1. Railings and barriers are referenced by their material, type code and performance or test level:

   **Railing/Barrier Name:**

   - CT–TL2 BARRIER
   - CP–PL2 BARRIER
   - CF–PL2 BARRIER
   - CF–PL3 BARRIER
   - S3–TL4 RAILING
   - BR–2 RAILING
   - CM–TL3 RAILING

2. All concrete for railing/traffic barrier systems, sidewalks and safety curbs shall be 5000 PSI, 4\(\frac{3}{8}\) IN, 685 HP Cement Concrete, except for the CT–TL2 Barrier, which shall be 5000 PSI, 4\(\frac{1}{4}\) IN, 710 HP Cement Concrete and shall be noted on the Construction Drawings. Concrete penetrant is not required for barriers composed of HP cement concrete.

3. Transverse steel in sidewalks and safety curbs shall follow the same direction as the transverse deck steel.

4. Details of railing/barriers for separated precast concrete box/deck and NEBT beam bridges are similar to the details for the steel stringer bridges, except that the maximum overhang shall be as follows: 2′–6″ from the outside fascia of the precast box/deck beam; 2′–0″ from the outside edge of the top flange for the NEBT beam.

5. The details of the dowel arrangement for the attachment of the sidewalk slab to precast adjacent beam bridges are shown in Section 3 of Chapter 4.

6. Deck Slab Thickness and Reinforcement as well as the Additional Overhang Reinforcement and its extension length (Ext.) shall be as per the design tables of Chapter 7. It was pre–designed for all referenced barrier/railing systems based on the type of beams and their spacing.

7. The minimum depth of slab for the overhanging sidewalk is 11″. All overhanging sidewalks have been pre–designed for utility loads up to 250 lb/ft that are centered in the overhang. The minimum depth of slab for the roadway deck (outside the exterior beam) is 9\(\frac{1}{4}\)″ at the location of the embedded reinforcement.

8. If the limits specified in the design tables or the minimum thicknesses stated above are violated, the Designer shall design the appropriate reinforcement in the decks, overhangs, and sidewalk slabs as well as the required embedment of the barrier reinforcement and rail anchor bolts.

9. The unit weights of the unmodified railings/barriers are as follows:

   - **CT–TL2 at sidewalk:** 369 lb/ft (between pilasters)
   - **CT–TL2 pilaster (16" wide) at sidewalk:** 608 lb/each
   - **CT–TL2 at safety curb:** 444 lb/ft
   - **CT–TL2 pilaster (16" wide) at safety curb:** 682 lb/each
   - **S3–TL4 at sidewalk:** 90 lb/ft (assuming 6′–6″ rail post spacing)
   - **S3–TL4 at safety curb:** 85 lb/ft (assuming 6′–6″ rail post spacing)
   - **CP–PL2 at sidewalk:** 400 lb/ft
   - **CP–PL2 at safety curb:** 459 lb/ft
   - **CF–PL2:** 457 lb/ft
   - **CF–PL2 (Modified):** 531 lb/ft
   - **CF–PL3:** 644 lb/ft
   - **CF–PL3 (Modified):** 706 lb/ft
   - **BR–2:** 21 lb/ft (assuming 6′–6″ rail post spacing)
   - **CM–TL3:** 30 lb/ft (assuming 6′–6″ rail post spacing)
   - **TYPE I PROTECTIVE SCREEN:** 34 lb/ft
   - **TYPE II PROTECTIVE SCREEN:** 21 lb/ft
   - **TYPE II ELECTRIFICATION BARRIER:** 47 lb/ft
SECTION THRU SAFETY CURB

SCALE: 1\(\frac{1}{2}\)" = 1'-0"

NOTES:
1. #A @ X" = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. #B @ X" = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Ext.) as per Design Tables of Chapter 7.
SECTION THRU SAFETY CURB

SCALE: 1" = 1'-0"

Set dimension to suit beam arrangement and roadway width

2" Chamfer (if possible, 0" Min.)

5" Deck Slab

Beam

#5 @ 9"
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SAFETY CURB
SCALE: 1” = 1’-0”

NOTE:
Provide all required barrier geometry and reinforcement information as per Dwg. No. 9.2.1.
Adjust as necessary to suit beam arrangement

SEE SECTION THRU CT-TL2 BARRIER AT SIDEWALK

#5 @ 9"

CONST. JOINT (RAKE FINISH)

#4 @ 12"

#5 @ 6"

2" CL.

1/8"/FT.

2'-6" Min.

(7/4" Min.)

12"

#5

2" CL.

#5

2" CHAMFER (TYP.)

#4 @ 12"

LEVEL

R = 1/2"

X'-X"

(2'-6" Max.)

Face of Precast Concrete Beam

SECTION THRU SIDEWALK
SCALE: 1" = 1'-0"
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SIDEWALK
SCALE: 1" = 1'-0"
NOTE:

FOR SIDEWALK REINFORCEMENT SEE SECTION THRU SIDEWALK.

SECTION THRU BARRIER AT SIDEWALK

SCALE: 1" = 1'-0"

1" CHAMFER (TYP.)

#7

3'-6"
2'-4"
4'-3"
4'-3"

#5 @ 9"±
2 BARS PER POST

TOP OF SIDEWALK

2" CL. (TYP.)

1½"

1½" (TYP.)

10"

2'-0" LAP

0" CL.
VERTICAL SECTION THRU OPTIONAL PILASTER

SCALE: 1" = 1'-0"
SECTION 3
SCALE: 1" = 1'-0"

SECTION 4
SCALE: 1" = 1'-0"

HORIZONTAL SECTIONS THRU
OPTIONAL PILASTERS

DATE OF ISSUE
JUNE 2013

DRAWING NUMBER
9.2.11
See Chapter 10 for joint details

**EXPANSION JOINT**

SCALE: $\frac{\frac{1}{2}}{\text{in}} = 1'-0''$

**PARAFFIN JOINT**

SCALE: $\frac{\frac{3}{4}}{\text{in}} = 1'-0''$

**NOTE:**
Paraffin joints shall be spaced a minimum of 20' and a maximum of 25' over deck and at construction joints on wingwalls.
NOTE:

SEE SECTION THRU CT–TL2 BARRIER AT SAFETY CURB FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U–WINGWALL DETAILS
AT SAFETY CURB

SCALE: 1” = 1’–0”

NOTE:

Include and label all reinforcement at the top of the wingwall.
NOTE:
SEE SECTION THRU CT-TL2 AT SIDEWALK FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U-WINGWALL DETAILS
AT SIDEWALK
SCALE: 1" = 1'-0"

NOTE:
Include and label all reinforcement at the top of the wingwall.
SECTION THRU SAFETY CURB

SCALE: 1” = 1’-0”

NOTES:

1. #A @ X” = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. #B @ X” = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Lext.) as per Design Tables of Chapter 7.
4. C = Same spacing as primary deck slab reinforcement.
SECTION THRU SAFETY CURB

SCALE: 1" = 1'-0"

NOTES:

1. #A @ X" = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. #B @ X" = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Lext.) as per Design Tables of Chapter 7.
4. C = Same spacing as primary deck slab reinforcement.
5. See Dwg. No. 9.3.5 for Details of Anchor Bolt Pocket.
6. See Dwg. No. 9.8.2 for Details of Curb Treatment.
NOTE:
Prestressing strands in the beam are not shown for clarity.

SECTION THRU SAFETY CURB

SCALE: 1" = 1'-0"

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9.3.3
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SAFETY CURB
SCALE: 1" = 1'-0"

DATED: JUNE 2013
NOTE:

PROVIDE 15 3/4" LONG, 11 1/4" WIDE, 2 1/4" DEEP POCKET IN THE DECK SLAB AT THE LOCATION OF EACH RAIL POST AT SAFETY CURB ONLY.

ANCHOR BOLT POCKET

SCALE: 3” = 1’-0”
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SIDEWALK
SCALE: 1" = 1'-0"
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SIDEWALK
SCALE: 1" = 1'-0"

NOTE:
See Dwg. No. 9.8.2 for details of Curb Treatment.
TOP OF U-WINGWALL
DETAILS AT SAFETY CURB

SCALE: 1" = 1'-0"

NOTE:
Include and label all reinforcement at the top of the wingwall.
TOP OF U-WINGWALL
DETAILS AT SIDEWALK

SCALE: 1" = 1'-0"

NOTE:
Include and label all reinforcement at the top of the wingwall.
SECTION THRU SAFETY CURB

NOTES:
1. \(A \times X''\) = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. \(B \times X''\) = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Ext.) as per Design Tables of Chapter 7.

SCALE: 1 1/2" = 1'-0"

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DRAWING NUMBER
9.4.1
SECTION THRU SAFETY CURB

SCALE: 1" = 1'-0"
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU SAFETY CURB
SCALE: 1" = 1'-0"

NOTE:
Provide all required barrier geometry and reinforcement information as per Dwg. No. 9.4.1.
NOTES:
1. #A @ X" = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. C = Same spacing as primary deck slab reinforcement.
3. #B = The sidewalk top reinforcement shall be one size larger than the primary deck reinforcement.

SECTION THRU SIDEWALK
SCALE: 1" = 1'-0"
SECTION THRU SIDEWALK

SCALE: 1” = 1’-0”
NOTE:

FOR SIDEWALK REINFORCEMENT SEE SECTION THRU SIDEWALK.

SECTION THRU BARRIER AT SIDEWALK

SCALE: 1\(\frac{1}{2}\)" = 1' - 0"

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DRAWING NUMBER
9.4.7
NOTE:

SEE SECTION THRU CP−PL2 BARRIER AT SAFETY CURB FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U−WINGWALL DETAILS AT SAFETY CURB

SCALE: 1” = 1’−0”

NOTE:
Include and label all reinforcement at the top of the wingwall.
TOP OF U-WINGWALL
DETAILS AT SIDEWALK

SCALE: 1" = 1'-0"

NOTE:
Include and label all reinforcement at the top of the wingwall.

NOTE:
SEE SECTION THRU CP-PL2 BARRIER AT SIDEWALK FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U-WINGWALL
DETAILS AT SIDEWALK

CP-PL2 BARRIER
SECTION THRU BARRIER AND OVERHANG

SCALE: 1\" = 1' - 0"

NOTES:
1. \#A @ X" = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. \#B @ X" = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Levt.) as per Design Tables of Chapter 7.
SECTION THRU OVERHANG

SCALE: 1" = 1'-0"

X" (Set this dimension to suit beam arrangement and roadway width, 2 1/2" Min.)

3" Cl.

11"

16"

#5 @ 8"

5" Deck Slab

2" Cl.

1" Chamfer

Beam

MODIFICATIONS FOR
ADJACENT BEAM BRIDGES
CF-PL2 BARRIER
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU OVERHANG
SCALE: 1" = 1'-0"

NOTE:
Provide all required barrier geometry and reinforcement as per Dwg. No. 9.5.1.
NOTE:
SEE SECTION THRU CF–PL2 BARRIER FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U–WINGWALL DETAILS
SCALE: 1” = 1’–0”

NOTE:
Include and label all reinforcement at the top of the wingwall.
SECTION THRU MODIFIED BARRIER

SCALE: 1 1/2" = 1’-0”

MODIFICATIONS FOR
PROTECTIVE SCREEN TYPE II

CF-PL2 BARRIER

DATE OF ISSUE
JUNE 2013

DRAWING NUMBER
9.5.5
**SECTION THRU BARRIER AND OVERHANG**

**SCALE:** $1\frac{1}{2}'' = 1'-0''$

**NOTES:**

1. $\#A @ X''$ = Size and spacing of the primary deck slab reinforcement as per Design Tables of Chapter 7.
2. $\#B @ X''$ = Size and spacing of the Additional Overhang Reinforcement as per Design Tables of Chapter 7.
3. Additional Overhang Reinforcement extension (Ext.) as per Design Tables of Chapter 7.

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“massDOT”

**LRFD BRIDGE MANUAL, PART II**

**SECTION THRU BARRIER AND OVERHANG, STRINGER BRIDGES**

**CF–PL3 BARRIER**

**DATE OF ISSUE**

**JUNE 2013**

**DRAWING NUMBER**

**9.6.1**
SECTION THRU OVERHANG

SCALE: 1" = 1'-0"

X" (Set this dimension to suit beam arrangement and roadway width, 2 1/2" Min.)

#5 @ 8"

1" Chamfer

5" Deck Slab

2" Cl.

Beam
NOTE:
PRESTRESSING STRANDS IN THE BEAM ARE NOT SHOWN FOR CLARITY.

SECTION THRU OVERHANG
SCALE: 1" = 1'-0"

NOTE:
Provide all required barrier geometry and reinforcement information as per Dwg. No. 9.6.1.
NOTE:
SEE SECTION THRU CF–PL3 BARRIER FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF U–WINGWALL DETAILS

SCALE: 1” = 1’–0”

NOTE:
Include and label all reinforcement at the top of the wingwall.
SECTION THRU MODIFIED BARRIER

SCALE: 1\frac{1}{2}” = 1’-0”
NOTE:

CF–PL2 Barrier similar, except modify details to be consistent with Dwg. No. 9.5.1.
3 1/2" x 3 1/4" BONDED CLOSED CELL FOAM JOINT SYSTEM (M.9.14.6)

X' - X" (2'-0" Max.)

12"

VARIABLES

18 1/4"

5"

3 1/4"

10"

5"

As Req'd

2" CL. (TYP.)

EQUAL SPACES @ 7" MAX.

VARIABLES

3 1/8"

28

#7

2' - 8"

7"

10"

7"

3' - 6"

2' - 8"

#7

#5 @ 8" (TYP.)

#6 (TYP.)

3" (TYP.)

11"

LEVEL (TYP.)

CONST. JOINT (RAKE FINISH)

ADD'L. #5 (TYP.)

Deck steel as req'd (TYP.)

#8

#8

4" CL. (TYP.)

2" CL. (TYP.)

3" CL. (TYP.)

X" (TYP.)

(7/8" Min.)

NOTE:

Dimension X" is equal to the Amount of Thermal Expansion + 1"

NOTES:

1. CF-PL2 Barrier similar, except modify details to be consistent with Dwg. No. 9.5.1.
2. Refer to Dwg. No. 9.6.1 for deck overhang limits.

SINGLE FACE MEDIAN BARRIER

SCALE: 1" = 1'-0"

SINGLE FACE MEDIAN BARRIER WITH JT. SYSTEM

CF-PL3 MEDIAN BARRIER
1½" x 1½" POLYURETHANE JOINT SEALANT AND 1" PREFORMED FILLER (TYP.)

CAST-IN-PLACE TOP SLAB
(To maintain a constant barrier height for both roadways, the top slab may be sloped up to 25%)

1" CHAMFER (TYP.)

VARIABLES

18 3/4"
5"
3 1/4"
7"
3"
4"/FT. MIN.

VARIABLES

1 (4'-0" Max.)
3"
7"
5"
1/4"/FT. MIN.

2" CL. (TYP.)

LEVEL (TYP.)

ADD'L. #5 (TYP.)

CONST. JOINT (RAKE FINISH)

#4 (TYP.)

#7 (TYP.)

#8 (TYP.)

#5 @ 8" (TYP.)

#7 (TYP.)

#8 (TYP.)

#6 (TYP.)

3" (TYP.)

16" (TYP.)

3" CL. (TYP.)

4" CL. (TYP.)

2" CL. (TYP.)

3" CL. (TYP.)

X" (TYP.)

 nhật

NOTES:
1. CF-PL2 Barrier similar, except modify details to be consistent with Dwg. No. 9.5.1.
2. Refer to Dwg. No. 9.6.1 for deck overhang limits.

SINGLE FACE MEDIAN BARRIER WITH TOP SLAB

SCALE: 1" = 1'-0"

DATE OF ISSUE
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DRAWING NUMBER
9.7.3

SINGLE FACE MEDIAN BARRIER WITH TOP SLAB

CF-PL3 MEDIAN BARRIER

massDOT
LRFD BRIDGE
MANUAL, PART II
NOTES:

1. TURN MEMBRANE UP INTO 3” HIGH POCKET.

2. DIMENSIONS AT THE FACE OF CURB ARE THE SAME FOR THE SAFETY CURB.

FACE OF SIDEWALK CURB DETAILS

SCALE: 3” = 1’-0”

NOTE:
For bridges with a variable depth HMA wearing surface, eliminate Note 1 and omit the height of pocket dimension on Construction Drawings.
NOTES:

1. METHACRYLATE CRACK SEALER SHALL BE APPLIED AFTER SIDEWALK OR SAFETY CURB/BARRIER CURING PERIOD IS COMPLETE AND IN ACCORDANCE WITH REQUIREMENTS OF MANUFACTURER AND THE STANDARD SPECIFICATIONS.

2. BEFORE SEALING, THE CONCRETE AT THE INTERFACE OF DECK AND CURB SHALL BE SWEEP CLEAN AND BLOWN OFF USING OIL FREE COMPRESSED AIR IMMEDIATELY PRIOR TO APPLYING THE SEALER.

3. APPLY 1/4" HIGH BEAD OF SILICONE CAULKING COMPOUND ABOUT 1/4" FROM THE FACE OF CURB.


5. CURB AT SIDEWALK SHOWN. SAFETY CURB IS SIMILAR.

**FACE OF CURB DETAILS**

SCALE: 1 1/2" = 1'–0"

DATE OF ISSUE
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DRAWING NUMBER
9.8.2
NOTE:
TURN MEMBRANE UP INTO 3" HIGH POCKET.

FACE OF SAFETY CURB DETAILS
SCALE: 3" = 1'-0"

NOTE:
For bridges with a variable depth HMA wearing surface, eliminate Note and omit the height of pocket dimension on Construction Drawings.
NOTE:

TURN MEMBRANE UP INTO 3” HIGH POCKET.

FACE OF SAFETY CURB DETAILS

SCALE: 3” = 1’-0”

NOTE:
For bridges with a variable depth HMA wearing surface, eliminate Note and omit the height of pocket dimension on Construction Drawings.
NOTE:

TURN MEMBRANE UP INTO 3” HIGH POCKET.

FACE OF SAFETY CURB DETAILS

SCALE: 3” = 1'-0"

NOTE:
For bridges with a variable depth HMA wearing surface, eliminate Note and omit the height of pocket dimension on Construction Drawings.


**Paraffin Joint Details**

**Notes:**

(See Dwg. No. 9.9.3 for notes to appear on Construction Drawings)
NOTE:
See Dwg. No. 9.9.1 for sidewalk details.

SIDEWALK SIDE

CT–TL2 BARRIER

3" x 1\frac{1}{2}" x 2'-0"
TAPERED KEY AT
EACH PARAFFIN JT.

NOTE:
See Dwg. No. 9.9.1 for sidewalk details.

SIDEWALK SIDE

CP–PL2 BARRIER

PARAFFIN JOINT DETAILS

NOTES: SCALE: 1\frac{3}{8}" = 1'-0"

(See Dwg. No. 9.9.3 for notes to appear on Construction Drawings)
NOTES:
1. ALL CONCRETE ABOVE SLAB SHALL BE POURED IN ALTERNATING SECTIONS WITH NOT LESS THAN 3 DAYS BETWEEN POURS.
2. DO NOT CARRY LONGITUDINAL BARS THROUGH THE PARAFFIN JOINTS. END THE REINFORCEMENT 2” CLEAR OF JOINT.
3. JOINT SHALL BE SQUARE TO FACE OF CURB (or coping).

PARAFFIN JOINT DETAILS
SCALE: $\frac{3}{8}” = 1’-0”$

NOTES:
1. Modify the details shown in this section as required to show the correct shape, wearing surface and support beams.
2. Paraffin joints shall be spaced preferably between 20’ and 25’. A minimum of 15’ may be used, if necessary. Paraffin joints for sidewalks and safety curbs with S3-TL4 rail shall be located using the above spacing, provided that the location of the joint falls approximately at the center of the railing panel. The location of the joints shall be dimensioned on the Construction Drawings.