WALL FACE SAFETY SHAPES

GENERAL NOTES:
1. Class II concrete shall be used for the construction of Concrete Barrier Walls, except, in moderately and extremely
ggressive environments, Class IV concrete shall be used. All non-designated size reinforcing steel shall be No. 5 bars.
Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Specification Section 521 or as
required per index.
2. Longitudinal reinforcement to be continuous or spliced No. 5 Bars. Lap splices a minimum of 2'-0".
3. Concrete barrier wall terminal notes for design speeds ≥50 mph.
   a. Wall segments < 40' in length shall be jointed by a transverse joint in accordance with DETAIL C. The minimum segment
      length is 20'.
   b. Expansion joints are required at bridge ends and/or at locations where the wall is an integral part of an existing or
      proposed concrete slab. Construct required joints to match existing or proposed expansion joints.
   c. Shoulder concrete barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety
      shapes which have been crash tested to NCHRP Report 350, TL-4 requirements.
7. Shoulder concrete barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety
   shapes which have been crash tested to NCHRP Report 350, TL-4 requirements.
8. For wall segments constructed with the slip form method, score 3/8" deep crack control V-Grooves while the concrete is
   still plastic and mold them when walls are constructed with the stationary form method. V-Grooves shall be spaced at 20
   intervals, the end of the side face grooves shall be in line with the ends of the top face grooves and the long dimension
   of all grooves shall align at 90 degrees to the longitudinal axis of the wall. When wall segments are less than 40' in
   length, space the V-Groove equally between open joints. Dowel transverse construction joints for abutting segments less
   than 40' (See DETAIL B).
9. Minimum length of cast-in-place or precast segments is 20 feet.
10. Precast construction is allowed as an alternate to cast-in-place construction.
   a. Wall segments < 40' in length shall be jointed by a transverse joint in accordance with DETAIL C. The minimum segment
      length is 20'.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.
11. On roadways designated for reverse laning, all downstream ends that are not shielded or outside the clear zone shall
    be marked by Type 3 Object Markers.
12. For BARRIER WALL INLET details see Index 218 and Index 219. For MEDIAN BARRIER INLETS see Index 217.
13. Concrete barrier wall with NJ Safety Shape may not be substituted for the Standard F Shape Barrier.
TRANSLATION BETWEEN NARROW AND WIDE MEDIANS WHERE END OF BARRIER
WALL IS LOCATED OUTSIDE THE APPROACH CLEAR ZONE OR LATERAL OFFSET

DETAIL A

COLD JOINT

INSTALL LOAD TRANSFER DEVICE

AT Q % OF WALL PER SPECIFICATION

SECTION 350 USING 1" Ø SMOOTH DOWELS.

DOWELED TRANSVERSE CONSTRUCTION JOINT WHERE
ABUTTING SEGMENT(S) LESS THAN 40" IN LENGTH
(REQUIRED ON ABUTTING ENDS OF SEGMENTS < 40" LONG)

DETAIL B

TOP VIEW

TONGUE DETAIL

GROOVE DETAIL

PRECAST TONGUE AND GROOVE TRANSVERSE JOINT
(REQUIRED ON ABUTTING ENDS OF PRECAST SEGMENTS ≥ 40" LONG)

DETAIL C

CONCRETE BARRIER WALL SPECIAL DETAILS

FREE END REINFORCEMENT

NOTE:
1. Free end reinforcement required for nonreinforced walls at the following locations: All exposed ends; abutting ends of precast segments ≥ 40'; ends with guardrail connections; ends with redirective crash cushion connections; and, ends connecting to bridge traffic rails or other rigid barriers.

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS

NOTES:
1. End of wall flush mounted connections are not applicable to two-lane two-way facilities. For trailing end connections on two-lane two-way facilities, see SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD ≤ 3.
2. Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
   (a) One-way traffic trailing condition one side only - flush mount with flat steel back-up plate on back side.
   (b) One-way traffic trailing condition both sides - flush mount both sides.
   (c) For trailing condition one side and approach traffic condition opposite side - see MEDIAN BARRIER WALL.
REINFORCED CONCRETE SHOULDER WALL

**SHOULDER WALL (TYPICAL)**

- **Quantities:** Concrete 0.30 CY/LF; Reinforcing Steel 32 LBS/LF

**SHOULDER WALL (MODIFIED)**

- **Quantities:** Concrete 0.26 CY/LF; Reinforcing Steel 28 LBS/LF

**SHOULDER WALL (RETAINING)**

- **Quantities:** With Reinforcing Steel (Bar SC) 27 LBS/LF; Concrete 0.27 CY/LF; With Reinforcing Steel (Bar SD) 23 LBS/LF; Concrete 0.23 CY/LF

**NOTES:**

1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
2. Unless otherwise noted, Minimum Segment Wall Length is 20 LF.
3. All walls may be made up of segments 20 or more in length provided the segments are joined by a transverse joint in accordance with the CONCRETE BARRIER WALL SPECIAL DETAILS, DETAIL B.
4. Quantities shown are for information only. Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1” expansion material.
5. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0”.
6. For additional information on Bars 5A, 5B, 5C and 5D, see BAR BENDING DIAGRAMS.

**PLAN VIEW**

- **Shoal Face Barrier Wall**
- **Top Of Footing**
- **Inlet Per Index 218**

**REINFORCED CONCRETE SHOULDER WALL**

**FY 2016-17**

**DESIGN STANDARDS**

**CONCRETE BARRIER WALL**

**INDEX NO. 410**

**SHEET NO. 3 of 25**
**F-SHAPE MEDIAN BARRIER WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES**

**CANTILEVER WALL SUPERELEVATED SECTION**

**L-WALL SUPERELEVATED SECTION**

**DIMENSIONS TABLE**

<table>
<thead>
<tr>
<th>Dimension Table</th>
<th>Cantilever Wall</th>
<th>L-Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Y</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>Width W</td>
<td>2'-6&quot;</td>
<td>2'-9&quot;</td>
</tr>
<tr>
<td>Min. Segment Wall Length</td>
<td>26-29</td>
<td>22-26</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Unless the plans stipulate a specific wall type, either the Cantilever Wall or the L-Wall may be constructed at the Contractor's option.

2. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.

3. All longitudinal reinforcement to be continuous or spliced as No. 5 bars. Lap splices a minimum of 2'-0".

4. For additional information on Bars 5E, 5F, 5G, 5H and 5J, see BAR BENDING DIAGRAMS.

5. No. 4 dowel may be extended to provide steel stake. Omit dowel bars when construction joint is not used.

**MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS WITH VARIABLE ROADWAY PROFILE GRADE LINES**
LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 1)
2" Cover (Min.)

#5 Stirrup Bars @ 1'-0" Spacing

To Maintain Cover

Field Bend #5 Bar

Symmetric About \( \frac{1}{2} \)

#5 Bars (Typ.)

3'-0" Max.

Spacing of #5 Stirrup Bars

Varying (15'-0" Min.)

Max. Shift To Clear Project Specific Sign Support Foundation

32" F-Shape Median Barrier

\* See Plans For Additional Project Specific Reinforcement For Sign Support Foundation.

Overhead Sign Support Foundation

(Spread Footing shown, Drilled Shaft similar)

#5 Stirrup @ Transition from 32" to 54" Barrier Height

3'-0" Setback (Min.)

Overhead Sign Support (Project Specific Design)

\* Transition from 32" to 54" Barrier Height

\* Transition from 32" to 54" Barrier Height

Design Standards Index 410

ELEVATION

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 2)
LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 3)

Design Standards Index 410

32" F-Shape Median Barrier

* Transition from 32" to 54" Barrier Height

32" High Vertical Face Barrier

* Transition from 32" to 54" Barrier Height

ELEVATION

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

2" Cover (Min.)

6 - #5 Bars

#5 Stirrup Bars

Varies

2" Cover (Min.)

6 - #5 Bars

2" Cover (Min.)

6 - #5 Bars

Design Standards Index 410

Overhead Sign Support

(Project Specific Design)

0' Setback

Distance (Min.)

Varies

2'-0"

7'-0" 9'-0" 11'-0"

2'-0"

3'-0"
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS

NOTE:
1. Footing Extended As Called For On Other Indexes Or As Called For In The Plans
**DESIGN STANDARDS**

**FY 2016-17**

**CONCRETE BARRIER WALL**

**REVISION NO.**

**SHEET NO.**

**INDEX NO.**

**DESCRIPTION:**

**MEDIAN BARRIER MOUNTED LIGHT POLE DETAILS**

**NOTES:**

1. Embedded junction boxes are to be fabricated from steel conforming to ASTM A36 and be hot-dip galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.

2. Remove excess concrete while green and hand form chamfers.

3. Embedded junction box complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.
WITH CONCRETE BARRIER WALL (SHOULDER)

Guardrail (For Additional Details See Index No. 400)

Approach End Anchorage Assembly (Flared). See Note 1

Transition Section

2 Panels

Varies

Approach End Anchorage Assembly (Flared). See Note 1

WITH SHOULDER GUTTER AND GUARDRAIL

Guardrail (For Additional Details See Index No. 400)

Approach End Anchorage Assembly (Flared). See Note 1

Transition Section

2 Panels

Varies

Approach End Anchorage Assembly (Flared). See Note 1

WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL

Notes:

1. To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent
    guardrail shall be anchored by End Anchorage Type II, Index No. 400.

2. To be deleted on trailing ends except for 2-lane 2-way facilities.

3. End measurement for guardrail payment when guardrail connected to shoulder barrier
    walls. See Index No. 400, Detail 1 for end measurement when guardrail connected to
    concrete traffic rails constructed with approach slab or on retaining walls.

4. Guardrail connection to concrete traffic railings or retaining walls shall be in
    accordance with the Design Standards, Index 400 Series and the plans.

5. Views show approach roadside barriers when length of need exceeds the length of
    either retaining walls with concrete traffic railings or Shoulder Wall. When either of
    these rigid barriers alone satisfies the approach length of need, the wall ends shall
    be shielded by crash cushions, or by guardrail the same as for bridge traffic rails, as
    detailed in Index No. 400. See other flagged notes for trailing end treatments.
    Resilient asphalt paving under guardrail not shown.

Either Reinforced Concrete Barrier Wall (Shoulder) or Retaining Wall with Concrete Traffic Railing

Concrete Barrier Walls on Bridge Approaches

REV 07/01/14

DESIGN STANDARDS

FY 2016-17

INDEX NO.
410

SHEET NO.
10 of 25
NOTES:
1. Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner: Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and No. 6 bars 15" long set in an Adhesive Bonded Material System per Standard Specification Section 416. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I Asphalt-saturated roofing felt with the ends crimped.

2. When Construction joints are utilized for Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner. Five No. 5 bars 18" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.

3. The detail BRIDGE WITH BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE and WITHOUT UTILITY STRIPS AND WITH BIKE LANE. The detail BRIDGE WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITHOUT BIKE LANE and WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE.

4. For SECTION DD, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE. For SECTION EE, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.

WITH AND WITHOUT UTILITY STRIP
PICTORIAL VIEW

SECTION DD
SECTION EE

BRIDGE WITHOUT BIKE LANE

WITH UTILITY STRIP AND WITHOUT BIKE LANE

WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE

HAZARD 4' OR LESS FROM FACE OF CURB
ONE-WAY CURB AND GUTTER DEPARTURES

CONCRETE BARRIER WALL

INDEX NO.
410

Sheet No.
11 of 25
1. For X=Length of advancement in feet for near and opposing lanes and for sectional details see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.

2. The 1'-6" and 2'-6" offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on HAZARD PENETRATION INTO STEM OF RIGID CONCRETE BARRIER WALLS; AND SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.

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4. For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.

5. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
For Section TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.

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5. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
For Section TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
NOTES:
1. For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.
2. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
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DESIGN STANDARDS

ONE-WAY AND TWO-WAY CURB AND GUTTER NEAR LANE APPROACHES TRAFFIC (UNDIVIDED)

HAZARD 4' OR LESS FROM FACE OF CURB

BRIDGE WITHOUT BIKE LANE

BRIDGE WITH BIKE LANE

WITH UTILITY STRIP AND WITHOUT BIKE LANE

WITH UTILITY STRIP AND WITH BIKE LANE

WITHOUT UTILITY STRIP AND WITHOUT BIKE LANE

WITHOUT UTILITY STRIP AND WITH BIKE LANE

SECTION GG

ConCRETE BARRIER WALL

INDEX No. 410

SHEET No. 13 of 25
Section TT (For High Side)

Section TT (For Low Side)

Section HH

Pictorial View

Sidewalk Drainage Slot for Barrier Wall (Rigid) (Curb & Gutter)

Notes:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.
4. For Concrete Barrier Wall Inlet details with Rigid Curb and Gutter applications, see Index No. 219.
5. Minimum Segment Wall Length = 20 LF.
6. For additional information on Bar SK, see BAR BENDING DIAGRAM.
7. Drainage slots shall be located at all low points along the sidewalk and unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' cut sections. Slots shall be located such that only two bars are cut away or deleted in front and back lines of vertical reinforcement. On each side of Drainage slots, vertical and horizontal bars shall be placed to provide 2" concrete cover.
Transition Section, see TRANSITION SECTION NOTES

1. Guardrail and Offset Block Views, see STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER.

2. Attach thrie-beam terminal connector to median barrier wall with 5-3/8x15" long MS hex bolts and nuts with 3/8" plain round washers under heads and nuts. Attach to shoulder barrier wall with a 31½x12½" thrie-beam terminal connector plate and 5-3/8x12" long MS hex bolts and nuts with 3/8" plain round washers under heads and nuts.

NOTES:

1. For Section II, JJ, KK and LL Guardrail and Offset Block Views, see STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER.

2. Attach thrie-beam terminal connector to median barrier wall with 5-3/8x15" long MS hex bolts and nuts with 3/8" plain round washers under heads and nuts. Attach to shoulder barrier wall with a 31½x12½" thrie-beam terminal connector plate and 5-3/8x12" long MS hex bolts and nuts with 3/8" plain round washers under heads and nuts.

LEFT SIDE APPROACH ONE-WAY LANES

LEFT SIDE OF TWO-LANE TWO-WAY (APPROACH FOR FAR LANE)

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS
STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

TRANSITION SECTION NOTES:

1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.

2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see FREE END REINFORCEMENT.

3. Where reaming is necessary to fit nested beams, the reamed surfaces shall be metalized in accordance with Section 562 of the Standard Specifications.

4. Either steel or timber guardrail post may be used, timber posts shown.

5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).

6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers (1), (2), (3), (5), (6), and (8).

7. For additional guardrail information refer to Index No. 400.

8. Single Thrie-Beam on trailing ends of barrier wall; Nested Thrie-Beams on approach ends of barrier wall.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS
### Standard Thrie-Beam Offset Block (Field Trimmed)

**Plan for Design Speed ≤ 45 MPH**

**Plan for Design Speed ≥ 50 MPH**

#### Notes:
1. The affected segments between bent supports or pier columns shall be constructed in accordance with the detail for REINFORCED CONCRETE SHOULDER WALL, Section QQ or Section TT. In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.

2. The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. For details on trailing ends of two-way multi-lane and one-way facilities, the end connection on W-Beam guardrail connection to concrete barrier wall trailing ends may be used.

3. Refer to Index No. 400 for additional guardrail information.

4. Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x5/8" thrie beam terminal connector plate and 5-5/8"x12" long HS hex bolts and nuts with 3/8" plain round washers under heads and nuts.

5. 12"x12"x5/8" galvanized steel back-up plate with 3/8" post bolts (either 14" or 18" long) and nuts with 3/8" plain round washers under nuts.

6. For details at Rigid Hazard, see HAZARD PENETRATION INTO STEM OF RIGID CONCRETE BARRIER WALLS.

7. For additional information on PLAN FOR DESIGN SPEED ≤ 45 MPH, see SHOULDER BARRIER WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.

8. For additional information on PLAN FOR DESIGN SPEED ≥ 50 MPH, see SHOULDER BARRIER WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≥ 50 MPH.

9. See GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS FOR POST SPACING AND BOLT CONNECTIONS, STEEL OR TIMBER POSTS ARE APPLICABLE.

#### Shoulder Barrier Wall at Above Ground Rigid Hazards When Offset from Hazard < 3'

<table>
<thead>
<tr>
<th>Arc Length (FT)</th>
<th>Distance &quot;X&quot; (FT)</th>
<th>Offsets &quot;Y&quot; (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.99</td>
<td>0.26</td>
</tr>
<tr>
<td>12</td>
<td>11.98</td>
<td>0.58</td>
</tr>
<tr>
<td>16</td>
<td>16.96</td>
<td>1.02</td>
</tr>
<tr>
<td>20</td>
<td>19.91</td>
<td>1.56</td>
</tr>
<tr>
<td>21</td>
<td>20.91</td>
<td>1.76</td>
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<tr>
<td>24</td>
<td>21.85</td>
<td>2.50</td>
</tr>
<tr>
<td>25</td>
<td>21.83</td>
<td>2.49</td>
</tr>
</tbody>
</table>

*Note: Wall may be constructed in chords having lengths ≤ 4 feet.*

### Standard Thrie-Beam Offset Block

For use with either 1:10 or 1:15 Guardrail Transitions.

**Ends for Post Spacing and Bolt Connections:** Steel or timber posts are applicable.
PIER AT BACK OF CONCRETE BARRIER WALL

NOTES:
1. These treatments are not applicable to hazards that cannot provide lateral support to resist the LRFD lateral equivalent static force. See the plans for limits of wall sections and other associated wall treatments.

2. For Low Speed SECTIONS MM, NN and OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.

3. For High Speed SECTIONS MM and NN, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≥ 50 MPH.

4. The details on this sheet are treatments to the F-shape concrete barrier walls, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown.

5. When thru drainage is required, a 3"x 12" Drain Slot shall be provided at one of the following locations:
   a. 4' upstream of pier edge for a declining approach.
   b. 4' downstream of pier edge for an inclining approach.

PIER PENETRATION INTO TOP OF CONCRETE BARRIER WALL

RIGID HAZARD PENETRATION INTO STEM OF CONCRETE BARRIER WALL
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A and 5L, see BAR BENDING DIAGRAMS.
4. ½ Min. Expansion Joint or at the contractor's option: Back face of barrier wall may be cast against Pier with ½ Expansion Material.

32" SHOULDER WALL
SECTION MM
WHEN PIER OFFSET ≥ 15½"

32" SHOULDER WALL
SECTION NN
WHEN 12½" ≤ PIER OFFSET < 15½"

32" OR 42" SHOULDER WALL
SECTION OO
WHEN 8½" ≤ PIER OFFSET < 12½"
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
4. For Section OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
5. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
6. ½" Min. Expansion Joint or at the contractor’s option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.

1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
4. For Section OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
5. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
6. ½" Min. Expansion Joint or at the contractor’s option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.

SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
4. For Section OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
5. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
6. ½" Min. Expansion Joint or at the contractor’s option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.

SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
4. For Section OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
5. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
6. ½" Min. Expansion Joint or at the contractor’s option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH
END TRANSITION DETAILS - 42" SHOULDER WALL WITH GUARDRAIL OR SHOULDER WALL CONTINUATION FOR DESIGN SPEED ≥ 50 MPH

NOTES:
For additional information on Bars 5A, 5M and 5N see BAR BENDING DIAGRAMS.
NOTE:
1. For Additional Information on "STANDARD BAR BENDING DETAILS," See Index 21300.
2. For Bar 5G, Bar 5J, and Dimensions (W, W1 and Y), see CANTILEVER WALL DIMENSIONS TABLE.

BAR 5A
BAR 5B
BAR 5C
BAR 5D
CANTILEVER WALL & L-WALL
BAR 5E
CANTILEVER WALL
BAR 5F
CANTILEVER WALL
BAR 5G

BAR 5H
BAR 5J
L-WALL
BAR 5K
BAR 5L
BAR 5M
BAR 5N
BAR 5P
BAR 5R

BAR BENDING DIAGRAMS

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CONCRETE BARRIER WALL

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DESIGN STANDARDS

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