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GENERAL NOTES:

- BARRIER CONCRETE:** Use Class II concrete for all barriers constructed in slightly aggressive environments, and use Class IV Concrete for all barriers constructed in moderately or extremely aggressive environments. On all exposed surfaces, apply a Class 3 surface finish in accordance with Specification 400.
- STEEL BAR REINFORCEMENT:** Where required to maintain continuity, provide lap splices of at least 18 inches for No. 4 bars and 20 inches for No. 5 bars, unless otherwise shown herein (including shorter splices as provided by the default bar bending diagrams).

The default reinforcing details shown herein, including bar shapes and lap splice positions, are intended to show required steel locations and provide for a constructible design. However, with the approval of the Engineer, alternate steel configurations may be used in the same locations shown herein, given that the equivalent strength reinforcing is provided and the cover, maximum spacing, and continuity requirements are maintained.
- OPTIONAL WELDED WIRE REINFORCEMENT:** With the approval of the Engineer, steel welded wire reinforcement in accordance with Specification 415 may be substituted for the steel bars shown herein. Place the welded wire in the same locations specified for the steel bars, and maintain the equivalent strength, cover, maximum spacing, and continuity requirements.

GENERAL NOTES (CONTINUED):

- TOP FACE LONGITUDINAL REINFORCEMENT:** Unless otherwise specified, the longitudinal reinforcement shown closest to the top face of the barrier has a maximum cover of 4½", measured from the top face of the barrier.
- MINIMUM BARRIER LENGTH:** Unless otherwise shown in the Plans, the minimum Concrete Barrier length is 40 feet.
- CONSTRUCTION JOINTS:** Install Construction Joints only as needed for discontinuous concrete casting or cold joints. Maintain continuity of steel reinforcement across Construction Joints. Construction Joints are classified herein as Transverse Joints or Longitudinal Joints.

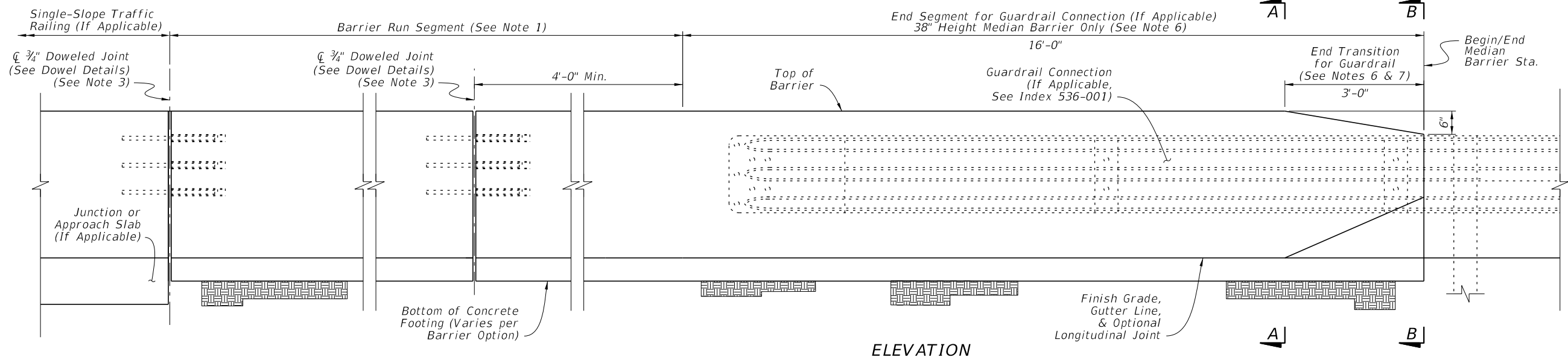
Transverse Joints are permitted at 20-foot or greater intervals along the barrier. For Tall Grade-Separated Sections, see Sheet 5 for additional Transverse Joint requirements.

Longitudinal Joints are only permitted where indicated in the following details and notes, with a vertical position tolerance of ± 1½" from the locations shown.
- DOWELED JOINTS:** As shown in the Dowel Details on Sheets 2 & 13, install ¾" Doweled Joints for Concrete Barrier connections to Pier Protection Barrier and Traffic Railings. Doweled Joints are also required for expansion mitigation in Median Barrier as defined per Sheets 2 & 5. Doweled Joints are not permitted within Grade-Separated Median Barrier.
- CRACK CONTROL V-GROOVES:** At 20-foot intervals, place ¾" depth V-grooves that run vertically and/or transversely in the front, top, and back faces of barriers. The V-grooves can be either molded or scored while the concrete is still plastic.
- SUBGRADE:** Compact the top layer of subgrade with Type B Stabilization, LBR 40 (12 in.).
- FOOTING BOTTOM CONCRETE COVER:** At the bottom of barrier footings shown throughout this Index, up to 2 inches of additional concrete cover is permitted beyond what is shown herein to accommodate soil grade irregularities.
- FINISH GRADE ELEVATION:** At the barrier face location, the finish grade pavement has a vertical position tolerance of ± ½" from the locations shown herein, relative to the barrier elevation. Maintain visually smooth and even pavement at the barrier face, per the approval of the Engineer.
- DRAINAGE INLETS:** Where called for in the Plans, install corresponding inlets per Indexes 425-030 thru 425-032.
- LIGHT POLE MOUNTING:** Where called for in the Plans, install aluminum light poles per Index 715-002.
- OPAQUE VISUAL BARRIER:** Where called for in the Plans, install Opaque Visual Barrier per Index 521-010.
- BARRIER END MARKERS:** For all free ends of concrete barriers that are not shielded with an end treatment or connection to another barrier or traffic railing type, install a Type 3 Object Marker on the end face per Specification 705.
- BARRIER DELINEATORS:** Install Barrier Delineators in accordance with Specification 705. For median barriers, mount the delineator on the top of the barrier, at the centerline of barrier, with reflective sheeting facing traffic on both approaches. For shoulder barriers and split sections, mount the delineators on the top of the barrier, with the roadway side of the delineator located 2" from the front face of the barrier and the reflective sheeting facing traffic of the nearest approach.
- TOLL SITES:** Where called for in the Plans, substitute the steel reinforcing bars shown herein with GFRP reinforcing bars of the same size. Construct GFRP reinforcing bars in accordance with Specification 932, and use a 4½" inner diameter for bar bends. Where required to fit pull boxes while maintaining bar spacing and concrete cover, trim GFRP bars as defined in the Plans.

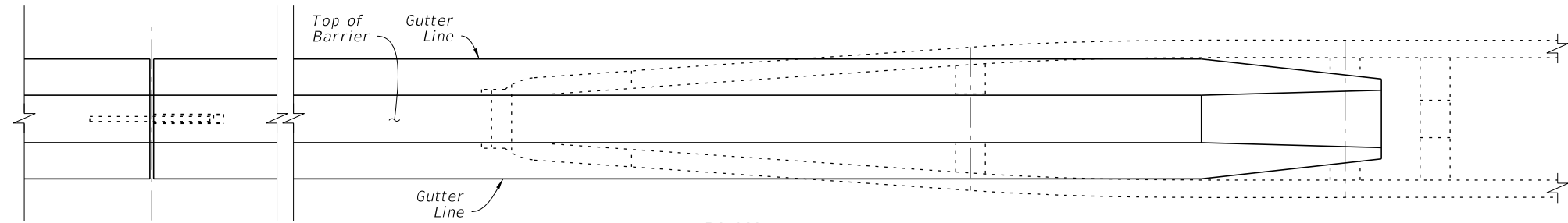
At toll site locations, the use of Median Barriers on outside shoulders is permitted where called for in the Plans. Shoulder Pavement shown herein may be substituted with material for an alternate usage where defined in the Plans.

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ELEVATION



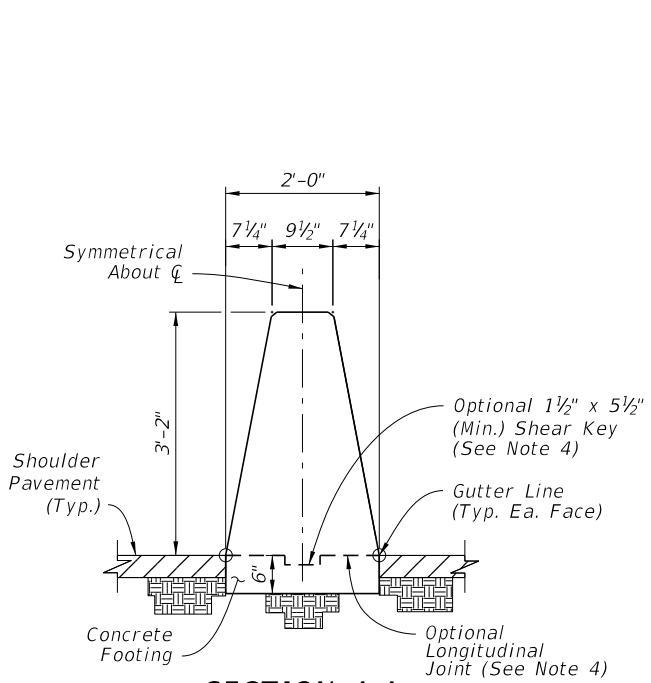
PLAN

NOTES:

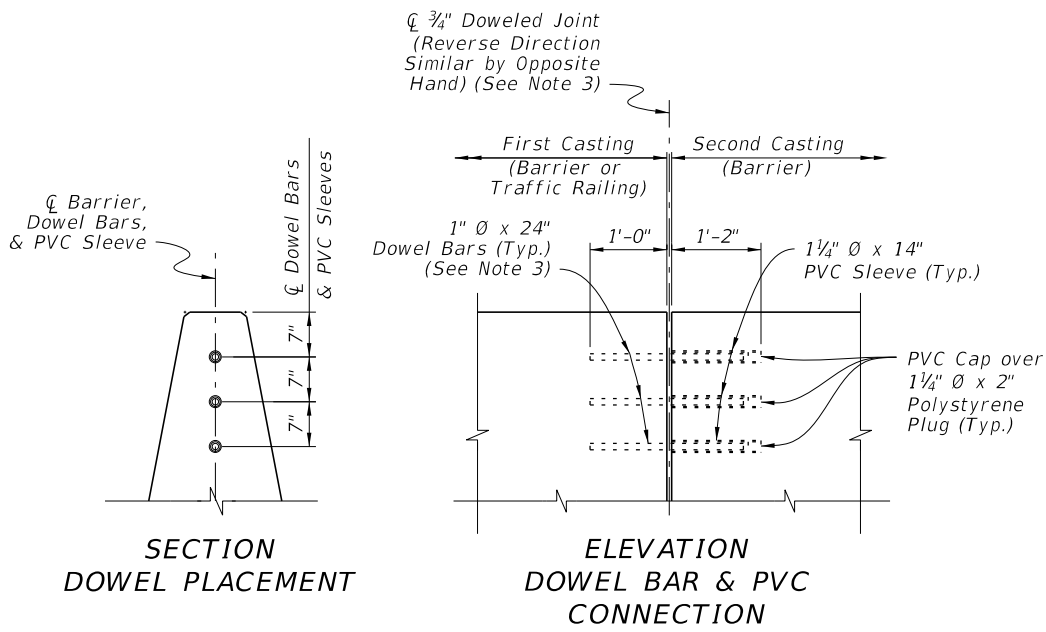
- BARRIER RUN SEGMENT:** Within the Barrier Run Segment, either the 38" Height Median Barrier or the differing Median Barrier sections shown throughout the Index may be placed as required per the Plans.
- SECTION VIEWS:** For additional Views A-A and B-B, see Sheet 3.
- DOWELED JOINTS:** See the General Notes on Sheet 1 for usage of joint types. Space Doweled Joints at 100-foot maximum intervals. Place steel reinforcing with a longitudinal 3" cover adjacent to the joint face(s) in the barrier. Use ASTM A36 smooth round bars with hot-dip galvanization.

For the dowel connection into the first casting, the dowel may be cast-in-place for new concrete or placed into a 1 1/8" x 13" (± 1/2") drilled hole for cured concrete. For drilled holes larger than 1 1/8" diameter, secure the dowel with adhesive in accordance with Specification 416. No load testing is required.

For the dowel connection into the second casting, use a 1 1/4" NPS Schedule 80 PVC pipe with a sealed cap, cast-in-place as shown.
- OPTIONAL LONGITUDINAL JOINT:** When a longitudinal joint is placed above the footing, use the Optional 1 1/2" x 5 1/2" Shear Key shown. As a substitute for the Shear Key, the concrete footing's top surface may be raked to provide additional shear friction. Rake the fresh concrete surface so that about half of the surface area consists of approximately 1/4" depth longitudinal grooves, distributed evenly and approved by the Engineer.
- TRAFFIC RAILING CONNECTIONS:** Align the barrier and Traffic Railing faces and connect with the 3/4" Doweled Joint.
- GUARDRAIL CONNECTIONS:** Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001 in conjunction with the 16'-0" End Segment for Guardrail shown herein.
- CRASH CUSHION CONNECTIONS:** Connect Crash Cushions per Index 544-001 in conjunction with the 3'-0" End Transition for Guardrail as shown herein.
- FREE ENDS:** When the barrier end does not terminate with a Traffic Railing Connection, Guardrail Connection, Crash Cushion Connection, or Sloped End Treatment as called for in the Plans, terminate in accordance with the Free End Reinforcing detail on Sheet 3.



SECTION A-A
38" HEIGHT MEDIAN BARRIER
(See Sheet 3 for Steel Reinforcing Details)



SECTION DOWEL PLACEMENT

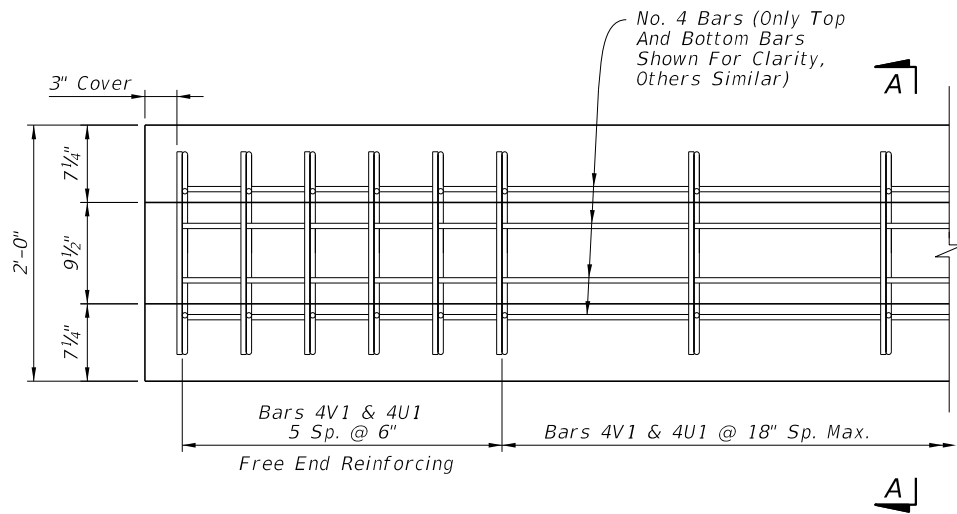
ELEVATION DOWEL BAR & PVC CONNECTION

DOWEL DETAILS

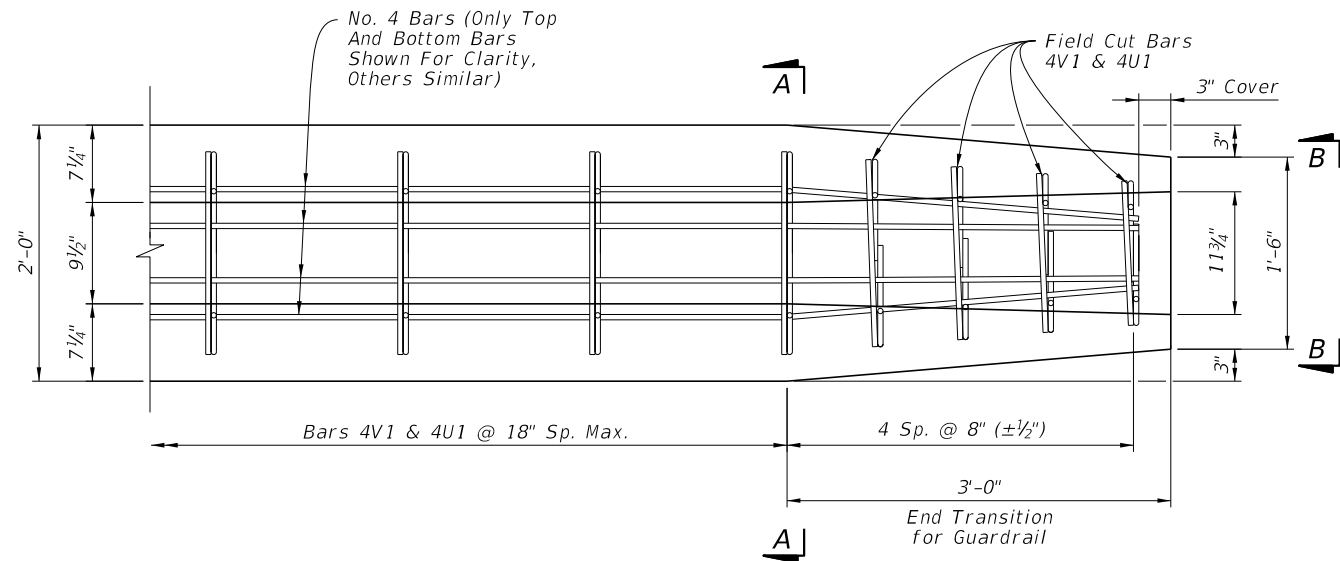
MEDIAN BARRIER

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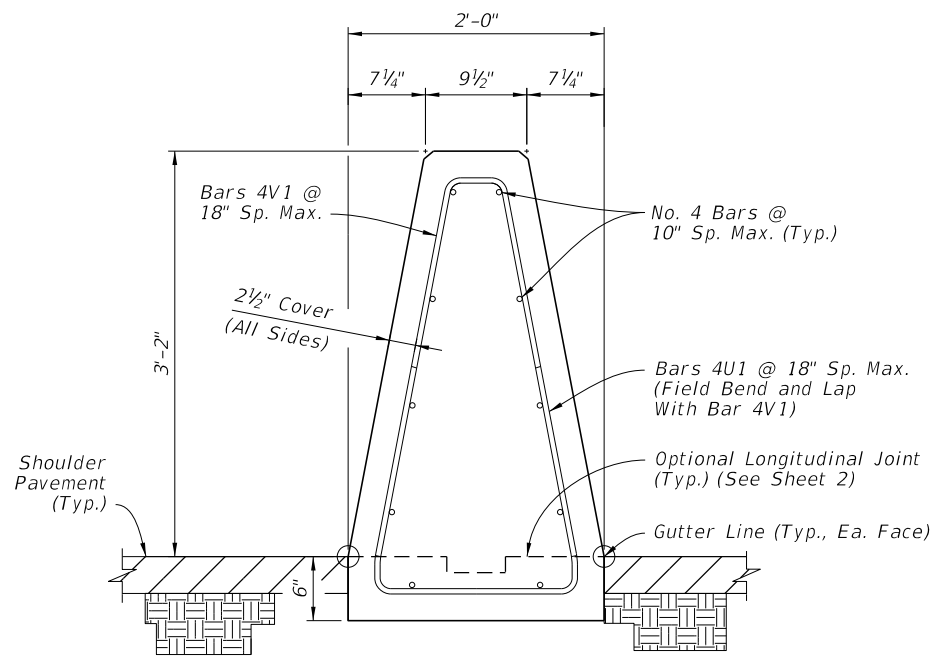
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PLAN VIEW - 38" HEIGHT MEDIAN BARRIER
FREE END REINFORCING (See Note 3)

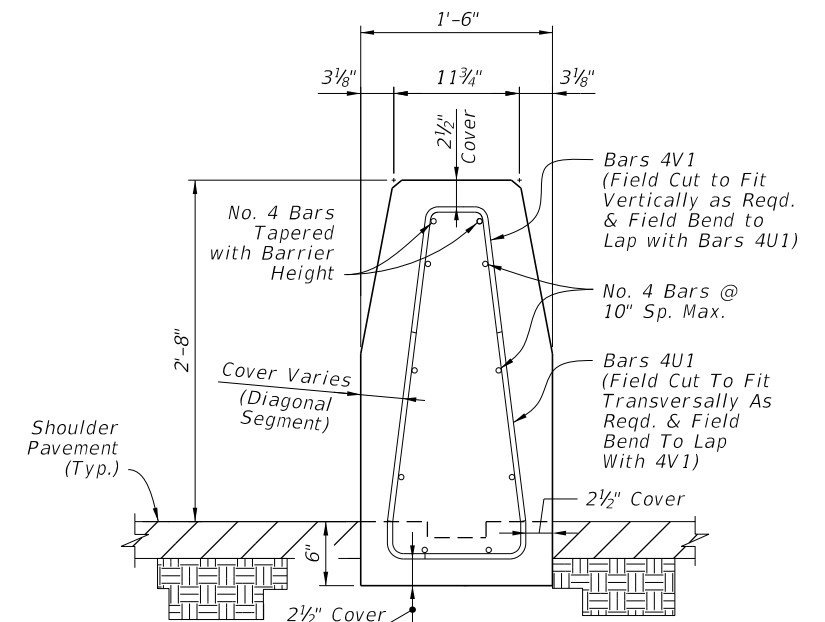


PLAN VIEW - END SEGMENT FOR
GUARDRAIL CONNECTION (See Note 3)



SECTION A-A
38" HEIGHT
MEDIAN BARRIER

Concrete Qty. = 0.20 CY/FT
Steel Qty. = 11.8 LB/FT




VIEW B-B
REDUCED SECTION
OF END TRANSITION
FOR GUARDRAIL
(End of Barrier)

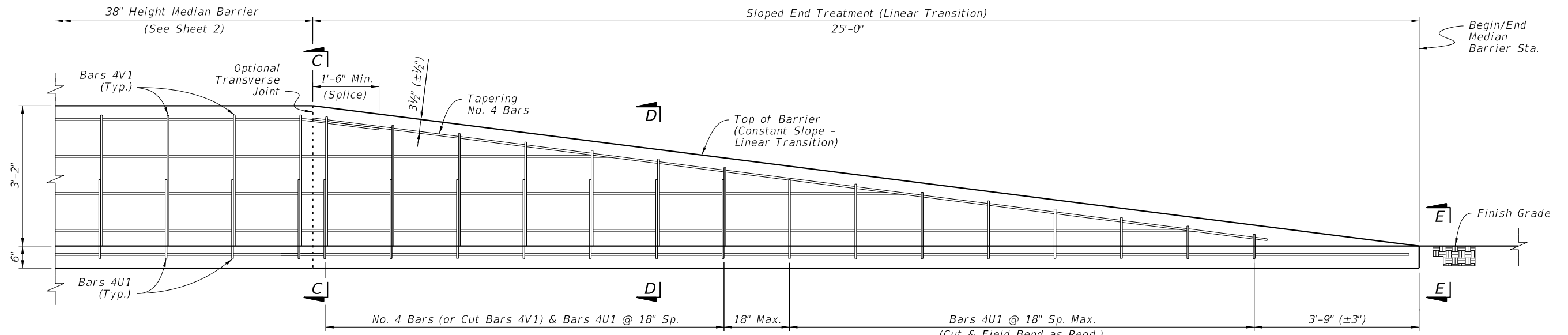
NOTES:

1. GENERAL: Work with the Plan and Elevation Views on Sheet 2.
2. BAR BENDING DIAGRAMS: For additional information on Bars 4V1 and 4U1, see the details on Sheet 26.
3. PLAN VIEWS: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal steel locations, see the section views.

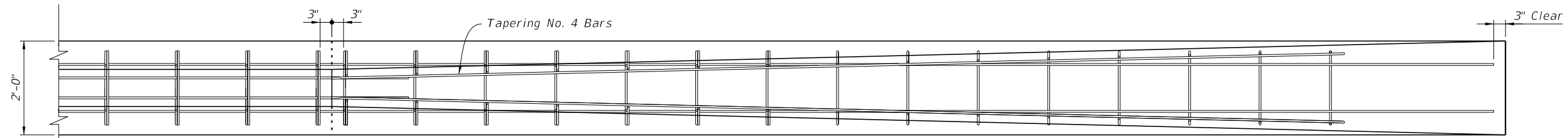
MEDIAN BARRIER - REINFORCING DETAILS

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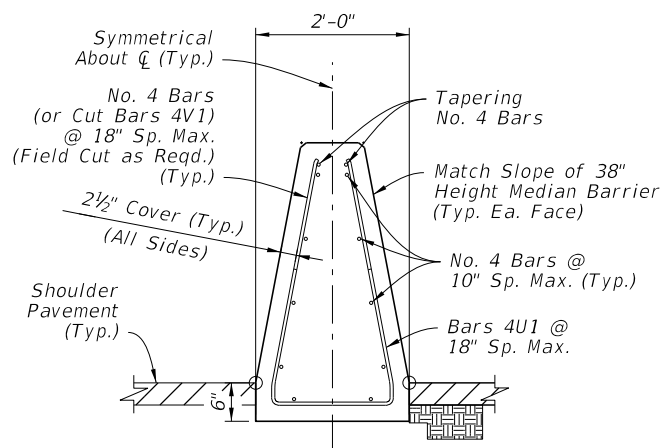
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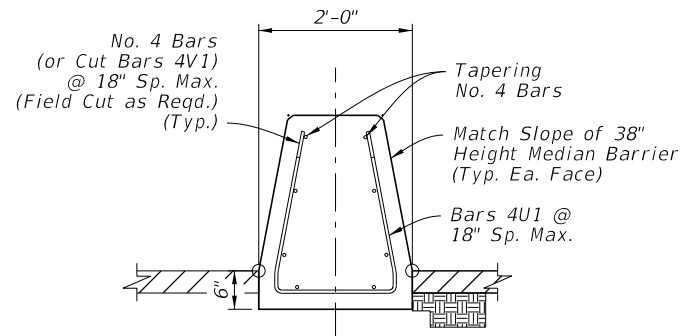
ELEVATION - SLOPED END TREATMENT



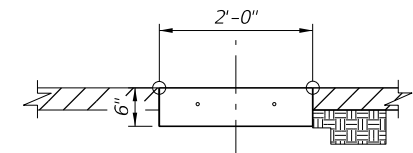
PLAN - SLOPED END TREATMENT
(Only Top & Bottom Longitudinal Bars Shown for Clarity,
See Section Views for All Longitudinal Steel Locations)



SECTION C-C
BEGIN TRANSITION
REINFORCING
(Height Varies Linearly
per Elevation View)



SECTION D-D
INTERMEDIATE TRANSITION
REINFORCING
(Height Varies Linearly
per Elevation View)



VIEW E-E
END TRANSITION

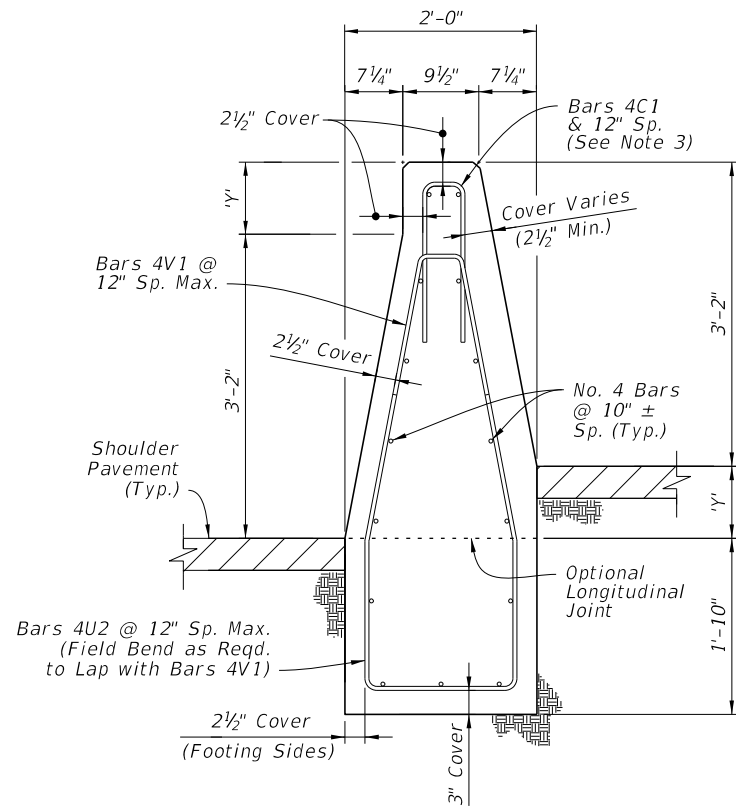
NOTES:

- GENERAL: Install Sloped End Treatment only where called for in the plans.
- JOINTS: Construction or Doweled Joints are not permitted within the Sloped End Treatment segment.

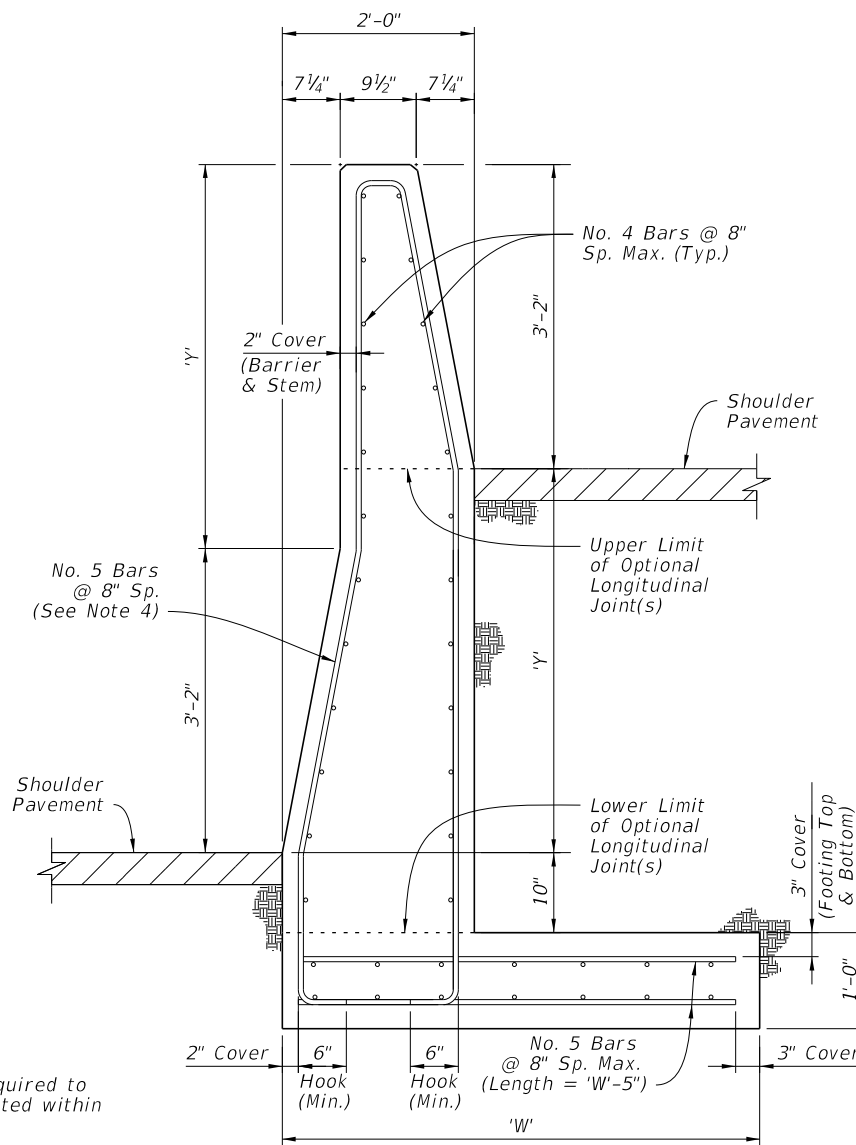
MEDIAN BARRIER -
SLOPED END TREATMENT

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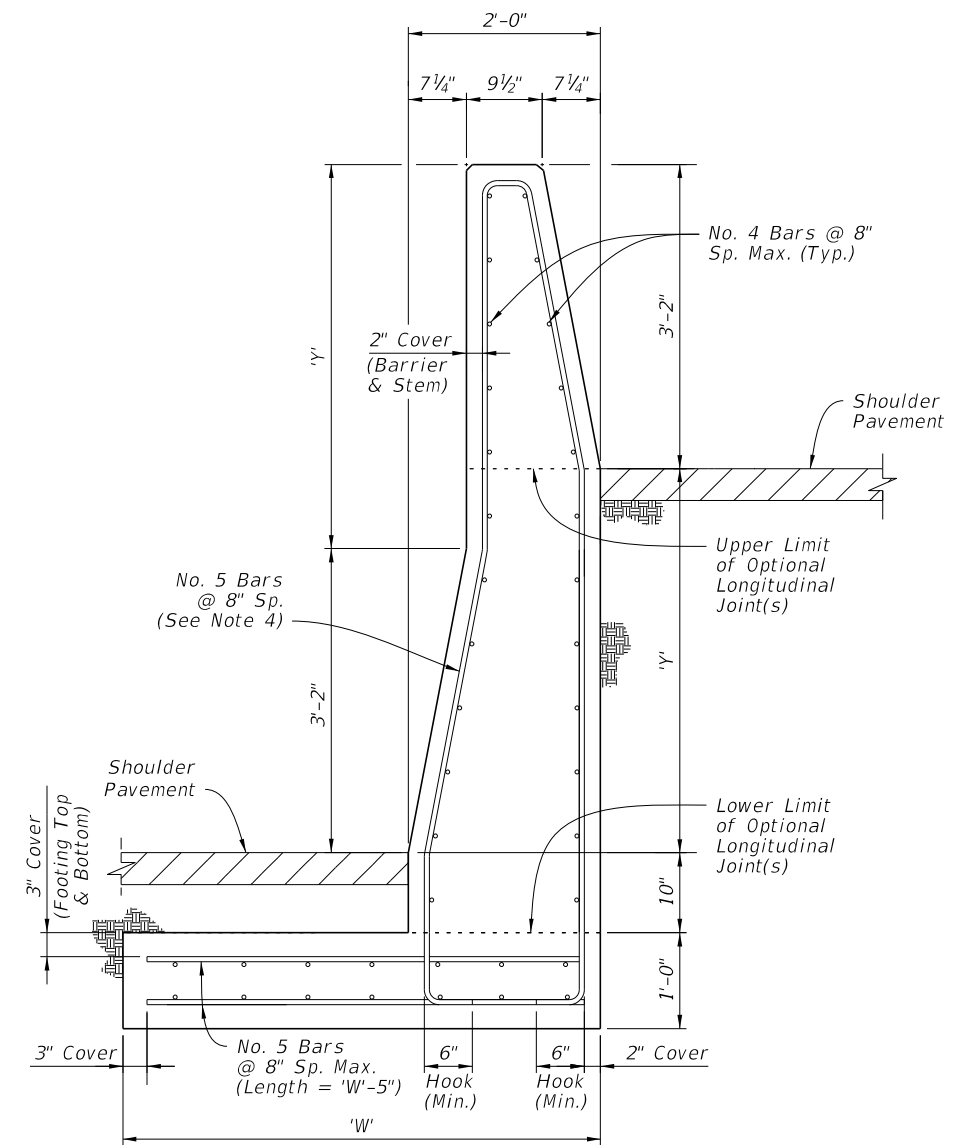
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SHORT GRADE-SEPARATED SECTION FOR $Y \leq 9"$



TALL GRADE-SEPARATED HEEL FOOTING SECTION FOR $Y \leq 4'-0"$



TALL GRADE-SEPARATED TOE FOOTING SECTION FOR $Y \leq 4'-0"$

NOTES:

- GENERAL:** Install the Grade-Separated sections where shown in the Plans and as required to accommodate vertical offsets in pavement of Height Y. Doweled Joints are not permitted within Grade-Separated sections.
- CONNECTIONS BETWEEN DIFFERENT SECTIONS:** Connect Short Grade-Separated sections and Tall Grade-Separated sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections or has a full lap splice with the adjacent section's longitudinal steel. Connect Short Grade-Separated sections and 38" Height Median Barrier sections of Sheet 2 using a 3/4" Doweled Joint.
- SHORT GRADE-SEPARATED SECTIONS:** Bars 4C1 and the two uppermost longitudinal bars may be omitted for segments where $Y < 2"$.
- TALL GRADE-SEPARATED SECTIONS:** For the vertical and transverse steel reinforcement shown in the Tall Grade-Separated Sections, bar bending diagrams are not provided due to varying section dimensions and Longitudinal Joint locations. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

Longitudinal Joints are permitted between the vertical limits shown, and must remain level and at a consistent height per each continuous casting of concrete. Longitudinal Joints may change elevations at Transverse Joint locations. Field bending of bars is permitted at Longitudinal Joint locations.

Transverse Joints between Tall Grade-Separated Sections do not require continuous steel across the joint if the following conditions are met:

- The barrier length on both sides is at least 40 feet, where each segment has continuous steel reinforcement.
- The barrier's vertical steel spacing is reduced to 4" O.C. for a total of 12 spaces on both sides of the joint.

Grade separation Heights of $Y \leq 9"$ are permitted on a limited basis using the Tall Grade-Separated section; this is to accommodate cases where maintaining the spread footing through lower height segments is more practical than changing to the Short Grade-Separated section.

TALL GRADE-SEPARATED SECTIONS DIMENSION TABLE							
Max. Height, Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Footing Width, W	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"	4'-6"	4'-6"

MEDIAN BARRIER - GRADE-SEPARATED

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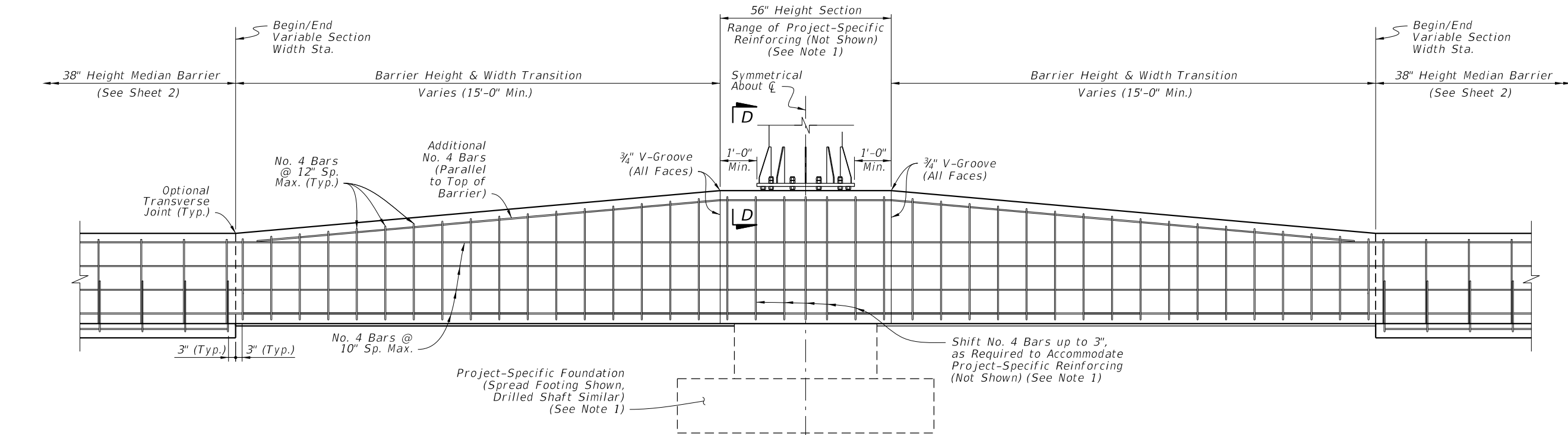


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STANDARD PLANS**

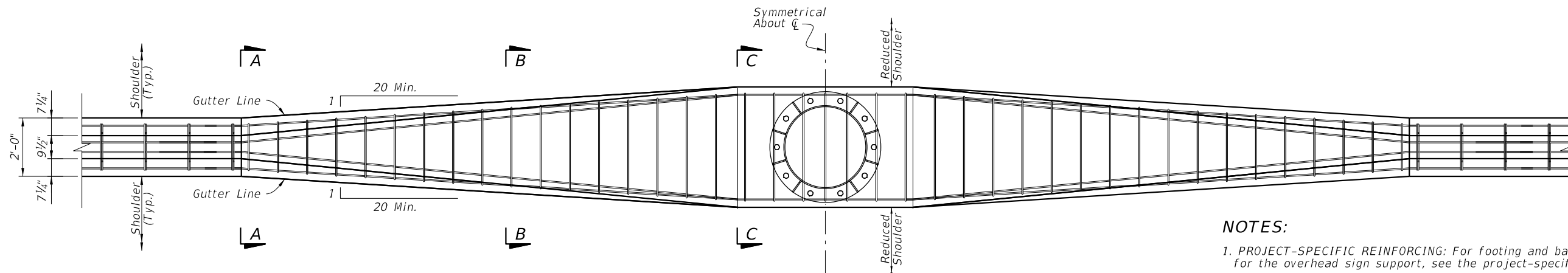
CONCRETE BARRIER

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ELEVATION

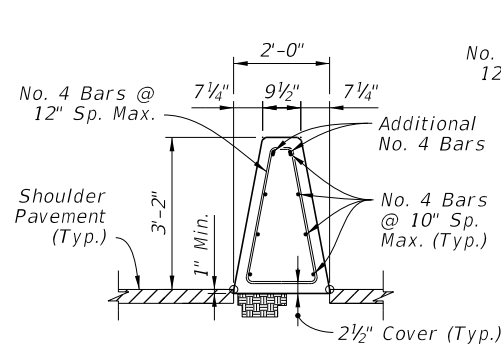


PLAN
(See Note 4)

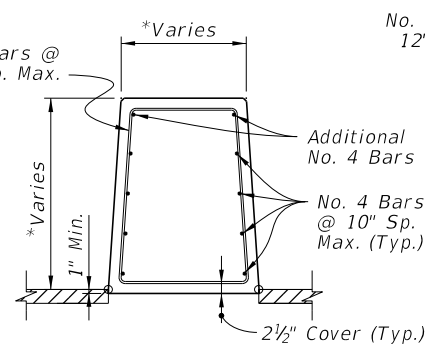
NOTES:

1. PROJECT-SPECIFIC REINFORCING: For footing and barrier reinforcing required for the overhead sign support, see the project-specific design in the Plans.
2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4 1/2" maximum cover from the top of the barrier.
3. PROJECT-SPECIFIC PEDESTAL WIDTH & SETBACK: The pedestal width is governed by the size requirements of the overhead sign support, as detailed in the Plans. Likewise, the setback distance from the sign support base to the barrier face is governed by the anchor bolt cover requirements, as defined per the Plans. The minimum pedestal width is 2'-0", where a complete removal of the gutter line taper is permitted.
4. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

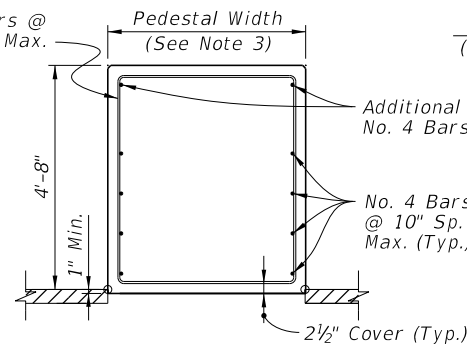
For the vertical and transverse reinforcement requirements shown in Sections A-A through C-C, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.



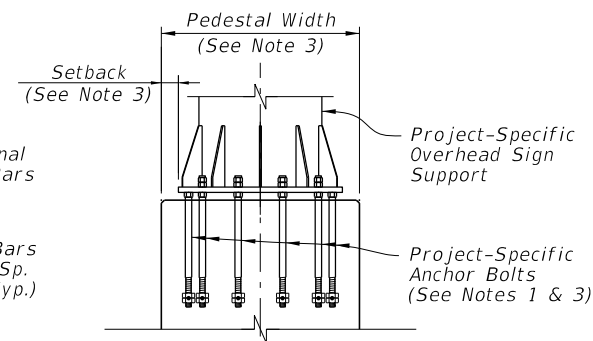
SECTION A-A
BEGIN TRANSITION



SECTION B-B
*Dimension Varies Linearly Between Section A-A and C-C



SECTION C-C
END TRANSITION
(56" Height Section)



SECTION D-D
(Reinforcing Steel Not Shown for Clarity)

MEDIAN BARRIER - 56" HEIGHT SECTION
FOR BARRIER-MOUNTED SIGN
SUPPORT SHIELDING - SYMMETRICAL

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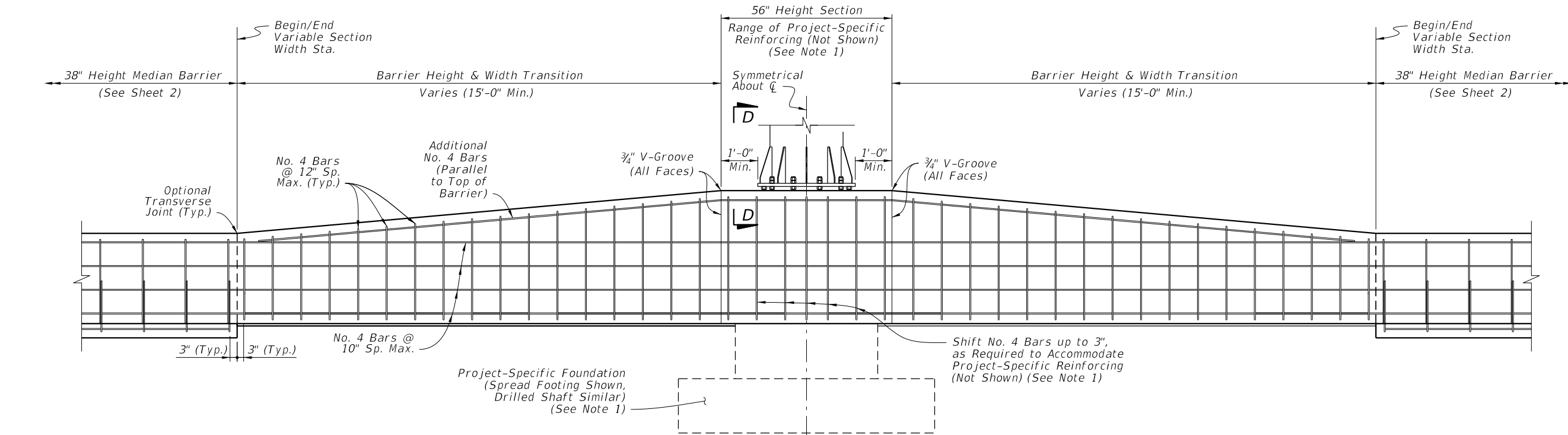


FY 2019-20
STANDARD PLANS

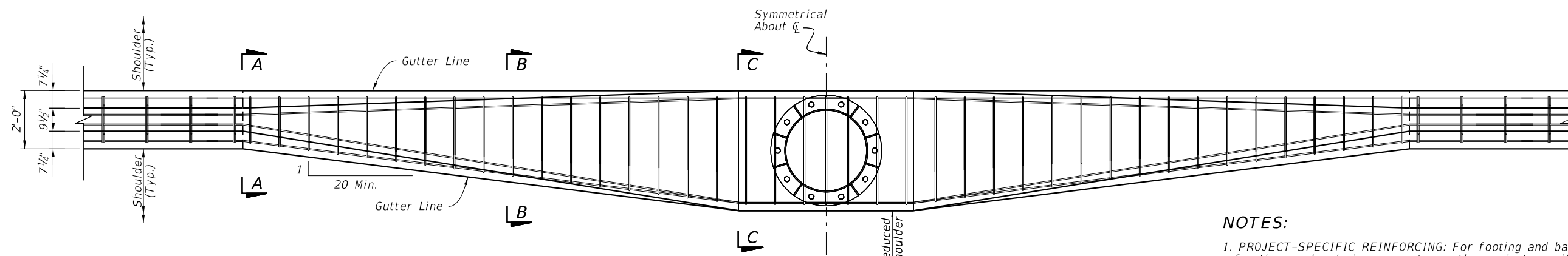
CONCRETE BARRIER

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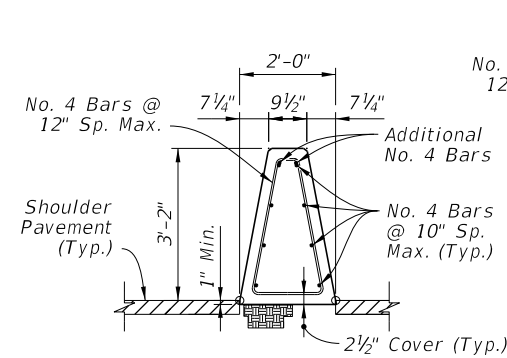
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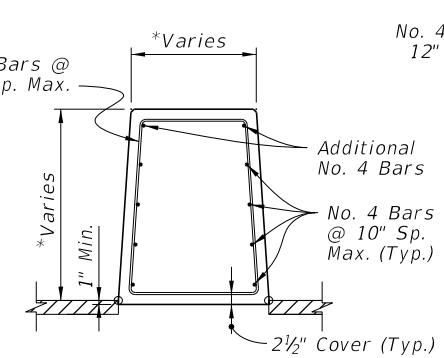
PLAN
(See Note 4)

NOTES:

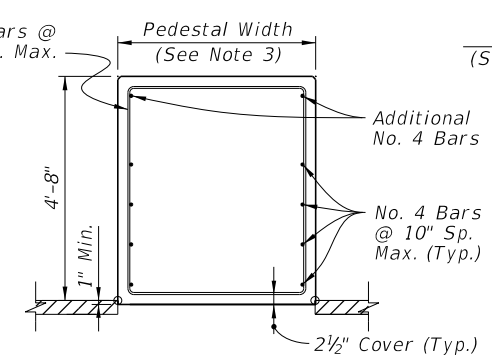
1. PROJECT-SPECIFIC REINFORCING: For footing and barrier reinforcing required for the overhead sign support, see the project-specific design in the Plans.
2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4 1/2" maximum cover from the top of the barrier.
3. PROJECT-SPECIFIC PEDESTAL WIDTH & SETBACK: The pedestal width is governed by the size requirements of the overhead sign support, as detailed in the Plans. Likewise, the setback distance from the sign support base to the barrier face is governed by the anchor bolt cover requirements, as defined per the Plans. The minimum pedestal width is 2'-0", where a complete removal of the gutter line taper is permitted.
4. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.



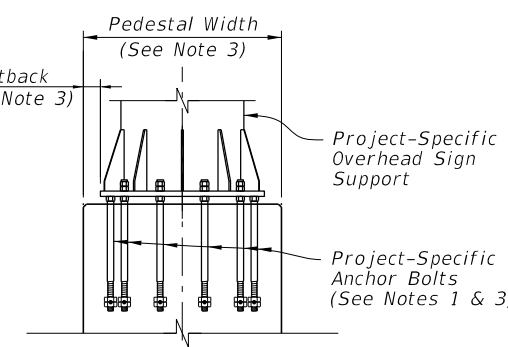
SECTION A-A
BEGIN TRANSITION



SECTION B-B
*Dimension Varies Linearly
Between Section A-A and C-C



SECTION C-C
END TRANSITION
(56" Height Section)

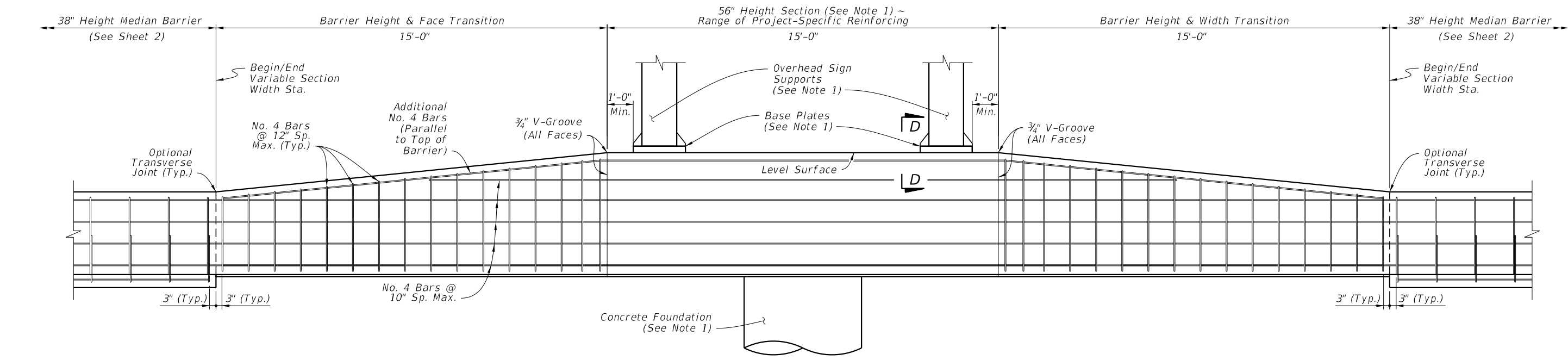


SECTION D-D
(Reinforcing Steel Not
Shown for Clarity)

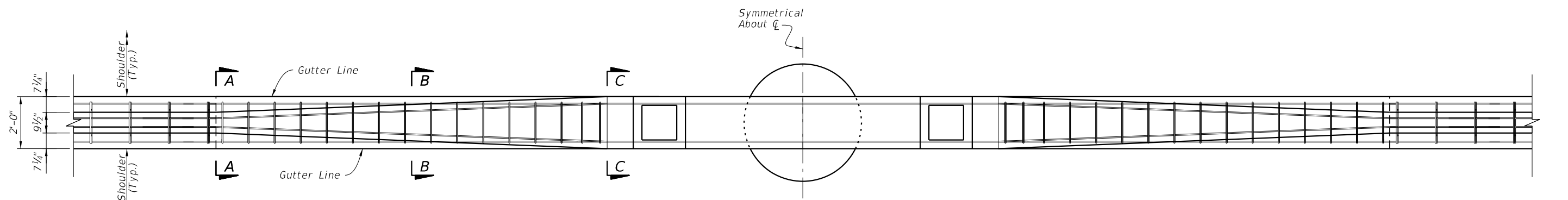
MEDIAN BARRIER - 56" HEIGHT SECTION
FOR BARRIER-MOUNTED SIGN
SUPPORT SHIELDING - ASYMMETRICAL

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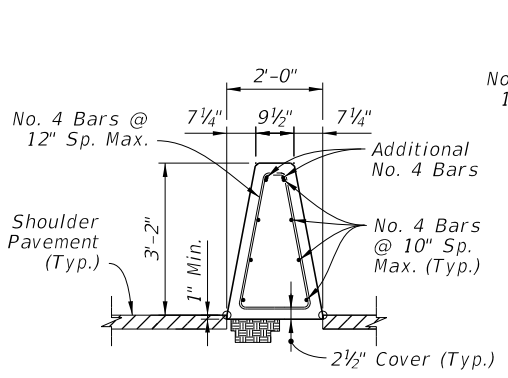
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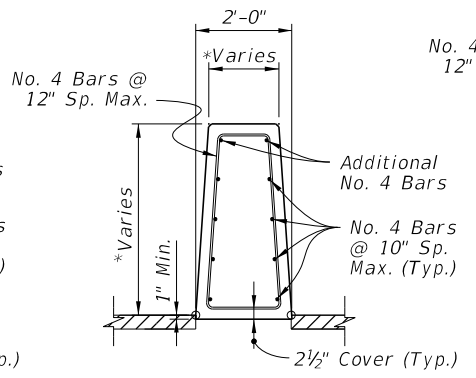
ELEVATION



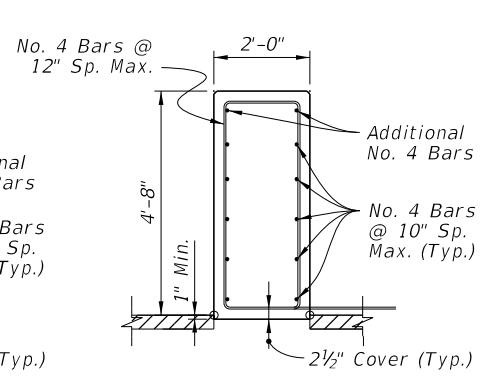
PLAN
(See Note 3)



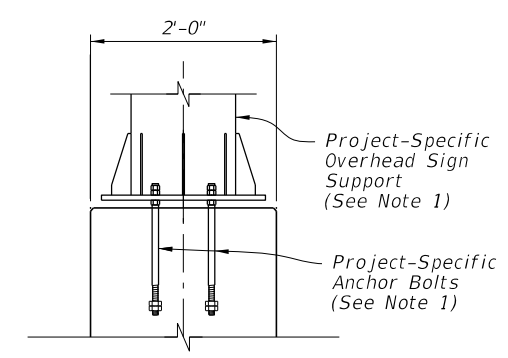
SECTION A-A
BEGIN TRANSITION



SECTION B-B
*Dimension Varies Linearly
Between Section A-A and C-C



SECTION C-C
END TRANSITION
(56" Height Section)



SECTION D-D
(Reinforcing Steel Not
Shown for Clarity)

NOTES:

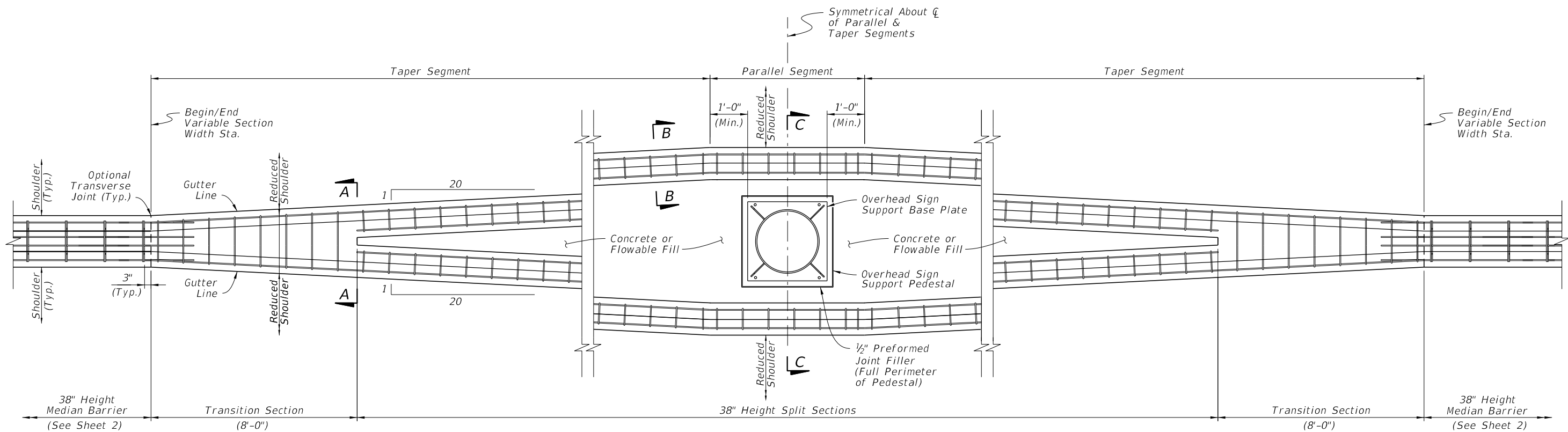
1. PROJECT-SPECIFIC DESIGN: For the base plate, anchor bolts, foundation design, and additional reinforcing required for the barrier, see the project-specific design in the Plans.
2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4 1/2" maximum cover from the top of the barrier.

For the vertical and transverse reinforcement requirements shown in Sections A-A through C-C, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.
3. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

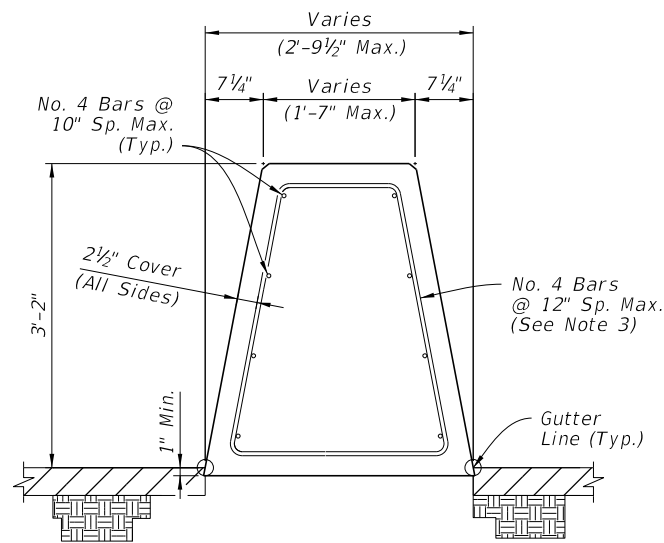
MEDIAN BARRIER - 56" HEIGHT SECTION
FOR BARRIER-MOUNTED DUAL SIGN
SUPPORT SHIELDING - MINIMUM WIDTH

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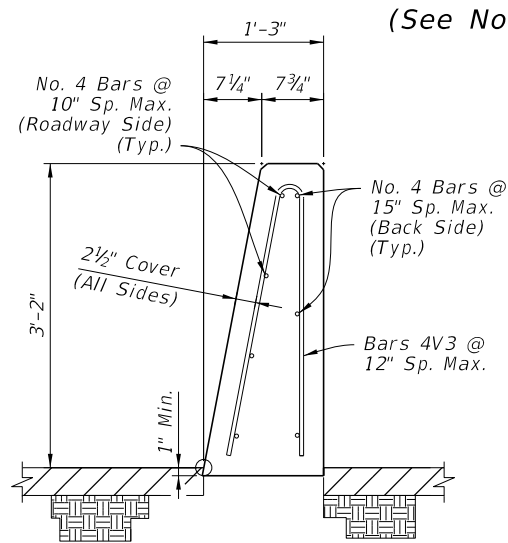
LAST REVISION 11/01/18	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 8 of 26
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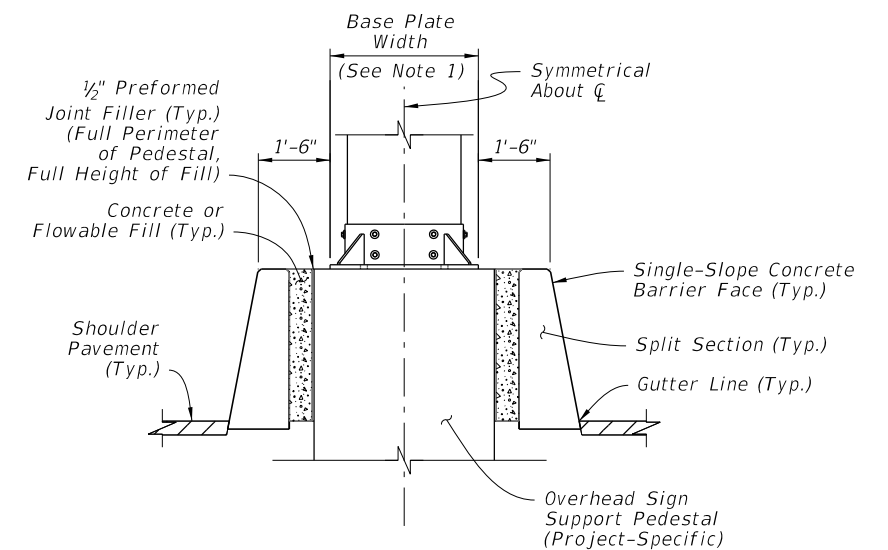
PLAN
(See Note 3)



SECTION A-A
TRANSITION SECTION
(AT BEGIN
SPLIT SECTIONS)



SECTION B-B
38" HEIGHT SPLIT SECTION
(OPPOSITE SIDE SIMILAR
BY OPPOSITE HAND)



SECTION C-C

NOTES:

1. OVERHEAD SIGN SUPPORT: The overhead sign support shown is an example only; see the Plans for the project-specific dimensions and requirements. The overall length and width of the barrier's taper and parallel segments is governed by the overhead sign support dimensions as defined in the Plans.
2. MULTIPLE SIGN SUPPORTS: The parallel segment may be lengthened to accommodate multiple sign supports, with the approach and trailing tapers located 1 foot, measured longitudinally, upstream and downstream from the first and last sign support bases, respectively.
3. PLAN VIEW: Only outermost longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.
4. STIRRUP BARS: For the vertical and transverse reinforcement requirements shown in Sections A-A, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.
5. CONCRETE OR FLOWABLE FILL: Use Class NS Concrete in accordance with Specification 347 or Non-Excavatable Flowable Fill in accordance with Specification 121.

MEDIAN BARRIER - 38" HEIGHT SPLIT SECTION
FOR STAND-ALONE SIGN SUPPORT SHIELDING

10/18/2018 11:14:46 AM

LAST REVISION	DESCRIPTION:
11/01/18	

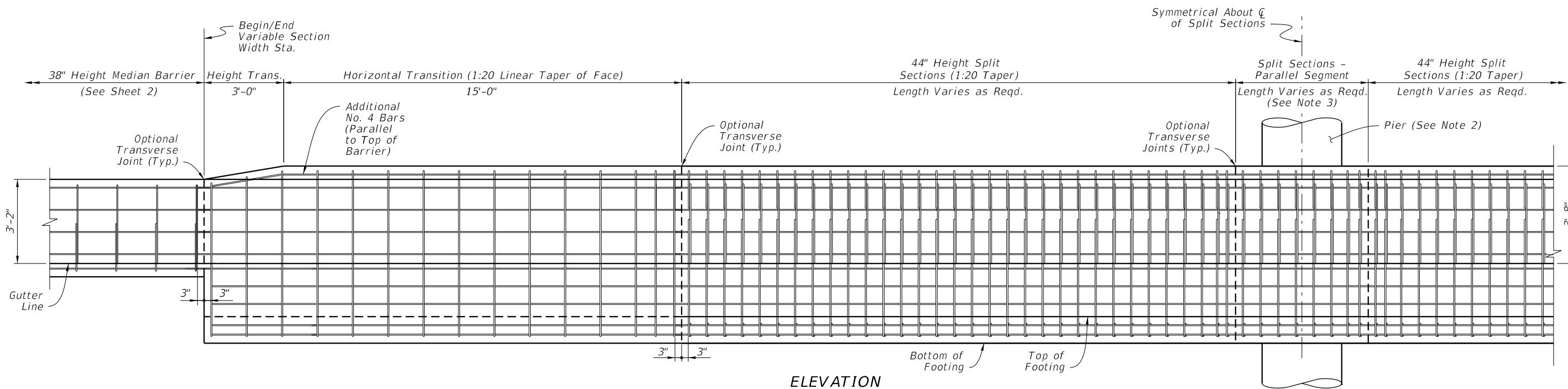


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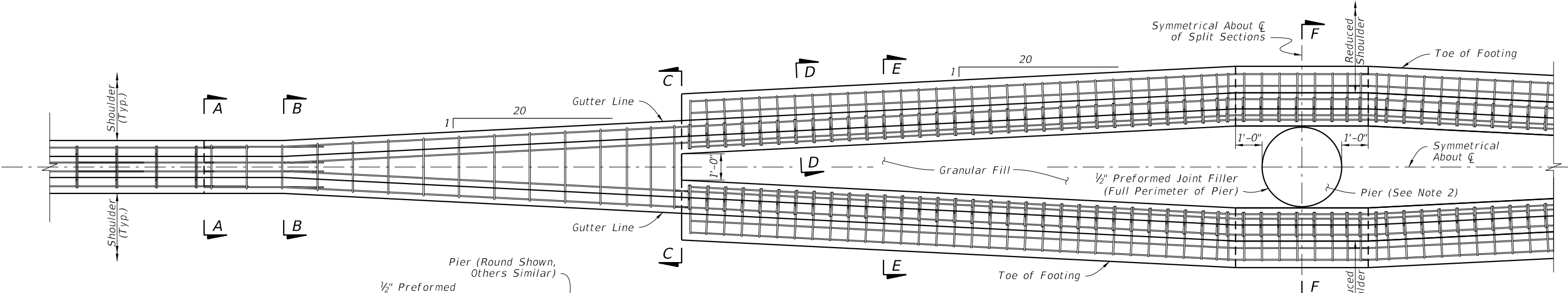
CONCRETE BARRIER

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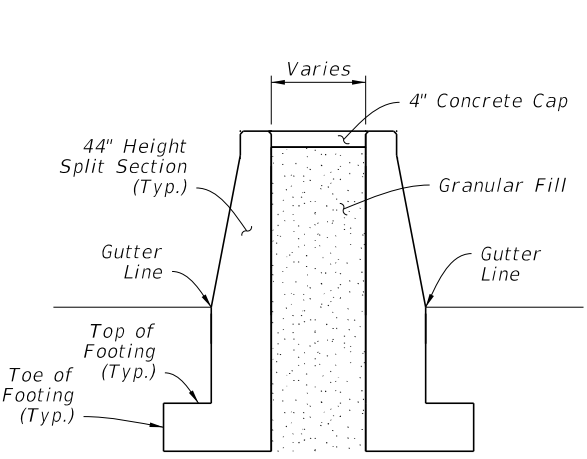
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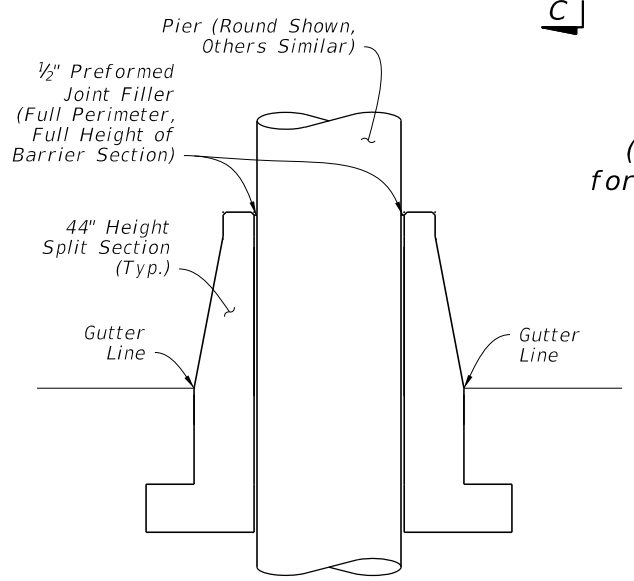
ELEVATION



PLAN
(See Section Views on Sheet 11 for All Longitudinal Steel Locations)



SECTION E-E
SPLIT SECTIONS



SECTION F-F
SPLIT SECTIONS AT PIER

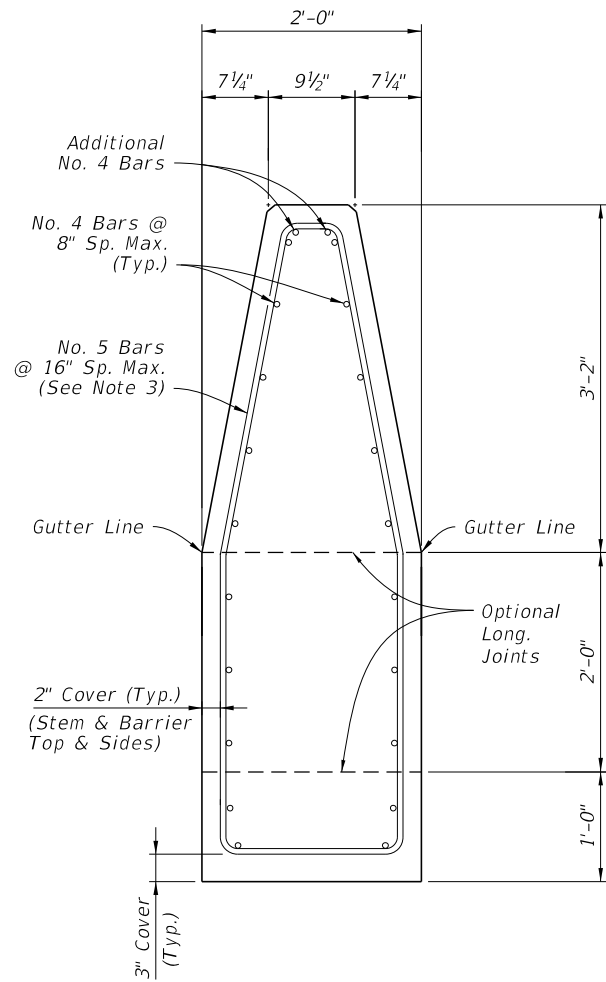
NOTES:

1. SECTION VIEWS: See Sheet 11 for Section Views A-A through D-D and corresponding reinforcing steel details.
2. PIER: The round pier shown is an example only, and project-specific pier shapes may vary. For actual dimensions and requirements, see the Plans. The overall length and width of the split barrier system is governed by the project-specific pier dimensions, as defined in the Plans.
3. MULTIPLE PIERS: The parallel segment may be lengthened to accommodate multiple consecutive piers, with the approach and trailing tapers located 1 foot, measured longitudinally, upstream and downstream from the first and last piers, respectively.

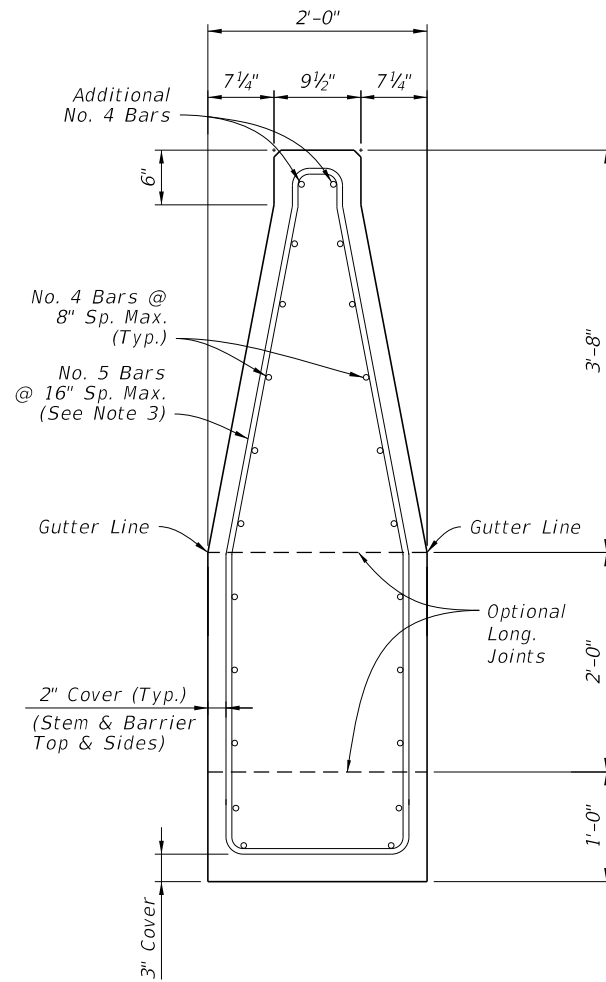
MEDIAN BARRIER - 44" HEIGHT
SPLIT SECTION FOR PIER SHIELDING

10/18/2018 11:14:48 AM

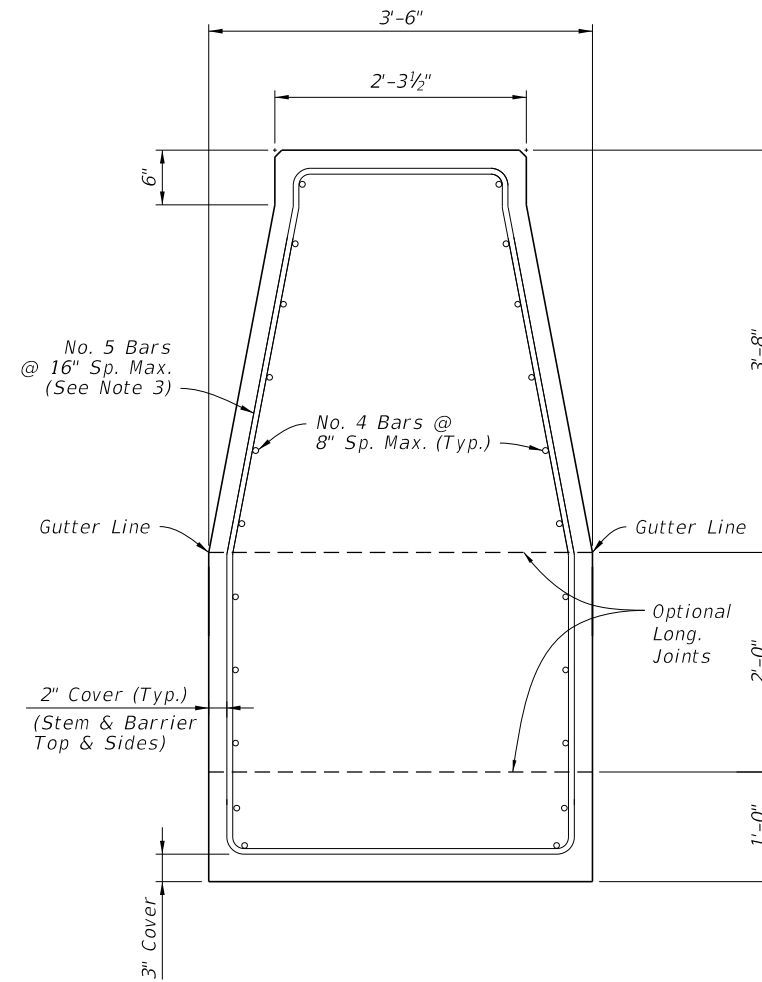
LAST REVISION 11/01/18	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 10 of 26
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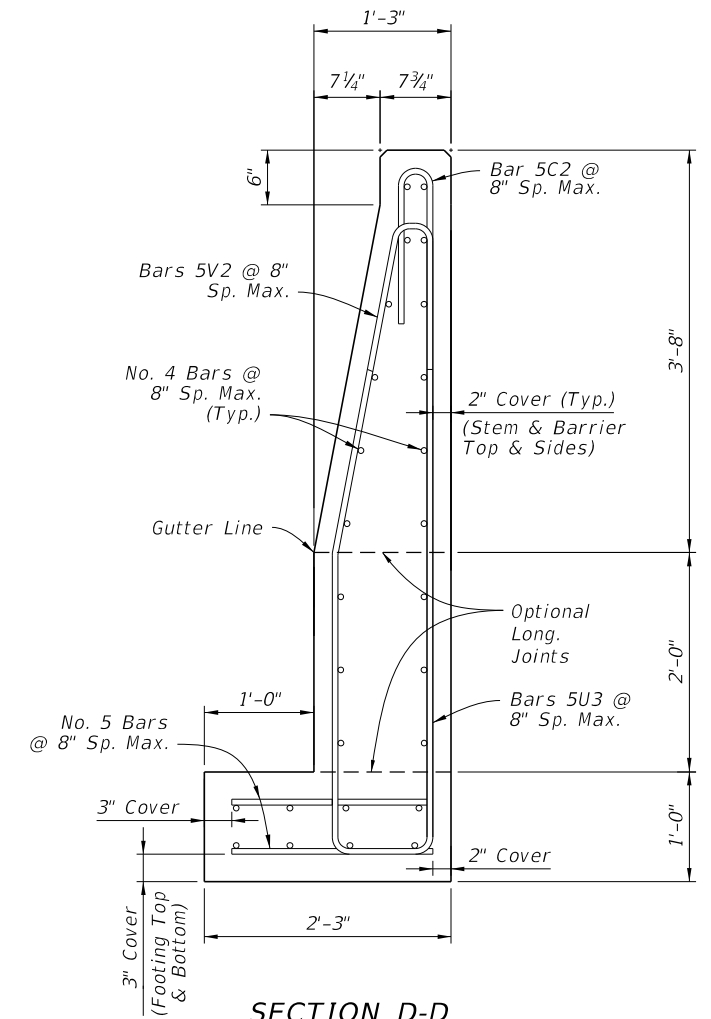
SECTION A-A
BEGIN HEIGHT
TRANSITION
(show spliced bars)



SECTION B-B
END HEIGHT TRANSITION
BEGIN WIDTH TRANSITION



SECTION C-C
END WIDTH TRANSITION
BEGIN SPLIT SECTIONS



SECTION D-D
44" HEIGHT SPLIT SECTION
(Opposite Side of Median
Similar by Opposite Hand)

Concrete Qty. = 0.30 CY/FT
 Steel Qty. = 52.6 LB/FT

NOTES:

1. GENERAL: Work with the Plan and Elevation views on Sheet 10.
2. LONGITUDINAL REINFORCING CONTINUITY: Maintain all longitudinal steel reinforcing shown in Section C-C continuously into Section D-D (spliced where required). The additional longitudinal reinforcing shown in Section D-D does not require continuity into Section C-C, and it starts 3" from the construction joint or edge of concrete per the details on Sheet 10.
3. STIRRUP BARS: For the vertical and transverse reinforcement requirement shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

MEDIAN BARRIER - 44" HEIGHT
SPLIT SECTION FOR PIER SHIELDING - DETAILS

10/18/2018 11:14:49 AM

LAST REVISION	DESCRIPTION:
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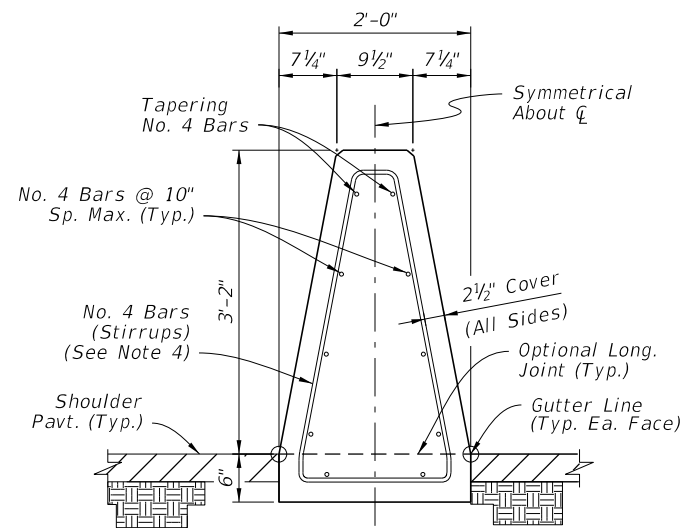


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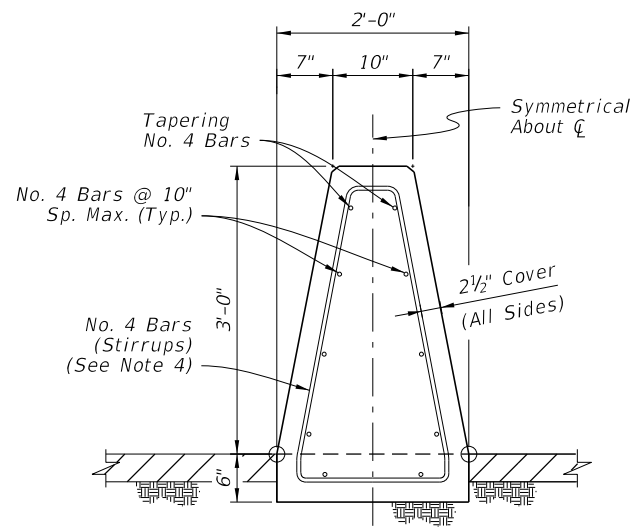
CONCRETE BARRIER

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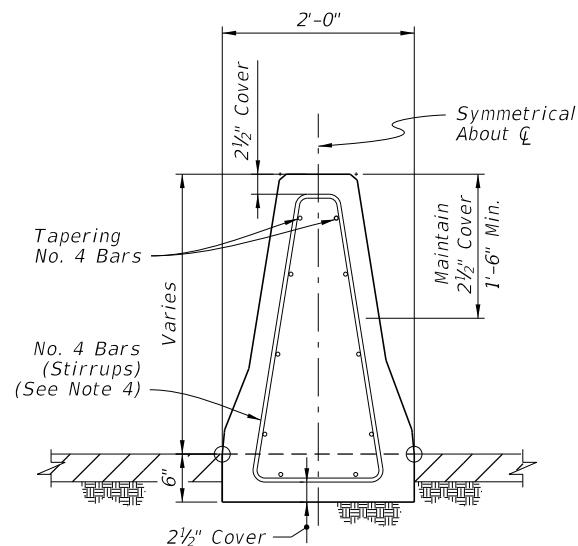
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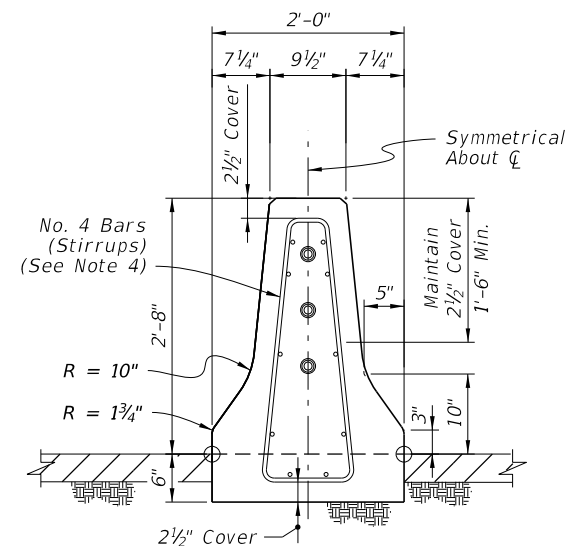
SECTION A-A
BEGIN TRANSITION - OPTION 'A'
MATCH SINGLE-SLOPE
38" HEIGHT MEDIAN BARRIER



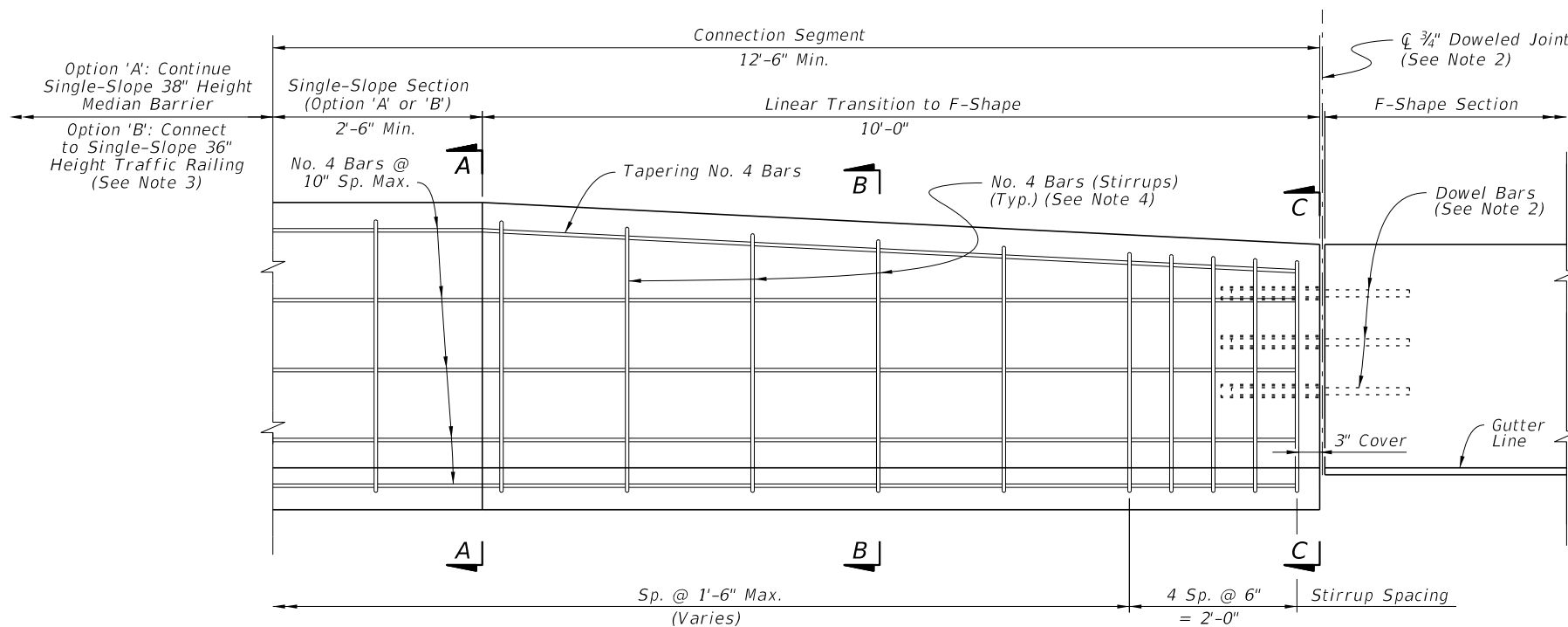
SECTION A-A
BEGIN TRANSITION - OPTION 'B'
MATCH SINGLE-SLOPE
36" HEIGHT TRAFFIC RAILING
(Bridge Applications)



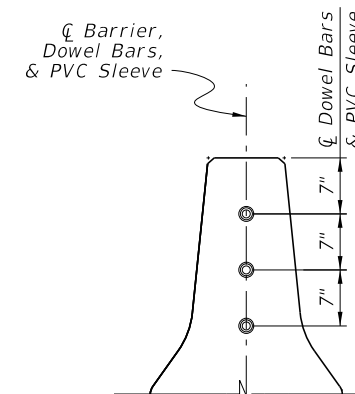
SECTION B-B
INTERMEDIATE SECTION
OF LINEAR TRANSITION



SECTION C-C
END TRANSITION
MATCH 32" HEIGHT
F-SHAPE SECTION



ELEVATION
(Reverse Direction Similar
by Opposite Hand)



SECTION - F-SHAPE
DOWEL PLACEMENT
(See Note 2)

NOTES:

- GENERAL:** Construct the Connection Segment as required per the Plans to connect existing F-Shape sections to Single-Slope Median Barrier or Traffic Railing sections. Construct Option 'A' or 'B' as required to match the heights of the connecting sections.
- DOWELED JOINT:** Install Dowel Bars per the Dowel Details on Sheet 2.
- TRAFFIC RAILING CONNECTION:** For the Option 'B' connection, use a Doweled Joint per Sheet 2 and the additional Free End Reinforcing with reduced bar spacing per Sheet 3.
- STIRRUP BARS:** For the vertical and transverse reinforcement requirements shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

MEDIAN BARRIER - CONNECTION TO F-SHAPE

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LAST REVISION 11/01/18	DESCRIPTION:
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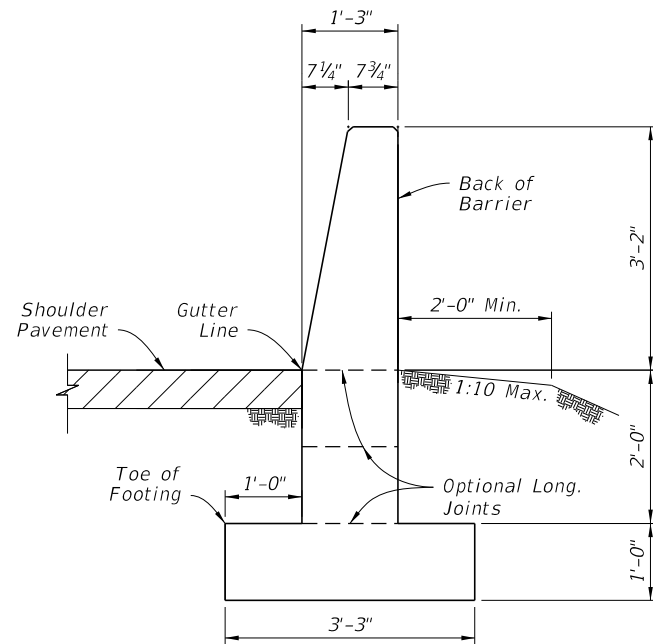


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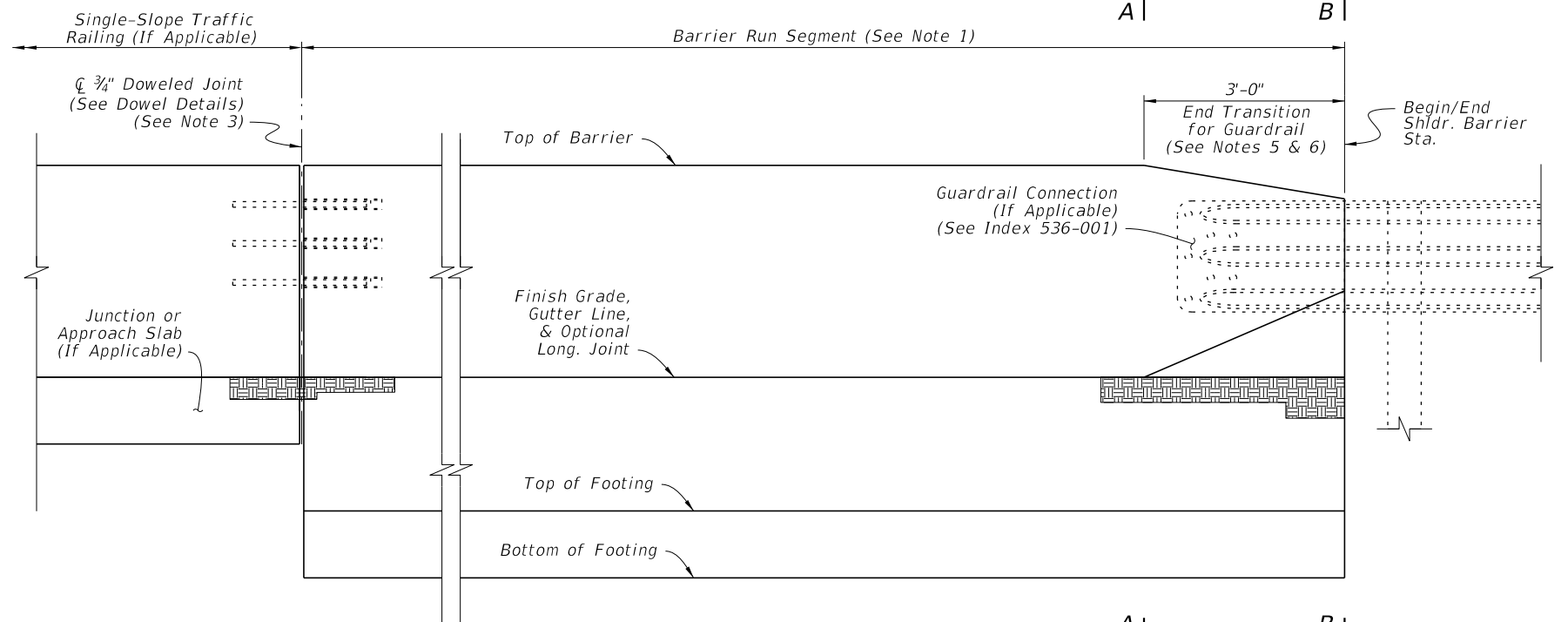
CONCRETE BARRIER

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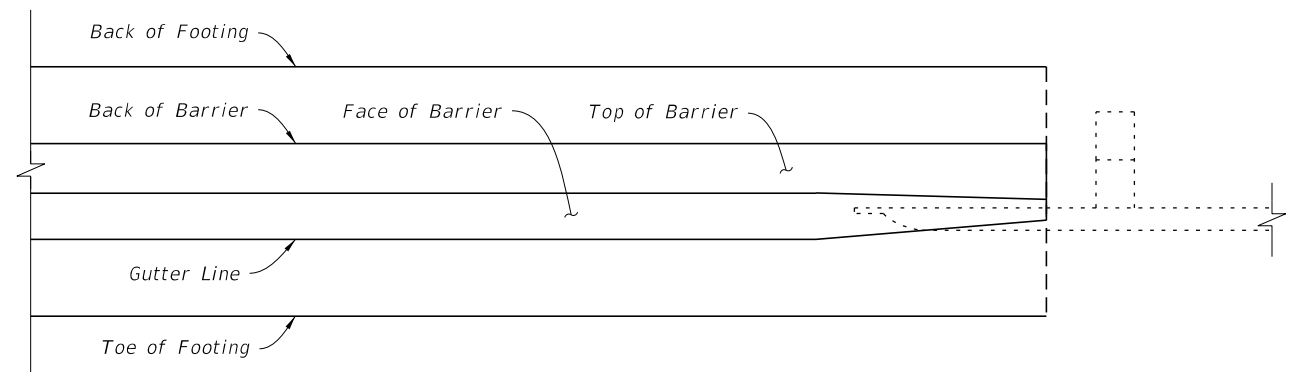
SHEET
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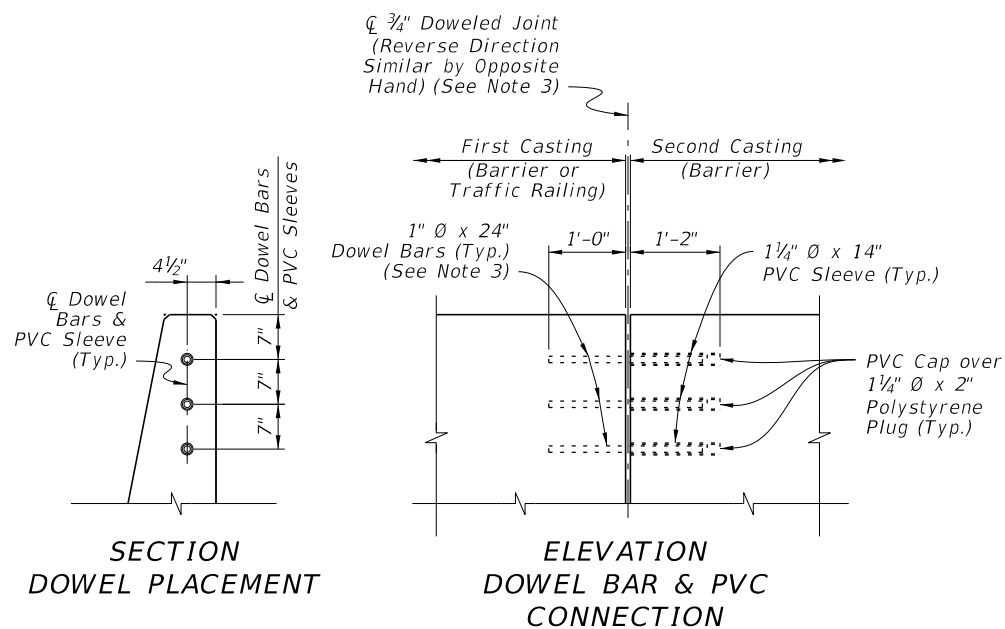
SECTION A-A
38" HEIGHT SHOULDER BARRIER
 (See Sheet 14 for
 Reinforcing Steel Details)



ELEVATION



PLAN



SECTION
DOWEL PLACEMENT

ELEVATION
DOWEL BAR & PVC CONNECTION

DOWEL DETAILS

NOTES:

- BARRIER RUN SEGMENT:** Either the 38" Height Shoulder Barrier or the differing Shoulder Barrier sections shown throughout the Index may be placed within this segment as required per the Plans.
- SECTION VIEWS:** For additional Views A-A and B-B, see Sheet 14.
- DOWELED JOINTS:** See the General Notes on Sheet 1 for usage of joint types. Place steel reinforcing with a longitudinal 3" cover adjacent to the joint face in the barrier. Use ASTM A36 smooth round bars with hot-dip galvanization.

For the dowel connection into the first casting, the dowel may be cast-in-place for new concrete or placed into a 1 1/8"Ø x 13"(± 1/2") drilled hole for cured concrete. For drilled holes larger than 1 1/8"Ø, secure the dowel with adhesive in accordance with Specification 416. No load testing is required.

For the dowel connection into the second casting, use a 1 1/4" NPS Schedule 80 PVC pipe with a sealed cap, cast-in-place as shown.
- TRAFFIC RAILING CONNECTIONS:** Align the barrier and Traffic Railing faces and connect with the 3/4" Doweled Joint.
- GUARDRAIL CONNECTIONS:** Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001.
- CRASH CUSHION CONNECTIONS:** Connect Crash Cushions per Index 544-001 in conjunction with the 3'-0" End Transition for Guardrail as shown herein.
- FREE ENDS:** When the barrier end does not terminate with a Traffic Railing Connection, Guardrail Connection, or Crash Cushion Connection as called for in the Plans, terminate in accordance with the Free End Reinforcing Note on Sheet 14.

SHOULDER BARRIER

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LAST REVISION 11/01/18	REVISION	DESCRIPTION:
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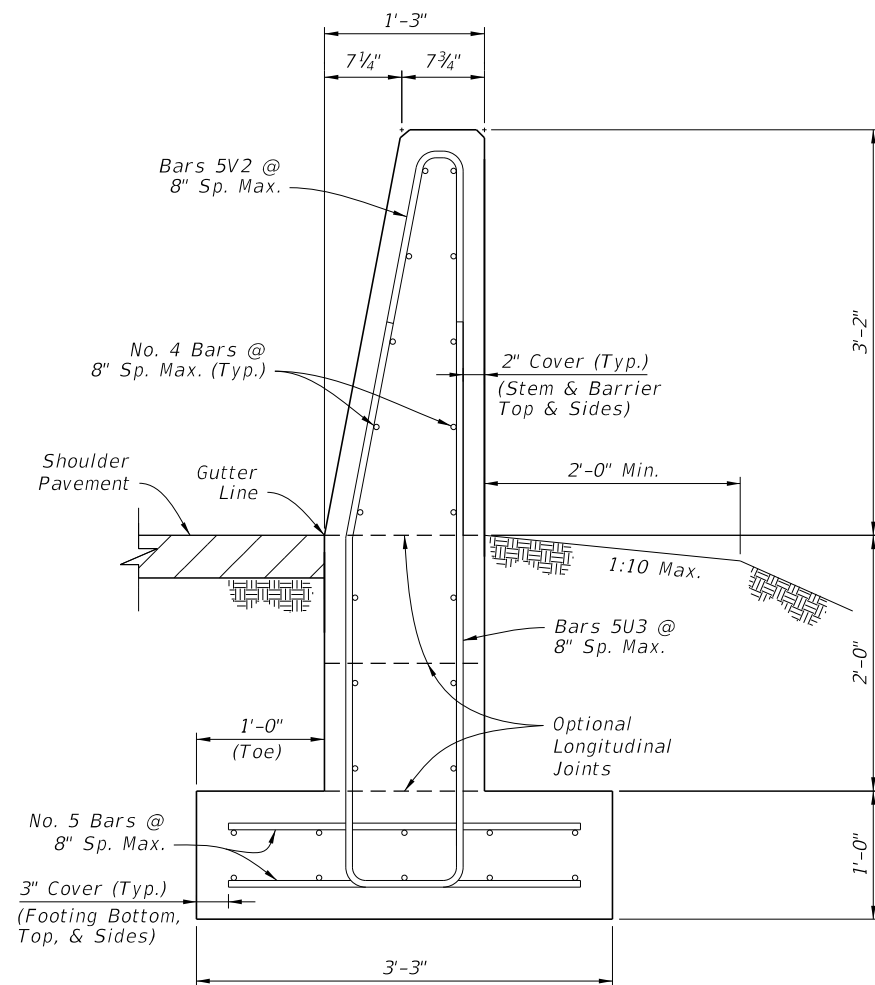


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CONCRETE BARRIER

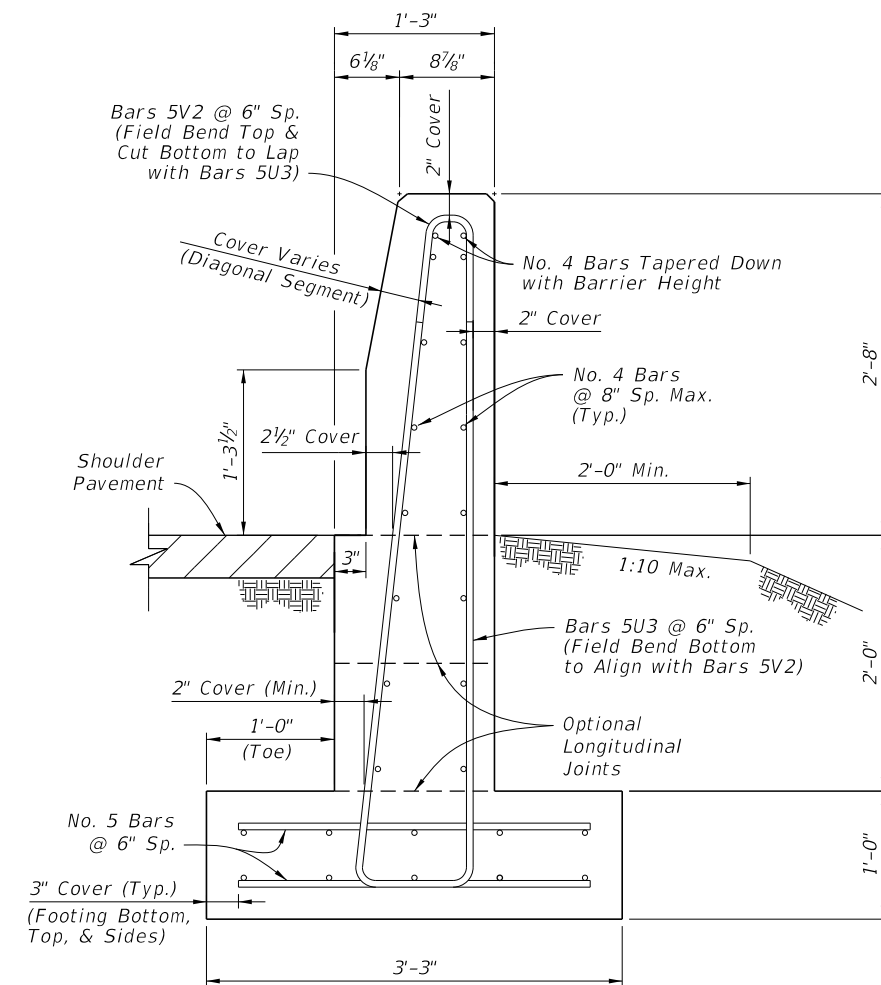
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**SECTION A-A
38" HEIGHT SHOULDER BARRIER**

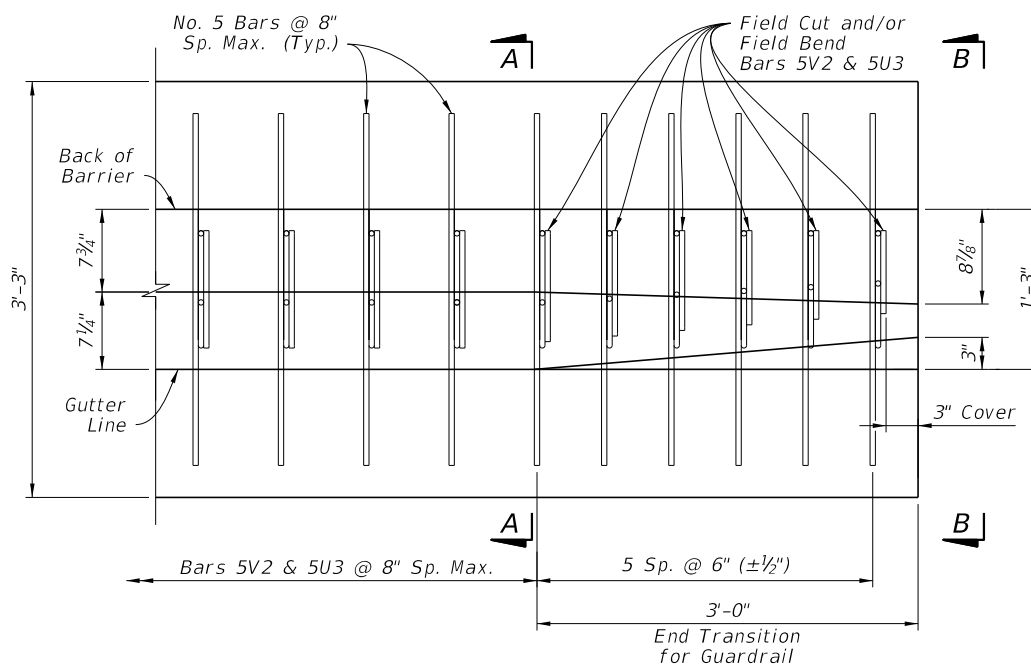
Concrete Qty. = 0.32 CY/FT
Steel Qty. = 50.9 LB/FT



**VIEW B-B
REDUCED SECTION OF
END TRANSITION
FOR GUARDRAIL
(End of Barrier)**

NOTES:

1. GENERAL: Work with the Plan and Elevation Views on Sheet 13. The Section Option footings shown on Sheet 15 may be substituted where called for in the Plans.
2. FREE END REINFORCING: Where shown in the Plans, terminate the 38" Height Barrier section with a transverse vertical end face. Reduce the spacing of Bars 5V2 and 5U3 to 6" for 5 Spaces, placed with 3" cover from the barrier's end face.
3. BAR BENDING DIAGRAMS: For additional details for bars 5V2 and 5U3, see the Bar Bending Diagrams on Sheet 26.



**PLAN VIEW - END SEGMENT FOR GUARDRAIL CONNECTION
(Longitudinal Steel Not Shown for Clarity)**

SHOULDER BARRIER - REINFORCING DETAILS

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LAST REVISION 11/01/18	DESCRIPTION:
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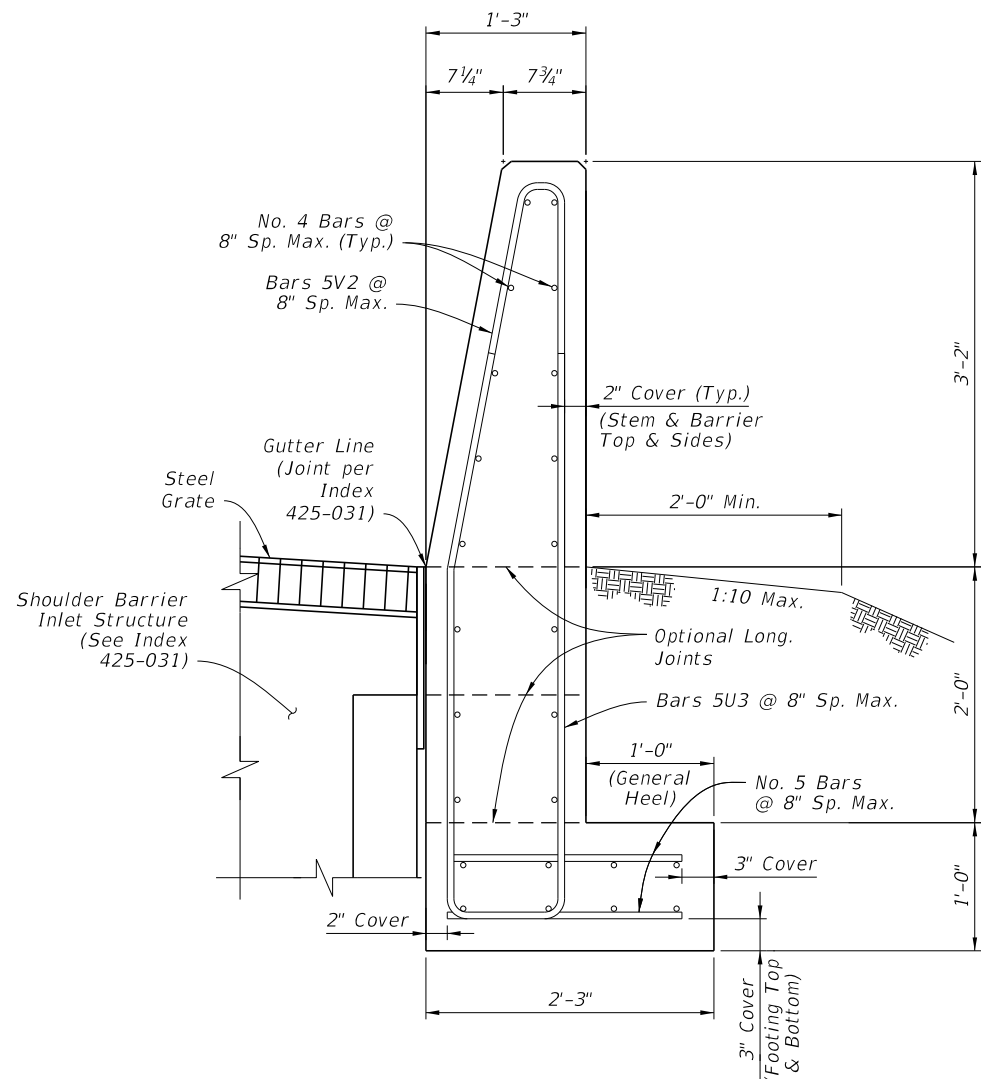


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CONCRETE BARRIER

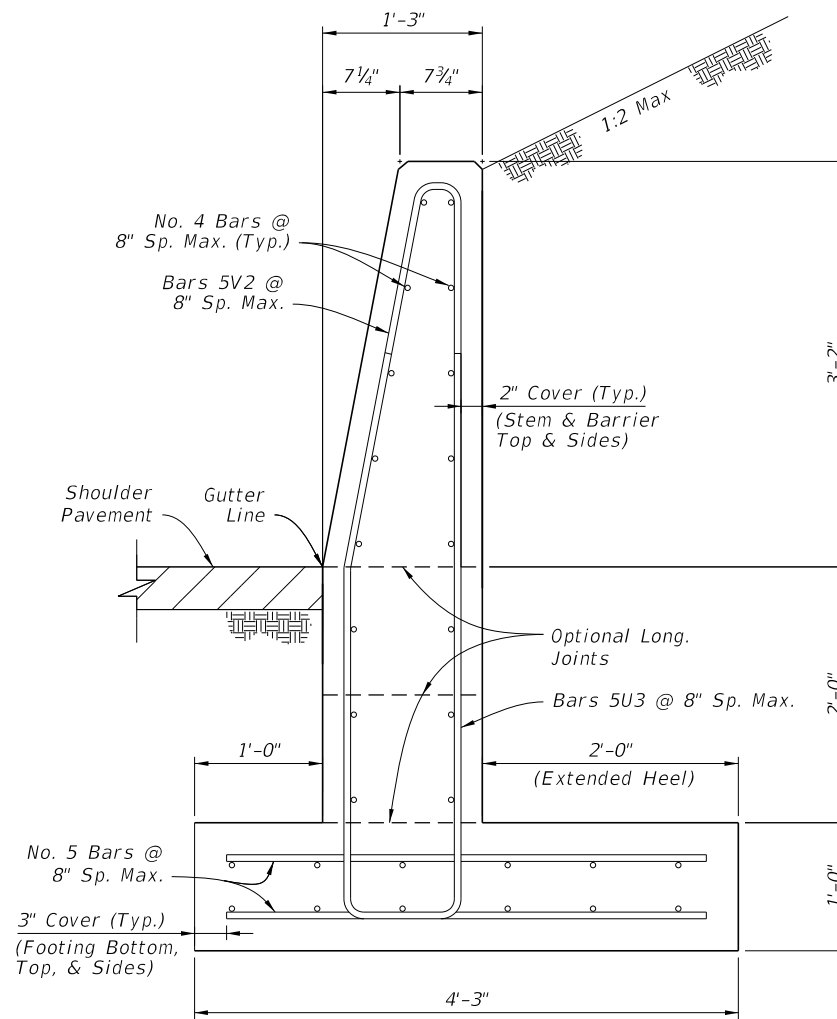
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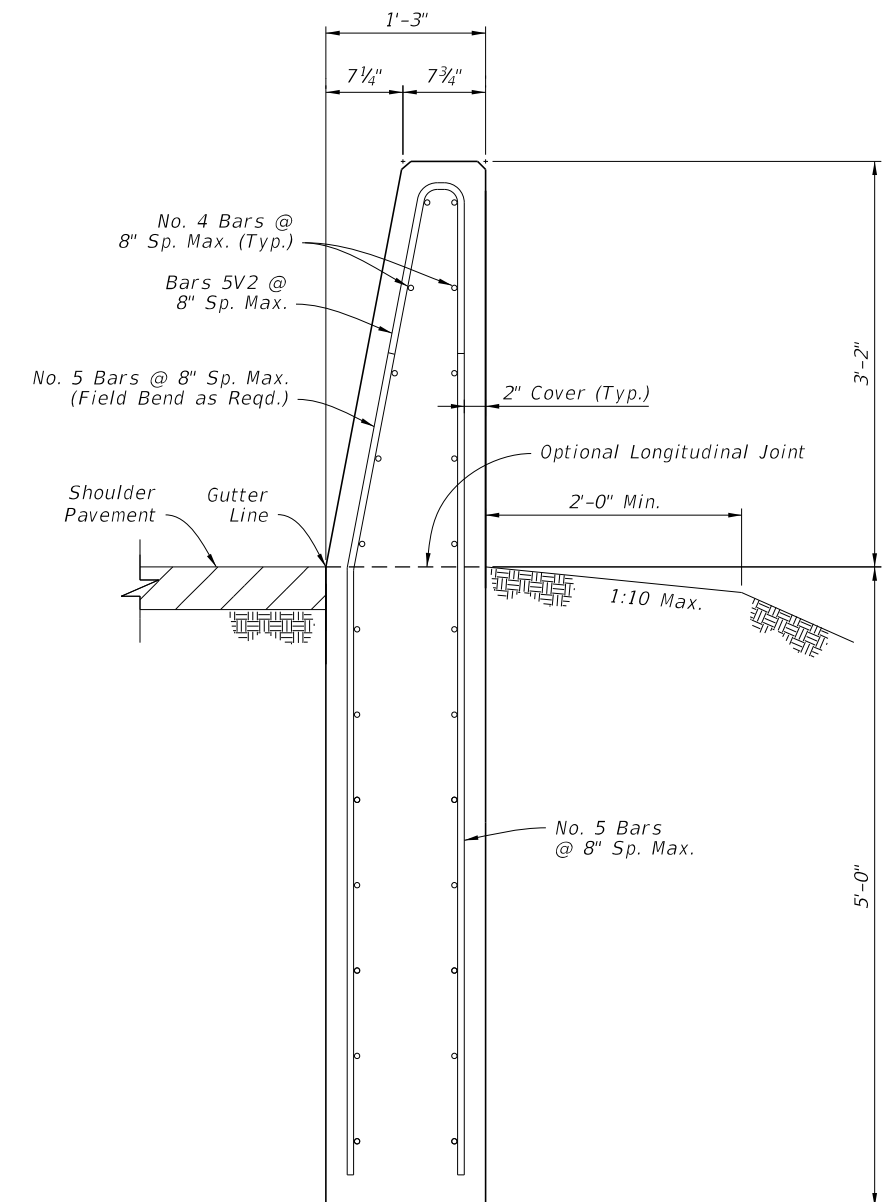
FRONT-FLUSH SECTION
(Where Required For
Barrier Inlet Locations)

Concrete Qty. = 0.29 CY/FT
Steel Qty. = 46.6 LB/FT



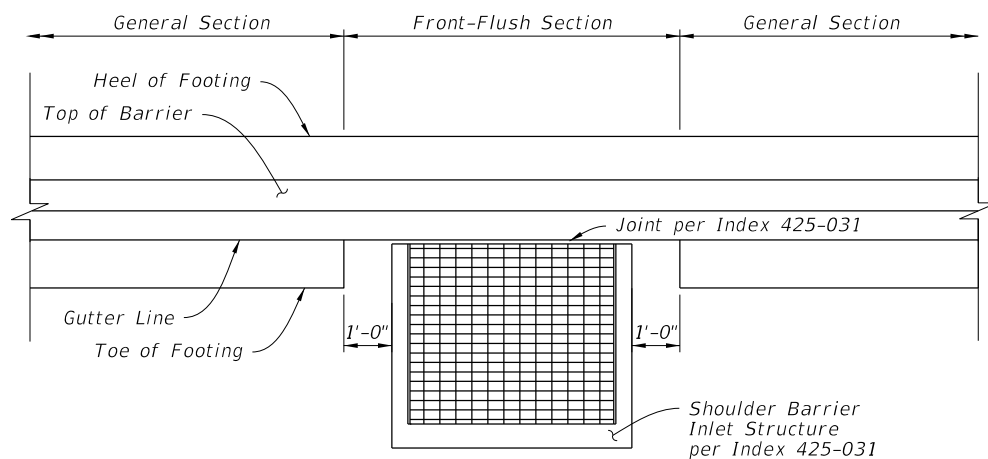
RETAINING SECTION

Concrete Qty. = 0.36 CY/FT
Steel Qty. = 55.3 LB/FT



TRENCH FOOTING SECTION

Concrete Qty. = 0.35 CY/FT
Steel Qty. = 46.2 LB/FT




FRONT-FLUSH SECTION - PLAN VIEW
(Not Applicable for Trench Footing Sections)

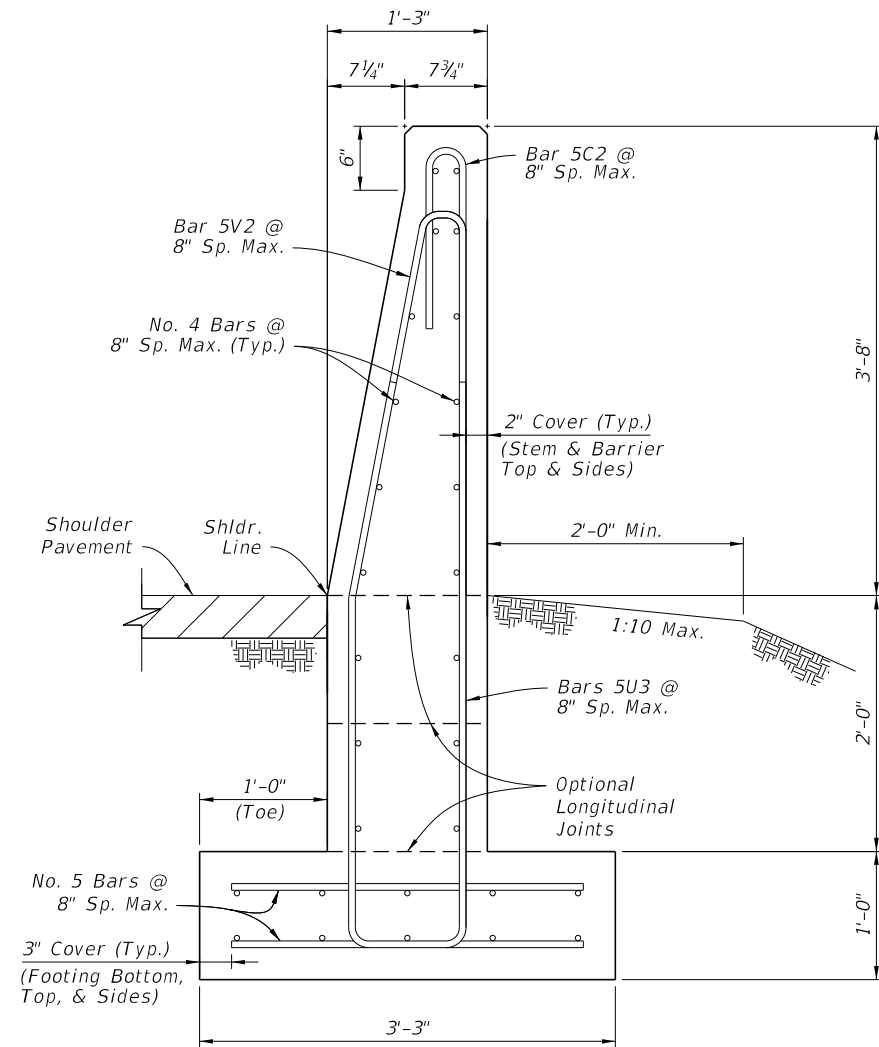
NOTES:

1. GENERAL: Install the differing Section Options as required per the Plans.
2. CONNECTIONS BETWEEN DIFFERENT SECTIONS: Connect differing Shoulder Barrier sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections. Alternatively, a Doweled Joint may be used as shown on Sheet 13.
3. FLUSH RETAINING SECTION COMBINATION: Where Barrier Inlets are required in retaining segments, install the Flush Section, except replace the 1'-0" General Heel with the 2'-0" Extended Heel as shown in the Retaining Section. Use longer lateral reinforcing bars of 2'-10" length to maintain the cover shown.

SHOULDER BARRIER - SECTION OPTIONS

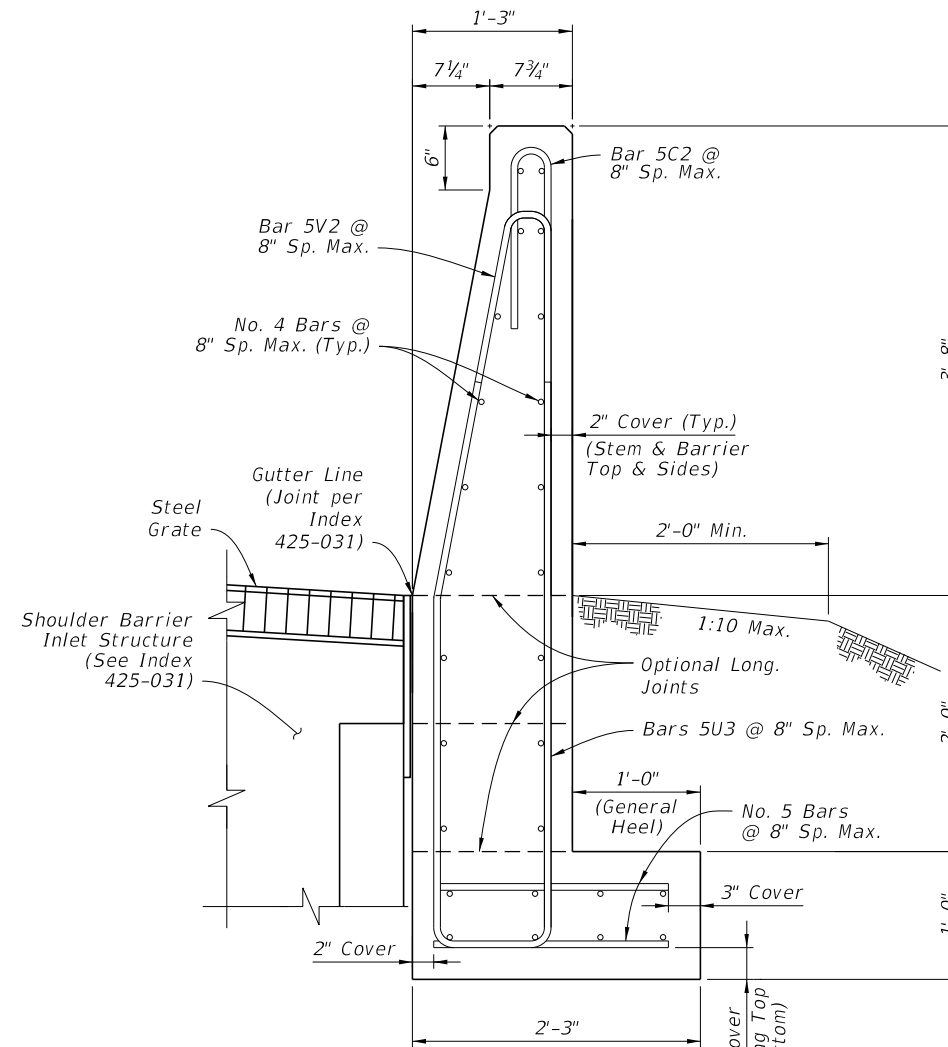
10/18/2018 11:14:52 AM

LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 15 of 26
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44" HEIGHT SECTION
 (For Use Adjacent to Rear-Flush
 Section on Sheet 18)

Concrete Qty. = 0.34 CY/FT
 Steel Qty. = 56.8 LB/FT



**44" HEIGHT
 FRONT-FLUSH SECTION**
 (For Use Adjacent to Rear-Flush
 Section on Sheet 18, as
 Required for Barrier Inlets)


Concrete Qty. = 0.30 CY/FT
 Steel Qty. = 52.6 LB/FT

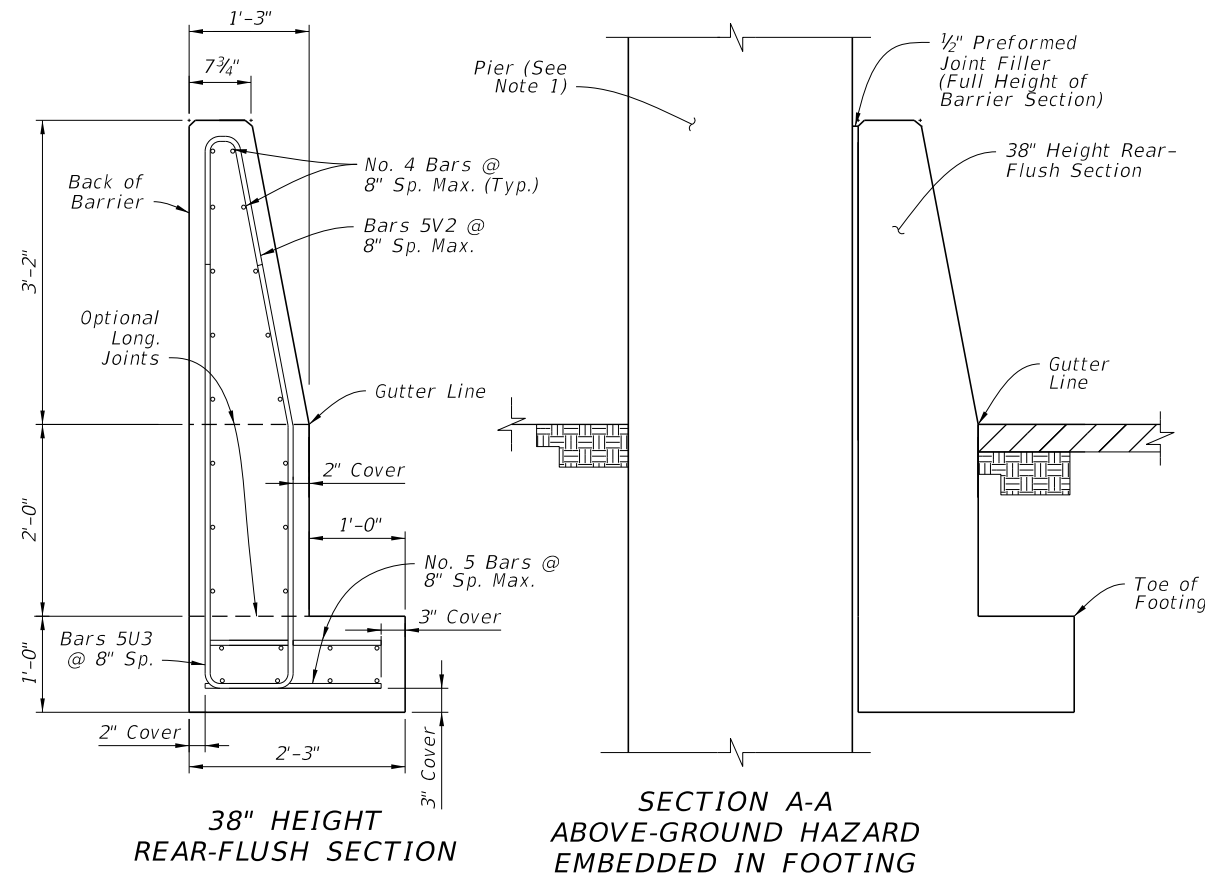
NOTE:

1. GENERAL: See the applicable Notes on Sheet 15.

SHOULDER BARRIER - SECTION OPTIONS (CONTINUED)

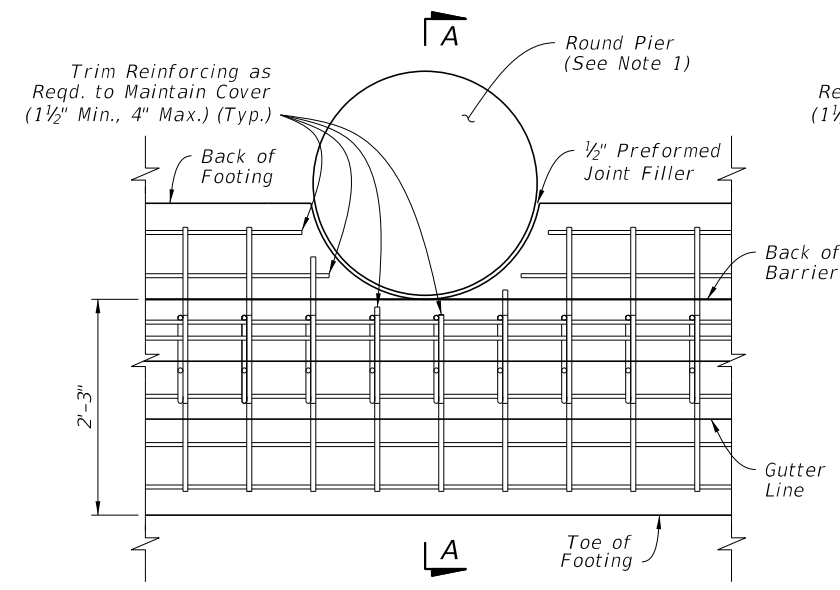
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LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 16 of 26
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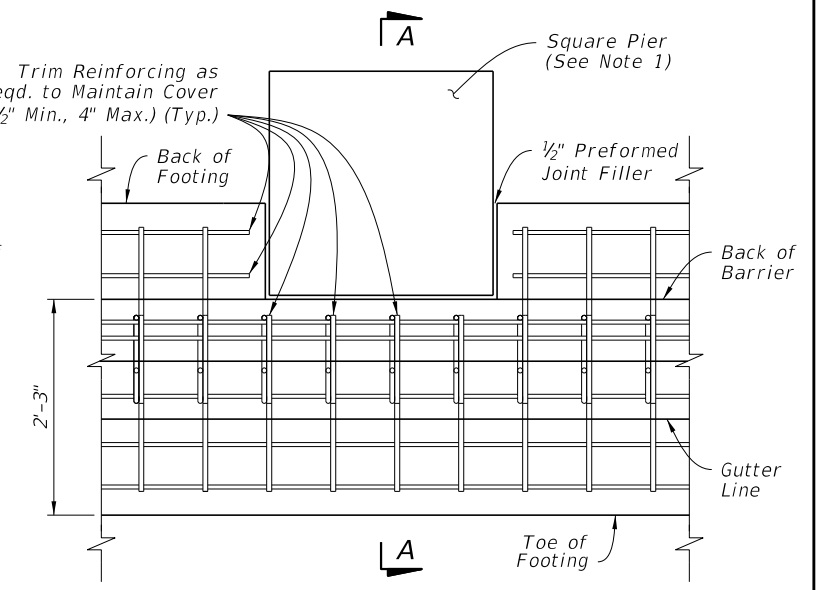


38" HEIGHT REAR-FLUSH SECTION

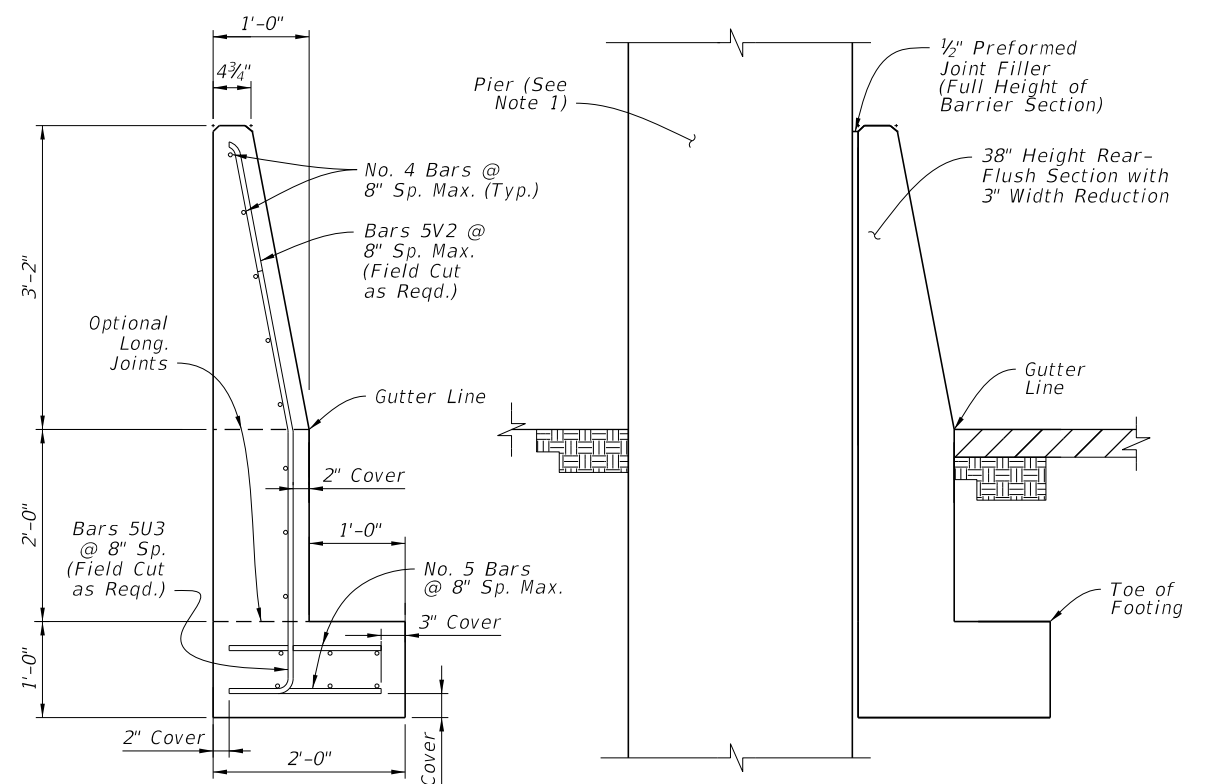
SECTION A-A ABOVE-GROUND HAZARD EMBEDDED IN FOOTING



PLAN - ROUND PIER EXAMPLE REAR-FLUSH SECTION (See Section View for All Longitudinal Steel Locations)

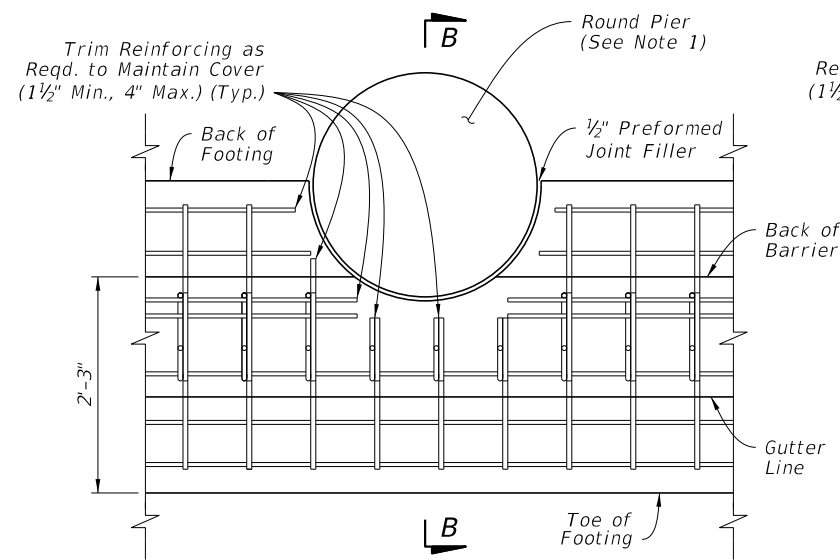


PLAN - SQUARE PIER EXAMPLE REAR-FLUSH SECTION (See Section View for All Longitudinal Steel Locations)

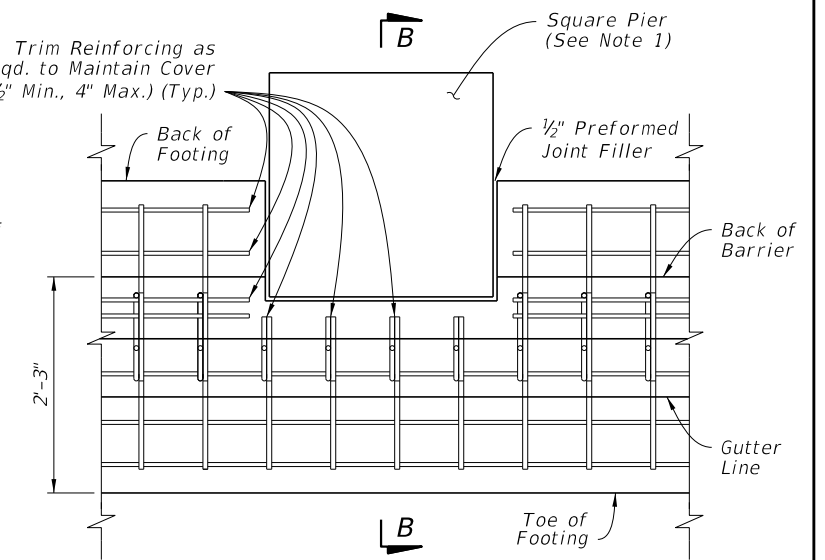


38" HEIGHT REAR-FLUSH SECTION WITH 3" WIDTH REDUCTION

SECTION B-B ABOVE-GROUND HAZARD EMBEDDED IN FOOTING & BARRIER



PLAN - ROUND PIER EXAMPLE REAR-FLUSH SECTION WITH 3" WIDTH REDUCTION (See Section View for All Longitudinal Steel Locations)



PLAN - SQUARE PIER EXAMPLE REAR-FLUSH SECTION WITH 3" WIDTH REDUCTION (See Section View for All Longitudinal Steel Locations)

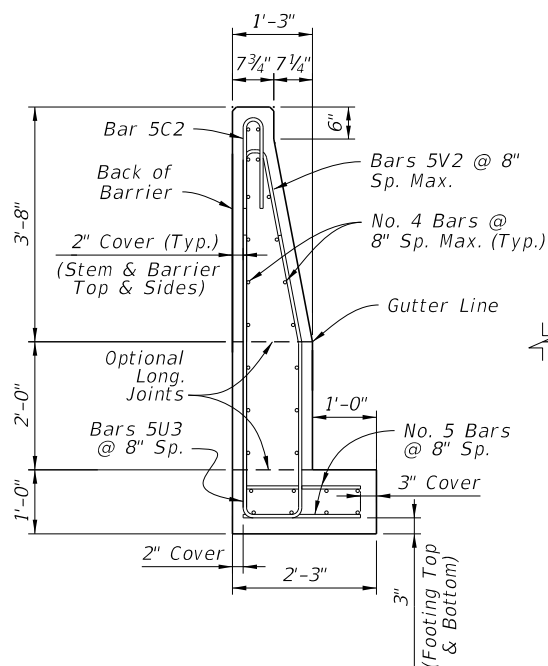
NOTE:

1. PIERS: The piers shown herein are example shapes only; see the Plans for the project-specific dimensions. The details shown herein are only for use when piers do not require protection per the AASHTO LRFD requirements. For piers requiring protection, see Index 521-002.

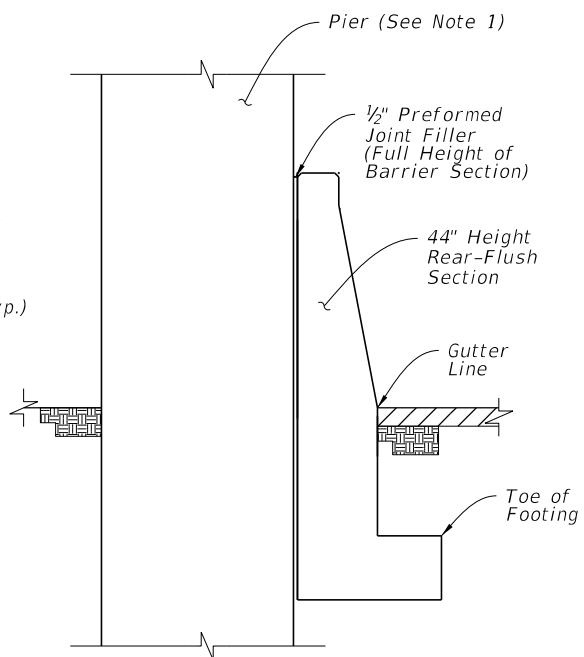
SHOULDER BARRIER - 38" HEIGHT REAR-FLUSH SECTION FOR REDUCED SETBACK PIER SHIELDING (DESIGN SPEED ≤ 45 MPH)

10/18/2018 11:14:54 AM

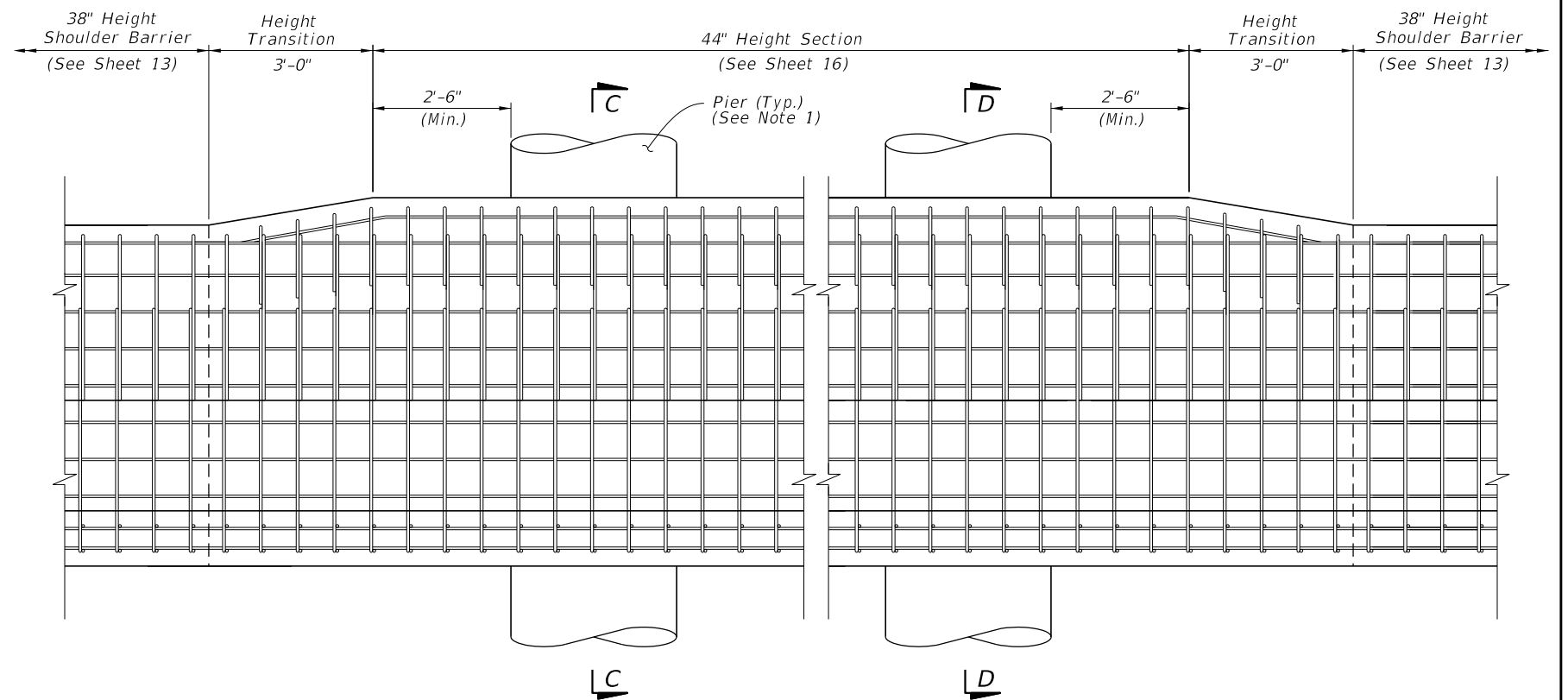
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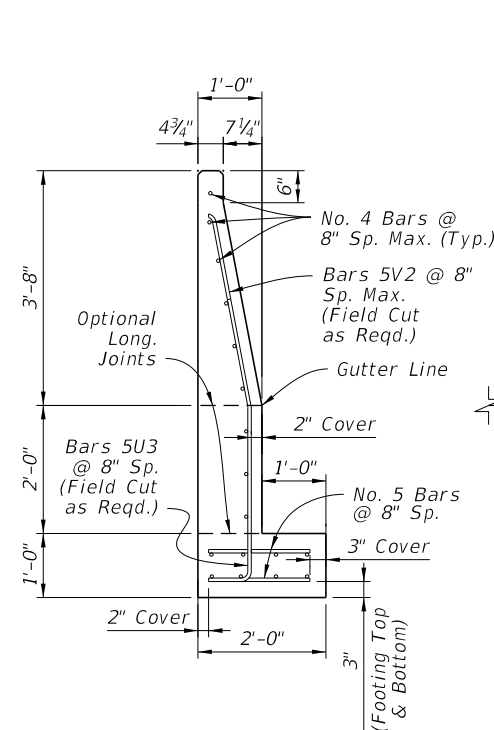
44" HEIGHT REAR-FLUSH SECTION



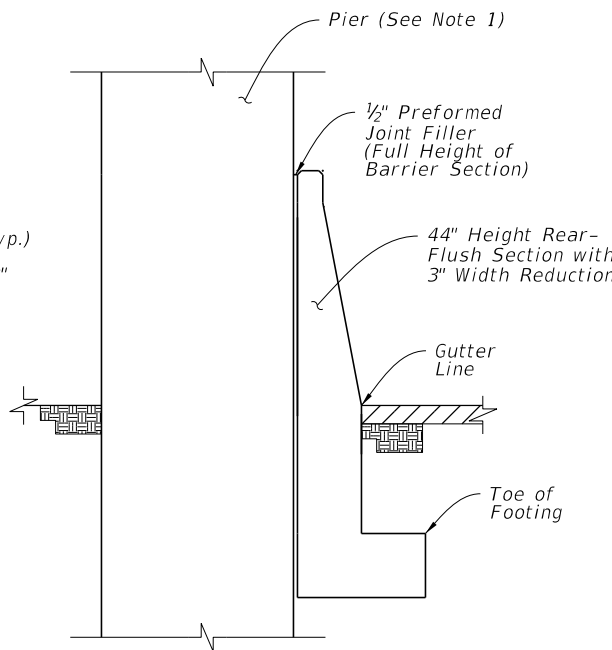
SECTION C-C ABOVE-GROUND HAZARD EMBEDDED IN FOOTING



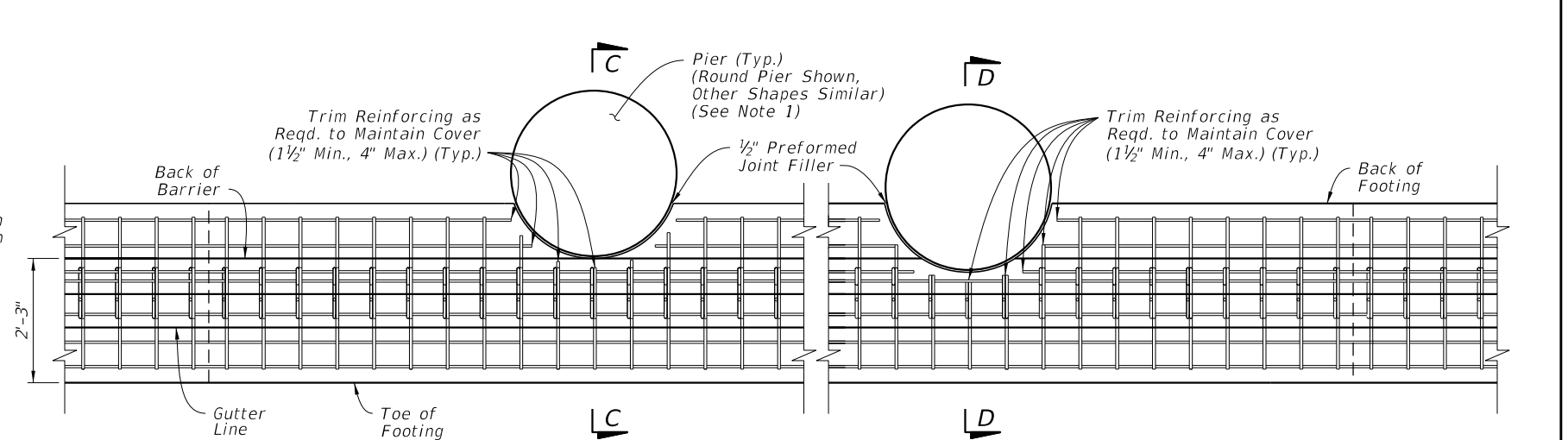
ELEVATION - ROUND PIERS EXAMPLE (SQUARE PIERS SIMILAR)



44" HEIGHT REAR-FLUSH SECTION WITH 3" WIDTH REDUCTION



SECTION D-D ABOVE-GROUND HAZARD EMBEDDED IN FOOTING & BARRIER



PLAN - ROUND PIERS EXAMPLE (SQUARE PIERS SIMILAR) (For All Longitudinal Steel Locations, See the Section Views)

NOTE:

1. PIERS: The piers shown herein are example shapes only; see the Plans for the project-specific dimensions. The details shown herein are only for use when piers do not require protection per the AASHTO LRFD requirements. For piers requiring protection, see Index 521-002.

SHOULDER BARRIER - 44" HEIGHT REAR-FLUSH SECTION FOR REDUCED SETBACK PIER SHIELDING

10/18/2018 11:14:55 AM

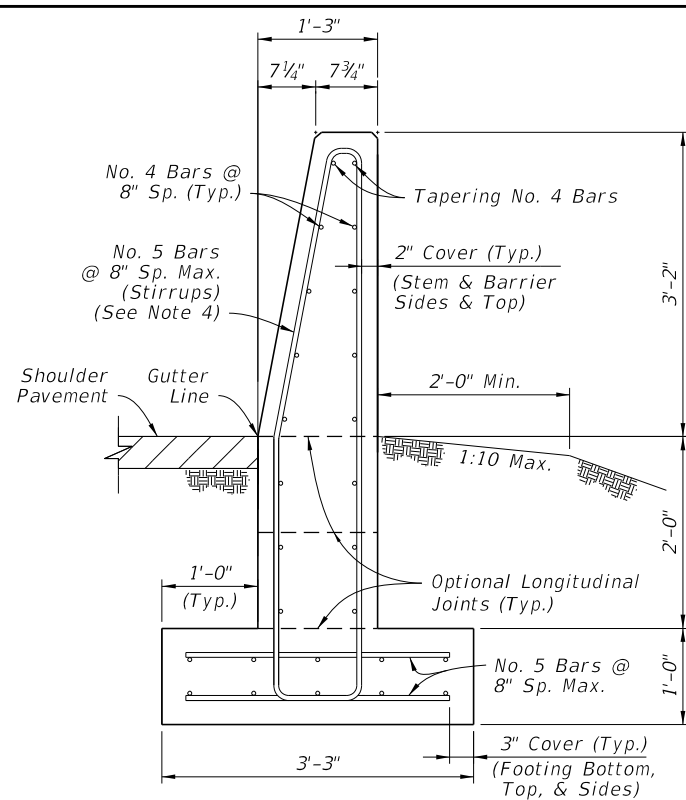
LAST REVISION 11/01/18	DESCRIPTION:
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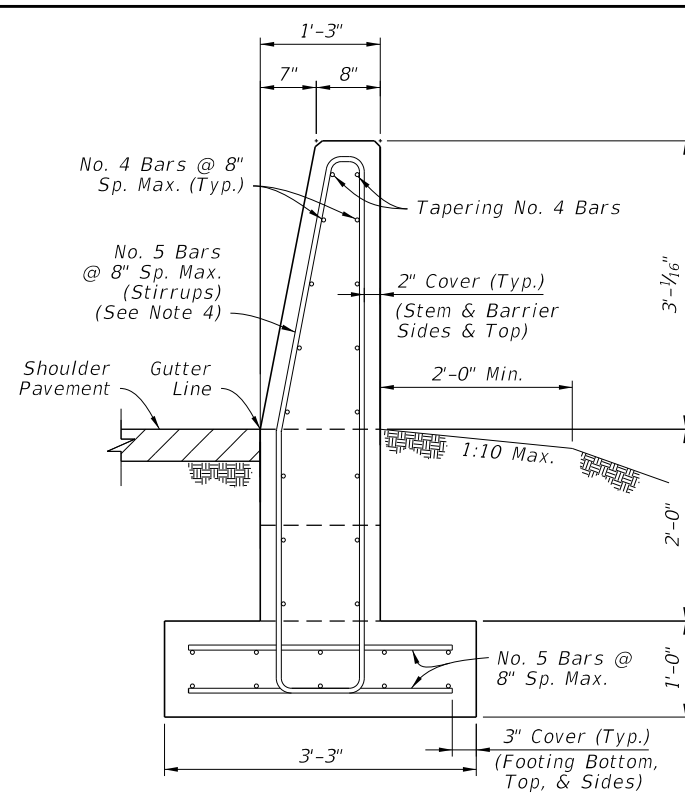
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STANDARD PLANS

CONCRETE BARRIER

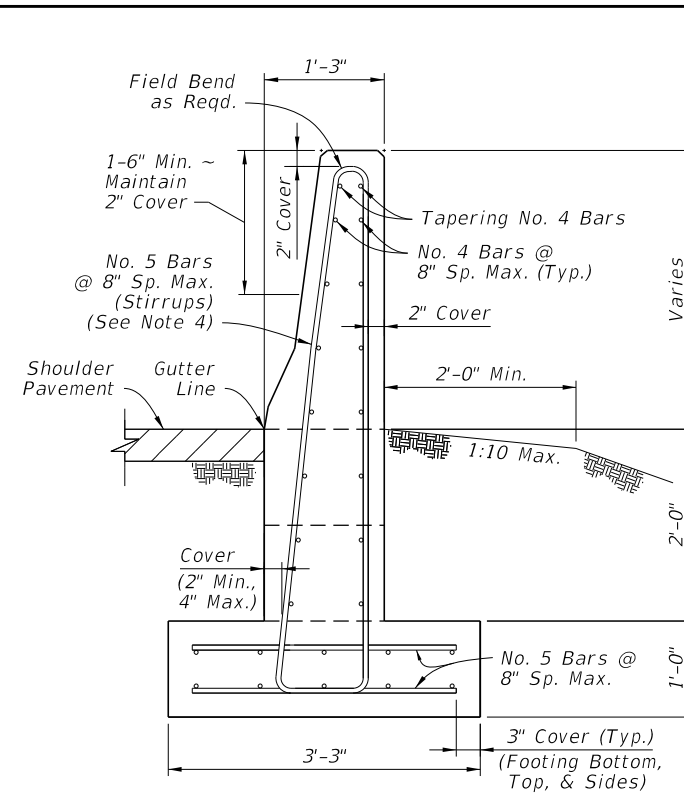
INDEX SHEET
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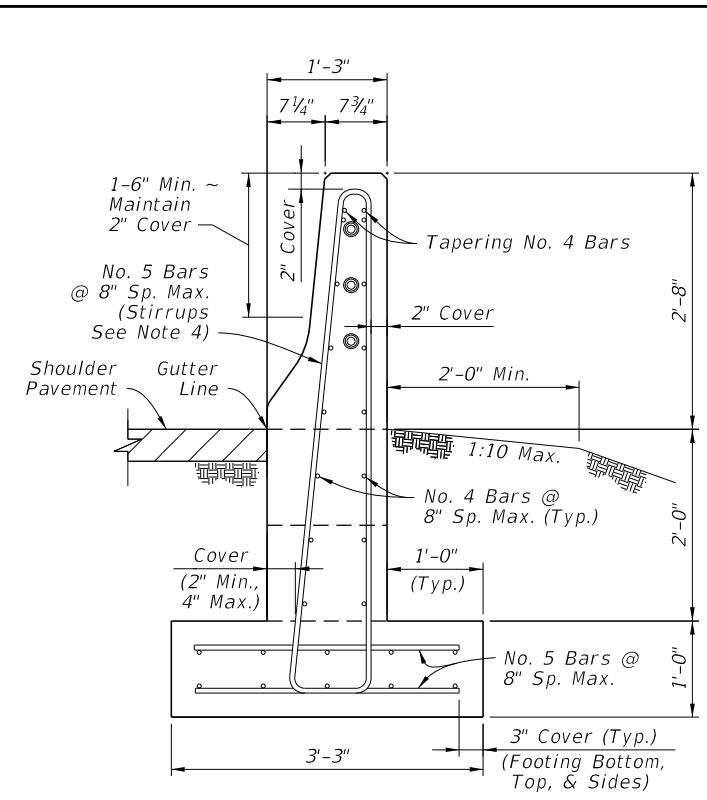
**SECTION A-A
BEGIN TRANSITION - OPTION 'A'
MATCH SINGLE-SLOPE
38" HEIGHT SHOULDER BARRIER**



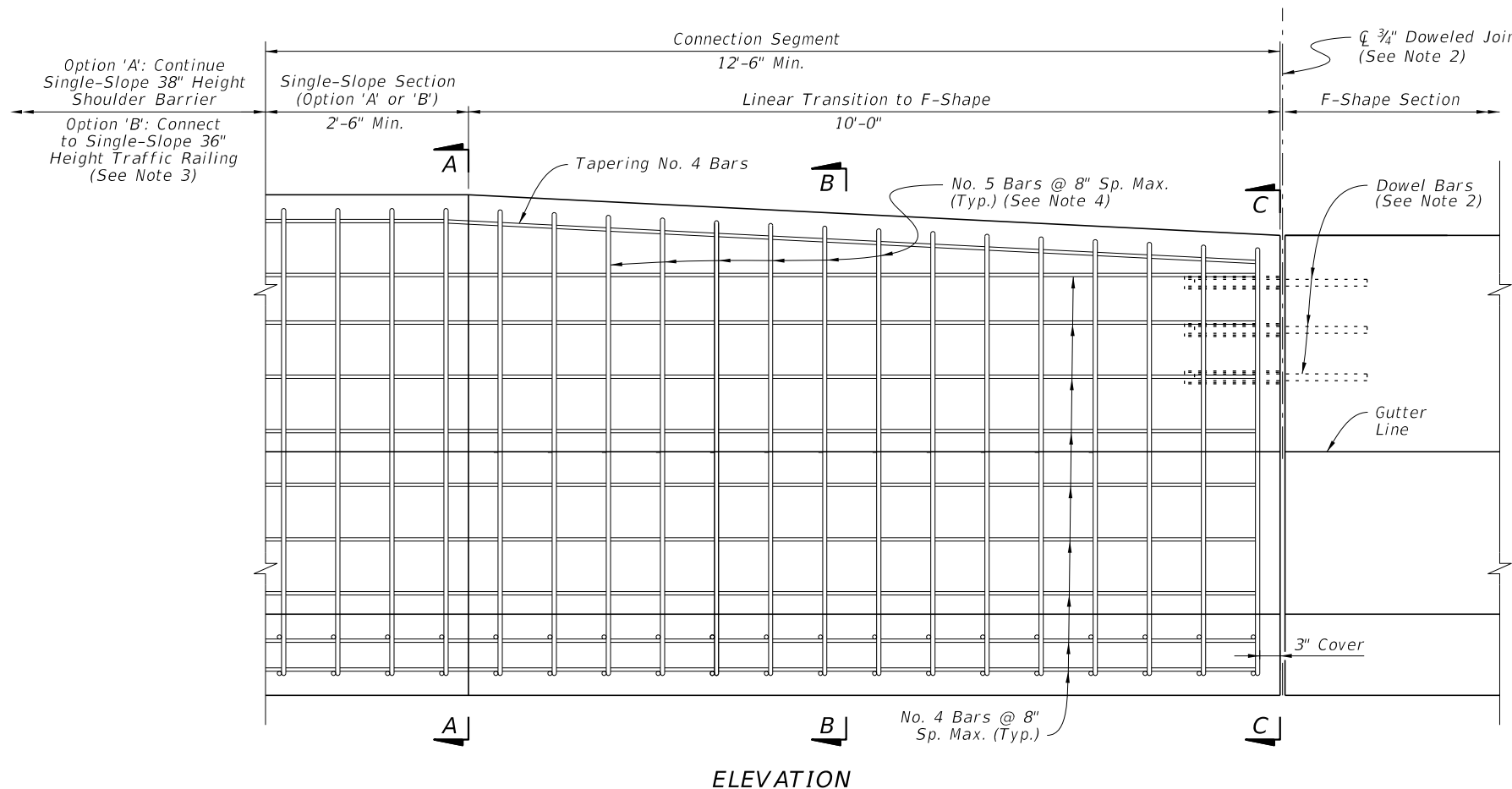
**SECTION A-A
BEGIN TRANSITION - OPTION 'B'
MATCH SINGLE-SLOPE
36" HEIGHT TRAFFIC RAILING
(Bridge Applications)**



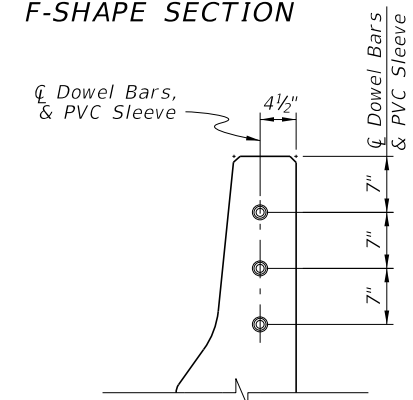
**SECTION B-B
INTERMEDIATE SECTION
OF LINEAR TRANSITION**



**SECTION C-C
END TRANSITION
MATCH 32" HEIGHT
F-SHAPE SECTION**



ELEVATION




**SECTION - F-SHAPE
DOWEL PLACEMENT
(See Note 2)**

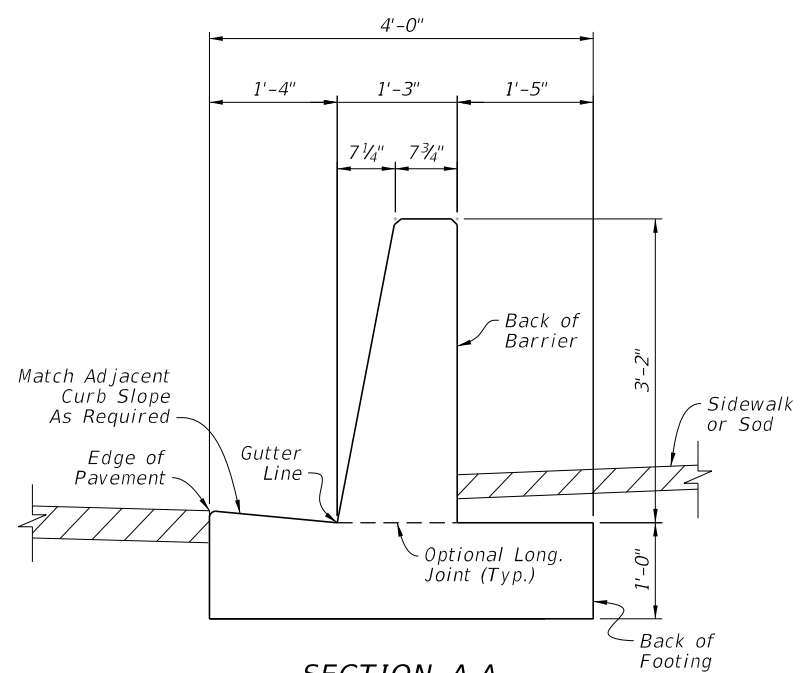
NOTES:

- GENERAL:** Construct the Connection Segment as required per the Plans to connect existing F-Shape sections to Single-Slope Shoulder Barrier or Traffic Railing sections. Construct Option 'A' or 'B' as required to match the heights of the connecting sections.
- DOWELED JOINT:** Install Dowel Bars per the Dowel Details on Sheet 13.
- TRAFFIC RAILING CONNECTION:** For the Option 'B' connection, use a Doweled Joint per Sheet 13 and the additional Free End Reinforcing with reduced bar spacing per Sheet 14.
- STIRRUP BARS:** For the vertical and transverse reinforcement requirements shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

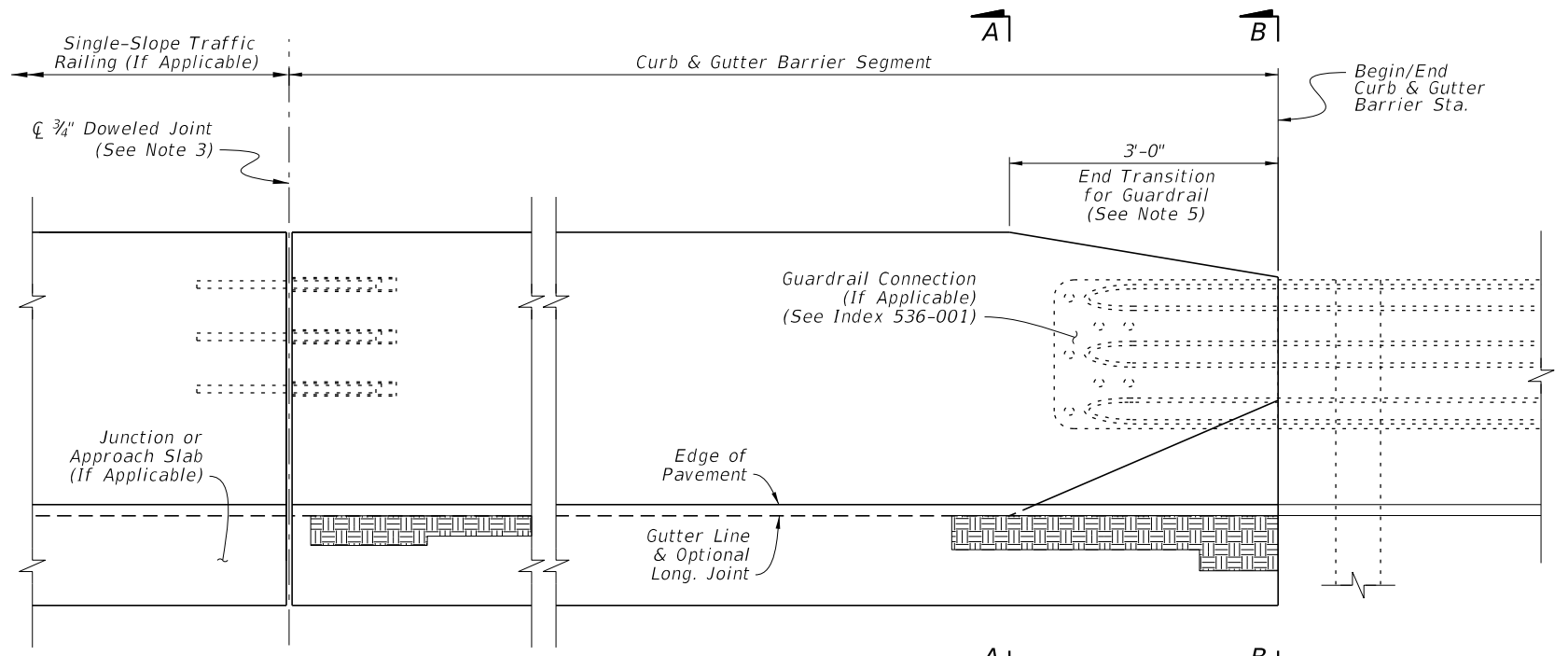
SHOULDER BARRIER - CONNECTION TO F-SHAPE

10/18/2018 11:14:56 AM

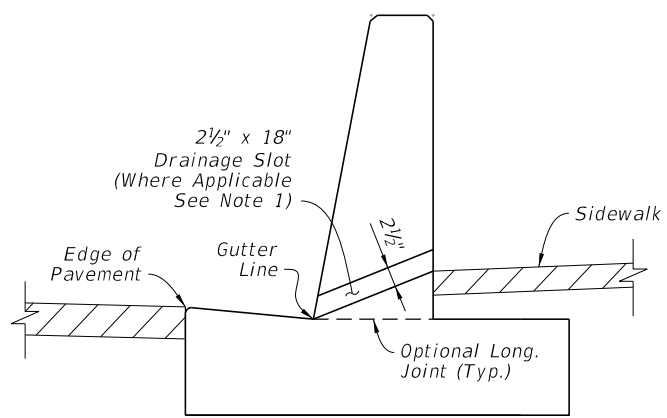
LAST REVISION 11/01/18	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 19 of 26
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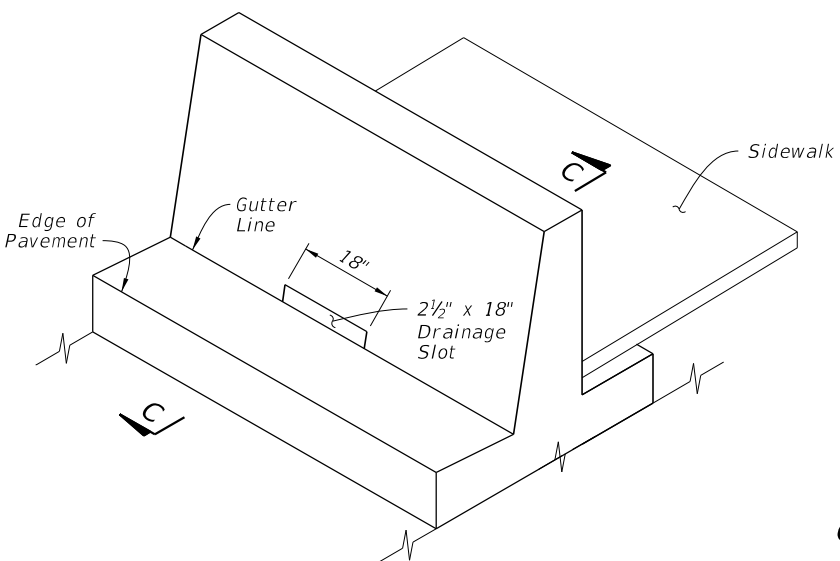
**SECTION A-A
CURB & GUTTER
BARRIER**



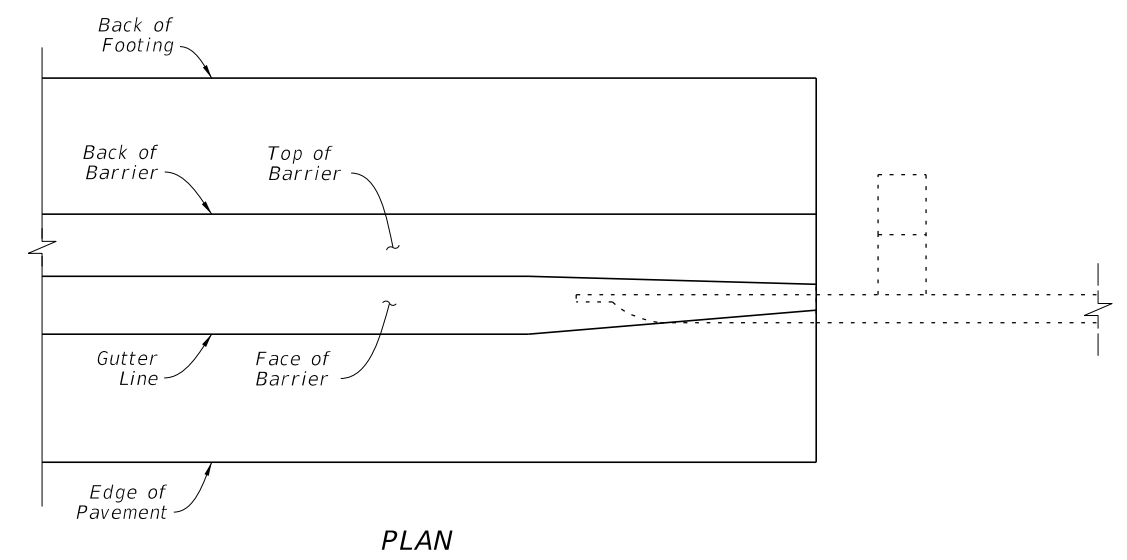
ELEVATION



**SECTION C-C
CURB & GUTTER
BARRIER WITH
DRAINAGE SLOT**



**ISOMETRIC VIEW
CURB GUTTER BARRIER
WITH DRAINAGE SLOT**



PLAN

DRAINAGE SLOT DETAILS

DRAINAGE SLOT NOTES:

1. GENERAL: Place 2 1/2" x 18" Drainage Slots at locations and/or spacing called for in the Plans.
2. STEEL REINFORCEMENT CONFLICT: When the Drainage Slot encounters a conflict with reinforcing steel, shift or cut the reinforcing steel to provide 2 1/2" (± 1/2") of concrete cover for the reinforcing around the Drainage Slot. If cutting the vertical bars, maintain 8" bar spacing. If shifting the vertical bars, move the bars from the standard 8" spacing location to the closest end of the drainage slot (distributing additional vertical reinforcement evenly on each side of the Drainage Slot).

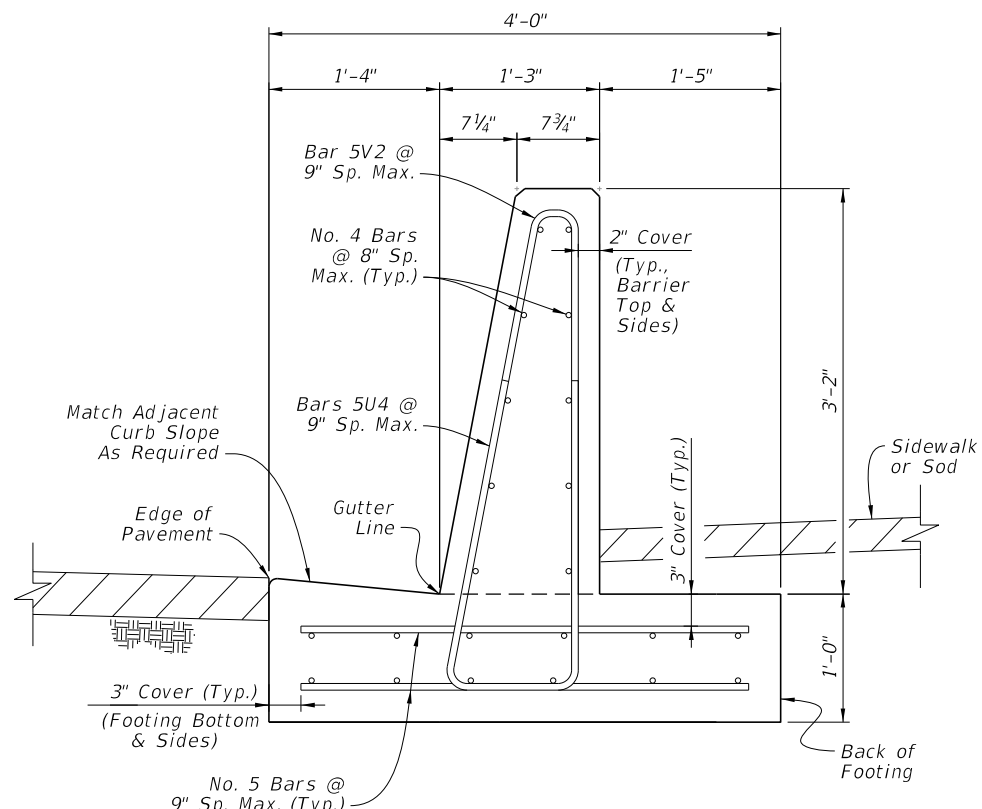
CURB AND GUTTER BARRIER NOTES:

1. SECTION VIEWS: For additional Views A-A and B-B, see Sheet 21.
2. EXPANSION JOINTS: Place 1/2" width transverse expansion joints through the barrier and footing spaced at 100-foot maximum intervals. On both sides of each joint, use the Free End Reinforcing bar spacing per Sheet 21.
3. DOWELED JOINTS: See the General Notes on Sheet 1 for usage of joint types. Where required, install 3/4" Doweled Joints as defined on Sheet 13.
4. TRAFFIC RAILING CONNECTIONS: Align the barrier and Traffic Railing faces and connect with the 3/4" Doweled Joint per Sheet 13.
5. GUARDRAIL CONNECTIONS: Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001 in conjunction with 3'-0" End Transition for Guardrail as shown herein.
6. FREE ENDS: When the barrier end does not terminate with a Traffic Railing connection or Guardrail connection as called for in the Plans, terminate the barrier in accordance with the Free End Reinforcing Note on Sheet 21.

CURB AND GUTTER BARRIER

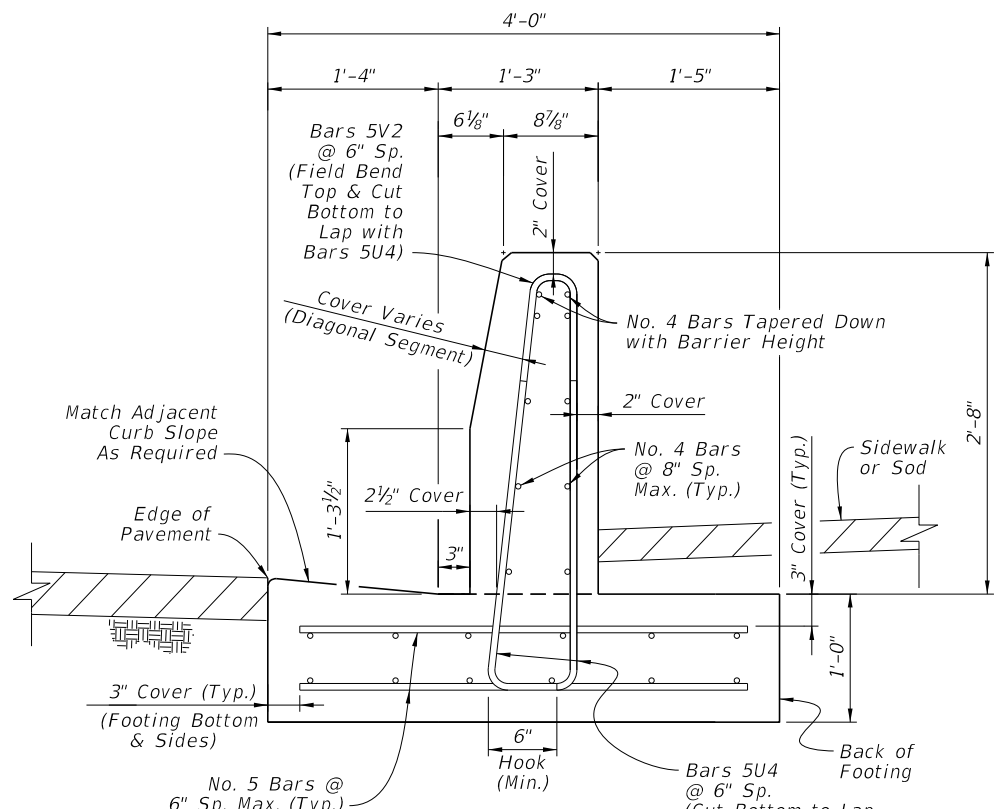
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LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 20 of 26
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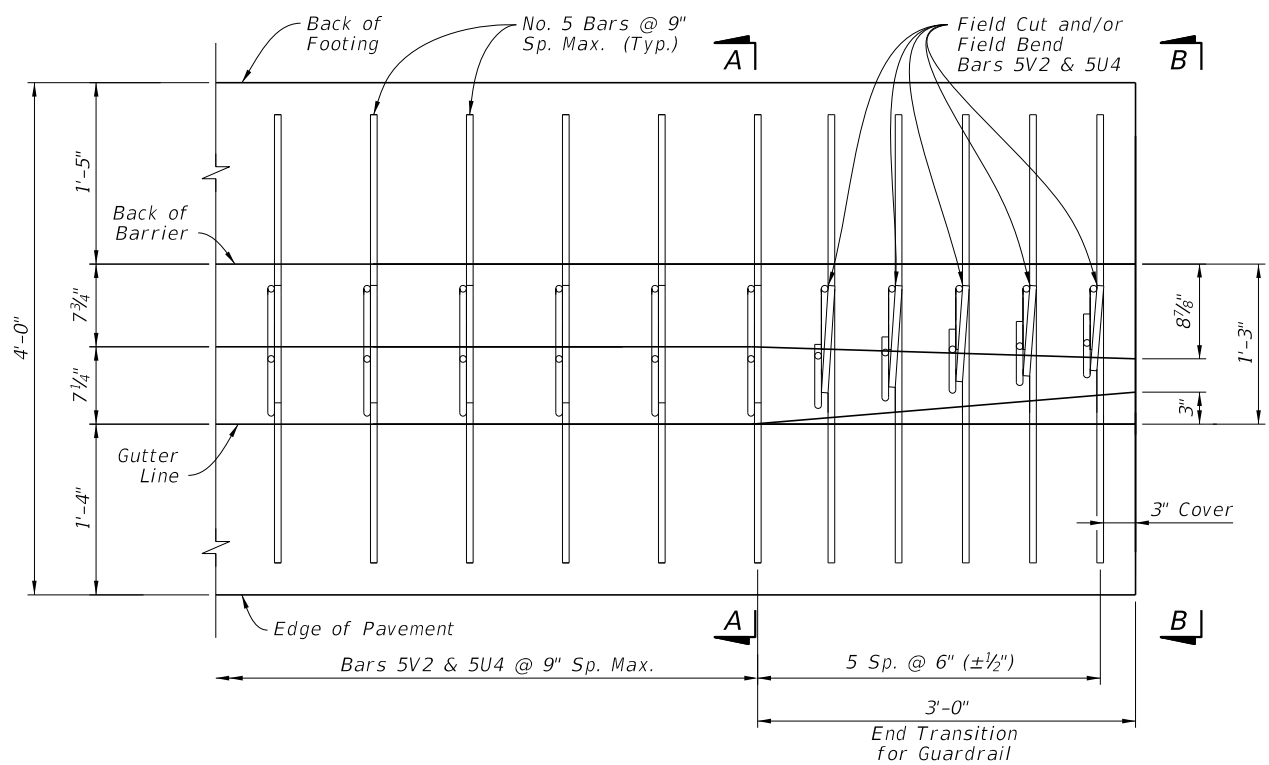


**SECTION A-A
CURB & GUTTER
BARRIER**

Concrete Qty. = 0.26 CY/FT
Steel Qty. = 41.2 LB/FT



**VIEW B-B
END OF
TRANSITION
FOR GUARDRAIL**



**PLAN VIEW - END SEGMENT FOR GUARDRAIL CONNECTION
(Longitudinal Steel Not Shown for Clarity)**

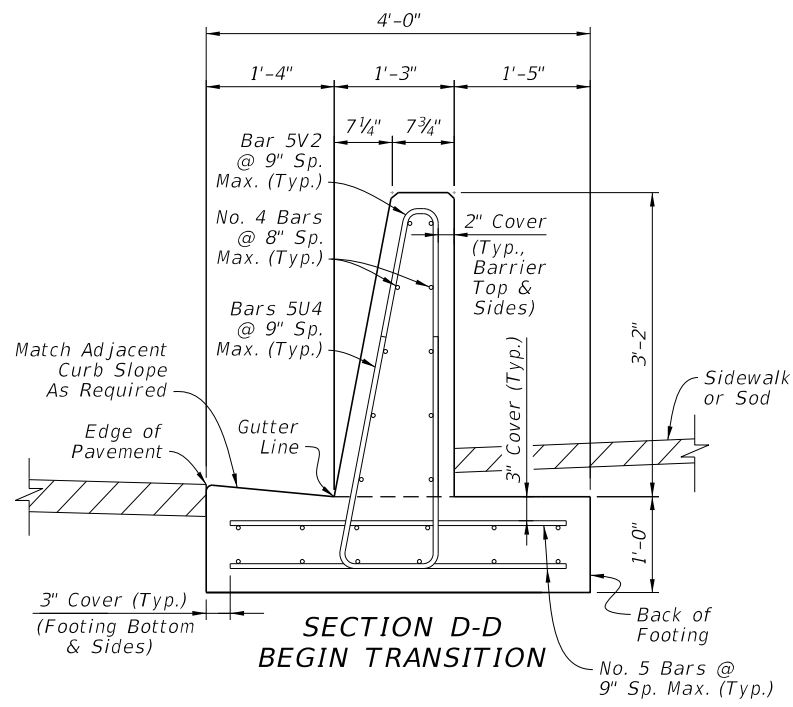
NOTES:

1. GENERAL: Work with the Plan and Elevation Views on Sheet 20.
2. FREE END REINFORCING: Where shown in the Plans, terminate the 38" Curb & Gutter Barrier section with a transverse vertical end face. Reduce the spacing of Bars 5V2 and 5U4 to 6" for 5 Spaces, placed with 3" cover from the barrier's end face.
3. BAR BENDING DIAGRAMS: For additional details for bars 5V2 and 5U4, see the Bar Bending Diagrams on Sheet 26.

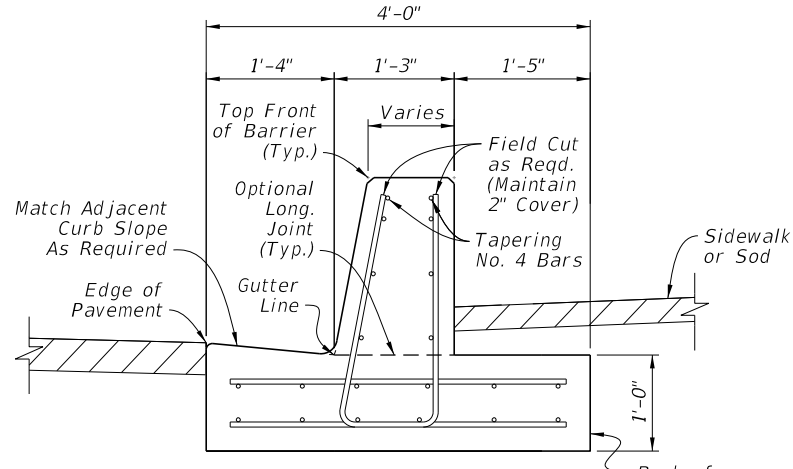
**CURB AND GUTTER BARRIER -
REINFORCING DETAILS**

10/18/2018 11:14:57 AM

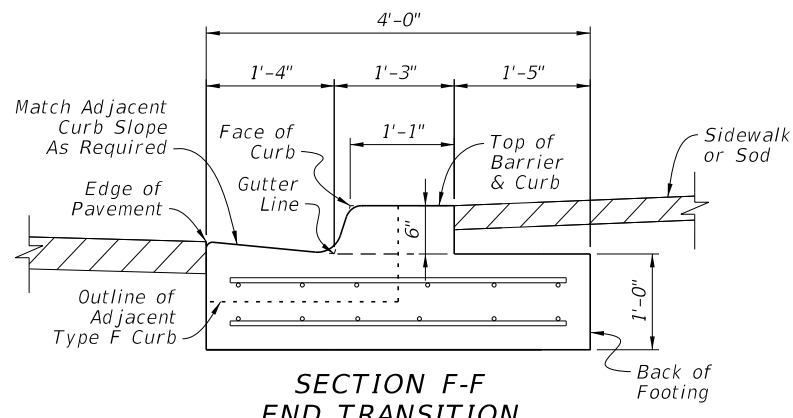
LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 21 of 26
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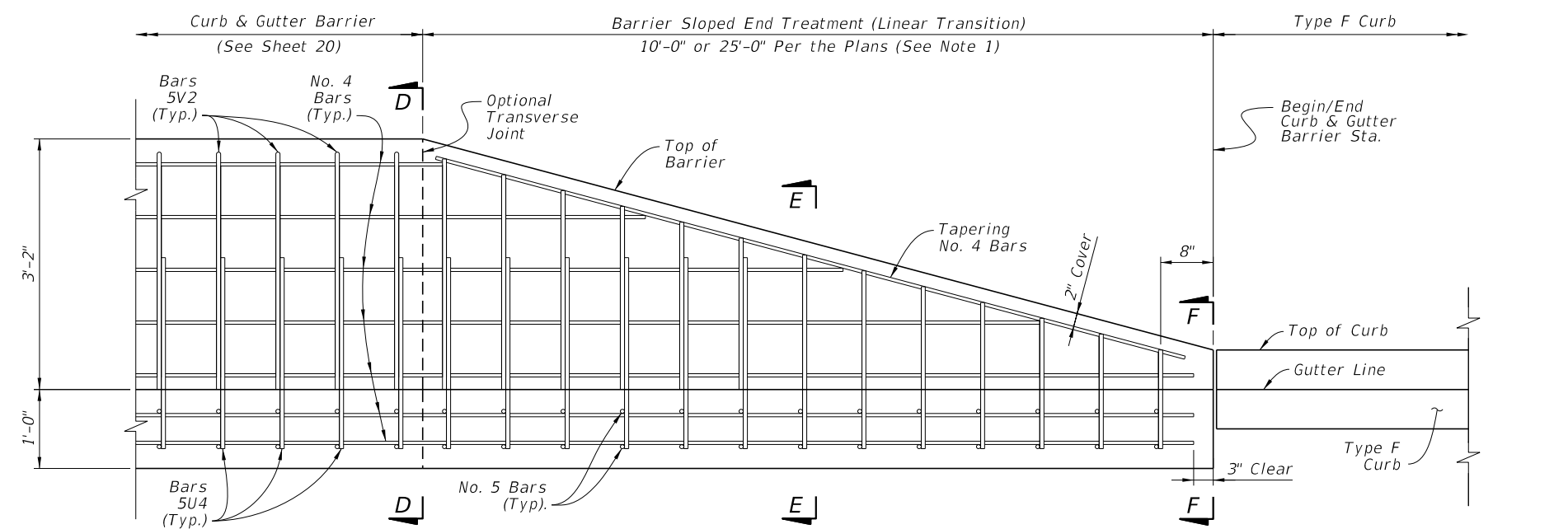
**SECTION D-D
BEGIN TRANSITION**



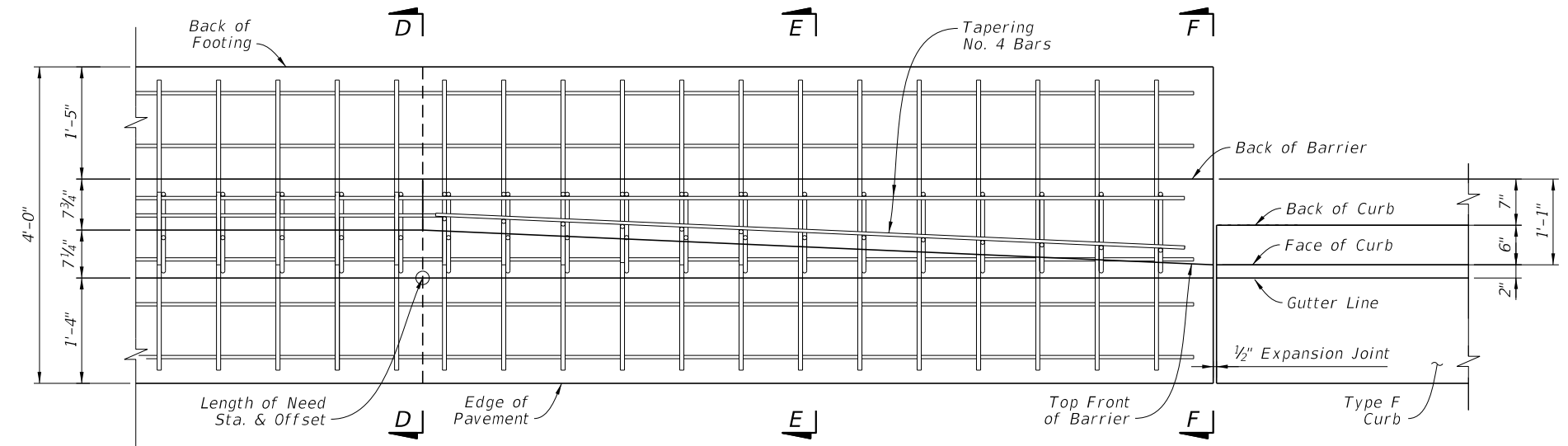
**SECTION E-E
INTERMEDIATE TRANSITION
(Height Varies Linearly
Per Elevation View)**



**SECTION F-F
END TRANSITION
(Align with Type-F Curb)**



**ELEVATION - CURB AND GUTTER BARRIER
SHOWING SLOPED END TREATMENT
(Approach and Trailing
End Similar by Opposite Hand)**



**PLAN - CURB AND GUTTER BARRIER
SHOWING SLOPED END TREATMENT
(Approach and Trailing End
Similar by Opposite Hand;
See Sections for All
Longitudinal Steel Locations)**

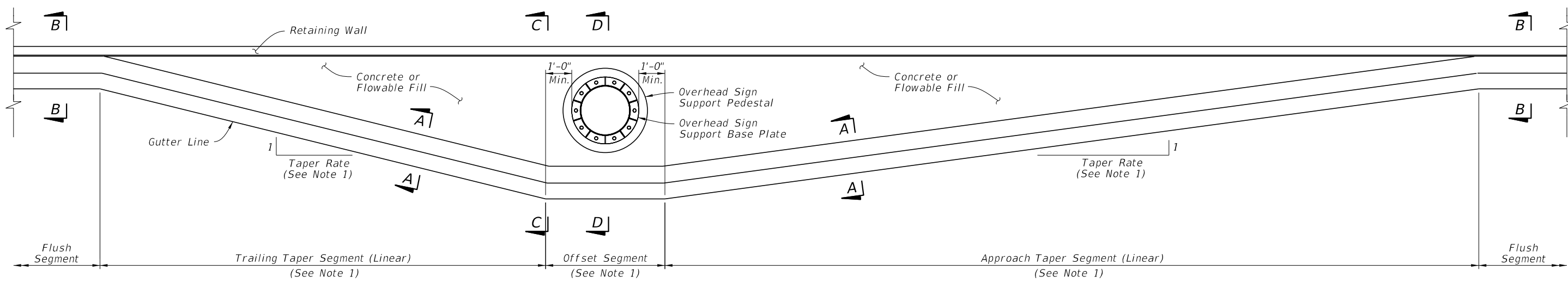
NOTES:

1. GENERAL: Install a Sloped End Treatment only where called for in the Plans, using either a 10'-0" length or 25'-0" length treatment as specified in the Plans. The 10'-0" length option is shown herein, while the 25'-0" length option requires additional trimmed Bars 5U4 & 5V2 at the same 9" longitudinal spacing.
2. BAR BENDING DIAGRAMS: For additional details on Bars 5V2 & 5U4, see the Bar Bending Diagrams on Sheet 26.

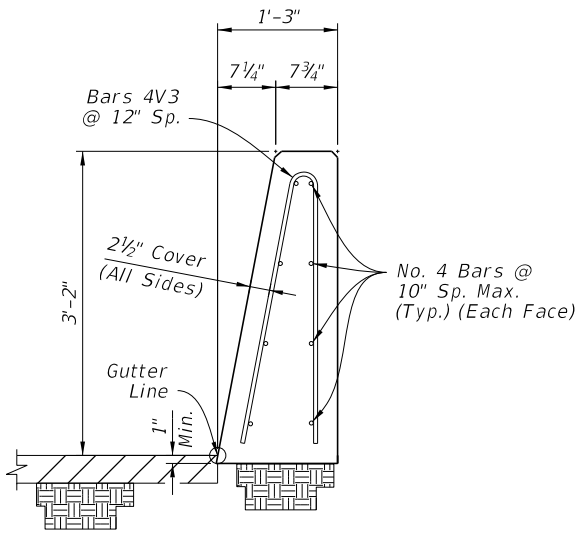
**CURB AND GUTTER BARRIER -
SLOPED END TREATMENT**

10/18/2018 11:14:58 AM

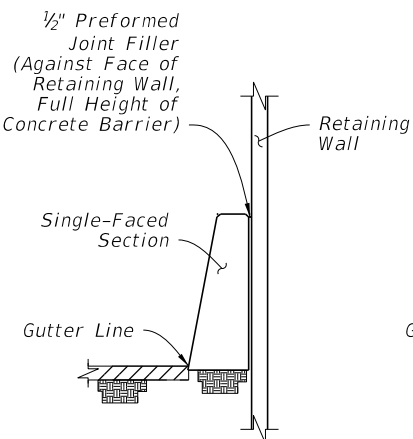
LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 22 of 26
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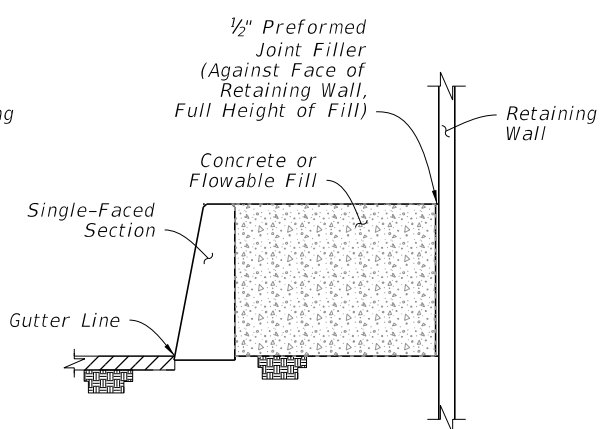
PLAN
(See Section A-A for Barrier Reinforcing)



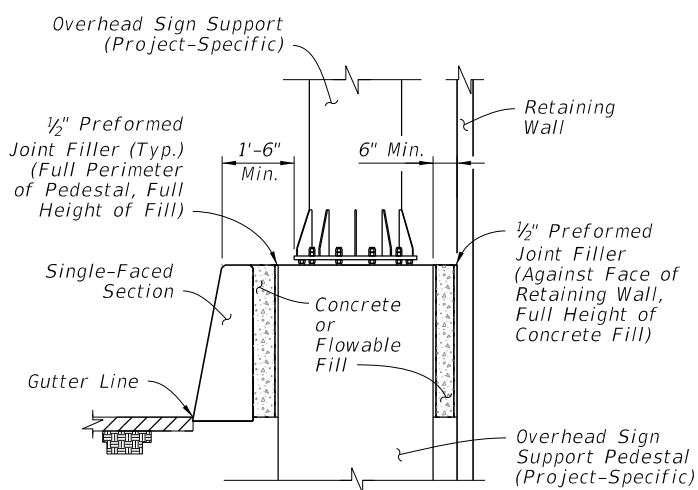
SECTION A-A
38" HEIGHT
SINGLE-FACED SECTION
(Reverse Side Similar by Opposite Hand)



SECTION B-B
FLUSH SEGMENT



SECTION C-C
OFFSET SEGMENT



SECTION D-D
OVERHEAD SIGN SUPPORT

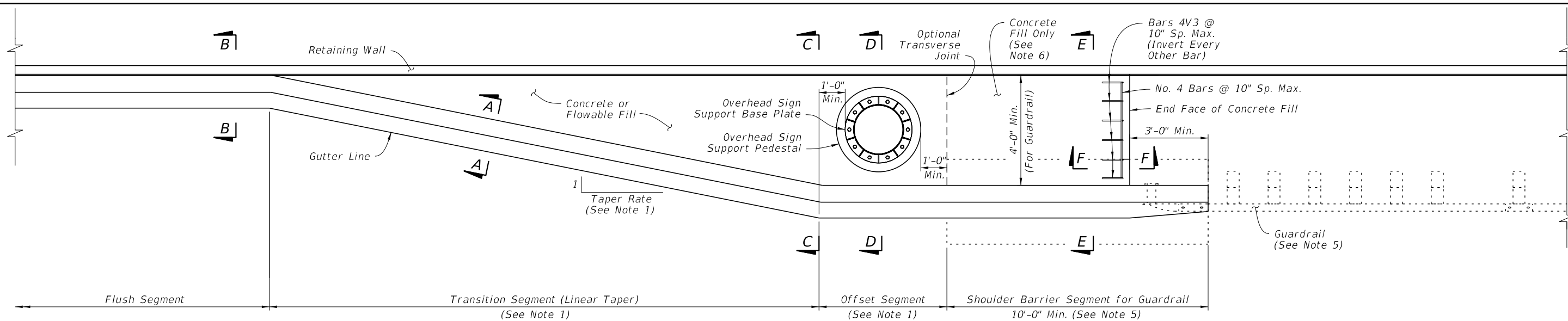
NOTES:

- TAPER SEGMENTS AND OFFSET SEGMENT:** The plan view shown is an example only, showing general geometry for the taper segments and offset segment. For the actual segment lengths and corresponding taper rates required, see the barrier placement information in the Plans.
- OVERHEAD SIGN SUPPORT:** The overhead sign support shown is an example only; see the Plans for the project-specific dimensions and requirements if applicable.
- CONNECTION TO SHOULDER BARRIER SECTIONS:** Connect to Shoulder Barrier sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections or has a full lap splice with the adjacent section's longitudinal steel.
- FREE ENDS:** Where shown in the Plans, terminate the Single-Faced Section with a transverse end face. Place a stirrup bar with a 3" cover from the end face. Place longitudinal bars with a 3" cover from the end face.
- CONCRETE OR FLOWABLE FILL:** Use Class NS Concrete in accordance with Specification 347 or Non-Excavatable Flowable Fill in accordance with Specification 121.

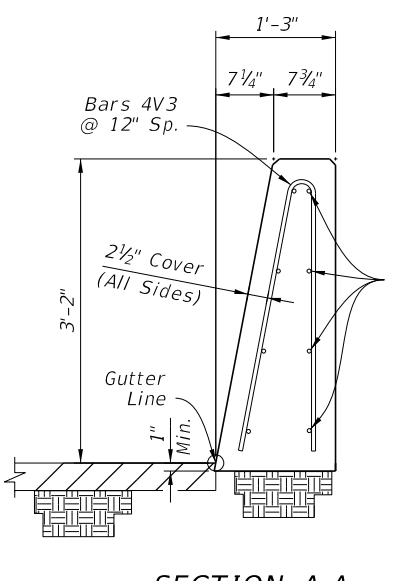
**WALL SHIELDING BARRIER -
38" HEIGHT SECTION -
APPROACH & TRAILING TRANSITION**

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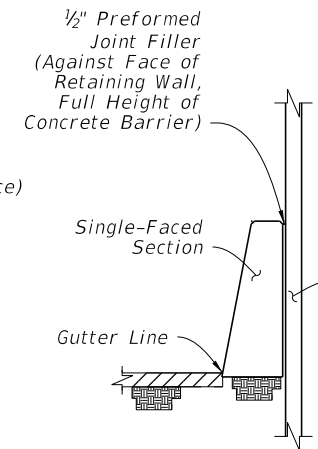
LAST REVISION 11/01/18	REVISION	DESCRIPTION:		FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 23 of 26
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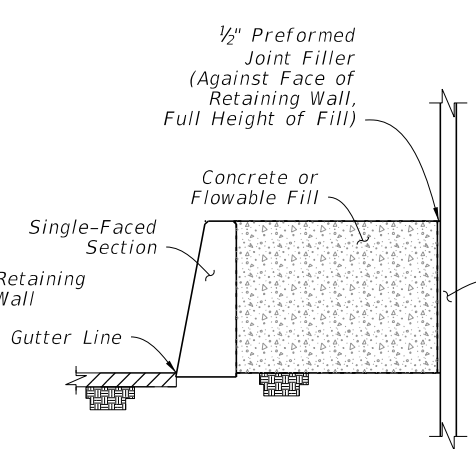
PLAN
(See Section A-A for Barrier Reinforcing)



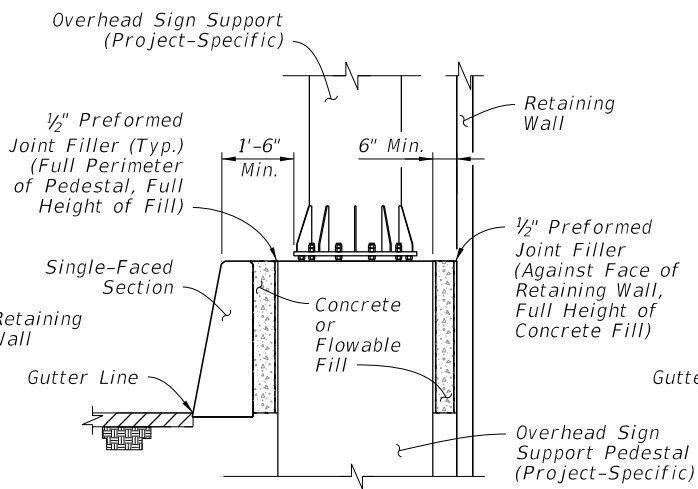
SECTION A-A
38" HEIGHT
SINGLE-FACED SECTION
(Reverse Side Similar by Opposite Hand)



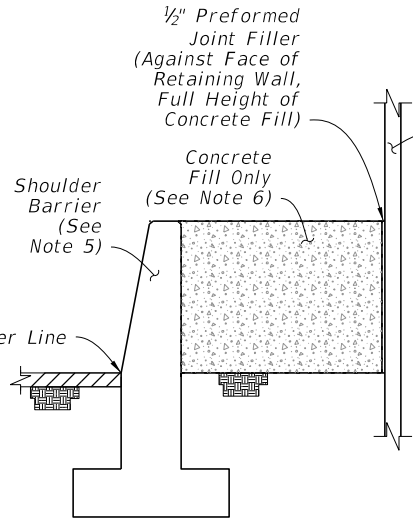
SECTION B-B
FLUSH SEGMENT



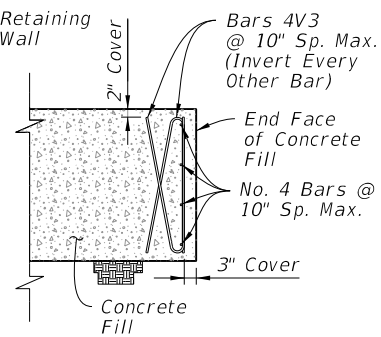
SECTION C-C
OFFSET SEGMENT



SECTION D-D
OVERHEAD SIGN SUPPORT



SECTION E-E
SHOULDER BARRIER SEGMENT FOR GUARDRAIL



SECTION F-F
CONCRETE FILL END FACE

NOTES:

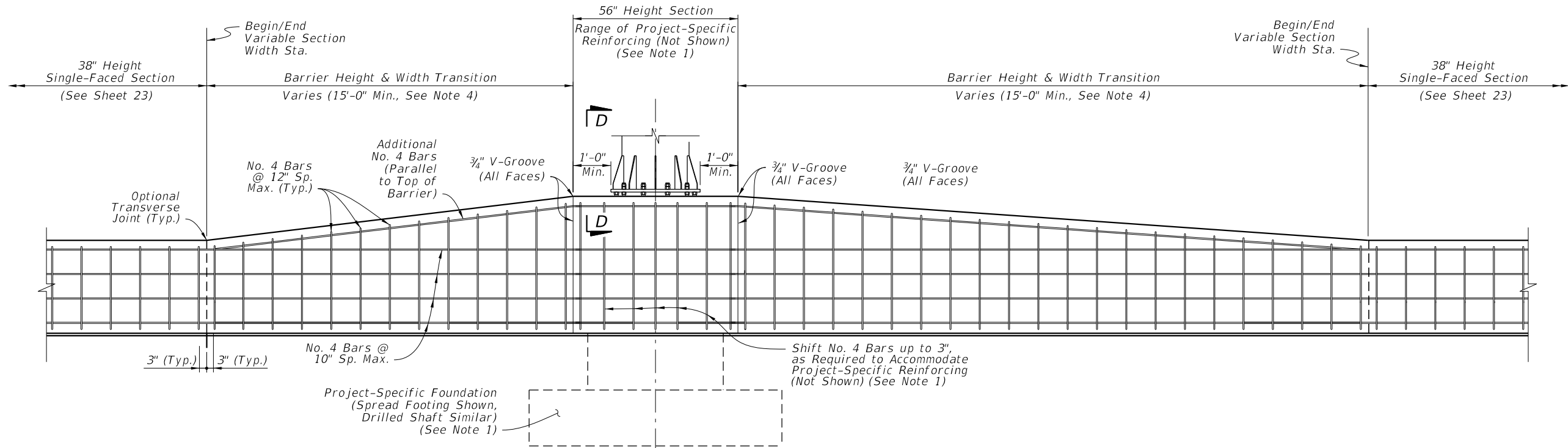
- TAPER SEGMENTS AND OFFSET SEGMENT:** The plan view shown is an example only, showing general geometry for the taper segments and offset segment. For the actual segment lengths and corresponding taper rates required, see the barrier placement information in the Plans.
- OVERHEAD SIGN SUPPORT:** The overhead sign support shown is an example only; see the Plans for the project-specific dimensions and requirements if applicable.
- CONNECTIONS TO DIFFERENT CONCRETE BARRIER SECTIONS:** Connect to aligning barrier sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections or has a full lap splice with the adjacent section's longitudinal steel.
- FREE ENDS:** Where shown in the Plans, terminate the Single-Faced Section with a transverse end face. Place a stirrup bar with a 3" cover from the end face. Place longitudinal bars with a 3" cover from the end face.
- GUARDRAIL CONNECTIONS:** Within the Shoulder Barrier Segment for Guardrail, install Shoulder Barrier as shown per Sheet 3, including the corresponding End Transition for Guardrail. Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001.
- CONCRETE OR FLOWABLE FILL:** Use Class NS Concrete in accordance with Specification 347 or Non-Excavatable Flowable Fill in accordance with Specification 121.

Use only concrete fill behind the Shoulder Barrier Segment; do not use flowable fill at this location.

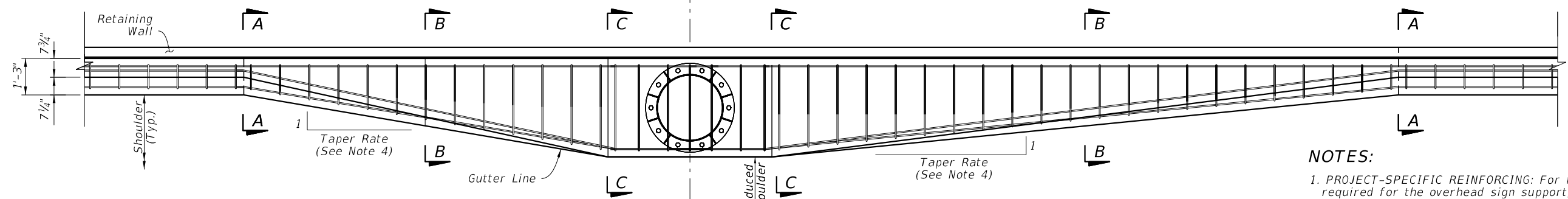
**WALL SHIELDING BARRIER -
38" HEIGHT SECTION -
GUARDRAIL CONNECTION**

10/18/2018 11:15:04 AM

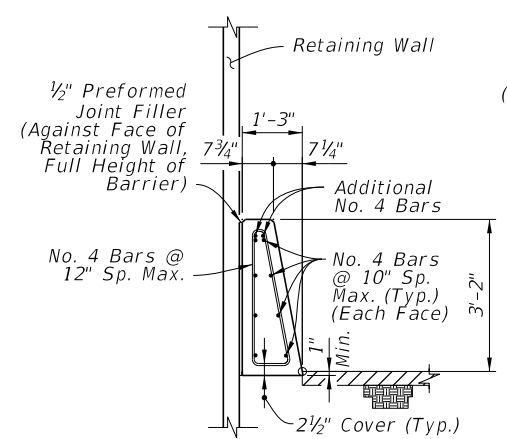
LAST REVISION 11/01/18	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 24 of 26
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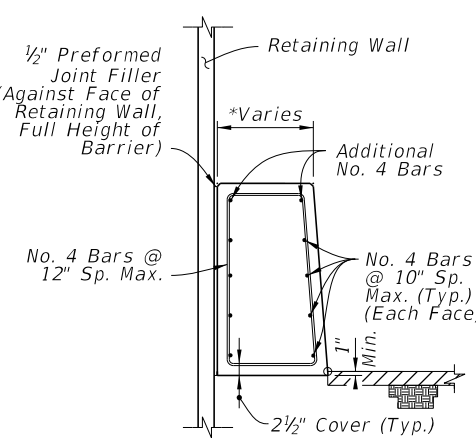
ELEVATION



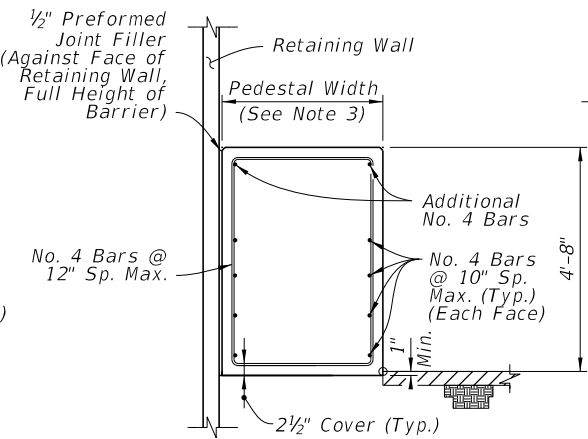
PLAN
(See Note 5)



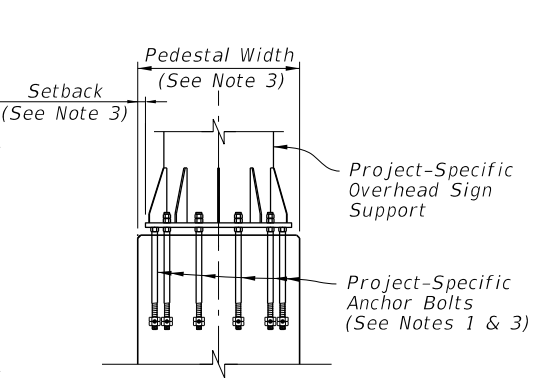
SECTION A-A
BEGIN TRANSITION



SECTION B-B
*Dimension Varies Linearly
Between Section A-A and C-C



SECTION C-C
END TRANSITION
(56" Height Section)



SECTION D-D
(Reinforcing Steel Not
Shown for Clarity)

NOTES:

1. PROJECT-SPECIFIC REINFORCING: For footing and barrier reinforcing required for the overhead sign support, see the project-specific design in the Plans.
2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4 1/2" maximum cover from the top of the barrier.

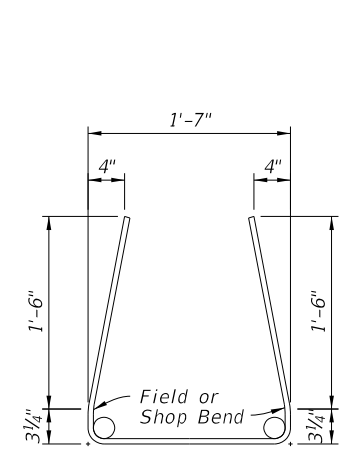
For the vertical and transverse reinforcement requirements shown in Sections A-A through C-C, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.
3. PROJECT-SPECIFIC PEDESTAL WIDTH & SETBACK: The pedestal width is governed by the size requirements of the overhead sign support, as detailed in the Plans. Likewise, the setback distance from the sign support base to the barrier face is governed by the anchor bolt cover requirements, as defined per the Plans.
4. TRANSITION SEGMENTS: The Transition Segments shown are examples only. For the actual approach and trailing transition taper rate, length, and width, see the details in the Plans.
5. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

WALL SHIELDING BARRIER - 56" HEIGHT
SECTION FOR BARRIER-MOUNTED
SIGN SUPPORT SHIELDING

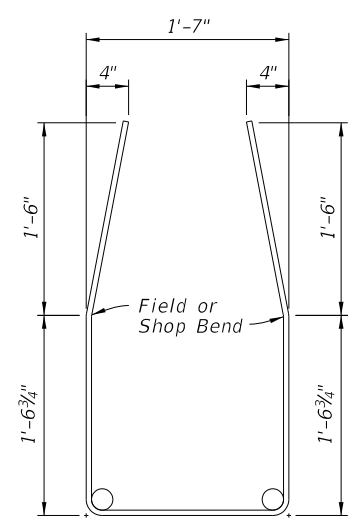
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LAST REVISION 11/01/18	DESCRIPTION:
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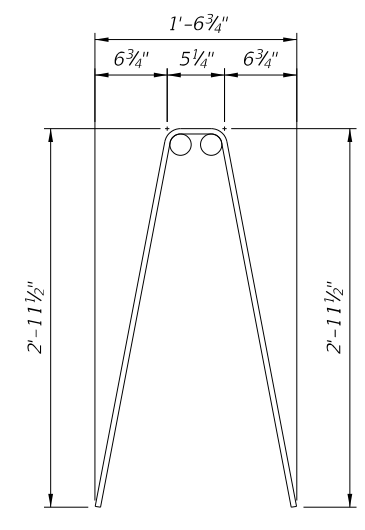
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
C1	4	3'-8"
C2	5	3'-0"
U1	4	5'-1"
U2	4	7'-8"
U3	5	9'-7"
U4	5	5'-9"
V1	4	6'-4"
V2	5	6'-3"
V3	4	5'-10"



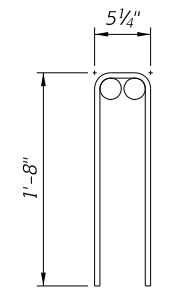
BARS 4U1



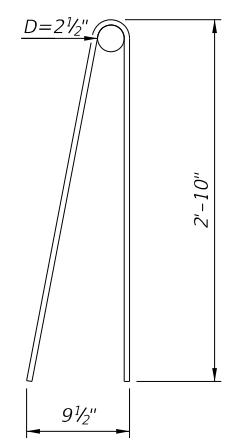
BAR 4U2



BAR 4V1



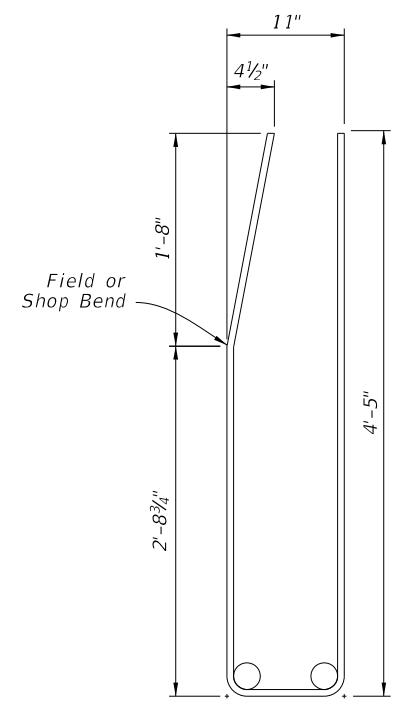
BAR 4C1



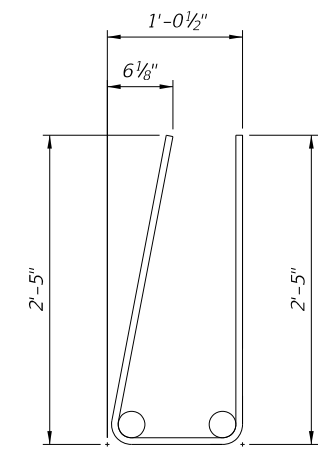
BAR 4V3

NOTES:

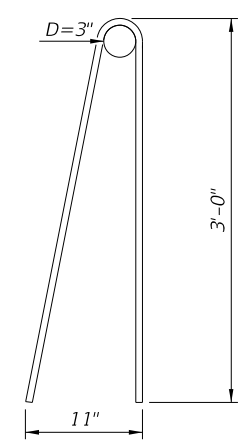
1. Work with the Standard Bar Bending Details per Index 415-001.
2. All bar dimensions in the bending diagrams are out to out.
3. Use standard inner diameters for bar bending unless otherwise shown.



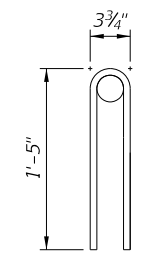
BAR 5U3



BAR 5U4



BAR 5V2



BAR 5C2

REINFORCING BAR BENDING DIAGRAMS

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LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001	SHEET 26 of 26
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