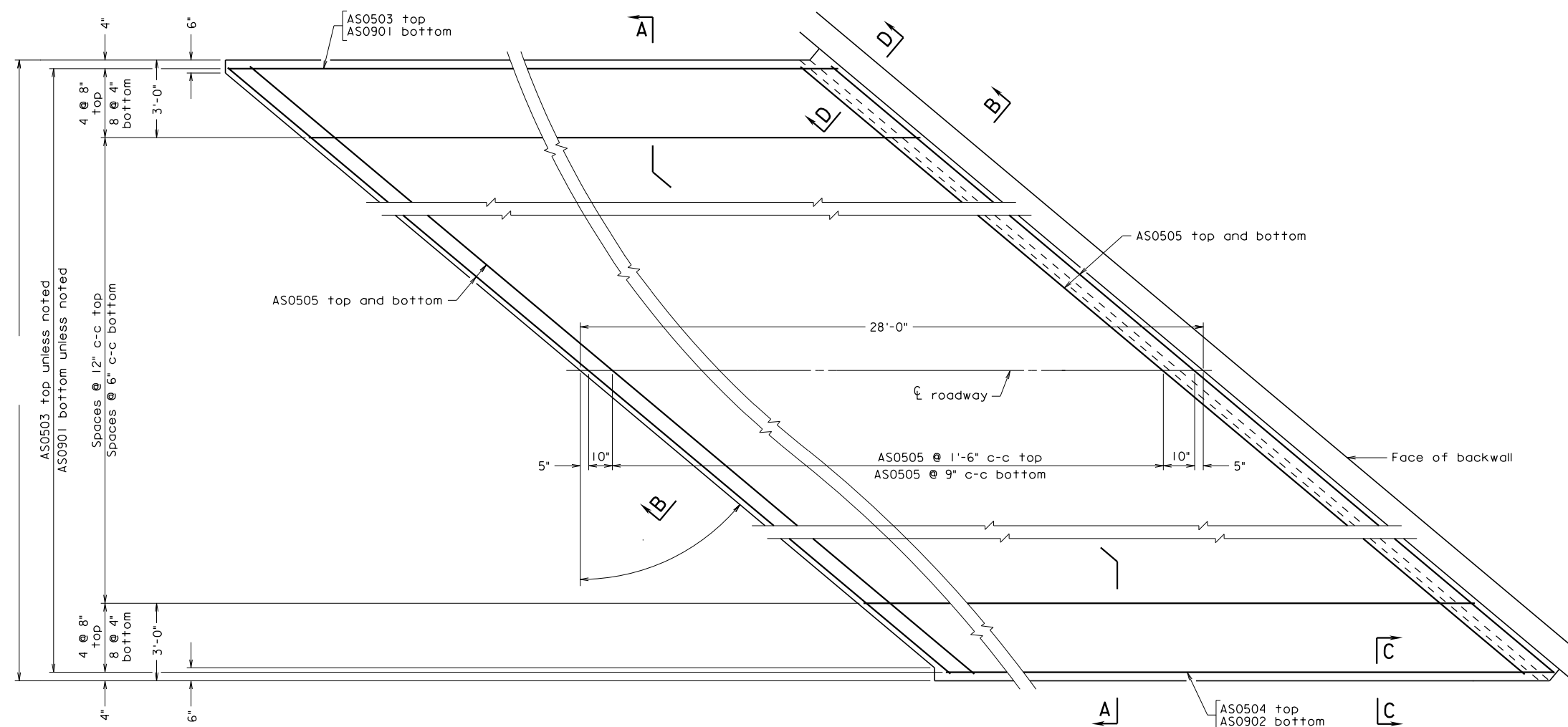
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

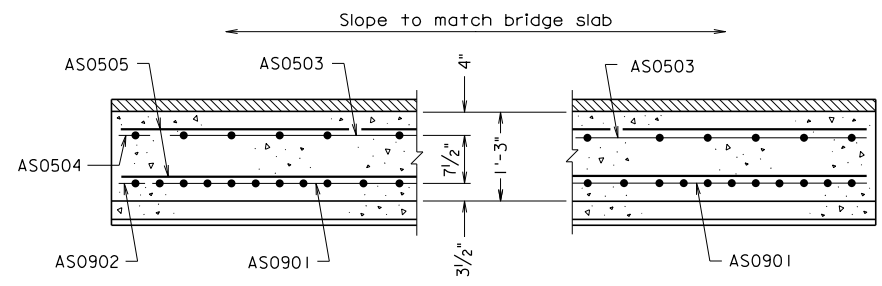
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

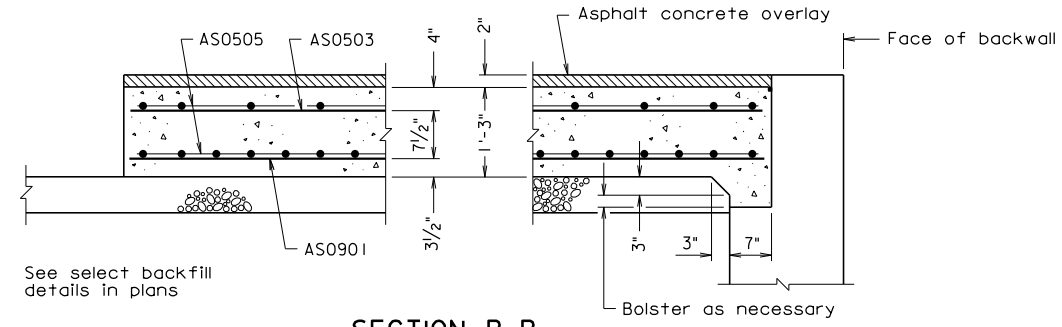
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



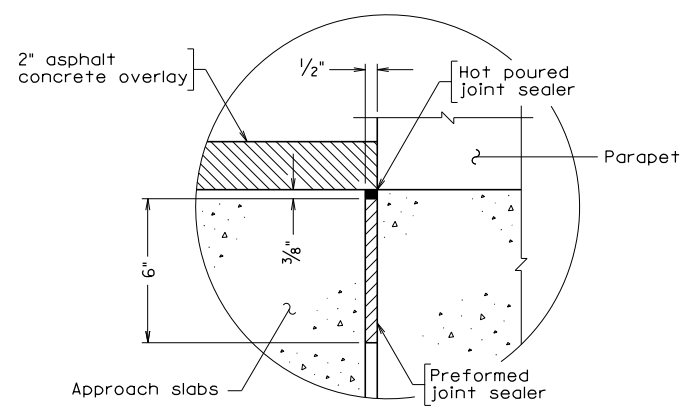
PLAN
Scale: 3/8" = 1'-0"



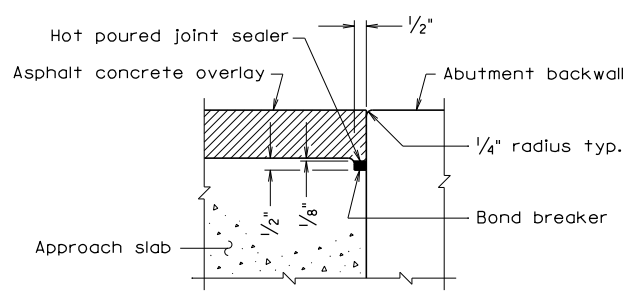
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
AS0901		#9		27'-5"	Bottom longitudinal
AS0902		#9		27'-2"	Bottom longitudinal
AS0503		#5		27'-5"	Top longitudinal
AS0504		#5		27'-2"	Top longitudinal
AS0505		#5			Top and bottom transverse

ESTIMATED QUANTITIES

	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB	Asphalt Concrete Type Ton
Abutment A			
Abutment B			
Totals			

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

BAS-15AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

APPROACH SLABS

No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
			Drawn: ...S&B...DIV			
			Checked: S&B...DIV			

BAS-15AL

APPROACH SLAB

SKEW OVER 45° TO 50°, SKEW LEFT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 45° to 50°, skew left

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

REINFORCING STEEL SCHEDULE:

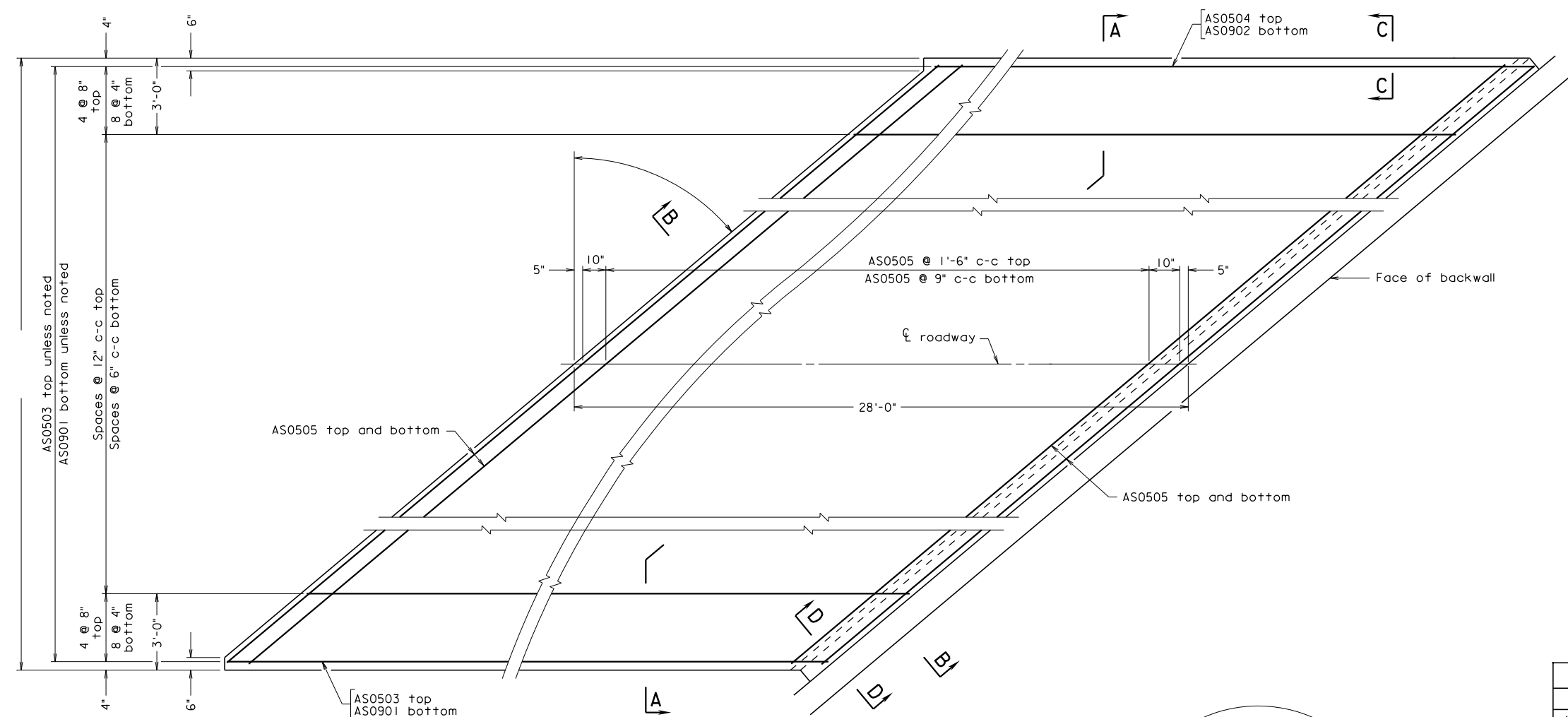
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	PROJECT	



Notes:

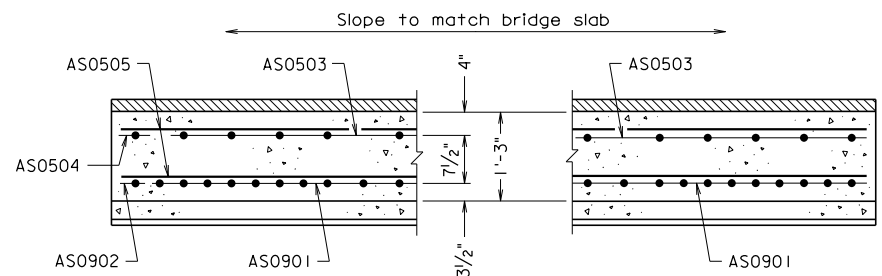
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

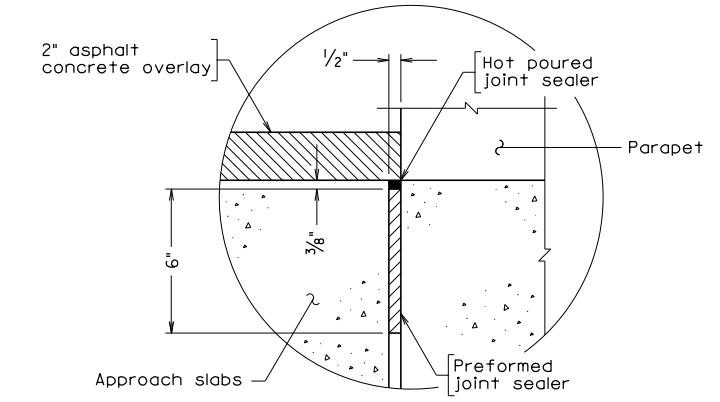
Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

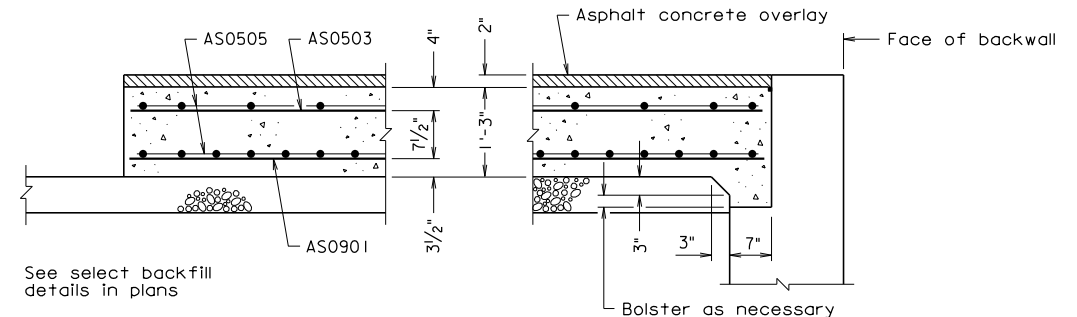
PLAN
Scale: 3/8" = 1'-0"



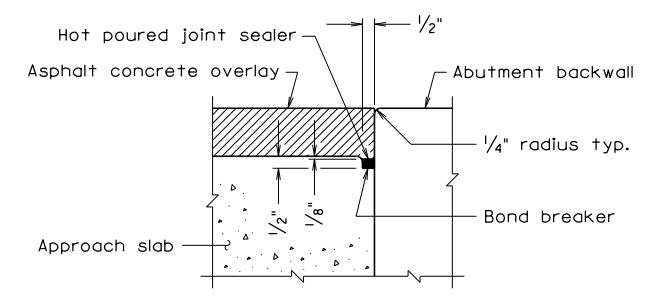
SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901		#9		27'-5"	Bottom longitudinal
AS0902		#9		27'-2"	Bottom longitudinal
AS0503		#5		27'-5"	Top longitudinal
AS0504		#5		27'-2"	Top longitudinal
AS0505		#5			Top and bottom transverse

ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A			
Abutment B			
Totals			

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
	Revisions		Date
			Plan No.
			Sheet No.

BAS-15AR

BAS-15AR 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

APPROACH SLAB

SKEW OVER 45° TO 50°, SKEW RIGHT; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 45° to 50°, skew right

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls.

REINFORCING STEEL SCHEDULE:

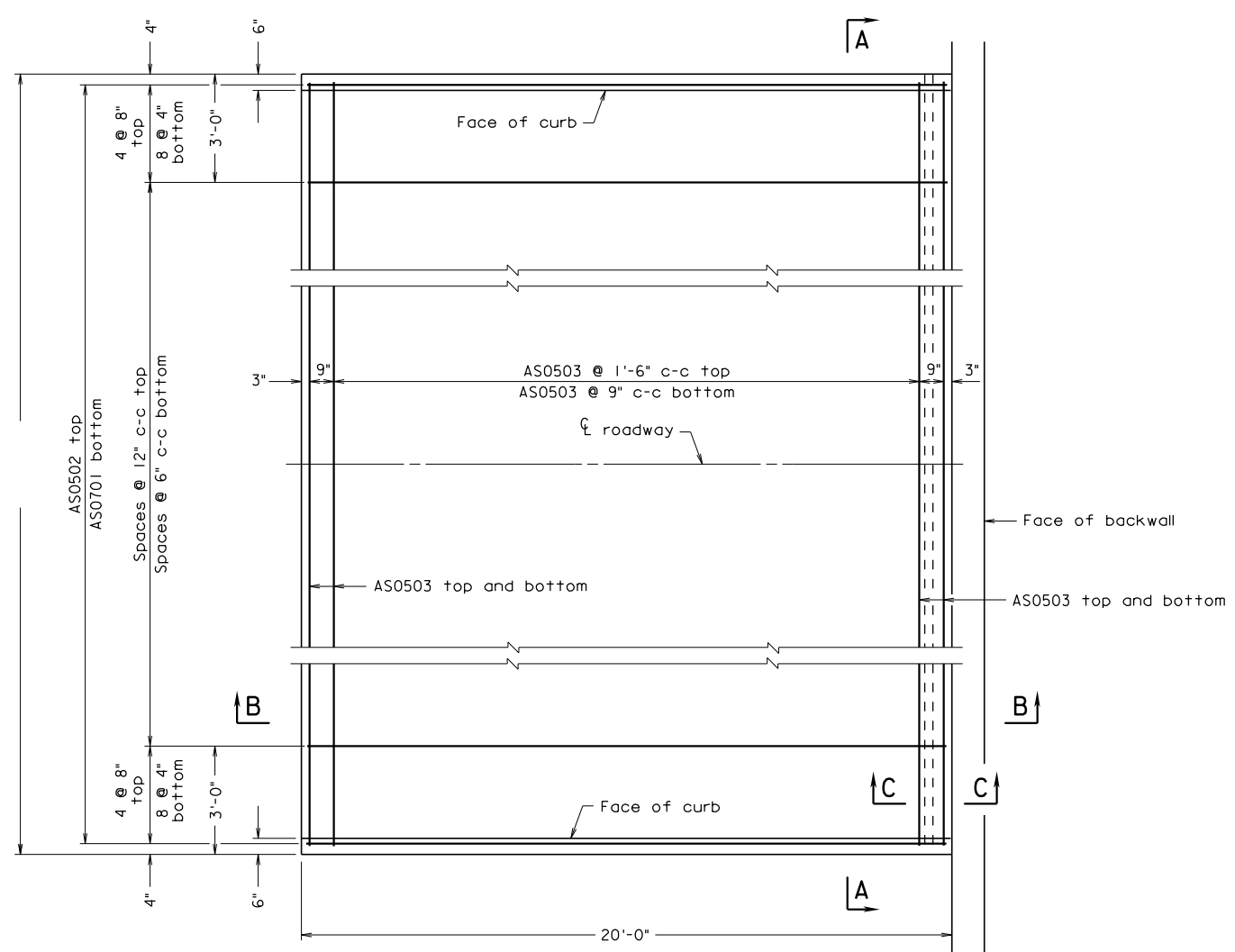
Enter number of bars and length of AS0505 bar.

ESTIMATED QUANTITIES:

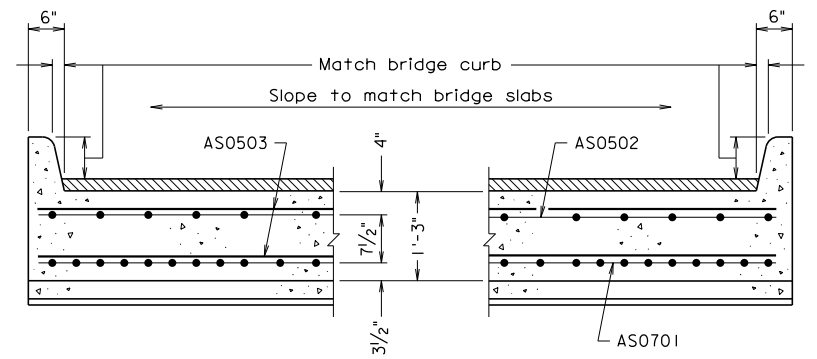
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

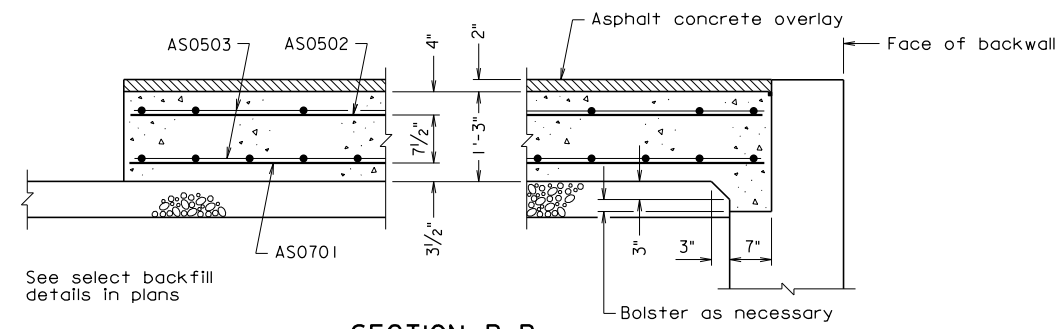
STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					



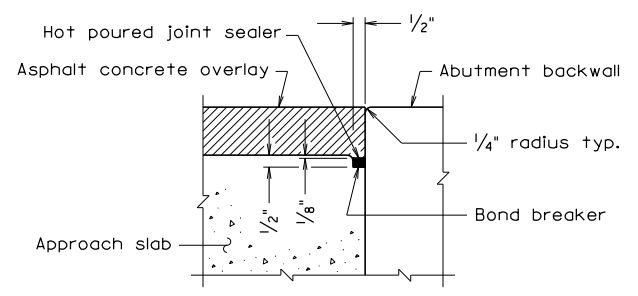
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES

	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-16A 05-03-2013 bas16a.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BAS-16A		

APPROACH SLAB
STRAIGHT CROSSING
STRUCTURE WITH SIDEWALKS;
APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: 0° Skew
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Modify details as needed when using integral abutments, elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

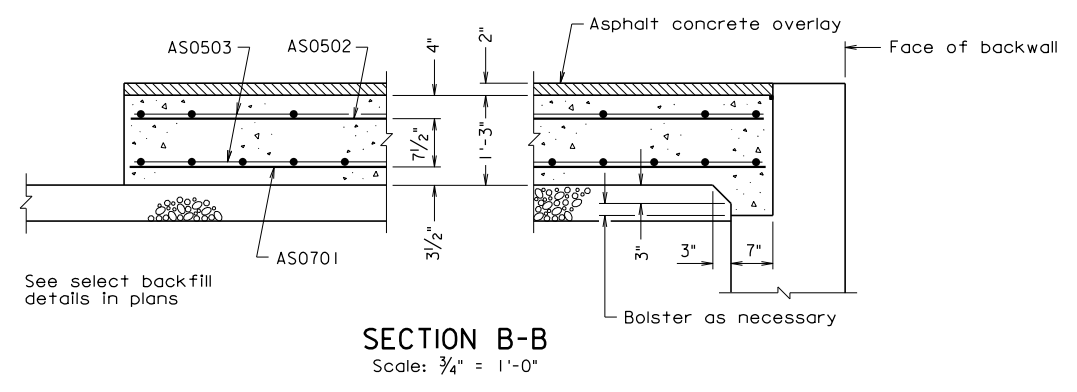
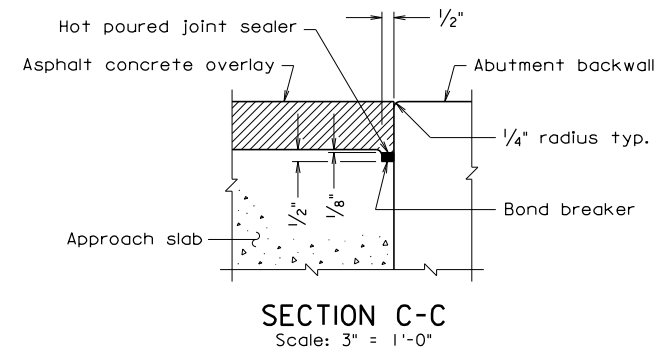
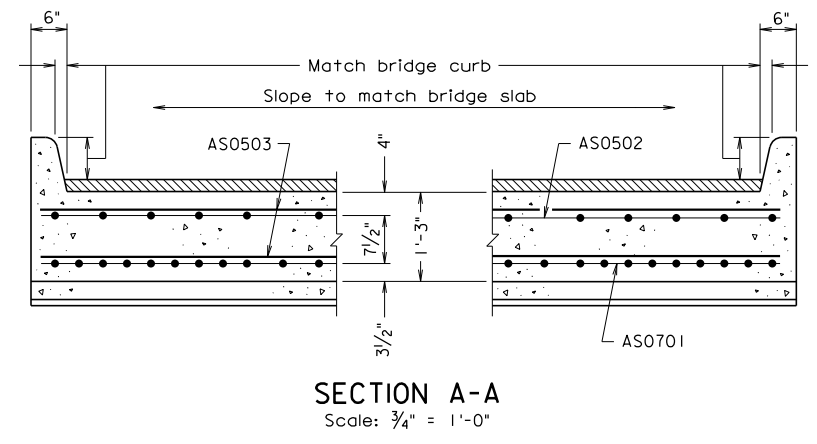
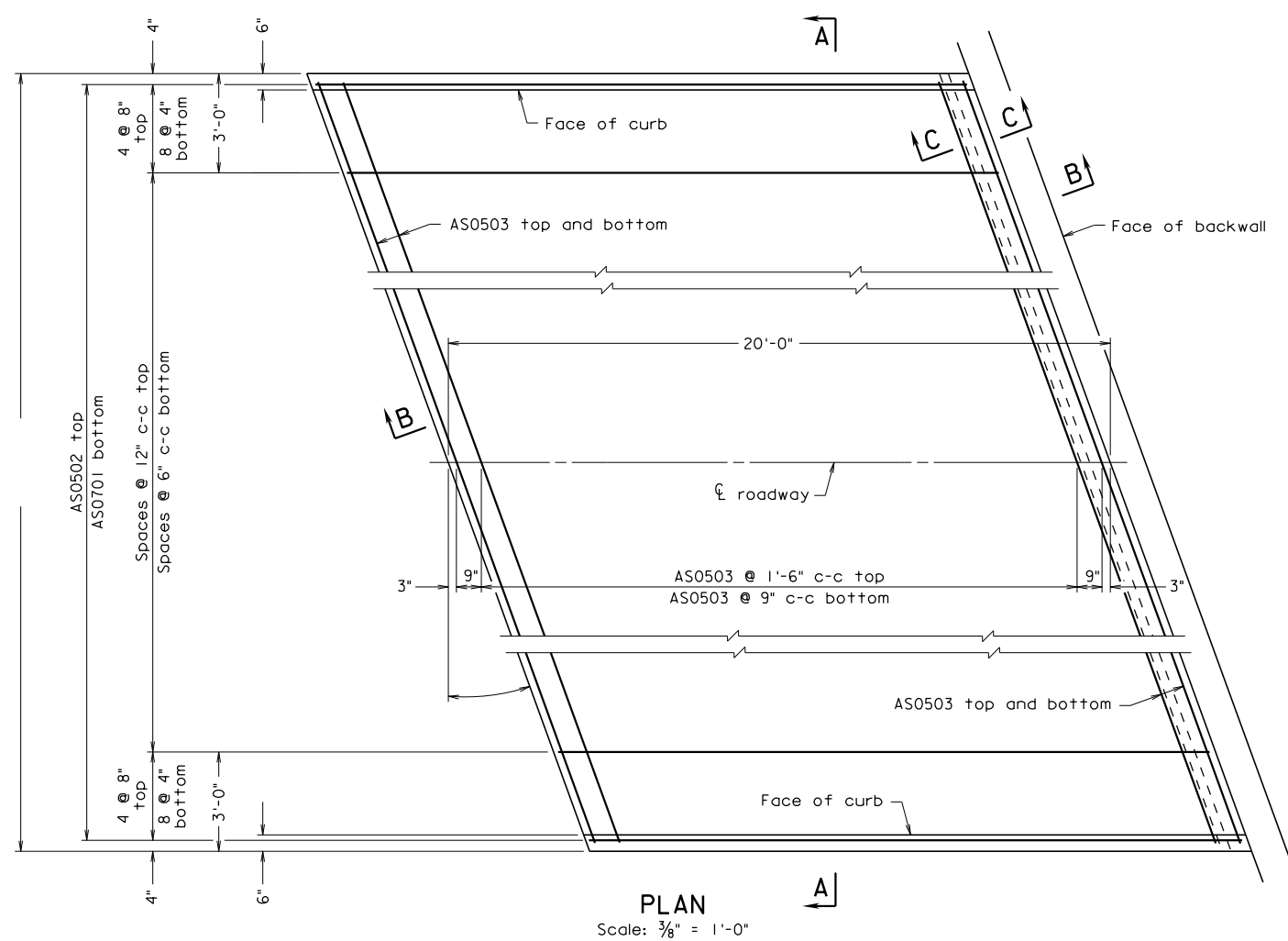
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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	Concrete Class A4 Bridge Approach Slab ⊗ CY	Reinforcing Steel Bridge Approach Slab ⊗ LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-17AL 05-03-2013 bas17al.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Sheet No.
Designed: S&B DIV		Date	Plan No.
Drawn: S&B DIV		Checked: S&B DIV	
Revisions		BAS-17AL	

APPROACH SLAB

SKEW 20° OR LESS, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° or less, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

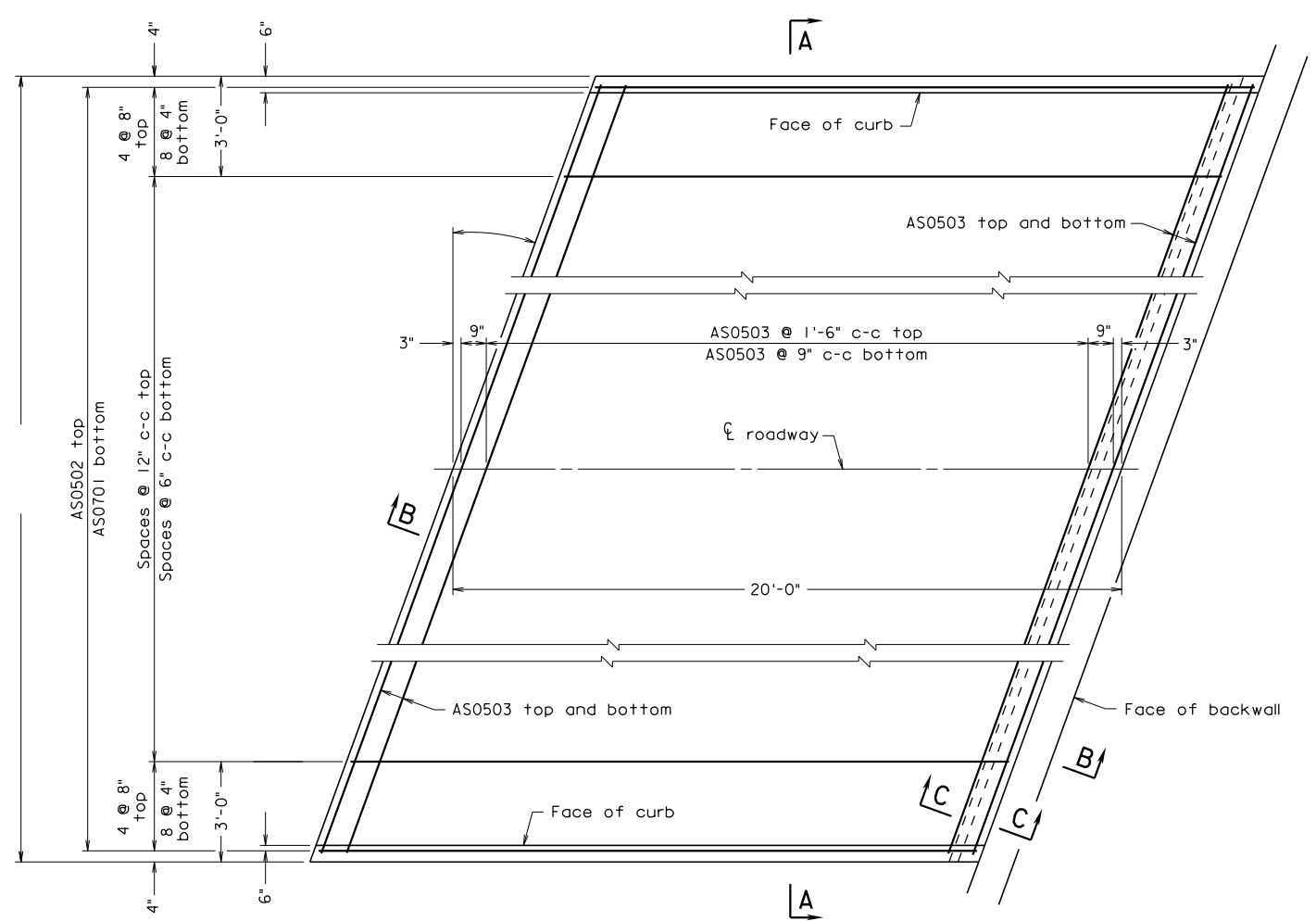
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

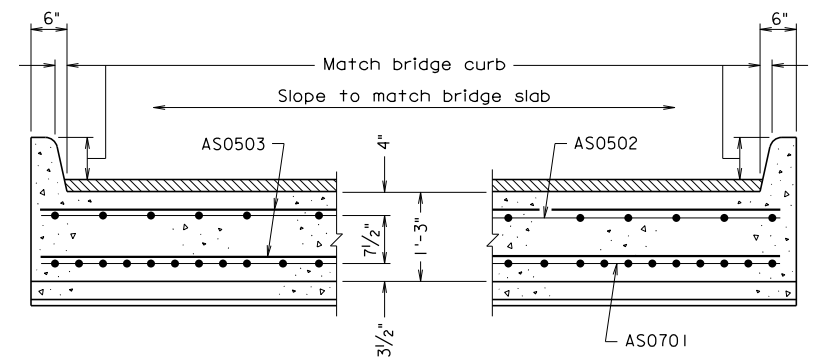
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

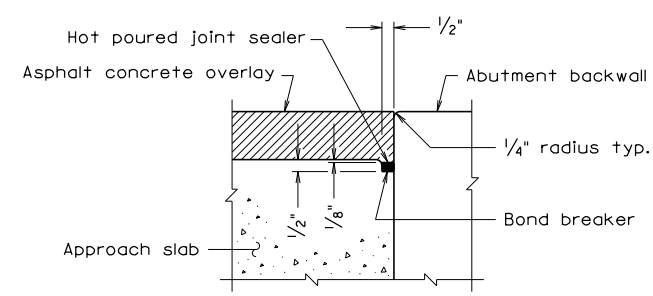
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



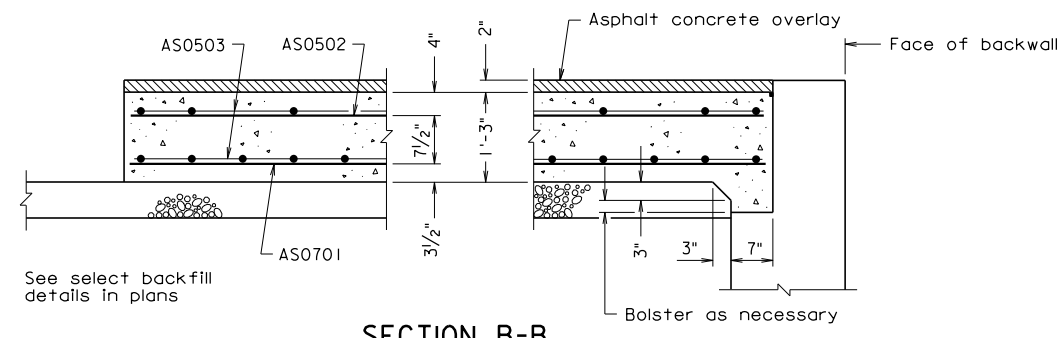
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0701	.	#7	—	19'-8"	Bottom longitudinal
AS0502	.	#5	—	19'-8"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-17AR 05-03-2013 bas17ar.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Designed: S&B, DIV
			Drawn: S&B, DIV
			Checked: S&B, DIV
	Revisions		
		Date	Plan No.
			Sheet No.
			BAS-17AR

APPROACH SLAB

SKEW 20° OR LESS, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew 20° or less, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 bar.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

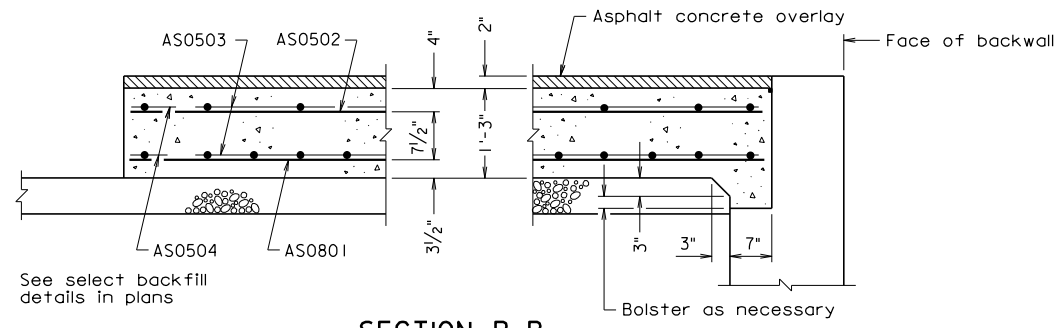
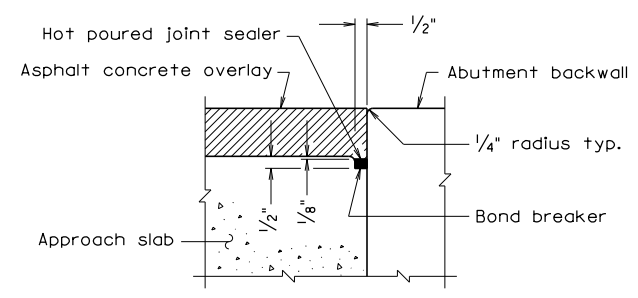
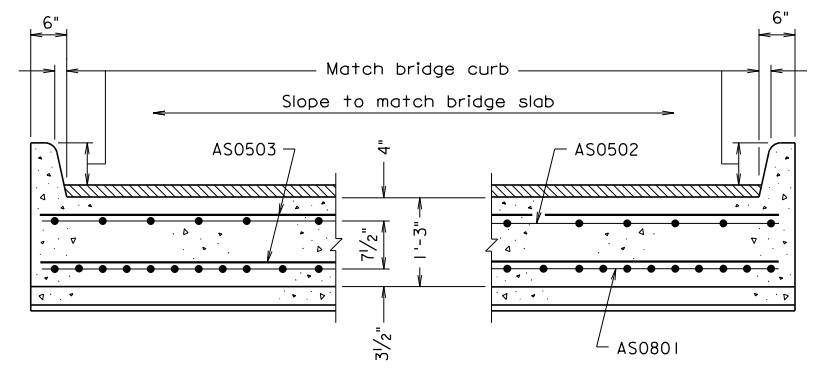
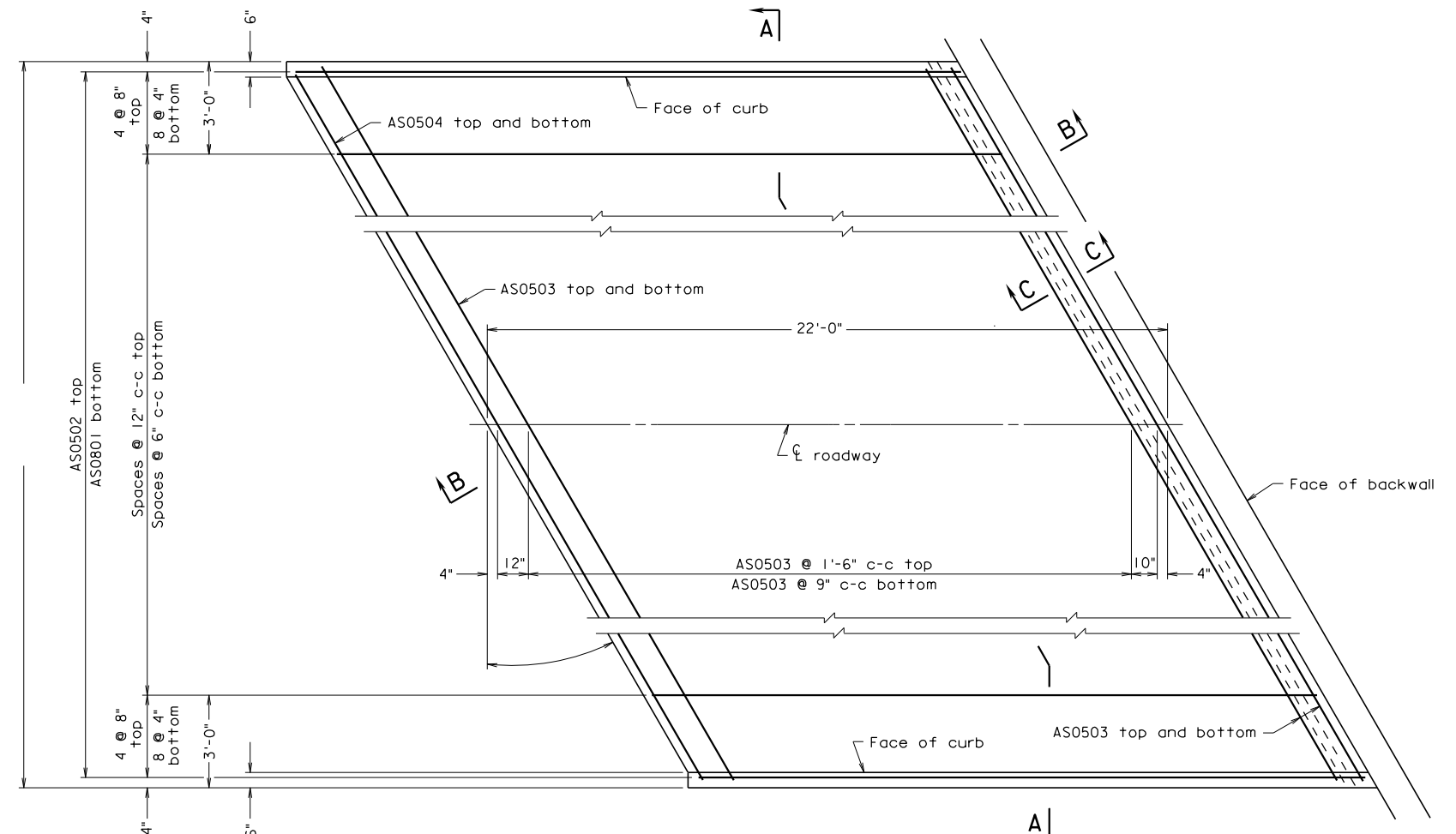
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0502	.	#5	—	21'-6"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-18AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Sheet No.
Designed: S&B DIV		Date	Plan No.
Drawn: S&B DIV		Checked: S&B DIV	
Revisions		BAS-18AL	

APPROACH SLAB

SKEW 20° TO 35°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 20° to 35°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	PROJECT	

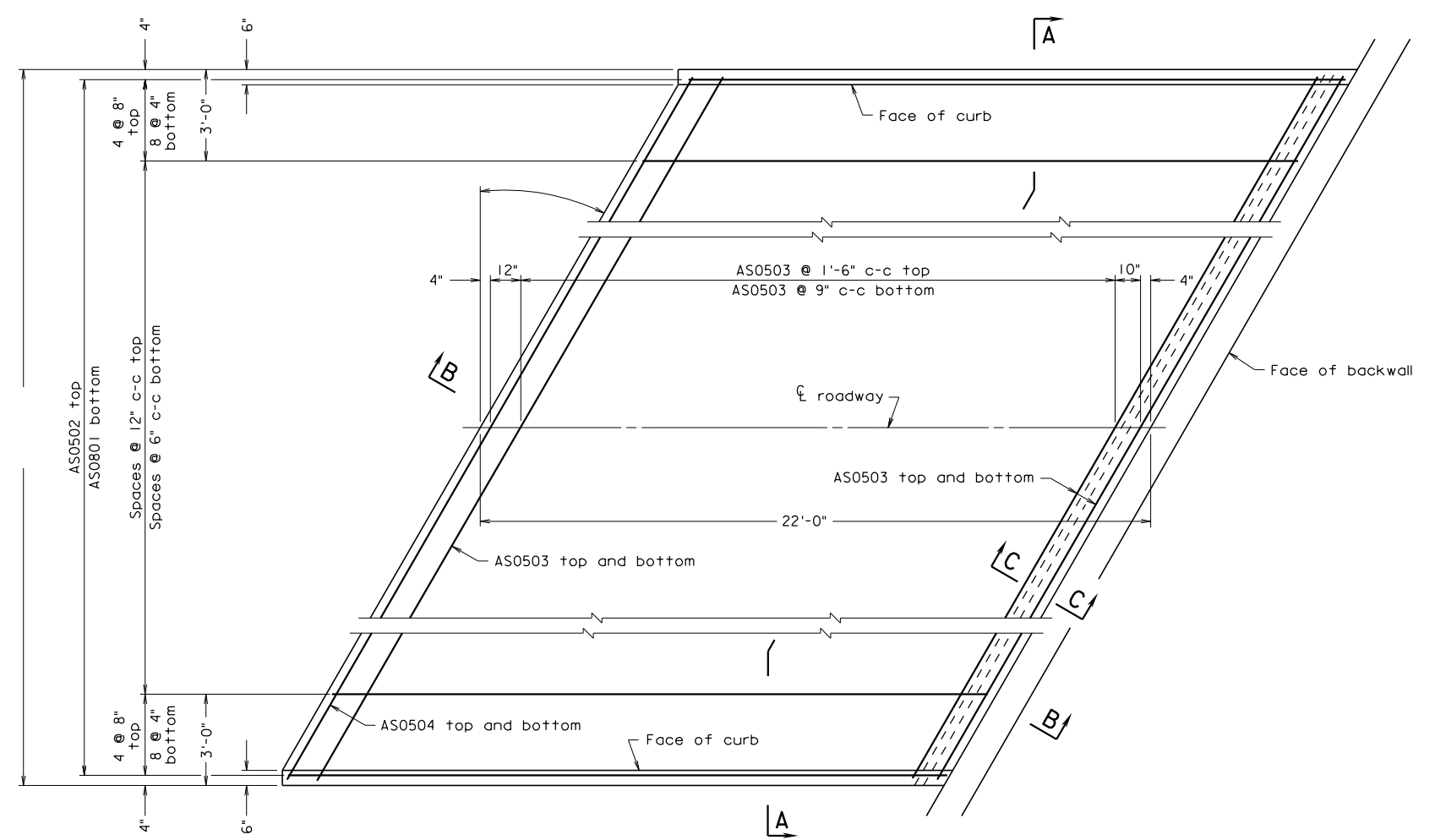
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

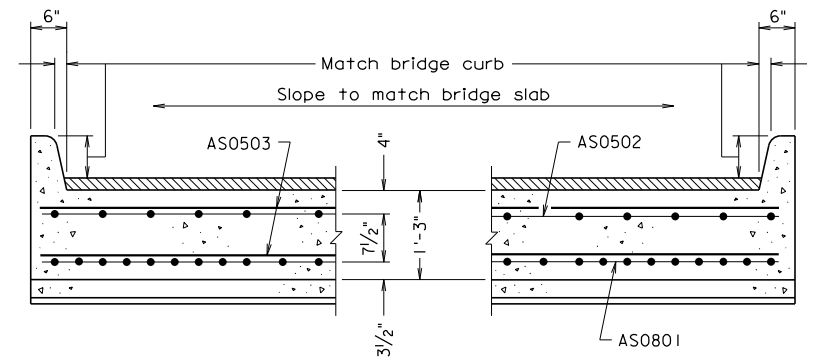
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

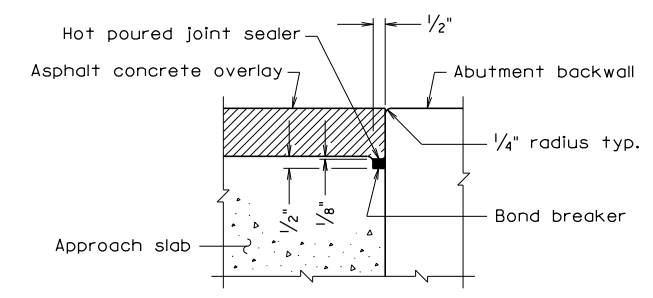
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



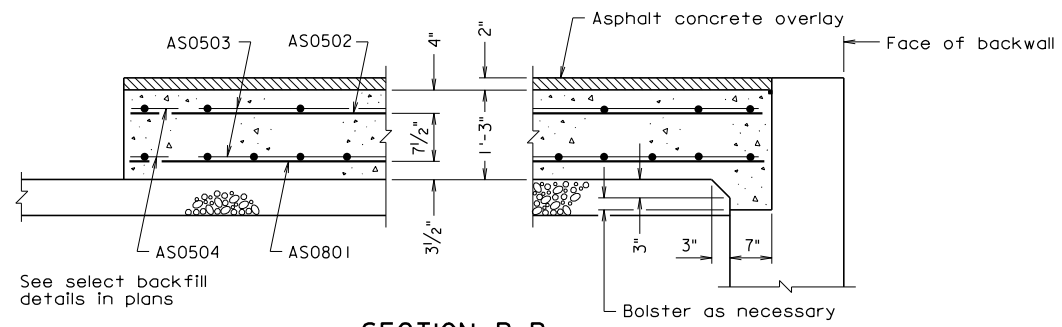
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	21'-6"	Bottom longitudinal
AS0502	.	#5	—	21'-6"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
.
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-18AR 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale as noted

© 2013, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Sheet No.
Revisions		Designed: S&B, DIV	Plan No.
		Drawn: S&B, DIV	Sheet No.
		Checked: S&B, DIV	

BAS-18AR

APPROACH SLAB

SKEW 20° TO 35°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 20° to 35°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using integral abutments, elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

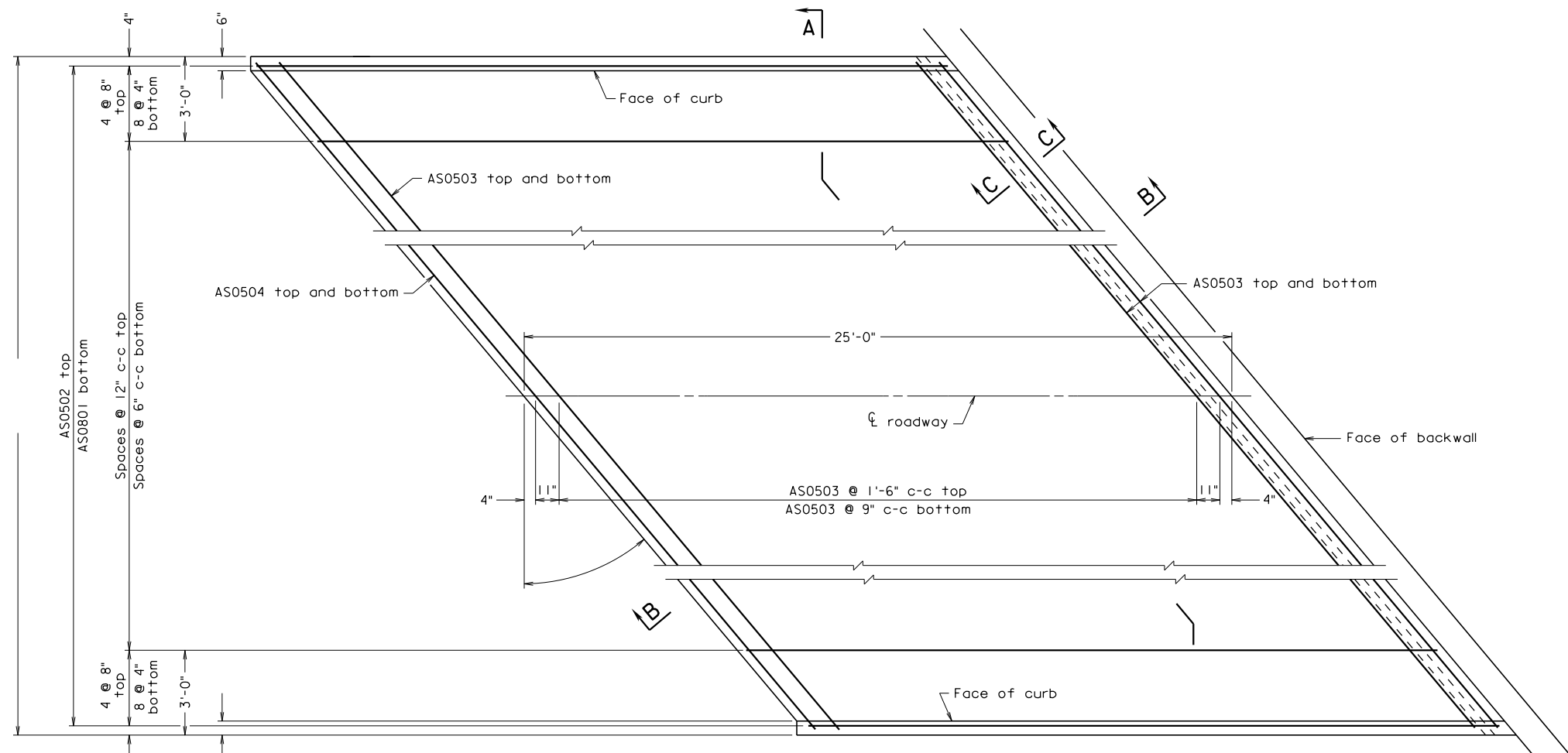
Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

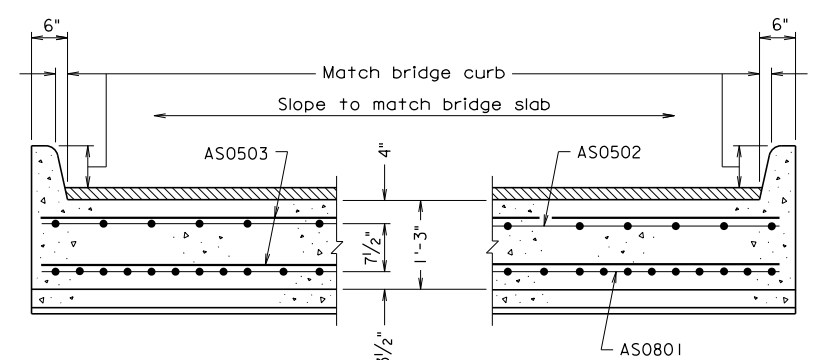
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

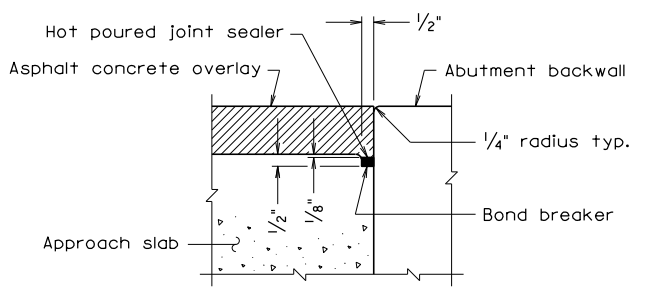
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



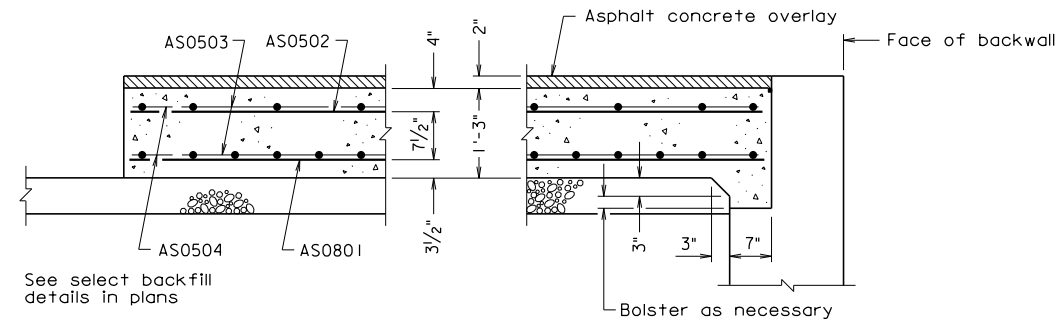
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0502	.	#5	—	24'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

bas19al.dgn

BAS-19AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Sheet No.
	Revisions		
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV			
Checked: S&B...DIV			

BAS-19AL

APPROACH SLAB

SKEW 35° TO 45°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 35° to 45°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

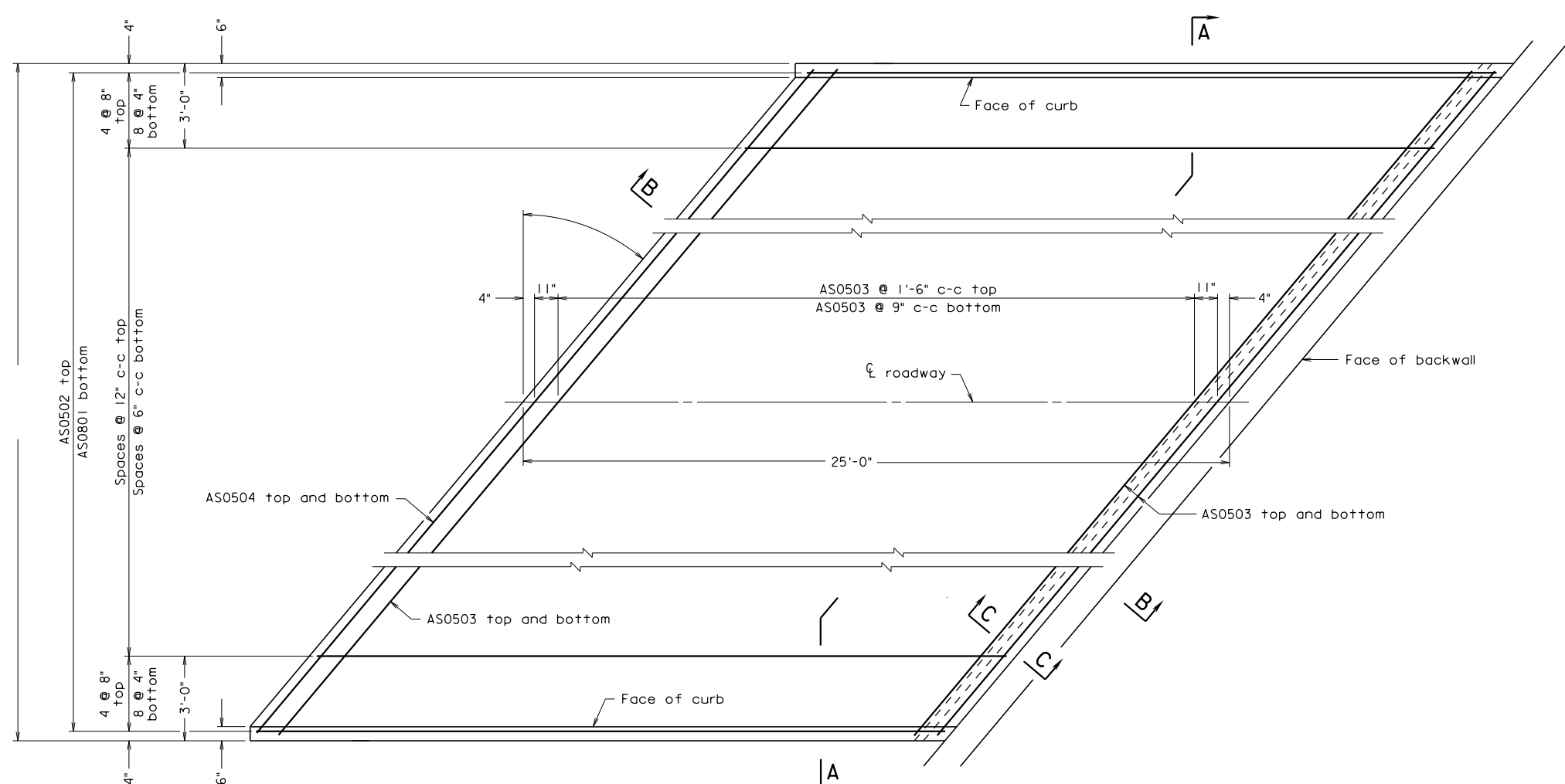
Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

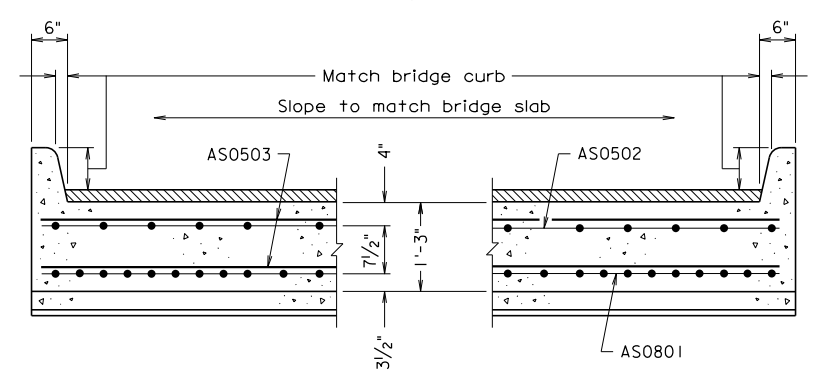
Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

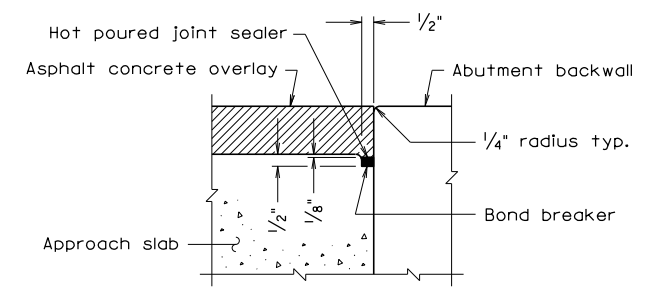
No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.



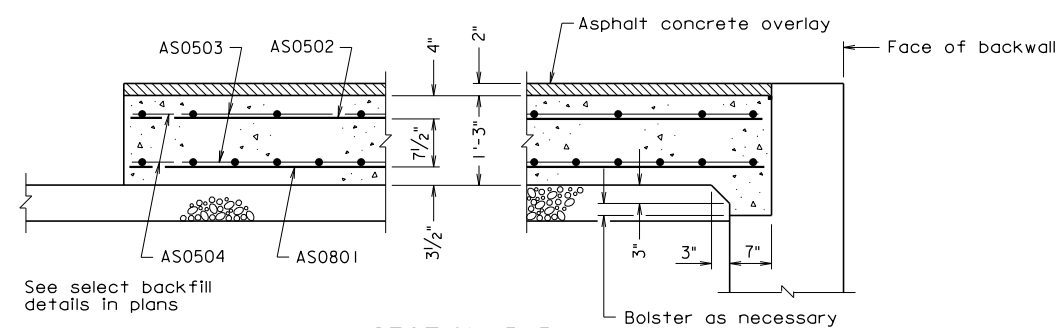
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0801	.	#8	—	24'-5"	Bottom longitudinal
AS0502	.	#5	—	24'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	—	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab CY	Reinforcing Steel Bridge Approach Slab LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
APPROACH SLABS			
No.	Description	Date	Designed: S&B, DIV
			Drawn: S&B, DIV
			Checked: S&B, DIV
	Revisions		
		Date	Plan No.
			Sheet No.
			BAS-19AR

BAS-19AR 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale as noted

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APPROACH SLAB

SKEW 35° TO 45°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 35° to 45°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

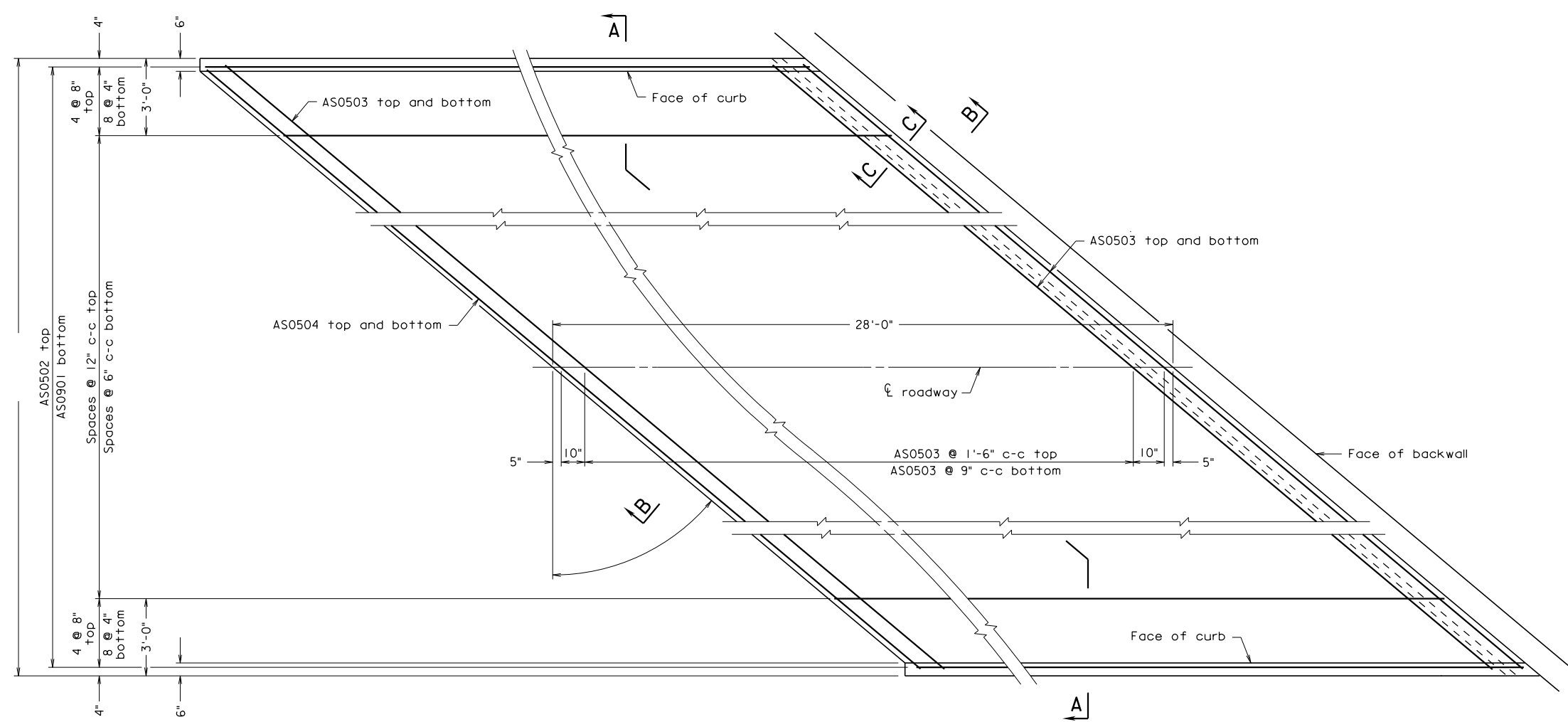
Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



PLAN
Scale: $\frac{3}{8}'' = 1'-0''$

Notes:

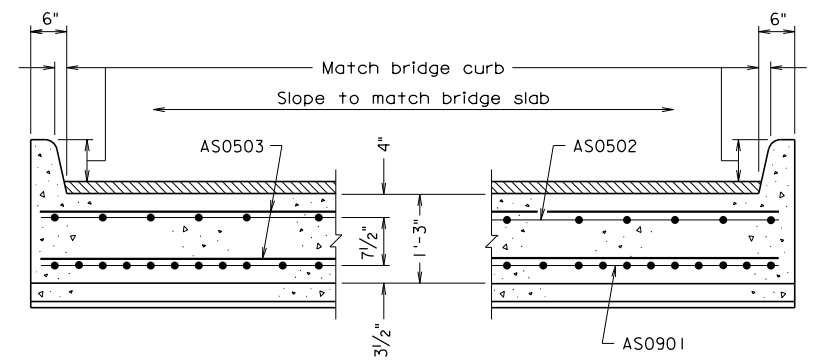
All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

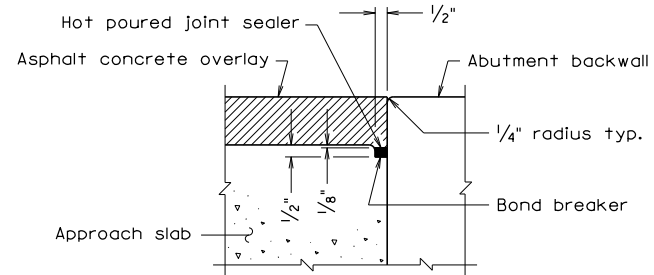
Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

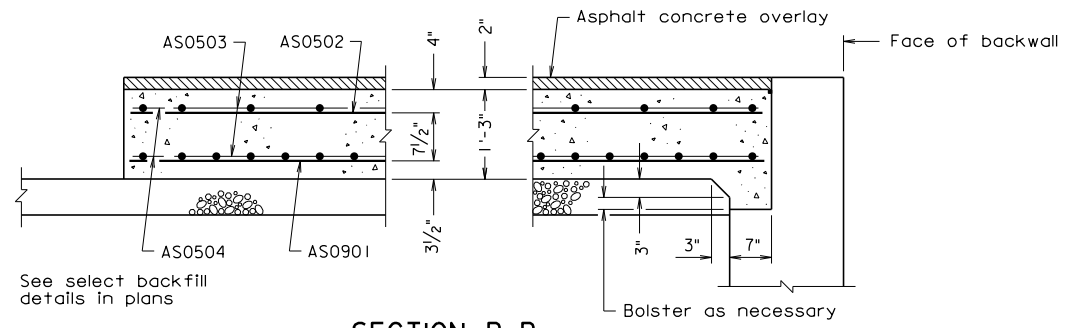
REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901	.	#9	—	27'-5"	Bottom longitudinal
AS0502	.	#5	—	27'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	.	.	Top and bottom transverse
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SECTION A-A
Scale: $\frac{3}{4}'' = 1'-0''$



SECTION C-C
Scale: $3'' = 1'-0''$



SECTION B-B
Scale: $\frac{3}{4}'' = 1'-0''$

ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

BAS-20AL 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
APPROACH SLABS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BAS-20AL		

APPROACH SLAB

SKEW 45° TO 50°, SKEW LEFT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 45° to 50°, skew left
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls, etc. Modify when sidewalk is only on one side.

REINFORCING STEEL SCHEDULE:

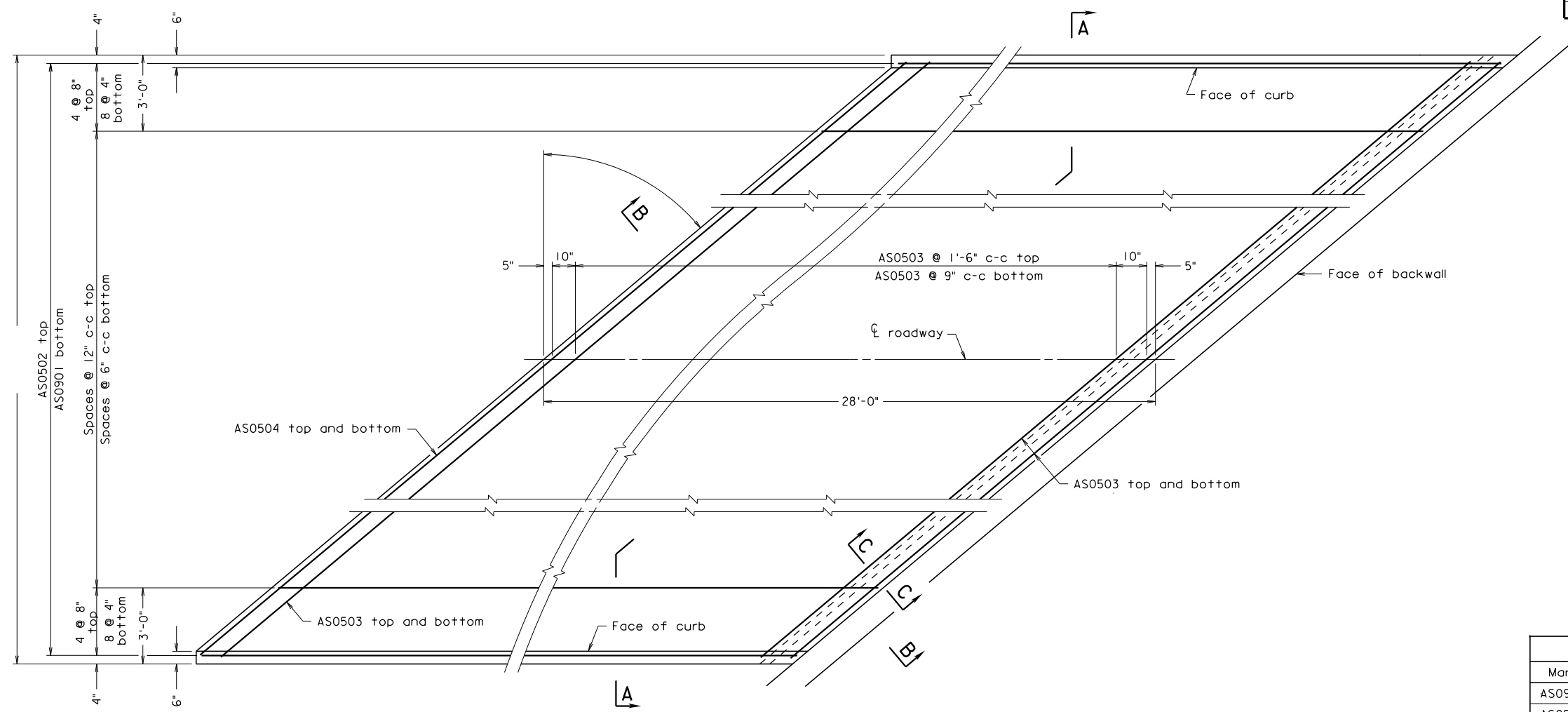
Enter number of bars and length of AS0503 and AS0504 bars.

ESTIMATED QUANTITIES:

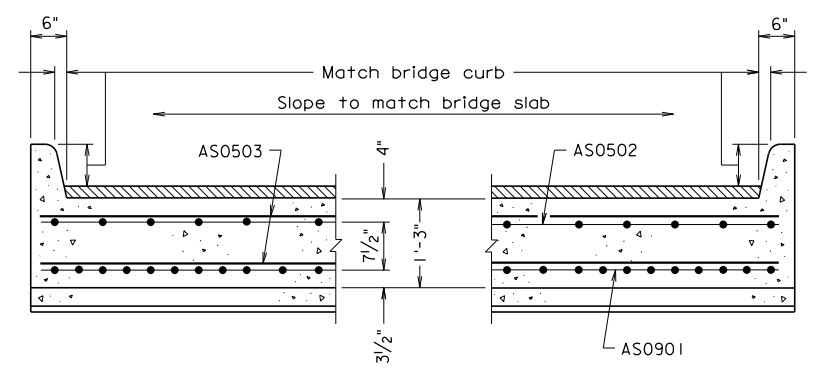
Indicate type of asphalt concrete overlay (in heading).

Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.

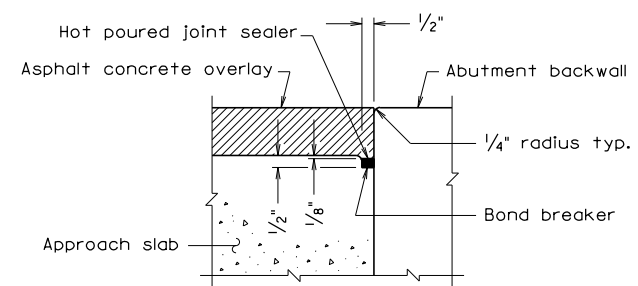
STATE	FEDERAL AID		STATE	SHEET
VA.	ROUTE	PROJECT	ROUTE	NO.



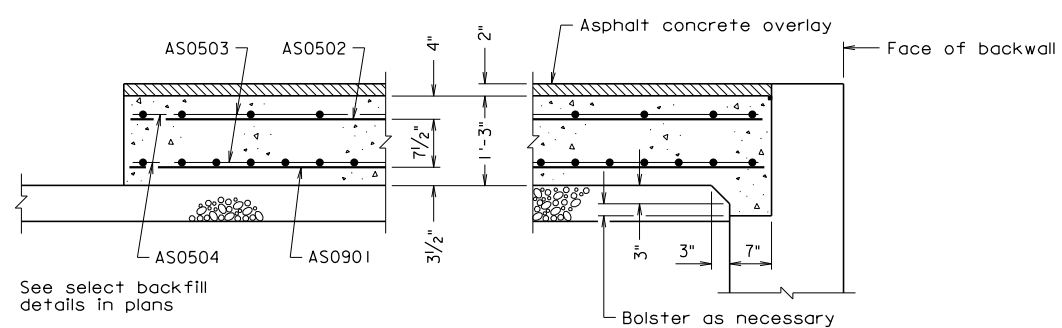
PLAN
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"



SECTION C-C
Scale: 3" = 1'-0"



SECTION B-B
Scale: 3/4" = 1'-0"

Notes:

All joints that are to be sealed shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free compressed air.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions except for bending diagram are to centers of bars.

Prime aggregate base material with 0.35 gal. per sq. yd. Liquid Asphalt Material Type RC-70, RC-250 or MC-250 if aggregate base is exposed for more than two weeks. Cost included in select backfill.

No grooving is required. The finish shall include a multi-ply damp fabric dragged over the approach slab surface to provide a gritty texture.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
AS0901	.	#9	—	27'-5"	Bottom longitudinal
AS0502	.	#5	—	27'-5"	Top longitudinal
AS0503	.	#5	—	.	Top and bottom transverse
AS0504	.	#5	.	.	Top and bottom transverse
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ESTIMATED QUANTITIES			
	Concrete Class A4 Bridge Approach Slab \otimes CY	Reinforcing Steel Bridge Approach Slab \otimes LB	Asphalt Concrete Type Ton
Abutment A	.	.	.
Abutment B	.	.	.
Totals	.	.	.

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

bas20ar.dgn

BAS-20AR 05-03-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
May 3, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

APPROACH SLABS

No.	Description	Date	Designed: S&B DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: S&B DIV			
			Checked: S&B DIV			

BAS-20AR

APPROACH SLAB

SKEW 45° TO 50°, SKEW RIGHT STRUCTURE WITH SIDEWALKS; APPROACH ROADWAY ASPHALT CONCRETE

NOTES TO DESIGNER:

Standard to be used when approach roadway is to be constructed of asphalt concrete.

Standard is for: Skew over 45° to 50°, skew right
Structure with sidewalks

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Enter skew angle, width dimension and number of spaces for AS bars (top and bottom). Check details of corner(s) where approach slab rests on back of abutment backwall. Modify details as needed when using elephant ear wing walls, etc. Modify when sidewalk is only on one side.

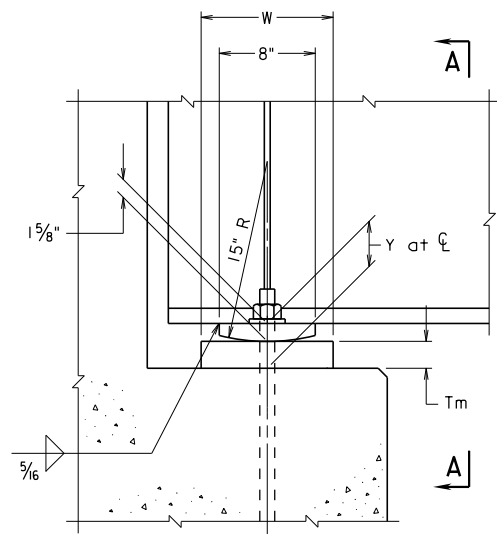
REINFORCING STEEL SCHEDULE:

Enter number of bars and length of AS0503 and AS0504 bars.

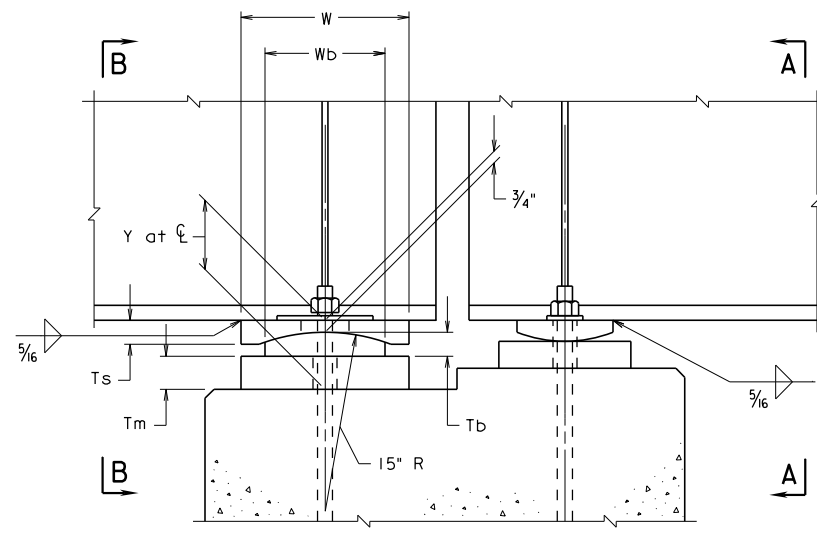
ESTIMATED QUANTITIES:

Indicate type of asphalt concrete overlay (in heading).

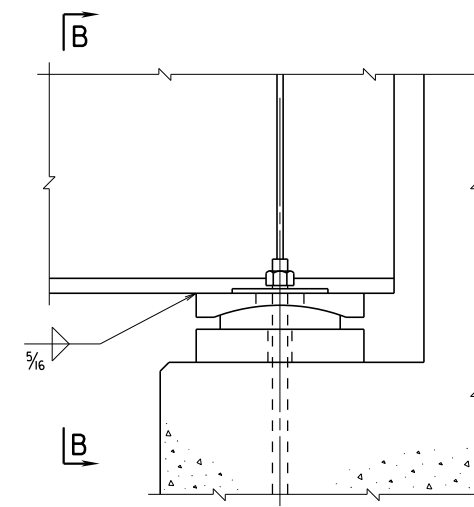
Enter concrete, reinforcing steel and asphalt concrete quantities for Abutments A and B and Totals.



FIXED BEARING ABUTMENT ELEVATION

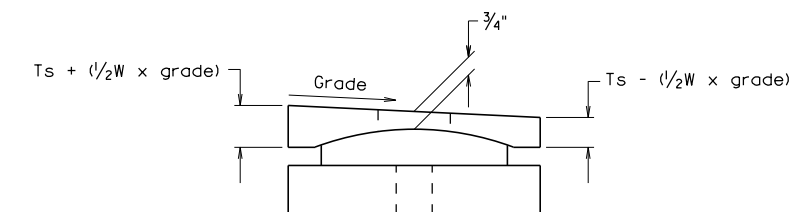


EXPANSION BEARING FIXED BEARING PIER ELEVATION

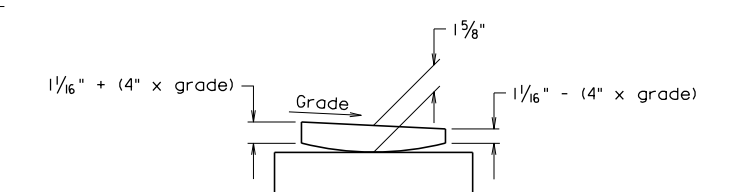


EXPANSION BEARING ABUTMENT ELEVATION

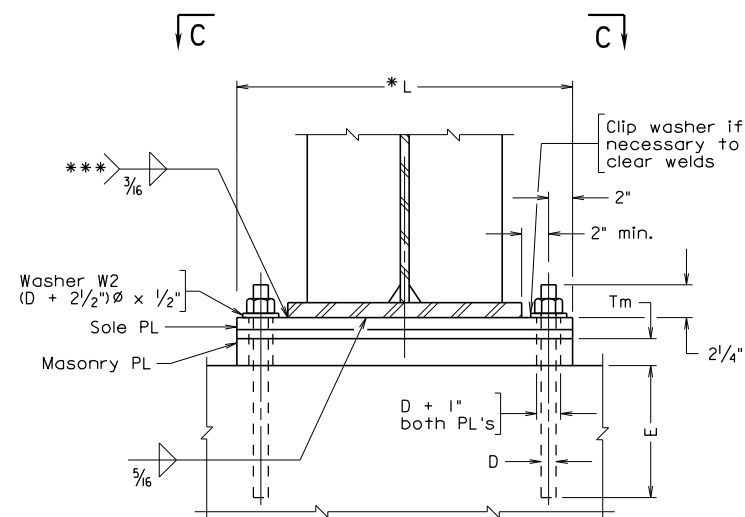
Notes:
The nuts on the fixed bearings shall be snug tightened.
Fill slots and holes in masonry plate around anchor bolts with a non-hardening caulking compound or elastic joint sealer.
For expansion bearing, bevel sole plate to match grade if grade exceeds 1%. For fixed bearing, bevel sole plate if grade exceeds 3%.
Bearing stiffeners shown are omitted if rolled beam is used.
Radius may be machined to compensate for grade.
Bearing shall be set so that at 60°F it is at the midpoint of its movement.
For expansion bearings, 15° radius tolerances: Sole PL - 0", + .01"
Bronze PL - .01", + 0"



PART DETAIL OF EXPANSION BEARING Showing beveled sole plate

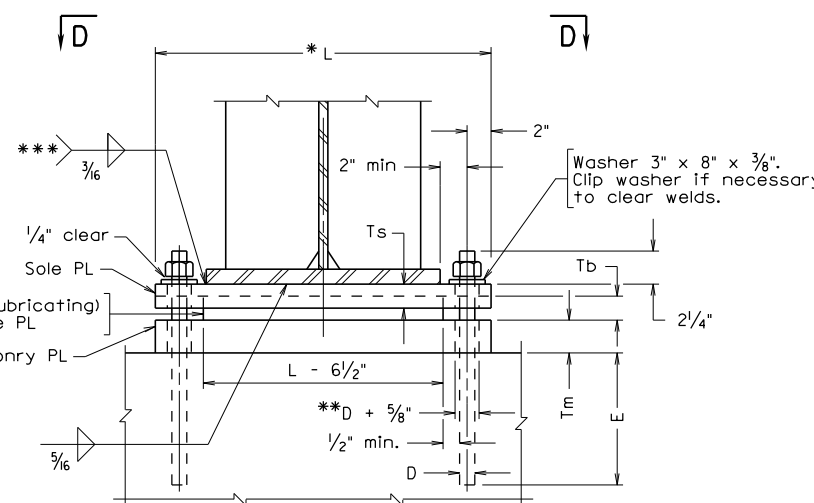


PART DETAIL OF FIXED BEARING Showing beveled sole plate



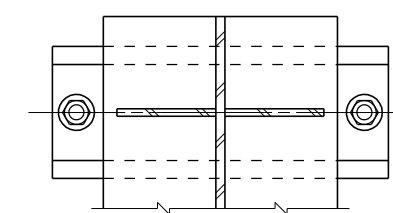
SECTION A-A

* Min. = flange width + 8" or calculated L whichever is greater.
*** Weld shall terminate 1/4" from edge of bearing plate.

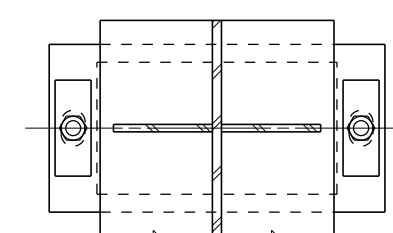


SECTION B-B

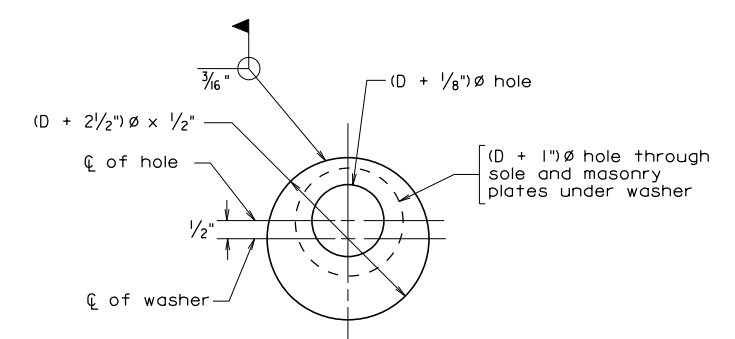
**Masonry PL only



SECTION C-C



SECTION D-D



WASHER W2

DESIGNATION TABLE																	
Span	Abut.	Pier	Type	L	W	Wb	Ts	Tb	D	E	Sole plate slots	Y	Tm	% Grade	Δ	Fh	Reaction (kips)

Slotted holes in sole plate may be drilled or machine burned.
Dimensions Ts, Tb and Y are measured at center of bearing.
All dimensions in table are in inches.

BBD-4 10-15-2015 bbd-4.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
BEARING DETAILS			
No.	Description	Date	Sheet No.
Designed: S&B DIV		Date	Plan No.
Drawn: S&B DIV			
Checked: S&B DIV			
Revisions			BBD-4

BEARING DETAILS

LOW PROFILE BEARINGS FOR STEEL BEAMS OR GIRDERS

NOTES TO DESIGNER:

Standard is for use with steel beams or girders.

Set fixed bearing assemblies at low end of spans where practical.

Include weight of bearing assemblies in structural steel quantities.

On vertical curves with skewed substructures, bearings may be grouped together by average Grade % as long as the grade does not vary by more than 0.25% in any group. The grade is the grade of the chord between the bearings at opposite ends of a beam.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

DESIGNATION TABLE:

Complete designation table with data as applicable: Span (designation), Abutment (A or B normally), Pier (designation), Type (Fixed or Exp.), and

"L" is length of sole plate and masonry plate. Use greater of flange width + 8" and calculated "L".

"W" is width of masonry plate for fixed bearing or width of sole plate and masonry plate for expansion bearing.

"Wb" is width of bronze plate.

"Ts" is thickness of sole plate.

"Tb" is thickness of bronze plate on centerline bearing.

"D" is diameter of anchor bolt.

"E" is embedment of anchor bolt.

"Sole Plate Slots" is dimension of slot in sole plate for expansion bearing.

"Y" is total height of bearing at centerline bearing.

"Tm" is thickness of masonry plate.

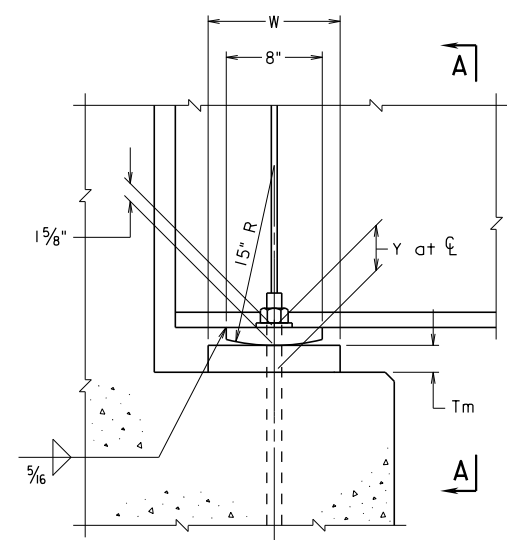
"Grade" is % of grade at centerline bearing.

"Δ" is longitudinal movement of superstructure at centerline bearing.

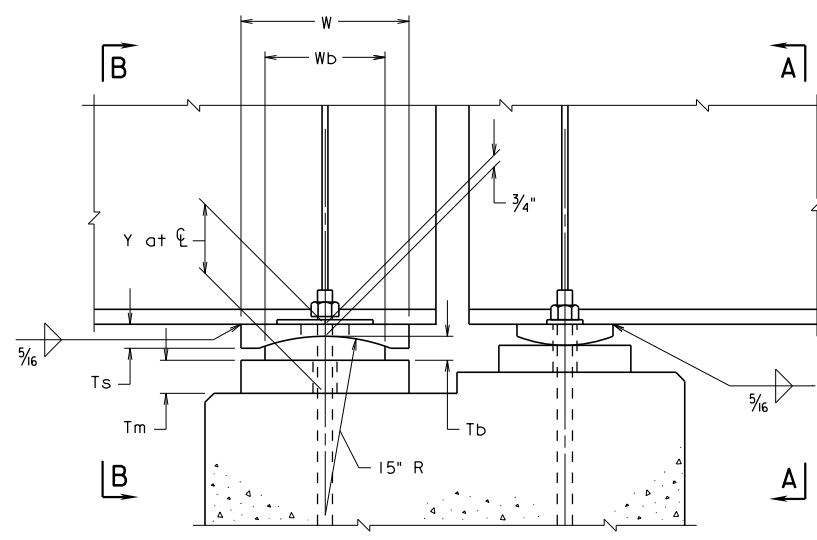
"Fh" is horizontal reaction for applicable Service Limit State.

"Reaction" is vertical reaction for applicable Service Limit State.

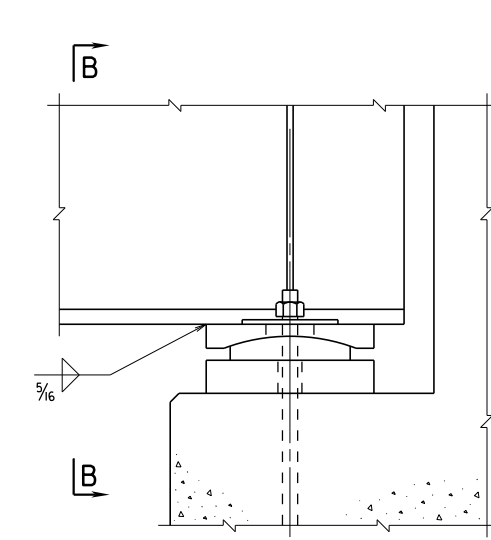
Minimum thickness of sole plate and masonry plate is $\frac{3}{4}$ ".



FIXED BEARING ABUTMENT ELEVATION

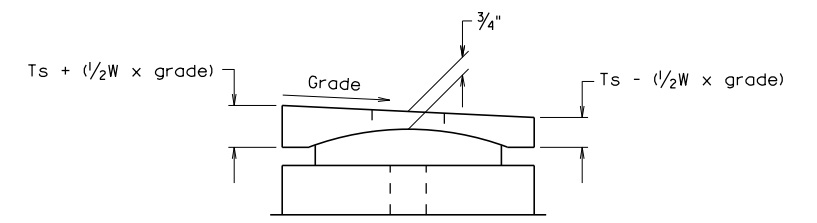


EXPANSION BEARING FIXED BEARING PIER ELEVATION

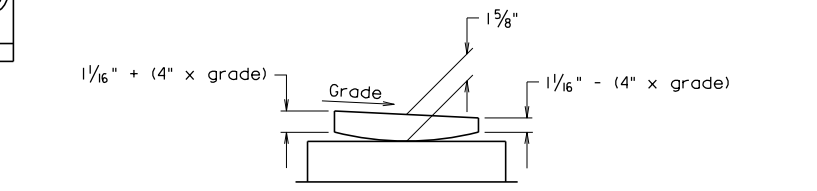


EXPANSION BEARING ABUTMENT ELEVATION

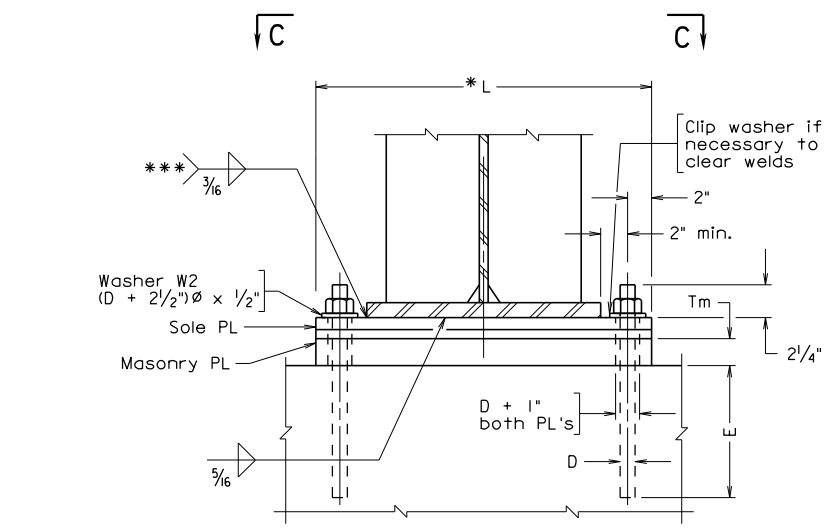
Notes:
 The nuts on the fixed bearings shall be snug tightened.
 Fill slots and holes in masonry plate around anchor bolts with a non-hardening caulking compound or elastic joint sealer.
 For expansion bearing, bevel sole plate to match grade if grade exceeds 1%. For fixed bearing, bevel sole plate if grade exceeds 3%.
 Bearing stiffeners shown are omitted if rolled beam is used.
 Radius may be machined to compensate for grade.
 Bearing shall be set so that at 60°F it is at the midpoint of its movement.
 For expansion bearings, 15° radius tolerances: Sole PL - 0", + .01"
 Bronze PL - .01", + 0"



PART DETAIL OF EXPANSION BEARING
Showing beveled sole plate

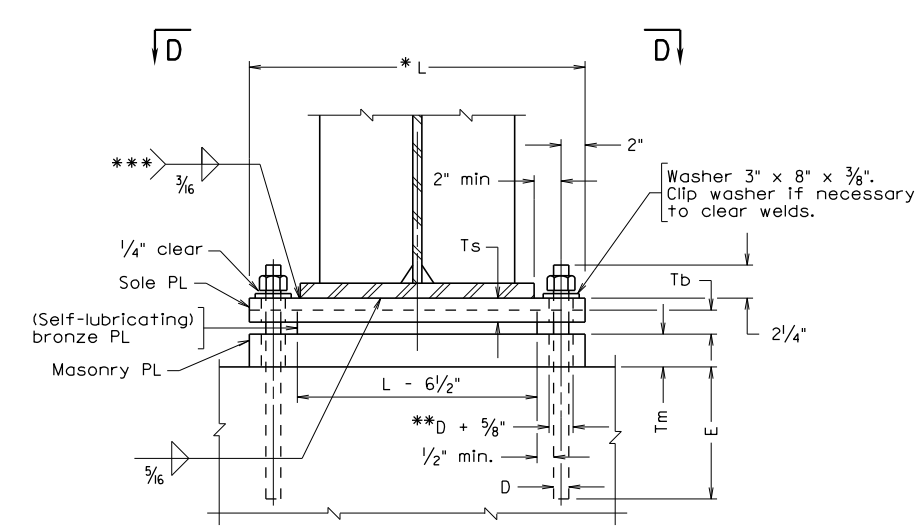


PART DETAIL OF FIXED BEARING
Showing beveled sole plate



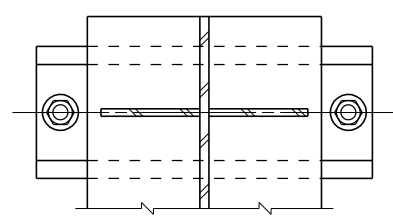
SECTION A-A

*Min. = flange width + 8" or calculated L whichever is greater.
 *** Weld shall terminate 1/4" from edge of bearing plate.

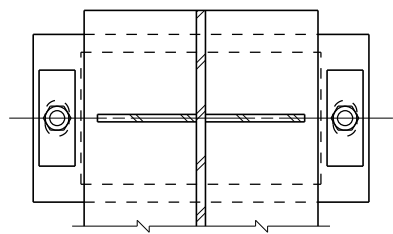


SECTION B-B

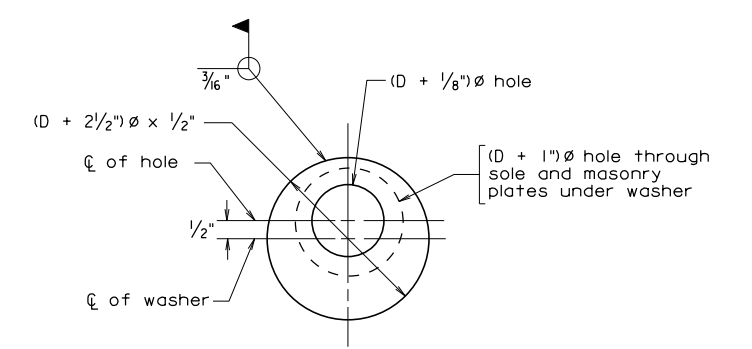
**Masonry PL only



SECTION C-C



SECTION D-D



WASHER W2

DESIGNATION TABLE																	
Span	Abut.	Pier	Type	L	W	Wb	Ts	Tb	D	E	Sole plate slots	Y	Tm	% Grade	Δ	Fh	Reaction (kips)

Slotted holes in sole plate may be drilled or machine burned.
 Dimensions Ts, Tb and Y are measured at ℓ of bearing.
 All dimensions in table are in inches.

BBD-4 10-15-2015

Sealed and Signed by:
 Prasad L. Nallapaneni
 Lic. No. 033003
 On the date of
 October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

Not to scale

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
BEARING DETAILS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BBD-4
Revisions			Checked: S&B, DIV		Sheet No.

BEARING DETAILS

LOW PROFILE BEARINGS FOR STEEL BEAMS OR GIRDERS

NOTES TO DESIGNER:

Standard is for use with steel beams or girders.

Set fixed bearing assemblies at low end of spans where practical.

Include weight of bearing assemblies in structural steel quantities.

On vertical curves with skewed substructures, bearings may be grouped together by average Grade % as long as the grade does not vary by more than 0.25% in any group. The grade is the grade of the chord between the bearings at opposite ends of a beam.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

DESIGNATION TABLE:

Complete designation table with data as applicable: Span (designation), Abutment (A or B normally), Pier (designation), Type (Fixed or Exp.), and

"L" is length of sole plate and masonry plate. Use greater of flange width + 8" and calculated "L".

"W" is width of masonry plate for fixed bearing or width of sole plate and masonry plate for expansion bearing.

"Wb" is width of bronze plate.

"Ts" is thickness of sole plate.

"Tb" is thickness of bronze plate on centerline bearing.

"D" is diameter of anchor bolt.

"E" is embedment of anchor bolt.

"Sole Plate Slots" is dimension of slot in sole plate for expansion bearing.

"Y" is total height of bearing at centerline bearing.

"Tm" is thickness of masonry plate.

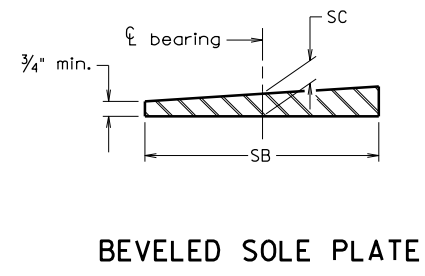
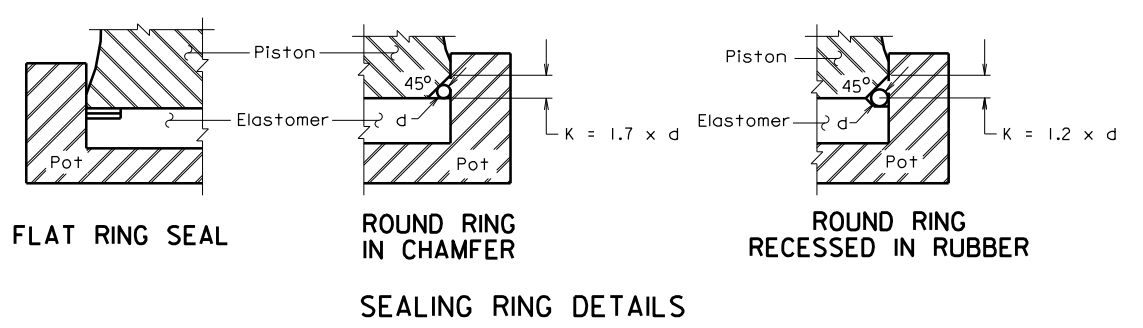
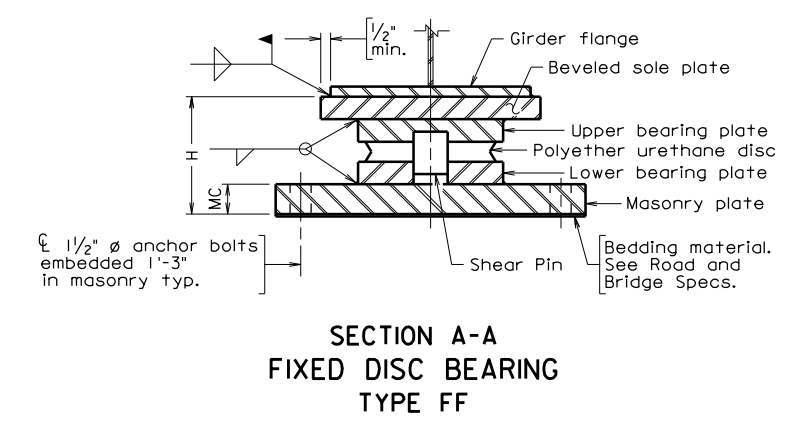
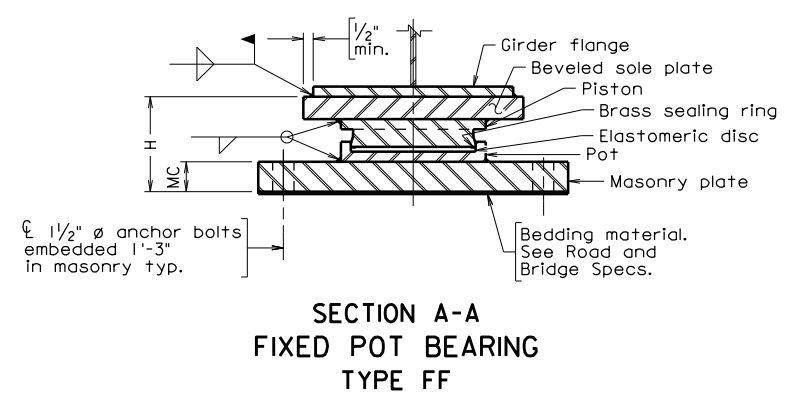
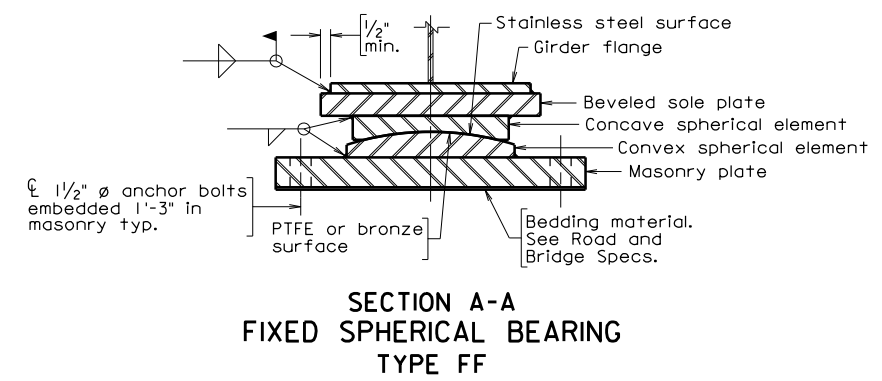
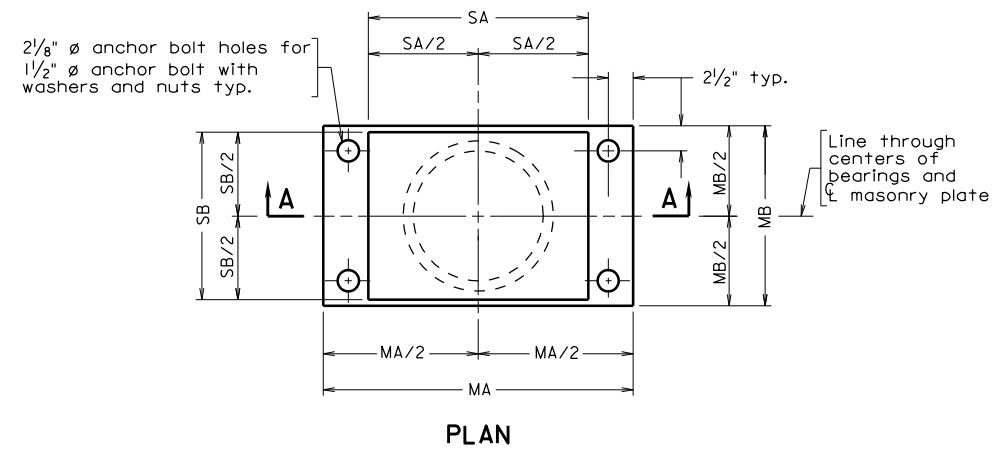
"Grade" is % of grade at centerline bearing.

"Δ" is longitudinal movement of superstructure at centerline bearing.

"Fh" is horizontal reaction for applicable Service Limit State.

"Reaction" is vertical reaction for applicable Service Limit State.

Minimum thickness of sole plate and masonry plate is $\frac{3}{4}$ ".



Notes:

S.H.C.S. designates socket head cap screws.

Bearings shall conform to Section 408.03(a), High Load Multi-Rotational Bearings, of the Specifications.

To restrict transverse movement, either a guide bar or keyway system shall be used.

Fill holes in masonry plate around anchor bolts with a nonhardening caulking compound or elastic joint sealer.

At no additional cost to the Department, pot, spherical or disc bearings differing in detail from those shown may be supplied provided they meet the requirements of Section 408.03(a) of the Specifications and are approved by the Engineer. Bridge seat elevations are based on Total Bearing Height H in table and shall be adjusted by Contractor based on height of bearing furnished.

Pot, spherical and disc bearings shall not be mixed at the same substructure support.

In lieu of welding, the pot may be recessed into the masonry plate. If this is done, the edge thickness of the masonry plate (MC) shall be increased by the depth of the recess.

Bearing heights are based on the use of pot bearings with flat sealing rings.

The Design Movement is the maximum movement to one side of the bearing centerline. The total movement is twice the Design Movement.

The Horizontal Design Load for Non-Guided Bearings is given solely for the design of the potwall thickness and piston edge widths, spherical radii or shear pin diameter.

Stainless steel, PTFE and bronze surfaces; and surfaces in contact with the elastomeric disc, the polyether urethane disc or the shear pin shall not be painted.

Dimension SA is perpendicular to the direction of movement and dimension SB is parallel to it.

Disc bearing design:

The instantaneous deflection under total load is limited to a maximum of 10% of the thickness of the unstressed disc.

Deflection caused by rotation is limited to the lesser of 10% of the thickness of the unstressed disc or the instantaneous deflection to prevent lift off during rotation.

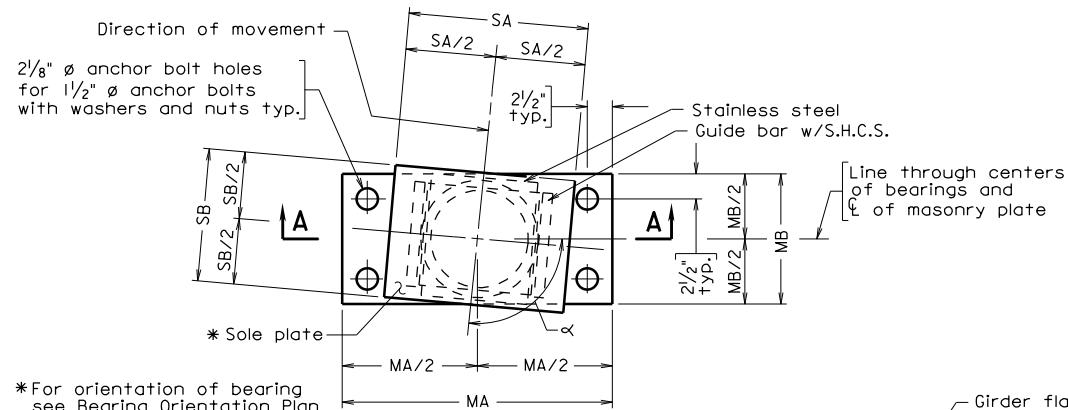
The strain under total vertical load may not exceed 10%, the strain under rotation alone may not exceed 10% and the total strain due to combined vertical load and rotation may not exceed 20%.

The minimum design rotation is set at 0.025 radians to prevent damage to the rings and leakage of elastomer.

BEARING SCHEDULE														
Location	Girder	Type	No. req'd.	Vertical design load kips		Horizontal design load kips	Sole Plate			Masonry Plate			Total bearing height H inches	Design rotation capacity of bearing Rb radians
				Min.	Max.		inches		Grade	inches				
							SA	SB		SC	MA	MB		

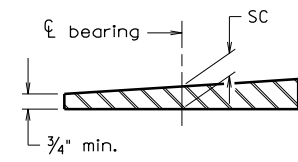
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BBD-6

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
HIGH LOAD MULTI-ROTATIONAL BEARINGS FIXED					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
Revisions			Checked: S&B DIV		BBD-6
					Sheet No.

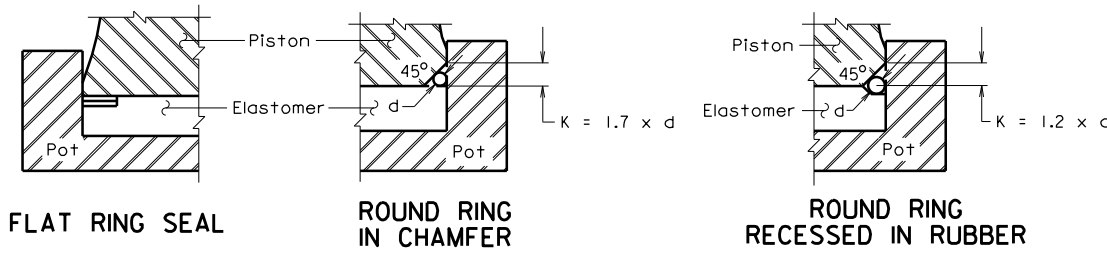


PLAN

*For orientation of bearing see Bearing Orientation Plan and Bearing Schedule



BEVELED SOLE PLATE



SEALING RING DETAILS

Notes:

S.H.C.S. designates socket head cap screws.

Bearings shall conform to Section 408.03(a). High Load Multi-Rotational Bearings, of the Specifications.

To restrict transverse movement, either a guide bar or keyway system shall be used.

Fill holes in masonry plate around anchor bolts with a nonhardening caulking compound or elastic joint sealer.

At no additional cost to the Department, pot, spherical or disc bearings differing in detail from those shown may be supplied provided they meet the requirements of Section 408.03(a) of the Specifications and are approved by the Engineer. Bridge seat elevations are based on Total Bearing Height H in table and shall be adjusted by Contractor based on height of bearing furnished.

Pot, spherical and disc bearings shall not be mixed at the same substructure support.

In lieu of welding, the pot may be recessed into the masonry plate. If this is done, the edge thickness of the masonry plate (MC) shall be increased by the depth of the recess.

Bearing heights are based on the use of pot bearings with flat sealing rings.

The Design Movement is the maximum movement to one side of the bearing centerline. The total movement is twice the Design Movement.

The Horizontal Design Load for Non-Guided Bearings is given solely for the design of the potwall thickness and piston edge widths, spherical radii or shear pin diameter.

Stainless steel, PTFE and bronze surfaces; and surfaces in contact with the elastomeric disc, the polyether urethane disc or the shear pin shall not be painted.

Dimension SA is perpendicular to the direction of movement and dimension SB is parallel to it.

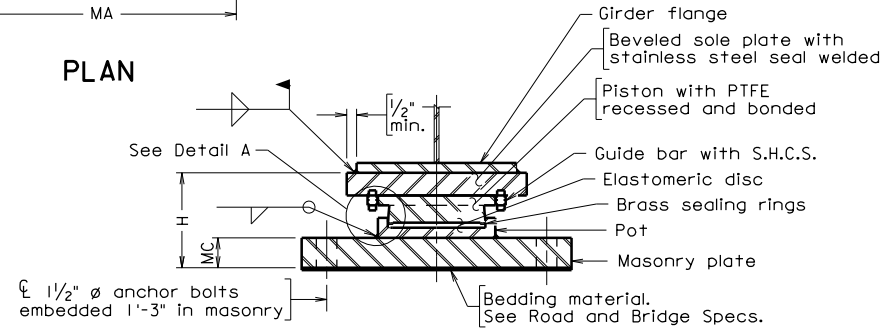
Disc bearing design:

The instantaneous deflection under total load is limited to a maximum of 10% of the thickness of the unstressed disc.

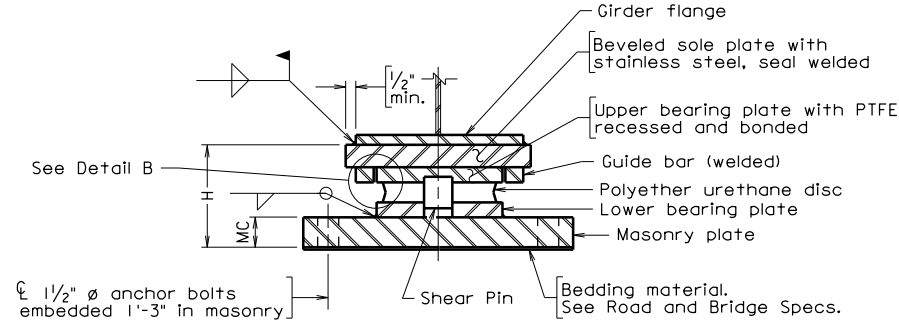
Deflection caused by rotation is limited to the lesser of 10% of the thickness of the unstressed disc or the instantaneous deflection to prevent lift off during rotation.

The strain under total vertical load may not exceed 10%, the strain under rotation alone may not exceed 10% and the total strain due to combined vertical load and rotation may not exceed 20%.

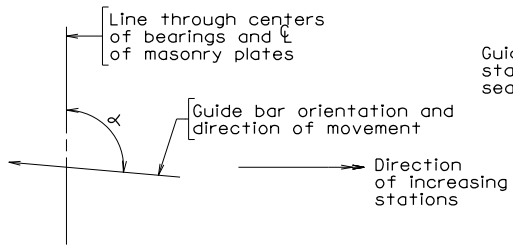
The minimum design rotation is set at 0.025 radians to prevent damage to the rings and leakage of elastomer.



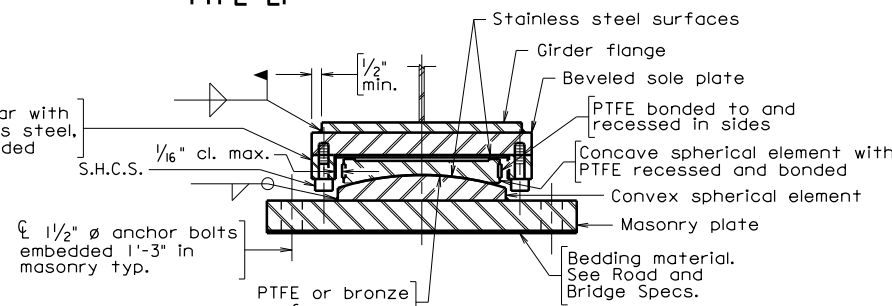
**SECTION A-A
GUIDED POT EXPANSION BEARING
TYPE EF**



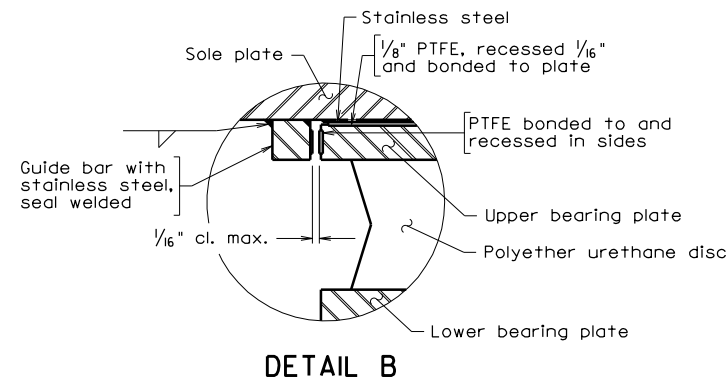
**SECTION A-A
GUIDED DISC EXPANSION BEARING
TYPE EF**



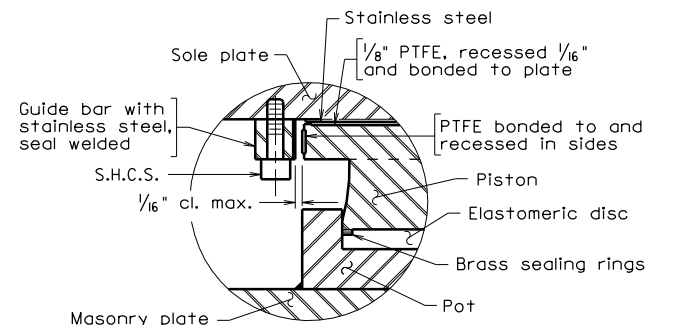
BEARING ORIENTATION PLAN



**SECTION A-A
GUIDED SPHERICAL EXPANSION BEARING
TYPE EF**



DETAIL B



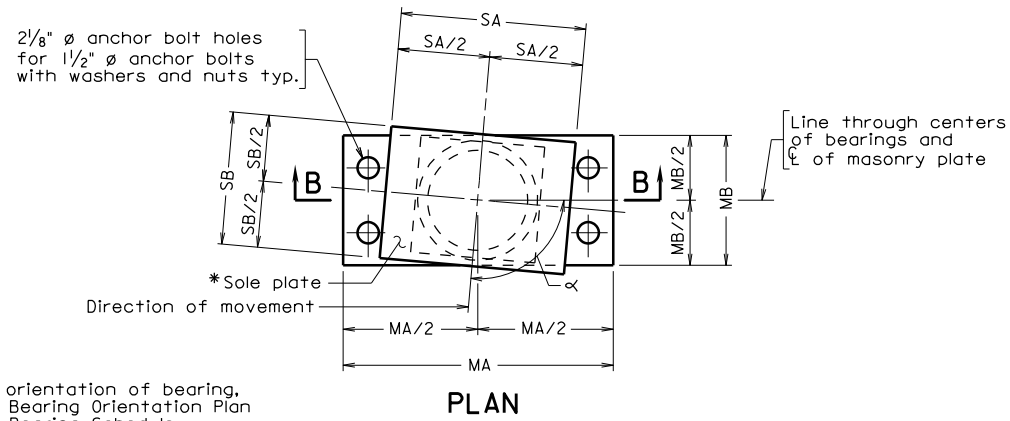
DETAIL A

BEARING SCHEDULE																		
Location	Girder	Type	No. req'd.	Vertical design load kips		Horizontal design load kips	Design movement inches			Sole Plate inches			Masonry Plate inches			Total bearing height H inches	Design rotation capacity of bearing R _b radians	Orientation angle α degrees
				Min.	Max.		Long.	Tran.	SA	SB	SC	Grade	MA	MB	MC			

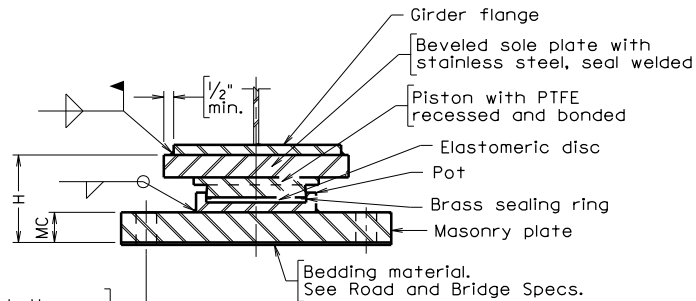
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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
HIGH LOAD MULTI-ROTATIONAL BEARINGS GUIDED EXPANSION					
No.	Description	Date	Date	Plan No.	Sheet No.
Revisions					

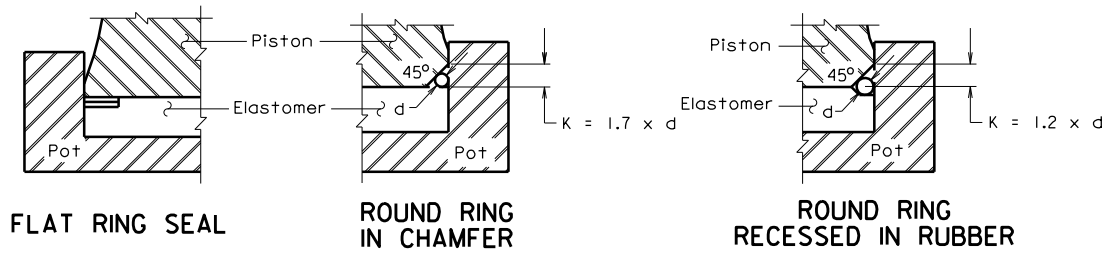
STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				



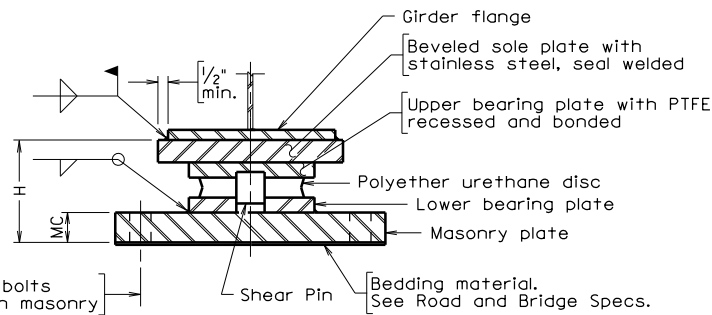
*For orientation of bearing, see Bearing Orientation Plan and Bearing Schedule.



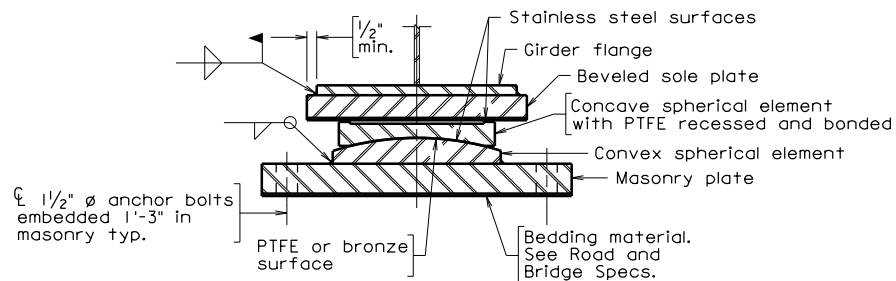
**SECTION B-B
NON-GUIDED POT EXPANSION BEARING
TYPE EE**



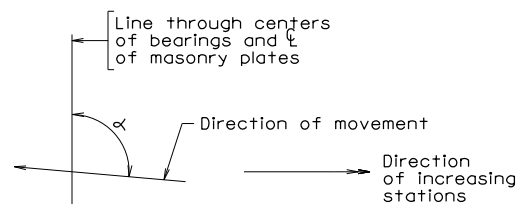
SEALING RING DETAILS



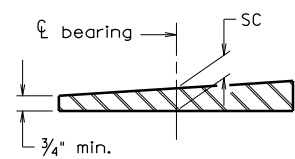
**SECTION B-B
NON-GUIDED DISC EXPANSION BEARING
TYPE EE**



**SECTION B-B
NON-GUIDED SPHERICAL EXPANSION BEARING
TYPE EE**



BEARING ORIENTATION PLAN



BEVELED SOLE PLATE

Notes:

S.H.C.S. designates socket head cap screws.
Bearings shall conform to Section 408.03(a), High Load Multi-Rotational Bearings, of the Specifications.
To restrict transverse movement, either a guide bar or keyway system shall be used.
Fill holes in masonry plate around anchor bolts with a nonhardening caulking compound or elastic joint sealer.
At no additional cost to the Department, pot, spherical or disc bearings differing in detail from those shown may be supplied provided they meet the requirements of Section 408.03(a) of the Specifications and are approved by the Engineer. Bridge seat elevations are based on Total Bearing Height H in table and shall be adjusted by Contractor based on height of bearing furnished.

Pot, spherical and disc bearings shall not be mixed at the same substructure support.

In lieu of welding, the pot may be recessed into the masonry plate. If this is done, the edge thickness of the masonry plate (MC) shall be increased by the depth of the recess.

Bearing heights are based on the use of pot bearings with flat sealing rings.

The Design Movement is the maximum movement to one side of the bearing centerline. The total movement is twice the Design Movement.

The Horizontal Design Load for Non-Guided Bearings is given solely for the design of the potwall thickness and piston edge widths, spherical radii or shear pin diameter.

Stainless steel, PTFE and bronze surfaces; and surfaces in contact with the elastomeric disc, the polyether urethane disc or the shear pin shall not be painted.

Dimension SA is perpendicular to the direction of movement and dimension SB is parallel to it.

Disc bearing design:

The instantaneous deflection under total load is limited to a maximum of 10% of the thickness of the unstressed disc.

Deflection caused by rotation is limited to the lesser of 10% of the thickness of the unstressed disc or the instantaneous deflection to prevent lift off during rotation.

The strain under total vertical load may not exceed 10%, the strain under rotation alone may not exceed 10% and the total strain due to combined vertical load and rotation may not exceed 20%.

The minimum design rotation is set at 0.025 radians to prevent damage to the rings and leakage of elastomer.

BEARING SCHEDULE

Location	Girder	Type	No. req'd.	Vertical design load kips		Horizontal design load kips	Design movement inches		Sole Plate			Masonry Plate			Total bearing height H inches	Design rotation capacity of bearing R _b radians	Orientation angle α degrees
				Min.	Max.		Long.	Tran.	SA	SB	SC	Grade	MA	MB			

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION				
STRUCTURE AND BRIDGE DIVISION				
HIGH LOAD MULTI-ROTATIONAL BEARINGS NON-GUIDED EXPANSION				
No.	Description	Date	Designed: SBB/DIV	Date
Revisions		Checked: SBB/DIV	Plan No.	Sheet No.
			BBD-7B	

HIGH LOAD MULTI-ROTATIONAL BEARINGS

NOTES TO DESIGNER:

1. The High Load Multi-Rotational Bearing Standard consists of three standard sheets:

BBD-6 Fixed Bearings
BBD-7A Guided Expansion Bearings
BBD-7B Non-Guided Expansion Bearings

Normally, a set of plans will have all three standards included. The type of bearing given in the Bearing Schedule shall be FF (Fixed), EF (Guided Expansion), or EE (Non-Guided Expansion).

2. Vertical Design Loads: The minimum vertical design load shall not be less than 20% of the maximum vertical design load. If this minimum load is not maintained on the bearing, it may not function properly and failure may occur.
3. Horizontal Design Loads: The total horizontal force on a row of bearings shall be the larger of:
 - a. The total actual horizontal design loads from the superstructure.
 - b. Seismic loads. (See AASHTO *Standard Specifications for Highway Bridges*, 16th Edition (1996) 1-A, Seismic Design):
 1. Seismic Performance Category A – a minimum horizontal capacity of 20% of the total vertical dead load of the superstructure.
 2. Seismic Performance Category B – the actual calculated seismic load divided by the response modification factor R.

Because of the clearances between parts of bearings and the difficulty of aligning them in the field, each bearing shall be designed for the total horizontal load when there are only two bearings resisting the load. If more than two bearings resist the load, use the number of bearings divided by two and round down. The horizontal design load on an individual fixed or guided expansion bearing shall be computed as the total horizontal force in a direction on a row of bearings but not less than 10% of the maximum vertical design load of the bearing. Frictional resistance shall be neglected when calculating the horizontal design load. If a row of bearings consists of two guided bearings which allow longitudinal movement and all the rest are unguided expansion bearings, then each of the two guided bearings would be designed to resist the total transverse horizontal load (wind, centrifugal, thermal, seismic etc.) from the superstructure. If a row of bearings consists of two fixed bearings and all the rest are guided bearings which allow transverse movement, then each of the two fixed bearings would resist the total transverse horizontal force and the total longitudinal force would be resisted by the number bearings divided by two and rounded down. The minimum horizontal design load for an unguided expansion bearing shall be equal to 10% of the maximum vertical design load of the bearing. This provides the design load for the pot and piston. It does not mean that the sliding surface must be able to transmit this much force or that stops have to be provided to limit movement.

4. Loads given in the Bearing Schedule shall be the maximum loads resulting from the various group load combinations divided by the percentage of the basic unit stress allowed for that group load combination. Therefore, if the Horizontal Design Load is from a Group III loading, the load would be divided by 1.25 before entering it into the Bearing Schedule. Seismic loads are divided by 1.5.

HIGH LOAD MULTI-ROTATIONAL BEARINGS

NOTES TO DESIGNER (cont'd):

5. The minimum design rotational capacity of the bearing (R_b) is the actual design rotation of the structure (R_s) plus 0.02 radians construction tolerance (R_c). The actual design rotation of the structure (R_s) shall not be less than 0.01 radians. Therefore, $R_b \geq 0.03$ radians.
6. The installed alignment of bearing guiding systems relative to the anticipated movement direction of the structure should be carefully considered to avoid bearing guide system failure. Special studies or designs may be required on curved or skewed structures to ensure correct installation. The STAAD-III/ISDS finite element computer program may be used with its thermal load case for this purpose. Generally, movements radiate away from points of fixity. The proper alignment of the guided bearings shall be shown in the plans.
7. Transverse rows of bearings should have two fixed bearings with the remainder guided expansion or two guided expansion bearings with the remainder unguided expansion. The two fixed or guided expansion bearings should be adjacent to each other. On curved structures with steel pier caps supported by two HLMR bearings, the fixed bearing at the pier cap should be on the outside of the curve.
8. The standard drawings are not to be used without referring to Specifications Section 408.03(a), High Load Multi-Rotational Bearings, for design criteria.
9. For large diameter bearings or for bearings with large movements, multiple pairs of bearing stiffeners may be required to insure uniform distribution of the load to the bearing.
10. When setting sole plate width, do not set minimum width based entirely on girder flange. The sole plate is set perpendicular to the direction of movement and may not be perpendicular to the girder. The sole plate width needs to be checked for this case.
11. Heights of bearings given in manufacturers' literature may not be accurate since they are generally designed for less than 0.03 radians rotation. Adjust the manufacturer's height by the difference in its rotation capacity and your rotation capacity times the radius of the elastomer.
12. A copy of any design calculations for HLMR bearings furnished by a fabricator should be provided to Structure and Bridge Division to the attention of the project designer. The design calculations should include an example of the formulas and theories used and not merely computer output listing final dimensions.
13. Always provide bridge seat reinforcement beneath High Load Multi-Rotational Bearings.
14. Anchor bolts must be located so that the nuts may be put on with the whole bearing (including sole plate) in place. The specifications do not allow the Contractor to disassemble the bearing in order to put the nuts on the bolts.
15. On expansion bearings, the dimension SA is always perpendicular to the direction of movement and dimension SB is always parallel to the direction of movement.

HIGH LOAD MULTI-ROTATIONAL BEARINGS

NOTES TO DESIGNER (cont'd):

16. Refer to the top figure on Sheet 7 and the following instructions as an example for determining the horizontal design loads for the bearings:

- V = maximum vertical design load on the bearing being designed
HT = total normal transverse loads (wind, centrifugal, etc.)
HL = total normal longitudinal loads (wind, traction, etc.)
ST = total transverse seismic load defined in 3b.
SL = total longitudinal seismic load defined in 3b.
N = number of bearings capable of resisting the horizontal force in a given direction
INT = integer

a. At the abutments, each NE bearing would be designed for a horizontal force of:

$$O.IV$$

b. At the abutments, each GEL bearing would be designed for a horizontal force equal to the larger of:

$$O.IV \text{ or } HT \text{ or } ST$$

c. At the pier, each GET bearing would be designed for a horizontal force equal to the larger of:

$$O.IV \text{ or } HL/INT(N/2) \text{ or } SL/INT(N/2)$$

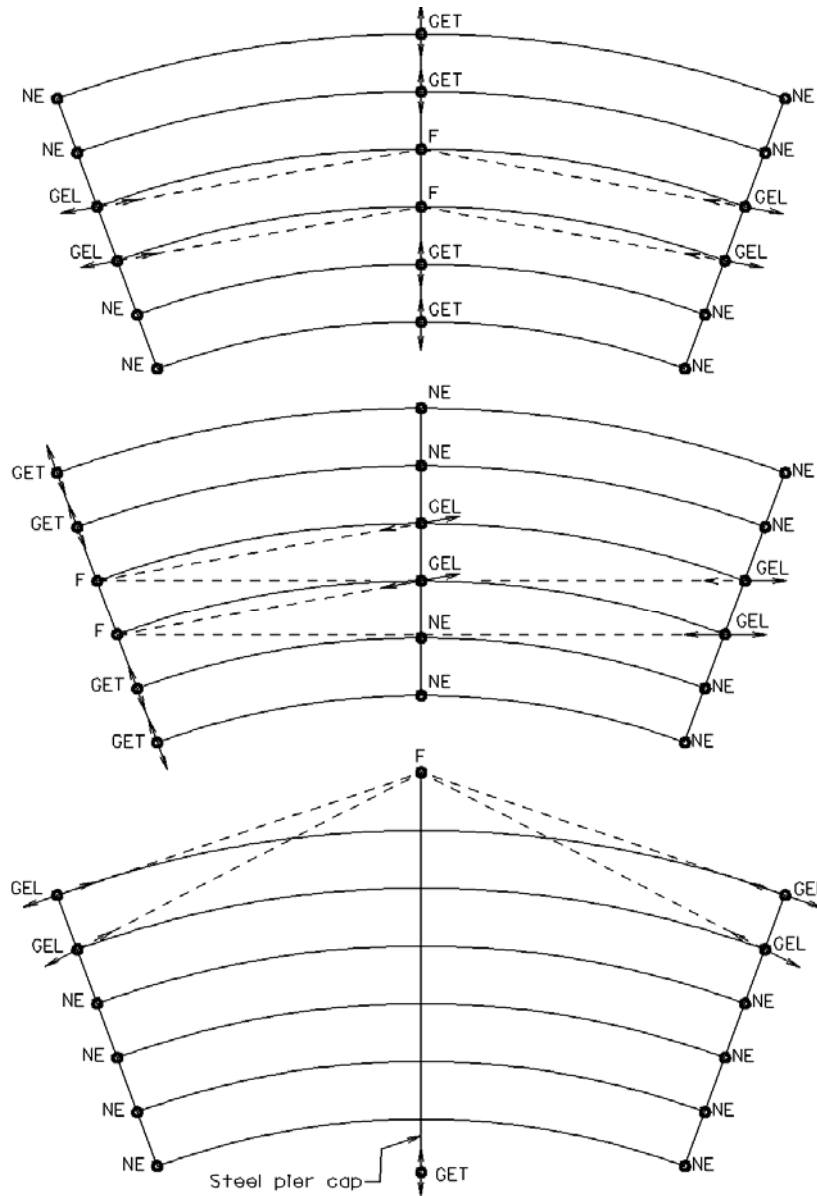
d. At the pier, each F bearing would be designed for a horizontal force equal to the larger of:

$$\sqrt{((HL/INT(N/2))^2 + HT^2)} \text{ or } SL/INT(N/2) + 0.3ST \text{ or } 0.3SL/INT(N/2) + ST$$

NOTES:

When comparing loads to determine the maximum, make the proper reduction for group load combinations.

Longitudinal horizontal loads not resisted by bearings at one substructure element will be carried by the bearings at other substructure elements.

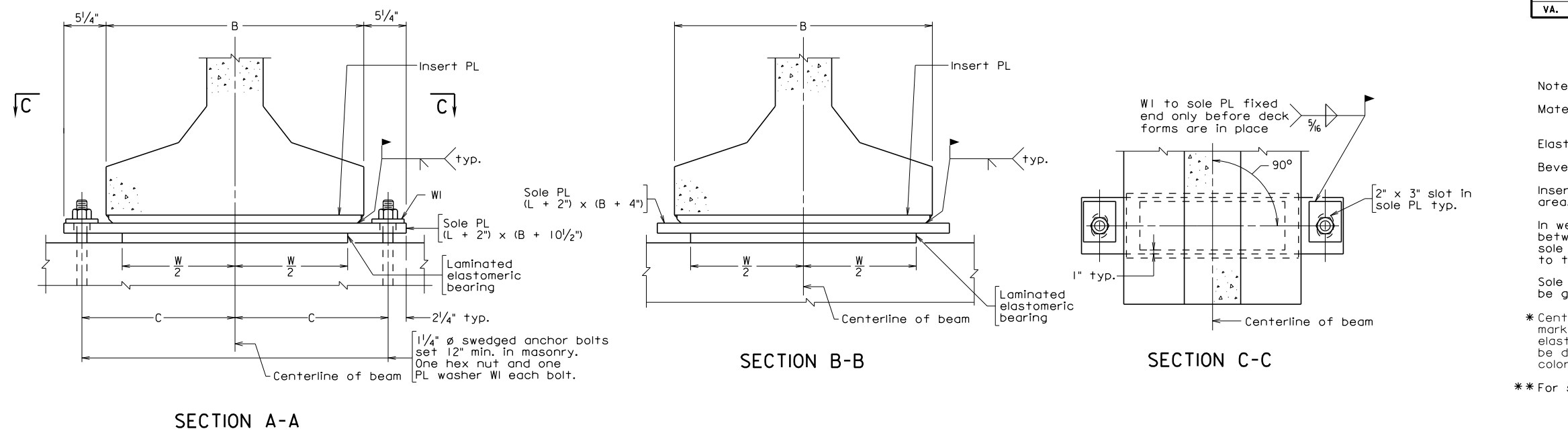


- - Bearing Location
- F - Fixed Bearing
- GET - Guided Expansion Transverse
- GEL - Guided Expansion Longitudinal
- NE - Nonguided Expansion
- - Direction of Movement

Notes: Individual orientation of guided bearings to be shown in the plans.
 Details only apply to bridges with radial supports

EXPANSION OF CURVED GIRDER BRIDGES USING HLMR BEARINGS

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Material: Elastomer - 50 durometer hardness.
Shim - ASTM A36 or A1011 mild steel.

Elastomeric bearings shall be molded as a single unit.

Bevel sole plates to grade shown in table. Minimum 3/4" thickness.

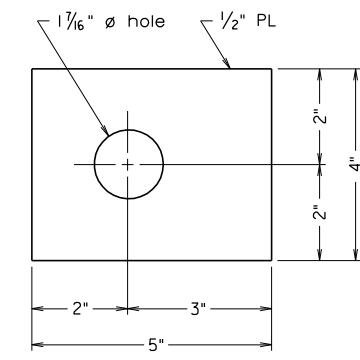
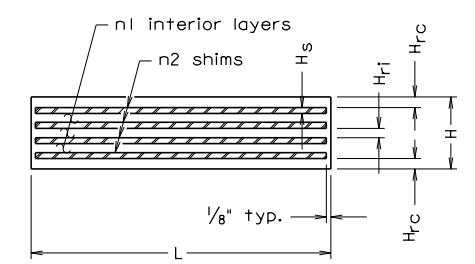
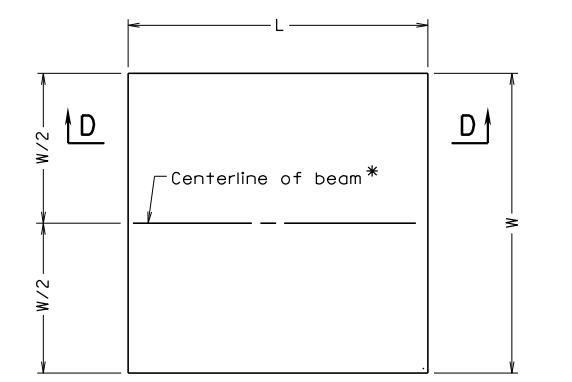
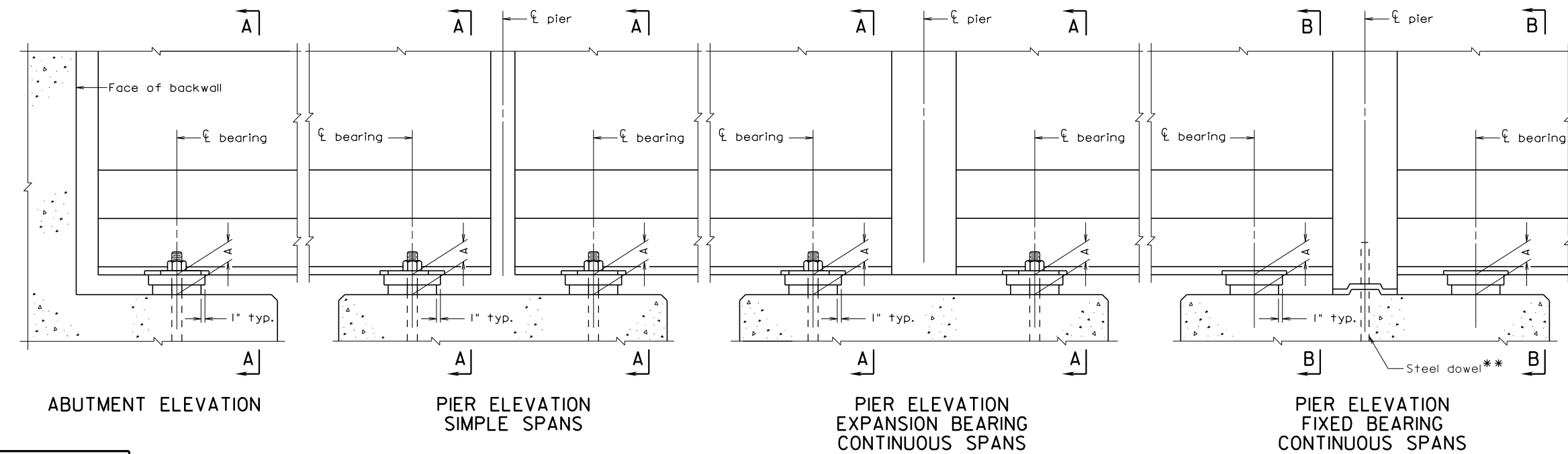
Insert plate shall provide uniform bearing over its entire contact area. For insert plate details, see sheet ...

In welding insert plate to sole plate, ample time shall be allowed between weld passes to prevent heat damage to the concrete, sole plate and elastomeric pad. Elastomer shall not be subjected to temperatures higher than 400°F.

Sole plates, insert plates, anchor bolts, nuts and washers shall be galvanized.

* Centerline of beam (including center line and text) shall be marked on the top and bottom surfaces of the laminated elastomeric bearing prior to shipping. The markings shall be done with an indelible ink or flexible paint of contrasting color.

** For steel dowel and closure diaphragm details, see sheet ...



Beam Type	B	C
H	1'-6"	12"
III	1'-10"	1'-2"
IV	2'-2"	1'-4"
V	2'-4"	1'-5"
VI	2'-4"	1'-5"
pcb+-series	2'-8"	1'-7"

Span	Abut.	Pier	Beam Type	Bearing Type	A	Laminated Elastomeric Bearing					Grade %	Total Load (kips)	
						W	L	H	H _{rc}	n1 @ H _{r1}			n2 @ H _s

All dimensions in table are in inches.

10-15-2015 BBD-8

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
PRESTRESSED BEAM BEARING DETAILS			
No.	Description	Date	Sheet No.
			BBD-8
Revisions		Designed: ... Drawn: ... Checked: ...	Plan No.

BEARING DETAILS

LAMINATED ELASTOMERIC BEARINGS PRESTRESSED CONCRETE BEAMS

NOTES TO DESIGNER:

Standard is for use with prestressed concrete beams.

Bearings may be fixed by welding washer W1 to the sole plate (see Section C-C).

At fixed bearings, anchor bolts must be designed for moment and shear. Therefore, either larger or additional anchor bolts may be required.

Do not bevel the sole plate unless required by AASHTO LRFD 14.8.2. Instead enter 0 (zero) in the table for the Grade %. Round off grade to two decimal places. The Grade is the grade of the chord between the bearings at opposite ends of a beam.

On vertical curves with skewed substructures, bearings may be grouped together by average Grade % as long as the grade does not vary by more than 0.25% in any group.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TABLE:

Complete table with data as applicable: Span (designation), Abutment (A or B normally), Pier (designation), Beam Type (II thru VI or PCBT (Bulb-T)), Bearing Type (Fix. or Exp.) and so forth.

"A" is dimension on centerline bearing. Minimum height is 2". Minimum dimension may be varied to suit grade by increasing the sole plate thickness. Minimum thickness of sole plate is $\frac{3}{4}$ ".

Minimum dimensions for "W":

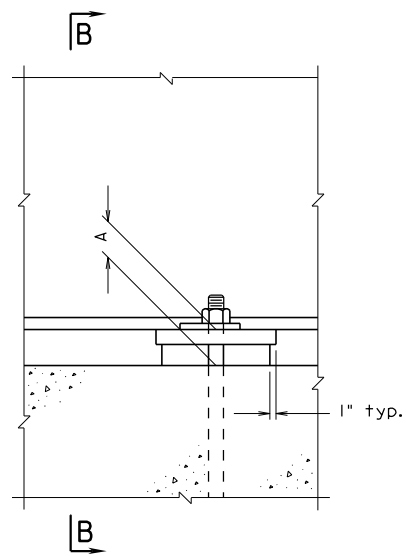
Beam Type	II	III	IV	V	VI	PCBT
W (min.)	1'-2"	1'-5"	1'-8"	1'-9"	1'-9"	2'-0"

"Total Load" is total vertical load at applicable Service Limit State.

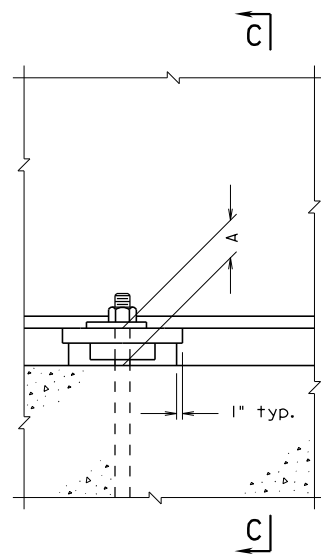
NOTES:

Add sheet number to "For closure diaphragm details, see sheet " if prestressed beam is designed for continuity (continuous for live load, etc.) or delete if not applicable.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ELEVATION EXPANSION ASSEMBLY



ELEVATION FIXED ASSEMBLY

Notes:

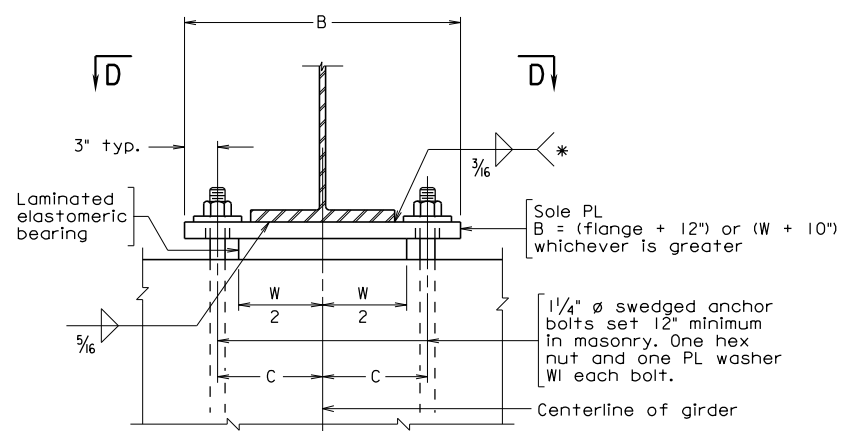
Material: Elastomer - 50 durometer hardness.
Shim - ASTM A36 or A1011 mild steel.

Bevel sole plates to grade shown. Minimum sole plate thickness is 3/4". Plates shall not be painted on the surface in contact with the elastomeric bearing.

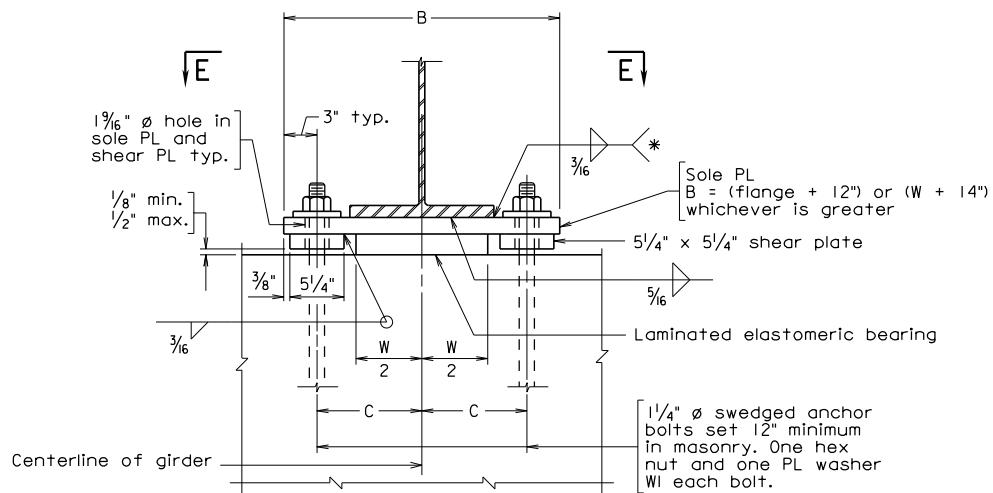
Elastomeric bearings shall be molded as a single unit.

* Weld shall terminate 1/4" from edge of sole plate.

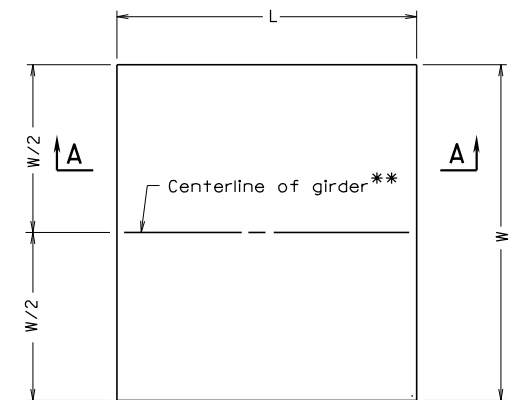
** Centerline of girder (including center line and text) shall be marked on the top and bottom surfaces of the laminated elastomeric bearing prior to shipping. The markings shall be done with an indelible ink or flexible paint of contrasting color.



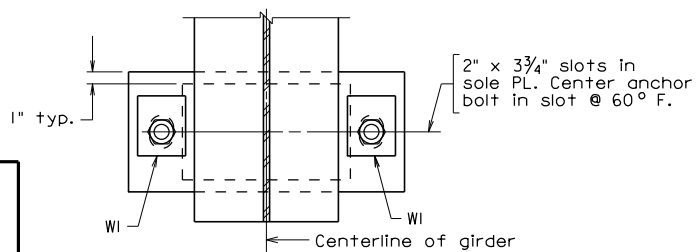
SECTION B-B



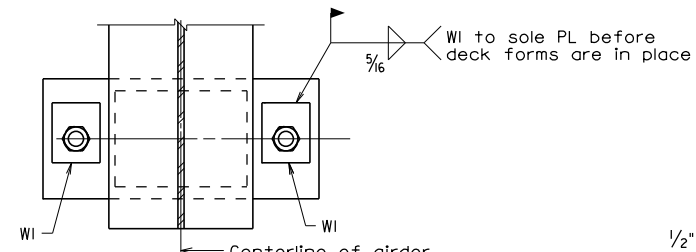
SECTION C-C



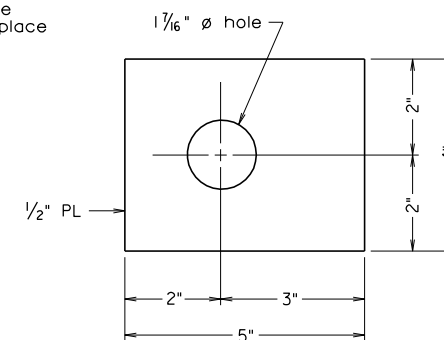
SECTION A-A LAMINATED ELASTOMERIC BEARING



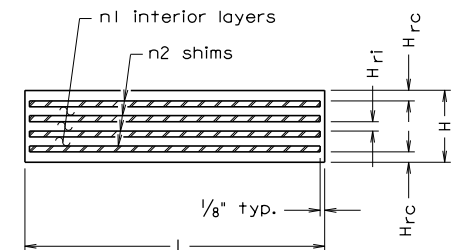
SECTION D-D



SECTION E-E



WASHER WI



SECTION A-A LAMINATED ELASTOMERIC BEARING

Span	Abut.	Pier	Bearing type	A	C	Laminated Elastomeric Bearing					Grade %	Total Load (kips)
						W	L	H	Hrc	n1 @ Hrl		

All dimensions in table are in inches.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
BEARING DETAILS					
No.	Description	Date	Designed:	Date	Plan No.
Revisions			Drawn:		
			Checked:		BBD-9

Not to scale

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bbs-9.dgn

10-15-2015

BBD-9

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

BEARING DETAILS

LAMINATED ELASTOMERIC BEARINGS STEEL BEAMS/GIRDERS

NOTES TO DESIGNER:

Standard is for use with steel beams/girders.

Bearings may be fixed by welding washer W1 to the sole plate (see Section E-E).

At fixed bearings, anchor bolts must be designed for moment and shear. Therefore, either larger or additional anchor bolts may be required.

Do not bevel the sole plate unless required by AASHTO LRFD 14.8.2. Instead enter 0 (zero) in the table for the Grade %. Round off grade to two decimal places. The Grade is the grade of the chord between the bearings at opposite ends of a beam. For simple spans, the Grade is the grade of the chord between the bearings at opposite ends of a beam/girder. For continuous spans, the Grade is the inclination of the underside of the beam/girder to the horizontal under full permanent load. As an approximation for continuous spans, calculate elevations at points 5 feet on either side of bearing, carrying elevation to three decimal places. Calculate % grade from these two points.

On vertical curves with skewed substructures, bearings may be grouped together by average Grade % as long as the grade does not vary by more than 0.25% in any group.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TABLE:

Complete table with data as applicable: Span (designation), Abutment (A or B normally), Pier (designation), Bearing Type (Fix. or Exp.) and so forth.

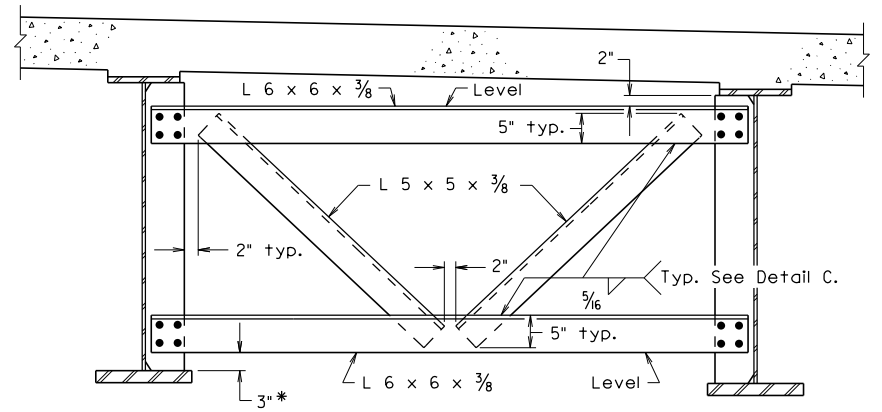
"A" is dimension on centerline bearing. Minimum height is 2". Minimum dimension may be varied to suit grade by increasing the sole plate thickness. Minimum thickness of sole plate is $\frac{3}{4}$ ".

Minimum dimension for "W" shall be the width of the bottom flange at the bearing.

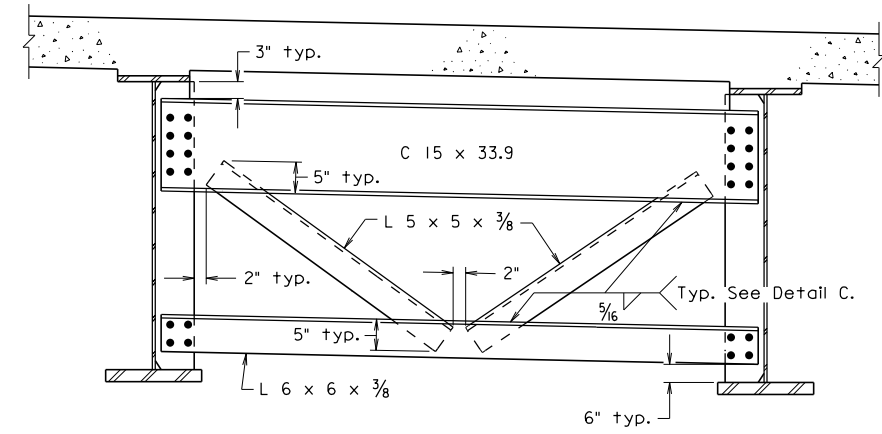
"Total Load" is total vertical load at applicable State Service Limit.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

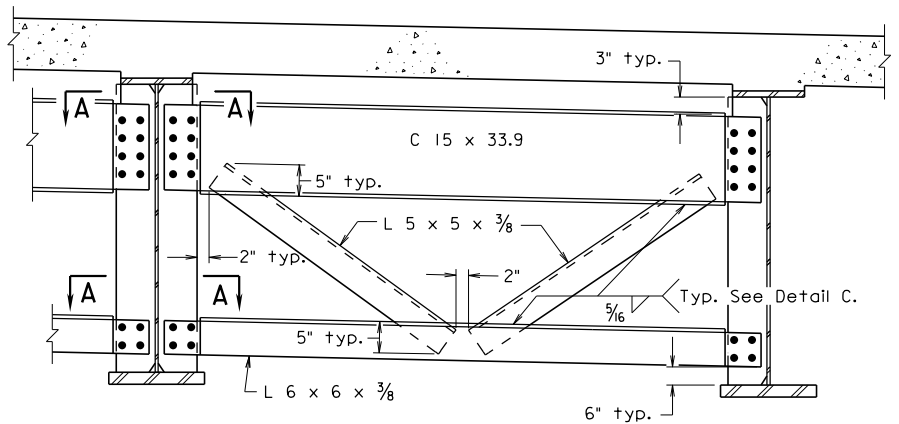
Note:
 All welding of structural steel and quality control inspection of welds, including field welding and quality control inspection of field welding, shall be the responsibility of the Contractor in accordance with Section 407.04(i) of the Specifications.



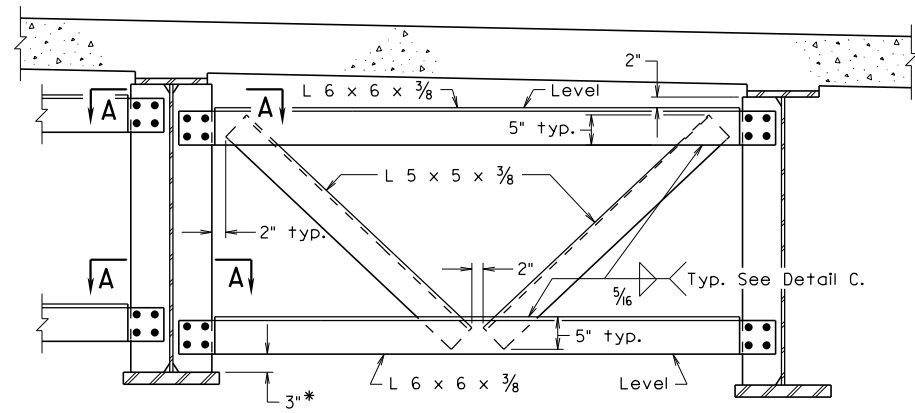
CROSS FRAME - CF1
 * Dimension shall be 6" at piers



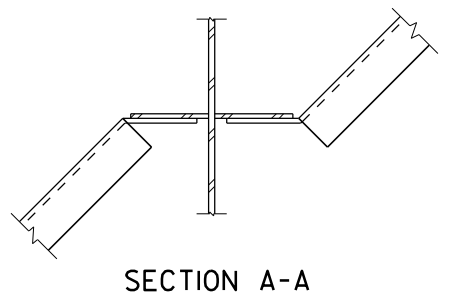
CROSS FRAME - CF2



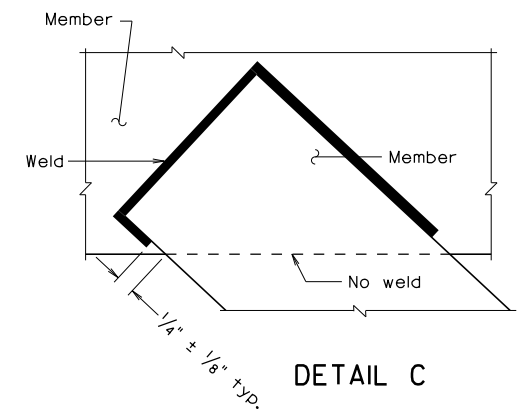
CROSS FRAME - CF3



CROSS FRAME - CF4
 * Dimension shall be 6" at piers



SECTION A-A



DETAIL C

Not to scale

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BCF-4 03-27-2013 bcf4.dgn

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 March 27, 2013

A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CROSS FRAME DETAILS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV		BCF-4

CROSS FRAME DETAILS

NOTES TO DESIGNER:

For use of standard cross frames (diaphragms), see Manual of the Structure and Bridge Division, Volume V, Part 2, Chapter 11. Use V-cross frames up to a maximum angle of 60°.

Indicate on framing plan which type(s) are used, e.g., Typical Cross Frame CF2 at (near) Abutments, or Typical Intermediate Cross Frame CF1.

Cross Frames detailed on standard are as follows:

CF1: V-Type, Intermediate Diaphragm, Normal (0° Skew). Used also at piers for continuous girders.

CF2: V-Type, End Diaphragm, Normal (0° Skew)

CF3: V-Type, End Diaphragm, Skewed

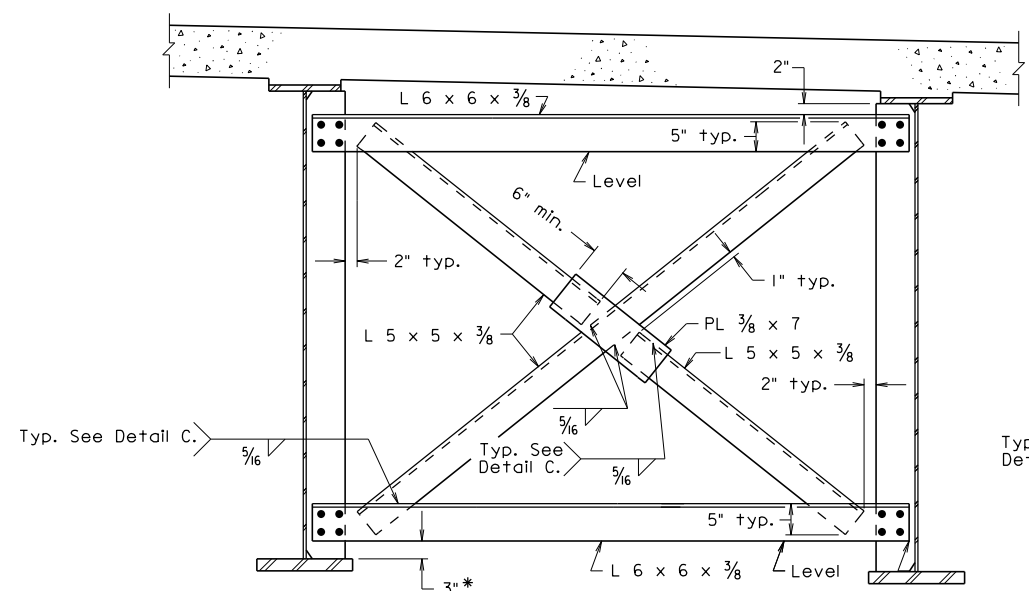
CF4: V-Type, Intermediate Diaphragm, Skewed. Used at piers for continuous girders.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

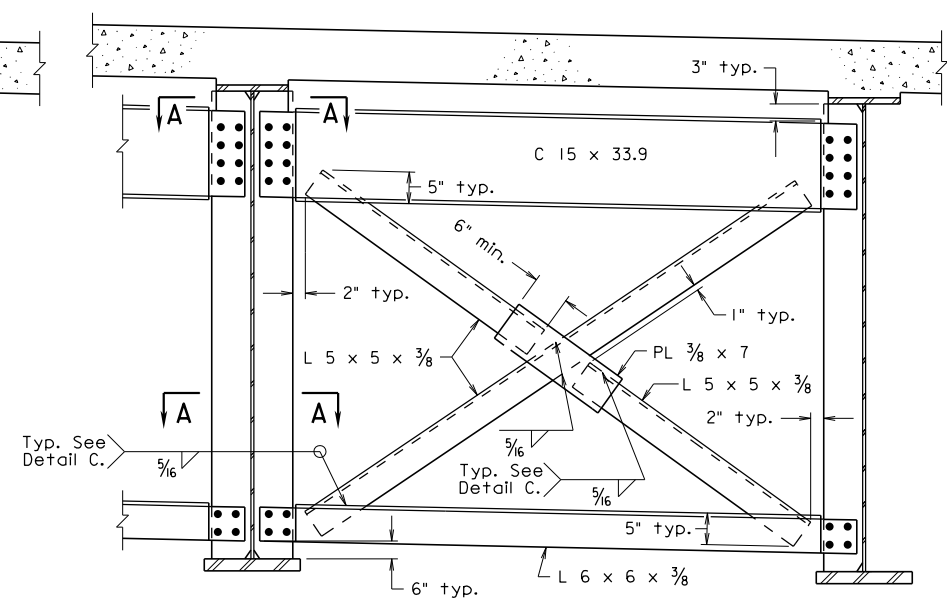
None

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

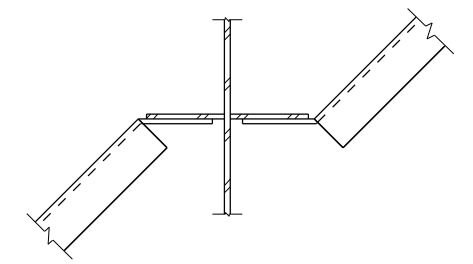
Note:
 All welding of structural steel and quality control inspection of welds, including field welding and quality control inspection of field welding, shall be the responsibility of the Contractor in accordance with Section 407.04(i) of the Specifications.



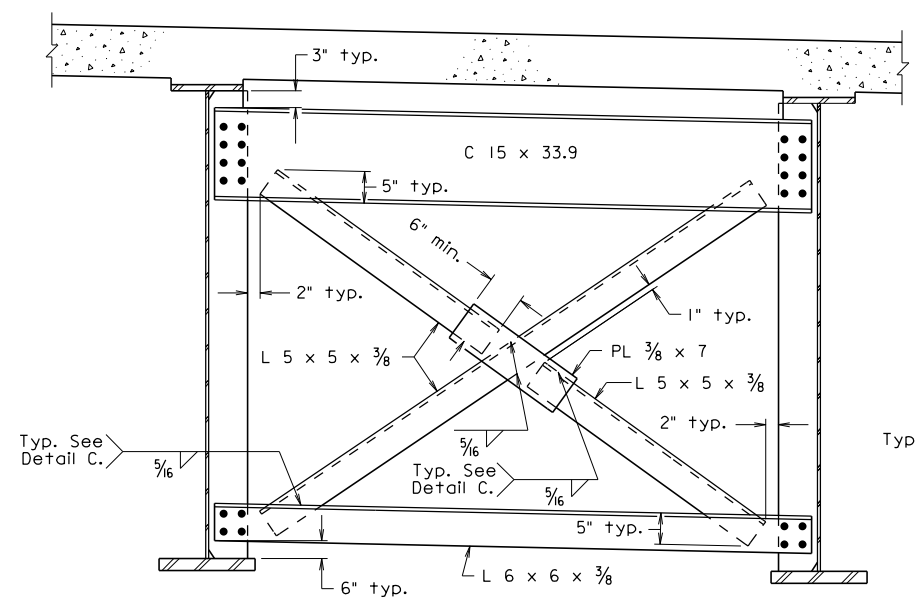
CROSS FRAME - CF5
 * Dimension shall be 6" at piers



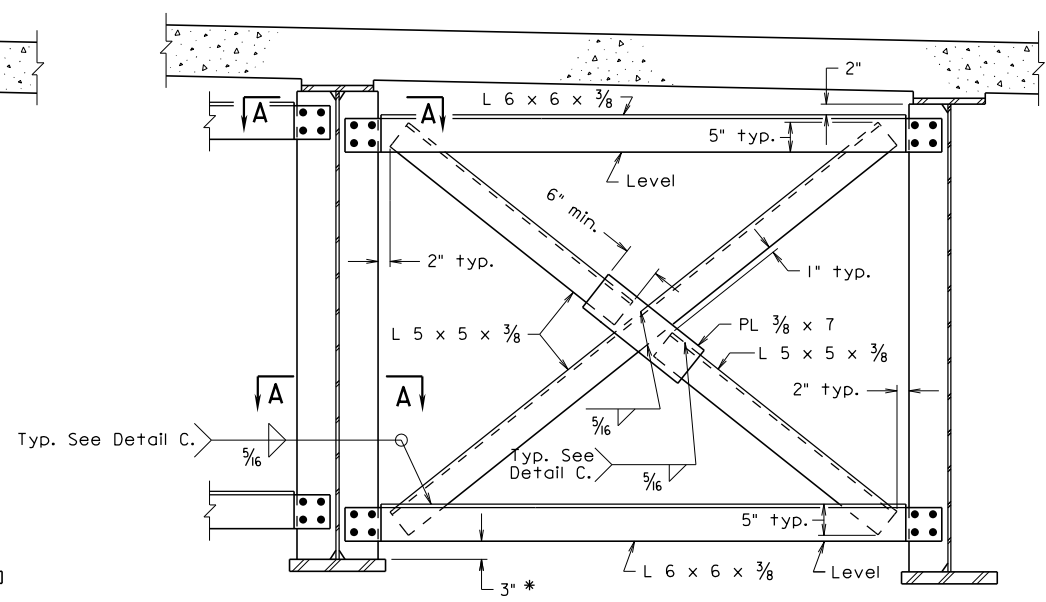
CROSS FRAME - CF7
 * Dimension shall be 6" at piers



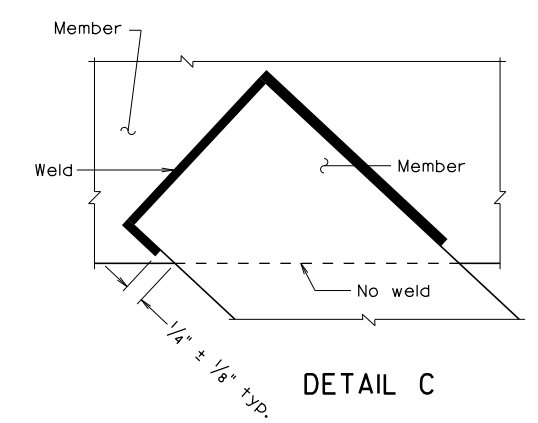
SECTION A-A



CROSS FRAME - CF6
 * Dimension shall be 6" at piers



CROSS FRAME - CF8
 * Dimension shall be 6" at piers



DETAIL C

bcf5.dgn
03-27-2013
BCF-5

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 March 27, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
CROSS FRAME DETAILS			
No.	Description	Date	Sheet No.
	Revisions		BCF-5

CROSS FRAME DETAILS

NOTES TO DESIGNER:

For use of standard cross frames (diaphragms), see Manual of the Structure and Bridge Division, Volume V, Part 2, Chapter 11. Use V-cross frames up to a maximum angle of 60°.

Indicate on framing plan which type(s) are used, e.g., Typical Cross Frame CF2 at (near) Abutments, or Typical Intermediate Cross Frame CF1.

Cross Frames detailed on standard are as follows:

CF5: X-Type, Intermediate Diaphragm, Normal (0° Skew), Used also at piers for continuous girders.

CF6: X-Type, End Diaphragm, Normal (0° Skew)

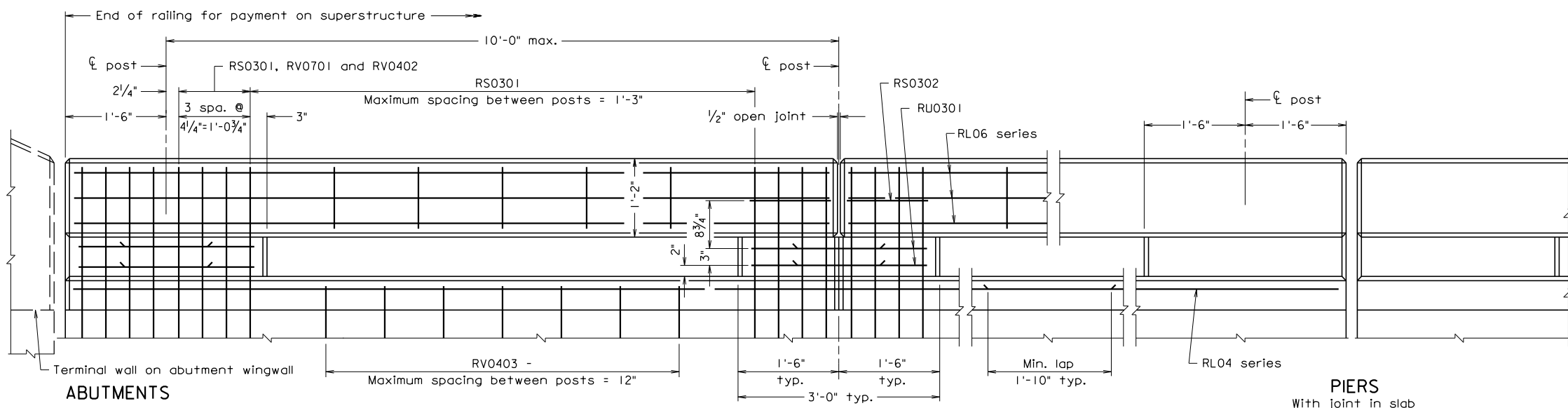
CF7: X-Type, End Diaphragm, Skewed.

CF8: X-Type, Intermediate Diaphragm, Skewed. Used at piers for continuous girders.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

None

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TYPICAL ELEVATION

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All levels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

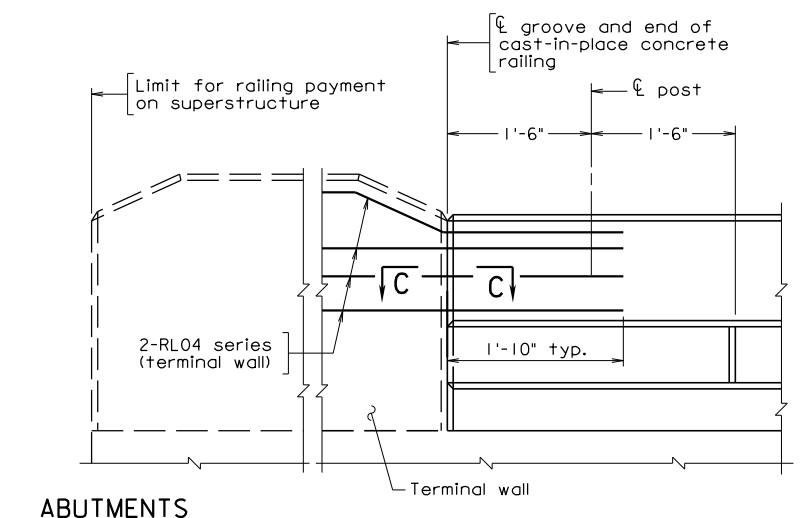
All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

RL0401 bars are not required for deck slabs.

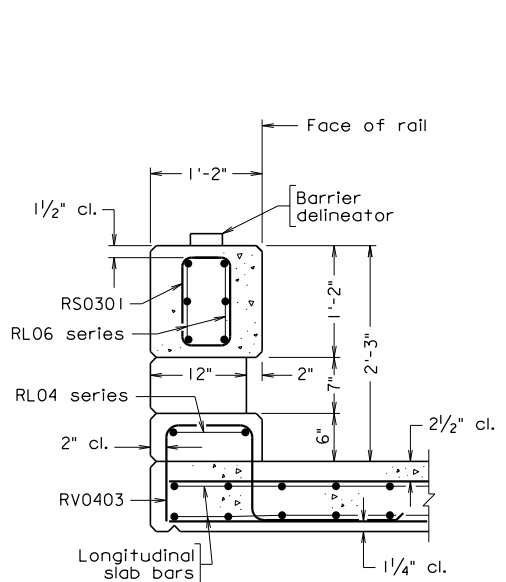
Barrier delineator size, color and spacing shall be in accordance with the Specifications.

For details and reinforcing steel schedule of terminal wall, see sheet ...

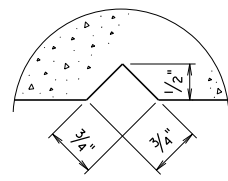
Bid item for railing shall include concrete noted in plans, barrier delineators and reinforcing steel indicated in reinforcing steel schedule.



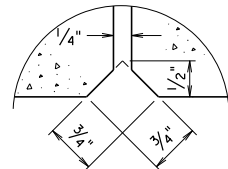
PART ELEVATION
Terminal Wall on Superstructure



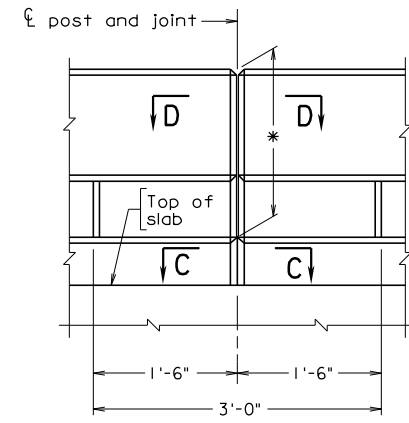
TYPICAL SECTION BETWEEN POSTS



SECTION C-C
Not to scale
Groove detail for both sides of curb



SECTION D-D
Not to scale
Deflection joint detail for both sides of rail and post

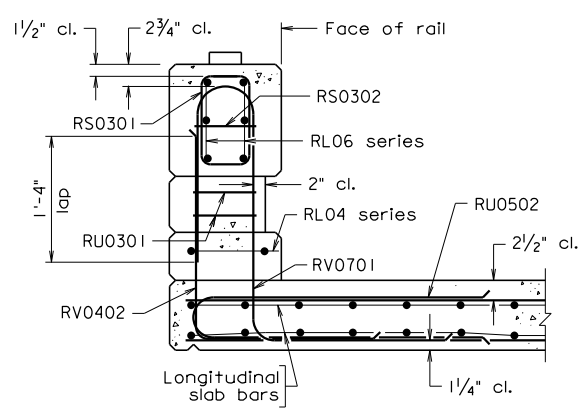


PIERS
Slab continuous over pier
* Open deflection joint 1'-9" deep

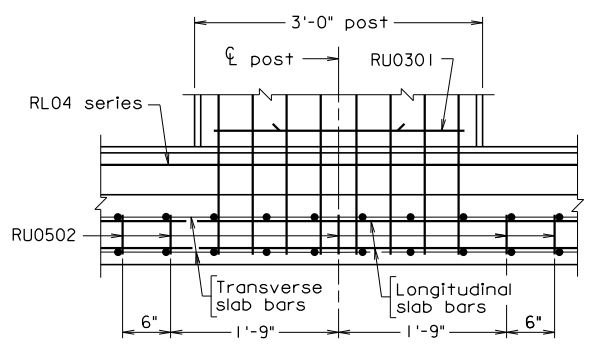
REINFORCING STEEL SCHEDULE					
RS0301 and RS0302					
RV0403	RV0701	RV0402			
Mark	No.	Size	Pin ø	Length	Location
RL0401		#4		6'-6"	Slab at posts
RL04		#4			Curb
RL06		#6			Rail
RS0301		#3	2 1/4"	3'-1"	Rail
RS0302		#3	2 1/4"	4'-1"	Posts
RU0301		#3	2 1/4"	4'-4"	Posts
RU0502		#5			Slab at posts
RV0701		#7	5 1/4"		Posts
RV0402		#4	3"		Posts
RV0403		#4	2"		Curb

Dimensions in bending diagram are out-to-out of bars, except as shown.

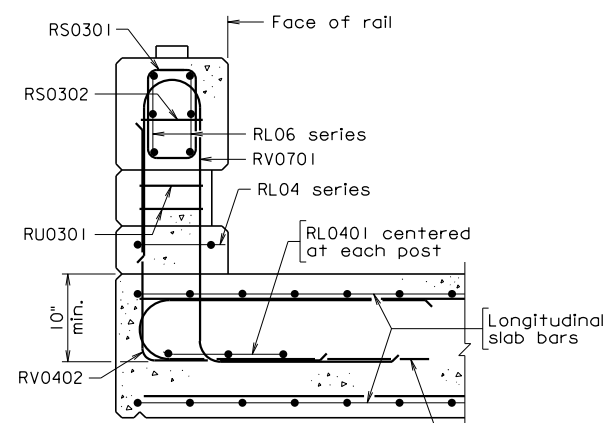
Gross concrete quantities above roadway slab :
Railing : C.Y. = Lin. ft. x 0.084



DECK SLABS



ELEVATION SHOWING RU0502 PLACEMENT
(Elevation shown is for deck slabs. Placement of RU0502 is the same for slab spans.)



SLAB SPANS

BCR-1

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE RAILING 27" KANSAS CORRAL W/ CURB					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions					BCR-1

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL**

2'-3" HEIGHT WITH CURB

NOTES TO DESIGNER:

The Kansas Corral with a railing height of 2'-3" and with curb section has been crash tested for TL-2 (TL = test level). The original rail has been modified as follows: rail width increased from 12" to 14" and the width of the post increased from 10" to 12". Dimensions were changed to allow for additional reinforcement cover. This rail is for use as a traffic barrier and shall not be used for sidewalk applications.

Use standard only for structures with low traffic volume that require increased hydraulic opening and/or visibility and when approach roadway has curb. Standard is not intended to be used with sidewalk curb(s). Standard may not be used for concrete slab spans having a slab thickness less than 15".

Standard BCR-5 (Cast-in-Place Terminal Wall – 27" Kansas Corral) must be included in the plans when using this standard.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

If bituminous overlay is placed, dimensions and rebars must be adjusted as noted below.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SECTION BETWEEN POSTS:

For projects with bituminous overlay, modify vertical dimensions (6" curb and 2'-3" railing height) so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for terminal wall.

REINFORCING STEEL SCHEDULE:

Add dimension and lengths for rebars RV0701, RV0402, RV0403 and RU0502.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

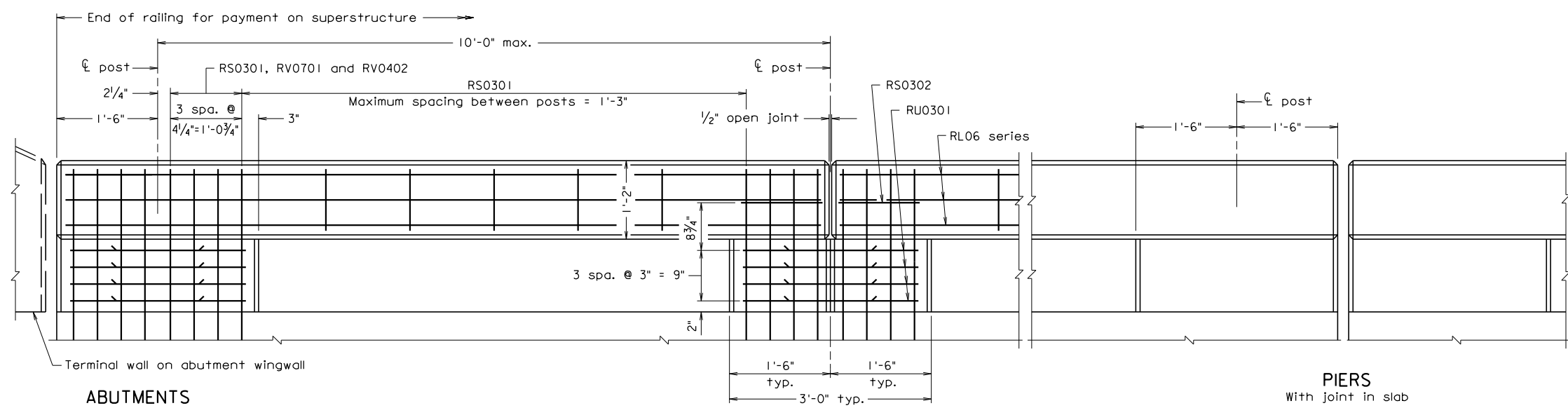
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-1: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 15Oct2015
SHEET 2 of 2
FILE NO. BCR-1-2

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TYPICAL ELEVATION

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

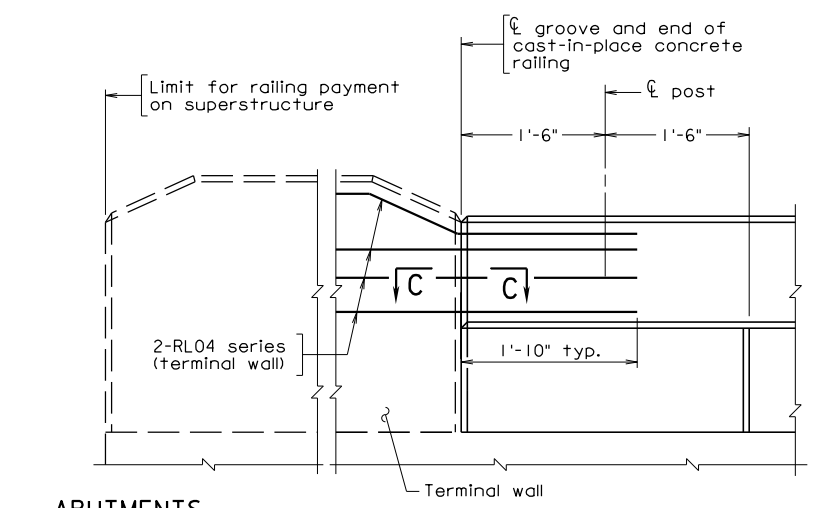
All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

RL0401 bars are not required for deck slabs.

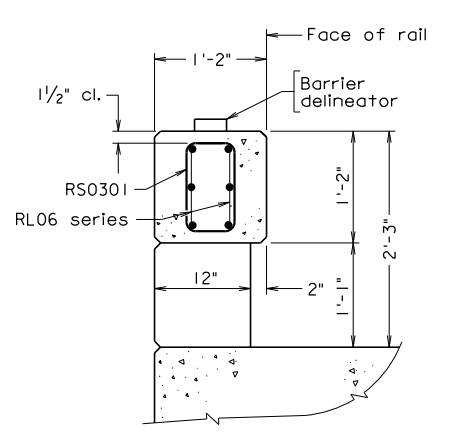
Barrier delineator size, color and spacing shall be in accordance with the Specifications.

For details and reinforcing steel schedule of terminal wall, see sheet ...

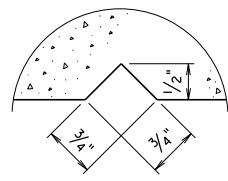
Bid item for railing shall include concrete noted in plans, barrier delineators and reinforcing steel indicated in reinforcing steel schedule.



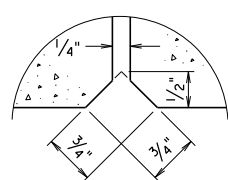
PART ELEVATION
Terminal Wall on Superstructure



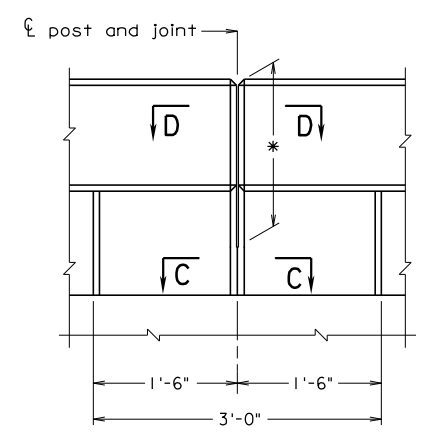
TYPICAL SECTION BETWEEN POSTS



SECTION C-C
Not to scale
Groove detail for both sides of curb



SECTION D-D
Not to scale
Deflection joint detail for both sides of rail and post

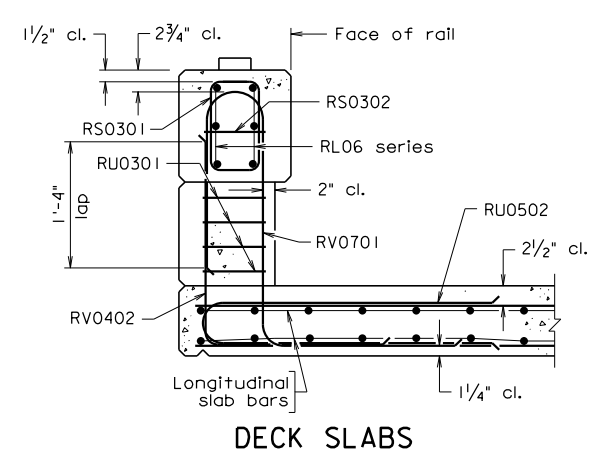


PIERS
Slab continuous over pier
* Open deflection joint 1'-9" deep

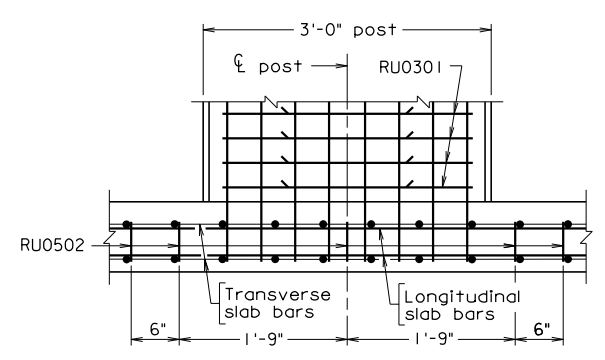
REINFORCING STEEL SCHEDULE					
RS0301 and RS0302			Const. joint		
Mark	No.	Size	Pin ø	Length	Location
RS0301		#3	2 1/4"	3'-11"	Rail
RS0302		#3	2 1/4"	4'-1"	Posts
RU0301		#3	2 1/4"	4'-4"	Posts
RU0502		#5			Slab at posts (Deck Slabs)
RV0701		#7	5 1/4"		Posts
RV0402		#4	3"		Posts
RL0401		#4		6'-6"	Slab at posts (Slab Spans)
RL06		#6			Rail

Dimensions in bending diagram are out-to-out of bars, except as shown.

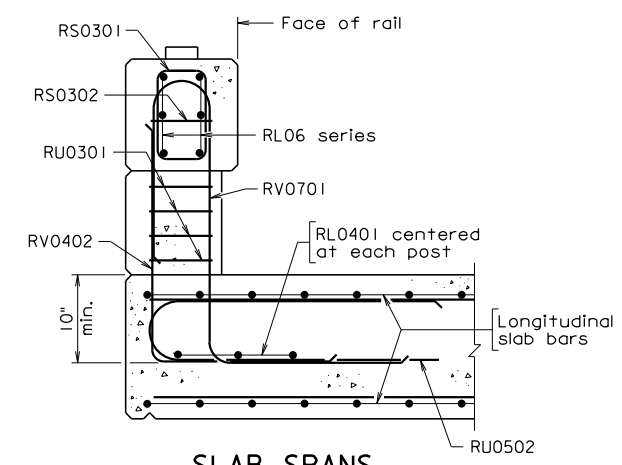
Gross concrete quantities above roadway slab :
Railing : C.Y. = Lin. Ft. x 0.066



DECK SLABS



ELEVATION SHOWING RU0502 PLACEMENT
(Elevation shown is for deck slabs.
Placement of RU0502 is the same for slab spans.)



SLAB SPANS

BCR-2 10-15-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE RAILING 27" KANSAS CORRAL W/O CURB					
No.	Description	Date	Designed:	Date	Plan No.
			Drawn:		Sheet No.
			Checked:		BCR-2

CAST-IN-PLACE CONCRETE RAILING

KANSAS CORRAL 2'-3" HEIGHT WITHOUT CURB

NOTES TO DESIGNER:

The Kansas Corral with a railing height of 2'-3" and without a curb section has been crash tested for TL-2 (TL = test level). The original rail has been modified as follows: rail width increased from 12" to 14" and the width of the post increased from 10" to 12". Dimensions were changed to allow for additional reinforcement cover. This rail is for use as a traffic barrier and shall not be used for sidewalk applications.

Use standard only for structures with low traffic volume that require increased hydraulic opening and/or visibility and when approach roadway has no curb. Standard is not intended to be used with sidewalk curb(s). Standard may not be used for concrete slab spans having a slab thickness less than 15".

Standard BCR-5 (Cast-in-Place Terminal Wall – 27" Kansas Corral) must be included in the plan when using this standard.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, the number of bars in the Reinforcing Steel Schedule is to be left blank by the designer.

If bituminous overlay is placed, dimensions and rebars must be adjusted as noted below.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SECTION BETWEEN POSTS:

For projects with bituminous overlay, modify vertical dimensions (6" curb and 2'-3" railing height) so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for terminal wall.

REINFORCING STEEL SCHEDULE:

Add dimension and lengths for rebar RV0701, RV0402, and RU0502.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

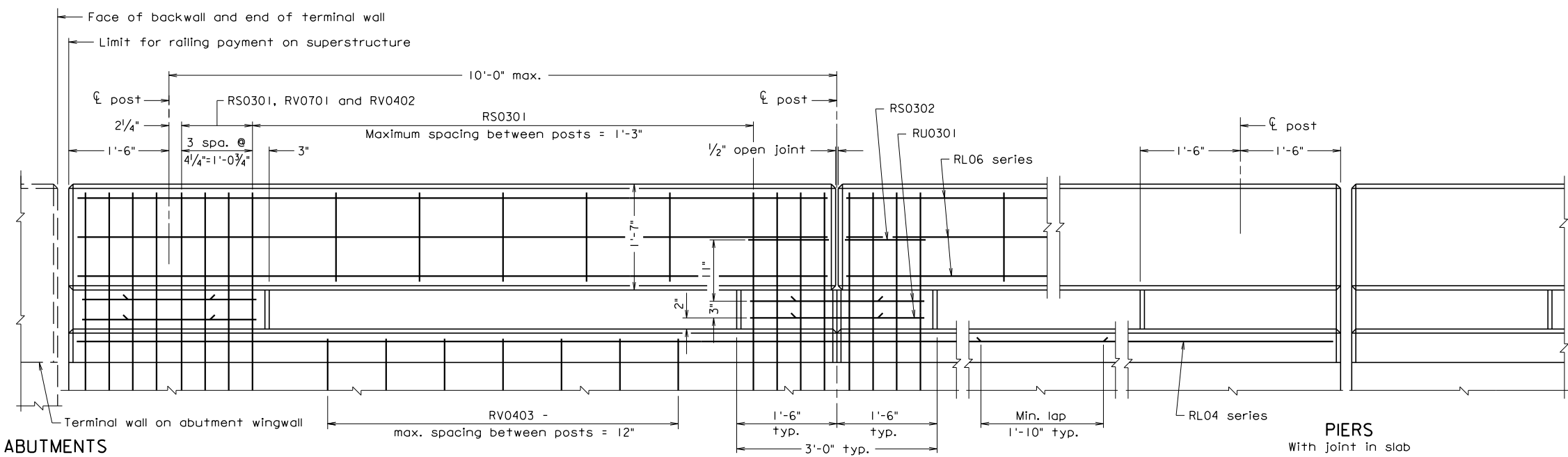
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-2: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 15Oct2015
SHEET 2 of 2
FILE NO. BCR-2-2

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

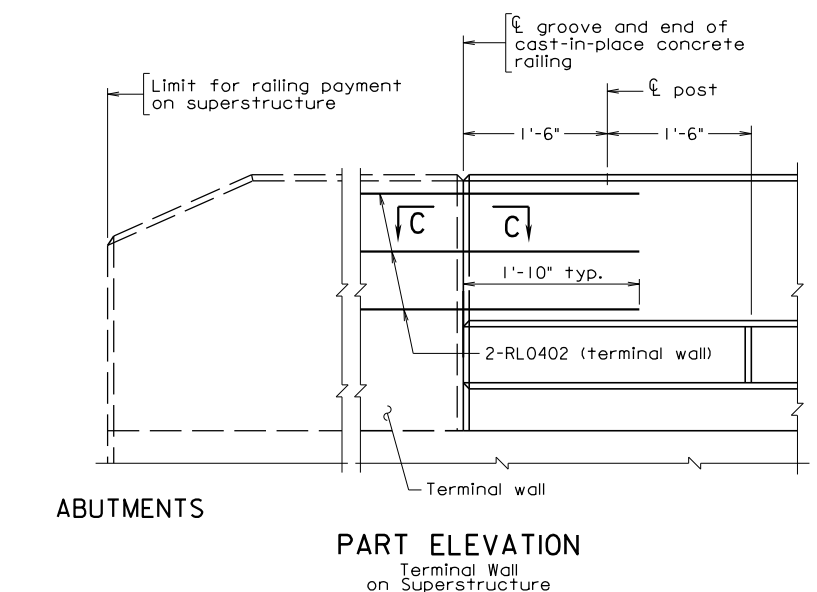
RL0401 bars are not required for deck slabs.

Barrier delineator size, color and spacing shall be in accordance with the Specifications.

For details and reinforcing steel schedule of terminal wall, see sheet ...

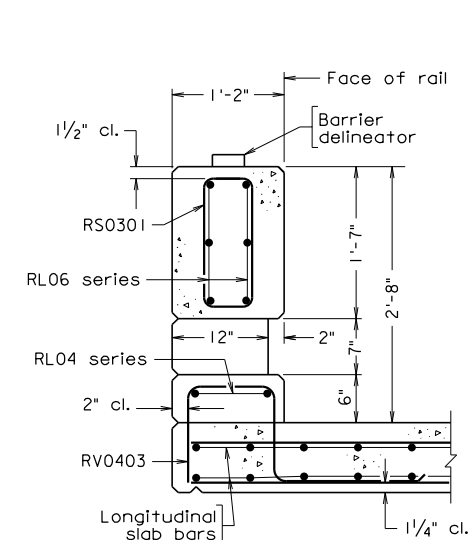
Bid item for railing shall include concrete noted in plans, barrier delineators and reinforcing steel indicated in reinforcing steel schedule.

ABUTMENTS

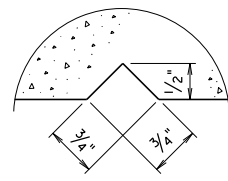


PART ELEVATION
Terminal Wall on Superstructure

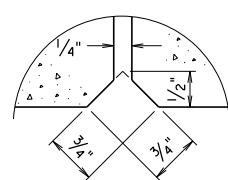
TYPICAL ELEVATION



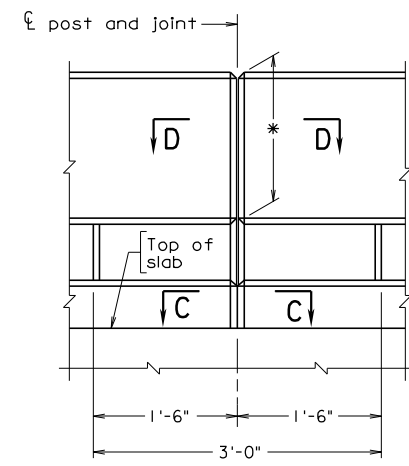
TYPICAL SECTION BETWEEN POSTS



SECTION C-C
both sides of curb
Not to scale
Groove detail for or joint



SECTION D-D
Not to scale
Deflection joint detail for both sides of rail and post

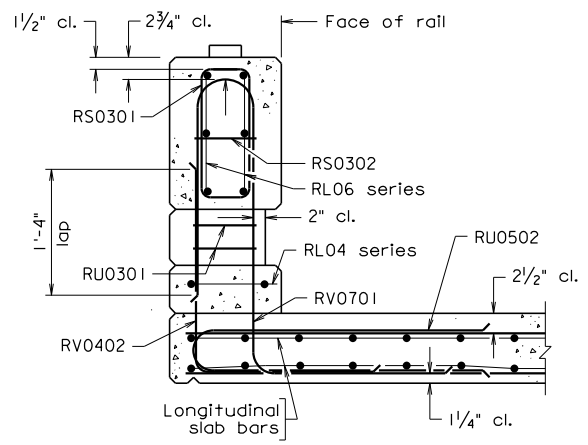


PIERS
Slab continuous over pier
* Open deflection joint 1'-7" deep

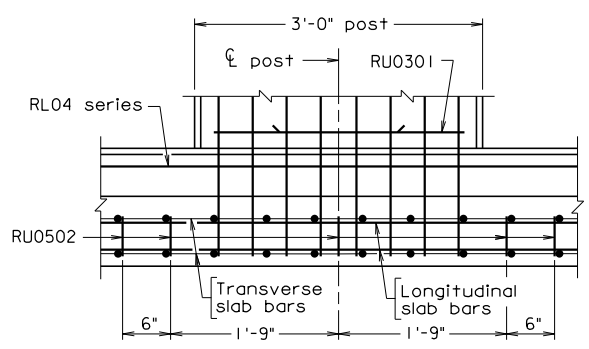
REINFORCING STEEL SCHEDULE					
RS0301 and RS0302					
RV0403	RV0701	RV0402			
Mark	No.	Size	Pin ø	Length	Location
RS0301		#3	2/4"	3'-11"	Rail
RS0302		#3	2/4"	4'-1"	Posts
RU0301		#3	2/4"	4'-4"	Posts
RU0502		#5			Slab at posts (Deck Slabs)
RV0701		#7	5/4"		Posts
RV0402		#4	3"		Posts
RV0403		#4	2"		Curb
RL0401		#4		6'-6"	Slab at posts (Slab Spans)
RL04		#4			Curb
RL06		#6			Rail

Dimensions in bending diagram are out-to-out of bars, except as shown.

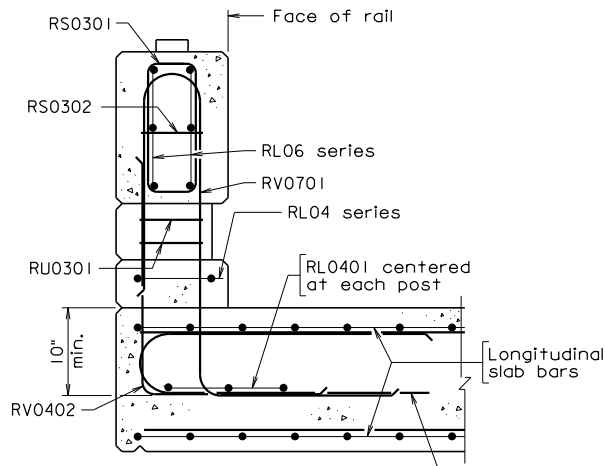
Gross concrete quantities above roadway slab :
Railing : C.Y. = Lin. ft. x 0.102



DECK SLABS



ELEVATION SHOWING RU0502 PLACEMENT
(Elevation shown is for deck slabs. Placement of RU0502 is the same for slab spans.)



SLAB SPANS

10-15-2015 BCR-3

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE RAILING 32" KANSAS CORRAL W/ CURB					
No.	Description	Date	Designed: S&B..DIV	Date	Plan No.
			Drawn: S&B..DIV		Sheet No.
			Checked: S&B..DIV		BCR-3

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL**

2'-8" HEIGHT WITH CURB

NOTES TO DESIGNER:

The Kansas Corral with a railing height of 2'-8" and with curb section has been crash tested for TL-4 (TL = test level). The original rail has been modified as follows: rail width increased from 12" to 14" and the width of the post increased from 10" to 12". Dimensions were changed to allow for additional reinforcement cover. This rail is for use as a traffic barrier and shall not be used for sidewalk applications.

Use standard only for structures that require increased hydraulic opening and/or visibility and when approach roadway has curb. Standard is not intended to be used with sidewalk curb(s). Standard may be used for deck slab on stringers and concrete slab spans having a minimum slab thickness of 15".

Select the appropriate terminal wall standard (BCR-6 to BCR-9) to be included in the plans when using this standard.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

If bituminous overlay is placed, dimensions and rebars must be adjusted as noted below.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SECTION BETWEEN POSTS:

For projects with bituminous overlay, modify vertical dimensions (6" curb and 2'-8" railing height) so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for terminal wall.

REINFORCING STEEL SCHEDULE:

Add dimension and lengths for rebars RV0701, RV0402, RV0403 and RU0502.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

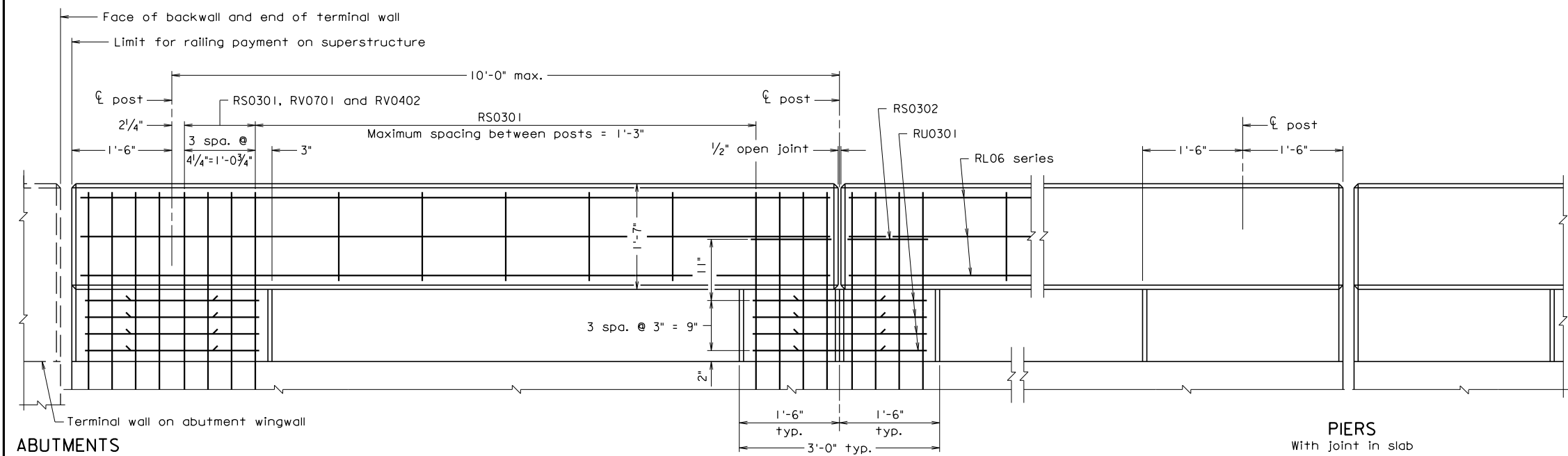
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-3: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 15Oct2015
SHEET 2 of 2
FILE NO. BCR-3-2

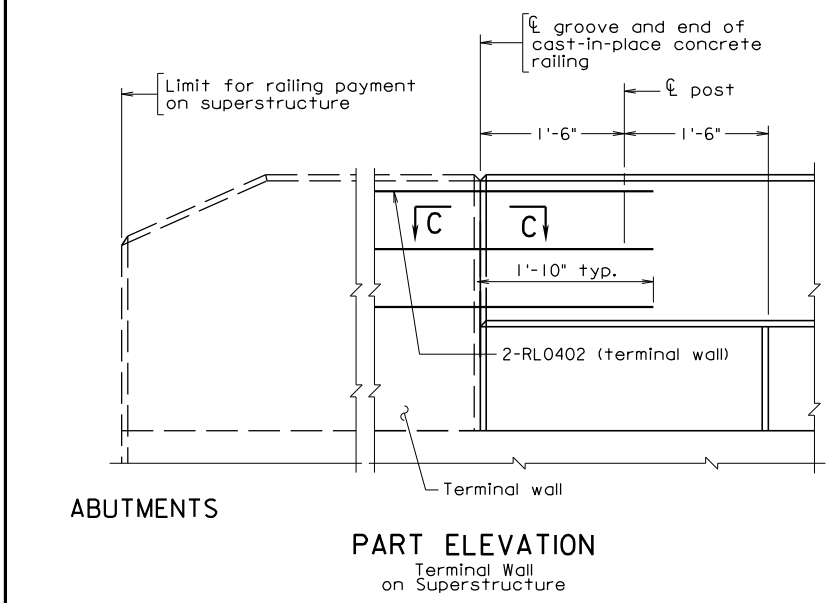
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



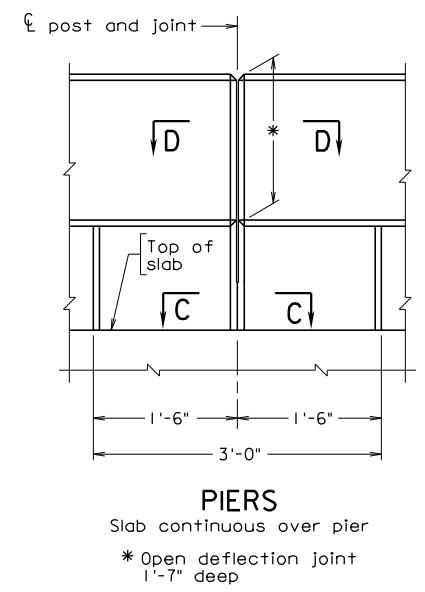
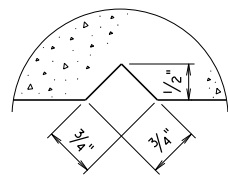
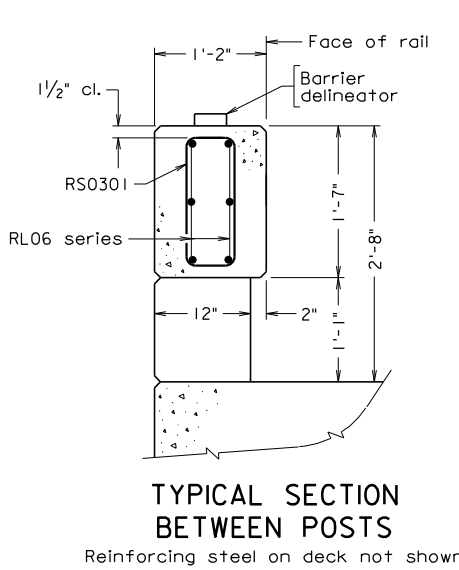
ABUTMENTS

PIERS
With joint in slab

Notes:
Plan dimensions shown are measured in the respective horizontal and vertical planes.
The Contractor shall determine all dimensions and details necessary for installation.
All concrete shall be Class A4.
All bevels for concrete shall be 3/4".
The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
RL0401 bars are not required for deck slabs.
Barrier delineator size, color and spacing shall be in accordance with the Specifications.
For details and reinforcing steel schedule of terminal wall, see sheet ...
Bid item for railing shall include concrete noted in plans, barrier delineators and reinforcing steel indicated in reinforcing steel schedule.

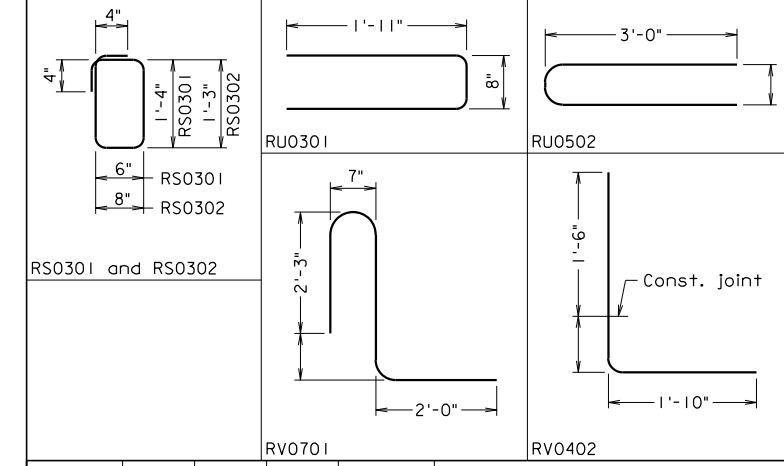


TYPICAL ELEVATION



SECTION D-D
Not to scale
Deflection joint detail for both sides of rail and post

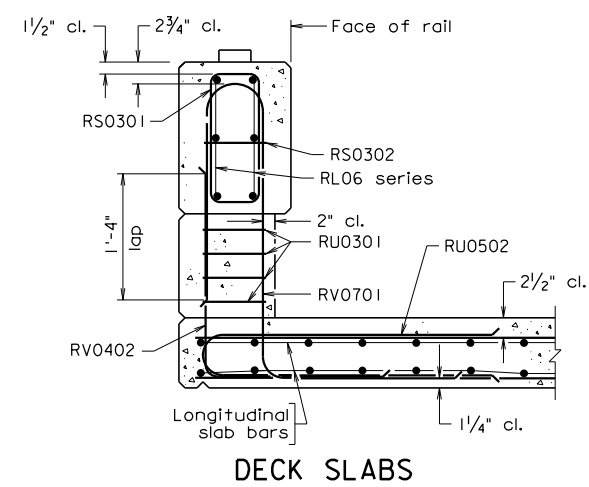
REINFORCING STEEL SCHEDULE



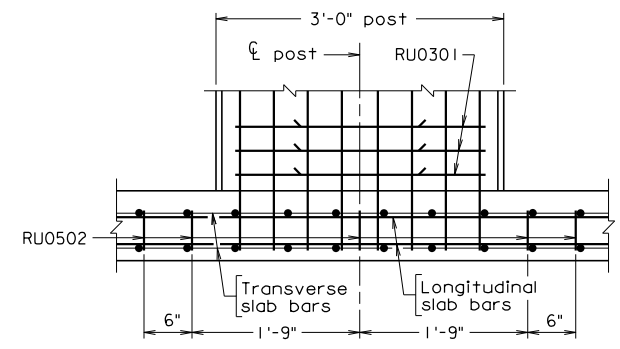
Mark	No.	Size	Pin ϕ	Length	Location
RS0301		#3	2 1/4"	3'-11"	Rail
RS0302		#3	2 1/4"	4'-1"	Posts
RU0301		#3	2 1/4"	4'-4"	Posts
RU0502		#5			Slab at posts (Deck Slabs)
RV0701		#7	5 1/4"		Posts
RV0402		#4	3"		Posts
RL0401		#4		6'-6"	Slab at posts (Slab Spans)
RL06		#6			Rail

Dimensions in bending diagram are out-to-out of bars, except as shown.
Gross concrete quantities above roadway slab :
Railing : C.Y. = Lin. Ft. x 0.084

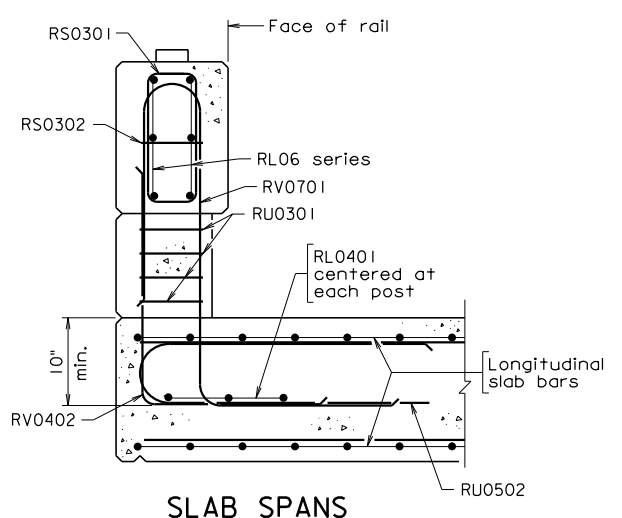
10-15-2015
Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015
A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER



DECK SLABS



ELEVATION SHOWING RU0502 PLACEMENT
(Elevation shown is for deck slabs.
Placement of RU0502 is the same for slab spans.)



SLAB SPANS

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE RAILING 32" KANSAS CORRAL W/O CURB					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		BCR-4

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL**

2'-8" HEIGHT WITHOUT CURB

NOTES TO DESIGNER:

The Kansas Corral with a railing height of 2'-8" and without curb section has been crash tested for TL-4 (TL = test level). The original rail has been modified as follows: rail width increased from 12" to 14" and the width of the post increased from 10" to 12". Dimensions were changed to allow for additional reinforcement cover. This rail is for use as a traffic barrier and shall not be used for sidewalk applications.

Use standard only for structures that require increased hydraulic opening and/or visibility and when approach roadway has no curb. Standard is not intended to be used with sidewalk curb(s). Standard may be used for deck slab on stringers and concrete slab spans having a minimum slab thickness of 15".

Select the appropriate terminal wall standard (BCR-6 to BCR-9) to be included in the plans when using this standard.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are left blank in the Reinforcing Steel Schedule.

If bituminous overlay is placed, dimensions and rebars must be adjusted as noted below.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SECTION BETWEEN POSTS:

For projects with bituminous overlay, modify vertical dimensions 1'-1" and 2'-8" (railing height) so that these dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for terminal wall.

REINFORCING STEEL SCHEDULE:

Add dimension for rebars RV0701, RV0402, and RU0502.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

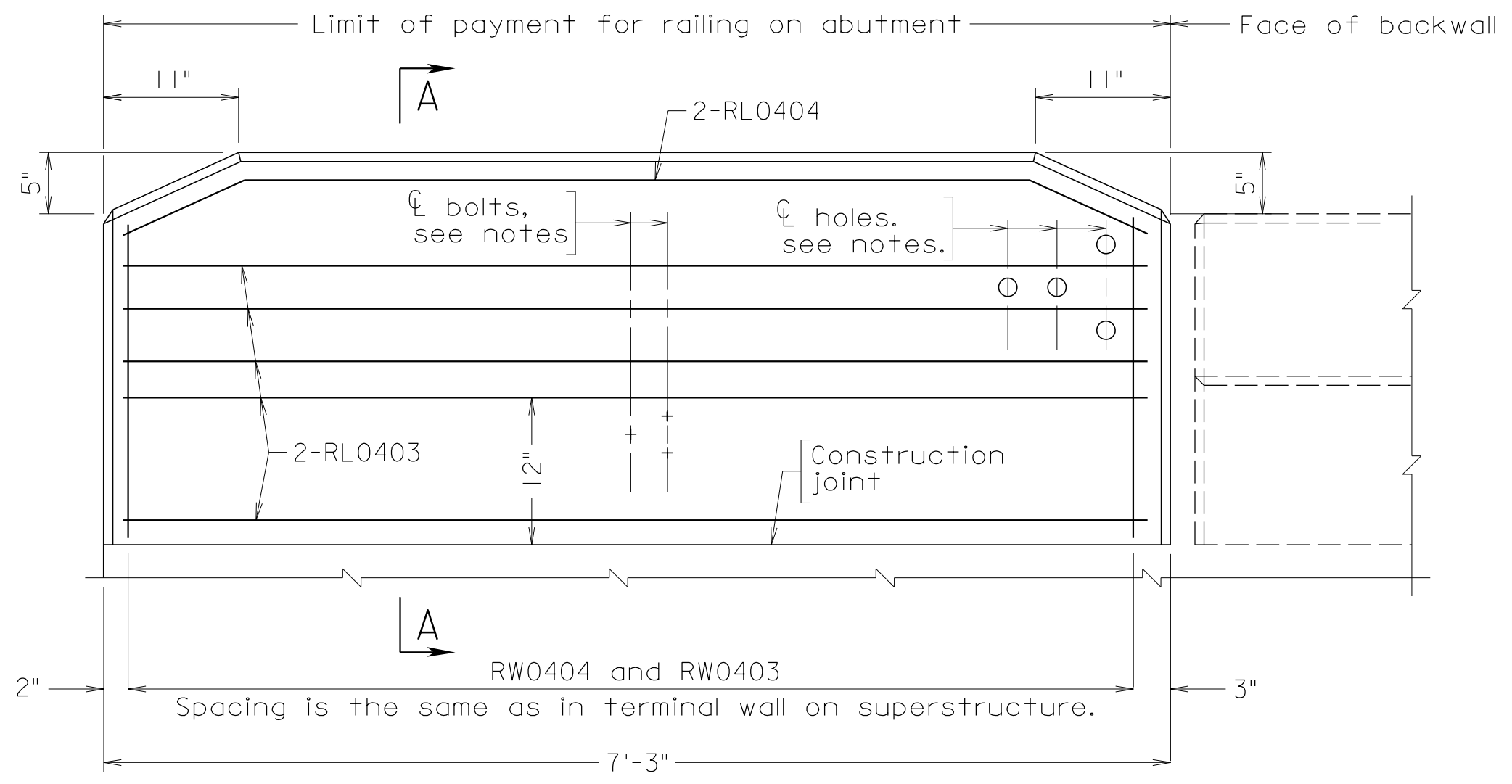
TITLE BLOCK:

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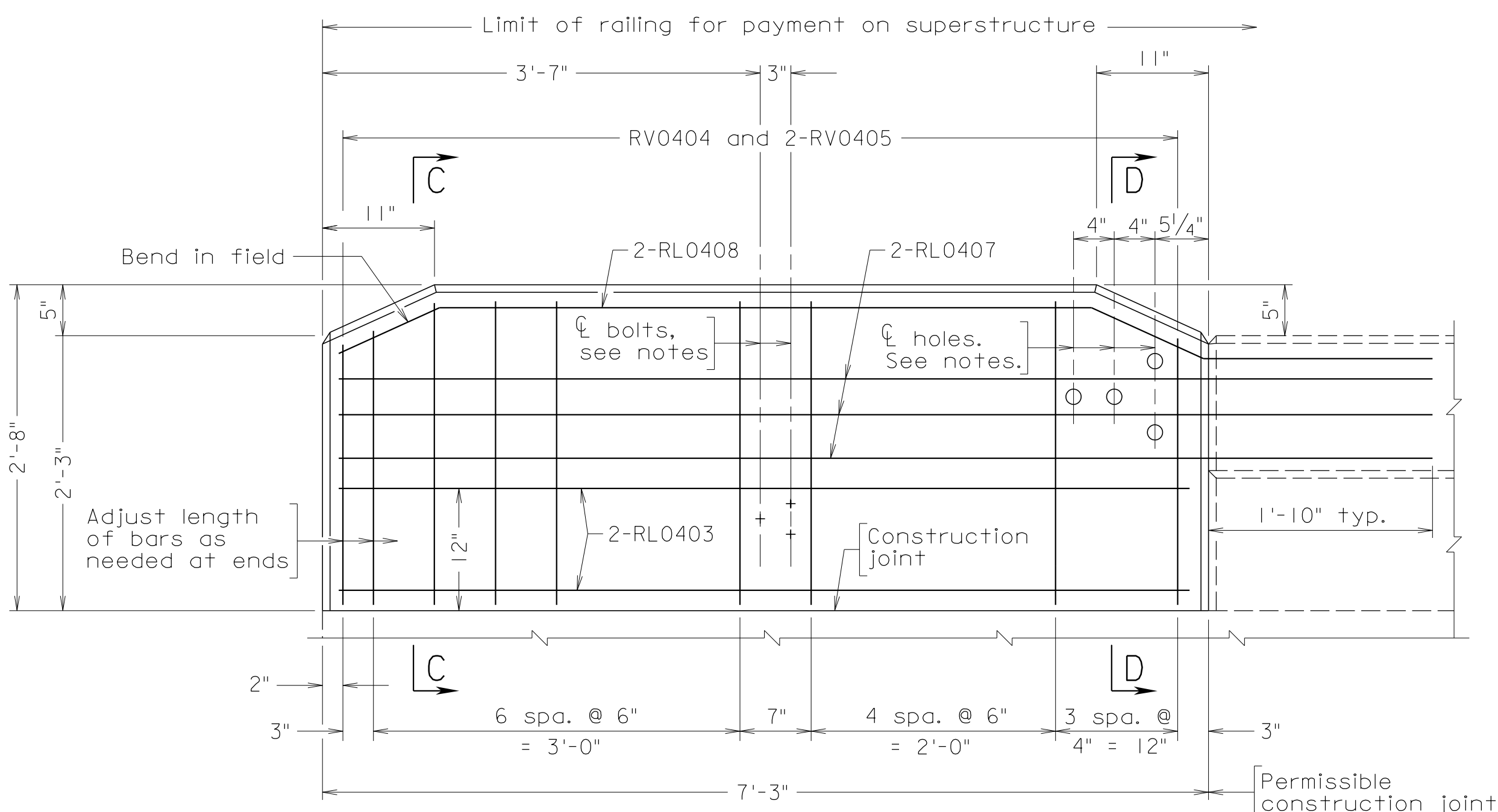
STANDARD BCR-4: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 15Oct2015
SHEET 2 of 2
FILE NO. BCR-4-2

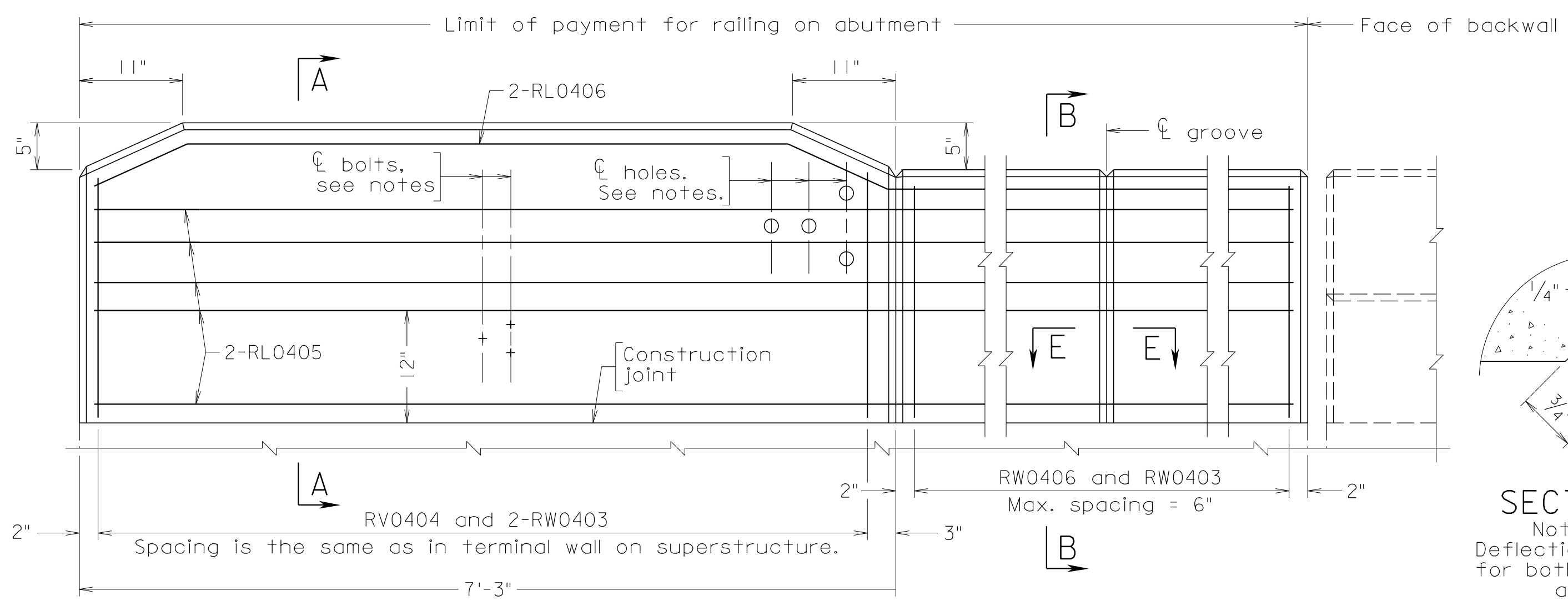
STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT		ROUTE	NO.
VA.				



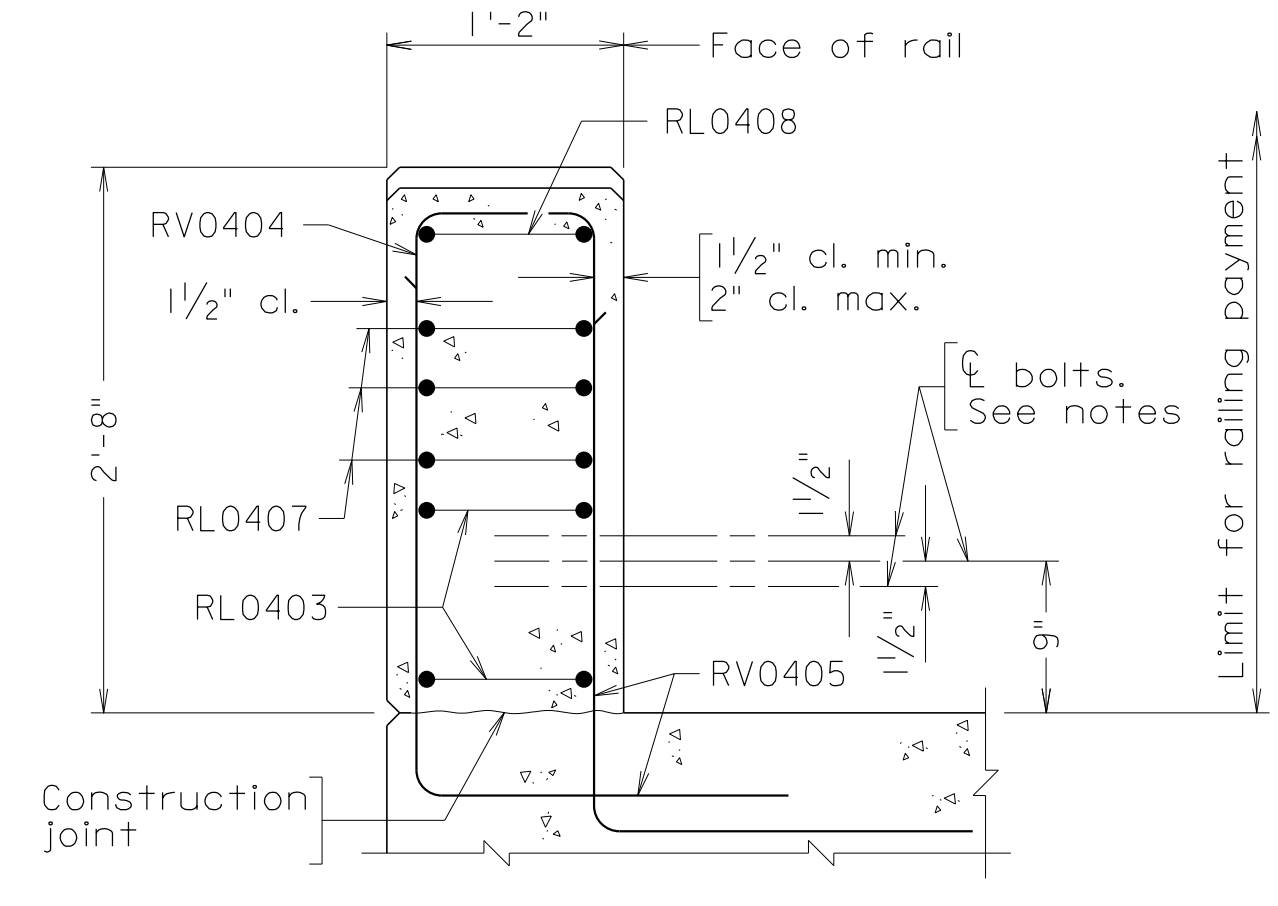
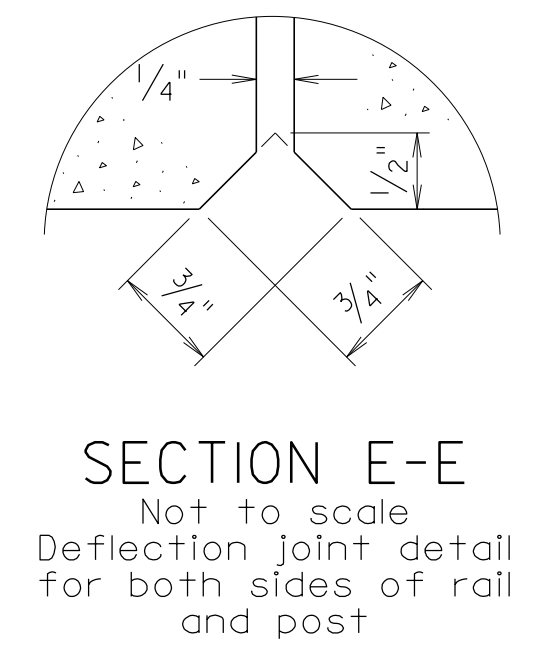
TERMINAL WALL ELEVATION ABUTMENT



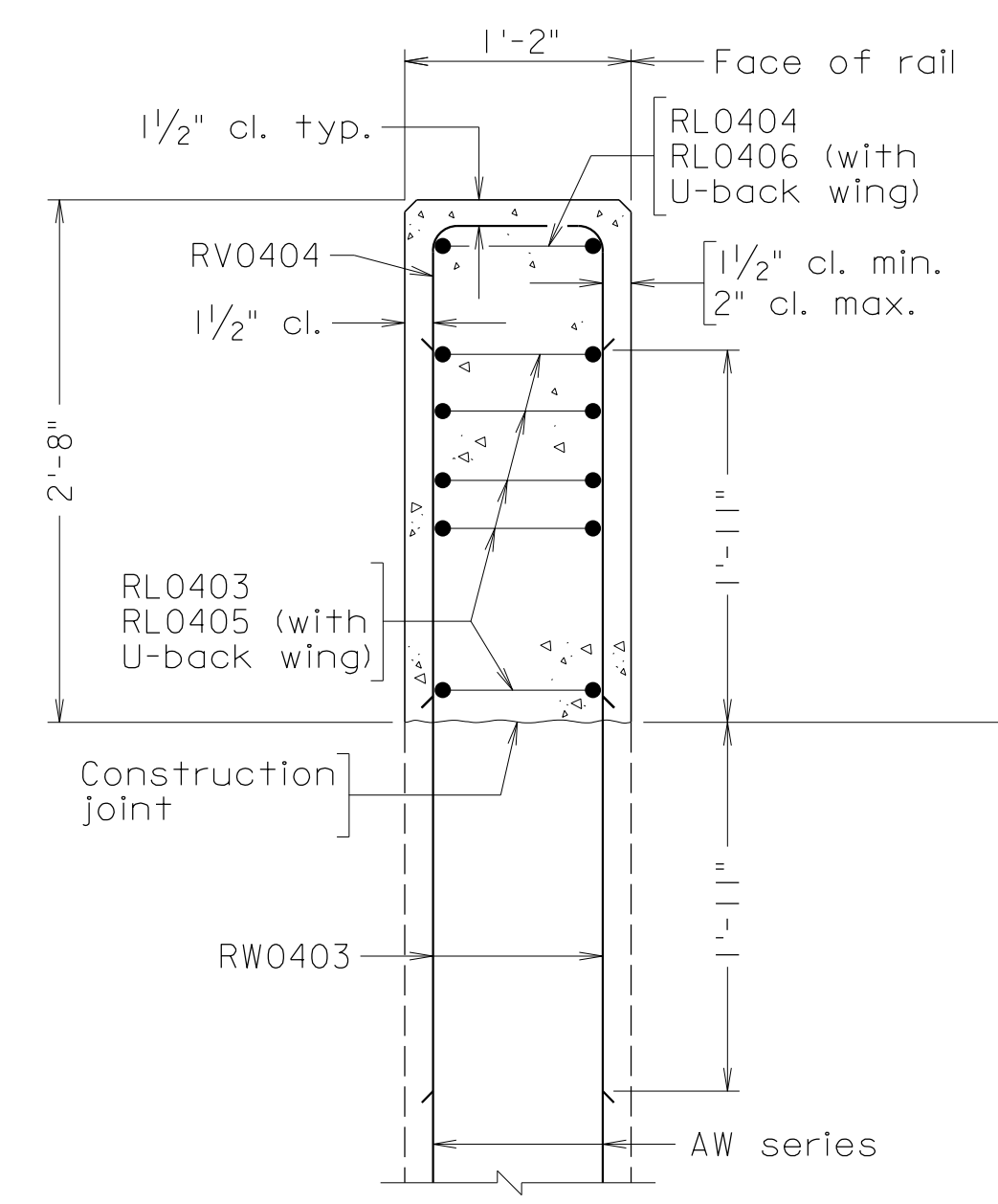
TERMINAL WALL ON SUPERSTRUCTURE ELEVATION



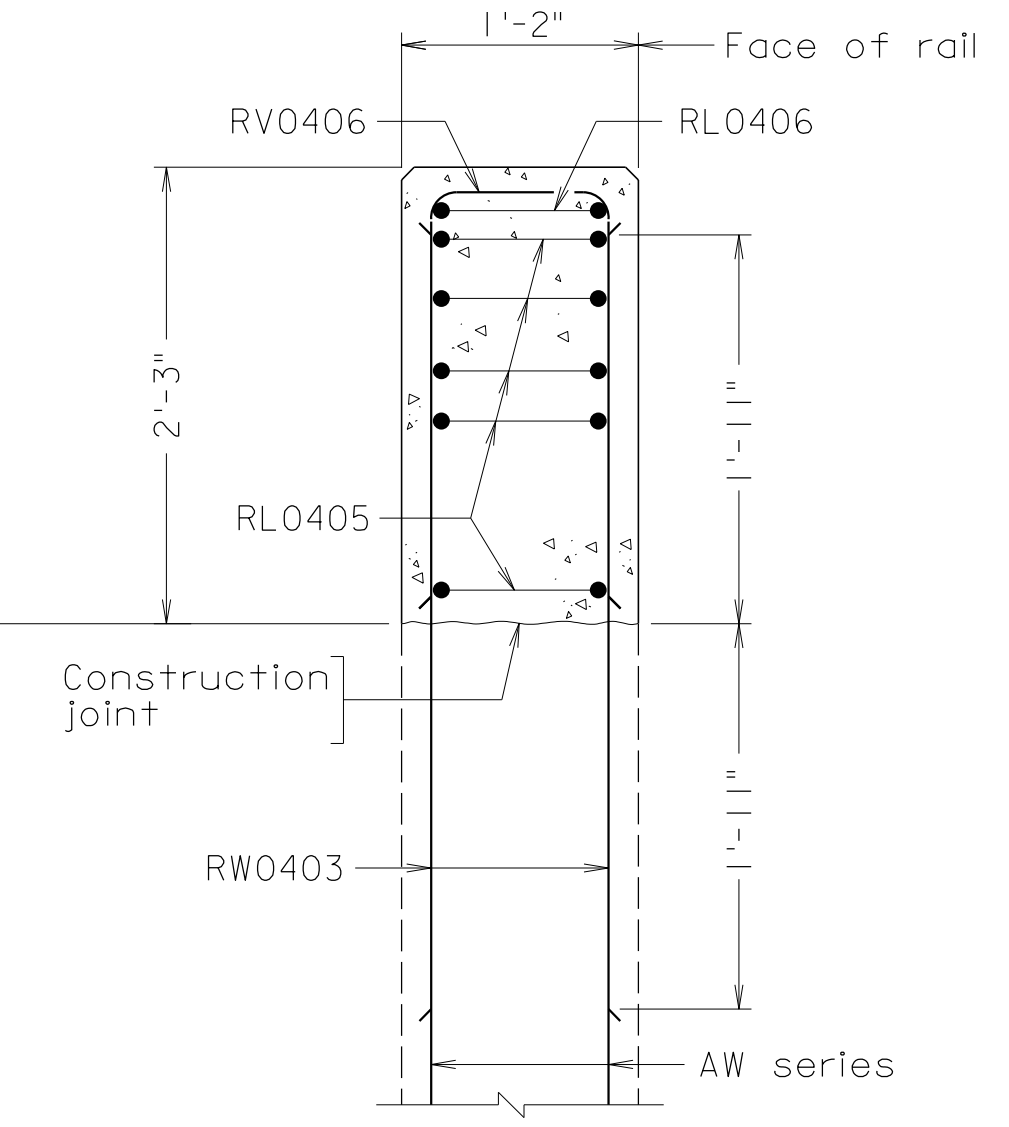
TERMINAL WALL ELEVATION U-BACK WING ABUTMENT



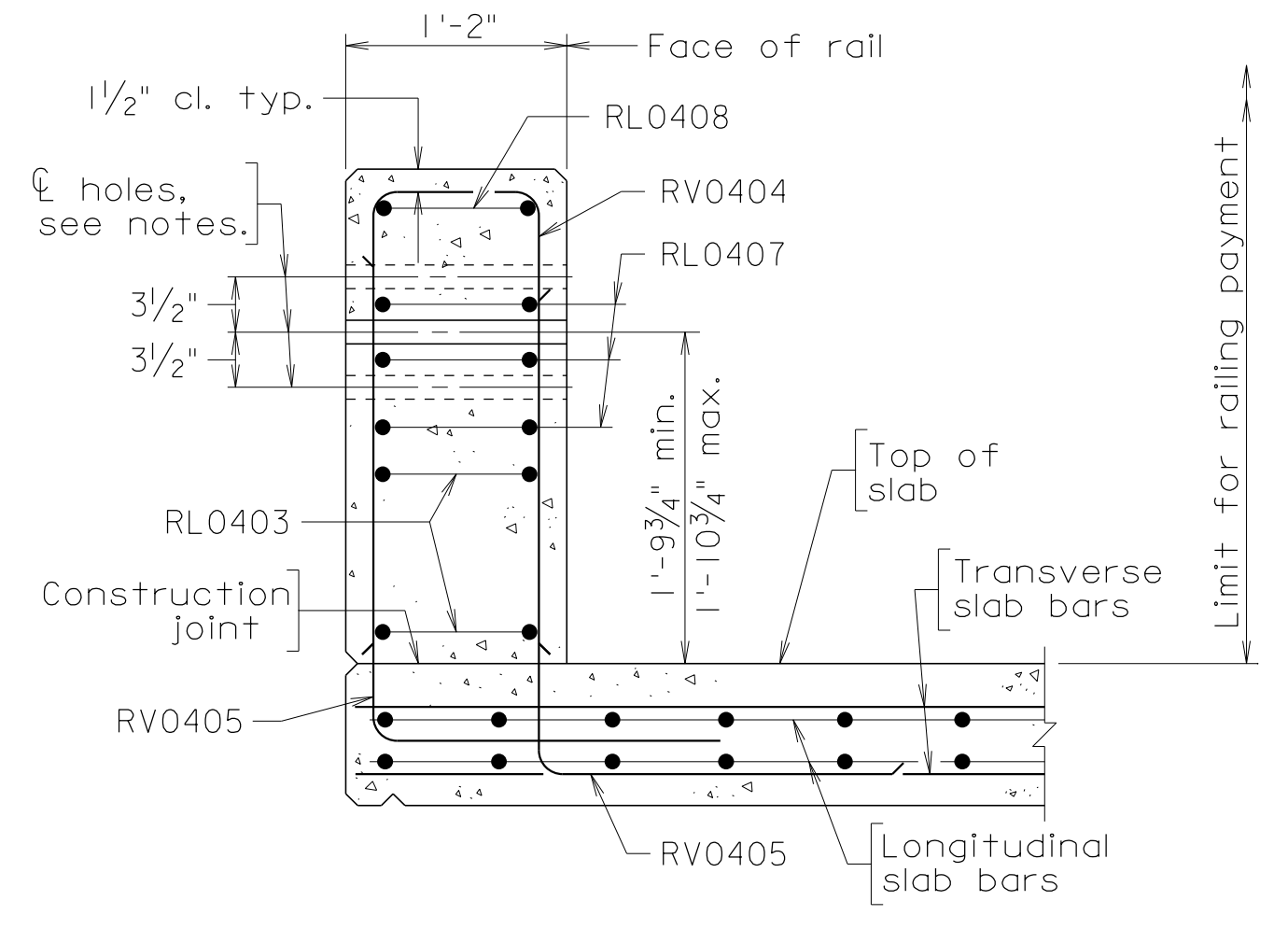
SECTION C-C



SECTION A-A



SECTION B-B



SECTION D-D

Notes:
 Plan dimensions shown are measured in the horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 For details and reinforcing steel schedule of cast in place concrete railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-F0A-1.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RV0404					
RL0403	#4			6'-11"	Terminal wall on abutment or superstructure
RL0404	#4			7'-2"	Terminal wall on abutment (field bend)
RL0405	#4				Terminal wall with U-back wing
RL0406	#4				Terminal wall with U-back wing (field bend)
RL0407	#4			8'-11"	Terminal wall on superstructure
RL0408	#4			9'-11"	Terminal wall on superstructure (field bend)
RV0404	#4	3"		5'-9"	Terminal wall on abutment or superstructure
RV0405	#4	3"			Terminal wall on superstructure
RV0406	#4	3"		4'-11"	Wall on U-back wing
RW0403	#4			3'-10"	Terminal wall and wall on U-back wing

Dimensions in bending diagram are out-to-out of bars, except as shown.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE TERMINAL WALL 27" KANSAS CORRAL					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		BCR-5

BCR-5 10-15-2015 bcr5.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-3")**

TERMINAL WALL

NOTES TO DESIGNER:

Include this standard when using standard BCR-1 and BCR-2.

Terminal wall is detailed on abutment and superstructure. Delete one that will not be used.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

For projects with bituminous concrete overlay, modify Sections so that dimensions will be established from top of overlay surface.

SECTION A-A:

Modify dimension 2'-8" height of terminal wall.

SECTION B-B:

Modify dimension 2'-3" height of terminal wall.

SECTION C-C:

Modify vertical dimensions 9" and 2'-8" height of terminal wall.

SECTION D-D:

Modify the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations and dimension 2'-8" height of terminal wall.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for cast-in-place concrete railing.

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-3")**

TERMINAL WALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Plan dimensions shown are measured in the horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of cast in place concrete railing, see sheet ...

Each terminal wall shall be cast as one piece.

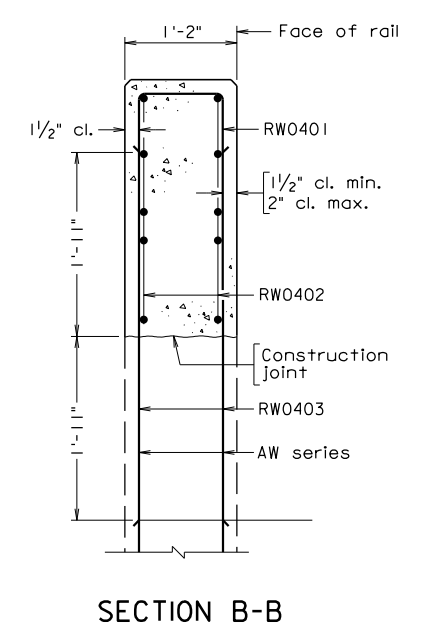
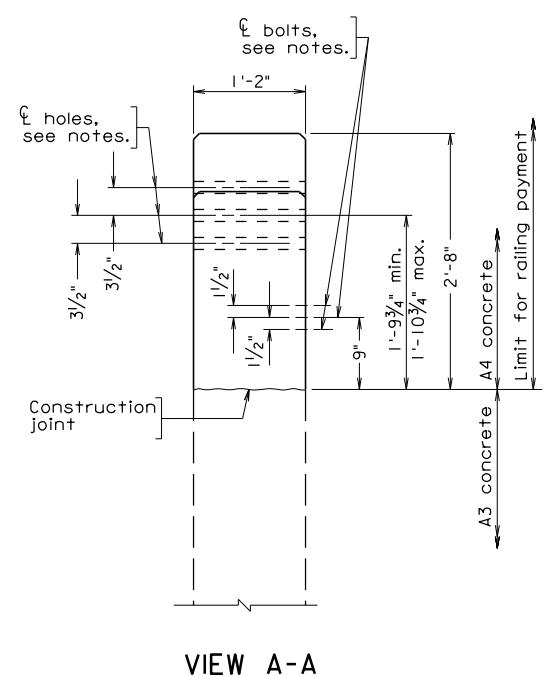
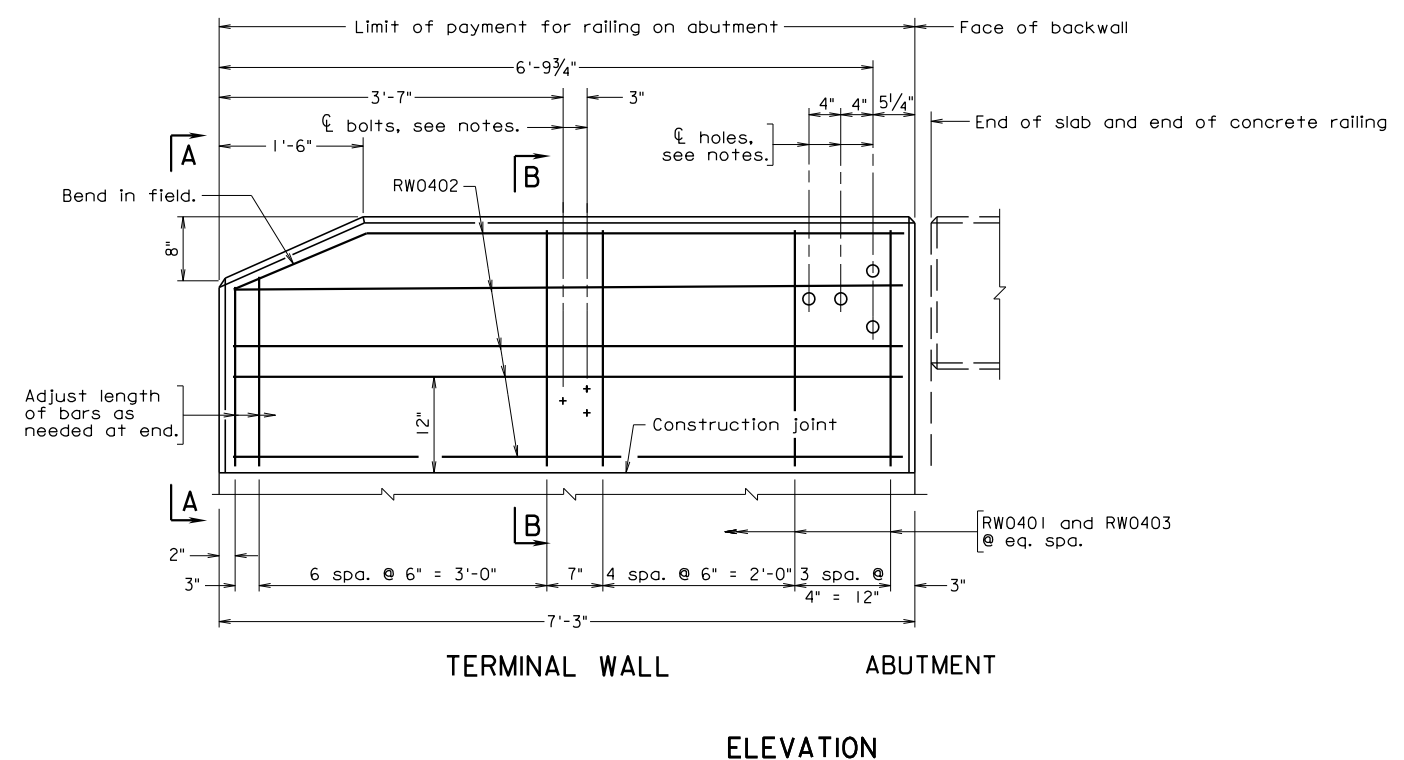
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RW0401		#4	3"	5'-9"	Terminal wall
RW0402		#4		6'-11"	Terminal wall
RW0403		#4		3'-10"	Terminal wall

Dimensions in bending diagram are out-to-out of bars, except as shown.

10-15-2015 bcr6.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE TERMINAL WALL 32" KANSAS CORRAL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BCR-6		

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-8")**

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

Include this standard when using standard BCR-3 or BCR-4.

Terminal wall is detailed on abutment wingwall.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify the vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations and 2'-8" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for cast-in-place concrete railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-6: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 2
FILE NO. BCR-6-2

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Plan dimensions shown are measured in the horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of cast in place concrete railing, see sheet ...

Each terminal wall shall be cast as one piece.

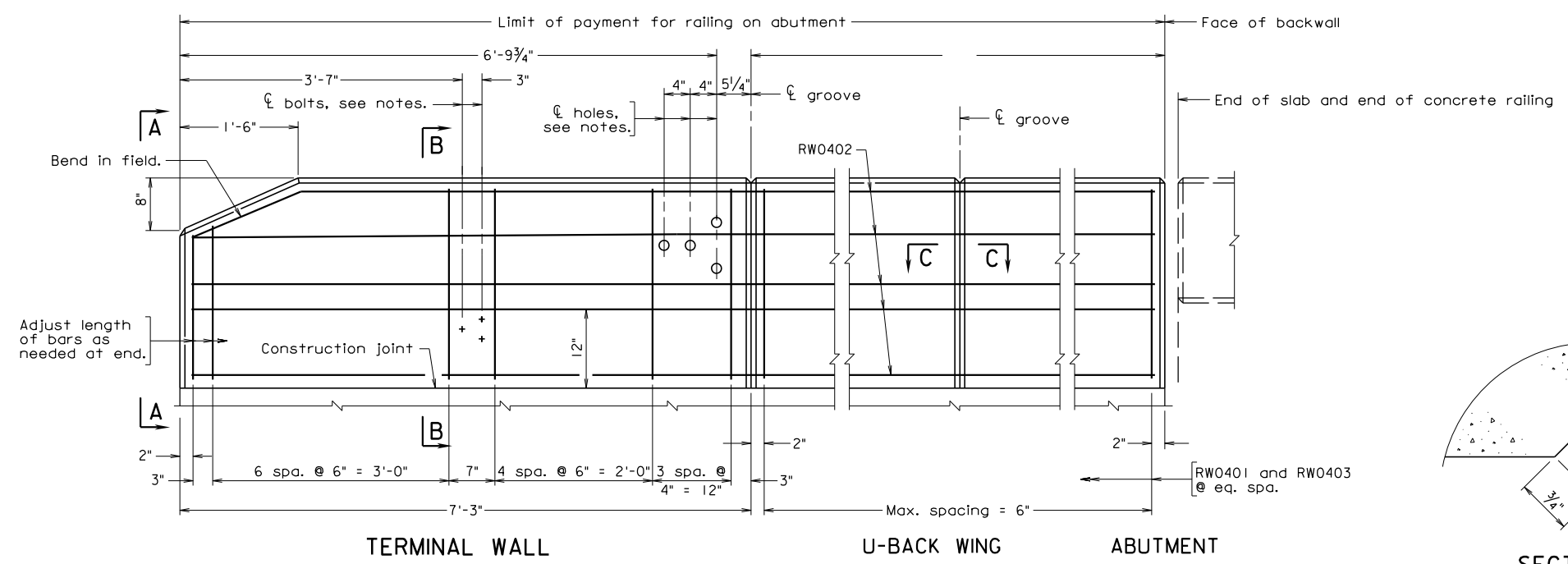
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

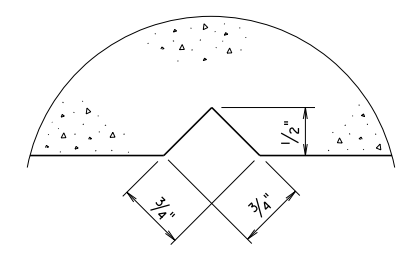
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

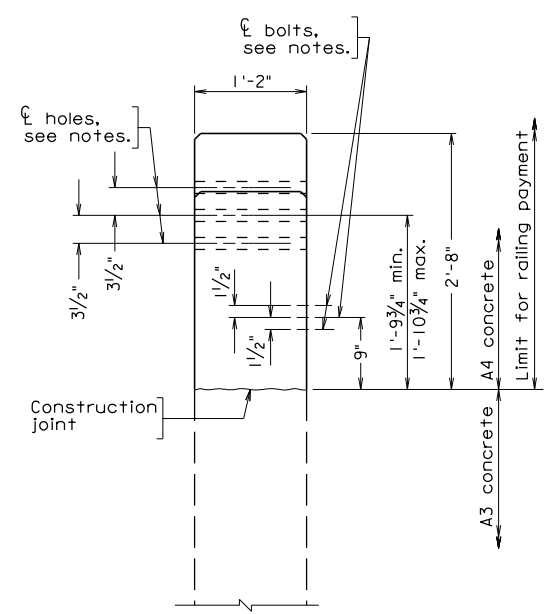
Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.



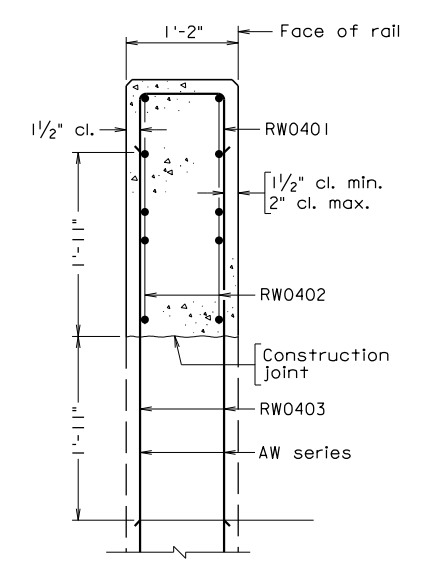
TERMINAL WALL U-BACK WING ABUTMENT
ELEVATION



SECTION C-C
Full scale
Groove detail for both sides of wall



VIEW A-A



SECTION B-B

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RW0401		#4	3"	5'-9"	Terminal wall and U-back wing
RW0402		#4			Terminal wall and U-back wing
RW0403		#4		3'-10"	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars, except as shown.

bcr7.dgn

10-15-2015

BCR-7

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE TERMINAL WALL 32" KANSAS CORRAL					
No.	Description	Date	Designed: S&B..DIV	Date	Plan No.
			Drawn: ...S&B..DIV		
			Checked: S&B..DIV		
Revisions					BCR-7
					Sheet No.

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-8")**

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

Include this standard when using standard BCR-3 or BCR-4.

Terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify the vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts and 2'-8" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for cast-in-place concrete railing.

REINFORCING STEEL SCHEDULE:

Add length for RW0402.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

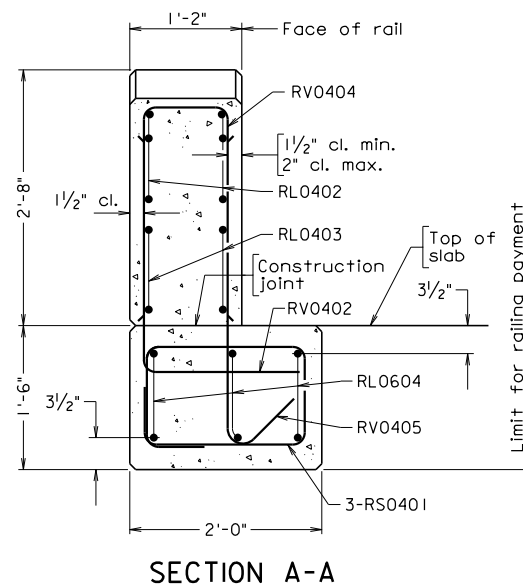
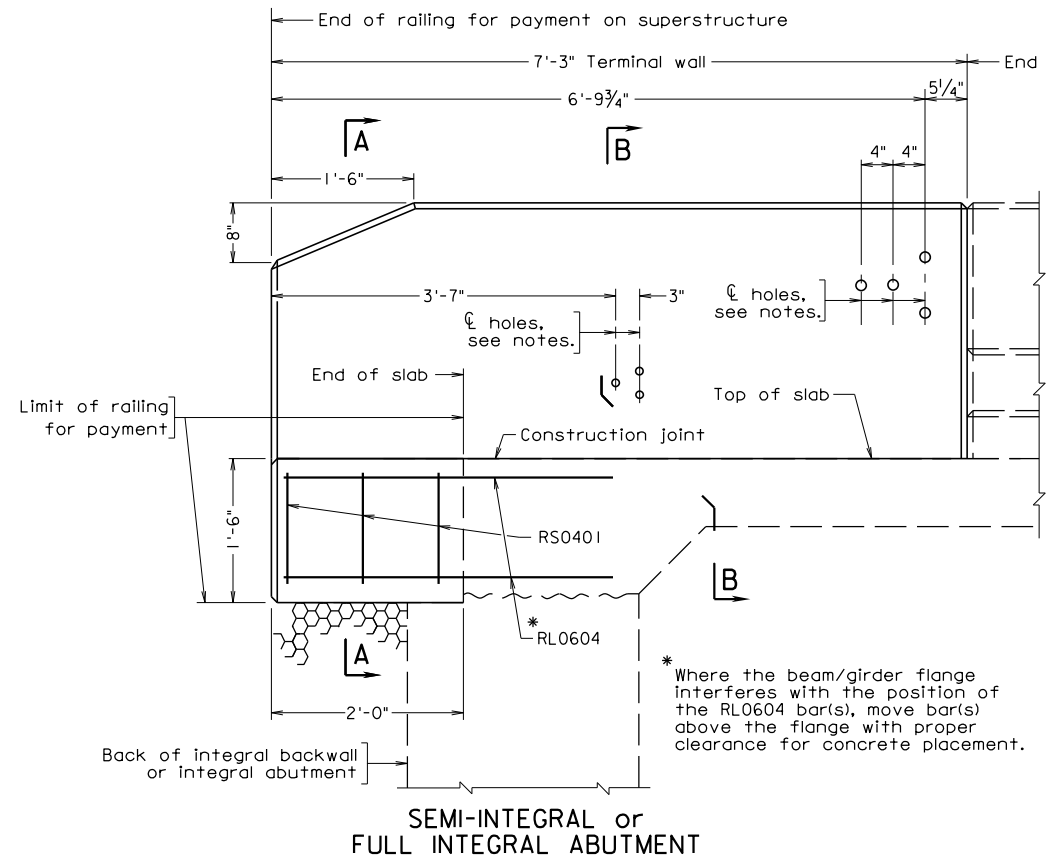
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-7: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 2
FILE NO. BCR-7-2

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Plan dimensions shown are measured in the horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of cast in place concrete railing, see sheet ...

Each terminal wall shall be cast as one piece.

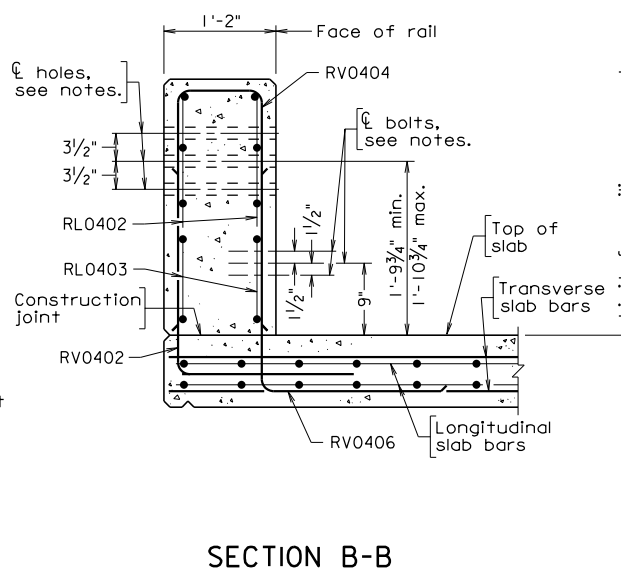
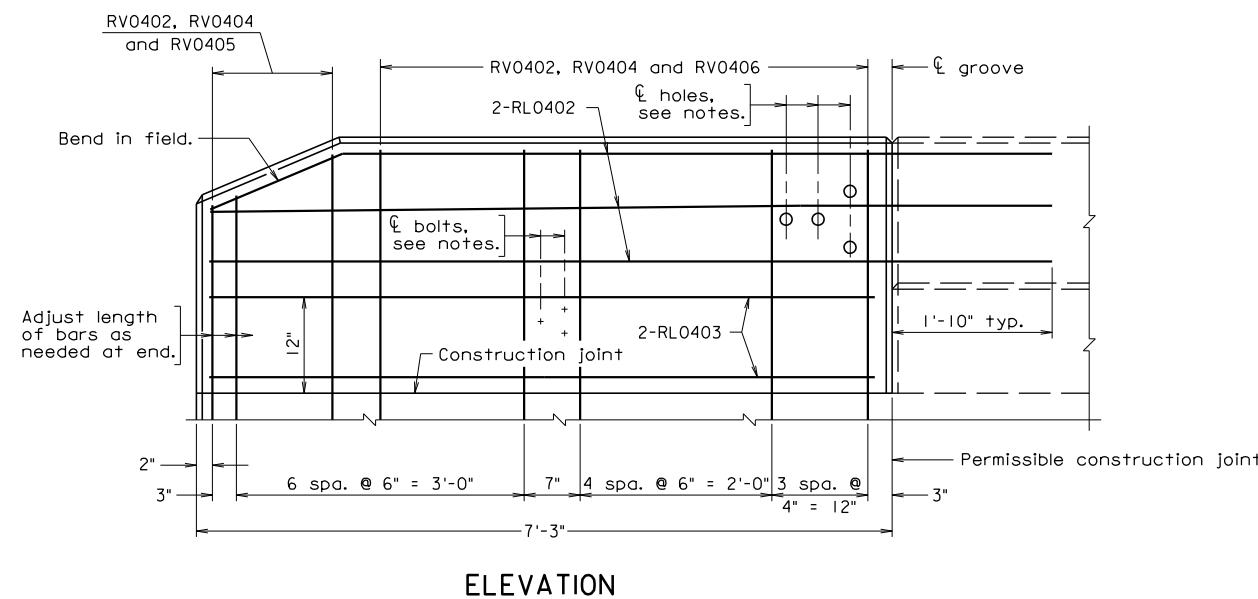
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
RV0402					
RV0404					
RV0405					
RV0406					
RS0401					
RL0402		#4		8'-11"	Terminal wall
RL0403		#4		6'-11"	Terminal wall
RL0604		#6		3'-6"	Terminal wall end support
RS0401		#4	3"	6'-2"	Terminal wall end support
RV0402		#4	3"	3'-7"	Terminal wall
RV0404		#4	3"	5'-9"	Terminal wall
RV0405		#4	3"		Terminal wall
RV0406		#4	3"		Terminal wall



Dimensions in bending diagram are out-to-out of bars, except as shown.

10-15-2015

BCR-8

bcr8.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

ELEVATION

SECTION B-B

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

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE TERMINAL WALL 32" KANSAS CORRAL					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions					BCR-8

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-8")**

**TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR
SEMI-INTEGRAL ABUTMENT**

NOTES TO DESIGNER:

Include this standard when using standard BCR-3 or BCR-4.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify 2'-8" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for cast-in-place concrete railing and for integral abutment.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RV0402.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

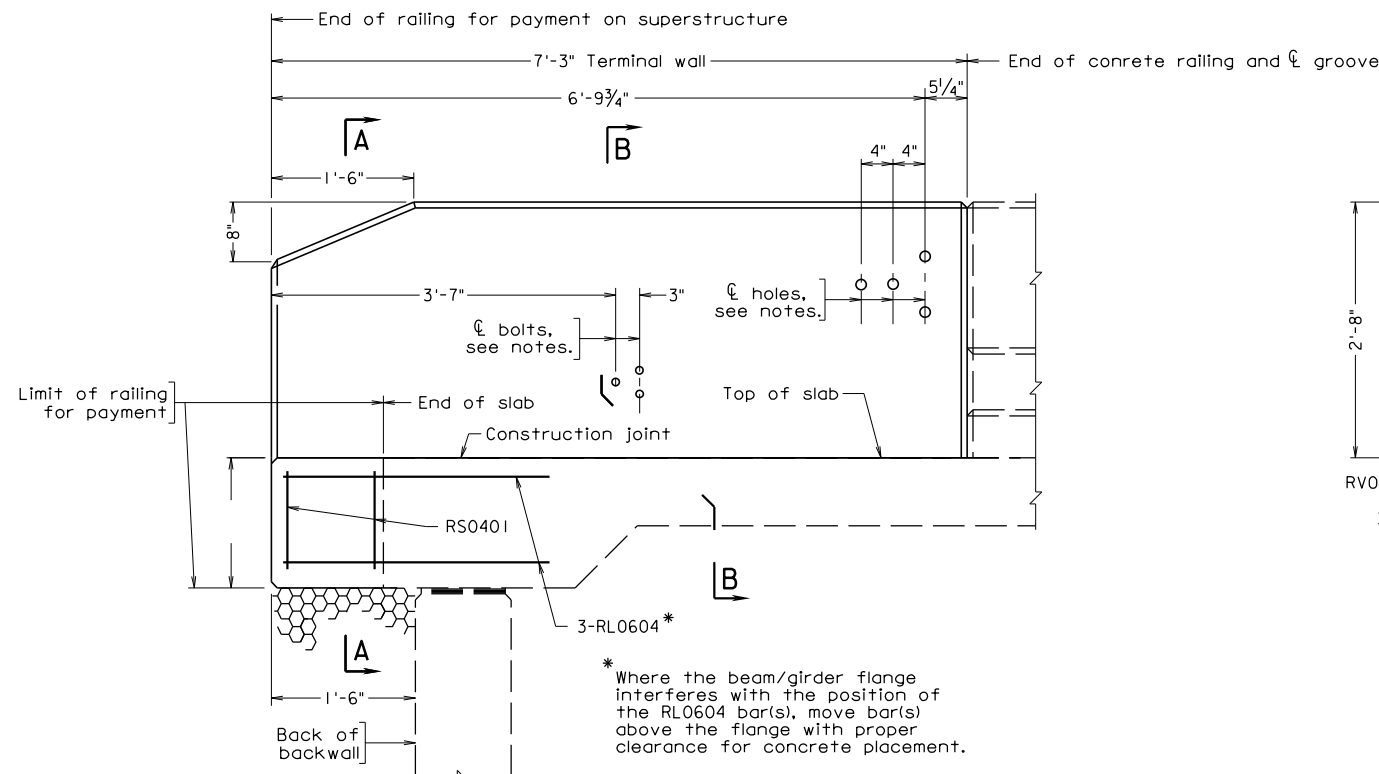
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-8: NOTES TO DESIGNER

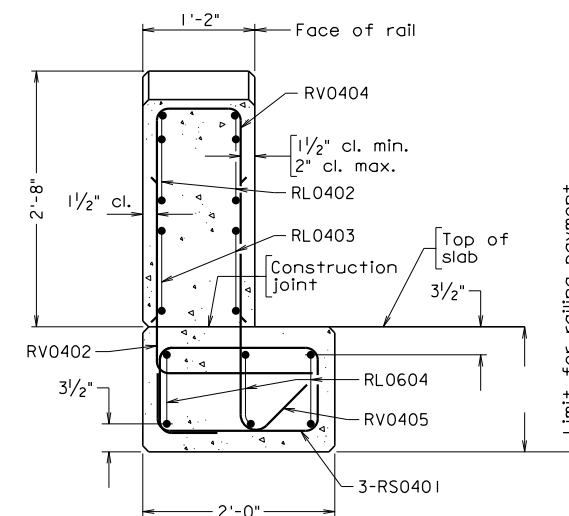
VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 2
FILE NO. BCR-8-2

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



DECK SLAB EXTENSION ABUTMENT

* Where the beam/girder flange interferes with the position of the RL0604 bar(s), move bar(s) above the flange with proper clearance for concrete placement.

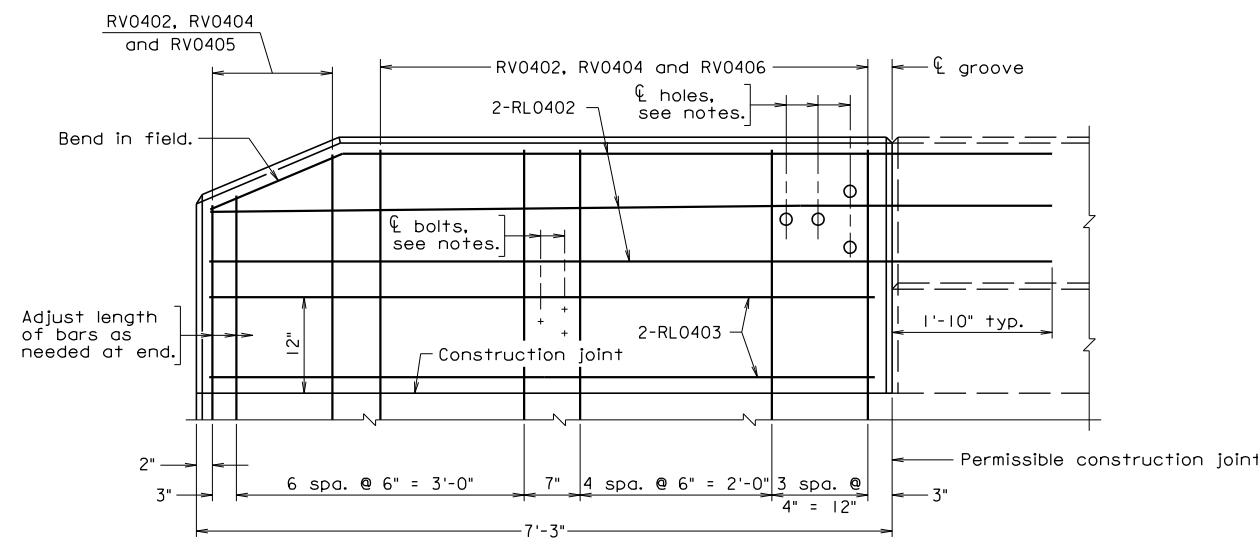


SECTION A-A

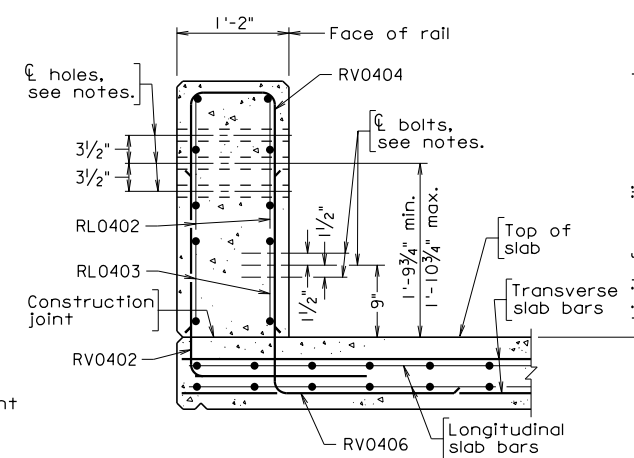
Notes:
 Plan dimensions shown are measured in the horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 For details and reinforcing steel schedule of cast in place concrete railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-1.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

REINFORCING STEEL SCHEDULE					
RV0402	RV0404	RV0405	RV0406	RS0401	
Mark	No.	Size	Pin ø	Length	Location
RL0402		#4		8'-11"	Terminal wall
RL0403		#4		6'-11"	Terminal wall
RL0604		#6		3'-0"	Terminal wall end support
RS0401		#4	3"		Terminal wall end support
RV0402		#4	3"	3'-7"	Terminal wall
RV0404		#4	3"	5'-9"	Terminal wall
RV0405		#4	3"		Terminal wall
RV0406		#4	3"		Terminal wall

Dimensions in bending diagram are out-to-out of bars, except as shown.



ELEVATION



SECTION B-B

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

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bcr9.dgn

10-15-2015

BCR-9

Sealed and Signed by:
 Prasad L. Nallaponteni
 Lic. No. 033003
 On the date of
 October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE TERMINAL WALL 32" KANSAS CORRAL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions					BCR-9

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-8")**

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

Include this standard when using standard BCR-3 or BCR-4.

Terminal wall is detailed on the deck slab extension of a superstructure or on a slab span. A 2'-0" wide section at the edge of superstructure is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of abutment backwall (back of abutment seat, in the case of a slab span). This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab or slab span.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension of terminal wall end support.

SECTION A-A:

Provide dimension of terminal wall end support.

For projects with bituminous overlay, modify 2'-8" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for deck slab extension or slab span and for cast-in-place concrete railing.

STANDARD BCR-9: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 3
FILE NO. BCR-9-2

**CAST-IN-PLACE CONCRETE RAILING
KANSAS CORRAL (2'-8")**

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Add dimensions and lengths for rebars RV0402 and RV0405.

For projects with bituminous overlay, modify rebar lengths to allow for dimension changes.

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BCR-9: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 3 of 3
FILE NO. BCR-9-3

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				

Notes:

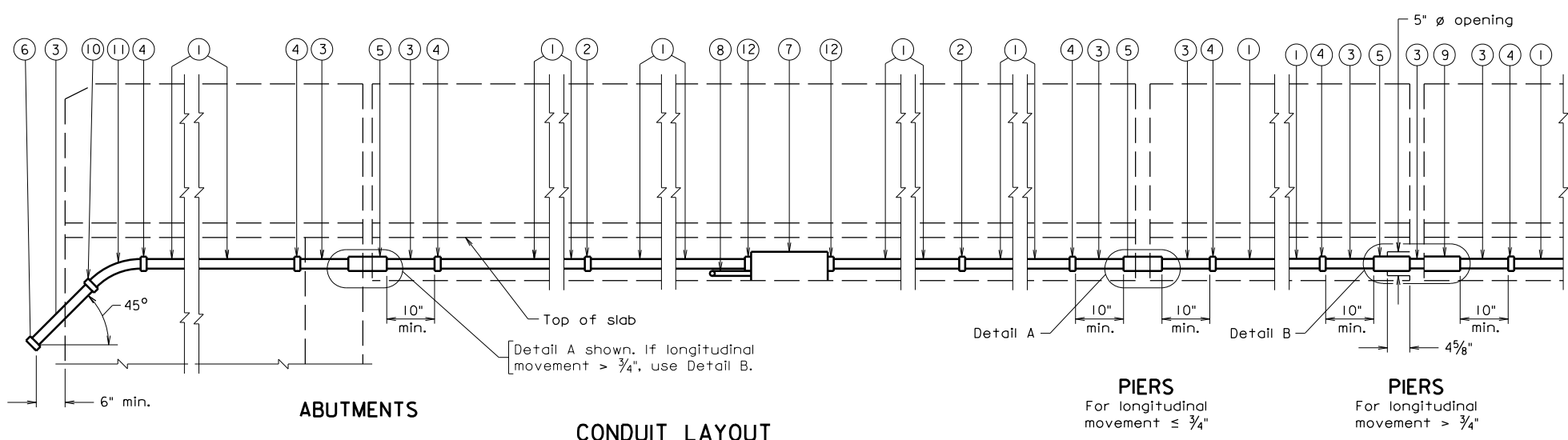
Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.

Cost of Bridge Conduit System and anchorages shall be included in price bid for parapet.

Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60°F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10°F temperature drop or rise respectively by t.

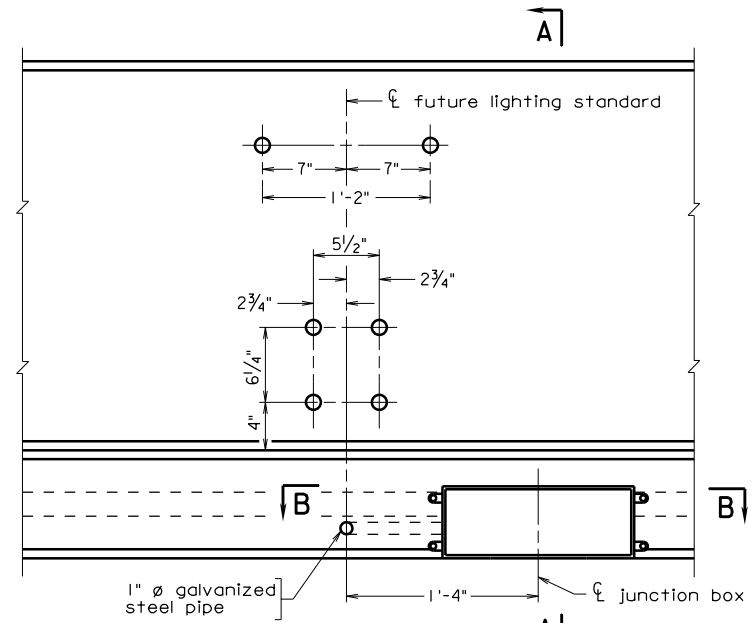
The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

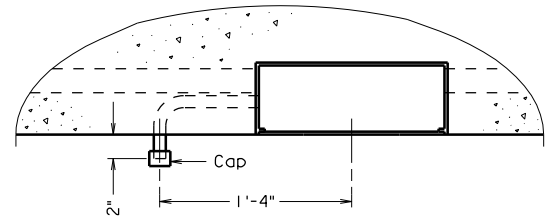


CONDUIT LAYOUT
Scale: 3/4" = 1'-0"

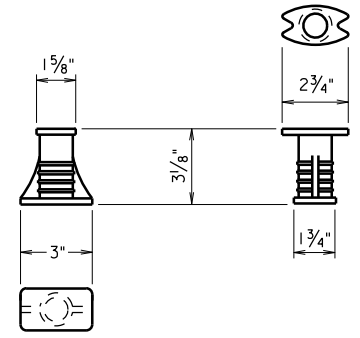
- ① 2" ø nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" ø metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" ø pipe cap
- ⑦ 8" x 6" x 1'-4" junction box
- ⑧ 1" ø galvanized steel pipe. Furnish locknut and bushing to connect conduit to junction box.
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" ø 45° 13" R steel elbow
- ⑫ Bell fitting or bushing to connect conduit to junction box



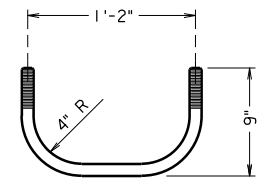
ELEVATION



SECTION B-B



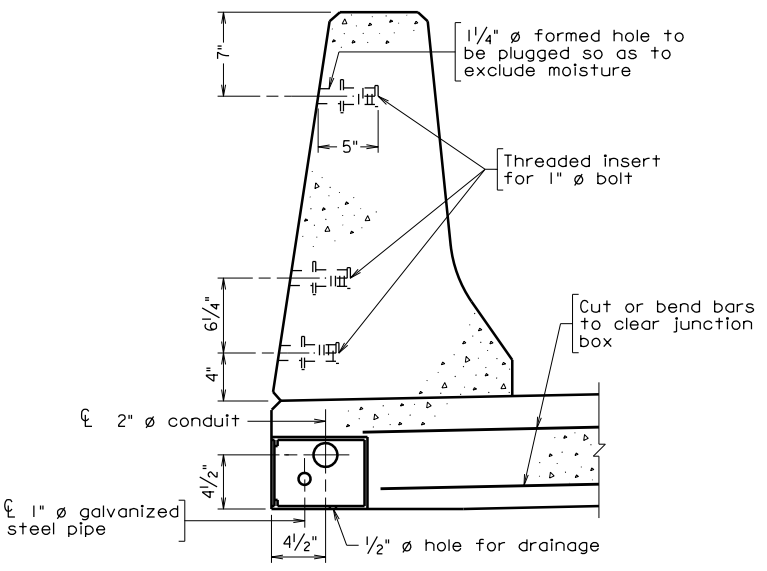
THREADED INSERT FOR 1" ø BOLT
Scale: 3" = 1'-0"



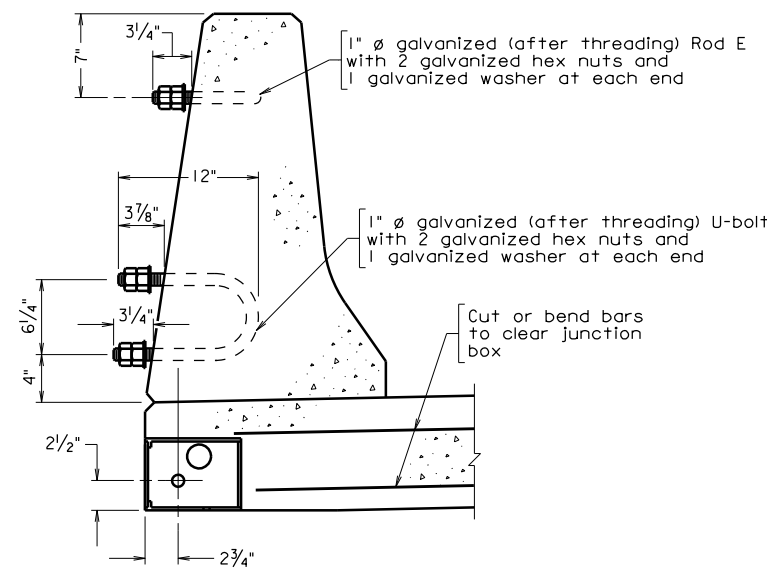
1" ø GALVANIZED ROD E

Abutment	Pier	Longitudinal Movement	+	Detail Type

When deck is continuous over pier, expansion and deflection fitting detail is not required.



SECTION A-A



ALTERNATE SECTION A-A

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

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bcs21a.dgn

06-14-2010

Sealed and Signed by:
Julius F.J. Volgyi Jr.,
Lic. No. 010487
On the date of
June 14, 2010

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION				
STRUCTURE AND BRIDGE DIVISION				
BRIDGE CONDUIT SYSTEM				
No.	Description	Date	Designed: S&B DIV	Sheet No.
	Revisions		Drawn: S&B DIV Checked: S&B DIV	BCS-21A

**BRIDGE CONDUIT SYSTEM
FOR FUTURE LIGHTING
WITH F-SHAPE PARAPET**

NOTES TO DESIGNER:

Standard is to be used only when lighting is not installed as part of project but at some future date and only the conduit and anchorage system is required. Details are for use with F-shape parapet. Terminal wall for parapet is located on abutment or U-back wing.

Access to junction box is from the outside of the parapet, not from the traffic side.

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.
Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab.

Size of junction chamber: 8" x 6" x 6". Show location of junction box(es) on appropriate plan sheet, normally plan of deck slab. Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. For larger conduits the bend radius in the conduit (steel elbow) in the CONDUIT LAYOUT needs to be changed.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$
 $t \text{ (movement/10°F)} = 250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

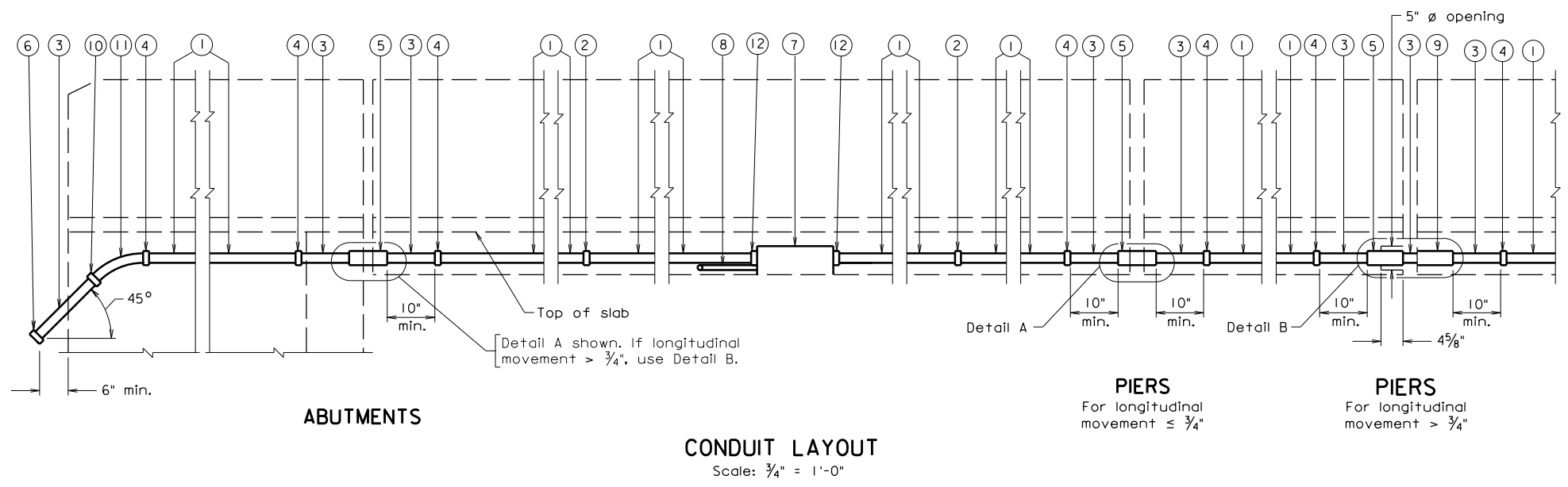
**BRIDGE CONDUIT SYSTEM
FOR FUTURE LIGHTING
WITH F-SHAPE PARAPET**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TABLE:

Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				



Notes:

Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.

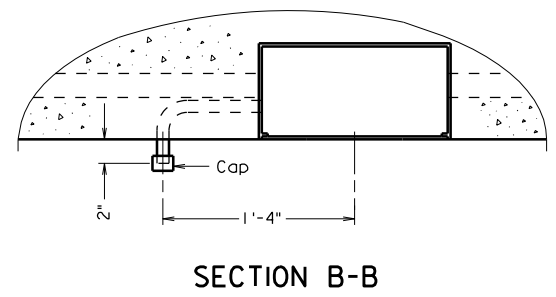
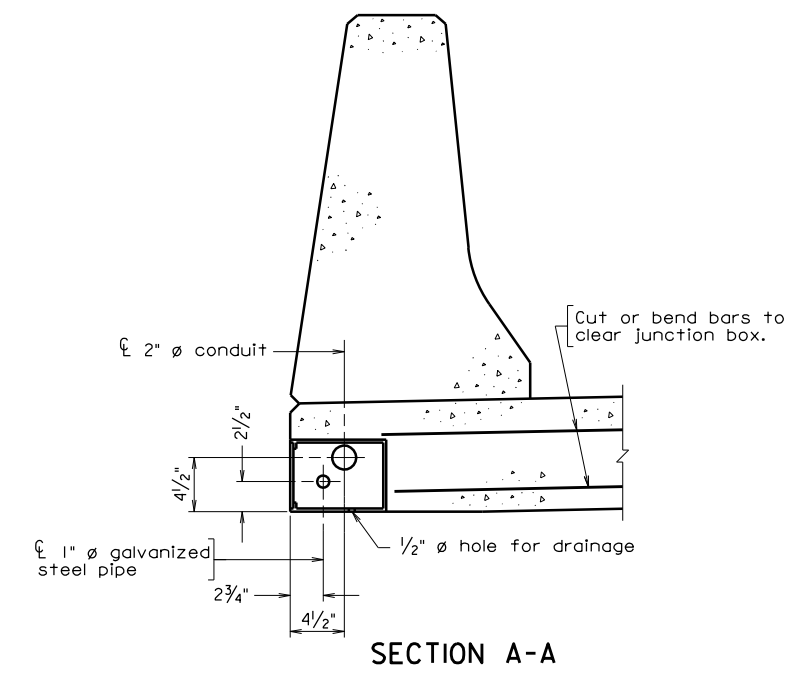
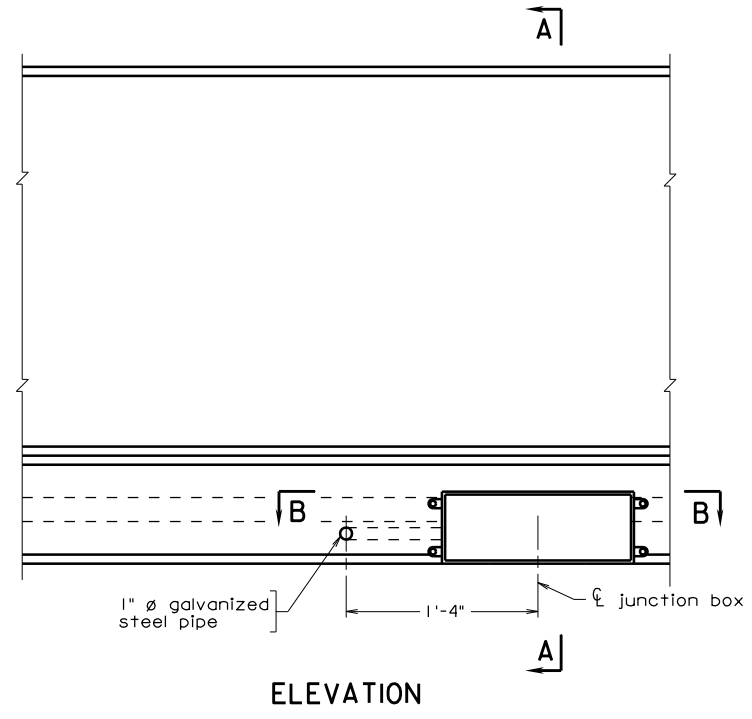
Cost of Bridge Conduit System and anchorages shall be included in price bid for parapet

Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60°F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10°F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

- ① 2" \varnothing nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" \varnothing metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" \varnothing pipe cap
- ⑦ 8" x 6" x 1'-4" junction box
- ⑧ 1" \varnothing galvanized steel pipe. Furnish locknut and bushing to connect conduit to junction box.
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" \varnothing 45° 13" R steel elbow
- ⑫ Bell fitting or bushing to connect conduit to junction box



Abutment	Pier	Longitudinal Movement	+	Detail Type

When deck is continuous over pier, expansion and deflection fitting detail is not required.

BCS-22A 06-14-2010 bcs22a.dgn

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 June 14, 2010

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

**BRIDGE CONDUIT SYSTEM
OTHER THAN LIGHTING
FOR F-SHAPE PARAPET**

NOTES TO DESIGNER:

Standard is to be used for miscellaneous bridge conduit system other than bridge lighting, e.g., for lighting signs/sign structures attached to bridge. Details are for use with F-shape parapet. Terminal wall for parapet is located on abutment or U-back wing.

Access to junction box is from the outside of the parapet, not from the traffic side. If access is required from inside parapet face is required, use standard BCS-29A.

Size of junction chamber: 8" x 6" x 6". Show location of junction box(es) on appropriate plan sheet, normally plan of deck slab. Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. For larger conduits the bend radius in the conduit (steel elbow) in the CONDUIT LAYOUT needs to be changed.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16)::

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

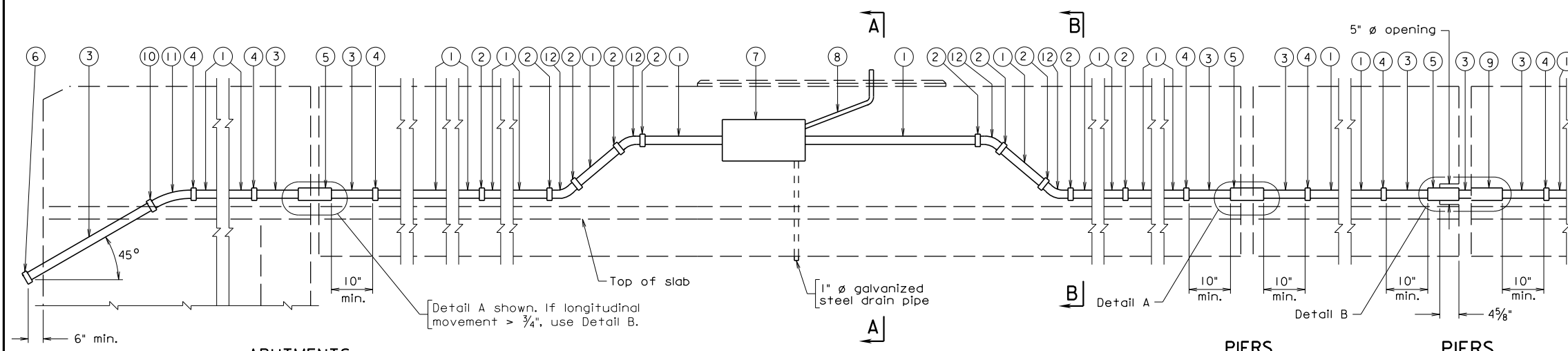
Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$
t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TABLE:

Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



Notes:

All reinforcing bars shall be corrosion resistant reinforcing steel -

Cut or bend bars to clear junction chamber.

Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.

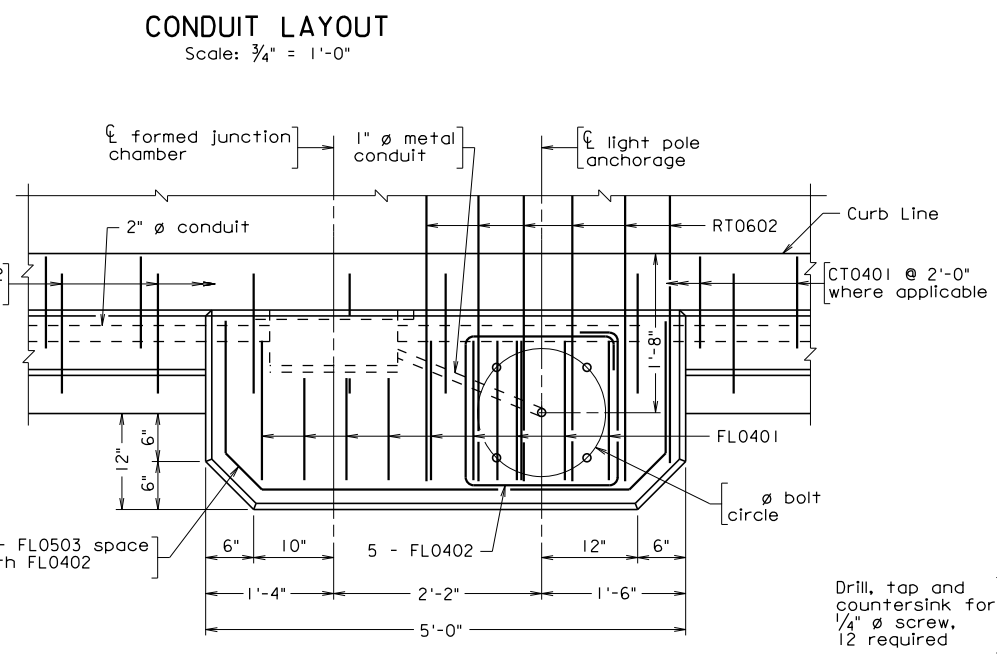
Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.

Cost of Bridge Conduit System and anchorages shall be included in price bid for parapet.

Anchor bolt specifications:

Nuts (Top): ASTM F467 Alloy 6262-T9 or 6061-T6.
 (Bottom): ASTM A563.
 Thread series for all nuts to be UNC-2B.
 Washers: (Top): ASTM B209 Alloy Alclad 2024-T3 or T4, 2 1/4" ϕ x 0.165".
 (Bottom): ASTM F844.
 Rods: 1" diameter, ASTM A276, type 430 or 410 annealed, hot-finished. Threads on rods may be rolled or cut. 3/2" at each end of rod shall be threaded. Each rod shall be supplied with 3 washers and 3 nuts.

- ① 2" ϕ nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" ϕ metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" ϕ pipe cap
- ⑦ 8" x 6" x 1'-4" formed junction chamber
- ⑧ 1" ϕ metal conduit.
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" ϕ 45° 13" R steel elbow
- ⑫ 2" ϕ 45° 9/2" R nonmetallic elbow



Abutment	Pier	Longitudinal Movement	t	Detail Type
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When deck is continuous over pier, expansion and deflection fitting detail is not required.

In the designations noted above, top refers to hardware above the top of baseplate. Bottom refers to hardware below the baseplate including embedment in concrete.

Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60° F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10° F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

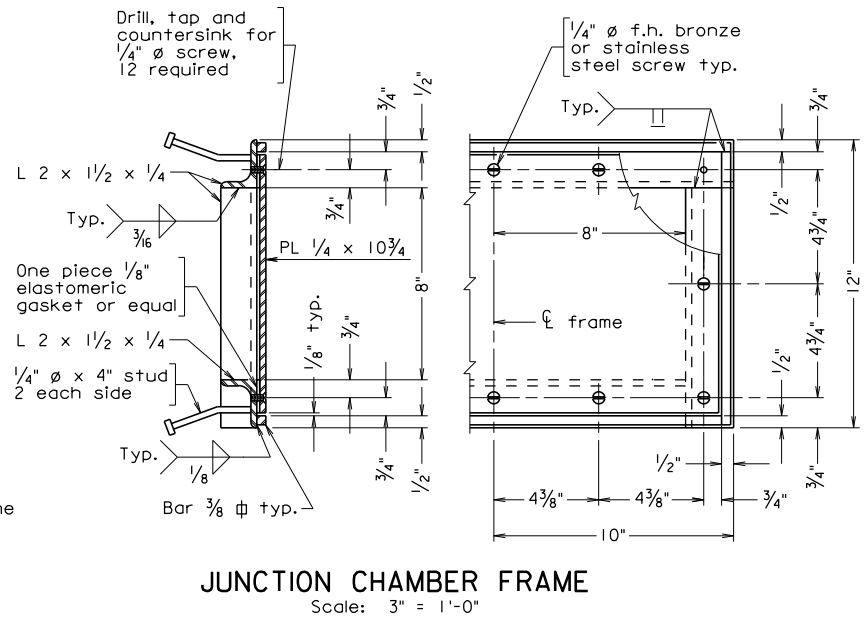
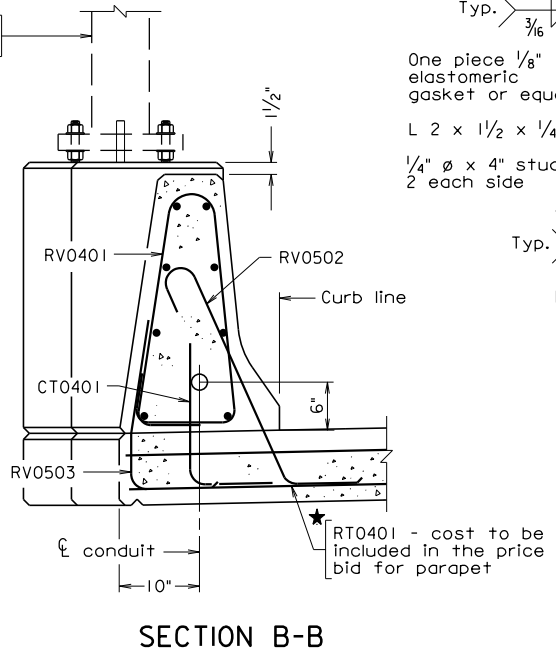
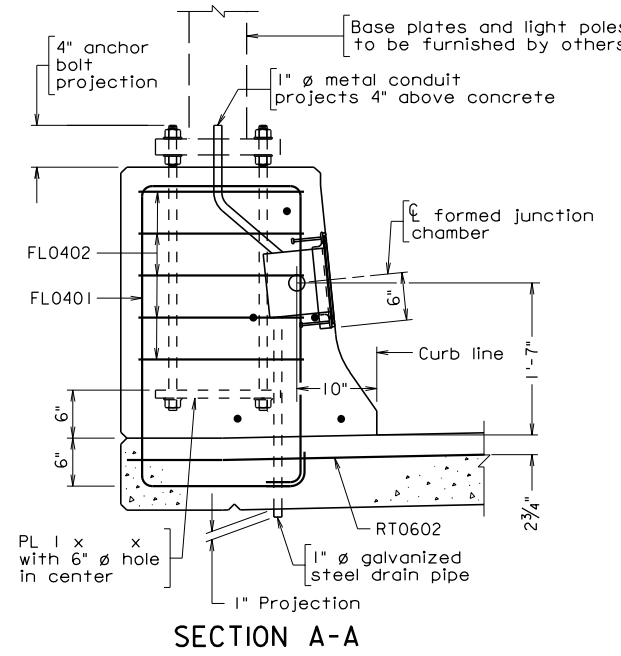
Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
FL0401	.	#4	2"	9'-8"	Light base
FL0402	.	#4	2"	6'-8"	Light base
FL0503	.	#5	3 3/4"	7'-5"	Light base
CT0401	.	#4	3"	2'-5"	Conduit tie
RV0401	⊙	#4	.	.	.
RV0502	⊙	#5	.	.	.
RV0503	⊙	#5	.	.	.
★RT0401	⊙	#4	.	.	.
RT0602	.	#6	.	.	Top of deck slab

Dimensions in bending diagram are out-to-out of bars.

⊙ Bars RV0401, RV0502, RV0503 and RT0401 are detailed and accounted for on parapet detail sheet.

★ Used only when deck transverse reinforcement is parallel to skew of bridge



BCS-28A

03-10-2015

bcs28a.dgn

Sealed and Signed by:
 Prasad L. Nallipamoni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
BRIDGE CONDUIT SYSTEM					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		Sheet No.
			Checked: S&B...DIV		BCS-28A
Revisions					

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING
WITH F-SHAPE PARAPET**

NOTES TO DESIGNER:

Standard is to be used only when lighting is installed as part of project and used with F-shape parapet (standard BPB-3A or BPB-3B). Terminal wall for parapet is located on abutment or U-back wing.

Access to junction chamber is from the inside of the parapet face on the traffic side.

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.
Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.
Bolt circle for anchorage (base plate): 11" diameter thru 16" diameter

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab.

Size of junction chamber: 8" x 8" x 1'-4". Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. Show location of junction chambers on appropriate plan sheet, normally plan of deck slab.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1-4" (8 x 2" = 16" = 1'-4"). If larger conduit is used, JUNCTION CHAMBER FRAME needs to be adjusted, i.e., spacing of screws needs to be adjusted. Also, the size of the concrete blister needs to be adjusted to provide additional space between the junction chamber and the light anchorage.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING
WITH F-SHAPE PARAPET**

NOTES TO DESIGNER (cont'd):

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$

t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add diameter of bolt circle.

SECTION A-A:

Add size of plate.

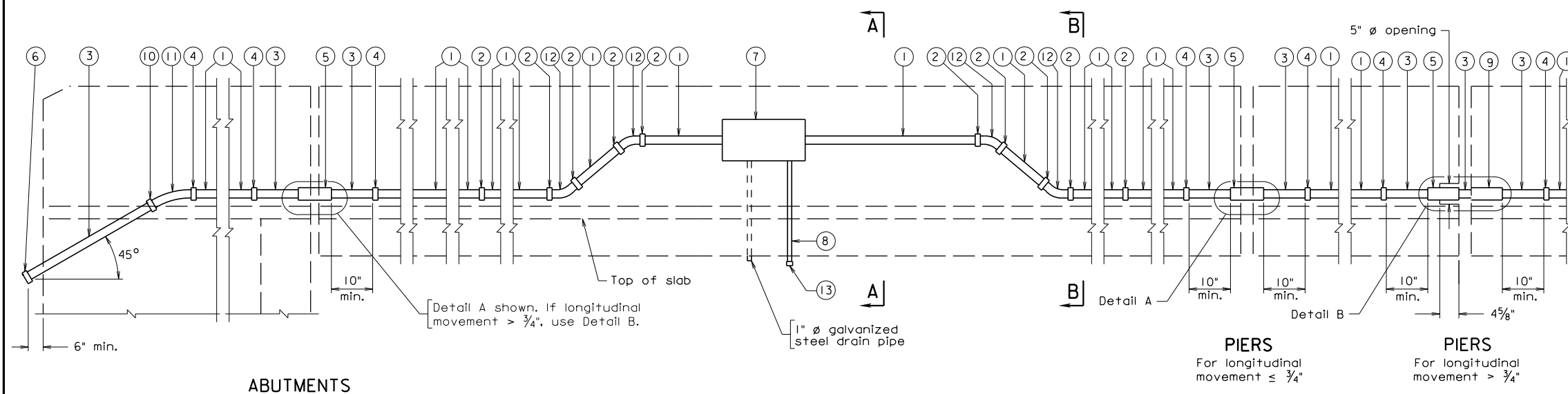
TABLE:

Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

NOTES:

Complete first note by adding the Class I, II or III of corrosion resistant reinforcing steel required. (For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Memorandum (current IIM-S&B-81).

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE PROJECT	



Notes:

Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.

Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.

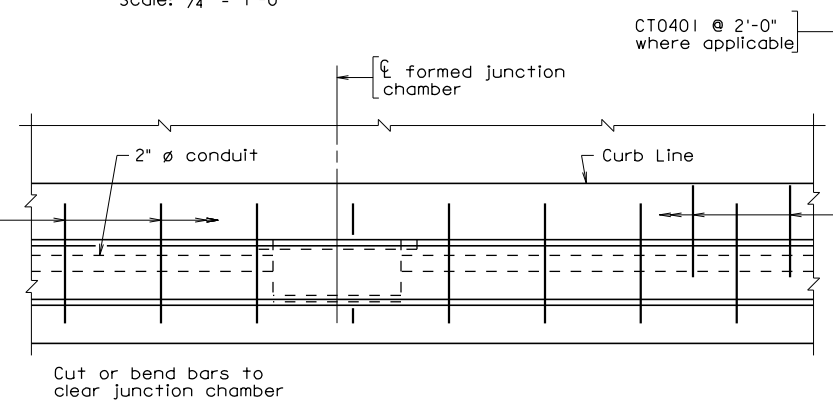
Cost of Bridge Conduit System and anchorages shall be included in price bid for parapet.

Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60°F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10°F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

- ① 2" \varnothing nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" \varnothing metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" \varnothing pipe cap
- ⑦ 8" x 8" x 1'-4" formed junction chamber
- ⑧ 1" \varnothing metal conduit
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" \varnothing 45° 13" R steel elbow
- ⑫ 2" \varnothing 45° 9 1/2" R nonmetallic elbow
- ⑬ 1" \varnothing pipe cap



Abutment	Pier	Longitudinal Movement	t	Detail Type

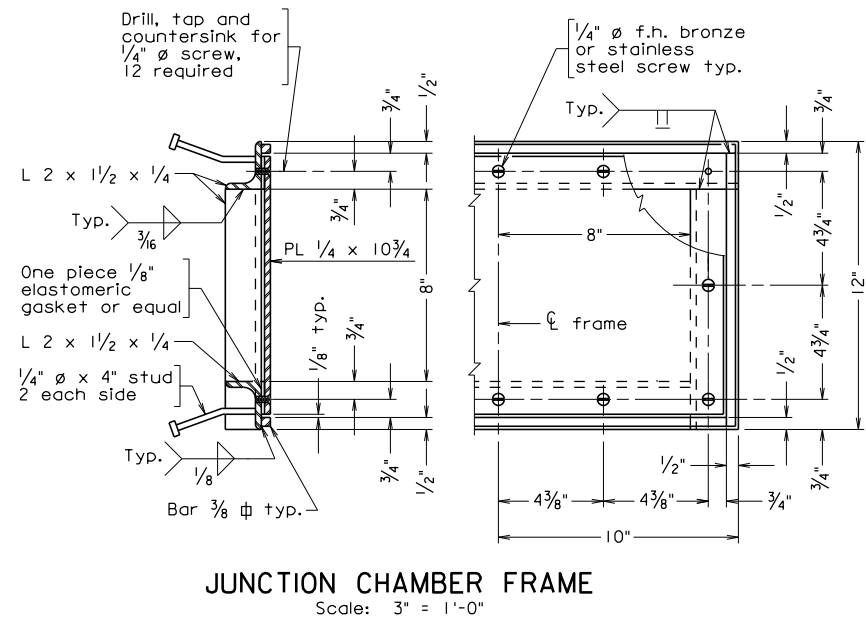
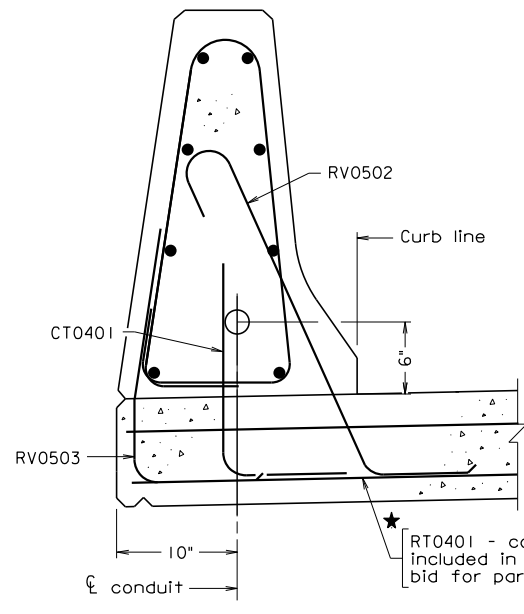
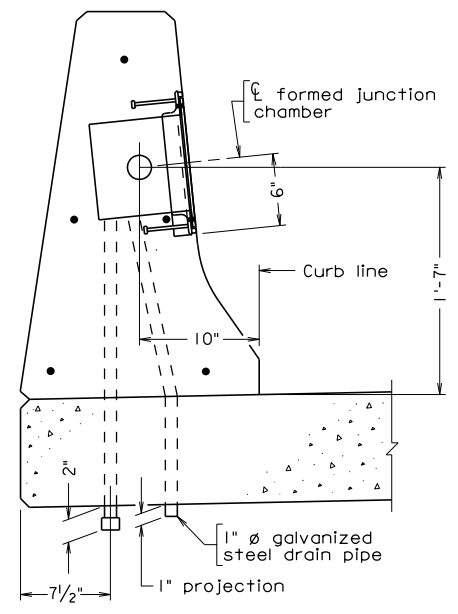
When deck is continuous over pier, expansion and deflection fitting detail is not required.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin \varnothing	Length	Location
CT0401		#4	3"	2'-5"	Conduit tie
RV0401	⊙	#4			
RV0502	⊙	#5			
RV0503	⊙	#5			
★RT0401	⊙	#4			

Dimensions in bending diagram are out-to-out of bars.

⊙ Bars RV0401, RV0502, RV0503 and RT0401 are detailed and accounted for on parapet detail sheet.

★ Used only when deck transverse reinforcement is parallel to skew of bridge



BCS-29A

Sealed and Signed by:
Prasad L. Nallipameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
BRIDGE CONDUIT SYSTEM					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
	Revisions		Checked: S&B...DIV		BCS-29A

**BRIDGE CONDUIT SYSTEM
OTHER THAN LIGHTING WITH F-SHAPE PARAPET**

NOTES TO DESIGNER:

Standard is to be used for miscellaneous bridge conduit system other than bridge lighting, e.g., for lighting signs/sign structures attached to bridge. Details are for use with F-shape parapet. Terminal wall for parapet is located on abutment or U-back wing.

Access to junction box is from the inside of the parapet face on the traffic side. If access is required from the outside of the parapet, use standard BCS-22A.

Size of junction chamber: 8" x 6" x 1'-4". Show location of junction chamber(s) on appropriate plan sheet, normally plan of deck slab. Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1'-4" (8 x 2" = 16" = 1'-4"). For large diameters, the JUNCTION CHAMBER FRAME needs to be adjusted, i.e., if the run is adjusted, the spacing of the screws also needs to be adjusted.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = 250 x 0.0000065 x 60 = 0.0975 ft = 1 1/8 in.

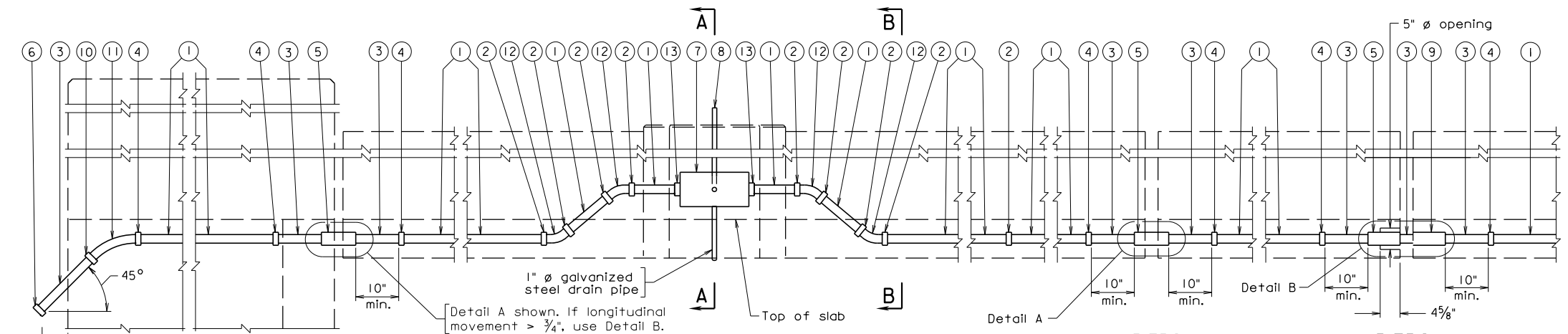
t (movement/10°F) = 250 x 0.0000065 x 10 = 0.01625 ft = 3/16 in.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

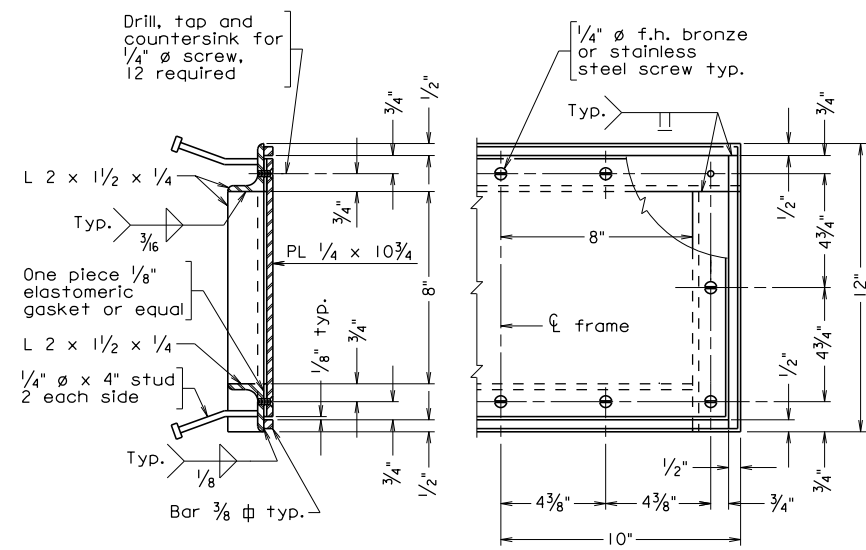
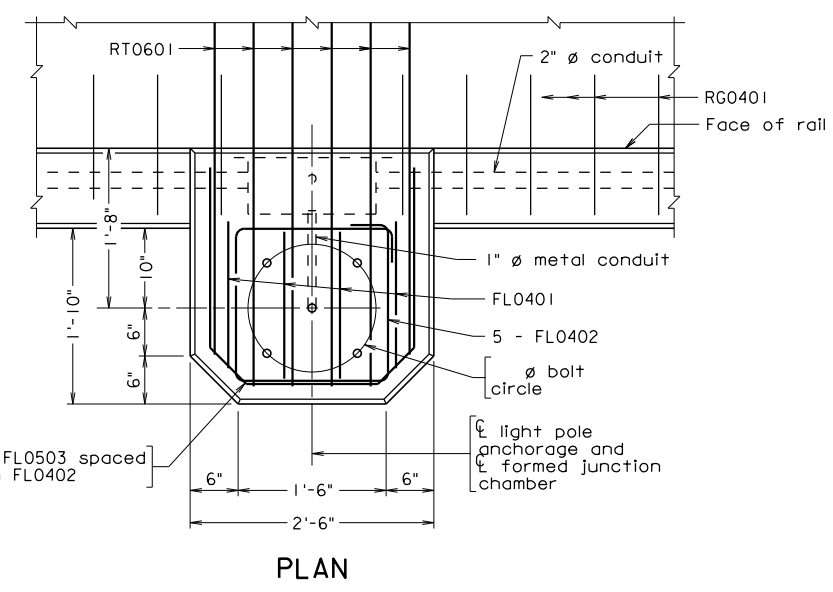
TABLE:

Complete table. Use 1/8" multiples for longitudinal movement. Use 1/16" multiples for t (movement/10°F).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



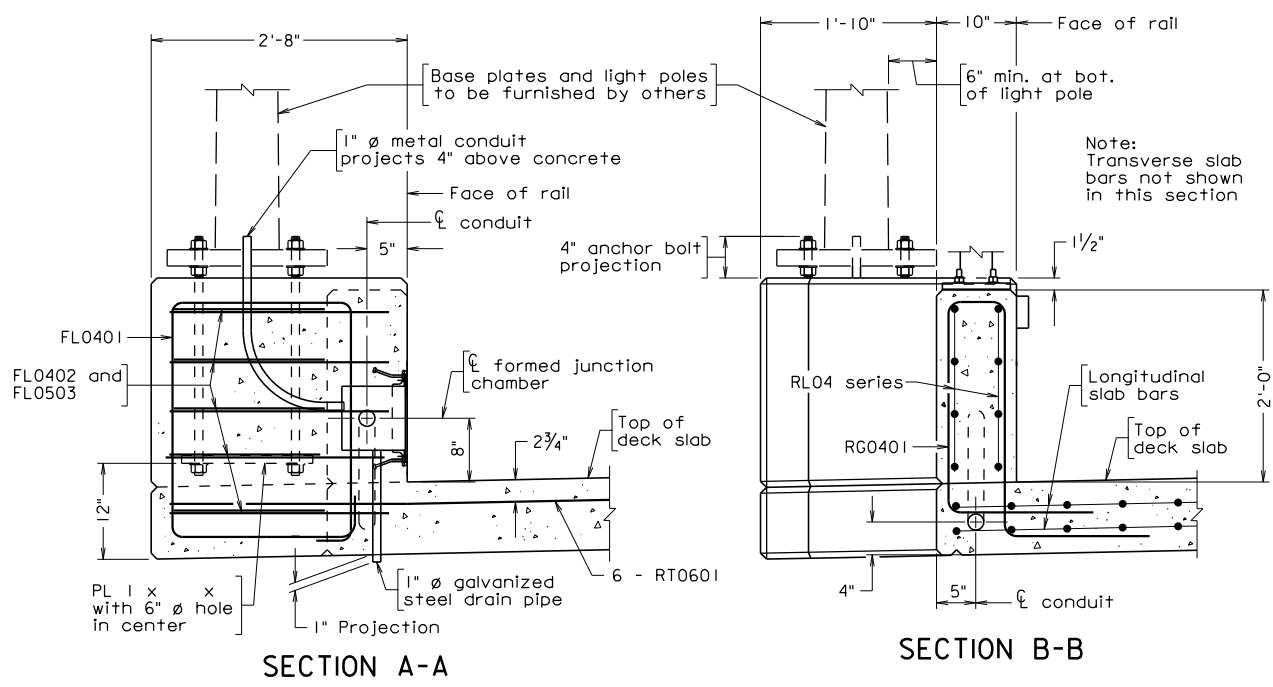
- ① 2" \varnothing nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" \varnothing metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" \varnothing pipe cap
- ⑦ 8" x 8" x 1'-4" formed junction chamber
- ⑧ 1" \varnothing metal conduit - Furnish locknut and bushing to connect conduit to junction box
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" \varnothing 45° 13" R steel elbow
- ⑫ 2" \varnothing 45° 9/2" R nonmetallic elbow
- ⑬ Bell fitting or bushing to connect conduit to junction box



JUNCTION CHAMBER FRAME
Scale: 3" = 1'-0"

Abutment	Pier	Longitudinal Movement	t	Detail Type
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When deck is continuous over pier, expansion and deflection fitting detail is not required.



SECTION A-A

SECTION B-B

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

Notes:

All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...
 Cut or bend bars to clear junction chamber.
 Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.
 Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.
 Cost of Bridge Conduit System and anchorages shall be included in price bid for railing.
 Anchor bolt specification:
 Nuts (Top): ASTM F467 Alloy 6262-T9 or 6061-T6, (Bottom): ASTM A563.
 Thread series for all nuts to be UNC-2B.
 Washers: (Top): ASTM B209 Alloy Alclad 2024-T3 or T4, 2 1/4" \varnothing x 0.165", (Bottom): ASTM F844.
 Rods: 1" diameter, ASTM A276, type 430 or 410 annealed, hot finished. Threads on rods may be rolled or cut. 3/2" at each end of rod shall be threaded. Each rod shall be supplied with 3 washers and 3 nuts.

In the designations noted above, top refers to hardware above the top of baseplate. Bottom refers to hardware below the baseplate including embedment in concrete.
 Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60° F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10° F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.
 Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

Location of light pole shall be adjusted such that anchor bolts of rail post clears the conduit system and the light pole base area.

REINFORCING STEEL SCHEDULE					
FL0401	2'-4 1/2"	4 1/2" typ.	1'-7"	FL0402	1'-4 1/4"
FL0402	1'-7"	FL0401	1'-7"	FL0503	4 3/4"
Mark	No.	Size	Pin \varnothing	Length	Location
FL0401	.	#4	2"	8'-3"	Light base
FL0402	.	#4	2"	6'-8"	Light base
FL0503	.	#5	3 3/4"	6'-0"	Light base
RG0401	⊙	#4	.	.	.
RT0601	.	#6	.	.	Top of deck slab

Dimensions in bending diagram are out-to-out of bars.
 Ⓞ Bars RG0401 are detailed and accounted for on the railing detail sheet (BR27C-series).

BCS-30A.dgn 08-07-2012

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
BRIDGE CONDUIT SYSTEM					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV	BCS-30A	

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27C-SERIES WITHOUT SIDEWALK**

NOTES TO DESIGNER:

Standard is to be used only when lighting is installed as part of project and used with the Railing standard BR27C-series without sidewalk and when all railings are attached on the traffic side of the rail posts. Terminal wall for the steel railing is located on abutment or U-back wing.

Access to junction chamber is from the inside of the steel railing concrete pedestal face on the traffic side.

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.
Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.
Bolt circle for anchorage (base plate): 11" diameter thru 16" diameter

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab. The standard provides for adequate pole clearance for placement of the rail on the front or back face of the post.

Size of junction chamber: 8" x 8" x 1'-4". Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. Show location of junction chambers on appropriate plan sheet, normally plan of deck slab.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1-4" (8 x 2" = 16" = 1'-4"). If larger conduit is used, JUNCTION CHAMBER FRAME needs to be adjusted, i.e., spacing of screws needs to be adjusted. Also, the size of the concrete blister needs to be adjusted to provide additional space between the junction chamber and the light anchorage.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27C-SERIES WITHOUT SIDEWALK**

NOTES TO DESIGNER (cont'd):

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$

t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add diameter of bolt circle.

SECTION A-A:

Add size of plate.

TABLE:

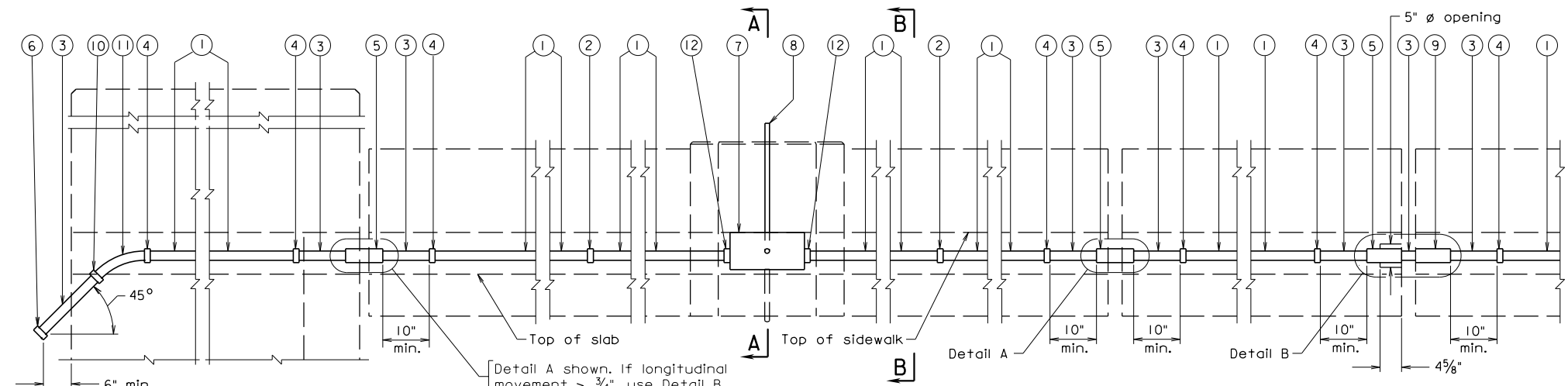
Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

For reinforcing steel schedule, complete the No. (number of bars) column.
For RT0601, input the length of bar.

NOTES:

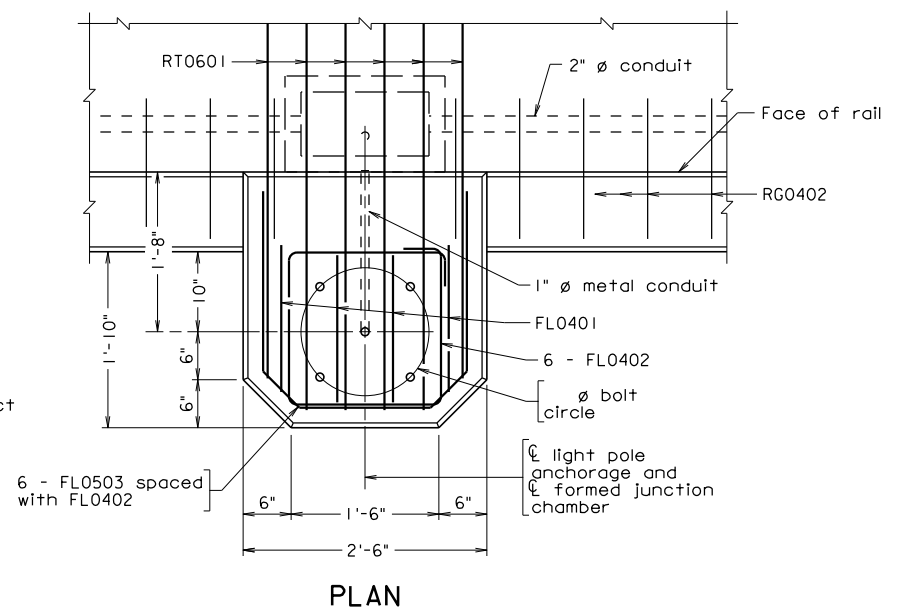
Complete first note by adding the Class I, II or III of corrosion resistant reinforcing steel required.
For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Memorandum (current IIM-S&B-81).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

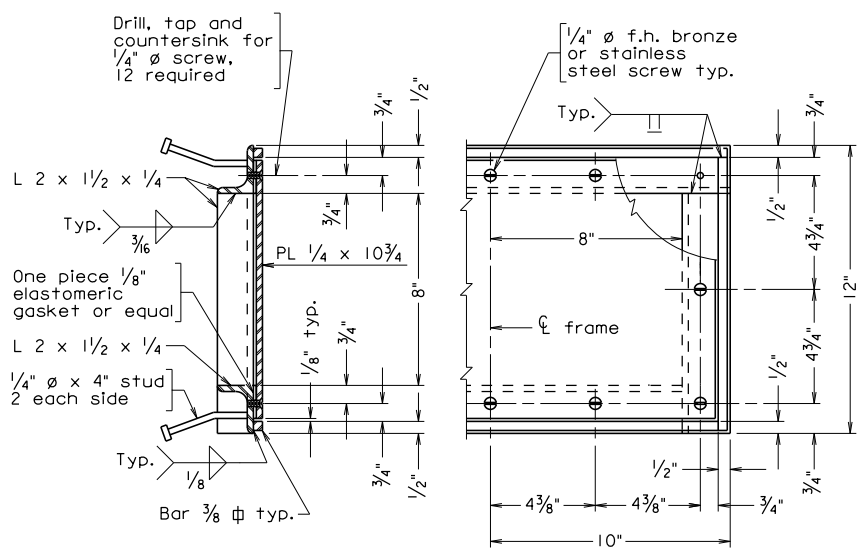


- ① 2" ϕ nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" ϕ metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" ϕ pipe cap
- ⑦ 8" x 8" x 1'-4" junction box
- ⑧ 1" ϕ metal conduit. Furnish locknut and bushing to connect conduit to junction box.
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" ϕ 45° 13" R steel elbow
- ⑫ Bell fitting or bushing to connect conduit to junction box

CONDUIT LAYOUT
Scale: $\frac{3}{4}" = 1'-0"$
(Railing not shown)



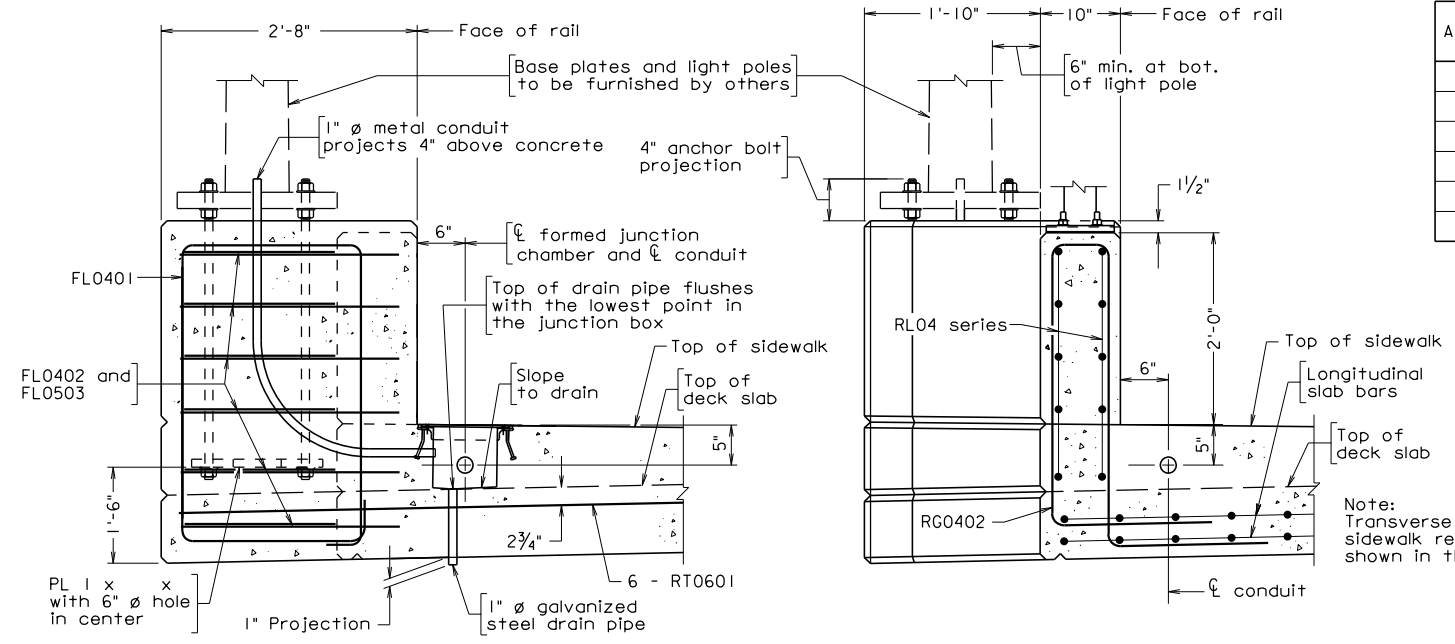
PLAN



JUNCTION CHAMBER FRAME
Scale: $3" = 1'-0"$

Abutment	Pier	Longitudinal Movement	+	Detail Type
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When deck is continuous over pier, expansion and deflection fitting detail is not required.



SECTION A-A

SECTION B-B

Scale: $1" = 1'-0"$ unless otherwise shown.

Notes:

All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...
Cut or bend bars to clear junction chamber.
Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.
Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.
Cost of Bridge Conduit System and anchorages shall be included in price bid for railing.

Anchor bolt specification:

Nuts (Top): ASTM F467 Alloy 6262-T9 or 6061-T6, (Bottom): ASTM A563.
Thread series for all nuts to be UNC-2B.
Washers (Top): ASTM B209 Alloy Alclad 2024-T3 or T4, 2 1/4" ϕ x 0.165". (Bottom): ASTM F844.
Rods: 1" diameter, ASTM A276, type 430 or 410 annealed, hot finished. Threads on rods may be rolled or cut. 3/2" at each end of rod shall be threaded. Each rod shall be supplied with 3 washers and 3 nuts.

In the designations noted above, top refers to hardware above the top of baseplate. Bottom refers to hardware below the baseplate including embedment in concrete.

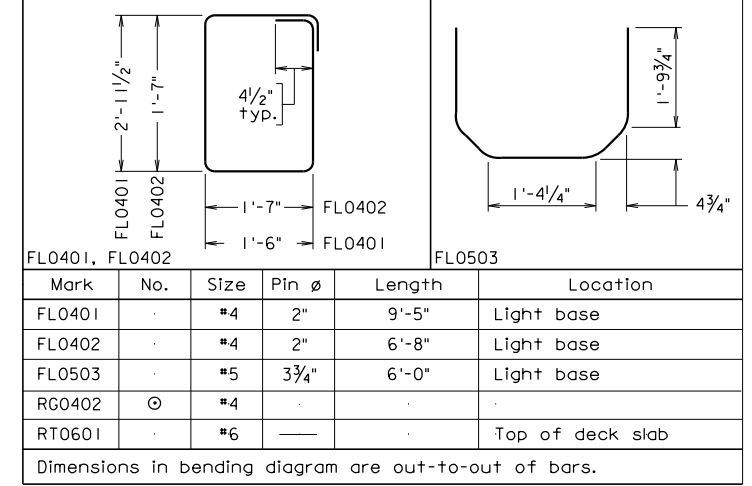
Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60° F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10° F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

Location of light pole shall be adjusted such that rail post clears the light pole base area.

REINFORCING STEEL SCHEDULE



Mark	No.	Size	Pin ϕ	Length	Location
FL0401	.	#4	2"	9'-5"	Light base
FL0402	.	#4	2"	6'-8"	Light base
FL0503	.	#5	3 3/4"	6'-0"	Light base
RG0402	⊙	#4	.	.	.
RT0601	.	#6	—	.	Top of deck slab

Dimensions in bending diagram are out-to-out of bars.
⊙ Bars RG0402 are detailed and accounted for on the railing detail sheet (BR27C-series).

BCS-31A 10-15-2015

Sealed and Signed by:
Prasad L. Nallapeneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

BRIDGE CONDUIT SYSTEM

No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
			Drawn: ...S&B...DIV			
			Checked: S&B...DIV			

BCS-31A

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**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27C-SERIES WITH SIDEWALK**

NOTES TO DESIGNER:

Standard is to be used only when lighting is installed as part of project and used with the Railing standard BR27C-series with sidewalk and when all railings are attached on the traffic side of the rail posts. Terminal wall for the steel railing is located on abutment or U-back wing.

Access to junction chamber is on the concrete sidewalk floor

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.

Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.
Bolt circle for anchorage (base plate): 11" diameter thru 16" diameter

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab. The standard provides for adequate pole clearance for placement of the rail on the front or back face of the post.

Size of junction chamber: 8" x 8" x 1'-4" if there is enough depth in the concrete sidewalk. Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. Show location of junction chambers on appropriate plan sheet, normally plan of deck slab.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1'-4" (8 x 2" = 16" = 1'-4"). If larger conduit is used, JUNCTION CHAMBER FRAME needs to be adjusted, i.e., spacing of screws needs to be adjusted. Also, the size of the concrete blister needs to be adjusted to provide additional space between the junction chamber and the light anchorage.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27C-SERIES WITH SIDEWALK**

NOTES TO DESIGNER (cont'd):

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$

t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add diameter of bolt circle.

SECTION A-A:

Add size of plate.

TABLE:

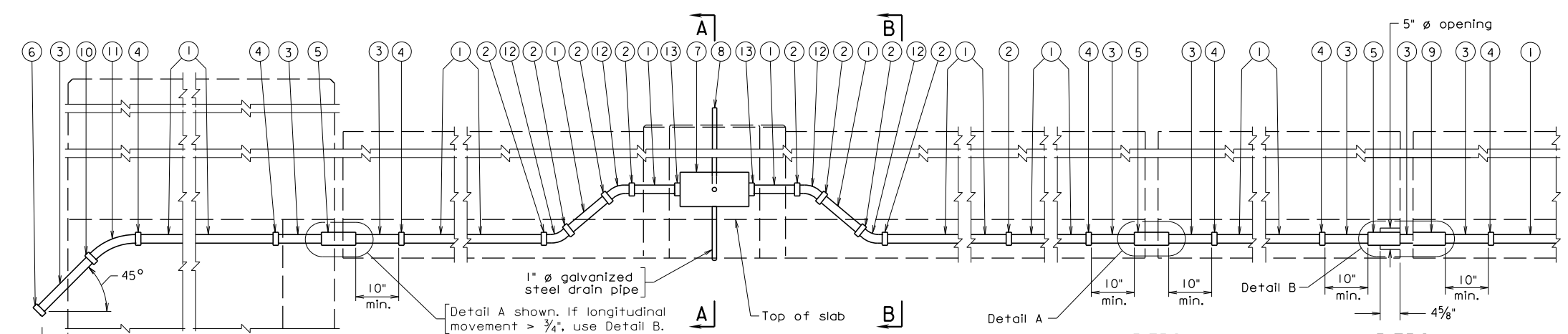
Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

For reinforcing steel schedule, complete the No. (number of bars) column.
For RT0601, input the length of bar.

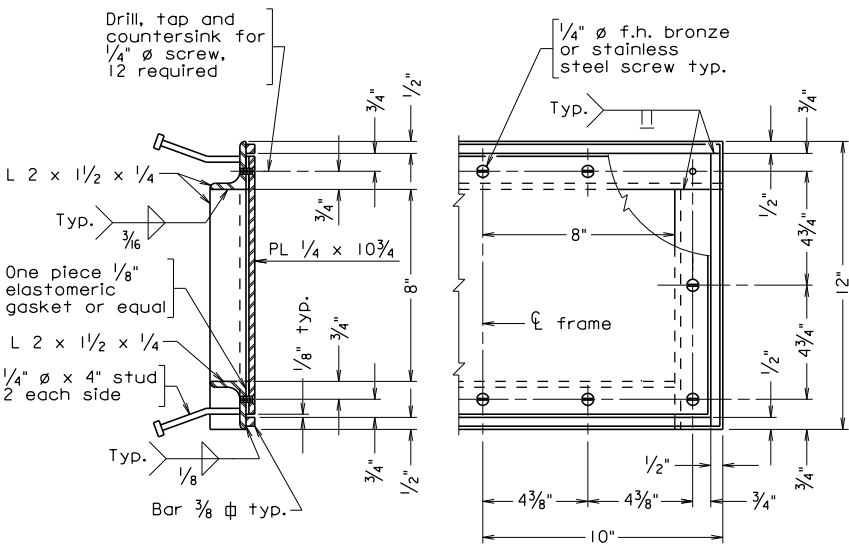
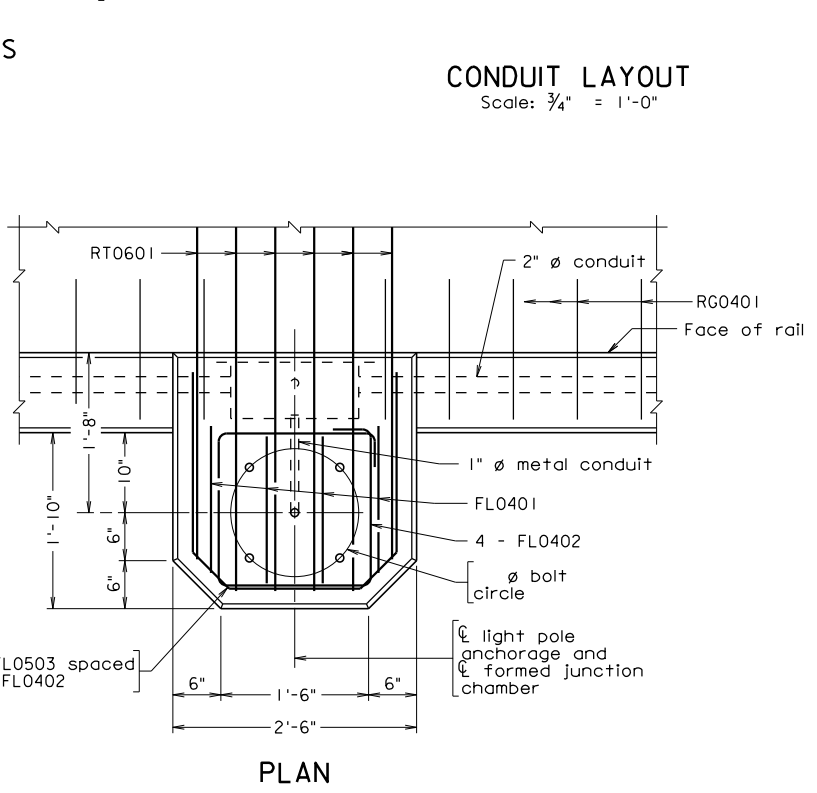
NOTES:

Complete first note by adding the Class I, II or III of corrosion resistant reinforcing steel required.
For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Memorandum (current IIM-S&B-81).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



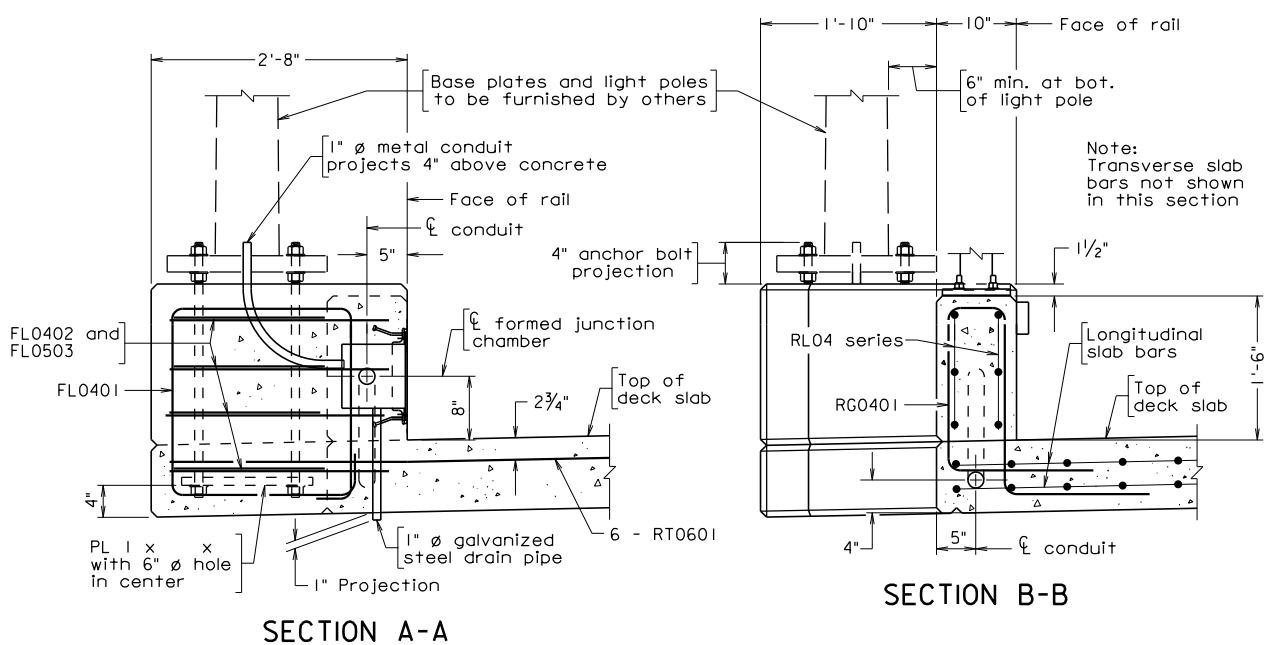
- ① 2" ϕ nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" ϕ metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" ϕ pipe cap
- ⑦ 8" x 8" x 1'-4" formed junction chamber
- ⑧ 1" ϕ metal conduit - Furnish locknut and bushing to connect conduit to junction box
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" ϕ 45° 13" R steel elbow
- ⑫ 2" ϕ 45° 9 1/2" R nonmetallic elbow
- ⑬ Bell fitting or bushing to connect conduit to junction box



JUNCTION CHAMBER FRAME
Scale: 3" = 1'-0"

Abutment	Pier	Longitudinal Movement	†	Detail Type
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When deck is continuous over pier, expansion and deflection fitting detail is not required.



SECTION A-A

SECTION B-B

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

Notes:

All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...
 Cut or bend bars to clear junction chamber.
 Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.
 Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.
 Cost of Bridge Conduit System and anchorages shall be included in price bid for railing.
 Anchor bolt specification:

- Nuts (Top): ASTM F467 Alloy 6262-T9 or 6061-T6, (Bottom): ASTM A563.
- Thread series for all nuts to be UNC-2B.
- Washers: (Top): ASTM B209 Alloy Alclad 2024-T3 or T4, 2 1/4" ϕ x 0.165", (Bottom): ASTM F844.
- Rods: 1" diameter, ASTM A276, type 430 or 410 annealed, hot finished. Threads on rods may be rolled or cut. 3/2" at each end of rod shall be threaded. Each rod shall be supplied with 3 washers and 3 nuts.

In the designations noted above, top refers to hardware above the top of baseplate. Bottom refers to hardware below the baseplate including embedment in concrete.

Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60° F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10° F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

Location of light pole shall be adjusted such that anchor bolts of rail post clear the conduit system and the light pole base area.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
FL0401	.	#4	2"	7'-3"	Light base
FL0402	.	#4	2"	6'-8"	Light base
FL0503	.	#5	3 3/4"	6'-0"	Light base
RG0401	⊙	#4	.	.	.
RT0601	.	#6	—	.	Top of deck slab

Dimensions in bending diagram are out-to-out of bars.

⊙ Bars RG0401 are detailed and accounted for on the railing detail sheet (BR27D-series).

BCS-32A.dgn 08-07-2012

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
BRIDGE CONDUIT SYSTEM					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BCS-32A		

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27D-SERIES WITHOUT SIDEWALK**

NOTES TO DESIGNER:

Standard is to be used only when lighting is installed as part of project and used with the Railing standard BR27D-series without sidewalk and when all railings are attached on the traffic side of the rail posts. Terminal wall for the steel railing is located on abutment or U-back wing.

Access to junction chamber is from the inside of the steel railing concrete pedestal face on the traffic side.

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.
Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.
Bolt circle for anchorage (base plate): 11" diameter thru 16" diameter

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab. The standard provides for adequate pole clearance for placement of the rail on the front or back face of the post.

Size of junction chamber: 8" x 8" x 1'-4". Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. Show location of junction chambers on appropriate plan sheet, normally plan of deck slab.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1-4" (8 x 2" = 16" = 1'-4"). If larger conduit is used, JUNCTION CHAMBER FRAME needs to be adjusted, i.e., spacing of screws needs to be adjusted. Also, the size of the concrete blister needs to be adjusted to provide additional space between the junction chamber and the light anchorage.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27D-SERIES WITHOUT SIDEWALK**

NOTES TO DESIGNER (cont'd):

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$

t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add diameter of bolt circle.

SECTION A-A:

Add size of plate.

TABLE:

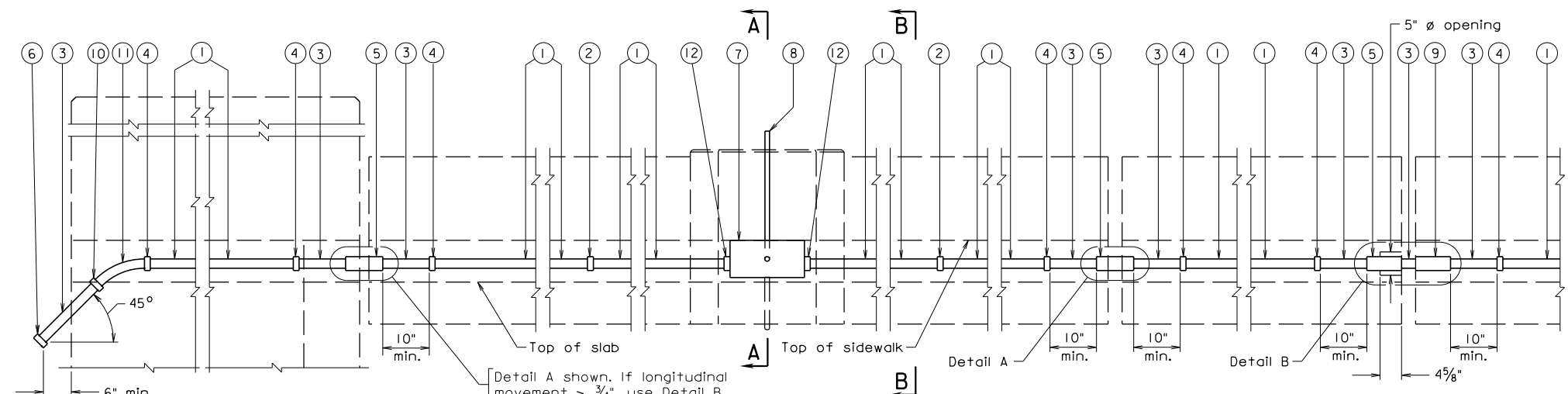
Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

For reinforcing steel schedule, complete the No. (number of bars) column.
For RT0601, input the length of bar.

NOTES:

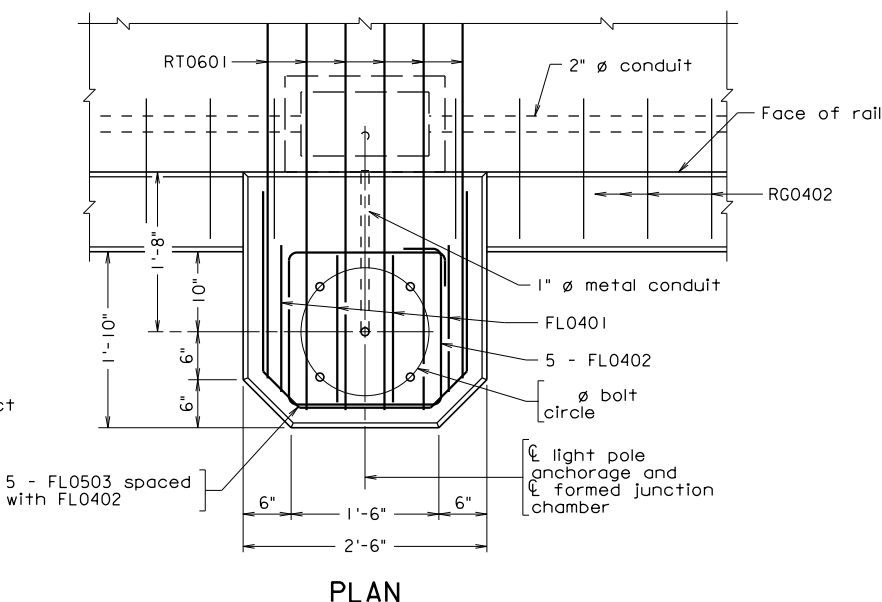
Complete first note by adding the Class I, II or III of corrosion resistant reinforcing steel required.
For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Memorandum (current IIM-S&B-81).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

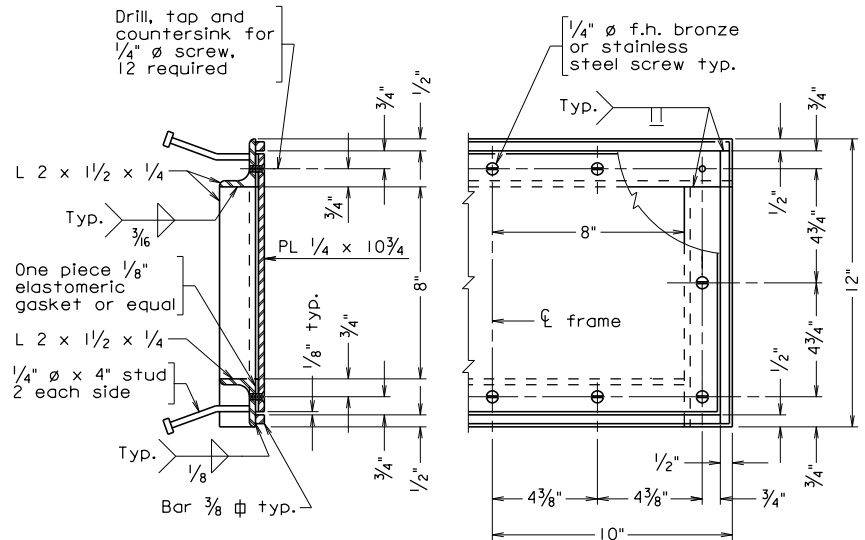


- ① 2" \varnothing nonmetallic conduit
- ② Nonmetallic coupling
- ③ 2" \varnothing metal conduit
- ④ Adapter to connect nonmetallic conduit to metal conduit
- ⑤ Metal expansion and deflection fitting
- ⑥ 2" \varnothing pipe cap
- ⑦ 8" x 8" x 1'-4" junction box
- ⑧ 1" \varnothing metal conduit. Furnish locknut and bushing to connect conduit to junction box.
- ⑨ Metal expansion fitting
- ⑩ Pipe coupling
- ⑪ 2" \varnothing 45° 13" R steel elbow
- ⑫ Bell fitting or bushing to connect conduit to junction box

CONDUIT LAYOUT
Scale: 3/4" = 1'-0"
(Railing not shown)



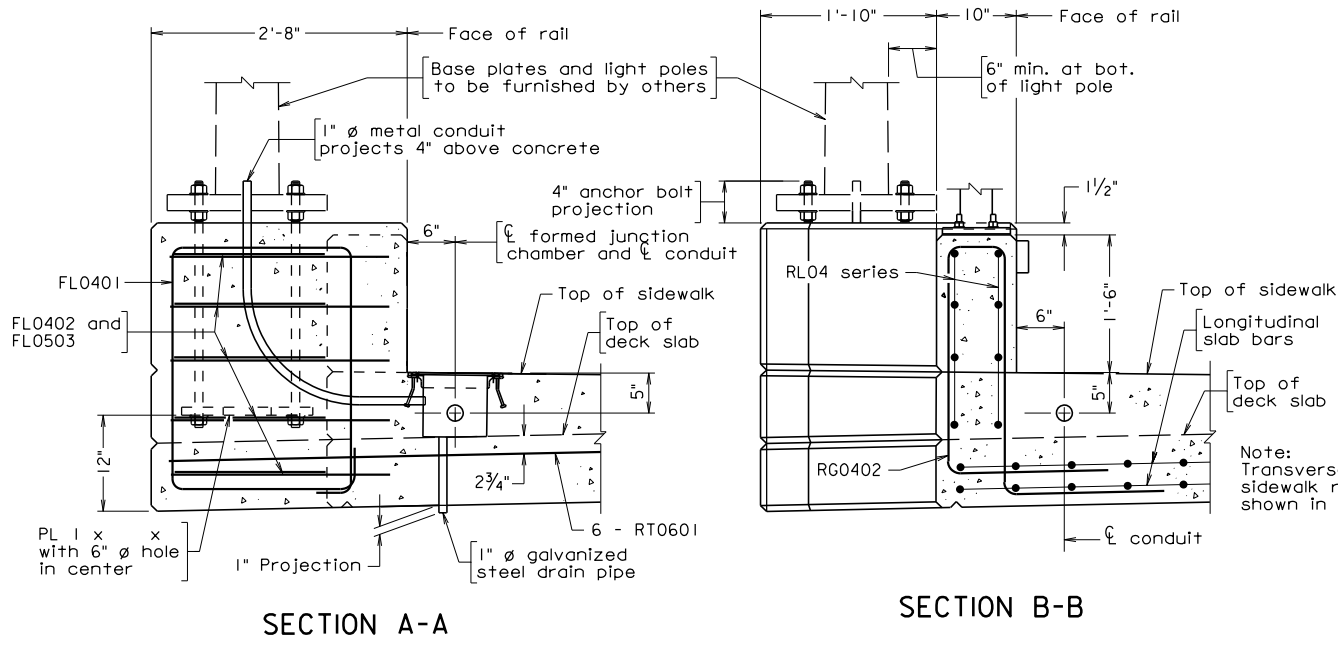
PLAN



JUNCTION CHAMBER FRAME
Scale: 3" = 1'-0"

Abutment	Pier	Longitudinal Movement	†	Detail Type
.
.
.
.
.

When deck is continuous over pier, expansion and deflection fitting detail is not required.



SECTION A-A

SECTION B-B

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

Notes:
All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...
Cut or bend bars to clear junction chamber.
Close adherence to the manufacturer's requirements in regard to clearances for the installation of deflection fittings shall be observed.
Junction chamber frame and cover to be galvanized, after fabrication, in accordance with ASTM A123.
Cost of Bridge Conduit System and anchorages shall be included in price bid for railing.
Anchor bolt specification:
Nuts (Top): ASTM F467 Alloy 6262-T9 or 6061-T6.
(Bottom): ASTM A563.
Thread series for all nuts to be UNC-2B.
Washers (Top): ASTM B209 Alloy Alclad 2024-T3 or T4, 2 1/4" \varnothing x 0.165".
(Bottom): ASTM F844.
Rods: 1" diameter, ASTM A276, type 430 or 410 annealed, hot finished. Threads on rods may be rolled or cut. 3/2" at each end of rod shall be threaded. Each rod shall be supplied with 3 washers and 3 nuts.

In the designations noted above, top refers to hardware above the top of baseplate. Bottom refers to hardware below the baseplate including embedment in concrete.
Longitudinal movement is the maximum amount of movement of the expansion and deflection fitting calculated for placement at 60° F and shall be adjusted in accordance with manufacturer's requirements. The amount of movement shall be increased or decreased for every 10° F temperature drop or rise respectively by t.

The Contractor shall determine all dimensions and details necessary for installation.

Conduit shall be grounded in conformance with Section 700 with grounding materials that conform to Section 238.

Location of light pole shall be adjusted such that rail post clears the light pole base area.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin \varnothing	Length	Location
FLO401	.	#4	2"	8'-5"	Light base
FLO402	.	#4	2"	6'-8"	Light base
FLO503	.	#5	3 3/4"	6'-0"	Light base
RG0402	⊙	#4	.	.	.
RT0601	.	#6	.	.	Top of deck slab

Dimensions in bending diagram are out-to-out of bars.
⊙ Bars RG0402 are detailed and accounted for on the railing detail sheet (BR27D-series).

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
BRIDGE CONDUIT SYSTEM					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
	Revisions		Checked: S&B...DIV		BCS-33A

BCS-33A 08-07-2012 bcs33a.dgn

Sealed and Signed by:
Julius F.J. Voigt Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27D-SERIES WITH SIDEWALK**

NOTES TO DESIGNER:

Standard is to be used only when lighting is installed as part of project and used with the Railing standard BR27D-series with sidewalk and when all railings are attached on the traffic side of the rail posts. Terminal wall for the steel railing is located on abutment or U-back wing.

Access to junction chamber is on the concrete sidewalk floor

Light pole anchorage is designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 4th Edition (2001), including Interim Specifications. Design requirements are as follows:

Pole mounting height: 40 feet
Pole size: avg. 6" O.D. (8" O.D. on base)
Bracket arm: length: 6'-0"; weight of truss: 15 lbs.

Size of luminaire: 3.2 sq. ft.
Weight of luminaire: 81 lbs.
Bolt circle for anchorage (base plate): 11" diameter thru 16" diameter

Light pole anchorage is to be located no closer than 4 feet to abutment (backwall) or parapet joint. Show location of centerline of light pole anchorage(s) on appropriate plan sheet, normally plan of deck slab. The standard provides for adequate pole clearance for placement of the rail on the front or back face of the post.

Size of junction chamber: 8" x 8" x 1'-4" if there is enough depth in the concrete sidewalk. Conduit size: 2" diameter. Show location and size of conduit(s) on transverse section sheet. Show location of junction chambers on appropriate plan sheet, normally plan of deck slab.

For larger conduits the bend radius in the conduit (steel elbow and nonmetallic elbow) and the run of the junction chamber need to be changed in the CONDUIT LAYOUT. The minimum run for the junction chamber is 8 x nominal diameter of conduit. For example, the minimum run for a 2" dia. conduit is 1'-4" (8 x 2" = 16" = 1'-4"). If larger conduit is used, JUNCTION CHAMBER FRAME needs to be adjusted, i.e., spacing of screws needs to be adjusted. Also, the size of the concrete blister needs to be adjusted to provide additional space between the junction chamber and the light anchorage.

Longitudinal movement (for filling table):

Coefficient of linear expansion of:

concrete: 0.000006 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 8.5.3)

steel: 0.0000065 in./in./°F (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 10.2.2)

**BRIDGE CONDUIT SYSTEM
FOR LIGHTING WITH STEEL RAILING
BR27D-SERIES WITH SIDEWALK**

NOTES TO DESIGNER (cont'd):

Temperature ranges (AASHTO *Standard Specification for Highway Bridges*, 1996; 1997 and 1998 Interim Specifications; and VDOT modifications, Article 3.16):

concrete structures: 40°F

steel structures: 60°F

Example: Steel structure, 250 feet of expansion

Longitudinal movement = $250 \times 0.0000065 \times 60 = 0.0975 \text{ ft} = 1 \frac{1}{8} \text{ in.}$

t (movement/10°F) = $250 \times 0.0000065 \times 10 = 0.01625 \text{ ft} = \frac{3}{16} \text{ in.}$

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add diameter of bolt circle.

SECTION A-A:

Add size of plate.

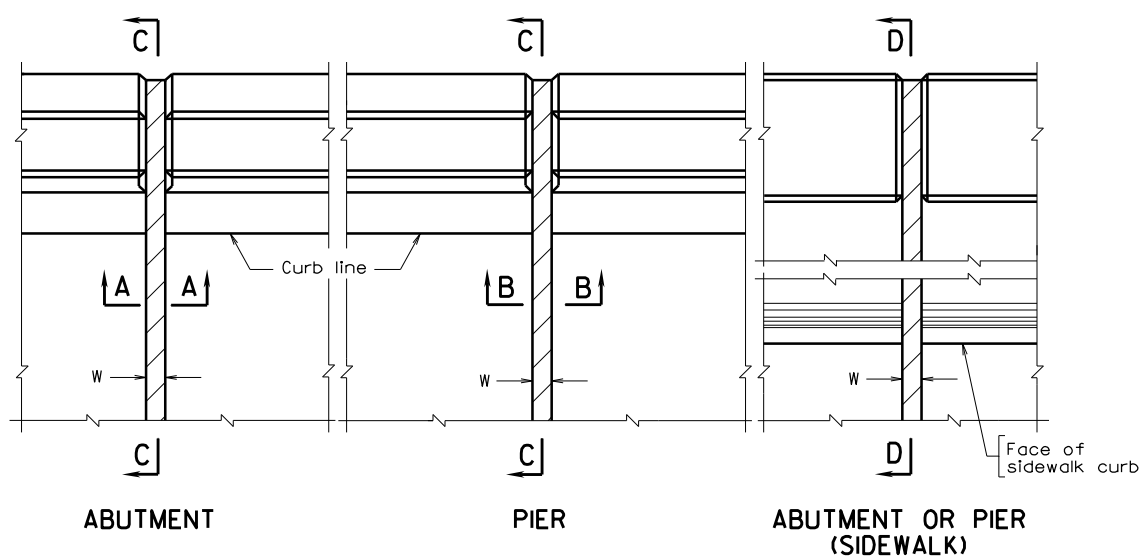
TABLE:

Complete table. Use $\frac{1}{8}$ " multiples for longitudinal movement. Use $\frac{1}{16}$ " multiples for t (movement/10°F).

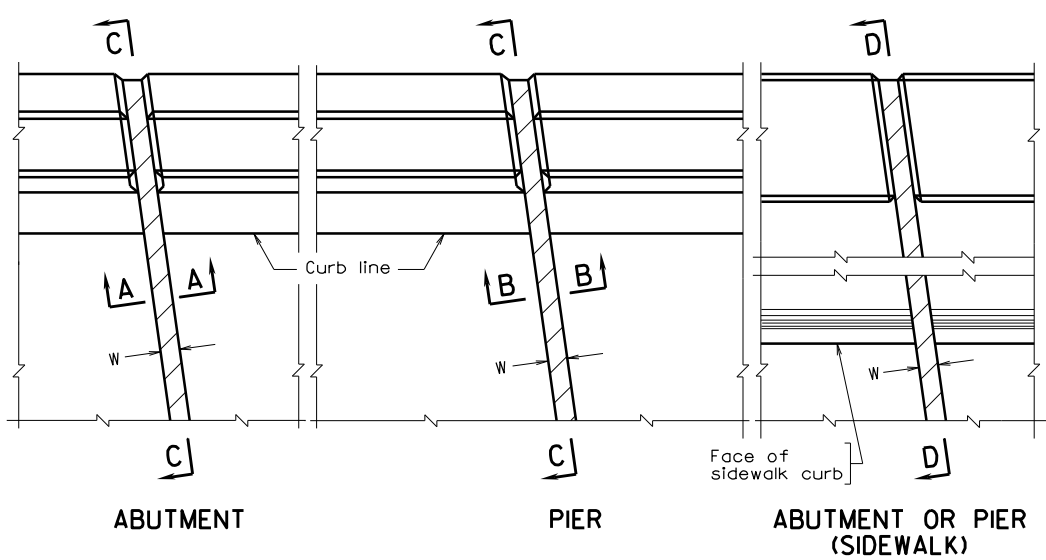
For reinforcing steel schedule, complete the No. (number of bars) column.
For RT0601, input the length of bar.

NOTES:

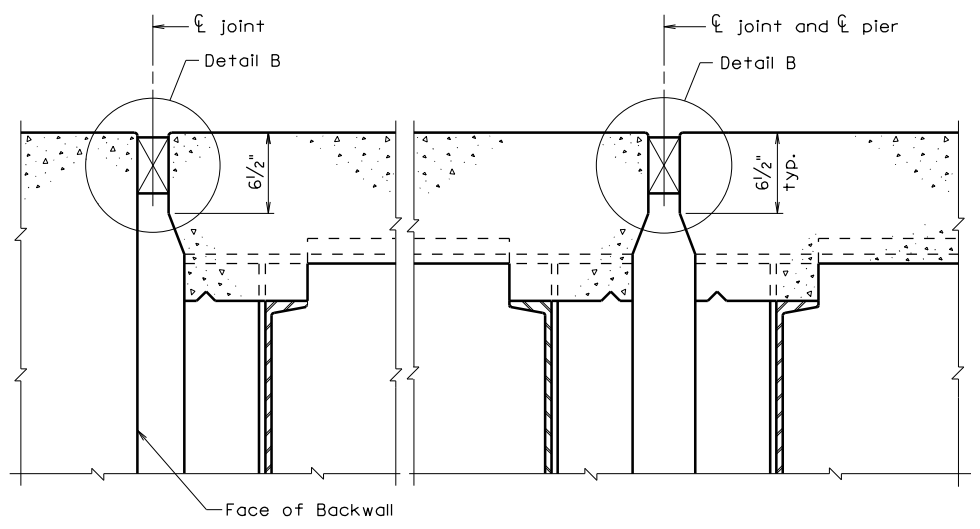
Complete first note by adding the Class I, II or III of corrosion resistant reinforcing steel required.
For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Memorandum (current IIM-S&B-81).



PART PLAN - STRAIGHT CROSSING

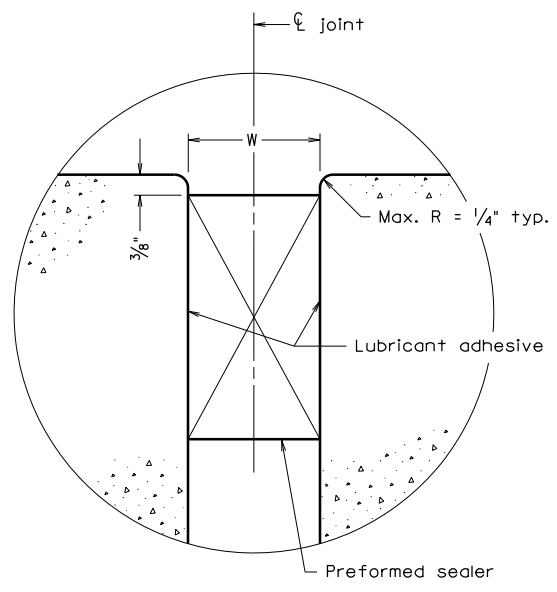


PART PLAN - SKEWED CROSSING

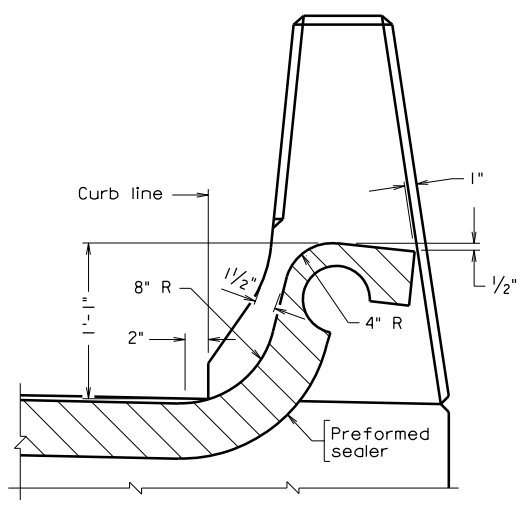


SECTION A-A

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.

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

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

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

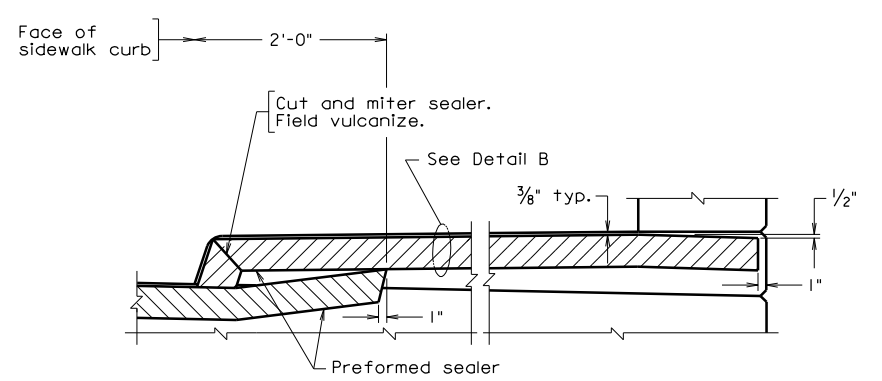
Δ's = Deflection of beam at midspan from dead load of concrete deck slab and bolsters. (See Dead Load Deflection Diagram.)

L = Length of span.

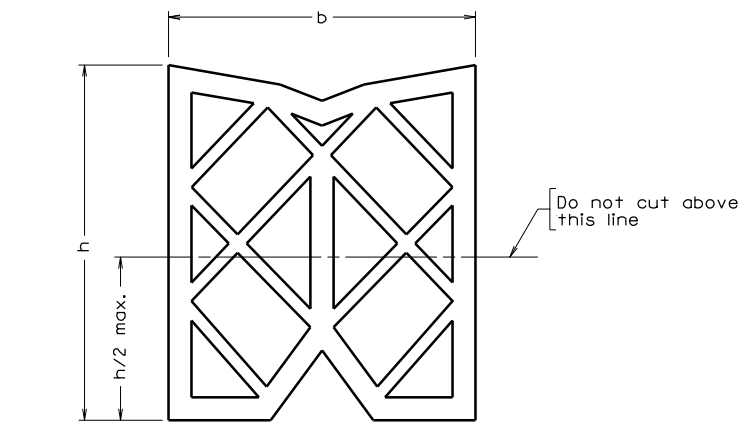
Δ = Compensation for joint opening due to deflection of beam during placement of concrete deck slab and bolsters for the last span placed adjacent to the joint.

All the dimensions are in the same units.

Abutment	Pier	Sealer Size b	Sealer Depth h	Joint Width W	t



SECTION D-D



PREFORMED ELASTOMERIC JOINT SEALER
In uncompressed state

Not to scale

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06-14-2010

BEJ-1

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
JOINT DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Checked:		BEJ-1
					Sheet No.

PREFORMED ELASTOMERIC JOINT DETAILS
STRAIGHT CROSSING AND SKEW UNDER 20°

NOTES TO DESIGNER:

See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 14 to determine size of joint required.

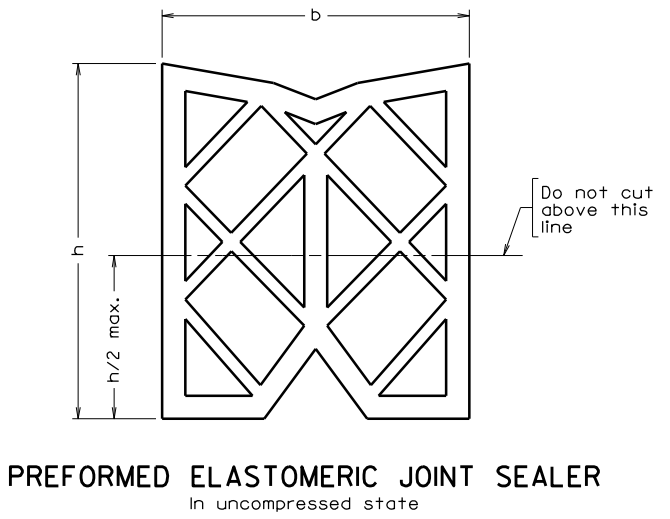
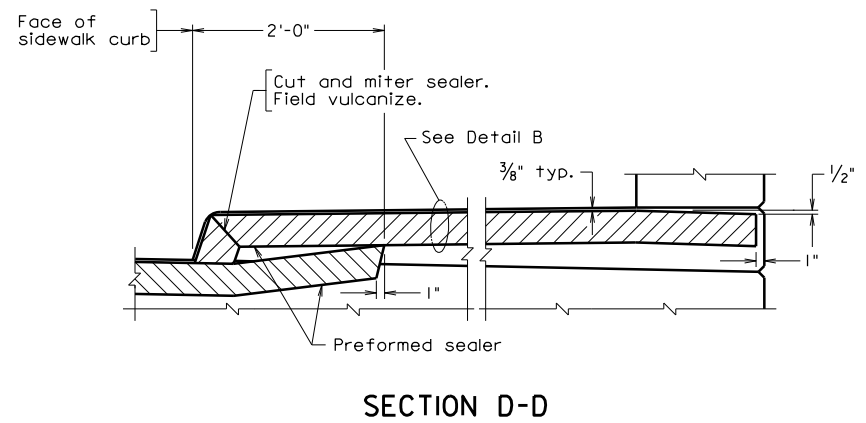
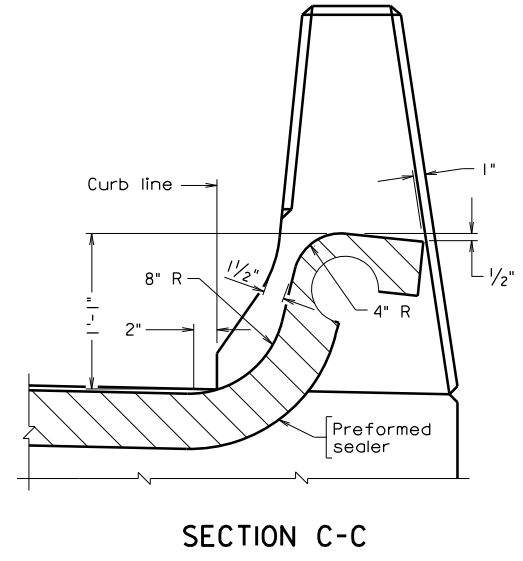
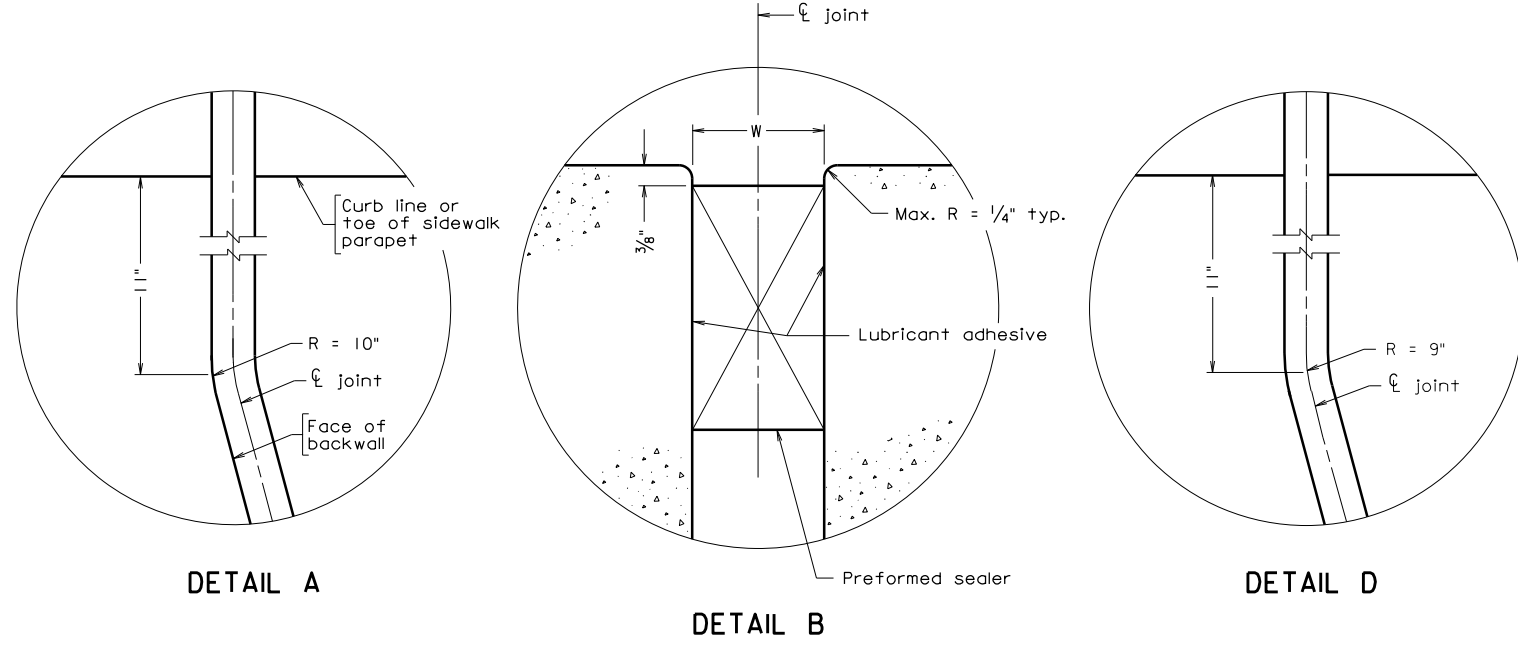
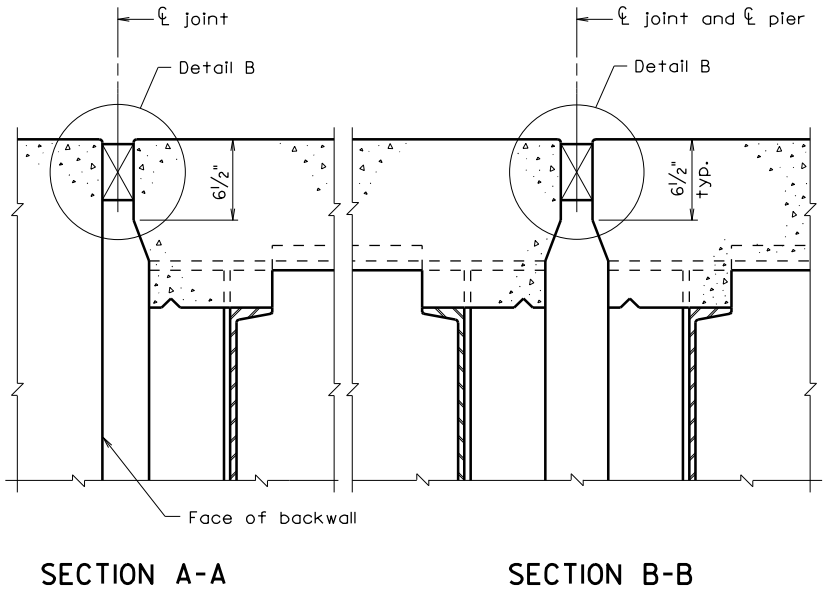
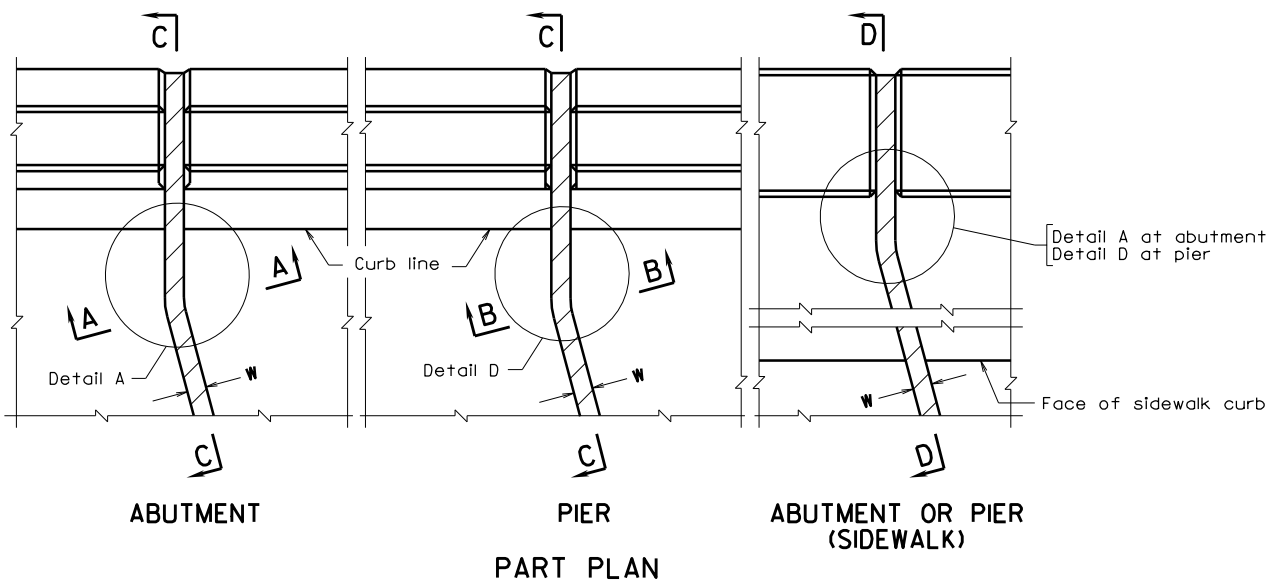
Standard to be used for straight crossings and skews $\leq 20^\circ$.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Complete table entering as appropriate either abutment or pier designation, sealer size (b), sealer depth (h), joint width (w) and temperature variation per $10^\circ\text{F}\pm$ (t).

Section D-D:

Modify details as needed for rail type used.



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

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

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

$\Delta's$ = Deflection of beam at midspan from dead load of concrete deck slab and bolsters. (See Dead Load Deflection 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.

Abutment	Pier	Sealer Size <i>b</i>	Sealer Depth <i>h</i>	Joint Width <i>W</i>	<i>t</i>

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PREFORMED ELASTOMERIC JOINT DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Checked:		BEJ-2
			Sheet No.		

bej2.dgn

06-14-2010

BEJ-2

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

PREFORMED ELASTOMERIC JOINT DETAILS

SKEWED CROSSING OVER 20°

NOTES TO DESIGNER:

See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 14 to determine size of joint required.

Standard to be used for skews > 20°.

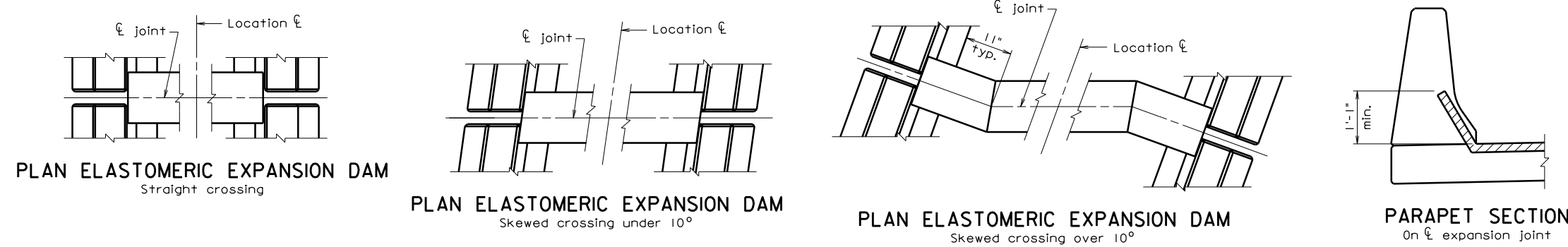
ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Complete table entering as appropriate either abutment or pier designation, sealer size (b), sealer depth (h), joint width (w) and temperature variation per 10°F± (t).

Section D-D:

Modify details as needed for rail type used.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



Notes:

Shop drawings of the type of dam(s) selected and corresponding slab opening(s) and anchor details shall be submitted to the Engineer for review in accordance with these details and Section 105.10 of the Specifications.

Top of dam shall be set below top of slab in accordance with manufacturer's recommendation or 1/8", whichever is greater.

Concrete shall be placed beneath the dam in such a manner as to prevent the formation of air pockets in the concrete.

All bolts, nuts, washers and cap screws shall be ASTM A276, Type 304 stainless steel.

Non-stainless ferrous metal shall be ASTM A709, Grade 36 and shall be painted in accordance with Section 411 of the Specifications.

Completely welded curb and gutter sections shall be furnished for Types F2 and I.

Steel sections shall be furnished in minimum lengths of 18' and shall be field welded into continuous sections. Welds shall be ground smooth in areas where they will be in contact with the elastomer.

Where the total length of the joint is less than 40', the minimum length of steel sections shall be half of the total length of the joint.

Dam Proprietary Nomenclature:

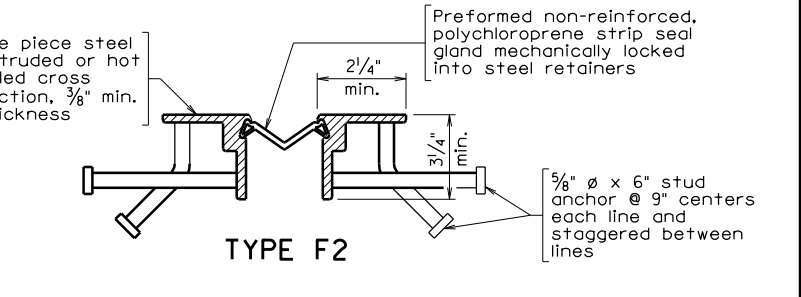
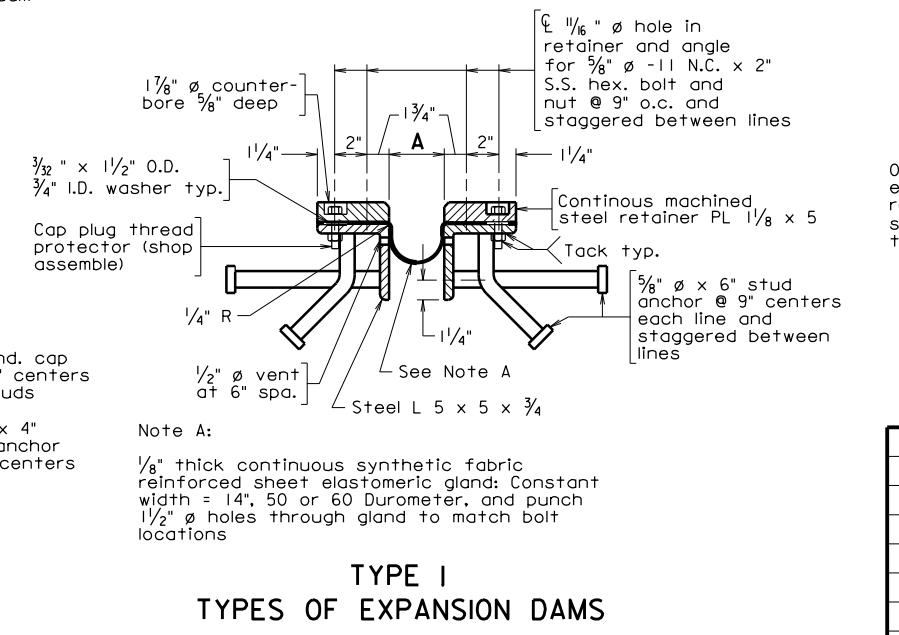
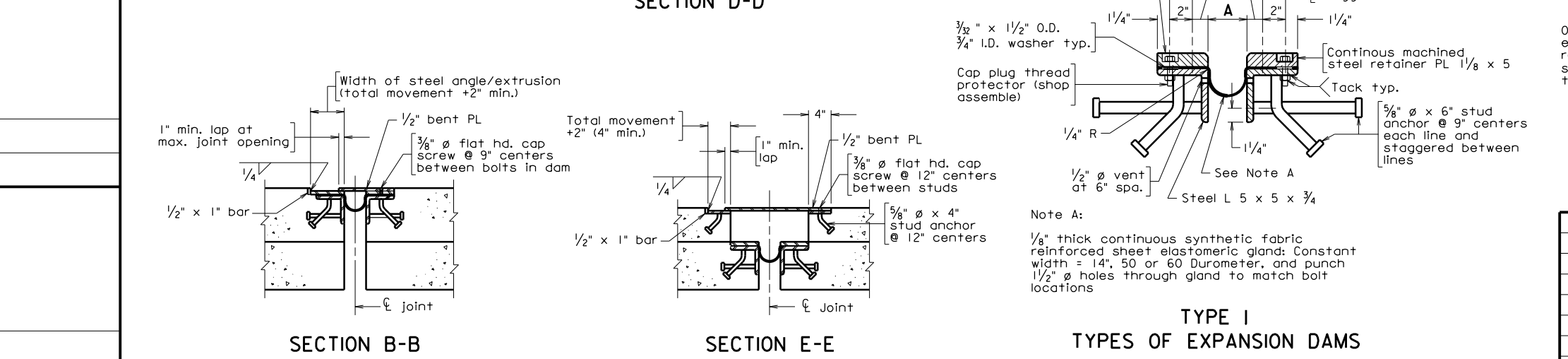
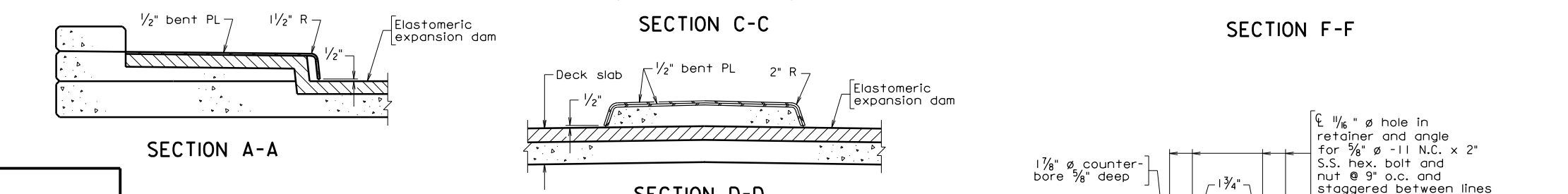
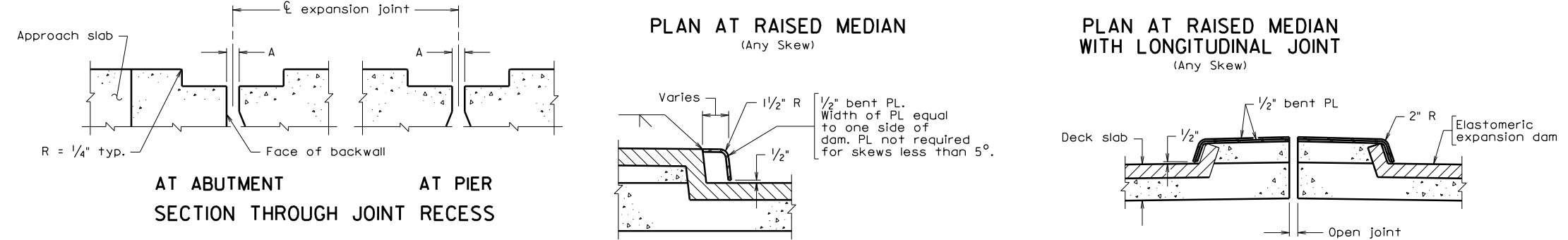
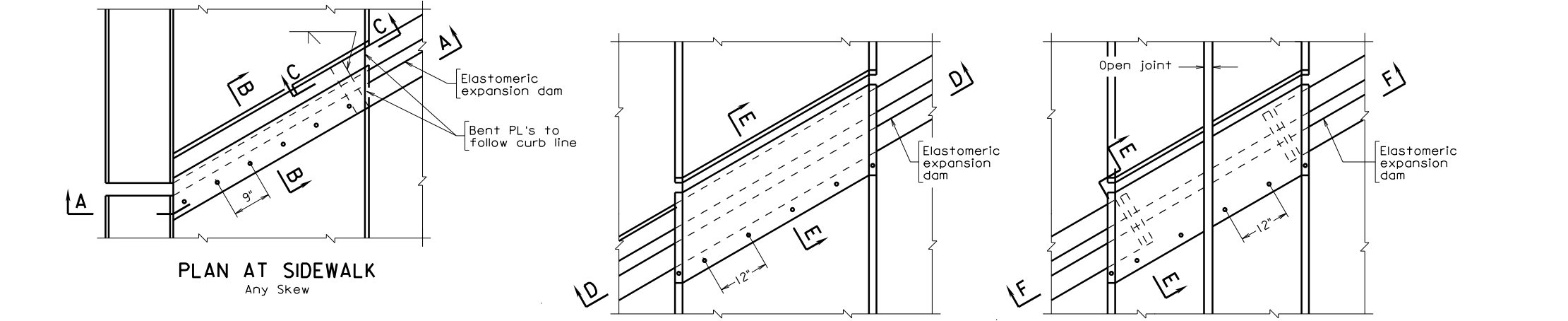
Type F2 = Acme Strip Seal, On-Flex Strip Seal (Structural Accessories), Steelflex SSC-M (D.S.Brown), E-Poxy Industries S400, & R. J. Watson RJM Strip Seal

Type I = Nonproprietary

Abutment	Pier	Types allowed	A (at 60°F)	†	Total Movement	Skew Angle

"A" shall be increased or decreased for every 10°F temperature drop or rise respectively by "+". "A" is measured perpendicular to the joint centerline.

Total movement is the movement the dam must be capable of providing to allow for the effects of temperature changes, girder end rotation under live load and racking caused by the skew angle.



COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ELASTOMERIC EXPANSION DAM					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Drawn: S&B DIV		BEJ-3
			Checked: S&B DIV		

bej3.dgn
 06-14-2010
 BEJ-3
 VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

ELASTOMERIC EXPANSION DAM

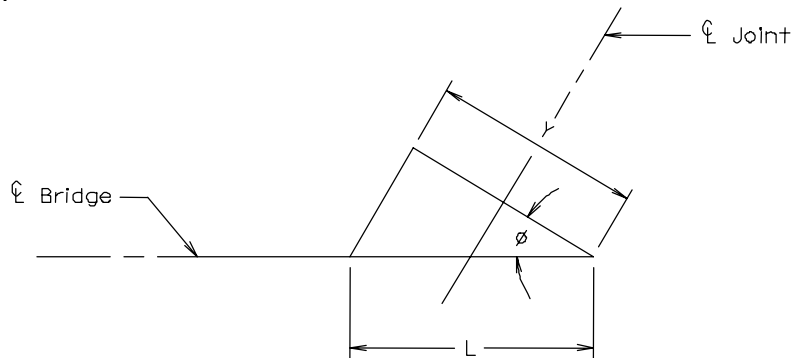
NOTES TO DESIGNER:

Procedure for Selecting Expansion Dam:

1. Determine if preformed elastomeric joint sealer (compression seal) can be used. See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 14.
2. If compression sealer cannot be used, determine total longitudinal movement. Convert this to movement perpendicular to joint. All dimensions in these notes are perpendicular to the joint centerline.
3. Check table below for dams that can be used based on total movement and skew angle:

DAM SELECTION CRITERIA		
Type	Manufacturer's Rated Movement Capacity	Allowable Skew Range
F2	0" to 4"	0° - 22°
I	0" to 4"	0° - 22°

Types F2 and I may be used on skews over 22° by using the following procedure to calculate the Total Movement::



\emptyset = Skew angle

L = Calculated longitudinal movement

Y = Total movement dam must be capable of providing to allow for the effects of temperature changes and racking caused by the skew angle. (This is not the actual movement and can exceed 3 1/2" so long as A_{max} does not.)

Skew	Total Movement (Y)
0° to 22°	$L \cos \emptyset$
Over 22°	$2.5L \sin \emptyset$

ELASTOMERIC EXPANSION DAM

NOTES TO DESIGNER (cont'd):

Example: Calculated longitudinal movement $L = 2''$.

Skew angle $\emptyset = 40^\circ$.

Total movement $Y = 2.5L \sin \emptyset = 2.5(2) \sin 40 = 3.21''$.

Enter $3 \frac{1}{4}''$ in total movement column on standard.

Actual movement = $L \cos \emptyset = 2 \cos 40 = 1.53''$.

$A_{max} = A_{min} + \text{actual movement} = 1'' + 1 \frac{1}{2}'' = 2 \frac{1}{2}'' < 3 \frac{1}{2}''$ O.K.

$A = A_{min} + \frac{1}{2} \text{ actual movement} = 1'' + \frac{3}{4}'' = 1 \frac{3}{4}''$.

Enter $1 \frac{3}{4}''$ in column A on standard.

4. Determine minimum opening in concrete slab (A_{min}):

Expansion Length	Minimum Opening	
	Type F2	Type I
0' to 100'	$\frac{3}{4}''$	$\frac{1}{2}''$
Over 100' to 200'	1"	$\frac{3}{4}''$
Over 200' to 300'	$1 \frac{1}{4}''$	1"
Over 300'	$1 \frac{1}{2}''$	$1 \frac{1}{4}''$

5. Determine maximum opening of concrete slab (A_{max}):

$$A_{max} = A_{min} + L \cos \emptyset$$

Note: The maximum opening between the rigid portions of the dam at roadway surface shall not exceed $3 \frac{1}{2}''$ for Types F2 and I.

6. When joint requirements do not fit within the dam selection criteria, tooth expansion joint should be used.
7. When an expansion dam is required at a joint with only fixed bearings because of the skew and/or rotation depth, set $A = A_{min} + \frac{1}{2}''$.

ELASTOMERIC EXPANSION DAM

NOTES TO DESIGNER (cont'd):

Design/Detailing Requirements:

1. Pay items for expansion dam shall be based on total movement as follows:

0" to 2"
2" + to 3"
3" + to 4"

2. Abutment design may be affected by the tensile and/or compressive forces transmitted by dams. Under extreme conditions any dam may transmit tensile and/or compressive forces of 300 lbs./lin.ft. of dam.
3. Where expansion dams are used, the ends of the deck slabs and abutment backwalls require additional reinforcing.
4. The following note shall be added to abutment and superstructure details as appropriate:

The Contractor shall adjust reinforcing steel as required to clear shear connectors.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Complete table by indicating abutment or pier designation, types (of dams) allowed (e.g. F2, I), A @ 60°F, t, total movement and skew angle.

A @ 60°F = slab opening at mid temp = $A_{min} + \frac{1}{2}$ actual movement

t = temperature variation per 10°F as follows:

Span Length	t
40'-59'	$\frac{3}{64}$ "
60'-99'	$\frac{1}{16}$ "
100'-124'	$\frac{3}{32}$ "
125'-149'	$\frac{7}{64}$ "
150'-199'	$\frac{1}{8}$ "
200'-249'	$\frac{11}{64}$ "
250'-300'	$\frac{7}{32}$ "

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				

Notes:

Structural steel shall be ASTM A36 and shall be fabricated in accordance with Section 407 and painted in accordance with Section 411 of the Specifications.

Bolts, nuts and washers in trough shall be ASTM A276, Type 304 stainless steel.

Flathead screws shall be ASTM F738, Type 304 stainless steel.

Elastomeric material for troughs shall be 50 durometer, nonwicking synthetic fabric reinforced, 1/4" thick sheets, in accordance with Section 212.02(j) of the Specifications. Fabric shall be woven nonwicking polyester. Width of sheets equal 2 times the tooth length (L) + 6".

Unit shall be shipped to the job site preassembled for lengths up to forty feet. One field welded splice is permissible for each additional forty feet.

Tooth plates shall be flame cut from one plate by a single cut of a machine guided torch. Sharp corners are to be removed by grinding. Width of cut shall be 1/4". Width of plate required equals $2F + 2 + (A + B - 1.75)\cos \theta$.

Joint shall be fabricated to follow the grade and the transverse contour of the roadway.

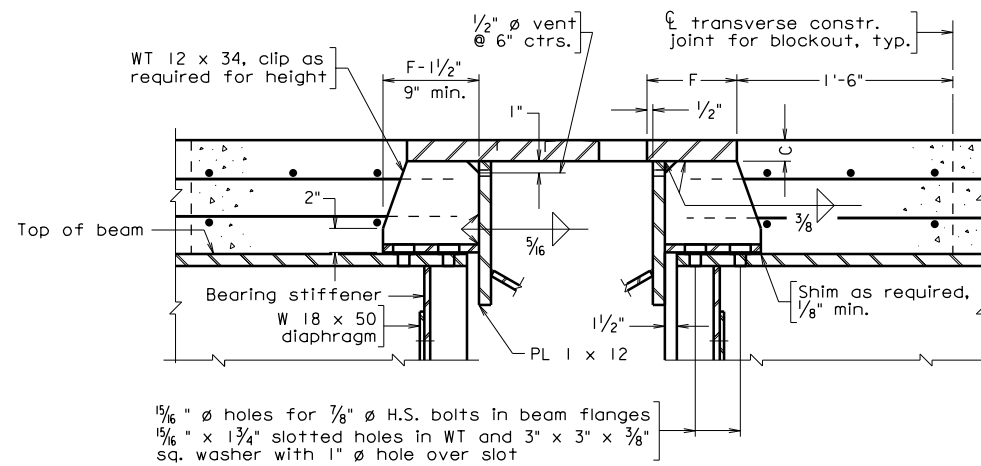
To assure that all bedding areas and recesses of the structural elements are completely filled with well compacted concrete, adequate venting, vibrating and hand packing of concrete into these areas shall be done.

Anchor bolts shall be cast in place.

Temporary L's 4 x 3 x 1/2 at maximum 5'-0" centers shall be shop welded. After erection and adjustment, bolts shall be tightened. After concrete has been set, angles shall be removed by chipping connection welds and grinding surfaces smooth.

Set joint and place blockout concrete after all deck slabs in spans that affect the joint have been placed. Before placing blockout concrete, apply epoxy bonding agent to transverse construction joint.

For details of tooth expansion joint, see standard(s) BEJ-8 and BEJ-9, sheet and .



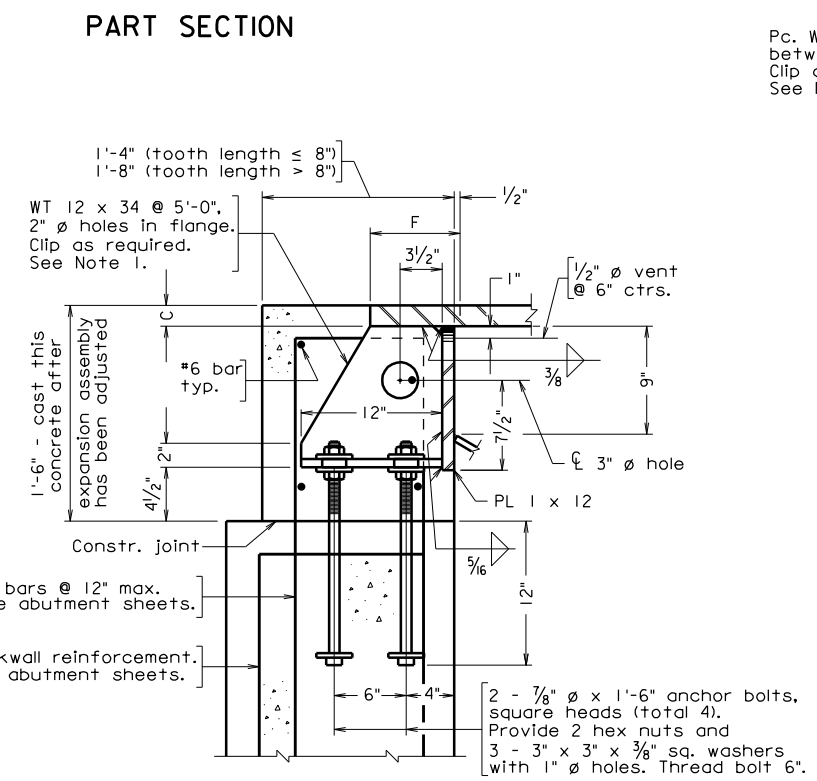
PART SECTION AT STEEL GIRDER

PART PLAN

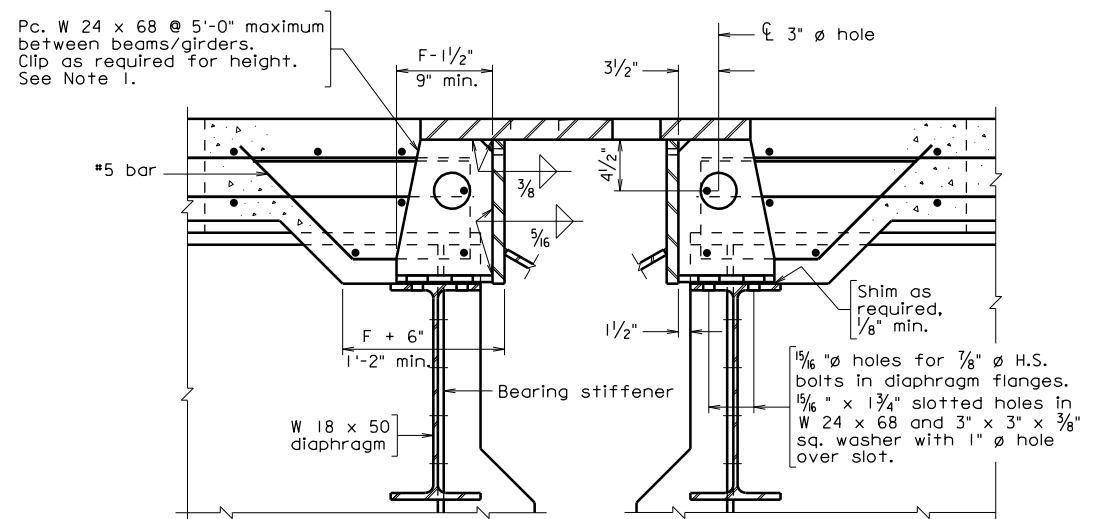
Abut.	Pier	Tooth Length L	C	D	E	F	G	Skew Angle θ	Trough Type

Temp.	" Tooth length Temperature adjustments		Temp.	" Tooth length Temperature adjustments	
	A	B		A	B
120°F			120°F		
100°F			100°F		
80°F			80°F		
60°F			60°F		
40°F			40°F		
20°F			20°F		
0°F			0°F		

Make linear interpolation for temperatures between those in table.



PART SECTION AT ABUTMENT



PART SECTION AT STEEL DIAPHRAGM

Note 1: Use intermediate anchors at 12" max. spacing between WT's.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TOOTH EXPANSION JOINT					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Checked: S&B DIV		BEJ-6
			Sheet No.		

bej6.dgn
06-14-2010
BEJ-6

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				

Notes:

Structural steel shall be ASTM A36 and shall be fabricated in accordance with Section 407 and painted in accordance with Section 411 of the Specifications.

Bolts, nuts and washers in trough shall be ASTM A276, Type 304 stainless steel.

Flathead screws shall be ASTM F738, Type 304 stainless steel.

Elastomeric material for troughs shall be 50 durometer, nonwicking synthetic fabric reinforced, 1/4" thick sheets, in accordance with Section 212.02(j) of the Specifications. Fabric shall be woven nonwicking polyester. Width of sheets equal 2 times the tooth length (L) + 6".

Unit shall be shipped to the job site preassembled for lengths up to forty feet. One field welded splice is permissible for each additional forty feet.

Tooth plates shall be flame cut from one plate by a single cut of a machine guided torch. Sharp corners are to be removed by grinding. Width of cut shall be 1/4". Width of plate required equals $2F + 2 + (A + B - 1.75)\cos \theta$.

Joint shall be fabricated to follow the grade and the transverse contour of the roadway.

To assure that all bedding areas and recesses of the structural elements are completely filled with well compacted concrete, adequate venting, vibrating and hand packing of concrete into these areas shall be done.

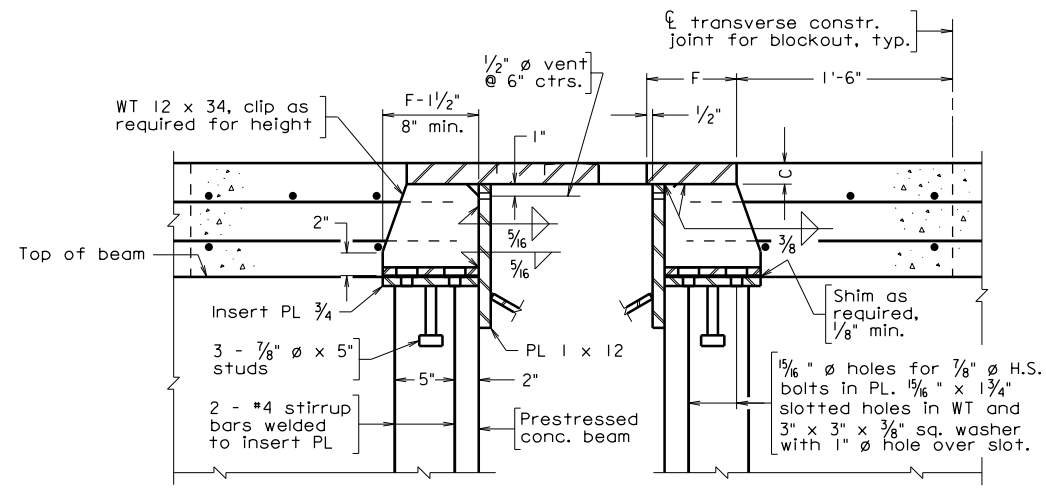
Anchor bolts shall be cast in place.

Temporary L's 4 x 3 x 1/2 at maximum 5'-0" centers shall be shop welded. After erection and adjustment, bolts shall be tightened. After concrete has been set, angles shall be removed by chipping connection welds and grinding surfaces smooth.

Set joint and place blockout concrete after all deck slabs in spans that affect the joint have been placed. Before placing blockout concrete, apply epoxy bonding agent to transverse construction joint.

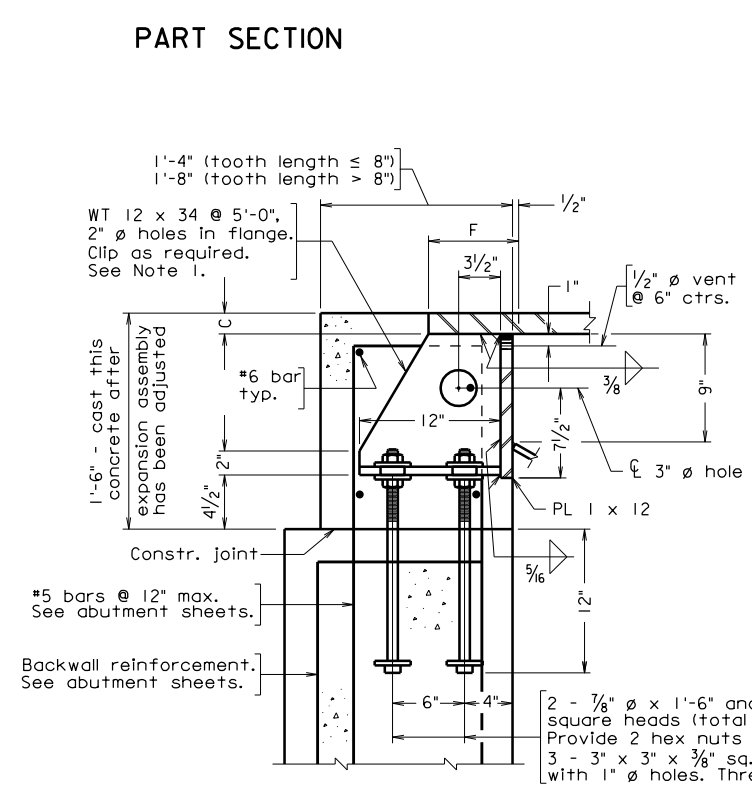
For details of tooth expansion joint, see standard(s) BEJ-8 and BEJ-9, sheet and .

PART PLAN

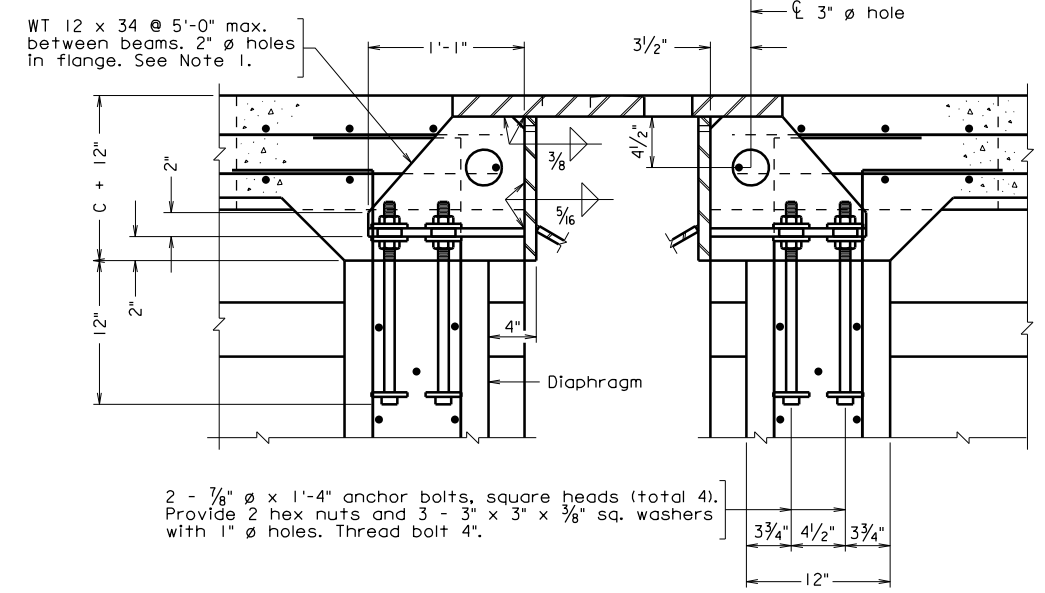


PART SECTION AT CONCRETE BEAM

PART SECTION



PART SECTION AT ABUTMENT



PART SECTION AT CONCRETE DIAPHRAGM

Abut.	Pier	Tooth Length L	C	D	E	F	G	Skew Angle θ	Trough Type

Temp.	" Tooth length Temperature adjustments		Temp.	" Tooth length Temperature adjustments	
	A	B		A	B
120°F			120°F		
100°F			100°F		
80°F			80°F		
60°F			60°F		
40°F			40°F		
20°F			20°F		
0°F			0°F		

Make linear interpolation for temperatures between those in table.

Note 1: Use intermediate anchors at 12" max. spacing between WT's.

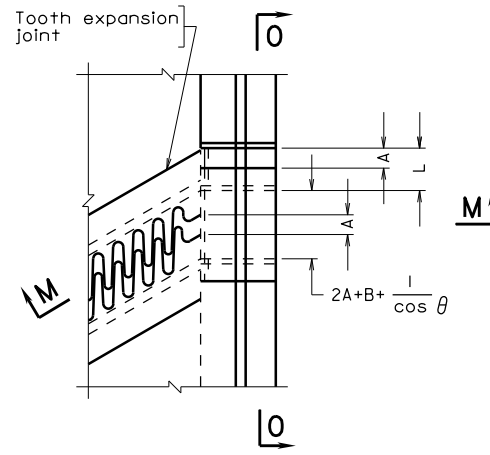
bej7.dgn

06-14-2010

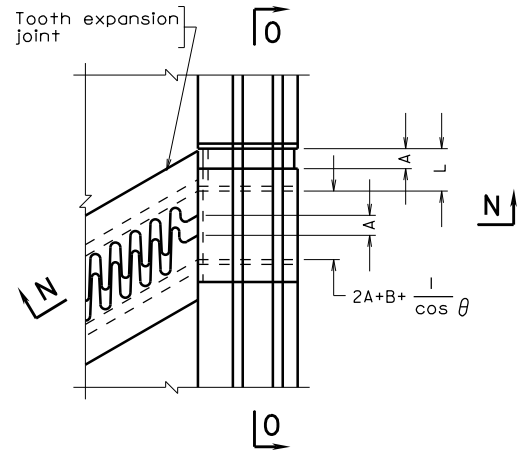
BEJ-7

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

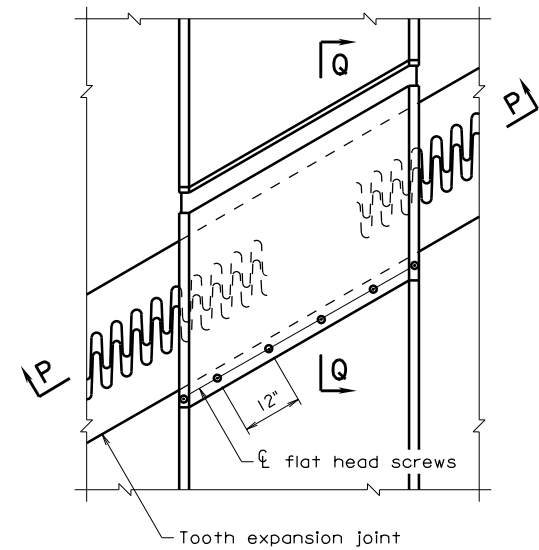
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TOOTH EXPANSION JOINT					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Checked: S&B DIV		BEJ-7
					Sheet No.



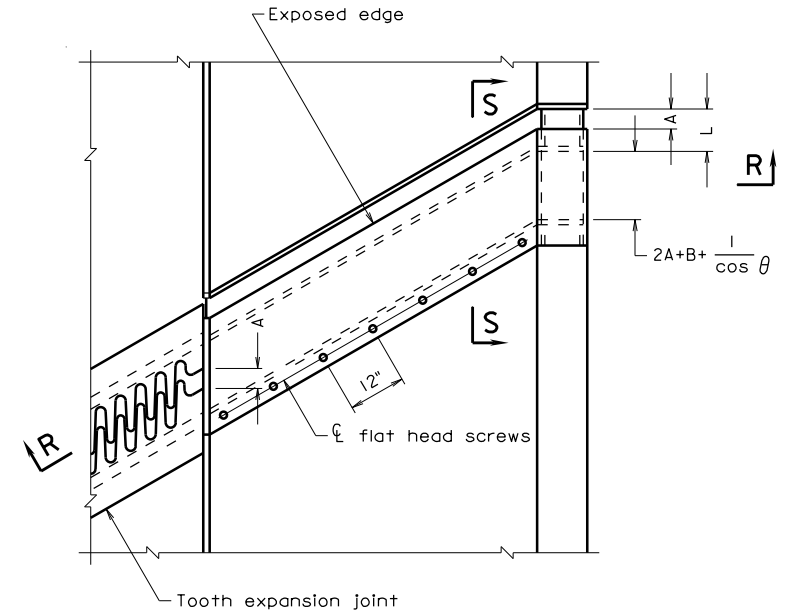
PLAN AT MEDIAN BARRIER



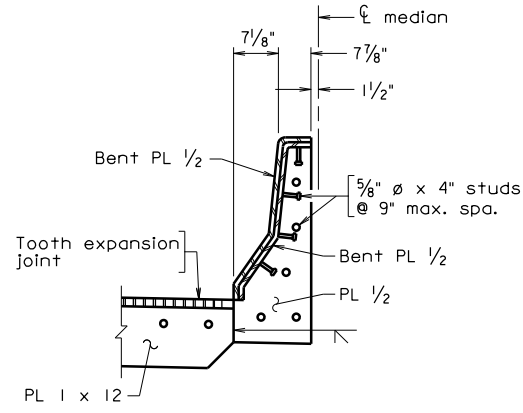
PLAN AT PARAPET



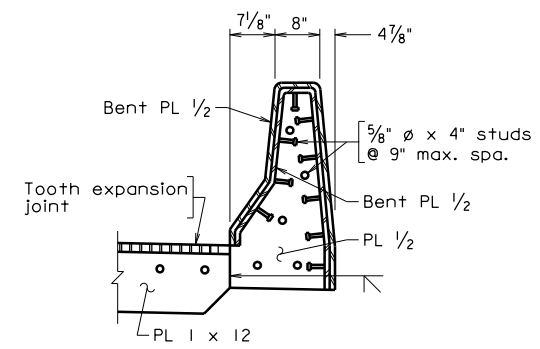
PLAN AT RAISED MEDIAN



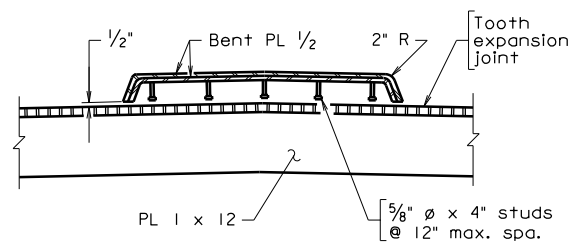
PLAN AT SIDEWALK



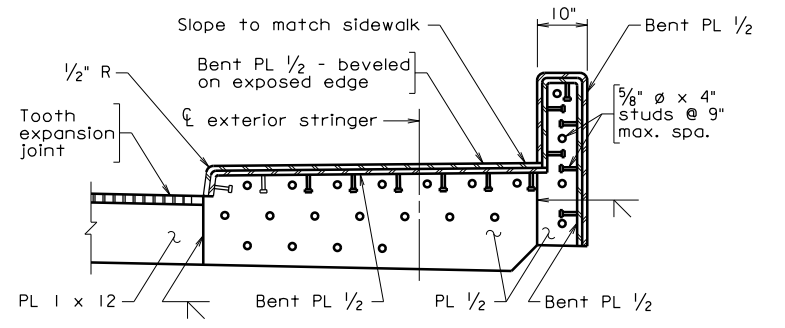
SECTION M-M



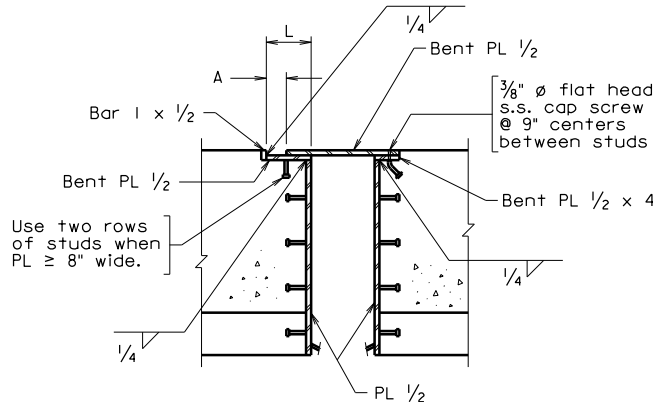
SECTION N-N



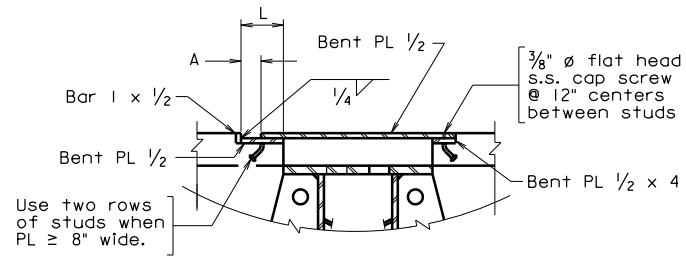
SECTION P-P



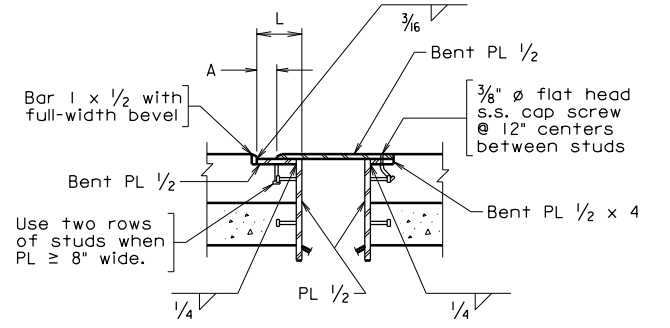
SECTION R-R



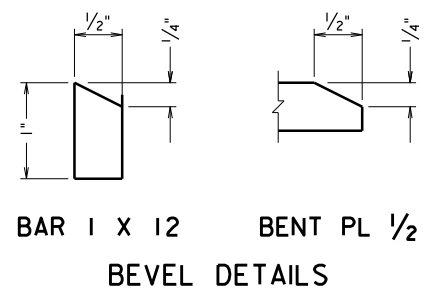
SECTION O-O



SECTION Q-Q



SECTION S-S



BAR 1 x 12 BENT PL 1/2
BEVEL DETAILS

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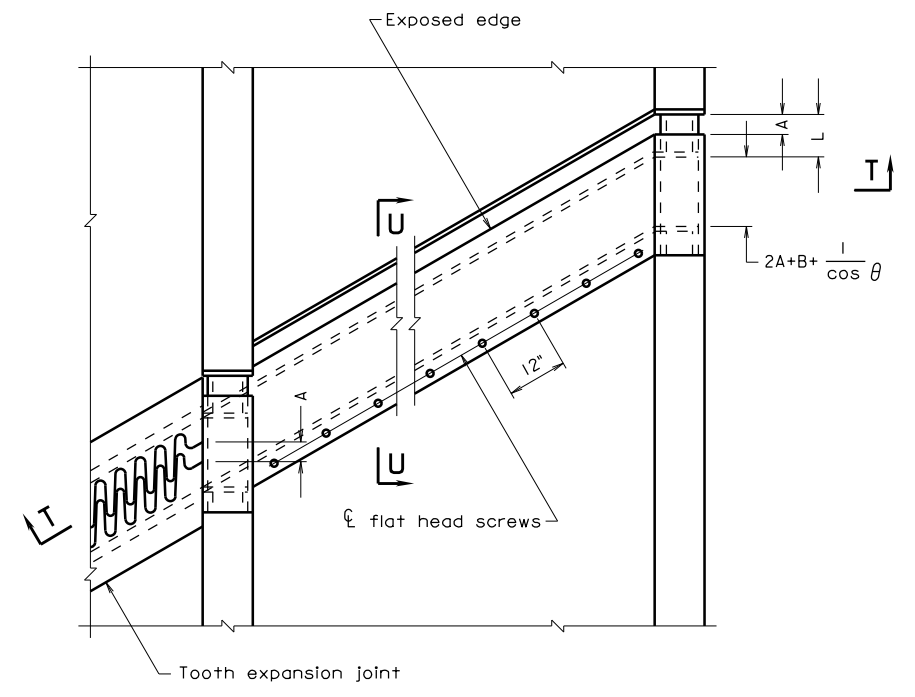
06-14-2010

BEJ-10

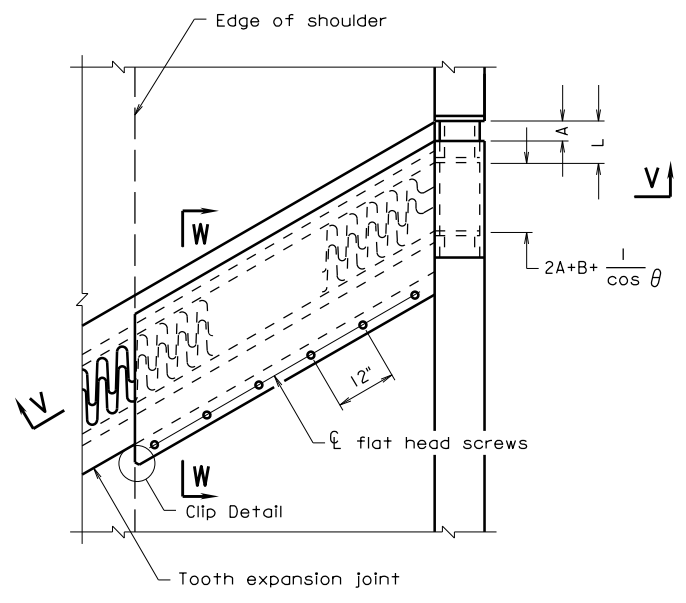
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
TOOTH EXPANSION JOINT MISCELLANEOUS DETAILS			
No.	Description	Date	Designed: S&B DIV Drawn: S&B DIV Checked: S&B DIV
	Revisions		Date Plan No. Sheet No.
			BEJ-10

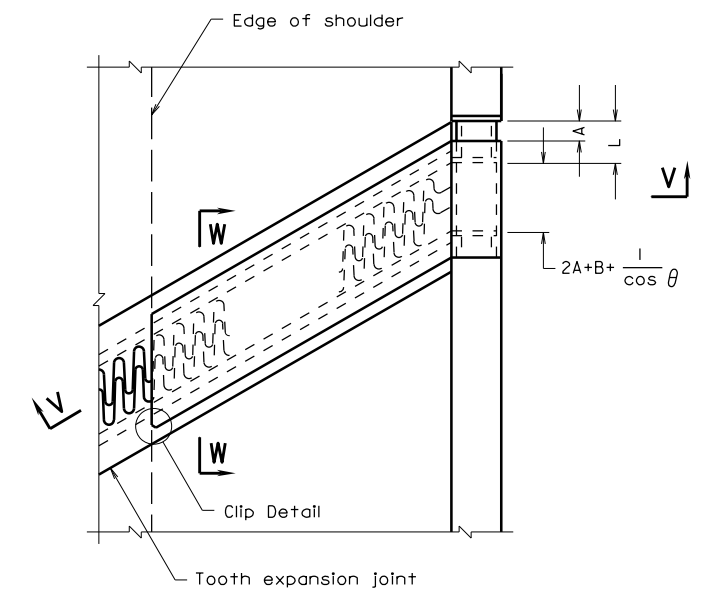
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



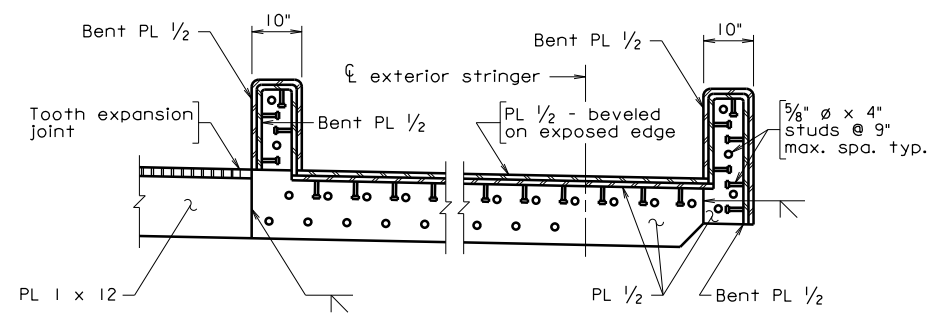
PLAN AT BARRIER SEPARATED PEDESTRIAN AND/OR BICYCLE FACILITY



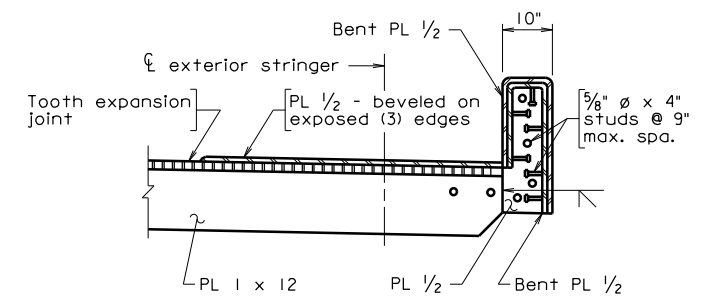
PLAN AT SHOULDER WHERE BICYCLE USE IS ANTICIPATED



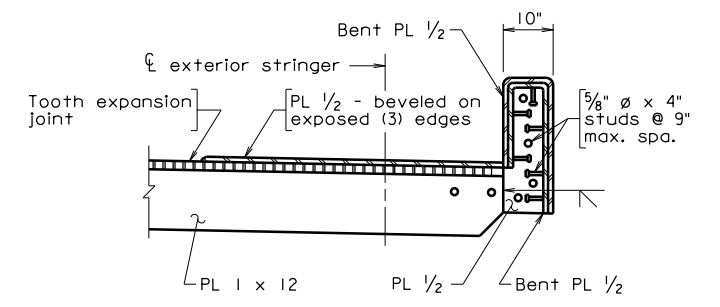
PLAN AT SHOULDER WHERE BICYCLE USE IS ANTICIPATED - ALTERNATE



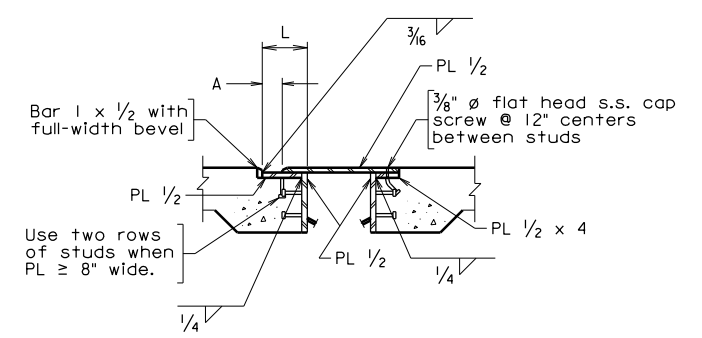
SECTION T-T



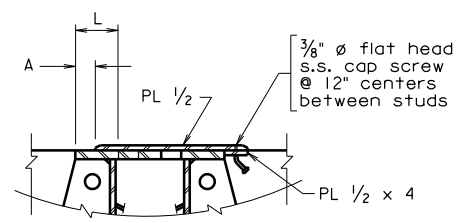
SECTION V-V



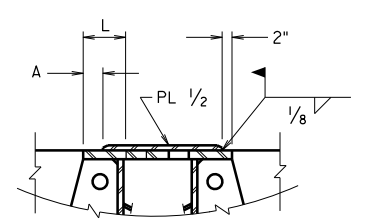
SECTION V-V - ALTERNATE



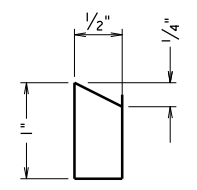
SECTION U-U



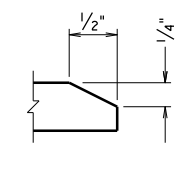
SECTION W-W



SECTION W-W - ALTERNATE

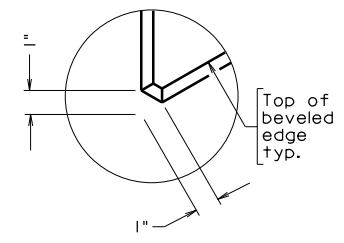


BAR 1 x 12



PL 1/2

BEVEL DETAILS



CLIP DETAIL

Not to scale © 2010, Commonwealth of Virginia

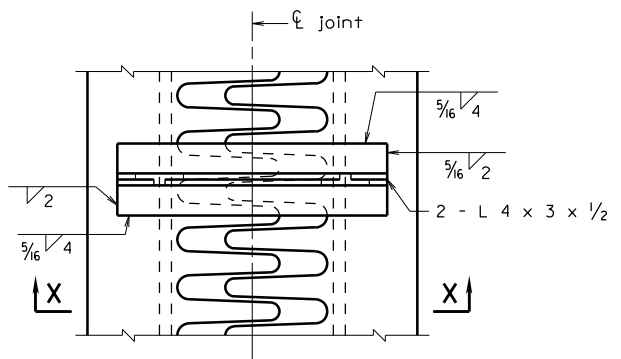
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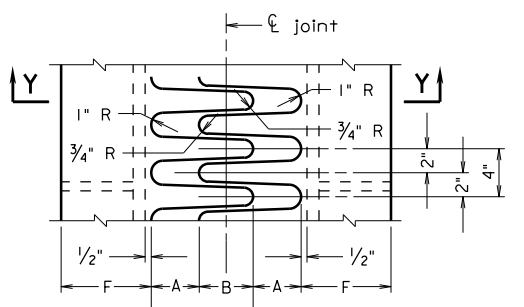
BEJ-11

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

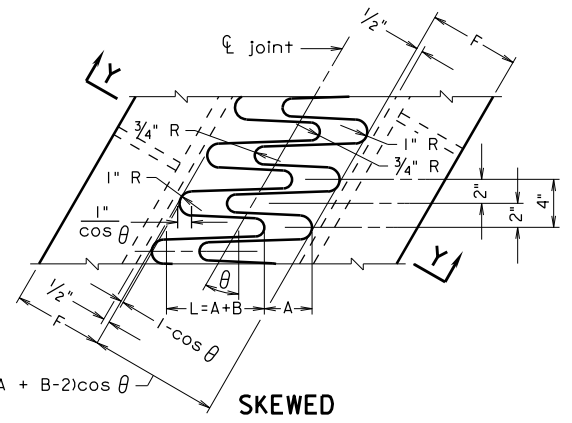
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TOOTH EXPANSION JOINT MISCELLANEOUS DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BEJ-11
			Checked: S&B DIV		
Revisions					



PLAN OF TEMPORARY ATTACHMENT

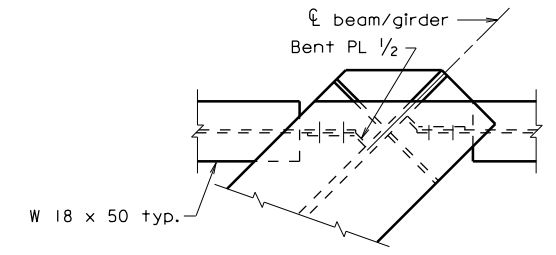


NO SKEW

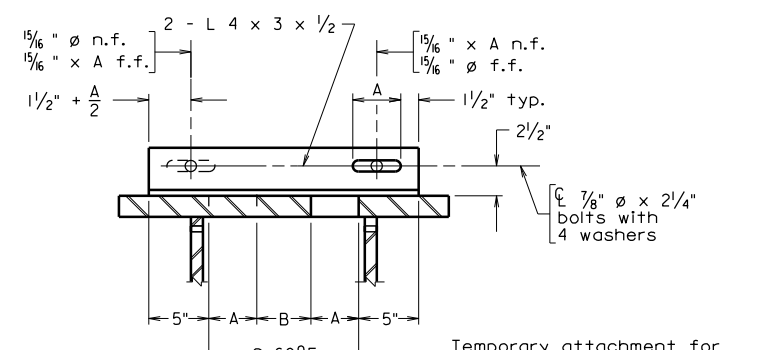


SKEWED

TOOTH PART PLAN

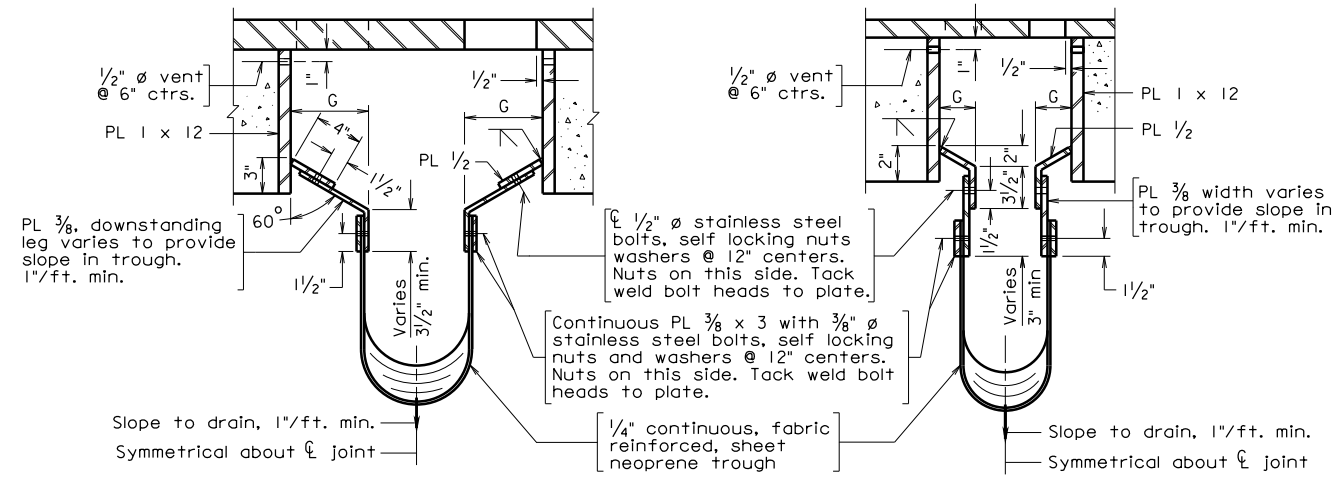


STEEL BEAM/GIRDER SKEWED BEARING STIFFENER DETAIL



SECTION X-X

Temporary attachment for shipping and erection of joint. Maximum spacing = 5'-0".

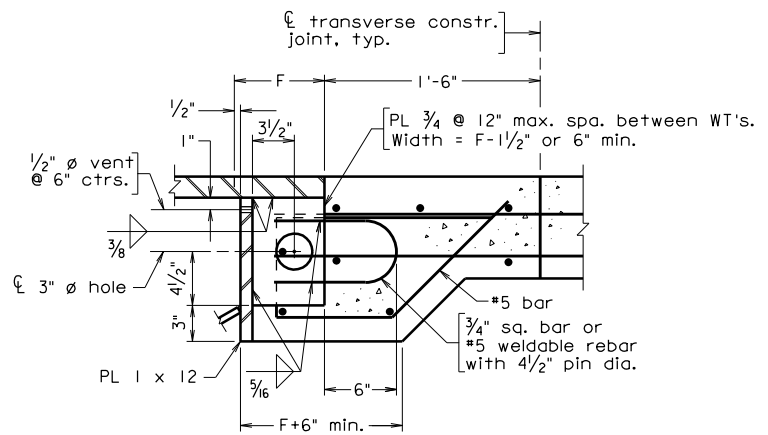


TYPE B

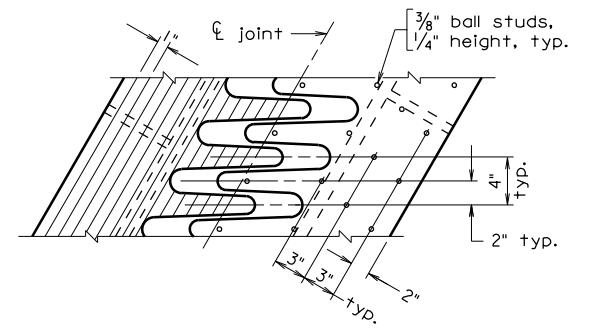
TYPE A

SECTION Y-Y (TROUGH DETAILS)

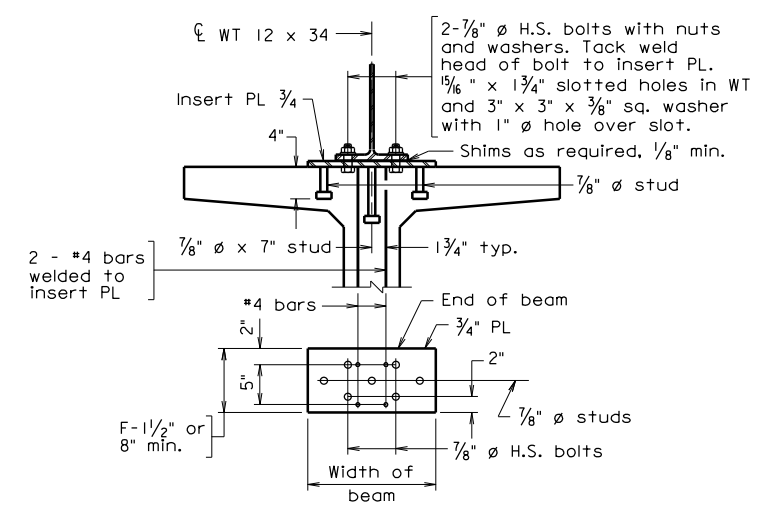
Note: Extend trough to edge of slab. Trough detail not shown.



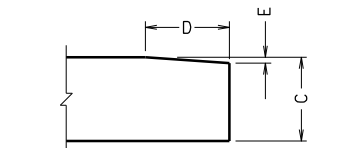
INTERMEDIATE ANCHOR DETAIL



WELD PATTERN STUD PATTERN SKID RESISTANCE DETAIL



CONCRETE BEAM INSERT PLATE



TOOTH BEVEL DETAIL

See note A Note A: Use minimum preheat and interpass temperature of 250° F.
Contractor may provide either studs or weld pattern. Do not place on beveled end of tooth.

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BEJ-12

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TOOTH EXPANSION JOINT MISCELLANEOUS DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
	Revisions		Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		BEJ-12

TOOTH EXPANSION JOINT

NOTES TO DESIGNER:

The tooth expansion joint standard consists of five standard sheets BEJ-6, BEJ-7, BEJ-10, BEJ-11 and BEJ-12. BEJ-6 is for steel girders and BEJ-7 is for concrete beams. BEJ-10, BEJ-11 and BEJ-12 are miscellaneous details and must be used with standards BEJ-6 and BEJ-7 as applicable.

1. Determine if preformed elastomeric joint sealer (compression sealer) or elastomeric expansion dam (strip seal) can be used. See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 14 and Manual of the Structure and Bridge Division, Volume V – Part 3, standards BEJ-1, -2 and -3.
2. If compression sealer or strip seal cannot be used, determine the appropriate tooth length based on the total length of movement over which thermal expansion will be occurring. A tooth expansion joint program is available for use by in-house design staff only. See Note 13 for values and formulas used by the program. For the required tooth length, complete the tables on standard sheet BEJ-6 for steel beams/girders and BEJ-7 for concrete beams.
3. All factors which affect movement should be considered in dimensioning the joint: creep, construction tolerances, temperature range, bearing types and direction of allowed movements, skews, external restraints, etc., and appropriate factors of safety applied to the design. The rated movement of the joint should exceed the temperature movement by at least 20%. This excess allowance is intended to prevent destruction of the joint due to unpredictable movements of a given location and is included in the calculation of the tooth length in the computer program.
4. The minimum joint opening in the longitudinal direction shall be 1". At maximum joint opening, the tooth overlap shall be 1 1/2".
5. Align teeth in the direction that the longitudinal thermal movement will occur. Special care needs to be taken on curved structures. When teeth do not align with the parapet, median, etc., a note shall be added to the plans to dimension a sufficient gap between the parapet, median, etc.. Sliding plates are to be provided for the transverse component of movement.
6. Where bicycle use is anticipated, use special floor plates in the shoulder area. Free ends of floor plates shall point in the direction of travel.
7. Maximum tooth length is determined by limiting the tooth plate thickness to 3". Greater tooth length can be accommodated by special design and providing support plates beneath the teeth.
8. Coordinate the details of the diaphragms supporting tooth joints between the joint standard and the structural steel details. Also, coordinate the location of the shear connectors on the ends of steel beams/girders. Provide adequate distance between centerline of joint and centerline of bearing to accommodate the joint. On skews, make sure that bearing stiffeners do not interfere with the trough.
9. Maximum length for W18x50 diaphragm is 15'-0". A heavier section must be designed for longer spans.

TOOTH EXPANSION JOINT

NOTES TO DESIGNER (cont'd):

10. The length of the teeth may be increased on skews in order to provide room to get the trough in. The length of the teeth may also be increased at abutments in order to provide space between the backwall and the trough. The computer program will make these adjustments. Because of limited space next to abutment backwalls, it is preferable not to locate a tooth joint at an abutment when the teeth are short.
11. The space requirements for tooth expansion joints shall be determined prior to designing the beams/girders and supporting substructure.
12. Space is provided on standard BEJ-6 for steel beams/girders and BEJ-7 for concrete beams for the designer to detail a Part Plan and Part Section of the joint. These details are not provided on the standard because of the many possible combinations of skew, beam/girder spacing, beam/girder type, etc. Part Plan should be long enough to cover the blockout area and wide enough to cover two beams/girders and the slab cantilever.
13. The Tooth Expansion Joint Program uses the following values and formulas:

TL = Tooth length (inches)

E = 0.0000065 in/in/°F for steel beams/girders

E = 0.000006 in/in/°F for concrete beams

T = 120 ° F temperature range for steel beams/girders

T = 80 ° F temperature range for concrete beams

S = Total thermal movement distance (feet)

F = Factor of safety of 1.25

CLR = Minimum clear distance between end plates.

TL = $2.5 + 12 \times E \times T \times S \times F$ (provides for 1" min. opening and 1 1/2" min. tooth lap
Min. TL = 5")

CLR = $3 + (TL - 1)\cos \emptyset$ If CLR $\geq 11"$, then trough type B
Else if CLR $\geq 9"$ and at abutment, then trough type A
Else if CLR $\geq 7"$ and at pier, then trough type A
Else adjust tooth length to meet the above minimum CLR

Dimension A = $1 + 12 \times E \times 60 \times S \times F$ at 60°F for steel beams/girders

Dimension A = $1 + 12 \times E \times 40 \times S \times F$ at 60°F for concrete beams
Adjust dimension A by $12 \times E \times 20 \times S$ for each 20°F temperature change.

TOOTH EXPANSION JOINT

NOTES TO DESIGNER (cont'd):

Dimension B = TL - A

Dimension C = $0.78994 \sqrt{(TL - 4)}$ (Based on 16k wheel of 20" width placed 4" from end of tooth and 30% impact. Minimum C = 1.5")

Dimension C = $0.88318 \sqrt{(TL - 4)}$ (Based on 20k wheel of 20" width placed 4" from end of tooth and 30% impact. Minimum C = 1.5")

Dimension D = 0.2 x TL

Dimension E = $\frac{1}{8}$ " for D < 2
 $\frac{3}{16}$ " for $2 \leq D < 3$
 $\frac{1}{4}$ " for D ≥ 3

Dimension F = Use sufficient length of $\frac{3}{8}$ " fillet weld (Category E) to resist vertical wheel load and horizontal traction load with anchors at 12" spacing.

Dimension G = (CLR-3)/2

These formulas are provided for use in special design situations. Normally, the values will be obtained using the computer program for in-house design staff. The program may oversize the joint in order to provide sufficient space for the trough when the bridge is skewed. Values are rounded to fractions of an inch. See File No. BEJ-6/7/10/11/12-11 for additional program information.

14. Pay items for tooth expansion joints shall be based on tooth thickness and bid on a linear foot basis.

Tooth Expansion Joint, (tooth thickness)

L.F.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

BEJ-6: Complete Tables, Part Plan and Part Section. (Steel beams/girders)

BEJ-7: Complete Tables, Part Plan and Part Section. (Concrete beams)

BEJ-10:

PLAN AT MEDIAN BARRIER:

Modify if other than split barrier, F-shape (Standard BMB-5A) is used.

SECTION M-M:

Modify if other than split barrier, F-shape (Standard BMB-5A) is used.

TOOTH EXPANSION JOINT

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

BEJ-10: (Cont.)

PLAN AT PARAPET:

Modify if other than F-shape parapet (Standard BPB-3A or BPB-3B) is used.

SECTION N-N:

Modify if other than F-shape parapet (Standard BPB-3A or BPB-3B) is used.

PLAN AT RAISED MEDIAN:

Modify if raised median differs.

SECTION P-P:

Modify if raised median differs.

PLAN AT SIDEWALK:

Modify based on rail and terminal wall details.

SECTION R-R:

Modify if other than Standard BR27C or BR27D series steel railing is used.

BEJ-11:

PLAN AT BARRIER SEPARATED PEDESTRIAN AND / OR BICYCLE FACILITY:

Modify based on rail and terminal wall details.

SECTION T-T:

Modify if other than Standard BR27C or BR27D series steel railing is used.

PLAN AT SHOULDER WHERE BICYCLE USE IS ANTICIPATED:

Modify based on rail and terminal wall details.

SECTION V-V:

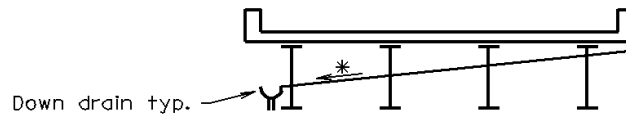
Modify if other than Standard BR27C or BR27D series steel railing is used.

STANDARD BEJ-6/7/10/11/12: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 29May2009
SHEET 9 of 11
FILE NO.
BEJ-6/7/10/11/12-9

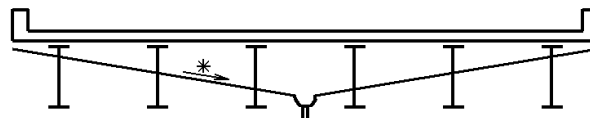
TOOTH EXPANSION JOINT

TYPICAL DETAILS:

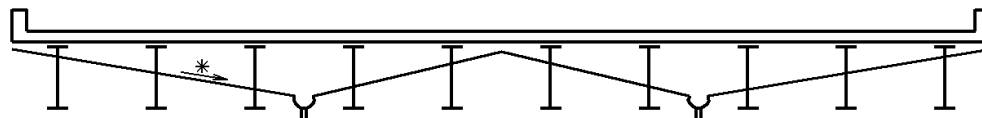


Down drain typ. →

SINGLE SLOPE



DOUBLE SLOPE



MULTIPLE SLOPES

TYPICAL TROUGH DETAILS

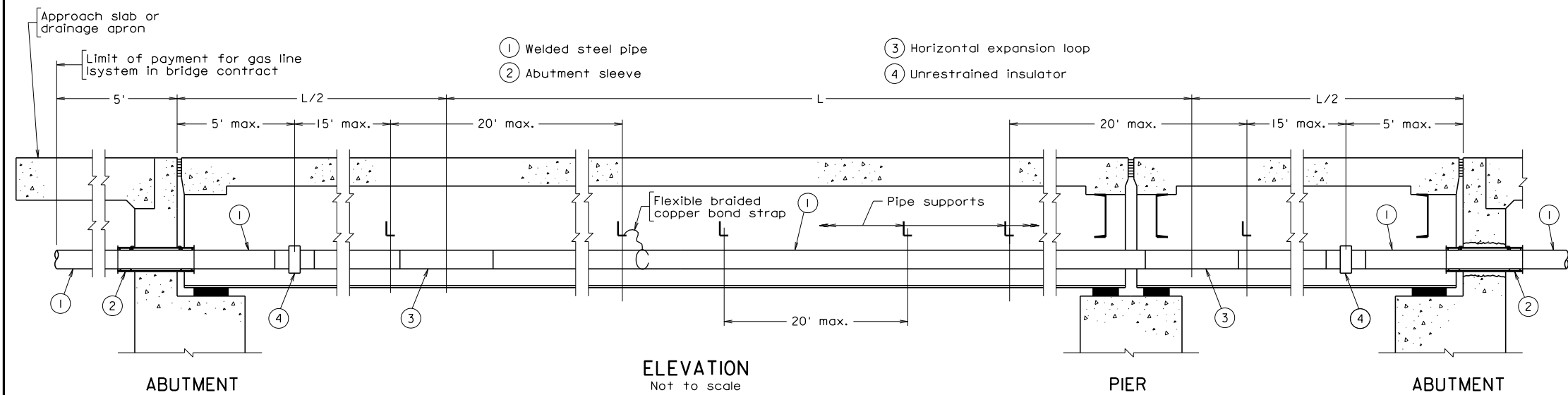
* Slope of trough to be a minimum of 1 in/ft. Make trough slope as steep as beam or girder depth will allow without using excessive down drains. Troughs should be accessible from beneath the bridge. Designer to provide details of drainage from down drain to the ground. Troughs should not hang beneath the bottom of the beams/girders. Locate trough high points between beams or girders where utilities exist.

TOOTH EXPANSION JOINT

ADDITIONAL TOOTH EXPANSION JOINT PROGRAM INFORMATION:

1. Program is run by typing TOOTHJTC and <ENTER>.
2. Input:
 - a. Project number
 - b. Description
 - c. Total expansion length (feet)
 - d. Skew angle (degrees)
 - e. (S)teel or (C)oncrete beams/girders
 - f. (1)=HS20 or (2)=HS25 Loading
 - g. Joint located at (A)butment or (P)ier
 - h. Weight data (Y)es or (N)o
 - i. (R)erun or (Q)uit
3. Output:
 - a. Project number
 - b. Description
 - c. Total expansion length (feet)
 - d. Skew angle (degrees)
 - e. Type beams
 - f. Type loading
 - g. Joint location
 - h. Trough type
 - i. Tooth length L
 - j. Dimension A and B Table
 - k. Dimension C
 - l. Dimension D
 - m. Dimension E
 - n. Dimension F
 - o. Dimension G
 - p. Approximate elastomer depth below bottom of plates
 - q. Weight data

Tooth Expansion Joint Program for use by in-house design staff only.



Notes:

Material - Seamless Steel Pipe - Welded Joint
 Specification - API 5LX
 Grade 5LX-42 (5L-35 for 4")
 Minimum Wall Thickness:
 For 6" and under - Schedule 40
 For 8" and over - Schedule 20
 Steel Casing - API 5L-B 3/8" wall thickness
 Casing pipe size - nom. pipe dia. + 4"

Structural steel for angles shall be the same as that for the beams/girders. If the beams/girders are painted, the angles shall be galvanized in accordance with ASTM A123.

If the angle is galvanized, the H.S. bolts shall be ASTM 325 galvanized. If the angle is not painted (unpainted weathering steel), the H.S. bolts shall be ASTM A325, Type 3.

Pipe Ends - Ends shall be beveled 30 degrees, protected with plastic end caps.

Fittings - Fittings for steel gas main shall conform to API Spec. 6D or ANSI B16.5, B16.9, or B16.11. Bends shall be made only with bending equipment and procedures specifically intended for that purpose. All bends shall be seamless, smooth and free from mechanical damage.

Rollers - Epoxy - Locate rollers at bottom only except at expansion joints/loops where they are required top and bottom and on each side of pipe.

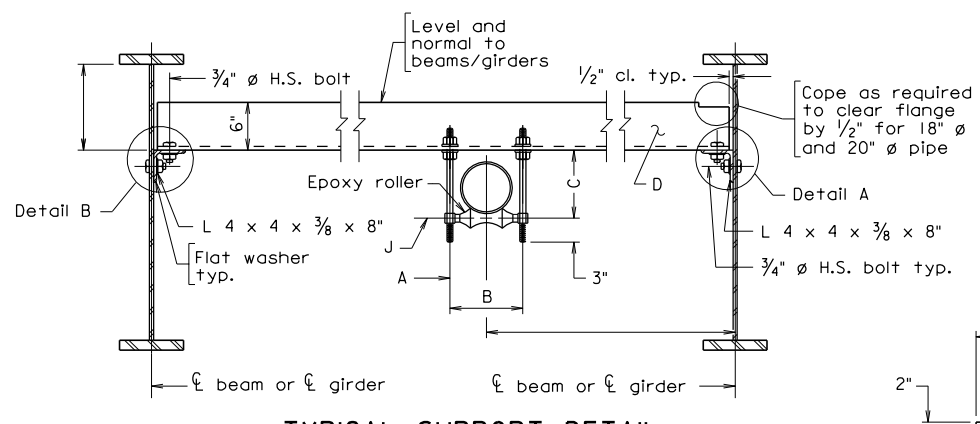
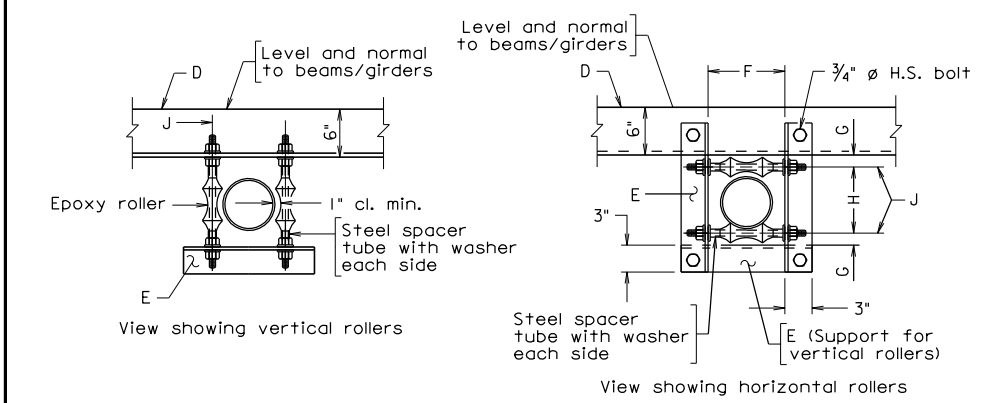
Unrestrained Insulator - Barlow insulator joint or equal.

Drips - Not required unless otherwise specified.

Cathodic Protection - Isolate bridge section from in ground section.

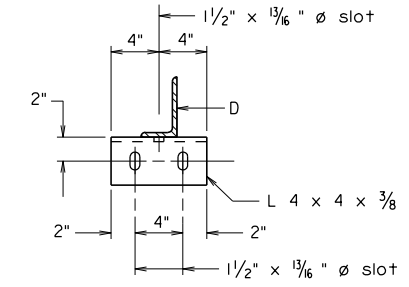
Galvanization - Miscellaneous hardware: Rods, nuts, etc. shall be galvanized in accordance with ASTM A153. When the supporting angles to which the rods are attached are weathering steel, a neoprene or vinyl washer shall be placed between the angle surface (on both sides) and the nut/washer to isolate the contact between the two surfaces.

Finish - Coatings shall be marked in compliance with U.S.D.O.T. Section 192.63. The finish shall consist of one of the following alternates:

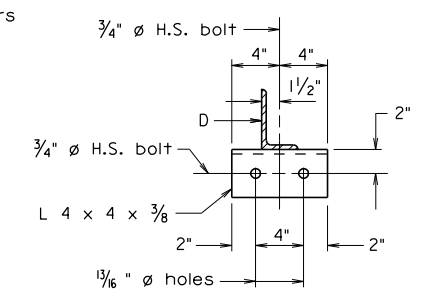


TYPICAL SUPPORT DETAIL AT EXPANSION JOINT
 Scale: 1" = 1'-0"

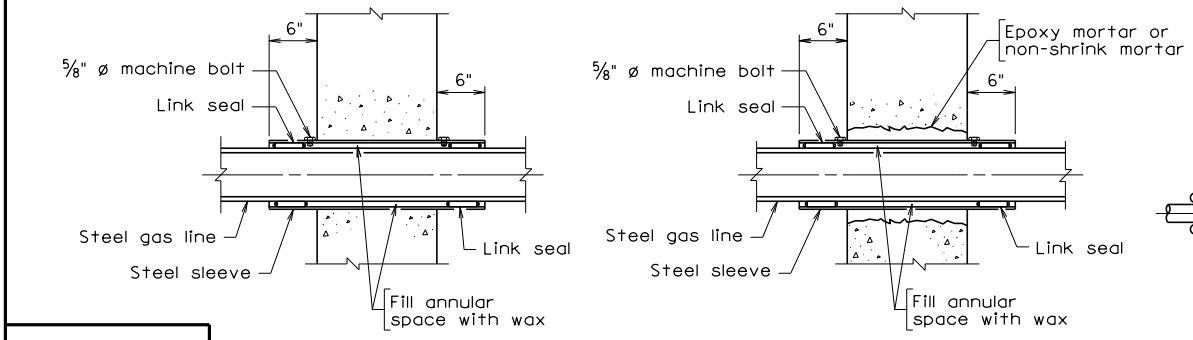
TYPICAL SUPPORT DETAIL
 Scale: 1" = 1'-0"



DETAIL A

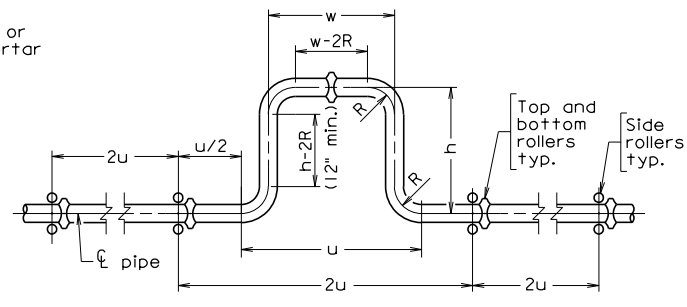


DETAIL B



NEW STRUCTURES EXISTING STRUCTURES

ABUTMENT SLEEVE DETAIL
 Scale: 1" = 1'-0"



HORIZONTAL EXPANSION LOOP
 Not to scale

DIMENSIONS									
Pipe ϕ	A	B	C	D	E	F	G	H	J
4"	5/8"	7"	6 3/4"	L 6 x 4 x 1/2	L 3 x 3 x 3/8	7"	1"	5 3/4"	1/2"
6"	3/4"	9 5/8"	9 3/4"	L 6 x 4 x 1/2	L 3 x 3 x 3/8	9 5/8"	1 1/2"	8 1/4"	3/4"
8"	7/8"	12"	12"	L 6 x 4 x 1/2	L 3 x 3 1/2 x 3/8	12"	1 1/2"	10 1/2"	7/8"
10"	7/8"	1'-2"	1'-3"	L 6 x 4 x 1/2	L 3 x 3 1/2 x 3/8	1'-2"	2"	1'-1"	7/8"
12"	7/8"	1'-4"	1'-5 1/4"	L 6 x 4 x 1/2	L 3 x 4 x 3/8	1'-4"	2 1/4"	1'-3"	1"
14"	1"	1'-5 7/8"	1'-7 1/2"	L 6 x 4 x 1/2	L 3 x 4 x 3/8	1'-5 7/8"	2 1/2"	1'-5"	1 1/8"
16"	1"	1'-8"	1'-10"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	1'-8"	3"	1'-7"	1 1/4"
18"	1 1/8"	1'-10"	2'-0"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	1'-10"	3"	1'-9"	1 1/4"
20"	1 1/4"	2'-0 3/8"	2'-2"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	2'-0 3/8"	3 1/2"	1'-10 1/2"	1 3/8"

J and A = diameter of rod

HORIZONTAL EXPANSION LOOP					
Pipe ϕ	R	w	h	u	Allow. L
4"	6"	3'-6"	3'-6"	4'-6"	120'
6"	9"	3'-6"	3'-6"	5'-0"	105'
8"	12"	3'-6"	3'-6"	5'-6"	110'
10"	1'-3"	3'-6"	3'-6"	6'-0"	100'
12"	1'-6"	4'-0"	4'-0"	7'-0"	125'
14"	1'-9"	4'-6"	4'-6"	8'-0"	150'
16"	2'-0"	5'-0"	5'-0"	9'-0"	170'

Allow. L = Expansion length per loop.
 For bridge lengths less than Allow. L, only one horizontal expansion loop will be required.

Notes (continued):

Payment - Gas Line System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price, which price shall include furnishing and installing epoxy coated steel gas line, fittings (when required), insulated joints, testing, hangers rollers, rods, abutment sleeves, link seals, and all miscellaneous hardware; all as detailed on the Gas Line System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

Testing Gas Line - Steel gas main, appurtenances and materials shall be tested for leakage after installation. Such testing shall be performed under the observation of the Owner, Contractor to give 48 hour notice prior to test. The Contractor shall provide all pumps, equipment, tools, labor, materials and incidentals necessary to perform the testing. In the event any section of main shows leakage in excess of that specified, the Contractor shall, at no additional cost to the Department, make such repairs or replacements as are required and testing shall be repeated until satisfactory results are obtained. Pressure test shall be in accordance with ANSI B31.2 with a test pressure of 125 psi. The line shall be pressured with clean, dry air and show no drop in pressure in a two hour period. Contractor shall submit to Engineer a copy of the test report.

Welding - Steel gas pipes shall be field welded and inspected in accordance with ANSI B31.2. Electrodes shall conform to the requirements of API 1104. Welded joints shall be inspected and tested as required by CFR, Title 49, Part 192. Welders shall be qualified for pipeline welding. The Contractor shall submit the welder's qualifications for approval by the Engineer and the utility owner. Welders will be required to weld to the utility owner's specification prior to being approved unless otherwise waived by the Engineer.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
GAS LINE SYSTEM					
G. Henderson					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BGL-1
			Checked: S&B, DIV		
Revisions					

BGL-1.dgn 08-07-2012 BGL-1

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

GAS LINE SYSTEM
STEEL BEAM/GIRDER SPANS

NOTES TO DESIGNER:

Standard is to be used with steel beam/girder spans. Maximum beam/girder spacing is limited to 10'-0".

To the extent possible, gas lines shall be placed in the exterior bays of the bridge.

Values in tables on the standard sheet are a composite from several manufacturers/suppliers.

Indicate location and size (diameter) of gas line to be used on the transverse section sheet. Indicate dimension from the bottom of top flange to bottom of angle support at the beam/girder. Indicate dimension from centerline of pipe to centerline of beam/girder. These dimensions must agree with those set on the transverse section sheet. Designer must consider the horizontal expansion loop when setting this dimension. Indicate location of gas line on framing plan. Show centerline and indicate size (diameter) of gas line. Do not show hanger spacing on framing plan.

Utilities Section (R/W) will provide the following information: Size of pipe.

For beam/girder design, the following weights may be used (includes total weight of hangers and pipe). Linear interpolation may be used for actual beam/girder spacing.

Diameter of Pipe (inches)	Weight of Gas Line (lbs./ft.)	
	Beam/Girder Spacing	
	6'-0"	10'-0"
4	19	24
6	25	29
8	41	46
10	50	54
12	58	62
14	63	68
16	73	78
18	81	87
20	90	95

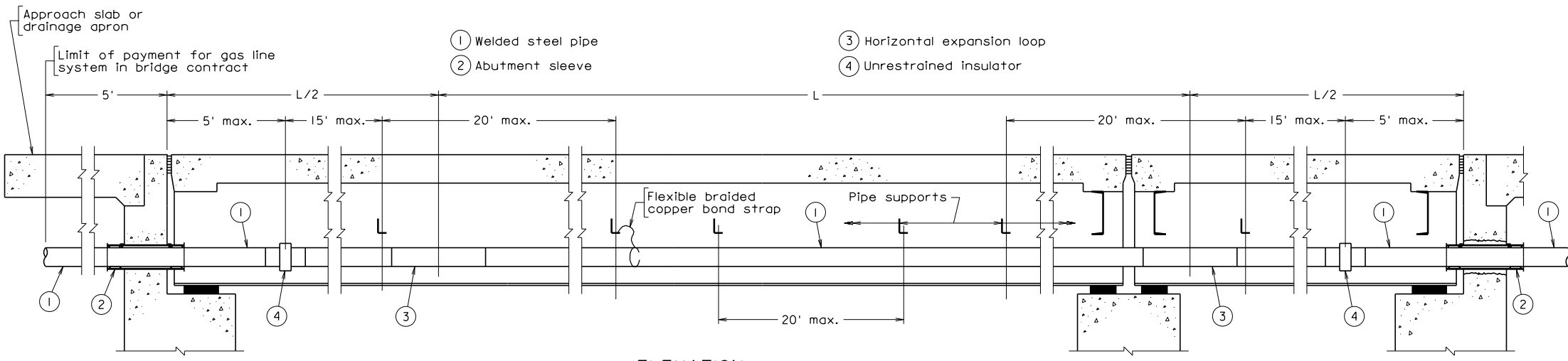
When designing beam/girder, the depth of the beam/girder must be sufficient to insure that the gas line supports at expansion details do not project below the bottom flange.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SUPPORT DETAIL AT EXPANSION JOINT:

Indicate dimension from bottom of top flange (top of web) to bottom of angle support (angle D in Table). Indicate dimension from centerline of pipe to centerline of beam/girder. These dimensions must agree with those set on transverse section sheet.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ELEVATION
Not to scale

Notes:

Material - Seamless Steel Pipe - Welded Joint
Specification - API 5LX
Grade 5LX-42 (5L-35 for 4")
Minimum Wall Thickness:
For 6" and under - Schedule 40
For 8" and over - Schedule 20
Steel Casing - API 5L-B 3/8" wall thickness
Casing pipe size - nom. pipe dia. + 4"

Structural steel for angles shall be ASTM A36. The angles shall be galvanized in accordance with ASTM A123.

H.S. bolts for angles shall be ASTM 325 galvanized.

Pipe Ends - Ends shall be beveled 30 degrees, protected with plastic end caps.

Fittings - Fittings for steel gas main shall conform to API Spec. 6D or ANSI B16.5, B16.9, or B16.11. Bends shall be made only with bending equipment and procedures specifically intended for that purpose. All bends shall be seamless, smooth and free from mechanical damage.

Rollers - Epoxy - Locate rollers at bottom only except at expansion joints/loops where they are required top and bottom and on each side of pipe.

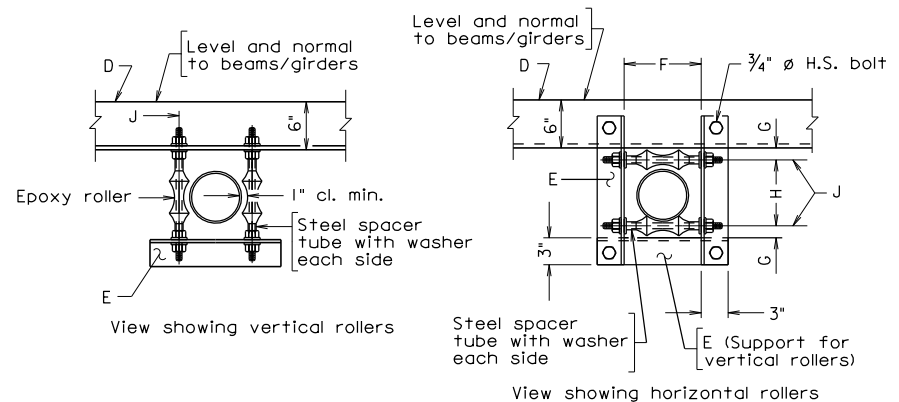
Unrestrained Insulator - Barlow insulator joint or equal.

Drips - Not required unless otherwise specified.

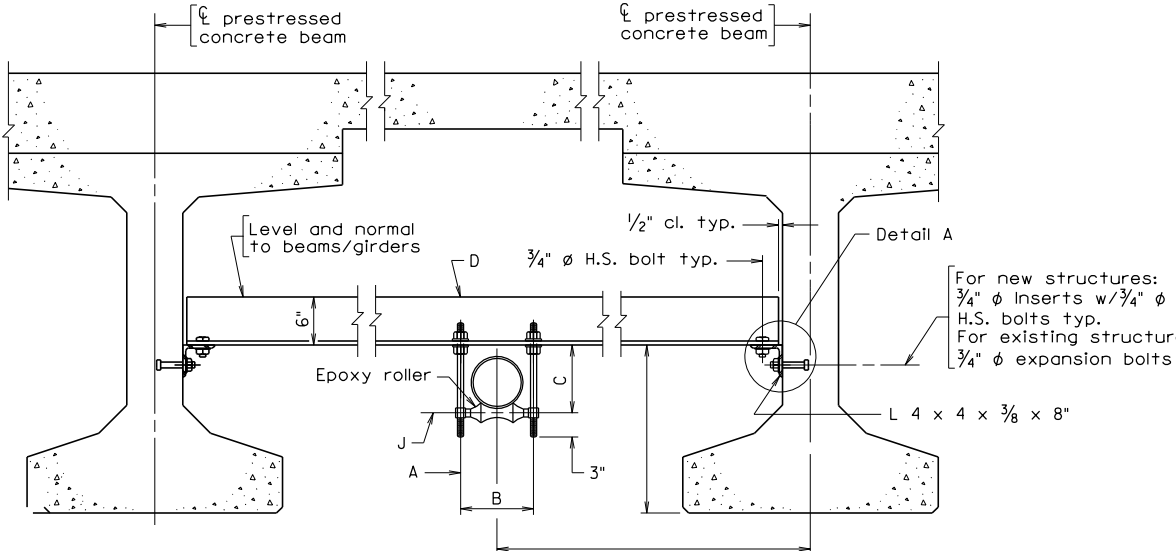
Cathodic Protection - Isolate bridge section from in ground section.

Galvanization - Miscellaneous hardware: Rods, nuts, etc. shall be galvanized in accordance with ASTM A153.

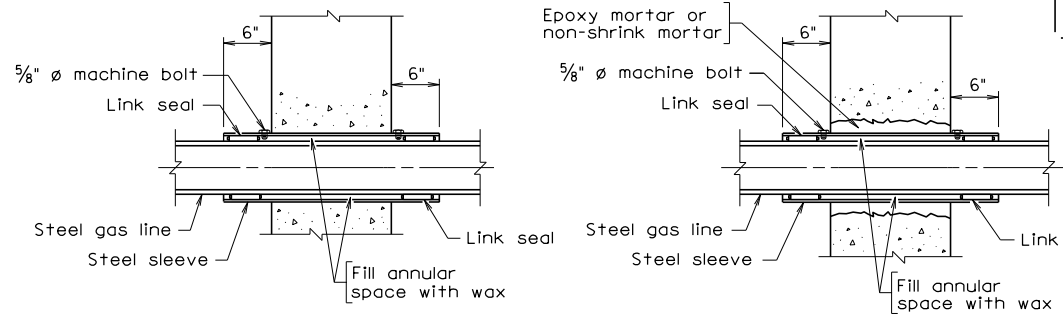
Finish - Coatings shall be marked in compliance with U.S.D.O.T. Section 192.63. The finish shall consist of one of the following alternates:



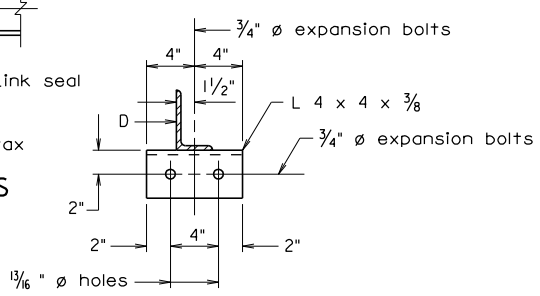
TYPICAL SUPPORT DETAIL AT EXPANSION JOINT
Scale: 1" = 1'-0"



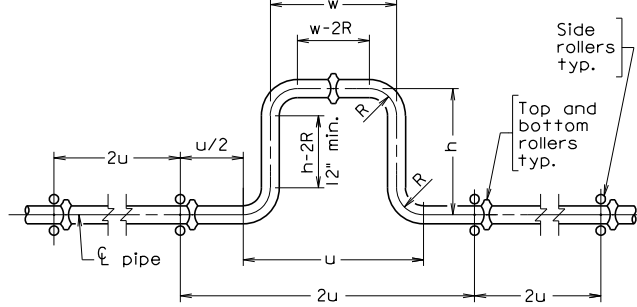
TYPICAL SUPPORT DETAIL
Scale: 1" = 1'-0"



NEW STRUCTURES
EXISTING STRUCTURES
ABUTMENT SLEEVE DETAIL
Scale: 1" = 1'-0"



DETAIL A
Scale: 1 1/2" = 1'-0"



HORIZONTAL EXPANSION LOOP
Scale: 3/8" = 1'-0"

DIMENSIONS									
Pipe ϕ	A	B	C	D	E	F	G	H	J
4"	5/8"	7"	6 3/4"	L 6 x 4 x 1/2	L 3 x 3 x 3/8	7"	1"	5 3/4"	1/2"
6"	3/4"	9 5/8"	9 3/4"	L 6 x 4 x 1/2	L 3 x 3 x 3/8	9 5/8"	1 1/2"	8 1/4"	3/4"
8"	7/8"	12"	12"	L 6 x 4 x 1/2	L 3 x 3 1/2 x 3/8	12"	1 1/2"	10 1/2"	7/8"
10"	7/8"	1'-2"	1'-3"	L 6 x 4 x 1/2	L 3 x 3 1/2 x 3/8	1'-2"	2"	1'-1"	7/8"
12"	7/8"	1'-4"	1'-5 1/4"	L 6 x 4 x 1/2	L 3 x 4 x 3/8	1'-4"	2 1/4"	1'-3"	1"
14"	1"	1'-5 7/8"	1'-7 1/2"	L 6 x 4 x 1/2	L 3 x 4 x 3/8	1'-5 7/8"	2 1/2"	1'-5"	1 1/8"
16"	1"	1'-8"	1'-10"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	1'-8"	3"	1'-7"	1 1/4"
18"	1 1/8"	1'-10"	2'-0"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	1'-10"	3"	1'-9"	1 1/4"
20"	1 1/4"	2'-0 3/8"	2'-2"	L 6 x 6 x 1/2	L 3 x 5 x 3/8	2'-0 3/8"	3 1/2"	1'-10 1/2"	1 3/8"

HORIZONTAL EXPANSION LOOP					
Pipe ϕ	R	w	h	u	Allow. L
4"	6"	3'-6"	3'-6"	4'-6"	120'
6"	9"	3'-6"	3'-6"	5'-0"	105'
8"	12"	3'-6"	3'-6"	5'-6"	110'
10"	1'-3"	3'-6"	3'-6"	6'-0"	100'
12"	1'-6"	4'-0"	4'-0"	7'-0"	125'
14"	1'-9"	4'-6"	4'-6"	8'-0"	150'
16"	2'-0"	5'-0"	5'-0"	9'-0"	170'

Allow. L = Expansion length per loop.
For bridge lengths less than Allow. L, only one horizontal expansion loop will be required.

1. Coating with Tramec system or equal consisting of three coats: zinc rich primer, polyamide epoxy, and aliphatic polyurethane. Welded joints shall be treated with a similar process.

2. Coating with Plexco Extruded Polyolefin, Pritec or Scotchkote 205 Fusion Bonded Epoxy meeting NAPCA-TGF-3 specifications. Plastic tape (cold applied, Tapecoat 7, Polyken # 932 or approved equal) shall be field applied to pipe joints and damaged areas of coatings. The joint area to be taped shall be clean and free of burrs and rust. Damaged coating shall be smoothed down or cut away if not firmly bonded to the pipe. Wrap spirally with a two-layer wrapping system, overlapping the coating surface at least 3 inches. The tape shall be initially stretched sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 2 inches or less in width, or one layer lapped at least one inch for tape more than 2 inches wide. A second layer lapped as above with a tenison as it comes off the roll shall then be applied and pressed to conform to the shape of the component.

Testing Gas Line - Steel gas main, appurtenances and materials shall be tested for leakage after installation. Such testing shall be performed under the observation of the Owner. Contractor to give 48 hour notice prior to test. The Contractor shall provide all plugs, equipment, tools, labor, materials and incidentals necessary to perform the testing. In the event any section of main shows leakage in excess of that specified, the Contractor shall, at no additional cost to the Department, make sure repairs or replacements as are required and testing shall be repeated until satisfactory results are obtained. Pressure test shall be in accordance with ANSI B31.2 with a test pressure of 125 psi. The line shall be pressured with clean, dry air and show no drop in pressure in a two hour period. Contractor shall submit to Engineer a copy of the test report.

Welding - Steel gas pipes shall be field welded and inspected in accordance with ANSI B31.2. Electrodes shall conform to the requirements of API 1104. Welded joints shall be inspected and tested as required by CFR, Title 49, Part 192. Welders shall be qualified for pipeline welding. The Contractor shall submit the welder's qualifications for approval by the Engineer and the utility owner. Welders will be required to weld to the utility owner's specifications prior to being approved unless otherwise waived by the Engineer.

Payment - Gas Line System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price, which price shall include furnishing and installing epoxy coated steel gas line, fittings (when required), insulated joints, taping, hangers, rollers, rods, abutment sleeves, link seals, and all miscellaneous hardware; all as detailed on the Gas Line System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

BGL-2.dgn
08-07-2012
BGL-2

Sealed and Signed by:
Julius F.J. Voloyt, Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
GAS LINE SYSTEM					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BGL-2
			Checked: S&B, DIV		
Revisions					

GAS LINE SYSTEM
CONCRETE BEAM SPANS

NOTES TO DESIGNER:

Standard is to be used with concrete beam/girder spans. Maximum beam/girder spacing is limited to 10'-0".

To the extent possible, gas lines shall be placed in the exterior bays of the bridge.

Values in tables on the standard sheet are a composite from several manufacturers/suppliers.

Indicate location and size (diameter) of gas line to be used on the transverse section sheet. Indicate dimension from the bottom of top flange to bottom of angle support at the beam/girder. Indicate dimension from centerline of pipe to centerline of beam/girder. These dimensions must agree with those set on the transverse section sheet. Designer must consider the horizontal expansion loop when setting this dimension. Indicate location of gas line on framing plan. Show centerline and indicate size (diameter) of gas line. Do not show hanger spacing on framing plan.

Utilities Section (R/W) will provide the following information: Size of pipe.

For beam/girder design, the following weights may be used (includes total weight of hangers and pipe). Linear interpolation may be used for actual beam/girder spacing.

Diameter of Pipe (inches)	Weight of Gas Line (lbs./ft.)	
	Beam/Girder Spacing	
	6'-0"	10'-0"
4	29	33
6	34	38
8	50	54
10	58	62
12	65	69
14	70	74
16	79	84
18	86	92
20	94	100

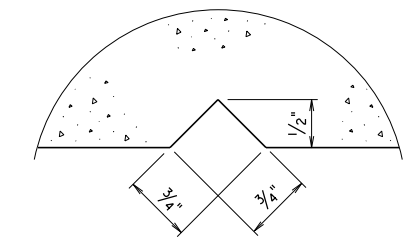
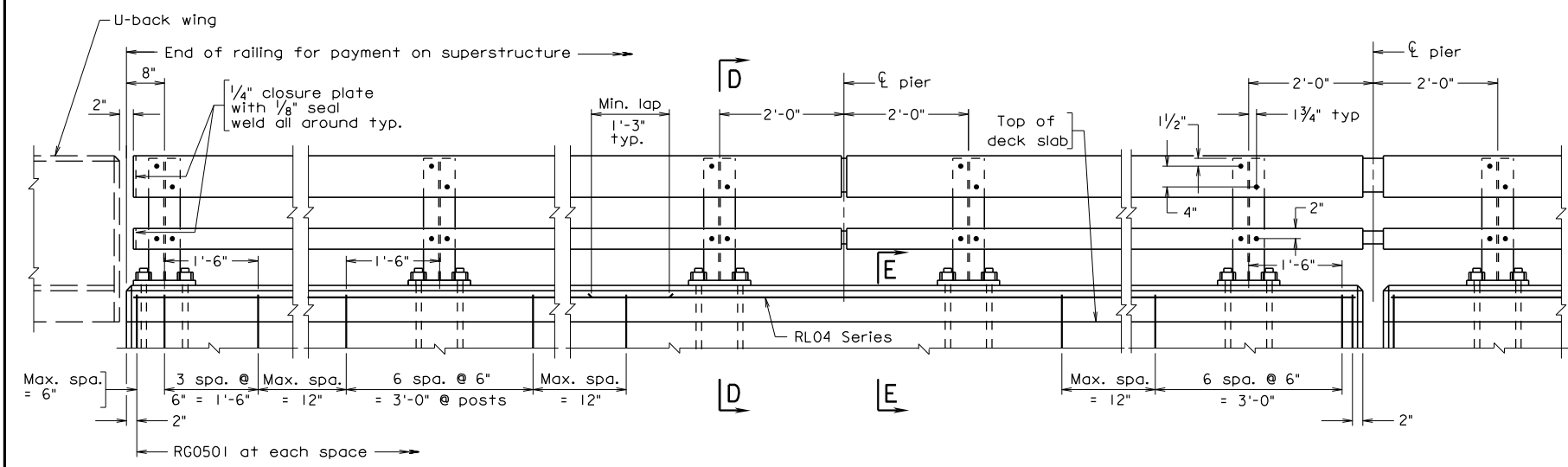
When designing beam/girder, the depth of the beam/girder must be sufficient to insure that the gas line supports at expansion details do not project below the bottom flange.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SUPPORT DETAIL AT EXPANSION JOINT:

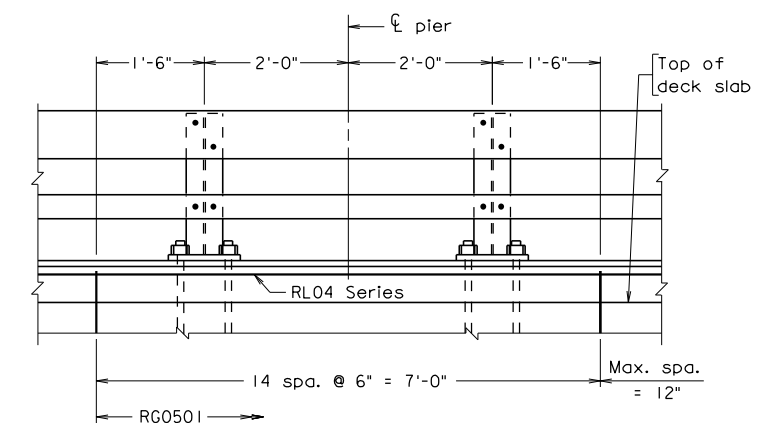
Indicate dimension from bottom of top flange (top of web) to bottom of angle support (angle D in Table). Indicate dimension from centerline of pipe to centerline of beam/girder. These dimensions must agree with those set on transverse section sheet.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



SECTION F-F
Full scale
Groove detail for
both sides of parapet

For notes and miscellaneous details, see sheet ...

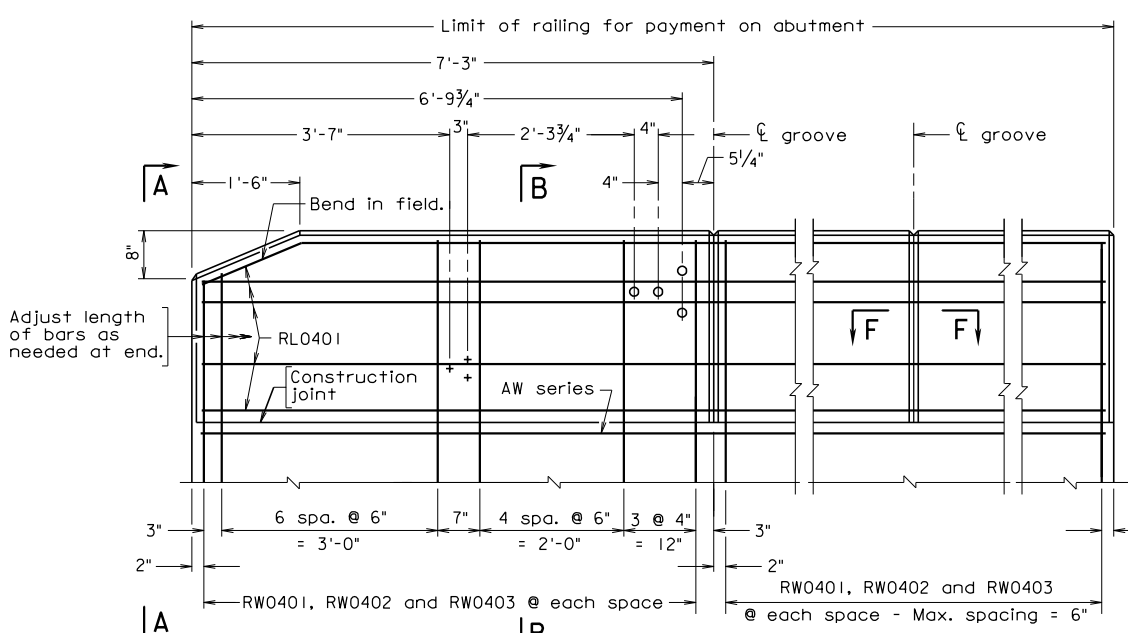


PIERS
Continuous - without joint in slab

ABUTMENTS

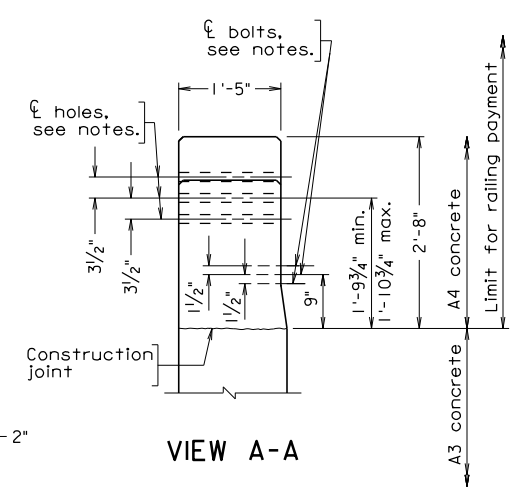
ELEVATION

PIERS
with joint in slab

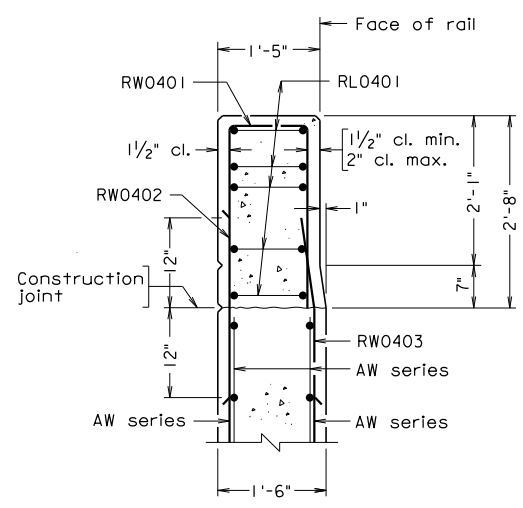


TERMINAL WALL

U-BACK WING



VIEW A-A

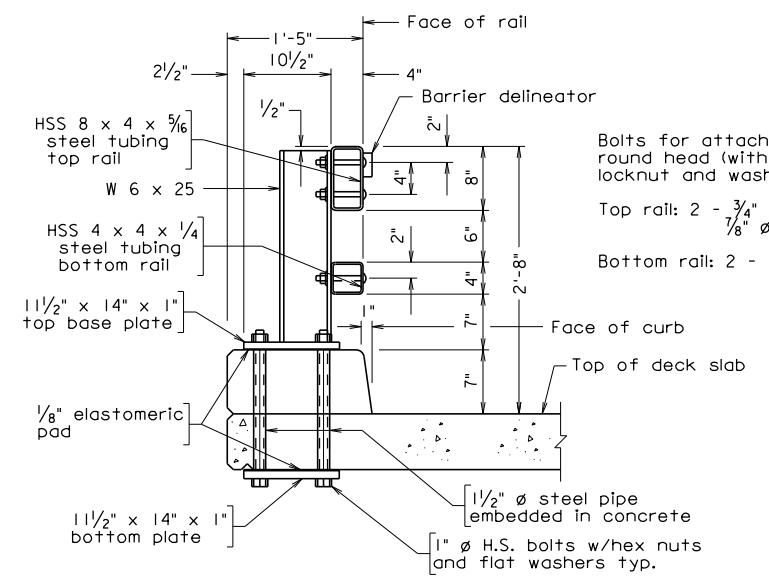


SECTION B-B

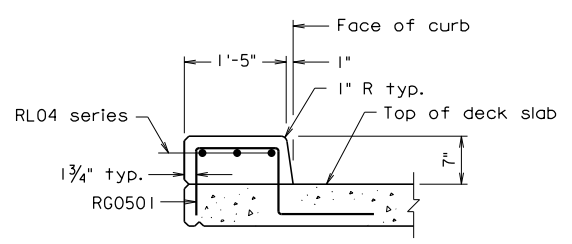
REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
RG0501		#5	3 3/4"		Curb
RW0401		#4	3"	6'-0"	Terminal wall and wing
RW0402		#4	—	2'-0"	Terminal wall and wing
RW0403		#4	3"	2'-0"	Terminal wall and wing
RL0401		#4	—		Terminal wall and wing
RL04		#4	—		Curb

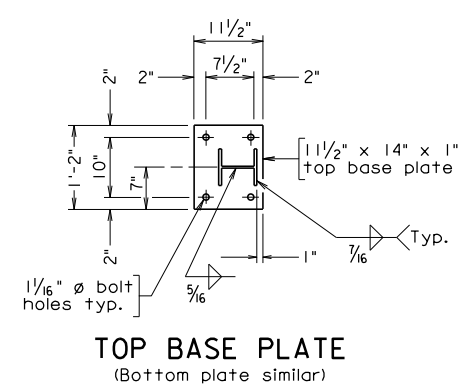
Dimensions in bending diagram are out-to-out of bars.



SECTION D-D
Not to scale



SECTION E-E



TOP BASE PLATE
(Bottom plate similar)

bir1.dgn

08-30-2013

BIR-1

Sealed and Signed by:
Julius F.J. Volzyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Bolts for attaching rails to post are round head (with slot in head) with locknut and washer.
Top rail: 2 - 3/4" ϕ x 6" bolts with 1/8" ϕ holes in post and tubing
Bottom rail: 2 - 1/2" ϕ x 6" bolts with 5/8" ϕ holes in post and tubing

Scale: 3/4" = 1'-0" unless otherwise shown.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ILLINOIS STEEL RAILING					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BIR-1
			Checked: S&B, DIV		
Revisions					

ILLINOIS STEEL RAILING

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The Illinois steel railing has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). The standard has a curb section. This rail is for use as a traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

Standard BIR-3 (miscellaneous details) must be included in plans when using this standard.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 7" curb dimension and the overall 2'-8" height of the rail would need to be adjusted to 8" and 2'-9" respectively. In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1"

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

Modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimension (7" break and 2'-8" railing height) as noted above if an initial overlay is used on bridge

SECTION D-D:

Modify vertical dimensions (7" curb and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

TITLE BLOCK:

Replace standard designation with plan number.

ILLINOIS STEEL RAILING
TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION E-E:

Modify vertical dimension (7" curb) as noted above if an initial overlay is used on bridge.

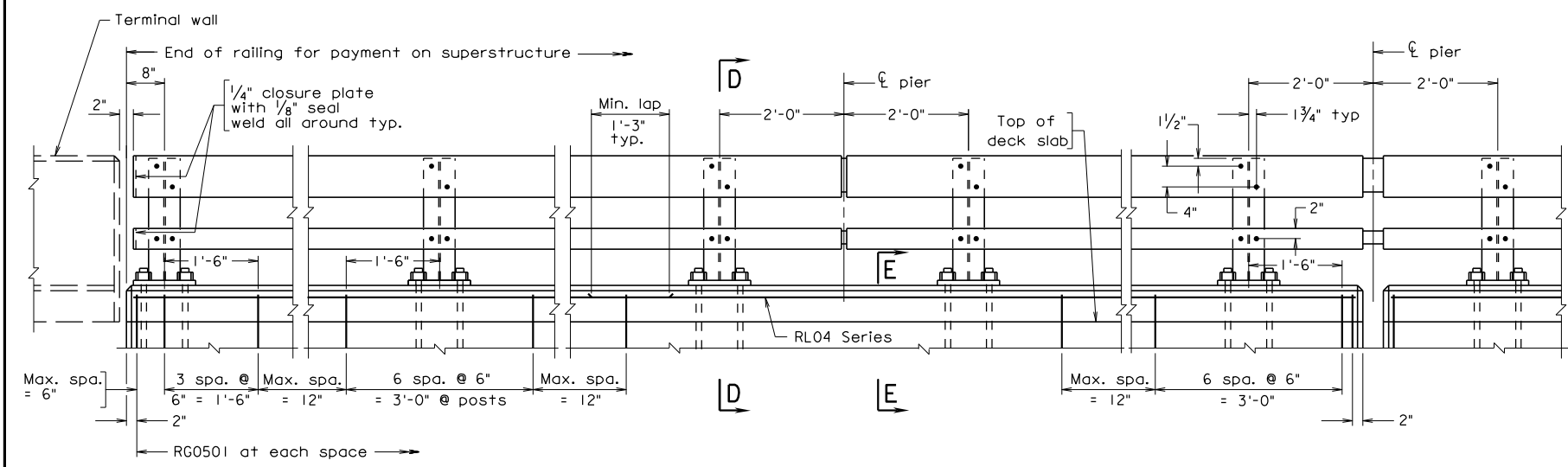
REINFORCING STEEL SCHEDULE:

Modify bars if an initial overlay is used on bridge.

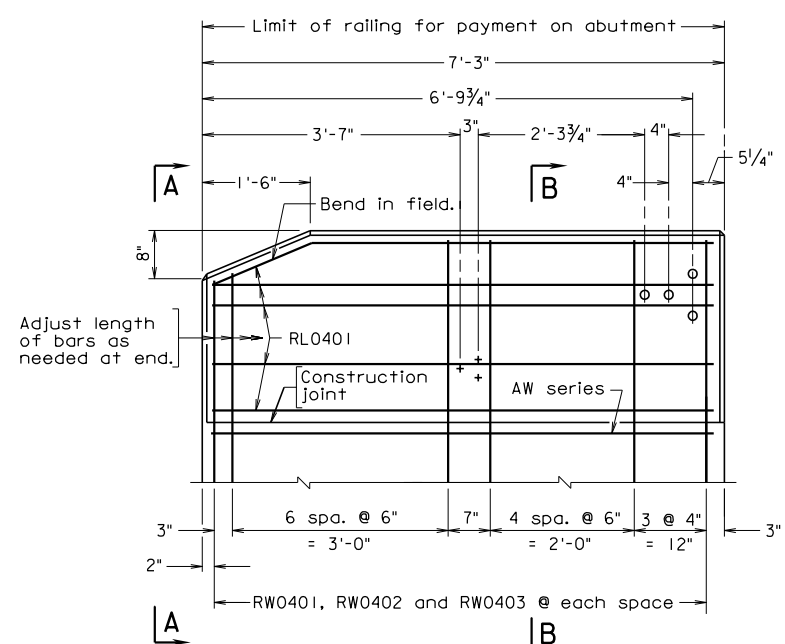
Complete dimension and length for rebar RG0501.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

For notes and miscellaneous details, see sheet ...

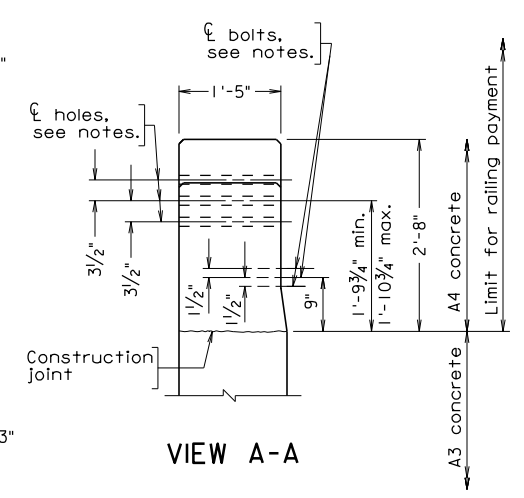


ABUTMENTS



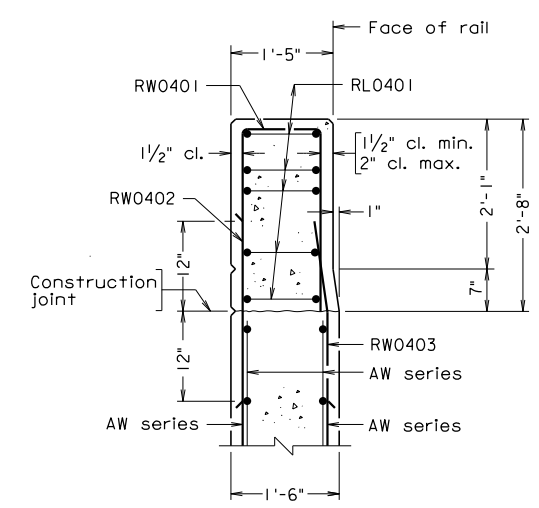
TERMINAL WALL

ELEVATION

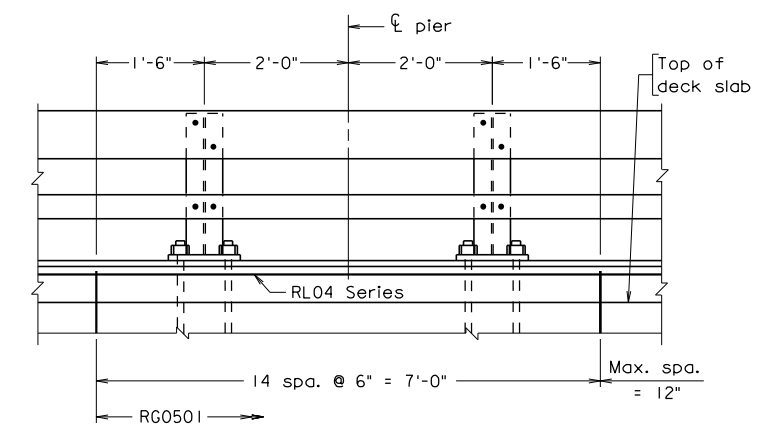


VIEW A-A

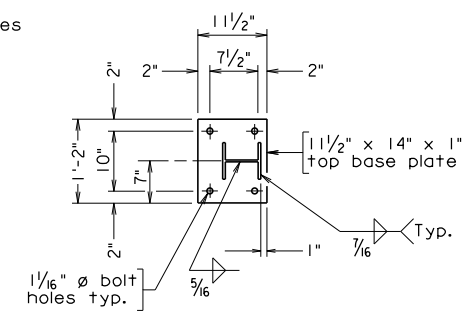
PIERS with joint in slab



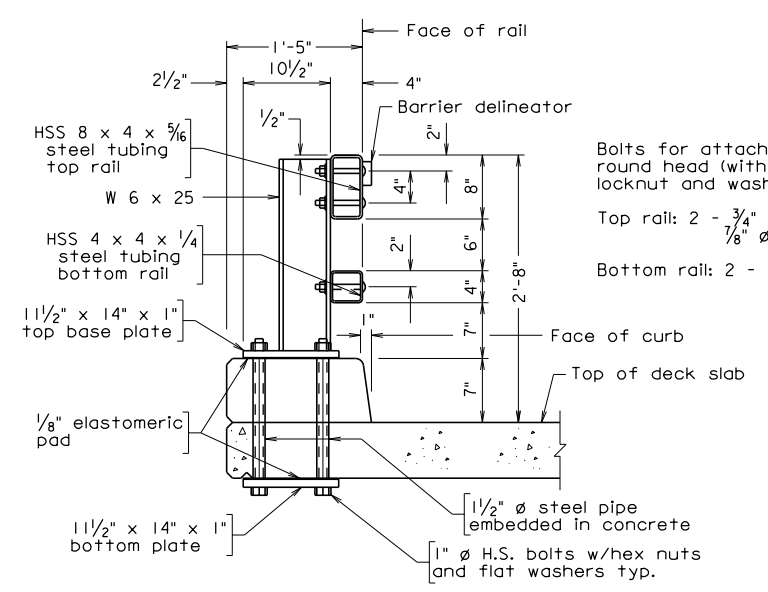
SECTION B-B



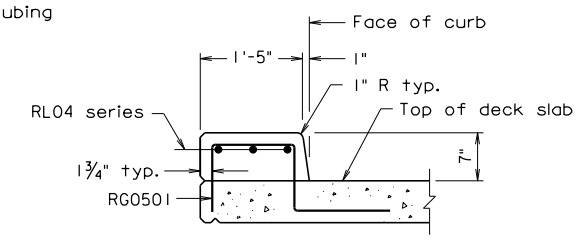
PIERS Continuous - without joint in slab



TOP BASE PLATE (Bottom plate similar)



SECTION D-D Not to scale



SECTION E-E

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RG0501		#5	3 3/4"		Curb
RW0401		#4	3"	6'-0"	Terminal wall
RW0402		#4	—	2'-0"	Terminal wall
RW0403		#4	3"	2'-0"	Terminal wall
RL0401		#4	—	6'-11"	Terminal wall
RL04		#4	—		Curb

Dimensions in bending diagram are out-to-out of bars.

bir2.dgn

08-30-2013

BIR-2

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Bolts for attaching rails to post are round head (with slot in head) with locknut and washer.
Top rail: 2 - 3/4" ϕ x 6" bolts with 3/8" ϕ holes in post and tubing
Bottom rail: 2 - 1/2" ϕ x 6" bolts with 5/8" ϕ holes in post and tubing

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
ILLINOIS STEEL RAILING					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		BIR-2
			Checked: S&B...DIV		
Revisions					

ILLINOIS STEEL RAILING

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The Illinois steel railing has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). The standard has a curb section. This rail is for use as a traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

Standard BIR-3 (miscellaneous details) must be included in plans when using this standard.

Terminal wall is detailed on abutment wingwall.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 7" curb dimension and the overall 2'-8" height of the rail would need to be adjusted to 8" and 2'-9" respectively. In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1"

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

Modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimension (7" break and 2'-8" railing height) as noted above if an initial overlay is used on bridge

SECTION D-D:

Modify vertical dimensions (7" curb and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

TITLE BLOCK:

Replace standard designation with plan number.

ILLINOIS STEEL RAILING
TERMINAL WALL ON ABUTMENT WINGWALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION E-E:

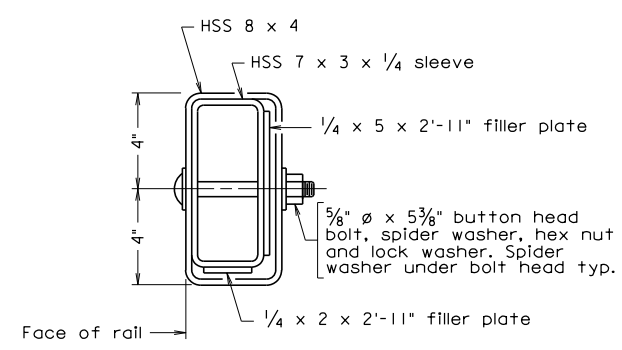
Modify vertical dimension (7" curb) as noted above if an initial overlay is used on bridge.

REINFORCING STEEL SCHEDULE:

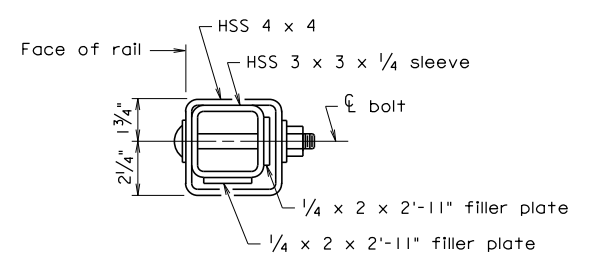
Modify bars if an initial overlay is used on bridge.

Complete dimension and length for rebar RG0501.

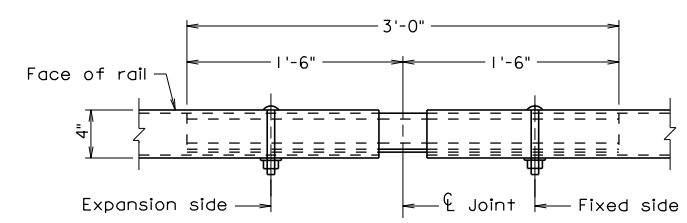
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



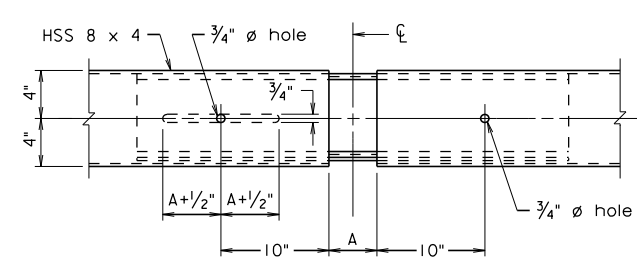
TOP RAIL



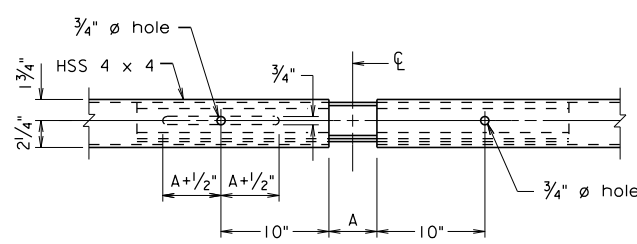
BOTTOM RAIL
END VIEW RAIL



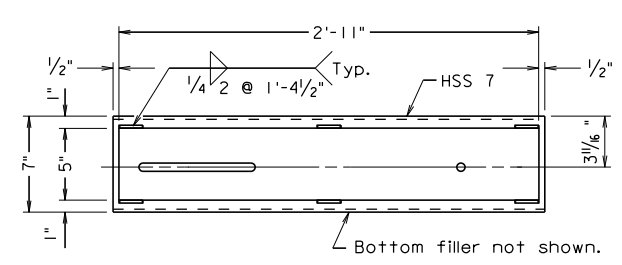
TOP VIEW FOR TOP AND BOTTOM RAILS



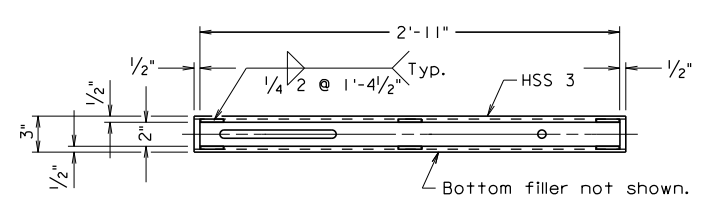
SIDE VIEW TOP RAIL



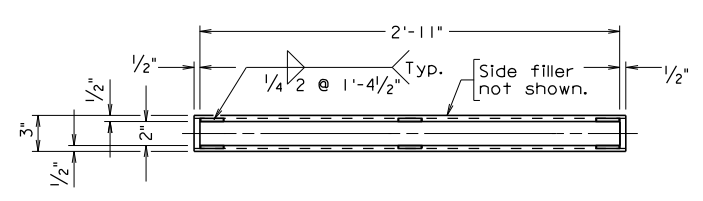
SIDE VIEW BOTTOM RAIL
EXPANSION/SPLICE JOINT DETAILS



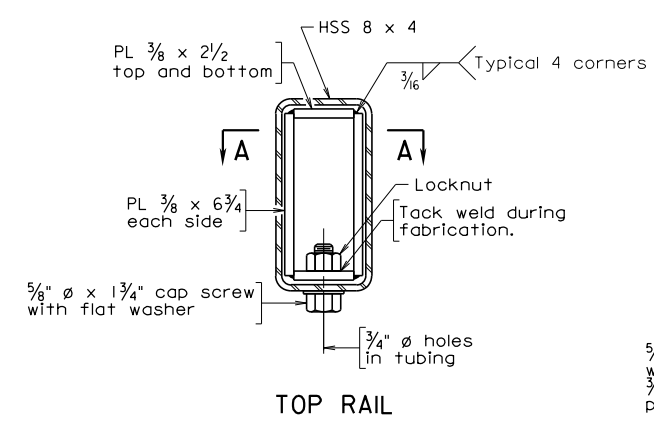
SIDE VIEW FILLER PLATE FOR 7" SLEEVE



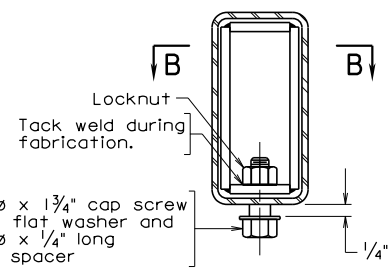
SIDE VIEW FILLER PLATE FOR 3" SLEEVE



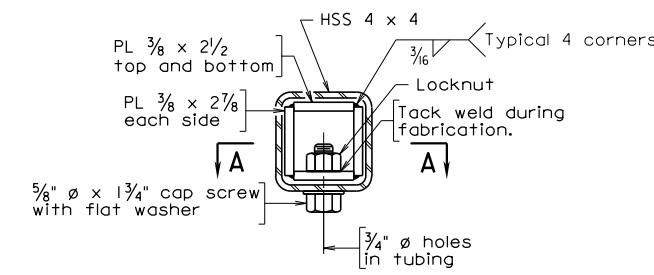
BOTTOM VIEW FILLER PLATE FOR 7" AND 3" SLEEVE
WELDED FILLER PLATE DETAILS



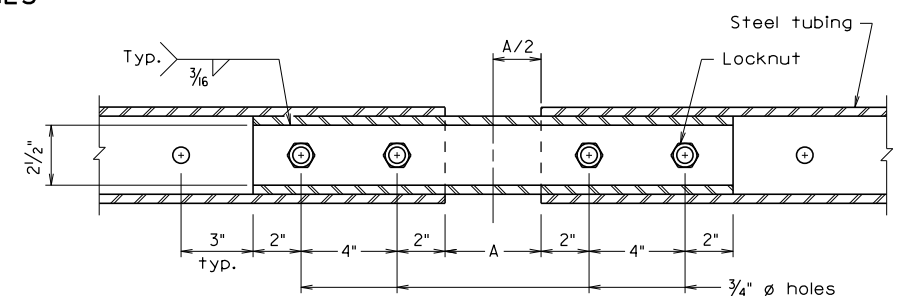
TOP RAIL



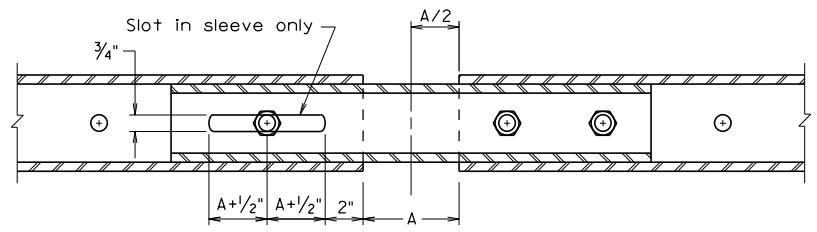
RAIL SPLICE CONNECTION
AT EXPANSION JOINT



BOTTOM RAIL
SECTION AT RAIL SPLICE



SECTION A-A



SECTION B-B

For details and dimensions not shown, see Section A-A.

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule, see sheet

Posts and plates shall be ASTM A36 steel. Rail members shall be ASTM A500 Grade B steel. Steel pipe sleeves shall be ASTM A53

Bolts for attaching rails to posts are round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 6'-0". Minimum spacing is 4'-0"

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing. Dimension A for splice joint = 1".

Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be tightened only to a point that will allow railing movement.

Drain holes shall be 1/2" diameter and shall be provided both in top and bottom rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each low end of rail.

Anchor bolts may be set normal to profile grade but may require beveled washers.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Spacing of grooves for U-back wings shall be approximately 8'-0". Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing schedule.

bir-3.dgn

08-30-2013

BIR-3

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ILLINOIS STEEL RAILING MISCELLANEOUS DETAILS					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BIR-3
			Checked: S&B...DIV		
Revisions					

Not to scale

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ALTERNATE EXPANSION/SPLICE JOINT DETAILS

**ILLINOIS STEEL RAILING
MISCELLANEOUS DETAILS**

NOTES TO DESIGNER:

Include this standard when using standard BIR-1 or BIR-2.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

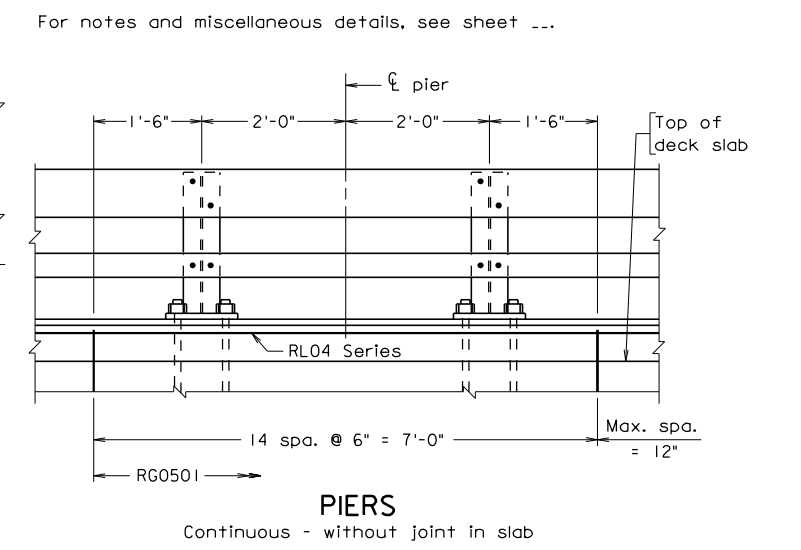
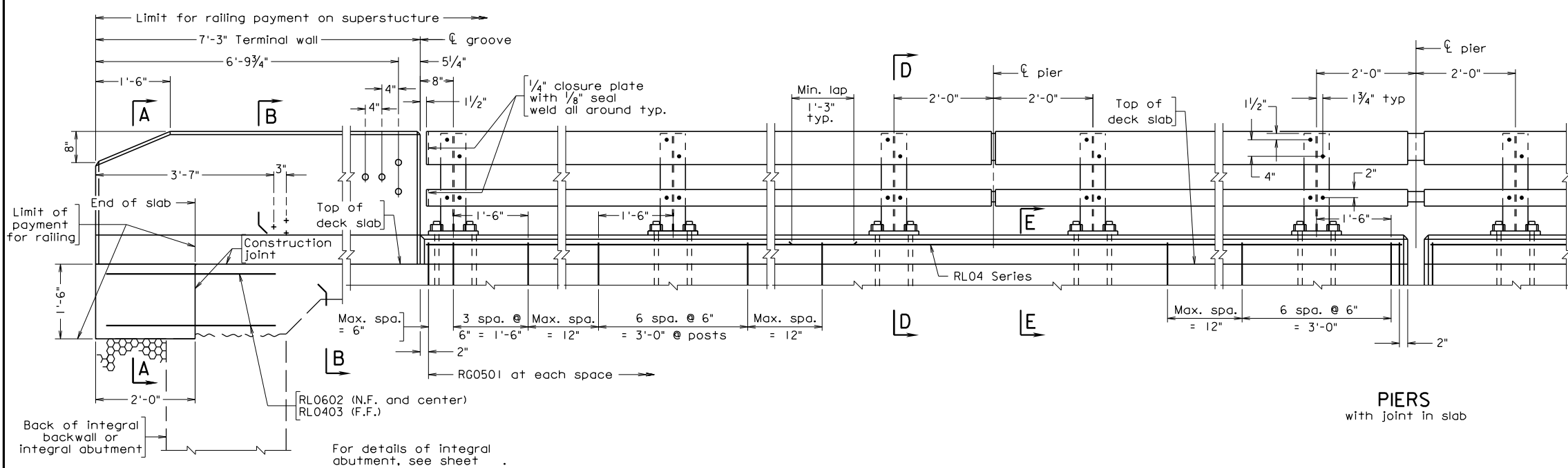
NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

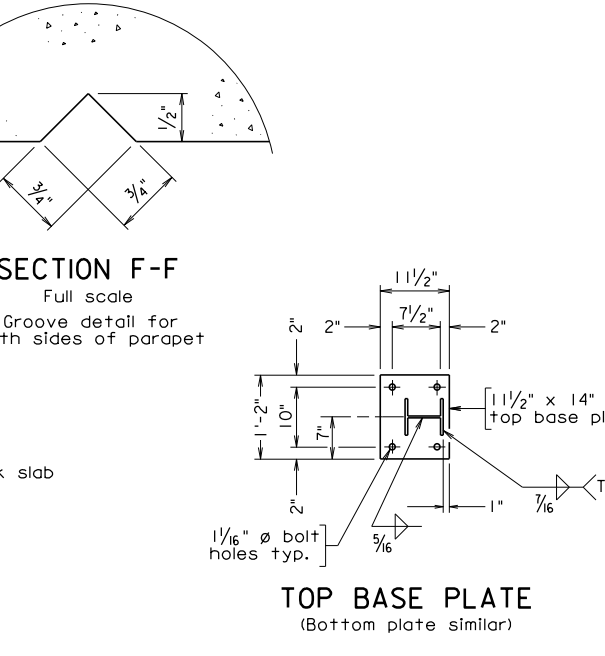
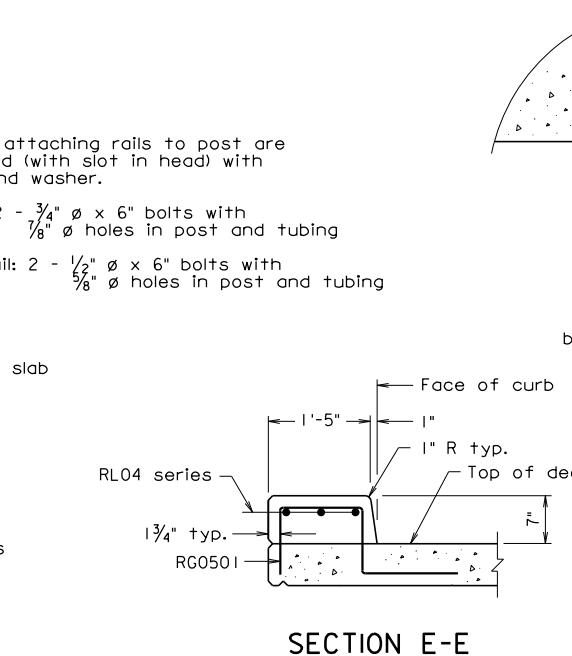
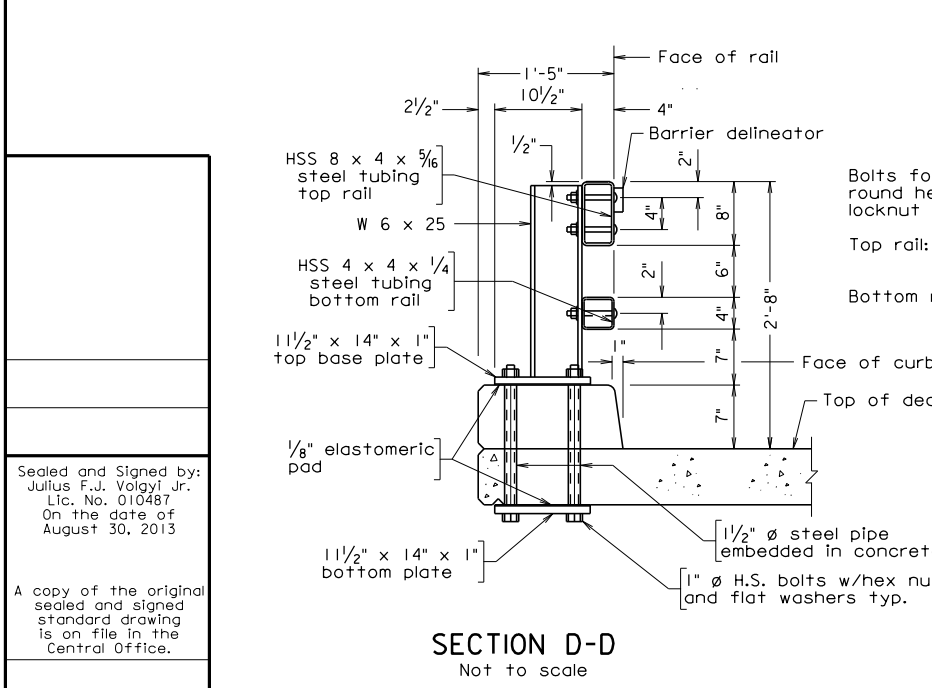
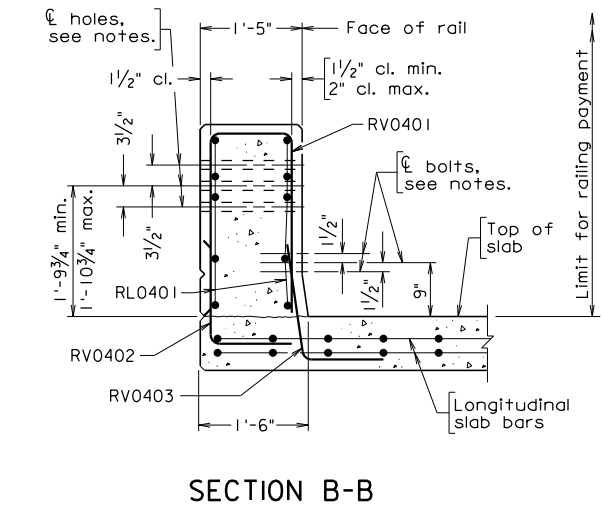
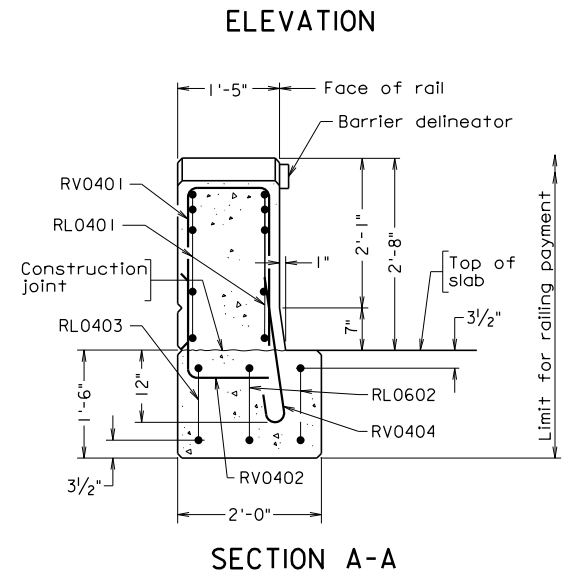
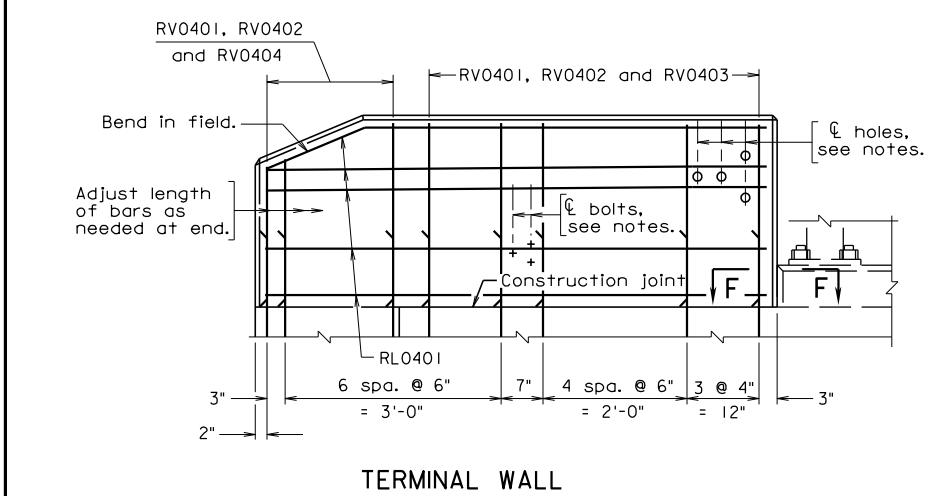
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



SEMI-INTEGRAL OR FULL INTEGRAL ABUTMENT



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RG0501		#5	3 3/4"		Curb
RV0401		#4	3"	6'-0"	Terminal wall
RV0402		#4	3"	2'-2"	Terminal wall, deck slab and terminal wall end support
RV0403		#4	3"	2'-4"	Terminal wall and deck slab
RV0404		#4	3"	2'-6"	Terminal wall and terminal wall end support
RL0401		#4		6'-11"	Terminal wall
RL0602		#6		4'-0"	Terminal wall end support
RL0403		#4		4'-0"	Terminal wall end support
RL04		#4			Curb

Dimensions in bending diagram are out-to-out of bars.

08-30-2013

BIR-4

Sealed and Signed by:
Julius F.J. Volzyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION				
STRUCTURE AND BRIDGE DIVISION				
ILLINOIS STEEL RAILING				
No.	Description	Date	Designed: S&B...DIV	Plan No.
			Drawn: ...S&B...DIV	BIR-4
			Checked: S&B...DIV	
Revisions				Sheet No.

ILLINOIS STEEL RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The Illinois steel railing has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). The standard has a curb section. This rail is for use as a traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

Standard BIR-3 (miscellaneous details) must be included in plans when using this standard.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 7" curb dimension and the overall 2'-8" height of the rail would need to be adjusted to 8" and 2'-9" respectively. In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1"

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (7" break and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations as noted above if an initial overlay is used on bridge

TITLE BLOCK:

Replace standard designation with plan number.

ILLINOIS STEEL RAILING

**TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION D-D:

Modify vertical dimensions (7" curb and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

SECTION E-E:

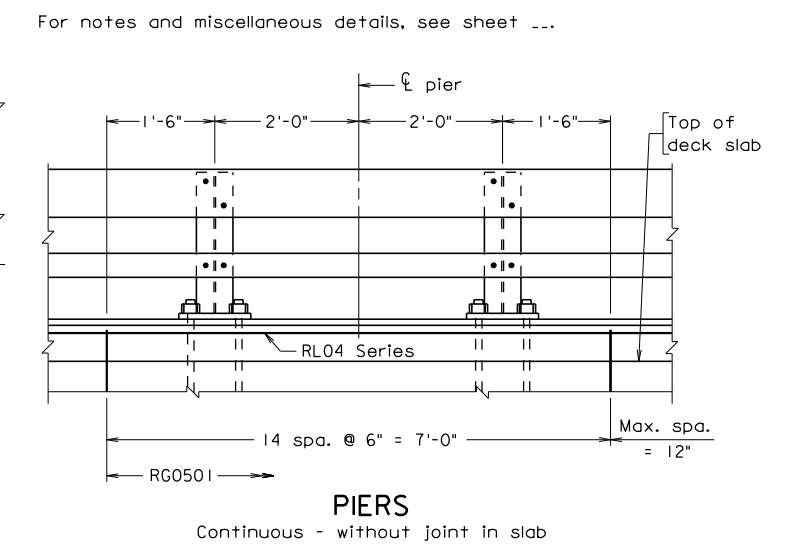
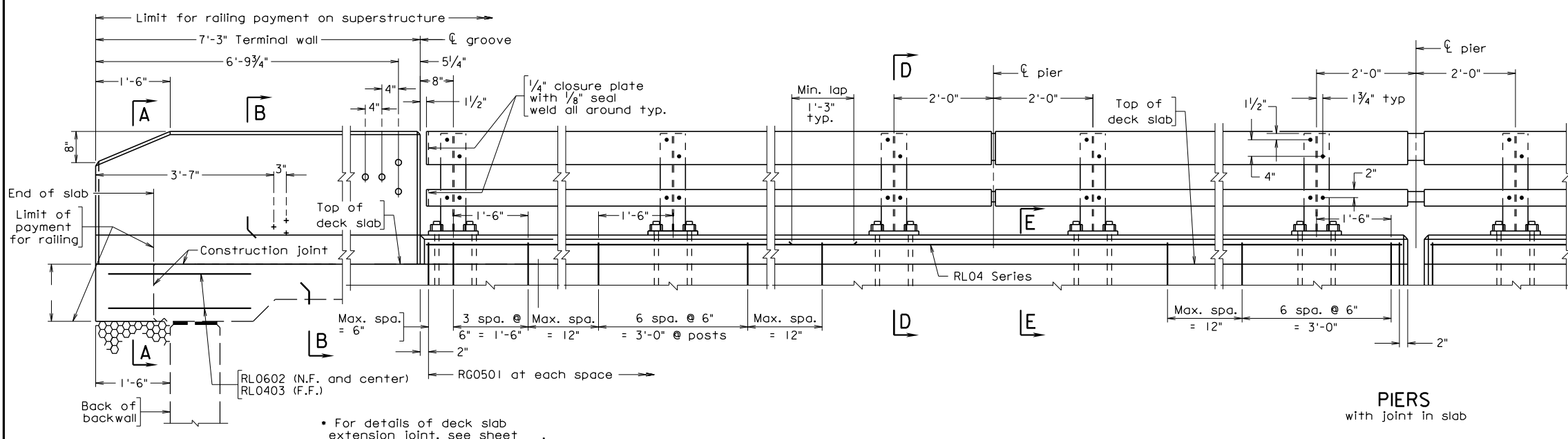
Modify vertical dimension (7" curb) as noted above if an initial overlay is used on bridge.

REINFORCING STEEL SCHEDULE:

Modify bars if an initial overlay is used on bridge.

Complete dimension and length for rebar RG0501.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

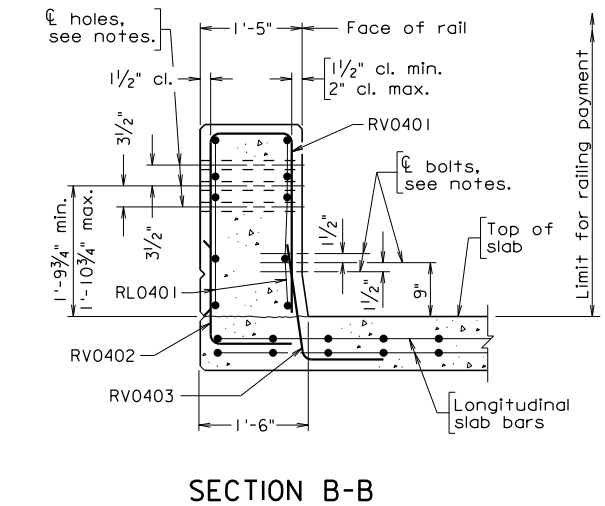
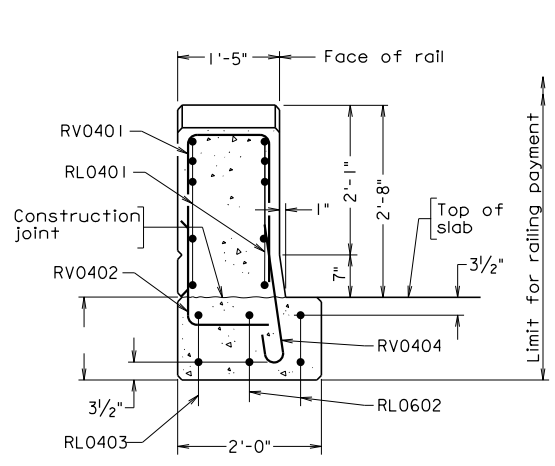
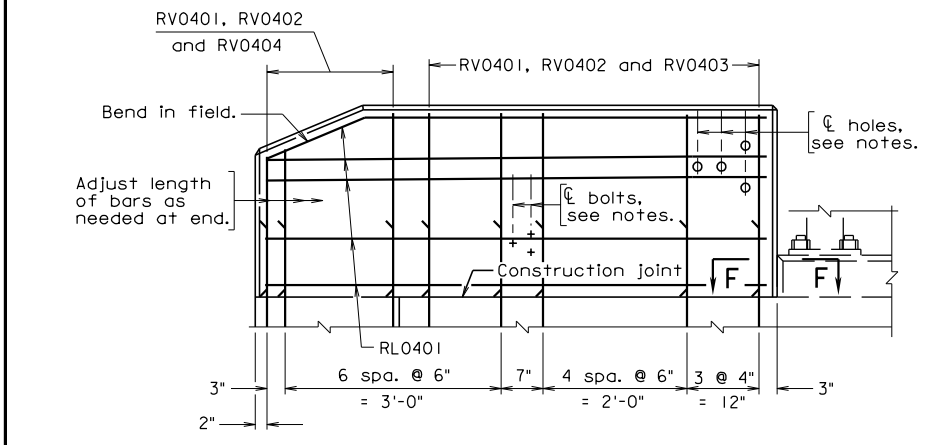


DECK SLAB EXTENSION
ABUTMENT

PIERS
with joint in slab

PIERS
Continuous - without joint in slab

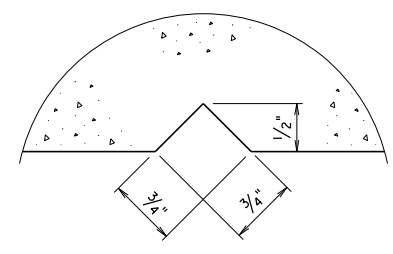
ELEVATION



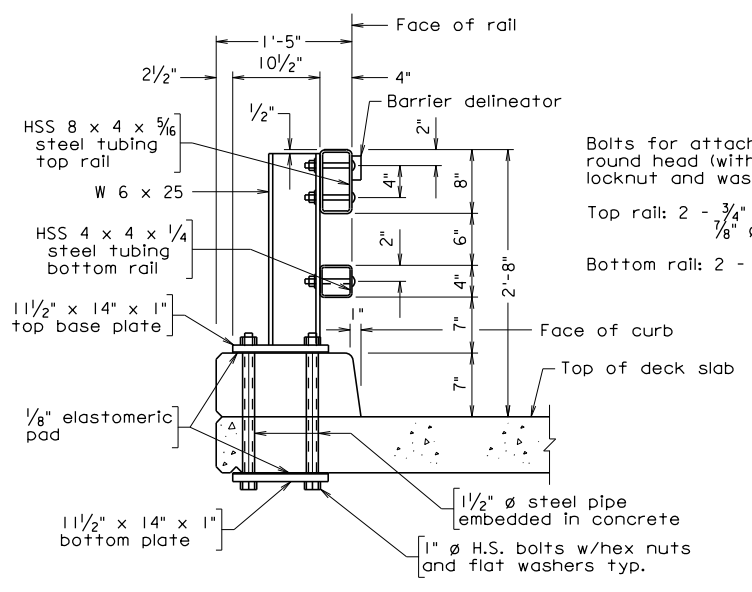
TERMINAL WALL

SECTION A-A

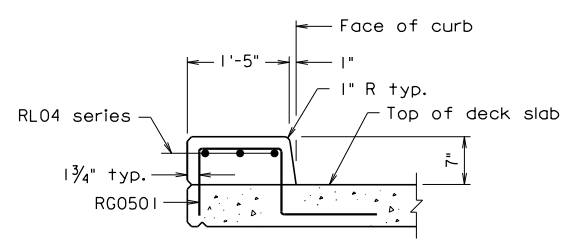
SECTION B-B



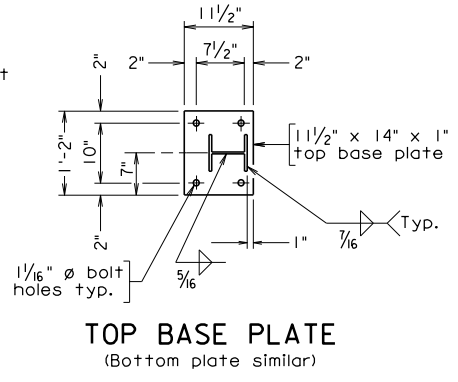
SECTION F-F
Full scale
Groove detail for both sides of parapet



SECTION D-D
Not to scale



SECTION E-E



TOP BASE PLATE
(Bottom plate similar)

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RG0501		#5	3 3/4"		Curb
RV0401		#4	3"	6'-0"	Terminal wall
RV0402		#4	3"	2'-2"	Terminal wall, deck slab and terminal wall end support
RV0403		#4	3"	2'-4"	Terminal wall and deck slab
RV0404		#4	3"		Terminal wall and terminal wall end support
RL0401		#4		6'-11"	Terminal wall
RL0602		#6		4'-0"	Terminal wall end support
RL0403		#4		4'-0"	Terminal wall end support
RL04		#4			Curb
Dimensions in bending diagram are out-to-out of bars.					

BIR-5
08-30-2013
bir5.dgn

Sealed and Signed by:
Julius F.J. Volody Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 3/4" = 1'-0" unless otherwise shown.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
ILLINOIS STEEL RAILING					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BIR-5
			Checked: S&B, DIV		
Revisions					
					Sheet No.

ILLINOIS STEEL RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The Illinois steel railing has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). The standard has a curb section. This rail is for use as a traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

Standard BIR-3 (miscellaneous details) must be included in plans when using this standard.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-0" wide section from the edge of superstructure is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of abutment backwall. This extended concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the 1'-6" slab extension at the corner of the end deck slab.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 7" curb dimension and the overall 2'-8" height of the rail would need to be adjusted to 8" and 2'-9" respectively. In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1"

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

Modify vertical dimensions (7" break and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for bolt locations as noted above if an initial overlay is used on bridge

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BIR-5: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 10Mar2015
SHEET 2 of 3
FILE NO. BIR-5-2

ILLINOIS STEEL RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION D-D:

Modify vertical dimensions (7" curb and 2'-8" railing height) as noted above if an initial overlay is used on bridge.

Provide depth for terminal wall end support.

SECTION E-E:

Modify vertical dimension (7" curb) as noted above if an initial overlay is used on bridge.

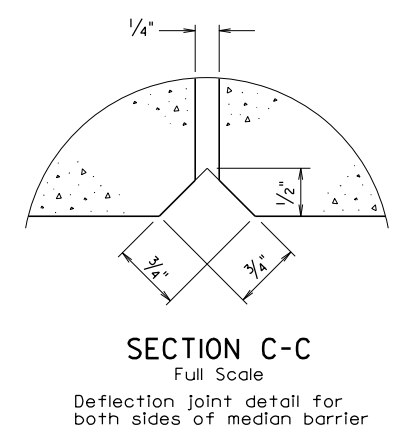
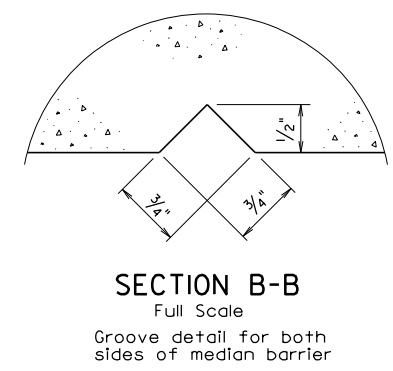
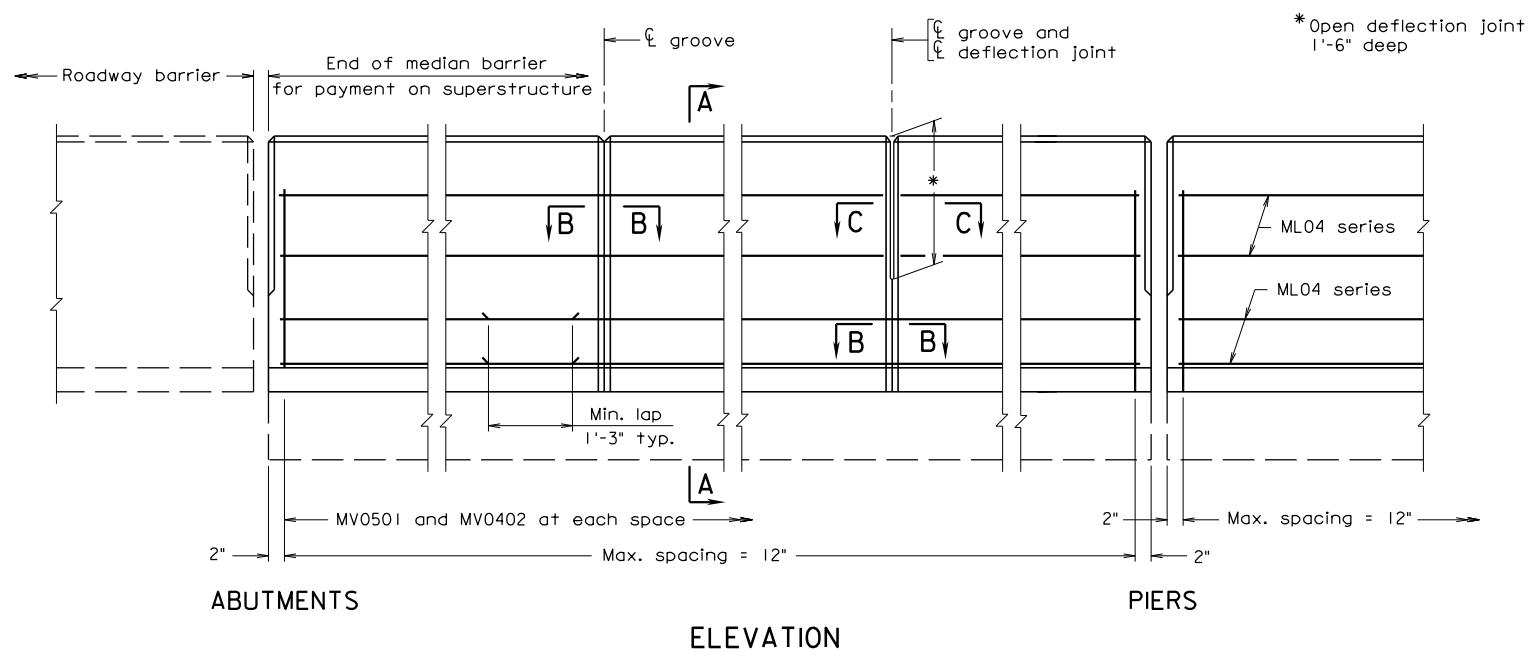
REINFORCING STEEL SCHEDULE:

Modify bars if an initial overlay is used on bridge.

Complete dimension and length for rebar RV0404.

Complete dimension and length for rebar RG0501.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

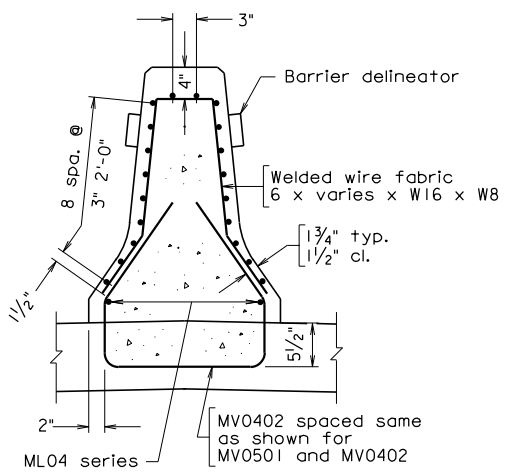
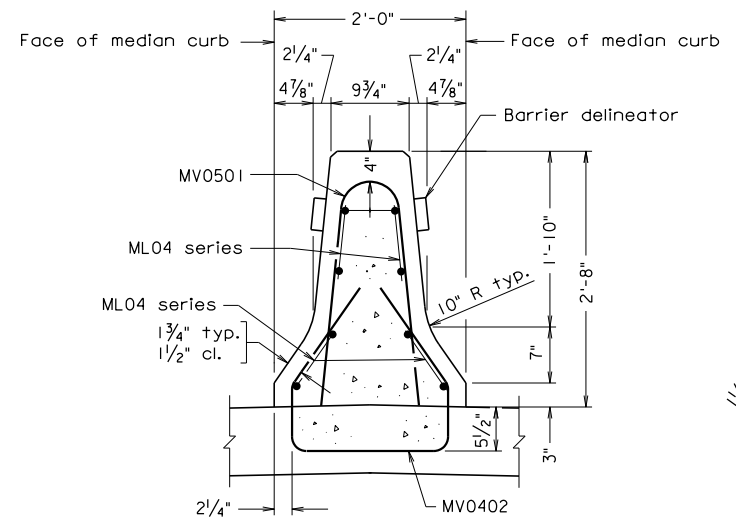
All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at Pier is applicable only when joint is in slab. When slab is continuous over Pier, use groove and deflection joint.

Spacing of grooves shall be approximately 8'-0". If lighting standard is used (see Bridge Conduit System), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier Delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator in all instances, shall face oncoming traffic.

Bid items for median barrier shall include barrier delineators, grounding, materials and other associated metal parts as shown on plans. Also included are concrete noted in the plans and reinforcing steel indicated in the Reinforcing Steel Schedule.



SECTION A-A

SECTION A-A ALTERNATE REINFORCING STEEL

ALTERNATE REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
MV0402		#4	3"	5'-5"	Median barrier
ML04		#4			Median barrier

Dimensions in bending diagram are out-to-out of bars.

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
MV0402		#4	3"	5'-5"	Median barrier
ML04		#4			Median barrier

Dimensions in bending diagram are out-to-out of bars, except as shown.

Gross concrete quantities (C.Y.) = Lin. ft. x 0.121 for all concrete above roadway slab.

BMB-3A 10-24-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE MEDIAN BARRIER (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV		BMB-3A

CAST-IN-PLACE CONCRETE MEDIAN BARRIER

F-SHAPE

NOTES TO DESIGNER:

Standard is used when there is no longitudinal joint in median barrier.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of roadway surface. Therefore, for example if a 1" overlay at the median barrier curb is set, the 3" curb dimension and the 2'-8" barrier height would need to be adjusted to 4" and 2'-9" respectively (Section A-A).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule and Alternate Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Modify vertical dimensions (3" curb and 2'-8" barrier height) as noted above if an initial overlay is used on bridge.

REINFORCING STEEL SCHEDULE:

Modify bars if an initial overlay is used on bridge.

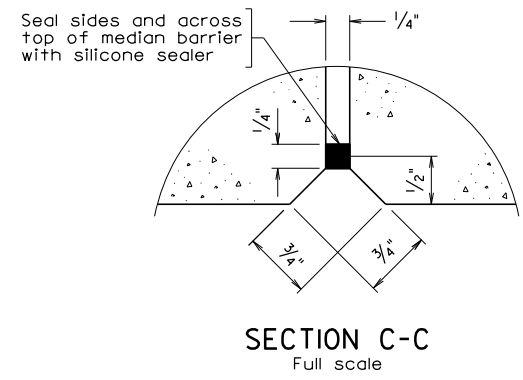
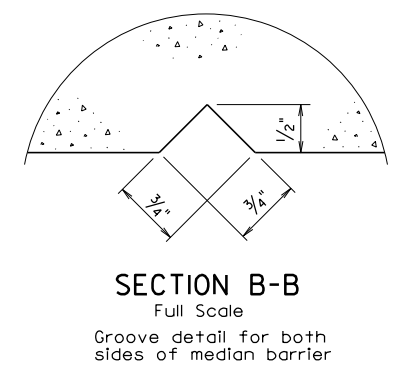
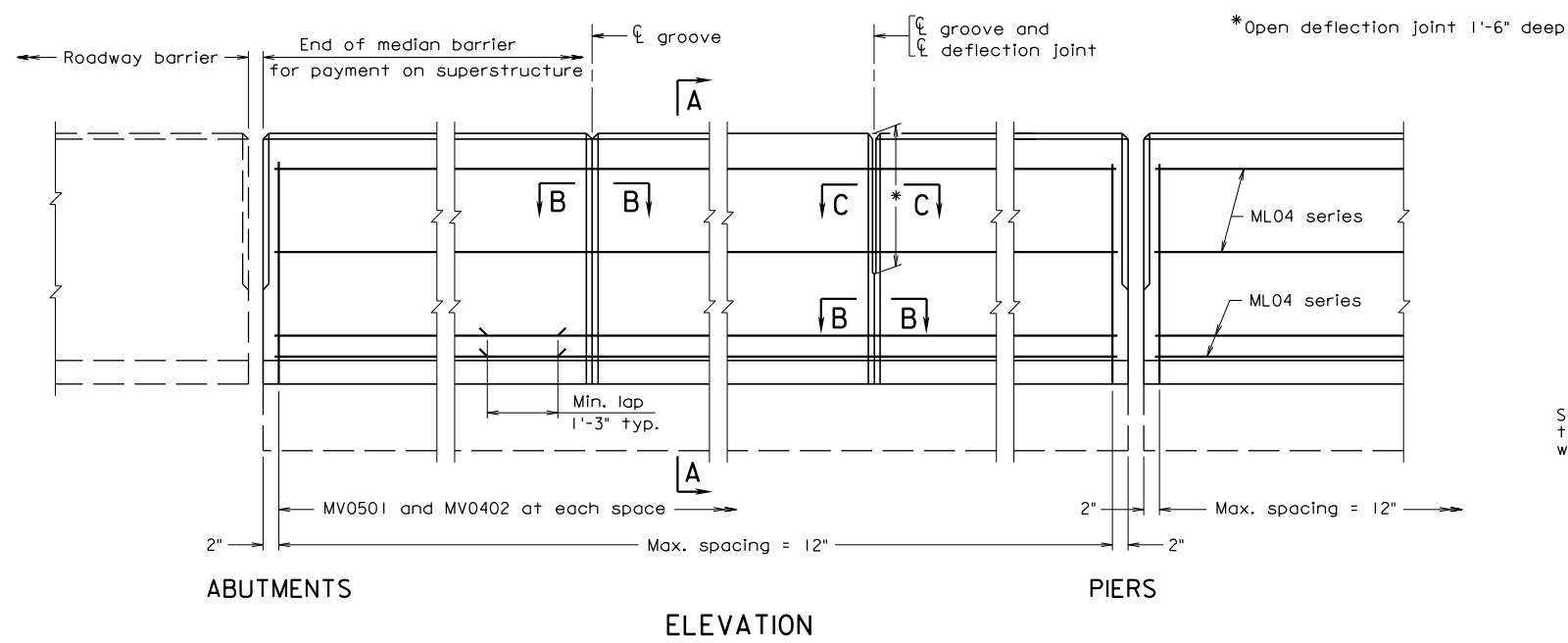
ALTERNATE REINFORCING STEEL SCHEDULE:

Modify bar MV0402 if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

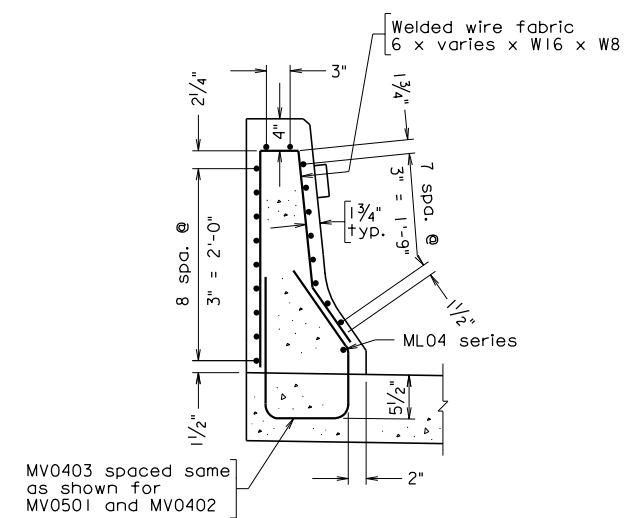
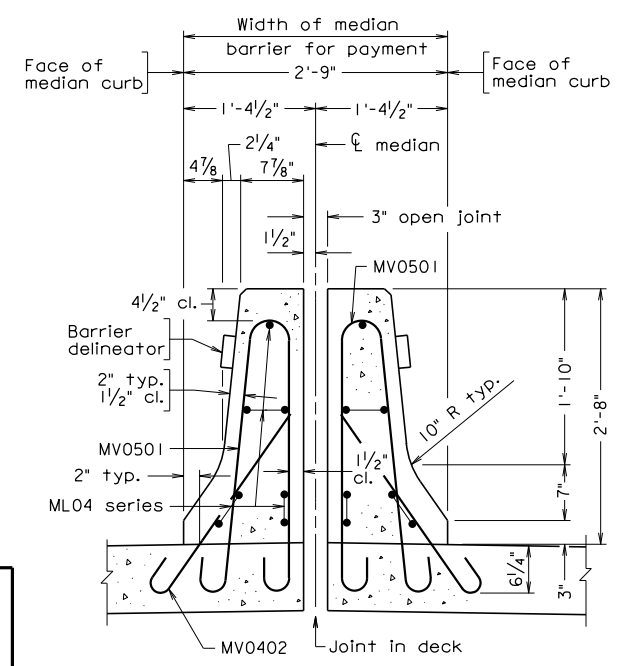
All reinforcing bars shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at Pier is applicable only when joint is in slab. When slab is continuous over Pier, use groove and deflection joint.

Spacing of grooves shall be approximately 8'-0". If lighting standard is used (see Bridge Conduit System), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier Delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator in all instances, shall face oncoming traffic.

Bid items for median barrier shall include barrier delineators, grounding, materials and other associated metal parts as shown on plans. Also included are concrete noted in the plans and reinforcing steel indicated in the Reinforcing Steel Schedule.



ALTERNATE REINFORCING STEEL SCHEDULE						
MV0403	Mark	No.	Size	Pin ϕ	Length	Location
MV0403			#4	3"	4'-0"	Median barrier
ML04			#4			Median barrier

Dimensions in bending diagram are out-to-out of bars.

REINFORCING STEEL SCHEDULE						
MV0501	Mark	No.	Size	Pin ϕ	Length	Location
MV0501			#5	*4 1/4"	6'-11"	Median barrier
MV0402			#4	2"	2'-10"	Median barrier
ML04			#4			Median barrier

* Pin ϕ 2 1/2" for hooks at ends

Dimensions in bending diagram are out-to-out of bars, except as shown.

Gross concrete quantities (C.Y.) = Lin. ft. x 0.170 for all concrete above roadway slab.

BMB-5A 10-24-2013 bmb5a.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE MEDIAN BARRIER (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions				BMB-5A	

CAST-IN-PLACE CONCRETE (SPLIT) MEDIAN BARRIER

F-SHAPE

NOTES TO DESIGNER:

Standard is used when there is longitudinal joint in median barrier. Although the joint opening of 3" should be satisfactory for most situations, it is up to the designer to adjust the opening if required, e.g., long spans, curved girders with small radii.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of roadway surface. Therefore, for example if a 1" overlay at the median barrier curb is set, the 3" curb dimension and the 2'-8" barrier height would need to be adjusted to 4" and 2'-9" respectively (Section A-A).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule and Alternate Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Modify vertical dimensions (3" curb and 2'-8" barrier height) as noted above if an initial overlay is used on bridge.

REINFORCING STEEL SCHEDULE:

Modify bars if an initial overlay is used on bridge.

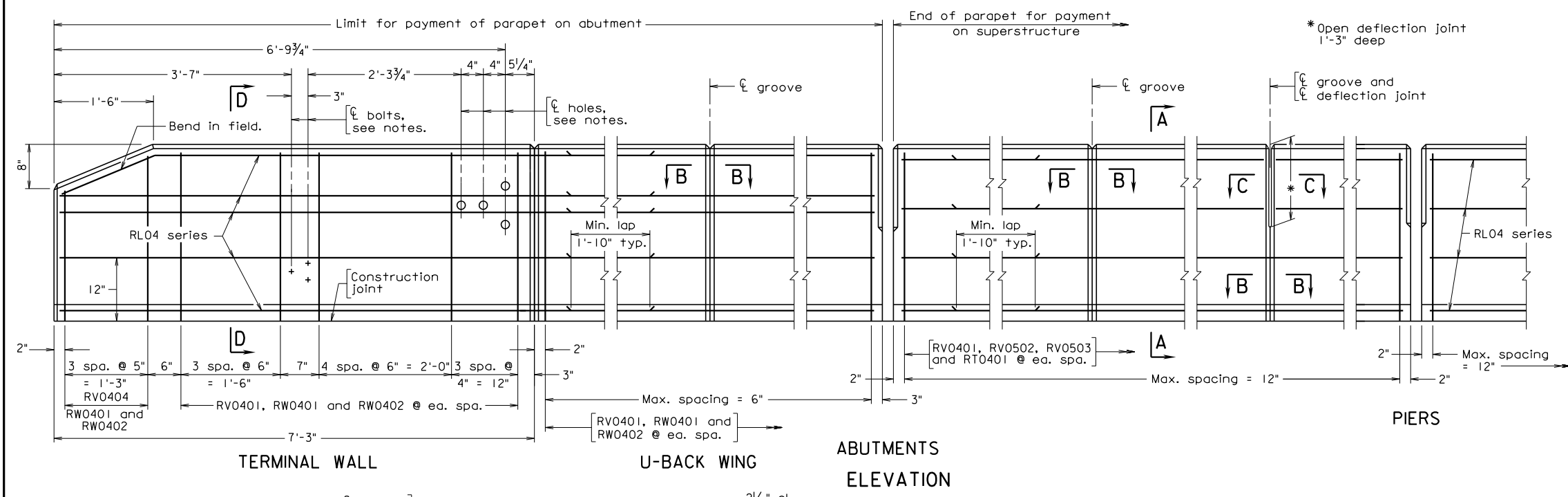
ALTERNATE REINFORCING STEEL SCHEDULE:

Modify bar MV0403 if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

STATE	ROUTE	FEDERAL AID	ROUTE	STATE	SHEET NO.
		PROJECT		PROJECT	
VA.					



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-2.

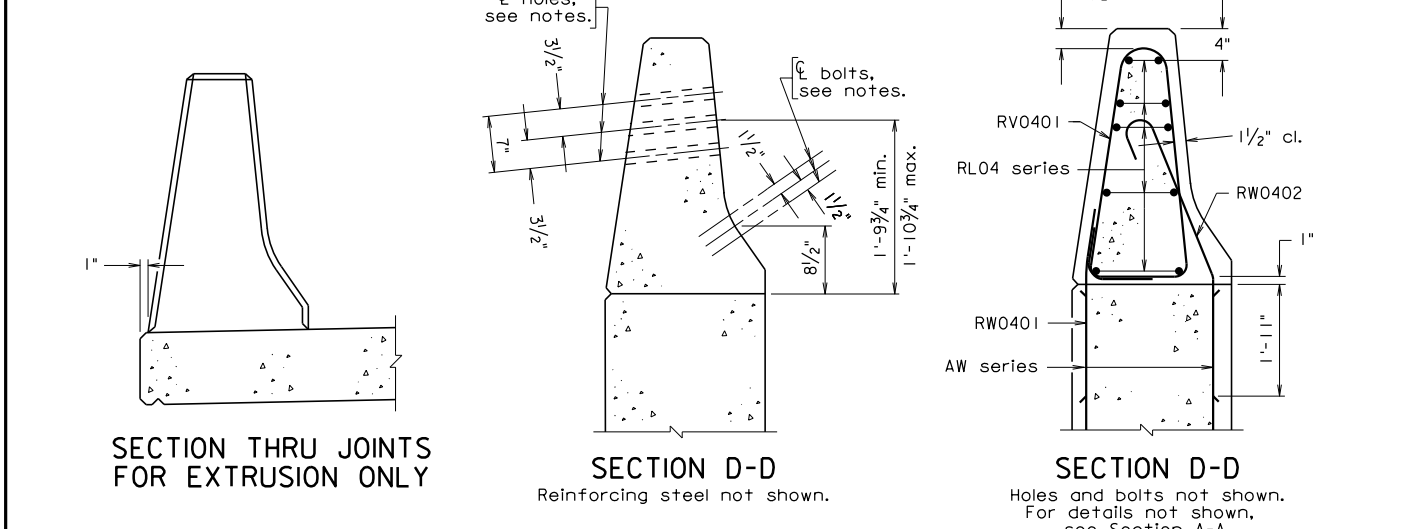
For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

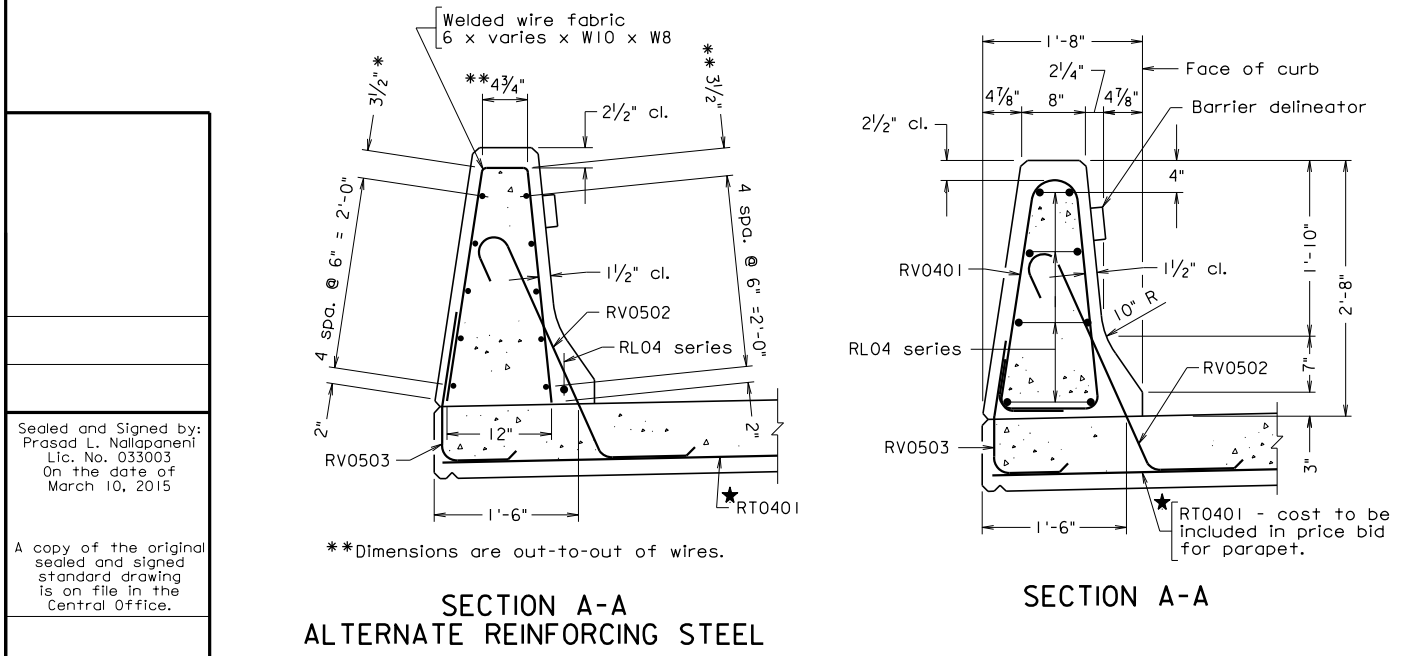
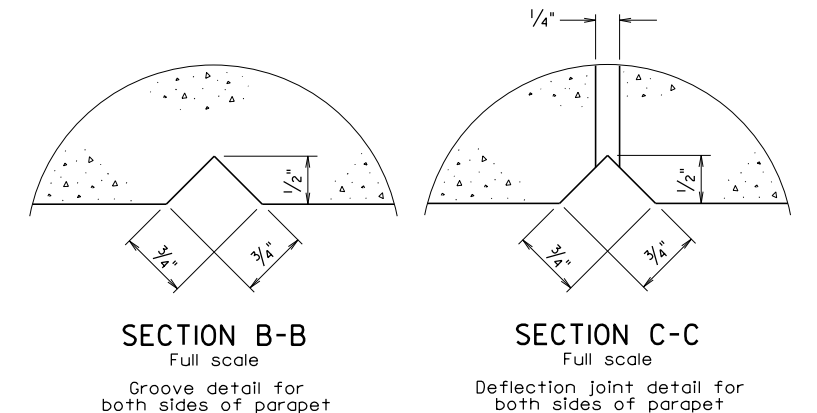
Bid Item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

For extruded parapets: During extrusion, if there are open joints at abutment(s) or pier(s), they shall be formed by the use of lubricated plates or other means so that uniformity of the opening and chamfers is maintained. Dimension of 1", as shown in Section thru joints for Extrusion Only, is for additional deck slab that shall be cast at Contractor's expense. Dimension(s) to face of curb shall not be reduced.



REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★RT0401		#4		3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet
RV0502		#5	3 3/4"	4'-7"	Parapet
RV0503		#5	3 3/4"	2'-4"	Parapet
RV0404		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RW0401		#4	3"	2'-0"	Terminal wall and wing
RW0402		#4	3"	4'-3"	Terminal wall and wing
RL04		#4			Parapet



Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab

★Used only when deck transverse reinforcement is parallel to skew of bridge

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-3A		

03-10-2015
Sealed and Signed by:
Prasad L. Nallapeneni
Lic. No. 033003
On the date of
March 10, 2015
A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-3A-AT.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

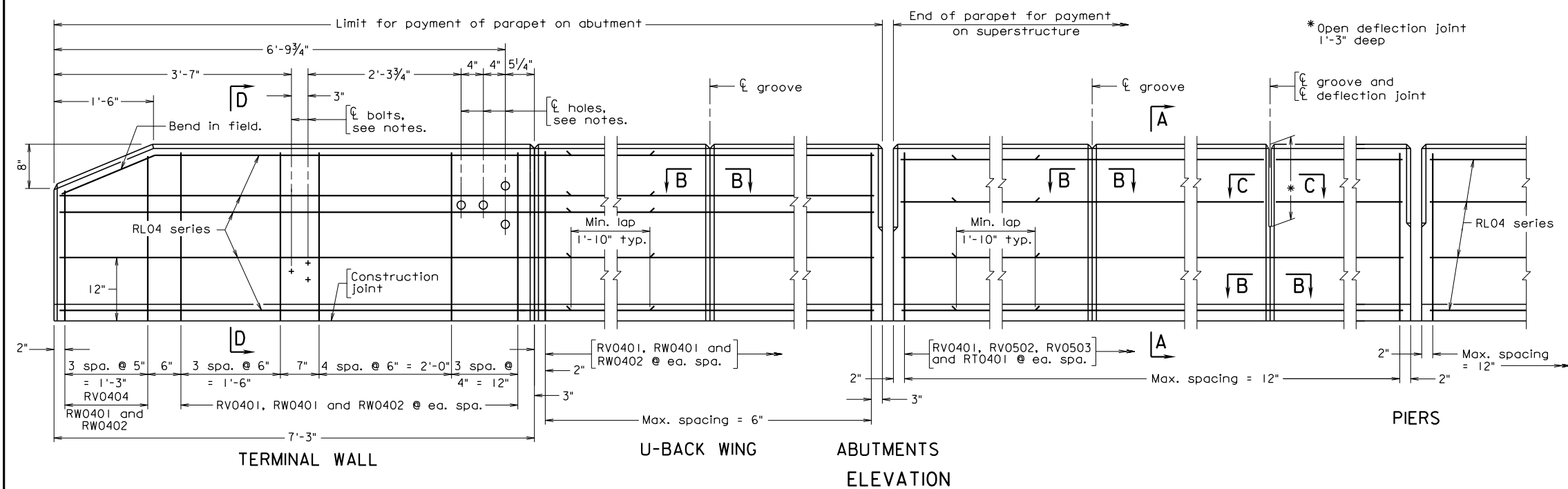
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-3A: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 2
FILE NO. BPB-3A-2

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-2.

For details of wingwall below construction joint, see abutment details.

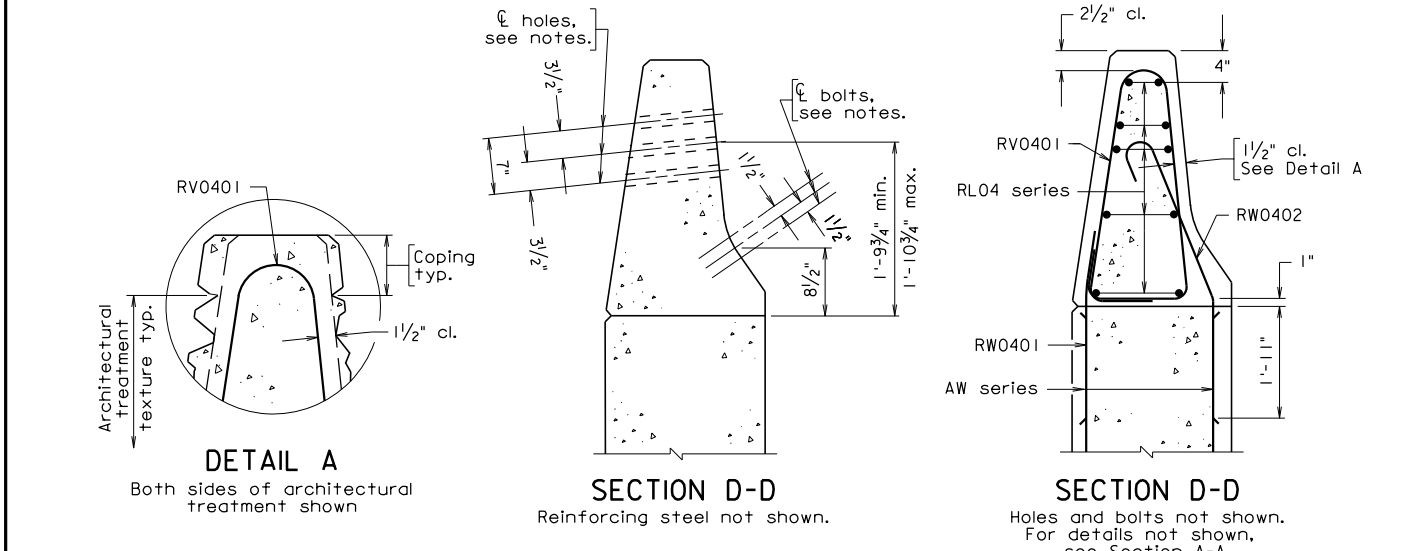
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

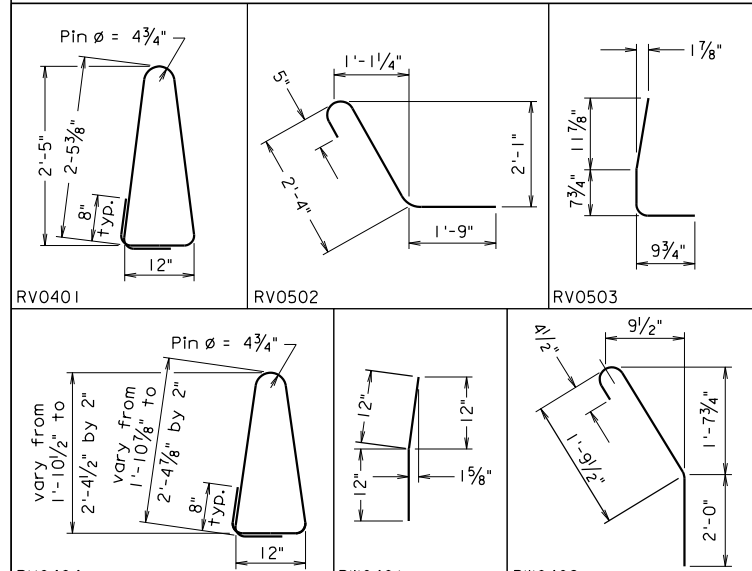
Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule. Concrete included in the architectural treatment is excluded.

Parapets shall not be extruded.

Bid price for architectural treatment includes concrete in the relief and the coping.



REINFORCING STEEL SCHEDULE



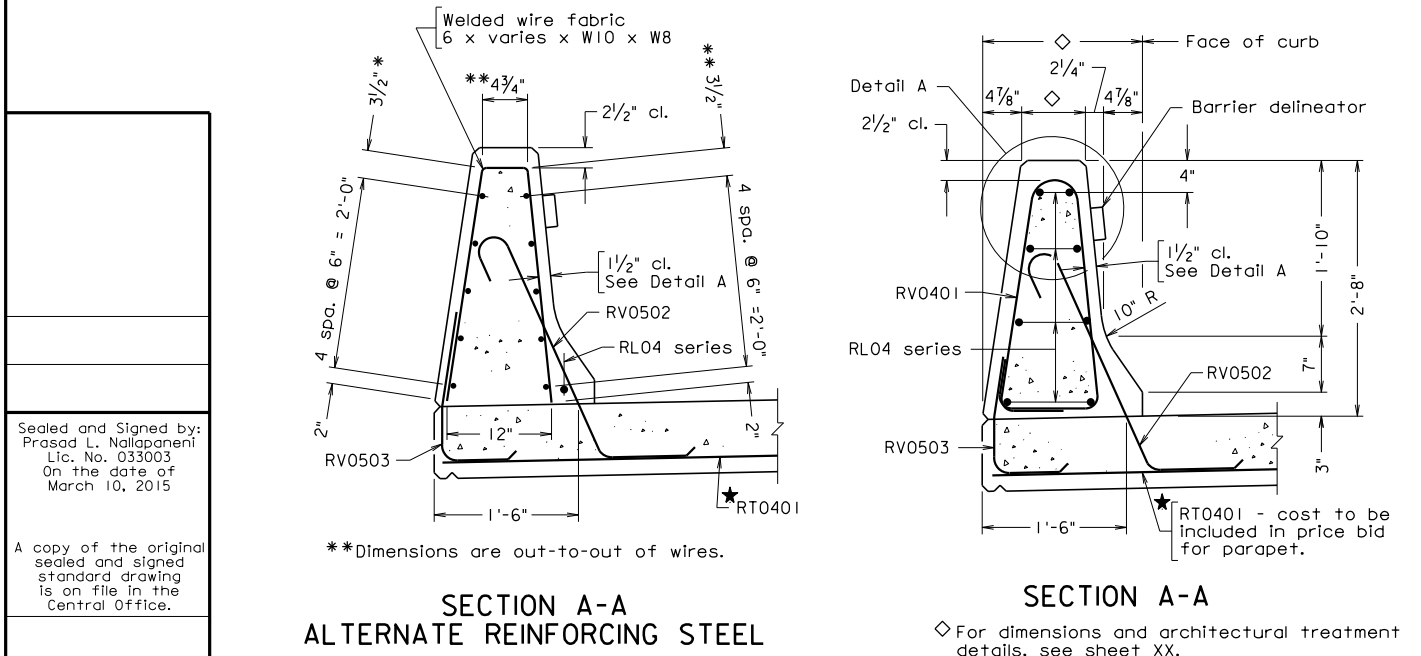
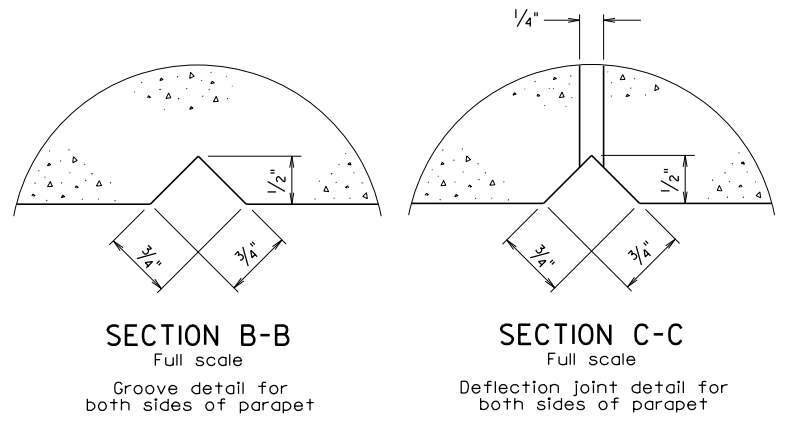
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet
RV0502		#5	3 3/4"	4'-7"	Parapet
RV0503		#5	3 3/4"	2'-4"	Parapet
RV0404		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RW0401		#4	3"	2'-0"	Terminal wall and wing
RW0402		#4	3"	4'-3"	Terminal wall and wing
RL04		#4	—		Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab
(These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge



BPB-3A-AT

03-10-2015

bb3a0at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Sheet No.
	Revisions		

**32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING**

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-3A.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

**32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

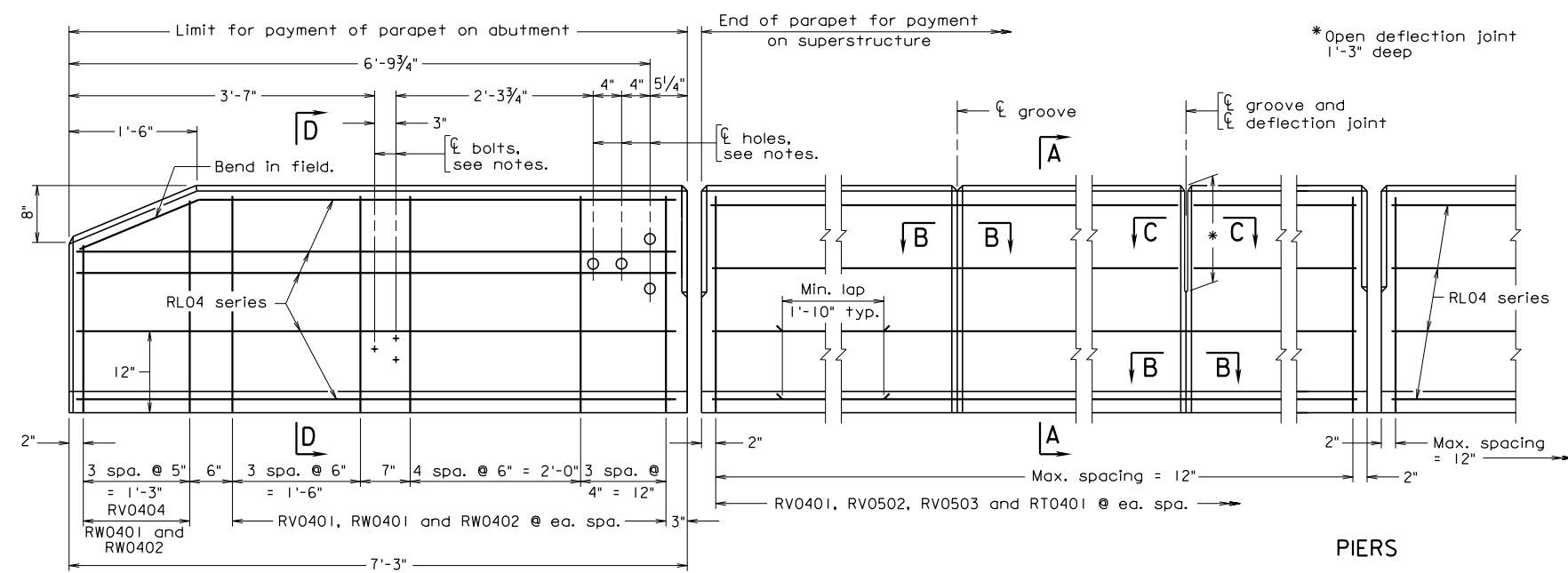
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-3A-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-3A-AT-3

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



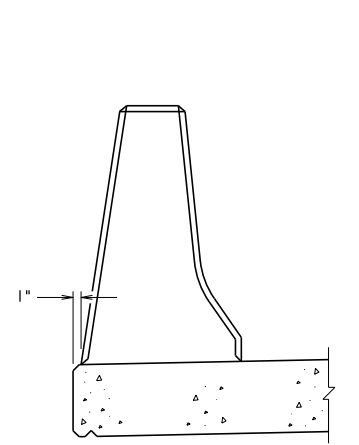
*Open deflection joint
1'-3" deep

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.
 Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.
 Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-2.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.
 For extruded parapets: During extrusion, if there are open joints at abutment(s) or pier(s), they shall be formed by the use of lubricated plates or other means so that uniformity of the opening and chamfers is maintained. Dimension of 1", as shown in Section thru joints for Extrusion Only, is for additional deck slab that shall be cast at Contractor's expense. Dimension(s) to face of curb shall not be reduced.

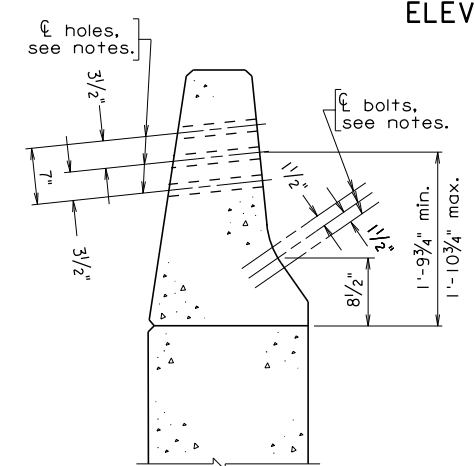
TERMINAL WALL ABUTMENTS

PIERS

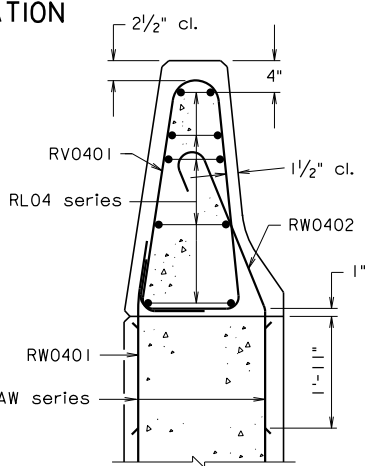
ELEVATION



SECTION THRU JOINTS FOR EXTRUSION ONLY

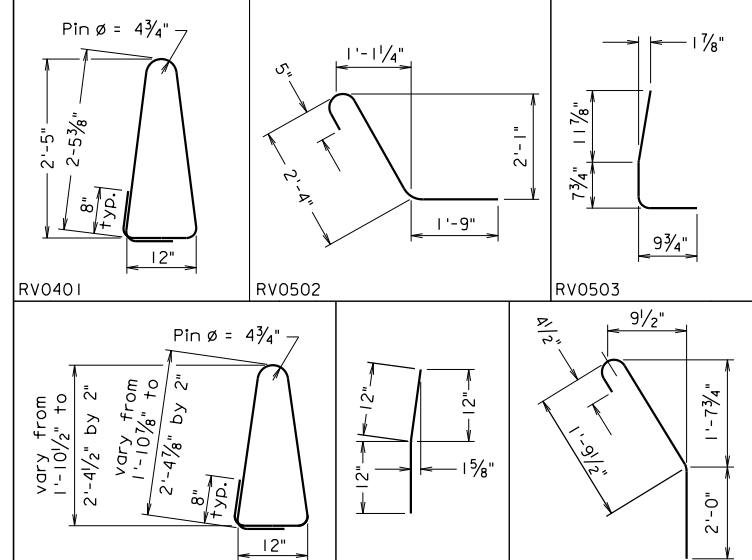


SECTION D-D
Reinforcing steel not shown.



SECTION D-D
Holes and bolts not shown. For details not shown, see Section A-A.

REINFORCING STEEL SCHEDULE



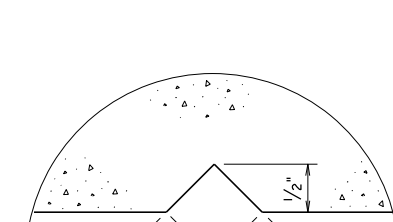
Mark	No.	Size	Pin ϕ	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet
RV0502		#5	3 3/4"	4'-7"	Parapet
RV0503		#5	3 3/4"	2'-4"	Parapet
RV0404		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RW0401		#4	3"	2'-0"	Terminal wall and wing
RW0402		#4	3"	4'-3"	Terminal wall and wing
RL04		#4	—		Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

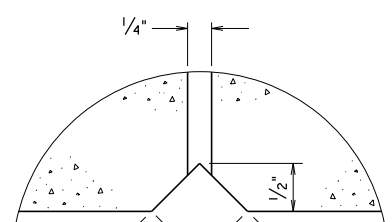
Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab

★Used only when deck transverse reinforcement is parallel to skew of bridge



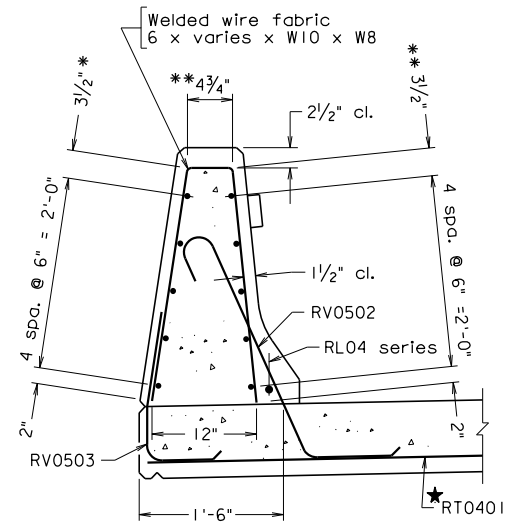
SECTION B-B
Full scale

Groove detail for both sides of parapet

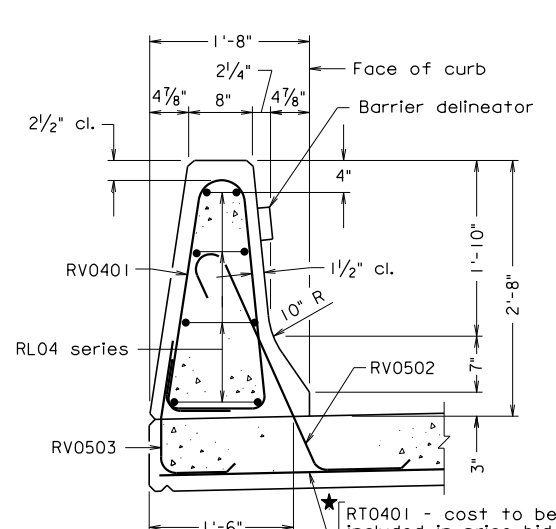


SECTION C-C
Full scale

Deflection joint detail for both sides of parapet



SECTION A-A
ALTERNATE REINFORCING STEEL



SECTION A-A

★RT0401 - cost to be included in price bid for parapet.

bpb3b.dgn

03-10-2015

BPB-3B

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-3B		

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-3B-AT.

Terminal wall is detailed on abutment wingwall.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

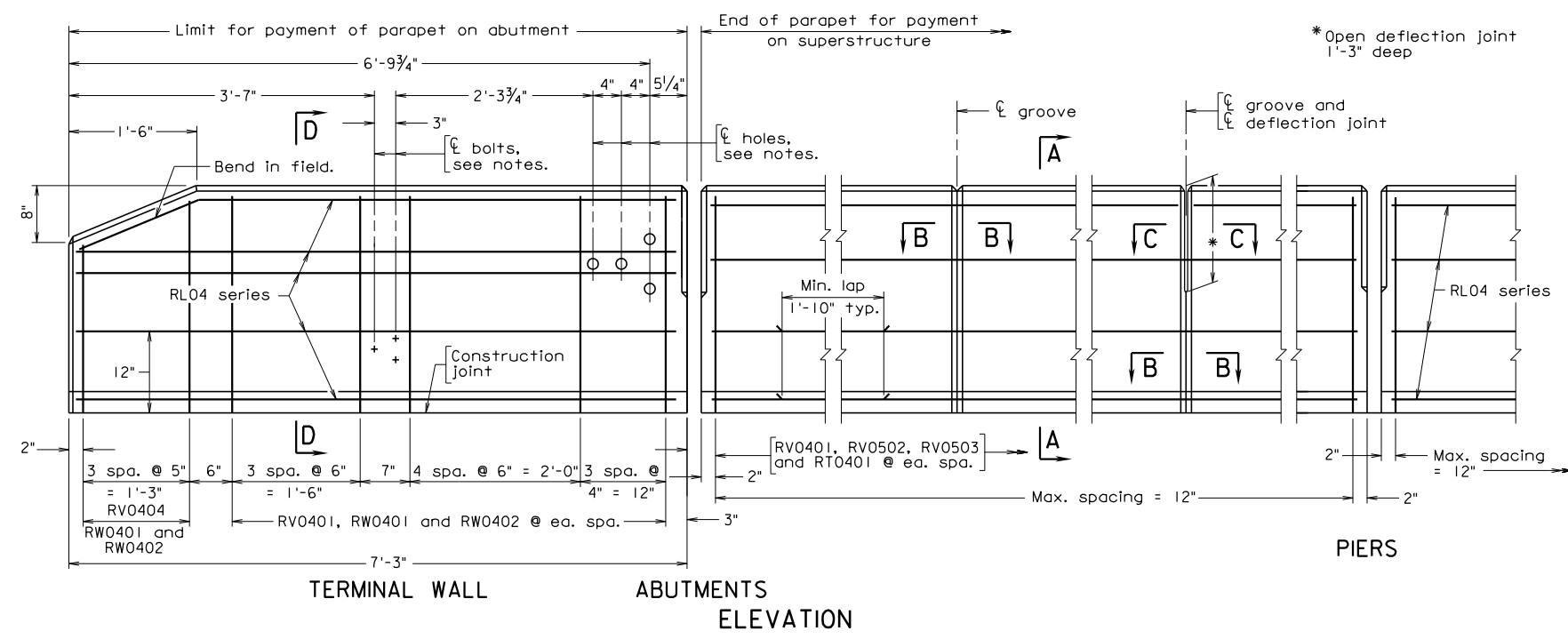
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-3B: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 2
FILE NO. BPB-3B-2

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-2.

For details of wingwall below construction joint, see abutment details.

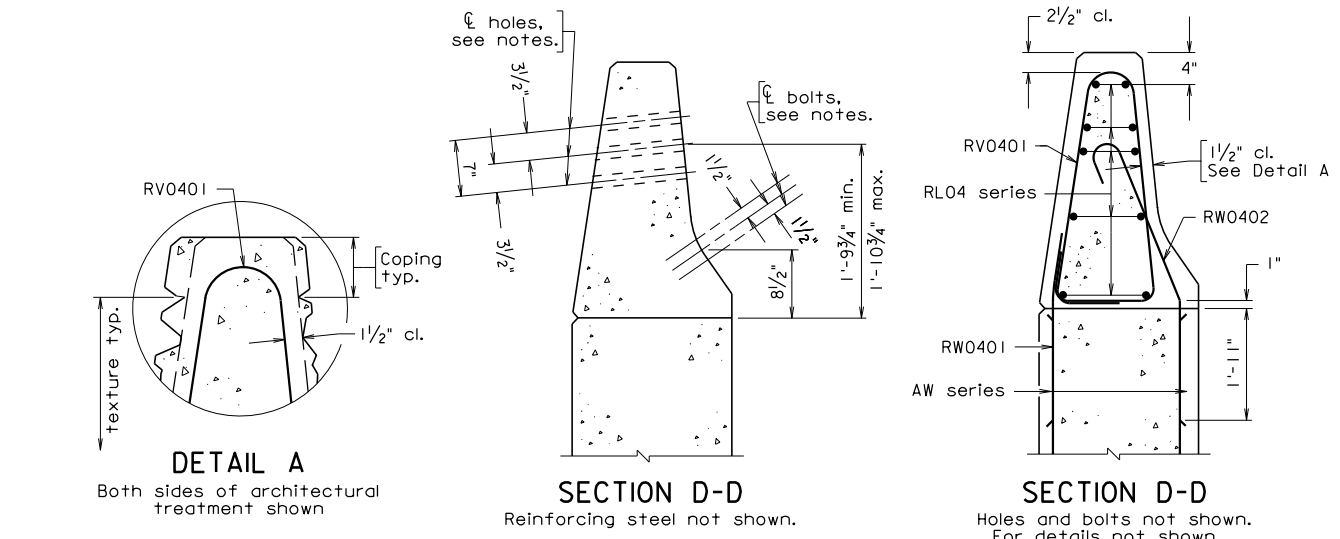
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

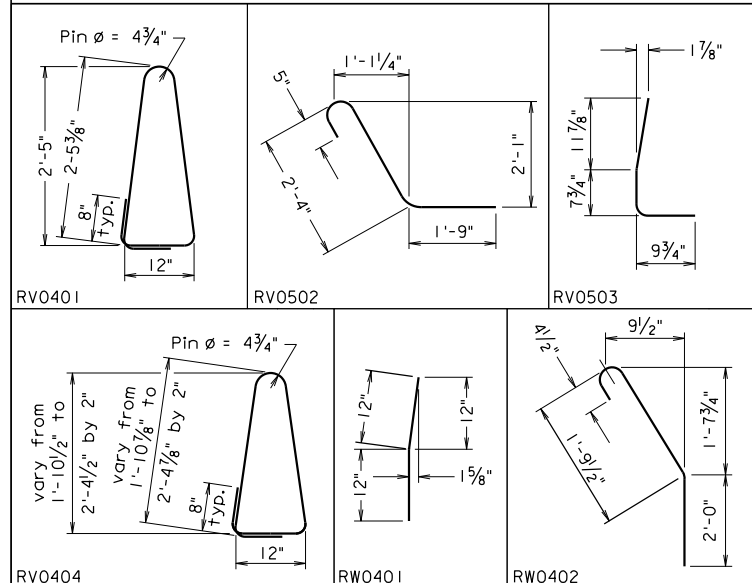
Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule. Concrete included in the architectural treatment is excluded.

Parapets shall not be extruded.

Bid price for architectural treatment includes concrete in the relief and the coping.



REINFORCING STEEL SCHEDULE



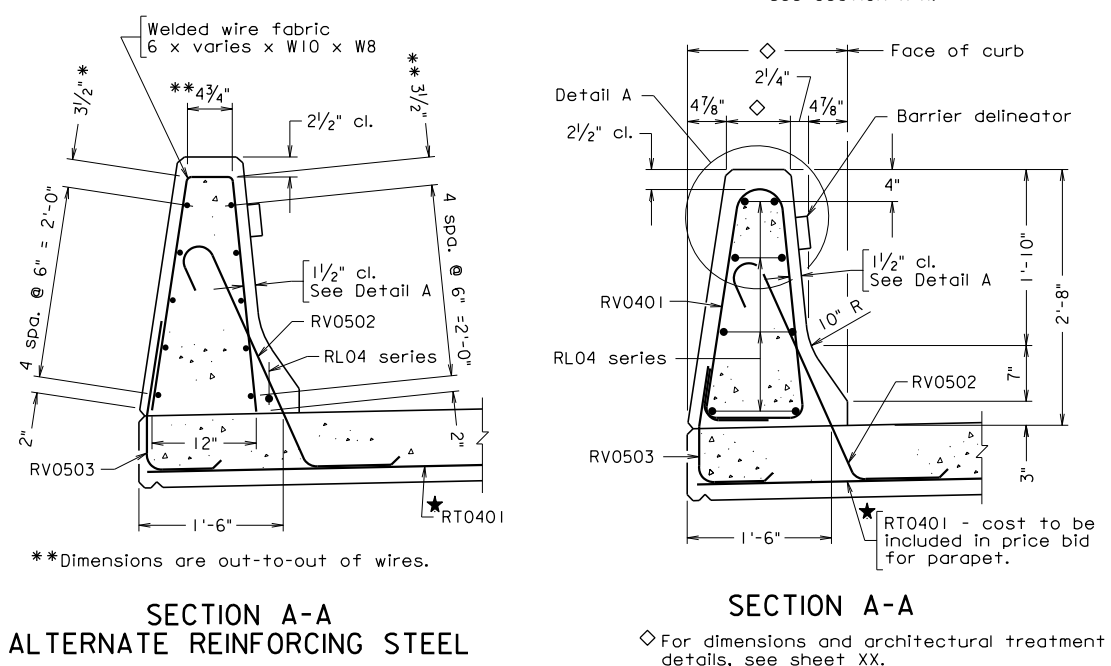
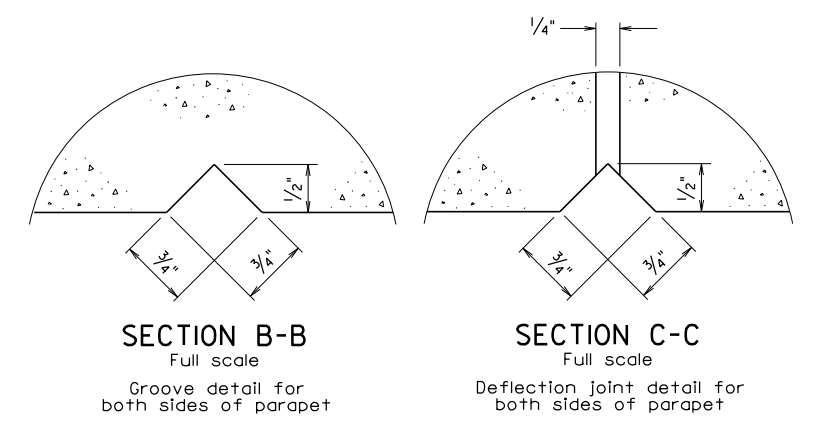
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet
RV0502		#5	3 3/4"	4'-7"	Parapet
RV0503		#5	3 3/4"	2'-4"	Parapet
RV0404		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RW0401		#4	3"	2'-0"	Terminal wall and wing
RW0402		#4	3"	4'-3"	Terminal wall and wing
RL04		#4	—		Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab
(These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge



BPB-3B-AT

03-10-2015

bpb3bot.dgn

Sealed and Signed by:
Prasad L. Nallipomani
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Designed: S&B... DIV Drawn: ...S&B... DIV Checked: S&B... DIV
Revisions		Date	Plan No. Sheet No.
			BPB-3B-AT

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-3B. Terminal wall is detailed on abutment wingwall.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

**32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT WINGWALL**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

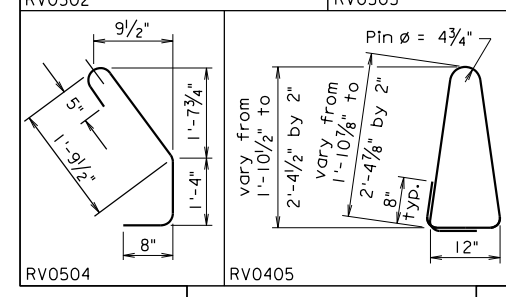
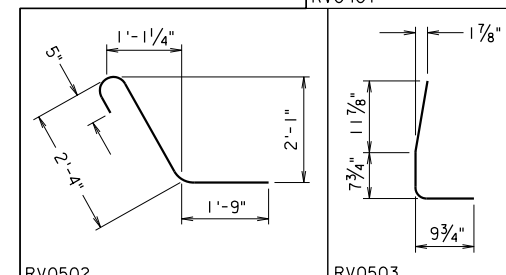
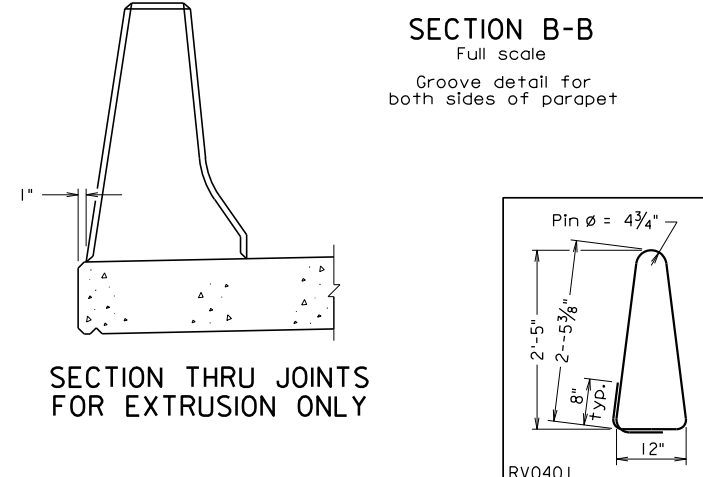
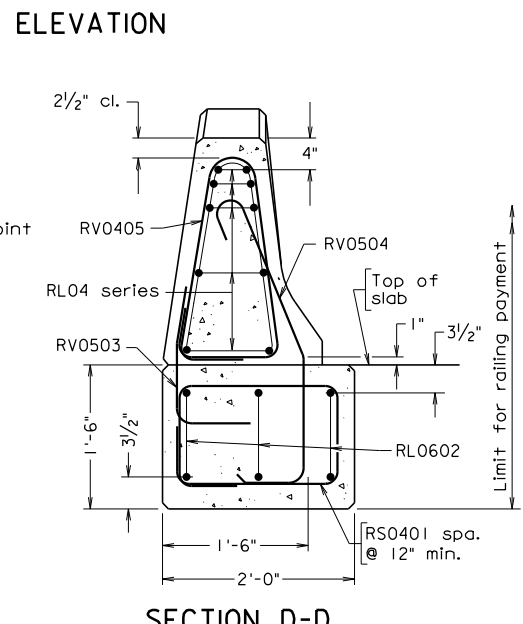
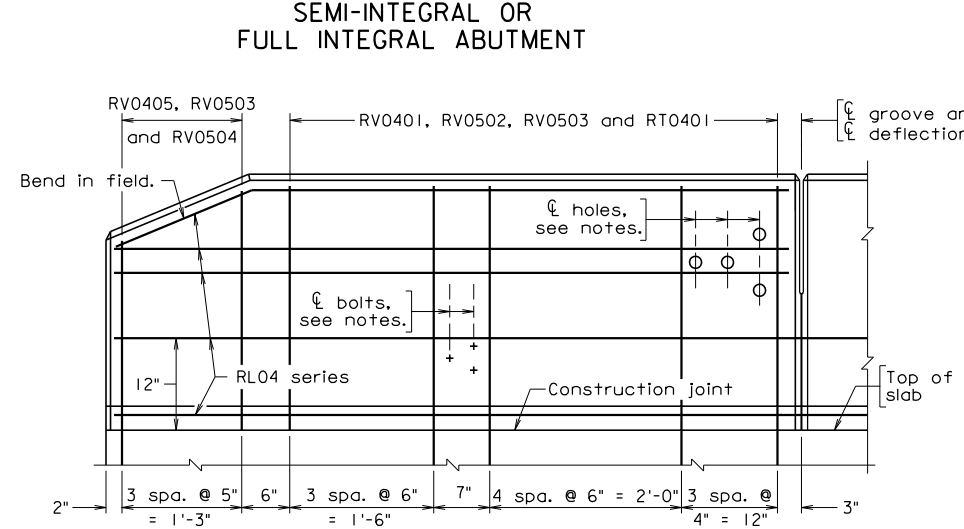
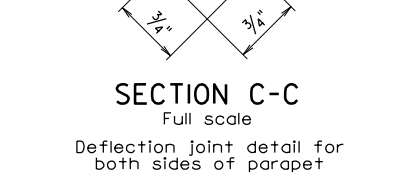
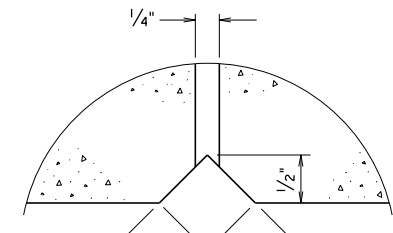
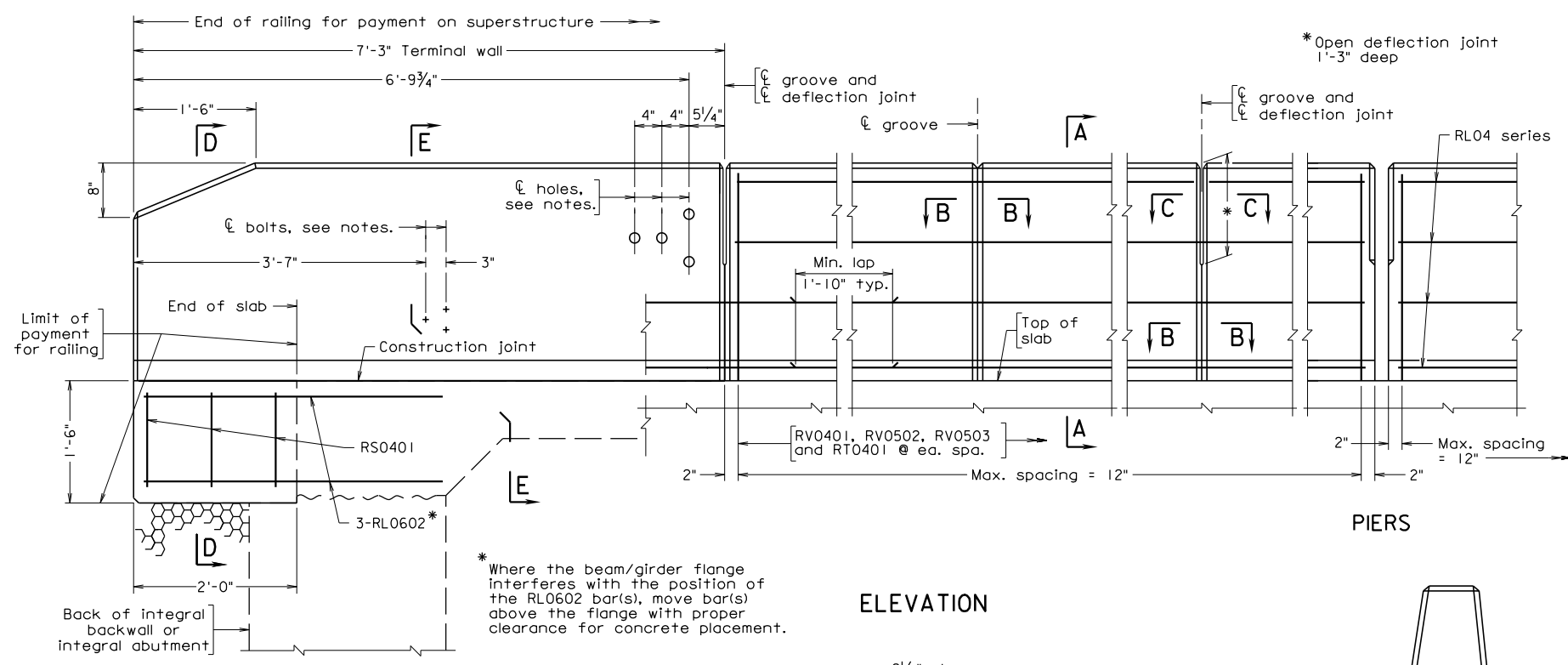
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Replace standard designation with plan number.

STANDARD BPB-3B-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-3B-AT-3

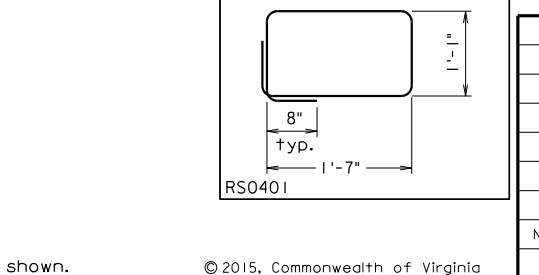
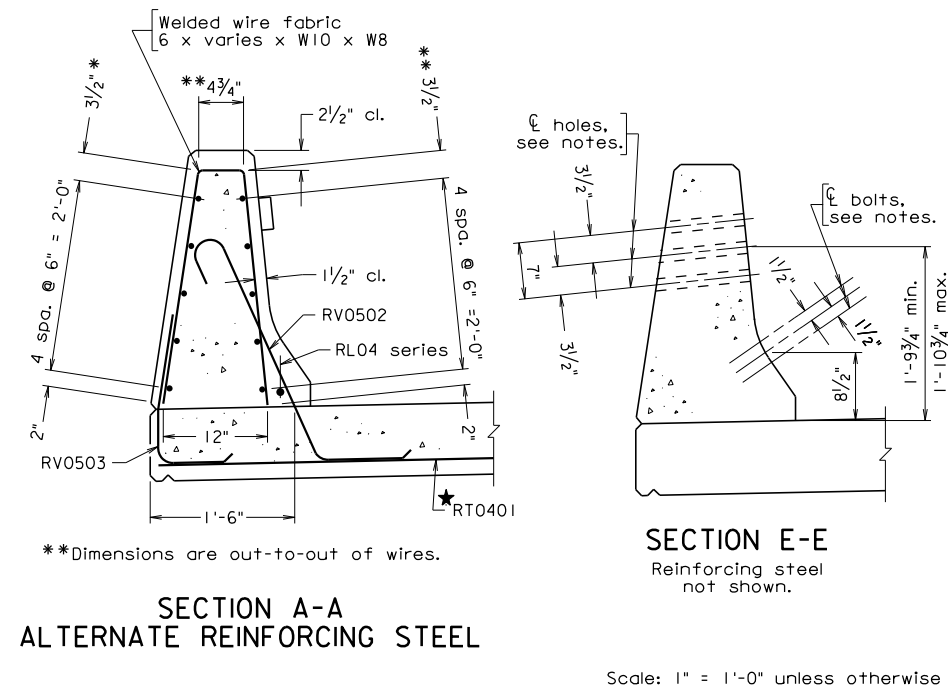
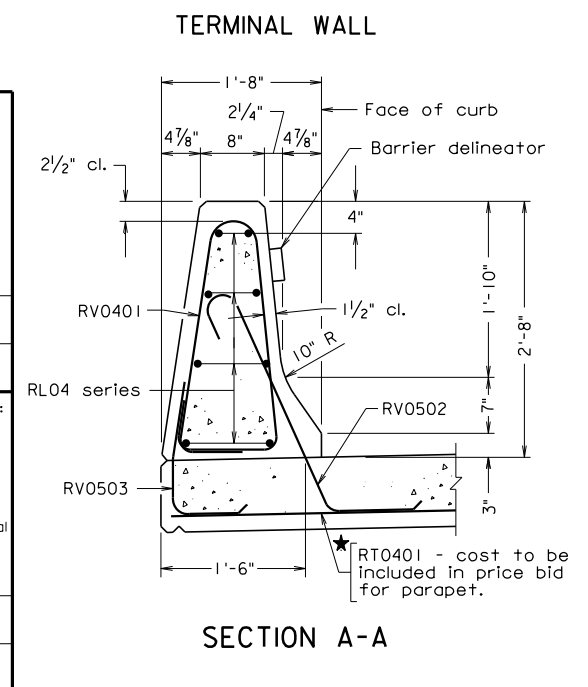
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
★	RT0401	#4	—	3'-0"	Slab
	RV0401	#4	3"	7'-3"	Parapet and terminal wall
	RV0502	#5	3 3/4"	4'-7"	Parapet and terminal wall
	RV0503	#5	3 3/4"	2'-4"	Parapet and terminal wall
	RV0504	#5	3 3/4"	4'-3"	Terminal wall end support
	RV0405	#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
	RL04	#4	—	—	Parapet and terminal wall
	RL0602	#6	—	3'-6"	Terminal wall end support
	RS0401	#4	3"	6'-2"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars, except as shown.
 Cost of all bars listed in schedule to be included in price bid for parapet.
 Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
 All concrete above roadway slab
 ★ Used only when deck transverse reinforcement is parallel to skew of bridge

03-10-2015
 Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015
 A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.
 BPB-3C
 VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER



COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		Sheet No.
			Checked: S&B...DIV		BPB-3C

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-3C-AT.

Terminal wall is detailed on superstructure. Standard is used with full integral or semi-integral abutment.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¼" min. – 1'- 10¼" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

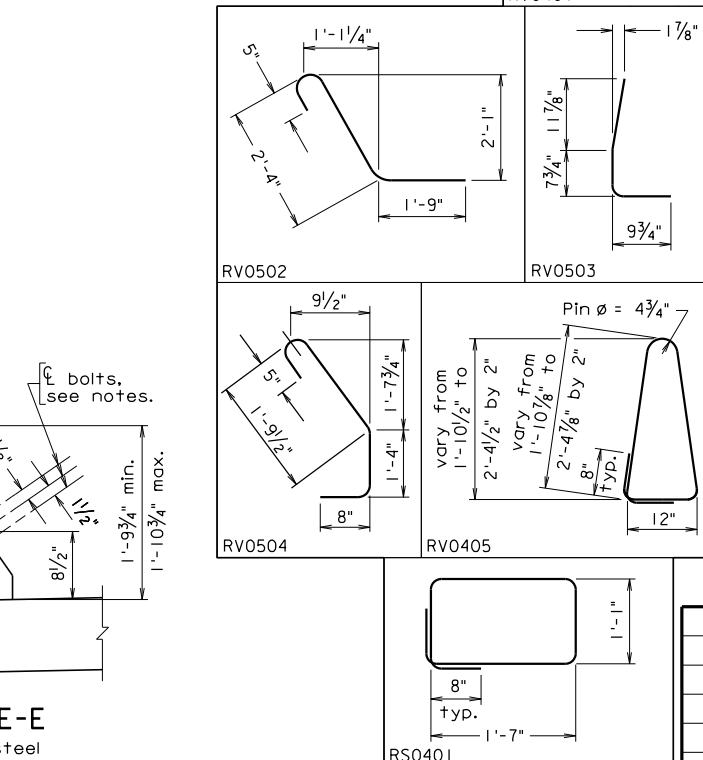
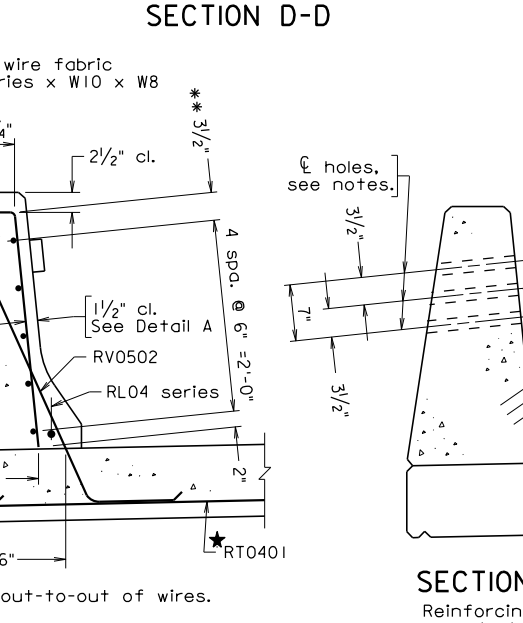
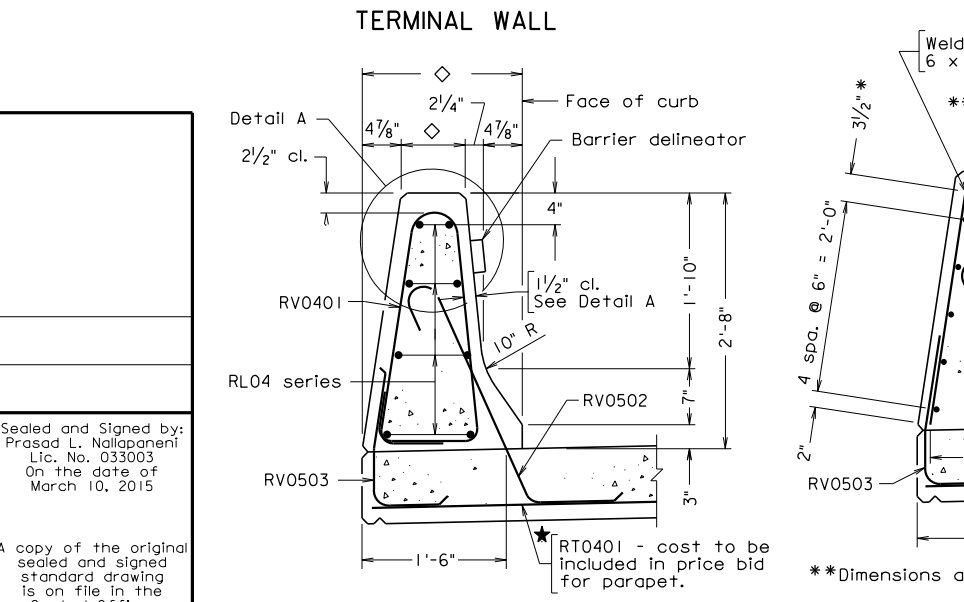
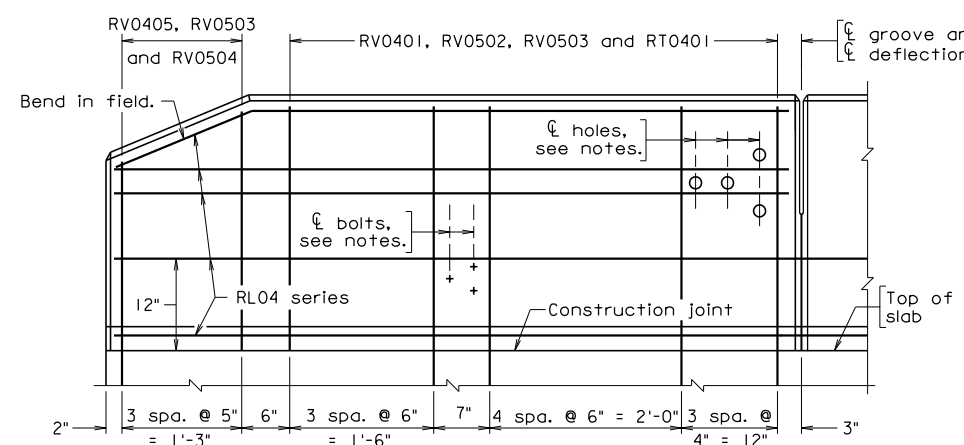
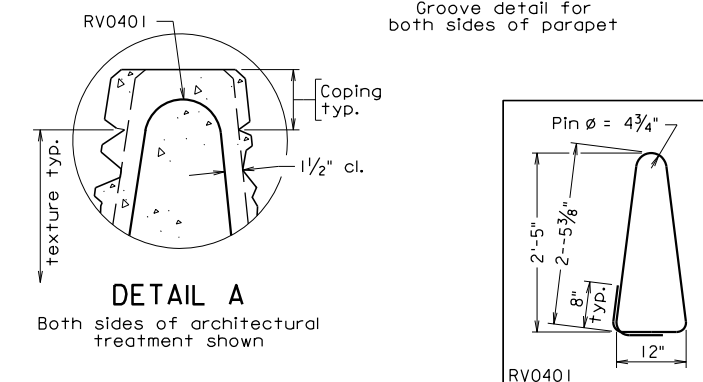
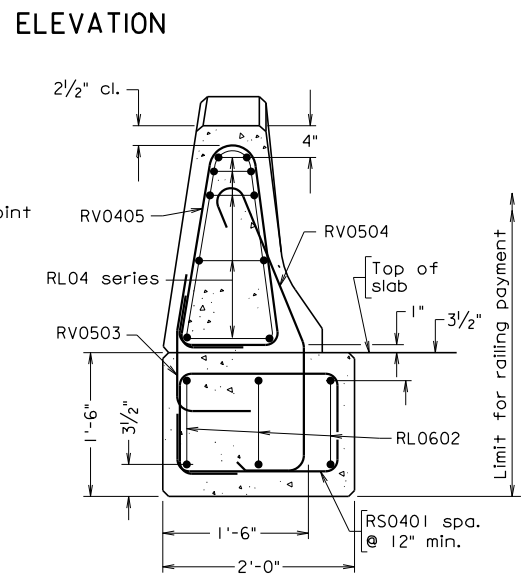
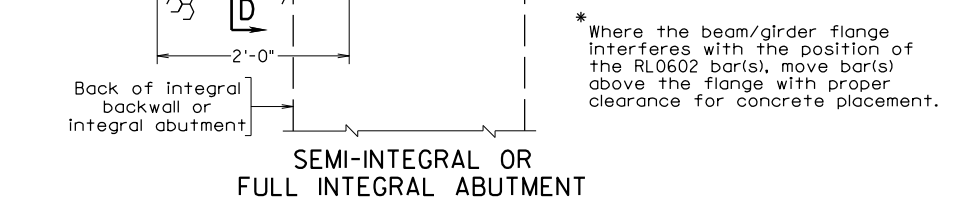
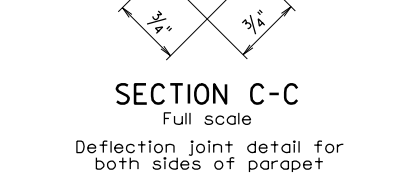
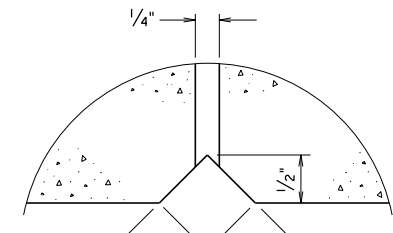
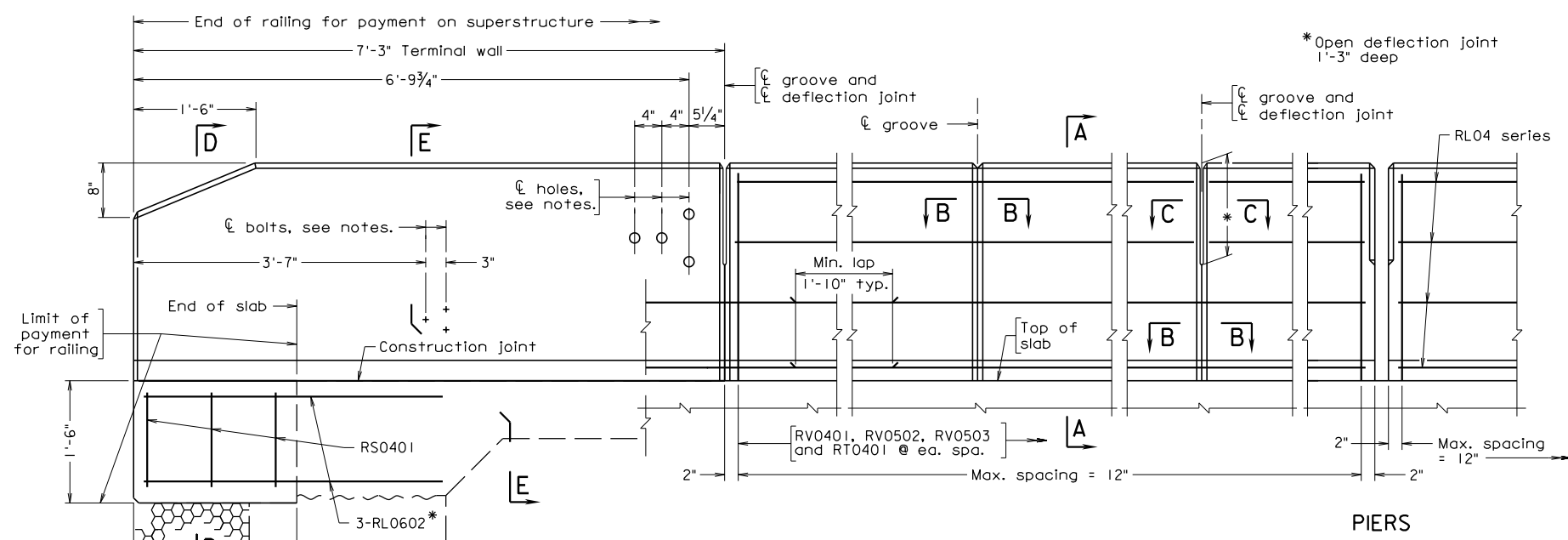
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-3C: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 2
FILE NO. BPB-3C-2

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	PROJECT
			NO.



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	4'-7"	Parapet and terminal wall
RV0503		#5	3 3/4"	2'-4"	Parapet and terminal wall
RV0504		#5	3 3/4"	4'-3"	Terminal wall end support
RV0405		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RL04		#4	—	—	Parapet and terminal wall
RL0602		#6	—	3'-6"	Terminal wall end support
RS0401		#4	3"	6'-2"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab (These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge

BPB-3C-AT 03-10-2015 bpb3cat.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
BPB-3C-AT					

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-3C.

Terminal wall is detailed on superstructure. Standard is used with full integral or semi-integral abutment.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'- 10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

STANDARD BPB-3C-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 3
FILE NO. BPB-3C-AT-2

**32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

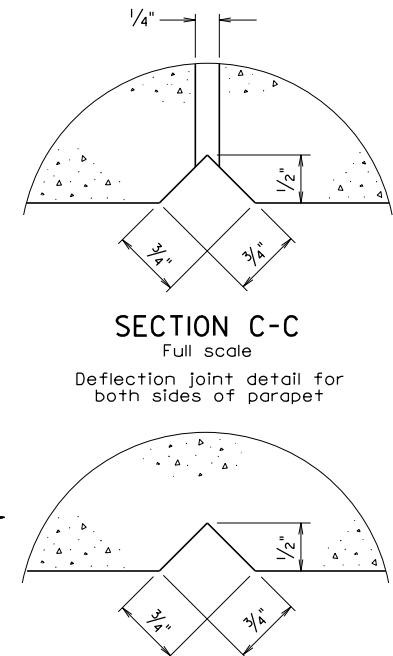
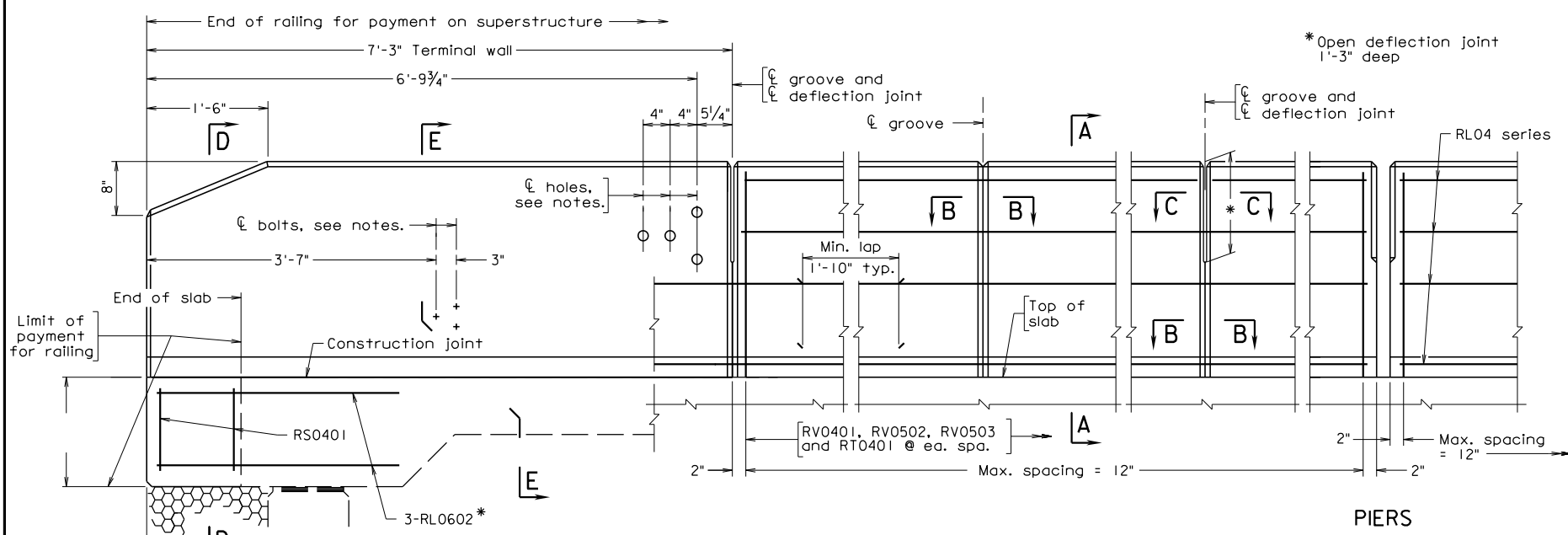
ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

TITLE BLOCK:

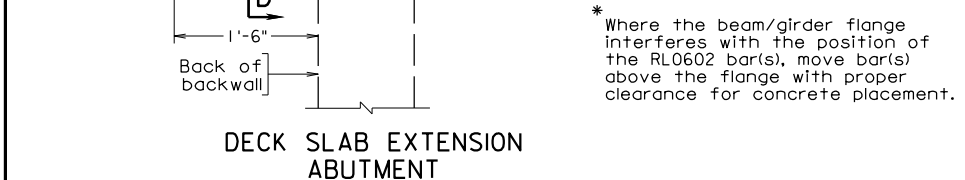
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STANDARD BPB-3C-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-3C-AT-3

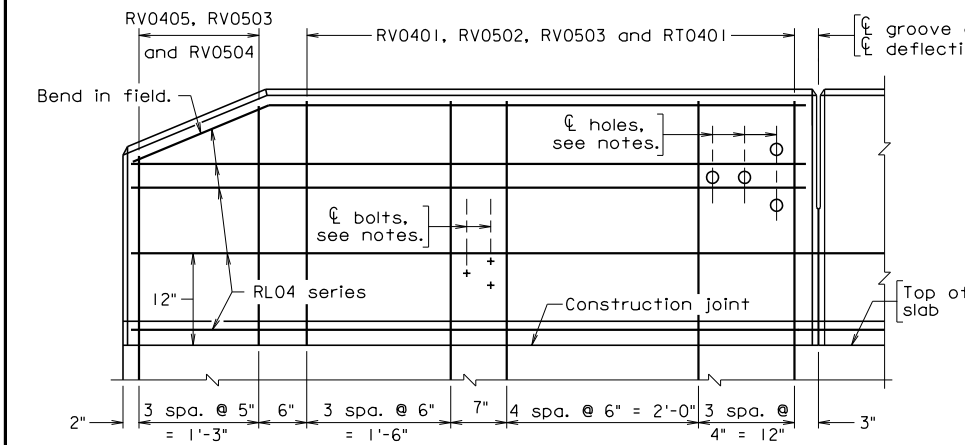
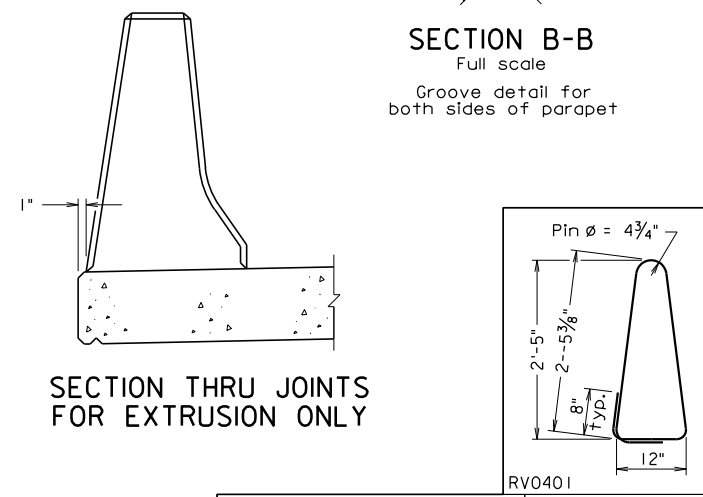
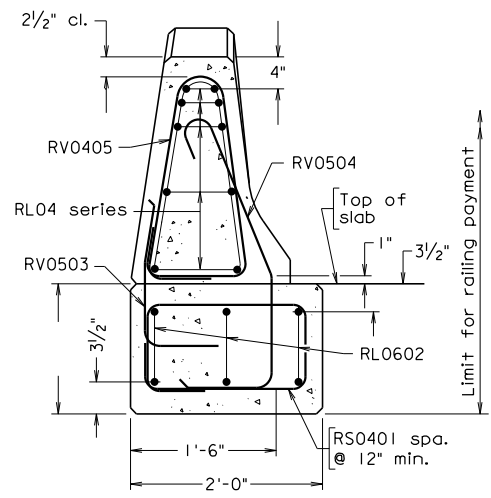


Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.
 Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.
 Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-2.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.



* Where the beam/girder flange interferes with the position of the RL0602 bar(s), move bar(s) above the flange with proper clearance for concrete placement.

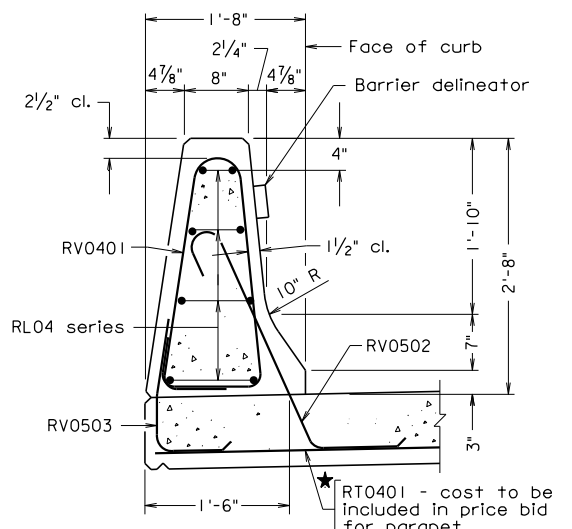
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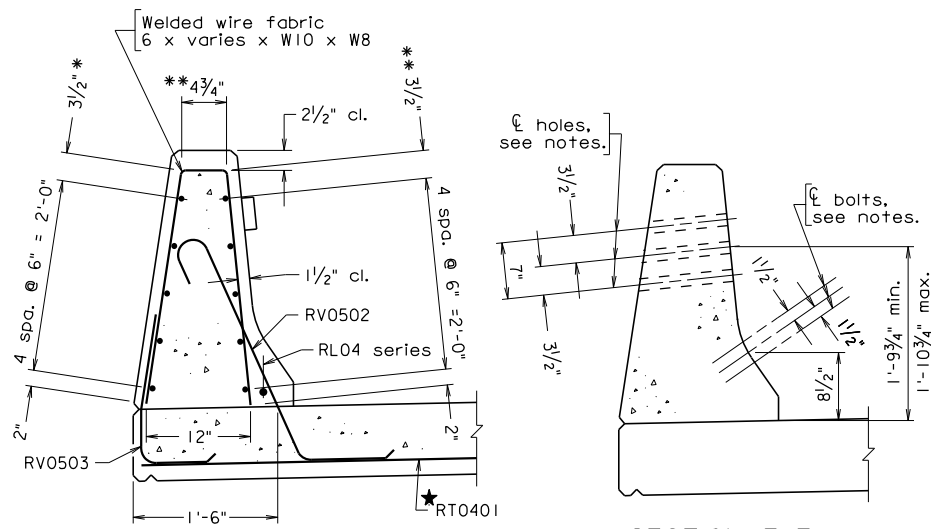
TERMINAL WALL

bpb3d.dgn

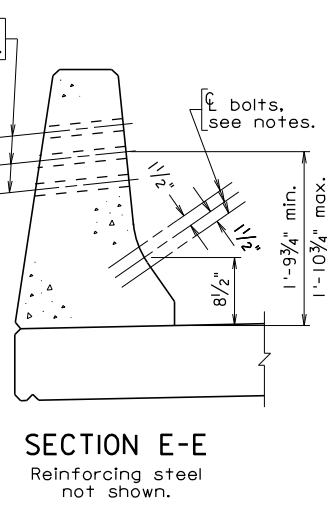
03-10-2015



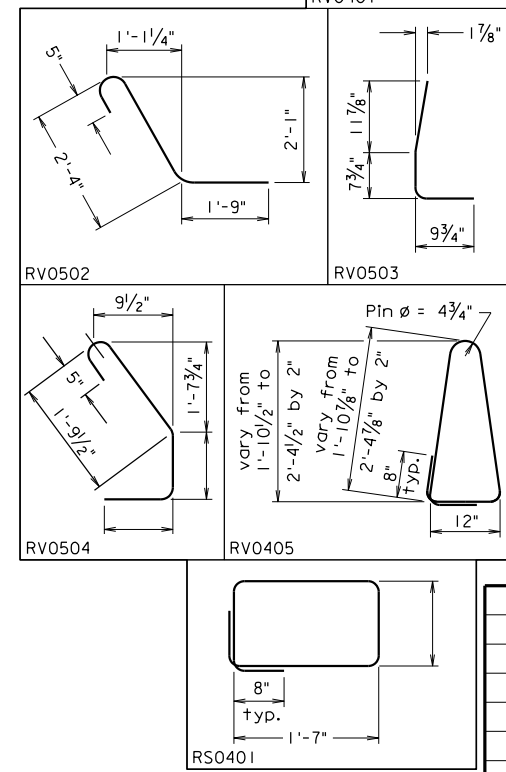
SECTION A-A



SECTION A-A ALTERNATE REINFORCING STEEL



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



REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★	RT0401	#4	—	3'-0"	Slab
	RV0401	#4	3"	7'-3"	Parapet and terminal wall
	RV0502	#5	3 3/4"	4-7	Parapet and terminal wall
	RV0503	#5	3 3/4"	2'-4"	Parapet and terminal wall
	RV0504	#5	3 3/4"		Terminal wall end support
	RV0405	#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
	RL04	#4	—		Parapet and terminal wall
	RL0602	#6	—	3'-0"	Terminal wall end support
	RS0401	#4	3"		Terminal wall end support

Dimensions in bending diagram are out-to-out of bars, except as shown.
 Cost of all bars listed in schedule to be included in price bid for parapet.
 Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
 All concrete above roadway slab
 ★ Used only when deck transverse reinforcement is parallel to skew of bridge

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-3D-AT.

Terminal wall is detailed on superstructure. Standard is used with deck slab extension.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Provide dimension for terminal wall end support.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Complete dimension and length of bars RV0504 and RS0401.

Modify steel rebars if initial overlay used on bridge.

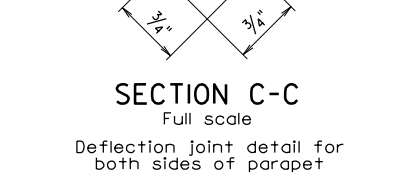
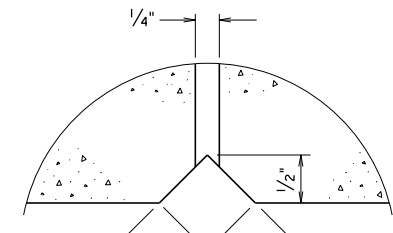
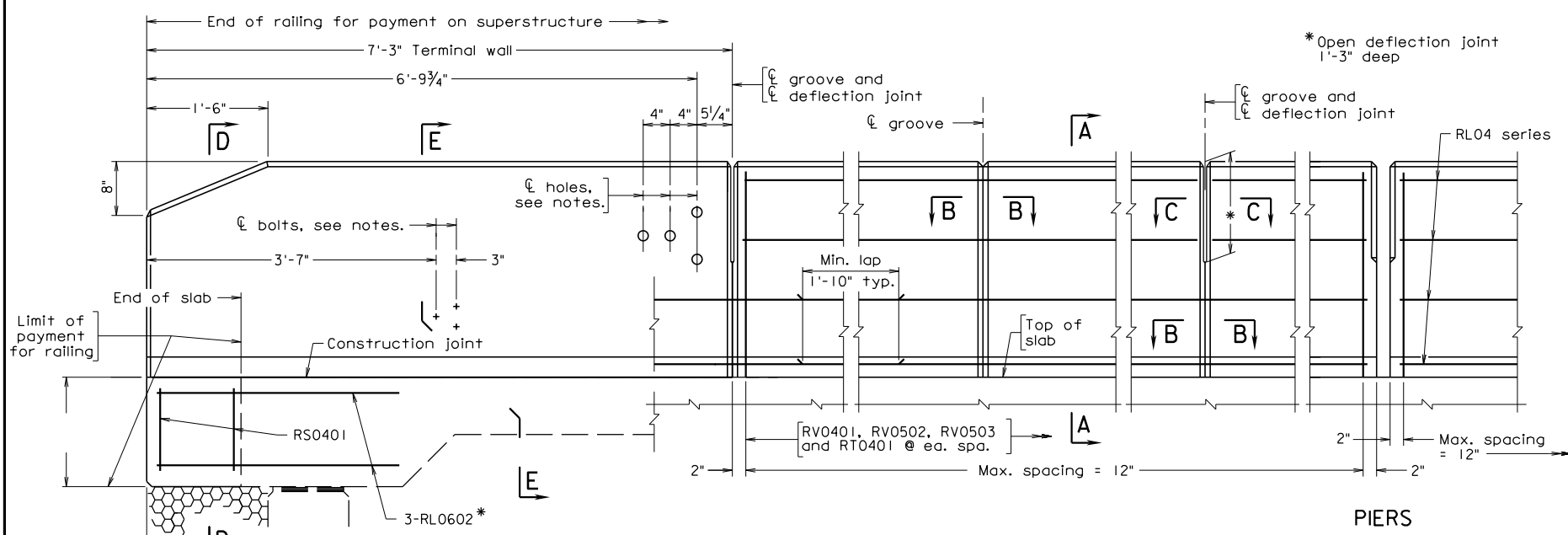
NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

TITLE BLOCK:

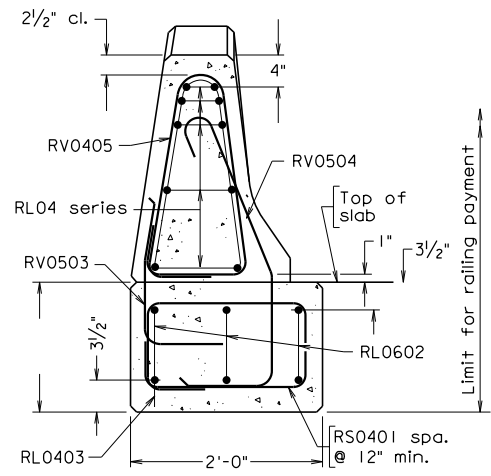
Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.

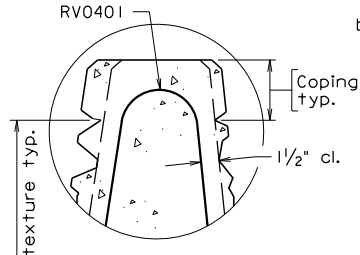


PIERS

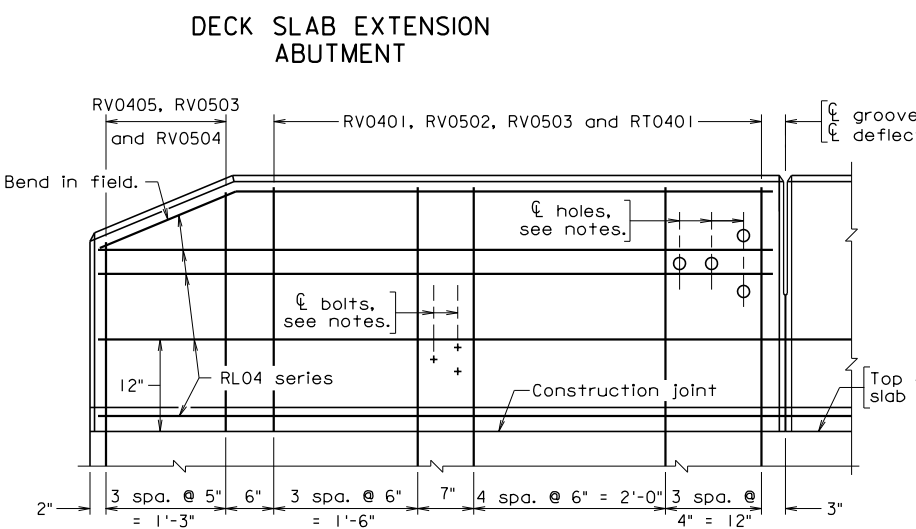
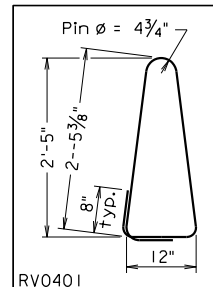
ELEVATION



SECTION D-D



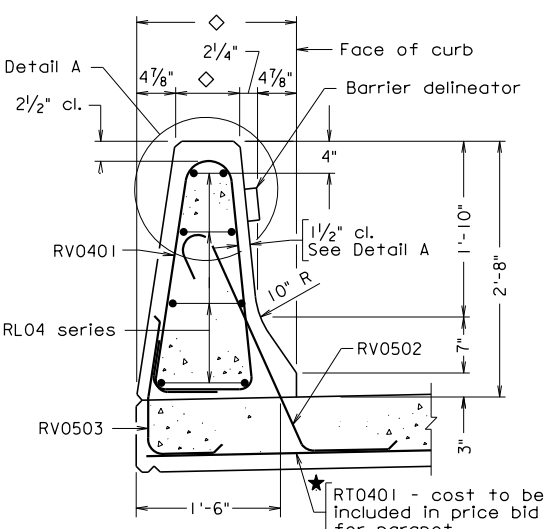
DETAIL A
Both sides of architectural treatment shown



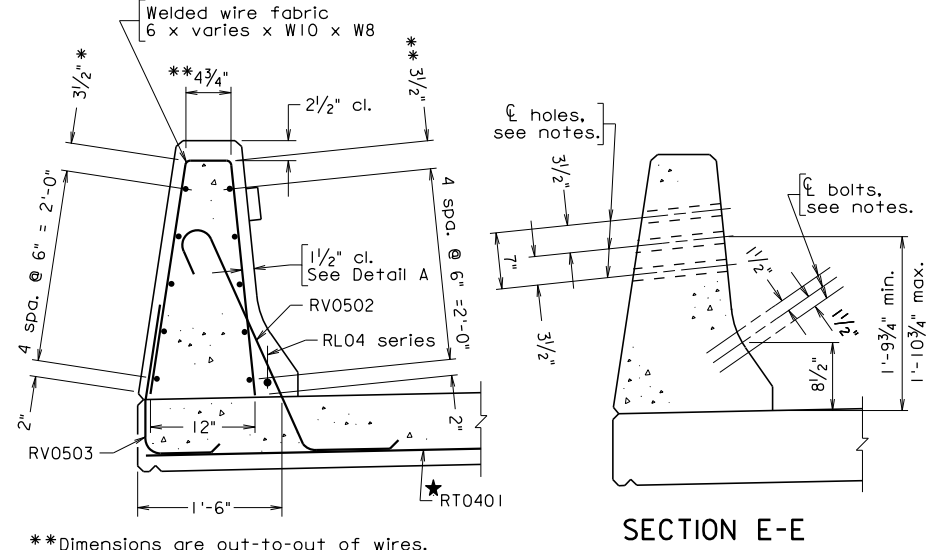
DECK SLAB EXTENSION ABUTMENT



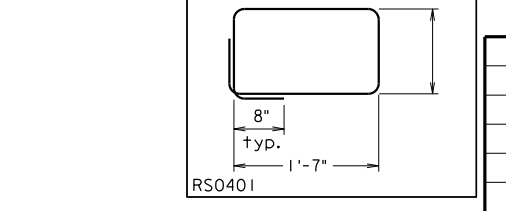
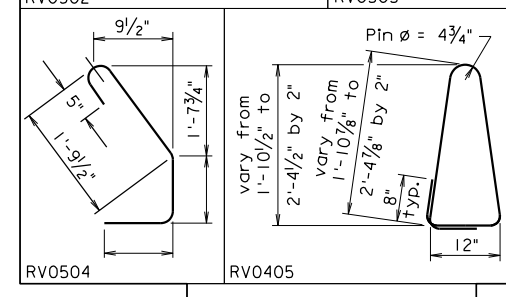
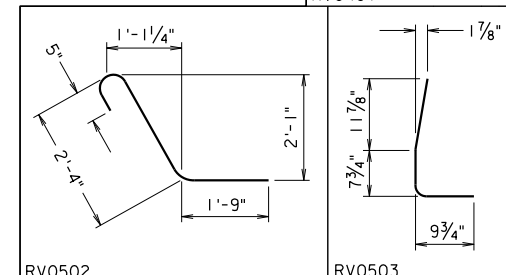
TERMINAL WALL



SECTION A-A



SECTION A-A
ALTERNATE REINFORCING STEEL



REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0401		#4	3"	7'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	4-7	Parapet and terminal wall
RV0503		#5	3 3/4"	2'-4"	Parapet and terminal wall
RV0504		#5	3 3/4"		Terminal wall end support
RV0405		#4	3"	from 6'-2" to 7'-2"	Terminal wall (4 per terminal wall)
RL04		#4	—		Parapet and terminal wall
RL0602		#6	—	3'-0"	Terminal wall end support
RS0401		#4	3"		Terminal wall end support

Dimensions in bending diagram are out-to-out of bars, except as shown.
Cost of all bars listed in schedule to be included in price bid for parapet.
Gross concrete quantities (C.Y.) = Lin. Ft. x 0.105
All concrete above roadway slab (These quantities do not include architectural treatment.)
★ Used only when deck transverse reinforcement is parallel to skew of bridge

BPB-3D-AT 03-10-2015 bpb3dat.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		
			Checked: S&B...DIV		
Revisions			BPB-3D-AT		

32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 2'-8" and has been crash tested for TL-4 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-3D.

Terminal wall is detailed on superstructure. Standard is used with deck slab extension.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 2'-8" height of the parapet would need to be adjusted to 4" and 2'-9" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL04-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

Modify vertical dimensions (3" curb and 2'-8" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Provide dimension for terminal wall end support.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¼" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

**32" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Complete dimension and length of bars RV0504 and RS0401.

Modify steel rebars if initial overlay used on bridge.

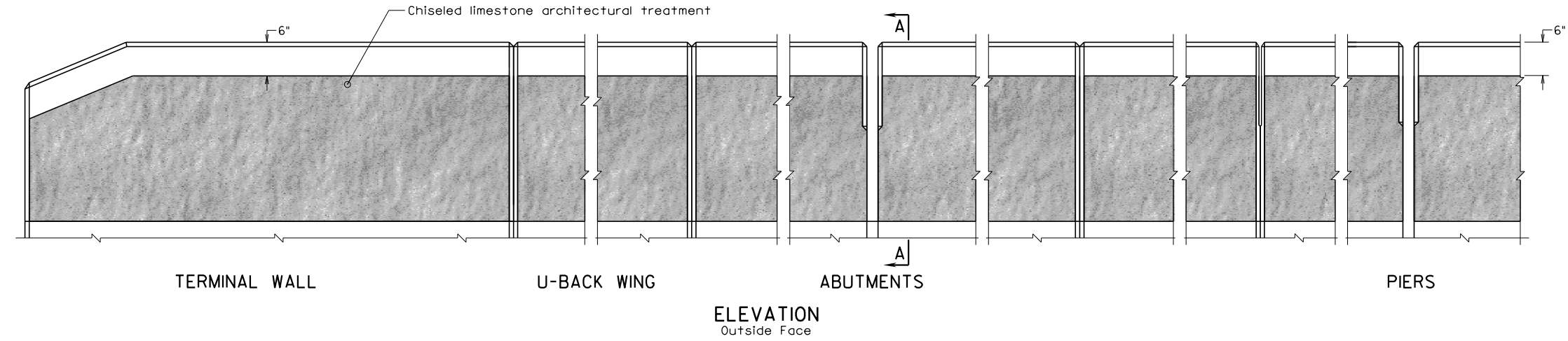
NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID		STATE		SHEET
VA.	ROUTE	PROJECT	ROUTE	PROJECT	NO.



Notes:

Architectural treatment for the parapet and terminal walls shall simulate chiseled limestone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled limestone pattern without obvious repetition of the pattern.

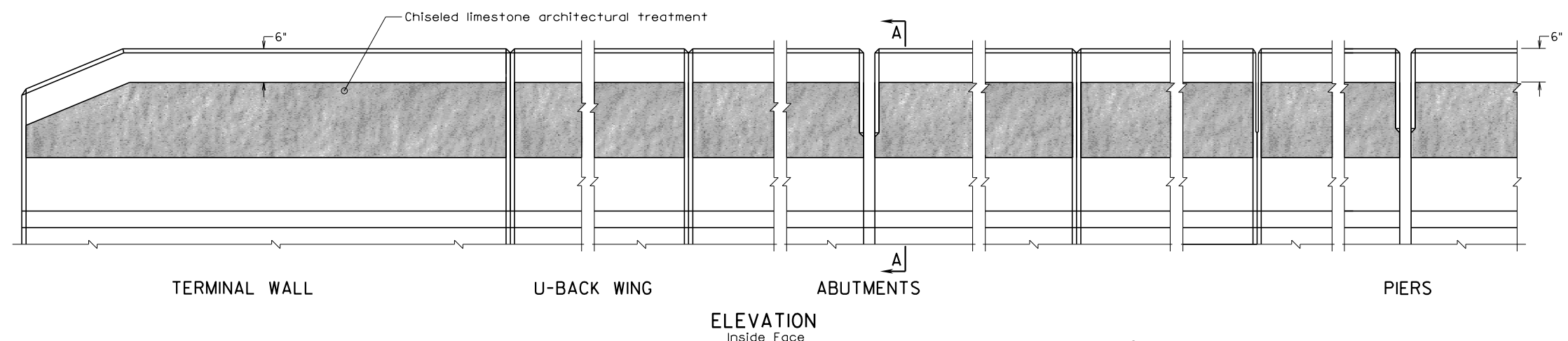
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

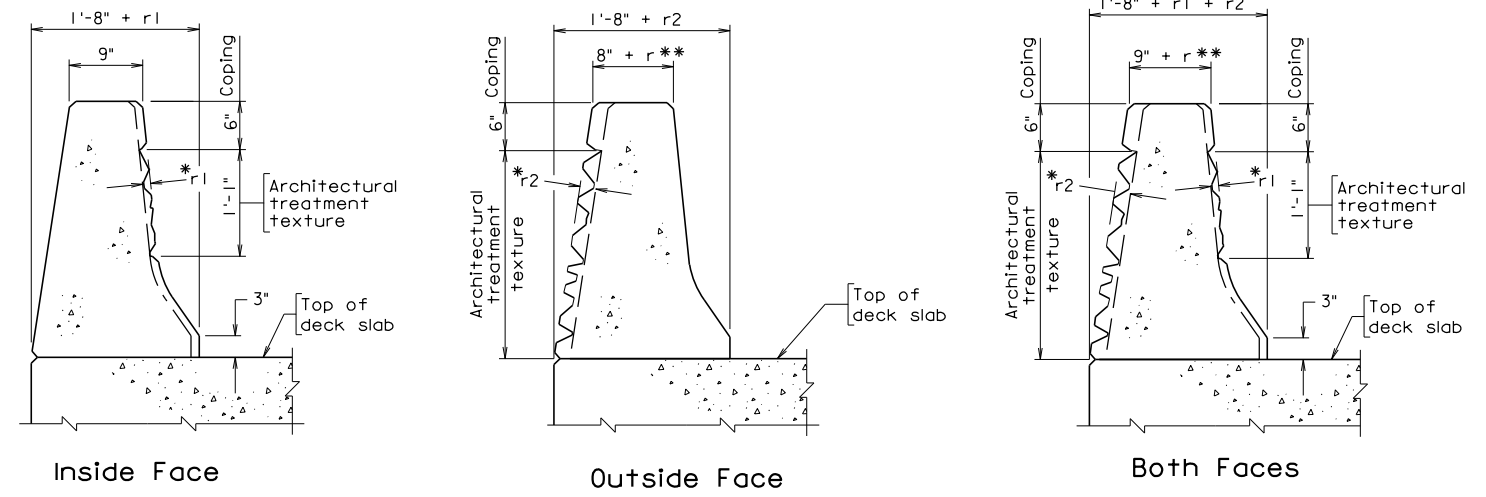
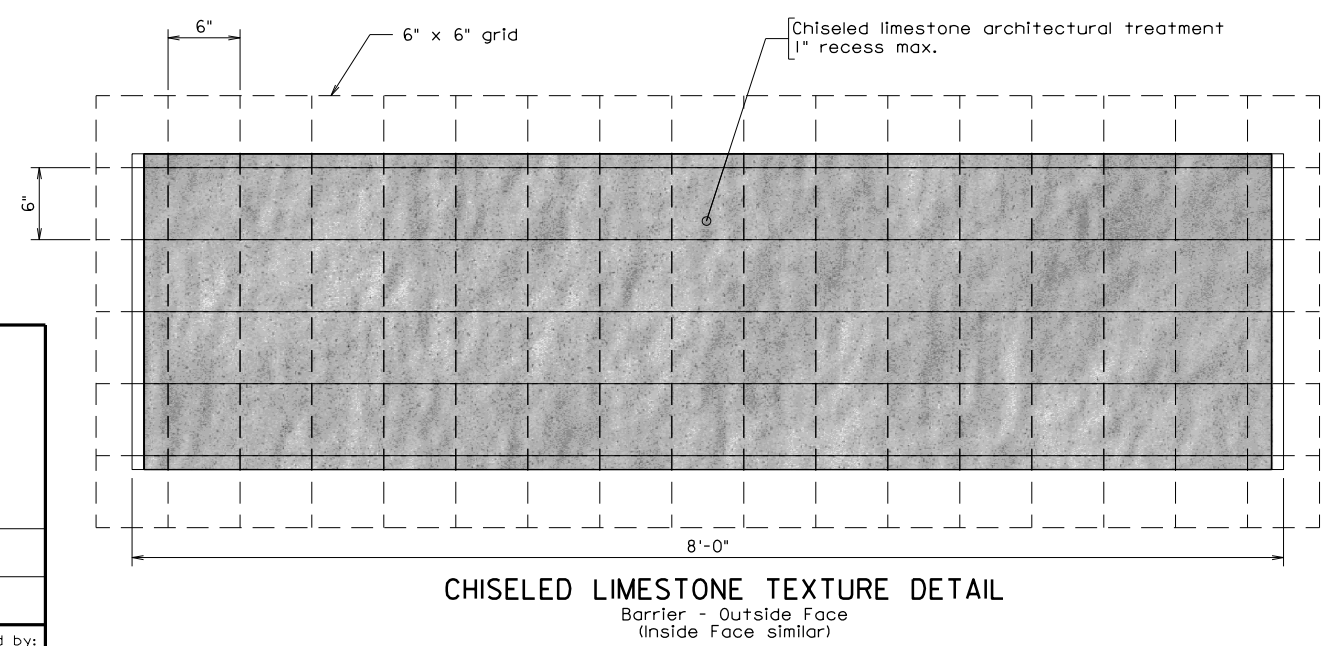
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-1
03-10-2015
bbpat1.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV	BPB-AT-1	

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**ARCHITECTURAL TREATMENT
WITH CHISLED LIMESTONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

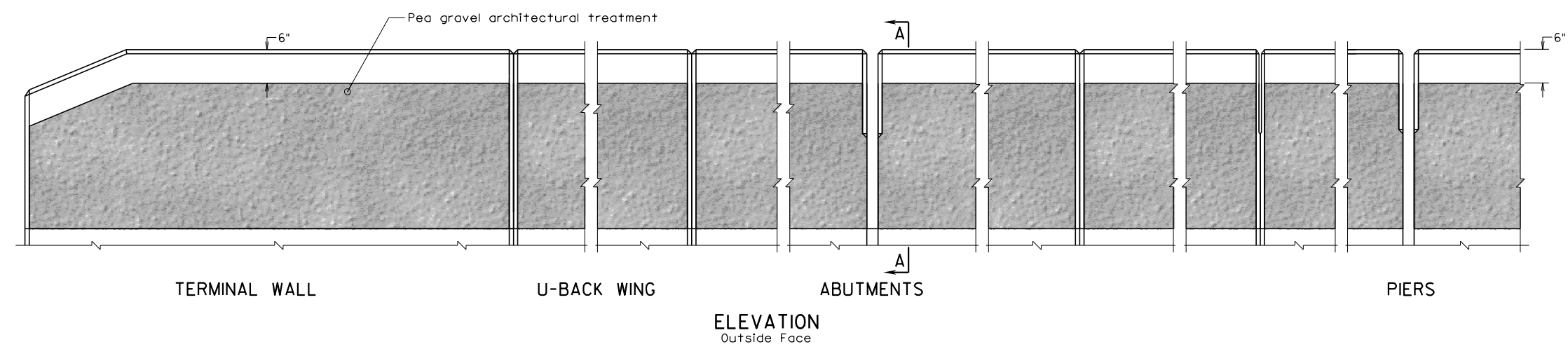
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	ROUTE	FEDERAL AID	PROJECT	ROUTE	PROJECT	SHEET NO.
VA.						



Notes:

Architectural treatment for the parapet and terminal walls shall simulate pea gravel texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous pea gravel pattern without obvious repetition of the pattern.

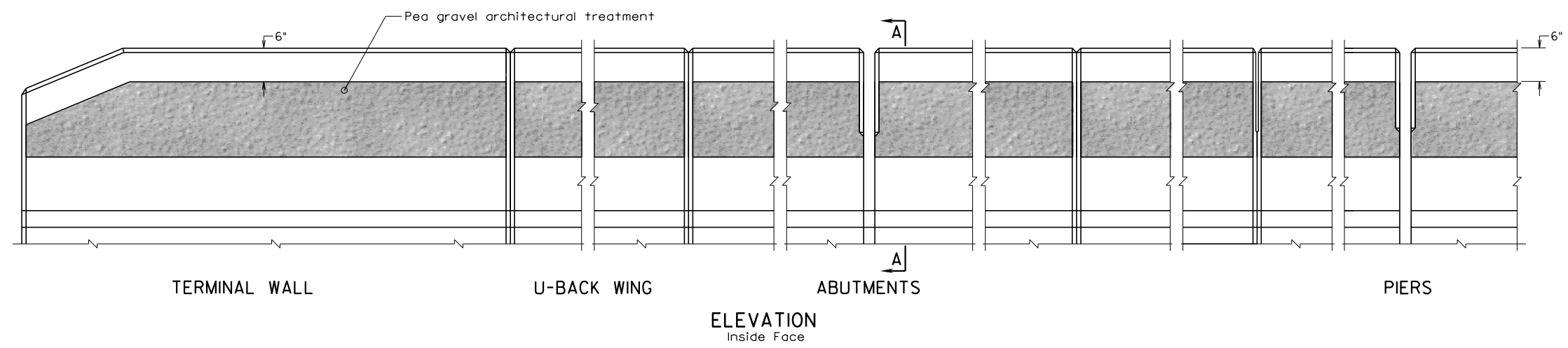
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

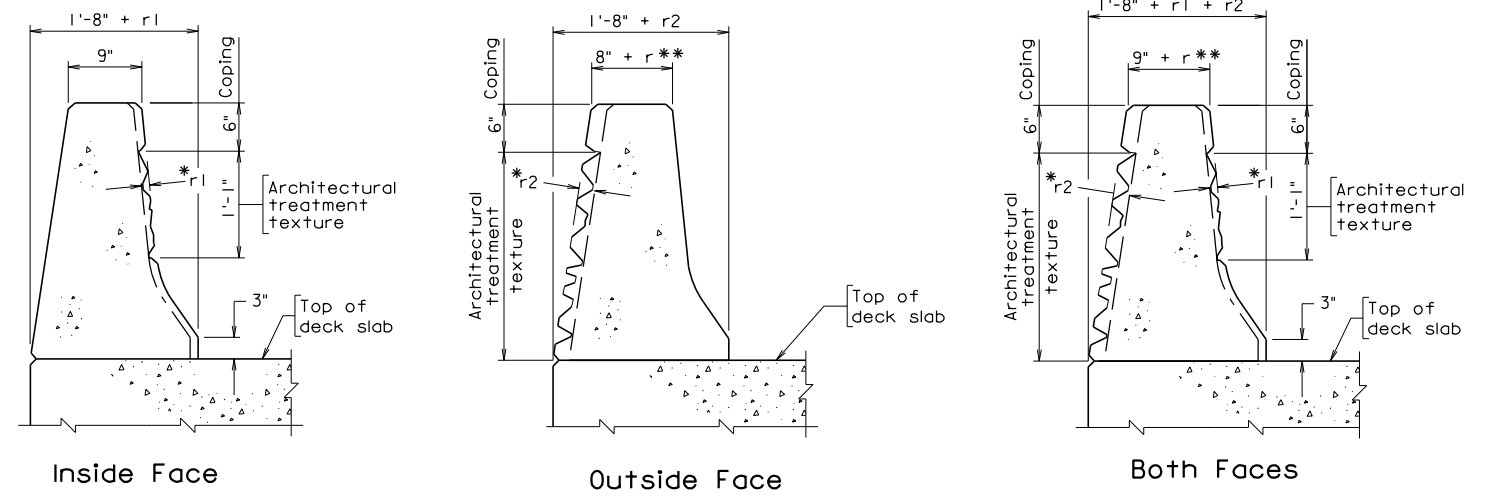
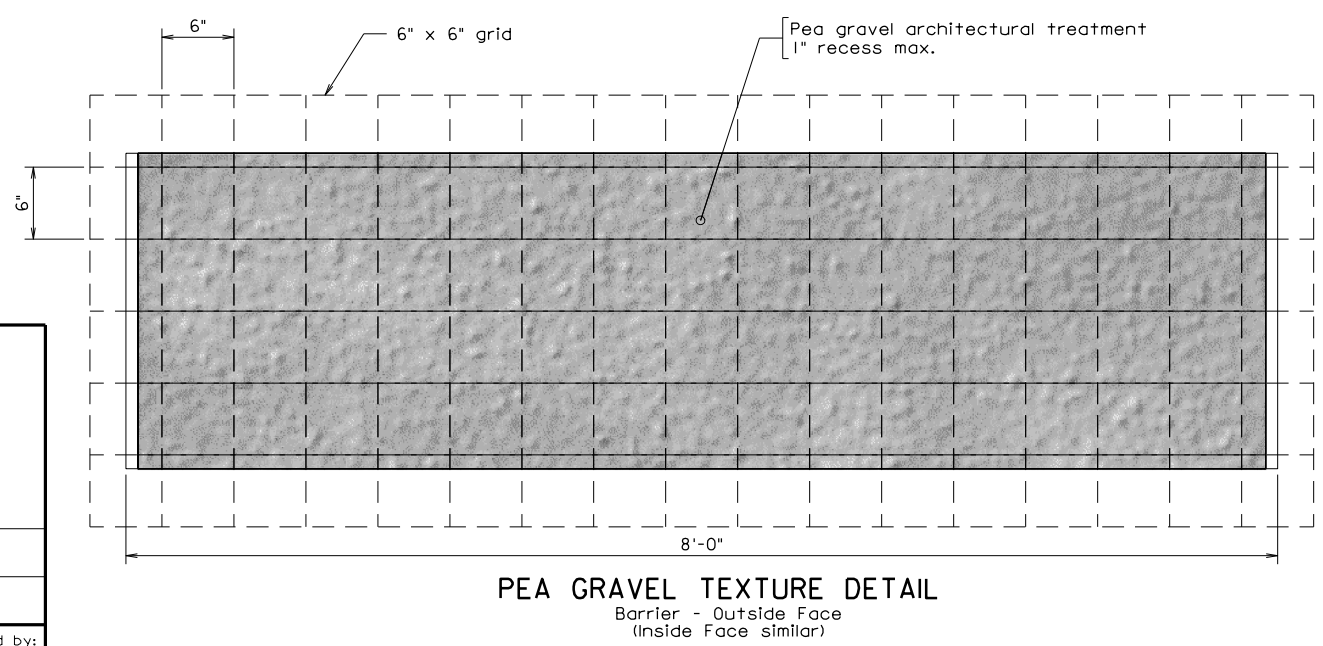
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-2 03-10-2015 bpbat2.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH PEA GRAVEL FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-AT-2		

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**ARCHITECTURAL TREATMENT
WITH PEA GRAVEL
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

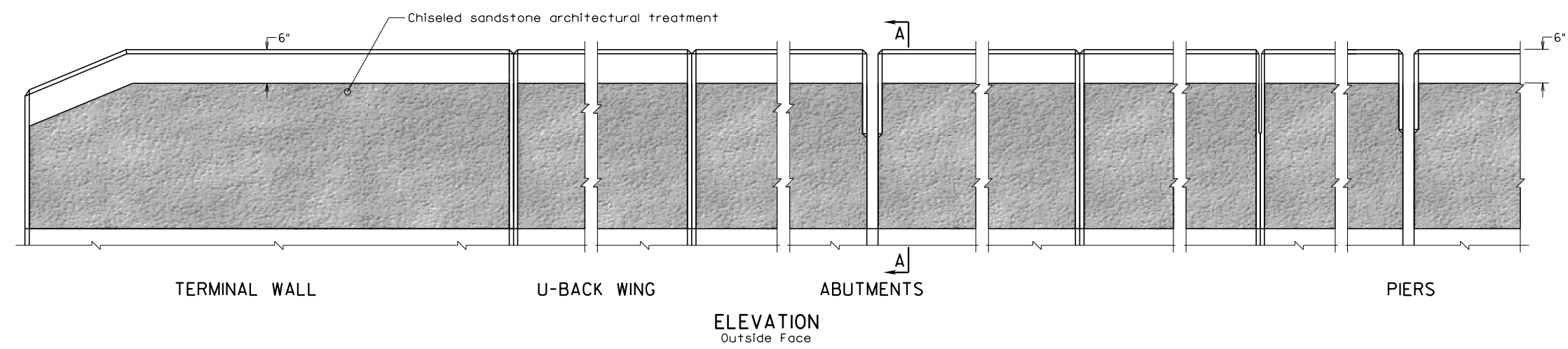
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate chiseled sandstone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled sandstone pattern without obvious repetition of the pattern.

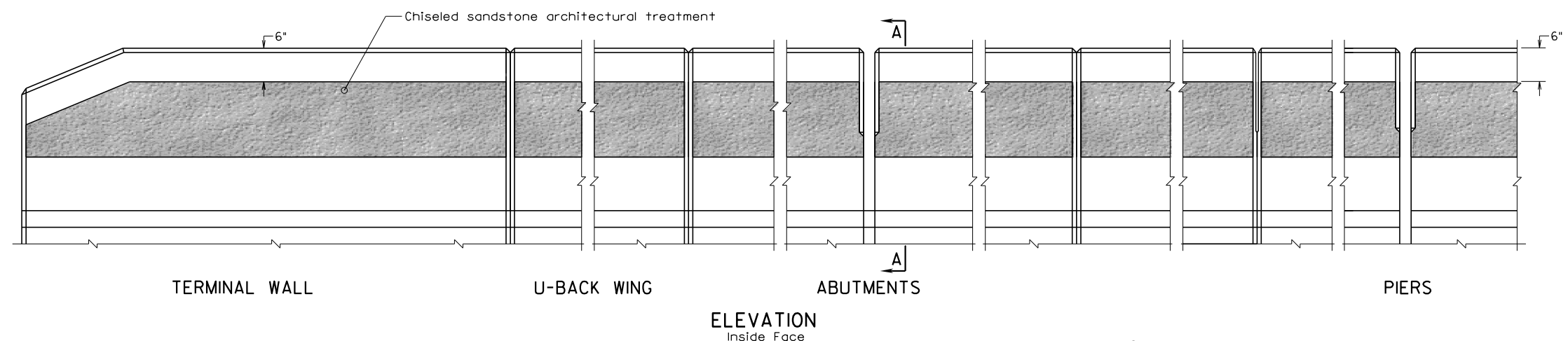
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

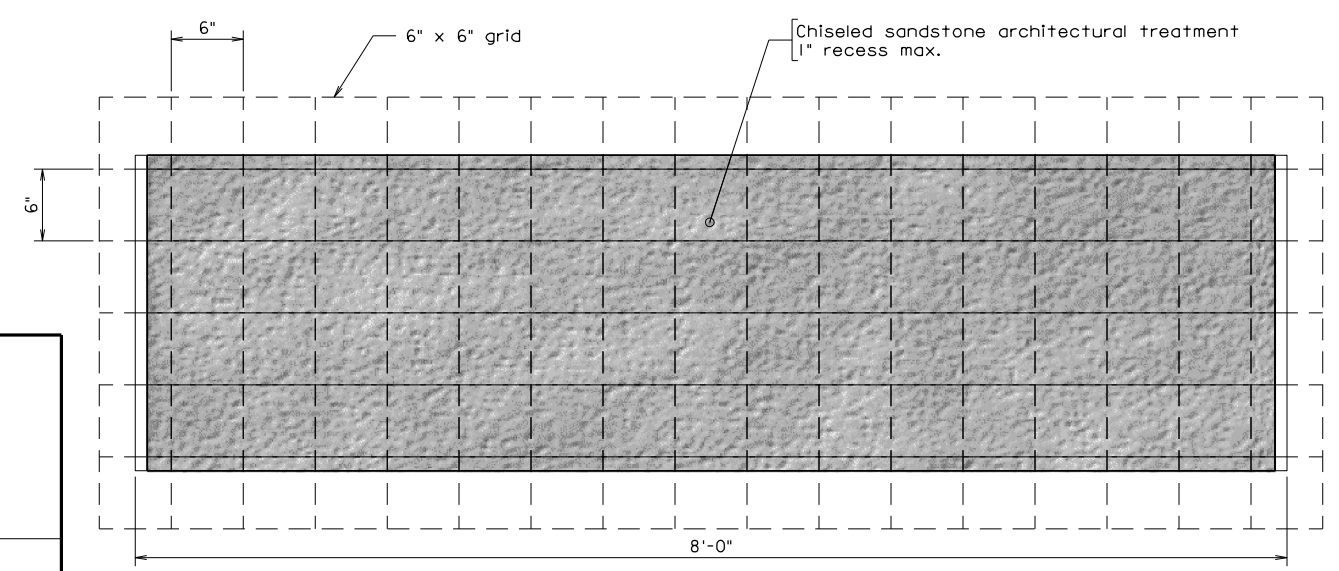
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

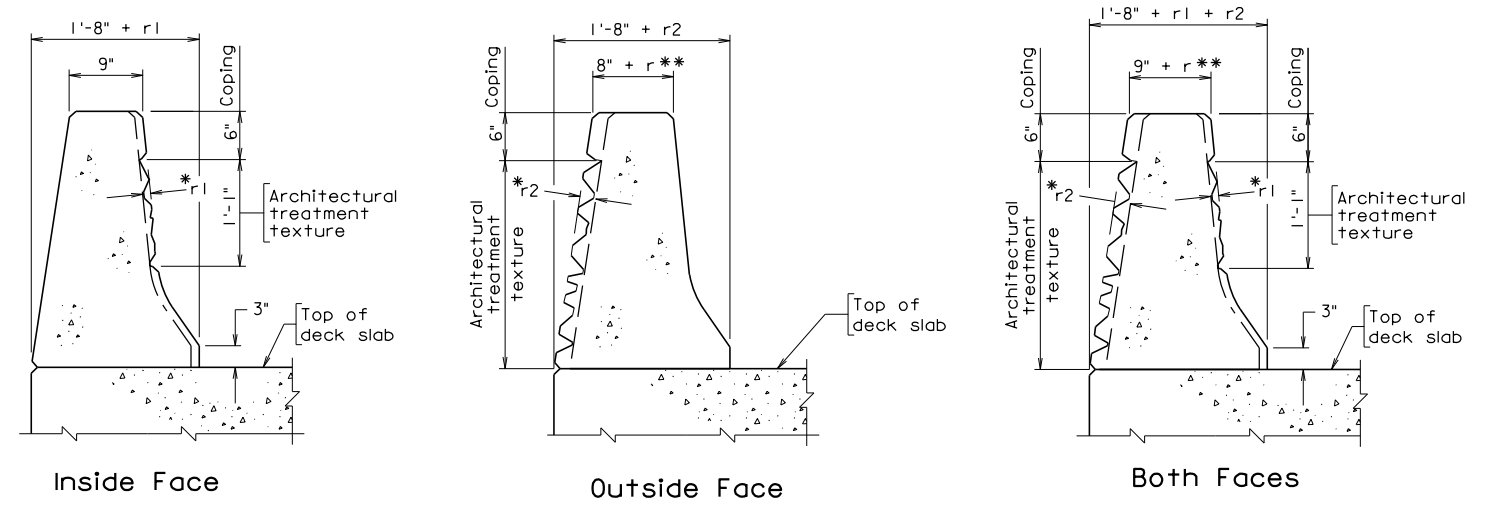
For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



CHISELED SANDSTONE TEXTURE DETAIL
Barrier - Outside Face
(inside face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

bbbat3.dgn

03-10-2015

BPB-AT-3

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH CHISELED SANDSTONE FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
Revisions			Checked: S&B, DIV		
BPB-AT-3					

**ARCHITECTURAL TREATMENT
WITH CHISLED SANDSTONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

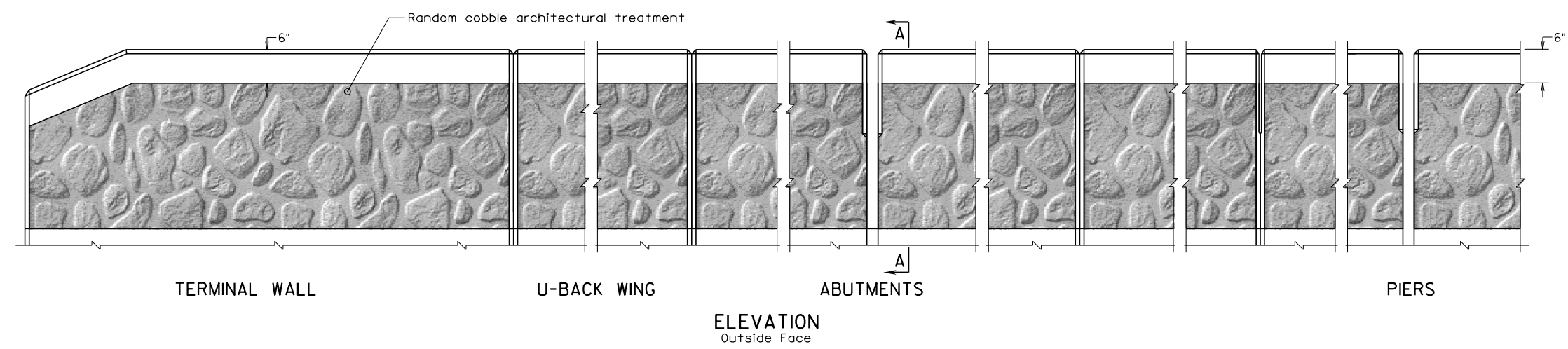
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT		
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate random cobble texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous random cobble pattern without obvious repetition of the pattern.

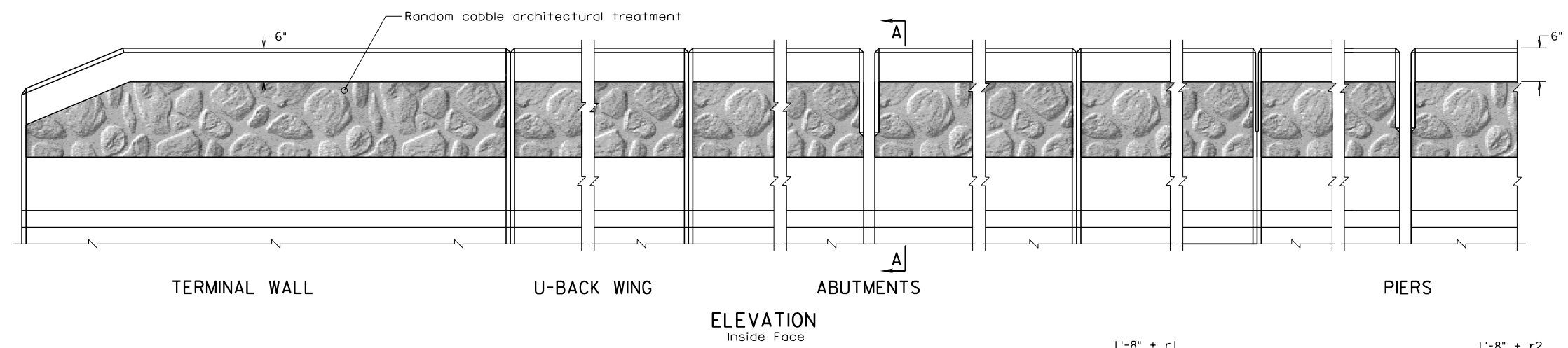
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

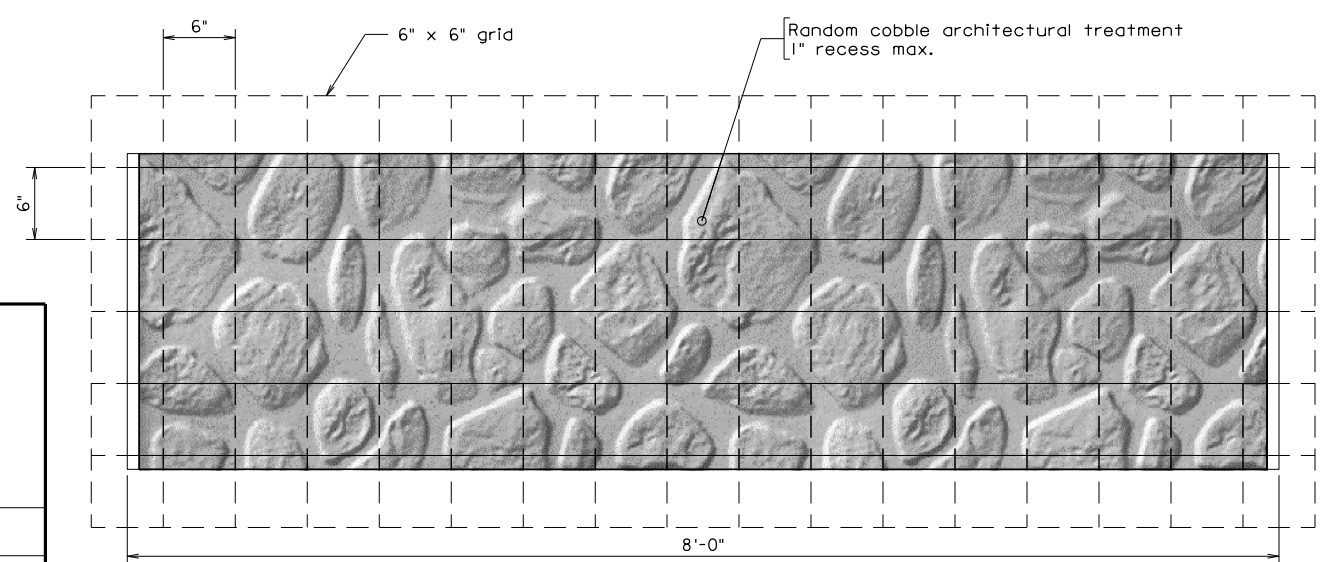
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

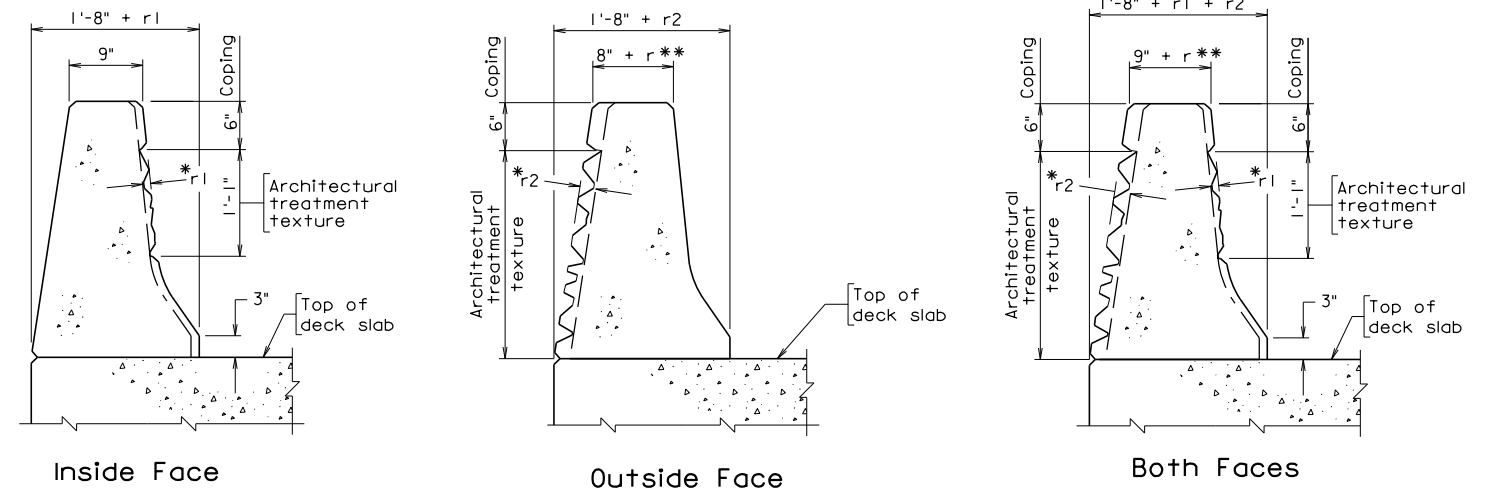
For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



RANDOM COBBLE TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

bbbat4.dgn

03-10-2015

BPB-AT-4

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH RANDOM COBBLE FOR CONCRETE PARAPET (F-SHAPE)			
No.	Description	Date	Revisions
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV		Sheet No.	
Checked: S&B...DIV		BPB-AT-4	

**ARCHITECTURAL TREATMENT
WITH RANDOM COBBLE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

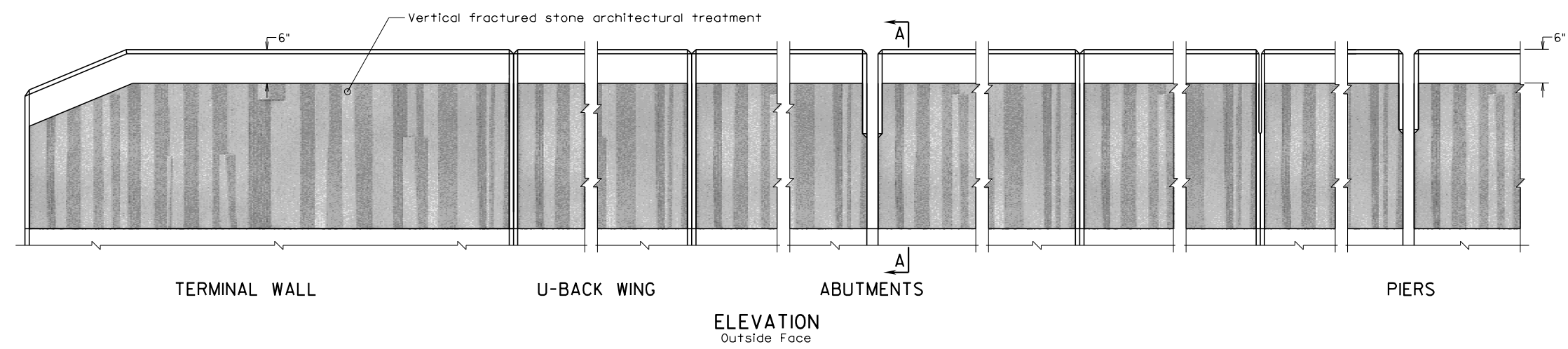
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate vertical fractured stone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous vertical fractured stone pattern without obvious repetition of the pattern.

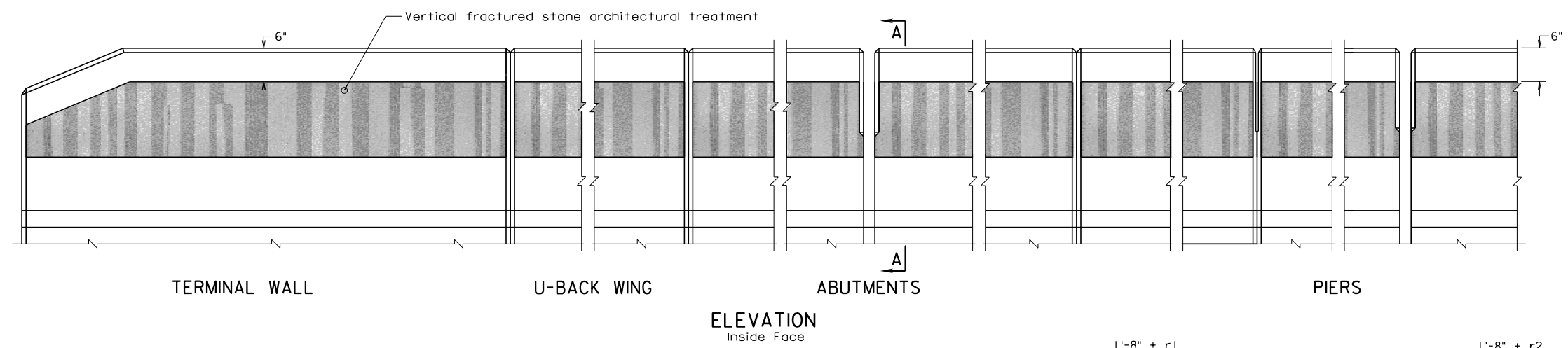
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

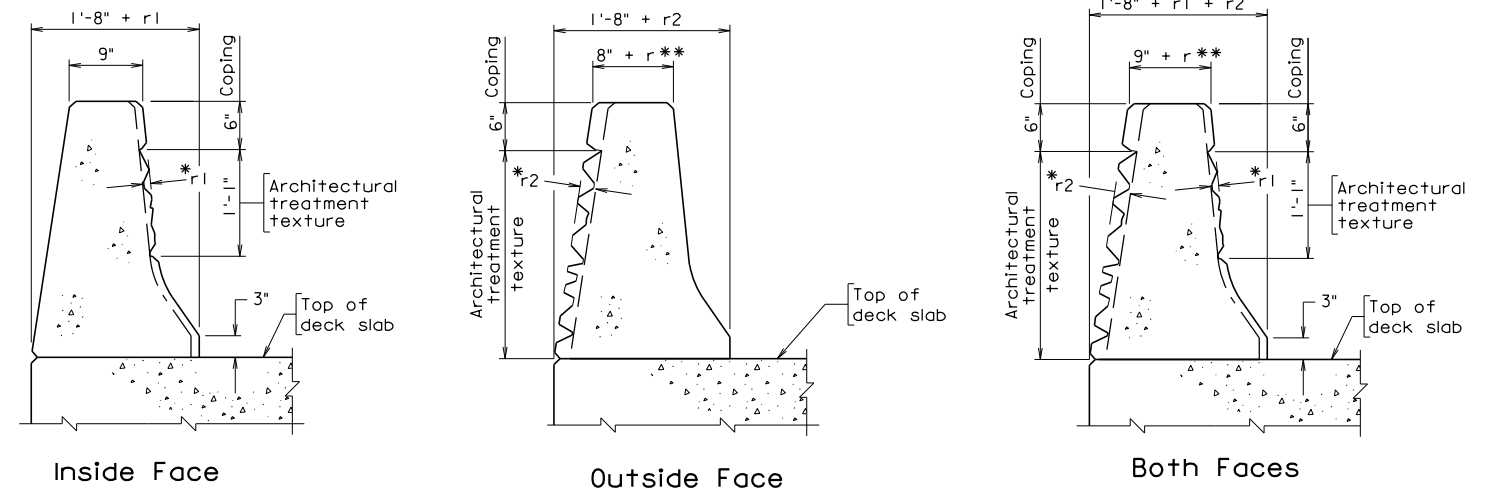
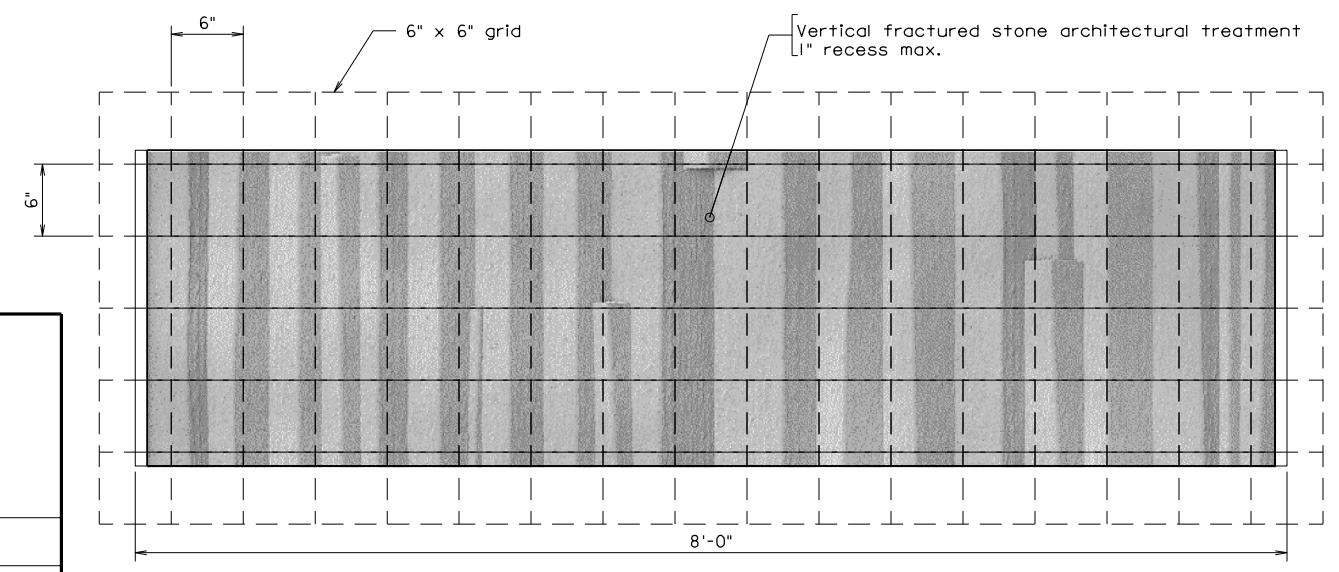
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

bbba15.dgn

03-10-2015

BPB-AT-5

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

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STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH VERTICAL FRACTURED STONE FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV		
BPB-AT-5					

**ARCHITECTURAL TREATMENT
WITH VERTICAL FRACTURE STONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

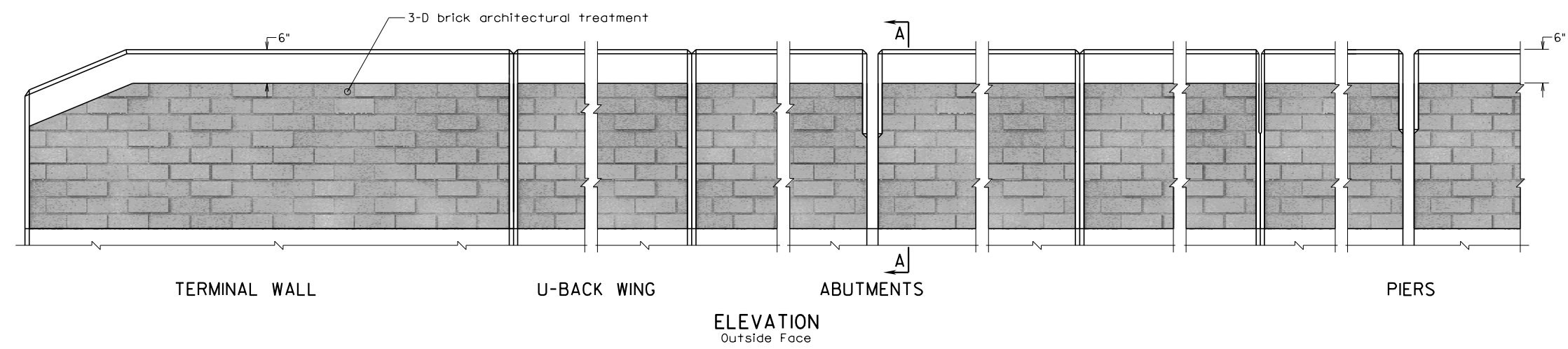
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT		
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate 3-D brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous 3-D brick pattern without obvious repetition of the pattern.

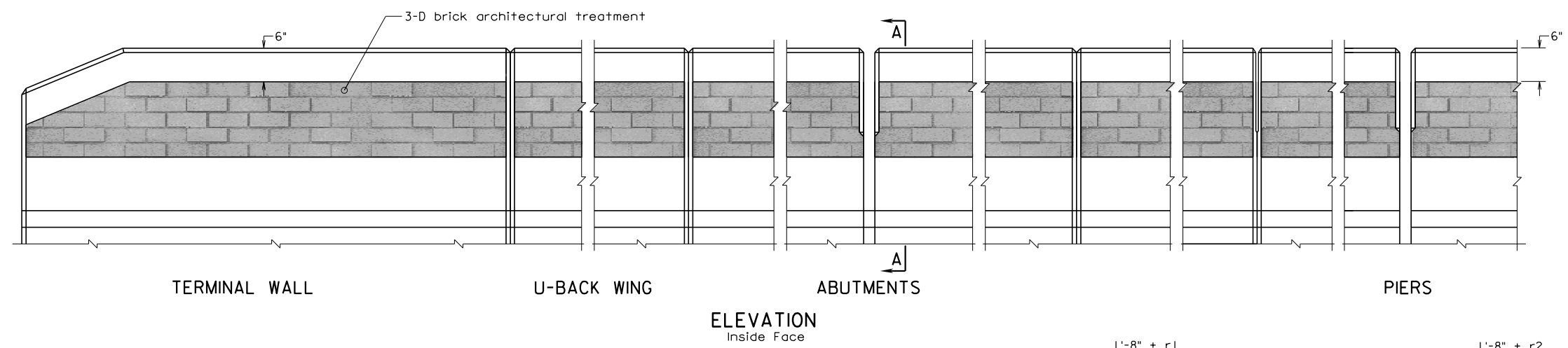
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

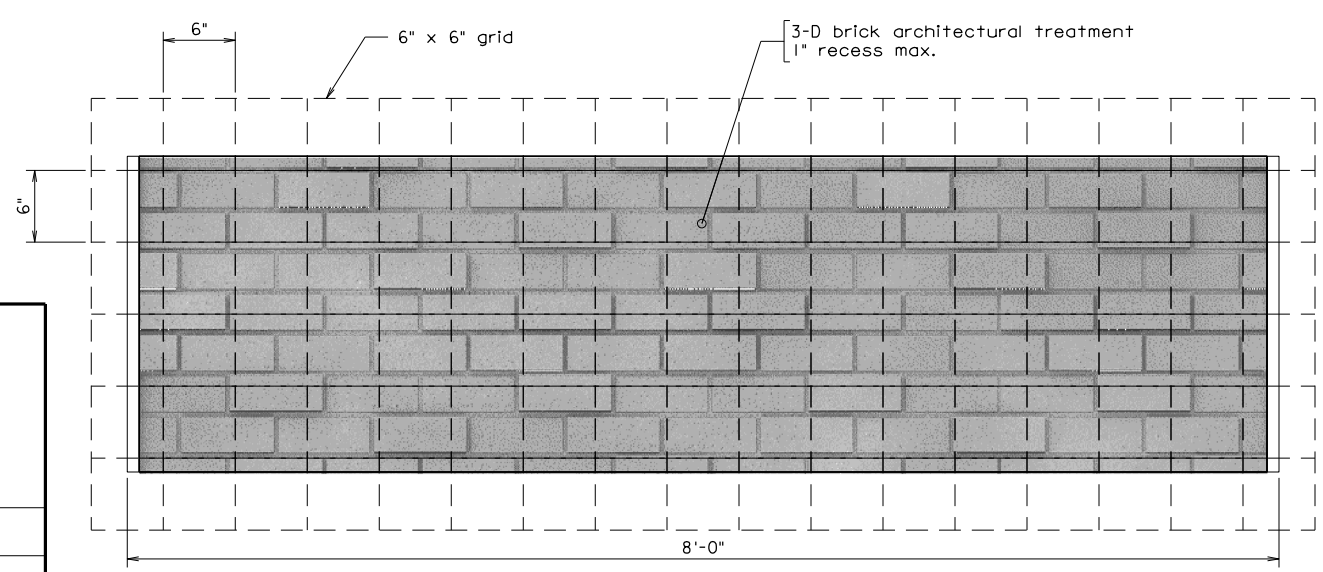
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

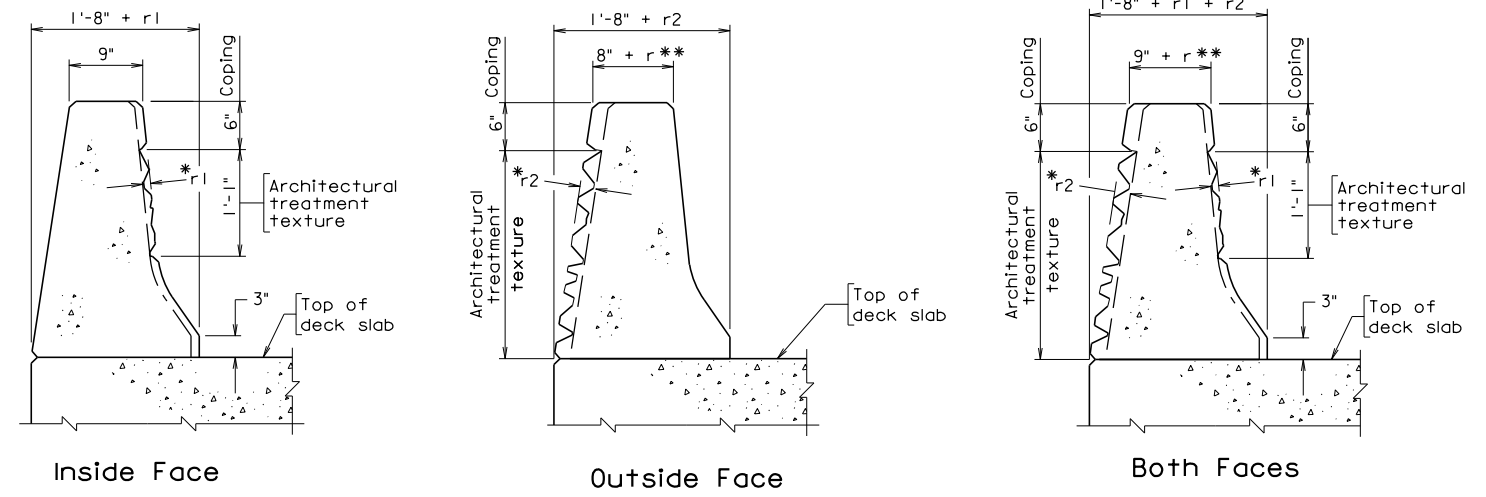
For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



3-D BRICK TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

bbbat6.dgn

03-10-2015

BPB-AT-6

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ARCHITECTURAL TREATMENT WITH 3-D BRICK FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No. Sheet No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions			BPB-AT-6		

**ARCHITECTURAL TREATMENT
WITH 3-D BRICK
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

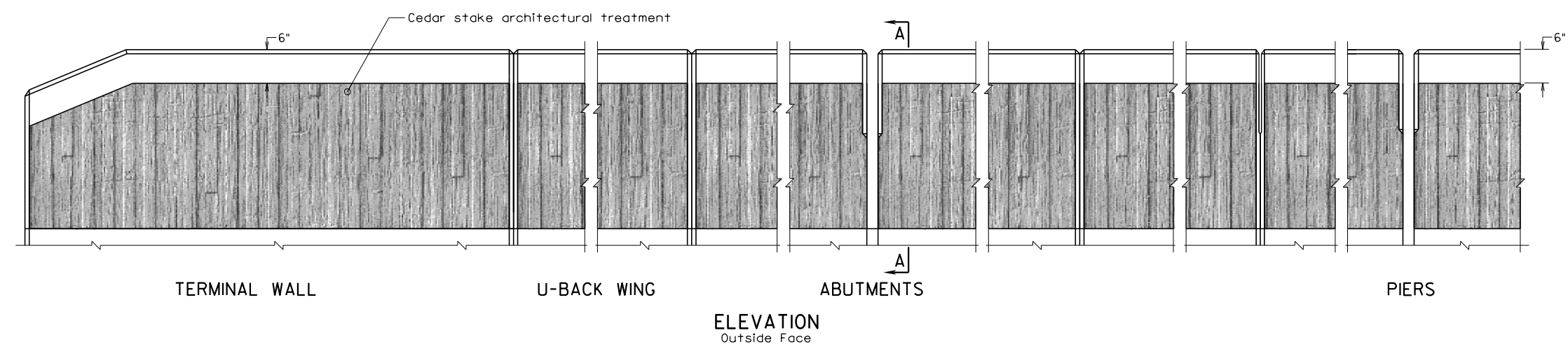
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT		
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate cedar stake texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous cedar stake pattern without obvious repetition of the pattern.

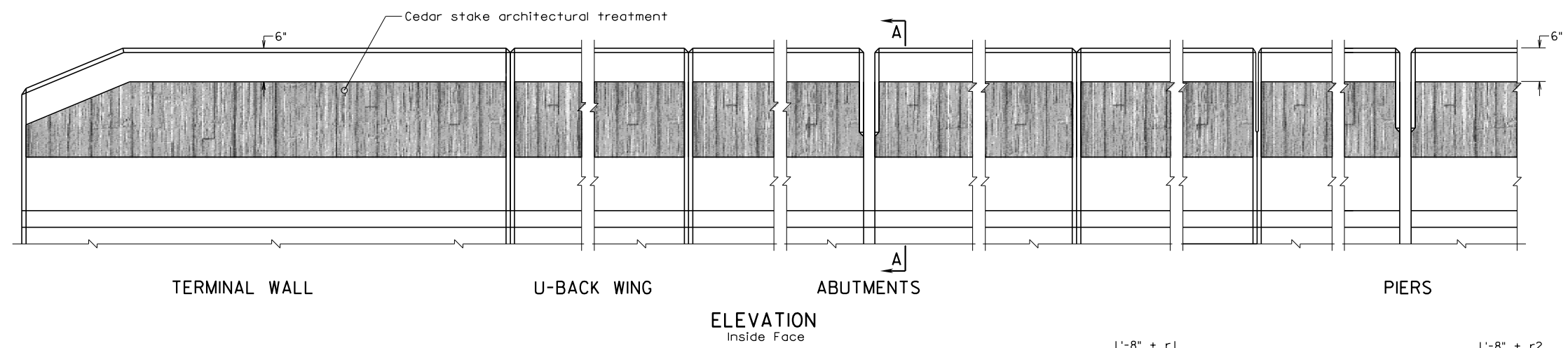
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

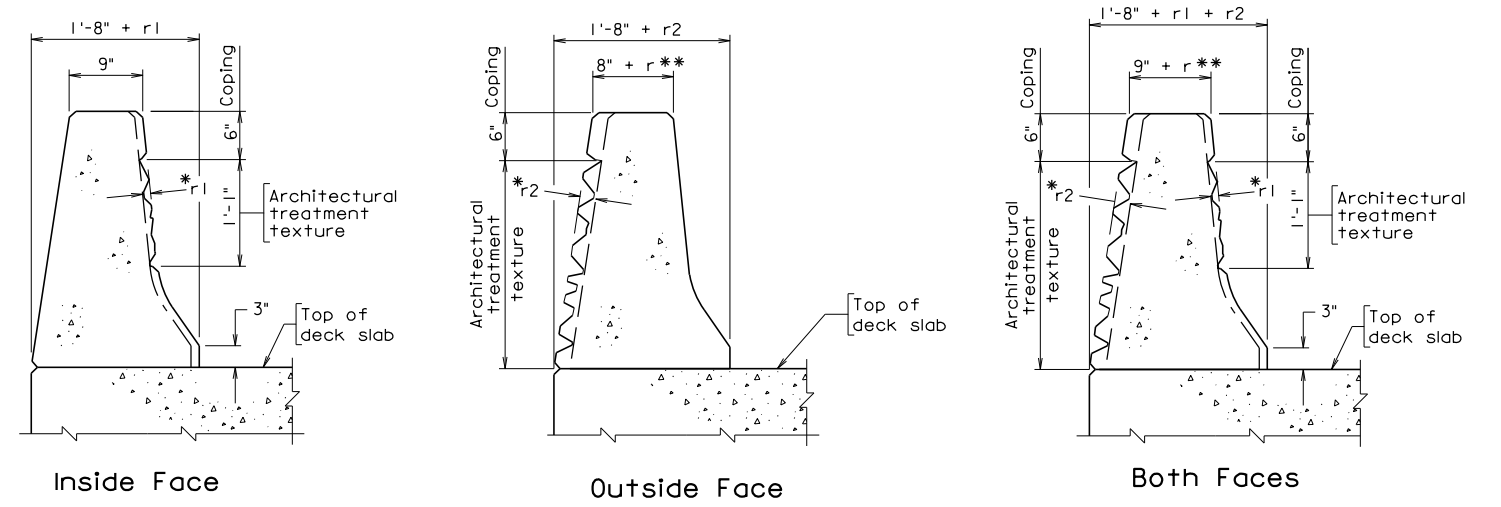
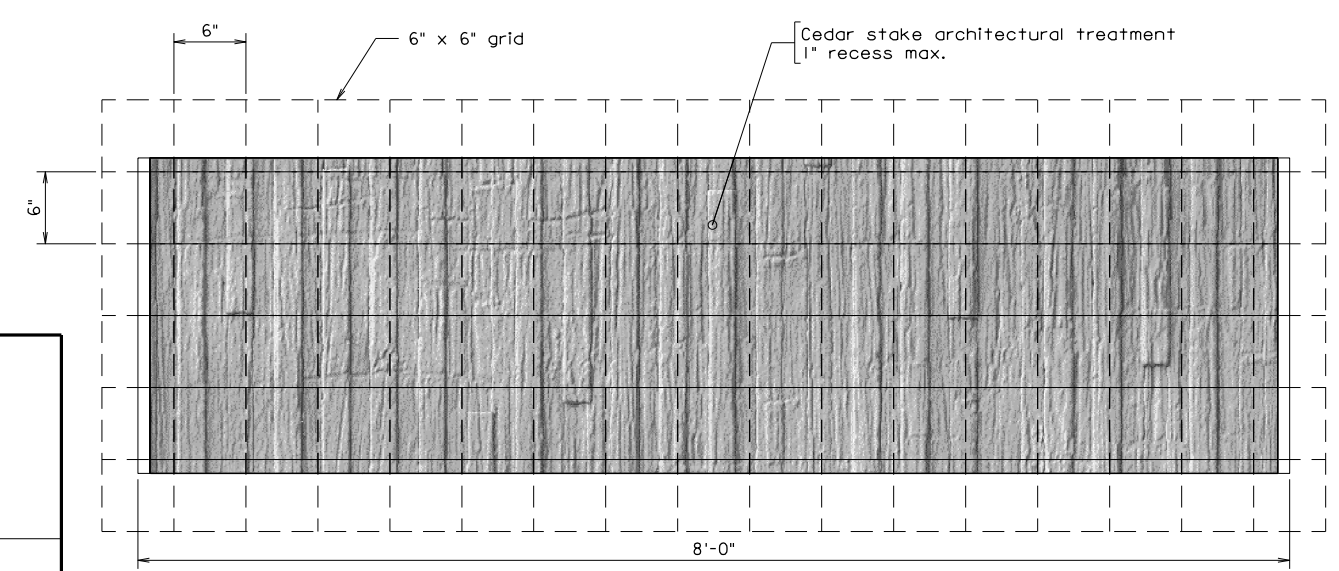
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-7
03-10-2015
bbbat7.dgn

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March 10, 2015

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH CEDAR STAKE FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BPB-AT-7		

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**ARCHITECTURAL TREATMENT
WITH CEDAR STAKE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

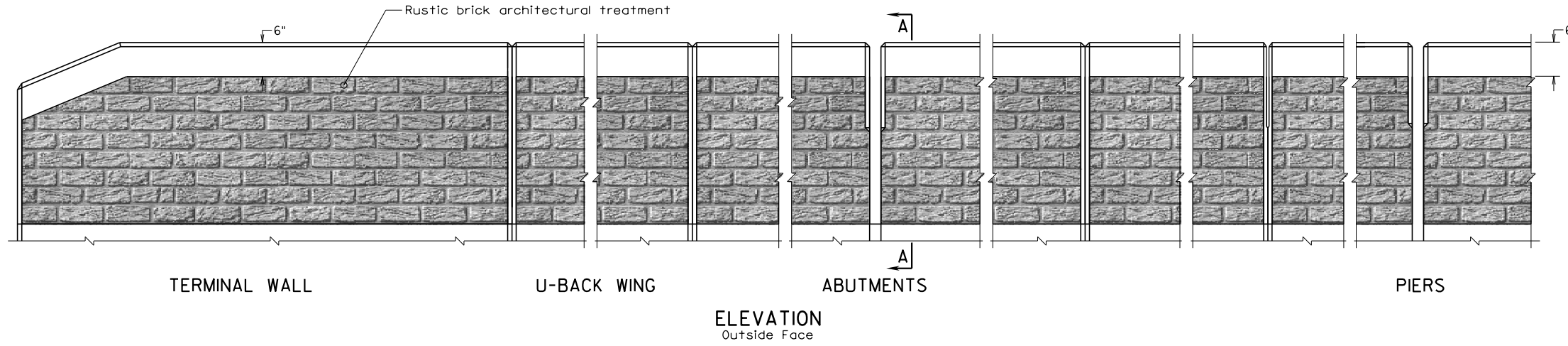
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT		
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate rustic brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous rustic brick pattern without obvious repetition of the pattern.

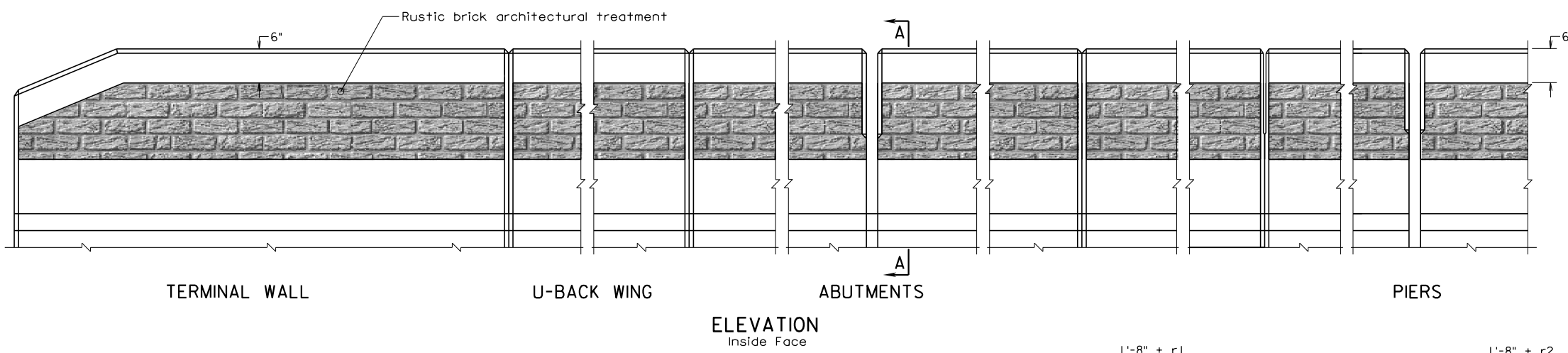
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

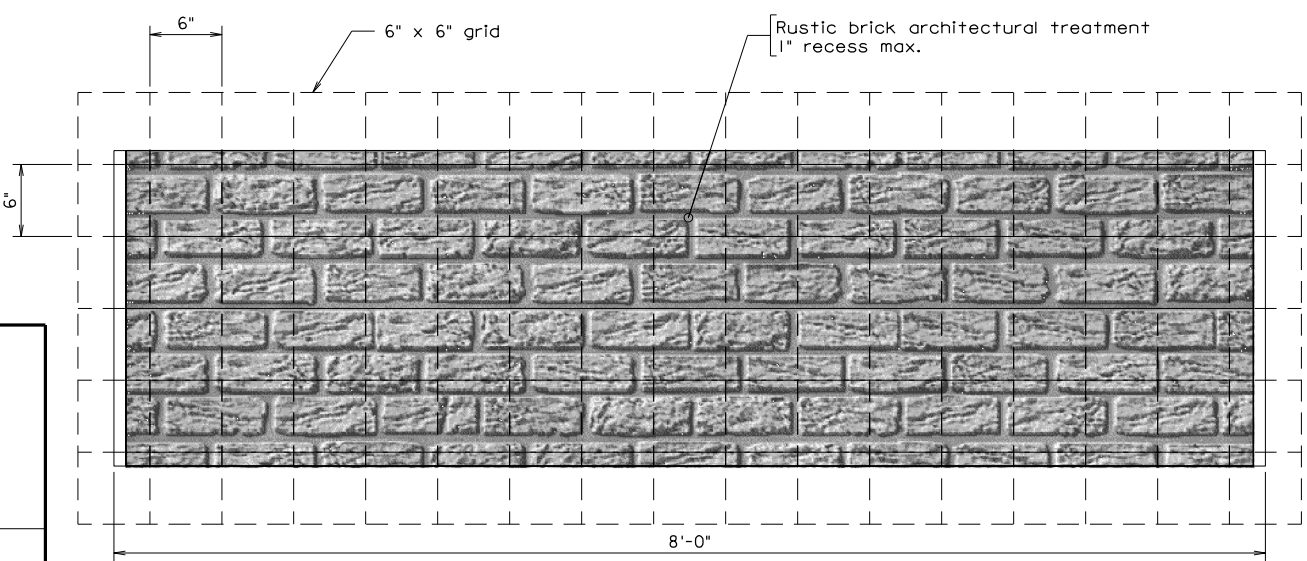
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

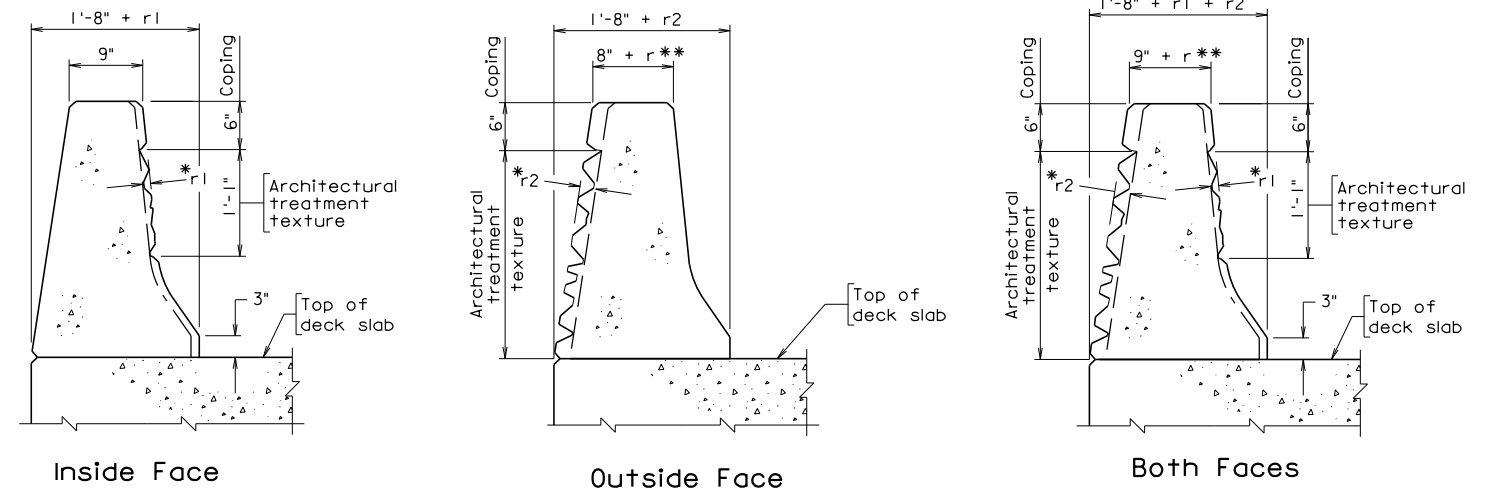
For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



RUSTIC BRICK TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

bbbat8.dgn

03-10-2015

BPB-AT-8

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On the date of
March 10, 2015

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			Drawn: S&B...DIV			
			Checked: S&B...DIV			
Revisions						
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION ARCHITECTURAL TREATMENT WITH RUSTIC BRICK FOR CONCRETE PARAPET (F-SHAPE) BPB-AT-8						

**ARCHITECTURAL TREATMENT
WITH RUSTIC BRICK
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

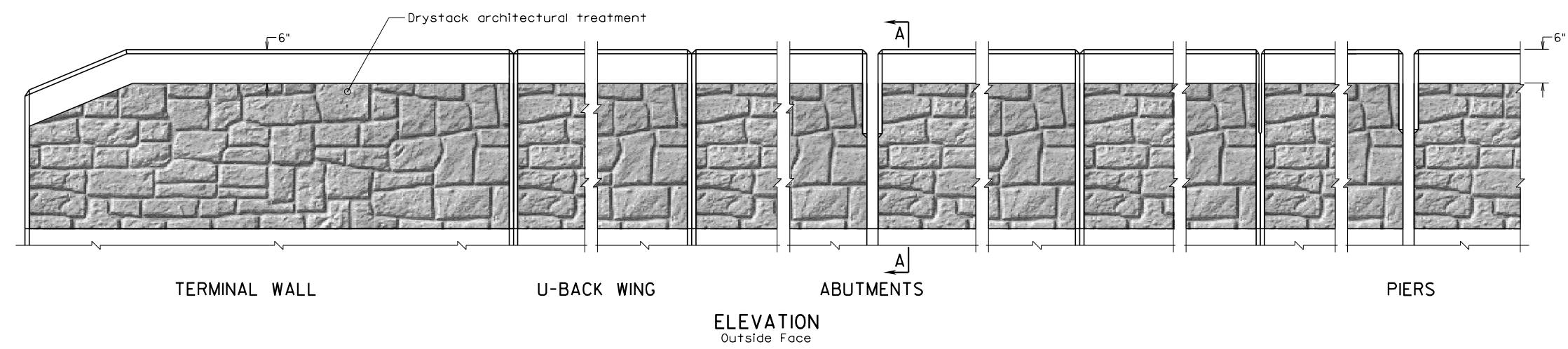
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate drystack texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous drystack pattern without obvious repetition of the pattern.

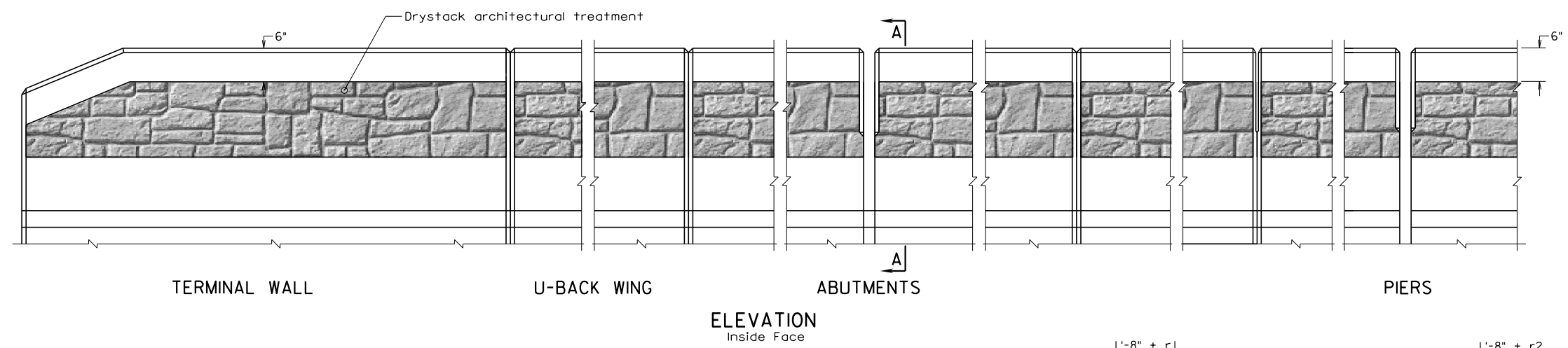
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

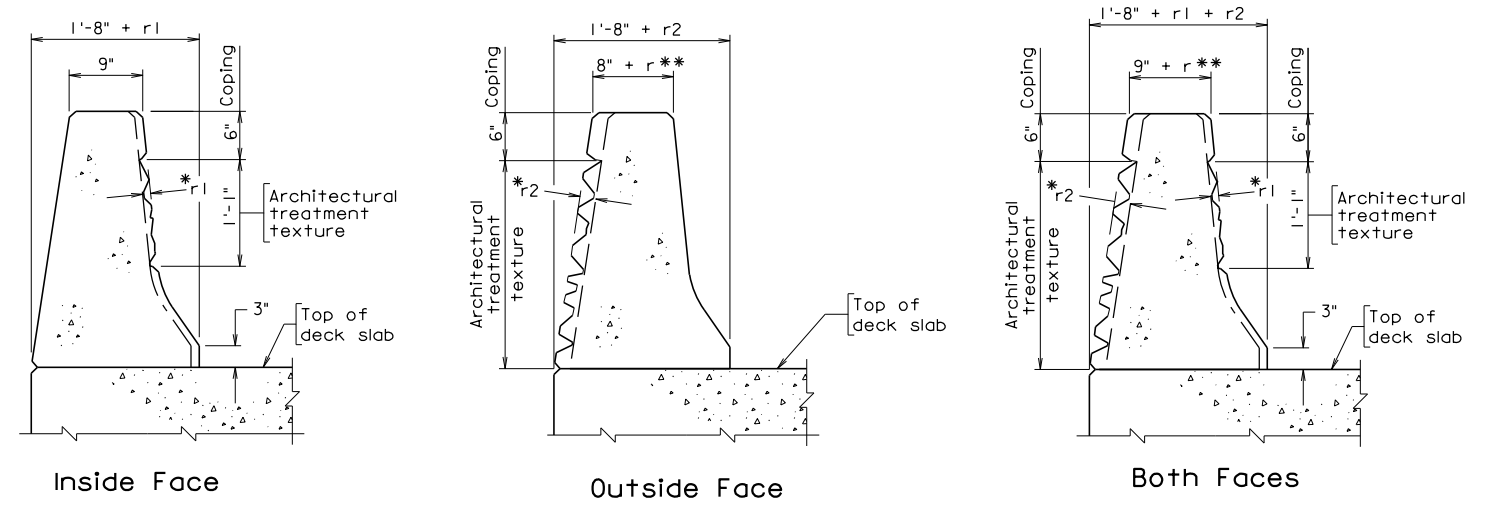
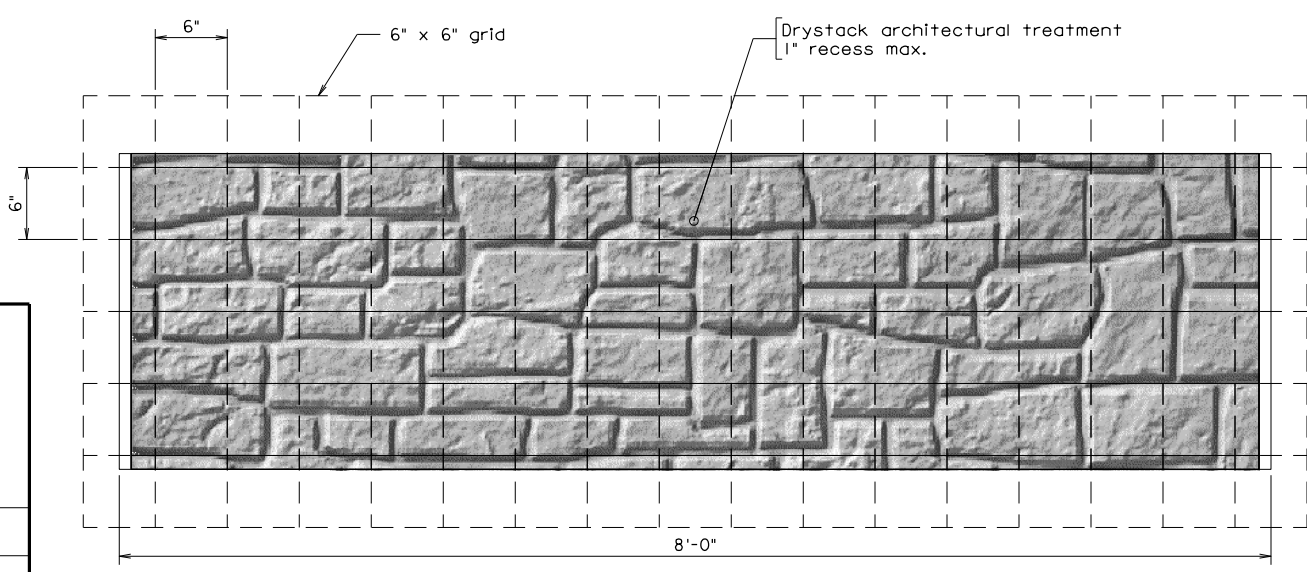
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

03-10-2015
BPB-AT-9

Sealed and Signed by:
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Lic. No. 033003
On the date of
March 10, 2015

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH DRYSTACK FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BPB-AT-9		

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**ARCHITECTURAL TREATMENT
WITH DRYSTACK
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

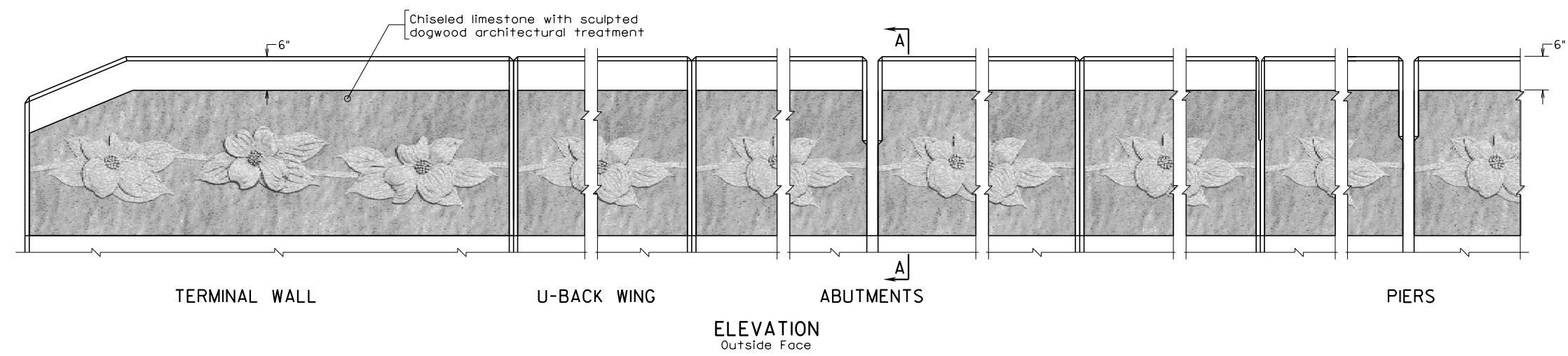
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted dogwood texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted dogwood pattern without obvious repetition of the pattern.

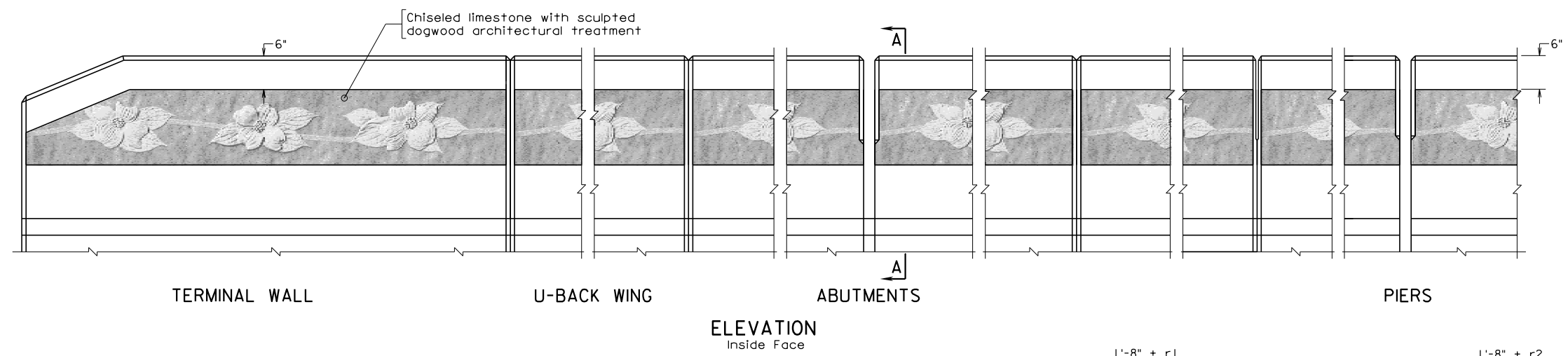
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

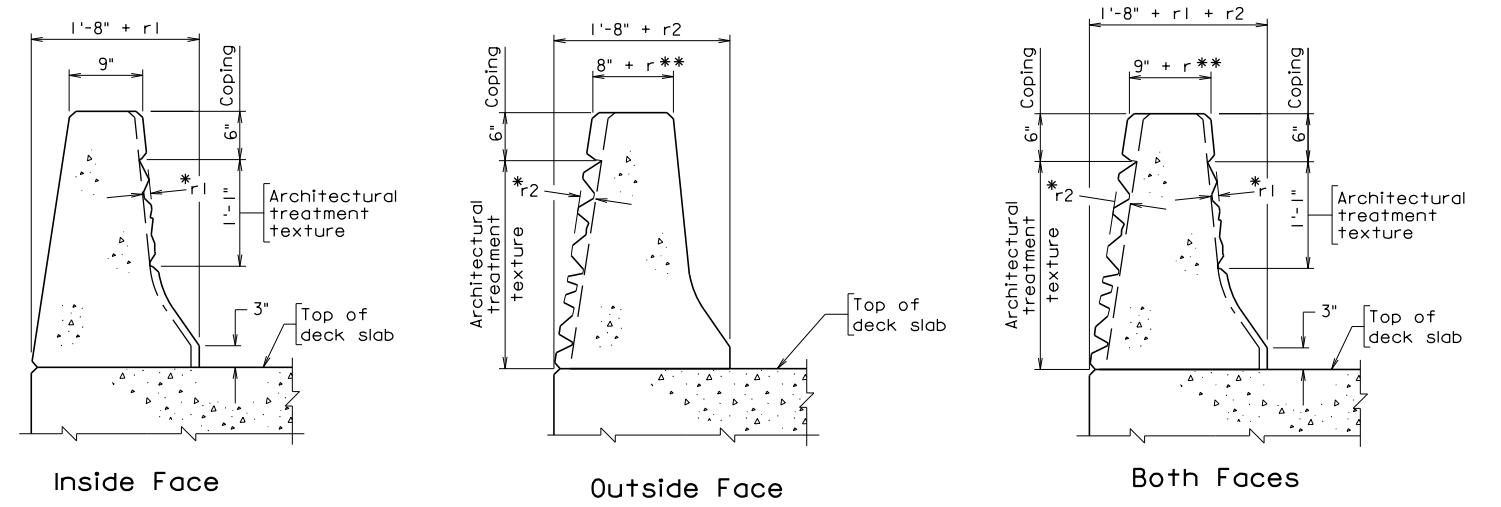
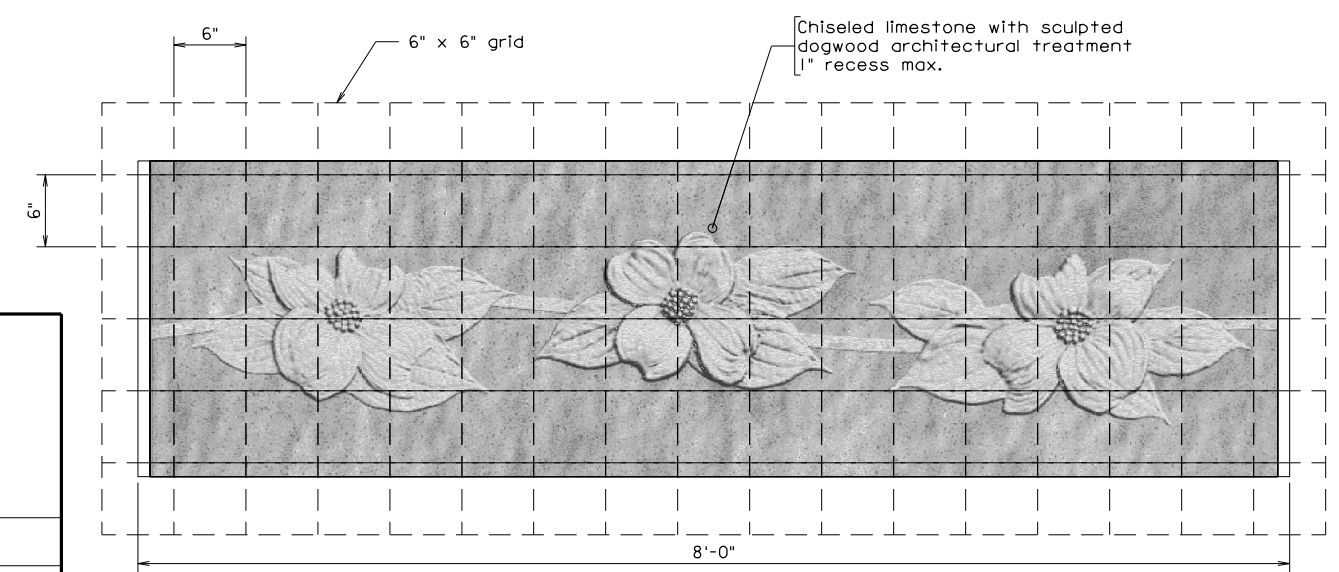
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-10
03-10-2015
bbbat10.dgn

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On the date of
March 10, 2015

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH SCULPTED DOGWOOD FOR CONCRETE PARAPET (F-SHAPE)			
No.	Description	Date	Revisions
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV		Sheet No.	
Checked: S&B...DIV		BPB-AT-10	

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**ARCHITECTURAL TREATMENT
WITH SCULPTED DOGWOOD
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

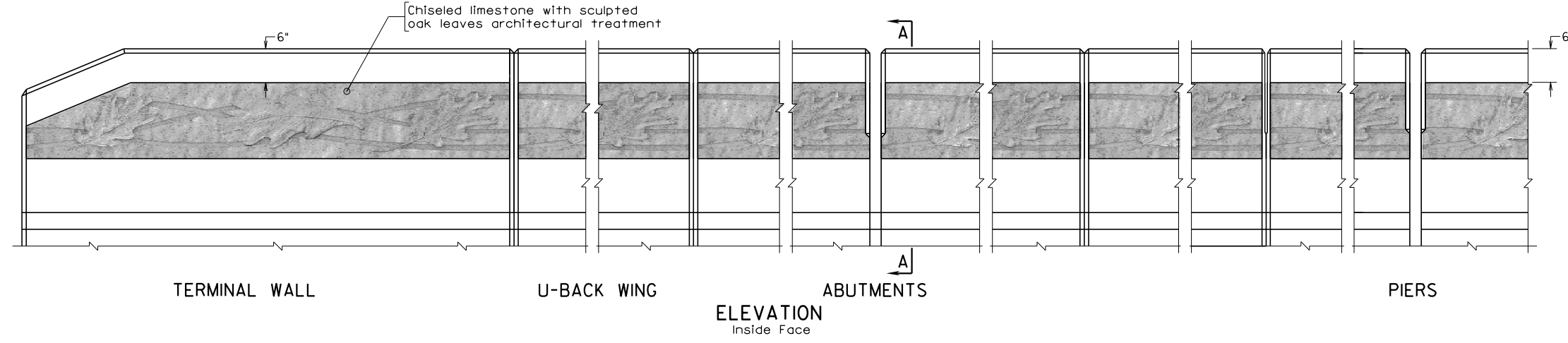
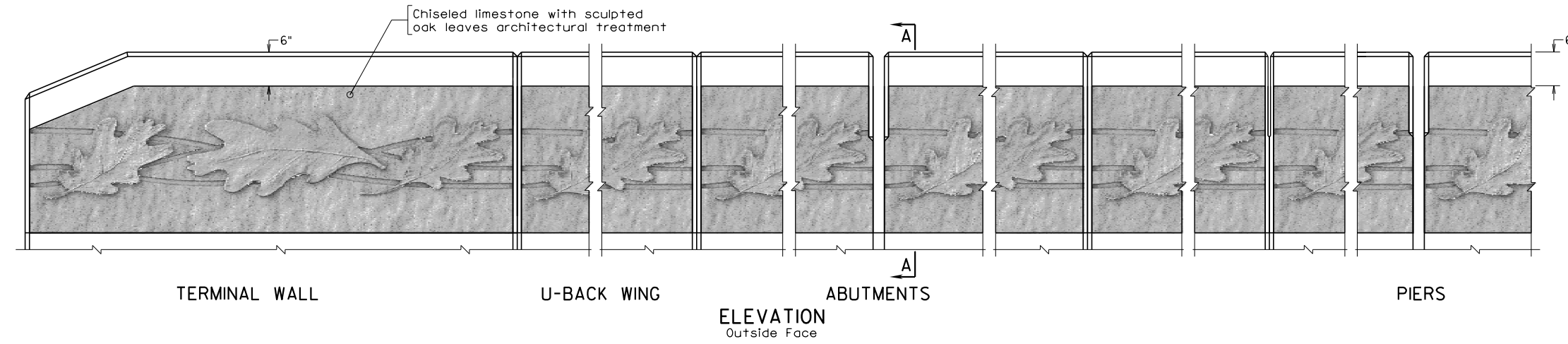
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted oak leaves texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted oak leaves pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

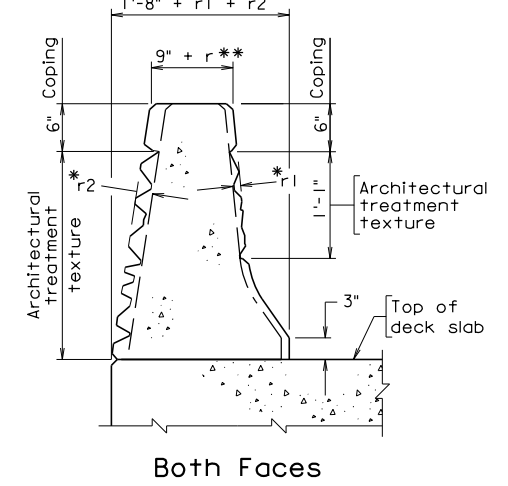
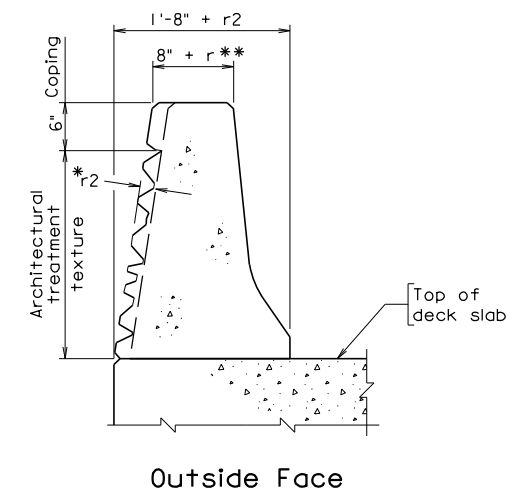
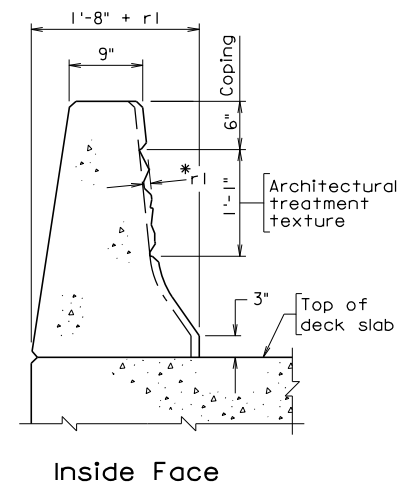
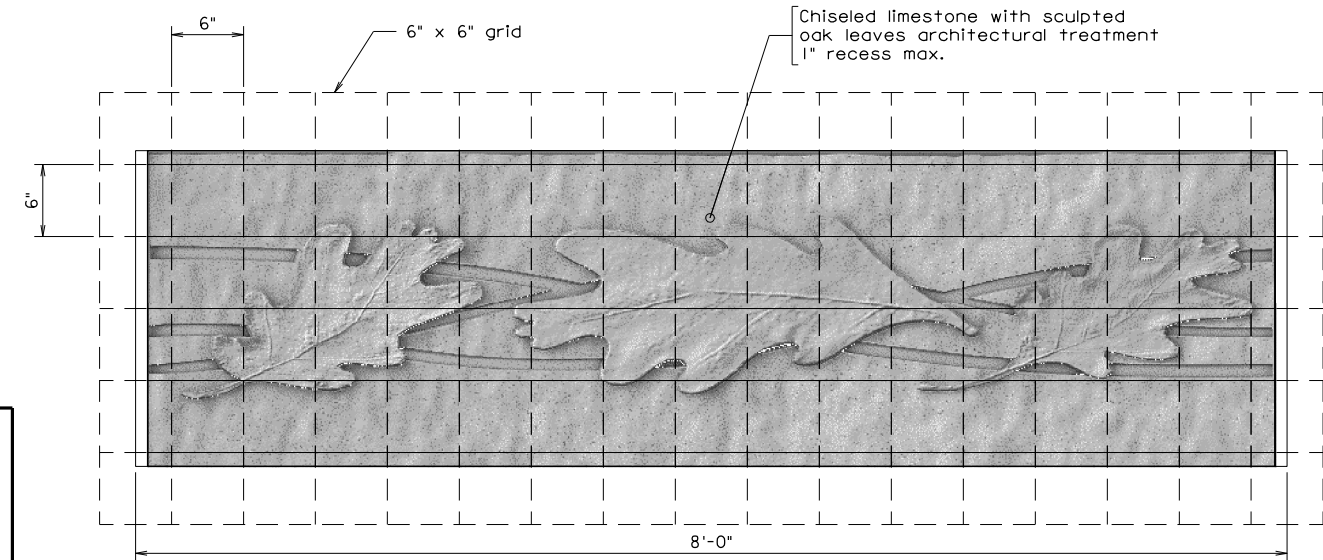
Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SCULPTED OAK LEAVES TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)

BPB-AT-11 03-10-2015 bpbatt11.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

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ARCHITECTURAL TREATMENT WITH SCULPTED OAK LEAVES FOR CONCRETE PARAPET (F-SHAPE)			
No.	Description	Date	Revisions
Designed: S&B.DIV		Date	Plan No.
Drawn: S&B.DIV		Sheet No.	
Checked: S&B.DIV		BPB-AT-11	

**ARCHITECTURAL TREATMENT
WITH SCULPTED OAK LEAVES
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

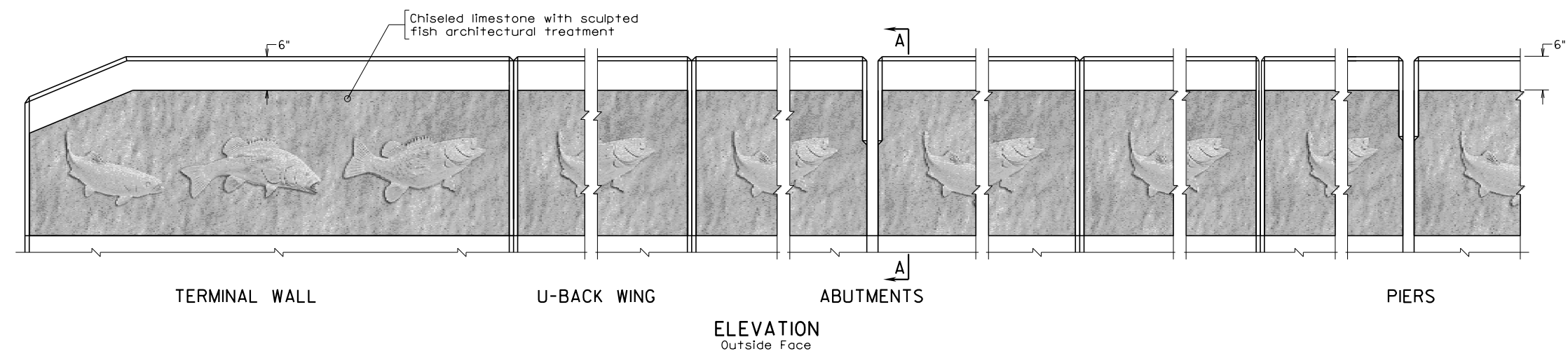
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted fish texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted fish pattern without obvious repetition of the pattern.

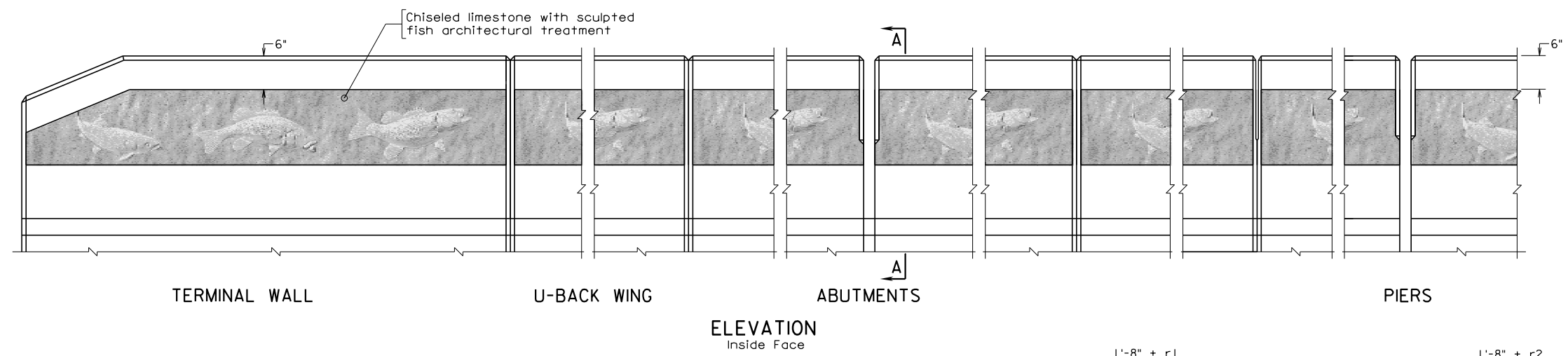
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

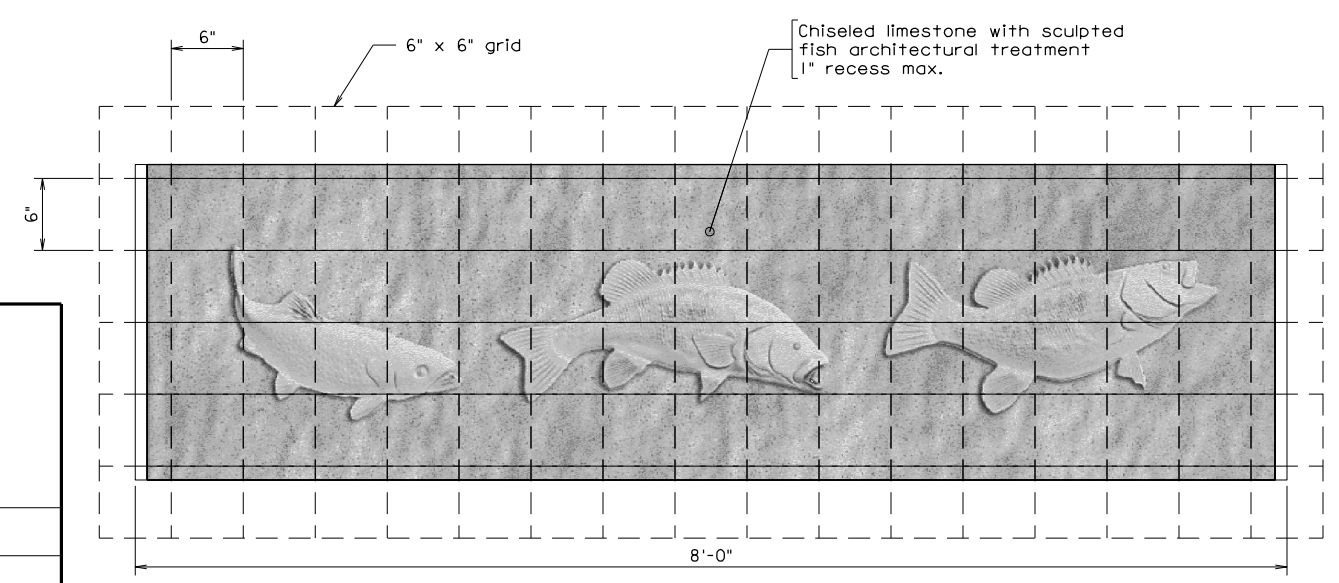
Architectural treatment shall be applied on XX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

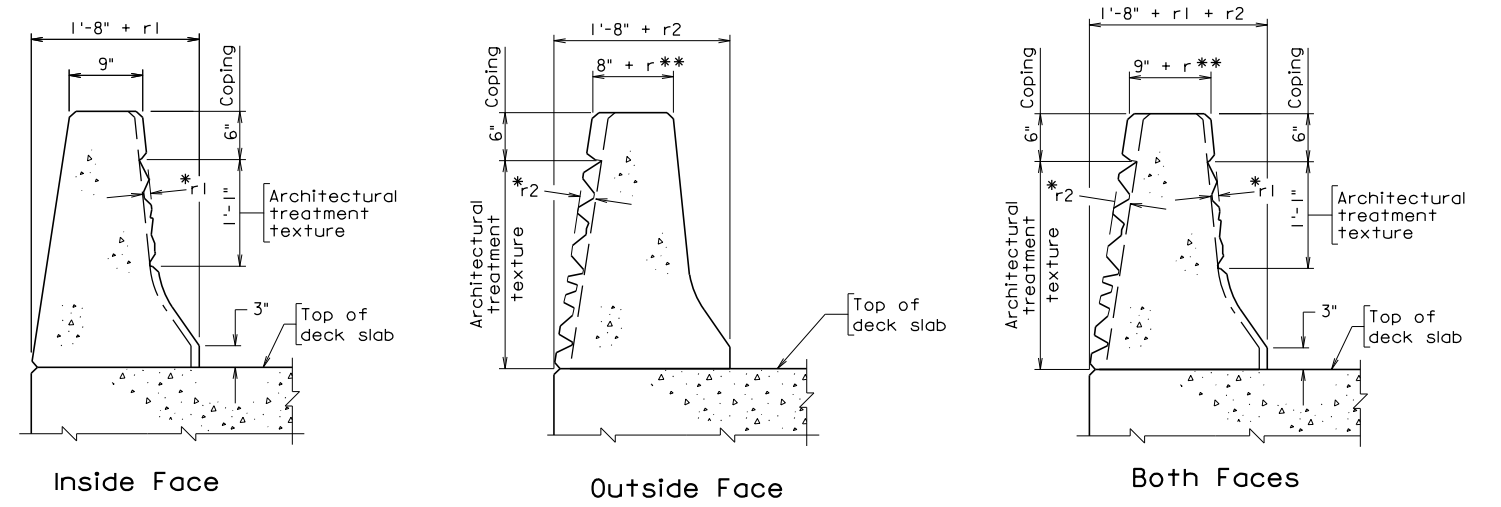
For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



SCULPTED FISH TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-12
03-10-2015
bbbat12.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH SCULPTED FISH FOR CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-AT-12		

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED FISH
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape parapet standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

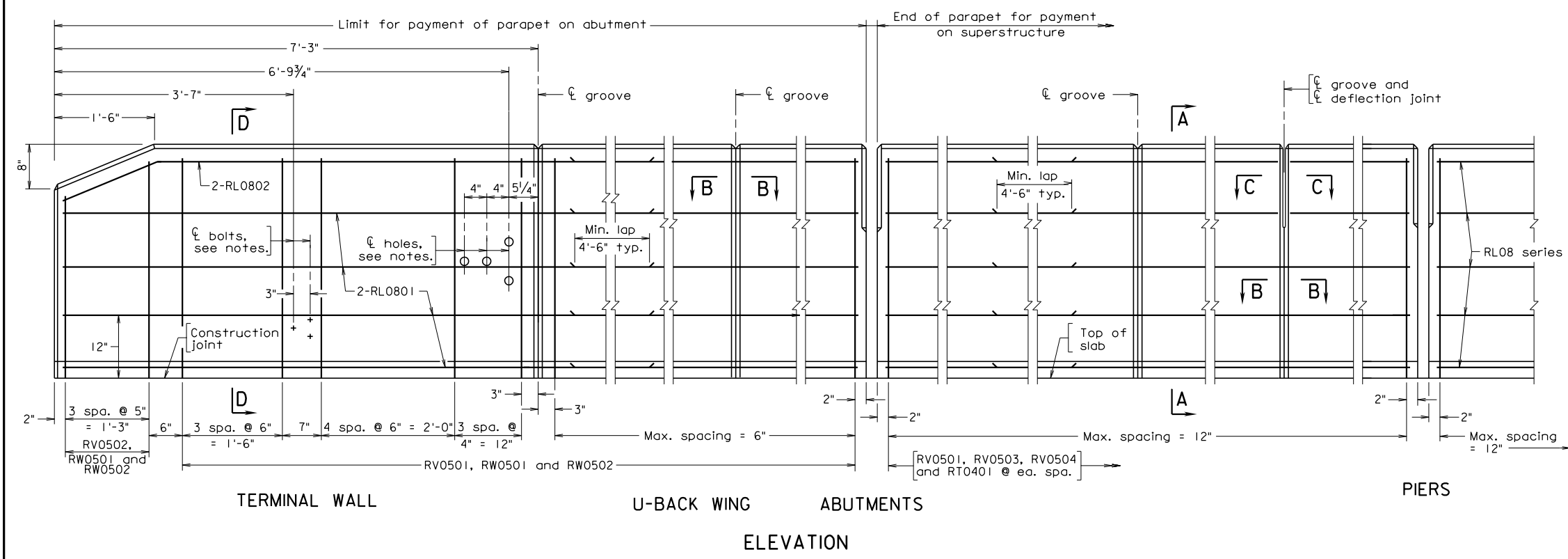
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

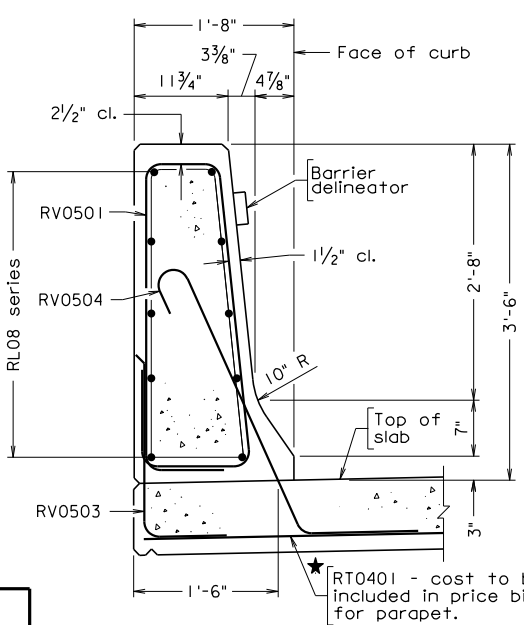
Terminal walls are detailed to take guardrail attachment GR-F0A-2.

For details of wingwall below construction joint, see abutment details.

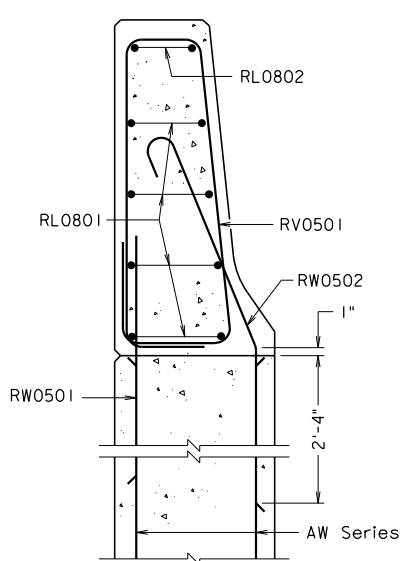
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rail is attached.

Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

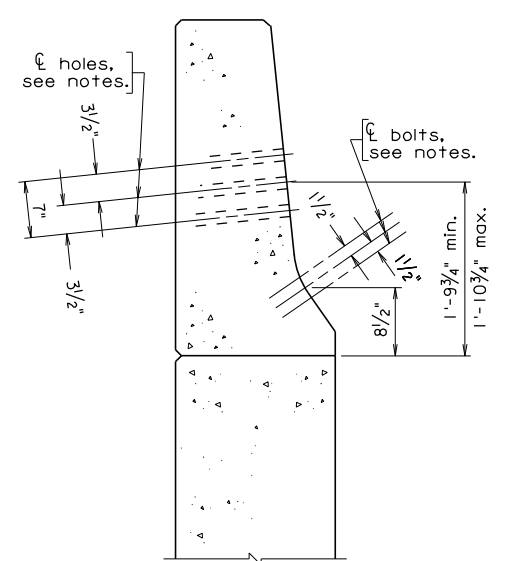


SECTION A-A



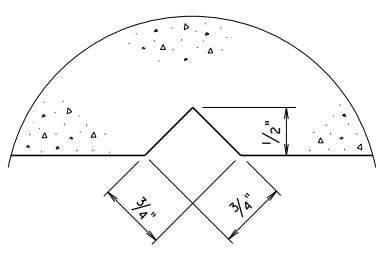
SECTION D-D

For dimensions and details not shown, see Section A-A.



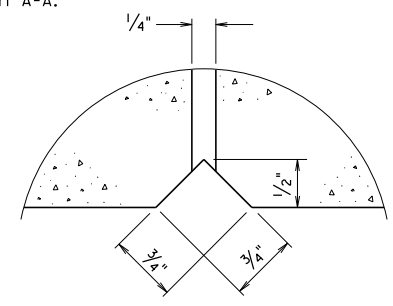
SECTION D-D

Reinforcing steel not shown.



SECTION B-B

Full scale
Groove detail for both sides of parapet



SECTION C-C

Full scale
Deflection joint detail for both sides of parapet

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1 to 9'-2'	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RW0501		#5	—	3'-0"	Terminal wall and wingwall
RW0502		#5	3 3/4"	5'-3"	Terminal wall and wingwall
RL0801		#8	—	—	Terminal wall and U-back wing
RL0802		#8	6"	—	Terminal wall
RL08		#8	—	—	Parapet

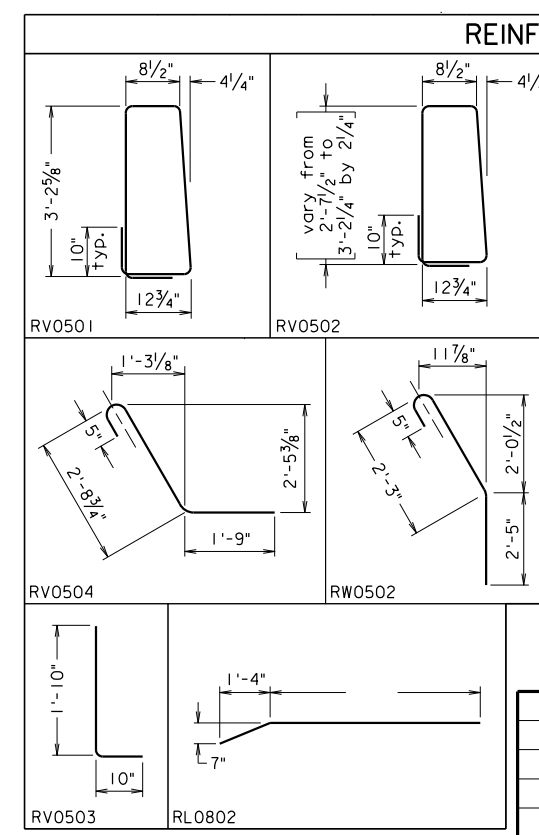
Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab.

★ Used only when deck transverse reinforcement is parallel to skew of bridge.



BPB-4A 03-10-2015 bpb4a.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-4A		

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-4A-AT.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

Complete dimension and length of rebar RL0802.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

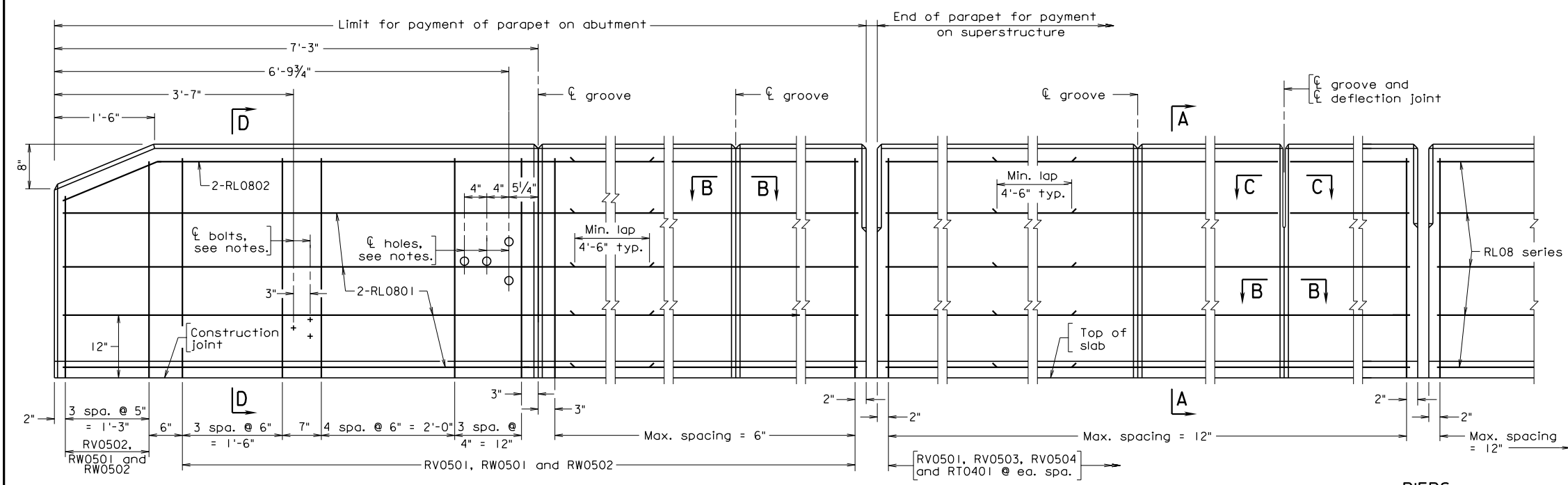
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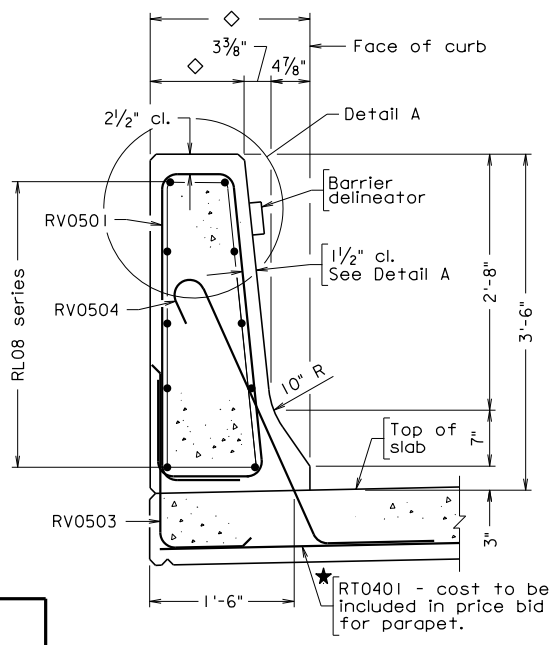
STANDARD BPB-4A: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 2
FILE NO. BPB-4A-2

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

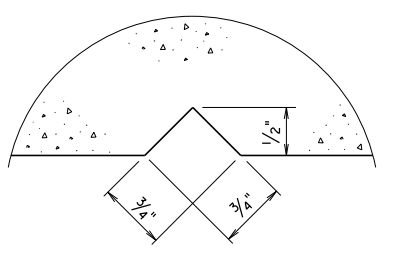


TERMINAL WALL U-BACK WING ABUTMENTS PIER
ELEVATION



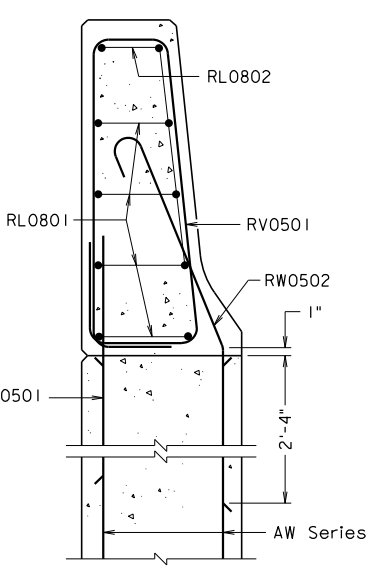
SECTION A-A

For dimensions and architectural treatment details, see sheet XX.



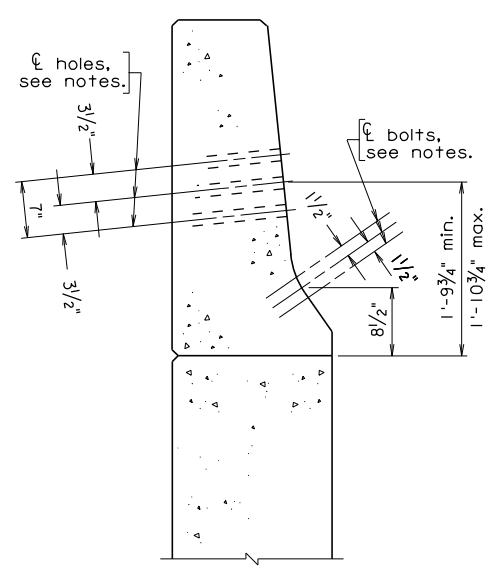
SECTION B-B

Full scale



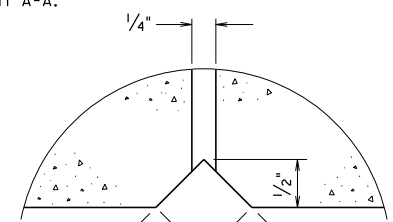
SECTION D-D

For dimensions and details not shown, see Section A-A.



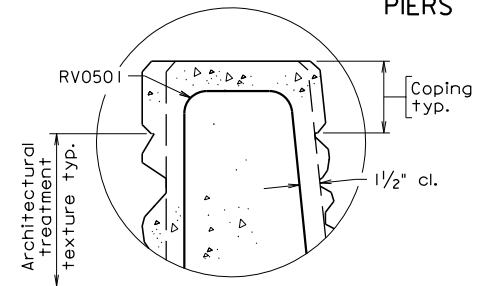
SECTION D-D

Reinforcing steel not shown.



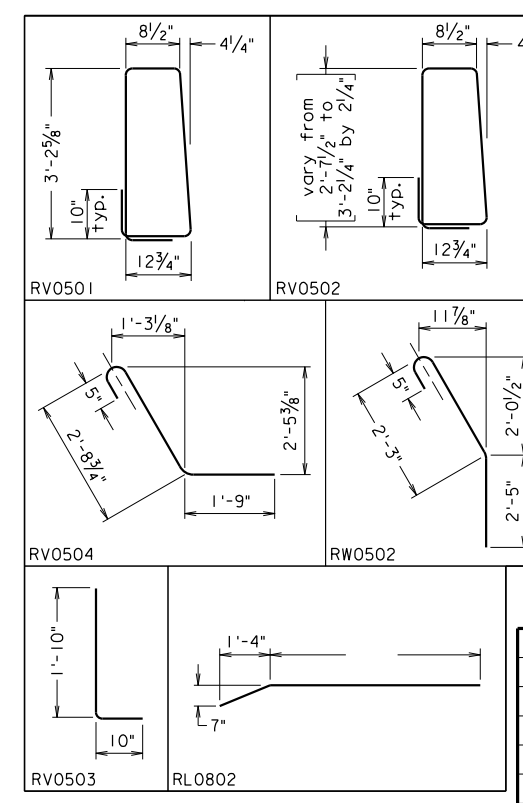
SECTION C-C

Full scale



DETAIL A

Both sides of architectural treatment shown



REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1 to 9'-2"	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RW0501		#5	—	3'-0"	Terminal wall and wingwall
RW0502		#5	3 3/4"	5'-3"	Terminal wall and wingwall
RL0801		#8	—	—	Terminal wall and U-back wing
RL0802		#8	6"	—	Terminal wall
RL08		#8	—	—	Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab (These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-4A-AT		

BPB-4A-AT 03-10-2015 bpb4aat.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING**

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-4A.

Terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

Complete dimension and length of rebar RL0802.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

**42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

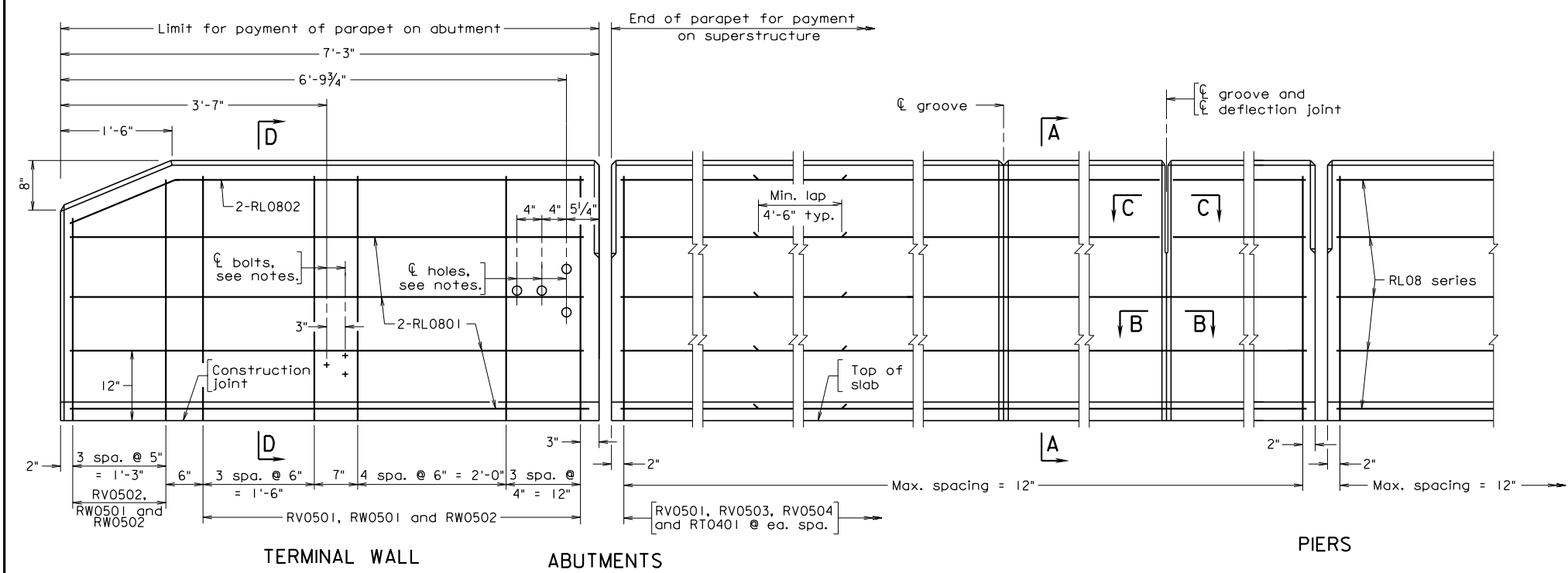
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-4A-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-4A-AT-3

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.



TERMINAL WALL ABUTMENTS PIERS
ELEVATION

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

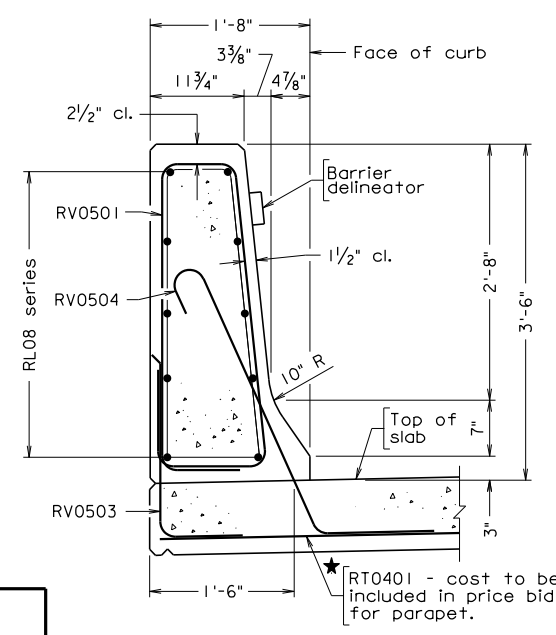
Terminal walls are detailed to take guardrail attachment GR-FOA-2.

For details of wingwall below construction joint, see abutment details.

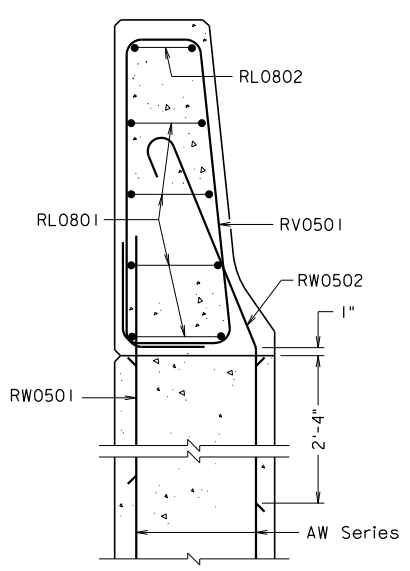
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

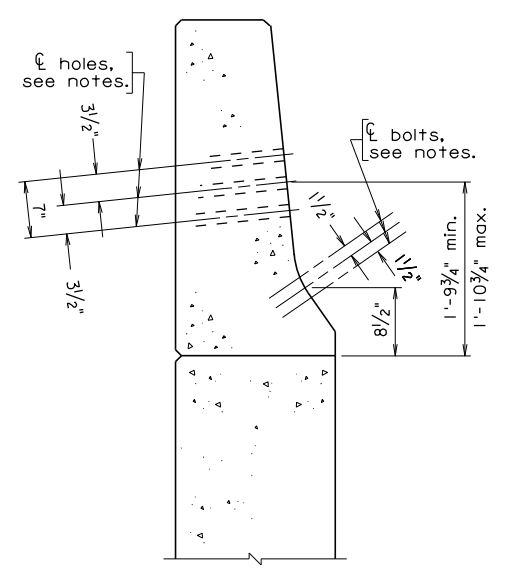


SECTION A-A



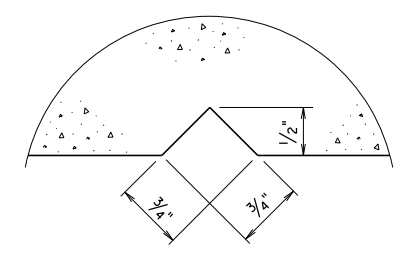
SECTION D-D

For dimensions and details not shown, see Section A-A.



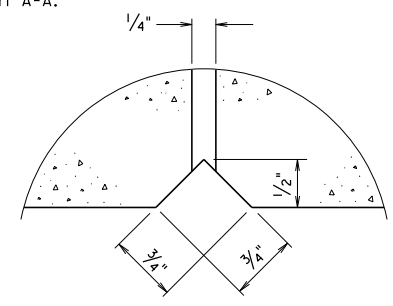
SECTION D-D

Reinforcing steel not shown.



SECTION B-B

Full scale
Groove detail for both sides of parapet



SECTION C-C

Full scale
Deflection joint detail for both sides of parapet

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1 to 9'-2'	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RW0501		#5	—	3'-0"	Terminal wall and wingwall
RW0502		#5	3 3/4"	5'-3"	Terminal wall and wingwall
RL0801		#8	—	6'-11"	Terminal wall
RL0802		#8	6"	7'-0 1/4"	Terminal wall
RL08		#8	—	—	Parapet

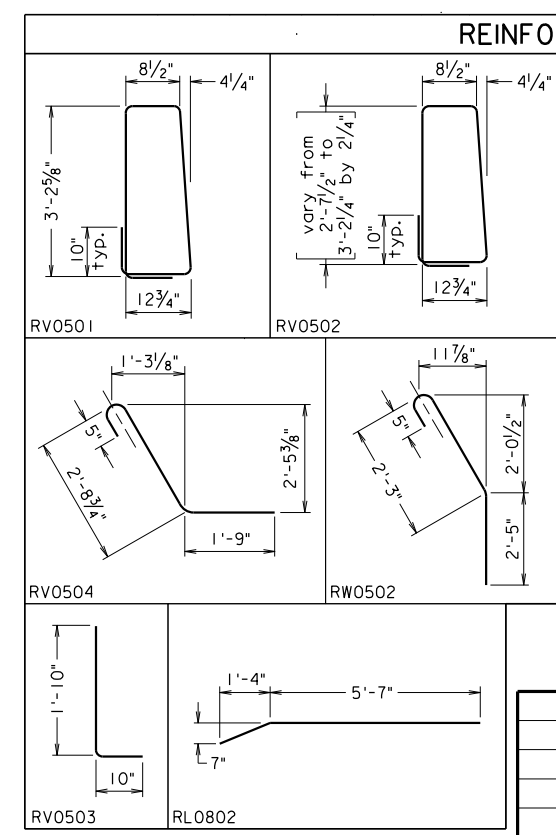
Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab.

★ Used only when deck transverse reinforcement is parallel to skew of bridge.



BPB-4B 03-10-2015 bpb4b.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-4B		

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The F-shape parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-4B-AT.

Terminal wall is detailed on abutment wingwall.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

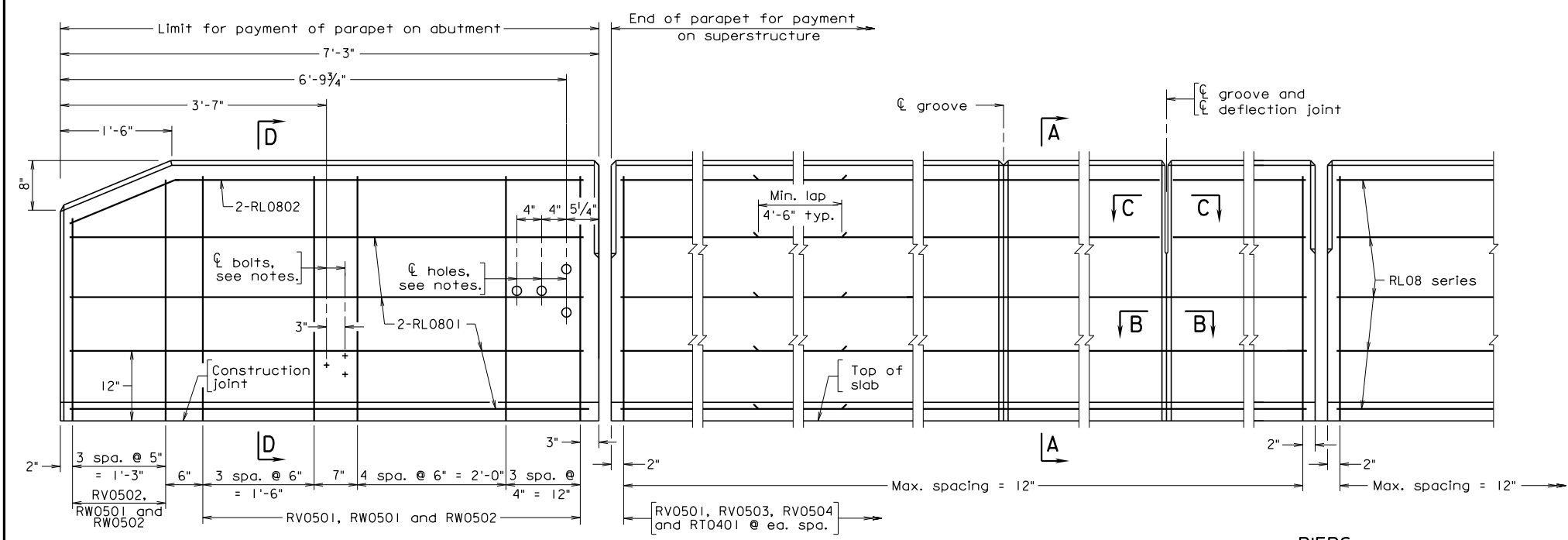
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Replace standard designation with plan number.

STANDARD BPB-4B: NOTES TO DESIGNER

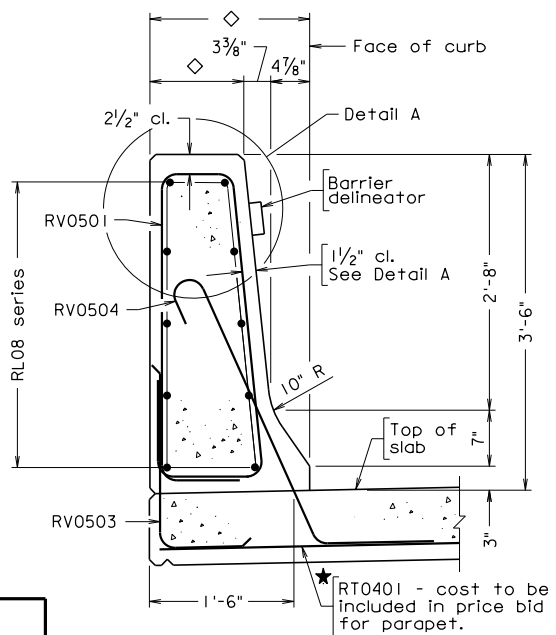
VOL. V - PART 3
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SHEET 2 of 2
FILE NO. BPB-4B-2

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



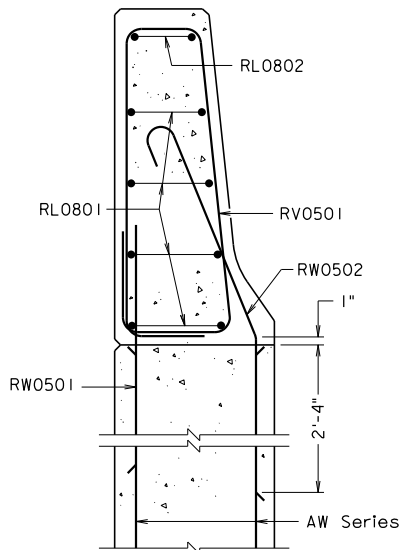
TERMINAL WALL ABUTMENTS

ELEVATION



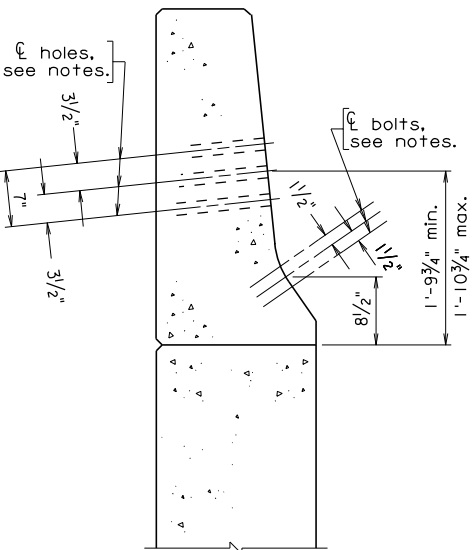
SECTION A-A

For dimensions and architectural treatment details, see sheet XX.

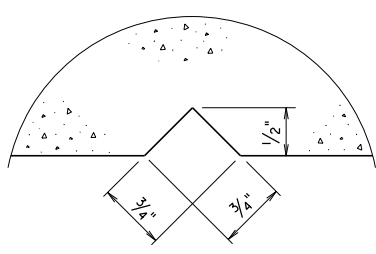


SECTION D-D

For dimensions and details not shown, see Section A-A.

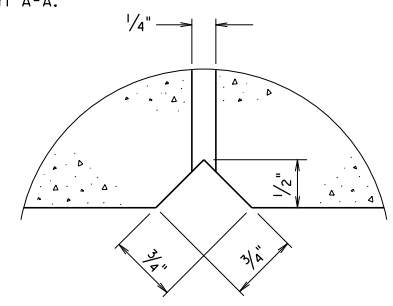


SECTION D-D



SECTION B-B

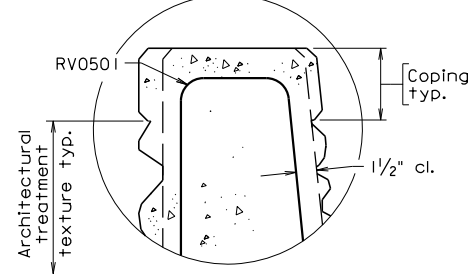
Groove detail for both sides of parapet



SECTION C-C

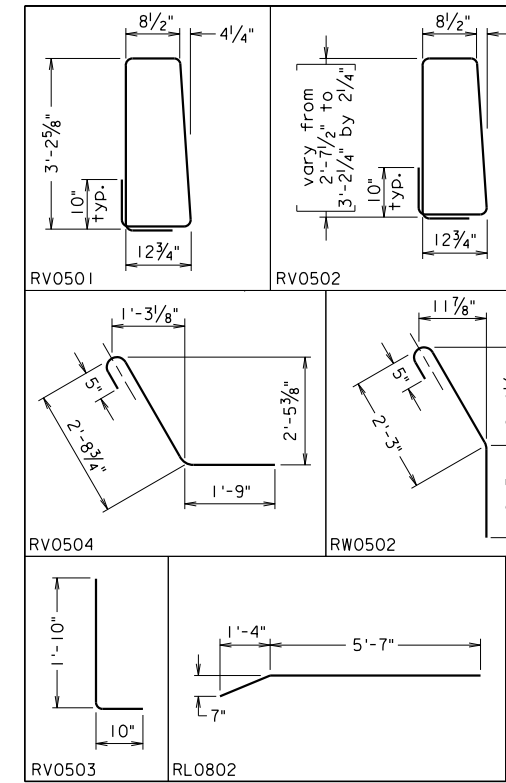
Deflection joint detail for both sides of parapet

PIERS



DETAIL A

Both sides of architectural treatment shown



REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ø	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1 to 9'-2"	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RW0501		#5	—	3'-0"	Terminal wall and wingwall
RW0502		#5	3 3/4"	5'-3"	Terminal wall and wingwall
RL0801		#8	—	6'-11"	Terminal wall and U-back wing
RL0802		#8	6"	7'-0 1/4"	Terminal wall
RL08		#8	—	—	Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab. (These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions					
BPB-4B-AT					

bpb4bot.dgn

03-10-2015

BPB-4B-AT

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-4B.

Terminal wall is detailed on abutment wingwall.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section D-D).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

**42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT WINGWALL**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

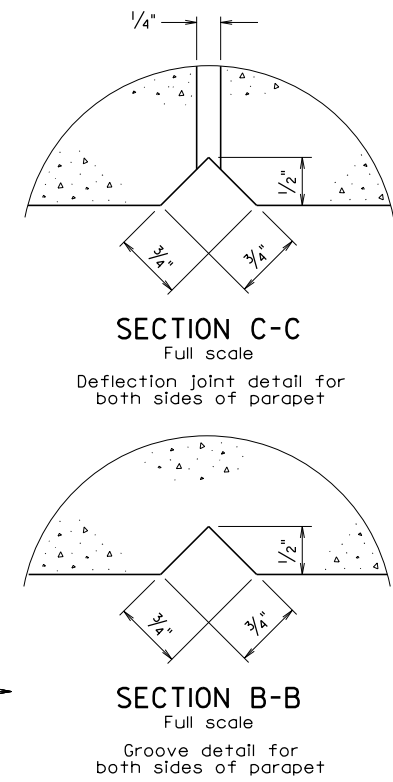
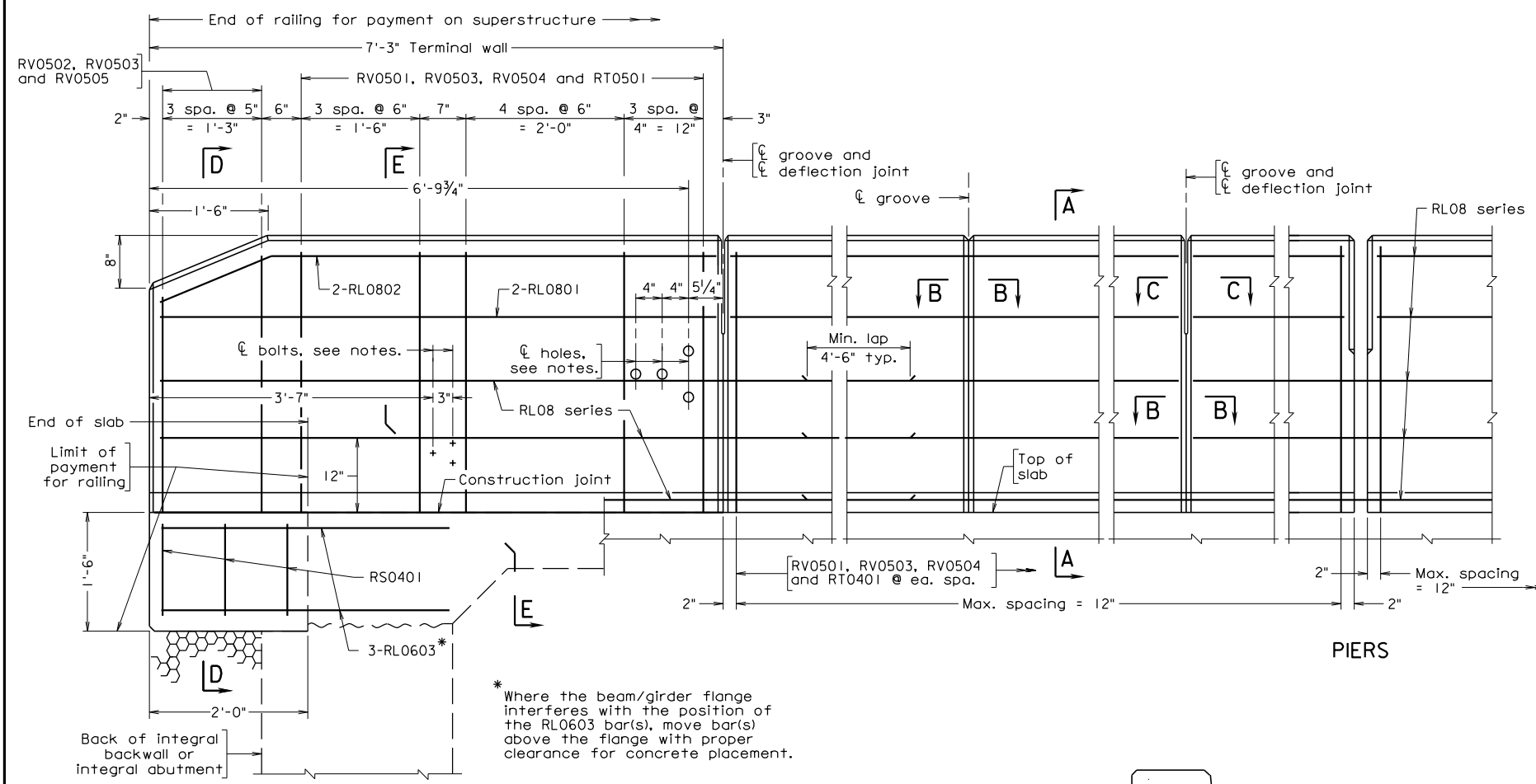
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-4B-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-4B-AT-3

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-F0A-2.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

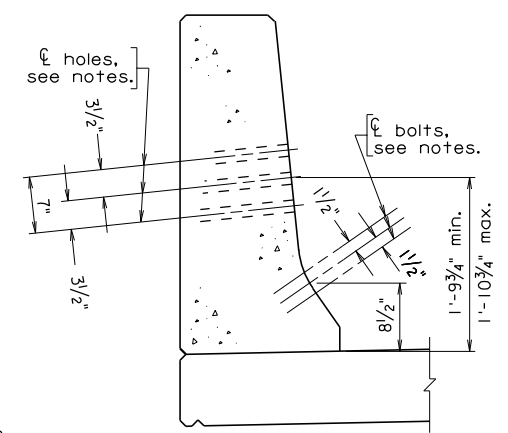
Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

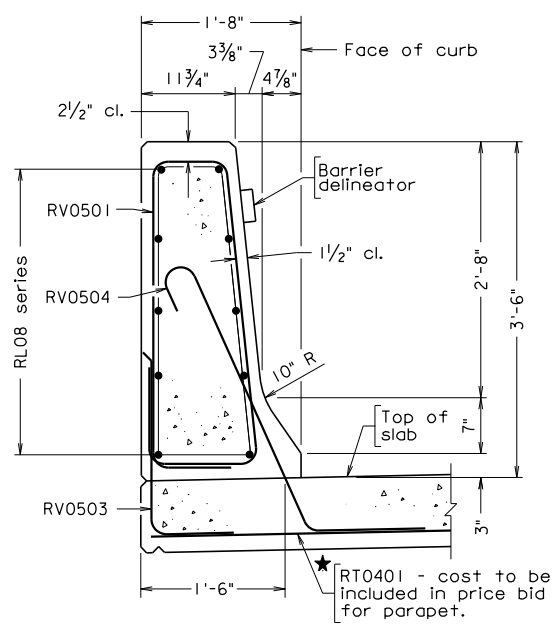
SEMI-INTEGRAL OR FULL INTEGRAL ABUTMENT

ELEVATION

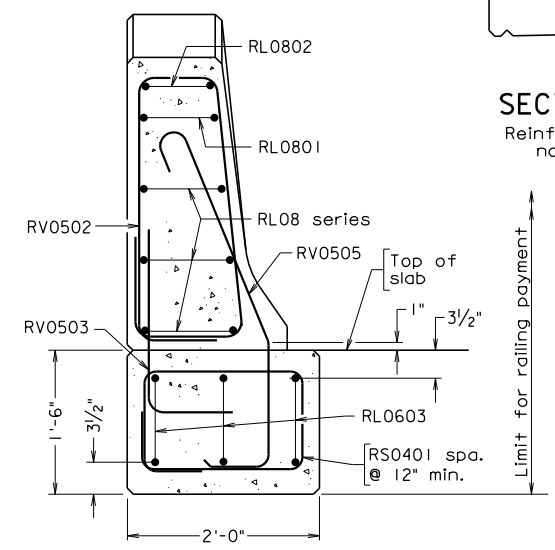
PIERS



SECTION E-E
Reinforcing steel not shown.

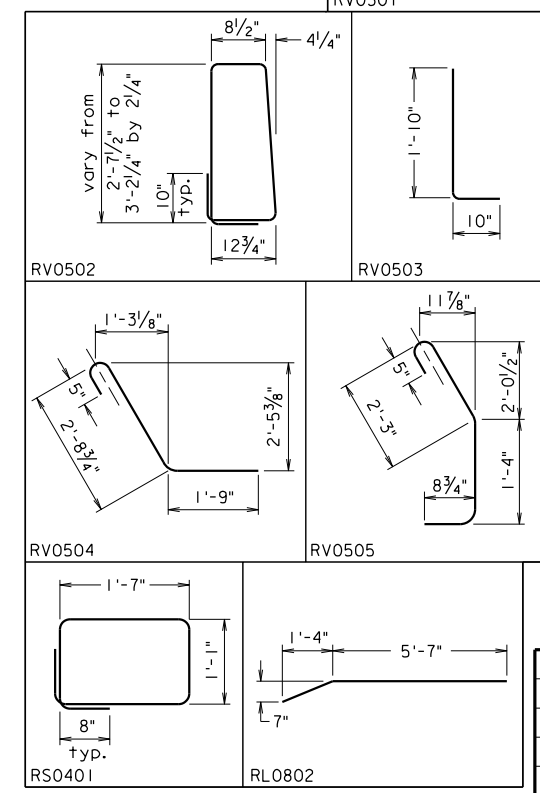


SECTION A-A



SECTION D-D

For dimensions and details not shown, see Section A-A.



REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★	RT0401	#4	—	3'-0"	Slab
	RV0501	#5	3 3/4"	9'-3"	Parapet and terminal wall
	RV0502	#5	3 3/4"	from 8'-1" to 9'-2"	Terminal wall (4 per terminal wall)
	RV0503	#5	3 3/4"	2'-6 1/2"	Parapet
	RV0504	#5	3 3/4"	5'-0"	Parapet
	RV0505	#5	—	4'-9"	Terminal wall and wingwall
	RS0401	#4	3"	6'-2"	Terminal wall end support
	RL0801	#8	—	6'-11"	Terminal wall and U-back wing
	RL0802	#8	6"	7'-0 1/4"	Terminal wall
	RL0603	#6	—	3'-6"	Terminal wall end support
	RL08	#8	—	—	Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab.

★ Used only when deck transverse reinforcement is parallel to skew of bridge.

BPB-4C 03-10-2015 bpb4c.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BPB-4C
			Checked: S&B, DIV		
Revisions					

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The F-shape parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-4C-AT.

Terminal wall is detailed on superstructure. Standard is used with full integral or semi-integral abutment.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'- 10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

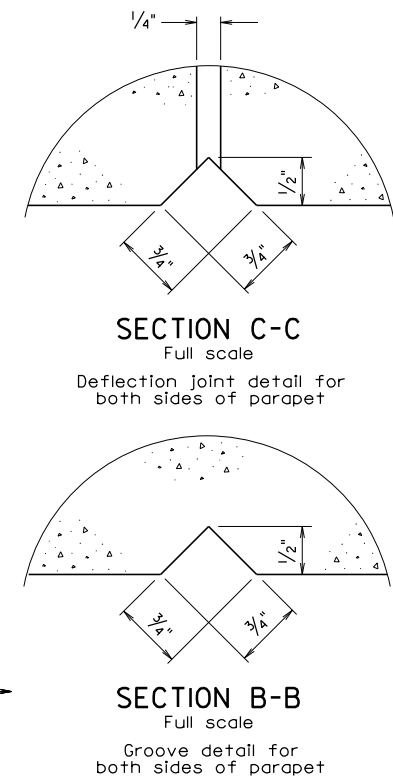
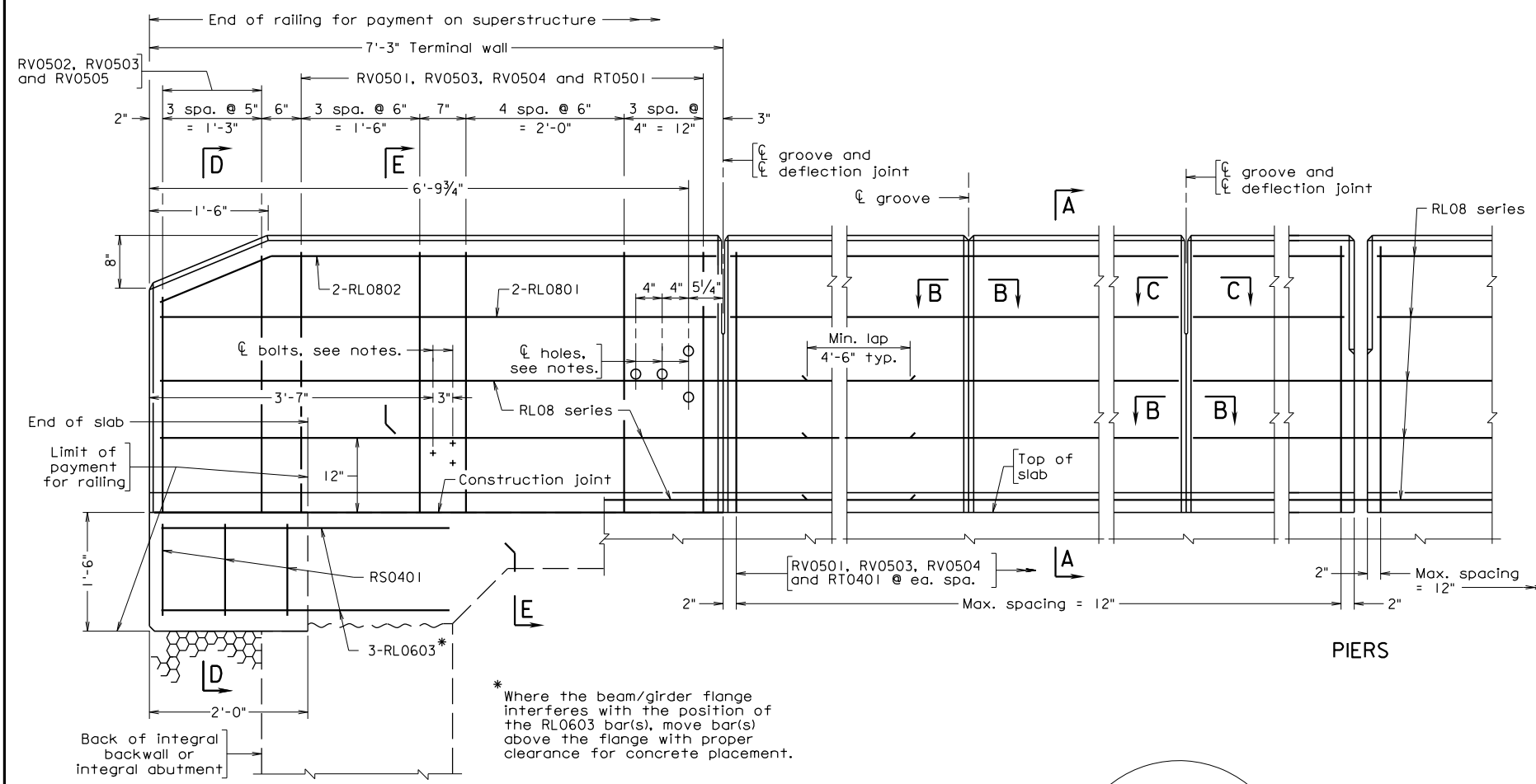
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BPB-4C: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 2
FILE NO. BPB-4C-2

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-F0A-2.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

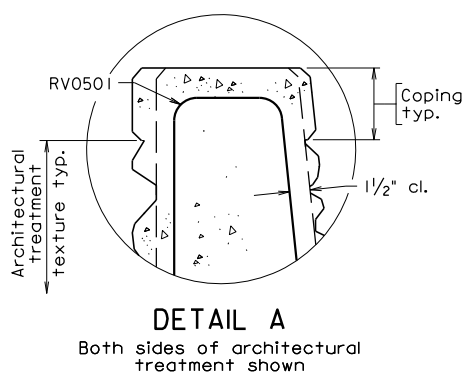
Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

Bid piece for architectural treatment includes concrete in relief and coping.

SEMI-INTEGRAL OR FULL INTEGRAL ABUTMENT

ELEVATION

PIERS



DETAIL A
Both sides of architectural treatment shown

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1 to 9'-2'	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RV0505		#5	—	4'-9"	Terminal wall and wingwall
RS0401		#4	3"	6'-2"	Terminal wall end support
RL0801		#8	—	6'-11"	Terminal wall and U-back wing
RL0802		#8	6"	7'-0 1/4"	Terminal wall
RL0603		#6	—	3'-6"	Terminal wall end support
RL08		#8	—		Parapet

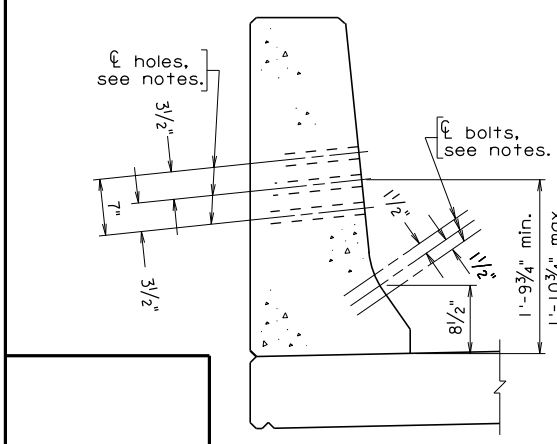
Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

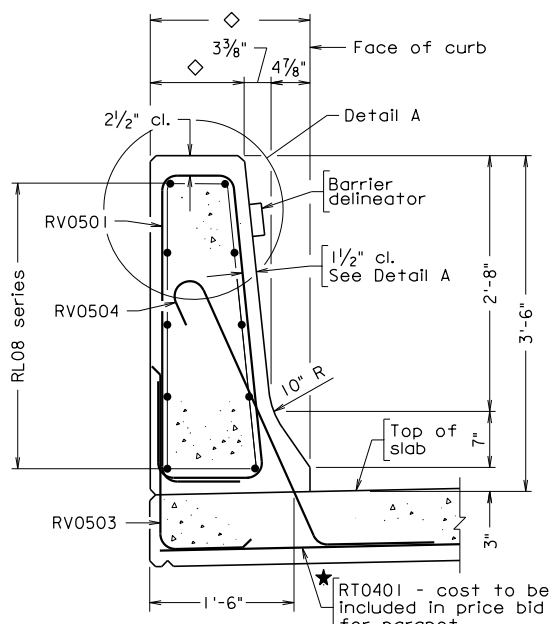
Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab. (These quantities do not include architectural treatment.)

★ Used only when deck transverse reinforcement is parallel to skew of bridge.

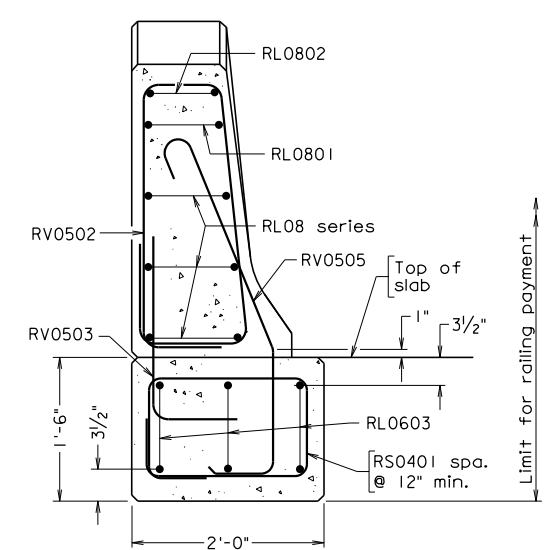


SECTION E-E
Reinforcing steel not shown.



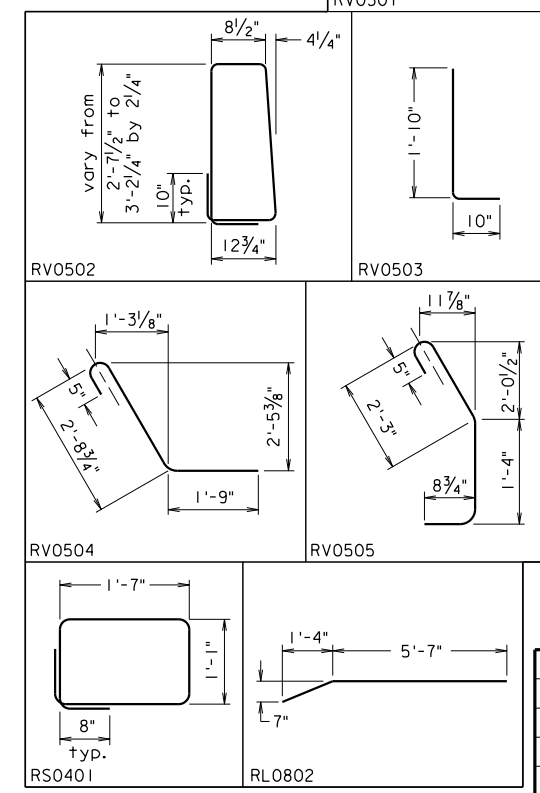
SECTION A-A

◇ For dimensions and architectural treatment details, see sheet XX.



SECTION D-D

For dimensions and details not shown, see Section A-A.



BPB-4C-AT 03-10-2015 bpb4cat.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

42" CAST-IN-PLACE
CONCRETE PARAPET (F-SHAPE)

No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
			Drawn: ...S&B...DIV			
			Checked: S&B...DIV			

BPB-4C-AT

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-4C.

Terminal wall is detailed on superstructure. Standard is used with full integral or semi-integral abutment.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'- 10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

STANDARD BPB-4C-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 3
FILE NO. BPB-4C-AT-2

**42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

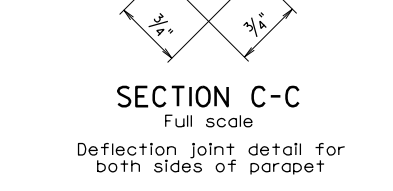
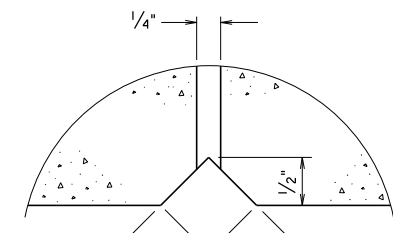
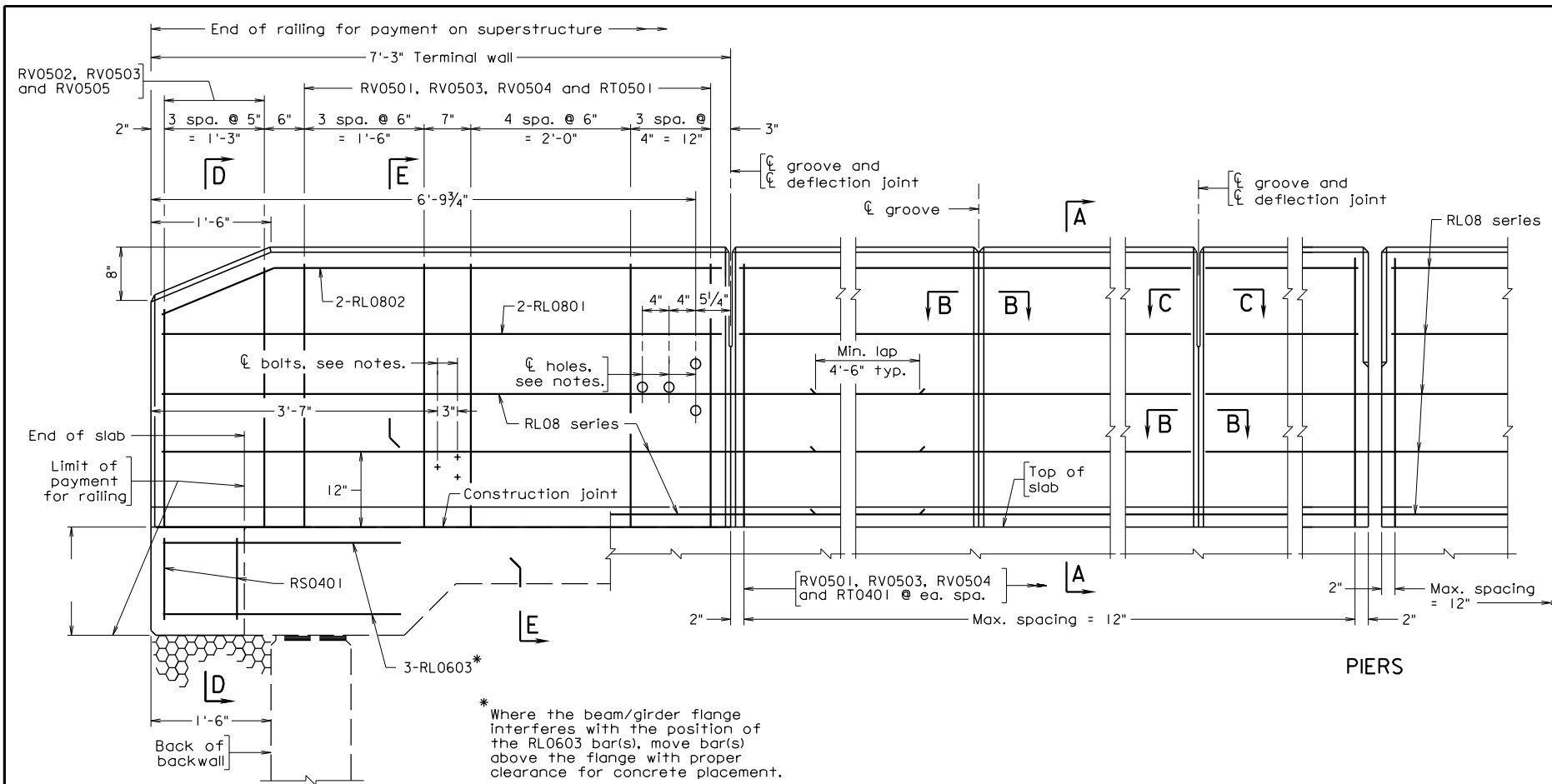
TITLE BLOCK:

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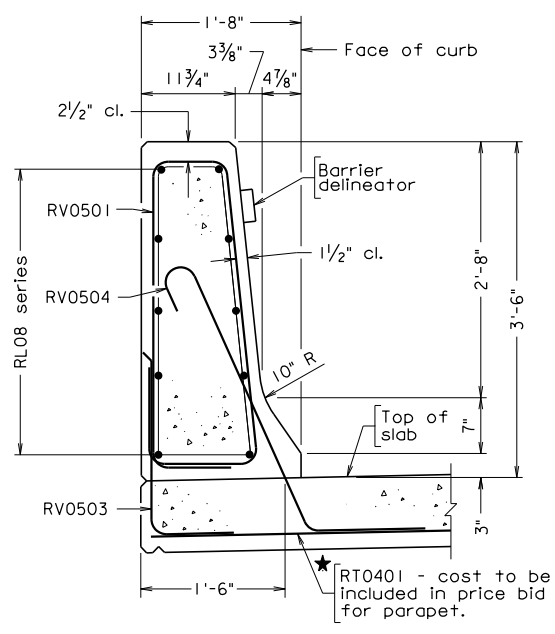
STANDARD BPB-4C-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 3 of 3
FILE NO. BPB-4C-AT-3

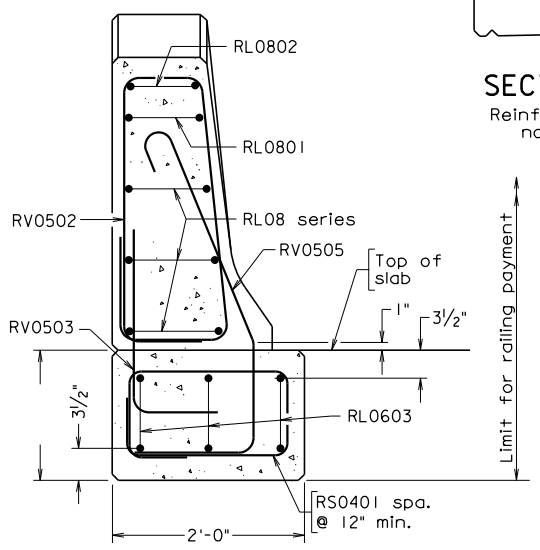
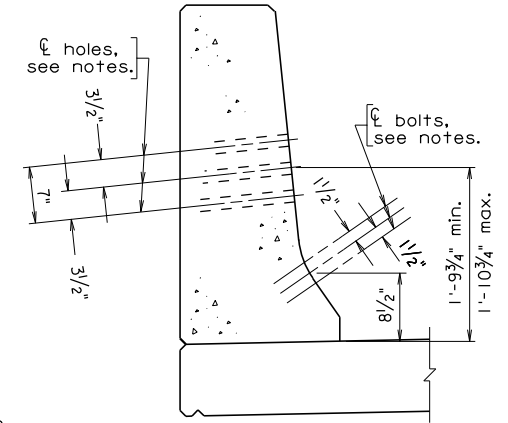
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



DECK SLAB EXTENSION ABUTMENT



ELEVATION



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.

Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-F0A-2.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★RT0401	-	#4	—	3'-0"	Slab
RV0501	-	#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502	-	#5	3 3/4"	from 8'-1" to 9'-2"	Terminal wall (4 per terminal wall)
RV0503	-	#5	3 3/4"	2'-6 1/2"	Parapet
RV0504	-	#5	3 3/4"	5'-0"	Parapet
RV0505	-	#5	—	—	Terminal wall and wingwall
RS0401	-	#4	3"	—	Terminal wall end support
RL0801	-	#8	—	6'-11"	Terminal wall and U-back wing
RL0802	-	#8	6"	7'-0 1/4"	Terminal wall
RL0603	-	#6	—	3'-0"	Terminal wall end support
RL08	-	#8	—	—	Parapet

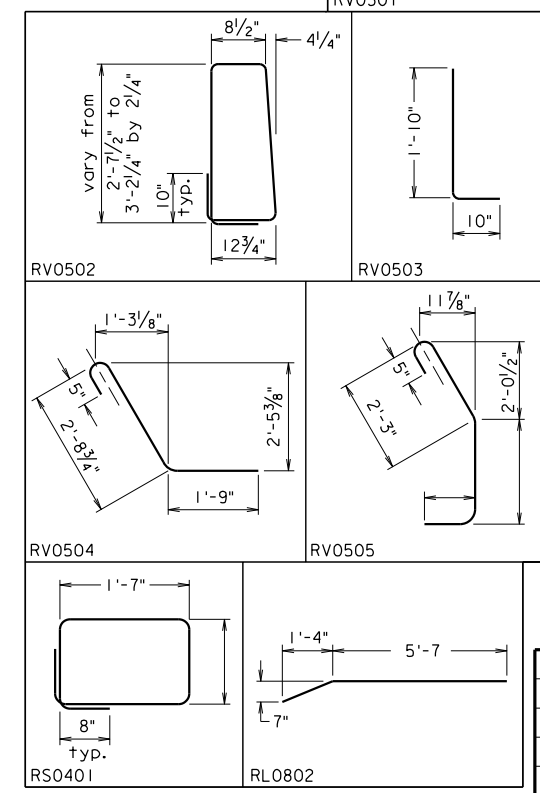
Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for parapet.

Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158

All concrete above roadway slab.

★ Used only when deck transverse reinforcement is parallel to skew of bridge.



bpb4a.dgn

03-10-2015

BPB-4D

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BPB-4D
			Checked: S&B, DIV		
Revisions					

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The F-shape parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is used as the normal traffic barrier unless an open rail is required. If architectural treatment is required, use standard BPB-4D-AT.

Terminal wall is detailed on superstructure. Standard is used with deck slab extension.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

SECTION D-D:

Provide dimension for terminal wall end support.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¾" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

Complete dimension and length of bars RV0505 and RS0401.

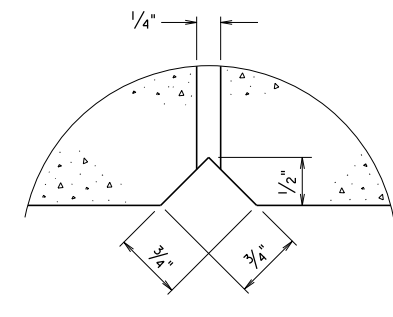
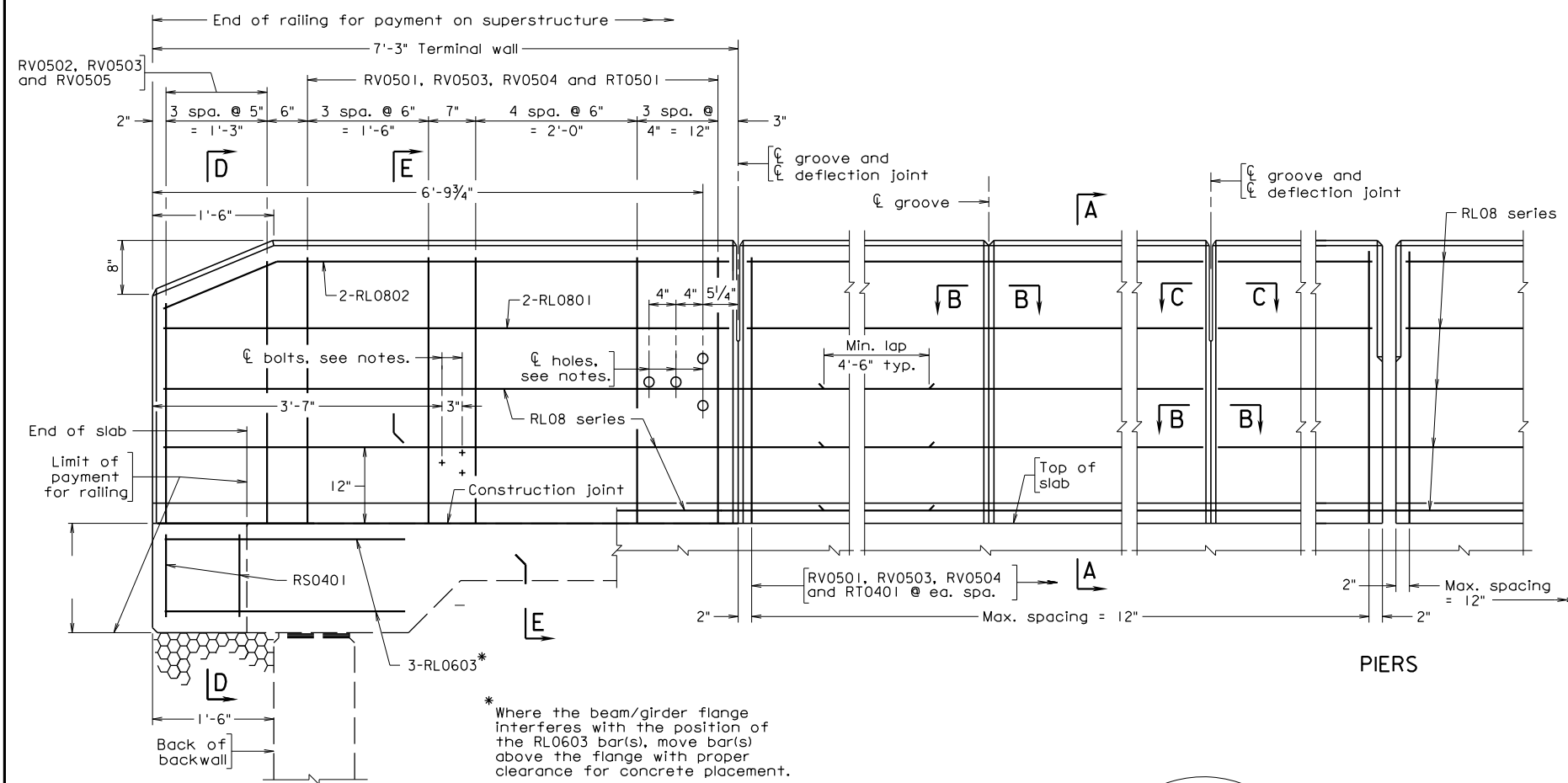
NOTES:

Complete corrosion resistant reinforcing steel note by adding the Class I, II or III. For additional information on corrosion resistant reinforcing steels (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

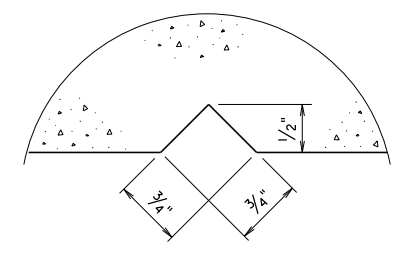
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID		STATE		SHEET
VA.	ROUTE	PROJECT	ROUTE	PROJECT	NO.



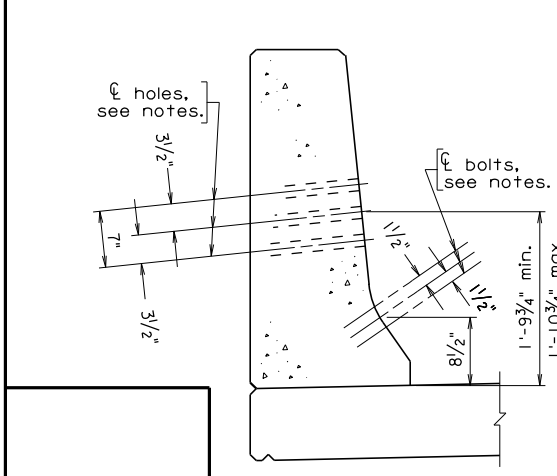
SECTION C-C
Full scale
Deflection joint detail for both sides of parapet



SECTION B-B
Full scale
Groove detail for both sides of parapet

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 Detail shown at pier is applicable only when joint is in slab. When slab is continuous over pier, use groove and deflection joint.
 Spacing of grooves is to be approximately 8'-0". If lighting standard is used (see bridge conduit system), groove shall be located approximately 4'-0" from centerline of light standard. Spacing of deflection joints shall not exceed three groove spaces.
 Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-2.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for parapet shall include bolts, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule. Concrete included in the architectural treatment is excluded.
 Bid price for architectural treatment includes concrete in relief and coping.

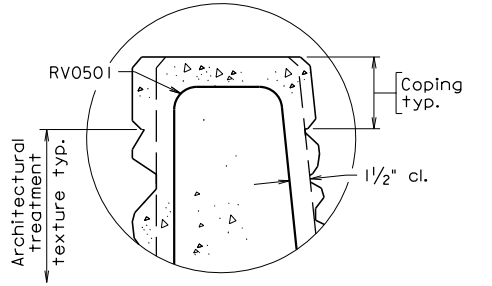
DECK SLAB EXTENSION ABUTMENT



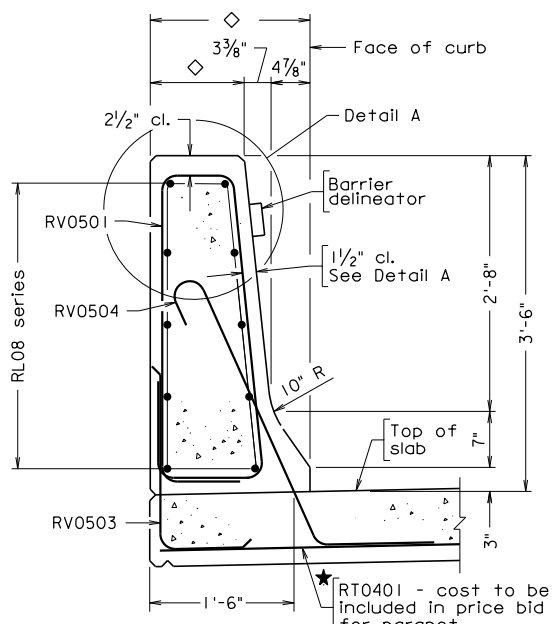
SECTION E-E
Reinforcing steel not shown.

* Where the beam/girder flange interferes with the position of the RL0603 bars, move bar(s) above the flange with proper clearance for concrete placement.

ELEVATION

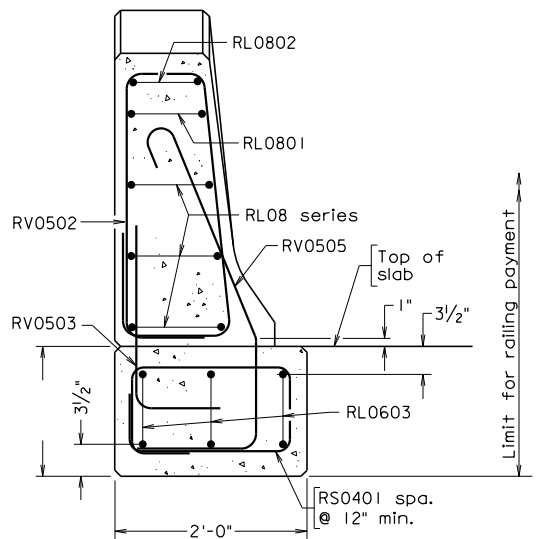


DETAIL A
Both sides of architectural treatment shown



SECTION A-A

◇ For dimensions and architectural treatment details, see sheet XX.



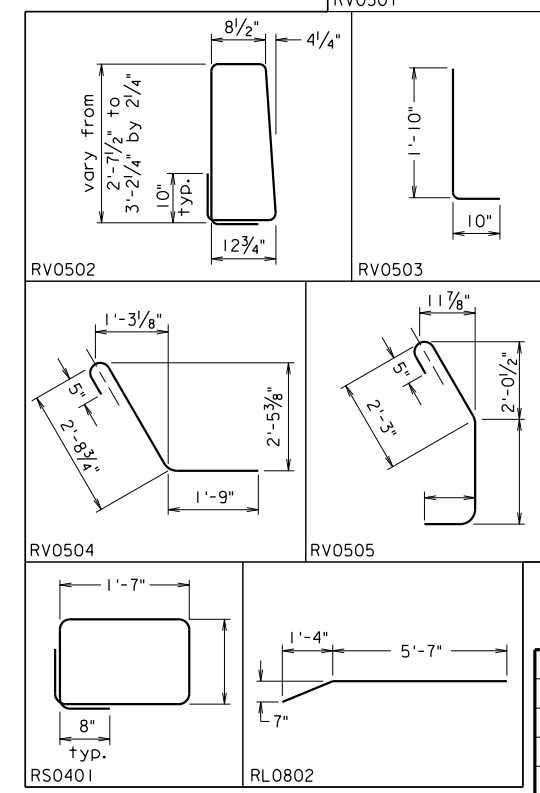
SECTION D-D

For dimensions and details not shown, see Section A-A.

REINFORCING STEEL SCHEDULE

Mark	No.	Size	Pin ϕ	Length	Location
★RT0401		#4	—	3'-0"	Slab
RV0501		#5	3 3/4"	9'-3"	Parapet and terminal wall
RV0502		#5	3 3/4"	from 8'-1" to 9'-2"	Terminal wall (4 per terminal wall)
RV0503		#5	3 3/4"	2'-6 1/2"	Parapet
RV0504		#5	3 3/4"	5'-0"	Parapet
RV0505		#5	—	—	Terminal wall and wingwall
RS0401		#4	3"	—	Terminal wall end support
RL0801		#8	—	6'-11"	Terminal wall and U-back wing
RL0802		#8	6"	7'-0 1/4"	Terminal wall
RL0603		#6	—	3'-0"	Terminal wall end support
RL08		#8	—	—	Parapet

Dimensions in bending diagram are out-to-out of bars, except as shown.
 Cost of all bars listed in schedule to be included in price bid for parapet.
 Gross concrete quantities (C.Y.) = Lin. Ft. x 0.158
 All concrete above roadway slab.
 (These quantities do not include architectural treatment.)
 ★ Used only when deck transverse reinforcement is parallel to skew of bridge.



BPB-4D-AT 03-10-2015 bpb4dat.dgn

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE) WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
BPB-4D-AT					

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

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42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)

WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The F-shape concrete parapet has a height of 3'-6" and has been crash tested for TL-5 (TL = test level). It is to be used as the normal traffic barrier unless an open rail is required. This standard is used only when architectural treatment is required. If none is required, use sheet BPB-4D.

Terminal wall is detailed on superstructure. Standard is used with deck slab extension.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 3" curb dimension and the overall 3'-6" height of the parapet would need to be adjusted to 4" and 3'-7" respectively (Section A-A). In addition, all height dimensions of bolt locations in relation to top of deck slab need to be adjusted by 1" (Section E-E).

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions (for example, the length of the RL08-series bars) for installation. Therefore, the remainder of the Reinforcing Steel Schedule including the number of bars required is to be left blank by the designer.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

Modify vertical dimensions (3" curb and 3'-6" parapet height) so that these dimensions will be established from top of overlay surface as noted above.

Complete sheet no. for architectural drawing(s).

SECTION D-D:

Provide dimension for terminal wall end support.

SECTION E-E:

Modify vertical dimension 8½" and the range (1'-9¾" min. – 1'-10¼" max.) for bolt locations so that these dimensions will be established from top of overlay surface as noted above.

STANDARD BPB-4D-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 24Oct2013
SHEET 2 of 3
FILE NO. BPB-4D-AT-2

**42" CAST-IN-PLACE CONCRETE PARAPET (F-SHAPE)
WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Modify steel rebars if initial overlay used on bridge.

Complete dimension and length of bars RV0505 and RS0401.

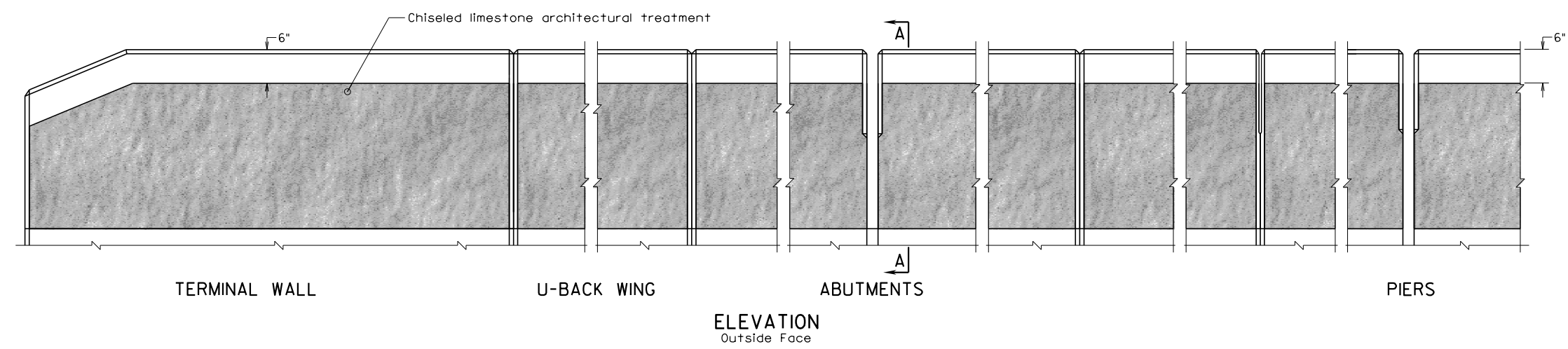
NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.



Notes:

Architectural treatment for the parapet and terminal walls shall simulate chiseled limestone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled limestone pattern without obvious repetition of the pattern.

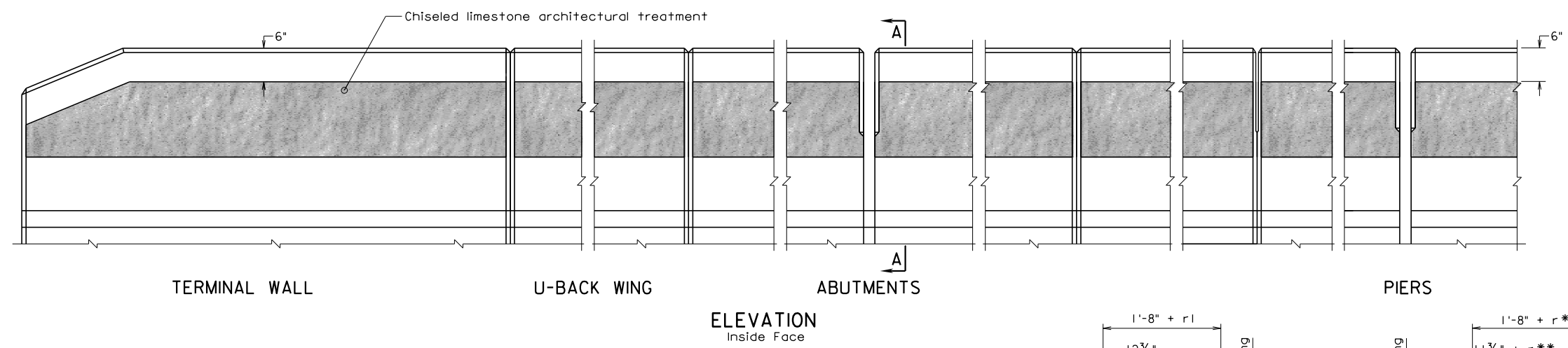
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

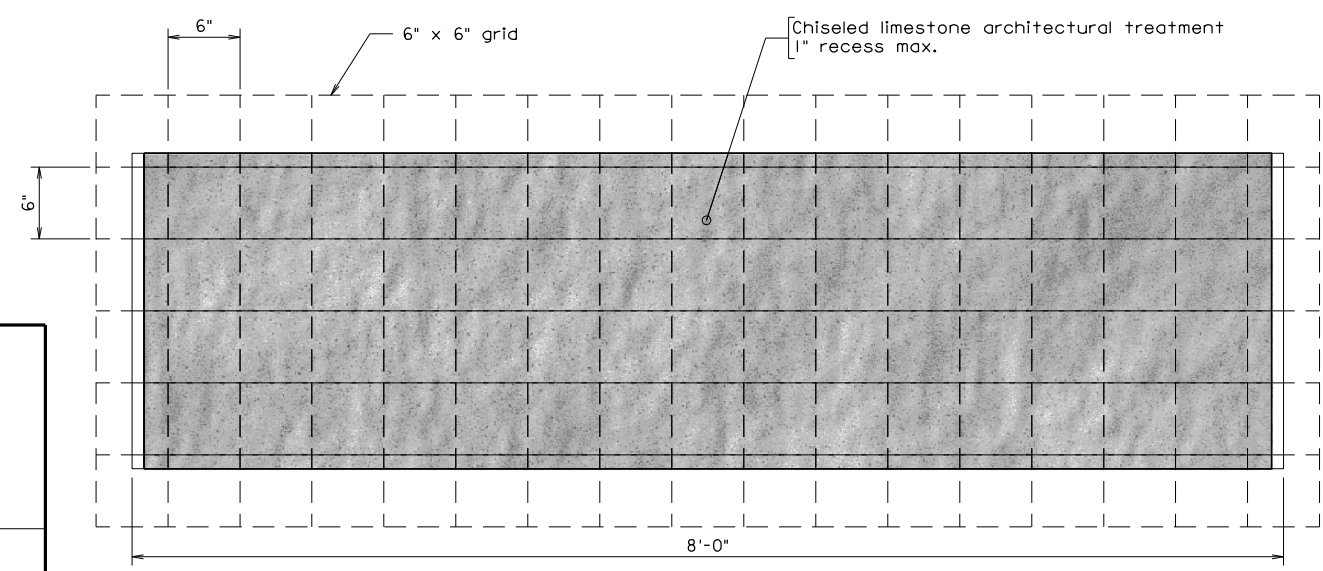
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

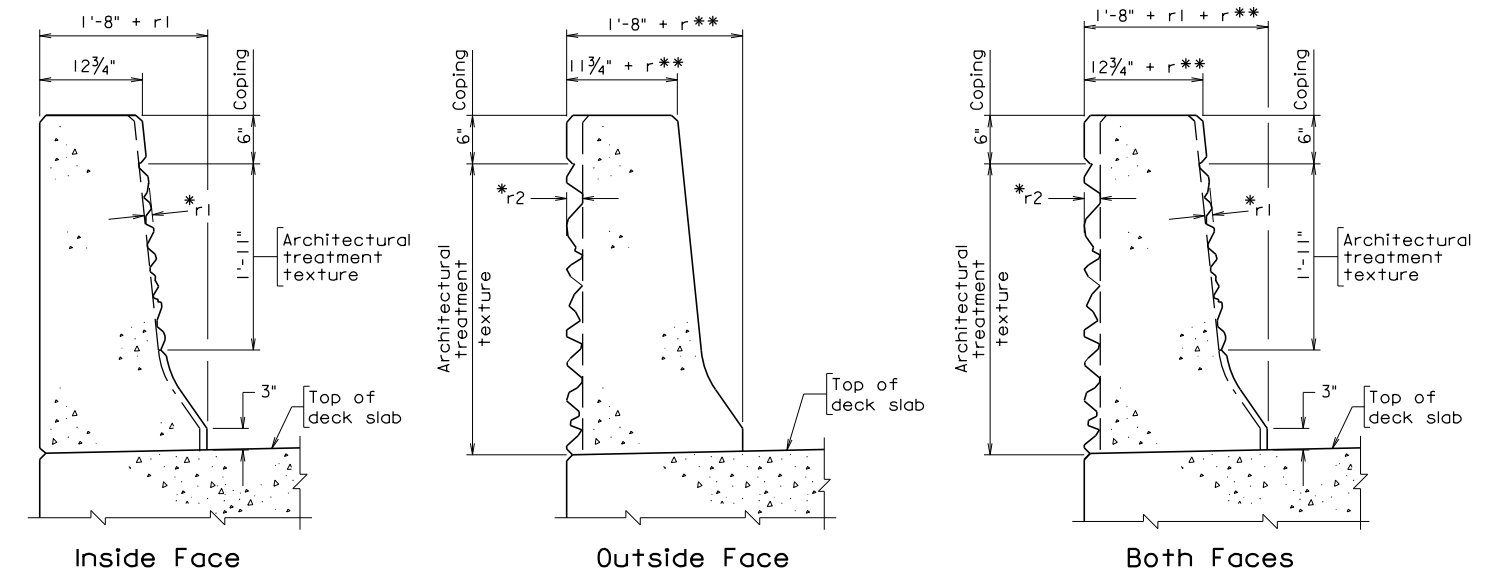
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



CHISELED LIMESTONE TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-21 03-10-2015 bpbat21.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR CONCRETE PARAPET (42" F-SHAPE)	
No.	Description
Revisions	
Designed: S&B, DIV	Date
Drawn: S&B, DIV	Plan No.
Checked: S&B, DIV	Sheet No.

BPB-AT-21

Not to scale

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**ARCHITECTURAL TREATMENT
WITH CHISLED LIMESTONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

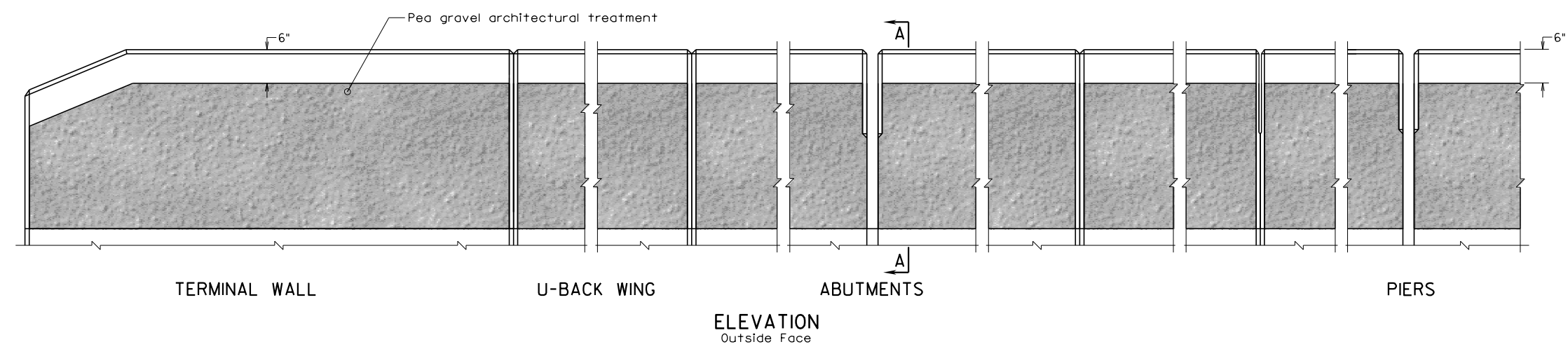
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate pea gravel texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous pea gravel pattern without obvious repetition of the pattern.

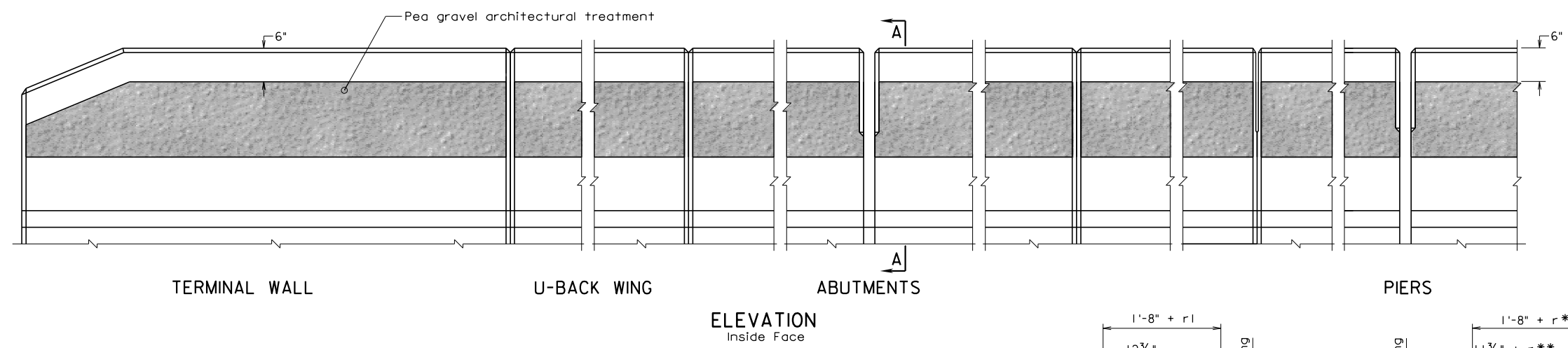
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

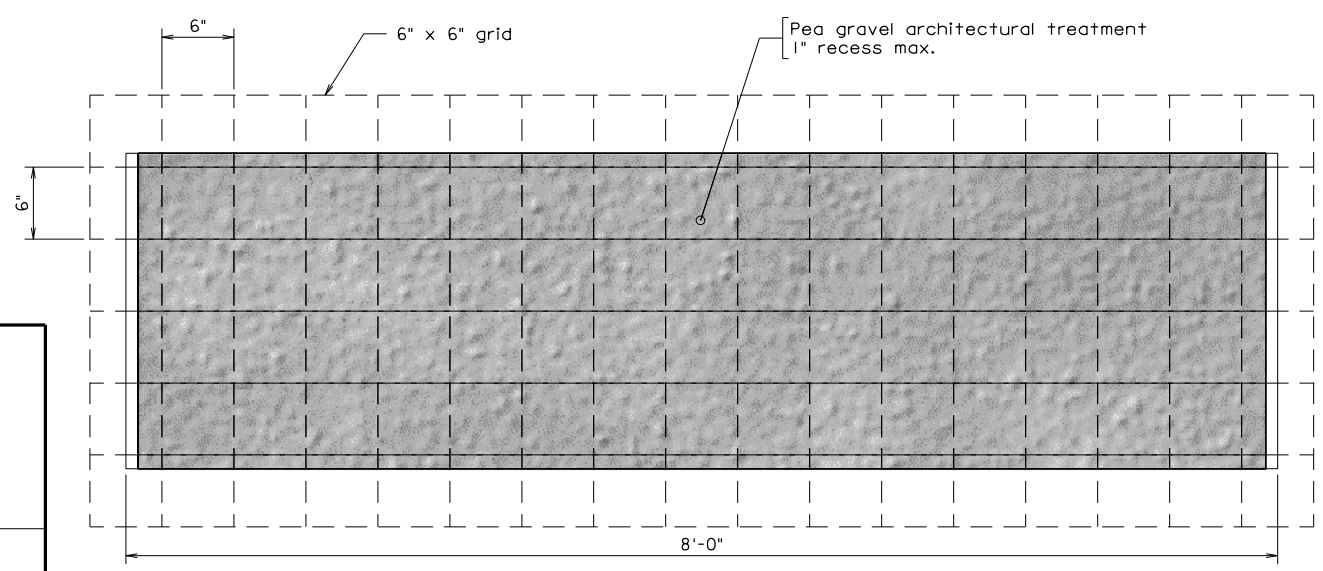
Architectural treatment shall be applied on ----- face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

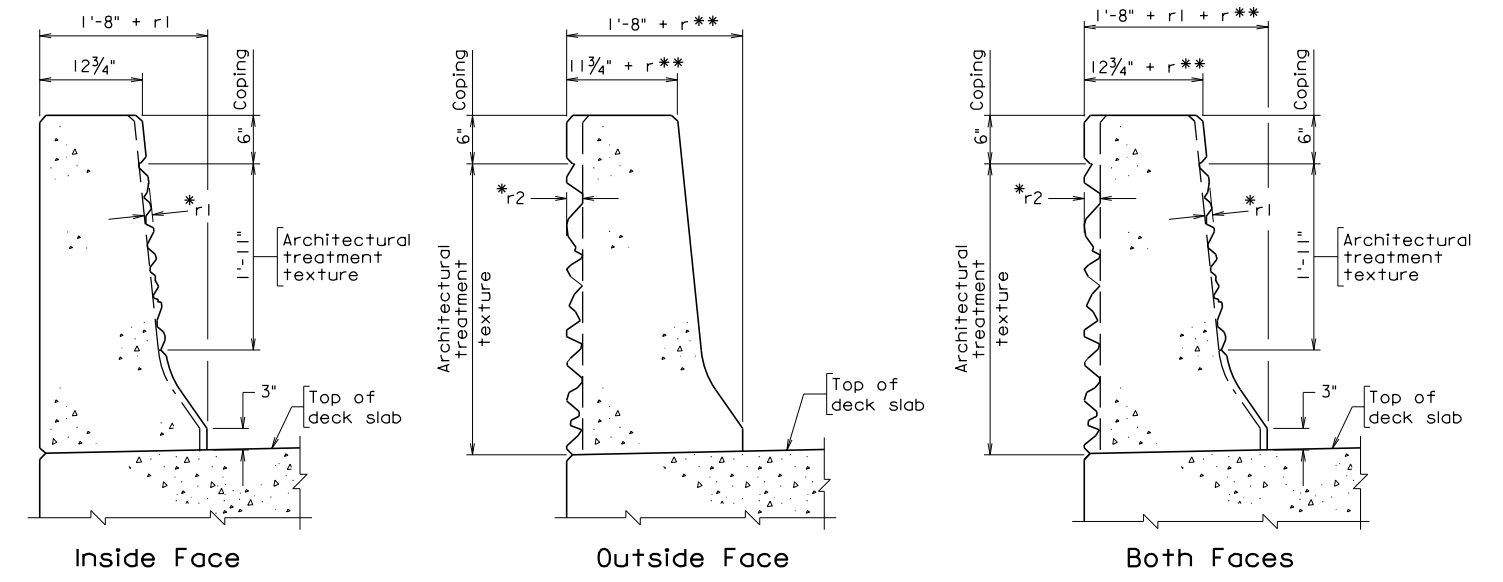
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



PEA GRAVEL TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-22
03-10-2015
bbbat22.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

		COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
		STRUCTURE AND BRIDGE DIVISION	
		ARCHITECTURAL TREATMENT WITH PEA GRAVEL FOR CONCRETE PARAPET (42" F-SHAPE)	
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
Revisions		Date	Plan No. Sheet No.
			BPB-AT-22

Not to scale

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**ARCHITECTURAL TREATMENT
WITH PEA GRAVEL
FOR 42" CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

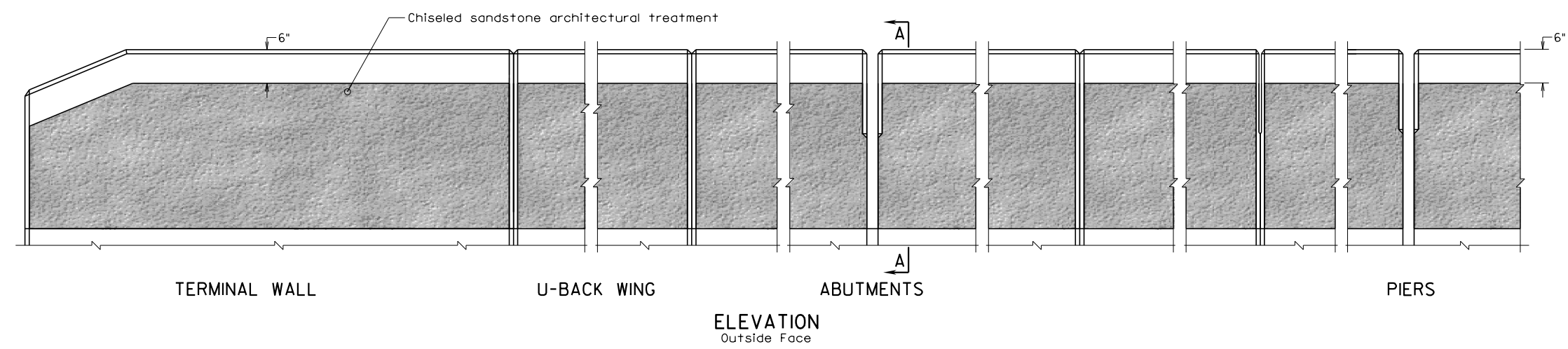
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate chiseled sandstone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled sandstone pattern without obvious repetition of the pattern.

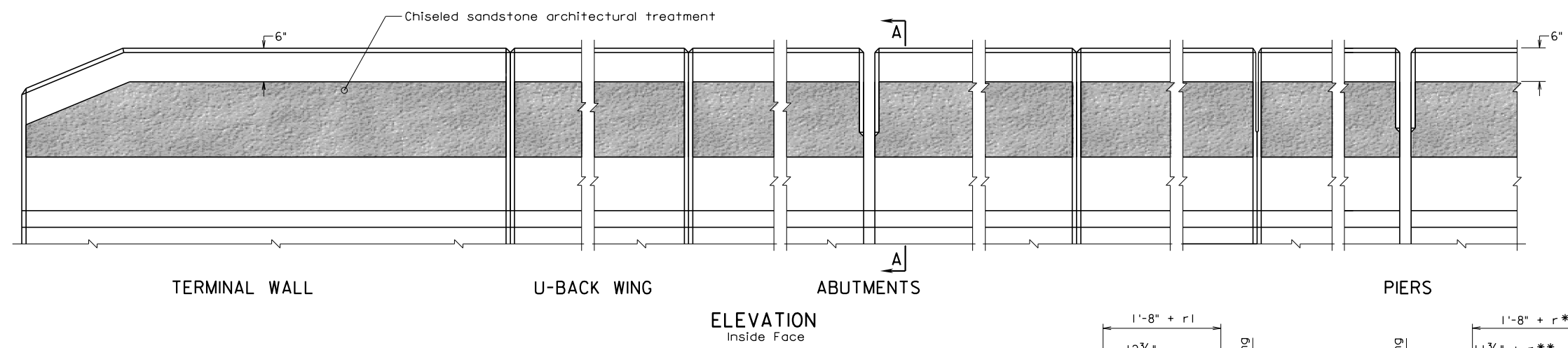
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

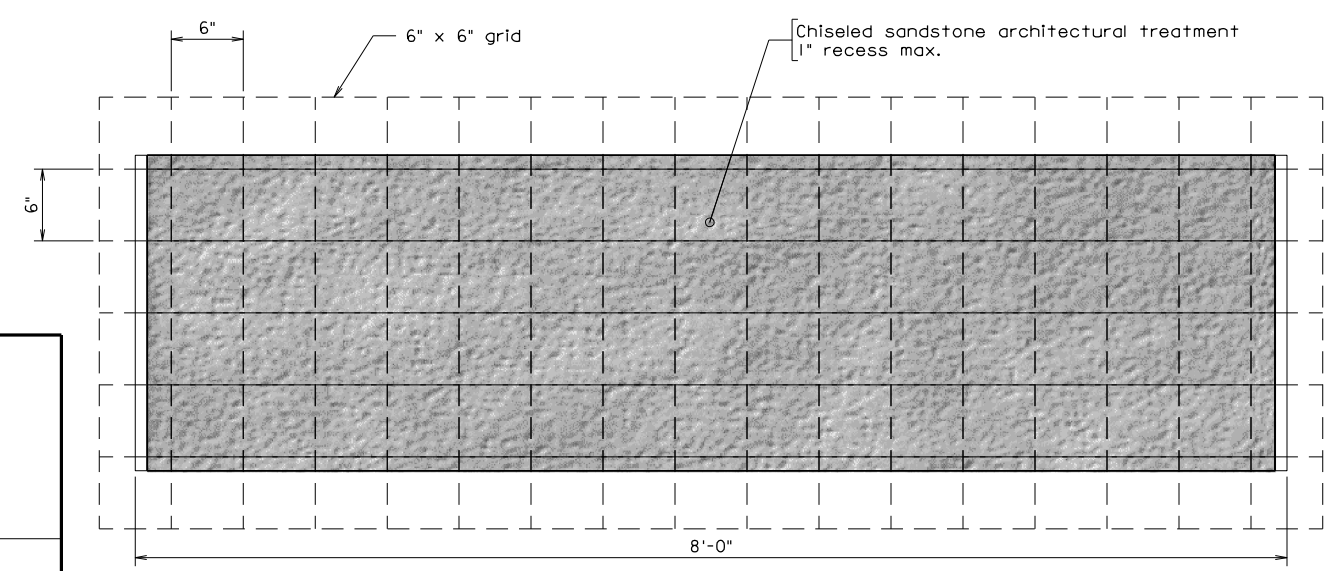
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

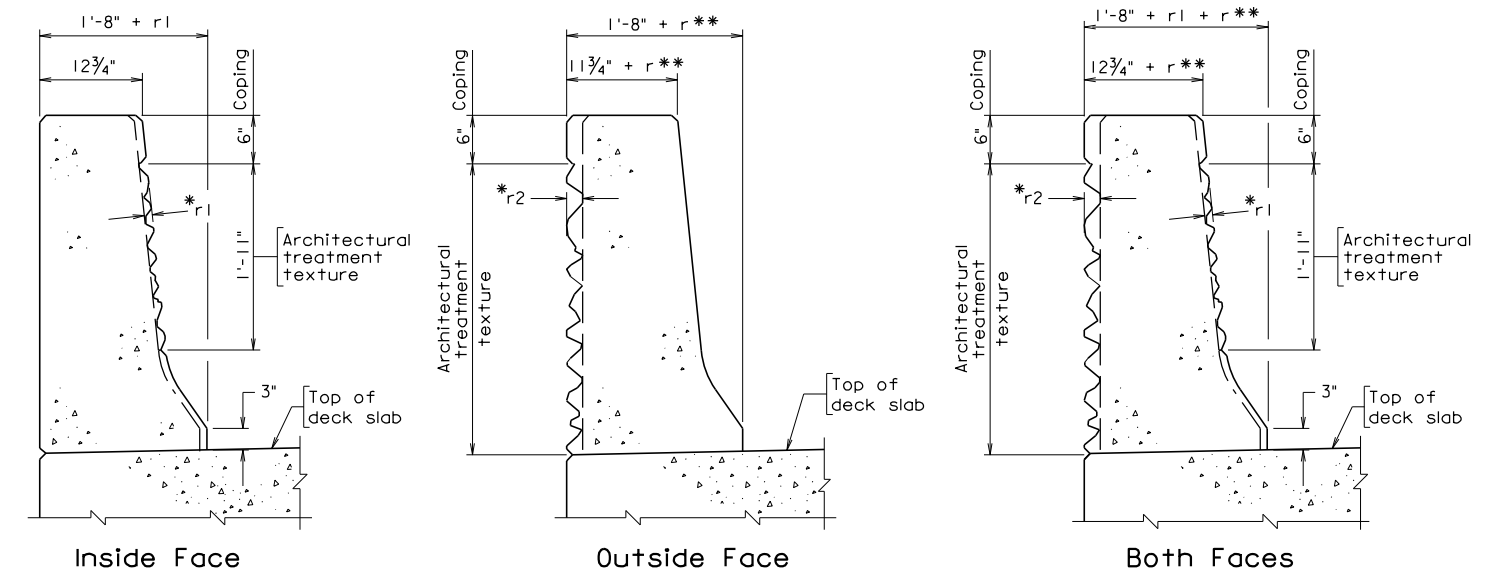
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



CHISELED SANDSTONE TEXTURE DETAIL
Barrier - Outside Face
(inside face similar)



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-23
03-10-2015
bbbat23.dgn

Sealed and Signed by:
Prasad L. Nallapareti
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED SANDSTONE FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
Revisions		Date	Plan No. Sheet No.
			BPB-AT-23

Not to scale

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**ARCHITECTURAL TREATMENT
WITH CHISLED SANDSTONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

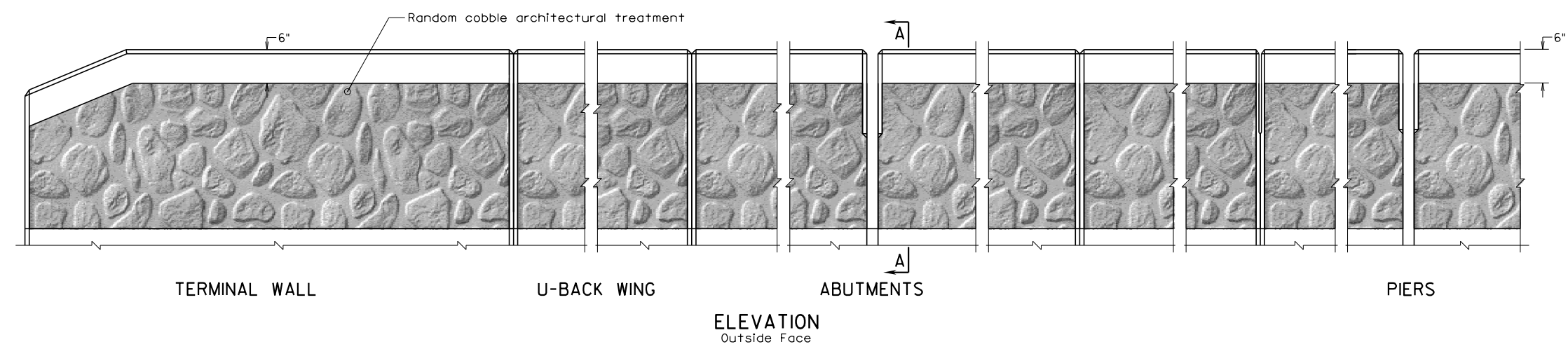
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate random cobble, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous random cobble pattern without obvious repetition of the pattern.

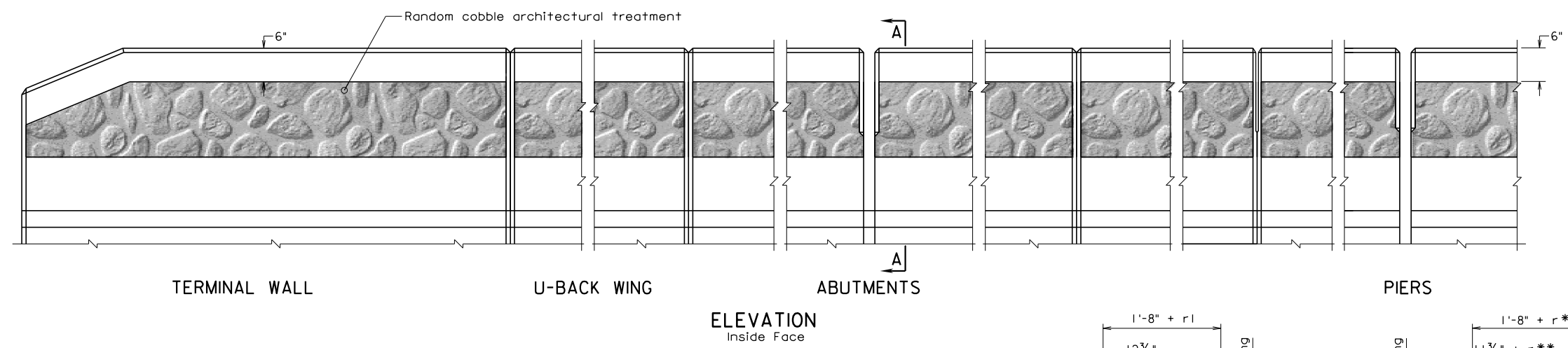
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

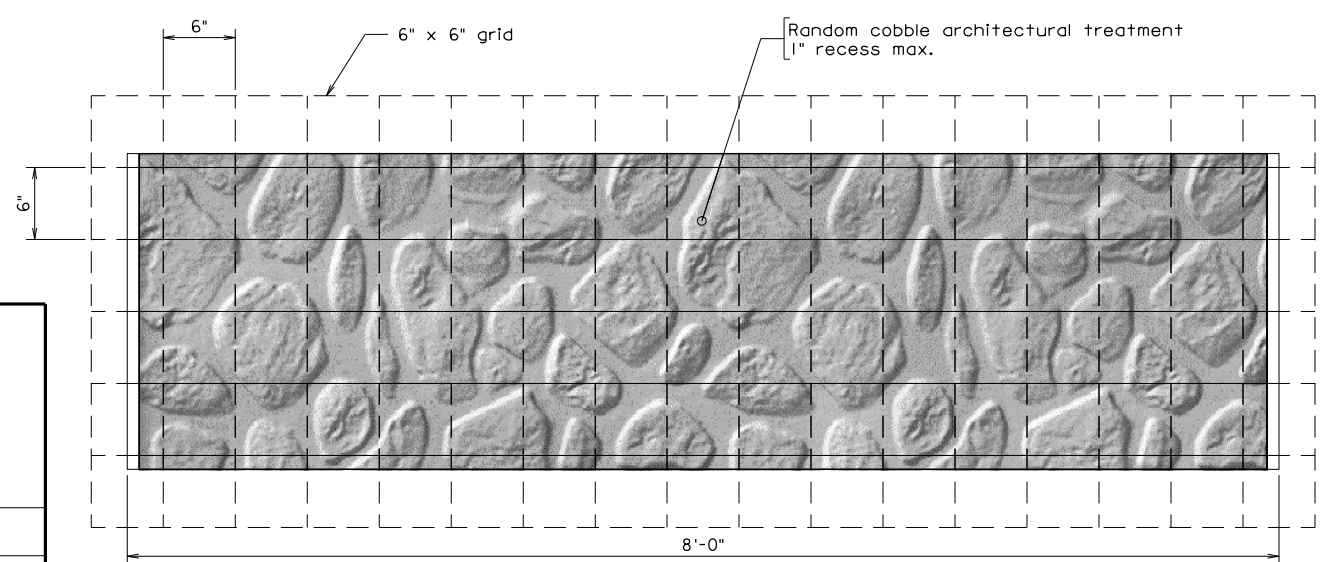
Architectural treatment shall be applied on ----- face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

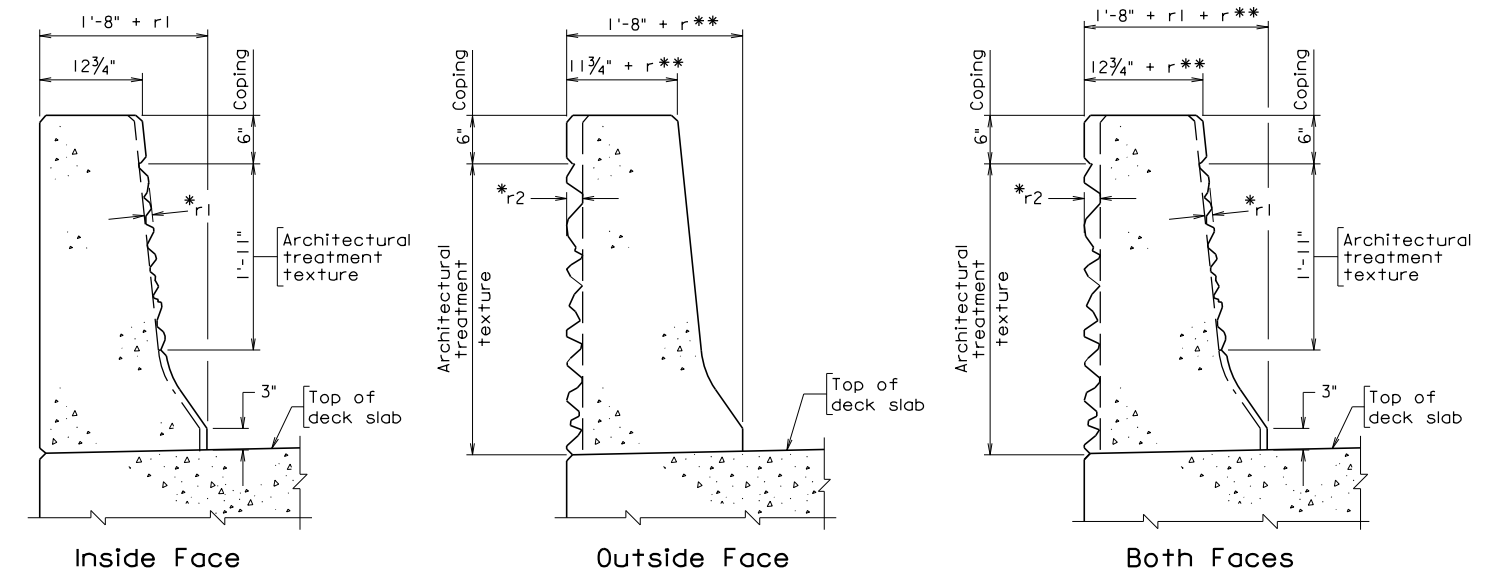
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



RANDOM COBBLE TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-24 03-10-2015 bpb0124.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RANDOM COBBLE FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
Revisions		Date	Plan No. Sheet No.
			BPB-AT-24

Not to scale

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**ARCHITECTURAL TREATMENT
WITH RANDOM COBBLE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

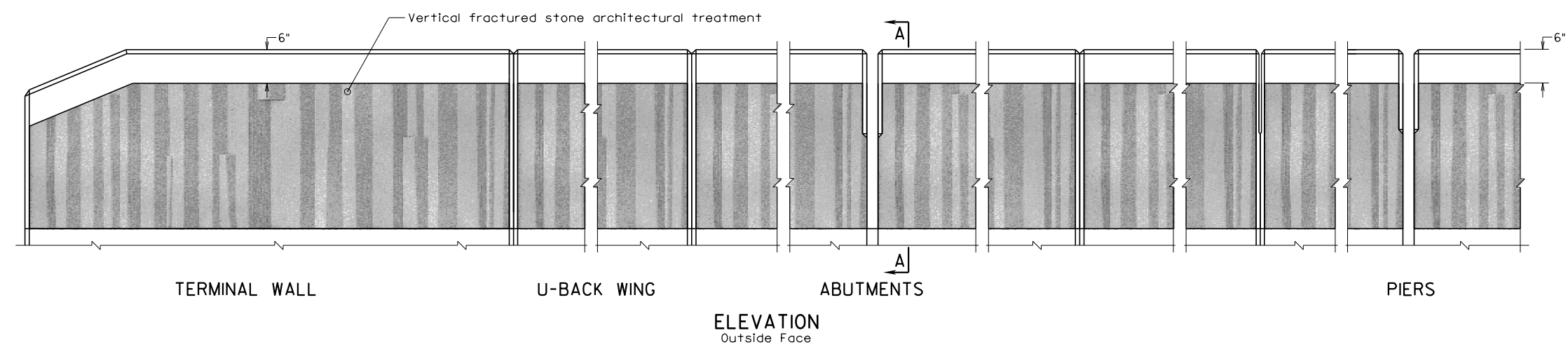
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate vertical fractured stone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous vertical fractured stone pattern without obvious repetition of the pattern.

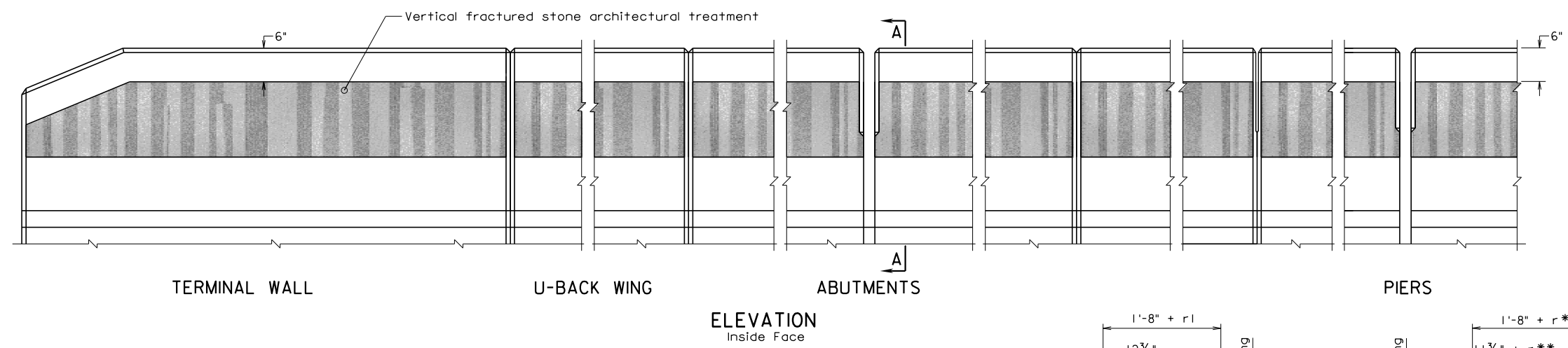
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

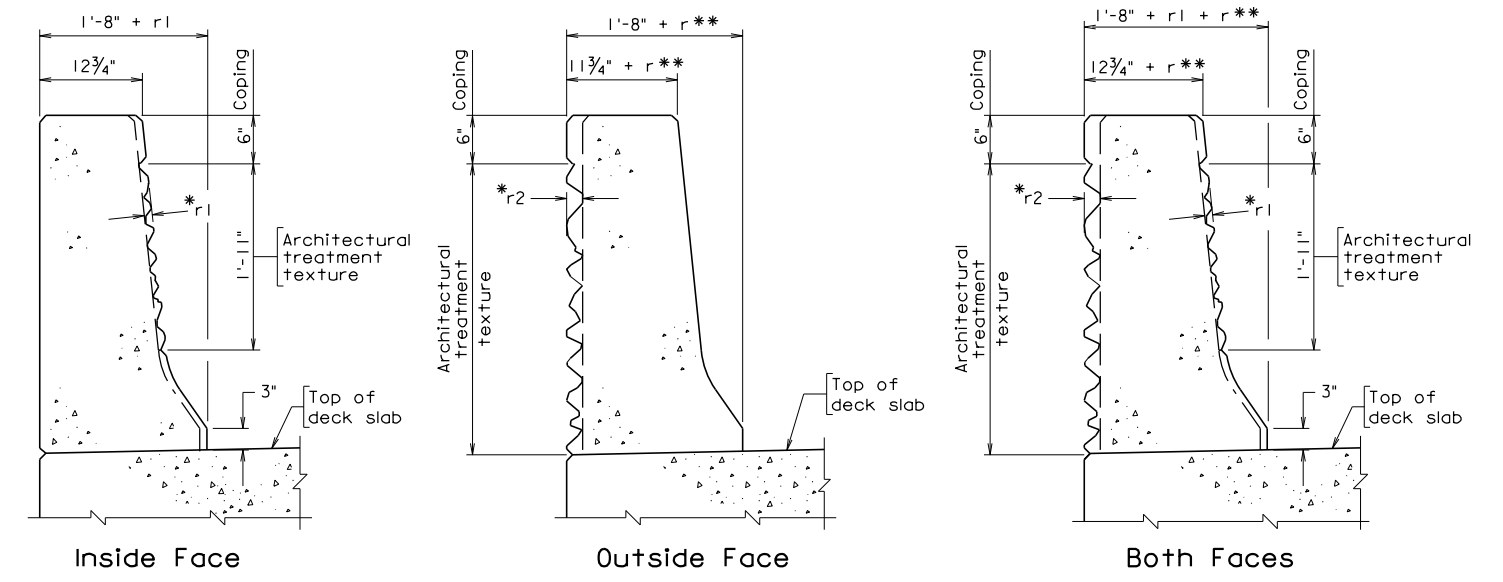
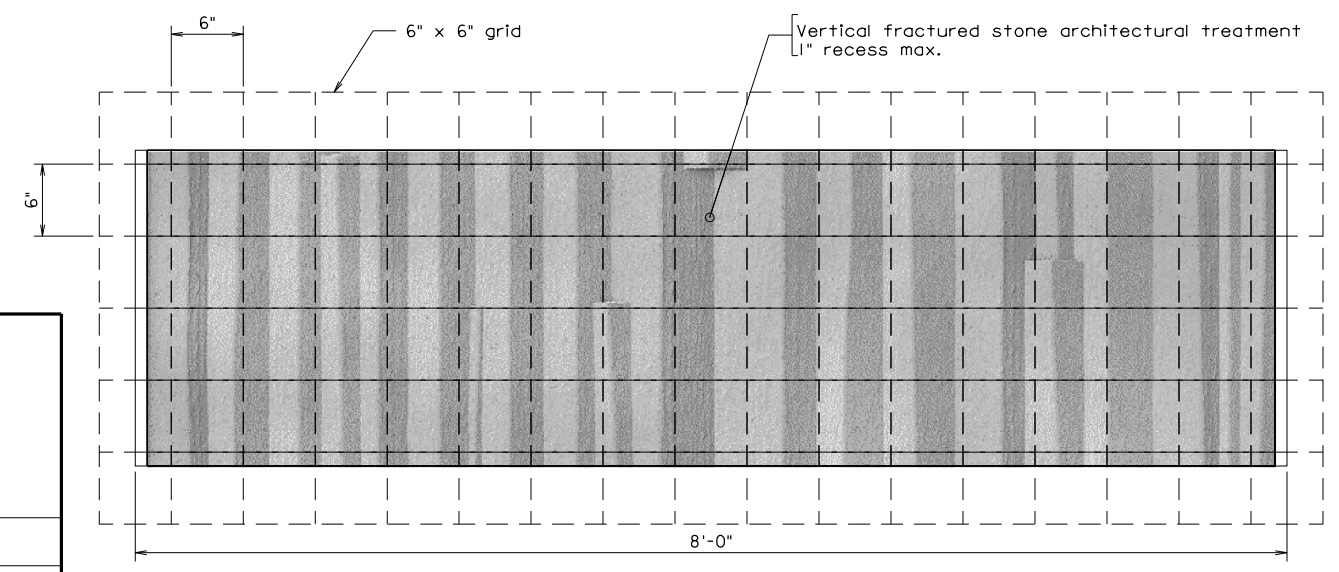
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-25 03-10-2015 bpb0125.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

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Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH VERTICAL FRACTURED STONE FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
	Revisions		Date
			Plan No.
			Sheet No.

BPB-AT-25

Not to scale

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**ARCHITECTURAL TREATMENT
WITH VERTICAL FRACTURE STONE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

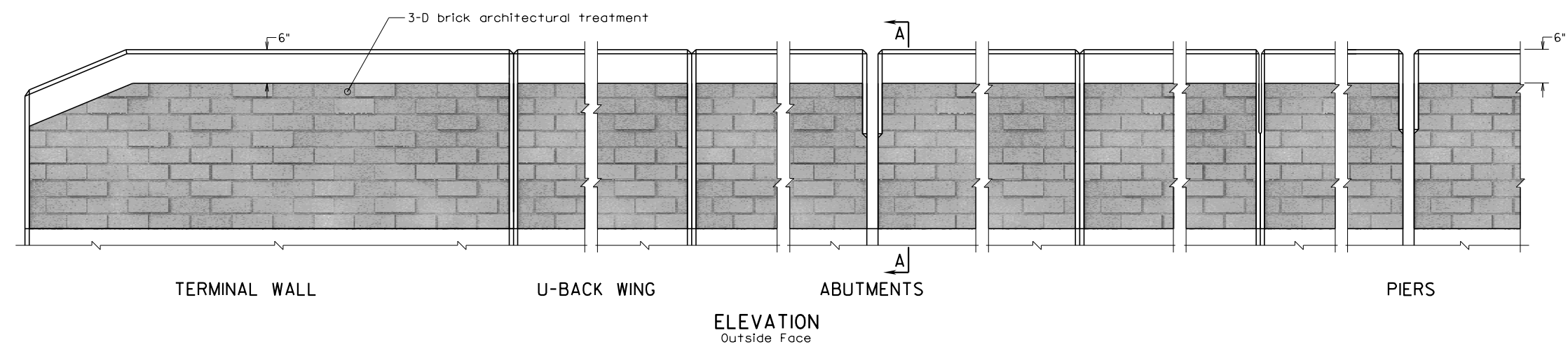
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate 3-D brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous 3-D brick pattern without obvious repetition of the pattern.

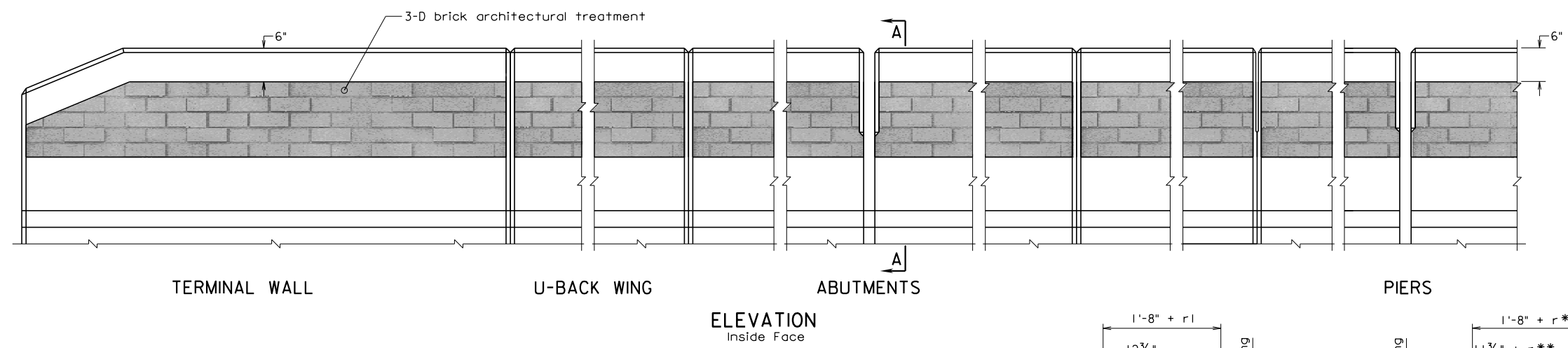
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

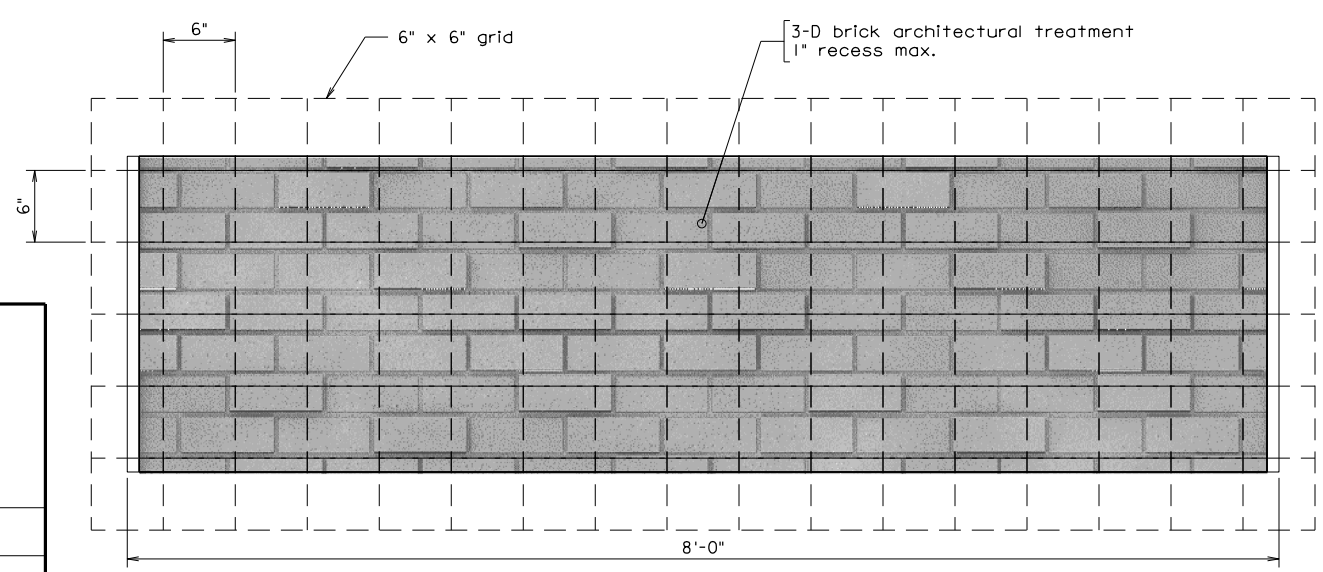
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

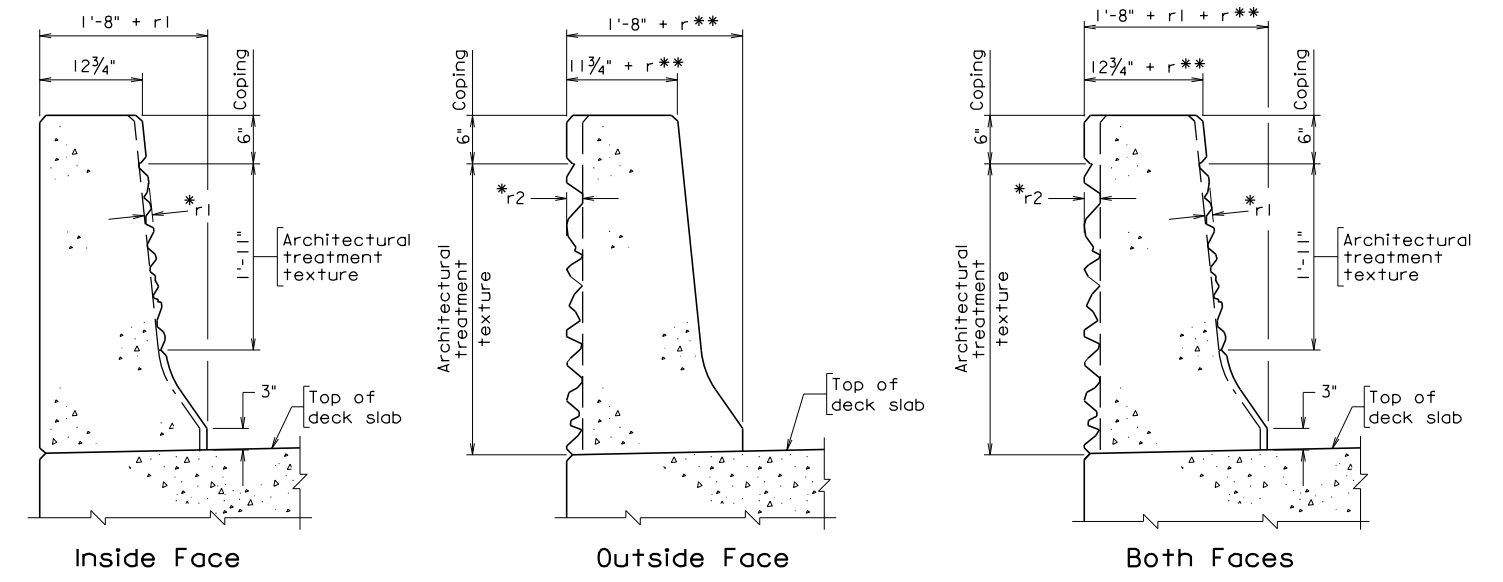
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



3-D BRICK TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-26 03-10-2015 bpb0126.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
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VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH 3-D BRICK FOR CONCRETE PARAPET (42" F-SHAPE)					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPB-AT-26		

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ARCHITECTURAL TREATMENT
WITH 3-D BRICK
FOR CONCRETE PARAPET (F-SHAPE)

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

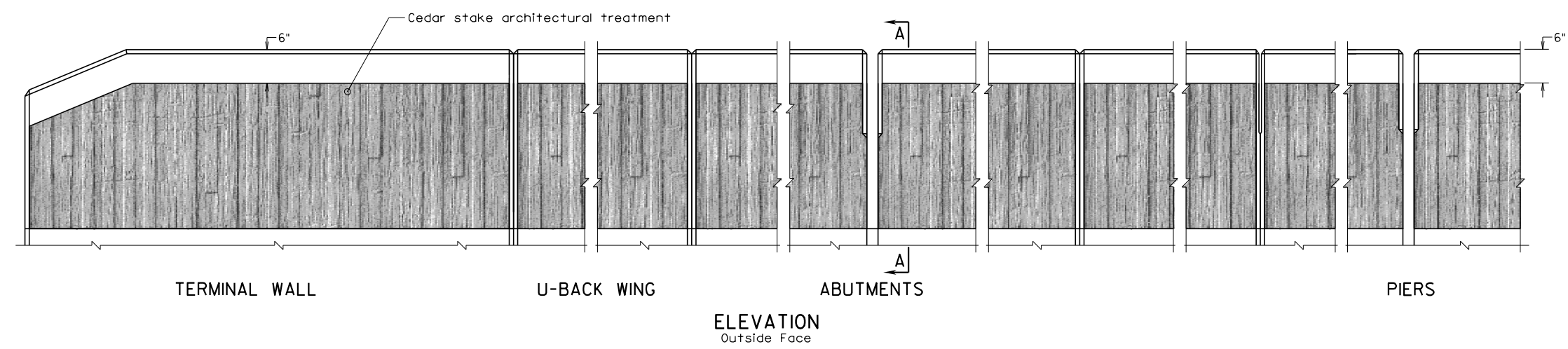
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT		
VA.					



Notes:

Architectural treatment for the parapet and terminal walls shall simulate cedar stake texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous cedar stake pattern without obvious repetition of the pattern.

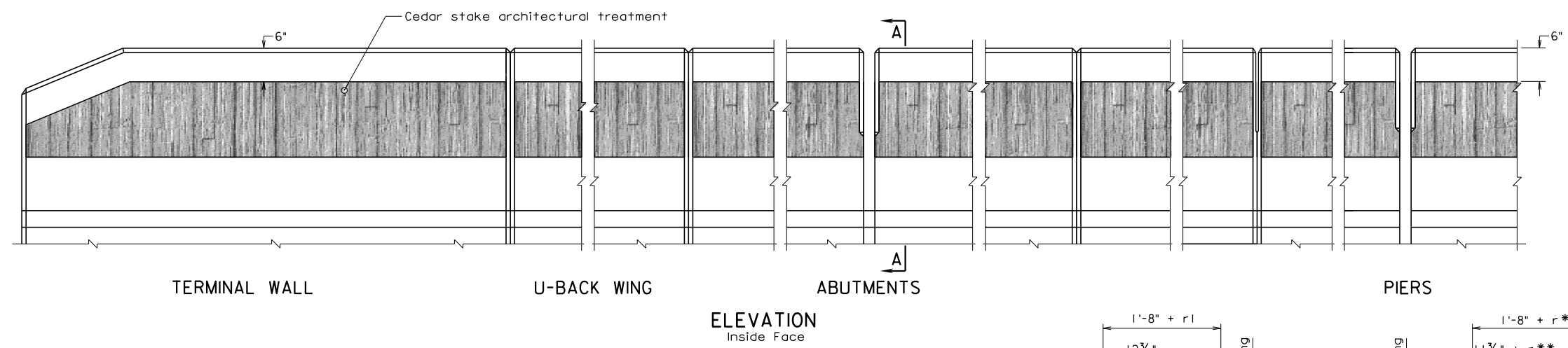
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

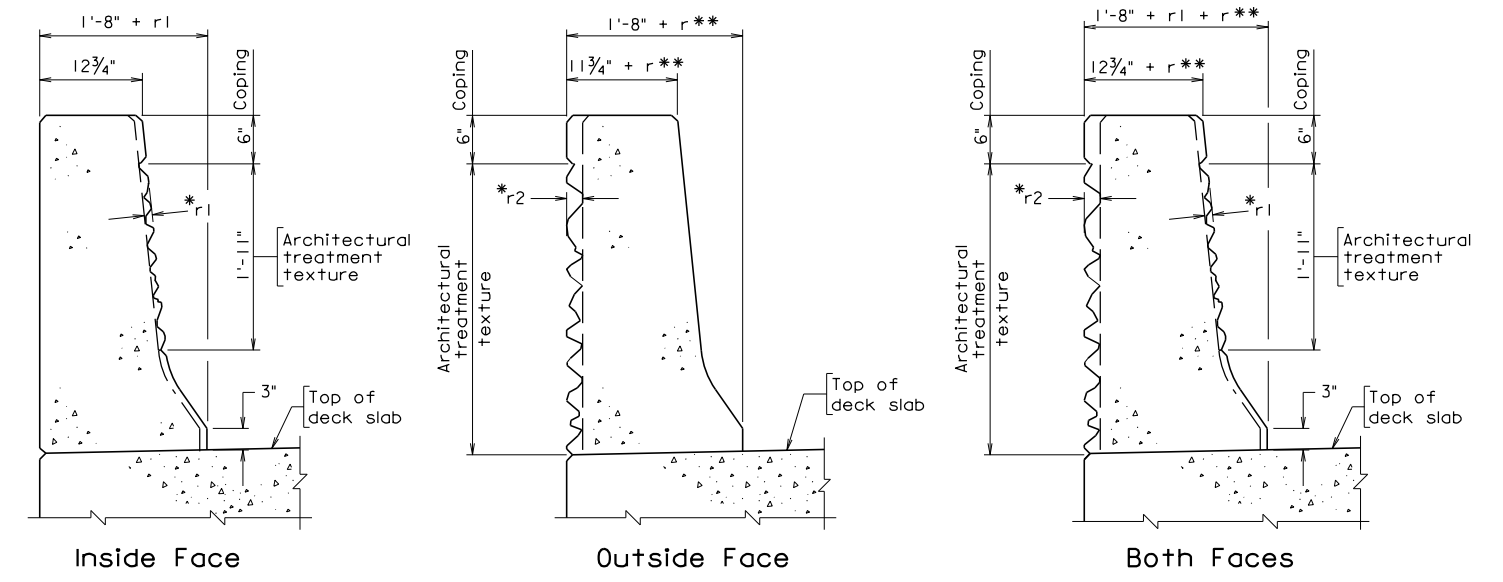
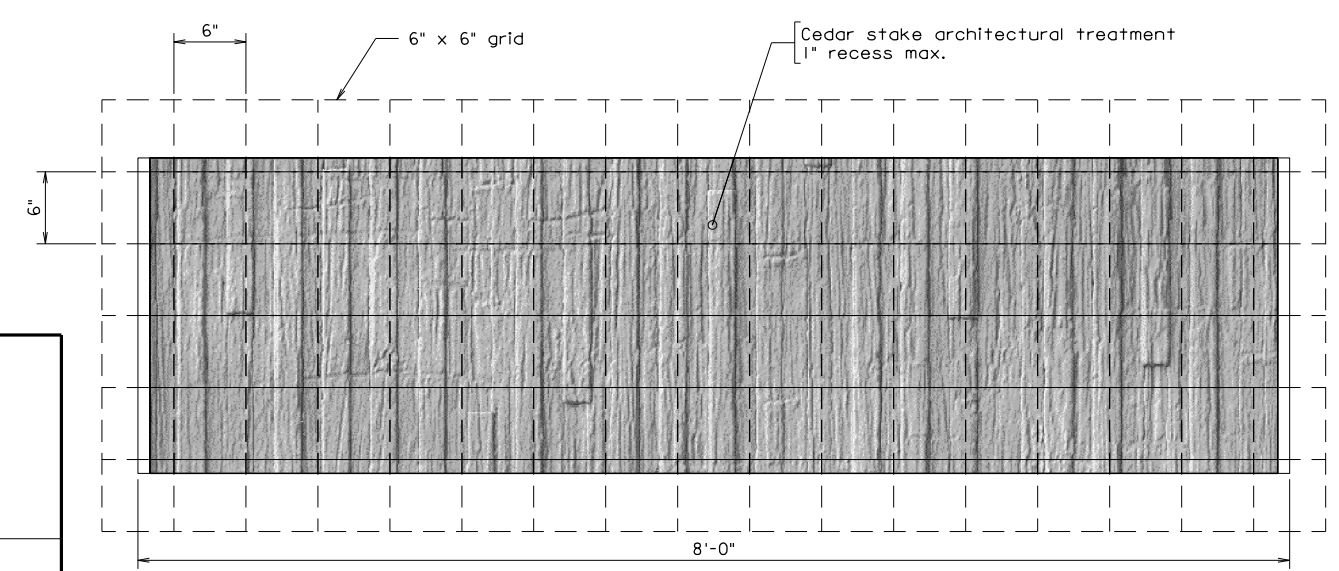
Architectural treatment shall be applied on ----- face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
 r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
 r = 2" for 1" < r2 ≤ 2"

BPB-AT-27
03-10-2015
bbbat27.dgn

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH CEDAR STAKE FOR CONCRETE PARAPET (42" F-SHAPE)	
No.	Description
Revisions	
Designed: S&B, DIV	Date
Drawn: S&B, DIV	Plan No.
Checked: S&B, DIV	Sheet No.
BPB-AT-27	

**ARCHITECTURAL TREATMENT
WITH CEDAR STAKE
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

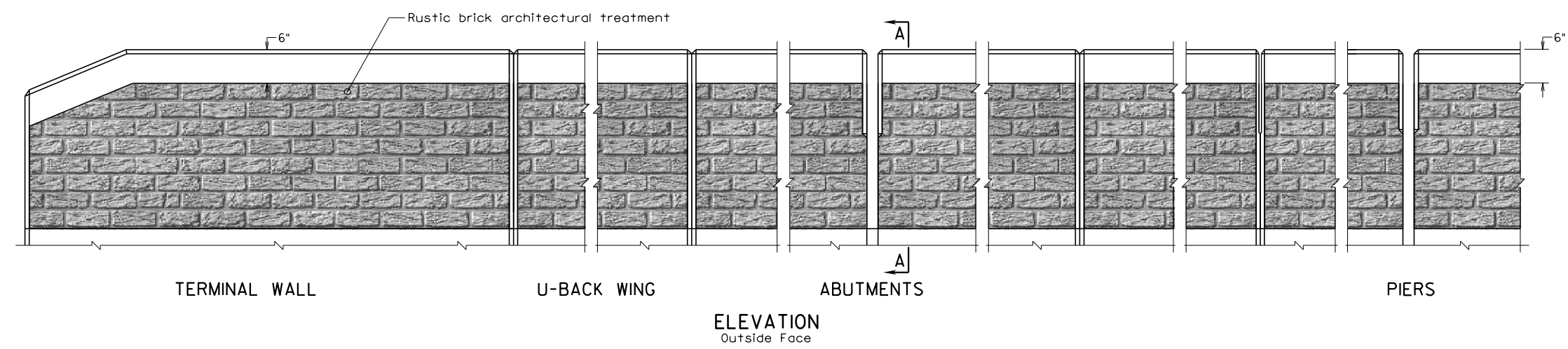
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate rustic brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous rustic brick pattern without obvious repetition of the pattern.

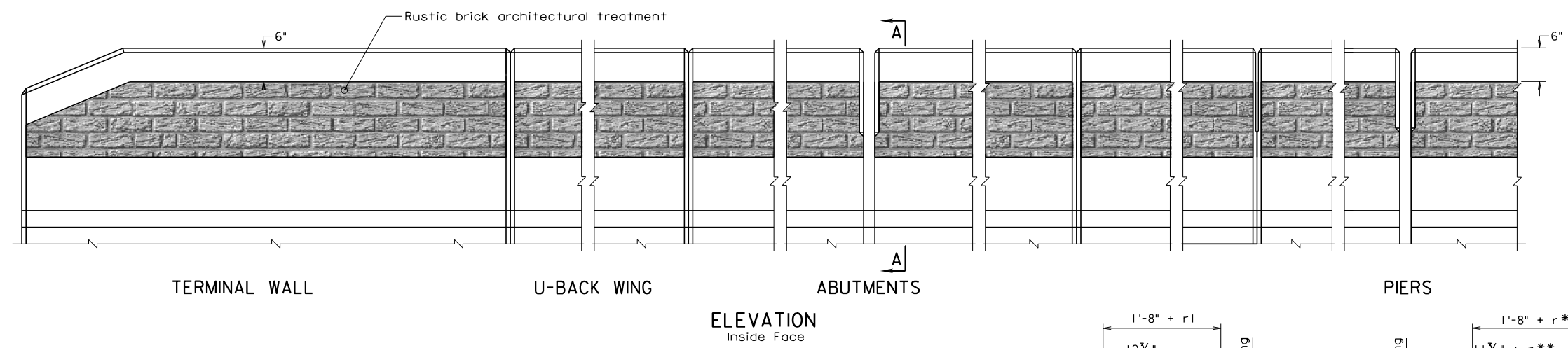
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

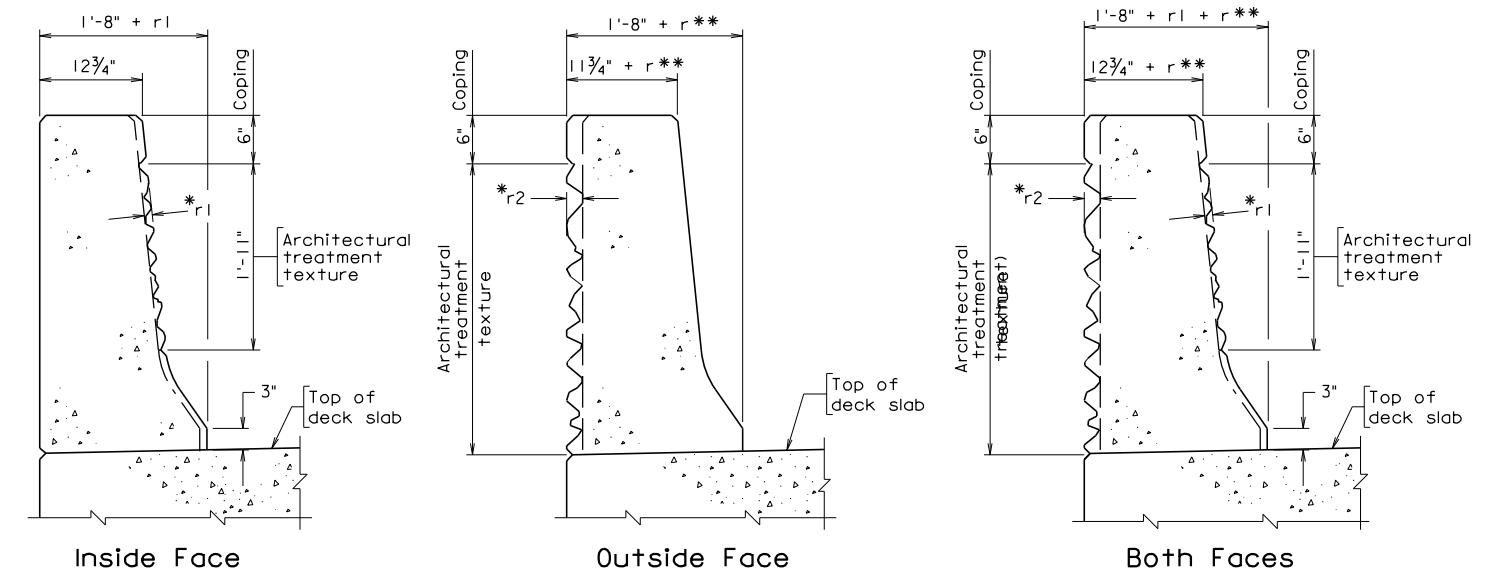
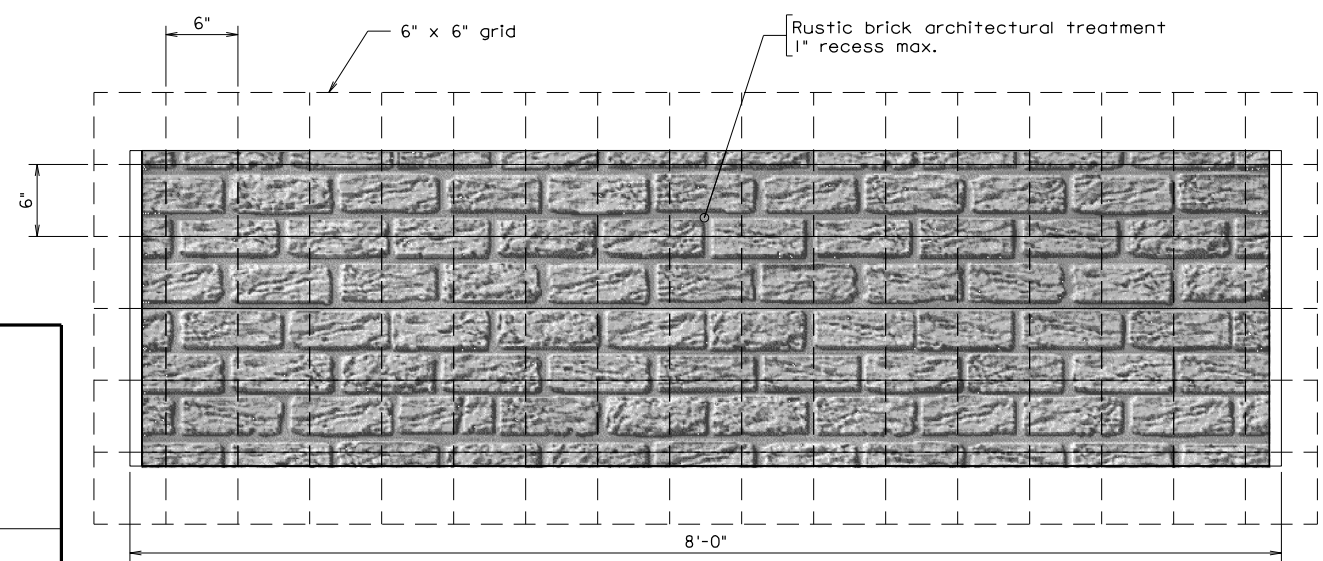
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-28 03-10-2015 bpbat28.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
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standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RUSTIC BRICK FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
Revisions		Date	Plan No. Sheet No.
			BPB-AT-28

**ARCHITECTURAL TREATMENT
WITH RUSTIC BRICK
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

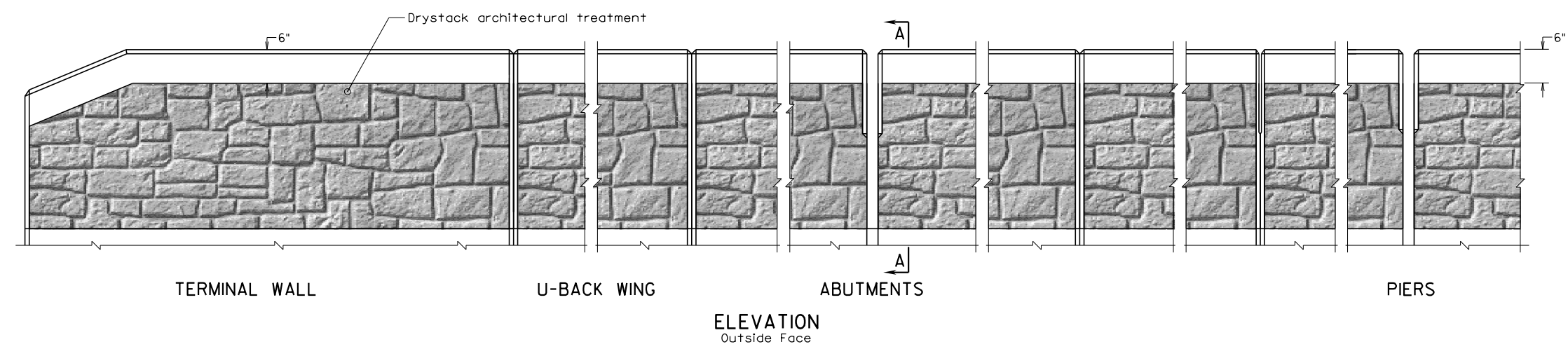
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate drystack texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous drystack pattern without obvious repetition of the pattern.

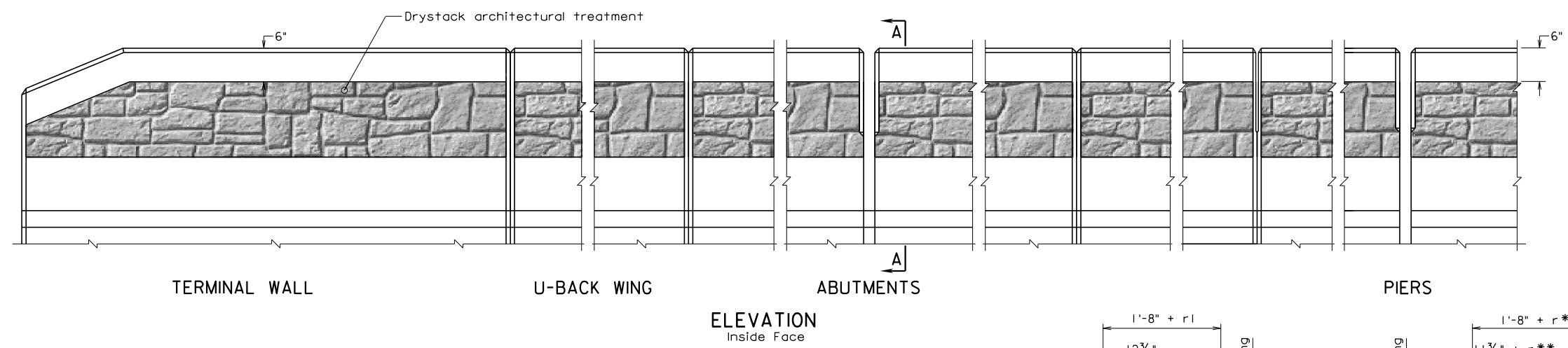
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

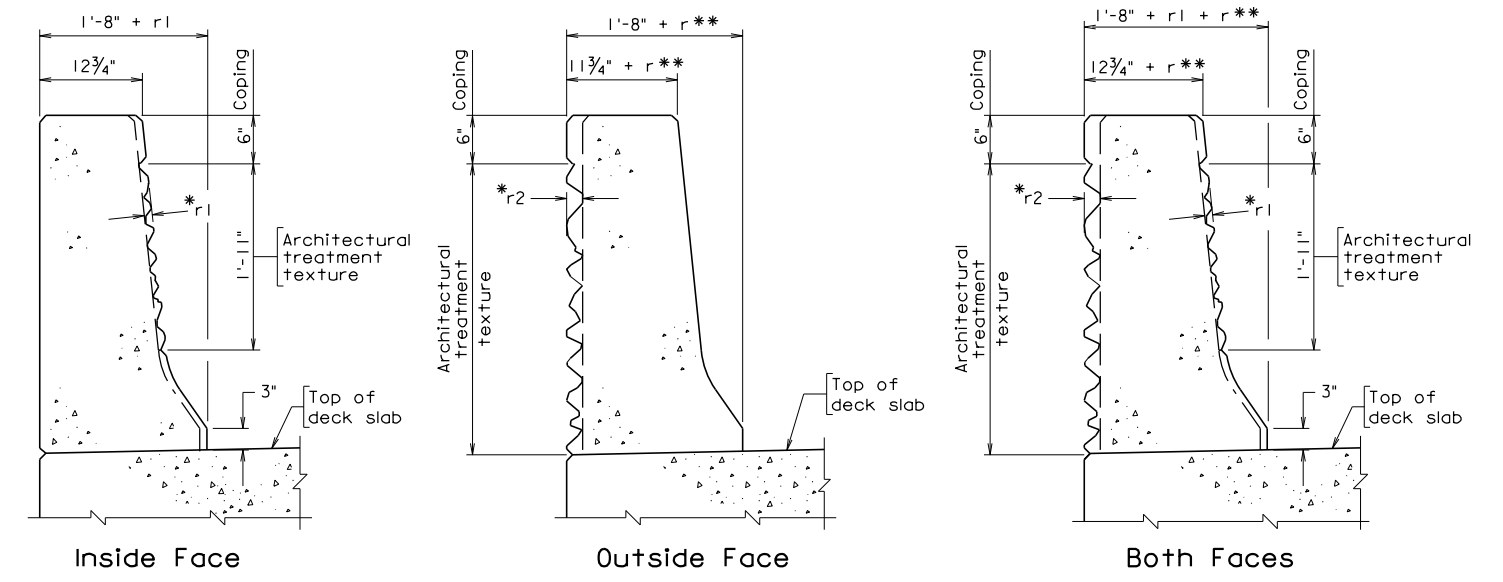
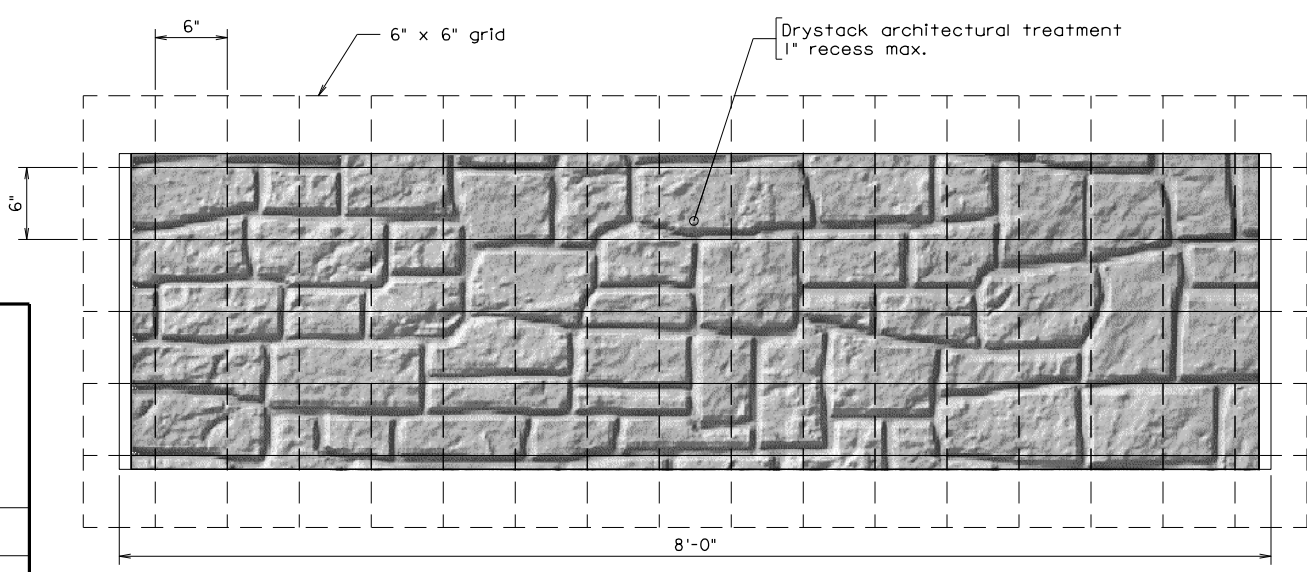
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A

BPB-AT-29 03-10-2015 bpb0129.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH DRystack FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B, DIV Drawn: S&B, DIV Checked: S&B, DIV
Revisions		Date	Plan No. Sheet No.
			BPB-AT-29

Not to scale

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**ARCHITECTURAL TREATMENT
WITH DRYSTACK
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied. (inside face, outside face or both faces)

Complete sheet number for dimensions and details not shown.

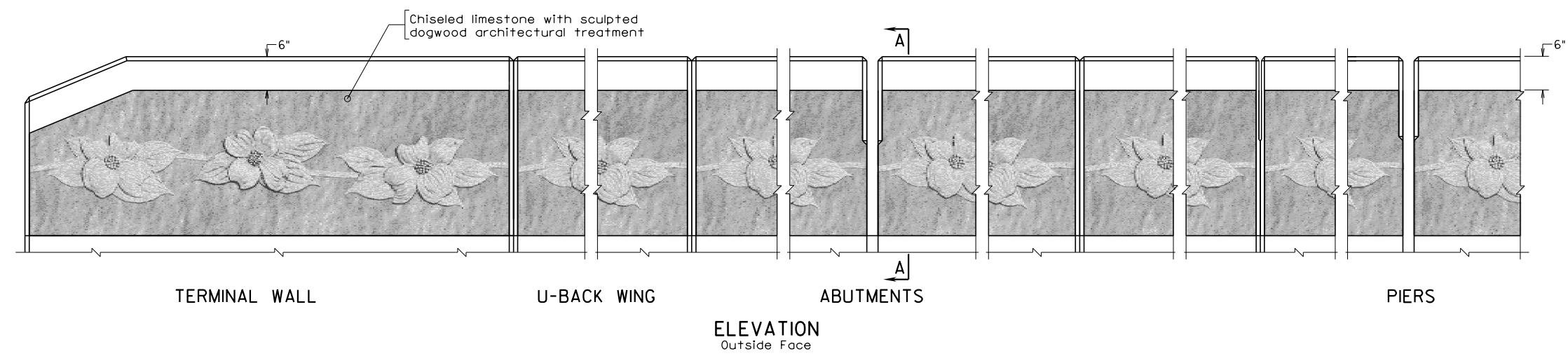
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted dogwood texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted dogwood pattern without obvious repetition of the pattern.

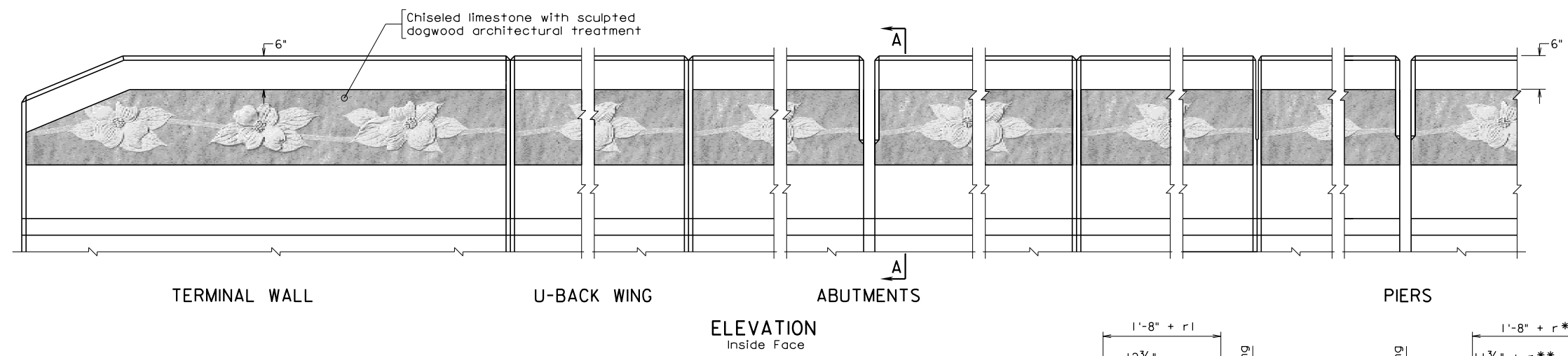
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

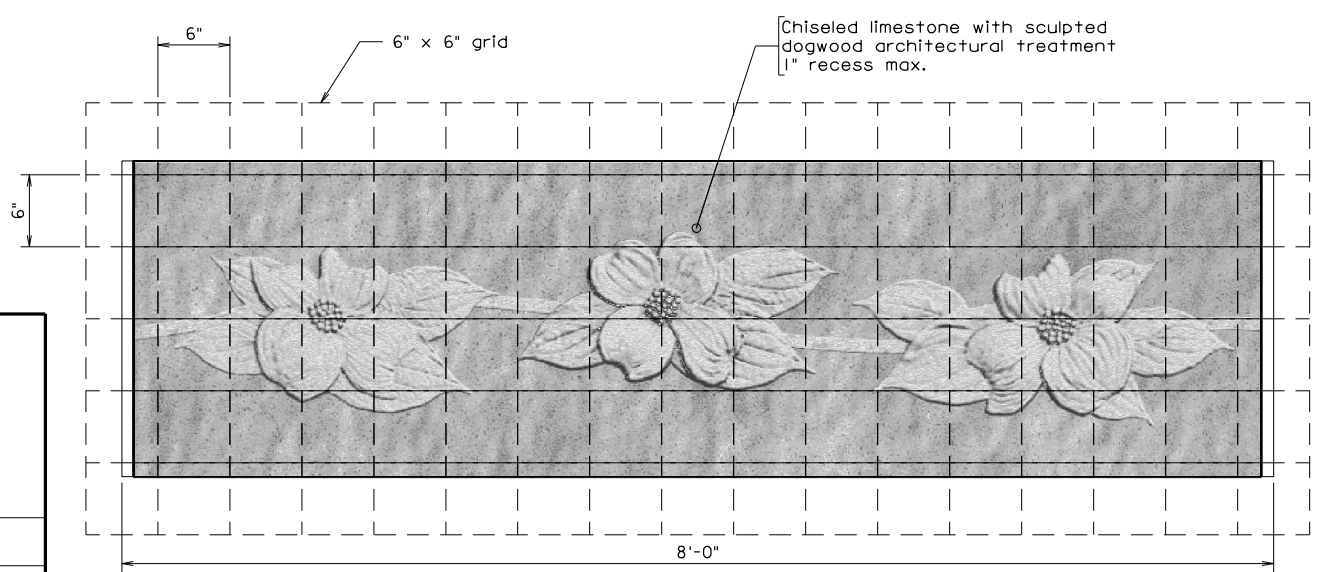
Architectural treatment shall be applied on _____ face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

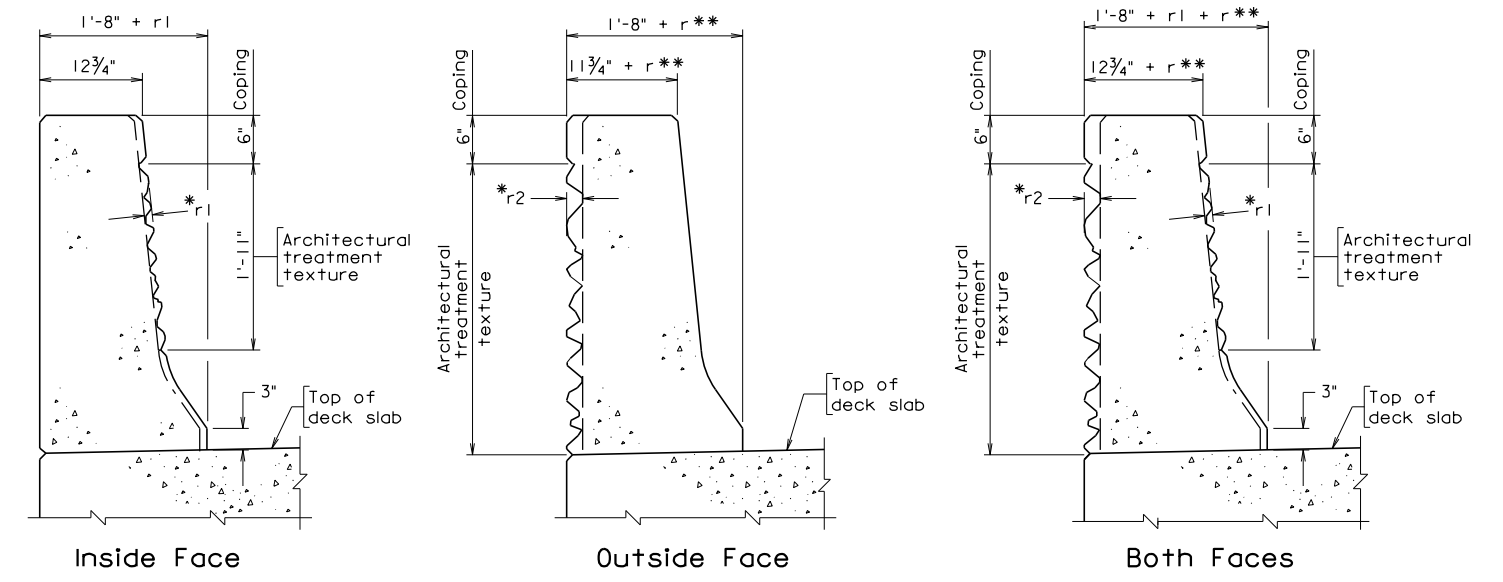
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



SCULPTED DOGWOOD TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-30 03-10-2015 bpbat30.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH SCULPTED DOGWOOD FOR CONCRETE PARAPET (42" F-SHAPE)	
No.	Description
Revisions	
Designed: S&B, DIV	Date
Drawn: S&B, DIV	Plan No.
Checked: S&B, DIV	Sheet No.
BPB-AT-30	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED DOGWOOD
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

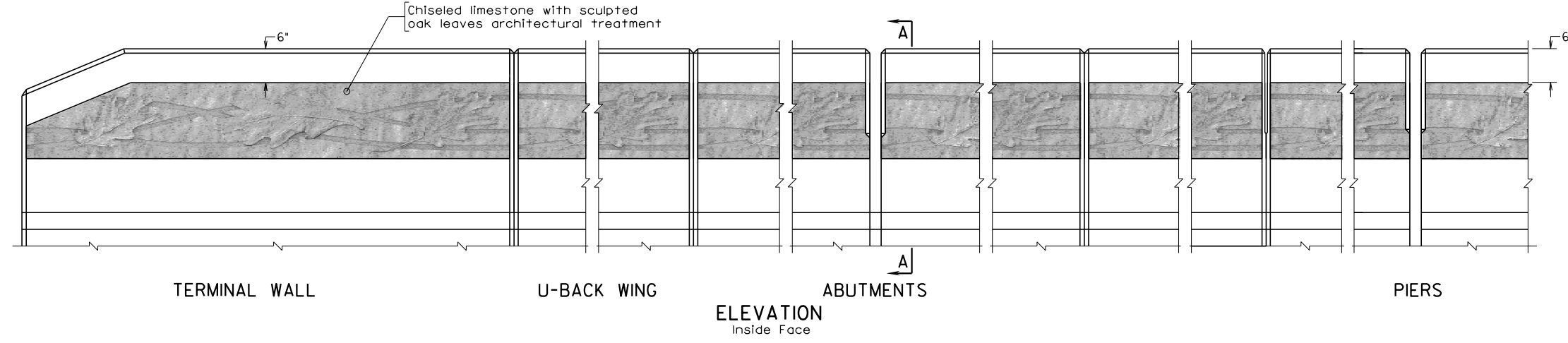
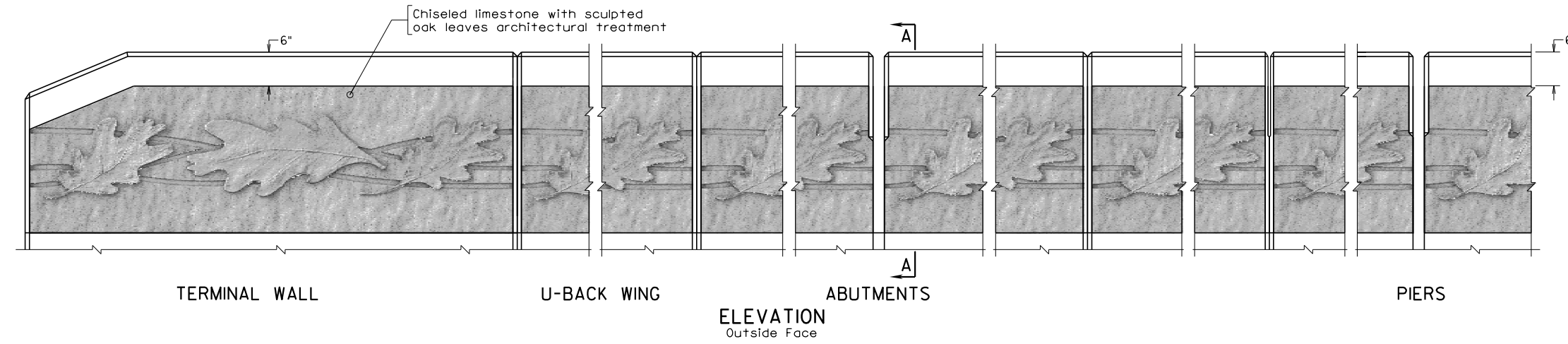
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted oak leaves texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted oak leaves pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

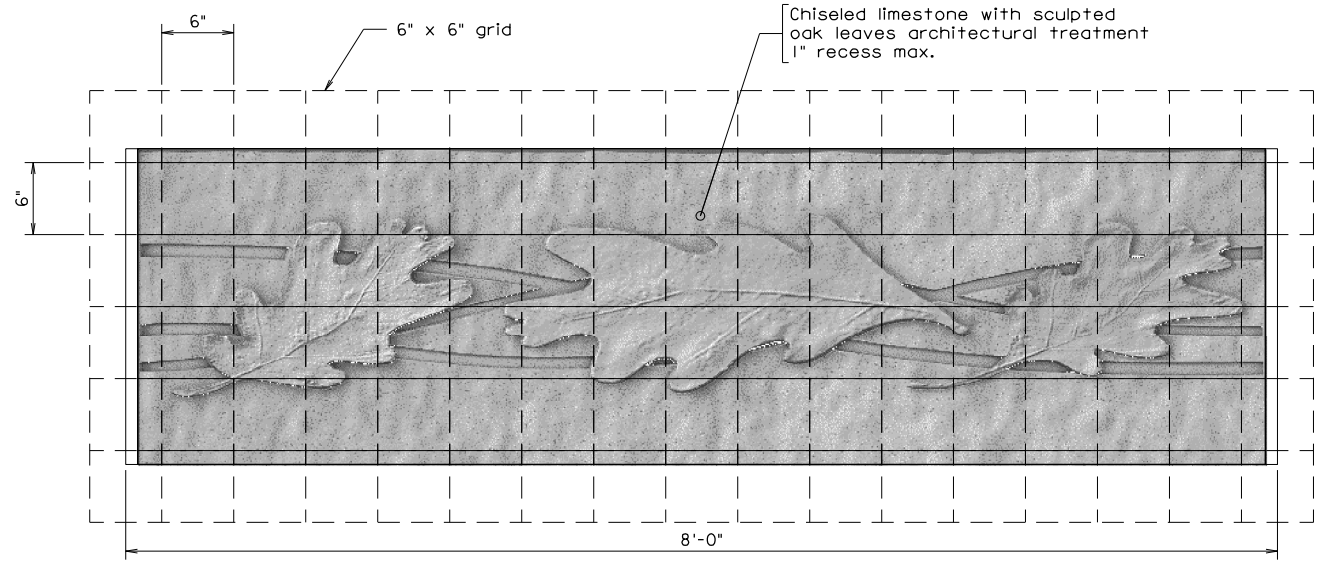
Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

Architectural treatment shall be applied on _____ face(s) of the barrier.

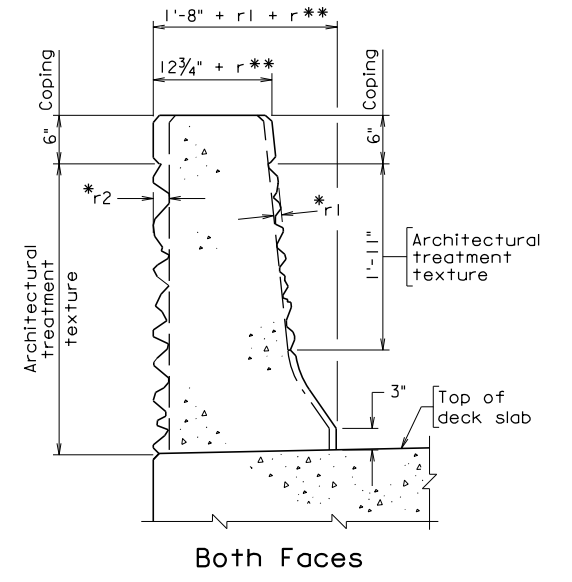
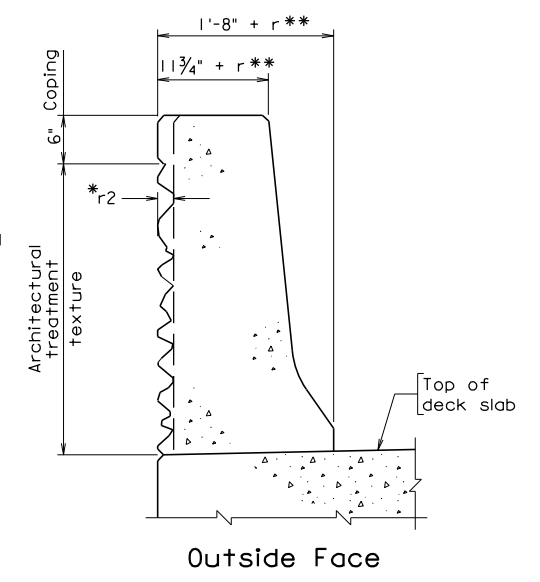
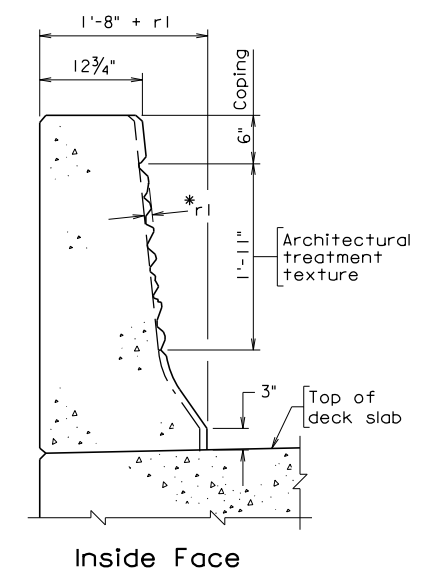
Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet ...

	Relief (in.)
r1	
r2	



SCULPTED OAK LEAVES TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-31 03-10-2015 bpb031.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH SCULPTED OAK LEAVES FOR CONCRETE PARAPET (42" F-SHAPE)			
No.	Description	Date	Designed: S&B.DIV Drawn: S&B.DIV Checked: S&B.DIV
	Revisions		Date
			Plan No.
			Sheet No.

BPB-AT-31

**ARCHITECTURAL TREATMENT
WITH SCULPTED OAK LEAVES
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

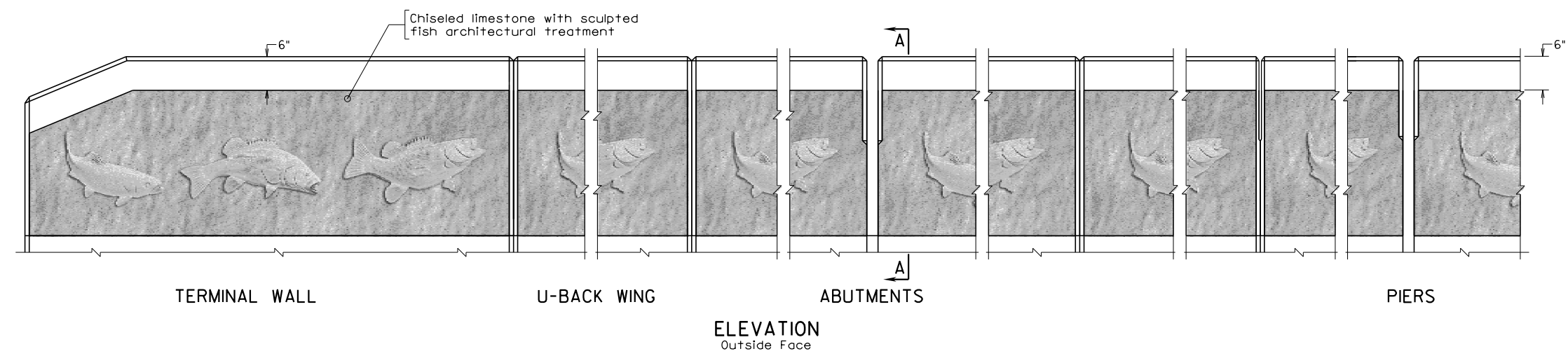
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the parapet and terminal walls shall simulate sculpted fish texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted fish pattern without obvious repetition of the pattern.

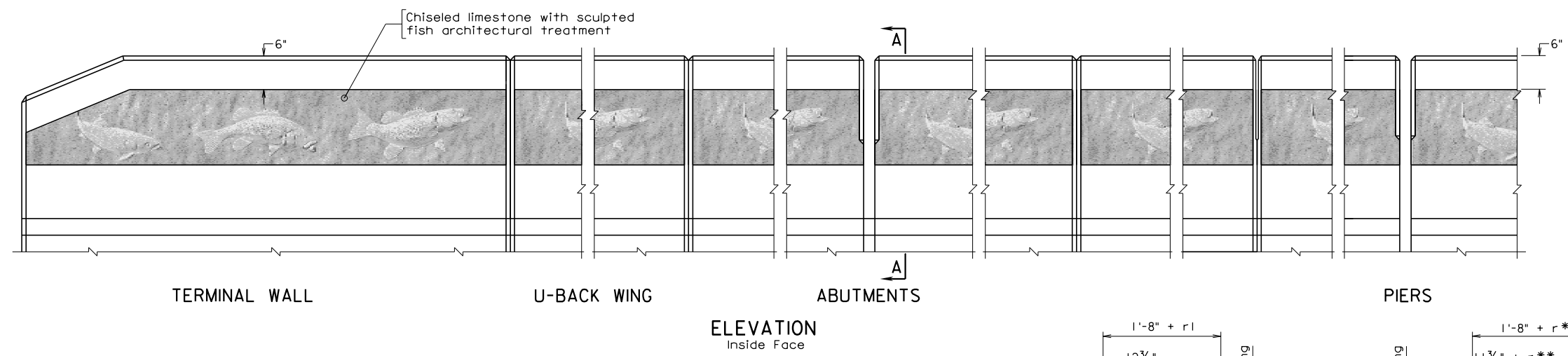
Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

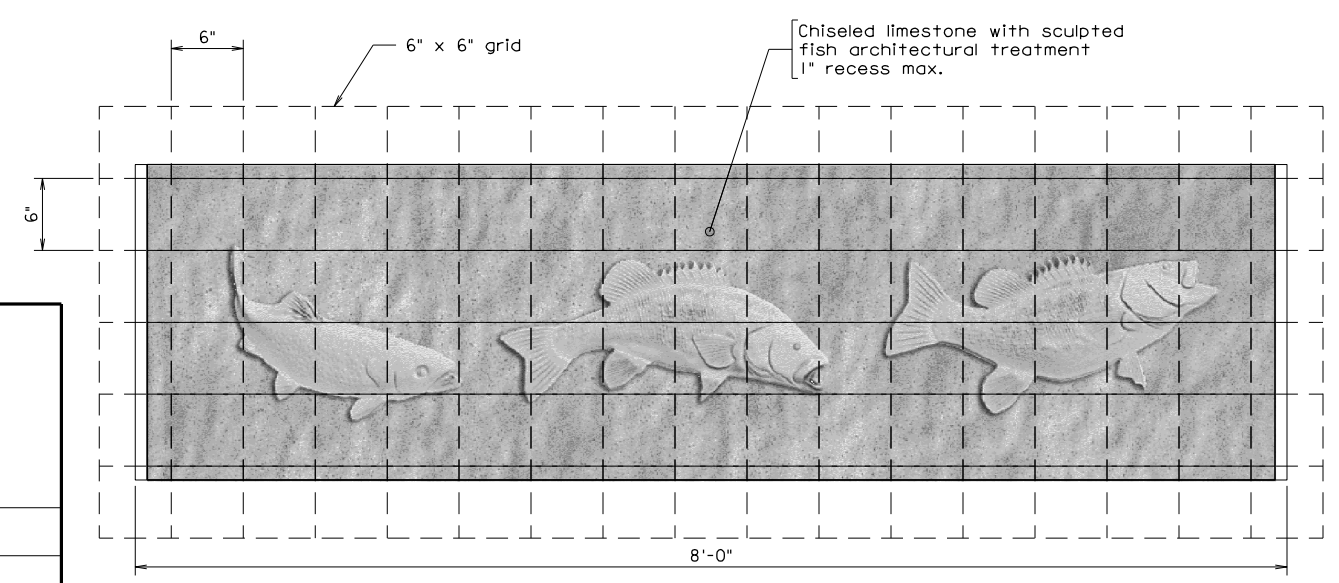
Architectural treatment shall be applied on ----- face(s) of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

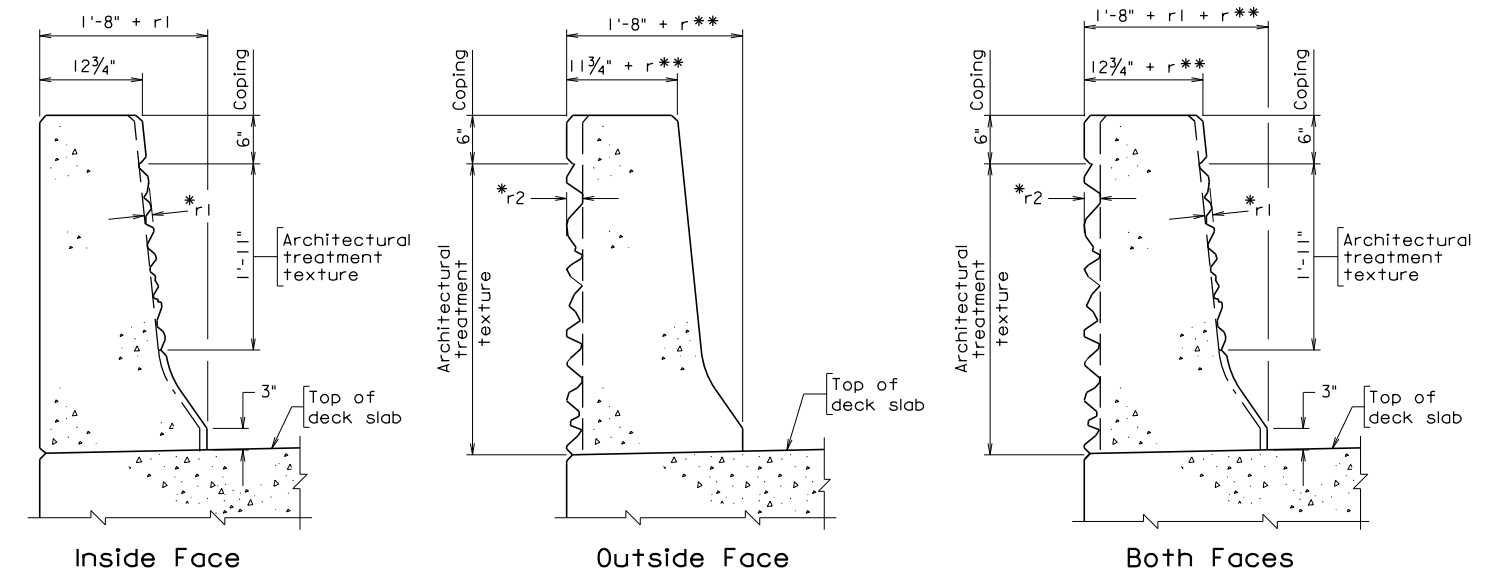
For all other dimensions and details not shown, see sheet ...



	Relief (in.)
r1	
r2	



SCULPTED FISH TEXTURE DETAIL
Barrier - Outside Face
(Inside Face similar)



SECTION A-A

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BPB-AT-32
03-10-2015
bbbot32.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH SCULPTED FISH FOR CONCRETE PARAPET (42" F-SHAPE)	
No.	Description
Revisions	
Designed: S&B, DIV	Date
Drawn: S&B, DIV	Plan No.
Checked: S&B, DIV	Sheet No.
BPB-AT-32	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED FISH
FOR CONCRETE PARAPET (F-SHAPE)**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate F-shape 42" concrete parapet standard (BPB-4A-AT, BPB-4B-AT, BPB-4C-AT or BPB-4D-AT) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

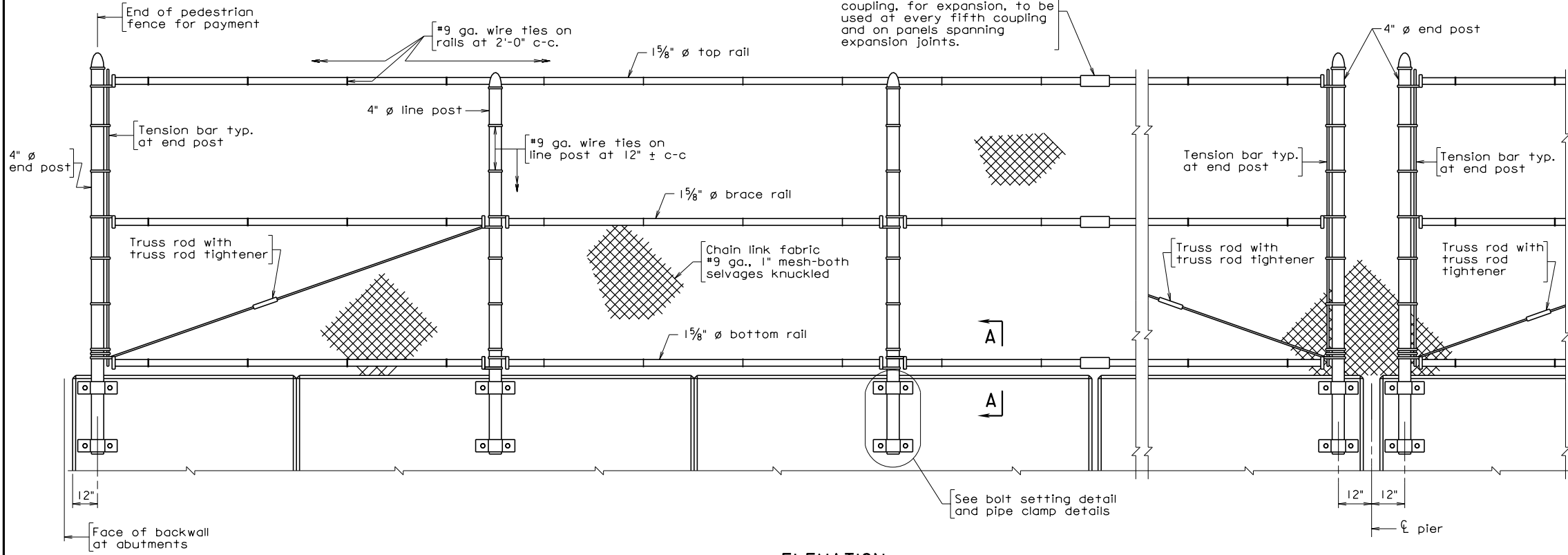
Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Outside sleeve type coupling spa. @ 21'-0" max. Spring type coupling, for expansion, to be used at every fifth coupling and on panels spanning expansion joints.



Notes:

The fence to be used on this project may be Type A or Type A Alternate as shown in Typical Section.

Posts shall be set vertical. Rails shall be set parallel to the top of parapet.

Line posts shall be located approximately midway between parapet grooves and deflection joints. Maximum spacing shall not exceed 10'-0".

Chain link fabric shall be placed on inside of posts and rails.

Chain link fabric, posts, rails, bolts excluding threads, and other associated hardware shall be

Threaded inserts and bolt threads shall not be galvanized or coated.

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

Brace rail shall be used for Type A and Type A Alternate fence. Adjustable truss rod with turnbuckle shall be installed between line post and base of end post.

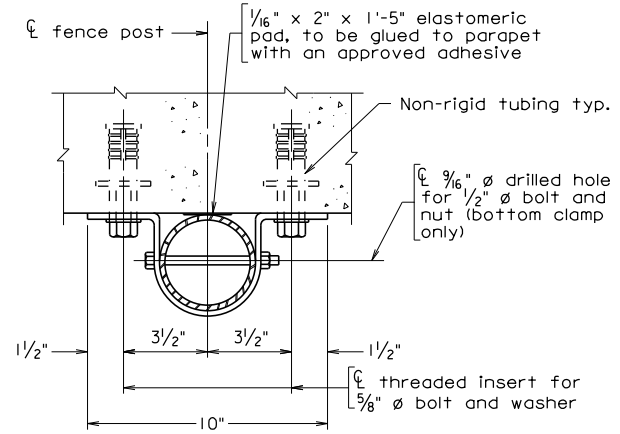
Threaded inserts, when embedded as shown, shall develop full strength of threaded bolts. Embedment of insert per manufacturers recommendations or 5" whichever is greater.

All bolts shall be high strength (ASTM A325)

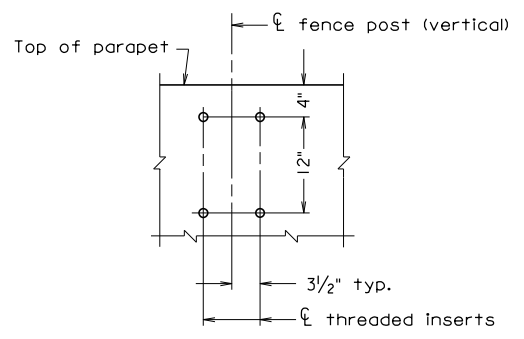
All welded or seamless steel galvanized pipe shall conform to ASTM F1083, Schedule 40.

Fence framing (posts and railing) shall be grounded.

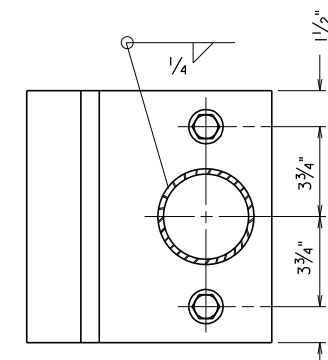
ELEVATION
Type A shown.
Not to scale



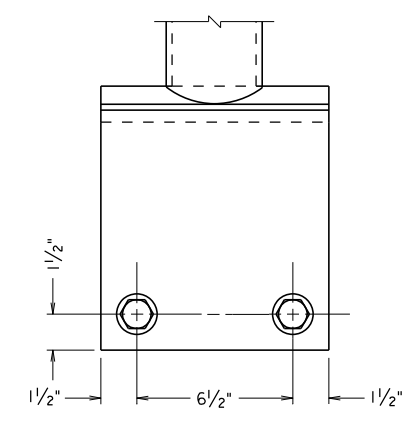
PLAN
Scale: 3" = 1'-0"



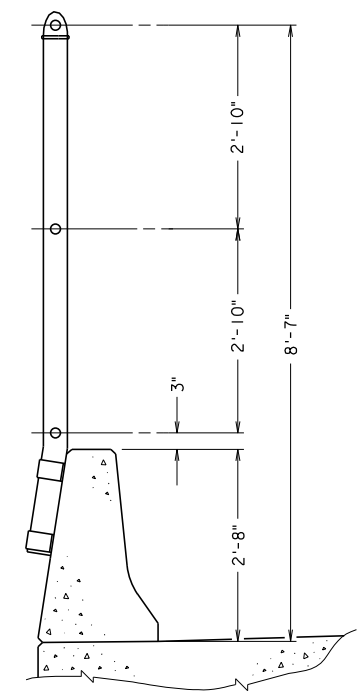
BOLT SETTING DETAIL
Scale: 1" = 1'-0"



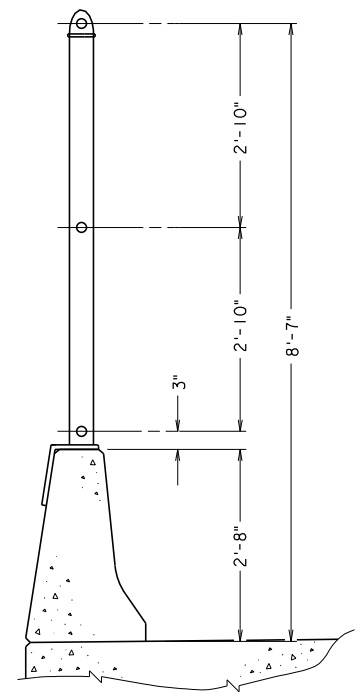
SECTION B-B
Scale: 3" = 1'-0"



VIEW C-C
Scale: 3" = 1'-0"

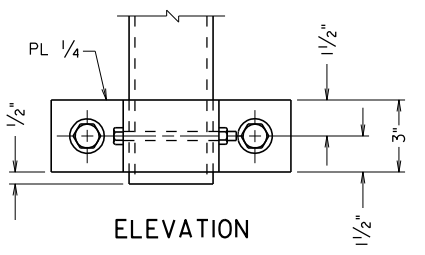


TYPE A

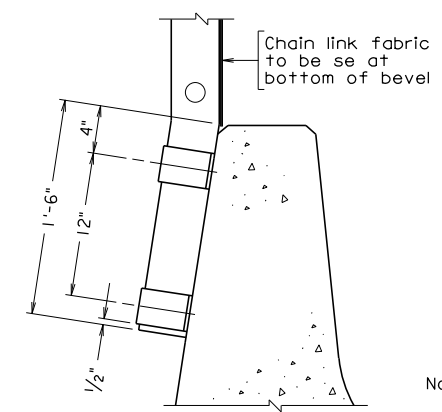


TYPE A ALTERNATE

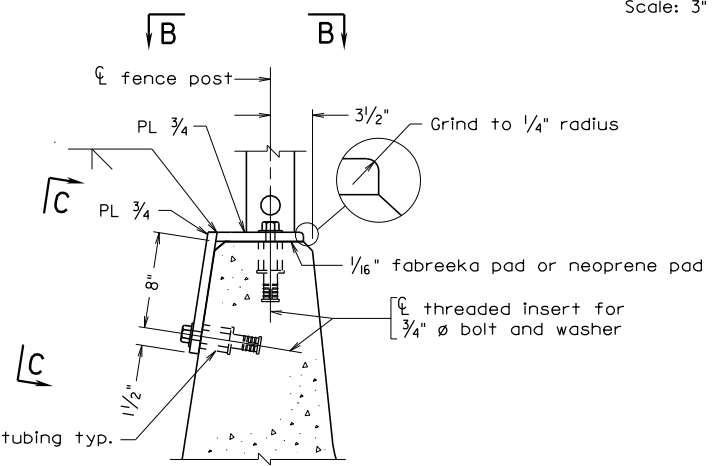
TYPICAL SECTION
Scale: 3/4" = 1'-0"



PIPE CLAMP DETAILS FOR TYPE C
Scale: 3" = 1'-0"



TYPE A SECTION A-A
Scale: 1 1/2" = 1'-0"



TYPE A ALTERNATE SECTION A-A
Scale: 1 1/2" = 1'-0"

Scale as noted. © 2015, Commonwealth of Virginia

BPF-3 03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION		
			PEDESTRIAN FENCE DETAILS		
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BPF-3
			Checked: S&B...DIV		
Revisions					

PEDESTRIAN FENCE DETAILS

WITH F-SHAPE PARAPET

NOTES TO DESIGNER:

See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 30: Fencing (Pedestrian).

Use this standard when F-shape parapet (Standard BPB-3A or BPB-3B) is used.

The limits of the pedestrian fence are to be designated in the bridge plans, normally front sheet. Limits shall be coordinated with Location and Design Traffic Engineering Design Section.

The District Structure and Bridge Engineer should be consulted before specifying fence material (and color if vinyl coated) to be used.

Design Loads:

Weight of fence: Type A/Type A Alternate: 27 lbs. per lin. ft. of fence

Wind effect (exposed area): Type A/Type A Alternate: 2.0 sq. ft. per lin. ft. of fence

Maximum post spacing: 10'-0".

For projects with initial bituminous overlay, modify details so that 2'-8" and 8'-7" dimensions shown to roadway surface will be established from top of overlay. (Must agree with standard BPB-3A or BPB-3B).

The first note allows the Contractor to furnish either Type A or Type A Alternate. If for any reason, one type is to be specified, the note needs to be revised to read, "The fence on this project shall be Type ___ as shown in Section."

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

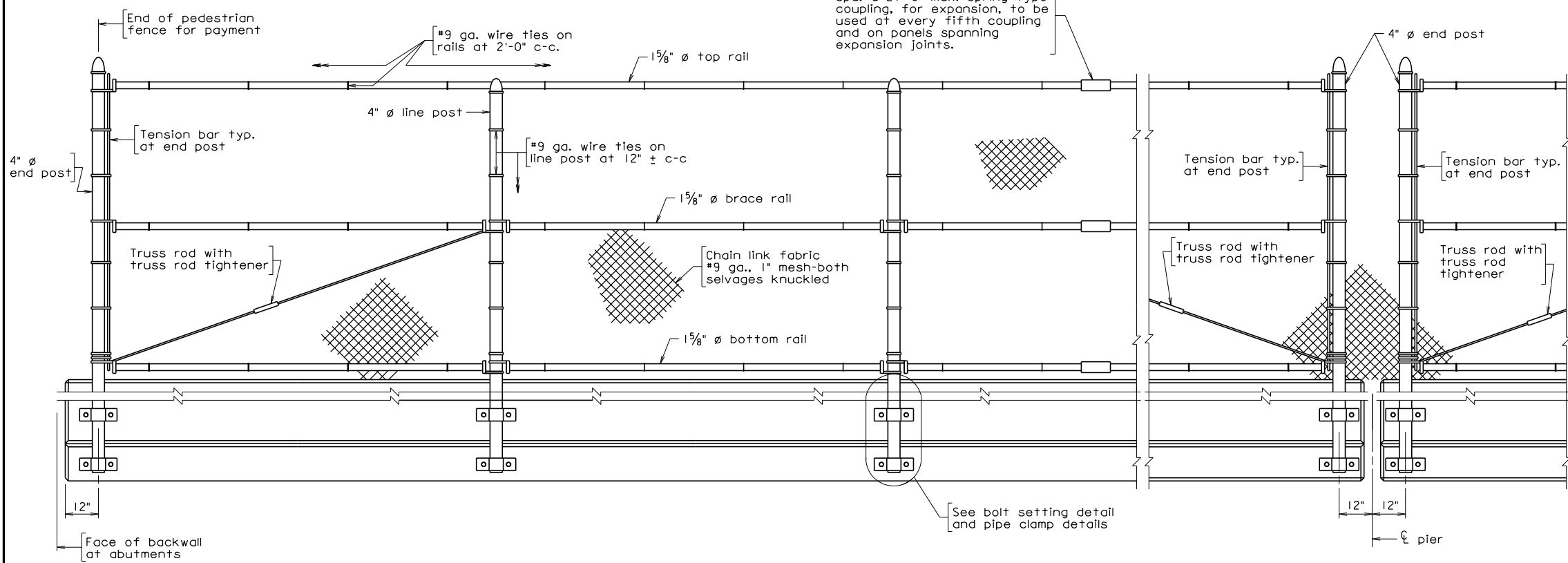
NOTES:

Complete the following notes:

"Chain link fabric, posts, rails and other associated hardware shall be ____". (Note: Designer must specify color and vinyl coated steel or galvanized steel).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Outside sleeve type coupling
 spa. @ 21'-0" max. Spring type
 coupling, for expansion, to be
 used at every fifth coupling
 and on panels spanning
 expansion joints.



ELEVATION
 Not to scale

Notes:

The fence to be used on this project shall be Type -- as shown in Typical Section.

Posts shall be set vertical. Rails shall be set parallel to the top of base of railing.

Spacing of posts to be equally spaced. Maximum spacing of posts shall not exceed 10'-0".

Chain link fabric shall be placed on inside of posts and rails.

Chain link fabric, posts, rails, bolts excluding threads, and other associated hardware shall be ---.

Threaded inserts and bolt threads shall not be galvanized or coated.

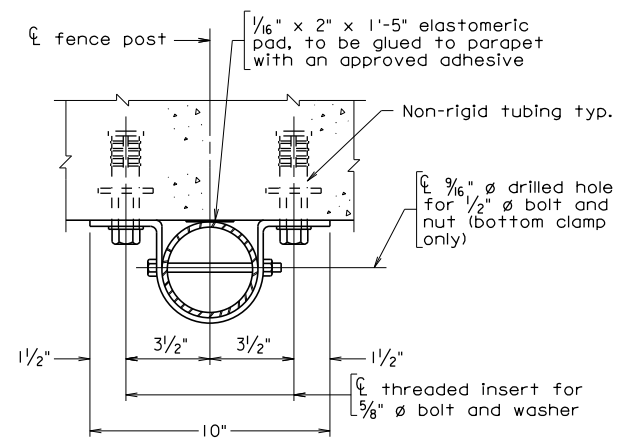
Ends of wire ties shall be turned to outside of fence to prevent injury to pedestrians.

Threaded inserts, when embedded as shown, shall develop full strength of threaded bolts. Embedment of insert per manufacturers recommendations or 5" whichever is greater.

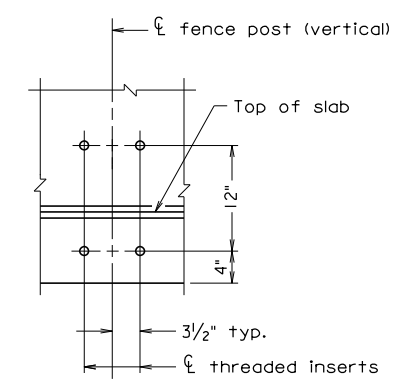
All bolts shall be high strength (ASTM A325).

All welded or seamless steel galvanized pipe shall conform to ASTM F1083, Schedule 40.

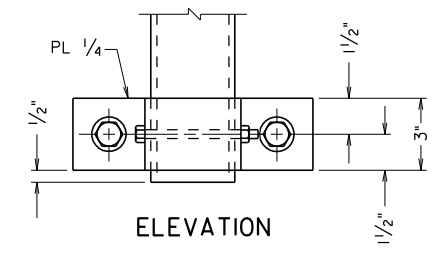
Fence framing (posts and railing) shall be grounded.



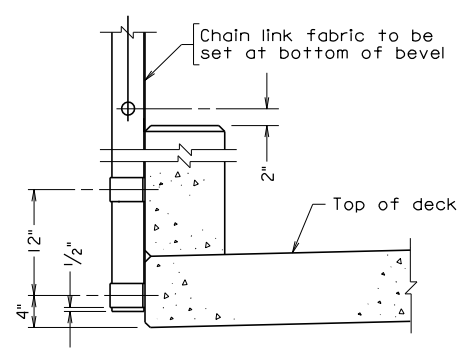
PLAN
 Scale: 3" = 1'-0"



BOLT SETTING DETAIL
 Scale: 1" = 1'-0"

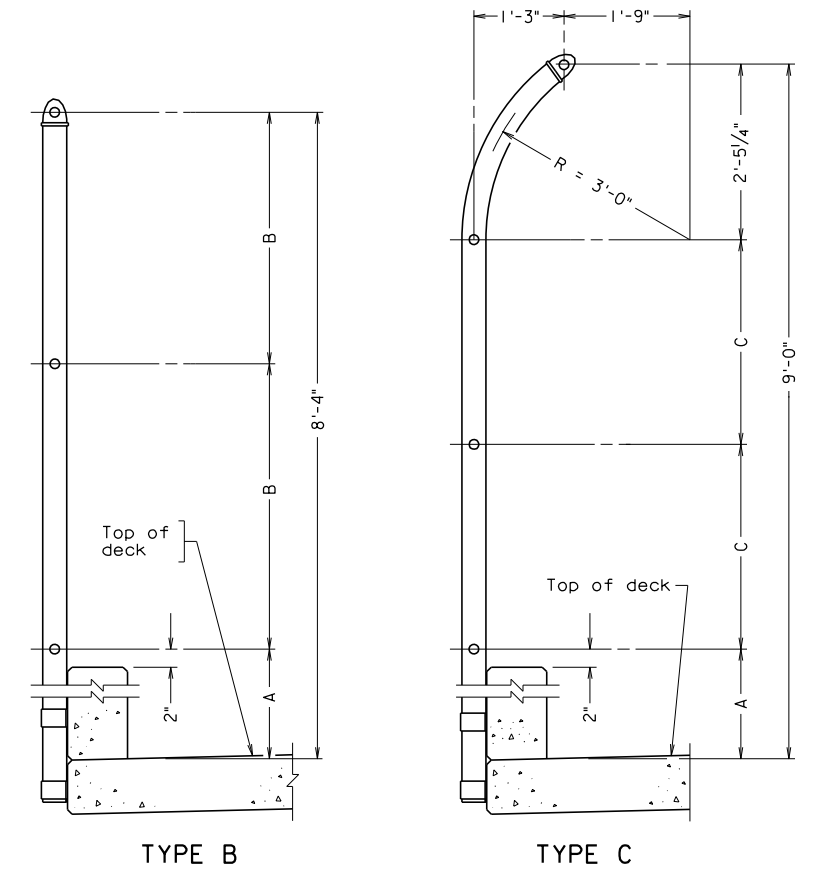


PIPE CLAMP DETAILS FOR TYPE C
 Scale: 3" = 1'-0"



TYPICAL PART SECTION
 Scale: 1" = 1'-0"

DIMENSION TABLE			
Railing Type	A	B	C
BR27C - series	2'-2"	3'-1"	2'-2 3/8"
BR27D - series	1'-8"	3'-4"	2'-5 3/8"



TYPICAL SECTION
 Scale: 3/4" = 1'-0"

bp4.dgn

10-15-2015

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 October 15, 2015

A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PEDESTRIAN FENCE DETAILS BR27C AND BR27D SERIES RAILING (WITHOUT SIDEWALK)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BPF-4
			Checked: S&B...DIV		
Revisions					

**PEDESTRIAN FENCE DETAILS
FOR BR27C-SERIES AND BR27D-SERIES SERIES RAILING
WITHOUT SIDEWALK**

NOTES TO DESIGNER:

See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 30: Fencing (Pedestrian).

Use this standard when BR27C-series and BR27D-series railing without sidewalk are used on project.

Where protection greater than that afforded by Type B is desired, Type C (curved fencing) may be specified. Type C shall not be used when BR27C-series and BR27D-series railing serves as a traffic barrier.

The limits of the pedestrian fence are to be designated in the bridge plans, normally title sheet.

The District Structure and Bridge Engineer should be consulted before specifying fence material (and color if vinyl coated) to be used.

Design Loads:

Weight of fence: Type B: 29 lbs. per lin. ft. of fence
Type C: 31 lbs. per lin. ft. of fence

Wind effect (exposed area): Type B: 2.6 sq. ft. per lin. ft. of fence
Type C: 3.0 sq. ft. per lin. ft. of fence

For projects with initial bituminous overlay, modify details so that curb dimension shown to roadway surface will be established from top of overlay.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

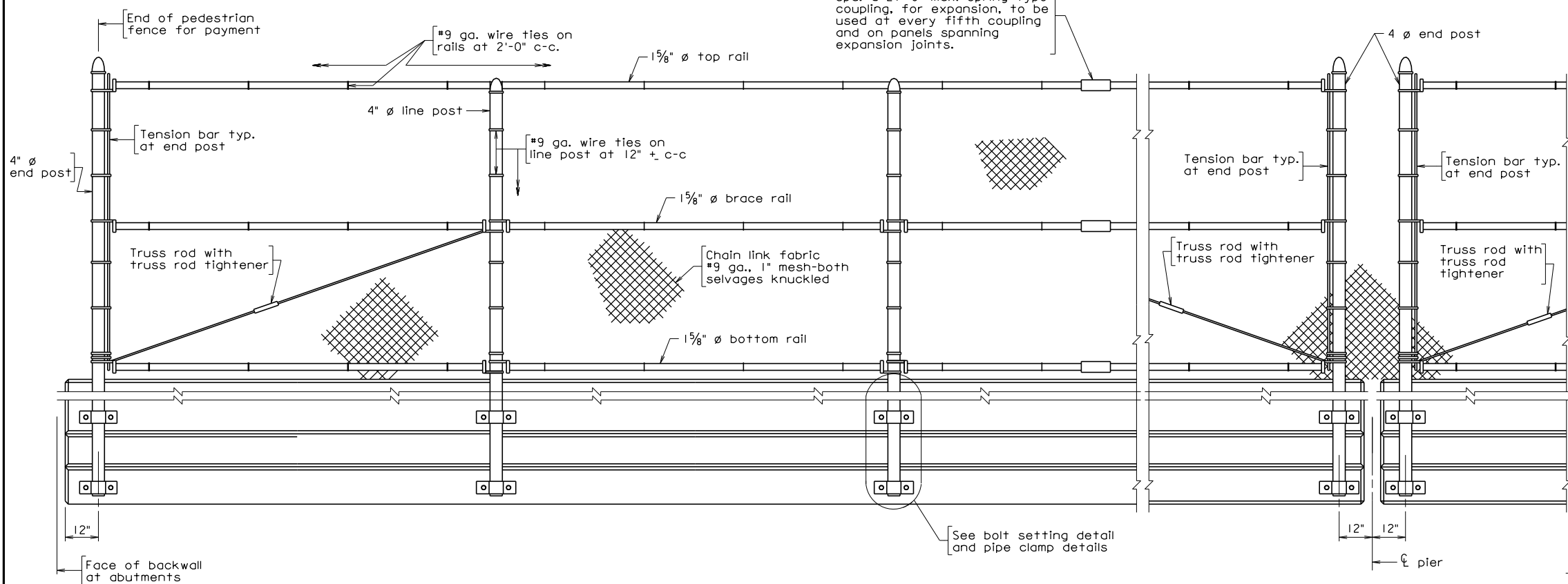
Complete the following notes:

“The fence on this project shall be Type _____ as shown in section.” (Specify type B or C).

“Chain link fabric, posts, rails and other associated hardware shall be _____”. (Note: Designer must specify color and vinyl coated steel or galvanized steel).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Outside sleeve type coupling spa. @ 21'-0" max. Spring type coupling, for expansion, to be used at every fifth coupling and on panels spanning expansion joints.



ELEVATION
Not to scale

Notes:

The fence to be used on this project shall be Type -- as shown in Typical Section.

Posts shall be set vertical. Rails shall be set parallel to the top of base of railing.

Spacing of posts to be equally spaced. Maximum spacing of posts shall not exceed 10'-0".

Chain link fabric shall be placed on inside of posts and rails.

Chain link fabric, posts, rails, bolts excluding threads, and other associated hardware shall be ---.

Threaded inserts and bolt threads shall not be galvanized or coated.

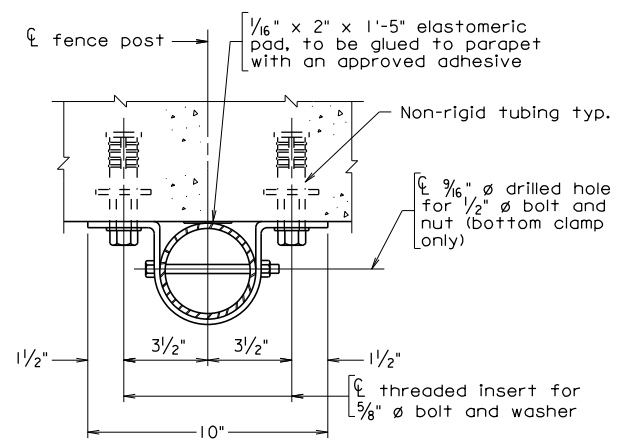
Ends of wire ties shall be turned to outside of fence to prevent injury to pedestrians.

Threaded inserts, when embedded as shown, shall develop full strength of threaded bolts. Embedment of insert per manufacturers recommendations or 5" whichever is greater.

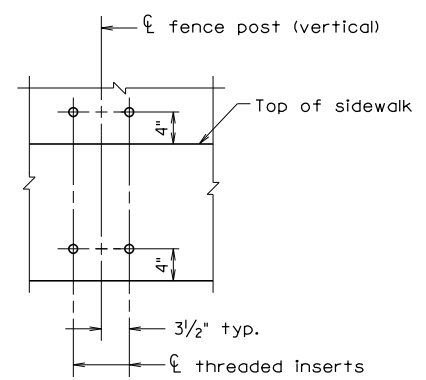
All bolts shall be high strength (ASTM A325).

All welded or seamless steel galvanized pipe shall conform to ASTM F1083, Schedule 40.

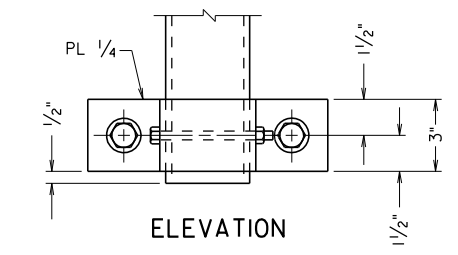
Fence framing (posts and railing) shall be grounded.



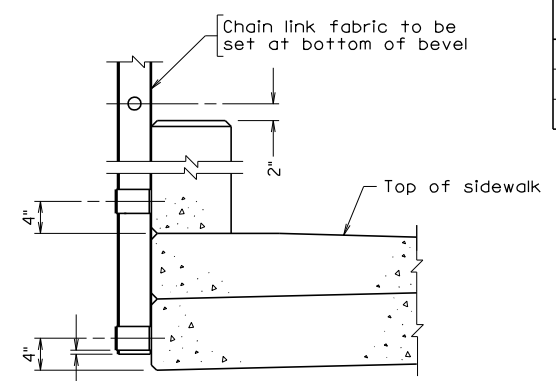
PLAN
Scale: 3" = 1'-0"



BOLT SETTING DETAIL
Scale: 1" = 1'-0"

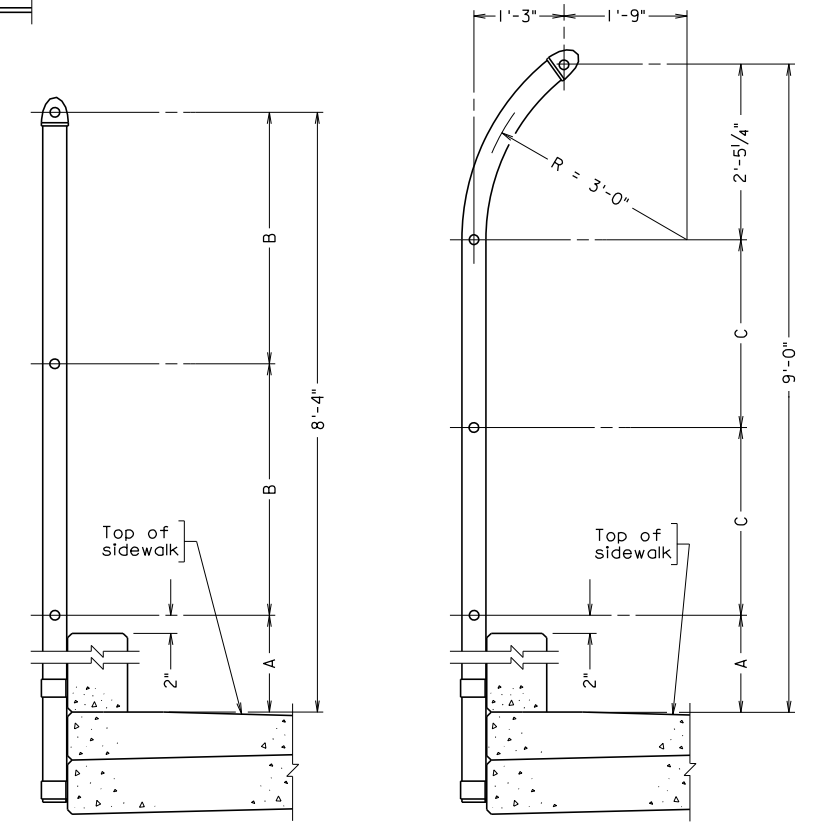


PIPE CLAMP DETAILS
Scale: 3" = 1'-0"



TYPICAL PART SECTION
Scale: 1" = 1'-0"

Railing Type	A	B	C
BR27C - series	2'-2"	3'-1"	2'-2 3/8"
BR27D - series	1'-8"	3'-4"	2'-5 3/8"



TYPE B

TYPE C

TYPICAL SECTION
Scale: 3/4" = 1'-0"

BPF-5 03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PEDESTRIAN FENCE DETAILS BR27C AND BR27D SERIES RAILING (WITH SIDEWALK)					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BPF-5
			Checked: S&B...DIV		
Revisions					

**PEDESTRIAN FENCE DETAILS
FOR BR27C-SERIES AND BR27D-SERIES RAILING
WITH SIDEWALK**

NOTES TO DESIGNER:

See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 30: Fencing (Pedestrian).

Use this standard when BR27C-series and BR27D-series railing with sidewalk are used on project.

Where protection greater than that afforded by Type B is desired, Type C (curved fencing) may be specified.

The limits of the pedestrian fence are to be designated in the bridge plans, normally title sheet.

The District Structure and Bridge Engineer should be consulted before specifying fence material (and color if vinyl coated) to be used.

Design Loads:

Weight of fence: Type B: 29 lbs. per lin. ft. of fence
Type C: 31 lbs. per lin. ft. of fence

Wind effect (exposed area): Type B: 2.6 sq. ft. per lin. ft. of fence
Type C: 3.0 sq. ft. per lin. ft. of fence

For projects with initial bituminous overlay, modify details so that curb dimension shown to roadway surface will be established from top of overlay.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Complete the following notes:

“The fence on this project shall be Type _____ as shown in section.” (Specify type B or C).

“Chain link fabric, posts, rails and other associated hardware shall be _____”. (Note: Designer must specify color and vinyl coated steel or galvanized steel).

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

POINTS	PICK UP POINTS
1	
2	
3	
4	

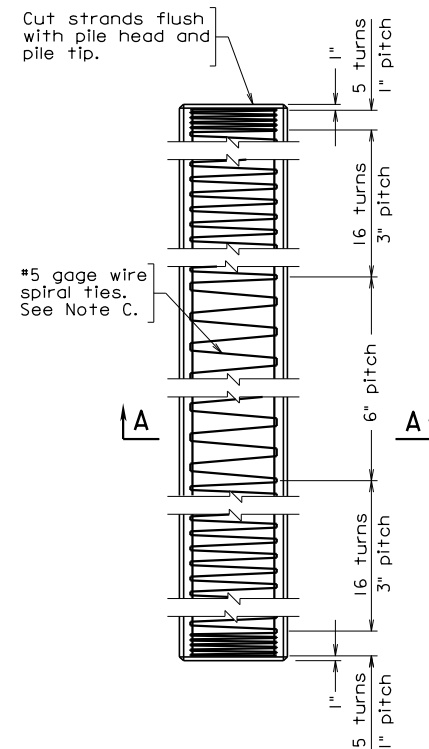
Unless special lifting devices are attached for pick-up, pick-up points shall be plainly marked on all piles after removal of the forms. The pile shall be supported only at the indicated pick-up points while in storage or while being handled.

The use of proper rigging is required to insure that the pick-up points remain in a straight line during lifting and when positioning the pile for driving.

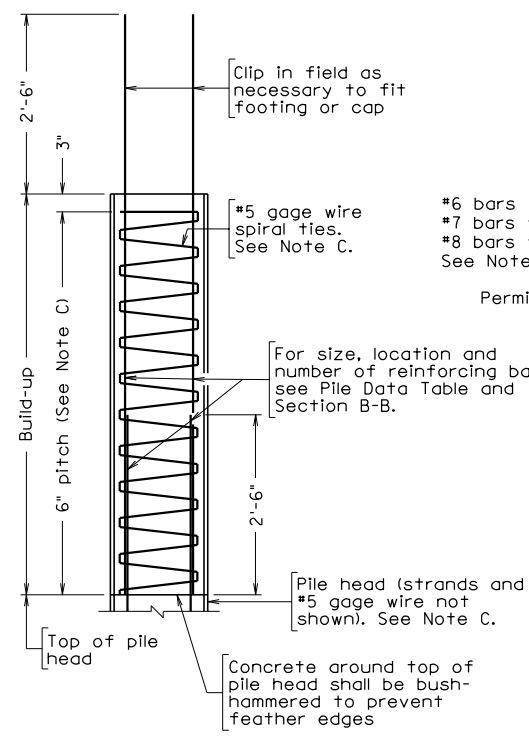
The use of special embedded or attached lifting devices, the employment of other pick-up points or any other method of pick-up shall be subject to approval by the Engineer.

Pile size	Approx. Wt. per LF	Maximum lengths for various pick-up systems			
		1-Point	2-Point	3-Point	4-Point
W	Lbs.	L	L	L	L
10"	140	47'	66'	95'	129'
12"	150	51'	73'	104'	141'
14"	204	55'	78'	112'	152'
16"	267	62'	88'	126'	171'
18"	338	64'	90'	129'	175'
20"	417	69'	97'	138'	188'
24"	600	72'	102'	146'	198'

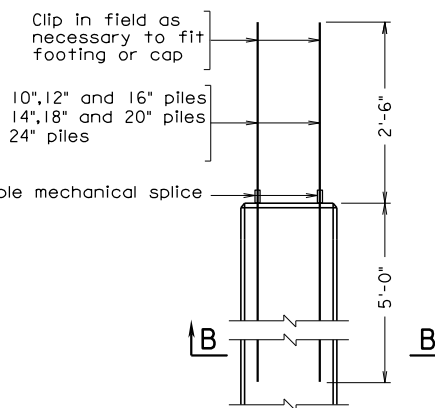
Maximum lengths are determined from impact loads. L is the maximum pick-up length based on a concrete compressive strength of 5000 psi. If piles are picked up when concrete strength is less than 5000 psi, the maximum pick-up length shall be the tabulated length reduced by 1% for every 250 psi below 5000 psi.



PILE ELEVATION



PILE BUILD-UP ELEVATION
See Note B



PILE HEAD PROJECTING BAR DETAIL
Strands and #5 gage wire not shown

Note:

All concrete shall be Class A5 having a minimum compressive cylinder strength at 28 days equal to 5000 psi and a minimum compressive cylinder strength at time of release of strands equal to 3500 psi.

All strands shall be low relaxation and shall have an ultimate strength of 270 ksi.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60.

One splice will be permitted where the length of pile required is greater than the maximum for 2-point pick-up unless specifically prohibited.

Build-ups shall be used only with written permission by the Engineer and then only after driving is complete.

Subject to approval by the Engineer, the bars projecting from the pile head may be cut prior to driving and rewelded upon completion of driving. The method of welding used shall develop the tensile strength of the bar.

Mechanical splices for reinforcing bars shall be in accordance with Section 406.03(e) of the Specifications. The Contractor shall provide adequate shielding to protect the ends of the reinforcing bars until the pile is driven and the bars are spliced.

When pile cut-off is greater than 2'-6" at least 30 inches of all the strands shall project into the cap or footing to serve for anchorage.

Where piles are exposed in bridges over tidal water such as in pile bents and in footings constructed above Mean High Tide elevation, the spiral ties and all other reinforcing bars in the pile shall be hot dip galvanized.

Note A:

In lieu of the reinforcing bars projecting from the head:

1. The pile may be cast 2'-6" longer than required. After driving the concrete pile, remove the concrete from the added length to expose the strands. The strands must be thoroughly cleaned before casting the footing or cap; or

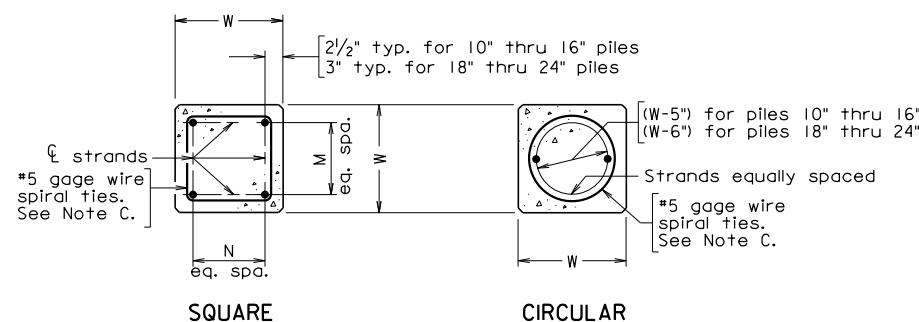
2. 1 1/8" ø preformed plain holes or 2" ø holes formed with galvanized corrugated metal may be used. After driving the pile and cleaning out the holes, the #6, #7 or #8 reinforcing bars shall be installed and the holes shall be filled with approved non-shrink grout.

Note B:

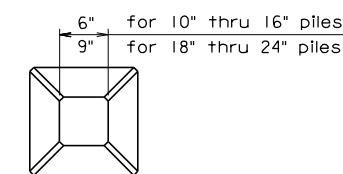
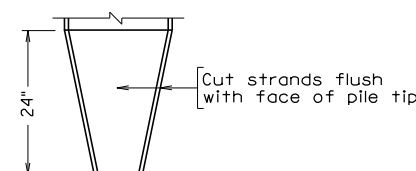
If alternate circular strand arrangement is used, bar extension must be placed to fit.

Note C:

For Seismic Performance Zone 2 bridges (structures), #4/0 gage wire or #3 bars shall be used and the pitch shall be 3".

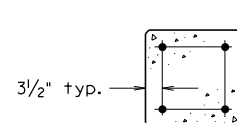


SECTION A-A: STRAND PATTERN FOR PILE

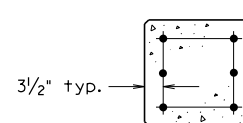


PILE TIP

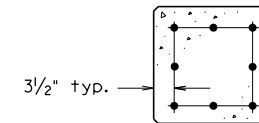
Pile tip(s) shall be used only when specified. Strands not shown.



10", 12" and 14" PILES



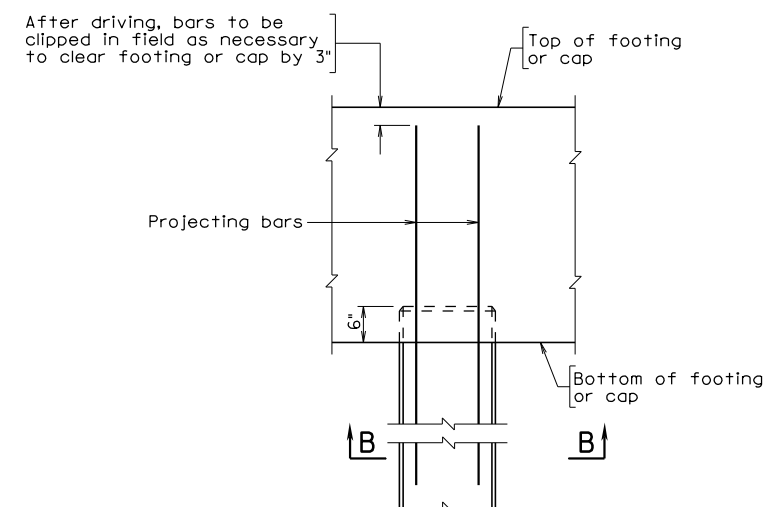
16" and 18" PILES



20" and 24" PILES

SECTION B-B: PILE HEAD

See Note B



PROJECTING BAR CLIP DETAIL

Strands and #5 gage wire not shown

Pile size W (in.)	Strand pattern	Total no. of strands in pile	Diameter of strands (in.)	Strand spacings		Prestressing force per strand (pounds)	Effective prestress after losses (psi)
				M	N		
10"	Square	4	1/2	1	1	28,910	966
	Circular	4	1/2	—	—	28,910	966
12"	Square	4	1/2	1	1	30,970	751
	Circular	4	1/2	—	—	30,970	751
14"	Square	6	1/2	2	1	30,970	820
	Circular	6	1/2	—	—	30,970	820
16"	Square	8	1/2	2	2	30,970	836
	Circular	8	1/2	—	—	30,970	836
18"	Square	10	1/2	3	2	30,970	826
	Circular	10	1/2	—	—	30,970	826
20"	Square	12	1/2	3	3	30,970	805
	Circular	12	1/2	—	—	30,970	805
24"	Square	16	1/2	4	4	30,970	751
	Circular	16	1/2	—	—	30,970	751

bpp1.dgn

BPP-1 10-15-2015

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
PRESTRESSED CONCRETE PILES SQUARE: 10" THRU 24"					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		BPP-1
Revisions					

Not to scale

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PRESTRESSED CONCRETE PILES

SQUARE: 10" THRU 24"

NOTES TO DESIGNER:

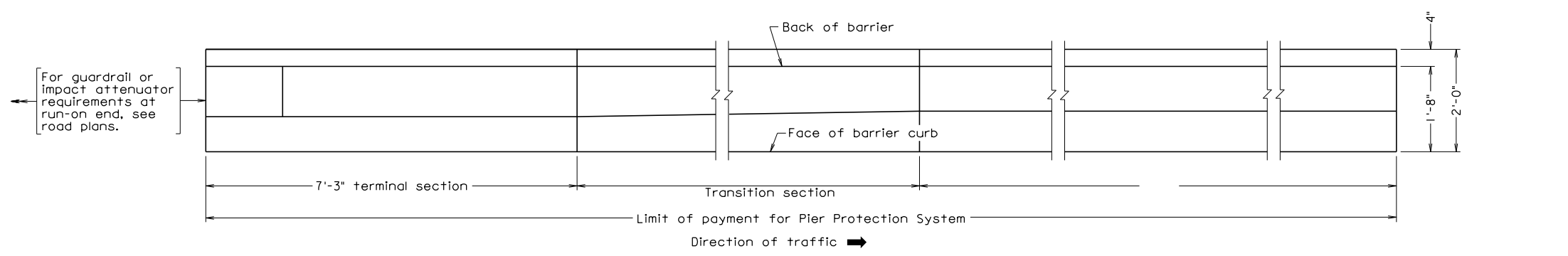
Section properties for piles:

Pile Size	Area (A) in ²	Moment of Inertia (I) in ⁴	Section Modulus(S) in ³
10"	100	833	167
12"	144	1728	288
14"	196	3201	457
16"	256	5461	683
18"	324	8748	972
20"	400	13,333	1333
24"	576	27,648	2304

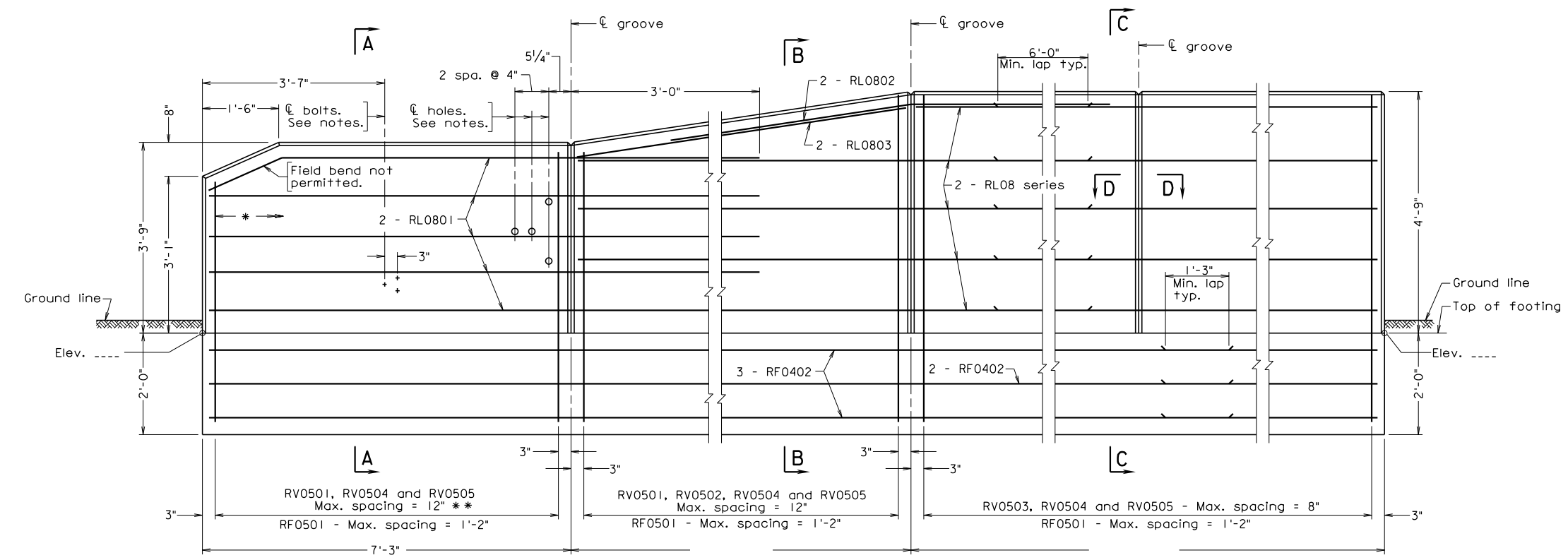
ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

None

STATE	FEDERAL AID		STATE		SHEET
VA.	ROUTE	PROJECT	ROUTE	PROJECT	NO.



PLAN



ELEVATION

* Adjust length of bars as needed at end.
 ** Adjust spacing to clear bolts and holes.

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be ASTM A615, Grade 60.
- Spacing of grooves shall be approximately 8"-0". Spacing of transverse construction joints for crack control shall be at approximately 24'-0" to coincide with centerline of groove. Transverse construction joint through barrier and footing shall be at the same location.
- Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
- Terminal sections are detailed to take guardrail attachment GR-FOA-2. Holes where shown, shall be formed with sleeves of 1/2" diameter nominal pipe. Bolts, where shown, shall be 5/8" diameter expansion bolts, 6" long and shall be drilled and installed when rub rail is attached.
- For reinforcing steel schedule and details not shown, see sheet ...
- Payment: Pier Protection System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price, which price shall include within the pay limits shown, the parapet, footing, excavation for footing and backfilling as directed by the Engineer and all miscellaneous hardware as detailed on the plans. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

BPPS-1 10-24-2013

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

LAYOUT OF BARRIER FOR PIER PROTECTION
 Scale: -----

Scale: 3/4" = 1'-0" unless otherwise shown.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PIER PROTECTION SYSTEM					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BPPS-1
			Checked: S&B, DIV		
Revisions					Sheet No.

PIER PROTECTION SYSTEM

NOTES TO DESIGNER:

This standard also requires the inclusion of Standard BPPS-2 in the set of plans.

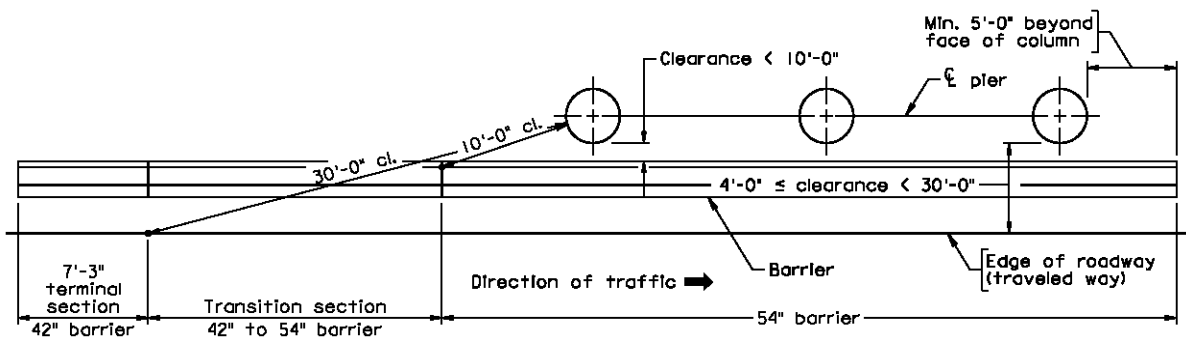
Standard is to be used for pier protection when the clearance between the pier column(s) or pier stem and the edge of roadway (traveled way) is less than 30'-0", the pier is not designed for collision nor exempt and the clearance between the pier column(s) or pier stem and back of the barrier footing is less than 10'-0". Minimum clearance between pier column/stem and the edge of roadway is 4'-0" where pier column/stem is directly against the barrier footing.

Designer shall coordinate with roadway designer for barrier termination at the run-on end (guardrail, impact attenuator, etc.). The terminal section is detailed to accommodate guardrail attachment GR-FOA-2.

Reference to barrier height is for portion above ground line. The standard indicates 3" of barrier below ground line to top of 2'-0" x 2'-0" footing.

Barrier height is 54" when clearance is less than 10'-0" and 42" when clearance is less than 30'-0". Barrier is transitioned (42" to 54" height) between 10'-0" and 30'-0" clearances. Minimum transition length shall be 10'-0".

Barrier shall extend a minimum of 5'-0" beyond the face of the pier column/stem.



See Part 2, Chapter 15: Pier Details, of this manual for additional guidance and examples.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add required dimensions. If project is "bridge only" add sheet number for details at end of barrier (run-on side).

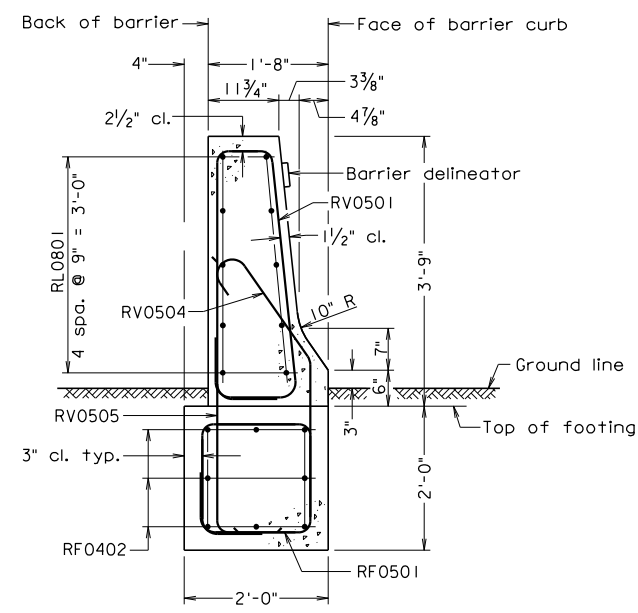
ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (cont'd):

ELEVATION:

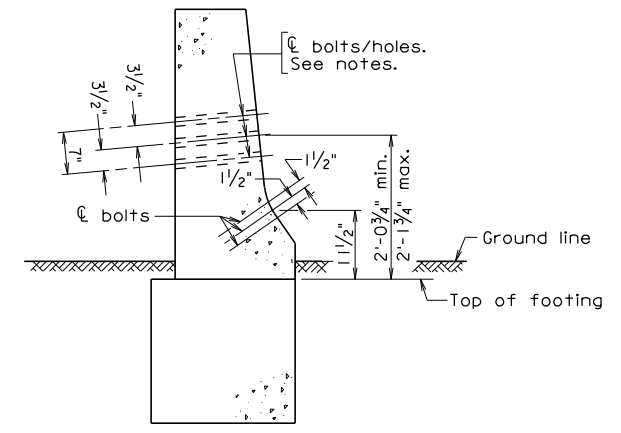
Add dimension for length of 42" to 54" barrier transition section and for length of 54" barrier section. Use 6" multiples for barrier length(s). Add elevations.

LAYOUT OF BARRIER FOR PIER PROTECTION:

Show plan view of pier column(s) or pier stem. Show tie point for intersection of CL pier and CL bridge such that the Contractor can lay out the footing for the Pier Protection System (location, orientation, etc.). The CL pier may not be parallel to the roadway. Show distance from face of barrier curb to CL pier. Show terminal section (42" high barrier), transition section (42" to 54" high barrier) and 54" high barrier section.

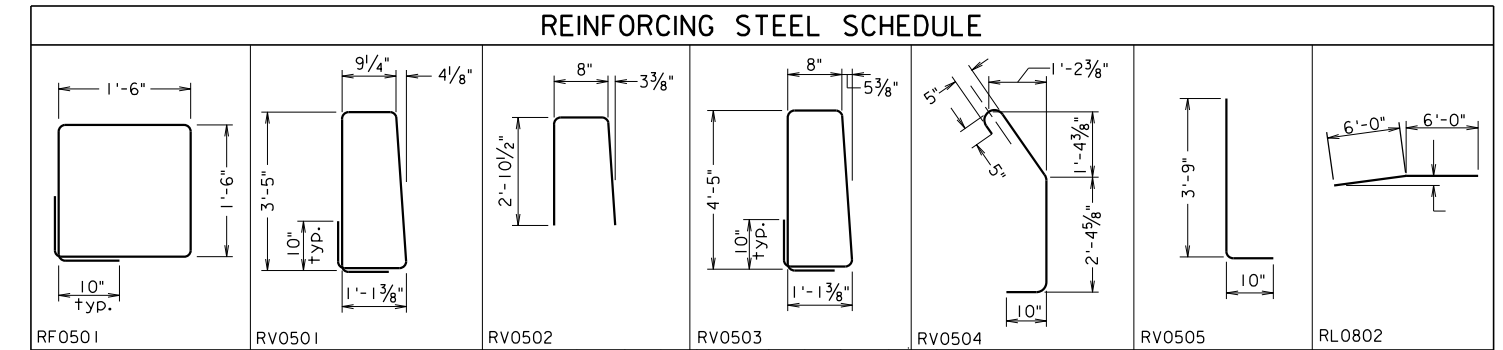


SECTION A-A

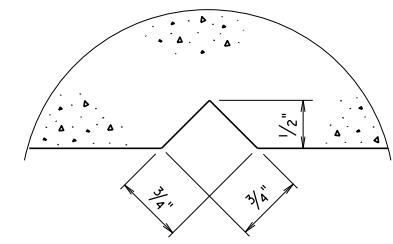


SECTION A-A

Showing location of bolts and holes in Terminal Section.



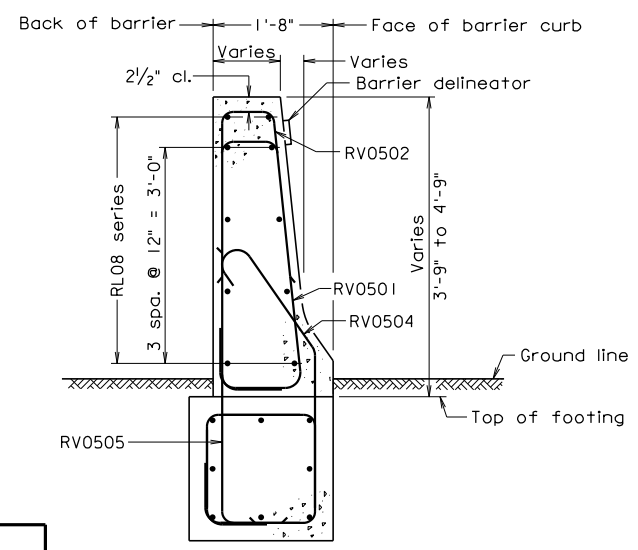
Mark	No.	Size	Pin ϕ	Length	Location
RV0501		#5	3 3/4"	9'-8 3/4"	Barrier
RV0502		#5	3 3/4"	6'-2 1/4"	Barrier
RV0503		#5	3 3/4"	11'-7 5/8"	Barrier
RV0504		#5	3 3/4"	5'-5 3/8"	Barrier
RV0505		#5	3 3/4"	4'-5 3/8"	Barrier/footing
RL0801		#8	—	—	Barrier
RL0802		#8	Var.	12'-0"	Barrier
RL0803		#8	—	—	Barrier
RL08		#8	—	—	Barrier
RF0501		#5	3 3/4"	7'-0 1/4"	Footing
RF0402		#4	—	—	Footing



SECTION D-D
Full scale
Groove detail for both sides of barrier

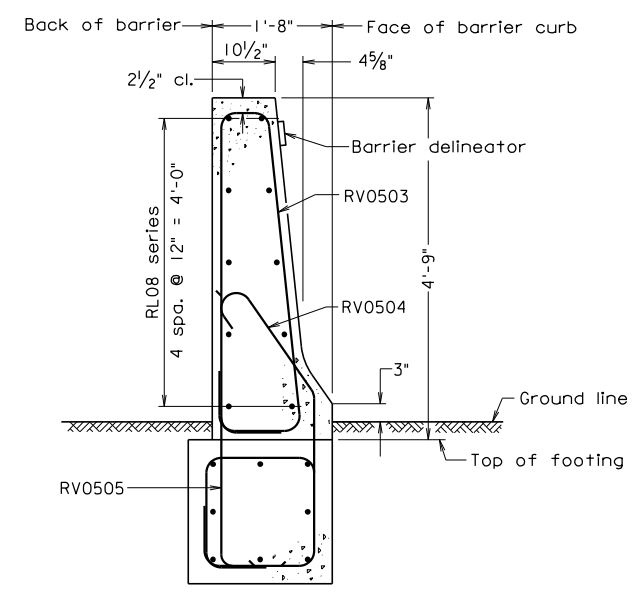
Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for Pier Protection System.



SECTION B-B

For dimensions and details not shown, see Section A-A.



SECTION C-C

For dimensions and details not shown, see Section A-A.

BPPS-2
12-14-2012
bpps2.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
December 14, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 3/4" = 1'-0" unless otherwise shown

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PIER PROTECTION SYSTEM					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BPPS-2		

PIER PROTECTION SYSTEM

NOTES TO DESIGNER:

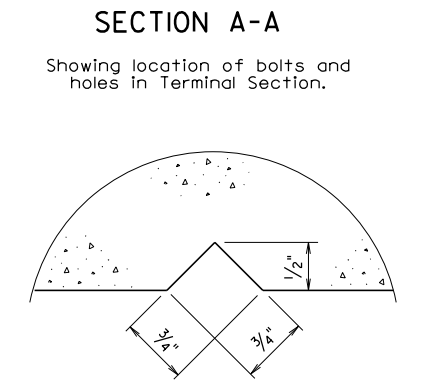
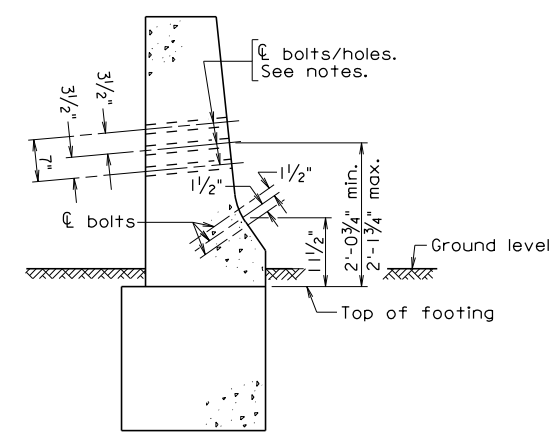
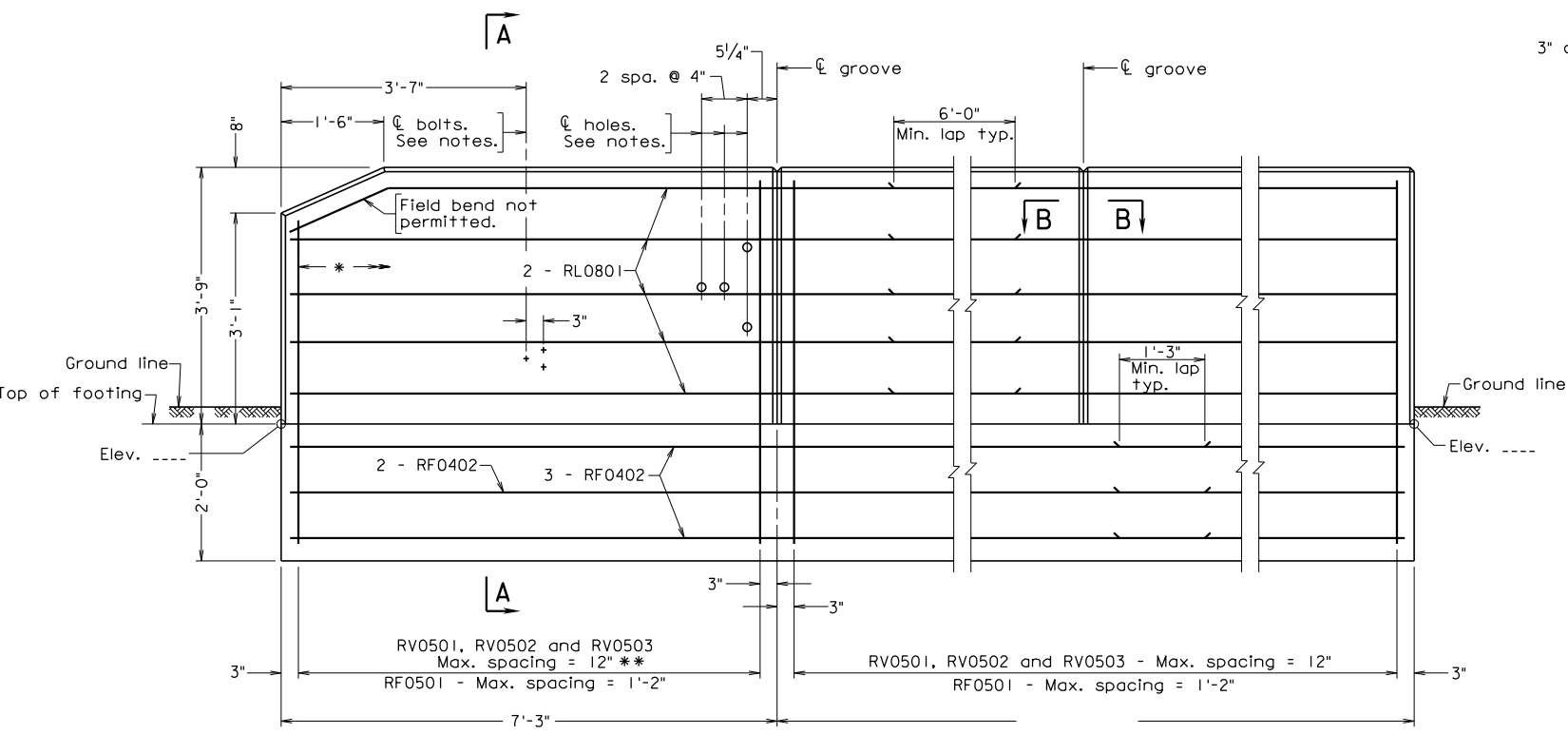
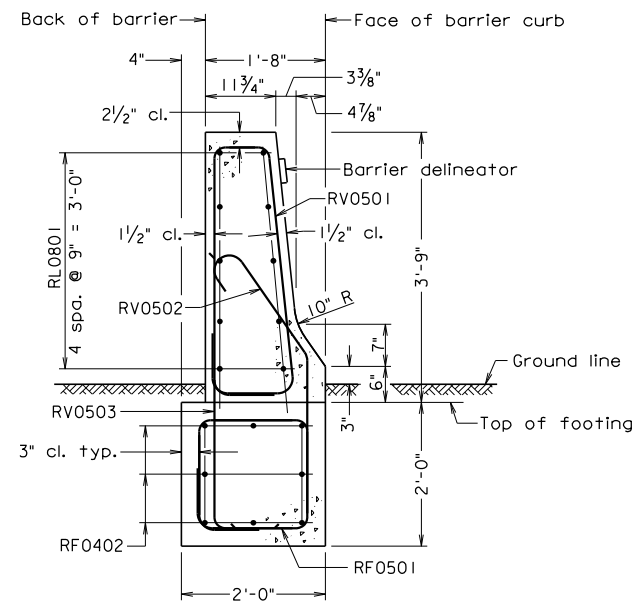
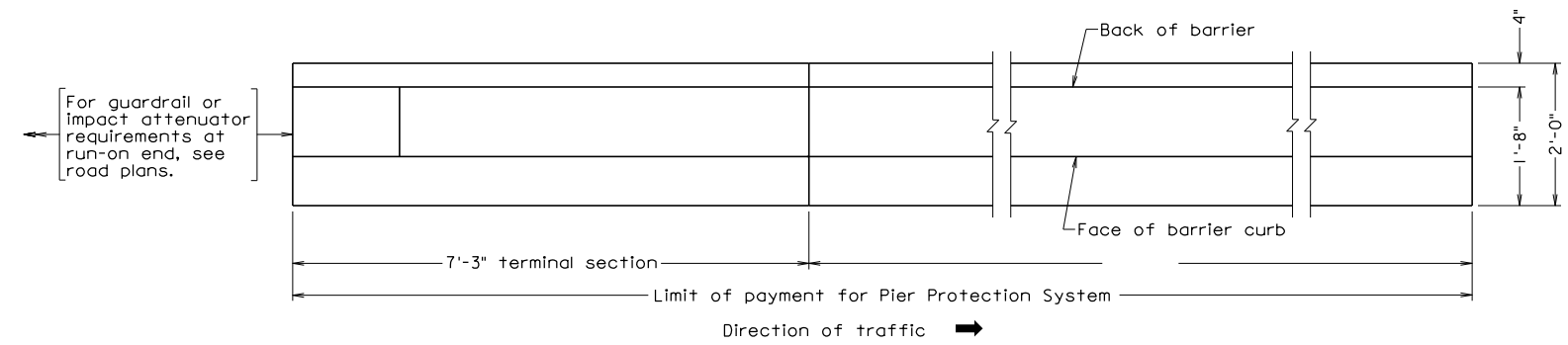
Include this standard in the plans when using standard BPPS-1.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARDS:

REINFORCING STEEL SCHEDULE:

Add dimension for bar RL0802 in bar diagram. This dimension is calculated from the slope of the 54" barrier and the 42" to 54" transition barrier section. See ELEVATION view on standard BPPS-1.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be ASTM A615, Grade 60.

Spacing of grooves shall be approximately 8'-0". Spacing of transverse construction joints for crack control shall be at approximately 24'-0" to coincide with centerline of groove. Transverse construction joint through barrier and footing shall be at the same location.

Barrier delineator size, color and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Terminal sections are detailed to take guardrail attachment GR-FOA-2. Holes where shown, shall be formed with sleeves of 1/2" diameter nominal pipe. Bolts, where shown, shall be 3/8" diameter expansion bolts, 6" long and shall be drilled and installed when rub rail is attached.

For additional details not shown, see sheet ...

Payment: Pier Protection System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price, which price shall include within the pay limits shown, the parapet, footing, excavation for footing and backfilling as directed by the Engineer and all miscellaneous hardware as detailed on the plans. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

REINFORCING STEEL SCHEDULE					
RF0501	RV0501	RV0502			
Mark	No.	Size	Pin ϕ	Length	Location
RV0501		#5	3 3/4"	9'-8 3/4"	Barrier
RV0502		#5	3 3/4"	5'-5 3/8"	Barrier
RV0503		#5	3 3/4"	4'-5 3/8"	Barrier
RL0801		#8	—	—	Barrier
RL08		#8	—	—	Barrier
RF0501		#5	3 3/4"	7'-0 1/4"	Footing
RF0402		#4	—	—	Footing
RF04		#4	—	—	Footing

Dimensions in bending diagram are out-to-out of bars, except as shown.

Cost of all bars listed in schedule to be included in price bid for Pier Protection System.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
PIER PROTECTION SYSTEM					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BPPS-3
			Checked: S&B, DIV		
Revisions					Sheet No.

LAYOUT OF BARRIER FOR PIER PROTECTION
Scale: -----

BPPS-3

10-24-2013

bpps3.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

PIER PROTECTION SYSTEM

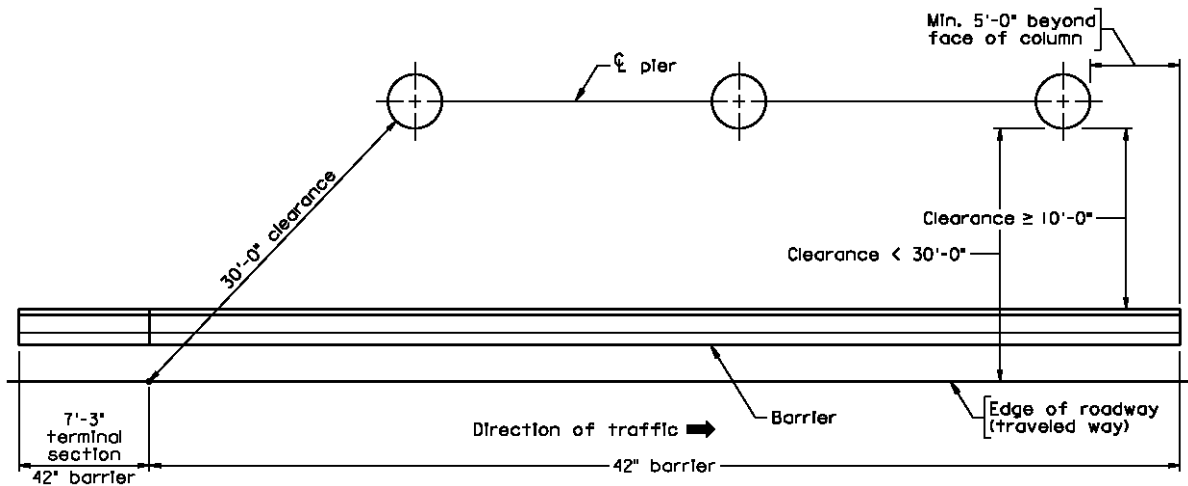
NOTES TO DESIGNER:

Standard to be used for pier protection when the clearance between the pier column(s) or pier stem and the edge of roadway (traveled way) is less than 30'-0", the pier is not designed for collision nor exempt and the clearance between the pier column(s) or pier stem and back of the barrier footing is greater than or equal to 10'-0".

Designer shall coordinate with roadway designer for barrier termination at the run-on end (guardrail, impact attenuator, etc.). The terminal section is detailed to accommodate guardrail attachment GR-FOA-2.

Reference to barrier height is for portion above ground line. The standard indicates 3" of barrier below ground line to top of 2'-0" x 2'-0" footing.

Barrier shall extend a minimum of 5'-0" beyond the face of the pier column/stem.



See Part 2, Chapter 15: Pier Details, of this manual for additional guidance, detailing requirements and examples.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

PLAN:

Add required dimensions, If project is "bridge only" add sheet number for details at end of barrier (run-on side).

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (cont'd):

ELEVATION:

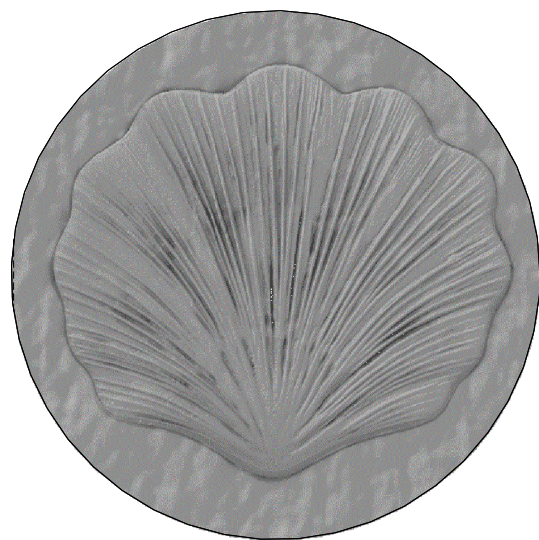
Add dimension for length of barrier. Use 6" multiples for barrier length(s). Add elevations.

LAYOUT OF BARRIER FOR PIER PROTECTION:

Show plan view of pier column(s) or pier stem. Show tie point for intersection of CL pier and CL bridge such that the Contractor can lay out the footing for the Pier Protection System (location, orientation, etc.). The CL pier may not be parallel to the roadway. Show distance from face of barrier curb to CL pier. Show terminal section (42" high barrier) and 42" high barrier section.

STATE	FEDERAL AID		STATE		SHEET
ROUTE	PROJECT		ROUTE	PROJECT	NO.
VA.					

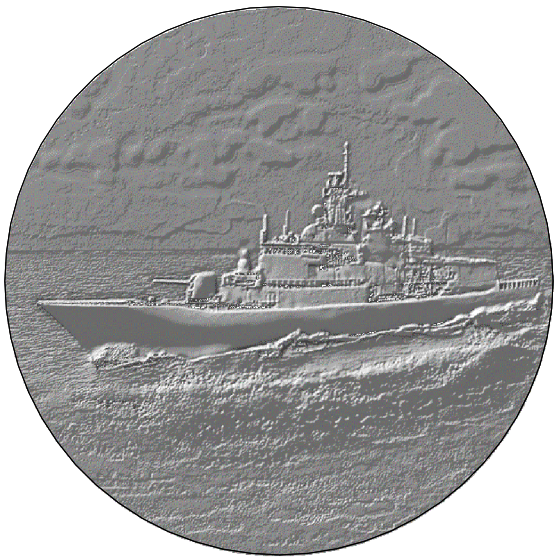
Notes:
For additional details, see sheet XX.



CLAMSHELL MEDALLION
Not to scale



CRAB MEDALLION
Not to scale



FRIGATE MEDALLION
Not to scale



SAND DOLLAR MEDALLION
Not to scale



STARFISH MEDALLION
Not to scale

2'-4" diameter medallions plus
2" wide coping around
medallion. Typ. for all
medallions.

BR27-ATM-1 08-30-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT MEDALLIONS FOR BR27C AND BR27D			
No.	Description	Date	Designed:
			Drawn:
			Checked:
	Revisions		
		Date	Plan No.
			Sheet No.
			BR27-ATM-1

ARCHITECTURAL TREATMENT

MEDALLIONS

FOR STEEL RAILING BR27C-SERIES and BR27D-SERIES

NOTES TO DESIGNER:

This standard depicts five options for medallions used with architectural treatment of railings. Five medallions are depicted on this standard and an additional three medallions on standard BR27-ATM-2. Medallions are only to be used on the BR27C-series and BR27D-series rails. This standard sheet is included in the plans only when one of the following architectural treatment standard sheets is used: BR27C-AT-8, BR27C-AT-9 BR27D-AT-8 and BR27D-AT-9.

For additional information, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 5: Architectural Treatment.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

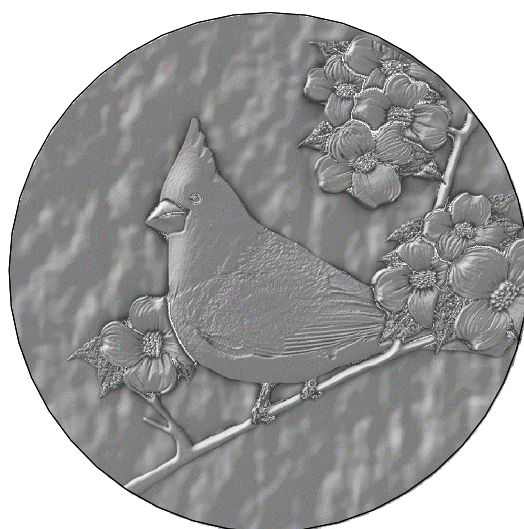
Complete sheet no.

TITLE BLOCK:

Replace standard designation with plan number.

STATE		FEDERAL AID		STATE		SHEET NO.
	ROUTE		PROJECT		ROUTE	PROJECT
VA.	—					

Notes:
For additional details, see sheet XX.



CARDINAL MEDALLION
Not to scale



DOGWOOD-BLOSSOM MEDALLION
Not to scale



TULIP-POPLAR MEDALLION
Not to scale

2'-4" diameter medallions plus
2" wide coping around
medallion. Typ. for all
medallions.

BR27-ATM-2 08-30-2013 br27atm2.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT MEDALLIONS FOR BR27C AND BR27D			
No.	Description	Date	Designed:
			Drawn:
			Checked:
Revisions			Date Plan No. Sheet No.
			BR27-ATM-2

ARCHITECTURAL TREATMENT

MEDALLIONS

FOR STEEL RAILING BR27C-SERIES and BR27D-SERIES

NOTES TO DESIGNER:

This standard depicts three options for medallions used with architectural treatment of railings. Five medallions are depicted on this standard and an additional five medallions on standard BR27-ATM-1. Medallions are only to be used on the BR27C-series and BR27D-series rails. This standard sheet is included in the plans only when one of the following architectural treatment standard sheets is used: BR27C-AT-8, BR27C-AT-9 BR27D-AT-8 and BR27D-AT-9.

For additional information, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 5: Architectural Treatment.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Complete sheet no.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

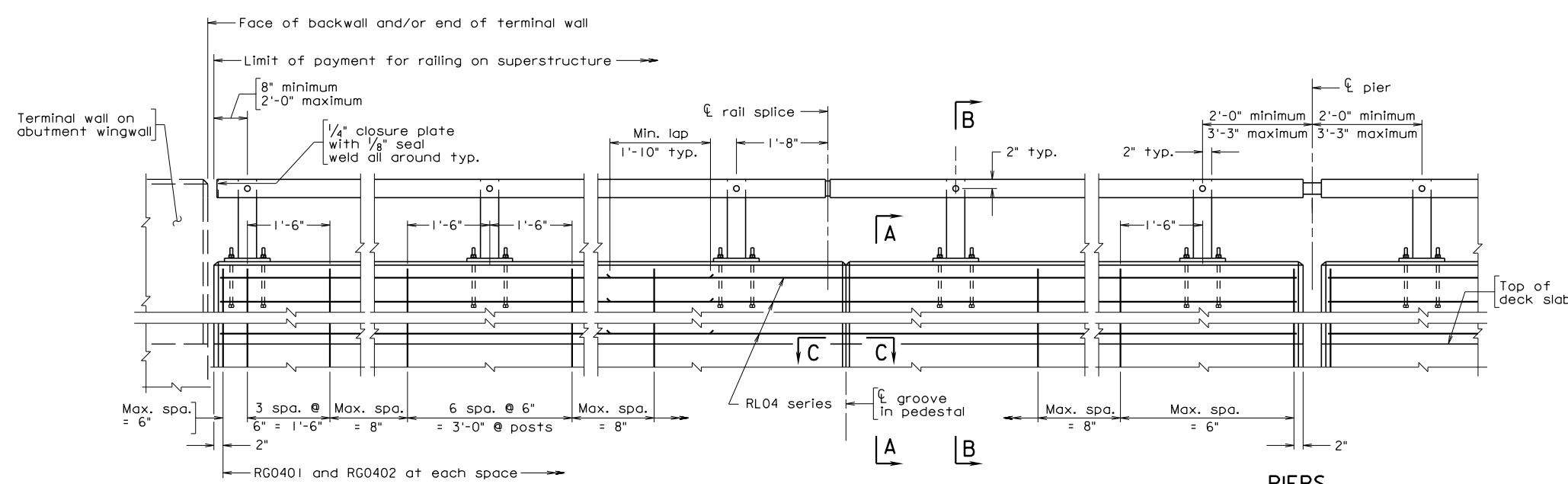
Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

For additional notes, see sheet...

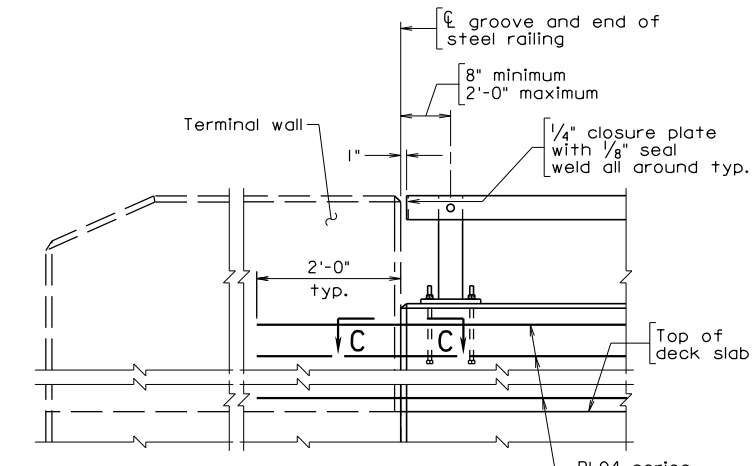
** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.



ABUTMENTS
Terminal Wall on Wingwall

ELEVATION

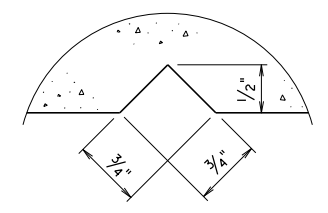
PIERS
with joint in slab



ABUTMENT

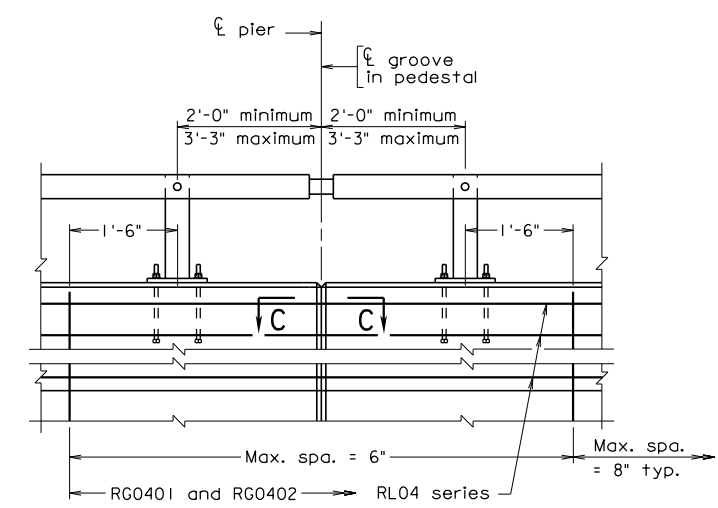
PART ELEVATION

Terminal Wall on Superstructure

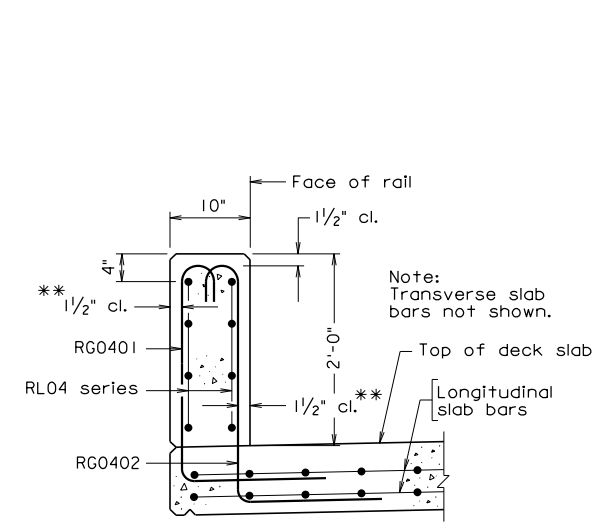


SECTION C-C
Full scale

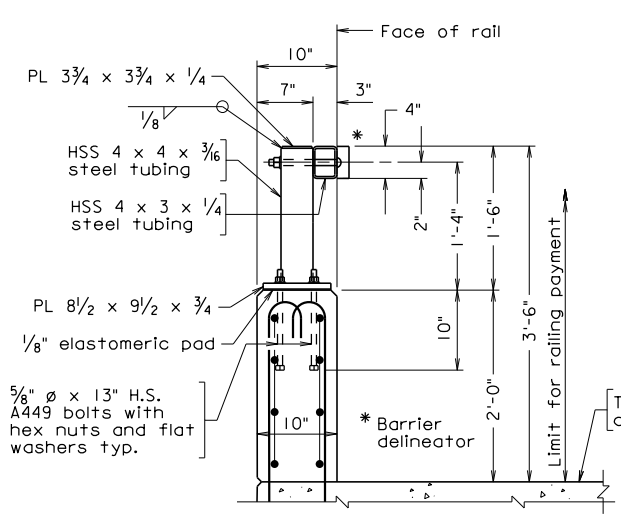
Groove detail for both sides of rail



PIERS
Continuous - without joint in slab

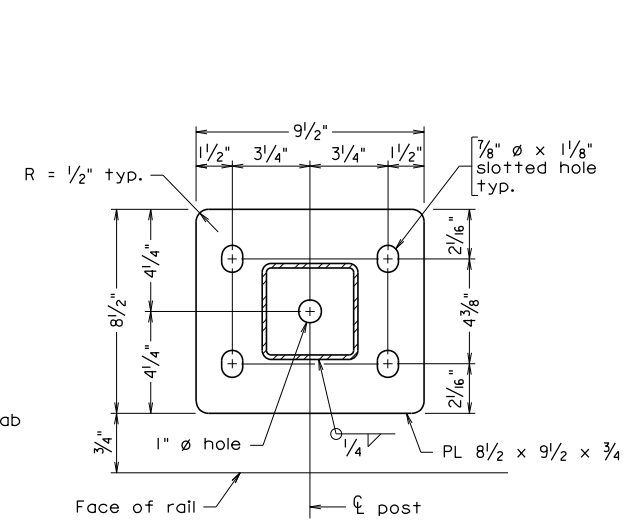


SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"

Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL
Not to scale

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42"-BR27C STEEL RAILING					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BR27C-12
			Checked: S&B, DIV		
Revisions					

BR27C-12 10-15-2015 br27c12.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

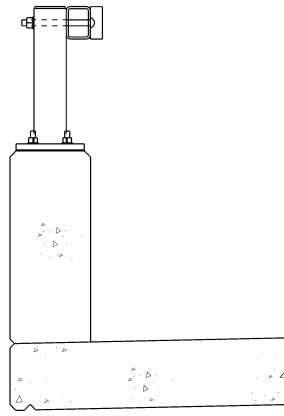
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

42" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER:

This railing as detailed is for use as a traffic barrier. The steel railing has a height of 3'-6" and has been crash tested for TL-4 (TL = test level). The standard may be used when an open railing is required. This standard shall not be used for sidewalk applications. If architectural treatment is required, use standard BR27C-12-AT.



BR27C-12 STEEL RAILING

Bid Item: Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 1 RAIL. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) and the appropriate terminal wall standard (BR27T-1 thru BR27T-4) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 3'-6" height of the rail would need to be adjusted to 2'-1" and 3'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

42" STEEL RAILING

BR27C-SERIES

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 3'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to posts are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

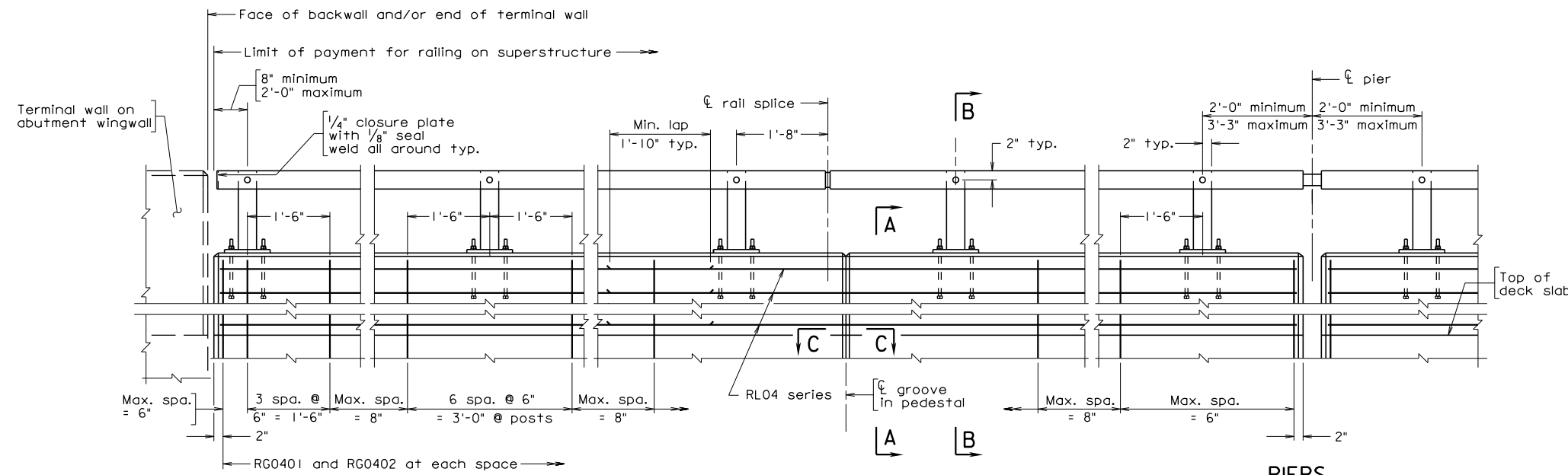
Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

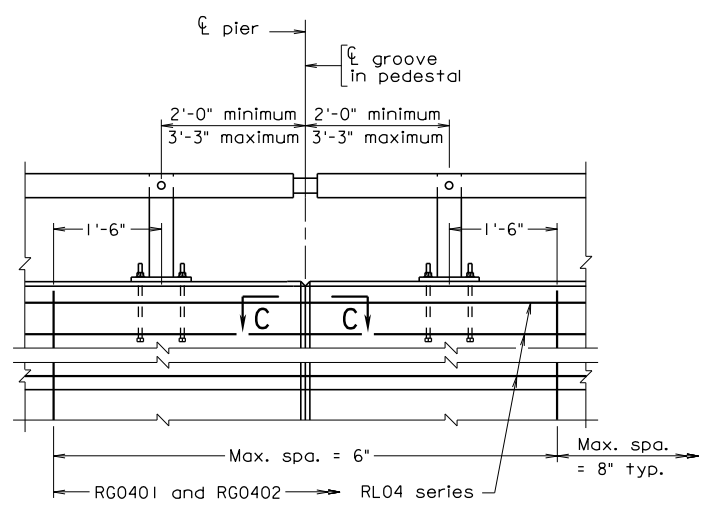
Bid price for architectural treatment includes concrete in relief and coping.

For additional notes, see sheet...

** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

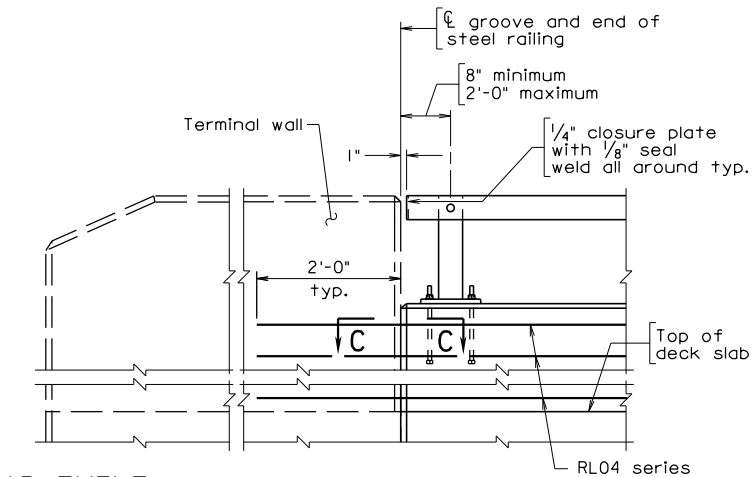


ELEVATION

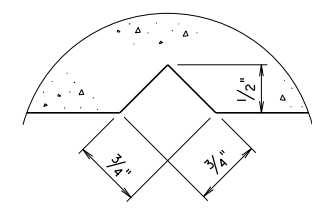


PIERS Continuous - without joint in slab

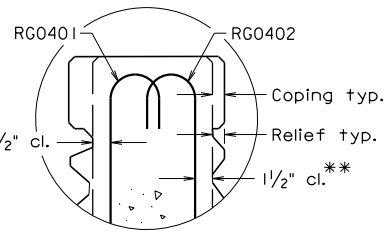
ABUTMENTS Terminal Wall on Wingwall



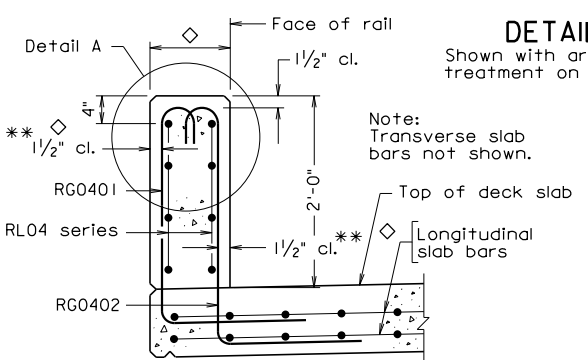
PART ELEVATION Terminal Wall on Superstructure



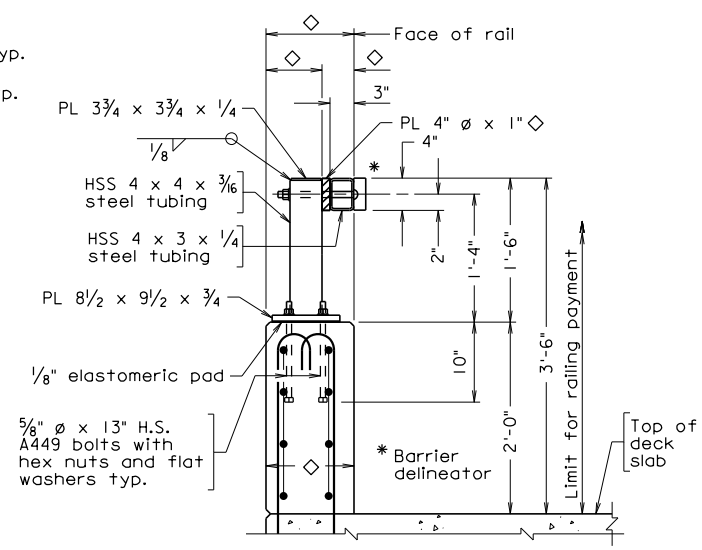
SECTION C-C Full scale Groove detail for both sides of rail



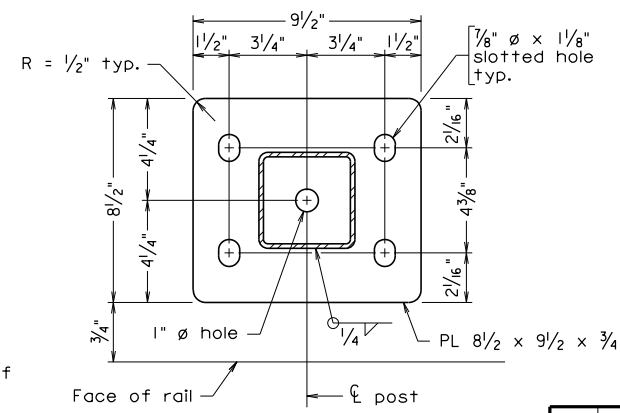
DETAIL A Shown with architectural treatment on both sides



SECTION A-A Scale: 1" = 1'-0"



SECTION B-B Scale: 1" = 1'-0" Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL Not to scale

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ø	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42"-BR27C STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions			BR27C-12-AT		

BR27C-12-AT 10-15-2015 br27c12at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

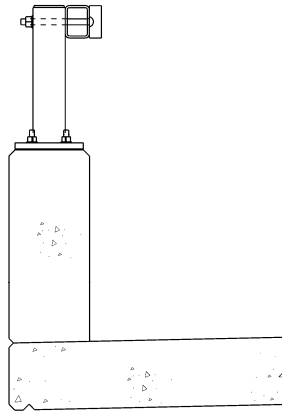
A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**42" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES**

NOTES TO DESIGNER:

This railing as detailed is for use as a traffic barrier. The steel railing has a height of 3'-6" and has been crash tested for TL-4 (TL = test level). The standard may be used when an open railing is required. This standard shall not be used for sidewalk applications. This standard is used only when architectural treatment is required. If none is required, use standard BR27C-12.



BR27C-12 STEEL RAILING
(Architectural treatment not shown)

Bid Item: Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 1 RAIL. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) and the appropriate terminal wall standard (BR27T-1-AT thru BR27T-4-AT) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 3'-6" height of the rail would need to be adjusted to 2'-1" and 3'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

42" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 3'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

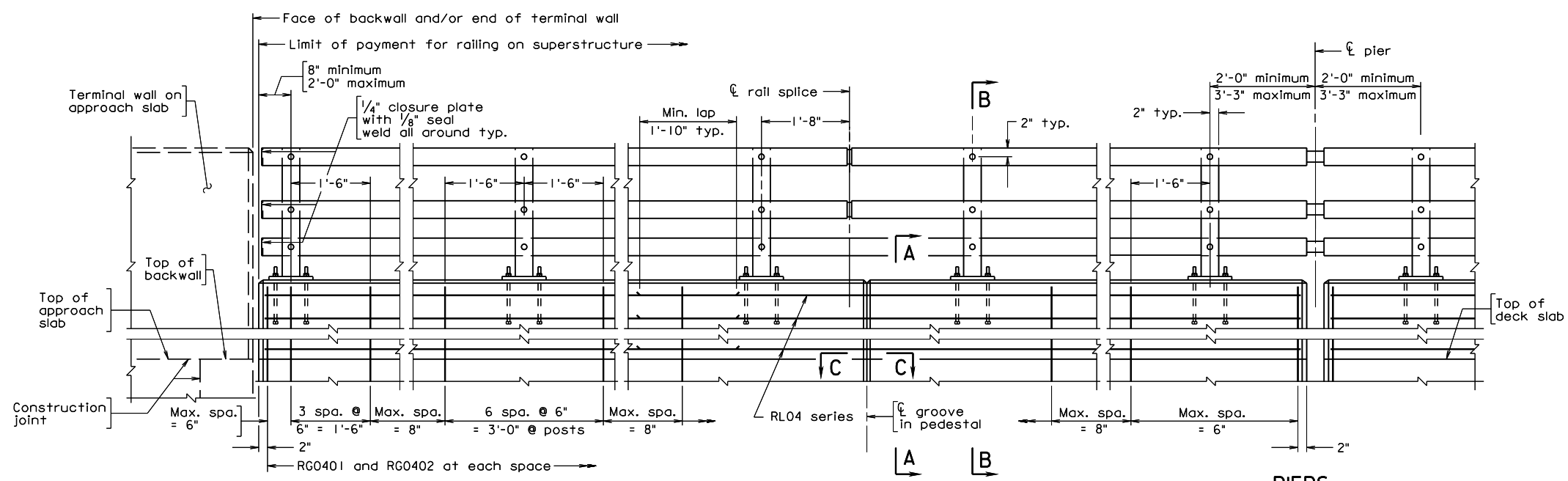
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

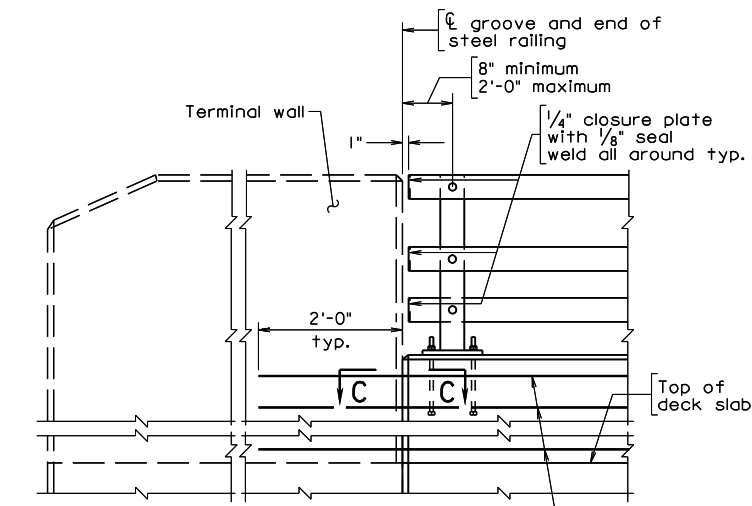
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ELEVATION

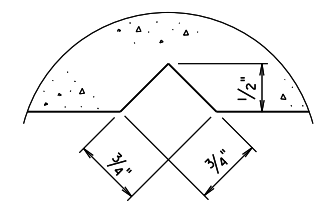
ABUTMENTS
Terminal Wall on Approach Slab

PIERS
with joint in slab

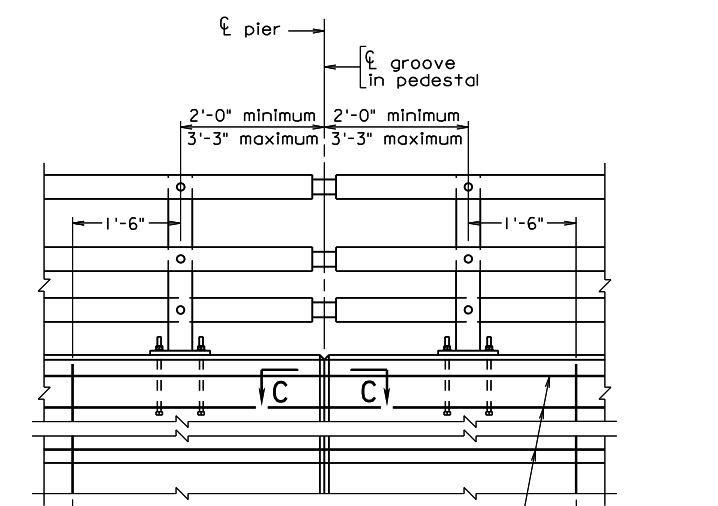


PART ELEVATION
Terminal Wall on Superstructure

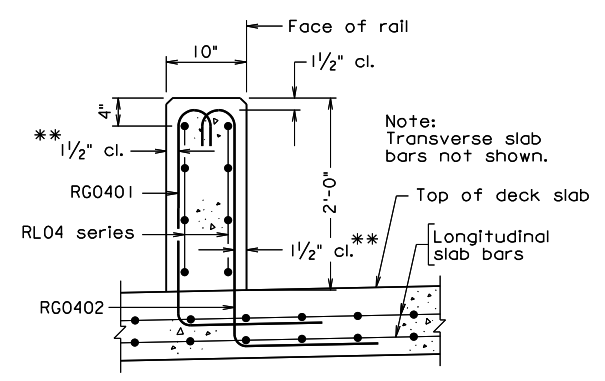
ABUTMENT



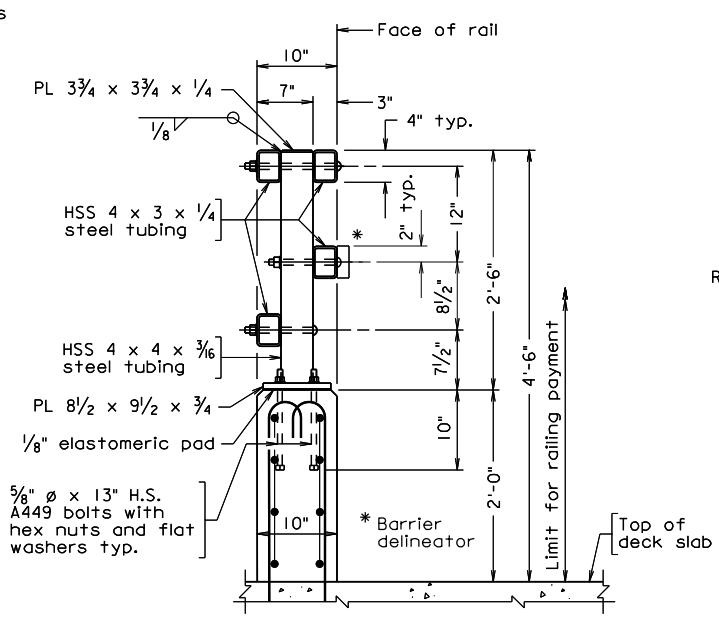
SECTION C-C
Full scale
Groove detail for both sides of rail



PIERS
Continuous - without joint in slab

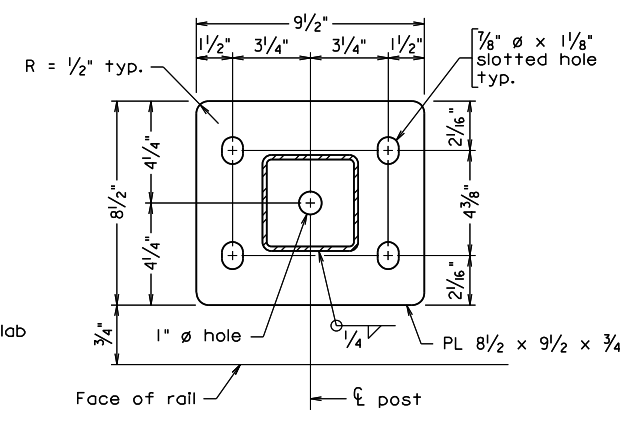


SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"

Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL
Not to scale

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of terminal wall, see sheet
- Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.
- Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.
- For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.
- All steel shall be hot dip galvanized.
- Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".
- Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
- Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.
- Rails to be continuous over a minimum of 3 posts before splicing.
- For additional notes, see sheet...
- **The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin dia	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27C STEEL RAILING					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV		BR27C-13

BR27C-13 10-15-2015 br27c13.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

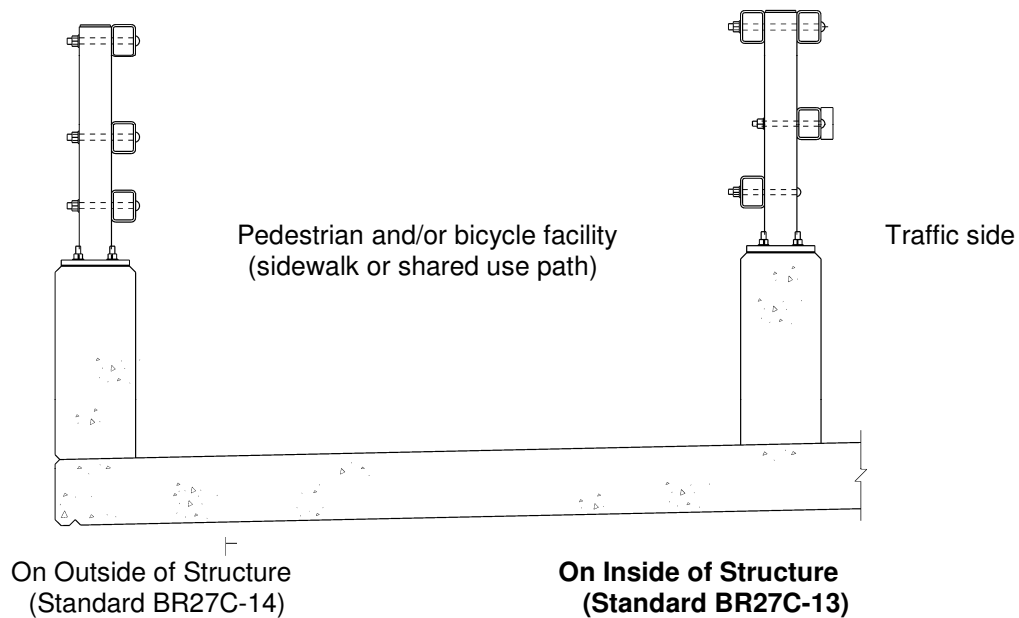
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier to separate a pedestrian and/or bicycle facility from traffic. The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the *AASHTO Standard Specifications for Highway Bridges* as well as the *AASHTO LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. If architectural treatment is required, use standard BR27C-13-AT.



For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 4 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) and the appropriate terminal wall standard (BR27T-7 thru BR27T-10) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

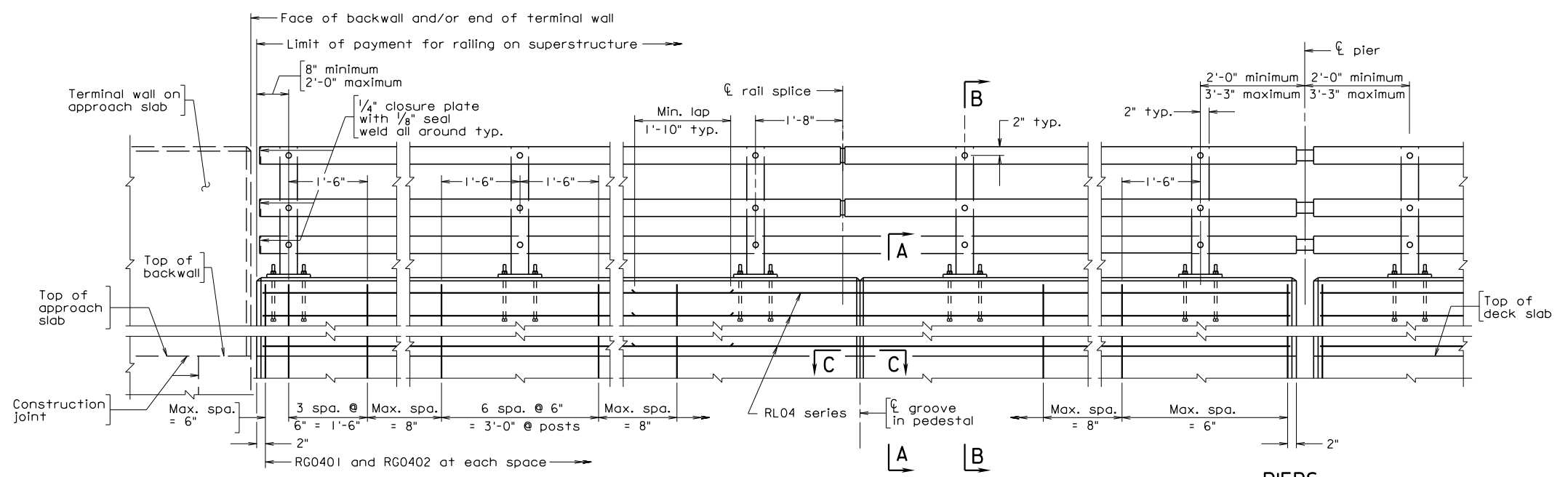
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ELEVATION

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

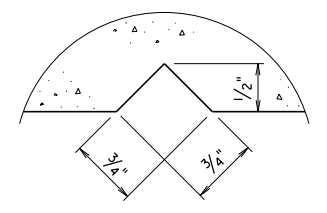
Bid price for architectural treatment includes concrete in relief and coping.

For additional notes, see sheet...

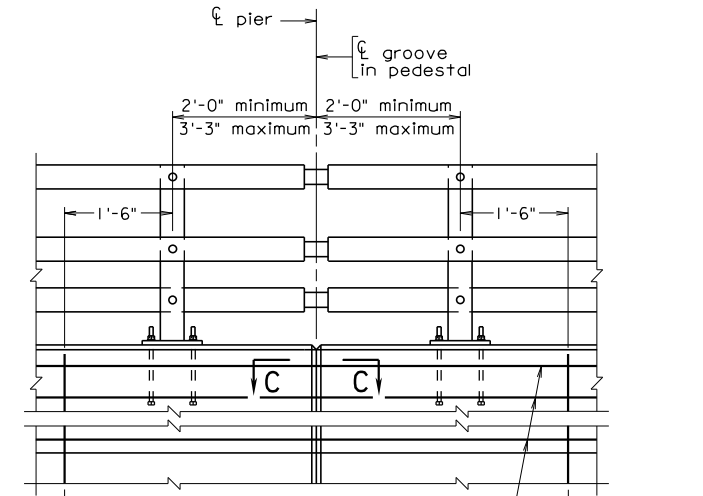
** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

ABUTMENTS
Terminal Wall on Approach Slab

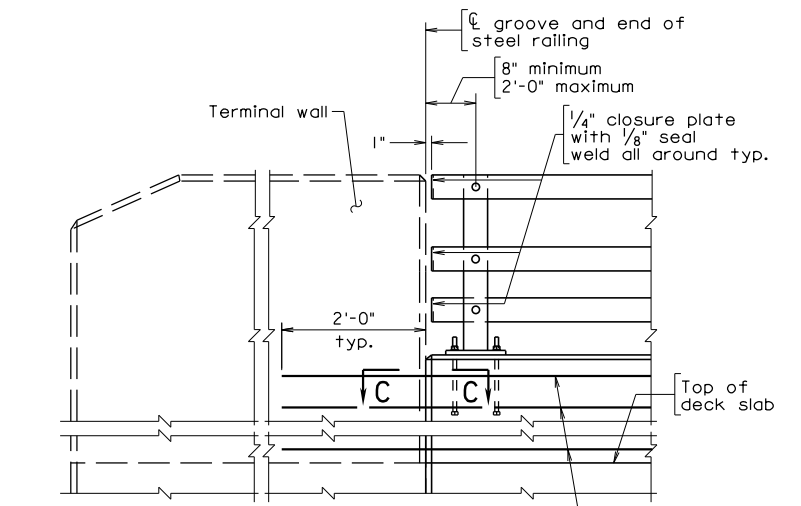
PIERS
with joint in slab



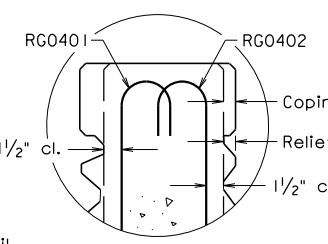
SECTION C-C
Full scale
Groove detail for both sides of rail



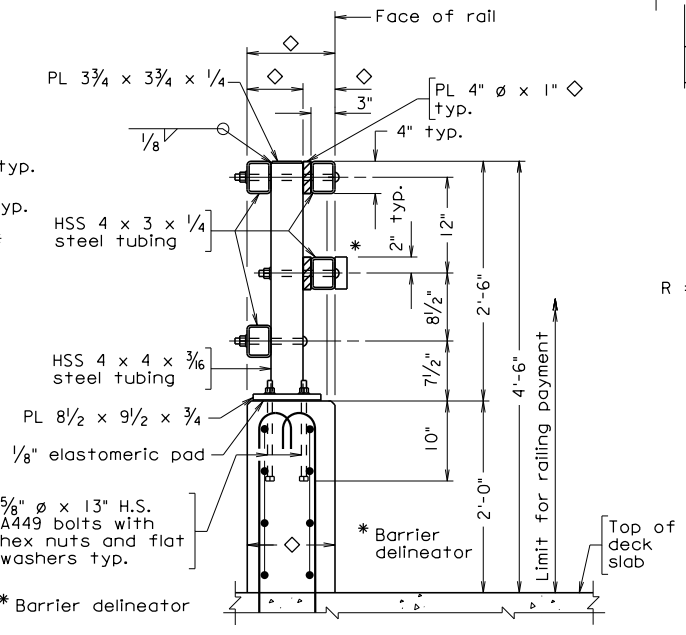
PIERS
Continuous - without joint in slab



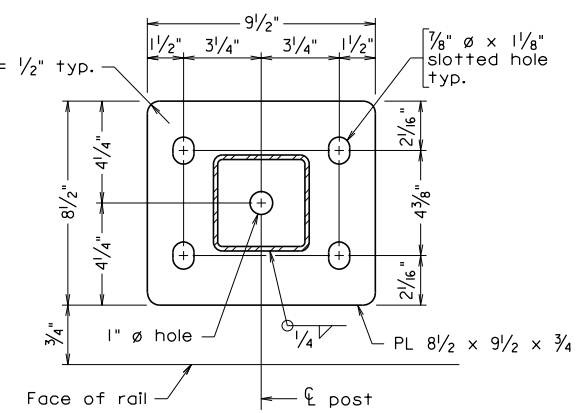
ABUTMENT
PART ELEVATION
Terminal Wall on Superstructure



DETAIL A
Shown with architectural treatment on both sides



SECTION B-B
Scale: 1" = 1'-0"
Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL
Not to scale

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ø	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27C STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BR27C-13-AT		

BR27C-13-AT 10-15-2015

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

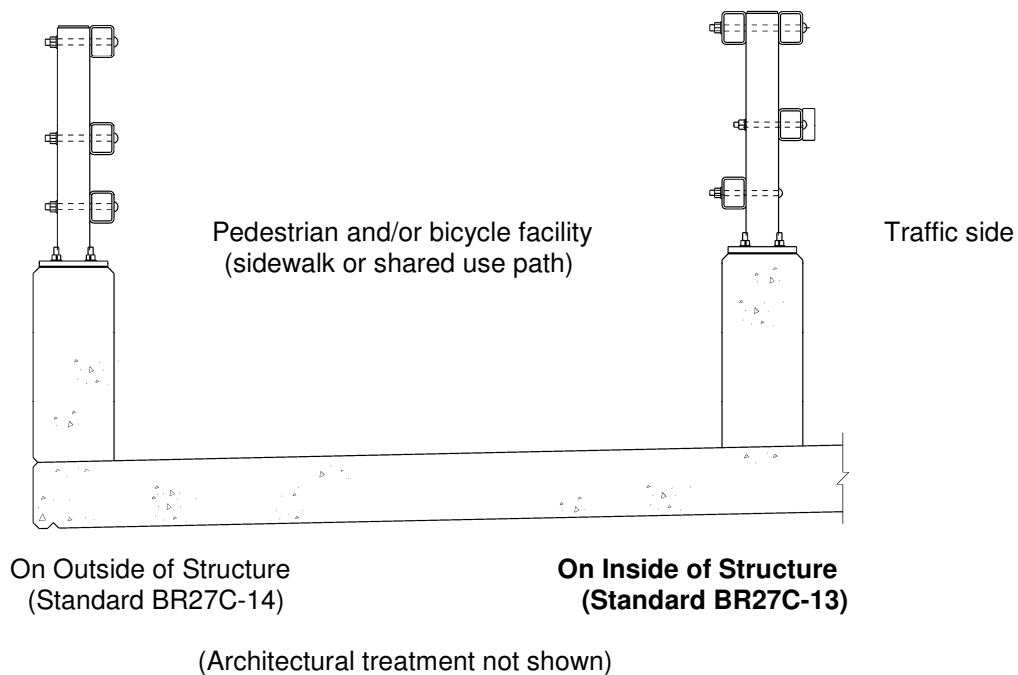
For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A. 1" spacer plate only required when treatment is on inside face.

Scale: 3/4" = 1'-0" unless otherwise noted. © 2015, Commonwealth of Virginia

**54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES**

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier to separate a pedestrian and/or bicycle facility from traffic. The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the *AASHTO Standard Specifications for Highway Bridges* as well as the *AASHTO LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. This standard is used only when architectural treatment is required. If none is required, use standard BR27C-13.



For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 4 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) and the appropriate terminal wall standard (BR27T-7-AT thru BR27T-10-AT) are to be included in the plans when using this standard.

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

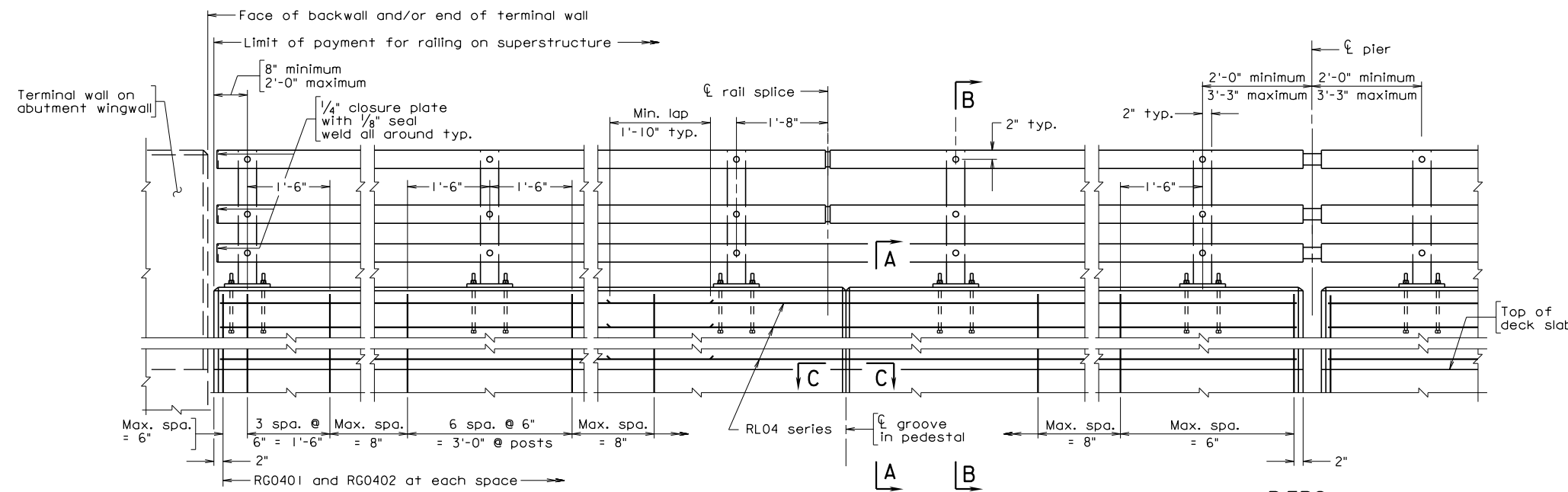
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

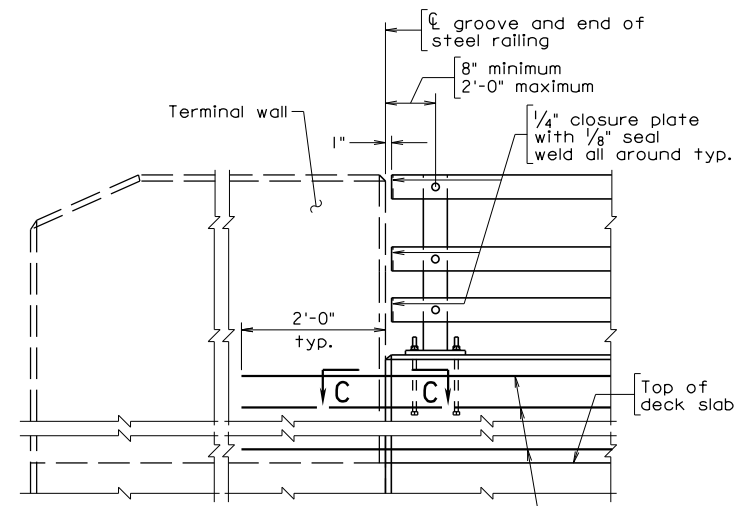
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



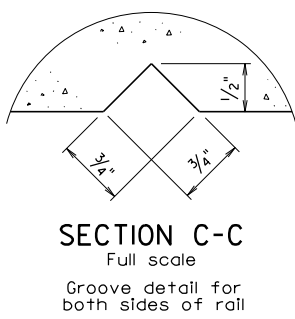
ABUTMENTS
Terminal Wall on Wingwall

PIERS
with joint in slab

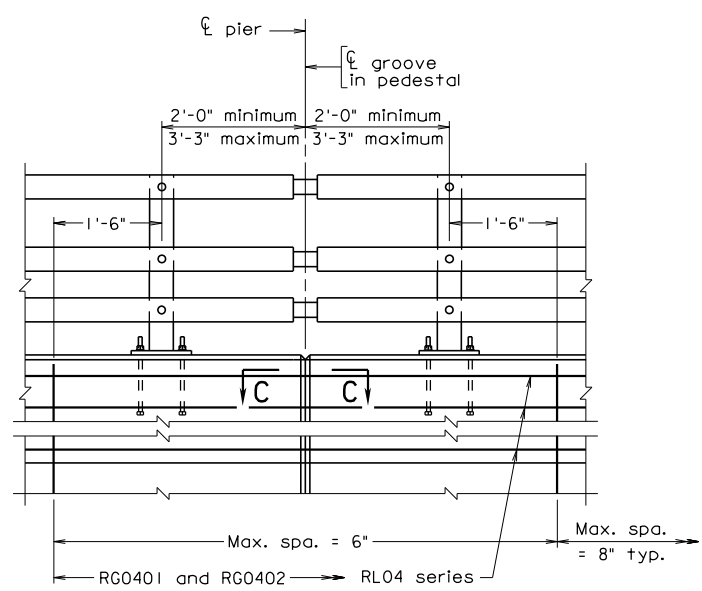
ELEVATION



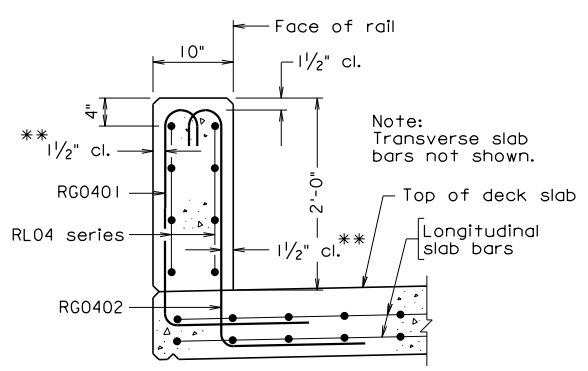
ABUTMENT PART ELEVATION
Terminal Wall on Superstructure



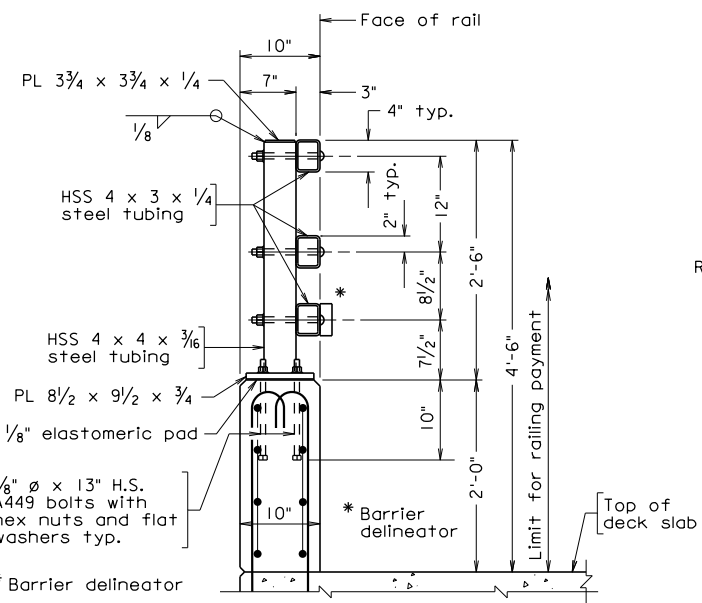
SECTION C-C
Full scale
Groove detail for both sides of rail



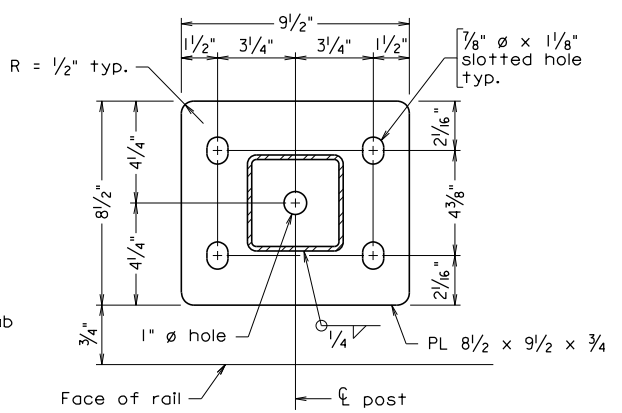
PIERS
Continuous - without joint in slab



SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"



BASE PLATE DETAIL
Not to scale

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of terminal wall, see sheet
- Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.
- Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.
- For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.
- All steel shall be hot dip galvanized.
- Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".
- Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
- Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.
- Rails to be continuous over a minimum of 3 posts before splicing.
- For additional notes, see sheet...

** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27C STEEL RAILING					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions					

BR27C-14 10-15-2015 br27c14.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

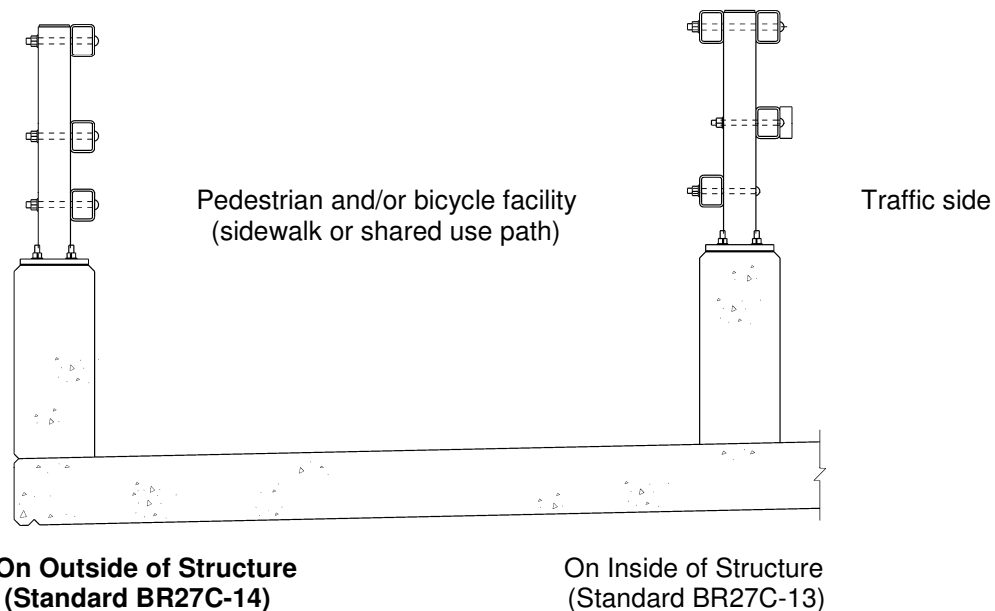
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER:

This railing is detailed for a pedestrian and/or bicycle facility and used on the outside of a structure provided that there is a traffic barrier separating the pedestrian and/or bicycle access from traffic (i.e., standard BR27C-13). For railing mounted on a sidewalk utilizing pedestrian and/or bicycle access without a traffic barrier, see Standard BR27C-15. The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the *AASHTO Standard Specifications for Highway Bridges* as well as the *AASHTO LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. If architectural treatment is required, use standard BR27C-14-AT.



For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) is to be included in the plans when using this standard. The appropriate terminal wall standard (BR27T-5 thru BR27T-8) is added if the terminal wall is to be on the superstructure. The guard rail transitioning from the roadway will not be attached to the terminal wall on the outside of structure, but on the inside of structure. Therefore, the terminal wall standard selected would have to be modified by removing details and notes that pertain to guard rail attachment.

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall if used.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

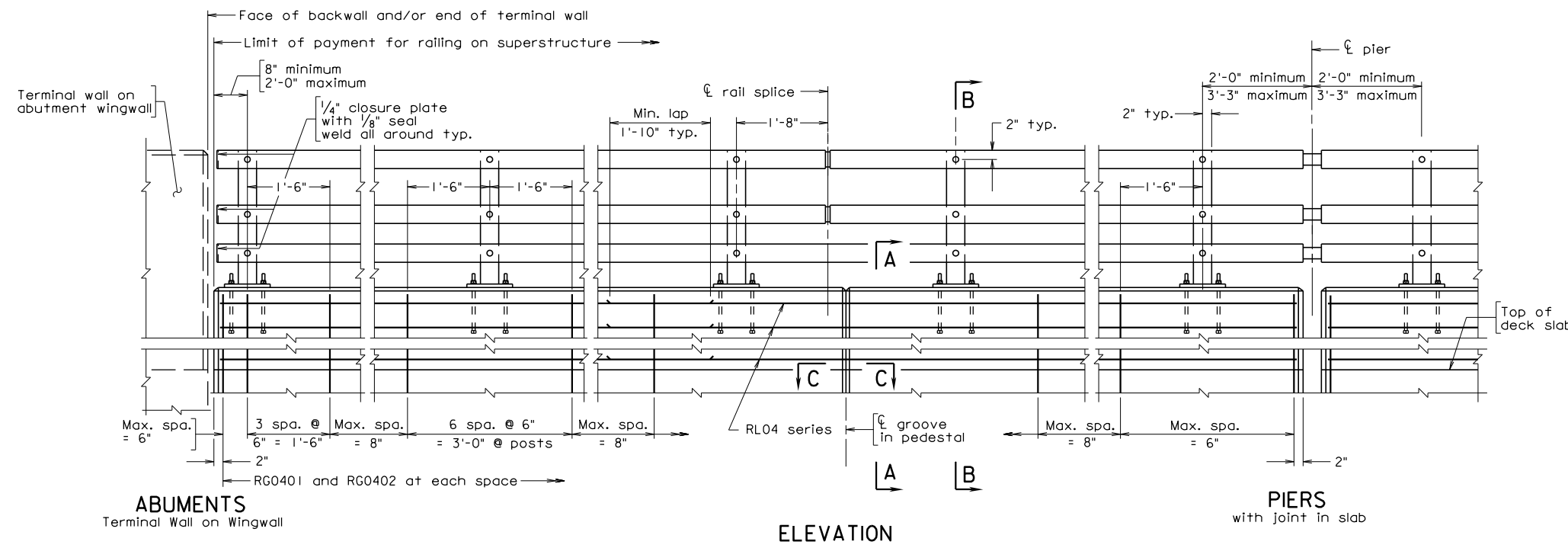
Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

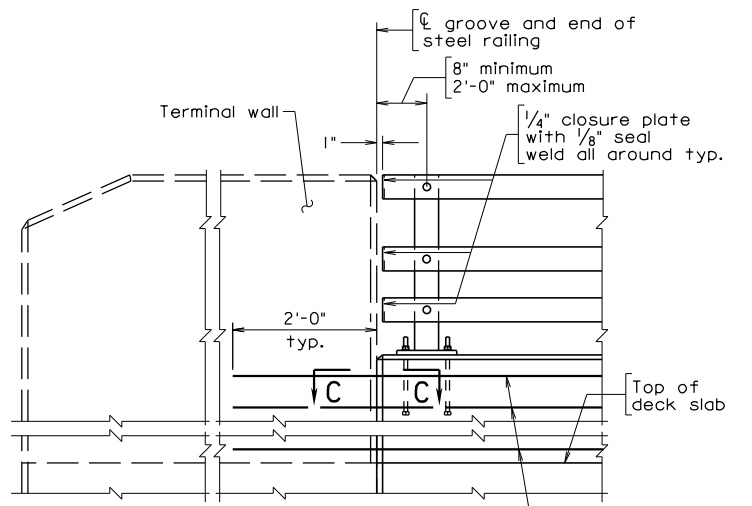
Bid price for architectural treatment includes concrete in relief and coping.

For additional notes, see sheet...

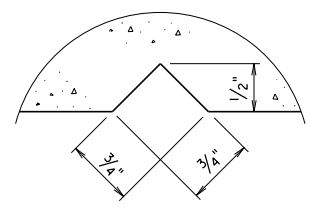
** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.



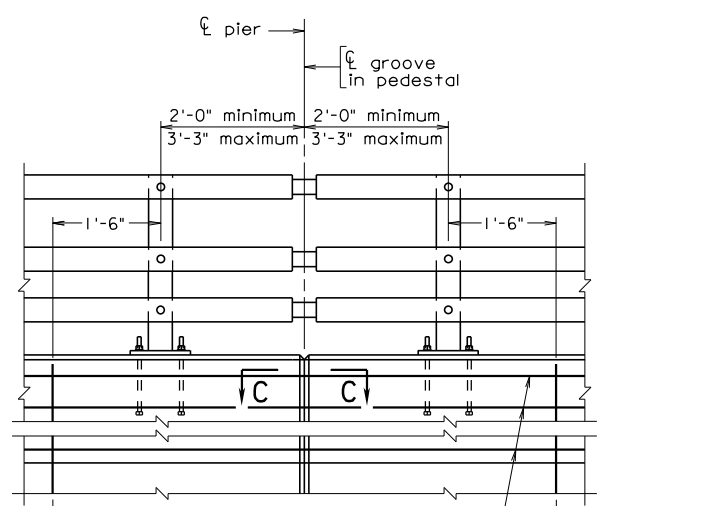
ELEVATION



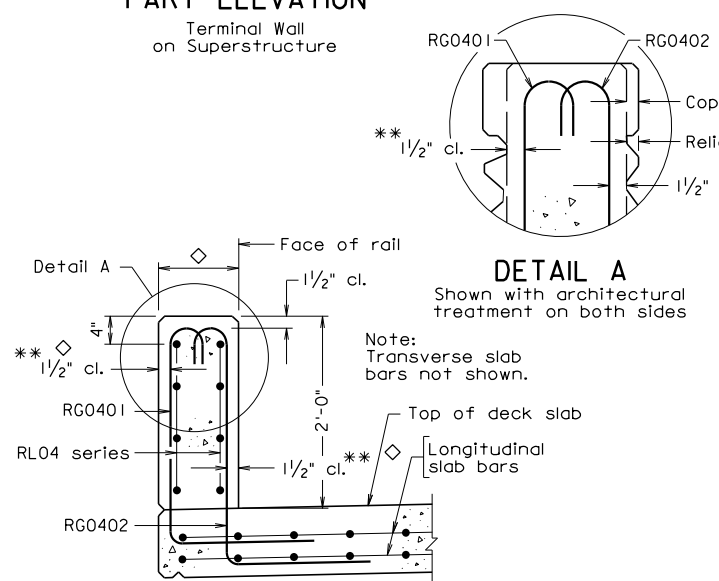
ABUTMENT PART ELEVATION



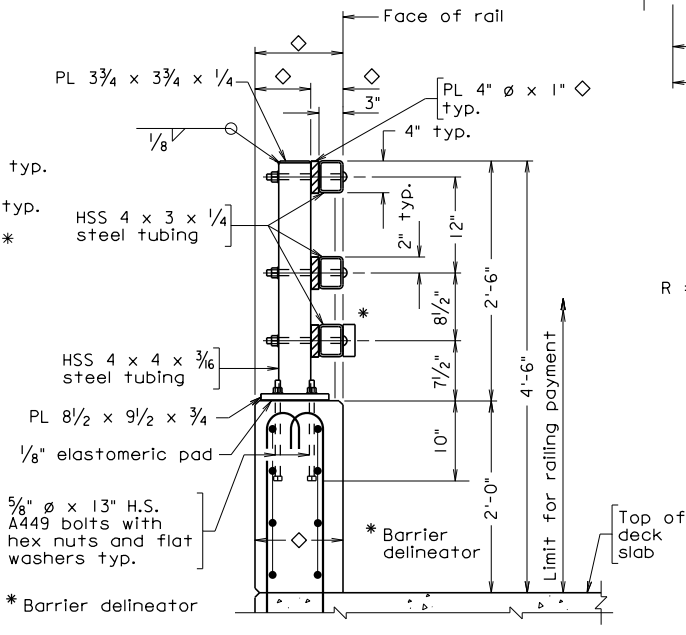
SECTION C-C Full scale Groove detail for both sides of rail



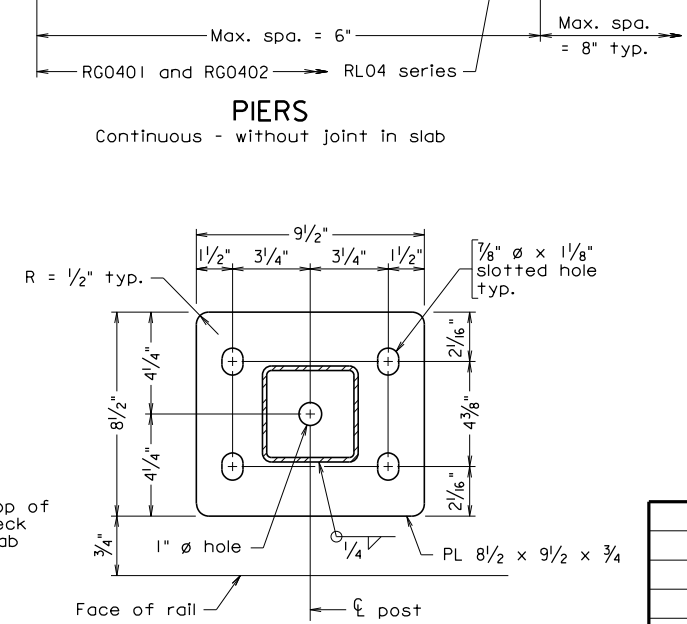
PIERS Continuous - without joint in slab



SECTION A-A Scale: 1" = 1'-0"



SECTION B-B Scale: 1" = 1'-0"



BASE PLATE DETAIL Not to scale

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27C STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
BR27C-14-AT					

BR27C-14-AT 10-15-2015

Sealed and Signed by:
Prasad L. Nallapanteni
Lic. No. 033003
On the date of
October 15, 2015

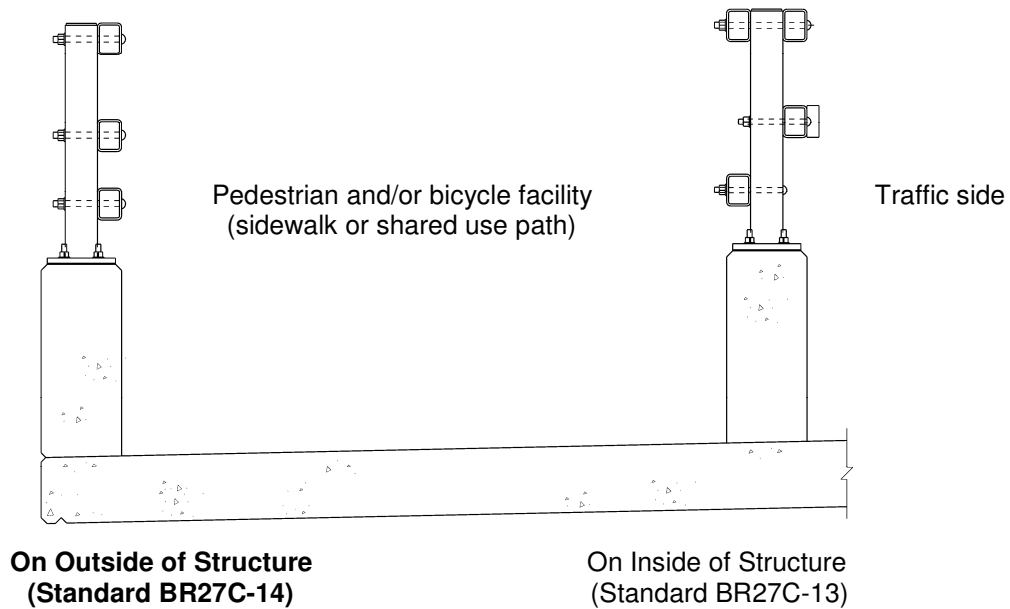
A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES

NOTES TO DESIGNER:

This railing is detailed for a pedestrian and/or bicycle facility and used on the outside of a structure provided that there is a traffic barrier separating the pedestrian and/or bicycle access from traffic (i.e., standard BR27C-13). For railing mounted on a sidewalk utilizing pedestrian and/or bicycle access without a traffic barrier, see Standard BR27C-15. The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the AASHTO *Standard Specifications for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. This standard is used only when architectural treatment is required. If none is required, use standard BR27C-14.



(Architectural treatment not shown)

For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27C-16) is to be included in the plans when using this standard. The appropriate terminal wall standard (BR27T-5-AT thru BR27T-8-AT) is added if the terminal wall is to be on the superstructure. The guard rail transitioning from the roadway will not be attached to the terminal wall on the outside of structure, but on the inside of structure. Therefore, the terminal wall standard selected would have to be modified by removing details and notes that pertain to guard rail attachment.

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (2'-0") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (2'-0" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall if used.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BR27C-14-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 10Mar2015
SHEET 3 of 3
FILE NO. BR27C-14-AT-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to posts are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

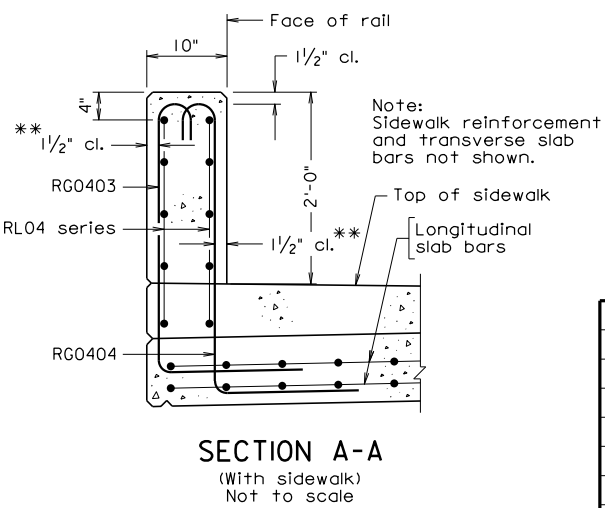
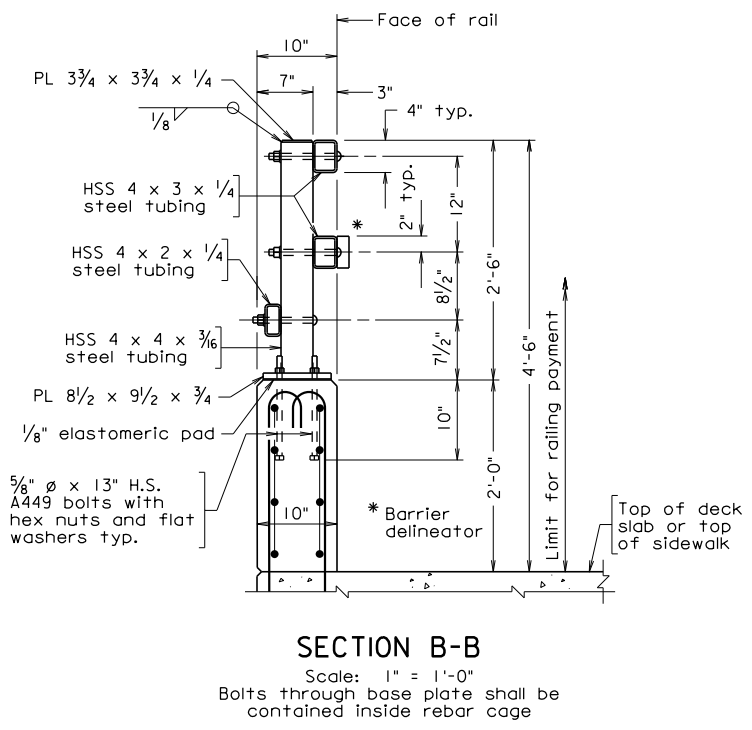
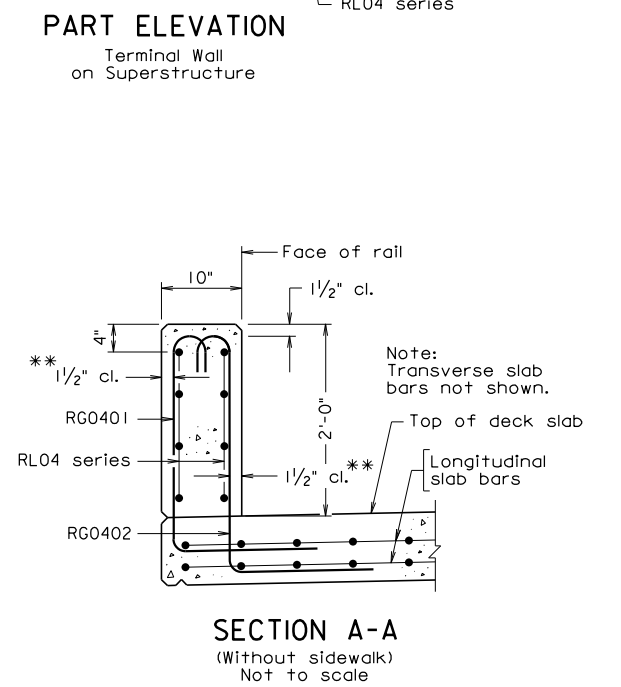
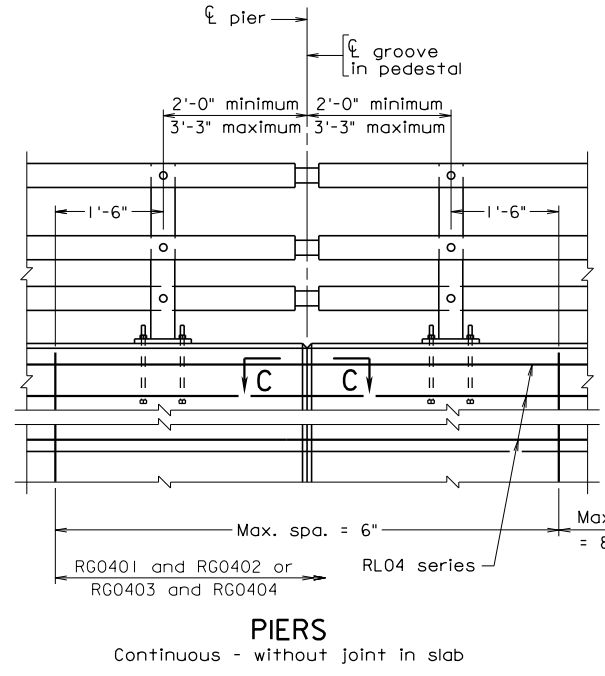
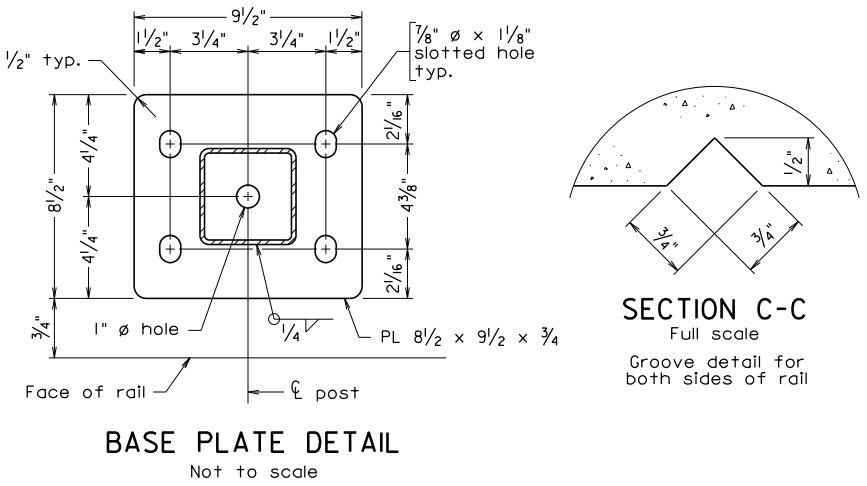
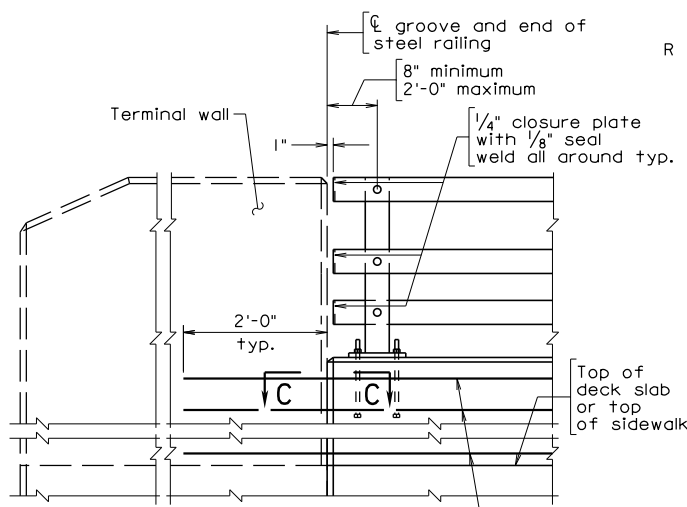
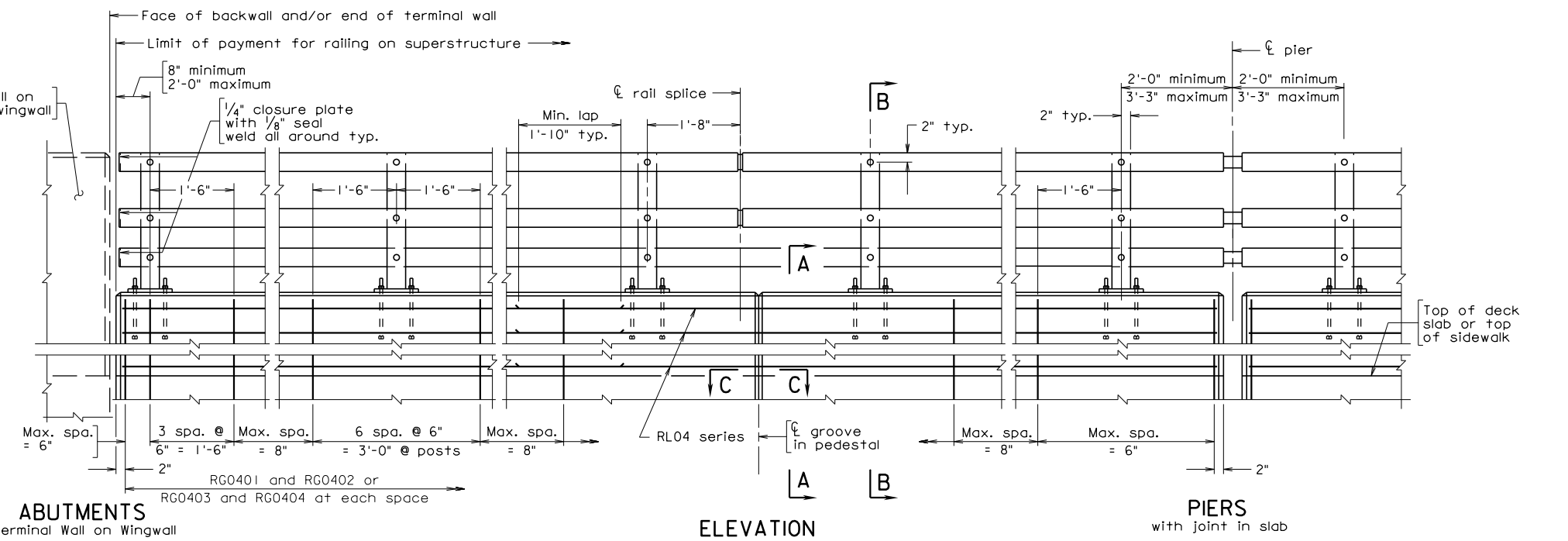
For additional notes, see sheet...

** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE				
Mark	Size	Length	Pin ϕ	Location
RG0401	#4	3"	3"	Parapet
RG0402	#4	3"	3"	Parapet
RG0403	#4	3"	3"	Parapet
RG0404	#4	3"	3"	Parapet
RL04	#4	—	—	Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION				
54"-BR27C STEEL RAILING				
No.	Description	Date	Designed: S&B...DIV	Drawn: ...S&B...DIV
Revisions		Date	Plan No.	Sheet No.
			BR27C-15	



Scale: 3/4" = 1'-0" unless otherwise noted. © 2015, Commonwealth of Virginia

BR27C-15 10-15-2015 br27c15.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

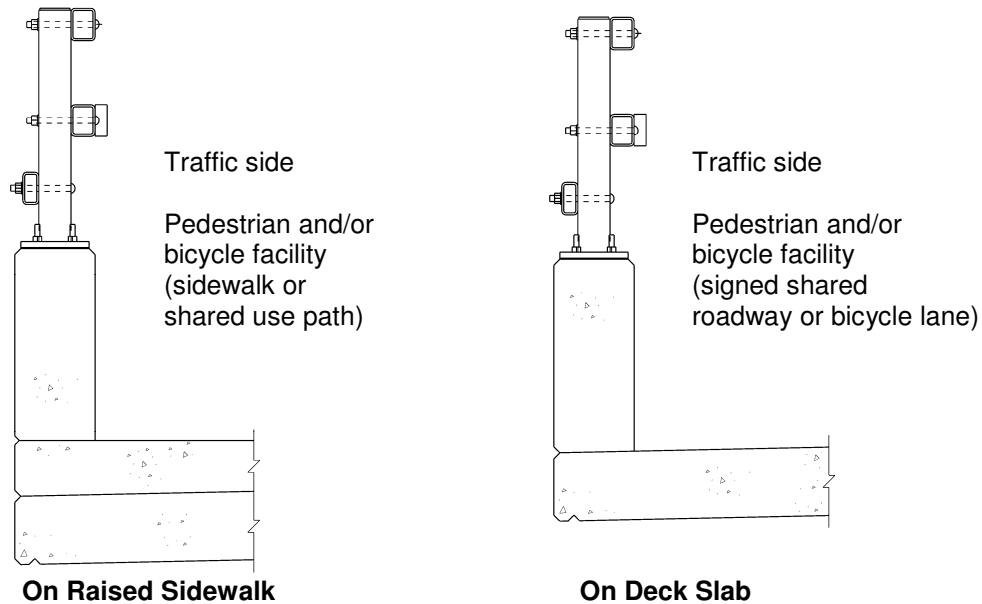
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier on the outside of a structure adjacent to a pedestrian and/or bicycle facility where there is no barrier separating the pedestrian and/or bicycle facility from traffic. The railing is mounted on the top of sidewalk (for sidewalk or shared use path) or top of deck (for signed shared roadway or bicycle lane). The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the AASHTO *Standard Specifications for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. If architectural treatment is required, use standard BR27C-15-AT.



Standard BR27C-15

For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standards BR27C-16 and BR27C-17) and the appropriate terminal wall standard (BR27T-5 thru BR27T-8) are to be included in the plans when using this standard.

54" STEEL RAILING

BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402 and/or RG0403 and RG0404.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

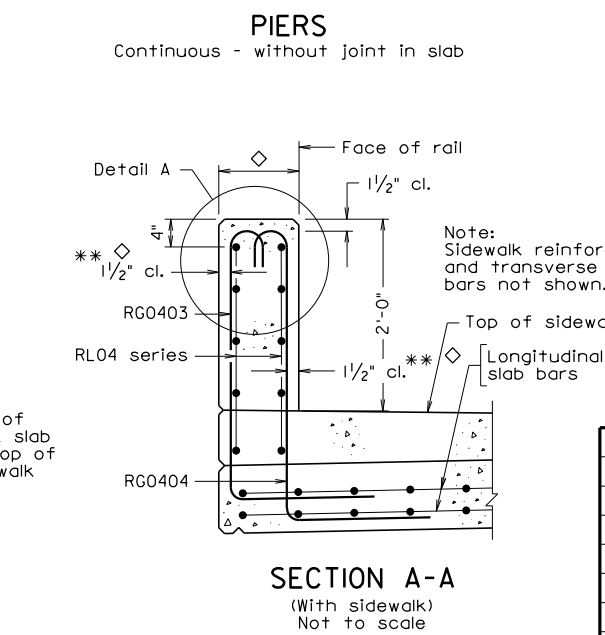
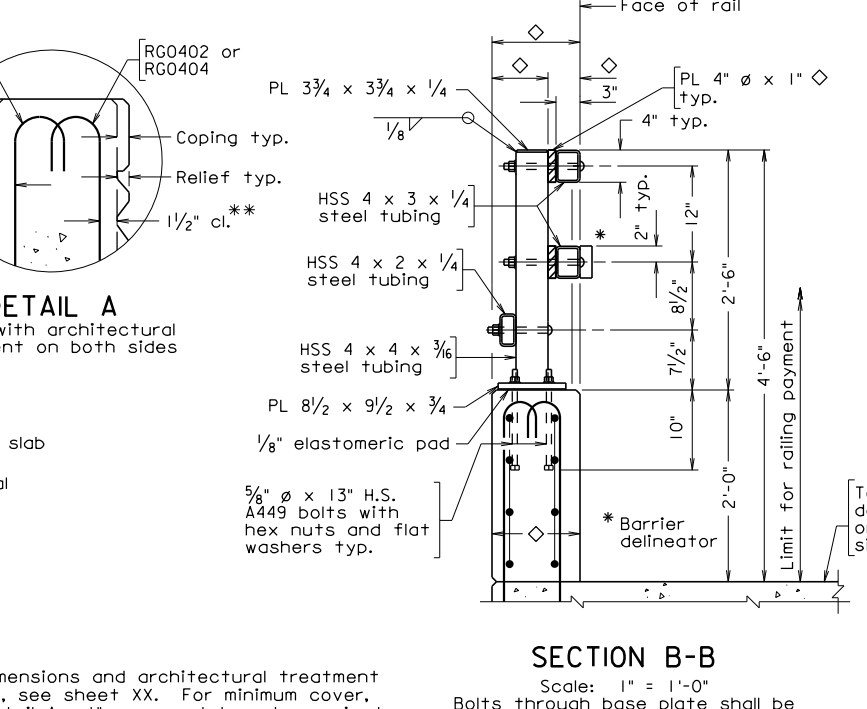
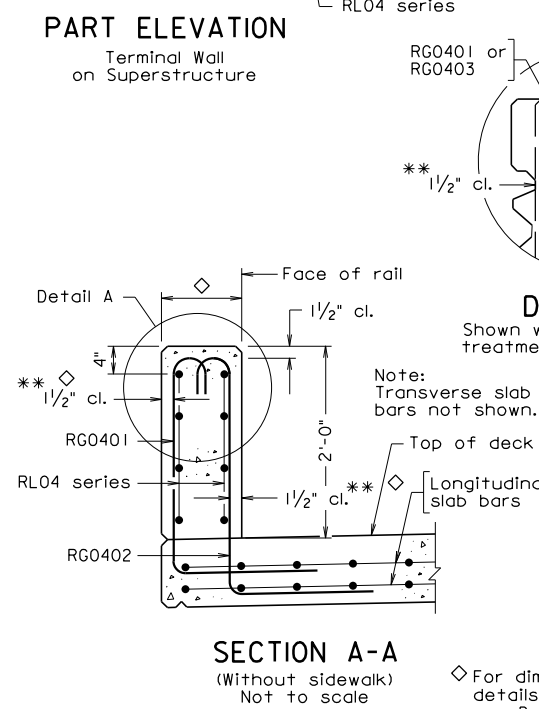
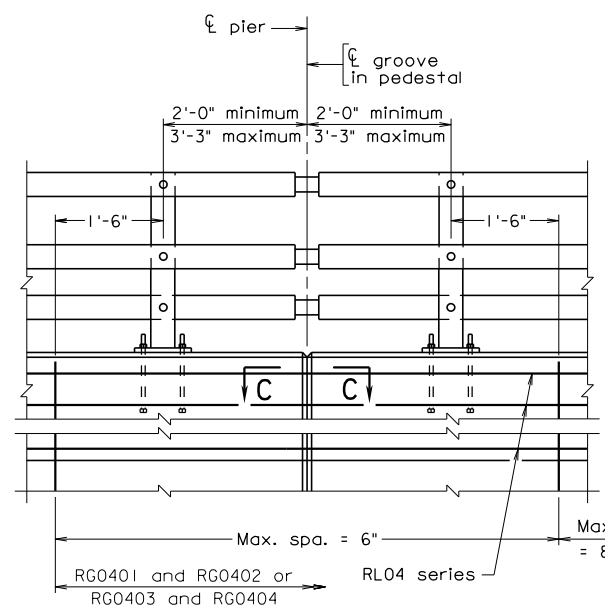
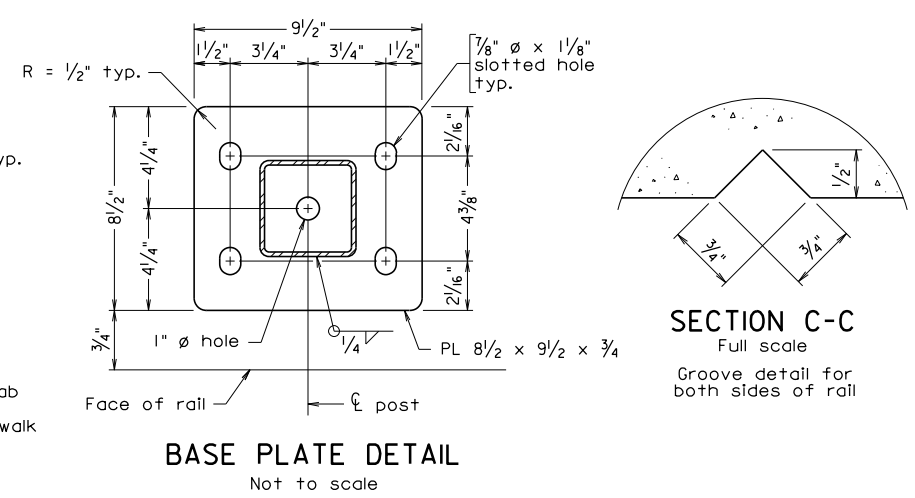
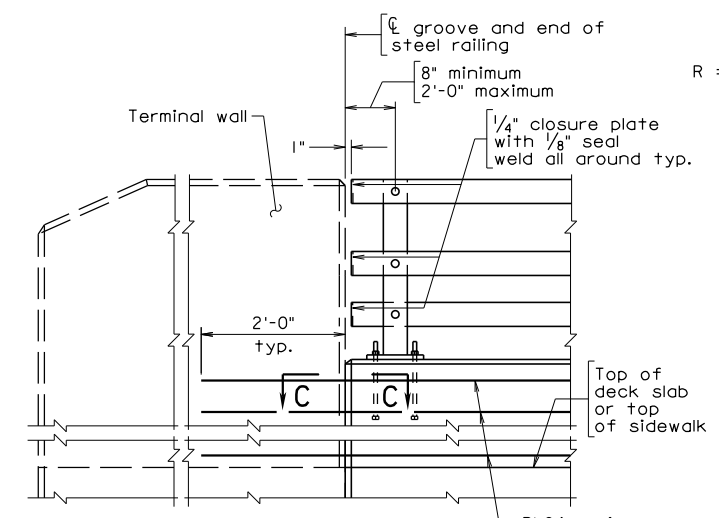
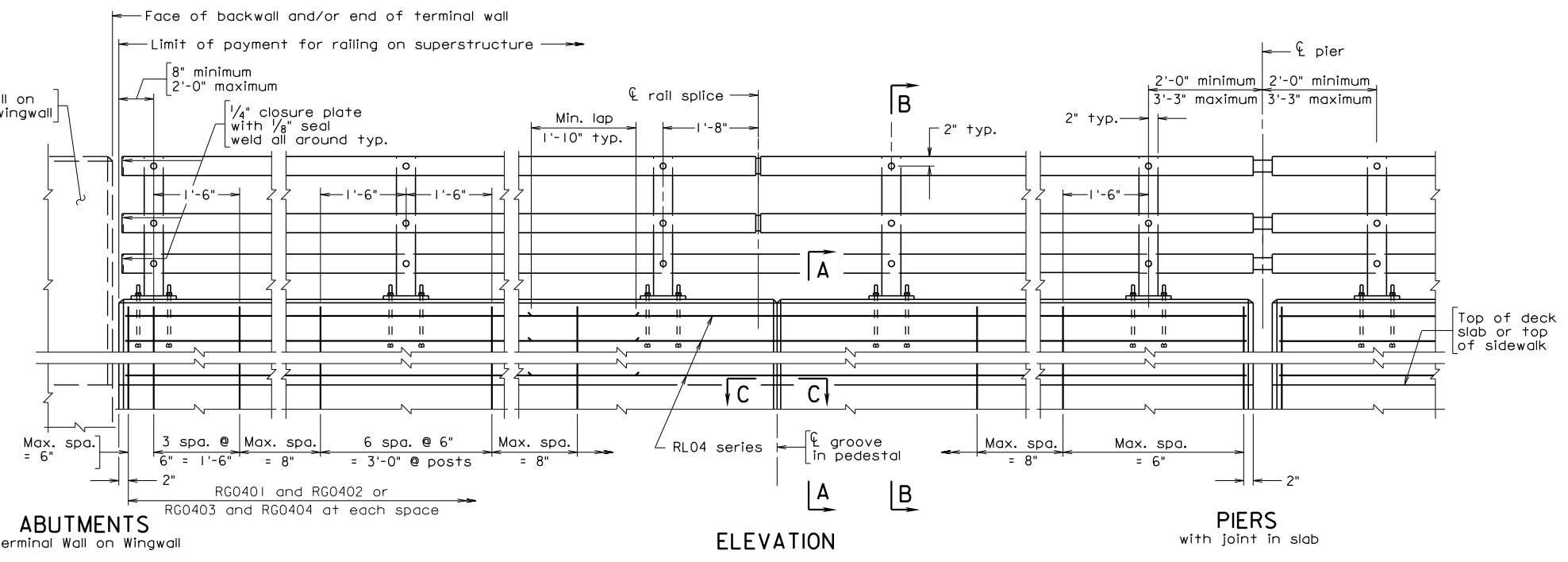
Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

Bid price for architectural treatment includes concrete in relief and coping.

For additional notes, see sheet...

** The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.



REINFORCING STEEL SCHEDULE				
Mark	Size	Length	Pin ø	Location
RG0401	#4		3"	Parapet
RG0402	#4		3"	Parapet
RG0403	#4		3"	Parapet
RG0404	#4		3"	Parapet
RL04	#4			Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION			
54"-BR27C STEEL RAILING WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Sheet No.
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV		BR27C-15-AT	
Checked: S&B...DIV			

BR27C-15-AT

10-15-2015

br27c15at.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
October 15, 2015

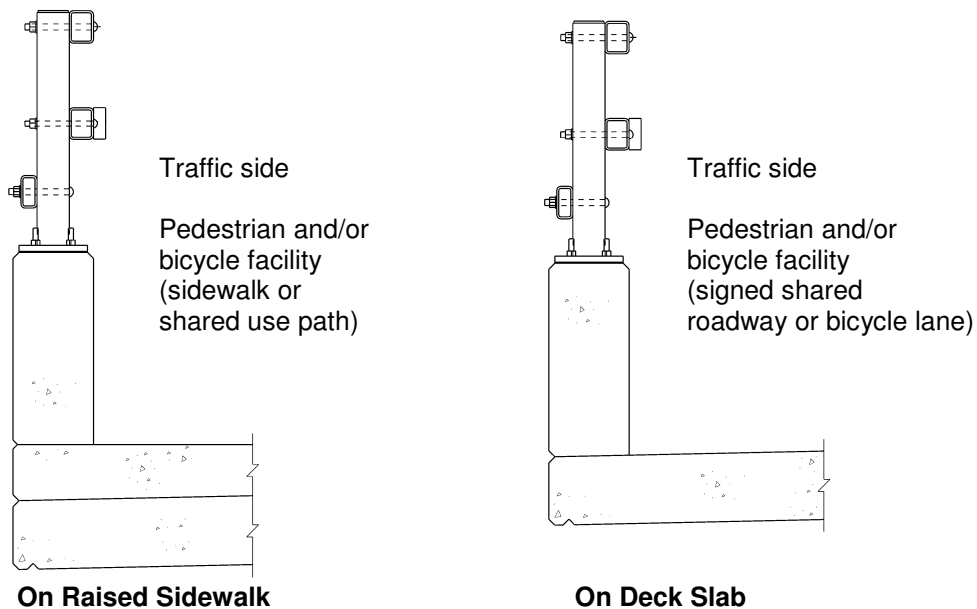
A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES**

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier on the outside of a structure adjacent to a pedestrian and/or bicycle facility where there is no barrier separating the pedestrian and/or bicycle facility from traffic. The railing is mounted on the top of sidewalk (for sidewalk or shared use path) or top of deck (for signed shared roadway or bicycle lane). The steel railing has a height of 4'-6" and has been crash tested for TL-4 (TL = test level). The crash tested rail has been modified to meet the rail opening requirements of the AASHTO *Standard Specifications for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by the FHWA. The standard may be used when an open railing is required. This standard is used only when architectural treatment is required. If none is required, use standard BR27C-15.



Standard BR27C-15

(Architectural treatment not shown)

For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27C 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standards BR27C-16 and BR27C-17) and the appropriate terminal wall standard (BR27T-5-AT thru BR27T-8-AT) are to be included in the plans when using this standard.

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27C-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if 1" overlay at the roadway surface is set, the 2'-0" dimension and overall 4'-6" height of the rail would need to be adjusted to 2'-1" and 4'-7" respectively (Section B-B) and the 2'-0" dimension in Section A-A would have to be adjusted to 2'-1".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402 and/or RG0403 and RG0404.

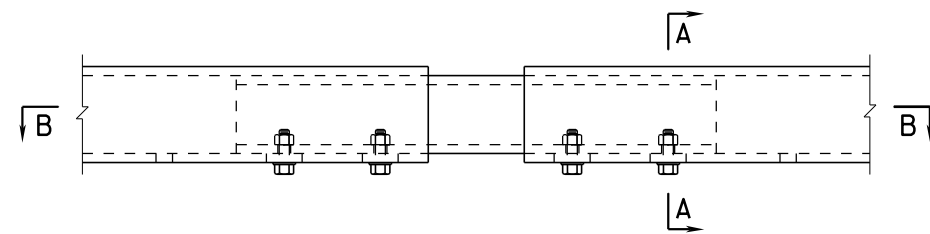
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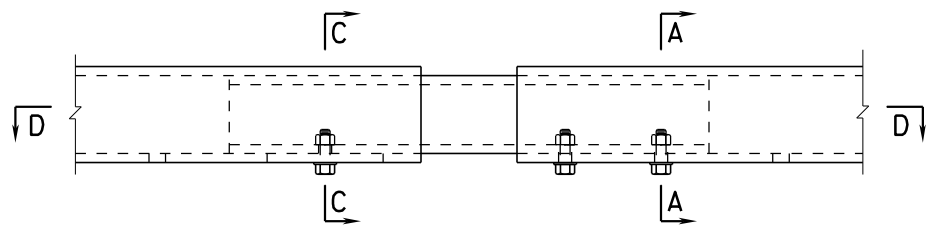
SECTION B-B:

Complete sheet no. for architectural drawing(s).

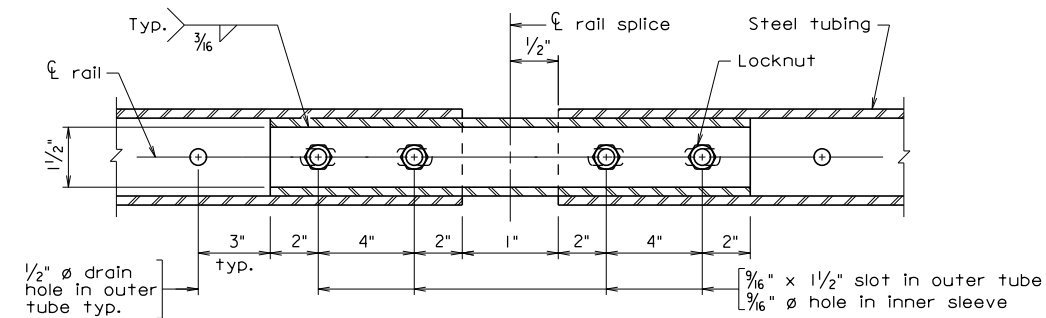
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



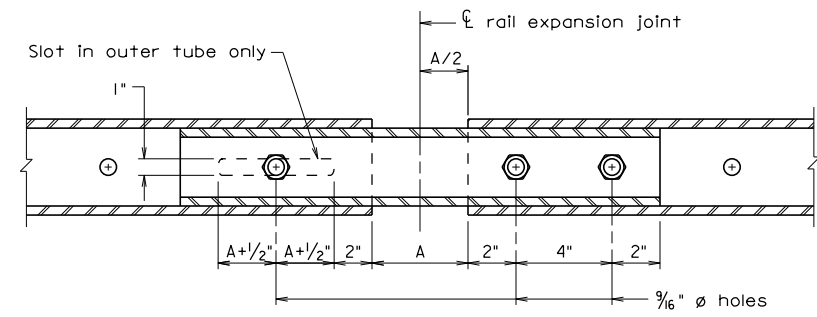
ELEVATION VIEW



ELEVATION VIEW

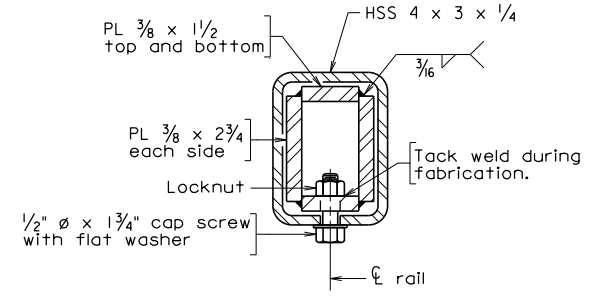


SECTION B-B



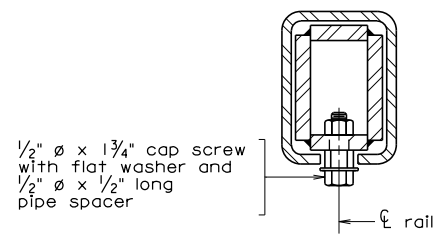
SECTION D-D

For details and dimensions not shown, see Section B-B.



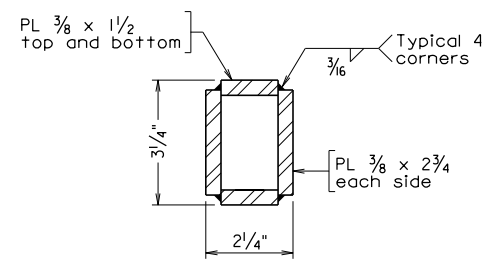
SECTION A-A
SECTION AT RAIL SPLICE

RAIL SPLICE DETAILS



SECTION C-C
Details not shown similar to Section A-A.

RAIL EXPANSION JOINT DETAILS



FINISHED DIMENSIONS OF INNER SLEEVE RAIL

Notes (cont'd):

Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be lightened only to a point that will allow ralling movement.

Drain holes shall be 1/2" diameter and shall be provided in all rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each end of rail.

Anchor bolts may be set normal to profile grade but may require beveled washers.

Barrier delineator size, color, and spacing shall be in accordance with the Specifications.

Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.

Alternate details for inner sleeve rail fabrication and bolted connection to outer tube may be submitted, but only used if approved by the Structure and Bridge Division Engineering Services Program Area. Not thru-bolt connections will be approved.

Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included is concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

BR27C-16 10-15-2015 br27c16.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
BR27C RAIL CONNECTIONS AND NOTES			
No.	Description	Date	Designed: S&B...DIV Date Drawn: ...S&B...DIV Checked: S&B...DIV
Revisions			Plan No. Sheet No. BR27C-16

BR27C-SERIES STEEL RAILING
RAIL CONNECTIONS AND NOTES

NOTES TO DESIGNER:

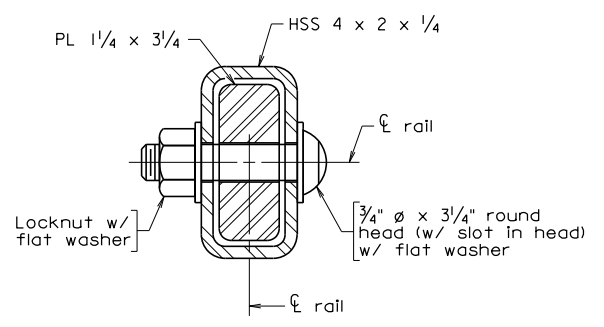
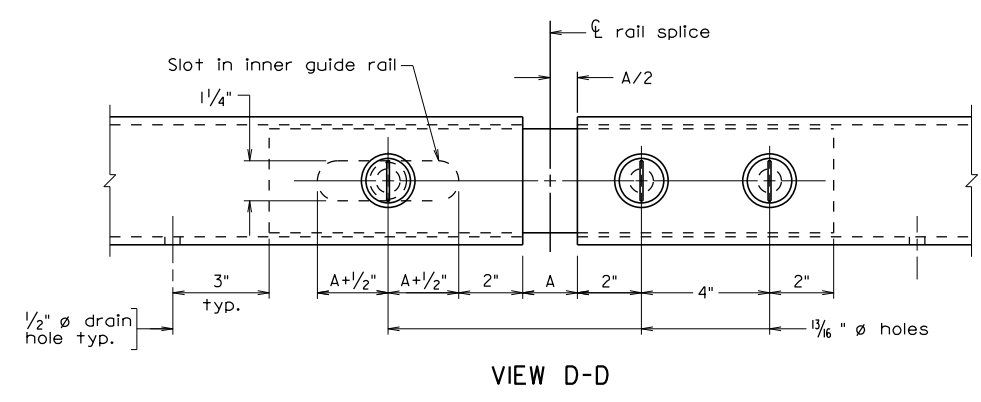
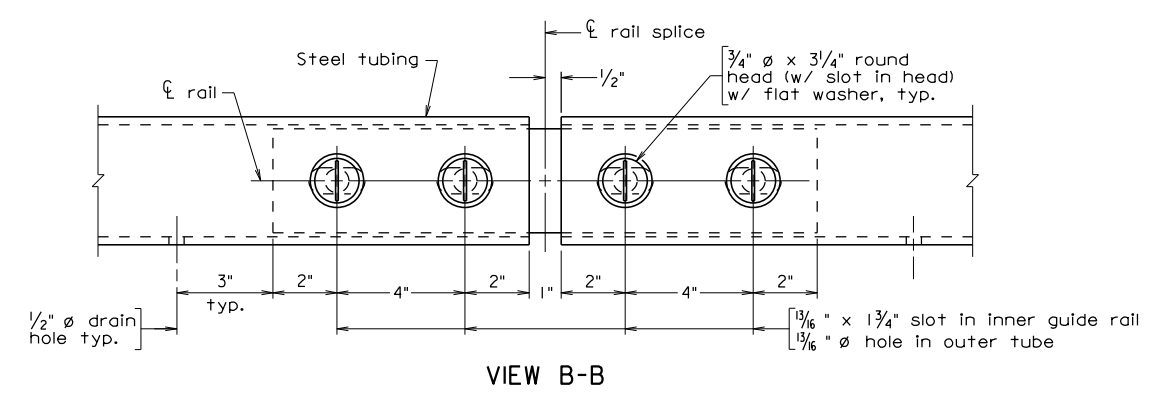
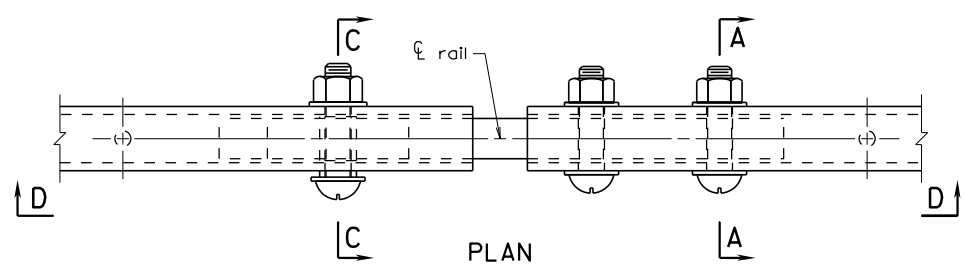
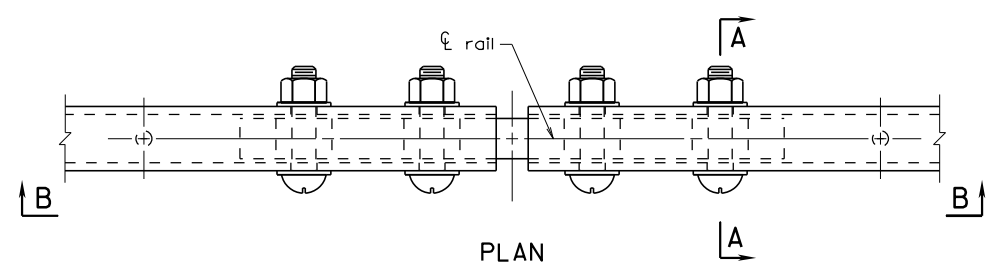
Include this standard in plans when using standard, BR27C-12 thru BR27C-15 and BR27C-12-AT thru BR27C-15-AT.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

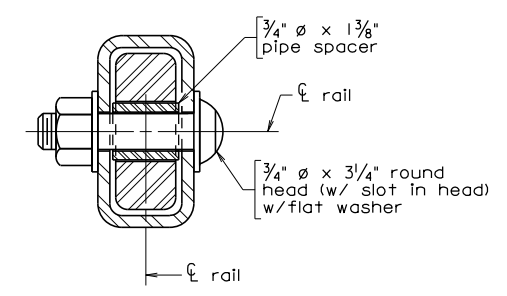
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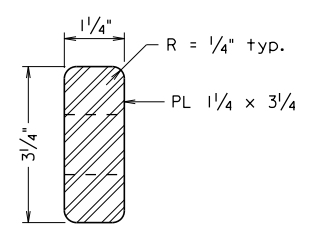
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



SECTION A-A
SECTION AT RAIL SPLICE
RAIL SPLICE DETAILS



SECTION C-C
Details not shown similar to Section A-A.
RAIL EXPANSION JOINT DETAILS



FINISHED DIMENSIONS OF INNER GUIDE RAIL

br27c17.dgn

10-15-2015

BR27C-17

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

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sealed and signed
standard drawing
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Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
BR27C RAIL CONNECTIONS AND NOTES			
No.	Description	Date	Revisions
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV		Sheet No.	
Checked: S&B...DIV		BR27C-17	

BR27C-SERIES STEEL RAILING

RAIL CONNECTIONS

NOTES TO DESIGNER:

Include this standard in plans when using standard, BR27C-15 or BR27C-15-AT.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TITLE BLOCK:

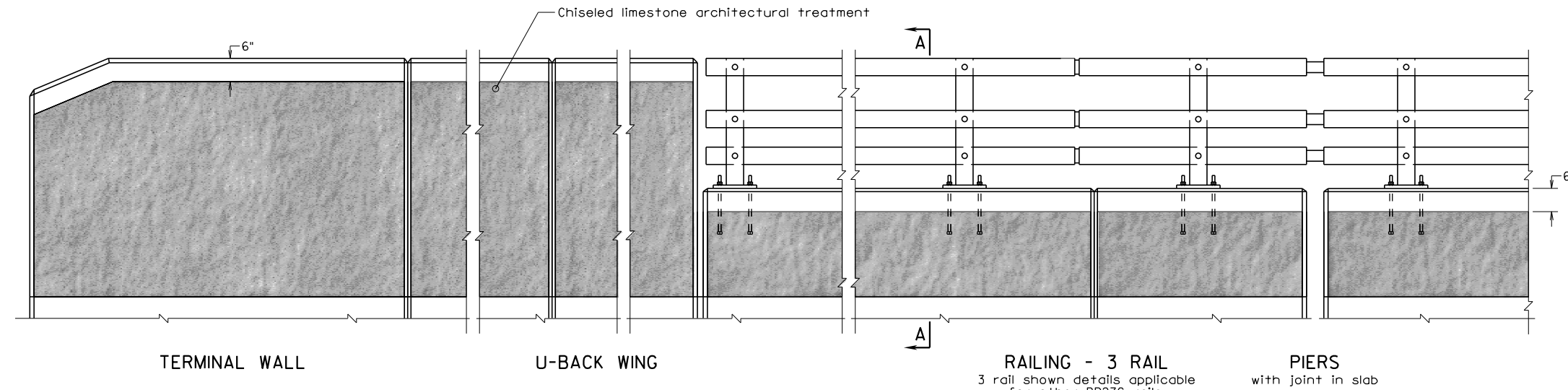
Replace standard designation with plan number.

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ROUTE	PROJECT	ROUTE	NO.
VA.			

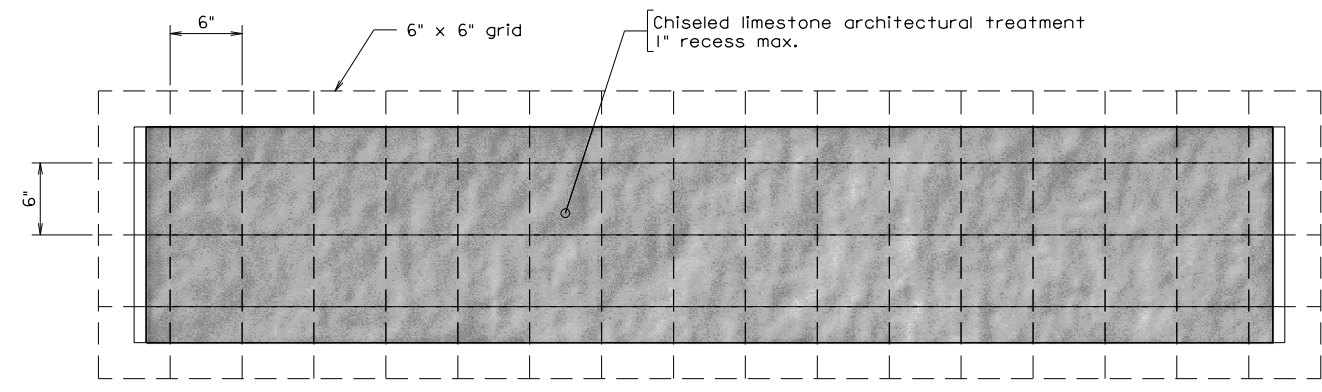
Notes:

- Architectural treatment for the railing and terminal walls shall simulate chiseled limestone texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous chiseled limestone pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

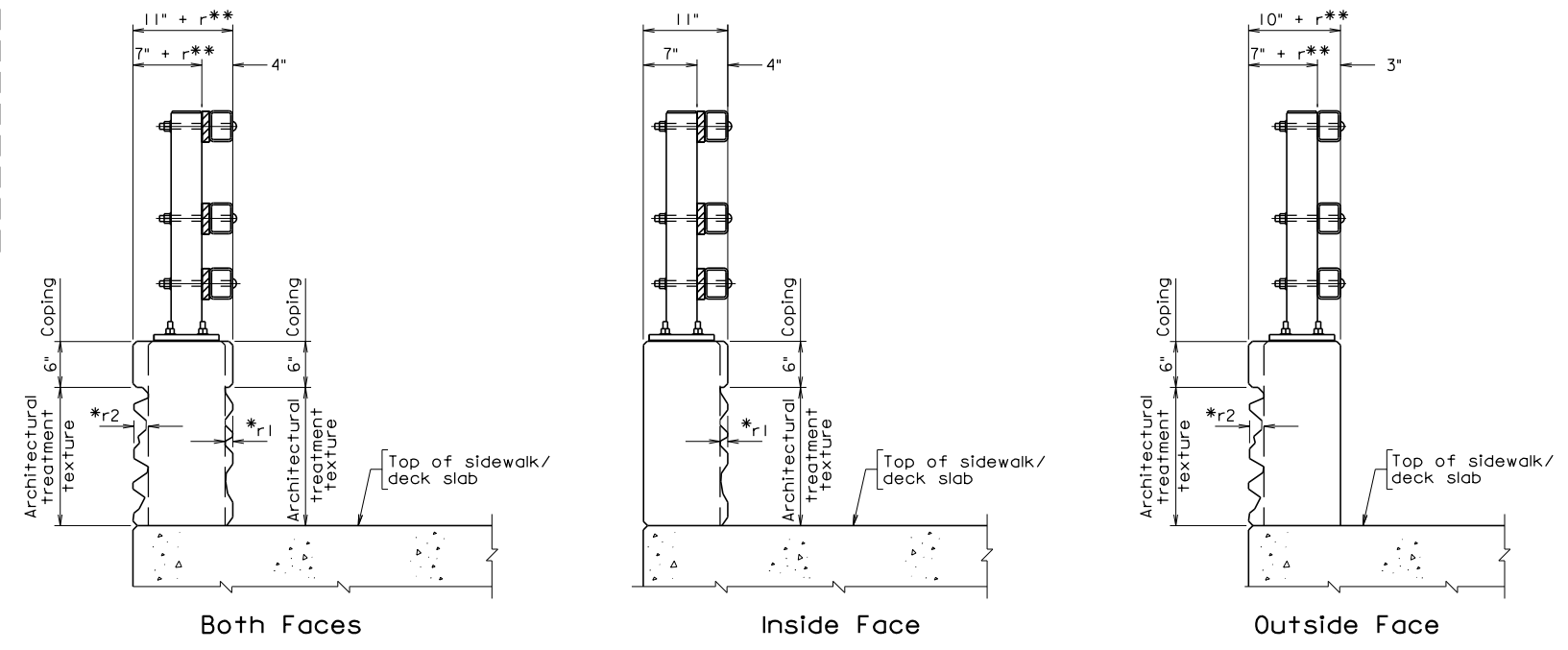
	Relief (in.)
r1	
r2	



ELEVATION



CHISELED LIMESTONE TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

BR27CAT-1.dgn
03-10-2015
BR27C-AT-1

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR STEEL RAILING BR27C			
No.	Description	Date	
Revisions		Designed: S&B...DIV	Date
		Drawn: ...S&B...DIV	Plan No.
		Checked: S&B...DIV	Sheet No.
		BR27C-AT-1	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH CHISLED LIMESTONE
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

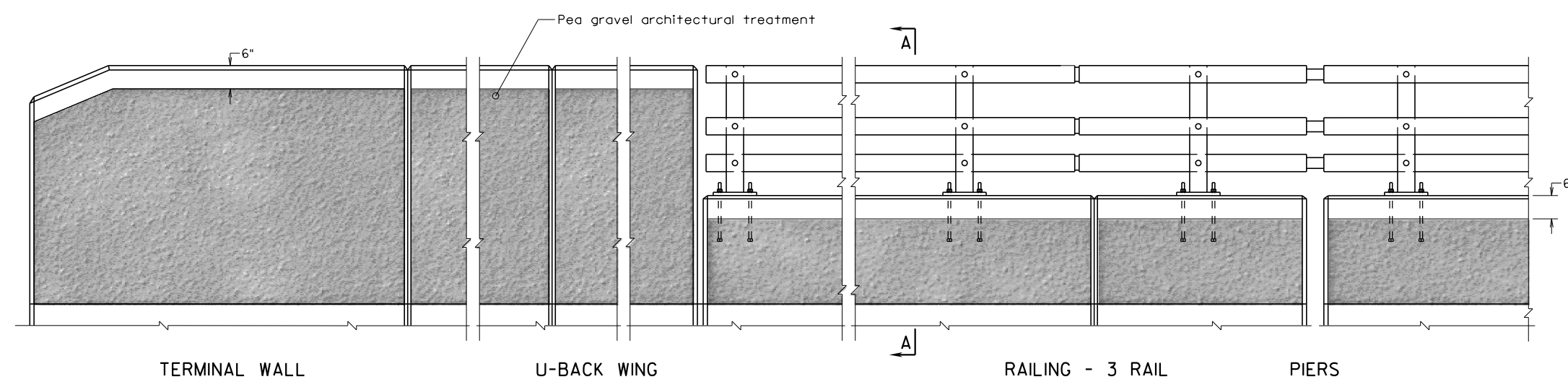
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

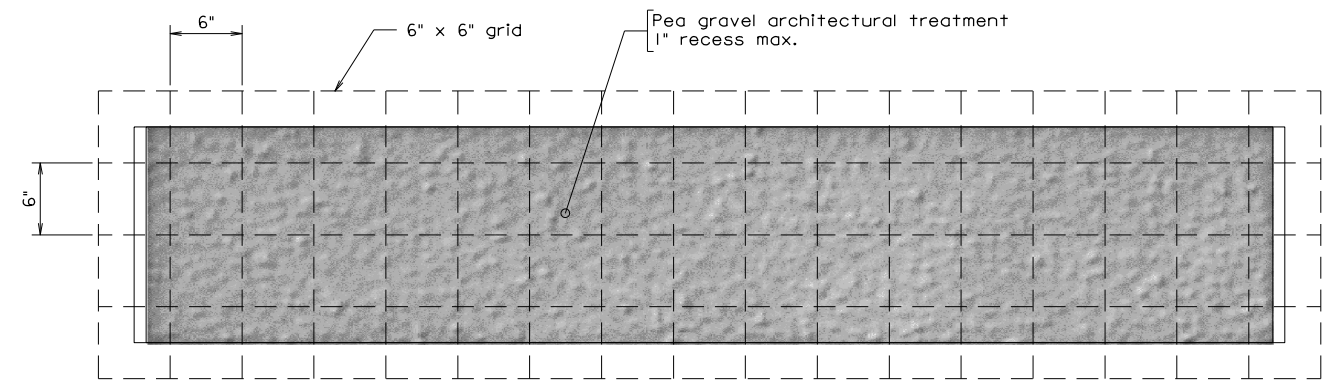
PIERS
with joint in slab

ELEVATION

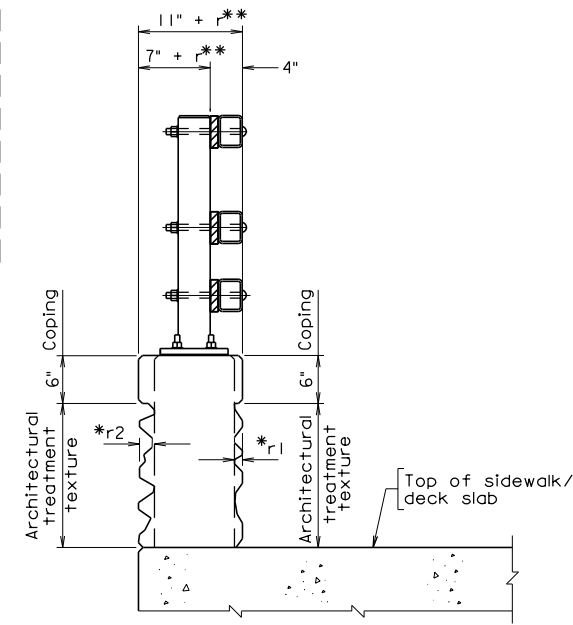
Notes:

- Aesthetic treatment for the railing and terminal walls shall simulate pea gravel texture, similar to the pattern detailed on this sheet.
- Formliner shall be arranged to produce a continuous pea gravel pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

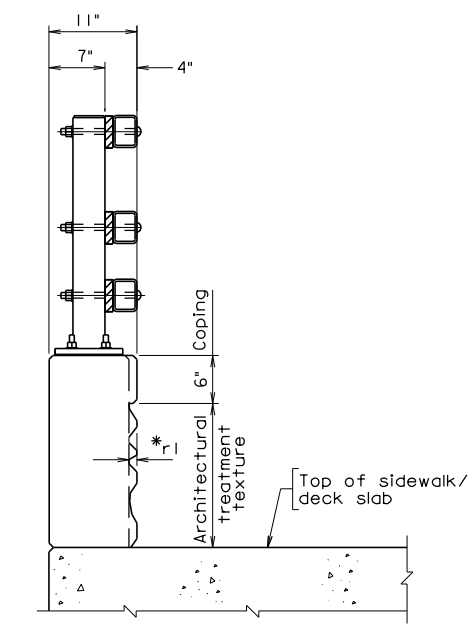
	Relief (in.)
r1	
r2	



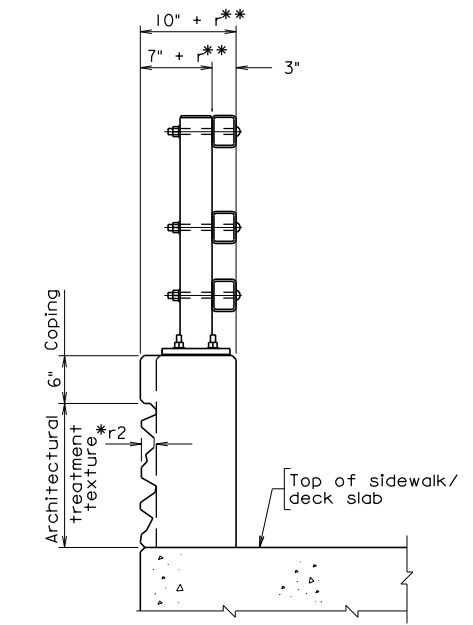
PEA GRAVEL TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



Both Faces



Inside Face



Outside Face

SECTION A-A
3 rail shown details applicable for other BR27C rails.

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27CAT2.dgn
03-10-2015
BR27C-AT-2

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH PEA GRAVEL FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27C-AT-2	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH PEA GRAVEL
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

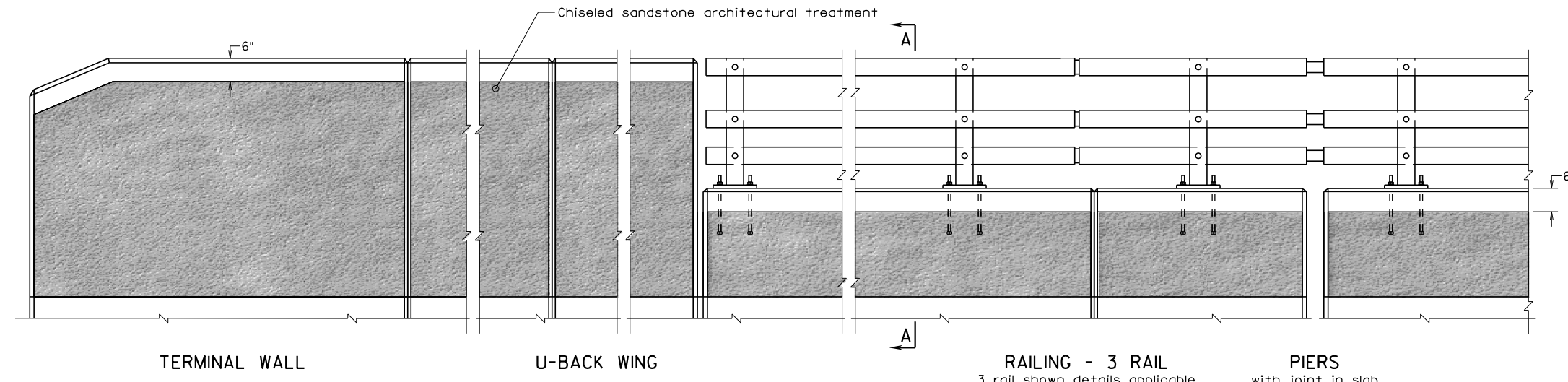
Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

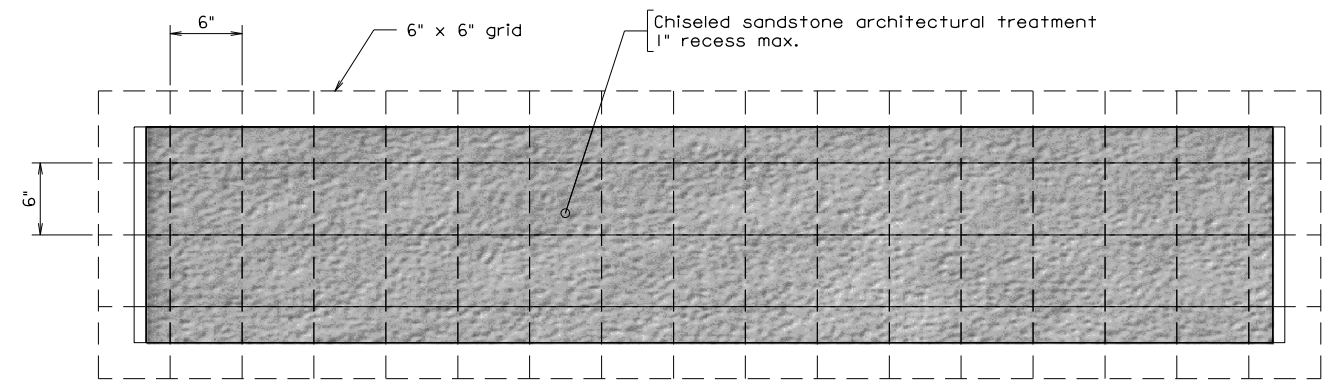
Notes:

- Architectural treatment for the railing and terminal walls shall simulate chiseled sandstone texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous chiseled sandstone pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

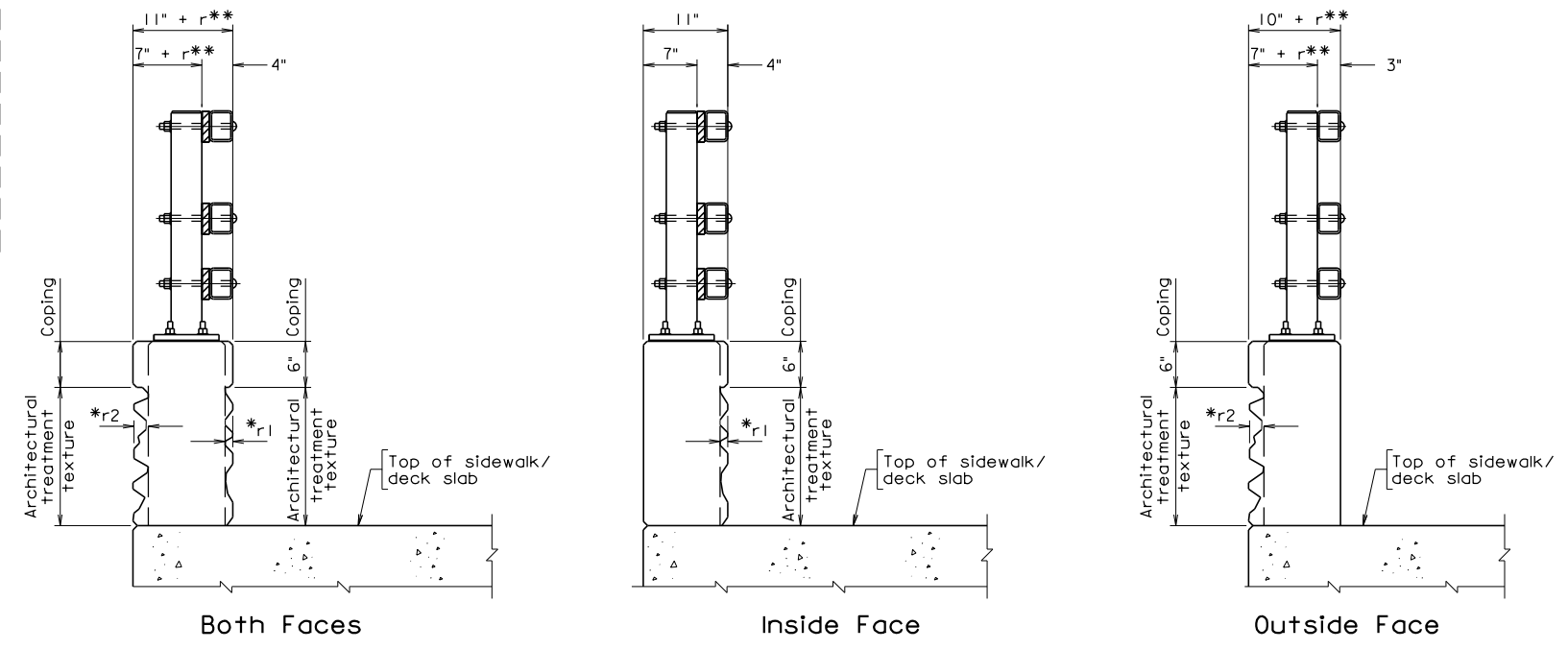
	Relief (in.)
r1	
r2	



ELEVATION



CHISELED SANDSTONE TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

BR27CAT-3
03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

ARCHITECTURAL TREATMENT WITH CHISELED SANDSTONE FOR STEEL RAILING BR27C

No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
			Drawn: ...S&B...DIV			
			Checked: S&B...DIV			

BR27C-AT-3

Not to scale

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**ARCHITECTURAL TREATMENT
WITH CHISLED SANDSTONE
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

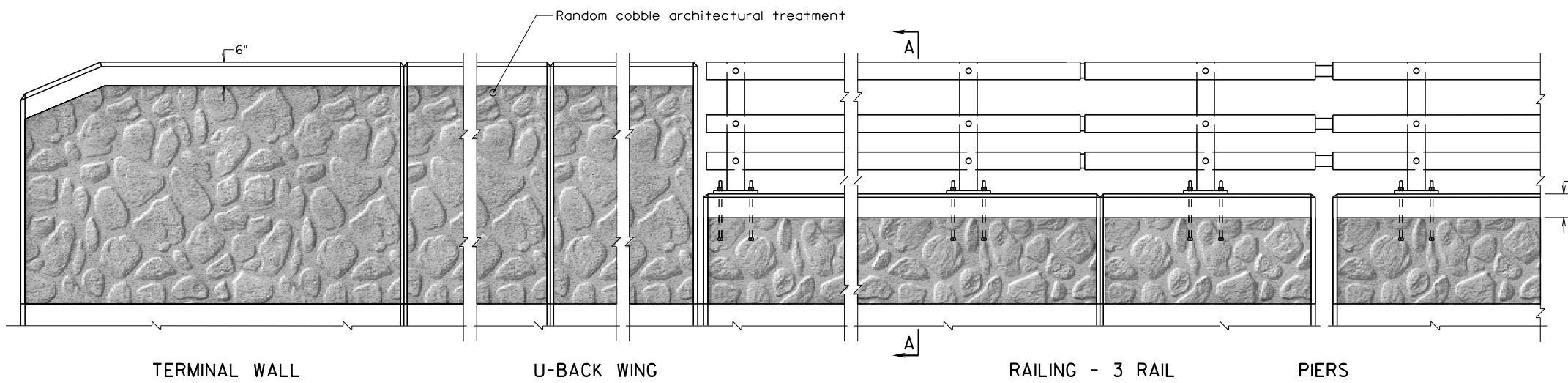
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

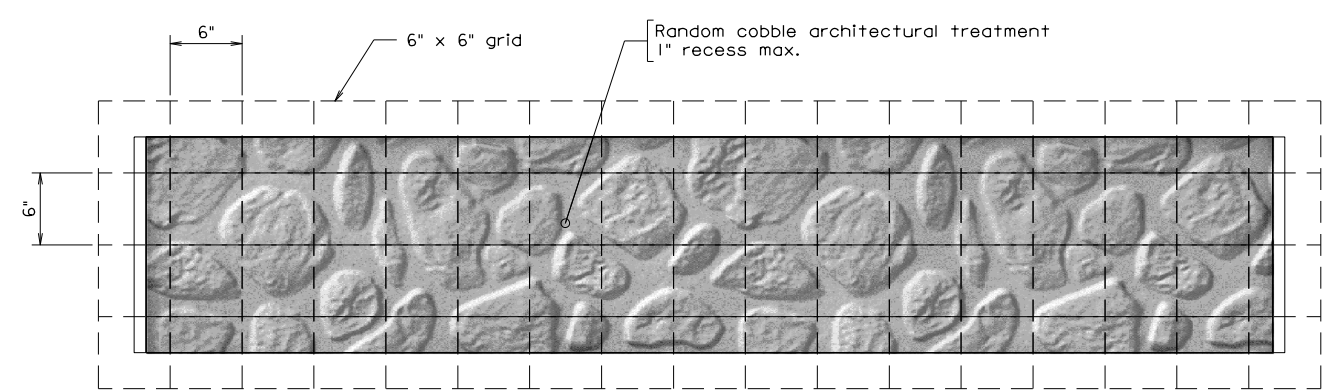
PIERS
with joint in slab

ELEVATION

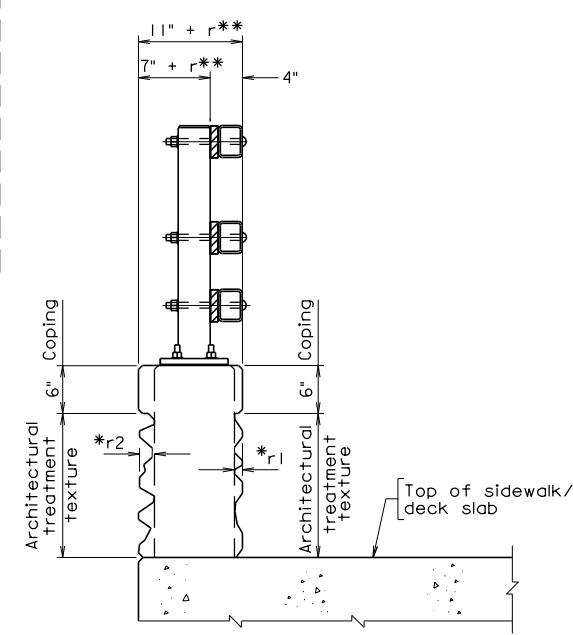
Notes:

- Architectural treatment for the railing and terminal walls shall simulate random cobble texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous random cobble pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

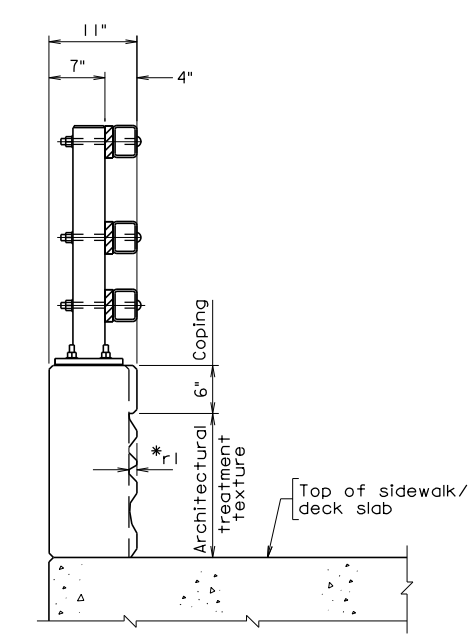
	Relief (in.)
r1	
r2	



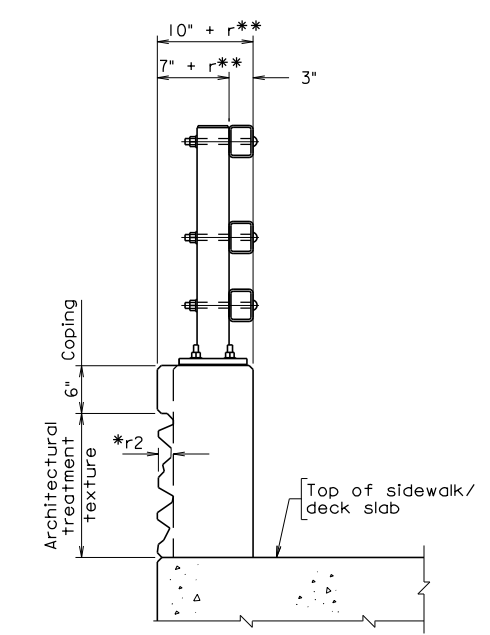
RANDOM COBBLE TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

** r = 1" for r2 = 1"
r = 2" for 1" < r2 = 2"

BR27CAT-4
03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RANDOM COBBLE FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27C-AT-4	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH RANDOM COBBLE
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

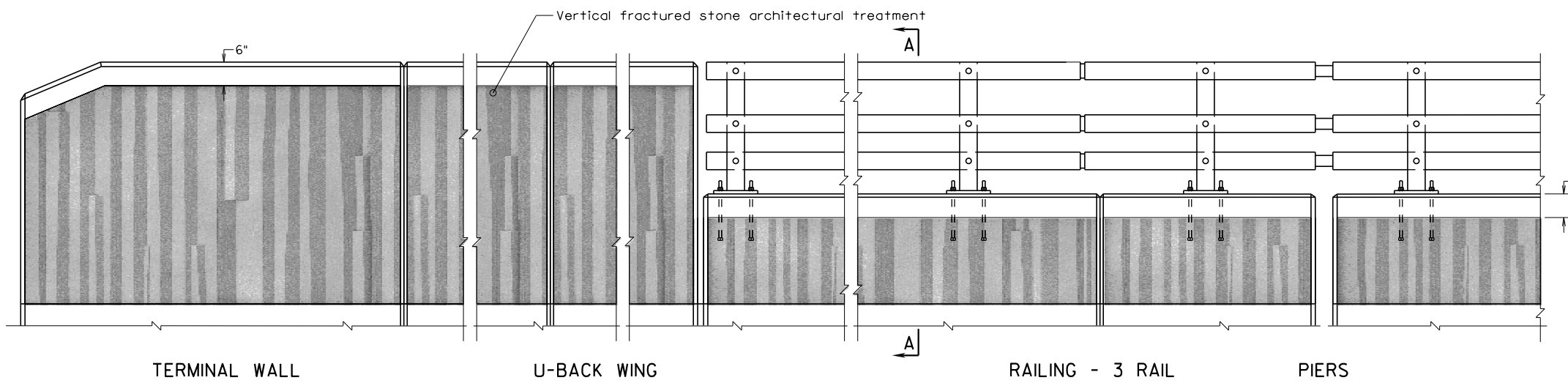
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

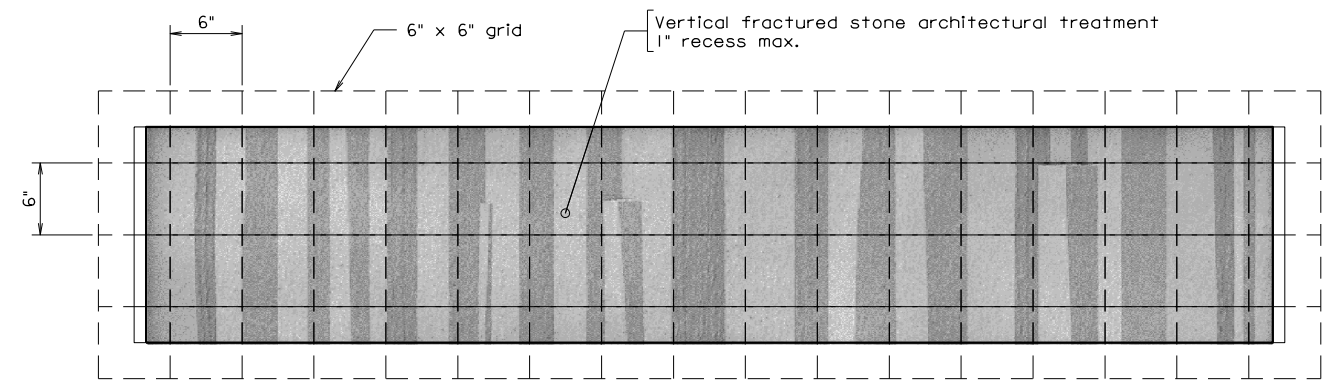
PIERS
with joint in slab

ELEVATION

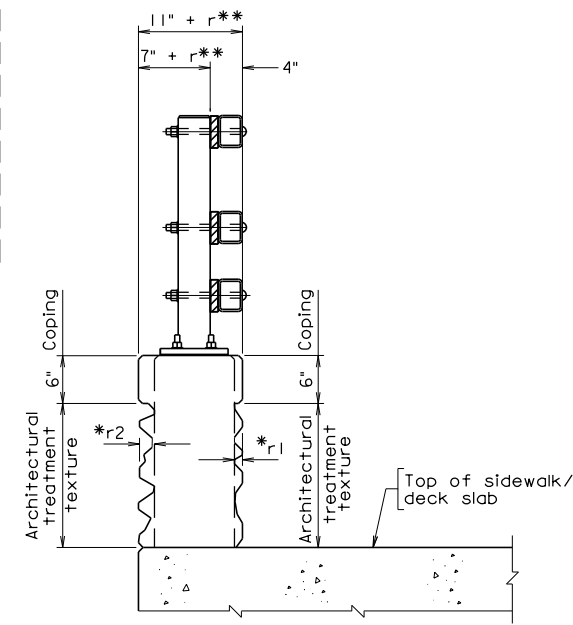
Notes:

- Architectural treatment for the railing and terminal walls shall simulate vertical fractured stone texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous vertical fractured stone pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

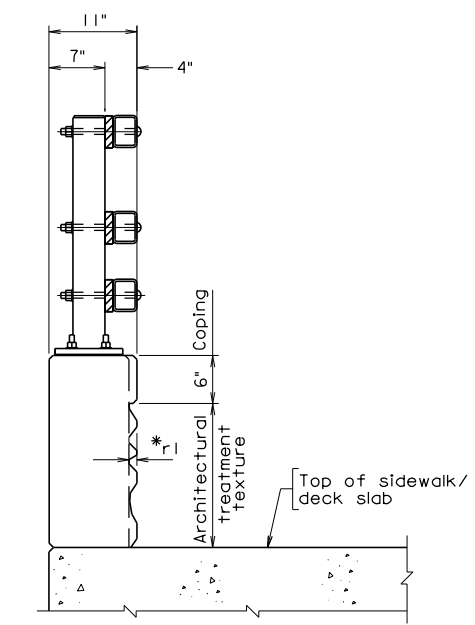
	Relief (in.)
r1	
r2	



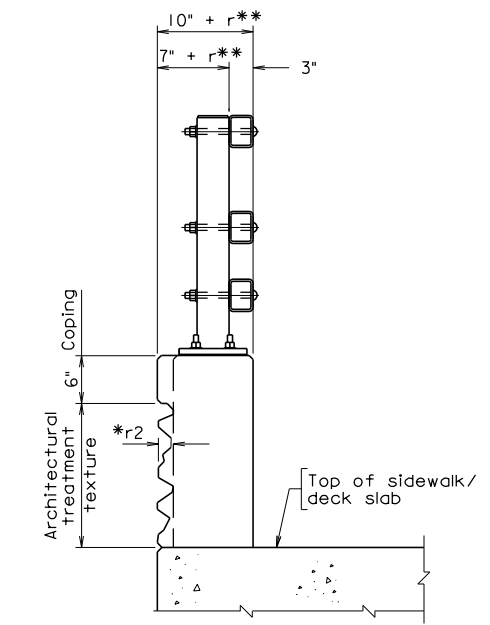
VERTICAL FRACTURED STONE TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

BR27CAT5.dgn
03-10-2015
BR27C-AT-5

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH VERTICAL FRACTURED STONE FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27C-AT-5	

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**ARCHITECTURAL TREATMENT
WITH VERTICAL FRACTURE STONE
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

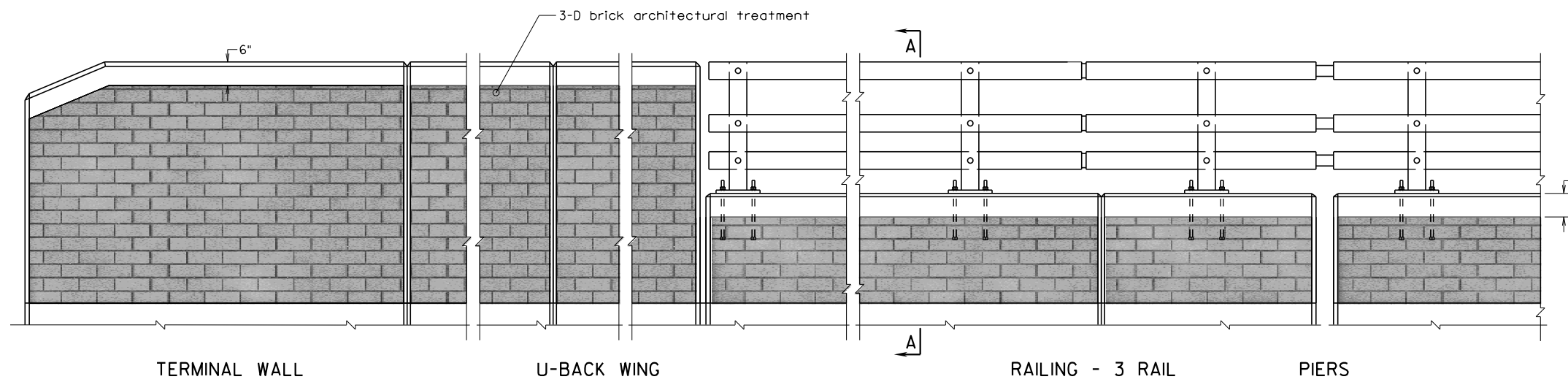
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

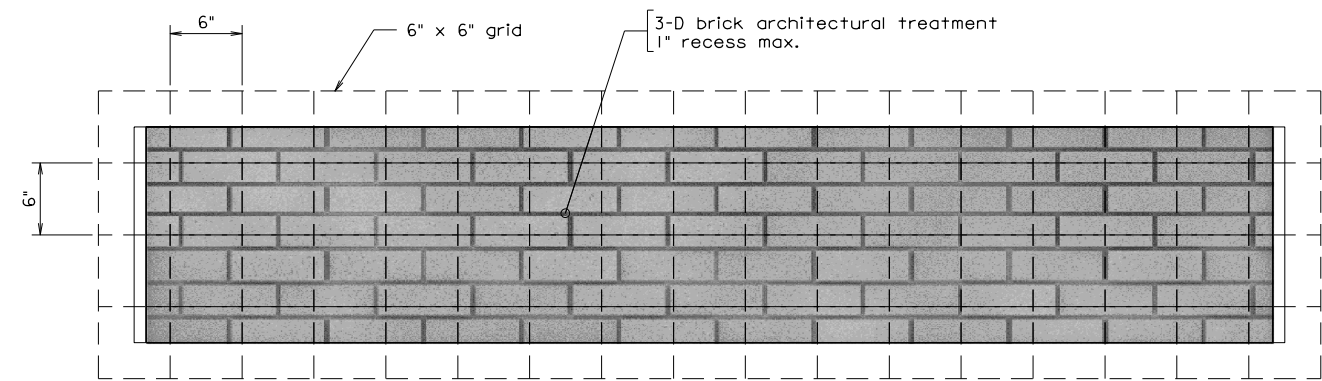
PIERS
with joint in slab

ELEVATION

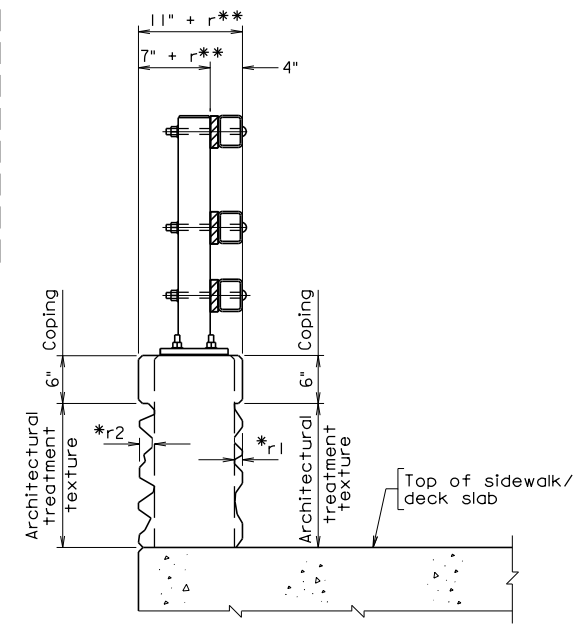
Notes:

- Architectural treatment for the railing and terminal walls shall simulate 3-D brick texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous 3-D brick pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.

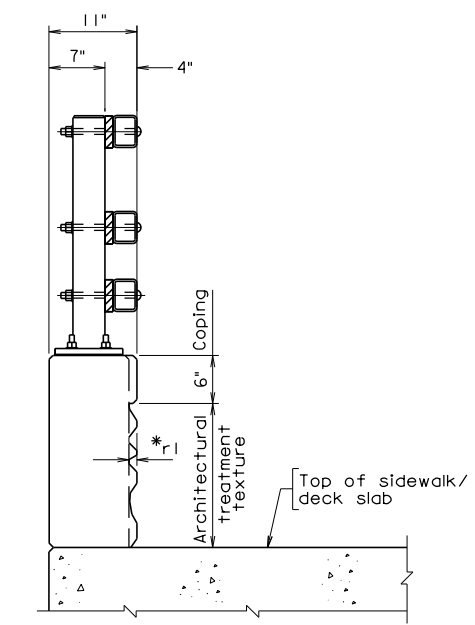
	Relief (in.)
r1	
r2	



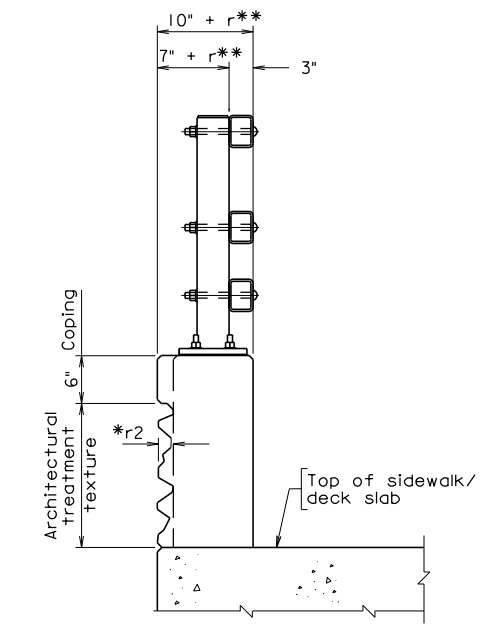
3-D BRICK TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27CAT-6
03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH 3-D BRICK FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Date	Plan No.	Sheet No.
Drawn: S&B...DIV			
Checked: S&B...DIV			
			BR27C-AT-6

Not to scale

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**ARCHITECTURAL TREATMENT
WITH 3-D BRICK
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

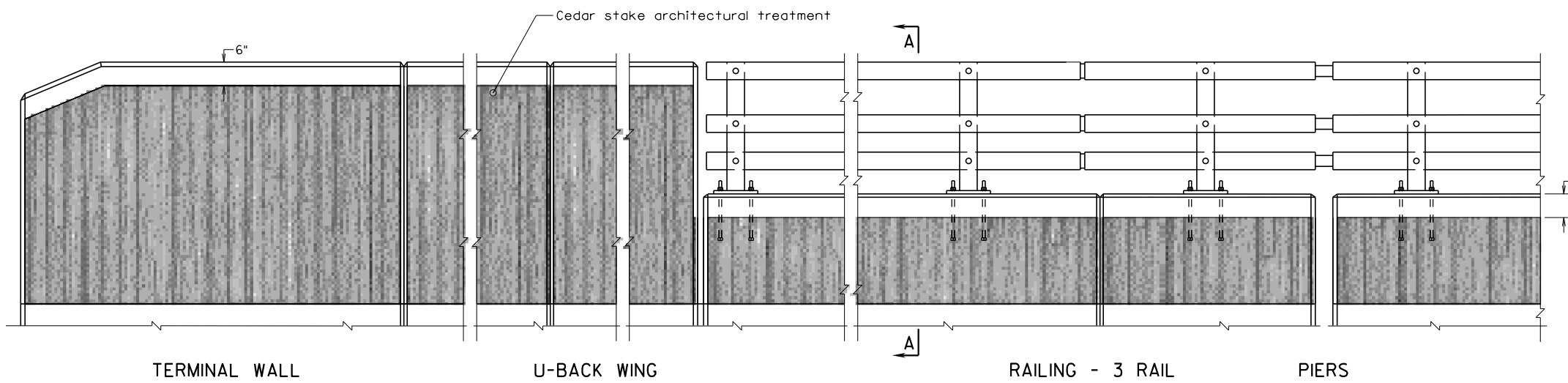
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

PIERS
with joint in slab

ELEVATION

Notes:

Architectural treatment for the railing and terminal walls shall simulate cedar stake texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous cedar stake pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

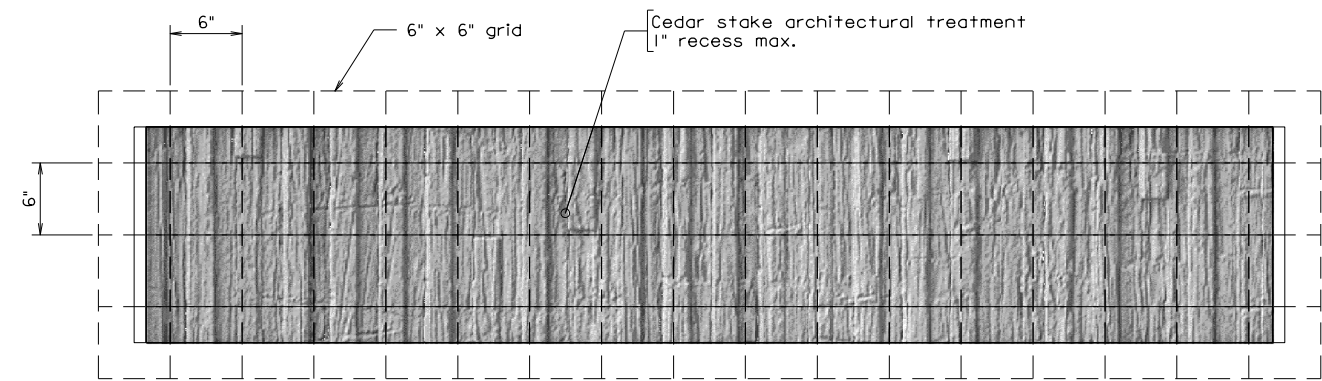
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

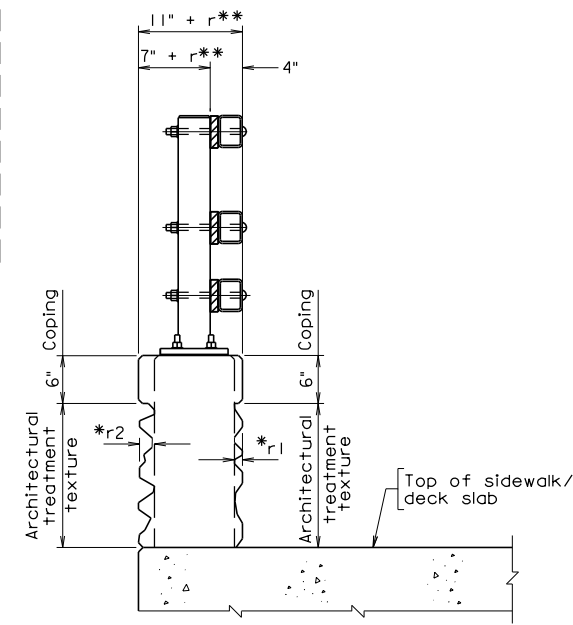
Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

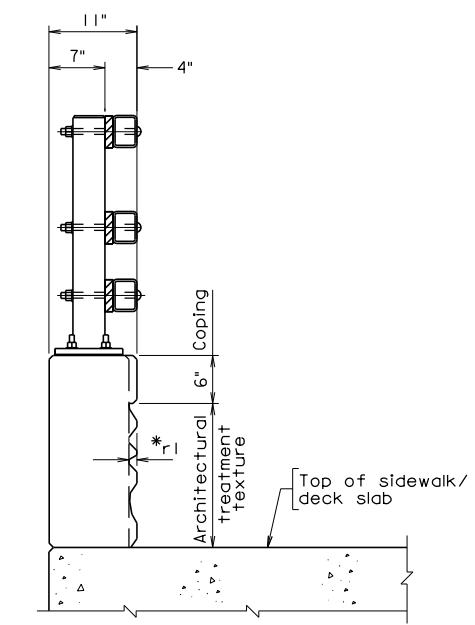
	Relief (in.)
r1	
r2	



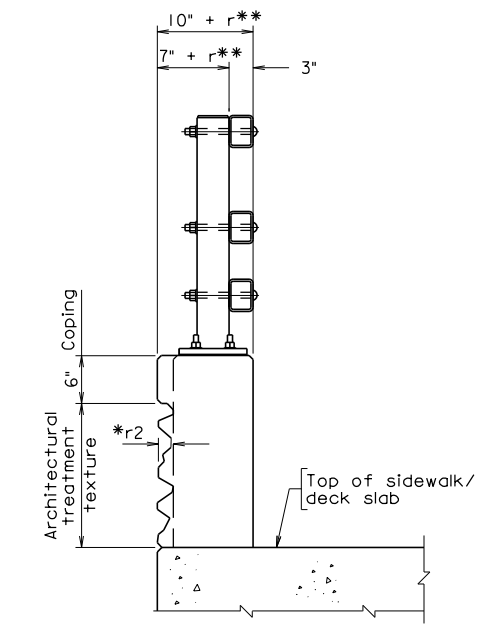
CEDAR STAKE TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27C-AT-7 03-10-2015 BR27CAT7.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CEDAR STAKE FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Date	Plan No.	Sheet No.
Drawn: S&B...DIV			
Checked: S&B...DIV			
			BR27C-AT-7

Not to scale

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**ARCHITECTURAL TREATMENT
WITH CEDAR STAKE
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

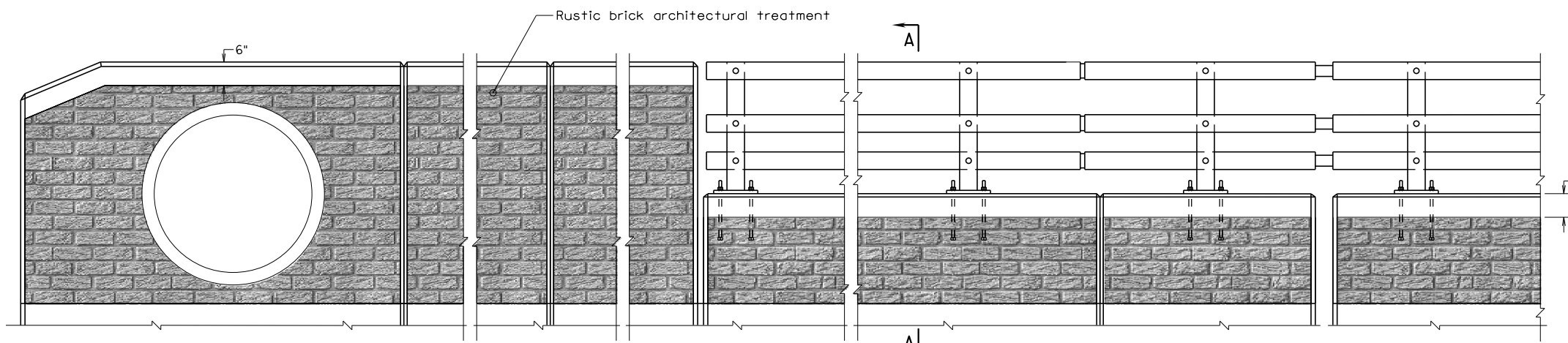
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL
Terminal Wall - Outside Face Only

U-BACK WING

RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

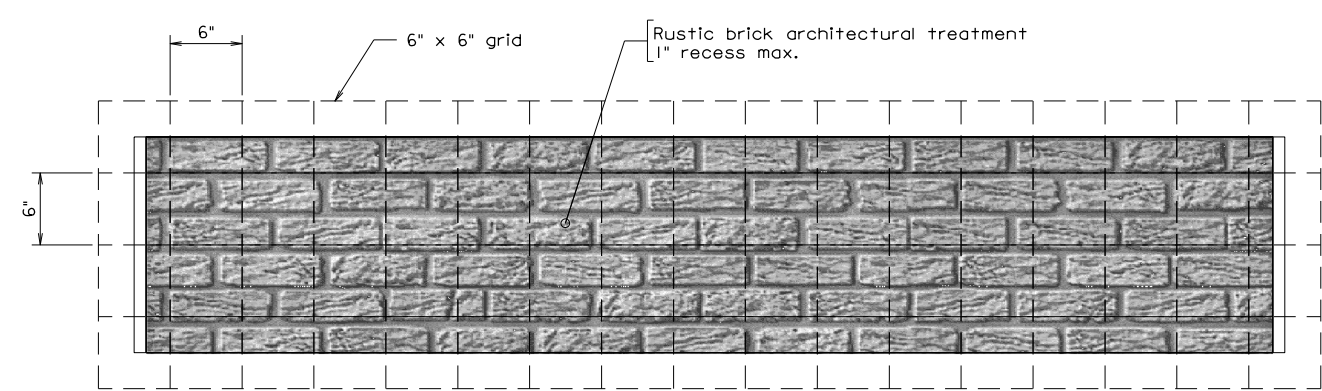
PIERS
with joint in slab

ELEVATION

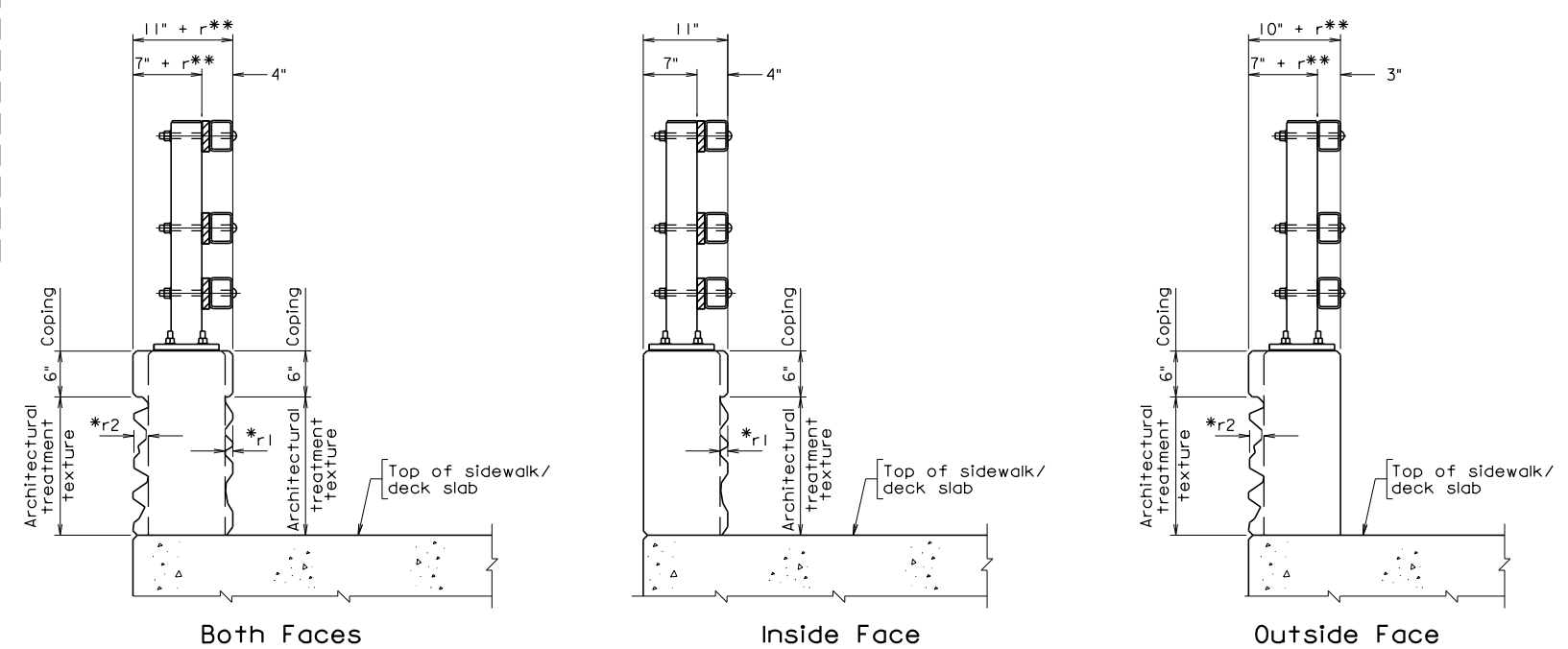
Notes:

- Architectural treatment for the railing and terminal walls shall simulate rustic brick texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous rustic brick pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.
- Medallions are required on XXXX of the barrier.
- Medallion type shall be XX. For medallion details, see sheet XX.

	Relief (in.)
r1	
r2	



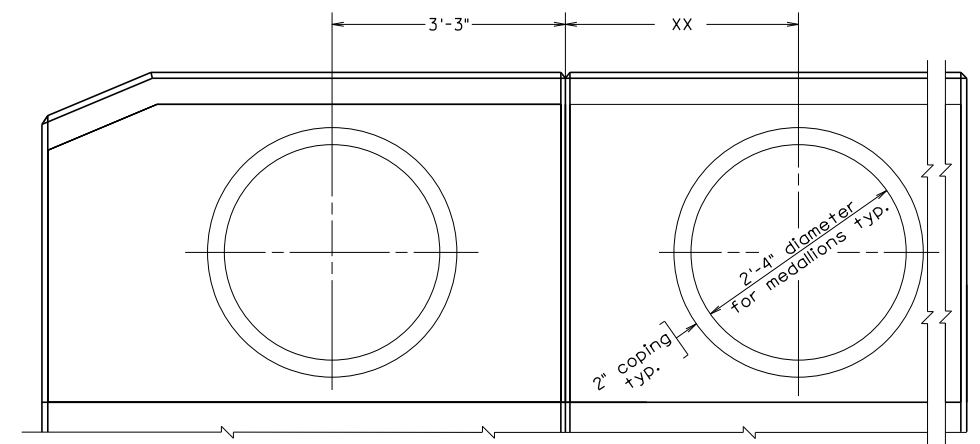
RUSTIC BRICK TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



SECTION A-A

3 rail shown details applicable for other BR27C rails.

- * r1 : relief on inside face is limited to 1"
- r2 : relief on outside face is limited to 2"
- ** r = 1" for r2 ≤ 1"
- r = 2" for 1" < r2 ≤ 2"



TERMINAL WALL
Outside Face

U-BACK WING
Inside Face

LOCATION OF MEDALLION

BR27CAT8.dgn
03-10-2015
BR27C-AT-8

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RUSTIC BRICK FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27C-AT-8	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH RUSTIC BRICK AND MEDALLIONS
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s). The standard includes architectural treatment (rustic brick texture) and 2'-4" diameter medallion(s). For medallion options, see standards BR27-ATM-1 and BR27-ATM-2. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information including location for the medallion(s), see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

LOCATION OF MEDALLION:

Add dimension for medallion on inside face if medallion is required. See Part 2, Chapter 5: Architectural Treatment, of this manual for location of medallions.

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

Specify face(s) of the rail to which a medallion is to be applied: (inside face, outside face or both faces).

Specify name of medallion to be applied. Complete sheet number for medallion standard.

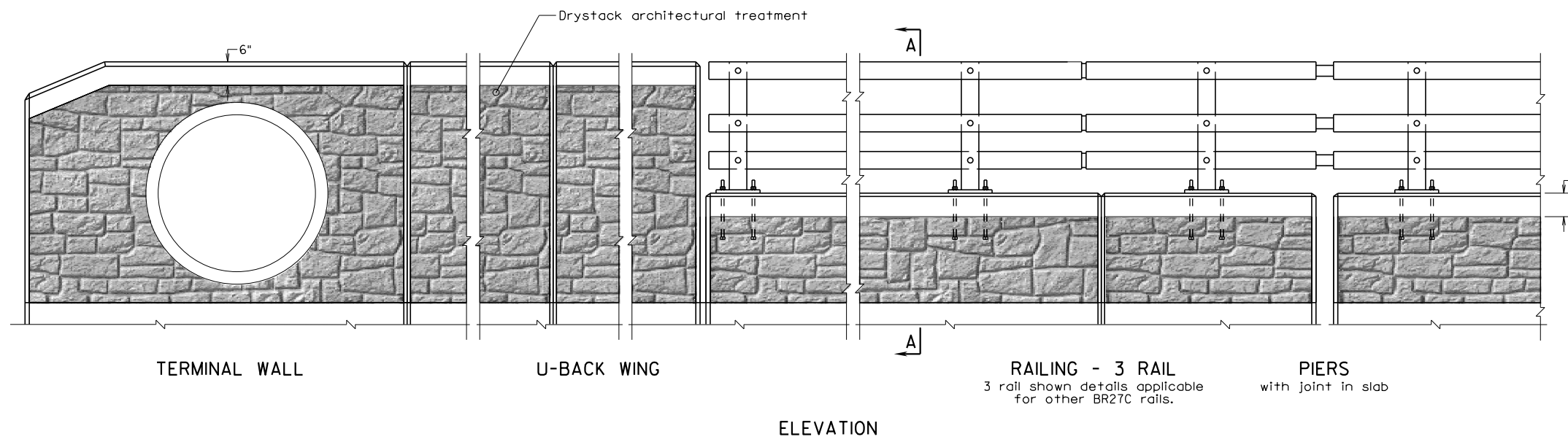
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate drystack texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous drystack pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

Architectural treatment shall be applied on XX of the barrier.

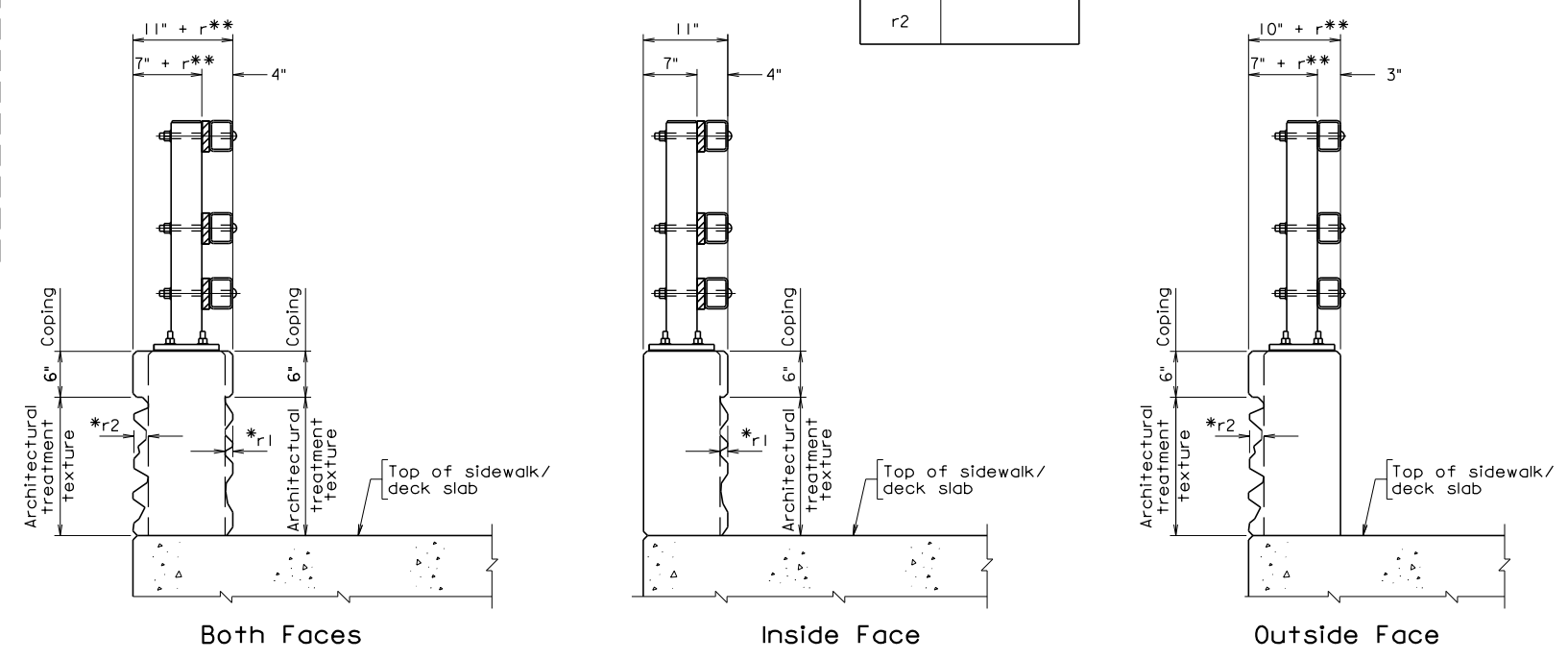
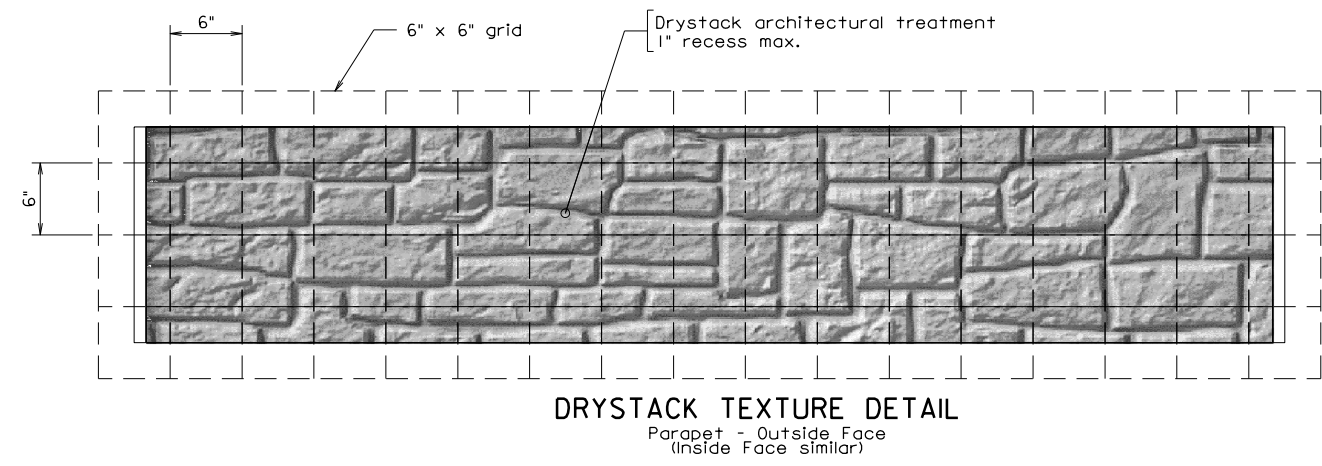
Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

Medallions are required on XXXX of the barrier.

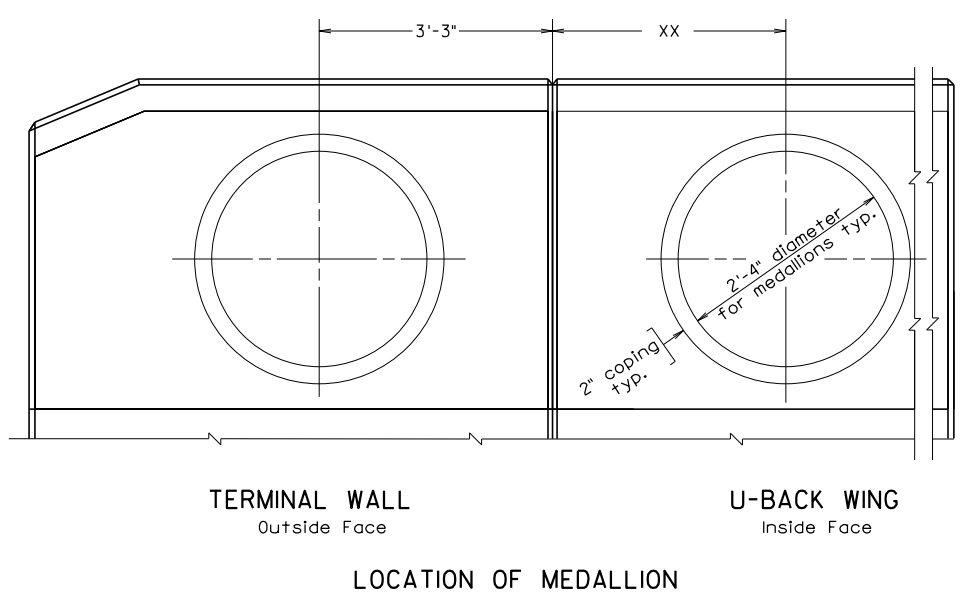
Medallion type shall be XX. For medallion details, see sheet XX.



	Relief (in.)
r1	
r2	

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27CAT9.dgn
03-10-2015
BR27C-AT-9

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH DRYSTACK WITH STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
BR27C-AT-9			

**ARCHITECTURAL TREATMENT
WITH DRYSTACK AND MEDALLIONS
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s). The standard includes architectural treatment (rustic brick texture) and 2'-4" diameter medallion(s). For medallion options, see standards BR27-ATM-1 and BR27-ATM-2. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information including location for the medallion(s), see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

LOCATION OF MEDALLION:

Add dimension for medallion on inside face if medallion is required. See Part 2, Chapter 5: Architectural Treatment, of this manual for location of medallions.

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

Specify face(s) of the rail to which a medallion is to be applied: (inside face, outside face or both faces).

Specify name of medallion to be applied. Complete sheet number for medallion standard.

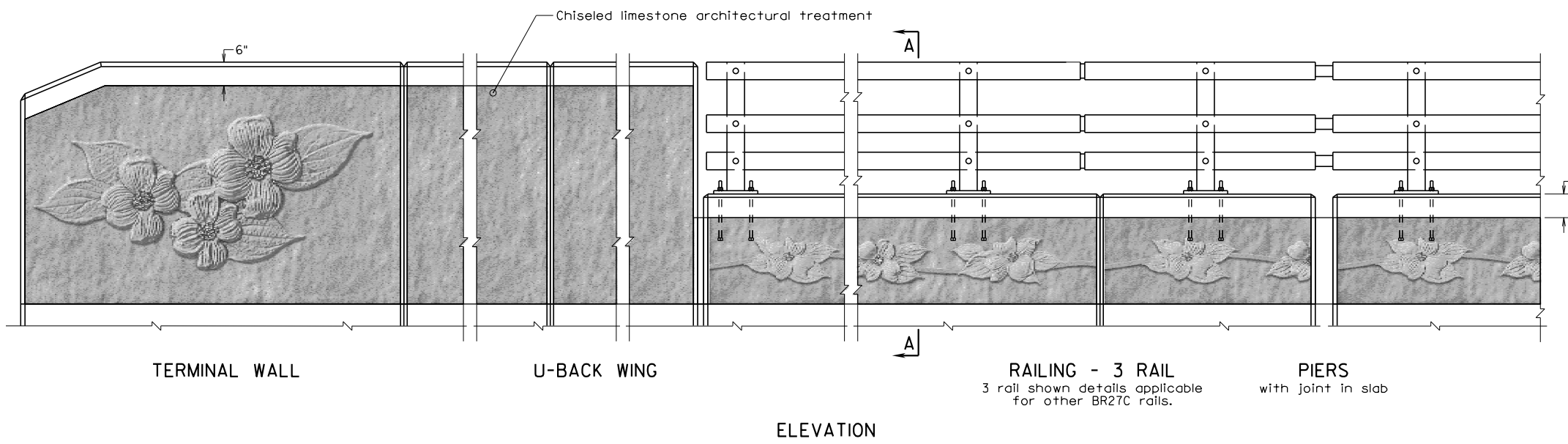
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate sculpted dogwood texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted dogwood pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

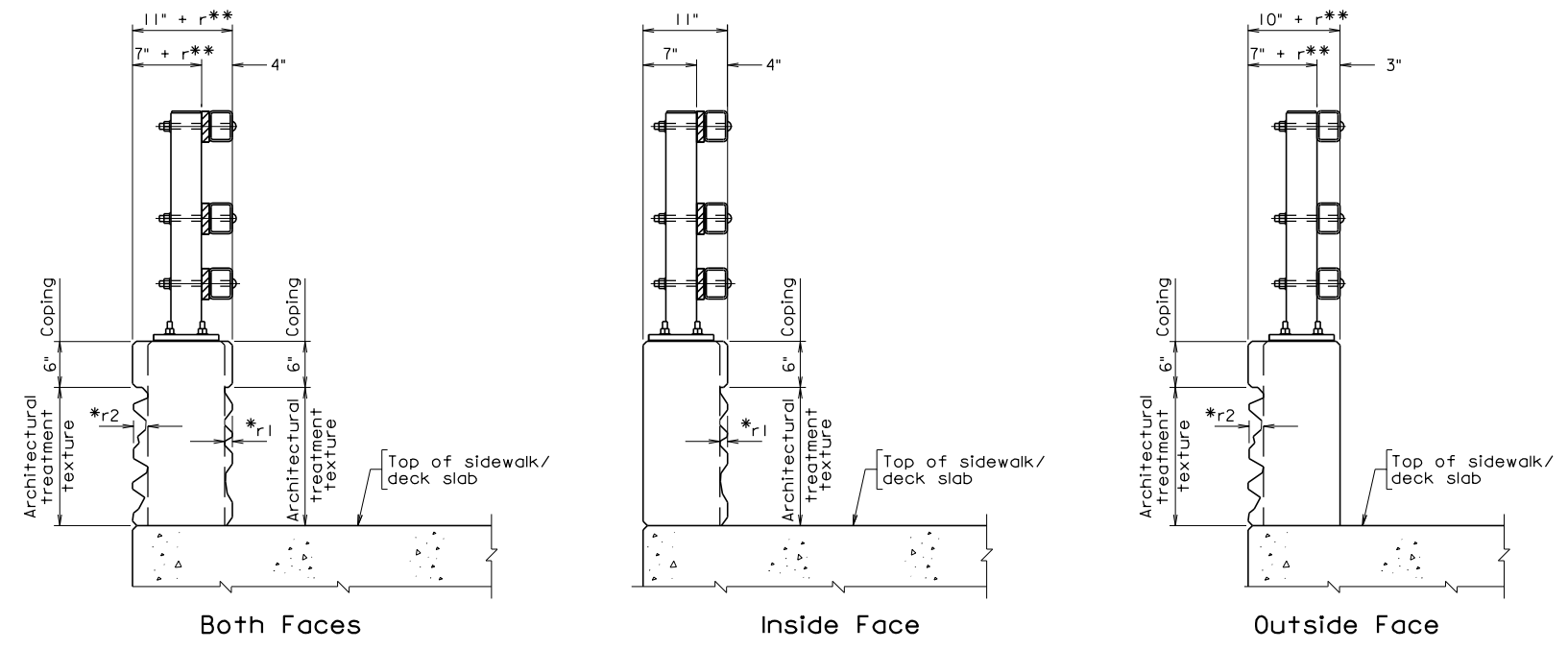
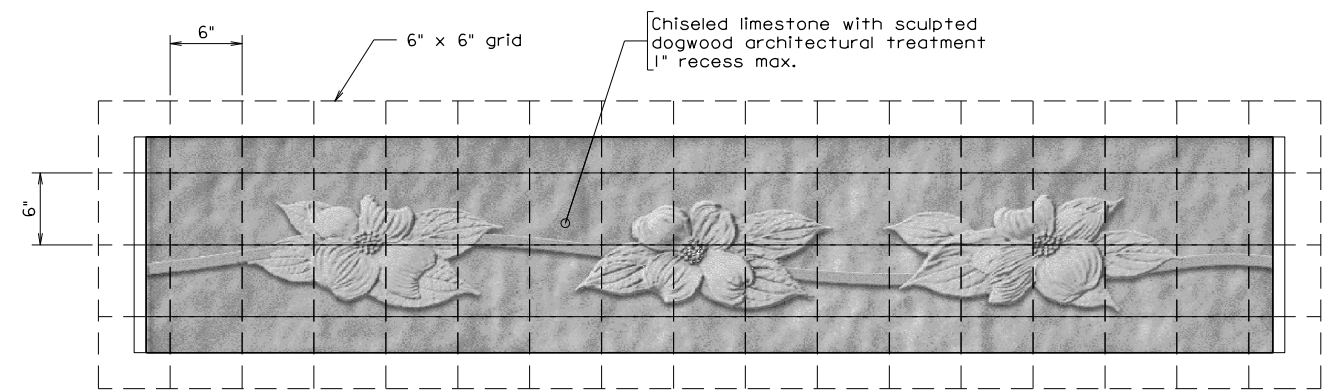
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

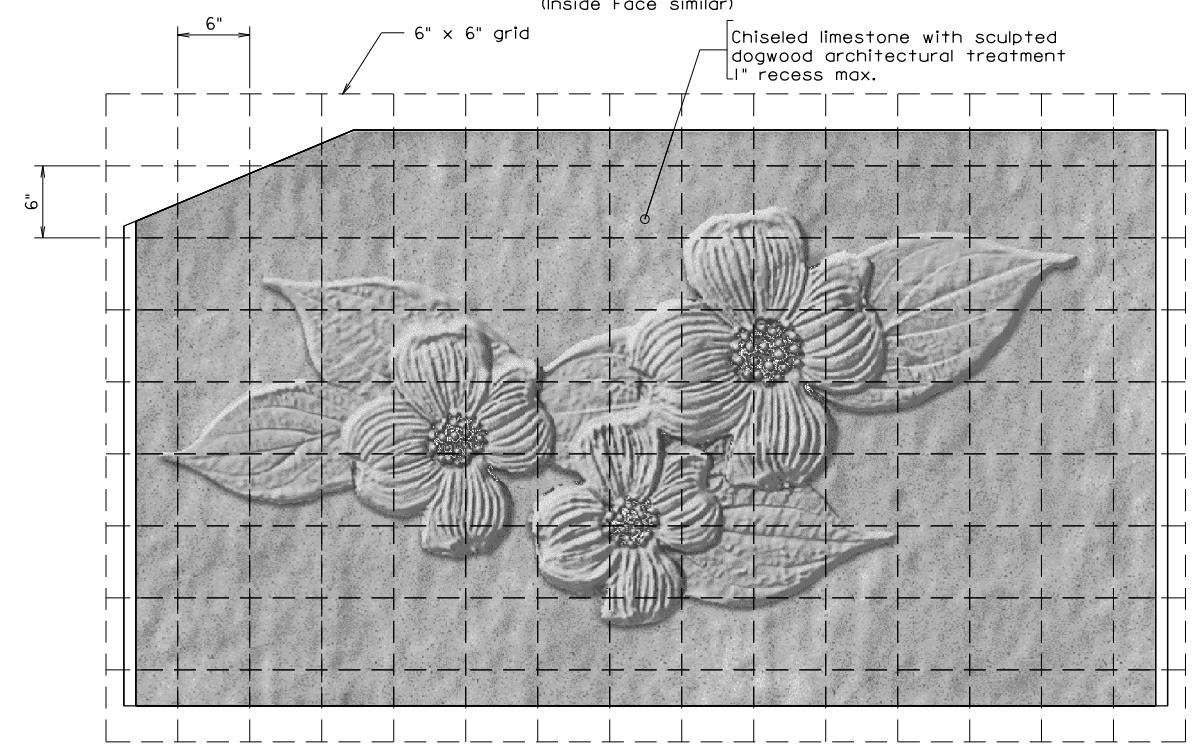
For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27C-AT-10

03-10-2015

BR27CAT10.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH SCULPTED DOGWOOD FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
BR27C-AT-10			

**ARCHITECTURAL TREATMENT
WITH SCULPTED DOGWOOD
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

Replace standard designation with plan number.

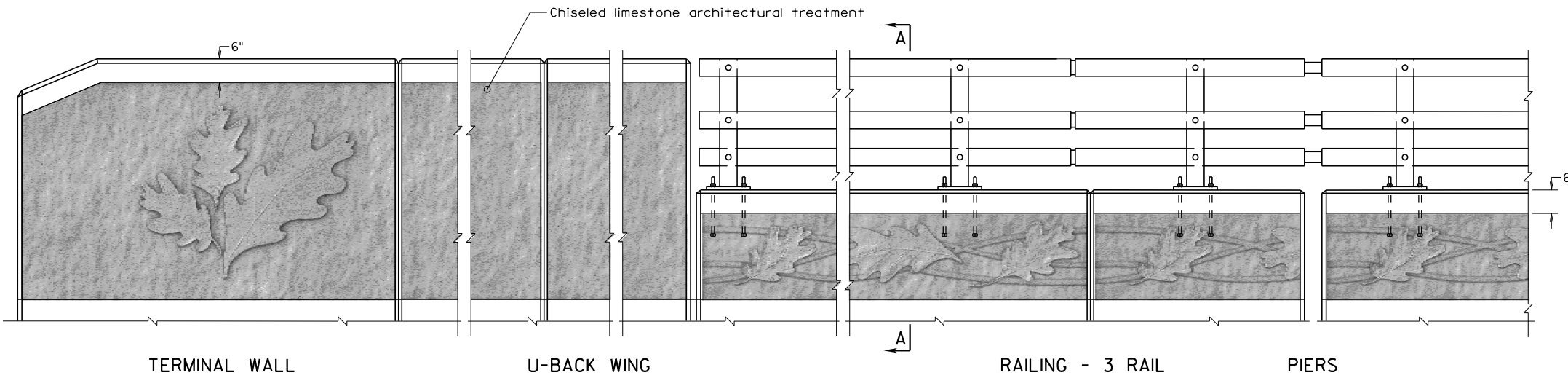
RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

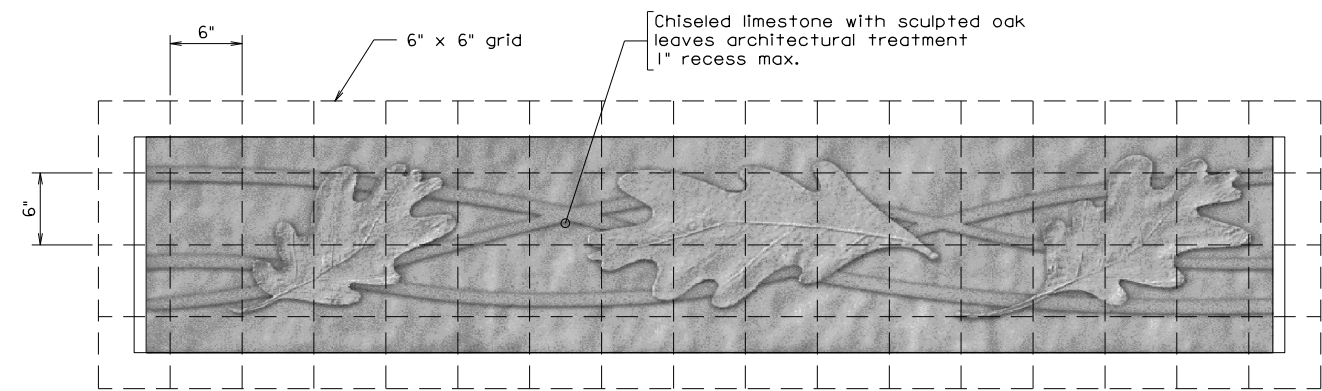
Notes:

- Architectural treatment for the railing and terminal walls shall simulate sculpted oak leaves texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous sculpted oak leaves pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.



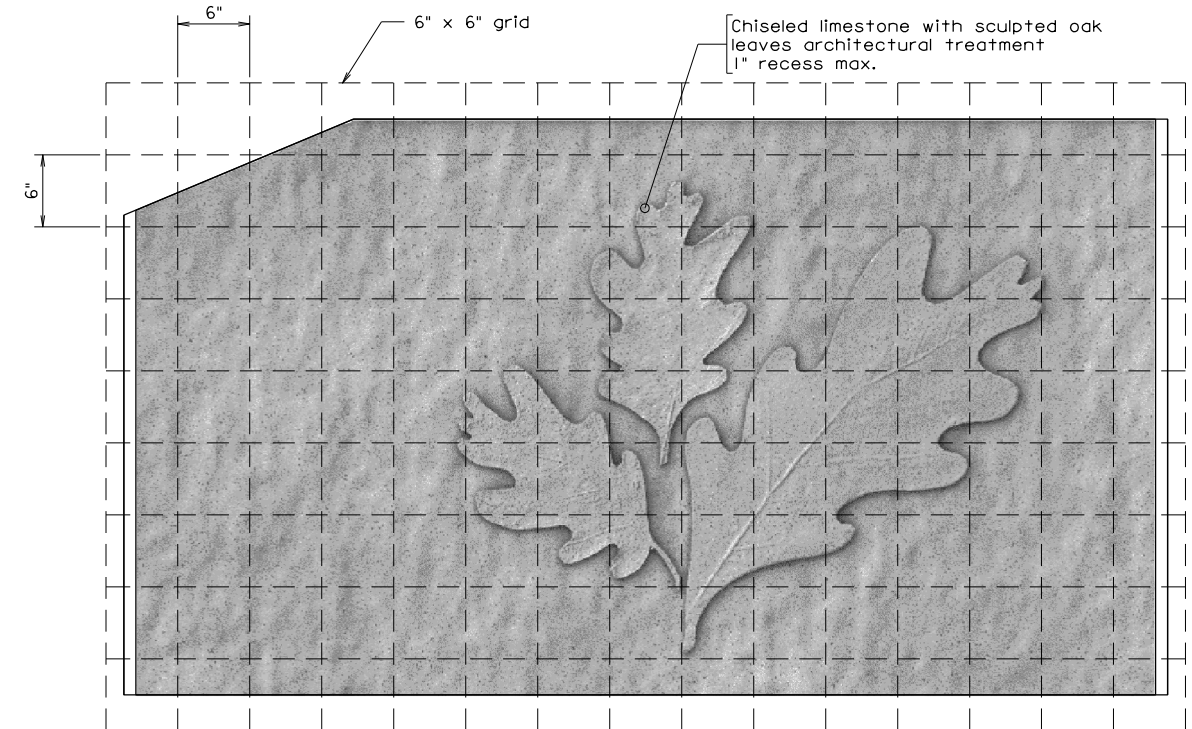
TERMINAL WALL U-BACK WING RAILING - 3 RAIL PERS with joint in slab

ELEVATION



SCULPTED OAK LEAVES TEXTURE DETAIL

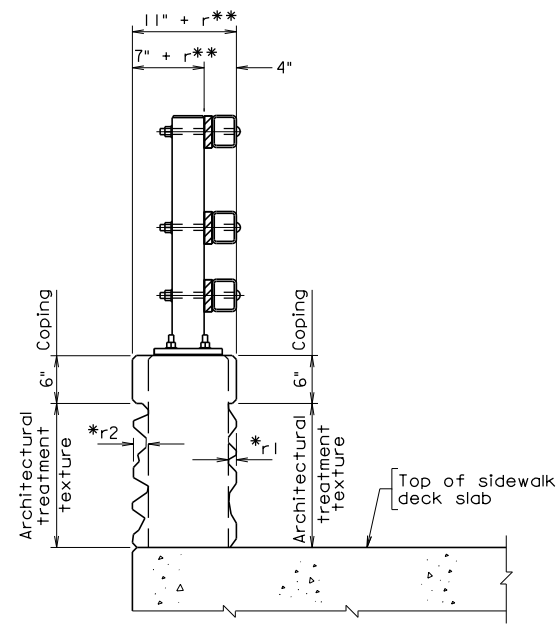
Parapet - Outside Face (Inside Face similar)



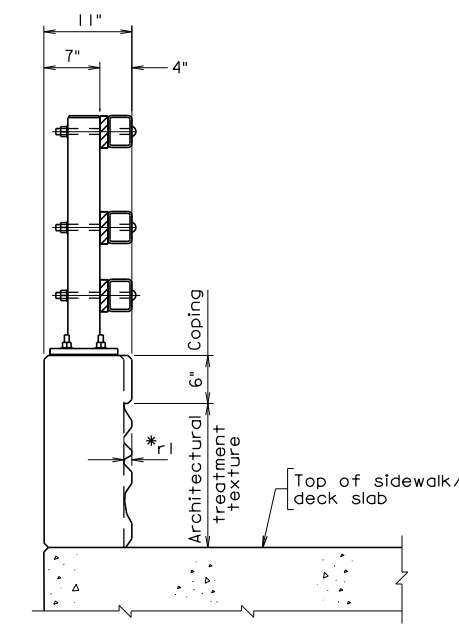
SCULPTED OAK LEAVES TEXTURE DETAIL

Terminal Wall - Outside Face Only

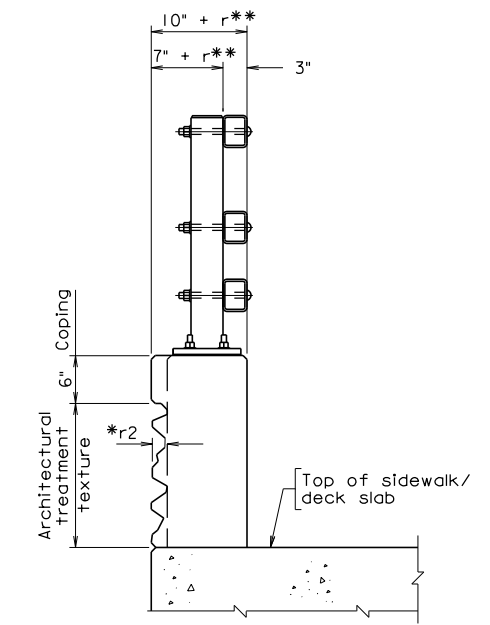
	Relief (in.)
r1	
r2	



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A

3 rail shown details applicable for other BR27C rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27CAT-11.dgn 03-10-2015 BR27C-AT-11

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH SCULPTED OAK LEAVES FOR STEEL RAILING BR27C			
No.	Description	Date	Designed: S&B...DIV Drawn: ...S&B...DIV Checked: S&B...DIV
Revisions		Date	Plan No. Sheet No.
			BR27C-AT-11

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED OAK LEAVES
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

Replace standard designation with plan number.

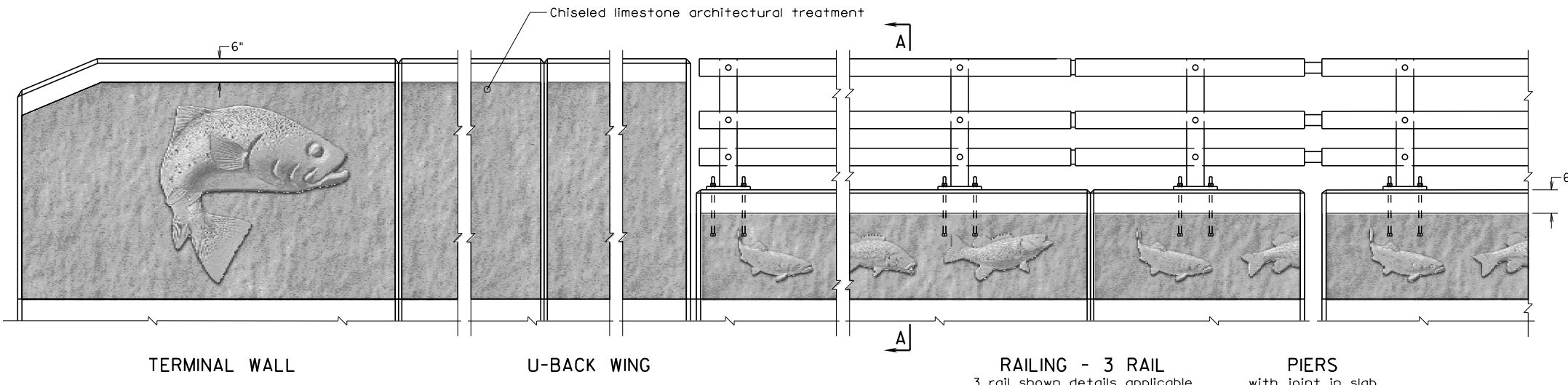
RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

- Architectural treatment for the railing and terminal walls shall simulate sculpted fish texture, similar to the pattern detailed on this sheet.
- Form liner shall be arranged to produce a continuous sculpted fish pattern without obvious repetition of the pattern.
- Form liner pattern shall be inspected and approved by the Department.
- Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.
- Architectural treatment shall be applied on XX of the barrier.
- Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.
- Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.
- For all other dimensions and details not shown, see sheet xxx.



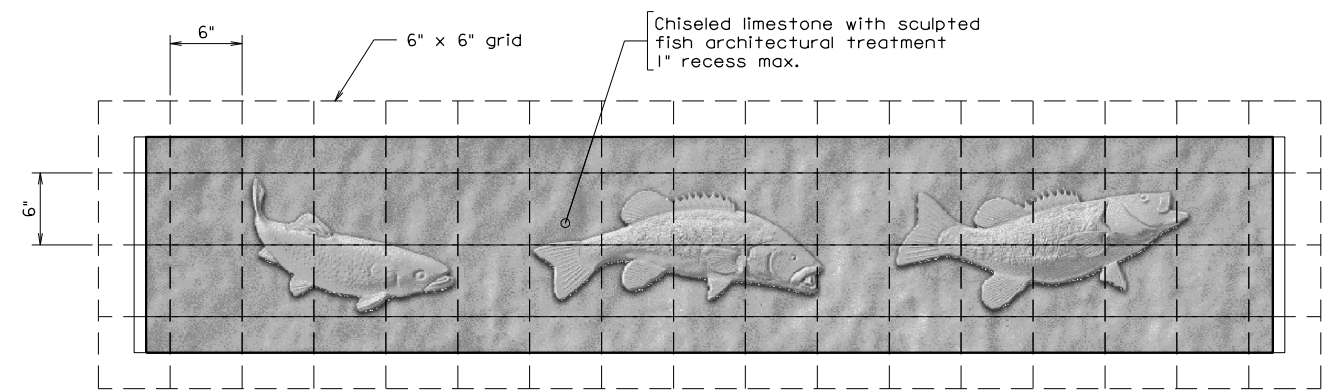
TERMINAL WALL

U-BACK WING

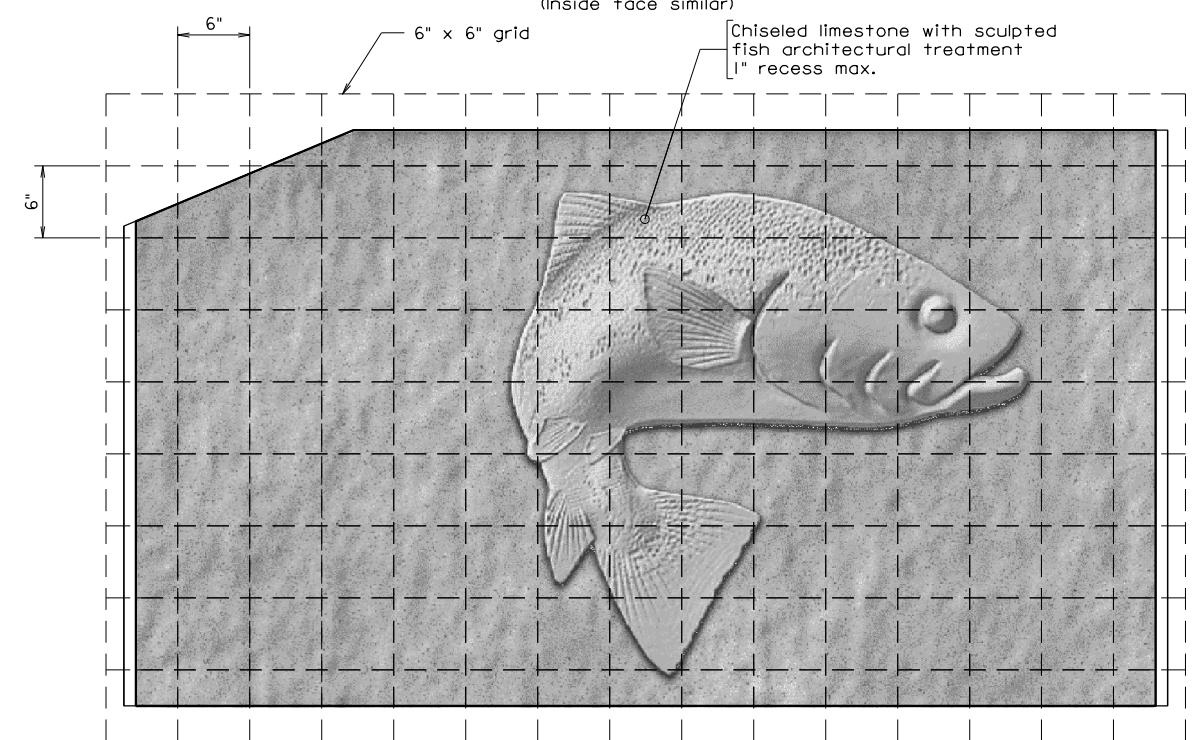
RAILING - 3 RAIL
3 rail shown details applicable for other BR27C rails.

PIERS
with joint in slab

ELEVATION

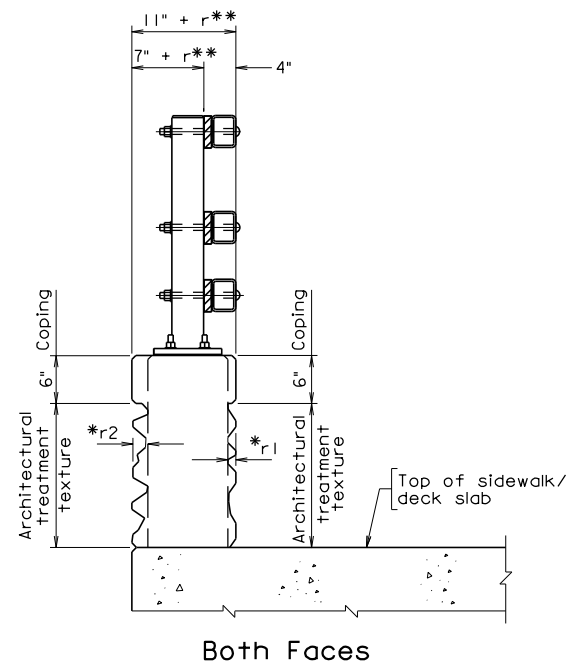


SCULPTED FISH TEXTURE DETAIL
Parapet - Outside Face
(Inside face similar)



SCULPTED FISH TEXTURE DETAIL
Terminal Wall - Outside Face Only

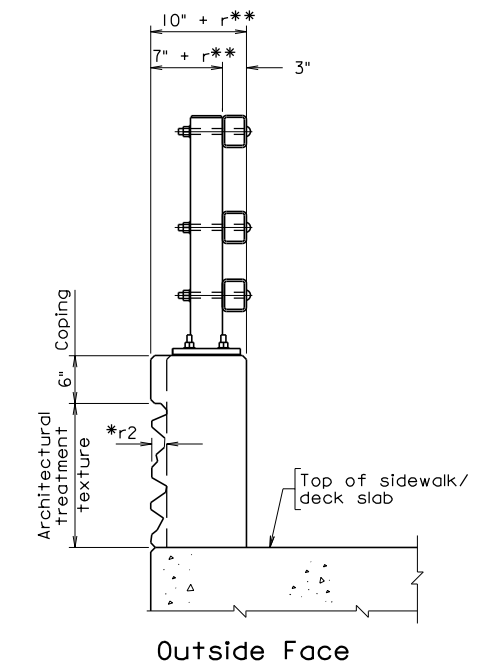
	Relief (in.)
r1	
r2	



Both Faces



Inside Face



Outside Face

* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
3 rail shown details applicable for other BR27C rails.

BR27CAT12.dgn
03-10-2015
BR27C-AT-12

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH SCULPTED FISH FOR STEEL RAILING BR27C			
No.	Description	Date	Revisions
Designed: S&B...DIV	Date	Plan No.	Sheet No.
Drawn: S&B...DIV			
Checked: S&B...DIV			
			BR27C-AT-12

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED FISH
FOR STEEL RAILING BR27C**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27C rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

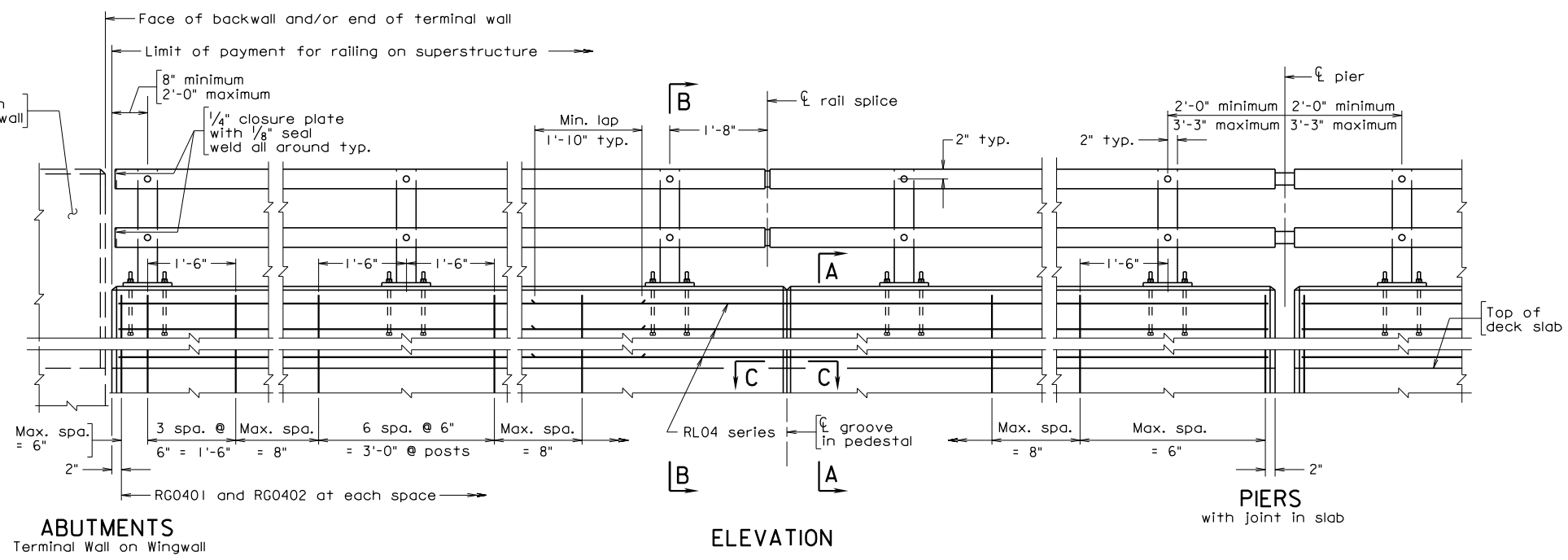
For additional notes, see sheet...

**The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

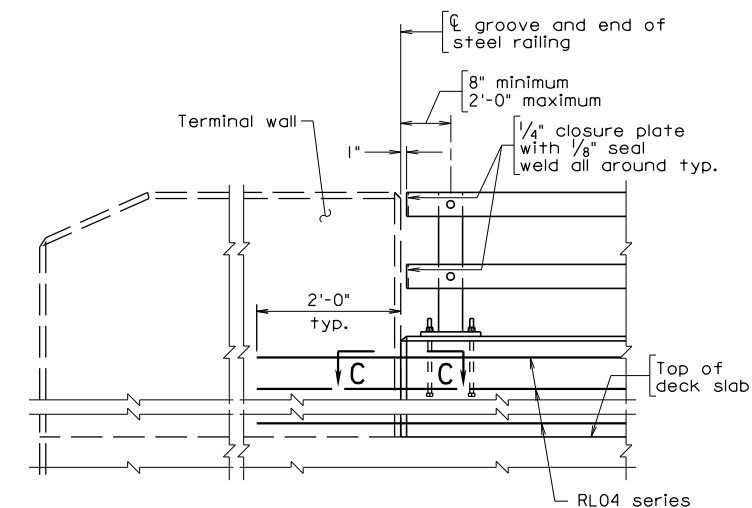
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42"-BR27D STEEL RAILING					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BR27D-8
			Checked: S&B, DIV		
Revisions					



ABUTMENTS
Terminal Wall on Wingwall

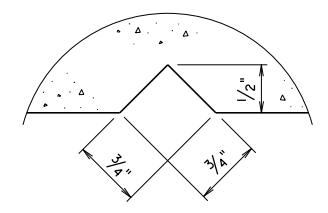
ELEVATION

PIERS
with joint in slab

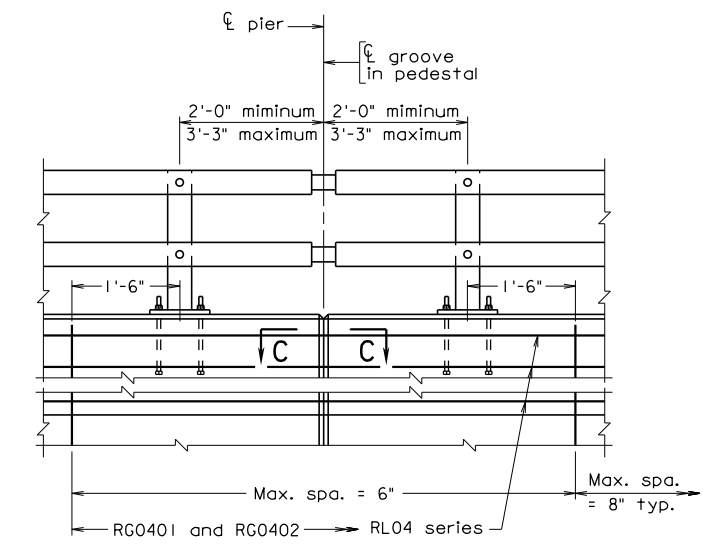


ABUTMENT

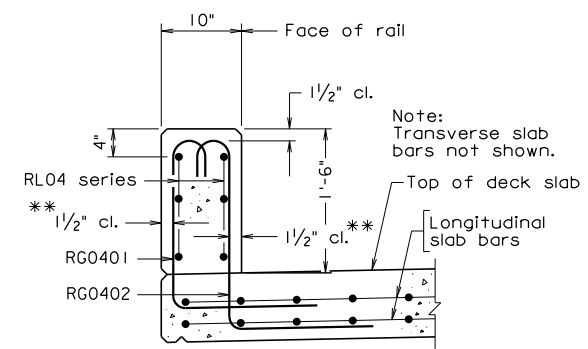
PART ELEVATION
Terminal Wall on Superstructure



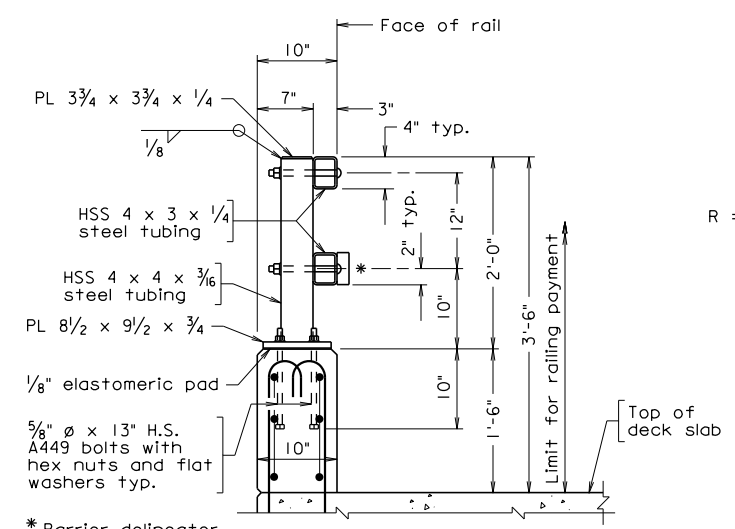
SECTION C-C
Full scale
Groove detail for both sides of rail



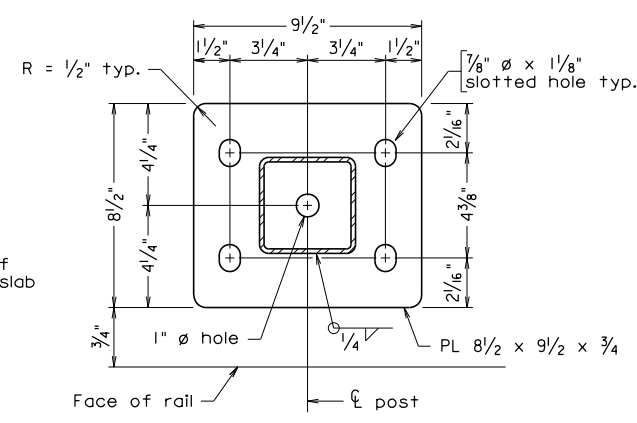
PIERS
Continuous - without joint in slab



SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"
Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL
Not to scale

Scale: 3/4" = 1'-0" unless otherwise noted. © 2015, Commonwealth of Virginia

BR27D-8 03-10-2015 br27d8.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

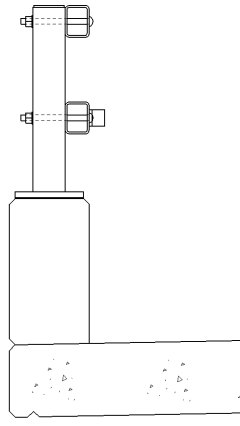
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

42" STEEL RAILING

BR27D-SERIES

NOTES TO DESIGNER:

The railing as detailed is for use as a traffic barrier. The steel railing has a height of 3'-6" and has been crash tested for TL-2 (TL = test level). The rail has not been modified from that which was crash-tested. The standard may be used when an open railing is required. This standard shall not be used for sidewalk application. If architectural treatment is required, use standard BR27D-8-AT.



BR27D-8 STEEL RAILING

Bid Items: Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 2 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and note (standard BR27D-11) and the appropriate terminal wall standard (BR27T-1 thru BR27T-4) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 3'-6" height of the rail would need to be adjusted to 1'-7" and 3'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

42" STEEL RAILING

BR27D-SERIES

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 3'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

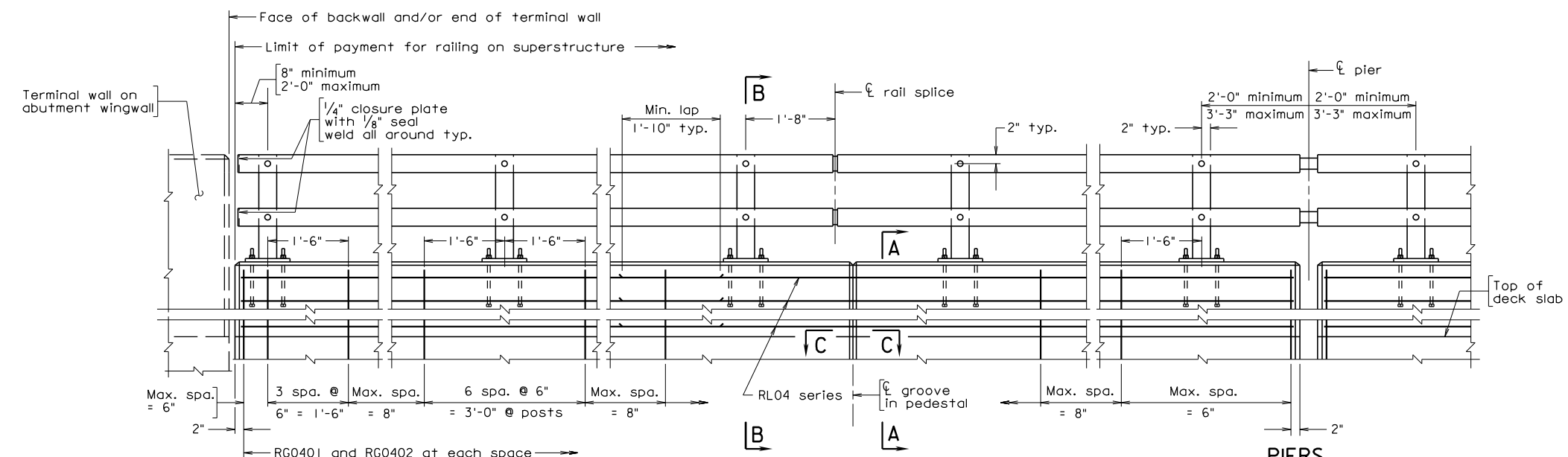
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

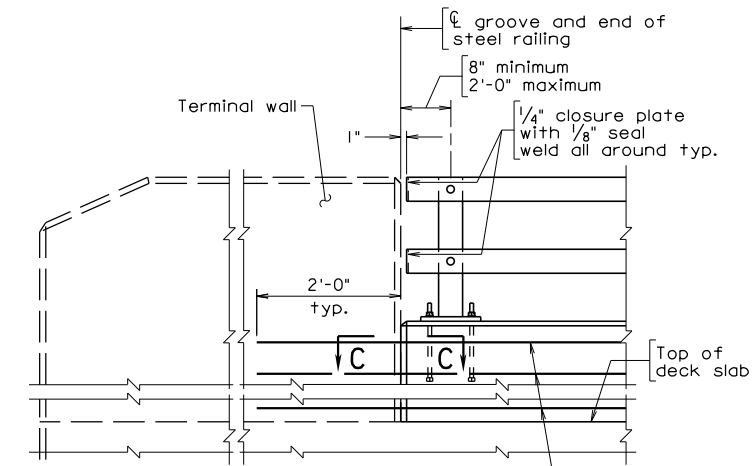
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



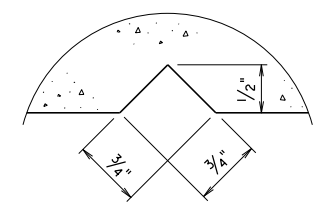
ABUTMENTS
Terminal Wall on Wingwall

ELEVATION

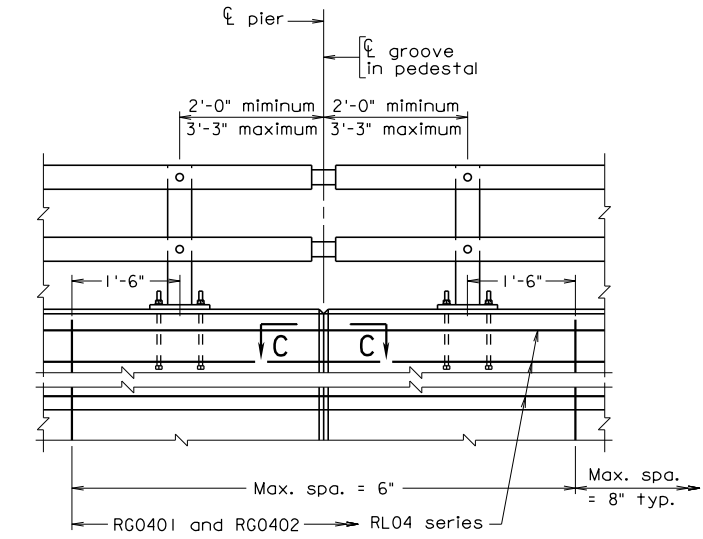
PIERS
with joint in slab



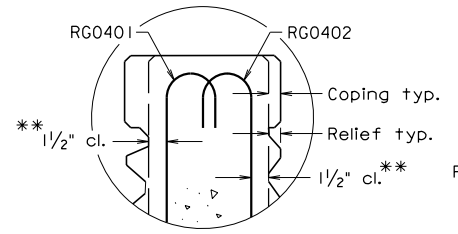
PART ELEVATION
Terminal Wall on Superstructure



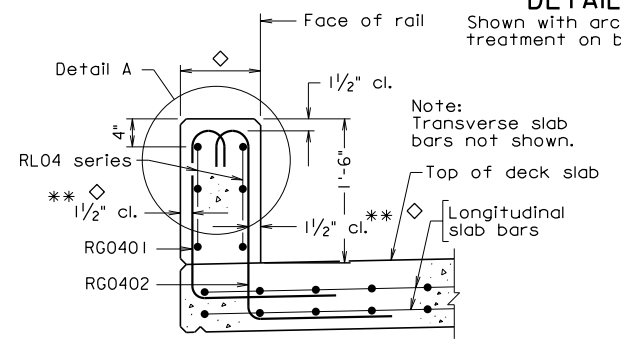
SECTION C-C
Full scale
Groove detail for both sides of rail



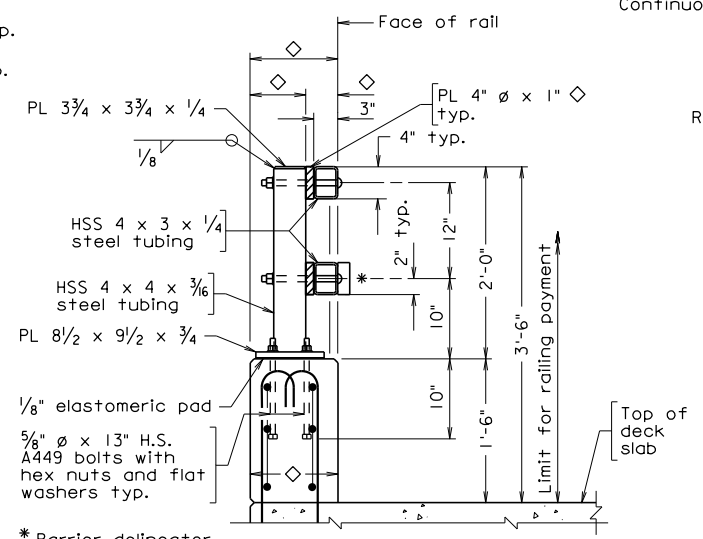
PIERS
Continuous - without joint in slab



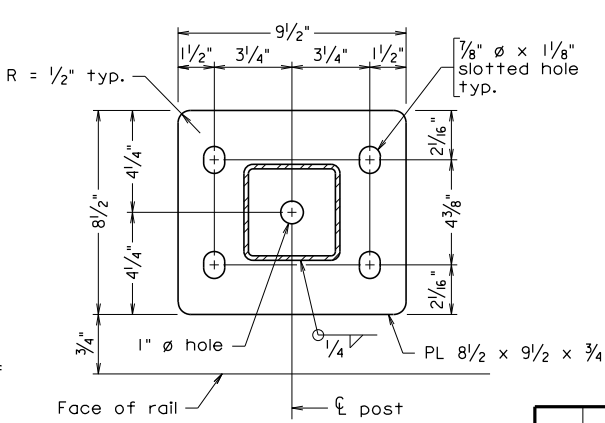
DETAIL A
Shown with architectural treatment on both sides



SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"



BASE PLATE DETAIL
Not to scale

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of terminal wall, see sheet
- Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.
- Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.
- For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.
- All steel shall be hot dip galvanized.
- Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6"
- Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
- Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.
- Rails to be continuous over a minimum of 3 posts before splicing.
- For additional notes, see sheet...

**The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42"-BR27D STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BR27D-8-AT		

BR27D-8-AT 03-10-2015 br27d8at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

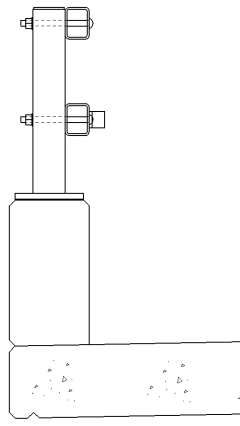
◇ For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A. 1" spacer plate only required when treatment is on inside face.

Scale: 3/4" = 1'-0" unless otherwise noted. © 2015, Commonwealth of Virginia

42" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES

NOTES TO DESIGNER:

The railing as detailed is for use as a traffic barrier. The steel railing has a height of 3'-6" and has been crash tested for TL-2 (TL = test level). The rail has not been modified from that which was crash-tested. The standard may be used when an open railing is required. This standard shall not be used for sidewalk application. This standard is used only when architectural treatment is required. If none is required, use standard BR27D-8.



BR27D-8 STEEL RAILING
(Architectural treatment not shown)

Bid Items: Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 2 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and note (standard BR27D-11-AT) and the appropriate terminal wall standard (BR27T-1-AT thru BR27T-4-AT) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 3'-6" height of the rail would need to be adjusted to 1'-7" and 3'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

**42" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 3'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

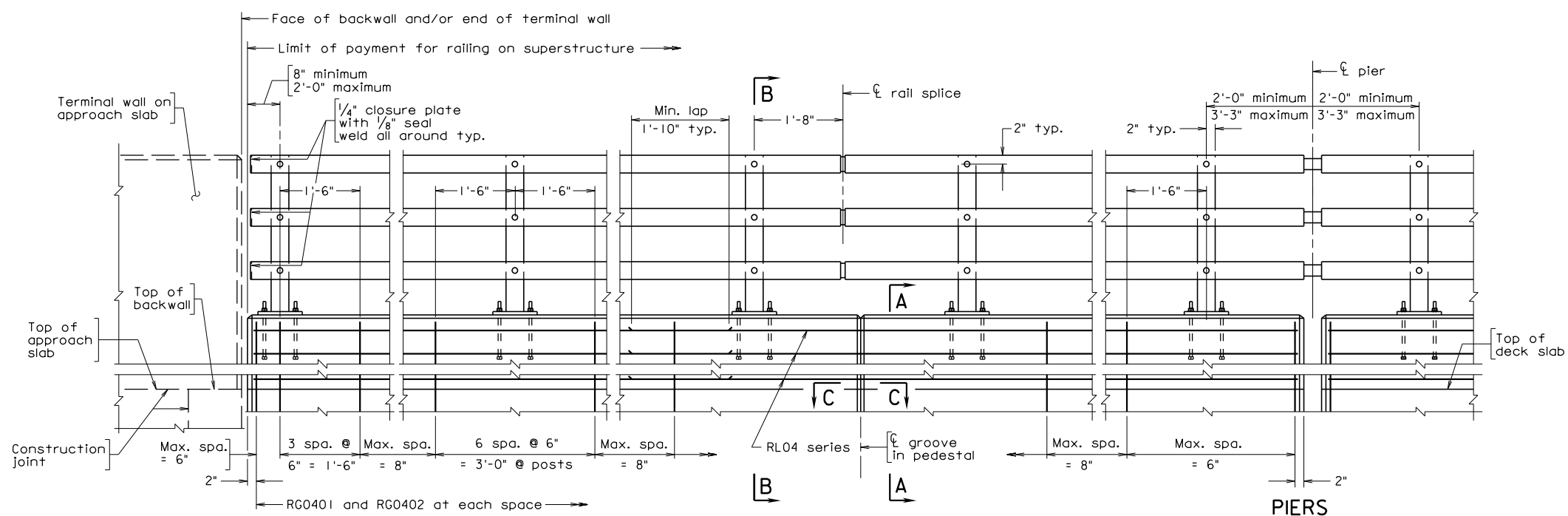
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ABUTMENTS
Terminal Wall on Approach Slab

ELEVATION

PIERS
with joint in slab

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

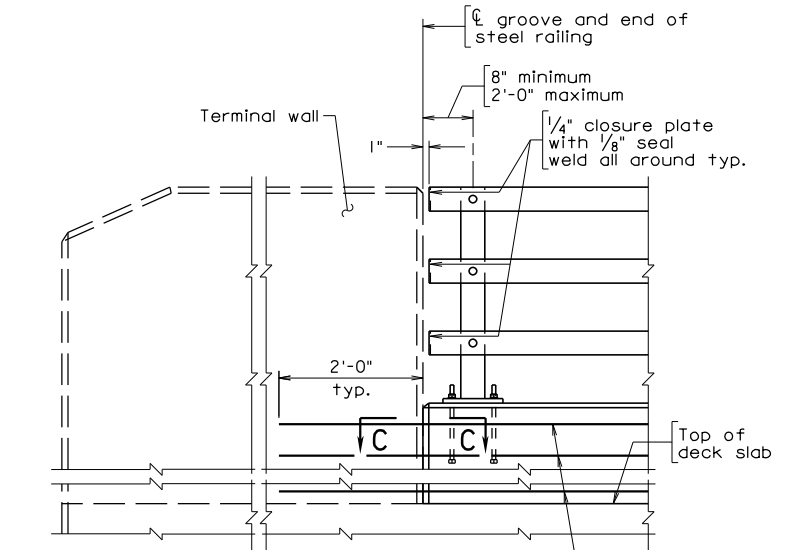
Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

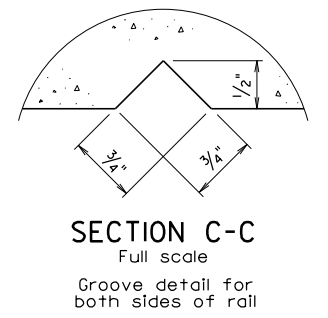
Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

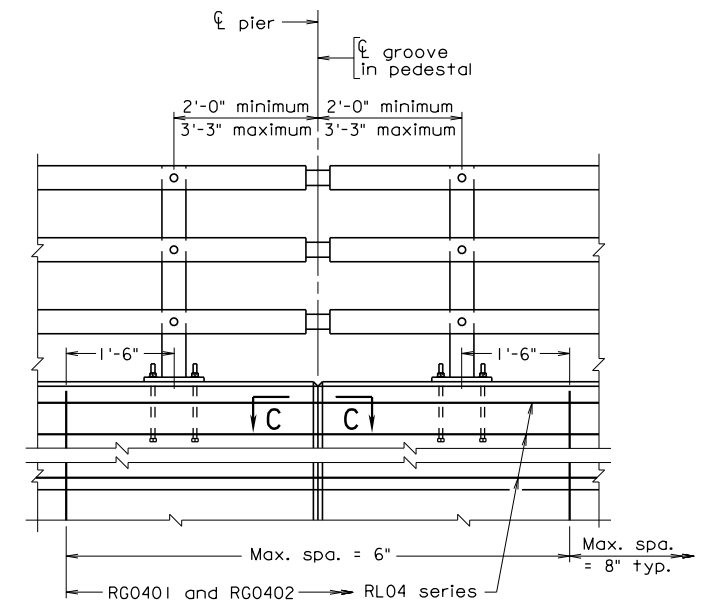
For additional notes, see sheet...



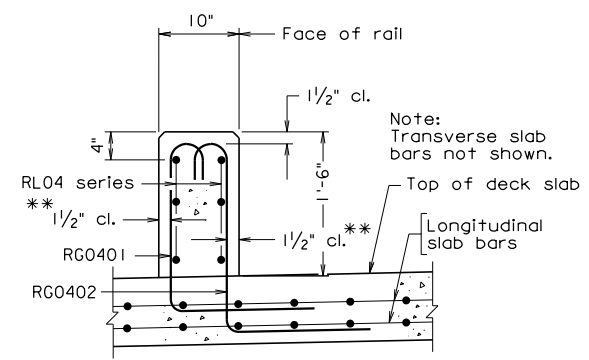
ABUTMENT PART ELEVATION
Terminal Wall on Superstructure



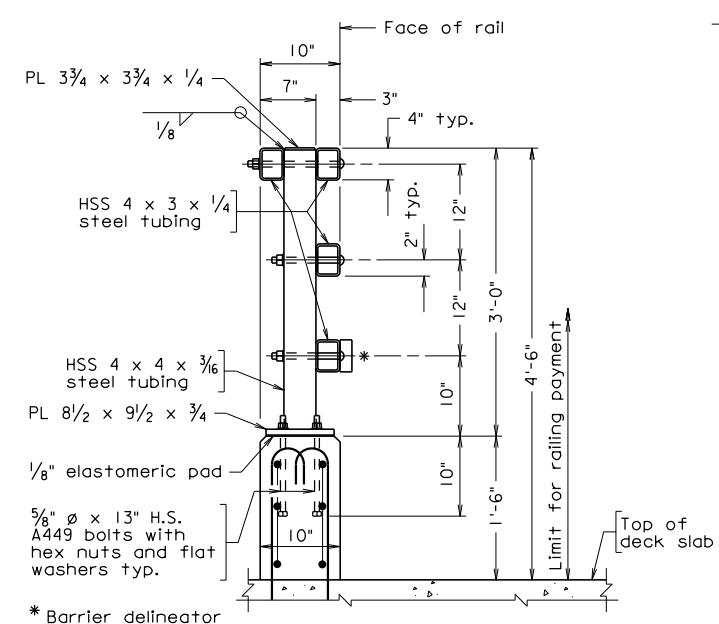
SECTION C-C
Full scale
Groove detail for both sides of rail



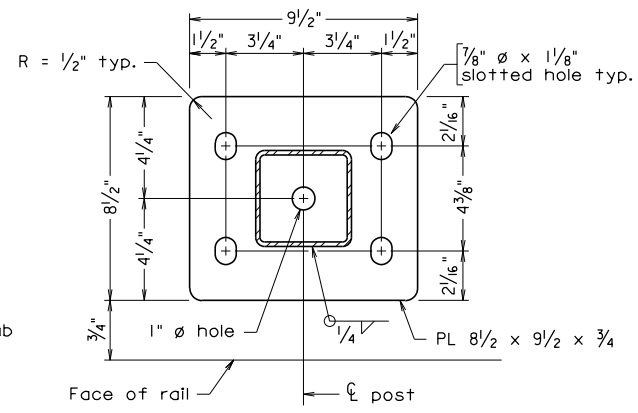
PIERS
Continuous - without joint in slab



SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"
Bolts through base plate shall be contained inside rebar cage



BASE PLATE DETAIL
Not to scale

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27D STEEL RAILING					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BR27D-9
			Checked: S&B, DIV		
Revisions					

BR27D-9

03-10-2015

br27d9.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

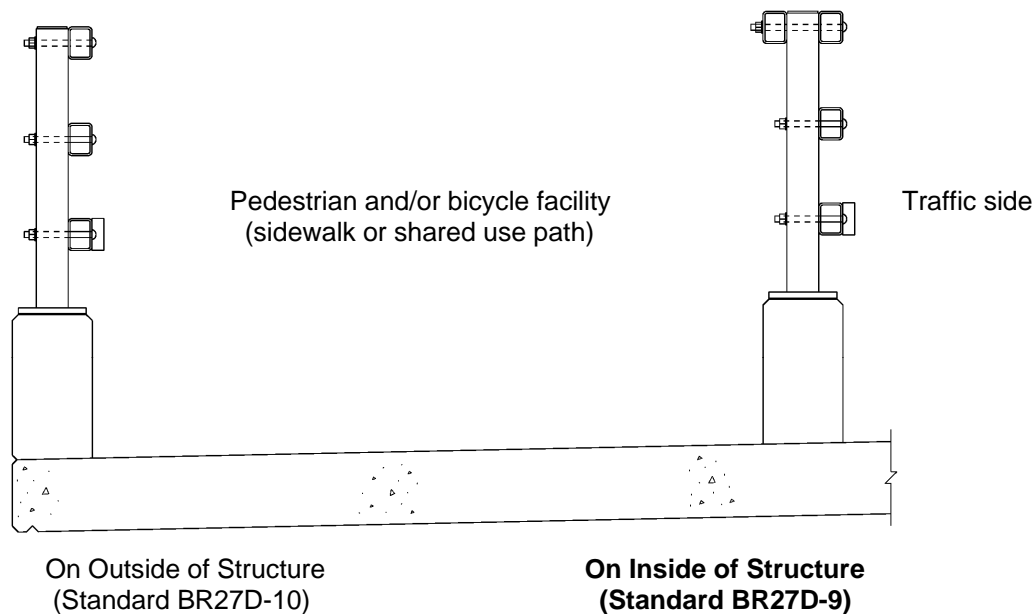
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27D-SERIES

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier to separate a pedestrian and/or bicycle facility from traffic. The steel railing has a height of 4'-6" and has been crash tested for TL-2 (TL = test level). The crash tested rail has been modified from that which was crash tested. The railing does not meet the rail opening requirements in the AASHTO *Standard Specification for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by FHWA. The standard may be used when an open railing is required. If architectural treatment is required, use standard BR27D-9-AT.



For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 4 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27D-11) and the appropriate terminal wall standard (BR27T-7 thru BR27T-10) are to be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 4'-6" height of the rail would need to be adjusted to 1'-6" and 4'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

54" STEEL RAILING

BR27D-SERIES

NOTES TO DESIGNER: (cont'd)

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for rail additional notes.

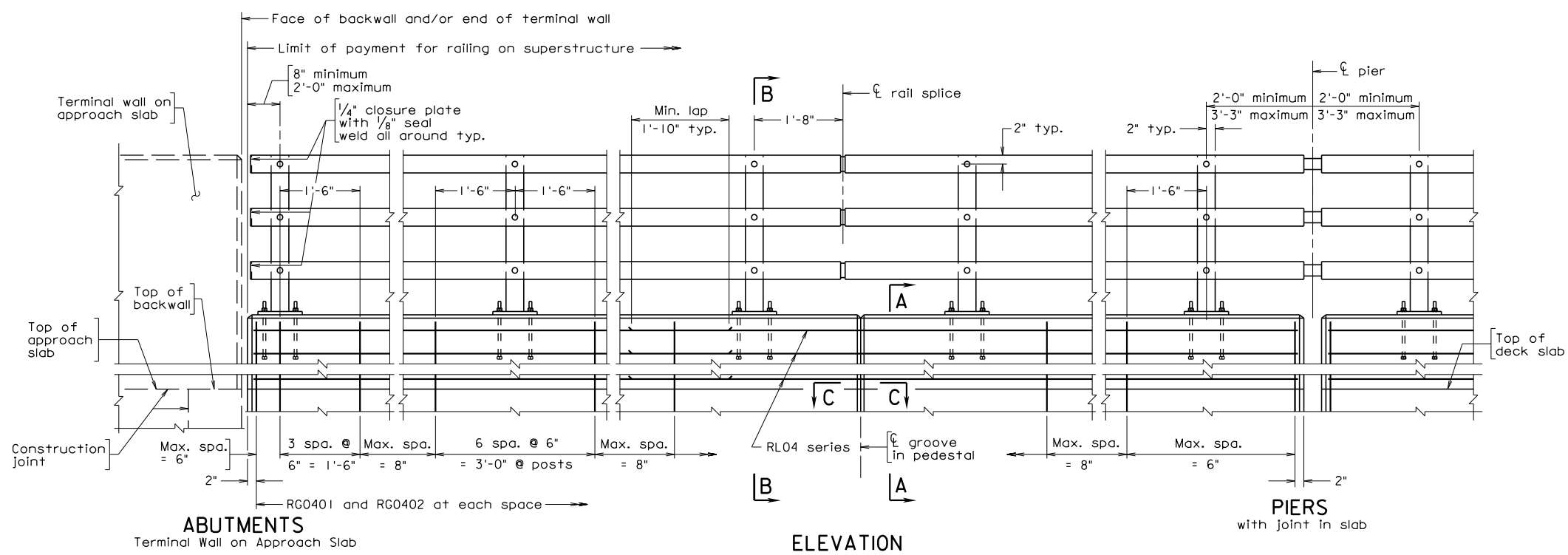
REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

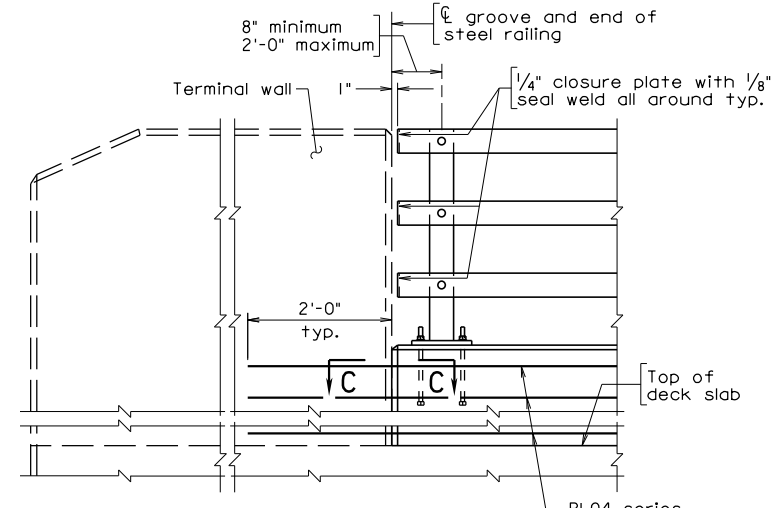
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



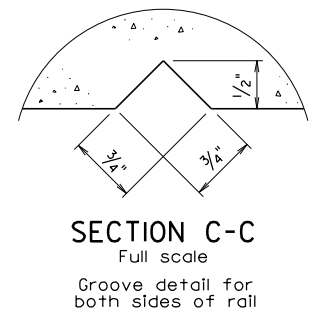
ABUTMENTS
Terminal Wall on Approach Slab

ELEVATION

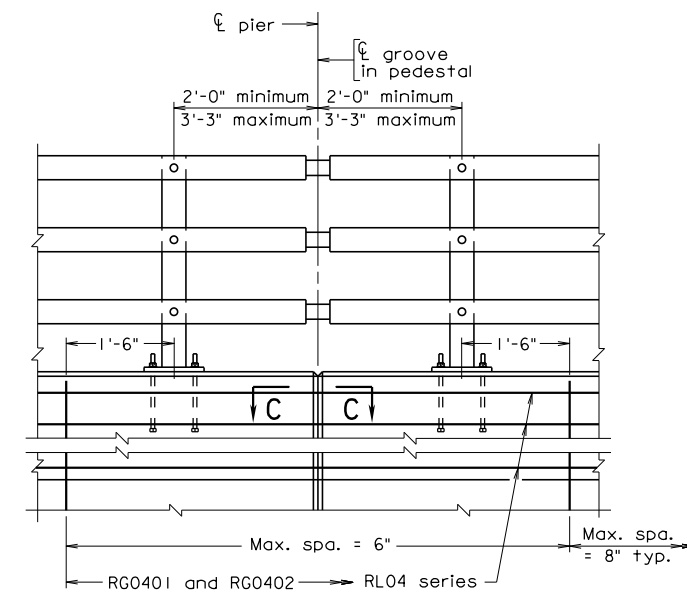
PIERS
with joint in slab



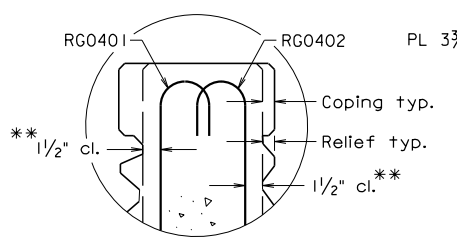
ABUTMENT PART ELEVATION
Terminal Wall on Superstructure



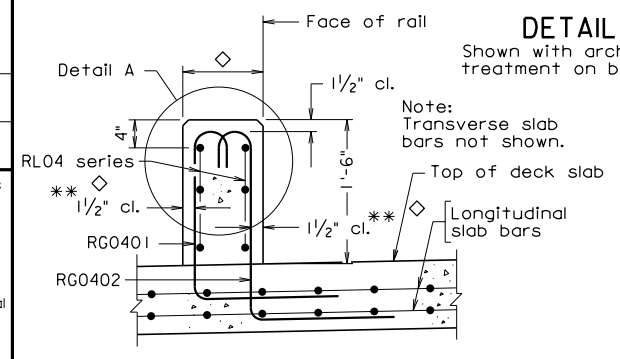
SECTION C-C
Full scale
Groove detail for both sides of rail



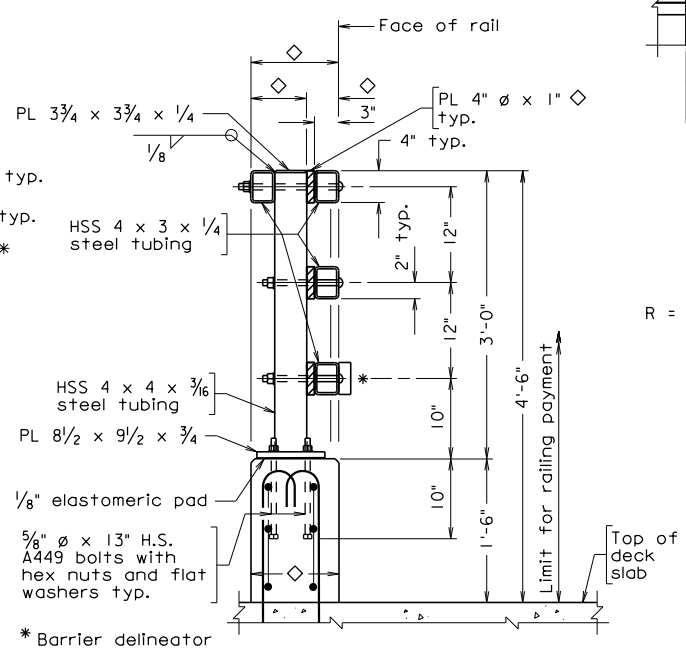
PIERS
Continuous - without joint in slab



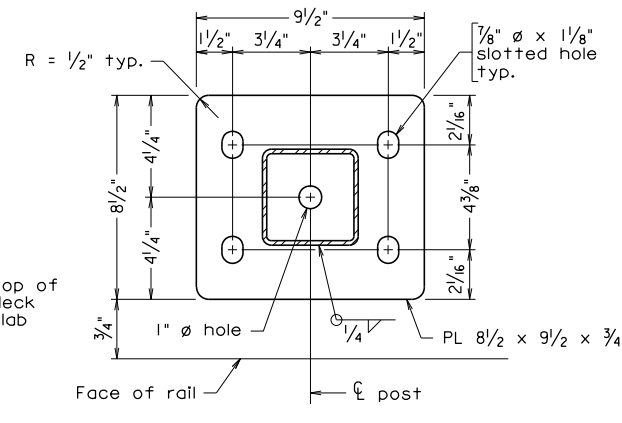
DETAIL A
Shown with architectural treatment on both sides



SECTION A-A
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"



BASE PLATE DETAIL
Not to scale

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of terminal wall, see sheet
- Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.
- Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.
- For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.
- All steel shall be hot dip galvanized.
- Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".
- Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
- Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.
- Rails to be continuous over a minimum of 3 posts before splicing.
- For additional notes, see sheet...
- **The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27D STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		Sheet No.
			Checked: S&B...DIV		
Revisions			BR27D-9-AT		

br27d9at.dgn

03-10-2015

BR27D-9-AT

Sealed and Signed by:
Prasad L. Nallapareni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A. 1" spacer plate only required when treatment is on inside face.

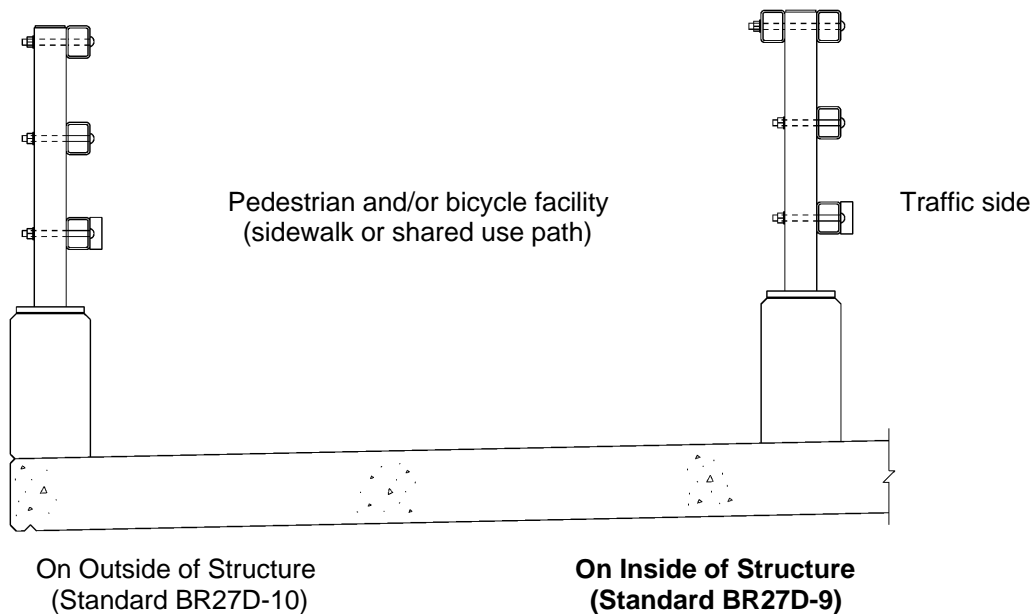
Scale: 3/4" = 1'-0" unless otherwise noted.

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**54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES**

NOTES TO DESIGNER:

This railing is detailed for use as a traffic barrier to separate a pedestrian and/or bicycle facility from traffic. The steel railing has a height of 4'-6" and has been crash tested for TL-2 (TL = test level). The crash tested rail has been modified from that which was crash tested. The railing does not meet the rail opening requirements in the AASHTO *Standard Specification for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by FHWA. The standard may be used when an open railing is required. This standard is used only when architectural treatment is required. If none is required, use standard BR27D-9.



(Architectural treatment not shown)

For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 4 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27D-11-AT) and the appropriate terminal wall standard (BR27T-7-AT thru BR27T-10-AT) are to be included in the plans when using this standard.

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 4'-6" height of the rail would need to be adjusted to 1'-6" and 4'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for rail additional notes.

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RG0401 and RG0402.

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BR27D-9-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 10Mar2015
SHEET 3 of 3
FILE NO. BR27D-9-AT-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

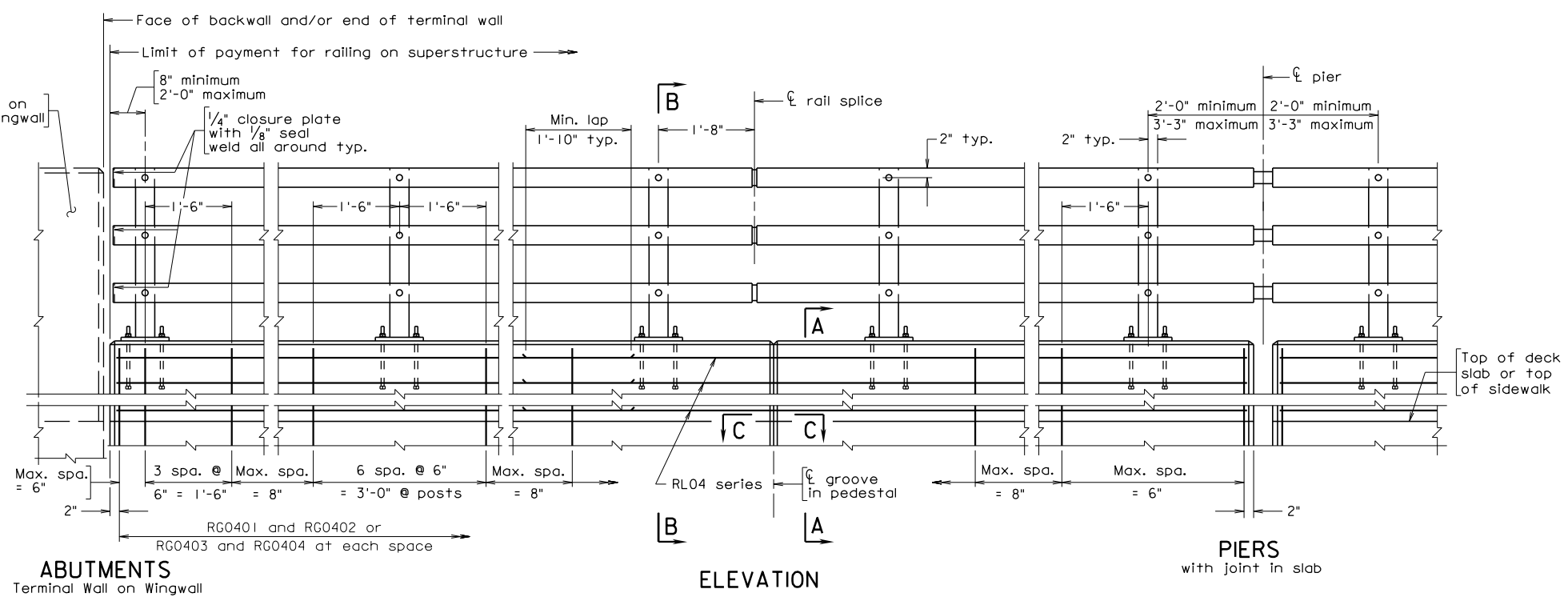
Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

For additional notes, see sheet...

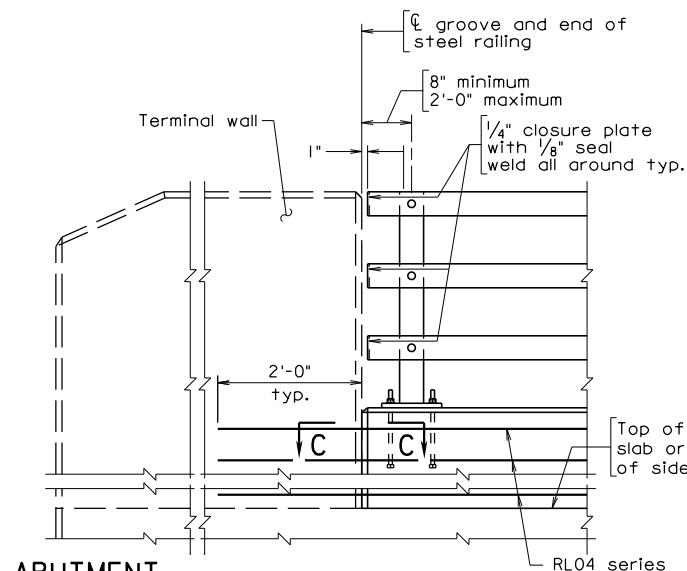
**The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.



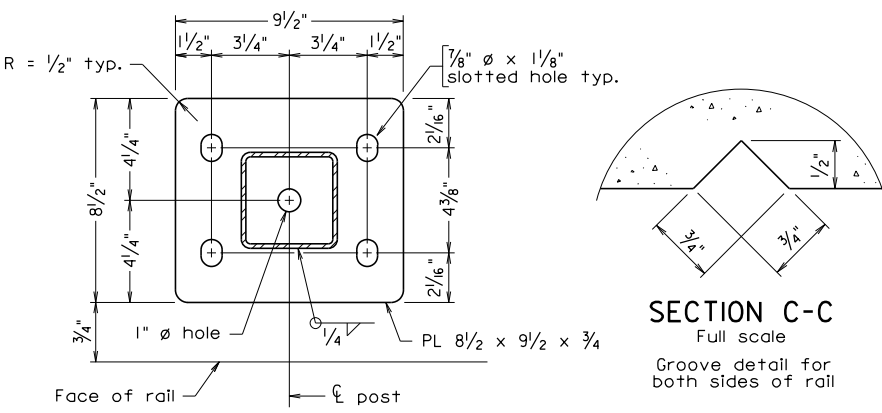
ABUTMENTS
Terminal Wall on Wingwall

ELEVATION

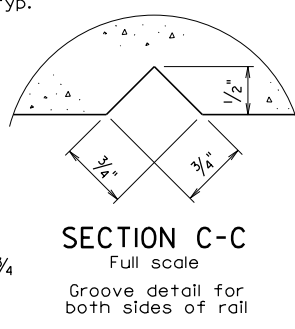
PIERS
with joint in slab



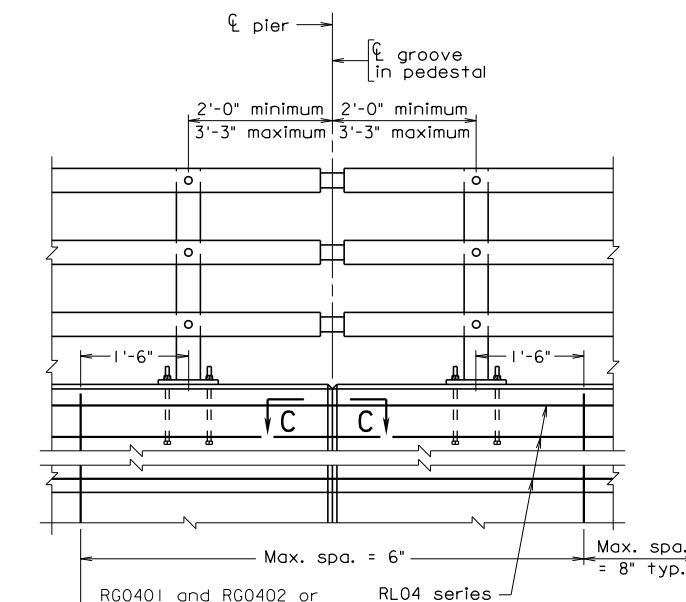
ABUTMENT
Terminal Wall on Superstructure



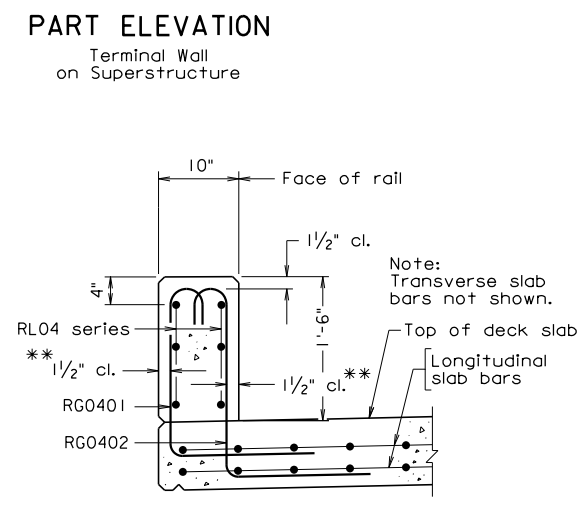
BASE PLATE DETAIL
Not to scale



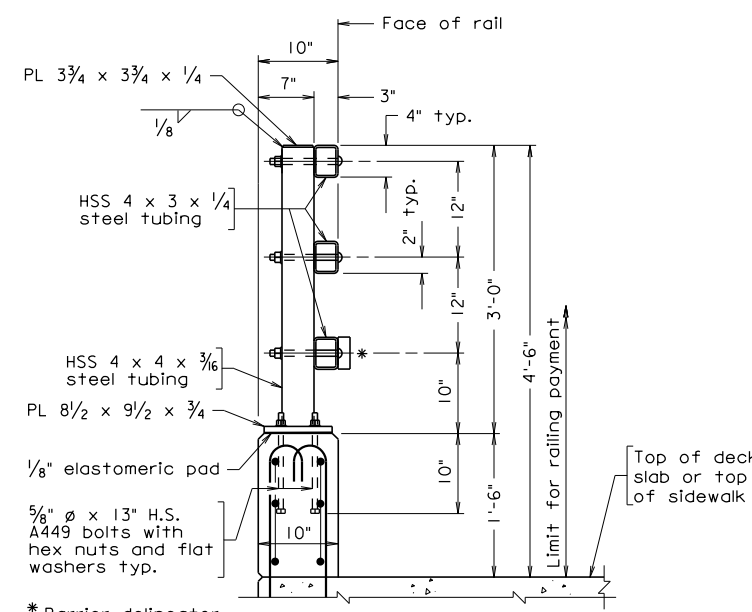
SECTION C-C
Full scale
Groove detail for both sides of rail



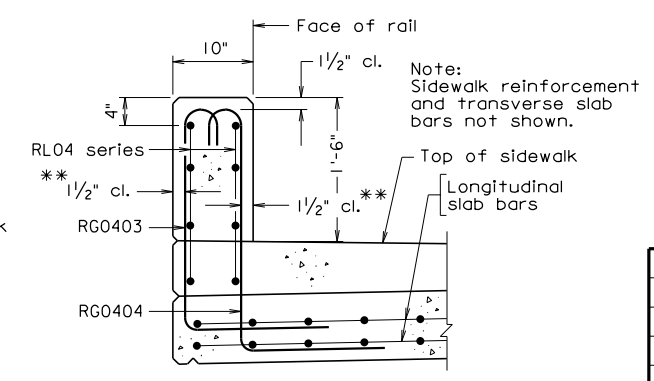
PIERS
Continuous - without joint in slab



SECTION A-A
(Without sidewalk)
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"
Bolts through base plate shall be contained inside rebar cage



SECTION A-A
(With sidewalk)
Scale: 1" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RG0403	#4			3"	Parapet
RG0404	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27D STEEL RAILING					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
	Revisions		Checked: S&B...DIV		BR27D-10

BR27D-10 03-10-2015 br27d10.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

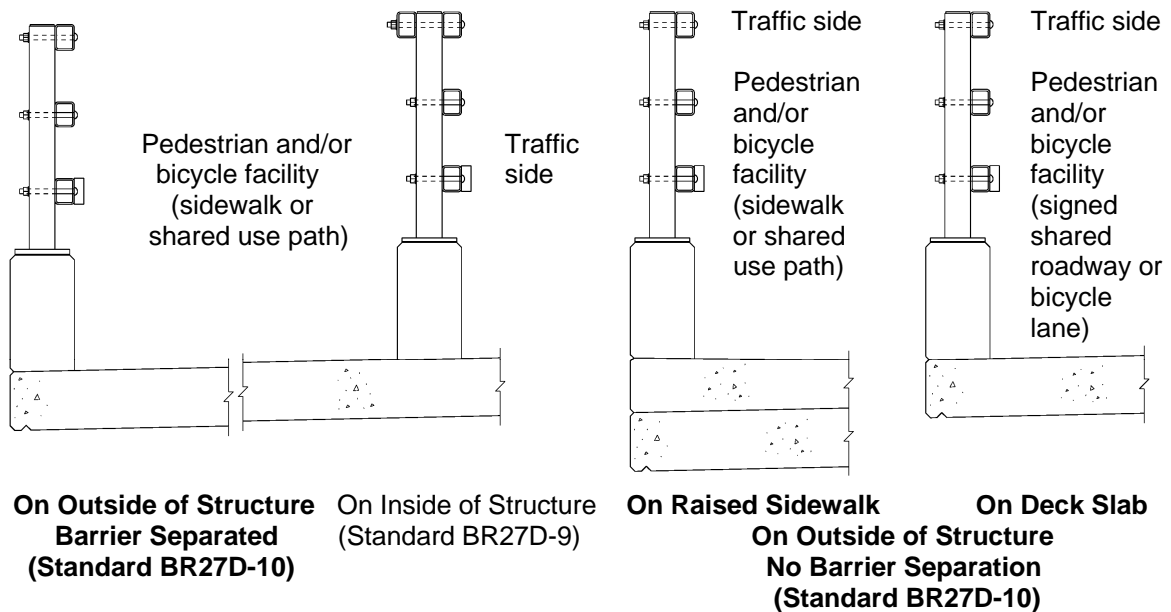
VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27D-SERIES

NOTES TO DESIGNER:

This railing is detailed for use on the outside of a structure adjacent to a pedestrian and/or bicycle facility regardless of whether a traffic barrier separates the pedestrian and/or bicycle facility from traffic. The traffic barrier can be mounted on a raised sidewalk or deck slab. The steel railing has a height of 4'-6" and has been crash tested for TL-2 (TL = test level). The crash tested rail has been modified from that which was crash tested. The railing does not meet the rail opening requirements in the AASHTO *Standard Specification for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by FHWA. The standard may be used when an open railing is required. If architectural treatment is required, use standard BR27D-10-AT.



For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27D-11) and the appropriate terminal wall standard (BR27T-5 thru BR27T-8) are to be included in the plans when using this standard. If this standard is used with an inside traffic barrier (i.e., Standard BR27D-9), the guard rail transitioning from the roadway will not be attached to the terminal wall on the outside of structure, but on the inside of structure. Therefore, the terminal wall standard selected would have to be modified by removing details and notes that pertain to guard rail attachment.

54" STEEL RAILING

BR27D-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 4'-6" height of the rail would need to be adjusted to 1'-7" and 4'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for rail additional notes.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0401 and RG0402 and/or RG0403 and RG0404.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of terminal wall, see sheet

Posts and rail members shall be ASTM A500 Grade B steel. Plates shall be ASTM A36 steel. Steel pipe sleeves shall be ASTM A53.

Bolts for attaching rails to post are 3/4" diameter round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325 unless otherwise indicated in the details. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436.

For bolts attaching rails to posts, bolt extensions beyond nut shall be limited to the smaller of one and a half finishing turns or 1/4". If the extension is longer, excess shall be cut off and the edges of the bolt end ground so that no sharp edges remain. Cold galvanizing shall be applied to damaged galvanized areas.

All steel shall be hot dip galvanized.

Posts shall be equally spaced within a span. Maximum spacing is 7'-0". Minimum spacing is 6'-6".

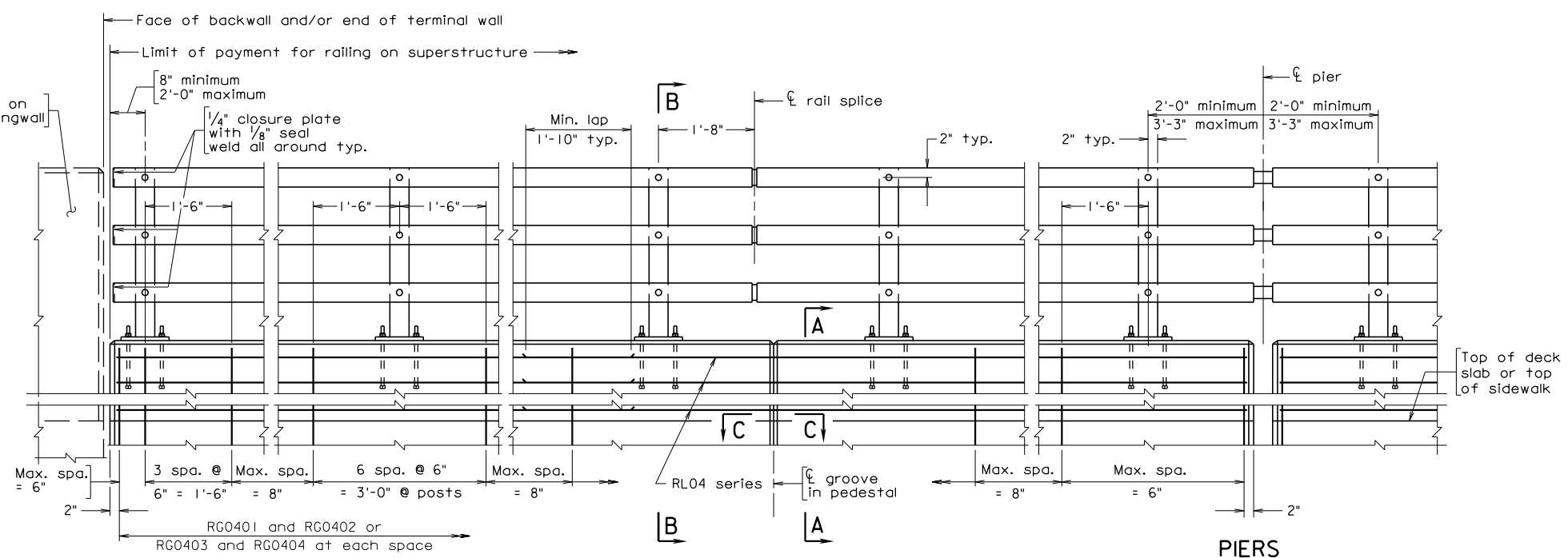
Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used to adjust post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be ground down.

Rails to be continuous over a minimum of 3 posts before splicing.

For additional notes, see sheet...

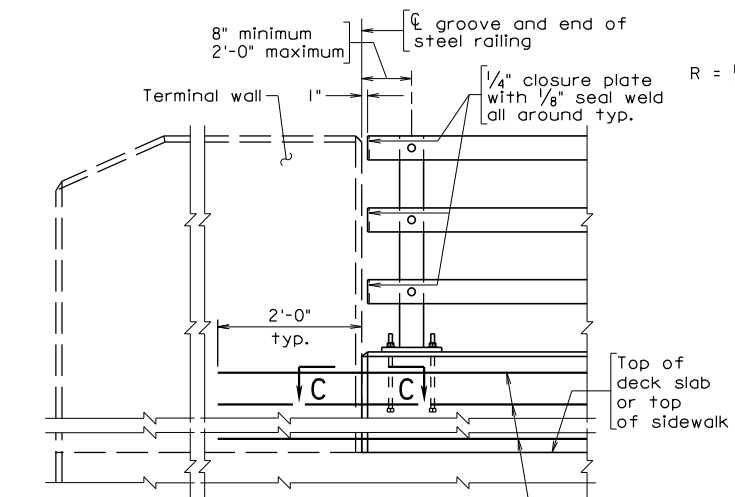
**The cover tolerance referenced in the VDOT Road and Bridge Specifications as -0" to +1/2" is shifted to -1/4" to +1/4" for placement of the RG04 series bars.



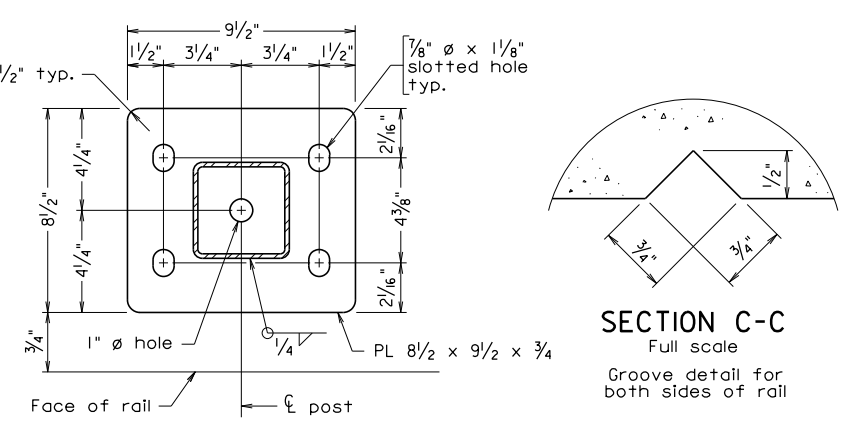
ABUTMENTS
Terminal Wall on Wingwall

ELEVATION

PIERS
with joint in slab

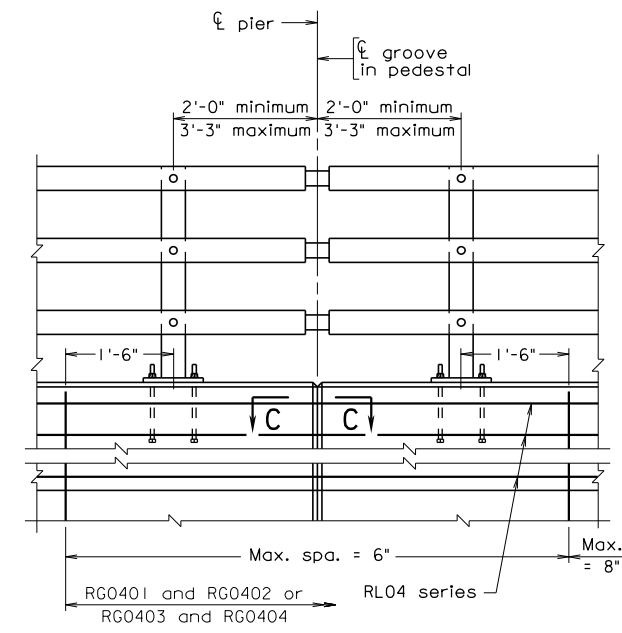


ABUTMENT
PART ELEVATION
Terminal Wall on Superstructure

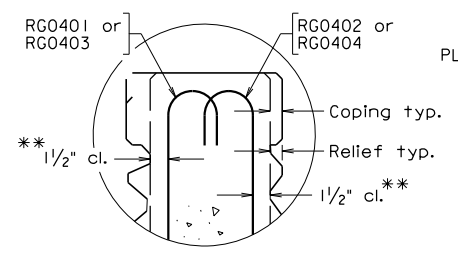


SECTION C-C
Full scale
Groove detail for both sides of rail

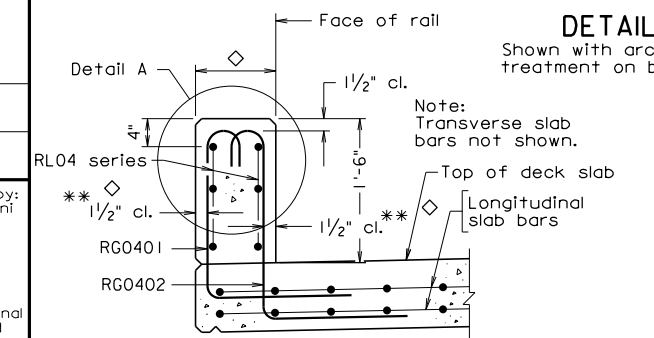
BASE PLATE DETAIL
Not to scale



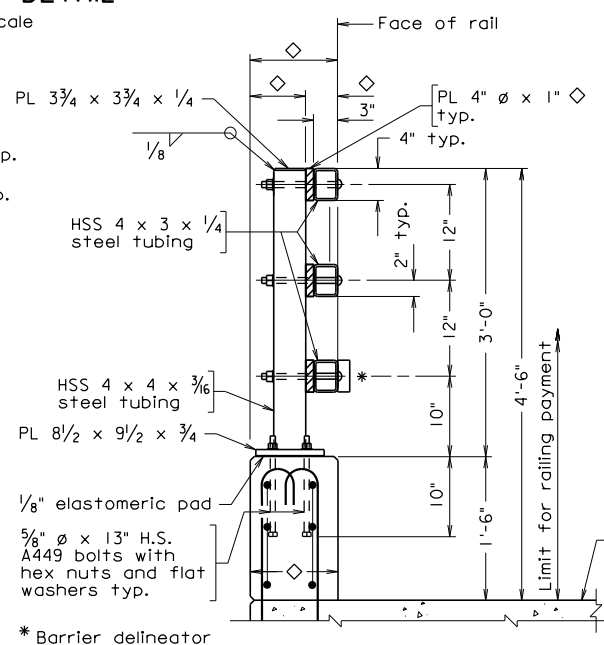
PIERS
Continuous - without joint in slab



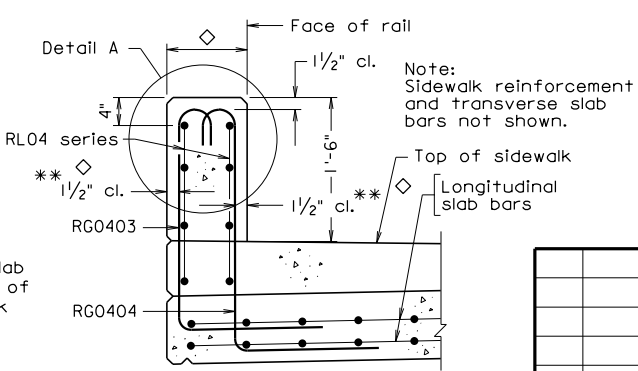
DETAIL A
Shown with architectural treatment on both sides



SECTION A-A
(Without sidewalk)
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"
Bolts through base plate shall be contained inside rebar cage



SECTION A-A
(With sidewalk)
Scale: 1" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RG0401	#4			3"	Parapet
RG0402	#4			3"	Parapet
RG0403	#4			3"	Parapet
RG0404	#4			3"	Parapet
RL04	#4				Parapet

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54"-BR27D STEEL RAILING WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
BR27D-10-AT					

BR27D-10-AT 03-10-2015

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
March 10, 2015

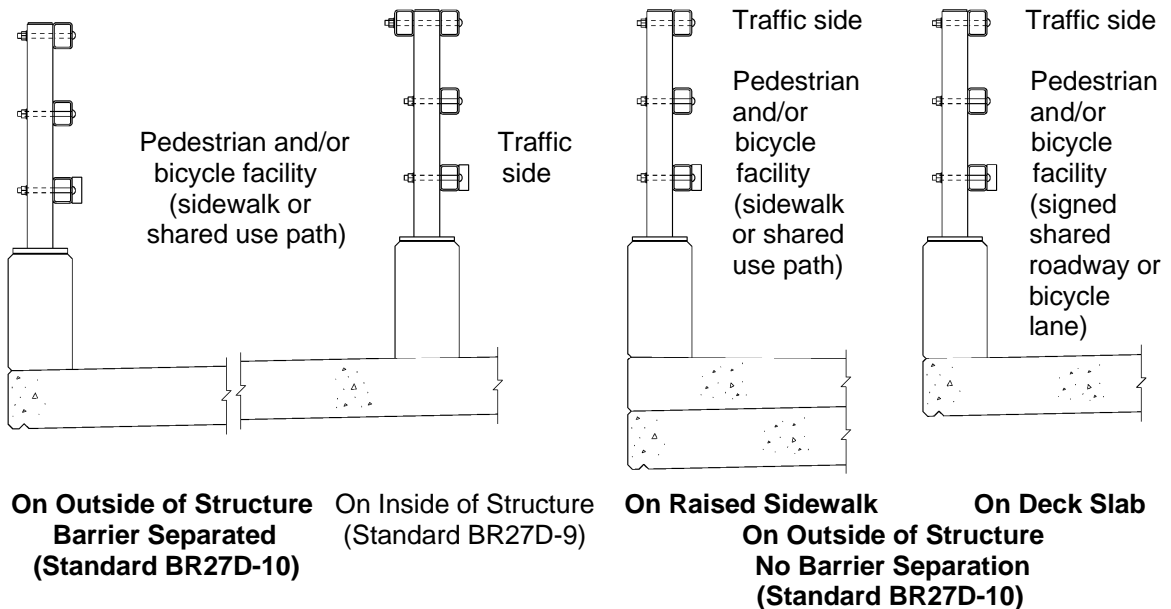
A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES**

NOTES TO DESIGNER:

This railing is detailed for use on the outside of a structure adjacent to a pedestrian and/or bicycle facility regardless of whether a traffic barrier separates the pedestrian and/or bicycle facility from traffic. The traffic barrier can be mounted on a raised sidewalk or deck slab. The steel railing has a height of 4'-6" and has been crash tested for TL-2 (TL = test level). The crash tested rail has been modified from that which was crash tested. The railing does not meet the rail opening requirements in the AASHTO *Standard Specification for Highway Bridges* as well as the AASHTO *LRFD Bridge Design Specifications*. A design exception has been approved by FHWA. The standard may be used when an open railing is required. This standard is used only when architectural treatment is required. If none is required, use standard BR27D-10.



(Architectural treatment not shown)

For geometrics of pedestrian and/or bicycle facilities, see Part 2, Chapter 6, of this manual.

Do not use the non-standard bid item for this rail. The bid item for this rail is RAILING BR27D 3 RAILS. See Part 2, Chapter 3, of this manual.

The rail connections and notes (standard BR27D-11-AT) and the appropriate terminal wall standard (BR27T-5-AT thru BR27T-8-AT) are to be included in the plans when using this standard. If this standard is used with an inside traffic barrier (i.e., Standard BR27D-9-AT), the guard rail transitioning from the roadway will not be attached to the terminal wall on the outside of structure, but on the inside of structure. Therefore, the terminal wall standard selected would have to be modified by removing details and notes that pertain to guard rail attachment.

54" STEEL RAILING
WITH ARCHITECTURAL TREATMENT
BR27D-SERIES

NOTES TO DESIGNER: (cont'd)

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from the top of the roadway surface. Therefore, for example if a 1" overlay at the roadway surface is set, the 1'-6" dimension and overall 4'-6" height of the rail would need to be adjusted to 1'-7" and 4'-7" respectively (Section B-B) and the 1'-6" dimension in Section A-A would have to be adjusted to 1'-7".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (1'-6") as noted above if an initial overlay is used on bridge.

SECTION B-B:

Modify vertical dimensions (1'-6" and 4'-6" railing height) as noted above if an initial overlay is used on bridge.

Complete sheet no. for architectural drawing(s).

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet no. for terminal wall.

Complete sheet no. for additional notes.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0401 and RG0402 and/or RG0403 and RG0404.

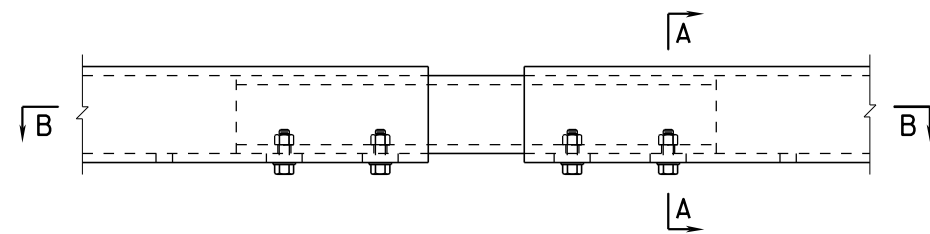
TITLE BLOCK:

Replace standard designation with plan number.

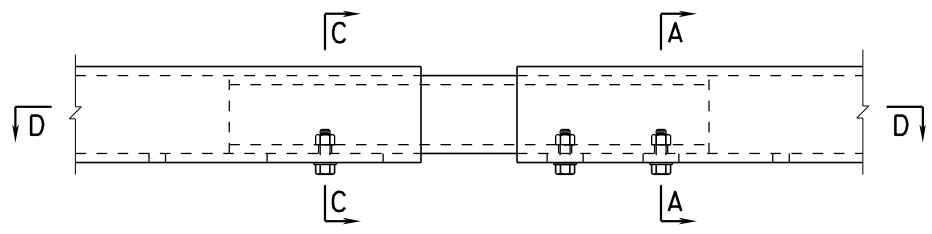
STANDARD BR27D-10-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 10Mar2015
SHEET 3 of 3
FILE NO. BR27D-10-AT-3

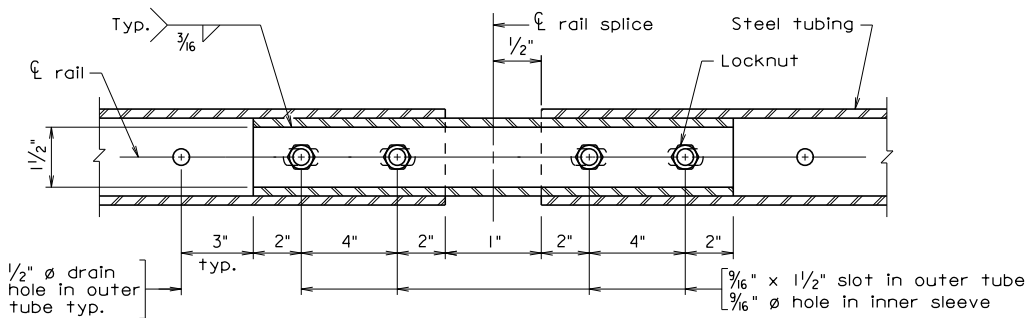
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



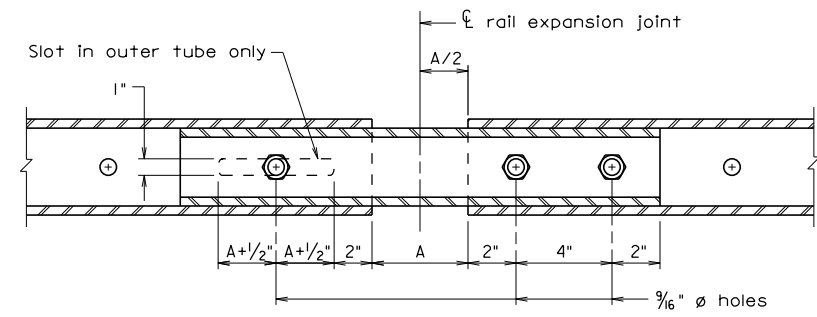
ELEVATION VIEW



ELEVATION VIEW

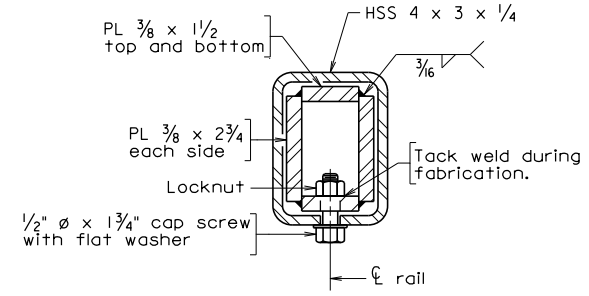


SECTION B-B



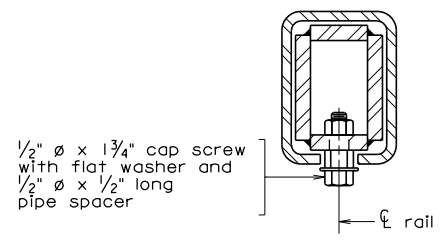
SECTION D-D

For details and dimensions not shown, see Section B-B.



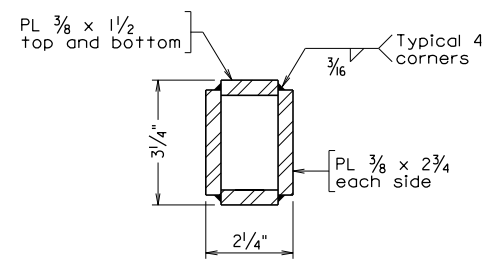
SECTION A-A
SECTION AT RAIL SPLICE

RAIL SPLICE DETAILS



SECTION C-C
Details not shown similar to Section A-A.

RAIL EXPANSION JOINT DETAILS



FINISHED DIMENSIONS OF INNER SLEEVE RAIL

Notes (cont'd):

Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be lightened only to a point that will allow railing movement.

Drain holes shall be 1/2" diameter and shall be provided in all rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each end of rail.

Anchor bolts may be set normal to profile grade but may require beveled washers.

Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.

Alternate details for inner sleeve rail fabrication and bolted connection to outer tube may be submitted, but only used if approved by the Structure and Bridge Division Engineering Services Program Area. No thru-bolt connections will be approved.

Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.

BR27D-11 03-10-2015 br27d11.dgn

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
BR27D RAIL CONNECTIONS AND NOTES			
No.	Description	Date	Sheet No.
	Revisions		BR27D-11

BR27D-SERIES STEEL RAILING
RAIL CONNECTIONS AND NOTES

NOTES TO DESIGNER:

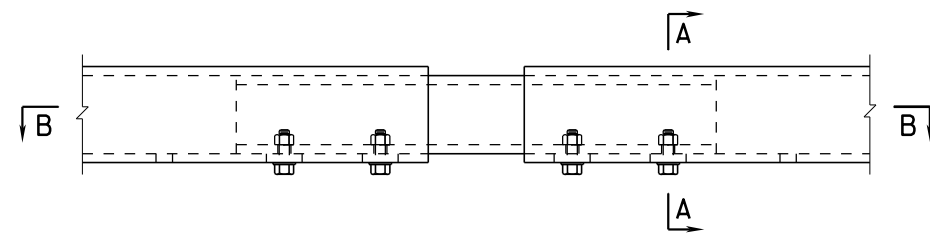
Include this standard in plans when using standard, BR27D-8 to BR27D-10.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

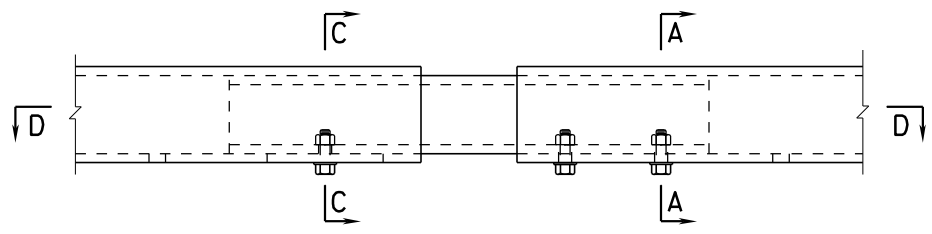
TITLE BLOCK:

Replace standard designation with plan number.

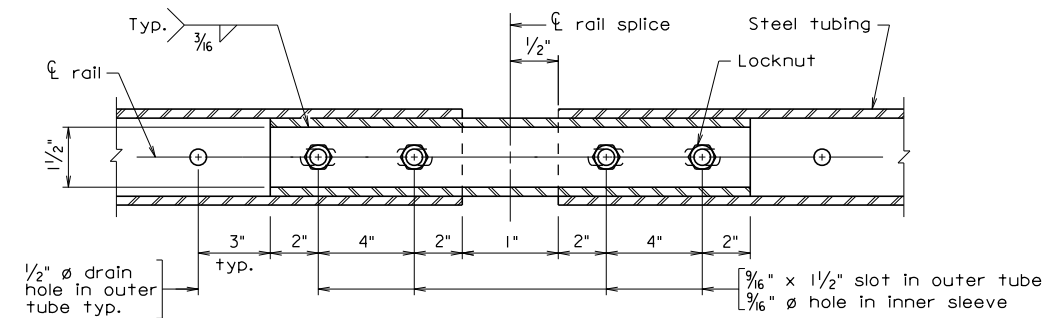
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



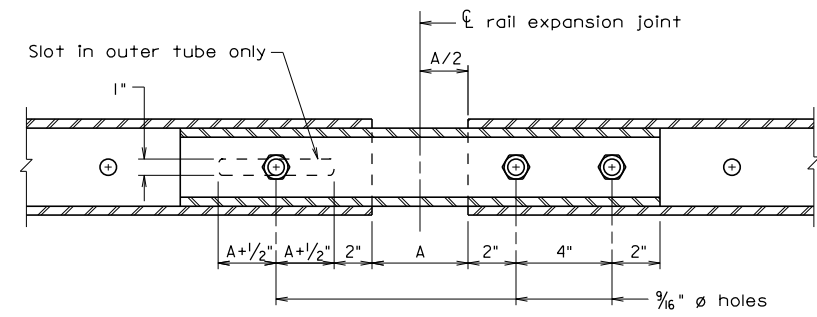
ELEVATION VIEW



ELEVATION VIEW

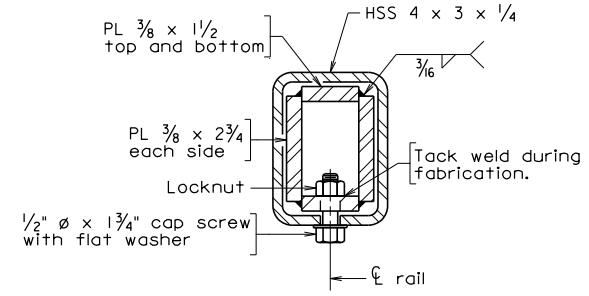


SECTION B-B



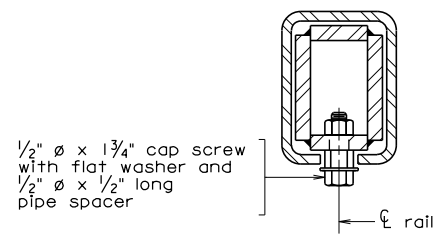
SECTION D-D

For details and dimensions not shown, see Section B-B.



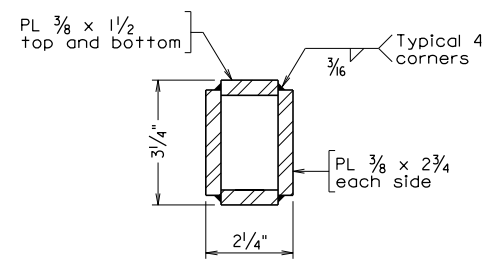
SECTION A-A
SECTION AT RAIL SPLICE

RAIL SPLICE DETAILS



SECTION C-C
Details not shown similar to Section A-A.

RAIL EXPANSION JOINT DETAILS



FINISHED DIMENSIONS OF INNER SLEEVE RAIL

Notes (cont'd):

Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be lightened only to a point that will allow railing movement.

Drain holes shall be 1/2" diameter and shall be provided in all rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each end of rail.

Anchor bolts may be set normal to profile grade but may require beveled washers.

Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.

Alternate details for inner sleeve rail fabrication and bolted connection to outer tube may be submitted, but only used if approved by the Structure and Bridge Division Engineering Services Program Area. No thru-bolt connections will be approved.

Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule. Concrete included in the architectural treatment is excluded.

Bid price for architectural treatment includes concrete in relief and coping.

BR27D-11-AT 03-10-2015 br27d11.at.dgn

Sealed and Signed by:
Prasad L. Nallapareni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
BR27D RAIL CONNECTIONS AND NOTES WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Designed: S&B...DIV Date Drawn: ...S&B...DIV Checked: S&B...DIV
Revisions			Plan No. Sheet No. BR27D-11-AT

**BR27D-SERIES STEEL RAILING
WITH ARCHITECTURAL TREATMENT
RAIL CONNECTIONS AND NOTES**

NOTES TO DESIGNER:

Include this standard in plans when using standard, BR27D-8-AT to BR27D-10-AT.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Architectural treatment for the railing and terminal walls shall simulate chiseled limestone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled limestone pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

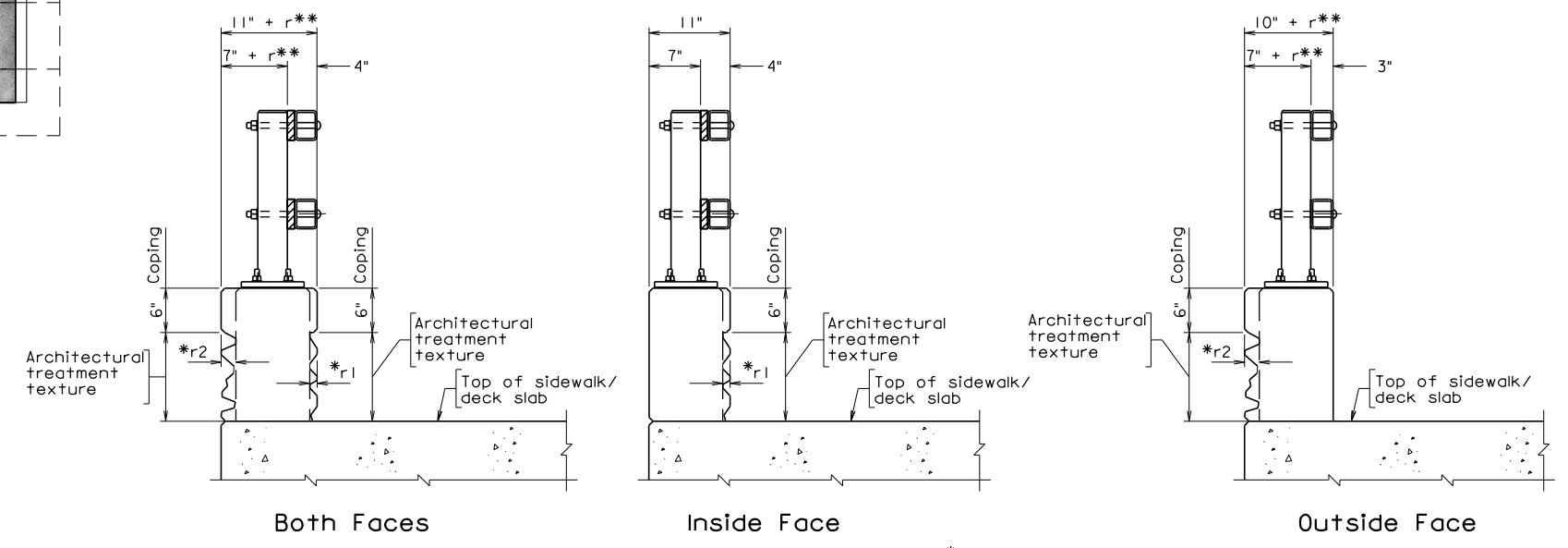
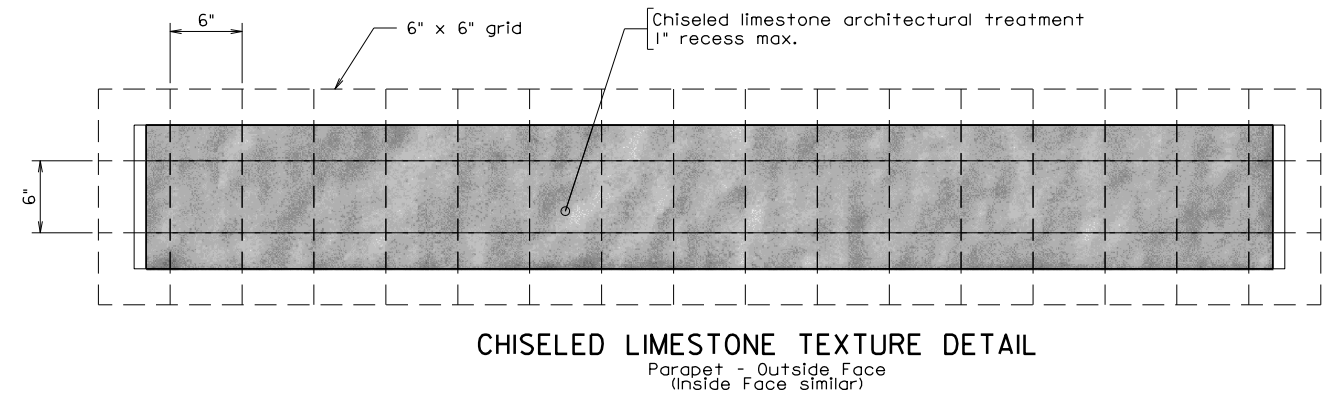
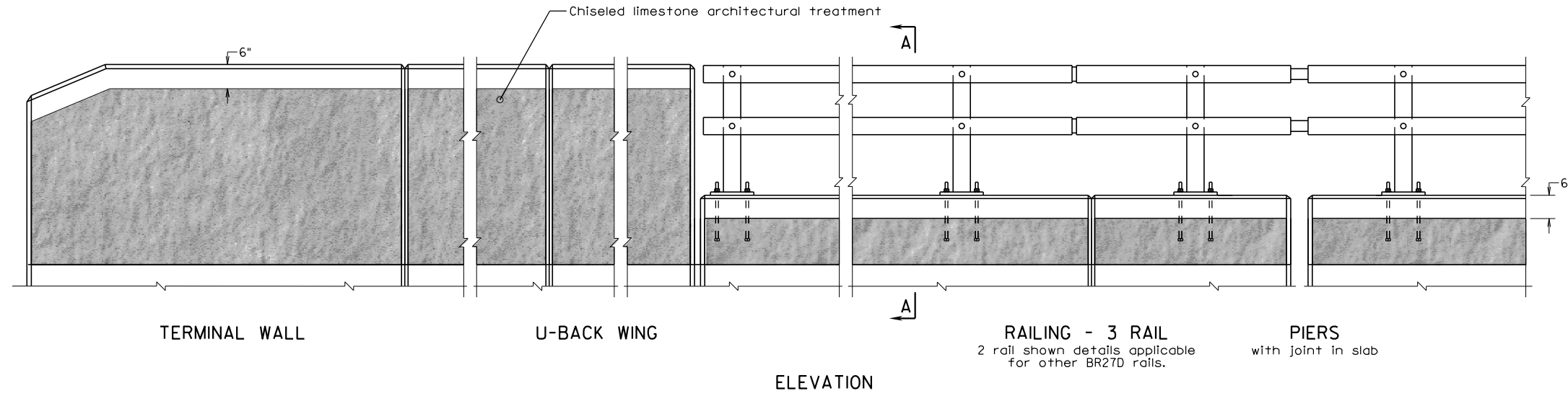
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
2 rail shown details applicable for other BR27D rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

br27dat1.dgn
03-10-2015
BR27D-AT-1

Sealed and Signed by:
Prasad L. Nallapareni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR STEEL RAILING BR27D					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
	Revisions		Checked: S&B...DIV		BR27D-AT-1

**ARCHITECTURAL TREATMENT
WITH CHISLED LIMESTONE
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

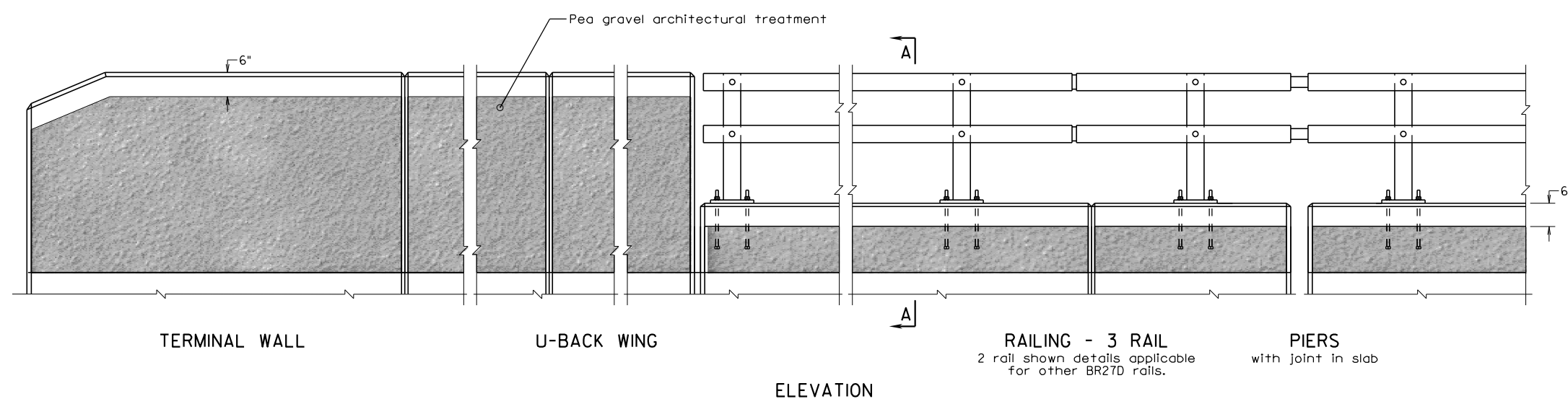
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate pea gravel texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous pea gravel pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

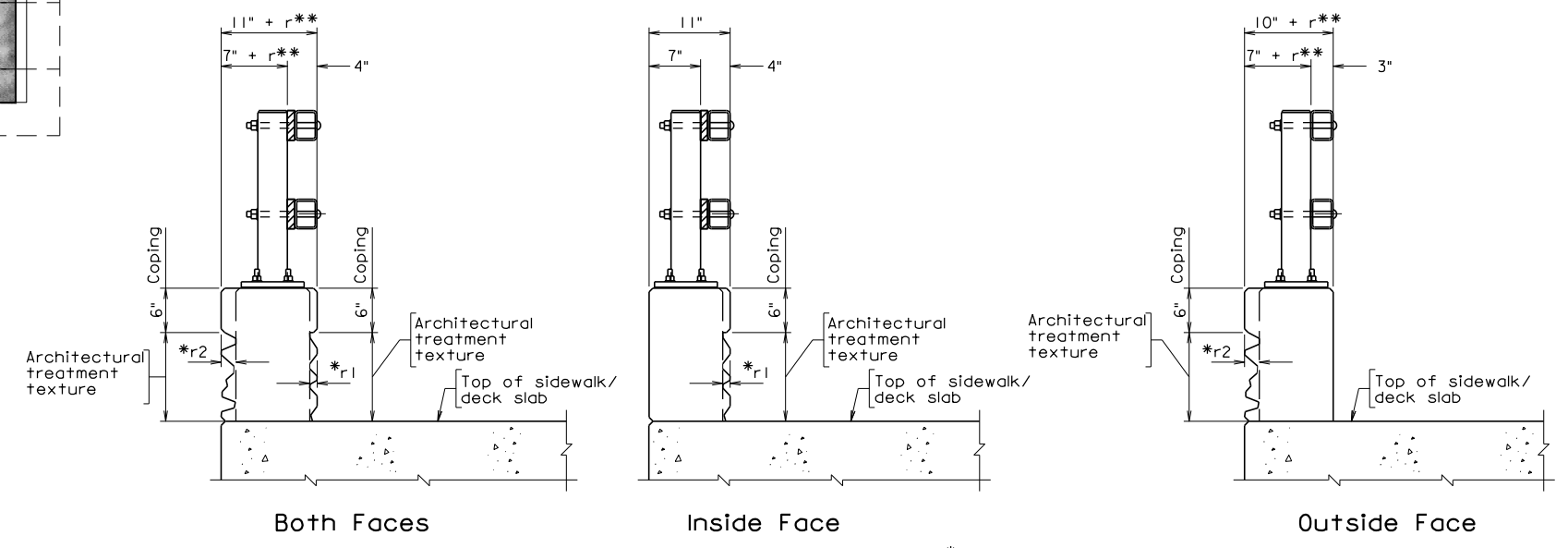
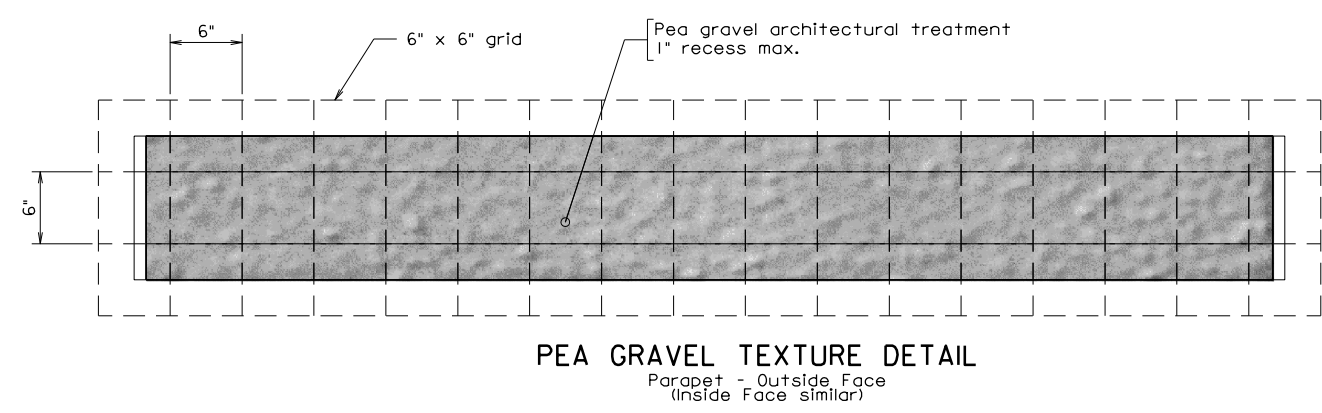
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
2 rail shown details applicable for other BR27D rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27D-AT-2 03-10-2015 br27dat2.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH PEA GRAVEL FOR STEEL RAILING BR27D			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27D-AT-2	

Not to scale

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**ARCHITECTURAL TREATMENT
WITH PEA GRAVEL
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

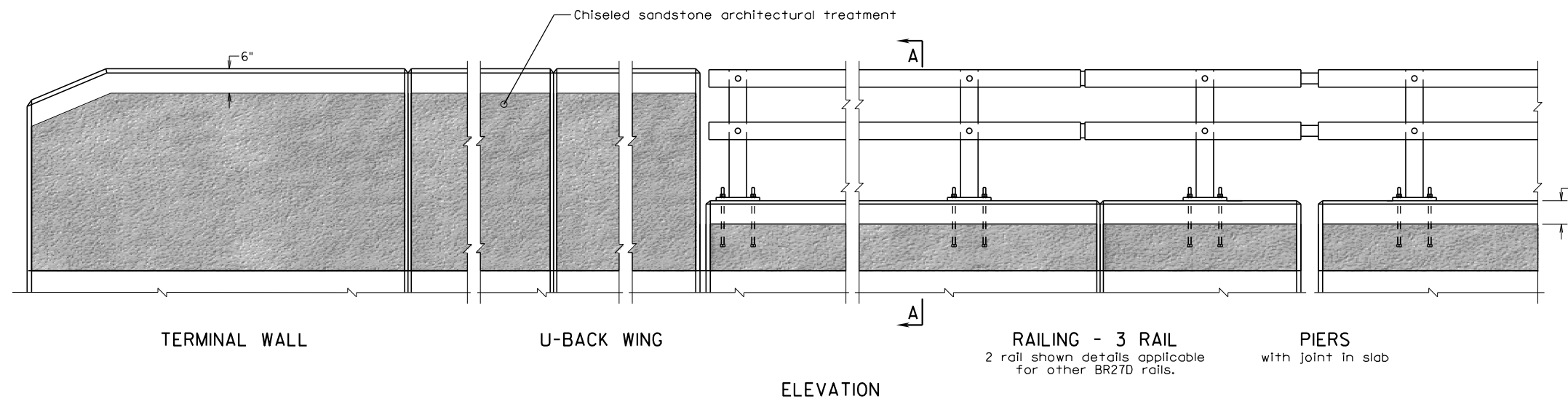
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectura treatment for the railing and terminal walls shall simulate chiseled sandstone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous chiseled sandstone pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

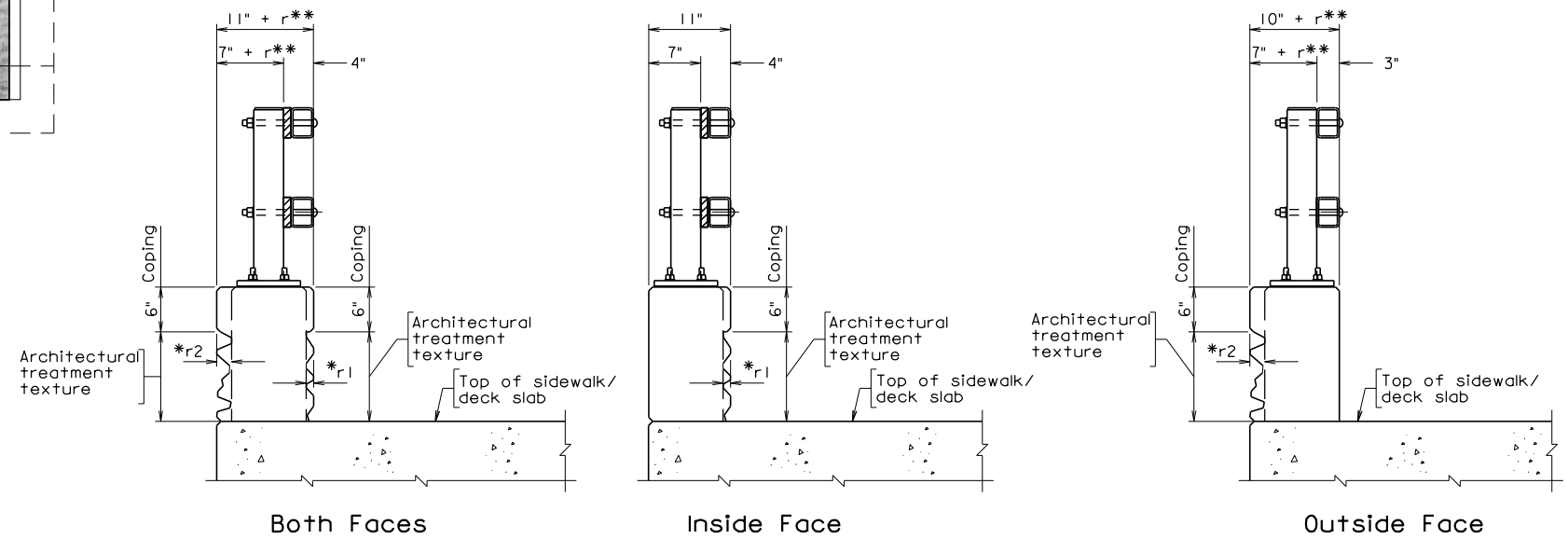
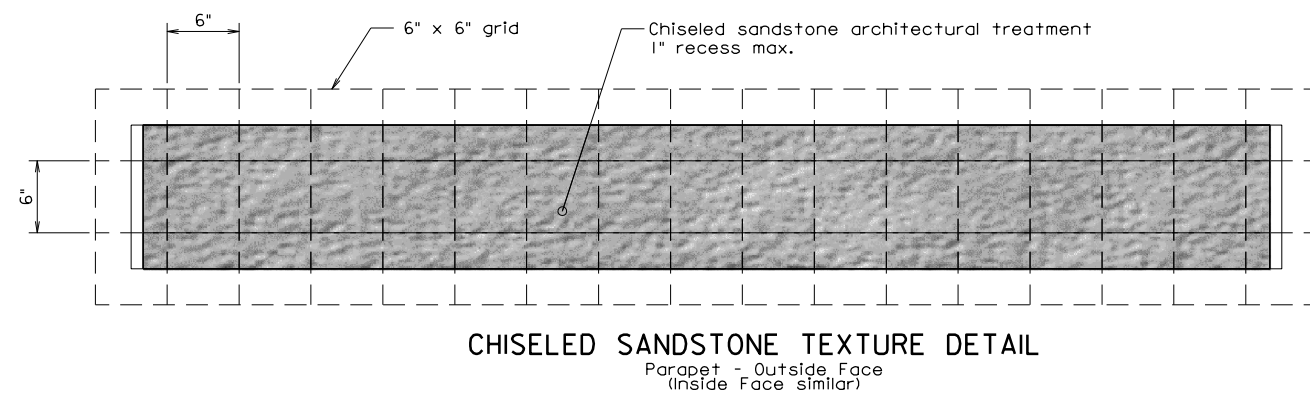
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

BR27D-AT-3

03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED SANDSTONE FOR STEEL RAILING BR27D			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
Plan No.		Sheet No.	
		BR27D-AT-3	

**ARCHITECTURAL TREATMENT
WITH CHISLED SANDSTONE
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

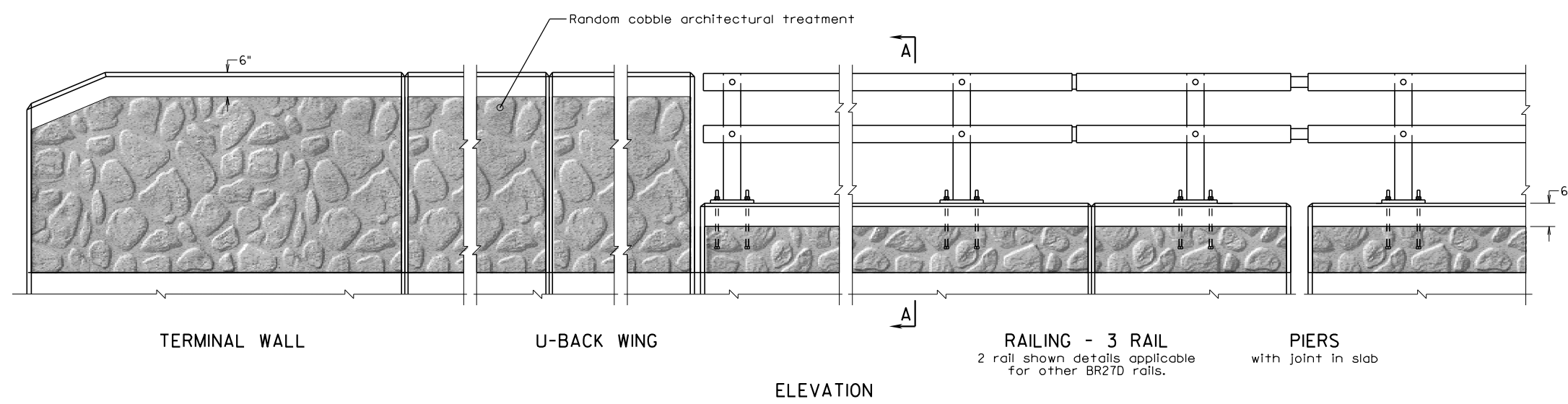
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate random cobble texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous random cobble pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

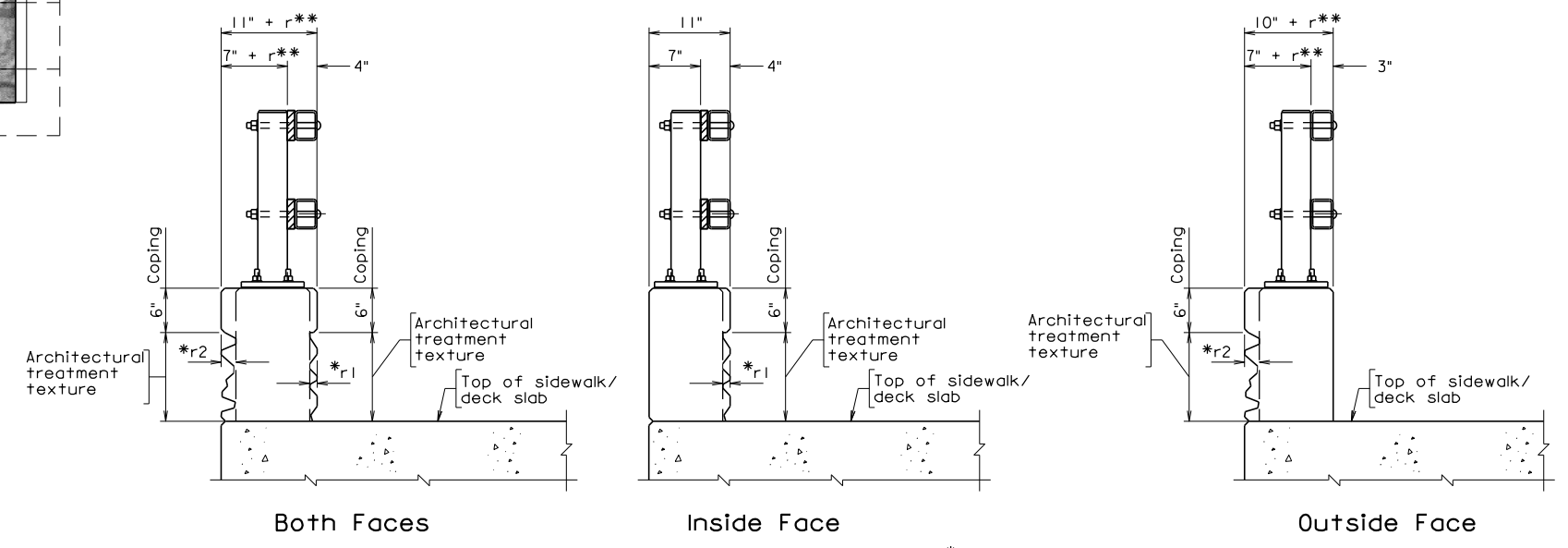
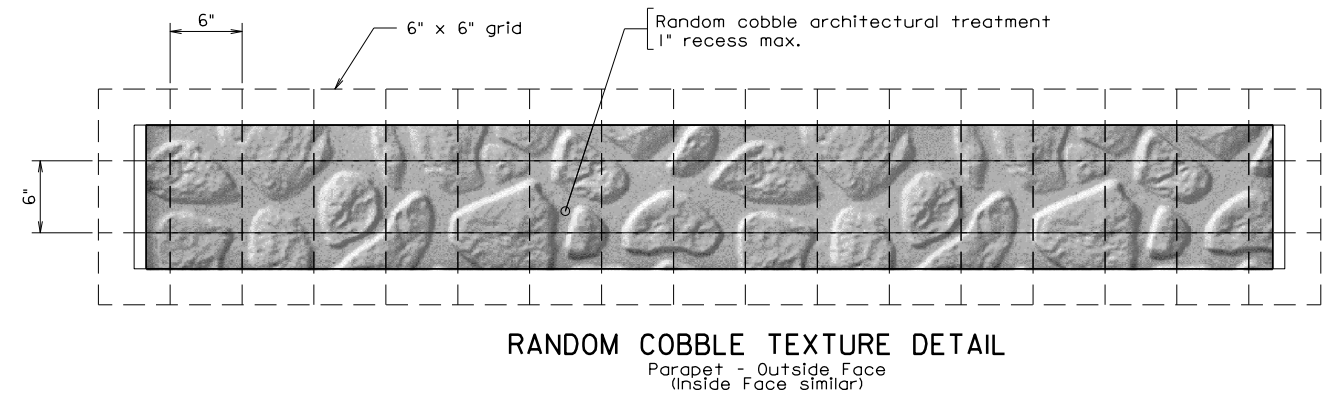
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
2 rail shown details applicable for other BR27D rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"

br27dat4.dgn
03-10-2015
BR27D-AT-4

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RANDOM COBBLE FOR STEEL RAILING BR27D			
No.	Description	Date	Revisions
Designed: S&B...DIV	Drawn: ...S&B...DIV	Checked: S&B...DIV	Date
			Plan No.
			Sheet No.
			BR27D-AT-4

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**ARCHITECTURAL TREATMENT
WITH RANDOM COBBLE
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

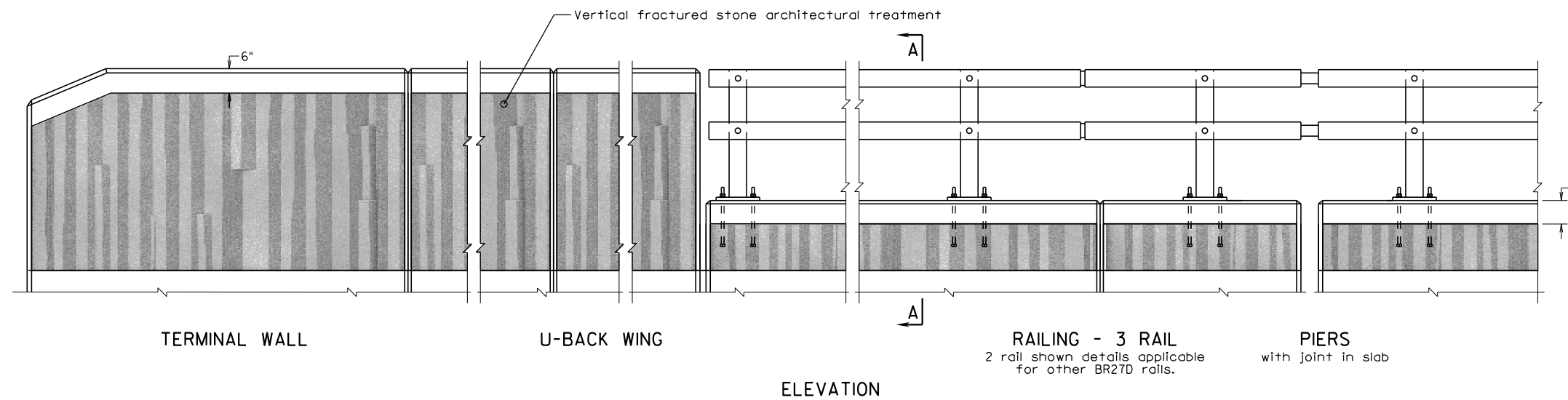
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate vertical fractured stone texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous vertical fractured stone pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

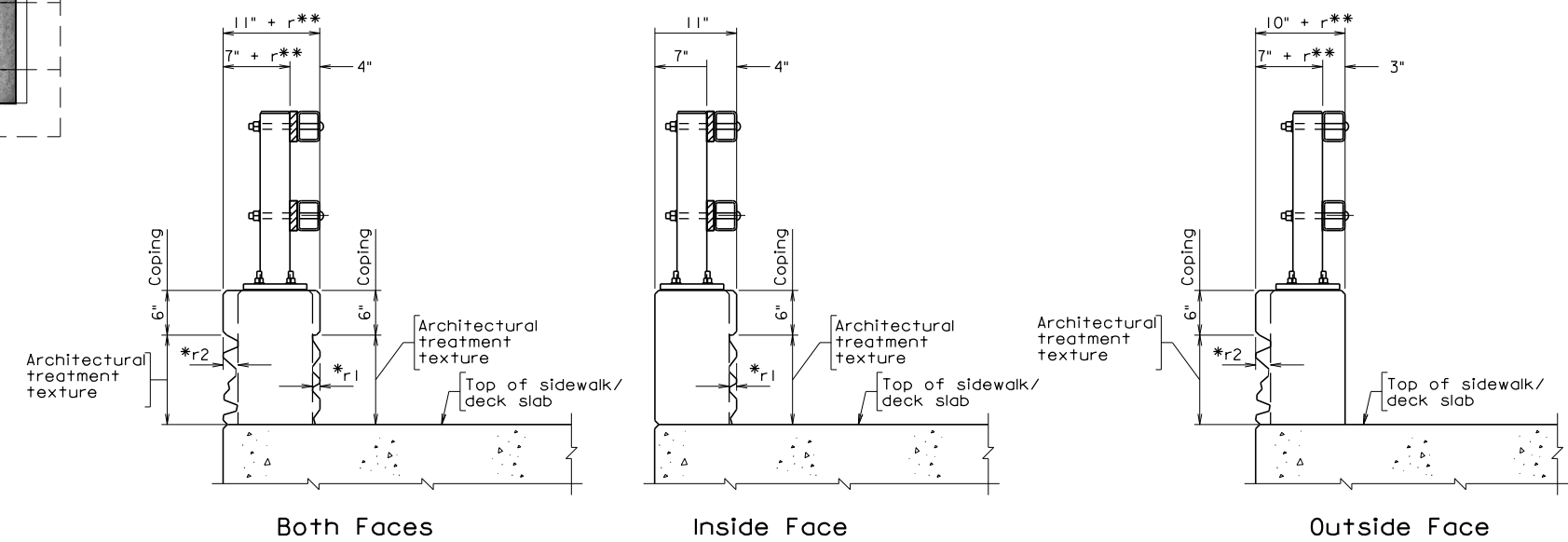
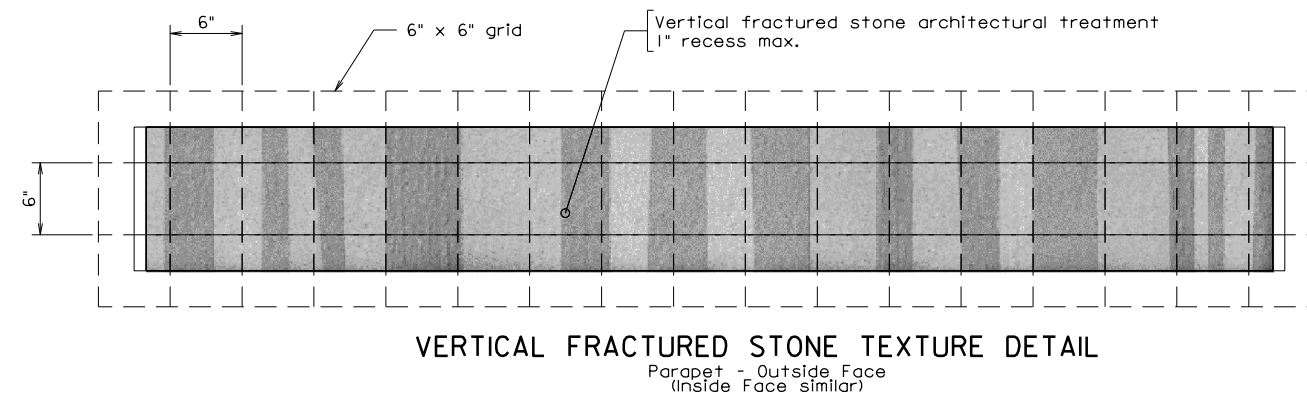
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 > 1"
r = 2" for 1" < r2 < 2"

BR27D-AT-5

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
ARCHITECTURAL TREATMENT WITH VERTICAL FRACTURED STONE FOR STEEL RAILING BR27D	
No.	Description
Revisions	
Date	Date
Designed: S&B...DIV	Plan No.
Drawn: S&B...DIV	Sheet No.
Checked: S&B...DIV	

BR27D-AT-5

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**ARCHITECTURAL TREATMENT
WITH VERTICAL FRACTURE STONE
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

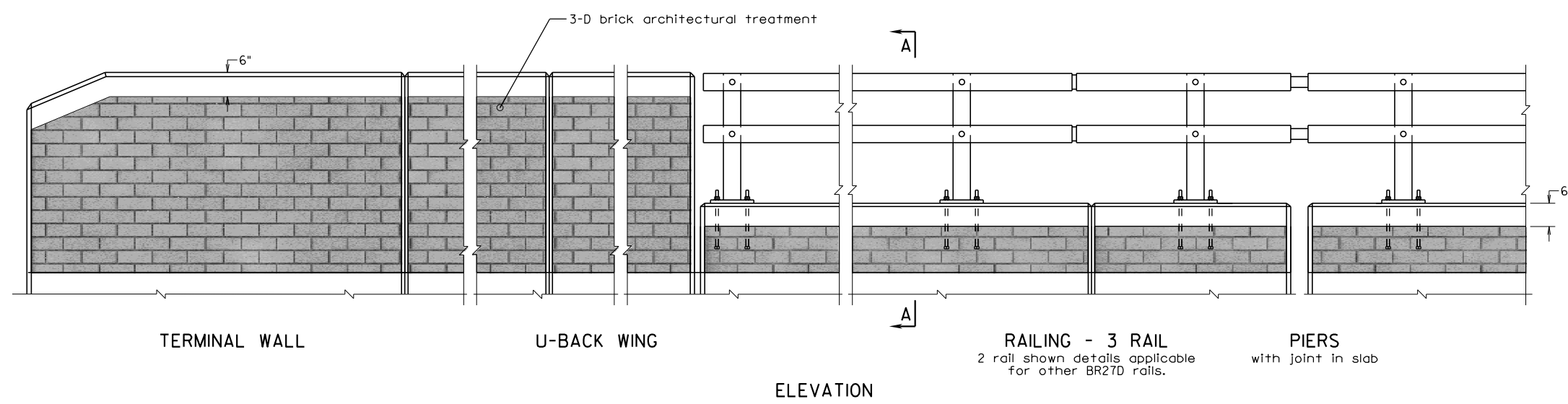
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate 3-D brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous 3-D brick pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

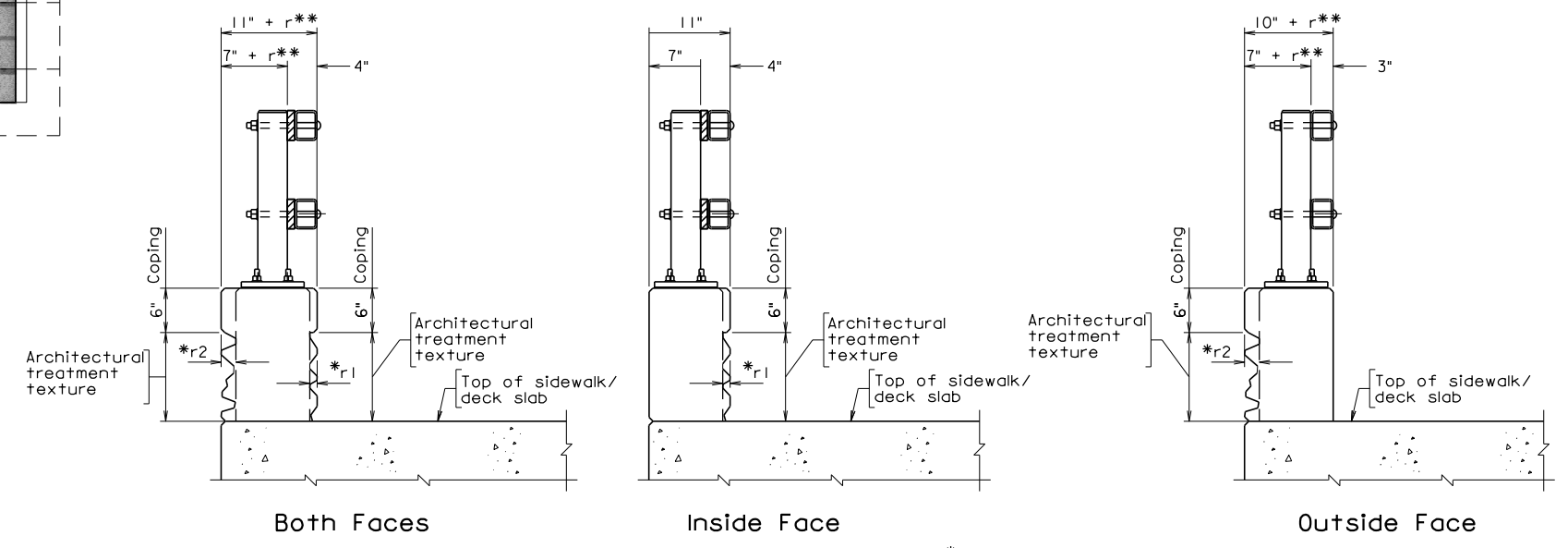
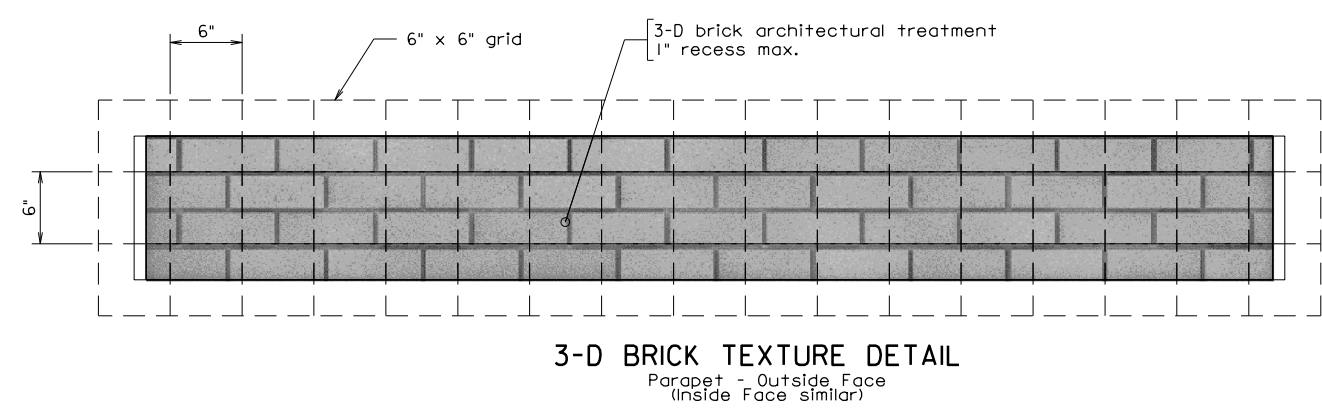
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 < 1"
r = 2" for 1" < r2 < 2"

BR27D-AT-6

03-10-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH 3-D BRICK FOR STEEL RAILING BR27D			
No.	Description	Date	Sheet No.
Revisions		Date	Plan No.
Designed: S&B...DIV		Date	Sheet No.
Drawn: S&B...DIV		BR27D-AT-6	
Checked: S&B...DIV			

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**ARCHITECTURAL TREATMENT
WITH 3-D BRICK
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Architectural treatment for the railing and terminal walls shall simulate cedar stake texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous cedar stake pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

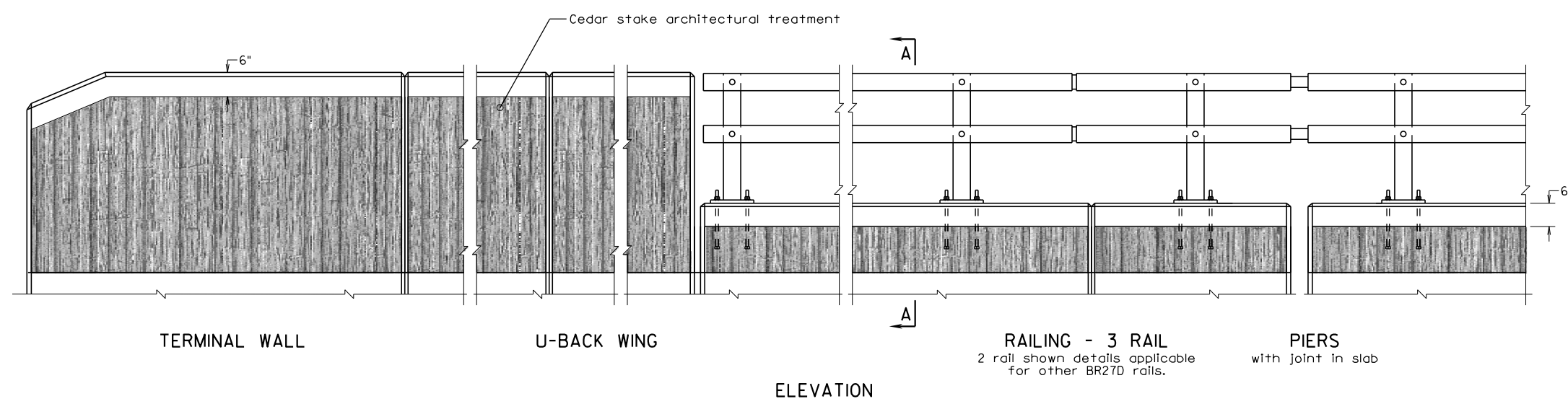
Details show a 8'-0" long form liner between grooves and joints. If any deviations from the standard 8'-0" form liner length are planned, the Contractor shall submit shop drawings with pattern layout for the Department approval.

Terminal wall length is 7'-3". Contractor shall submit shop drawings showing the terminal wall pattern layout for the inside and outside face to the Department for approval.

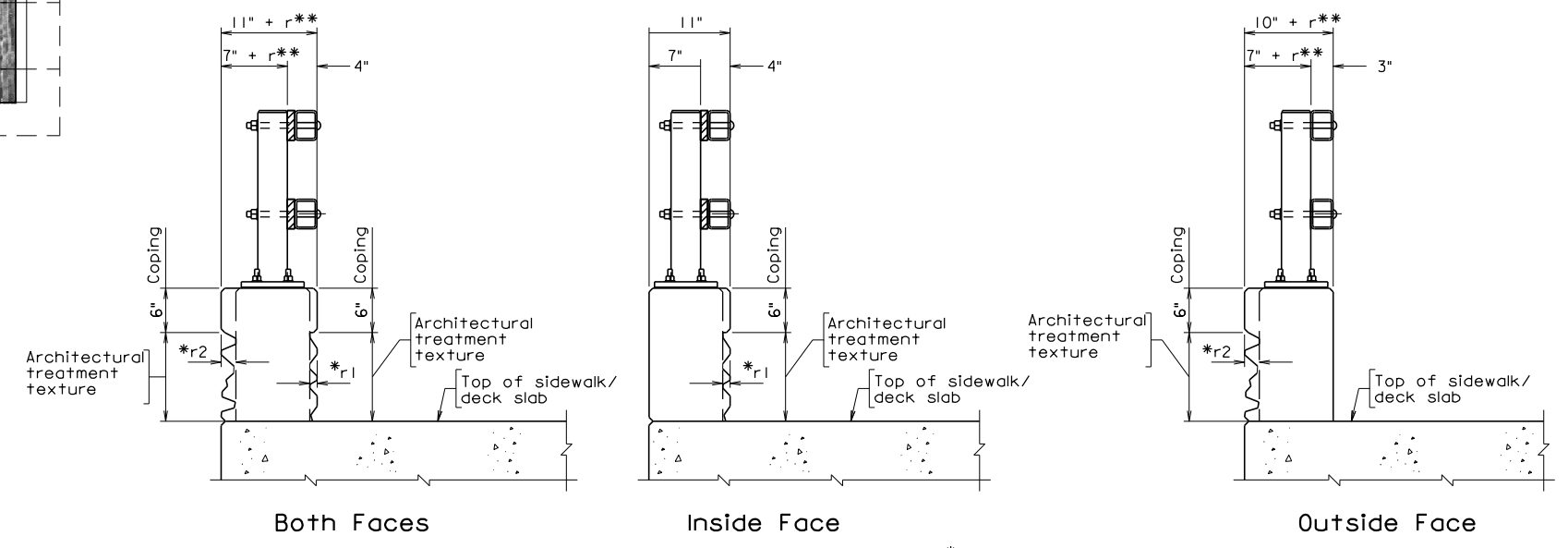
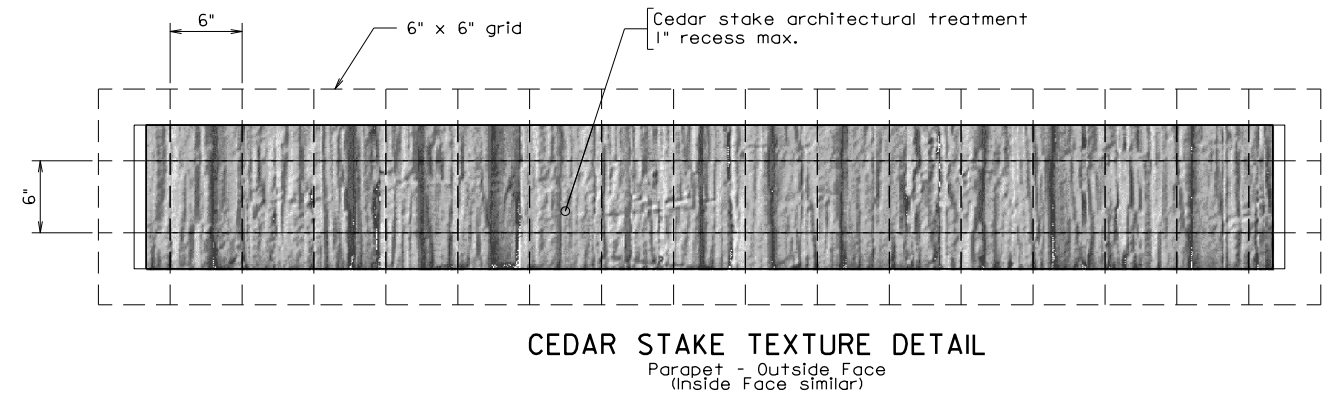
Architectural treatment shall be applied on XXXX of the barrier.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.



	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 < 1"
r = 2" for 1" < r2 < 2"

BR27D-AT-7 03-10-2015 br27dat7.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CEDAR STAKE FOR STEEL RAILING BR27D			
No.	Description	Date	Sheet No.
	Revisions		BR27D-AT-7

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**ARCHITECTURAL TREATMENT
WITH CEDAR STAKE
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

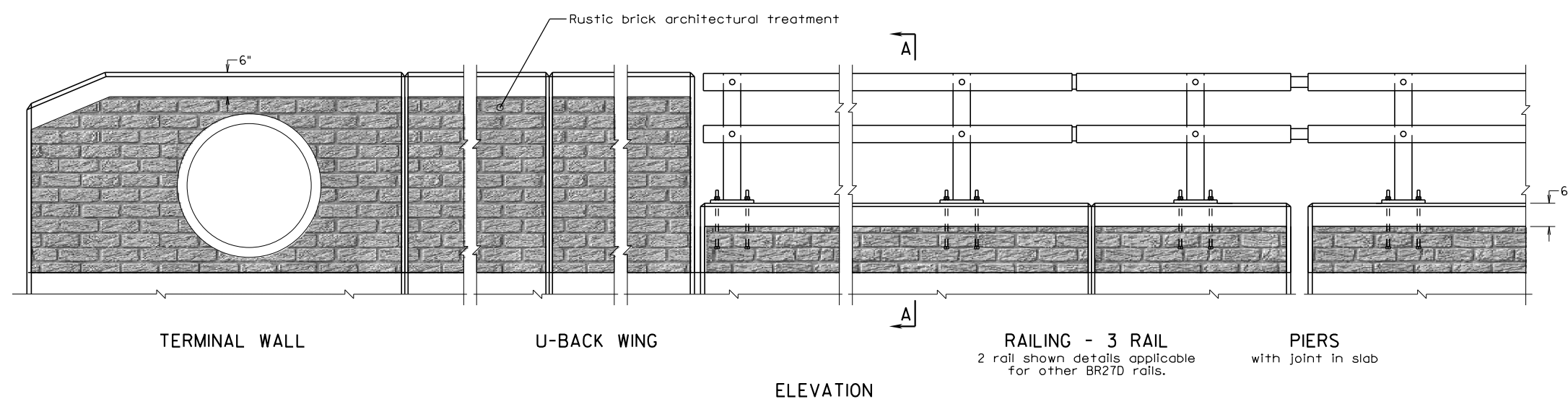
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate rustic brick texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous rustic brick pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

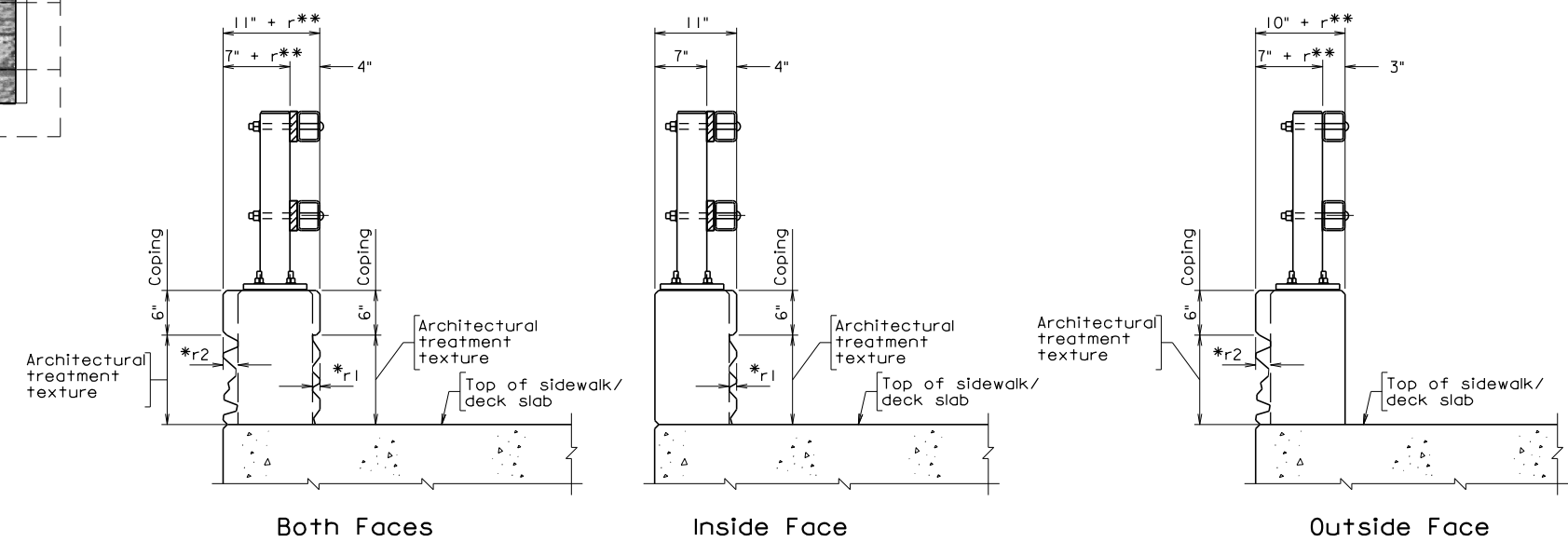
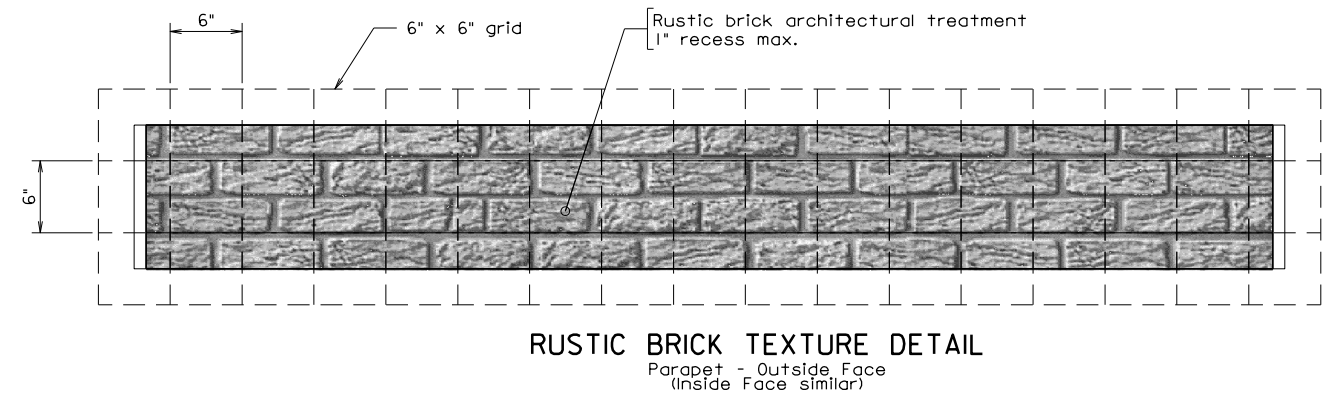
Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

Medallions are required on XXXX of the barrier.

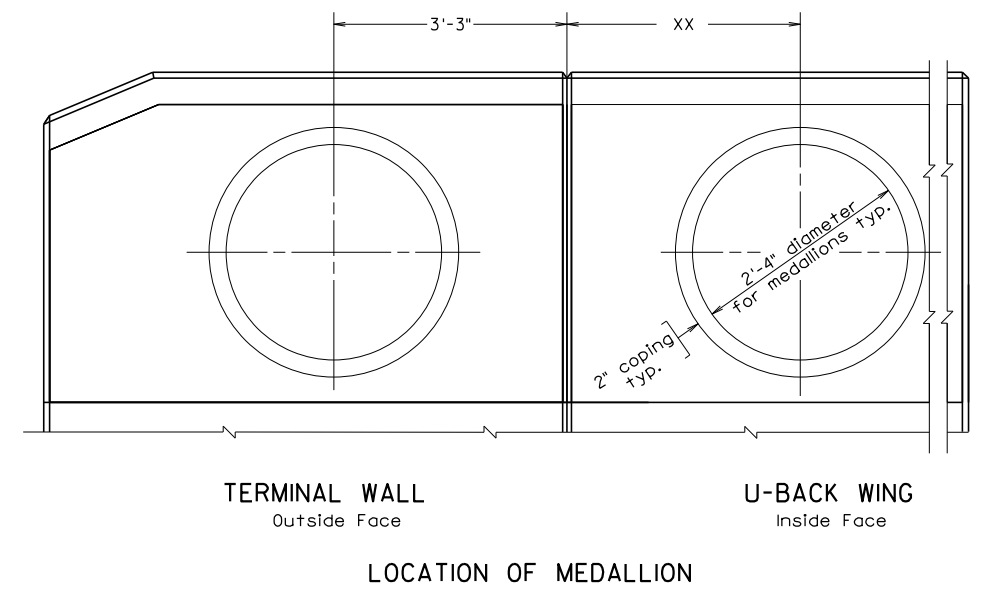
Medallion type shall be XX. For medallion details, see sheet XX.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27D-AT-8 03-10-2015 br27dat8.dgn

Sealed and Signed by:
Prasad L. Nallipomeni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH RUSTIC BRICK FOR STEEL RAILING BR27D			
No.	Description	Date	Sheet No.
	Revisions		BR27D-AT-8

**ARCHITECTURAL TREATMENT
WITH RUSTIC BRICK AND MEDALLIONS
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s). The standard includes architectural treatment (rustic brick texture) and 2'-4" diameter medallion(s). For medallion options, see standards BR27-ATM-1 and BR27-ATM-2. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information including location for the medallion(s), see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

LOCATION OF MEDALLION:

Add dimension for medallion on inside face if medallion is required. See Part 2, Chapter 5: Architectural Treatment, of this manual for location of medallions.

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

Specify face(s) of the rail to which a medallion is to be applied: (inside face, outside face or both faces).

Specify name of medallion to be applied. Complete sheet number for medallion standard.

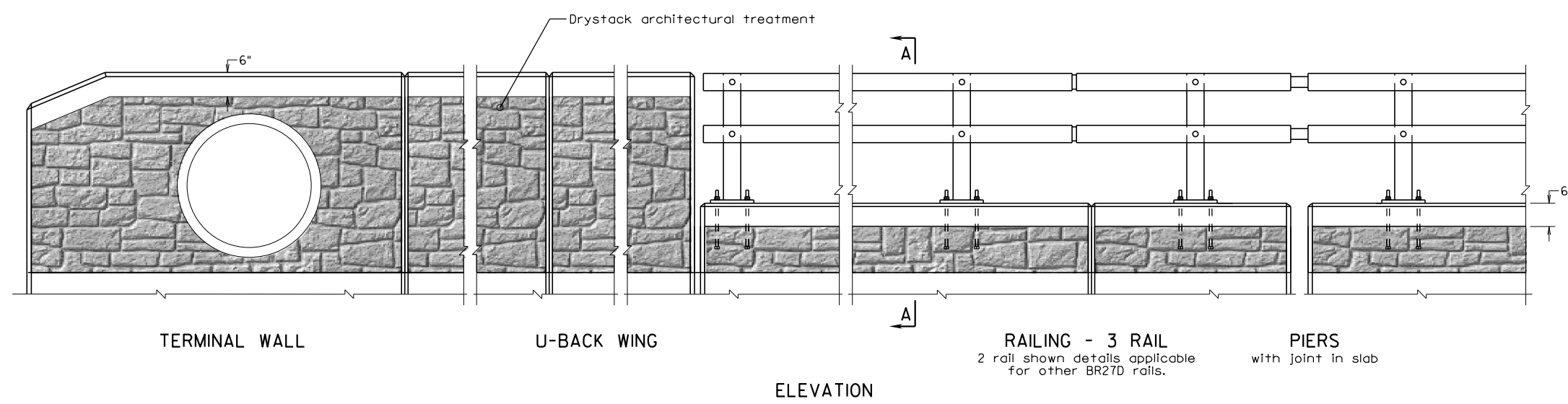
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID		STATE		SHEET NO.
ROUTE	PROJECT		ROUTE	PROJECT	
VA.					



Notes:

Architectural treatment for the railing and terminal walls shall simulate drystack texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous drystack pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

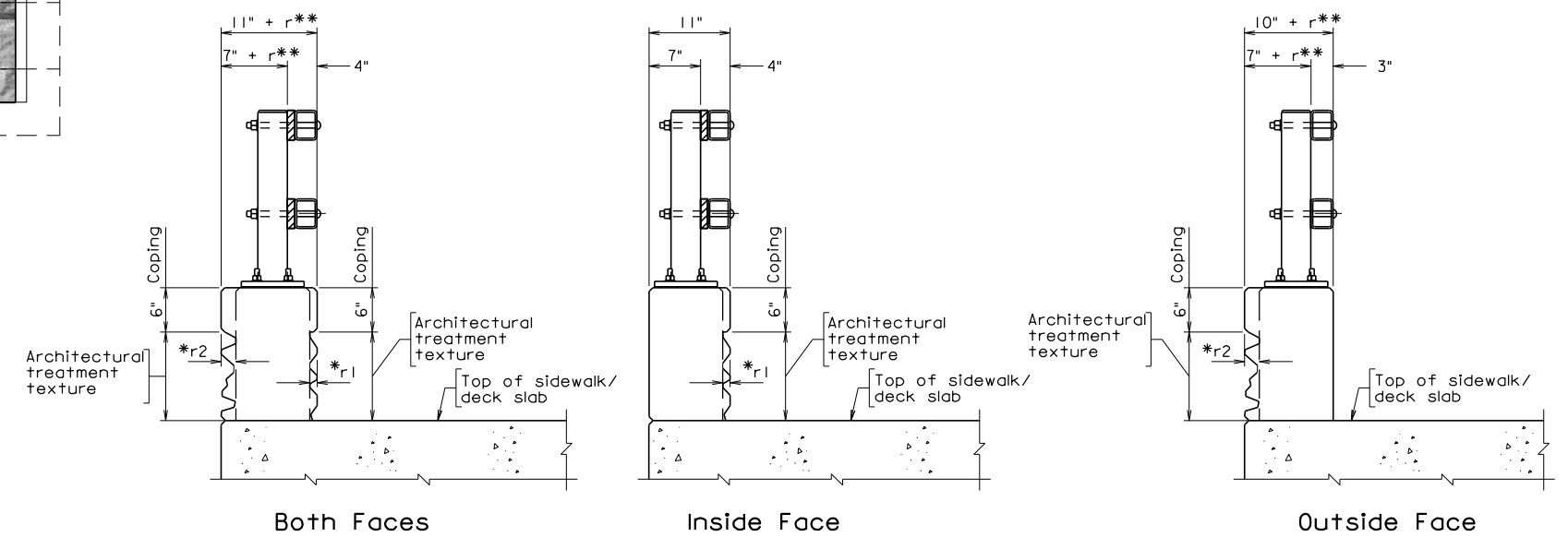
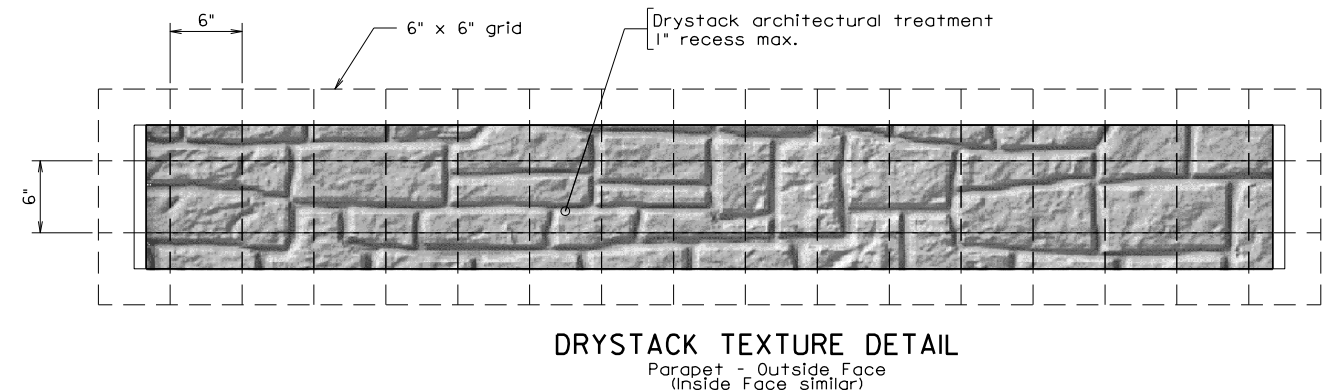
Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

Medallions are required on XXXX of the barrier.

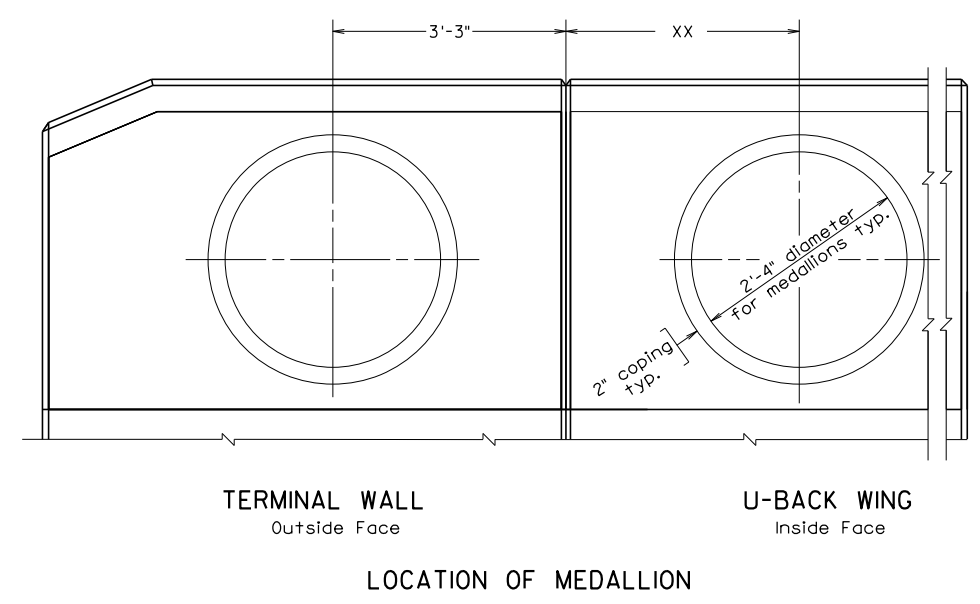
Medallion type shall be XX. For medallion details, see sheet XX.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27D-AT-9

03-10-2015

br27dat9.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH DRYSTACK FOR STEEL RAILING BR27D			
No.	Description	Date	Revisions
Designed: S&B...DIV		Date	Plan No.
Drawn: ...S&B...DIV		Sheet No.	
Checked: S&B...DIV		BR27D-AT-9	

**ARCHITECTURAL TREATMENT
WITH DRYSTACK AND MEDALLIONS
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s). The standard includes architectural treatment (rustic brick texture) and 2'-4" diameter medallion(s). For medallion options, see standards BR27-ATM-1 and BR27-ATM-2. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information including location for the medallion(s), see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

LOCATION OF MEDALLION:

Add dimension for medallion on inside face if medallion is required. See Part 2, Chapter 5: Architectural Treatment, of this manual for location of medallions.

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

Specify face(s) of the rail to which a medallion is to be applied: (inside face, outside face or both faces).

Specify name of medallion to be applied. Complete sheet number for medallion standard.

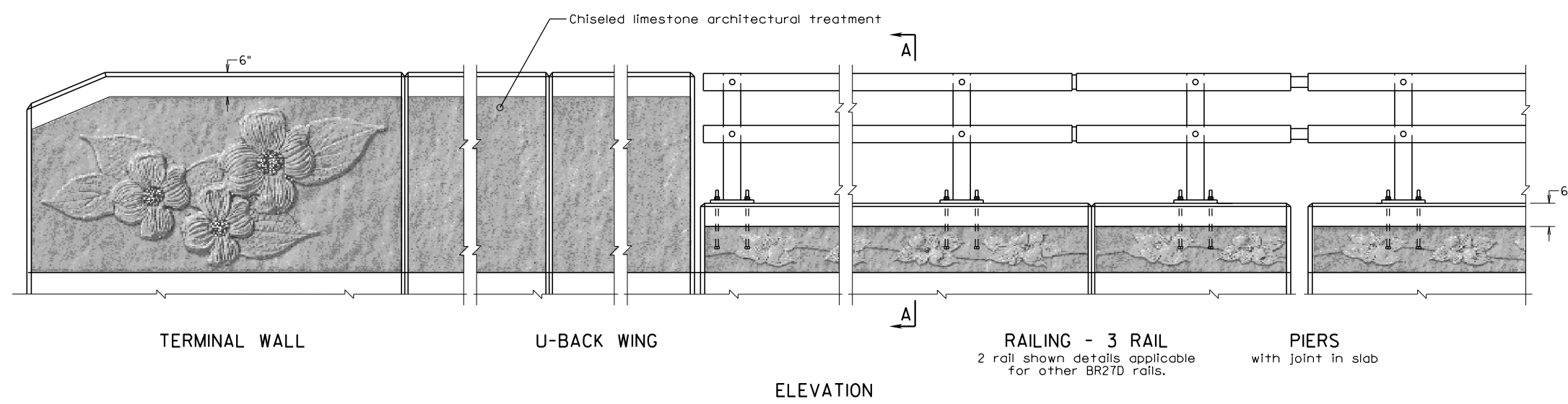
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate sculpted dogwood texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted dogwood pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

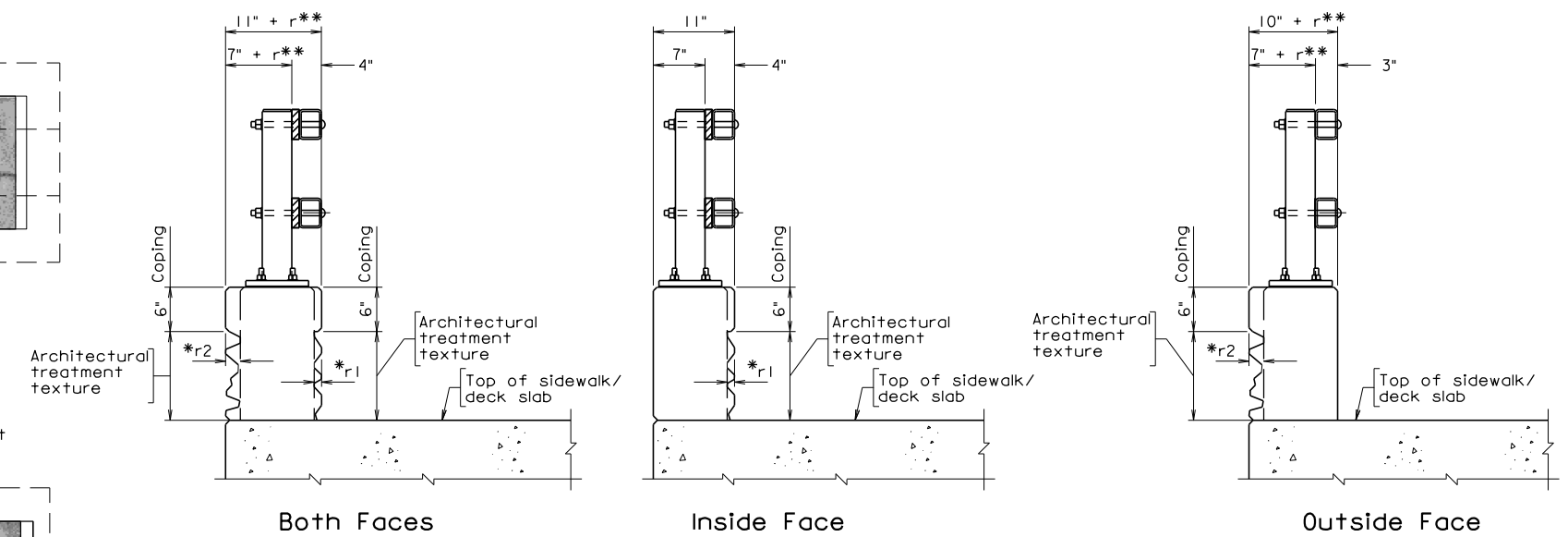
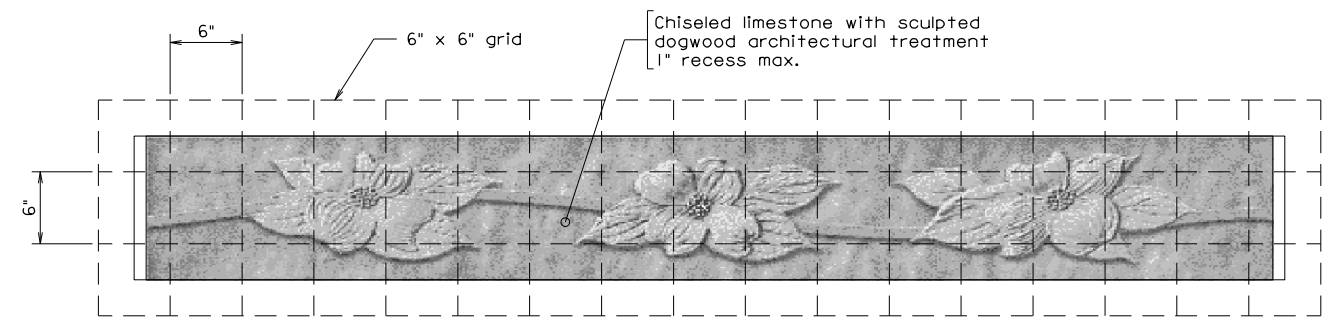
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

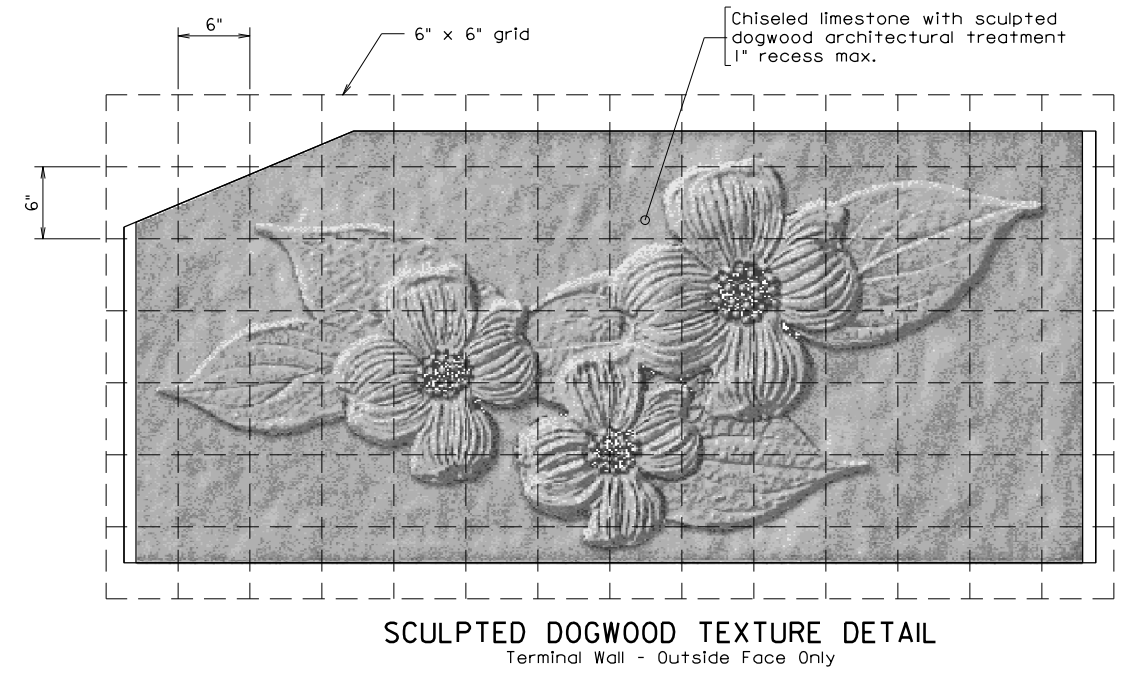
For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27D-AT-10 03-10-2015 br27dat10.dgn

Sealed and Signed by:
Prasad L. Nallipameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR STEEL RAILING BR27D			
No.	Description	Date	Designed:
			Drawn:
			Checked:
Revisions		Date	Plan No.
			Sheet No.
			BR27D-AT-10

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED DOGWOOD
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

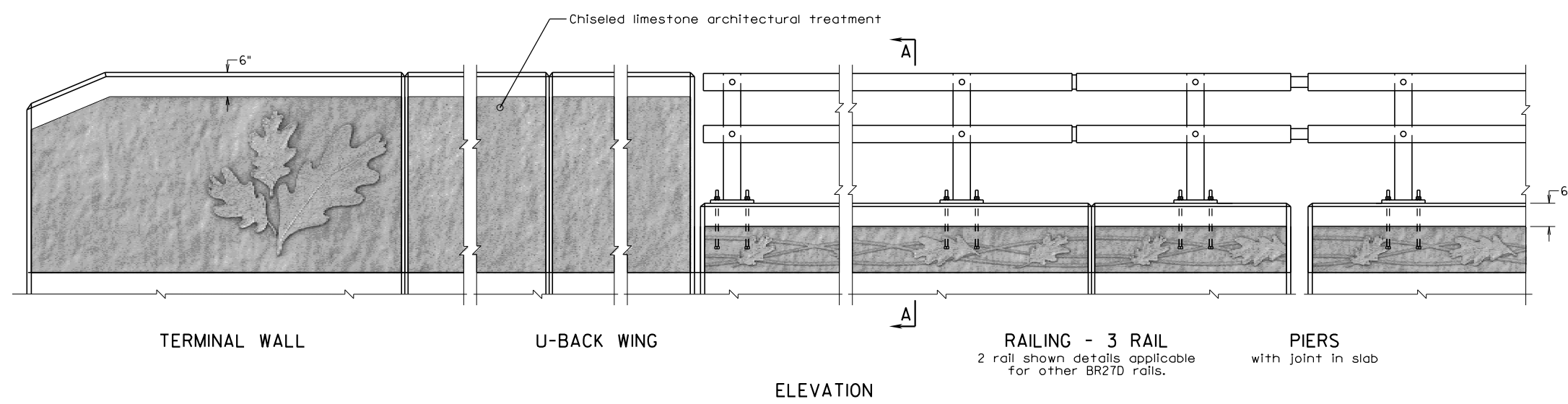
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate sculpted oak leaves texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted oak leaves pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

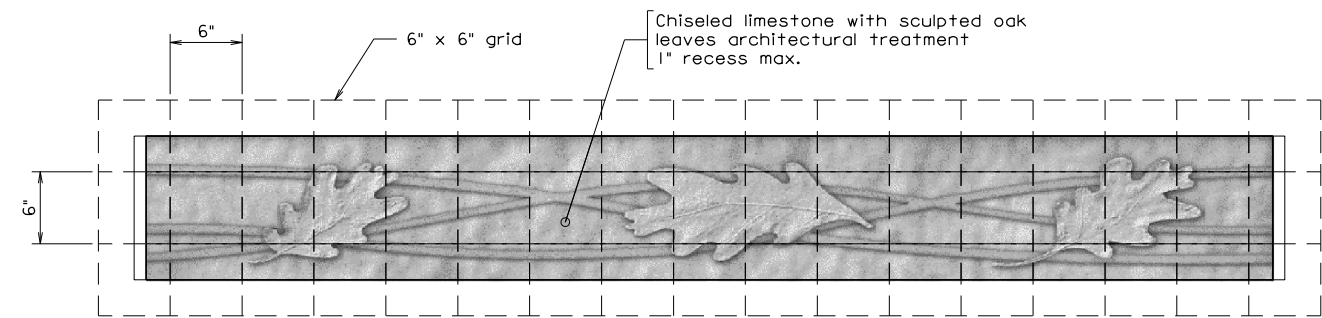
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

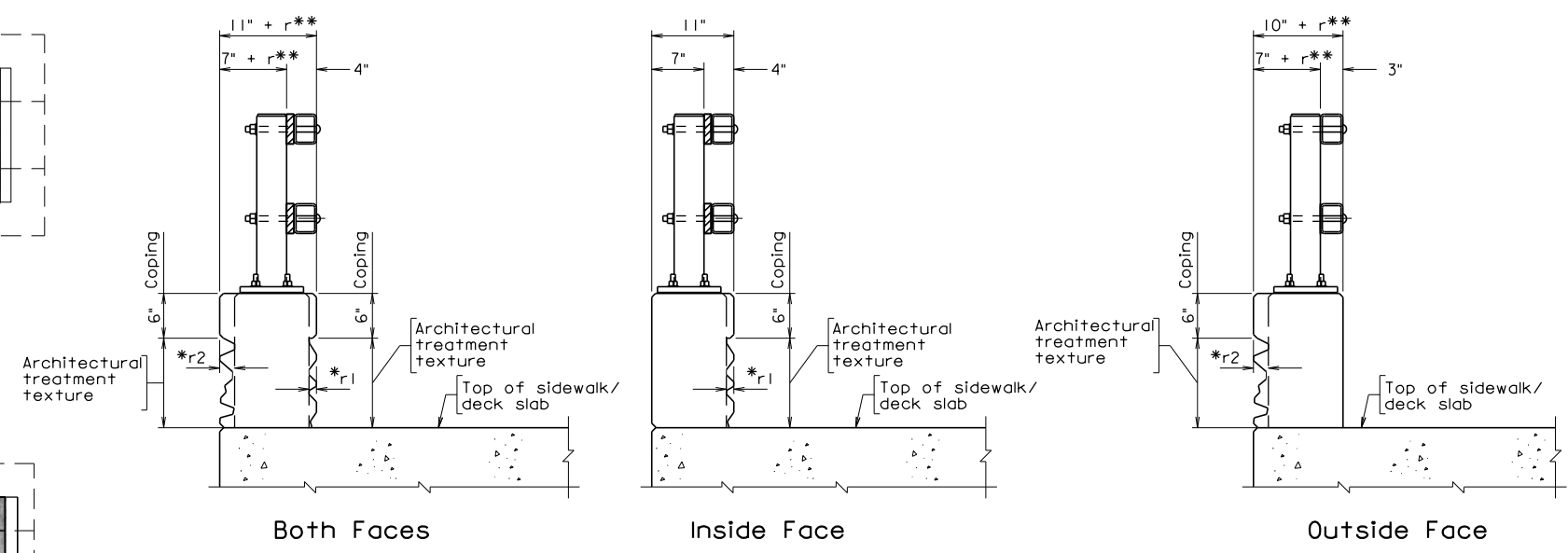
Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



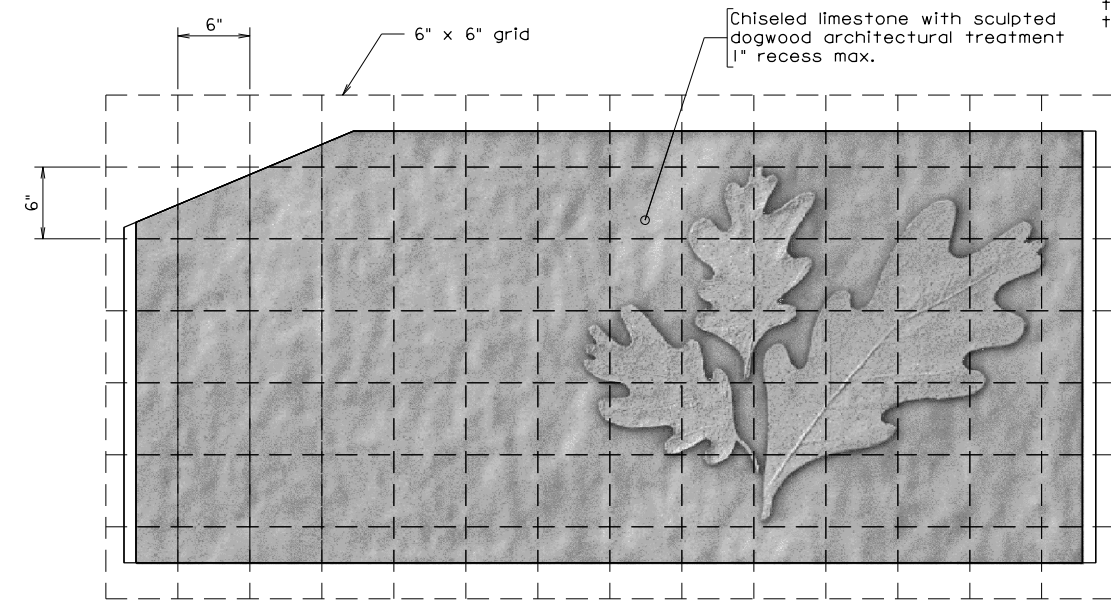
SCULPTED OAK LEAVES TEXTURE DETAIL
Parapet - Outside Face
(Inside Face similar)



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

SECTION A-A
2 rail shown details applicable for other BR27D rails.

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



SCULPTED OAK LEAVES TEXTURE DETAIL
Terminal Wall - Outside Face Only

BR27D-AT-11 03-10-2015 br27dat11.dgn

Sealed and Signed by:
Prasad L. Nallipameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR STEEL RAILING BR27D			
No.	Description	Date	Sheet No.
	Revisions		BR27D-AT-11

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**ARCHITECTURAL TREATMENT
WITH SCULPTED OAK LEAVES
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

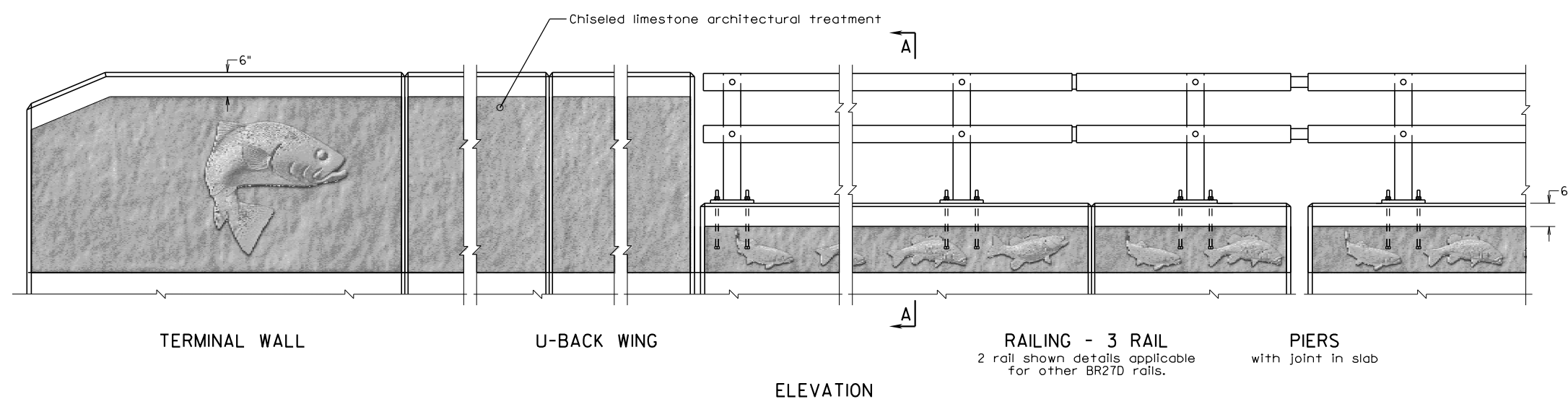
TITLE BLOCK:

Replace standard designation with plan number.

RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:

Architectural treatment for the railing and terminal walls shall simulate sculpted fish texture, similar to the pattern detailed on this sheet.

Form liner shall be arranged to produce a continuous sculpted fish pattern without obvious repetition of the pattern.

Form liner pattern shall be inspected and approved by the Department.

Details shown for a 8'-0" long form liner. Contractor shall submit shop drawings with pattern layout for approval by the Department.

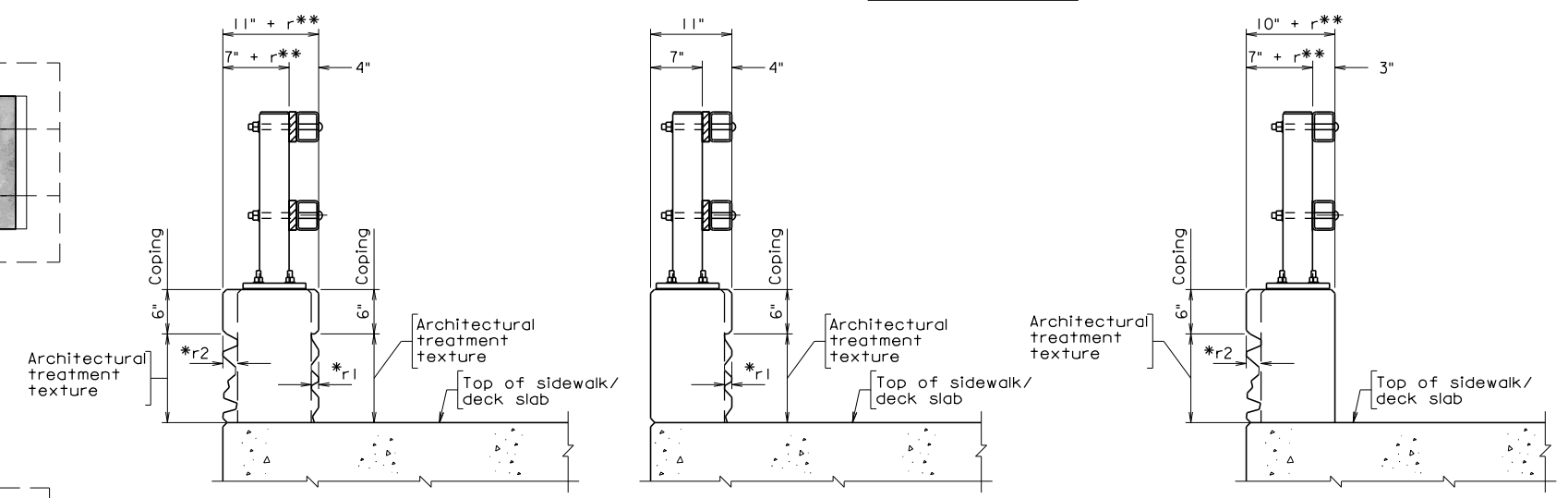
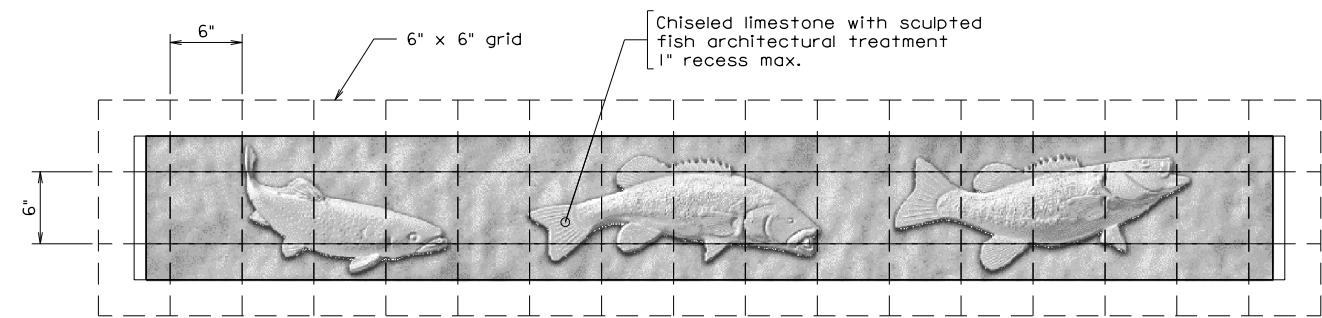
Architectural treatment shall be applied on XX of the barrier.

Width of terminal wall shall be equal to the width of the concrete pedestal of the railing in Section A-A.

Cost of architectural treatment for the parapet and terminal wall shall be included in the price bid for architectural treatment.

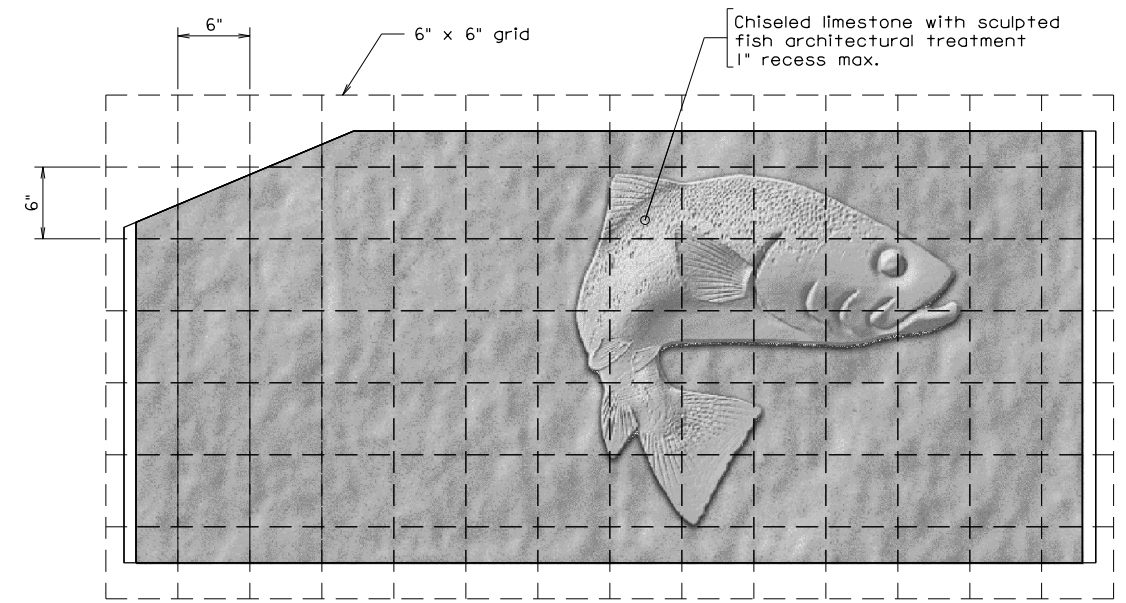
For all other dimensions and details not shown, see sheet xxx.

	Relief (in.)
r1	
r2	



* r1 : relief on inside face is limited to 1"
r2 : relief on outside face is limited to 2"

** r = 1" for r2 ≤ 1"
r = 2" for 1" < r2 ≤ 2"



BR27D-AT-12
03-10-2015
br27dat12.dgn

Sealed and Signed by:
Prasad L. Nallipameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ARCHITECTURAL TREATMENT WITH CHISELED LIMESTONE FOR STEEL RAILING BR27D			
No.	Description	Date	Sheet No.
	Revisions		BR27D-AT-12

Not to scale

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**ARCHITECTURAL TREATMENT
WITH SCULPTED FISH
FOR STEEL RAILING BR27D**

NOTES TO DESIGNER:

This standard is to be used in conjunction with the appropriate BR27D rail standard(s) for detailing architectural treatment. The standard depicts three options for architectural treatment: inside face, outside face or both faces. For additional information, see Part 2, Chapter 5: Architectural Treatment of this manual.

Both a DGN file for the standard drawing and a PDF file for the rendering of the architectural treatment shown in Part 2, Chapter 5: Architectural Treatment, are attached to this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

Modify note to specify face(s) of the parapet where architectural treatment is to be applied (inside face, outside face or both faces).

Complete sheet number for dimensions and details not shown.

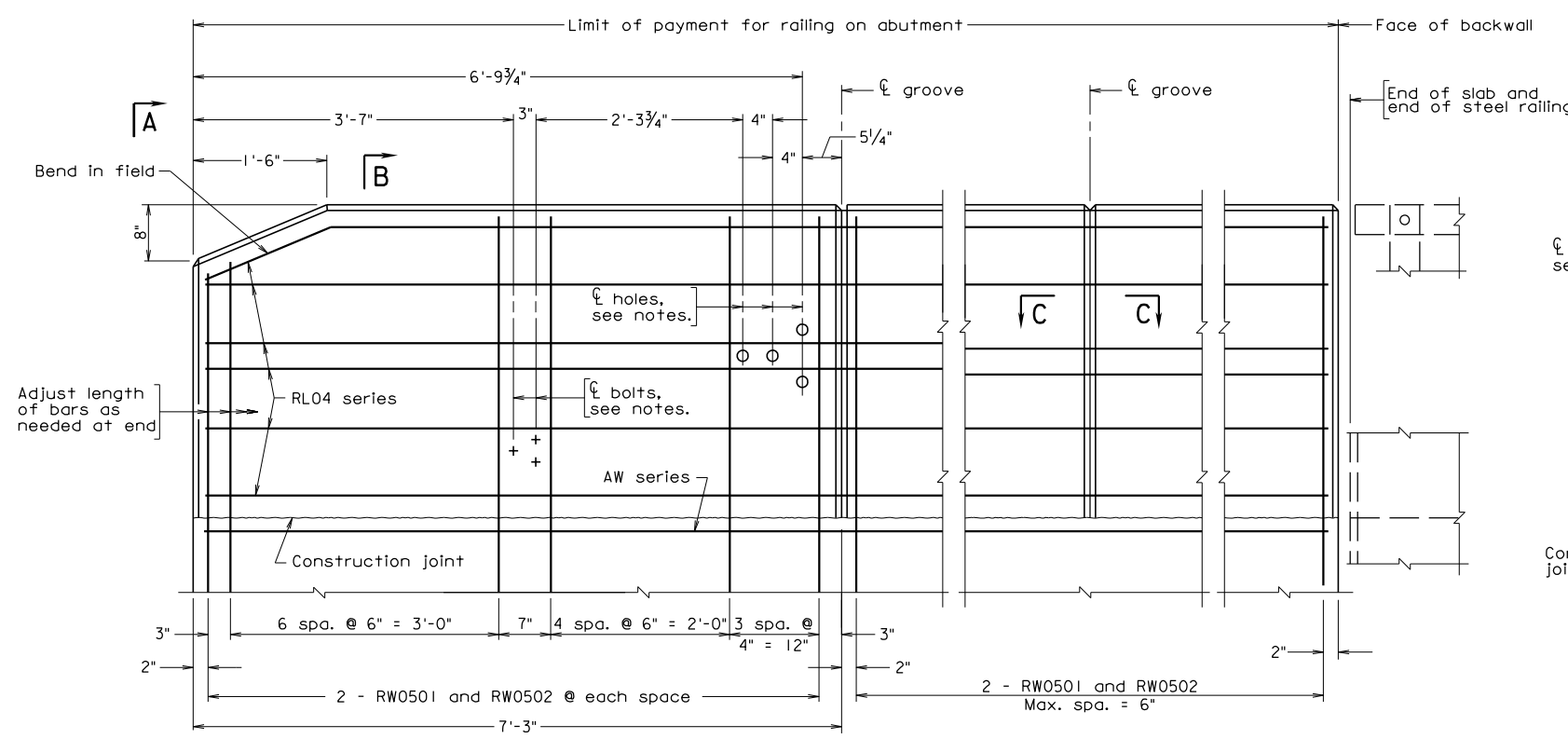
TITLE BLOCK:

Replace standard designation with plan number.

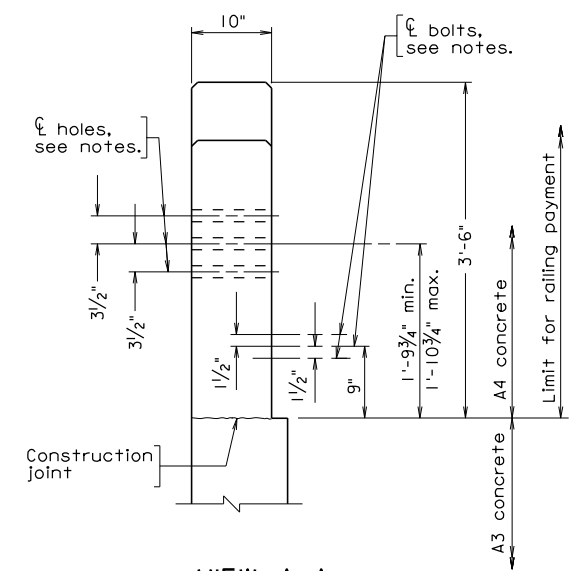
RELIEF TABLE:

Complete table indicating relief(s) for the face(s) where architectural treatment is to be applied.

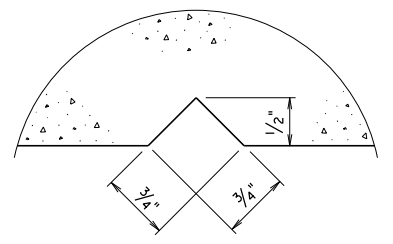
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



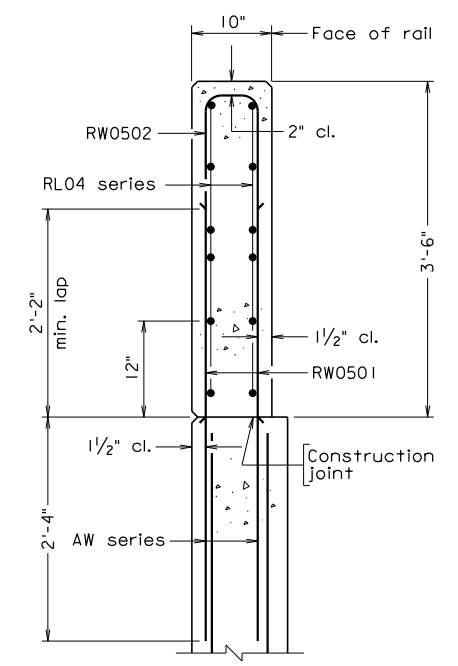
TERMINAL WALL
U-BACK WING
ELEVATION



VIEW A-A



SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION B-B
AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4\".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 For details and reinforcing steel schedule of steel railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-1.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.
 Spacing of grooves for U-back wings shall be approximately 8'-0\".
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
RW0502					
Mark	Size	No.	Length	Pin ϕ	Location
RW0501	#5		4'-7"	—	Terminal wall and U-back wing
RW0502	#5		6'-11"	3 3/4"	Terminal wall and U-back wing
RL04	#4			—	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

br27t-1.dgn

03-10-2015

BR27T-1

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions					BR27T-1

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12 or BR27D-8 and when terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on the standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{1}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

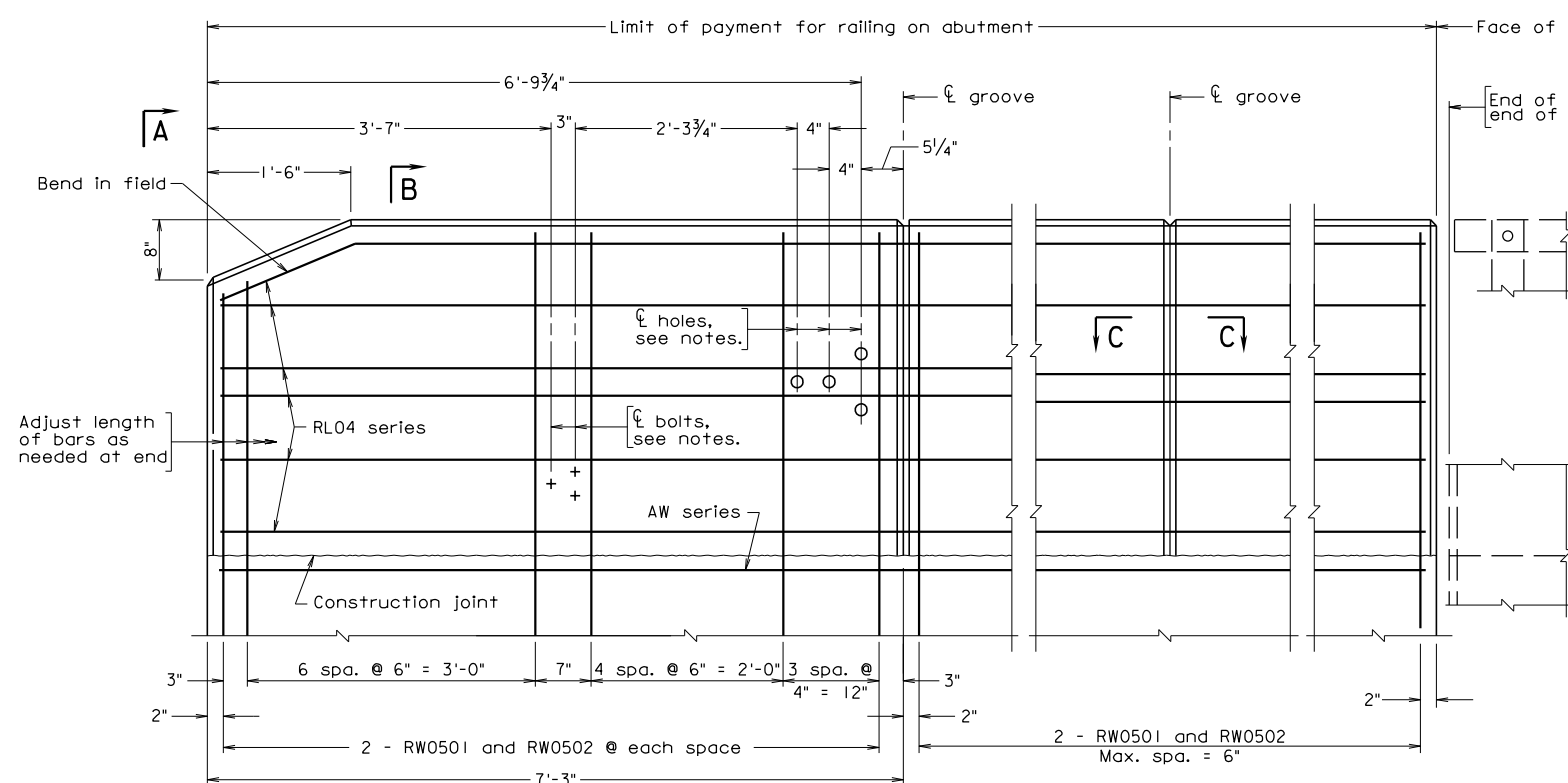
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

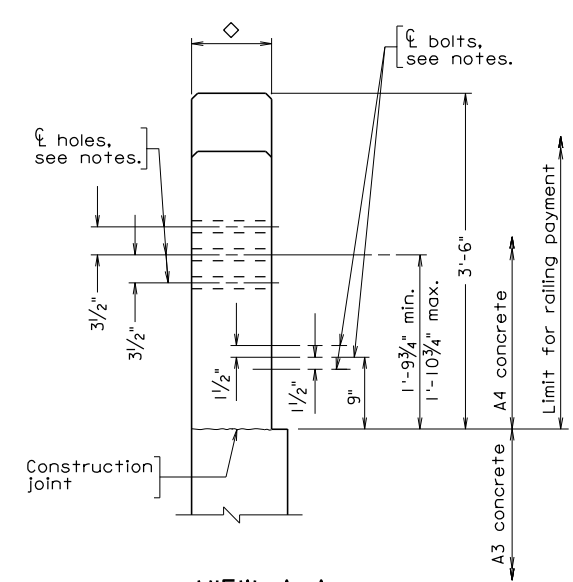
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

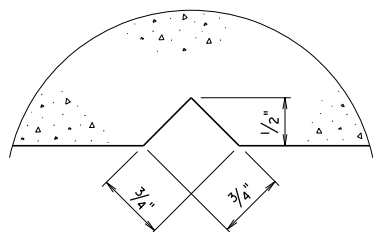


TERMINAL WALL ELEVATION U-BACK WING

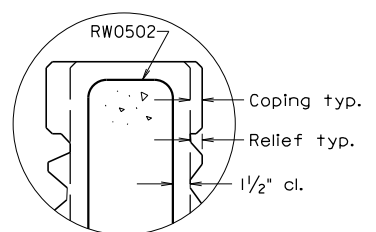


VIEW A-A

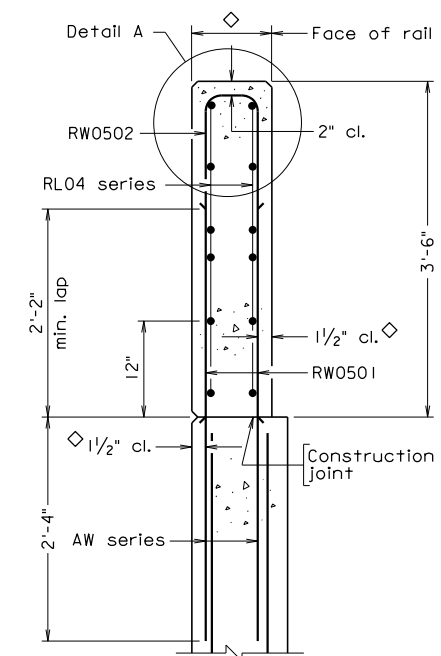
For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



SECTION C-C Full scale Groove detail for both sides of rail



DETAIL A Shown with architectural treatment on both sides



SECTION B-B AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4\"/>
 For details and reinforcing steel schedule of steel railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-1.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2\"/>
 Bolts for guardrail attachment, where shown, shall be 5/8\"/>
 Spacing of grooves for U-back wings shall be approximately 8'-0\"/>
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.
 Bid price for architectural treatment includes concrete in relief and coping.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0501	#5		4'-7"	—	Terminal wall and U-back wing
RW0502	#5		6'-11"	3 3/4"	Terminal wall and U-back wing
RL04	#4			—	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

BR27T-1-AT 03-10-2015 br27t1.at.dgn

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions			BR27T-1-AT		

42" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12-AT or BR27D-8-AT and when terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on the standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

42" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

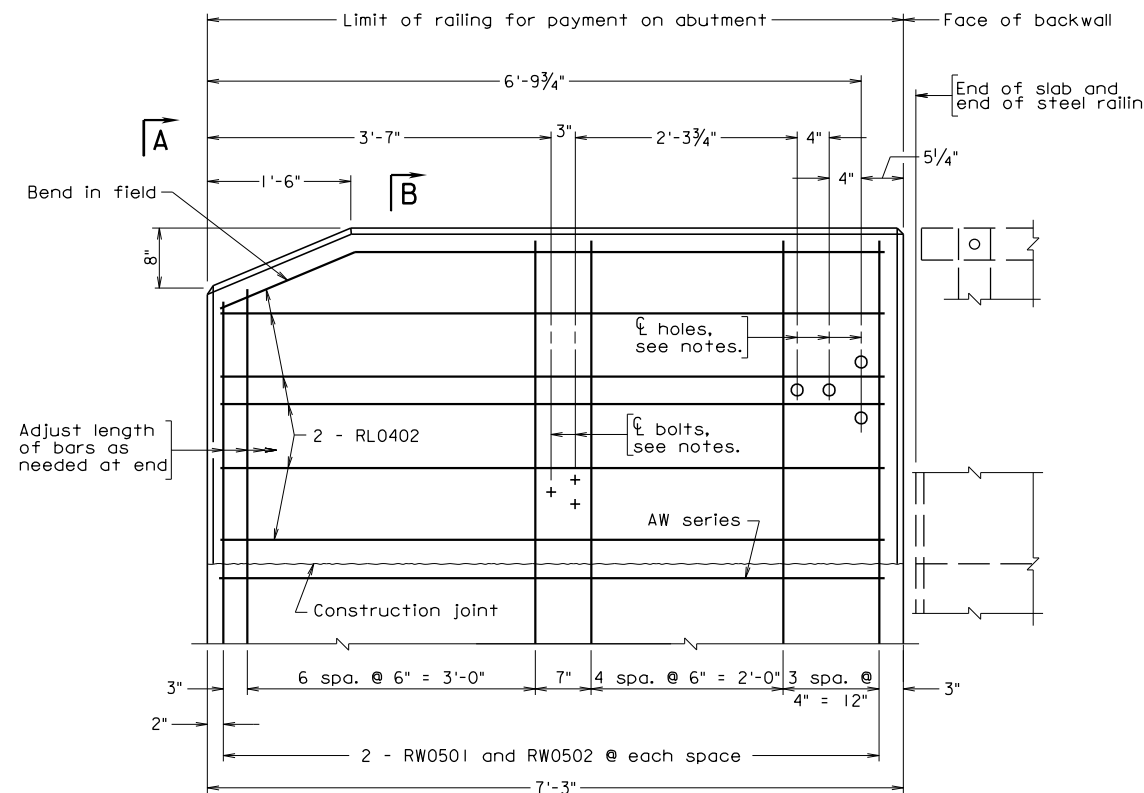
SECTION B-B:

Complete sheet number for architectural treatment details.

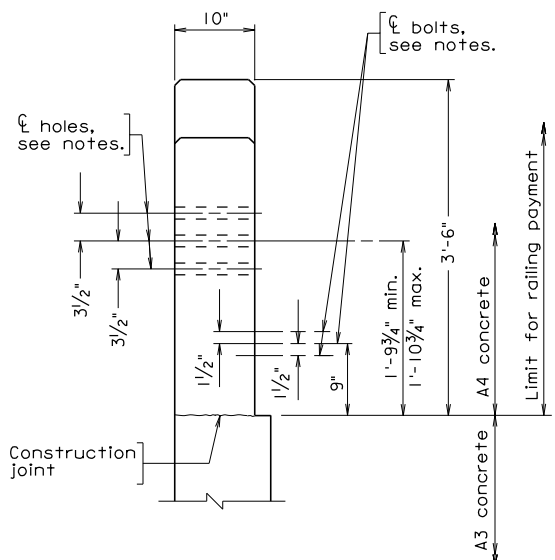
TITLE BLOCK:

Replace standard designation with plan number.

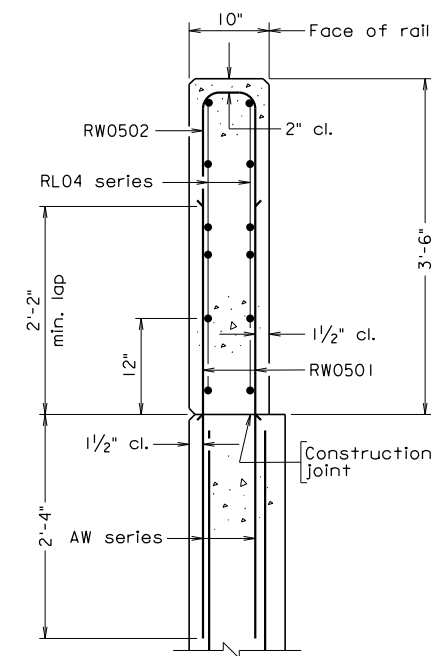
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL - ELEVATION



VIEW A-A



SECTION B-B

AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE						
RW0502	Mark	Size	No.	Length	Pin ϕ	Location
	RW0501	#5		4'-7"	—	Terminal wall
	RW0502	#5		6'-11"	3 3/4"	Terminal wall
	RL0402	#4		6'-11"	—	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR27T-2 03-10-2015 br27t2.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION						
STRUCTURE AND BRIDGE DIVISION						
42" BR27C/BR27D TERMINAL WALL						
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
			Drawn: ...S&B...DIV		BR27T-2	
Revisions			Checked: S&B...DIV			

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12 or BR27D-8 and when terminal wall is detailed on abutment wingwall.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Complete sheet number for steel railing.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{1}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT WINGWALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

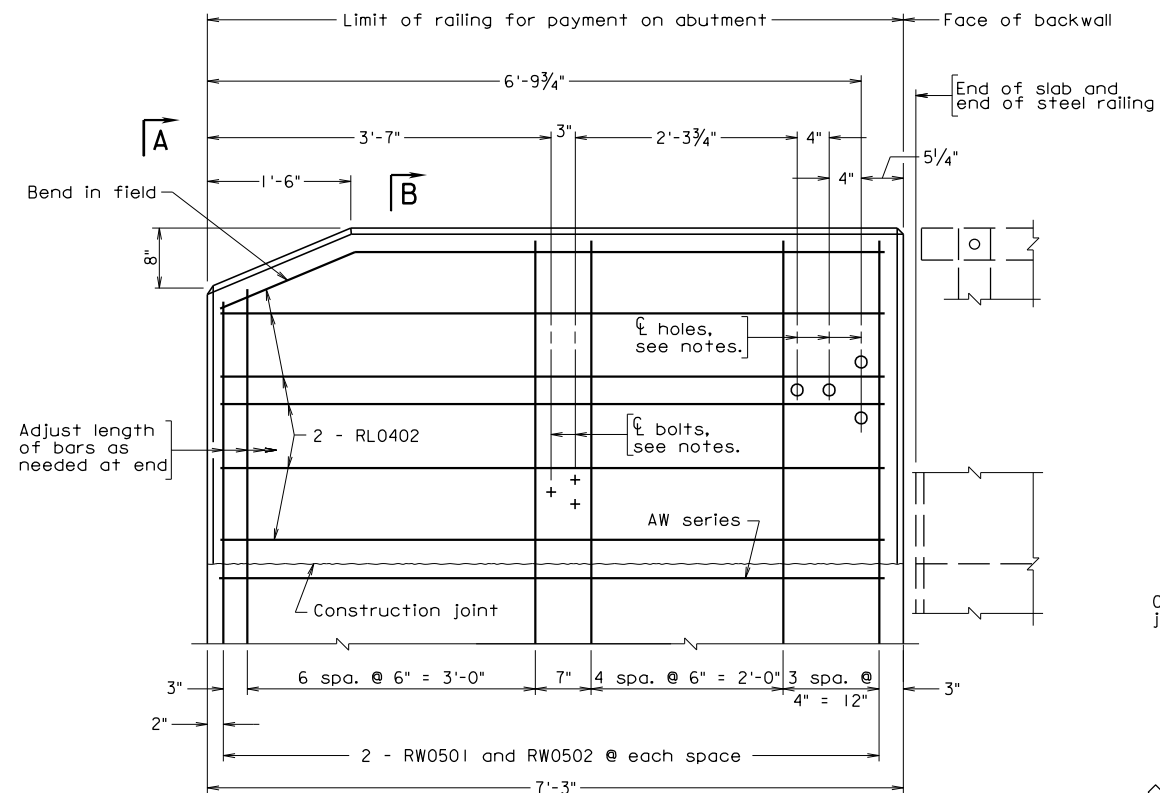
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

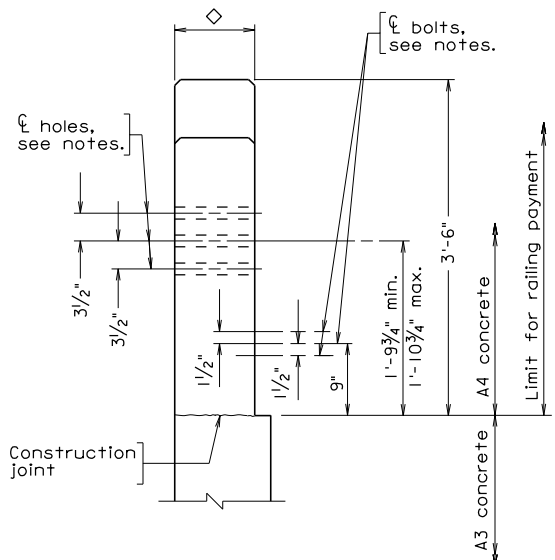
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

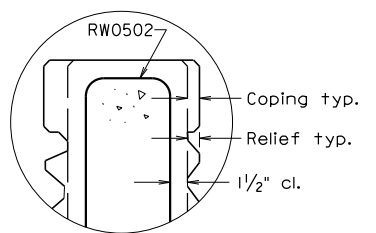


TERMINAL WALL - ELEVATION

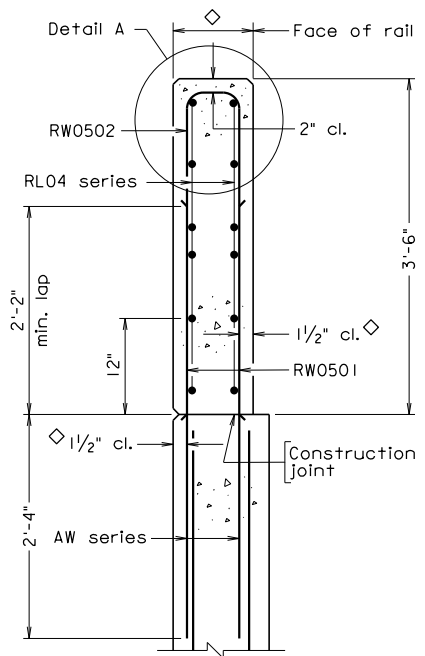


VIEW A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



DETAIL A
Shown with architectural treatment on both sides



SECTION B-B

AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.

Bid price for architectural treatment includes concrete in relief and coping.

REINFORCING STEEL SCHEDULE						
RW0502	Mark	Size	No.	Length	Pin ϕ	Location
	RW0501	#5		4'-7"	—	Terminal wall
	RW0502	#5		6'-11"	3 3/4"	Terminal wall
	RL0402	#4		6'-11"	—	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR27T-2-AT 03-10-2015 br27t2at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION						
STRUCTURE AND BRIDGE DIVISION						
42" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT						
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: ...S&B...DIV			
			Checked: S&B...DIV			

BR27T-2-AT

42" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12-AT or BR27D-8-AT and when terminal wall is detailed on abutment wingwall.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Complete sheet number for steel railing.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

42" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT WINGWALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

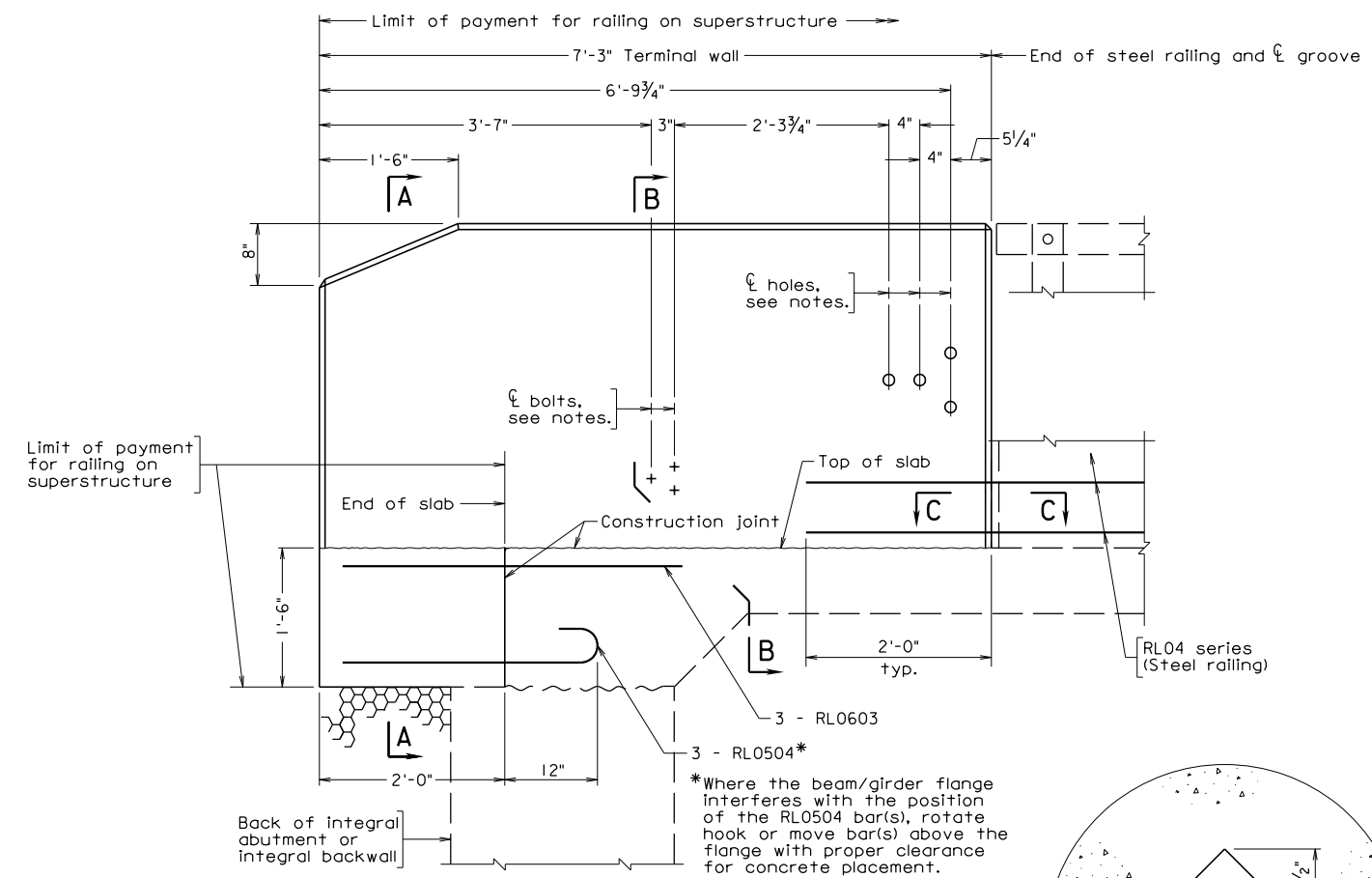
SECTION B-B:

Complete sheet number for architectural treatment details.

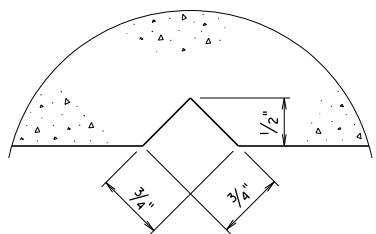
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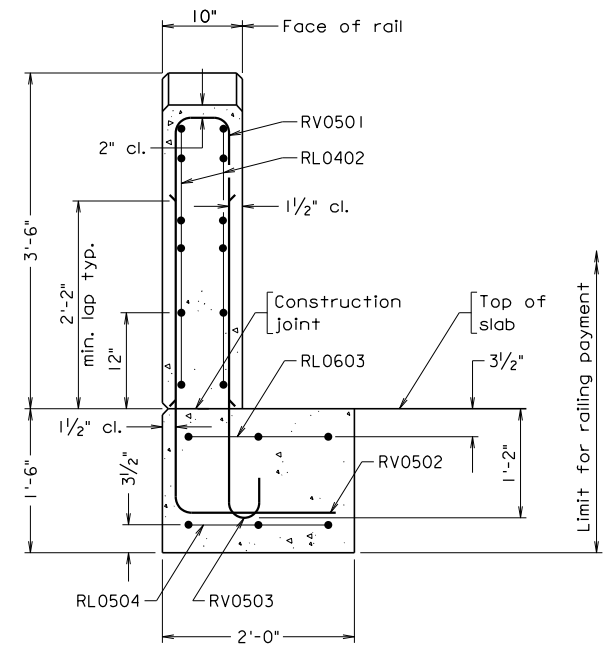
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



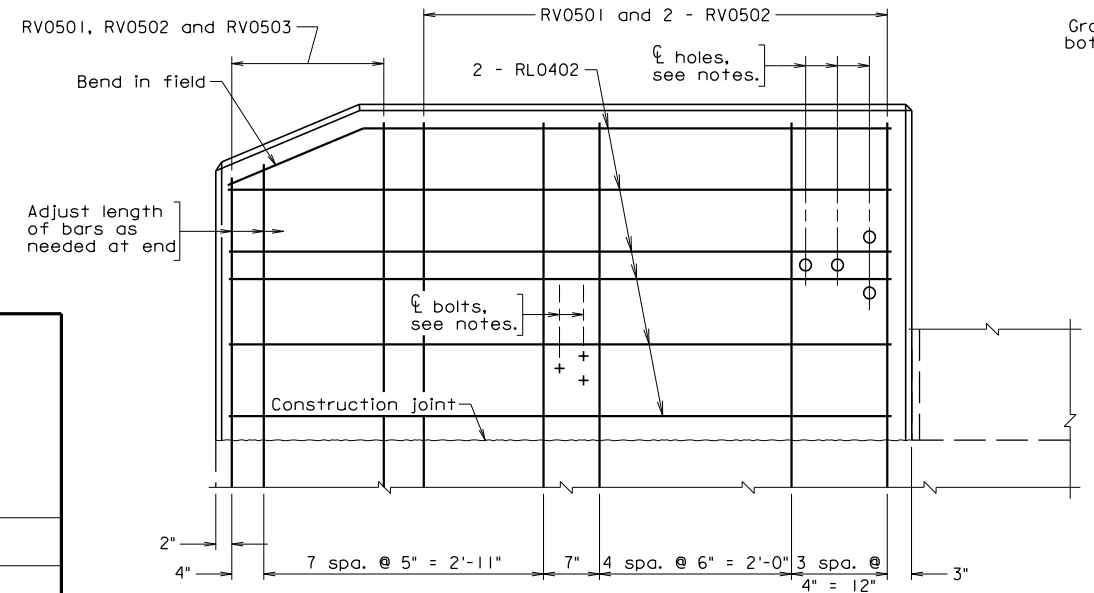
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT



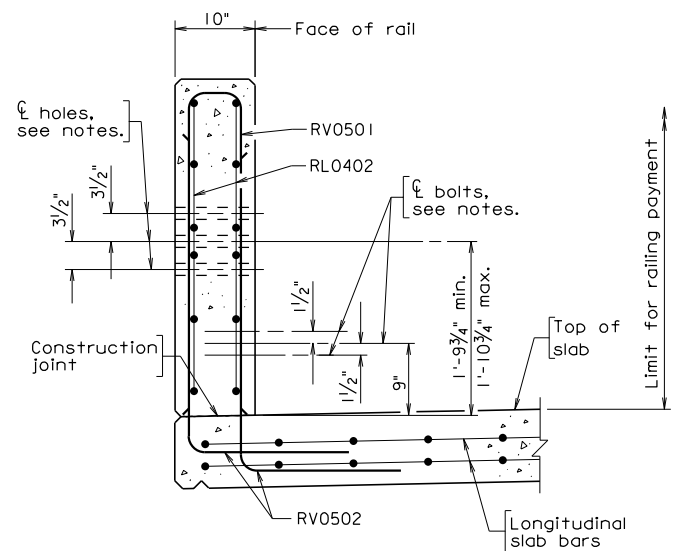
SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A



TERMINAL WALL



SECTION B-B
Transverse slab bars not shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of steel railing, see sheet ...
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE

RV0501	RV0502	RL0504, RV0503			
Mark	Size	No.	Pin ø	Length	Location
RL0402	#4			6'-11"	Terminal wall
RL0603	#6			4'-0"	Terminal wall end support
RL0504	#5		3 3/4"	3'-4"	Terminal wall end support
RV0501	#5		3 3/4"	6'-11"	Terminal wall
RV0502	#5		3 3/4"	5'-0"	Terminal wall
RV0503	#5		3 3/4"	4'-0"	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR27T-3
03-10-2015
br27t3.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
42" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
Revisions			Checked: S&B, DIV		BR27T-3

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12 or BR27D-8 with terminal wall on superstructure with integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify 3'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

42" STEEL RAILING

BR27T-SERIES

**TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of integral abutment.

Complete sheet number for details and reinforcing steel schedule of steel railing.

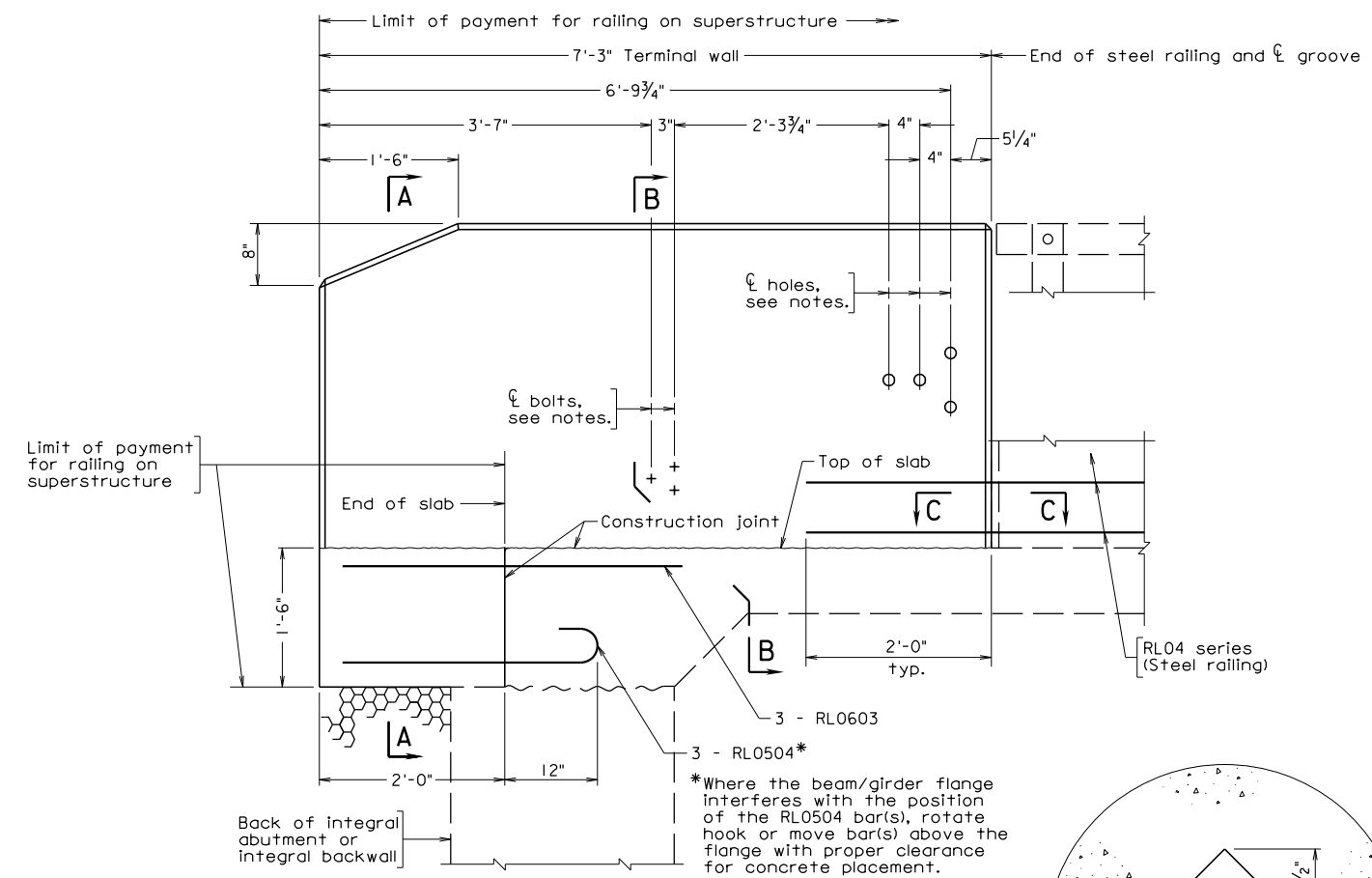
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

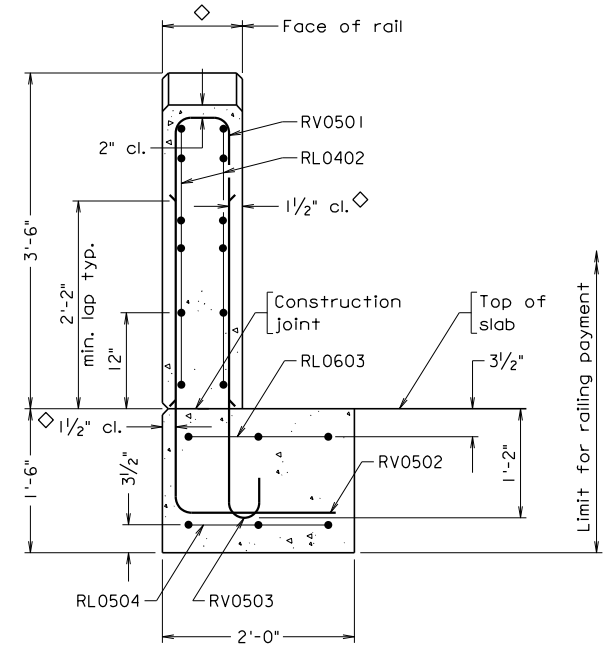
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Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

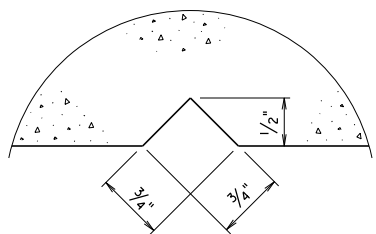


FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT



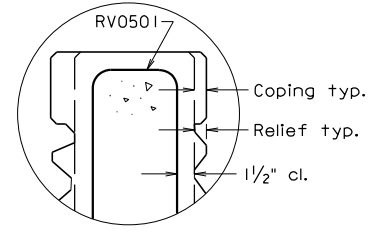
SECTION A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



SECTION C-C Full scale

Groove detail for both sides of rail



DETAIL A

Shown with architectural treatment on both sides

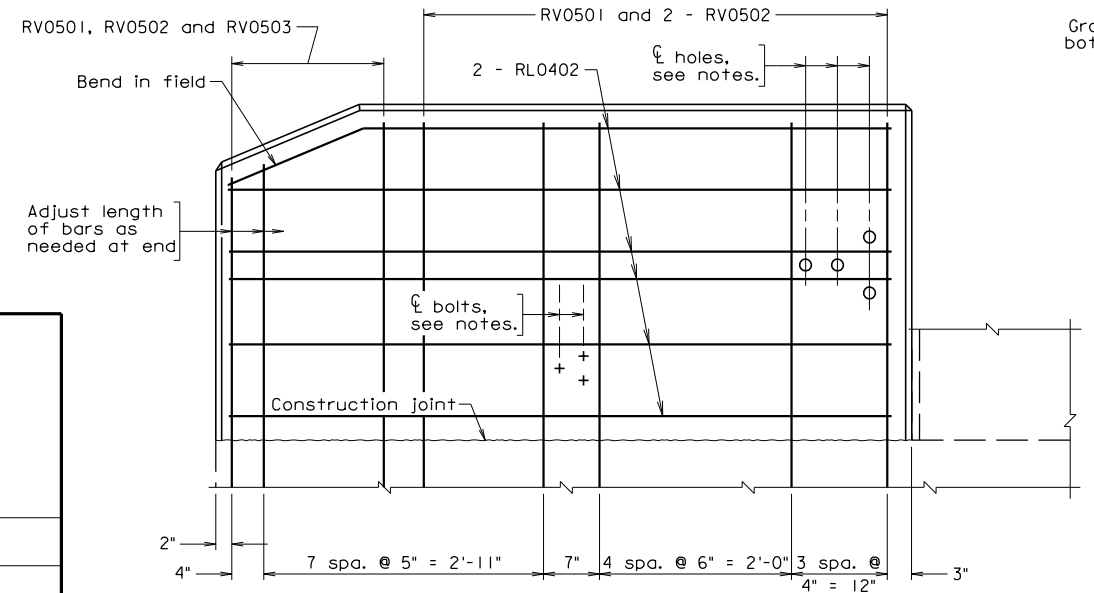
Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of steel railing, see sheet ...
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.
- Bid price for architectural treatment includes concrete in relief and coping.

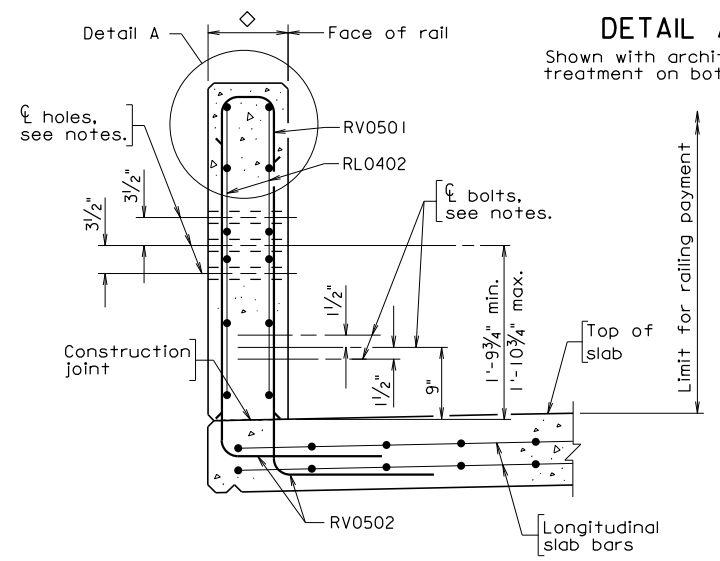
REINFORCING STEEL SCHEDULE

Mark	Size	No.	Pin ø	Length	Location
RV0501					
RV0502					
RV0503					
RL0402	#4			6'-11"	Terminal wall
RL0603	#6			4'-0"	Terminal wall end support
RL0504	#5		3 3/4"	3'-4"	Terminal wall end support
RV0501	#5		3 3/4"	6'-11"	Terminal wall
RV0502	#5		3 3/4"	5'-0"	Terminal wall
RV0503	#5		3 3/4"	4'-0"	Terminal wall

Dimensions in bending diagram are out-to-out of bars.



TERMINAL WALL



SECTION B-B

Transverse slab bars not shown

BR27T-3-AT 03-10-2015 br27t3at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
42" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Revisions
Designed: S&B...DIV		Date	Plan No.
Drawn: S&B...DIV		Sheet No.	
Checked: S&B...DIV		BR27T-3-AT	

42" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12-AT or BR27D-8-AT with terminal wall on superstructure with integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify 3'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¼" min. – 1'-10¾" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

42" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of integral abutment.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

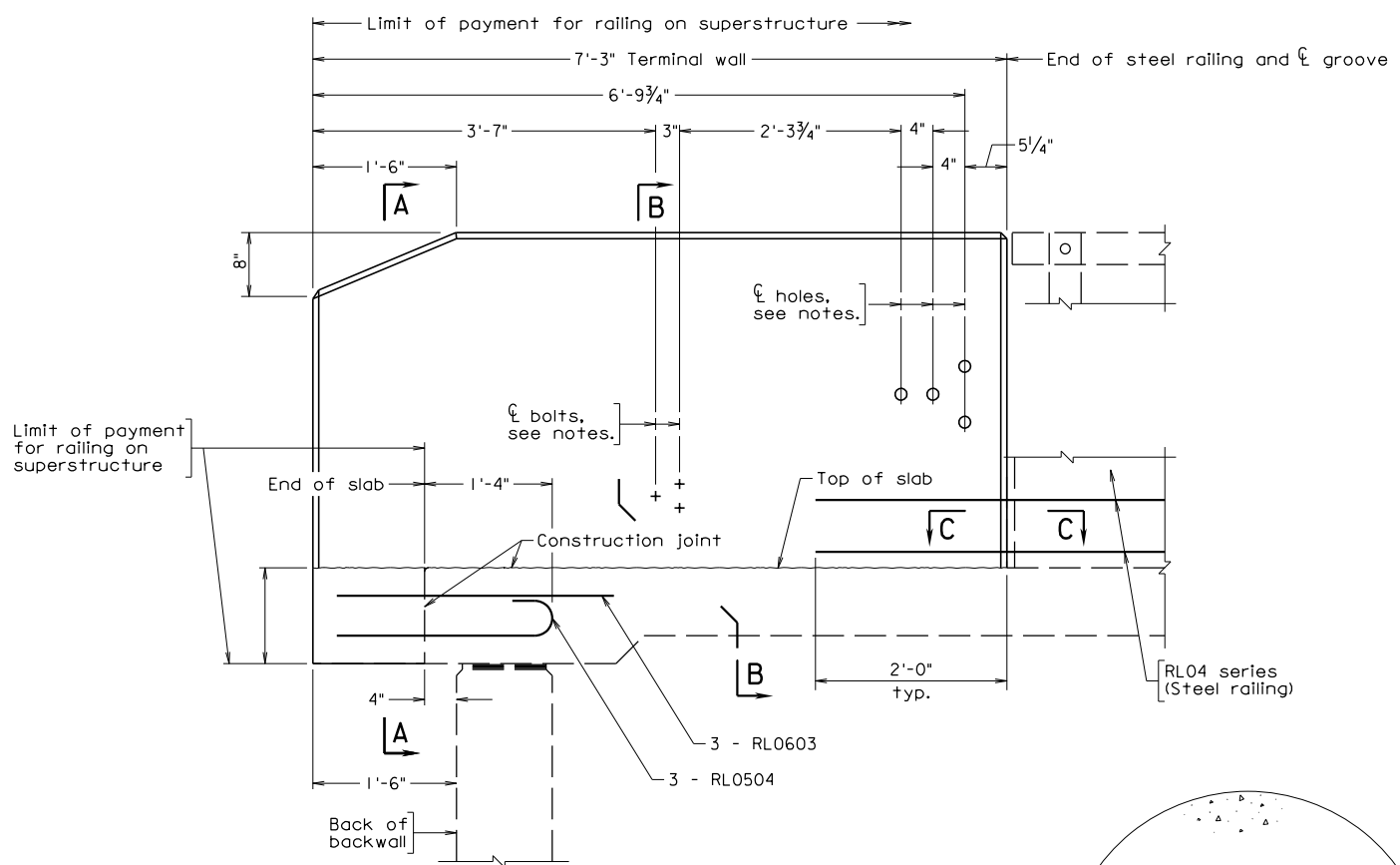
SECTION A-A:

Complete sheet number for architectural treatment details.

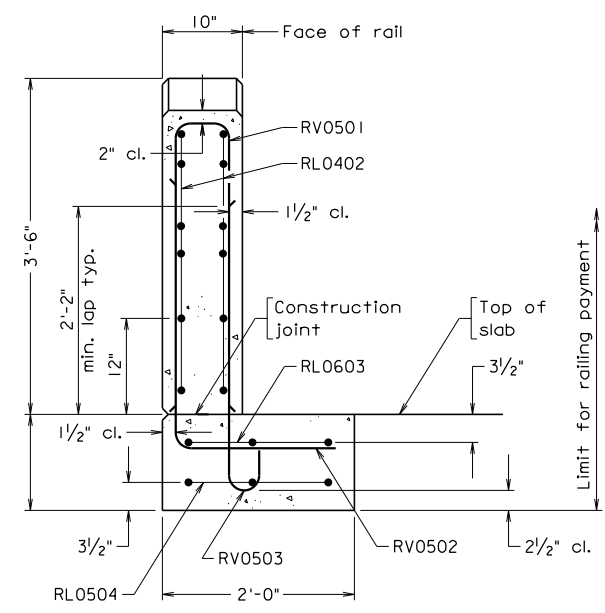
TITLE BLOCK:

Replace standard designation with plan number.

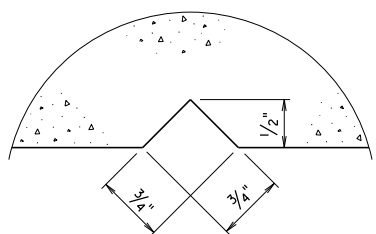
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



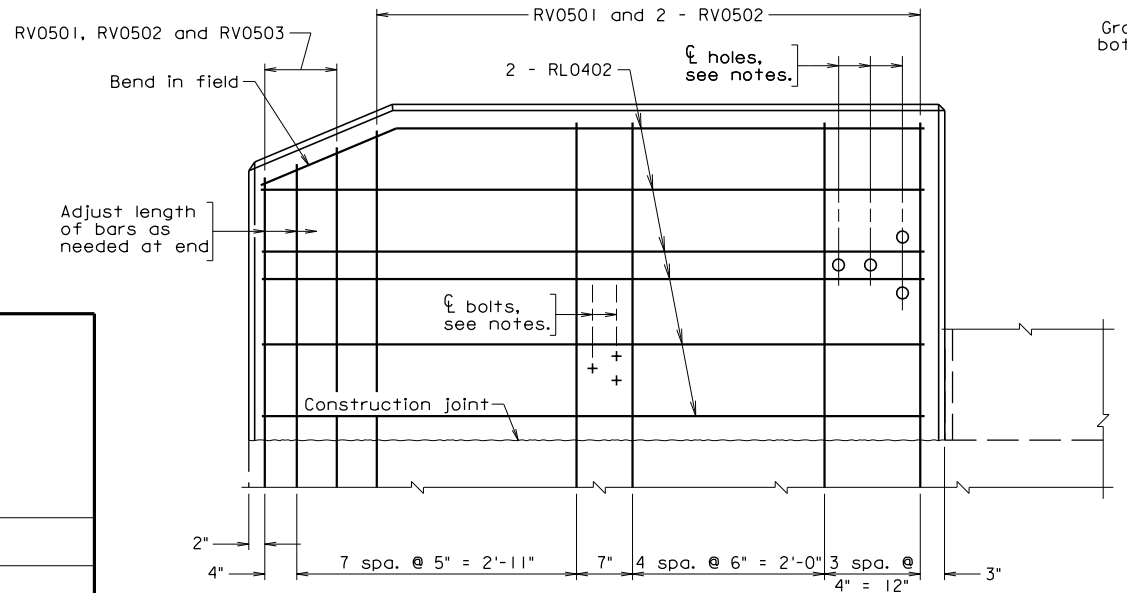
DECK SLAB EXTENSION ABUTMENT



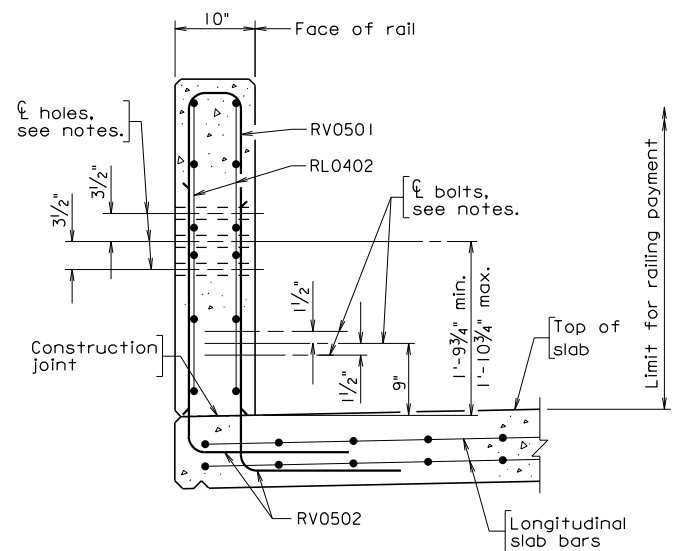
SECTION A-A



SECTION C-C
Full scale
Groove detail for both sides of rail



TERMINAL WALL



SECTION B-B
Transverse slab bars not shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be $\frac{3}{4}$ ".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ϕ	Length	Location
RV0501	#5	3	3/4"	2'-10"	Terminal wall end support
RV0502	#5	2	3/4"	6'-11"	Terminal wall
RV0503	#5	3	3/4"	3'-7"	Terminal wall
RL0402	#4	1	—	6'-11"	Terminal wall
RL0603	#6	1	—	4'-0"	Terminal wall end support
RL0504	#5	2	3/4"	2'-10"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars.

BR27T-4

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION			
42" BR27C/BR27D TERMINAL WALL			
No.	Description	Date	Sheet No.
	Revisions		BR27T-4

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12 or BR27D-8 with terminal wall on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-0" wide section at the edge of superstructure is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify 3'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

Provide dimension for terminal wall end support.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

42" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of deck slab extension.

Complete sheet number for details and reinforcing steel schedule of steel railing.

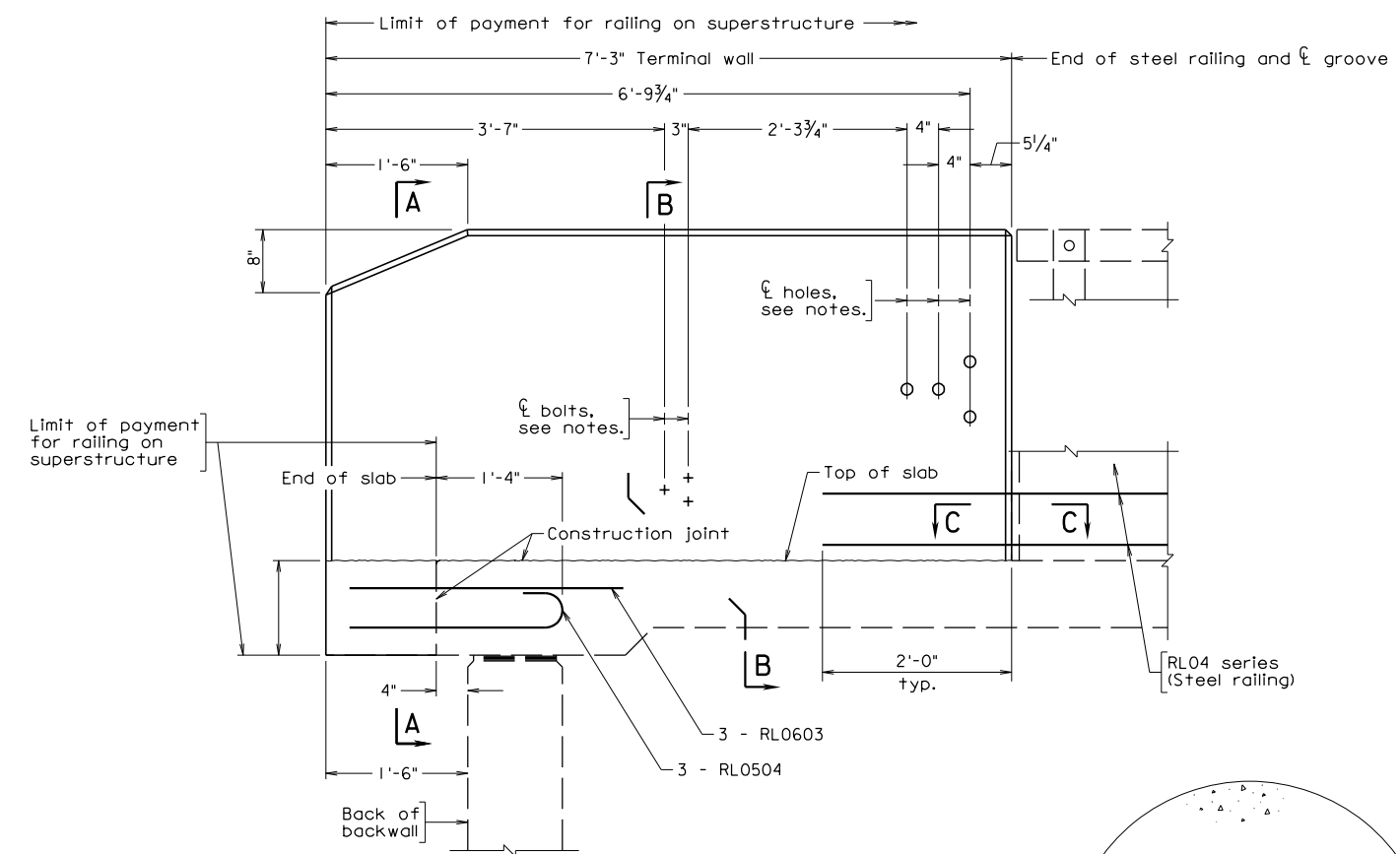
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

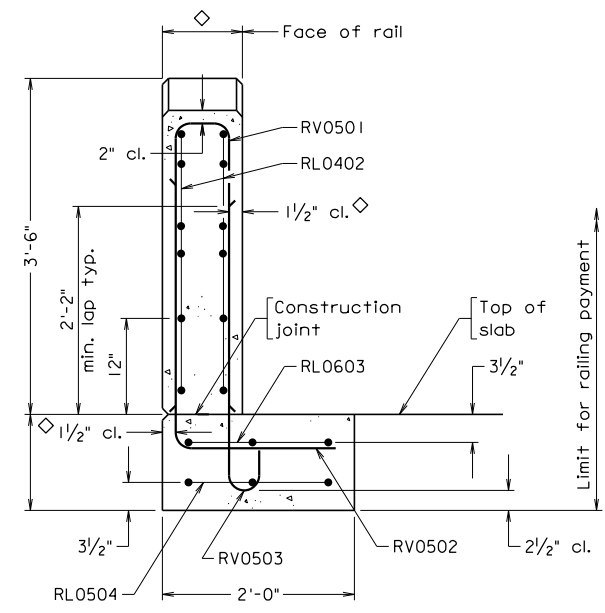
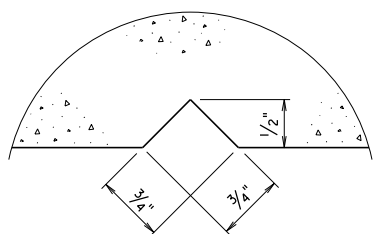
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

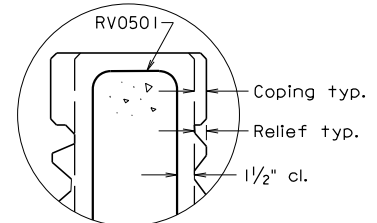


DECK SLAB EXTENSION ABUTMENT



SECTION A-A

\diamond For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



DETAIL A
Shown with architectural treatment on both sides

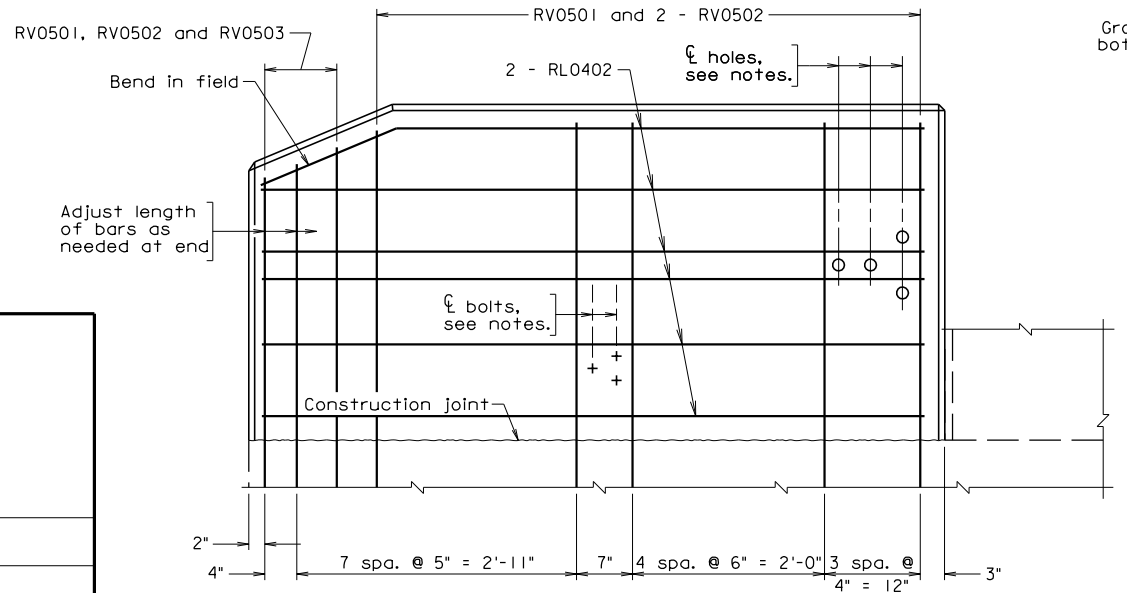
Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be $\frac{3}{4}$ ".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of steel railing, see sheet ...
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1 $\frac{1}{2}$ " diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be $\frac{5}{8}$ " diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.
- Bid price for architectural treatment includes concrete in relief and coping.

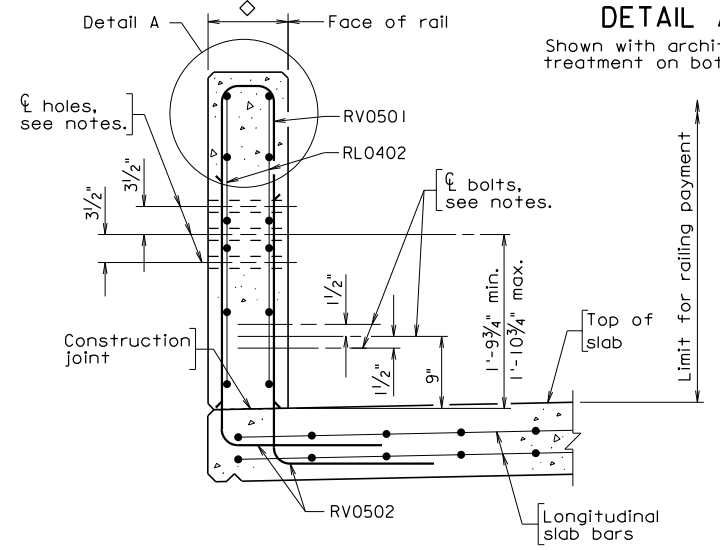
REINFORCING STEEL SCHEDULE

RV0501	RV0502	RL0504, RV0503			
Mark	Size	No.	Pin ϕ	Length	Location
RL0402	#4			6'-11"	Terminal wall
RL0603	#6			4'-0"	Terminal wall end support
RL0504	#5		3 $\frac{3}{4}$ "	2'-10"	Terminal wall end support
RV0501	#5		3 $\frac{3}{4}$ "	6'-11"	Terminal wall
RV0502	#5		3 $\frac{3}{4}$ "	4'-6"	Terminal wall
RV0503	#5		3 $\frac{3}{4}$ "	3'-7"	Terminal wall

Dimensions in bending diagram are out-to-out of bars.



TERMINAL WALL



SECTION B-B
Transverse slab bars not shown

BR27T-4-AT 03-10-2015 br27t4at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		
			Checked: S&B...DIV		
Revisions			BR27T-4-AT		

42" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR27C-12-AT or BR27D-8-AT with terminal wall on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-0" wide section at the edge of superstructure is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify 3'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

Provide dimension for terminal wall end support.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

42" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of deck slab extension.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

SECTION A-A:

Complete sheet number for architectural treatment details.

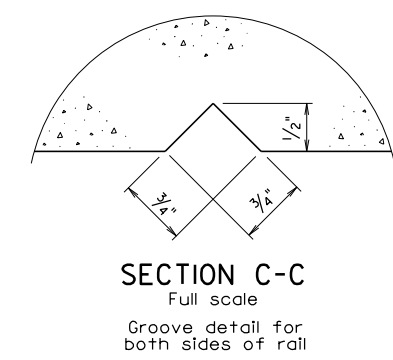
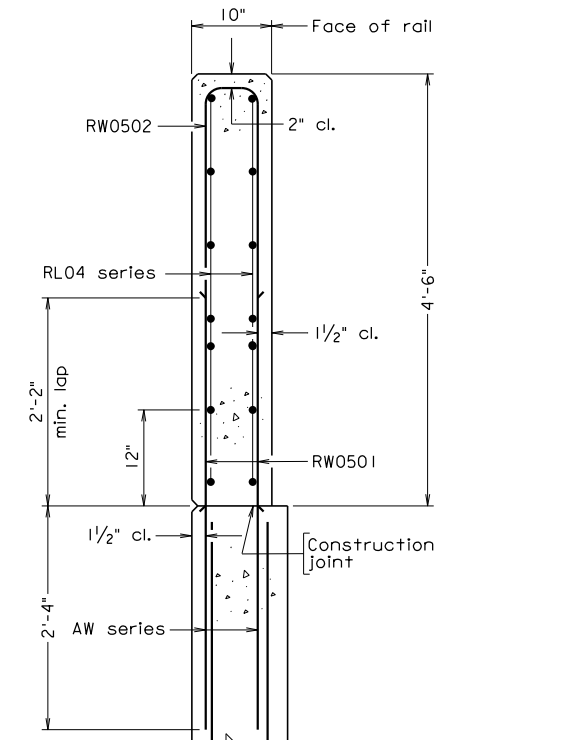
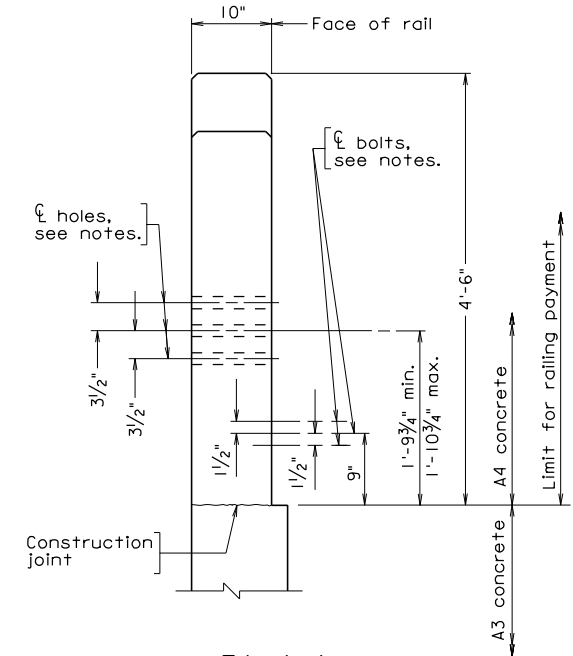
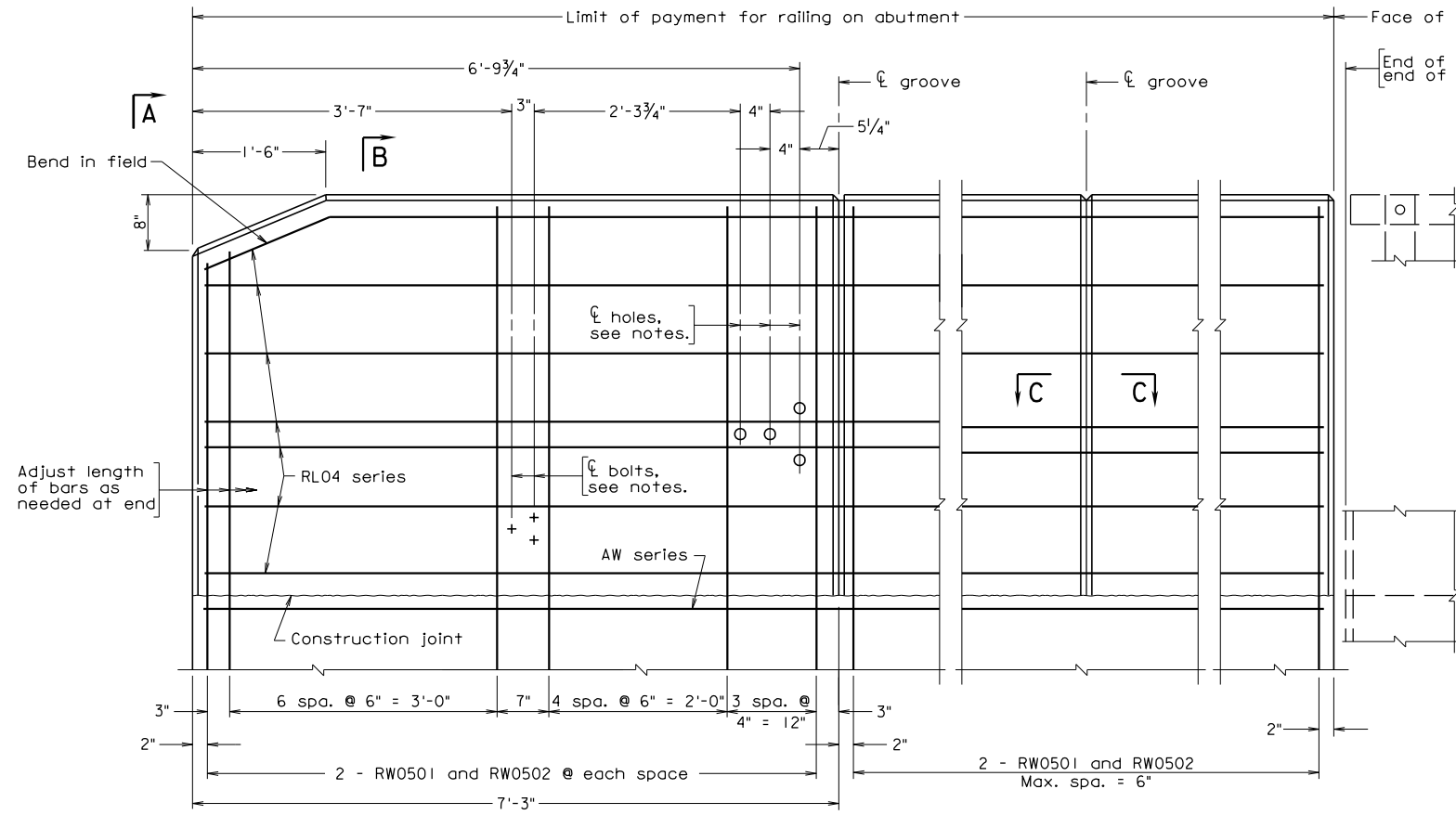
TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BR27T-4-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 3 of 3
FILE NO. BR27T-4-AT-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL ELEVATION U-BACK WING

SECTION B-B
AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Spacing of grooves for U-back wings shall be approximately 8'-0".

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0501	#5		4'-7"	—	Terminal wall and U-back wing
RW0502	#5		8'-11"	3 3/4"	Terminal wall and U-back wing
RL04	#4			—	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

BR27T-5 03-10-2015 br27t5.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BR27T-5
			Checked: S&B...DIV		

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C-14, BR27C-15 or BR27D-10 and when terminal wall is detailed on abutment U-back wing. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on the standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

54" STEEL RAILING
BR27T-SERIES
TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

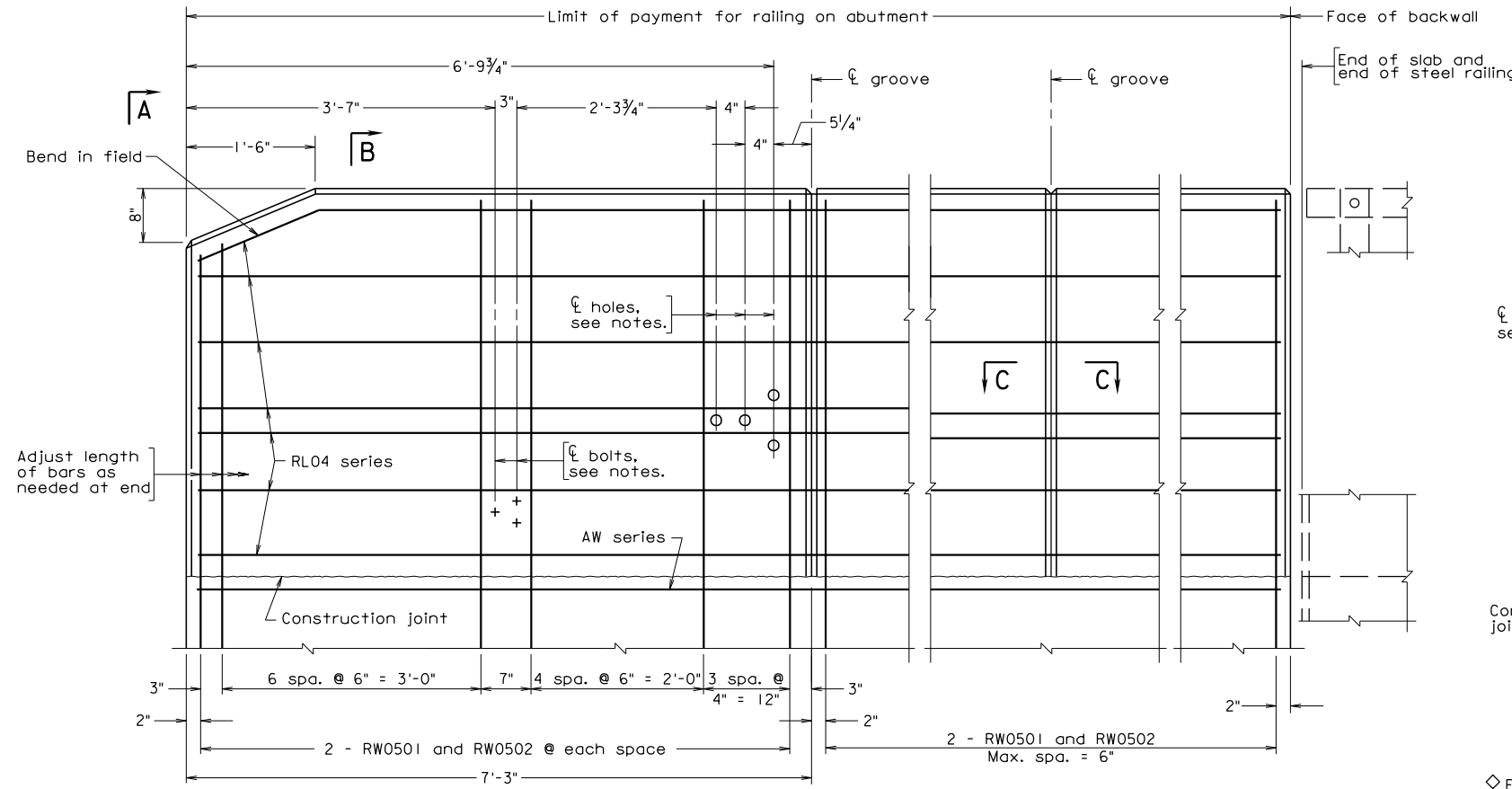
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

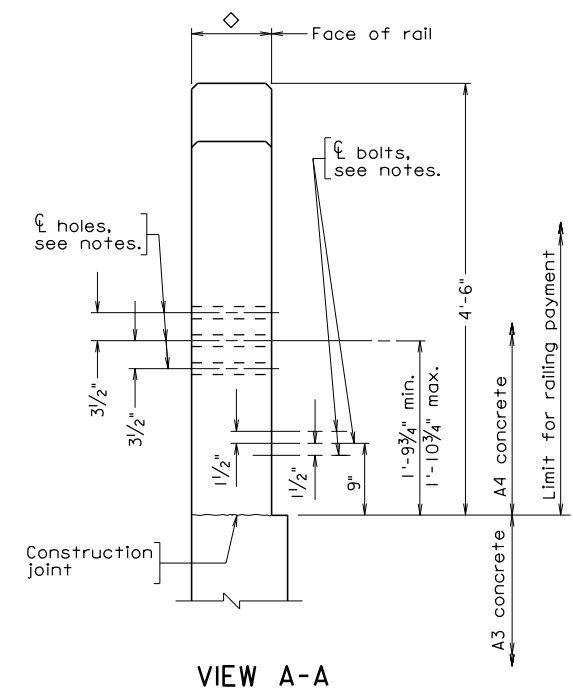
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



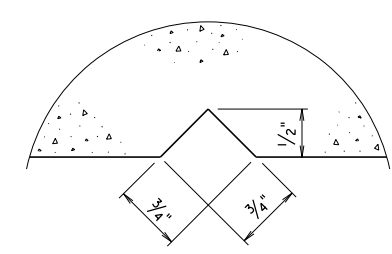
TERMINAL WALL ELEVATION U-BACK WING



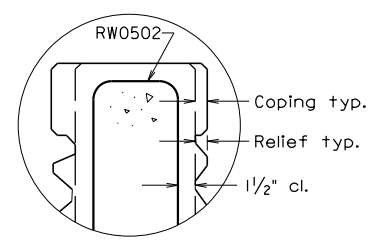
VIEW A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.

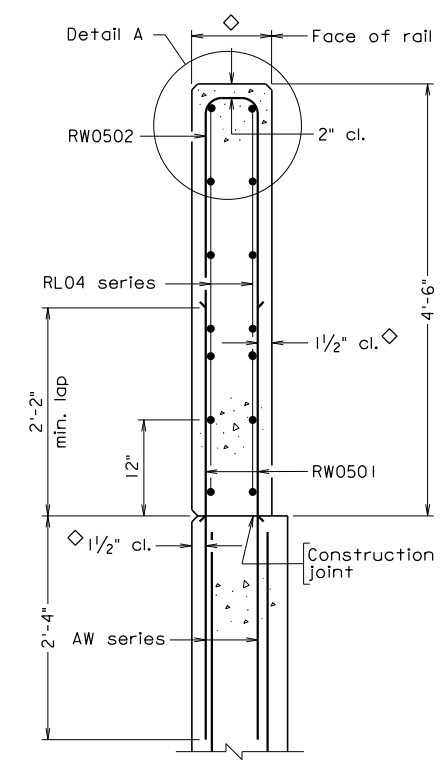
Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 For details and reinforcing steel schedule of steel railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-1.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Spacing of grooves for U-back wings shall be approximately 8'-0".
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.
 Bid price for architectural treatment includes concrete in relief and coping.



SECTION C-C Full scale Groove detail for both sides of rail



DETAIL A Shown with architectural treatment on both sides



SECTION B-B AW series bars may / may not be aligned or positioned with RW bars as shown

REINFORCING STEEL SCHEDULE						
Mark	Size	No.	Length	Pin ϕ	Location	
RW0501	#5		4'-7"	—	Terminal wall and U-back wing	
RW0502	#5		8'-11"	3 3/4"	Terminal wall and U-back wing	
RL04	#4			—	Terminal wall and U-back wing	

Dimensions in bending diagram are out-to-out of bars.

BR27T-5-AT 03-10-2015 br27t5at.dgn

Sealed and Signed by:
 Prasad L. Nallapameni
 Lic. No. 033003
 On the date of
 March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT			
No.	Description	Date	Designed: S&B...DIV Drawn: ...S&B...DIV Checked: S&B...DIV
Revisions		Date	Plan No. Sheet No.
			BR27T-5-AT

54" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C-14-AT, BR27C-15-AT or BR27D-10-AT and when terminal wall is detailed on abutment U-back wing. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on the standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

54" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

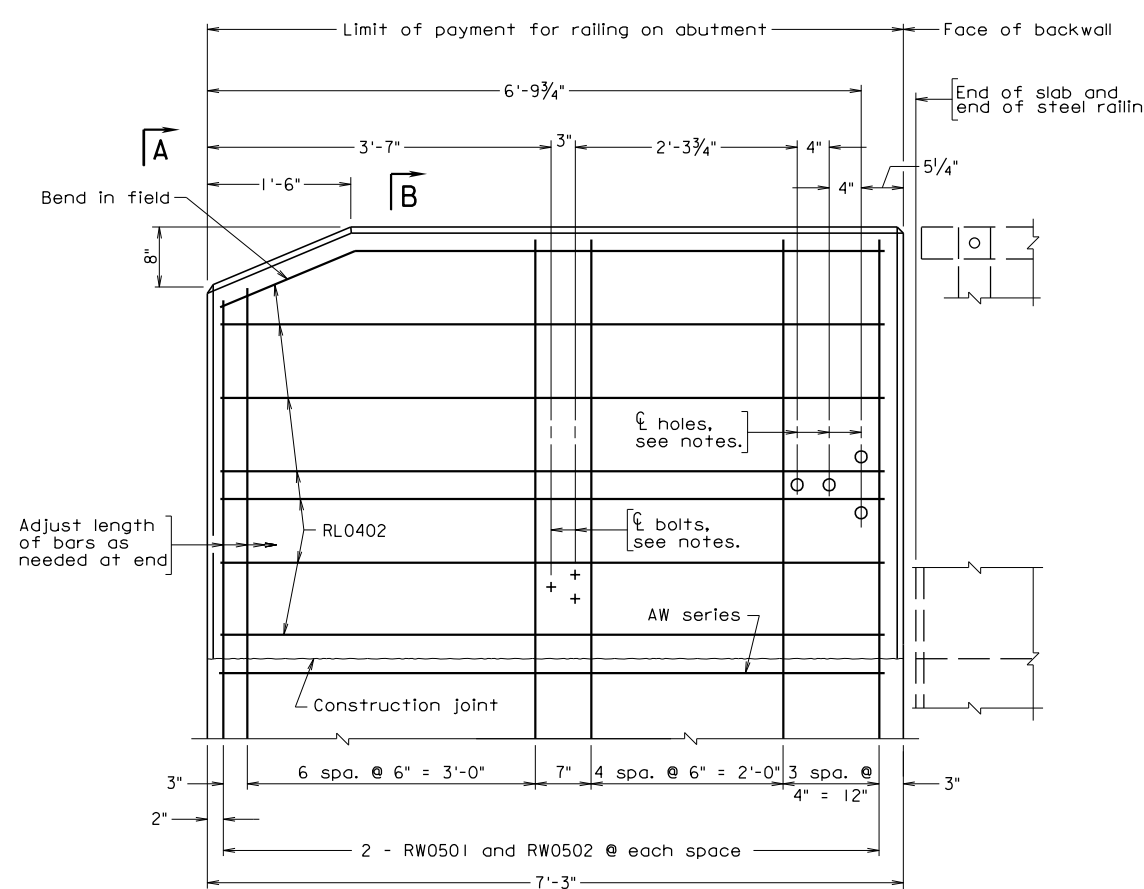
SECTION B-B:

Complete sheet number for architectural treatment details.

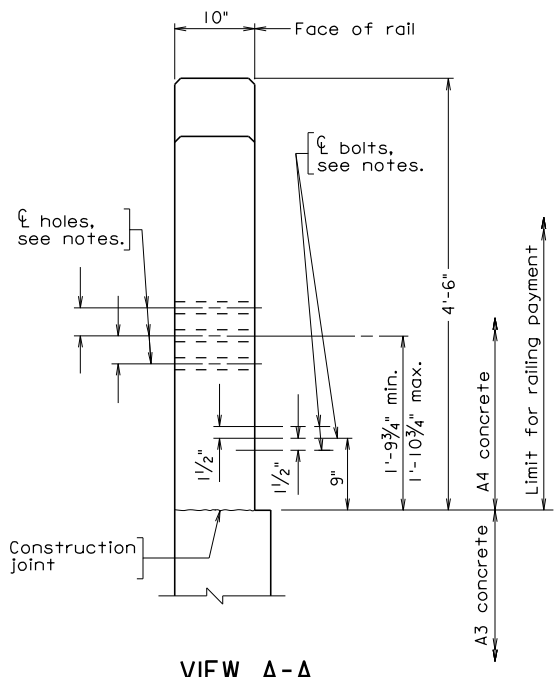
TITLE BLOCK:

Replace standard designation with plan number.

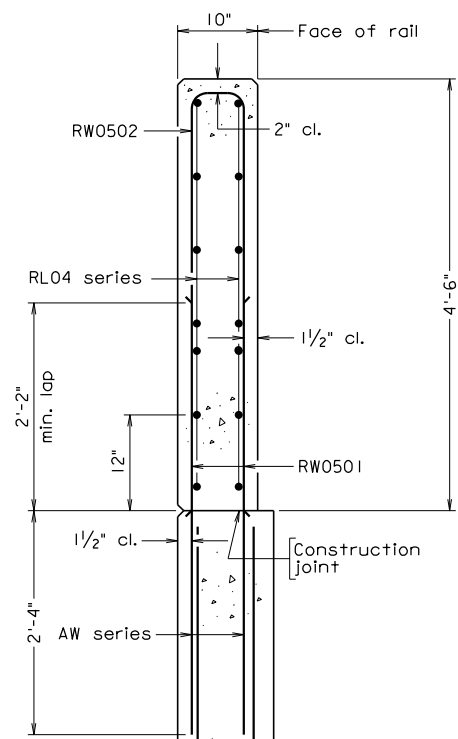
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL - ELEVATION



VIEW A-A



SECTION B-B

AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4\".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of steel railing, see sheet ...
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- For details of wingwall below construction joint, see abutment details.
- Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
RW0502					
Mark	Size	No.	Length	Pin ϕ	Location
RW0501	#5		4'-7"		Terminal wall
RW0502	#5		8'-11"	3/4"	Terminal wall
RL0402	#4		6'-11"		Terminal wall

Dimensions in bending diagram are out-to-out of bars.

br27t6.dgn

03-10-2015

BR27T-6

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BR27T-6
			Checked: S&B...DIV		
Revisions					

Scale: 1" = 1'-0" unless otherwise noted.

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54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C-14, BR27C-15 or BR27D-10 and when terminal wall is detailed on abutment wingwall. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON ABUTMENT WINGWALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

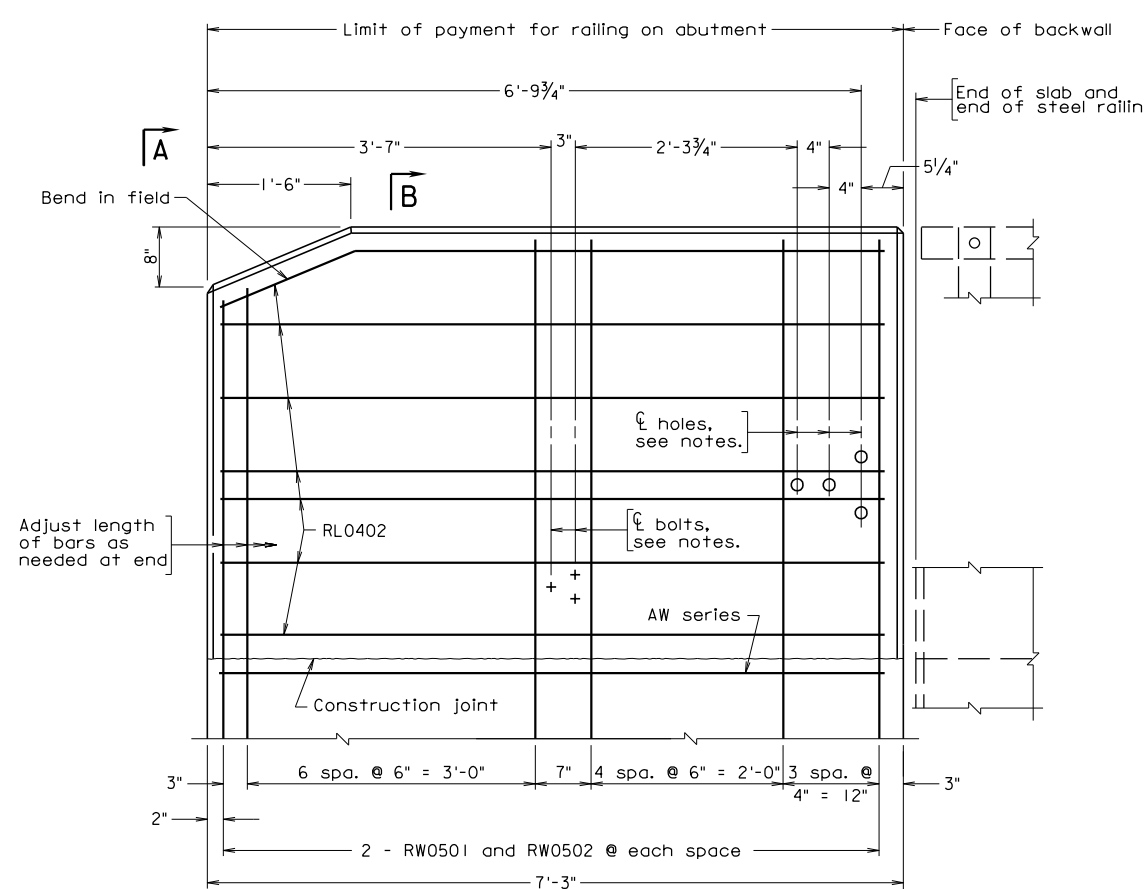
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

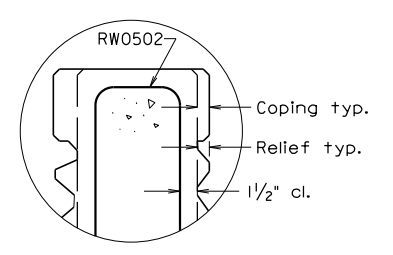
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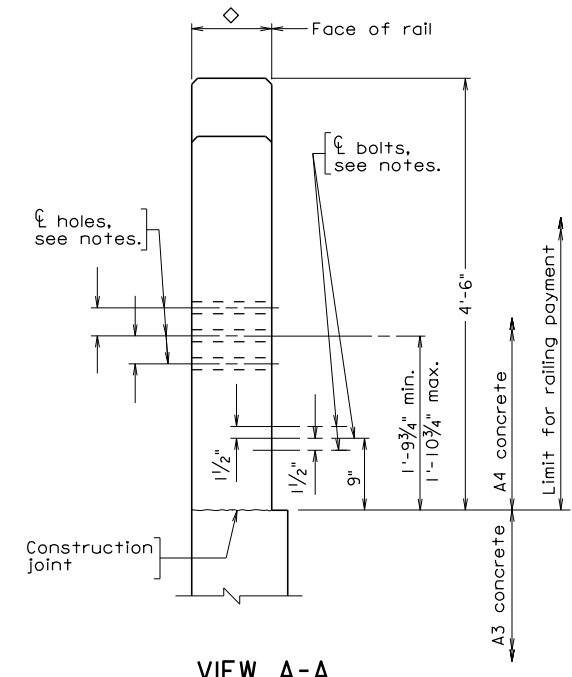
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL - ELEVATION

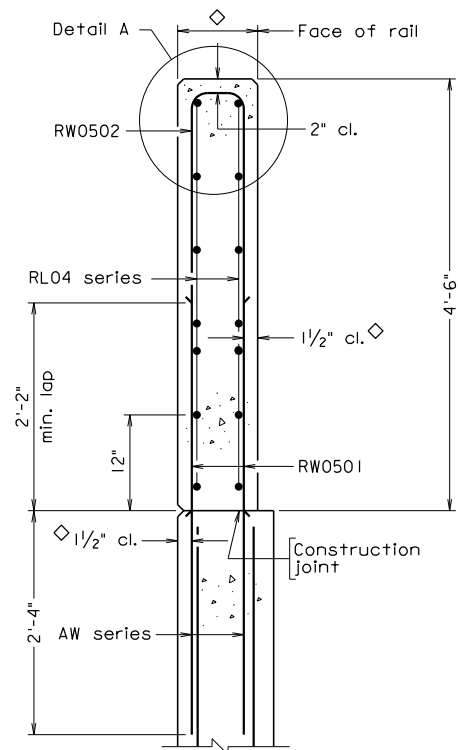


DETAIL A
Shown with architectural treatment on both sides



VIEW A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



SECTION B-B

AW series bars may / may not be aligned or positioned with RW bars as shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing steel schedule of steel railing, see sheet ...
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- For details of wingwall below construction joint, see abutment details.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.
- Bid price for architectural treatment includes concrete in relief and coping.

REINFORCING STEEL SCHEDULE					
RW0502					
Mark	Size	No.	Length	Pin ϕ	Location
RW0501	#5		4'-7"		Terminal wall
RW0502	#5		8'-11"	3/4"	Terminal wall
RL0402	#4		6'-11"		Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR27T-6-AT 03-10-2015 br27t6at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		
			Checked: S&B, DIV		
Revisions			BR27T-6-AT		

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON ABUTMENT WINGWALL

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C-14-AT, BR27C-15-AT or BR27D-10-AT and when terminal wall is detailed on abutment wingwall. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

54" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON ABUTMENT WINGWALL

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RW0502.

SECTION B-B:

Complete sheet number for architectural treatment details.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

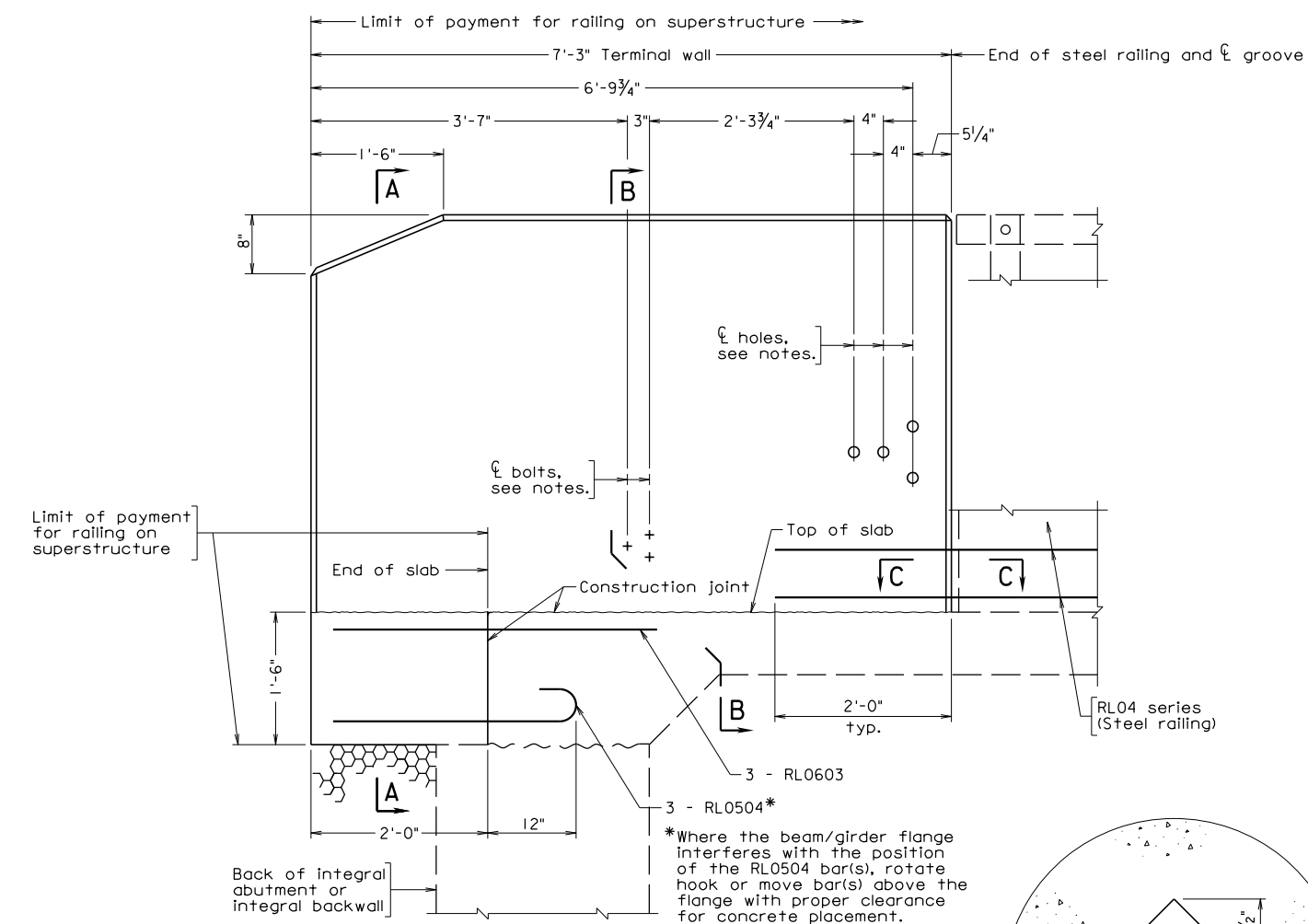
Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

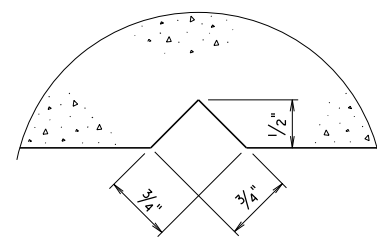
Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

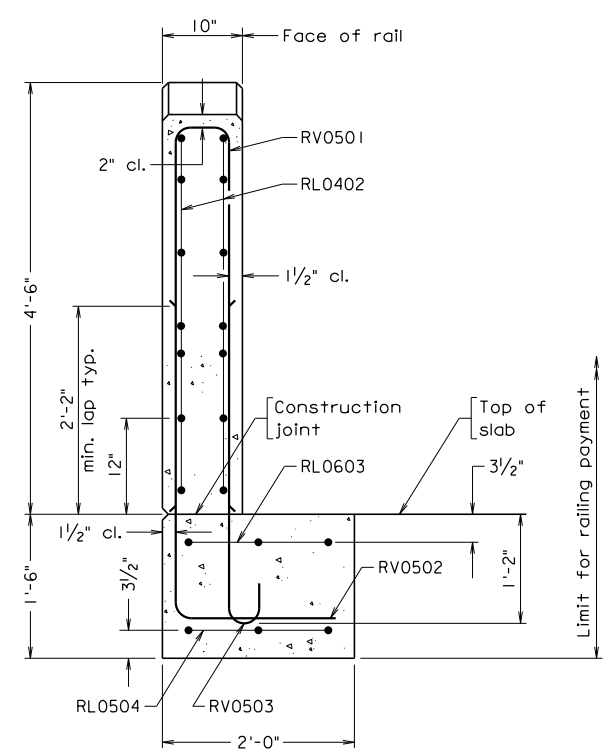
Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.



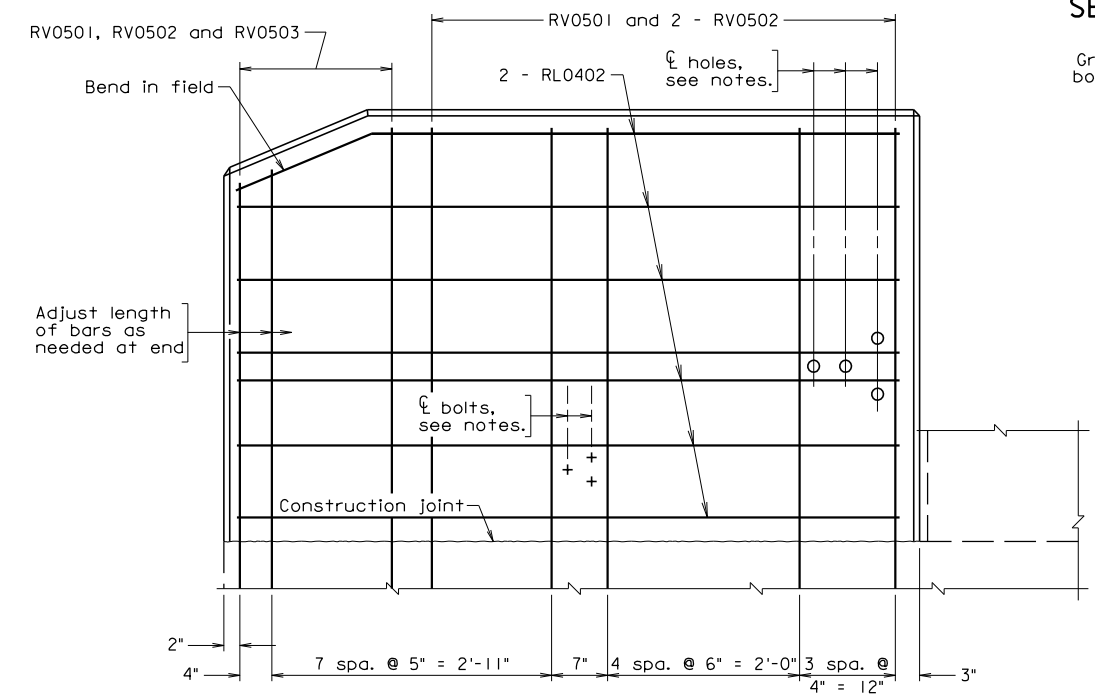
FULL INTEGRAL OR SEMI-INTegral ABUTMENT



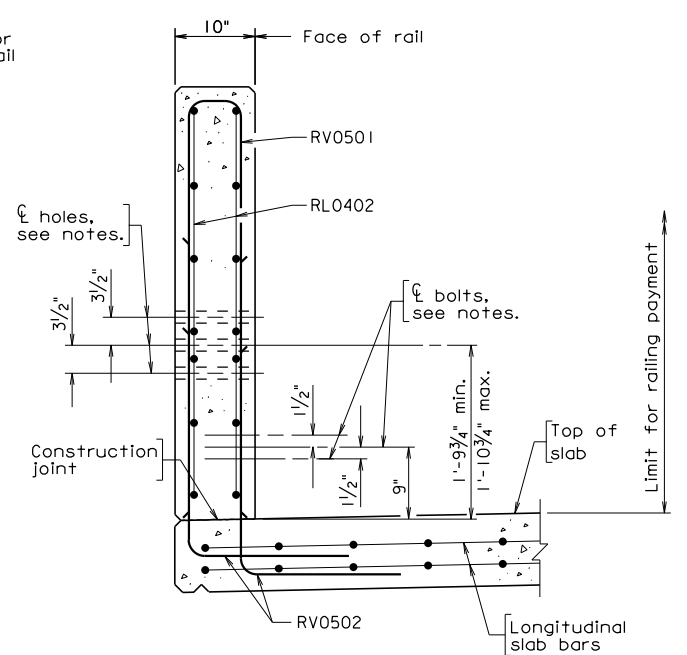
SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A



TERMINAL WALL



SECTION B-B
Transverse slab bars not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ϕ	Length	Location
RV0501					
RV0502					
RV0503					
RL0402	#4			6'-11"	Terminal wall
RL0603	#6			4'-0"	Terminal wall end support
RL0504	#5		3 3/4"	3'-4"	Terminal wall end support
RV0501	#5		3 3/4"	8'-11"	Terminal wall
RV0502	#5		3 3/4"	5'-0"	Terminal wall
RV0503	#5		3 3/4"	4'-0"	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR27T-7
03-10-2015
br27t7.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		BR27T-7
Revisions					

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C series (BR27C-13 thru BR27C-15) or BR27D series (BR27D-9 and BR27D-10) with terminal wall on superstructure with integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section on inside of superstructure (for BR27C-13 and BR27D-9) or at the edge of superstructure (for BR27C-14, BR27C-15 and BR27D-10) is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the location of the slab extension at the end of the deck slab. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify 4'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'- 10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

54" STEEL RAILING

BR27T-SERIES

**TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of integral abutment.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

TITLE BLOCK:

Replace standard designation with plan number.

STANDARD BR27T-7: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 3 of 3
FILE NO. BR27T-7-3

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

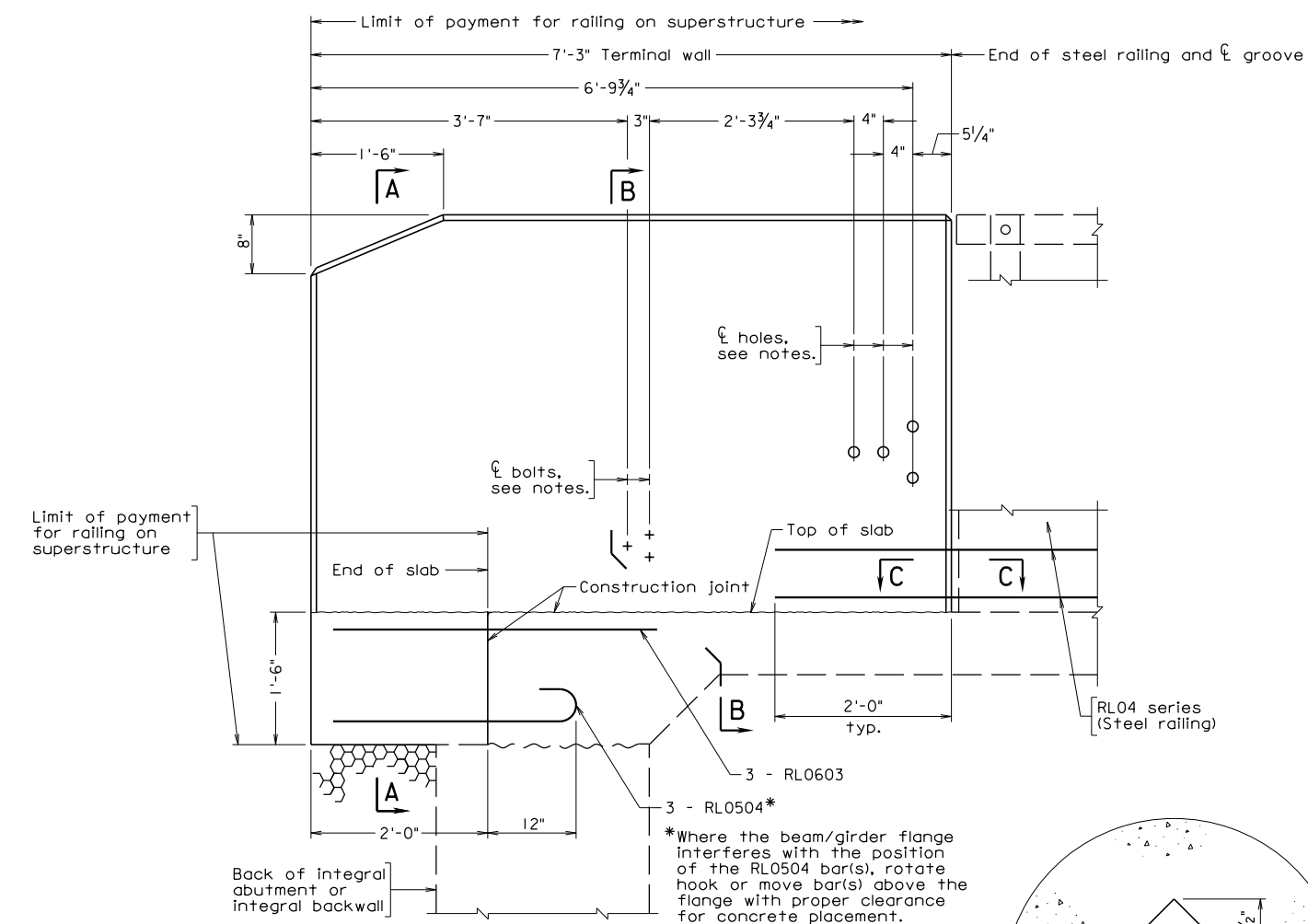
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

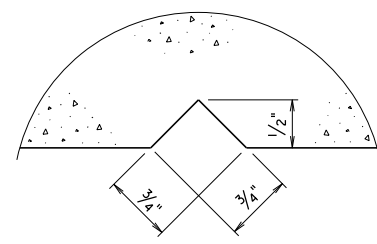
Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.

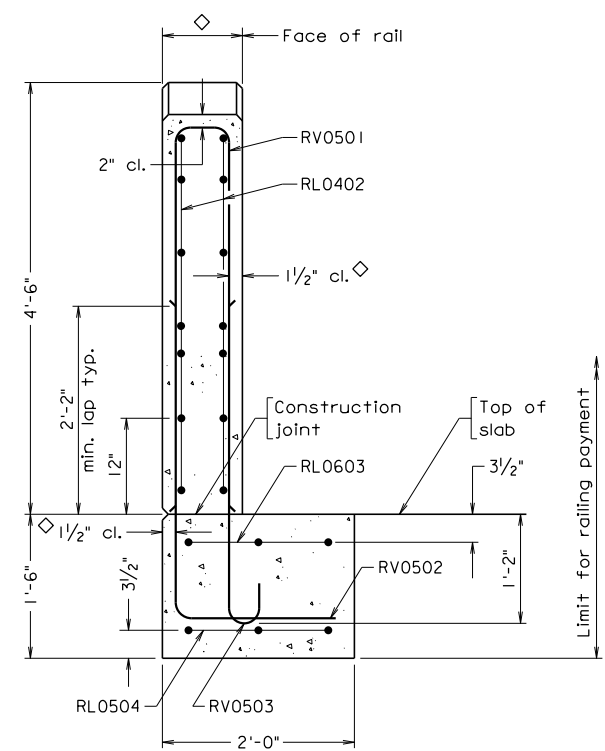
Bid price for architectural treatment includes concrete in relief and coping.



FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

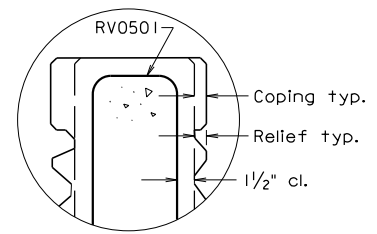


SECTION C-C
Full scale
Groove detail for both sides of rail

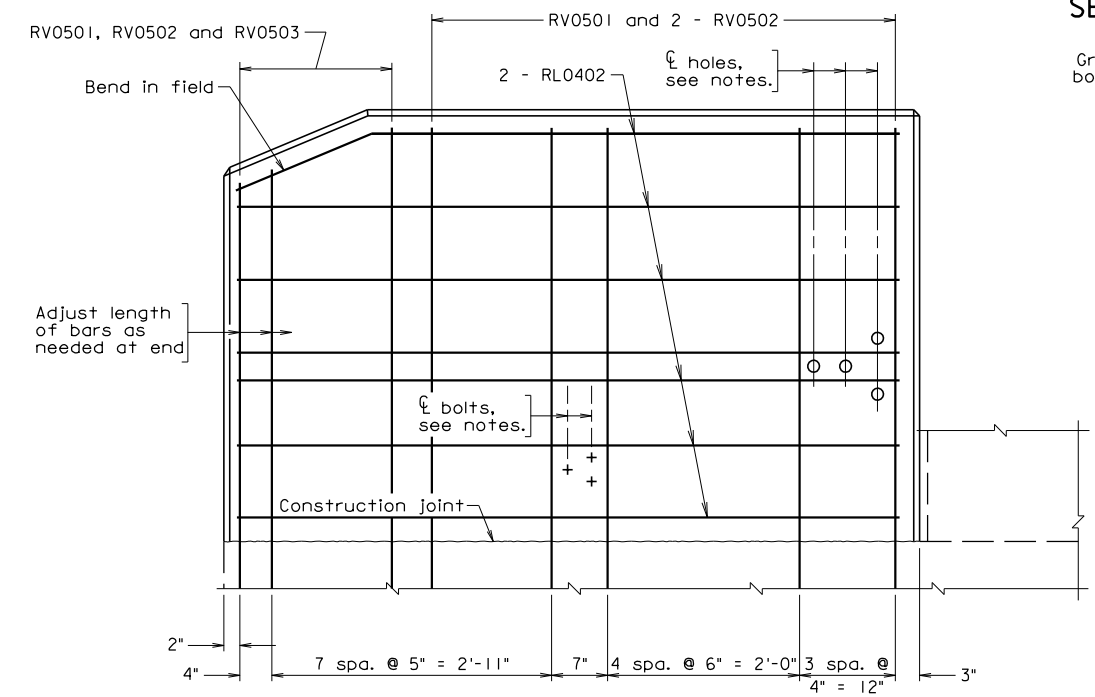


SECTION A-A

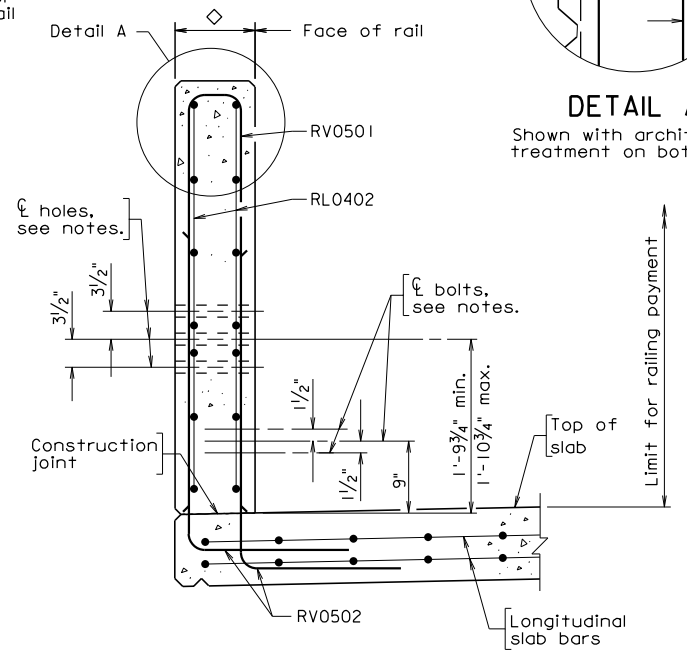
◇ For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



DETAIL A
Shown with architectural treatment on both sides



TERMINAL WALL



SECTION B-B
Transverse slab bars not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ϕ	Length	Location
RV0501	#5	3	3 3/4"	8'-11"	Terminal wall
RV0502	#5	3	3 3/4"	5'-0"	Terminal wall
RV0503	#5	3	3 3/4"	4'-0"	Terminal wall
RL0402	#4	2	—	6'-11"	Terminal wall
RL0603	#6	1	—	4'-0"	Terminal wall end support
RL0504	#5	3	3 3/4"	3'-4"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars.

BR27T-7-AT 03-10-2015 br27t7at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BR27T-7-AT		

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C series (BR27C-13-AT thru BR27C-15-AT) or BR27D series (BR27D-9-AT and BR27D-10-AT) with terminal wall on superstructure with integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-0" wide section on inside of superstructure (for BR27C-13-AT and BR27D-9-AT) or at the edge of superstructure (for BR27C-14-AT, BR27C-15-AT and BR27D-10-AT) is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the location of the slab extension at the end of the deck slab. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify 4'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'- 10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

STANDARD BR27T-7-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 2 of 3
FILE NO. BR27T-7-AT-2

54" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of integral abutment.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

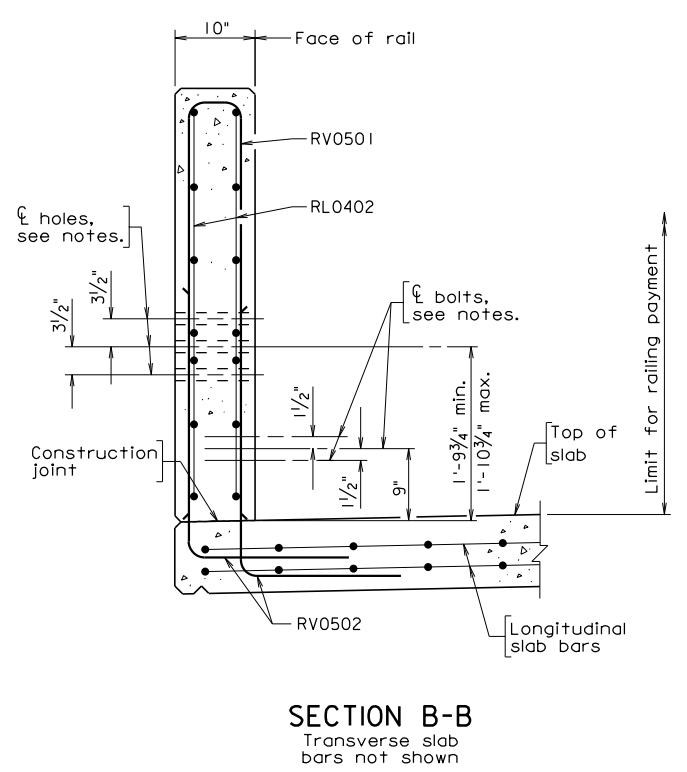
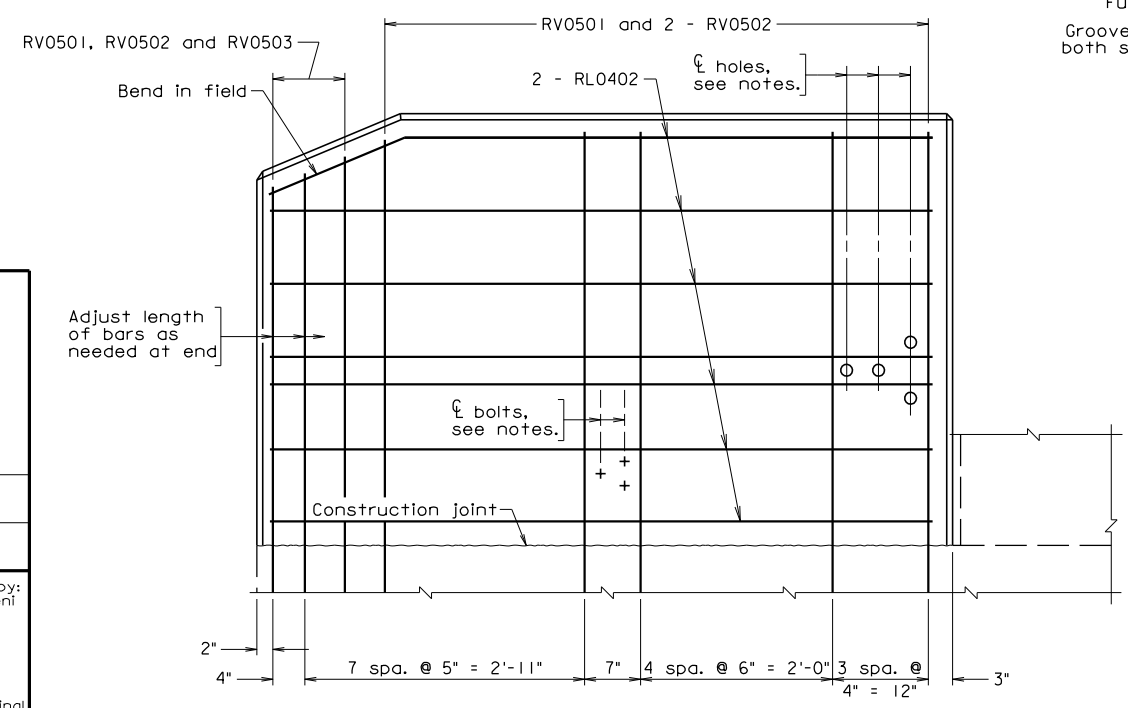
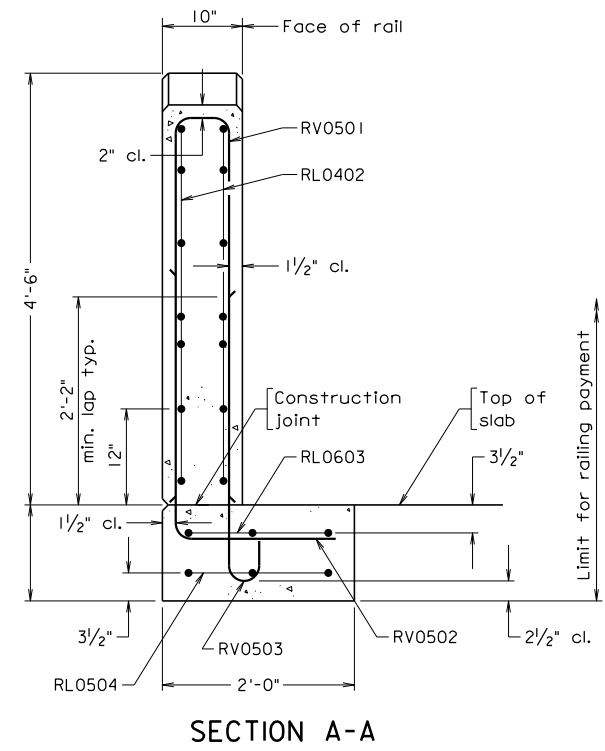
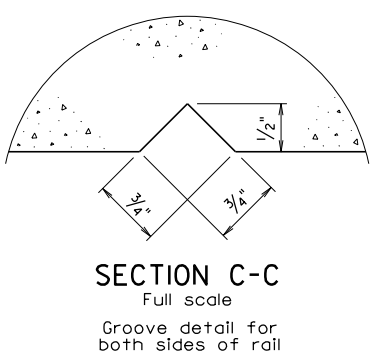
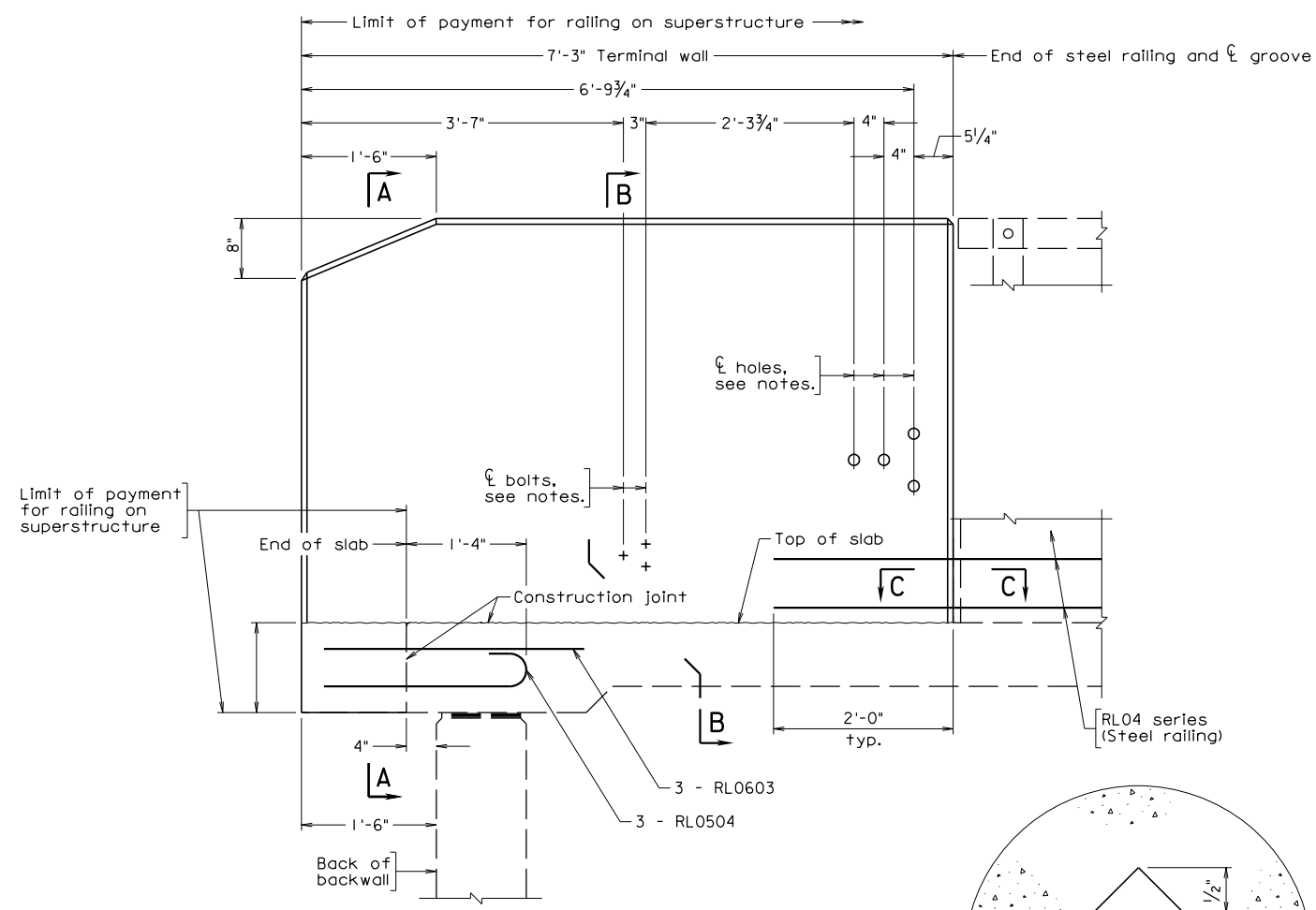
SECTION A-A:

Complete sheet number for architectural treatment details.

TITLE BLOCK:

Replace standard designation with plan number.

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
 For details and reinforcing steel schedule of steel railing, see sheet ...
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-FOA-1.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.



REINFORCING STEEL SCHEDULE						
RV0501	RV0502	RL0504, RV0503				
Mark	Size	No.	Pin ø	Length	Location	
RL0402	#4		—	6'-11"	Terminal wall	
RL0603	#6		—	4'-0"	Terminal wall end support	
RL0504	#5		3 3/4"	2'-10"	Terminal wall end support	
RV0501	#5		3 3/4"	8'-11"	Terminal wall	
RV0502	#5		3 3/4"	4'-6"	Terminal wall	
RV0503	#5		3 3/4"	3'-7"	Terminal wall	

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BR27T-8
	Revisions		Checked: S&B, DIV		

BR27T-8
03-10-2015
br27t8.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C series (BR27C-13 thru BR27C-15) or BR27D series (BR27D-9 and BR27D-10) with terminal wall on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-0" wide section on inside of superstructure (for BR27C-13 and BR27D-9) or at the edge of superstructure (for BR27C-14, BR27C-15 and BR27D-10) is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the location of the slab extension at the end of the deck slab. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify 4'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

Provide dimension for terminal wall end support.

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'- 10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of deck slab extension.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

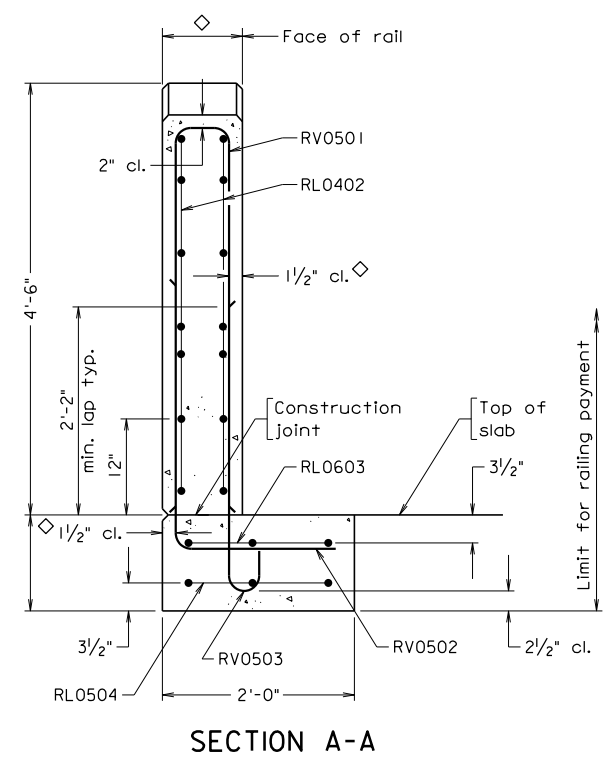
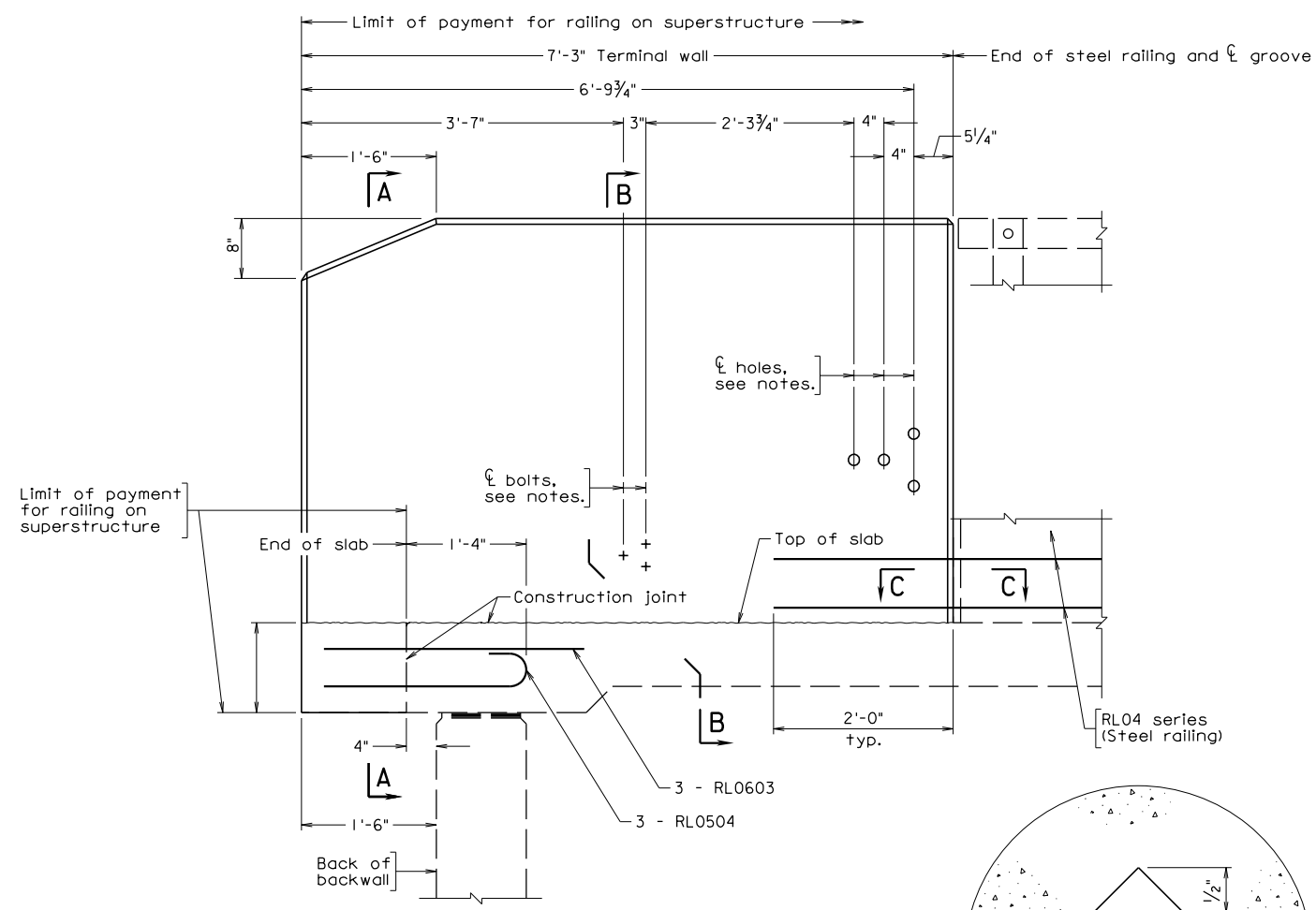
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

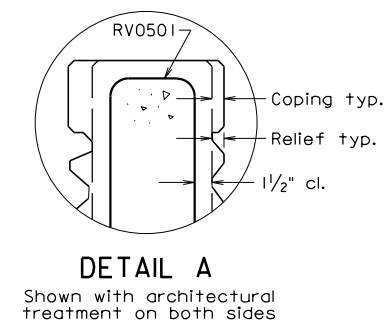
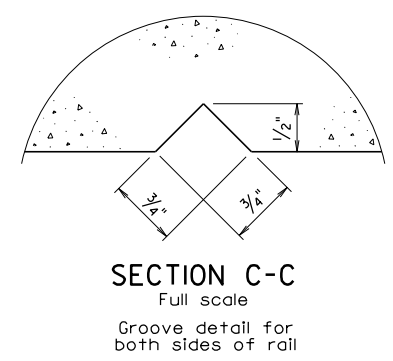
Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.

Bid price for architectural treatment includes concrete in relief and coping.

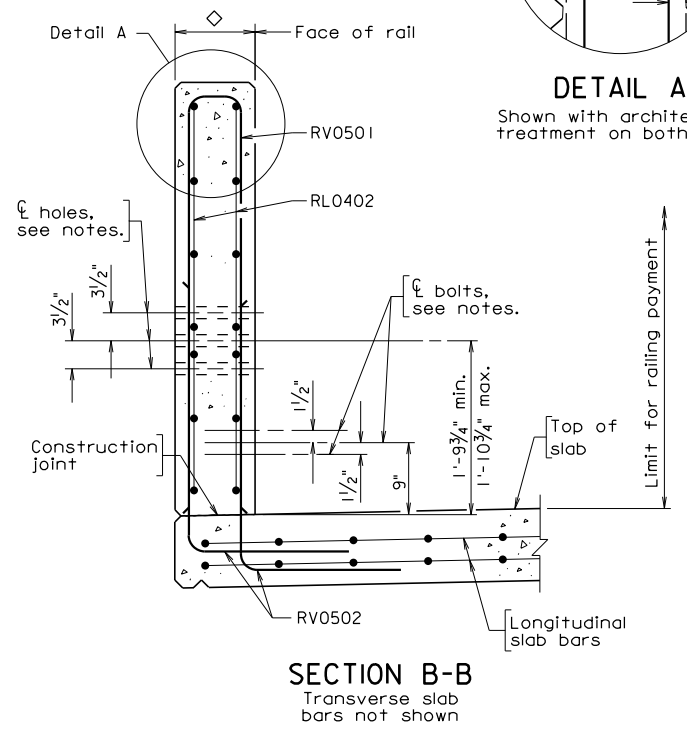
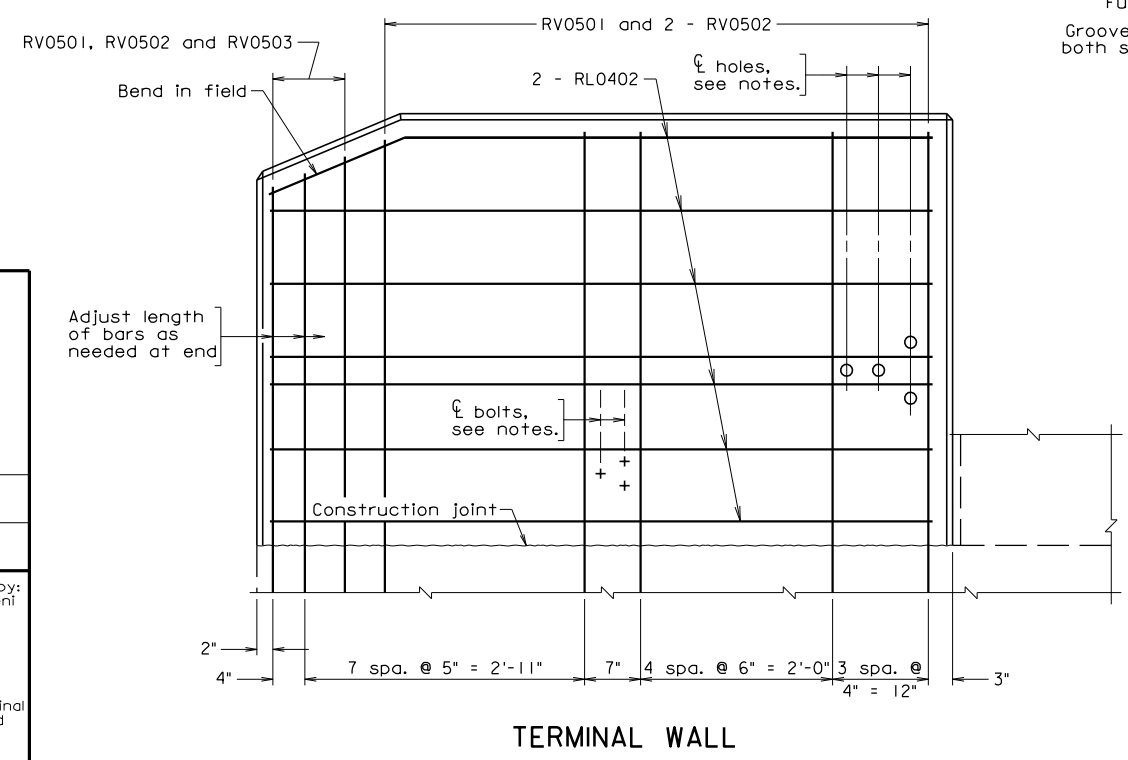


For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.



REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RV0501					
RV0502					
RV0503					
RV0504					
RL0402	#4			6'-11"	Terminal wall
RL0603	#6			4'-0"	Terminal wall end support
RL0504	#5		3 3/4"	2'-10"	Terminal wall end support
RV0501	#5		3 3/4"	8'-11"	Terminal wall
RV0502	#5		3 3/4"	4'-6"	Terminal wall
RV0503	#5		3 3/4"	3'-7"	Terminal wall

Dimensions in bending diagram are out-to-out of bars.



Scale: 1" = 1'-0" unless otherwise noted. © 2015, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions			BR27T-8-AT		

BR27T-8-AT 03-10-2015 br27t8at.dgn

Sealed and Signed by:
Prasad L. Nallaponteni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard BR27C series (BR27C-13-AT thru BR27C-15-AT) or BR27D series (BR27D-9-AT and BR27D-10-AT) with terminal wall on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-0" wide section on inside of superstructure (for BR27C-13-AT and BR27D-9-AT) or at the edge of superstructure (for BR27C-14-AT, BR27C-15-AT and BR27D-10-AT) is extended further from the end of deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the location of the slab extension at the end of the deck slab. This standard may be modified by omitting the details and notes for guardrail attachment when used on the outside of structure in conjunction with an inside traffic barrier separating the pedestrian and/or bicycle facility from traffic. For geometrics of pedestrian and/or bicycle facilities, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required and these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify 4'-6" height of terminal wall so that this dimension will be established from top of overlay surface.

Provide dimension for terminal wall end support.

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'- 10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details of deck slab extension.

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

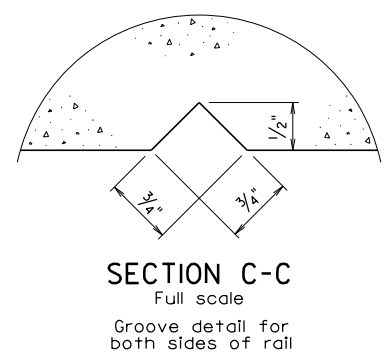
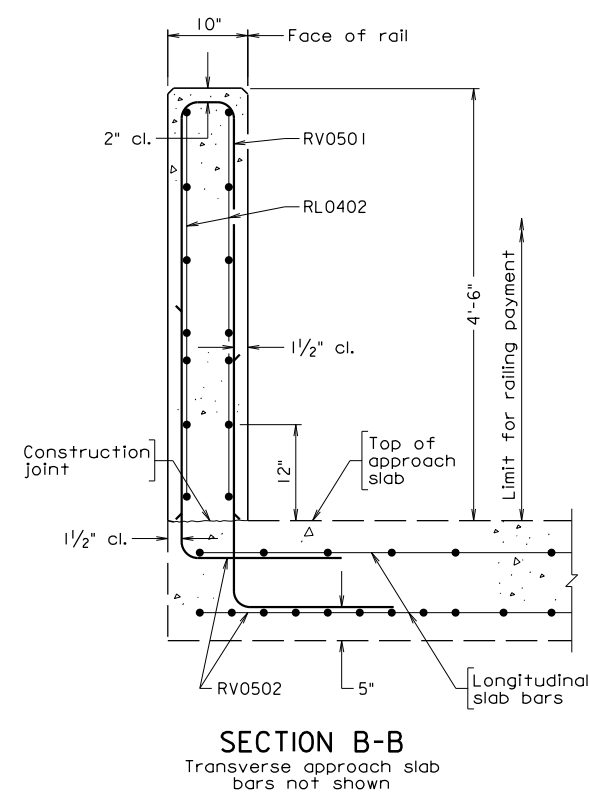
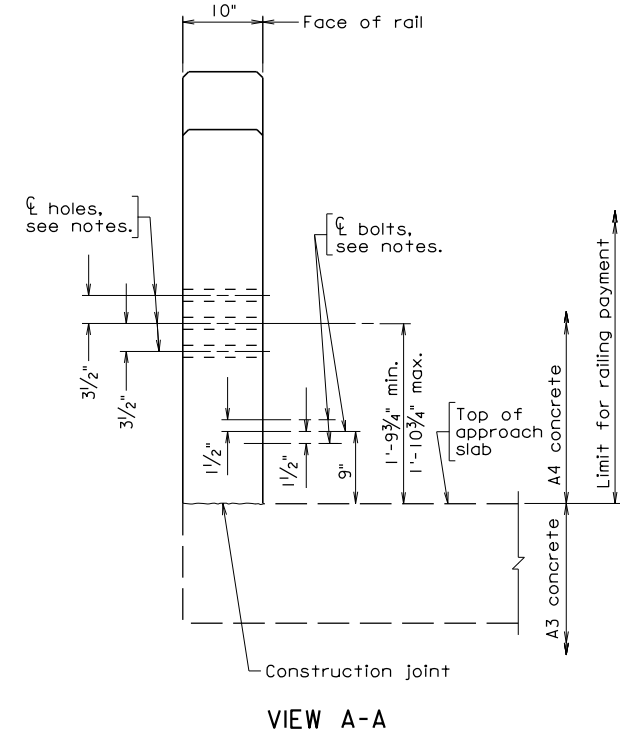
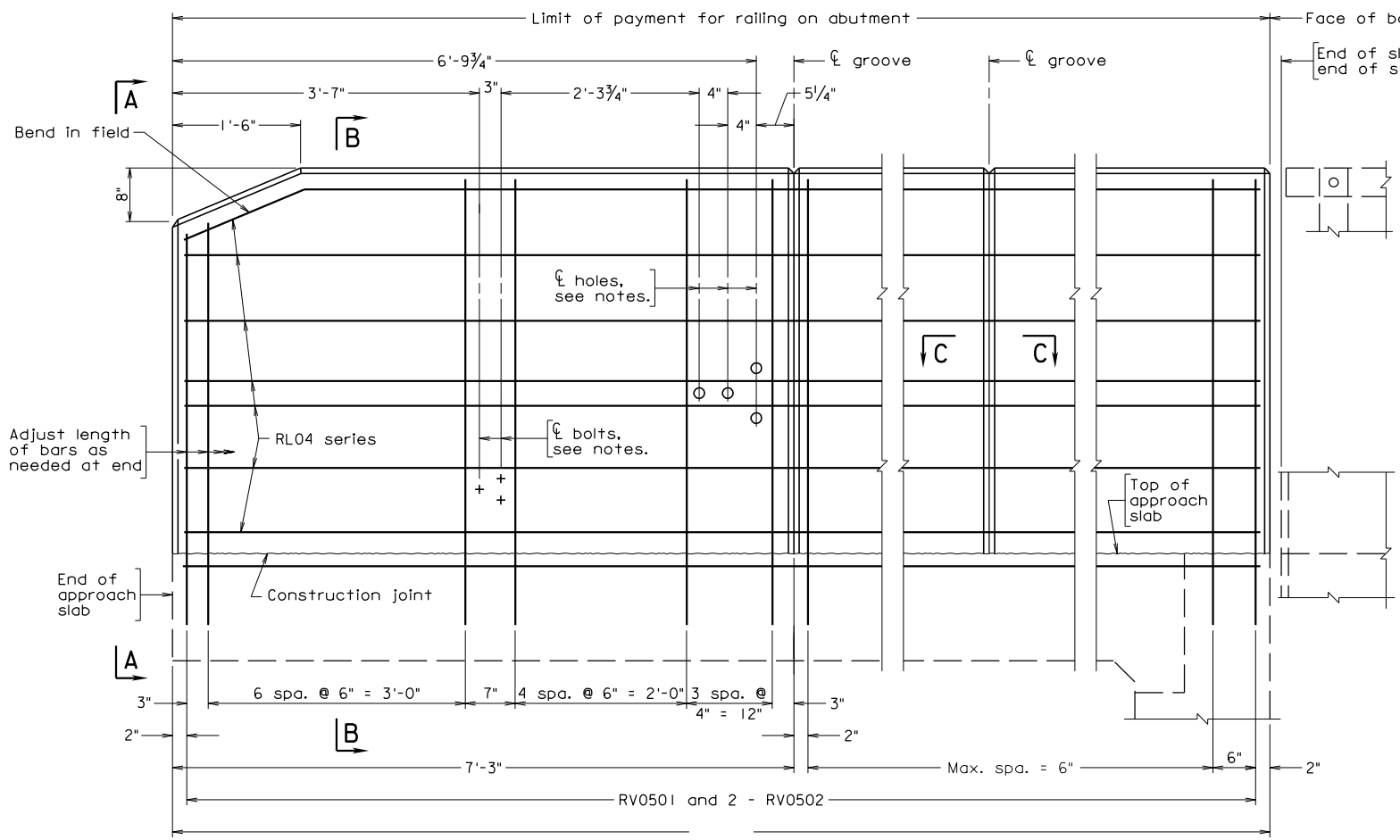
SECTION A-A:

Complete sheet number for architectural treatment details.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For approach slab details, see sheet ...

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Spacing of grooves shall be approximately 8'-0".

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RV0501	#4				Terminal wall and parapet
RV0501	#5		8'-11"	3 3/4"	Terminal wall and parapet
RV0502	#5		4'-8"	3 3/4"	Terminal wall and parapet

Dimensions in bending diagram are out-to-out of bars.

BR27T-9 03-10-2015 br27t9.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		BR27T-9
			Checked: S&B...DIV		

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON APPROACH SLAB

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard B27C-13 or BR27D-9 and when terminal wall is detailed on approach slab. This terminal wall with parts of steel railing joined together with the approach slab shall be part of the steel railing for payment under the abutment. For geometrics of terminal wall with approach slab, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6. Use standard BR27T-10 when using standard BR27C-13 or BR27D-9 and when terminal wall is detailed on approach slab with full integral or semi-integral abutments.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide overall length from end of approach slab to face of backwall.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet numbers for details of approach slab, for details and reinforcing steel schedule of steel railing and for rail expansion joint detail.

STANDARD BR27T-9: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 2 of 3
FILE NO. BR27T-9-2

**54" STEEL RAILING
BR27T-SERIES
TERMINAL WALL ON APPROACH SLAB**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

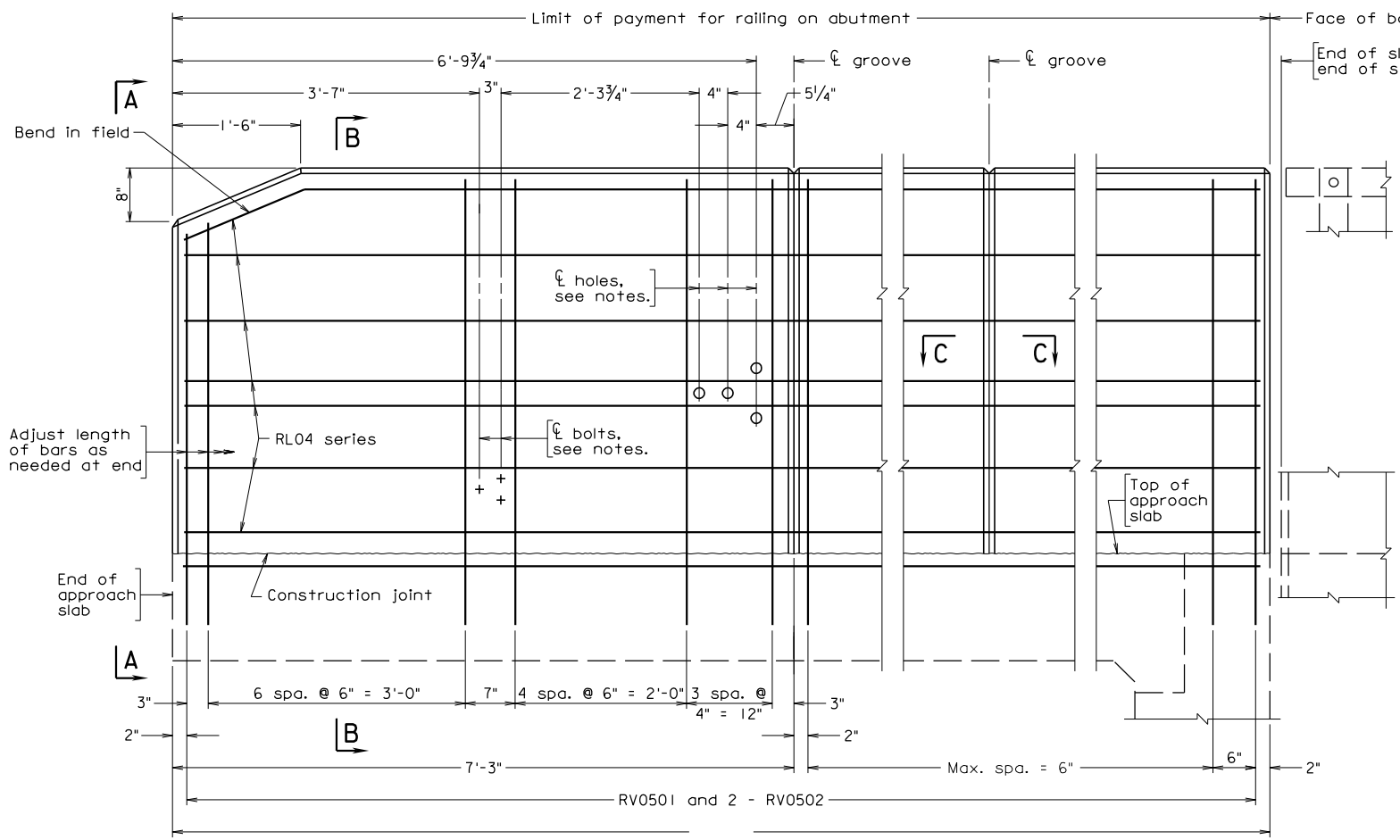
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

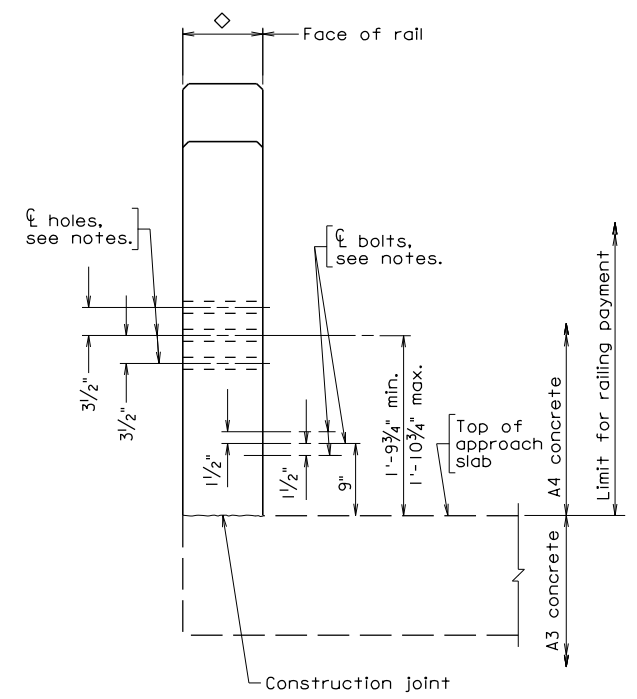
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



TERMINAL WALL ELEVATION ABUTMENT



VIEW A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For approach slab details, see sheet ...

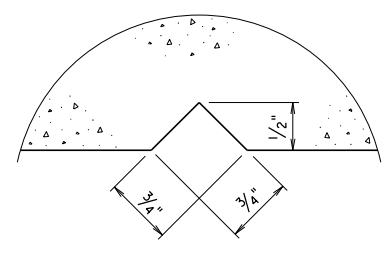
Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

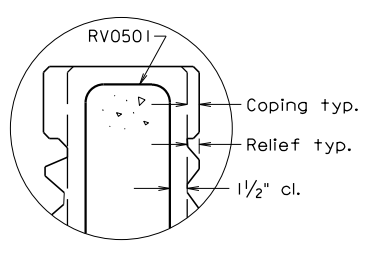
Spacing of grooves shall be approximately 8'-0\".

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.

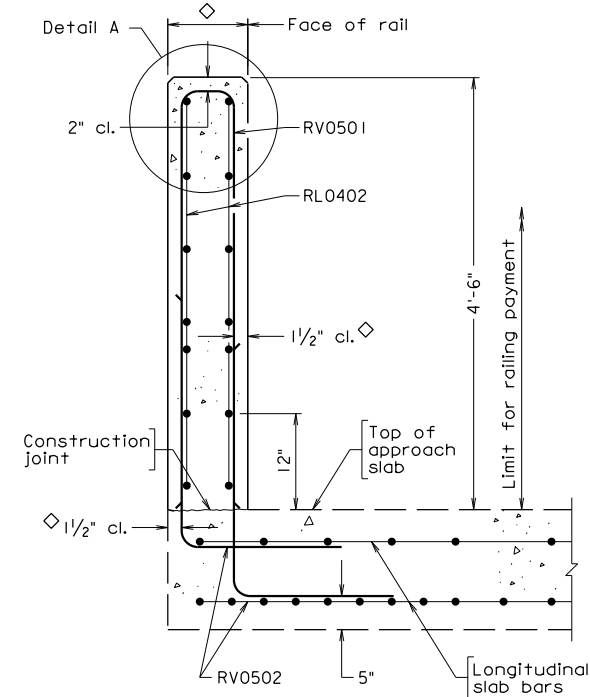
Bid price for architectural treatment includes concrete in relief and coping.



SECTION C-C Full scale Groove detail for both sides of rail



DETAIL A Shown with architectural treatment on both sides



SECTION B-B Transverse approach slab bars not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RV0501	#4				Terminal wall and parapet
RV0501	#5		8'-11"	3 3/4"	Terminal wall and parapet
RV0502	#5		4'-8"	3 3/4"	Terminal wall and parapet

Dimensions in bending diagram are out-to-out of bars.

br27t9at.dgn

03-10-2015

BR27T-9-AT

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV	BR27T-9-AT	

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON APPROACH SLAB

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard B27C-13-AT or BR27D-9-AT and when terminal wall is detailed on approach slab. This terminal wall with parts of steel railing joined together with the approach slab shall be part of the steel railing for payment under the abutment. For geometrics of terminal wall with approach slab, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6. Use standard BR27T-10-AT when using standard B27C-13-AT or BR27D-9-AT and when terminal wall is detailed on approach slab with full integral or semi-integral abutments.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide overall length from end of approach slab to face of backwall.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min. – 1'-10³/₄" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

Complete sheet number for architectural treatment details.

54" STEEL RAILING
BR27T-SERIES WITH ARCHITECTURAL TREATMENT
TERMINAL WALL ON APPROACH SLAB

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet numbers for details of approach slab, for details and reinforcing steel schedule of steel railing and for rail expansion joint detail.

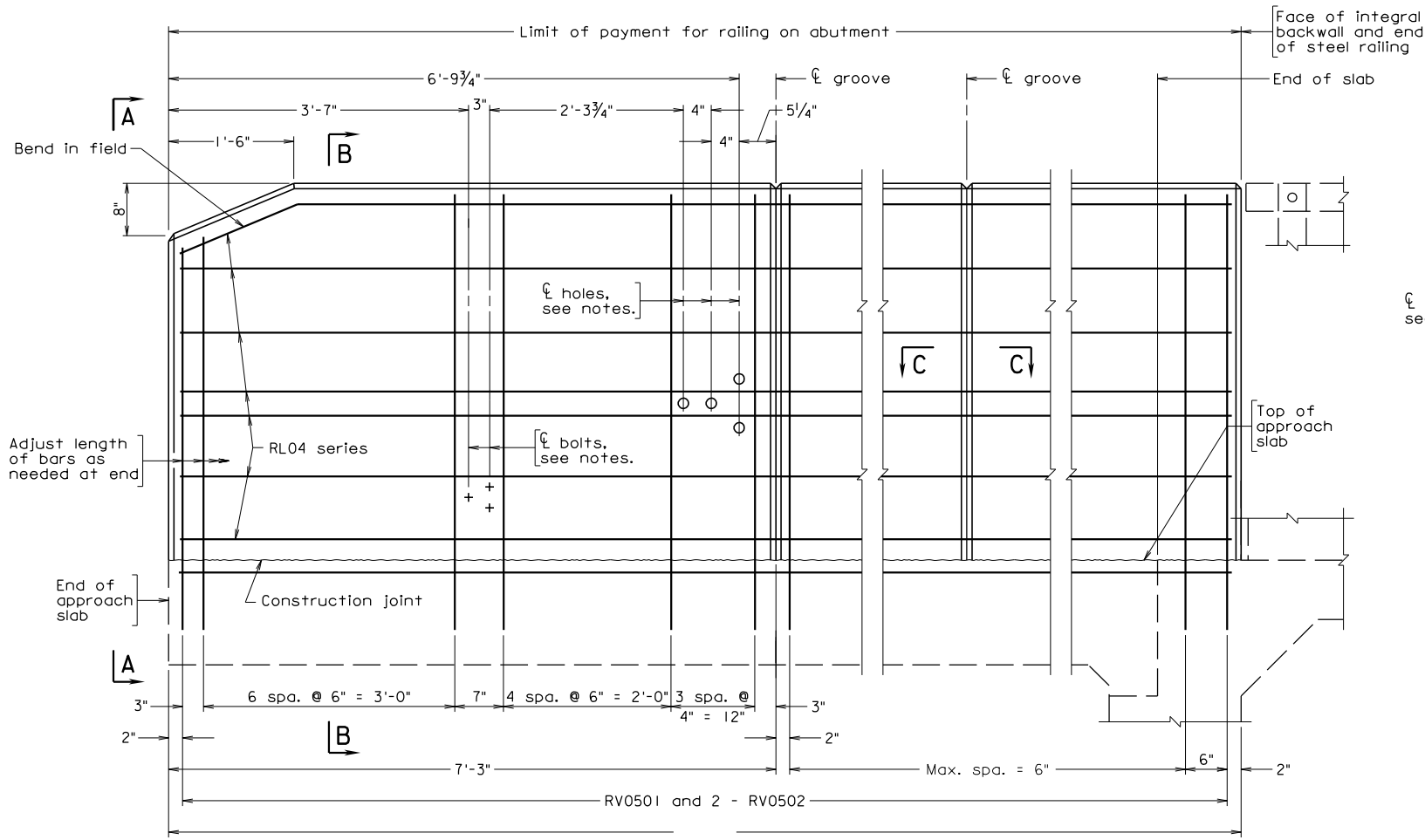
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

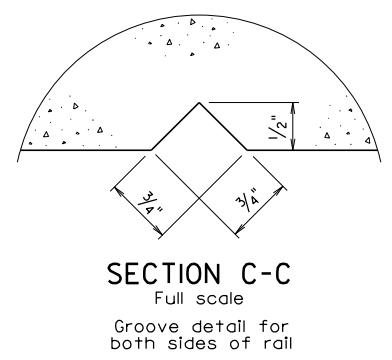
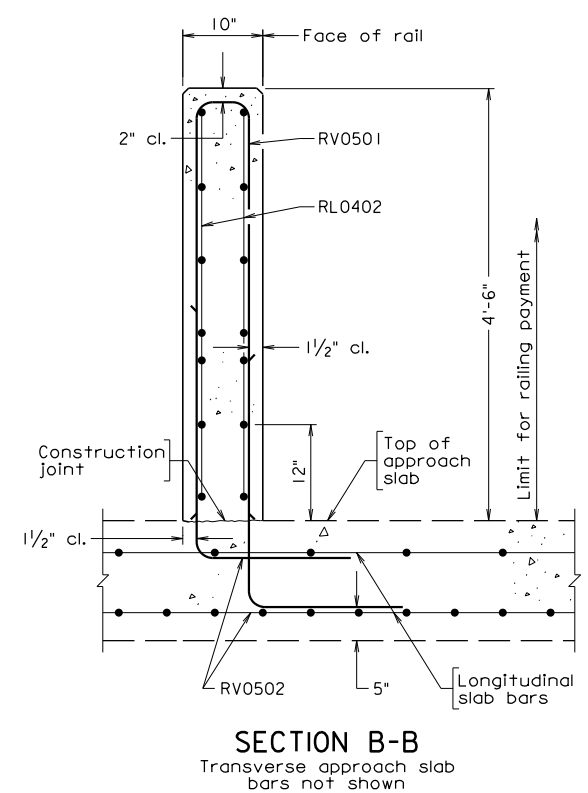
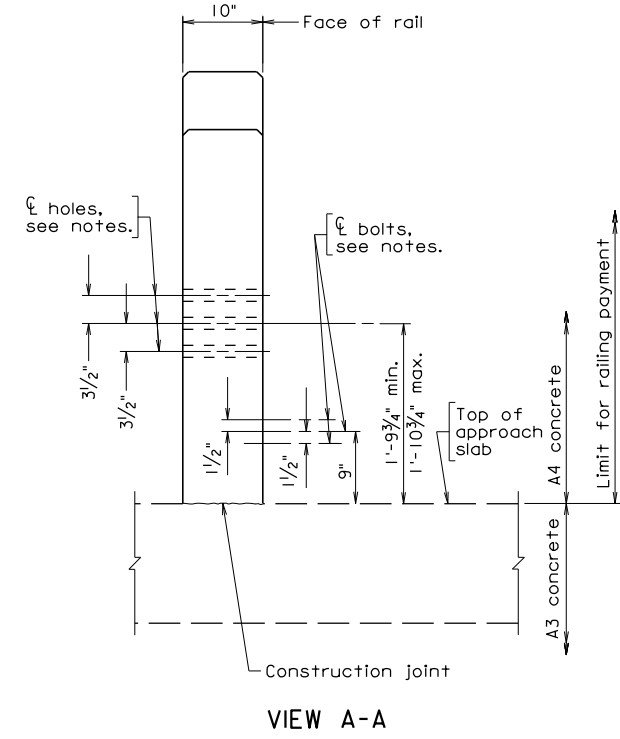
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



TERMINAL WALL ELEVATION ABUTMENT



SECTION C-C Full scale Groove detail for both sides of rail

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For approach slab details, see sheet ...

Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

Spacing of grooves shall be approximately 8'-0\".

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RV0501	#4				Terminal wall and parapet
RV0501	#5		8'-11"	3 3/4"	Terminal wall and parapet
RV0502	#5		4'-8"	3 3/4"	Terminal wall and parapet

Dimensions in bending diagram are out-to-out of bars.

BR27T-10 03-10-2015 br27t10.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		Sheet No.
Revisions			Checked: S&B...DIV	BR27T-10	

54" STEEL RAILING

BR27T-SERIES

TERMINAL WALL ON APPROACH SLAB WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard B27C-13 or BR27D-9 and when terminal wall is detailed on approach slab with full integral or semi-integral abutments. This terminal wall with parts of steel railing joined together with the approach slab shall be part of the steel railing for payment under the abutment. For geometrics of terminal wall with approach slab, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide overall length from end of approach slab to face of backwall.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min. – 1'-10¾" max.) for location of bolts so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet numbers for details of approach slab, for details and reinforcing steel schedule of steel railing and for rail expansion joint detail.

STANDARD BR27T-9: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 2 of 3
FILE NO. BR27T-10-2

54" STEEL RAILING

BR27T-SERIES

**TERMINAL WALL ON APPROACH SLAB WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

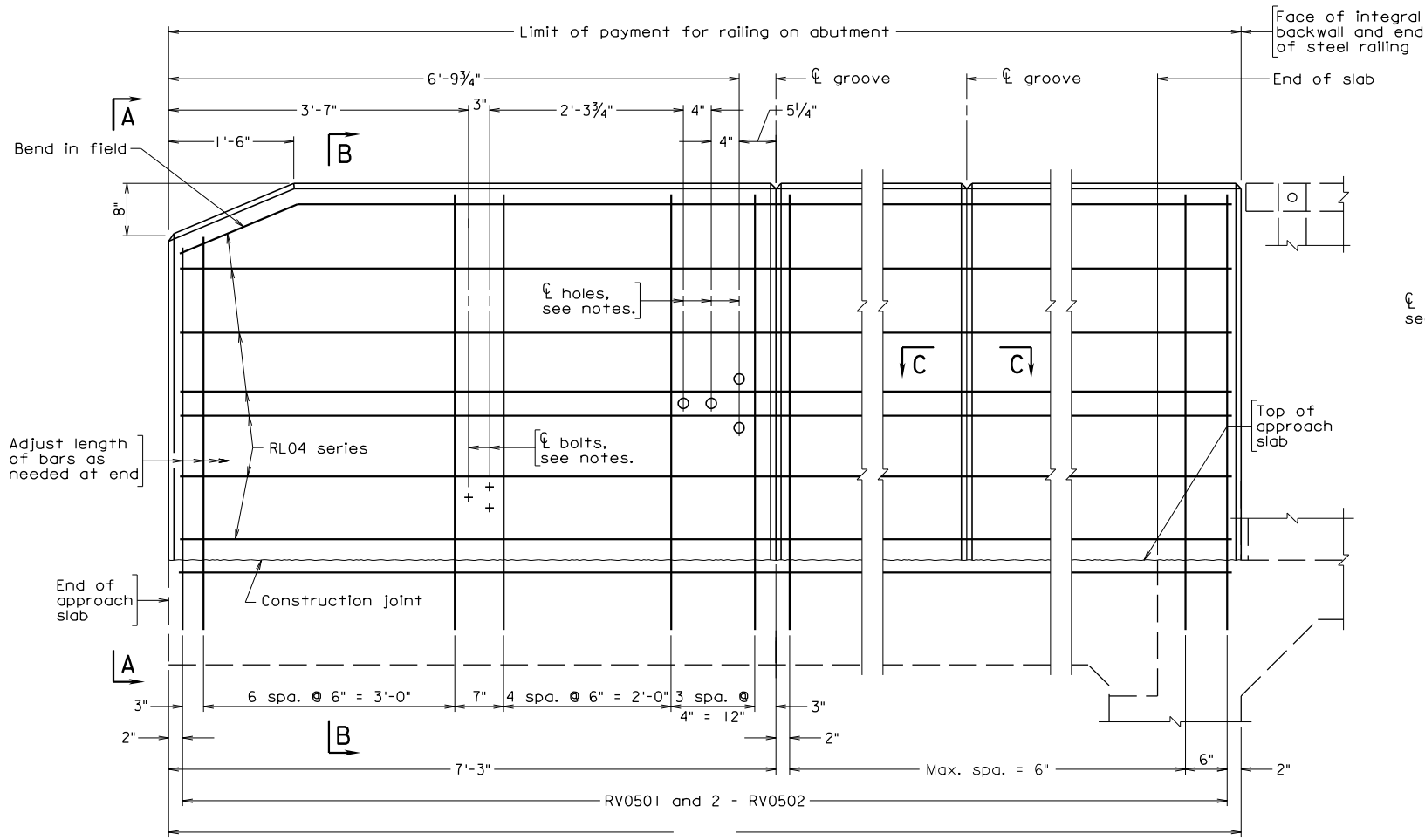
TITLE BLOCK:

Replace standard designation with plan number.

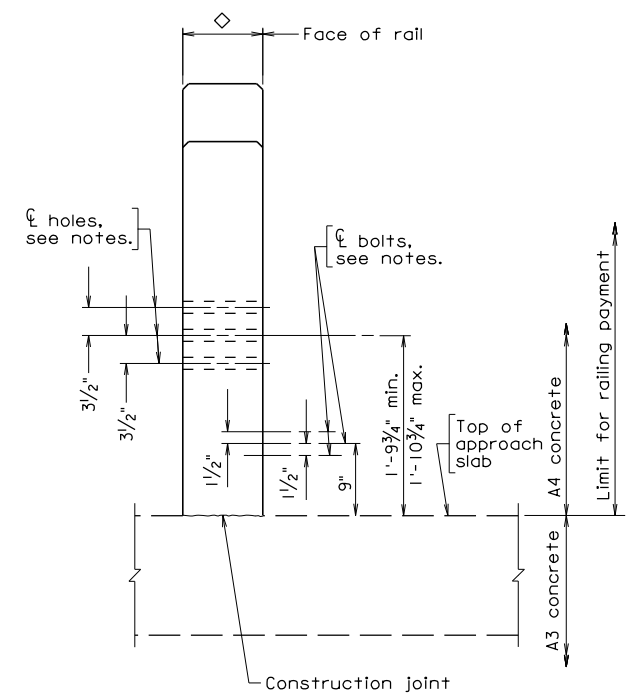
STANDARD BR27T-9: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 3 of 3
FILE NO. BR27T-10-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



TERMINAL WALL ELEVATION ABUTMENT



VIEW A-A

For dimensions and architectural treatment details, see sheet XX. For minimum cover, see Detail A.

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...

For details and reinforcing steel schedule of steel railing, see sheet ...

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For approach slab details, see sheet ...

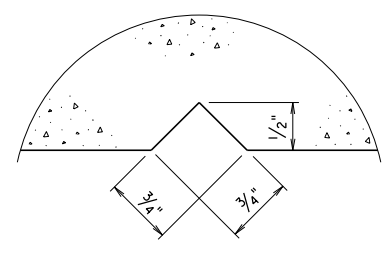
Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

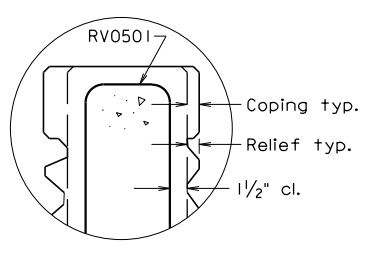
Spacing of grooves shall be approximately 8'-0\".

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule. Concrete included in the architectural treatment is excluded.

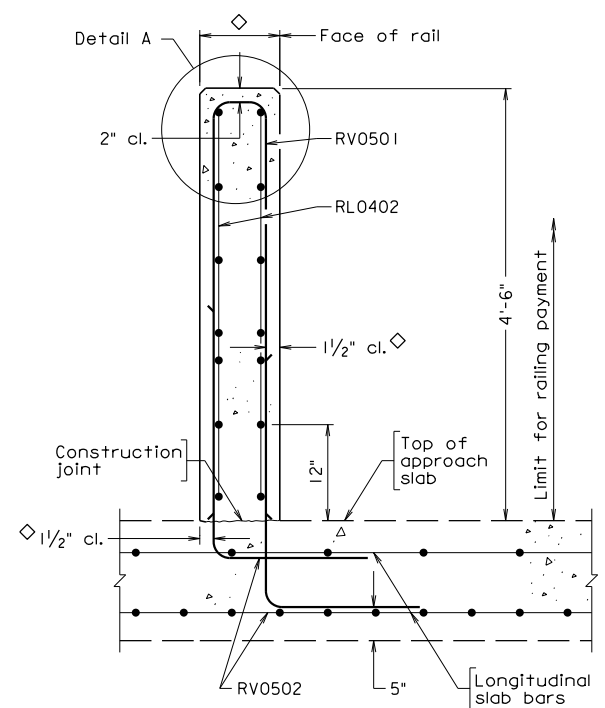
Bid price for architectural treatment includes concrete in relief and coping.



SECTION C-C Full scale Groove detail for both sides of rail



DETAIL A Shown with architectural treatment on both sides



SECTION B-B Transverse approach slab bars not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RV0501	#4				Terminal wall and parapet
RV0501	#5		8'-11"	3 3/4"	Terminal wall and parapet
RV0502	#5		4'-8"	3 3/4"	Terminal wall and parapet

Dimensions in bending diagram are out-to-out of bars.

BR27T-10-AT 03-10-2015 br27t10at.dgn

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54" BR27C/BR27D TERMINAL WALL WITH ARCHITECTURAL TREATMENT					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: ...S&B...DIV		
			Checked: S&B...DIV		
Revisions			BR27T-10-AT		

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

TERMINAL WALL ON APPROACH SLAB WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

The BR27T-series standards are to be used for concrete terminal walls in conjunction with the BR27C or BR27D steel rail series.

This concrete terminal wall standard has a height of 4'-6" from the roadway surface.

Include this standard when using standard B27C-13-AT or BR27D-9-AT and when terminal wall is detailed on approach slab with full integral or semi-integral abutments. This terminal wall with parts of steel railing joined together with the approach slab shall be part of the steel railing for payment under the abutment. For geometrics of terminal wall with approach slab, see Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 6.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as details or dimensions left blank on standard sheet. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide overall length from end of approach slab to face of backwall.

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min. – 1'-10 $\frac{3}{4}$ " max.) for location of bolts so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 4'-6" so that this dimension will be established from top of overlay surface.

Complete sheet number for architectural treatment details.

54" STEEL RAILING

BR27T-SERIES WITH ARCHITECTURAL TREATMENT

**TERMINAL WALL ON APPROACH SLAB WITH FULL INTEGRAL
OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet numbers for details of approach slab, for details and reinforcing steel schedule of steel railing and for rail expansion joint detail.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay, adjust dimension and length of rebar RV0501.

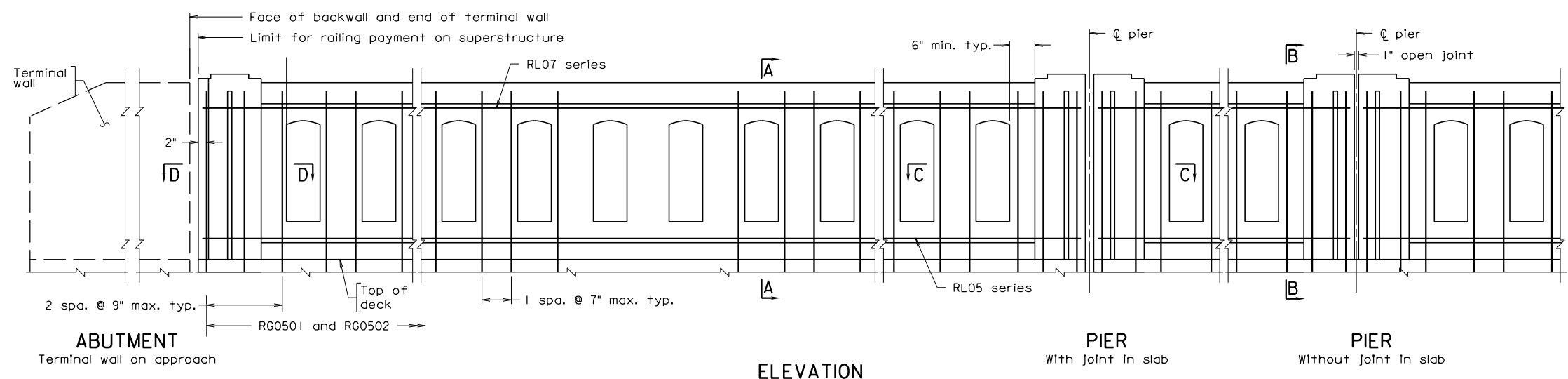
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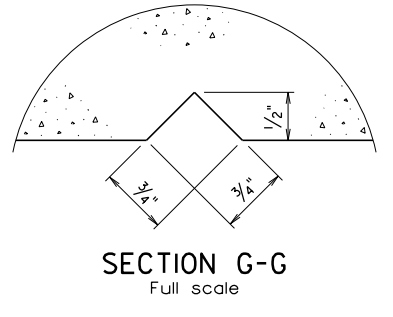
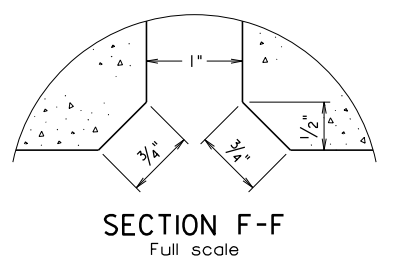
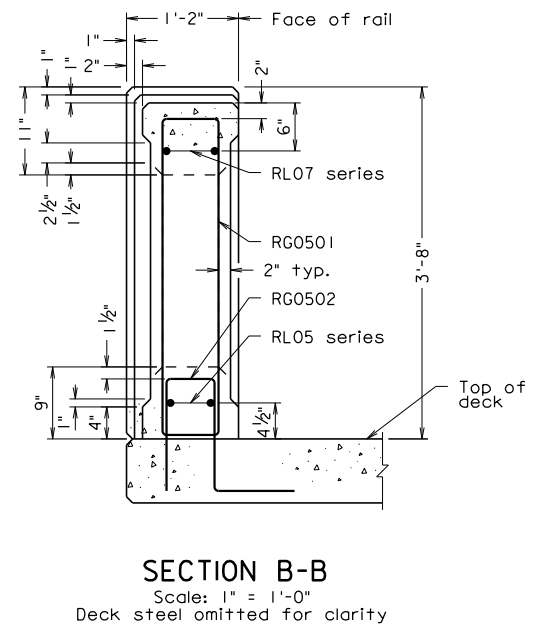
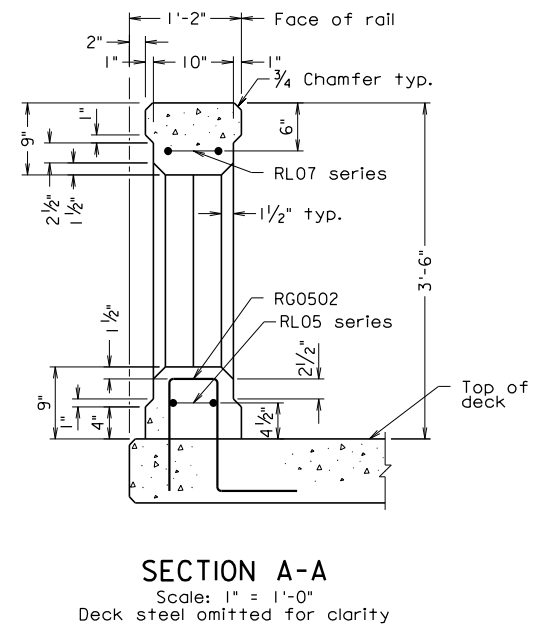
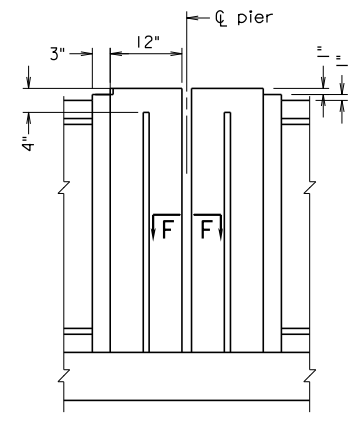
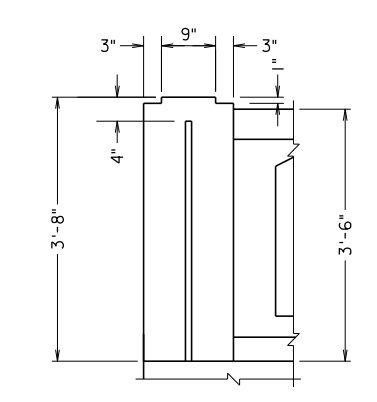
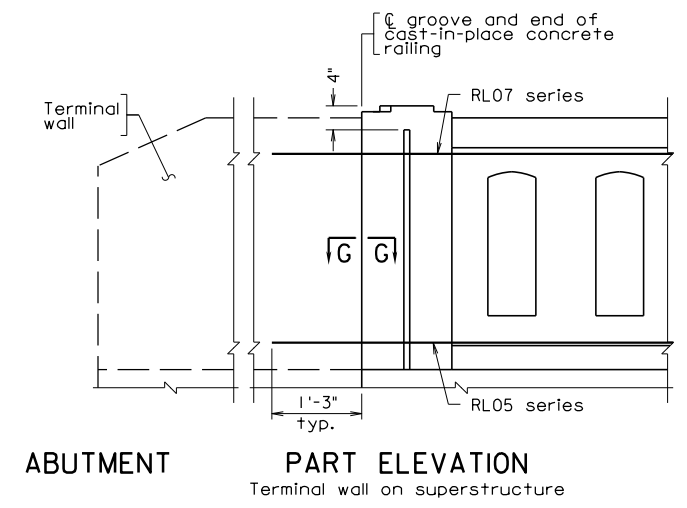
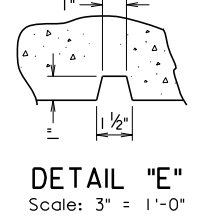
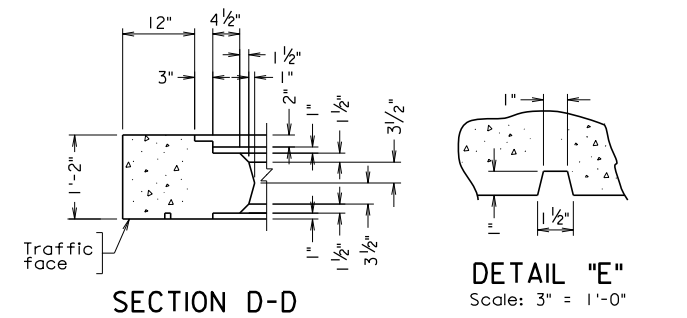
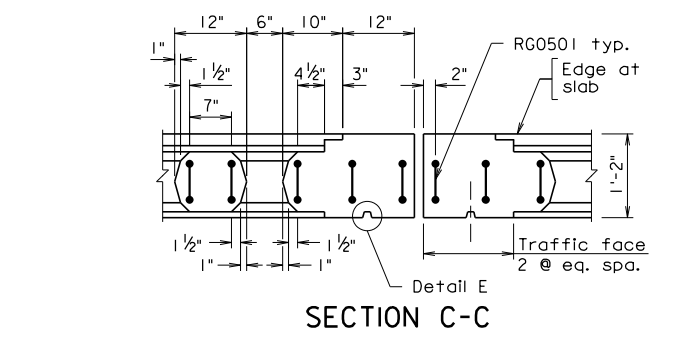
STANDARD BR27T-9-AT: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Dec2013
SHEET 3 of 3
FILE NO. BR27T-10-AT-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



Notes:
 For notes, rail details and window dimensioning see sheet
 For details and reinforcing steel schedule of terminal wall, see sheet



REINFORCING STEEL SCHEDULE					
RG0501					
Mark	No.	Size	Pin ϕ	Length	Location
RL05		#5			Rail
RL07		#7			Rail
RG0501		#5	3 3/4"	8'-8"	Rail
RG0502		#5	3 3/4"		Rail

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" TEXAS C411 RAILING					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BR411-1
			Checked: S&B DIV		
Revisions					

Scale: 3/4" = 1'-0" unless otherwise noted. © 2013, Commonwealth of Virginia

BR411-1 08-30-2013 br41101.dgn

Sealed and Signed by:
 Julius F.J. Volcyl Jr.
 Lic. No. 010487
 On the date of
 August 30, 2013

A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

NOTES TO DESIGNER:

The Texas C411 concrete rail has a height of 3'-6" and has been crash tested for TL-2 (TL = Test Level). The railing is for use as a traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

The standard showing railing miscellaneous details (BR411-3) and the appropriate terminal wall standard (BR411-4 thru BR411-7) are to be included in plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 4" dimension and overall 3'-6" height of the rail need to be adjusted to 5" and 3'-7" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Complete sheet number for window dimension details.

SECTION A-A:

Modify vertical dimension (4" and 3'-6" railing height) as noted above if an initial overlay is used on the bridge.

SECTION B-B:

Modify vertical dimension (4" and 3'-8" end detail height) as noted above if an initial overlay is used on the bridge.

END OF BARRIER ELEVATION:

Modify vertical dimension (3'-8" end detail height and 3'-6" railing height) as noted above if an initial overlay is used on the bridge.

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0502.

Modify bars if an initial overlay is used on the bridge.

NOTES:

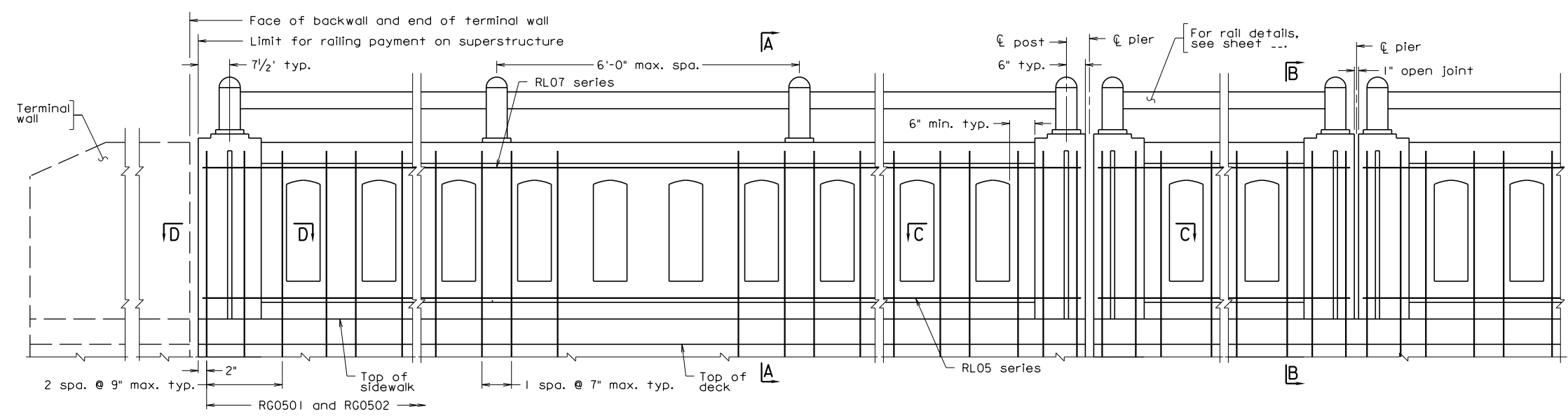
Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal wall.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

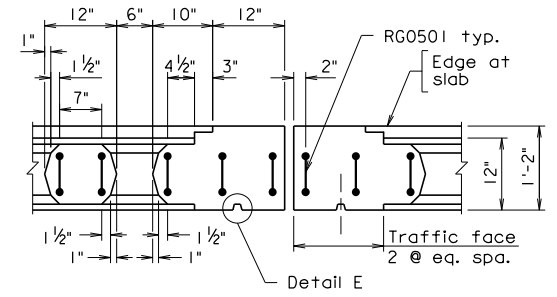


Notes:
 For notes, rail details and window dimensioning see sheet
 For details and reinforcing steel schedule of terminal wall, see sheet
 For Detail A, see sheet

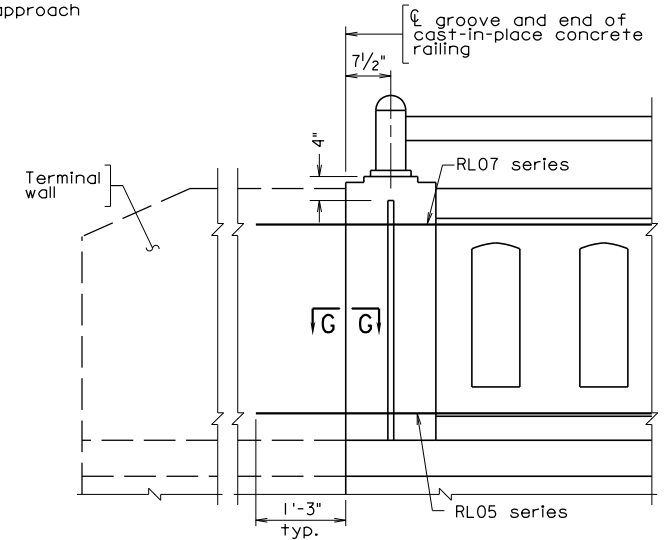
ABUTMENT
Terminal wall on approach

ELEVATION

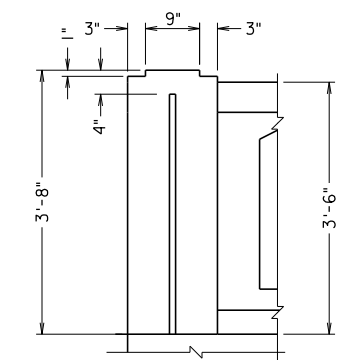
PIER
With joint in slab **PIER**
Without joint in slab



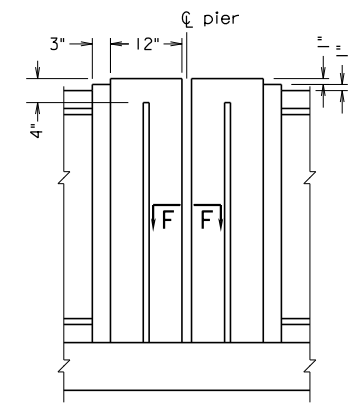
SECTION C-C



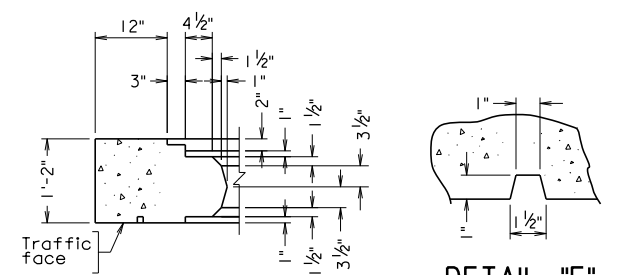
ABUTMENT PART ELEVATION
Terminal wall on superstructure



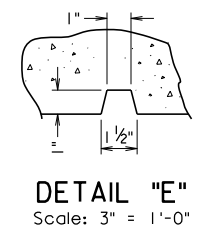
END OF BARRIER ELEVATION



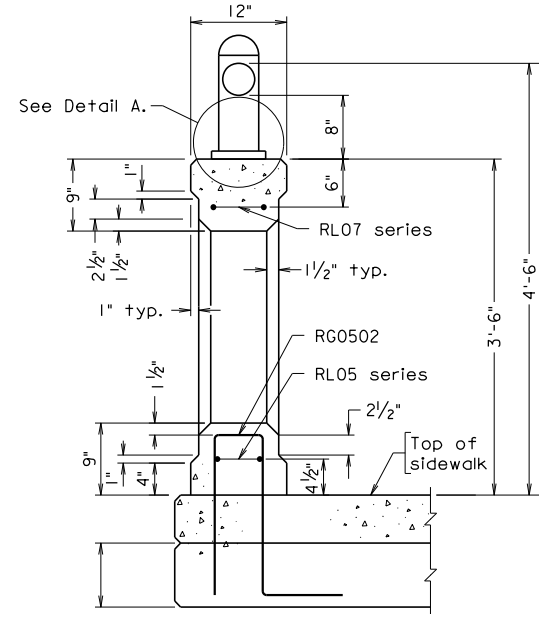
PIER



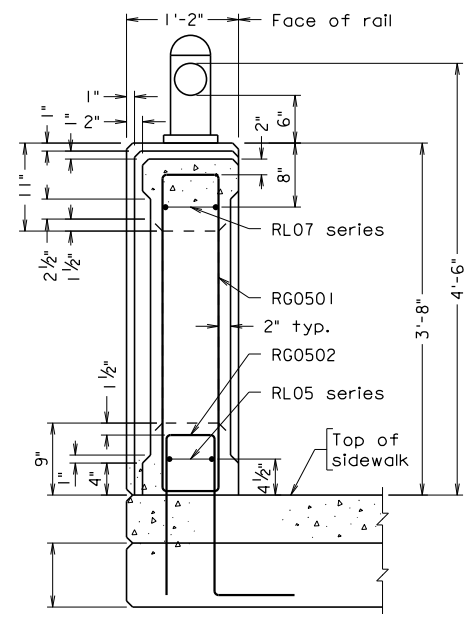
SECTION D-D



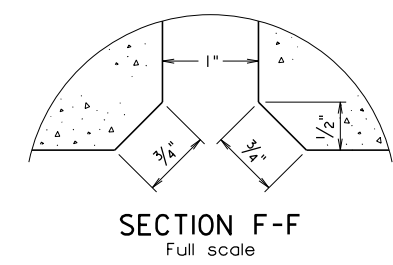
DETAIL "E"
Scale: 3" = 1'-0"



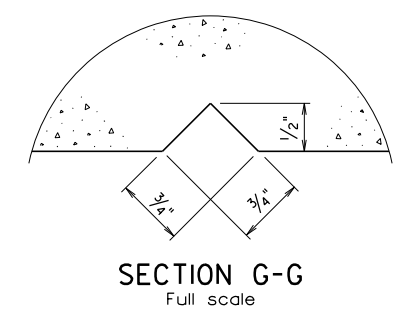
SECTION A-A
Scale: 1" = 1'-0"
Deck steel omitted for clarity



SECTION B-B
Scale: 1" = 1'-0"
Deck steel omitted for clarity



SECTION F-F
Full scale



SECTION G-G
Full scale

REINFORCING STEEL SCHEDULE					
RG0501					
Mark	No.	Size	Pin ø	Length	Location
RL05		#5			Rail
RL07		#7			Rail
RG0501		#5	3 3/4"	8'-8"	Rail
RG0502		#5	3 3/4"		Rail

Dimensions in bending diagram are out-to-out of bars.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
54" TEXAS C411 RAILING					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BR411-2
			Checked: S&B DIV		
Revisions					

BR411-2 10-15-2015 br41102.dgn

Sealed and Signed by:
Prasad L. Nallipameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

54" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

NOTES TO DESIGNER:

The Texas C411 concrete rail with a height of 3'-6" and has been crash tested for TL-2 (TL = Test Level). The crash tested rail has been modified to meet VDOT pedestrian rail height requirements by adding a steel top rail. This railing is for use as a traffic barrier and for sidewalk applications. The standard may be used when an open railing is required.

The standard showing railing miscellaneous details (BR411-3) and the appropriate terminal wall standard (BR411-4 thru BR411-7) are to be included in plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 4" dimension and overall 3'-6" height of the rail would need to be adjusted to 5" and 3'-7" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Complete sheet number for window dimension details.

SECTION A-A:

Modify vertical dimension (4" and 3'-6" concrete railing height, and 4'-6" steel railing height) as noted above if an initial overlay is used on the bridge.

SECTION B-B:

Modify vertical dimension (4" and 3'-8" concrete railing height, and 4'-6" steel railing height) as noted above if an initial overlay is used on the bridge.

END OF BARRIER ELEVATION:

Modify vertical dimension (3'-8" end detail height and 3'-6" railing height) as noted above if an initial overlay is used on the bridge.

54" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0502.

Modify bars if an initial overlay is used on the bridge.

NOTES:

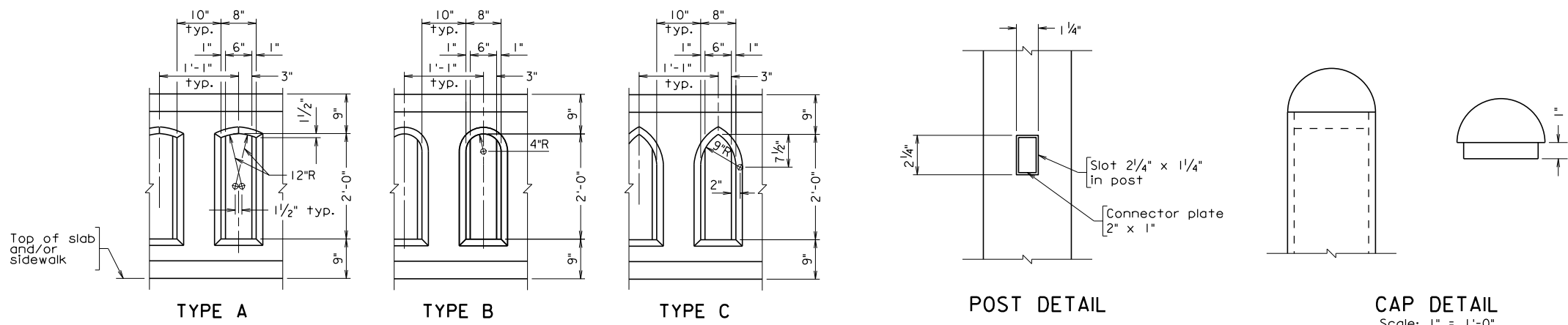
Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal wall.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



WINDOW TYPES
Scale: 3/4" = 1'-0"

POST DETAIL
CAP DETAIL
Scale: 1" = 1'-0"

Notes:
Plan dimensions shown are measured in the respective horizontal and vertical planes.
The Contractor shall determine all dimensions and details necessary for installation.
All concrete shall be Class A4.
All bevels for concrete shall be 3/4".
The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
For details and reinforcing schedule, see sheet

Railing, posts, end caps, connector plates and base plates shall be aluminum with an anodized bronze finish conforming to ASTM B580, Type C. The color and finish appearance shall be established or approved by the Engineer prior to any work being performed.

Anchor bolts shall be AASTH0 M314 Grade 55 with supplemental requirements of S1. Anchor bolt nuts shall be ASTM A563 and washers shall be ASTM F844.

All steel shall be hot dip galvanized.

Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.

Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used for adjusting post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be grounded down.

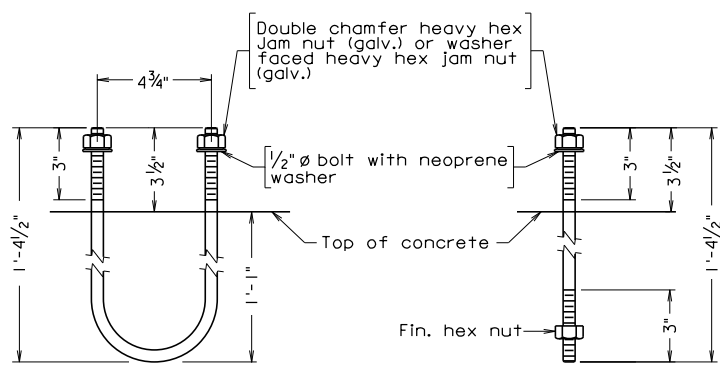
Drain holes shall be 1/2" diameter and shall be provided in rails (approximately half-way between posts except at open joints near pier(s)). Drain holes shall be provided at each end of rail.

Anchor bolts may be set normal to profile grade but may require beveled washers.

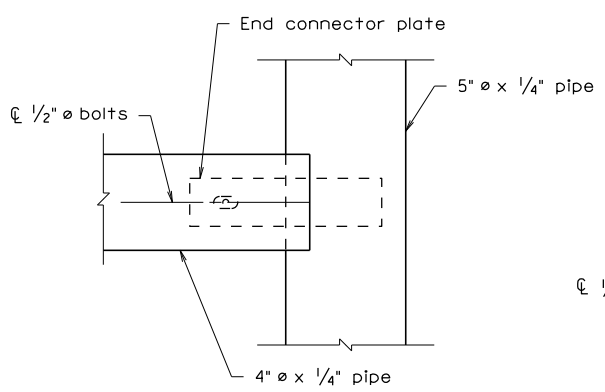
Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Spacing of grooves for U-back wings shall be approximately 8'-0". Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.

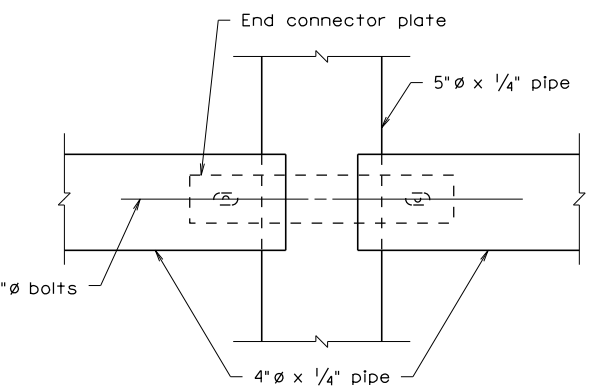
Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.



U-TYPE ANCHOR BOLT
ANCHOR BOLT

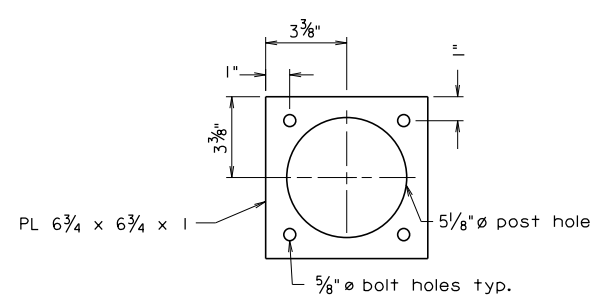


END CONNECTION DETAIL - ELEVATION

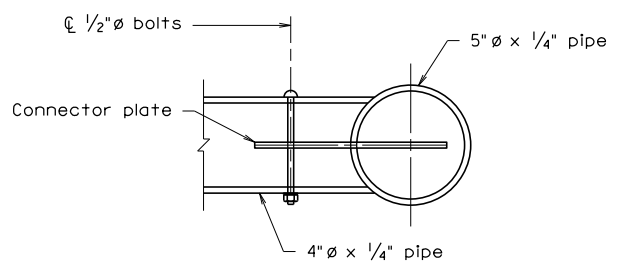


CONNECTION DETAIL - ELEVATION

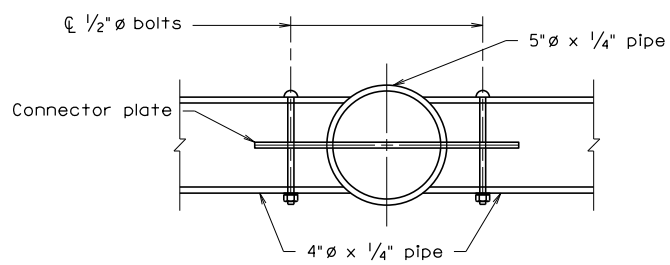
ANCHOR BOLTS



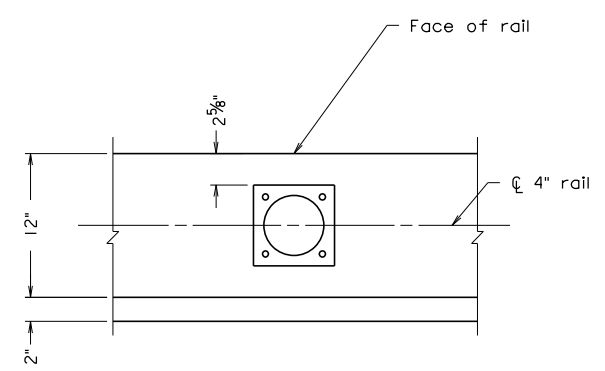
ANCHOR PLATE



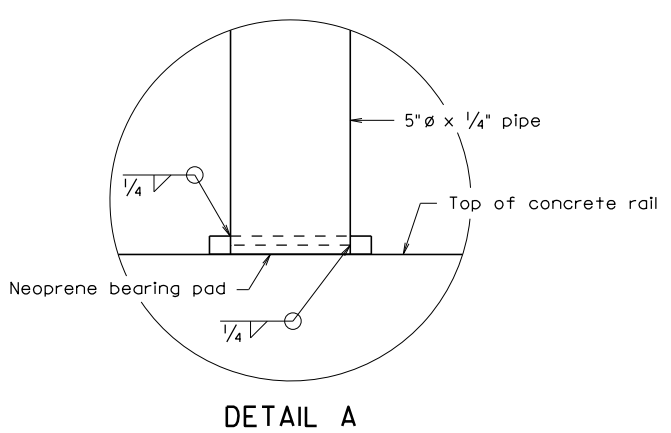
END CONNECTION DETAIL - PLAN



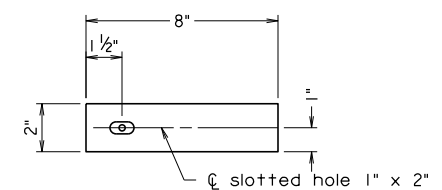
CONNECTION DETAIL - PLAN



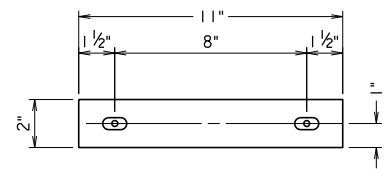
POST DETAIL - PLAN
Scale: 1 1/2" = 1'-0"



DETAIL A



END CONNECTOR PLATE DETAILS



CONNECTOR PLATE DETAILS

Scale: 3" = 1'-0" unless otherwise noted.

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BR411-3 10-15-2015

Sealed and Signed by:
Prasad L. Nallapameni
Lic. No. 033003
On the date of
October 15, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
TEXAS C411 RAILING			
MISCELLANEOUS DETAILS			
No.	Description	Date	Sheet No.
			BR411-3
Designed: S&B.DIV		Date	Plan No.
Drawn: ...S&B.DIV			
Checked: S&B.DIV			

CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

NOTES TO DESIGNER:

Include this standard when using either the BR411-1 or BR411-2 standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

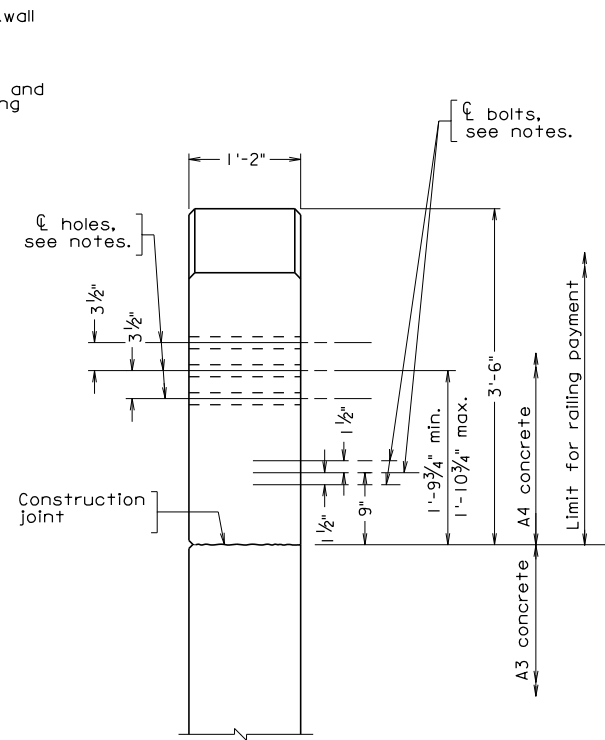
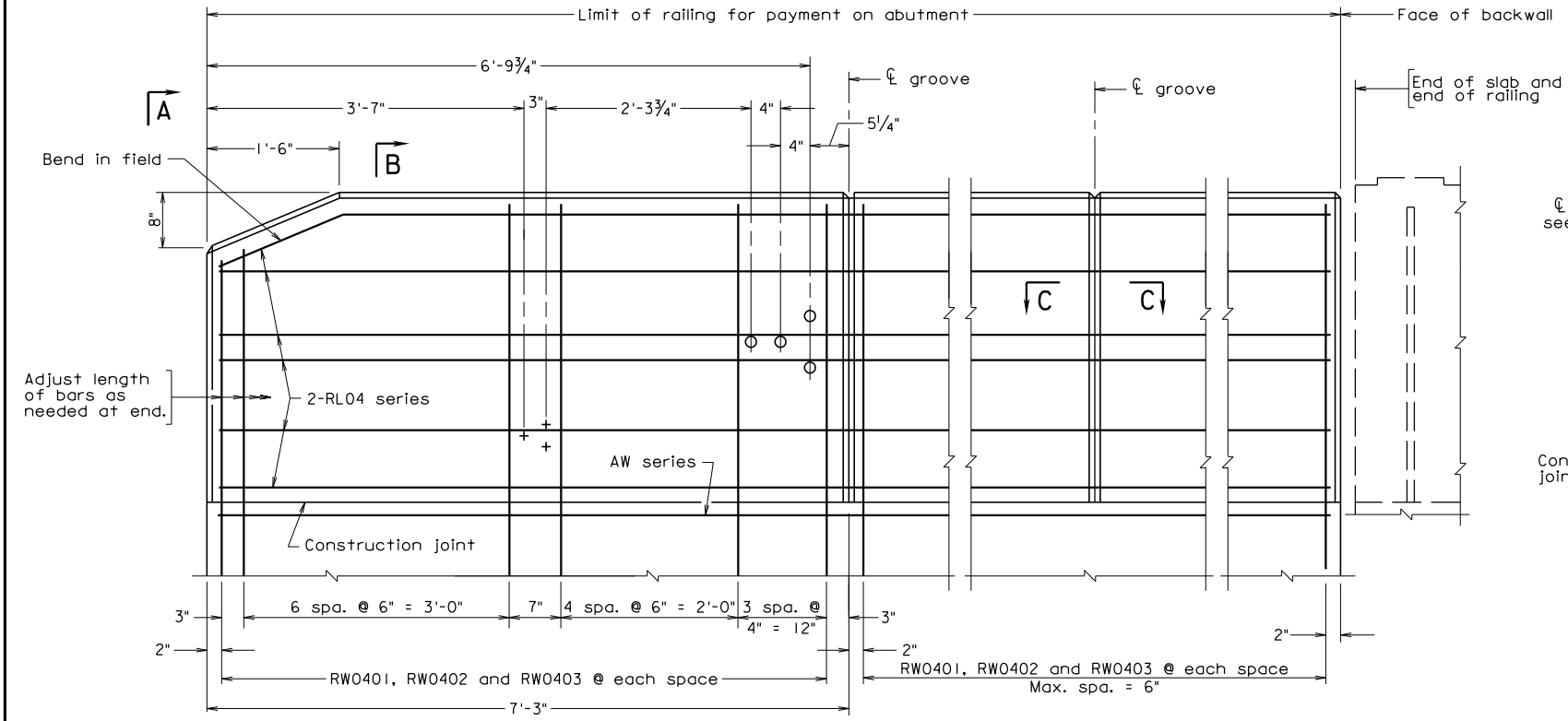
Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete note for terminal wall.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All levels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing steel, Class ----.

For details and reinforcing steel schedule of cast-in-place railing, see sheet ----.

Each terminal wall shall be cast as one piece.

Terminal wall are detailed to take quardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

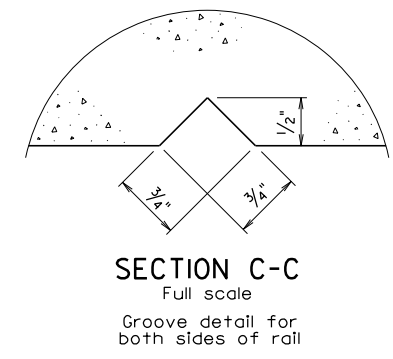
Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

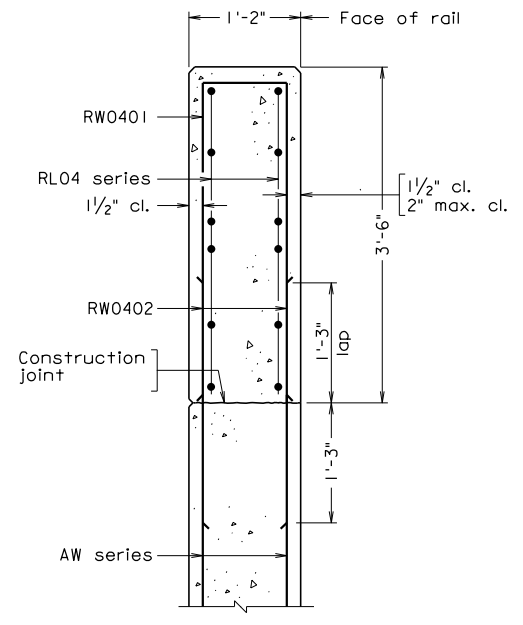
Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

TERMINAL WALL ELEVATION U-BACK WING

VIEW A-A



SECTION C-C Full scale Groove detail for both sides of rail



SECTION B-B

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ø	Location
RW0401	#4		7'-4"	3"	Terminal wall and U-back wing
RW0402	#4		2'-6"		Terminal wall and U-back wing
RL04	#4				Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

BR411-4 08-30-2013

Sealed and Signed by:
 Julius F.J. Volcyl Jr.
 Lic. No. 010487
 On the date of
 August 30, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TEXAS C411 TERMINAL WALL					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		
			Checked: S&B DIV		
Revisions					BR411-4
					Sheet No.

42" CAST-IN-PLACE CONCRETE RAILING
TEXAS C411
TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR411-1 or BR411-2 and when terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of cast-in-place concrete railing.

42" CAST-IN-PLACE CONCRETE RAILING
TEXAS C411
TERMINAL WALL ON ABUTMENT U-BACK WING

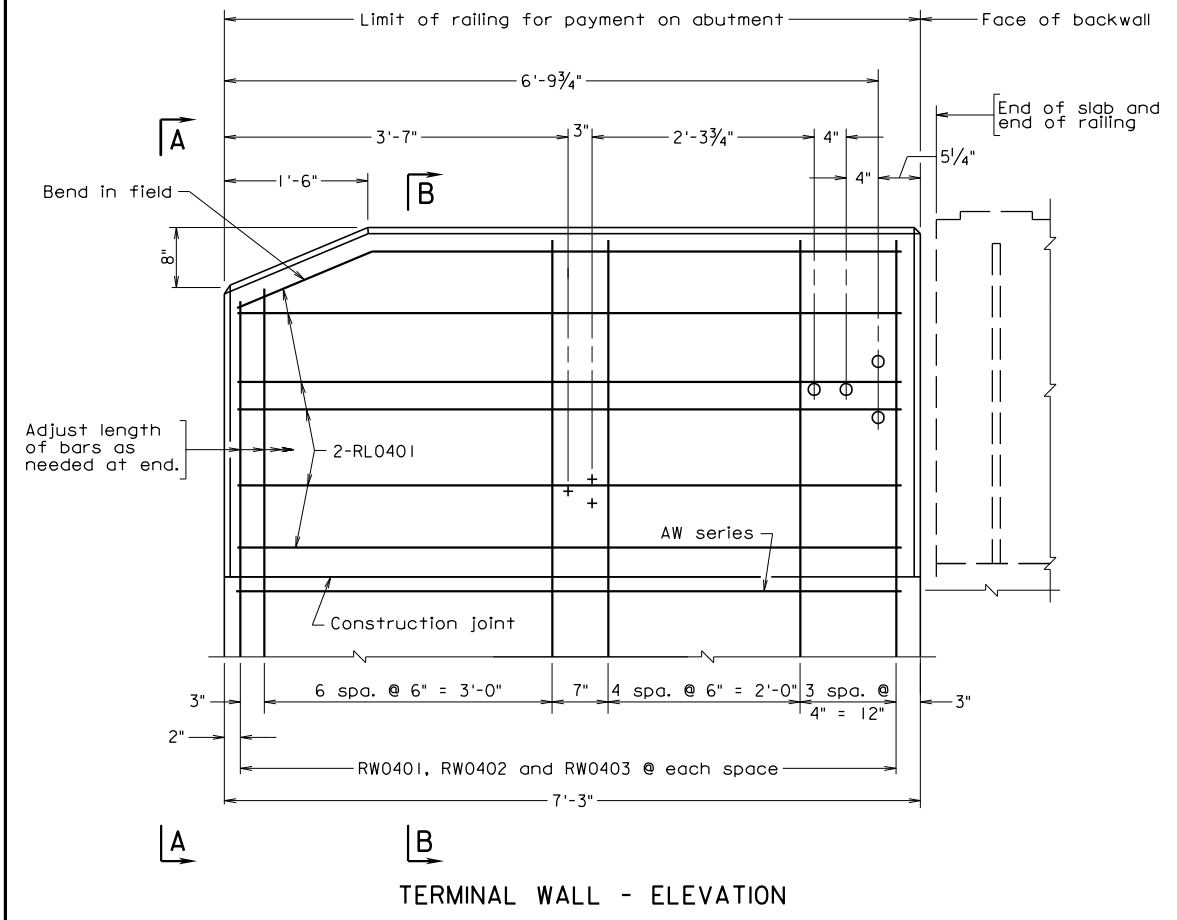
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401, and RW0402.

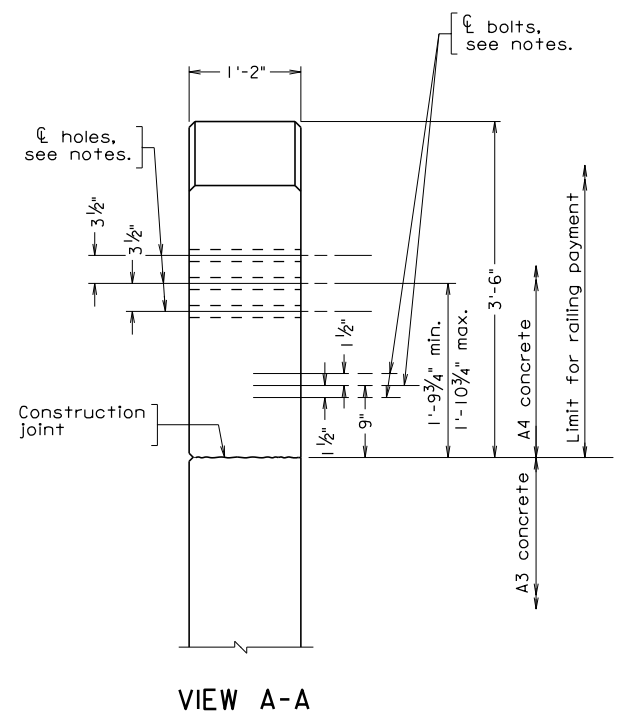
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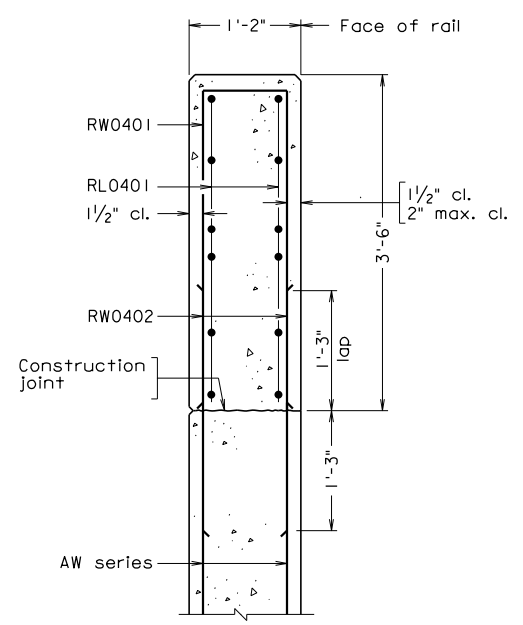
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



TERMINAL WALL - ELEVATION



VIEW A-A



SECTION B-B

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All levels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing steel, Class ----
 For details and reinforcing steel schedule of cast-in-place railing, see sheet ----
 Each terminal wall shall be cast as one piece.
 Terminal wall are detailed to take quardrail attachment GR-FOA-1.
 For details of wingwall below construction joint, see abutment details.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid Item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ø	Location
RW0401	#4		7'-4"	3"	Terminal wall
RW0402	#4		2'-6"		Terminal wall
RL0401	#4		6'-11"		Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BR411-5 08-30-2013 br4115.dgn

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 August 30, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TEXAS C411 TERMINAL WALL					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BR411-5
			Checked: S&B DIV		
Revisions					

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

TERMINAL WALL ON ABUTMENT WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR411-1 or BR411-2 and when terminal wall is detailed on abutment wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of cast-in-place concrete railing.

REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401, and RW0402.

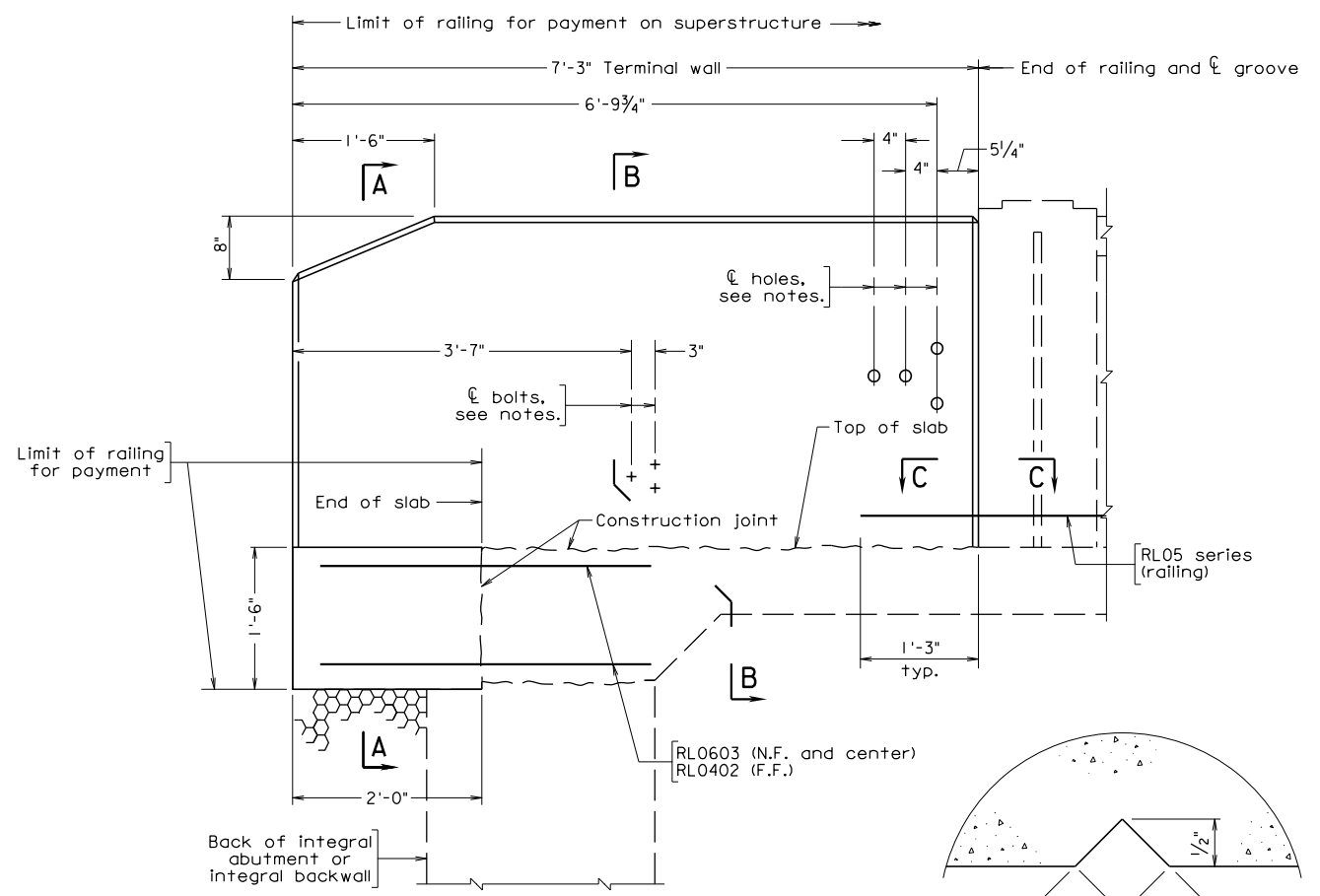
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Replace standard designation with plan number.

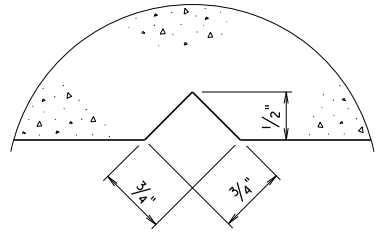
STANDARD BR411-5: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 2
FILE NO. BR411-5-2

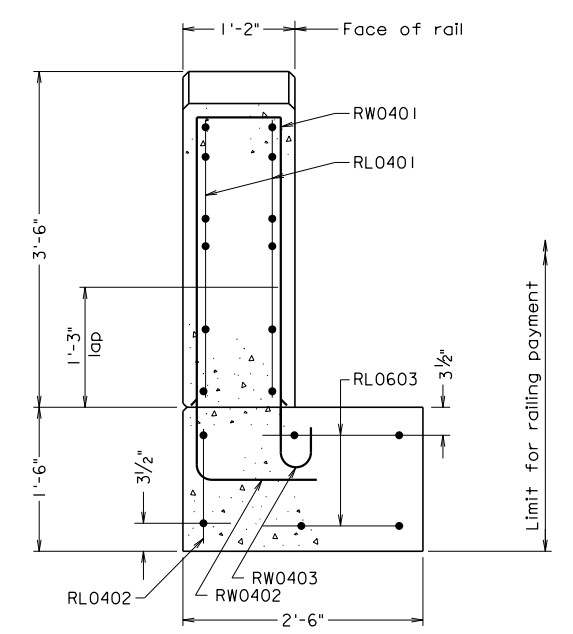
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



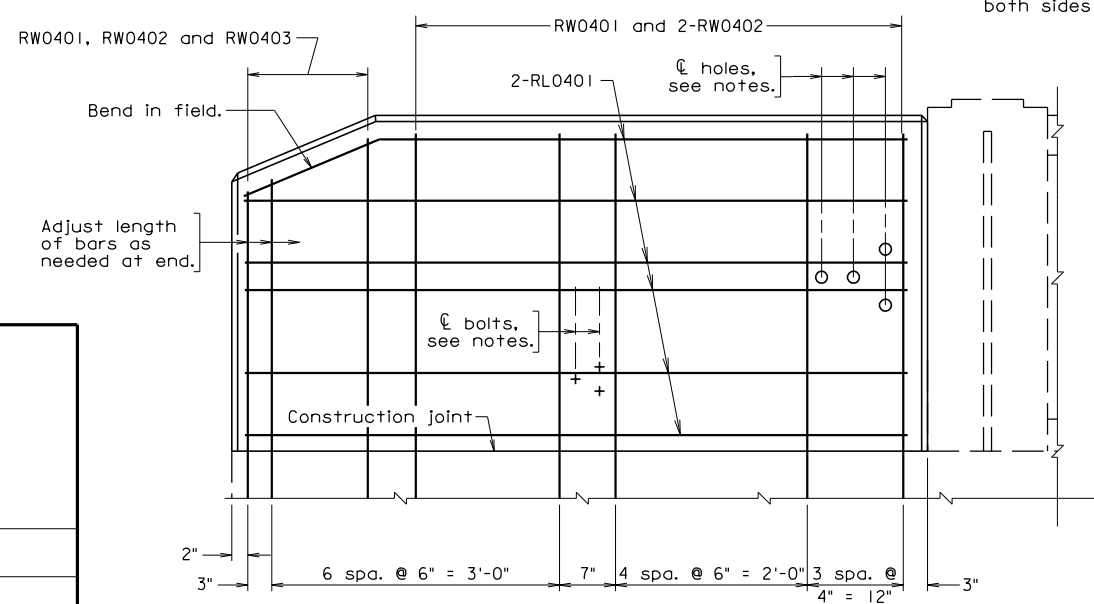
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT



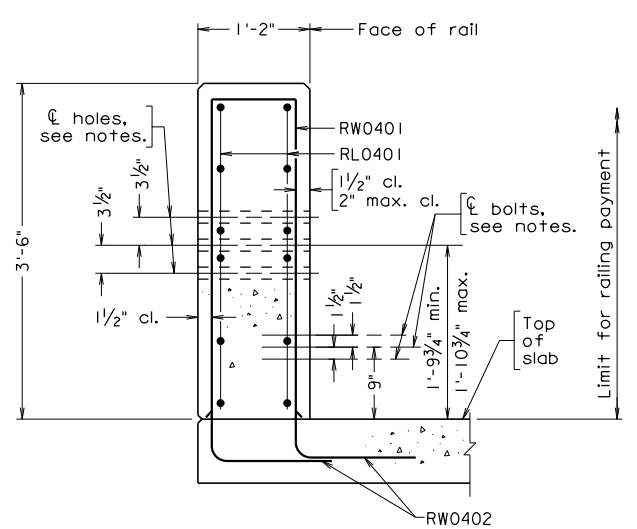
SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A



TERMINAL WALL



SECTION B-B

Note: Deck reinforcement not shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All levels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing steel, Class ----.
- For details and reinforcing steel schedule of cast-in-place railing, see sheet ----.
- Each terminal wall shall be cast as one piece.
- Terminal wall are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RW0401	#4		3"	7'-4"	Terminal wall
RW0402	#4		3"		Terminal wall
RW0403	#4		3"		Terminal wall
RL0401	#4		---	6'-11"	Terminal wall
RL0402	#4		---	4'-0"	Terminal wall end support
RL0603	#6		---	4'-0"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars.

08-30-2013

BR411-6

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TEXAS C411 TERMINAL WALL					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BR411-6
			Checked: S&B DIV		
Revisions					Sheet No.

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR411-1 or BR411-2 and when terminal wall is detailed on superstructure with an integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-6" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the cast-in-place concrete railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of the cast-in-place concrete railing.

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

**TERMINAL WALL ON SUPERSTRUCTURE WITH
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RW0402 and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0402, and RW0403.

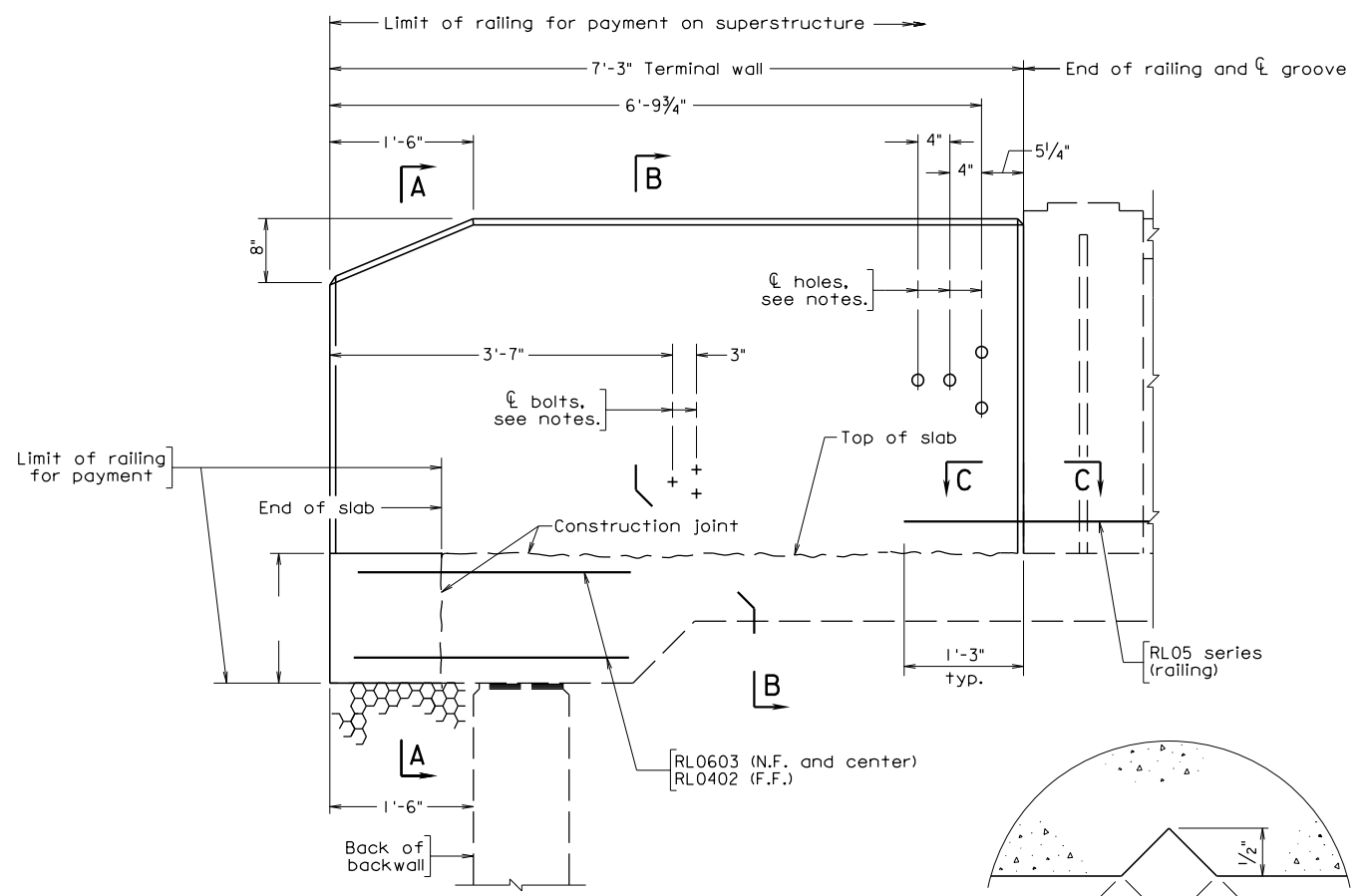
TITLE BLOCK:

Replace standard designation with plan number.

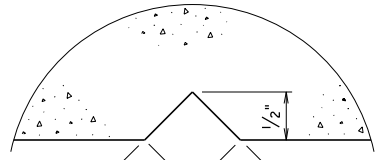
STANDARD BR411-6: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 3 of 3
FILE NO. BR411-6-3

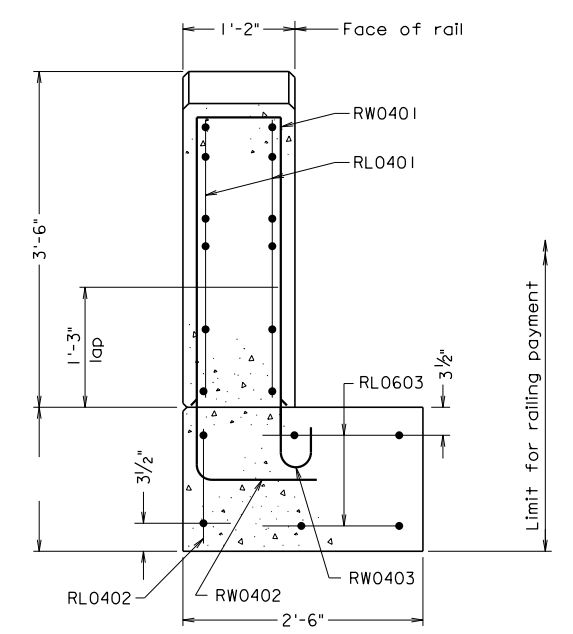
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



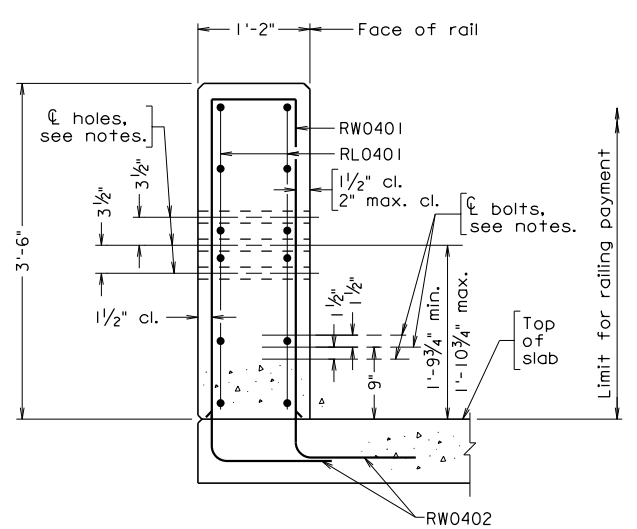
DECK SLAB EXTENSION ABUTMENT



SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A

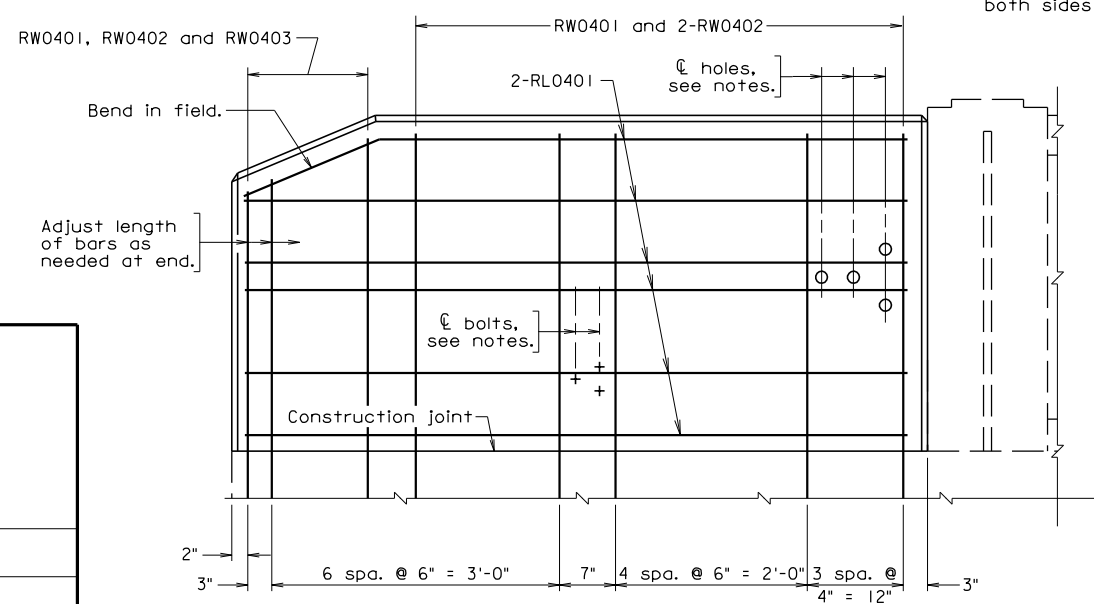


SECTION B-B

Note: Deck reinforcement not shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All levels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing steel, Class ----.
- For details and reinforcing steel schedule of cast-in-place railing, see sheet ----.
- Each terminal wall shall be cast as one piece.
- Terminal wall are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in reinforcing steel schedule.



TERMINAL WALL

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RW0401	#4		3"	7'-4"	Terminal wall
RW0402	#4		3"		Terminal wall
RW0403	#4		3"		Terminal wall
RL0401	#4		---	6'-11"	Terminal wall
RL0402	#4		---	4'-0"	Terminal wall end support
RL0603	#6		---	4'-0"	Terminal wall end support

Dimensions in bending diagram are out-to-out of bars.

br4117.dgn

08-30-2013

BR411-7

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

© 2013, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
TEXAS C411 TERMINAL WALL					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BR411-7
			Checked: S&B DIV		
Revisions					

42" CAST-IN-PLACE CONCRETE RAILING

TEXAS C411

TERMINAL WALL ON SUPERSTRUCTURE WITH DECK SLAB EXTENSION

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BR411-1 or BR411-2 and when terminal wall is detailed on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-6" wide section at the edge of the superstructure is extended further from the end of the deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the cast-in-place concrete railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimension 3'-6" so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of the cast-in-place concrete railing.

STANDARD BR411-7: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 3
FILE NO. BR411-7-2

42" CAST-IN-PLACE CONCRETE RAILING
TEXAS C411
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (cont'd)

REINFORCING STEEL SCHEDULE:

Add dimensions and length for rebar RW0402 and RW0403.

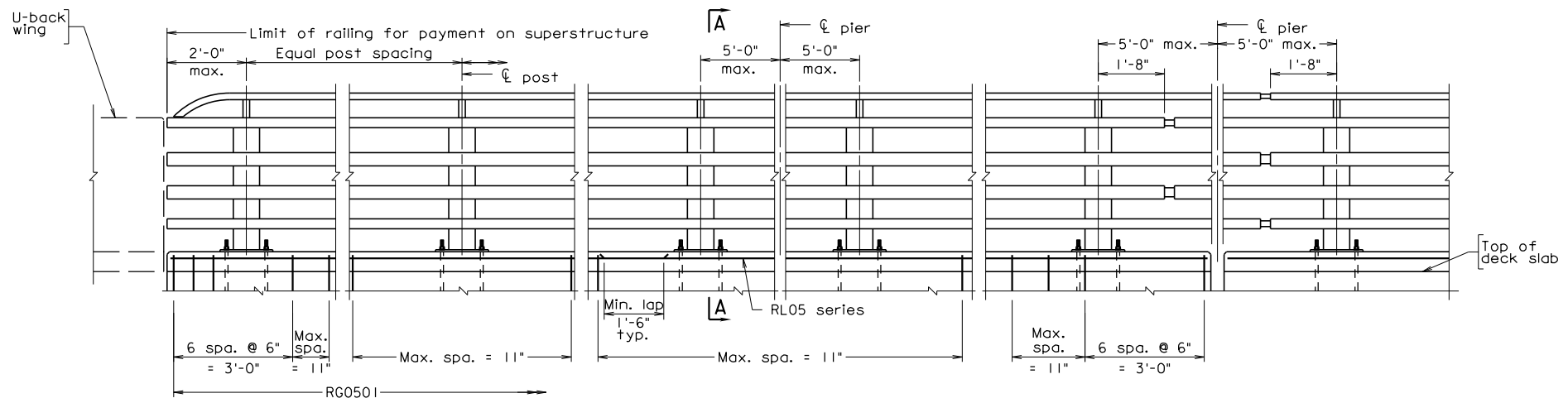
For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0402, and RW0403.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.

Notes:
 For notes, rail connections, and miscellaneous details see sheet .
 For details and reinforcing steel schedule of terminal wall, see sheet .

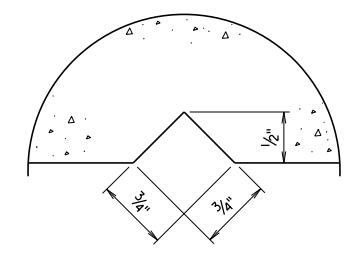


ABUTMENTS
Terminal wall on approach

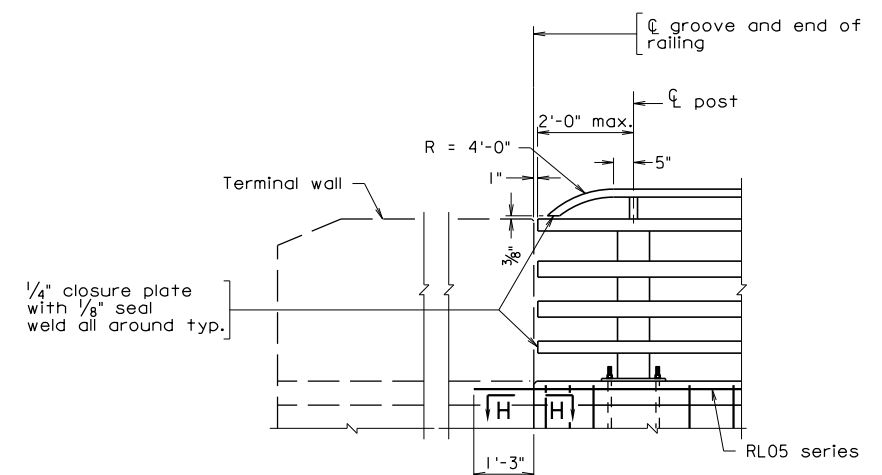
ELEVATION

PIERS
continuous - without joint in slab

PIERS
with joints in slab

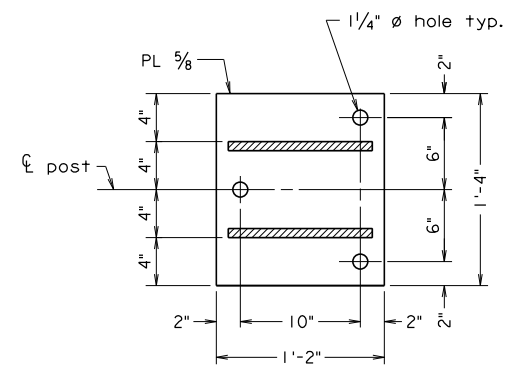


SECTION H-H
Full scale
Groove detail for both sides of rail

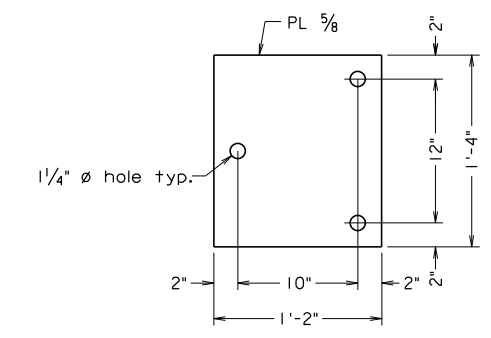


ABUTMENT

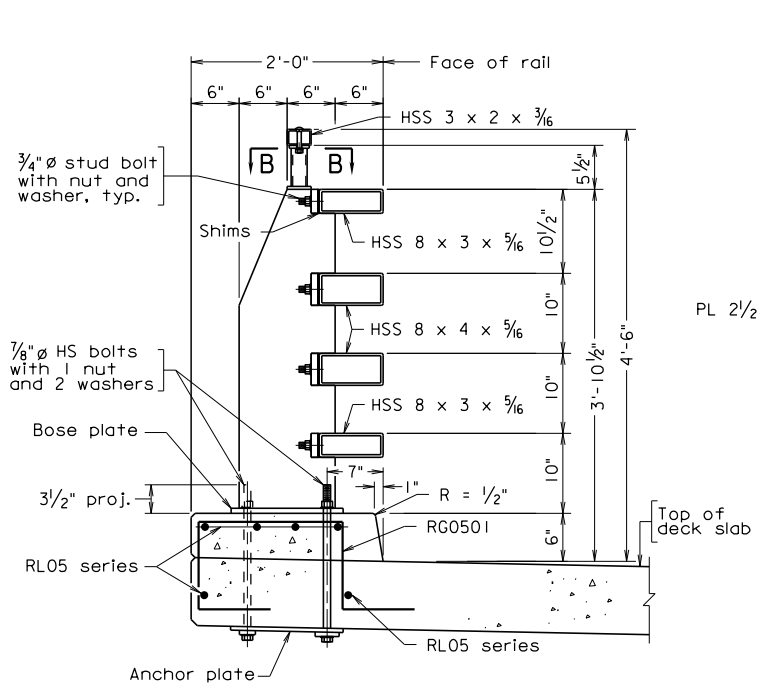
PART ELEVATION
Terminal wall on superstructure



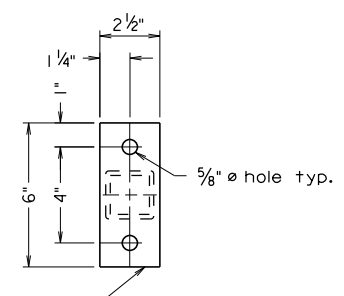
BASE PLATE
Scale: 1/2" = 1'-0"



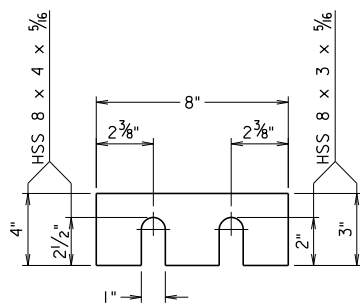
ANCHOR PL
Scale: 1/2" = 1'-0"



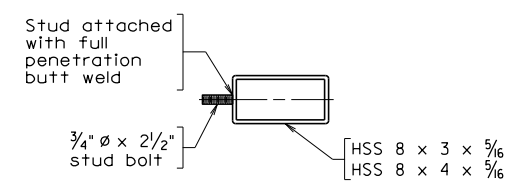
SECTION A-A
Scale: 1" = 1'-0"
Deck steel omitted for clarity



SECTION B-B
Scale: 3" = 1'-0"



SHIMS REQUIRED FOR ALL RAILS
Scale: 3" = 1'-0"



SECTION AT POST
Scale: 1/2" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ø	Length	Location
RG0501					
RG0501		#5	3 3/4"		Curb
RL05		#5			Curb

Dimensions in bending diagram are out-to-out of bars.

BRCAS-1
10-01-2013
BRCAS1.dgn

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 October 1, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
CALIFORNIA ST-20S RAILING					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		
Revisions			BRCAS-1		

CALIFORNIA ST-20S RAILING

NOTES TO DESIGNER:

The California ST-20S steel rail has a height of 4'-6" and has been crash tested for TL-4 (TL = Test Level). The standard has a curb section. This railing is for use as traffic barrier and shall not be used for sidewalk applications. The standard may be used when an open railing is required.

The railing miscellaneous details and general notes (BRCAS-2) and the appropriate terminal wall standard (BRCAS-3 thru BRCAS-6) are to be included in plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 6" curb dimension and overall 4'-6" height of the rail would need to be adjusted to 7" and 4'-7" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (6" curb and 4'-6" railing height) as noted above if an initial overlay is used on the bridge.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0501.

Modify bars if an initial overlay is used on the bridge.

NOTES:

Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal wall.

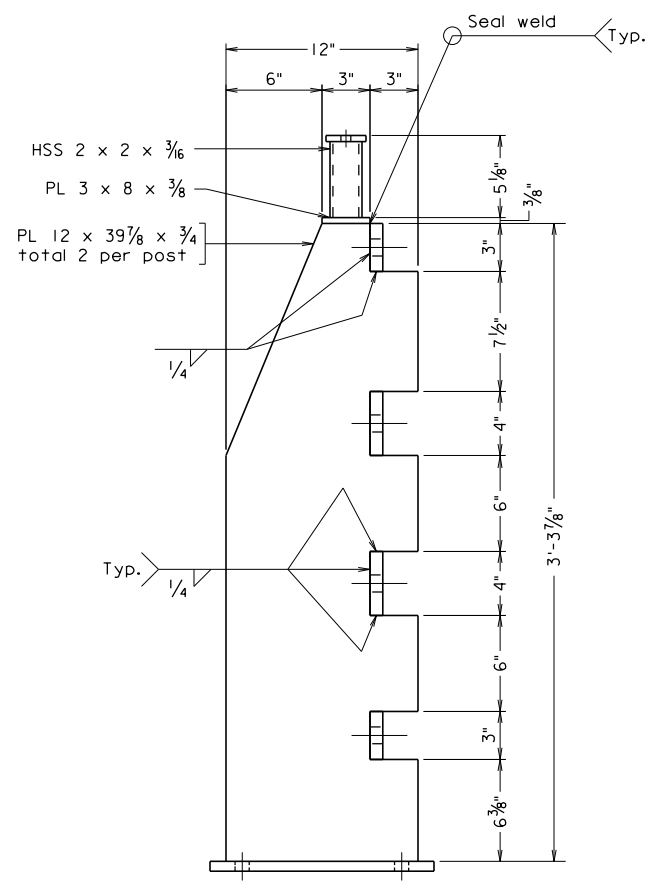
TITLE BLOCK:

Replace standard designation with plan number.

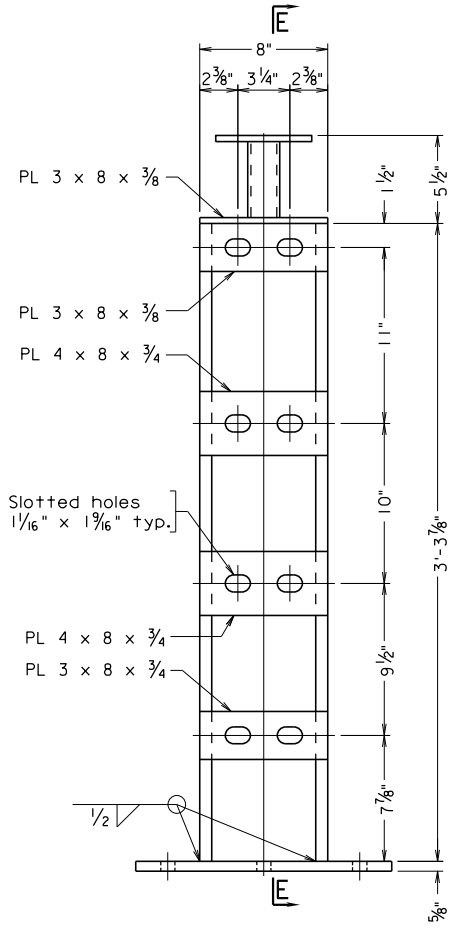
STANDARD BRCAS-1: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 2 of 2
FILE NO. BRCAS-1-2

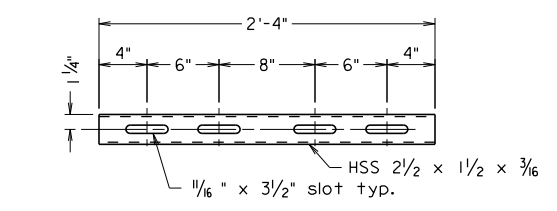
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



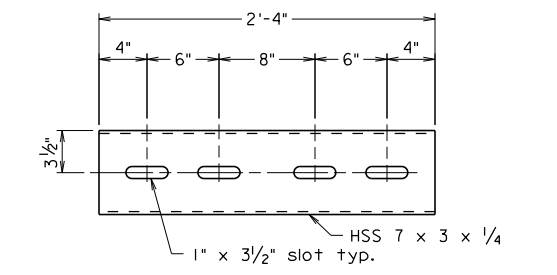
SECTION E-E
Not to scale



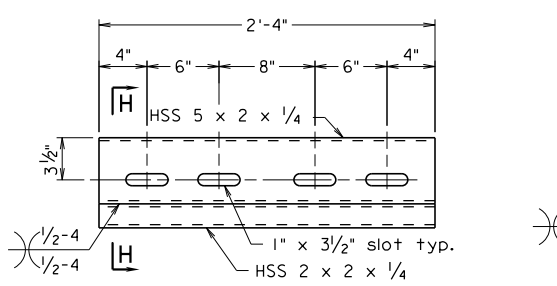
ELEVATION
Not to scale



For HSS 3 x 2 x 3/16 rail

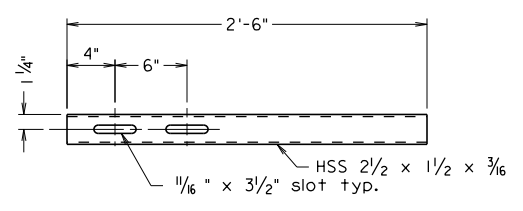


For HSS 8 x 4 x 5/16 rail

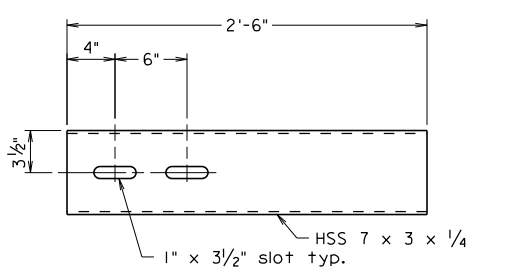


For HSS 8 x 3 x 5/16 rail

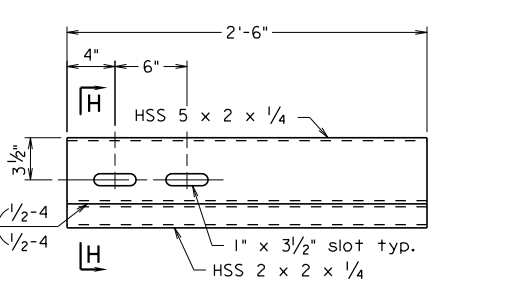
STANDARD SLEEVE DETAILS
Scale: 1 1/2" = 1'-0"



For HSS 3 x 2 x 3/16 rail

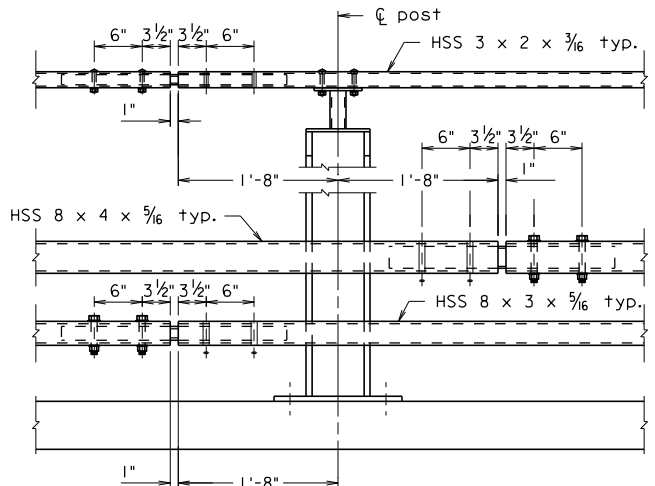


For HSS 8 x 4 x 5/16 rail

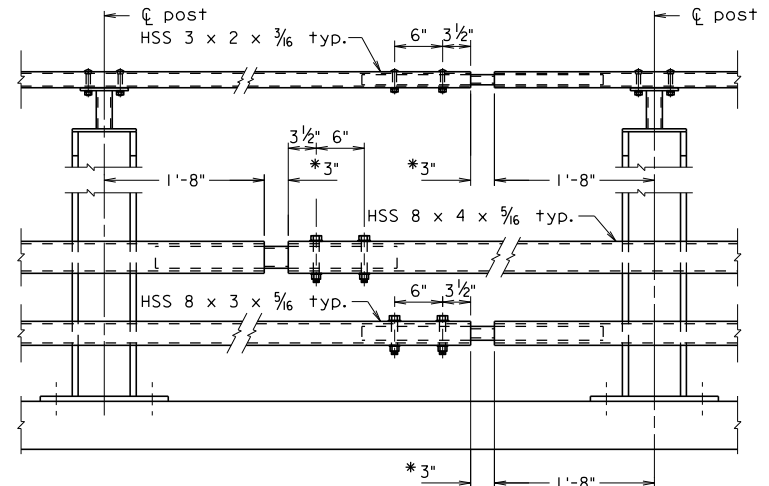


For HSS 8 x 3 x 5/16 rail

EXPANSION SLEEVE DETAILS
Scale: 1 1/2" = 1'-0"



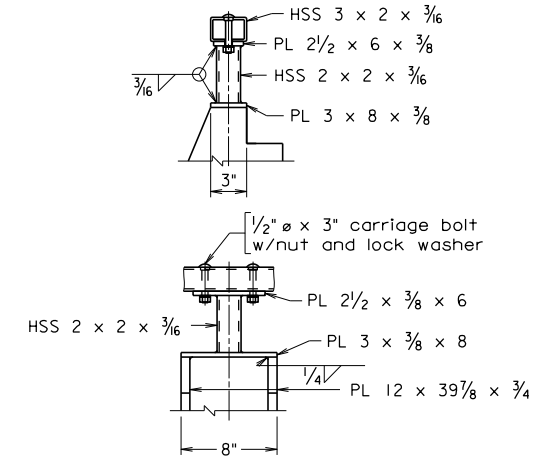
STANDARD SPLICE



EXPANSION SPLICE

*Match deck or abutment joint

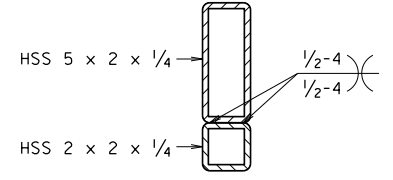
Scale: 1" = 1'-0" unless otherwise noted.



RAIL CONNECTION DETAILS
Scale: 1 1/2" = 1'-0"

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All levels for concrete shall be 3/4".
- The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope and for an 8 1/2" slab depth. The Contractor shall adjust the reinforcing steel as required for other cross slopes and slab depths.
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
- For details and reinforcing schedule, see sheet
- Rail members and sleeves shall be ASTM A500, Grade B steel.
- All bolts shall be ASTM A325. Nuts shall be ASTM A563 and washers shall be ASTM F436.
- All steel shall be hot dip galvanized.
- Posts shall be equally spaced within a span. Maximum spacing is 10'-0". Minimum spacing is 4'-0".
- Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
- Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used for adjusting post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be grounded down.
- Rails to be continuous over a minimum of 3 posts before splicing.
- Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be lightened only to a point that will allow ralling movement.
- Drain holes shall be 1/2" diameter and shall be provided both in all rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each end of rail.
- Anchor bolts may be set normal to profile grade but may require beveled washers.
- Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
- Spacing of grooves for U-back wings shall be approximately 8'-0". Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.
- Bid item for ralling shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing steel schedule.



SECTION H-H
Scale: 3" = 1'-0"

brcas2.dgn

10-24-2013

BRCAS-2

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CALIFORNIA ST-20S RAILING					
MISCELLANEOUS DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		Sheet No.
			Checked: S&B DIV		
Revisions			BRCAS-2		

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CALIFORNIA ST-20S RAILING

MISCELLANEOUS DETAILS

NOTES TO DESIGNER:

Include this standard when using standard BRCAS-1.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION E-E:

Designer is responsible for adding weld thickness and length to callout.

NOTES:

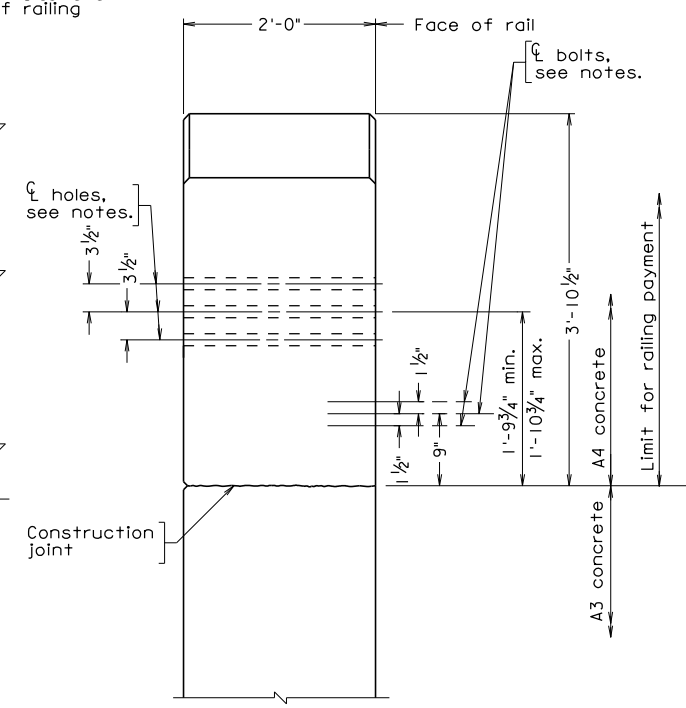
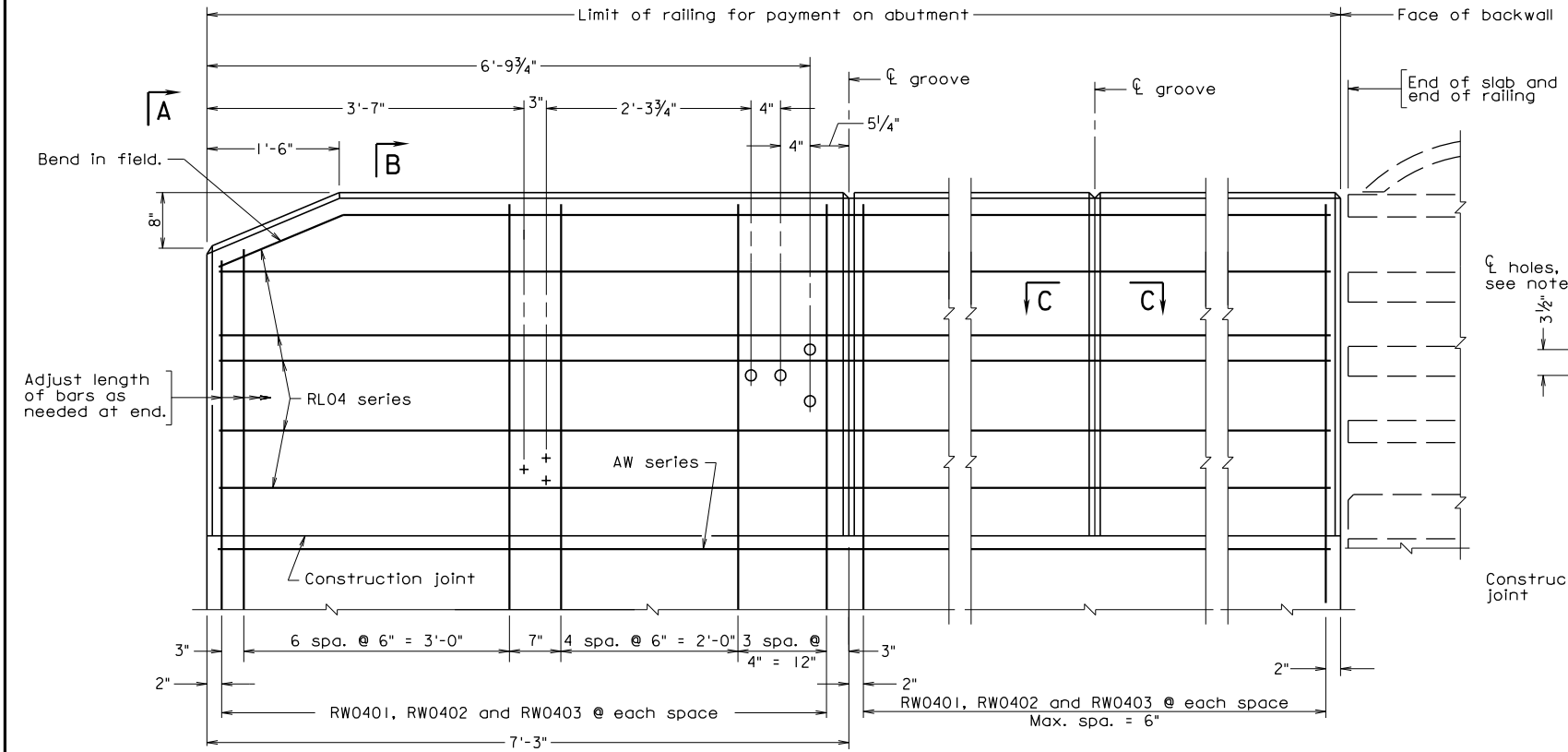
Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	ROUTE	PROJECT



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All levels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class

For details and reinforcing steel schedule of steel railing, see sheet

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

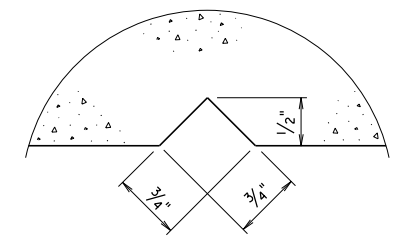
Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

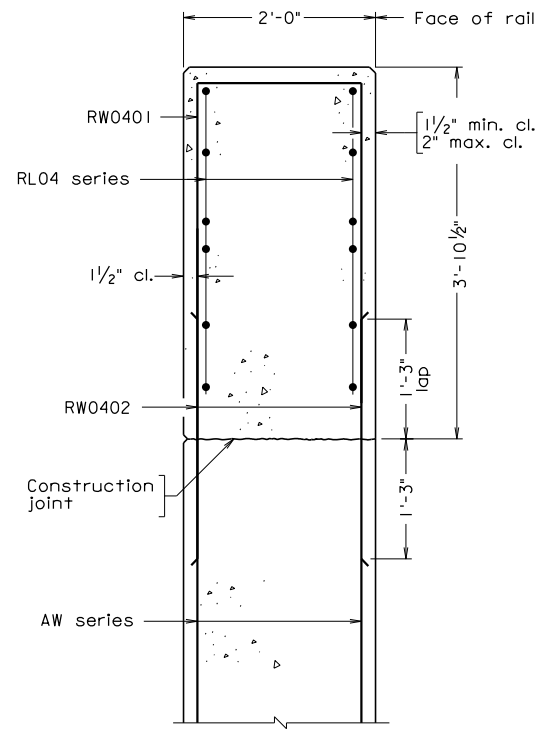
Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

TERMINAL WALL ELEVATION U-BACK WING

VIEW A-A



SECTION C-C Full scale Groove detail for both sides of rail



SECTION B-B

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		8'-11 1/2"	3"	Terminal wall and U-back wing
RW0402	#4		2'-6"		Terminal wall and U-back wing
RL04	#4				Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

BRCAS-3 10-24-2013 brcas3.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

CALIFORNIA ST-20S
TERMINAL WALL

No.	Description	Date	Designed: S&B, DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: ...S&B, DIV		BRCAS-3	
			Checked: S&B, DIV			

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-10½" from the roadway surface.

Include this standard when using standard BRCAS-1 and when terminal wall is detailed on abutment U-back wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 6" curb height dimension and 3'-10½" height of wall would need to be adjusted to 7" and 3'-11½" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min – 1'-10¾" max) for locations of bolts, curb dimension 6", and 3'-10½" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-10½" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON ABUTMENT U-BACK WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

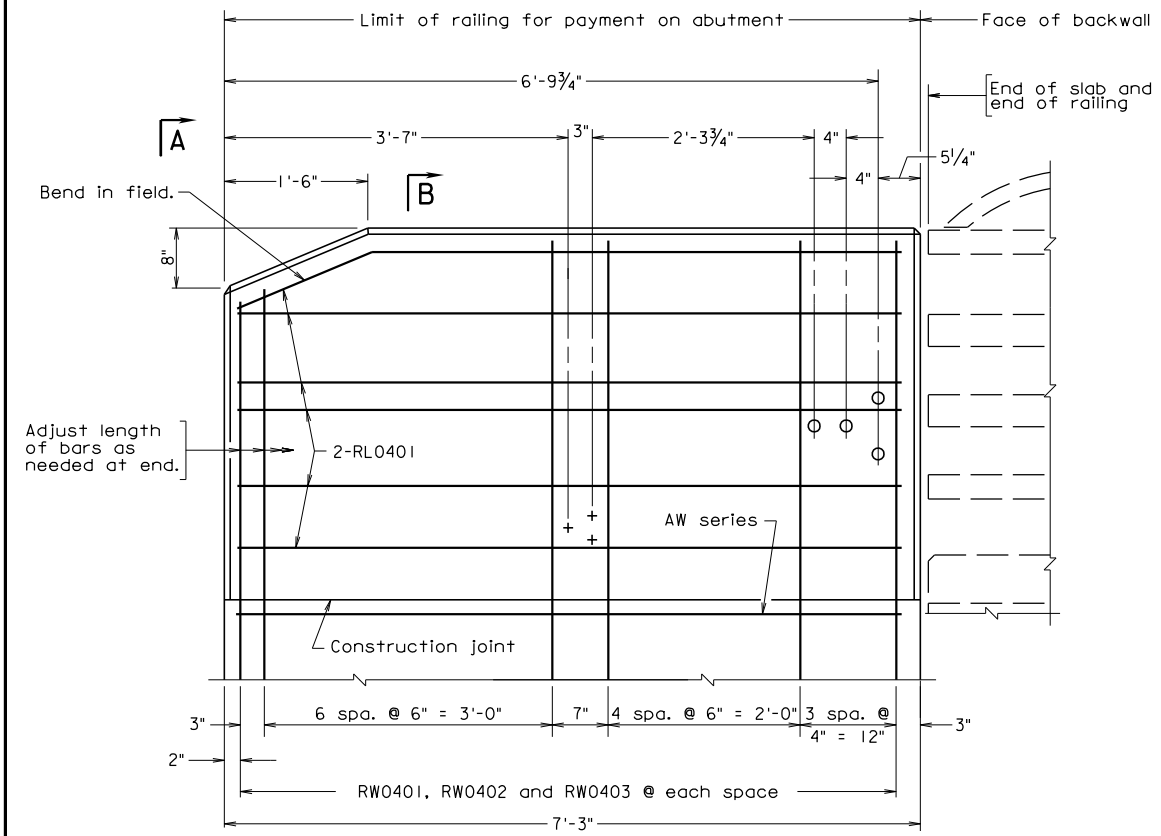
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

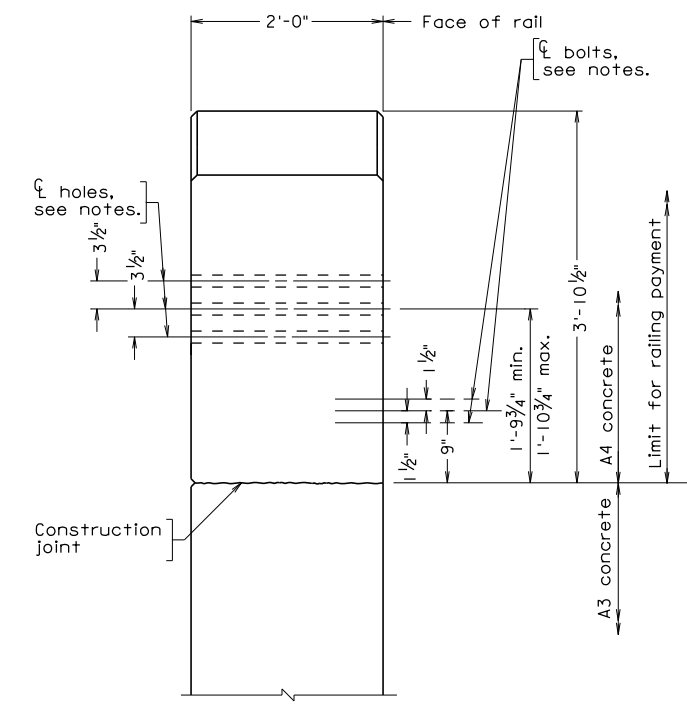
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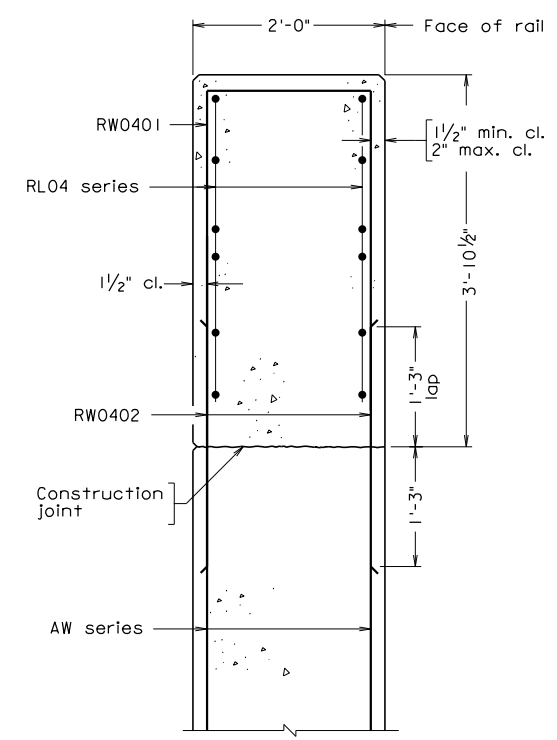
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



TERMINAL WALL - ELEVATION



VIEW A-A



SECTION B-B

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ----.

For details and reinforcing steel schedule of steel railing, see sheet ----.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		8'-11 1/2"	3"	Terminal wall
RW0402	#4		2'-6"		Terminal wall
RL0401	#4		6'-11"		Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BRCAS-4
10-24-2013
brcas4.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CALIFORNIA ST-20S TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		
			Checked: S&B.DIV		
BRCAS-4					

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON ABUTMENT WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-10½" from the roadway surface.

Include this standard when using standard BRCAS-1 and when terminal wall is detailed on abutment wing.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 6" curb height dimension and 3'-10½" height of wall would need to be adjusted to 7" and 3'-11½" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min – 1'-10¾" max) for locations of bolts, curb dimension 6", and 3'-10½" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 3'-10½" so that this dimension will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON ABUTMENT WING

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

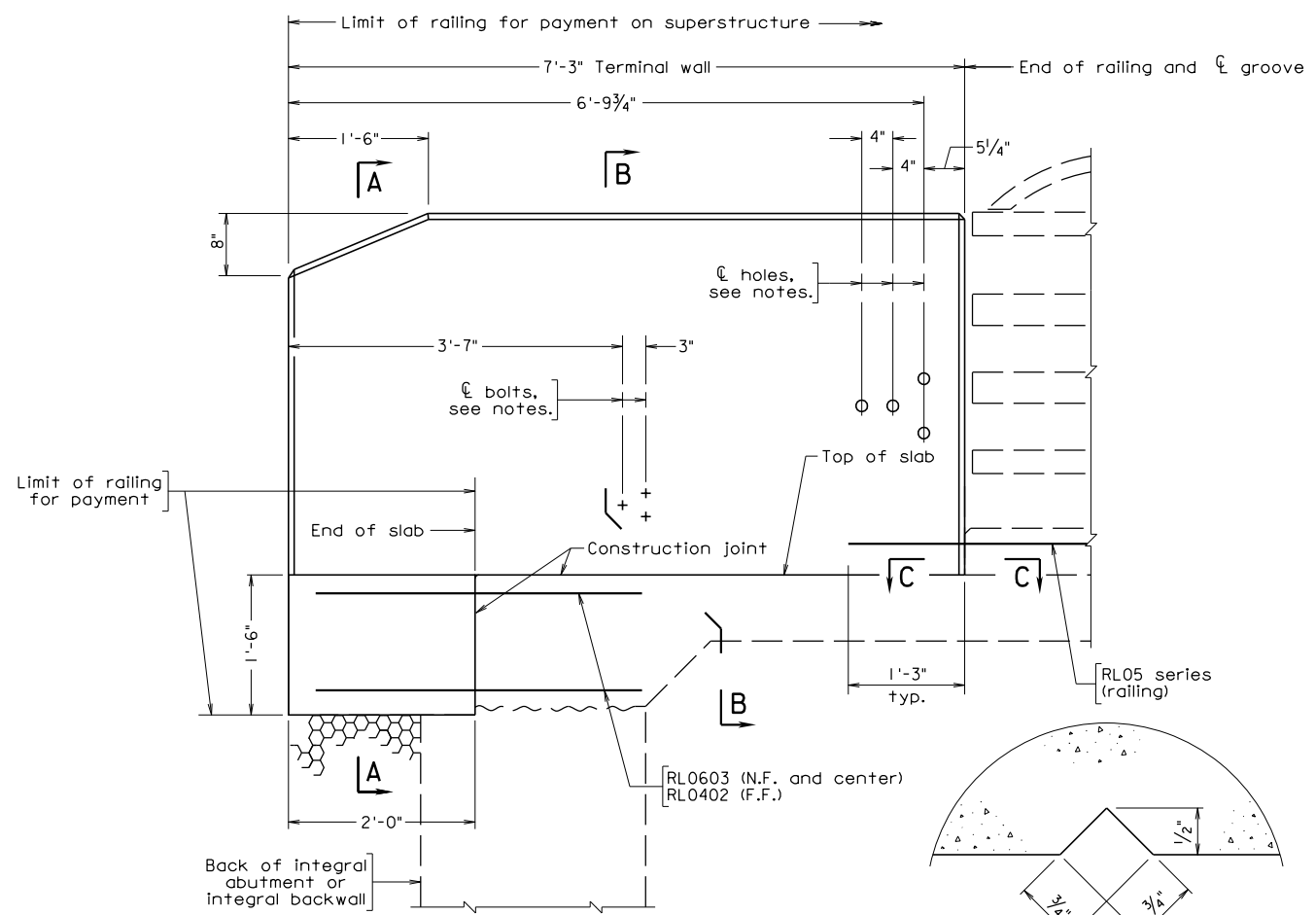
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

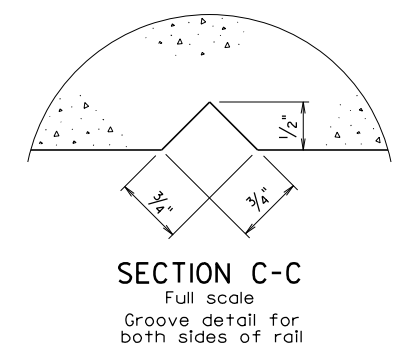
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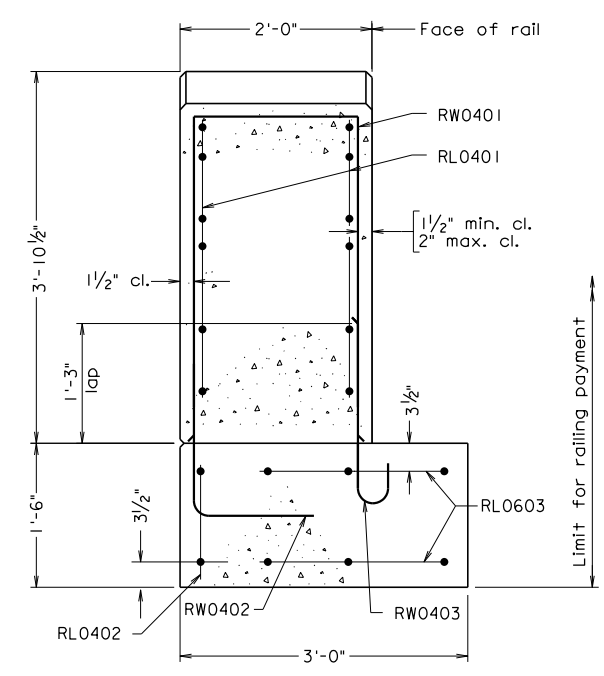
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



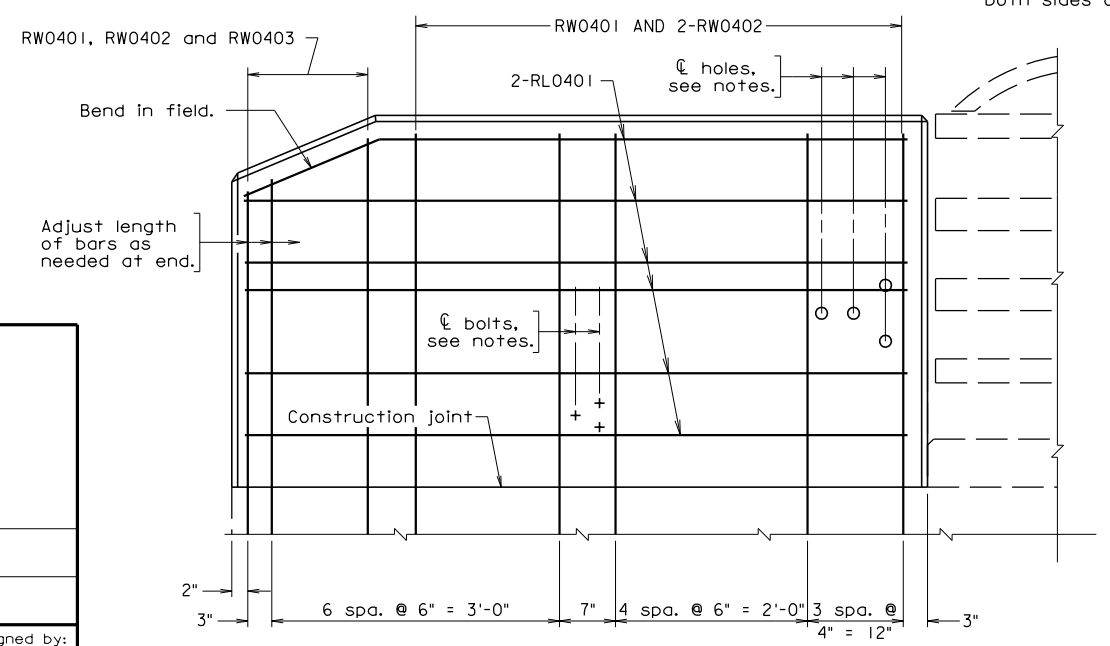
FULL INTEGRAL OR SEMI-INTegral ABUTMENT



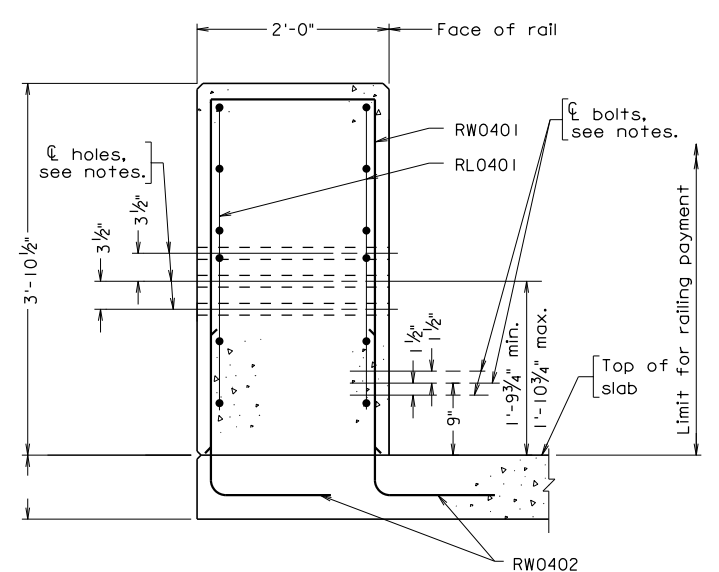
SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A



TERMINAL WALL



SECTION B-B

Note: Deck reinforcement not shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.
- For details and reinforcing steel schedule of steel railing, see sheet ---.
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RL0401	#4	---	---	6'-11"	Terminal wall
RL0402	#4	---	---	4'-0"	Terminal wall end support
RL0603	#6	---	---	4'-0"	Terminal wall end support
RW0401	#4	3"	---	8'-11 1/2"	Terminal wall
RW0402	#4	3"	---	---	Terminal wall
RW0403	#4	3"	---	---	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BRCAS-5 10-24-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CALIFORNIA ST-20S TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		
			Checked: S&B.DIV		
Revisions			BRCAS-5		

Scale: 1" = 1'-0" unless otherwise noted.

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CALIFORNIA ST-20S RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-10½" from the roadway surface.

Include this standard when using standard BRCAS-1 and when terminal wall is detailed on superstructure with an integral abutment.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 6" curb height dimension and 3'-10½" height of wall would need to be adjusted to 7" and 3'-11½" respectively.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 3'-0" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimension 3'-10½" so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min – 1'-10¾" max) for locations of bolts, curb dimension 6", and 3'-10½" height of terminal wall so that these dimensions will be established from top of overlay surface.

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

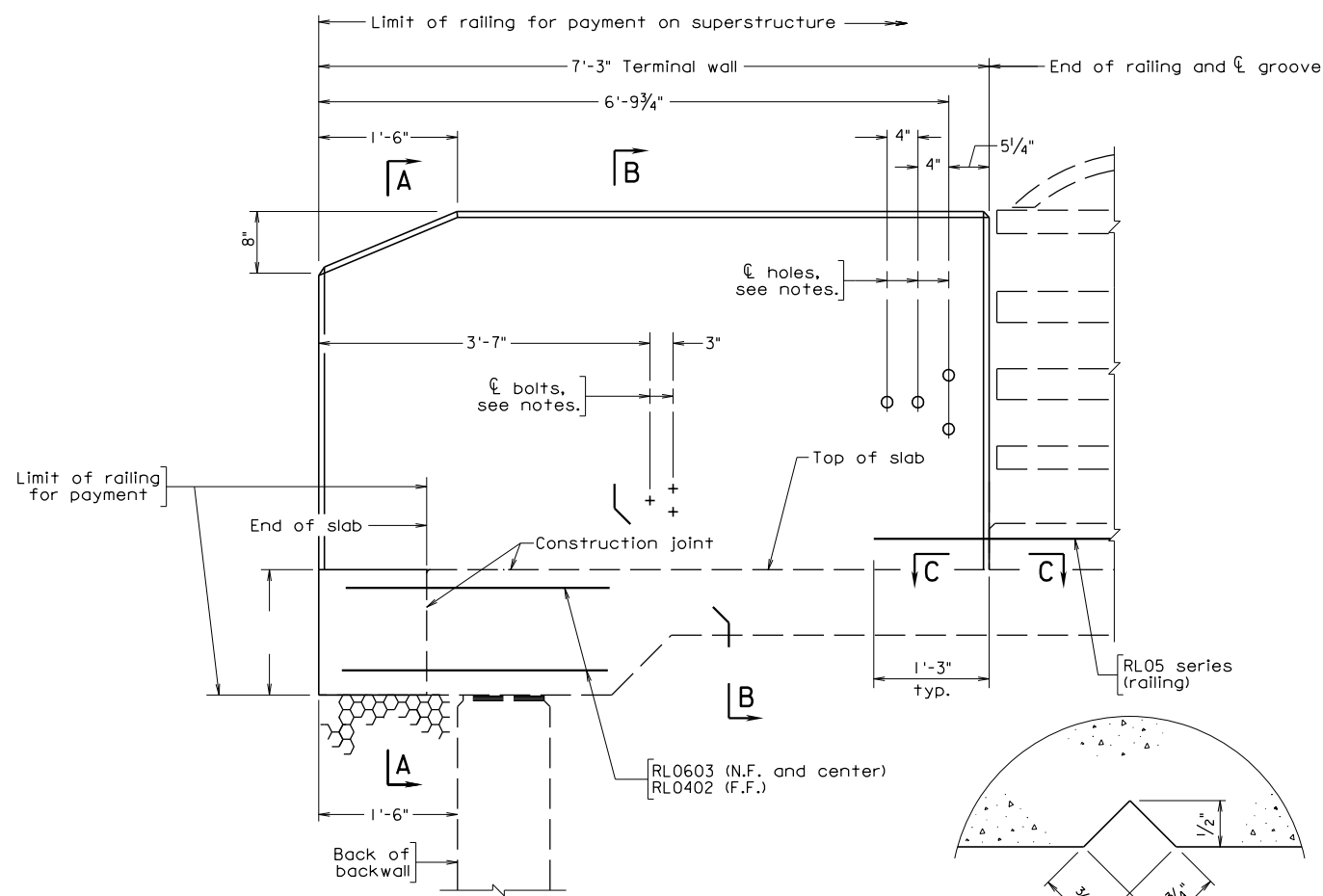
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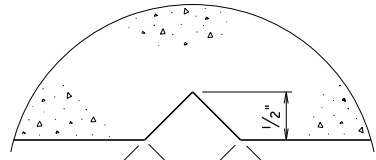
STANDARD BRCAS-5: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 30Aug2013
SHEET 3 of 3
FILE NO. BRCAS-5-3

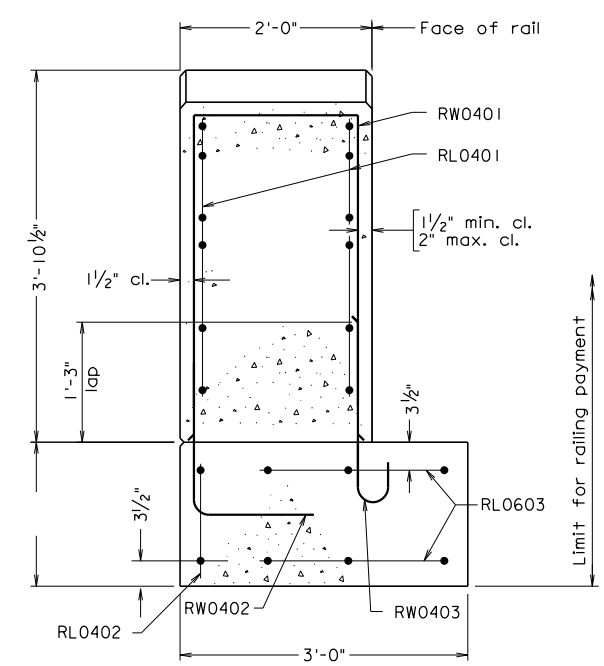
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



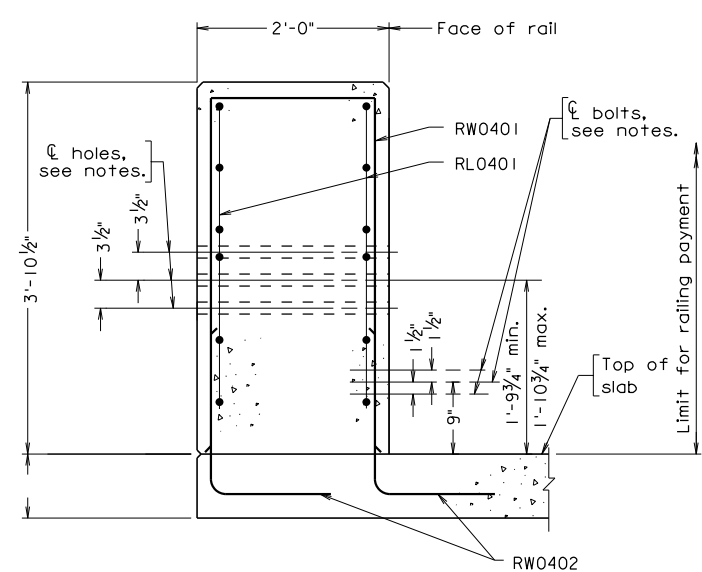
DECK SLAB EXTENSION ABUTMENT



SECTION C-C
Full scale
Groove detail for both sides of rail



SECTION A-A



SECTION B-B

Note: Deck reinforcement not shown

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All concrete shall be Class A4.
- All bevels for concrete shall be 3/4".
- All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.
- For details and reinforcing steel schedule of steel railing, see sheet ---.
- Each terminal wall shall be cast as one piece.
- Terminal walls are detailed to take guardrail attachment GR-FOA-1.
- Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
- Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
- Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE

RW0401	RW0402	RW0403			
Mark	Size	No.	Pin ϕ	Length	Location
RL0401	#4	---	---	6'-11"	Terminal wall
RL0402	#4	---	---	4'-0"	Terminal wall end support
RL0603	#6	---	---	4'-0"	Terminal wall end support
RW0401	#4	3"	3"	8'-11 1/2"	Terminal wall
RW0402	#4	3"	---	---	Terminal wall
RW0403	#4	3"	---	---	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

brcas6.dgn

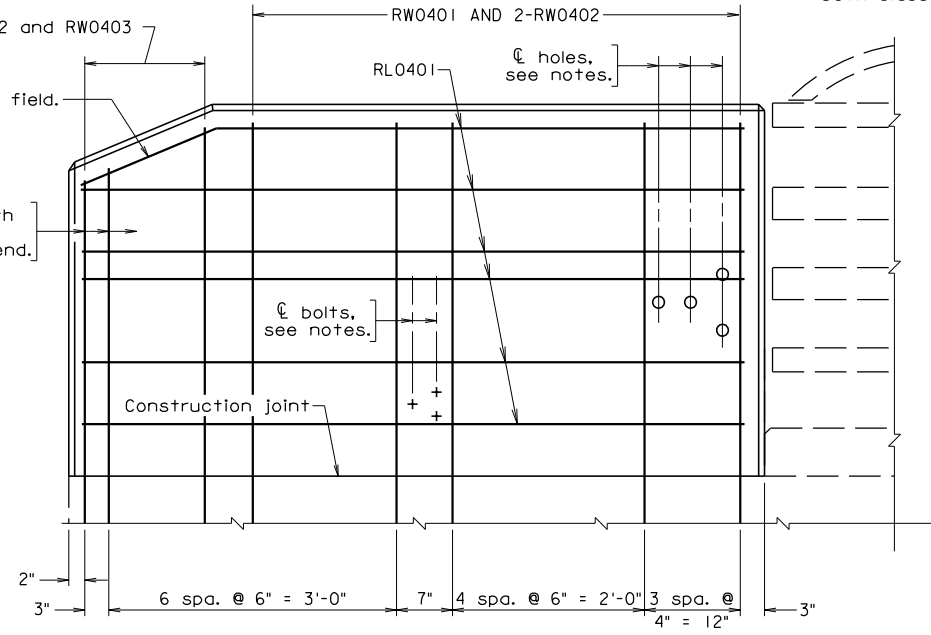
10-24-2013

BRCAS-6

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER



TERMINAL WALL

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
CALIFORNIA ST-20S TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		
			Checked: S&B.DIV		
Revisions			BRCAS-6		

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-10½" from the roadway surface.

Include this standard when using standard BRCAS-1 and when terminal wall is detailed on superstructure with deck slab extension.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 6" curb height dimension and 3'-10½" height of wall would need to be adjusted to 7" and 3'-11½" respectively.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 3'-0" wide section at the edge of the superstructure is extended further from the end of the deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimension 3'-10½" so that this dimension will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9¾" min – 1'-10¾" max) for locations of bolts, curb dimension 6", and 3'-10½" height of terminal wall so that these dimensions will be established from top of overlay surface.

CALIFORNIA ST-20S RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

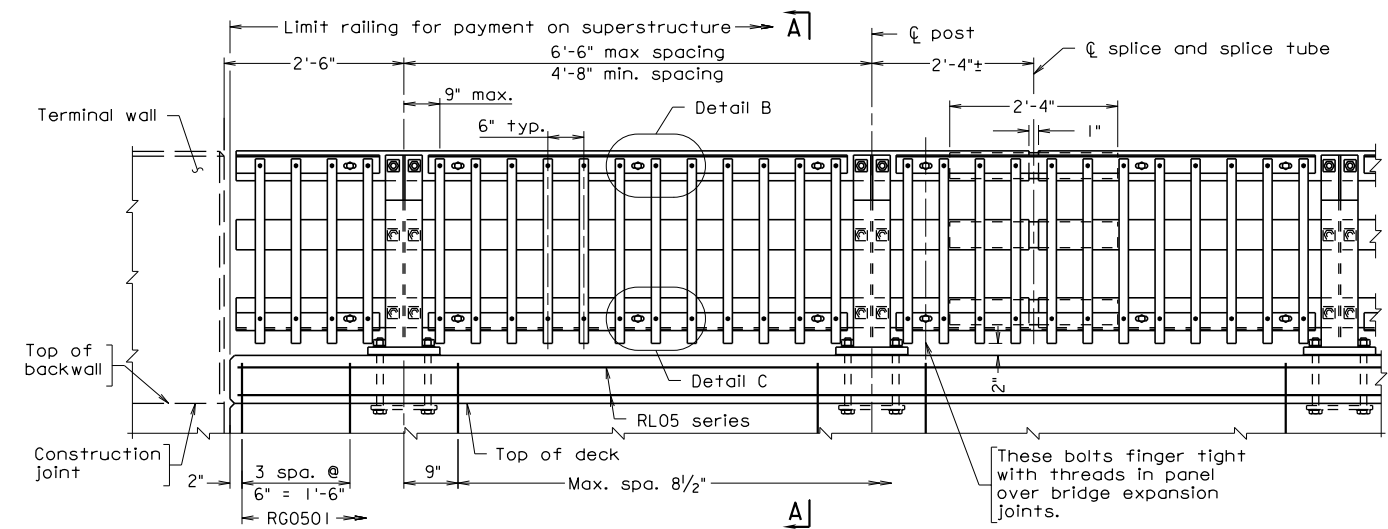
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Replace standard designation with plan number.

STANDARD BRCAS-6: NOTES TO DESIGNER

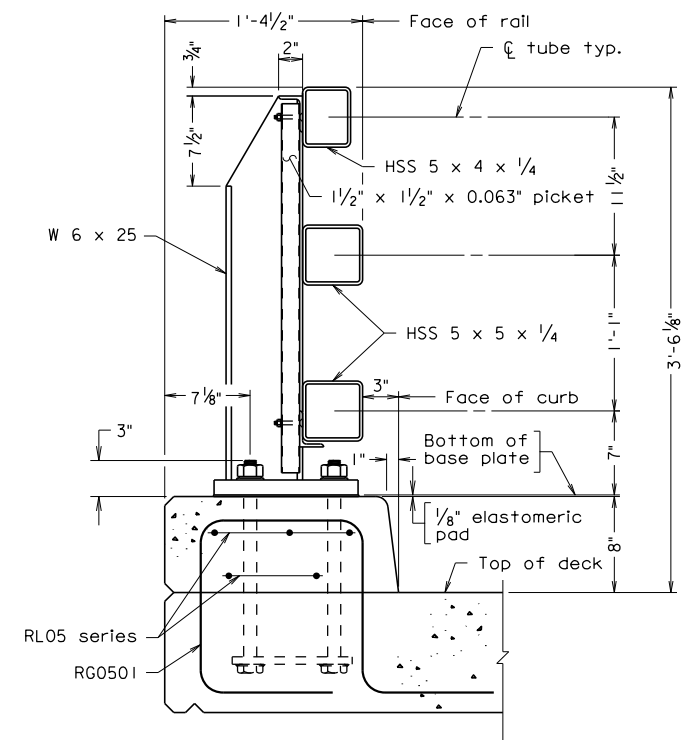
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FILE NO. BRCAS-6-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



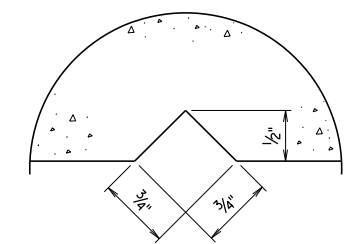
ABUTMENT
Terminal wall on approach

ELEVATION



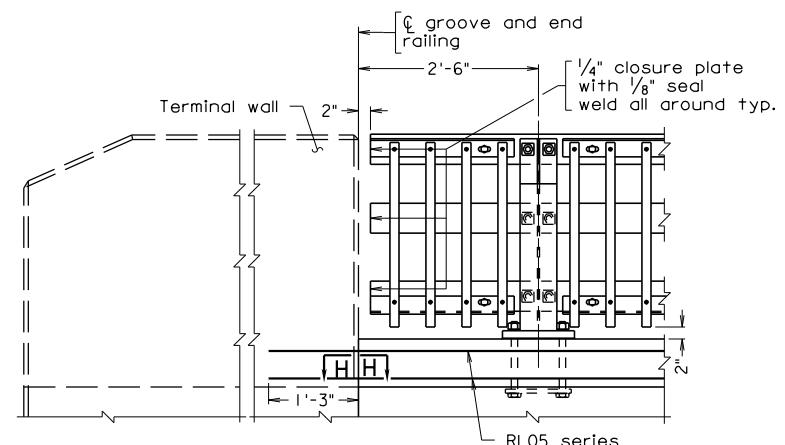
SECTION A-A
Scale: 1/2" = 1'-0"

Slab steel omitted for clarity



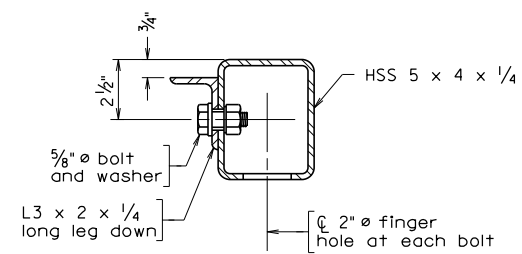
SECTION H-H
Full scale
Groove detail for
both sides of rail

Notes:
For notes, rail connections, and miscellaneous details see sheet .
For details and reinforcing steel schedule of terminal wall, see sheet .

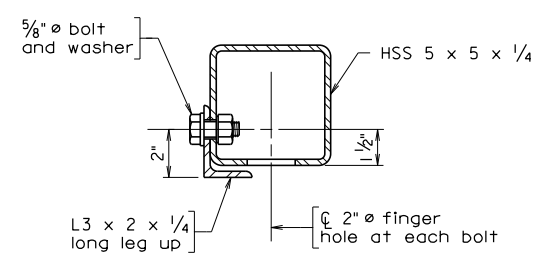


ABUTMENT

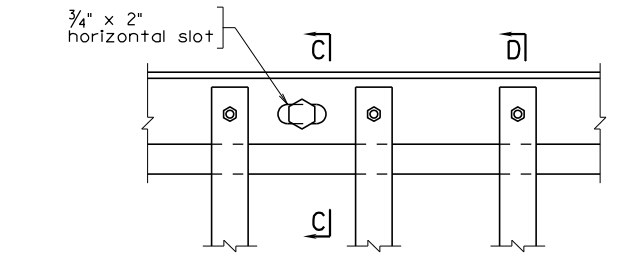
PART ELEVATION
Terminal wall on superstructure



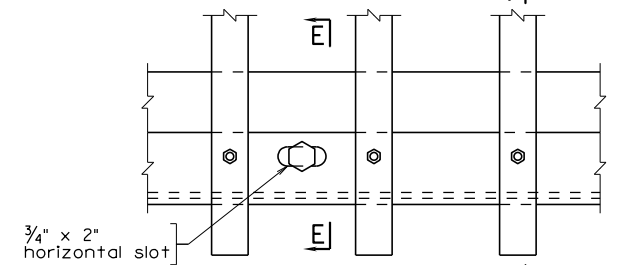
SECTION C-C
Scale: 3" = 1'-0"



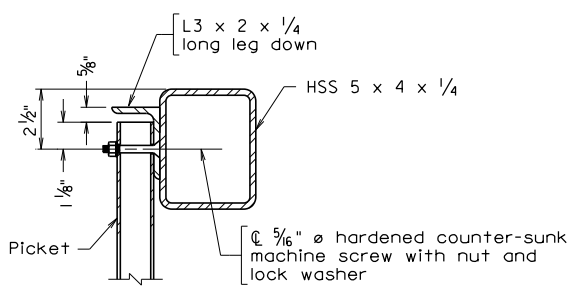
SECTION E-E
Scale: 3" = 1'-0"



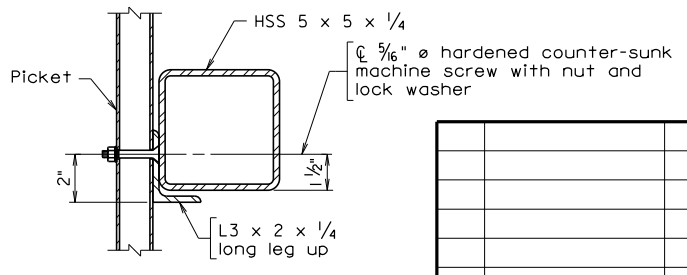
DETAIL B
Scale: 3" = 1'-0"



DETAIL C
Scale: 3" = 1'-0"



SECTION D-D
Scale: 3" = 1'-0"

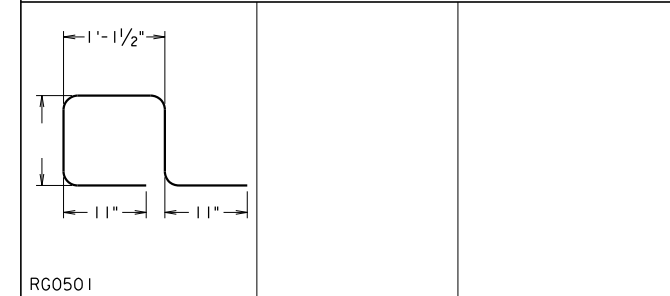


SECTION F-F
Scale: 3" = 1'-0"

Scale: 3/4" = 1'-0" unless otherwise noted.

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REINFORCING STEEL SCHEDULE



Mark	No.	Size	Pin ø	Length	Location
RG0501		#5	3 3/4"		Curb
RL05		#5			Curb

Dimensions in bending diagram are out-to-out of bars.

brma1.dgn

08-30-2013

BRMA-1

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

**42" MASSACHUSETTS
S3 RAILING WITH CURB**

No.	Description	Date	Designed: S&B DIV	Date	Plan No.	Sheet No.
	Revisions		Drawn: S&B DIV		BRMA-1	
			Checked: S&B DIV			

42" MASSACHUSETTS S3 RAILING

NOTES TO DESIGNER:

The Massachusetts S3 steel rail has a height of 3'-6¹/₈" and has been crash tested for TL-4 (TL = Test Level). The standard has a curb section. This railing is for use as traffic barrier and shall not be used for sidewalk applications. For sidewalk applications, use standard BRMA-2. The standard may be used when an open railing is required.

The standard showing railing miscellaneous details (BRMA-3) and the appropriate terminal wall standard (BRMA-4 thru BRMA-7) are to be included in plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the curb is set, the 8" curb dimension and overall 3'-6¹/₈" height of the rail would need to be adjusted to 9" and 3'-7¹/₈" respectively.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (8" curb and 3'-6¹/₈" railing height) as noted above if an initial overlay is used on the bridge.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0501.

Modify bars if an initial overlay is used on the bridge.

NOTES:

Complete sheet number for rail connections and miscellaneous details.

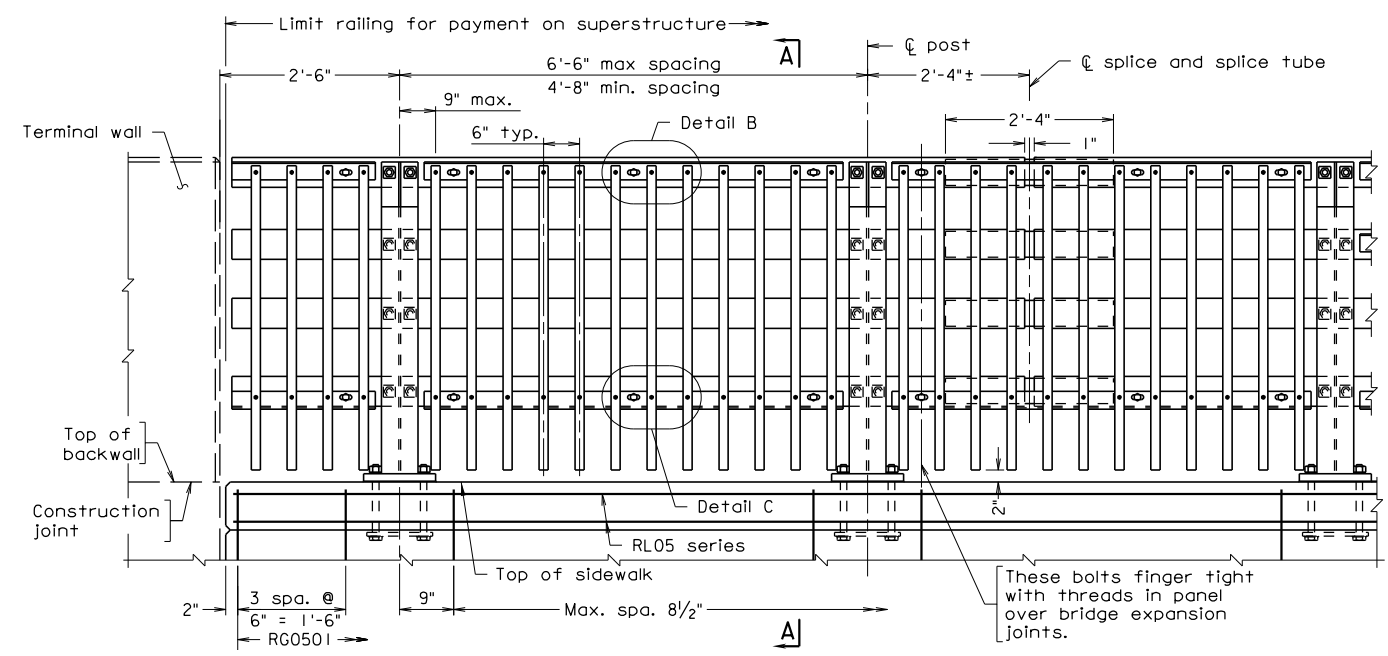
Complete sheet number for terminal wall.

TITLE BLOCK:

Replace standard designation with plan number.

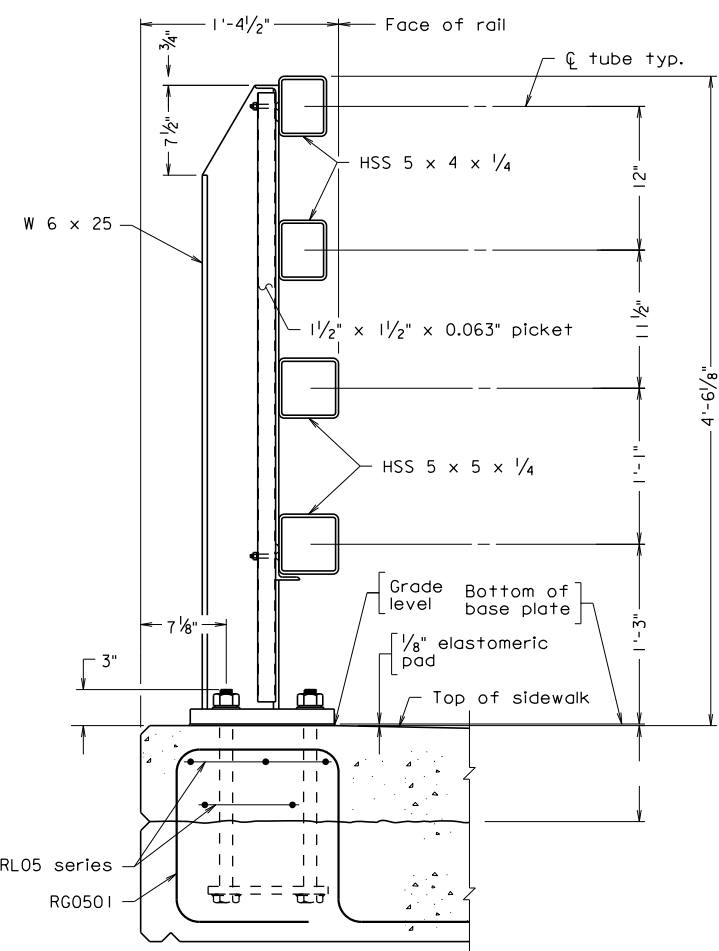
STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.

Notes:
 For notes, rail connections, and miscellaneous details see sheet .
 For details and reinforcing steel schedule of terminal wall, see sheet .



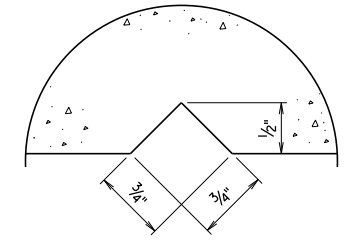
ABUTMENT
Terminal wall on approach

ELEVATION

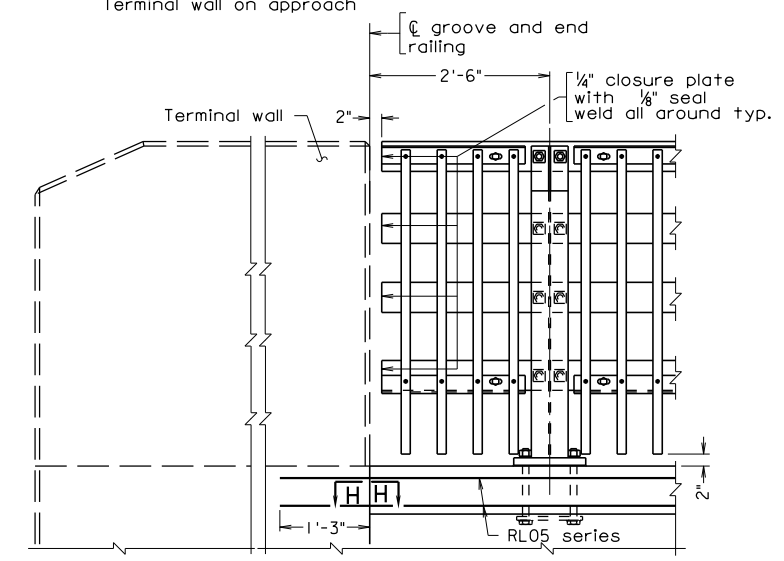


SECTION A-A
Scale: 1/2" = 1'-0"

Slab and sidewalk steel omitted for clarity

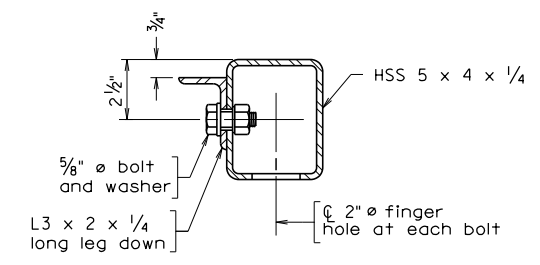


SECTION H-H
Full scale
Groove detail for both sides of rail

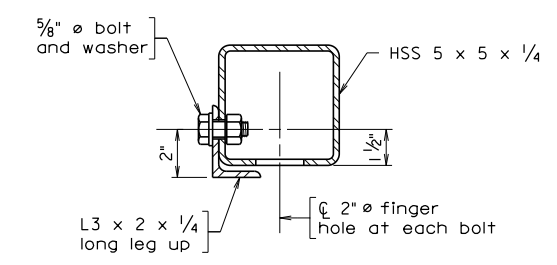


ABUTMENT

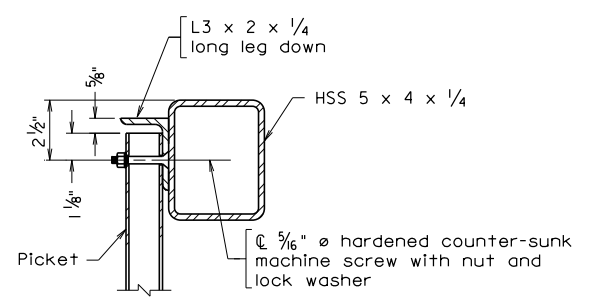
PART ELEVATION
Terminal wall on superstructure



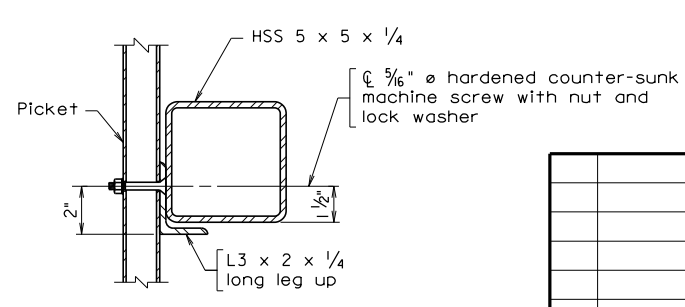
SECTION C-C
Scale: 3" = 1'-0"



SECTION E-E
Scale: 3" = 1'-0"



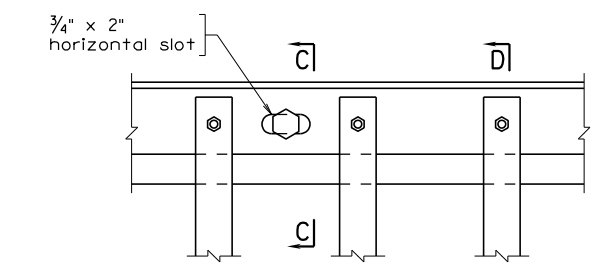
SECTION D-D
Scale: 3" = 1'-0"



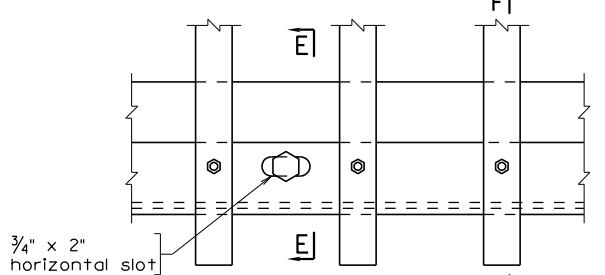
SECTION F-F
Scale: 3" = 1'-0"

REINFORCING STEEL SCHEDULE					
Mark	No.	Size	Pin ϕ	Length	Location
RG0501					
RG0501		#5	3 3/4"		Curb
RL05		#5			Curb

Dimensions in bending diagram are out-to-out of bars.



DETAIL B
Scale: 3" = 1'-0"



DETAIL C
Scale: 3" = 1'-0"

Scale: 3/4" = 1'-0" unless otherwise noted. © 2013, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" MASSACHUSETTS S3 RAILING ON SIDEWALK					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BRMA-2
			Checked: S&B DIV		
Revisions					

08-30-2013
 brma2.dgn
 BRMA-2
 Sealed and Signed by:
 Julius F.J. Volcyl Jr.
 Lic. No. 010487
 On the date of
 August 30, 2013
 A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.
 VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

54" MASSACHUSETTS S3 RAILING

NOTES TO DESIGNER:

The Massachusetts S3 steel rail has a height of 4'-6¹/₈" and has been crash tested for TL-4 (TL = Test Level). The crash tested rail has been modified to meet VDOT pedestrian rail height requirements. This railing is for use as a traffic barrier for sidewalk applications. The standard may be used when an open railing is required.

The standard showing railing miscellaneous details (BRMA-3) and the appropriate terminal wall standard (BRMA-8 thru BRMA-11) are to be included in plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, vertical dimensions and dimensions for reinforcing steel need to be adjusted. The dimensions shown are established from top of the roadway surface. Therefore, for example if a 1" overlay at the edge of travel way is set, the overall 4'-6¹/₈" height of the rail would need to be adjusted to 4'-7¹/₈".

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any other details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical dimension (4'-6¹/₈" railing height) as noted above if an initial overlay is used on the bridge.

REINFORCING STEEL SCHEDULE:

Add dimension and length for rebar RG0501.

Modify bars if an initial overlay is used on the bridge.

NOTES:

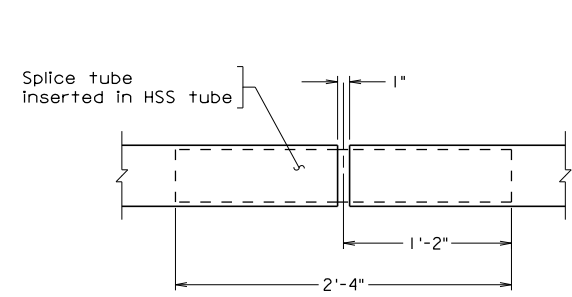
Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal wall.

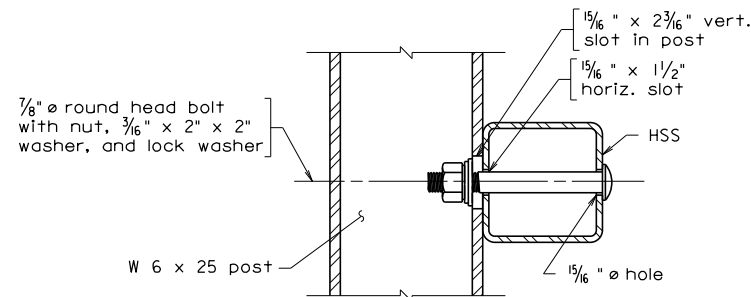
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



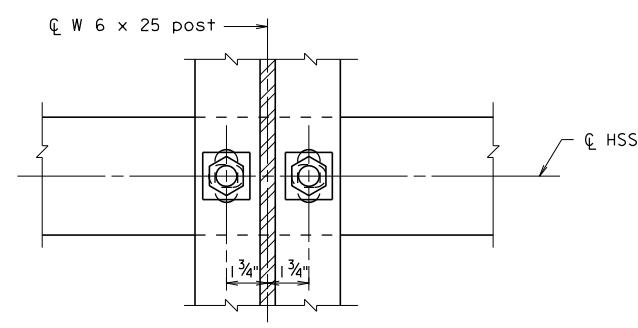
TYPICAL SPLICE
Scale: 1/2" = 1'-0"



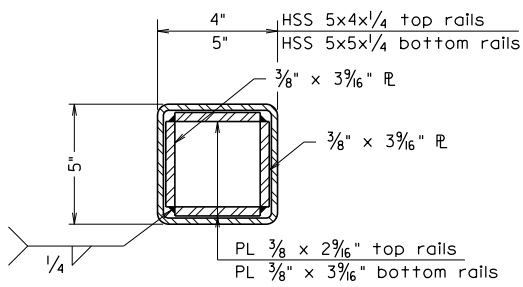
SECTION THROUGH RAIL

Note:
Connections at lower rails shown.
Connections at top of rail similar.

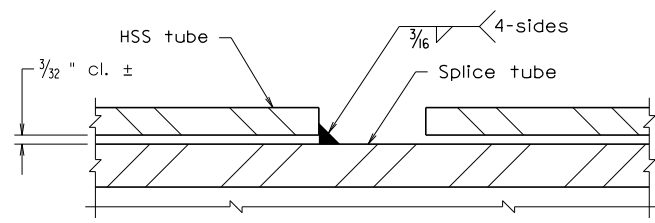
TYPICAL RAIL TO POST CONNECTIONS



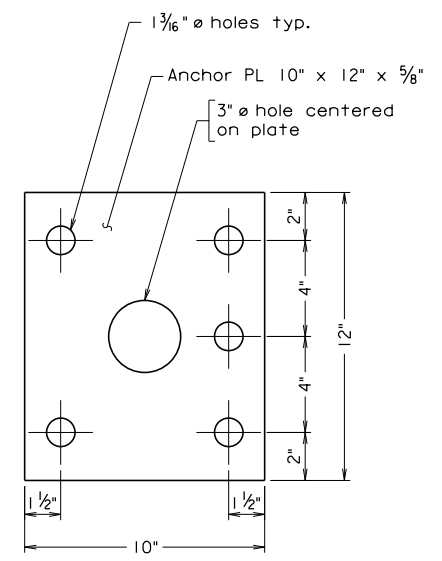
SECTION THROUGH POST WEB



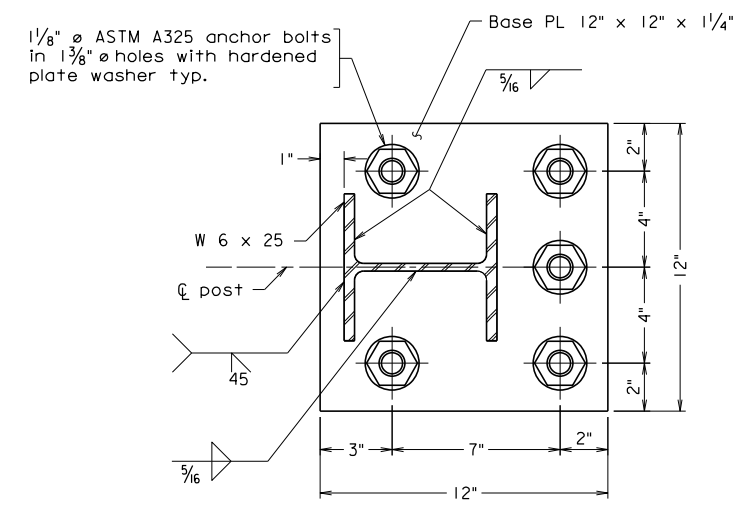
SPLICE TUBE DETAILS



SPLICE DETAIL
Full scale



ANCHOR PLATE



BASE PLATE

Notes:
Plan dimensions shown are measured in the respective horizontal and vertical planes.
The Contractor shall determine all dimensions and details necessary for installation.
All concrete shall be Class A4.
All bevels for concrete shall be 3/4".
The reinforcing steel shown has been detailed based on a standard 1/4" per foot cross slope. The Contractor shall adjust the reinforcing steel as required for other cross slopes.
All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ...
For details and reinforcing schedule, see sheet
All structural steel shall be ASTM A709 Grade 50. Structural tubing shall be ASTM A500 with a yield stress of 50 ksi. Picket tubing shall be ASTM A709, Grade 36.
Bolts for attaching rails to post are round head (with slot in head), ASTM A449. All other bolts shall be ASTM A325. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washer shall be ASTM F436.

All steel shall be hot dip galvanized.
Posts shall be seated on neoprene pads 1/8" minimum thickness, having a nominal durometer hardness of 60. Pads shall conform to post base dimensions.
Cut bottom of posts to match cross slope before welding so that posts will be vertical. Steel shims may be used for adjusting post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete shall be grounded down.
Rails to be continuous over a minimum of 3 posts before splicing.
Rail expansion joint shall be provided between any two posts which span a deck expansion joint. Dimension A for expansion joint is equal to deck joint opening plus 1". Bolts in slot on the expansion side shall be tightened only to a point that will allow railing movement.
Drain holes shall be 1/2" diameter and shall be provided both in all rails approximately half-way between posts except at open joints near pier(s). Drain holes shall be provided at each end of rail.
Anchor bolts may be set normal to profile grade but may require beveled washers.
Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
Spacing of grooves for U-back wings shall be approximately 8'-0". Maximum spacing of grooves in pedestal shall be limited to 3 x post spacing, shall be centered between posts and shall be no closer than 10'-0" to joints.
Bid item for railing shall include rails, rail posts, bearing pads, bolts, anchor assemblies, sleeves, barrier delineators, grounding materials and other associated metal parts as shown on the plans. Also included are concrete noted in the plans and reinforcing steel indicated in the reinforcing schedule.

BRMA-3

10-24-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION	
STRUCTURE AND BRIDGE DIVISION	
MASSACHUSETTS S3 RAILING MISCELLANEOUS DETAILS	
No.	Description
Date	Date
Designed: S&B.DIV	Plan No.
Drawn: ...S&B.DIV	Sheet No.
Checked: S&B.DIV	BRMA-3

MASSACHUSETTS S3 RAILING

MISCELLANEOUS DETAILS

NOTES TO DESIGNER:

Include this standard when using either the BRMA-1 or BRMA-2 standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

NOTES:

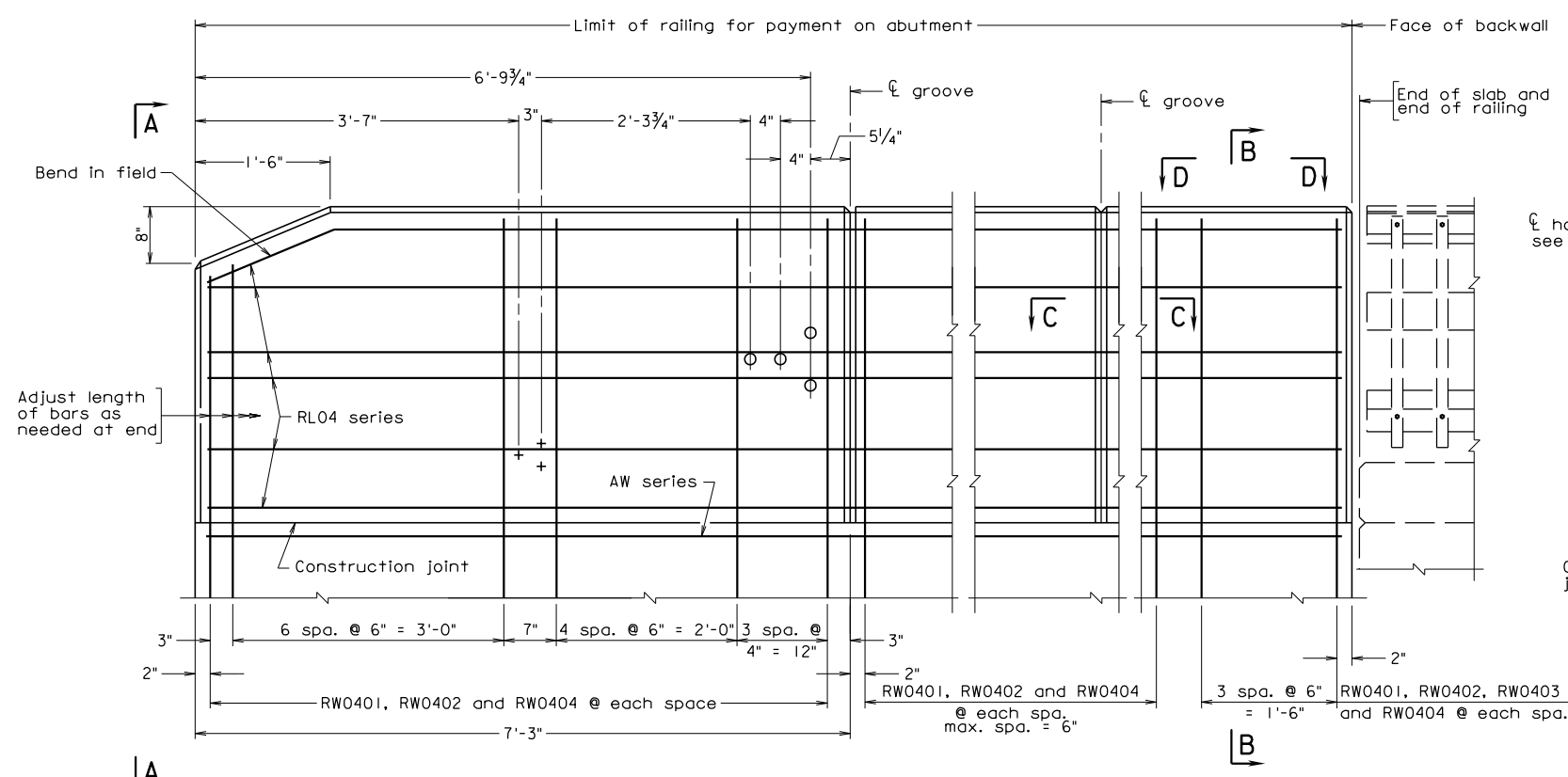
Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete note for rail sheet reference.

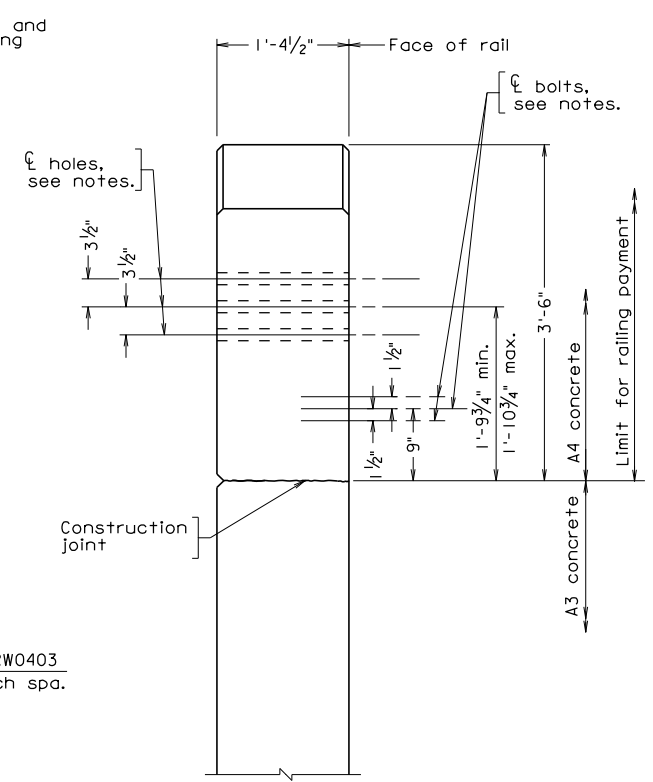
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	PROJECT	

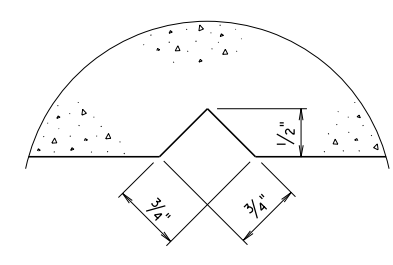


TERMINAL WALL ELEVATION U-BACK WING

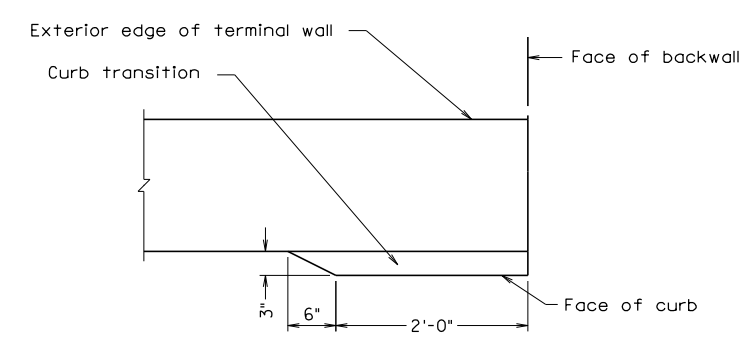


VIEW A-A

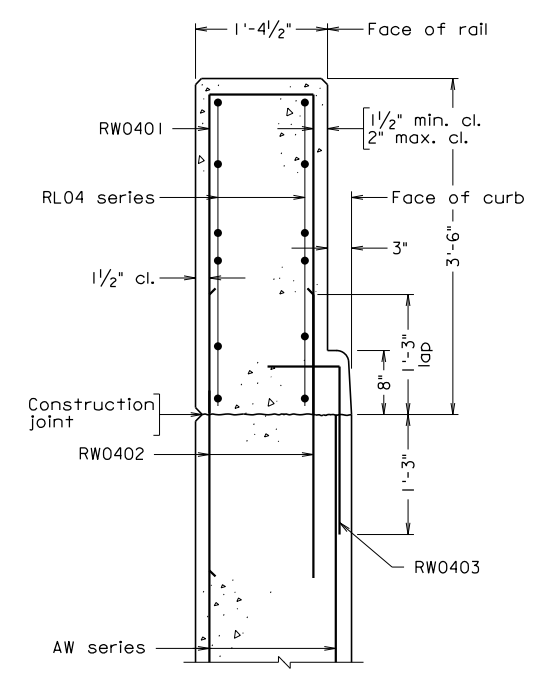
Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All bevels for concrete shall be 3/4\"/>



SECTION C-C Full scale Groove detail for both sides of rail



VIEW D-D



SECTION B-B

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		7'-7"	3"	Terminal wall and U-back wing
RW0402	#4		2'-6"	---	Terminal wall and U-back wing
RW0403	#4		2'-5"	3"	Terminal wall and U-back wing
RL04	#4		---	---	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

10-24-2013 brma4.dgn

BRMA-4

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
	Revisions		Drawn: ...S&B.DIV		Sheet No.
			Checked: S&B.DIV		BRMA-4

42" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BRMA-1 and when terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify 8" curb dimension and vertical dimension 3'-6" so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

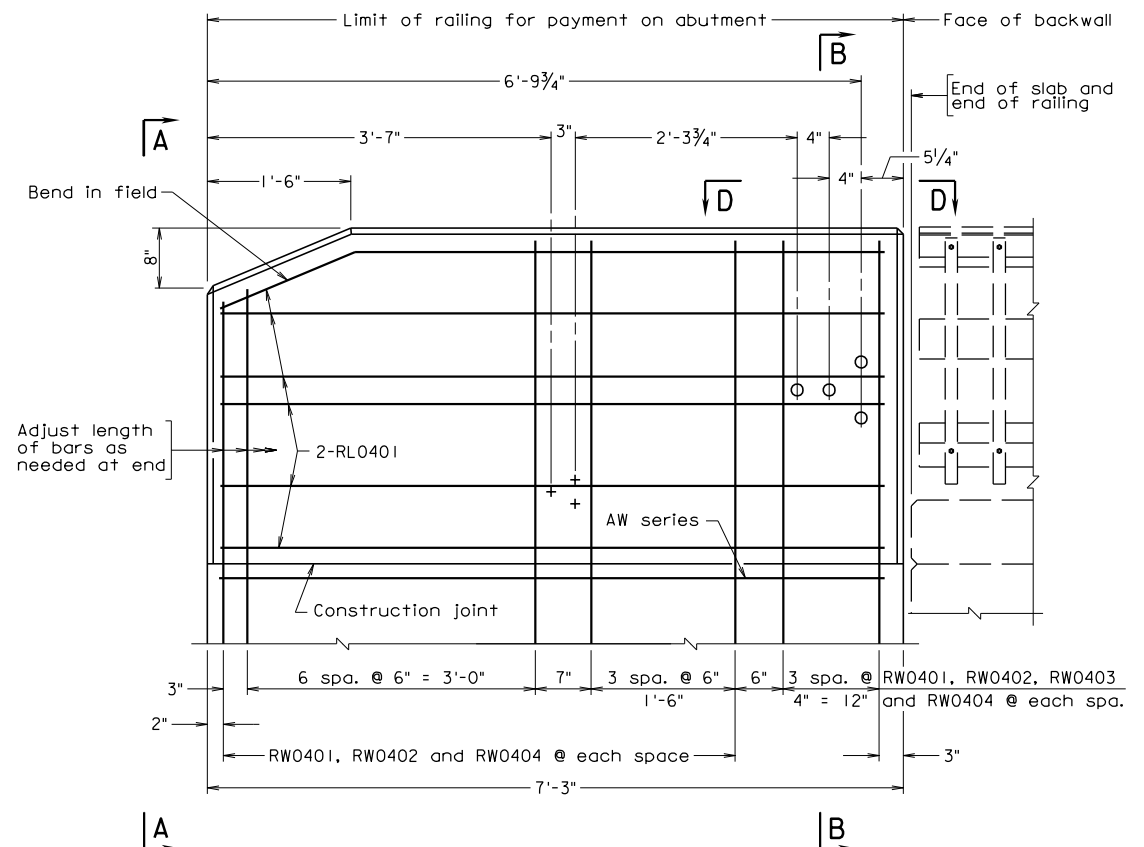
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

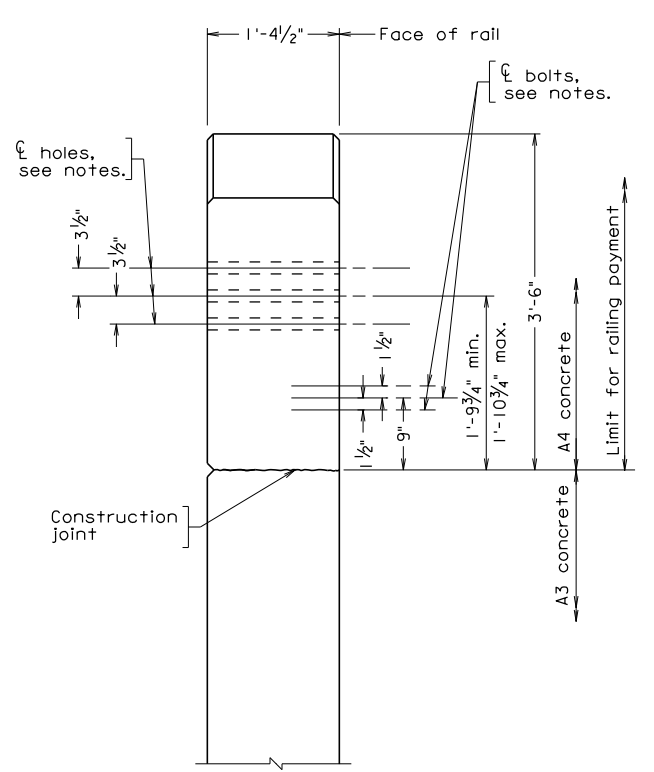
TITLE BLOCK:

Replace standard designation with plan number.

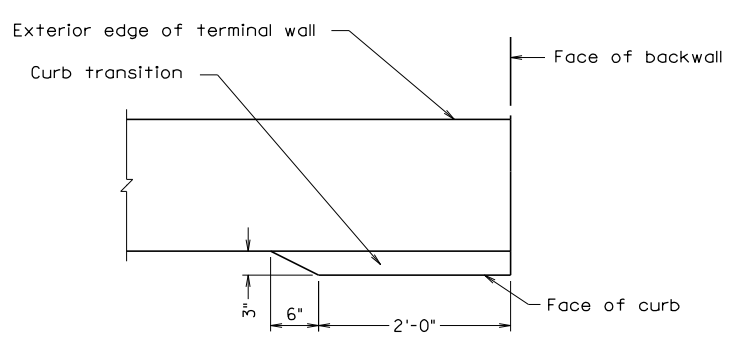
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



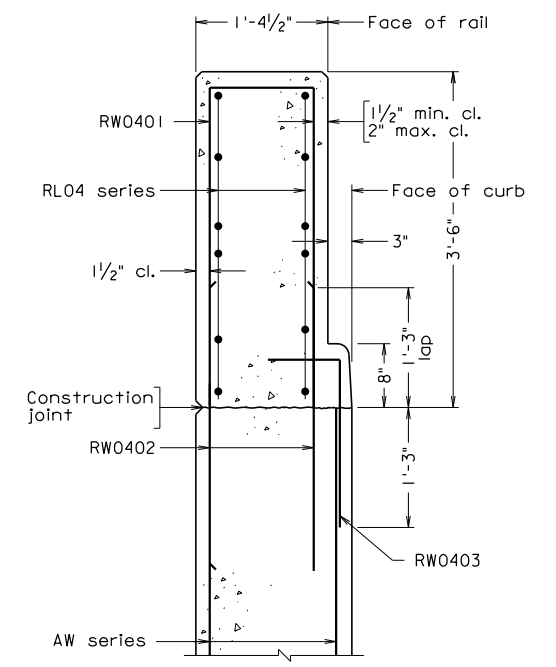
TERMINAL WALL - ELEVATION



VIEW A-A



VIEW D-D



SECTION B-B

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.

For details and reinforcing steel schedule of steel railing, see sheet ---.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
RW0401			RW0403		
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		7'-7"	3"	Terminal wall
RW0402	#4		2'-6"	---	Terminal wall
RW0403	#4		2'-5"	3"	Terminal wall
RL0401	#4		6'-11"	---	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

10-24-2013

BRMA-5

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
	Revisions		Drawn: ...S&B.DIV		Sheet No.
			Checked: S&B.DIV		BRMA-5

42" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON ABUTMENT WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BRMA-1 and when only terminal wall is detailed on abutment wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify 8" curb dimension and vertical dimension 3'-6" so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

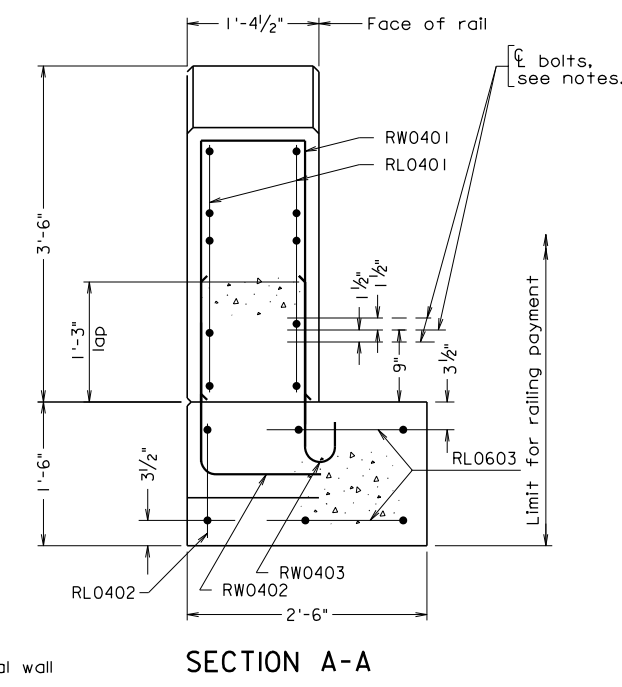
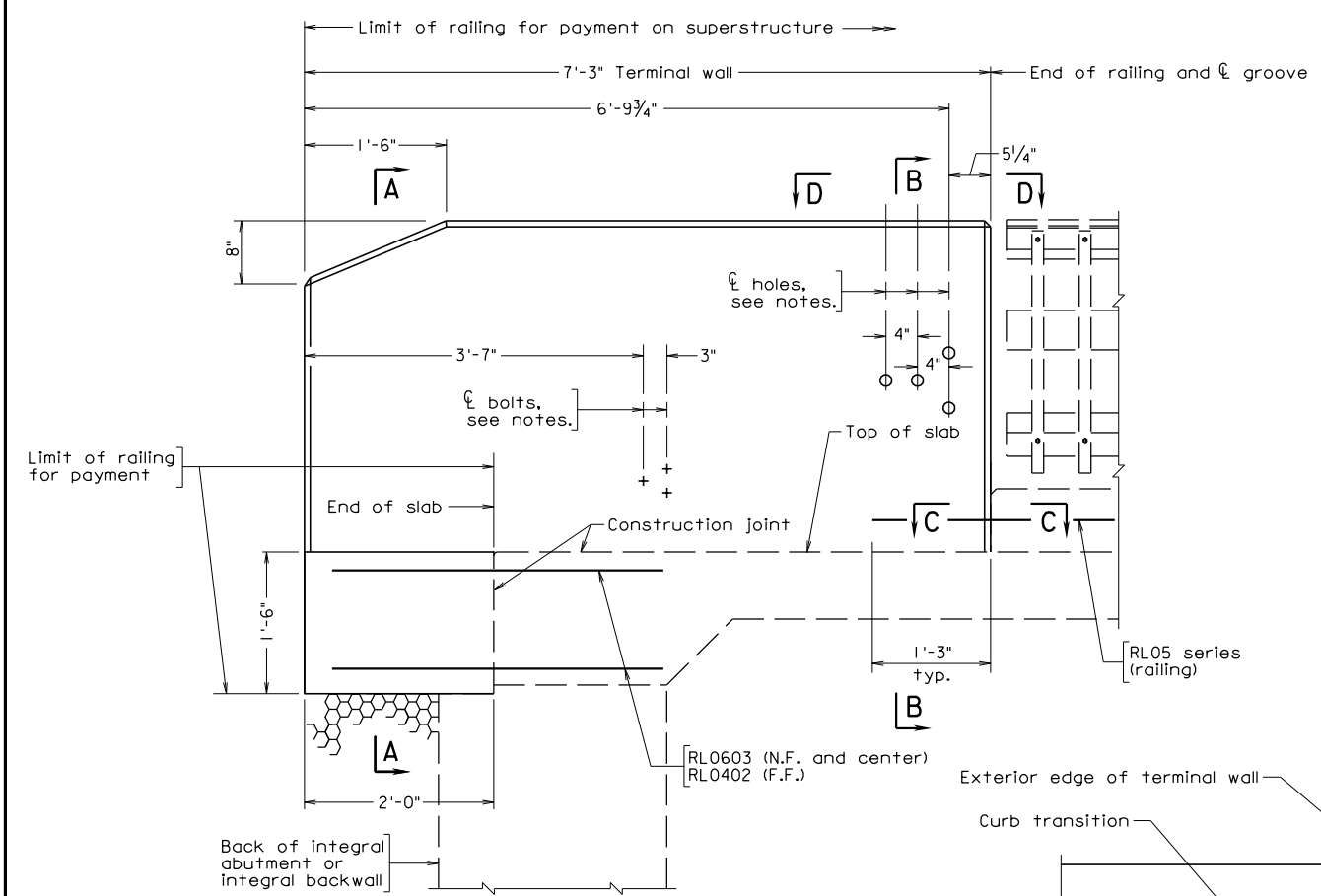
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.

For details and reinforcing steel schedule of steel railing, see sheet ---.

Each terminal wall shall be cast as one piece.

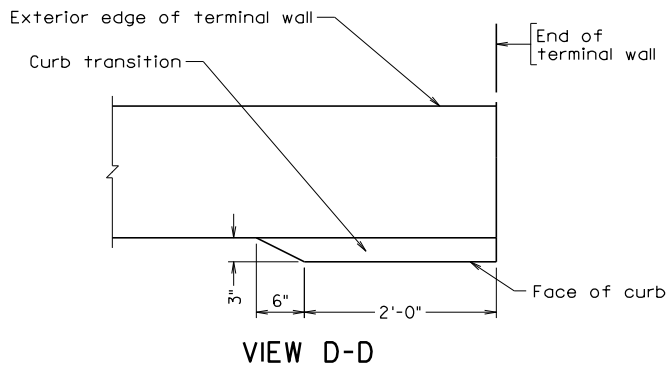
Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

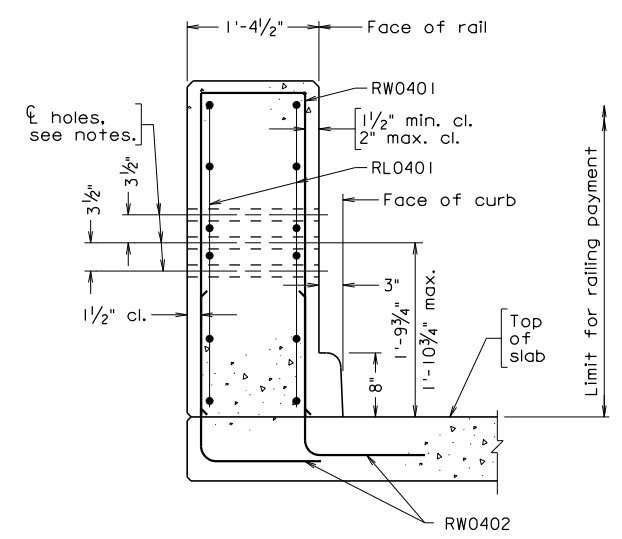
Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT



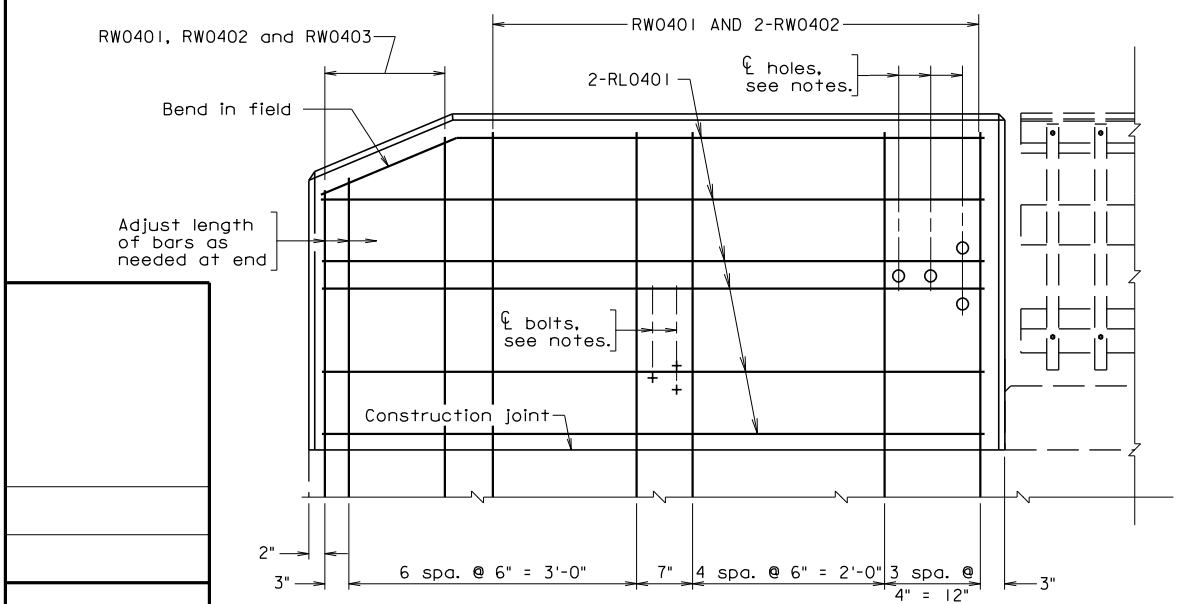
VIEW D-D



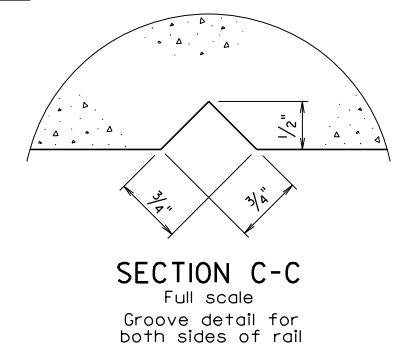
SECTION B-B
Deck reinforcement not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RL0401	#4	---	---	6'-11"	Terminal wall
RL0402	#4	---	---	4'-0"	Terminal wall end support
RL0603	#6	---	---	4'-0"	Terminal wall end support
RW0401	#4	3"	3"	7'-7"	Terminal wall
RW0402	#4	3"	3"	---	Terminal wall
RW0403	#4	3"	3"	---	Terminal wall

Dimensions in bending diagram are out-to-out of bars.



TERMINAL WALL



SECTION C-C
Full scale
Groove detail for both sides of rail

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		Sheet No.
Revisions			Checked: S&B.DIV		BRMA-6

10-24-2013

BRMA-6

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

42" MASSACHUSETTS S3 RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BRMA-1 and when terminal wall is detailed on superstructure with an integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-6" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimensions 9" and 3'-6" so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, 8" curb dimension and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

42" MASSACHUSETTS S3 RAILING

**TERMINAL WALL ON SUPERSTRUCTURE WITH
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

REINFORCING STEEL SCHEDULE:

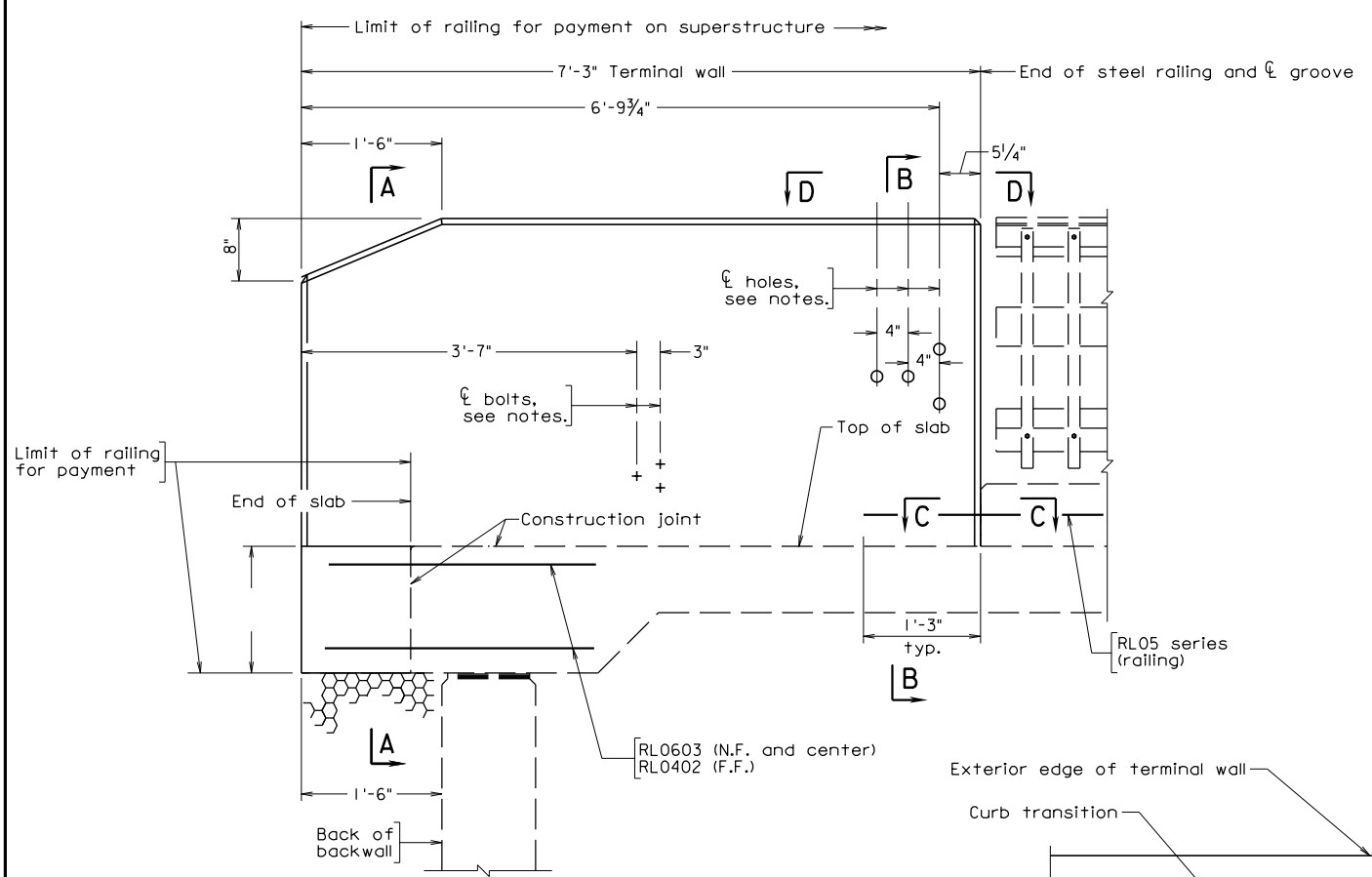
Add dimensions and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

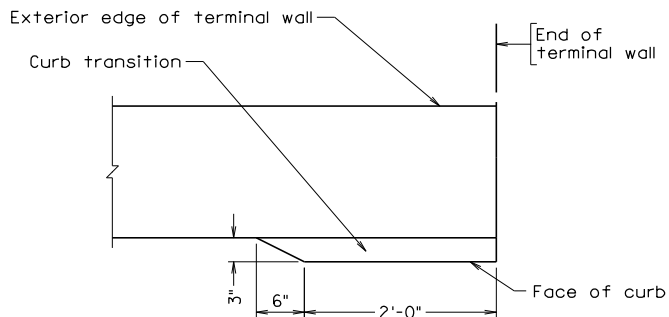
TITLE BLOCK:

Replace standard designation with plan number.

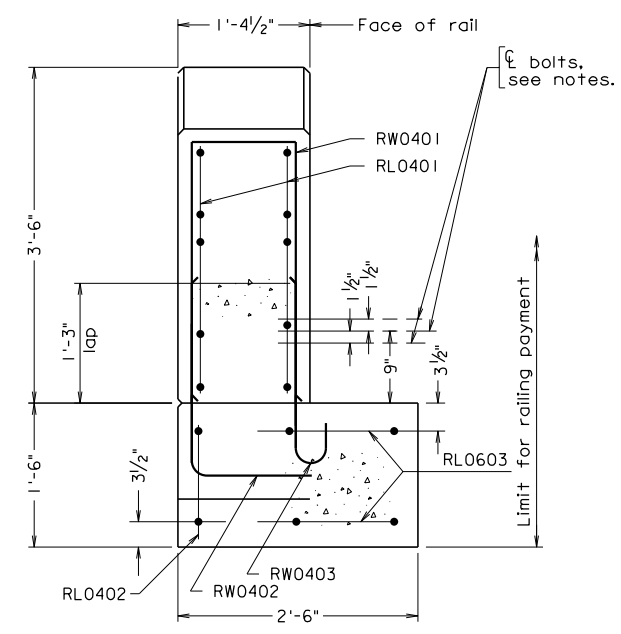
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



DECK SLAB EXTENSION ABUTMENT

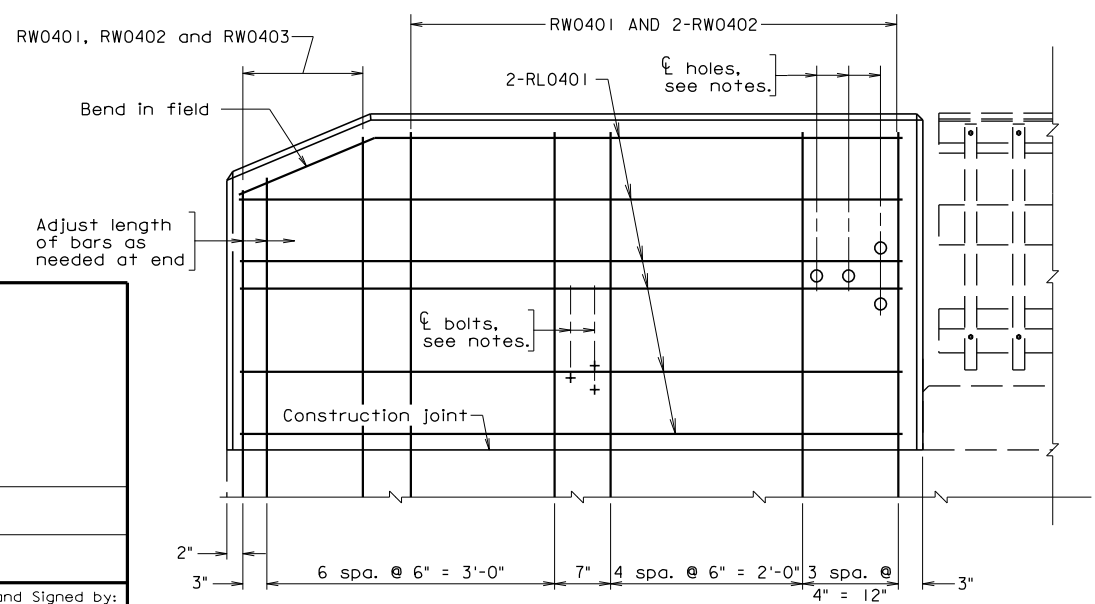


VIEW D-D

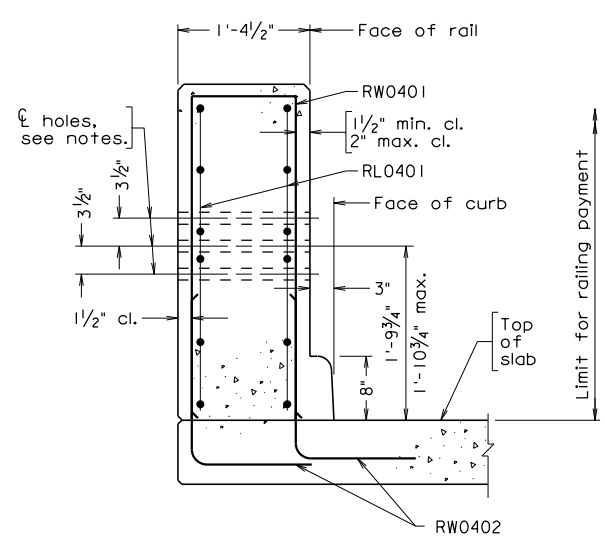


SECTION A-A

Notes:
 Plan dimensions shown are measured in the respective horizontal and vertical planes.
 The Contractor shall determine all dimensions and details necessary for installation.
 All concrete shall be Class A4.
 All levels for concrete shall be 3/4".
 All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class
 For details and reinforcing steel schedule of steel railing, see sheet
 Each terminal wall shall be cast as one piece.
 Terminal walls are detailed to take guardrail attachment GR-F0A-1.
 Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.
 Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.
 Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.



TERMINAL WALL



SECTION B-B
Deck reinforcement not shown

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RL0401	#4	—	—	6'-11"	Terminal wall
RL0402	#4	—	—	4'-0"	Terminal wall end support
RL0603	#6	—	—	4'-0"	Terminal wall end support
RW0401	#4	3"	3"	7'-7"	Terminal wall
RW0402	#4	3"	3"	—	Terminal wall
RW0403	#4	3"	3"	—	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

brma7.dgn

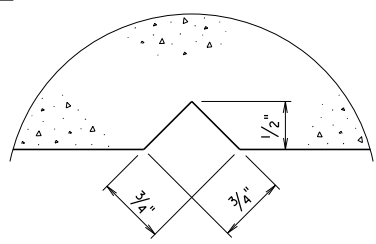
10-24-2013

BRMA-7

Sealed and Signed by:
 Julius F.J. Volgyi Jr.
 Lic. No. 010487
 On the date of
 October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER



SECTION C-C
Full scale
Groove detail for both sides of rail

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
42" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		Sheet No.
Revisions			Checked: S&B.DIV		BRMA-7

42" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

NOTES TO DESIGNER:

This concrete terminal wall has a height of 3'-6" from the roadway surface.

Include this standard when using standard BRMA-1 and when terminal wall is detailed on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-6" wide section at the edge of the superstructure is extended further from the end of the deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify vertical dimensions 9" and 3'-6" so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, 8" curb dimension and 3'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

42" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

NOTES:

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

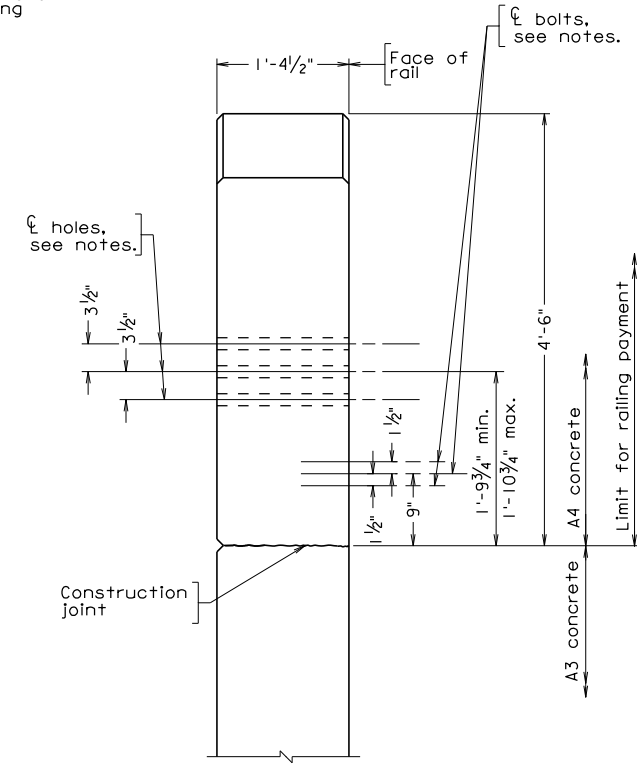
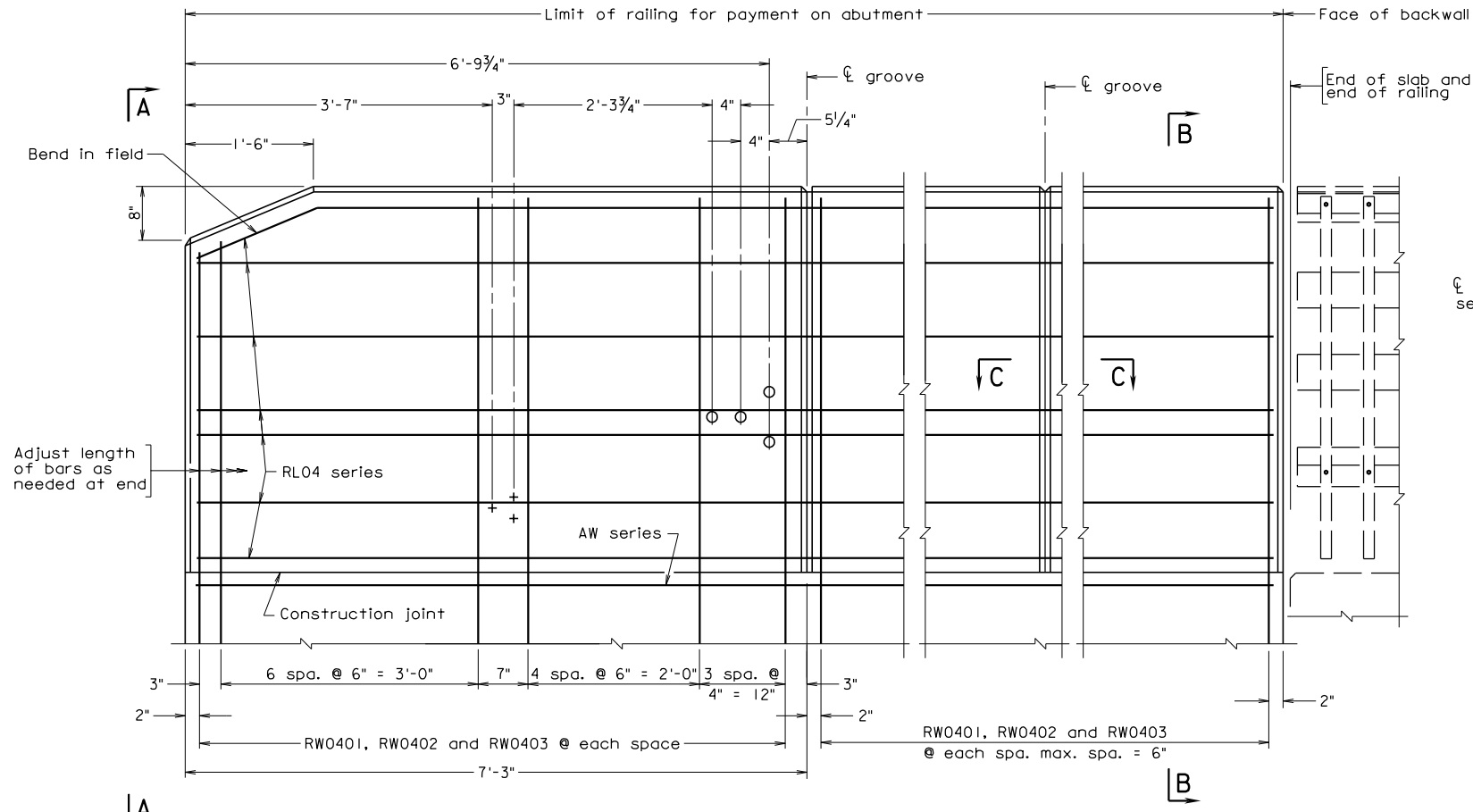
Add dimensions and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

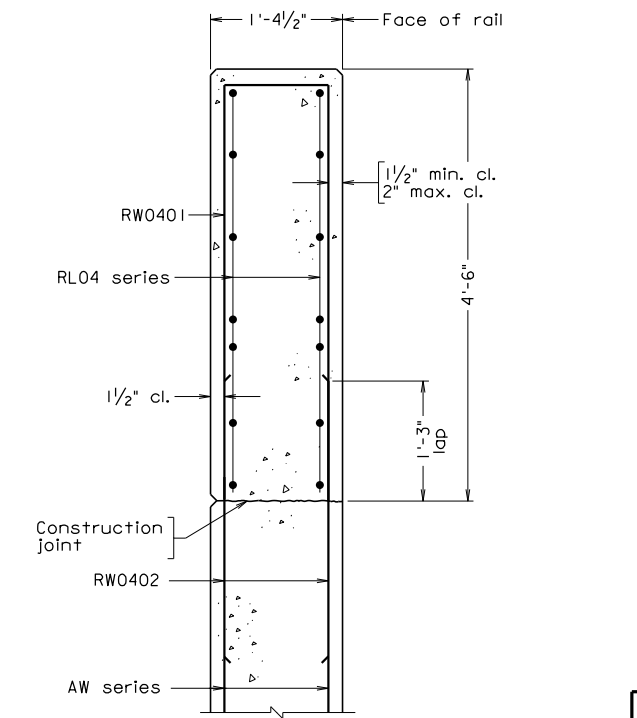
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
VA.			NO.



VIEW A-A



SECTION B-B

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4\".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.

For details and reinforcing steel schedule of steel railing, see sheet ---.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

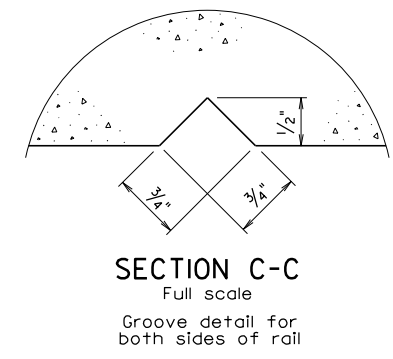
For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2\" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8\" diameter expansion anchor bolts, 6\" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

TERMINAL WALL ELEVATION U-BACK WING



SECTION C-C Full scale Groove detail for both sides of rail

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		9'-7"	3"	Terminal wall and U-back wing
RW0402	#4		2'-6"	---	Terminal wall and U-back wing
RL04	#4			---	Terminal wall and U-back wing

Dimensions in bending diagram are out-to-out of bars.

10-24-2013 BRMA-8

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		
			Checked: S&B.DIV		
Revisions					BRMA-8
					Sheet No.

54" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON ABUTMENT U-BACK WING

NOTES TO DESIGNER:

This concrete terminal wall has a height of 4'-6" from the roadway surface.

Include this standard when using standard BRMA-2 and when terminal wall is detailed on abutment U-back wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify 8" curb dimension and vertical dimension 4'-6" so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

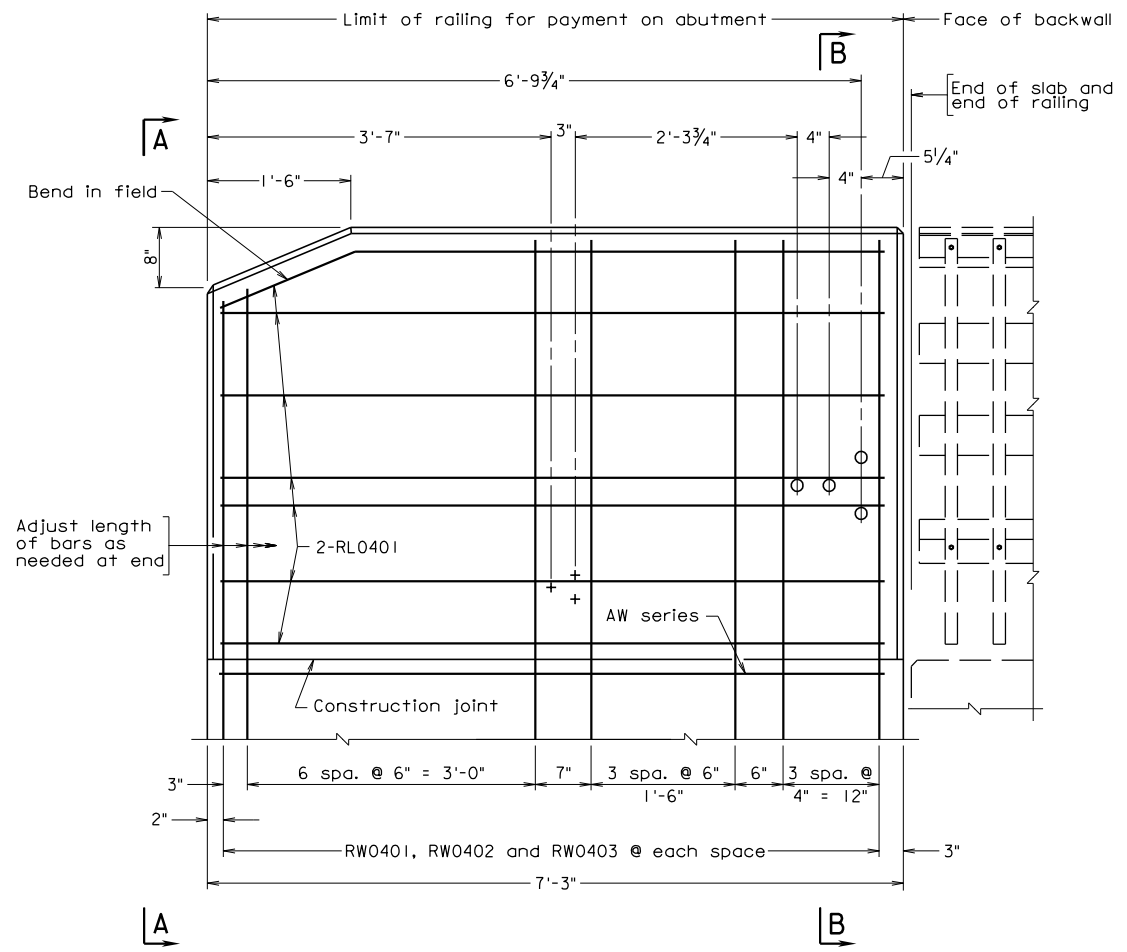
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

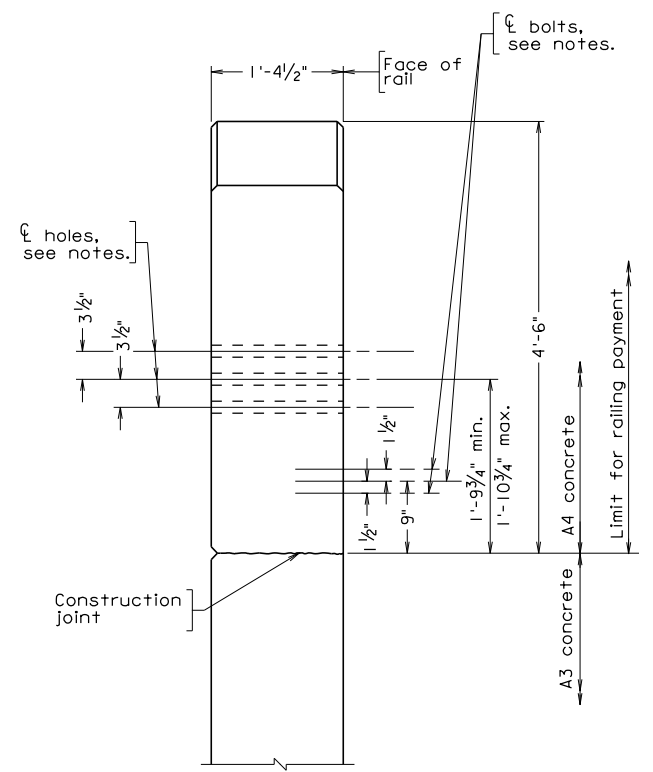
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Replace standard designation with plan number.

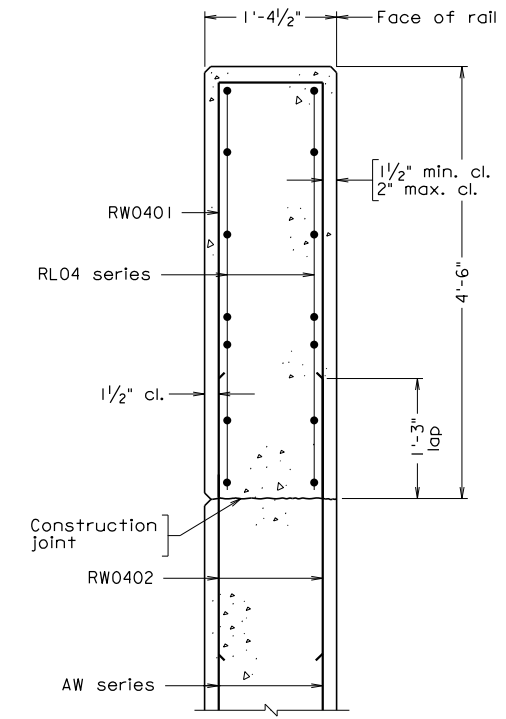
STATE	FEDERAL AID	STATE	SHEET NO.
VA.	PROJECT	PROJECT	



TERMINAL WALL - ELEVATION



VIEW A-A



SECTION B-B

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.

For details and reinforcing steel schedule of steel railing, see sheet ---.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

For details of wingwall below construction joint, see abutment details.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Length	Pin ϕ	Location
RW0401	#4		9'-7"	3"	Terminal wall
RW0402	#4		2'-6"	---	Terminal wall
RL0401	#4		6'-11"	---	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BRMA-9 10-24-2013 brma9.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
	Revisions		Drawn: ...S&B.DIV		Sheet No.
			Checked: S&B.DIV		BRMA-9

**54" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON ABUTMENT WING**

NOTES TO DESIGNER:

This concrete terminal wall has a height of 4'-6" from the roadway surface.

Include this standard when using standard BRMA-2 and when terminal wall is detailed on abutment wing.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

AW series bars are included in abutment reinforcement.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

VIEW A-A:

For projects with bituminous overlay, modify vertical dimension 9" and the range (1'-9³/₄" min – 1'-10³/₄" max) for locations of bolts, and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify 8" curb dimension and vertical dimension 4'-6" so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

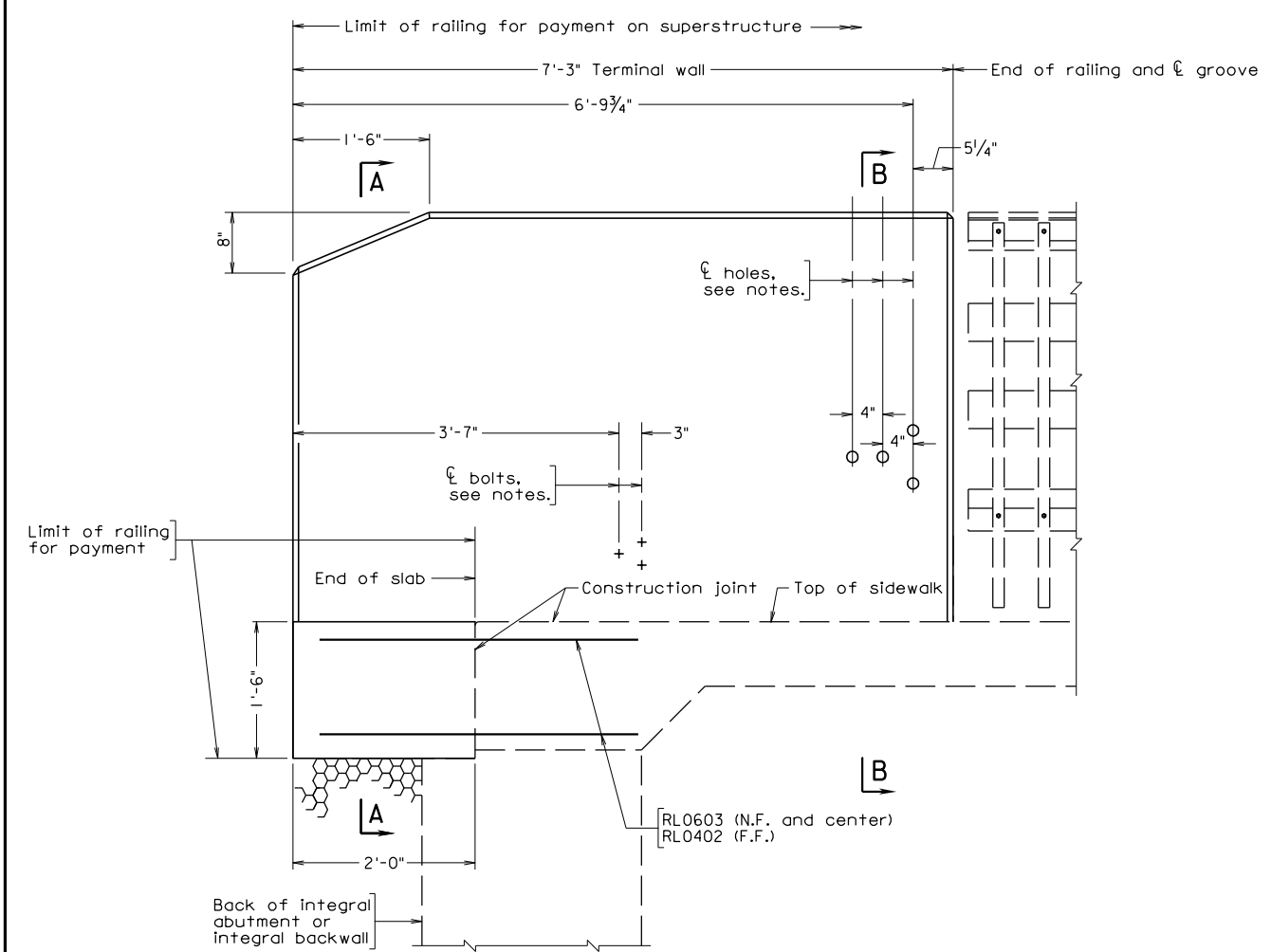
REINFORCING STEEL SCHEDULE:

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0401.

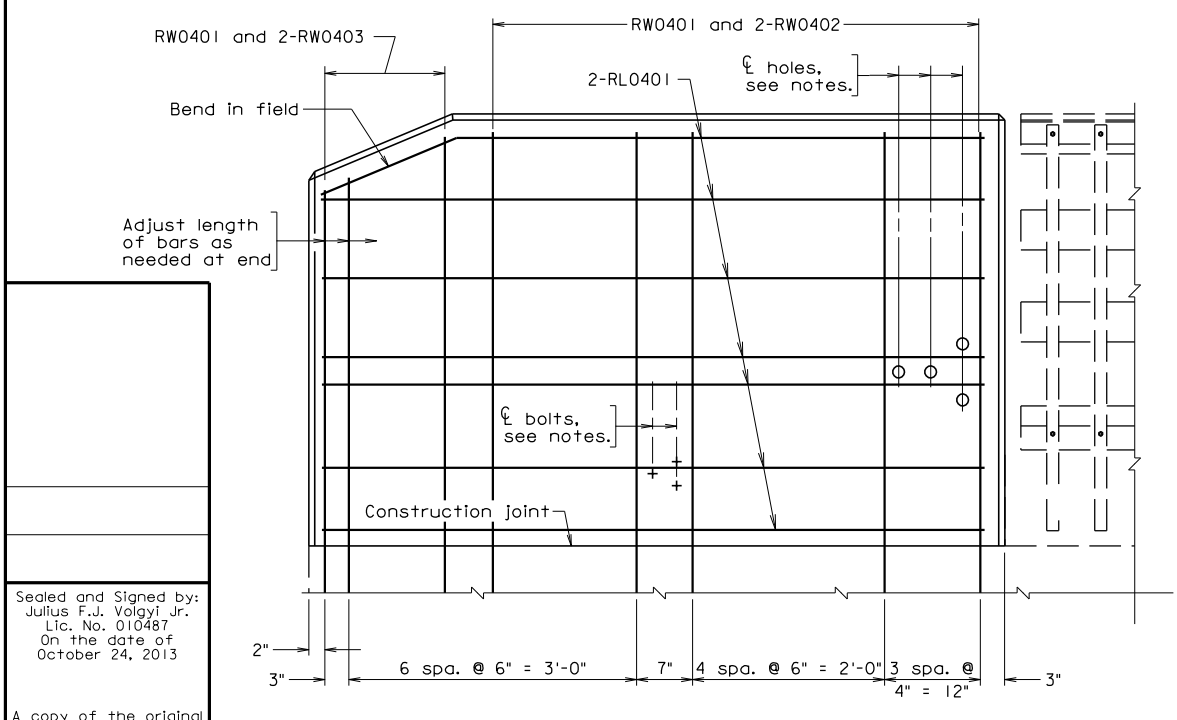
TITLE BLOCK:

Replace standard designation with plan number.

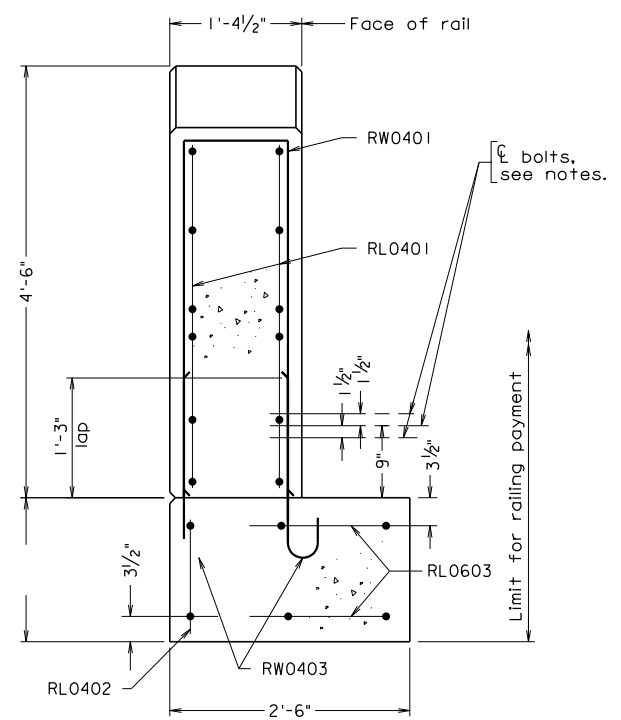
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



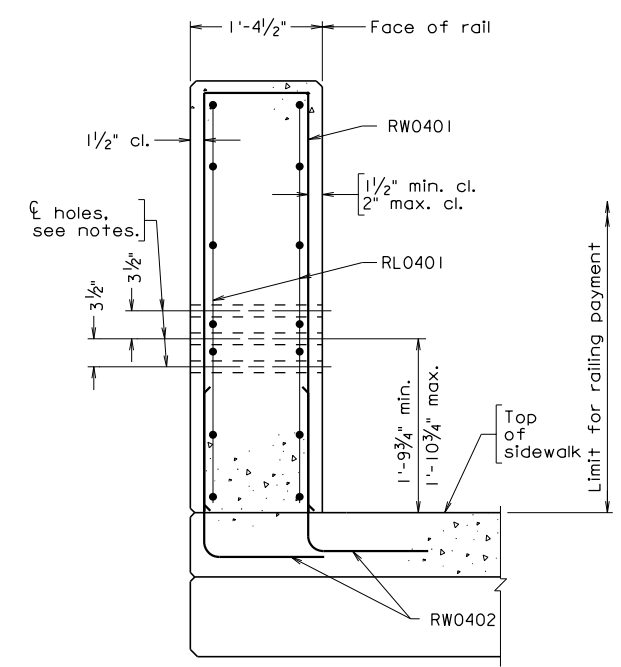
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT



TERMINAL WALL



SECTION A-A



SECTION B-B
Deck reinforcement not shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ____.

For details and reinforcing steel schedule of steel railing, see sheet ____.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ø	Length	Location
RL0401	#4	—	—	6'-11"	Terminal wall
RL0402	#4	—	—	4'-0"	Terminal wall end support
RL0603	#6	—	—	4'-0"	Terminal wall end support
RW0401	#4	3"	3"	9'-7"	Terminal wall
RW0402	#4	3"	3"	—	Terminal wall
RW0403	#4	3"	3"	—	Terminal wall

Dimensions in bending diagram are out-to-out of bars.

BRMA-10
10-24-2013
brma10.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
drawing is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		Sheet No.
			Checked: S&B.DIV		
Revisions			BRMA-10		

54" MASSACHUSETTS S3 RAILING

TERMINAL WALL ON SUPERSTRUCTURE WITH FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

NOTES TO DESIGNER:

This concrete terminal wall has a height of 4'-6" from the roadway surface.

Include this standard when using standard BRMA-2 and when terminal wall is detailed on superstructure with an integral abutment.

Terminal wall is detailed on the deck slab of a superstructure with full integral or semi-integral abutment. A 2'-6" wide section at the edge of superstructure is extended 2'-0" from the end of deck slab to support the end of the terminal wall. This concrete section and the terminal wall shall be part of the steel railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

For projects with bituminous overlay, modify vertical dimensions 9" and 4'-6" so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, 8" curb dimension and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

Complete sheet number for details and reinforcing steel schedule of steel railing.

54" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
FULL INTEGRAL OR SEMI-INTEGRAL ABUTMENT

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

REINFORCING STEEL SCHEDULE:

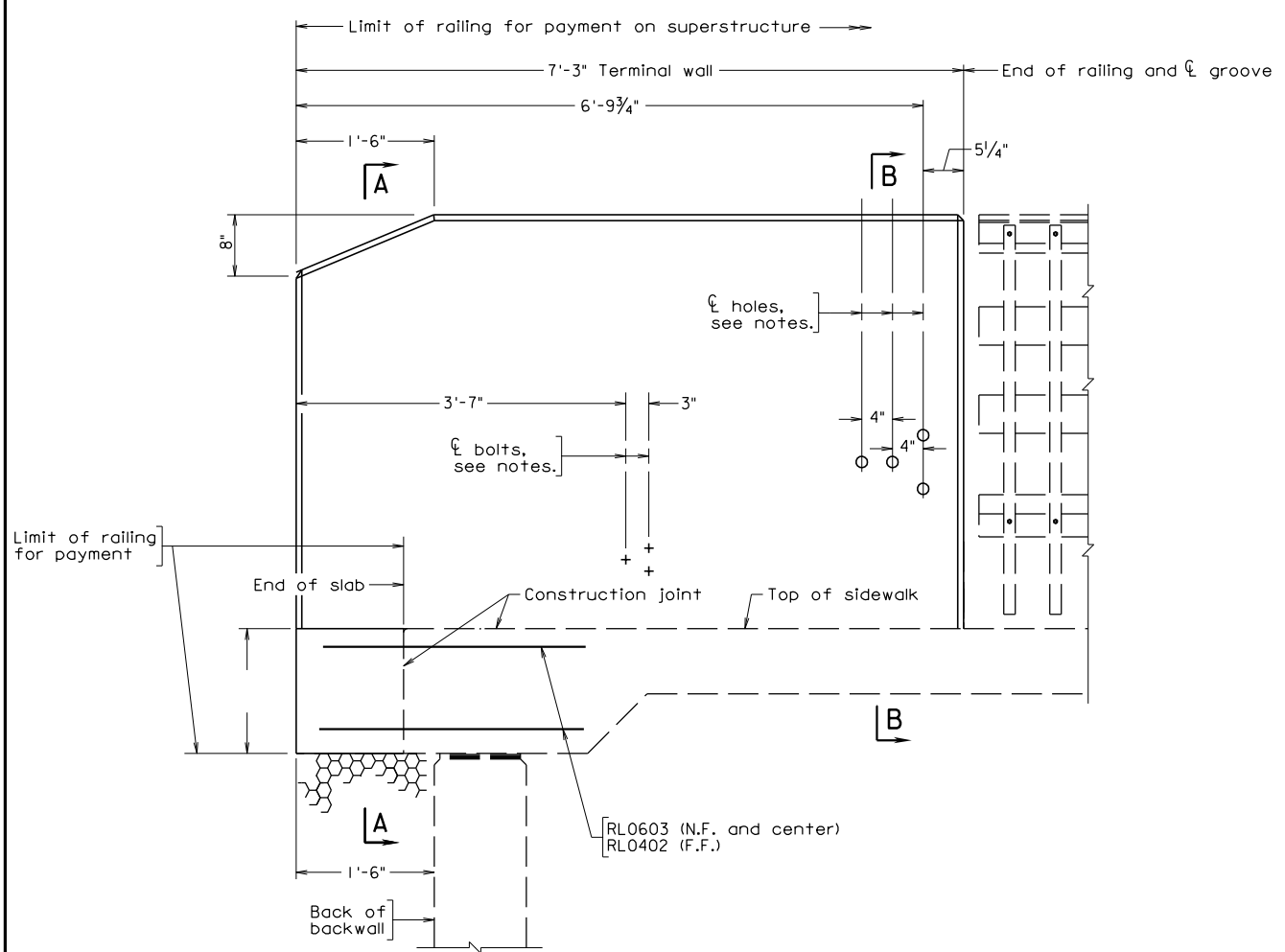
Add dimensions and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

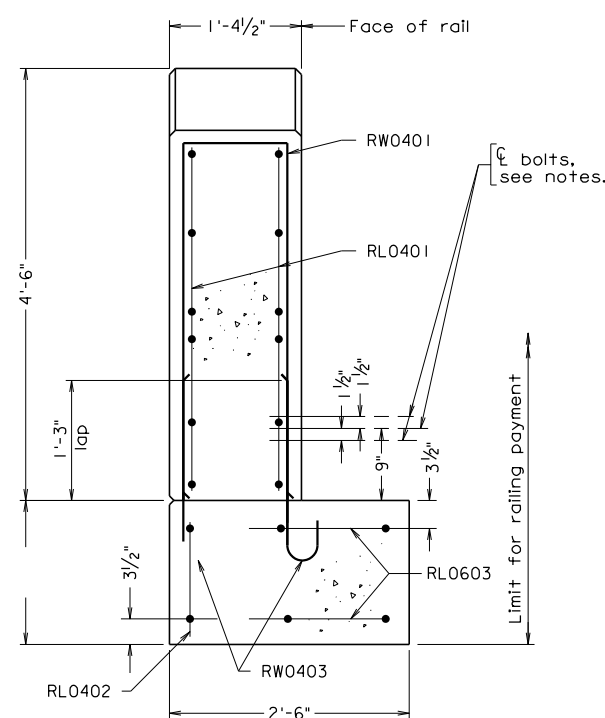
TITLE BLOCK:

Replace standard designation with plan number.

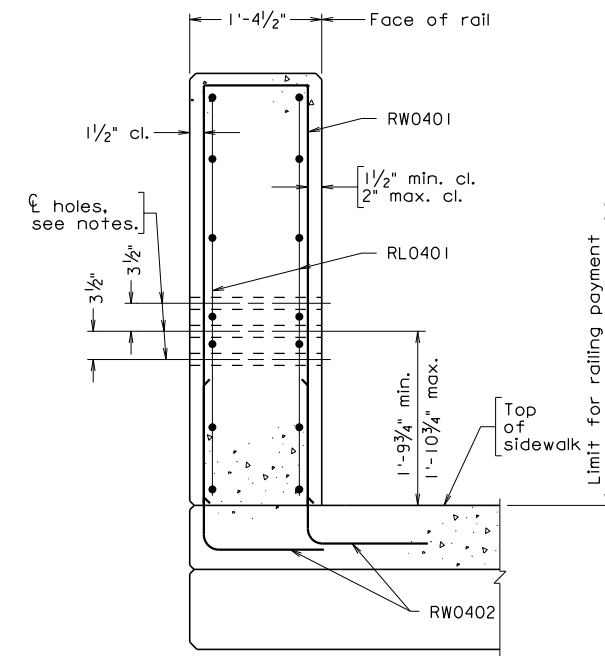
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



DECK SLAB EXTENSION ABUTMENT



SECTION A-A



SECTION B-B
Deck reinforcement not shown

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All concrete shall be Class A4.

All bevels for concrete shall be 3/4".

All reinforcing steel shall be Corrosion Resistant Reinforcing Steel, Class ---.

For details and reinforcing steel schedule of steel railing, see sheet ---.

Each terminal wall shall be cast as one piece.

Terminal walls are detailed to take guardrail attachment GR-FOA-1.

Holes, where shown, shall be formed with sleeves of 1/2" diameter nominal pipe.

Bolts for guardrail attachment, where shown, shall be 5/8" diameter expansion anchor bolts, 6" long and shall be drilled and installed when rub rail is attached.

Bid item for terminal wall shall include concrete noted in plans and reinforcing steel indicated in Reinforcing Steel Schedule.

REINFORCING STEEL SCHEDULE					
Mark	Size	No.	Pin ϕ	Length	Location
RL0401	#4	---	---	6'-11"	Terminal wall
RL0402	#4	---	---	4'-0"	Terminal wall end support
RL0603	#6	---	---	4'-0"	Terminal wall end support
RW0401	#4	3"	3"	9'-7"	Terminal wall
RW0402	#4	3"	3"	---	Terminal wall
RW0403	#4	3"	3"	---	Terminal wall

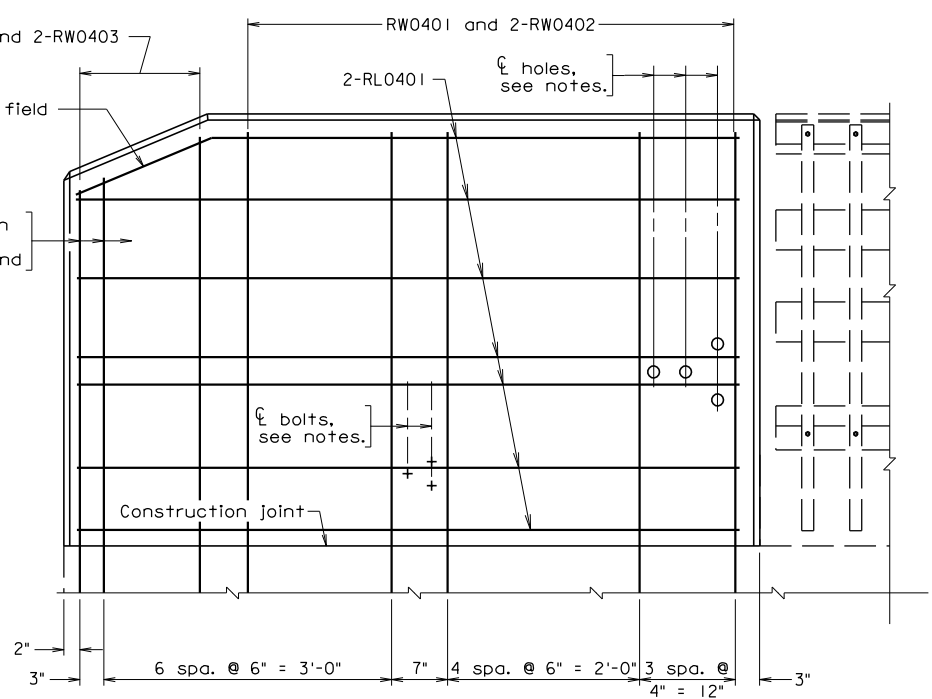
Dimensions in bending diagram are out-to-out of bars.

BRMA-11 10-24-2013

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER



TERMINAL WALL

Scale: 1" = 1'-0" unless otherwise noted.

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
54" MASSACHUSETTS S3 TERMINAL WALL					
No.	Description	Date	Designed: S&B.DIV	Date	Plan No.
			Drawn: ...S&B.DIV		Sheet No.
Revisions			Checked: S&B.DIV	BRMA-11	

54" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION

NOTES TO DESIGNER:

This concrete terminal wall has a height of 4'-6" from the roadway surface.

Include this standard when using standard BRMA-2 and when terminal wall is detailed on superstructure with deck slab extension.

Terminal wall is detailed on the deck slab extension of a superstructure or a slab span. A 2'-6" wide section at the edge of the superstructure is extended further from the end of the deck slab to an overall distance of 1'-6" from the end of the terminal wall to the back of the abutment backwall. This extended concrete section and the terminal wall shall be part of the railing for payment. The superstructure plan would need to be adjusted to reflect the slab extension at the corner of the end deck slab.

It is the Contractor's responsibility to determine the number of reinforcing bars required as well as any details or dimensions. Therefore, these items are to be left blank in the Reinforcing Steel Schedule.

Transverse bars and longitudinal bars of the deck slab or slab span are included in the Superstructure Reinforcing Steel Schedule.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

ELEVATION:

Provide dimension for terminal wall end support.

SECTION A-A:

For projects with bituminous overlay, modify vertical dimension 9" and 4'-6" so that these dimensions will be established from top of overlay surface.

SECTION B-B:

For projects with bituminous overlay, modify the range (1'-9 $\frac{3}{4}$ " min – 1'-10 $\frac{3}{4}$ " max) for locations of bolts, 8" curb dimension and 4'-6" height of terminal wall so that these dimensions will be established from top of overlay surface.

NOTES:

Complete corrosion resistant reinforcing steel note by adding Class I, II or III. For additional information on corrosion resistant reinforcing steel (CRR), see Structure and Bridge Division Instructional and Informational Memorandum (current IIM-S&B-81).

**54" MASSACHUSETTS S3 RAILING
TERMINAL WALL ON SUPERSTRUCTURE WITH
DECK SLAB EXTENSION**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD: (CON'T)

NOTES:

Complete sheet number for details and reinforcing steel schedule of steel railing.

REINFORCING STEEL SCHEDULE:

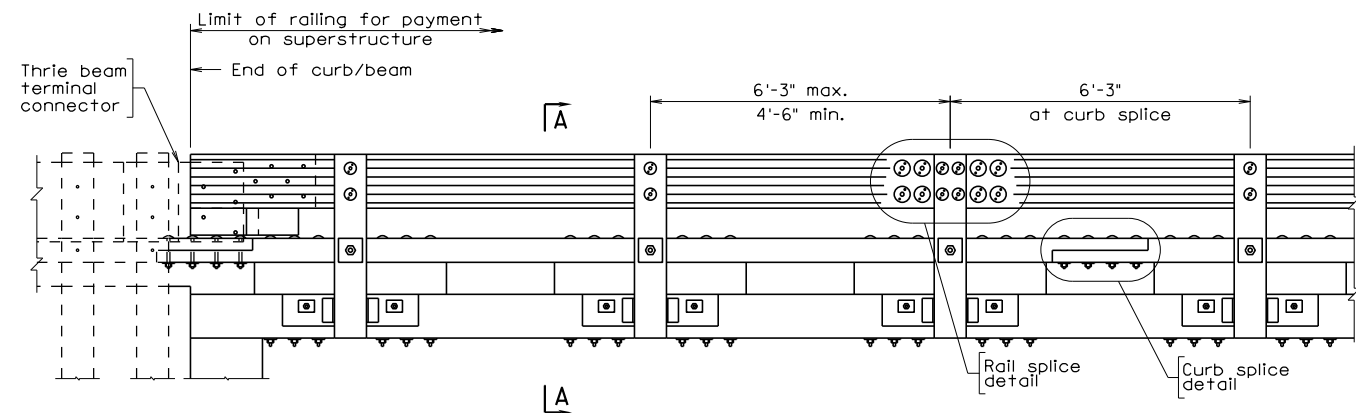
Add dimensions and length for rebar RW0402, and RW0403.

For projects with bituminous overlay bituminous, adjust dimensions and length of rebar RW0403.

TITLE BLOCK:

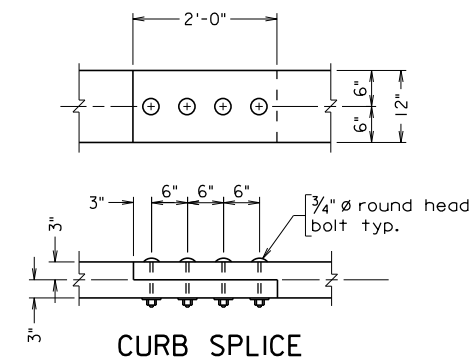
Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

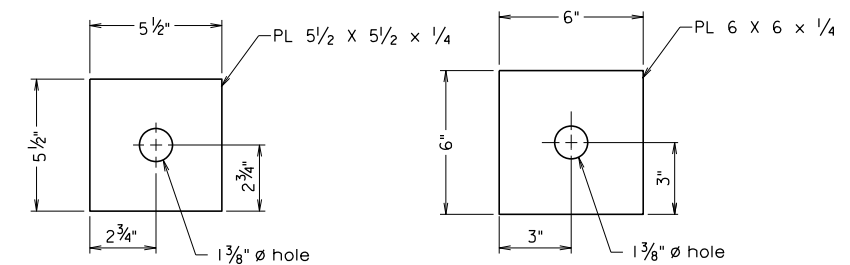


ABUTMENTS

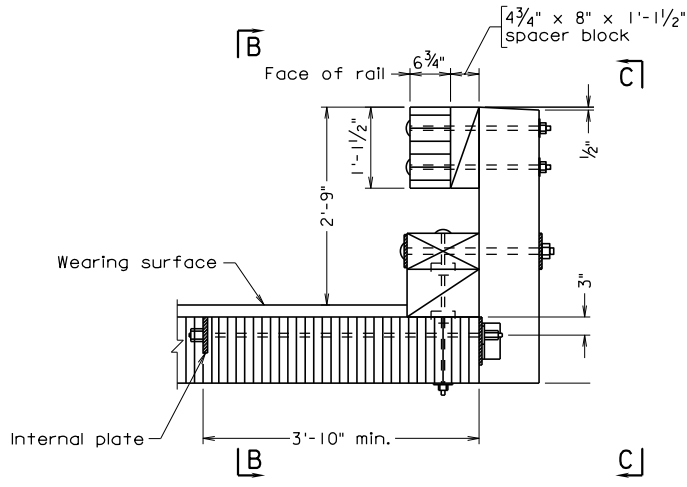
ELEVATION
Scale: 1/2" = 1'-0"



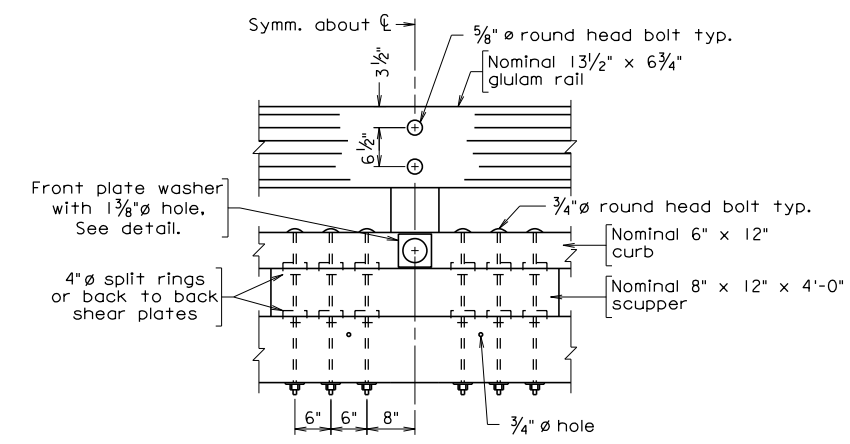
CURB SPLICE



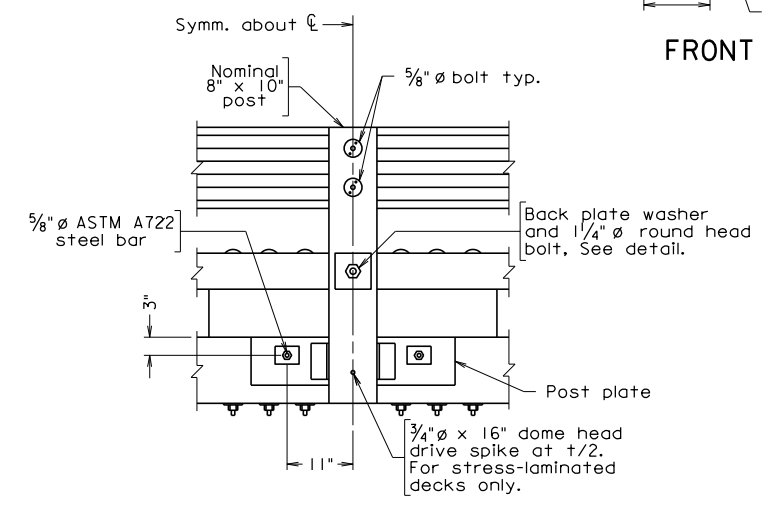
FRONT BACK
PLATE WASHERS
Scale: 3" = 1'-0"



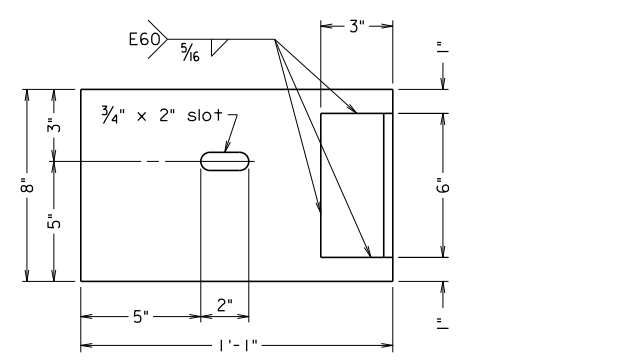
SECTION A-A



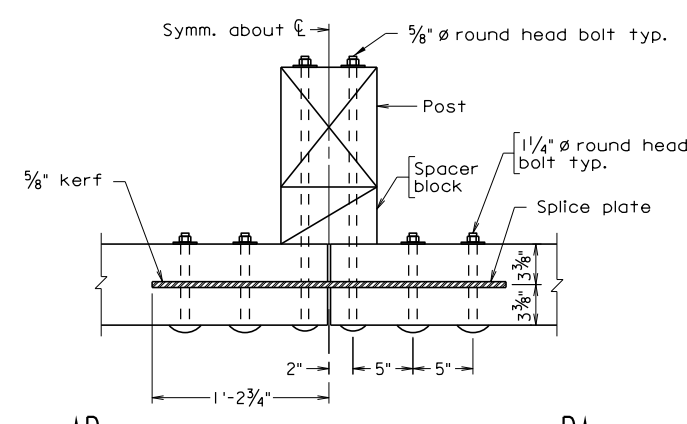
VIEW B-B



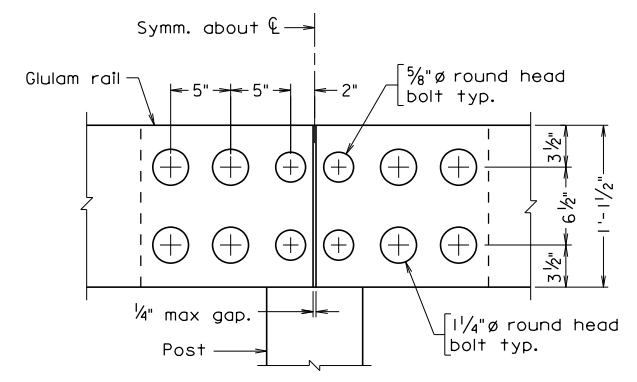
VIEW C-C



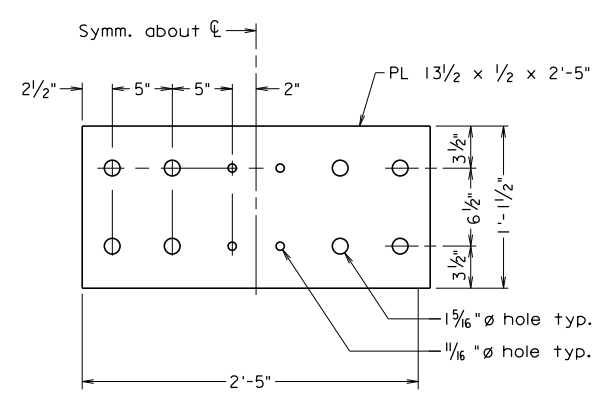
POST PLATE DETAIL
Scale: 3" = 1'-0"



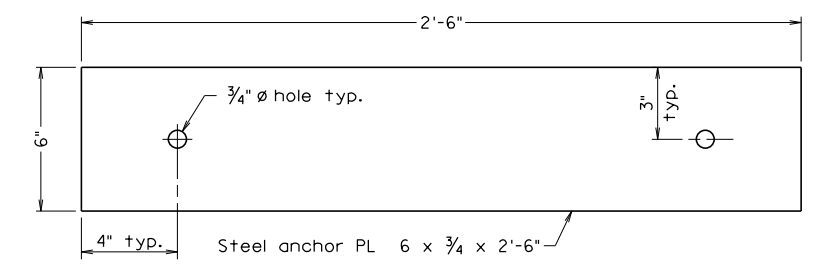
RAIL SPLICE
Scale: 1 1/2" = 1'-0"



VIEW D-D
Scale: 1 1/2" = 1'-0"



STEEL SPLICE PLATE
Scale: 1 1/2" = 1'-0"



INTERNAL PLATE DETAIL
Scale: 3" = 1'-0"

BRGC8-1
08-30-2013
brgc81.dgn

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
GC-8000 RAILING			
No.	Description	Date	Sheet No.
	Revisions		BRGC8-1

GC-8000 TIMBER RAILING

NOTES TO DESIGNER:

This GC-8000 timber railing is detailed for mounting on the outside of a structure with a longitudinally spanning glulam timber deck. The wood railing has a height of 2'-9" above the riding surface and has been crash tested for TL-4 (TL = test level). The railing does meet the rail opening requirements in the AASHTO *LRFD Bridge Design Specifications*. The standard may be used when an open railing is required.

The Railing Transition details and General Notes (BRGC8-2) and Thrie Beam Transition details (BRGC8-3) must be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction, the vertical dimensions of the post length and glulam rail height need to be adjusted. The dimensions shown are established from top of the roadway surface. Modifications to post and glulam rail height must take into the account final dimensioning of Curb Transition Block. Base height of Curb Transition Block is 7½". The dimensions of the curb and scupper blocks should not be change.

It is the Contractor's responsibility to determine any other details or dimensions required for installation.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical post length dimension 2'-9" plus wearing surface thickness plus deck thickness if an initial overlay is used on bridge.

NOTES:

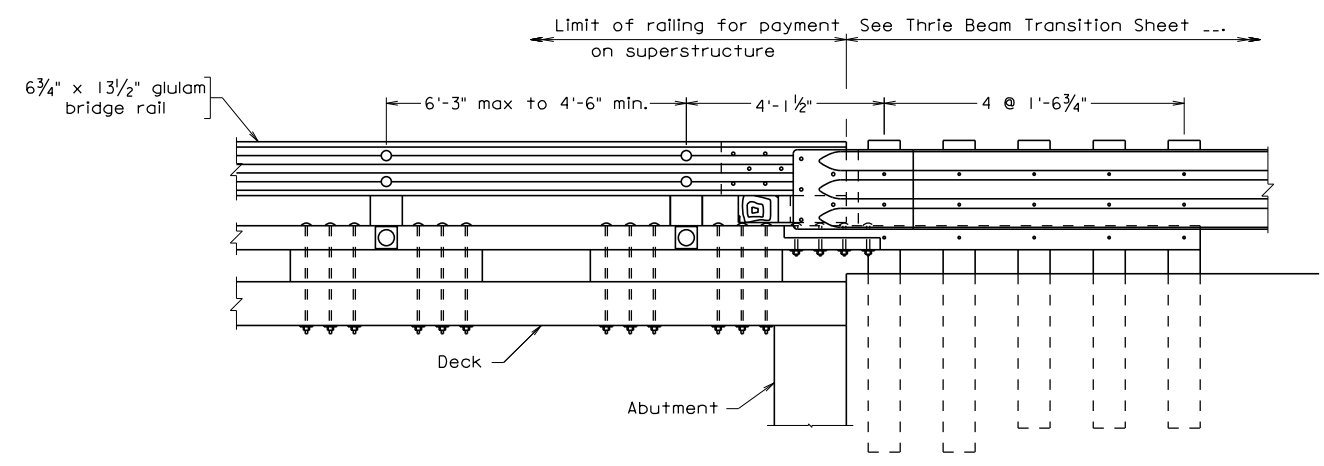
Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal transition.

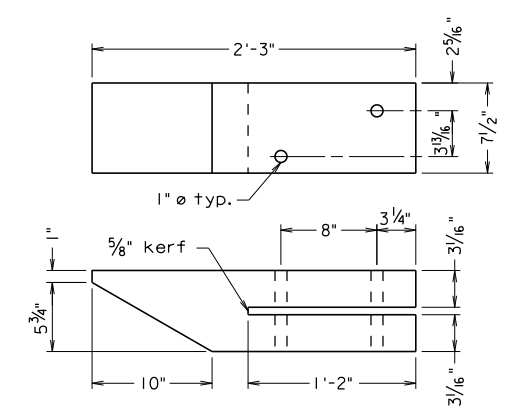
TITLE BLOCK:

Replace standard designation with plan number.

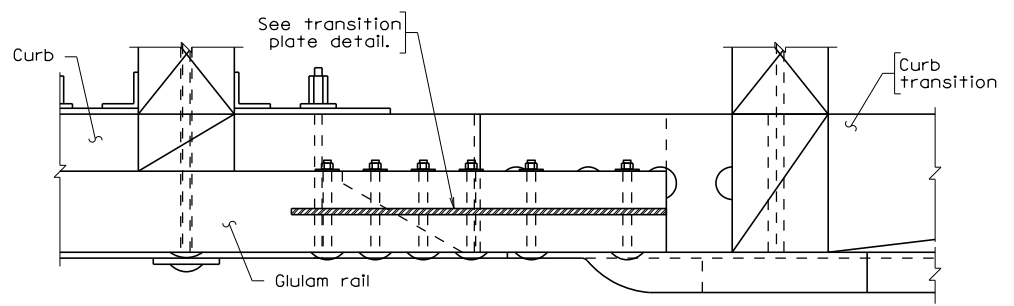
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



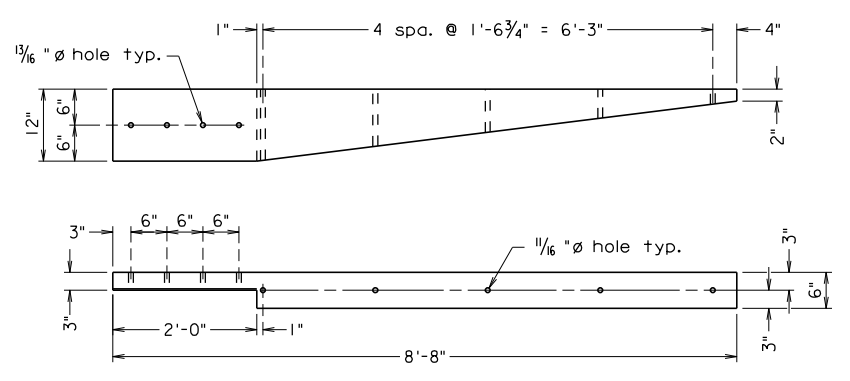
TRANSITION ELEVATION
Scale: 1/2" = 1'-0"



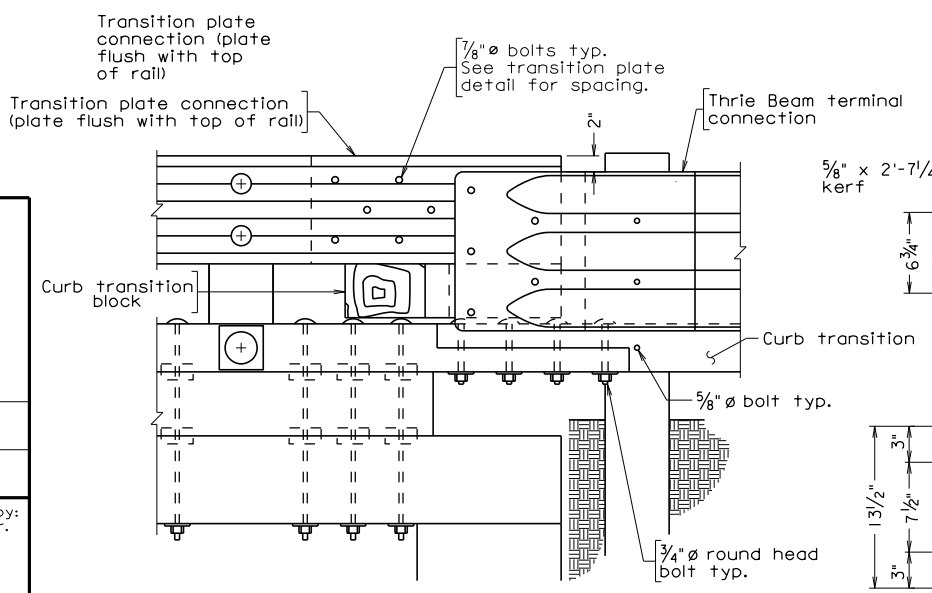
CURB TRANSITION BLOCK DETAIL



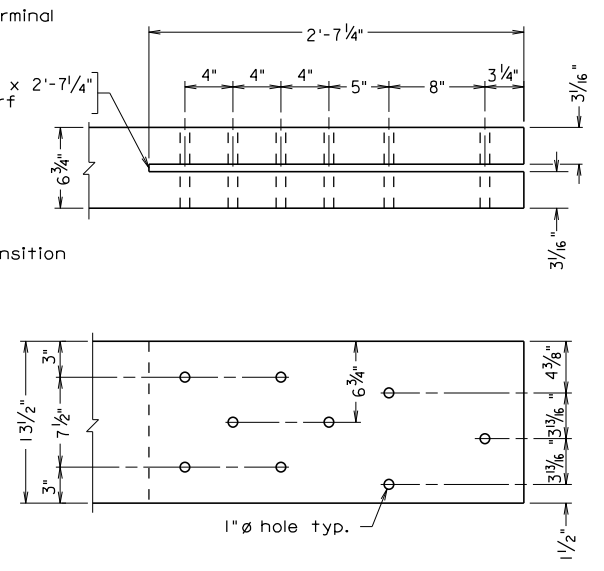
PLAN VIEW OF TRANSITION JOINT



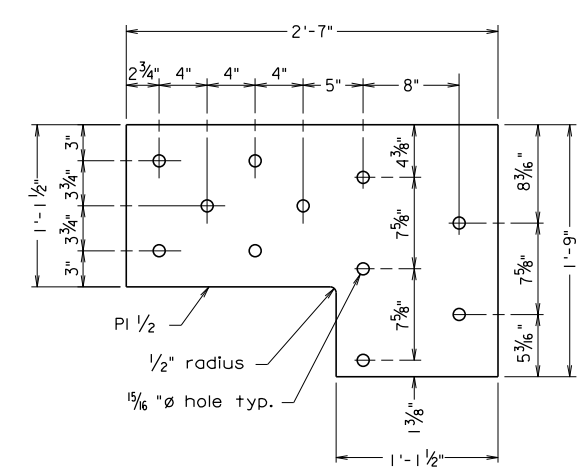
CURB TRANSITION DETAIL
Scale: 3/4" = 1'-0"



ELEVATION OF TRANSITION JOINT
Scale: 1" = 1'-0"



RAIL END DETAIL



TRANSITION PLATE DETAIL

Notes:

Plan dimensions shown are measured in the respective horizontal and vertical planes.

The Contractor shall determine all dimensions and details necessary for installation.

All timber shall conform to the requirements of AASHTO M168, Dense Select Structural Southern Pine, and preservative treated in accordance with the Specifications.

The glulam rail shall be fabricated with West Coast Douglas Fir and treated with pentachlorophenol in heavy oil to a minimum net retention of 0.6 pcf as specified in AWP Standard C14.

All structural steel shall be ASTM A709 Grade 50 and shall be hot dipped galvanized.

Round head bolts shall be ASTM A449. All other bolts shall be ASTM A325. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436. All steel shall be hot dip galvanized.

All holes for bolts shall be 1/8" larger in diameter than bolt diameter unless otherwise noted on plans.

All high-strength bars shall be ASTM A722 and shall be galvanized.

Curb splices should be located adjacent to rail splices.

Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.

Bid item for railing shall include rails, rail posts, barrier delineators, anchor assemblies, sleeves, and other associated metal parts as shown on the plans.

BRGC8-2
10-24-2013
brgc82.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
GC-8000 RAILING					
RAILING TRANSITION DETAILS					
No.	Description	Date	Designed: S&B DIV	Date	Plan No.
			Drawn: S&B DIV		BRGC8-2
			Checked: S&B DIV		
Revisions					

GC-8000 TIMBER RAILING

TRANSITION DETAILS

NOTES TO DESIGNER:

Include standards BRGC8-1 and BRGC8-3 in the plans when using this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

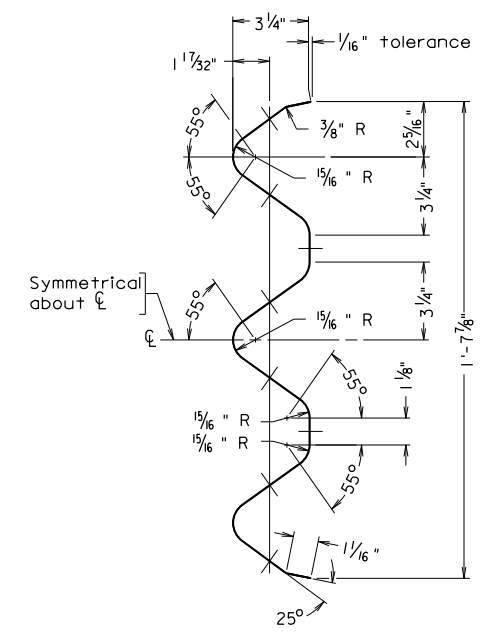
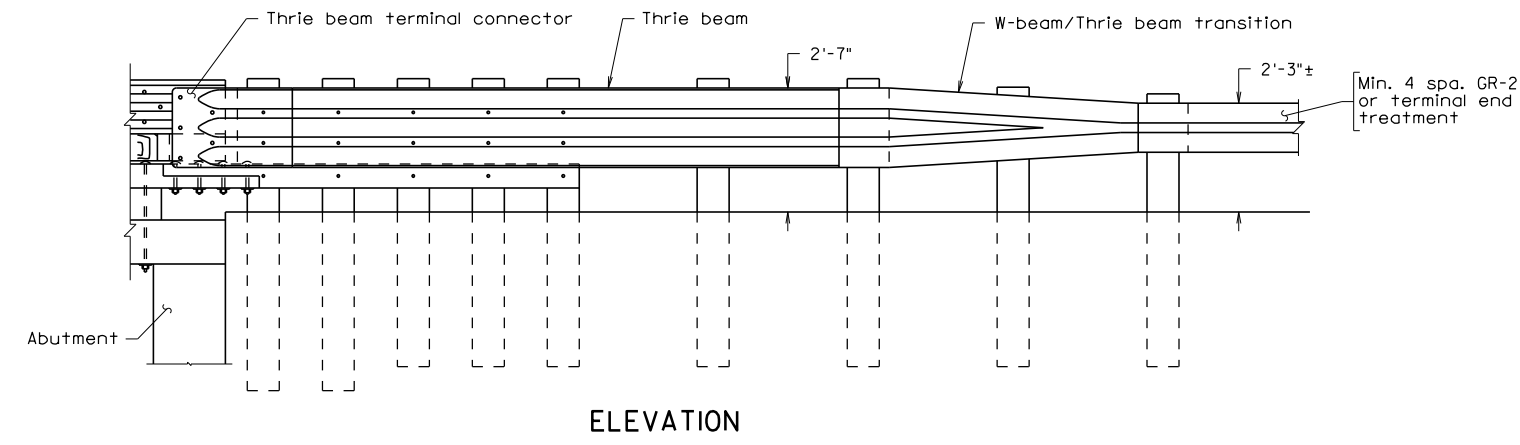
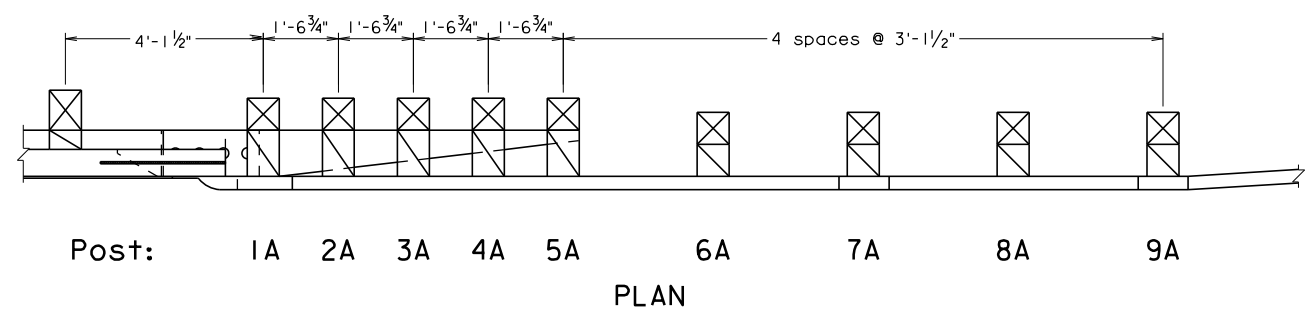
TRANSITION ELEVATION:

Complete sheet number for three beam transition sheet.

TITLE BLOCK:

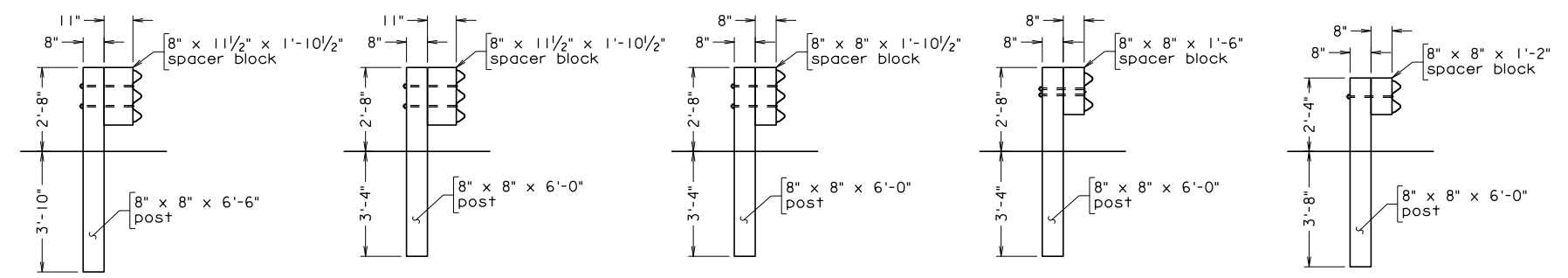
Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

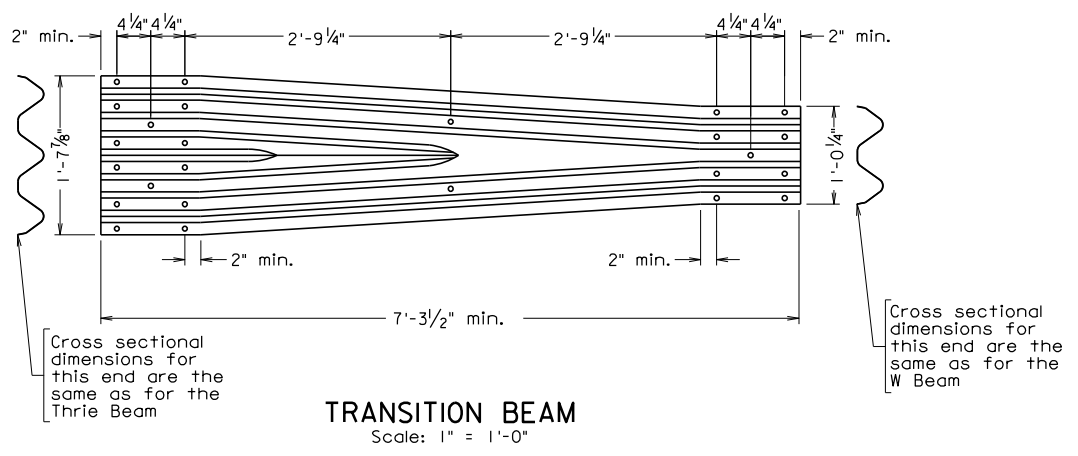


SECTION THRU RAIL AT SPLICE
Scale: 3" = 1'-0"

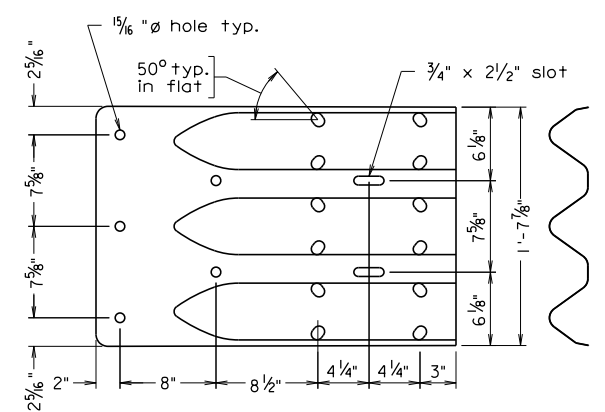
Notes:
Guardrail components shall be in accordance with VDOT Road and Bridge Standards.
Posts 1A, 2A, 3A, 4A, and 5A require an additional hole to attach lower curb transition. Guardrail bolts 5/8" diameter and recessed nuts to be used for attachments, length as required.
The Lower Curb Transition located on posts 1A through 5A shall be secured with 5/8" carriage bolts, length as required.
Thrie Beam Terminal Connector shall be 10 gage steel. Thrie Beam and Transition Beam shall be 12 gage steel.
Refer to VDOT Road and Bridge Standards, Section 500, for all details not shown. When railing cannot be terminated as per the VDOT Road and Bridge Standards, contact the Location and Design Special Design Section to obtain recommendations.



Post: 1A, 2A 3A-5A 6A, 7A 8A 9A
TRANSITION POST
Scale: 3/8" = 1'-0"



TRANSITION BEAM
Scale: 1" = 1'-0"



TERMINAL CONNECTOR
Scale: 1/2" = 1'-0"

Scale: 1/2" = 1'-0" unless otherwise noted. © 2013, Commonwealth of Virginia

BRGC8-3 08-30-2013 brgc83.dgn

Sealed and Signed by:
Julius F.J. Volcyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
GC-8000 RAILING			
THRIE BEAM TRANSITION DETAILS			
No.	Description	Date	Sheet No.
	Revisions		BRGC8-3

**GC-8000 TIMBER RAILING
THRIE BEAM TRANSITION DETAILS**

NOTES TO DESIGNER:

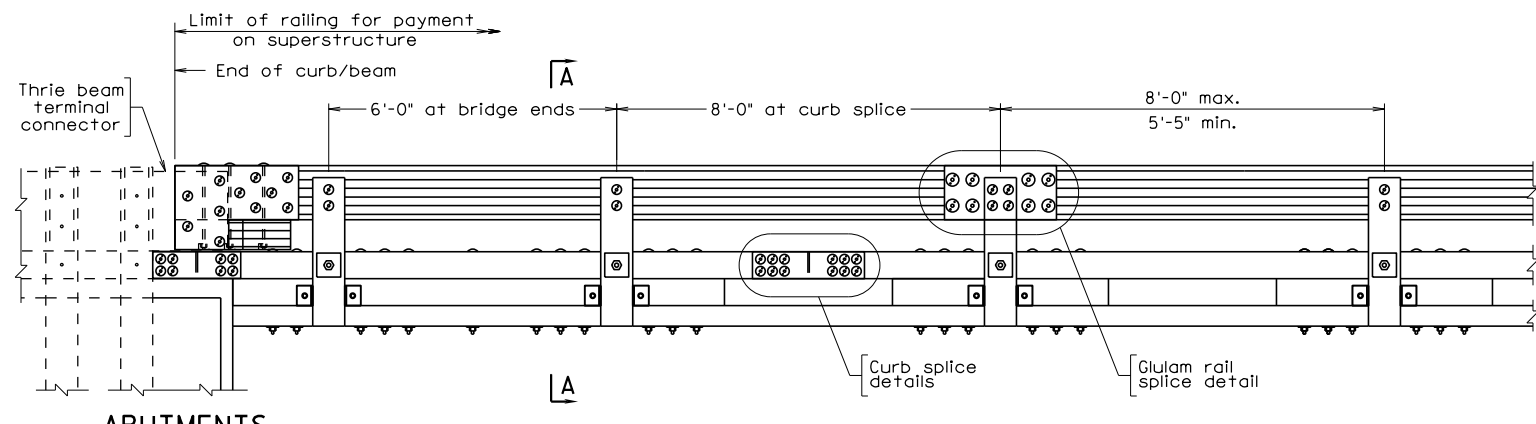
Include standards BRGC8-1 and BRGC8-2 in the plans when using this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

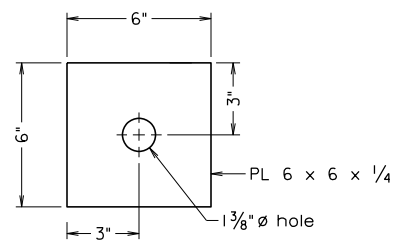
TITLE BLOCK:

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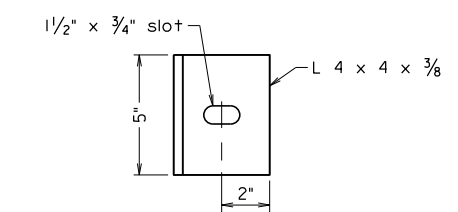
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			



ELEVATION
Scale: 1/2" = 1'-0"

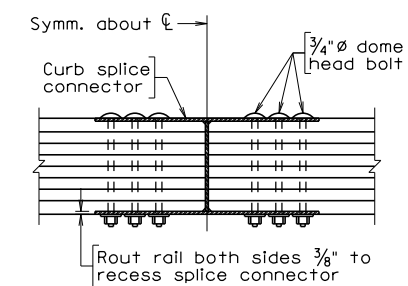


**FRONT AND BACK
PLATE WASHERS**
Scale: 3" = 1'-0"

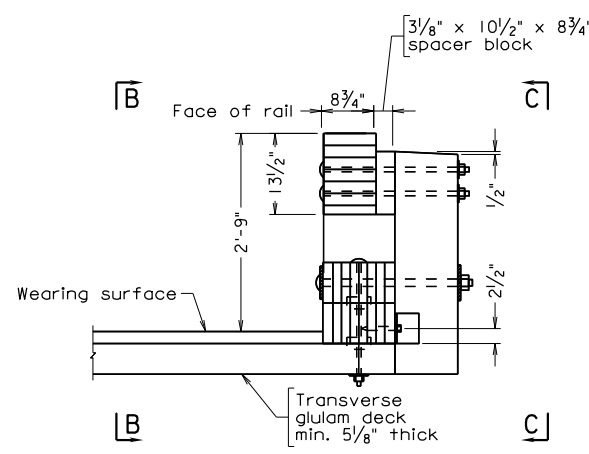


ANGLE DETAIL
Scale: 3" = 1'-0"

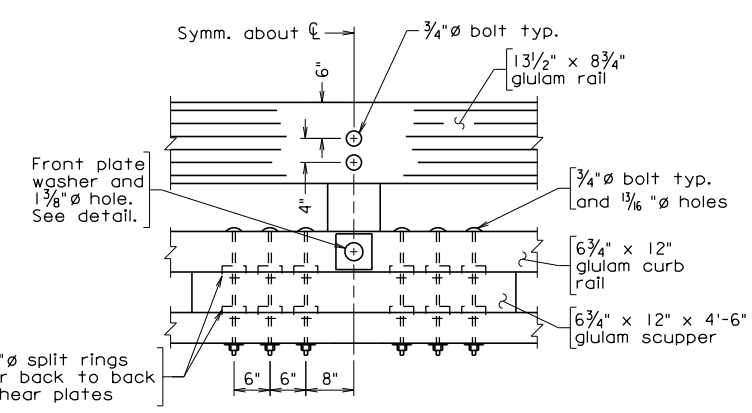
Notes:
For notes, rail connections and miscellaneous details, see sheet ...
For details of terminal transition, see sheet ...



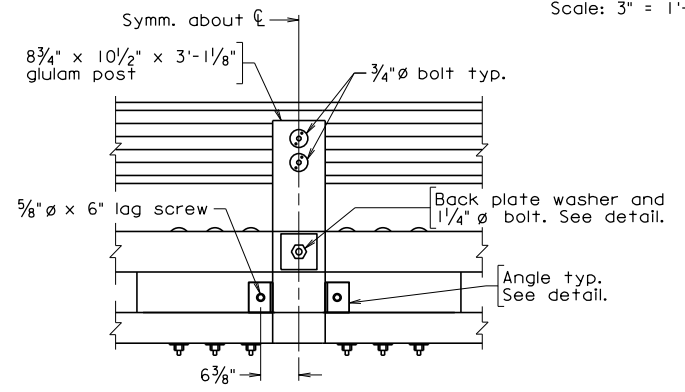
CURB SPLICE PLAN VIEW
Scale: 1" = 1'-0"



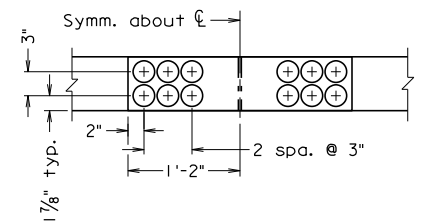
SECTION A-A



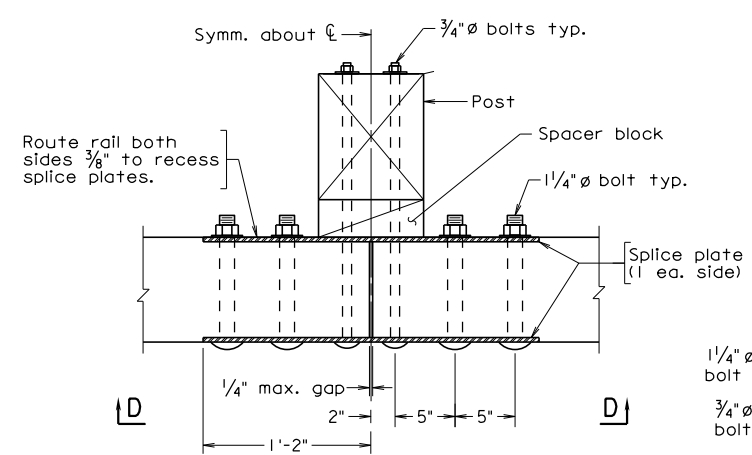
VIEW B-B



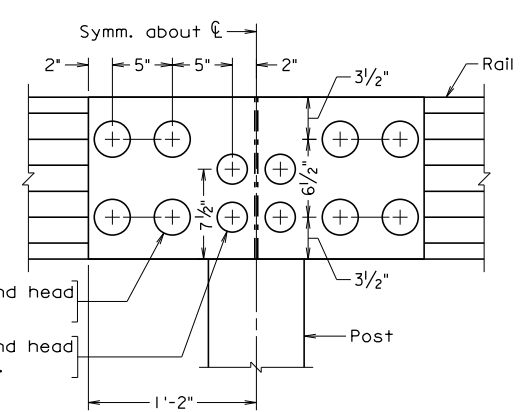
VIEW C-C



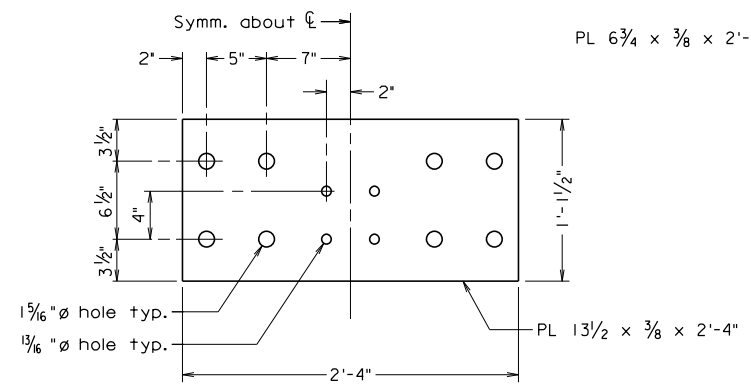
CURB SPLICE FRONT VIEW
Scale: 1" = 1'-0"



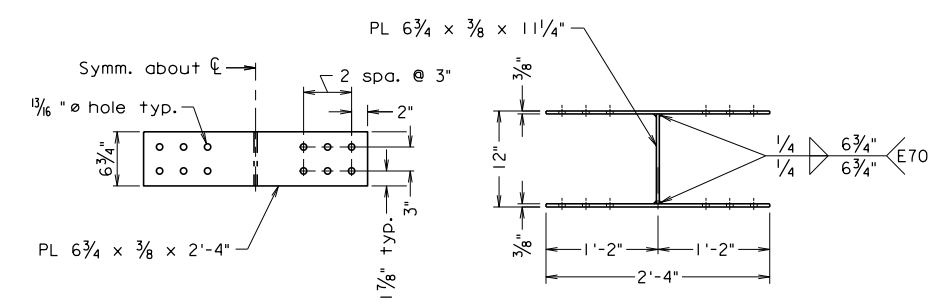
GLULAM RAIL SPLICE
Scale: 1/2" = 1'-0"



VIEW D-D
Scale: 1/2" = 1'-0"



STEEL SPLICE PLATE
Scale: 1/2" = 1'-0"



CURB SPLICE DETAILS
Scale: 1" = 1'-0"

BRSBD-1.dgn
08/30/2013
BRSBD-1

Sealed and Signed by:
Julius F.J. Volzyl Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		
			STRUCTURE AND BRIDGE DIVISION		
			SBD01d RAILING		
No.	Description	Date	Designed: S&B, R.V.	Date	Plan No.
			Drawn: S&B, R.V.		BRSBD-1
			Checked: S&B, R.V.		Sheet No.
Revisions					

SBD01d TIMBER RAILING

NOTES TO DESIGNER:

This SBD01d timber railing is detailed for mounting on the outside of a structure with a transverse glulam timber deck. The wood railing has a height of 2'-9" above the riding surface and has been crash tested for TL-4 (TL = test level). The railing does meet the rail opening requirements in the AASHTO *LRFD Bridge Design Specifications*. The standard may be used when an open railing is required.

The Railing Transition details and General Notes (BRSBD-2) and Thrie Beam Transition details (BRSBD-3) must be included in the plans when using this standard.

If an initial bituminous overlay is used on the bridge at the time of construction the vertical dimensions of the post length and glulam rail height need to be adjusted. The dimensions shown are established from top of the roadway surface. Modifications to post and glulam rail height must be taken into account for final dimensioning of Curb Transition Block. Base height of Curb Transition Block is 7½". The dimensions of the curb and scupper blocks should not be changed.

It is the Contractor's responsibility to determine any other details or dimensions required for installation.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

SECTION A-A:

Modify vertical post length dimension 2'-9" plus wearing surface thickness plus deck thickness if an initial overlay is used on bridge.

NOTES:

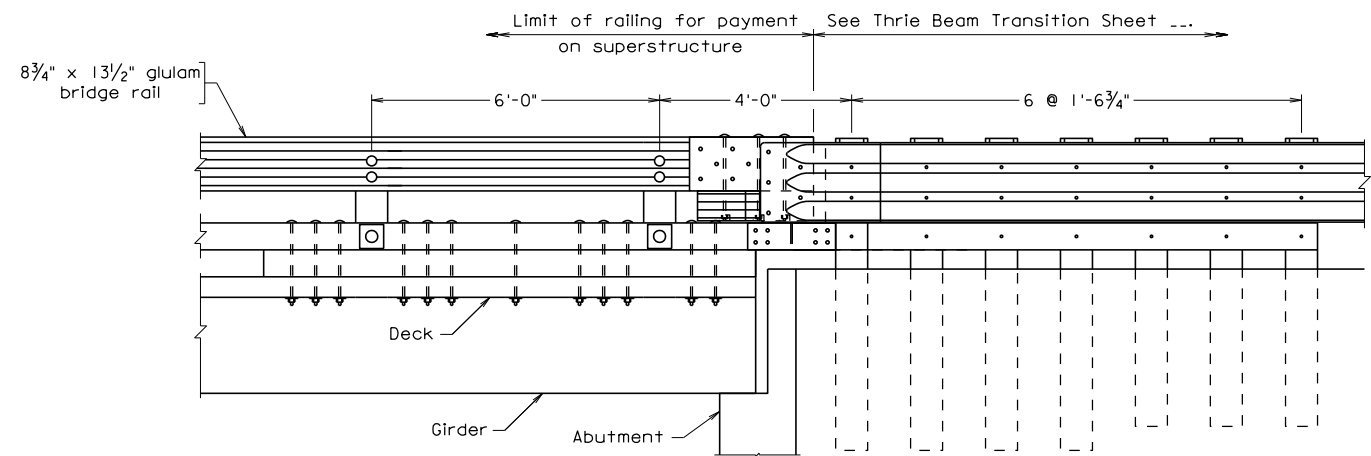
Complete sheet number for rail connections and miscellaneous details.

Complete sheet number for terminal transition.

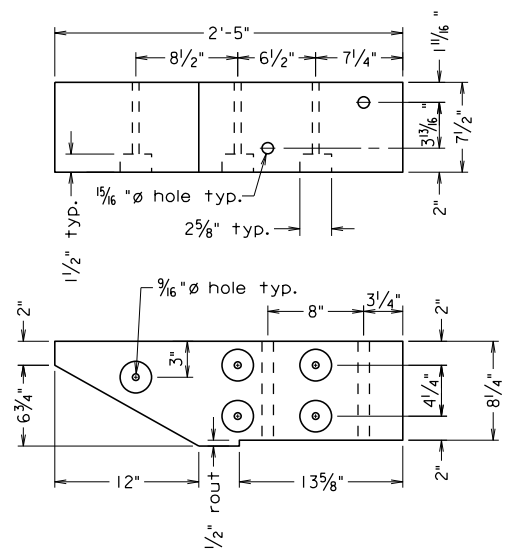
TITLE BLOCK:

Replace standard designation with plan number.

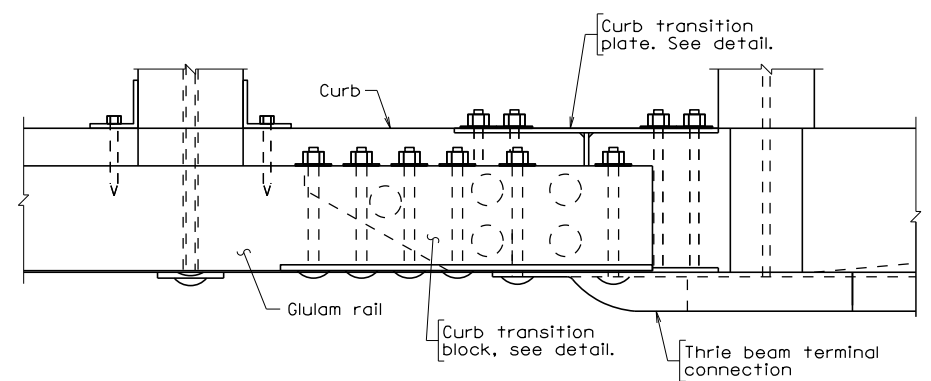
STATE	FEDERAL AID	STATE	SHEET
VA.	PROJECT	ROUTE	NO.



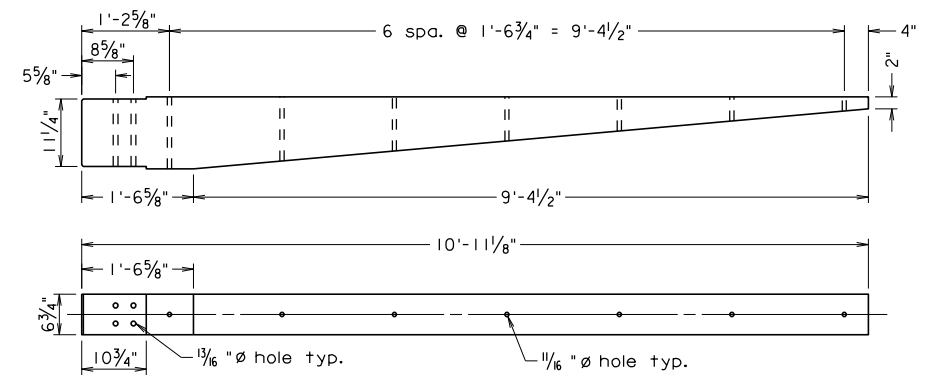
TRANSITION ELEVATION
Scale: 1/2" = 1'-0"



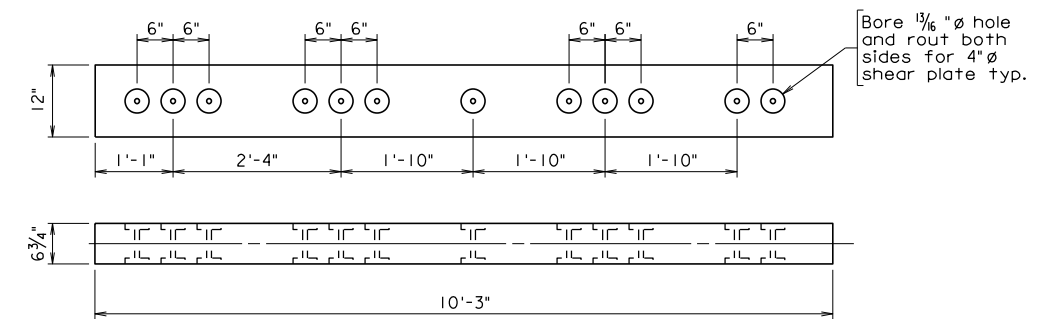
CURB TRANSITION BLOCK DETAIL



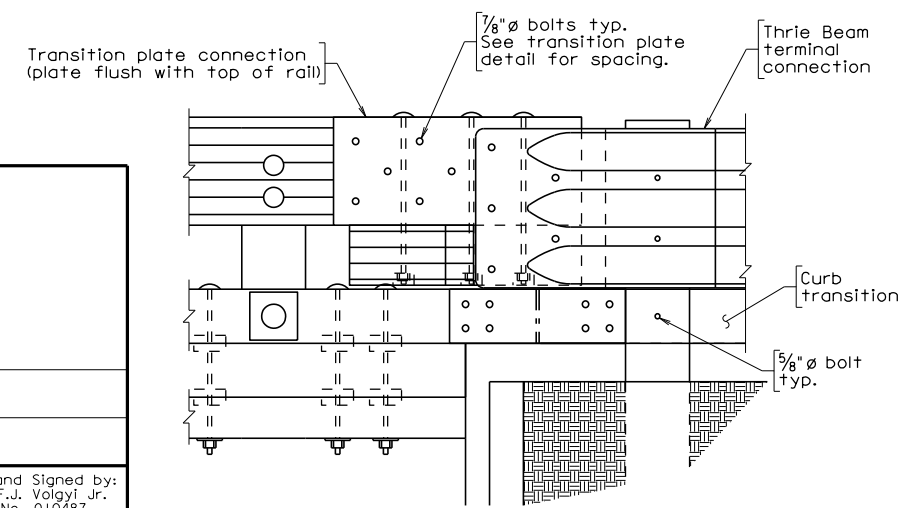
PLAN VIEW OF TRANSITION JOINT



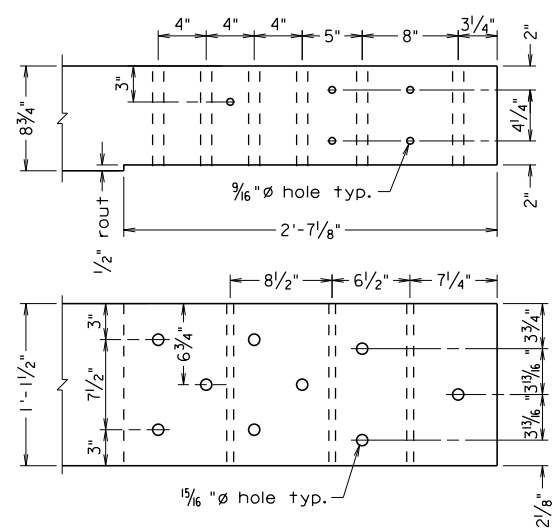
CURB TRANSITION DETAIL
Scale: 3/4" = 1'-0"



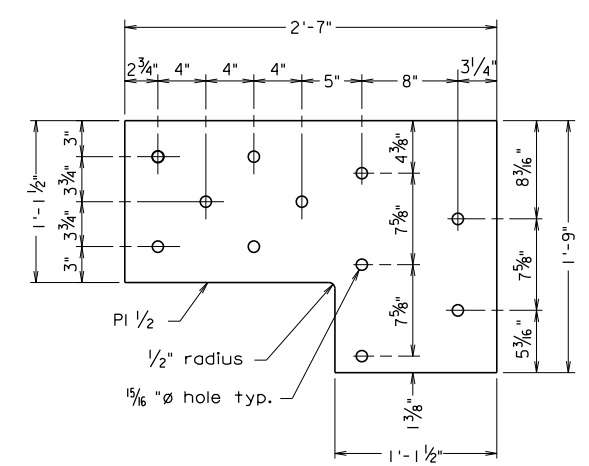
TRANSITION SCUPPER BLOCK
Scale: 3/4" = 1'-0"



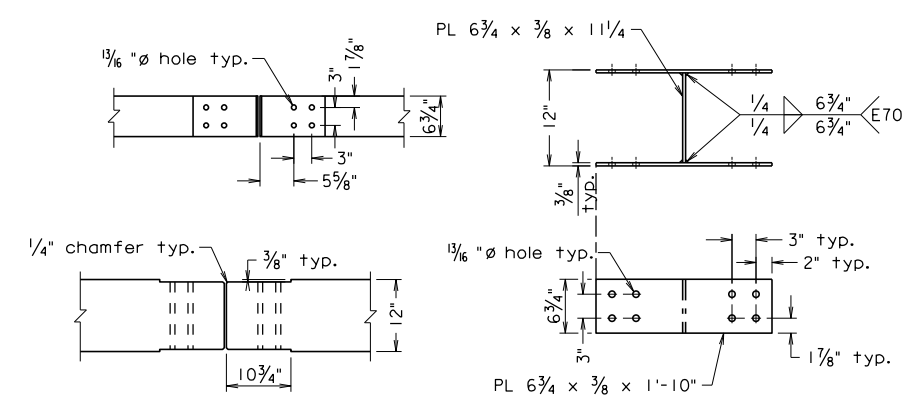
ELEVATION OF TRANSITION JOINT
Scale: 1" = 1'-0"



RAIL END DETAIL



TRANSITION PLATE DETAIL



CURB TRANSITION BORING DETAIL
Scale: 3/4" = 1'-0"

CURB TRANSITION SPLICE DETAILS
Scale: 1" = 1'-0"

Notes:

- Plan dimensions shown are measured in the respective horizontal and vertical planes.
- The Contractor shall determine all dimensions and details necessary for installation.
- All timber shall conform to the requirements of AASHTO M168, Dense Select Structural Southern Pine, and preservative treated in accordance with the Specifications.
- The glulam rail shall be fabricated with West Coast Douglas Fir and treated with pentachlorophenol in heavy oil to a minimum net retention of 0.6 pcf as specified in AWP Standard C14.
- All structural steel shall be ASTM A709 Grade 50 and shall be hot dipped galvanized.
- Round head bolts shall be ASTM A449. All other bolts shall be ASTM A325. Nuts shall be ASTM A563 Grade DH or ASTM A194 Grade 2H. Washers shall be ASTM F436. All steel shall be hot dip galvanized.
- All holes for bolts shall be 1/8" larger in diameter than bolt diameter unless otherwise noted on plans.
- All high-strength bars shall be ASTM A722 and shall be galvanized.
- Curb splices should be located adjacent to rail splices.
- Barrier delineator size, color, and spacing shall be in accordance with the Specifications. Reflective surface of barrier delineator, in all instances, shall face oncoming traffic.
- Bid item for railing shall include rails, rail posts, barrier delineators, anchor assemblies, sleeves, and other associated metal parts as shown on the plans.

BRSBD-2
10/24/2013
BRSBD2.dgn

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
SBDO1d RAILING TRANSITION DETAILS					
No.	Description	Date	Designed: SSB, RW.	Date	Plan No.
			Drawn: SSB, RW.		Sheet No.
			Checked: SSB, RW.		
Revisions			BRSBD-2		

SBD01d TIMBER RAILING

TRANSITION DETAILS

NOTES TO DESIGNER:

Include standards BRSBD-1 and BRSBD-3 in the plans when using this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

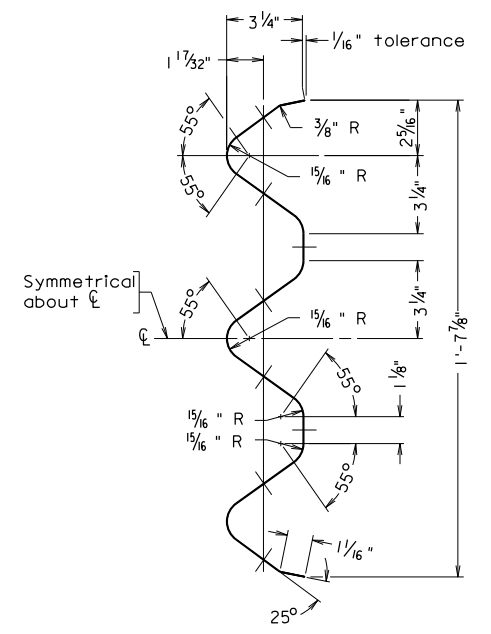
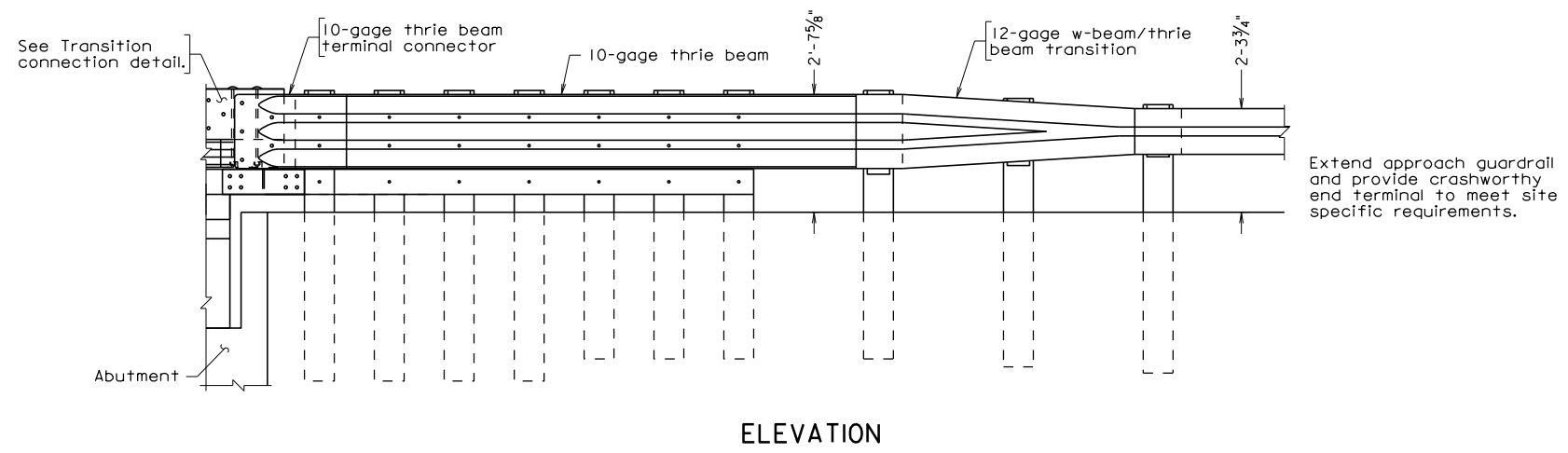
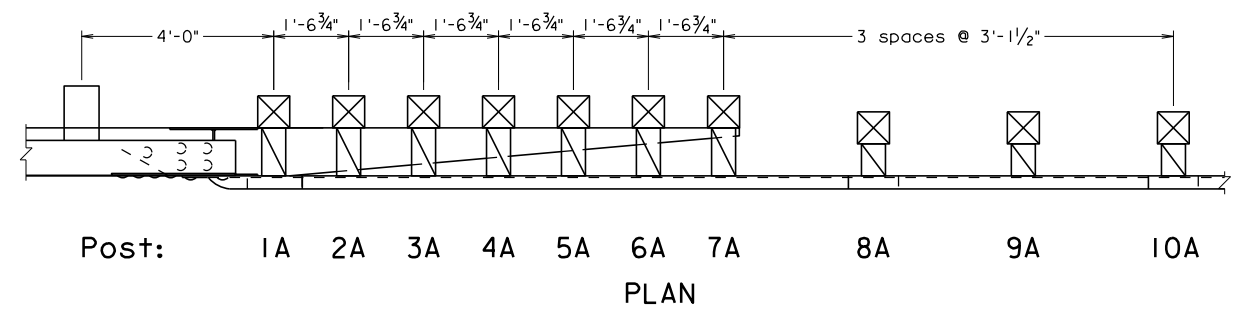
TRANSITION ELEVATION:

Complete sheet number for thrie beam transition sheet.

TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.				



Notes:

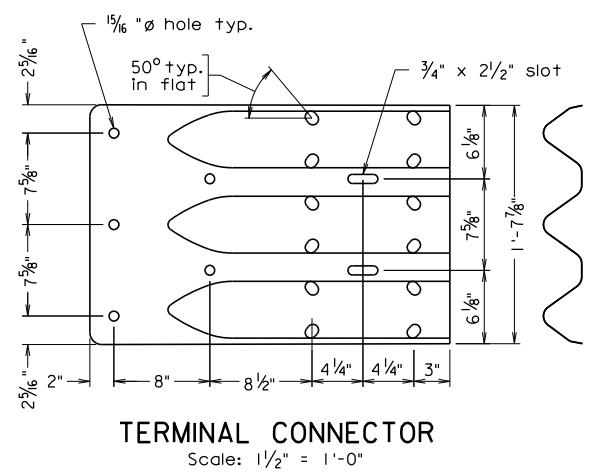
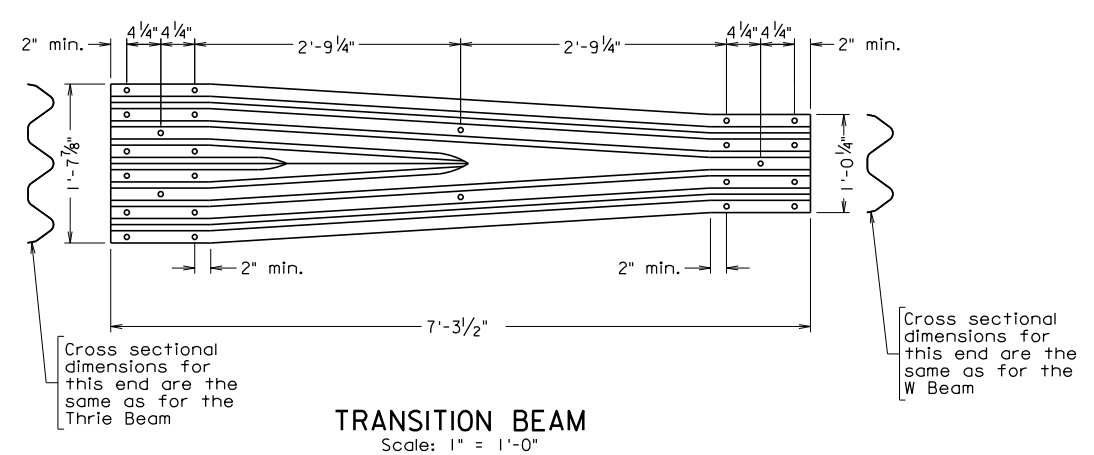
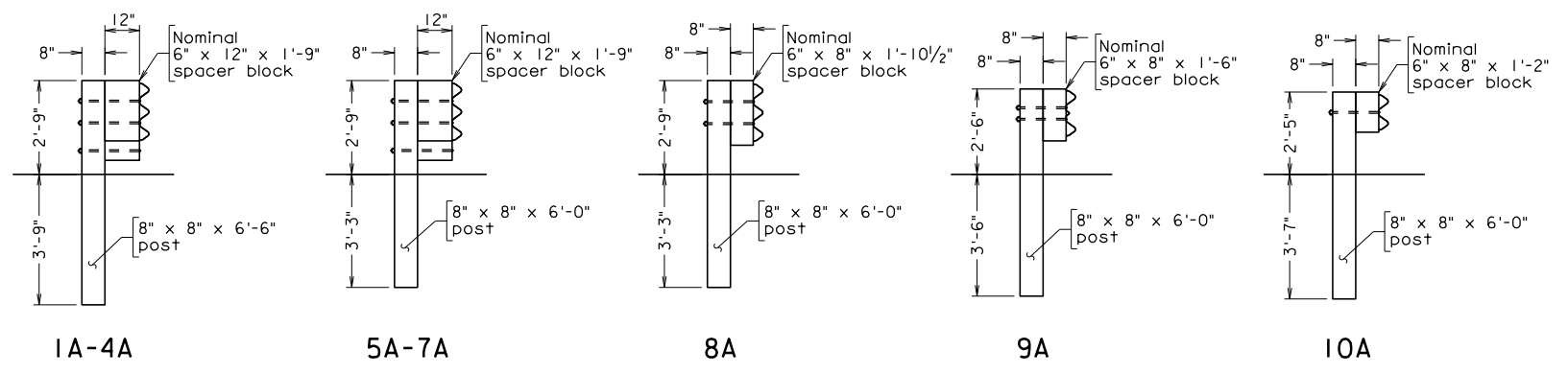
Guardrail components shall be in accordance with VDOT Road and Bridge Standards.

Posts 1A, 2A, 3A, 4A, 5A, 6A, and 7A require an additional hole to attach lower curb transition. Guardrail bolts 5/8" diameter long and recessed nuts shall be used for attachments, length as required.

The Lower Curb Transition located on posts 1A through 7A shall be secured with 5/8" carriage bolts, length as required.

Thrie Beam Terminal Connector shall be 10 gage steel. Thrie Beam and Transition Beam shall be 12 gage steel.

Refer to VDOT Road and Bridge Standards, Section 500, for all details not shown. When railing cannot be terminated as per the VDOT Road and Bridge Standards, contact the Location and Design Special Design Section to obtain recommendations.



BRSD3.dgn
08/30/2013
BRSD-3

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
August 30, 2013

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1/2" = 1'-0" unless otherwise noted. © 2013, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION				
STRUCTURE AND BRIDGE DIVISION				
SBD01d RAILING THRIE BEAM TRANSITION DETAILS				
No.	Description	Date	Designed: S&B.DIV.	Date
			Drawn: S&B.DIV.	Plan No.
			Checked: S&B.DIV.	Sheet No.
Revisions			BRSD-3	

SBD01d TIMBER RAILING
THRIE BEAM TRANSITION DETAILS

NOTES TO DESIGNER:

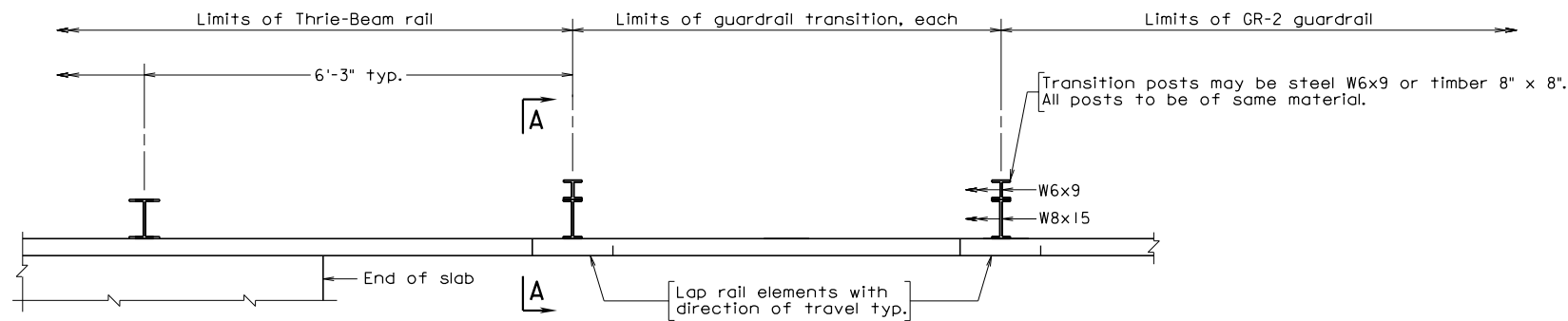
Include standards BRSBD-1 and BRSBD-2 in the plans when using this standard.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

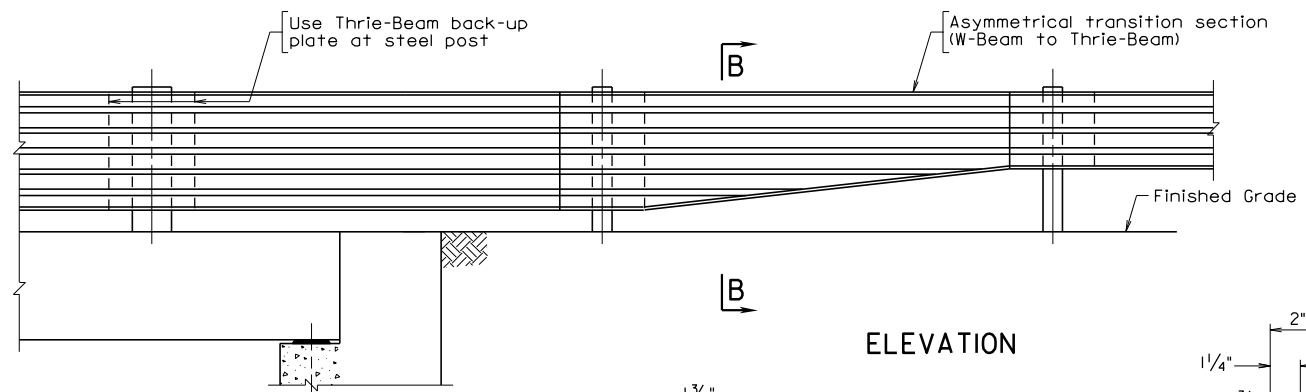
TITLE BLOCK:

Replace standard designation with plan number.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



PLAN



ELEVATION

Notes:

Posts and plates shall conform to ASTM A709 Grade 36 unless noted otherwise. Structural tubes shall conform to ASTM A500 Grade B. High Strength bolts shall conform to ASTM A325. All steel shall be hot dip galvanized.

For Standard Thrie-Beam Guardrail details, see Road and Bridge Standards.

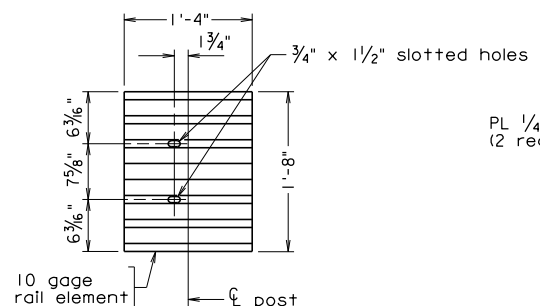
Guardrail hardware shall be in accordance with VDOT Road and Bridge Standards. Hot dip galvanize all structural steel and hardware after fabrication. Fabricate railing to the horizontal and vertical alignment of the structure. Install posts normal to grade. When wearing surface thickness varies due to beam camber and/or superelevation, vary rail post lengths to provide uniform height.

Tighten upper high strength post bolts 1/2 turn past snug tight condition. Tighten lower high strength post bolts 1/2 turn past snug tight condition.

When railing cannot be terminated as per the Road and Bridge Standards, contact the Location and Design Special Design Section to obtain recommendations.

Limits for payment of thrie-beam rail shall include rail posts and required hardware and inserts to install railing to exterior bridge slabs. The length of 10 gage thrie-beam rail shall be sufficient for lap details described in plans.

Limits for payment of guardrail transition shall include posts, W8x15 post offsets and transition piece of thrie-beam rail as detailed. The length of 10 gage guardrail transition rail shall be sufficient for lap details described in plans.



BACK-UP PLATE

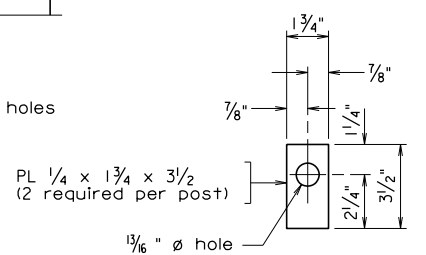


PLATE WASHER A

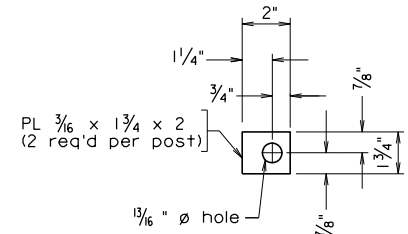


PLATE WASHER C

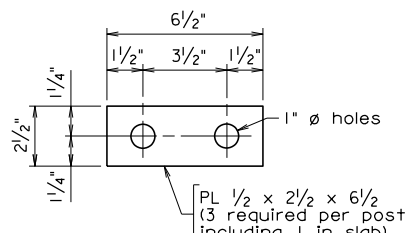


PLATE WASHER B

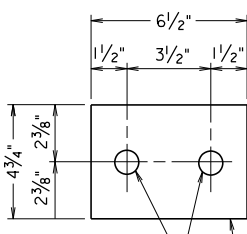
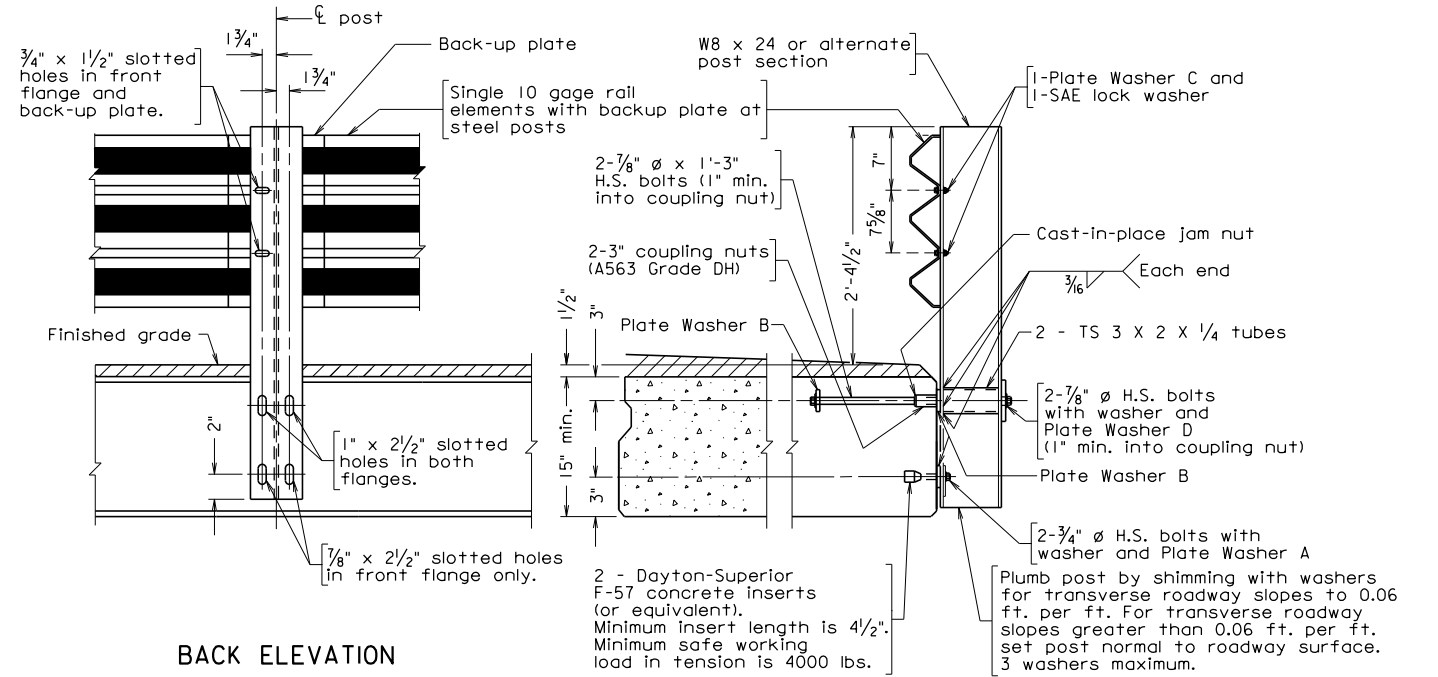
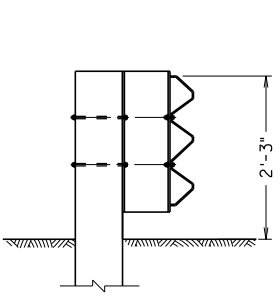


PLATE WASHER D

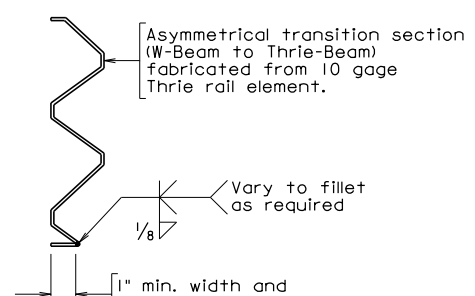


BACK ELEVATION

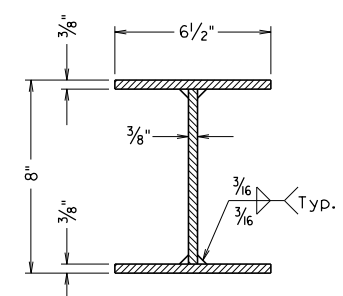
SIDE ELEVATION



SECTION A-A
Shown with timber post



SECTION B-B



ALTERNATE POST SECTION

Not to Scale

© 2015, Commonwealth of Virginia

brtbl.dgn

BTB-1 03-10-2015

Sealed and Signed by:
Prasad L. Nallapaneni
Lic. No. 033003
On the date of
March 10, 2015

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION		STRUCTURE AND BRIDGE DIVISION	
THRIE-BEAM GUARDRAIL SIDE MOUNT			
No.	Description	Date	Sheet No.
	Designed: S&B...DIV	Date	Plan No.
	Drawn: S&B...DIV		BTB-1
	Checked: S&B...DIV		
Revisions			

**THRIE-BEAM GUARDRAIL
SIDE MOUNT**

BTB SERIES

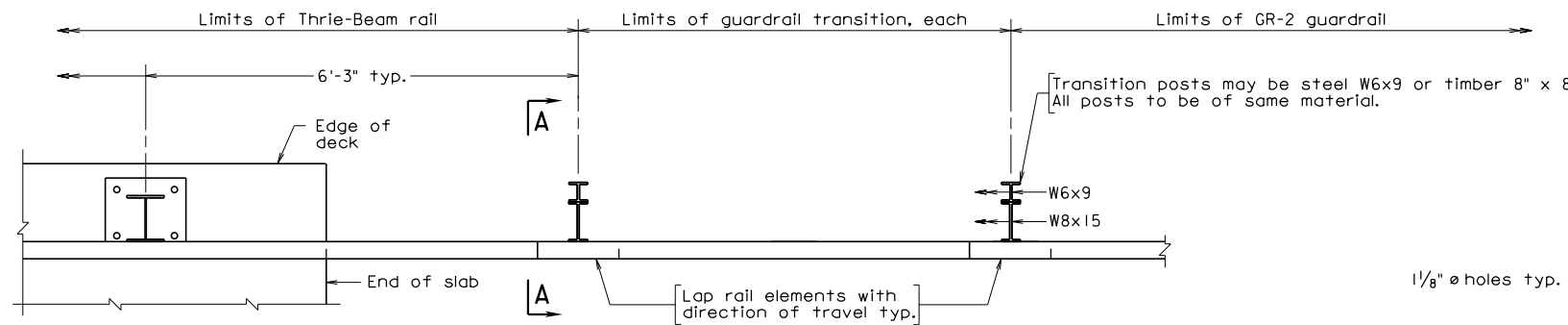
NOTES TO DESIGNER:

The Thrie-Beam railing has a height of 2'-3" and has been crash tested for TL-2 (TL = test level). The standard may be used on low volume roads when an open railing is required. See Volume V – Part 2: Chapter 25 for additional information on the appropriate use of this railing.

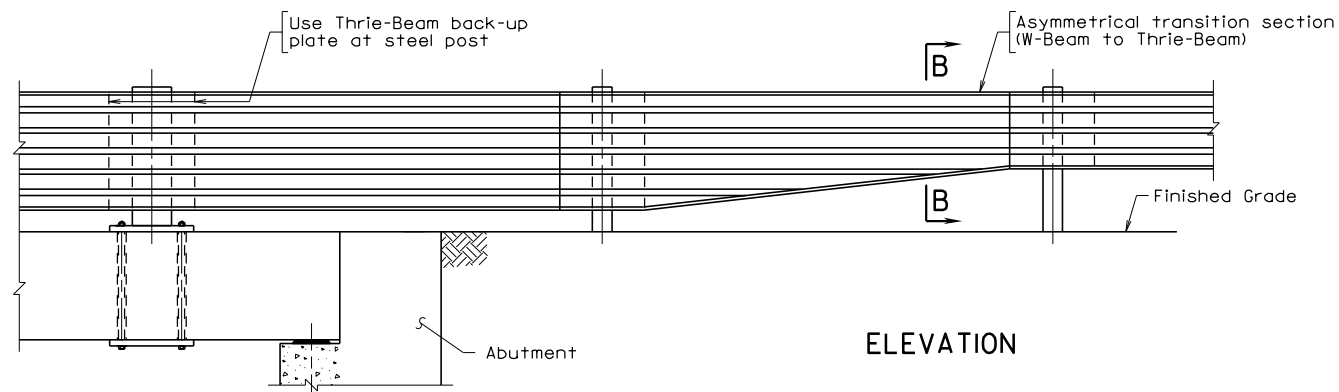
This Thrie-Beam railing was crash tested by Oregon and approved by the FHWA.

There is another Thrie-Beam rail designed by Oregon consisting of nested railing and changes in post spacing, etc. and has been crash tested. The modified nested railing is not approved for use on projects.

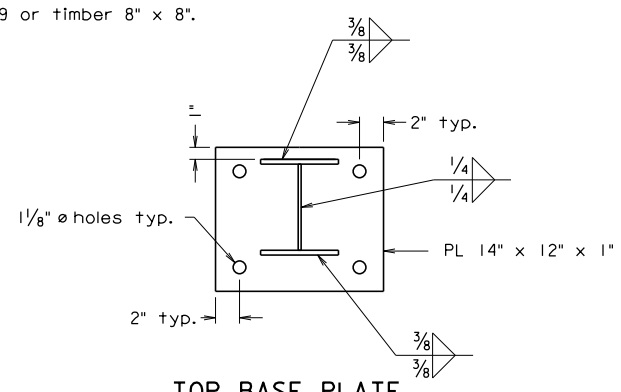
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



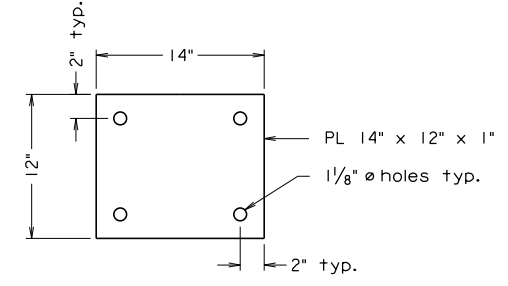
PLAN



ELEVATION



TOP BASE PLATE



BOTTOM BASE PLATE

Notes:

Posts and plates shall conform to ASTM A709 Grade 36 unless noted otherwise. Structural tubes shall conform to ASTM A500 Grade B. High Strength bolts shall conform to ASTM A325. All steel shall be hot dip galvanized. Steel pipe sleeves shall be ASTM A53.

For Standard Thrie-Beam Guardrail details, see Road and Bridge Standards.

Anchor bolts may be set normal to grade.

Posts shall be seated on neoprene pads 1/8" thick, having a nominal durometer hardness of 60. Pads shall conform to post base plate dimensions.

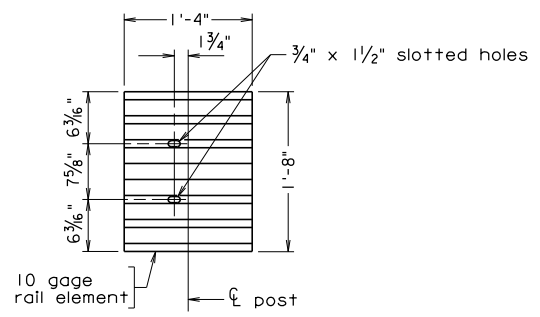
Guardrail hardware shall be in accordance with VDOT Road and Bridge Standards. Hot dip galvanize all structural steel and hardware after fabrication. Fabricate railing to the horizontal and vertical alignment of the structure. Install posts normal to grade. When wearing surface thickness varies due to beam camber and/or superelevation, vary rail post lengths to provide uniform height.

Tighten upper high strength post bolts 1/6 turn past snug tight condition. Tighten lower high strength post bolts 1/3 turn past snug tight condition.

When railing cannot be terminated as per the Road and Bridge Standards, contact the Location and Design Special Design Section to obtain recommendations.

Limits for payment of thrie-beam rail shall include rail posts and required hardware and inserts to install railing to exterior bridge slabs. The length of 10 gage thrie-beam rail shall be sufficient for lap details described in plans.

Limits for payment of guardrail transition shall include posts, W8x15 post offsets and transition piece of thrie-beam rail as detailed. The length of 10 gage guardrail transition rail shall be sufficient for lap details described in plans.



BACK-UP PLATE

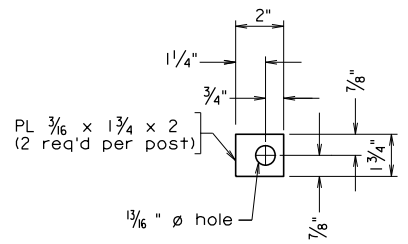
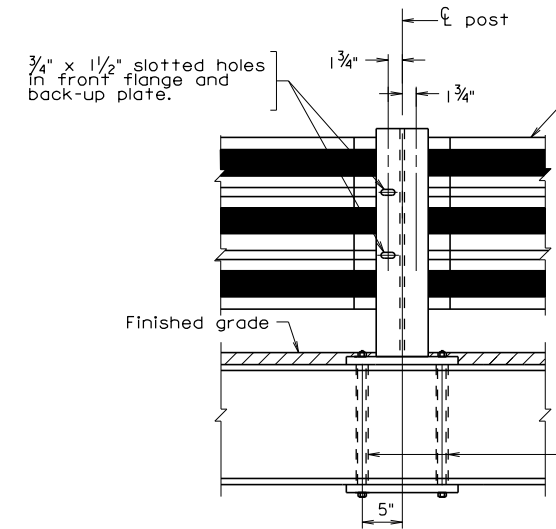


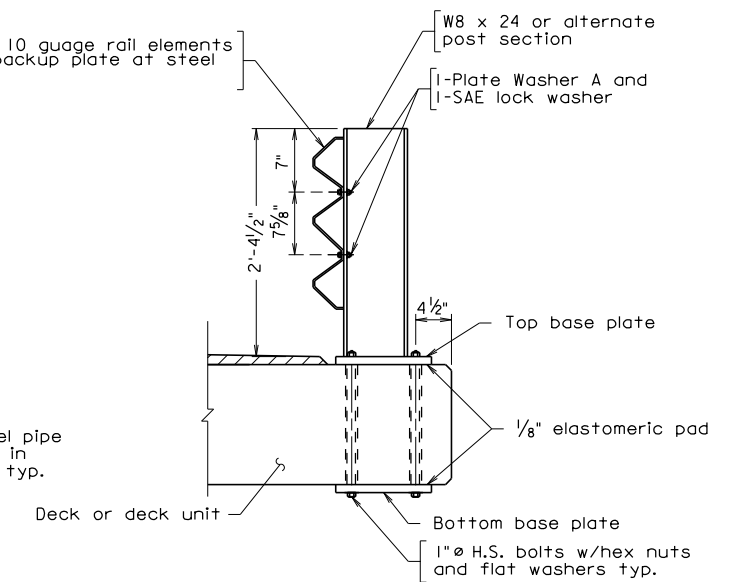
PLATE WASHER A

Note: Position washer to completely cover slotted hole.



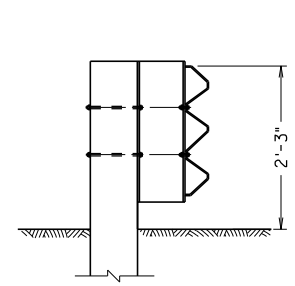
BACK ELEVATION

Deck steel omitted for clarity



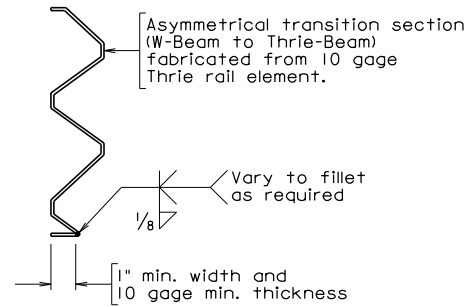
SIDE ELEVATION

Deck steel omitted for clarity

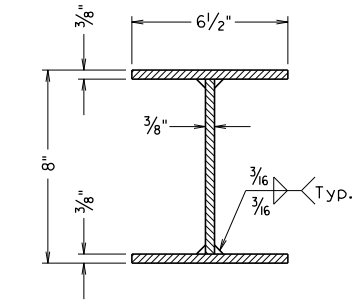


SECTION A-A

Shown with timber post



SECTION B-B



ALTERNATE POST SECTION

Not to Scale

© 2013, Commonwealth of Virginia

b:tb2.dgn

10-24-2013

BTB-2

Sealed and Signed by:
Julius F.J. Volgyt Jr.
Lic. No. 010487
On the date of
October 24, 2013

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

TranSystems Corp.
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
THRIE-BEAM GUARDRAIL TOP MOUNT			
No.	Description	Date	Designed:
			Drawn:
			Checked:
Revisions			Date
			Plan No.
			Sheet No.
			BTB-2

**THRIE-BEAM GUARDRAIL
TOP MOUNT**

BTB SERIES

NOTES TO DESIGNER:

The Thrie-Beam railing has a height of 2'-3" and has been crash tested for TL-2 (TL = test level). The standard may be used on low volume roads when an open railing is required. See Volume V – Part 2: Chapter 25 for additional information on the appropriate use of this railing.

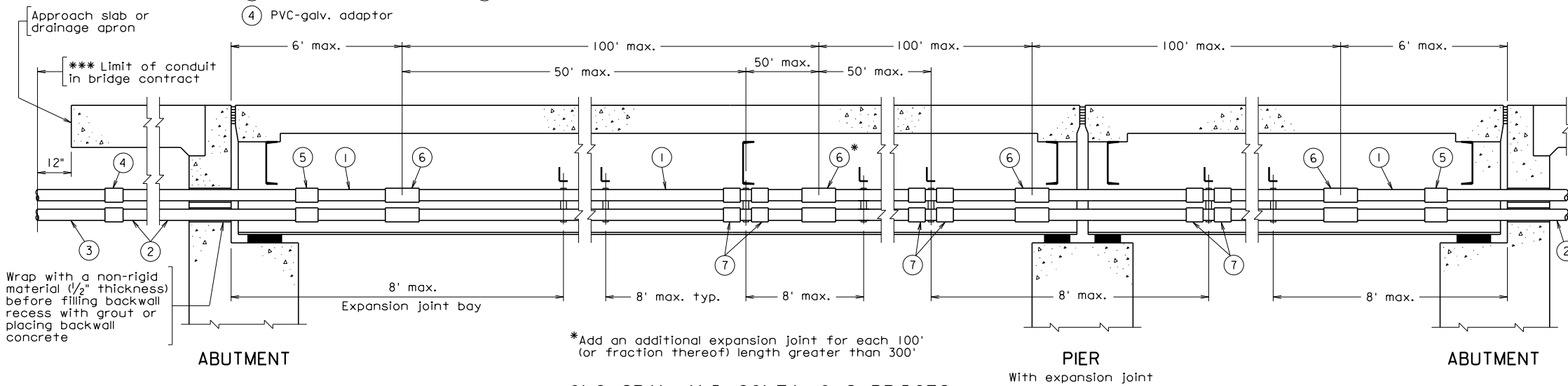
This Thrie-Beam railing was crash tested by Oregon and has been modified with a through bolt connection to the deck (BTB-2).

There is another Thrie-Beam rail designed by Oregon consisting of nested railing and changes in post spacing, etc. and has been crash tested. The modified nested railing is not approved for use on projects.

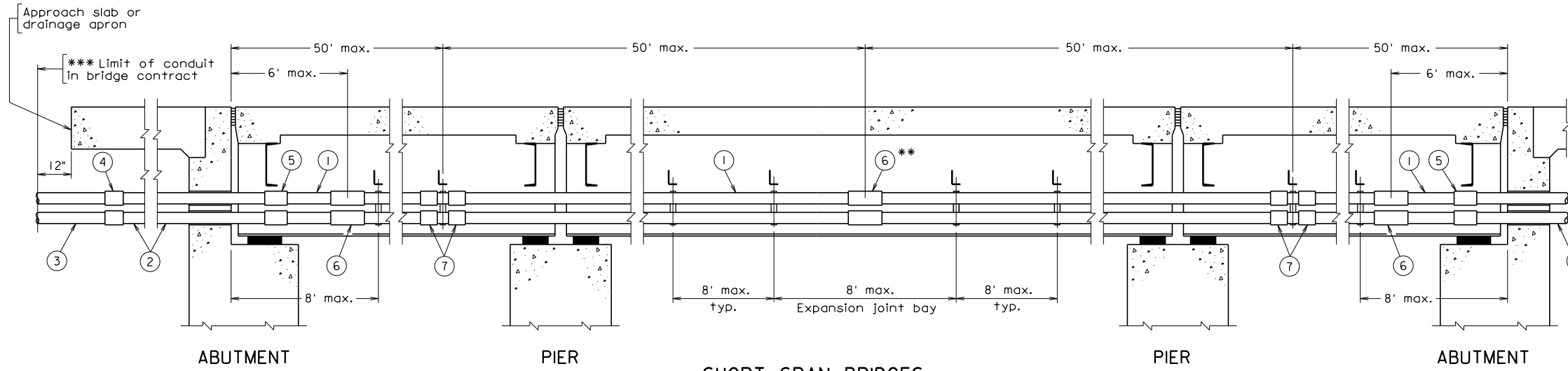
STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

- ① 4" Ø PVC-D duct
- ② 4" Ø galv. steel duct
- ③ 4" Ø PVC-B duct
- ④ PVC-galv. adaptor
- ⑤ Galv.-PVC adaptor
- ⑥ PVC exp. joint
- ⑦ PVC lock ring

*** Limit of telephone conduit in bridge contract when approach slabs or drainage aprons are not used shall be the extension of the conduit a minimum of one foot behind back of backwall



LONG SPAN AND CONTINUOUS BRIDGES



SHORT SPAN BRIDGES

Notes:

PVC conduit shall be PVC-B in buried locations and PVC-D in exposed locations, and shall meet the requirements of AT&T specifications AT-8546.

Duct splices shall be adhesive bonded bell and spigot.

Expansion joints shall be sliding sleeve type to accommodate at least 6" of expansion travel.

Threaded couplings shall be used on steel conduit.

Steel fittings and rods shall be galvanized in accordance with ASTM A153. When the supporting angles to which the rods are attached are weathering steel, a neoprene or vinyl washer shall be placed between the angle surface (on both sides) and the nut/washer to isolate the contact between the two surfaces.

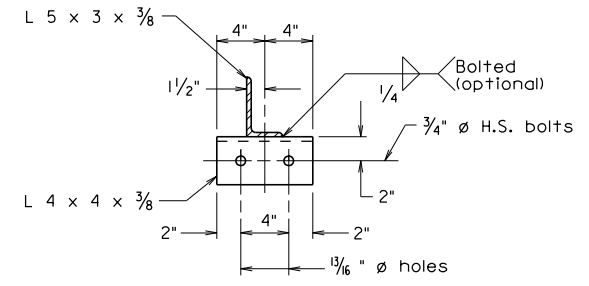
Structural steel for angles shall be the same as that for the beams/girders. If the beams/girders are painted, the angles shall be galvanized in accordance with ASTM A123.

If the angle is galvanized, the H.S. bolts shall be ASTM A325 galvanized. If the angle is not painted (unpainted weathering steel), the H.S. bolts shall be ASTM A325, Type 3.

Hanger details shown are designed to support as many as 12 conduits. Dead Loads: Cables: 8.5 lbs./ft. per conduit
Conduit: 1.5 lbs./ft.

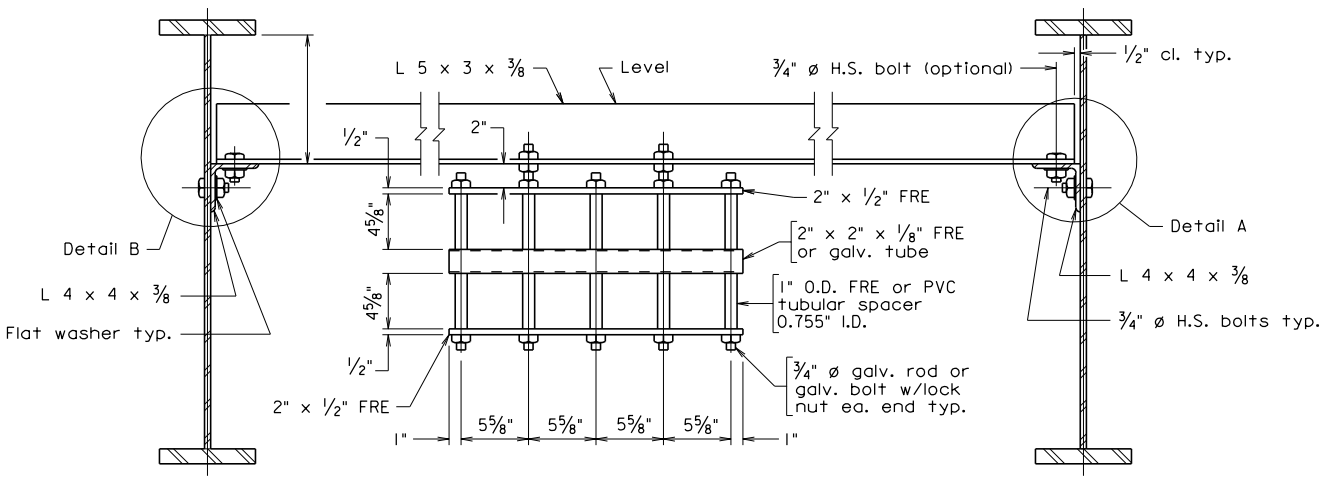
Under ground installation of PVC-B duct shall be in accordance with Road and Bridge Standards EC1-1 except the minimum spacing between ducts shall be 3/4".

Payment - Telephone Conduit System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price. Price shall include furnishing and installing conduit, supporting angles, connections, all related parts/attachments and miscellaneous hardware; all as detailed on the Telephone Conduit System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.



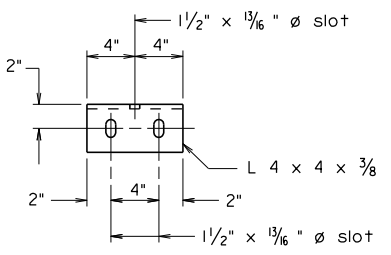
DETAIL B

** Not required on bridges under 100' total length. Add an additional expansion joint for every 100' (or fraction thereof) length greater than 200'.



TYPICAL SUPPORT DETAIL

Use Detail A at one end and Detail B at the other end



DETAIL A

CONDUIT FORMATIONS

Number of conduits	2	4	6	8	12
Preferred formation					
Alternate formation					

btc4.dgn

08-07-2012

BTC-4

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
TELEPHONE CONDUIT SYSTEM					
G. Henderson					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		BTC-4
			Checked: S&B...DIV		

Not to scale

© 2012, Commonwealth of Virginia

TELEPHONE CONDUIT SYSTEM

PVC CONDUIT STEEL BEAM/GIRDER SPANS

NOTES TO DESIGNER:

Standard is for use with: PVC conduit
Steel beam/girder spans

Show conduit formation on transverse section sheet and indicate number of conduits (e.g. 4 -4" ϕ telephone conduits). Show dimension from bottom of top flange (top of web) to support angle at the beam/girder the dimension is set on transverse section sheet. When setting the dimension allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames etc. Normally the critical clearances are at the ends of spans (at supports). Indicate location of centerline of telephone conduits on framing plan (e.g., centerline of 4 - 4" ϕ telephone conduits). Do not show hanger spacing on framing plan.

Utilities shall be placed in the exterior bays of the bridge if possible.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

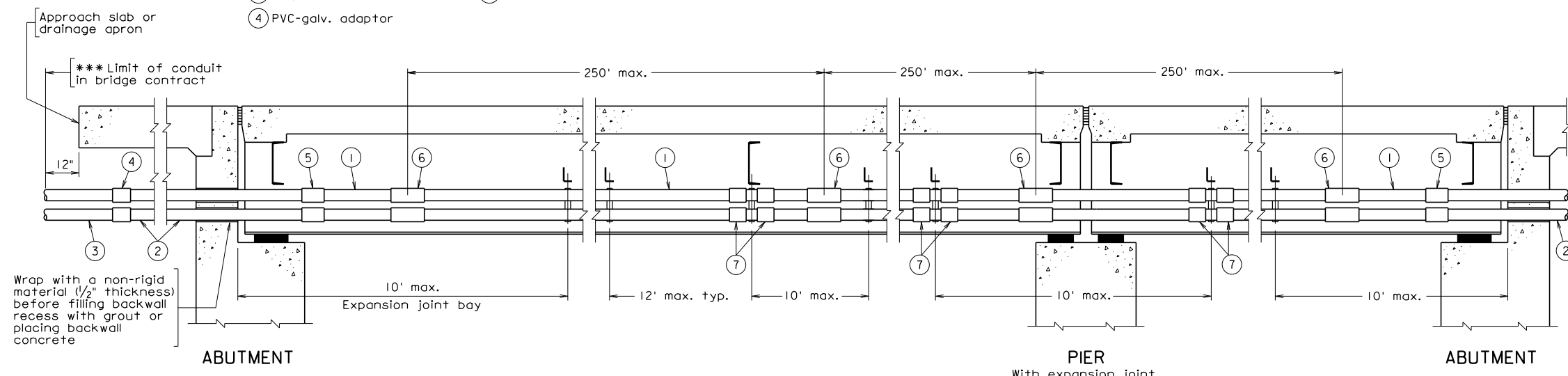
TYPICAL SUPPORT DETAIL:

Enter dimension from bottom of top flange to L 5 x 3 x $\frac{3}{8}$ support. This must agree with dimension set on transverse section sheet.

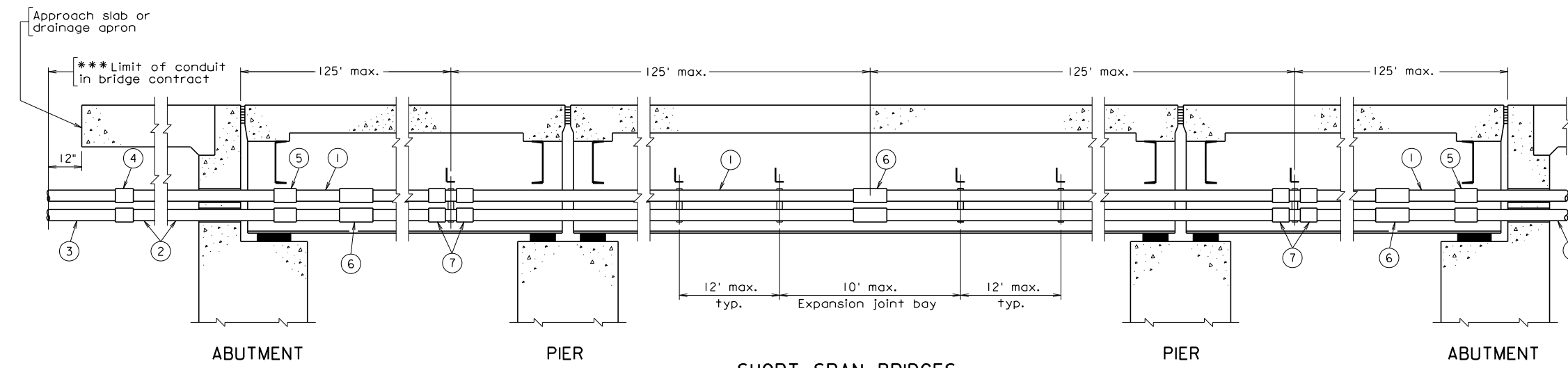
STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

- ① 4" Ø FRE duct
- ② 4" Ø galv. steel duct
- ③ 4" Ø PVC-B duct
- ④ PVC-galv. adaptor
- ⑤ Galv.-FRE adaptor
- ⑥ FRE exp. joint
- ⑦ FRE lock ring

***Limit of telephone conduit in bridge contract when approach slabs or drainage aprons are not used shall be the extension of the conduit a minimum of one foot behind back of backwall



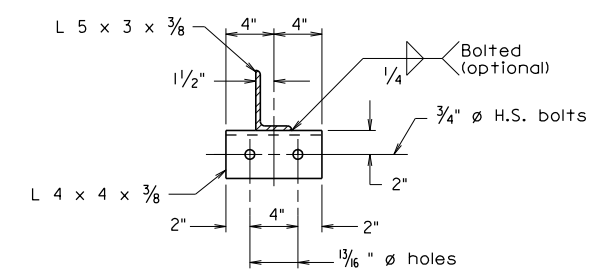
LONG SPAN AND CONTINUOUS BRIDGES



SHORT SPAN BRIDGES

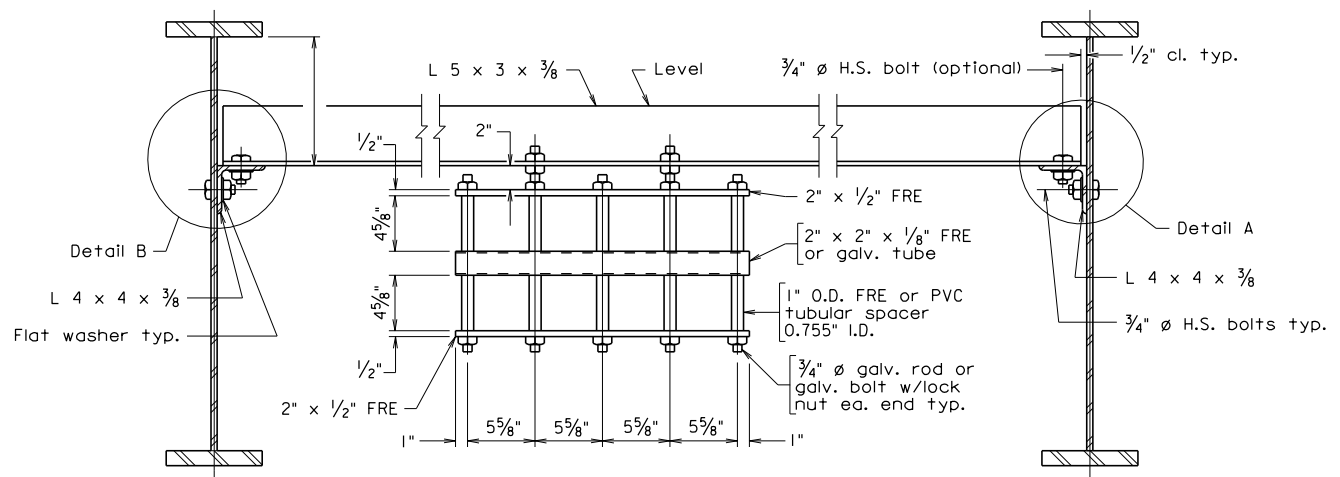
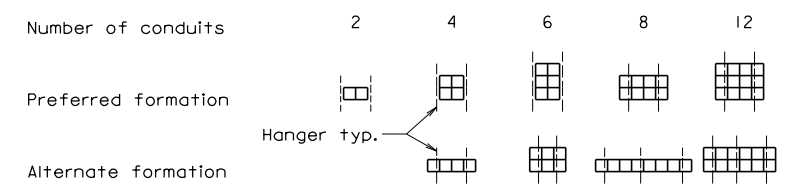
Notes:

- Glass fiber reinforced epoxy (FRE) duct shall comply with ASTM D2310 and ASTM D2996, and shall be RTRP-IIAD-III, except as modified herein.
- Inside diameter shall be 4.00" minimum, wall thickness shall be 0.060" minimum.
- Duct performance shall not be impaired by exposure to ultraviolet radiation. Duct shall have fire resistance which equals or exceeds requirements of U.L. 651 - Section 17.
- Joints shall be positive locking (threaded bell and spigot, adhesive bonded bell and spigot, or driven tapered bell and spigot).
- Expansion joints shall be sliding sleeve type, with or without o-rings, with provision for minimum of 6" expansion travel.
- Lock rings shall be split FRE duct, minimum of 3" long, .025" minimum thickness, glued in place after installation of conduit system.
- Threaded couplings shall be used on steel conduit.
- Steel fittings and rods shall be galvanized in accordance with ASTM A153. When the supporting angles to which the rods are attached are weathering steel, a neoprene or vinyl washer shall be placed between the angle surface (on both sides) and the nut/washer to isolate the contact between the two surfaces.
- Structural steel for angles shall be the same as that for the beams/girders. If the beams/girders are painted, the angles shall be galvanized in accordance with ASTM A123.
- If the angle is galvanized, the H.S. bolts shall be ASTM A325 galvanized. If the angle is not painted (unpainted weathering steel), the H.S. bolts shall be ASTM A325, Type 3.
- For all spans (or expansion lengths) in excess of 250', provide an expansion joint dedicated solely to deck expansion. Additional expansion joints shall be provided as noted to accommodate differential expansion between steel and FRE.
- Hanger details shown are designed to support as many as 12 conduits. Dead Loads: Cables: 8.5 lbs./ft. per conduit, Conduit: 0.8 lbs./ft.
- Under ground installation of PVC-B duct shall be in accordance with Road and Bridge Standards EC1-1 except the minimum spacing between ducts shall be 3/4".
- Payment - Telephone Conduit System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price. Price shall include furnishing and installing conduit, supporting angles, connections, all related parts/attachments and miscellaneous hardware; all as detailed on the Telephone Conduit System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.



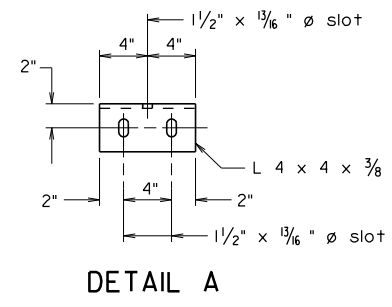
DETAIL B

CONDUIT FORMATIONS



TYPICAL SUPPORT DETAIL

Use Detail A at one end and Detail B at the other end



DETAIL A

BTC-5 08-07-2012

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION		TELEPHONE CONDUIT SYSTEM	
G. Henderson		Date	
No.	Description	Date	Plan No.
			BTC-5
Revisions		Drawn: S&B...DIV	Sheet No.
		Checked: S&B...DIV	

TELEPHONE CONDUIT SYSTEM

FRE CONDUIT STEEL BEAM/GIRDER SPANS

NOTES TO DESIGNER:

Standard is for use with: FRE conduit
Steel beam/girder spans

Show conduit formation on transverse section sheet and indicate number of conduits (e.g. 4 -4" ϕ telephone conduits). Show dimension from bottom of top flange (top of web) to support angle at the beam/girder the dimension is set on transverse section sheet. When setting the dimension allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames etc. Normally the critical clearances are at the ends of spans (at supports). Indicate location of centerline of telephone conduits on framing plan (e.g., centerline of 4 - 4" ϕ telephone conduits). Do not show hanger spacing on framing plan.

Utilities shall be placed in the exterior bays of the bridge if possible.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

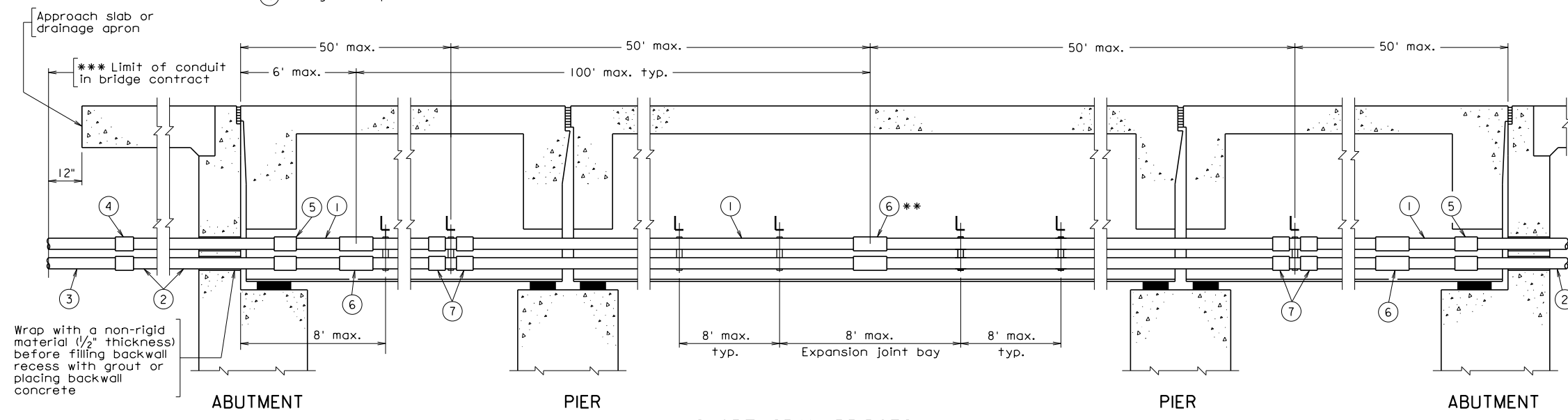
TYPICAL SUPPORT DETAIL:

Enter dimension from bottom of top flange to L 5 x 3 x $\frac{3}{8}$ support. This must agree with dimension set on transverse section sheet.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

- ① 4" Ø PVC-D duct
- ② 4" Ø galv. steel duct
- ③ 4" Ø PVC-B duct
- ④ PVC-galv. adaptor
- ⑤ Galv.-PVC adaptor
- ⑥ PVC exp. joint
- ⑦ PVC lock ring

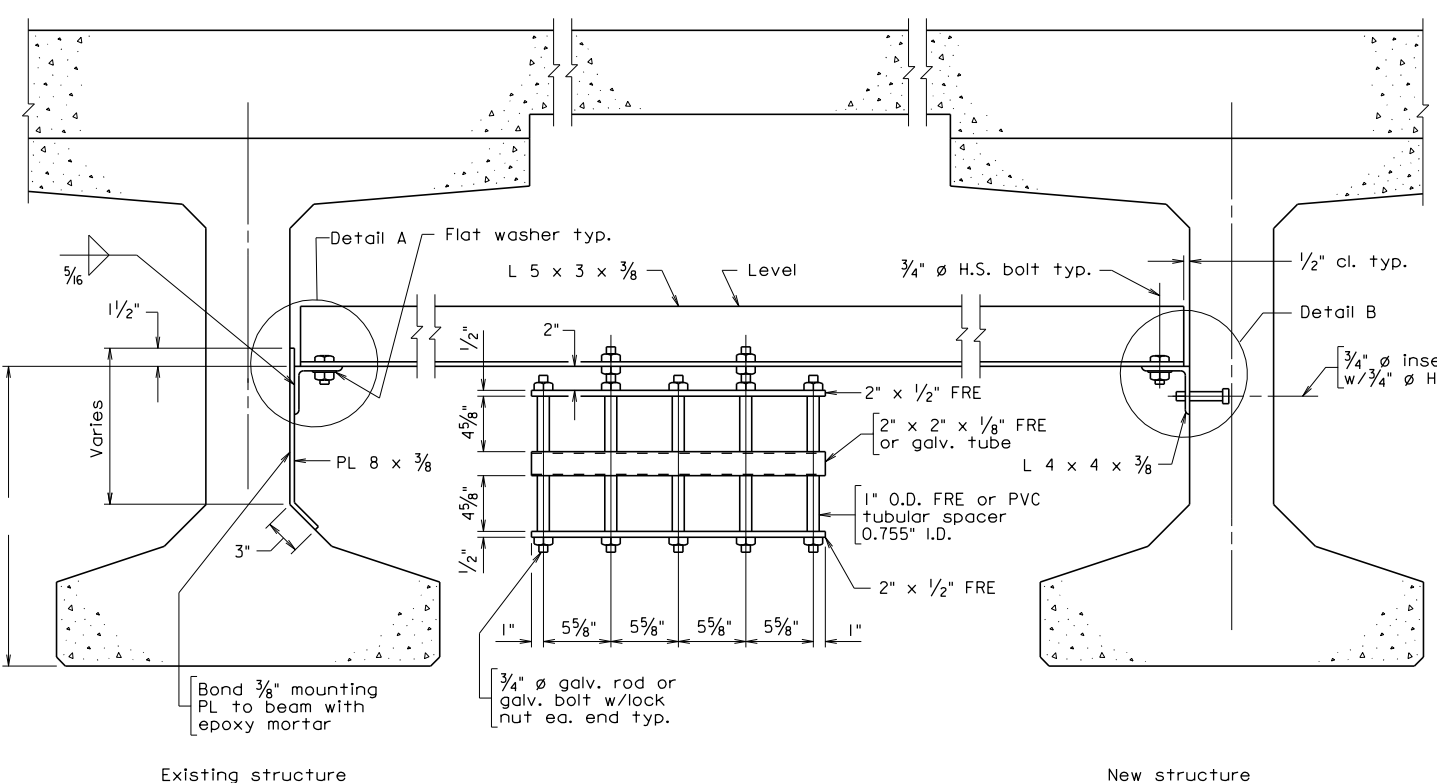
*** Limit of telephone conduit in bridge contract when approach slabs or drainage aprons are not used shall be the extension of the conduit a minimum of one foot behind back of backwall



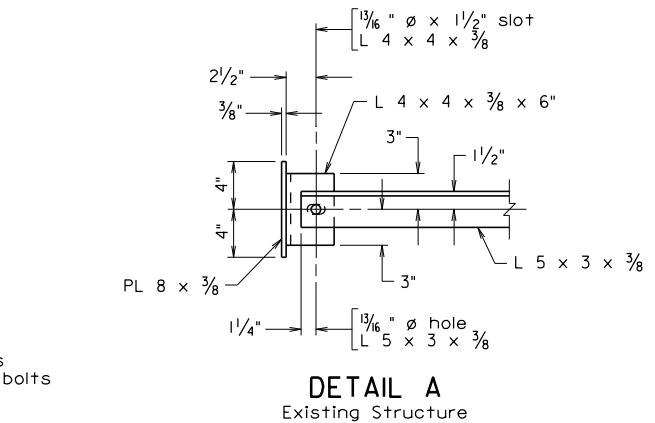
SHORT SPAN BRIDGES
Max. span L = 100'

** Not required on bridges under 100' total length. Add an additional expansion joint for every 100' (or fraction thereof) length greater than 200'.

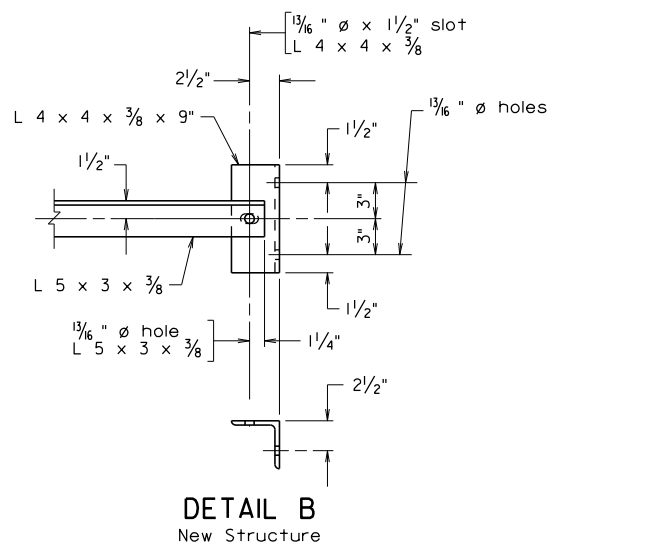
Notes:
 PVC conduit shall be PVC-B in buried locations and PVC-D in exposed locations, and shall meet the requirements of AT&T Specification AT-8546.
 Duct splices shall be adhesive bonded bell and spigot.
 Expansion joints shall be sliding sleeve type to accommodate at least 6" of expansion travel.
 Threaded couplings shall be used on steel conduit.
 Steel fittings and rods shall be galvanized in accordance with ASTM A153.
 Structural steel for angles shall be ASTM A36. The angles shall be galvanized in accordance with ASTM A123.
 H.S. bolts for angles shall be ASTM A325 galvanized.
 Hanger details shown are designed to support as many as 12 conduits.
 Dead Loads: Cables: 8.5 lbs./ft. per conduit
 Conduit: 1.5 lbs./ft.
 Under ground installation of PVC-B duct shall be in accordance with Road and Bridge Standards ECI-1 except the minimum spacing between ducts shall be 3/4".
 Payment - Telephone Conduit System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price. Price shall include furnishing and installing conduit, supporting angles, connections, all related parts/attachments and miscellaneous hardware; all as detailed on the Telephone Conduit System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.



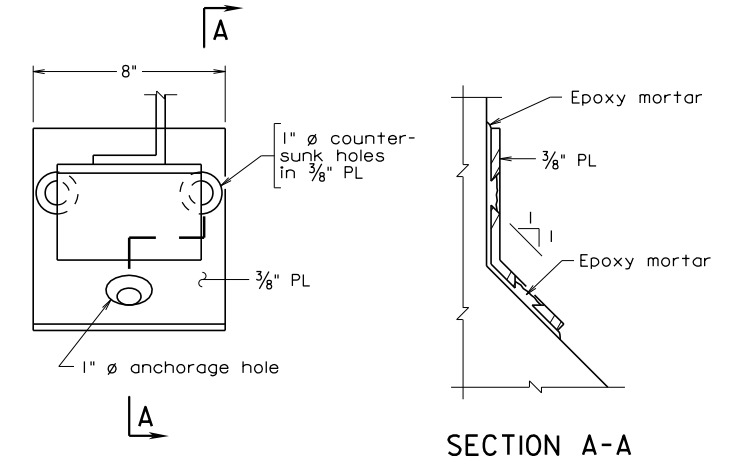
TYPICAL SUPPORT DETAIL



DETAIL A
Existing Structure



DETAIL B
New Structure



ELEVATION

SECTION A-A

MOUNTING PLATE DETAIL

CONDUIT FORMATIONS

Number of conduits	2	4	6	8	12
Preferred formation					
Alternate formation					

BTC-6

Sealed and Signed by:
 Julius F.J. Volgyi, Jr.
 Lic. No. 010487
 On the date of
 Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
TELEPHONE CONDUIT SYSTEM					
G. Henderson					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BTC-6
			Checked: S&B, DIV		
Revisions					

TELEPHONE CONDUIT SYSTEM
PVC CONDUIT
PRESTRESSED CONCRETE BEAM SPANS

NOTES TO DESIGNER:

Standard is for use with: PVC conduit
prestressed concrete Bulb-T beam spans

Show dimension from bottom of beam to bottom of angle support at the beam/girder the dimension is set on the transverse section sheet. When setting the dimension, allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames, etc. Include insulation requirements when setting clearances.

Utilities shall be placed in the exterior bays of the bridge if possible.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

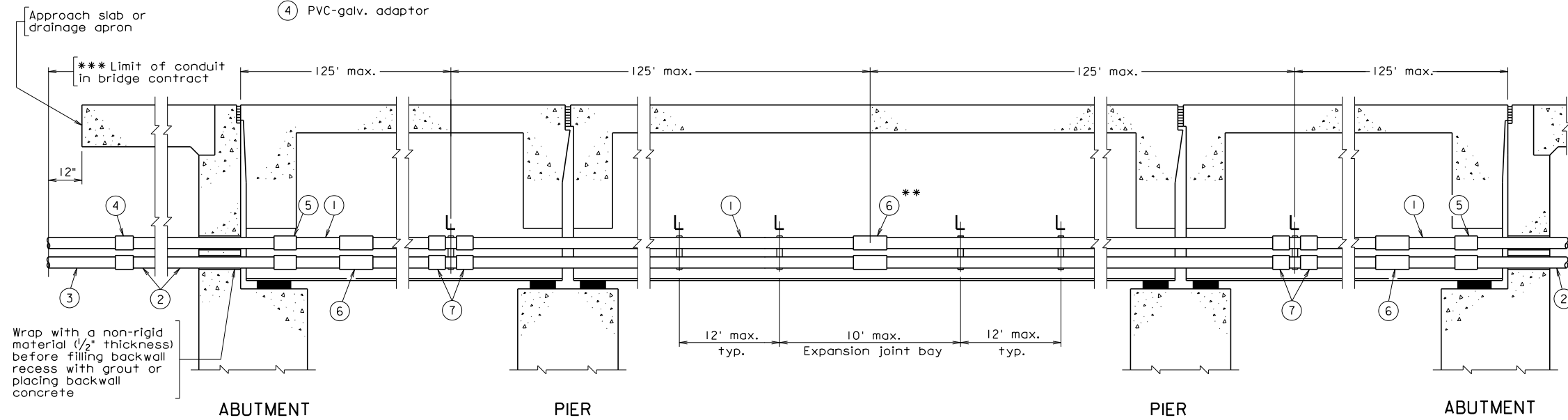
TYPICAL SUPPORT DETAIL:

Enter dimension from bottom of beam to L 5 x 3 x $\frac{3}{8}$ support. This must agree with dimension set on transverse section sheet.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			

- ① 4" Ø FRE duct
- ② 4" Ø galv. steel duct
- ③ 4" Ø PVC-B duct
- ④ PVC-galv. adaptor
- ⑤ Galv.-FRE adaptor
- ⑥ FRE exp. joint
- ⑦ FRE lock ring

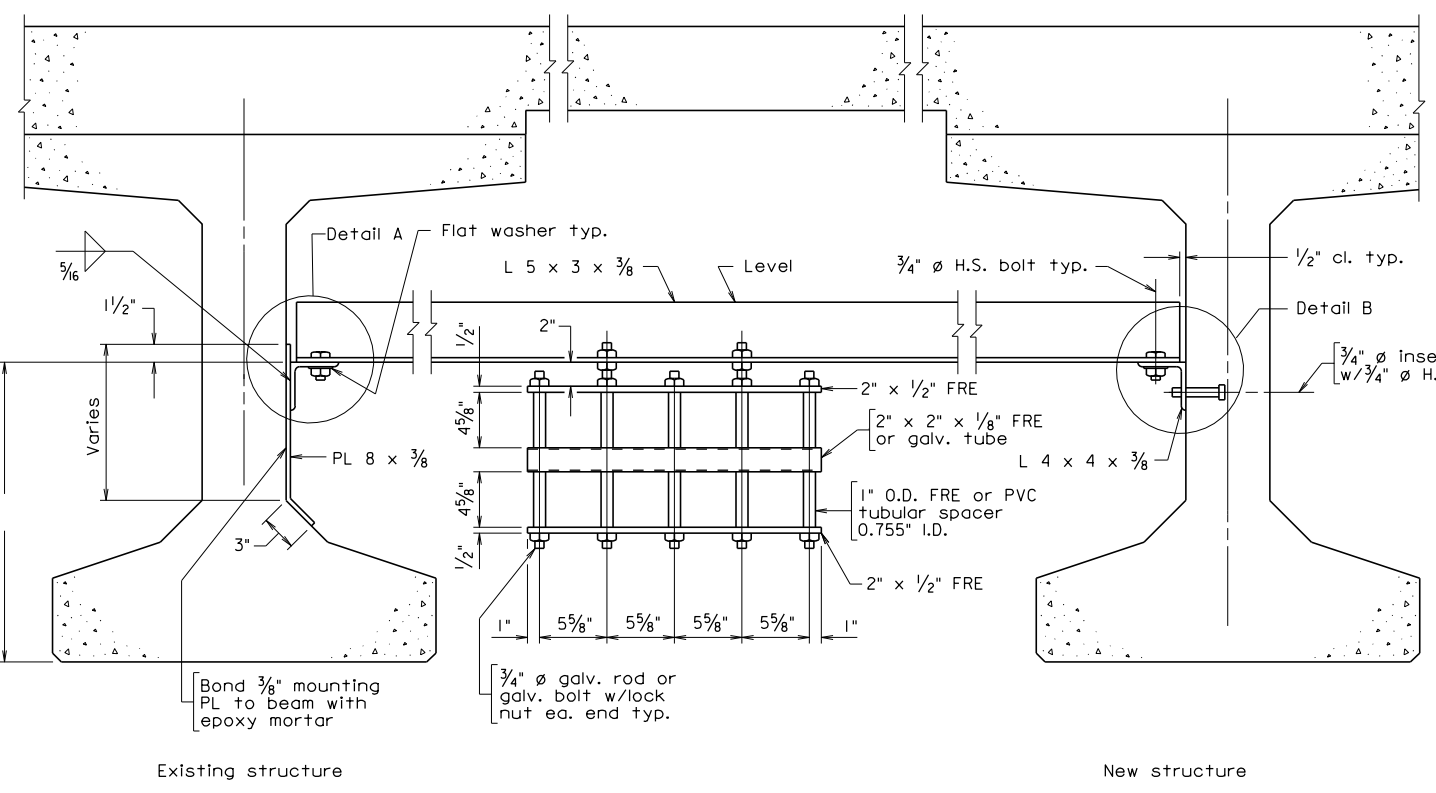
***Limit of telephone conduit in bridge contract when approach slabs or drainage aprons are not used shall be the extension of the conduit a minimum of one foot behind back of backwall



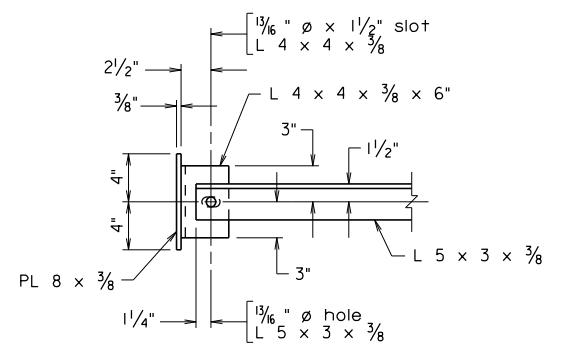
SHORT SPAN BRIDGES
Max. span L = 200'

** Not required on bridges under 250' total length

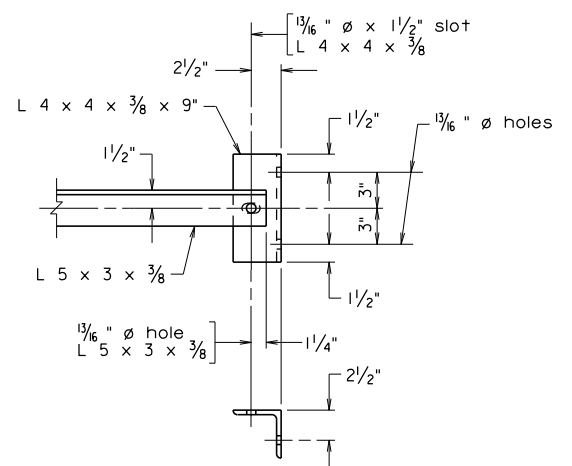
Notes:
Glass fiber reinforced epoxy (FRE) duct shall comply with ASTM D2310 and ASTM D2996, and shall be RTRP-IIAD-III, except as modified herein. Inside diameter shall be 4.00" minimum, wall thickness shall be 0.060" minimum.
Duct performance shall not be impaired by exposure to ultraviolet radiation. Duct shall have fire resistance which equals or exceeds requirements of U.L. 651 - Section 17.
Joints shall be positive locking, (threaded bell and spigot, adhesive bonded bell and spigot, or driven tapered bell spigot).
Expansion joints shall be sliding sleeve type, with or without o'ringss, with provision for minimum of 6" expansion travel.
Lock rings shall be split FRE duct, minimum of 3" long, .025" minimum thickness, glued in place after installation of conduit system.
Threaded couplings shall be used on steel conduit.
Steel fittings and rods shall be galvanized in accordance with ASTM A153.
Structural steel for angles shall be ASTM A36. The angles shall be galvanized in accordance with ASTM A123.
H.S. bolts for angles shall be ASTM A325 galvanized.
Hanger details shown are designed to support as many as 12 conduits. Dead Loads: Cables: 8.5 lbs./ft. per conduit
Conduit: 0.8 lbs./ft.
Under ground installation of PVC-B duct shall be in accordance with Road and Bridge Standards EC-1 except the minimum spacing between ducts shall be 3/4".
Payment - Telephone Conduit System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price. Price shall include furnishing and installing conduit, supporting angles, connections, all related parts/ attachments and miscellaneous hardware; all as detailed on the Telephone Conduit System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.



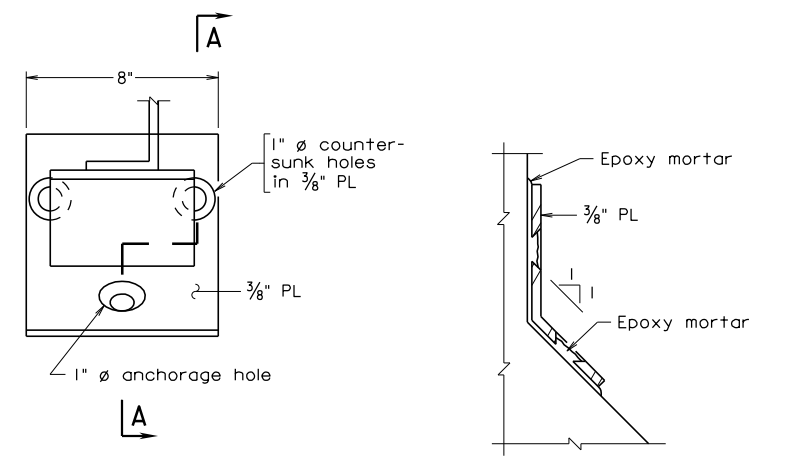
TYPICAL SUPPORT DETAIL



DETAIL A
Existing structure

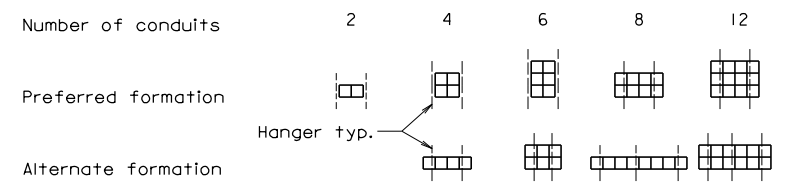


DETAIL B
New structure



MOUNTING PLATE DETAIL

CONDUIT FORMATIONS



Not to scale © 2012, Commonwealth of Virginia

btc7.dgn

08-07-2012
BTC-7

Sealed and Signed by:
Julius F.J. Volgyi Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original sealed and signed standard drawing is on file in the Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION		TELEPHONE CONDUIT SYSTEM	
No.	Description	Date	Revisions
G. Henderson		Date	Plan No.
Designed: S&B, DIV		Sheet No.	
Drawn: S&B, DIV		BTC-7	
Checked: S&B, DIV			

TELEPHONE CONDUIT SYSTEM
FRE CONDUIT
PRESTRESSED CONCRETE BEAM SPANS

NOTES TO DESIGNER:

Standard is for use with: FRE conduit
Prestressed concrete Bulb-T beam spans

Show dimension from bottom of beam to bottom of angle support at the beam/girder the dimension is set on the transverse section sheet. When setting the dimension, allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames, etc. Include insulation requirements when setting clearances.

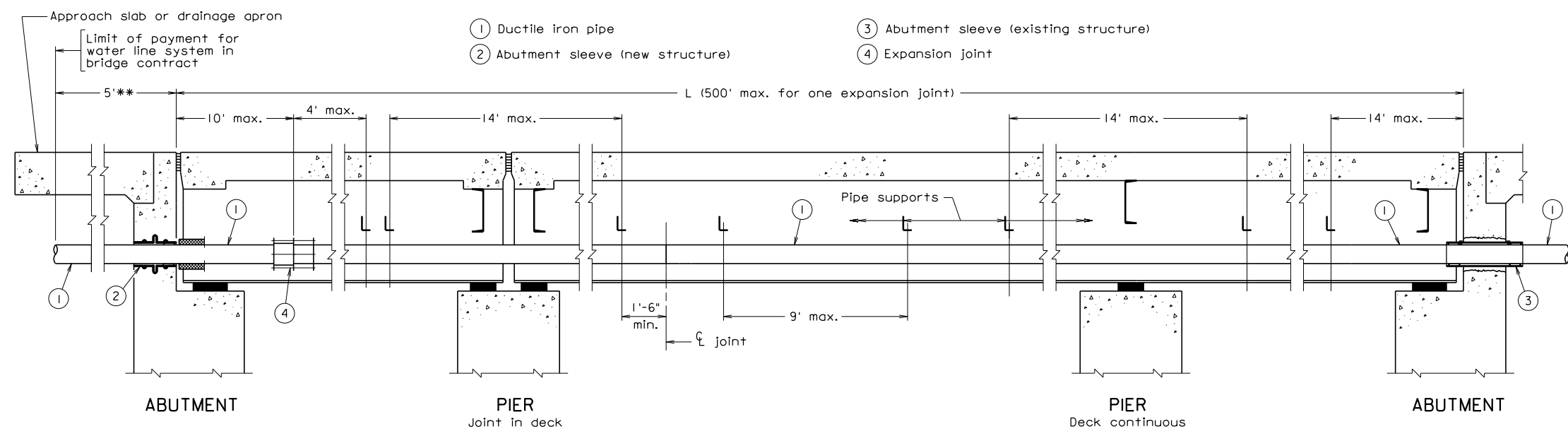
Utilities shall be placed in the exterior bays of the bridge if possible.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SUPPORT DETAIL:

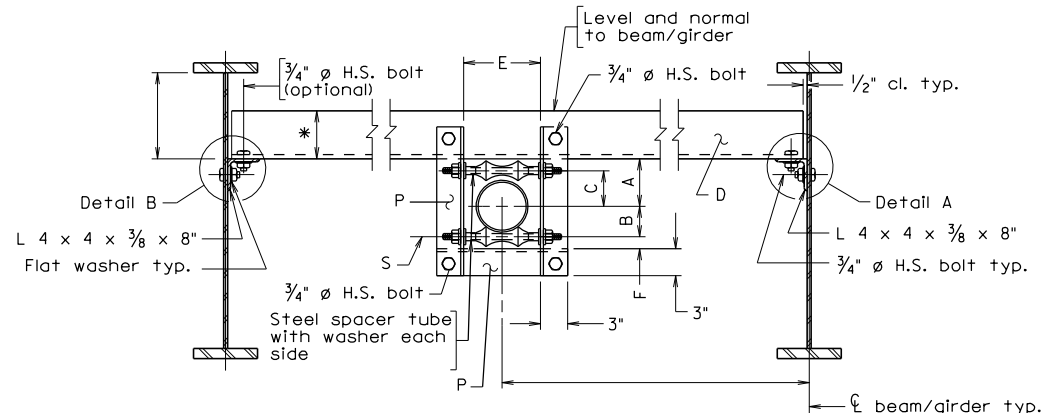
Enter dimension from bottom of beam to L 5 x 3 x $\frac{3}{8}$ support. This must agree with dimension set on transverse section sheet.

STATE	FEDERAL AID	STATE	SHEET NO.
ROUTE	PROJECT	ROUTE	PROJECT
VA.			



ELEVATION
Not to scale

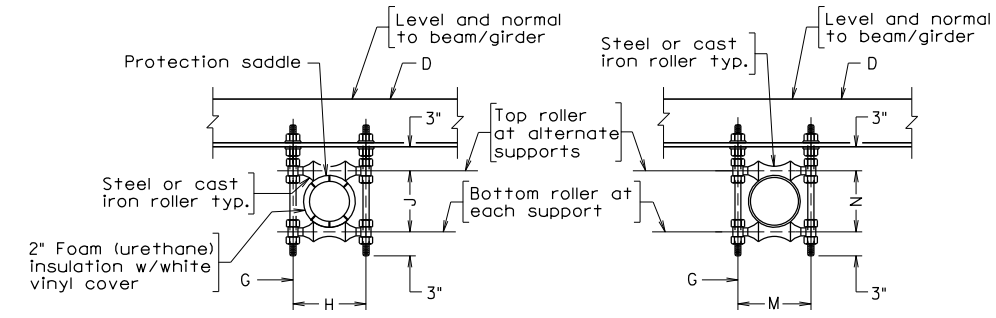
*** Or 2' beyond approach slab when casing is required



TYPICAL SUPPORT DETAIL AT EXPANSION JOINT
Scale: 1" = 1'-0"

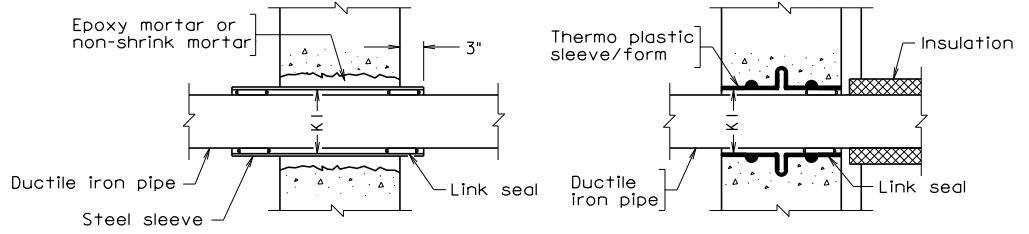
For insulation, use 2" foam (urethane) insulation with white vinyl cover and protection saddles. Provide support detail on both sides of expansion joint for bridges over 500'.

* Dimension is either 6", 7" or 8"

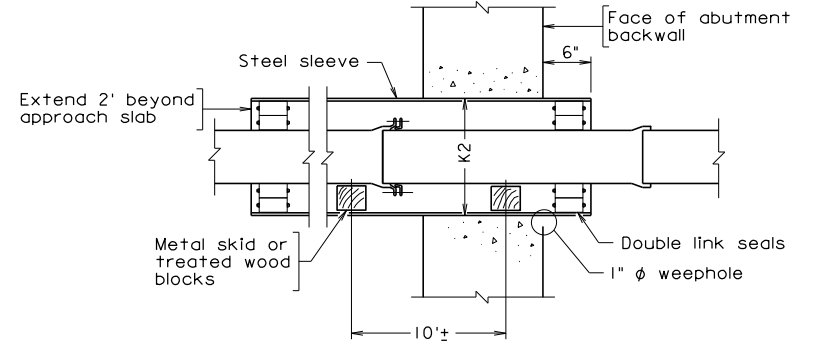


TYPICAL SUPPORT DETAIL
Scale: 1" = 1'-0"

For details not shown, see Typical Support Detail at Expansion Joint.



ABUTMENT SLEEVE DETAIL
Scale: 1" = 1'-0"

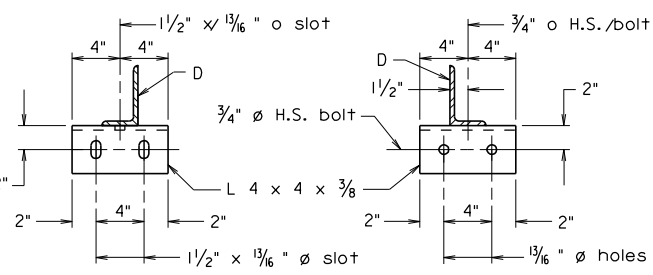


ABUTMENT SLEEVE DETAIL NEW STRUCTURE
Scale: 1" = 1'-0"

Note: Water line casing detail when line is under approach slab.

DIMENSIONS															
Pipe ϕ	A	B	C	D	E	F	G	H	J	K1	K2	M	N	P	S
6"	8 1/2"	6 1/2"	6 3/4"	L 6 x 4 x 1/2	1'-1"	2 3/4"	7/8"	1'-2"	1'-1 1/8"	0'-10"	1'-2"	9 1/16"	8 1/8"	L 3 x 3 x 3/8	7/8"
8"	9 3/4"	7 1/2"	7 3/4"	L 6 x 4 x 1/2	1'-3"	2 3/4"	7/8"	1'-3 3/4"	1'-3 5/8"	1'-0"	1'-4"	1'-0 1/8"	10 5/16"	L 3 x 3 x 3/8	1"
10"	11 1/2"	8 3/4"	9"	L 6 x 4 x 1/2	1'-5"	2 3/4"	1"	1'-5 3/4"	1'-6 3/4"	1'-2"	1'-6"	1'-2 1/8"	1'-0 5/8"	L 3 x 3 1/2 x 3/8	1 1/8"
12"	1'-0 3/4"	10"	10 1/4"	L 6 x 4 x 1/2	1'-7"	2 3/4"	1"	1'-7 3/4"	1'-8 1/4"	1'-4"	1'-8"	1'-4"	1'-3"	L 3 x 3 1/2 x 3/8	1 1/4"
14"	11"	8 3/8"	8 5/8"	L 7 x 4 x 1/2	1'-9"	4"	1"	1'-9 1/2"	1'-9 5/8"	1'-6"	1'-10"	1'-5 3/4"	1'-4 3/4"	L 3 x 4 x 3/8	1 1/8"
16"	1'-0 1/4"	9 1/2"	9 3/4"	L 7 x 4 x 1/2	1'-11"	4"	1"	1'-11 1/2"	1'-11 3/8"	1'-8"	2'-0"	1'-7 3/4"	1'-7"	L 3 x 4 x 3/8	1 1/4"
18"	1'-1 1/2"	10 1/2"	10 3/4"	L 8 x 4 x 1/2	2'-1"	4"	1 1/8"	2'-1 3/4"	2'-2 1/8"	1'-10"	2'-2"	1'-9 7/8"	1'-9"	L 3 x 5 x 3/8	1 1/4"
20"	1'-3"	11 5/8"	11 7/8"	L 8 x 4 x 3/4	2'-3"	4"	1 1/4"	2'-4"	2'-4 1/8"	2'-0"	2'-4"	2'-0 1/4"	1'-11 1/4"	L 3 x 5 x 3/8	1 1/4"
24"	1'-7"	1'-2"	1'-2 1/4"	L 8 x 4 x 3/4	2'-7"	4"	1 1/2"	2'-8 3/8"	2'-9 1/8"	2'-6"	2'-10"	2'-4 5/8"	2'-4"	L 3 x 5 x 3/8	1 1/2"

G = diameter of rod
S = diameter of shaft



DETAIL A **DETAIL B**
Scale: 1 1/2" = 1'-0"

Scale as noted. © 2012, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
WATER LINE SYSTEM					
G. Henderson					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		BWL-1
			Checked: S&B, DIV		
Revisions					

BWL-1.dgn
08-07-2012
BWL-1

Sealed and Signed by:
Julius F.J. Volzyl Jr.
Lic. No. 010487
On the date of
Aug. 7, 2012

A copy of the original
sealed and signed
standard drawing
is on file in the
Central Office.

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

**WATER LINE SYSTEM
STEEL BEAM/GIRDER SPANS**

NOTES TO DESIGNER:

Standard is to be used with steel beam/girder spans. Maximum beam/girder spacing is limited to 10'-0".

Utilities shall be placed in the exterior bays of the bridge if possible.

Values in table on the standard sheet are a composite from several manufacturers/suppliers.

Designer is required to check clearances at abutments if pipe is placed under approach slab. Minimum clearance varies linearly from 6" for a 6" diameter pipe to 12" for a 24" diameter pipe.

Indicate location and size (diameter) of water line to be used on the transverse section sheet. Show dimension from bottom of top flange (top of web) to bottom of angle support at the beam/girder the dimension is set on the transverse section sheet. When setting the dimension, allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames, etc. Include insulation requirements when setting clearances. Normally critical clearances are at the ends of spans (at supports). Indicate location of water line on framing plan. Show centerline and indicate size of water line. Do not show hanger spacing on framing plan.

Utilities Section (R/W) will provide the following information.

1. Size of pipe
2. Requirement for insulation of pipe
3. Requirement for casing under approach slab

For beam/girder design, the following weights may be used (includes total weight of hangers, pipe, and water). Linear interpolation may be used for actual beam/girder spacing.

Diameter of Pipe (inches)	Weight of Water Line (lbs./ft.)	
	Beam/Girder Spacing	
	6'-0"	10'-0"
6	47	54
8	66	72
10	90	95
12	115	121
14	136	144
16	168	175
18	202	210
20	248	259
24	336	348

**WATER LINE SYSTEM
STEEL BEAM/GIRDER SPANS**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SUPPORT DETAIL AT EXPANSION JOINT:

Enter dimension from bottom of top flange (top of web) to bottom of angle support (angle D in Table). This must agree with dimension set on transverse section sheet. Indicate dimension from centerline of pipe to centerline of beam/girder.

NOTES:

Indicate if insulation will/will not be required. Indicate if casing under approach slab will/will not be required.

STANDARD BWL-1: NOTES TO DESIGNER

VOL. V - PART 3
DATE: 29May2009
SHEET 3 of 3
FILE NO. BWL-1-3

STATE	FEDERAL AID	STATE	SHEET
ROUTE	PROJECT	ROUTE	NO.
VA.			

Notes:

Material - Ductile iron with mechanical joint
 Minimum thickness - Class 52 (rated pressure 300 psi)
 Hydrostatic test pressure shall be 200 psi minimum.
 Specification: ANSI A 21.51/AWWA C151
 Finish - Cement lined; bituminous outer coat
 Steel casing - API 5L-B 3/8" wall

Structural steel for angles shall be ASTM A36. The angles shall be galvanized in accordance with ASTM A123.

H.S. bolts for angles shall be ASTM 325 galvanized.

Abutment - Casing as detailed or Century-Line sleeve to be used for proposed structure only.
 Seal - one link-seal at each face.

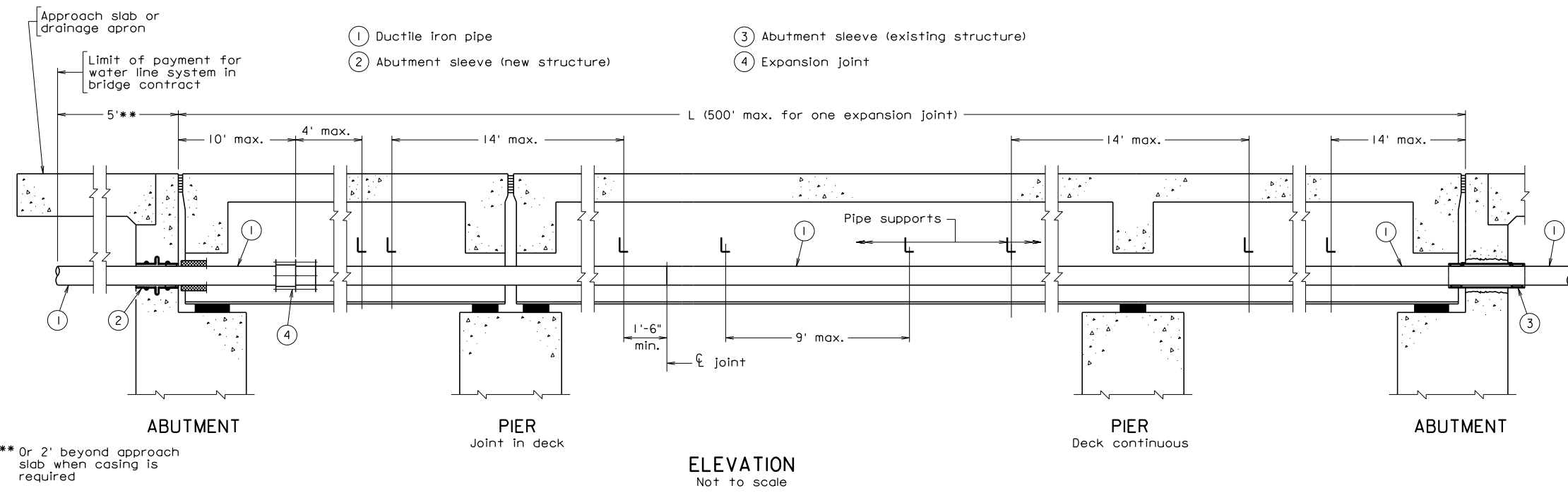
Expansion Joint - Dresser style 63, Type 3

Galvanization - Miscellaneous hardware: Rods, nuts, etc. shall be galvanized in accordance with ASTM A153.

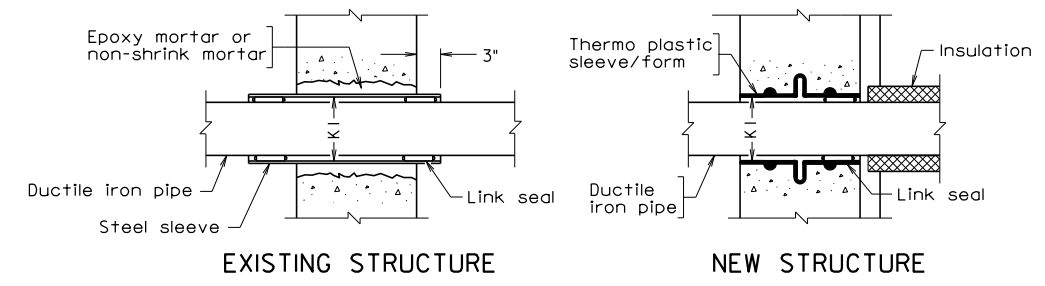
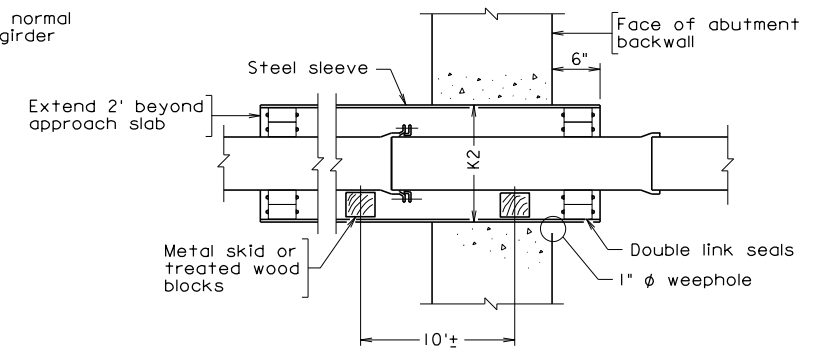
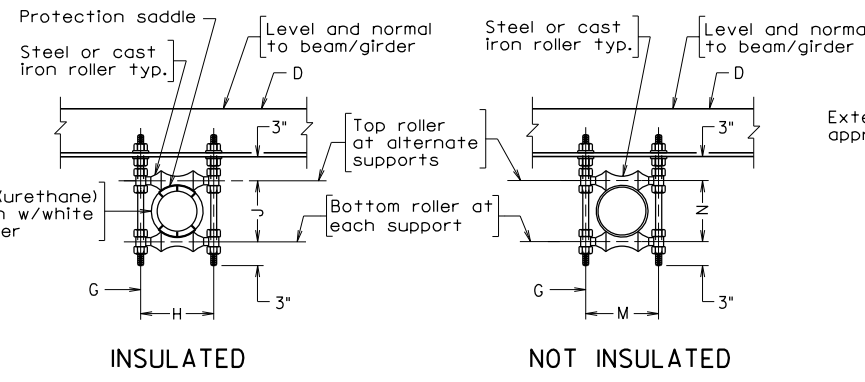
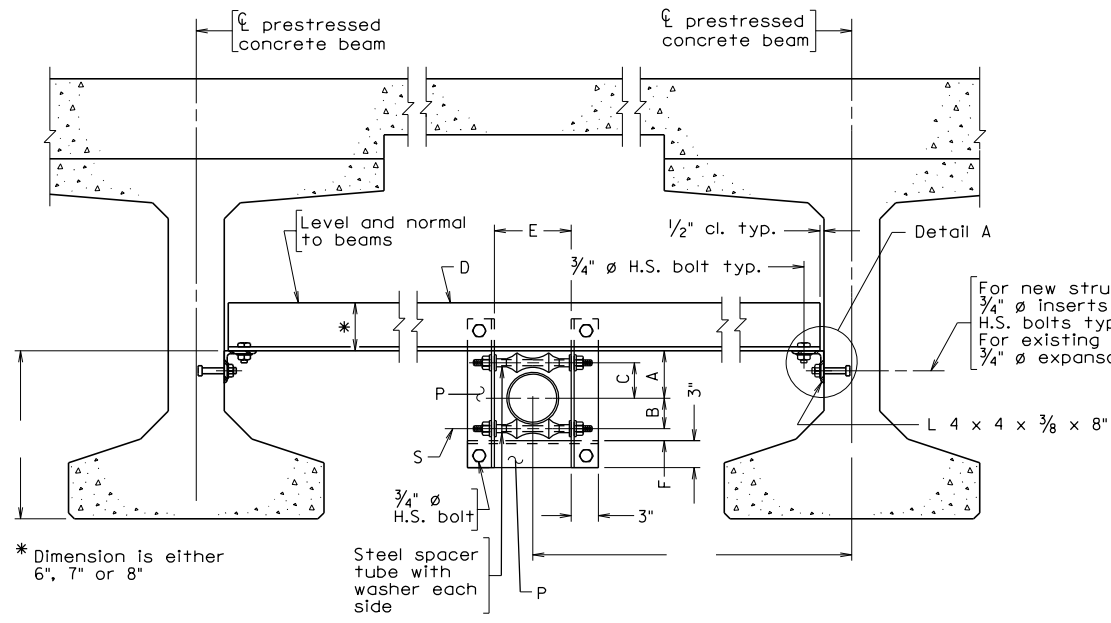
Insulation will ___ will not ___ be required.

Casing under approach slab will ___ will not ___ be required.

Payment - Water Line System shall be paid for on a lump sum basis, wherein no measurement shall be made, and shall be paid for at the contract lump sum price, which price shall include furnishing and installing ductile iron water main, expansion joints, testing, disinfecting (when required), insulation and cover (when required), hangers, rollers, rods, abutment sleeves, link seals, casing under approach slab (when required) and miscellaneous hardware; all as detailed on the Water Line System drawing included herein and within the pay limits shown thereon. Such price shall be full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

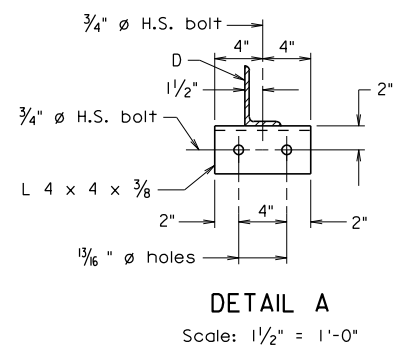


** Or 2' beyond approach slab when casing is required



DIMENSIONS															
Pipe ϕ	A	B	C	D	E	F	G	H	J	K1	K2	M	N	P	S
6"	8 1/2"	6 1/2"	6 3/4"	L 6 x 4 x 1/2	1'-1"	2 3/4"	7/8"	1'-2"	1'-1 1/8"	0'-10"	1'-2"	9 1/16"	8 1/8"	L 3 x 3 x 3/8	7/8"
8"	9 3/4"	7 1/2"	7 3/4"	L 6 x 4 x 1/2	1'-3"	2 3/4"	7/8"	1'-3 3/4"	1'-3 5/8"	1'-0"	1'-4"	1'-0 1/8"	10 5/8"	L 3 x 3 x 3/8	1"
10"	11 1/2"	8 3/4"	9"	L 6 x 4 x 1/2	1'-5"	2 3/4"	1"	1'-5 3/4"	1'-6 3/4"	1'-2"	1'-6"	1'-2 1/8"	1'-0 5/8"	L 3 x 3 1/2 x 3/8	1 1/8"
12"	1'-0 3/4"	10"	10 1/4"	L 6 x 4 x 1/2	1'-7"	2 3/4"	1"	1'-7 3/4"	1'-8 1/4"	1'-4"	1'-8"	1'-4"	1'-3"	L 3 x 3 1/2 x 3/8	1 1/4"
14"	11"	8 3/8"	8 5/8"	L 7 x 4 x 1/2	1'-9"	4"	1"	1'-9 1/2"	1'-9 5/8"	1'-6"	1'-10"	1'-5 3/4"	1'-4 3/4"	L 3 x 4 x 3/8	1 1/8"
16"	1'-0 1/4"	9 1/2"	9 3/4"	L 7 x 4 x 1/2	1'-11"	4"	1"	1'-11 1/2"	1'-11 3/8"	1'-8"	2'-0"	1'-7 3/4"	1'-7"	L 3 x 4 x 3/8	1 1/4"
18"	1'-1 1/2"	10 1/2"	10 3/4"	L 8 x 4 x 1/2	2'-1"	4"	1 1/8"	2'-1 3/4"	2'-2 1/8"	1'-10"	2'-2"	1'-9 7/8"	1'-9"	L 3 x 5 x 3/8	1 1/4"
20"	1'-3"	11 3/8"	11 1/8"	L 8 x 4 x 1/2	2'-3"	4"	1 1/4"	2'-4"	2'-4 1/8"	2'-0"	2'-4"	2'-0 1/4"	1'-11 1/4"	L 3 x 5 x 3/8	1 1/4"
24"	1'-7"	1'-2"	1'-2 1/4"	L 8 x 4 x 1/2	2'-7"	4"	1 1/2"	2'-8 3/8"	2'-9 1/8"	2'-6"	2'-10"	2'-4 5/8"	2'-4"	L 3 x 5 x 3/8	1 1/2"

G = diameter of rod
 S = diameter of shaft



Scale as noted. © 2015, Commonwealth of Virginia

BWL-2.dgn
10-15-2015
BWL-2

Sealed and Signed by:
 Prasad L. Nallaprageni
 Lic. No. 033003
 On the date of
 October 15, 2015

A copy of the original
 sealed and signed
 standard drawing
 is on file in the
 Central Office.

VDOT S&B DIVISION
 RICHMOND, VA
 STRUCTURAL ENGINEER

COMMONWEALTH OF VIRGINIA STRUCTURE AND BRIDGE DIVISION					
WATER LINE SYSTEM					
G. Henderson					
No.	Description	Date	Designed: S&B...DIV	Date	Plan No.
			Drawn: S&B...DIV		BWL-2
			Checked: S&B...DIV		
Revisions					

**WATER LINE SYSTEM
CONCRETE BEAM SPANS**

NOTES TO DESIGNER:

Standard is to be used with concrete beam/girder spans. Maximum beam/girder spacing is limited to 10'-0".

Utilities shall be placed in the exterior bays of the bridge if possible.

Values in table on the standard sheet are a composite from several manufacturers/suppliers.

Designer is required to check clearances at abutments if pipe is placed under approach slab. Minimum clearance varies linearly from 6" for a 6" diameter pipe to 12" for a 24" diameter pipe.

Indicate location and size (diameter) of water line to be used on the transverse section sheet. Show dimension from bottom of beam to bottom of angle support at the beam/girder the dimension is set on the transverse section sheet. When setting the dimension, allow for a minimum of 1" (2" to 3" preferred) clearance to diaphragms, cross frames, etc. Include insulation requirements when setting clearances. Indicate location of water line on framing plan (erection diagram). Show centerline and indicate size of water line. Do not show hanger spacing on framing plan (erection diagram).

Utilities Section (R/W) will provide the following information.

1. Size of pipe
2. Requirement for insulation of pipe
3. Requirement for casing under approach slab

For beam design, the following weights may be used (includes total weight of hangers, pipe, and water). Linear interpolation may be used for actual beam/girder spacing.

Diameter of Pipe (inches)	Weight of Water Line (lbs./ft.)	
	Beam Spacing	
	6'-0"	10'-0"
6	57	64
8	75	81
10	97	103
12	122	128
14	143	150
16	174	181
18	211	218
20	253	265
24	340	351

**WATER LINE SYSTEM
CONCRETE BEAM SPANS**

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

TYPICAL SUPPORT DETAIL AT EXPANSION JOINT:

Enter dimension from bottom of beam to bottom of angle support (angle D in Table). This must agree with dimension set on transverse section sheet. Indicate dimension from centerline of pipe to centerline of beam/girder.

NOTES:

Indicate if insulation will/will not be required. Indicate if casing under approach slab will/will not be required.

STANDARD BWL-2: NOTES TO DESIGNER

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DATE: 29May2009
SHEET 3 of 3
FILE NO. BWL-2-3