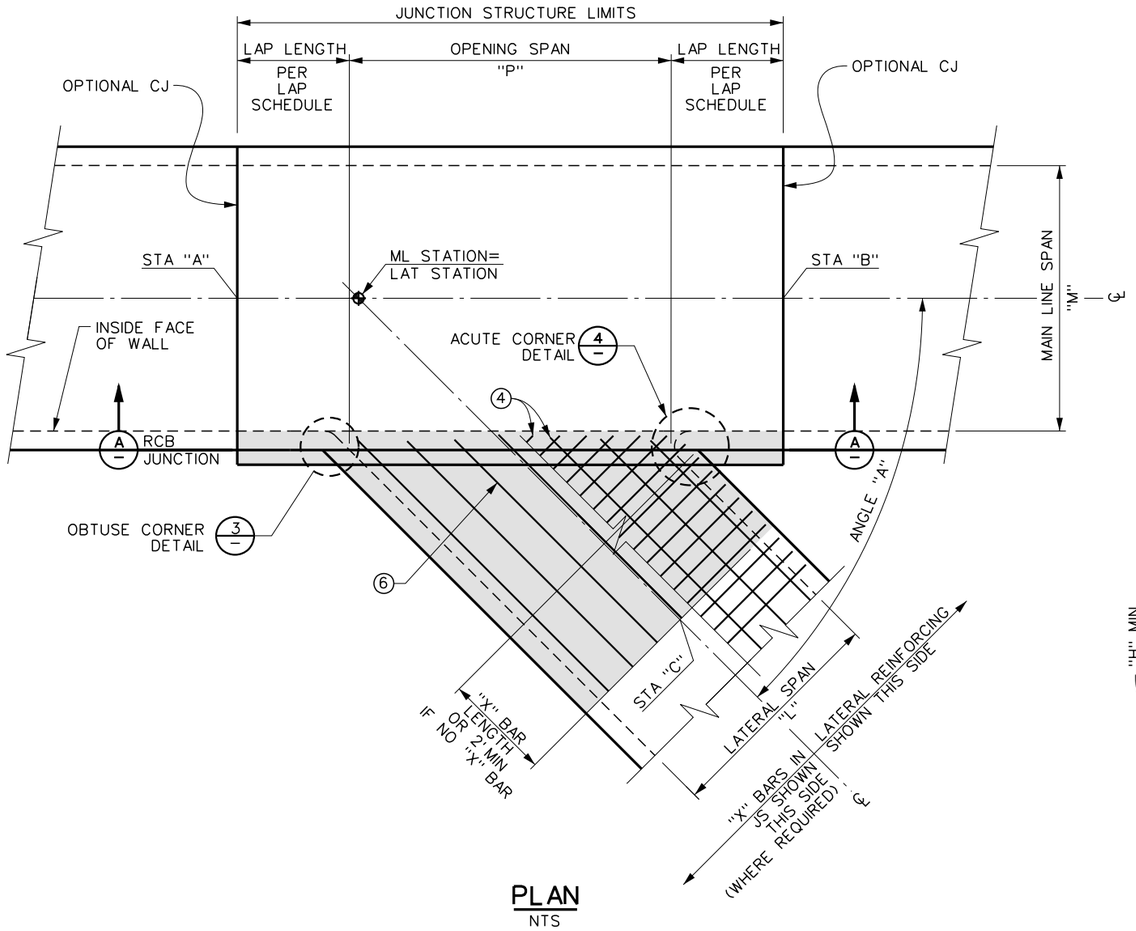
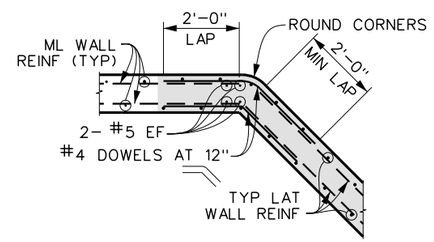
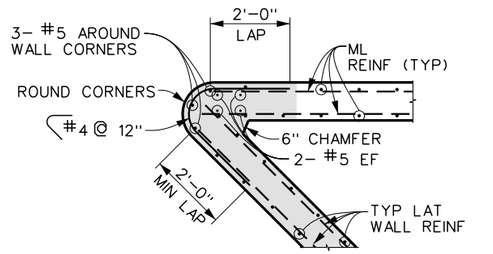


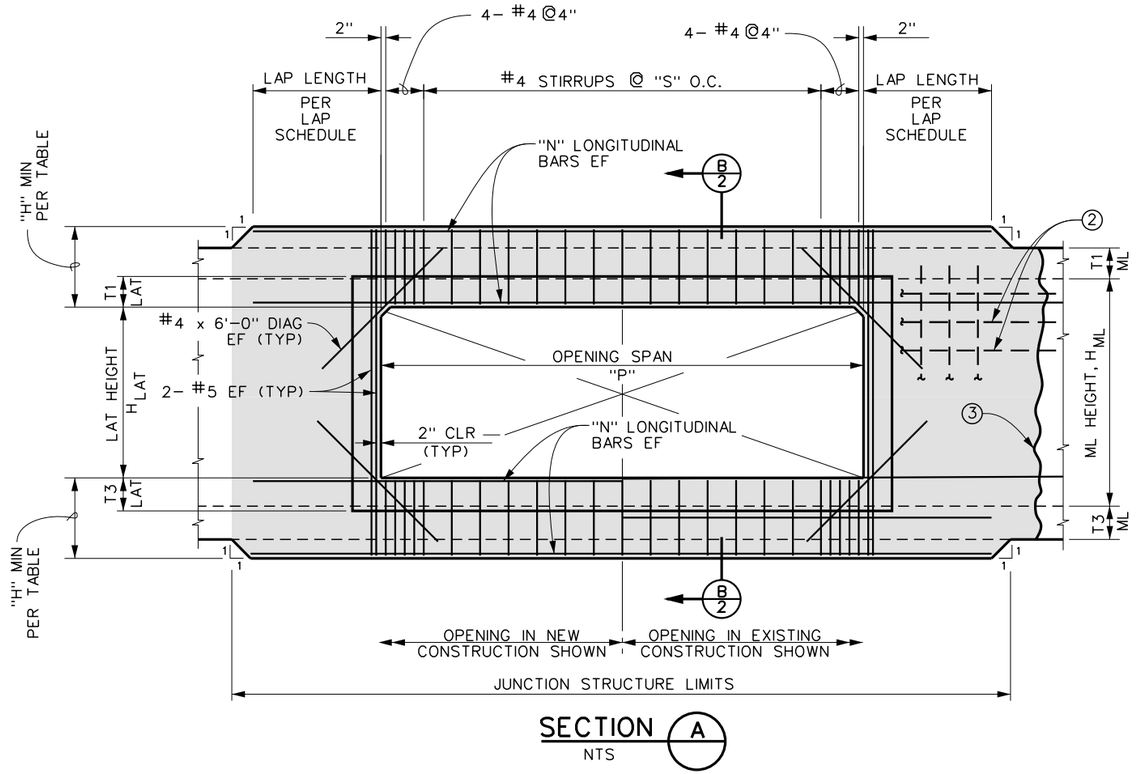

PLAN
NTS




DETAIL 3
OBTUSE WALL CORNER
NTS




DETAIL 4
ACUTE WALL CORNER
NTS




SECTION A
NTS

## NOTES:

1. FOR INSTRUCTION ON USE OF THIS STANDARD, GENERAL NOTES AND DESIGN TABLES, SEE SHEET 3. VARIABLES B, H, N AND S PROVIDED IN TABLES A, B, OR C ON SHEET 3. DESIGN CASE SHALL BE SHOWN ON PLANS.

(2) PROTECT EXISTING REINFORCING. NOT ALL REINFORCING SHOWN. ANY BARS EXPOSED SHALL HAVE CONCRETE REMOVED TO 1". CONTINUE EXISTING LONGITUDINAL WALL STEEL THROUGH LAP LENGTH SHOWN.

(3) ROUGHEN SURFACE TO APPROXIMATE 1/4" AMPLITUDE. SURFACE SHALL BE CLEANED AND FREE OF LAITANCE.

(4) CUT LATERAL REINFORCING WHERE INTERSECTS WITH INSIDE OF MAINLINE RCB WALL, MAINTAIN 1 1/2" CLEAR FROM INSIDE FACE.

5. ABBREVIATIONS SHALL BE AS DEFINED:

| | |
|---|---|
| ML | MAIN LINE |
| LAT | LATERAL |
| T1 | DECK THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS |
| T3 | INVERT THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS |

(6) "X" BAR, SEE TABLE ON SHEET 3 AND DETAIL 1 ON SHEET 2.

f'c = 3,600 PSI
Fy = 60,000 PSI

| BAR SIZE | ALL BARS |
|---|---|
| #3 | 1'-1" |
| #4 | 1'-6" |
| #5 | 1'-9" |
| #6 | 2'-2" |
| #7 | 2'-10" |
| #8 | 3'-8" |
| #9 | 4'-8" |
| #10 | 5'-11" |
| #11 | 7'-3" |

LAP SCHEDULE

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REGISTERED PROFESSIONAL ENGINEER CHAD W. HARDEN No. 55232 STRUCTURAL STATE OF CALIFORNIA

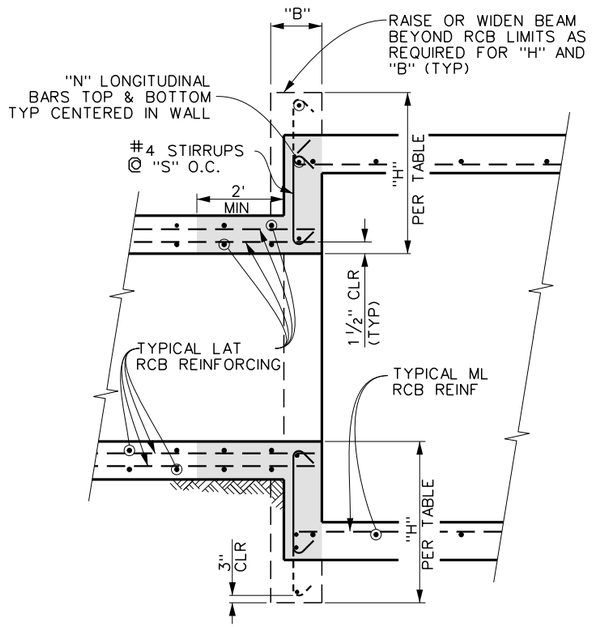
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: _____ GENERAL MANAGER-CHIEF ENGINEER
DATE: 08/2015 R.C.E. NO. 59795

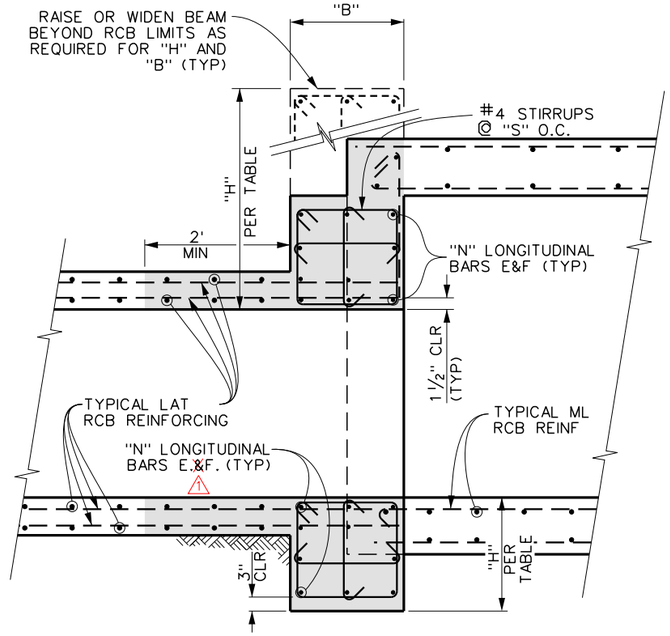
APPROVED BY: _____ CHIEF, DESIGN & CONSTRUCTION
DATE: 08/2015 R.C.E. NO. 70355

# JUNCTION STRUCTURE NO. 5

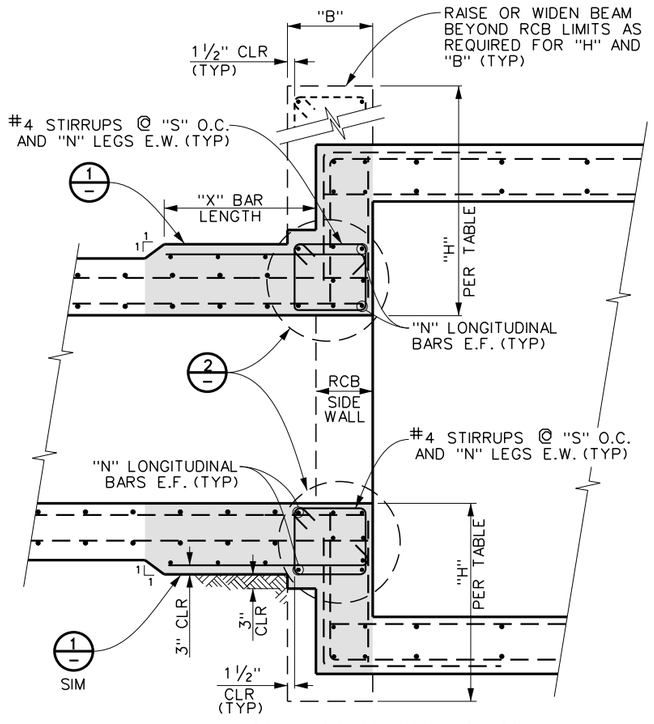
STANDARD DRAWING NUMBER JS230
SHEET 1 OF 3



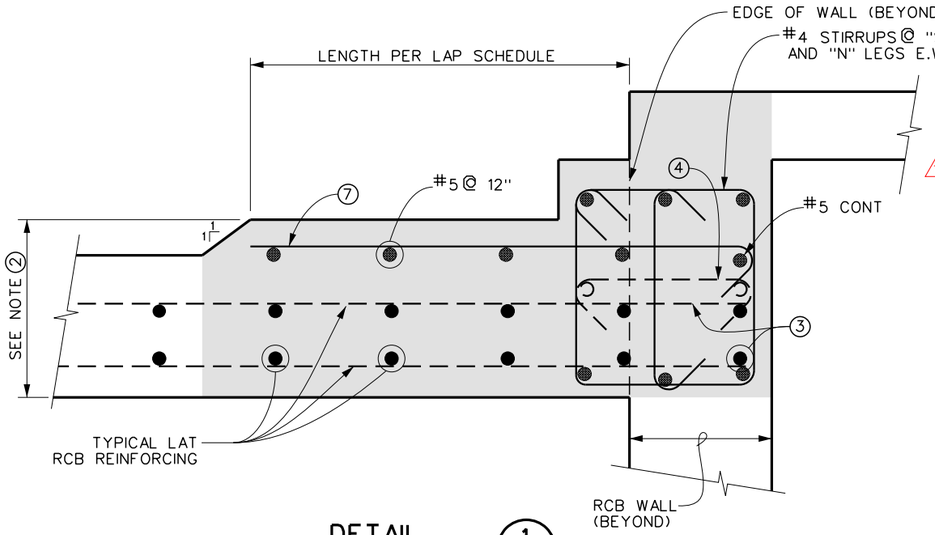

N=1, WITHOUT "X" BARS
NTS




N>1, WITHOUT "X" BARS
NTS




N>1, WITH "X" BARS
NTS




DETAIL 1
THICKENED DECK/INVERT
NTS

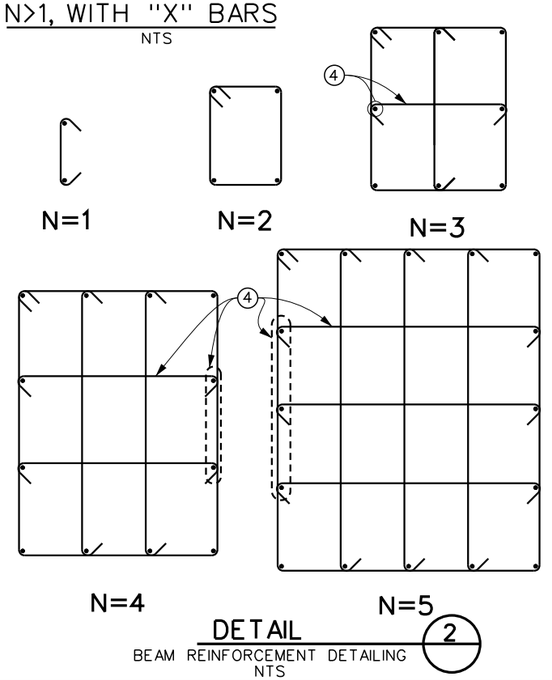
TYPICAL SECTION B 1
BEAM SECTION
SEE NOTE 5
NTS

## NOTES:

1. VARIABLES B, H, N AND S PROVIDED IN TABLES A, B OR C ON SHEET 3. N IS THE BAR CONFIGURATION PER DETAIL 2 HEREON, THE SIZE OF BARS IS PER THE TABLES ON SHEET 3.
2. DEPTH OF THICKENED SLAB SHALL MATCH THE MAIN LINE DECK OR INVERT, WHICHEVER IS GREATER.
3. CUT LATERAL REINFORCING OF MAINLINE RCB WALL TO MAINTAIN 1½" CLEAR FROM INSIDE FACE.
4. OMIT HORIZONTAL TIES AND BARS WHERE TIE IS WITHIN LATERAL SLAB, INVERT OR THICKENED EDGE.
5. SAMPLE CONFIGURATIONS OF LATERAL, MAIN LINE AND JUNCTION STRUCTURE GEOMETRIES ARE SHOWN. PLEASE NOTE THE POSITION OF THE LATERAL TO THE MAINLINE MAY VARY, SUCH AS MATCHING OR OFFSET INVERT ELEVATIONS, AND MATCHING OR OFFSET TOP SLAB ELEVATIONS. REINFORCING STEEL SHOP DRAWINGS SHOWING SPECIFIC GEOMETRY AND REINFORCING SHALL BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL.
6. ABBREVIATIONS SHALL BE AS DEFINED:

| | |
|---|---|
| ML | MAIN LINE |
| LAT | LATERAL |
| T1 | DECK THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS |
| T3 | INVERT THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS |

7. "X" BAR, SEE TABLE ON SHEET 3 AND DETAIL 1.




DETAIL 2
BEAM REINFORCEMENT DETAILING
NTS

| REVISIONS | | | |
|---|---|---|---|
| ⚠ | CORRECT TYPO: ADD TEXT TO NOTE 1 ON SHEET 2 OF 3 | CP | 7/2020 |
| REF. | DESCRIPTION | APPR. | DATE |

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: _____ GENERAL MANAGER-CHIEF ENGINEER
DATE: 08/2015 R.C.E. NO. 59795

APPROVED BY: _____ CHIEF, DESIGN & CONSTRUCTION
DATE: 08/2015 R.C.E. NO. 70355

# JUNCTION STRUCTURE NO. 5

STANDARD DRAWING NUMBER JS230
SHEET 2 OF 3

## DESIGN NOTES

DESIGN SPECIFICATIONS:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2012 (SIXTH EDITION) WITH CALIFORNIA AMENDMENTS (AASHTO-CA BDS-6)

LOADING:
LIVE LOAD: (AASHTO LRFD 3.6.1.2)
HL-93 CONSISTS OF DESIGN TRUCK OR DESIGN TANDEM AND DESIGN LANE LOAD.

IMPACT FACTOR: (APPLY TO ROOF SLAB ONLY)
IM = 33(1.0-0.125DE) = 33 at 2-FT Fill, 0 OTHERWISE (AASHTO LRFD 3.6.2.2)
DE = MINIMUM DEPTH OF EARTH COVER

EARTH LOAD:
VERTICAL EARTH PRESSURE: 140 pcf

LOAD FACTORS:
AASHTO LRFD TABLE 3.4.1.1 & TABLE 3.4.1.2
STRENGTH I: U=1.35 (DC+EV) + 1.75 (LL+IM+LS)
STRENGHT IV: U=1.50(DC+EV)

STRENGTH REDUCTION FACTORS:
Ø = 0.90 SHEAR & MOMENT

UNIT STRESSES:
f'c = 3,600 psi
fy = 60,000 psi

SHEAR:

$V_c = (0.0676\sqrt{f_c'} + 4.6 \frac{A_s}{b d_e} \frac{V_u d_e}{M_u}) \; b \times d_e$ (Kips)

$V_c \leq 0.126\sqrt{f_c'} b \times d_e$ (Kips)

$V_c$ SHALL NOT BE LESS THAN $0.0948\sqrt{f_c'} b \times d_e$ FOR FRAME MEMBERS AND $0.0791\sqrt{f_c'} b \times d_e$ FOR SIMPLY SUPPORTED MEMBERS.

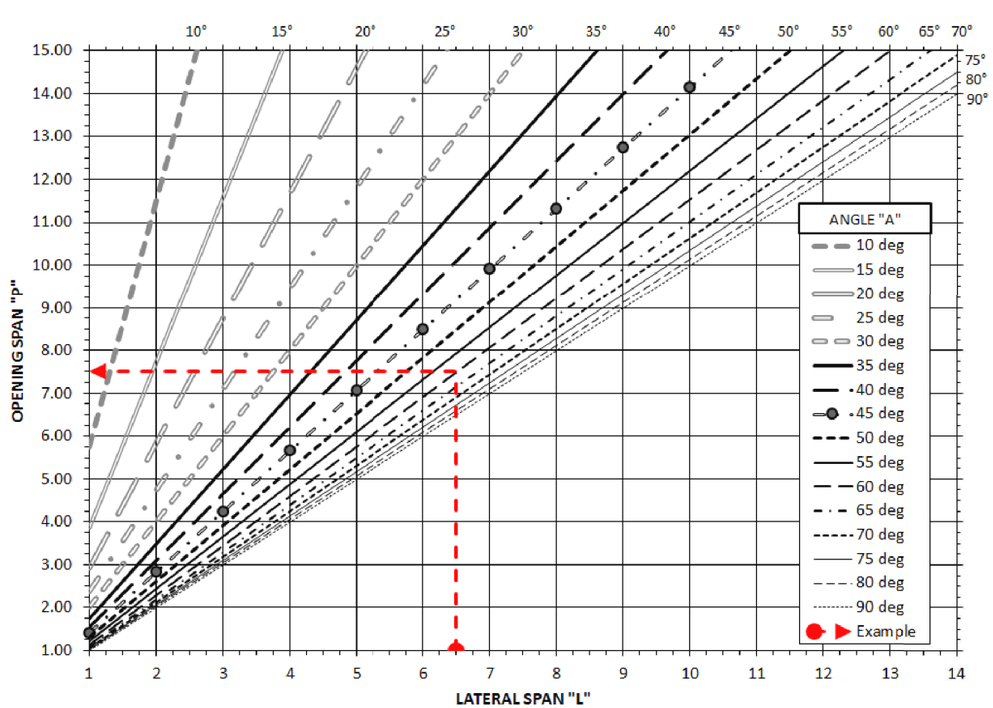
## STRUCTURAL GENERAL NOTES

1. VERIFY ALL DIMENSIONS AND JOB SITE CONDITIONS PRIOR TO THE FABRICATION OF ANY MATERIAL.
2. THESE NOTES AND DETAILS ARE INTENDED TO WORK WITH CALTRANS STANDARD PLANS D80, D81 AND D82 BUT MAY BE USED FOR OTHER RCB DESIGNS AND GEOMETRIES UPON APPROVAL FROM THE PROJECT ENGINEER OF RECORD, AND AS REFERENCED BY PROJECT DRAWINGS.
3. THE PROJECT ENGINEER OF RECORD IS RESPONSIBLE FOR CHECKING THE PROPOSED IMPROVEMENTS ARE WITHIN THE DESIGN LIMITATIONS AND VARIABLES PRESENTED HEREIN.

## STANDARD DRAWINGS NOTES FOR DESIGN TABLES

1. FOR DEFINITION OF LATERAL SPAN ("L") AND SKEW ("A") AS USED IN THE FOLLOWING NOMOGRAPH, SEE PLAN ON SHEET 1 HERON.
2. THE ENGINEER SHALL SPECIFY THE CONSTRUCTION CONDITION BY DESIGN COVER (TABLE A, B, OR C) AND MAXIMUM MAIN LINE SPAN ("M") AND OPENING SPAN ("P").
   EXAMPLE
   MAIN LINE SPAN, ("M")=9'-0", EARTH COVER=8'-0",
   OPENING SPAN ("P")=7'-8", LATERAL SPAN ("L")=6'6" WITH 60° SKEW
   WOULD SPECIFY:

   "CONSTRUCT JS NO.5 PER DISTRICT STD. JS230 DESIGN CASE BM10P8".
3. TO ESTIMATE OPENING SPAN BASED ON LATERAL SPAN AND SKEW, SEE "NOMOGRAPH FOR OPENING SPAN" BELOW.
4. BEAM WIDTH SHALL BE AS SPECIFIED OR MATCH MAIN LINE WALL WIDTH, WHICHEVER IS LARGER.
5. BEAM DEPTH SHALL BE AS SPECIFIED OR MATCH MAIN LINE DECK OR INVERT THICKNESS, WHICHEVER IS LARGER.




### EQUATION

P = L / SIN (A)

### "P" SPAN NOMOGRAPH

## TABLE A

| EARTH COVER = 0' TO 2'-0" | | | | | | |
|---|---|---|---|---|---|---|
| DESIGN CASE | B (in) | H (in) | N (--) | BAR SIZE | S (in) | "X" BAR |
| AM4P2 | 12 | 12 | 2 | 6 | 6½ | N/A |
| AM4P4 | 12 | 16 | 2 | 6 | 4½ | N/A |
| AM4P6 | 12 | 18 | 2 | 7 | 6½ | N/A |
| AM5P2 | 12 | 12 | 2 | 6 | 6½ | N/A |
| AM5P4 | 12 | 16 | 2 | 6 | 4½ | N/A |
| AM5P6 | 12 | 18 | 2 | 7 | 5 | N/A |
| AM5P8 | 12 | 20 | 2 | 8 | 7 | N/A |
| AM6P3 | 12 | 14 | 2 | 6 | 4 | N/A |
| AM6P4 | 12 | 16 | 2 | 6 | 4½ | N/A |
| AM6P6 | 12 | 18 | 2 | 7 | 5 | N/A |
| AM6P8 | 12 | 20 | 2 | 8 | 5½ | N/A |
| AM6P9 | 12 | 22 | 2 | 8 | 7 | N/A |
| AM7P3 | 12 | 14 | 2 | 6 | 4 | N/A |
| AM7P4 | 12 | 16 | 2 | 6 | 4½ | N/A |
| AM7P6 | 12 | 18 | 2 | 7 | 5 | N/A |
| AM7P8 | 12 | 20 | 2 | 8 | 5½ | N/A |
| AM7P10 | 12 | 24 | 3 | 7 | 10½ | N/A |
| AM8P4 | 12 | 16 | 2 | 6 | 4½ | N/A |
| AM8P6 | 12 | 18 | 2 | 7 | 5 | N/A |
| AM8P8 | 12 | 20 | 2 | 8 | 5½ | N/A |
| AM8P10 | 12 | 24 | 3 | 7 | 10½ | N/A |
| AM8P12 | 12 | 28 | 3 | 7 | 10½ | N/A |
| AM10P4 | 8½ | 28 | 2 | 6 | 11½ | #7 @10" |
| AM10P6 | 12 | 18 | 2 | 7 | 5 | #7 @10" |
| AM10P8 | 12 | 20 | 2 | 8 | 5½ | #7 @10" |
| AM10P10 | 12 | 24 | 2 | 8 | 6½ | #7 @10" |
| AM10P12 | 18 | 18 | 4 | 9 | 5 | #7 @10" |
| AM10P14 | 18 | 20 | 4 | 9 | 5½ | #7 @10" |
| AM10P15 | 18 | 22 | 4 | 9 | 6 | #7 @10" |
| AM12P4 | 12 | 16 | 3 | 6 | 4½ | #7 @9" |
| AM12P6 | 12 | 16 | 3 | 7 | 4½ | #7 @9" |
| AM12P8 | 12 | 18 | 3 | 8 | 5 | #7 @9" |
| AM12P10 | 12 | 18 | 3 | 8 | 5 | #7 @9" |
| AM12P12 | 18 | 18 | 4 | 9 | 5 | #7 @9" |
| AM12P14 | 18 | 20 | 4 | 9 | 5½ | #7 @9" |
| AM12P15 | 18 | 22 | 4 | 9 | 6 | #7 @9" |
| AM14P4 | 12 | 16 | 3 | 6 | 4½ | #8 @9" |
| AM14P6 | 12 | 16 | 3 | 7 | 4½ | #8 @9" |
| AM14P8 | 12 | 18 | 3 | 8 | 5 | #8 @9" |
| AM14P10 | 12 | 20 | 3 | 9 | 5½ | #8 @9" |
| AM14P12 | 18 | 18 | 4 | 9 | 5 | #8 @9" |
| AM14P14 | 18 | 22 | 4 | 9 | 6 | #8 @9" |
| AM14P15 | 18 | 24 | 4 | 9 | 9½ | #8 @9" |

## TABLE B

| EARTH COVER = 2'-1" TO 10'-0" | | | | | | |
|---|---|---|---|---|---|---|
| DESIGN CASE | B (in) | H (in) | N (--) | BAR SIZE | S (in) | "X" BAR |
| BM4P2 | 6 | 9 | 1 | 6 | 6 | N/A |
| BM4P4 | 8 | 10 | 1 | 6 | 6 | N/A |
| BM4P6 | 12 | 12 | 2 | 6 | 6½ | N/A |
| BM5P2 | 6 | 9 | 1 | 6 | 6 | N/A |
| BM5P4 | 6 | 10 | 1 | 6 | 5½ | N/A |
| BM5P6 | 12 | 12 | 2 | 6 | 6½ | N/A |
| BM5P8 | 12 | 14 | 2 | 7 | 8 | N/A |
| BM6P3 | 6½ | 9 | 1 | 6 | 5 | N/A |
| BM6P4 | 6½ | 10 | 1 | 7 | 5½ | N/A |
| BM6P6 | 12 | 12 | 2 | 7 | 6½ | N/A |
| BM6P8 | 12 | 14 | 2 | 8 | 8 | N/A |
| BM6P9 | 12 | 14½ | 2 | 9 | 8 | N/A |
| BM7P3 | 6½ | 9 | 1 | 6 | 5 | N/A |
| BM7P4 | 6½ | 12 | 1 | 7 | 6½ | N/A |
| BM7P6 | 12 | 12 | 2 | 7 | 6½ | N/A |
| BM7P8 | 12 | 14 | 2 | 8 | 8 | N/A |
| BM7P10 | 12 | 17 | 2 | 9 | 9½ | N/A |
| BM8P4 | 6½ | 12 | 1 | 7 | 6½ | N/A |
| BM8P6 | 12 | 14 | 2 | 8 | 8 | N/A |
| BM8P8 | 12 | 16 | 2 | 8 | 9 | N/A |
| BM8P10 | 12 | 18 | 2 | 9 | 10 | N/A |
| BM8P12 | 18 | 18 | 4 | 8 | 10 | N/A |
| BM10P4 | 12 | 12 | 2 | 6 | 6½ | #7 @10" |
| BM10P6 | 12 | 14 | 2 | 7 | 8 | #7 @10" |
| BM10P8 | 12 | 16 | 3 | 7 | 9 | #7 @10" |
| BM10P10 | 18 | 18 | 4 | 7 | 10 | #7 @10" |
| BM10P12 | 18 | 20 | 4 | 8 | 11½ | #7 @10" |
| BM10P14 | 18 | 22 | 4 | 9 | 11½ | #7 @10" |
| BM10P15 | 18 | 24 | 4 | 9 | 11½ | #7 @10" |
| BM12P4 | 12 | 12 | 2 | 6 | 6½ | #7 @9" |
| BM12P6 | 12 | 14 | 3 | 7 | 8 | #7 @9" |
| BM12P8 | 12 | 18 | 3 | 7 | 10 | #7 @9" |
| BM12P10 | 18 | 20 | 4 | 7 | 11½ | #7 @9" |
| BM12P12 | 18 | 22 | 4 | 8 | 11½ | #7 @9" |
| BM12P14 | 18 | 24 | 4 | 9 | 11½ | #7 @9" |
| BM12P15 | 18 | 26 | 4 | 9 | 11½ | #7 @9" |
| BM14P4 | 12 | 14 | 2 | 6 | 8 | #8 @9" |
| BM14P6 | 12 | 14 | 3 | 7 | 8 | #8 @9" |
| BM14P8 | 12 | 18 | 3 | 8 | 10 | #8 @9" |
| BM14P10 | 18 | 20 | 4 | 8 | 11½ | #8 @9" |
| BM14P12 | 18 | 22 | 4 | 9 | 11½ | #8 @9" |
| BM14P14 | 18 | 24 | 4 | 10 | 11½ | #8 @9" |
| BM14P15 | 18 | 26 | 4 | 10 | 11½ | #8 @9" |

## TABLE C

| EARTH COVER = 10'-1" TO 20'-0" | | | | | | |
|---|---|---|---|---|---|---|
| DESIGN CASE | B (in) | H (in) | N (--) | BAR SIZE | S (in) | "X" BAR |
| CM4P2 | 6 | 10 | 1 | 6 | 5½ | N/A |
| CM4P4 | 12 | 10 | 2 | 6 | 5½ | N/A |
| CM4P6 | 12 | 14 | 2 | 6 | 7½ | N/A |
| CM5P2 | 6 | 10 | 1 | 6 | 5½ | N/A |
| CM5P4 | 12 | 12 | 2 | 6 | 6½ | N/A |
| CM5P6 | 12 | 14 | 2 | 7 | 4 | N/A |
| CM5P8 | 12 | 20 | 2 | 7 | 5½ | N/A |
| CM6P3 | 7 | 12 | 1 | 6 | 3 | N/A |
| CM6P4 | 12 | 12 | 2 | 6 | 6½ | N/A |
| CM6P6 | 12 | 16 | 2 | 7 | 4½ | N/A |
| CM6P8 | 12 | 22 | 2 | 7 | 6½ | N/A |
| CM6P9 | 12 | 26 | 2 | 7 | 6½ | N/A |
| CM7P3 | 7 | 12 | 1 | 6 | 3 | N/A |
| CM7P4 | 12 | 12 | 2 | 6 | 3 | N/A |
| CM7P6 | 12 | 18 | 2 | 6 | 7 | N/A |
| CM7P8 | 12 | 24 | 2 | 7 | 6½ | N/A |
| CM7P10 | 12 | 20 | 3 | 8 | 5 | N/A |
| CM8P4 | 12 | 14 | 2 | 6 | 8 | N/A |
| CM8P6 | 12 | 20 | 2 | 6 | 7 | N/A |
| CM8P8 | 12 | 26 | 2 | 7 | 6½ | N/A |
| CM8P10 | 12 | 34 | 3 | 6 | 10 | N/A |
| CM8P12 | 18 | 20 | 4 | 9 | 5 | N/A |
| CM10P4 | 12 | 14 | 2 | 7 | 4 | #7 @10" |
| CM10P6 | 12 | 22 | 2 | 7 | 6½ | #7 @10" |
| CM10P8 | 12 | 30 | 2 | 7 | 6½ | #7 @10" |
| CM10P10 | 12 | 38 | 3 | 7 | 9½ | #7 @10" |
| CM10P12 | 18 | 22 | 4 | 9 | 4½ | #7 @10" |
| CM10P14 | 24 | 26 | 5 | 9 | 6 | #7 @10" |
| CM10P15 | 24 | 28 | 5 | 9 | 6 | #7 @10" |
| CM12P4 | 12 | 14 | 2 | 7 | 4 | #8 @9" |
| CM12P6 | 12 | 16 | 3 | 7 | 4½ | #8 @9" |
| CM12P8 | 12 | 20 | 3 | 8 | 4½ | #8 @9" |
| CM12P10 | 12 | 24 | 3 | 9 | 4 | #8 @9" |
| CM12P12 | 18 | 24 | 4 | 10 | 4½ | #8 @9" |
| CM12P14 | 24 | 26 | 5 | 10 | 5½ | #8 @9" |
| CM12P15 | 24 | 28 | 5 | 10 | 5½ | #8 @9" |
| CM14P4 | 12 | 14 | 2 | 7 | 4 | #8 @9" |
| CM14P6 | 12 | 18 | 3 | 8 | 5 | #8 @9" |
| CM14P8 | 12 | 20 | 3 | 9 | 4 | #8 @9" |
| CM14P10 | 12 | 24 | 3 | 11 | 3½ | #8 @9" |
| CM14P12 | 18 | 24 | 4 | 10 | 4 | #8 @9" |
| CM14P14 | 24 | 26 | 5 | 10 | 4½ | #8 @9" |
| CM14P15 | 24 | 28 | 5 | 10 | 4½ | #8 @9" |

NOTES:
1. M=MAIN LINE SPAN
2. P=OPENING SPAN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# JUNCTION STRUCTURE NO. 5

STANDARD DRAWING NUMBER JS230