1. All bar dimensions are out-to-out.
2. Place one (1) Bar 5K or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Index Nos. 20036, 20045, 20054, 20063, 20072, 20084 and 20096).
3. Strands N shall be ASTM A416, Grade 270, seven-wire strands \( \geq 90 \) or larger, stressed to 10,000 lbs each.
4. For beams with ends not to be encased in permanent concrete diafragms, after detensioning cut wedge to recess Prestressing Strands at the end of the beam without damaging the surrounding concrete. See STRAND CUTTING AND PROTECTING DETAIL on Sheet 2.
5. For beams with ends not to be encased in permanent concrete diafragms, protect end of recessed strands in accordance with Specification Section 450.
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At the Contractor's option, welded deformed wire reinforcement may be used in lieu of Bars 3D, 5K, 4M, and 5Z as shown on the Standard Details for each beam size. Bolted deformed wire reinforcement shall meet requirements of Specification Section 931.
8. Safety Line Anchorage Devices or sleeves are required and permitted in the top flange only to accommodate fall protection systems used during construction. See shop drawings for details and spacing of any required embedments.
9. For beams with skewed end conditions, the end reinforcement, defined as Bars 3C1, 3C2, 3D1, 3D2, 5K, 4M1, 4M2, 5Y and 5Z placed within the limits of the spacing for Bars 3C in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 3D3, 5X and 4M3 located beyond the limits of Bars 3C shall be placed perpendicular to the longitudinal axis of the beam! Fan bars as needed to avoid overlapping bars at the transition to Bars 3D3 and 4M3, and field cut to maintain minimum cover. Provide additional Bars 4M1, 4M2, 3D1 and 3D2 as required; additional bars are not included in the Number Required on the "BILL OF REINFORCING STEEL". For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3C1, 3C2, 3D1, 3D2, 4M1 and 4M2 as shown on the "BENDING DIAGRAM" for skewed end conditions.
10. Placement of Bars 3C1, 3C2 and 4M1 correspond to END 1, and Bars 3C2, 3D2 and 4M2 correspond to END 2. END 1 and END 2 are shown on the beam "ELEVATION".
11. For beams with vertically beveled end conditions, place first row of Bars 3C1, 3C2, 3D1, 3D2, 5K, 5Y and 5Z parallel to the end of the beam. Bars 3D3, 5K and 4M3 located beyond the limits of Bars 3C shall be placed perpendicular to the longitudinal axis of the beam. Fan Bars as needed to avoid overlapping bars at the transition to Bars 3D3 and 4M3, and field cut to maintain minimum cover. Provide additional Bars 4M1, 4M2, 3D1 and 3D2 as required; additional bars are not included in the Number Required on the "BILL OF REINFORCING STEEL". For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3C1, 3C2, 3D1, 3D2, 4M1 and 4M2 as shown on the "BENDING DIAGRAM" for skewed end conditions.
12. For beams with skewed end conditions, welded deformed wire reinforcement shall not be used for end reinforcement (Bars 3D1, 3D2, 4M1 and 4M2) .
13. Bars 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). At the Contractor's option the length of the bottom legs of Bars 3K and 5Z may be extended to facilitate tying to the exterior strands. For welded deformed wire reinforcement, supplemental transverse #4 bars are permitted to support pieces K & S under the cross wires on the bottom row of strands.
14. At the Contractor's option, Bars 3D1, 3D2 and 3D3 may be fabricated as a single bar with a 0.5" minimum lap splice of the top legs, or the length of the bottom legs may be extended to facilitate tying to the exterior strands.
15. For referenced Dimensions, Angles and Case Numbers, see the Table of Beam Variables in Structures Plans.
INSERT DETAIL

INSERT NOTES

1. Provide 1" B, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/0 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 psi concrete.

2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.

3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan and may be required at the end of the beams when end diaphragms are shown. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.

TYPICAL SECTION SHOWING CUT STRAND RECESS LIMITS

TYPICAL SECTION AFTER PROTECTING

PARTIAL PLAN VIEW (SHOWING TOP FLANGE)

(Bars 5A, 5Y & Strands N not shown for clarity)

PARTIAL SECTION THRU WEB (SHOWING BOTTOM FLANGE)

(Bars 5Y, Strands, and Embedded Bearing Plate "A" not shown for clarity)

SKewed Beam End Details for Widening Existing Bridges

(Florida-I 36 Beam shown, others similar)
**FLORIDA-I 36 BEAM - STANDARD DETAILS**

**DESIGN STANDARDS**

**BILL OF REINFORCING STEEL**

**CONVENTIONAL REINFORCING BAR BENDING DETAILS**

**BILL OF REINFORCING STEEL**

**BENDING DIAGRAMS**

**NOTES:**

A. Work this index with index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.

B. For referenced notes, see Index No. 20010.

C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

**SECTION A-A FOR CONVENTIONAL REINFORCING (Showing Bars 5K, 5Y & 5Z Only)**

**ELEVATION AT END OF BEAM**

(End 1 Shown, End 2 Similar)

**ELEVATION**

(Overall Length of Beam along Beam including length increase as required for Beam placed on grade and Dim. R to compensate for elastic and time dependent shortening effects)
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

PIECES M
END VIEW

PIECES K & S
END VIEW

PIECES D
END VIEW

PLAN VIEW
PIECE M-1
(2 Required)

PLAN VIEW
PIECE M-3
(2 Required)

PLAN VIEW
PIECE M-1
ties to Piece K-2

W13 (Piece K-1)
W12 (Pieces K-2 & S)

D51 (Piece K-1)
D52 (Pieces K-2 & S)
W124 (Piece K-1)
W10 (Pieces K-2 & S)

END OF BEAM

Plan View
PIECE K-1
(Aligned EF)
(4 Required ~ 2 Pairs)

PIECE K-2
(FF Shown Solid,
BF Shown Dashed)
(4 Required)

PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)

PIECE D-1
(4 Required ~ 2 Pairs)

PIECE D-2
(4 Required ~ 2 Pairs)

PIECE D-3
(4 Required ~ 2 Pairs)

LEGEND:

EF = Each Face
BF = Back Face

NOTES:

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

PARTIAL BEAM END VIEW

(Conventional Reinforcing Bars A, C, Y and Strands not Shown for Clarity)

PIECES K & S
END VIEW

PIECES D
END VIEW

PLAN VIEW
PIECE M-1
(2 Required)

PLAN VIEW
PIECE M-3
(2 Required)

PLAN VIEW
PIECE M-1
ties to Piece K-2

W13 (Piece K-1)
W12 (Pieces K-2 & S)

D51 (Piece K-1)
D52 (Pieces K-2 & S)
W124 (Piece K-1)
W10 (Pieces K-2 & S)

END OF BEAM

Plan View
PIECE K-1
(Aligned EF)
(4 Required ~ 2 Pairs)

PIECE K-2
(FF Shown Solid,
BF Shown Dashed)
(4 Required)

PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)

PIECE D-1
(4 Required ~ 2 Pairs)

PIECE D-2
(4 Required ~ 2 Pairs)

PIECE D-3
(4 Required ~ 2 Pairs)

LEGEND:

EF = Each Face
BF = Back Face

NOTES:

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

PLAN VIEW
PIECE M-1
(2 Required)

PLAN VIEW
PIECE M-3
(2 Required)

END VIEW
PIECE D-1
(4 Required ~ 2 Pairs)

END VIEW
PIECE D-2
(4 Required ~ 2 Pairs)

END VIEW
PIECE D-3
(4 Required ~ 2 Pairs)

END VIEW
PIECE M-1
(2 Required)

END VIEW
PIECE M-3
(2 Required)

SECTION A-A
FOR WELDED WIRE REINFORCEMENT

PARTIAL BEAM END VIEW

NOTES:

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.

b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.

c. Pieces may be fabricated in multiple length sections.

d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

W10 (Pieces K-2 & S)
W12.4 (Piece K-1)
W10 (Pieces K-2 & S)
W6.4 (Piece K-1)
W6.4 (Pairs)
D31 (Piece K-1)
D25 (Pieces K-2 & S)
D16's @ 1'-0" sp.

FLORIDA-I 45 BEAM - STANDARD DETAILS

INDEX NO.
20045

Sheet No.
2 of 2

2016 DESIGN STANDARDS

07/01/10

REVISION
07/01/10
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

NOTES:

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.

b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.

c. Pieces may be fabricated in multiple length sections.

d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used. Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

PIECES M END VIEW

PLAN VIEW
PIECE M-1
(2 Required)

PLAN VIEW
PIECE M-3
(2 Required)

PIECES K & S END VIEW

PIECE K-1
(Aligned EF)

(4 Required ~ 2 Pairs)

PIECE K-2
(FF Shown Solid, BF Shown Dashed)

(4 Required)

PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)

NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D3, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

FLORIDA-I 63 BEAM - STANDARD DETAILS

2016 DESIGN STANDARDS

INDEX NO. 20063 SHEET NO. 2 of 2
INDEX NO. 20072

ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

PIECES M
END VIEW

PIECES K & S
END VIEW

PIECES D
END VIEW

PIECES M-1
(2 Required)

PIECES M-3
(2 Required)

PIECE K-1
(Aligned EF)
(2 Required)

PIECE K-3
(2 Required)

PIECE S-1, S-2, S-3 or S-4
(2 Required ~ Each Piece)

PIECE D-1
(4 Required ~ 2 Pairs)

PIECE D-2
(4 Required ~ 2 Pairs)

PIECE D-3
(4 Required ~ 2 Pairs)

NOTES:

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

**DESCRIPTION:**

**REVISION**

**LAST REVISION**

**INDEX NO.**

**SHEET NO.**

**FLORIDA-1 84 BEAM - STANDARD DETAILS**

**NOTE:**

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces M-1, M-2, M-3, D-1, D-2, & M-1 shall not be used; Conventional Reinforcement Bars D11, D2, C1, C2, M1 & M2 shall be used. See Index No 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.
**FLORIDA-1 96 BEAM - STANDARD DETAILS**

**INDEX NO.** 20096  
**SHEET NO.** 2 of 2

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**NOTES:**

a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.

b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.

c. Pieces may be fabricated in multiple length sections.

d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

---
1. All bar dimensions are out-to-out.
2. Place one (1) Bar 4K, or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Sheet 3).
3. Strands $N$ shall be ASTM A416, Grade 270, seven-wire strands $\frac{3}{16}$ in. or larger, stressed to 10,000 lbs. each.
4. For beams with ends not to be encased in permanent concrete diaphragms, after detensioning cut wedge to recess Prestressing Strands at the end of the beam without damaging the surrounding concrete. See "STRAND CUTTING AND PROTECTING DETAIL" on Sheet 2.
5. For beams with ends not to be encased in permanent concrete diaphragms, protect end of recessed strands in accordance with Specification Section 450.
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2 in.
7. At the Contractor's option, welded deformed wire reinforcement may be used in lieu of Bars 3D, 4K, and 5Z as shown on Sheet 4. Welded deformed wire reinforcement shall meet requirements of Specification Section 931.
8. Safety Line Anchorage Devices or sleeves are required and permitted in the top flange only to accommodate fall protection systems used during construction. See shop drawings for details and spacing of any required embedments.
9. For beams with skewed end conditions, the end reinforcement, defined as Bars 3D1, 3D2, 4K, and 5Z placed within the limits of Bars 3D in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 3D and 4K, located beyond the limits of Bars 3D shall be placed perpendicular to the longitudinal axis of the beam. For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3D1 and 3D2, as shown on the "BENDING DIAGRAM" for skewed end conditions.
10. Placement of Bars 3D1 correspond to END 1, and Bars 3D2, correspond to END 2. END 1 and END 2 are shown on the beam "ELEVATION".
11. Bars 4K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). For welded deformed wire reinforcement, supplemental transverse bars are permitted to support Pieces K & S under the cross wires on the bottom row of strands or Strands $N$.
12. At the Contractor's option, Bars 3D1, 3D2 and 3D3 may be fabricated as a two-piece bar with a 1'-0" minimum lap splice of the bottom legs.
13. Bars 4K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). For welded deformed wire reinforcement, supplemental transverse bars are permitted to support Pieces K & S under the cross wires on the bottom row of strands or Strands $N$.
14. For beams with skewed end conditions, welded deformed wire reinforcement shall not be used for end confinement reinforcement (Bars 3D1 and 3D2).
15. For referenced Dimensions, Angles and Case Numbers, see the Table of Beam Variables in Structures Plans.

SCHEMATIC PLAN VIEWS AT BEAM ENDS

SCHEMATIC END ELEVATIONS OF BEAMS
(Showing Vertical Bevel of Beam End)
When Intermediate Diaphragms are Required by Design

Face of Beam Web

Bars 3D1 or 3D2 (Pairs)

Bars 4K (Typ.)

Bars 5Z (shown dotted, Typ.)

3" Chamfer

3" Chamfer

Bars 5Z (shown dotted, Typ.)

Bars 4K (Typ.)

Bars 4K spaced perpendicular to end of beam @ 3". Skewed Bars 5Z, placed with Bars 4K.*

Bars 4K spaced along @ 3". Bars 5D or 3D2, placed with alternate Bars 4K.*

Bars 3D1 or 3D2 (Pairs)

TYPICAL SECTION

SHOWING CUT STRAND RECESS LIMITS

Epoxy Coating (1/16" minimum thickness) (See Beam Note 5, Sheet 1)

1/2" Min.

End of Beam

AASHTO Type II

Strand Recess (formed by cutting or grinding)

End of Beam

AASHTO Type II

REINFORCEMENT

BEGIN WELDED WIRE REINFORCEMENT OPTION WHEN APPLICABLE, PIECE S-1, SEE SHEET 4.

INSERT DETAIL

1. Provide 1/8, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/8 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 psi concrete.

2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.

3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan and may be required at the end of the beams when end diaphragms are shown. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.
END VIEW

ELEVATION AT END OF BEAM
((Flanges Not Shown For Clarity)

SECTION A-A
(Showing Bars 4K, 4Y & 5Z Only)

END 1

DIM L = Beam Casting Length
(Overall Length of Beam along Beam including length increase as required for Beam placed on grade and DIM R to compensate for elastic and time dependent shortening effects)

END 2

BARS 3D1 & 3D2
BARS 4K & 5Z

NOTES:
Work this Index with the AASHTO Type II Beam - Table of Beam Variables in Structures Plans.

For referenced notes, see Sheet 1.

For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see AASHTO Type II Beam - Table of Beam Variables.

WORK THIS INDEX WITH THE AASHTO TYPE II BEAM - TABLE OF BEAM VARIABLES IN STRUCTURES PLANS.

NOTES:

FOR REFERENCED NOTES, SEE SHEET 1.

FOR DIMENSIONS L, R, V1 THRU V4 AND NUMBER OF SPACES S1 THRU S4, SEE AASHTO TYPE II BEAM - TABLE OF BEAM VARIABLES.

STANDARD DETAILS

INDEX NO.
20120

SHEET NO.
3 of 4

AASHTO TYPE II BEAM

DIMENSIONS

END VIEW

ELEVATION

LAST
REVISION
07/01/13

DESCRIPTION:

2016
DESIGN STANDARDS

AASHTO TYPE II BEAM

BILLY REINFORCING STEEL FOR ONE BEAM ONLY

MARK
A

NOTE NUMBERS
- 5

SIZE
4

NUMBER REQUIRED
12-

LENGTH

DI 9 & 11 & 14 3 12 See Table
D2 9, 11 & 14 2 12 See Table
K 9, 11 & 13 4 See Table 4-
N 3 & 5 ½ Ø Strand 2 DIM L/15
Y 9 & 11 4 8 2-6
Z 9, 11 & 13 5 8 2-5

BENDING DIAGRAMS

SEE NOTE 1

SECTION A-A
(Showing Bars 4K, 4Y & 5Z Only)

END 1

END 2

DIRECTION OF STATIONING

OPTIONAL SPICE

(Symmetrical)

SEE NOTE 14

5A 12-0'

4K 2-5/8'

BARS 5A & 4Y

(See Note 9)

Bars 3D1 or 3D2 @ 6" as shown

Bars 4K & 5Z

Bars 3D (Typ.)

Bars 4K (Typ.)

Bars 5A & Strands N

Bars 4Y (shown as (    ))

Bars 5Z

(See Note 9)

Optional Splice

N

12 sp. @ 3"

S1 sp. @ V1 (6" max.)

S2 sp. @ V2

S3 sp. @ V3

S4 sp. • Spacing Bars 4K (Symmetrical)

Beam

DIMENSIONS

S1 sp. @ V1

S2 sp. @ V2

S3 sp. @ V3

S4 sp. • Spacing Bars 4K (Symmetrical)

Beam

DIMENSIONS
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

SECTION A-A
FOR WELDED WIRE REINFORCEMENT

PIECES D
END VIEW

PIECE K-1
(Aligned EF)
(4 Required ~ 2 Pairs)

PIECE K-2
(FF Shown Solid,  BF Shown Dashed)
(4 Required)

PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)

END OF BEAM

Support Wire Permitted

Strands N

2" Cover

PARTIAL SECTION AT CENTER BEAM

PARTIAL BEAM END VIEW
(Conventional Reinforcing Bars A, Y and Bottom Strands not Shown for Clarity)

NOTES:

a. See Sheet 3 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A as shown on Sheet 3. Place additional Bars 4Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1 & D-2 shall not be used. Conventional Reinforcement Bars D1 & D2 shall be used. See Sheet 2 Skew Details and Sheet 1 Note 9 for placement details. Shift Pieces K & Bars 4Y to accommodate skewed end conditions and align with Bars D.

STANDARD DETAILS

AASHTO TYPE II BEAM

2016 DESIGN STANDARDS

INDEX NO.

SHEET NO.

REV

DEVELOPER

20120

4 of 4
BEAM CAMBER AND BUILD-UP NOTES:
The build-up values given in the Data Table* are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than +/- 1/2" from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table*, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum of 21 days prior to casting.

Dim. "A" includes the weight of the Stay-In-Place Formwork.

* NOTE:
Work this Index with the Build-up and Deflection Data Table for Florida-I and AASHTO Type II Beams in Structures Plans.
**BEAM NOTES**

1. All bar dimensions are out-to-out.
2. Strands N (Dormant Strands) shall be ASTM A416, Grade 270, seven-wire strands 3⁄8" Ø or larger, stressed to 10,000 lbs each.
3. Unless otherwise noted in Structures Plans, the minimum concrete cover for reinforcing steel shall be 2".
4. At the option of the Contractor and with the Engineer's Approval, deformed welded wire reinforcement (WWF) may be used in lieu of Bars A416, A63, 5B, 4C, 3D, 5E, 4F, 4G, 4H, 5K, 5L, and 4M except as noted below in note 7, provided the wire sizes and spacing match those shown on the Standard Beam Detail sheets for these bars. WWF must consist of Deformed wire meeting the requirements of Specification Section 931.
5. Safety Line Anchorage devices or sleeves are required and permitted in the top flanges only to accommodate fall protection systems used during construction. See shop drawings for details and spacing of any required embedments.
6. For Beams with vertically beveled end conditions when "Dim. P" exceeds 1", Bars 5E and the first Bars 4F and 5K shall be placed parallel to the end of the beam. The remaining Bars 4F and 5K within the limits of "Dim. B" shall be fanned at equal spaces.
7. Welded deformed wire reinforcement shall not be used for the end reinforcement (Bars 5B, 4C, 3D, 5E, 4F, 5K, and 5L) for beams with skewed end conditions or vertically beveled end conditions when "Dim. P" exceeds 1".
8. Bars 5K shall be placed and tied to the fully bonded strands in the bottom row (see "STRAND PATTERN" in Structures Plans).
9. Strand Protection at beam ends shall consist of a 2" deep recess formed around all strands (including dormant) or strand groups. Extend recess to face of web and bottom of flange for bottom row of strands. After detensioning, cut strands 1⁄8" from recessed surface and fill the recess with a Type F-2 or Q Epoxy Compound in accordance with Section 926 of the Specifications.
10. Use Size No. 67 maximum sized aggregate.
11. Use Stay-in-Place metal deck forms inside the beams.
12. Prior to deck placement, based on the deck forming system and deck placement sequence, evaluate and provide, if necessary, temporary bracing between the U Beams. Also, prior to deck placement, provide temporary blocking under each web at both ends of the beam. Ensure the temporary blocking is adequate to resist movements and rotations that occur during placement of the deck. Leave temporary blocking and bracing in place for a minimum of four days after the deck placement.
13. For referenced Dimensions, Angles and Case Numbers see Table of Beam Variables in Structures Plans.

**NOTE:**

Work this Index with Florida-U Beam - Table of Beam Variables in Structures Plans.
** Intermediate Diaphragms shall be provided:
(1) At midspan.
(2) At 20'-0" Max. from midspan when beam length (L) exceeds 60 Ft.

NOTES:
- Bars A are shown as (*).
- Bars A are symmetrical about \( \ell \) Beam for Half Sections A-A and B-B.

Dim. L = Casting Length (Overall Length of Beam along \( \ell \) Beam including length increase as required for beam placed on grade and Dim. R to compensate for elastic and time dependent shortening effects)

** Reinforcing steel is symmetrical about \( \ell \) Beam for Half Sections A-A and B-B.

** Intermediate Diaphragms shall be provided:
(1) At midspan.
(2) At 20'-0" Max. from midspan when beam length (L) exceeds 60 Ft.
NOTES:
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

TOP VIEW OF END DIAPHRAGM (Bars 3D1 And 3D2 Not Shown For Clarity)
FLORIDA-U 48 BEAM - STANDARD DETAILS

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

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<td>2</td>
<td>Dim. L - 3'</td>
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NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.
FLORIDA-U 54 BEAM - STANDARD DETAILS

**TYPICAL SECTION**

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<tr>
<td>C</td>
<td>16' - 23'</td>
</tr>
<tr>
<td>D</td>
<td>23' - 1'</td>
</tr>
</tbody>
</table>

**ELEVATION AT END OF BEAM**

- **Bars 4M** (in pairs)
- **Spacing Bars 5K** (in pairs)
- **Spinning Bars 4M**
- **Bars 6A1, 4A2 and Strand N**

**NOTES:**

- Work this Index with Index No. 20210 - Typical Florida-U Beam Details and Notes and the Florida-U Beam - Table of Beam Variables in Structures Plans.
- For referenced notes see Index No. 20210.

**END 1**

- **End Face (Typ.)**
- **End Diaphragm (Typ.)**
- **Intermediate Diaphragm**

**END 2**

- **Intermediate Diaphragm**
- **Intermediate Diaphragm**
- **Bars 4M** (see ELEVATION AT END OF BEAM above)

**ELEVATION**

- **Bars 5K (Typ.)**
- **Bars 6A1 (Typ.)**
- **Bars 5L**

**Safety Line**

- **Anchorage Device (Typ.)**
- **(See Note 5)**

**NOTES:**

- Reinforcing steel is symmetrical about ξ Beam for Half Sections A-A and B-B.
- **Intermediate Diaphragms** shall be provided:
  1. At midspan.
  2. At 20'-0" Max. from midspan when beam length (L) exceeds 60 Ft.

**Dim. L** = Casting Length (Overall Length of Beam along ξ Beam including length increase as required for beam placed on grade and DIM R to compensate for elastic and time dependent shortening effects)
NOTES:
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

TOP VIEW OF END DIAPHRAGM
(Bars 3D1 and 3D2 Not Shown For Clarity)
NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.
NOTES:

- Reinforcing steel is symmetrical about η Beam for Half Sections A-A and B-B.

** Intermediate Diaphragms shall be provided:
 1. At midspan.
 2. At 25'-0" Max. from midspan when beam length (L) exceeds 70 ft.

**Half Section A-A**

**Half Section B-B**

TYPICAL SECTION

Dim. L = Casting Length (Overall Length of Beam along η Beam including length increase as required for beam placed on grade and Dim. R to compensate for elastic and time dependent shortening effects)

---

Work this Index with Index No. 20210 - Typical Florida-U Beam Details and Notes and the Florida-U Beam - Table of Beam Variables in Structures Plans.

For referenced notes see Index No. 20210.

---

END 1

---

** Void Face (Typ.) **

---

ELEVATION AT END OF BEAM

---

END 2

---

** Chamfer (Typ. bottom of top flange only) **

---

ELEVATION

---

DRAIN PIPING

---

PRINCIPAL SYMMETRY

---

Interim Diaphragms

---

Intermediate Diaphragm (when required) **

---

Intermediate Diaphragm (when required) **

---

1 ½' x 1 ½' Chamfer

---

20'-0" Min. - 25'-0" Max. - Spacing Intermediate Diaphragms **

---

Symmetrical about η @ top of Beam

---

Symmetrical about η @ top of Beam

---

** Begin at end Bars 4M (see "ELEVATION AT END OF BEAM" above) **
**DESCRIPTION:**

FLORIDA-U 63 BEAM - STANDARD DETAILS

**NOTES:**

1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.

2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

**END VIEW AT END DIAPHRAGM**

(Bars 3D1 And 3D2 Not Shown For Clarity)

**SECTION C-C**

**TOP VIEW OF END DIAPHRAGM**

(Bars 3D1 And 3D2 Not Shown For Clarity)

**TOP VIEW OF SKEWED END DIAPHRAGM**

AND STIRRUP TRANSITION ZONE

(Bars 3D2 Not Shown For Clarity)
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

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<th>SIZE</th>
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<th>LENGTH</th>
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<tr>
<td>A2</td>
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<td>12</td>
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</tr>
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<td>28</td>
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<td>½ Ø Strand</td>
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<td>Dim. L - 3'</td>
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</table>

NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

FLORIDA-U 63 BEAM - STANDARD DETAILS

TOP VIEW OF INTERMEDIATE DIAPHRAGM

SECTION AT INTERMEDIATE DIAPHRAGM

NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.
NOTES:
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm. Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

FLORIDA-U 72 BEAM - STANDARD DETAILS

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

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</tbody>
</table>

NOTE 1: Bars A (Shown as ( ))

NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm. Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

FLORIDA-U 72 BEAM - STANDARD DETAILS

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

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<tr>
<td>N</td>
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</table>

NOTE 1: Bars A (Shown as ( ))

NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm. Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

FLORIDA-U 72 BEAM - STANDARD DETAILS

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

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<tr>
<td>N</td>
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<td>B Strand</td>
<td>2</td>
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</table>

NOTE 1: Bars A (Shown as ( ))

NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm. Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.
Begin Span

**BUILD-UP DIAGRAM FOR TANGENT SPANS**
(ALONG Q FLANGE)  (CASE 1)

**BEAM CAMBER AND BUILD-UP NOTES:**
The build-up values given in the Data Table* are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than \( \pm \frac{1}{2} \) from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table*, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum of 21 days prior to casting.

Dim. "A" includes the weight of the Stay-In-Place Formwork.

**BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE & HORIZONTAL CURVE SPANS**
(ALONG Q FLANGE)  (CASE 2)

**BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS**
- CONTROL AT CASE SPAN
(ALONG Q FLANGE)  (CASE 3)

**BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS**
- CONTROL AT BEGIN OR END SPAN
(ALONG Q FLANGE)  (CASE 4)

**DEAD LOAD DEFLECTION DIAGRAM**
(ALONG Q BEAM)

**SECTION A-A**
BUILD-UP OVER BEAMS
(LOOKING AHEAD STATION)

* Dimensions are along slope.

* NOTE:
Work this Index with the Build-up and Deflection Data Table for Florida-U Beams in Structures Plans.

For Cases 1, 2 & 3 = Dim. "C"
For Case 4 = Dim. "B" or Dim. "D"

For Cases 1, 2 & 3 = Dim. "C"
For Case 4 = Dim. "B" or Dim. "D"