

Plot Scale - 1:200

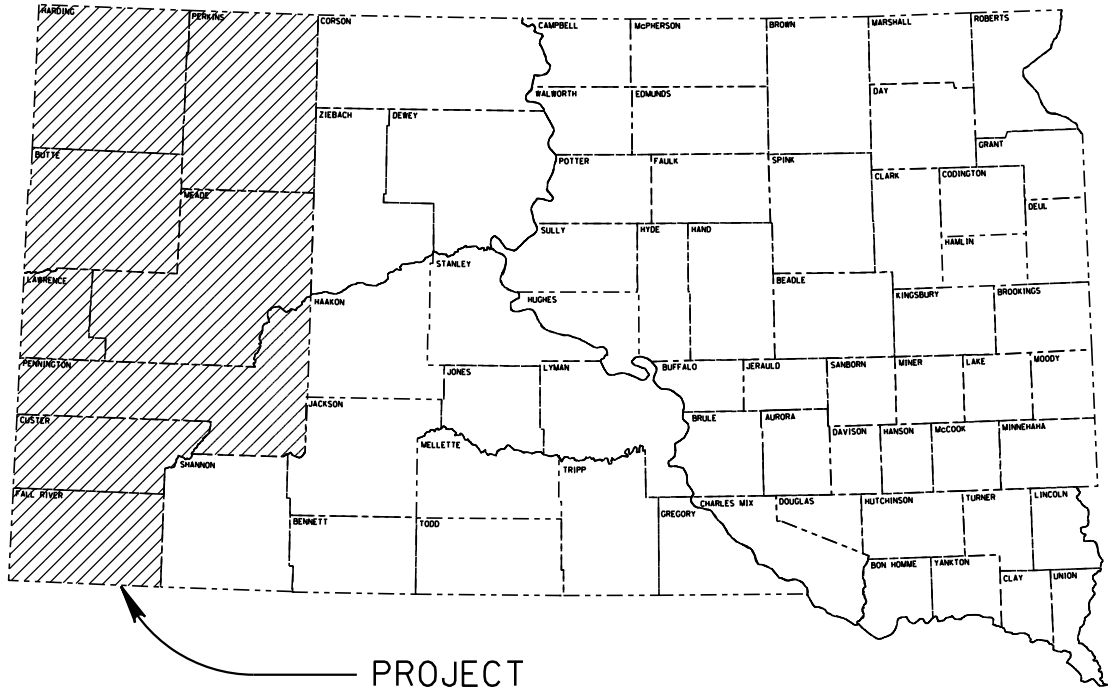
Plotted From - TRRC11951

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

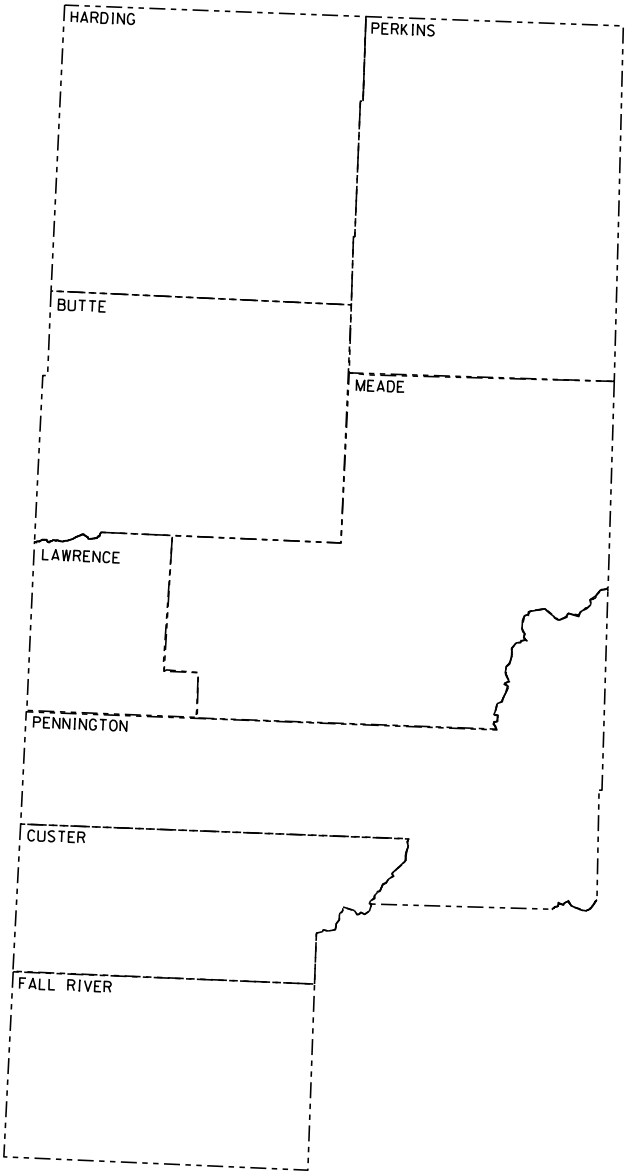
PROJECTS
000I-469, 000N-469, & 000P-469
RAPID CITY REGION
GUARDRAIL MAINTENANCE

GUARDRAIL REPAIR AT VARIOUS LOCATIONS
ON A DEMAND BASIS

PCNs i2r4, i2r5, & i2r6



PROJECT



LEGEND

STATE AND NATIONAL LINE	==
COUNTY LINE	---
SECTION LINE	----
QUARTER LINE	-----
SIXTEENTH LINE	-----
PROPERTY LINE	-----
CONSTRUCTION LINE	=====
R. O. W. LINE	=====
WORK LIMITS	-----

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-469, 000N-469 & 000P-469	1	30

Plotting Date: 08/29/2012

INDEX OF SHEETS

- 1 Title Sheet
- 2-4 Estimate of Quantities and
Plan Notes
- 5-30 Standard Plates

ESTIMATE OF QUANTITIES, 000I-469, PCN i2r4, (Interstate)

Bid Item Number	Item	Quantity	Unit
009E0198	Mobilization 2	2	Each
110E0700	Remove 3 Cable Guardrail	25	Ft
110E0730	Remove Beam Guardrail	100.0	Ft
110E0770	Remove W Beam Guardrail Breakaway Cable Terminal	1	Each
110E0800	Remove W Beam Guardrail End Terminal	1	Each
110E6230	Remove W Beam Guardrail for Reset	25.0	Ft
629E0100	3 Cable Guardrail	100	Ft
629E0110	NCHRP 350 Test Level 3 High Tension Cable Guardrail	100	Ft
629E0290	NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly	1	Each
629E0300	3 Cable Guardrail Slip Base Anchor Assembly	1	Each
629E1000	Repair 3 Cable Guardrail	100	Ft
629E1100	3 Cable Guardrail End Post	3	Each
629E1102	3 Cable Guardrail Intermediate Post	10	Each
629E1104	3 Cable Guardrail Post, Winter	15	Each
629E1106	Drive Down 3 Cable Guardrail Post	10	Each
629E1110	Cable Anchor Bracket	1	Each
629E1112	Cable Splice	1	Each
629E1114	3 Cable Guardrail J Hook Bolt	100	Each
629E1116	Steel Turnbuckle Cable End Assembly	1	Each
629E1118	Spring Cable End Assembly with Turnbuckle	2	Each
629E1120	W Beam to 3 Cable Transition Bracket	1	Each
629E1122	3 Cable Guardrail End Post Cap	5	Each
630E0200	Straight Class A Thrie Beam Rail	12.5	Ft
630E0210	Straight Class B Thrie Beam Rail	12.5	Ft
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	12.5	Ft
630E1200	Straight Class A W Beam Rail	75.0	Ft
630E1210	Straight Class B W Beam Rail	25.0	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	1	Each
630E2015	W Beam Guardrail Flared End Terminal	1	Each
630E2020	W Beam Guardrail Tangent End Terminal	1	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal	1	Each
630E2110	Beam Guardrail Post and Block	10	Each
630E2120	Beam Guardrail Post and Block, Winter	5	Each
630E2210	Breakaway Cable Terminal End Rail	1	Each
630E2215	W Beam Guardrail End Section Buffer	1	Each
630E5120	Reset Thrie Beam Rail	12.5	Ft
630E5160	Reset W Beam Rail	12.5	Ft
630E5170	Reset Double W Beam Rail	12.5	Ft
630E5520	Drive Down Beam Guardrail Post	3	Each
630E5550	Reset Beam Guardrail Post and Block	5	Each
634E0010	Flagging	3	Hour
634E0125	Traffic Control for Guardrail Repair	2	Site
634E0420	Type C Advance Warning Arrow Panel	1	Each

WORK DESCRIPTION

Work on the contract shall include the following:

- Repair of guardrail at various locations in the Rapid City Region on a demand basis.

SPECIFICATIONS

Standard Specifications for Roads & Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

ESTIMATE OF QUANTITIES, 000N-469, PCN i2r5, (Non-Priority)

Bid Item Number	Item	Quantity	Unit
009E0197	Mobilization 1	2	Each
009E0198	Mobilization 2	2	Each
009E0199	Mobilization 3	2	Each
110E0700	Remove 3 Cable Guardrail	25	Ft
110E0730	Remove Beam Guardrail	100.0	Ft
110E0770	Remove W Beam Guardrail Breakaway Cable Terminal	1	Each
110E0800	Remove W Beam Guardrail End Terminal	1	Each
110E6230	Remove W Beam Guardrail for Reset	25.0	Ft
629E0100	3 Cable Guardrail	100	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly	1	Each
629E1000	Repair 3 Cable Guardrail	100	Ft
629E1100	3 Cable Guardrail End Post	3	Each
629E1102	3 Cable Guardrail Intermediate Post	10	Each
629E1104	3 Cable Guardrail Post, Winter	15	Each
629E1106	Drive Down 3 Cable Guardrail Post	10	Each
629E1110	Cable Anchor Bracket	1	Each
629E1112	Cable Splice	1	Each
629E1114	3 Cable Guardrail J Hook Bolt	100	Each
629E1116	Steel Turnbuckle Cable End Assembly	1	Each
629E1118	Spring Cable End Assembly with Turnbuckle	2	Each
629E1120	W Beam to 3 Cable Transition Bracket	1	Each
629E1122	3 Cable Guardrail End Post Cap	5	Each
630E0200	Straight Class A Thrie Beam Rail	12.5	Ft
630E0210	Straight Class B Thrie Beam Rail	12.5	Ft
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	12.5	Ft
630E1200	Straight Class A W Beam Rail	75.0	Ft
630E1210	Straight Class B W Beam Rail	25.0	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	1	Each
630E2015	W Beam Guardrail Flared End Terminal	1	Each
630E2020	W Beam Guardrail Tangent End Terminal	1	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal	1	Each
630E2110	Beam Guardrail Post and Block	10	Each
630E2120	Beam Guardrail Post and Block, Winter	5	Each
630E2210	Breakaway Cable Terminal End Rail	1	Each
630E2215	W Beam Guardrail End Section Buffer	1	Each
630E5120	Reset Thrie Beam Rail	12.5	Ft
630E5160	Reset W Beam Rail	12.5	Ft
630E5170	Reset Double W Beam Rail	12.5	Ft
630E5520	Drive Down Beam Guardrail Post	3	Each
630E5550	Reset Beam Guardrail Post and Block	5	Each
634E0010	Flagging	3	Hour
634E0125	Traffic Control for Guardrail Repair	6	Site
634E0420	Type C Advance Warning Arrow Panel	1	Each

CONTRACT TIME PROVISIONS

- The contract will expire on September 30, 2013.
- At such time as repairs are required, the Contractor will be notified. The Contractor will have 7 calendar days to complete the repairs.

ESTIMATE OF QUANTITIES, 000P-469, PCN i2r6, (Priority)

Bid Item Number	Item	Quantity	Unit
009E0197	Mobilization 1	2	Each
009E0198	Mobilization 2	2	Each
009E0199	Mobilization 3	2	Each
110E0700	Remove 3 Cable Guardrail	25	Ft
110E0730	Remove Beam Guardrail	100.0	Ft
110E0770	Remove W Beam Guardrail Breakaway Cable Terminal	1	Each
110E0800	Remove W Beam Guardrail End Terminal	1	Each
110E6230	Remove W Beam Guardrail for Reset	25.0	Ft
629E0100	3 Cable Guardrail	100	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly	1	Each
629E1000	Repair 3 Cable Guardrail	100	Ft
629E1100	3 Cable Guardrail End Post	3	Each
629E1102	3 Cable Guardrail Intermediate Post	10	Each
629E1104	3 Cable Guardrail Post, Winter	15	Each
629E1106	Drive Down 3 Cable Guardrail Post	10	Each
629E1110	Cable Anchor Bracket	1	Each
629E1112	Cable Splice	1	Each
629E1114	3 Cable Guardrail J Hook Bolt	100	Each
629E1116	Steel Turnbuckle Cable End Assembly	1	Each
629E1118	Spring Cable End Assembly with Turnbuckle	2	Each
629E1120	W Beam to 3 Cable Transition Bracket	1	Each
629E1122	3 Cable Guardrail End Post Cap	5	Each
630E0200	Straight Class A Thrie Beam Rail	12.5	Ft
630E0210	Straight Class B Thrie Beam Rail	12.5	Ft
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	12.5	Ft
630E1200	Straight Class A W Beam Rail	75.0	Ft
630E1210	Straight Class B W Beam Rail	25.0	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	1	Each
630E2015	W Beam Guardrail Flared End Terminal	1	Each
630E2020	W Beam Guardrail Tangent End Terminal	1	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal	1	Each
630E2110	Beam Guardrail Post and Block	10	Each
630E2120	Beam Guardrail Post and Block, Winter	5	Each
630E2210	Breakaway Cable Terminal End Rail	1	Each
630E2215	W Beam Guardrail End Section Buffer	1	Each
630E5120	Reset Thrie Beam Rail	12.5	Ft
630E5160	Reset W Beam Rail	12.5	Ft
630E5170	Reset Double W Beam Rail	12.5	Ft
630E5520	Drive Down Beam Guardrail Post	3	Each
630E5550	Reset Beam Guardrail Post and Block	5	Each
634E0010	Flagging	3	Hour
634E0125	Traffic Control for Guardrail Repair	6	Site
634E0420	Type C Advance Warning Arrow Panel	1	Each

UTILITIES

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

MOBILIZATION

If more than one location within an area is to be repaired, the Contractor will be compensated for only one mobilization per area.

Mobilization 1 is the cost of mobilization per each time the Contractor is called in by the Belle Fourche Area Engineer, or his designated representative, to perform guardrail repair within the Belle Fourche Area.

Mobilization 2 is the cost of mobilization per each time the Contractor is called in by the Rapid City Area Engineer, or his designated representative, to perform guardrail repair within the Rapid City Area.

Mobilization 3 is the cost of mobilization per each time the Contractor is called in by the Custer Area Engineer, or his designated representative, to perform guardrail repair within the Custer Area

Mobilization will be paid once each time the Contractor is called to repair guardrail, regardless of the number of sites requiring repair within the project limits.

Guardrail repairs will be limited to all Interstate and State highways within the boundaries of the Rapid City Region. Maintenance maps for priority and non-priority routes are available at the Rapid City Region office.

TRAFFIC CONTROL

Traffic control shall at all times be maintained in accordance with applicable MUTCD Standards, Section 634 of the Standard Specifications and these plans.

The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.

The bid item “Traffic Control for Guardrail Repair” shall include all necessary traffic control devices as required by these plans and shall be measured and paid and the contract unit price per “site”. The Contractor shall be compensated each time they are required to mobilize to a “site” for guardrail repair. If the Contractor relocates the traffic control devices to a different location during the same mobilization, additional compensation will not be made and it shall be considered the same “site”.

Construction vehicles shall exit or enter the construction work zone at locations identified by the Engineer. At no time shall construction vehicles utilize the maintenance crossovers or the I-90 median to exit or enter I-90 traffic.

Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined, as ½ hour after sunset until ½ hour before sunrise.

All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.

Traffic shall be returned to the normal driving lanes during non-working hours.

TRAFFIC CONTROL (CONTINUED)

Storage of vehicles and equipment shall be as near the right-of-way as possible. Contractor’s employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of the vegetation, surfacing, embankment, delineators, and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 ± 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable.

The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

RESTORATION OF DISTURBED AREAS

Areas disturbed as a result of the work necessary to repair guardrail shall be reshaped and/or restored to the satisfaction of the Engineer. The disturbed areas shall be tilled to a minimum depth of three inches and seeded with the following seed mix rate:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	16
Canada Wildrye	Mandan	2
Total:		18

All costs for reshaping, leveling, tilling, and seeding disturbed areas shall be incidental to the various bid items on the project.

GUARDRAIL

When guardrail adjoining bridge ends is ordered to be repaired, the contractor shall replace with the same size and type as the existing guardrail.

When a W beam guardrail end terminal is replaced, the new end terminal shall be of the same type (flared or tangent) that was originally installed.

Beam Guardrail Post and Block, Winter - Includes the additional cost for removal and installation of a Beam Guardrail Wood Post and Block when there is at least one foot of solid frozen ground at the work site. This bid item shall be an additional payment. (i.e. the Contractor will be paid once for the respective Beam Guardrail Post and Block bid item and once for Beam Guardrail Post and Block, Winter for each post when the Engineer determines winter conditions apply).

GUARDRAIL (CONTINUED)

3 Cable Guardrail Post, Winter - Includes the additional costs for removal and installation of a 3 Cable I Beam Steel and 3 Cable Flanged Channel Post when there is in excess of one foot of solid frozen ground at the work site. This bid item shall be an additional payment. (i.e. the Contractor will be paid once for the respective 3 Cable Guardrail Post bid item and once for 3 Cable Guardrail Post, Winter for each post when the Engineer determines winter conditions apply).

All reset portions of W Beam and Thrie Beam Guardrail sections shall include the removal of wood guardrail posts and resetting these posts to the proper alignment with the steel beam guardrail. Payment for this work will be the same for frozen or unfrozen ground.

Repair 3 Cable Guardrail – Includes all costs for replacing and repairing damaged cable, realigning posts, and the tensioning of the three cable guardrail. Payment for this item is applicable only when the cable is replaced, broken cable repaired, or the existing cable rail required realigning and retensioning.

"3 Cable Guardrail Intermediate Post" includes all costs to furnish and install either I Beam or Flanged type of posts. The post for this item shall be furnished and installed consistent with the type of posts presently in place at the proposed repair site.

"Beam Guardrail Post and Block" shall include all costs to furnish and install the appropriate size wood block. The Engineer shall designate the proper post length of six, six and one-half, or seven feet as needed to fit the repair situation.

W Beam Guardrail Breakaway Cable Terminal will be repaired only when they are behind 3 Cable Guardrail. W Beam Guardrail Breakaway Cable Terminal - Includes the costs of removing damaged components of the BCT System, furnishing and installing new Wood Breakaway End Posts (2), W Beam End Section (Buffer) 11” + radius, related items and all hardware to attach same. Any other BCT items that are required will be paid for at invoice cost plus shipping, taxes and ten percent for profit.

W Beam Guardrail BCT’s or MELT’s that are damaged and are not behind 3 Cable guardrail will be replaced with a new W Beam Guardrail End Terminal. Approved products are available at the following web address. <http://apps.sd.gov/Applications/HC54ApprovedProducts/main.asp>

The Contractor may be required to furnish some items that are not listed in the Contract Proposal. The Contractor shall furnish the invoice and will be paid invoice cost plus shipping, handling, taxes and 10 percent for profit. The Contractor is required to receive prior approval of the Engineer before making these purchases. Installation cost for these items shall be incidental to the contract unit prices for the various items.

The Contractor shall place “State Furnished Asphalt Concrete Cold Mix” around the posts to fill and level any voids created by the driving of the posts through the asphalt. This material will be available at the SDDOT maintenance in Rapid City. The material shall be placed ½” high around the post to force the water to drain away from the post. Cost for this work shall be incidental to the various bid items on the project.

All costs to furnish and install new bolts, nuts, washers, nails, misc. shall be incidental to the various bid items on the project. All removed guardrail items that are not reused shall become the property of the Contractor.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-469, 000N-469 & 000P-469	3	30

NCHRP 350 TEST LEVEL 3 HIGH TENSION CABLE GUARDRAIL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-469, 000N-469		
	& 000P-469	4	30

The Contractor shall furnish and install a 3 or 4 cable high tension guardrail system that meets the crash testing requirements of NCHRP 350 Test Level 3. The maximum dynamic deflection of the system shall be less than 8'. All posts shall be galvanized and inserted into driven steel sleeves. The driven steel sleeves shall have soil plates. Reflective sheeting shall be placed on the face of every other post cap or cable spacer and on the cable release post. The sheeting shall be in conformance with Section 982.2.1.2 of the Standard Specifications. The sheeting shall be in conformance with Section 982.2.1.2 of the Standard Specifications. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The Contractor shall check and adjust the tension of the cables approximately 3 weeks after installation. Cost for this work shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

The Contractor shall install the system according to the manufacturer's recommendations, specifications, and installation instructions. A copy of the specifications, detail drawings, and installation instructions for the high tension cable guardrail and anchor assemblies shall be given to the Engineer 2 weeks prior to installation of the high tension cable guardrail system.

The lengths of high tension cable guardrail stated in the plans were based on a CASS Cable Guardrail Safety System. The length and location of the high tension cable guardrail at each site will need to be adjusted during construction as necessary if a system with a different non-effective length is used and it shall be approved by the Engineer before installation.

The high tension cable guardrail shall be measured along the centerline of the cable guardrail from the first post of the approach anchor assembly to last post of the departure anchor assembly to the nearest foot.

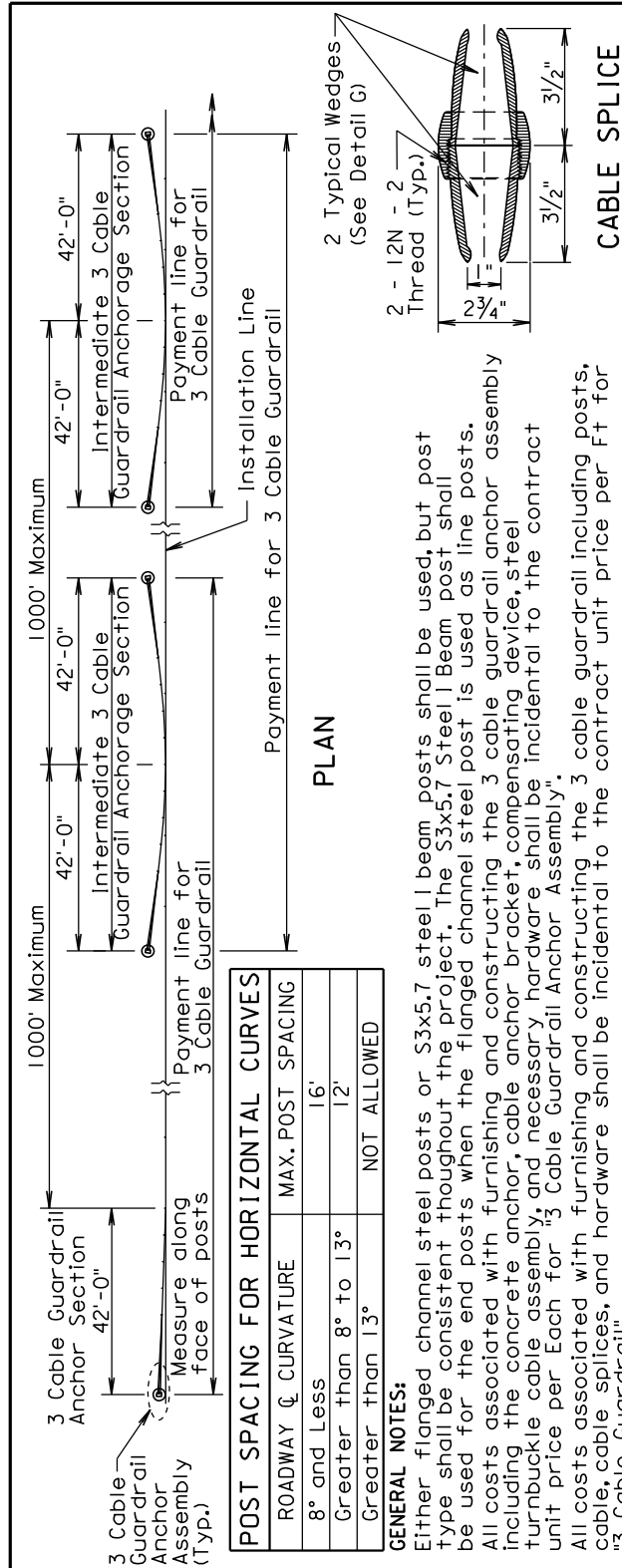
All costs for furnishing and installing the 3 or 4 cable high tension guardrail system including all labor, materials, and equipment shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

NCHRP 350 TEST LEVEL 3 HIGH TENSION CABLE GUARDRAIL
ANCHOR ASSEMBLY

The beginning and end of each "run" of high tension cable guardrail shall terminate with an anchor assembly that meets the crash testing requirements of NCHRP 350 Test Level 3.

The footing size for the anchor assembly shall be designed appropriately based on the soil type and conditions located on the project. The footing size shall be a minimum of 5' deep and shall be approved by the Engineer before installation.

All costs for furnishing and installing the NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly including all labor, equipment, and materials which include the anchor footing, hardware, and all attachments to the anchor footing, shall be incidental to the contract unit price per each for "NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly".



LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
To 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 above.

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 Lbs. per inch and shall have a total available travel of 6" minimum.

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

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

December 23, 2010

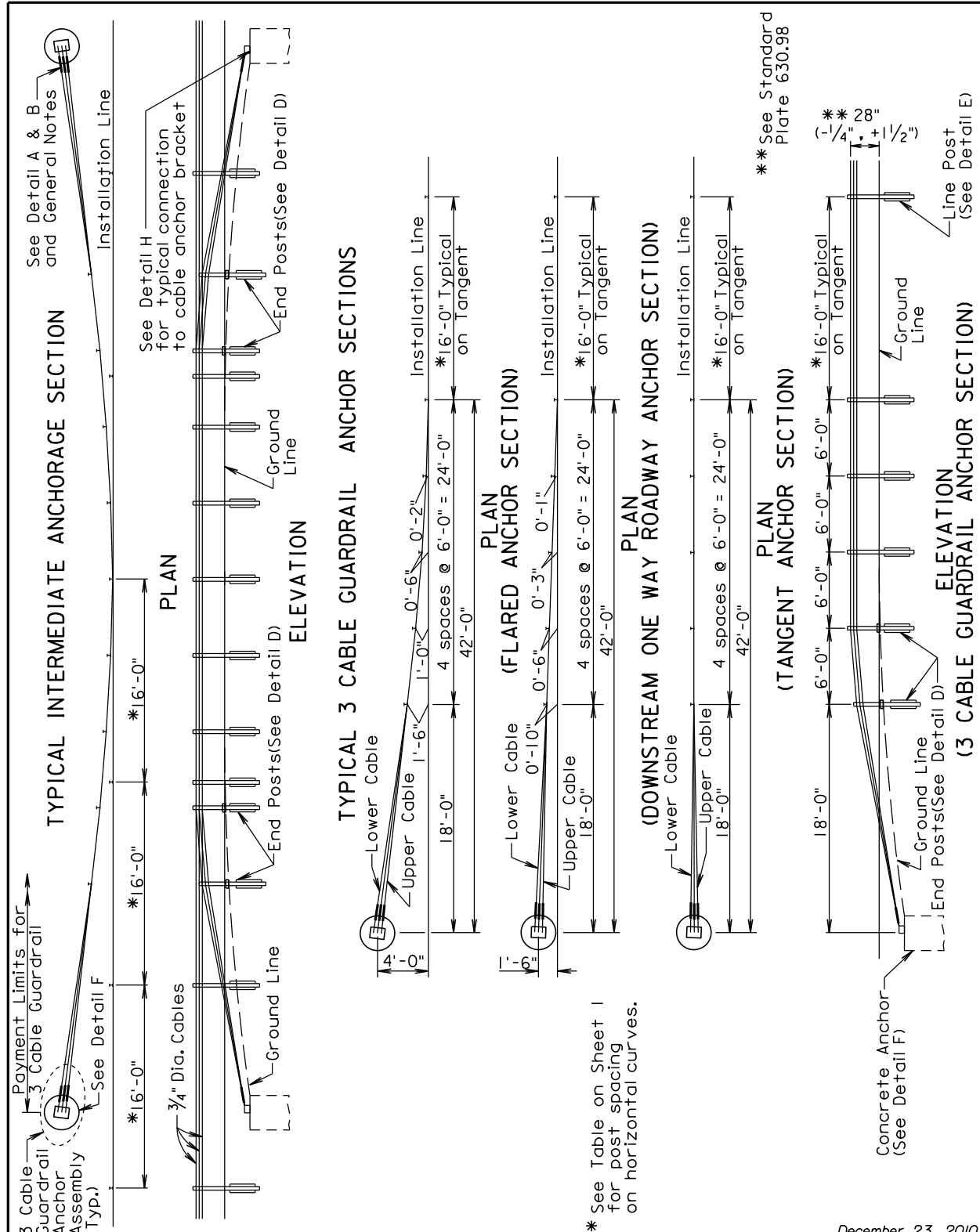
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3 CABLE GUARDRAIL

PLATE NUMBER
629.01

Sheet 1 of 6



* See Table on Sheet 1 for post spacing on horizontal curves.

** See Standard Plate 630.98

December 23, 2010

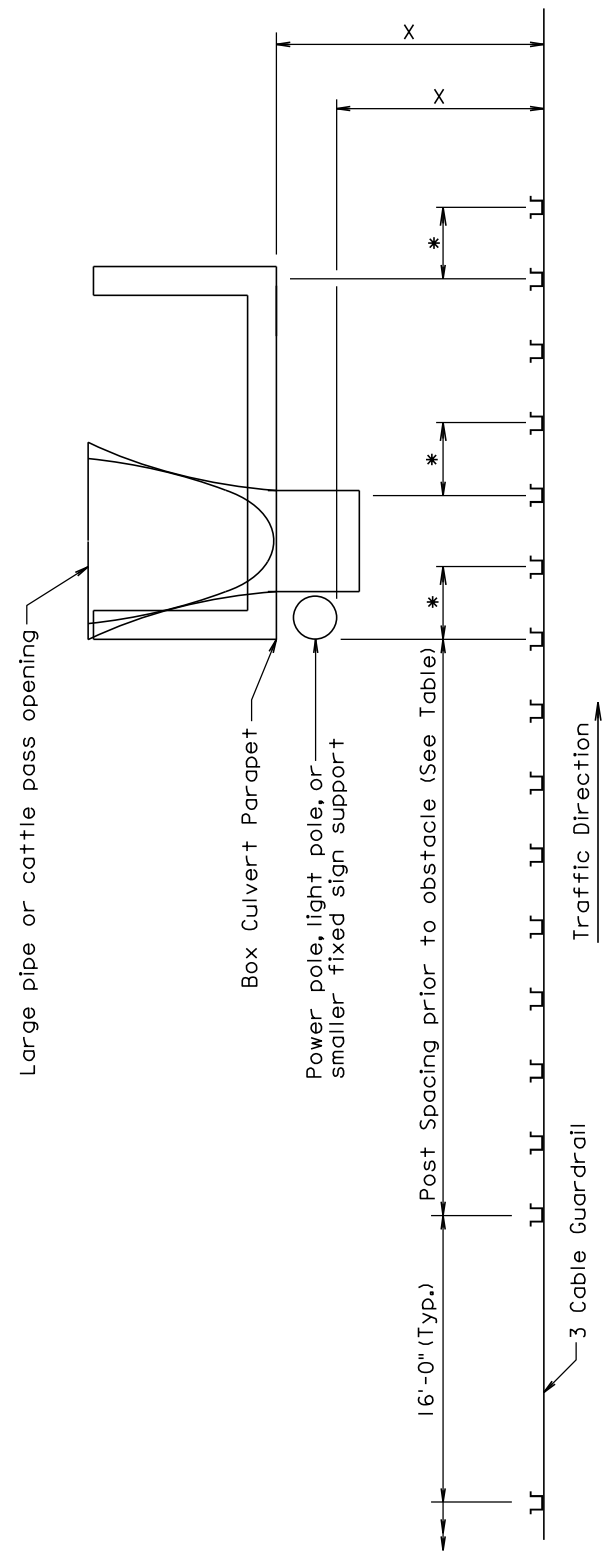
Published Date: 3rd Qtr. 2012

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3 CABLE GUARDRAIL

PLATE NUMBER
629.01

Sheet 2 of 6



* Post spacings for control of deflection shall continue to one post past the obstacle for one way traffic.
Post spacings for control of deflection shall be provided on both sides of the obstacle for two way traffic.

X (Ft)	POST SPACING PRIOR TO OBSTACLE
7.0 to 7.9	8 @ 4'-0"
8.0 to 9.4	6 @ 8'-0"
9.5 to 10.9	4 @ 12'-0"
11.0 and Greater	16'-0" (Typ.)

GENERAL NOTE:

For illustrational purposes, the 3 cable guardrail posts and post spacings shown on this standard plate depict the situation when there is a box culvert 7' to 7.9 away from the 3 cable guardrail and the traffic is one way.

March 31, 2000

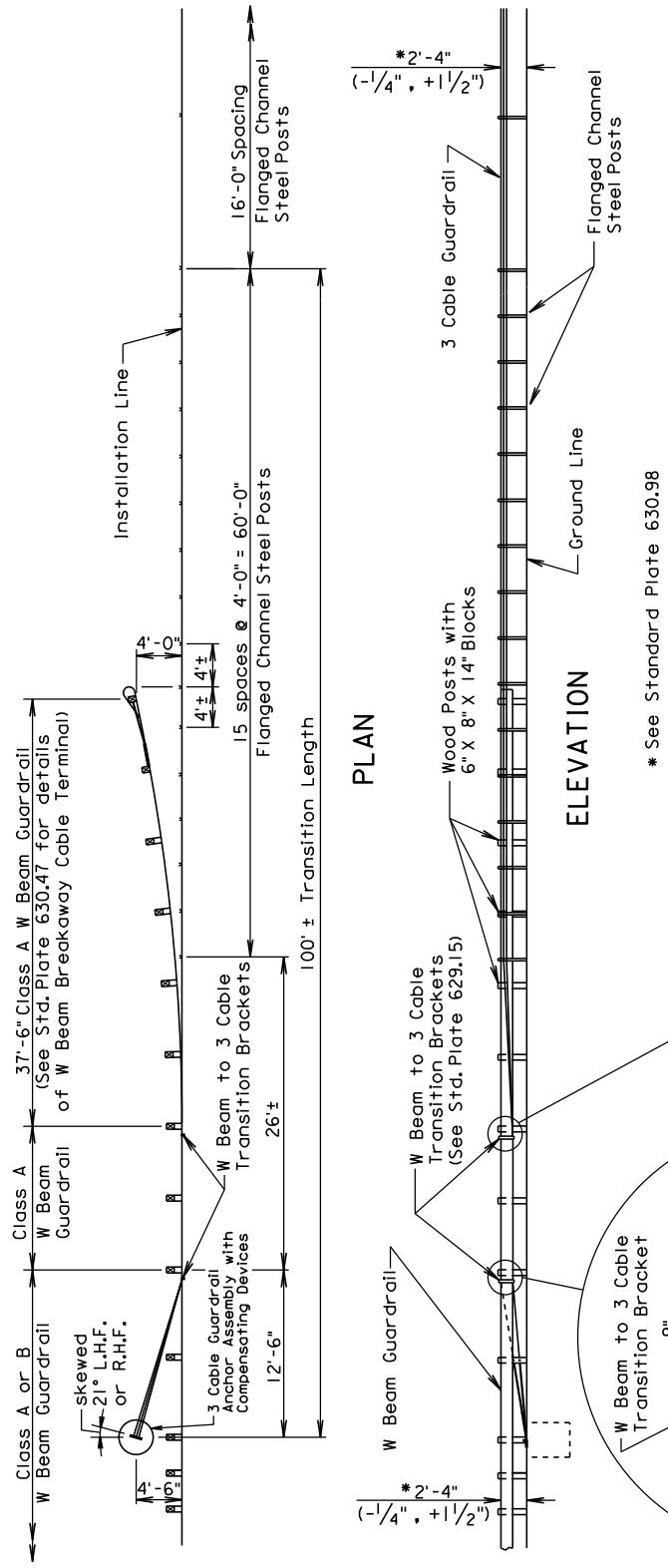
Published Date: 3rd Qtr. 2012

SDDOT

3 CABLE GUARDRAIL POST SPACING FOR DEFLECTION CONTROL

PLATE NUMBER
629.02

Sheet 1 of 1



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 23, 2010

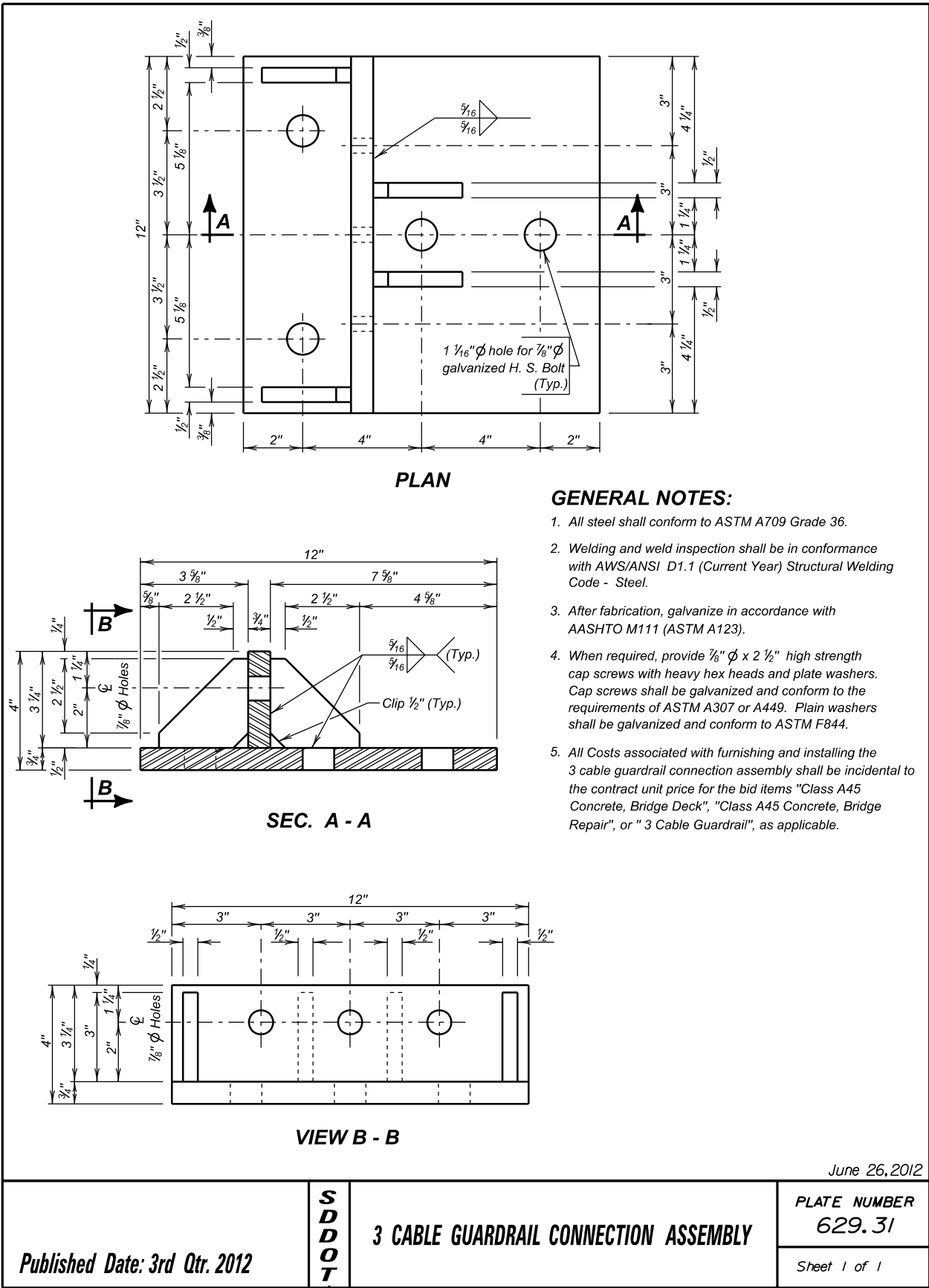
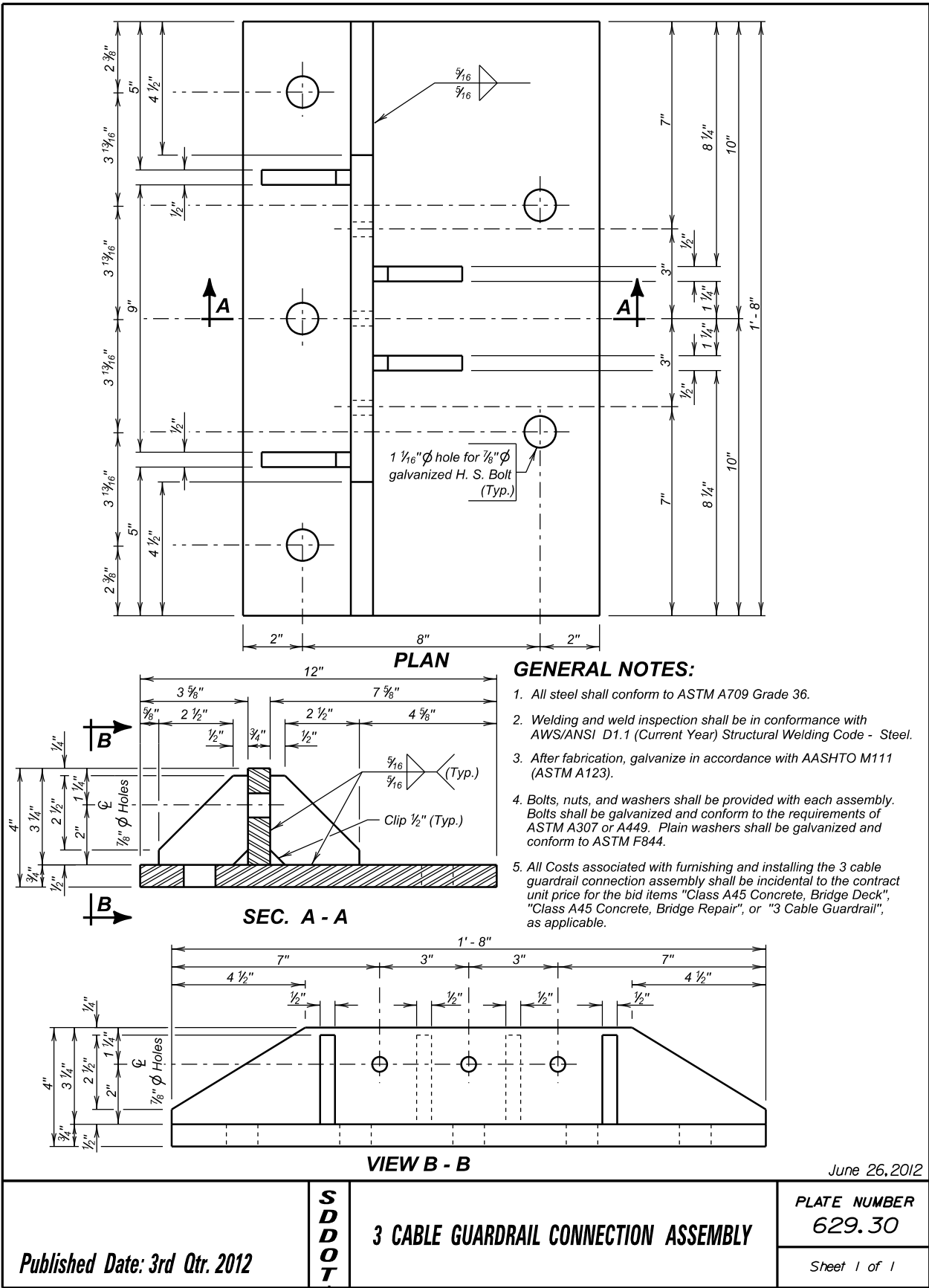
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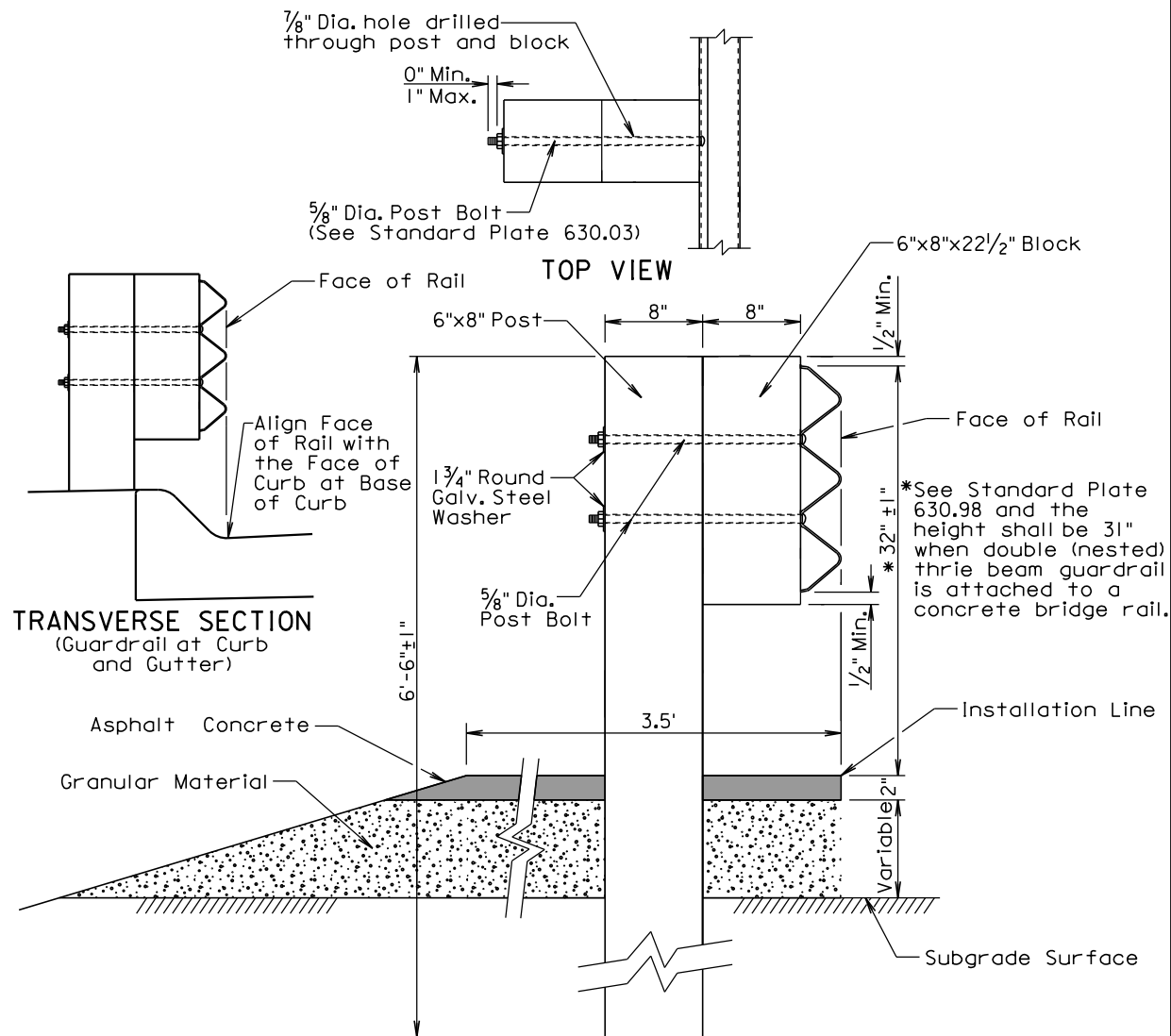
SDDOT

W BEAM TO 3 CABLE TRANSITION

PLATE NUMBER
629.05

Sheet 1 of 1





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 SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

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 SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

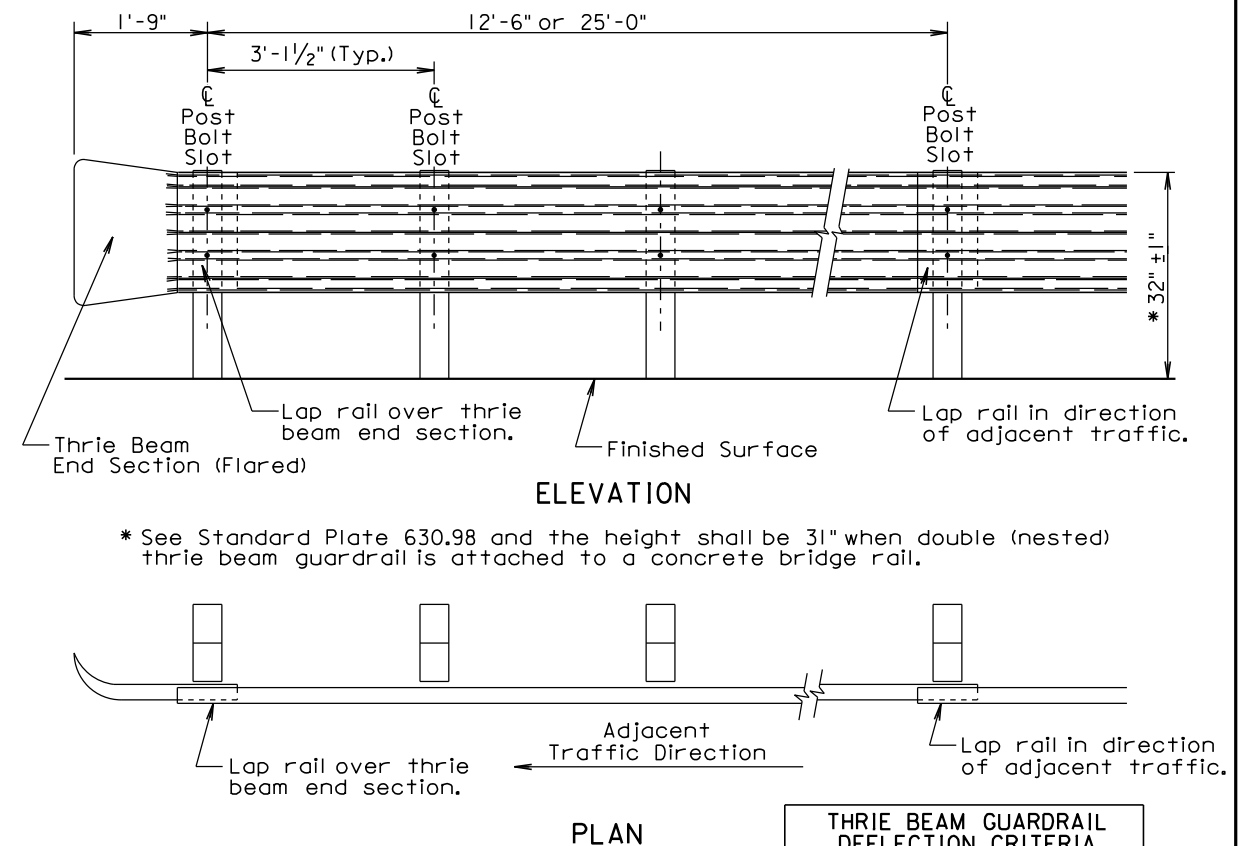
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

December 23, 2010

Published Date: 3rd Qtr. 2012	S D D O T	THRIE BEAM GUARDRAIL POST INSTALLATION	PLATE NUMBER 630.01
			Sheet 1 of 1



GENERAL NOTES:

All thrie beam rail shall be Type I.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors. All costs for the Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Thrie 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.

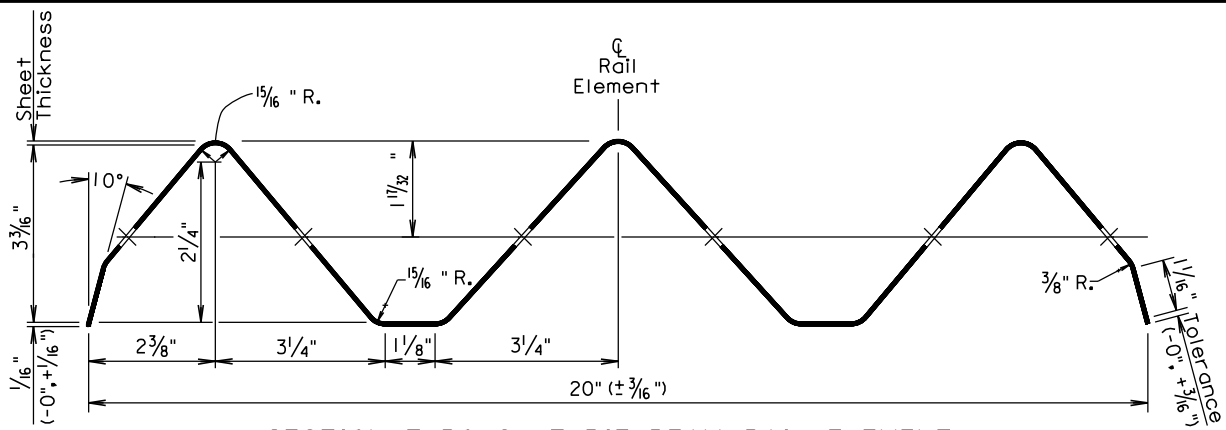
Thrie Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing thrie beam guardrail 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 the respective "Thrie Beam Guardrail" bid item.

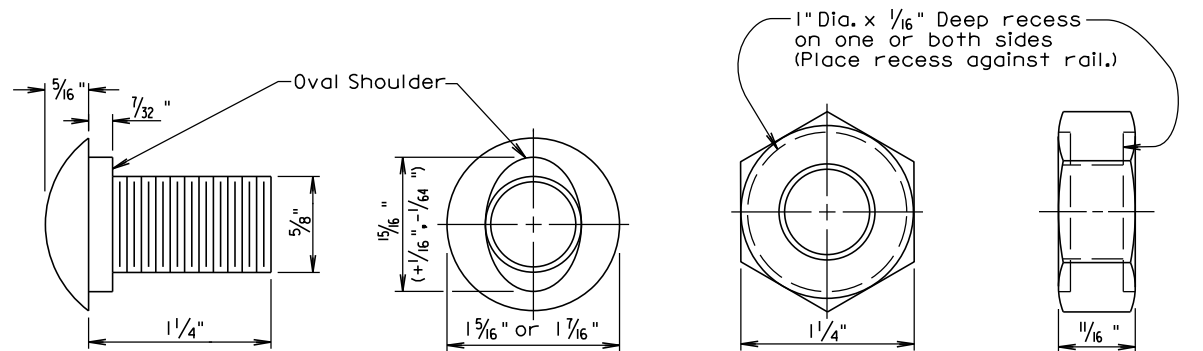
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

December 23, 2010

Published Date: 3rd Qtr. 2012	S D D O T	THRIE BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.02
			Sheet 1 of 1

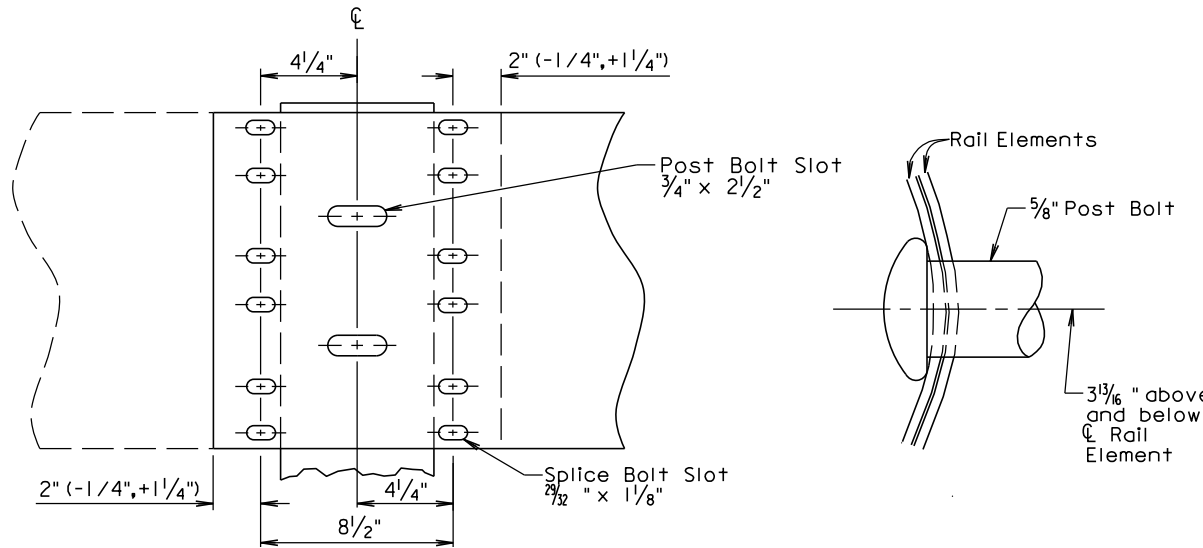


SECTION THROUGH THRIE BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)

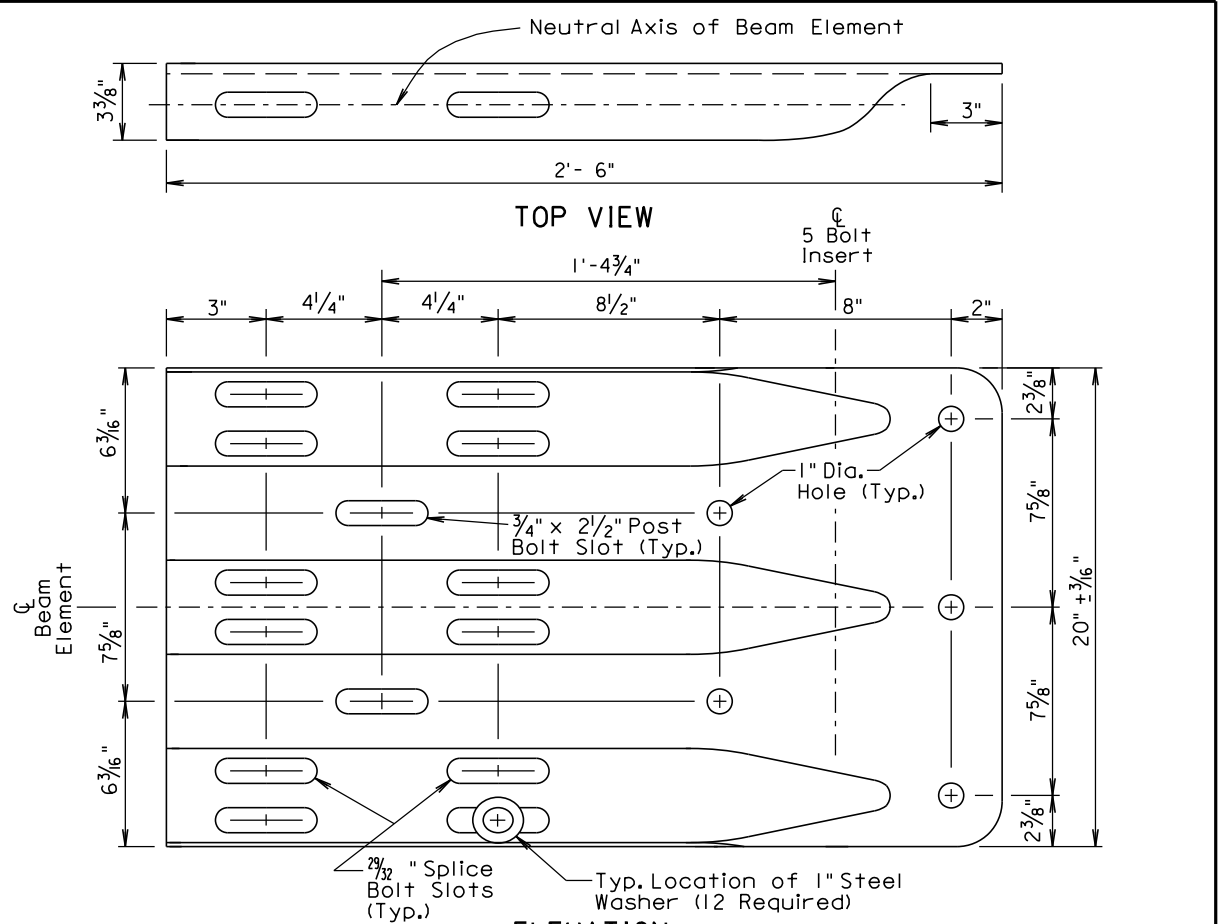


Lap in direction of traffic.

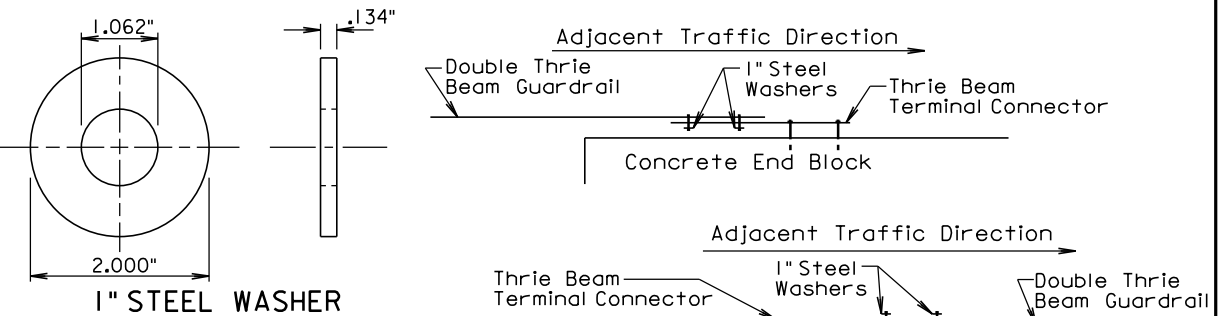
RAIL SPLICE

March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.03
			Sheet 1 of 1



ELEVATION
THRIE BEAM TERMINAL CONNECTOR



GENERAL NOTES:

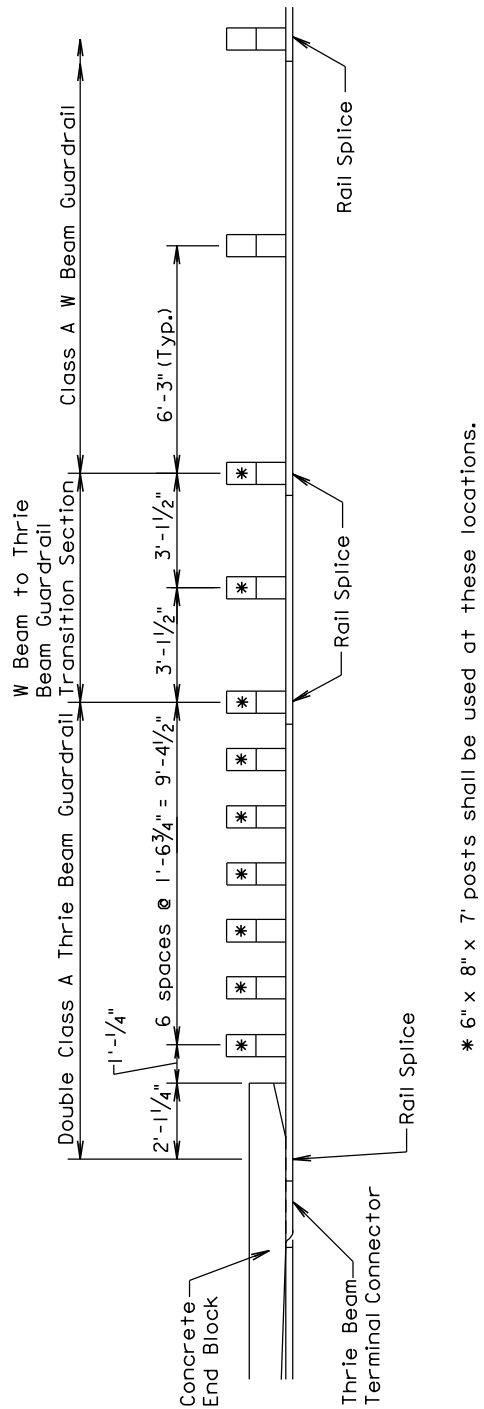
Thrie Beam Terminal Connectors shall be 10 gauge.

When the thrie beam terminal connector is used to connect the rail to the bridge, 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 the Thrie Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

September 14, 2001

Published Date: 3rd Qtr. 2012	S D D O T	THRIE BEAM TERMINAL CONNECTOR AND 1 " STEEL WASHER	PLATE NUMBER 630.05
			Sheet 1 of 1



POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

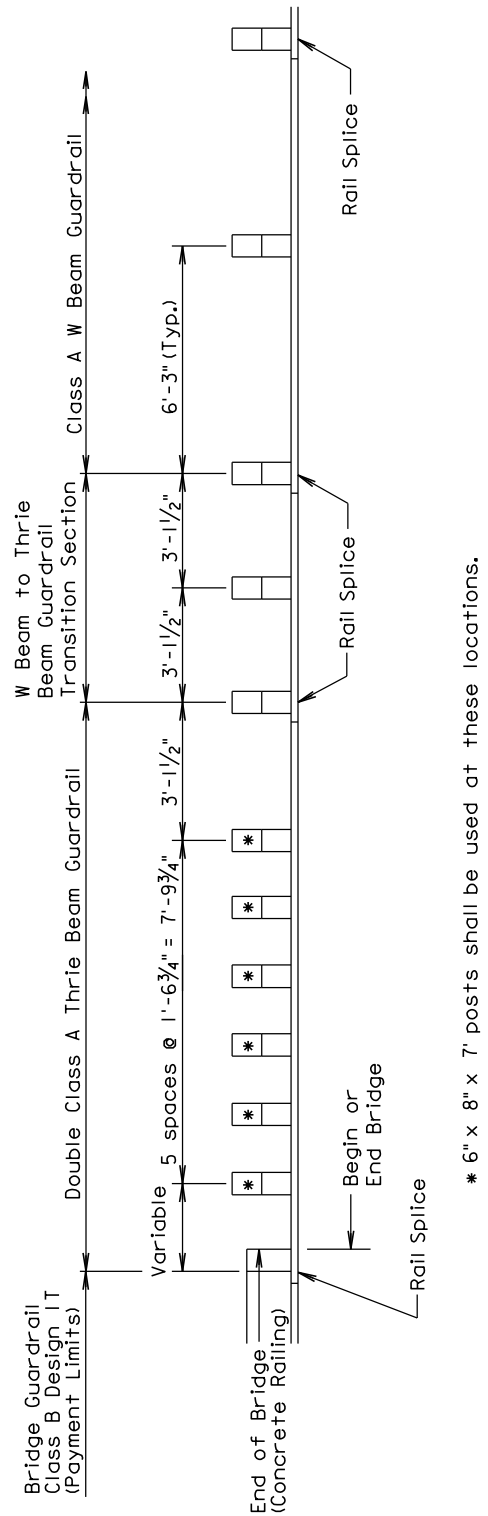
Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
THRIE BEAM GUARDRAIL AT BRIDGE END

PLATE NUMBER
630.15

Sheet 1 of 1



POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

March 31, 2000

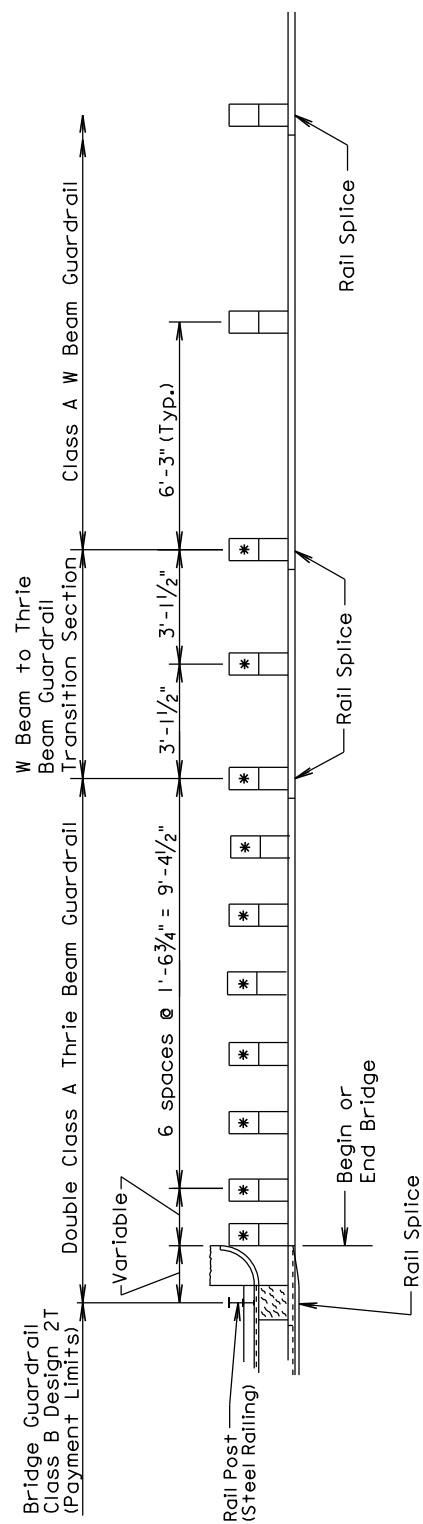
Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
THRIE BEAM GUARDRAIL AT BRIDGE END
(BRIDGE GUARDRAIL DESIGN 1T)

PLATE NUMBER
630.20

Sheet 1 of 1



* 6" x 8" x 7' posts shall be used at these locations.

POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

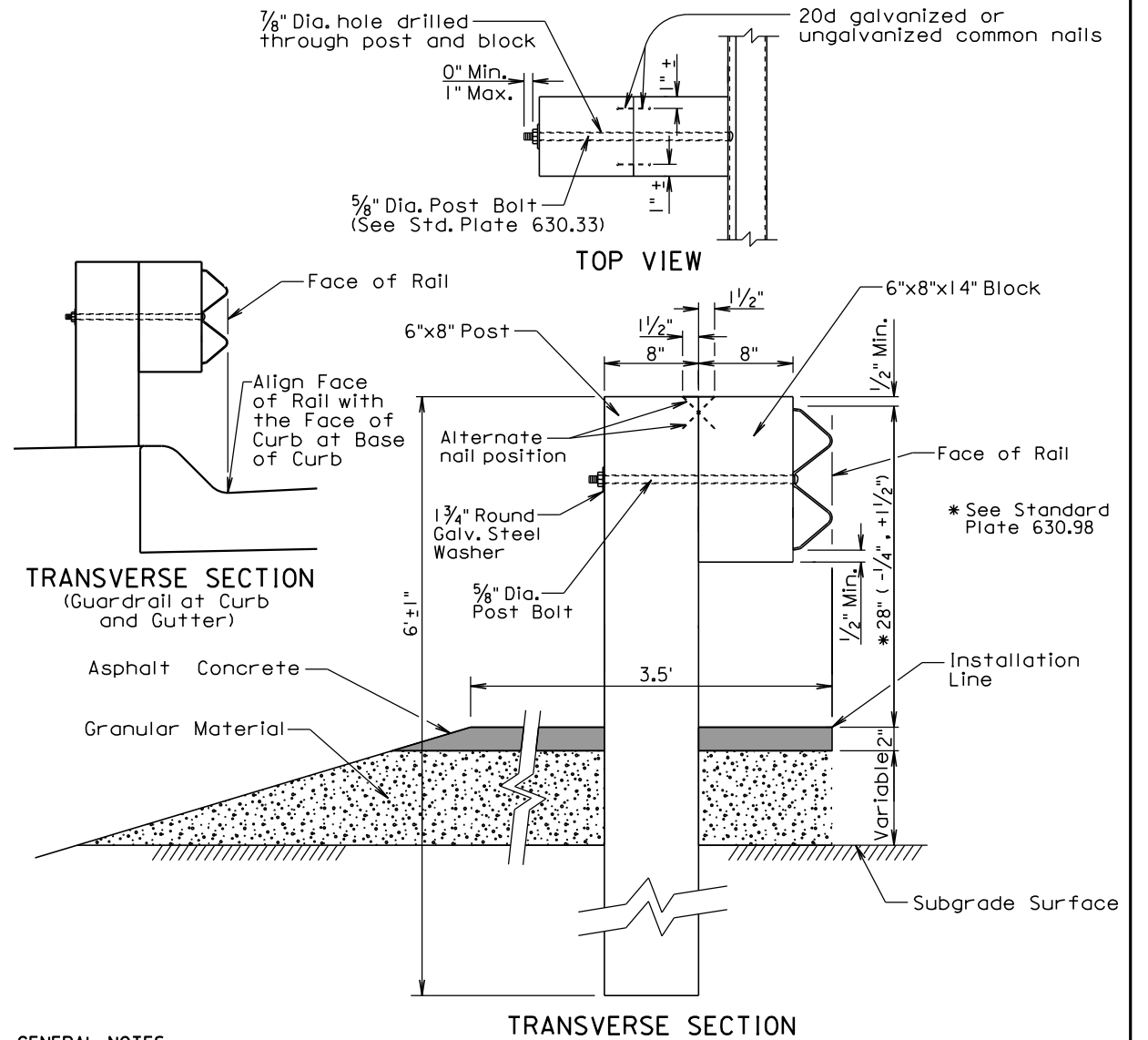
Published Date: 3rd Qtr. 2012

SD
DOT

POST SPACING ARRANGEMENT FOR
THRIE BEAM GUARDRAIL AT BRIDGE END
(BRIDGE GUARDRAIL DESIGN 2T)

PLATE NUMBER
630.21

Sheet 1 of 1



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 SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

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 SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

December 23, 2010

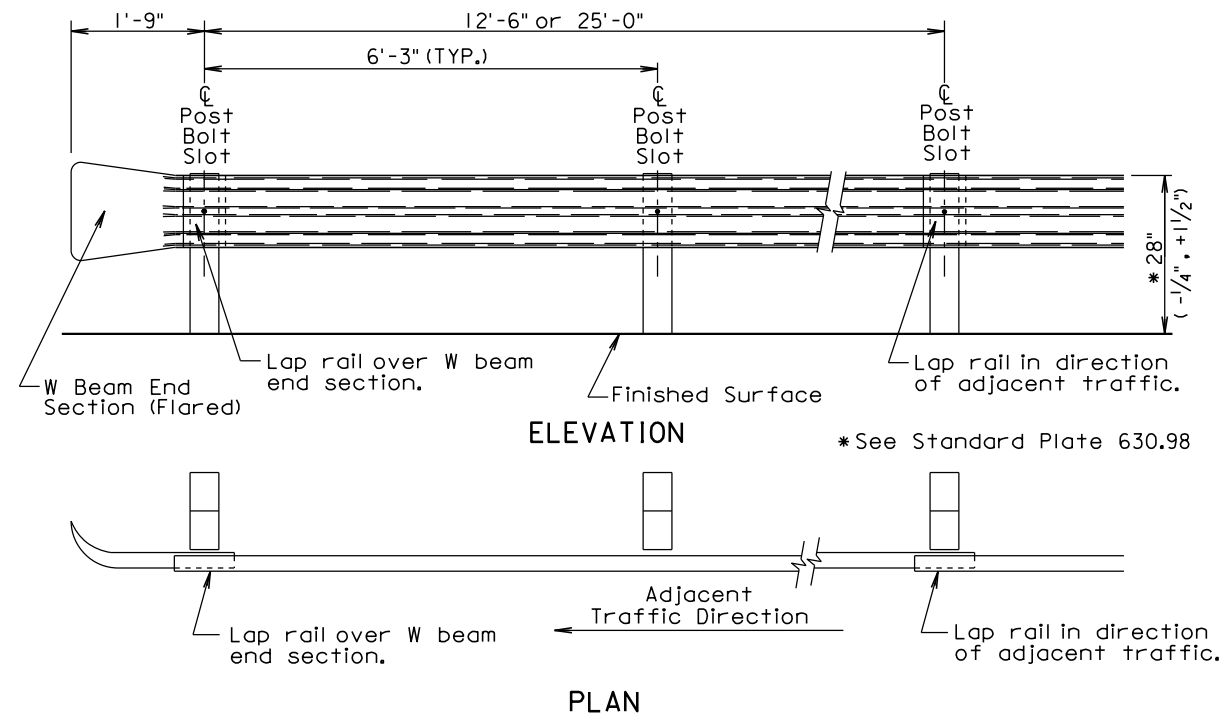
Published Date: 3rd Qtr. 2012

SD
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W BEAM GUARDRAIL POST INSTALLATION

PLATE NUMBER
630.31

Sheet 1 of 1



*See Standard Plate 630.98

W BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	3'-3"
3'-1 1/2"	2'-0"

For Informational Purposes Only

GENERAL NOTES:

All W beam rail shall be Type I.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared) and W Beam Terminal Connectors. All costs for the W Beam End Sections (Flared) and W Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

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.

W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing W beam guardrail 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 the respective "W Beam Guardrail" bid item.

Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

December 23, 2010

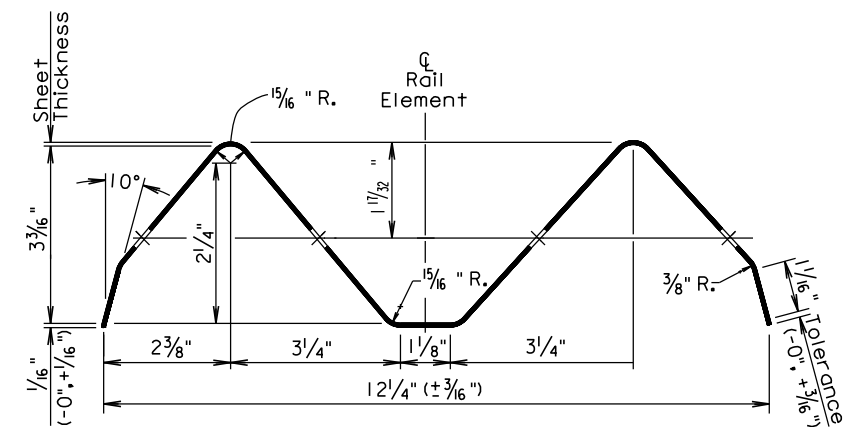
Published Date: 3rd Qtr. 2012

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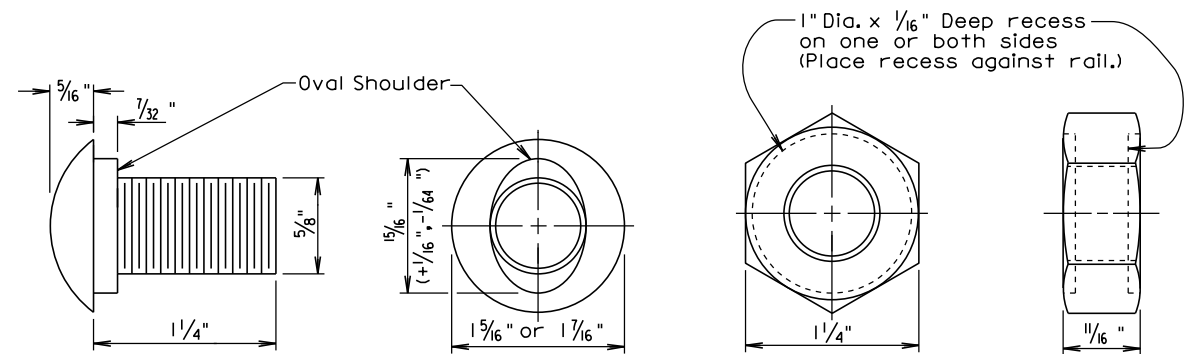
W BEAM GUARDRAIL INSTALLATION

PLATE NUMBER
630.32

Sheet 1 of 1

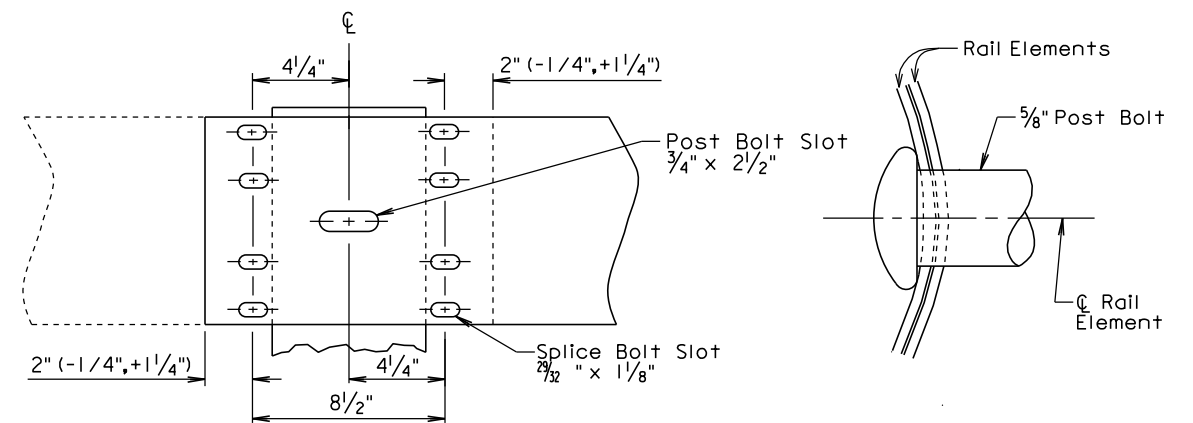


SECTION THROUGH W BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

**SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)**



RAIL SPLICE

December 23, 2004

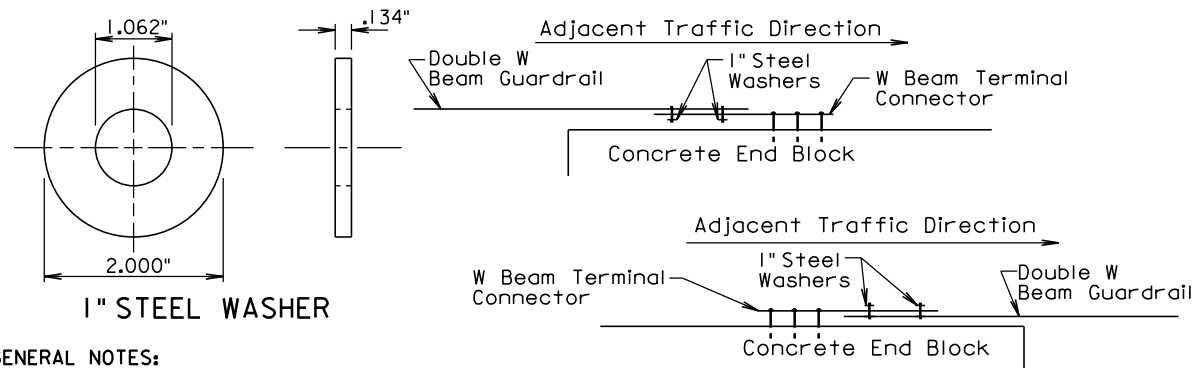
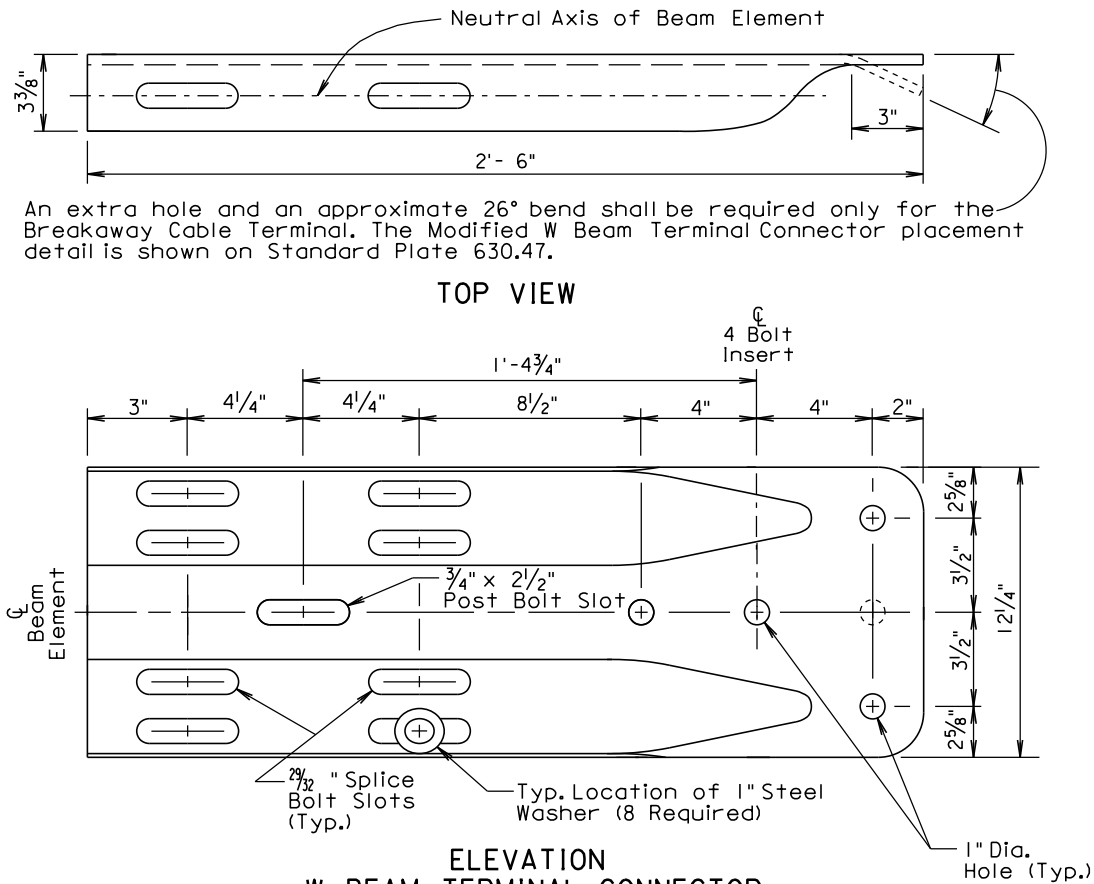
Published Date: 3rd Qtr. 2012

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W BEAM RAIL, RAIL SPLICE, AND HARDWARE

PLATE NUMBER
630.33

Sheet 1 of 1



GENERAL NOTES:

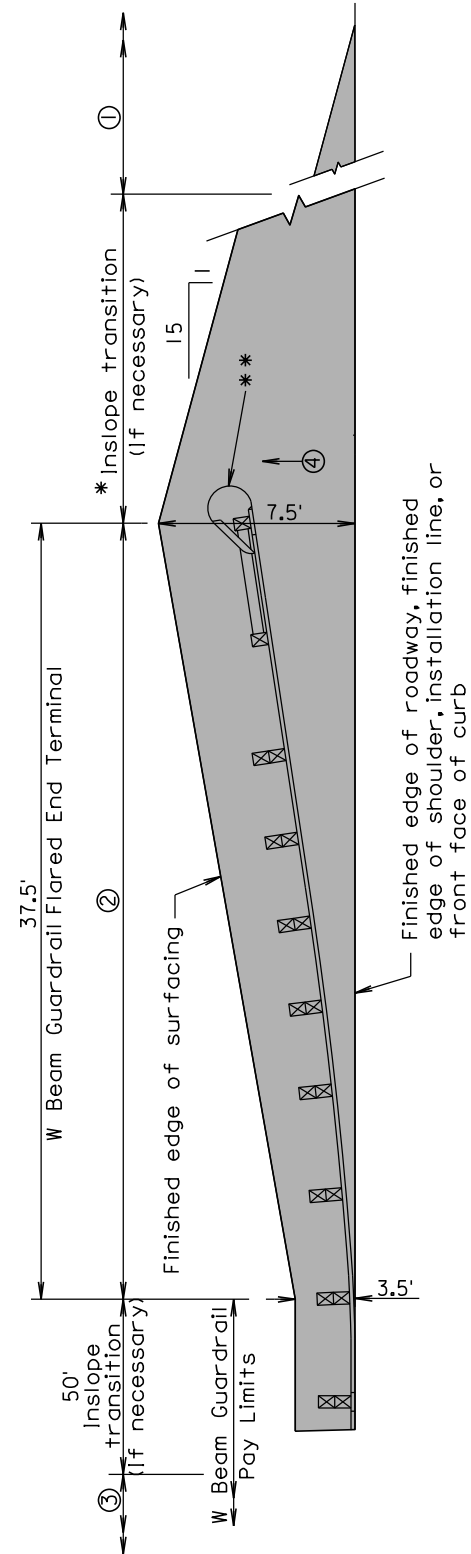
W Beam Terminal Connectors shall be 10 gauge.

When the W beam terminal connector is used to connect the rail to the bridge, 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 the W Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

September 14, 2001

Published Date: 3rd Qtr. 2012	S D D O T	W BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER	PLATE NUMBER 630.35
			Sheet 1 of 1



* 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'.

- 2' Asphalt concrete surfacing with variable thickness granular material
- Same inslope as mainline inslope
- 4:1 inslope
- 2:1 inslope or flatter, or inslope as specified in plans
- Same slope as roadway cross slope

GENERAL NOTES:

The W beam guardrail flared end terminal shall be installed according to the manufacturer's installation instructions.

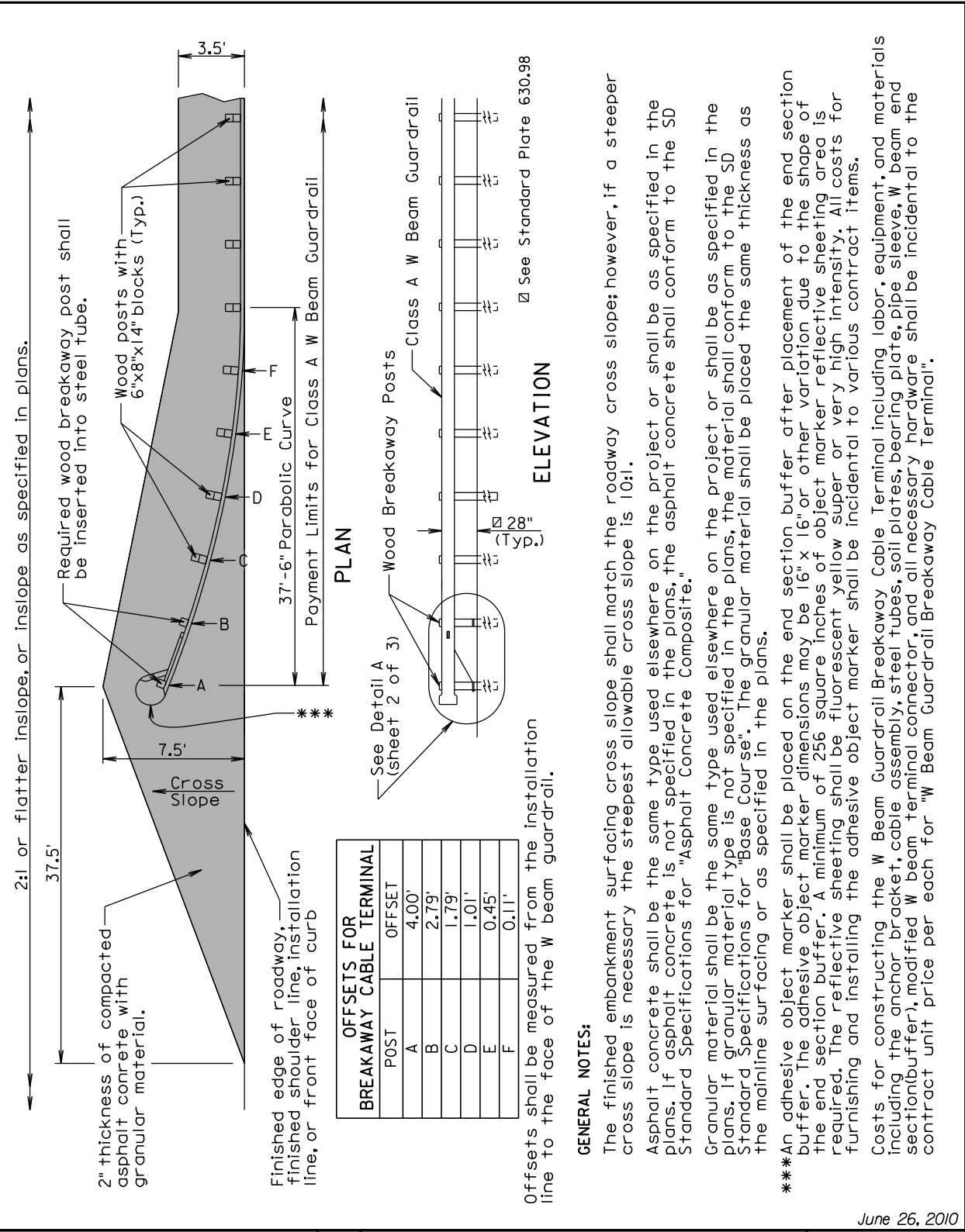
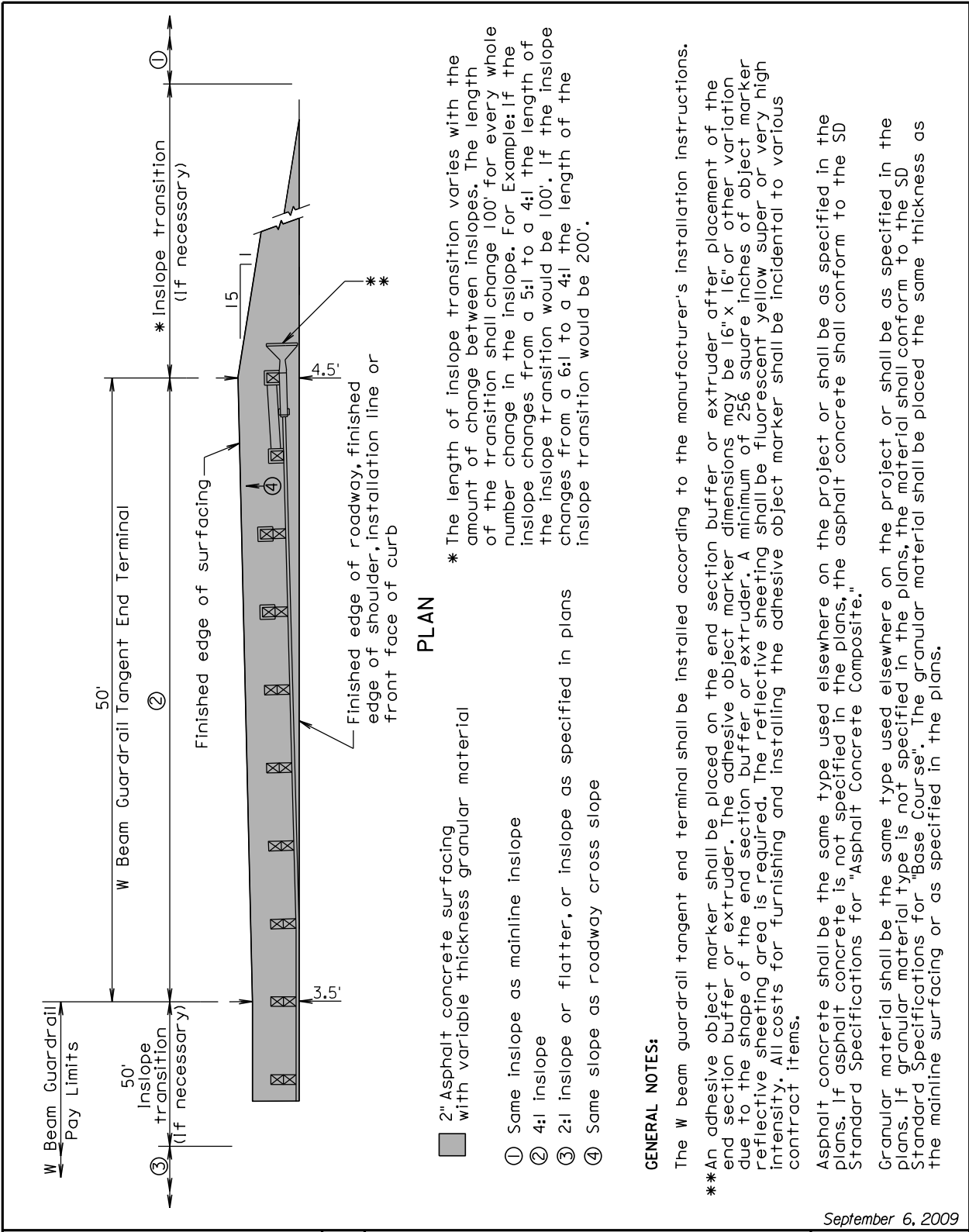
** An adhesive object marker shall be placed on the end section buffer or extruder after placement of the end section buffer or extruder. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer or extruder. A minimum of 256 square inches of 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.

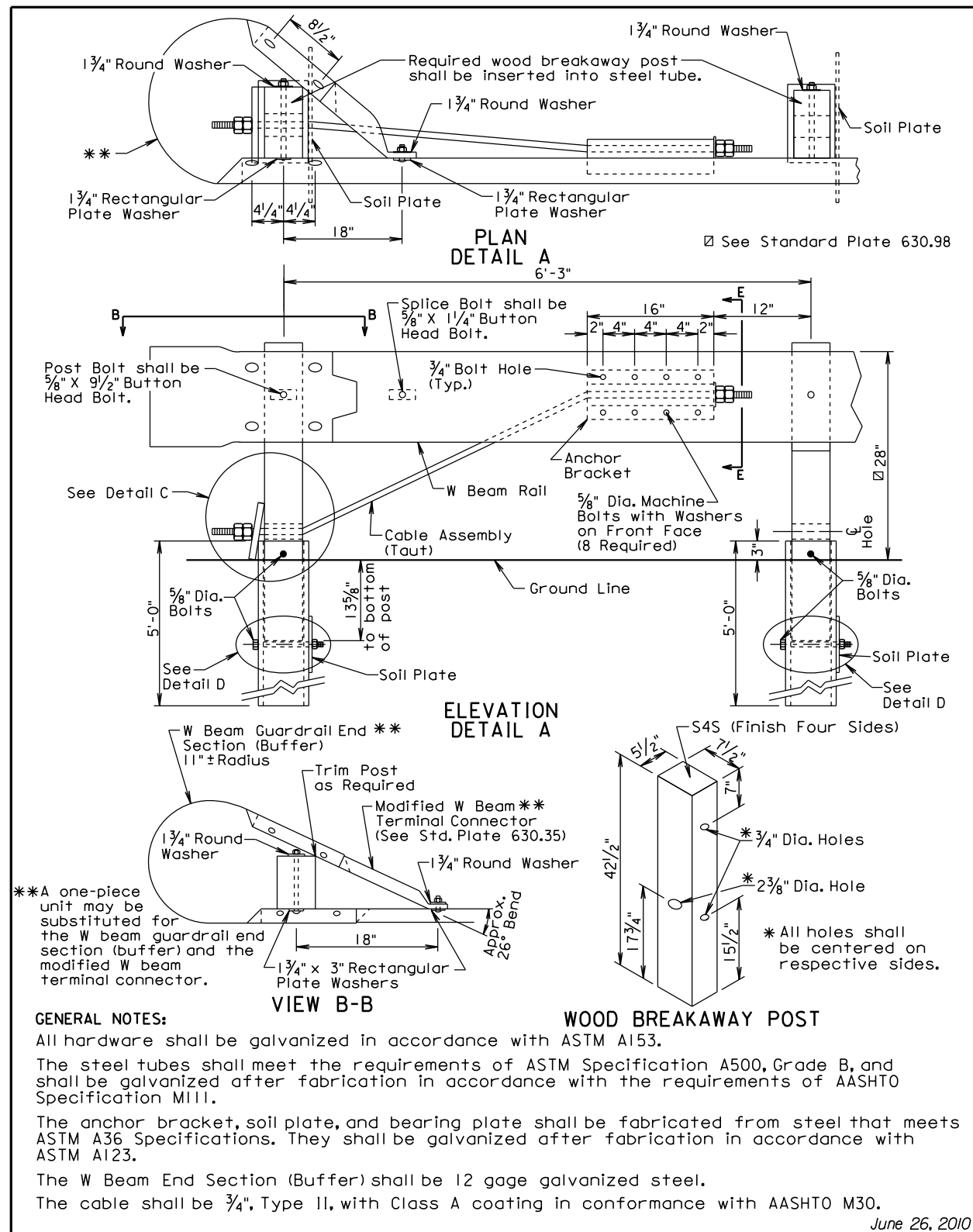
Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite."

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 SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

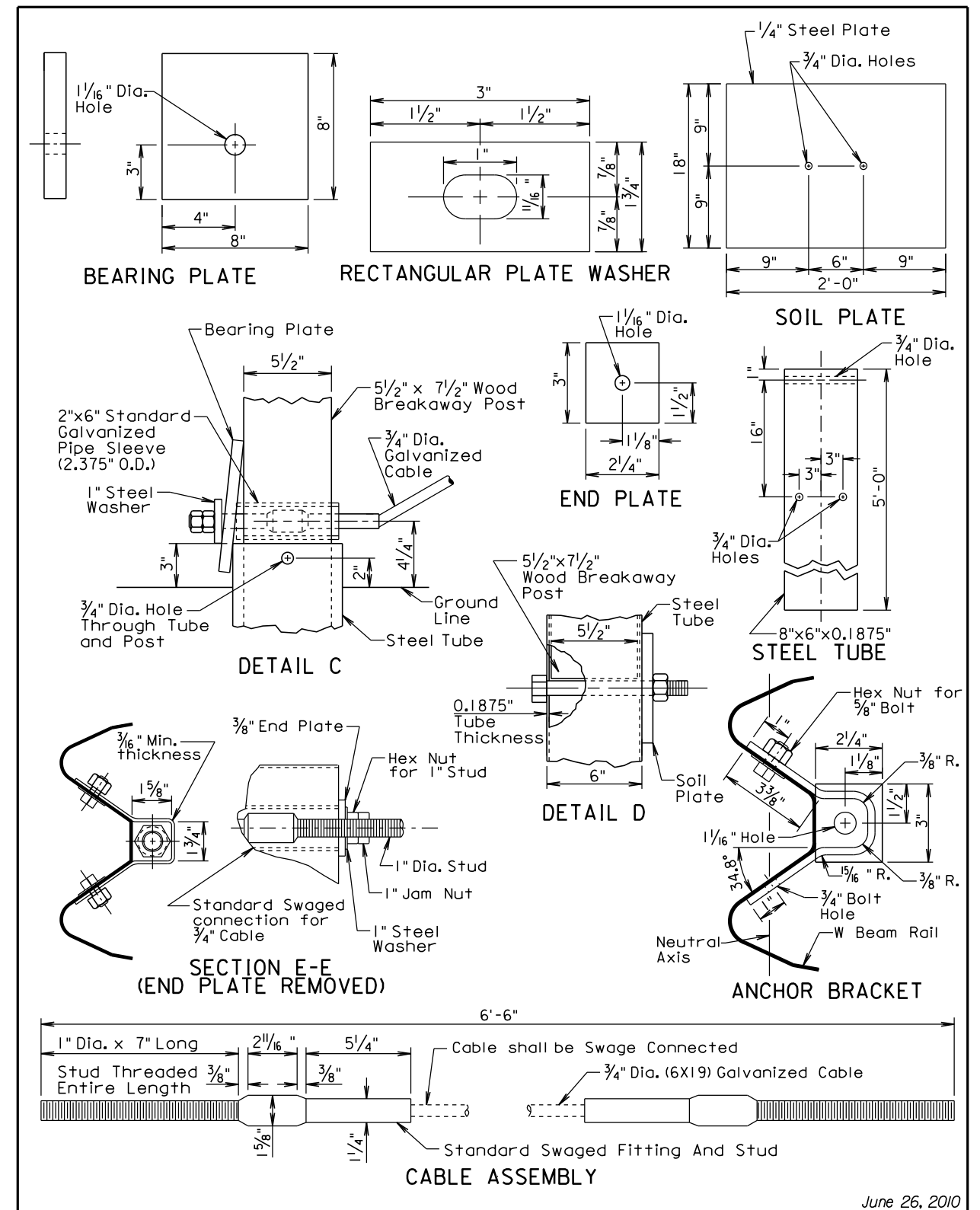
September 6, 2009

Published Date: 3rd Qtr. 2012	S D D O T	EMBANKMENT AND SURFACING FOR W BEAM GUARDRAIL FLARED END TERMINAL	PLATE NUMBER 630.45
			Sheet 1 of 1

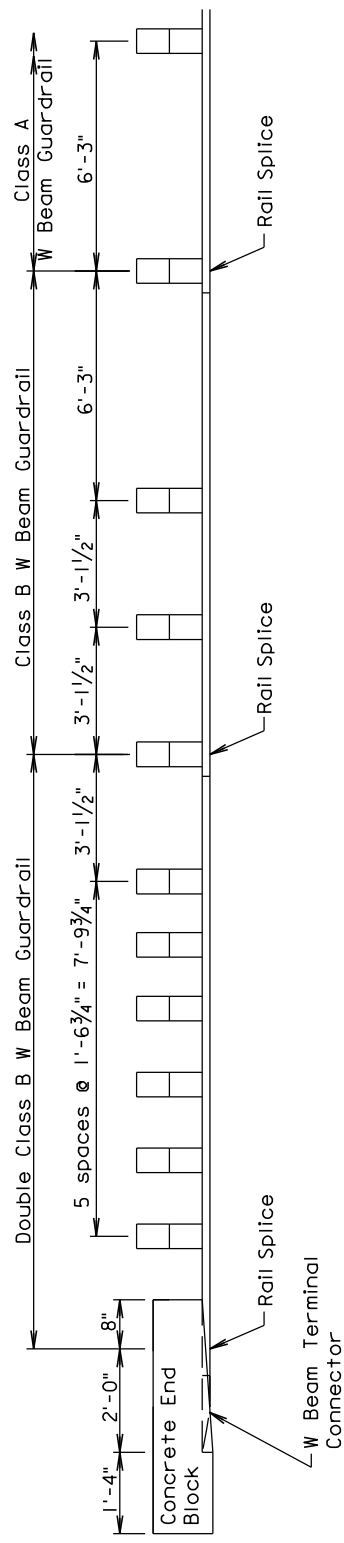




Published Date: 3rd Qtr. 2012	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 2 of 3



Published Date: 3rd Qtr. 2012	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 3 of 3



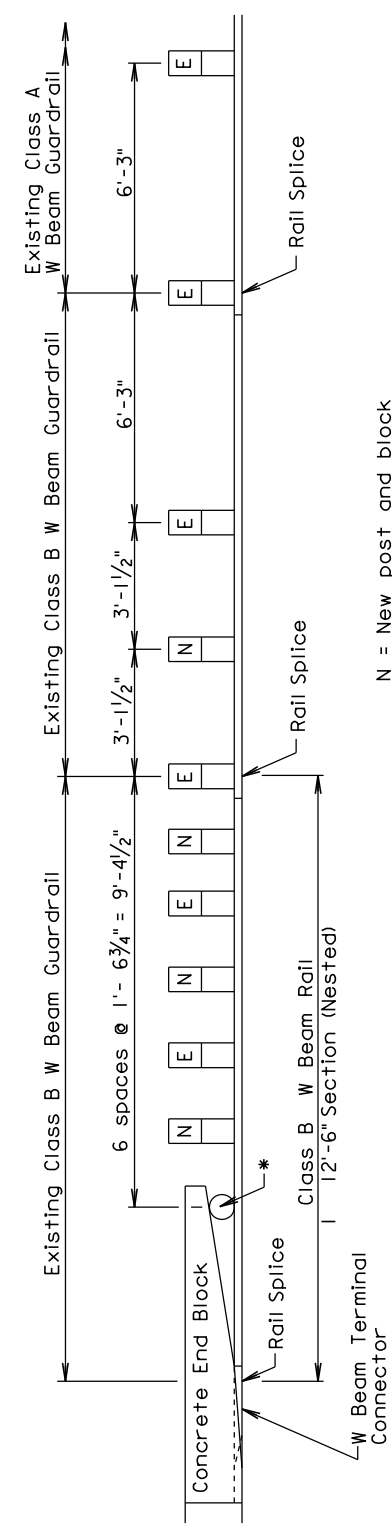
POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END

March 31, 2000
PLATE NUMBER
630.50
Sheet 1 of 1

Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
W BEAM GUARDRAIL AT BRIDGE END



POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END
(W BEAM RETROFIT)

- * Remove and discard the in place tapered block and 5/8" threaded bolt. Install at the same location a 6" I.D. x 9" long schedule 40 galvanized pipe. Fasten to nested rails with 2" button head bolt with nut, rectangular plate washer, and 5/8" bolt washer.
- * All costs incurred to remove the block and furnish and install the pipe shall be incidental to the contract unit price per foot for "Straight Class B W Beam Rail".

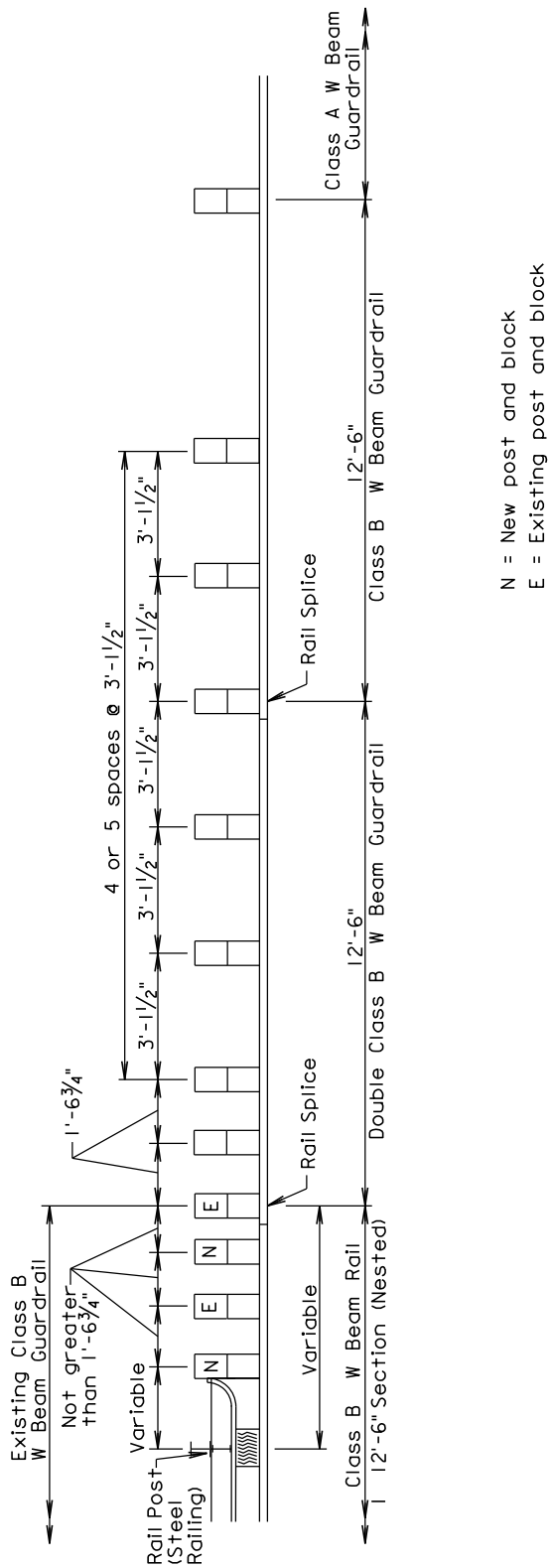
N = New post and block
E = Existing post and block

March 31, 2000
PLATE NUMBER
630.55
Sheet 1 of 1

Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
W BEAM GUARDRAIL AT BRIDGE END
(W BEAM RETROFIT)



POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END
(W BEAM REALIGNMENT)

March 31, 2000

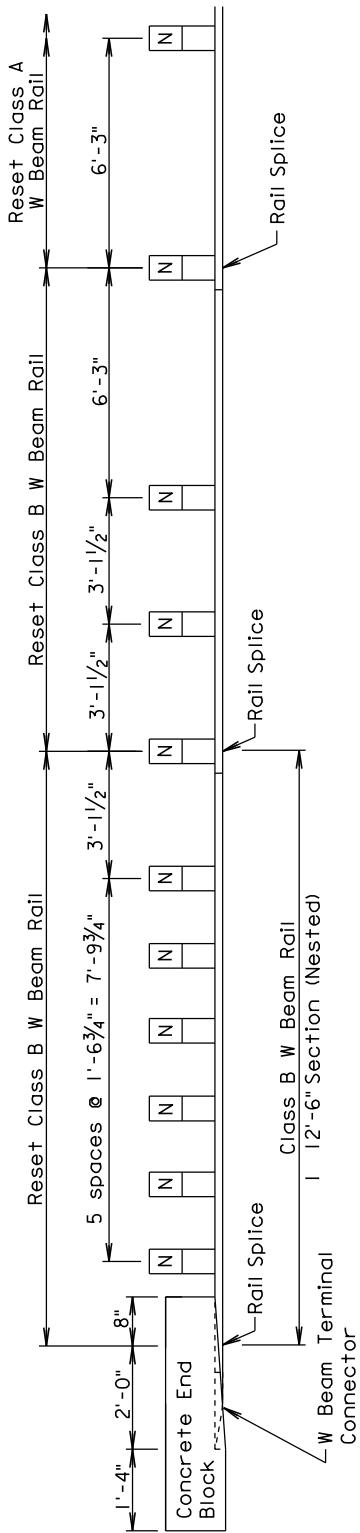
Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
W BEAM GUARDRAIL AT BRIDGE END
(W BEAM REALIGNMENT)

PLATE NUMBER
630.58

Sheet 1 of 1



POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END
(W BEAM RESET AND RETROFIT)

March 31, 2000

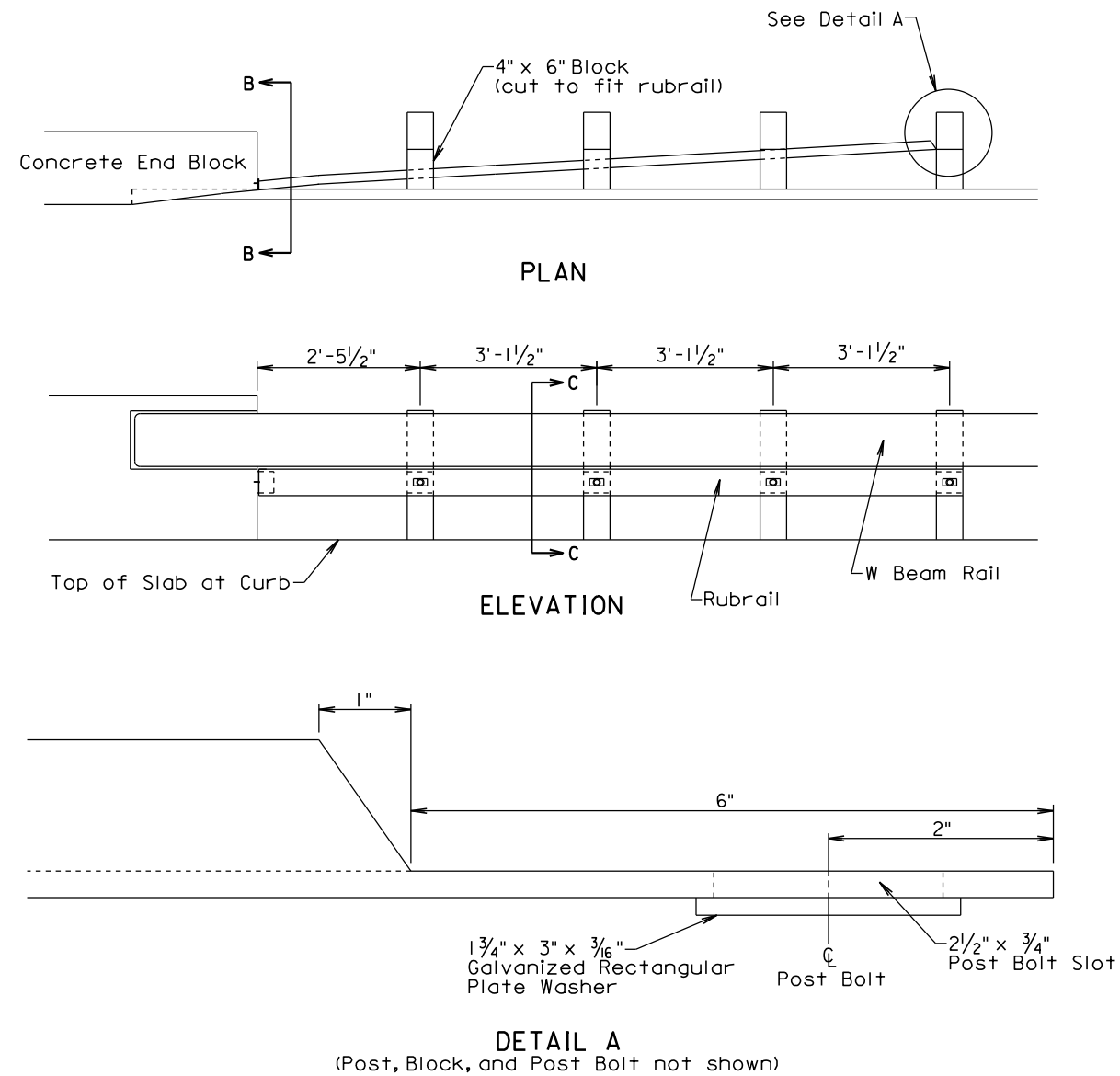
Published Date: 3rd Qtr. 2012

SDOT

POST SPACING ARRANGEMENT FOR
W BEAM GUARDRAIL AT BRIDGE END
(W BEAM RESET AND RETROFIT)

PLATE NUMBER
630.59

Sheet 1 of 1



GENERAL NOTES:

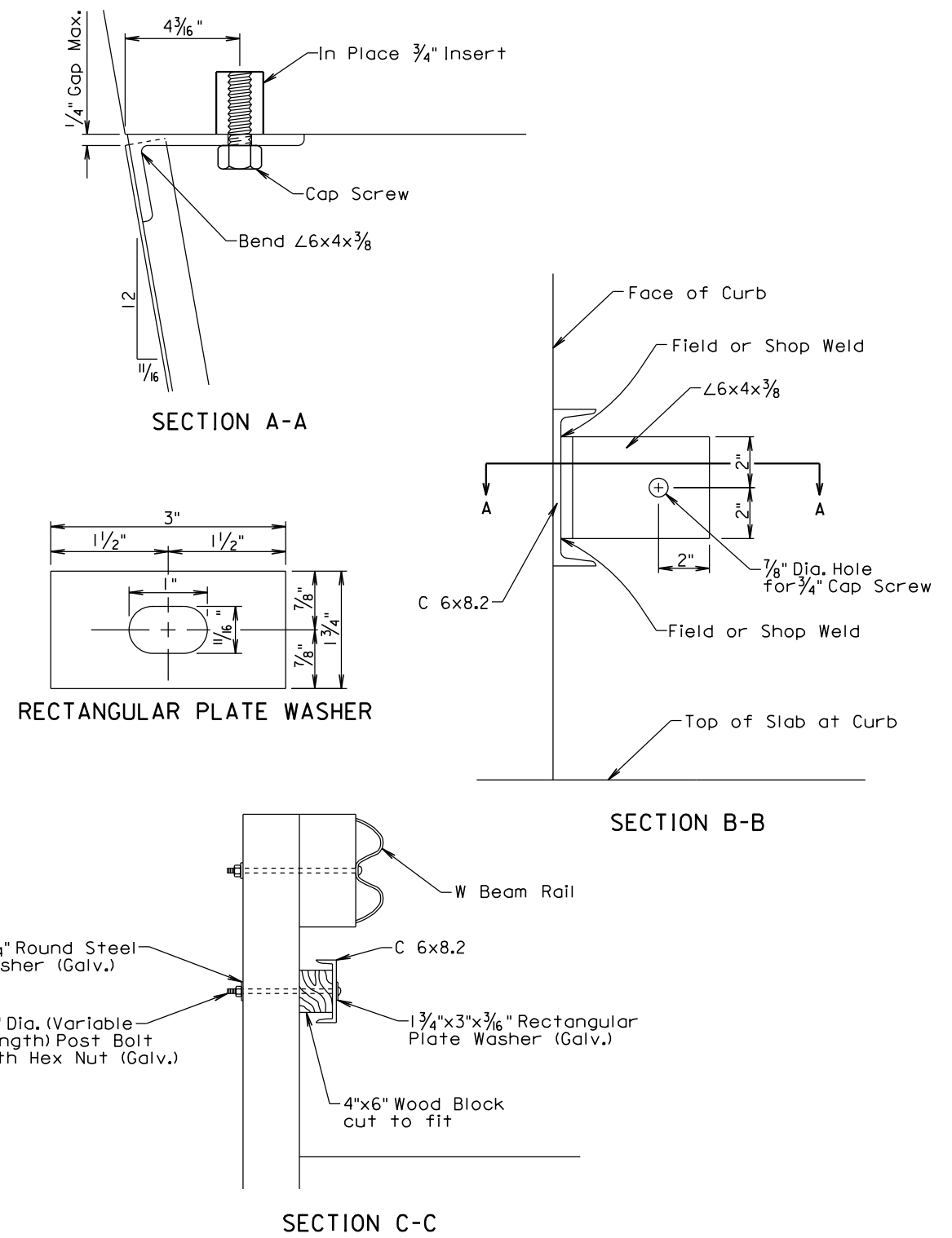
The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

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

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

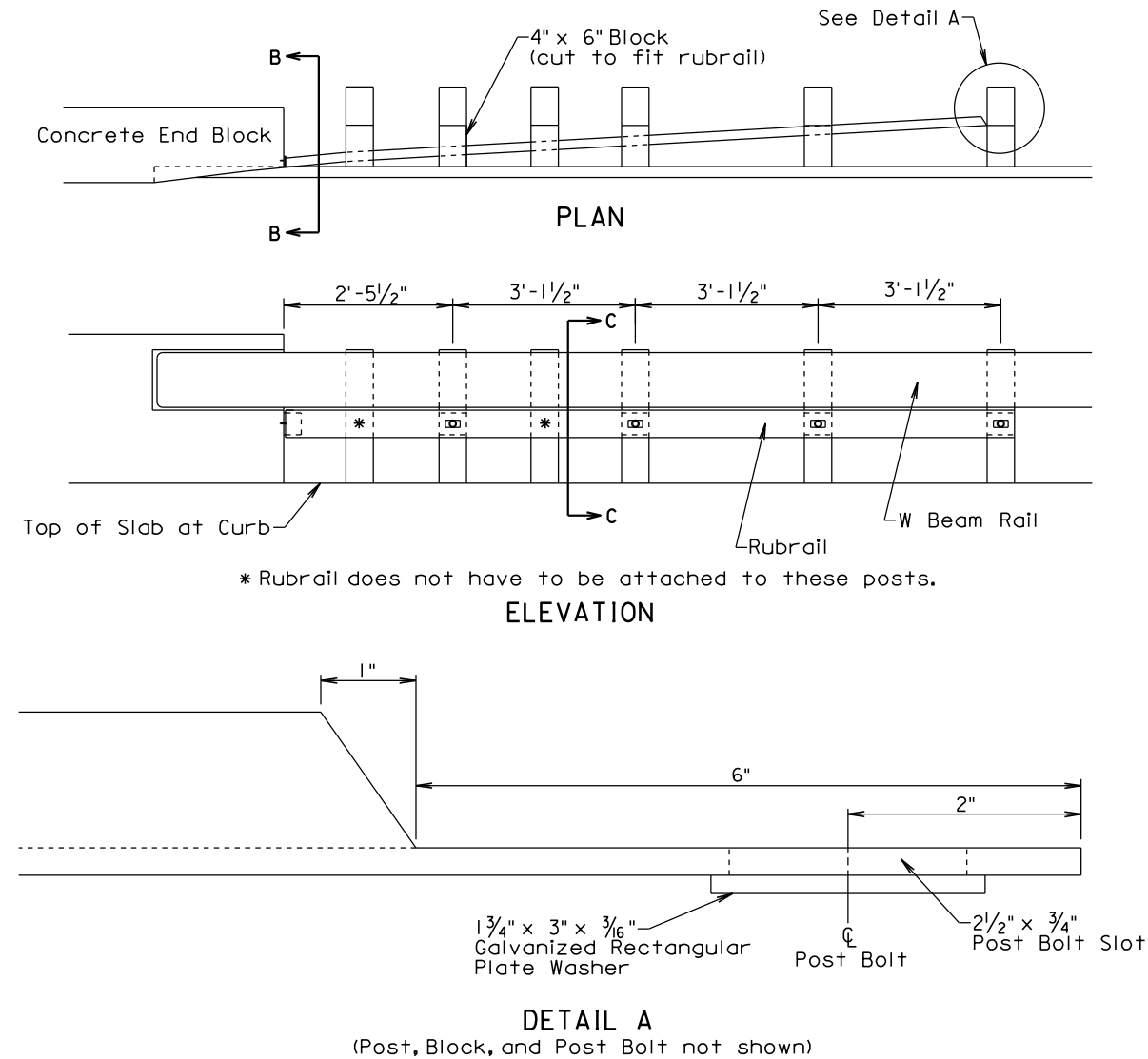
March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (CAST IN INSERT)	PLATE NUMBER 630.75
			Sheet 1 of 2



March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (CAST IN INSERT)	PLATE NUMBER 630.75
			Sheet 2 of 2



GENERAL NOTES:

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

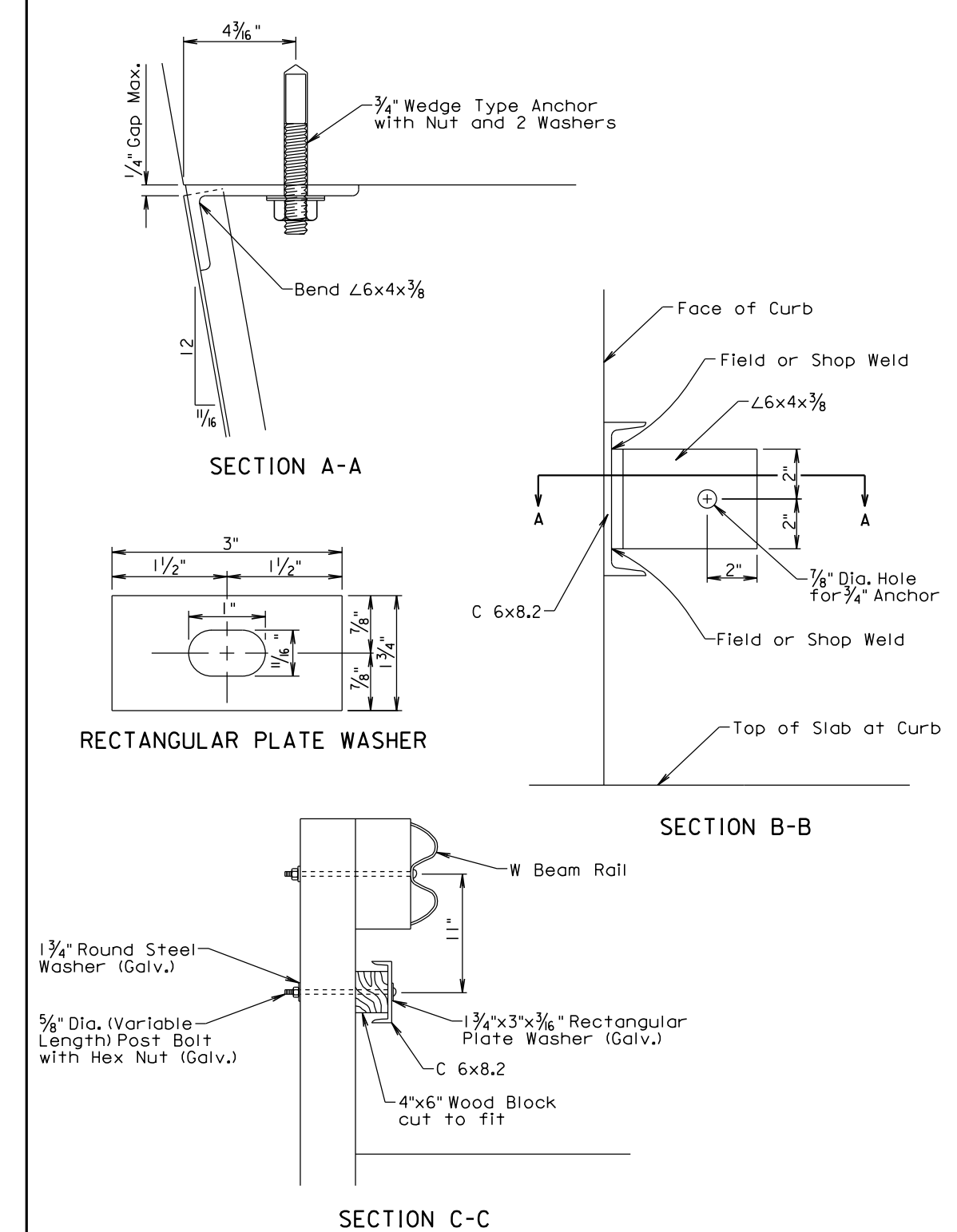
Offset blocks shall be in conformance with section 630 of the Standard Specifications.

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

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

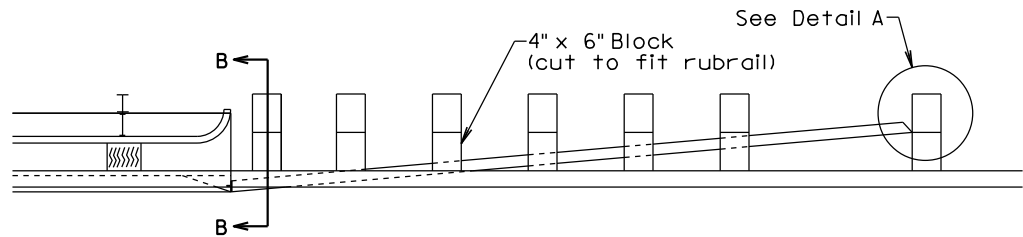
March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND DRILLED IN ANCHOR)	PLATE NUMBER 630.76
			Sheet 1 of 2

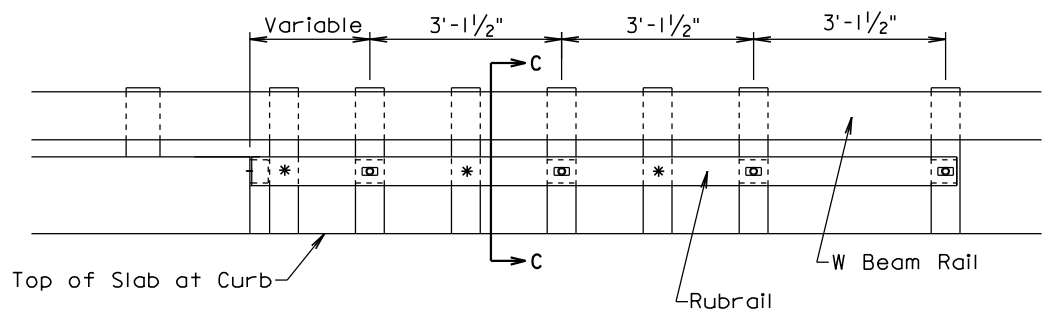


March 31, 2000

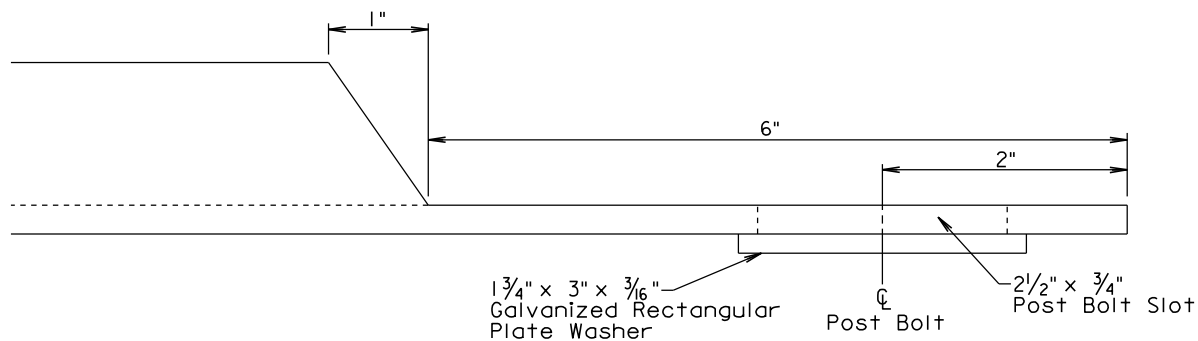
Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND DRILLED IN ANCHOR)	PLATE NUMBER 630.76
			Sheet 2 of 2



PLAN



ELEVATION



DETAIL A

(Post, Block, and Post Bolt not shown)

GENERAL NOTES:

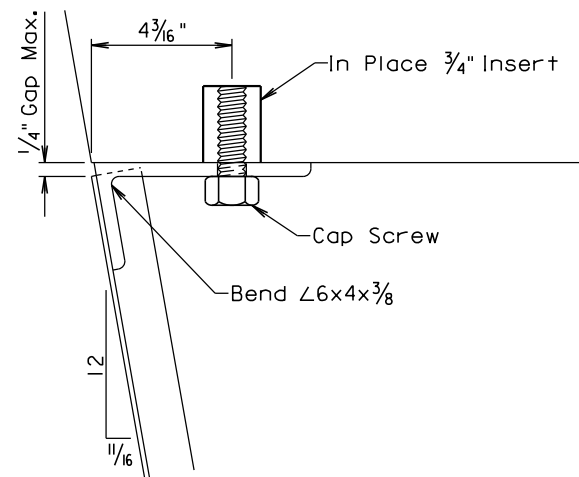
The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

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

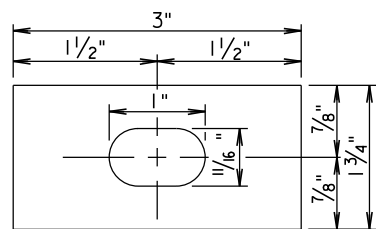
All hardware shall be in conformance with the requirements of AASHTO M 180.

March 31, 2000

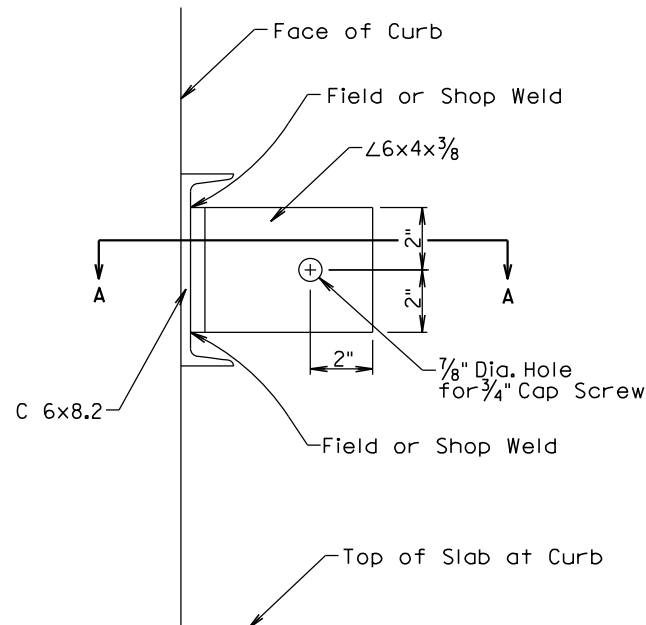
Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND CAST IN INSERT)	PLATE NUMBER 630.77
			Sheet 1 of 2



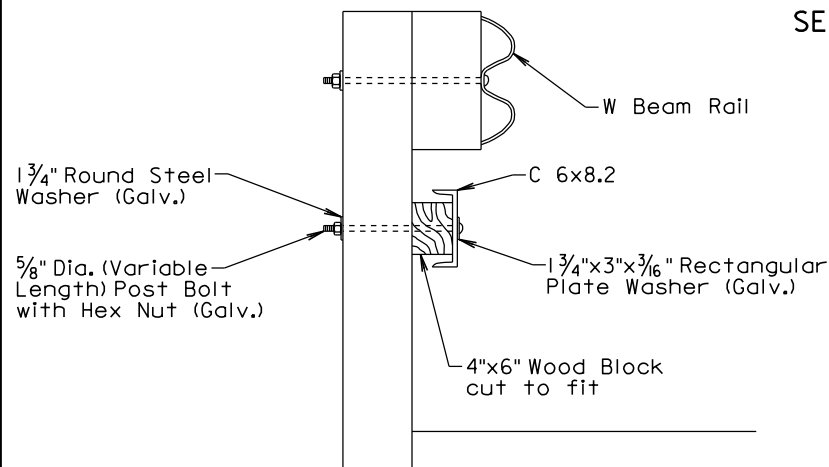
SECTION A-A



RECTANGULAR PLATE WASHER



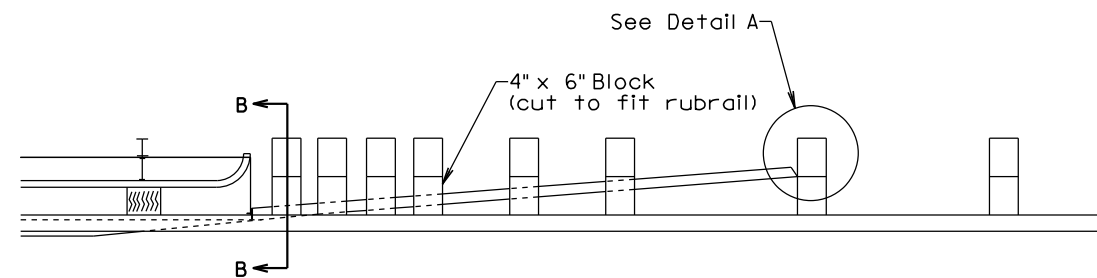
SECTION B-B



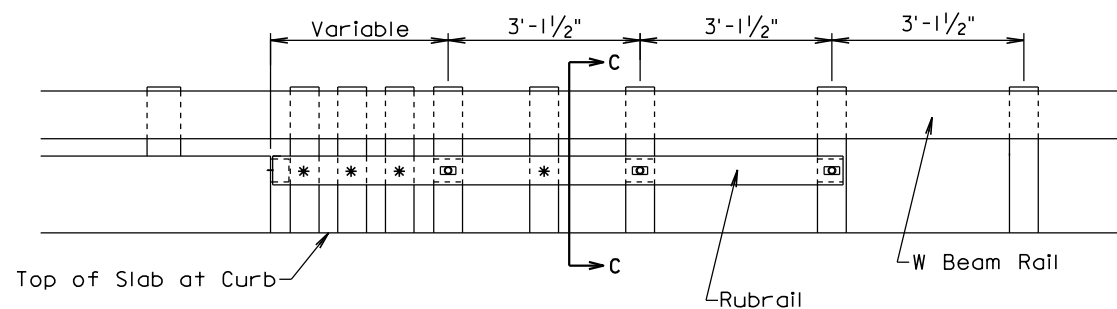
SECTION C-C

March 31, 2000

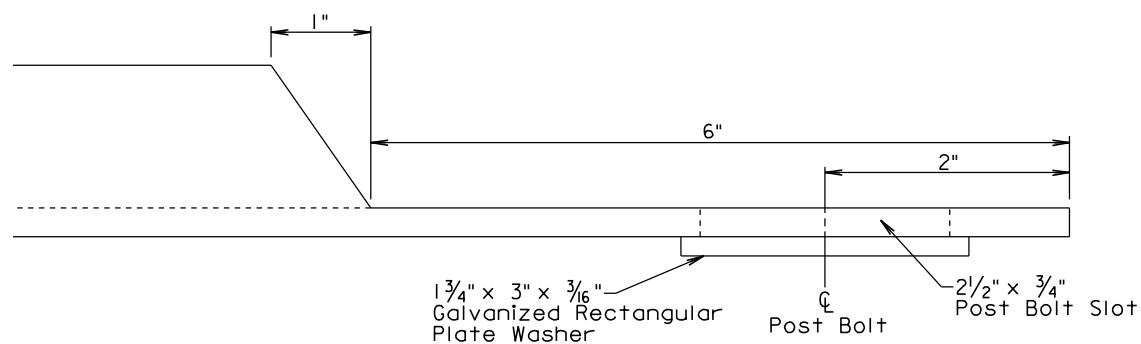
Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND CAST IN INSERT)	PLATE NUMBER 630.77
			Sheet 2 of 2



PLAN



ELEVATION



DETAIL A

(Post, Block, and Post Bolt not shown)

GENERAL NOTES:

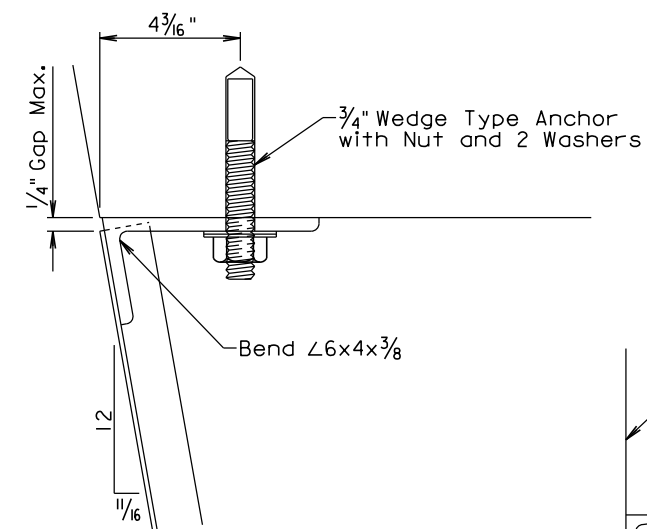
The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

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

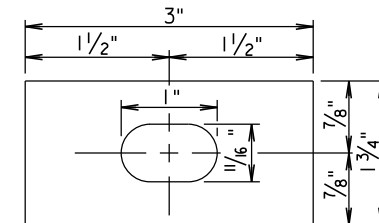
All hardware shall be in conformance with the requirements of AASHTO M 180.

March 31, 2000

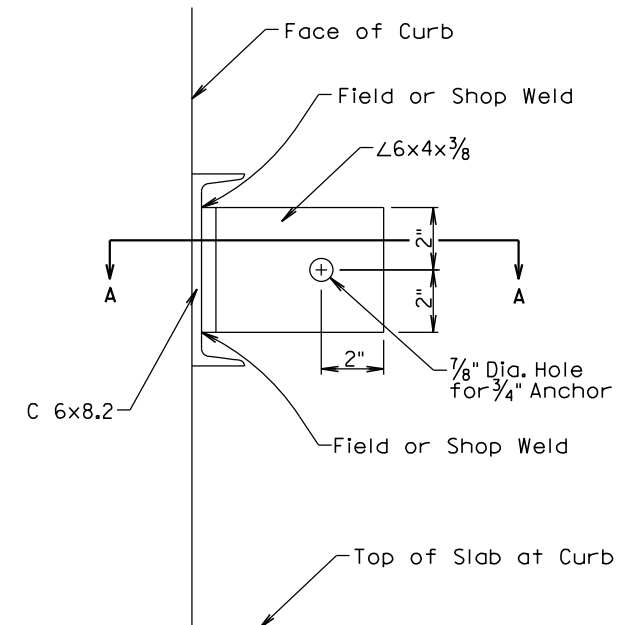
Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND DRILLED IN ANCHOR)	PLATE NUMBER 630.78
			Sheet 1 of 2



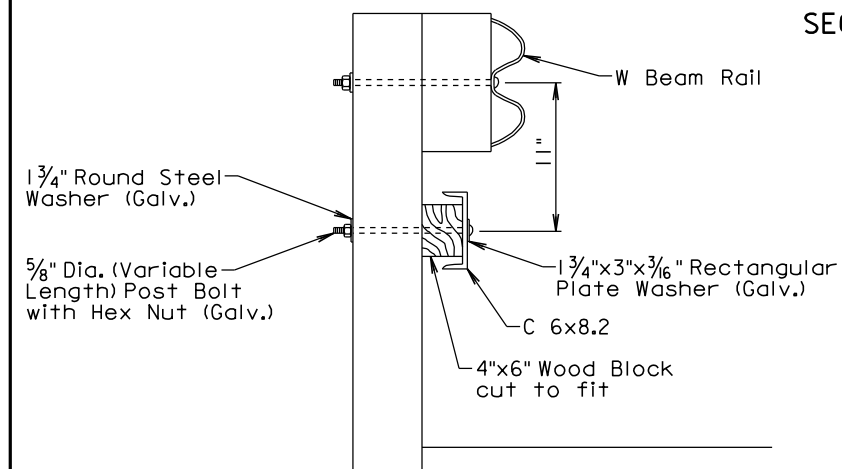
SECTION A-A



RECTANGULAR PLATE WASHER



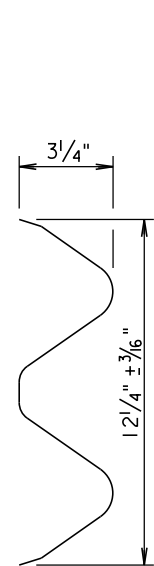
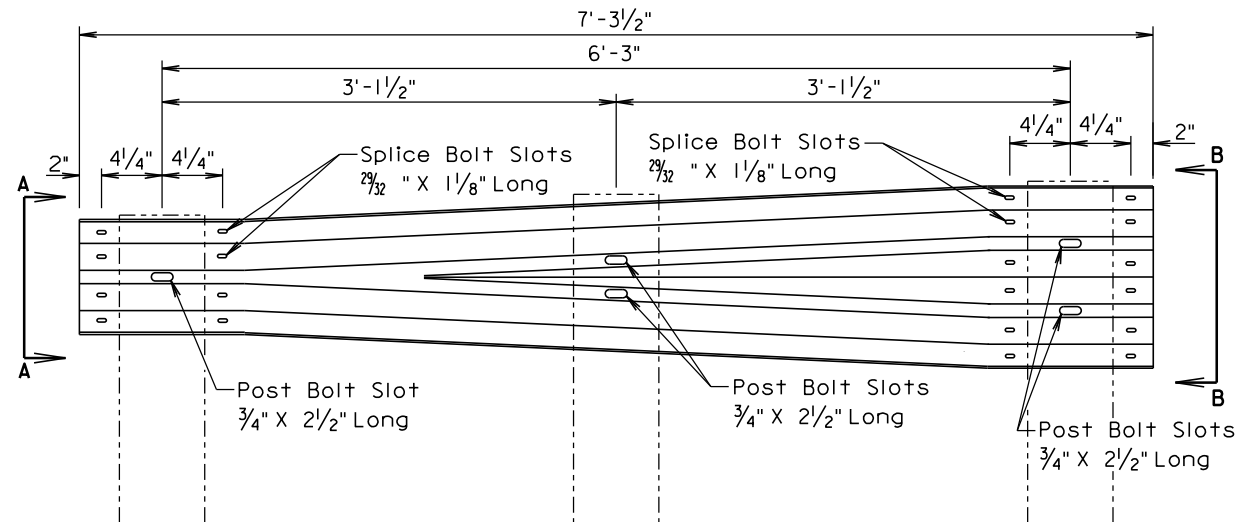
SECTION B-B



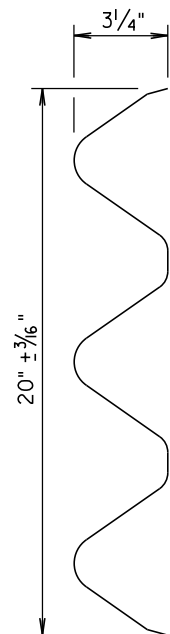
SECTION C-C

March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND DRILLED IN ANCHOR)	PLATE NUMBER 630.78
			Sheet 2 of 2



VIEW A-A



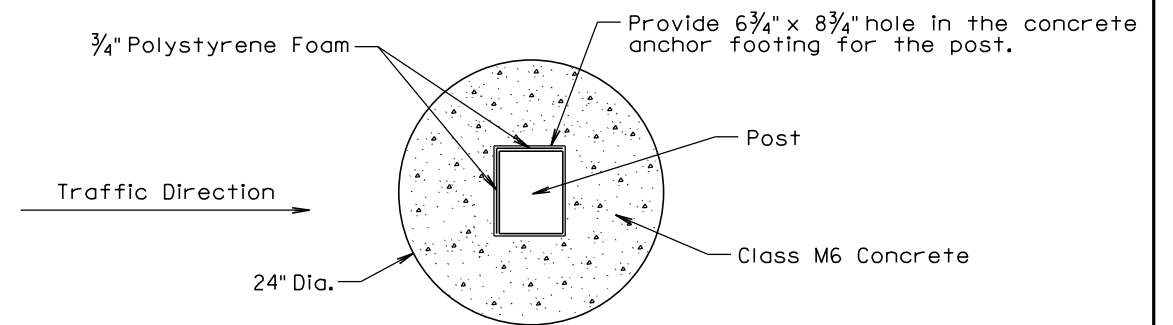
VIEW B-B

GENERAL NOTE:

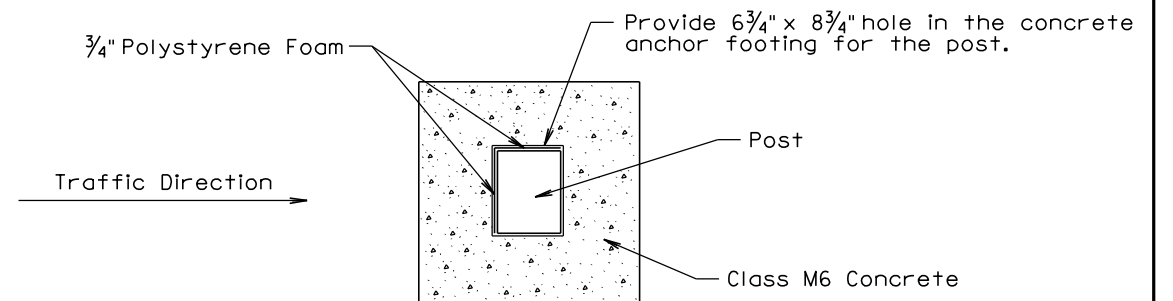
All costs for constructing the W Beam to Thrie Beam Guardrail Transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

March 31, 2000

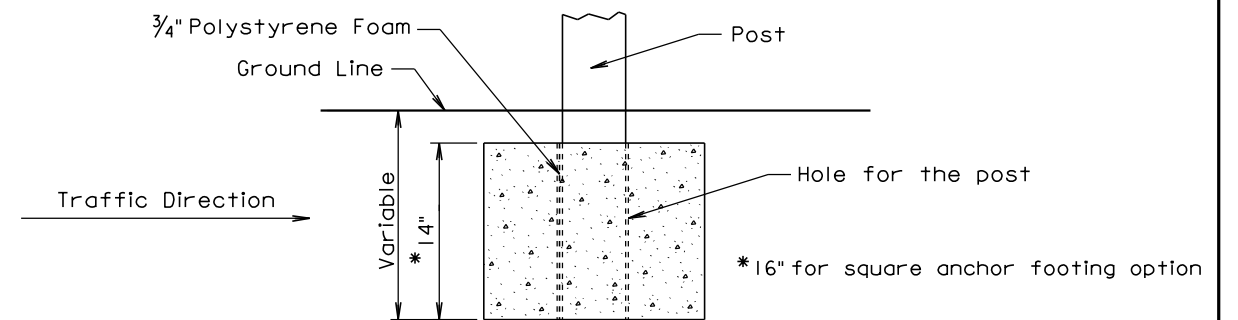
Published Date: 3rd Qtr. 2012	S D D O T	W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION	PLATE NUMBER 630.82
			Sheet 1 of 1



PLAN
(PREFERRED 24" DIA. ROUND
CONCRETE ANCHOR FOOTING)



PLAN
(20" x 20" SQUARE
CONCRETE ANCHOR FOOTING)



ELEVATION

GENERAL NOTES:

In areas where the required guardrail wood post depth is not obtainable, shorter posts may be used and shall be anchored in concrete in accordance with the details shown on this standard plate.

A 20" x 20" square concrete anchor footing may be used in lieu of the 24" diameter round anchor footing.

Forms for the concrete anchor footing hole is not required.

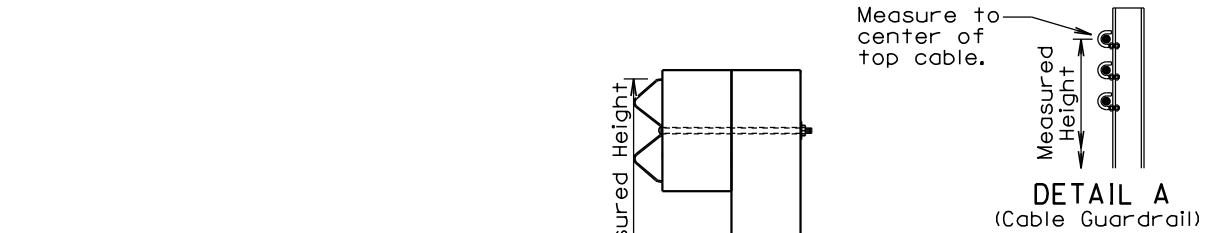
Concrete for the concrete anchor footing shall be Class M6.

Three quarter inch polystyrene foam shall be attached to two sides of the posts. See details above for placement position of the polystyrene foam.

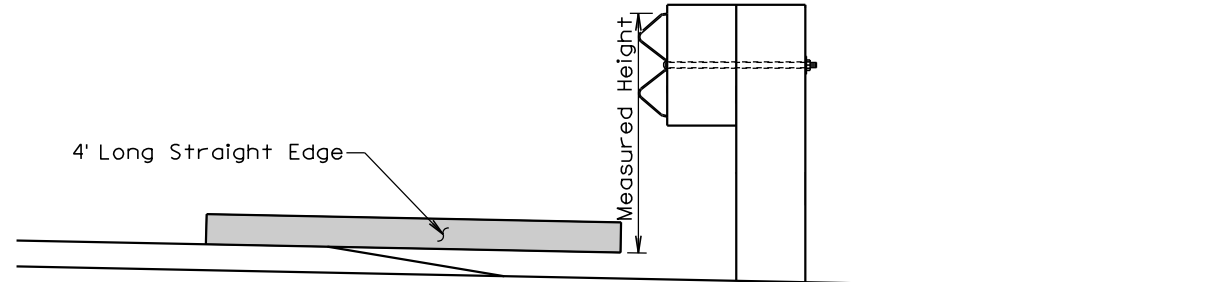
There will be no separate payment for furnishing and installing the concrete anchor footing for short guardrail post. All costs for concrete anchor footings shall be incidental to the contract unit price per foot for the respective "Thrie Beam or W Beam Guardrail" bid item.

March 31, 2000

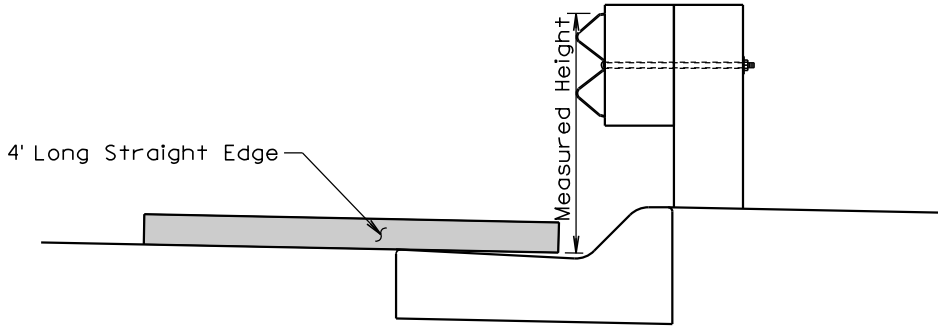
Published Date: 3rd Qtr. 2012	S D D O T	CONCRETE ANCHOR FOOTING FOR SHORT GUARDRAIL POST	PLATE NUMBER 630.84
			Sheet 1 of 1



ELEVATION VIEW
(Guardrail Adjacent to Differential Slopes)



ELEVATION VIEW
(Guardrail Adjacent to Differential Surfacing Elevations)



ELEVATION VIEW
(Guardrail at Curb and Gutter)

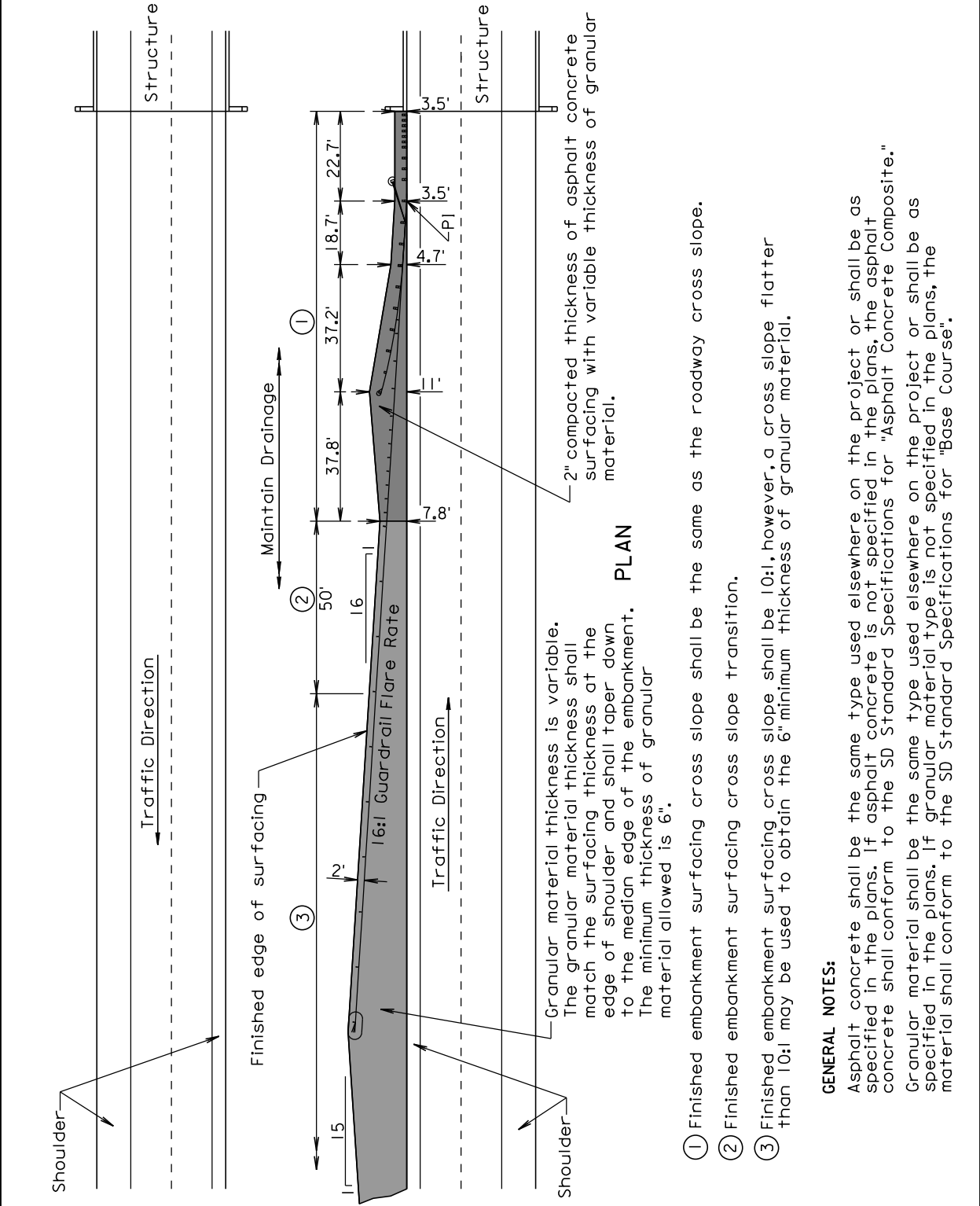
GENERAL NOTES:

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

When measuring height of cable guardrail or cable barrier the height shall be measured to the center of the top cable. See Detail A.

June 26, 2010

Published Date: 3rd Qtr. 2012	S D D O T	MEASURING GUARDRAIL HEIGHT	PLATE NUMBER 630.98
			Sheet 1 of 1



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

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 SD Standard 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 SD Standard Specifications for "Base Course".

March 31, 2000

Published Date: 3rd Qtr. 2012	S D D O T	EMBANKMENT AND SURFACING FOR TYPICAL MEDIAN PROTECTION	PLATE NUMBER 630.99
			Sheet 1 of 1

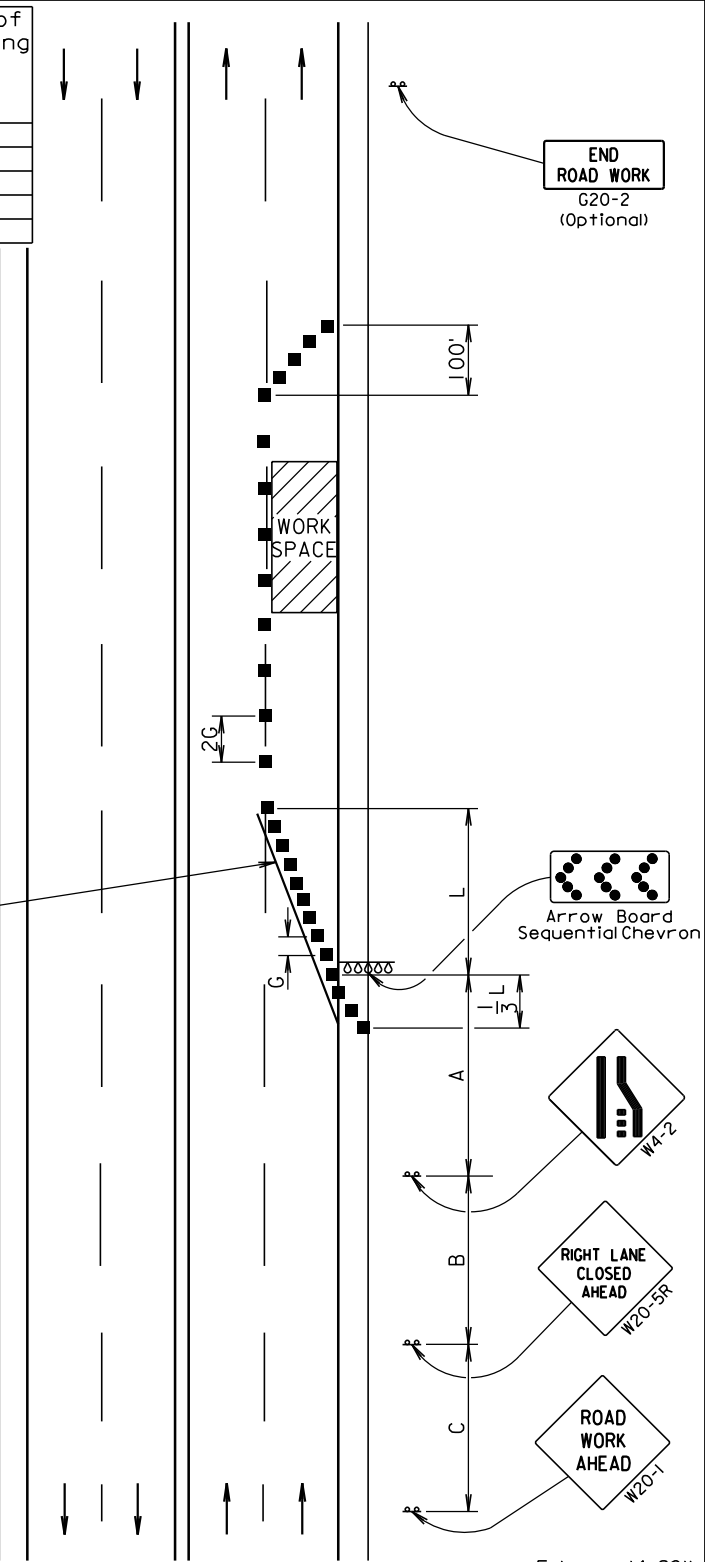
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet)	Spacing of Channelizing Devices (Feet)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45 - 50	500			600	50
55	750			660	50
60 - 65	1000			780	50

■ Channelizing Device

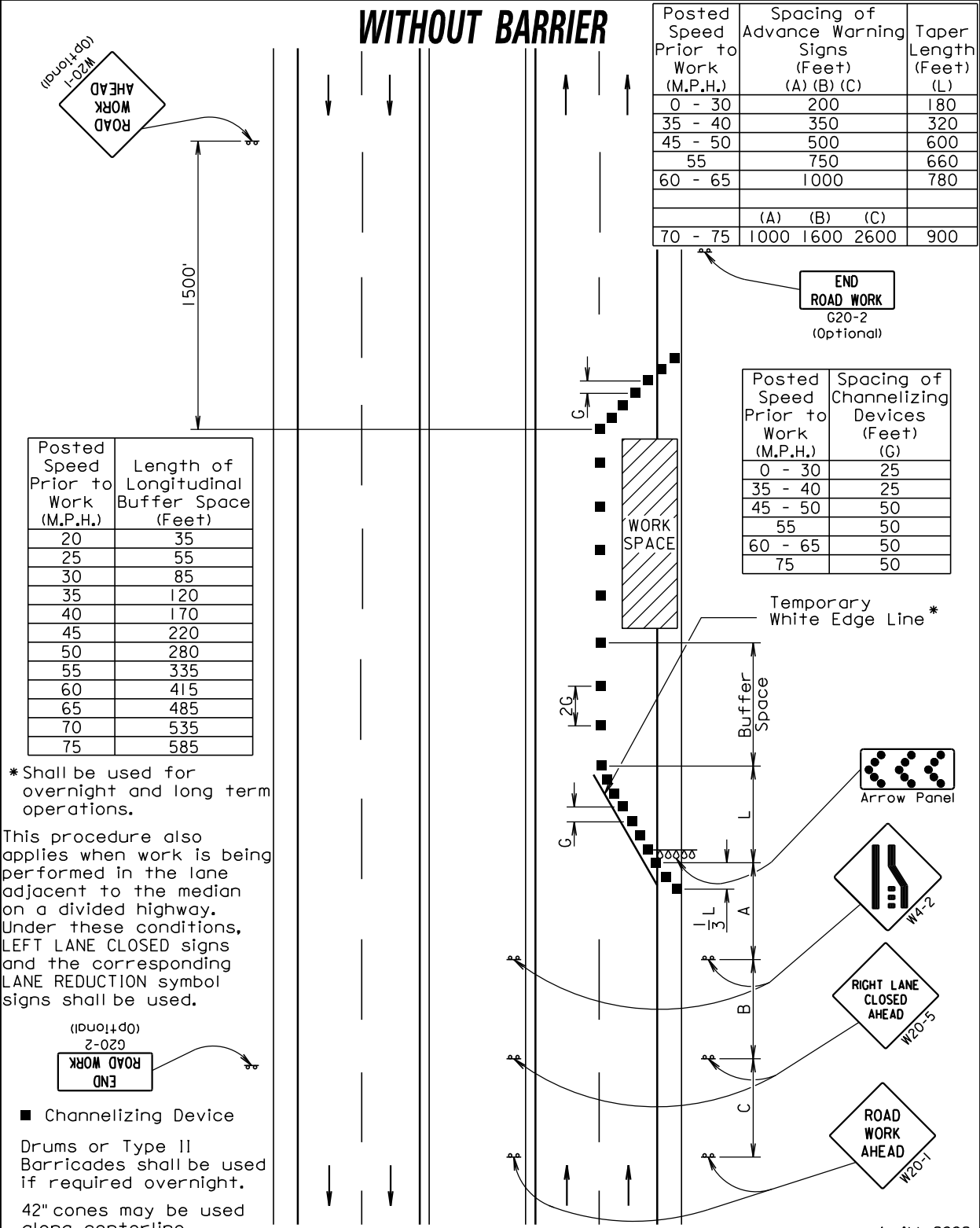
The channelizing devices shall be drums or 42" cones if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums along the centerline.

Longitudinal dimensions may be adjusted to fit project conditions such as horizontal curves, vertical curves, and other site restrictions.

Four inch white temporary pavement marking shall be used if traffic control must remain overnight or longer.



February 14, 2011



April 1, 2008