



**PRESTRESSED CONCRETE BEAM  
PCBT-29 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 29" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library..

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-29C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-29C

**PRESTRESSED CONCRETE BEAM  
PCBT-29 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

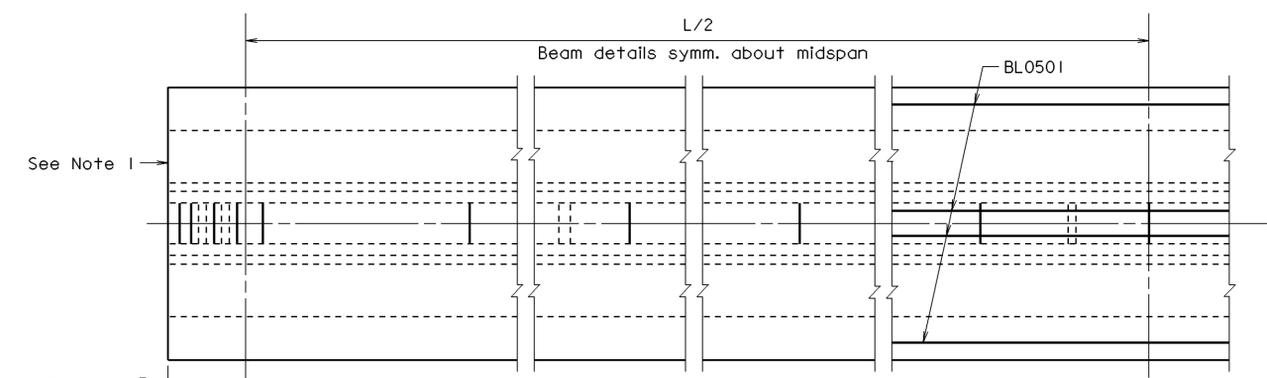
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-29C: NOTES TO DESIGNER**

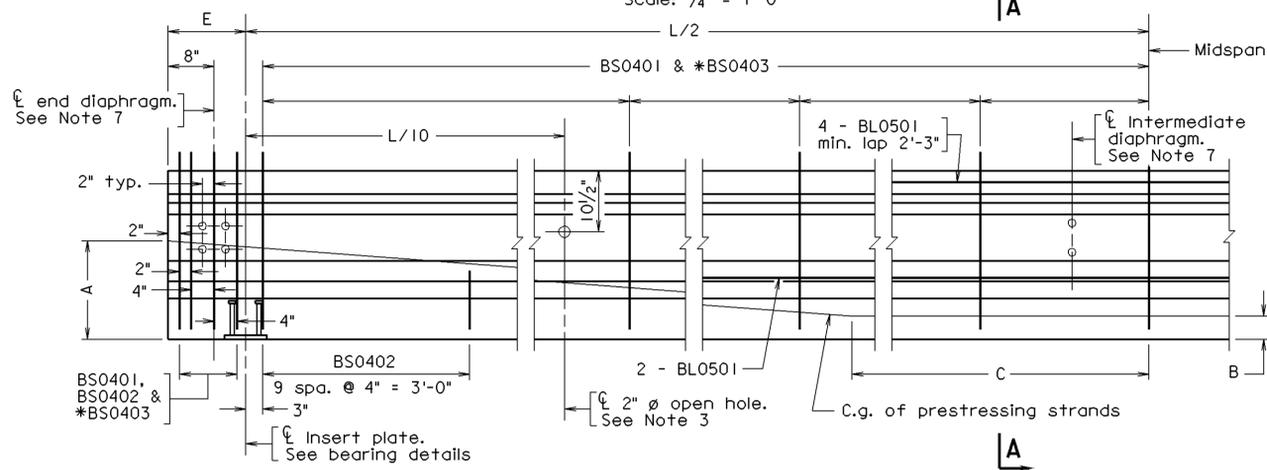
VOL. V - PART 4  
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Notes:

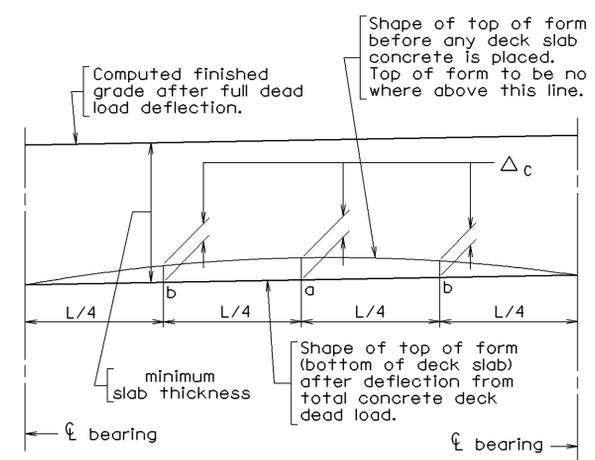
- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



**PART PLAN**  
Scale: 3/4" = 1'-0"



**PART ELEVATION**  
Scale: 3/4" = 1'-0"



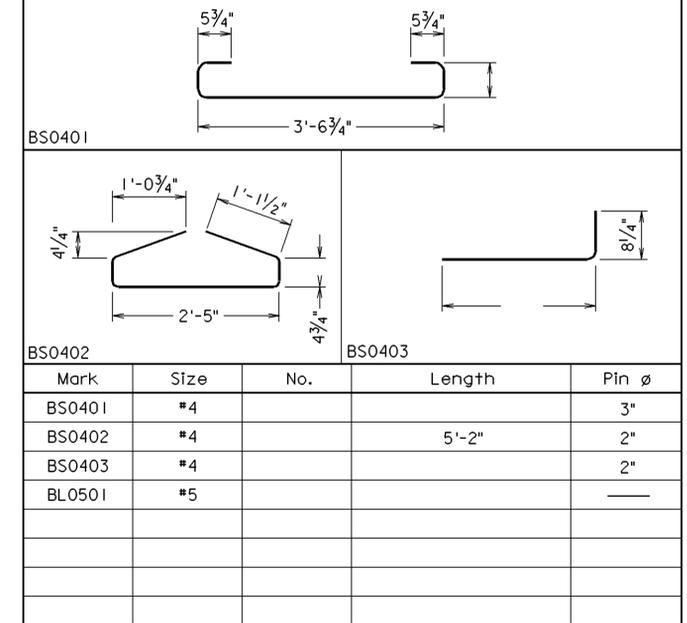
Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_c$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.  
 $\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).  
 $\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

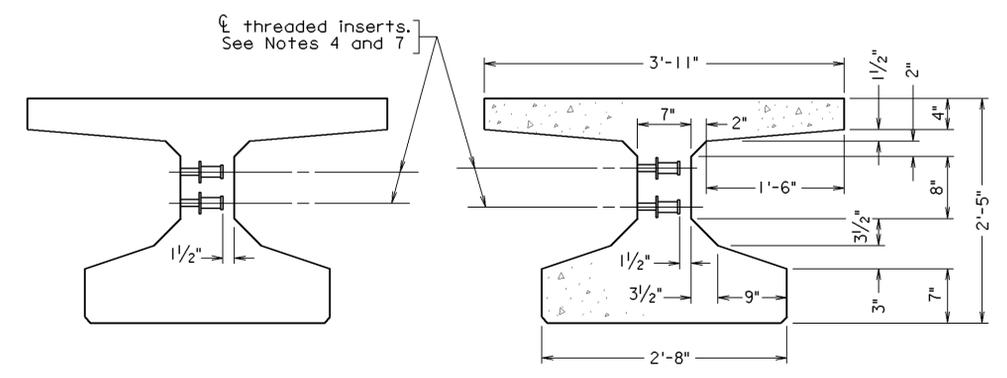
**DEAD LOAD DEFLECTION DIAGRAM**

**REINFORCING STEEL SCHEDULE**

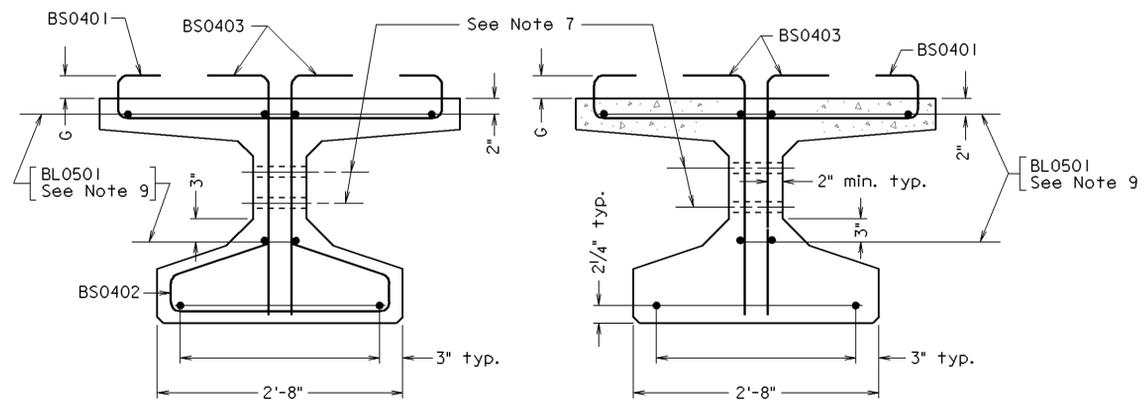


Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

Dimensions in bending diagram are out-to-out of bars.  
 Reinforcing bars shown on the above schedule are for beams shown on this sheet only.  
 \*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.  
 Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.

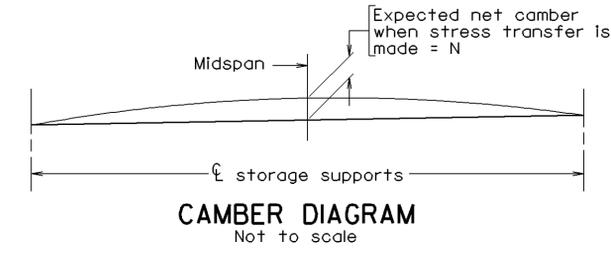


**EXTERIOR BEAM**  
Scale: 1" = 1'-0"



**INTERIOR BEAM**  
For dimensions not shown, see Exterior Beam  
Scale: 1" = 1'-0"

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.



**CAMBER DIAGRAM**  
Not to scale

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 29" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

05-07-01 PCBT-29S

**PRESTRESSED CONCRETE BEAM  
PCBT-29 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 29" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-29S: NOTES TO DESIGNER**

VOL. V - PART 4  
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**PRESTRESSED CONCRETE BEAM  
PCBT-29 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-29S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-29S



**PRESTRESSED CONCRETE BEAM  
PCBT-37 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 37" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-37C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-37C

**PRESTRESSED CONCRETE BEAM  
PCBT-37 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

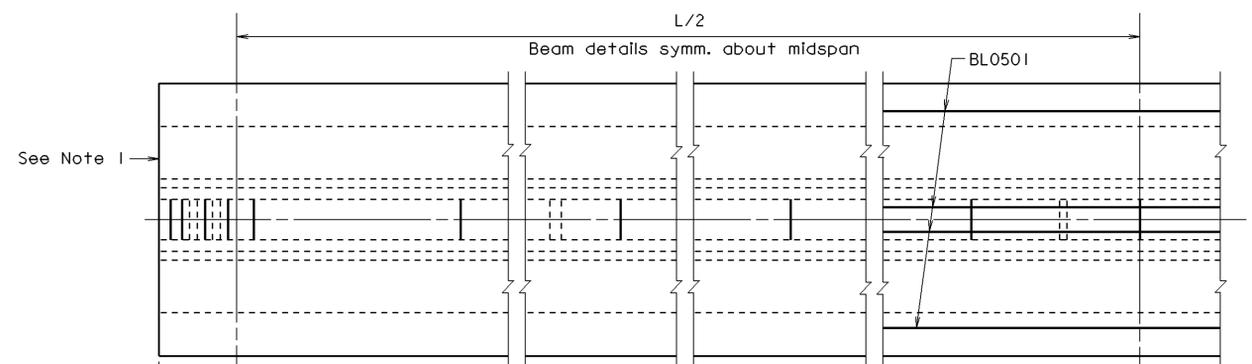
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-37C: NOTES TO DESIGNER**

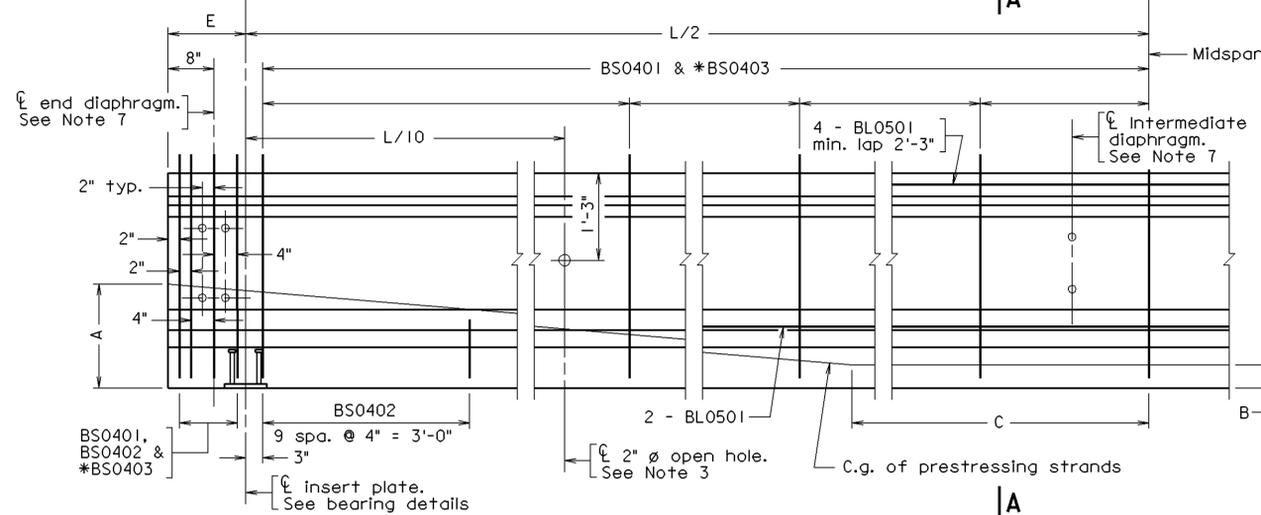
VOL. V - PART 4  
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Notes:

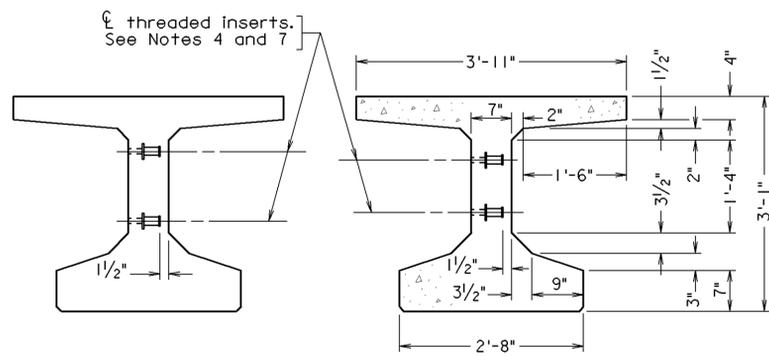
- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



PART PLAN



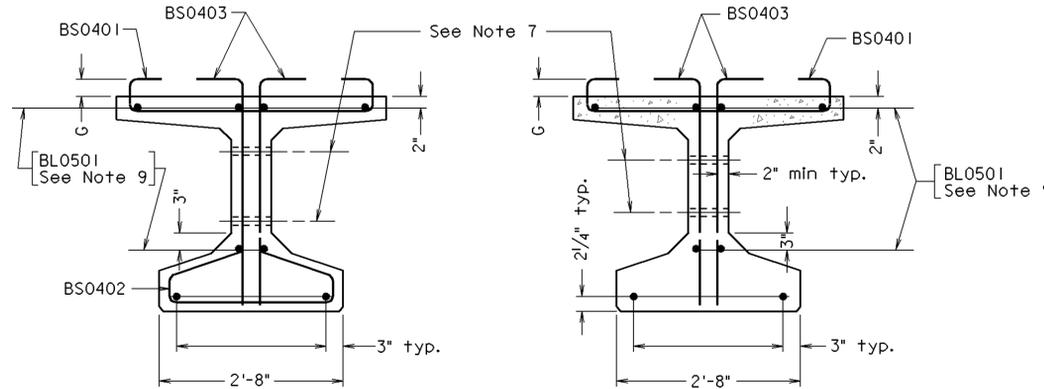
PART ELEVATION



END VIEW

SECTION A-A

EXTERIOR BEAM

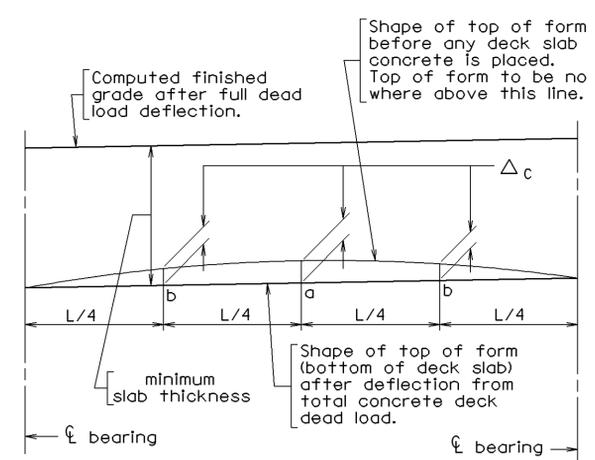


END VIEW

SECTION A-A

INTERIOR BEAM

For dimensions not shown, see Exterior Beam



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	ANTICIPATED DEAD LOAD DEFLECTION			
	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE				
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

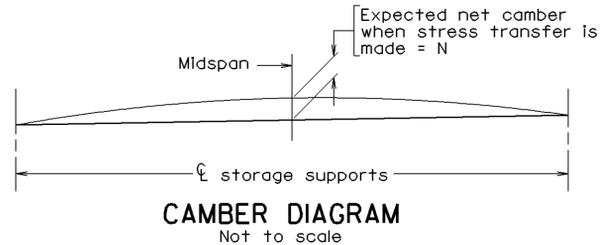
Dimensions in bending diagram are out-to-out of bars.

Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.

DIMENSION TABLE										
Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.



CAMBER DIAGRAM  
Not to scale

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 37" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
	Revisions		Checked: .....		Sheet No.

05-07-01  
PCBT-37S

**PRESTRESSED CONCRETE BEAM  
PCBT-37 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 37" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-37S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-37S

**PRESTRESSED CONCRETE BEAM  
PCBT-37 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

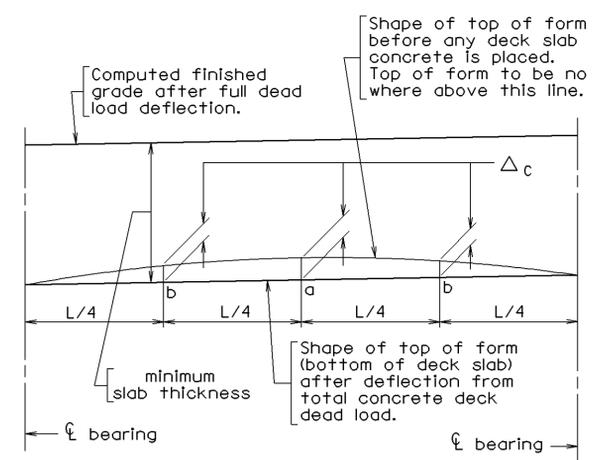
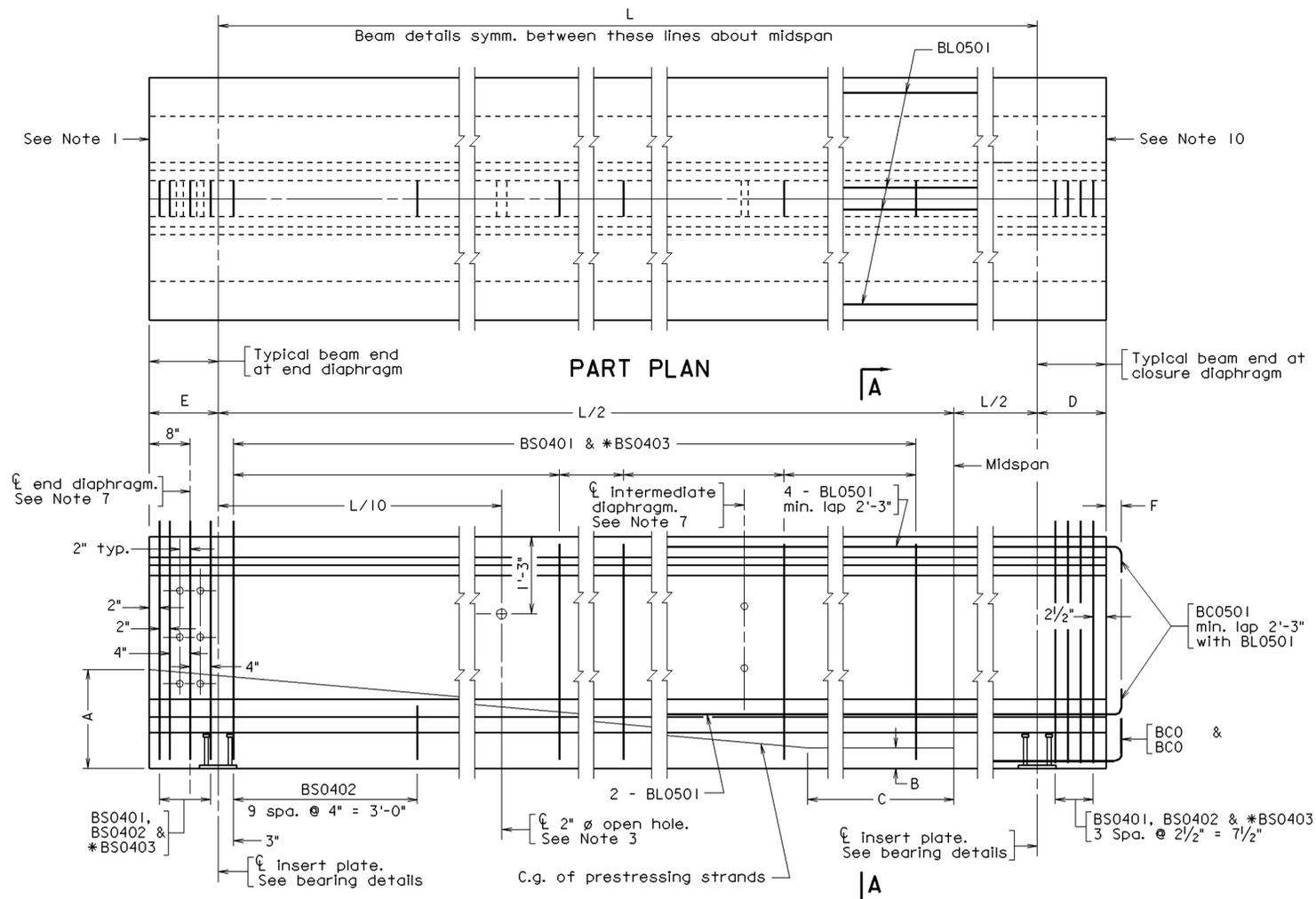
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-37S: NOTES TO DESIGNER**

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SHEET 3 of 3  
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Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

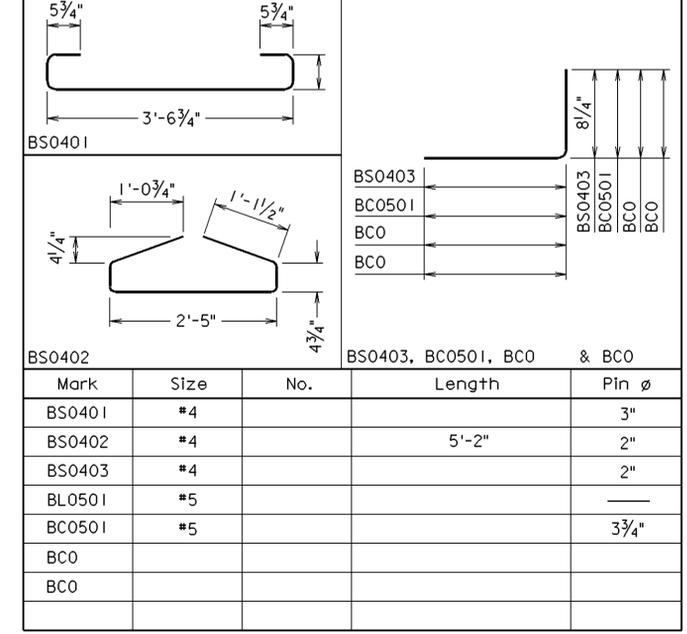
$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE

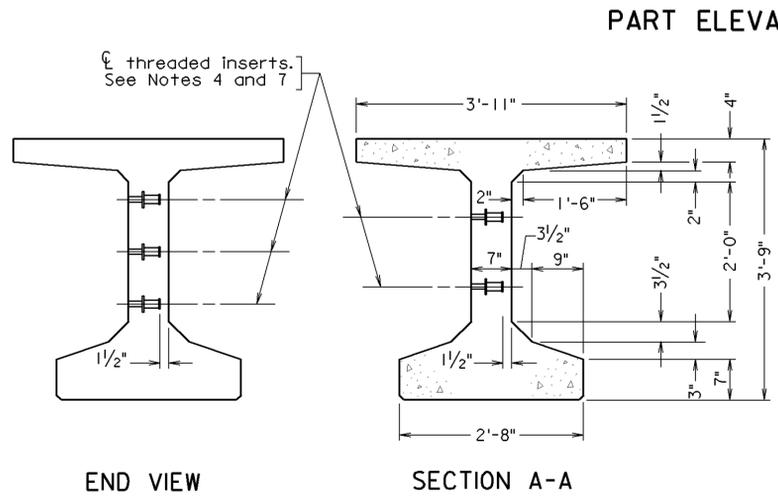


Dimensions in bending diagram are out-to-out of bars.

Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

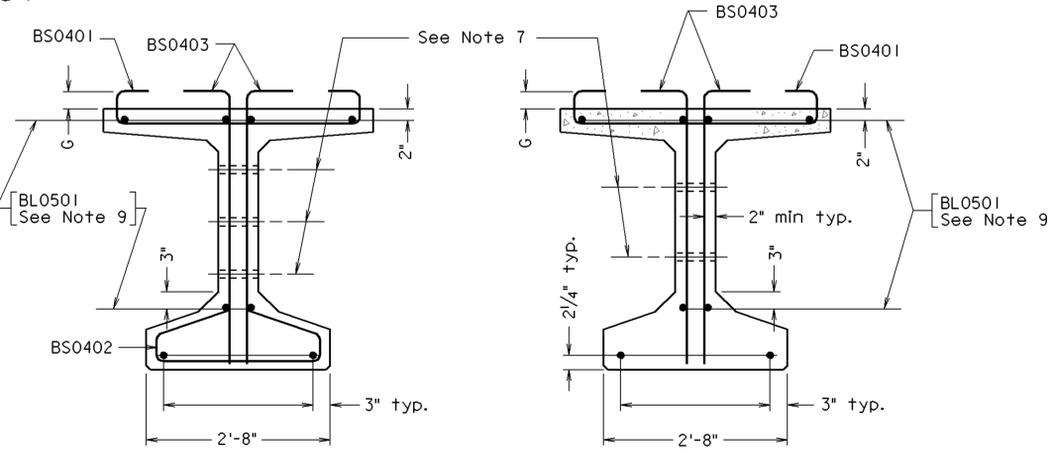
Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



END VIEW

SECTION A-A

EXTERIOR BEAM



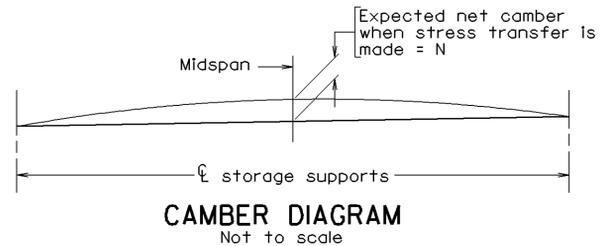
END VIEW

SECTION A-A

INTERIOR BEAM

For dimensions not shown, see Exterior Beam

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



Scale: 3/4" = 1'-0" © 2001, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
PRESTRESSED CONCRETE BULB-T 45" DEPTH					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

05-07-01 PCBT-45C

**PRESTRESSED CONCRETE BEAM  
PCBT-45 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 45" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-45C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-45C

**PRESTRESSED CONCRETE BEAM  
PCBT-45 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-45C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-45C



**PRESTRESSED CONCRETE BEAM  
PCBT-45 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 45" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-45S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-45S

**PRESTRESSED CONCRETE BEAM  
PCBT-45 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

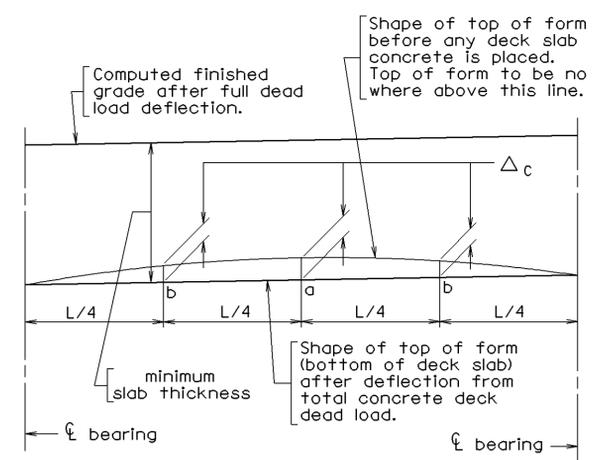
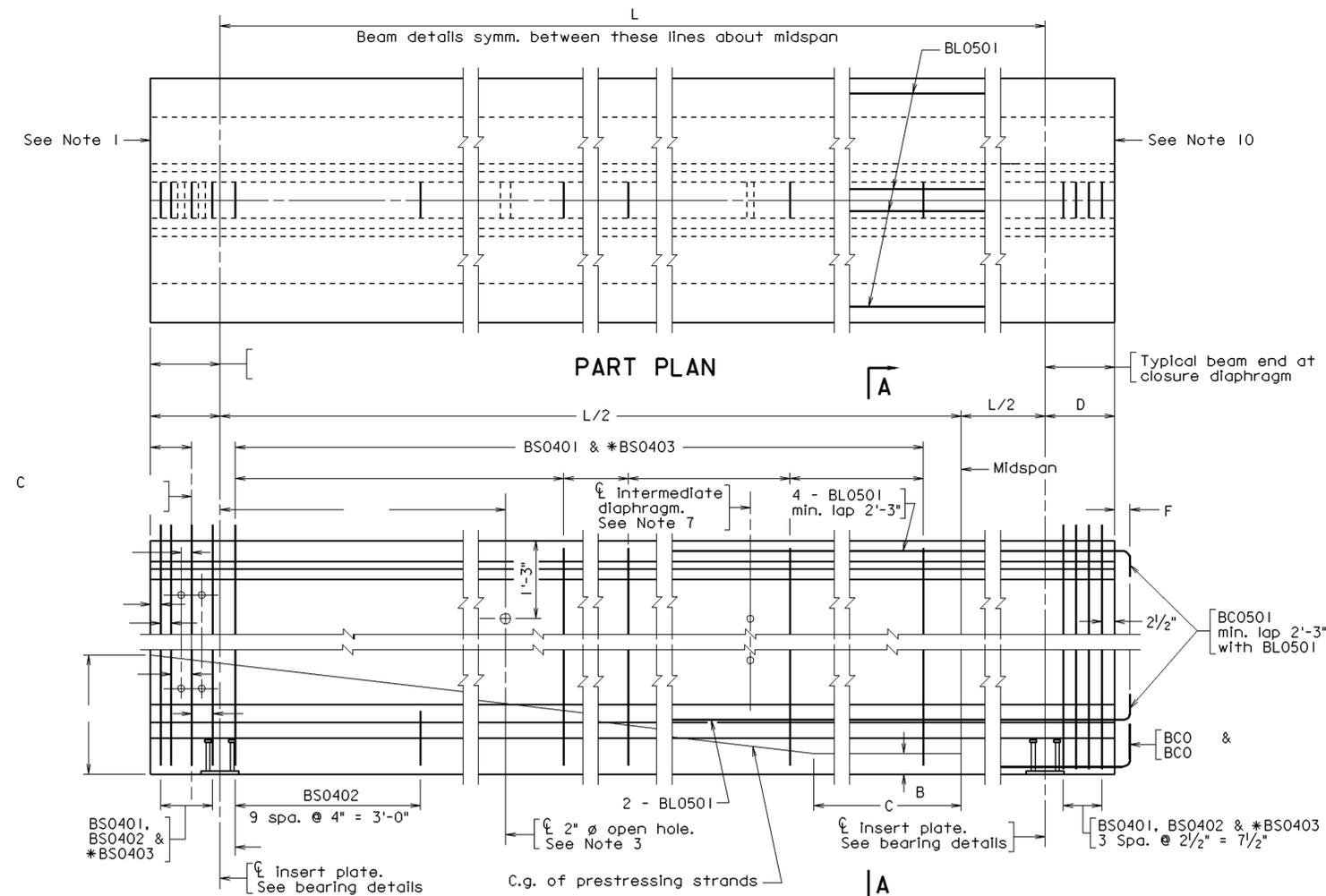
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-45S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-45S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



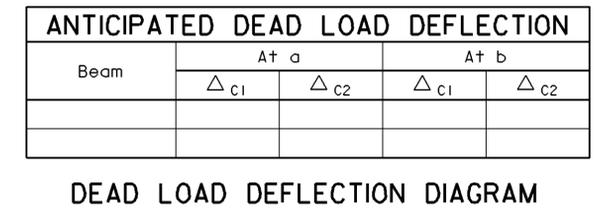
Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$



REINFORCING STEEL SCHEDULE

<p>BS0401</p>		<p>BS0403</p>	
<p>BS0402</p>		<p>BC0501</p>	
		<p>BCO</p>	
		<p>BCO</p>	

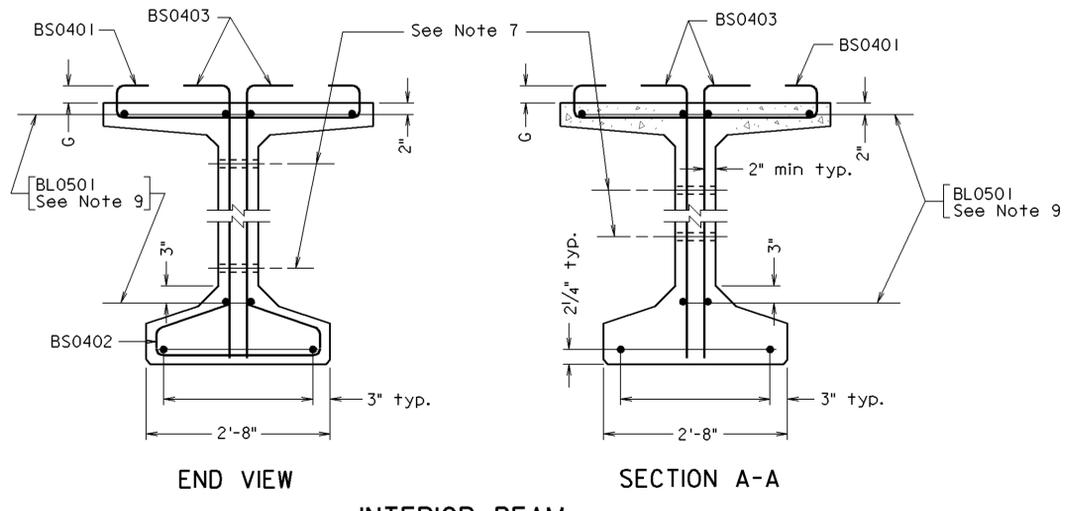
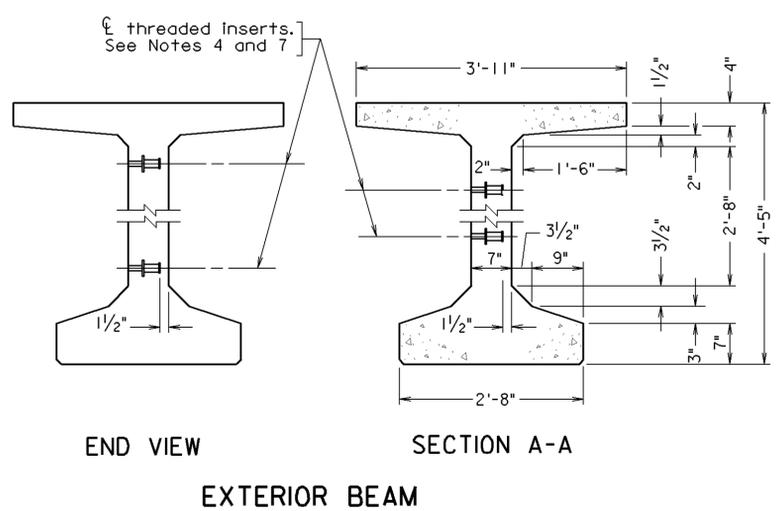
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			
BC0501	#5			3 3/4"
BCO				
BCO				

Dimensions in bending diagram are out-to-out of bars.

Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

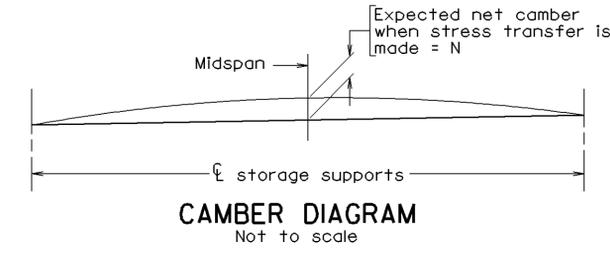
\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



For dimensions not shown, see Exterior Beam

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 53" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
	Revisions		Checked: .....		Sheet No.

05-07-01 PCBT-53C

**PRESTRESSED CONCRETE BEAM  
PCBT-53 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 53" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-53C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-53C

**PRESTRESSED CONCRETE BEAM  
PCBT-53 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

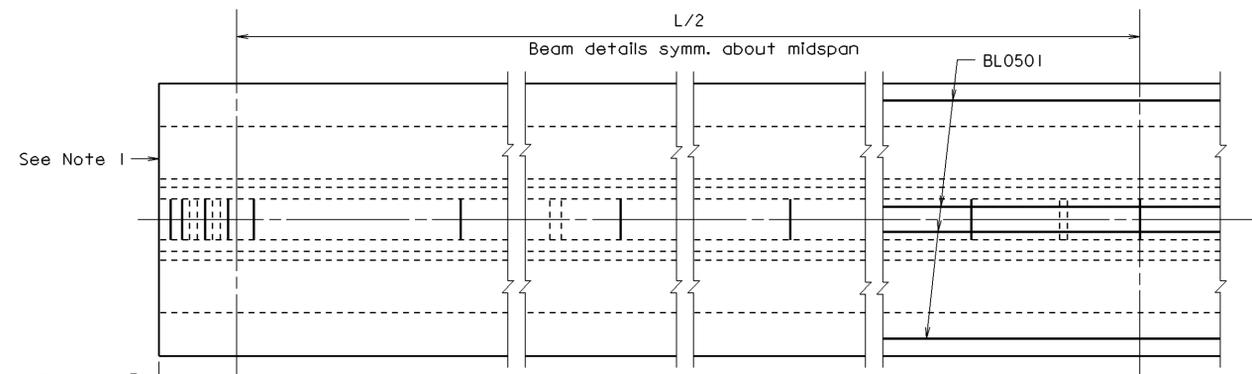
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-53C: NOTES TO DESIGNER**

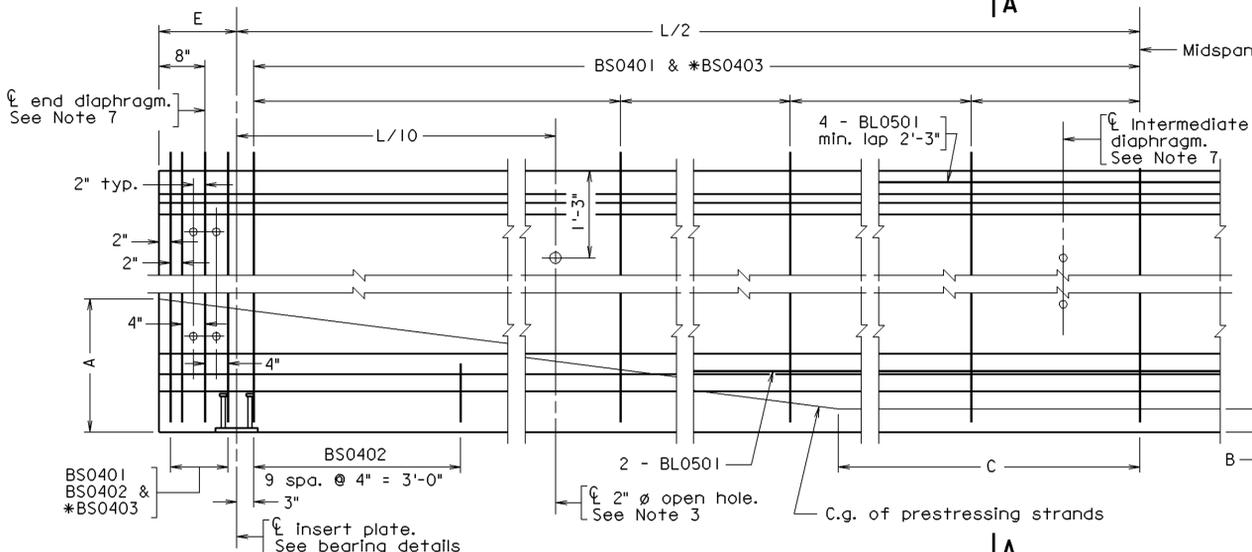
VOL. V - PART 4  
DATE:  
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FILE NO. PCBT-53C

Notes:

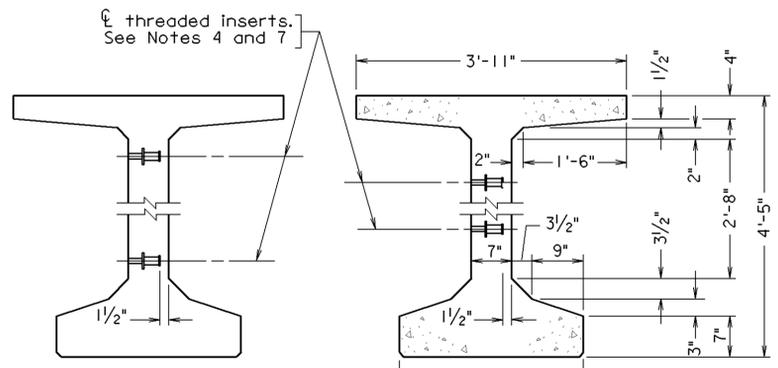
- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



PART PLAN



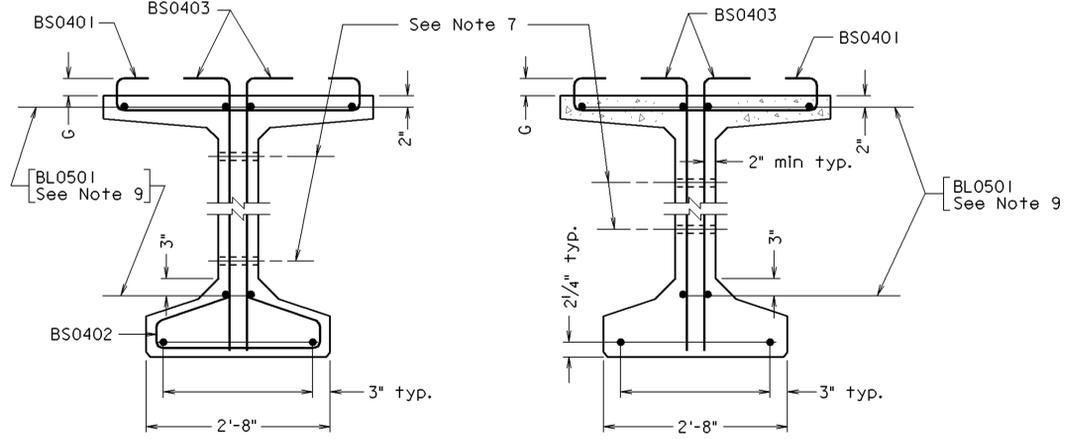
PART ELEVATION



END VIEW

SECTION A-A

EXTERIOR BEAM

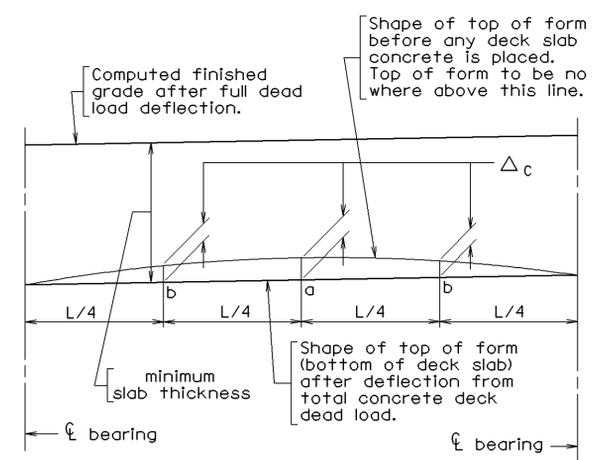


END VIEW

SECTION A-A

INTERIOR BEAM

For dimensions not shown, see Exterior Beam



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_c$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

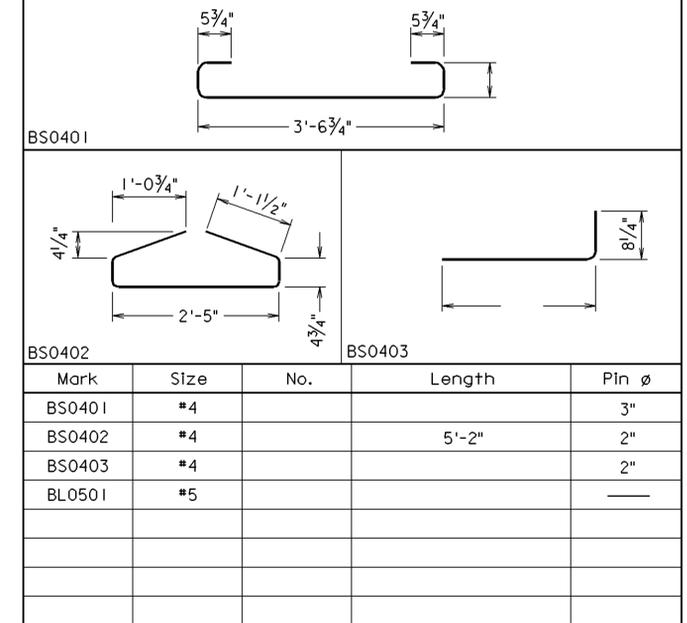
$\Delta_c = \Delta_{c1} + \Delta_{c2}$

ANTICIPATED DEAD LOAD DEFLECTION

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE



Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

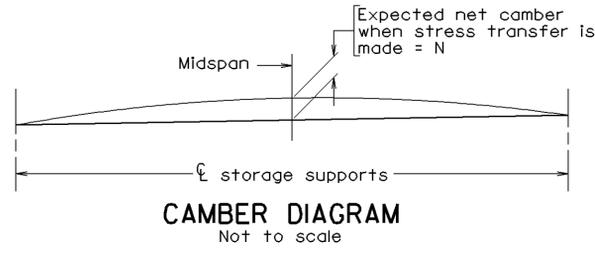
Dimensions in bending diagram are out-to-out of bars.

Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.

DIMENSION TABLE										
Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.



CAMBER DIAGRAM

Scale: 3/4" = 1'-0"

© 2001, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 53" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
			Drawn: .....		Sheet No.
			Checked: .....		
Revisions					

05-07-01 PCBT-53S

**PRESTRESSED CONCRETE BEAM  
PCBT-53 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 53" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-53S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-53S

**PRESTRESSED CONCRETE BEAM  
PCBT-53 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

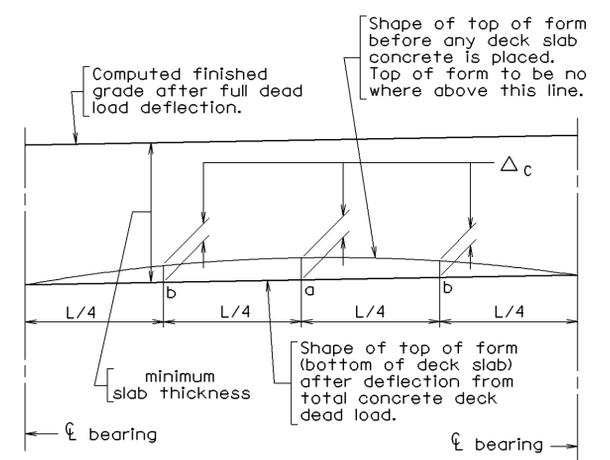
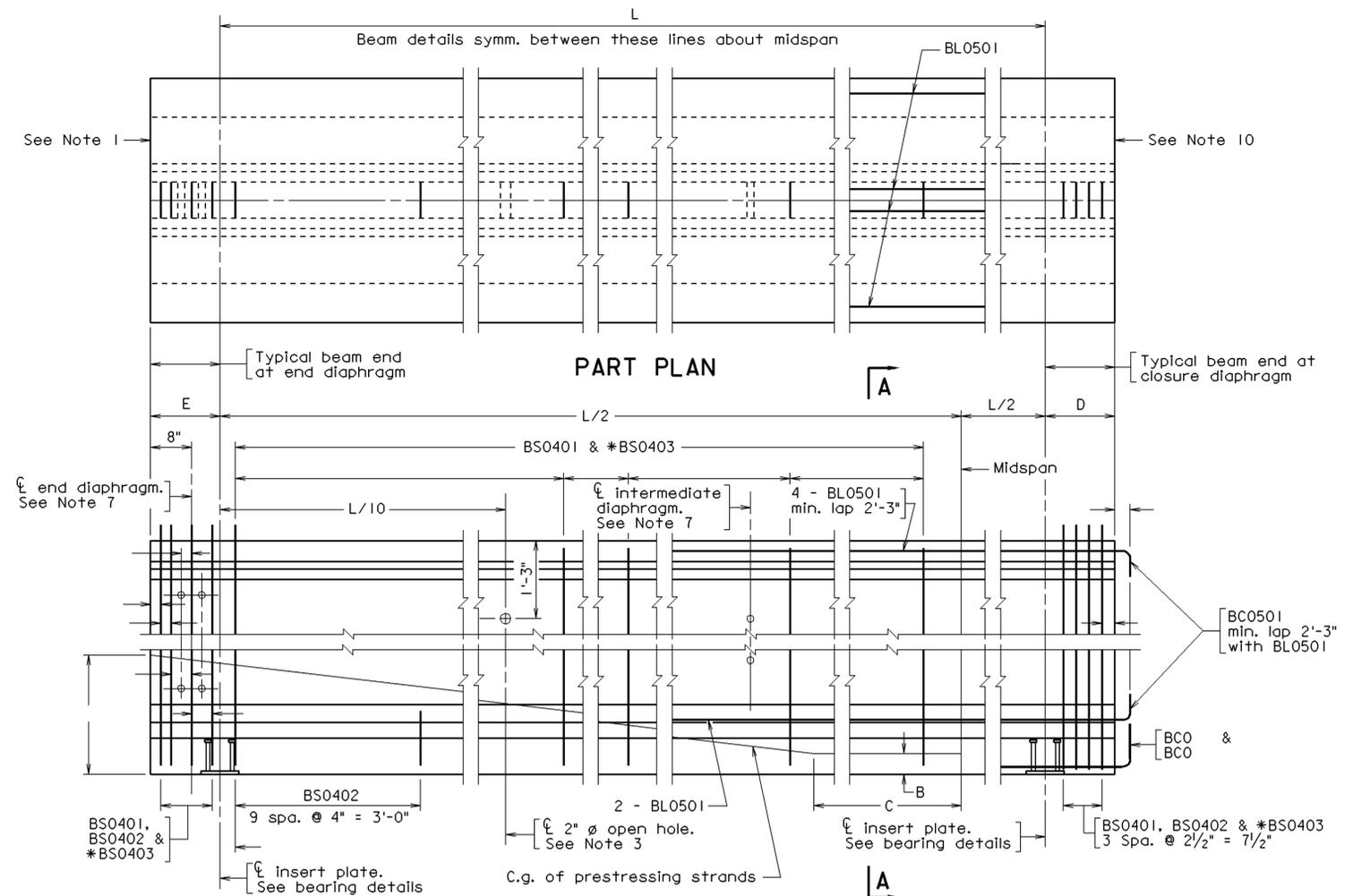
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-53S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-53S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

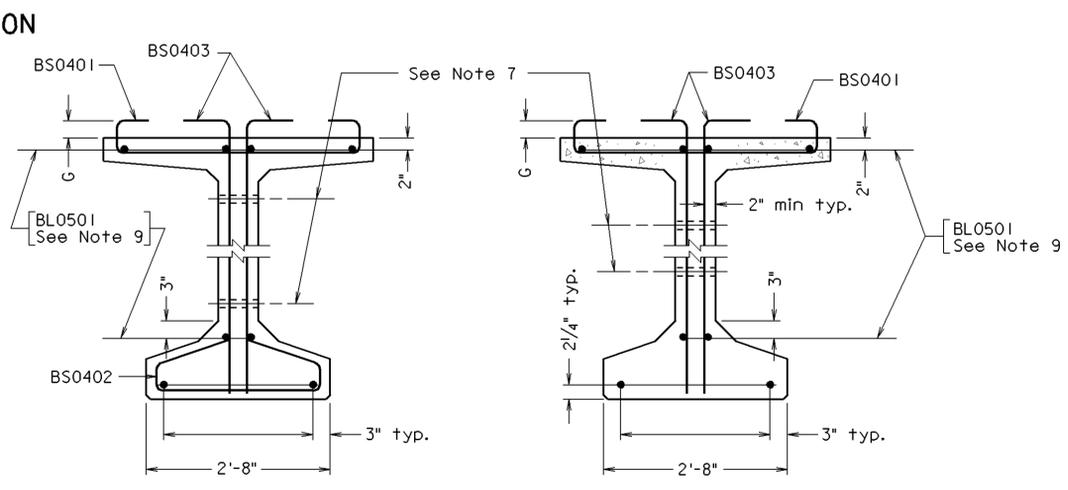
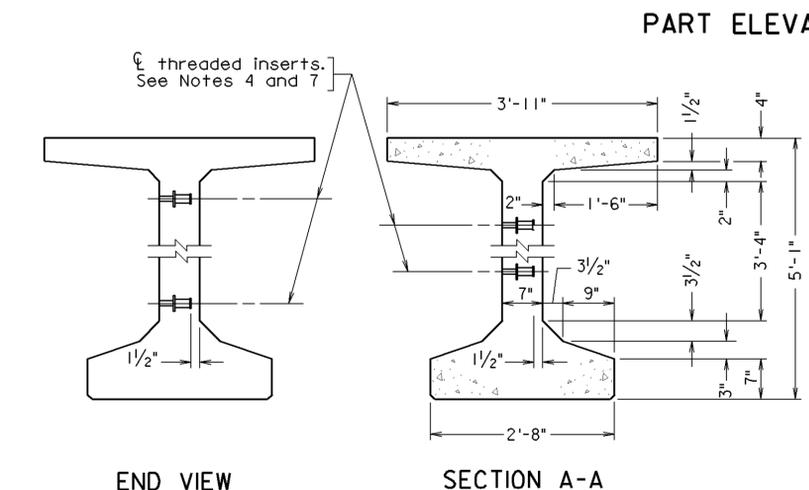
$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

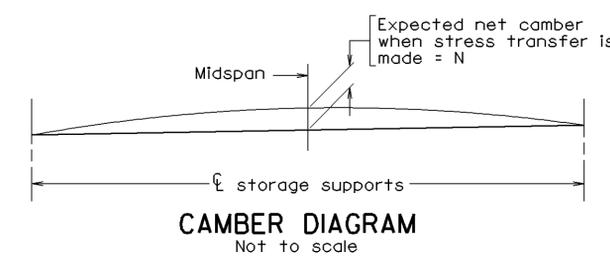
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4		5'-2"	3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			
BC0501	#5			3 3/4"
BC0				
BC0				



END VIEW SECTION A-A EXTERIOR BEAM

END VIEW SECTION A-A INTERIOR BEAM

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



COMMONWEALTH OF VIRGINIA  
DEPARTMENT OF TRANSPORTATION  
STRUCTURE AND BRIDGE DIVISION

**PRESTRESSED CONCRETE BULB-T  
61" DEPTH**

No.	Description	Date	Designed: .....	Date	Plan No.	Sheet No.
	Revisions		Checked: .....			

07-25-01 PCBT-61C

**PRESTRESSED CONCRETE BEAM  
PCBT-61 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 61" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-61C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-61C

**PRESTRESSED CONCRETE BEAM  
PCBT-61 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

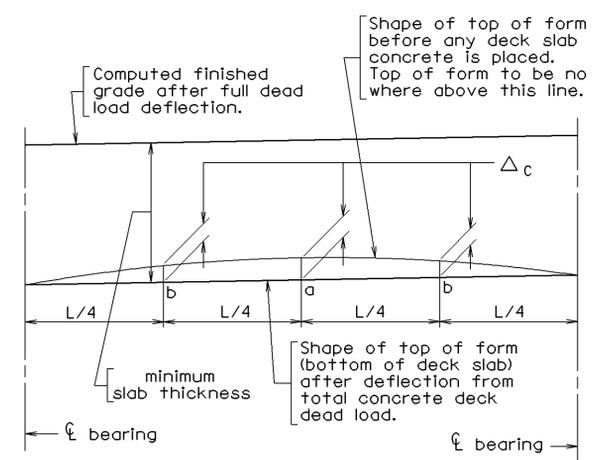
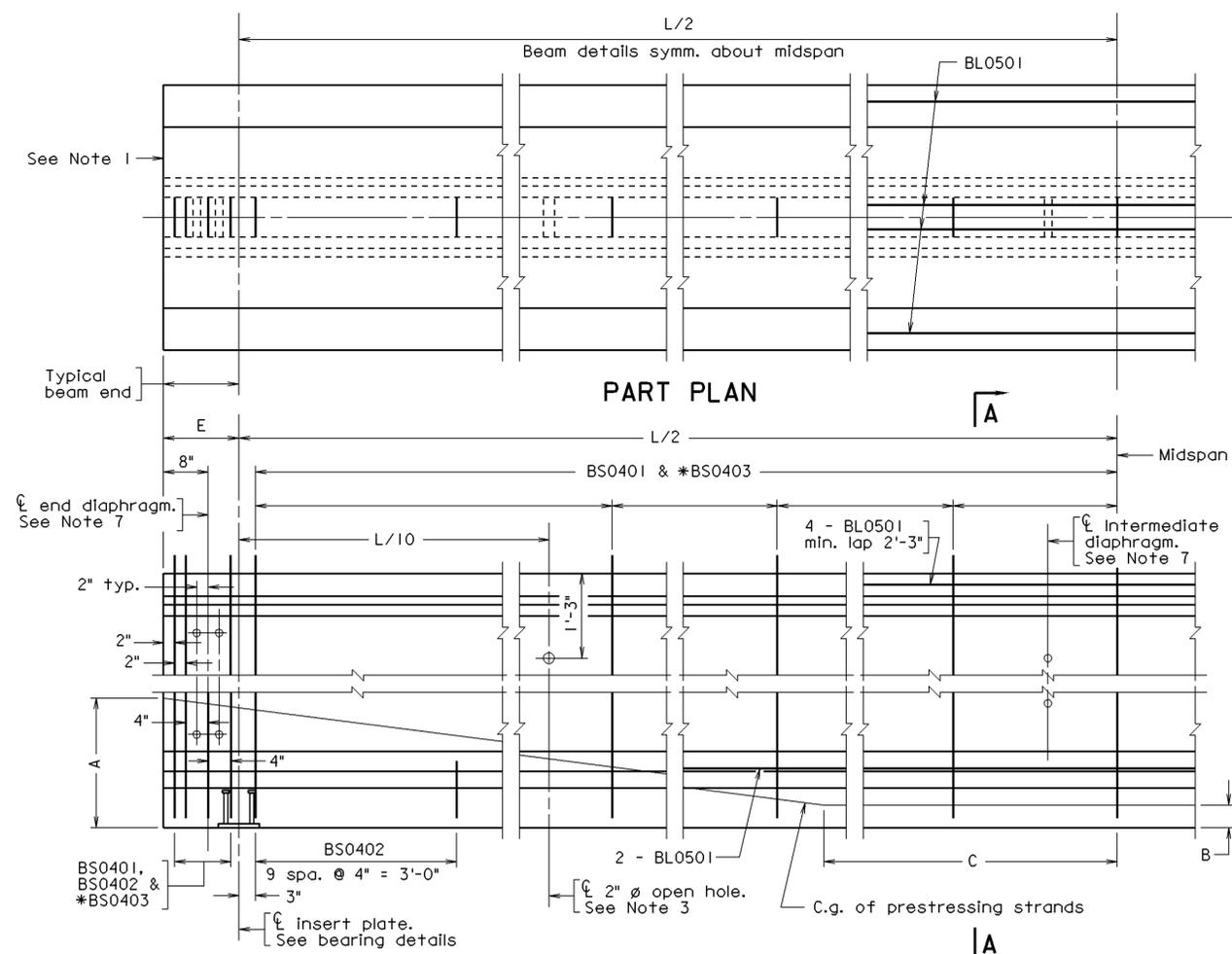
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-61C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-61C

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.

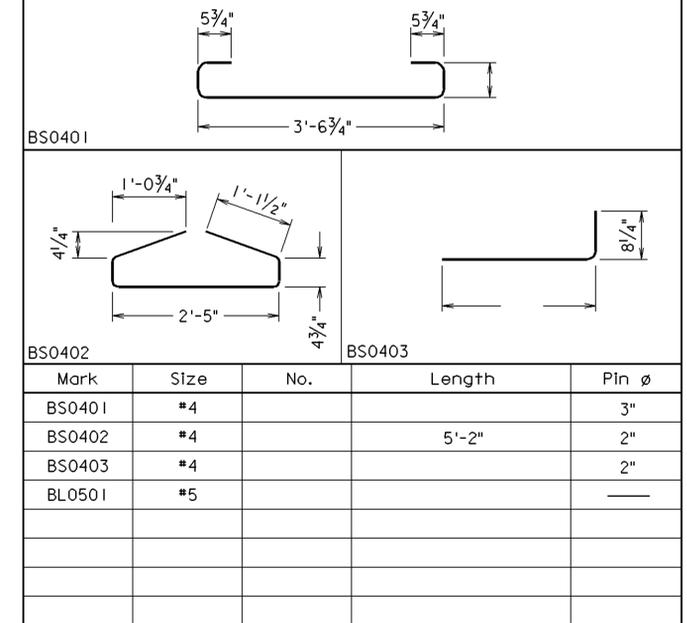


ANTICIPATED DEAD LOAD DEFLECTION

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE

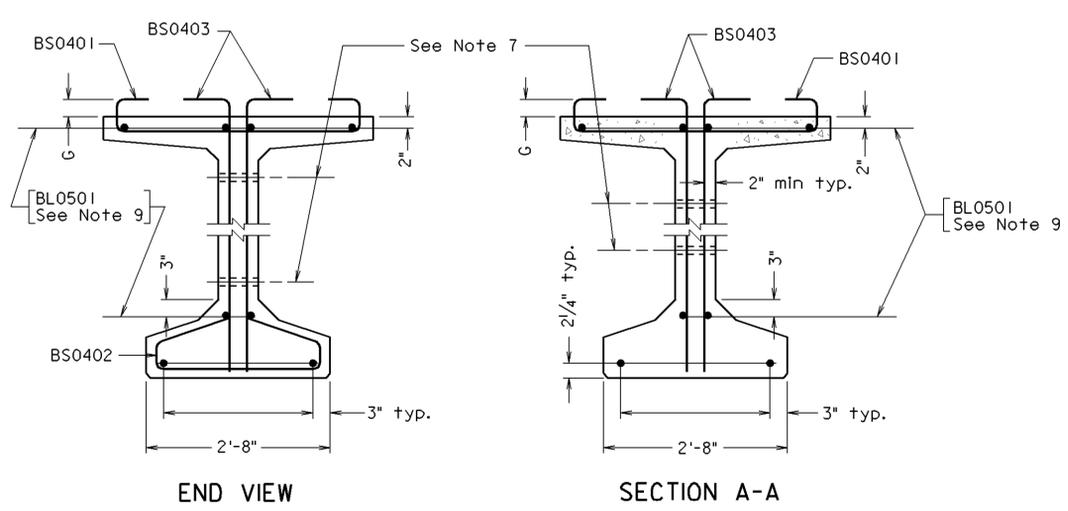
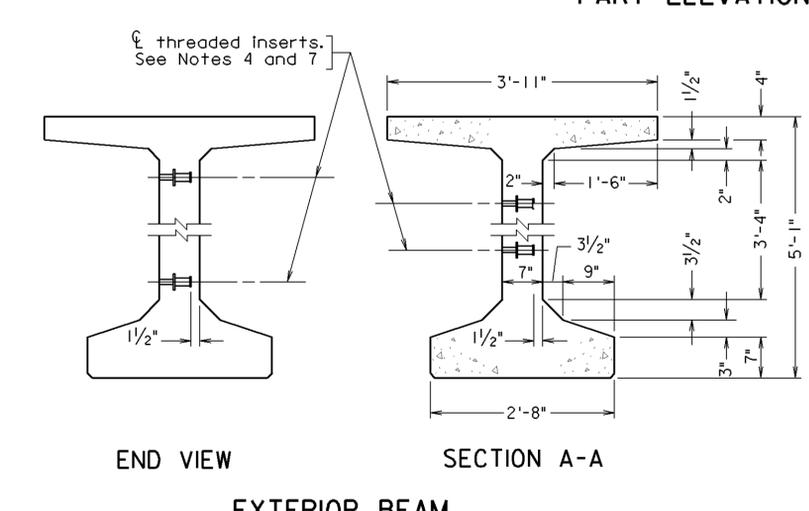


Dimensions in bending diagram are out-to-out of bars.

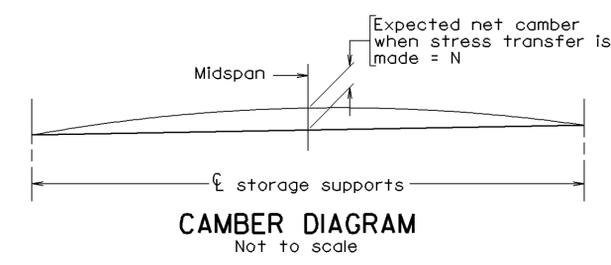
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



INTERIOR BEAM  
 For dimensions not shown, see Exterior Beam



**DIMENSION TABLE**

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.

COMMONWEALTH OF VIRGINIA  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURE AND BRIDGE DIVISION

**PRESTRESSED CONCRETE BULB-T  
 61" DEPTH**

No.	Description	Date	Designed: .....	Date	Plan No.	Sheet No.
	Revisions		Checked: .....			

07-25-01 PCBT-61S

**PRESTRESSED CONCRETE BEAM  
PCBT-61 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 61" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-61S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-61S

**PRESTRESSED CONCRETE BEAM  
PCBT-61 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

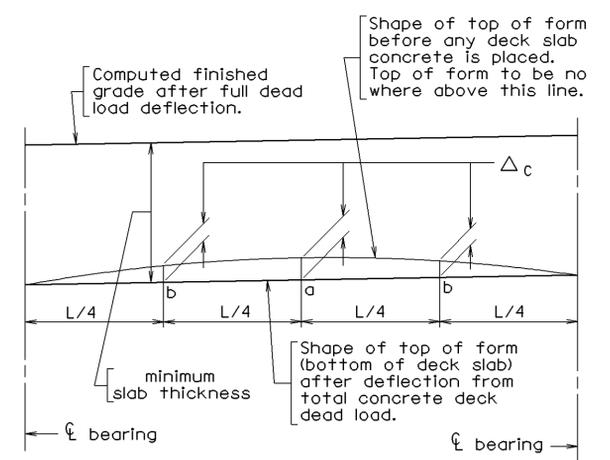
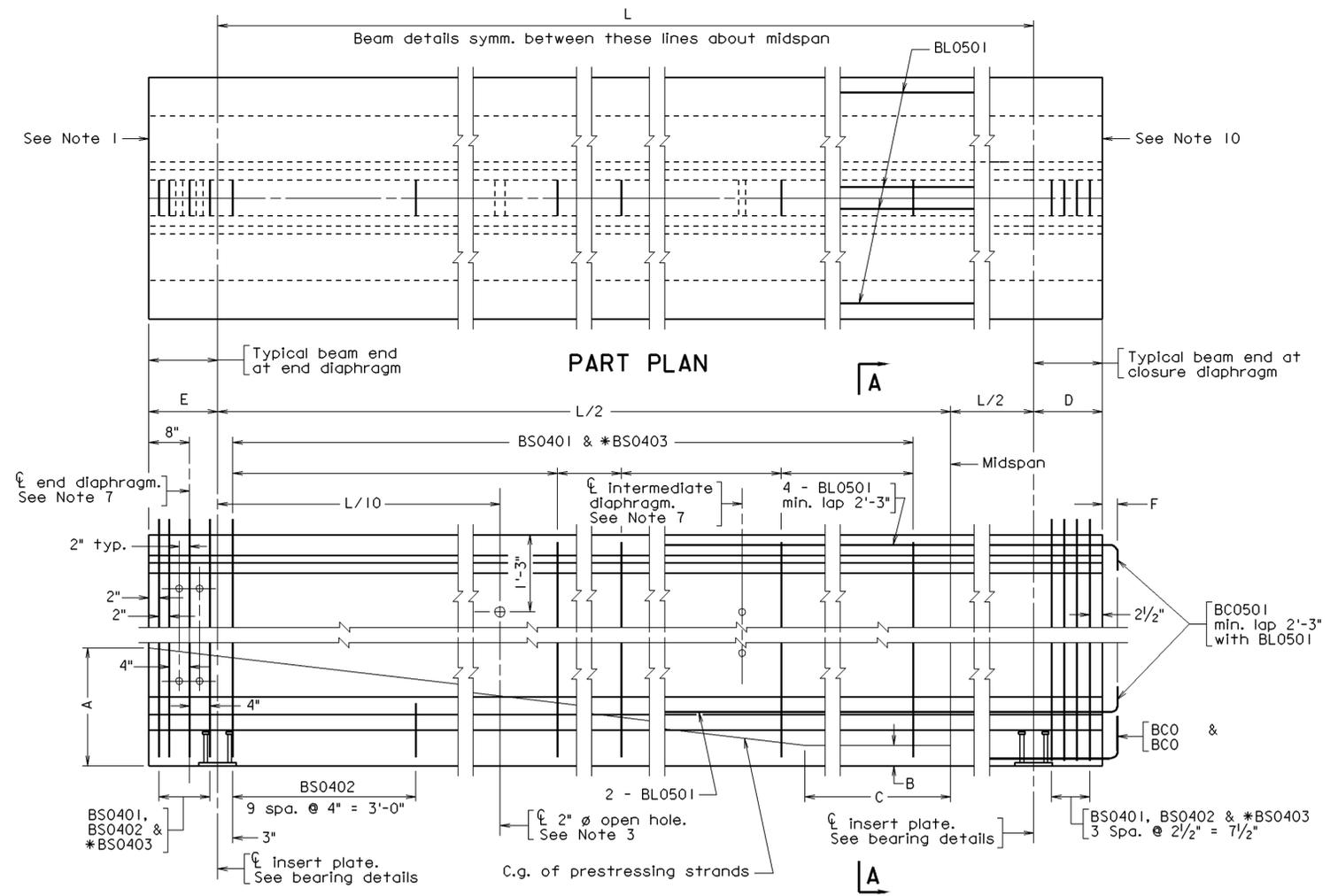
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-61S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-61S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



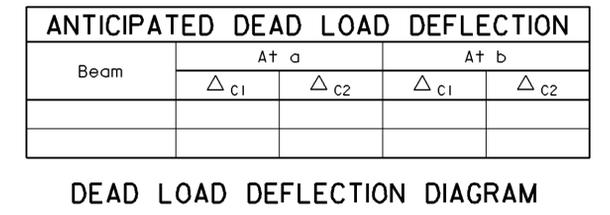
Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

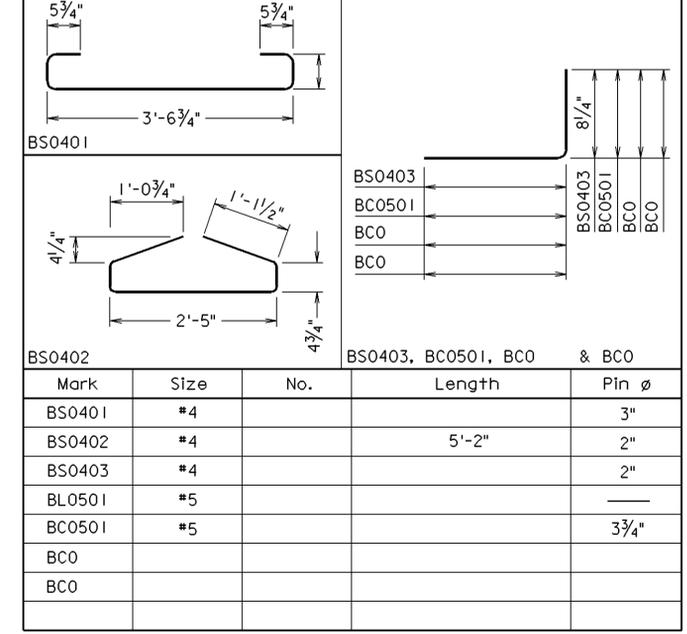
$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$



REINFORCING STEEL SCHEDULE

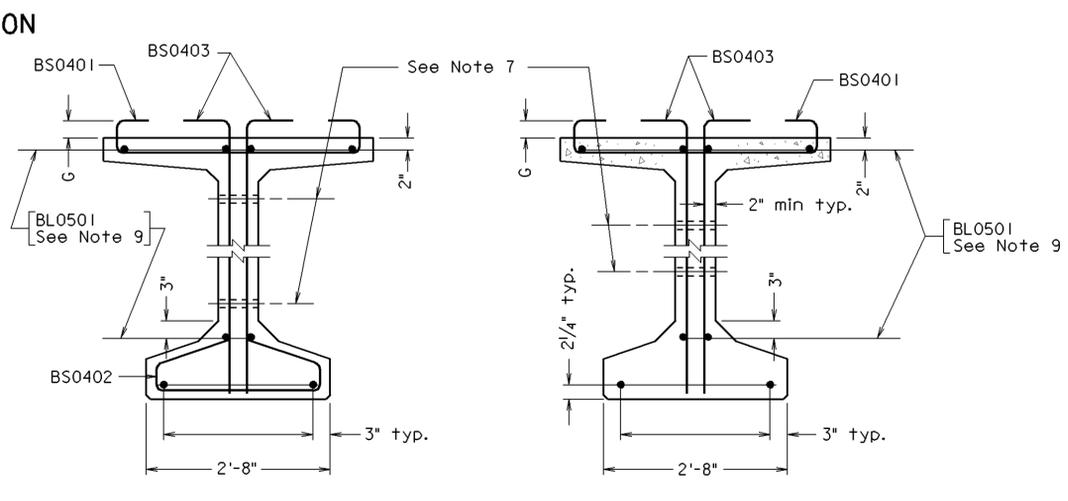
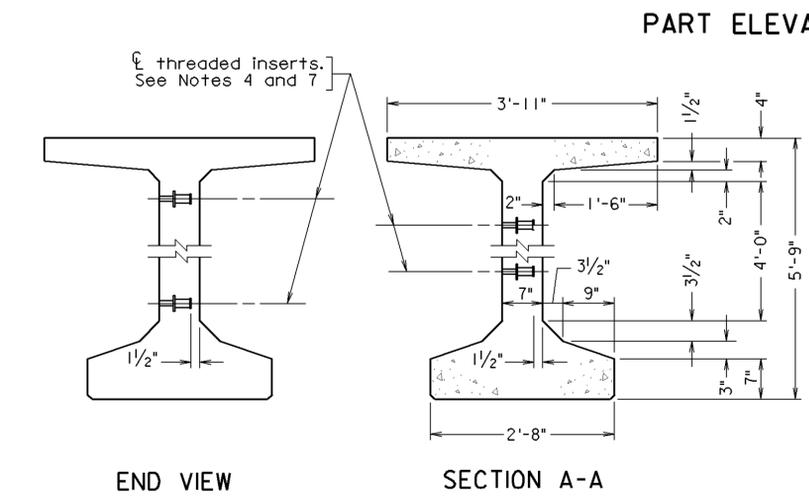


Dimensions in bending diagram are out-to-out of bars.

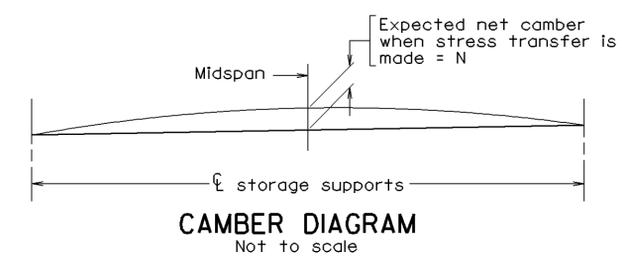
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



For dimensions not shown, see Exterior Beam



Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 69" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

07-25-01 PCBT-69C

**PRESTRESSED CONCRETE BEAM  
PCBT-69 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 69" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-69C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-69C

**PRESTRESSED CONCRETE BEAM  
PCBT-69 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

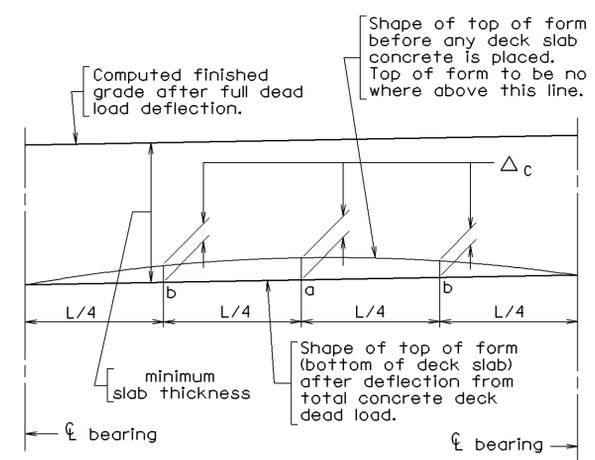
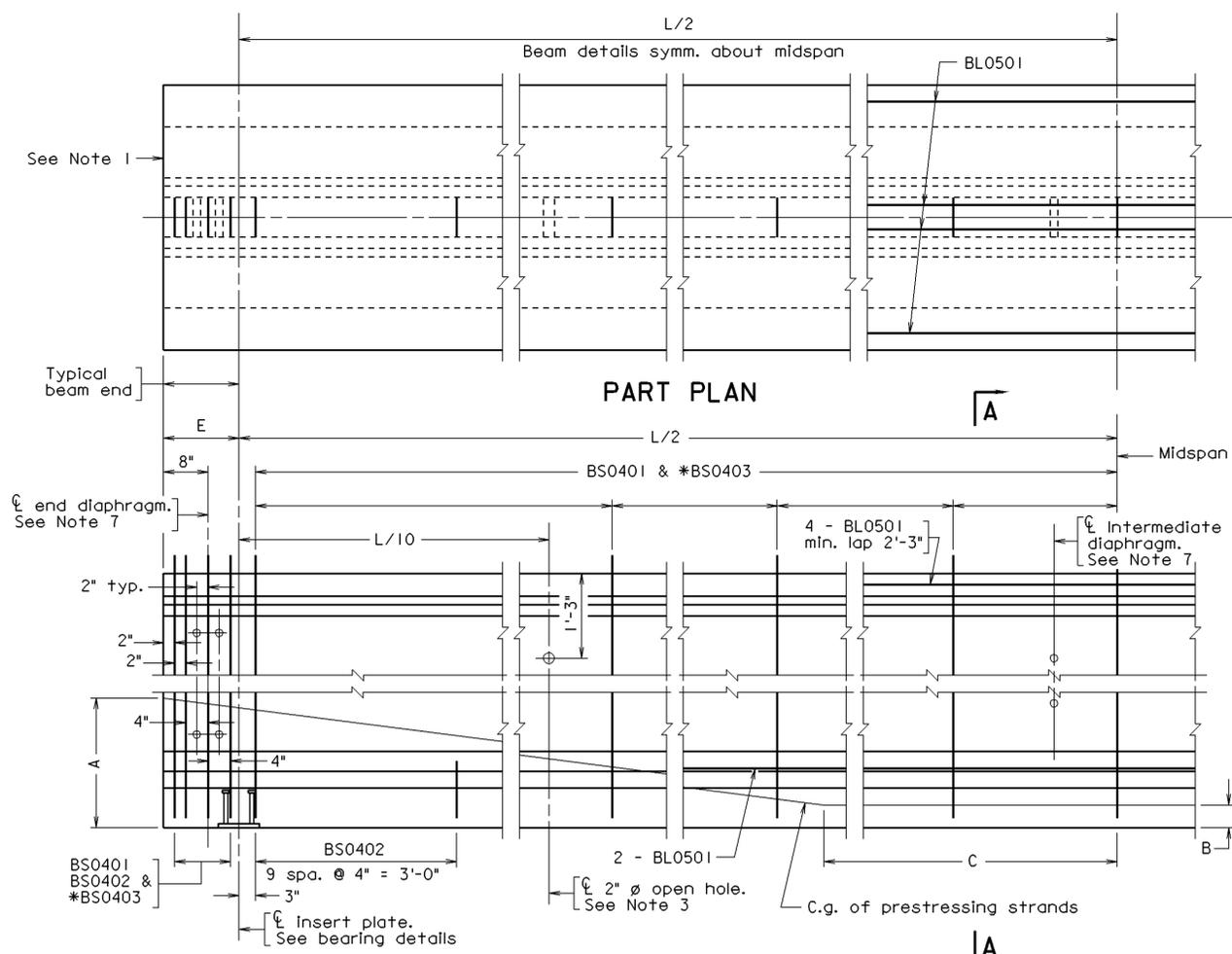
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-69C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-69C

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_c$

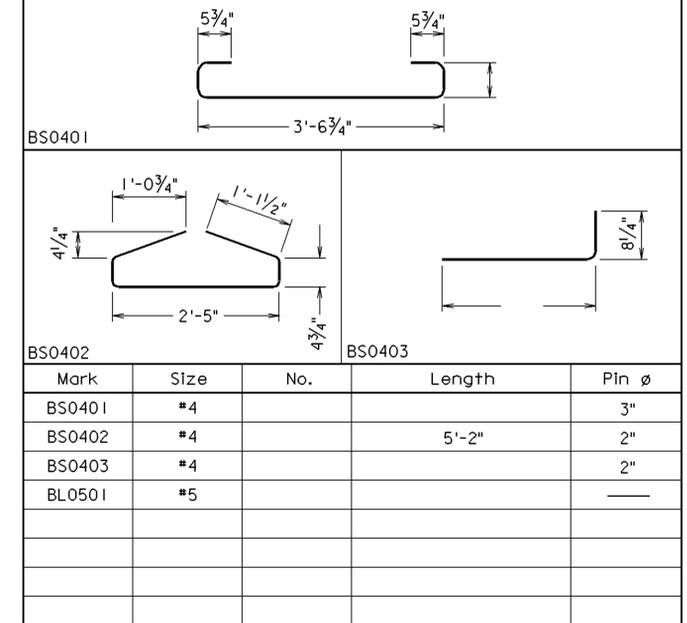
$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

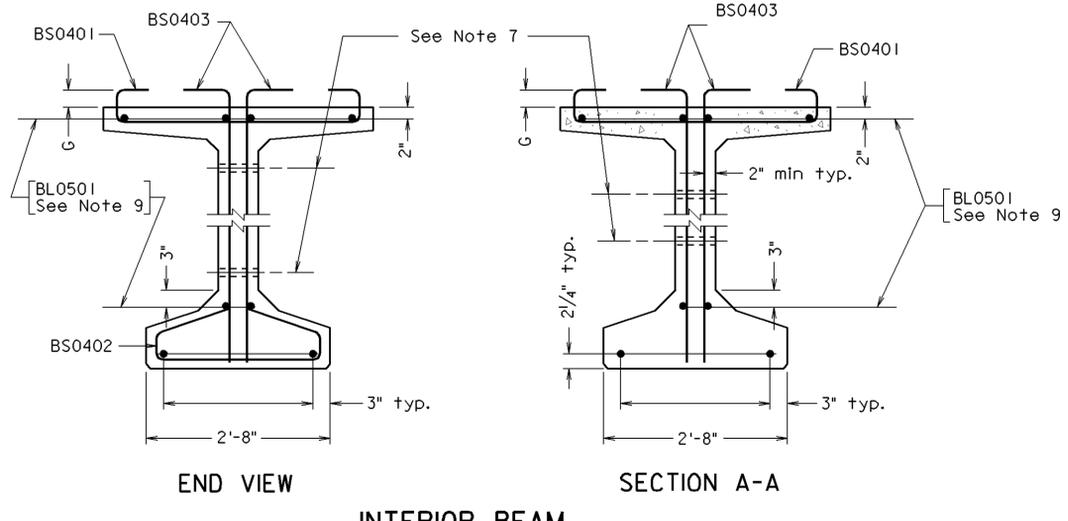
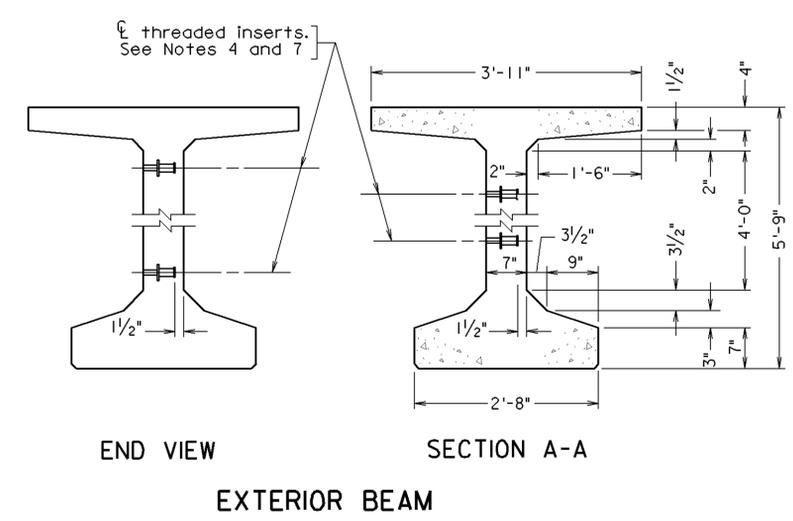
Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

**REINFORCING STEEL SCHEDULE**

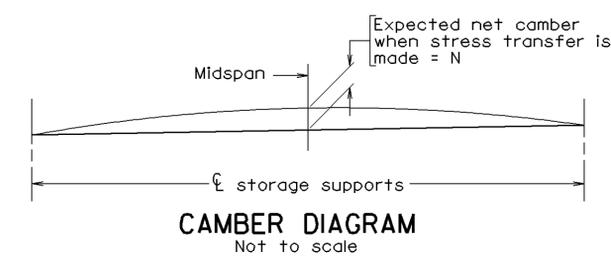


Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

Dimensions in bending diagram are out-to-out of bars.  
 Reinforcing bars shown on the above schedule are for beams shown on this sheet only.  
 \*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.  
 Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



**INTERIOR BEAM**  
 For dimensions not shown, see Exterior Beam



Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.

COMMONWEALTH OF VIRGINIA  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURE AND BRIDGE DIVISION

**PRESTRESSED CONCRETE BULB-T  
 69" DEPTH**

No.	Description	Date	Designed: .....	Date	Plan No.	Sheet No.
Revisions			Checked: .....			

07-25-01 PCBT-69S

**PRESTRESSED CONCRETE BEAM  
PCBT-69 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 69" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-69S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-69S

**PRESTRESSED CONCRETE BEAM  
PCBT-69 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

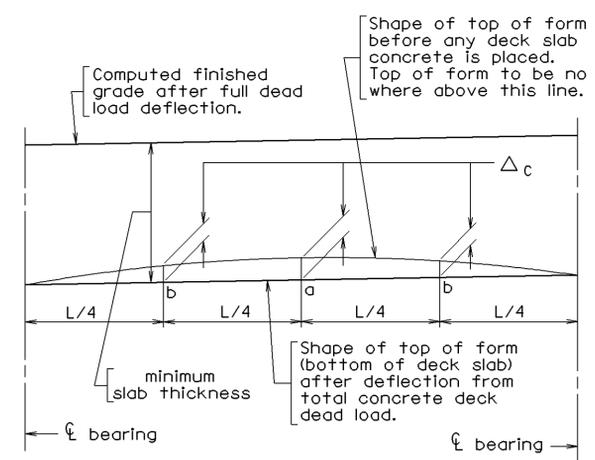
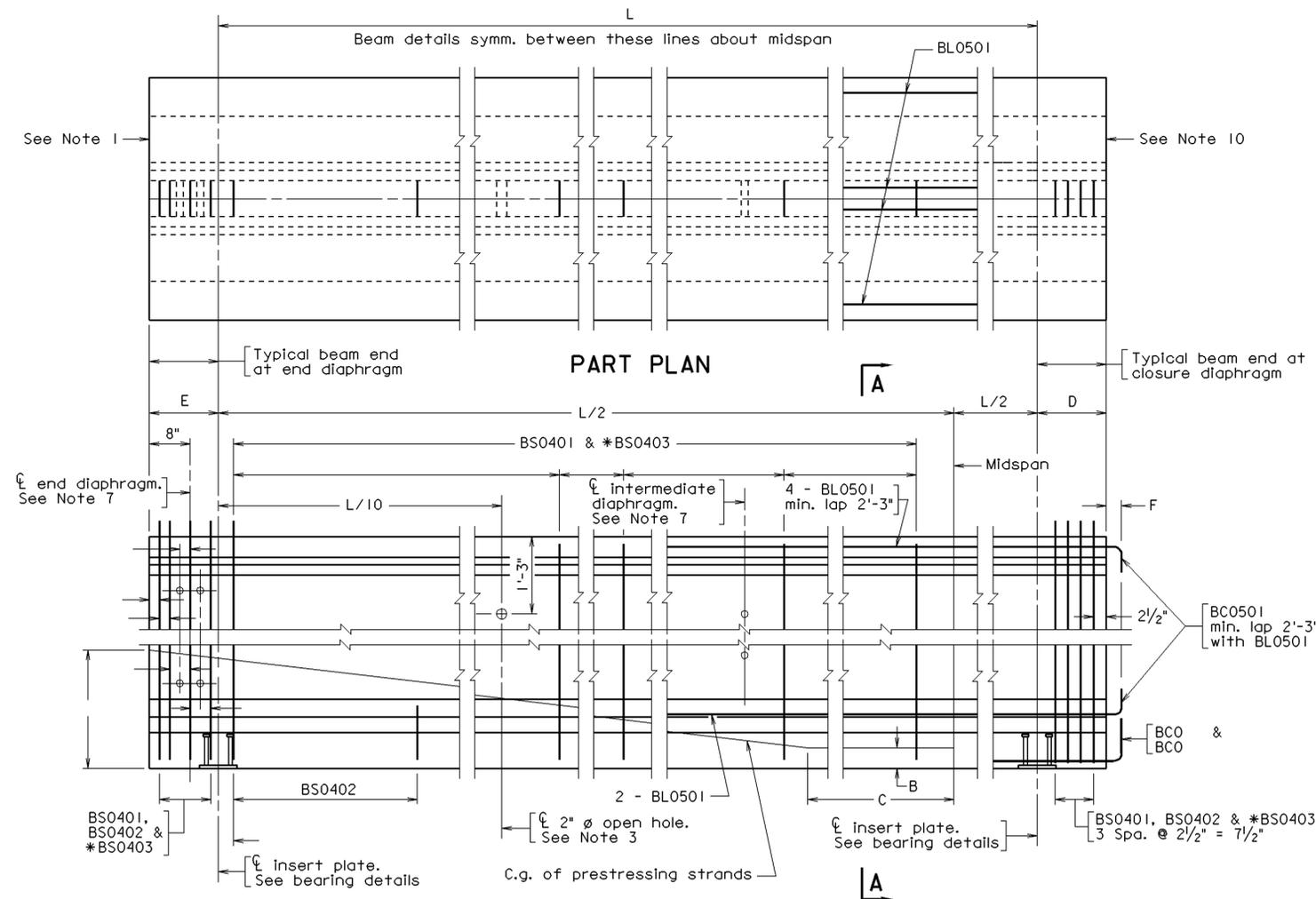
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-69S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-69S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

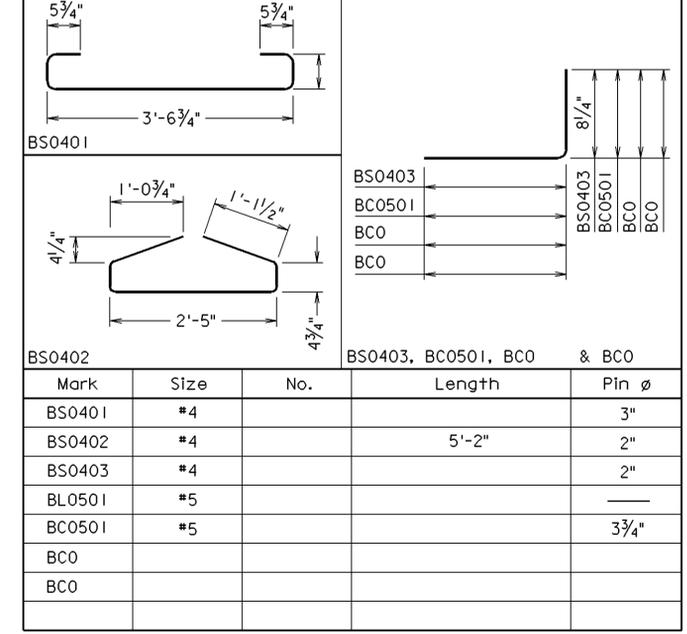
$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE

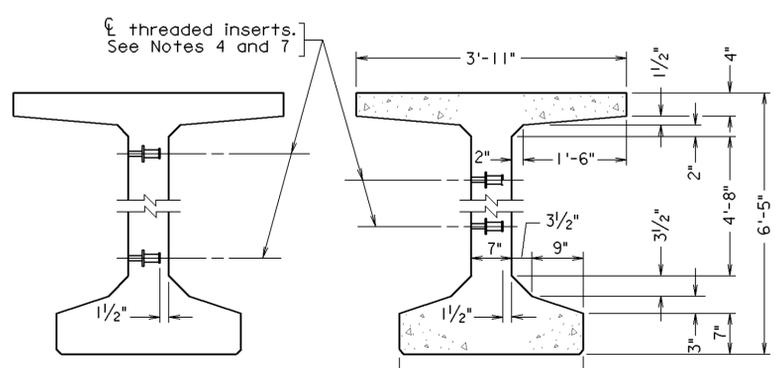


Dimensions in bending diagram are out-to-out of bars.

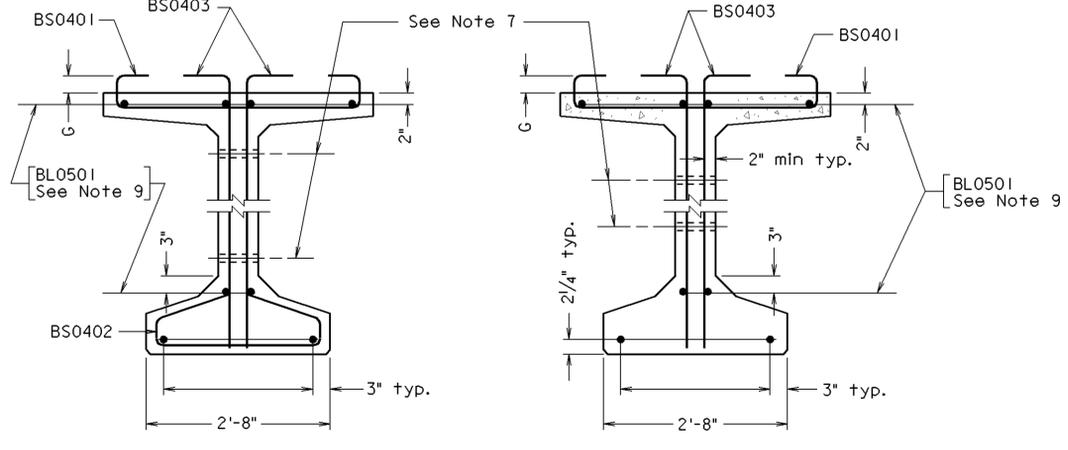
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



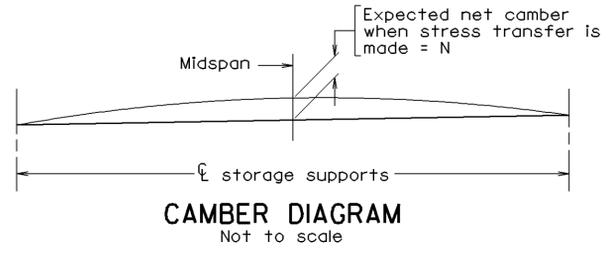
END VIEW SECTION A-A EXTERIOR BEAM



END VIEW SECTION A-A INTERIOR BEAM

For dimensions not shown, see Exterior Beam

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 77" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

07-25-01 PCBT-77C

**PRESTRESSED CONCRETE BEAM  
PCBT-77 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 77" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-77C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-77C

**PRESTRESSED CONCRETE BEAM  
PCBT-77 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

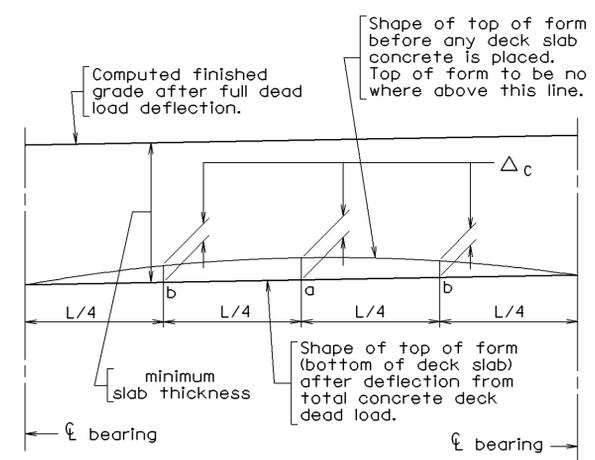
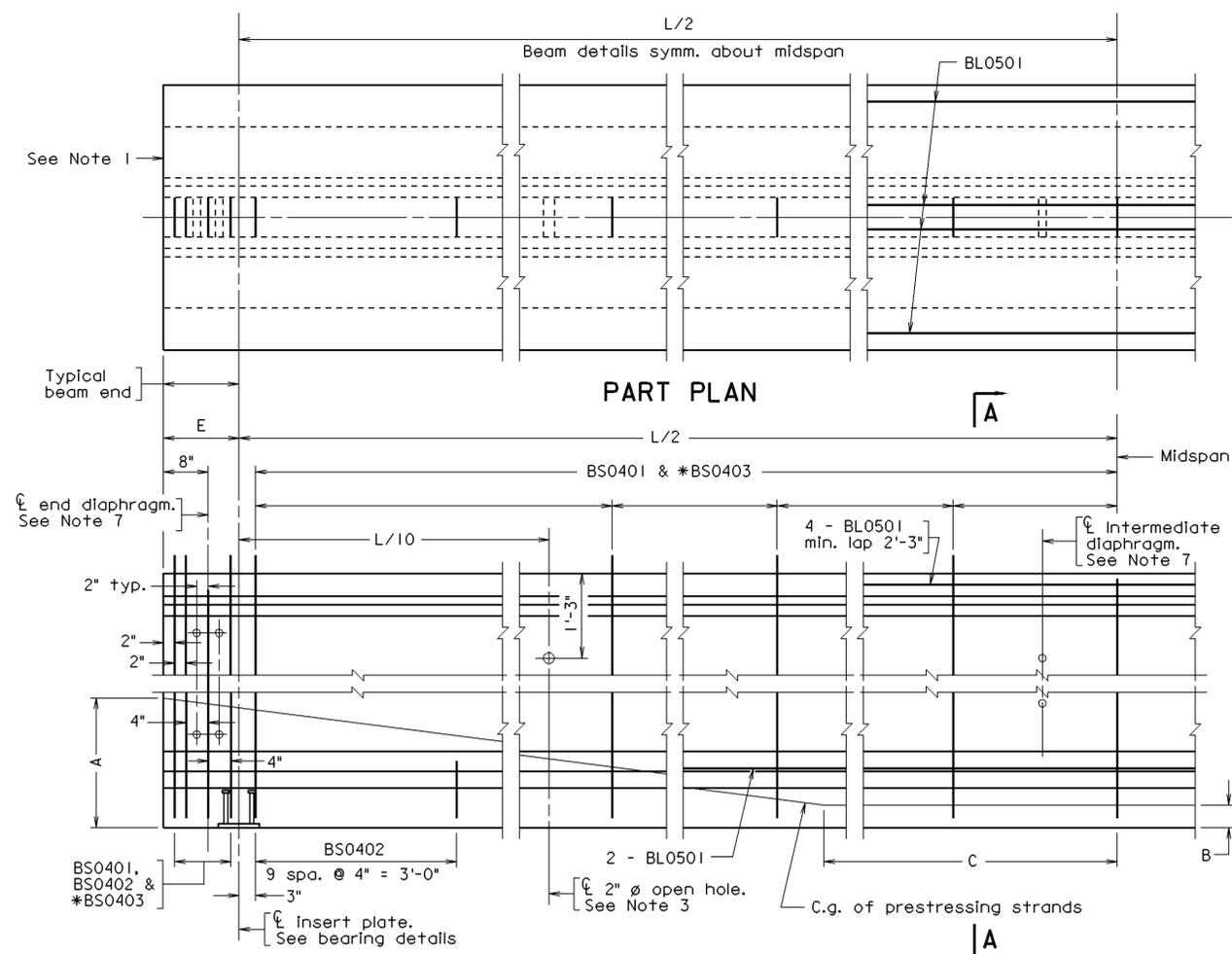
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-77C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-77C

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_c$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

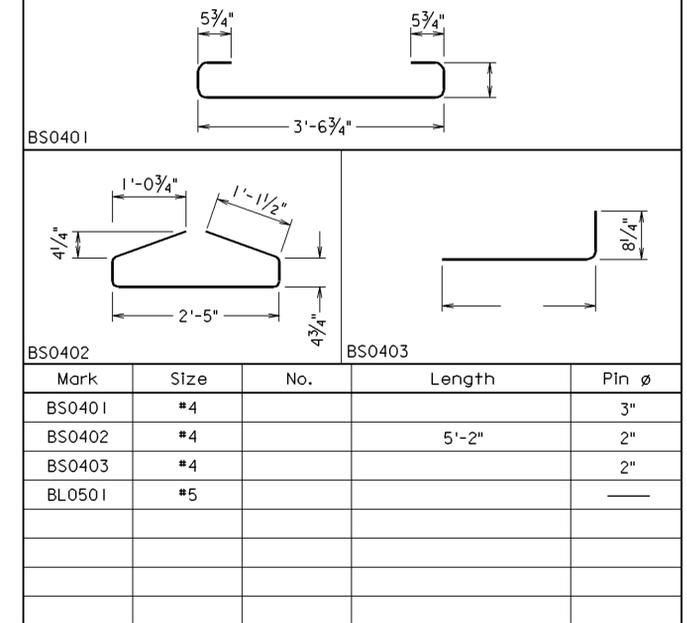
$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE



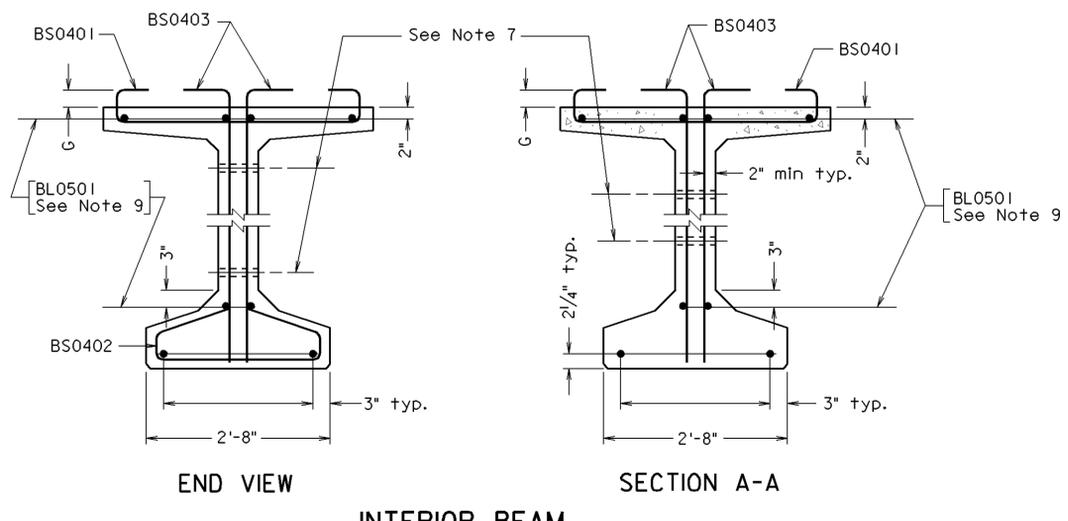
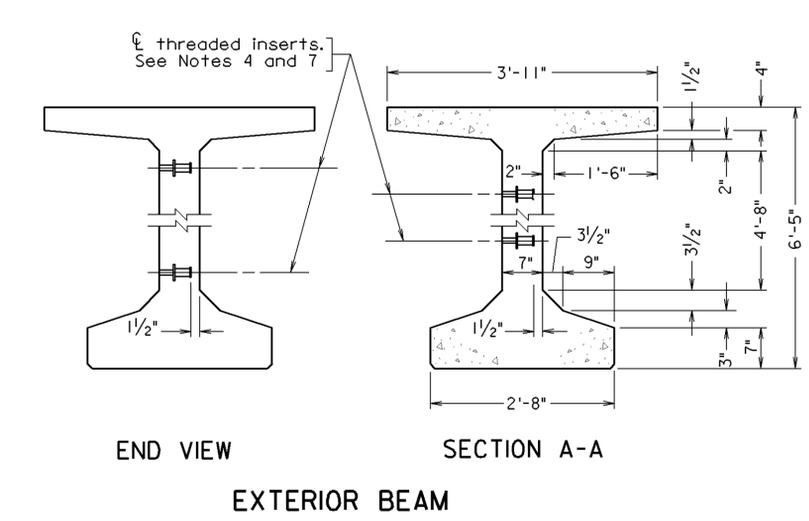
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

Dimensions in bending diagram are out-to-out of bars.

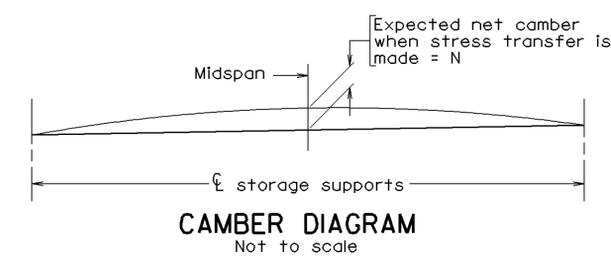
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



INTERIOR BEAM  
 For dimensions not shown, see Exterior Beam



Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.

COMMONWEALTH OF VIRGINIA  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURE AND BRIDGE DIVISION

**PRESTRESSED CONCRETE BULB-T  
 77" DEPTH**

No.	Description	Date	Designed: .....	Date	Plan No.	Sheet No.
			Checked: .....			
	Revisions					

07-25-01 PCBT-77S

**PRESTRESSED CONCRETE BEAM  
PCBT-77 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 77" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-77S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
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**PRESTRESSED CONCRETE BEAM  
PCBT-77 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

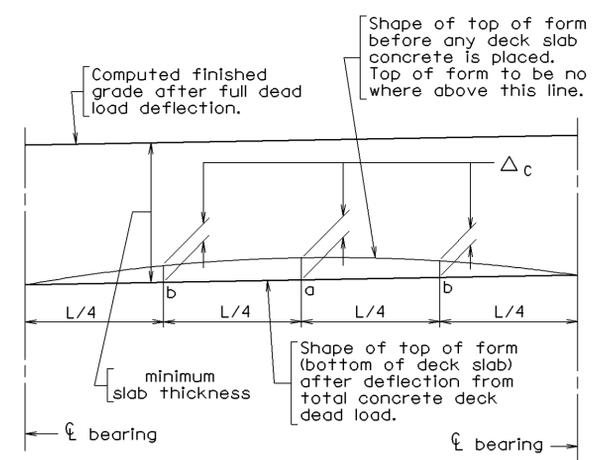
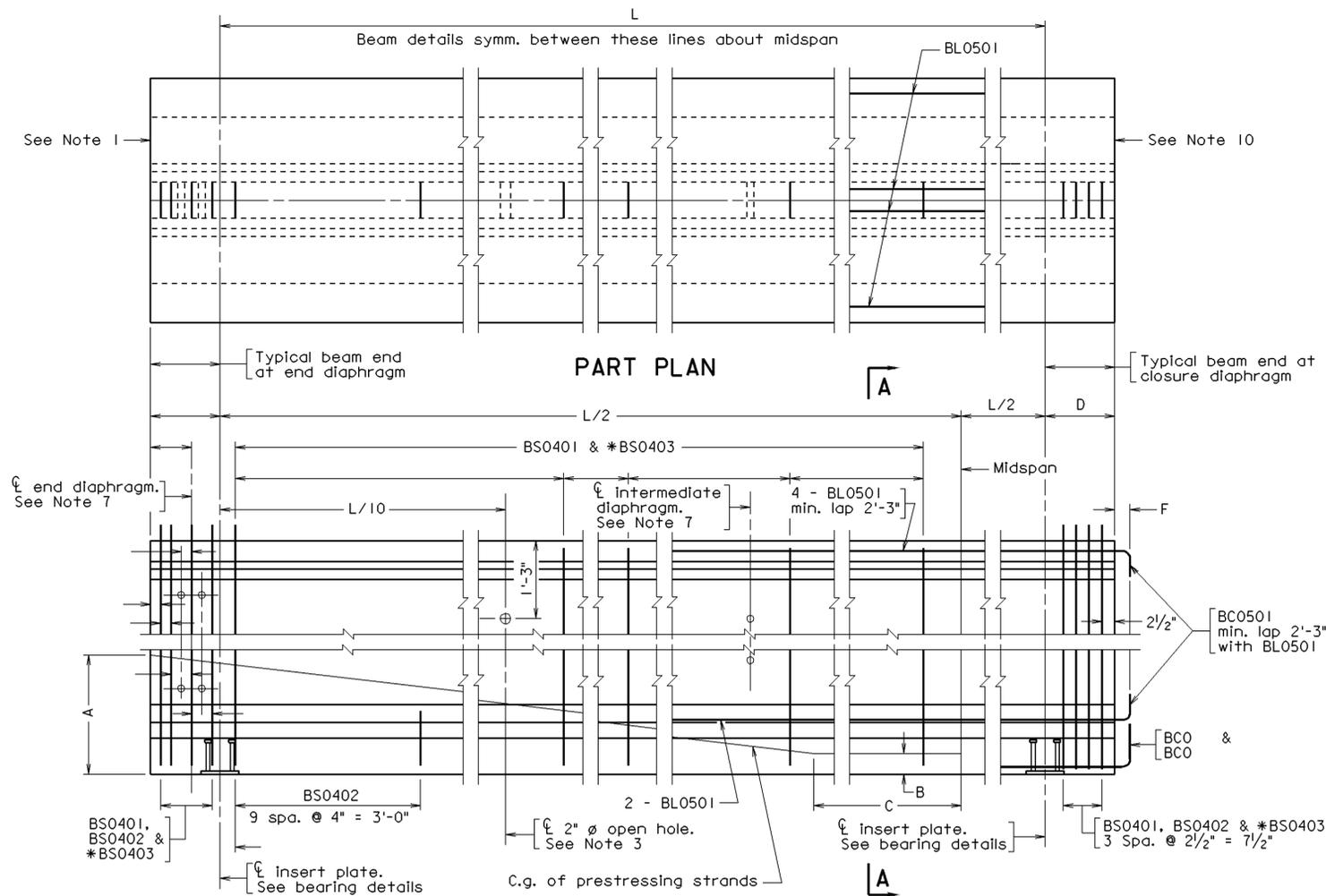
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-77S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-77S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE

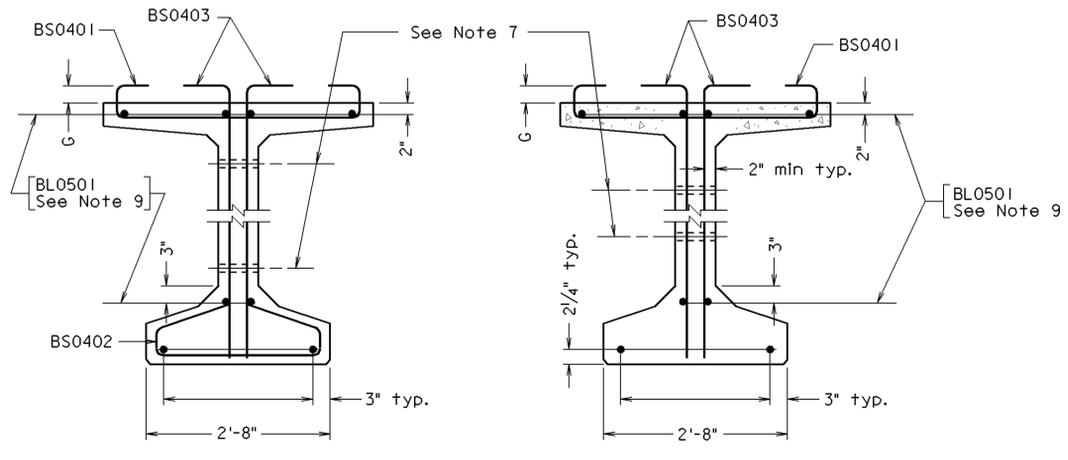
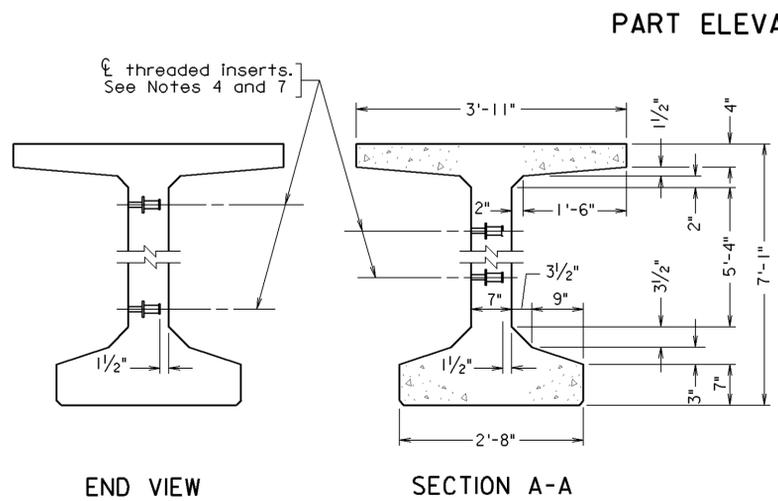
BS0401				
BS0402				
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			
BC0501	#5			3 3/4"
BC0				
BC0				

Dimensions in bending diagram are out-to-out of bars.

Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

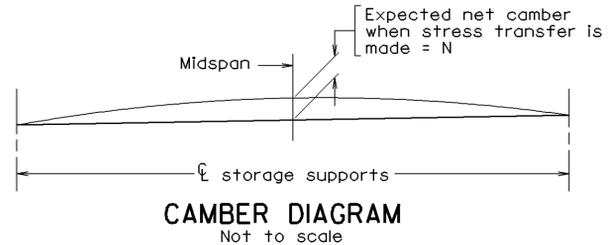
\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



For dimensions not shown, see Exterior Beam

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 85" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions		Checked: .....			Sheet No.

07-25-01 PCBT-85C

**PRESTRESSED CONCRETE BEAM  
PCBT-85 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 85" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-85C: NOTES TO DESIGNER**

VOL. V - PART 4  
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**PRESTRESSED CONCRETE BEAM  
PCBT-85 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

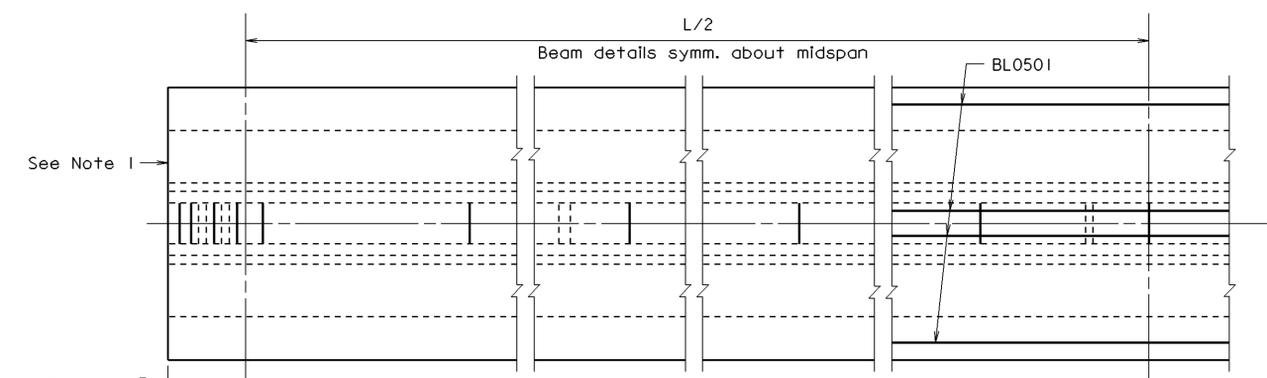
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-85C: NOTES TO DESIGNER**

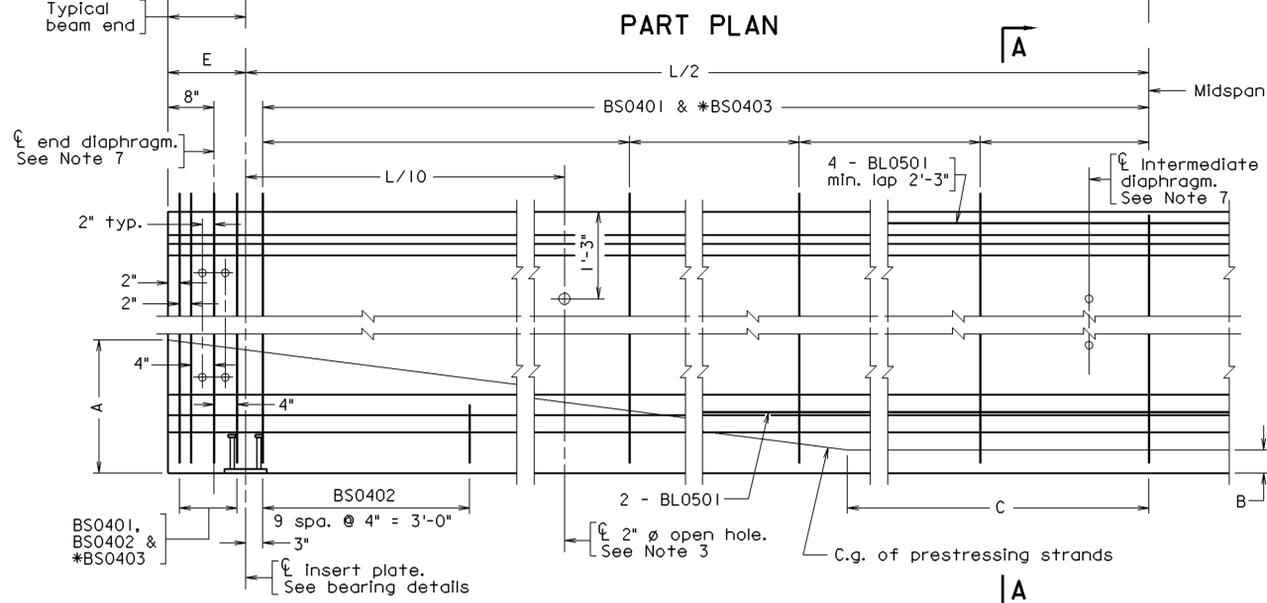
VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-85C

Notes:

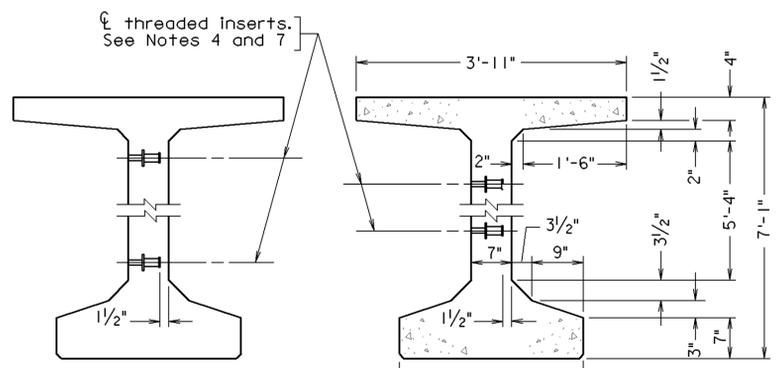
- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.



PART PLAN



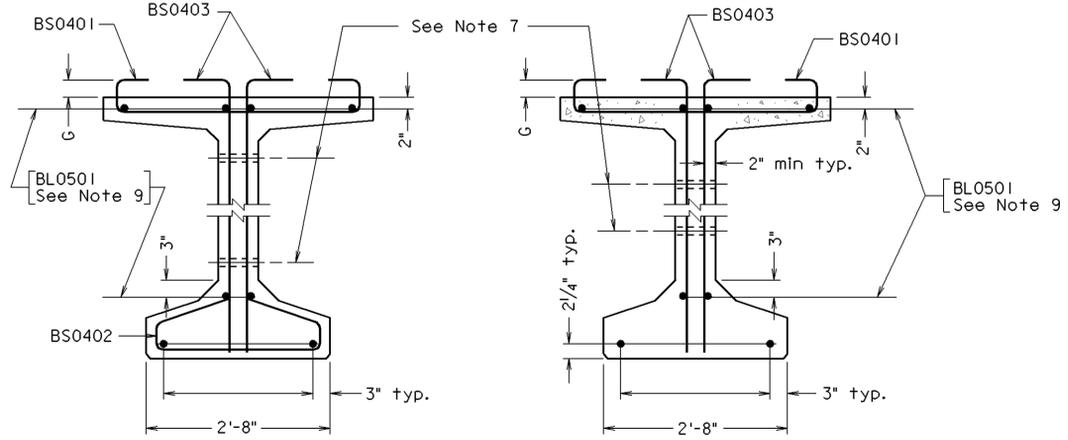
PART ELEVATION



END VIEW

SECTION A-A

EXTERIOR BEAM

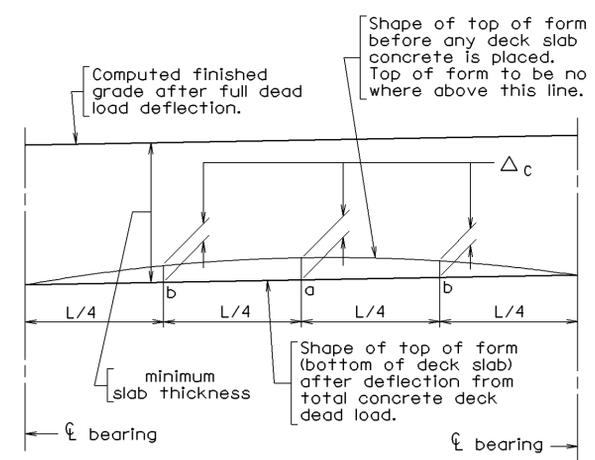


END VIEW

SECTION A-A

INTERIOR BEAM

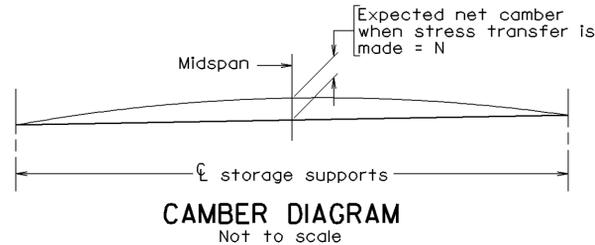
For dimensions not shown, see Exterior Beam



DEAD LOAD DEFLECTION DIAGRAM

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	E in.	G in.	L ft.-in.



CAMBER DIAGRAM  
Not to scale

Mark	Size	No.	Length	Pin $\phi$
BS0401	#4		3'-6 3/4"	3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			

Dimensions in bending diagram are out-to-out of bars.  
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.  
\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.  
Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
PRESTRESSED CONCRETE BULB-T 85" DEPTH					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

07-25-01 PCBT-85S

**PRESTRESSED CONCRETE BEAM  
PCBT-85 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 85" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-85S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-85S

**PRESTRESSED CONCRETE BEAM  
PCBT-85 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

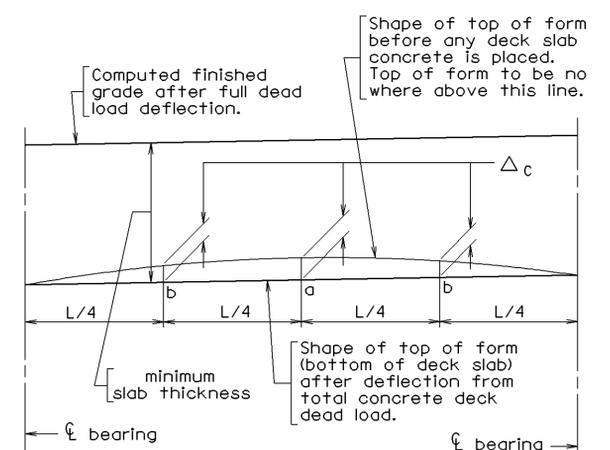
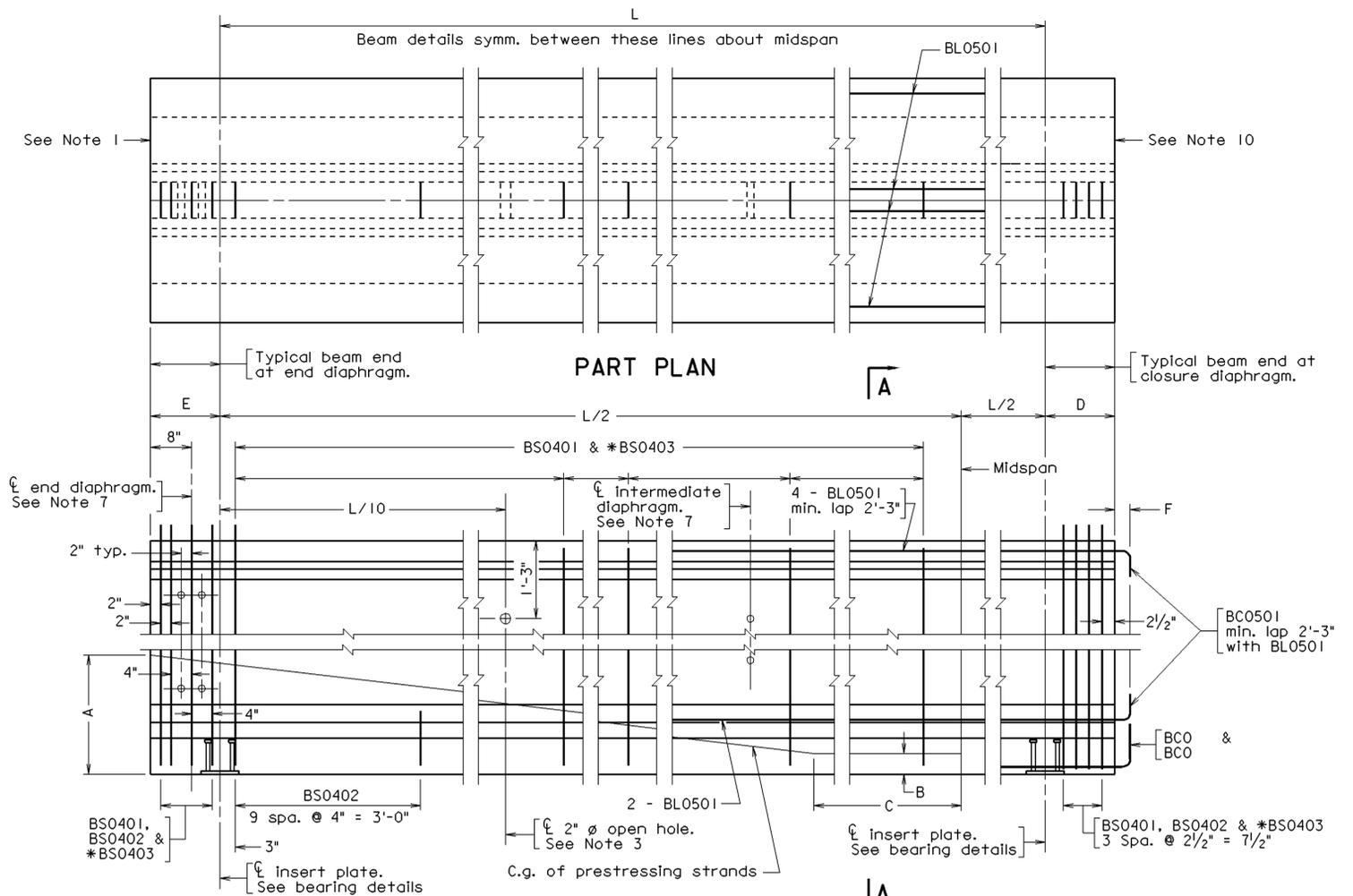
**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-85S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-85S

Notes:

- At beam ends use 1" deep recesses around local strand groups with 2" minimum edge clearances and fill with pneumatically applied mortar immediately after clipping strands. An approved epoxy mortar covering the ends of strands with a minimum thickness of 1/8" may be used as an alternate. Strands should be cool before mortar is applied. After mortar is allowed to cure, the entire end of beam shall be covered with epoxy type EP-3T.
- For reinforcing steel, prestressing strands and dimensions not shown in the exterior beam, see interior beam.
- Beams shall have 2"  $\phi$  open holes formed with nonrigid tubing only on stream crossings. Holes may be slightly shifted to clear reinforcing bars and strands.
- Threaded Insert, when embedded shall develop full strength of 7/8"  $\phi$  threaded bolt (ASTM A307).
- All prestressing strands shall be low-relaxation, grade 270K and uncoated.
- For details of Insert plate, see sheet .
- 1/2"  $\phi$  open holes formed with non-rigid tubing or threaded inserts. For location of end and intermediate diaphragms, see Erection Diagram on sheet . For location of holes and inserts for end diaphragms and intermediate diaphragms, see sheet .
- The Contractor, after written approval from the Engineer, may use different prestressing strand arrangement provided that the total prestressing force and its c.g. are the same as shown on the plans.
- 2 - 1/2"  $\phi$  strands stressed to 1000 lbs. may be substituted for 2 - #5 bars.
- At closure diaphragm, end strands may project 1" + from beam after clipping. End of beam shall be roughened in accordance with Section 405.05 of the Road and Bridge Specifications.



Adjustment of deck slab forms to correct for dead load deflections shall be made by varying thickness of concrete bolster between slab and beam without alteration of slab thickness. Longitudinal screed should be set above final finished grade by amounts =  $\Delta_{c2}$

$\Delta_{c1}$  = Deflection of beam from dead load of concrete deck slab, bolsters and diaphragms and does not include the deflection of the beam from its own weight.

$\Delta_{c2}$  = Deflection of composite section from dead load (e.g. parapet and curb added after deck is cast).

$\Delta_c = \Delta_{c1} + \Delta_{c2}$

Beam	At a		At b	
	$\Delta_{c1}$	$\Delta_{c2}$	$\Delta_{c1}$	$\Delta_{c2}$

DEAD LOAD DEFLECTION DIAGRAM

REINFORCING STEEL SCHEDULE

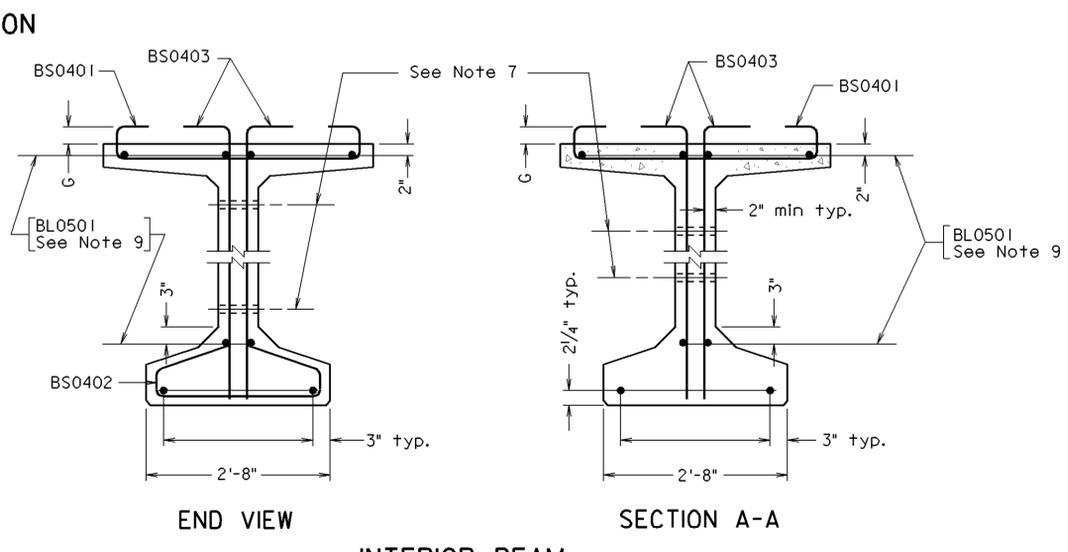
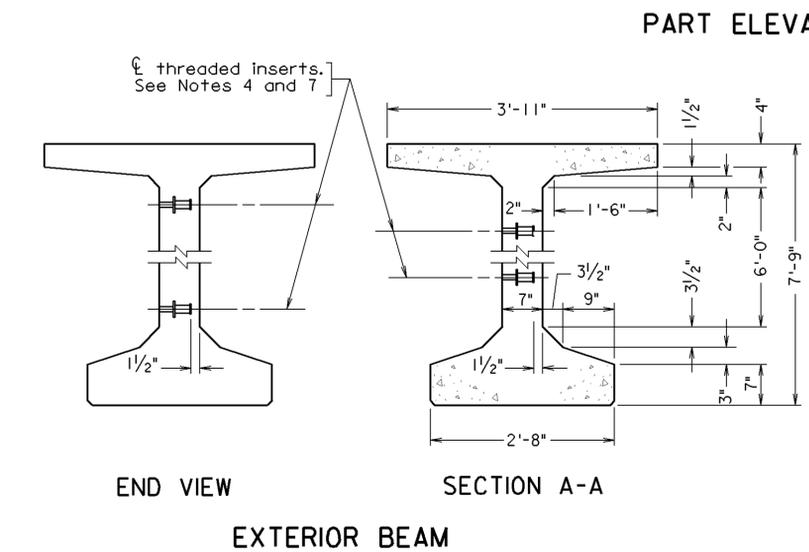
BS0401	BS0403	BC0501	BCO	
BS0402	BS0403, BC0501, BCO & BCO			
Mark	Size	No.	Length	Pin $\phi$
BS0401	#4			3"
BS0402	#4		5'-2"	2"
BS0403	#4			2"
BL0501	#5			
BC0501	#5			3 3/4"
BCO				
BCO				

Dimensions in bending diagram are out-to-out of bars.

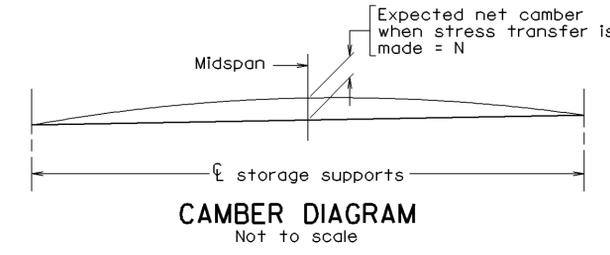
Reinforcing bars shown on the above schedule are for beams shown on this sheet only.

\*BS0401 or BS0403 may be slightly shifted as directed by the Engineer to clear anchorage inserts.

Reinforcing bars BS0401 and BS0403 shall be galvanized. All other reinforcing bars shall be epoxy coated.



Span	Beam	Prestr. force per strand lb.	No. and size of strands/beam	Net camber N in.	A ft.-in.	B in.	C ft.-in.	D in.	E in.	F in.	G in.	L ft.-in.



CAMBER DIAGRAM Not to scale

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BULB-T 93" DEPTH</b>					
No.	Description	Date	Designed: .....	Date	Plan No.
Revisions			Checked: .....		Sheet No.

07-25-01  
PCBT-93C

**PRESTRESSED CONCRETE BEAM  
PCBT-93 BULB-T  
CONTINUOUS SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 93" depth, made continuous for composite dead load and live load plus impact.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet. Details are shown for method outlined in August 1969 PCA Engineering Bulletin, "Design of Continuous Highway Bridges with Precast, Prestressed Concrete Girders". Modify details when using Alternate Method recommendations for design and detailing contained in NCHRP Report 322.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Modify as needed for continuity (see Notes to Designer above) or when integral backwalls are used.

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-93C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-93C

**PRESTRESSED CONCRETE BEAM  
PCBT-93 BULB-T  
CONTINUOUS SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DIMENSION TABLE:

Complete table.

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

REINFORCING STEEL SCHEDULE:

Complete dimension, numbers and lengths or rebars in table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-93C: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-93C



**PRESTRESSED CONCRETE BEAM  
PCBT-93 BULB-T  
SIMPLE SPAN**

**NOTES TO DESIGNER:**

Standard is to be used for simple spans, prestressed concrete bulb-t's with a 93" depth.

End details (Part Plan) shown for 0° skew. For skews > 0°, use details in the cell library.

PART ELEVATION shows two stud shear connectors (total 4). Designer must check for required number and modify as needed on this sheet and have it agree with the bearing standard sheet.

Vertical stirrup details for the end of beams shown in the PART PLAN and PART ELEVATION of the standard shall meet the minimum requirements of the VDOT Modifications to the AASHTO Standard Specifications for Highway Bridges for pretensioned anchorage zones.

The designer shall ensure that bars BS0401 and BS0403 project beyond the top flange of beam to mid-depth of deck slab when determining the dimensions "G" and "H".

The designer shall coordinate the location of diaphragm inserts and web through holes with that of draped strands to avoid conflicts. Adjust location of diaphragms as may be required.

Cells for modifying the standard are located in pcb.cel. See individual cell designations on "CELLS" sheets.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

PART PLAN:

Modify end detail(s) if required for skew > 0°. Replace beam end shown in PART PLAN with appropriate cell from cell library.

PART ELEVATION:

Complete the vertical stirrup details for end of beams. Modify bar sizes as needed.

END VIEW and SECTION A-A (INTERIOR BEAM):

Complete details for strand pattern (spacings) for both details with low-relaxation strands.

DIMENSION TABLE:

Complete table.

**TENTATIVE  
(27Apr04)**

**STANDARD PCBT-93S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 2 of 3  
FILE NO. PCBT-93S

**PRESTRESSED CONCRETE BEAM  
PCBT-93 BULB-T  
SIMPLE SPAN**

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD (Continued):**

DEAD LOAD DEFLECTION:

Complete table of anticipated dead load deflections using 1/8" increments. Deflection diagram is shown for gradient. For hump or sag vertical curves, replace diagram with cell from library.

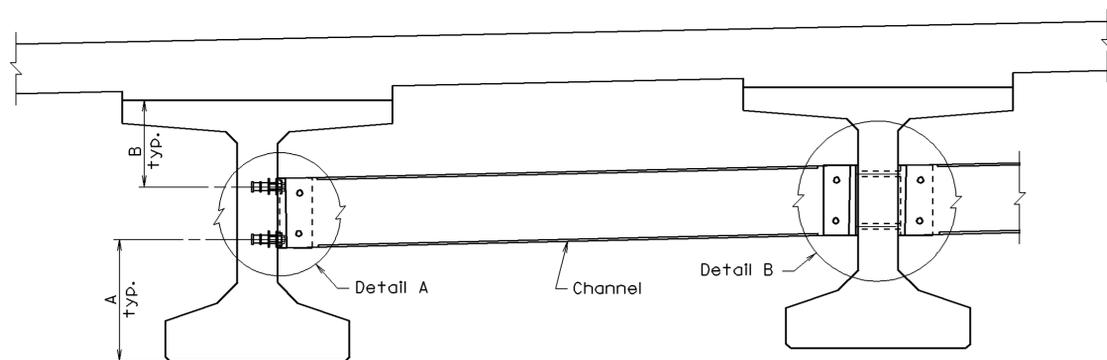
REINFORCING STEEL SCHEDULE:

Complete dimensions, numbers and lengths of rebars in table.

**TENTATIVE  
(27Apr04)**

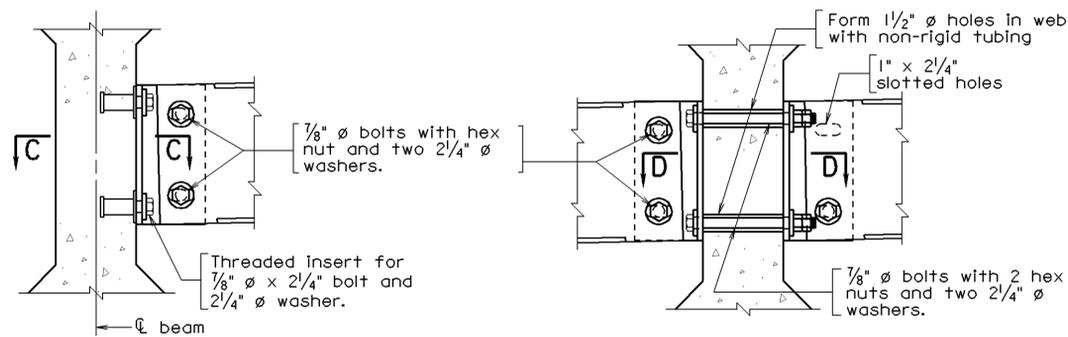
**STANDARD PCBT-93S: NOTES TO DESIGNER**

VOL. V - PART 4  
DATE:  
SHEET 3 of 3  
FILE NO. PCBT-93S



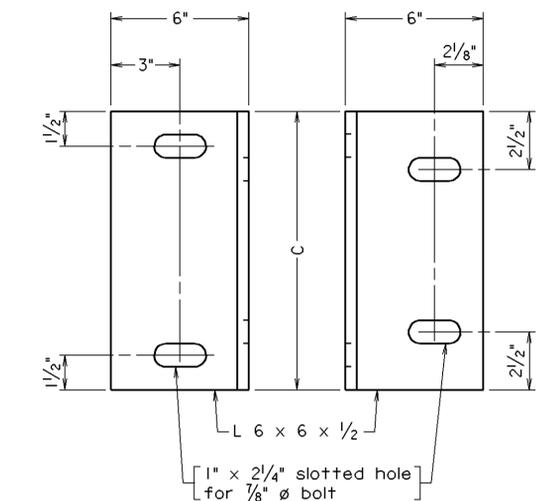
**PART TRANSVERSE SECTION**

Use Detail A at exterior beams and interior beams where line of diaphragms is discontinued at interior beam. Use Detail B at interior beams where line of diaphragms is continuous across the structure.

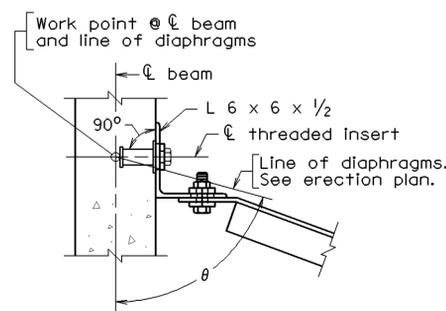


**DETAIL A**

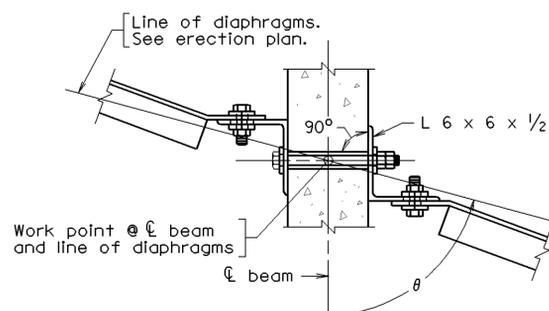
**DETAIL B**



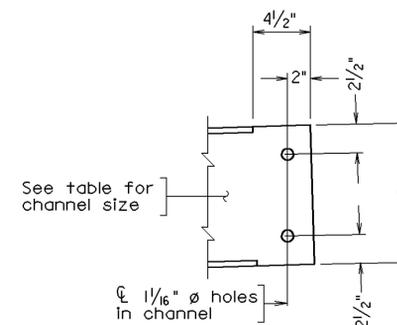
**CONNECTOR PLATE DETAIL**



**SECTION C-C**



**SECTION D-D**



**CHANNEL DETAIL**

BEAM TYPE	A	B	C	CHANNEL SIZE
PCBT-29	1'-3"	9"	8"	MC8x22.8
PCBT-37	1'-5"	11"	12"	C12x20.7
PCBT-45	1'-7 1/2"	1'-1 1/2"	1'-3"	C15x33.9
PCBT-53	1'-11 1/2"	1'-5 1/2"	1'-3"	C15x33.9

**Notes:**

All structural steel shall be ASTM A709, Grade 36.

All bolts shall be 7/8"  $\phi$  H.S. bolts, ASTM 325.

All H.S. bolts shall be tensioned by the turn-of-nut method.

All diaphragm materials including bolts, nuts and washers shall be galvanized.

All threaded inserts shall develop the full strength of the threaded bolts.

Payment for furnishing and installing steel intermediate diaphragms shall be included in the contract unit price for prestressed concrete members.

Skew angle	$\theta$
$\leq 20^\circ$	90°- skew angle
$> 20^\circ$	90°

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
<b>PRESTRESSED CONCRETE BEAM (BULB-T'S PCBT-29 THRU -53) INTERMEDIATE DIAPHRAGM DETAILS</b>					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions					

**PRESTRESSED CONCRETE BEAM  
BULB-T'S  
INTERMEDIATE STEEL DIAPHRAGMS**

**NOTES TO DESIGNER:**

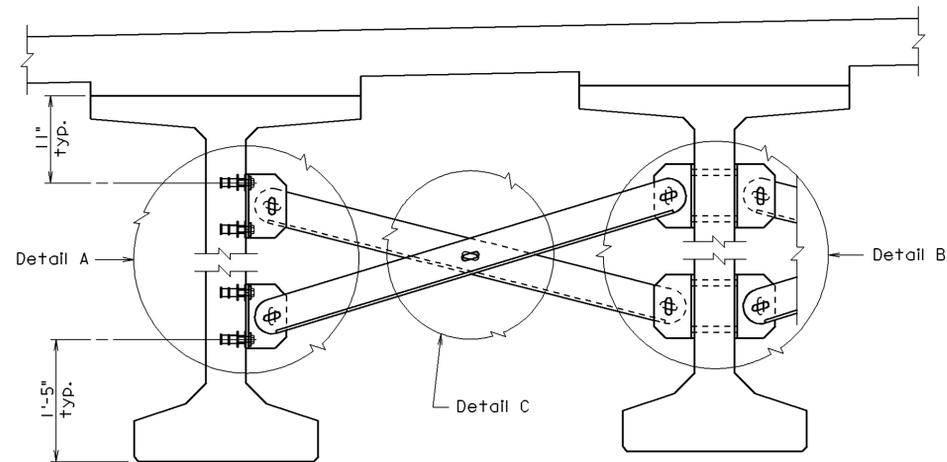
Standard is to be used as an insertable sheet for steel intermediate diaphragms with the Bulb-T standards for depths of 29" through 53" (standards PCBT-29, -37, -45 and -53).

The steel quantity is included in price bid for prestressed concrete beams and should be so noted under the GENERAL NOTES on the front sheet of plans.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

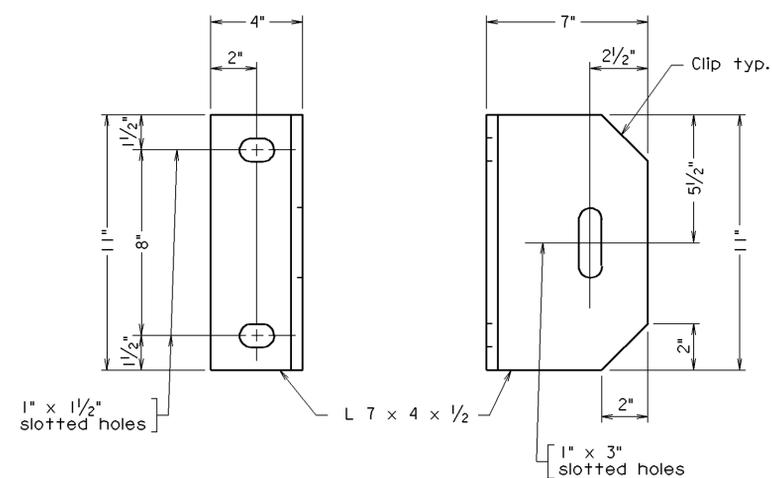
None

FHWA REGION	STATE	FEDERAL AID		STATE		SHEET NO.
		ROUTE	PROJECT	ROUTE	PROJECT	
3	VA.					



**PART TRANSVERSE SECTION AT DIAPHRAGM**

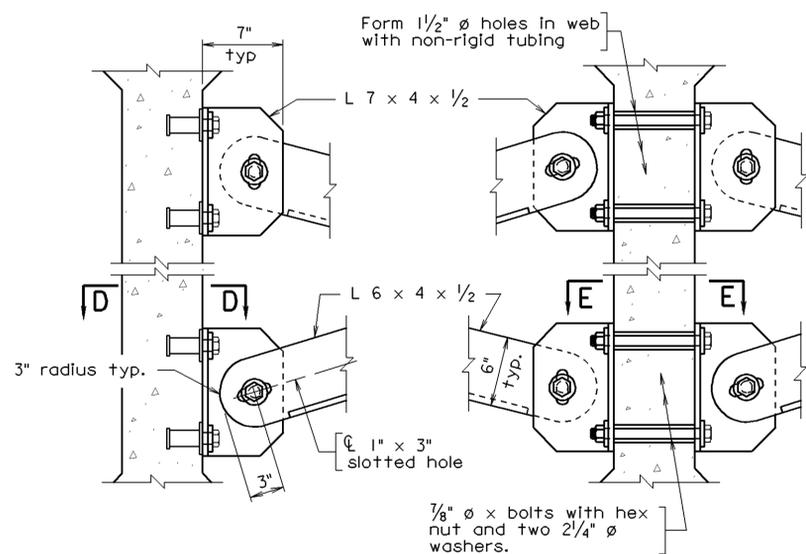
Use Detail A at exterior beams and interior beams where line of diaphragms is discontinued at interior beam. Use Detail B at interior beams where line of diaphragms is continuous across the structure.



**CONNECTOR PLATE DETAIL**

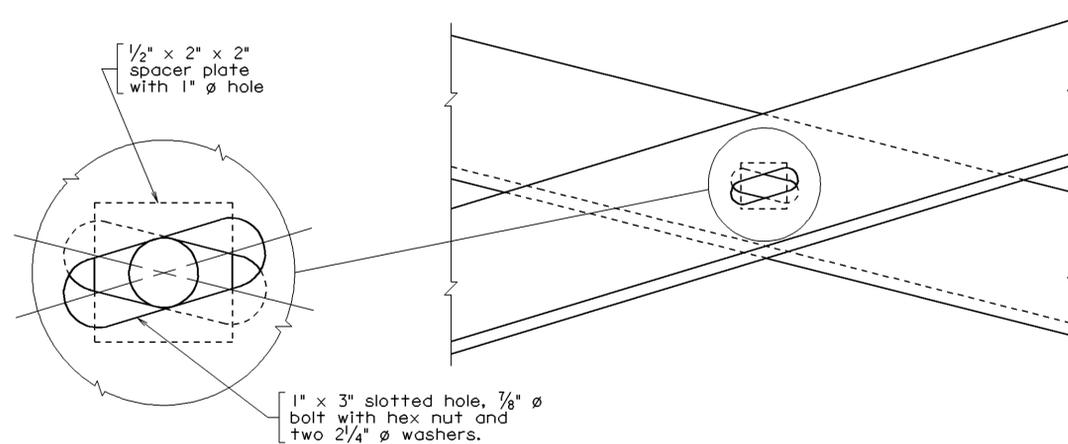
**Notes:**

- All structural steel shall be ASTM A709, Grade 36.
- All bolts shall be 7/8"  $\phi$  H.S. bolts, ASTM 325.
- All H.S. bolts shall be tensioned by the turn-of-nut method.
- All diaphragm materials including bolts, nuts and washers shall be galvanized.
- All threaded inserts shall develop the full strength of the threaded bolts.
- Payment for furnishing and installing steel intermediate diaphragms shall be included in the contract unit price for prestressed concrete members.

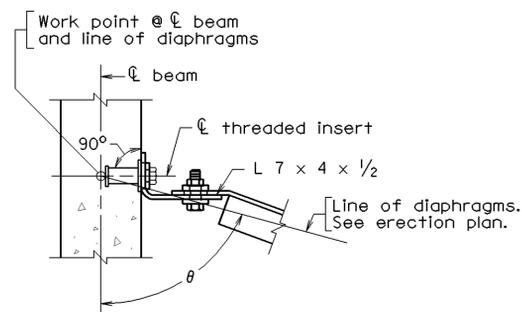


**DETAIL A**

**DETAIL B**

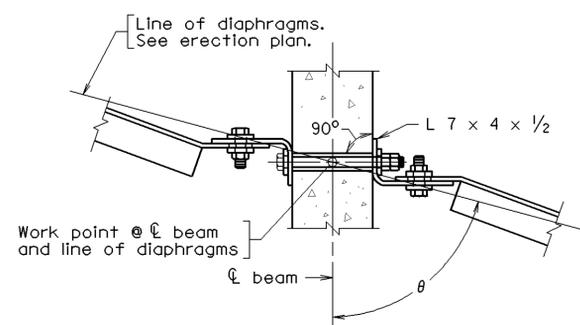


**DETAIL C**



**SECTION D-D**

Skew angle	$\theta$
$< 20^\circ$	90°- skew angle
$> 20^\circ$	90°



**SECTION E-E**

05-07-01

PCBT-D2

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PRESTRESSED CONCRETE BEAM (BULB-T'S PCBT-61 THRU -93) INTERMEDIATE DIAPHRAGM DETAILS					
No.	Description	Date	Designed: S&B, DIV	Date	Plan No.
			Drawn: S&B, DIV		Sheet No.
			Checked: S&B, DIV		
Revisions					

**PRESTRESSED CONCRETE BEAM  
BULB-T'S  
INTERMEDIATE STEEL DIAPHRAGMS**

**NOTES TO DESIGNER:**

Standard is to be used as an insertable sheet for steel intermediate diaphragms with the Bulb-T standards for depths of 61" through 93" (standards PCBT-61, -69, -77, -85 and -93).

The steel quantity is included in price bid for prestressed concrete beams and should be so noted under the GENERAL NOTES on the front sheet of plans.

**ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:**

None