

## Appendix A—Deschutes Trail Cattle Guard Plans

### Materials List

Material	Quantities	
	Order	Pre-cut the piece(s) to:
<b>Base—</b> Treated standard & better, 2 by 12 inches	2 each: 8 feet 1 each: 10 feet	2 each: 89 inches 2 each: 5 feet
<b>Brace—</b> Treated standard & better, 2 by 10 inches	1 each: 8 feet	4 each: 1 foot
<b>Wings—</b> Treated standard & better, 2 by 4 inches • With joist hangers: - OR - • With wing supports:	3 each: 10 feet 2 each: 14 feet  2 each: 10 feet 1 each: 12 feet 2 each: 14 feet	2 each: 5 feet; 2 each: 3½ feet; 2 each: 6½ feet 4 each: 7 feet  2 each: 3½ feet; 2 each: 6½ feet 2 each: 5 feet; 4 each: 6 inches 4 each: 7 feet
<b>Deck—</b> Angle iron, 2 by 3 by 3/16 inches Steel square tubing, 2 by 2 by 3/16 inches	2 each: 8 feet 69 feet-6¾ inches	Precut and predrilled Precut and predrilled, 14 each: 59¾ inches
<b>Hardware—</b> Tempered steel hex head bolts (grade 5, coarse thread), ½ by 3 inches, plus washers, lock washers, and nuts		29 each
Lag screws, 3/8- by 4-inch		7 each
Barbed or No. 9 wire		±12 feet
Galvanized common nails, 16d		2½ pounds
Galvanized fence staples, 1½-inch		½ pound
Galvanized common nails for joist hangers, 6d		½ pound
Wood preservative meeting AWPB M4		1 gallon
<b>Furnished—</b> Posts and H-braces		
<b>Optional—</b> Simpson SUR 26 skewed 45° joist hanger (or similar)		4 each
Simpson SUL 26 skewed 45° joist hanger (or similar)		4 each
Paint		
Reflectors and/or delineators		

*Note: All lumber shall be pressure treated with creosote meeting AWPB LP 55, or water-borne preservatives meeting AWPB LP 22. Retention shall be 0.40 minimum.*

### Deschutes Trail Cattle Guard Construction Notes

**1—**Locate crossings so the trail will cross at 90° for safety. Where possible, locate cattle guard in timbered or rocky areas to discourage access by full-sized vehicles. Pre-installing posts and braces will save time. Need 9 feet inside posts.

**2—**Be sure to specify the retention when ordering the lumber. Note that the lumber order is different if metal joist hangers are used (recommended). It saves time to pre-cut the lumber as shown on the materials list. This should be done in a shop to insure proper dimensions and straight cuts.

**3—**These are designed to be lightweight, portable, and easily constructed with simple hand tools. All the materials for two cattle guards will easily fit into the back of a standard pickup truck with the longest pieces being 10 feet. Cost is around \$550 each for materials. I use volunteers for construction. A six person crew can easily construct two cattle guards in a day.

**4—**In cases where the deck can be transported to the site in one piece, an alternate design is to weld all of the rails to the angle iron except for the last 3 on each end, which are bolted. This will reduce fabrication cost and still provide cleanouts on each end.

**5—**Paint all lumber cuts with preservative. Be sure all lumber is standard or better or it could be too warped and knotty. When putting the base together, arrange the lumber so the angle iron will rest on the flattest and straightest surfaces.

**6—**The cattle guard can be on a grade lengthwise, but must be level side to side.

**7—**Tools needed:  
• Small (12-inch) chain saw  
• Hand saw

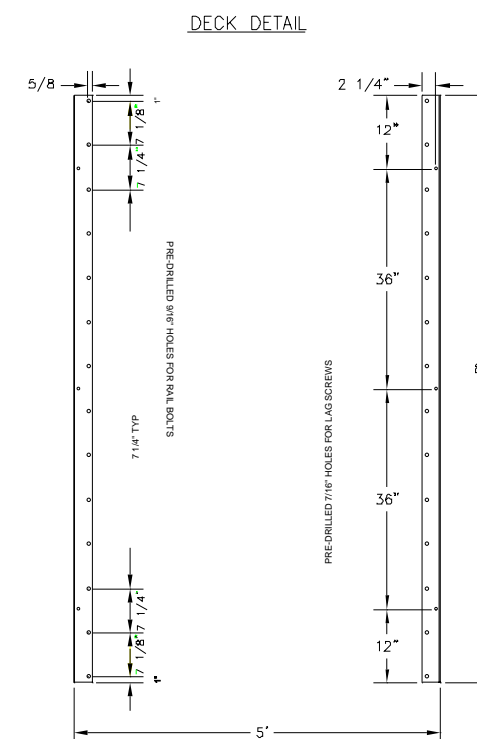
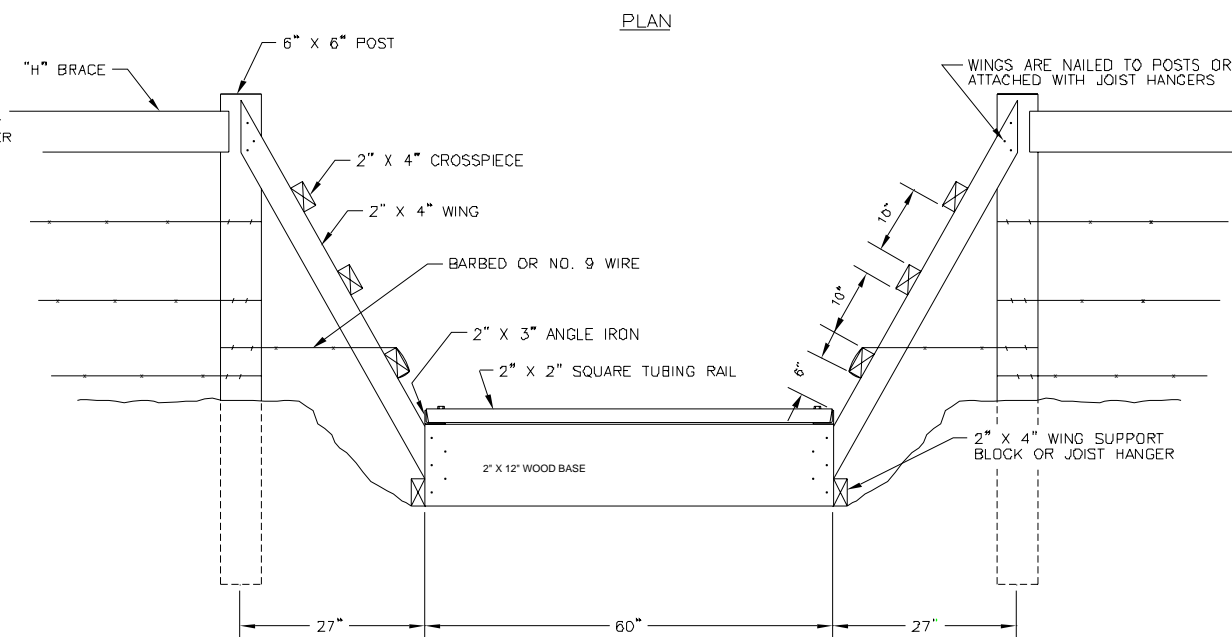
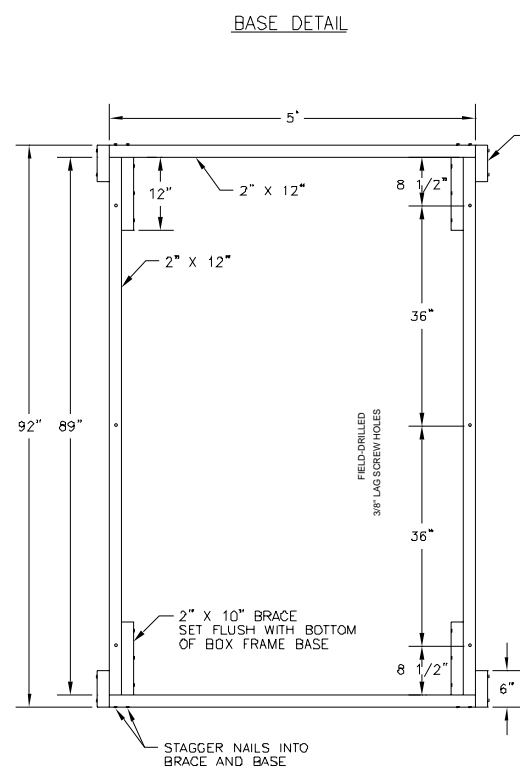
- Four hammers
- Half-inch drive socket set (2, if possible)
- Crescent wrench, 10- or 12-inch
- Brace and bit (to drill 2 sizes to accommodate lag bolts)
- Nail punch
- Two measuring tapes (minimum)
- Straight edge
- Level
- Shovels, picks, pulaskis
- Wood chisel
- Small crowbar
- Pencils
- Wire cutters or fence tool
- Two-inch paint brush (to apply preservative to cut ends)
- Gloves for all (treated timber is messy, rails are oily)
- Rod and hand level (to establish grade of excavation)
- First aid kit
- Cattle guard plan
- Chain saw chaps
- Safety goggles.

- 8—**Sequence of construction.
- Set stakes to establish four corners and grade.
  - Have part of crew excavate to grade while the others nail the box base together.
  - Put base in hole. Dirt under base must be compacted, and base must have firm, even bearing all around. Attach joist hangers (if used) before putting base in hole.
  - Square up and level base.
  - Lay angle iron on base.
  - Put one tread rail on each end and loosely attach with bolts.
  - Put on all other rails and put bolts through holes.
  - Align deck with base, then tighten bolts.
  - Recheck deck and base alignment.
  - Install lag bolts.
  - Construct wings.
  - Backfill ends. Smooth approaches.
  - Install barbed wire from bottom crosspiece to posts.

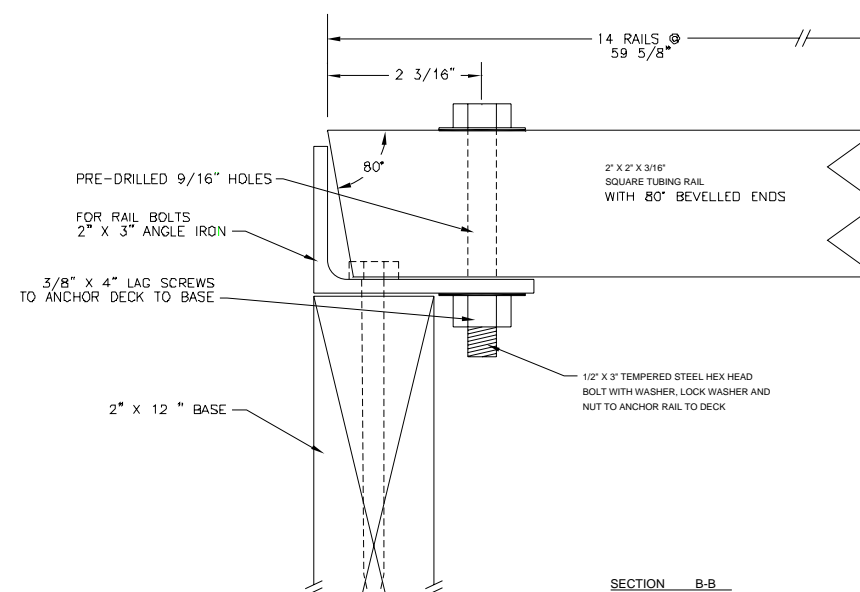
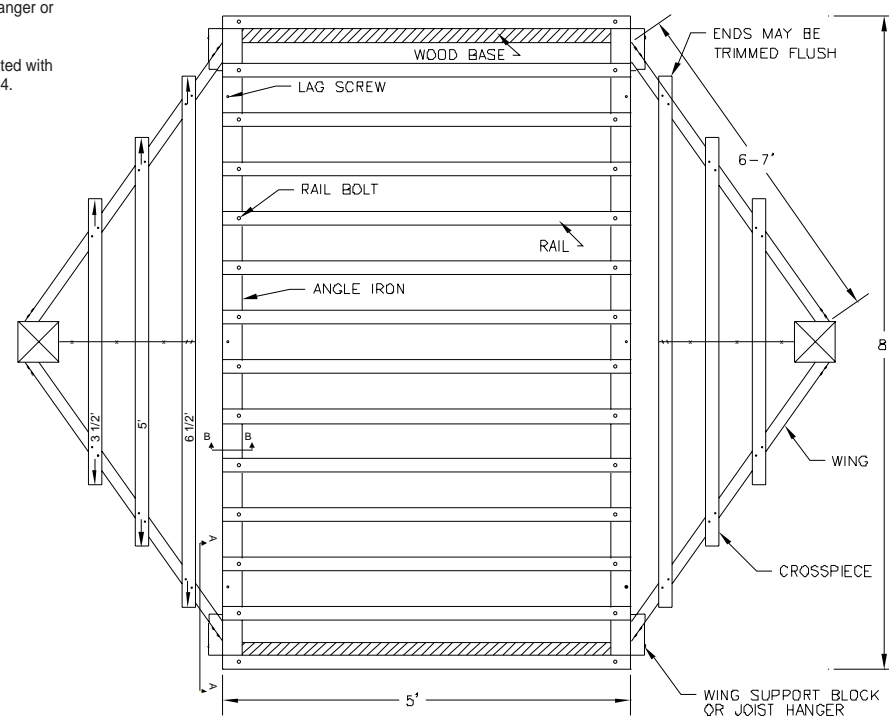
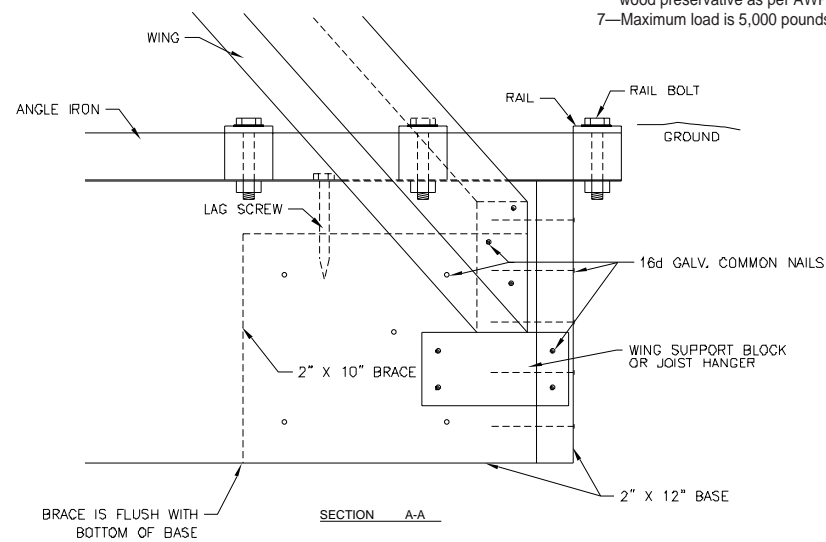
—Technical contact—

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Appendix A—Deschutes Trail Cattle Guard Plans

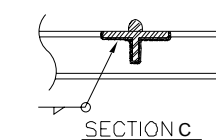
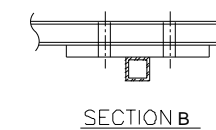
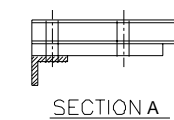
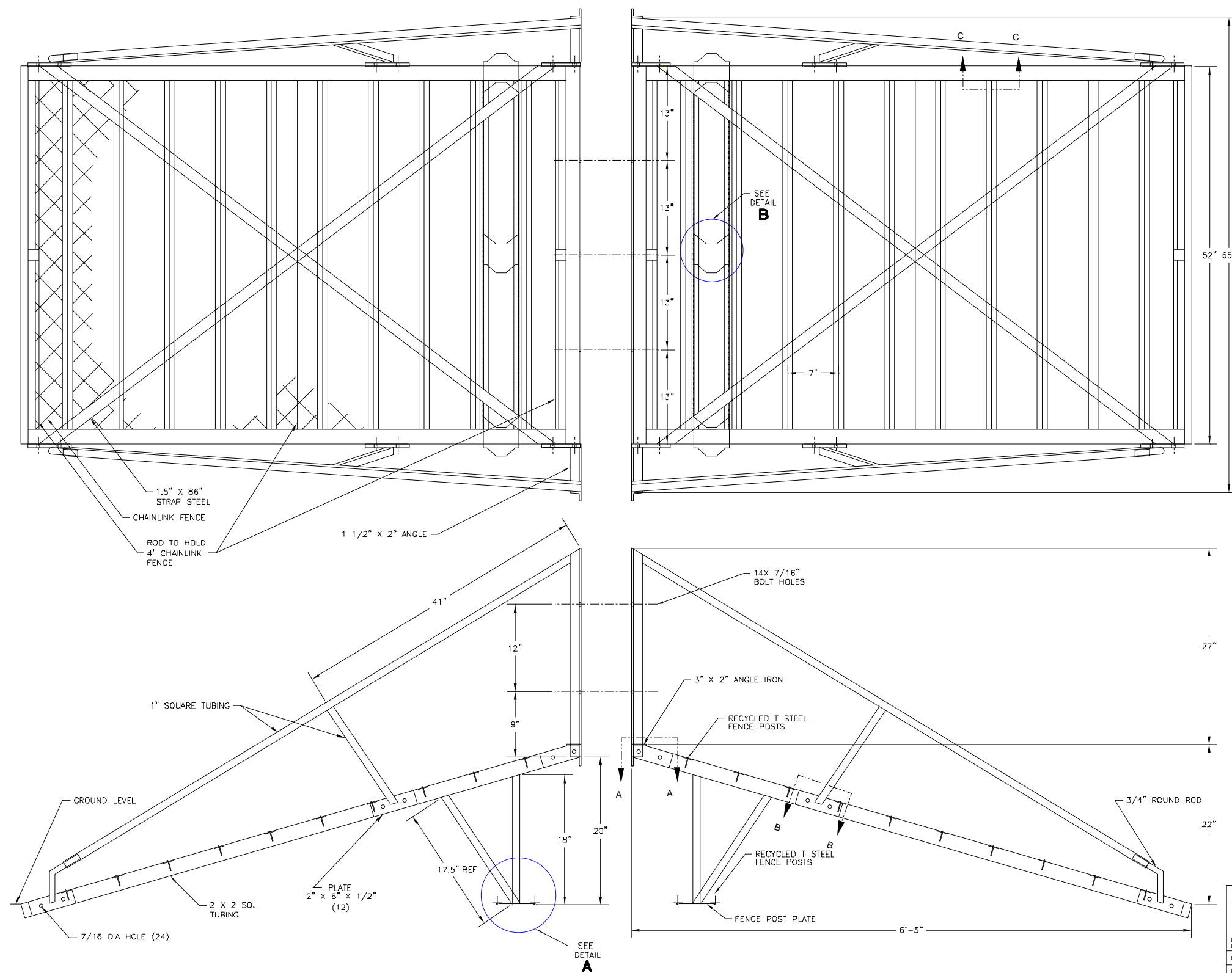


- NOTES**
- 1—All wood shall be pressure treated with creosote or water-borne preservatives with 0.40 retention.
  - 2—Lumber dimensions are nominal.
  - 3—The base shall be installed so all sides have even bearing on the bottom. The top 4 inches below the base shall not contain rocks larger than 3 inches in greatest dimension.
  - 4—Wings may be attached to posts and base with joist hangers which have been field modified to fit. Recommend the Simpson SUR 26 and SUL 26 skewed 45° hanger or similar.
  - 5—See materials list.
  - 6—All field cuts in lumber shall be treated with wood preservative as per AWPA M4.
  - 7—Maximum load is 5,000 pounds.

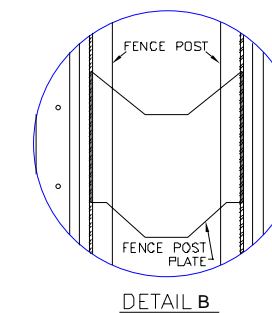
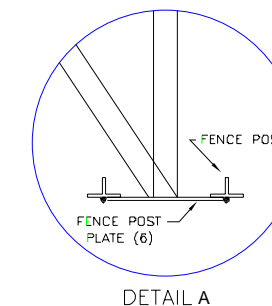


UNLESS OTHERWISE SPECIFIED	DATE	REVISION	BY
TOLERANCES: FRACTIONS ±/— DECIMALS ±/— ANGLES ±/—			
DRAWN: Deb Mucci	TITLE		
DESIGNED: Dick Dufourd	<b>Trail Cattle Guard, Deschutes</b>		
CHECKED:			
APPROVED:			
SCALE: None			
DATE: July 1987	Sheet 1 of 1	MTDC-951-3	

**Appendix B—Caribou Trail Cattle Guard Plans**



See next page for  
Materials List  
and  
Construction Notes



Unless Otherwise Specified	DATE	REVISION	BY
TOLERANCES: FRACTIONS +/- DECIMALS +/- ANGLES +/-			
Dimensions are in inches. Break sharp edges.			
DRAWN: Deb Mucci	USDA Forest Service		
DESIGNED: Mark Booth Carl Stoddard John Newcom	Caribou National Forest, Montpelier Ranger District		
	Montpelier, Idaho		
	TITLE		
	<b>Trail Cattle Guard, Caribou</b>		
SCALE: None	Sheet 1 of 1	MTDC-951-1	
DATE: 1995			

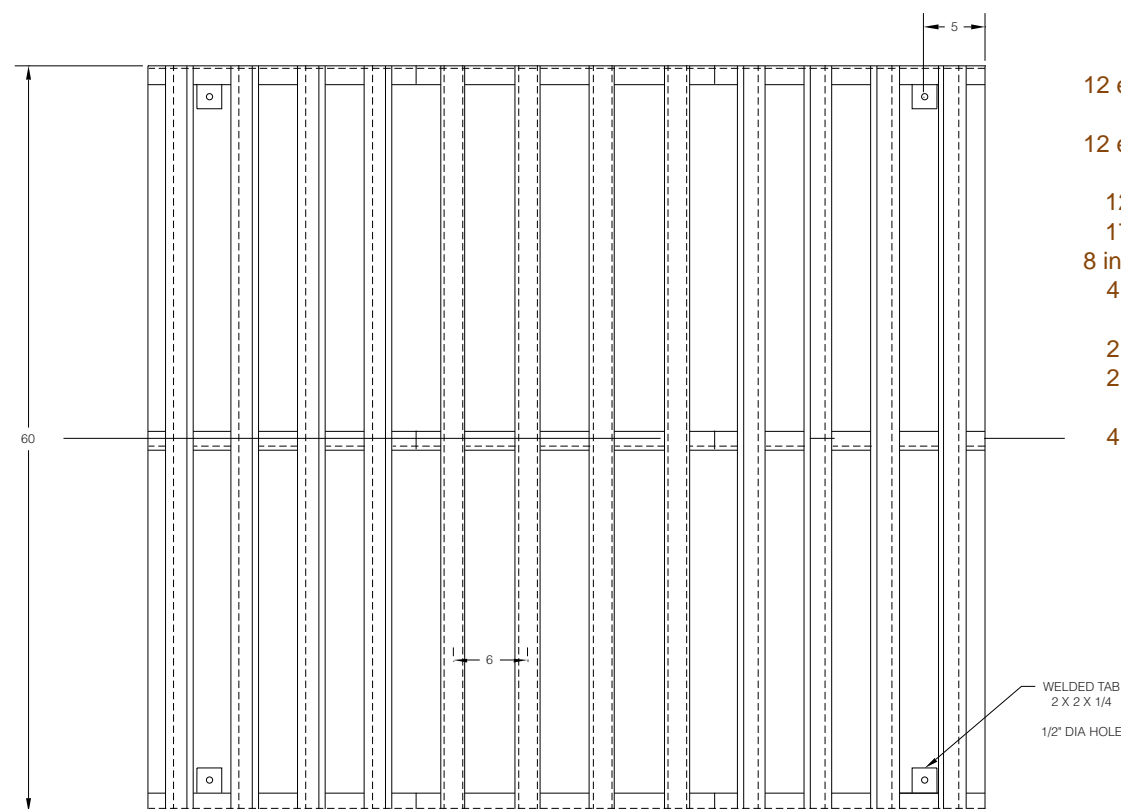
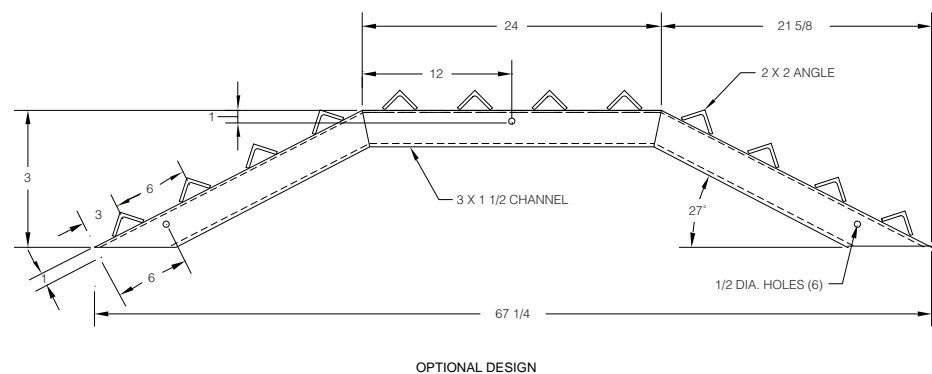
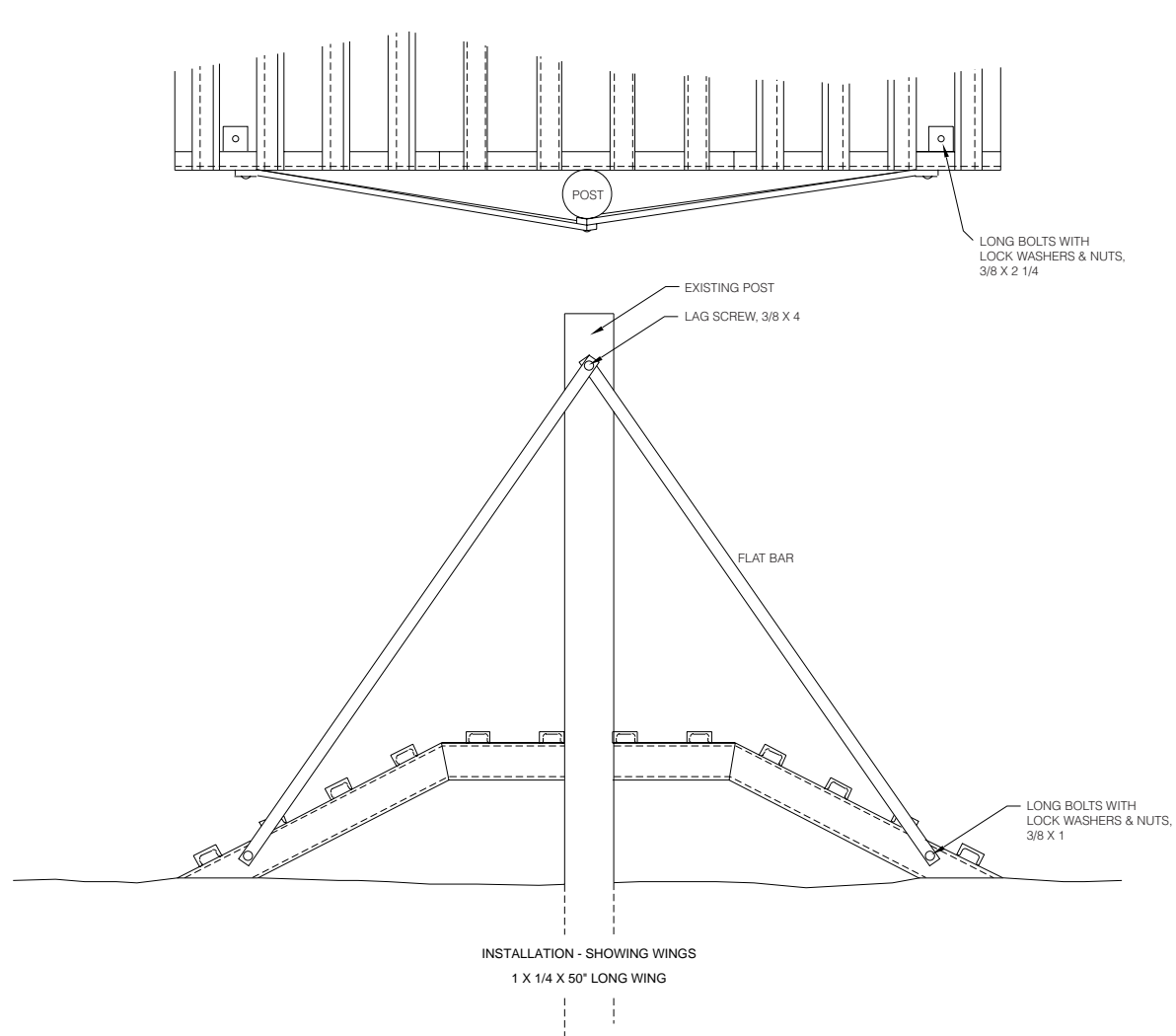
## Appendix B—Caribou Trail Cattle Guard Plans

Materials List	Construction Notes
<p>24 each: T-type steel fenceposts (preferably used), 6 feet long</p> <p>9 feet: Angle iron, 3 by 2 inches</p> <p>10 feet: Angle iron, 1½ by 2 inches</p> <p>54 feet: Square tubing, 1 by 1 inch</p> <p>28 feet: Square tubing, 2 by 2 inches</p> <p>33 feet: Flat bar, ½ by 1½ inches</p> <p>26 feet: Metal rod, ¾-inch diameter</p> <p>12 feet: Galvanized chain link fence, 4 feet wide</p> <p>4 feet: Metal rod, ¾-inch diameter</p> <p>6 each: Fence post plates</p> <p>6 feet: Flat bar, ½ by 2 inches</p> <p>7 each: Lag bolts, ¾ by 1¼ inches, plus lock washers and nuts</p> <p>24 each: Lag bolts, ¾ by 3 inches, plus lock washers and nuts</p>	<ul style="list-style-type: none"> <li>• The steel fence posts are cut to the proper length, the short pieces are welded on the ends to form additional tread rails, or are used for legs.</li> <li>• The ¾-inch-diameter rod is cut into short pieces and inserted into the ends of the 1-inch square tubing—the rod is easier to bend and makes for a stronger weld.</li> <li>• The ¾-inch-diameter rod is slipped through the ends of the chain-link fence material and used to stretch and hold it tight. A short piece of the flat bar is bent and welded at the center of the lowest and highest point of each half of the ramp to add additional strength to the rod. The ends of the rod are finally welded to the inside of the 2-inch square tubing.</li> <li>• The flat bar is bent at the proper angle on each end and welded to the 2-inch square tubing to provide lateral strength, additional tread strength, and to hold the chain-link fence in place.</li> <li>• Steel angle iron (2 by 2 inches) could be substituted for the steel fence posts. They would also be welded on the ends to the 1-inch square tubing with the point of the angle facing up.</li> </ul>

—Designed by Mark Booth, Carl Stoddard, and John Newcom at:

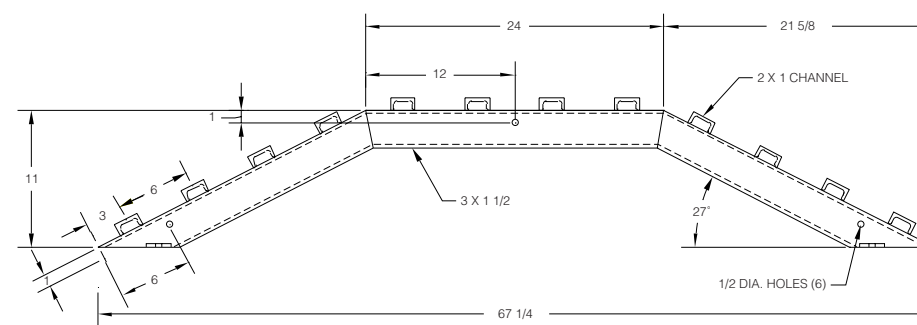
USDA Forest Service, Montpelier Ranger District  
 322 North 4th Street  
 Montpelier, ID 83254  
 Ph: (208) 847-0375  
 Fax: (208) 847-3426

## Appendix C—Deerlodge Trail Cattle Guard Plans



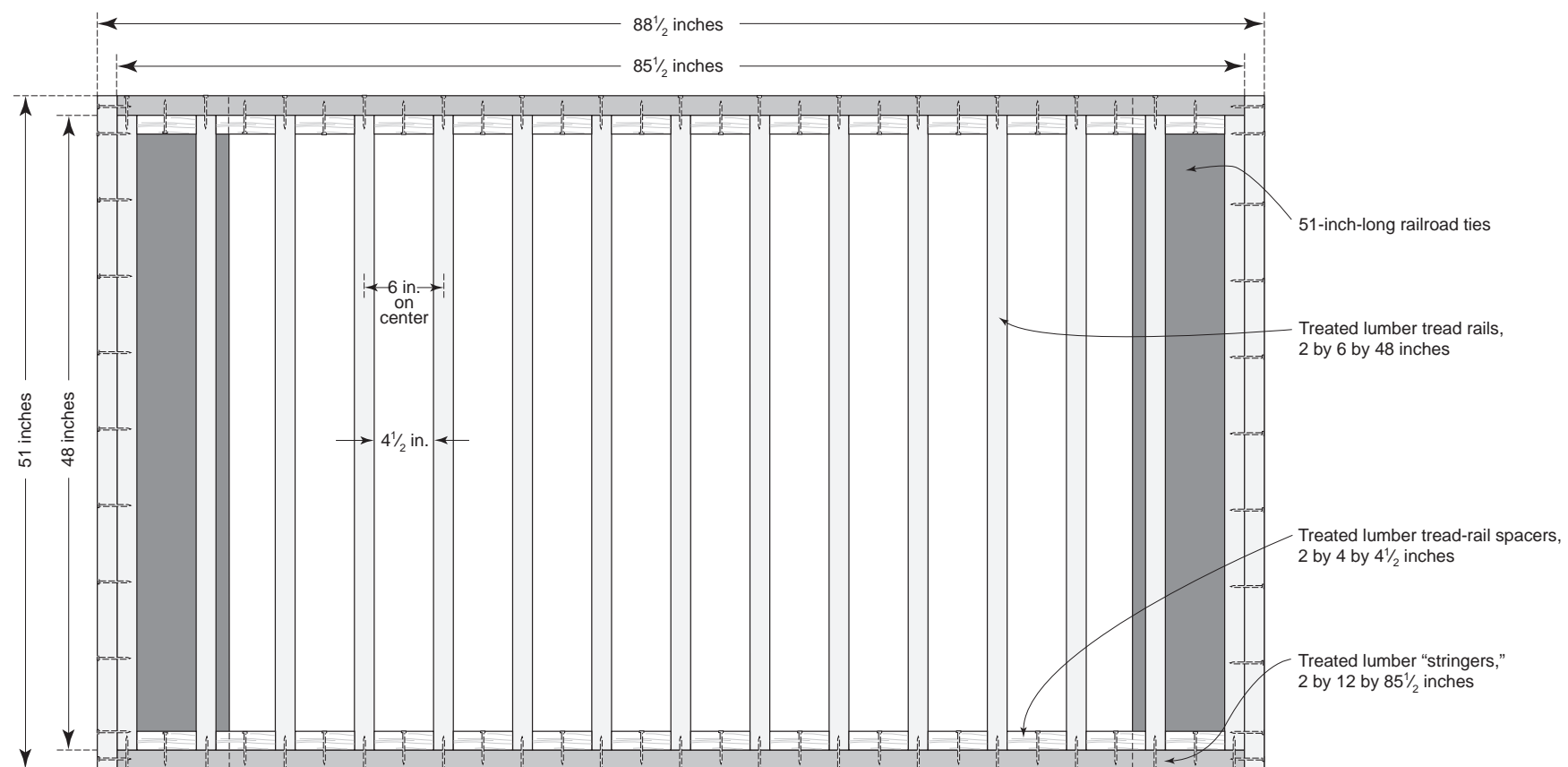
### Materials List

- 12 each: Channel for tread rails, 2 by 1 by 60 inches **or**
- 12 each: Angle iron, 2 by 2 by 60 inches
- 12 feet: Channel for "stringers," 3 by 1 1/2 inches
- 17 feet: Flat bar for wings, 1/4 by 1 inch
- 8 inches: Flat bar for tabs, 1/4 by 2 inches
- 4 each: Long bolts for wings, 3/8 by 1 inch, plus lock washers and nuts
- 2 each: Lag screws for wings, 3/8 by 4 inches
- 2 each: Treated lumber for across ends underneath, 2 by 6 by 60 inches
- 4 each: Long bolts, 3/8 by 2 1/4 inches, plus lock washers and nuts

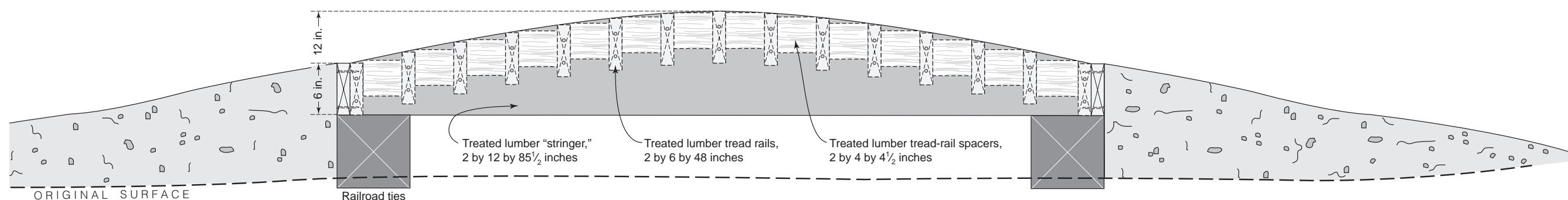


Unless Otherwise Specified	DATE	REVISION	BY
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Dimensions are in inches. Break sharp edges.			
DRAWN: Deb Mucci			
DESIGNED: Darrow Hippert Eric Toll			
SCALE: None			
DATE:			
	USDA Forest Service Deerlodge National Forest, Jefferson Ranger District Whitehall, Montana		
	<b>Trail Cattle Guard, Deerlodge</b>		
	Sheet 1 of 1	MTDC-951-2	

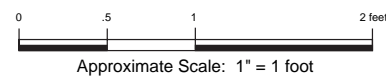
## Appendix D—Challis Trail Cattle Guard Plans



PLAN VIEW



ELEVATION VIEW



### Materials List

- 15 each: Treated lumber, 2 by 6 by 48 inches
- 2 each: Treated lumber, 2 by 12 by 85½ inches
- 14 each: Treated lumber, 2 by 4 by 4½ inches
- 2 each: Railroad ties, 51 inches long
- 4 each: Treated lumber for wings
- Galvanized annular ring nails
- Wood preservative
- Suitable exterior glue

### Construction Notes

- The structure will last much longer if all new cuts made in the lumber are treated with wood preservative.

Unless Otherwise Specified	DATE	REVISION	BY
TOLERANCES: FRACTIONS +/- _____ DECIMALS +/- _____ ANGLES +/- _____ Dimensions are in inches. Break sharp edges.		USDA Forest Service Challis National Forest, Lost River Ranger District Challis, Idaho	
DRAWN: Sara Lustgraaf	TITLE <b>Trail Cattle Guard, Challis</b>		
DOCUMENTED BY: Howard Rosenkrance	APPROX. SCALE: 1 in. = 1 ft.		
DATE: June 1998	Sheet 1 of 1	MTDC-951-4	

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