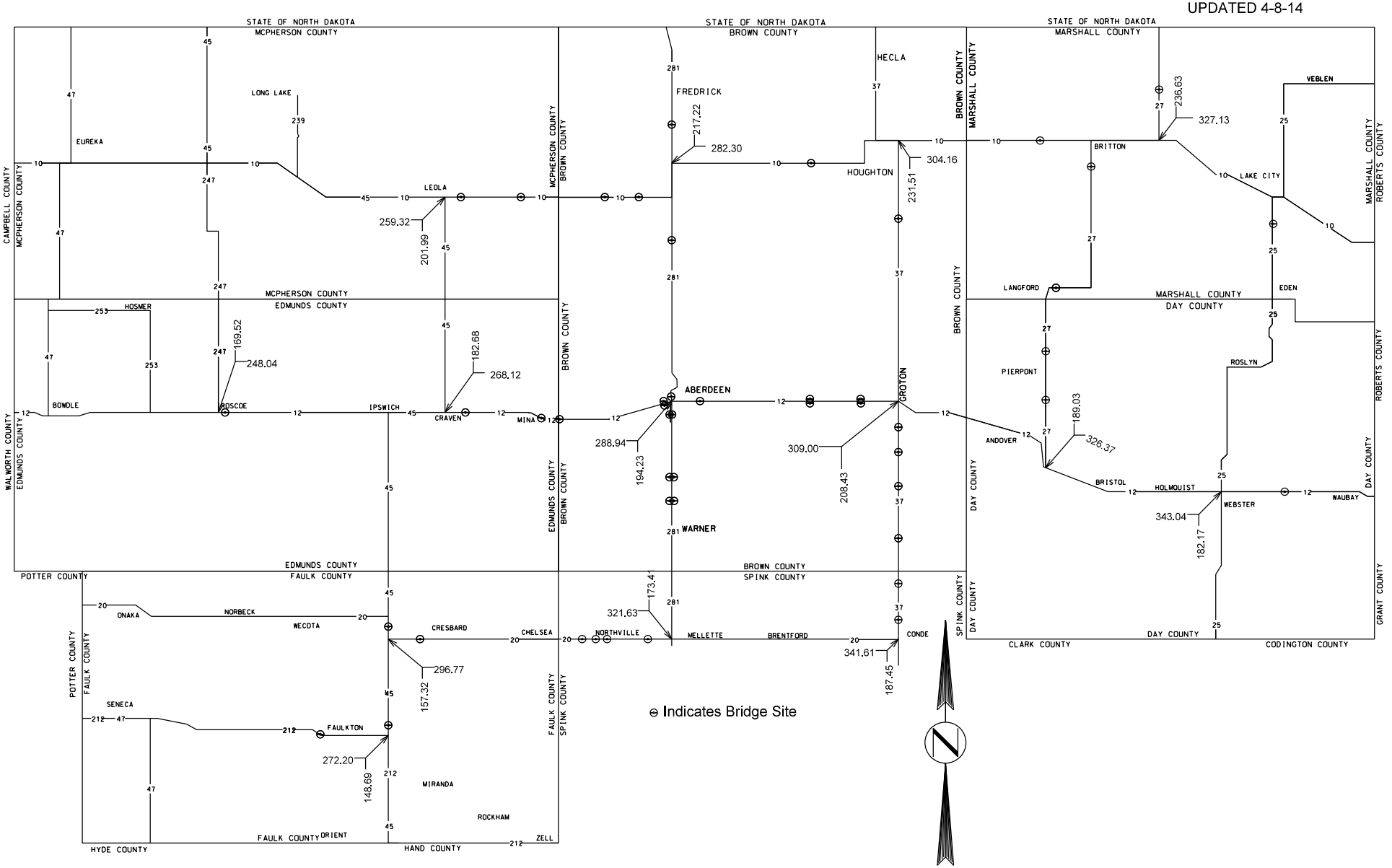
ABERDEEN AREA

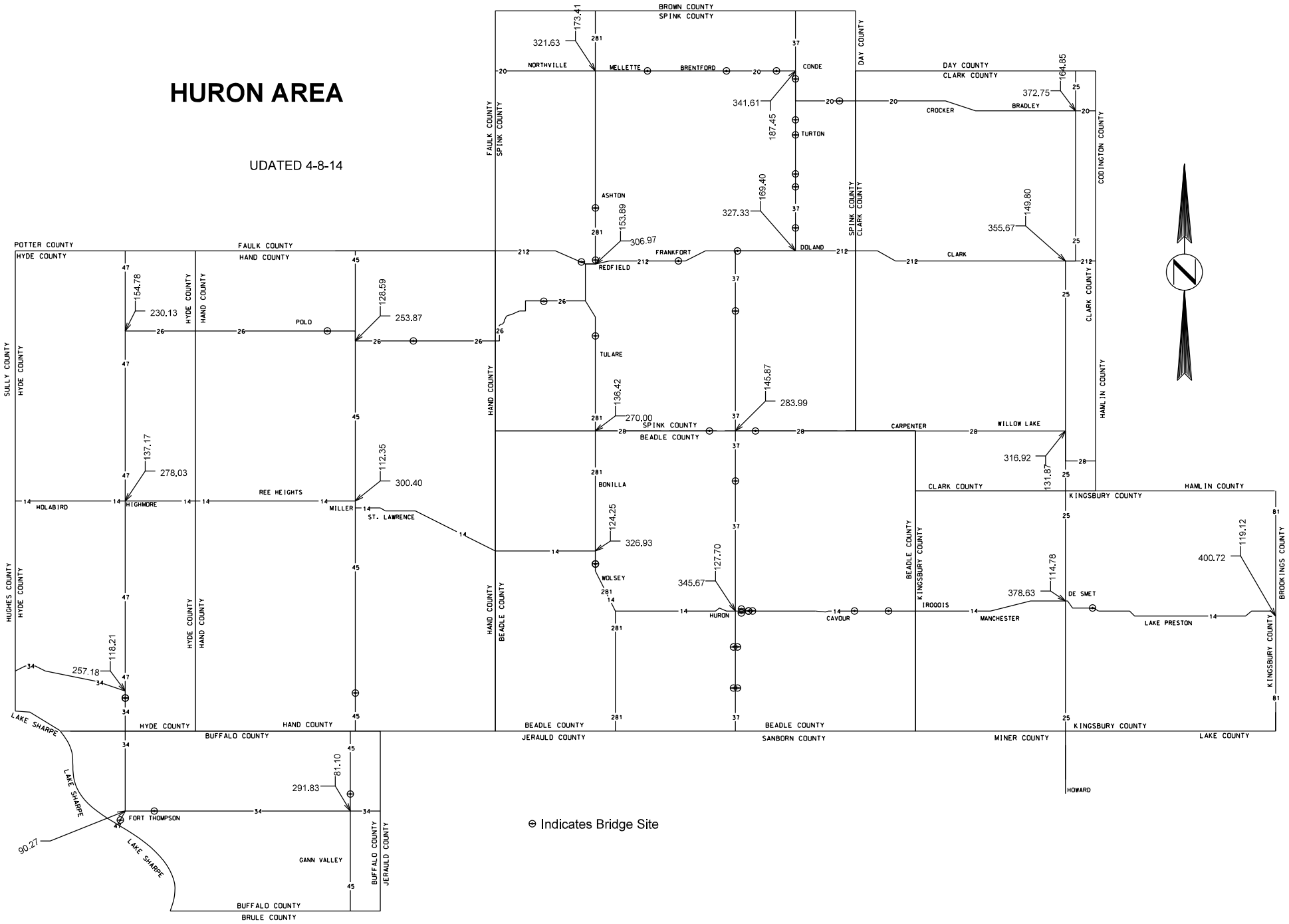
UPDATED 4-8-14



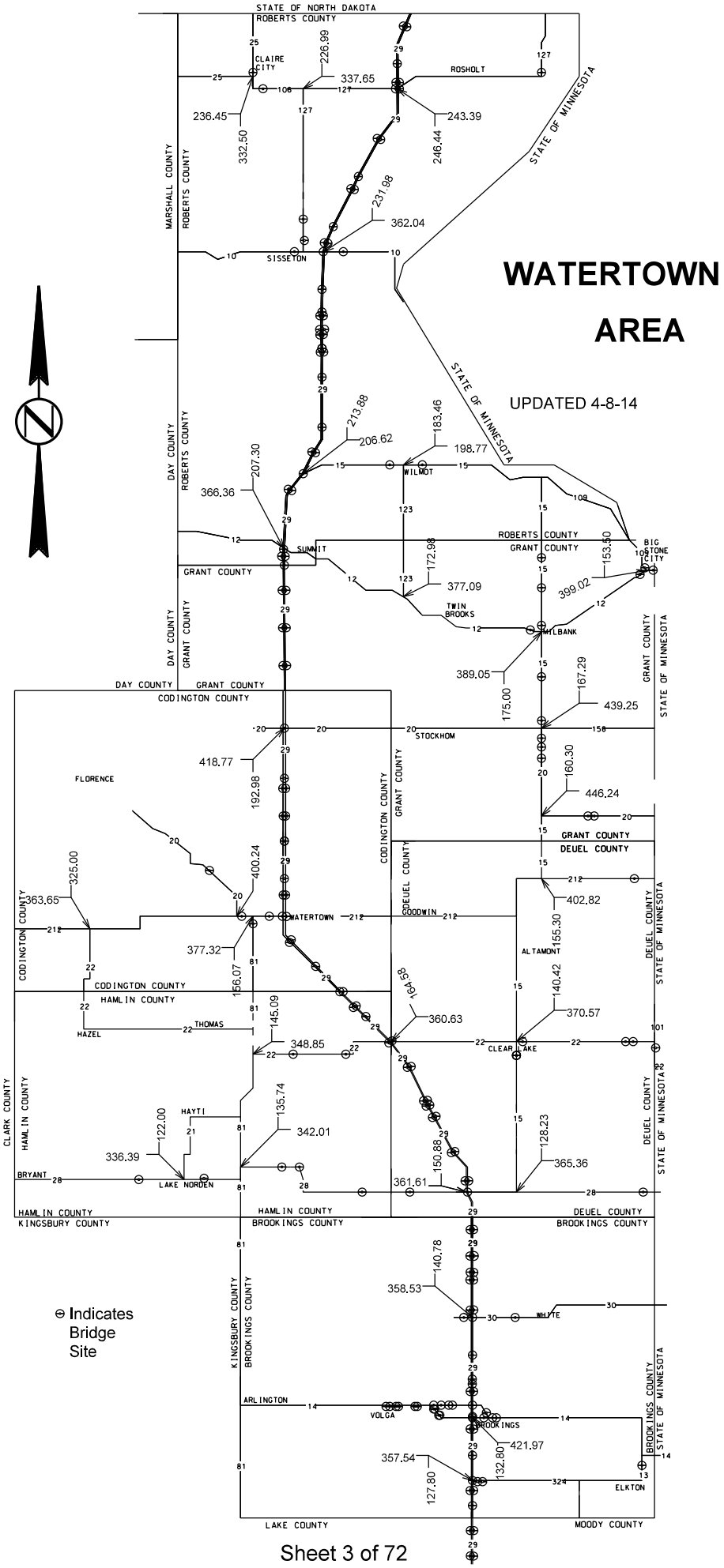
Sheet 1 of 72

HURON AREA

UDATED 4-8-14



⊖ Indicates Bridge Site


STATE OF NORTH DAKOTA
ROBERTS COUNTY
CLAIRE CITY
ROSHOLT
STATE OF MINNESOTA
MARSHALL COUNTY
ROBERTS COUNTY
SISSETON
WATERTOWN
AREA
UPDATED 4-8-14
DAY COUNTY
ROBERTS COUNTY
WILMOT
SUMMIT
ROBERTS COUNTY
GRANT COUNTY
BIG STONE CITY
GRANT COUNTY
TWIN BROOKS
MYLBANK
DAY COUNTY
GRANT COUNTY
CODINGTON COUNTY
STOCKHOM
FLORENCE
GRANT COUNTY
DEUEL COUNTY
CODINGTON COUNTY
WATERTOWN
GOODWIN
ALTAMONT
CODINGTON COUNTY
HAMLIN COUNTY
HAZEL
THOMAS
CLEAR LAKE
CLARK COUNTY
HAMLIN COUNTY
HAYTI
BRYANT
LAKE NORDEN
HAMLIN COUNTY
KINGSBURY COUNTY
HAMLIN COUNTY
BROOKINGS COUNTY
DEUEL COUNTY
BROOKINGS COUNTY
KINGSBURY COUNTY
BROOKINGS COUNTY
WHITE
ARLINGTON
VOLGA
BROOKINGS
ELKTON
LAKE COUNTY
MOODY COUNTY
⊖ Indicates Bridge Site

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

Action Taken/Required:

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.

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.

All costs 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.

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

CONTRACT PROVISIONS

1. The Contract will become effective beginning July 1, 2018 and will expire on July 1, 2019.

2. Guardrail repairs will be limited to Interstate and State Highways located in the Aberdeen Region within the boundaries of Beadle, Brookings, Brown, Buffalo, Clark, Codington, Day, Deuel, Edmunds, Faulk, Grant, Hamlin, Hand, Hyde, Kingsbury, McPherson, Marshall, Moody, Roberts, and Spink Counties.

3. Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal shall apply to this contract. Guardrail repair shall conform to current Department of Transportation Standards or as directed by the Engineer.

4. The quantities shown on the SDDOT CONTRACT PROPOSAL are estimated quantities only, based upon previous years quantities. The actual amount of work accomplished may vary greatly from the quantities shown. There will be NO negotiation of contract unit prices for over-runs or under-runs.

5. All repair items shall be furnished new by the Contractor. Should some guardrail items be required that are not included in the contract, the Contractor will be paid for invoice cost of the item(s) plus shipping charges, taxes and ten percent for profit. Approval from the Area Engineer will be required prior to the purchase of non-contract item materials.

   All costs to furnish and install new bolts, nuts, washers, nails, and other miscellaneous items shall be incidental to the various other contract items.

   All damaged and replaced materials shall become the property of the Contractor for disposal.

   The Contractor shall remove broken stub posts protruding from the ground when installing new posts. Any holes left after replacement of the guardrail shall be backfilled with material furnished by the Contractor and compacted to the satisfaction of the Engineer.

6. Any damage to the roadway surfacing, embankment, vegetation, signing, etc. that occurs during guardrail repair operations shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

7. The Contractor will be notified at such time as repairs are required. The Contractor shall complete all necessary repairs within twenty-one (21) calendar days after notification. For each day after the 21 calendar day limitation, the Contractor will be assessed liquidated damages at the rate of $200.00 per day.

   The Contractor shall inform the Engineer of the work schedule for guardrail repairs and any changes in the work schedule shall be provided per Section 5.11 of the Specifications.

8. The Contract Items F through V listed under No. 9 Definition of Contract Items shall apply to 3 cable low tension guardrail, unless otherwise indicated.

   To date there are 3 installation locations of high tension cable guardrail installed within the geographic boundaries of this contract. These installations are Trinity Cass 4 Cable High Tension located on SD 25 south of Webster in Day County, SD10 west of Sisseton in Roberts County, and I-29 at Brookings in Brookings County. Numerous additional location of high tension cable guardrail will be installed during the 2018 construction season in the median of I-29.

   Supplier installation details and drawings for the high tension guardrail installation may be obtained by contacting Scott.Schneider@state.sd.us.

9. Definition of Contract Items:

   A. **Mobilization 1:** Mobilization 1 (Aberdeen Area) shall include all costs of mobilization within the Aberdeen Area to and from the project and will be paid on a per each basis each time the Contractor is called in by the Area Engineer to perform guardrail accident damage repair. The Aberdeen Area includes the following counties: Brown, Day, Edmunds, Faulk, McPherson, and Marshall Counties.

   B. **Mobilization 2:** Mobilization 2 (Huron Area) shall include all costs of mobilization within the Huron Area to and from the project and will be paid on a per each basis each time the Contractor is called in by the Area Engineer to perform guardrail accident damage repair. The Huron Area includes the following counties: Beadle, Buffalo, Clark, Hand, Hyde, Kingsbury, and Spink Counties.

   C. **Mobilization 3**: Mobilization 3 (Watertown Area) shall include all costs of mobilization within the Watertown Area to and from the project and will be paid on a per each basis each time the Contractor is called in by the Area Engineer to perform guardrail accident damage repair. The Watertown Area includes the following counties: Brookings, Codington, Deuel, Grant, Hamlin, Moody and Roberts Counties.

   D. **Remove and Replace Bolt Assembly:** Remove and Replace Bolt Assembly shall include replacement of Part No. 4211G (5/16 Hex Bolt x 1 ¾" A307) on the Trinity SRT-350 Terminal.

   E. **Reset High Tension Cable Guardrail Terminal Post:** Reset High Tension Cable Guardrail Terminal Post shall include all costs to reset the terminal post if the cable was released after the post was struck. Posts need to be in good working condition. This contract item shall include miscellaneous hardware and tensioning cable.

   F. **Retension 3 Cable Guardrail:** Retension 3 Cable Guardrail shall include all costs to adjust the tension in a length of 3 Cable Guardrail. The tension shall be as shown on Standard Plate 629.01 (1 of 6). Measurement for payment will be per foot for all runs of 3 Cable Guardrail and shall include all 3 cables and both anchor ends that make up a run of 3 Cable Guardrail. Retension 3 Cable Guardrail may include cutting and shortening of cables at the anchors to allow for the proper tensioning. Payment will be center of anchor to center of anchor.

   G. **Retension High Tension 4 Cable Guardrail:** Retension High Tension 4 Cable Guardrail shall include all costs to adjust the tension in a length of High Tension 4 Cable Guardrail to manufacturers specifications. Measurement for payment shall be from center of anchor to center of anchor and shall include all 4 cables that make up a run of High Tension 4 Cable Guardrail. Retension High Tension 4 Cable Guardrail shall include cutting and shortening of cables at the anchors to allow for the proper tensioning.

   H. **Repair 3 Cable Guardrail Slip Base Anchor Assembly:** Repair 3 Cable Guardrail Slip Base Anchor Assembly shall include full compensation for repair 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 broke 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.

I. **3 Cable Guardrail End Post:** 3 Cable Guardrail End Post shall include all costs for removal of damaged end post and installation of 3 cable guardrail end post. 3 Cable Guardrail End Post shall also include a new end post cap. All costs incurred for removal and replacement of the existing cable on the new post shall be incidental to this contract item.

J. **3 Cable Guardrail Intermediate Post:** 3 Cable Guardrail Intermediate Post shall include all costs for removal of damaged post and installation of 3 cable guardrail intermediate line post. All costs incurred for removal and replacement of the existing cable on the new post, including J Hook Bolts shall be incidental to this contract item.

K. **3 Cable Guardrail Slip Base Anchor Post:** 3 Cable Guardrail Slip Base Anchor Post shall include all costs for removal of damaged post and installation of 3 cable guardrail slip base anchor post. All costs incurred for removal and replacement of the existing cable on the new post, shall be incidental to this contract item.

L. **3 Cable Guardrail Post, Winter:** 3 Cable Guardrail Post, Winter shall include all costs for removal of the damaged post and installation of cable guardrail post when there is in excess of one foot of frozen ground at the work site. When this condition exists, the contract unit price per each for “3 Cable Guardrail Post, Winter” will be the pay unit rather than the contract unit price per each for "3 Cable Guardrail Intermediate Post" and/or "3 Cable Guardrail End Post". The Contractor shall furnish any J Hook Bolts needed as shown on Standard Plate 629.01 (5 of 6).

   All costs incurred for removal and replacement of the existing cable on the new post, including J Hook Bolts shall be incidental to this contract item.

M. **Drive Down 3 Cable Guardrail Post:** Drive Down 3 Cable Guardrail Post shall include all costs for adjusting the height of a Cable Rail Post. All costs to disassemble the cable rail to do this work shall be incidental to this contract item.

N. **Reset 3 Cable Guardrail Post:** Reset 3 Cable Guardrail Post shall include all costs incurred for the realignment and/or removal and resetting of a cable guardrail post to properly align cable guardrail section. The Contractor shall furnish any J Hook Bolts needed as shown on Standard Plate 629.01 (5 of 6).

   Work under this item may require straightening of in place bent cable guardrail posts to bring them into alignment with cable guardrail section. Payment for “Reset 3 Cable Guardrail Post” will be the same whether in frozen or unfrozen ground. All costs incurred for removal and replacement of the existing cable on the new post shall be incidental to this item.

O. **Cable Anchor Bracket:** Cable Anchor Bracket shall include furnishing and installing the Cable Anchor Bracket as shown on Standard Plate 629.01 (3 of 6).

P. **Cable Splice:** Cable Splice shall include all costs incurred for cutting existing cable and for furnishing and installing the necessary cable splice. This contract item shall be used for low tension and high tension cable guardrail.

Q. **3 Cable Guardrail J Hook Bolt:** 3 Cable Guardrail J Hook Bolt shall include furnishing & installing J hook bolts when no other work is required to the 3 cable guardrail other than missing or broken J hook bolts.

R. **Steel Turnbuckle Cable End Assembly:** Steel Turnbuckle Cable End Assembly shall include all costs for furnishing and installing the Steel Turnbuckle Cable End Assembly as shown on Standard Plate 629.01 (4 of 6).

S. **Turnbuckle Assembly:** Turnbuckle Assembly shall include all costs for furnishing and installing the Turnbuckle Assembly on high tension cable guardrail.

T. **Spring Cable End Assembly with Turnbuckle:** Spring Cable End Assembly with Turnbuckle shall include all costs for furnishing and installing the Spring Cable End Assembly with Turnbuckle as shown on Standard Plate 629.01 (4 of 6).

U. **W Beam to 3 Cable Transition Bracket:** W Beam to 3 Cable Transition Bracket shall include all costs incurred for removing the damaged transition bracket and installing a transition bracket in accordance with the details on Standard Plates 629.05 & 629.15.

V. **3 Cable Guardrail End Post Cap:** 3 Cable Guardrail End Post Cap shall include all costs for furnishing and installing an end post cap as shown on Standard Plate 629.01 (6 of 6).

W. **High Tension 4 Cable Guardrail Post:** High Tension 4 Cable Guardrail Post shall include all costs for removal of damaged post and installation of a High Tension 4 Cable Guardrail Post. All costs incurred for removal and replacement of the existing cable on the new post, including hardware shall be incidental to this contract item.

X. **High Tension 4 Cable Guardrail Post and Sleeve:** High Tension 4 Cable Guardrail Post and Sleeve shall include all costs for removal of damaged post and sleeve, and installation of a High Tension 4 Cable Guardrail Post and Sleeve. All costs incurred for removal and replacement of the existing cable on the new post, including hardware shall be incidental to this contract item.

Y. **High Tension 4 Cable Guardrail Sleeve:** High Tension 4 Cable Guardrail Sleeve shall include all costs for removal of damaged sleeve and installation of a High Tension 4 Cable Guardrail Sleeve. All costs incurred for removal and replacement of the existing post and of the existing cable on the post, including hardware shall be incidental to this contract item.

Z. **High Tension Cable Guardrail Terminal Post:** High Tension Cable Guardrail Terminal Post shall include all costs for removal of damaged terminal post and installation of a High Tension Cable Guardrail Terminal Post. All costs incurred for removal and replacement of the existing cable on the new post, including reflective sheeting, hardware and tensioning cable shall be incidental to this contract item.

AA. **Hardware For High Tension Cable Attachment To Terminal Post:** Hardware For High Tension Cable Attachment To Terminal Post shall be used for furnishing and installing the hardware for a high tension cable guardrail terminal post. This item is used for a typical repair if a high tension cable guardrail terminal post is struck and releases the cable(s). Use this item when the terminal post is in good condition and only new hardware and resetting the terminal post is necessary. Payment includes cost for furnishing and installing hardware for the high tension cable attachment to terminal post, resetting terminal post, labor, equipment, and incidentals.

BB. **Hardware For High Tension Cable Attachment To Post:** Hardware For High Tension Cable Attachment To Post shall be used for furnishing and installing the hardware for a high tension cable attachment to post. This item is used for a typical repair if the hardware was damaged by a snow plow or other crash. Use this item when the post is in good condition and only new hardware is necessary. The quantity and unit for the bid item is one “Each” for one attachment, i.e. if several attachments are damaged on a high tension 4 cable guardrail post then the quantity would be more than 1. Payment includes cost for furnishing and installing hardware for the high tension cable attachment to post, labor, equipment, and incidentals.

CC. **High Tension Cable Guardrail Cable Strap:** High Tension Cable Guardrail Cable Strap shall include all costs for removal of damaged/missing strap and installation of a High Tension Cable Guardrail Cable Strap. High Tension Cable Guardrail Cable Strap contract item will not be paid for when a new guardrail post is paid for as the new guardrail post shall include the strap. This item is specific to products from Trinity known as the CASS high tension cable barrier.

DD. **High Tension Cable Guardrail Cable Spacer:** High Tension Cable Guardrail Cable Spacer shall include all costs for removal of damaged spacer and installation of a High Tension Cable Guardrail Cable Spacer. High Tension Cable Guardrail Cable Spacer contract item will not be paid for when a new guardrail post is paid for as the new guardrail post shall include the spacer. This item is specific to products from Trinity known as the CASS high tension cable barrier.

EE. **Cable:** This contract item shall include furnishing and installing cable for both low tension and high tension cable guardrail when the in place cable is damaged and needs to be replaced. Cable Splices required shall be incidental to this contract item. All costs for retensioning of cables shall be incidental to the contract unit price per foot for the respective cable retensioning contract item.

FF. **Straight Class A Thrie Beam Rail:** Straight Class A Thrie Beam Rail shall include all costs for removing damaged Thrie Beam rail and replacing with Class A Thrie Beam rail.

GG. **Straight Class A W Beam Rail:** Straight Class A W Beam Rail shall include all costs for removing damaged W Beam rail and replacing with Class A W Beam rail.

HH. **Straight Class B W Beam Rail:** Straight Class B W Beam Rail shall include all costs for removing damaged W Beam rail and replacing with Class B W Beam rail.

II. **W Beam to Thrie Beam Guardrail Transition:** W Beam to Thrie Beam Guardrail Transition shall include all costs for removing damaged rail and replacing with a W Beam to Thrie Beam Guardrail Transition.

JJ. **Asymmetrical W Beam to Thrie Beam Guardrail Transition:** Asymmetrical W Beam to Thrie Beam Guardrail Transition shall include all costs for removing damaged rail and replacing with a Asymmetrical W Beam to Thrie Beam Guardrail Transition.

KK. **W Beam Guardrail Flared End Terminal:** W Beam Guardrail Flared End Terminal shall include all costs incurred for furnishing and installing an approved flared end terminal in accordance with details on Standard Plate 630.87. At some locations of W Beam Guardrail Flared End Terminal damage, the Area Engineer may decide to replace the existing W Beam Guardrail Flared End Terminal in lieu of replacing the various components of the W Beam Guardrail Flared End Terminal.

The W Beam Guardrail Flared End Terminal shall be on the approved products list: http://apps.sd.gov/HC60ApprovedProducts/main.aspx

The contract unit price per each for "W Beam Guardrail Flared End Terminal" shall include all costs incurred for furnishing and installing one (1) end section as shown on Standard Plate 630.87 including removal of the existing end terminal.

LL. **MGS Flared End Terminal:** MGS Flared End Terminal shall include all costs incurred for furnishing and installing an approved MGS flared end terminal in accordance with details on Standard Plate 630.87. At some locations of MGS Flared End Terminal damage, the Area Engineer may decide to replace the existing MGS Flared End Terminal in lieu of replacing the various components of the MGS Flared End Terminal.

The MGS Flared End Terminal shall be on the approved products list: http://apps.sd.gov/HC60ApprovedProducts/main.aspx

The contract unit price per each for "MGS Flared End Terminal" shall include all costs incurred for furnishing and installing one (1) end section as shown on Standard Plate 630.87 including removal of the existing end terminal.

MM. **MGS Tangent End Terminal:** MGS Tangent End Terminal shall include all costs incurred for furnishing and installing an approved MGS tangent end terminal in accordance with details on Standard Plate 630.88. At some locations of MGS Tangent End Terminal damage, the Area Engineer may decide to replace the existing MGS Tangent End Terminal in lieu of replacing the various components of the MGS Tangent End Terminal.

The MGS Tangent End Terminal shall be on the approved products list: http://apps.sd.gov/HC60ApprovedProducts/main.aspx

The contract unit price per each for "MGS Tangent End Terminal" shall include all costs incurred for furnishing and installing one (1) end section as shown on Standard Plate 630.88 including removal of the existing end terminal.

NN. **W Beam Guardrail Tangent End Terminal:** W Beam Guardrail Tangent End Terminal shall include all costs incurred for furnishing and installing an approved tangent end terminal in accordance with details on Standard Plate 630.88. At some locations of W Beam Guardrail Tangent End Terminal damage, the Area Engineer may decide to replace the existing W Beam Guardrail Tangent End Terminal in lieu of replacing the various components of the W Beam Guardrail Tangent End Terminal.

The W Beam Guardrail Tangent End Terminal shall be on the approved products list: http://apps.sd.gov/HC60ApprovedProducts/main.aspx

The contract unit price per each for "W Beam Guardrail Tangent End Terminal" shall include all costs incurred for furnishing and installing one (1) end section as shown on Standard Plate 630.88 including removal of the existing end terminal.

OO. **Beam Guardrail Block:** Beam Guardrail Block shall include all costs for removing the broken block and installing a block.

PP. **Beam Guardrail Post & Block:** Beam Guardrail Post & Block shall include all costs for removing the broken post and installing a post and block. Any holes required to be drilled in the posts, such as the 3 1/2" diameter holes for the MELT end posts as per Standard Plate SPECIAL - A (3 of 3), shall also be included. Beam Guardrail Post & Block shall include replacement of post and blocks located within the limits of the Tangent and Flared End Terminals.

QQ. **Beam Guardrail Post & Block, Winter:** Beam Guardrail Post & Block, Winter shall include all costs incurred for replacement of a steel beam guardrail post when there is in excess of one foot of frozen ground at the work site. When this condition exists, the contract unit price per each for "Beam Guardrail Post & Block, Winter" will be the pay unit rather than the contract unit price per each for "Beam Guardrail Post & Block". The Contractor shall field drill 3 1/2" diameter holes in posts as per Standard Plate SPECIAL - A (3 of 3) when placing MELT ends. Beam Guardrail Post & Block, Winter shall include replacement of post and blocks located within the limits of the Tangent and Flared End Terminals.

RR. **End Terminal Wood Breakaway Post:** End Terminal Wood Breakaway Post shall include all costs incurred for removal of a broken wood end post and installing a replacement wood end post in a steel tube sleeve. This contract item shall include replacement of wood posts on various end terminals including Breakaway Cable Terminals (BCT), Modified Eccentric Loader Terminals (MELT), Trailing End Terminals, Tangent End Terminals and Flared End Terminals. The Contractor shall be responsible for making sure the wood post matches the appropriate Standard Plate or end terminal manufacturer's requirements.

SS. **End Terminal Hinged Breakaway Post:** End Terminal Hinged Breakaway Post shall include all costs incurred for removal of a hinged breakaway end post and installing a replacement hinged post on a post bottom base. This contract item shall include replacement of hinged breakaway posts on various end terminals including Tangent End Terminals and Flared End Terminals. The Contractor shall be responsible for making sure the hinged breakaway post matches the end terminal manufacturer's requirements.

TT. **Breakaway Cable Terminal End Rail:** Breakaway Cable Terminal (B.C.T) End Rail shall include all costs incurred for removing the 12.5 ft. or 25 ft section of damaged B.C.T. W beam adjacent to the Radius Terminal Element and replacing with new guardrail. The Contractor shall field drill holes in the guardrail for installation.

UU. **W-Beam Guardrail End Section Buffer:** W-Beam Guardrail End Section Buffer shall include all costs incurred for installing a buffer assembly. Removal of the existing end section buffer shall be incidental to this contract item.

VV. **Tangent End Terminal Extruder Head:** Tangent End Terminal Extruder Head shall include all costs incurred for removing the damaged extruder head and installing a new extruder head on the Tangent End Terminal.

WW. **Tangent End Terminal Rail:** Tangent End Terminal Rail shall include all costs incurred for removing 12.5 ft. or 25 ft. section(s) of damaged beam guardrail and replacing new beam guardrail on the Tangent End Terminal.

XX. **Rubrail:** Rubrail shall include all costs to install rubrail. The Contractor shall provide the necessary wood blocks and bolts to attach the rubrail to the wood posts.

YY. **Drive Down Beam Guardrail Post:** Drive Down Beam Guardrail Post shall include all costs for adjusting the height of a steel beam guardrail post. All costs to disassemble the steel beam guardrail shall be incidental to this contract item.

ZZ. **Reset Beam Guardrail Post & Block:** Reset Beam Guardrail Post & Block shall include all costs for removing and resetting post to properly align the steel beam section. Payment for "Reset Beam Guardrail Post & Block" shall be the same in frozen or unfrozen ground.

AAA. **2.0 LB/FT Flanged Channel Post:** 2.0 LB/FT Flanged Channel Post shall be used to replace damaged delineator posts in a guardrail installation area. 2.0 LB/FT Flanged Channel Post will also be the pay item for the 3.5 ft long base post if it is required. The retainer-spacer strap and other miscellaneous hardware required shall be incidental to the contract unit price per foot for 2.0 LB/FT Flanged Channel Post. Delineators themselves will be paid for separately as 4" x 4" White Delineator Reflector.

BBB. **4" x 4" White Delineator Reflector:** 4" x 4" White Delineator Reflector shall be used to replace damaged and/or missing delineator heads on existing delineator posts in a guardrail installation area. Any post straightening or realignment of posts shall be incidental to the contract unit price per each for 4" x 4" White Delineator Reflector. 4" x 4" White Delineator Reflector will also be the pay item for delineator heads when installing a new 2.0 LB/FT Flanged Channel Post. A typical installation will require 2 delineator heads. Delineator heads shall be fastened to the post with pop rivets.

CCC. **Guardrail Delineator:** Guardrail Delineators shall be as shown on Standard Plate 632.40. The appropriate delineator shall be used on the 3 Cable Guardrail and the Beam Guardrail as indicated on Standard Plate 632.40. Delineator color shall be as detailed on Standard Plate 632.40.

DDD. **Type 2 Object Marker Back to Back:** Type 2 Object Markers shall be as shown on Standard Plate 632.40. Type 2 Object Markers Back to Back shall be installed to mark the Cable Guardrail Anchor for two-way traffic as indicated on Standard Plate 632.40. Contract item includes the post and the reflectors.

EEE. **Type 2 Object Marker:** Type 2 Object Markers shall be as shown on Standard Plate 632.40. Type 2 Object Markers shall be installed to mark the Cable Guardrail Anchor for one-way traffic as indicated on Standard Plate 632.40. Contract item includes the post and the reflector.

FFF. **Flagging:** Payment for flagging will include all costs for provided certified flagger, stop/slow paddle, flag, and any nighttime illumination required. The accepted number of flagging hours will be paid for at the rate specified in the Special Provision for Price Schedule for Miscellaneous Items.

9. Traffic Control shall be installed by the Contractor in accordance with the details on Sheets 16 thru 18 of the Contract. All signs, channelizing devices, and arrow boards shall conform to the requirements of the Manual of Uniform Traffic Control Devices. All costs for furnishing, installing, and maintaining the traffic control shall be incidental to the contract unit prices for the various contract items. Separate measurement and payment will not be made.

   When work is being performed on two way traffic roadways, flagging shall be furnished by the Contractor in accordance with the standard plate included in this contract.

   Portable sign supports shall be constructed to yield upon impact to minimize hazards to motorists. The bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed location, ground mounted, breakaway supports.

   Equipment and vehicles entering or exiting the roadway, traveling on the shoulders or driving lanes at low speeds or working within the right-of-way shall display a flashing amber light visible from all directions at a minimum distance of 1/2 mile. The amber light shall be mounted on the uppermost part of the Contractor's vehicle. Lights must flash at 75 ±15 flashes per minute. Vehicle flasher/hazard lights are not acceptable.

10. When the Contractor is called in to work at more than one site within an Area, Mobilization will only be paid once. In the event that Mobilization is required in two or more Areas at one time, the Contractor will be paid Mobilization into each one of the specific Areas. The cover sheets show where bridges are located within the Areas. There may be additional locations that have guardrail such as box culverts, large pipe, and steep inslopes which are not indicated on the cover sheets. Long runs of Cable Guardrail exist on several water hazard sites. These include:

    SD 25 from MRM 175.5 to MRM 177.8 in Day County – High Tension 4 Cable Guardrail
    (Lengths of cable runs at this location are 784', 1291', 2255', 2464', 4335', & 7118')

    US 212 from MRM 350.6 to MRM 351.7 in Clark County – Low Tension 3 Cable Guardrail

11. The Standard Plates included in this contract are provided for information purposes on how the various guardrail items are to be constructed and the materials required to complete the work. Plan notes contained on Sheets 7 thru 15 of this contract shall take precedence over notes contained on the Standard Plates.

12. The Contractor shall be responsible for removing and disposing of all guardrail components that are not being reused on the project. Guardrail components shall not be discarded in the highway right-of-way or waterways.

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.

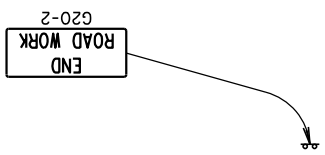
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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.

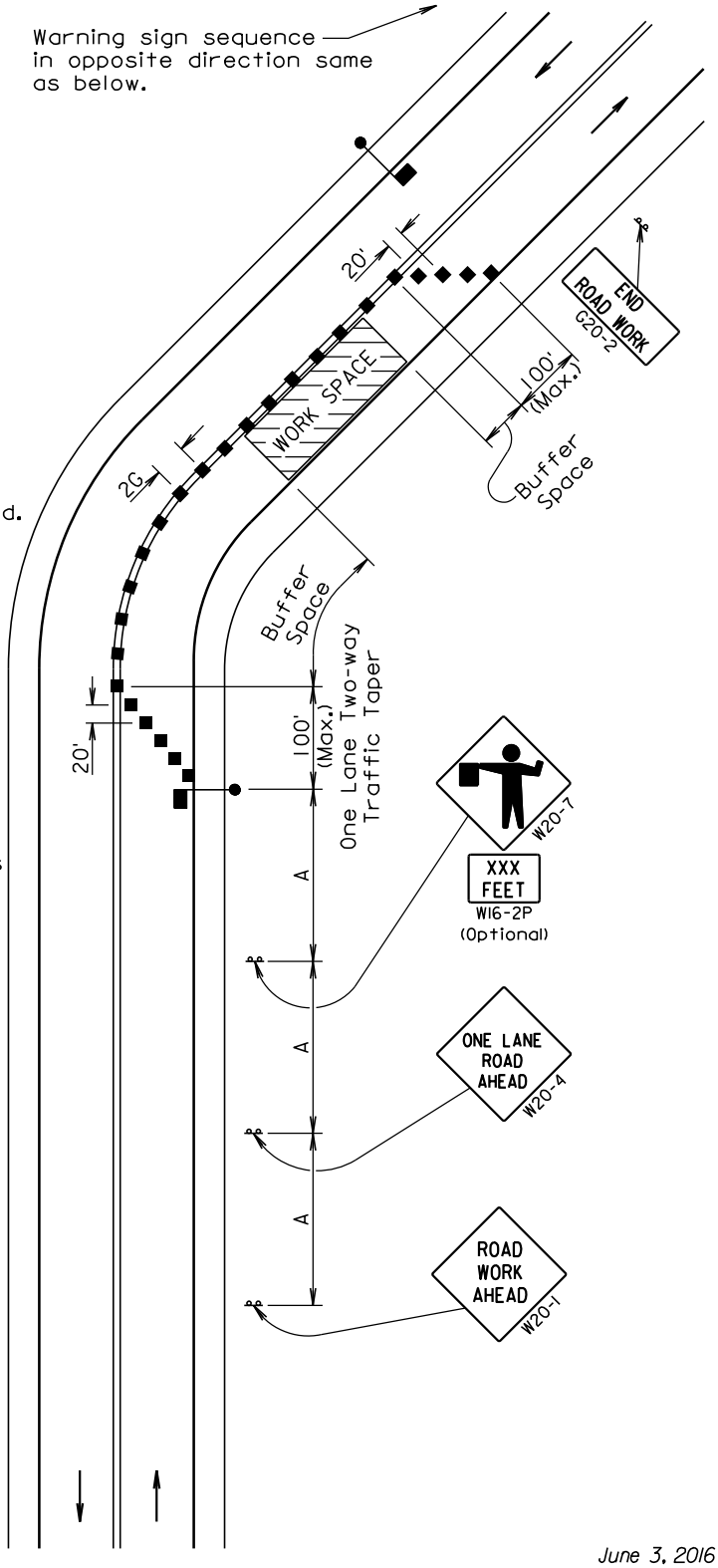
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.



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.



June 3, 2016

Published Date: 2nd Qtr. 2018	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23 Sheet 1 of 1

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK 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

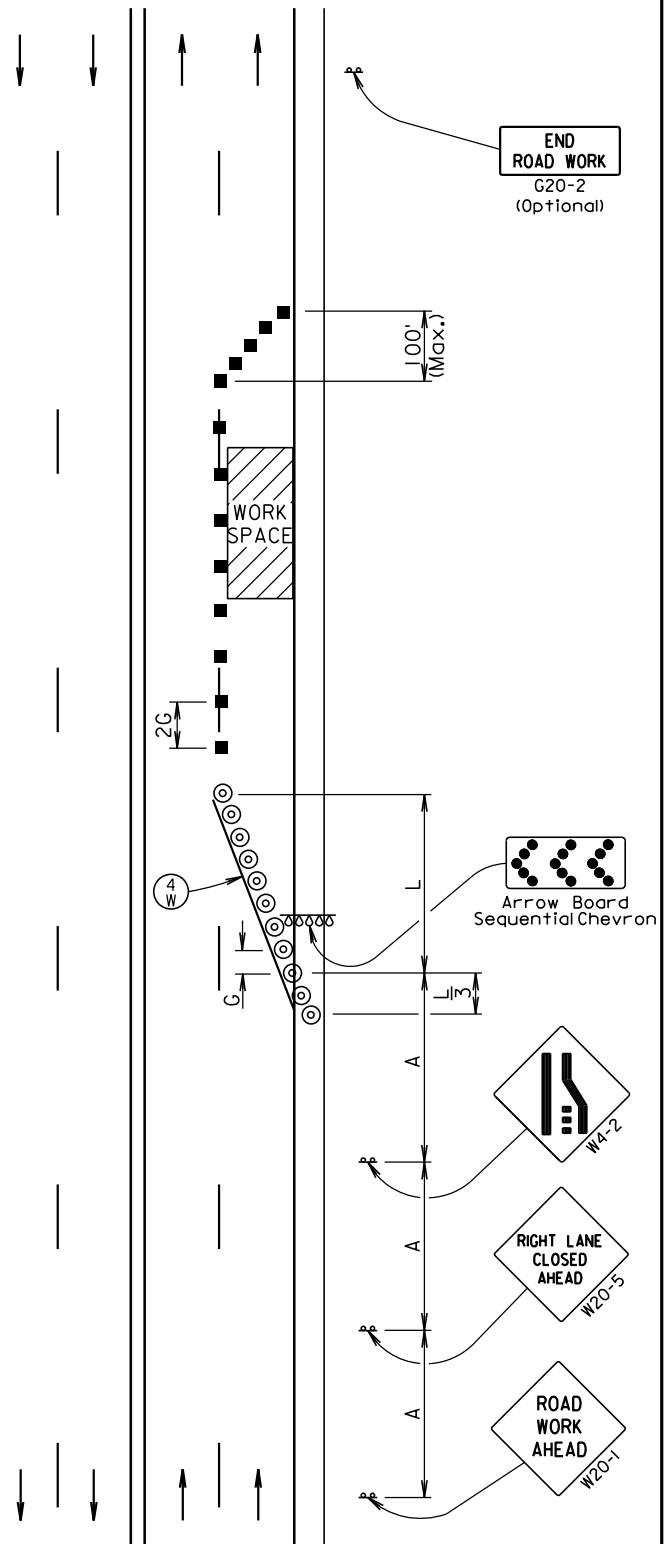
(4W) 4" White Temporary Pavement Marking

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.

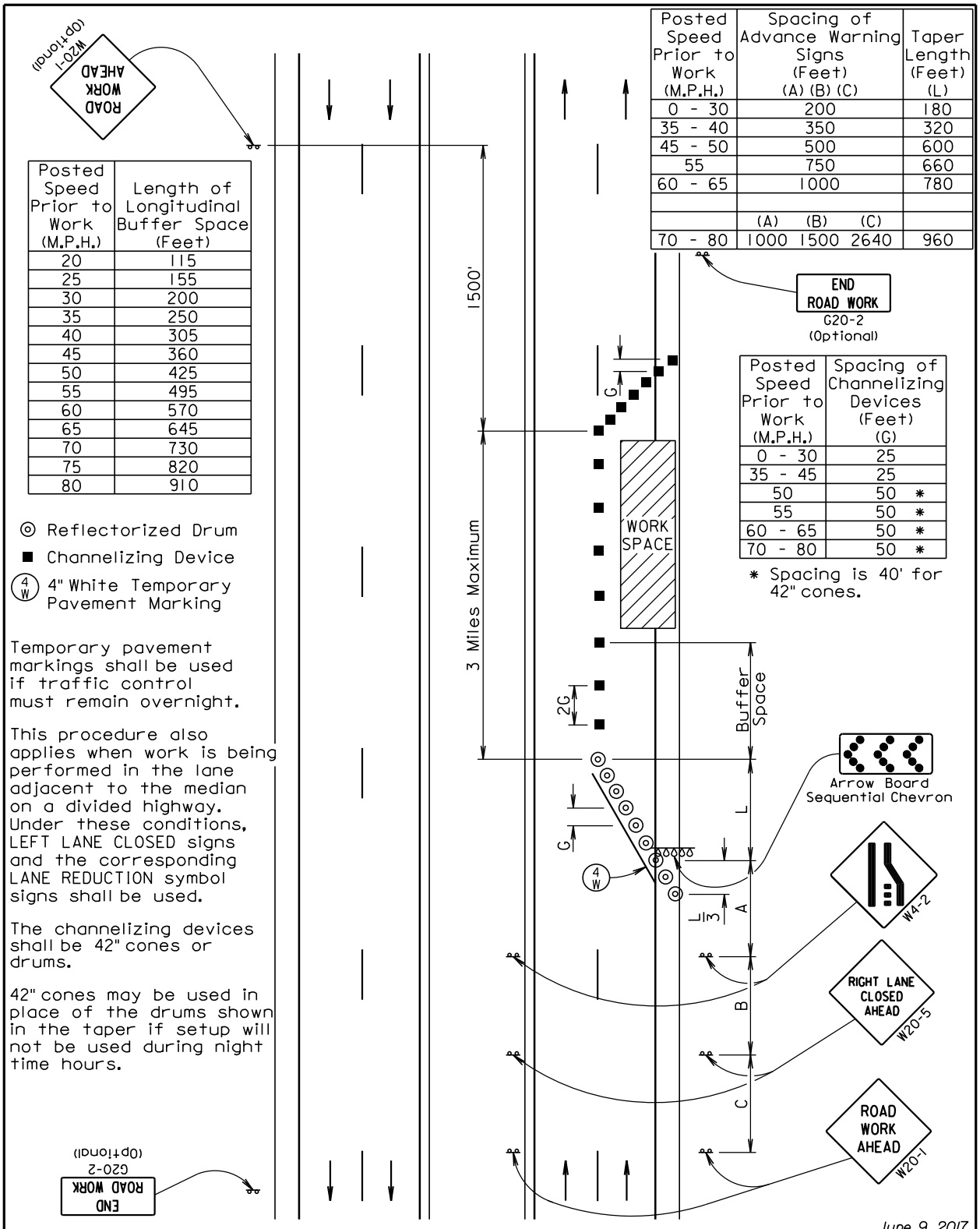


June 3, 2016

Published Date: 2nd Qtr. 2018	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, RIGHT LANE CLOSED	PLATE NUMBER 634.47 Sheet 1 of 1

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	Taper Length (Feet) (L)
0 - 30	200	180
35 - 40	350	320
45 - 50	500	600
55	750	660
60 - 65	1000	780
	(A) (B) (C)	
70 - 80	1000 1500 2640	960

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	25
35 - 45	25
50	50 *
55	50 *
60 - 65	50 *
70 - 80	50 *

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

(4W) 4" White Temporary Pavement Marking

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

This procedure also applies when work is being performed in the lane adjacent to the median on a divided highway. Under these conditions, LEFT LANE CLOSED signs and the corresponding LANE REDUCTION symbol signs shall be used.

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.

June 9, 2017

Published Date: 2nd Qtr. 2018	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITHOUT BARRIER	PLATE NUMBER 634.64 Sheet 1 of 1

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent thoughout 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.

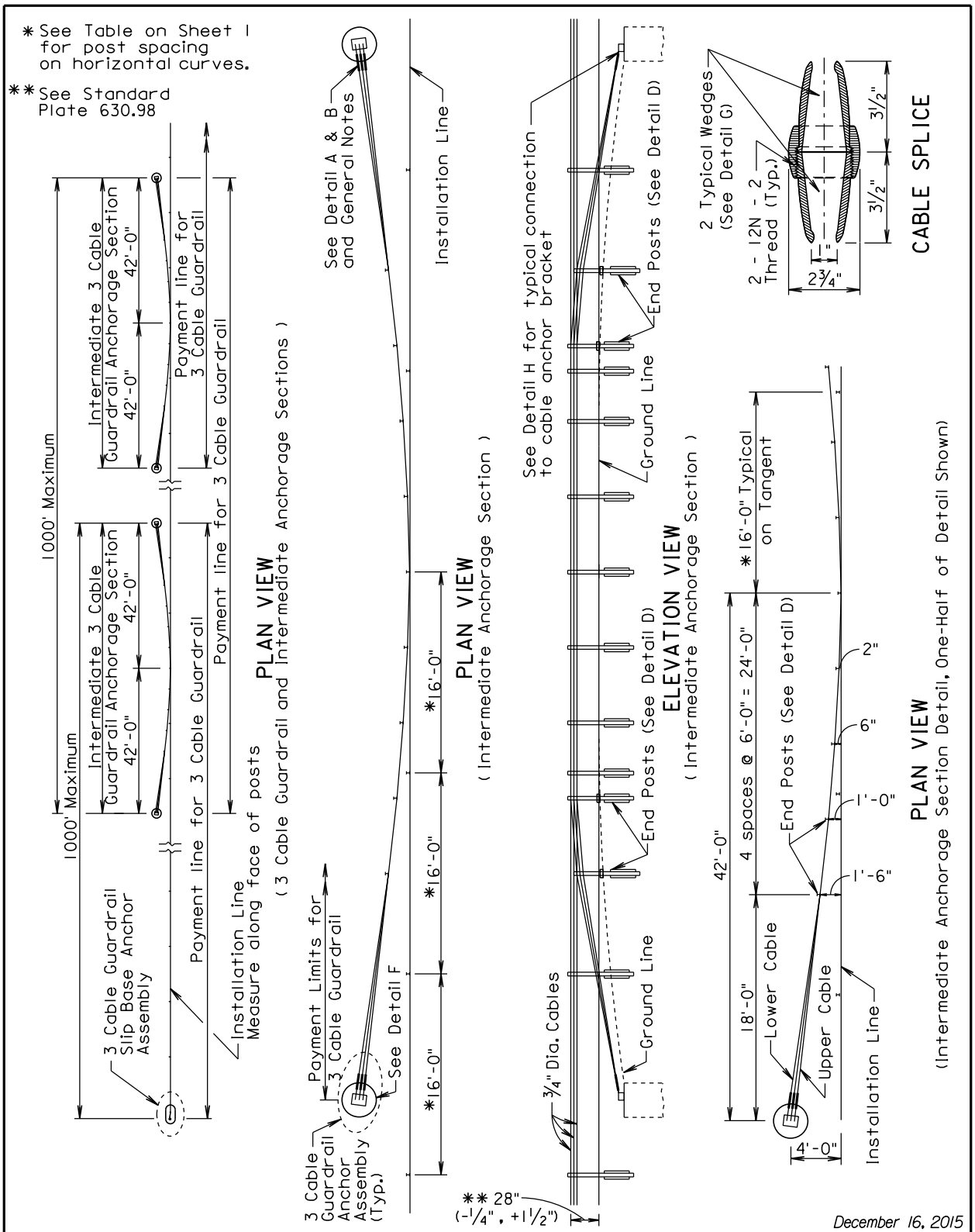
The cable shall be retensioned after the initial 2 week pretension period in accordance with the following table:

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

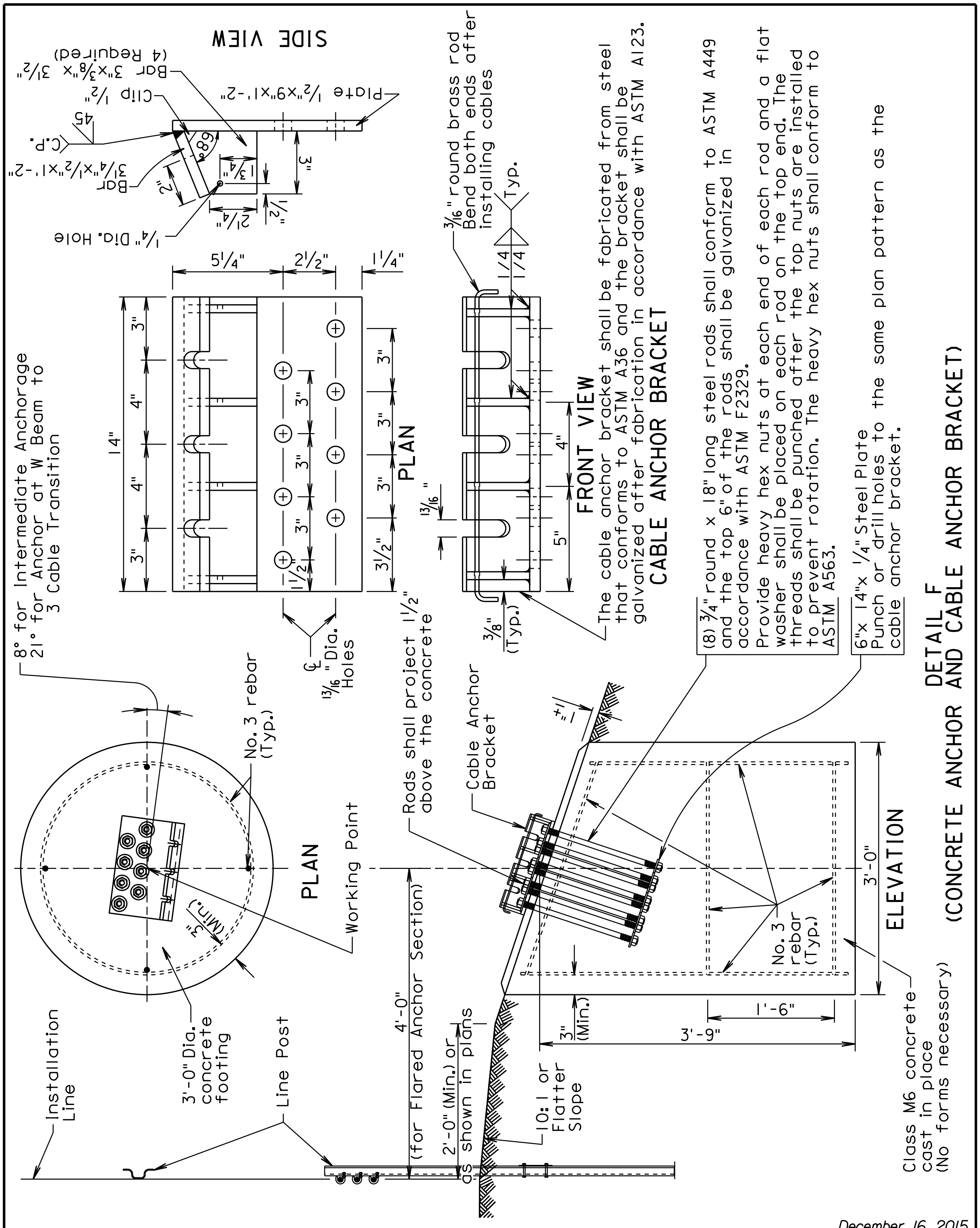
POST SPACING FOR HORIZONTAL CURVES	
Roadway ℄ Curvature	Maximum Post Spacing (Ft)
1° and Less	16'
Greater than 1° to 8°	12'
Greater than 8° to 13°	8'
Greater than 13°	NOT ALLOWED

December 16, 2015

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL (LOW TENSION)	PLATE NUMBER 629.01 Sheet 1 of 6



Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL (LOW TENSION)	PLATE NUMBER 629.01 Sheet 2 of 6



December 16, 2015

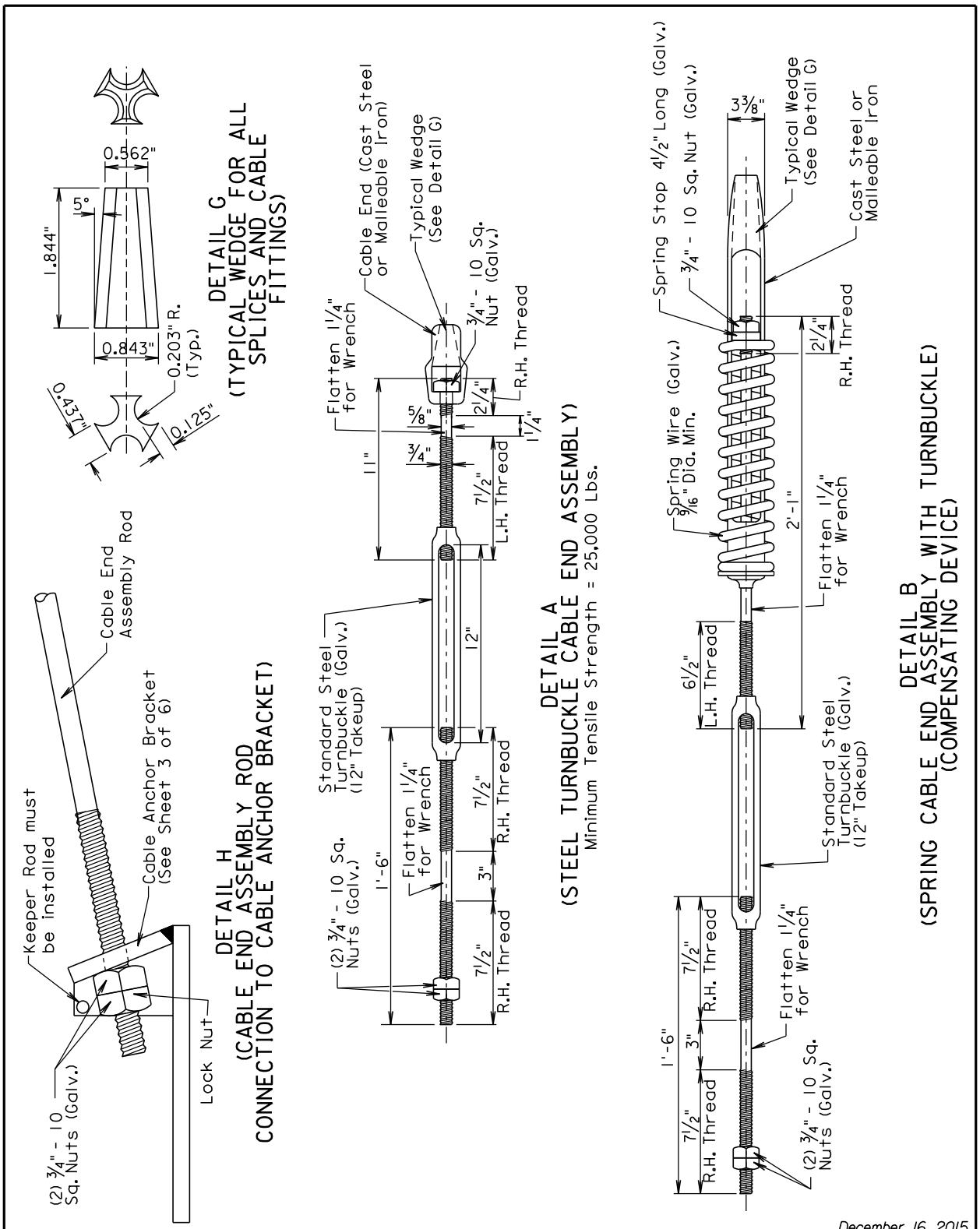
Published Date: 2nd Qtr. 2018

SDDOT

3 CABLE GUARDRAIL (LOW TENSION)

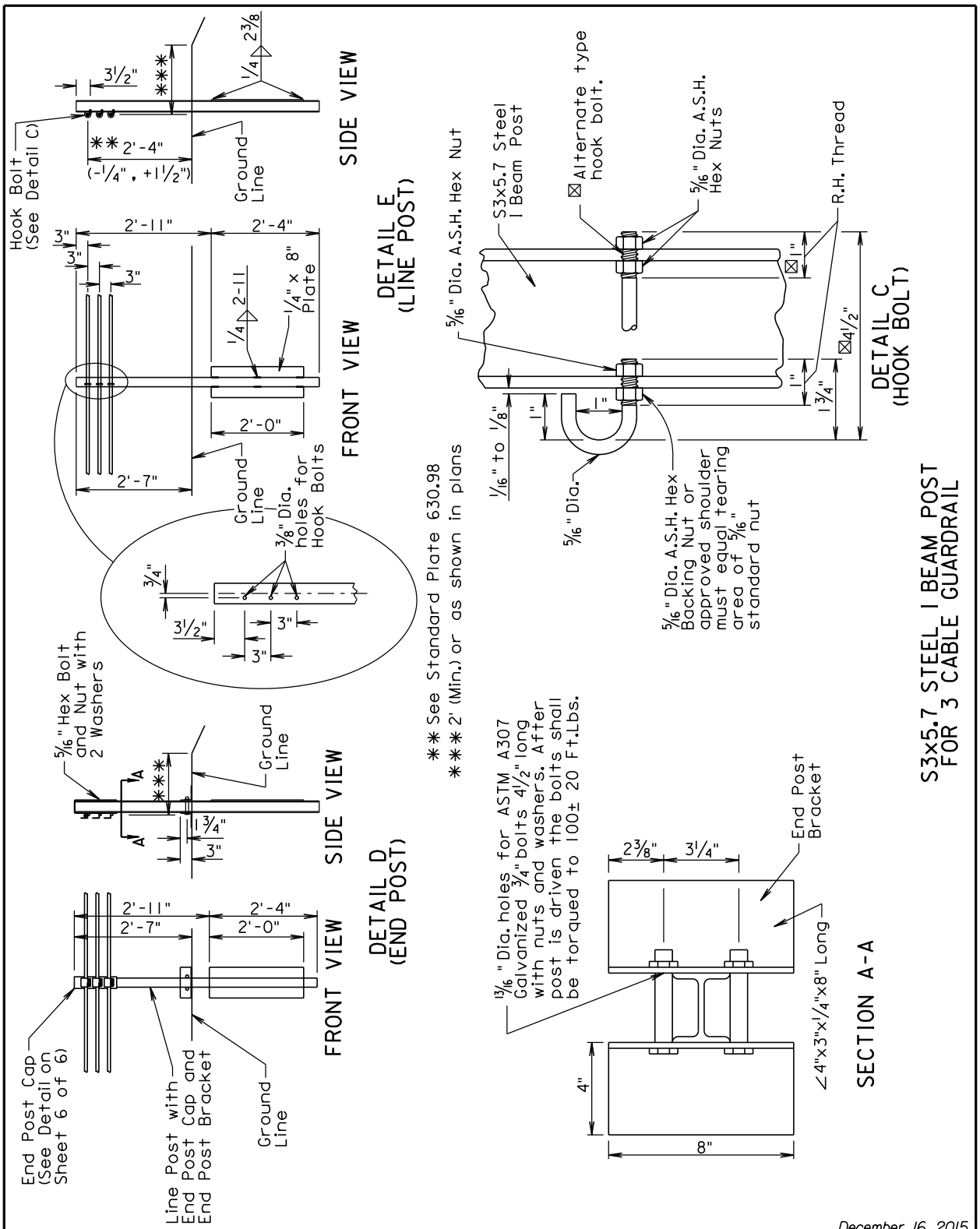
PLATE NUMBER 629.01

Sheet 3 of 6



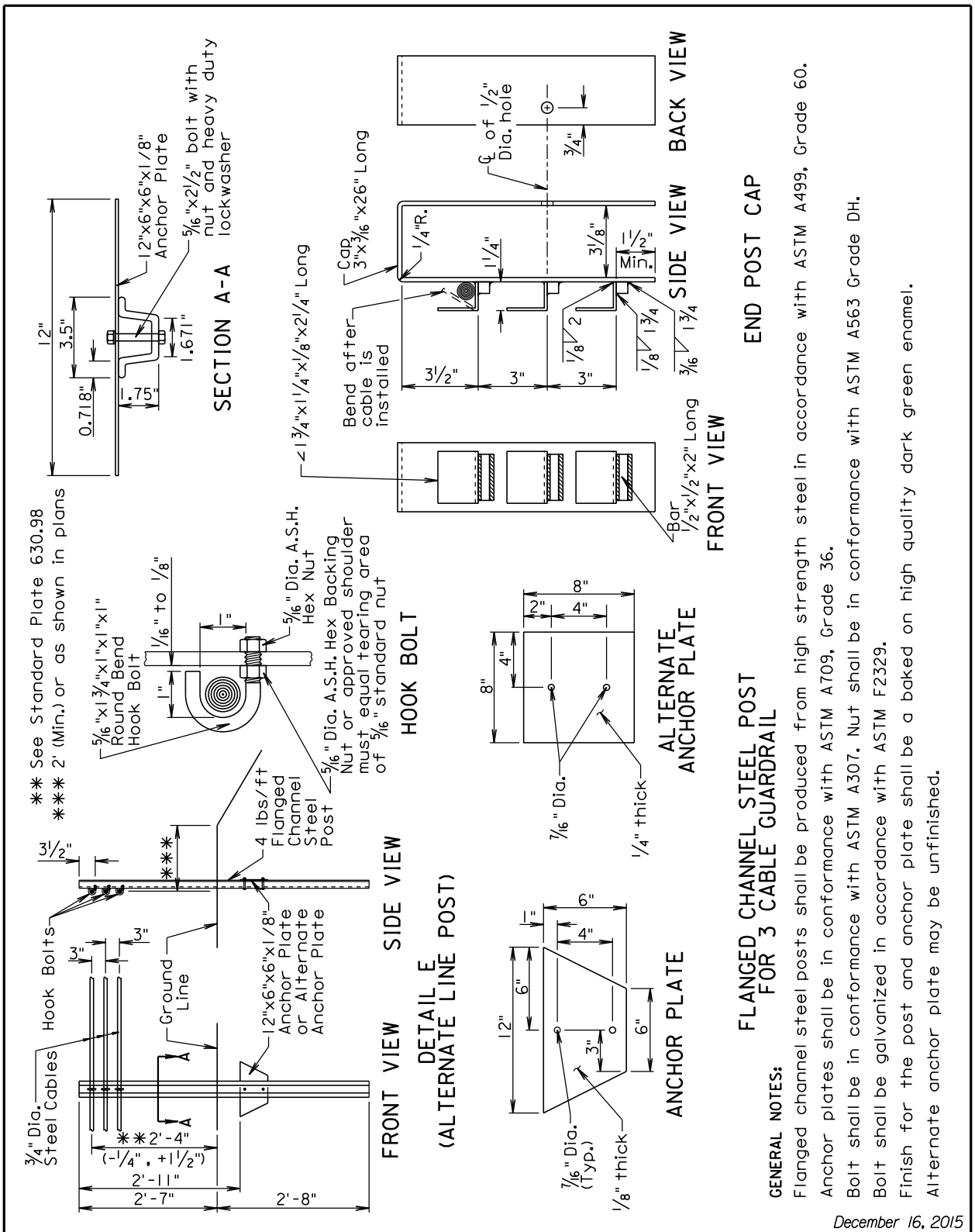
December 16, 2015

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL (LOW TENSION)	PLATE NUMBER 629.01 Sheet 4 of 6



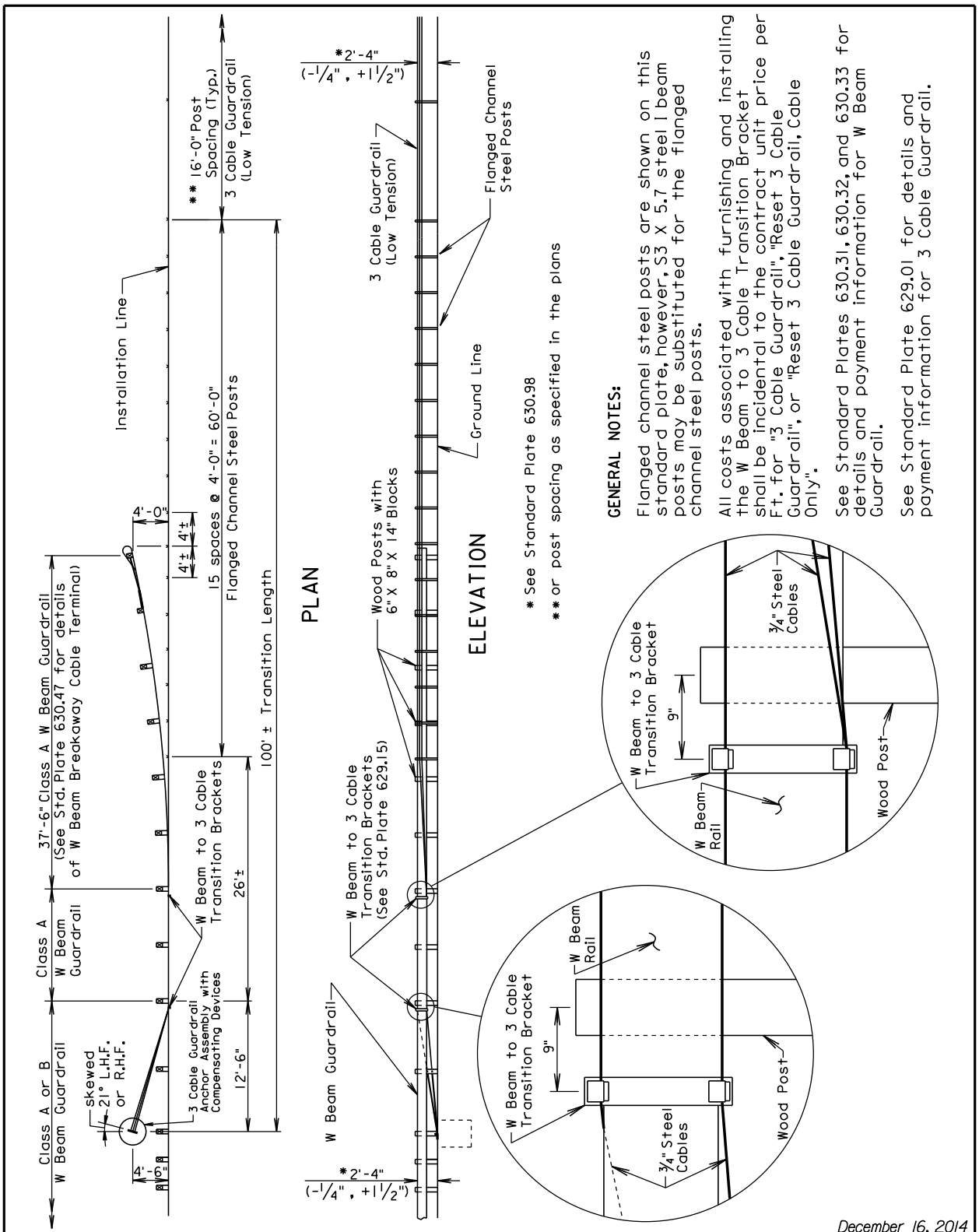
December 16, 2015

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL (LOW TENSION)	PLATE NUMBER 629.01 Sheet 5 of 6



December 16, 2015

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL (LOW TENSION)	PLATE NUMBER 629.01
			Sheet 6 of 6



GENERAL NOTES:

Flanged channel steel posts are shown on this standard plate, however, S3 X 5.7 steel I beam posts may be substituted for the flanged channel steel posts.

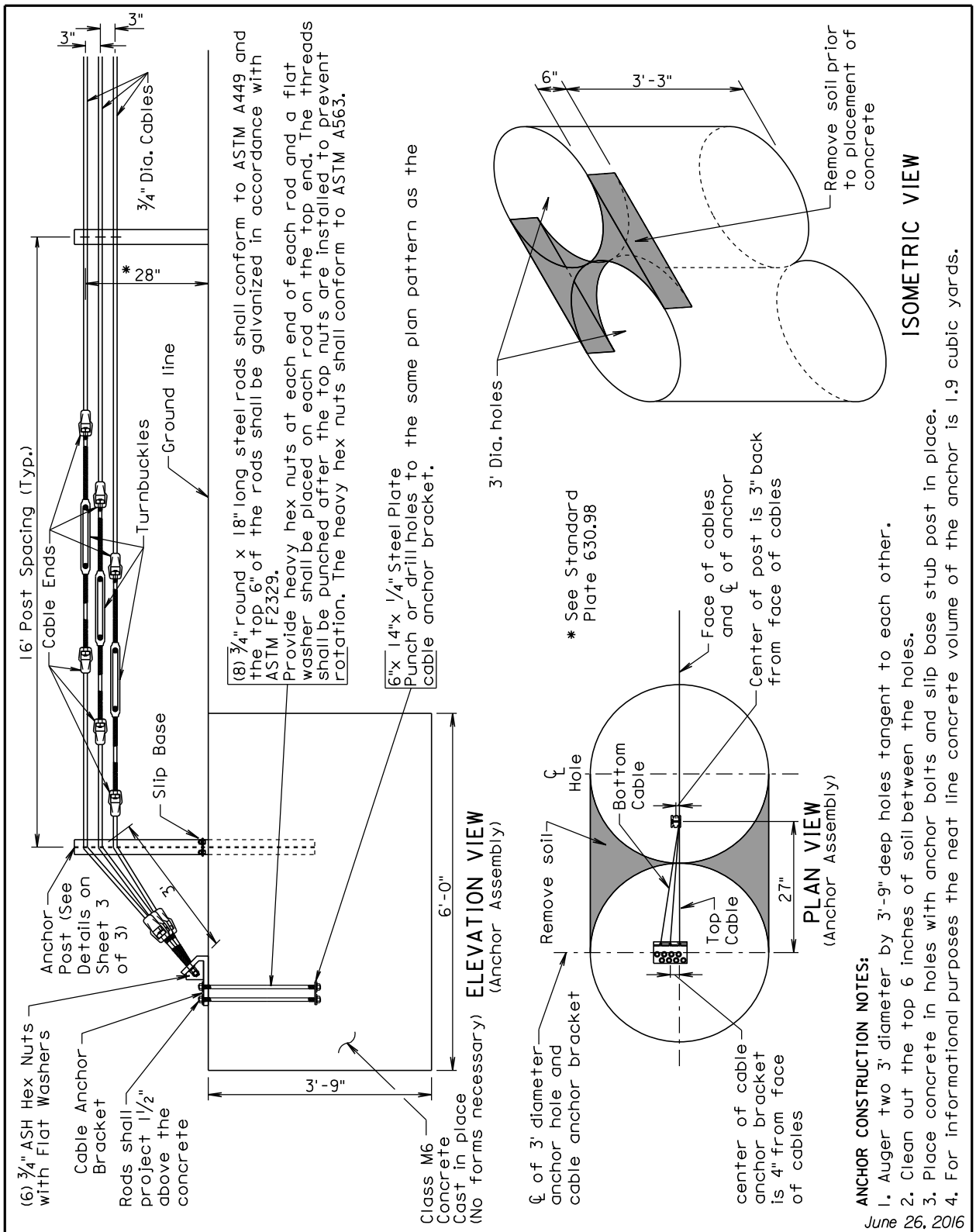
All costs associated with furnishing and installing the W Beam to 3 Cable Transition Bracket shall be incidental to the contract unit price per Ft. for "3 Cable Guardrail", "Reset 3 Cable Guardrail", or "Reset 3 Cable Guardrail, Cable Only".

See Standard Plates 630.31, 630.32, and 630.33 for details and payment information for W Beam Guardrail.

See Standard Plate 629.01 for details and payment information for 3 Cable Guardrail.

December 16, 2014

Published Date: 2nd Qtr. 2018	SDDOT	W BEAM TO 3 CABLE TRANSITION	PLATE NUMBER 629.05 Sheet 1 of 1

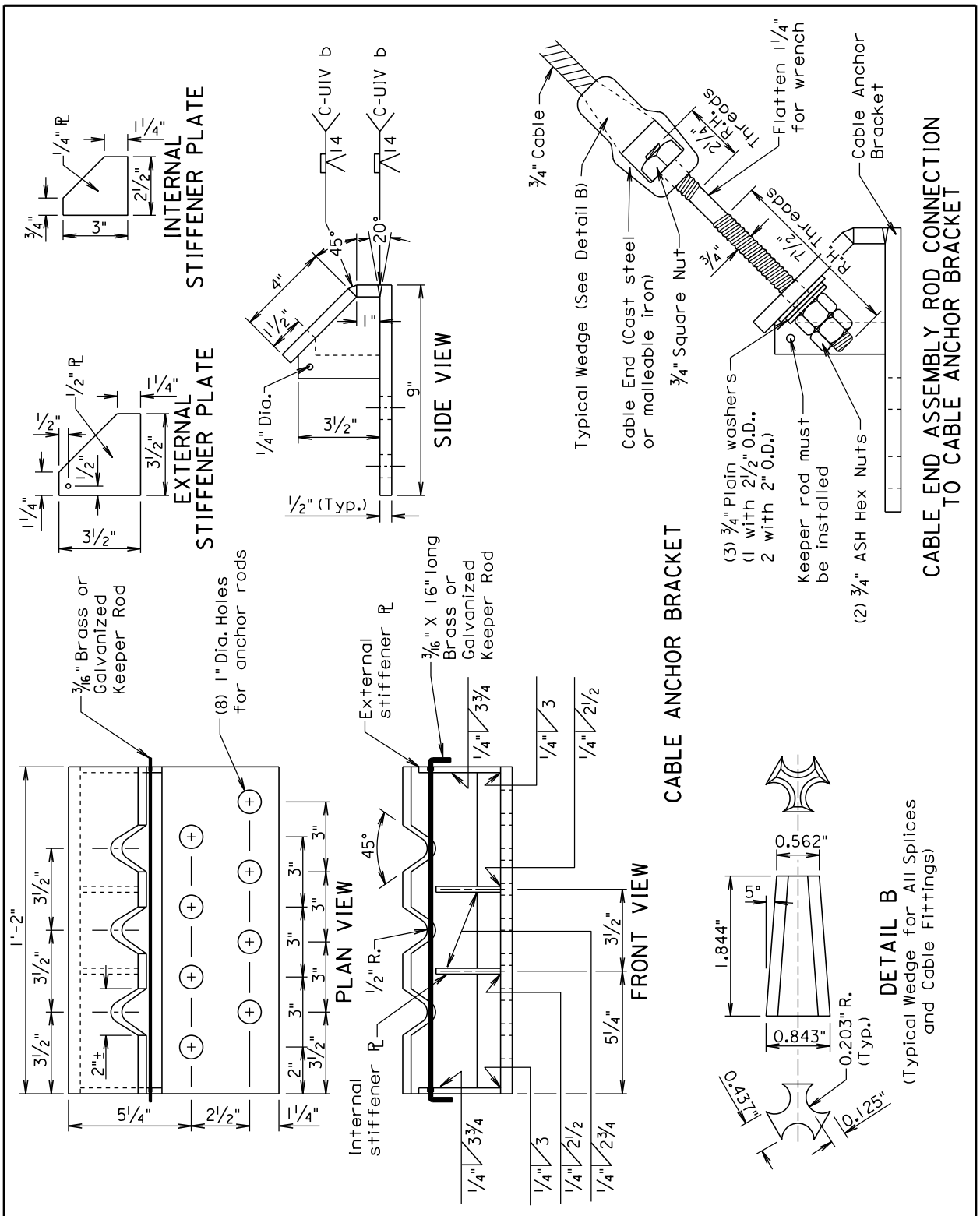


ANCHOR CONSTRUCTION NOTES:

1. Auger two 3' diameter by 3'-9" deep holes tangent to each other.
2. Clean out the top 6 inches of soil between the holes.
3. Place concrete in holes with anchor bolts and slip base stub post in place.
4. For informational purposes the neat line concrete volume of the anchor is 1.9 cubic yards.

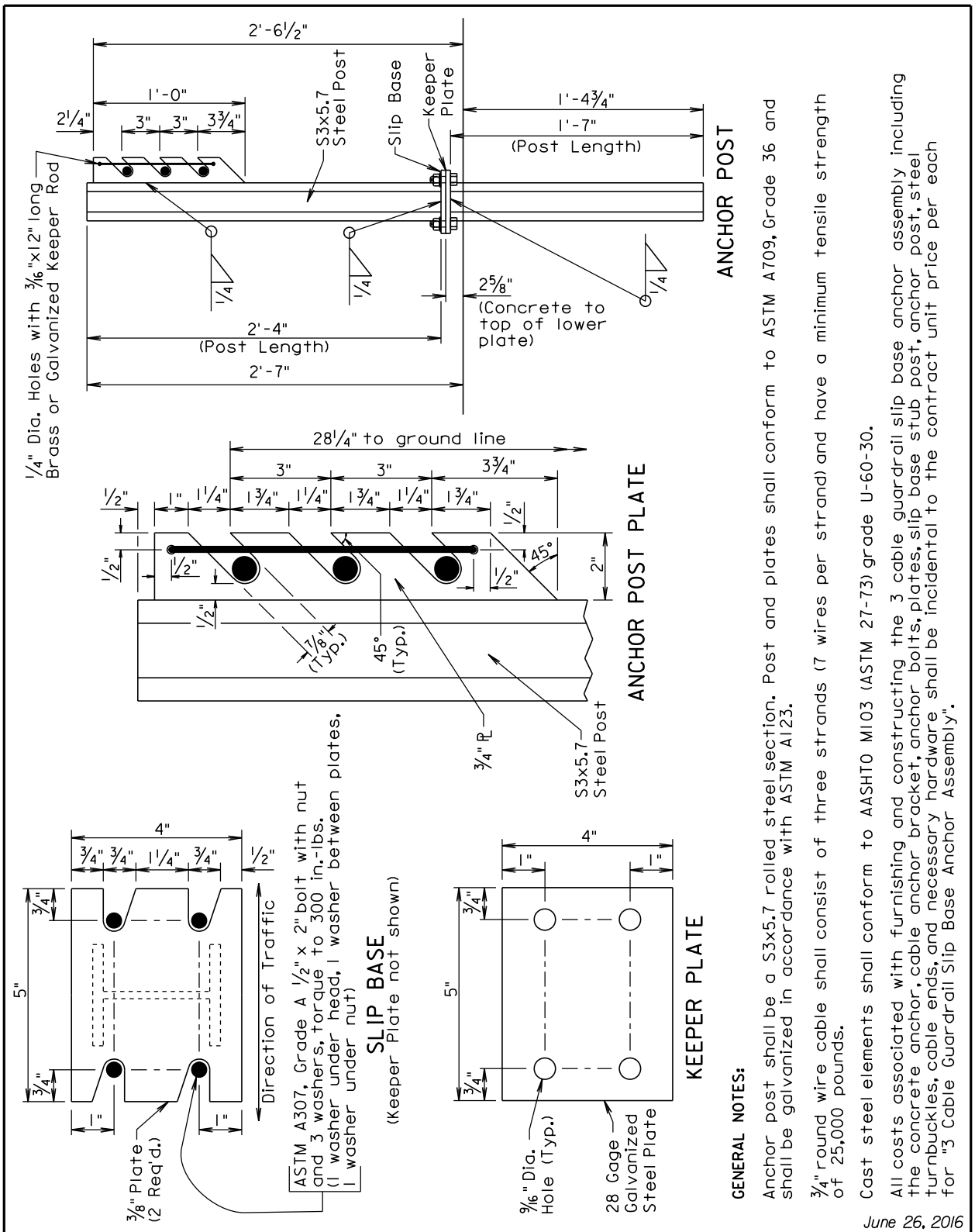
June 26, 2016

Published Date: 2nd Qtr. 2018	SDDOT	*3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY*	PLATE NUMBER 629.10 Sheet 1 of 3



June 26, 2016

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY	PLATE NUMBER 629.10 Sheet 2 of 3



GENERAL NOTES:

Anchor post shall be a S3x5.7 rolled steel section. Post and plates shall conform to ASTM A709, Grade 36 and shall be galvanized in accordance with ASTM A123.

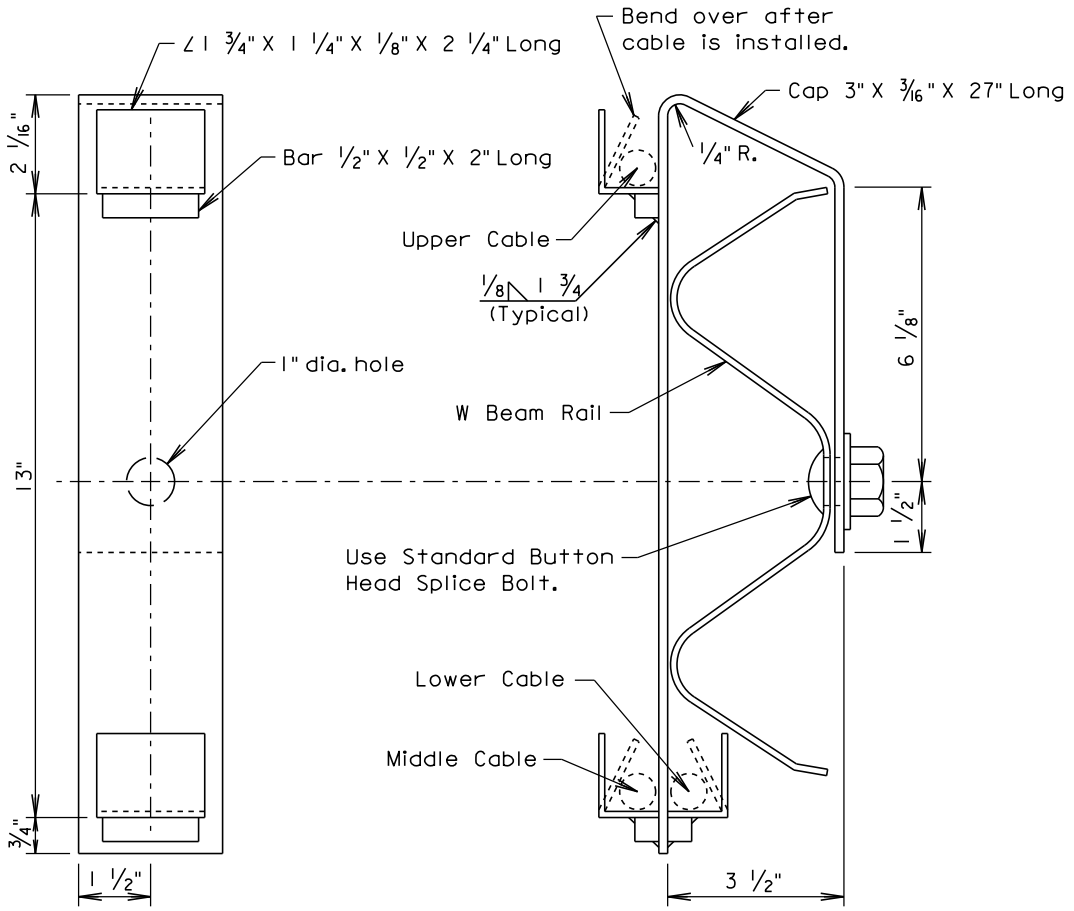
¾" round wire cable shall consist of three strands (7 wires per strand) and have a minimum tensile strength of 25,000 pounds.

Cast steel elements shall conform to AASHTO M103 (ASTM 27-73) grade U-60-30.

All costs associated with furnishing and constructing the 3 cable guardrail slip base anchor assembly including the concrete anchor, cable anchor bracket, anchor bolts, plates, slip base stub post, anchor post, steel turnbuckles, cable ends, and necessary hardware shall be incidental to the contract unit price per each for "3 Cable Guardrail Slip Base Anchor Assembly".

June 26, 2016

Published Date: 2nd Qtr. 2018	SDDOT	3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY	PLATE NUMBER 629.10 Sheet 3 of 3



ELEVATION (TRANSITION BRACKET)

END VIEW (W BEAM RAIL AND TRANSITION BRACKET)

GENERAL NOTES:

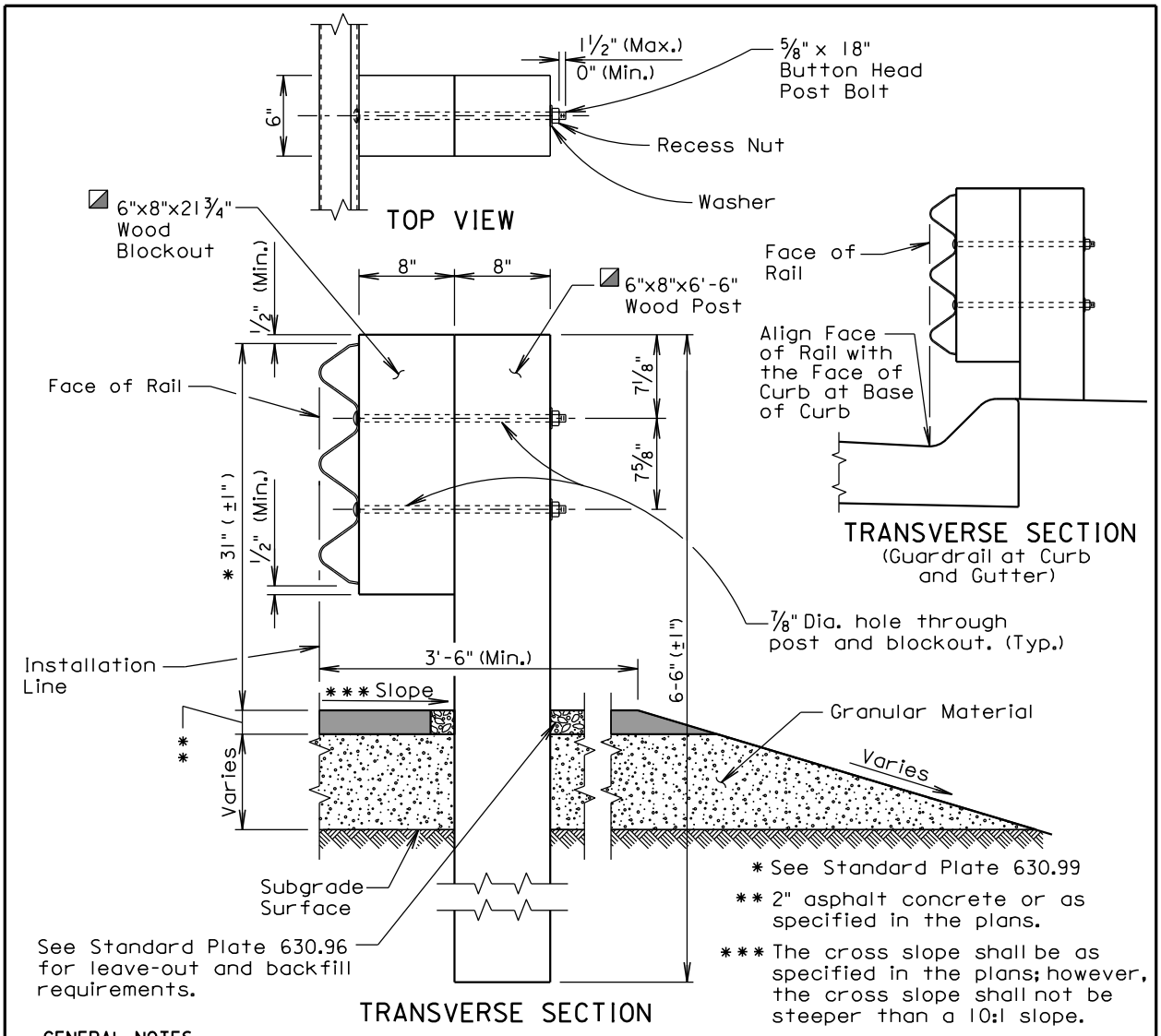
Steel used in the fabrication of the bracket shall conform to ASTM A36 and the bracket shall be galvanized after fabrication in accordance with ASTM A123.

March 31, 2000

Published Date: 2nd Qtr. 2018	SDDOT	W BEAM TO 3 CABLE TRANSITION BRACKET	PLATE NUMBER 629.15 Sheet 1 of 1

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK 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.

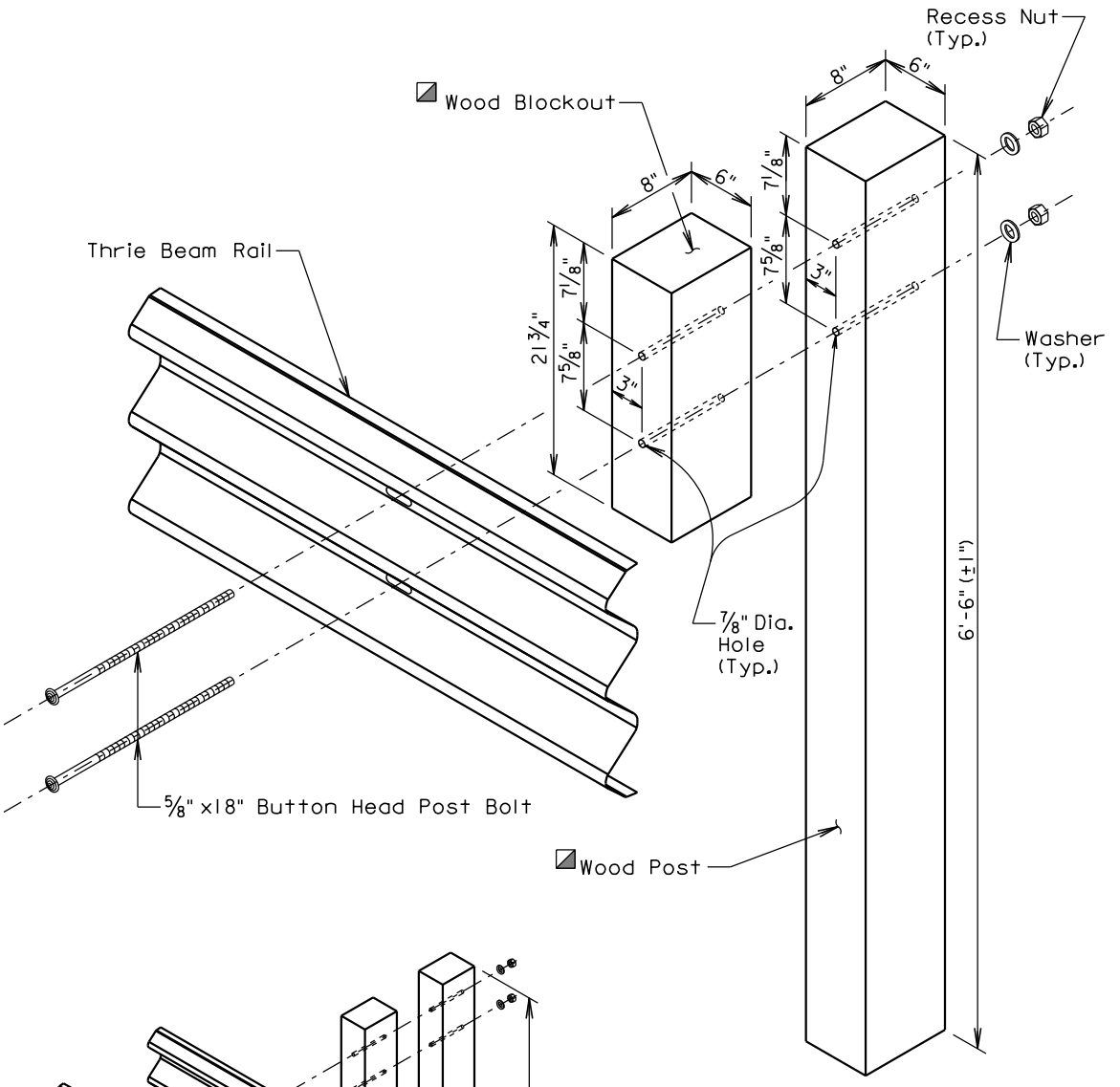
☑ The post and blockout illustrated above is typical for standard thrie beam guardrail. When other variations of posts and blockouts are specified on other standard plates (e.g. transitions) then the posts and blockouts shall be as specified on the other standard plates or as specified in the plans.

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.

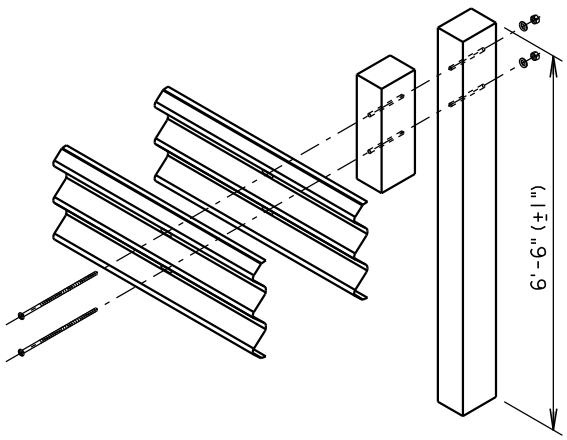
The top of post and top of block shall have a true square cut. The top of block shall be a maximum of ±½ inch from the top of the post.

September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*THRIE BEAM GUARDRAIL*	*PLATE NUMBER* 630.01 *Sheet 1 of 5*



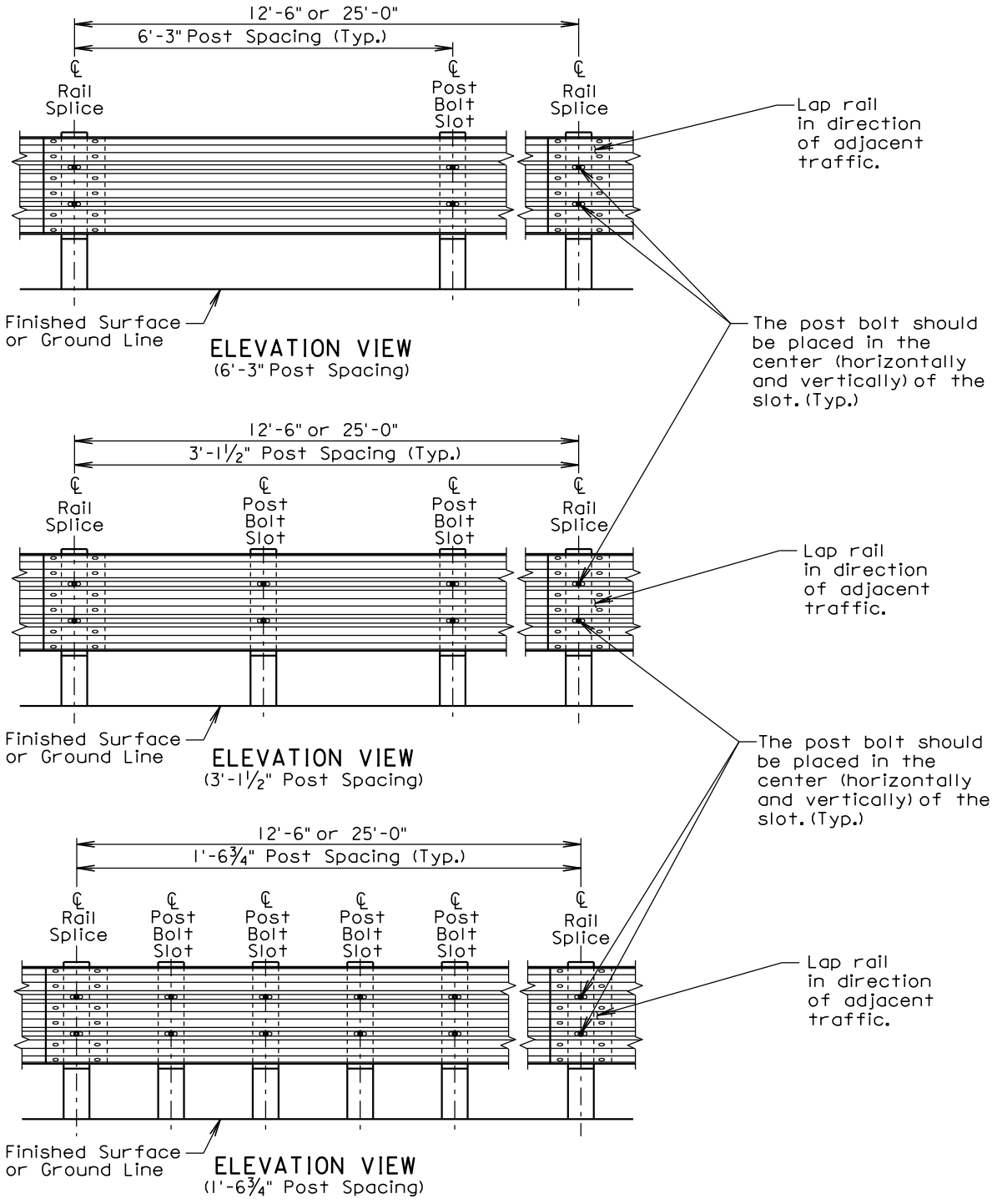
EXPANDED ISOMETRIC VIEW AT MIDSPAN OF THRIE BEAM GUARDRAIL



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

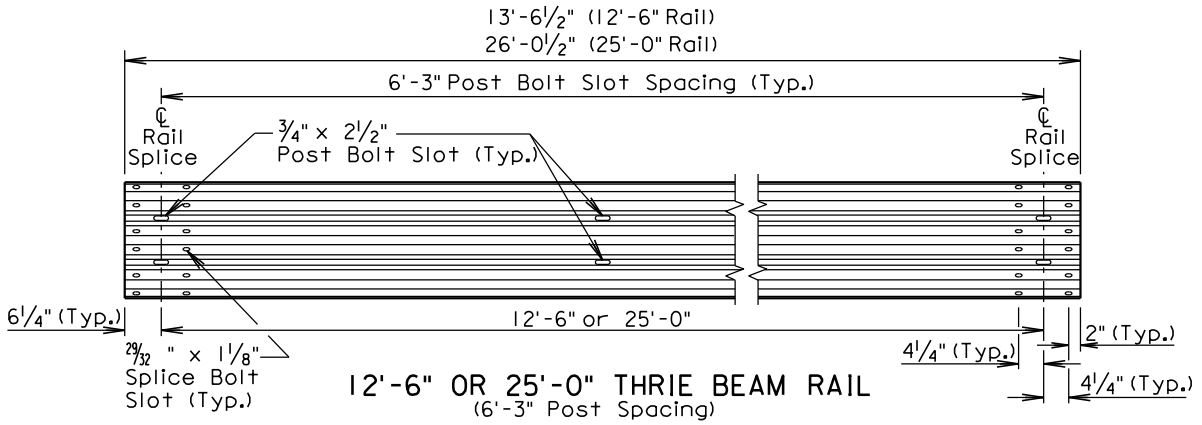
September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01 Sheet 2 of 5

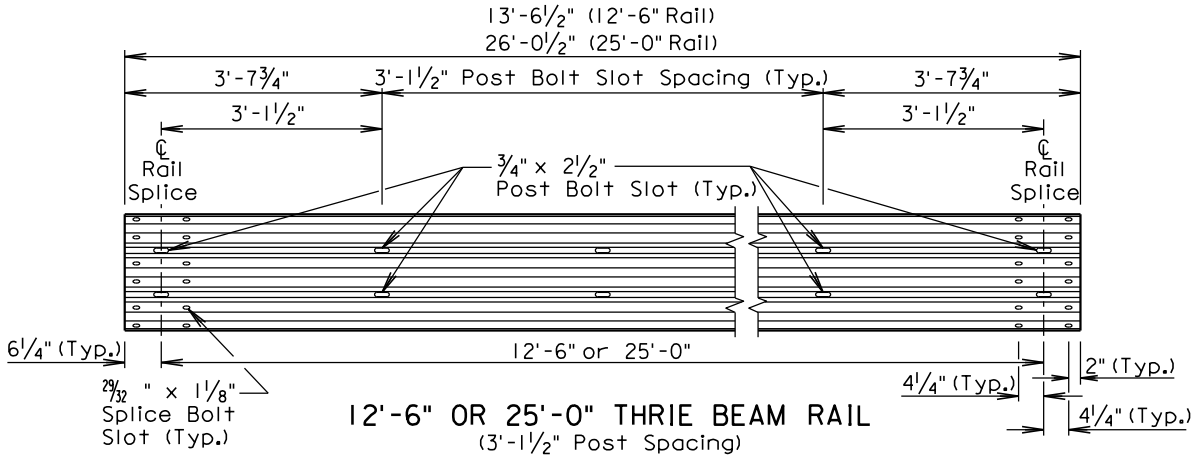


September 14, 2017

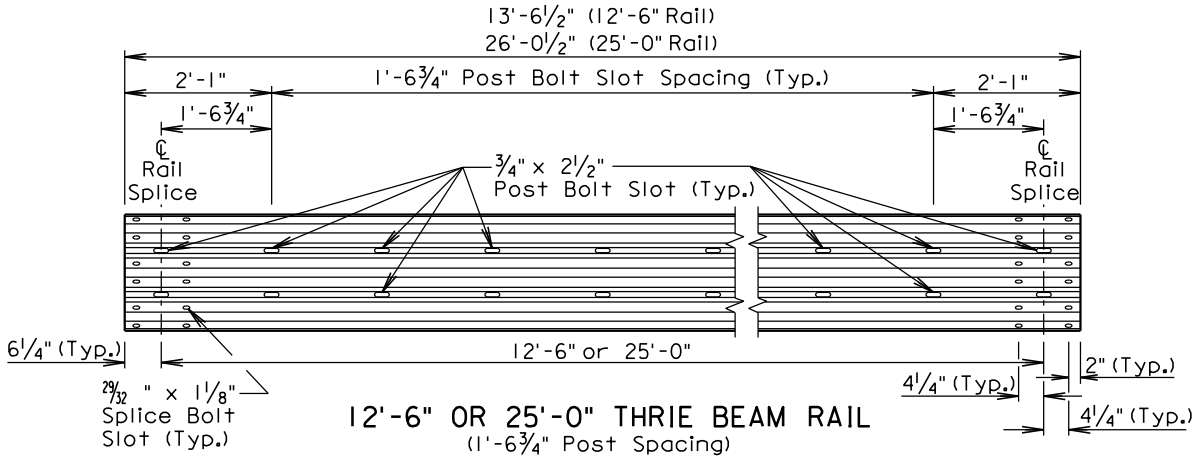
Published Date: 2nd Qtr. 2018	SDDOT	***THRIE BEAM GUARDRAIL***	***PLATE NUMBER*** *630.01*
			Sheet 3 of 5



12'-6" OR 25'-0" THRIE BEAM RAIL
(6'-3" Post Spacing)



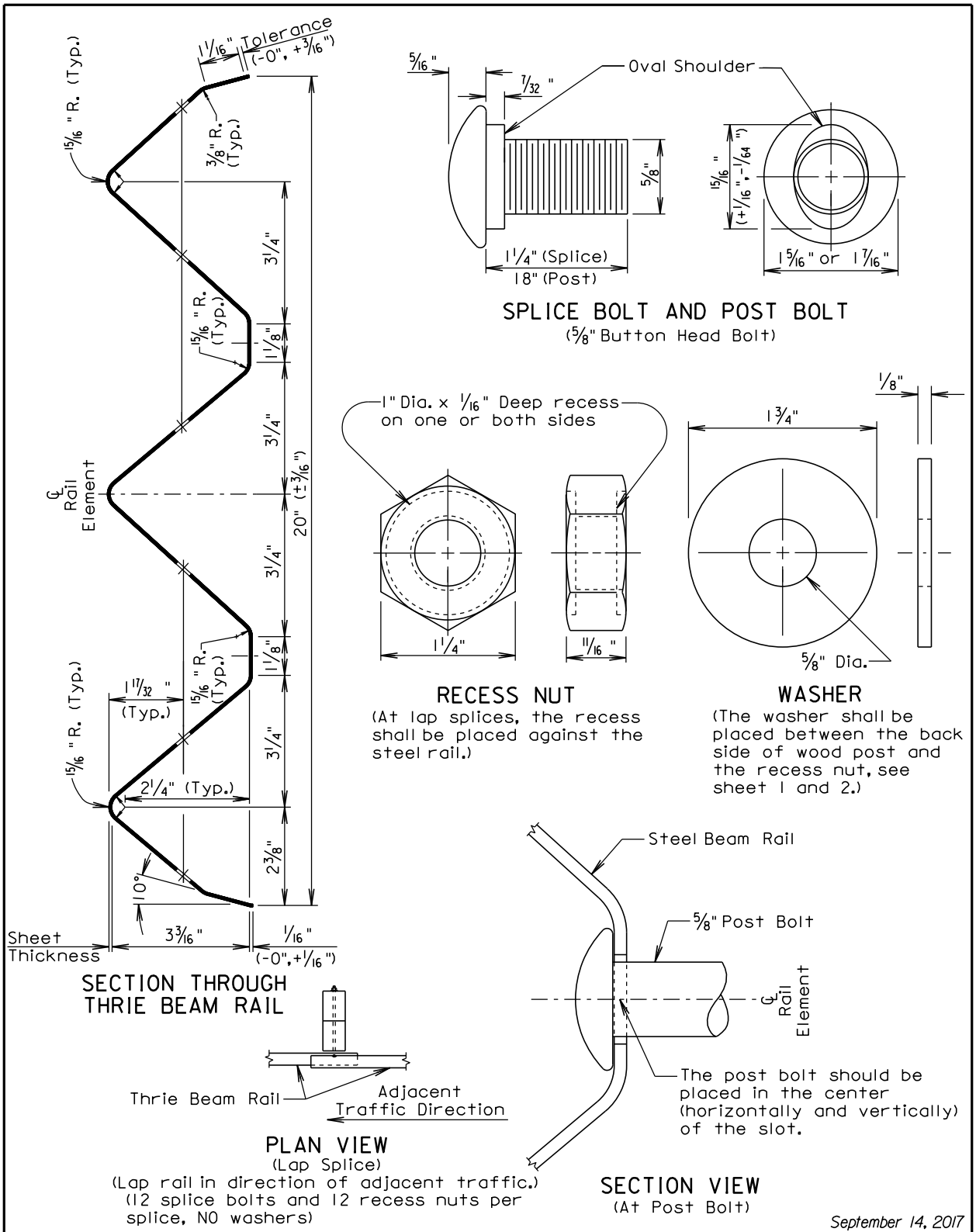
12'-6" OR 25'-0" THRIE BEAM RAIL
(3'-1 1/2" Post Spacing)



12'-6" OR 25'-0" THRIE BEAM RAIL
(1'-6 3/4" Post Spacing)

September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01 Sheet 4 of 5

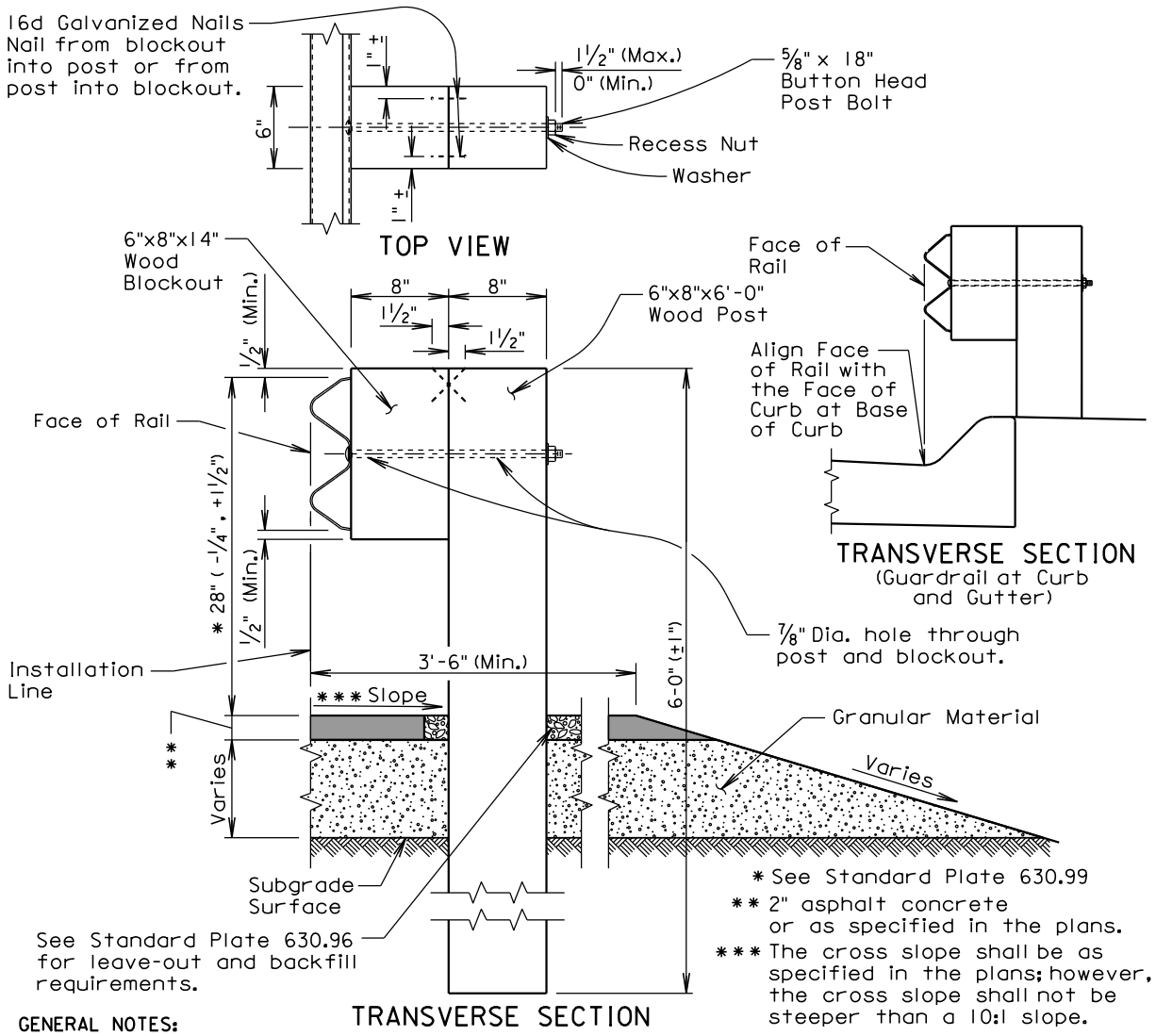


September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01 Sheet 5 of 5

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK 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.

All W beam rail shall be Type I and Class A (12 Ga.) unless specified otherwise in the plans.

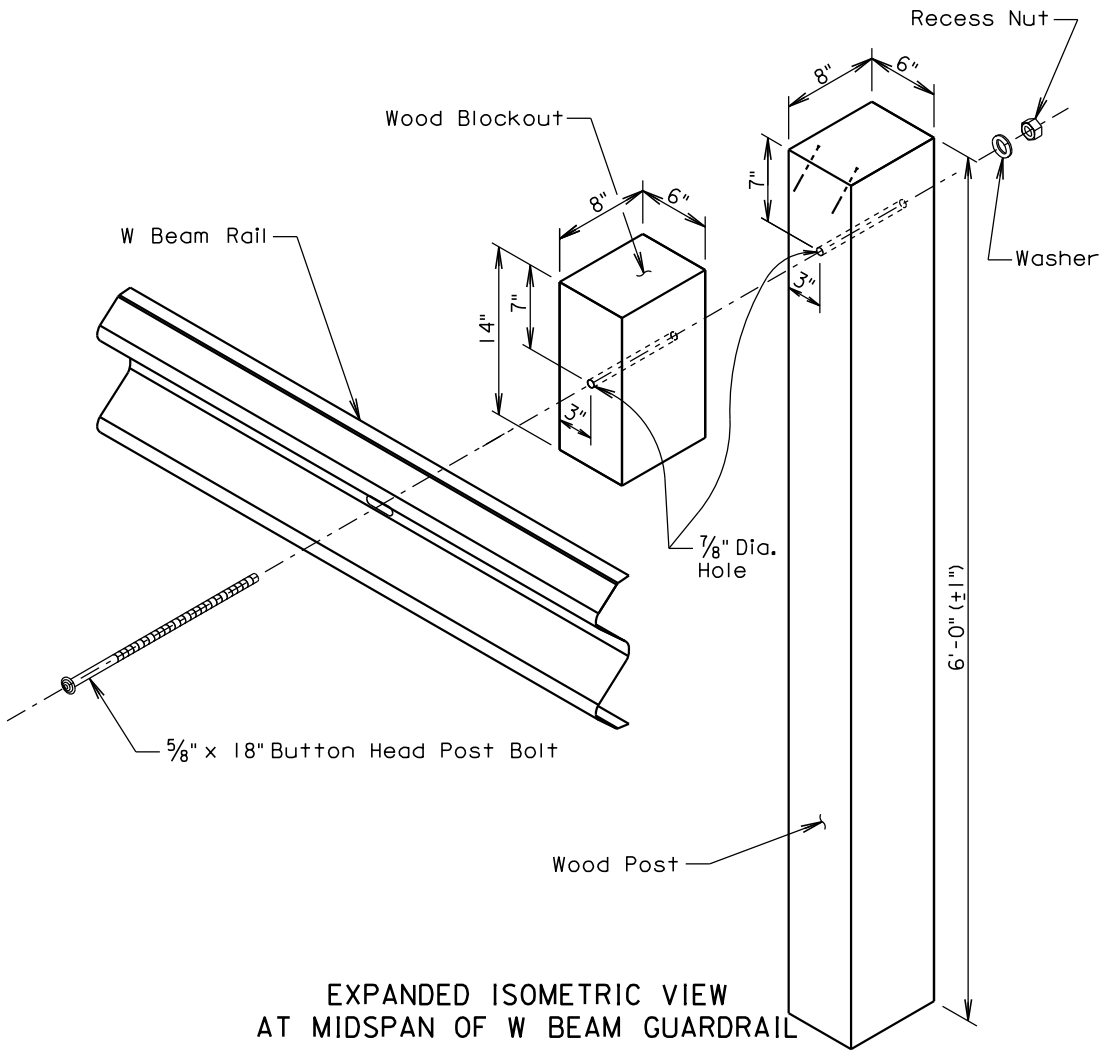
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

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.

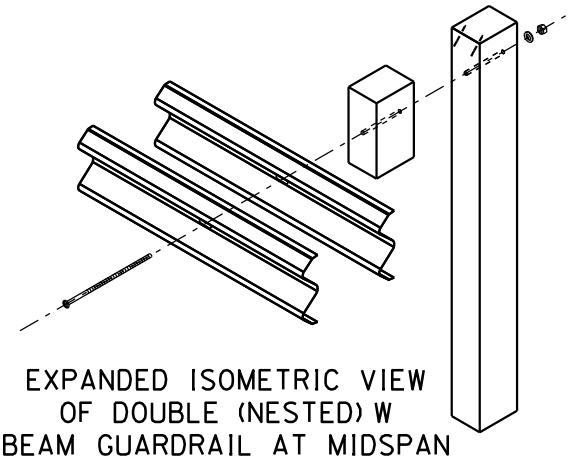
The top of post and top of block shall have a true square cut. The top of block shall be a maximum of ±½ inch from the top of the post.

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	**W BEAM GUARDRAIL**	PLATE NUMBER 630.10 Sheet 1 of 5



EXPANDED ISOMETRIC VIEW
AT MIDSPAN OF W BEAM GUARDRAIL



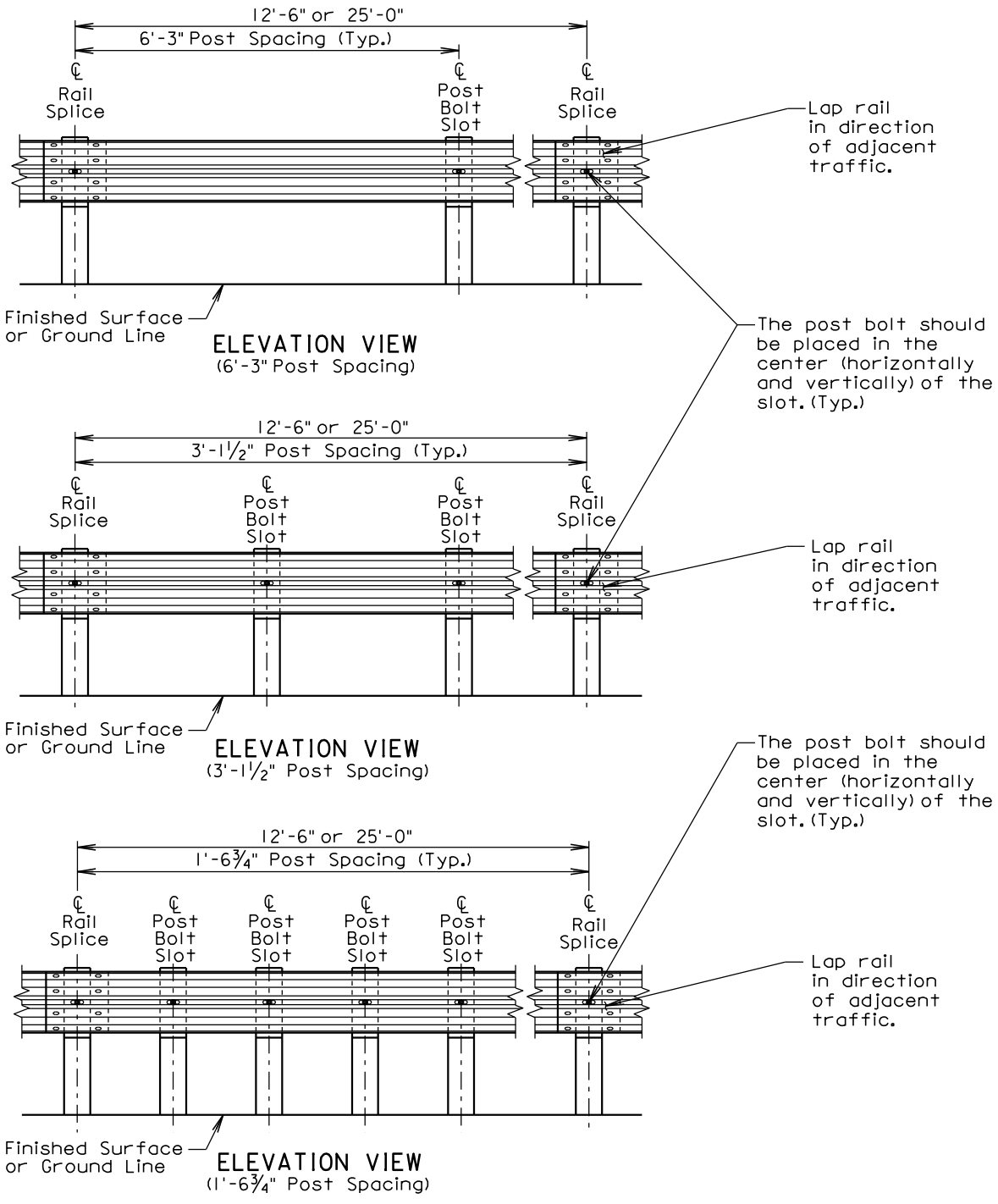
EXPANDED ISOMETRIC VIEW
OF DOUBLE (NESTED) W
BEAM GUARDRAIL AT MIDSPAN
(For Information Only, Not to Scale)

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10 Sheet 2 of 5

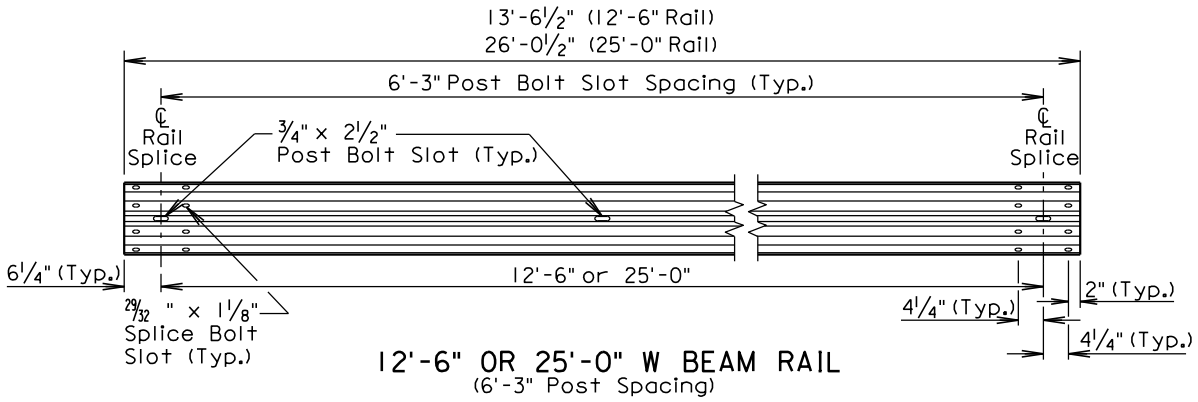
GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

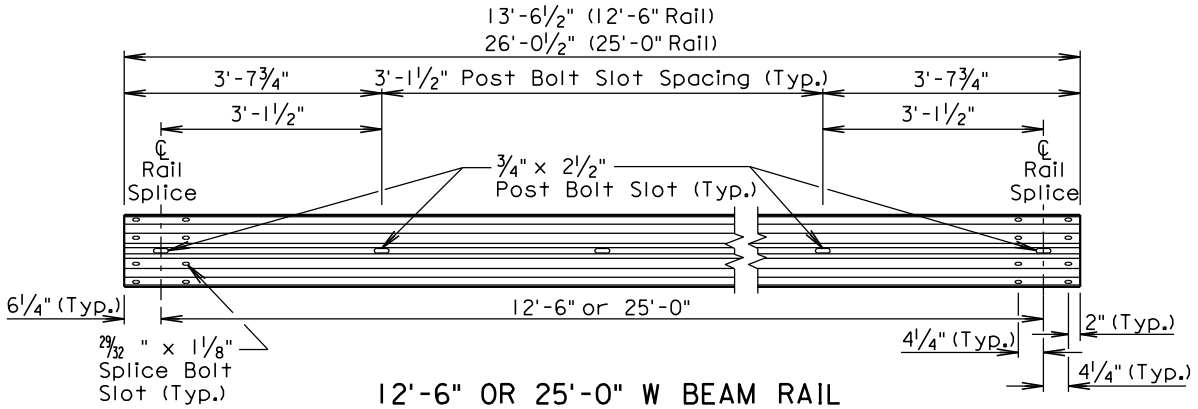


February 14, 2017

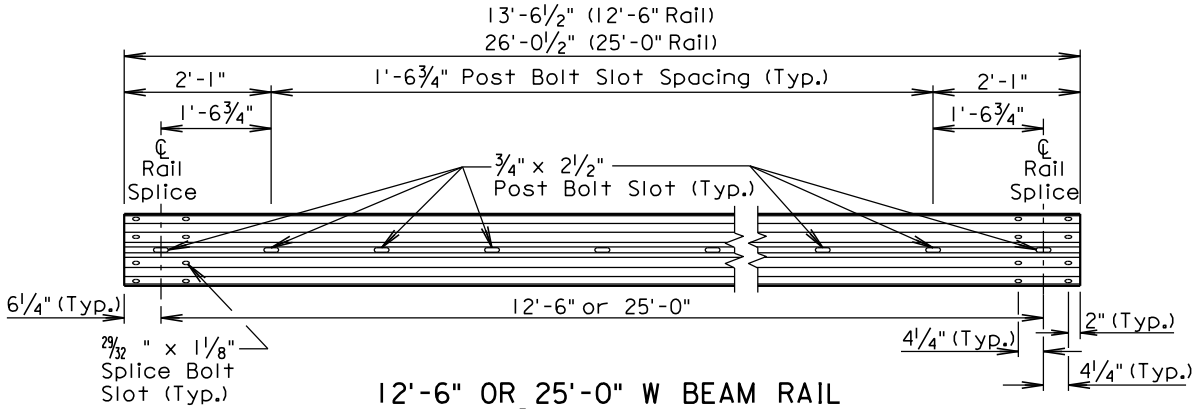
Published Date: 2nd Qtr. 2018	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10 Sheet 3 of 5



12'-6" OR 25'-0" W BEAM RAIL
(6'-3" Post Spacing)



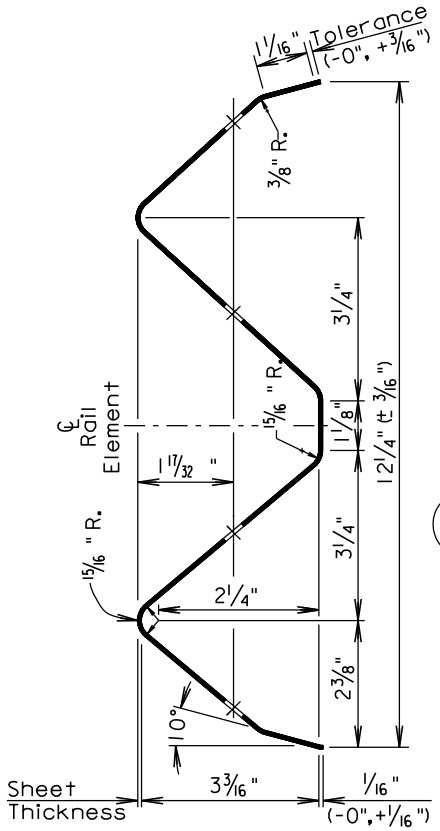
12'-6" OR 25'-0" W BEAM RAIL
(3'-1½" Post Spacing)



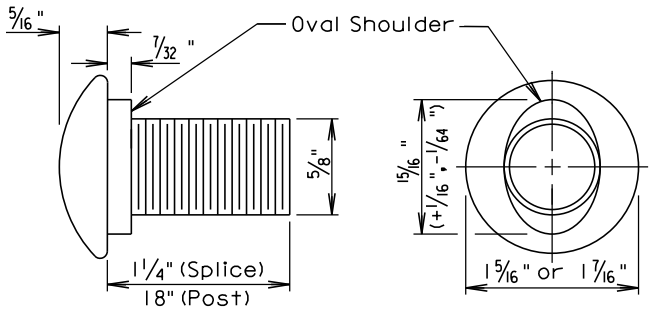
12'-6" OR 25'-0" W BEAM RAIL
(1'-6¾" Post Spacing)

February 14, 2017

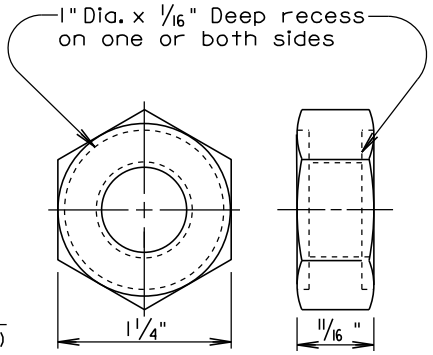
Published Date: 2nd Qtr. 2018	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10 Sheet 4 of 5



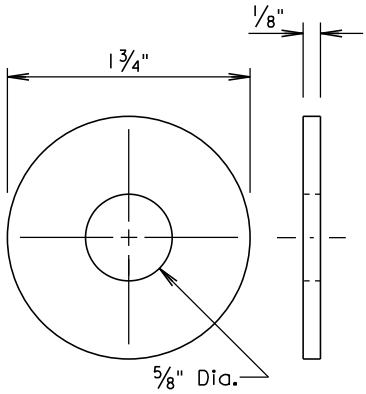
SECTION THROUGH W BEAM RAIL



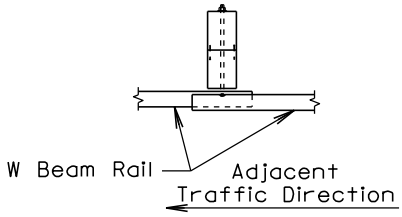
SPLICE BOLT AND POST BOLT
(5/8" Button Head Bolt)



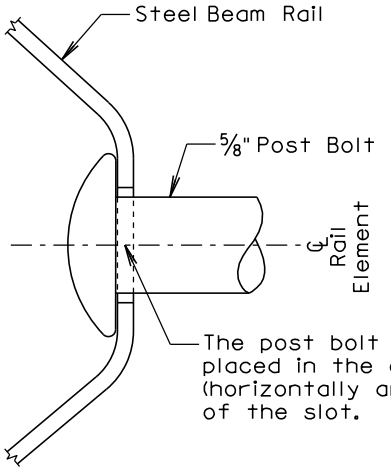
RECESS NUT
(At lap splices, the recess shall be placed against the steel rail.)



WASHER
(The washer shall be placed between the back side of wood post and the recess nut, see sheet 1 and 2.)



PLAN VIEW
(Lap Splice)
(Lap rail in direction of adjacent traffic.)
(8 splice bolts and 8 recess nuts per splice, NO washers)



SECTION VIEW
(At Post Bolt)

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*W BEAM GUARDRAIL*	*PLATE NUMBER* 630.10 *Sheet 5 of 5*

TYPE AND DETAILS OF MGS						
Type of MGS	W Beam Rail Single or Double (Nested)	Blockout Size	Blockout Material	Post Size	Post Material	Post Spacing
1	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"
1C	Single	6"x12"x14"	Wood	6"x8"x7'-6"	Wood	6'-3"
2	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	3'-1 1/2"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6 3/4"
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"

STANDARD PLATE REFERENCE	
Type of MGS	See Standard Plate(s)
1	630.20, 630.22
1C	630.20, 630.25
2	630.20
3	630.20
4	630.20

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 on sheet 2 of 6.

All W beam rail shall be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

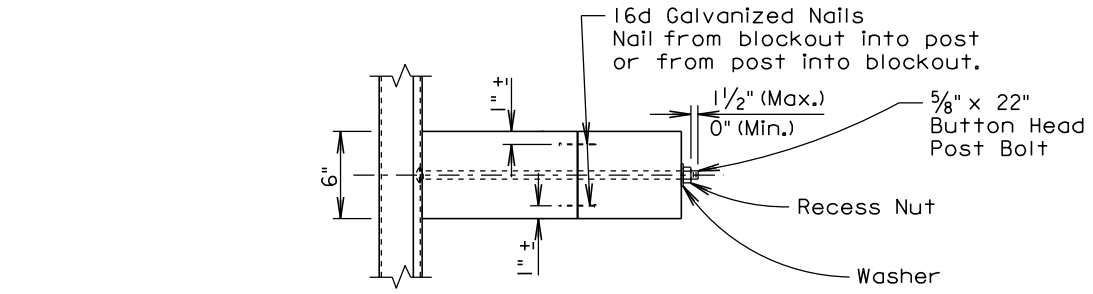
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

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.

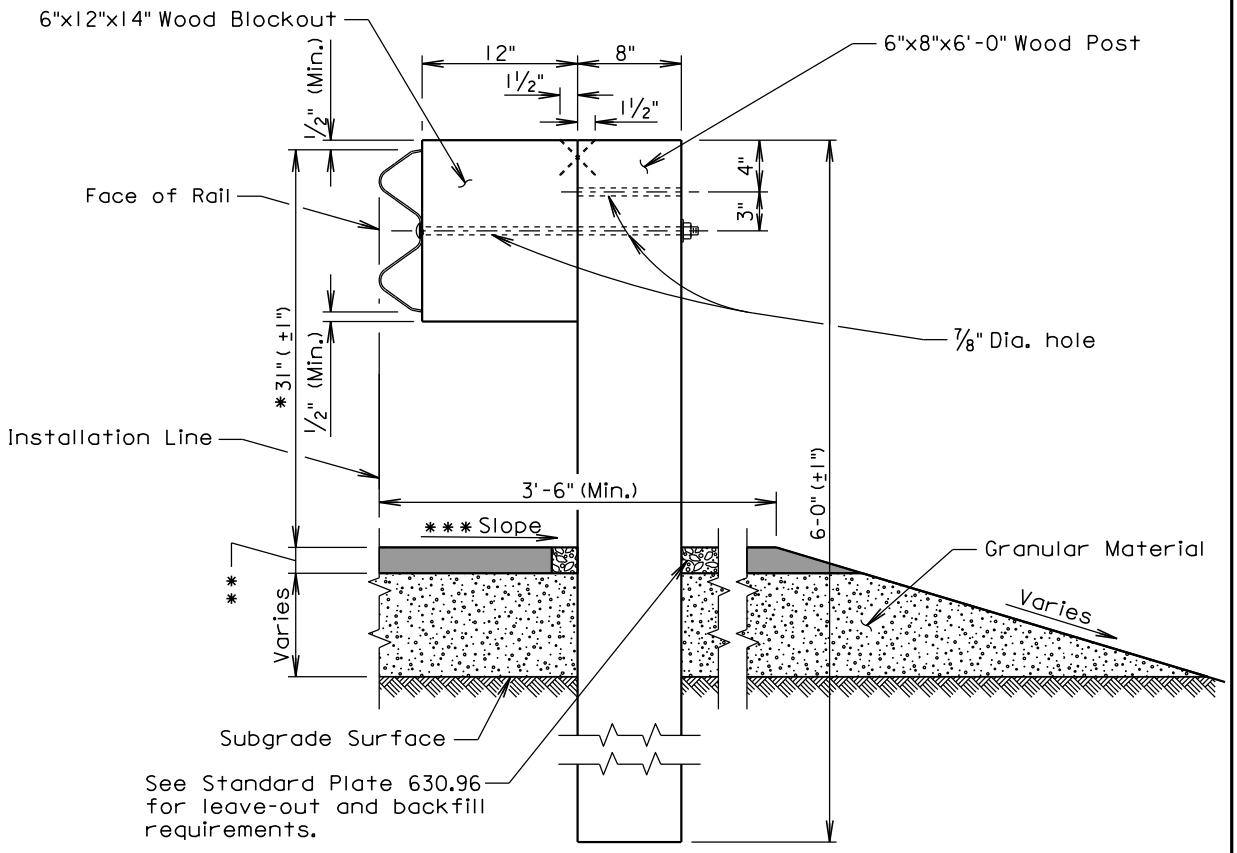
All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective MGS bid item.

September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*MIDWEST GUARDRAIL SYSTEM (MGS)*	*PLATE NUMBER* 630.20
			Sheet 1 of 6



TOP VIEW
(Type 1, 2, or 3 MGS Installation)



TRANSVERSE SECTION
(Type 1, 2, or 3 MGS Installation)

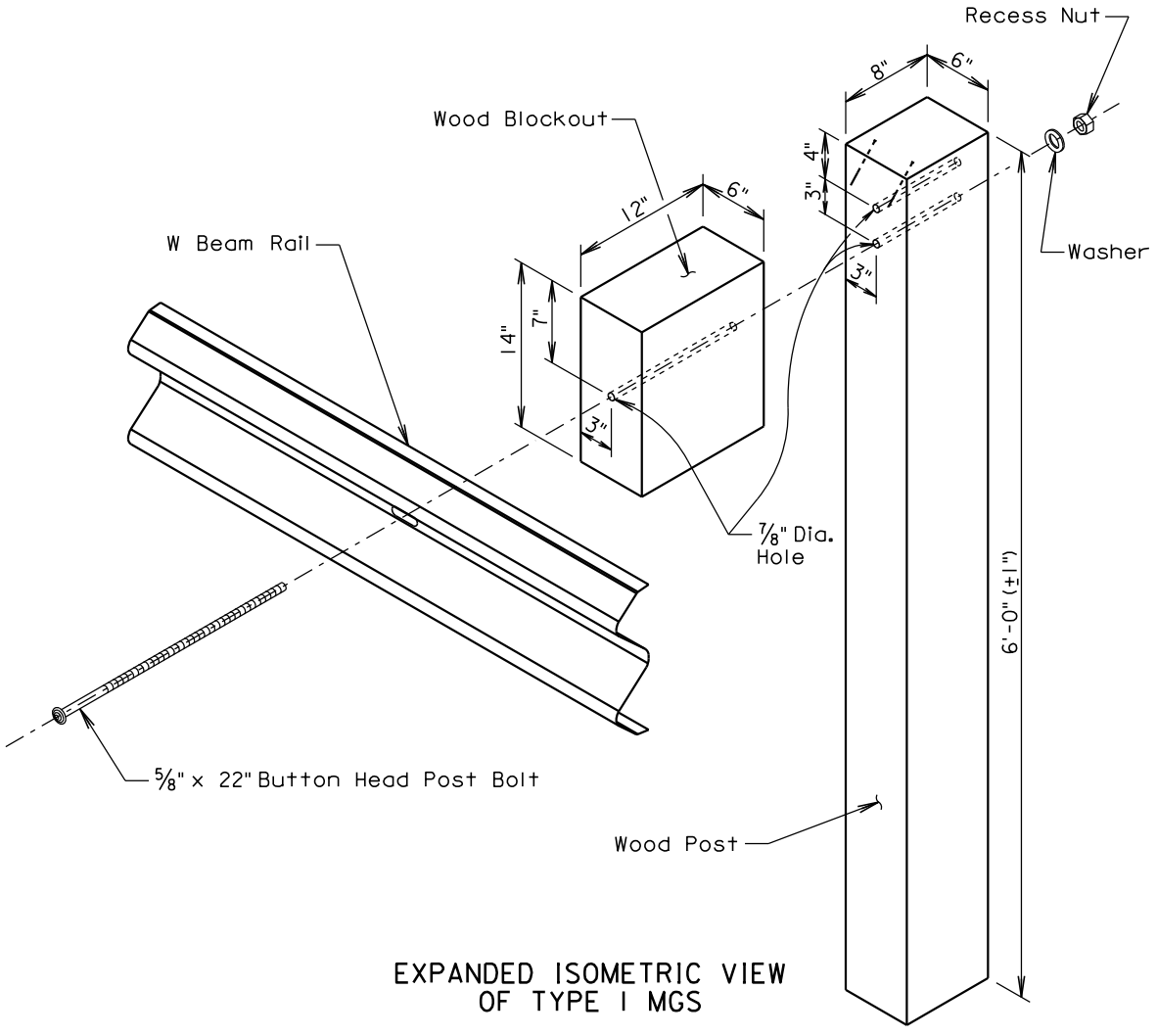
* See Standard Plate 630.99

** 2" asphalt concrete or as specified in the plans.

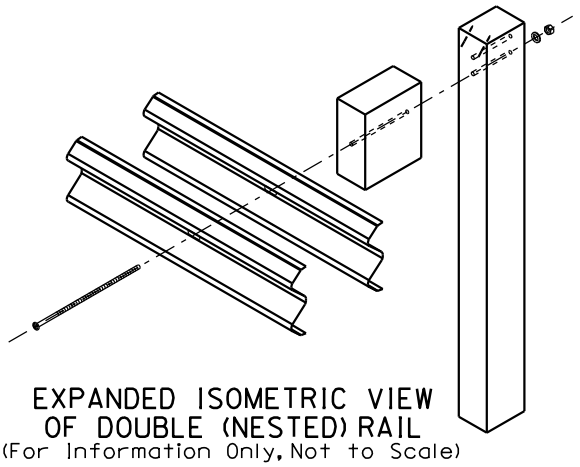
*** The cross slope shall be as specified in the plans; however, the cross slope shall not be steeper than a 10:1 slope.

September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	**MIDWEST GUARDRAIL SYSTEM (MGS)**	PLATE NUMBER 630.20 Sheet 2 of 6



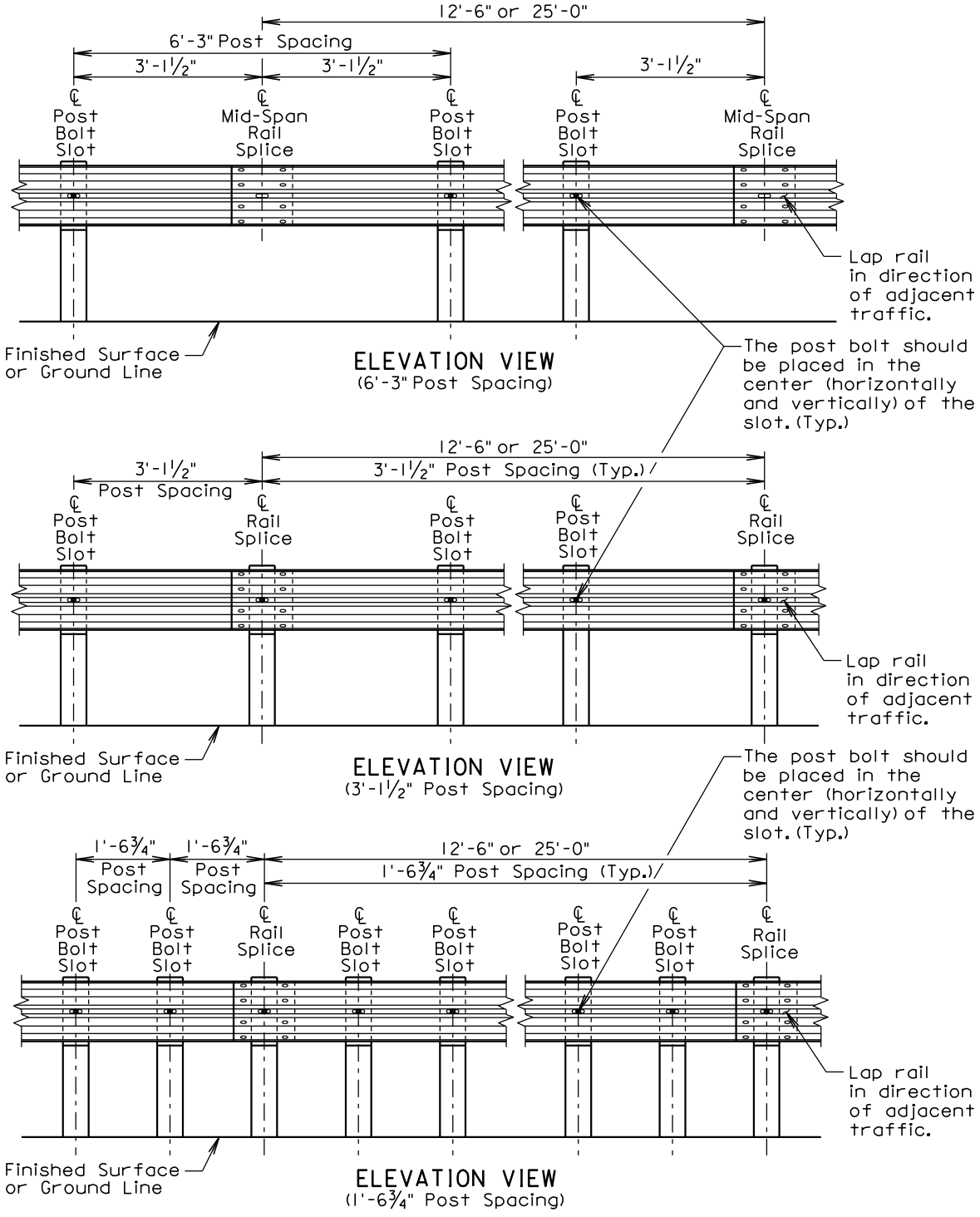
EXPANDED ISOMETRIC VIEW OF TYPE I MGS



EXPANDED ISOMETRIC VIEW OF DOUBLE (NESTED) RAIL
(For Information Only, Not to Scale)

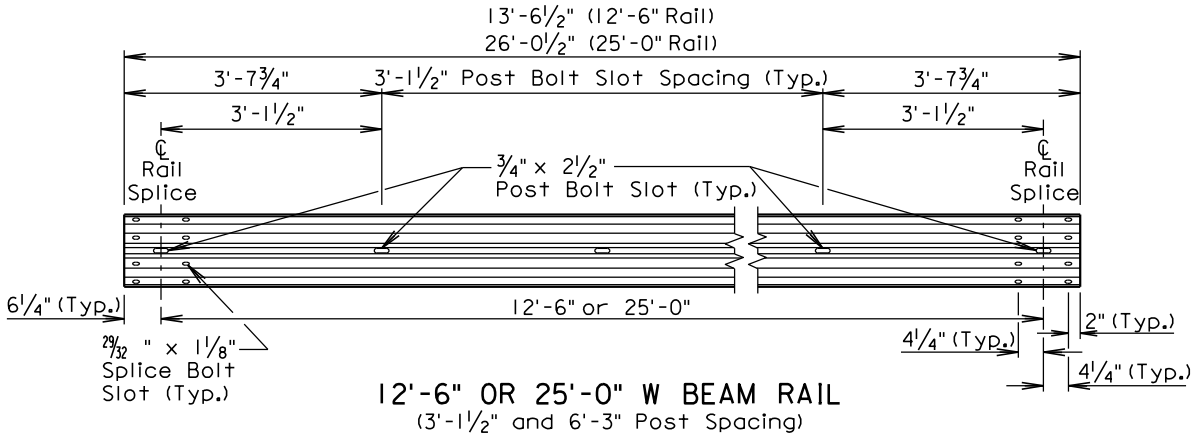
September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20 Sheet 3 of 6

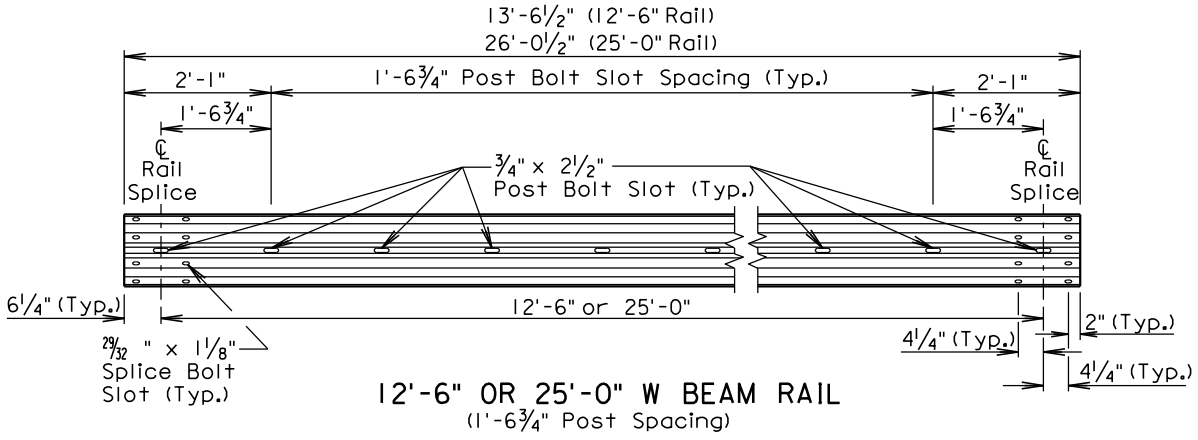


September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*MIDWEST GUARDRAIL SYSTEM (MGS)*	*PLATE NUMBER* 630.20
			Sheet 4 of 6



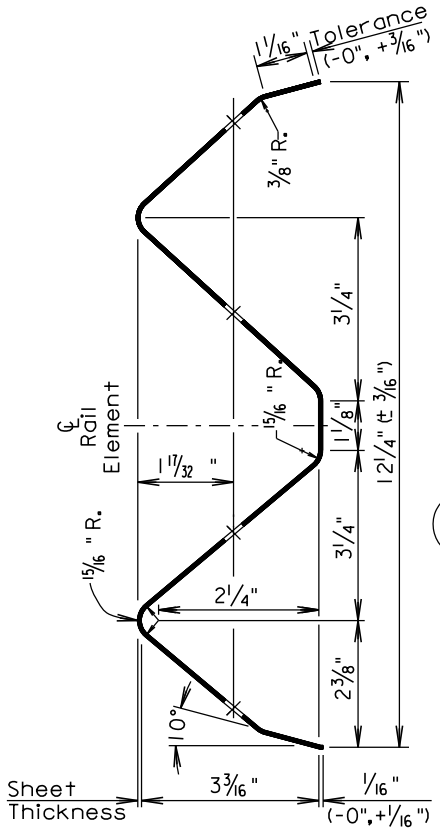
12'-6" OR 25'-0" W BEAM RAIL
(3'-1 1/2" and 6'-3" Post Spacing)



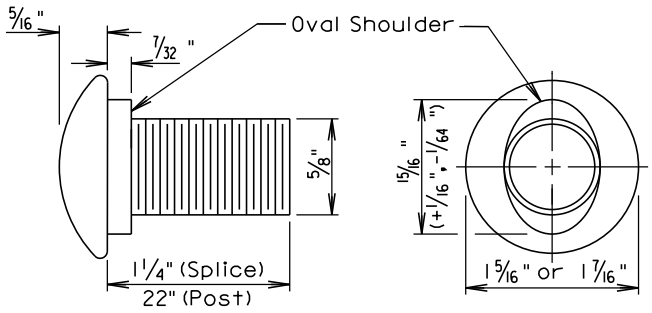
12'-6" OR 25'-0" W BEAM RAIL
(1'-6 3/4" Post Spacing)

September 14, 2017

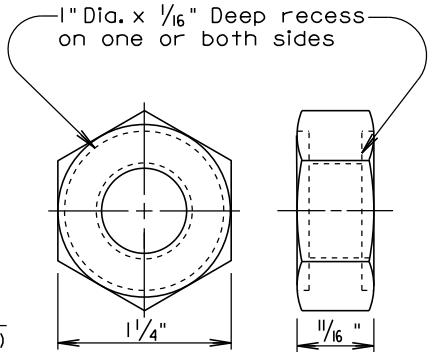
Published Date: 2nd Qtr. 2018	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20 Sheet 5 of 6



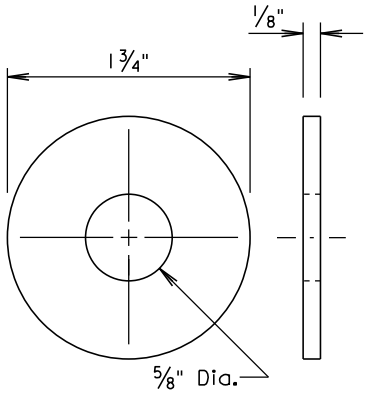
SECTION THROUGH W BEAM RAIL



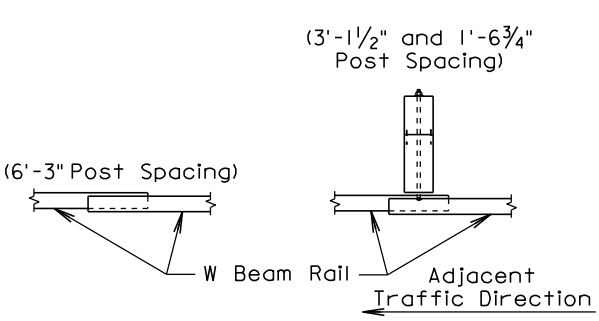
SPLICE BOLT AND POST BOLT
(5/8" Button Head Bolt)



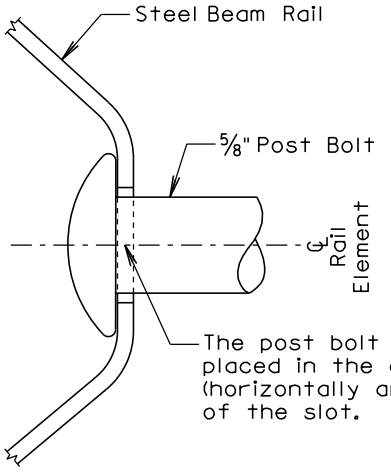
RECESS NUT
(At lap splices, the recess shall be placed against the steel rail.)



WASHER
(The washer shall be placed between the back side of wood post and the recess nut, see sheet 2 and 3.)



PLAN VIEW
(Lap Splices)
(Lap rail in direction of adjacent traffic.)
(8 splice bolts and 8 recess nuts per splice, NO washers)



SECTION VIEW
(At Post Bolt)

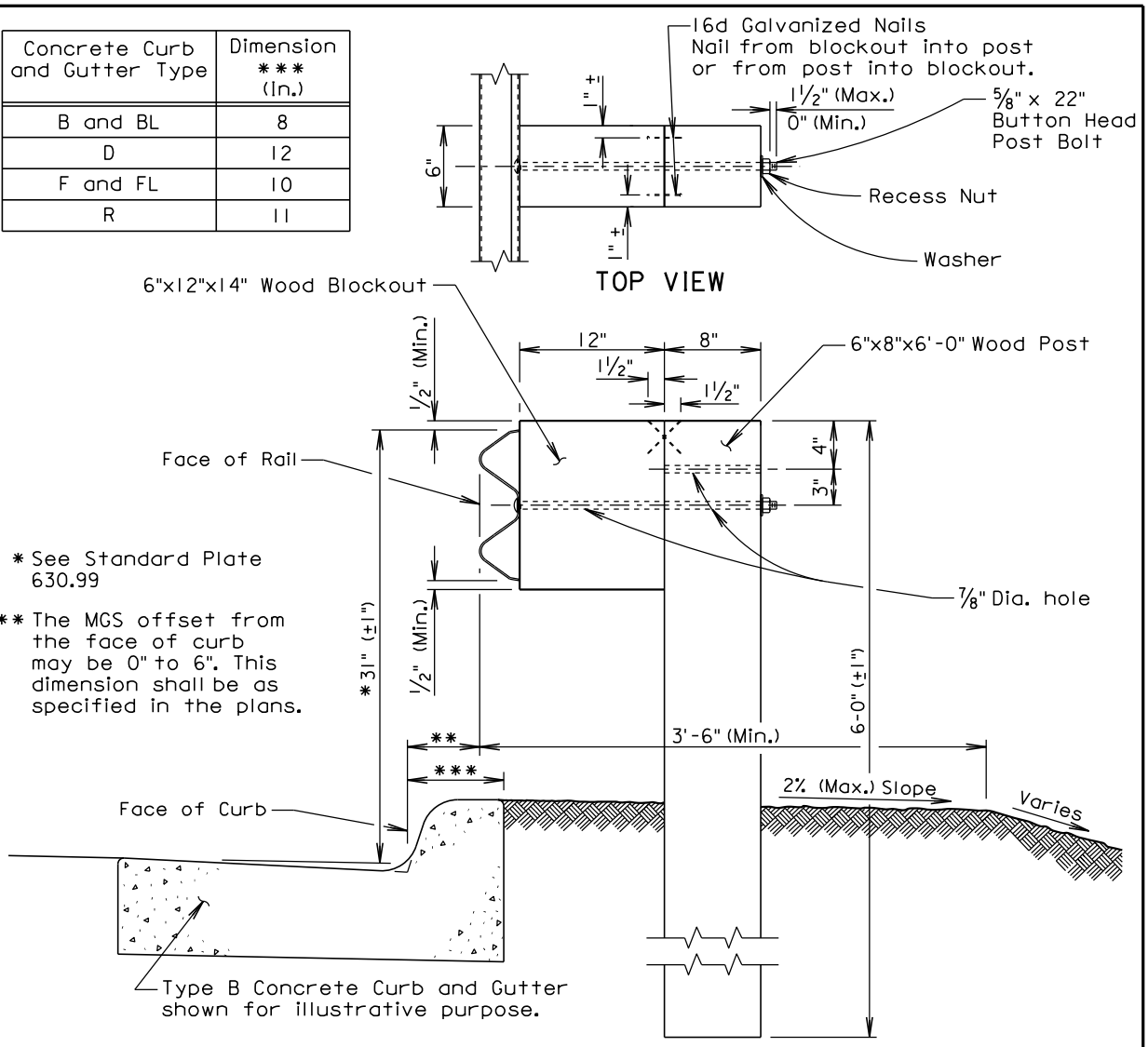
September 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*MIDWEST GUARDRAIL SYSTEM (MGS)*	*PLATE NUMBER* 630.20
			Sheet 6 of 6

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

Concrete Curb and Gutter Type	Dimension *** (In.)
B and BL	8
D	12
F and FL	10
R	11



TRANSVERSE SECTION

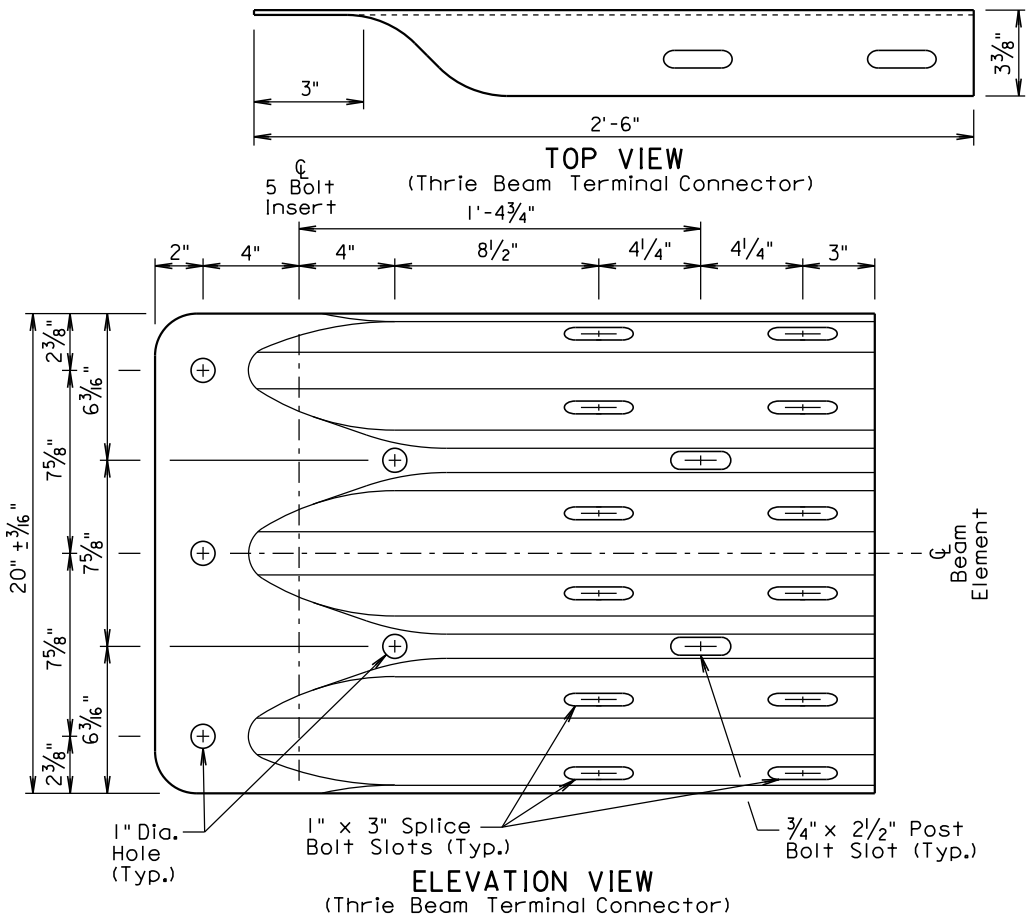
GENERAL NOTES:

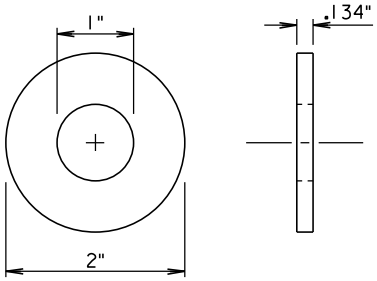
The guardrail on this standard plate is Type 1 MGS. See standard plate 630.20 for specifications regarding Type 1 MGS.

When PCC pavement or asphalt concrete pavement is adjacent to the post, see standard plate 630.96 for leave-out and backfill requirements.

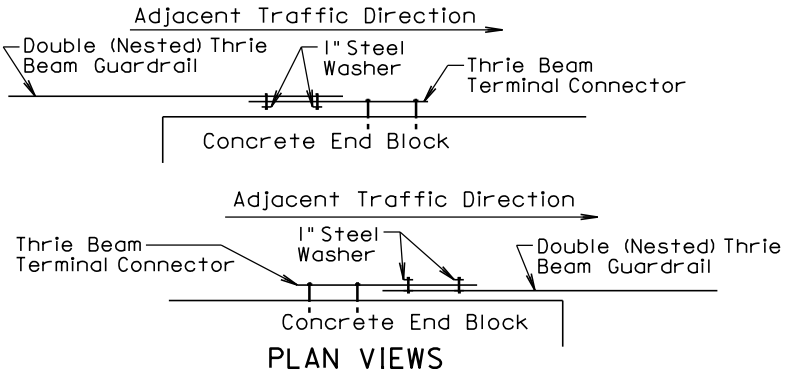
February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS) AT CURB AND GUTTER	PLATE NUMBER 630.22 Sheet 1 of 1





1" STEEL WASHER
(12 washers required)



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

GENERAL NOTES:

Thrie Beam Terminal Connectors shall be 10 gauge.

When the thrie 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 thrie beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

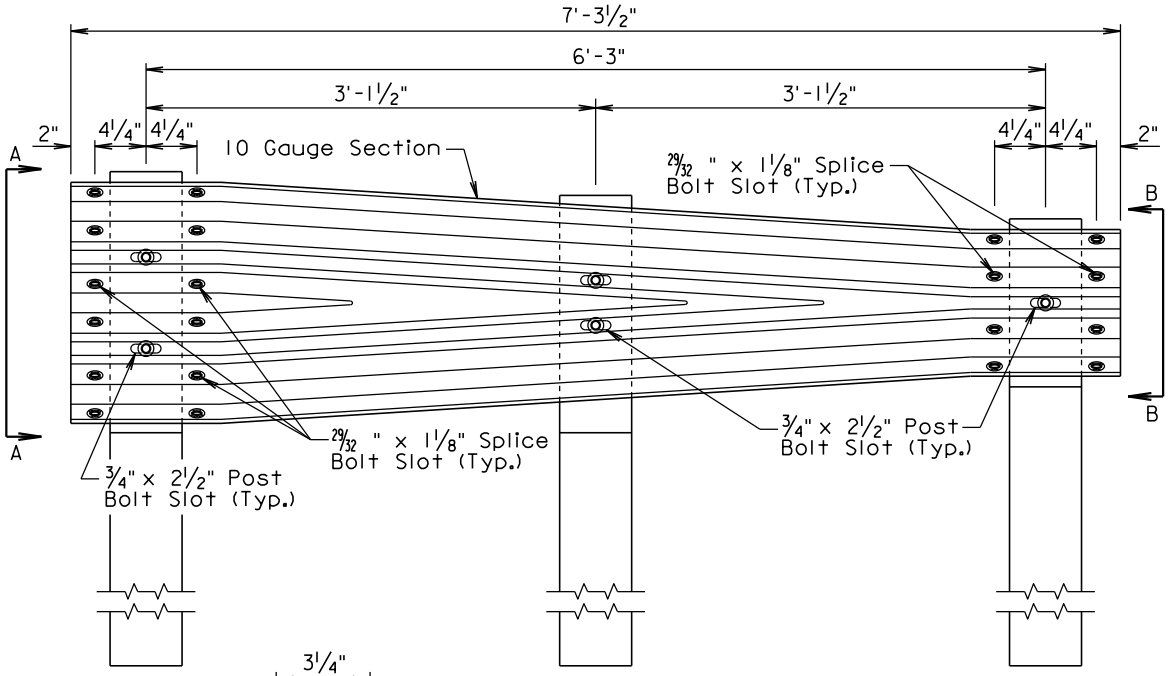
There will be no separate payment for furnishing and installing the thrie beam terminal connector. All costs for furnishing and installing the thrie beam terminal connector shall be incidental to the contract unit price of the respective guardrail item it is attached to.

February 14, 2017

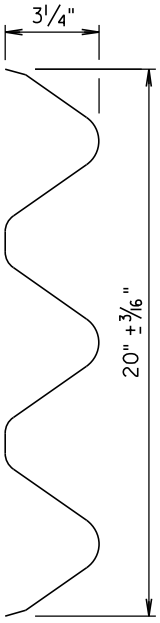
Published Date: 2nd Qtr. 2018	SDDOT	*THRIE BEAM TERMINAL CONNECTOR*	*PLATE NUMBER* 630.47 *Sheet 1 of 1*

GUARDRAIL REPAIR

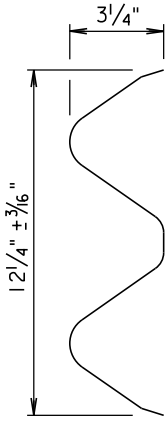
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



ELEVATION VIEW



VIEW A-A



VIEW B-B

GENERAL NOTES:

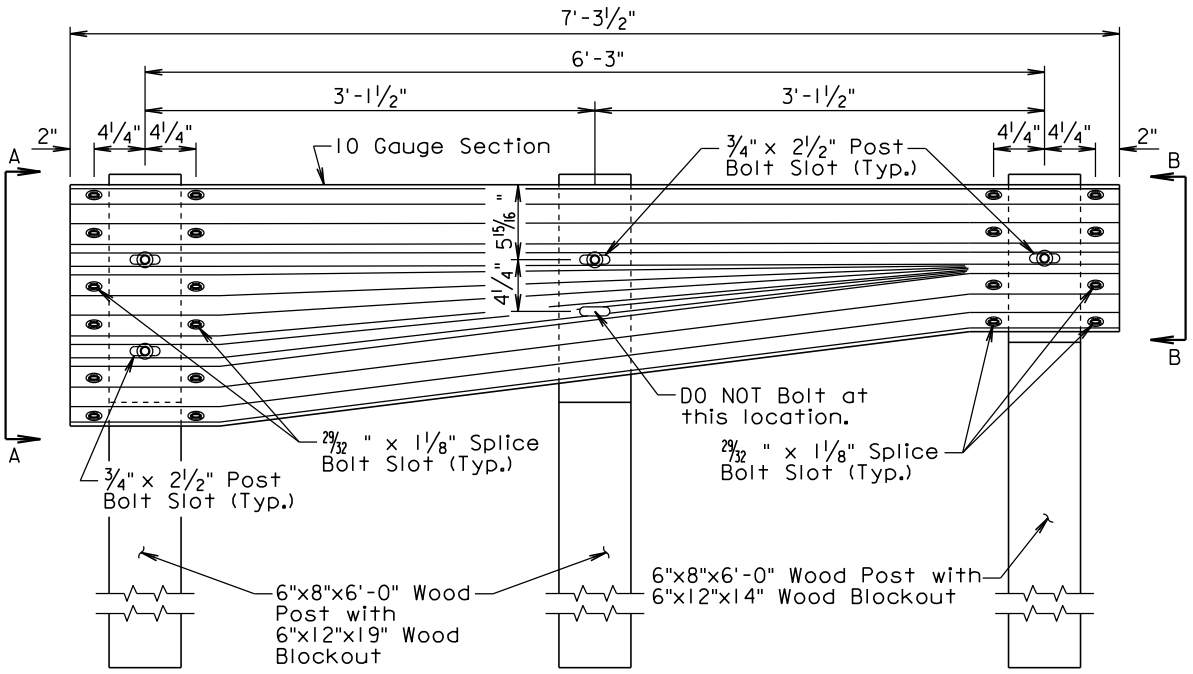
All costs for furnishing and installing the W beam to thrie beam guardrail transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

February 14, 2017

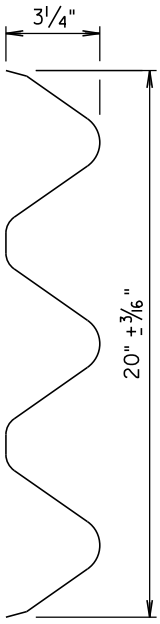
Published Date: 2nd Qtr. 2018	SDDOT	*W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION*	*PLATE NUMBER 630.48*
			Sheet 1 of 1

GUARDRAIL REPAIR

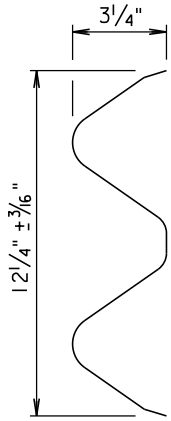
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



ELEVATION VIEW



VIEW A-A



VIEW B-B

GENERAL NOTES:

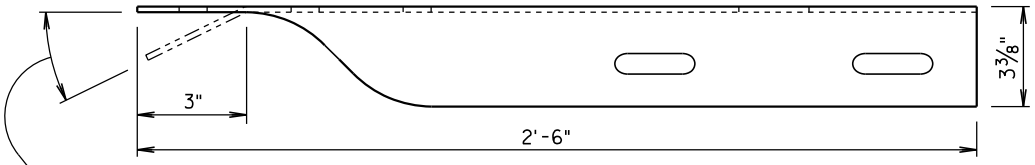
All costs for furnishing and installing the asymmetrical W beam to thrie beam guardrail transition including labor, equipment, and materials including two posts, two blocks, asymmetrical W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for the corresponding guardrail transition bid item.

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*ASYMMETRICAL W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION*	*PLATE NUMBER* 630.49 *Sheet 1 of 1*

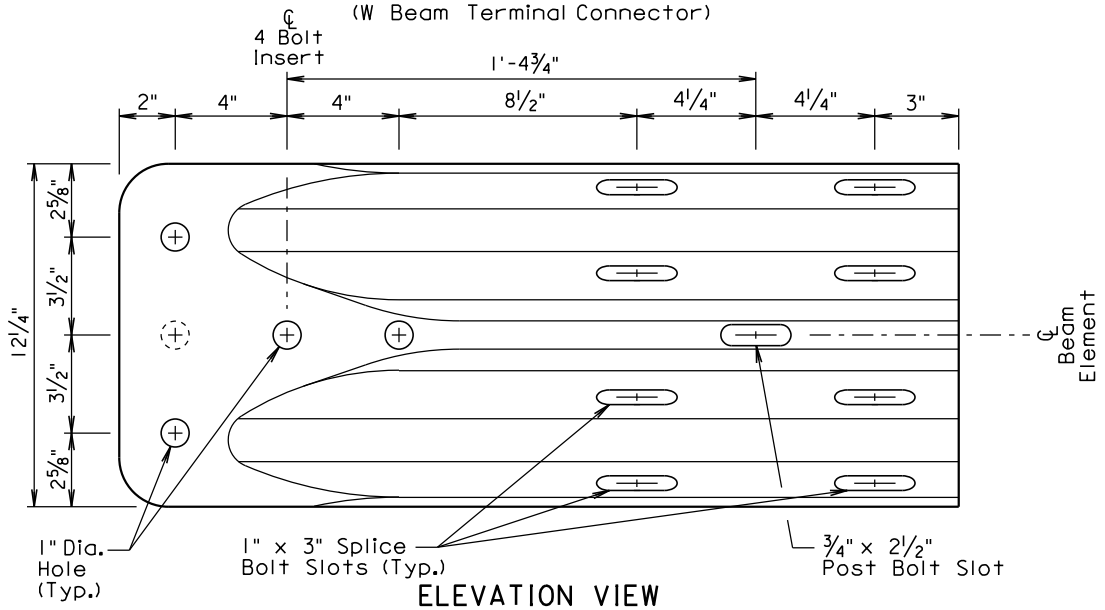
GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

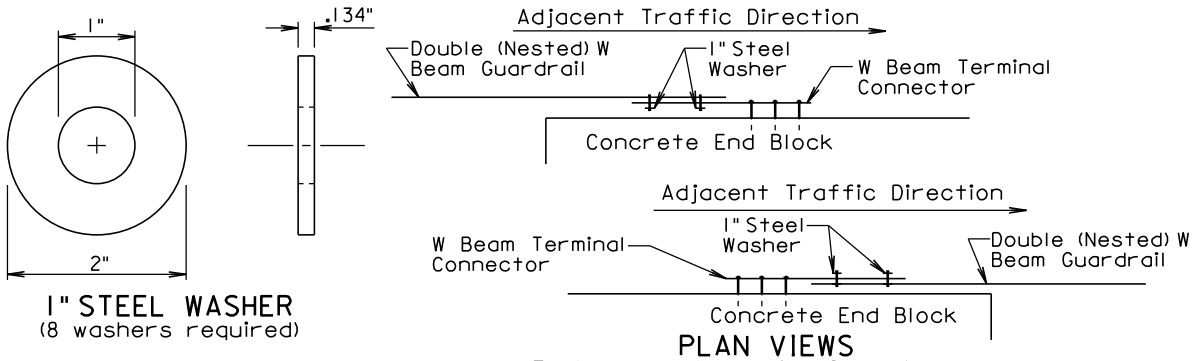


An extra hole and an approximate 26° bend shall be required only for the Special Anchor Assembly and Breakaway Cable Terminal. The Modified W Beam Terminal Connector placement detail is shown on standard plates 630.84 and 630.85.

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:

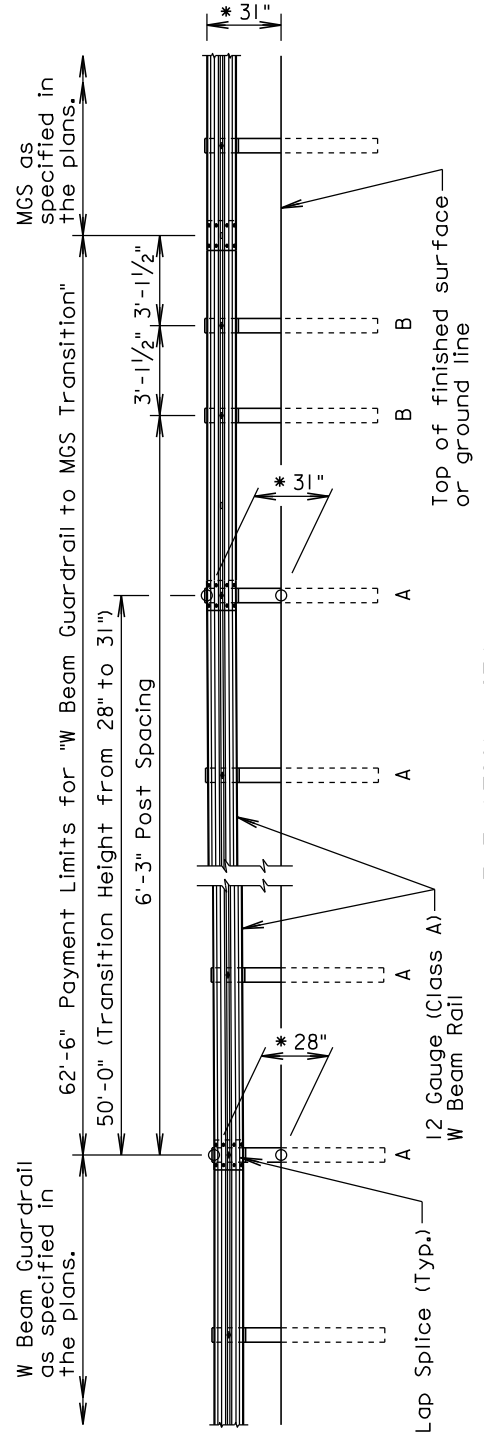
W Beam Terminal Connectors shall be 10 gauge.

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	SDDOT	*W BEAM TERMINAL CONNECTOR*	*PLATE NUMBER* 630.59 *Sheet 1 of 1*



A: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout (See standard plate 630.10)

B: 6" x 8" x 6'-0" Wood Post and 6" x 12" x 14" Wood Blockout (See standard plate 630.20)

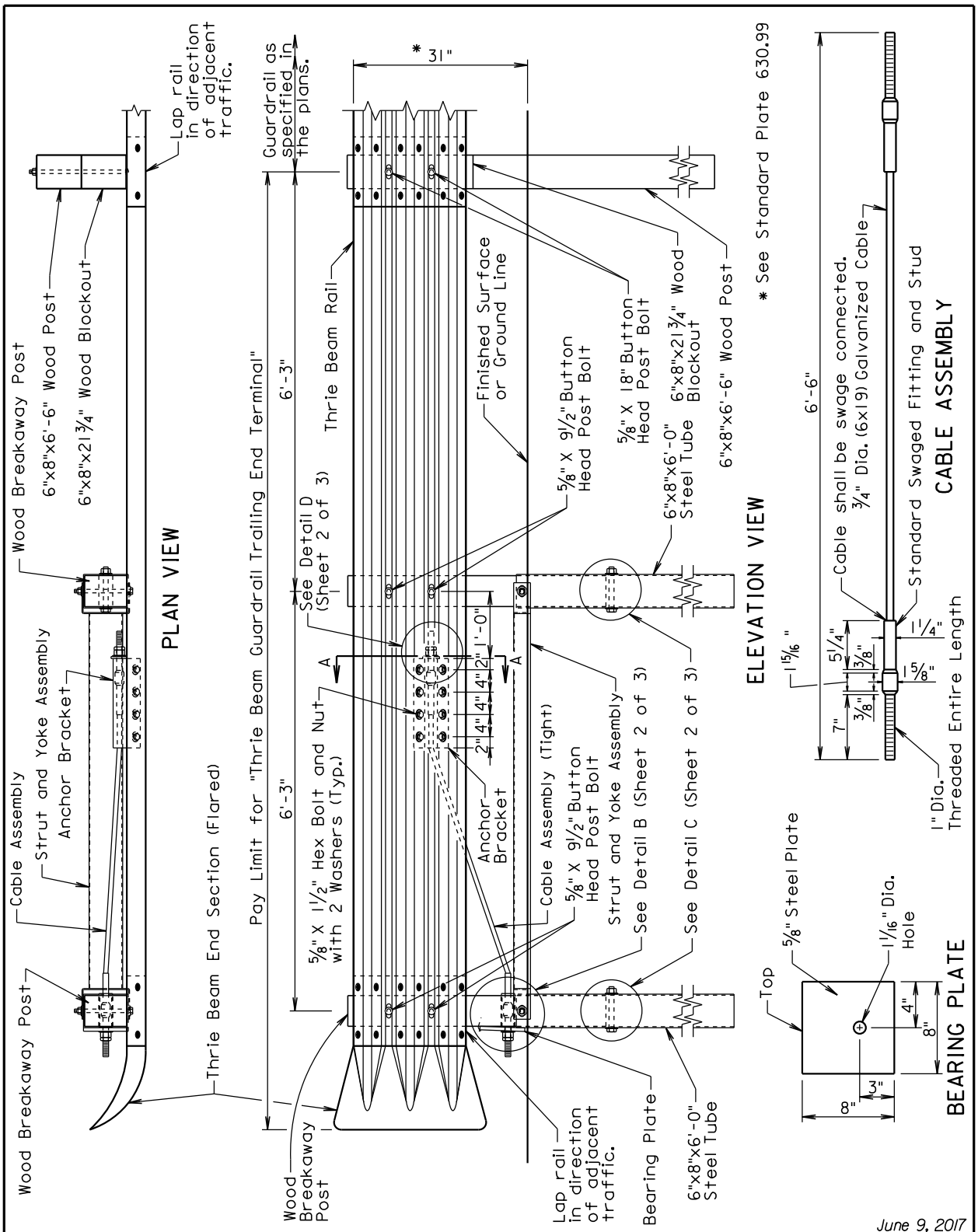
* See standard plate 630.99

GENERAL NOTES:

All costs for furnishing and installing the W beam guardrail to MGS transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, hardware, and incidentals shall be included in the contract unit price per each for "W Beam Guardrail to MGS Transition".

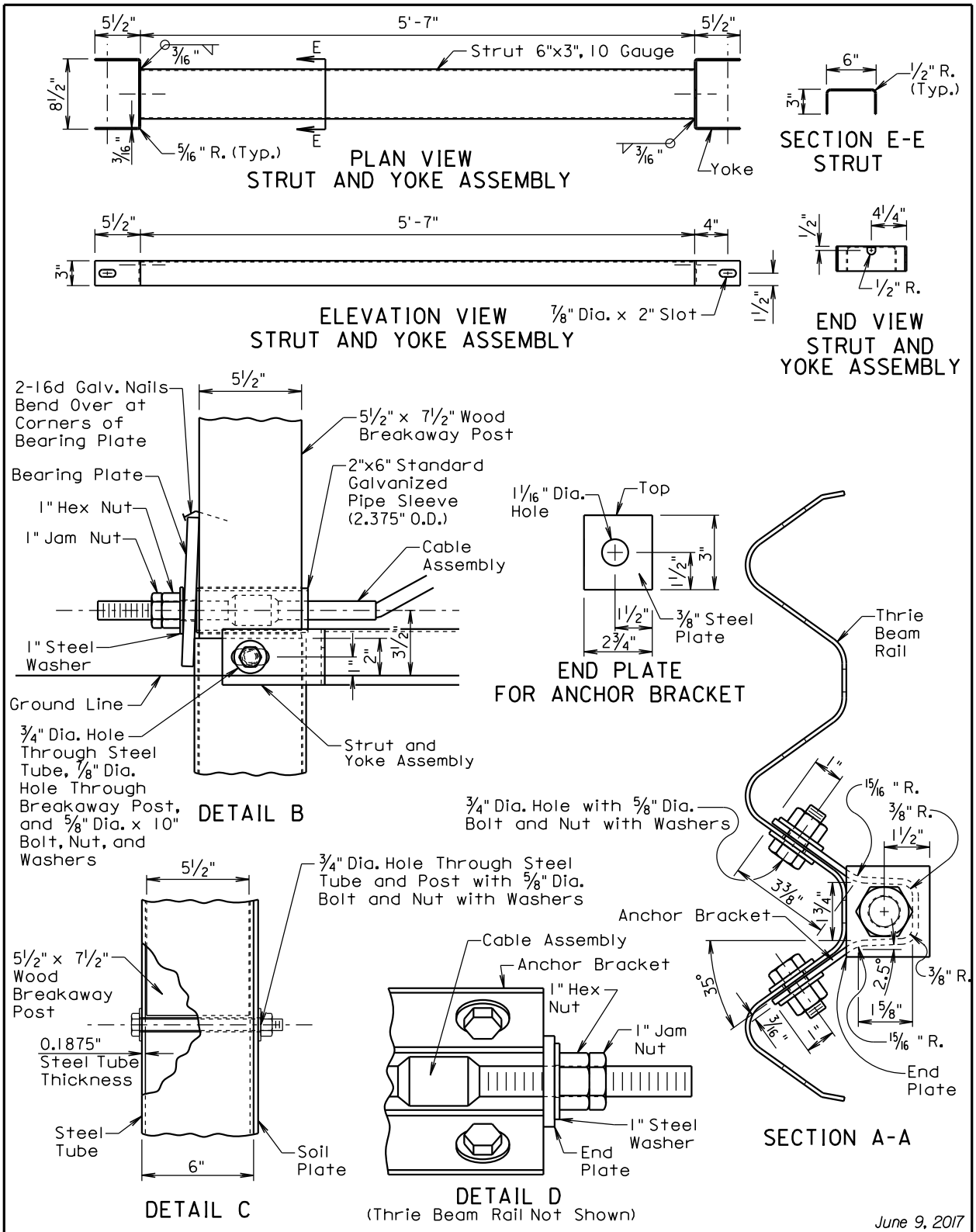
February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***W BEAM GUARDRAIL TO MGS (MIDWEST GUARDRAIL SYSTEM) TRANSITION***	*PLATE NUMBER* 630.64 *Sheet 1 of 1*



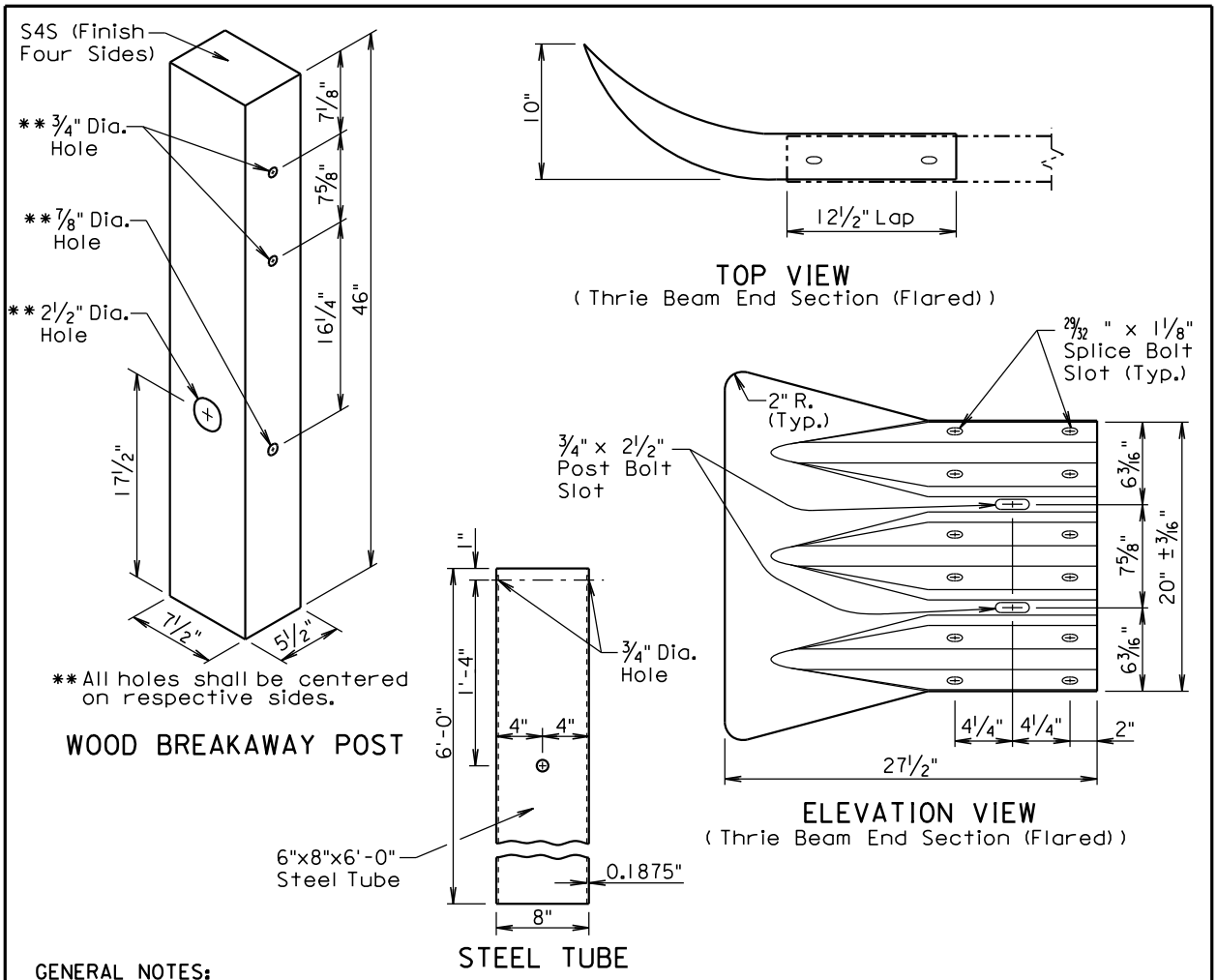
June 9, 2017

Published Date: 2nd Qtr. 2018	SDDOT	THRIE BEAM GUARDRAIL TRAILING END TERMINAL	PLATE NUMBER 630.80 Sheet 1 of 3



June 9, 2017

Published Date: 2nd Qtr. 2018	SDDOT	THRIE BEAM GUARDRAIL TRAILING END TERMINAL	PLATE NUMBER 630.80
			Sheet 2 of 3



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 M111.

All hardware shall be galvanized in accordance with ASTM A153.

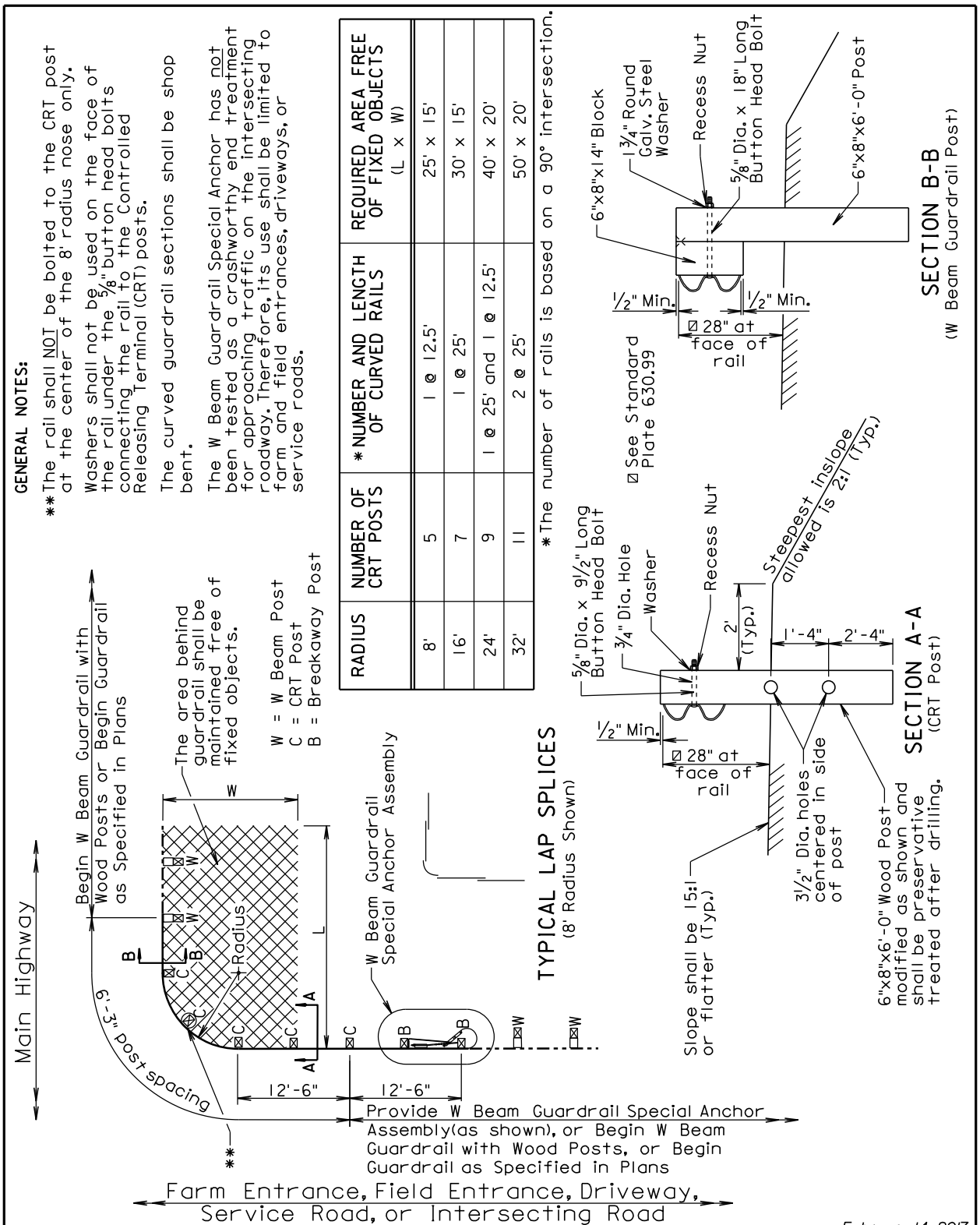
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

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, post and blockout, 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".

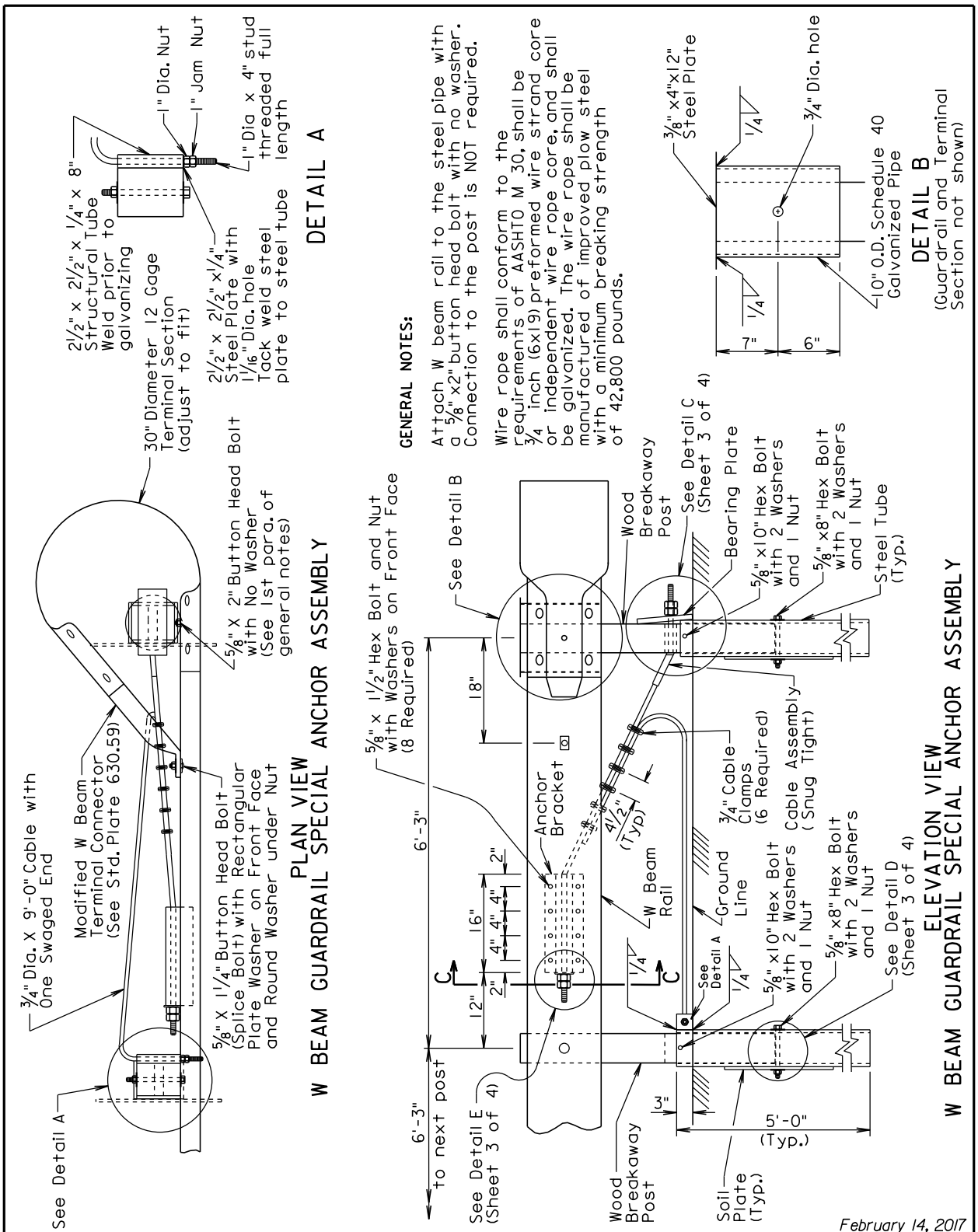
June 9, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*THRIE BEAM GUARDRAIL TRAILING END TERMINAL*	*PLATE NUMBER* 630.80 *Sheet 3 of 3*



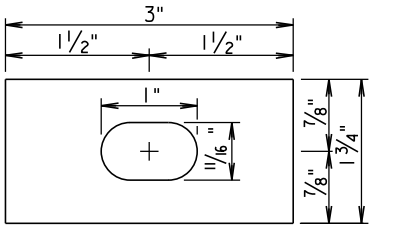
February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY	PLATE NUMBER 630.84 Sheet 1 of 4

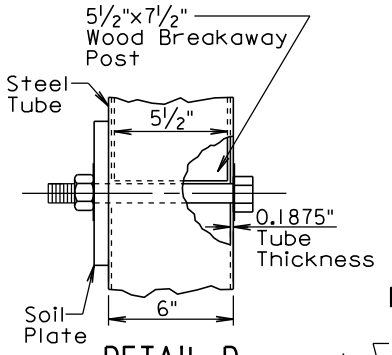

DETAIL A
1" Dia. Nut
1" Jam Nut
1" Dia x 4" stud threaded full length
2½" x 2½" x ¼" x 8" Structural Tube Weld prior to galvanizing
2½" x 2½" x ¼" Steel Plate with 1⅛" Dia. hole Tack weld steel plate to steel tube
30" Diameter 12 Gage Terminal Section (adjust to fit)
⅝" X 2" Button Head Bolt with No Washer (See 1st para. of general notes)
PLAN VIEW
W BEAM GUARDRAIL SPECIAL ANCHOR ASSEMBLY
¾" Dia. X 9'-0" Cable with One Swaged End
Modified W Beam Terminal Connector (See Std. Plate 630.59)
⅝" X 1¼" Button Head Bolt (Splice Bolt) with Rectangular Plate Washer on Front Face and Round Washer under Nut
See Detail A
GENERAL NOTES:
Attach W beam rail to the steel pipe with a ⅝" x 2" button head bolt with no washer. Connection to the post is NOT required.
Wire rope shall conform to the requirements of AASHTO M 30, shall be ¾" inch (6x19) preformed wire strand core or independent wire rope core, and shall be galvanized. The wire rope shall be manufactured of improved plow steel with a minimum breaking strength of 42,800 pounds.
⅝" x 1½" Hex Bolt and Nut with Washers on Front Face (8 Required)
See Detail B
Wood Breakaway Post
See Detail C (Sheet 3 of 4)
Bearing Plate
⅝" x10" Hex Bolt with 2 Washers and 1 Nut
⅝" x8" Hex Bolt with 2 Washers and 1 Nut
Steel Tube (Typ.)
18"
6'-3"
6'-3" to next post
See Detail E (Sheet 3 of 4)
Anchor Bracket
4½" (Typ.)
¾" Cable Clamps (6 Required)
Cable Assembly (Snug Tight)
W Beam Rail
Ground Line
See Detail A
¼
⅝" x10" Hex Bolt with 2 Washers and 1 Nut
⅝" x8" Hex Bolt with 2 Washers and 1 Nut
See Detail D (Sheet 3 of 4)
3"
5'-0" (Typ.)
Soil Plate (Typ.)
Wood Breakaway Post
16"
12"
4" 4" 4"
2"
2"
C
C
ELEVATION VIEW
W BEAM GUARDRAIL SPECIAL ANCHOR ASSEMBLY
⅜" x4"x12" Steel Plate
¼
¾" Dia. hole
10" O.D. Schedule 40 Galvanized Pipe
7"
6"
DETAIL B
(Guardrail and Terminal Section not shown)
February 14, 2017
Published Date: 2nd Qtr. 2018
SDDOT
SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY
PLATE NUMBER 630.84
Sheet 2 of 4

GUARDRAIL REPAIR

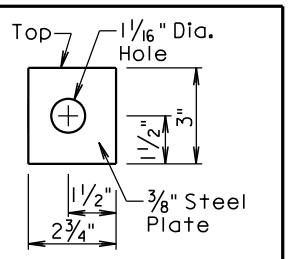
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



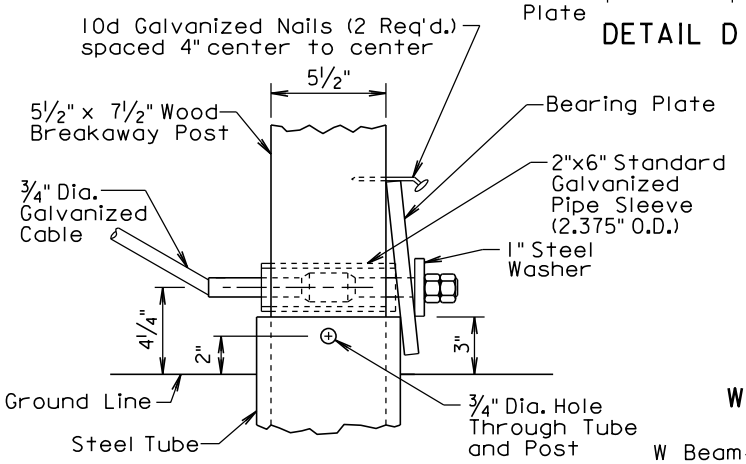
RECTANGULAR PLATE WASHER



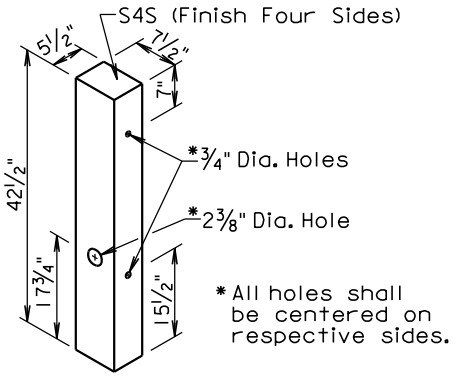
DETAIL D



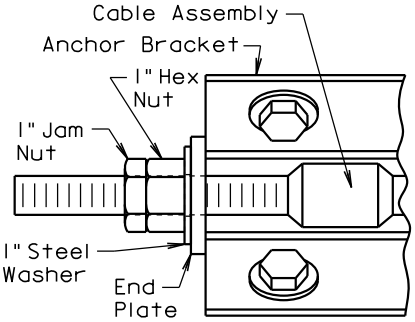
END PLATE
FOR ANCHOR BRACKET



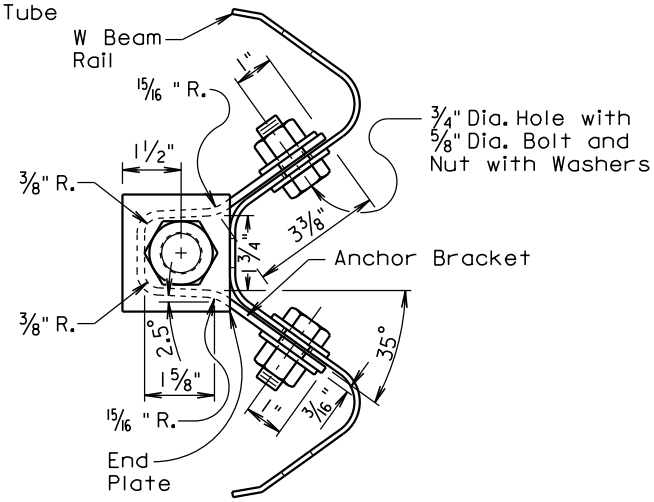
DETAIL C



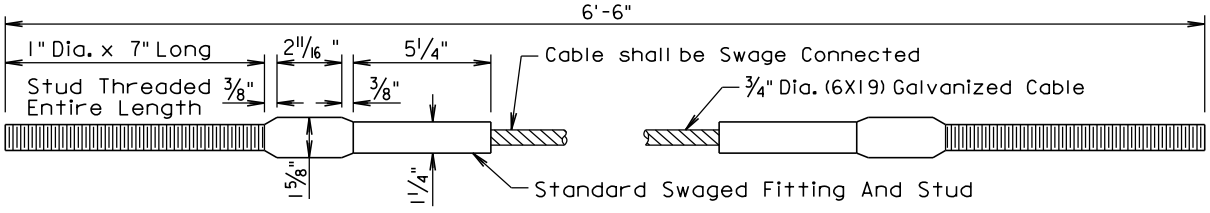
WOOD BREAKAWAY POST



DETAIL E
(W Beam Rail Not Shown)



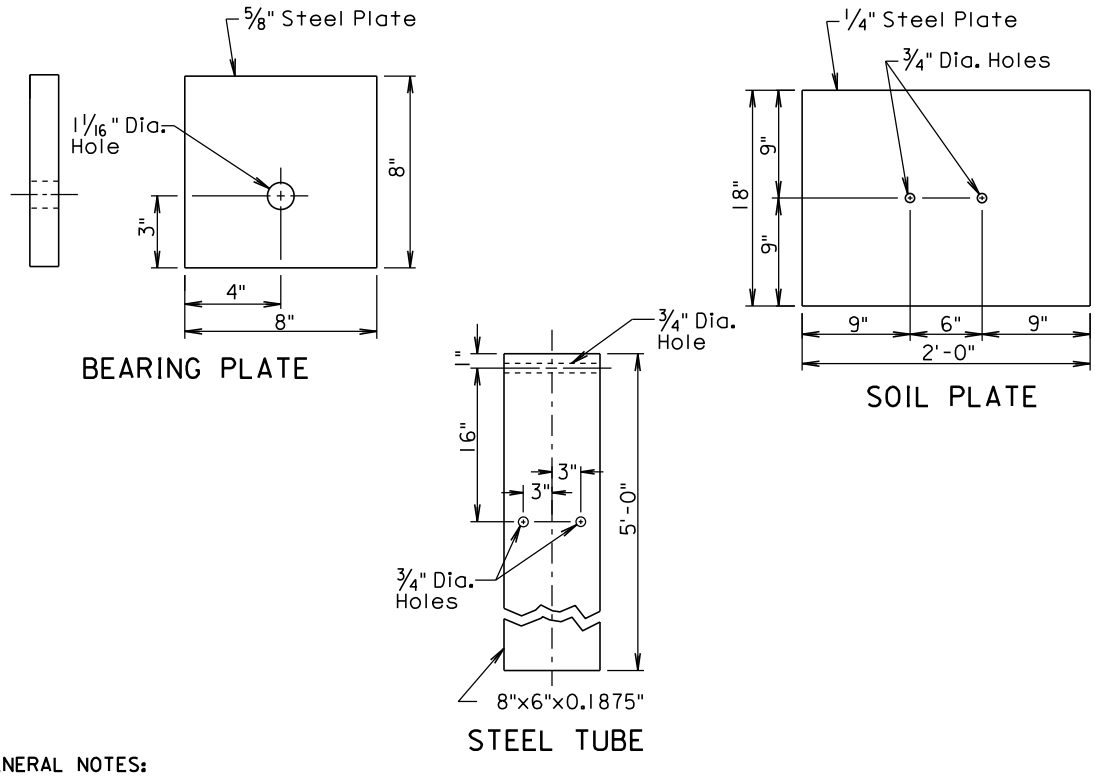
SECTION C-C



CABLE ASSEMBLY

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY***	***PLATE NUMBER*** 630.84 *Sheet 3 of 4*



GENERAL NOTES:

The wood breakaway post shall be in conformance with Section 630.2 A. of the Specifications.

The bolts shall be in conformance with ASTM A307 and the nuts shall be in conformance with ASTM A563, Grade A or better. The bolts and nuts shall be galvanized in accordance with ASTM A153.

All angles, channels, and plates shall conform to the requirements of ASTM A36 and the structural tubing shall conform to ASTM A500. Welding shall meet the current requirements of the Structural Welding Code AWS D1.1. All structural steel shall be galvanized in accordance with ASTM A123. Punching, drilling, cutting, or welding will NOT be permitted after galvanizing.

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.

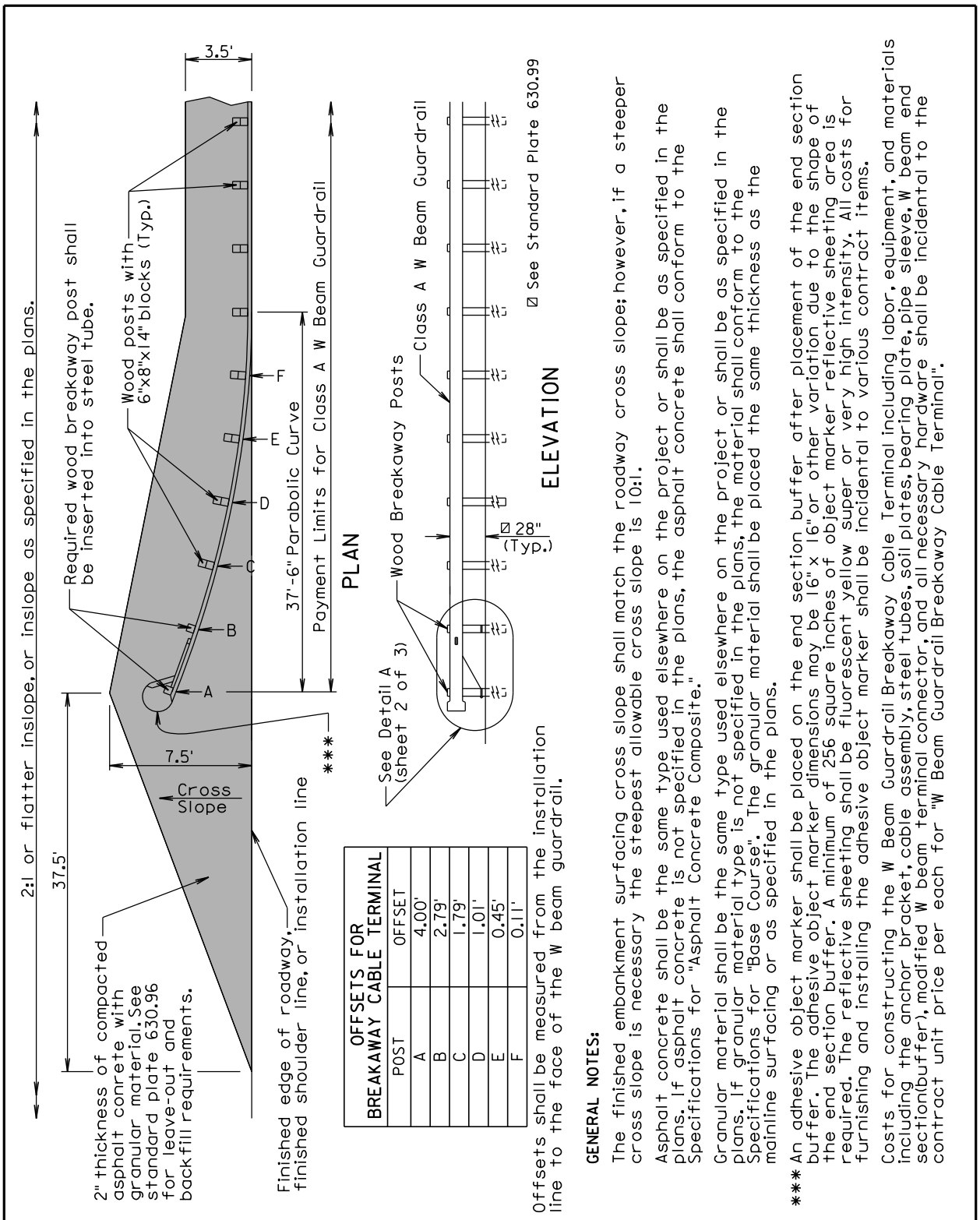
All costs for constructing the straight W beam guardrail with CRT posts including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for "Straight Class A W Beam Guardrail with CRT Posts".

All costs for constructing the curved W beam guardrail with CRT posts including labor, equipment, and materials including all CRT posts, steel beam rail, and hardware shall be incidental to the contract unit price per foot for "Curved Class A W Beam Guardrail with CRT Posts".

All costs for constructing the W beam guardrail special anchor assembly including labor, equipment, hardware, and all components of the W beam guardrail special anchor assembly except the W beam rail shall be incidental to the contract unit price per each for "W Beam Guardrail Special Anchor Assembly". The 12'-6" length of W beam rail located within the W beam guardrail special anchor assembly shall be paid for per foot with the bid item "Straight Class A W Beam Guardrail with Wood Posts".

February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY***	PLATE NUMBER 630.84 Sheet 4 of 4



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'

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."

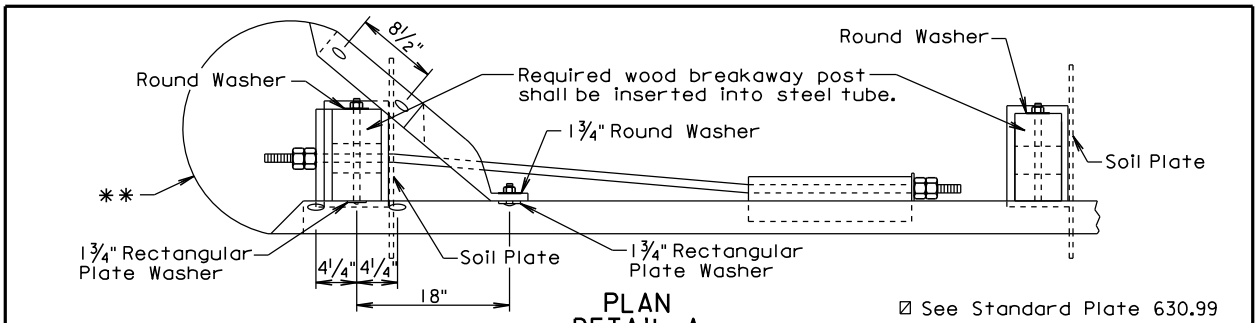
Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline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

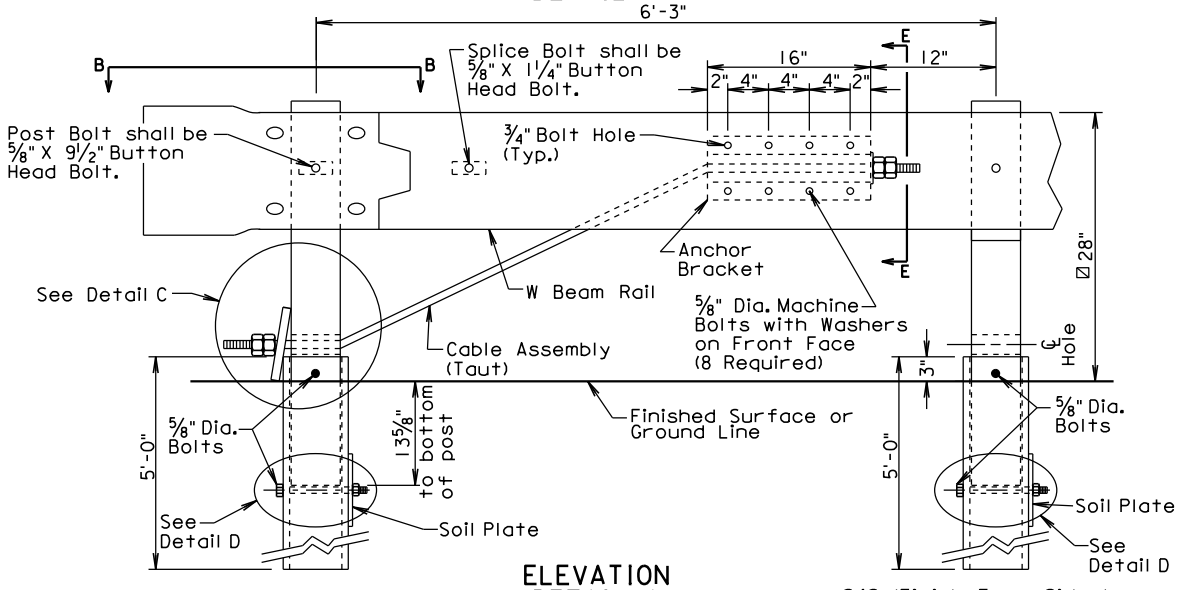
February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL***	***PLATE NUMBER 630.85*** *Sheet 1 of 3*

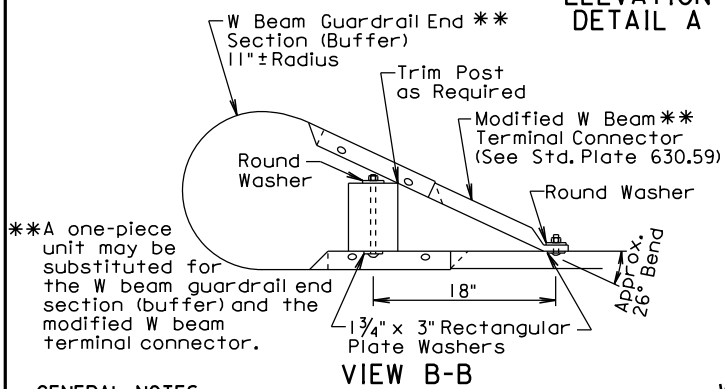


PLAN
DETAIL A

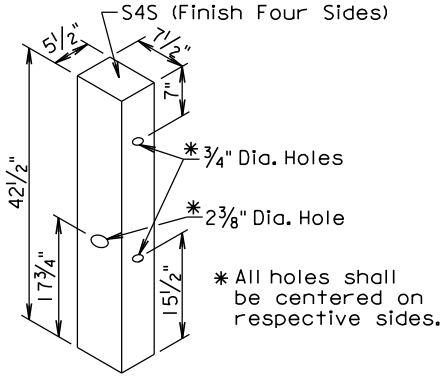
Ø See Standard Plate 630.99



ELEVATION
DETAIL A



VIEW B-B



WOOD BREAKAWAY POST

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.

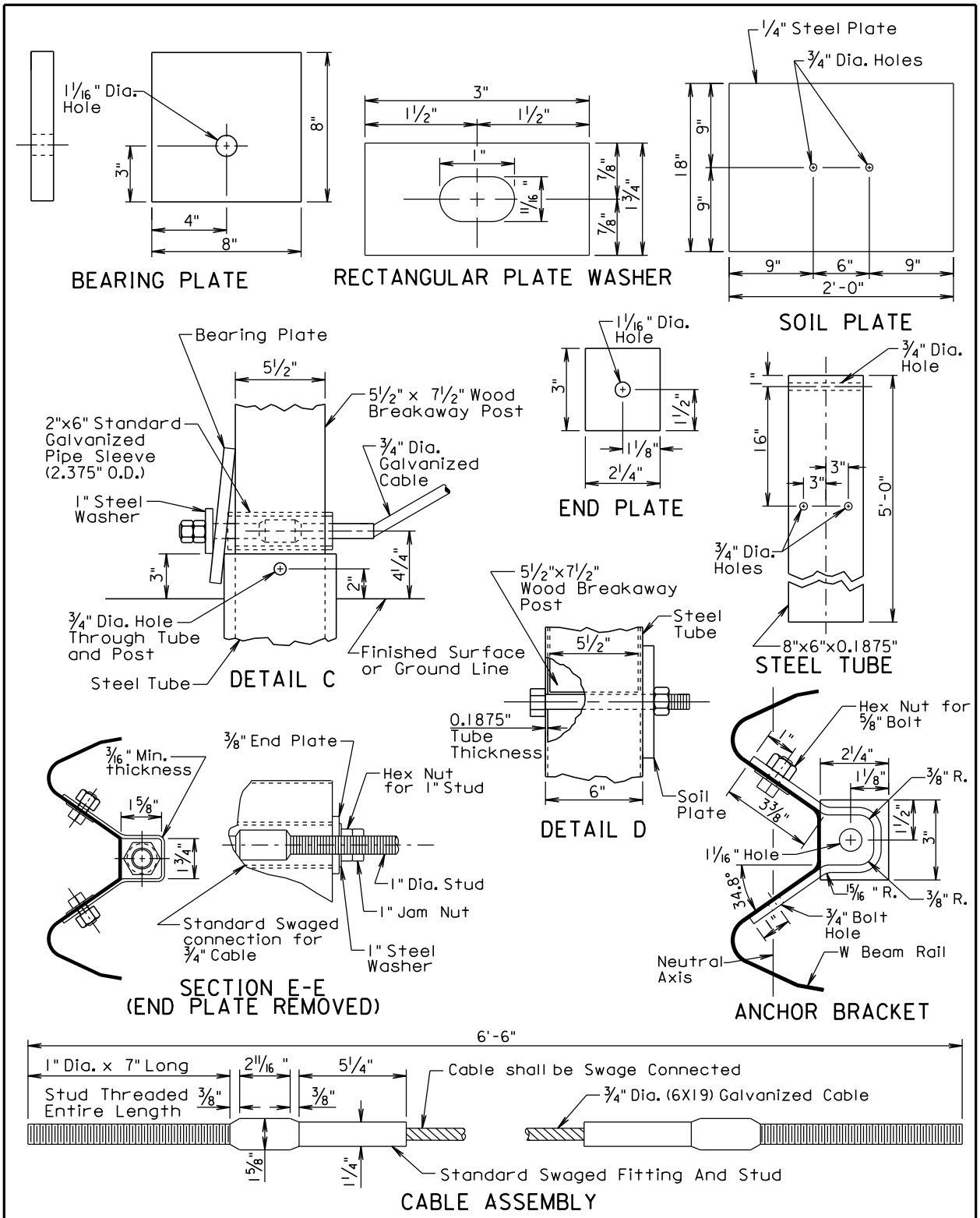
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

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

The cable shall be ¾", Type II, with Class A coating in conformance with AASHTO M30.

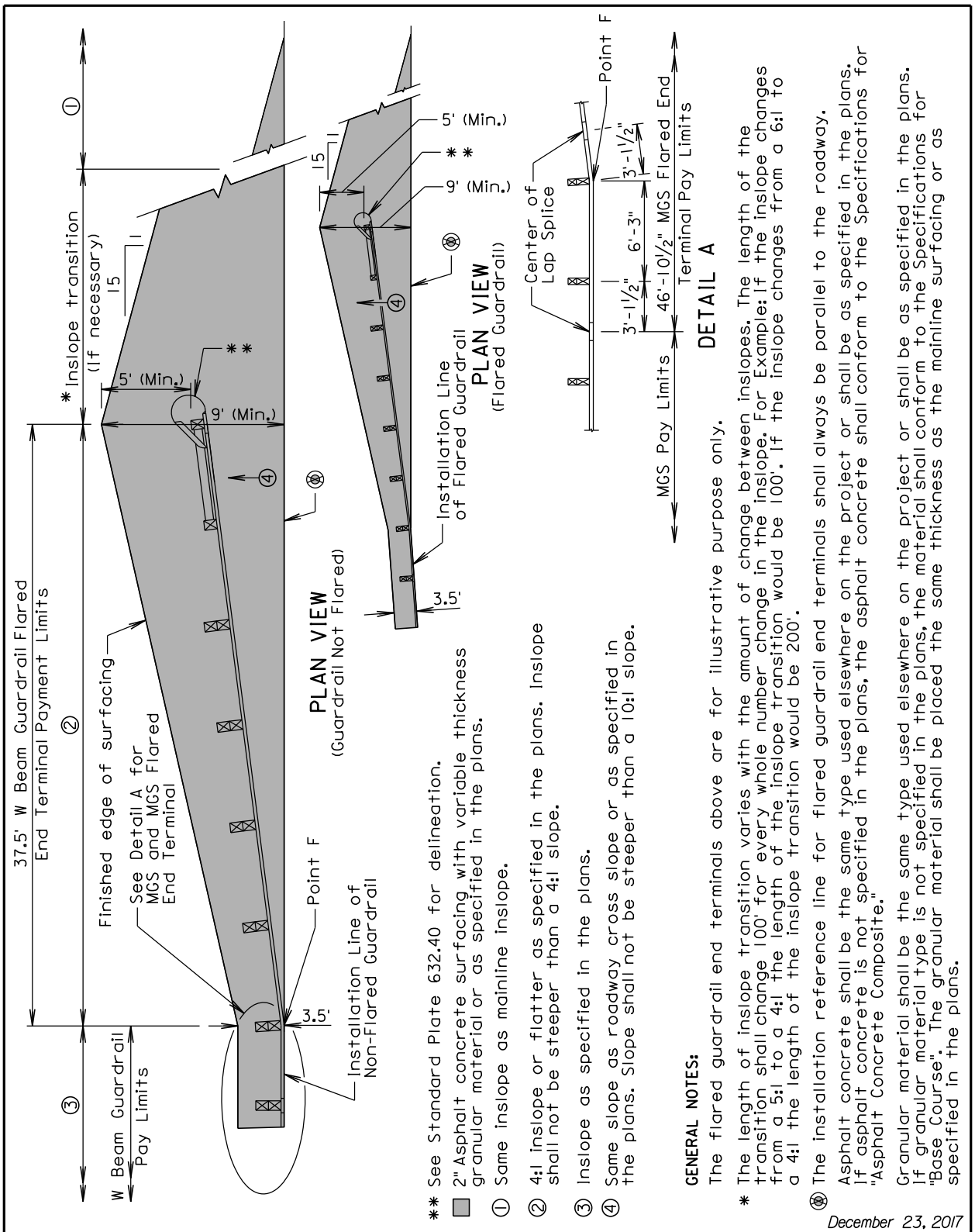
February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL***	***PLATE NUMBER*** 630.85 *Sheet 2 of 3*



February 14, 2017

Published Date: 2nd Qtr. 2018	SDDOT	***W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL***	***PLATE NUMBER*** *630.85* *Sheet 3 of 3*



** See Standard Plate 632.40 for delineation.
■ 2" Asphalt concrete surfacing with variable thickness granular material or as specified in the plans.
① Same inslope as mainline inslope.
② 4:1 inslope or flatter as specified in the plans. Inslope shall not be steeper than a 4:1 slope.
③ Inslope as specified in the plans.
④ Same slope as roadway cross slope or as specified in the plans. Slope shall not be steeper than a 10:1 slope.

GENERAL NOTES:

The flared guardrail end terminals above are for illustrative purpose only.

* The length of inslope transition varies with the amount of change between inslopes. The length of the transition shall change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.

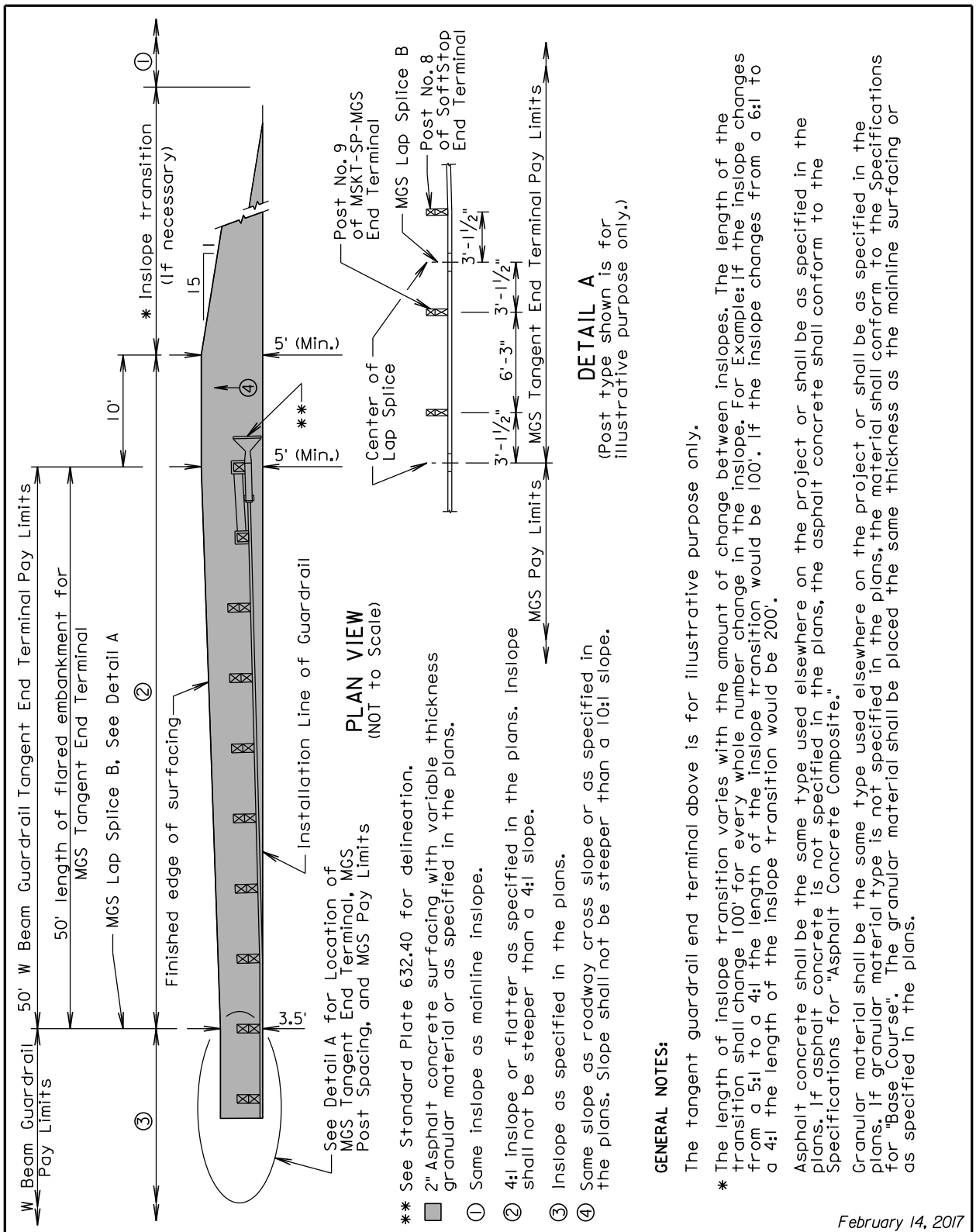
Ⓢ The installation reference line for flared guardrail end terminals shall always be parallel to the roadway.

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.

December 23, 2017

Published Date: 2nd Qtr. 2018	SDDOT	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



GENERAL NOTES:

The tangent guardrail end terminal above is for illustrative purpose only.

* The length of inslope transition varies with the amount of change between inslopes. The length of the transition shall change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.

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.

February 14, 2017

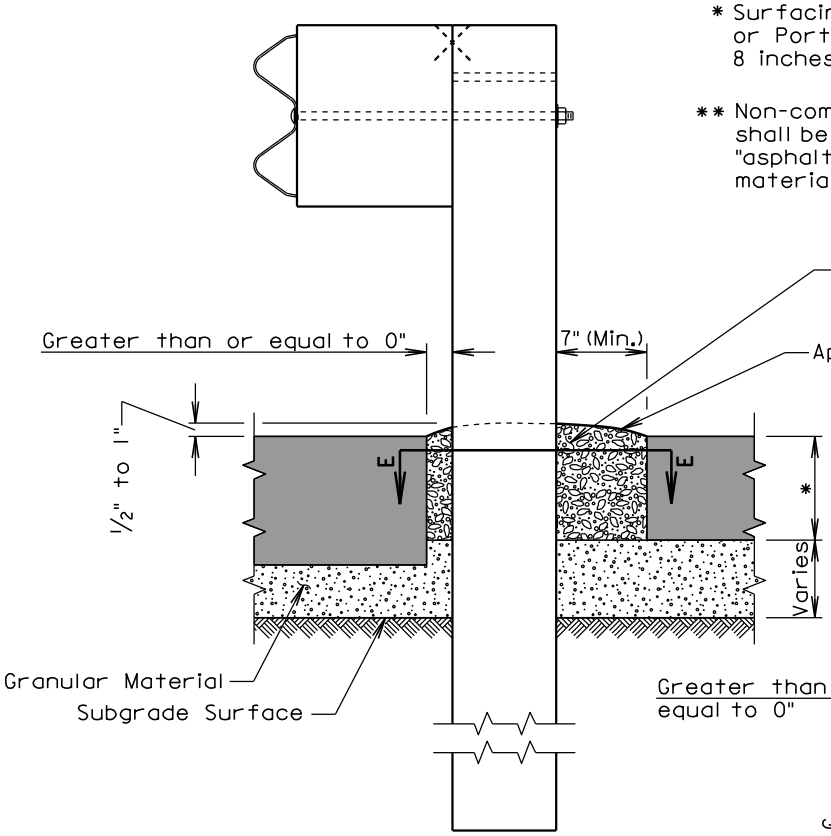
Published Date: 2nd Qtr. 2018	SDDOT EMBANKMENT, SURFACING, AND PAYMENT LIMITS FOR W BEAM GUARDRAIL TANGENT END TERMINAL AND MGS TANGENT END TERMINAL	PLATE NUMBER 630.88 Sheet 1 of 1

GUARDRAIL REPAIR

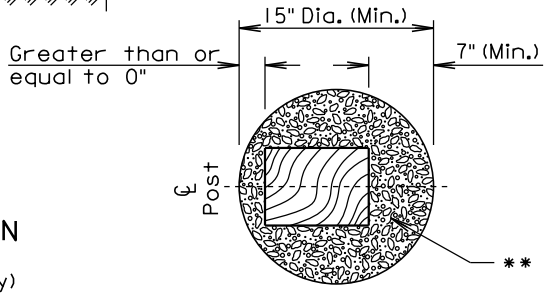
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES

* Surfacing Material (Asphalt Concrete or Portland Cement Concrete) 8 inches maximum

** Non-compacted backfill material shall be a granular material or "asphalt mix and granular base material".



TRANSVERSE SECTION
(Wood post shown for illustrative purpose only)



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

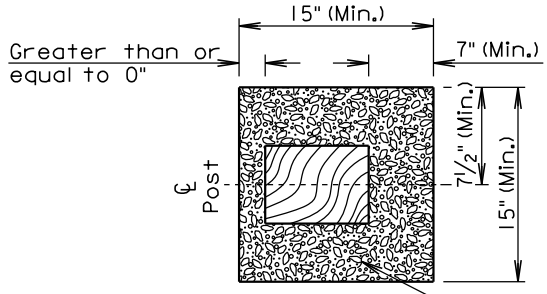
GENERAL NOTES:

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

The backfill material shall be mounded ½ 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.



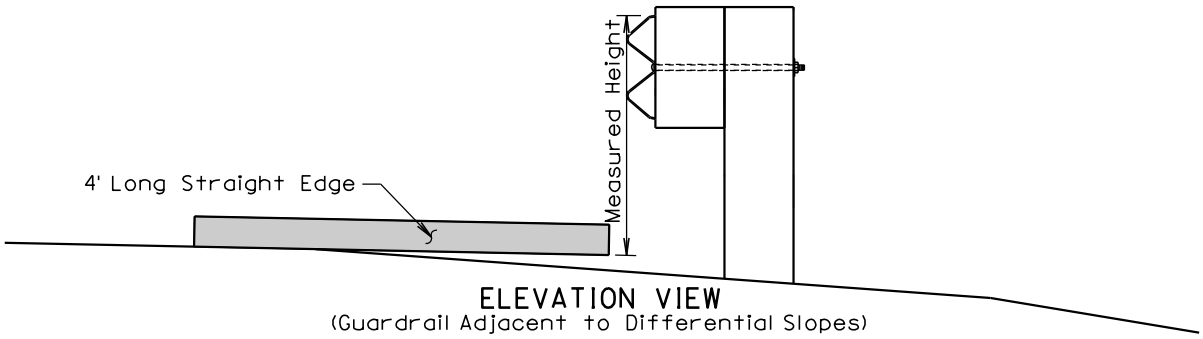
SECTION E-E
(Square option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

February 14, 2017

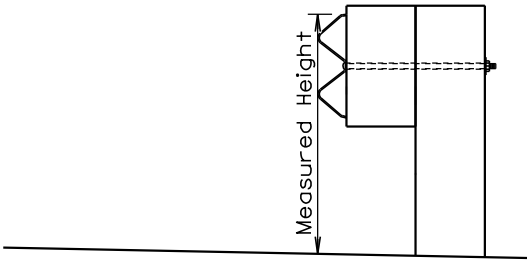
Published Date: 2nd Qtr. 2018	SDDOT	GUARDRAIL POST INSTALLED IN ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE	PLATE NUMBER 630.96 Sheet 1 of 1

GUARDRAIL REPAIR

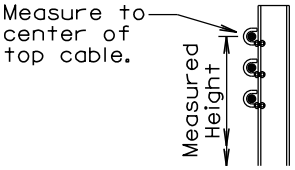
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



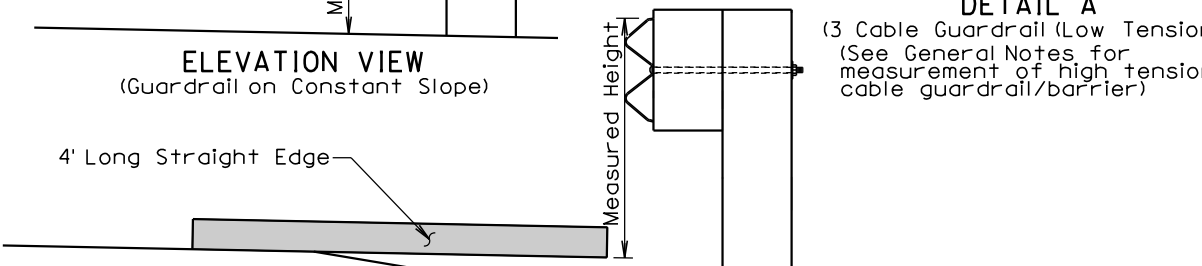
ELEVATION VIEW
(Guardrail Adjacent to Differential Slopes)



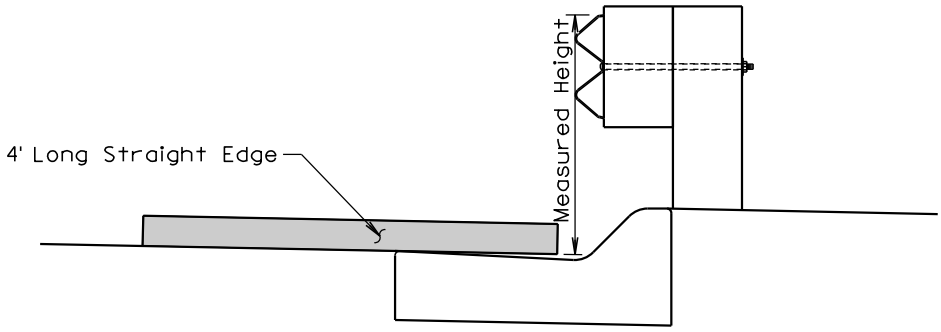
ELEVATION VIEW
(Guardrail on Constant Slope)



DETAIL A
(3 Cable Guardrail (Low Tension))
(See General Notes for measurement of high tension cable guardrail/barrier)



ELEVATION VIEW
(Guardrail Adjacent to Differential Surfacing Elevations)



ELEVATION VIEW
(Guardrail at Curb and Gutter)

GENERAL NOTES:

The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems except for high tension cable guardrail/barrier shall be measured in accordance with this standard plate.

When measuring height of 3 cable guardrail (low tension) the height shall be measured to the center of the top cable. See Detail A.

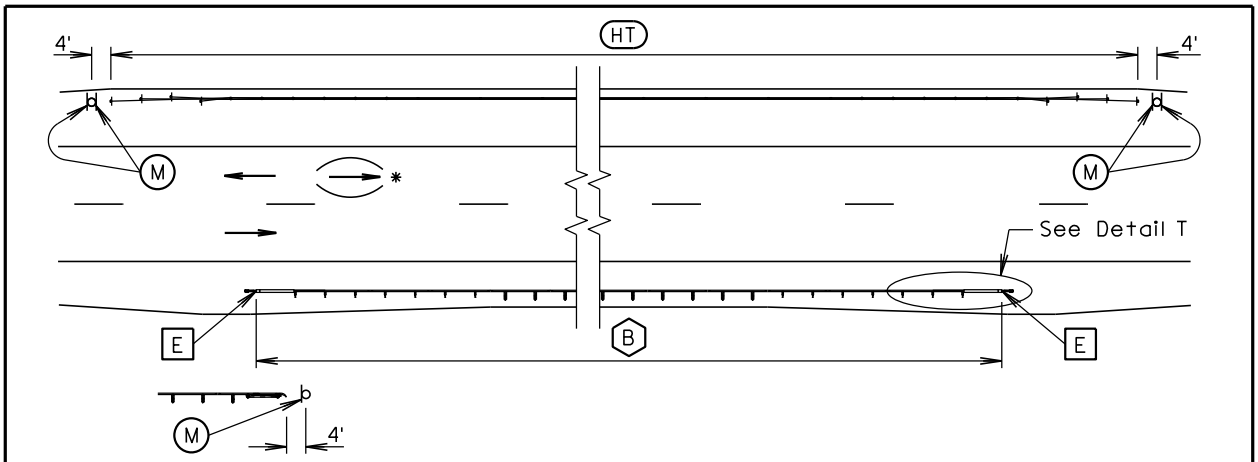
The height of high tension cable guardrail/barrier shall be measured in accordance with the Manufacturer's installation instructions.

December 23, 2017

Published Date: 2nd Qtr. 2018	SDDOT	*MEASURING GUARDRAIL HEIGHT*	PLATE NUMBER 630.99 Sheet 1 of 1

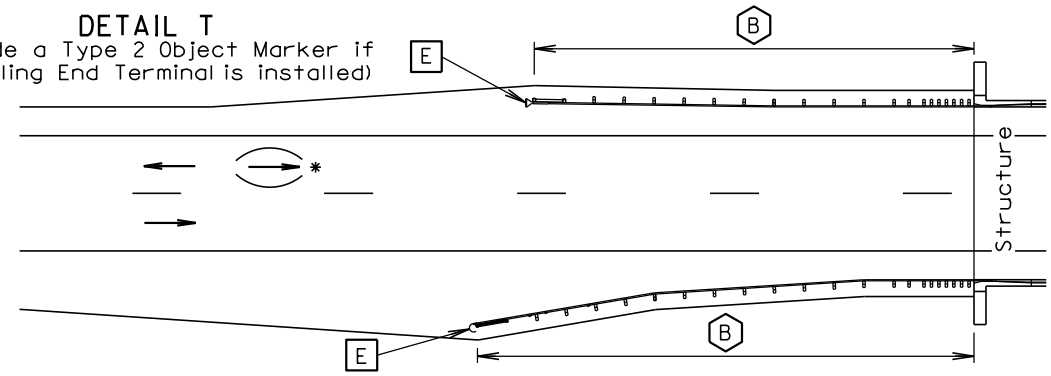
GUARDRAIL REPAIR

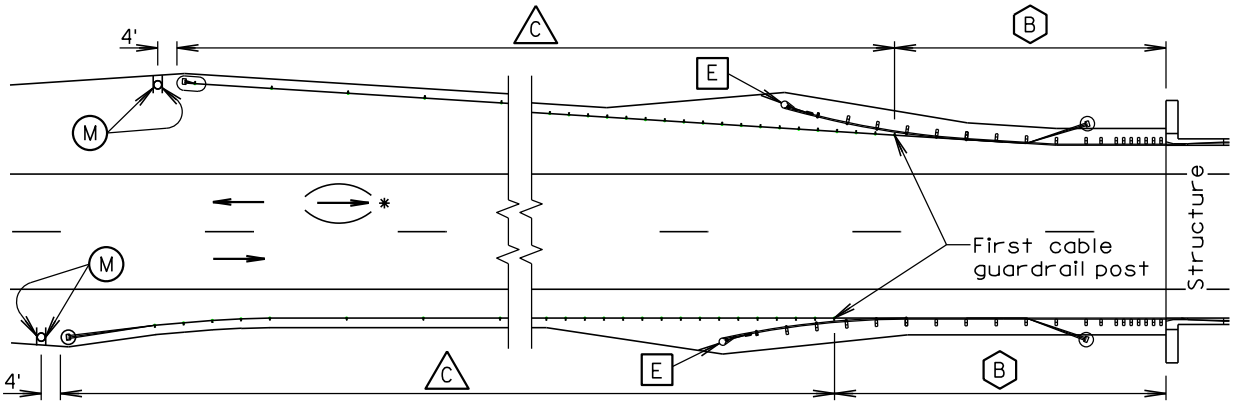
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



DETAIL T

(Provide a Type 2 Object Marker if a Trailing End Terminal is installed)





TYPICAL GUARDRAIL LAYOUTS

(B) Steel Beam Guardrail Delineation

(HT) High Tension Cable Guardrail Delineation

[E] Guardrail End Terminal Object Marker

(M) Type 2 Object Marker

△C 3 Cable Guardrail Delineation

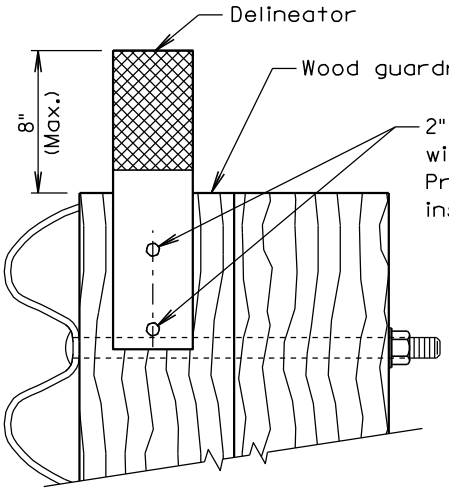
* For two-way traffic, install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic, single-sided delineation for one-way traffic.

June 9, 2017

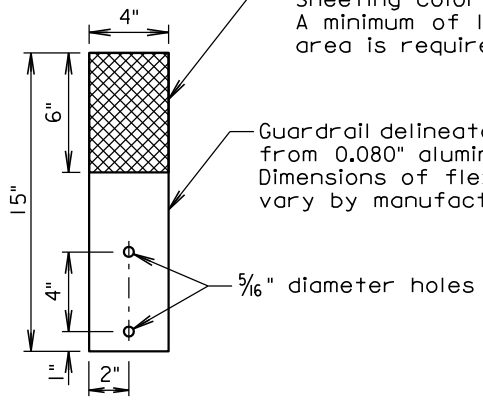
Published Date: 2nd Qtr. 2018	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40 Sheet 1 of 4

GUARDRAIL REPAIR

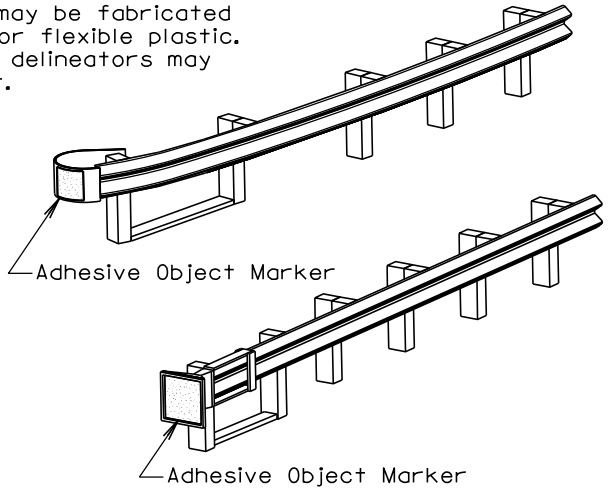
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



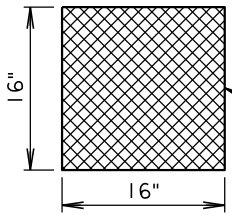
(B) STEEL BEAM GUARDRAIL DELINEATION



DELINEATOR
(For Steel Beam Guardrail)



(E) GUARDRAIL END TERMINAL OBJECT MARKER

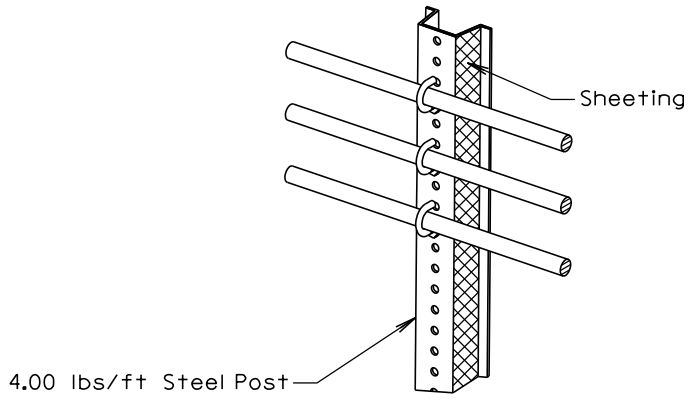


ADHESIVE OBJECT MARKER

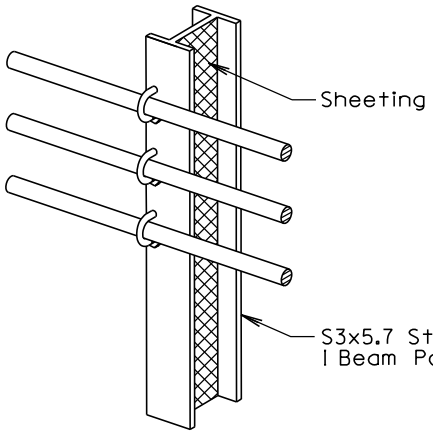
Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting shall be fluorescent yellow.

June 9, 2017

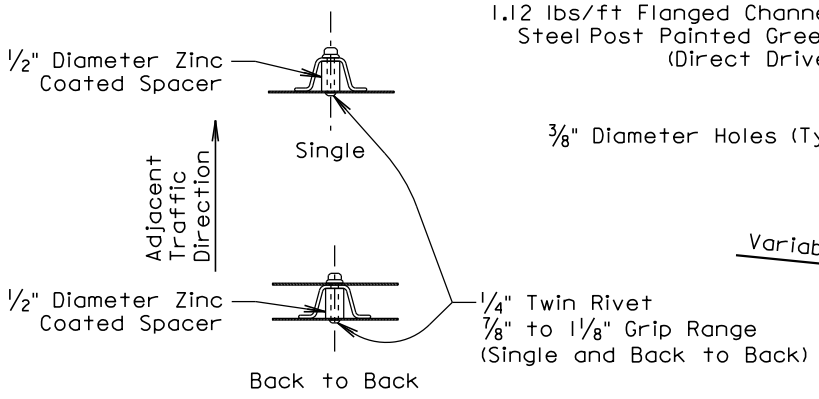
Published Date: 2nd Qtr. 2018	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40 Sheet 2 of 4



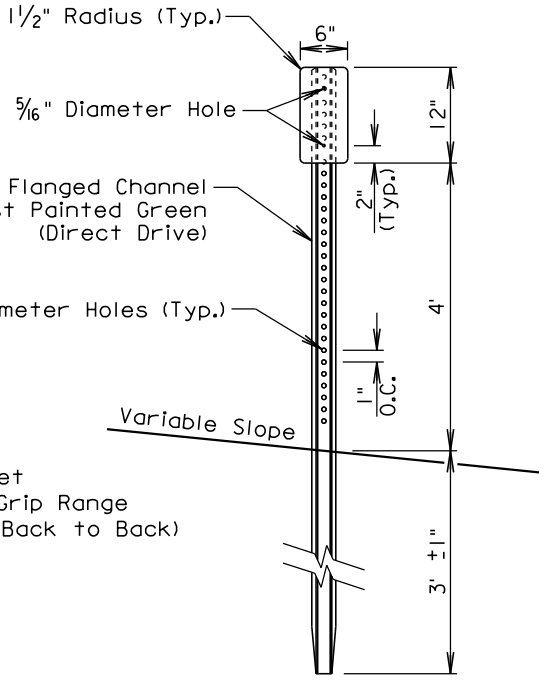
Ⓒ 3 CABLE GUARDRAIL DELINEATION



Ⓒ 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	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40 Sheet 3 of 4

GUARDRAIL REPAIR

BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK 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.

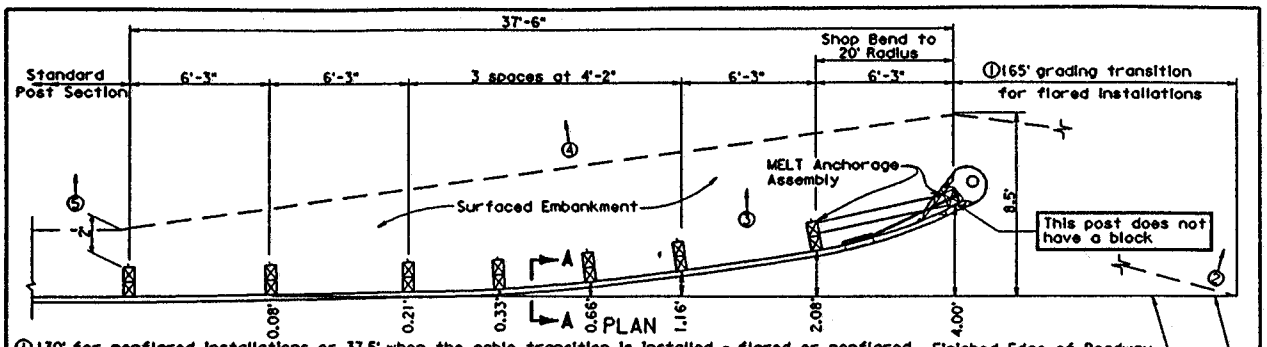
A type 2 object marker shall be placed adjacent to the 3 cable guardrail anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") shall have fluorescent yellow type XI sheeting in conformance with 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

Published Date: 2nd Qtr. 2018	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40 Sheet 4 of 4

GUARDRAIL ACCIDENT DAMAGE REPAIR

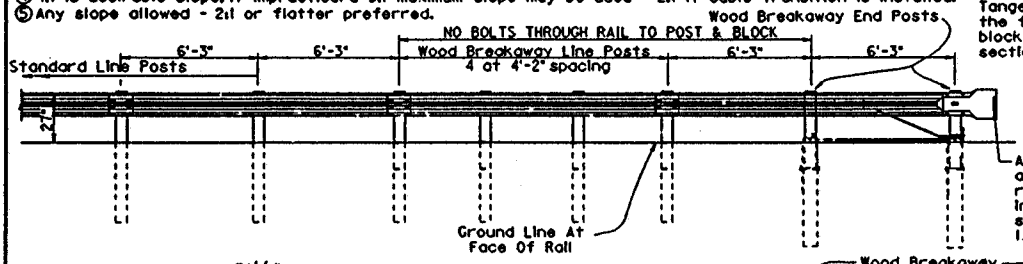
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



① 130' for nonflared installations or 37.5' when the cable transition is installed - flared or nonflared.
② Same slope as mainline inslope - may be as steep as 2:1 if cable transition is installed.
③ 0.02 slope is normally used but up to 0.10 slope is allowed.
④ 4:1 is desirable slope. If impractical a 3:1 maximum slope may be used - 2:1 if cable transition is installed.
⑤ Any slope allowed - 2:1 or flatter preferred.

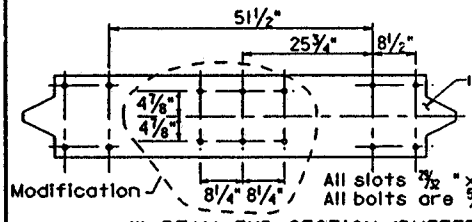
Finished Edge of Roadway
Finished Shoulder Line, Installation Line or Front Face of Curb

Tangent line projected from the face of the last two post blocks in the standard post section

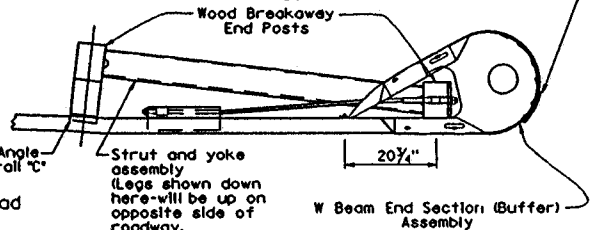


ELEVATION

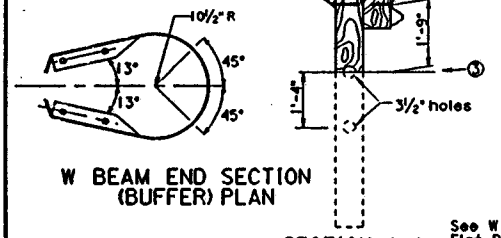
After nose is in place, apply 12" x 8½" yellow retroreflective high intensity adhesive sheeting at this location - 12" dimension horizontal.



W BEAM END SECTION (BUFFER) FLAT PLATE LAYOUT- MODIFIED

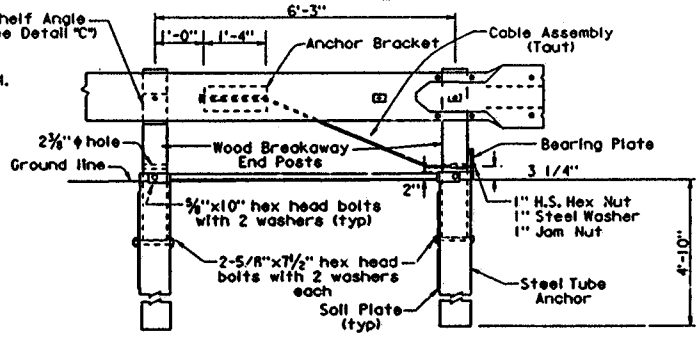


PLAN

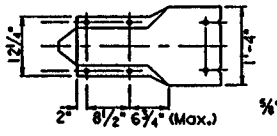


W BEAM END SECTION (BUFFER) PLAN

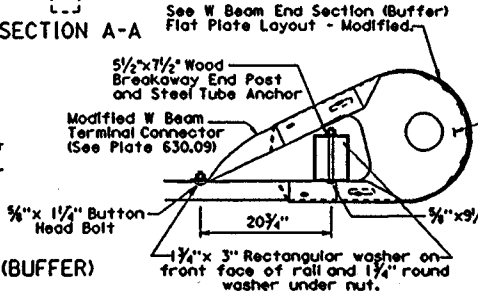
SECTION A-A



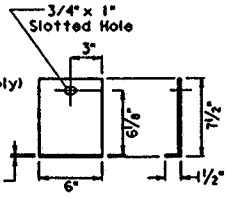
ELEVATION
BUFFERED END & ANCHORAGE ASSEMBLY



W BEAM END SECTION (BUFFER) ELEVATION



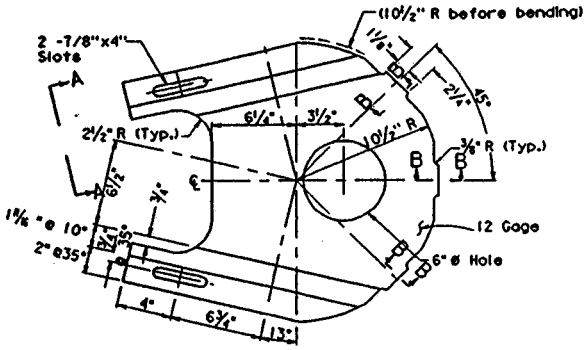
W BEAM END SECTION (BUFFER) ASSEMBLY



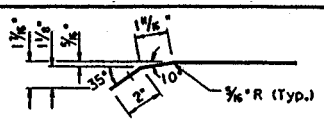
DETAIL "C" SHELF ANGLE

May 7, 1997

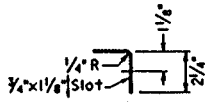
	SDDOT	**W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL**	PLATE NUMBER **SPECIAL -A** Sheet 1 of 3



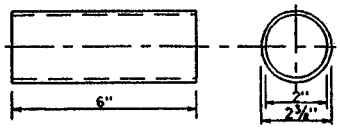
DIAPHRAGM PLATE DETAIL
[2 Required in each
W Beam End Section (Buffer)]



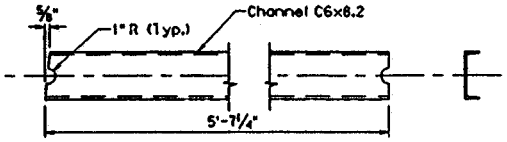
DIAPHRAGM PLATE DETAIL
VIEW A-A



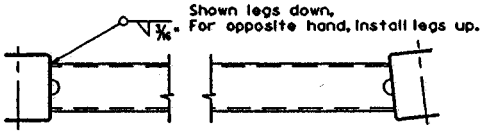
DIAPHRAGM PLATE DETAIL
SECTION B-B



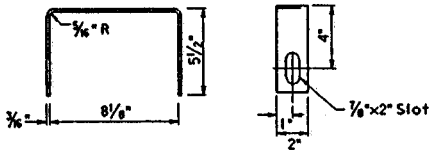
WOOD BREAKAWAY END POST SLEEVE
(Post without block only)



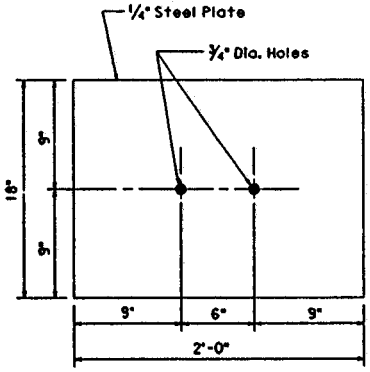
STRUT DETAILS



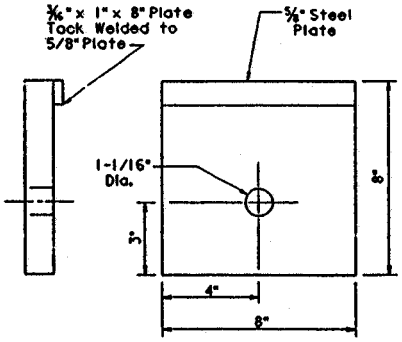
STRUT AND YOKE ASSEMBLY



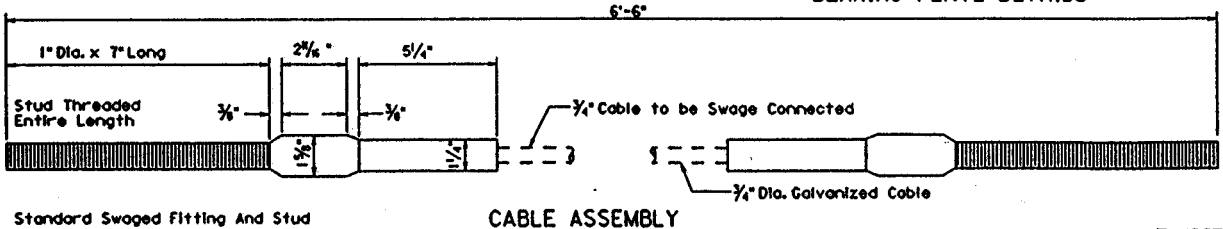
YOKE DETAILS



SOIL PLATE



BEARING PLATE DETAILS



Standard Swaged Fitting And Stud

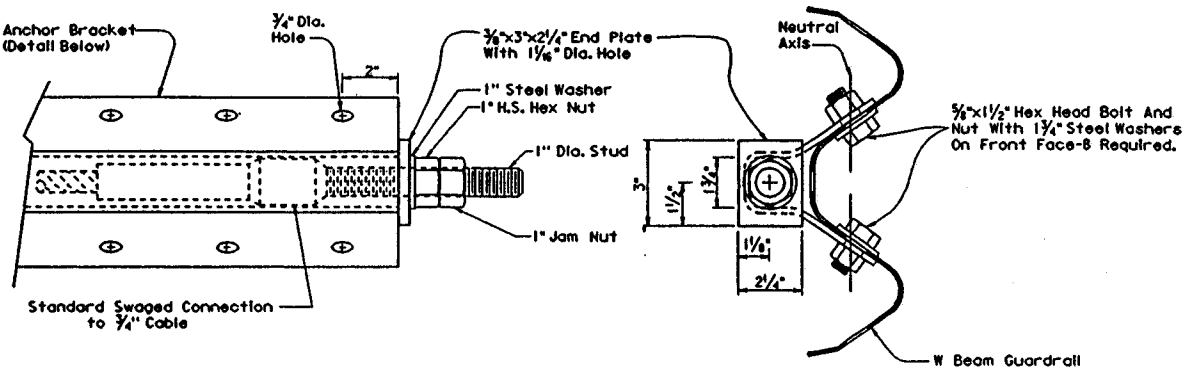
CABLE ASSEMBLY

May 7, 1997

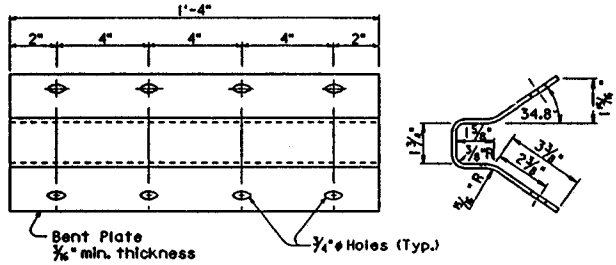
	SDDOT	**W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL**	PLATE NUMBER **SPECIAL -A** Sheet 2 of 3

GUARDRAIL ACCIDENT DAMAGE REPAIR

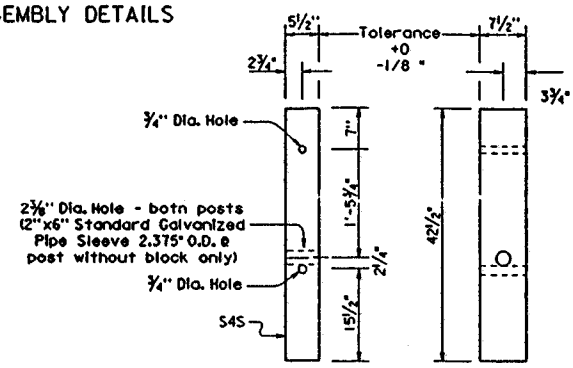
BEADLE, BROOKINGS, BROWN, BUFFALO, CLARK, CODINGTON, DAY, DEUEL, EDMUNDS, FAULK, GRANT, HAMLIN, HAND, HYDE, KINGSBURY, MCPHERSON, MARSHALL, MOODY, ROBERTS, AND SPINK COUNTIES



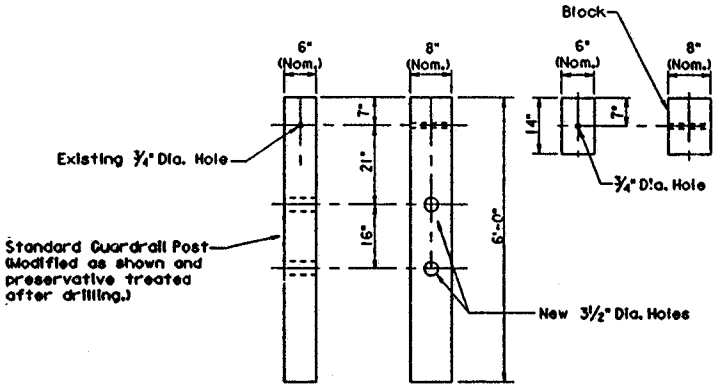
ANCHOR BRACKET ASSEMBLY DETAILS



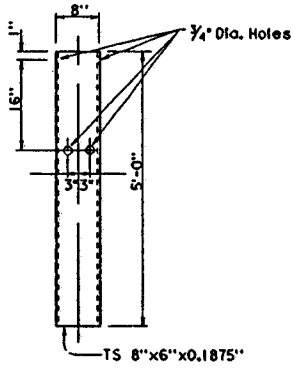
ANCHOR BRACKET



WOOD BREAKAWAY END POST



WOOD BREAKAWAY LINE POST AND BLOCK



STEEL TUBE ANCHOR

GENERAL NOTES:

1. All angles, channels, and plates shall conform to the requirements of A.S.T.M. A36 and structural tubing to A.S.T.M. A500 or A.S.T.M. A513, Grade 1008. Diaphragm plate shall conform to A.S.T.M. A36 or AASHTO M180. Welding shall meet the current requirements of the American Welding Society Structural Welding Code ANSI/AASHTO/AWS D1.5. All structural steel shall be galvanized in accordance with A.S.T.M. A123. No punching, cutting, or drilling will be permitted after galvanizing. All hardware shall be galvanized according to ASTM A153.

2. The two (2) Wood Breakaway End Posts shall be made of S4S timber with a stress grade of 1200 psi and shall be grademarked or certified by a recognized association or agency which is certified by the Board of Review, American Lumber Standards Committee, to grade the species. They shall receive a preservative treatment in accordance with AASHTO designation M133.

3. The post offset dimensions are given to the center of the traffic face of the blockouts, except at the first post, where the dimension is to the center of the traffic face of the post. Offset points are to be located by chord measurements at the back of rail equal to the nominal post spacings shown. Posts are to be set approximately radial to the railing at each post location.

4. The contract unit price per each for W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL is to include the anchor bracket, cable assembly, steel tube anchors with soil plates, bearing plate, wood breakaway end post sleeve, modified W beam terminal connector, diaphragm plates, strut, W beam end section, retroreflective adhesive sheeting, shelf angle and all hardware and labor to attach the above to the W beam guardrail. The wood breakaway end posts, wood breakaway line posts, the cost of shop bending the last half of the end section containing the anchor bracket to a 20' radius, and the guardrail will be paid for at the contract unit price per linear foot for W BEAM GUARDRAIL STRAIGHT, CLASS A, WOOD POSTS.

May 7, 1997

	SDDOT	W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL	PLATE NUMBER SPECIAL -A
			Sheet 3 of 3