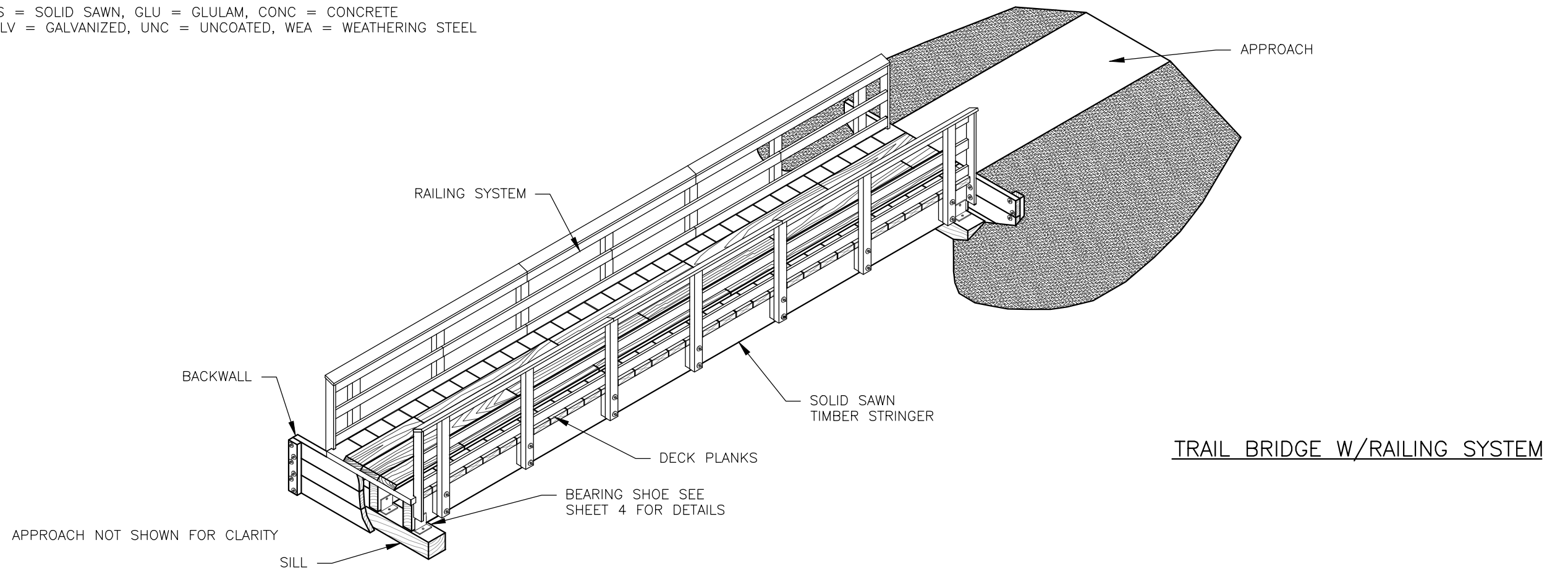


STRUCTURE NUMBER	TRAIL NO.	BRIDGE LOCATION	BRIDGE LENGTH OUT-TO-OUT	STRINGER SPAN C-C BRNG	BRIDGE CLEAR WIDTH	PEDESTRIAN LOAD	GROUND SNOW LOAD	STRINGERS				DECK			BACKWALL						
								SPECIES	NUMBER	MATERIAL SIZE	TREATMENT		SPECIES	SIZE	TREATMENT	TYPE	SPECIES	SIZE	WIDTH	HEIGHT	TREATMENT
											YES	NO									

NA = NOT APPLICABLE

STRUCTURE NUMBER	RAILING SYSTEM/CURB						RUNNING PLANK				SILL			APPROACHES					HARDWARE	COMMENTS			
	SPECIES	TYPE	HEIGHT	MATERIAL TYPE	TREATMENT		SPECIES	SIZE	WIDTH	TREATMENT		TYPE	SIZE	TREATMENT	LENGTH		WIDTH	MATERIAL TYPE	MATERIAL DEPTH		GEO- SYNTHETIC TYPE	COATINGS	
					YES	NO				YES	NO				NEAR	FAR							
X																							

ABUTMENT MATERIAL TYPE: SS = SOLID SAWN, GLU = GLULAM, CONC = CONCRETE
 HARDWARE COATING TYPE: GALV = GALVANIZED, UNC = UNCOATED, WEA = WEATHERING STEEL



SHEET 1 OF 4

U.S. DEPARTMENT OF AGRICULTURE
 FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
SAWN TIMBER STRINGER TRAIL BRIDGE

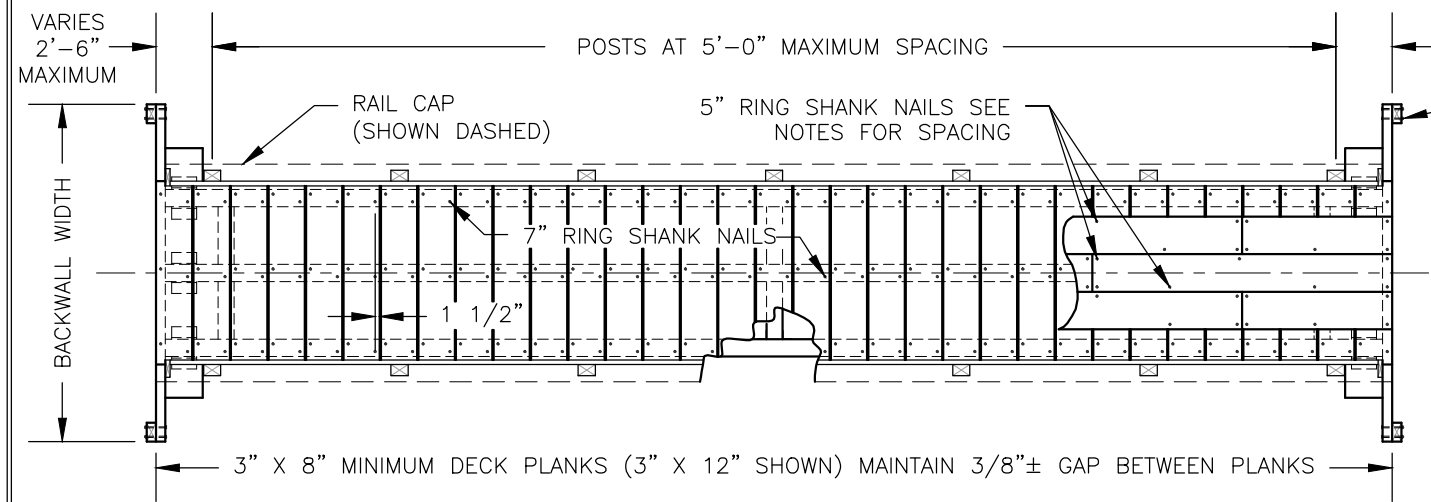
SECTION: **962 - SAWN TIMBER TRAIL BRIDGE** TYPICAL ID: **STS**

REVISION DATE

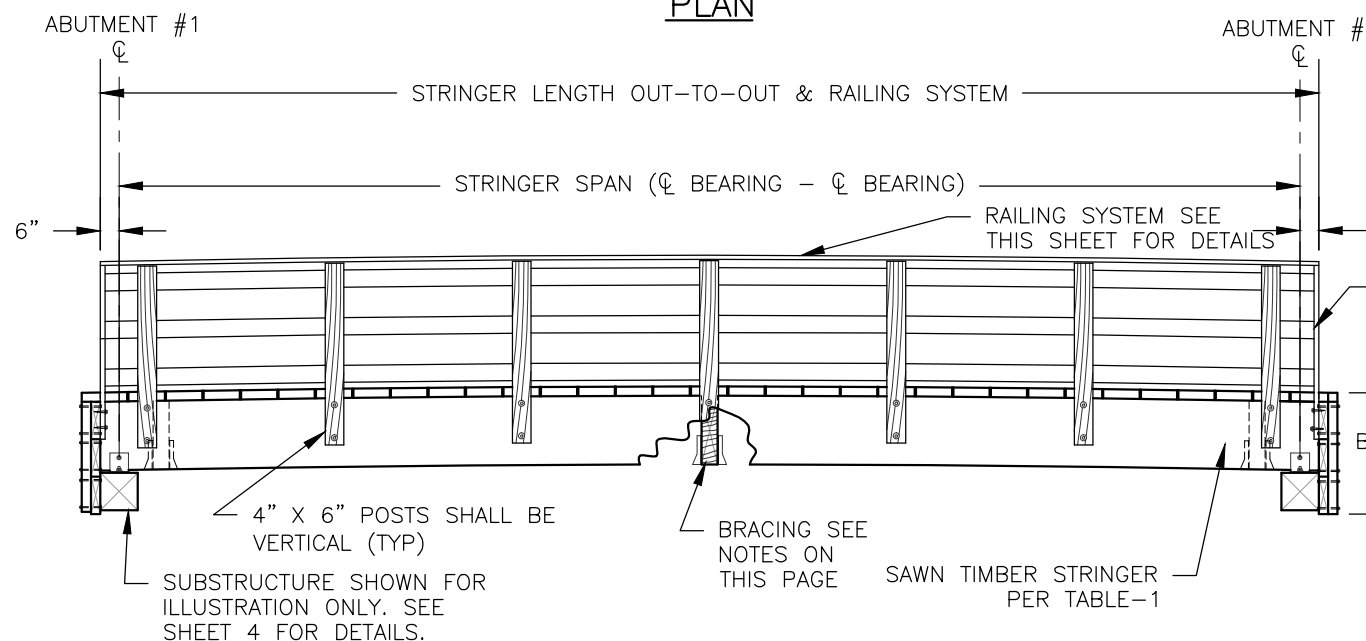
NOT TO SCALE

DRAWING NO.
STD_962-10-01

SHEET OF



PLAN

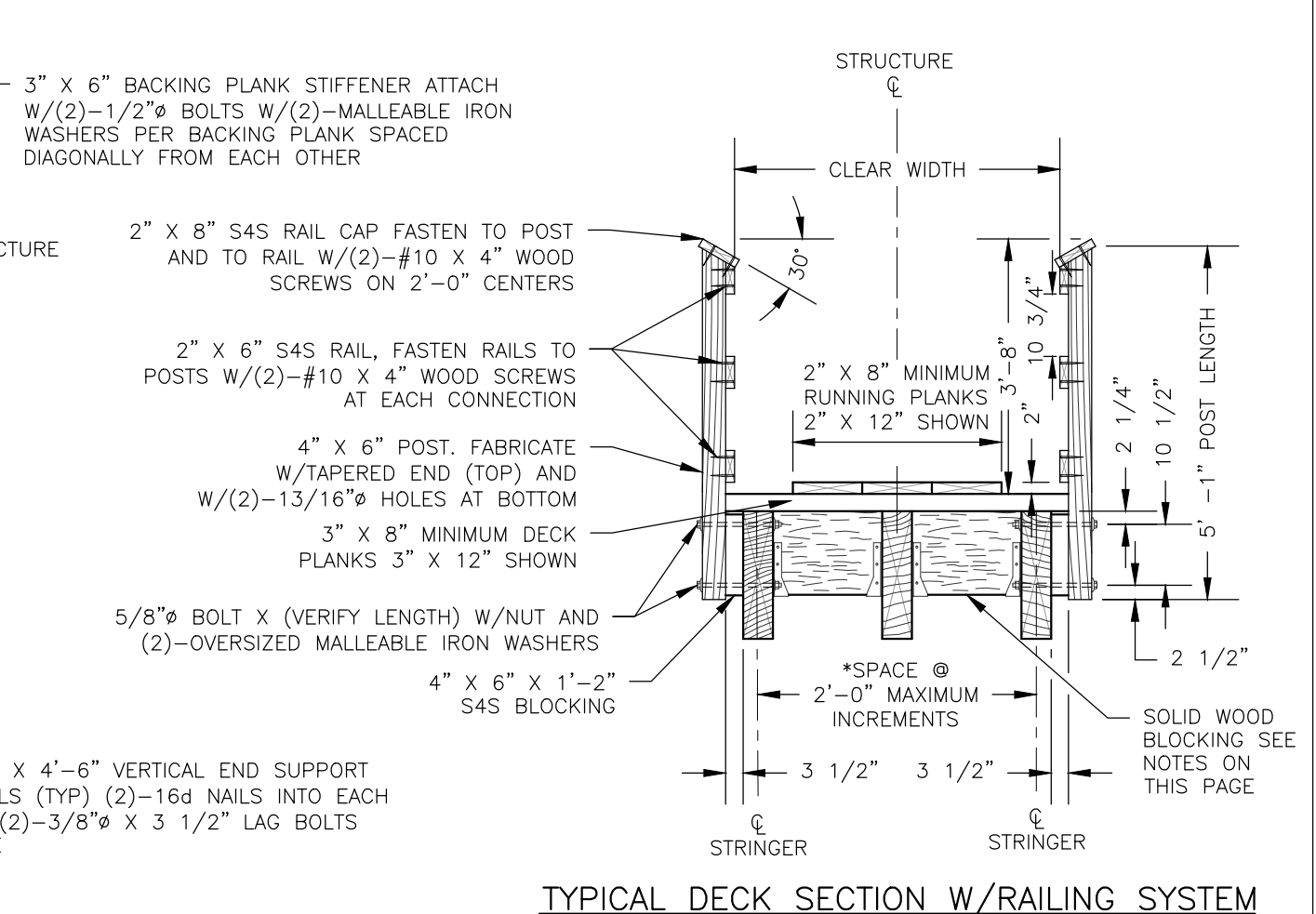


ELEVATION

NOTES:

GRADE SHOWN = 0.0%, RUNNING PLANKS NOT SHOWN FOR CLARITY

- ALL DIMENSIONS IN TABLE-1 ARE NOMINAL (ROUGH SAWN). THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH A PEDESTRIAN RAILING SYSTEM IS 15-INCHES. BRIDGES WITH STRINGER DEPTHS LESS THAN 15-INCHES SHALL HAVE CURBS ONLY. THE MINIMUM NUMBER OF STRINGERS IS THREE.
- FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 5/16-INCH DIAMETER X 7-INCH RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE SIDES.
- FASTEN RUNNING PLANKS TO DECK WITH 40d (5-INCH RING SHANK) NAILS AT 24-INCH SPACING. ALTERNATE SIDES WITH TWO AT EACH END.
- PROVIDE A MINIMUM 1/2-INCH SPACE BETWEEN BLOCKING AND BACKWALL FOR AIR CIRCULATION.
- SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE RAIL SPLICE AT ANY ONE POST.
- BRACING REQUIRED AT THE ENDS OF EACH MEMBER. THE BRACING SHALL BE THREE-QUARTERS TO FULL DEPTH AND PLACED WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING. BRACING REQUIRED AT MID-SPAN FOR SPANS OVER 20 FEET LONG.
- WOOD BLOCKING SHALL BE BOLTED TO STRINGERS WITH STEEL ANGLES OR SUSPENDED IN STEEL HANGERS THAT ARE NAILED TO BLOCKS AND STRINGER SIDES

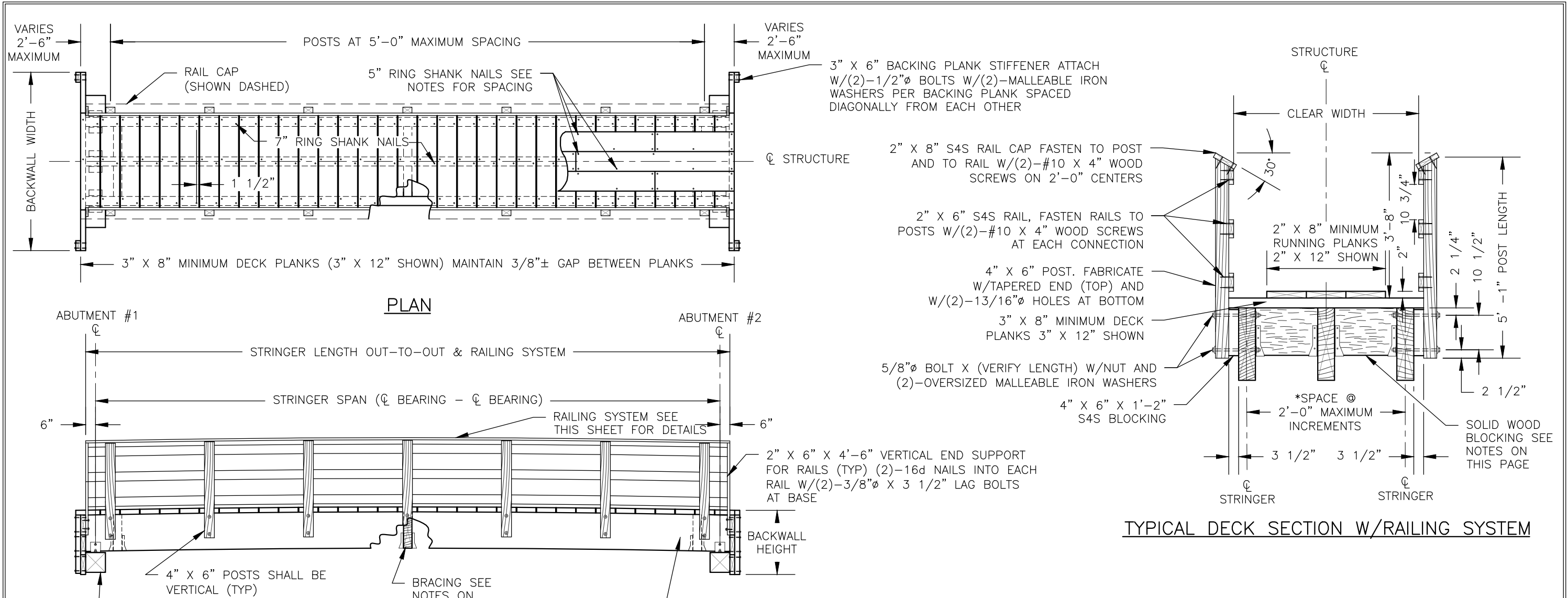


TYPICAL DECK SECTION W/RAILING SYSTEM

***TABLE-1: SOLID SAWN STRINGER SIZE REQUIREMENTS – LRFD**

**STRINGER SPAN (FEET)	TIMBER SPECIES – DOUGLAS FIR – LARCH GRADE – NO.1				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	***65	90	120	150	200
● 10	3" X 8"	3" X 10"	3" X 12"	4" X 10"	4" X 12"
● 15	4" X 10"	4" X 12"	4" X 14"	4" X 16"	6" X 12"
● 20	4" X 14"	6" X 12"	6" X 12"	6" X 14"	6" X 16"
▲ 25	6" X 14"	6" X 14"	6" X 16"	6" X 18"	6" X 20"
▲ 30	6" X 16"	6" X 18"	6" X 20"	6" X 20"	8" X 20"

- INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING
- ▲ INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING & MID-SPAN
- * STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
- ** STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
- *** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL



*TABLE-1: SOLID SAWN STRINGER SIZE REQUIREMENTS - LRFD

**STRINGER SPAN (FEET)	TIMBER SPECIES - SOUTHERN PINE GRADE - NO.1				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	**65	90	120	150	200
● 10	3" X 8"	3" X 10"	3" X 10"	3" X 12"	4" X 12"
● 15	4" X 10"	4" X 12"	4" X 14"	4" X 16"	6" X 12"
● 20	4" X 14"	4" X 16"	6" X 12"	6" X 14"	6" X 16"
▲ 25	6" X 14"	6" X 16"	6" X 16"	6" X 16"	6" X 20"
▲ 30	6" X 16"	6" X 18"	6" X 18"	6" X 20"	8" X 20"

● INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING
 ▲ INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING & MID-SPAN
 * STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
 ** STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
 *** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

NOTES:

GRADE SHOWN = 0.0%, RUNNING PLANKS NOT SHOWN FOR CLARITY

- ALL DIMENSIONS IN TABLE-1 ARE NOMINAL (ROUGH SAWN). THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH A PEDESTRIAN RAILING SYSTEM IS 15-INCHES. BRIDGES WITH STRINGER DEPTHS LESS THAN 15-INCHES SHALL HAVE CURBS ONLY. THE MINIMUM NUMBER OF STRINGERS IS THREE.
- FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 5/16-INCH DIAMETER X 7-INCH RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE SIDES.
- FASTEN RUNNING PLANKS TO DECK WITH 40d (5-INCH RING SHANK) NAILS AT 24-INCH SPACING. ALTERNATE SIDES WITH TWO AT EACH END.
- PROVIDE A MINIMUM 1/2-INCH SPACE BETWEEN BLOCKING AND BACKWALL FOR AIR CIRCULATION.
- SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE RAIL SPLICE AT ANY ONE POST.
- BRACING REQUIRED AT THE ENDS OF EACH MEMBER. THE BRACING SHALL BE THREE-QUARTERS TO FULL DEPTH AND PLACED WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING. BRACING REQUIRED AT MID-SPAN FOR SPANS OVER 20 FEET LONG.
- WOOD BLOCKING SHALL BE BOLTED TO STRINGERS WITH STEEL ANGLES OR SUSPENDED IN STEEL HANGERS THAT ARE NAILED TO BLOCKS AND STRINGER SIDES

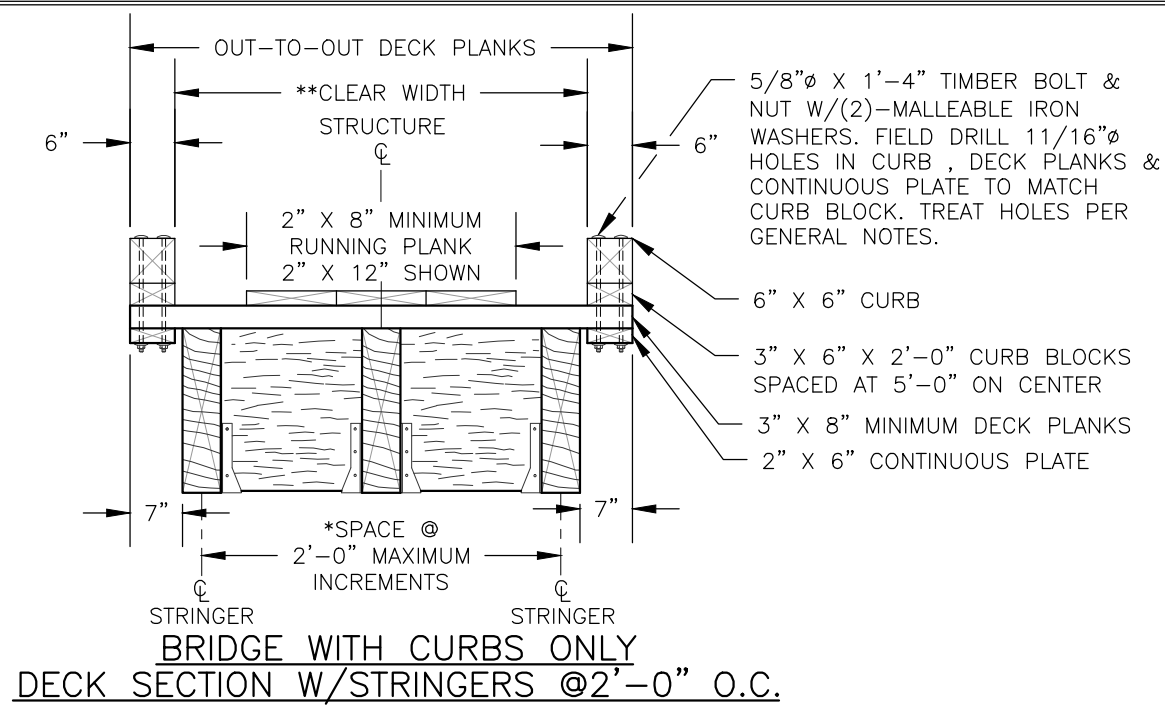


PROJECT NAME & LOCATION

DRAWING NAME
SAWN TIMBER STRINGER TRAIL BRIDGE
 SECTION: 962 - SAWN TIMBER TRAIL BRIDGE
 TYPICAL ID: STS

REVISION DATE
 NOT TO SCALE

DRAWING NO.
STD_962-10-02b
 SHEET OF



**BRIDGE WITH CURBS ONLY
DECK SECTION W/STRINGERS @2'-0" O.C.**

* MINIMUM NUMBER OF STRINGERS IS THREE
** INSIDE FACE TO INSIDE FACE OF RAILING SYSTEM

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

TIMBER & LUMBER: SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW.

DECK PLANKS, CURBS, SILLS, & BACKING PLANKS

- COASTAL REGION DOUGLAS FIR-LARCH ROUGH SAWN NO.1 GRADE, GRADING RULES AGENCY - WWPA, WCLIB

RUNNING PLANKS

- COASTAL REGION DOUGLAS FIR-LARCH ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY - WWPA, WCLIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED

- REDWOOD, S4S, NO.1 GRADE GRADING RULES AGENCY - RIS
- WESTERN RED CEDAR, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY - WWPA, WCLIB

TREATED

- HEM-FIR/DOUGLAS FIR, S4S, NO.1 GRADE GRADING RULES AGENCY - WWPA, WCLIB

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

STRINGERS, DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED

- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND-EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

SILLS, BACKING PLANKS, CRIBS, & TIMBER WALLS, IF TREATED

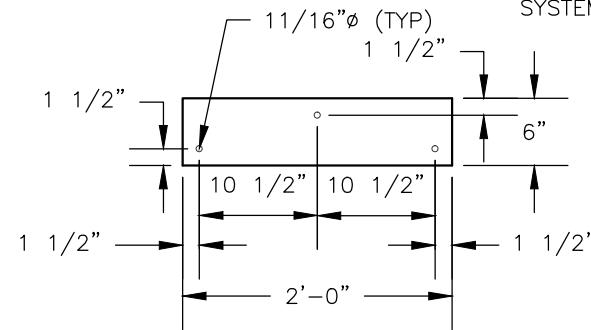
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT-HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS -APPROVED BY THE C.O.R.- SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

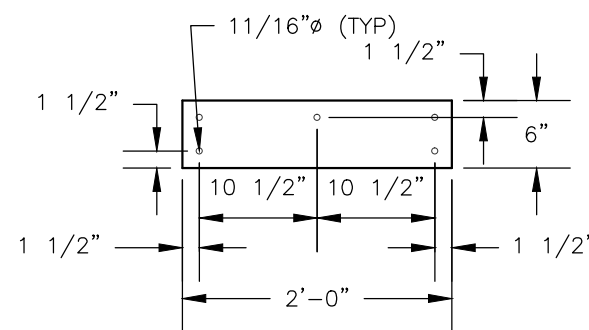
HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

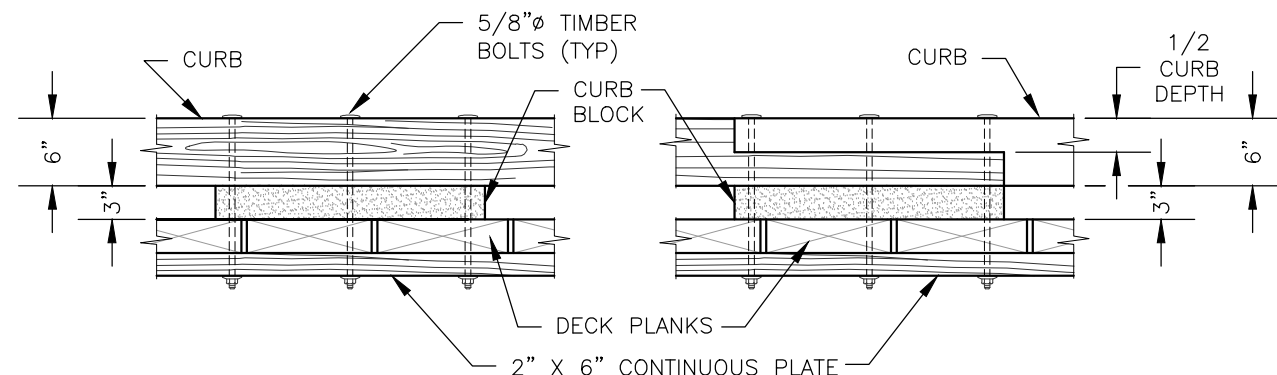
FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.



PLAN-CURB BLOCK



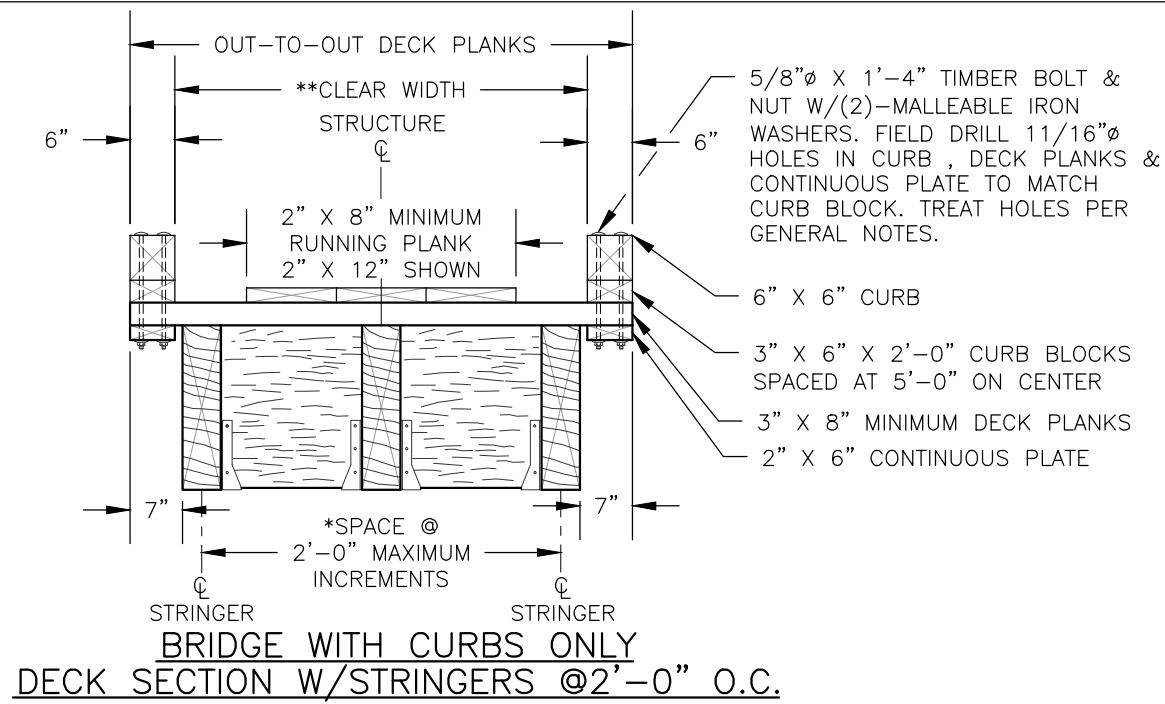
PLAN-CURB BLOCK AT SPLICE



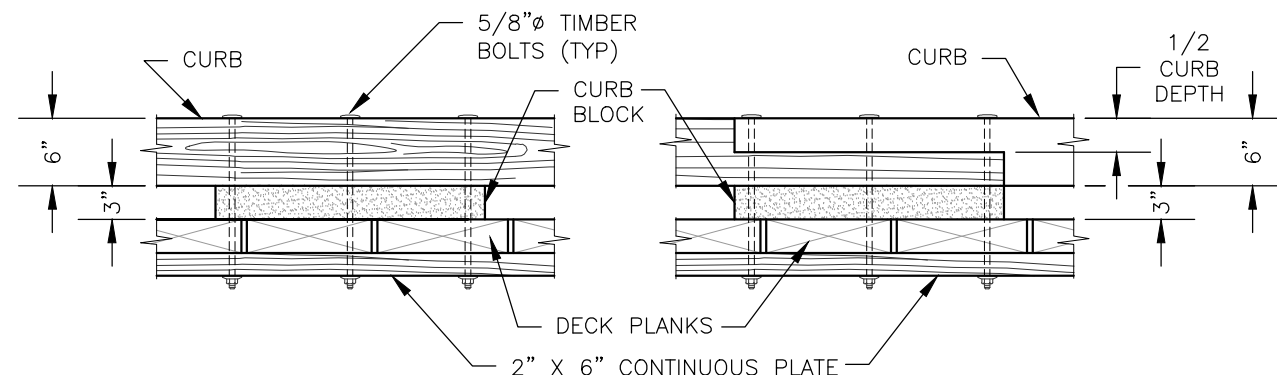
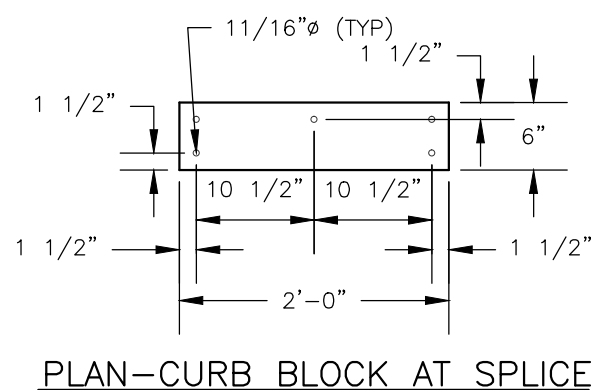
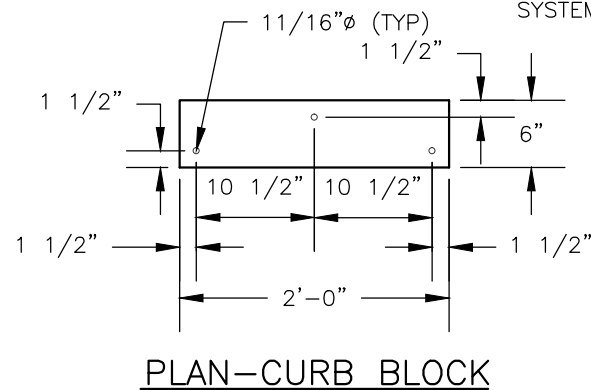
ELEVATION-TYPICAL CONNECTION

ELEVATION-CONNECTION AT SPLICE

SOLID SAWN CURB CONNECTION DETAILS



* MINIMUM NUMBER OF STRINGERS IS THREE
 ** INSIDE FACE TO INSIDE FACE OF RAILING SYSTEM



SOLID SAWN CURB CONNECTION DETAILS

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

TIMBER & LUMBER: SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW.

DECK PLANKS, CURBS, SILLS, & BACKING PLANKS RUNNING PLANKS

- SOUTHERN PINE NO.2 GRADE GRADING RULES AGENCY - SPIB
- SOUTHERN PINE NO.2 GRADE GRADING RULES AGENCY - SPIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED

- BALDCYPRESS, S4S, NO.1 GRADE GRADING RULES AGENCY - SPIB
- WHITE OAK, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY - NELMA

TREATED

- SOUTHERN PINE, S4S, NO.1 GRADE GRADING RULES AGENCY - SPIB

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

STRINGERS, DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED

- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND-EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

SILLS, BACKING PLANKS, CRIBS, & TIMBER WALLS, IF TREATED

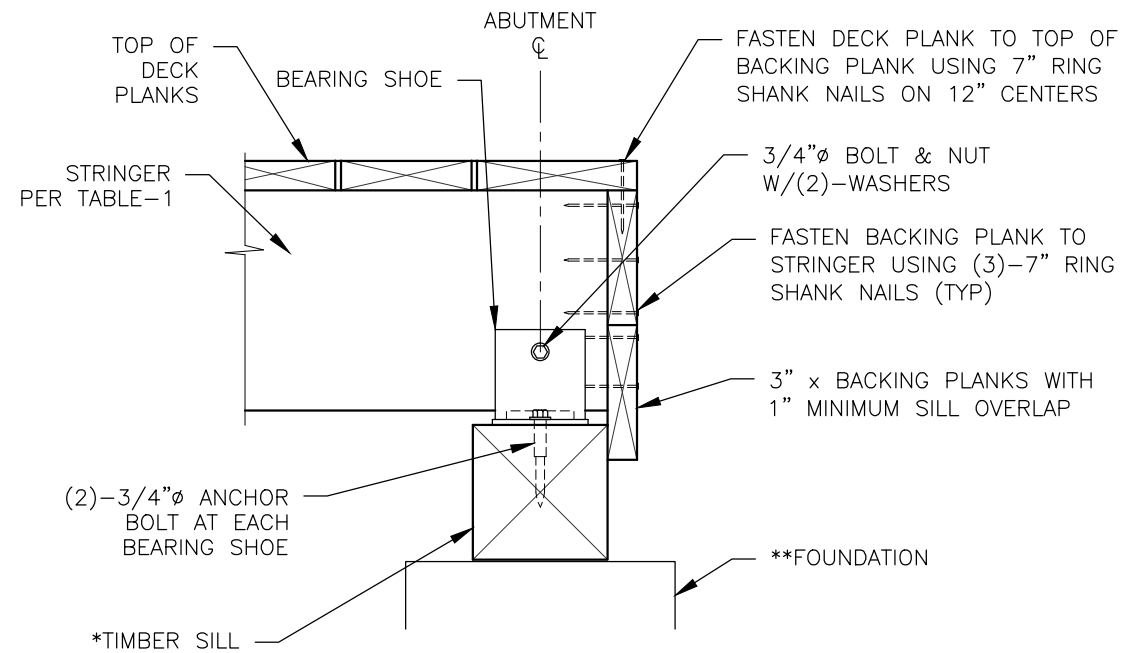
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT-HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS -APPROVED BY THE C.O.R.- SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

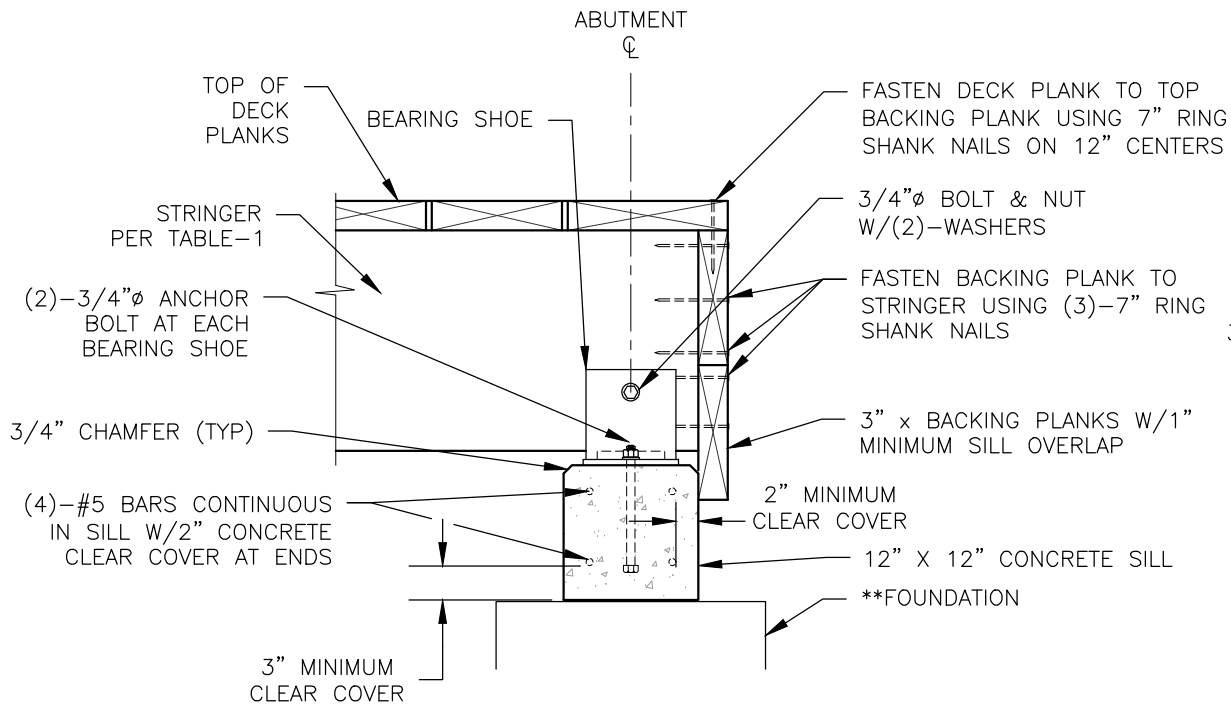
HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

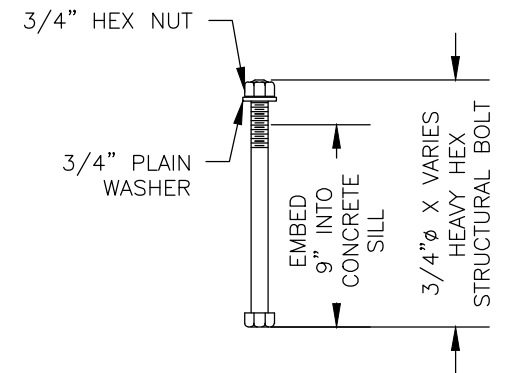
FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.



GLU-LAM/SAWN TIMBER SILL CONNECTION DETAIL



CONCRETE SILL CONNECTION DETAIL



CONCRETE SILL ANCHOR BOLT DETAIL

BACKING PLANK STIFFENER NOT SHOWN FOR CLARITY

** TIMBER SILL CAN BE EITHER 12" X 12" SOLID SAWN 10 3/4" X 12" GLUE-LAMINATED, BUILT-UP 3" X 12", 4" X 12", & 6" X 12" TREATED MEMBERS.

** SEE STANDARD DRAWINGS 965-10, 965-20, 965-30, & 965-40 FOR FOUNDATION ALTERNATIVES

NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

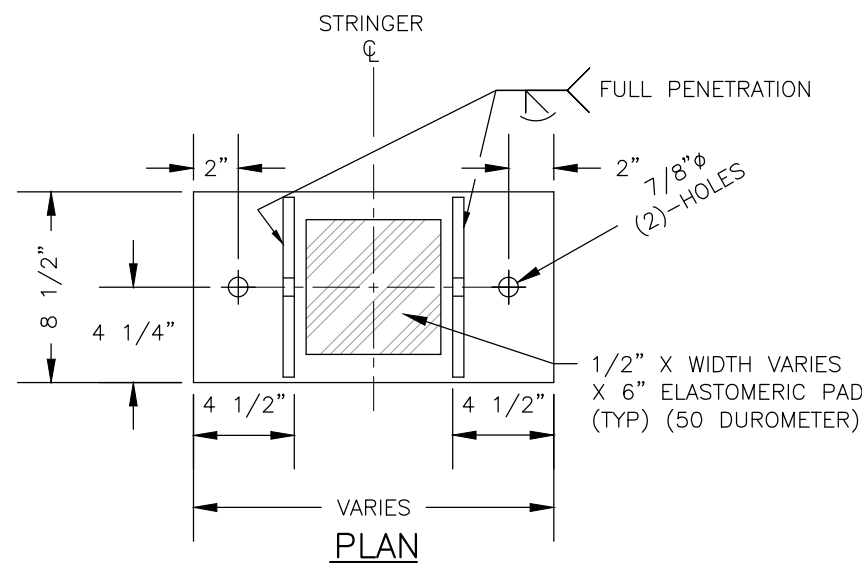
CONCRETE: USE STRUCTURAL CONCRETE WITH 7 SACK MINIMUM MIX APPROVED BY THE C.O., CONCRETE SHALL RECEIVE A TOWELED SURFACE FINISH. CONCRETE SHALL HAVE 4%-6% ENTRAINED AIR. MAXIMUM SIZE AGGREGATE SHALL BE 3/4-INCH AND CONCRETE SLUMP SHALL NOT EXCEED 4-INCHES.

REINFORCING STEEL: PROVIDE REINFORCING STEEL THAT CONFORMS TO ASTM A615 (AASHTO M31), GRADE 40 OR 60. PROVIDE 2-INCH CLEAR CONCRETE COVER FOR ALL REBAR, UNLESS NOTED OTHERWISE ON THE PLANS.

HARDWARE AND STRUCTURAL STEEL: SEE SHEET 3 FOR PROJECT DESIGN CRITERIA AND GENERAL NOTES.

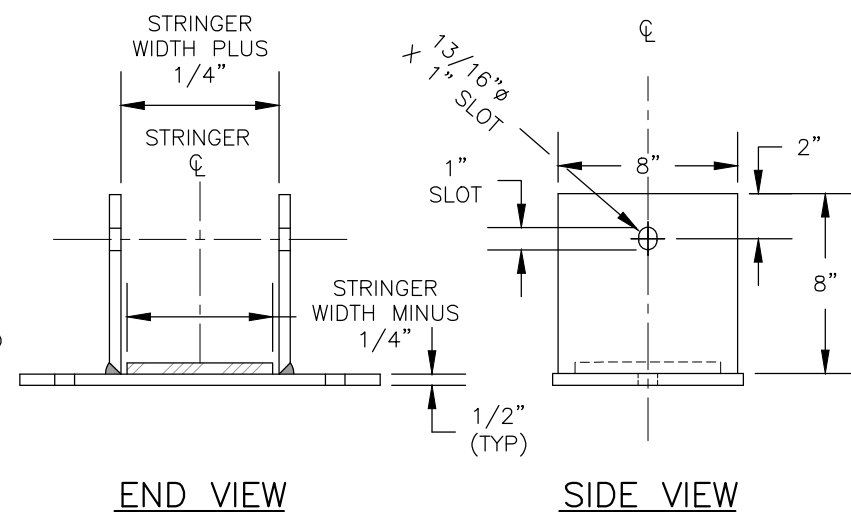
TREATED TIMBER & LUMBER: REFER TO THE GENERAL NOTES ON THE SUBSTRUCTURE DRAWINGS FOR TREATED TIMBER & LUMBER SPECIFICATIONS AND FIELD TREATING OF WOOD

LAG SCREW INSTALLATION: PRE-BORE LAG SCREW HOLES USING TWO DIAMETERS, ONE FOR THE SHANK AND ONE FOR THE THREADS. THE LEAD HOLE FOR THE SHANK IS TO BE 1/16-INCH LARGER THAN THE SHANK DIAMETER AND IS TO BE BORED TO THE DEPTH OF PENETRATION OF THE SHANK. THE LEAD HOLE FOR THE THREADED PORTION IS TO BE 70% OF THE BOLT DIAMETER AS SHOWN ON THE PLANS AND IS TO BE BORED AT LEAST TO THE LENGTH OF THE THREADS. **DO NOT DRIVE LAG SCREWS WITH A HAMMER.**



BEARING SHOE DETAIL

MATERIAL = 1/2" STEEL PLATE A36



END VIEW

SIDE VIEW