

DESIGNER NOTES

LAP LENGTHS FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

PILING SPACING IN ABUTMENT BODY SHALL BE 8'-0" MAX. FOR ALL TYPES OF PILING. THE MAX. PILE SPACING FROM THE END OF THE ABUT. BODY TO THE FIRST PILE SHALL BE THE MINIMUM OF ONE-HALF PILE SPACE OR 2'-6".

★ WHEN BODY SECTION IS $> \pm 50'-0"$ LONG PROVIDE VERTICAL CONSTRUCTION JOINT. RUN BAR STEEL THRU JOINT, SEAL JOINT WITH 18" RUBBERIZED MEMBRANE WATERPROOFING. SEE STD. 12.09 FOR ALTERNATE CONSTRUCTION JOINT.

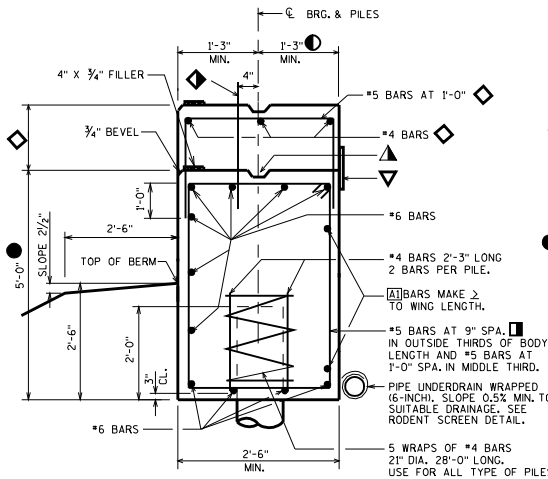
CONCRETE POURED UNDER WATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH SECTION 502.3.5.3 STANDARD SPECIFICATIONS.

THE SEMI-EXPANSION SEAT SHALL BE USED WHEN REQUIRED AS STATED IN CHAPTER 12, FIGURE 12.7-1 OF THE BRIDGE MANUAL OR WHENEVER A WING PILE IS REQUIRED.

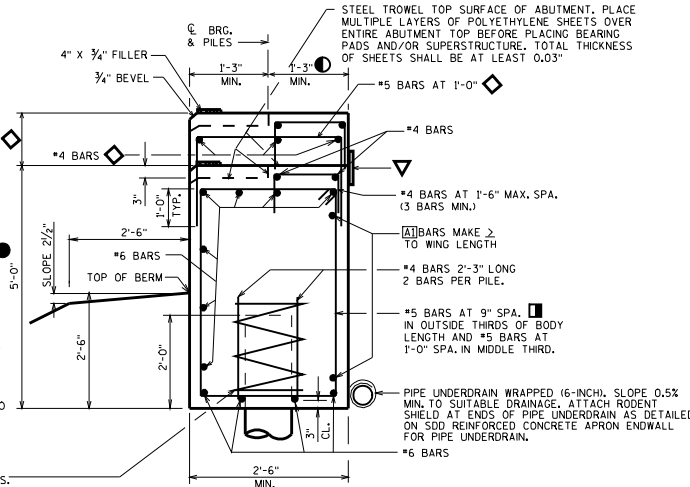
THE FIXED SEAT CANNOT BE USED WHEN A WING PILE IS REQUIRED.

LEGEND

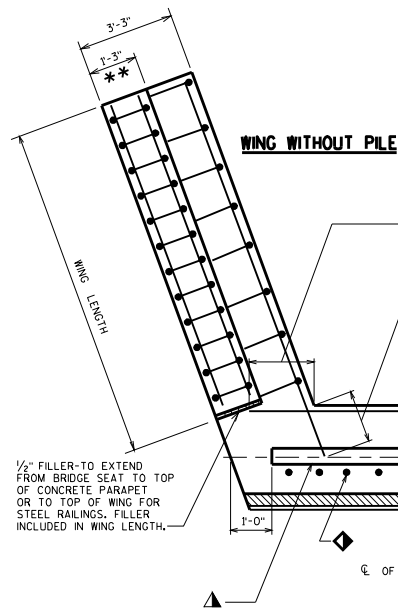
- ◆ *5 BARS (COATED) AT 1'-0" (2'-0" LONG). THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE.
- ◇ WHEN THIS DIMENSION $> 4"$ THIS ADDITIONAL REINFORCEMENT SHALL BE ADDED. MAX. SPA. OF HORIZ. #4 BARS = 1'-0".
- USE 1'-3" FOR ALL SLAB SPANS AND FOR GIRDER SPANS WITH NO PAVING NOTCH EXCEPT 36W, 45W, 54W, 54W, 70W, 72W & 82W ORDERS WITH SKEWS $> 25^\circ$ - USE 1'-6". USE 1'-3" FOR GIRDER SPANS WITH PAVING NOTCH.
- DIMENSION IS FROM BOTTOM OF ABUTMENT TO LOW BEAM SEAT OR LOW SIDE OF SLAB TYPE SUPERSTRUCTURE.
- ▽ 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZONTAL AND VERTICAL JOINTS ON BACKFACE.
- ▲ KEYED CONST. JOINT FORMED BY BEVELED 2" x 6".
- ** WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "M" RAILING OR VERTICAL FACE PARAPET, TYPE "TX" IS USED.
- USE #5 BARS AT 6" SPA. IN OUTSIDE THIRDS OF BODY LENGTH WHEN THE WING LENGTH $> 20'-0"$ AND WING HEIGHT $> 10'-0"$.



TYPE A1 WITH FIXED SEAT

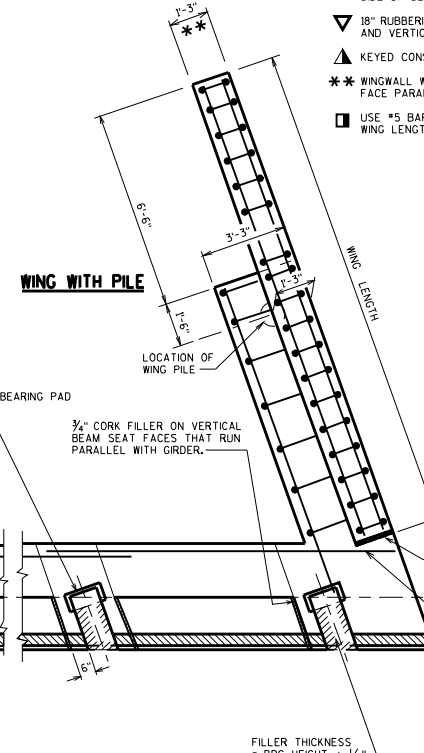


TYPE A1 WITH SEMI-EXPANSION SEAT

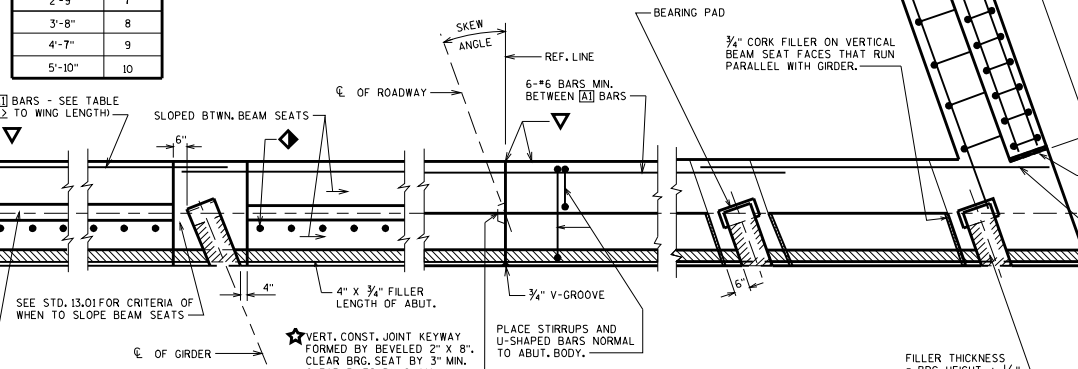


WING WITHOUT PILE

DISTANCE OR EQUIVALENT STD. HOOK	BAR SIZE
1'-9"	5
2'-1"	6
2'-9"	7
3'-8"	8
4'-7"	9
5'-10"	10



WING WITH PILE



SLAB SPAN WITH FIXED SEAT

GIRDER SPAN WITH FIXED SEAT

SLAB SPAN WITH SEMI-EXPANSION SEAT

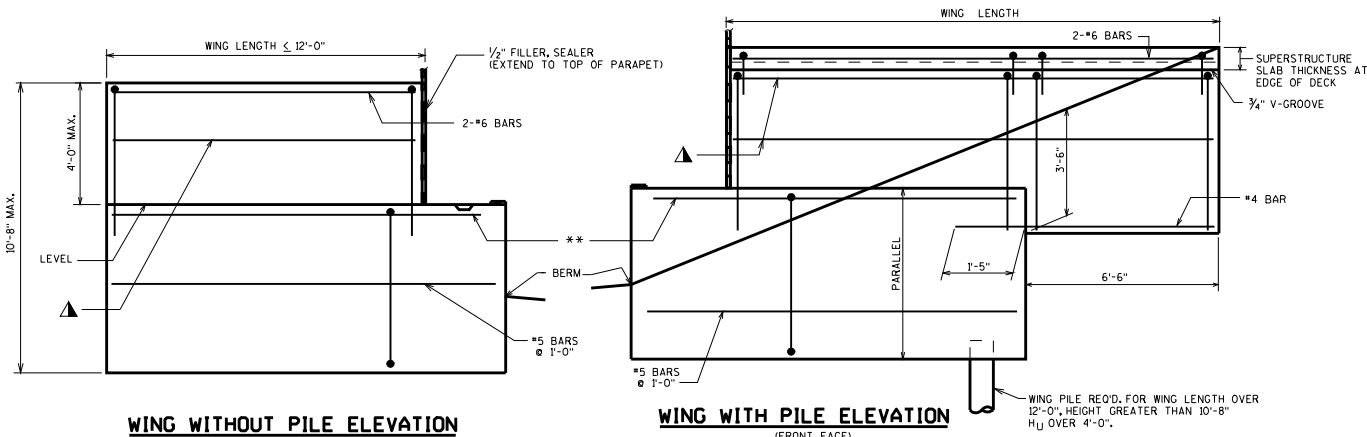
GIRDER SPAN WITH SEMI-EXPANSION SEAT

ABUTMENT TYPE A1 (INTEGRAL ABUTMENT)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker*

DATE:
1-10



WING WITHOUT PILE ELEVATION
(FRONT FACE)

WING WITH PILE ELEVATION
(FRONT FACE)

DESIGNER NOTES

LENGTH OF #1 BARS SHALL BE \geq TO WING LENGTH.
WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.

LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

WING BARS AND DOWEL BARS SHALL BE EPOXY COATED.

WHEN TYPE "F", "W" OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

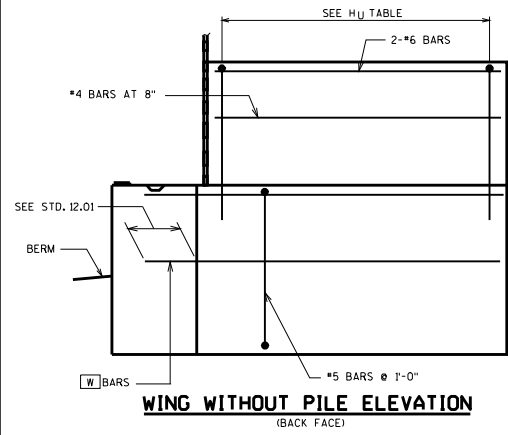
SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE). EXTEND SEALER 3" BELOW GUTTER LINE AT INSIDE FACE.

LRFD DESIGN LOADS

LIVE LOAD = 2'-0" SURCHARGE
LOAD FACTORS:
 $\gamma_{DC} = 1.25$
 $\gamma_{PEH} = 1.50$
 $\gamma_{PEV} = 1.35$
 $\gamma_{LS} = 1.75$
EXPOSURE CLASS 2, $\gamma_E = 0.75$
 $f_y = 60,000$ P.S.I.
 $f'_c = 3,500$ P.S.I.
HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT WEIGHT OF SOIL

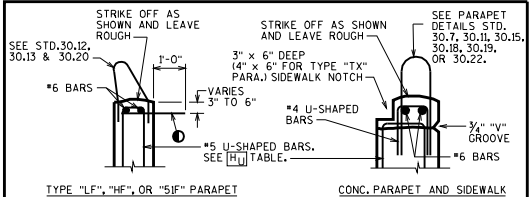
WING LENGTH	WING HEIGHT			
	8'-6"	10'-0"	11'-6"	13'-0"
10'-0"	#6-#6's	#6-#6's	6-#5's	W
	#7-#8's	#7-#8's	6-#5's	A1
12'-0"	#6-#6's	#7-#6's	7-#5's	W
	#7-#8's	#7-#8's	6-#7's	A1
16'-0"	#7-#8's	8-#8's	7-#7's	W
	5-#8's	6-#8's	7-#8's	A1
20'-0"	7-#7's	7-#8's	8-#8's	W
	6-#9's	7-#9's	8-#10's	A1
24'-0"	8-#8's	9-#8's	9-#9's	W
	7-#9's	8-#9's	8-#10's	A1

* WING WITHOUT PILE VALUES SHOWN. (FOR WING WITH PILE THAT HAS WING LENGTH IN THIS REGION, USE VALUES FOR 11'-6" WING HEIGHT.)



WING WITHOUT PILE ELEVATION
(BACK FACE)

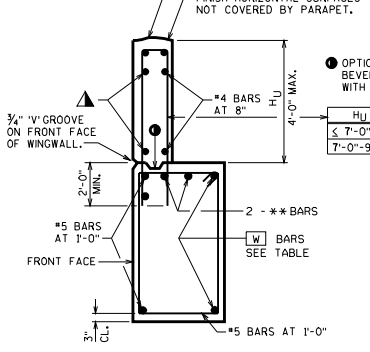
WING WITH PILE ELEVATION
(BACK FACE)



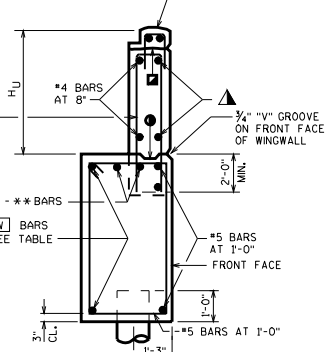
① #4 DOWELS (COATED) 2'-0" LONG AT 1'-0" ALONG ENTIRE WING LENGTH. PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

DETAIL FOR TYPE "LF", "HF", "PF", OR "SF" PARAPET SHOWN. SEE "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.

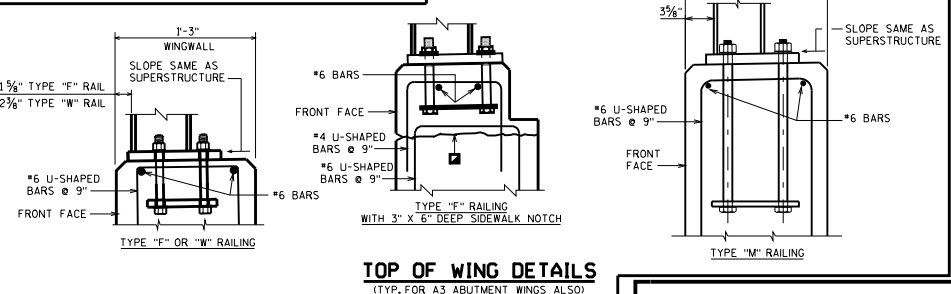
DETAIL FOR CONC. PARAPET WITH SIDEWALK SHOWN. SEE "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.



WING WITHOUT PILE SECTION



WING WITH PILE SECTION



TOP OF WING DETAILS
(TYP. FOR A3 ABUTMENT WINGS ALSO)

** BARS TO BE SAME SIZE AS "W" BARS.
☑ CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.

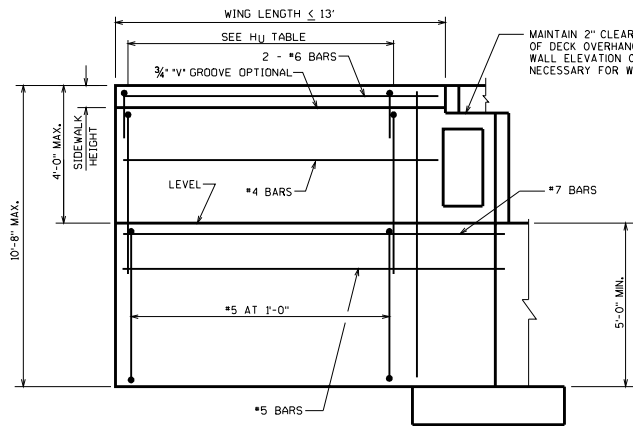
▲ USE #4 BARS @ 1'-6" FOR WINGWALL WIDTH = 1'-3" USE #4 BARS @ 1'-4" FOR WINGWALL WIDTH = 1'-6".

ABUTMENT TYPE A1

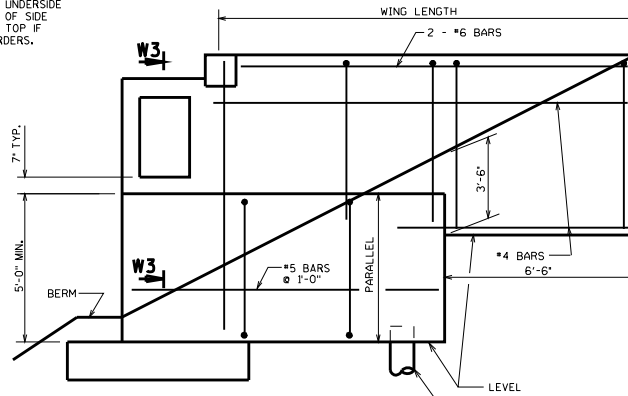
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: Scot Becker

DATE:
1-10



WING WITHOUT PILE ELEVATION
(FRONT FACE)



WING WITH PILE ELEVATION
(FRONT FACE)

WING PILE RECD. FOR WING LENGTH OVER 13'-0", HEIGHT GREATER THAN 10'-8" H_U OVER 4'-0".

DESIGNER NOTES

- LENGTH OF A3 BARS SHALL BE ≥ TO WING LENGTH.
- WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.
- LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.
- BARS IN WINGS, ABUTMENT BACKWALL AND PAVING BLOCK SHALL BE EPOXY COATED.
- WHEN TYPE "F", "W", OR "W" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.
- FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH $\gamma_{DEH} = 1.50$, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH $\gamma_{DEH} \text{ MIN.} = 0.90$, AND "P".
- FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK; IF SIDEWALL IS USED, FORM SIDEWALL 2" BELOW CONC. DIAPH.
- CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.
- OPTIONAL CONST. JOINT FORMED BY BEVELED 2" x 6" KEYWAY WITH MEMBRANE ON BACKFACE.

LRFD DESIGN LOADS

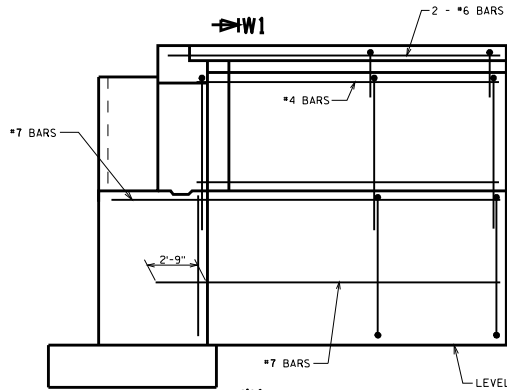
LIVE LOAD = 2'-0" SURCHARGE
LOAD FACTORS:
 $\gamma_{DC} = 1.25$
 $\gamma_{DW} = 1.50$
 $\gamma_{DEH} = 1.50$
 $\gamma_{DEH \text{ MIN.}} = 0.90$
 $\gamma_{EV} = 1.35$
 $\gamma_{LL} = 1.75$
 EXPOSURE CLASS 2, $\gamma_E = 0.75$
 $f_y = 60,000 \text{ P.S.I.}$
 $f'_c = 3,500 \text{ P.S.I.}$
 HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT WEIGHT OF SOIL

TABLE A

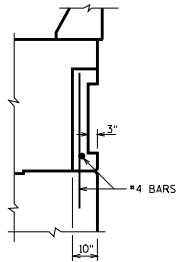
W BARS	DISTANCE*	WING 2 HEIGHT				BARS
		10'-0"	11'-6"	13'-0"	14'-6"	
#5	1'-9"					W
#6	2'-1"					A3
#7	2'-9"					W
#8	3'-8"					A3
#9	4'-7"					W
#10	5'-10"					A3

* OR EQUIVALENT STANDARD HOOK

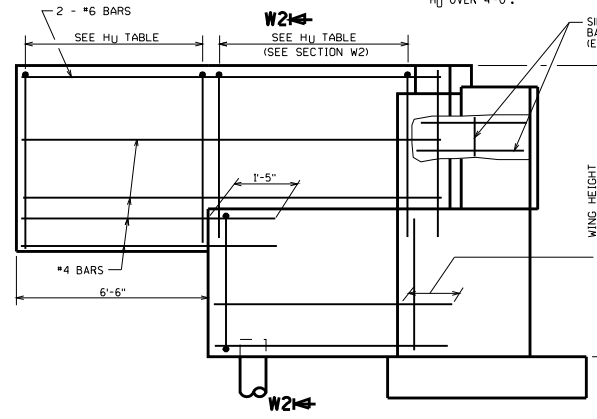
* USE 4'-6" FOR LOWER WING POUR WIDTH
 ** USE 3'-3" MIN. FOR BEARING SEAT WIDTH



WING WITHOUT PILE ELEVATION
(BACK FACE)

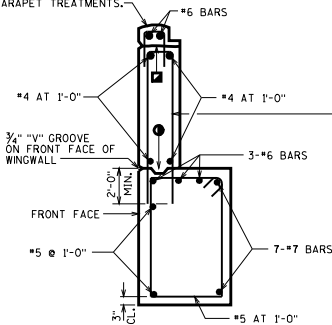


SECTION W3



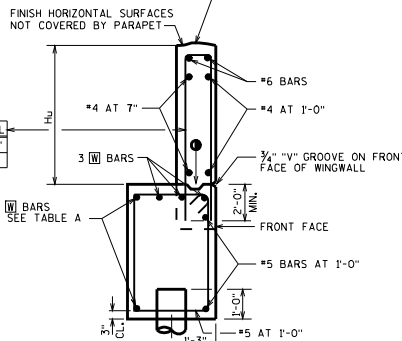
WING WITH PILE ELEVATION
(BACK FACE)

DETAIL FOR CONC. PARAPET WITH SIDEWALK SHOWN. SEE STD. 12.02 - "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.



SECTION W1
WING WITHOUT PILE

DETAIL FOR TYPE "LF", "HF", "PF", OR "SP" PARAPET SHOWN. SEE STD. 12.02 - "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.



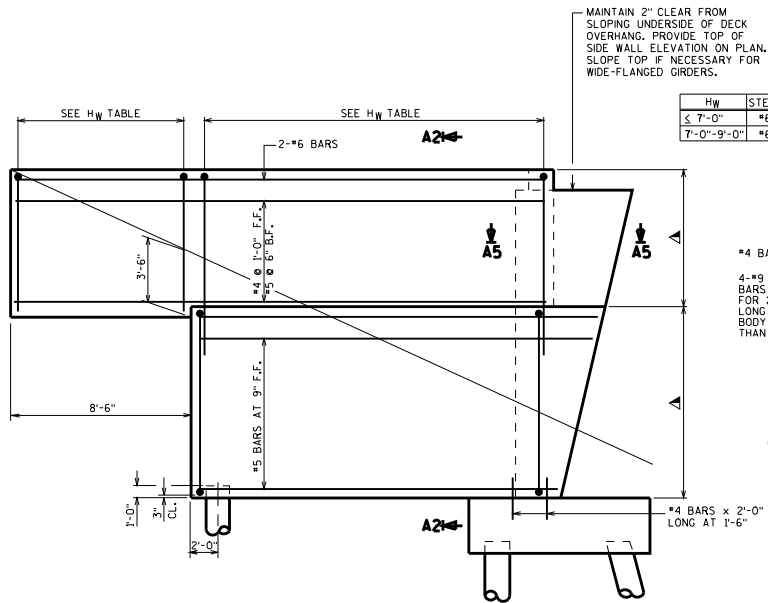
SECTION W2
WING WITH PILE

H _U	STEEL RAIL	CONC. RAIL
< 7'-0"	#6 @ 9"	#5 @ 1'-0"
7'-0"-9'-6"	#6 @ 9"	#5 @ 6"

ABUTMENT TYPE A3

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: Scot Becker DATE: 1-10



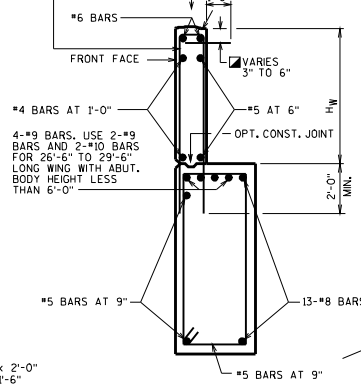
WING ELEVATION
WING LENGTH TO 26'-6"

MAINTAIN 2" CLEAR FROM SLOPING UNDERSIDE OF DECK OVERHANG. PROVIDE TOP OF SIDE WALL ELEVATION ON PLAN. SLOPE TOP IF NECESSARY FOR WIDE-FLANGED GIRDERS.

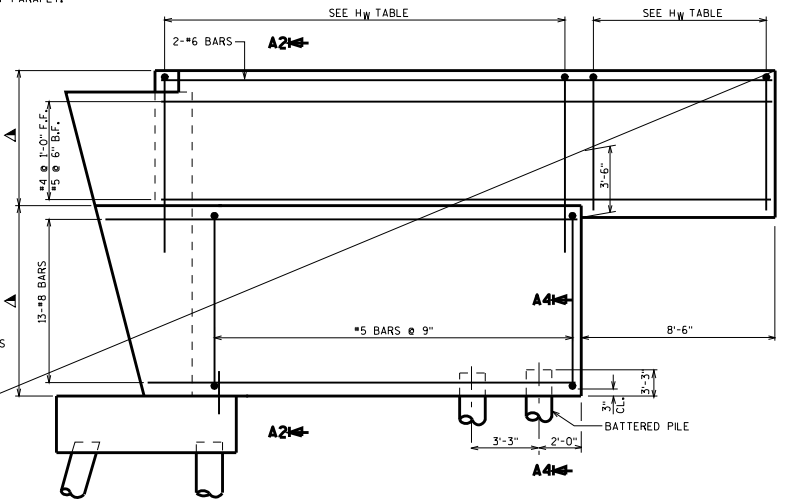
H _w	STEEL RAIL	CONC. RAIL
≤ 7'-0"	#6 @ 9"	#5 @ 1'-0"
7'-0"-9'-0"	#6 @ 9"	#5 @ 6"

DETAIL FOR TYPE "LF", "HF", "PF", OR "5F" PARAPET SHOWN. SEE STD. 12.02 - "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.

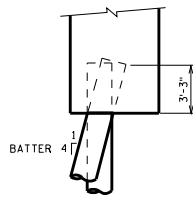
FINISH HORIZONTAL SURFACES NOT COVERED BY PARAPET.



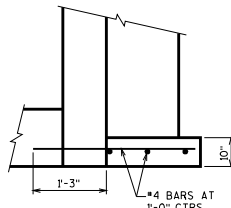
SECTION A2
ALL WING LENGTHS



WING ELEVATION
WING LENGTH OVER 26'-6" TO 29'-6"



SECTION A4



SECTION A5

DESIGNER NOTES

BODY DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F., A 1'-6" SURCHARGE AND SUPERSTRUCTURE REACTIONS "P".

WING DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 35 P.C.F. AND A 2'-0" SURCHARGE. A 5 KIP LATERAL RESISTANCE IS USED FOR EACH WING PILE.

FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH $\delta_{PEH} = 1.50$, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 20 P.C.F. WITH $\delta_{PEH_{MIN}} = 0.90$, AND "P".

UNIT WEIGHT OF SOIL IS ASSUMED AS 120 P.C.F.

BRIDGE SEATS BETWEEN BEARINGS SHALL SLOPE 1" FROM FRONT FACE OF BACKWALL.

PAY LIMITS FOR EXCAVATION FOR STRUCTURES & GRANULAR BACKFILL IS SHOWN IN CHAPTER 12 OF THE BRIDGE MANUAL.

BARs IN WINGS, ABUTMENT BACKWALL AND PAVING BLOCK SHALL BE EPOXY COATED.

WHEN TYPE "F", "W" OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK; IF SIDEWALL IS USED, FORM SIDEWALL 2" BELOW CONC. DIAPH.

■ #4 DOWELS (COATED), 2'-0" LG. AT 1'-0" CTRS. FROM WING TIP TO PAVING NOTCH. PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

▲ DIMENSIONS TO BE CONSTANT.

LRFD DESIGN LOADS

- LIVE LOAD
 BODY = 1'-6" SURCHARGE
 WINGS = 2'-0" SURCHARGE
 HORIZ. EARTH LOAD BASED ON:
 BODY = 40 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL
 WINGS = 35 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL
 LOAD FACTORS:
 $\gamma_{DC} = 1.25$
 $\gamma_{DW} = 1.50$
 $\gamma_{PEH} = 1.50$
 $\gamma_{PEH_{MN}} = 0.90$
 $\gamma_{PEV} = 1.35$
 $\gamma_{LL} = 1.75$
 EXPOSURE CLASS 2, $\gamma_E = 0.75$
 $f_y = 60,000$ P.S.I.
 $f_c = 3,500$ P.S.I.

ABUTMENT A4 PILE FOOTING	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Scot Becker</u>	DATE: 1-10

DESIGNER NOTES

THIS TYPE OF WING MAY BE USED IN LIEU OF WINGS PARALLEL TO ROADWAY IF APPROVED BY THE BUREAU OF STRUCTURES DESIGN SECTION. DO NOT USE FOR STREAM CROSSINGS WHEN HIGH WATER ELEVATION IS ABOVE TOP OF BERM ELEVATION.

*USE 2 1/2" FOR THE UNSTABLE CLAYS WHICH ARE SOMETIMES ENCOUNTERED IN NORTHWEST WISC. (SUPERIOR AREA)

WHEN TIMBER RAILING IS USED AS PER STANDARD 30.24, AND THE SKEW IS > 0°, THIS CONSTRUCTION JOINT SHALL BE MANDATORY. THE WING CONCRETE SHALL BE PLACED ABOVE CONSTR. JT. AFTER THE TIMBER END POSTS ARE IN PLACE.

ALL WING BARS SHALL BE EPOXY COATED.

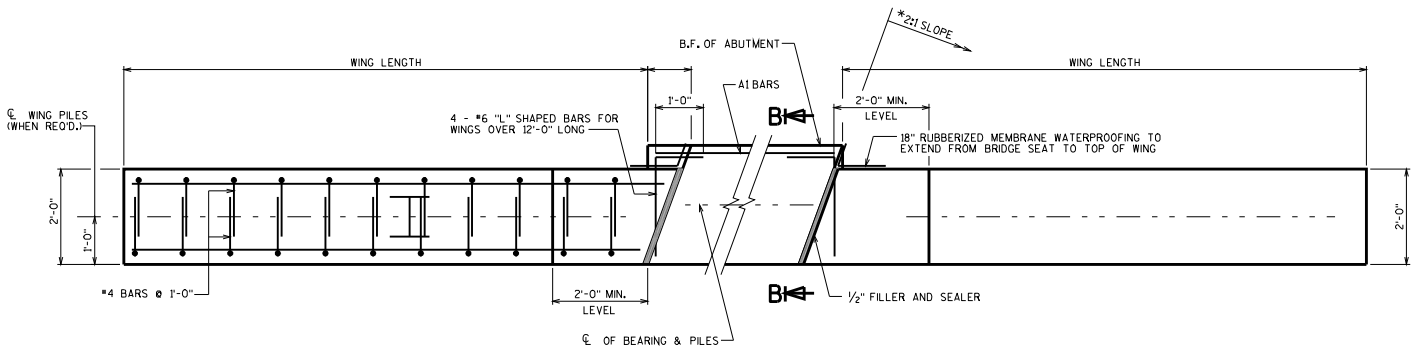
LRFD DESIGN LOADS (WINGS)

LIVE LOAD = 1'-0" SURCHARGE
 LOAD FACTORS:
 γ_{DC} = 1.25
 γ_{EM} = 1.50
 γ_{IM} = 1.75
 EXPOSURE CLASS 2, γ_F = 0.75
 HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT
 WEIGHT OF SOIL
 F_y = 60,000 P.S.I.
 F_c = 3,500 P.S.I.

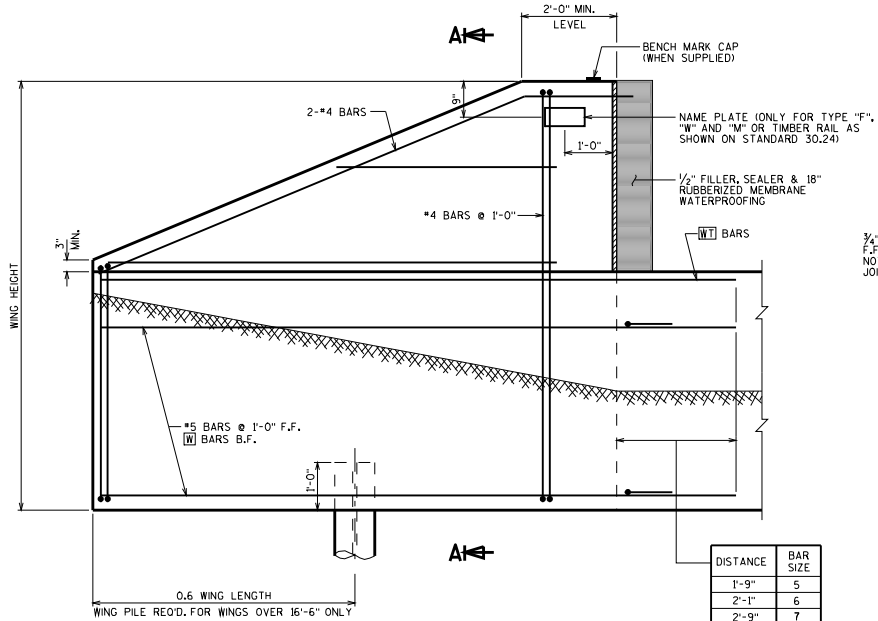
TABLE A

WING LENGTH	WING HEIGHT				BARS
	8'-6"	10'-0"	11'-6"	13'-0"	
10'-0"	5-#5s	5-#5s	6-#5s	W	WT
	4-#6s	4-#6s	5-#6s	W	
12'-0"	5-#6s	5-#7s	6-#7s	W	WT
	2-#7s	2-#7s	2-#8s	W	
16'-0"	5-#6s	6-#6s	6-#7s	W	WT
	5-#8s	6-#8s	5-#9s	W	
20'-0"	2-#8s	2-#8s	2-#9s	W	WT
	5-#8s	6-#8s	7-#8s	W	
▲	2-#8s	2-#9s	2-#9s	W	▲
▲	7-#9s	8-#9s	▲	▲	▲

▲ WING PILE REQUIRED

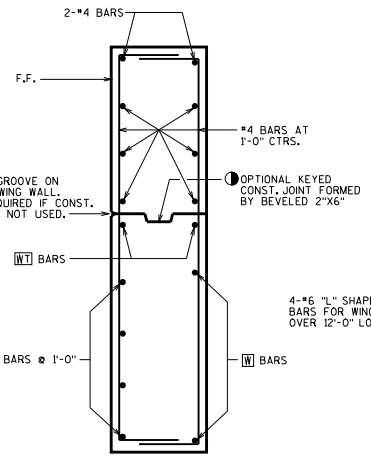


PLAN FOR TYPE A1 ABUTMENT

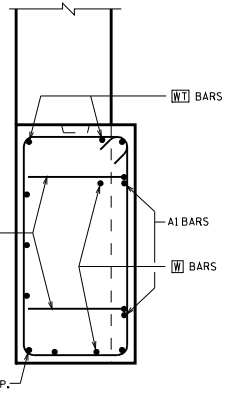


WING ELEVATION (A1 ABUTMENT)

DISTANCE	BAR SIZE
1'-9"	5
2'-1"	6
2'-9"	7
3'-8"	8
4'-7"	9



SECTION A-A



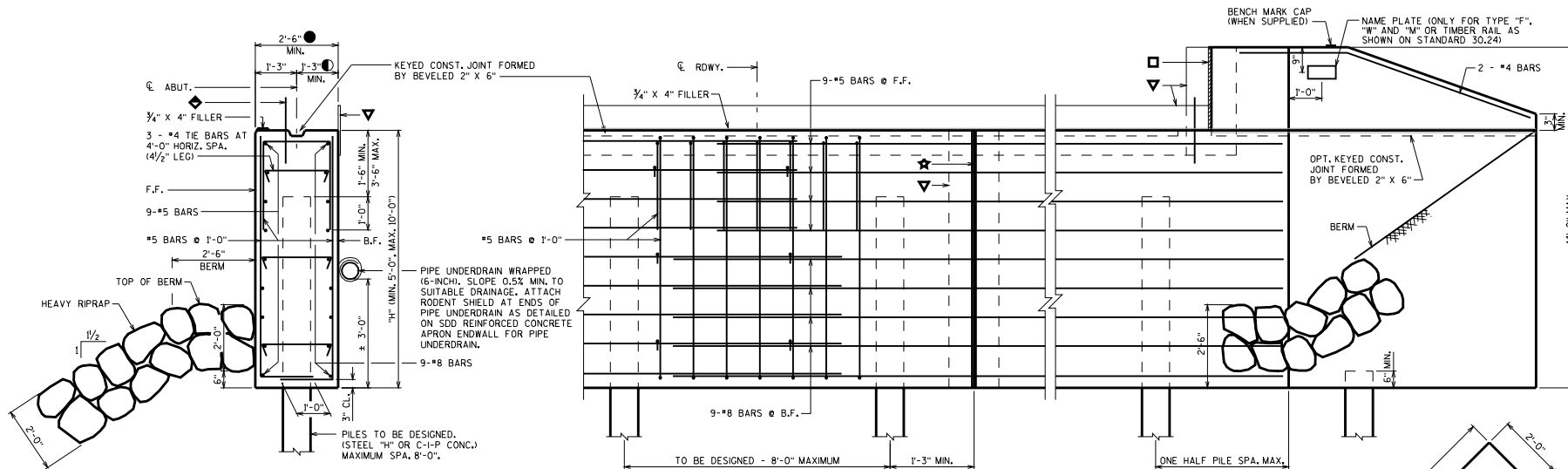
SECTION B-B

SEE STD. 12.01 & 12.02 FOR NOTES & DETAILS

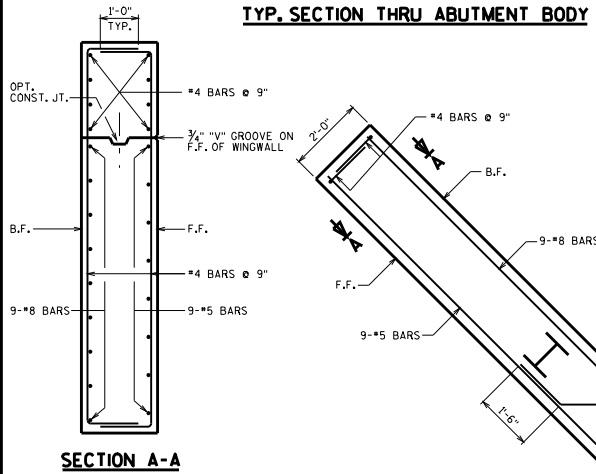
DETAILS FOR WINGS PARALLEL TO A1 ABUTMENT CENTERLINE

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker* DATE: 1-10

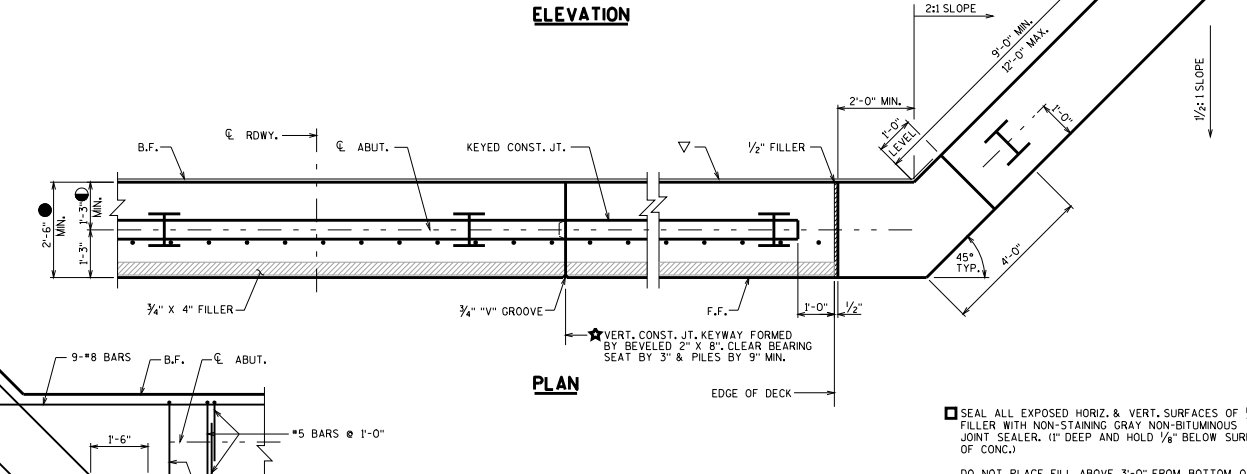


TYP. SECTION THRU ABUTMENT BODY



SECTION A-A

ELEVATION



PLAN

SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCR.)

DO NOT PLACE FILL ABOVE 3'-0" FROM BOTTOM OF ABUTMENT UNTIL SUPERSTRUCTURE IS IN PLACE.

18" RUBBERIZED MEMBRANE WATERPROOFING.

WHEN ABUTMENT WIDTH > 2'-10" FIXED POINT OF WING ROTATION SHALL BE ON F.F. OF ABUTMENT 10° SKEW ONLY.

THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED, BUT BEFORE INITIAL SET HAS TAKEN PLACE. SEE STD. 12.01 & 27.05

DESIGNER NOTES

FOR SLAB AND PRESTRESSED GIRDER SPANS L < 200'-0" & FOR STEEL GIRDER SPANS L < 150'-0" WHERE L = LENGTH OF CONTINUOUS SUPERSTRUCTURE BETWEEN ABUTMENTS.

WHEN GIRDERS WITH SEMIEXPANSION SEAT OR FIXED SEAT, OR SLAB SPAN WITH SEMIEXPANSION SEAT ARE USED, MAKE BEAM SEATS SIMILAR TO THAT SHOWN ON STANDARD 12.01.

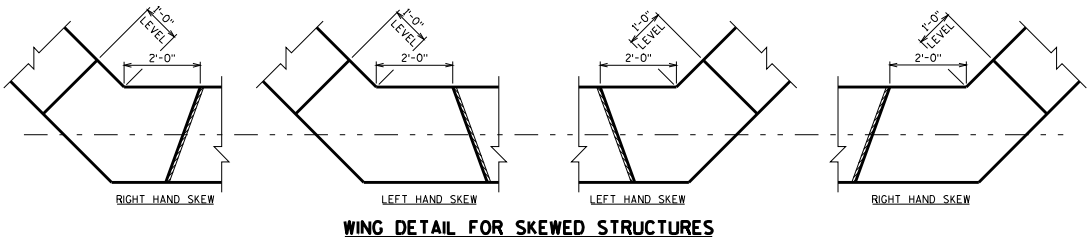
WING BARS AND DOWEL BARS SHALL BE EPOXY COATED.

WHEN BODY SECTION IS > 50'-0" LONG, PROVIDE VERT. CONST. JOINT. RUN BAR STEEL THRU JOINT. BEVEL EXPOSED EDGES 3/4" AND SEAL JOINT. SEE STD. 12.09 FOR ALTERNATE CONSTRUCTION JOINT.

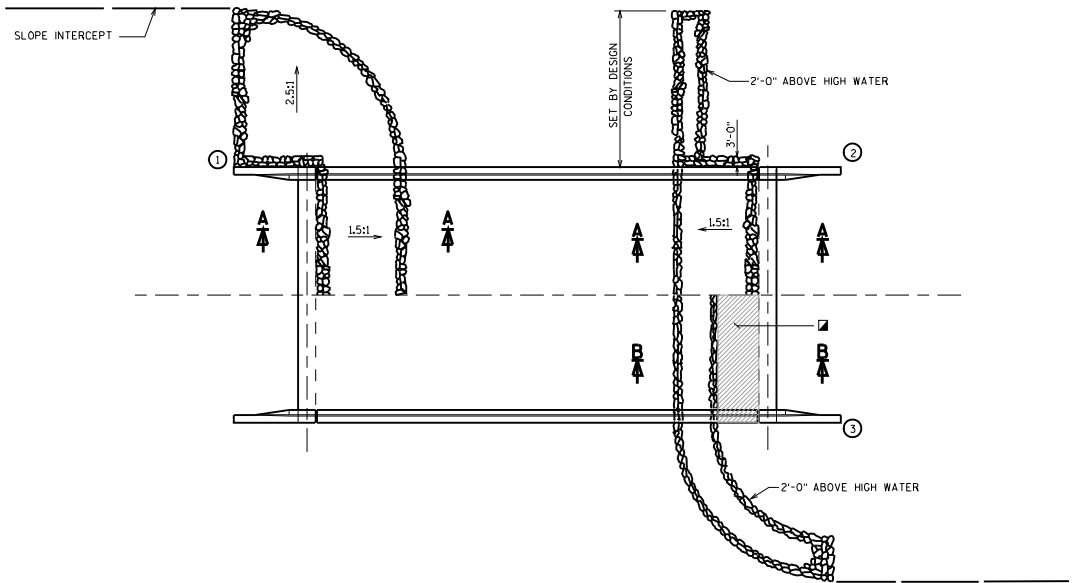
USE 1'-3" FOR ALL SLAB SPANS AND FOR GIRDER SPANS WITH NO PAVING NOTCH EXCEPT 36W, 45W, 54", 64W, 70", 72W" & 82W" GIRDERS WITH SKEWS > 25° - USE 1'-6". USE 1'-11" FOR GIRDER SPANS WITH PAVING NOTCH.

LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

ABUTMENT A5 (INTEGRAL, PILE ENCASED ABUTMENT)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10



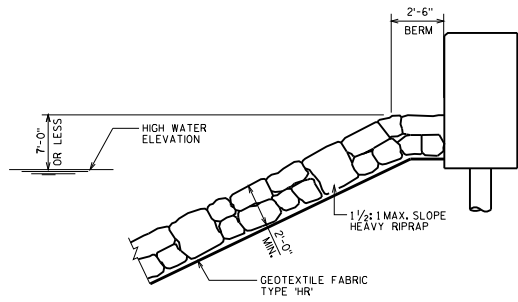
WING DETAIL FOR SKEWED STRUCTURES



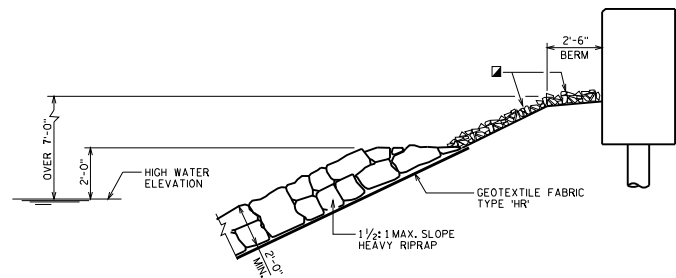
ALTERNATE ①
NORMAL CONDITION FOR EMBANKMENT FILLS

ALTERNATE ②
USE WHERE BERM ELEVATION IS LESS THAN 7'-0" ABOVE HIGH WATER

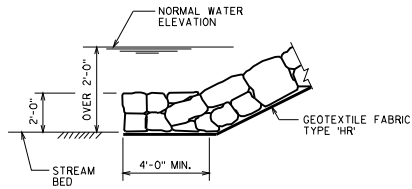
ALTERNATE ③
USE WHERE BERM ELEVATION IS OVER 7'-0" ABOVE HIGH WATER



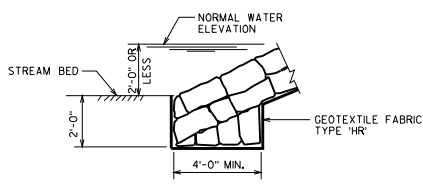
SECTION A-A



SECTION B-B



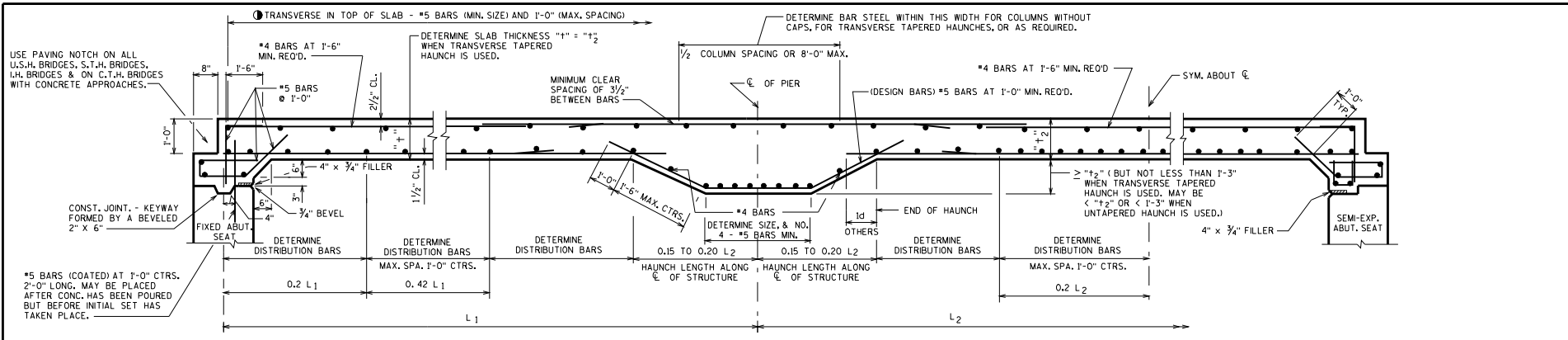
TOE DETAIL
NORMAL WATER ELEVATION > 2'-0" ABOVE STREAM BED



TOE DETAIL
NORMAL WATER ELEVATION ≤ 2'-0" ABOVE STREAM BED

☑ HEAVY RIPRAP OR OTHER SLOPE PROTECTION. IF HEAVY RIPRAP IS USED, PLACE GEOTEXTILE FABRIC TYPE 'HR' BELOW IT.

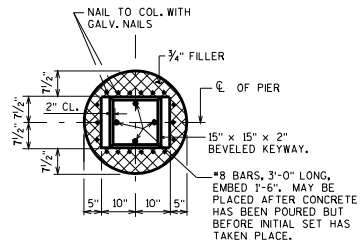
PLACEMENT OF HEAVY RIPRAP AT RIVER CROSSINGS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10



LONGITUDINAL SECTION

NOTES

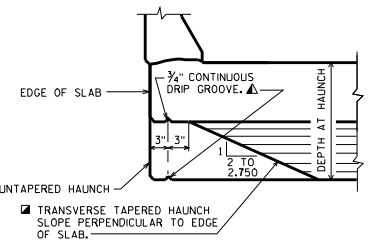
- TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.
- ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).
- PARAPETS SHOWN ABOVE THE HORIZONTAL CONSTRUCTION JOINT SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED EXCEPT FOR STAGE CONSTRUCTION.
- CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION & FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.
- △ 3/4" CONTINUOUS DRIP GROOVE TO END 2'-0" AWAY FROM FACE OF ABUTMENT.



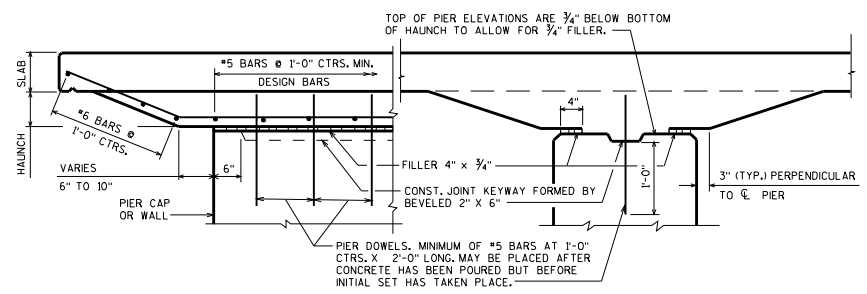
**COLUMN W/O CAP TYPE PIER
DETAIL AT TOP OF COLUMN**

DESIGNER NOTES

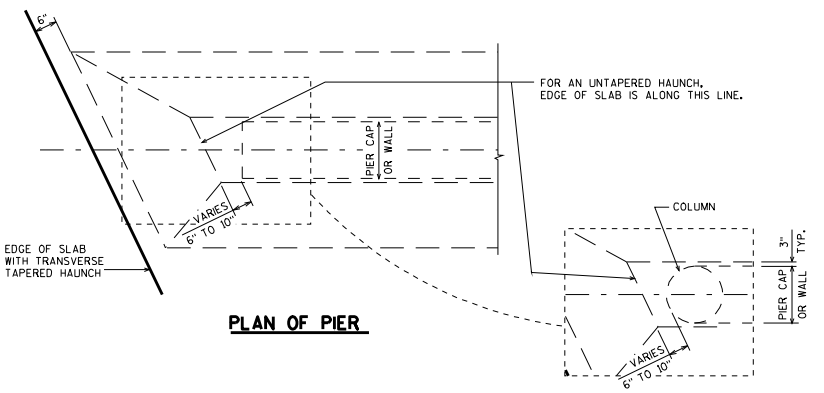
- THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.
- ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.
- USE OPTIONAL LONGITUDINAL JOINTS WHEN ROADWAY WIDTH IS OVER 52'-0". SEE STANDARD 18.02 FOR DETAIL.
- FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD INFLECTION.
- ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.
- FLOOR DRAINS ARE TO BE OMITTED FROM THESE UNITS WHERE POSSIBLE. IF FLOOR DRAINS ARE REQ'D., PLACE ONLY AT THE 2/10 & 8/10 PTS. BEND MAIN REBARS PAST DRAINS - DO NOT CUT.
- TRANSVERSE TAPERED HAUNCHES MAY BE USED TO ELIMINATE A COLUMN (PROVIDED A MINIMUM OF 3 COL'S. ARE USED), OR FOR AESTHETICS.
- PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. COLUMN W/O CAP TYPE PIERS MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.



**TAPERED/UNTAPERED HAUNCH
CROSS SECTION**



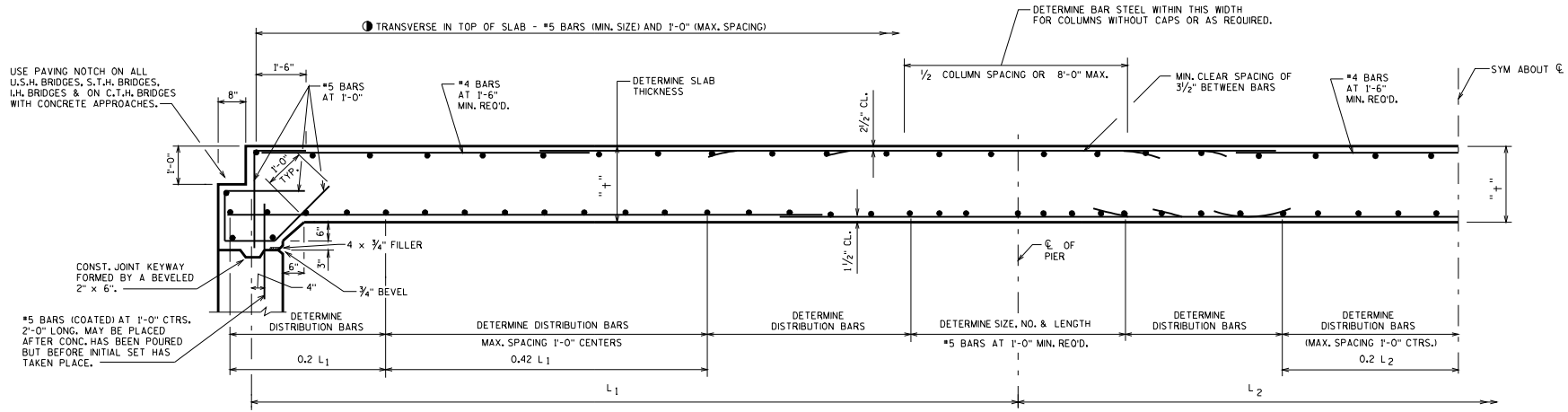
**PIER CAP OR WALL TYPE PIER
SHOWING TRANSVERSE TAPERED HAUNCH**



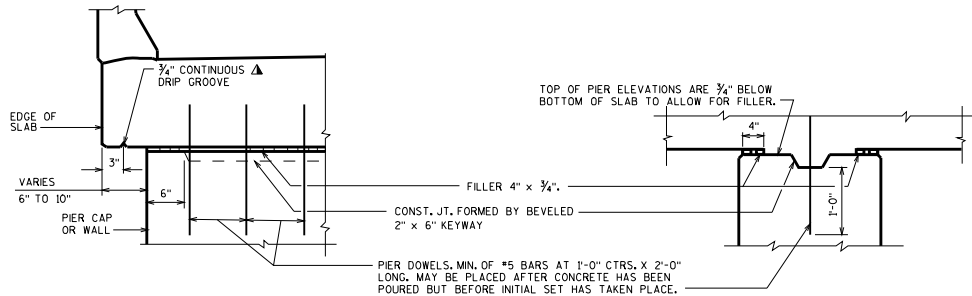
PLAN OF PIER

TOP TRANSVERSE REINF. FOR RAILINGS/PARAPETS		
SLOPED FACE PARAPETS LF/HF/5IF	MAIN BARS RUN FROM EDGE TO EDGE OF SLAB	SHORT BARS PLACED BETWEEN MAIN BARS AT EDGE OF SLAB
SLAB THICK. ≥ 15"	(*5 @ 1'-0")	(*5 @ 1'-0") 4'-9" LONG NO HOOK REQ'D. AT END
13" ≤ SLAB THICK. < 15"	(*5 @ 10")	(*5 @ 10") 4'-3" LONG STD. HOOK REQ'D. AT END
STEEL RAILINGS TYPE "M"/"W"	○ TOP TRANSVERSE REINF. SPECIFIED IN "LONGIT. SECTION" IS ADEQUATE	

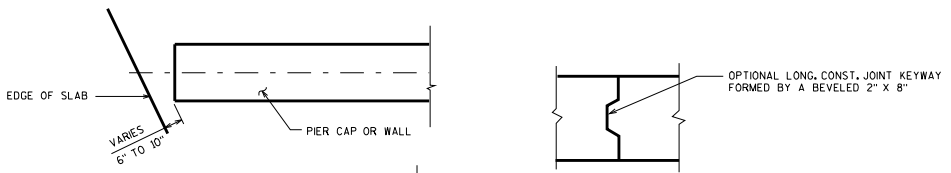
CONTINUOUS HAUNCHED SLAB	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10



HALF LONGITUDINAL SECTION



PIER CAP OR WALL TYPE PIER
SEE STD. 18.01 FOR COLUMN W/O CAP PIER DETAIL.



PLAN OF PIER

OPTIONAL LONGITUDINAL CONSTRUCTION JOINT

TOP TRANSVERSE REINF. FOR RAILINGS/PARAPETS		
SLOPED FACE PARAPETS LF/HF/5F	MAIN BARS RUN FROM EDGE TO EDGE OF SLAB	SHORT BARS PLACED BETWEEN MAIN BARS AT EDGE OF SLAB
SLAB THICK. ≥ 15"	(*5 @ 1'-0")	(*5 @ 1'-0") 4'-9" LONG NO HOOK REQ'D. AT END
13" ≤ SLAB THICK. < 15"	(*5 @ 10")	(*5 @ 10") 4'-9" LONG STD. HOOK REQ'D. AT END
STEEL RAILINGS TYPE "M"/"W"	TOP TRANSVERSE REINF. SPECIFIED IN "LONGIT. SECTION" IS ADEQUATE	

NOTES

- TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.
- ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).
- PARAPETS SHOWN ABOVE THE HORIZONTAL CONSTRUCTION JOINT SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED EXCEPT FOR STAGE CONSTRUCTION.
- CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION & FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.
- ▲ 3/4" CONTINUOUS DRIP GROOVE TO END 2'-0" AWAY FROM FACE OF ABUTMENT.

DESIGNER NOTES

- ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.
- USE OPTIONAL LONGITUDINAL JOINTS WHEN ROADWAY WIDTH IS OVER 52'-0".
- FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD INFLECTION.
- ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.
- FLOOR DRAINS ARE TO BE OMITTED FROM THESE UNITS WHERE POSSIBLE. IF FLOOR DRAINS ARE REQ'D., PLACE ONLY AT THE 2/10 & 8/10 PTS. BEND MAIN REBARS PAST DRAINS - DO NOT CUT.
- PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. COLUMN W/O CAP TYPE PIERS (SEE STD. 18.01) MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.
- THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.

CONTINUOUS FLAT SLAB

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: Scot Becker DATE: 1-10

GENERAL NOTES

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAMING.

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 8" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 8" OF THE TOP FLANGE.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, THE FOLLOWING OPTION IS AVAILABLE:

USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN UPON APPROVAL OF THE STRUCTURES DEVELOPMENT CHIEF, 16081266-5161.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 36W-INCH".

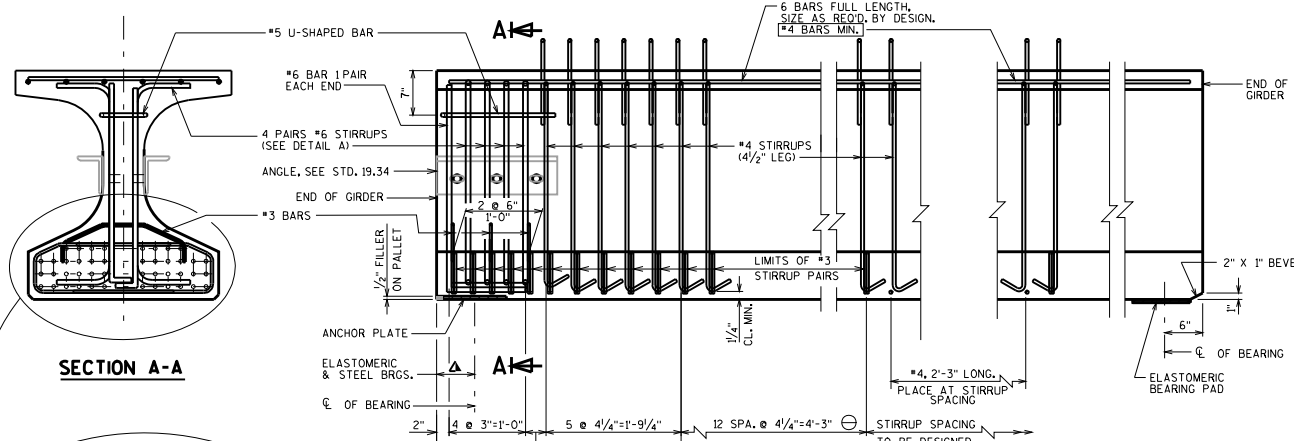
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,600 PSI. USE 0.6" STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" STRANDS IS 8.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STRAND PATTERNS LISTED ON STANDARD 19.12 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT. PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES IS REQUIRED IF DESIGN OF THE END REINFORCEMENT IS REQUIRED.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09).

⊖ DETAIL TYPICAL AT EACH END

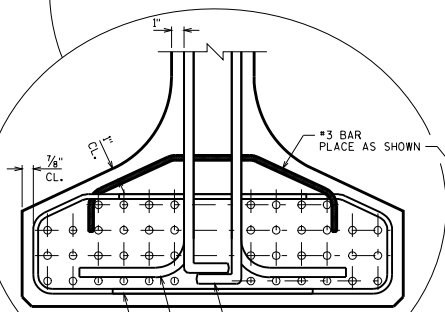
● THE DESIGN ENGINEER NEEDS TO DETERMINE THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND RESIDUAL CAMBER OF THE GIRDER, INCLUDING VARIANCE IN GIRDER CAMBER OF 2". THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF GIRDER LENGTH. ONE VALUE FOR ENTIRE GIRDER LENGTH CAN BE GIVEN IF 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK.



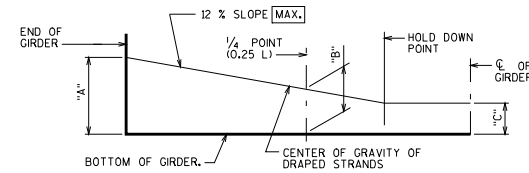
SECTION A-A

SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SUPPORT WITH 1/2\"/>

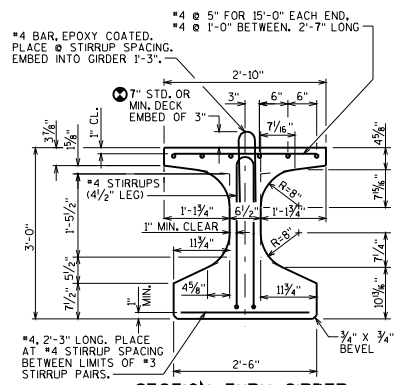


**DETAIL A
BOTTOM FLANGE**

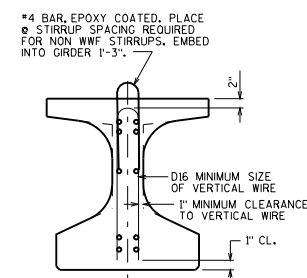


"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = 1/4("A" + 3 "C") [MIN.]
 "B" = 1/4("A" + 3 "C") + 3" [MAX.]

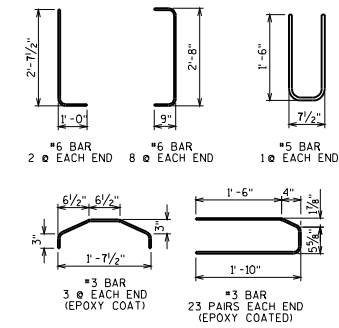
RECORD DIMENSIONS "A", "B" & "C" ON FINAL PLANS.



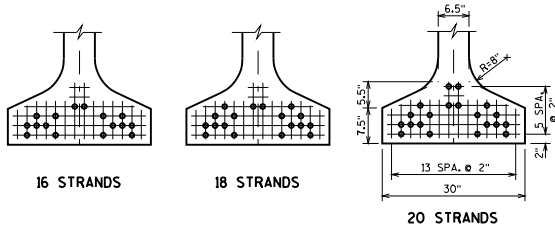
**SECTION THRU GIRDER
STRANDS NOT SHOWN**



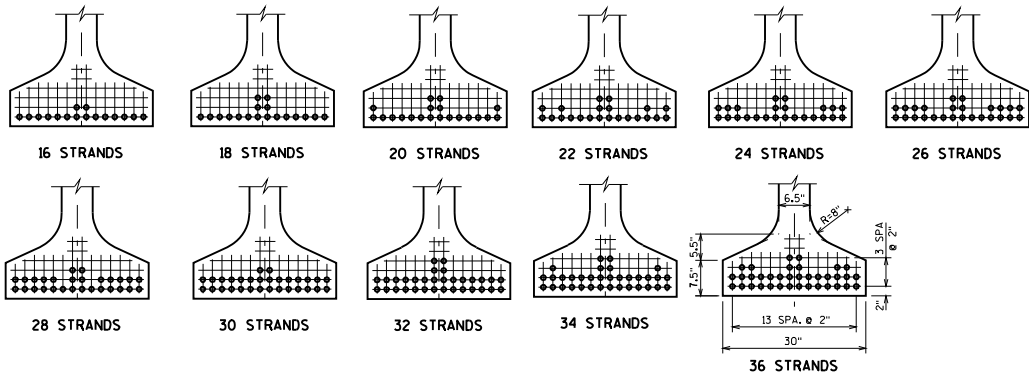
**SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS**



36W\"/> 	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10



STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6"Ø STRANDS



ARRANGEMENT AT C/4 SPAN - FOR GIRDERS WITH DRAPED 0.6"Ø STRANDS

36W" GIRDER

A = 632 SQ. IN.
 $r^2 = 158.20 \text{ IN.}^2$
 $y_T = 19.37 \text{ IN.}$
 $y_B = -16.63 \text{ IN.}$
 $I = 99,980 \text{ IN.}^4$
 $S_T = 5,162 \text{ IN.}^3$
 $S_B = -6,012 \text{ IN.}^3$
 WT. = 658 #/FT.

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 for low relaxation strands

PI PER 0.6" Ø STRAND = $0.217 \times 202,500 = 43,94 \text{ KIPS}$

$\frac{y_B}{r^2} = \frac{-16.63}{158.20} = -0.10512 \text{ in/in}^2$

$f_B (\text{init.}) = \frac{A_s f_s}{A} (1 + \frac{e_s y_B}{r^2})$

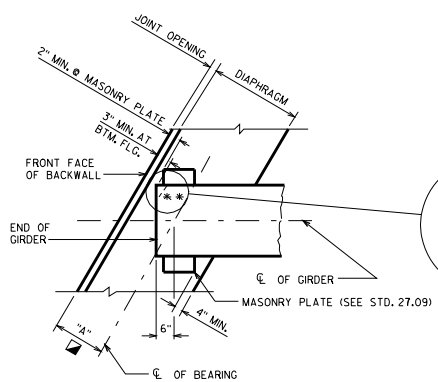
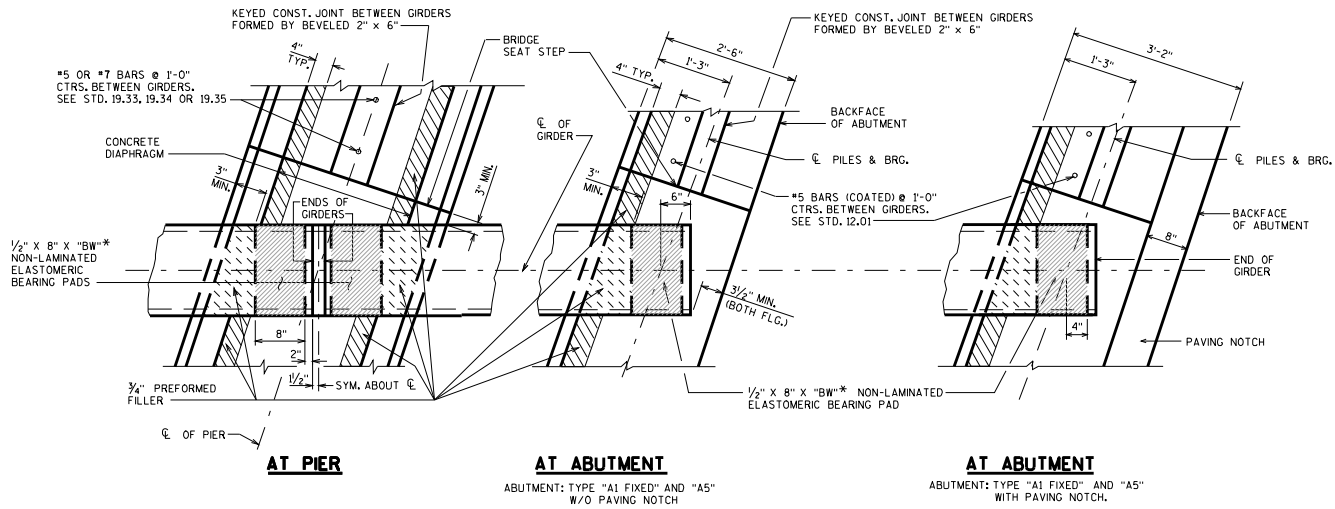
(COMPRESSION IS POSITIVE)

NO. STRANDS	e_s (inches)	$P(\text{init.}) = A_s f_s$ (KIPS)	$f_B (\text{init.})$ (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-12.13	703	2.531
18	-11.74	791	2.796
20	-11.03	879	3.003
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-14.38	703	2.794
18	-13.96	791	3.088
20	-13.83	879	3.413
22	-13.72	967	3.737
24	-13.63	1055	4.061
26	-13.55	1143	4.385
28	-13.49	1230	4.706
30	-13.43	1318	5.030
32	-13.13	1406	5.295
34	-12.98	1494	5.589
36	-12.85	1582	5.885

36W" PRESTRESSED GIRDER DESIGN DATA

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

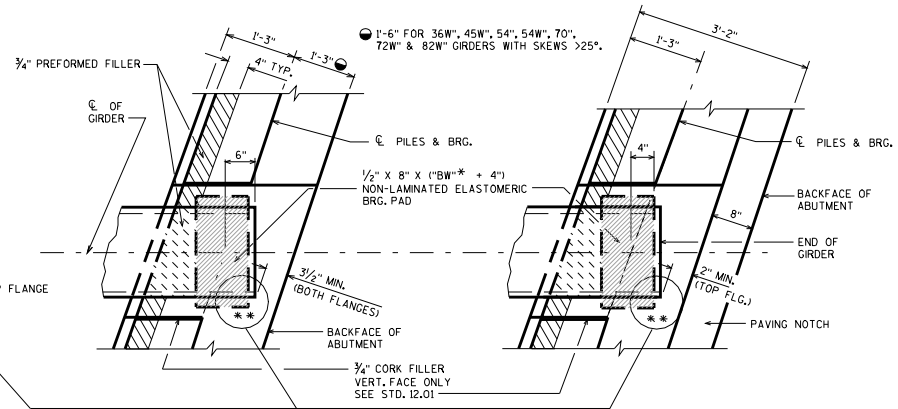
APPROVED: Scot Becker DATE: 1-10



PLAN AT ABUTMENT

ABUTMENT: TYPE "A3" OR "A4"
SEE TABLE FOR MIN. "A" VALUES
REQ'D. TO MEET MIN. CLEARANCE
CRITERIA ABOVE.

** FORM-OUT CORNER OF TOP FLANGE ON 36W*,
45W, 54W, 70", 72W" & 82W" PRESTRESSED
GIRDERS TO MEET MIN. CLEARANCE REQ'D.



AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP."
W/O PAVING NOTCH

AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP."
WITH PAVING NOTCH

MIN. "A" DIMENSION IN INCHES FOR A3 AND A4 ABUTMENTS WITH STEEL BEARINGS AS SHOWN ON STD. 27.09.

☐ "A" DIMENSION BASED ON BOTTOM FLANGE CLEARANCE IS CALCULATED USING 6" OFFSET FROM C.G. BRG. TO END OF GIRDER AND 3" MIN. OFFSET BETWEEN FLANGE AND BACKWALL TO ACCOMMODATE EXPANSION. IF CONDITIONS REQUIRE OFFSETS OTHER THAN THESE, THE "A" DIMENSION MUST BE CALCULATED.

"A" DIMENSION BASED ON MASONRY PLATE CLEARANCE IS CALCULATED ASSUMING A 10" LONG PLATE. IF LONGER PLATE IS REQUIRED, RECALCULATE "A".

SKEW ANGLE °	GIRDER DEPTHS									
	28"	36"	36W"	45"	45W"	54"	54W"	70"	72W"	82W"
0-5	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
> 5-15	12"	12"	13"	12"	13"	12.5"	13"	13"	13"	13"
> 15-25	12.5"	12.5"	15"	13"	15"	14"	15"	15"	15"	15"
> 25-35	(14")	(14")	(17.5")	(15")	(17.5")	(16.5")	(17.5")	16.5"	(17.5")	(17.5")
> 35-45	(15.5")	(15.5")	(20")	(17")	(20")	(18.5")	(20")	(18.5")	(20")	(20")
> 45-55	(17")	(17")	(21.5")	(18.5")	(21.5")	(20")	(21.5")	(20")	(21.5")	(21.5")

VALUES IN PARENTHESIS ARE CONTROLLED BY 2" CLR. CRITERIA AT EDGE OF MASONRY PLATE. VALUES MAY BE ADJUSTED IF MASONRY PLATE IS CLIPPED PER STANDARD 27.02.

PRESTRESSED GIRDER FLANGE WIDTH TABLE

GIRDER DEPTH	28"	36"	36W"	45"	45W"	54"	54W"	70"	72W"	82W"
TOP FLANGE WIDTH	18"	12"	34"	16"	34"	20"	48"	30"	48"	48"
BOTTOM FLANGE WIDTH "BW"	18"	18"	30"	22"	30"	26"	30"	26"	30"	30"

DESIGNER NOTES

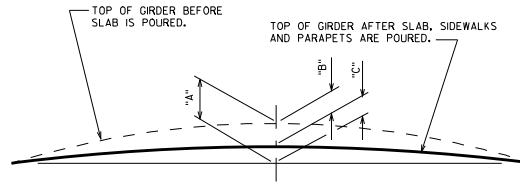
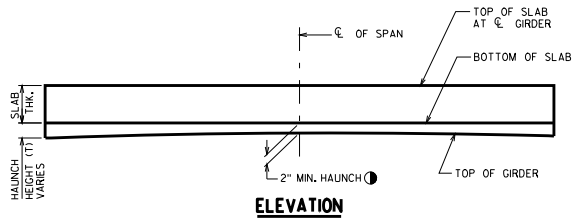
STANDARD DETAIL DRAWINGS FOR THE 45", 54" AND 70" CAN BE FOUND IN CHAPTER 40, BRIDGE REHABILITATION. THESE GIRDERS HAVE BEEN REPLACED WITH THE 45W", 54W" AND 72W" RESPECTIVELY AND ARE NO LONGER USED ON NEW CONSTRUCTION PROJECTS.

BEARING PAD DETAILS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: Scot Becker

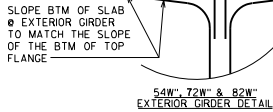
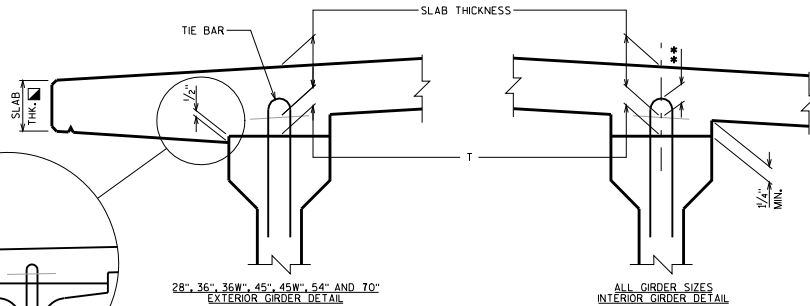
DATE:
1-10



- * "A" = PRESTRESS CAMBER
- * "B" = DEAD LOAD DEFLECTION * ROUND OFF TO NEAREST 1/8"
- * "C" = RESIDUAL CAMBER

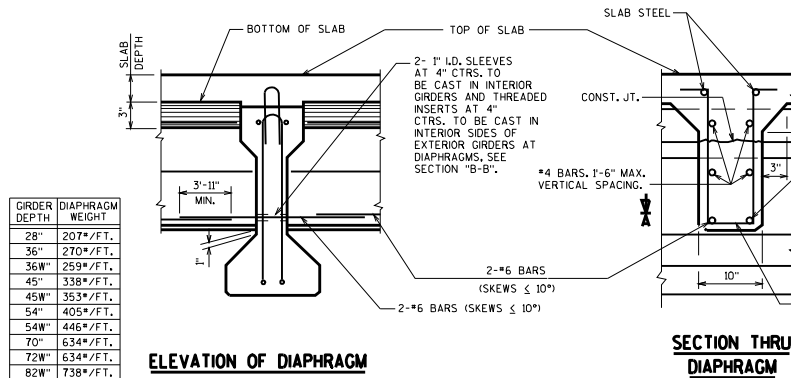
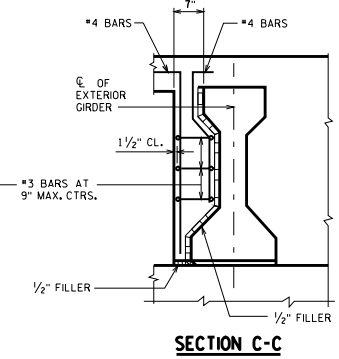
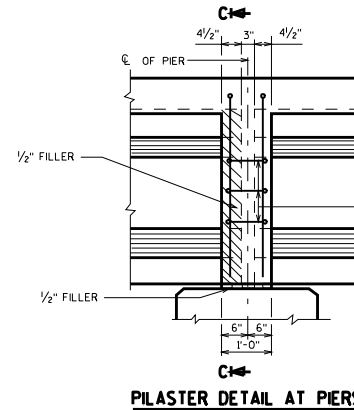
DESIGNER NOTES

- 1 PRESENT PRACTICE IS TO USE A MINIMUM "HAUNCH HEIGHT" (AT EDGE OF GIRDER FLANGE) OF 2" FOR DESIGN CALCULATIONS. THE MINIMUM HAUNCH (AT EDGE OF GIRDER FLANGE) ALLOWED IN CONSTRUCTION IS 1/4".
- USE THE CALCULATED THEORETICAL AVERAGE "HAUNCH HEIGHT" AT CENTERLINE OF FLANGE FOR COMPUTING THE HAUNCH CONCRETE QUANTITY.
- USE TOP OF DECK ELEVATIONS AND CALCULATED "HAUNCH HEIGHT" AT CENTERLINE OF GIRDER FOR COMPUTING BEAM SEAT ELEVATIONS AT SUBSTRUCTURES.
- "INTERMEDIATE CONCRETE DIAPHRAGMS" SHALL BE USED ONLY WHEN THE USE OF STEEL DIAPHRAGMS IS NOT FEASIBLE BECAUSE OF UTILITIES OR FOR OTHER SPECIAL SITUATIONS. ONLY ONE TYPE OF INTERMEDIATE DIAPHRAGM SHALL BE SHOWN ON THE PLANS. THE USE OF BOTH INTERMEDIATE CONCRETE & STEEL DIAPHRAGMS ON THE SAME BRIDGE IS NOT ALLOWED.
- FOR SKEWS < 10°, PLACE INTERMEDIATE DIAPHRAGMS IN A STRAIGHT LINE. REFER TO STANDARD 19.36. PROVIDE OFFSET FOR SKEWS > 10°.
- PIER PILASTERS ARE TYPICALLY NOT USED, BUT MAY BE USED AS PART OF THE BRIDGE AESTHETIC PACKAGE ON 28", 36", 45", 54" AND 70" PRESTRESSED GIRDERS. PILASTERS ARE NOT USED ON 56W", 45W", 54W", 72W" OR 82W".
- WHEN THE TYPE "M" RAILING IS USED WITH THE 28", 36", 36W", 45", 45W", 54" AND 70", THE THICKNESS AT THE EDGE OF DECK IS 10 1/2".
- DIAPHRAGM SPACING: FOR SPANS < 80'-0" PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER, FOR SPANS OVER 80'-0" PLACE AT 1/3 AND 2/3 POINTS.

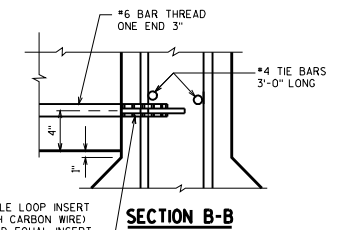
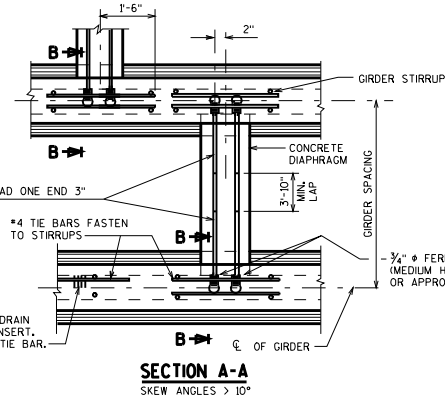


IF 1/4" MINIMUM HAUNCH HEIGHT AT EDGE OF GIRDER CANNOT BE MAINTAINED, THE GRADE LINE MAY BE REVISED BY THE ENGINEER AT THE OPTION OF THE CONTRACTOR, THE PLAN SLAB THICKNESS SHALL BE HELD, NOTIFY THE STRUCTURES SECTION IF THE GRADE LINE IS RAISED FROM THE PLAN PROFILE BY MORE THAN 1/2" OR, ** IF 3" MINIMUM DECK EMBEDMENT OF TIE BAR CANNOT BE OBTAINED, TO DETERMINE 'T', ELEV. OF TOP OF GIRS. AT CL OF SUBSTRUCTURE UNITS & AT 1/10 POINTS OF EACH SPAN SHALL BE TAKEN, THEN FOLLOW THIS PROCESS:

- TOP OF DECK ELEV. AT FINAL GRADE
- TOP OF GIRDER ELEVATION
- + DEAD LOAD DEFLECTION
- SLAB THICKNESS
- = HAUNCH HEIGHT 'T'



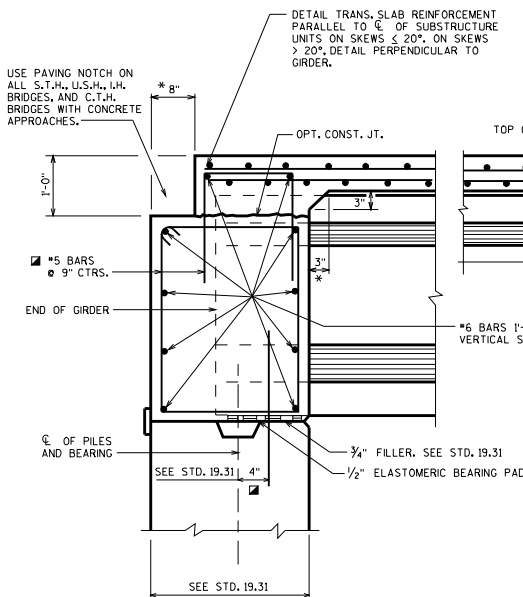
GIRDER DEPTH	DIAPHRAGM WEIGHT
28"	207#/FT.
36"	270#/FT.
36W"	259#/FT.
45"	338#/FT.
45W"	353#/FT.
54"	405#/FT.
54W"	446#/FT.
70"	634#/FT.
72W"	634#/FT.
82W"	738#/FT.



PRESTRESSED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

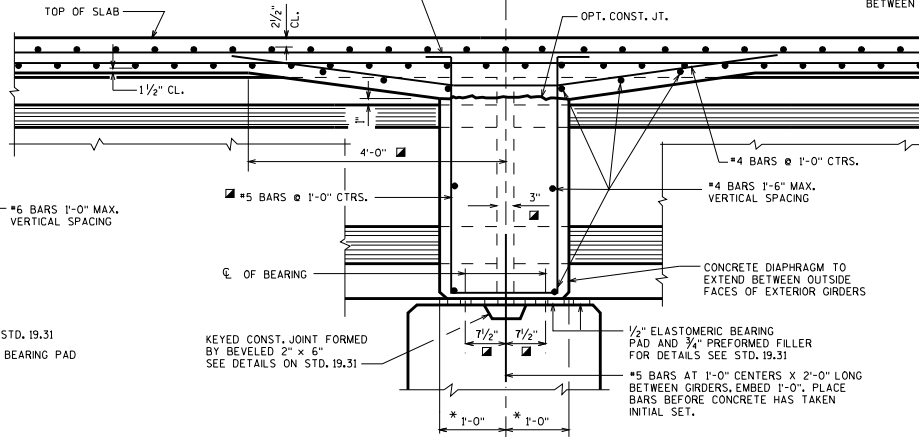
APPROVED: Scot Becker DATE: 1-10



**FIXED END
FOR SKEWED AND SQUARE STRUCTURES**

DESIGN BAR STEEL FOR SPANS WITH GIRDER CONTINUITY. USE #7 BARS x 16'-0" LONG ON SPANS WITHOUT CONTINUITY. SPLICE TO LONGITUDINAL BARS IN LONGER SPAN.

DETAIL TRANS. SLAB REINFORCEMENT PARALLEL TO ϕ OF SUBSTRUCTURE UNITS ON SKEWS $\leq 20^\circ$. ON SKEWS $> 20^\circ$, DETAIL PERPENDICULAR TO GIRDER.

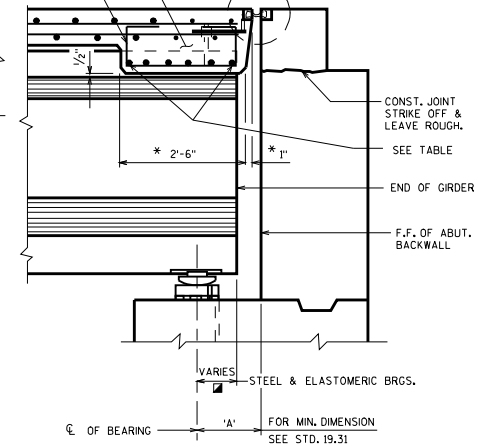


DIAPHRAGM AT 1/2" ELASTOMERIC BEARING

SEE STD. 28.01 FOR STRIP SEAL EXPANSION JOINT DEVICE. SEE STD. 28.03 FOR MODULAR JOINT EXPANSION JOINT DEVICE AND ABUTMENT BACKWALL DETAILS.

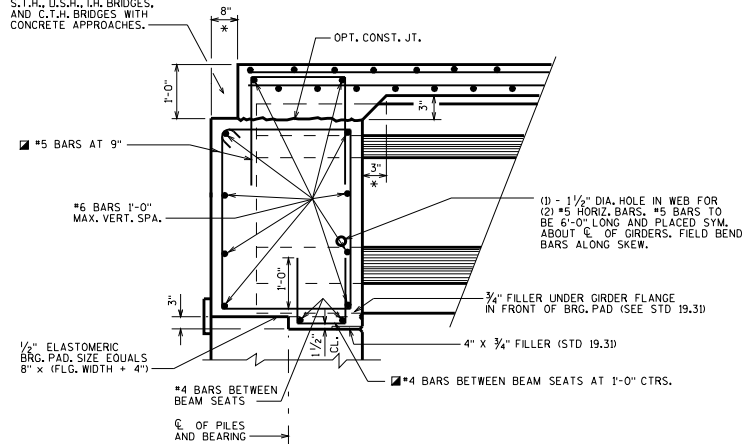
CONCRETE DIAPHRAGM TO EXTEND BETWEEN INSIDE FACES OF EXTERIOR GIRDERS FOR STRIP SEALS. SEE STD. 28.03 FOR MODULAR EXPANSION JOINTS.

#4 STIRRUPS ϕ 10" CTRS. BETWEEN GIRDERS



EXPANSION END

USE PAVING NOTCH ON ALL S.T.H., U.S.H., L.H. BRIDGES, AND C.T.H. BRIDGES WITH CONCRETE APPROACHES.



**PRESTRESSED GIRDER WITH
SEMI-EXPANSION SEAT**

EXPANSION END DIAPHRAGM STEEL

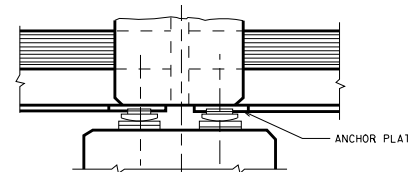
DIAPHRAGM LENGTH (ALONG SKEW) BETWEEN GIRDERS (ϕ TO ϕ OF GRDS.)	NO. OF BARS & BAR SIZE	
	28"	36"
$\leq 8'-4"$	6 - #6	6 - #6
$> 8'-4"$ $\leq 11'-4"$	6 - #8	6 - #7
$> 11'-4"$ $\leq 14'-9"$		6 - #8

NOTES

LAP LENGTHS FOR ALL BARS SHALL BE BASED ON A "CLASS C" TENSION LAP SPLICE, EXCEPT HORIZONTAL DIAPHRAGM BARS, IF SPLICED, CAN UTILIZE A "CLASS A" TENSION LAP SPLICE.

LEGEND

- ▣ THESE DIMENSIONS PARALLEL TO GIRDER
- * DIMENSION IS TAKEN NORMAL TO ϕ SUBSTRUCTURE UNITS.



**DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS
SECTION THRU HAUNCH AT PIER**

SEE STANDARD 19.34 FOR 36" & 45" PRESTRESSED GIRDERS SLAB AND SUPERSTRUCTURE DETAILS

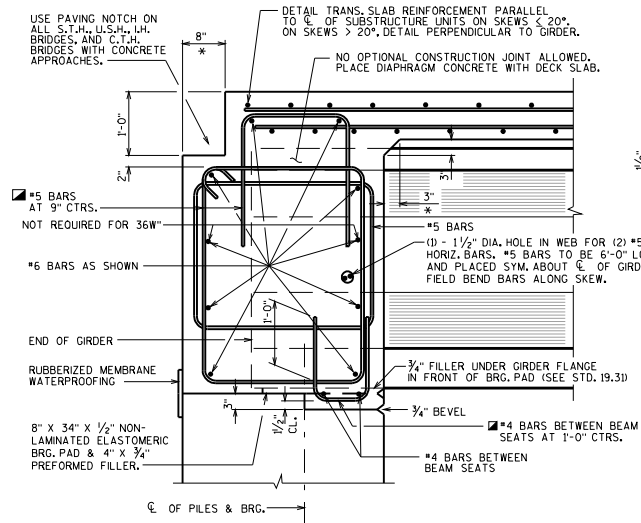
SEE STANDARD 19.35 FOR 54", 72" & 82" PRESTRESSED GIRDERS SLAB & SUPERSTRUCTURE DETAILS.

**28" & 36" PRESTRESSED GIRDERS
SLAB & SUPERSTRUCTURE DETAILS**

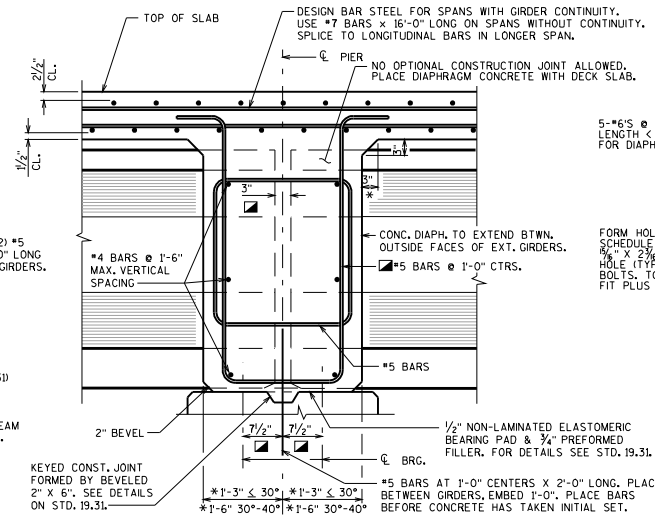
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker*

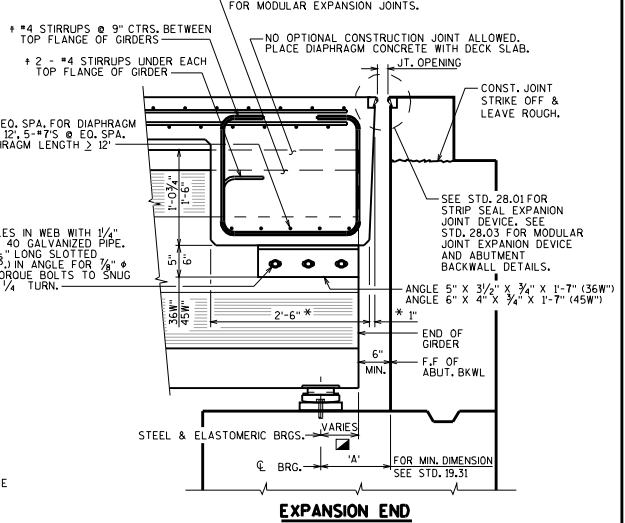
DATE:
1-10



PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT



DIAPHRAGM AT 1/2" ELASTOMERIC BEARING

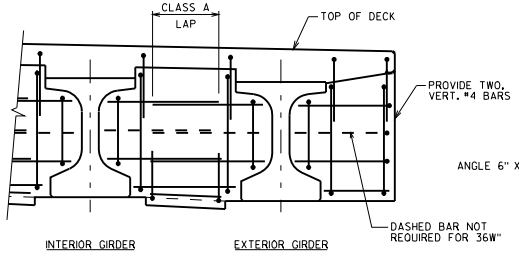


EXPANSION END

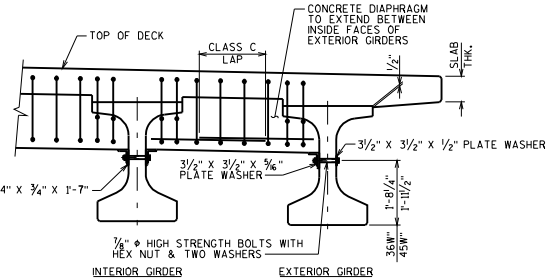
0° SKEW SHOWN (NON 0° SKEW SHOWN IN TOP VIEW)

LEGEND

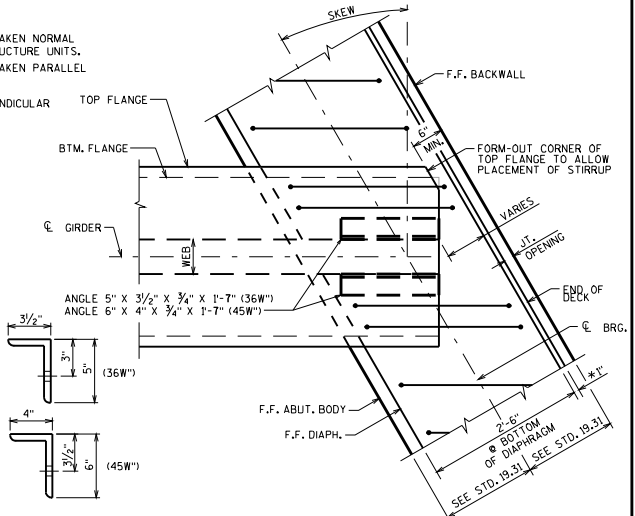
- * DIMENSION IS TAKEN NORMAL TO CL OF SUBSTRUCTURE UNITS.
- DIMENSION IS TAKEN PARALLEL TO CL OF GIRDER.
- + SPACING PERPENDICULAR TO CL OF GIRDERS



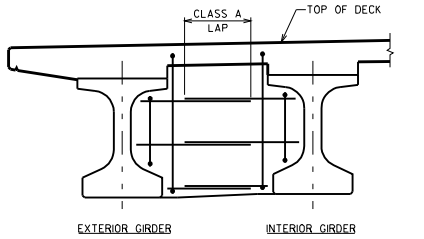
PART TRANSVERSE SECTION AT DIAPHRAGM SEMI-EXPANSION END



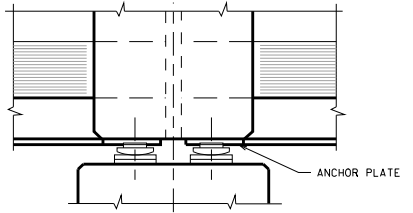
PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END



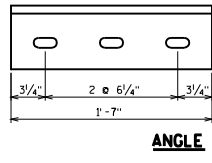
TOP VIEW OF DIAPHRAGM (EXPANSION END)



PART TRANSVERSE SECTION AT DIAPHRAGM PIER



DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS SECTION THRU HAUNCH AT PIER



ANGLE

NOTES

- DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE 1.
- ALL SUPPORT ANGLES SHALL BE HOT-DIPPED GALVANIZED.
- ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.
- LAP LENGTHS FOR DIAPHRAGM REINFORCEMENT SHALL BE BASED ON A CLASS "C" TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.
- ALL DIAPHRAGM SUPPORT HARDWARE SHALL BE INCIDENTAL TO "CONCRETE MASONRY BRIDGES".
- CONCRETE FOR ABUTMENT AND PIER DIAPHRAGMS SHALL BE PLACED WITH THE DECK CONCRETE. NO OPTIONAL CONSTRUCTION JOINT WILL BE ALLOWED.
- THESE DIMENSIONS PARALLEL TO GIRDER

PRESTRESSED 36W" & 45W" GIRDER SLAB & SUPERSTRUCTURE DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10

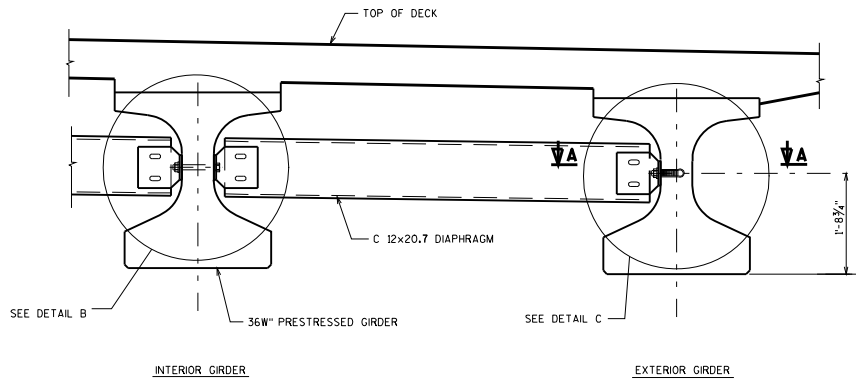
NOTES

ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGMS B - - ", EACH.

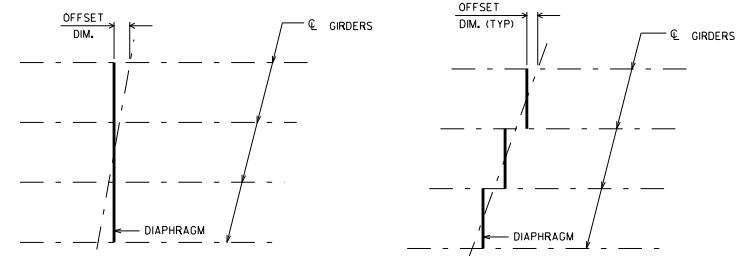
EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT. ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE 1.

ALL DIAPHRAGM STRUCTURAL STEEL SHOWN SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S10 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

FOR SPANS EQUAL TO OR LESS THAN 80'-0", PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0", PLACE AT 1/3 AND 2/3 POINTS.

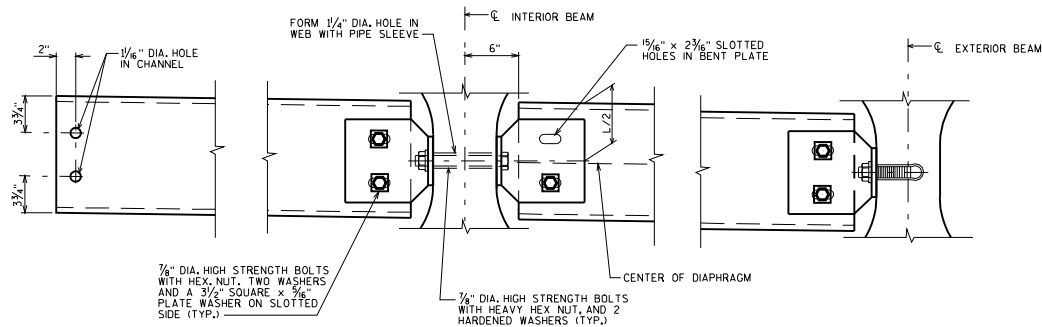


PART TRANSVERSE SECTION AT DIAPHRAGM



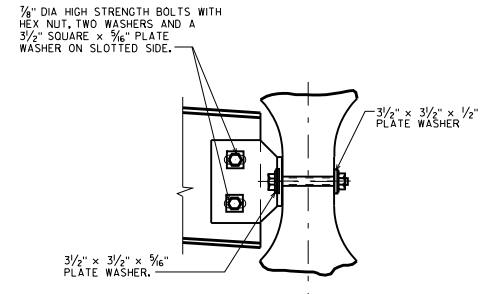
PLAN FOR SKEW ANGLES < 10°

PLAN FOR SKEW ANGLES > 10°

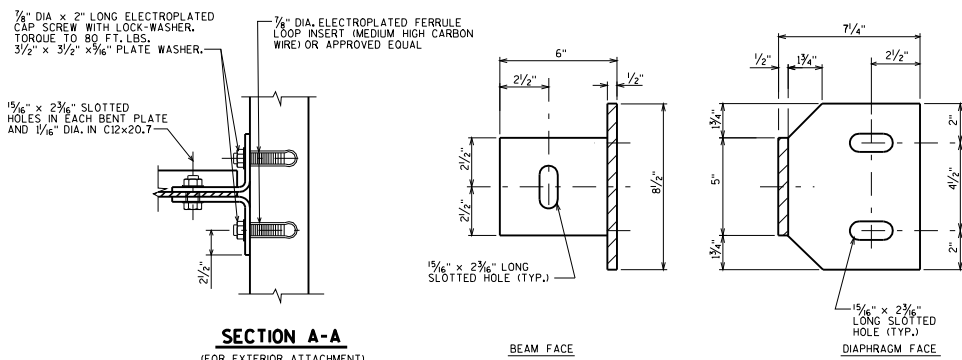


DETAIL B

DETAIL C



SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°



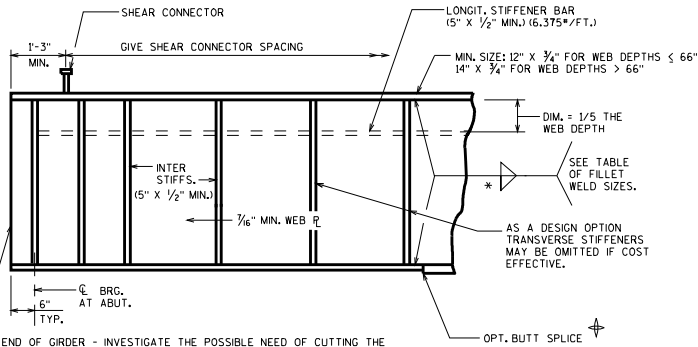
SECTION A-A
(FOR EXTERIOR ATTACHMENT)

BEAM FACE

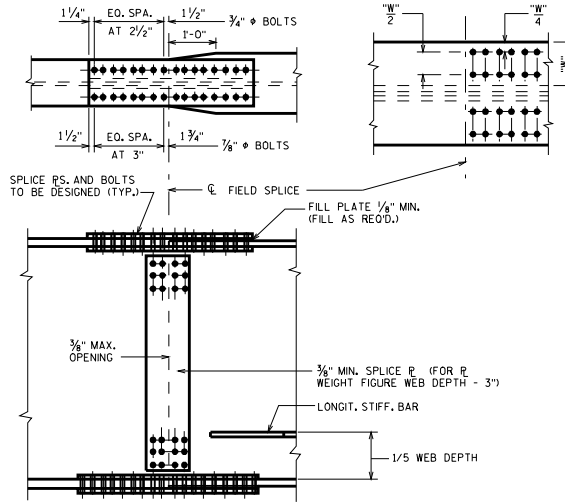
DIAPHRAGM FACE

ATTACHMENT TO CHANNEL

INTERM. STEEL DIAPHS. FOR 36W PRESTRESSED GIRDERS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10



PART GIRDER ELEVATION



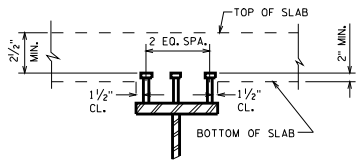
FIELD SPlice DETAILS

SEE STANDARD 24.07 FOR KINKED GIRDER DETAILS.

NOTES

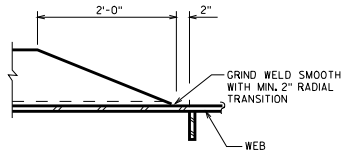
- OPTIONAL WELDED SHOP SPICES MAY BE USED FOR ALL FLANGE AND WEB PLATES OVER 60'-0" LONG. IF USED, THE LOCATION OF THE SPICE SHALL BE SHOWN ON SHOP DRAWINGS AND WILL BE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION.
- OPTIONAL FLANGE BUTT SPICE, A FLANGE PLATE OF THE LARGER SIZE MAY BE FURNISHED FULL LENGTH, BUT PAY WEIGHT SHALL BE BASED ON SECTIONS AS DETAILED, IF A PERMANENT HOLD DOWN DEVICE IS USED AT THE ABUTMENT, THEN THE BUTT SPICE SHALL NOT BE OPTIONAL.
- (REMINDER - BASE BEARING SEAT ELEVATIONS AT ABUTMENT ON THICKER FLANGE AND DETAIL SHM PLATES TO ACCOMMODATE THINNER FLANGE.)
- AT EXTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON INTERIOR FACE OF GIRDER, PLACE LONGITUDINAL STIFFENERS ON THE OUTSIDE FACE.
- AT INTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON ONE SIDE OF GIRDER AND LONGITUDINAL STIFFENERS ON THE OPPOSITE SIDE OF GIRDER, KEEP INTERMEDIATE STIFFENERS ON ONE SIDE WHEN LONGITUDINAL STIFFENERS ARE NOT REQUIRED.
- AVOID USE OF LONGITUDINAL STIFFENERS IF PRACTICAL BY THICKENING WEB, WHERE LONGITUDINAL STIFFENERS ARE USED, RUN THEM CONTINUOUS WITHOUT BREAKS AT CONNECTION STIFFENERS.
- AT EXTERIOR GIRDER PLACE INTERMEDIATE STIFFENERS ALONG ENTIRE LENGTH OF GIRDER AT A MAX. SPACING EQUAL TO 1.5 X THE DEPTH OF WEB, SPACE EQUALLY BETWEEN DIAPHRAGM CONNECTION STIFFENER. THIS REQUIREMENT IS NECESSARY TO SUPPORT THE FALSEWORK FOR THE SLAB OVERHANG AND MAY BE DISREGARDED IF THE SLAB OVERHANG, MEASURED FROM CL. WEB, IS 1'-6" OR LESS OR ANY OF THE FOLLOWING CRITERIA ARE SATISFIED:
 ...WEB THICKNESS > 3/8" AND WEB DEPTH < 48"
 ...WEB THICKNESS > 1/2" AND WEB DEPTH < 60"
 ...WEB THICKNESS > 3/4" AND WEB DEPTH < 66"
- PRIOR TO STEEL BLAST, ALL FLAME CUT EDGES OF PLATES THAT ARE TO BE PAINTED SHALL BE GROUND OR PLANED TO REMOVE THE HARDENED SURFACE CAUSED BY THE FLAME.

NOTE: USE THREE FIELD WELDED 7/8" DIA. X 5" LONG phi STUDS EQUALLY SPACED WITH A MIN. OF 1 1/2" CL. FROM THE FLANGE EDGE, STUDS SHALL NOT BE PLACED OVER FIELD SPICE PLATES.

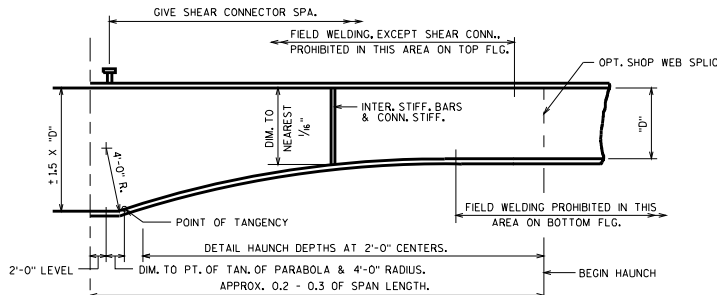


USE DIFFERENT LENGTH STUDS IF 2 1/2" MIN. CLEARANCE OR 2" EXTENSION CRITERIA IS VIOLATED.

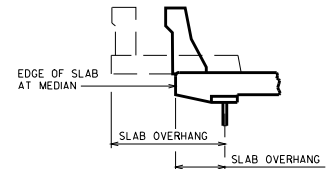
SHEAR CONN. DETAILS



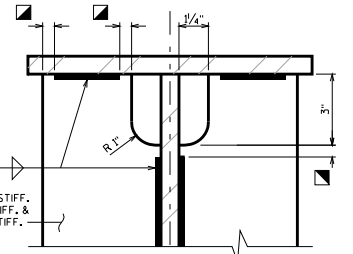
LONGIT. STIFF. TERMINATION



PARABOLIC HAUNCH DETAILS



SLAB OVERHANG DEFINITION

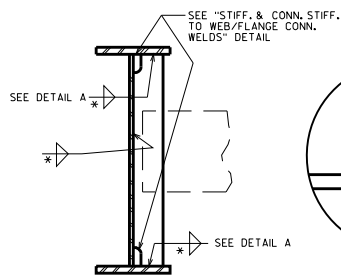


STIFF. & CONN. STIFF. TO WEB/FLANGE CONN. WELDS

*** TABLE OF FILLET WELD SIZES**

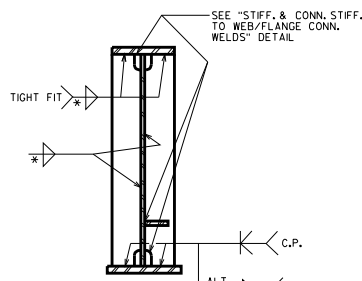
MATERIAL THICKNESS OF THICKER PART JOINED	MIN. SIZE OF FILLET WELD
TO 1/2" INCLUSIVE	3/16"
OVER 1/2" TO 3/4"	1/4"
OVER 3/4" TO 1 1/2"	5/16"
OVER 1 1/2" TO 2 1/4"	3/8"
OVER 2 1/4" TO 6"	1/2"

EXCEPT THAT THE WELD SIZE SHALL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED.
MIN. PASS SIZE IS 3/16"

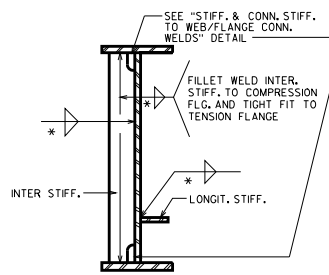


CONNECTION STIFF. DETAILS

DETAIL A
CONNECTION STIFFENER
DETAIL phi TENSION FLANGE



BRG. STIFF. DETAILS
TYP. AT ABUT. & PIER



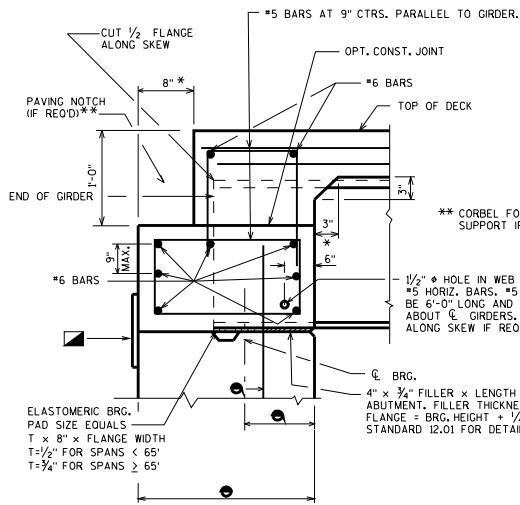
INTERMEDIATE & LONGITUDINAL STIFF. DETAILS
(ALL GIRDERS)

PLATE GIRDER DETAILS

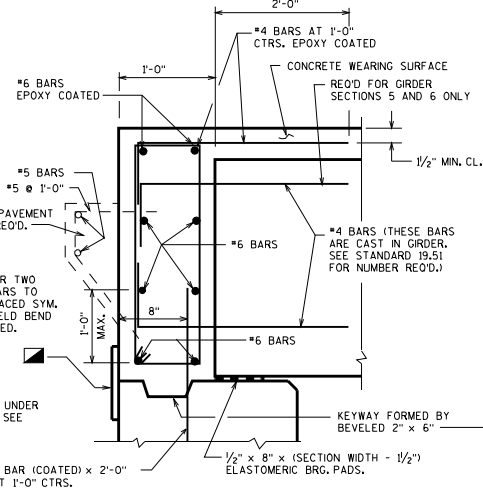
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker*

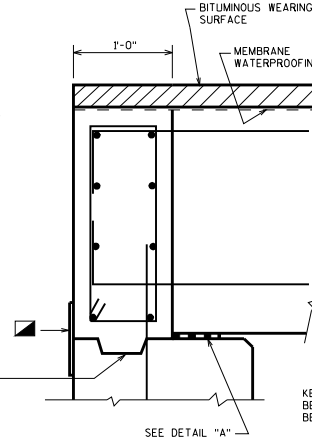
DATE:
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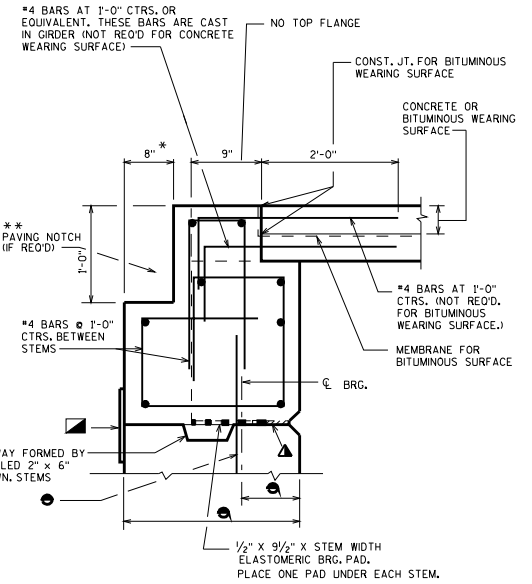
**STEEL GIRDER WITH
FIXED SEAT**



**WITH CONCRETE
WEARING SURFACE**

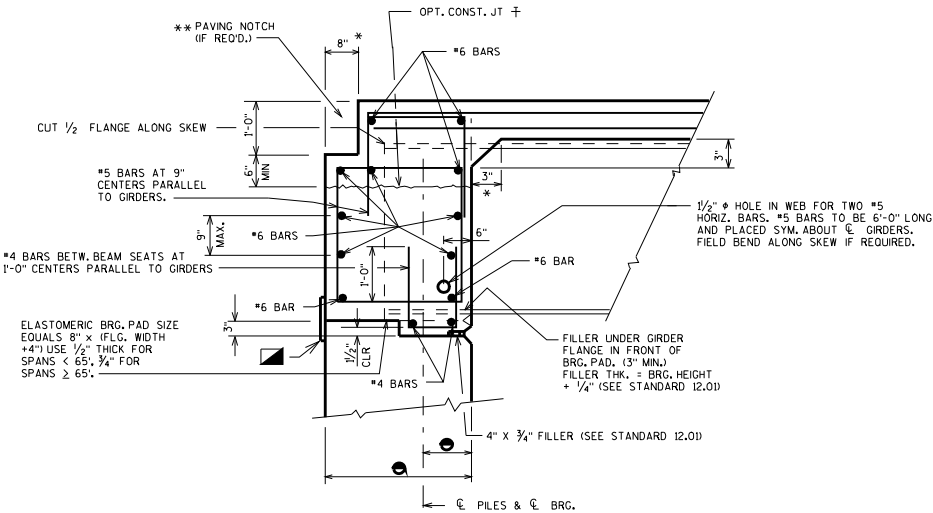


**WITH BITUMINOUS
WEARING SURFACE**

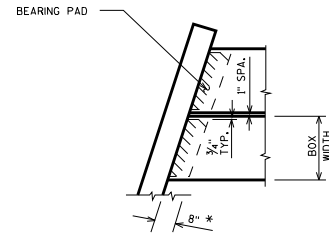


**PRECAST DOUBLE TEE OR
MULTI-STEM SECTION**

PRECAST BOX OR SLAB SECTION



**STEEL GIRDER WITH
SEMI-EXPANSION SEAT**



DETAIL "A"

NOTE: BEARING PAD WIDTH IS 1'-0" AT PIERS

NOTES

FOR SKEWED STRUCTURES CAST END OF PRECAST BOX, SLAB, OR TEE ALONG SKEW.

† THE USE OF THIS OPT. CONST. JOINT IS NOT RECOMMENDED FOR SKEWS OVER 15° WHEN LARGE DEADLOAD END ROTATION IS ANTICIPATED.

** USE PAVING NOTCH ON ALL S.T.H. & I.H. BRIDGES & ON C.T.H. BRIDGES WITH CONCRETE APPROACHES.

▲ 3/4" x 4" FILLER x LENGTH OF ABUT. PLACE ADDITIONAL FILLER BETWEEN BRG. PAD AND 3/4" x 4" FILLER.

* DIMENSION IS TAKEN NORMAL TO C. SUBSTRUCTURE UNITS.

▣ 1'-6" RUBBERIZED MEMBRANE WATERPROOFING

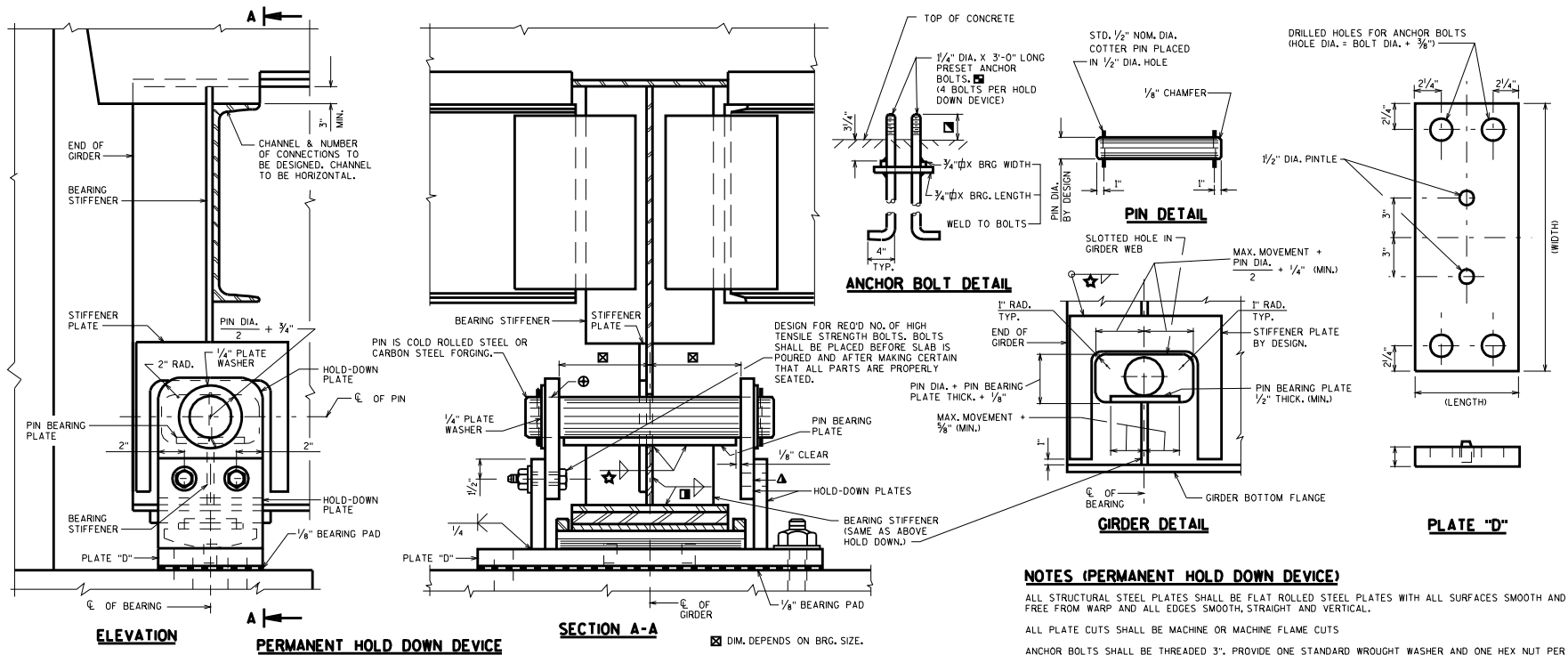
● SEE STD. 12.01

**BRG. DETAILS FOR STEEL GDERS.
AND PRECAST UNITS ON AI
ABUTMENTS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker*

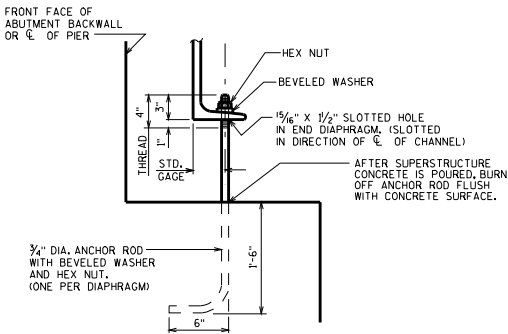
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NOTES (PERMANENT HOLD DOWN DEVICE)

- ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.
- ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS
- ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. CHAMFER TOP OF ANCHOR BOLTS PRIOR TO THREADING.
- ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS C.
- THE MATERIAL FOR THE HOLD-DOWN PLATES SHALL CONFORM TO ASTM A709 GRADE 50W.
- ALL MATERIAL WELDED TO THE GIRDERS, WHICH INCLUDES BEARING STIFFENERS, STIFFENER PLATE, AND PIN BEARING PLATE, SHALL MATCH THE STEEL REQUIREMENTS OF THE WEB AT THAT LOCATION.
- ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 36 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.
- ALL MATERIAL IN HOLD DOWN DEVICES, WHICH INCLUDES HOLD-DOWN PLATES, HIGH TENSILE STRENGTH BOLTS, PINS AND ANCHOR BOLTS, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "BEARING ASSEMBLIES EXPANSION B-...".
- ALL MATERIAL WELDED TO THE GIRDERS, WHICH INCLUDES BEARING STIFFENERS, STIFFENER PLATE, AND PIN BEARING PLATE, SHALL BE INCLUDED IN THE BID ITEM USED FOR THE STEEL GIRDER QUANTITIES.
- FOR REPLACEMENT BEARINGS, ANCHOR BOLTS SHALL BE 1/2" DIAMETER X 3'-0" LONG AND FULLY THREADED. THESE ANCHOR BOLTS SHALL BE PAID FOR AS "MASONRY ANCHORS TYPE S 1 1/2-INCH" AND BE EPOXY ANCHORED.
- SHOP DRILL HOLES IN HOLD-DOWN PLATE ATTACHED TO PLATE "D". FIELD DRILL HOLES IN UPPER HOLD-DOWN PLATE AFTER ALIGNING IN THE FIELD.
- SEE STANDARD 24.02 FOR TABLE OF FILLET WELD SIZES.
- SEE STANDARD 24.02 FOR WELD DETAILS SHOWING BEARING STIFFENER CONNECTION TO WEB AND FLANGE.
- PROJECT ANCHOR BOLTS, PLATE "D" THICKNESS + 2/4", ABOVE TOP OF CONCRETE.
- HOLES FOR PIN IN HOLD-DOWN PLATES AND PLATE WASHERS SHALL BE AS STATED IN STANDARD SPECIFICATION 506.3.17.

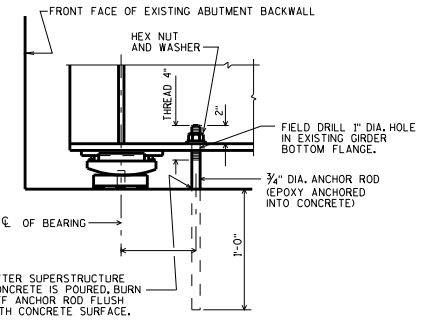
WHEN REQUIRED, HOLD DOWN DEVICES SHALL BE PLACED SYMMETRICALLY ABOUT LONGITUDINAL C/L OF FRAMING PLAN, MAXIMUM SPACING OF HOLD DOWNS SHALL BE AT ALTERNATE GIRDERS. HOLD DOWN DEVICE TO BE DESIGNED FOR MINIMUM UPLIFT CAPACITY OF 20 KIPS.



ELEVATION - NEW CONSTRUCTION

TEMPORARY HOLD DOWN DEVICES SHALL BE PLACED AT THAT END OF ALL CONTINUOUS STEEL GIRDER UNITS WHERE THE SLAB POUR TERMINATES, EXCEPT WHERE PERMANENT HOLD DOWN DEVICES ARE PLACED AT THIS LOCATION, LOCATE 1'-6" (NORMAL) OFF C/L OF GIRDER, TO BE PAID FOR AS "STRUCTURAL CARBON STEEL".

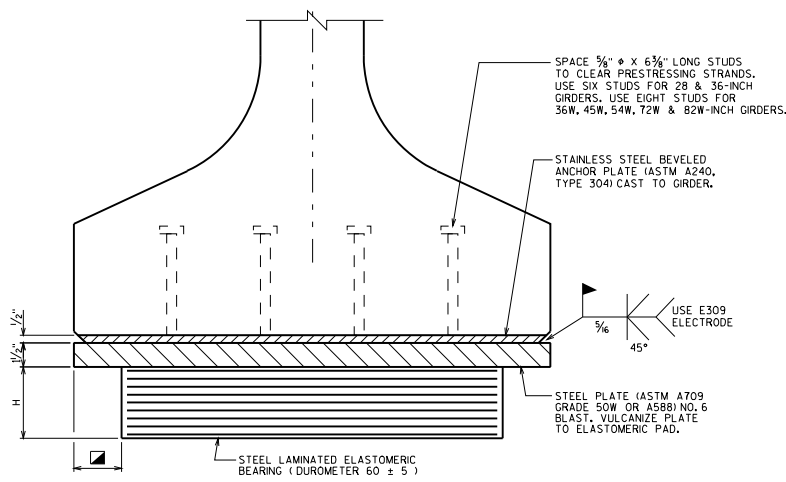
TEMPORARY HOLD DOWN DEVICE



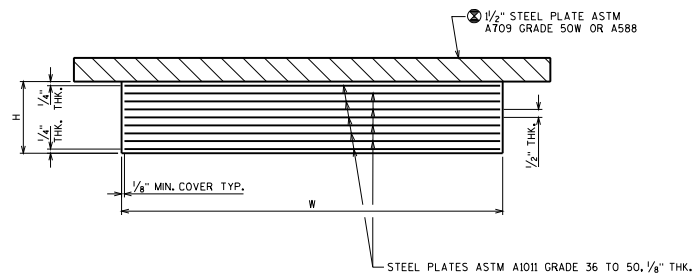
ELEVATION - DECK REPLACEMENT

PLACE ONE ANCHOR ROD PER GIRDER AT ABUTMENT WHERE SLAB POUR TERMINATES. LOCATE 4" (NORMAL) OFF C/L OF GIRDER. ANCHOR ROD, NUT, WASHER AND DRILLED HOLE IN GIRDER FLANGE SHALL BE PAID FOR AS "MASONRY ANCHORS TYPE S 3/4-INCH". MINIMUM PULLOUT CAPACITY OF 27 KIPS.

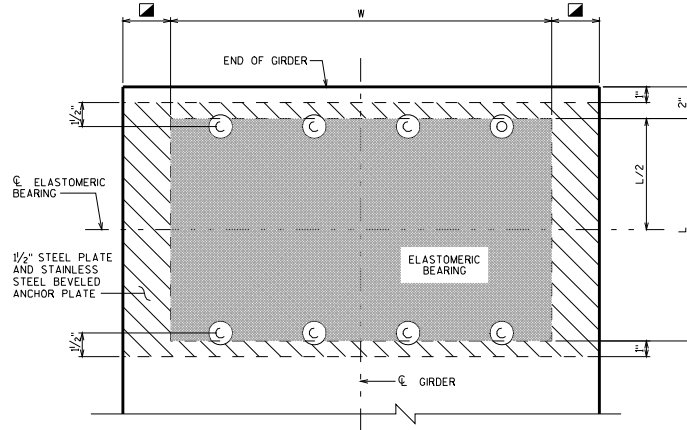
HOLD DOWN DEVICES	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Scot Becker</u>	DATE: 1-10



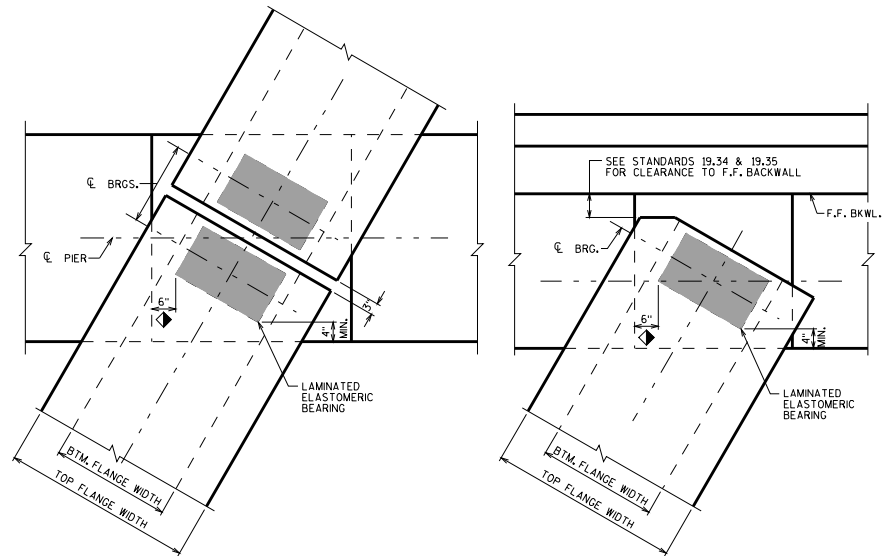
END VIEW



SECTION THRU ELASTOMERIC BEARING



PLAN VIEW



DETAIL SHOWN IS FOR A CONTINUOUS DECK AT AN EXPANSION PIER. IF PIER CAP WIDTH BECOMES EXCESSIVE, CONSIDER USING STEEL BEARINGS.

CLEARANCE DIAGRAM

EXPANSION BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

Δ_H (INCHES)	EXP. LENGTH (FEET)	TOTAL BEARING HEIGHT H (INCHES)	TOTAL ELASTOMER THICKNESS (INCHES)	LONGITUDINAL LENGTH OF BEARING L (MIN.) (INCHES)	NO. OF PLATES REQ'D.
1"	130	2 $\frac{1}{2}$ "	2"	8"	4
1 $\frac{1}{4}$ "	165	3 $\frac{3}{8}$ "	2 $\frac{1}{2}$ "	10"	5
1 $\frac{1}{2}$ "	195	3 $\frac{3}{4}$ "	3"	1'-0"	6
1 $\frac{3}{4}$ "	230	4 $\frac{3}{8}$ "	3 $\frac{1}{2}$ "	1'-2"	7
2"	260	5"	4"	1'-3"	8
2 $\frac{1}{4}$ "	295	5 $\frac{5}{8}$ "	4 $\frac{1}{2}$ "	1'-5"	9

THE VALUES IN THIS TABLE ARE FOR PRELIMINARY DESIGN PURPOSES.

NOTES

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING PADS ELASTOMERIC LAMINATED", EACH.

ON BEARING REPLACEMENTS, COMPRESSION LOAD AND ADHESION TESTS WILL BE WAIVED WHERE BEARINGS ARE DETAILED TO MEET HEIGHT REQUIREMENTS.

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

SEE CHAPTER 40 STANDARDS FOR USE OF ELASTOMERIC BEARINGS ON NEW AND REHABILITATED STEEL GIRDER BRIDGES.

★ THE "EXPANSION LENGTH" IN THE TABLE WAS CALCULATED BASED ON THE TOTAL ELASTOMER THICKNESS IN COLUMN 4). IT IS FOUND BY APPLYING LRFD (14.7.6.3.4), USING A TEMPERATURE RANGE OF 55° F, A COEFFICIENT OF THERMAL EXPANSION OF 0.00006 FT./FT./°F, AND A CREEP/SHRINKAGE COEFFICIENT OF 0.0003 FT./FT. THE DESIGNER IS TO SELECT PRELIMINARY BEARING DATA FROM THE TABLE BASED ON "EXPANSION LENGTH" AND THEN COMPLETE THE DESIGN BY SATISFYING ALL CRITERIA IN LRFD SPECIFICATION - SECTION 14, (SEE SECTION 27.4 IN "BRIDGE MANUAL" FOR DESIGN EXAMPLE.)

▲ L (MIN.) IS BASED ON STABILITY REQUIREMENTS (LRFD 14.7.6.3.6).

△ = TOTAL HORIZONTAL MOVEMENT OF SUPERSTRUCTURE H MEASURED FROM STATE AT WHICH BEARING IS UNDEFORMED.

⊗ CHECK 27.2.1 ELASTOMERIC BEARINGS IN THE BRIDGE MANUAL FOR REQUIREMENTS TO SEE IF THIS PLATE SHOULD BE TAPERED.

☑ 3" FOR 36W, 45W, 54W, 72W" & 82W"
1" FOR 28" & 36"

◆ MIN. DISTANCE FROM EDGE OF PIER/ABUT. STEP TO LAMINATED ELASTOMERIC BEARING

ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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BEARING NOTES

- ALL BEARINGS ARE SYMMETRICAL ABOUT \bar{C} OF GIRDER AND \bar{C} OF BEARING.
- ALL MATERIAL IN BEARINGS, BUT EXCLUDING STAINLESS STEEL PLATE, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.
- STAINLESS STEEL PLATE SHALL CONFORM TO ASTM A240, TYPE 304.
- STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.
- ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 36, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.
- ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.
- ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.
- ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.
- ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS, MASONRY PLATE "D" THICKNESS + 2/4" ABOVE TOP OF CONCRETE.
- CHAMFER ANCHOR BOLTS PRIOR TO THREADING.
- MASONRY PLATE "D", ROCKER PLATE "C", ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS "C". STEEL PLATE "B" SHALL BE SHOP PAINTED. DO NOT PAINT TEFLON SURFACE.
- ALL MATERIAL IN "STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS", INCLUDING BEARING PADS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES EXPANSION B-...", EACH.
- † DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 3/8" LARGER THAN ANCHOR BOLT.
- ▲ TEFLON SURFACE, USE UNFILLED WITH MINIMUM 1/16" THICKNESS. PLACE WITH SCRIBE MARKS IN DIRECTION OF MOVEMENT. BOND STEEL PLATE "B" AND TEFLON WITH ADHESIVE MATERIAL MEETING FEDERAL SPECIFICATION MMM-A-134, FEP FILM OR EQUAL.
- ☑ PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING.

DESIGNER NOTES

- IF ALL BEARINGS AT A GIVEN SUBSTRUCTURE UNIT ARE FIXED, UTILIZE 1/2" THICK ELASTOMERIC BEARING PADS AND FULL-DEPTH CONCRETE DIAPHRAGMS.
- FOR EXPANSION BEARINGS, USE LAMINATED ELASTOMERIC BEARINGS WHENEVER POSSIBLE.
- SEE STANDARD 27.02 AND 19.31 FOR CLEARANCE REQUIREMENTS AND STANDARD 27.02 FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 3%.
- HEIGHT OF BEARING SHOWN IN "EXPANSION BEARING ASSEMBLY" INCLUDES 1/8" BEARING PAD AND 1/16" TEFLON SURFACE.
- ▲ ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.
- ☑ ANCHOR PLATE LENGTH TO BE DESIGNED. MINIMUM LENGTH IS 10"

CALCULATE THE REACTIONS AT THE BEARINGS DUE TO "TOTAL LOADS" AND ALSO "DEAD LOADS" ONLY. USE THE AASHTO LRFD SERVICE I LOAD COMBINATION AND CHECK TO SEE IF THE REACTIONS EXCEED THE BEARING CAPACITIES IN THE TABLE BELOW. CONSIDER ONLY DEAD LOAD (DC + DW) AND HL-93 LIVE LOADS (LL), INCLUDING A 33% DYNAMIC LOAD ALLOWANCE (IM).

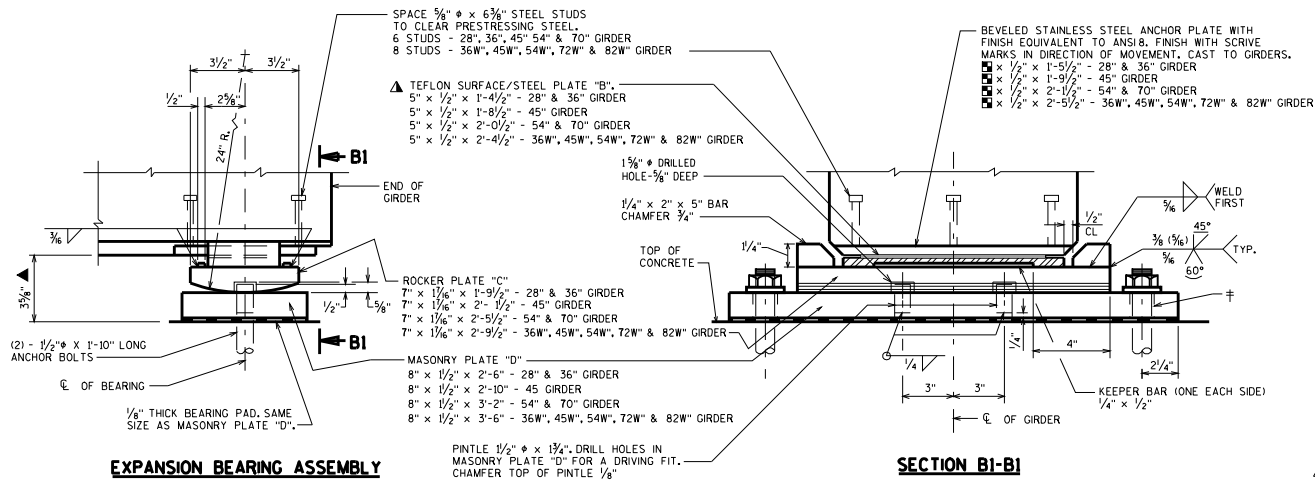
IF EITHER REACTION EXCEEDS ITS CORRESPONDING BEARING CAPACITY, THE BEARING DETAILS AS SHOWN ON THIS STANDARD MUST BE MODIFIED TO INCREASE THE BEARING CAPACITY. IF BEARING DETAILS ARE CHANGED AND ANY PLATE HAS A THICKNESS GREATER THAN 2", THEN PROVIDE AN ANS1250 FINISH TO TOP AND BOTTOM SURFACE OF THESE PLATES.

	GIRDER SIZE	28" & 36"	45"	54" & 70"	36W", 45W", 54W", 72W" & 82W"
BEARING CAPACITY (KIPS)	TOTAL LOAD (DC+DW+LL+IM)	180	230	280	330
	DEAD LOAD (DC + DW)	110	140	170	200

STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

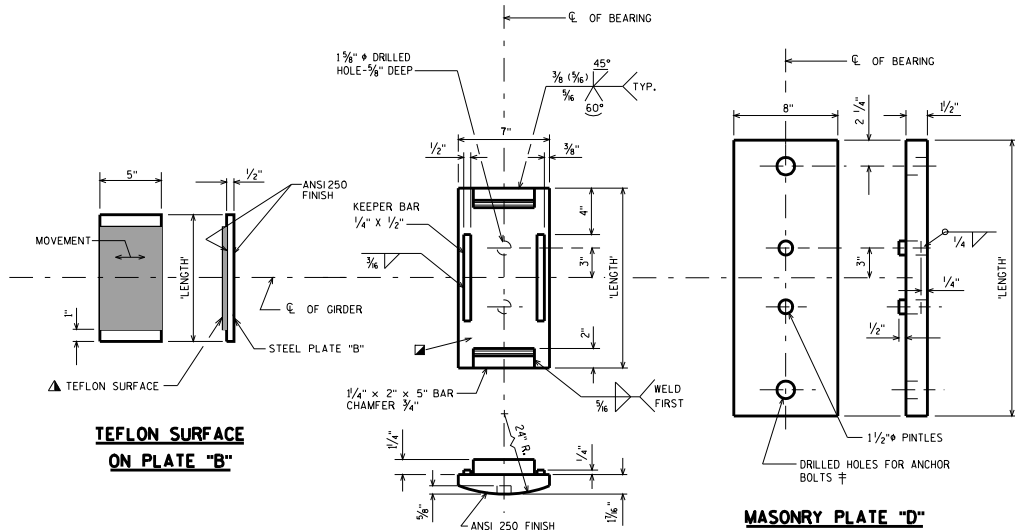
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SECTION BI-BI

EXPANSION BEARING ASSEMBLY

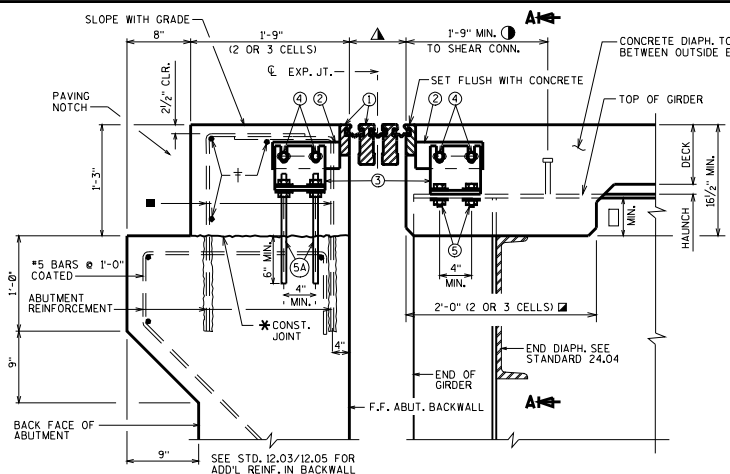


TEFLON SURFACE ON PLATE "B"

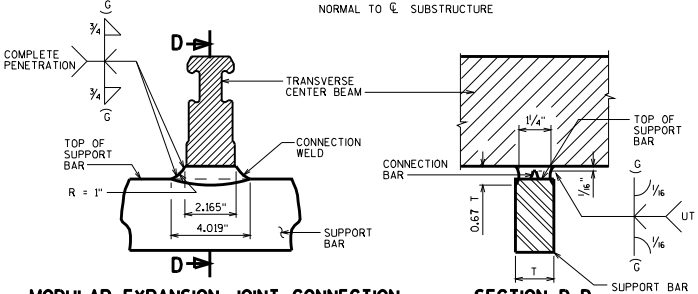
ROCKER PLATE "C"

EXPANSION BEARING

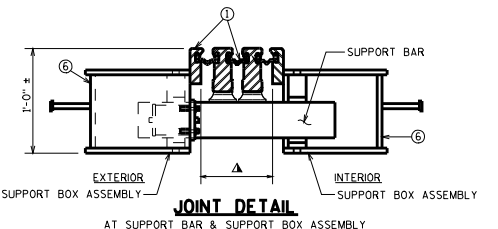
MASONRY PLATE "D"



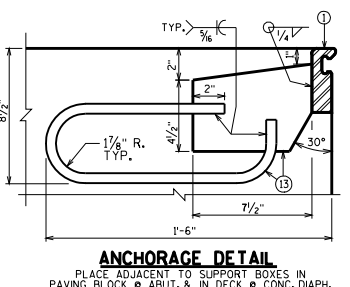
JOINT @ ABUT. (STEEL GIRDERS)
NORMAL TO \bar{C} SUBSTRUCTURE



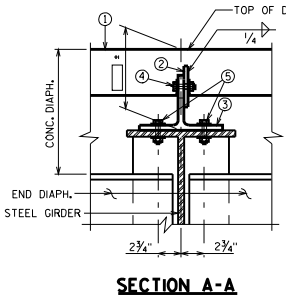
**MODULAR EXPANSION JOINT CONNECTION
DETAIL AND WELD SPECIFICATION**



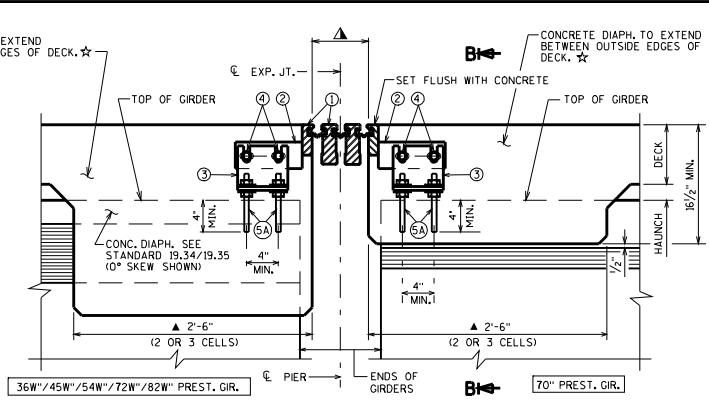
JOINT DETAIL
AT SUPPORT BAR & SUPPORT BOX ASSEMBLY



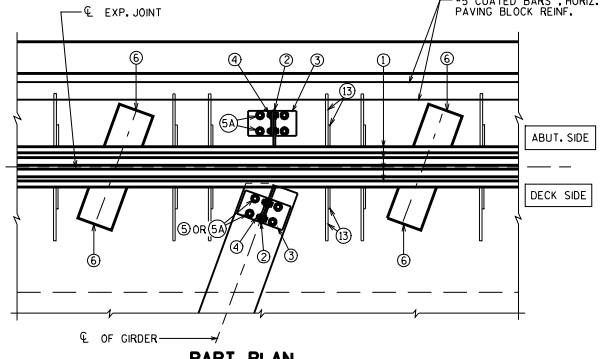
ANCHORAGE DETAIL
PLACE ADJACENT TO SUPPORT BOXES IN PAVING BLOCK @ ABUT. & IN DECK @ CONC. DIAPH.



SECTION A-A



JOINT @ PIER (PRESTRESSED GIRDERS)
NORMAL TO \bar{C} SUBSTRUCTURE



PART PLAN

NOTE: MODULAR EXPANSION DEVICE DESIGN AND DETAILS ARE SPECIFIC TO THE MANUFACTURER SELECTED FROM THOSE LISTED IN THE SPECIAL PROVISIONS. FABRICATION DRAWING IS SUBJECT TO THE APPROVAL OF THE BUREAU OF STRUCTURES.

▲ SUPPORT BOXES ARE SHOWN FOR GENERAL INFORMATION AND LOCATION MAY VARY ACCORDING TO FABRICATOR DESIGN. SPACE SUPPORT BOXES TO MISS GIRDER TOP FLANGES WHEN POSSIBLE, BUT NOT TO EXCEED MAXIMUM SPACING PER SPECIAL PROVISIONS.

TEMP. TABLE

TEMPERATURE TABLE FOR SETTING JOINT OPENINGS TO BE DETERMINED BY JOINT MANUFACTURER WITH THE FOLLOWING DESIGN DATA:

1. \square IN. OF MOVEMENT PER 10° F
2. MEDIAN TEMPERATURE OF 45° F
3. TEMP. RANGE IN TABLE FROM (59° F) TO (85° F) FOR PRESTRESSED CONCRETE GIRDERS AND FROM (-59° F) TO (+95° F) FOR STEEL GIRDERS.
4. ADJUST INITIAL JOINT OPENINGS BY A REDUCTION OF \square IN., WHICH ACCOUNTS FOR SHRINKAGE (CREEP) OF THE SUPERSTRUCTURE OVER TIME, TO PRODUCE FINAL JOINT OPENINGS FOR TABLE.

A TABLE OF JOINT OPENINGS BASED ON ABOVE DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

INCLUDE ITEM 4. FOR PRESTRESSED GIRDER STRUCTURES ONLY. SEE CHAPT. 28 IN BRIDGE DESIGN MANUAL FOR ADJUSTMENT FACTOR.

STANDARD COVERS:

- SKEWS \leq 30°
- 2 OR 3 CELL MODULAR EXPANSION JOINTS
- STEEL GIRDER BRIDGES
- PRESTRESSED GIRDER BRIDGES (70", 36", 45W", 54W", 72W" AND 82W" SECTION)

LEGEND

1. MODULAR EXPANSION JOINT DEVICE, \square CELLS.
2. 1/2" PLATE, ONE PER GIRDER MIN. PROVIDE 2 - 1" X 2" MIN. SLOTTED HOLES PLACED HORIZONTALLY FOR NO. 4.
3. WT 6 X 29 OR EQUIVALENT BUILT UP T-SECTION, ONE PER GIRDER. PROVIDE 2 - 1" X 3" MIN. SLOTTED HOLES PLACED VERTICALLY IN WEB OF WT FOR BOLTS NO. 4.
4. 3/4" ϕ HIGH STRENGTH BOLTS WITH NUTS & WASHERS. (A325 GALV.)
5. 3/4" ϕ HIGH STRENGTH BOLTS WITH NUTS & WASHERS. FIELD DRILL HOLES IN GIRDER TOP FLANGE. (A325 GALV.)
- 5A. 3/4" ϕ THREADED ROD WITH 2 NUTS & WASHERS. GROUT THREADED ROD INTO FIELD DRILLED HOLES. (GALV.)
6. SUPPORT BOX ASSEMBLY FOR SUPPORT BAR (SPA, PER MANUFACTURER). FABRICATE BOX FROM 1/2" PLATES.
7. 3/8" BULKHEAD PLATE, WELD TO NO. 1, NO. 8 AND NO. 14. WHEN CONDUIT IS PRESENT IN PARAPET OR SIDEWALK, ACCOMMODATE FOR BY PROVIDING OPENING IN NO. 7.
8. INSIDE PLATE, FABRICATE FROM 3/8" PLATE.
9. OUTSIDE PLATE, FABRICATE FROM 3/8" PLATE.
10. 3/4" SQUARE BAR, WELD TO NO. 8 AS SHOWN.
11. 3/4" ϕ X 4" LONG STUDS, WELD TO NO. 8, NO. 7 & NO. 14 AS SHOWN.
12. 3/4" ϕ X 2" STAINLESS STEEL FLAT CTSK. SLOTTED HEAD CAP SCREWS. RECESS 1/16" BELOW PLATE SURFACE.
13. 1/2" PLATE WITH 3/4" ϕ LOOP ANCHOR FABRICATED AS SHOWN, SPACED AT MANUFACTURER'S SPEC.
14. INSIDE PLATE, FABRICATE FROM 3/8" PLATE
15. ADIPRENE BUTTON. SEE DETAIL. SET IN OUTSIDE PLATE.

★ AT LOCATION WHERE EXT. GIR. IS ADJACENT TO A RAISED SIDEWALK (STD. 30.07), CONC. DIAPH. DOES NOT EXTEND OUT TO EDGE OF DECK, BUT IS TERMINATED AT INSIDE FACE OF EXT. GIR.

† #5 COATED BARS, + 8'-0" LONG, 1'-0" MIN. LAP. CUT IN FIELD TO CLEAR JOINT SUPPORT SYSTEM AS RECD.

* POUR CONC. ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONC. IS IN PLACE, STRIKE OFF & LEAVE ROUGH.

○ DIMENSION IS PARALLEL TO \bar{C} GIRDER.

▲ MANUFACTURER'S RECOMMENDED JOINT OPENING BASED ON THE TEMPERATURE ON THE DAY OF PLACEMENT PER TEMPERATURE TABLE. THE MODULAR EXPANSION DEVICE SHALL HAVE THE NUMBER OF CELLS AS INDICATED IN (D).

■ (Z)-SHAPED #5 BARS ϕ 1'-0" SPA, (COATED) ANCHOR INTO PLACE W/ EPOXY RESIN AFTER MODULAR JOINT IS IN POSITION. FOLLOW STD. SPEC FOR MASONRY ANCHOR TYPE 'S' WITH A MIN. PULLOUT CAPACITY OF 20 KIPS AND EMBEDMT OF 1'-0".

☑ TOP FLANGE WIDTH WITHIN LIMITS OF CONC. DIAPH. SHALL BE \leq 20" FOR SKEWS \leq 30°

▲ FOR PRESTRESSED GIRDERS, PLACE THE FOLLOWING NOTE ON PLANS: "JOINT MANUFACTURER SHALL INFORM AND PROVIDE NECESSARY DETAILS TO THE PRESTRESSED GIRDER FABRICATOR WHEN FORM-OUT OF THE TOP FLANGE IS RECD. TO ALLOW PLACEMENT OF SUPPORT BOX ASSEMBLY."

NOTES

ONE FIELD SPlice PERMITTED IN STEEL EXTRUSIONS. DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING PERMITTED IN NEOPRENE GLAND. AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST & SWEEP.

NO EXPANSION JOINT PROTRUSIONS PERMITTED ABOVE ROADWAY SURFACE, ON PARAPET ROADWAY FACE OR ABOVE SIDEWALK SURFACE (FOR RAISED SIDEWALK).

THE EXPANSION JOINT SEALS SHALL BE PLACED, BONDED & SEALED AS RECOMMENDED BY THE MANUFACTURER. FORM WORK SHALL BE PLACED BETWEEN THE SUPPORT BOXES TO PREVENT CONCRETE INTRUSION INTO THE SUPPORT BOX. A TECHNICAL REPRESENTATIVE OF THE MANUFACTURER SHALL BE PRESENT DURING INSTALLATION. PRIOR TO SETTING THE JOINT ASSEMBLY INTO POSITION, THE PROJECT ENGINEER SHALL DETERMINE THE PROPER JOINT OPENING.

EXPANSION JOINT EXTRUSIONS SHALL BE FABRICATED TO CONFORM TO ROADWAY CROWN & GRADE. FABRICATOR SHALL PROVIDE MEANS OF KEEPING GALVANIZED EXTRUSIONS CLEAN & SMOOTH DURING SHIPMENT AND PRIOR TO APPLYING LUBRICANT ADHESIVE FOR NEOPRENE GLAND INSTALLATION.

SANDBLAST BARS, PLATES, WT-SECTION, ANCHORAGE LOOP, & EXTRUSIONS AFTER FABRICATION IN ACCORDANCE WITH SSPC SP. #6 "COMMERCIAL BLAST CLEANING". AFTER BLAST CLEANING, THIS ASSEMBLY SHALL BE HOT DIPPED GALVANIZED.

COST OF FURNISHING & PLACING OF THE EXPANSION JOINTS COMPLETE WITH PARAPET PLATES & SIDEWALK PLATES SHALL BE PAID FOR UNDER THE PRICE BID FOR "EXPANSION JOINTS MODULAR B".

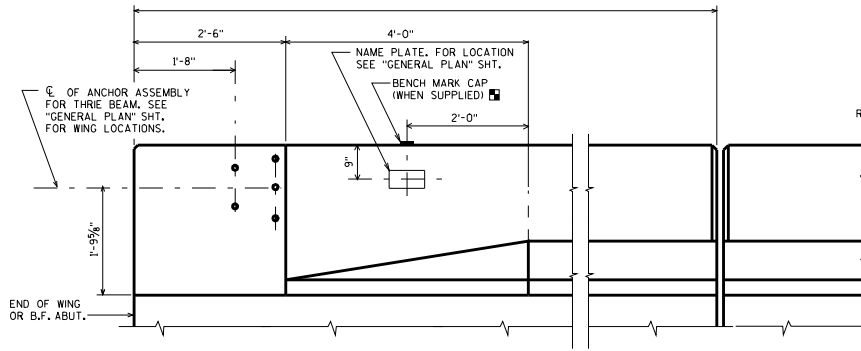
BAR STEEL REINF. IN DECK AND CONC. DIAPHRAGM SHALL BE REPLACED AS NECESSARY TO ALLOW PLACEMENT OF JOINT ASSEMBLY. TOP TRANSVERSE BARS, ADJACENT TO MOD. JT., TO BE CUT AND PLACED BETWEEN JT. SUPPORT SYSTEM.

MODULAR EXPANSION JOINT DETAILS

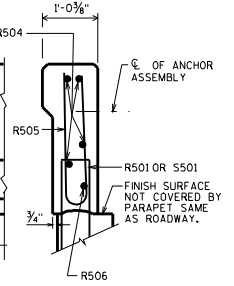
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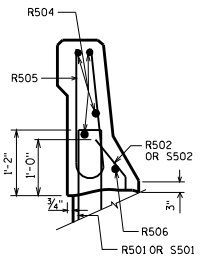
AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



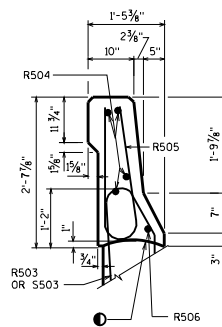
INSIDE ELEVATION



SECTION A



SECTION B

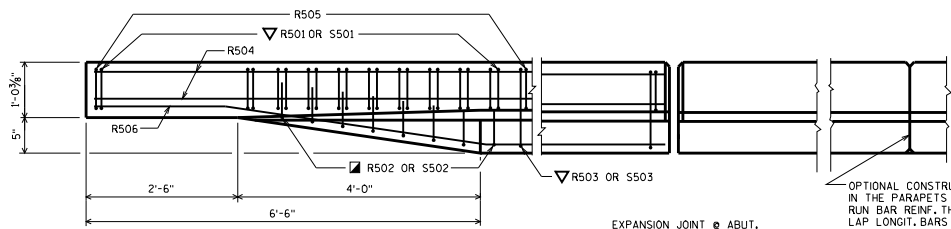


SECTION C

BILL OF BARS

FOR ABUTMENT PARAPETS

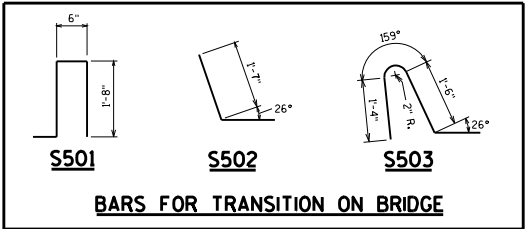
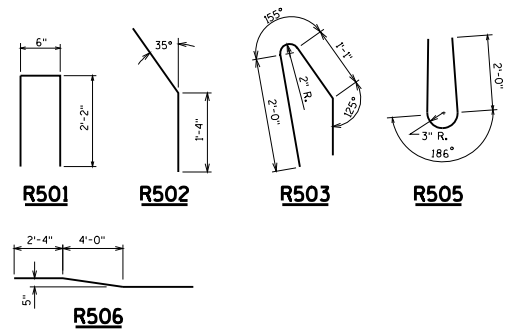
BAR MARK	COU	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R501	X			4'-7"	X	PARAPET VERT.
R502	X			2'-4"	X	PARAPET VERT.
R503	X			4'-7"	X	PARAPET VERT.
R504	X					PARAPET HORIZ.
R505	X			4'-10"	X	PARAPET VERT.
R506	X				X	PARAPET HORIZ.
S501	X			4'-5"	X	PARAPET VERT.
S502	X			2'-4"	X	PARAPET VERT.
S503	X			4'-2"	X	PARAPET VERT.



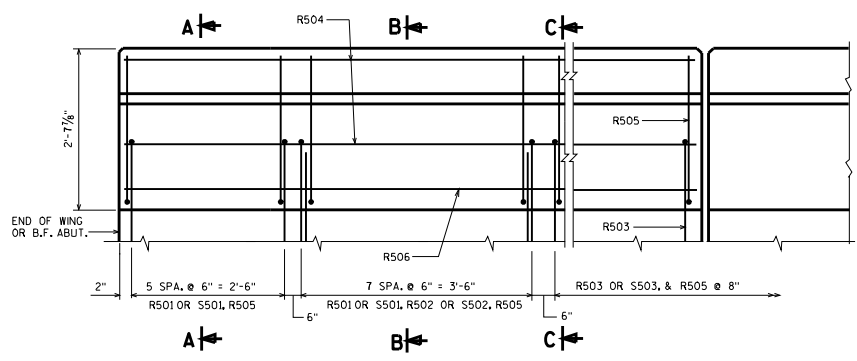
PLAN

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - V GROOVE.

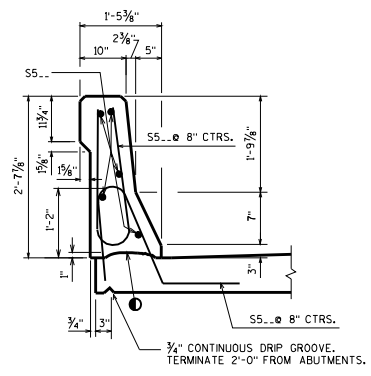
EXPANSION JOINT @ ABUT. 0° SKEW SHOWN. MATCH EXP. JT. OPENING.
FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.01.



BARS FOR TRANSITION ON BRIDGE



OUTSIDE ELEVATION



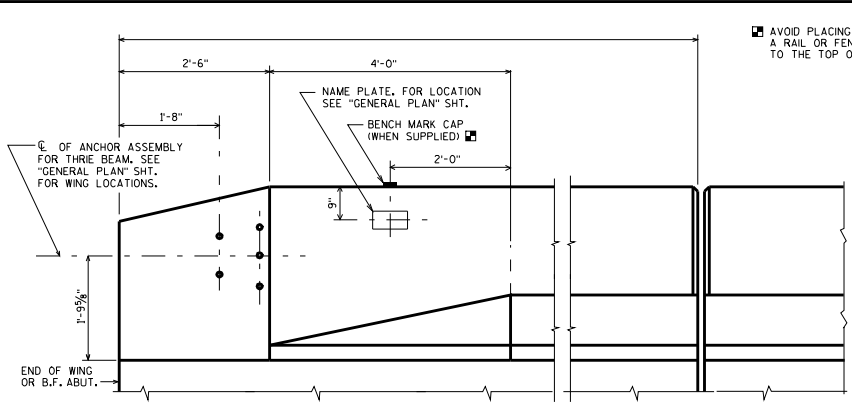
SECTION THRU PARAPET ON BRIDGE

- AREA = 2.58 SF
WEIGHT = 587 LB/FT
- CONST. JOINT - STRIKE OFF AS SHOWN.
- R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R502 OR S502 BARS CORRECTLY ALONG TRANSITION OF PARAPET.
- R501 AND R503 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

SLOPED FACE PARAPET 'LF'

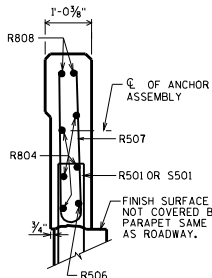
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: Scot Becker DATE: 1-10

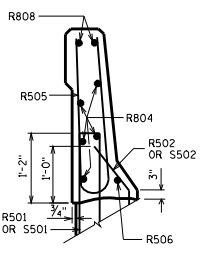


INSIDE ELEVATION

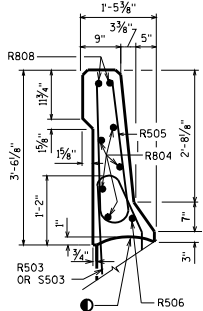
AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



SECTION A



SECTION B



SECTION C

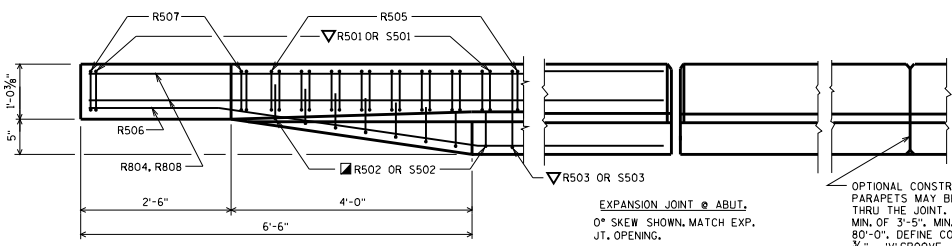
LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

BILL OF BARS FOR ABUTMENT PARAPETS

BAR MARK	COUPLER	ABUT.	ABUT.	LENGTH	BAR SERIES	LOCATION
R501	X			4'-7"	X	PARAPET VERT.
R502	X			2'-4"	X	PARAPET VERT.
R503	X			4'-7"	X	PARAPET VERT.
R804	X				X	PARAPET HORIZ.
R505	X			6'-6"	X	PARAPET VERT.
R506	X				X	PARAPET HORIZ.
R507	X			5'-8"	X	PARAPET VERT.
R808	X				X	PARAPET HORIZ.
S501	X			4'-5"	X	PARAPET VERT.
S502	X			2'-4"	X	PARAPET VERT.
S503	X			4'-7"	X	PARAPET VERT.

BAR SERIES TABLE

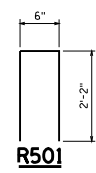
MARK	NO. REOD.	LENGTH
R507	4 SERIES OF 6	4'-10" TO 6'-6"



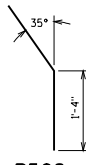
PLAN

EXPANSION JOINT @ ABUT. 0° SKEW SHOWN, MATCH EXP. JT. OPENING. FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.01.

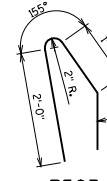
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED, RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 3'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 1" GROOVE.



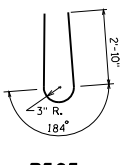
R501



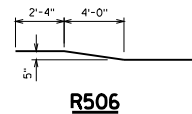
R502



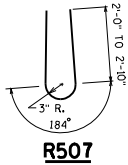
R503



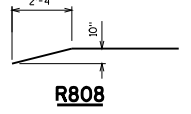
R505



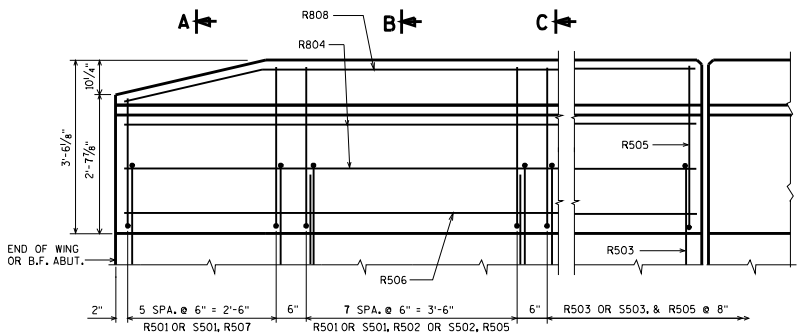
R506



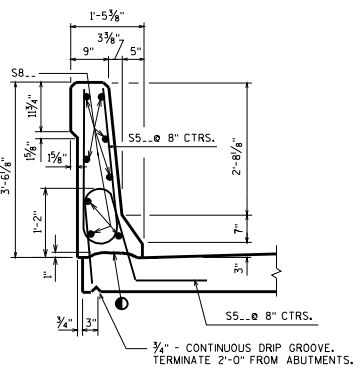
R507



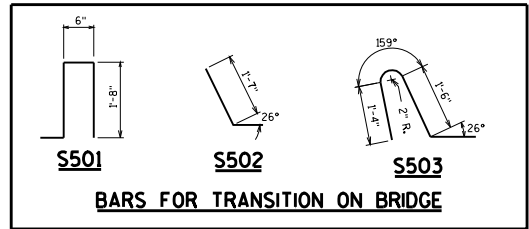
R808



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



BARS FOR TRANSITION ON BRIDGE

AREA = 3.16 SF
WEIGHT = 474 LB/FT

CONST. JOINT - STRIKE OFF AS SHOWN.

R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R502 OR S502 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

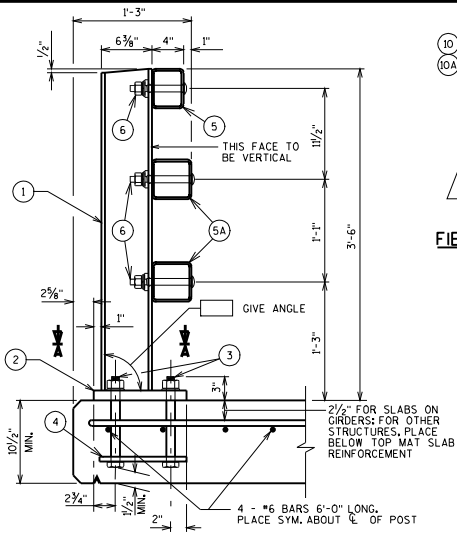
R501 AND R503 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

SLOPED FACE PARAPET 'HF'

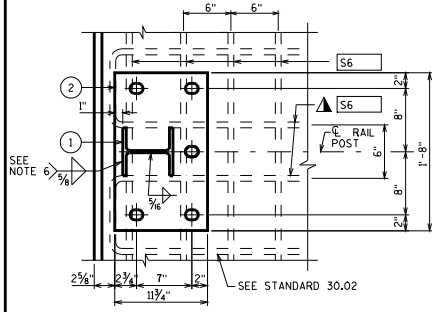
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Scot Becker*

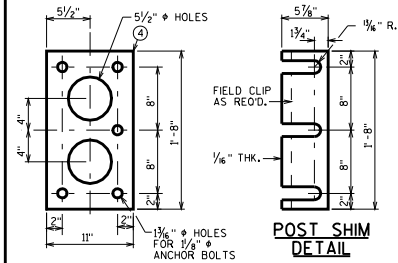
DATE:
1-10



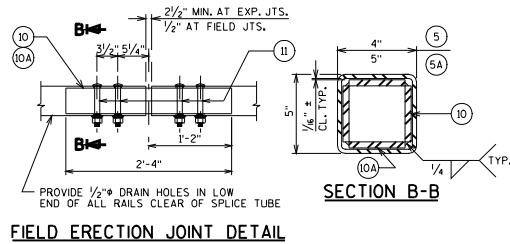
SECTION THRU RAILING ON DECK



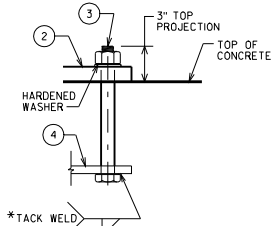
SECTION A-A



ANCHOR PLATE AT RAIL TO DECK CONNECTION

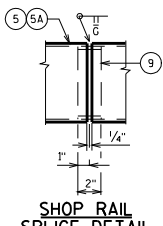


FIELD ERECTION JOINT DETAIL



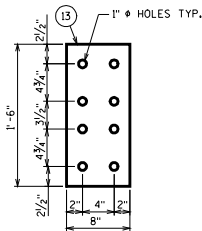
ANCHOR BOLTS

*FOR ANCHOR BOLTS IN WINGS, TACK WELD MAY BE USED IN FIELD AFTER ANCHOR PLATE IS IN POSITION IF REQD. FOR CONSTRUCTIBILITY.

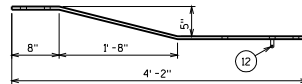


SHOP RAIL SPLICE DETAIL

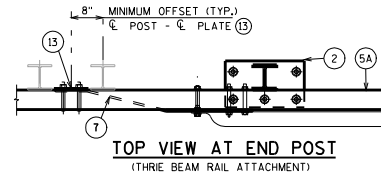
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)



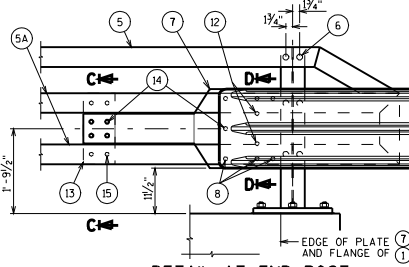
ANCHOR PLATE AT BEAM GUARD ATTACHMENT



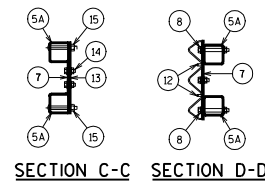
BACK-UP PLATE DETAIL AT BEAM GUARD ATTACHMENT



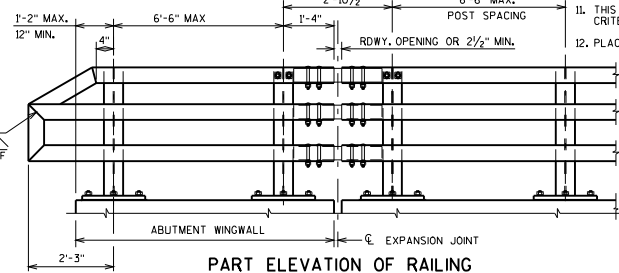
TOP VIEW AT END POST (THIRIE BEAM RAIL ATTACHMENT)



DETAIL AT END POST (THIRIE BEAM RAIL ATTACHMENT)



SECTION C-C SECTION D-D



PART ELEVATION OF RAILING

LEGEND

- ① #6 x 25 WITH 1/4" x 1 1/2" HORIZONTAL SLOTS ON EACH SIDE OF POST FOR BOLT NO. 5. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE 1 1/4" x 1 1/2" x 1'-8" WITH 1 1/2" x 1 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE
- ③ ASTM A449 - 1/4" DIA. ANCHOR BOLTS WITH NUT AND HARDENED WASHER (ALL GALVANIZED, 5 REQD. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1'-9" LONG IN ABUTMENT WINGS. AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 16" USE 1'-3" LONG. USE 10 1/2" LONG AT ALL OTHER LOCATIONS. (AN EQUIVALENT THREADED ROD WITH NUTS AND HARDENED WASHERS MAY BE SUBSTITUTED FOR ANCHOR BOLTS IN WINGS IF REQD. FOR CONSTRUCTIBILITY.)
- ④ 3/4" x 11" x 1'-8" ANCHOR PLATE (GALVANIZED) WITH 1 1/2" DIA. HOLES FOR ANCHOR BOLTS NO. 3
- ⑤ TS 5 x 4 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑥ TS 5 x 5 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑦ 3/4" DIA. A325 SLOTTED ROUND HEAD BOLT WITH NUT, 3/8" x 1 1/2" x 1 1/2" WASHER, AND LOCK WASHER (2 REQD. AT EACH RAIL TO POST LOCATION.)
- ⑧ 1/2" THK. BACK-UP PLATE WITH 2 - 7/8" x 1 1/2" THREADED SHOP WELDED STUDS (NO. 12). BOLT TO RAILS AS SHOWN IN DETAIL. REQUIRED AT THIRIE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5A.
- ⑨ 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5A FOR 7/8" DIA. A325 BOLTS WITH HEX NUTS AND WASHERS. 6 HOLES IN TUBES AND PLATE NO. 7.
- ⑩ SPLICE SLEEVE FABRICATED FROM 1/4" PLATE. PROVIDE "SLIDING FIT"
- ⑪ 3/8" x 3 1/2" x 2'-4" PLATE. 2 PER RAIL. USED IN NO. 5 & 5A.
- ⑫ 3/8" x 2 1/2" x 2'-4" PLATE USED IN NO. 5. 3/8" x 3 1/2" x 2'-4" PLATE USED IN NO. 5A. 2 PER RAIL.
- ⑬ 7/8" x 3" A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER. USE 7/8" x 1 1/4" LONG. SLOTTED HOLES AT EXP. JOINTS AND 1 1/2" x 2 1/4" MIN. LONG. SLOTTED HOLES AT EXP. JOINTS IN PLATE NO. 10A.
- ⑭ 7/8" DIA. x 1 1/2" LONG THREADED SHOP WELDED STUDS (2 REQD.)
- ⑮ 3/4" x 8" x 1'-6" PLATE. BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THIRIE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5A.
- ⑯ 7/8" DIA. x 2" LONG A325 HEX BOLT WITH NUT AND WASHER (5 REQD.)
- ⑰ 1" HOLES IN TUBES NO. 5A FOR 7/8" DIA. A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER (4 REQD.). 4 HOLES IN TUBES.

GENERAL NOTES

1. BID ITEM SHALL BE "RAILING TUBULAR TYPE M B--" WHICH INCLUDES ALL ITEMS SHOWN.
2. RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED FY = 50 KSI. ANCHOR PLATES & SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.
3. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN.
4. RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF THREE (3) POSTS WITHOUT SPLICES WHERE POSSIBLE. RAILS SHALL BE SPLICED IN A PANEL OVER EXPANSION JOINTS.
5. ENDS OF TUBE SECTIONS SHALL BE SAWED, GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
6. WELD IS THE SAME ON BOTH FLANGES. FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING.
7. FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQD. FOR ALIGNMENT.
8. POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
9. ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY SSPC SPECIFICATIONS.
10. WHEN PAINTING IS REQUIRED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & 4) SHALL BE PAINTED OVER GALVANIZING WITH APPROVED TIE COAT AND TOP COAT.
11. THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 4 (TL-4).
12. PLACE FIRST BOTTOM LONGITUDINAL BAR CLEAR OF DRIP GROOVE.

▲ TIE TO TOP MAT OF STEEL.
WEIGHT = 75 LB/FT (BASED ON 6'-6" POST SPACING.)

TUBULAR STEEL RAILING TYPE "M"	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Scot Becker</i>	DATE: 1-10