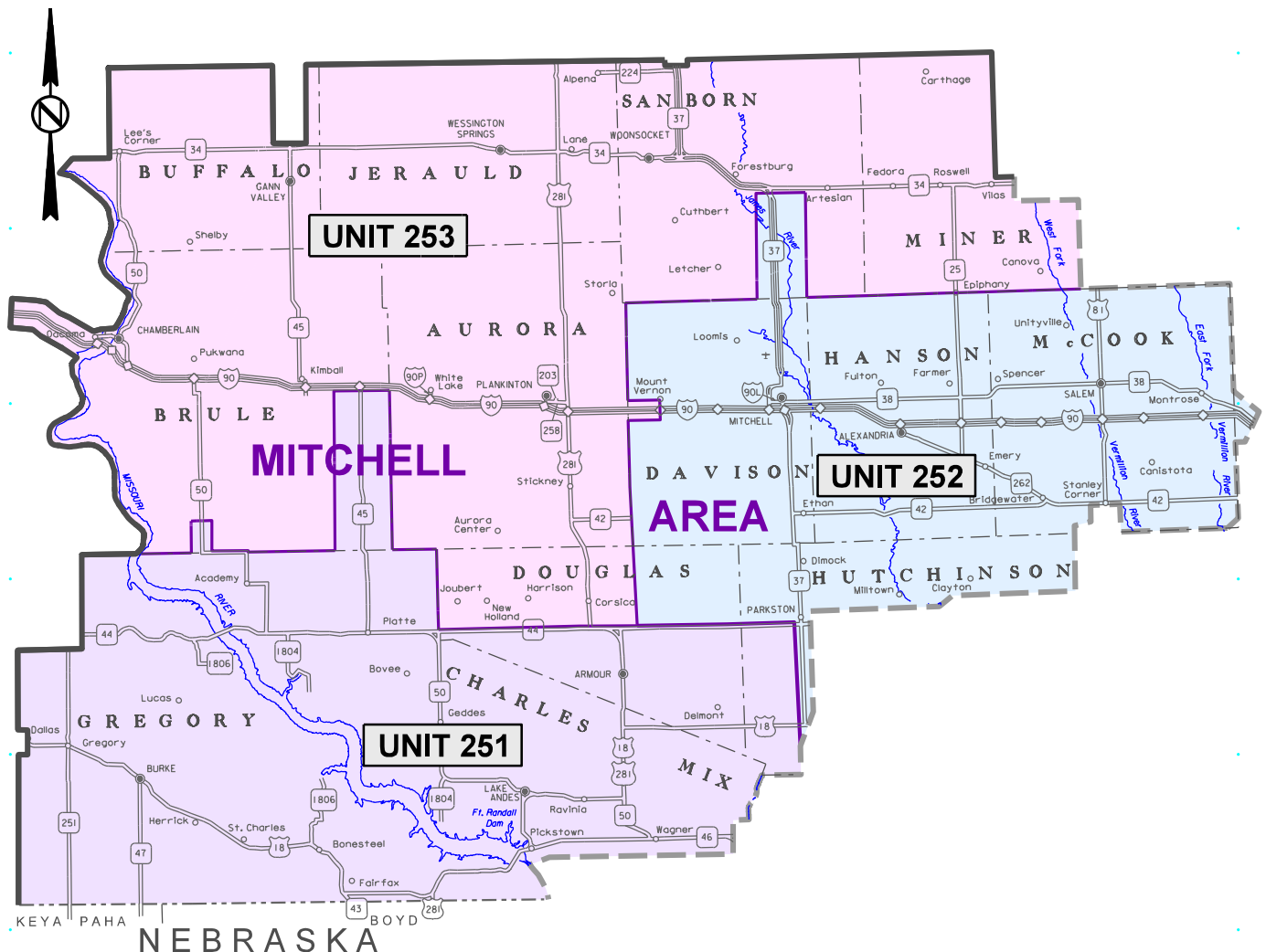


GUARDRAIL REPAIR
000P-251, 000I-252 & 000I-253
AURORA, BRULE, BUFFALO, CHARLES MIX,
DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, MCCOOK,
MINER & SANBORN COUNTIES
PCN I5EC, I5ED & I5EE



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

INDEX OF SHEETS

Sheet 1	Layout Map
Sheet 2	Index of Sheets
Sheet 3	Estimate of Quantities
Sheets 4 & 5	Environmental Commitments
Sheets 6 - 10	Plan Notes
Sheets 11 - 19	Traffic Control
Sheets 20 - 31	Standard Plates for Cable Guardrail
Sheets 32 - 73	Standard Plates for Beam Guardrail
Sheets 74 & 75	Details for Rubrail
Sheet 76	Details for Median Guardrail
Sheets 77 - 80	Standard Plates for Guardrail Delineation

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM		000P-251 PCN I5EC QUANTITY	000I-252 PCN I5ED QUANTITY	000I-253 PCN I5EE QUANTITY	TOTAL QUANTITY	UNIT
009E0197	Mobilization 1	(Unit 251)	2	-	-	2	Each
009E0198	Mobilization 2	(Unit 252)	-	6	-	6	Each
009E0199	Mobilization 3	(Unit 253)	-	-	6	6	Each
629E0100	3 Cable Guardrail		<----- 50 ----->			50	Ft
629E0210	Reset High Tension 3 Cable Guardrail		<----- 50 ----->			50	Ft
629E0211	Reset High Tension 4 Cable Guardrail		<----- 100 ----->			100	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly		<----- 1 ----->			1	Each
629E0400	3 Cable Guardrail Anchor Assembly		<----- 1 ----->			1	Each
629E0450	Retension 3 Cable Guardrail		4	8	8	20	Each
629E0453	Retension High Tension 3 Cable Guardrail		<----- 200 ----->			200	Ft
629E0454	Retension High Tension 4 Cable Guardrail		<----- 300 ----->			300	Ft
629E1000	Repair 3 Cable Guardrail		500	1000	1000	2500	Ft
629E1010	Repair 3 Cable Guardrail Slip Base Anchor Assembly		<----- 1 ----->			1	Each
629E1100	3 Cable Guardrail End Post	(I Beam)	2	4	4	10	Each
629E1102	3 Cable Guardrail Intermediate Post	(Flanged)	20	50	50	120	Each
629E1102	3 Cable Guardrail Intermediate Post	(I Beam)	3	6	6	15	Each
629E1103	3 Cable Guardrail Slip Base Anchor Post		1	2	2	5	Each
629E1104	3 Cable Guardrail Post, Winter		10	30	30	70	Each
629E1106	Drive Down 3 Cable Guardrail Post		3	4	3	10	Each
629E1108	Reset 3 Cable Guardrail Post		4	10	10	24	Each
629E1110	Cable Anchor Bracket		<----- 1 ----->			1	Each
629E1112	Cable Splice		1	1	1	3	Each
629E1114	3 Cable Guardrail J Hook Bolt		100	200	200	500	Each
629E1116	Steel Turnbuckle Cable End Assembly		2	5	5	12	Each
629E1118	Spring Cable End Assembly with Turnbuckle		2	2	2	6	Each
629E1120	W Beam to 3 Cable Transition Bracket		2	2	2	6	Each
629E1122	3 Cable Guardrail End Post Cap		2	4	4	10	Each
629E1143	High Tension 3 Cable Guardrail Post		<----- 1 ----->			1	Each
629E1144	High Tension 4 Cable Guardrail Post		<----- 1 ----->			1	Each
629E1158	High Tension 3 Cable Guardrail Post and Sleeve		<----- 1 ----->			1	Each
629E1159	High Tension 4 Cable Guardrail Post and Sleeve		<----- 1 ----->			1	Each
629E1163	High Tension 3 Cable Guardrail Sleeve		<----- 1 ----->			1	Each
629E1164	High Tension 4 Cable Guardrail Sleeve		<----- 1 ----->			1	Each
629E1170	High Tension Cable Guardrail Terminal Post		<----- 1 ----->			1	Each
630E0200	Straight Class A Thrie Beam Rail	(12 Gauge)	12.5	12.5	12.5	37.5	Ft
630E0210	Straight Class B Thrie Beam Rail	(10 Gauge)	12.5	12.5	12.5	37.5	Ft
630E1200	Straight Class A W Beam Rail	(12 Gauge)	50	75	75	200	Ft
630E1210	Straight Class B W Beam Rail	(10 Gauge)	12.5	12.5	12.5	37.5	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	(6.25')	<----- 1 ----->			1	Each
630E2015	W Beam Guardrail Flared End Terminal		<----- 1 ----->			1	Each
630E2020	W Beam Guardrail Tangent End Terminal		<----- 1 ----->			1	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal		<----- 1 ----->			1	Each
630E2050	Beam Guardrail Trailing End Terminal	(W or Thrie)	<----- 1 ----->			1	Each
630E2100	Beam Guardrail Post	(6" x 8" x 6', 6.5' or 7')	2	2	2	6	Each
630E2105	Beam Guardrail Block	(6" x 8" x 14" or 22.5")	2	2	2	6	Each
630E2110	Beam Guardrail Post and Block	(6', 6.5' or 7' Post)	10	10	10	30	Each
630E2120	Beam Guardrail Post and Block, Winter		3	4	3	10	Each
630E2150	End Terminal Wood Breakaway Post		1	1	1	3	Each
630E2155	End Terminal Hinged Breakaway Post		<----- 1 ----->			1	Each
630E2210	Breakaway Cable Terminal End Rail		<----- 1 ----->			1	Each
630E2215	W Beam Guardrail End Section Buffer		<----- 2 ----->			2	Each
630E2220	Tangent End Terminal Extruder Head		<----- 1 ----->			1	Each
630E2235	Tangent End Terminal Rail		<----- 25 ----->			25	Ft
630E2300	Rubrail		<----- 14 ----->			14	Ft
630E5520	Drive Down Beam Guardrail Post		2	2	2	6	Each
630E5550	Reset Beam Guardrail Post and Block		2	4	4	10	Each
632E2220	Guardrail Delineator		10	20	20	50	Each
632E2510	Type 2 Object Marker Back to Back		1	1	1	3	Each
632E2520	Type 2 Object Marker		2	4	4	10	Each
634E0010	Flagging		1	1	1	3	Hour
634E0110	Traffic Control Signs		48	80	80	208	SqFt
634E0120	Traffic Control, Miscellaneous		<----- Lump Sum ----->			Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel		<----- 1 ----->			1	Each

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Section A Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf>

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT B4: BALD EAGLE

Bald eagles are known to occur in this area.

Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor will furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

COMMITMENT H: WASTE DISPOSAL SITE (CONTINUED)

The waste disposal site(s) will not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Environmental Office and the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements will apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with fences, gates and placement of a sign or signs at the entrance to the site stating No Dumping Allowed.
2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10.06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

Cost associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

State Historical Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

Action Taken/Required:

All earth disturbing activities require a cultural resource review prior to scheduling the pre-construction meeting. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will arrange and pay for a record search and when necessary, a cultural resource survey. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view of which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow 30 Days from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

The Contractor is responsible for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the proposal.

LOCATION

Guardrail repair will be limited to all Interstate and State Highways within the Mitchell Area.

ESTIMATED QUANTITIES

The Contractor shall furnish and install new guardrail material as per the Contract Proposal. The quantities for each item are estimated. The actual amount of work required may vary greatly from the Estimate of Quantities. There will be NO negotiation for overruns or underruns on this contract.

MOBILIZATION

Mobilization 1 (Unit 251) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 251.

Mobilization 2 (Unit 252) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 252.

Mobilization 3 (Unit 253) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 253.

The maximum allowable contract unit price submitted for Mobilization 1 (Unit 251), Mobilization 2 (Unit 252) or Mobilization 3 (Unit 253) shall not exceed \$1500.

Mobilization 1 (Unit 251), Mobilization 2 (Unit 252) or Mobilization 3 (Unit 253) will be paid for once each time the Contractor is called to the Unit, regardless of the number of sites requiring repair within that Unit.

EMBANKMENT AND SURFACING FOR GUARDRAIL INSTALLATIONS

It is not anticipated that embankment and surfacing will be required as a part of this contract. However, if embankment and/or surfacing material (base material and/or asphalt concrete) are/is required to perform a guardrail installation, it will be provided in accordance with the specifications, and either:

1. Furnished by the State and a placement price will be negotiated, or
2. Furnished and placed by the Contractor and a price will be negotiated, or
3. Accomplished by other means approved by the Engineer.

RESTORATION OF DISTURBED AREAS

Areas disturbed as a result of work necessary under this Contract shall be reshaped and/or restored to the satisfaction of the Engineer.

Slopes and berms disturbed shall be leveled, excess material removed, area tilled to the minimum depth of three inches, seeded with Intermediate Wheatgrass at the rate of 18 Pounds P.L.S. per acre and fertilized with a commercial fertilizer with a minimum guaranteed analysis of 18-46-0 applied at the rate of 100 pounds per acre.

Cost for reshaping, leveling, removal of excess material, tilling, seeding and fertilizing disturbed areas on the slopes and berms shall be incidental to the contract unit prices for the various items.

REMOVING GUARDRAIL

Cost for removing and disposing of guardrail items shall be incidental to the contract unit prices for the various items. Removed guardrail items that are not reused shall become the property of the Contractor.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

GUARDRAIL COMPLETION REQUIREMENTS

At such time as repairs are required, the Contractor will be notified. The Contractor will have 21 days to complete the repairs. In the event that the Contractor has other guardrail work scheduled on another SD State contract, the Contractor may contact the Engineer to work out a reasonable schedule to accomplish the work. The Engineer will consider extending the completion time based on traffic volume, possible accident severity and probability.

Once the existing guardrail is removed from any item of concern (bridge end, box culvert, bridge column, etc.), the Contractor shall place drums or Type 2 Barricades at 25 foot intervals at each location where existing guardrail is removed. These devices shall extend 175 feet beyond the item of concern for each direction of traffic. Drums or Barricades shall remain in place until new guardrail has been installed.

Post end, beam, and end terminal sections shall be erected in a continuous operation within each individual run of guardrail. Incomplete guardrail installations shall be marked by delineation as noted in the previous paragraph.

If the Contractor fails to complete the required work within the time allowed, the Contractor shall install an approved safety treatment that complies with NCHRP 350, level 3, to protect the site.

Failure to comply with this requirement will necessitate liquidated damages being assessed at a rate of \$500 for each calendar day that the guardrail work remains incomplete for the item of concern. This provision applies up to the contract completion date. After the contract completion date, liquidated damages will be assessed in accordance with Section 8.8 or \$500, whichever is greater.

GUARDRAIL GENERAL

Cost for furnishing and installing hardware (including, but not limited to new bolts, nuts, washers, straps, cable spacers, nails, etcetera) necessary for installing, resetting and repairing any of the various beam/cable/high tension cable guardrail types shall be incidental to the contract unit prices for the various items.

Should other items be required that are not in the Contract Proposal, the Contractor shall furnish the items and will be paid invoice cost plus shipping, taxes and ten percent for profit. Prior approval of the Engineer will be required. Installation cost for these items shall be incidental to the contract unit prices for the various items.

When a significant portion of any guardrail installation is damaged (say, more than half the installation) the Contractor shall request a new guardrail design from the Department.

Entirely new combination flared beam and cable guardrail installations shall be placed at a flare rate no sharper than 34:1.

OUTSIDE SHOULDER INSTALLATION

Whenever an outside shoulder beam end terminal is significantly damaged, the entire end terminal shall be removed and replaced with an approved end terminal from the SDDOT Approved List of W Beam Guardrail Terminals. The Contractor may select from any of the terminals specified. Installation of these terminals shall be as per Standard Plates 630.87 and/or 630.88.

The entire beam portion of the guardrail shall be installed within the allotted time as described in the Guardrail Completion Requirement notes. The cable portion may be installed in early spring after the ground has thawed, however, the Department, for safety, may order installation of the cable portion within the allotted time as described in the Guardrail Completion Requirements notes.

MEDIAN SHOULDER INSTALLATION

Whenever a median beam end terminal is significantly damaged, the entire length of beam guardrail (except for the 43.75' closest to the bridge, if this portion of the guardrail is not damaged) shall be replaced as per the detail for Typical Median Protection. This may involve cutting the existing guardrail. Whether the existing installation is W Beam or Thrie/W Beam, the total length of the newly completed installation shall be 81.25'. When an obsolete median installation is replaced with this standard, the existing guardrail (if present) in the median, protecting the opposite direction traffic from the back of obsolete guardrail, shall be removed.

The entire beam portion of the guardrail shall be installed within the allotted time as described in the Guardrail Completion Requirement notes. The cable portion may be installed in early spring after the ground has thawed, however, the Department, for safety, may order installation of the cable portion within the allotted time as described in the Guardrail Completion Requirements notes.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

3 CABLE GUARDRAIL

Repair 3 Cable Guardrail - Includes the cost for putting existing 3 cable guardrail back into its original position and, if required, realigning posts within the displaced length of three cable guardrail. Payment for this item is applicable only when the existing cable rail requires being put back in place and posts require realigning.

Payment length shall be:

- From the first existing post that does not need replacing on each end of the repair area,
- From the first existing post that does not need replacing to the anchor if the anchor post, end posts or transition bracket are replaced or,
- From the first existing post that does not need replacing to the transition bracket if the transition bracket is not replaced.

If multiple areas require repair within a cable installation, the areas shall be measured separately.

Retension 3 Cable Guardrail – Includes the cost for retensioning of the entire run of cable guardrail. Payment will be made once per each installation retensioned, regardless of whether one, two or three cables require retensioning. Retensioning may include cutting and shortening of cables at the anchors to allow for proper tensioning.

Repair 3 Cable Guardrail Slip Base Anchor Assembly - This item will be considered full compensation for removal, repair and replacement of the damaged Slip Base Anchor Assembly. This work will be performed if it is determined that the Slip Base Anchor Assembly can be repaired without total footing removal. The work will consist of coring a 12" diameter section into the existing footing, centered over the existing slip base anchor stub post, to a depth of 22". The core will then be broken off and disposed of. The sides of the hole in the footing shall be roughened to the satisfaction of the Engineer. A rapid-setting, non-shrink, non-metallic grout shall be used (in accordance with the manufacturer's recommendations) to anchor the new slip base anchor stub post in the footing. The grout shall reach a compressive strength of over 5000 PSI.

3 Cable Guardrail Post, Winter - Includes the additional cost for removal and installation of 3 Cable Guardrail Posts (I Beam and Flanged Channel) when there is in excess of one foot of solid frozen ground at the work site. This contract unit price will be an additional payment for each post installed under these conditions.

Drive Down 3 Cable Guardrail Post - Includes the cost for adjusting the height of a cable guardrail post. Cost for disassembly/reassembly of the cable guardrail necessary to perform this adjustment shall be incidental to the contract unit price for this item.

Reset 3 Cable Guardrail Post - Includes removing and resetting cable guardrail post to the proper alignment with existing cable guardrail. Payment will be the same in frozen or unfrozen ground.

HIGH TENSION CABLE GUARDRAIL

High Tension Guardrail items shall be furnished and installed per the manufacturer's details and instructions.

Retension High Tension Cable Guardrail – Includes the cost for retensioning a length of high tension cable guardrail. Payment will be made once per foot length of installation retensioned, regardless of whether one, two three or four cables require retensioning. Retensioning shall include cutting and shortening of cables at the anchors to allow for proper tensioning.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

BEAM GUARDRAIL

Contract unit prices for the various Post and Block items shall include the appropriate size wood block.

Beam Guardrail Post and Block, Winter - Includes the additional cost for removal and installation of wood posts and blocks when there is in excess of one foot of solid frozen ground at the work site. This contract unit price will be an additional payment for each post and block installed under these conditions.

Drive Down Beam Guardrail Post - Includes the cost for adjusting the height of a beam guardrail post. Cost for disassembly/reassembly of the beam guardrail necessary to perform this adjustment shall be incidental to the contract unit price for this item.

Reset Beam Guardrail Post and Block - Includes removing and resetting wood guardrail post and block to the proper alignment with existing beam guardrail. Payment will be the same in frozen or unfrozen ground.

W Beam Guardrail Breakaway Cable Terminal (BCT) – Includes the cost for removing damaged components of the existing terminal (including rail), furnishing and installing new Wood Breakaway End Posts (2), W Beam End Section (Buffer) 11" +/- radius, the Modified W Beam Connector, related items and all hardware to attach. Any other BCT items that are required will be paid for at invoice cost plus shipping, taxes and ten percent profit (labor will be incidental to other items). The BCT will only be installed at locations where a W Beam to 3 Cable Transition is required.

Breakaway Cable Terminal End Rail – Includes the cost to remove existing and install a new end rail.

W Beam Guardrail End Section Buffer – Includes the cost to remove existing and install a new buffer assembly.

W Beam Guardrail End Terminals (except BCTs) must be selected from the SDDOT Approved Products List at: <http://www.sddot.com/business/certification/products/Default.aspx>

End Terminal Wood Breakaway Post – Includes the cost to remove the existing and install a new wood breakaway post on an end terminal.

End Terminal Hinged Breakaway Post – Includes the cost to remove the existing and install a new breakaway post on an end terminal.

Tangent End Terminal Extruder Head – Includes the cost to remove the existing and install a new Tangent End Terminal Extruder Head on a tangent end terminal.

Tangent End Terminal Rail – Includes the cost to remove existing and install new beam guardrail on a tangent end terminal.

MIDWEST GUARDRAIL SYSTEM (MGS)

If the Contractor is directed to perform repair on an MGS site, the repair shall be in accordance with the applicable standard plates for MGS. These standard plates can be accessed by selecting "630 Steel Beam Guardrail" and "Show Standard Plates" at: <http://www.sddot.com/business/design/plates/index/Default.aspx> Each of the standard plates pertaining to MGS have "MGS" as a part of the title.

Cost for repair at an MGS site will be included in the contract unit prices for the pertinent MGS items. If repair of an MGS site becomes necessary, the pertinent MGS items will be added to the contract by construction change order, and contract unit prices will be negotiated at that time.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

GUARDRAIL DELINEATION

Whenever the Contractor is directed to perform guardrail repair, all of the guardrail delineation at the location will be considered for upgrade. This will typically involve guardrail delineation at two to eight guardrail runs (For example: At twin structures, if one guardrail run is damaged, and the existing guardrail delineation at the site is not at the current standard, then all of the substandard guardrail delineation at each guardrail run (all traffic directions, over and under) will be upgraded).

Cost for this work shall be included in the contract unit prices per each for Guardrail Delineator, Type 2 Object Marker Back to Back, and Type 2 Object Marker.

GENERAL MAINTENANCE OF TRAFFIC

Portable sign supports may be used as long as the duration is 3 days or less. If the duration is more than 3 days the signs shall be on fixed location, ground mounted, breakaway supports.

Sufficient traffic control devices have been included in these plans to sign one workspace. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per square foot for Traffic Control Signs.

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-5	SHOULDER WORK	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK (36" x 18" may be used on Conventional Roads)	2	48" x 24"	8.0	16.0
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			
		208.0			

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device

**END
ROAD WORK**
G20-2

The channelizing devices shall be drums or 42" cones if traffic control must remain overnight.

For short duration operations (1 hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

WORK SPACE

WORK SPACE

SHOULDER WORK
W21-5

ROAD WORK AHEAD
W20-1

Published Date: 2nd Qtr. 2018

**S
D
D
O
T**

**GUIDES FOR TRAFFIC CONTROL DEVICES
WORK ON SHOULDERS**

June 3, 2016

PLATE NUMBER
634.03

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45	500	25
50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

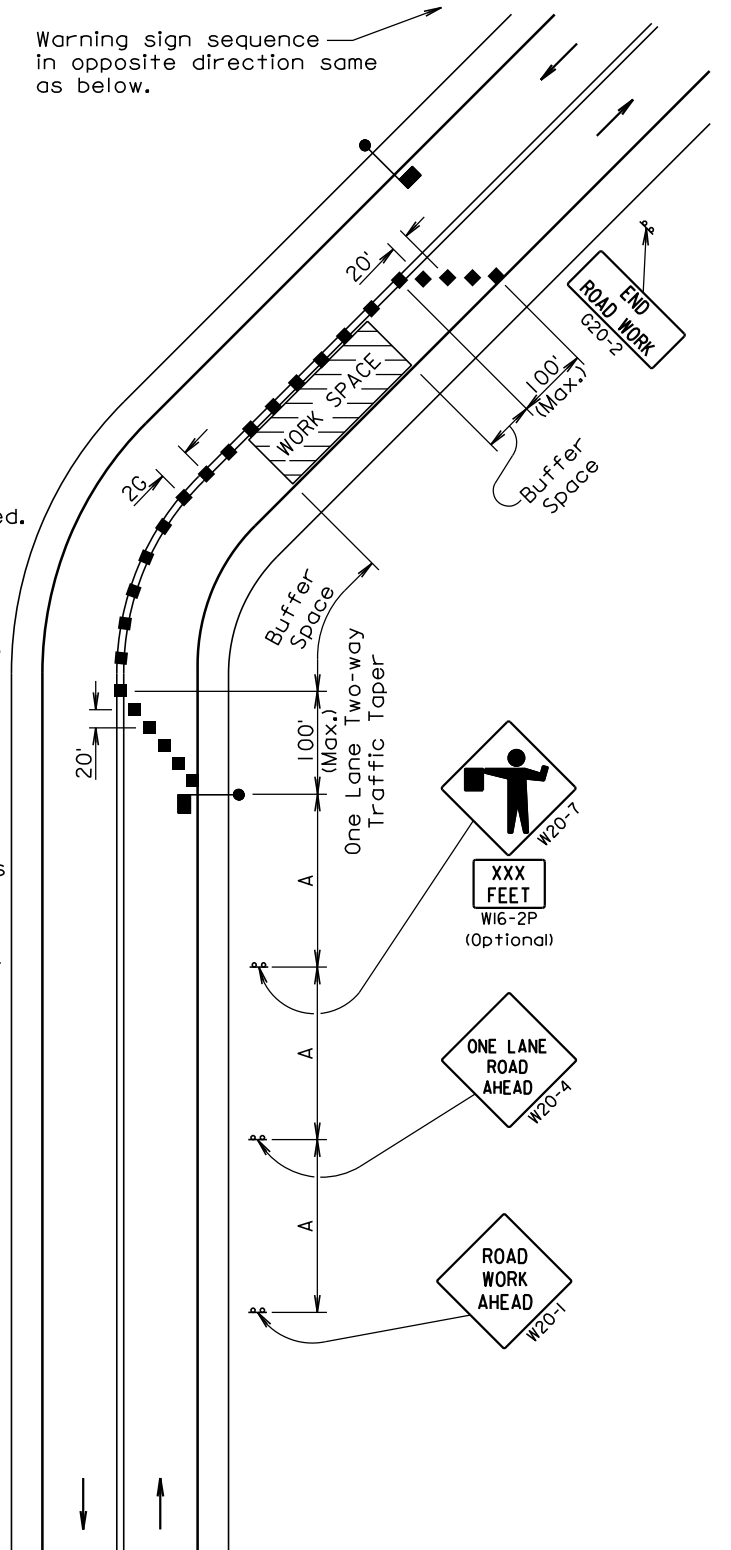
END ROAD WORK
G20-2

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

The length of A may be adjusted to fit field conditions.

Warning sign sequence in opposite direction same as below.



June 3, 2016

Published Date: 2nd Qtr. 2018

**S
D
D
O
T**

**GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH FLAGGER PROVIDED**

PLATE NUMBER
634.23

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50 *
55	750	660	50 *
60 - 65	1000	780	50 *

* Spacing is 40' for 42" cones.

⊙ Reflectorized Drum

■ Channelizing Device

④ W 4" White Temporary Pavement Marking

The channelizing devices shall be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

Temporary pavement markings shall be used if traffic control must remain overnight.

The length of A and L may be adjusted to fit field conditions.

SDOT

Published Date: 2nd Qtr. 2018

GUIDES FOR TRAFFIC CONTROL DEVICES

4-LANE UNDIVIDED, RIGHT LANE CLOSED

June 3, 2016

PLATE NUMBER
634.47

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

⊙ Reflectorized Drum

■ Channelizing Device

□ Movable Concrete Barrier

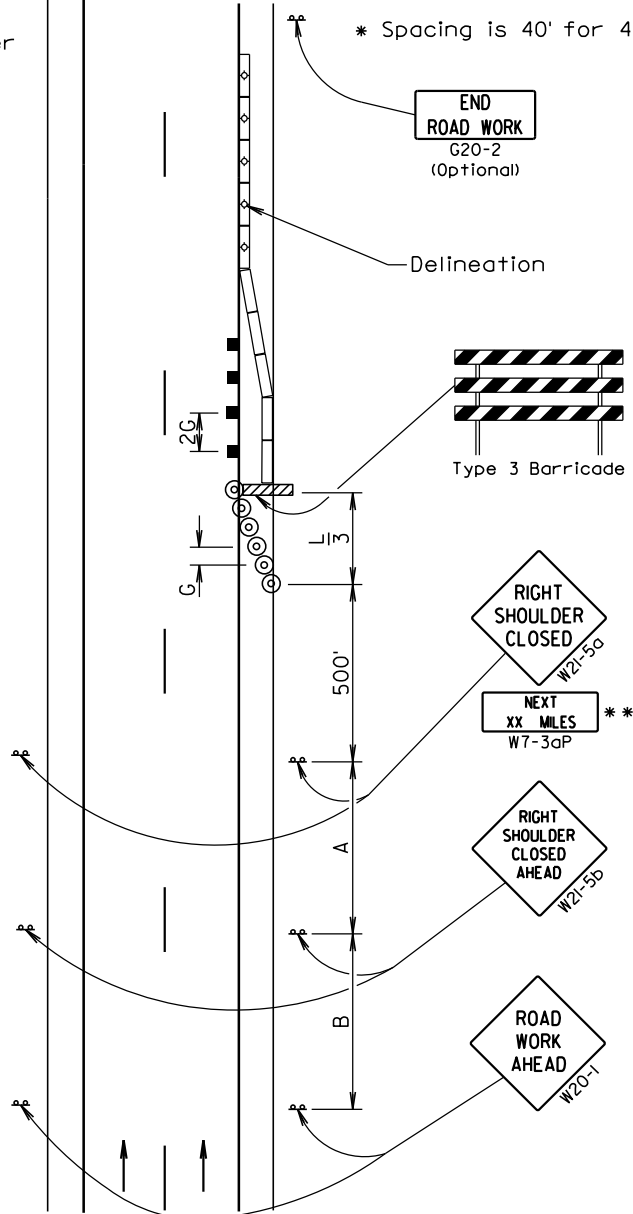
** For distances 1/2 mile or greater.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

This standard plate shows one method which may be used to close a shoulder of a roadway for a long term project. The Highway Authority will determine if the use of barriers is required. If barriers are required, the layout details will be included elsewhere in the plans.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45	500			600	25
50	500			600	50 *
55	750			660	50 *
60 - 65	1000			780	50 *
	(A) (B)				
70 - 80	1000	1500		1125	50 *

* Spacing is 40' for 42" cones.



June 3, 2016

Published Date: 2nd Qtr. 2018

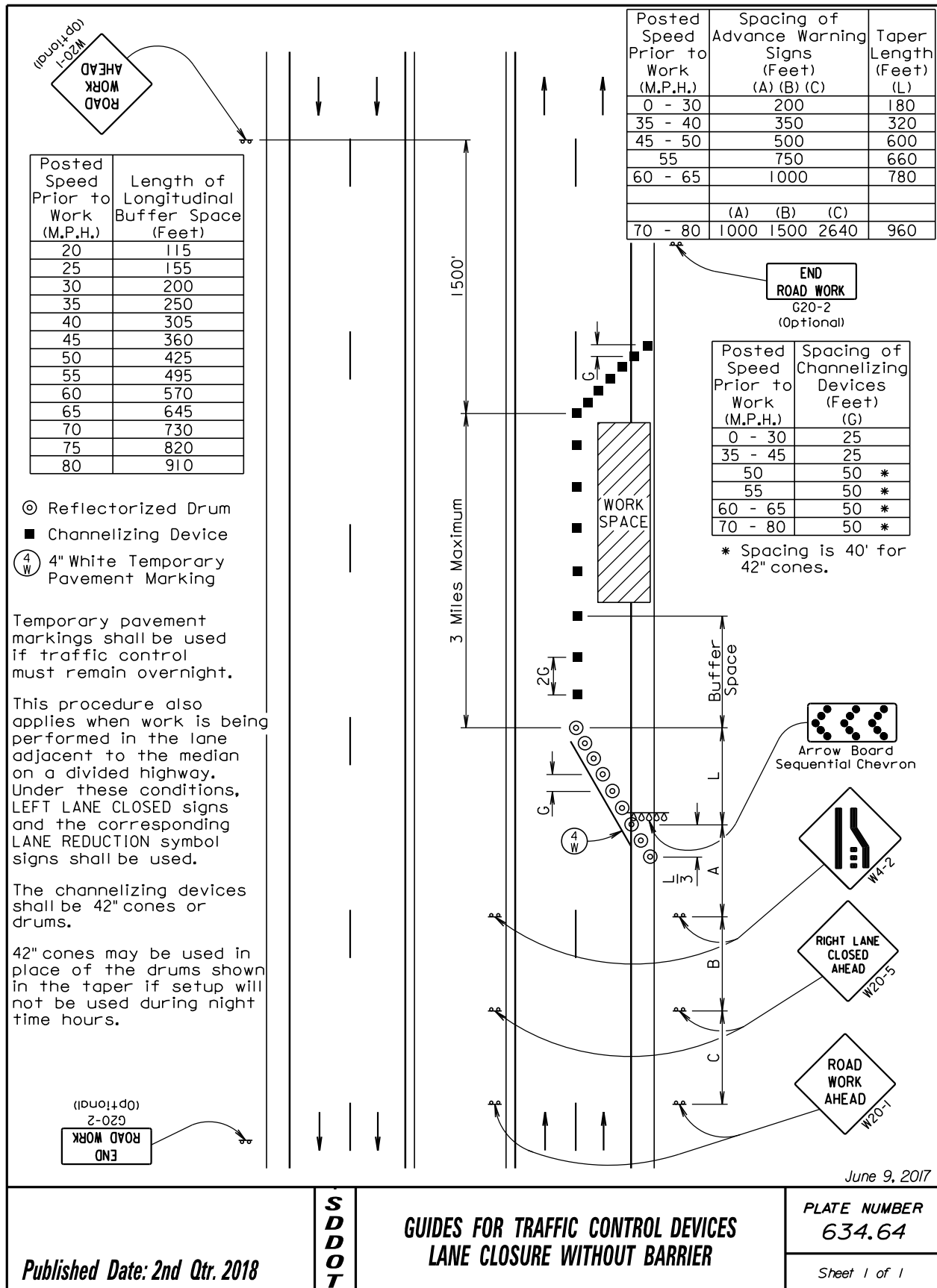
**S
D
D
O
T**

**GUIDES FOR TRAFFIC CONTROL DEVICES
SHOULDER CLOSED**

PLATE NUMBER
634.61

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



June 9, 2017

Published Date: 2nd Qtr. 2018

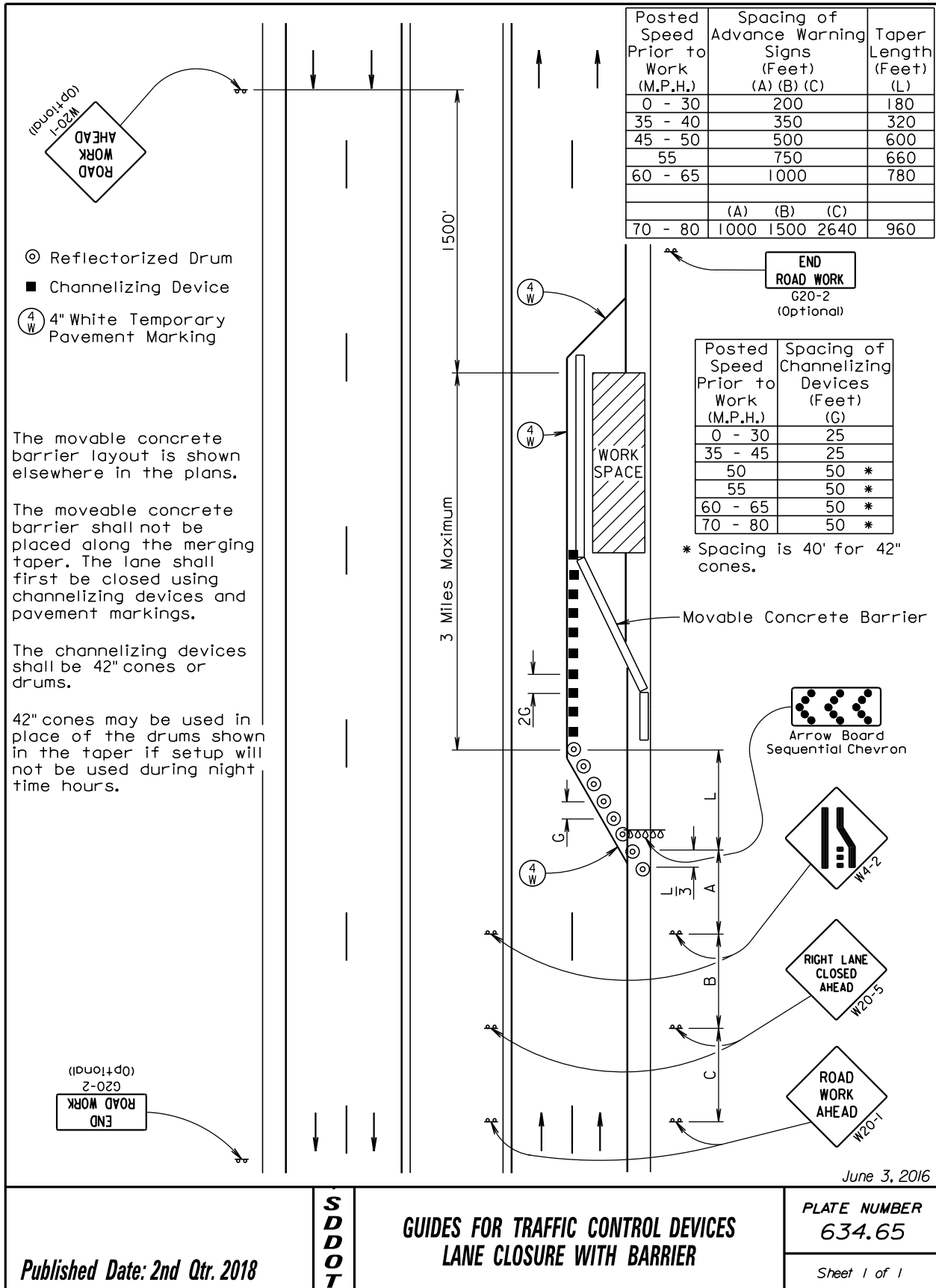
**S
D
D
O
T**

**GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITHOUT BARRIER**

PLATE NUMBER
634.64

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



June 3, 2016

Published Date: 2nd Qtr. 2018

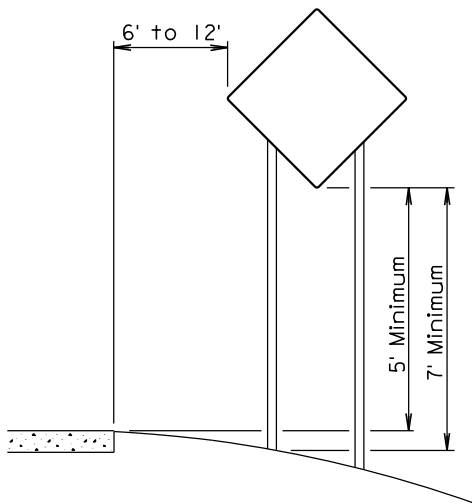
**S
D
D
O
T**

**GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH BARRIER**

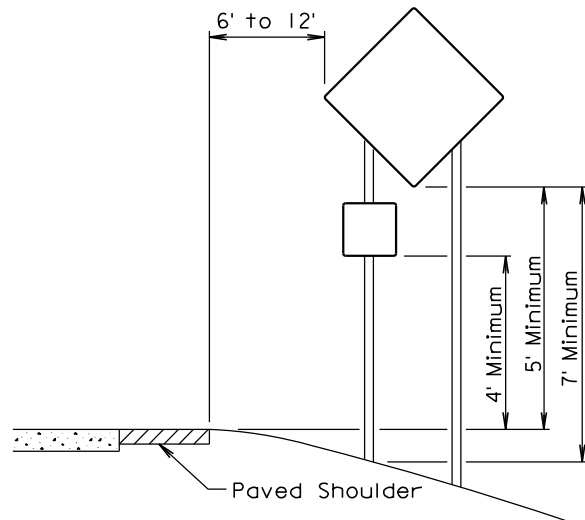
PLATE NUMBER
634.65

Sheet 1 of 1

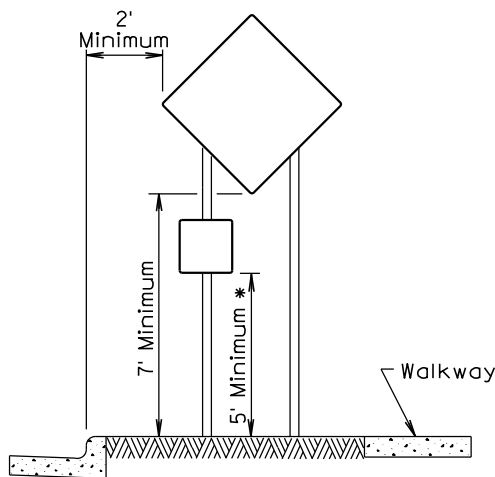
**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



RURAL DISTRICT

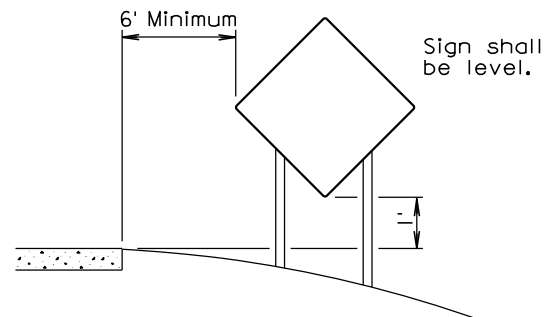


**RURAL DISTRICT WITH
SUPPLEMENTAL PLATE**



URBAN DISTRICT

* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



**RURAL DISTRICT
3 DAY MAXIMUM**

(Not applicable to regulatory signs)

September 22, 2014

Published Date: 2nd Qtr. 2018

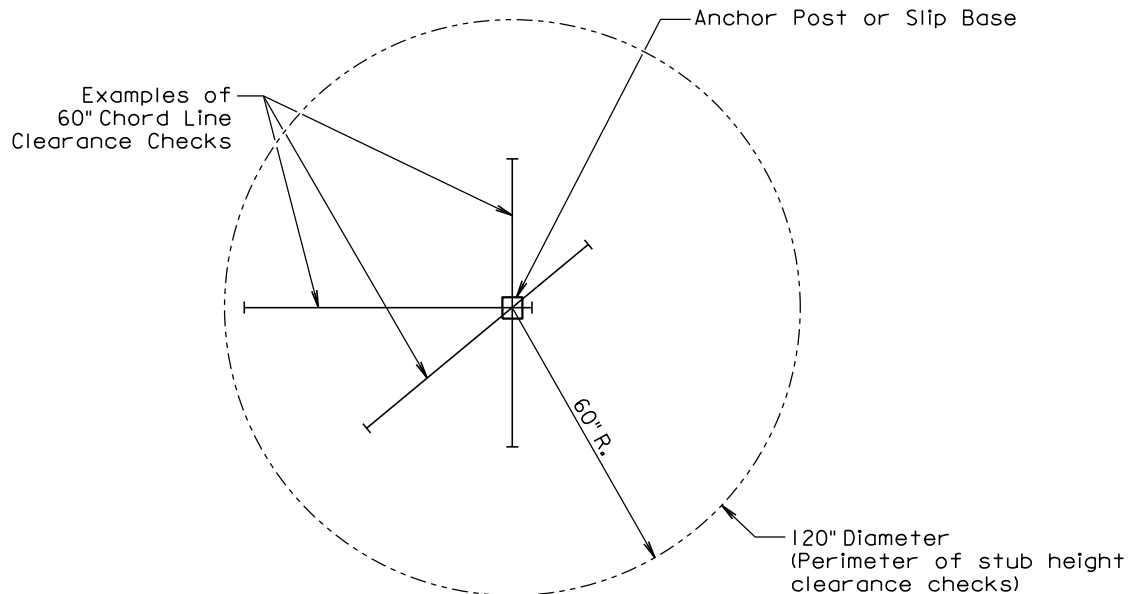
**S
D
D
O
T**

**CRASHWORTHY SIGN SUPPORTS
(Typical Construction Signing)**

**PLATE NUMBER
634.85**

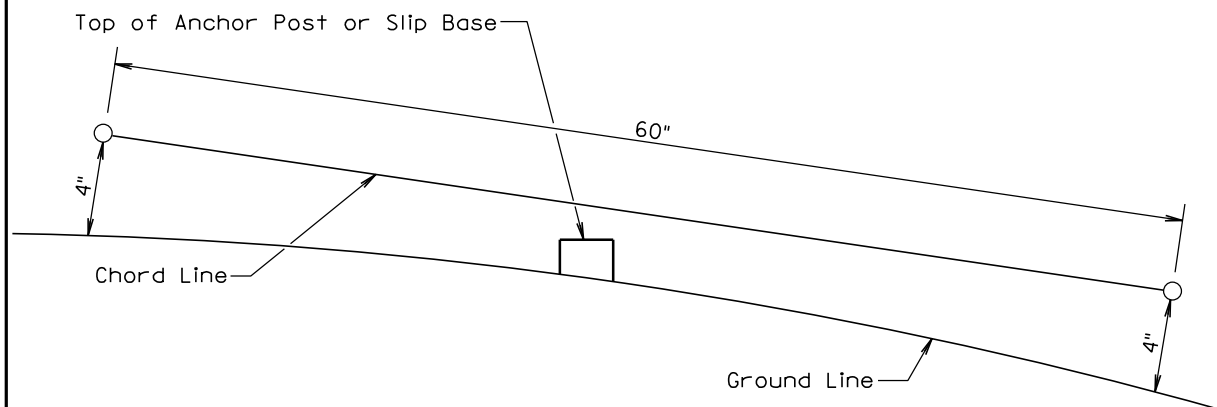
Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



PLAN VIEW

(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 2nd Qtr. 2018

**S
D
D
O
T**

BREAKAWAY SUPPORT STUB CLEARANCE

**PLATE NUMBER
634.99**

Sheet 1 of 1

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent throughout the project. The S3x5.7 Steel I Beam post shall be used for the end posts.

All costs associated with furnishing and constructing the 3 cable guardrail anchor assembly including the concrete anchor, cable anchor bracket, compensating device, steel turnbuckle cable assembly, and necessary hardware shall be incidental to the contract unit price per each for "3 Cable Guardrail Anchor Assembly".

All costs associated with furnishing and constructing the 3 cable guardrail including posts, cable, cable splices, and hardware shall be incidental to the contract unit price per foot for "3 Cable Guardrail".

The following table and criteria shall apply to the arrangement of the Spring Cable End Assemblies (Compensation Devices) and Turnbuckle Cable End Assemblies:

LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
Less than 500'	Use turnbuckle on the approaching traffic end and compensating device on the other end of each individual cable, except in the W Beam to 3 Cable Transition where all compensating devices shall be provided at the bridge ends.
Greater than 500' to 1000'	Use compensating device on each end of each individual cable.
Greater than 1000'	Start new run by interlacing at last parallel post as shown on sheet 2 of 6.

All Compensating Devices shall be attached to the cable anchor bracket when one end of the run is attached to a bridge.

Compensating Devices must have a spring rate of 450 ± 50 pounds per inch and shall have a total available travel of 6 inches minimum.

The cable shall be retensioned after the initial 2 week pretension period in accordance with the following table:

CABLE TENSIONING SPECIFICATIONS														
Temperature Range (Degree F)	-20 to -11	-10 to -1	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 120
Spring Compression (Inch)	4 1/4	4	3 3/4	3 1/2	3 1/4	3	2 3/4	2 1/2	2 1/4	2	1 3/4	1 1/2	1 1/4	1

POST SPACING FOR HORIZONTAL CURVES	
Roadway \angle Curvature	Maximum Post Spacing (Ft)
1° and Less	16'
Greater than 1° to 8°	12'
Greater than 8° to 13°	8'
Greater than 13°	NOT ALLOWED

December 16, 2015

Published Date: 2nd Qtr. 2018

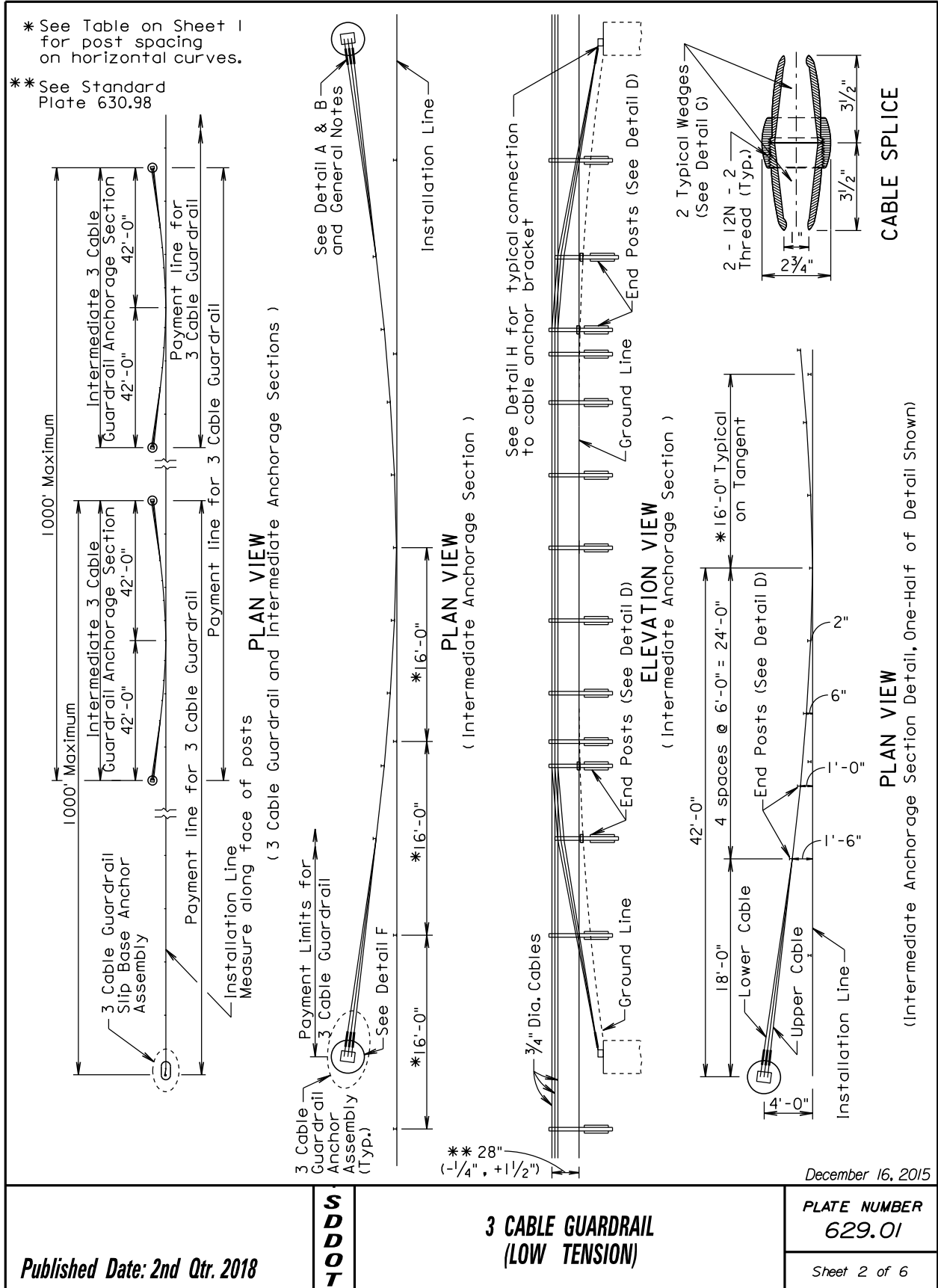
**S
D
D
O
T**

**3 CABLE GUARDRAIL
(LOW TENSION)**

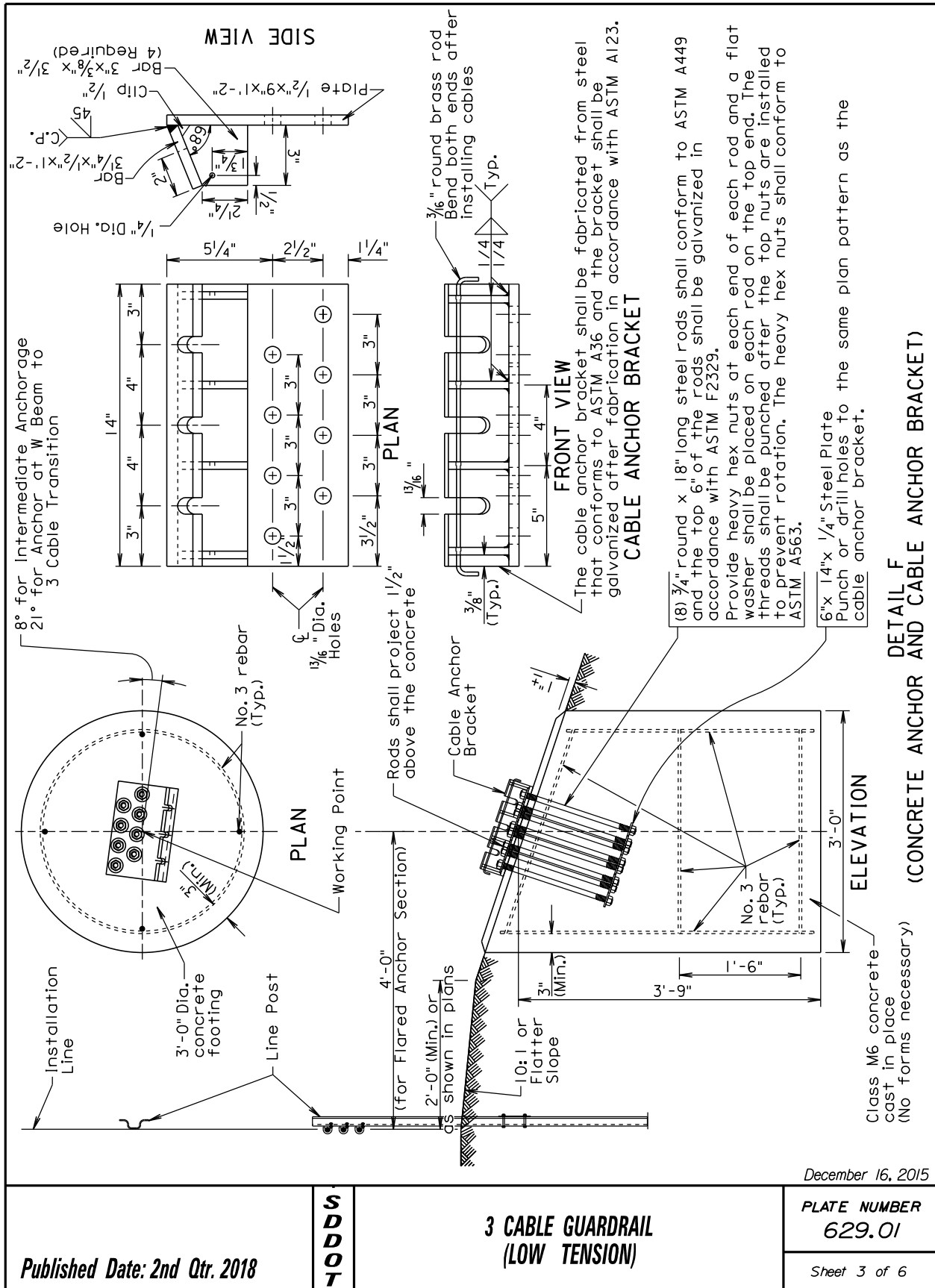
**PLATE NUMBER
629.01**

Sheet 1 of 6

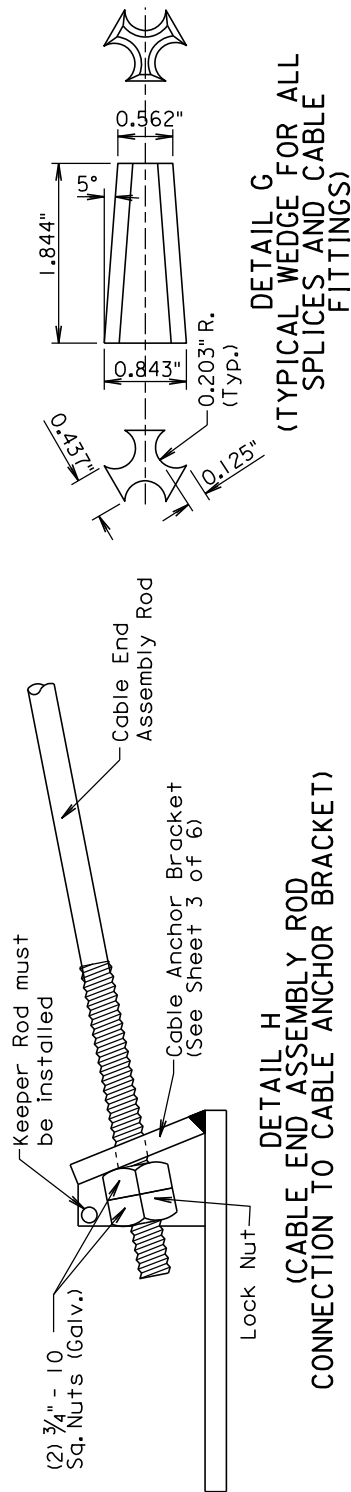
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES

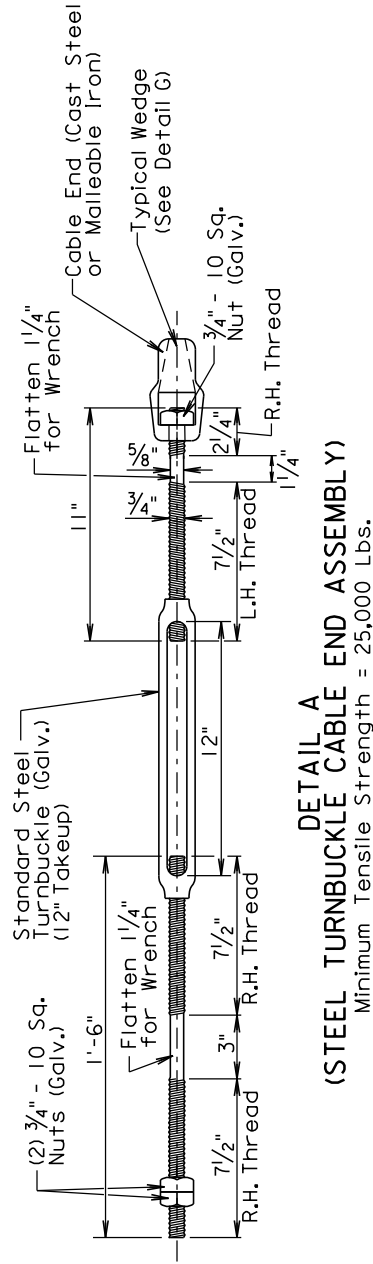


000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
 AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
 HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES

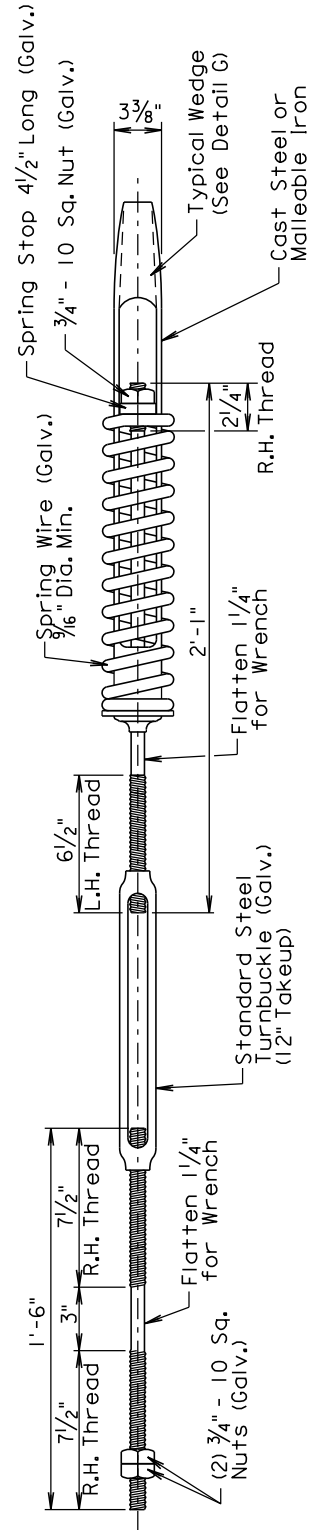


DETAIL G
 (TYPICAL WEDGE FOR ALL
 SPLICES AND CABLE
 FITTINGS)

DETAIL H
 (CABLE END ASSEMBLY ROD
 CONNECTION TO CABLE ANCHOR BRACKET)



DETAIL A
 (STEEL TURNBUCKLE CABLE END ASSEMBLY)
 Minimum Tensile Strength = 25,000 Lbs.



DETAIL B
 (SPRING CABLE END ASSEMBLY WITH TURNBUCKLE)
 (COMPENSATING DEVICE)

December 16, 2015

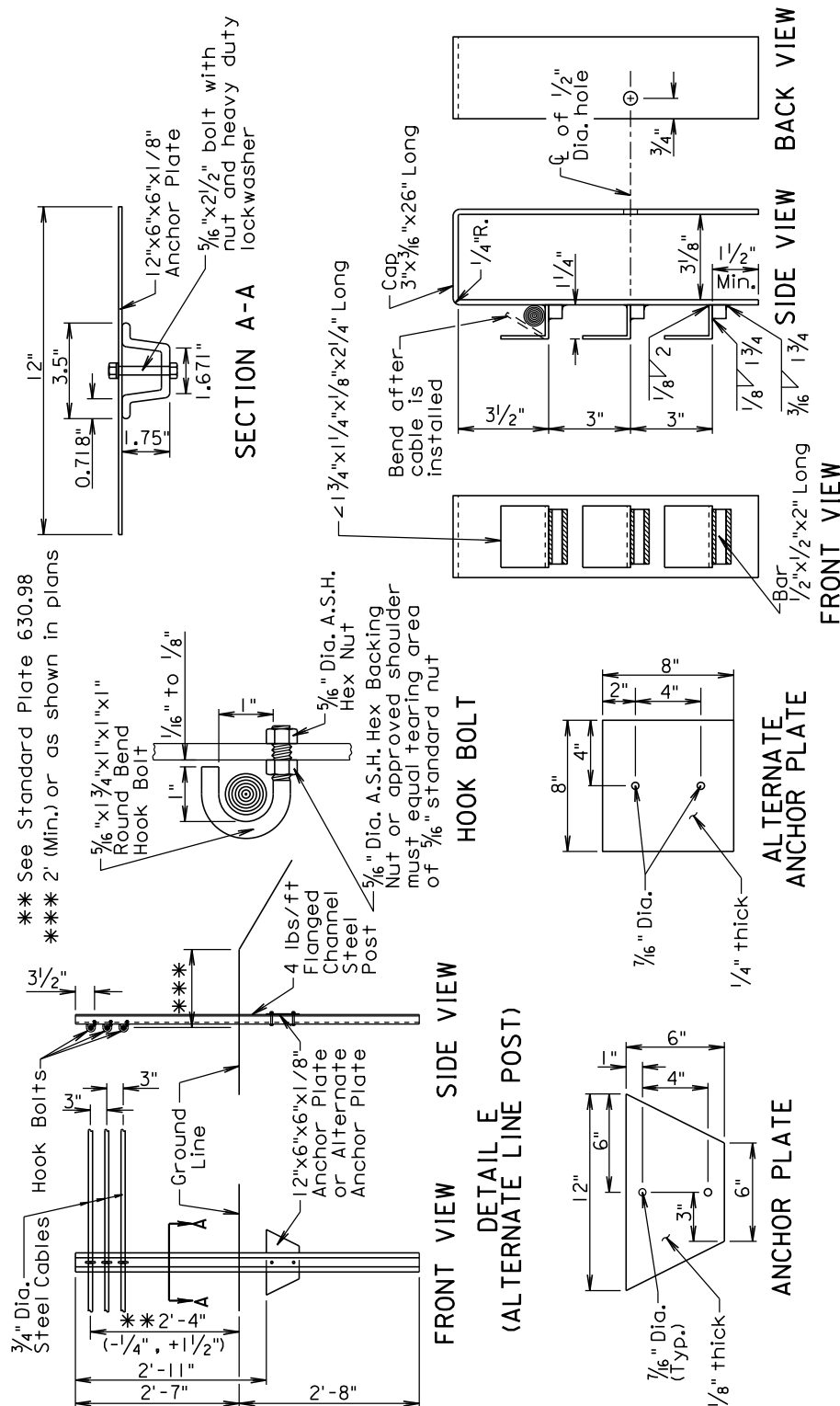
Published Date: 2nd Qtr. 2018

SDOT

3 CABLE GUARDRAIL
 (LOW TENSION)

PLATE NUMBER
 629.01

Sheet 4 of 6



FLANGED CHANNEL STEEL POST
FOR 3 CABLE GUARDRAIL

GENERAL NOTES:

Flanged channel steel posts shall be produced from high strength steel in accordance with ASTM A499, Grade 60.

Anchor plates shall be in conformance with ASTM A709, Grade 36.

Bolt shall be in conformance with ASTM A307. Nut shall be in conformance with ASTM A563 Grade DH.

Bolt shall be galvanized in accordance with ASTM F2329.

Finish for the post and anchor plate shall be a baked on high quality dark green enamel.

Alternate anchor plate may be unfinished.

December 16, 2015

PLATE NUMBER
629.01

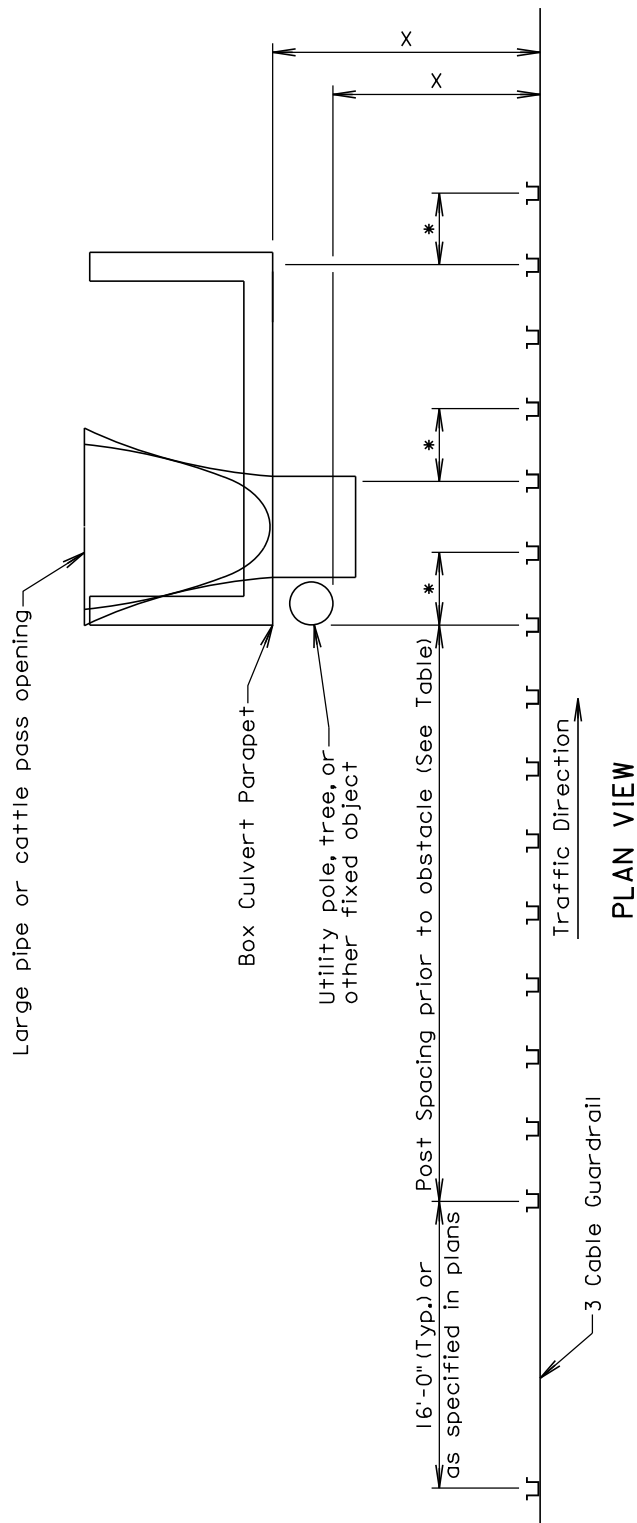
Sheet 6 of 6

Published Date: 2nd Qtr. 2018

***S
D
D
O
T***

3 CABLE GUARDRAIL (LOW TENSION)

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



POST SPACING PRIOR TO OBSTACLE		
X Deflection Distance (Ft)	Number of Post Spaces	Post Spacing (Ft)
10.5 to 11.4	8	4
11.5 to 12.9	6	8
13.0 to 14.9	4	12
15 and Greater	3	16

GENERAL NOTES:

- * Post spacing for deflection control shall continue to one post past the obstacle for one-way traffic.
- Post spacing for deflection control shall be provided on both sides of the obstacle for two-way traffic.
- For illustrational purposes, the 3 cable guardrail posts and post spacings shown on this standard plate depict the situation when there is a box culvert 10.5' to 11.49' away from the 3 cable guardrail and the traffic is one-way.
- This standard plate shall not be used for high tension cable guardrail installations.

December 16, 2014

Published Date: 2nd Qtr. 2018

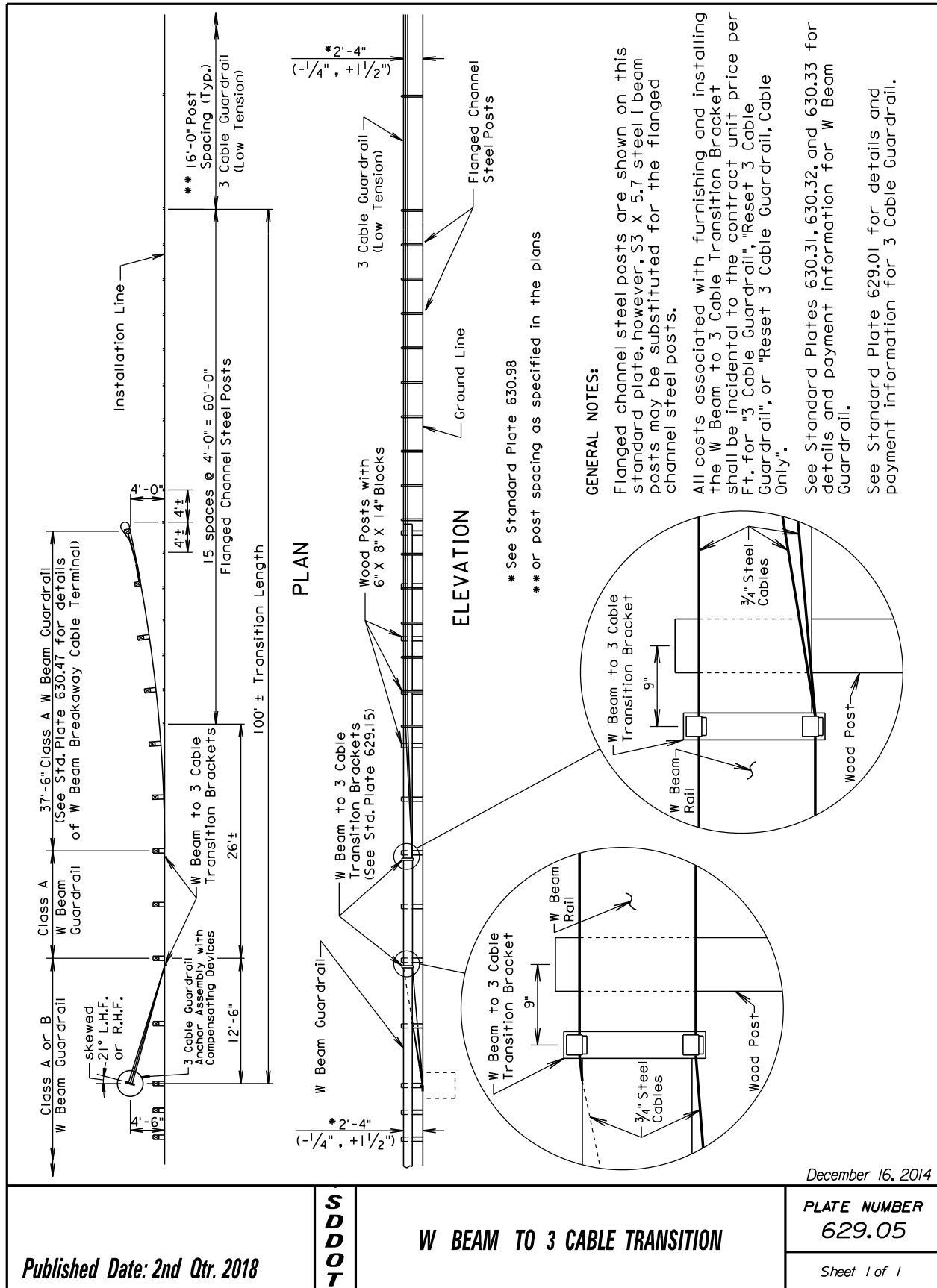
**S
D
D
O
T**

**3 CABLE GUARDRAIL (LOW TENSION)
POST SPACING FOR DEFLECTION CONTROL**

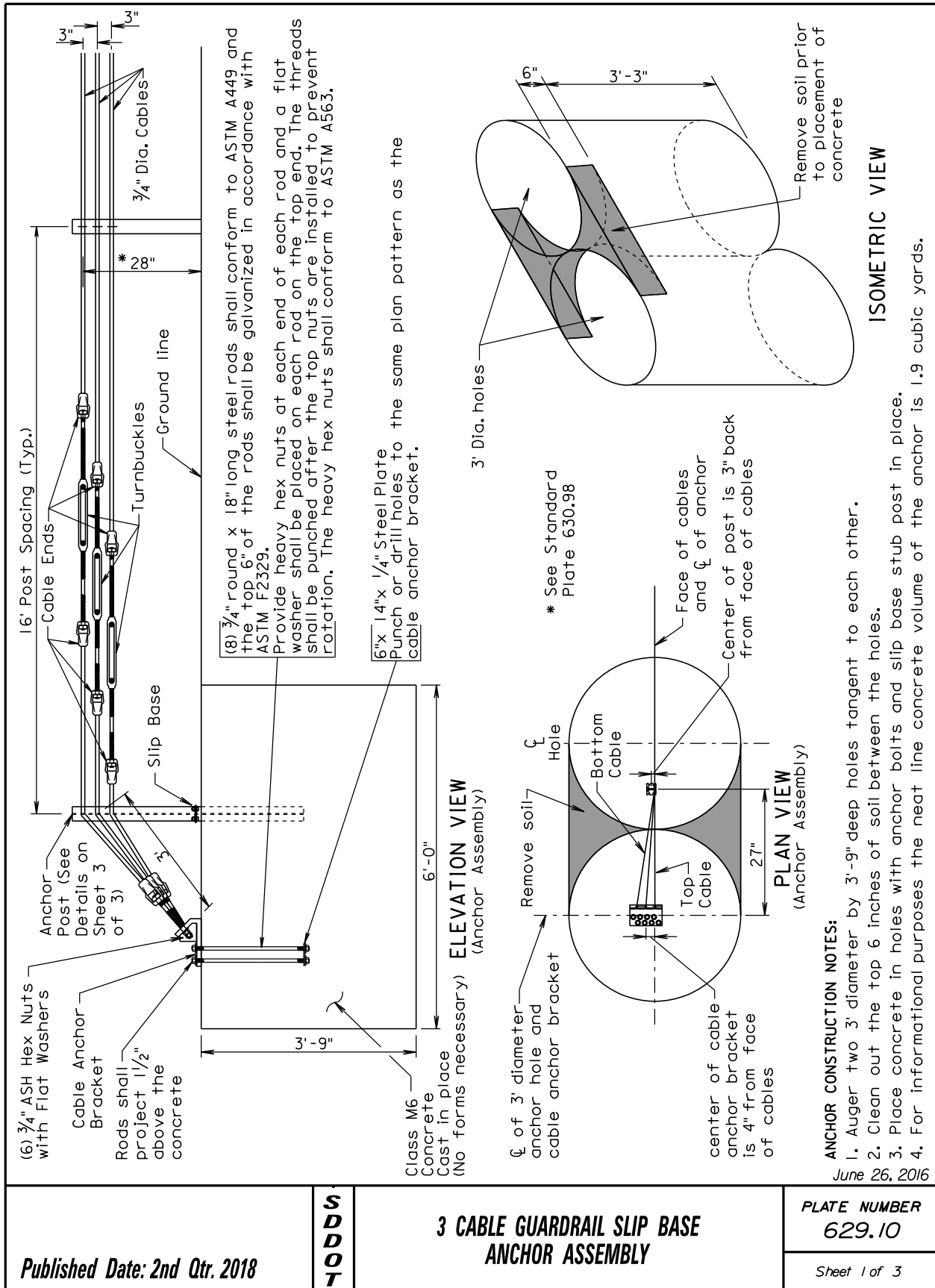
**PLATE NUMBER
629.02**

Sheet 1 of 1

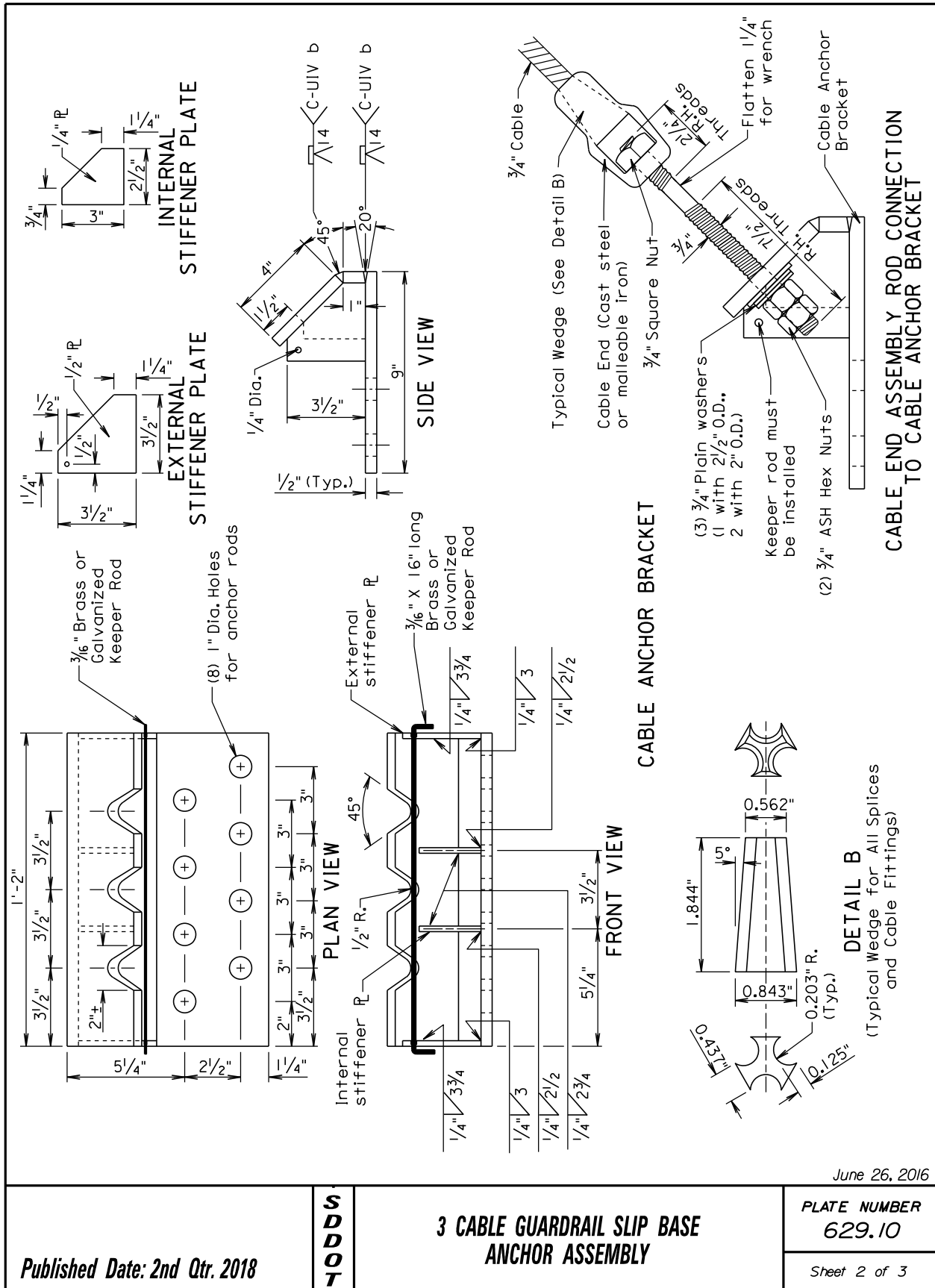
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES

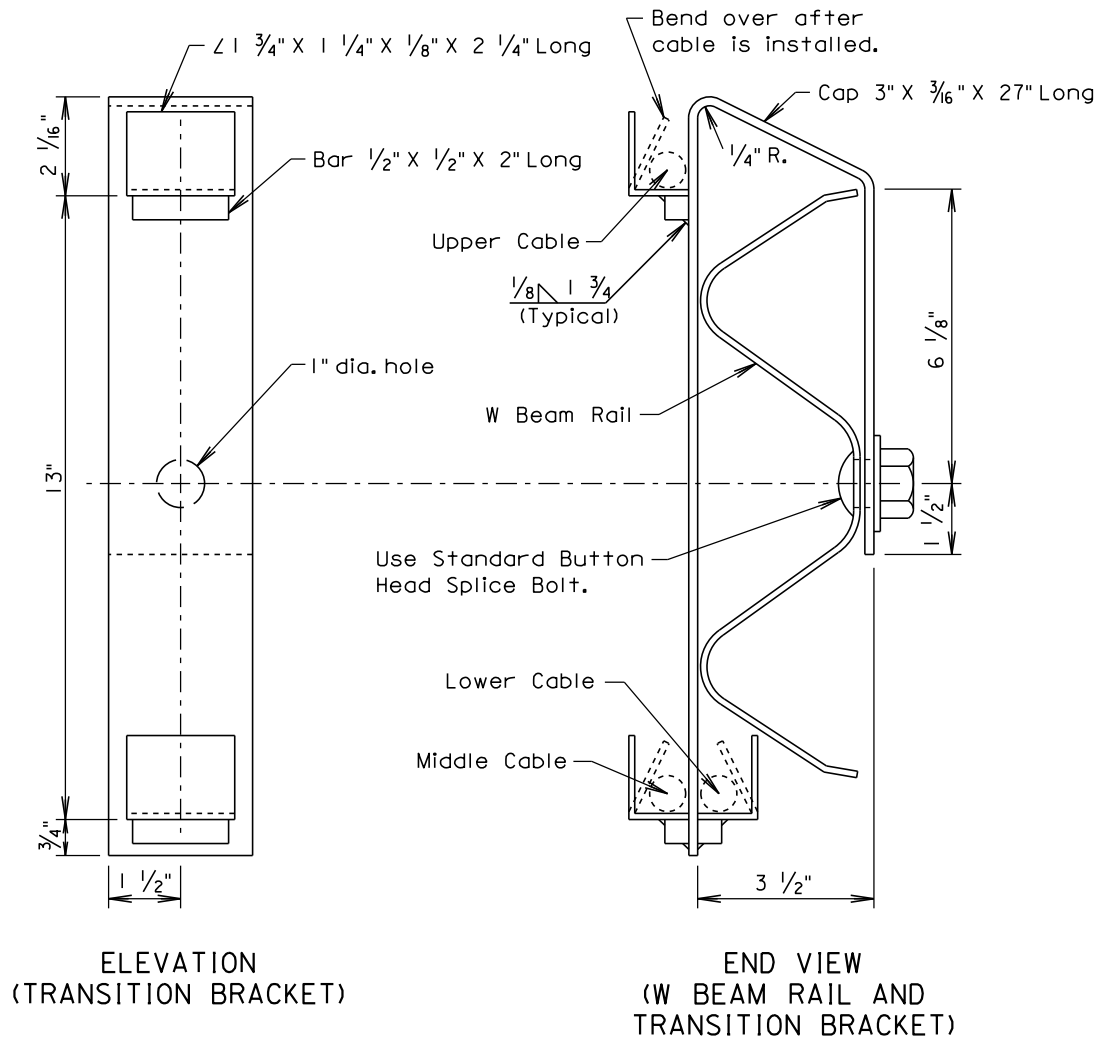


000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



[illegible]

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



GENERAL NOTES:

Steel used in the fabrication of the bracket shall conform to ASTM A36 and the bracket shall be galvanized after fabrication in accordance with ASTM A123.

March 31, 2000

Published Date: 2nd Qtr. 2018

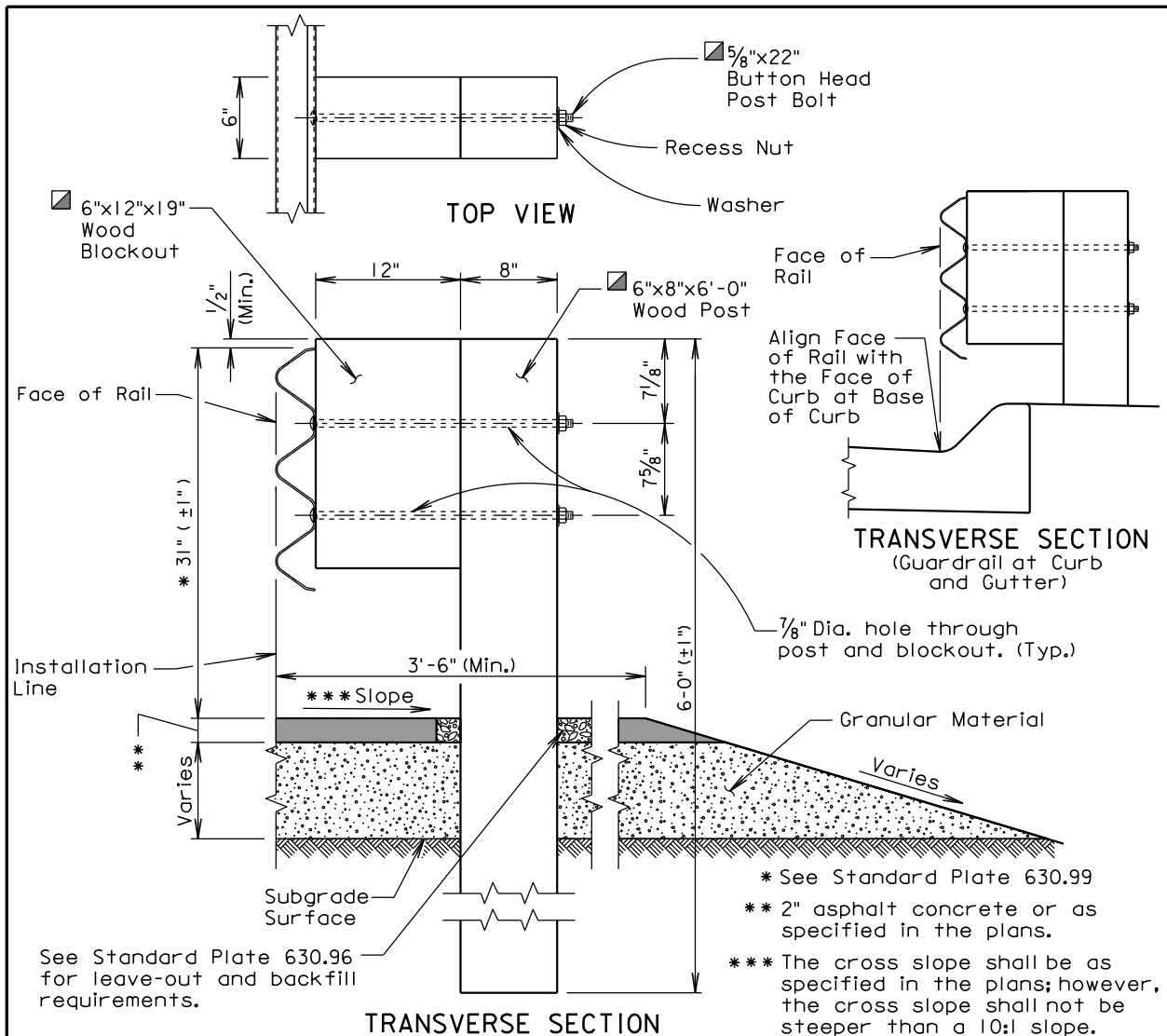
**S
D
D
O
T**

W BEAM TO 3 CABLE TRANSITION BRACKET

**PLATE NUMBER
629.15**

Sheet 1 of 1

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing.

- ☑ The post and blockout illustrated above is typical for single thrie beam guardrail. When other variations of posts and blockouts are specified on other standard plates (e.g. transitions) then the posts and blockouts shall be as specified on the other standard plates or as specified in the plans.

Slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

The top of post and top of block shall have a true square cut. The top of block shall be a maximum of $\pm 1/2$ inch from the top of the post.

May 1, 2018

Published Date: 2nd Qtr. 2018

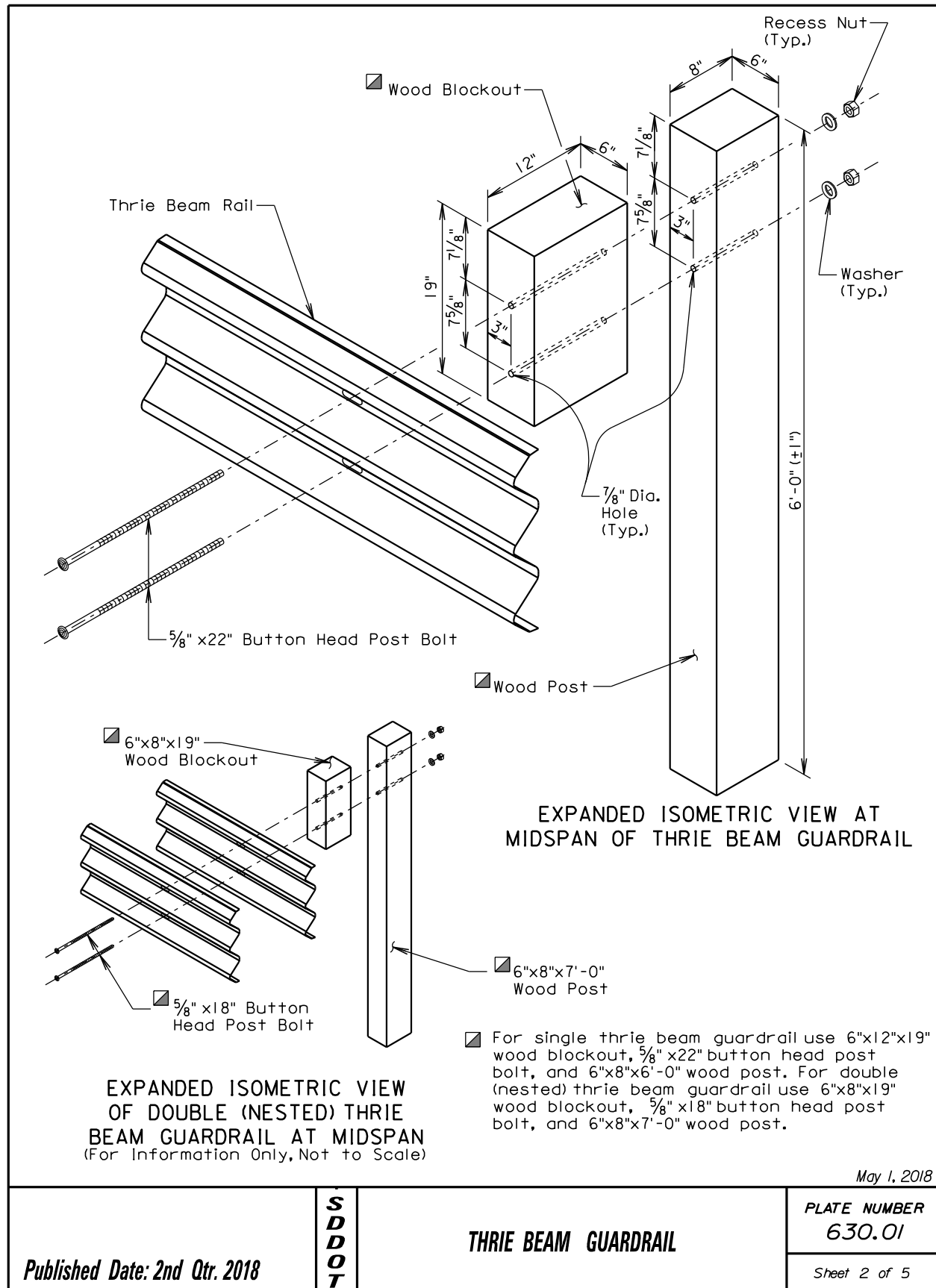
**S
D
D
O
T**

THRIE BEAM GUARDRAIL

PLATE NUMBER
630.01

Sheet 1 of 5

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



May 1, 2018

Published Date: 2nd Qtr. 2018

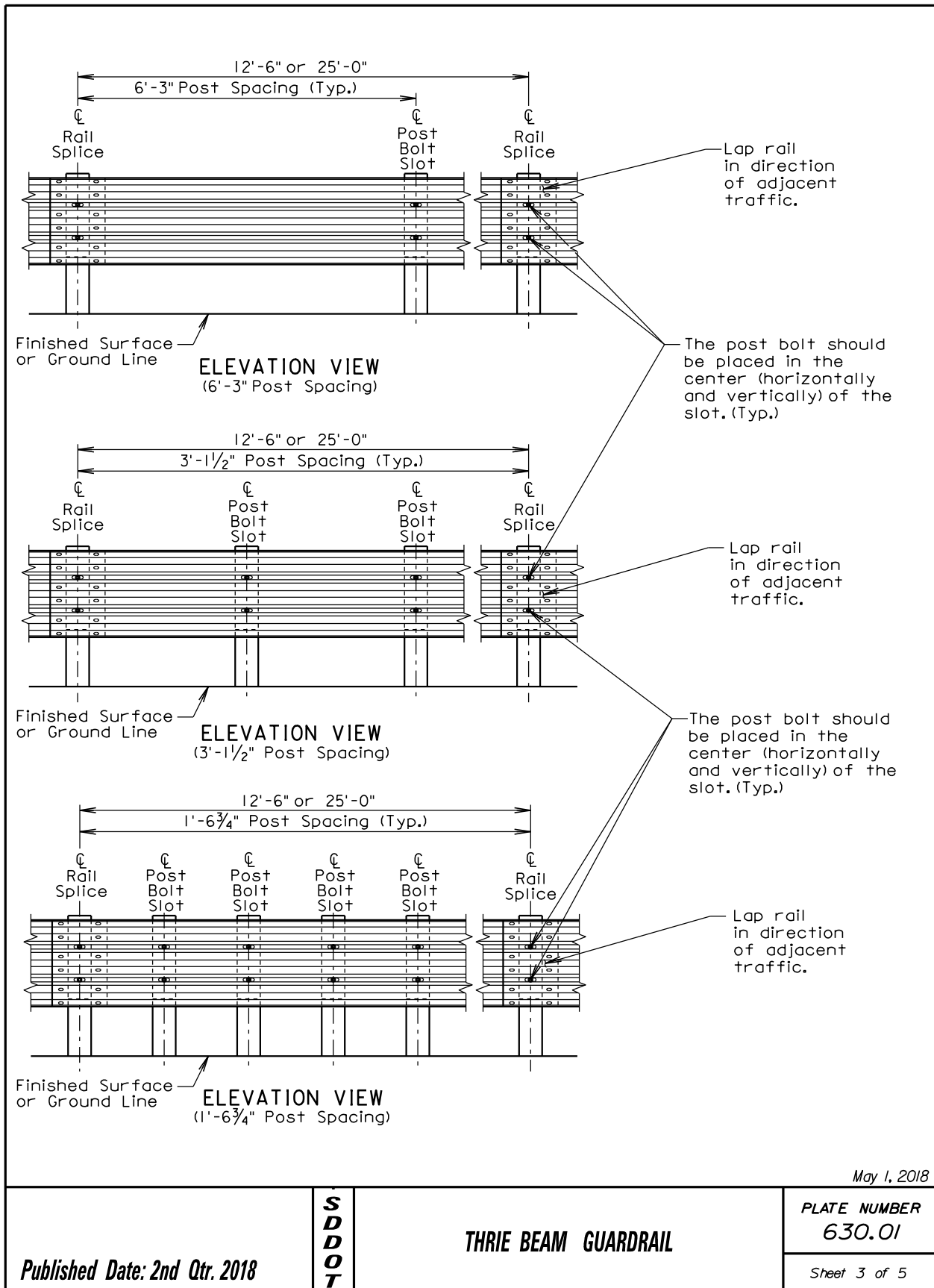
**S
D
D
O
T**

THRIE BEAM GUARDRAIL

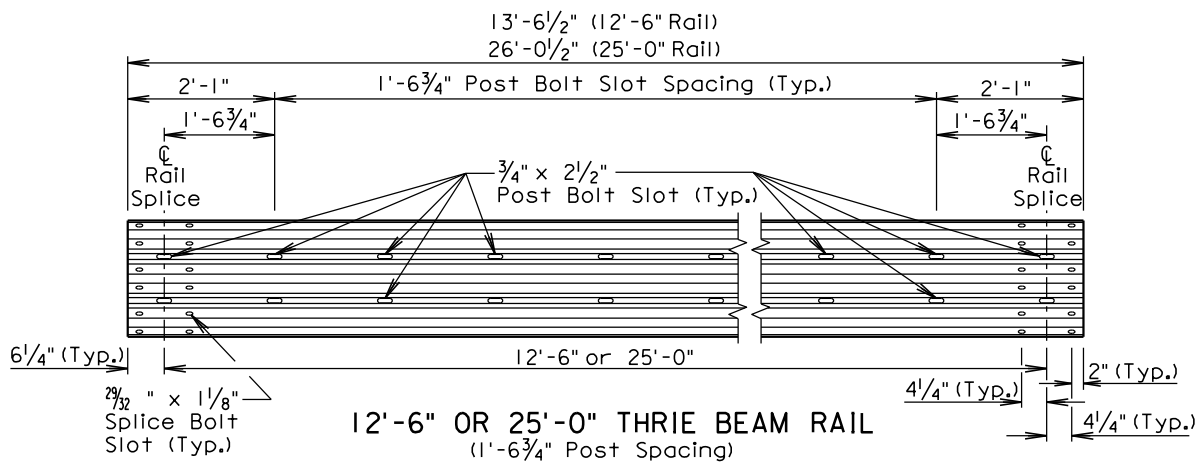
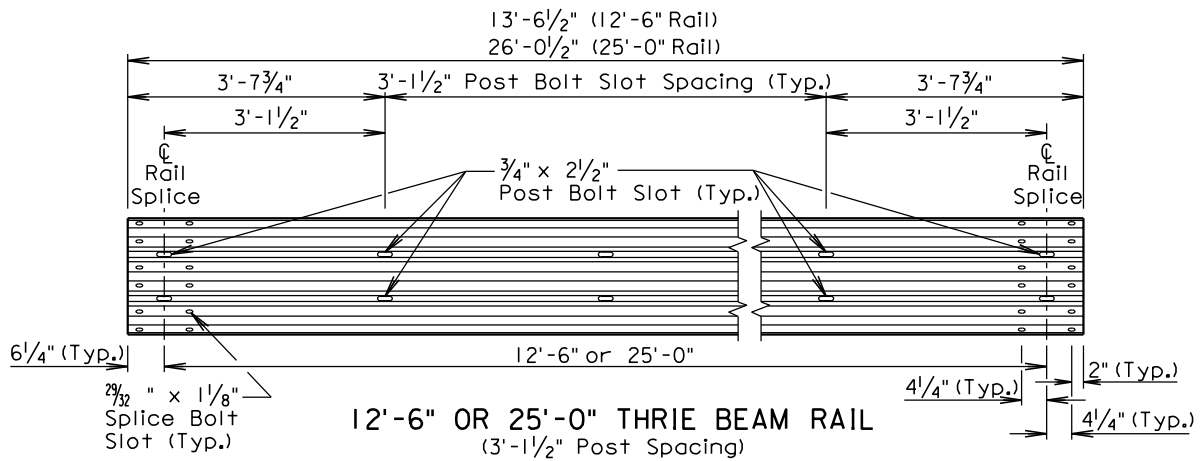
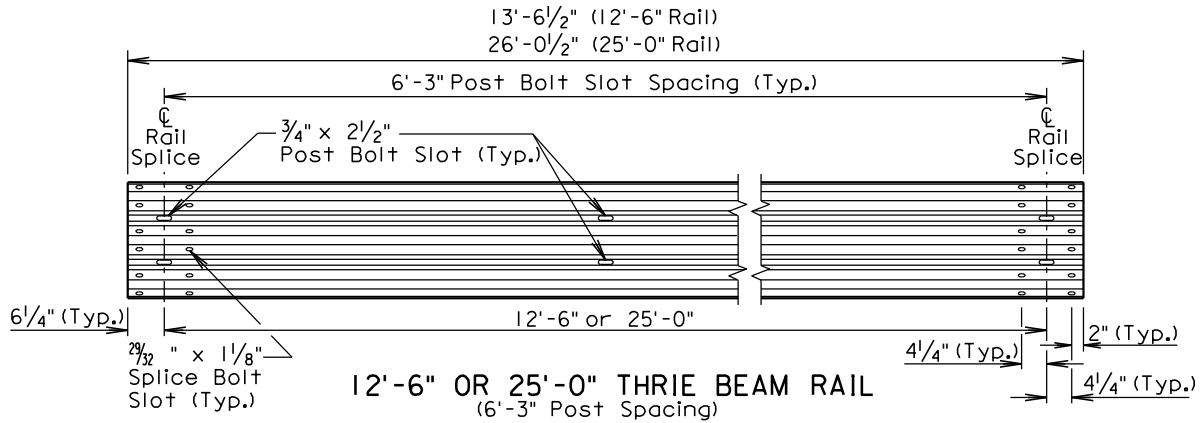
**PLATE NUMBER
630.01**

Sheet 2 of 5

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



May 1, 2018

Published Date: 2nd Qtr. 2018

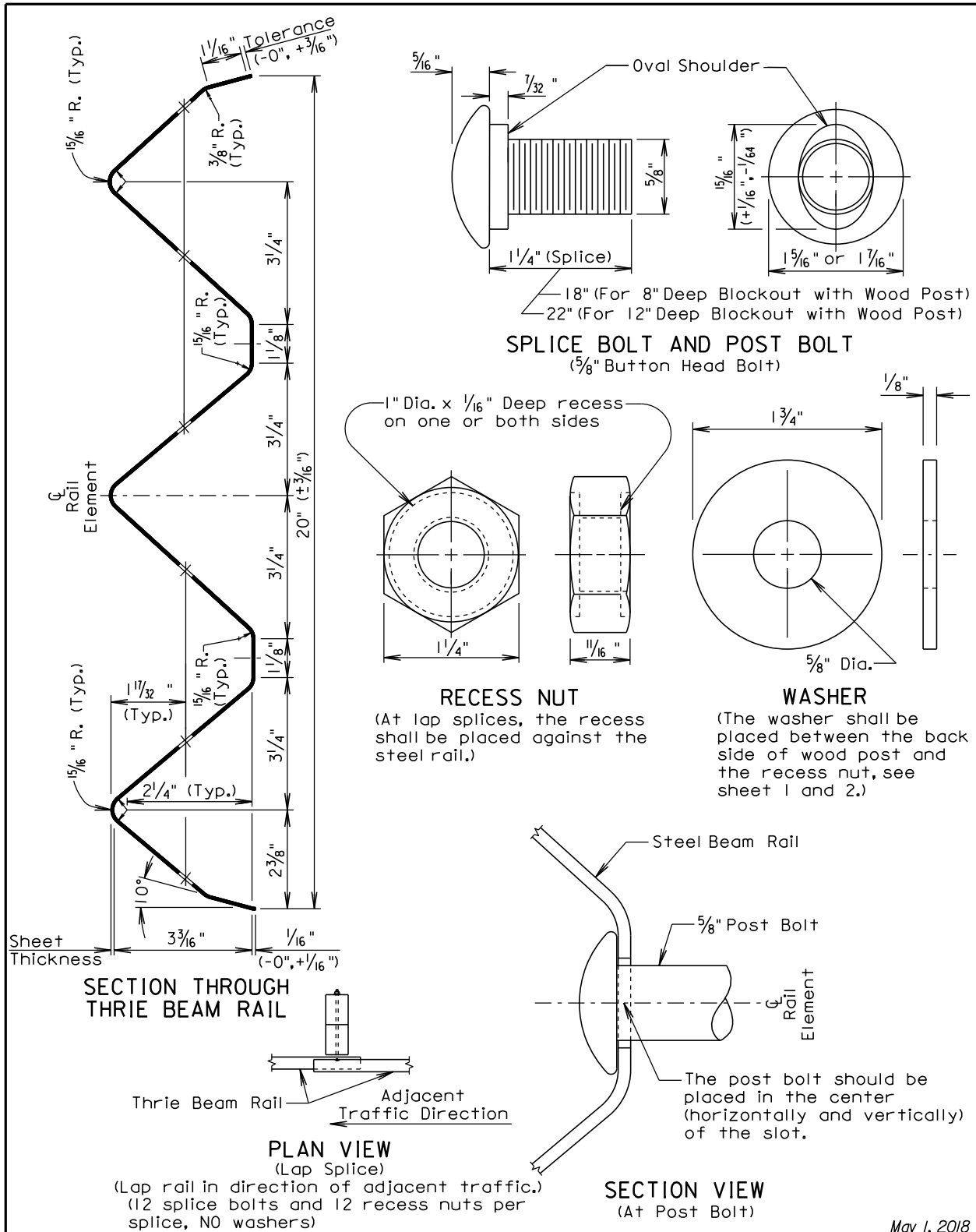
**S
D
D
O
T**

THRIE BEAM GUARDRAIL

PLATE NUMBER
630.01

Sheet 4 of 5

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



May 1, 2018

Published Date: 2nd Qtr. 2018

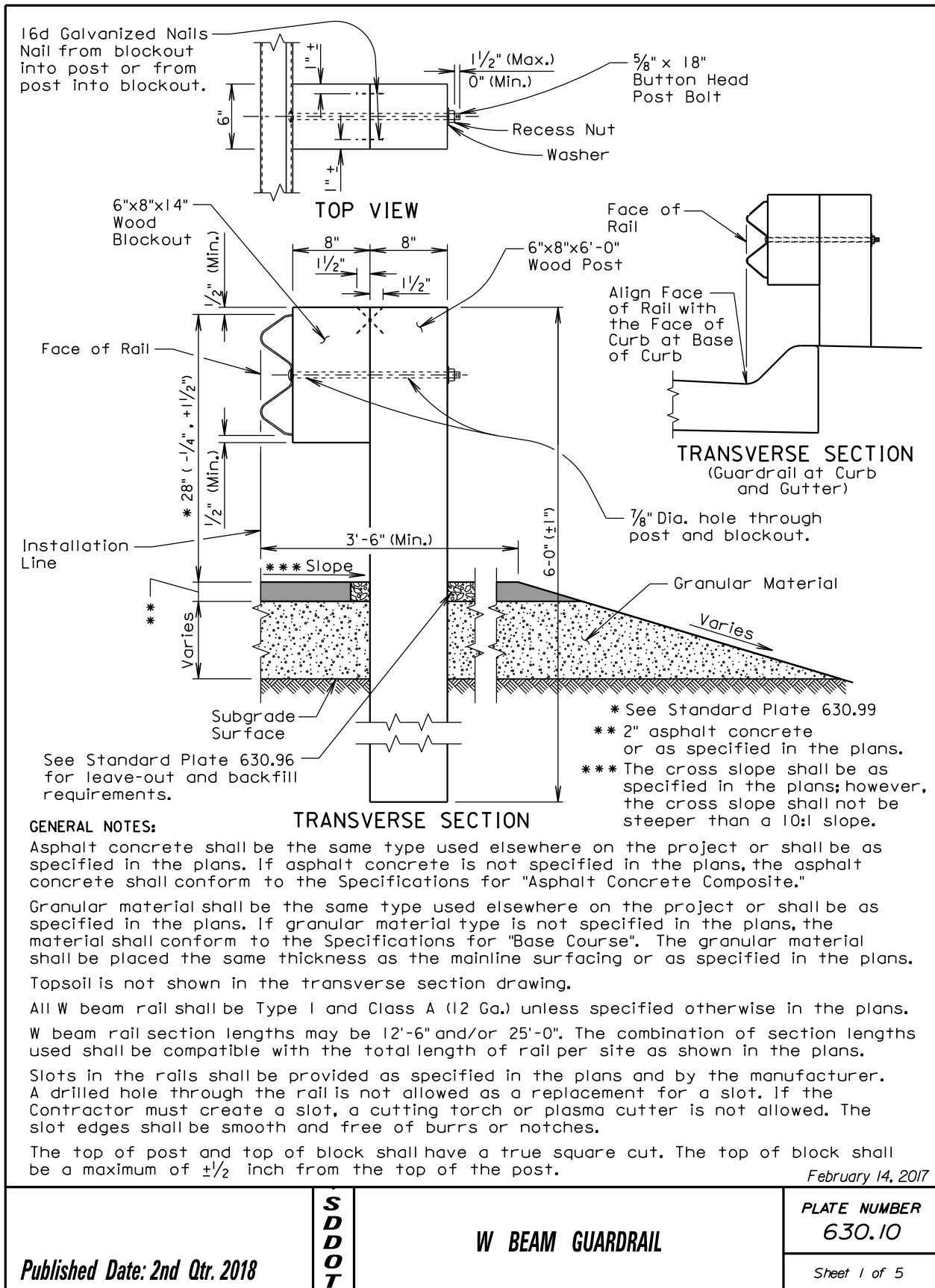
**S
D
D
O
T**

THRIE BEAM GUARDRAIL

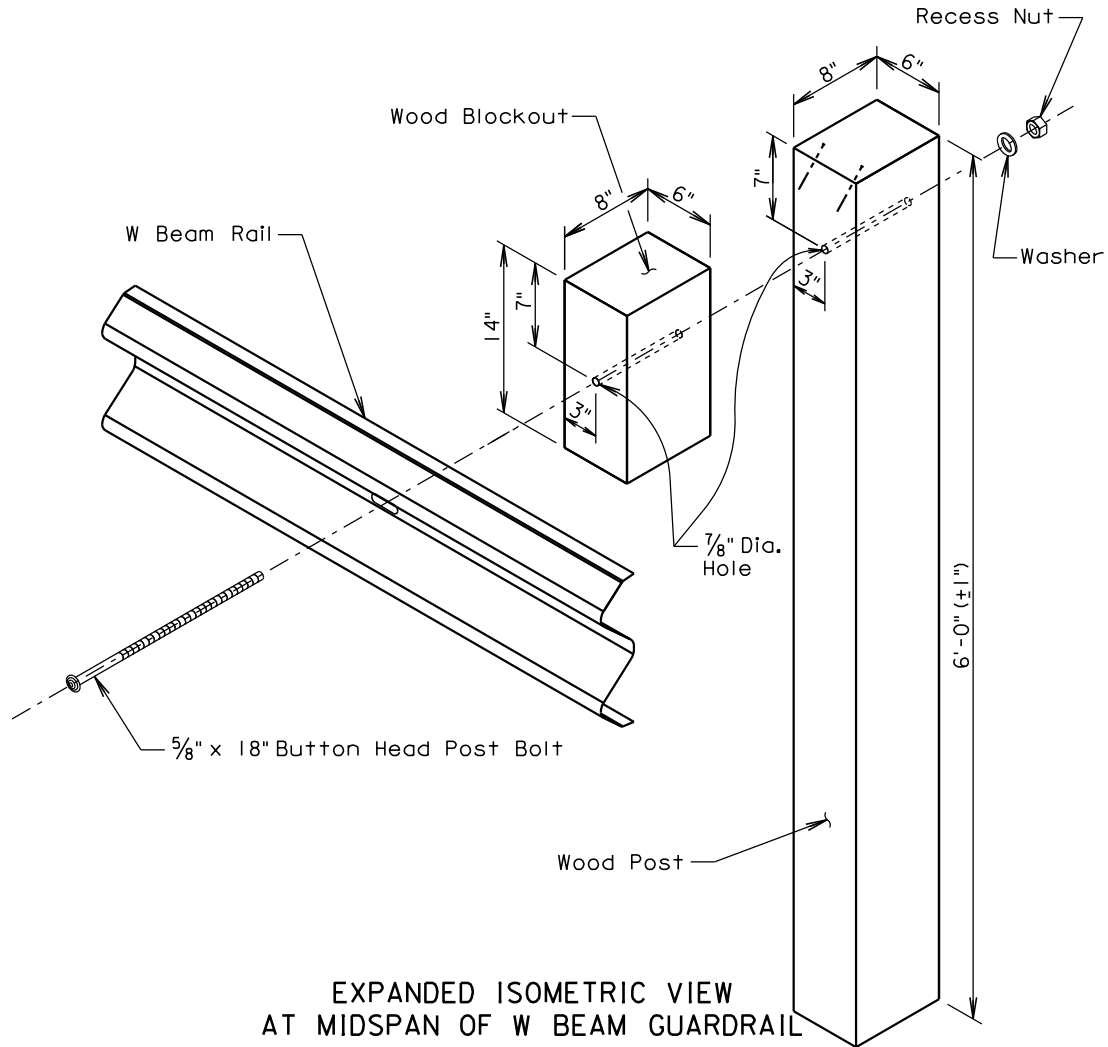
PLATE NUMBER
630.01

Sheet 5 of 5

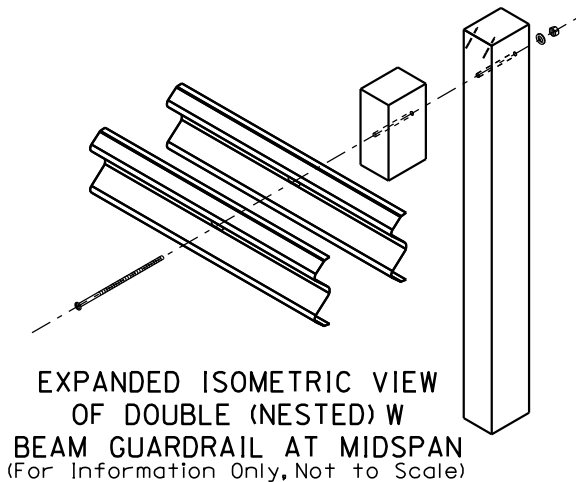
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



EXPANDED ISOMETRIC VIEW
AT MIDSPAN OF W BEAM GUARDRAIL



EXPANDED ISOMETRIC VIEW
OF DOUBLE (NESTED) W
BEAM GUARDRAIL AT MIDSPAN
(For Information Only, Not to Scale)

February 14, 2017

Published Date: 2nd Qtr. 2018

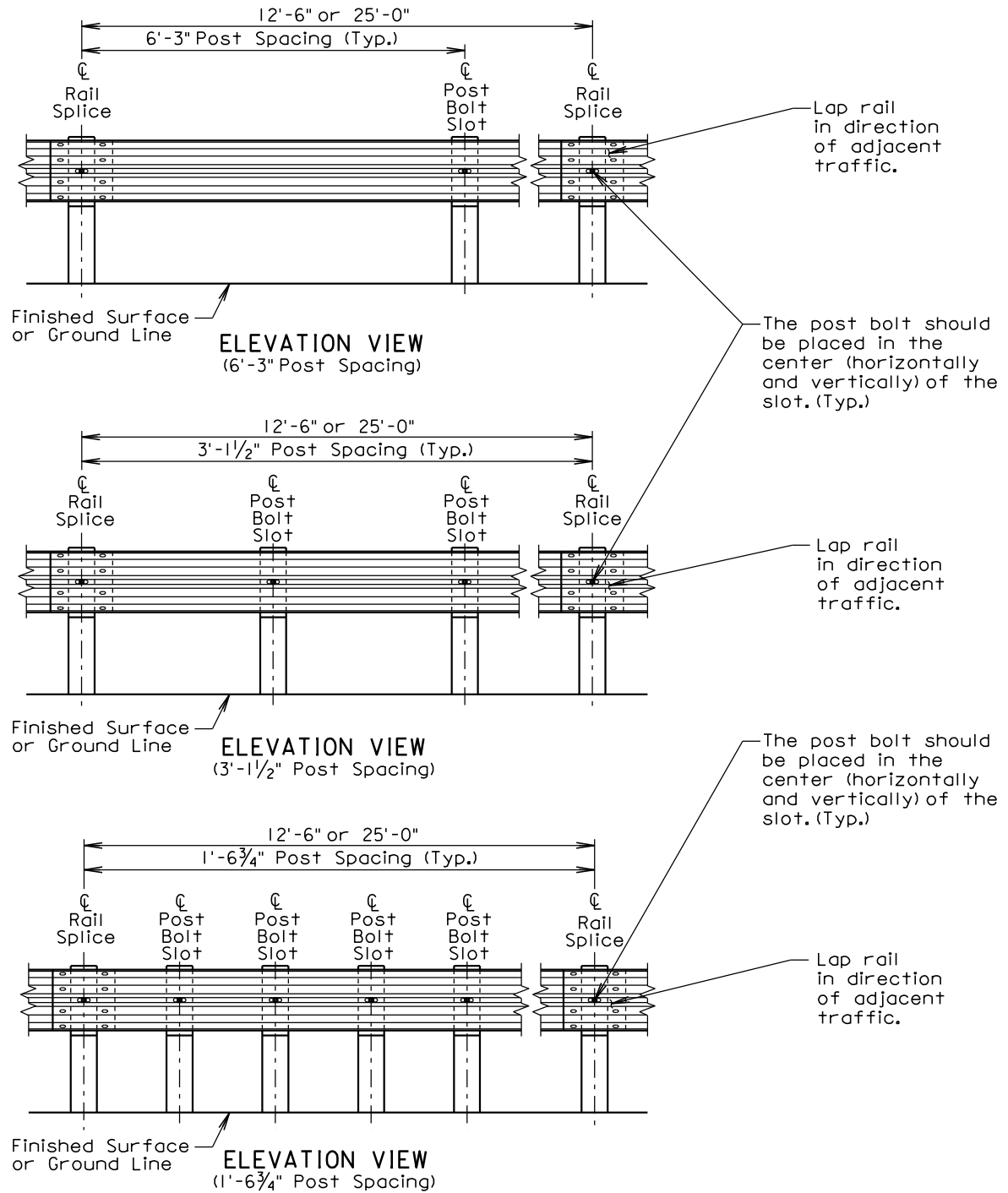
**S
D
D
O
T**

W BEAM GUARDRAIL

**PLATE NUMBER
630.10**

Sheet 2 of 5

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



February 14, 2017

Published Date: 2nd Qtr. 2018

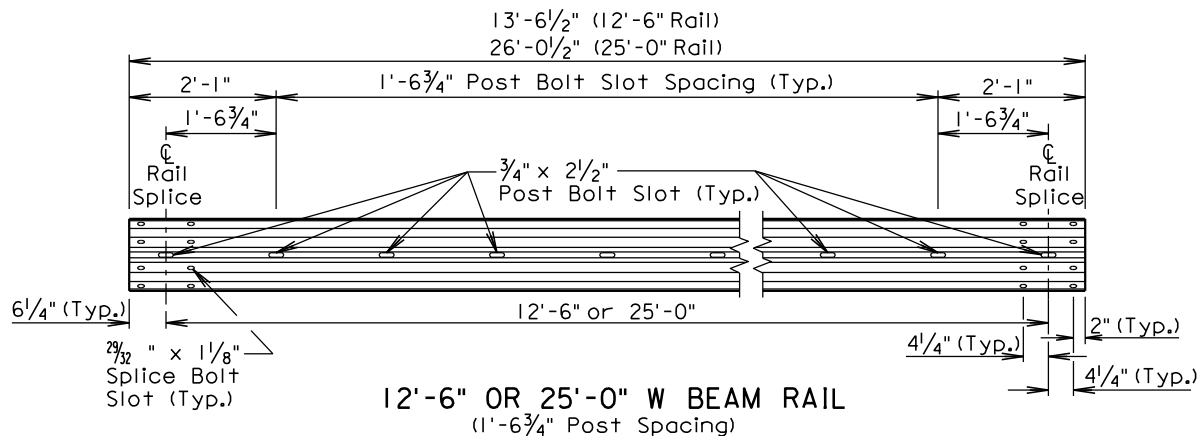
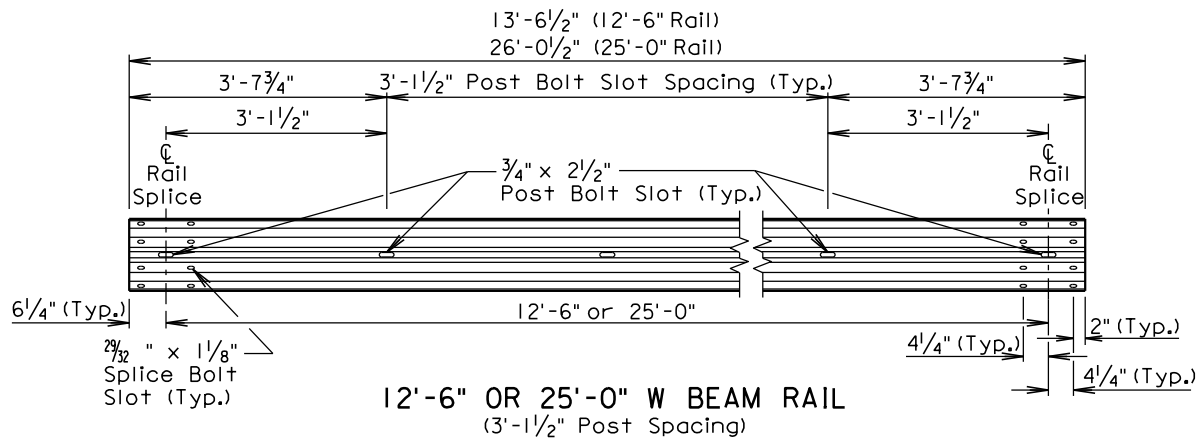
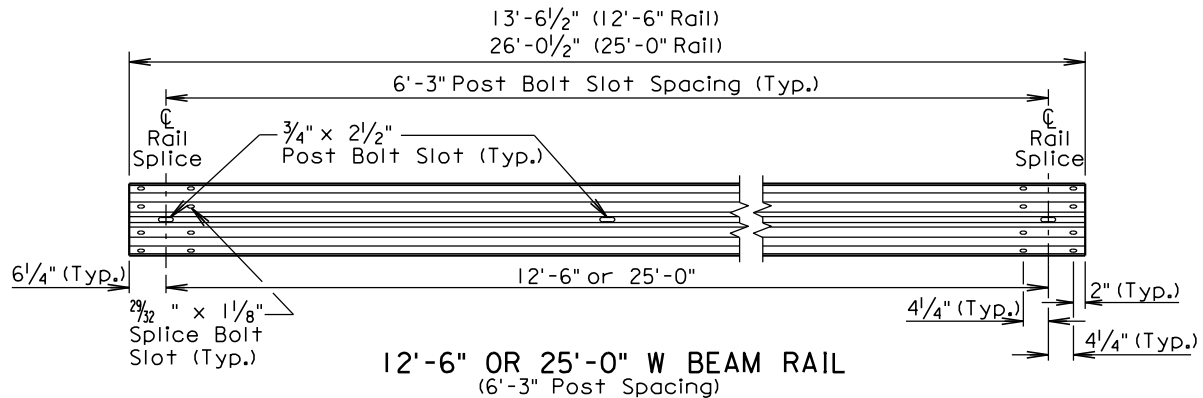
**S
D
D
O
T**

W BEAM GUARDRAIL

PLATE NUMBER
630.10

Sheet 3 of 5

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



February 14, 2017

Published Date: 2nd Qtr. 2018

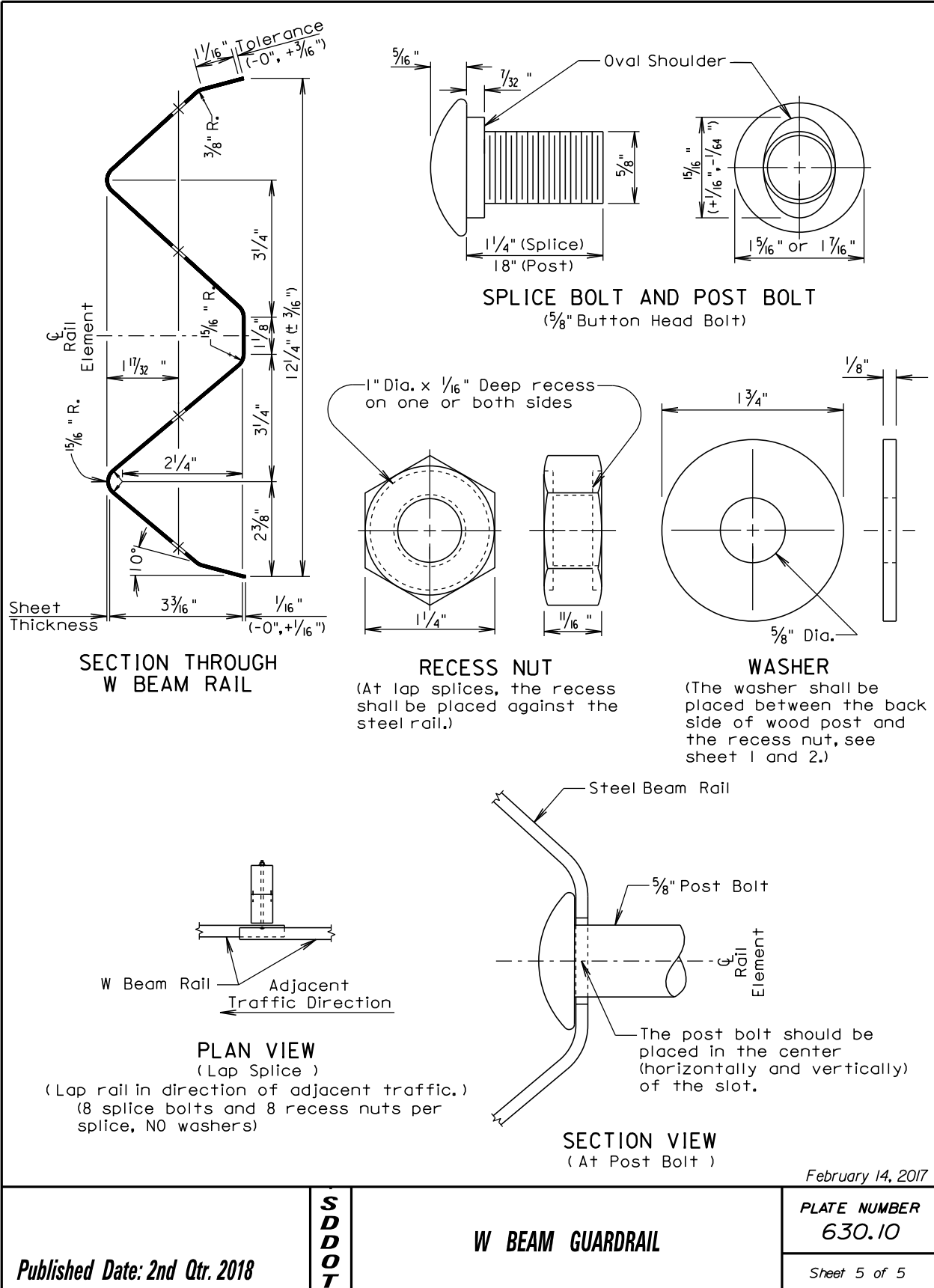
**S
D
D
O
T**

W BEAM GUARDRAIL

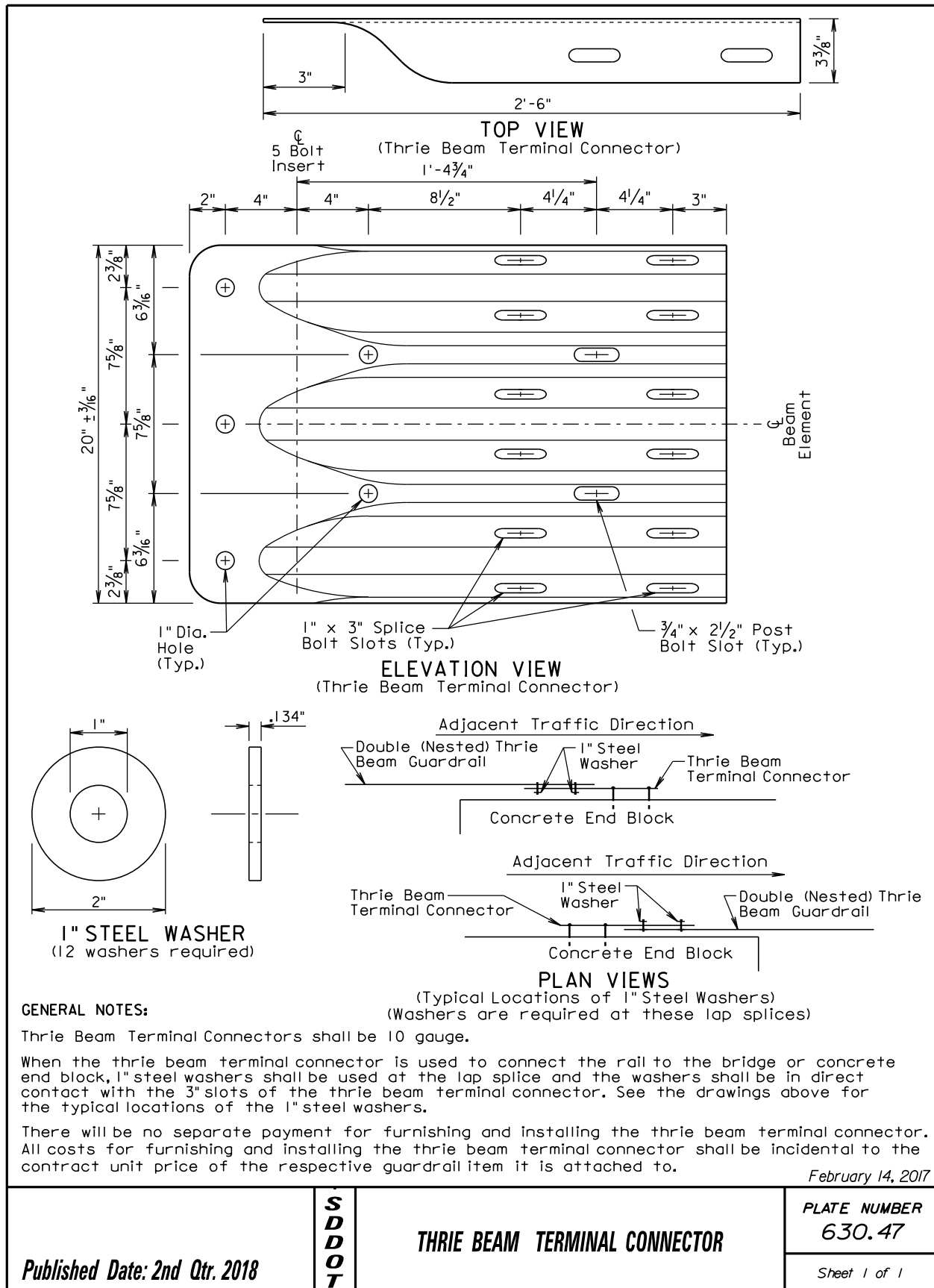
PLATE NUMBER
630.10

Sheet 4 of 5

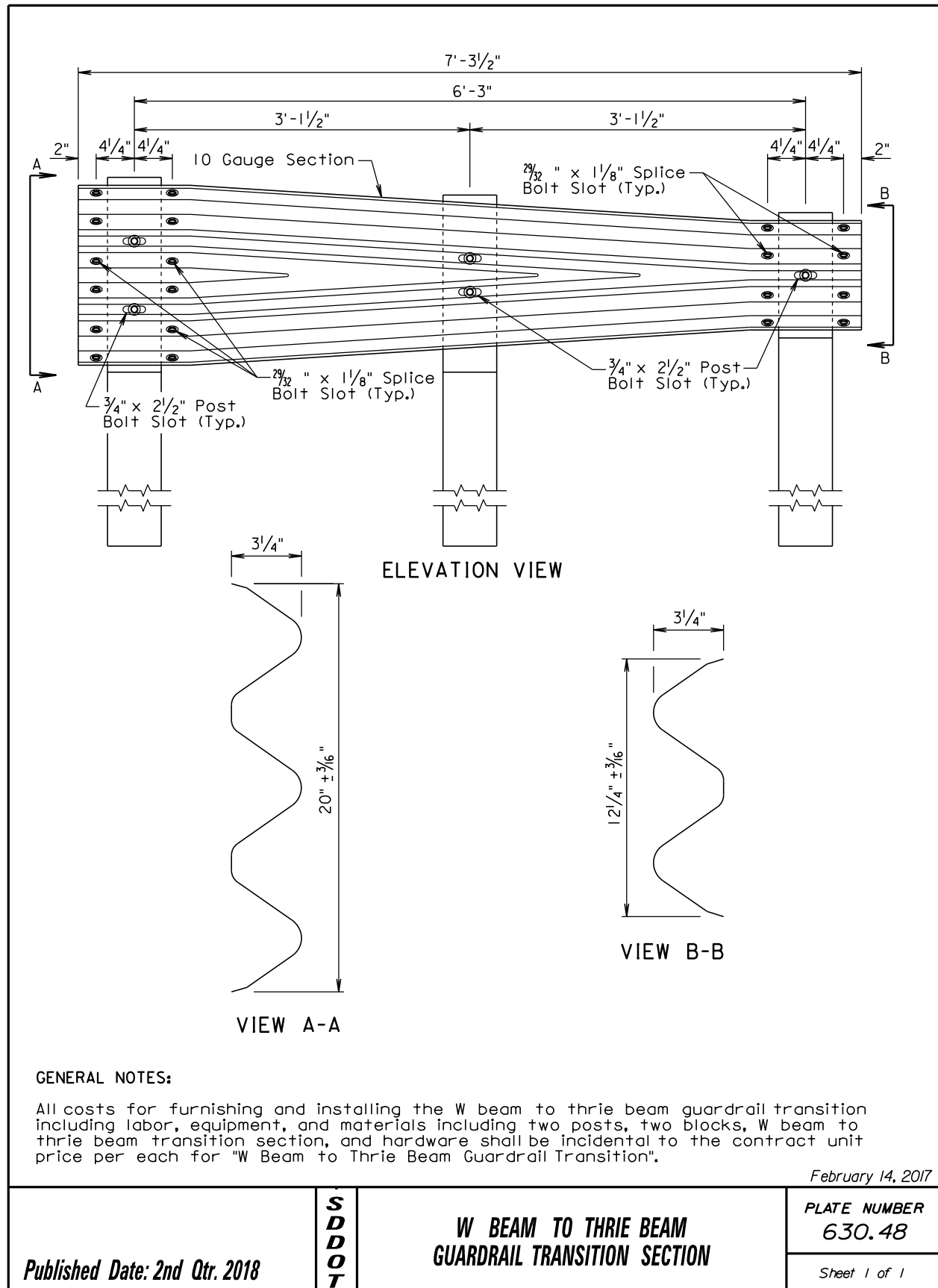
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



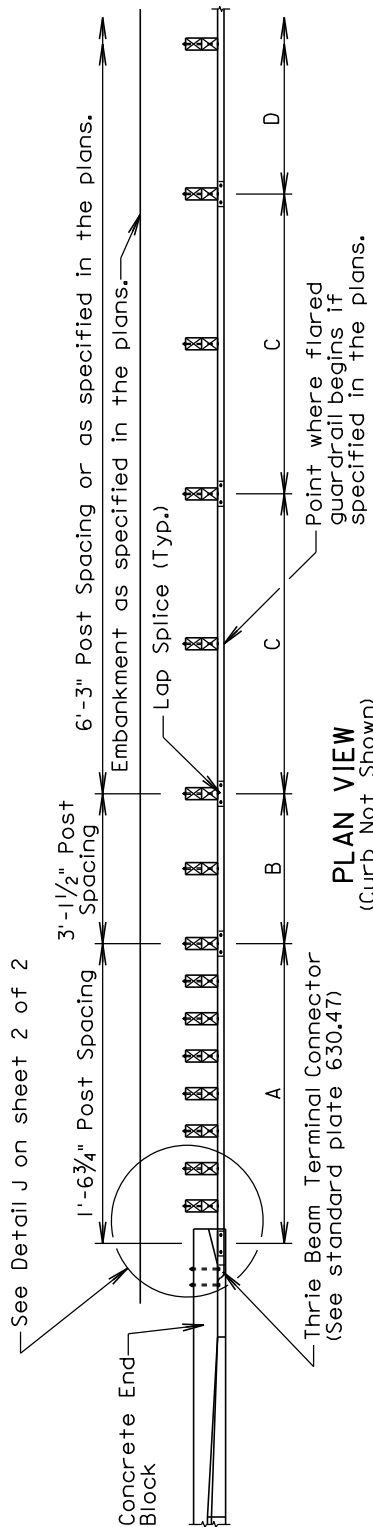
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



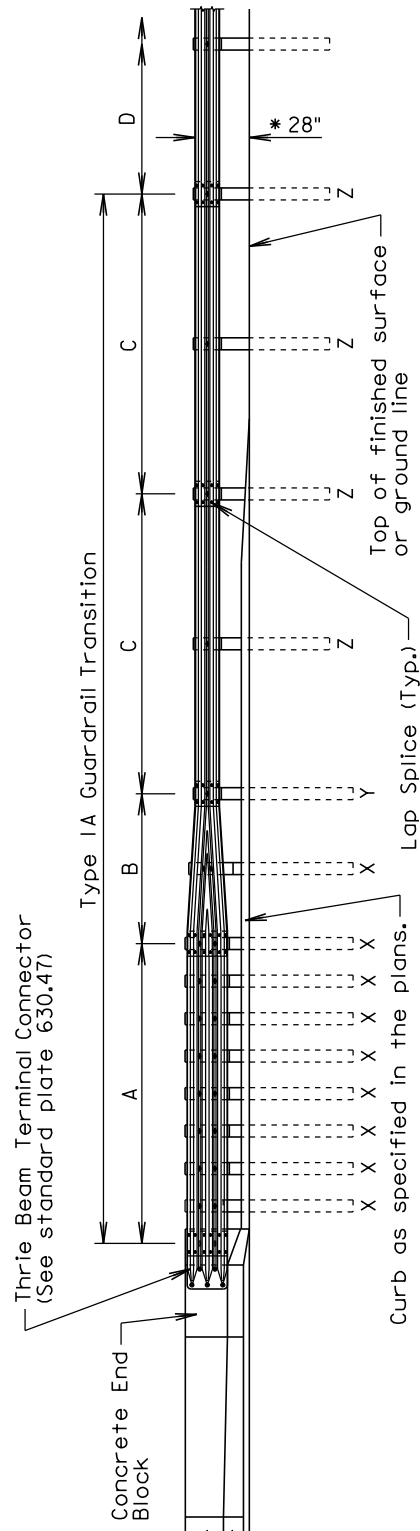
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



- PLAN VIEW**
(Curb Not Shown)
- A: 12'-6" Straight Double (Nested) Class A Thrie Beam Guardrail with Wood Posts (See standard plate 630.01)
 - B: 6'-3" W Beam to Thrie Beam Guardrail Transition Section with Wood Posts (See standard plate 630.48)
 - C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
 - D: Guardrail as specified in the plans.



ELEVATION VIEW

- X: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 21 3/4" Wood Blockout
 - Y: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 14" Wood Blockout
 - Z: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout
- * See standard plate 630.99

February 14, 2017

Published Date: 2nd Qtr. 2018

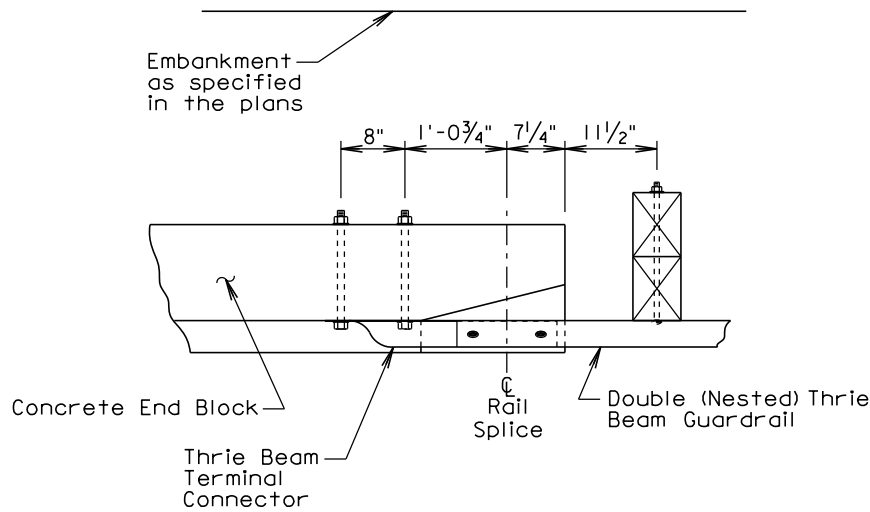
SDOT

TYPE 1A GUARDRAIL TRANSITION
(CONCRETE END BLOCK TO
W BEAM GUARDRAIL)

PLATE NUMBER
630.52

Sheet 1 of 2

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



DETAIL J

GENERAL NOTES:

Throughout the type 1A guardrail transition, slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

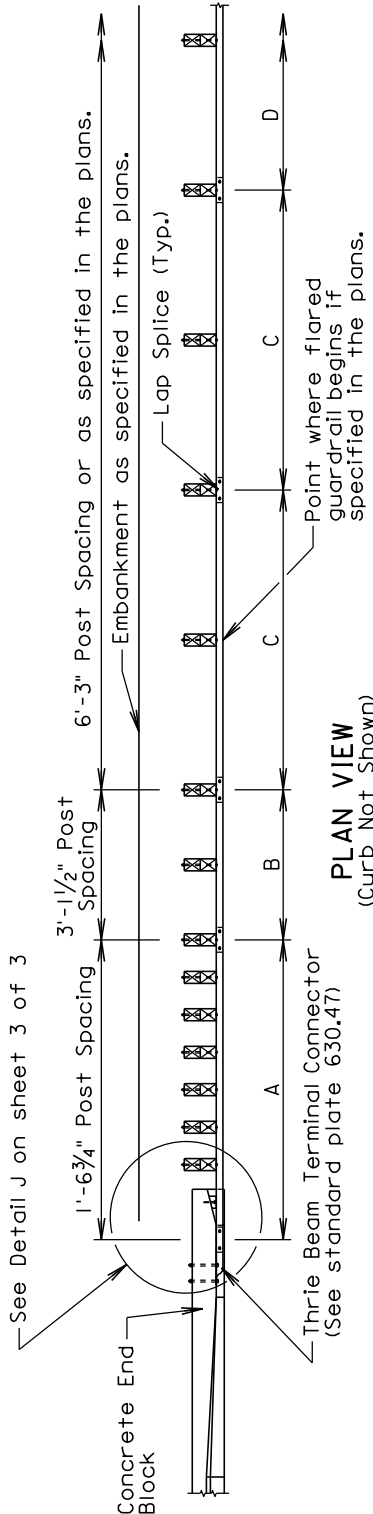
All costs for furnishing and installing the straight double class A thrie beam guardrail including labor, equipment, and materials including the thrie beam rails, posts, blockouts, thrie beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class A Thrie Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 1A guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

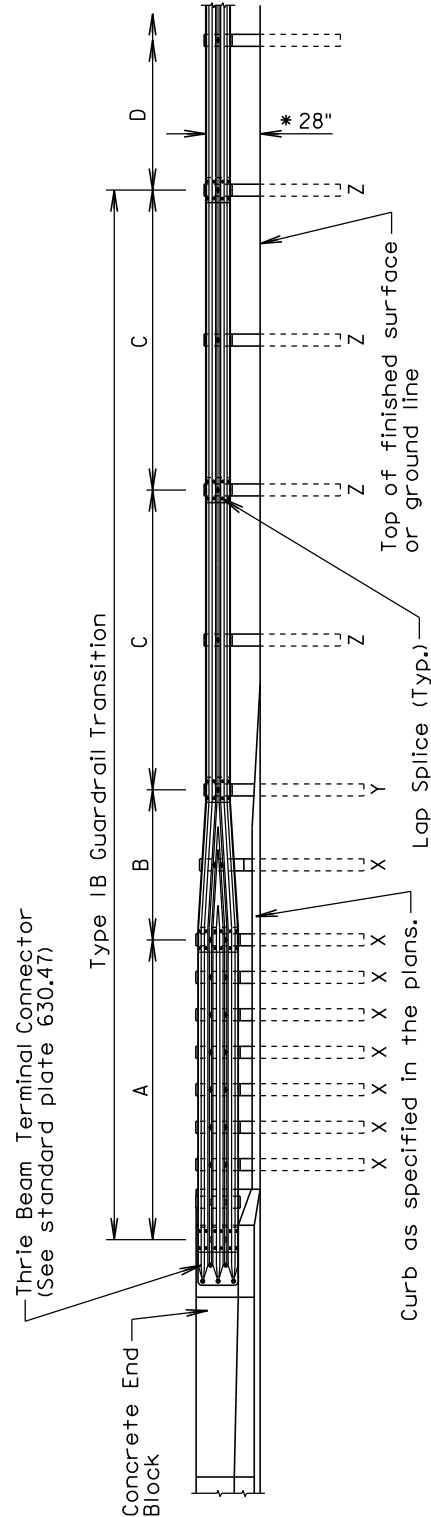
February 14, 2017

Published Date: 2nd Qtr. 2018	S D D O T	TYPE 1A GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.52
			Sheet 2 of 2

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



- A: 12'-6" Straight Double (Nested) Class A Thrie Beam Guardrail with Wood Posts (See standard plate 630.01)
 B: 6'-3" W Beam to Thrie Beam Guardrail Transition Section with Wood Posts (See standard plate 630.48)
 C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
 D: Guardrail as specified in the plans.



ELEVATION VIEW

- X: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 21 3/4" Wood Blockout
 Y: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 14" Wood Blockout
 Z: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

* See standard plate 630.99

February 14, 2017

Published Date: 2nd Qtr. 2018

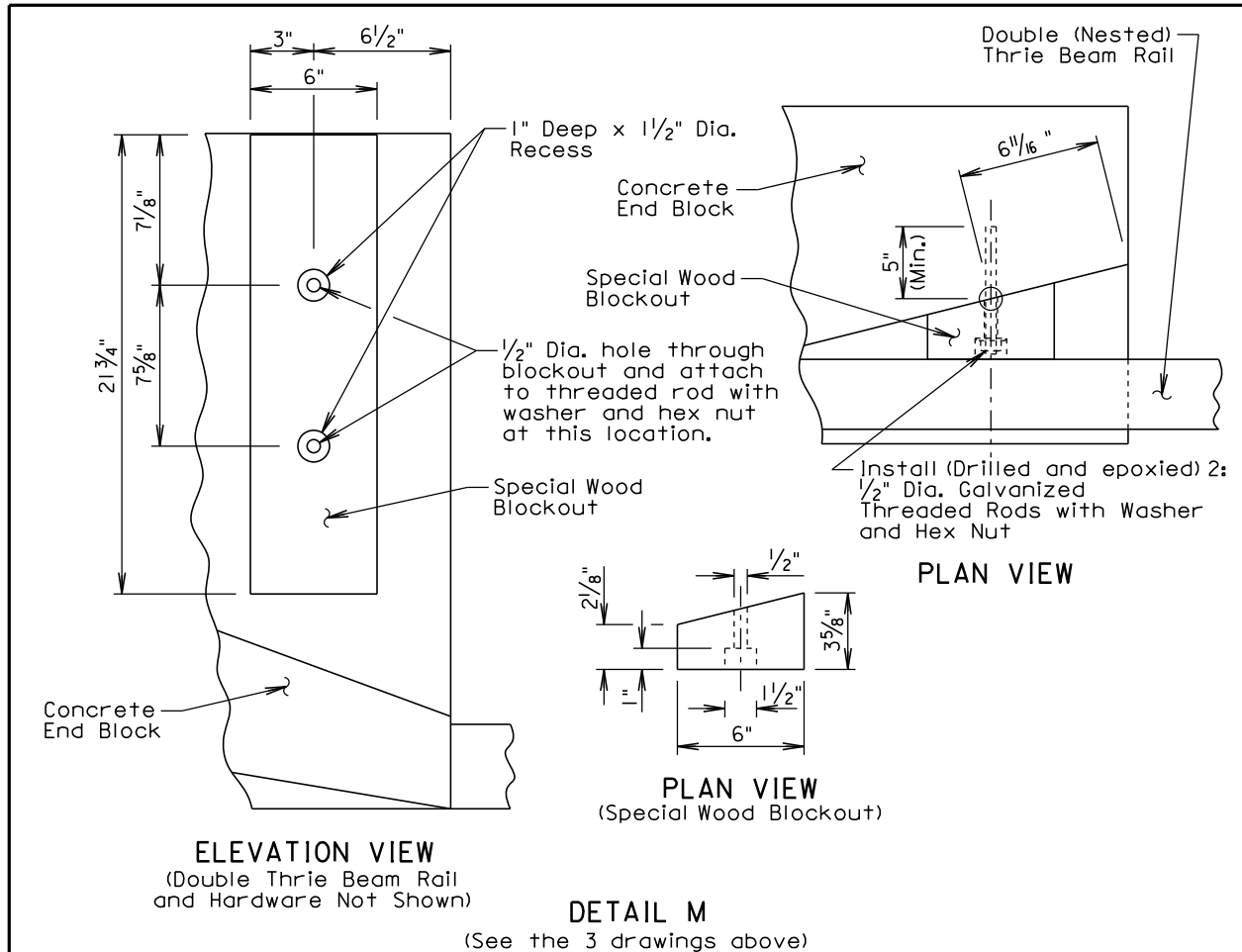
SDOT

TYPE 1B GUARDRAIL TRANSITION
(CONCRETE END BLOCK TO
W BEAM GUARDRAIL)

PLATE NUMBER
630.53

Sheet 1 of 3

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:

The special wood blockout may need to be installed at a different location than what is shown in Detail M as the in place concrete end block may not have been constructed to the exact dimensions. The blockout may be moved in the longitudinal (sideways) direction as necessary such that the blockout rests against the back of the double (nested) thrie beam rail and the rail is straight. The location shall be approved by the Engineer before installation of the blockout.

The threaded rods shall be 1/2" diameter and conform to ASTM F1554 Grade 55. The threaded rods shall be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes shall not be less than 1/8" greater or more than 3/8" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes shall not be drilled using core bits. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

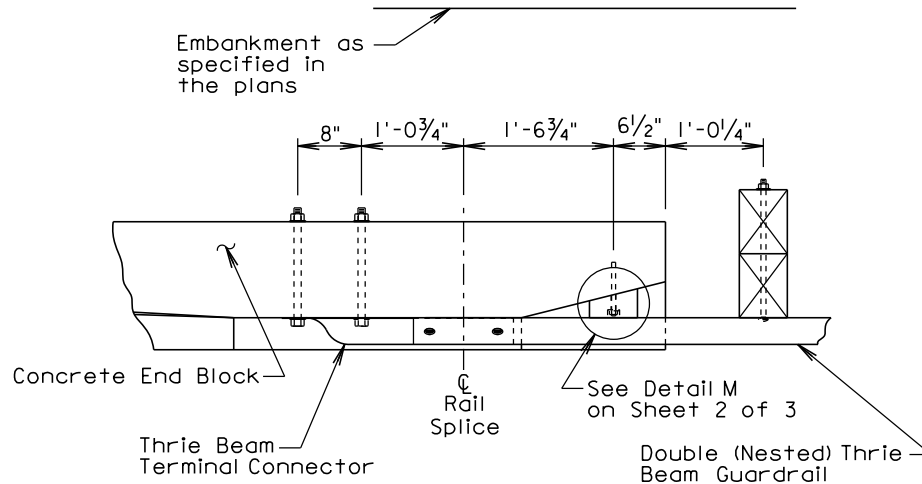
Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads shall not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

February 14, 2017

Published Date: 2nd Qtr. 2018	S D D O T	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53
			Sheet 2 of 3

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



DETAIL J

GENERAL NOTES:

Throughout the type 1B guardrail transition, slots in the rails shall be provided as specified in the plans and by the Manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

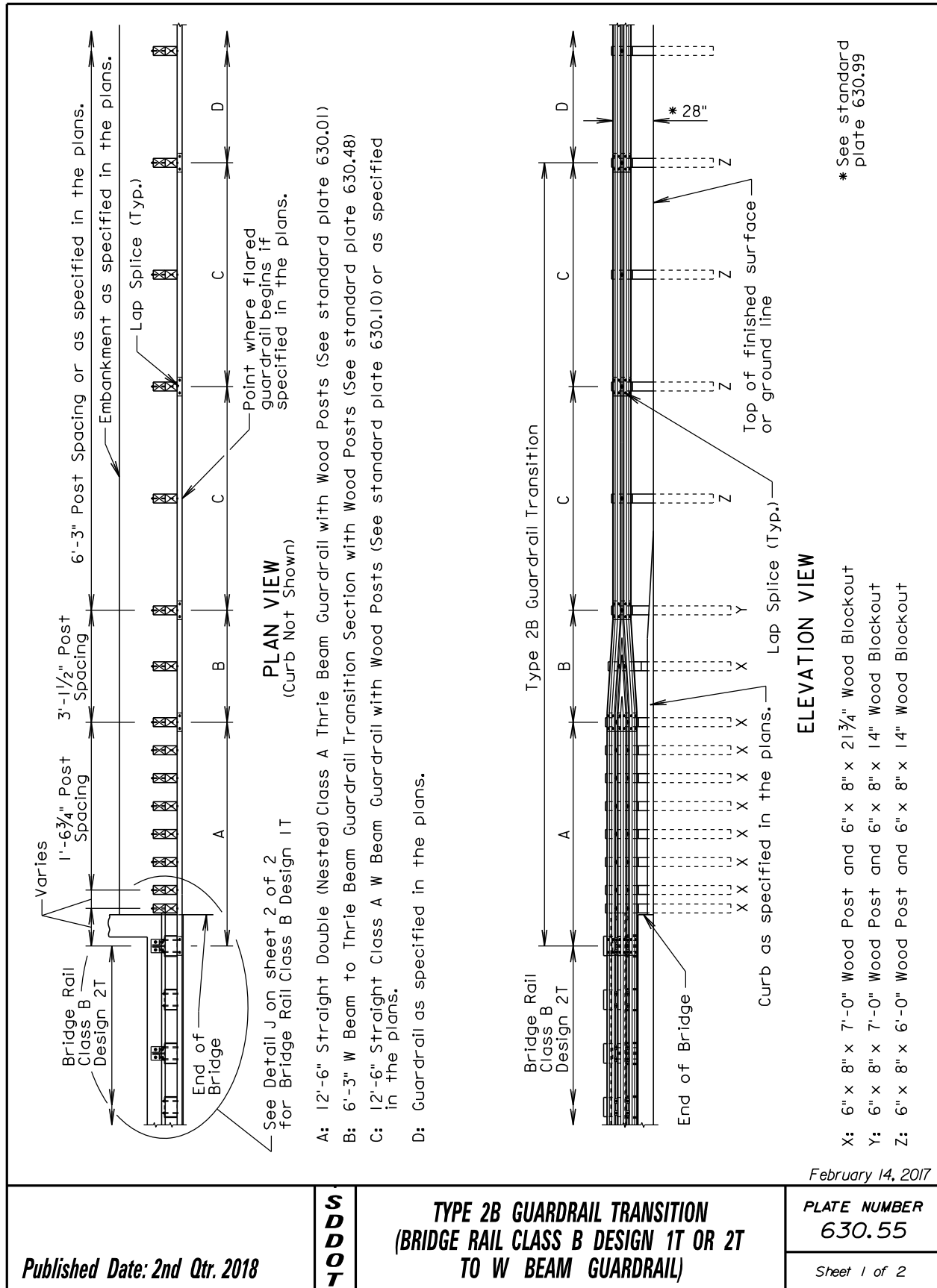
All costs for furnishing and installing the straight double class A thrie beam guardrail including labor, equipment, and materials including the thrie beam rails, posts, blockouts, special blockout, thrie beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class A Thrie Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 1B guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

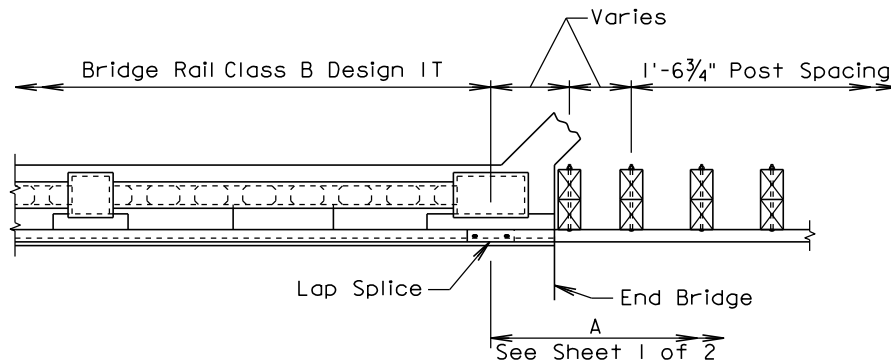
February 14, 2017

Published Date: 2nd Qtr. 2018	S D D O T	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53
			Sheet 3 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



DETAIL J

GENERAL NOTES:

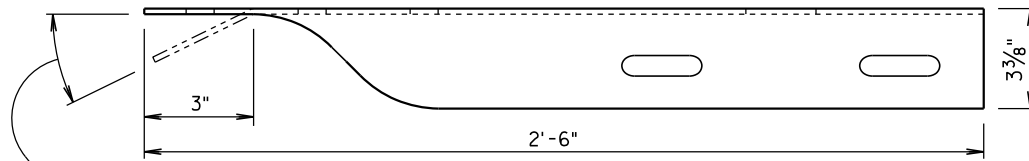
Throughout the type 2B guardrail transition, slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

All costs for furnishing and installing the type 2B guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

<i>Published Date: 2nd Qtr. 2018</i>	S D D O T	TYPE 2B GUARDRAIL TRANSITION (BRIDGE RAIL CLASS B DESIGN 1T OR 2T TO W BEAM GUARDRAIL)	PLATE NUMBER 630.55
			<i>Sheet 2 of 2</i>

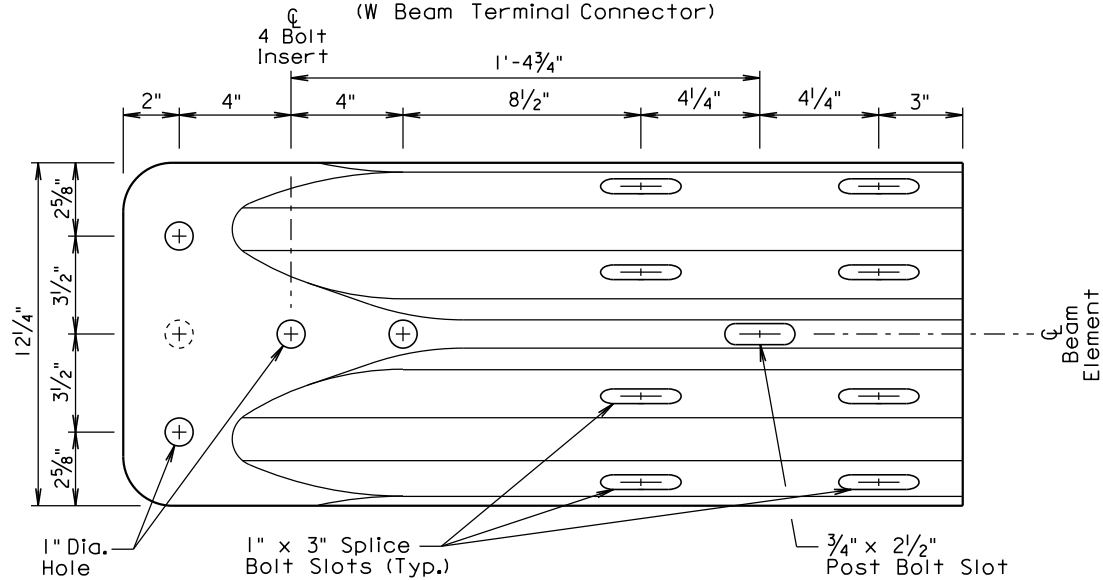
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



An extra hole and an approximate 26° bend shall be required only for the Special Anchor Assembly and Breakaway Cable Terminal. The Modified W Beam Terminal Connector placement detail is shown on standard plates 630.84 and 630.85.

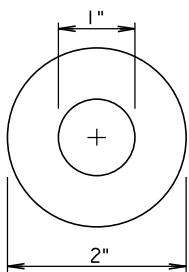
TOP VIEW

(W Beam Terminal Connector)

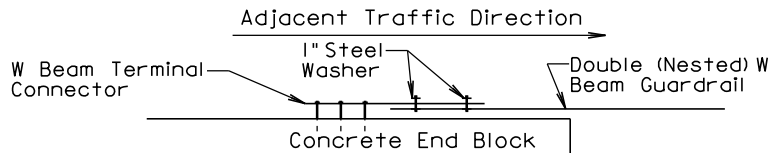
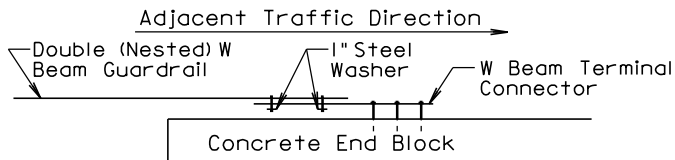
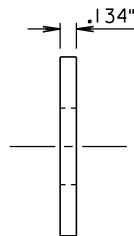


ELEVATION VIEW

(W Beam Terminal Connector)



1" STEEL WASHER
(8 washers required)



PLAN VIEWS

(Typical Locations of 1" Steel Washers)
(Washers are required at these lap splices)

GENERAL NOTES:

W Beam Terminal Connectors shall be 10 gauge.

When the W beam terminal connector is used to connect the rail to the bridge or concrete end block, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the W beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the W beam terminal connector. All costs for furnishing and installing the W beam terminal connector shall be incidental to the contract unit price of the respective guardrail item it is attached to.

February 14, 2017

Published Date: 2nd Qtr. 2018

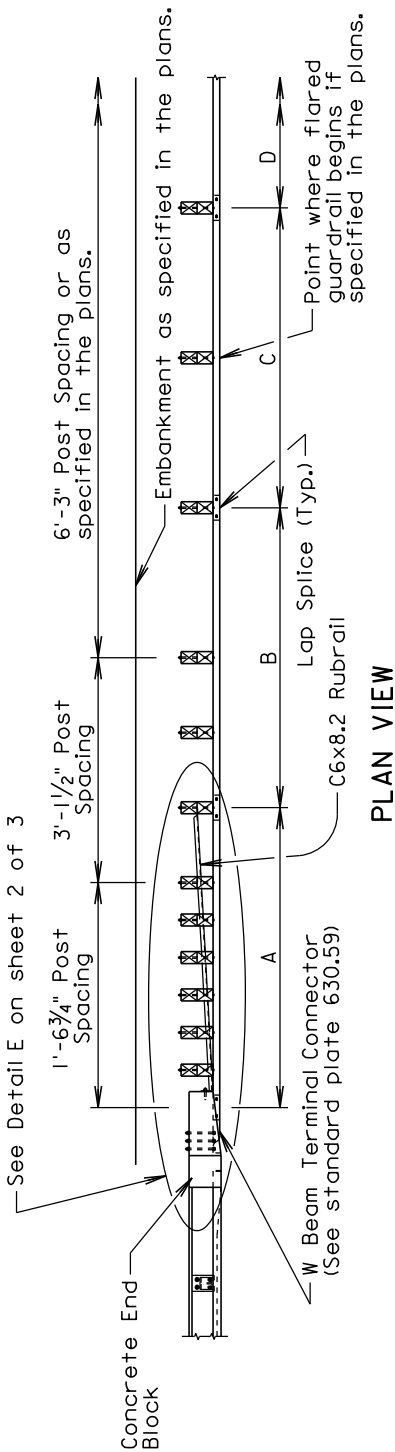
**S
D
D
O
T**

W BEAM TERMINAL CONNECTOR

PLATE NUMBER
630.59

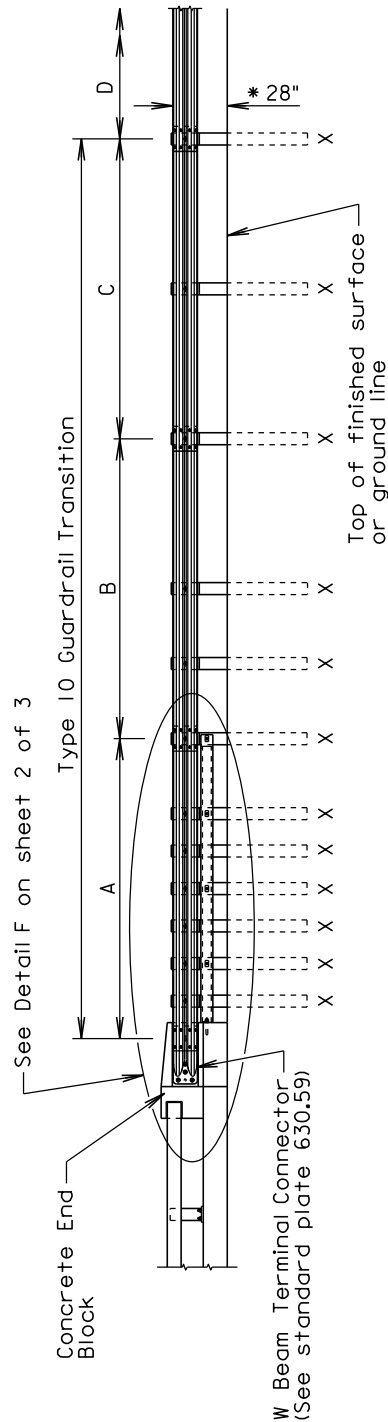
Sheet 1 of 1

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



PLAN VIEW

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
 B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
 C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
 D: Guardrail as specified in the plans.



ELEVATION VIEW

* See standard plate 630.99

X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

February 14, 2017

Published Date: 2nd Qtr. 2018

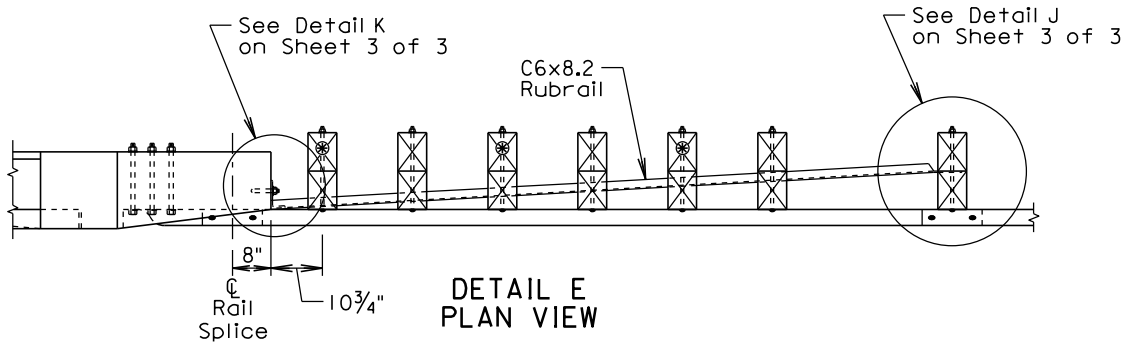
**S
D
D
O
T**

**TYPE 10 GUARDRAIL TRANSITION
 (CONCRETE END BLOCK TO
 W BEAM GUARDRAIL)**

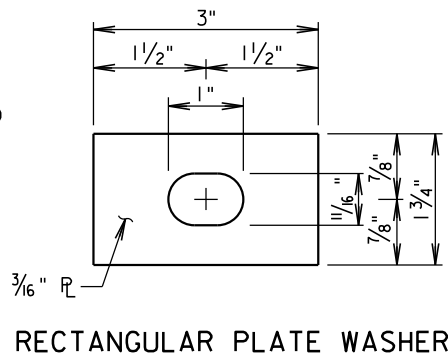
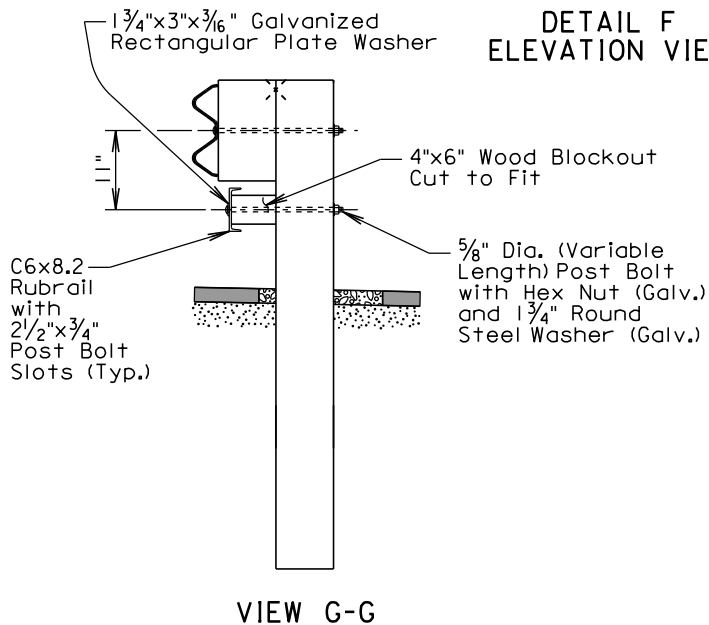
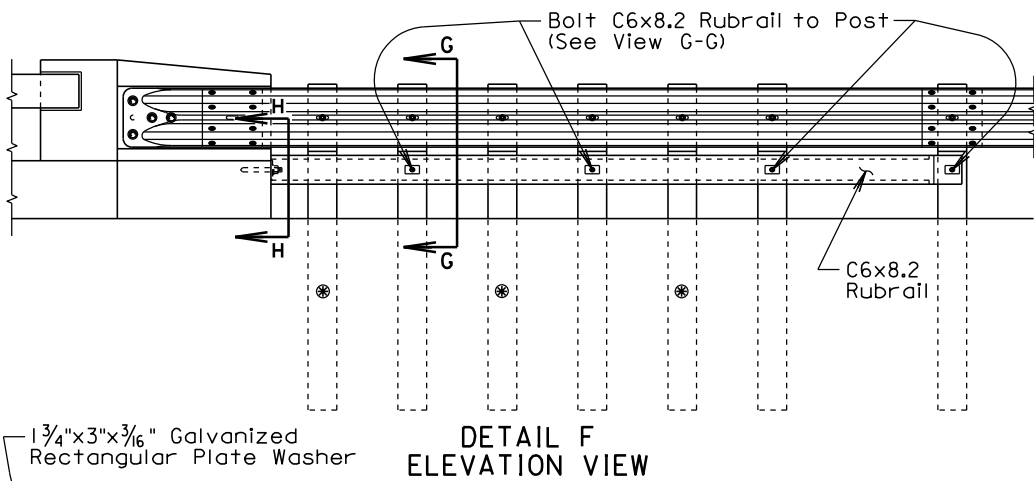
**PLATE NUMBER
 630.60**

Sheet 1 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



⊗ Rubrail shall not be attached to these posts.



February 14, 2017

Published Date: 2nd Qtr. 2018

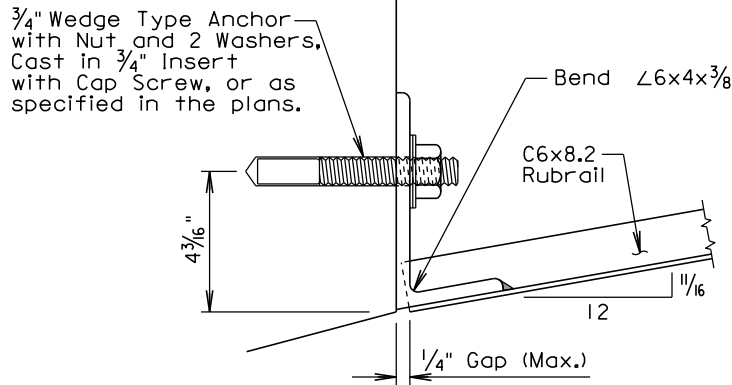
**S
D
D
O
T**

**TYPE 10 GUARDRAIL TRANSITION
(CONCRETE END BLOCK TO
W BEAM GUARDRAIL)**

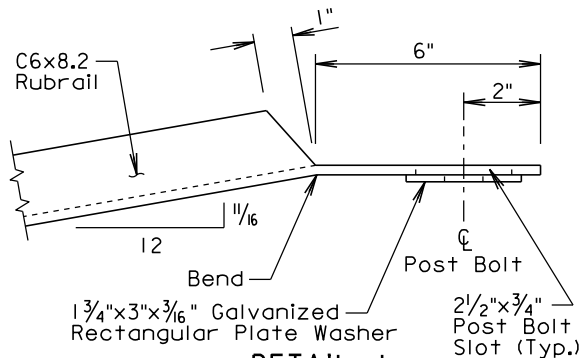
**PLATE NUMBER
630.60**

Sheet 2 of 3

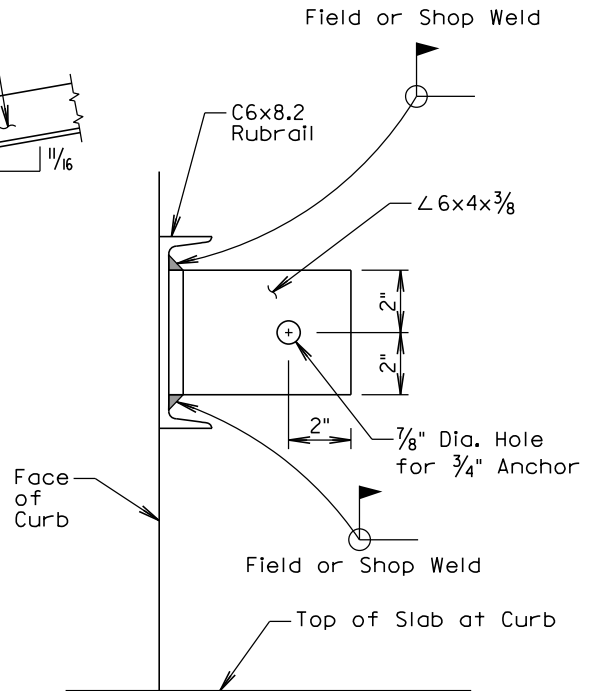
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



DETAIL K
 (Double Class B Rail Not Shown)



DETAIL J
 (Post, Blockout, Post Bolt, and Rail Not Shown)



VIEW H-H
 (Anchor and Rail Not Shown)

GENERAL NOTES:

Throughout the type 10 guardrail transition, slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

The rubrail steel shall be in conformance with ASTM A36 and shall be galvanized after fabrication in conformance with ASTM A123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

The wedge type anchor bolt, nut, and washers shall be hot dipped galvanized or made of a corrosion resistant material. The wedge type anchor shall be capable of sustaining an ultimate load in tension or shear of 17,000 pounds when the anchor is set in 4,500 psi compressive strength concrete. The anchor shall be installed according to the manufacturer's recommendations. The Contractor shall obtain certification from the manufacturer that the anchor meets the tensile and shear requirements and shall submit the certification to the Engineer. The cost for furnishing and installing the wedge type anchor, nut, and washers shall be incidental to the contract unit price per foot for "Rubrail".

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 10 guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

Published Date: 2nd Qtr. 2018

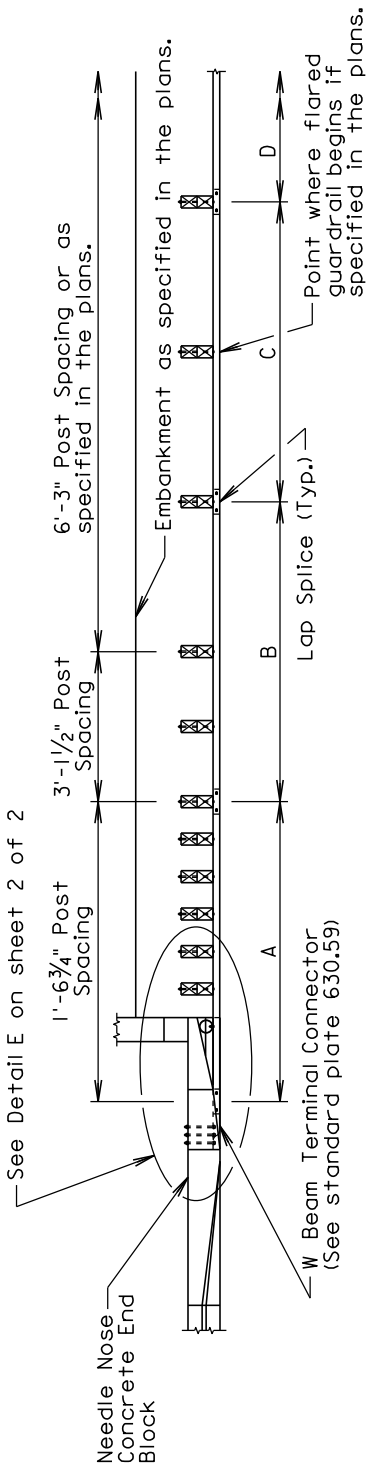
**S
D
D
O
T**

**TYPE 10 GUARDRAIL TRANSITION
 (CONCRETE END BLOCK TO
 W BEAM GUARDRAIL)**

**PLATE NUMBER
 630.60**

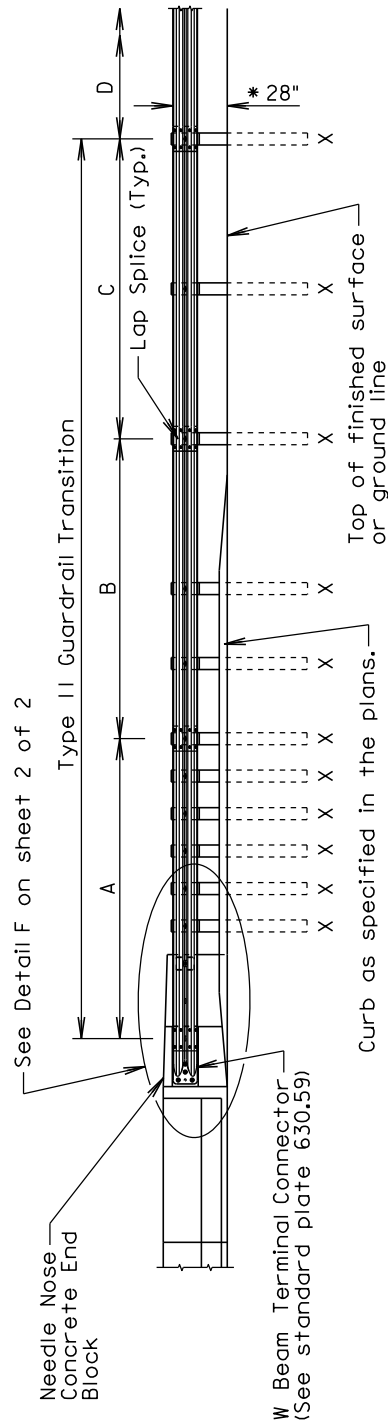
Sheet 3 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



PLAN VIEW
(Curb Not Shown)

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
- D: Guardrail as specified in the plans.



ELEVATION VIEW

* See standard plate 630.99

X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

February 14, 2017

Published Date: 2nd Qtr. 2018

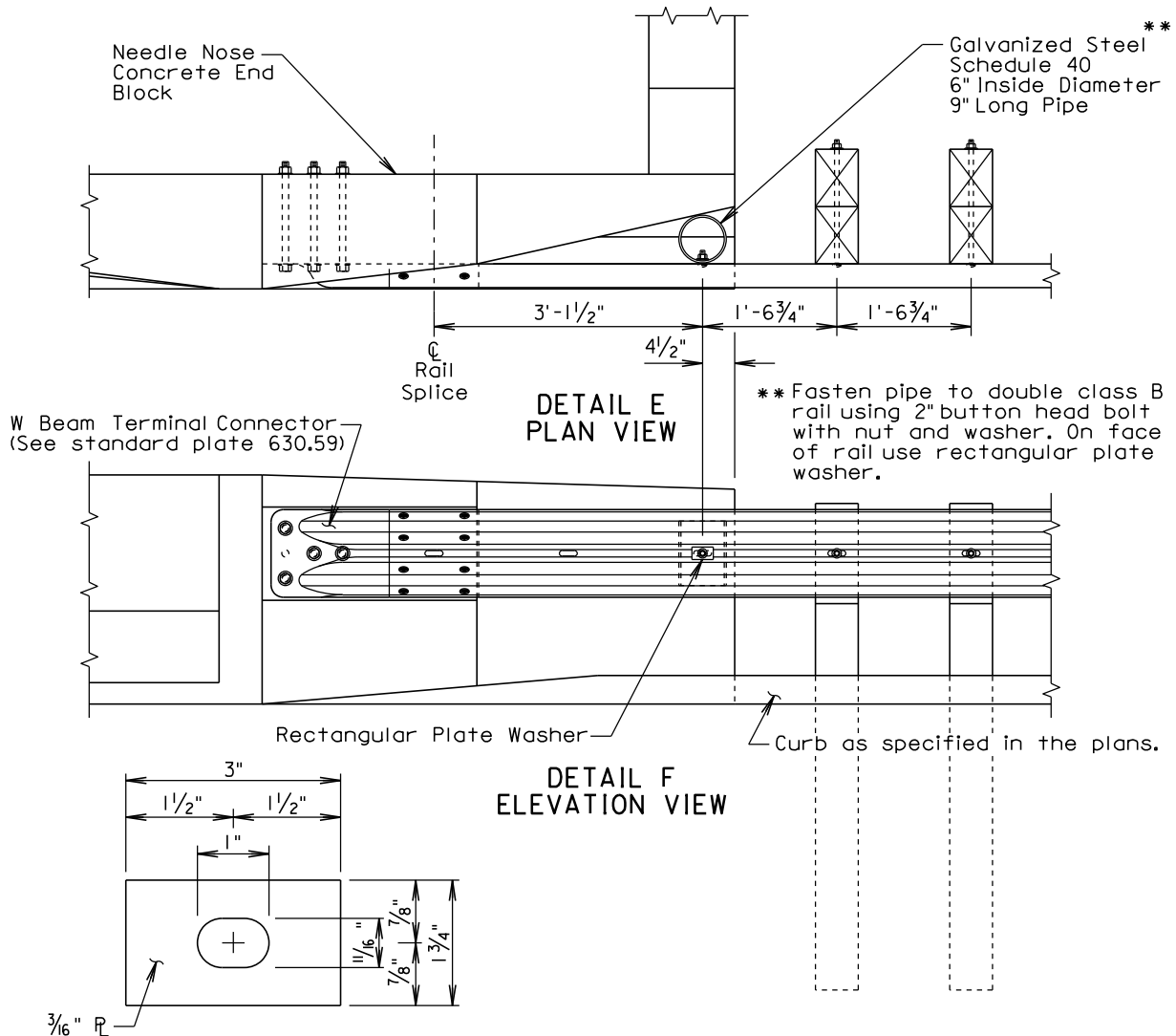
SDOT

TYPE 11 GUARDRAIL TRANSITION
(NEEDLE NOSE CONCRETE END BLOCK
TO W BEAM GUARDRAIL)

PLATE NUMBER
630.61

Sheet 1 of 2

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



RECTANGULAR PLATE WASHER

GENERAL NOTES:

Throughout the type II guardrail transition, slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, steel pipe, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type II guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

Published Date: 2nd Qtr. 2018

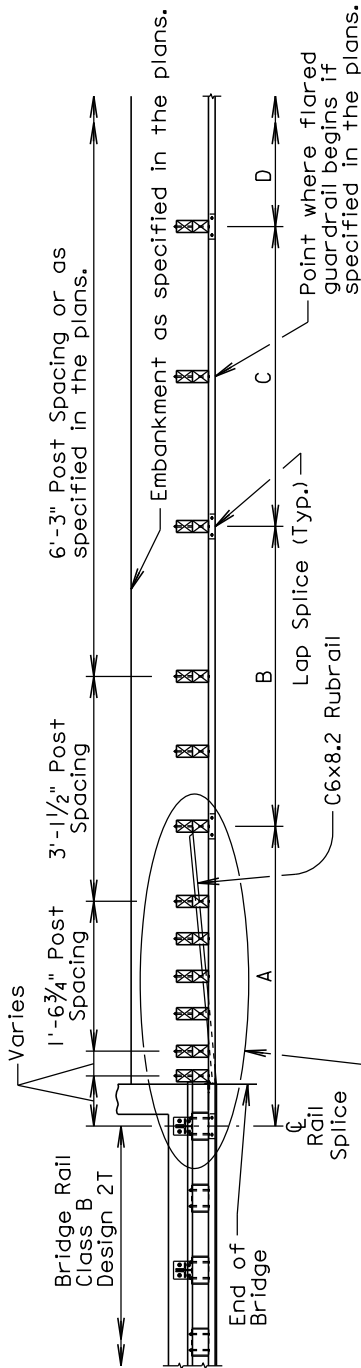
**S
D
D
O
T**

**TYPE 11 GUARDRAIL TRANSITION
 (NEEDLE NOSE CONCRETE END BLOCK
 TO W BEAM GUARDRAIL)**

**PLATE NUMBER
 630.61**

Sheet 2 of 2

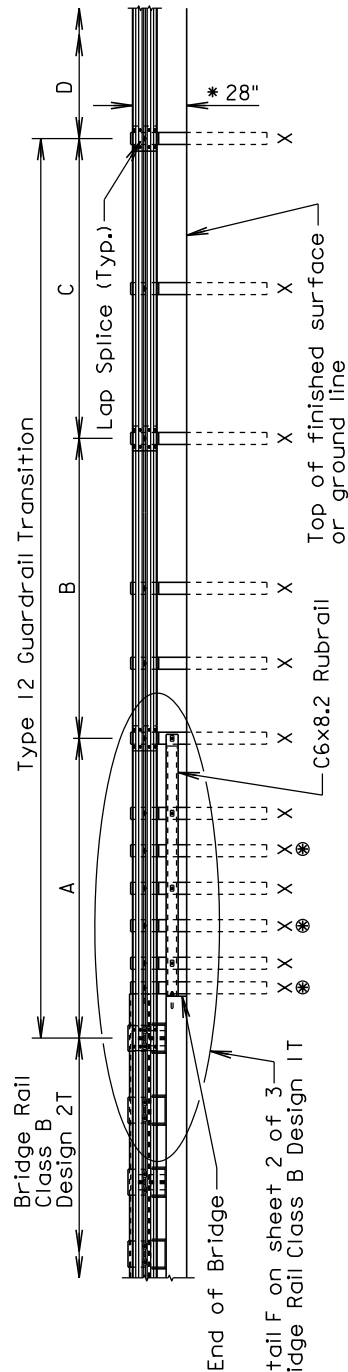
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



PLAN VIEW

See Detail E on sheet 2 of 3 for Bridge Rail Class B Design 1T

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
- D: Guardrail as specified in the plans.



ELEVATION VIEW

See Detail F on sheet 2 of 3 for Bridge Rail Class B Design 1T

February 14, 2017

* See standard plate 630.99

- X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout
- ⊗: Rubrail shall not be attached to these posts.

Published Date: 2nd Qtr. 2018

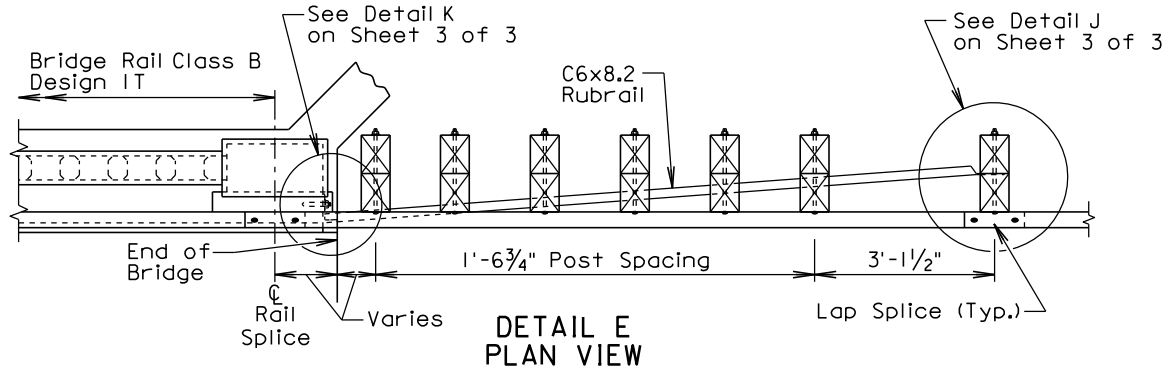
SDS

**TYPE 12 GUARDRAIL TRANSITION
(W BEAM BRIDGE RAIL CLASS B DESIGN
1T OR 2T TO W BEAM GUARDRAIL)**

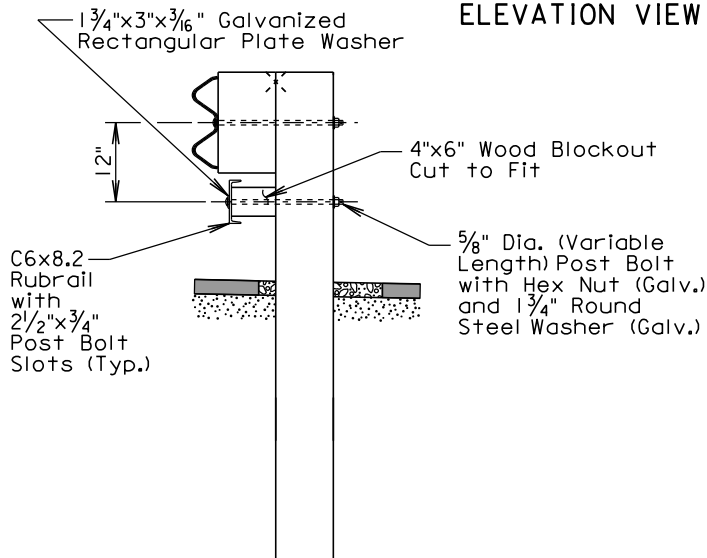
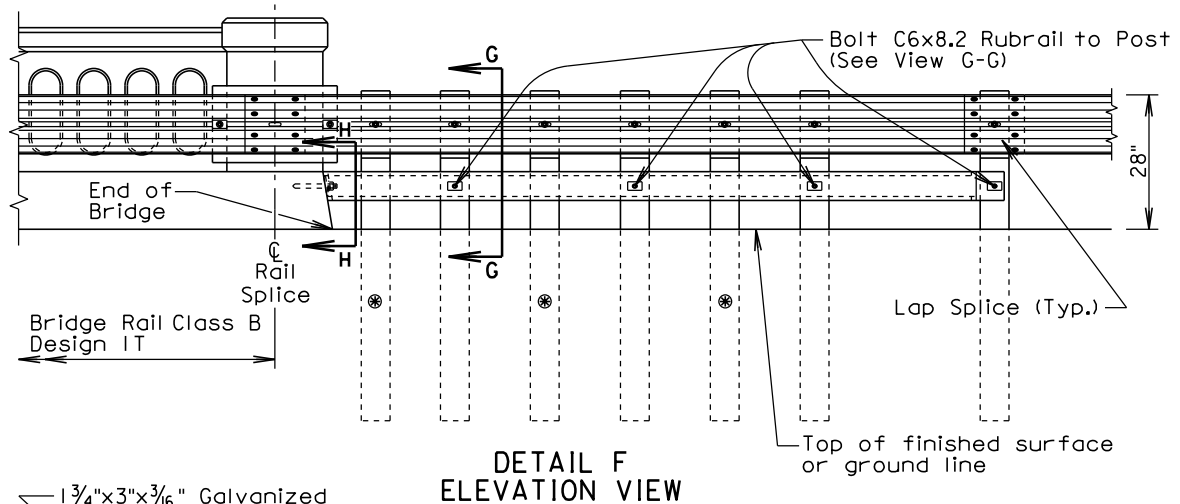
**PLATE NUMBER
630.63**

Sheet 1 of 3

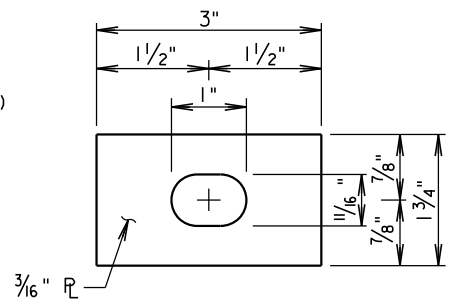
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



* Rubrail shall not be attached to these posts.



(For Bridge Rail Class B Design 1T or 2T)



February 14, 2017

Published Date: 2nd Qtr. 2018

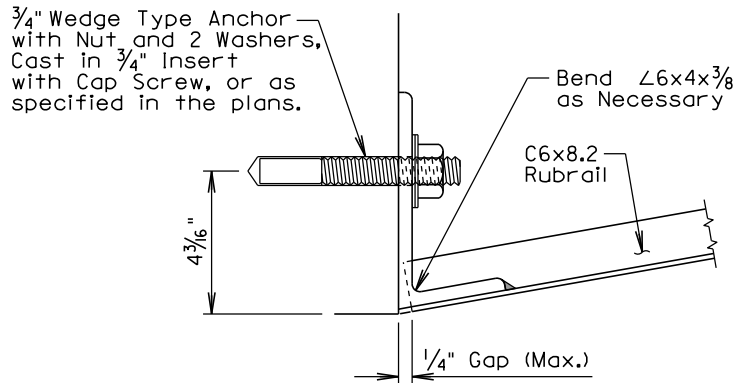
**S
D
D
O
T**

**TYPE 12 GUARDRAIL TRANSITION
(W BEAM BRIDGE RAIL CLASS B DESIGN
1T OR 2T TO W BEAM GUARDRAIL)**

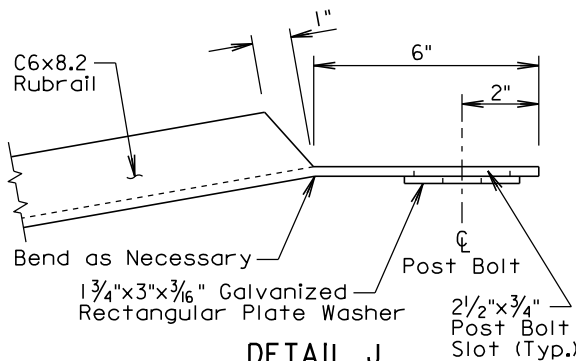
**PLATE NUMBER
630.63**

Sheet 2 of 3

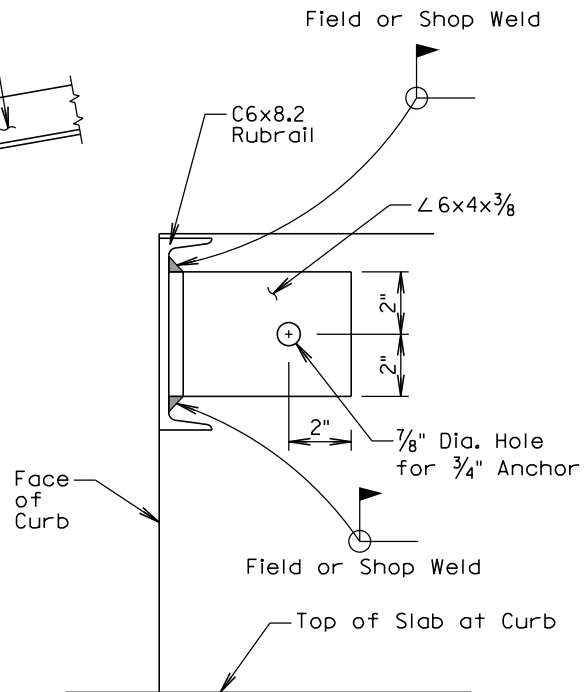
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



DETAIL K
 (Double Class B Rail Not Shown)
 (For Bridge Rail Class B Design 1T or 2T)



DETAIL J
 (Post, Blockout, Post Bolt, and Rail Not Shown)
 (For Bridge Rail Class B Design 1T or 2T)



VIEW H-H
 (Anchor and Rail Not Shown)
 (For Bridge Rail Class B Design 1T or 2T)

GENERAL NOTES:

Throughout the type 12 guardrail transition, slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

The rubrail steel shall be in conformance with ASTM A36 and shall be galvanized after fabrication in conformance with ASTM A123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

The wedge type anchor bolt, nut, and washers shall be hot dipped galvanized or made of a corrosion resistant material. The wedge type anchor shall be capable of sustaining an ultimate load in tension or shear of 17,000 pounds when the anchor is set in 4,500 psi compressive strength concrete. The anchor shall be installed according to the manufacturer's recommendations. The Contractor shall obtain certification from the manufacturer that the anchor meets the tensile and shear requirements and shall submit the certification to the Engineer. The cost for furnishing and installing the wedge type anchor, nut, and washers shall be incidental to the contract unit price per foot for "Rubrail".

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 12 guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

Published Date: 2nd Qtr. 2018

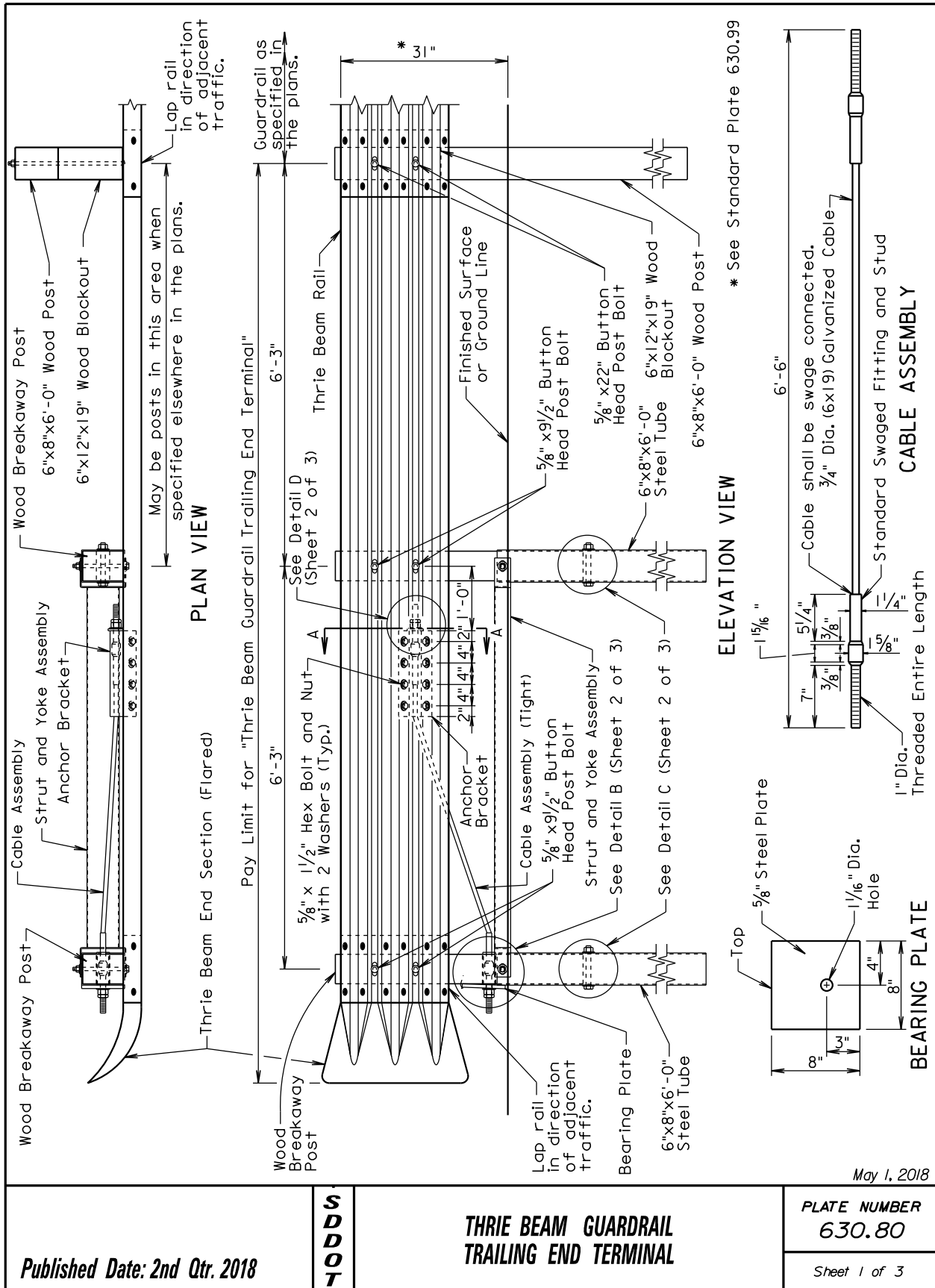
**S
D
D
O
T**

TYPE 12 GUARDRAIL TRANSITION
(W BEAM BRIDGE RAIL CLASS B DESIGN
1T OR 2T TO W BEAM GUARDRAIL)

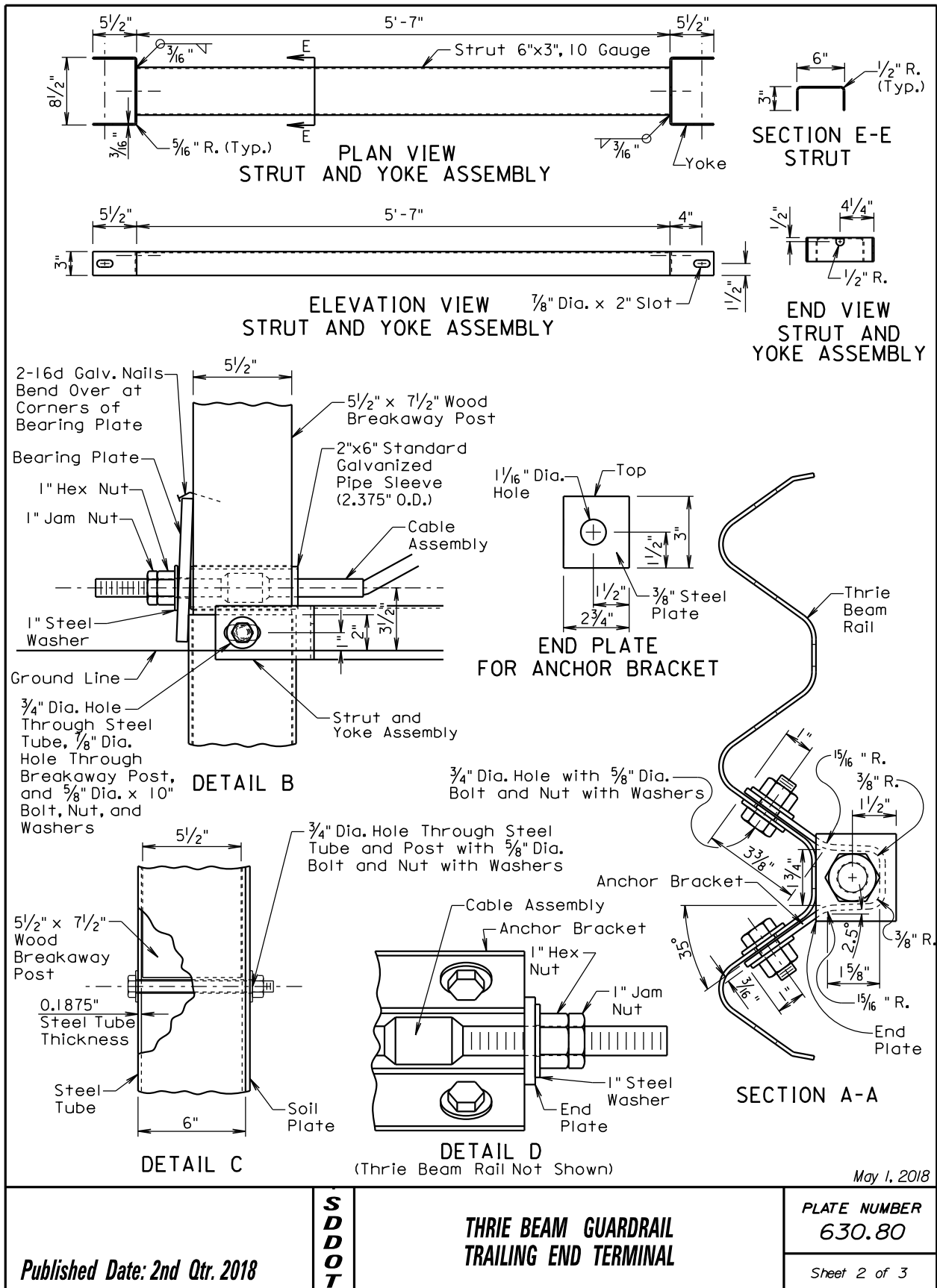
PLATE NUMBER
630.63

Sheet 3 of 3

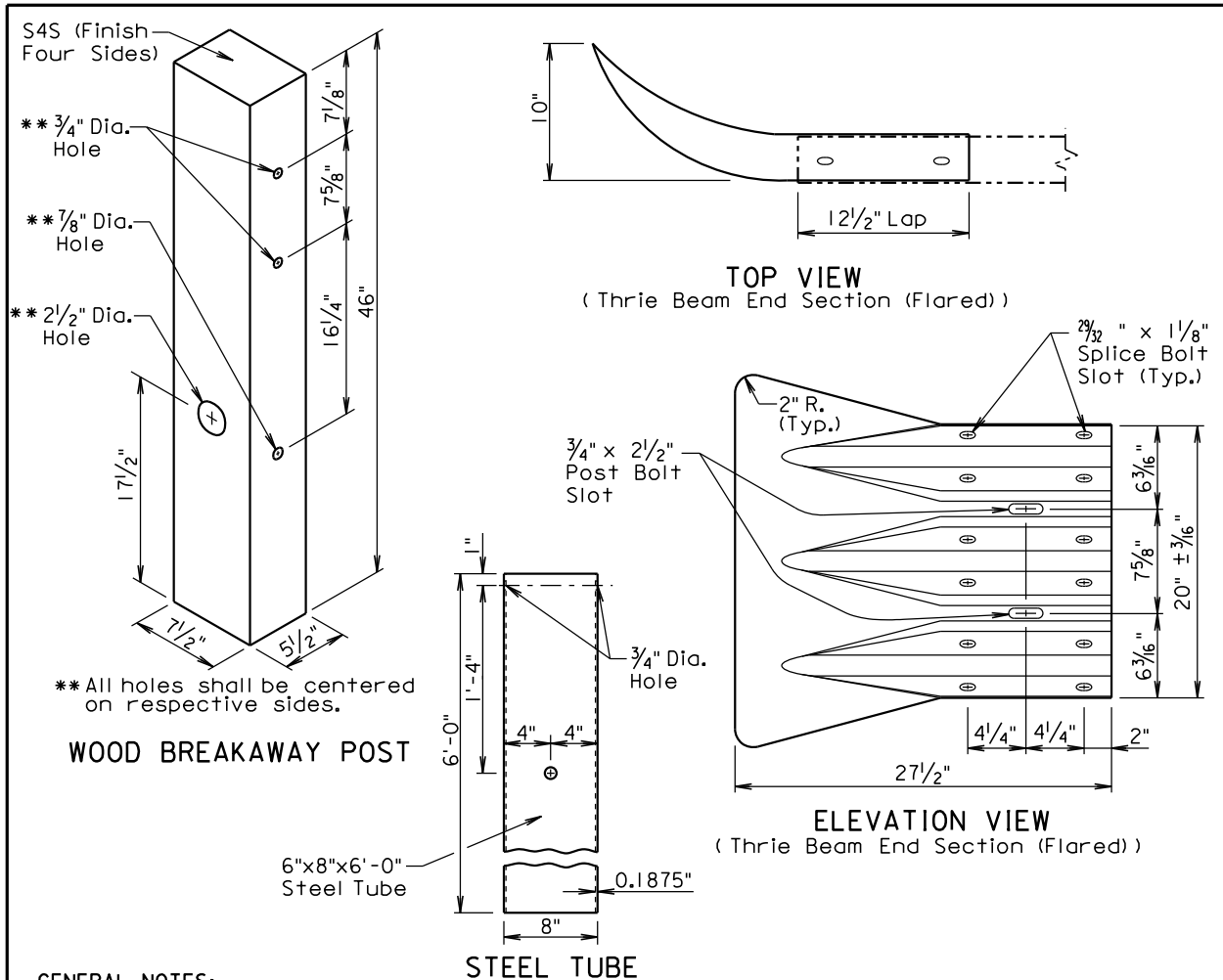
000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



GENERAL NOTES:

The thrie beam guardrail trailing end terminal shall only be used in a one-way traffic situation.

Thrie beam end sections (flared) shall be 12 gauge.

The cable shall be 3/4", Type II, with Class A coating in conformance with AASHTO M30.

The steel tube shall meet the requirements of ASTM Specification A500, Grade B, and shall be galvanized after fabrication in accordance with the requirements of AASHTO Specification M11.

All hardware shall be galvanized in accordance with ASTM A153.

The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

Slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or notches.

All costs for furnishing and constructing the thrie beam guardrail trailing end terminal including labor, equipment, materials which includes thrie beam rail section, all posts and blockouts, wood breakaway posts, steel tubes, cable assembly, bearing plate, anchor bracket, strut and yoke assembly, thrie beam end section (flared), hardware, and incidentals shall be included in the contract unit price per each for "Thrie Beam Guardrail Trailing End Terminal".

May 1, 2018

Published Date: 2nd Qtr. 2018

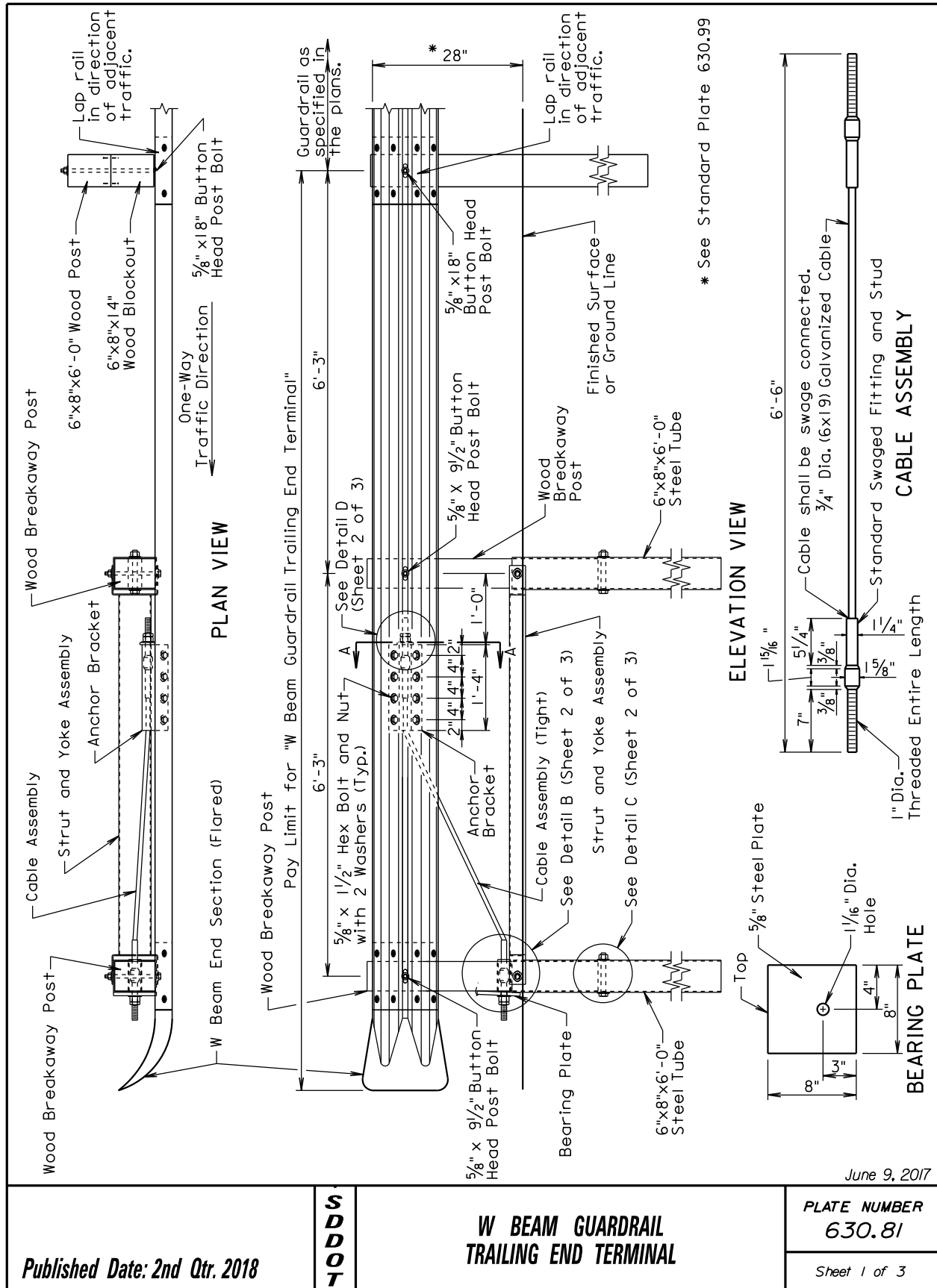
**S
D
D
T**

**THRIE BEAM GUARDRAIL
TRAILING END TERMINAL**

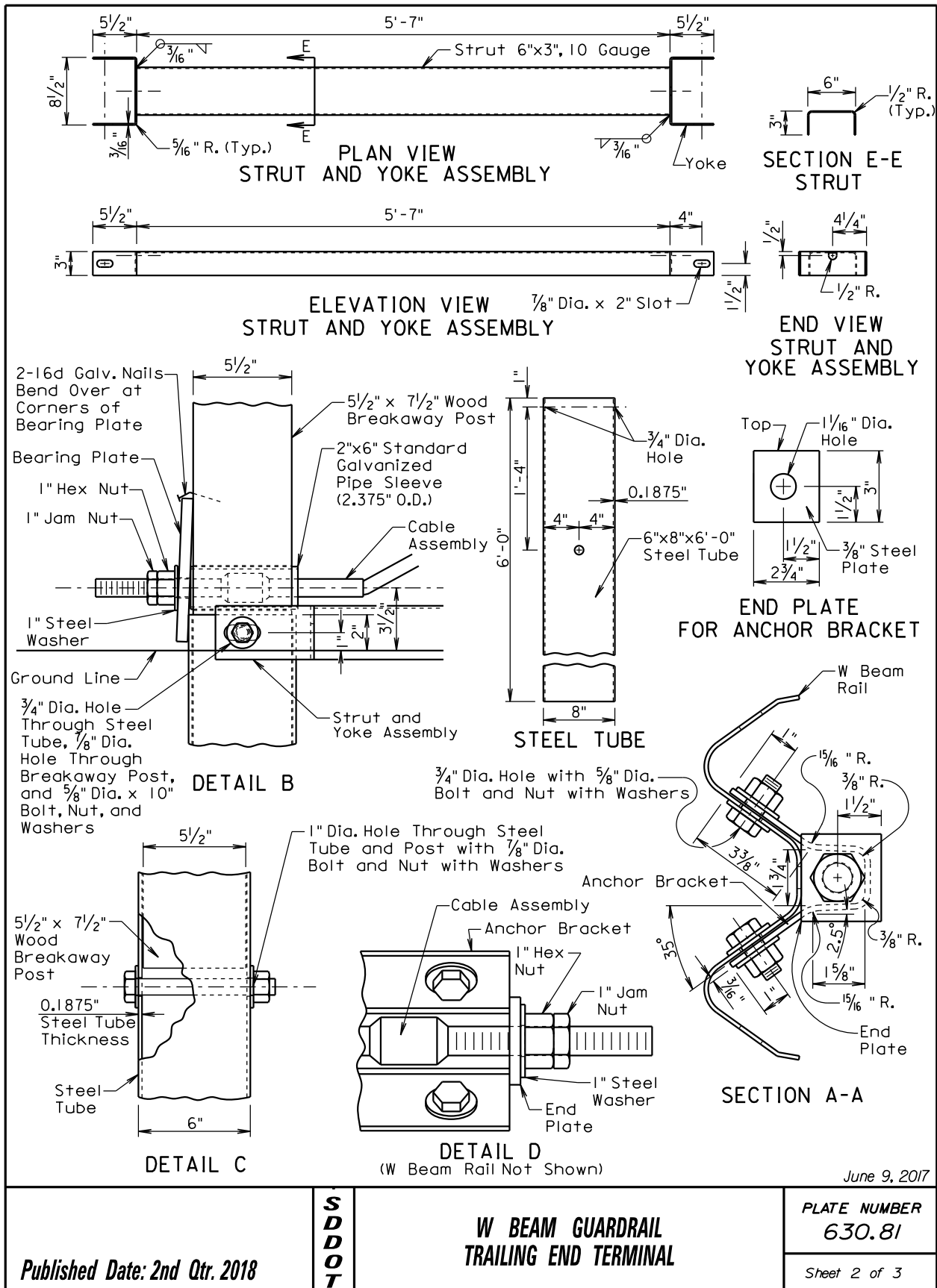
**PLATE NUMBER
630.80**

Sheet 3 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



June 9, 2017

Published Date: 2nd Qtr. 2018

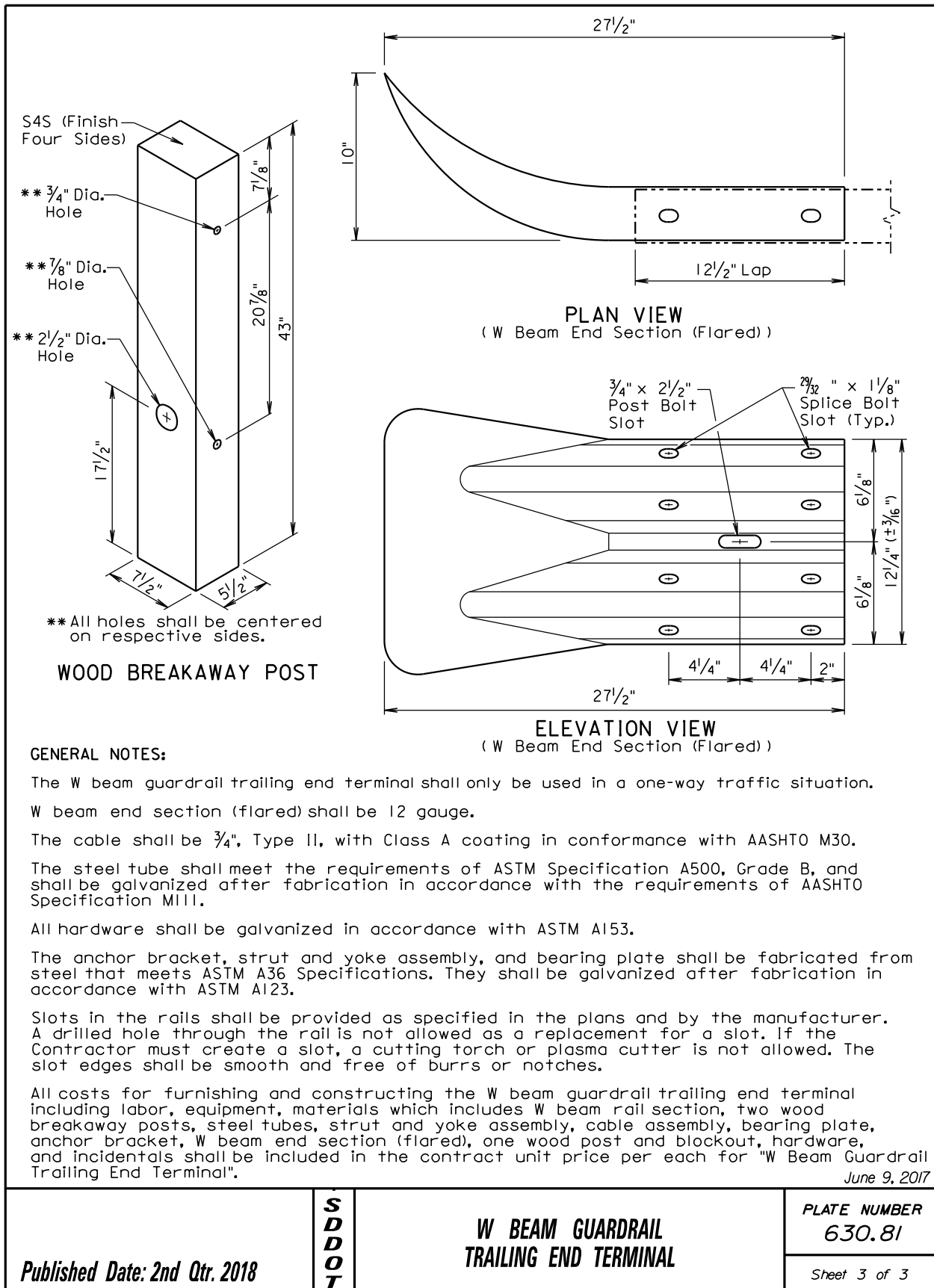
**S
D
D
T**

**W BEAM GUARDRAIL
TRAILING END TERMINAL**

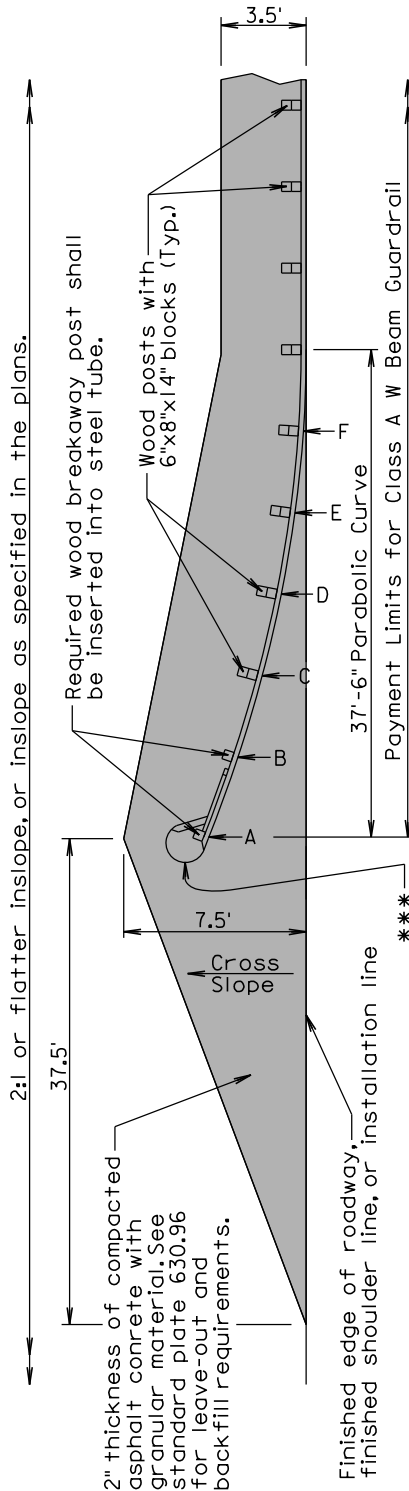
**PLATE NUMBER
630.81**

Sheet 2 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



PLAN

OFFSETS FOR BREAKAWAY CABLE TERMINAL	
POST	OFFSET
A	4.00'
B	2.79'
C	1.79'
D	1.01'
E	0.45'
F	0.11'

Offsets shall be measured from the installation line to the face of the W beam guardrail.

GENERAL NOTES:

The finished embankment surfacing cross slope shall match the roadway cross slope; however, if a steeper cross slope is necessary the steepest allowable cross slope is 10:1.

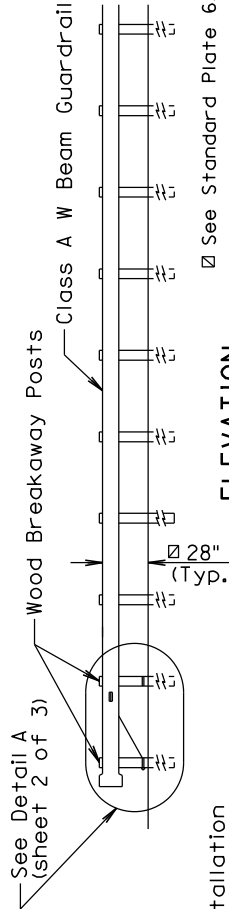
Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

*** An adhesive object marker shall be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items. Costs for constructing the W Beam Guardrail Breakaway Cable Terminal including labor, equipment, and materials including the anchor bracket, cable assembly, steel tubes, soil plates, bearing plate, pipe sleeve, W beam end section (buffer), modified W beam terminal connector, and all necessary hardware shall be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

See Standard Plate 630.99

ELEVATION



Published Date: 2nd Qtr. 2018

SDOT

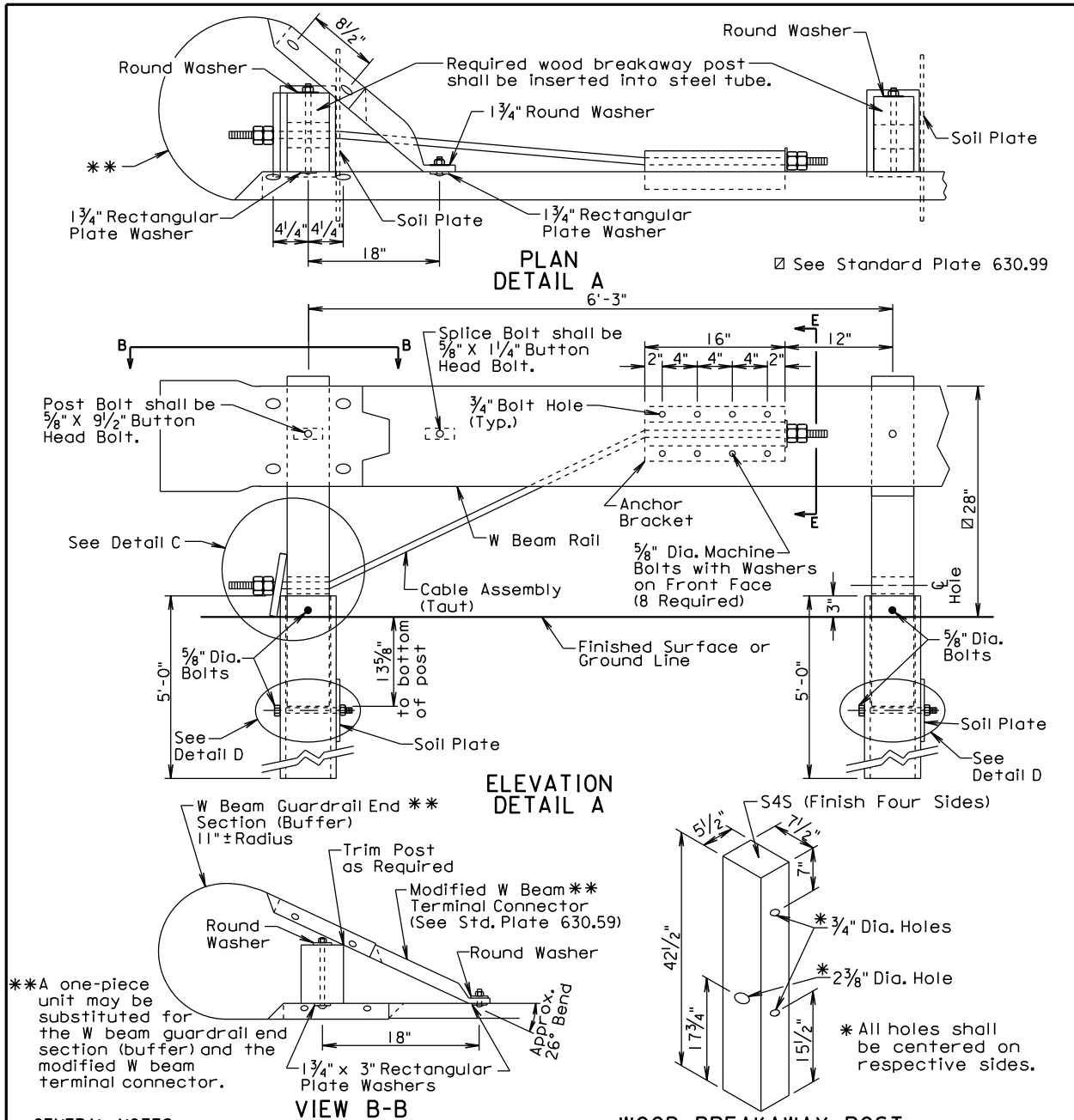
**W BEAM GUARDRAIL
BREAKAWAY CABLE TERMINAL**

February 14, 2017

**PLATE NUMBER
630.85**

Sheet 1 of 3

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



GENERAL NOTES:

All hardware shall be galvanized in accordance with ASTM A153.

The steel tubes shall meet the requirements of ASTM Specification A500, Grade B, and shall be galvanized after fabrication in accordance with the requirements of AASHTO Specification M111.

The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

The W Beam End Section (Buffer) shall be 12 gage galvanized steel.

The cable shall be 3/4", Type II, with Class A coating in conformance with AASHTO M30.

February 14, 2017

Published Date: 2nd Qtr. 2018

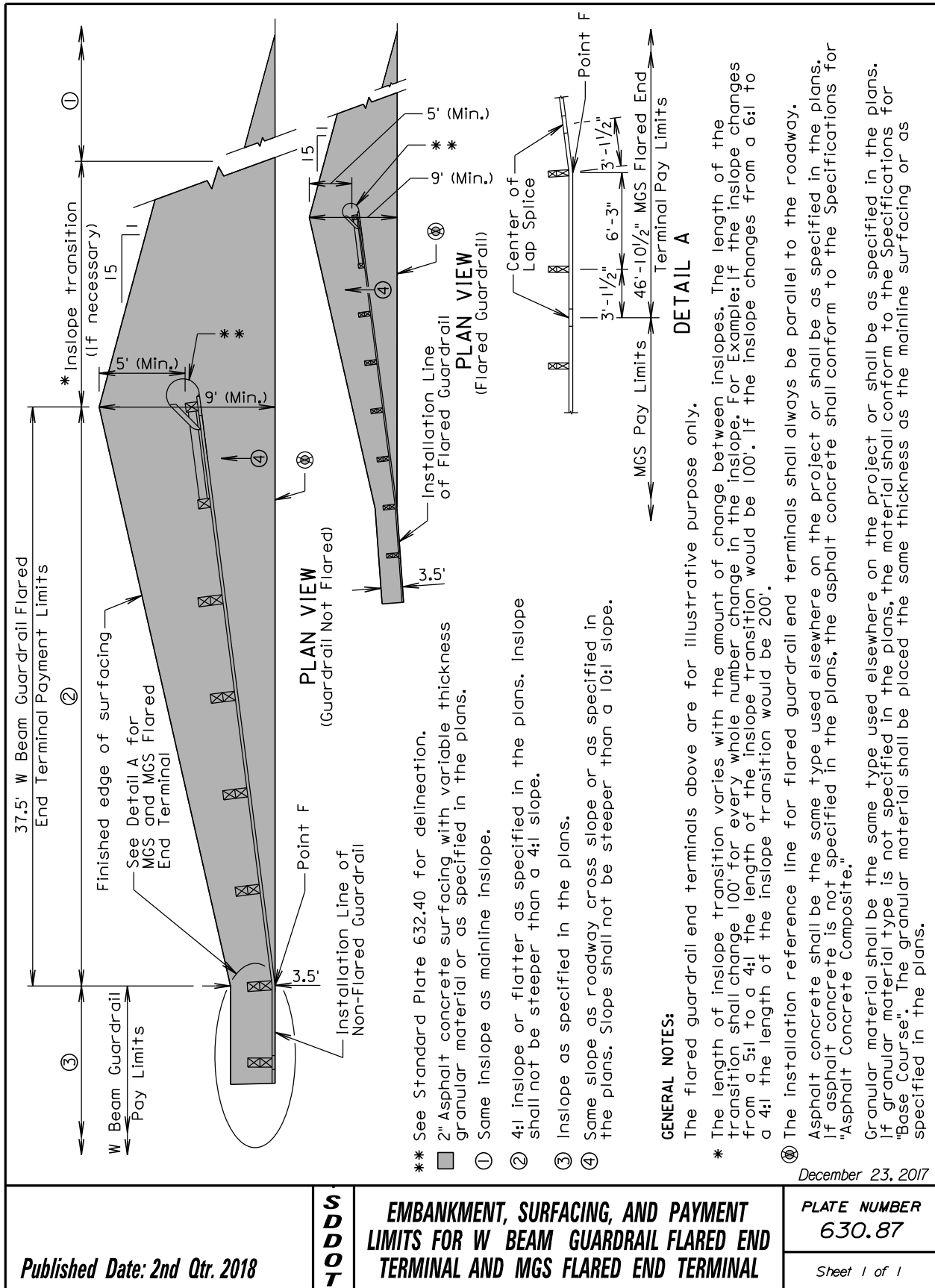
**S
D
D
T**

**W BEAM GUARDRAIL
BREAKAWAY CABLE TERMINAL**

**PLATE NUMBER
630.85**

Sheet 2 of 3

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



Published Date: 2nd Qtr. 2018

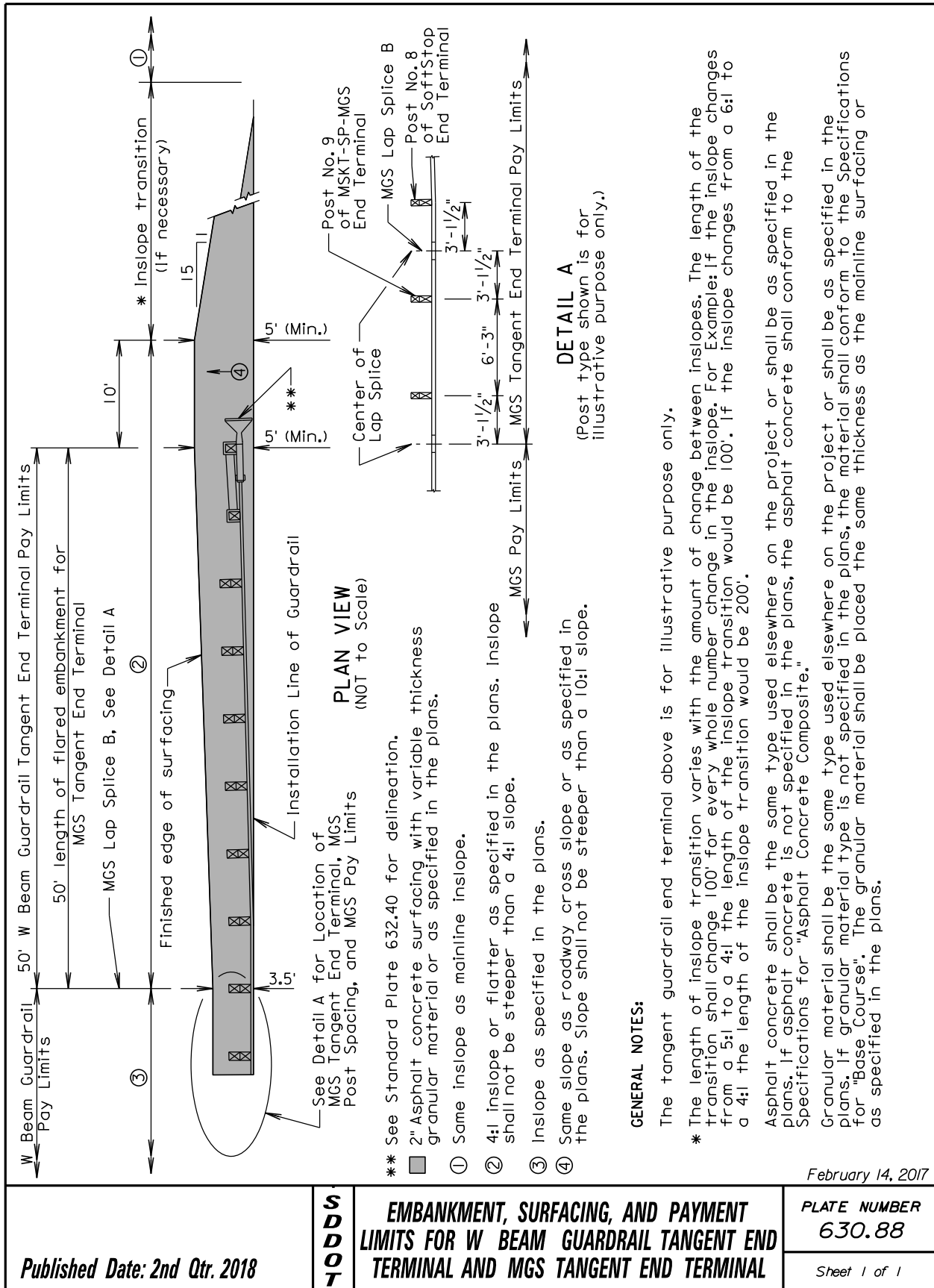
SDOT

**EMBANKMENT, SURFACING, AND PAYMENT
 LIMITS FOR W BEAM GUARDRAIL FLARED END
 TERMINAL AND MGS FLARED END TERMINAL**

PLATE NUMBER
630.87

Sheet 1 of 1

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



Published Date: 2nd Qtr. 2018

SDS

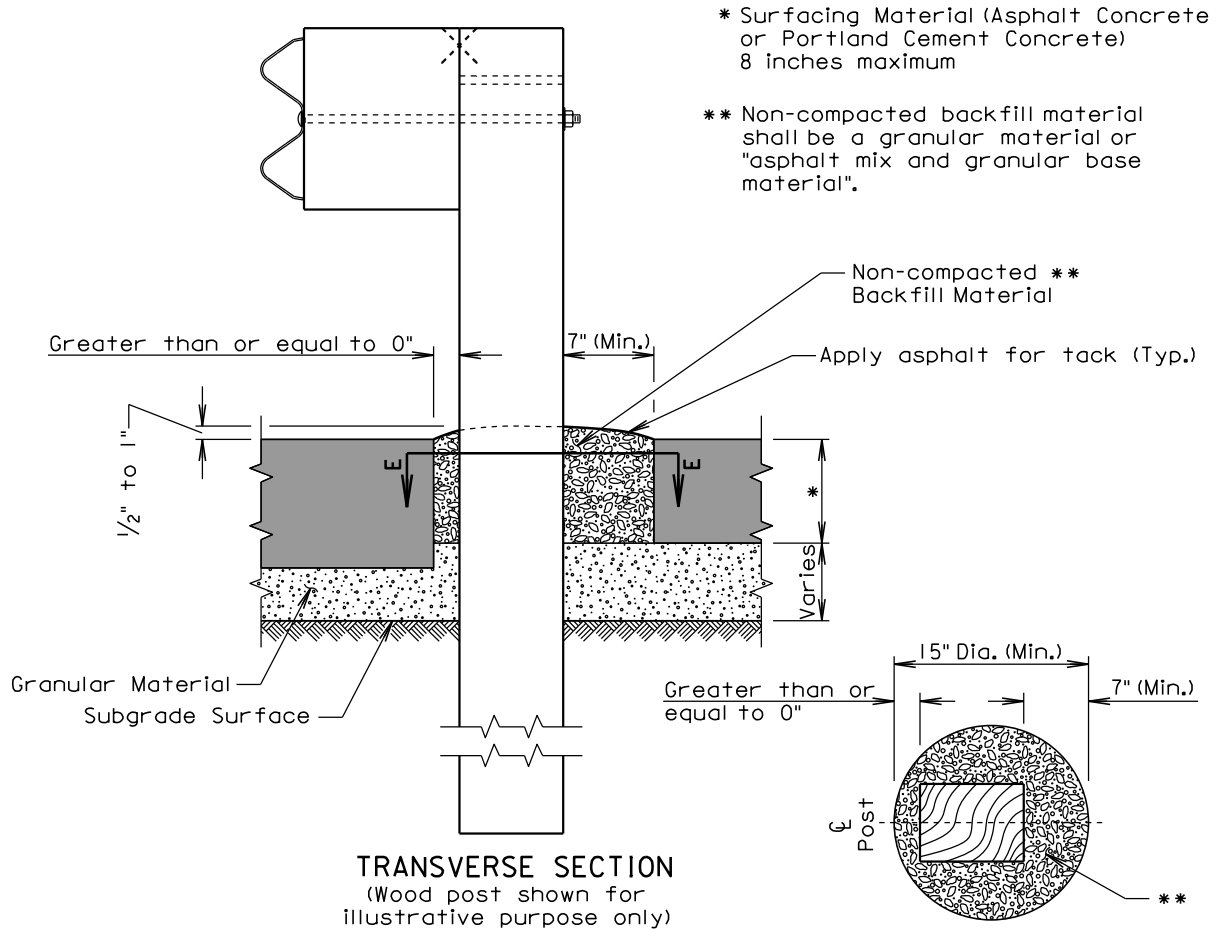
EMBANKMENT, SURFACING, AND PAYMENT LIMITS FOR W BEAM GUARDRAIL TANGENT END TERMINAL AND MGS TANGENT END TERMINAL

February 14, 2017

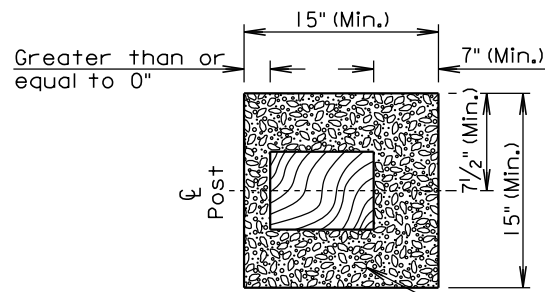
PLATE NUMBER
630.88

Sheet 1 of 1

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



SECTION E-E
(Round option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)



SECTION E-E
(Square option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

GENERAL NOTES:

The leave-out limits may be increased to accommodate construction equipment and tolerances.

The backfill material shall be mounded 1/2 inch to 1 inch above the top of the adjacent surfacing as illustrated above.

Asphalt for tack shall be applied to the surface of the backfill material at the rate of .15 to .20 gallons per square yard.

All costs for constructing the leave-out including labor, equipment, and materials which includes the backfill material and tack coat shall be incidental to the contract unit price for the respective guardrail bid item.

February 14, 2017

Published Date: 2nd Qtr. 2018

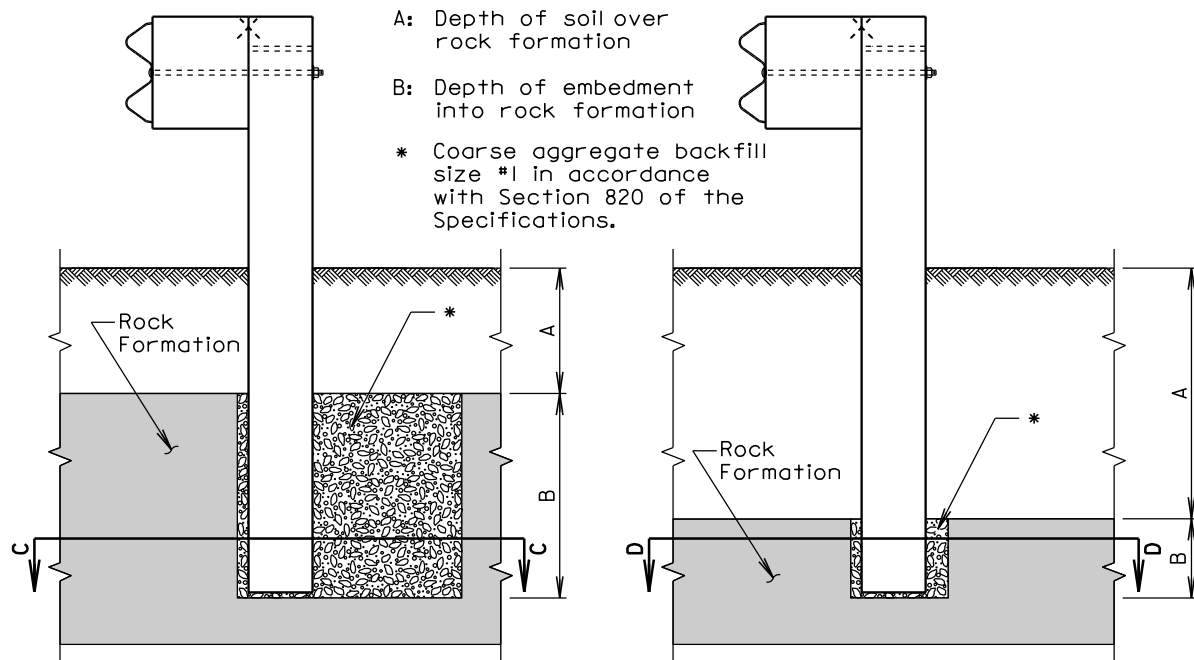
**S
D
D
O
T**

**GUARDRAIL POST INSTALLED IN
ASPHALT CONCRETE OR
PORTLAND CEMENT CONCRETE**

PLATE NUMBER
630.96

Sheet 1 of 1

000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES



TRANSVERSE SECTION

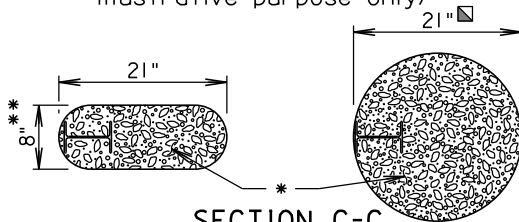
(Configuration Type 1)

(Wood post shown for illustrative purpose only)

TRANSVERSE SECTION

(Configuration Type 2)

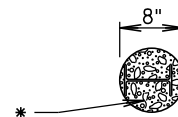
(Wood post shown for illustrative purpose only)



SECTION C-C

(Configuration Type 1)

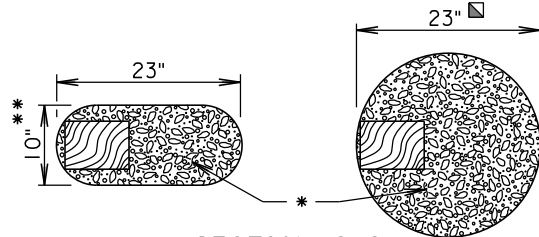
(Steel posts, either hole shown is acceptable.)



SECTION D-D

(Configuration Type 2)

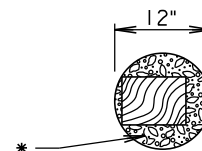
(Steel Posts)



SECTION C-C

(Configuration Type 1)

(Wood posts, either hole shown is acceptable.)



SECTION D-D

(Configuration Type 2)

(Wood Posts)

GENERAL NOTES FOR CONFIGURATION TYPE 1:

The overlying soil depth "A" is 0 to 18 inches and the depth into rock "B" is 24 inches.

** May be increased to 15 inches to accommodate construction tolerances.

■ May be increased to 24 inches to accommodate construction tolerances.

GENERAL NOTES FOR CONFIGURATION TYPE 2:

The overlying soil depth "A" is 18 inches to full post embedment depth. The required depth into rock "B" is equal to full post embedment depth minus "A".

February 14, 2017

Published Date: 2nd Qtr. 2018

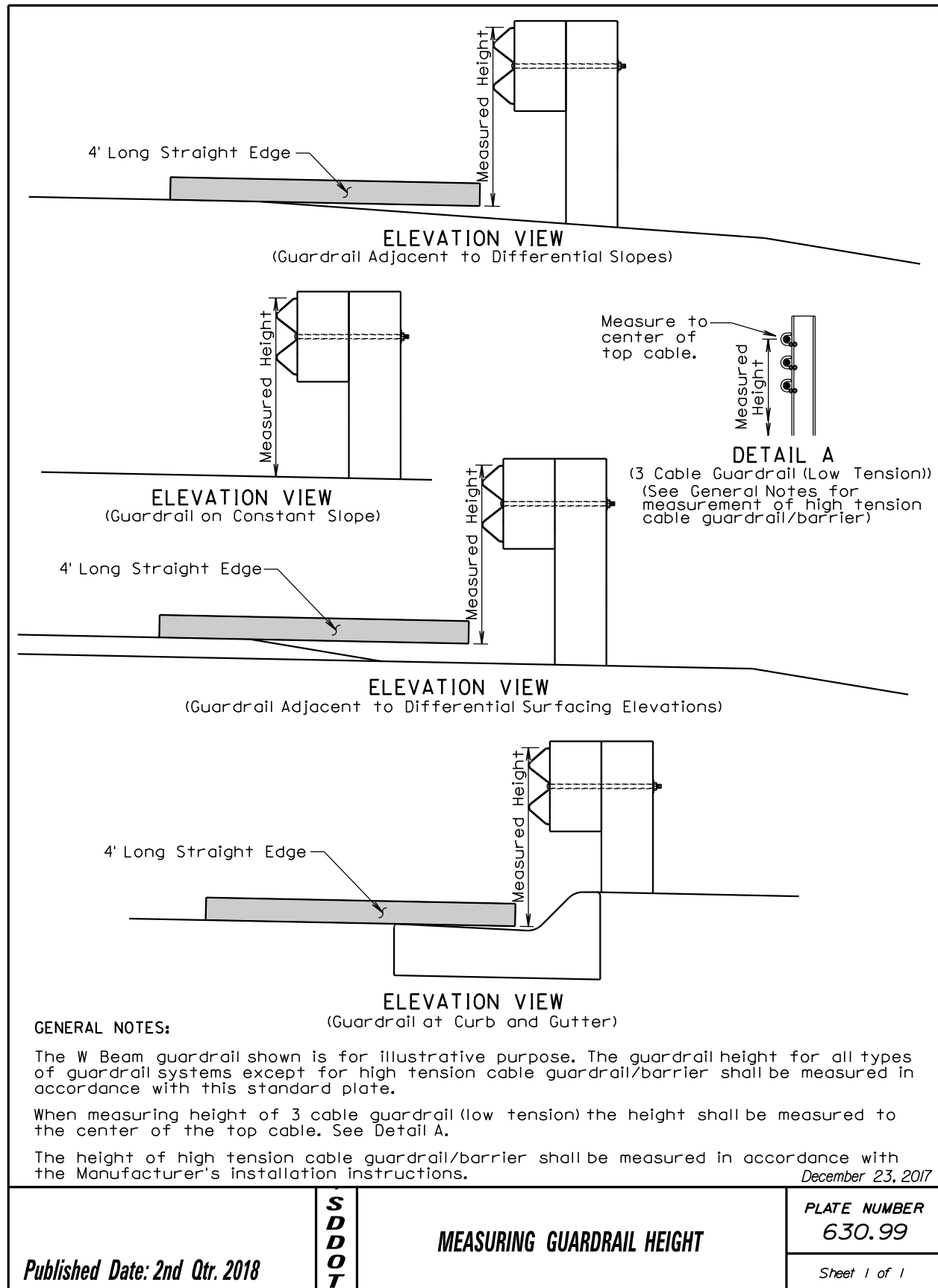
**S
D
D
O
T**

**GUARDRAIL POST INSTALLED
IN ROCK FORMATION**

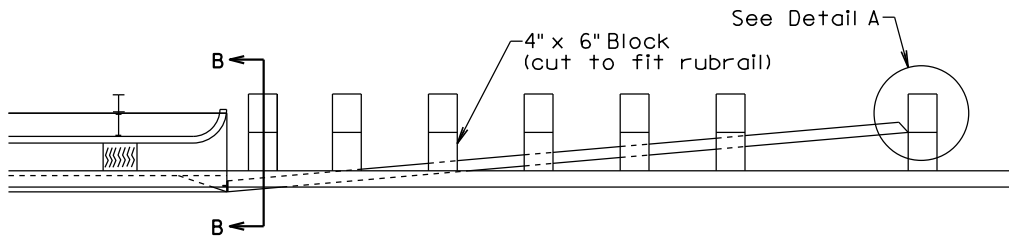
**PLATE NUMBER
630.97**

Sheet 1 of 1

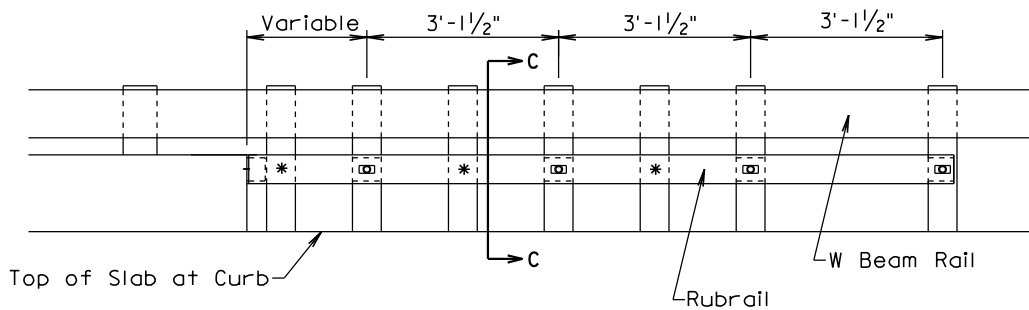
**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

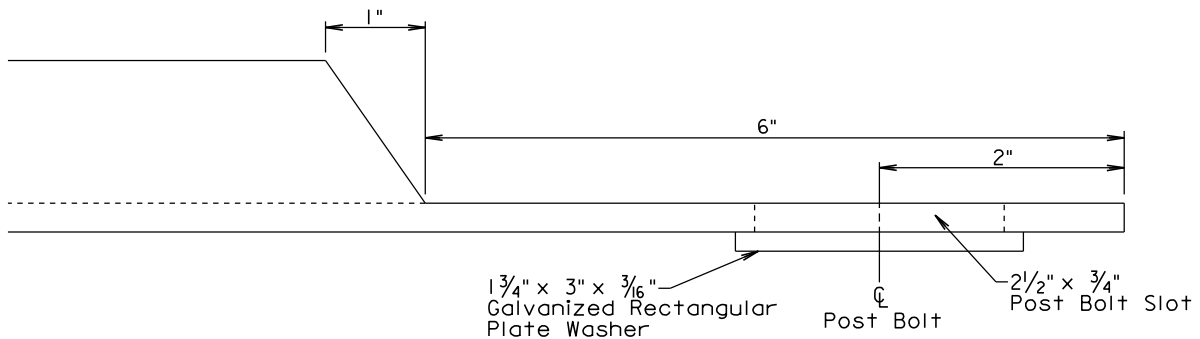


PLAN



*Rubrail does not have to be attached to these posts.

ELEVATION



DETAIL A

(Post, Block, and Post Bolt not shown)

GENERAL NOTES:

The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

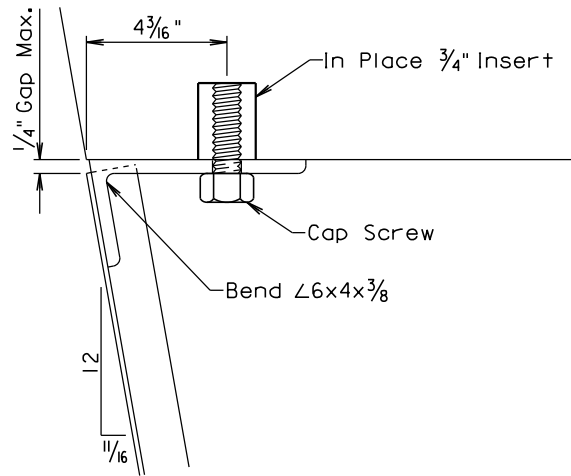
Offset blocks shall be in conformance with section 630 of the Standard Specifications.

All hardware shall be in conformance with the requirements of AASHTO M 180.

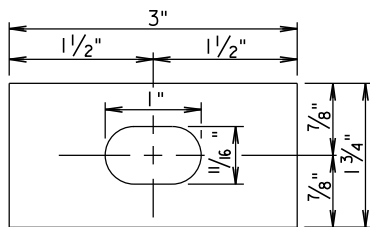
March 31, 2000

RUBRAIL (1 of 2)

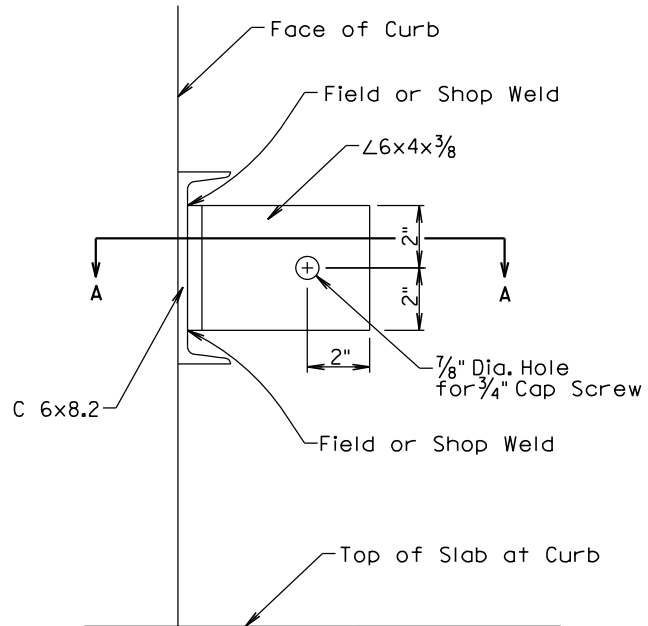
**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



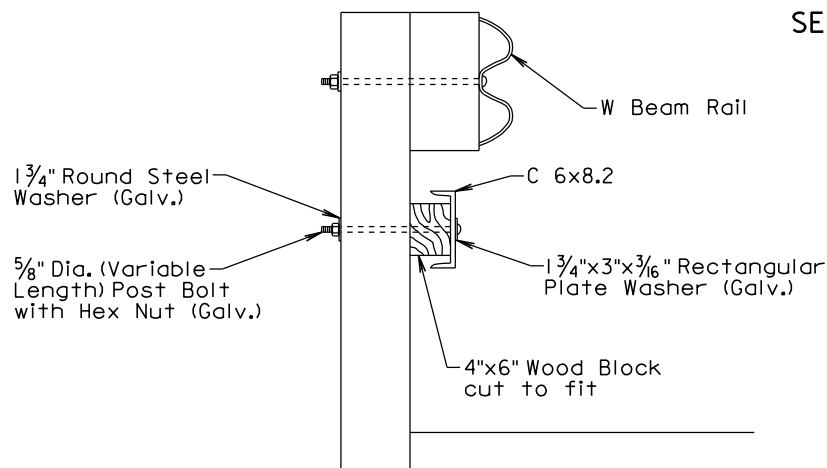
SECTION A-A



RECTANGULAR PLATE WASHER



SECTION B-B



SECTION C-C

March 31, 2000

RUBRAIL (2 of 2)

EMBAKMENT & SURFACING FOR TYPICAL MEDIAN PROTECTION

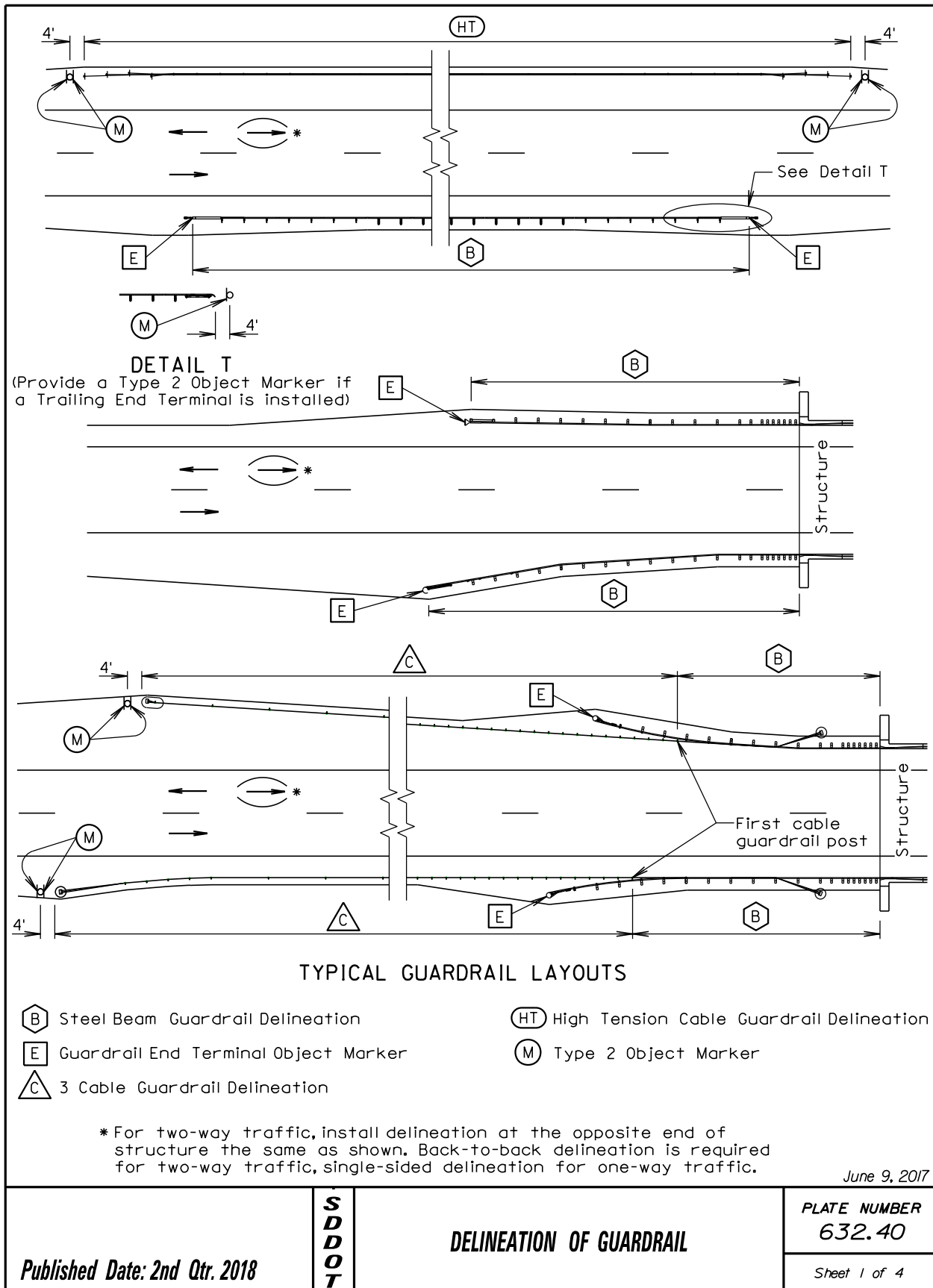
GENERAL NOTES:

- ① Finished embankment surfacing cross slope shall be the same as the roadway cross slope.
- ② Finished embankment surfacing cross slope transition.
- ③ Finished embankment surfacing cross slope shall be 10:1, however, a cross slope flatter than 10:1 may be used to obtain the 6" minimum thickness of granular material.

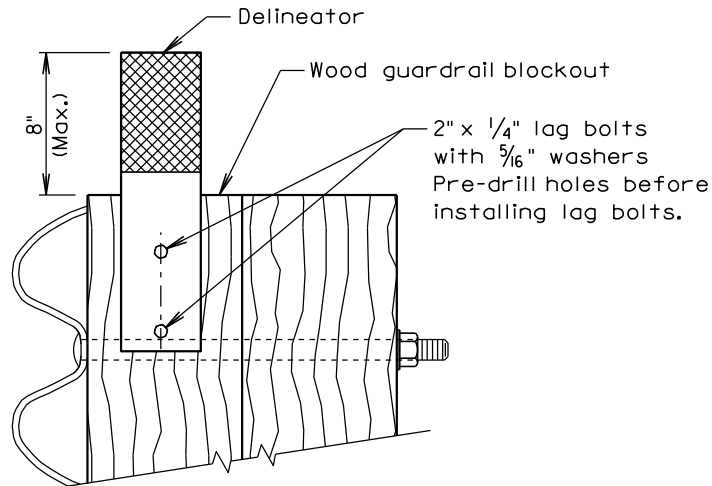
Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course."

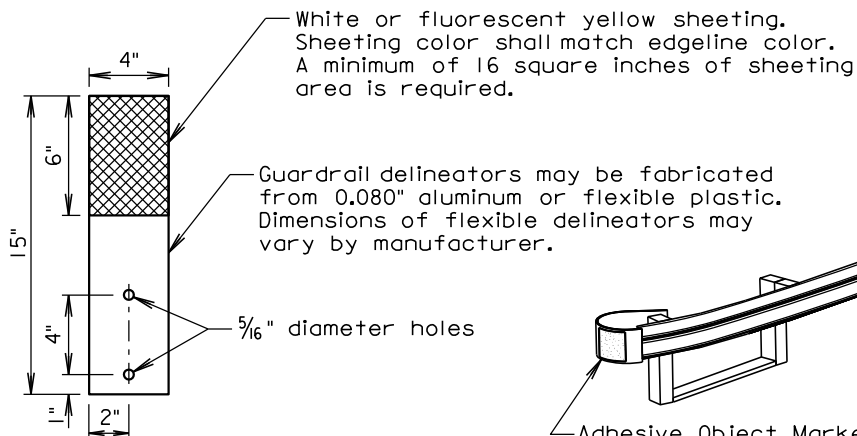
**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

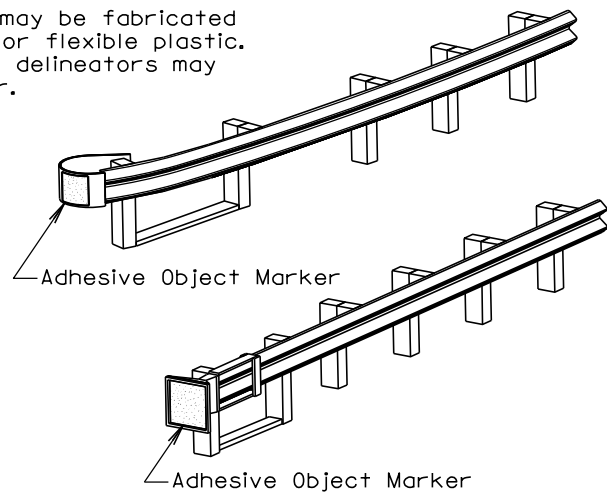


B STEEL BEAM GUARDRAIL DELINEATION

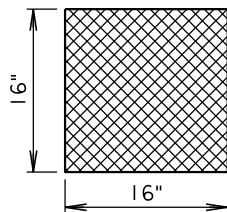


DELINEATOR

(For Steel Beam Guardrail)



E GUARDRAIL END TERMINAL OBJECT MARKER



ADHESIVE OBJECT MARKER

Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting shall be fluorescent yellow.

June 9, 2017

Published Date: 2nd Qtr. 2018

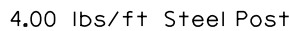
**S
D
D
O
T**

DELINEATION OF GUARDRAIL

**PLATE NUMBER
632.40**

Sheet 2 of 4

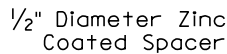
**AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**



 3 CABLE GUARDRAIL DELINEATION



 3 CABLE GUARDRAIL DELINEATION



TYPE 2 OBJECT MARKER DETAILS AND POST ORIENTATION

Ⓜ TYPE 2 OBJECT MARKER

(For Marking 3 Cable Guardrail Anchor,
High Tension Cable Guardrail Anchor,
and Trailing End Terminal)

June 9, 2017

Published Date: 2nd Qtr. 2018

***S
D
D
O
T***

DELINEATION OF GUARDRAIL

PLATE NUMBER
632.40

Sheet 3 of 4

**000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON,
HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES**

GENERAL NOTES:

The delineation of high tension cable guardrail shall be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting shall be type XI in conformance with ASTM D4956. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The delineators for steel beam guardrail and sheeting on 3 cable guardrail posts shall be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting shall be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting shall be on both sides of the delineators and guardrail posts and shall be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

When steel beam guardrail is attached to a bridge the first delineator shall be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators shall be placed in addition to the end terminal yellow object marker. The spacing between the delineators shall be approximately one third of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, including bridges that have steel beam guardrail transitioning to 3 cable guardrail, the delineators shall be placed at a spacing of approximately 50 feet. Delineation shall extend throughout the length of the guardrail system.

Steel beam guardrail that is not attached to a bridge and is less than 200 feet in length, a minimum of 4 delineators shall be placed in addition to the end terminal yellow object markers. The spacing between the delineators shall be approximately one third of the length of the guardrail.

Steel beam guardrail that is not attached to a bridge and is 200 feet and greater in length, including steel beam guardrail transitioning to 3 cable guardrail, the delineators shall be placed at a spacing of approximately 50 feet. Delineation shall extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation on 3 cable guardrail and steel beam guardrail shall be included in the contract unit price per each for "Guardrail Delineator".

All costs for furnishing and installing the reflective sheeting on the cable spacers or post caps for the high tension cable guardrail shall be incidental to the respective high tension cable guardrail bid item.

An adhesive object marker shall be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.

A type 2 object marker shall be placed adjacent to the 3 cable guardrail anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") shall have fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware shall be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

June 9, 2017

<i>Published Date: 2nd Qtr. 2018</i>	S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 4 of 4