Chapter 02 - Substructure

SECTION 02

ABUTMENT (SUB-AB)
TYPICAL SECTION FOR CANTILEVER ABUTMENTS ON PILES CARRYING STEEL GIRDERS WITH STEEL FIXED BEARINGS OR STEEL EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION < 70 FT.

**Notes:**
- All dimensions measured \( \perp \) to L of bearing.
- *Minimum dimensions shown, utilize dimensioning as required by design.
- **If concrete slope protection is used, add one layer of tar paper full contact area where substructure unit is adjacent to slope protection. The open joint that remains after slope protection has cured shall be filled with joint sealer conforming to Specifications.

**Slope protection**

2 ply membrane waterproofing 16'' min. width centered on joint (typ.)

Top of roadway

Top of approach roadway subgrade

Top of backwall to match underside of diaphragm, use 2 ply roofing paper bond breaker.

Limits of epoxy protective coating for bottom wall and bridge seat areas

**Varies**

The use of stay-in-place forms is prohibited in this area of the deck & bearing.

Substructure Concrete

Concrete Footing

Mix No. 6 Concrete

Mix No. 3 Concrete

SUB-AB-101

SUB-STRUCTURE - ABUT

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TYPICAL SECTION FOR CANTILEVER ABUTMENTS ON PILES CARRYING STEEL GIRDERS WITH STEEL FIXED BEARINGS OR STEEL EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION < 70 FT.

**SECTION**

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

**FOR OFFICE USE ONLY**
Typical section for cantilever abutments on piles carrying prestressed concrete girders with elastomeric fixed bearings or elastomeric expansion bearings with length contributing to expansion ≤ 70 ft.

**Substrahure - Abut**

**Detail No.** SUB-AB-101

*For Office Use Only - Do not include this sheet in contract plans*

**Notes:**
- All dimensions measured to L of bearing.
- *Minimum dimensions shown, utilize dimensioning as required by design.*
- **If concrete slope protection is used, add one layer of tar paper full contact area where substructure unit is adjacent to slope protection. The open joint that remains after slope protection has cured shall be filled with joint sealer conforming to Specifications.*

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**Typical section for cantilever abutments on piles carrying prestressed concrete girders with elastomeric fixed bearings or elastomeric expansion bearings with length contributing to expansion ≤ 70 ft.**

**Scale:** 3/8'' = 1'-0''

**For abutment drainage, see Std. No. SUB-DR-201**

**2 ply membrane waterproofing 16'' min. width centered on joint (typ.)**

**Closed cell neoprene sponge elastomer 1/2'' thick x 7'' wide for full length conforming to Section 911.40 seated in 7/8'' x 1/2'' deep key centered in backwall**

**Top of roadway**

**Substructure Concrete**

**Concrete FOOTING**

**6'' 1'-0''**

**Mix No. 6**

**Top of approach roadway subgrade**

**Limit of epoxy protective coating for backwall and bridge seat areas**

**Sloped to drain 1/4''/ft.**

**5'' min. reinforced concrete bearing pad**

**For elevations see sheets containing abutment elevation views**

**Construction joint with 2'' x 4'' key centered on joint**

**Slope protection**

**Max. batter 4 : 12**

**1'-6'' 3'-0'' **

**6'-0'' **

**SECTION**

**Scale: 3/8'' = 1'-0''**

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**SUBSTR-AB-101**

**Version 1.0**

**DATE: 06-26-2013**
NOTES:

1. All dimensions, bar sizes, and bar spacings are minimum if required by design, modify.

2. Contractor has option of lapping stem reinforcing and dowels as shown, or extending dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.

3. For abutment modifications carrying prestressed concrete girders see Detail 'A' on this sheet.

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TYPICAL SECTION FOR CANTILEVER ABUTMENTS
ON PILES WITH FIXED BEARINGS OR EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION ≤ 70 FT.
REINFORCEMENT DETAILS

DETAIL NO. SUB-AB-101

SHEET 3 OF 4
Note:
All dimensions measured \( \perp \) to L of bearing.

4-#5 bars spaced as shown min. (epoxy coated) add #5 bars as required @ 1'-0" c/c

**For abutment drainage, see Std. No. SUB-DR-201**

**See note below**

- For stub abutments, chamfer top of footing to follow slope. Use 2:1 unless otherwise noted on abutment sheets.

TYPICAL SECTION
Scale: \( \frac{3}{8"} = 1'-0"\)

Top of beam seat

2" cl.

#5 bars @ 1'-0" c/c (epoxy coated)

#5 bars @ 1'-0" c/c

#5 bars bent as shown @ 1'-0" c/c (epoxy coated)

2" cl.

1'-3" (typ.)

2" cl.

TYPICAL SECTION WITH REINFORCEMENT
Scale: \( \frac{3}{8"} = 1'-0"\)

Top of beam seat

#5 bars placed as shown

#6 bars @ 1'-0" min. or as required by design

3-#6 bars each way over piles

**Minimum dimensions shown, utilize dimensioning as required by design.**

**If concrete slope protection is used, add one layer of tar paper full contact area where substructure unit is adjacent to slope protection. The open joint that remains after slope protection has cured shall be filled with joint sealer conforming to Specifications.**
Normal wing wall reinforcing

Normal reinforcing steel lapped with longitudinal reinforcing in backwall (typ.)

2 ply membrane waterproofing 16" min., width centered on joint

Epoxy coated rein. steel

Construction joint with 2" x 4" key for backwall up to 1'-3" thick, over 1'-3" thick use 3" x 6" key

Lap + 3" (typ.)

Loose corner bar to match spacing and size of bars being lapped (typ.). As an option to a loose corner bar, the longitudinal steel may be extended and bent to the required lap.

SECTION ABOVE BRIDGE SEAT

Scale: 1/4" = 1'-0"

SECTION BELOW BRIDGE SEAT

Scale: 1/4" = 1'-0"

Note:
1. For bar lap lengths, see appropriate bar lap charts.
2. For normal reinforcing steel size and spacing refer to typical abutment and wing wall sections.
The use of stay-in-place forms is prohibited in this area of the deck.

2 ply membrane waterproofing 16" min., width centered on joint all around (typ.)

Top of roadway

Expansion joint cross beam shall not be placed until adjacent deck placement has been completed.

Construction joint with 2" x 6" x 6" key

Construction joint with 2" x 6" x 1'-2" key

For abutment drainage, see Std. No. SUB-DR-202

1'-6" x 2'-2" exp. jt. cross beam support columns equally spaced at 15'-0" max. c/c across rear face of abutment stem. For staged construction and columns at wing walls, see Std. No. SUB-AB-202.

Notes:

All dimensions measured L to L of bearing.

* Minimum dimensions shown, utilize dimensions as required by design.

** If concrete slope protection is used, add one layer of tar paper full contact area where substructure unit is adjacent to slope protection. The open joint that remains after slope protection has cured shall be filled with joint sealer conforming to Specifications.

*** X = joint opening dimension see chart on joint seal details.

**** The Contractor has the option to cast the exp. jt. cross beam support column monolithically with the abutment and backwall stem or in a separate pour. No additional compensation will be given for either alternate selected.
The use of stay-in-place forms is prohibited in this area of the deck.

2 ply membrane waterproofing 16" min., width centered on joint all around (typ.)

Top of roadway

Top of approach roadway subgrade

Expansion joint cross beam shall not be placed until adjacent deck placement has been completed.

Construction joint with 2" x 6" x 6" key

Construction joint with 2" x 6" x 1'-2" key

For abutment drainage, see Std. No. SUB-DR-202

1'-6" x 2'-2" exp. jt. cross beam support columns equally spaced at 15'-0" max, c/c across rear face of abutment stem. For staged construction and columns at wing walls, see Std. No. SUB-AB-202. ****

Notes:
All dimensions measured to L of bearing.

* Minimum dimensions shown, utilize dimensions as required by design.

** If concrete slope protection is used, add one layer of tar paper full contact area where substructure unit is adjacent to slope protection. The open joint that remains after slope protection has cured shall be filled with joint sealer conforming to Specifications.

*** X = joint opening dimension see chart on joint seal details.

**** The Contractor has the option to cast the exp. jt. cross beam support column monolithically with the abutment and backwall stem or in a separate pour. No additional compensation will be given for either alternate selected.
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**TYPICAL SECTION FOR CANTILEVER ABUTMENTS ON PILES WITH EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION > 70 FT.**

**FOR STEEL GIRDERS**

**SECTION WITH REINFORCEMENT**

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

**Notes:**
1. All dimensions, bar sizes, and bar spacings are minimum if required by design. Modify.
2. Contractor has option of lapping stem reinforcing and dowels as shown or extending dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
3. Use straight threaded bars lapped to a C bar if threaded couplers are used.
4. For abutment modifications carrying prestressed concrete girders, see Detail 'A'.

**DETAIL NO.**

10-03-2013

**SUB-STRUCTURE - ABUT**

**SUB-AB-201**

**SUB-AB-202**

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**TYPICAL SECTION FOR CANTILEVER ABUTMENTS ON PILES WITH EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION > 70 FT.**

**REINFORCEMENT DETAILS**

1. **For expansion joint cross beam support column see Std. No. SUB-BP-101.**

2. Use straight threaded bars lapped to a C bar if threaded couplers are used.

3. For abutment modifications carrying prestressed concrete girders, see Detail 'A'.


5. For expansion joint cross beam support column see Std. No. SUB-BP-101.

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**TYPICAL SECTION FOR CANTILEVER ABUTMENTS ON PILES WITH EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION > 70 FT.**

**REINFORCEMENT DETAILS**

1. **For expansion joint cross beam support column see Std. No. SUB-BP-101.**

2. Use straight threaded bars lapped to a C bar if threaded couplers are used.

3. For abutment modifications carrying prestressed concrete girders, see Detail 'A'.


5. For expansion joint cross beam support column see Std. No. SUB-BP-101.
For abutment drainage, see Std. No. SUB-DR-202

For stub abutments, chamfer top of footing to follow slope. Use 2:1 unless otherwise noted on abutment sheets.

**See note below

**Note:
All dimensions measured \( \perp \) to \( \& \) of bearing.

* **GUIDE SHEET FOR PLAN DEVELOPMENT ONLY – DO NOT INCLUDE THIS SHEET IN CONTRACT PLANS **

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SUB-AB-201

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TYPICAL SECTION FOR STUB ABUTMENTS ON PILES WITH EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION > 70 FT.

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TYPICAL SECTION FOR STUB ABUTMENTS ON PILES WITH EXPANSION BEARINGS WITH LENGTH CONTRIBUTING TO EXPANSION > 70 FT.
At the Contractor's option, the loose corner bars may be eliminated provided the longitudinal reinforcing be extended to lap the minimum distance shown on one face. No additional compensation will be given for this option.

For staged construction, there shall be 3'-0" c/c spacing between support columns as shown.

*** Orient construction joint so that the key is embedded in the subsequent stage.
*5#5 bars @ 1'-0" c/c max. (typ.) each side, use straight threaded bars lapped to a #7 bar if couplers are used.*

Normal wing wall reinforcement lapped with reinforcement in backwall

9'-0" min.

Optional threaded couplers, if bracket is cast in separate pour (typ.)

5#5's dowels placed as shown

Location of second support column in staged construction

Lap

Lap

LOCATION OF SECOND SUPPORT COLUMN IN STAGED CONSTRUCTION

15'-0" max.

15'-0" max. to the L of next support column *

5#5 bars @ 1'-0" c/c max. (typ.), use straight threaded bars lapped to a #5 bar if couplers are used.

Optional threaded couplers, if bracket is cast in separate pour (typ.)

5#5's dowels placed as shown

Location of second support column in staged construction

15'-0" max.

L lap

L expansion joint cross beam support column

L expansion joint cross beam support column

Optional threaded couplers, if bracket is cast in separate pour (typ.)

5#5's dowels placed as shown

Location of second support column in staged construction

Normal wing wall reinforcement lapped with reinforcement in backwall

2" x 4" key for backwall up to 1'-3" thick, over 1'-3" thick use 3" x 6" key

Construction joint with 2" x 4" key for backwall up to 1'-3" thick, over 1'-3" thick use 3" x 6" key

Epoxy coated reinforcement

Location of second support column in staged construction

5#5's dowels placed as shown

Staged construction joint

5#5's dowels placed as shown

Epoxy coated reinforcement

Construction joint with 2" x 4" key for backwall up to 1'-3" thick, over 1'-3" thick use 3" x 6" key

* For staged construction, there shall be 3'-0" c/c spacing between support columns as shown.

Scale: 3/16" = 1'-0"
**For more details, see "Cheek Wall at Bridge Abutment" standard detail.**

***Designer shall show this conduit on wing wall elevation sheets.***
A detail showing the keyways at construction joints in the abutments shall be included in the Contract Plans. The information provided in this detail is for guidance only.