

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BR 2022 (416)		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	MEDINA	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	45	056	CR 2615

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO.: BR 2022(416)
CSJ: 0915-45-056
MEDINA COUNTY
CR 2615

LIMITS: CR 2615 @ MEDINA RIVER

NET LENGTH OF ROADWAY = 302.40 FT = 0.057 MI
NET LENGTH OF BRIDGE = 70.00 FT = 0.013 MI
NET LENGTH OF PROJECT = 372.40 FT = 0.070 MI

TYPE OF WORK: FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF: REPLACE BRIDGE AND APPROACHES

DESIGN SPEED = MEETS EXISTING
AREA OF DISTURBED SOIL = 0.447 ACRE
ADT: 250 AADT (2022)
350 AADT (2042)

FINAL PLANS

LETTING DATE: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS ACCEPTED: _____
FINAL CONTRACT COST: \$ _____
CONTRACTOR: _____

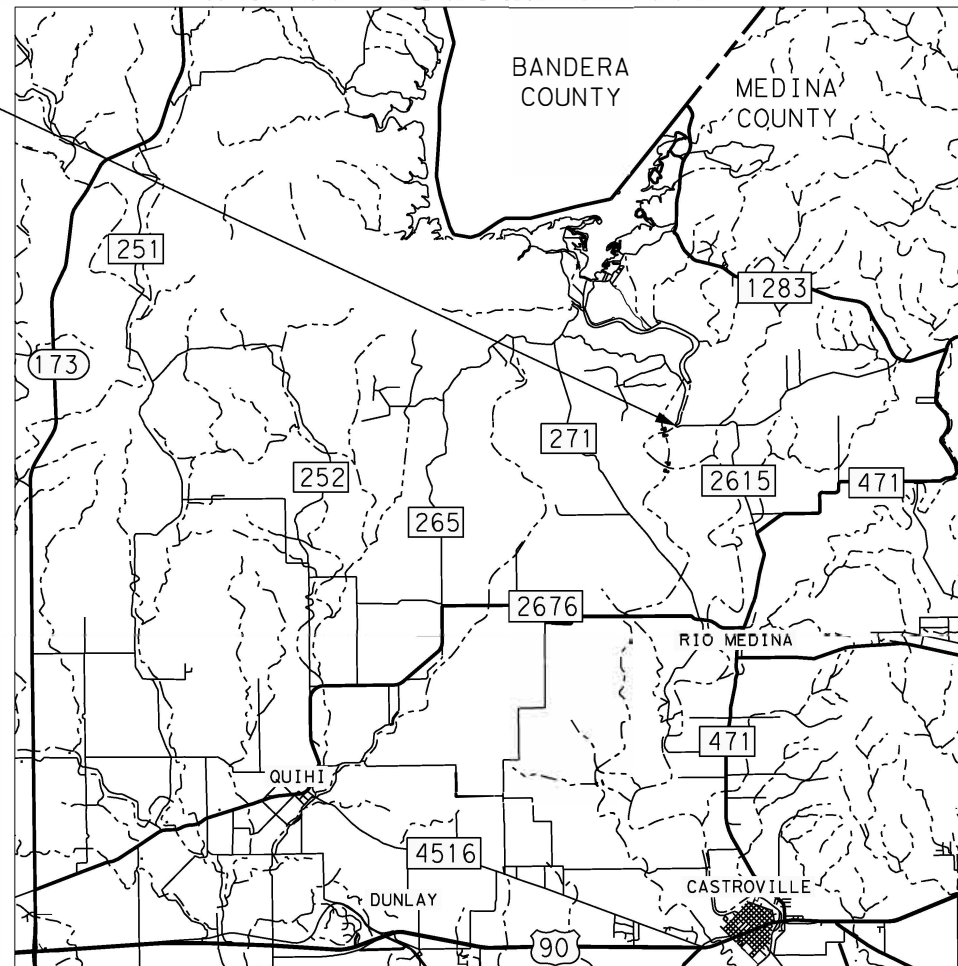
FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED
IN ACCORDANCE WITH THE PLANS.

AREA ENGINEER _____ P.E. _____ DATE _____

TEXAS DEPARTMENT OF TRANSPORTATION

CSJ: 0915-45-056
BEGIN PROJECT STA 21+50.82
END PROJECT STA 25+23.22



SCALE: 1"=20000'

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,
NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS
FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS
FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY, 2022)

SUBMITTED FOR LETTING **DocuSigned by: 3/21/2023**

Ligette G. Colbert, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
770915513A45A...

REVIEWED FOR LETTING **DocuSigned by: 3/22/2023**

DeRogio, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
770915513A45A...

RECOMMENDED FOR LETTING **DocuSigned by: 3/23/2023**

Clayton Ripps, P.E.
PLANNING & DEVELOPMENT
770915513A45A...

APPROVED FOR LETTING **DocuSigned by: 3/23/2023**

Gina E. Gallegos, P.E.
DISTRICT ENGINEER
124372000P004P5...



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028900

FILE LOCATION
<http://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html>

LEVELS DISPLAYED	
1	

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

Plotted on: 2/27/2023

Design Filename: P:\117\99\06\CR2615\Design\Civil\General\1179906IND01.dgn

SHEET NO. DESCRIPTION

GENERAL

1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4	TYPICAL SECTIONS
5, 5A-5D	GENERAL NOTES
6 & 6A	ESTIMATE AND QUANTITY
7	SUMMARY OF QUANTITIES
8	SUMMARY OF SMALL SIGNS

TRAFFIC CONTROL PLAN

9	TCP NARRATIVE
10	ADVANCE WARNING LAYOUT
11	TRAFFIC CONTROL PLAN
12	DETOUR LAYOUT
13-24	* BC (1 THRU 12) -21

ROADWAY

25-26	HORIZONTAL AND VERTICAL CONTROL SHEET
27	HORIZONTAL ALIGNMENT DATA
28	REMOVAL LAYOUT
29	PLAN AND PROFILE
30	SIGN DETAILS
31	* GF (31) -19
32	* GF (31) TR TL2-19
33	* SGT (12S) 31-18
34	* SGT (15) 31-20
35	* GF (31) MS-19
36	* BED-14

PAVEMENT MARKING, SIGNING AND DELINEATION STANDARDS

37	* PM (1) -22
38	* PM (2) -22
39	* SMD (GEN) -08
40	* SMD (SLIP-1) -08
41	* SMD (SLIP-2) -08
42	* SMD (SLIP-3) -08
43	* D & OM (1) -20
44	* D & OM (2) -20
45	* D & OM (3) -20
46	* D & OM (5) -20
47	* D & OM (VIA) -20

DRAINAGE

48	DRAINAGE AREA MAP
49	HYDROLOGY DATA SHEET
50-55	HYDRAULIC DATA SHEET

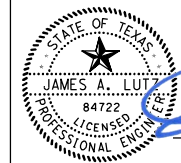
BRIDGE

56	BRIDGE LAYOUT
57	COFFERDAM CONSTRUCTION SEQUENCE
58	TEST HOLE ELEVATION
59	ESTIMATED QUANTITIES & CAP ELEVATIONS
60	ABUTMENT NO. 1
61	ABUTMENT NO. 1 DETAILS
62	ABUTMENT NO. 3
63	ABUTMENT NO. 3 DETAILS
64	BENT NO. 2
65	BEAM LAYOUT
66-67	70.00' PRESTR CONC SLAB BEAM UNIT
68	PSBND
69	# AJ
70	# BAS-C
71	# CRR
72-73	# FD
74	# PSBEB
75	# PSBRA
76	# PSB-5SB12
77-79	# TYPE T223

ENVIRONMENTAL

80	SW3P LAYOUT
81-81A	* SW3P
82	* EPIC
83	* EC (1) -16

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (*), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



James A. Lutz
 JAMES A. LUTZ, P.E. 2/27/2023
 DATE

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (#), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



Farren Scott Basse
 FARREN SCOTT BASSE, P.E. 2/27/2023
 TEXAS REG. ENGINEERING FIRM F-199

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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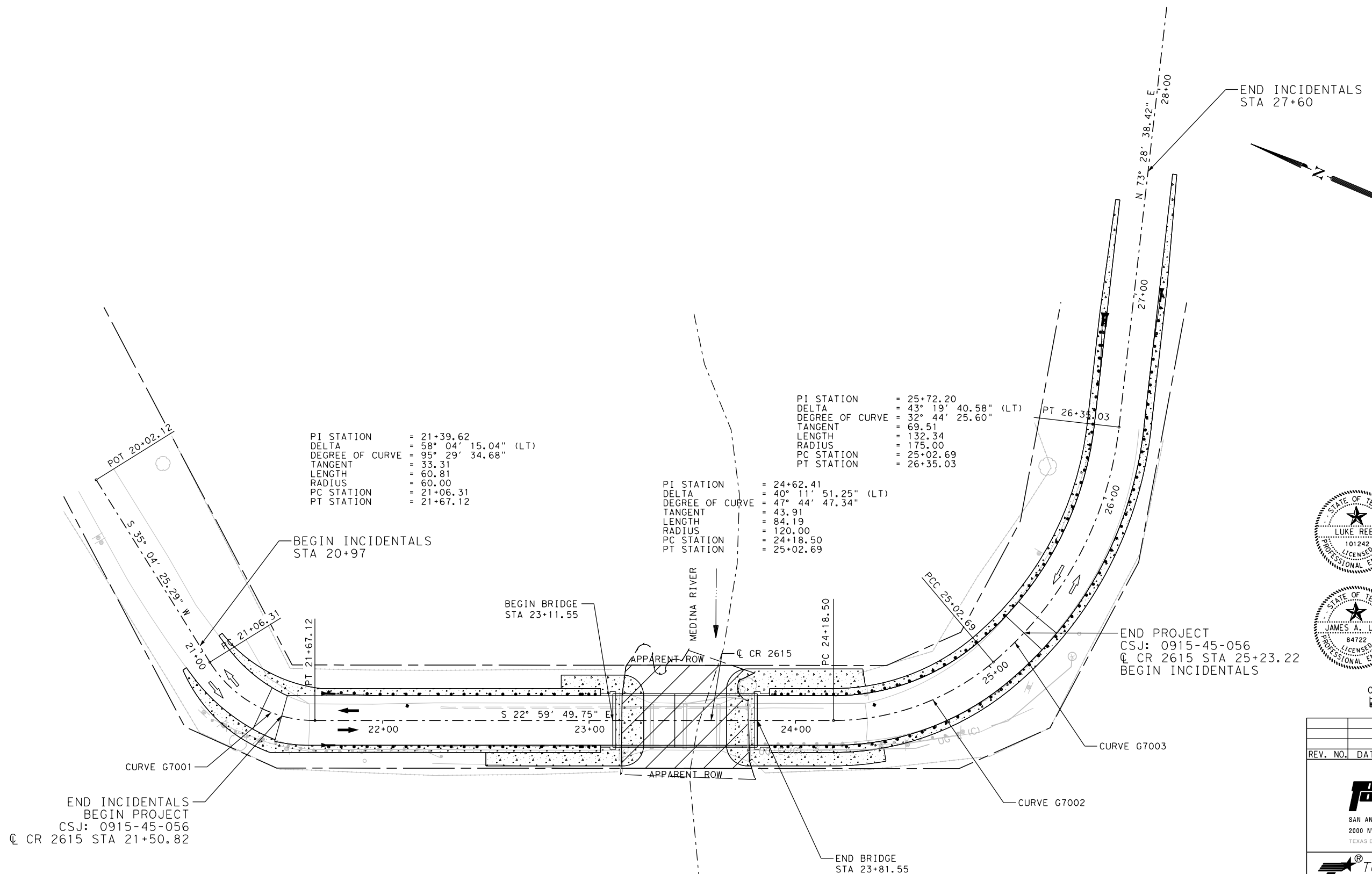
CR 2615 AT MEDINA RIVER

INDEX OF SHEETS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	0915	45	056	2

Plotted on: 2/24/2023

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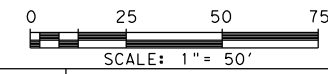
STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER

[Signature]
 LUKE REED, P.E.
 2/24/2023
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER

[Signature]
 JAMES A. LUTZ, P.E.
 2/24/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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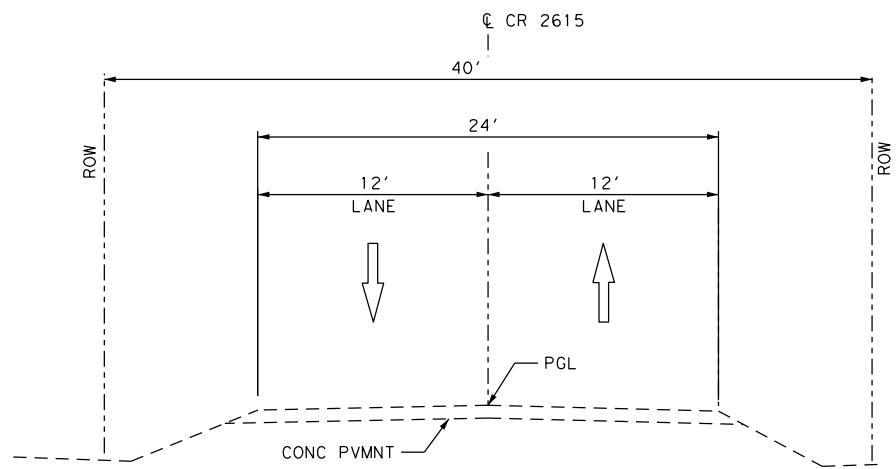
CR 2615 AT MEDINA RIVER

PROJECT LAYOUT

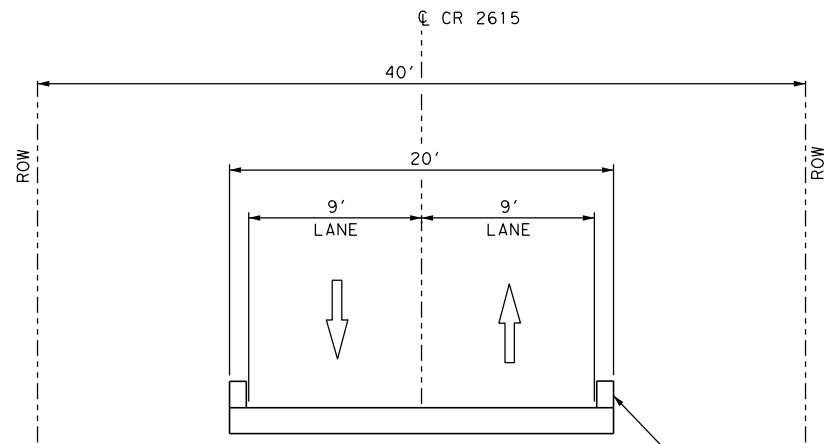
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	0915	45
			056	3

Plotted on: 2/24/2023

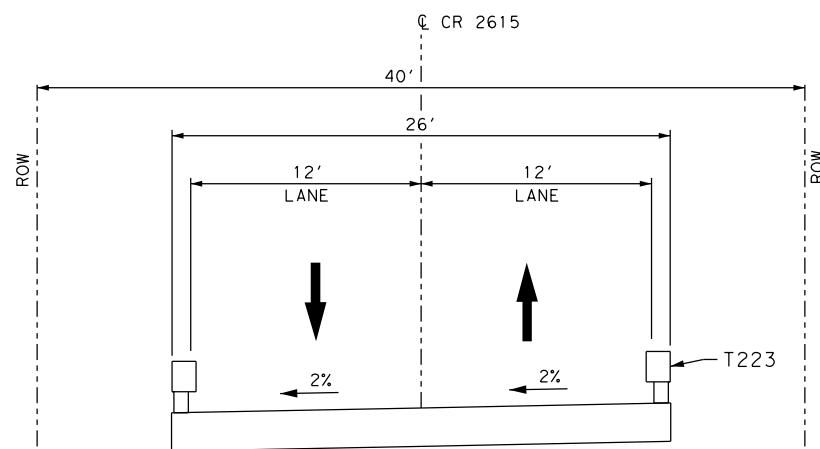
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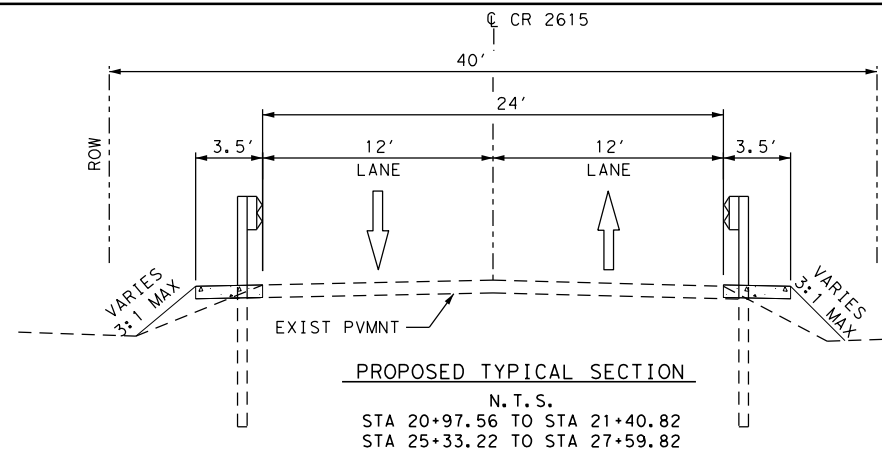
EXISTING TYPICAL SECTION
N. T. S.
STA 20+97.56 TO STA 23+14.30
STA 23+78.30 TO STA 27+59.82



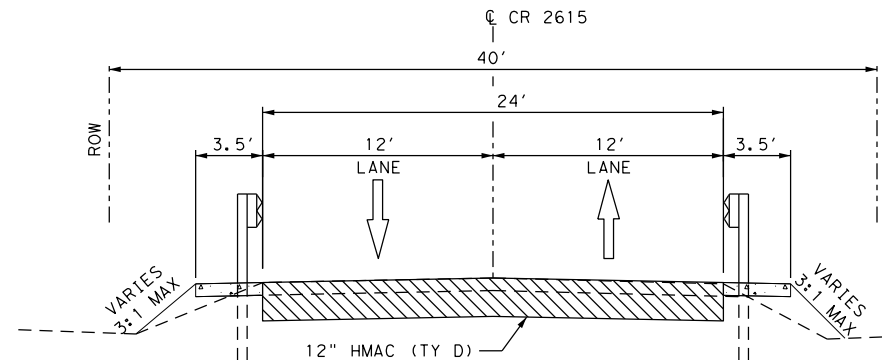
EXISTING BRIDGE TYPICAL SECTION
N. T. S.
STA 23+14.30 TO STA 23+78.30



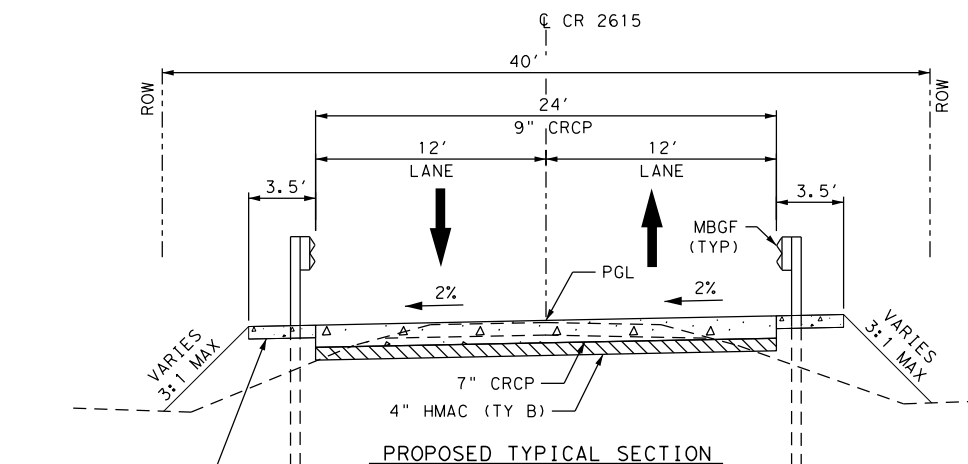
PROPOSED BRIDGE TYPICAL SECTION
N. T. S.
STA 23+11.55 TO STA 23+81.55



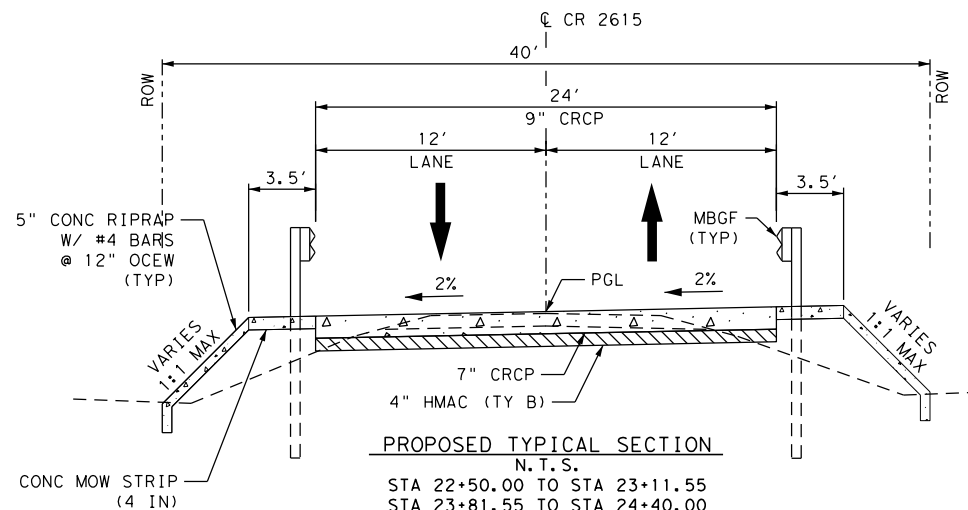
PROPOSED TYPICAL SECTION
N. T. S.
STA 20+97.56 TO STA 21+40.82
STA 25+33.22 TO STA 27+59.82



PROPOSED TYPICAL SECTION
N. T. S.
STA 21+40.82 TO STA 21+50.82
STA 25+23.22 TO STA 25+33.22



PROPOSED TYPICAL SECTION
N. T. S.
STA 21+51.47 TO STA 22+50.00
STA 24+40.00 TO STA 25+21.47



PROPOSED TYPICAL SECTION
N. T. S.
STA 22+50.00 TO STA 23+11.55
STA 23+81.55 TO STA 24+40.00

DESIGN

APPROVAL

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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CR 2615 AT MEDINA RIVER

TYPICAL SECTIONS

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	4

Control: 0915-45-056

County: Medina

Highway: CR 2615

*****GENERAL NOTES*****
2014 Specification Book (Revised January 18, 2023)

Basis of Estimate				
Item	Description	Rate	Area	Quant-Unit
3076-6001	D-GR HMA TY-B PG64-22	*	806 SY	186 TON
0360-6001	CONC PVMT (CONT REINF-CRCP)(7")	805 LBS/SY	806 SY	806 SY
	*115 LBS/SY/IN			

--General--

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

Control: 0915-45-056

Sheet 5

County: Medina

Highway: CR 2615

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s): Christen Longoria, P.E. 830-426-2522. Christen.Longoria@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address: <https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors>

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

Control: 0915-45-056

County: Medina

Highway: CR 2615

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

--Item 6--

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

--Item 7--

The total disturbed area within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However, should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-

Control: 0915-45-056

Sheet 5A

County: Medina

Highway: CR 2615

depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--

Working days will be computed and charged in accordance with Article 8.3.1.1: Five-Day Workweek.

The Start Work Date is Sept 1, 2023

Create and maintain a Critical Path Method (CPM) schedule.

The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2.

Incentive using road-user cost or contract administration liquidated damage values and disincentive using road-user cost will be paid in accordance with special provision 008---006.

Notes for Milestones

Substantial Completion of Work is defined in Special Provision to Item 8.

Milestone 1

See the traffic control plans (TCP) for a detailed description of the work included in Milestone 1.

The daily road-user cost for disincentive for Milestone 1 will be **\$4100** per day.

The contractor will have **126** working days for Substantial Completion of Work for Milestone 1.

Working daytime charges for Milestone 1 will be computed and charged in accordance with Article 8.3.1.1: Five-Day.

The time charges for the purpose of computing disincentive for Milestone 1 will begin when the bridge is closed, and traffic is detoured. Contractor may not begin on these efforts until after September 4th, 2023.

Control: 0915-45-056

County: Medina

Highway: CR 2615

The time charges for the purpose of computing disincentive for Milestone 1 will end when the bridge including bridge rail, MBGF, and pavement markings/signing is completed, the bridge is open to traffic and all vehicular traffic is placed in its preconstruction configuration. Opening all traffic prior to March 16th, 2024, is required.

Failure of Substantial Completion of Work for Milestone 1 within the established number of working days shown above will result in the assessment of disincentives using the daily road-user costs shown above for each working day more than those allowed for Milestone 1.

--Item 100--

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

Removal and disposal of existing abandoned utilities that were unable to be identified before letting required to support this project's construction shall be performed under the overall Preparing Right of Way. If you are uncertain whether the utility is active, contact the District Utility Section.

--Item 132--

Use TY B Embankment (ordinary compaction).

--Item 164--

Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during "Broadcast Seeding" operations, provided each component is applied at the specified rate.

Control: 0915-45-056

Sheet 5B

County: Medina

Highway: CR 2615

--Item 166--

Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--

Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--

There is no minimum PI requirement for this project.

--Item 316--

Asphalt season will be year-round but meet temperature limitations specified in the standard specifications for Item 316.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.

--Item 420--

Mass concrete will be measured in place.

Pier and Bent Concrete will be paid for as "Plans Quantity".

--Item 422--

For construction of approach slabs, longitudinal joints shall be placed on lane lines. Joints may be either a saw-cut crack control joint or a construction joint. Saw cut joints shall terminate 1'-0" before reaching the edge of the slab, must be saw cut as soon as possible after placement of

Control: 0915-45-056

County: Medina

Highway: CR 2615

concrete, and will be cut within 12 hours of concrete placement. Once sawing begins, it should be a continuous operation and should only be stopped if raveling occurs. Saw cut will be to a depth of 1.5" and filled with approved joint sealant.

--Item 496--

The Contractor will submit a demolition plan for all structures to be replaced and/or removed in accordance with Item 496.

Provide for the safety and health of employees and abide by all OSHA Standards and Regulations. All costs incurred for proper management, shall be subsidiary to this Item.

--Item 500--

"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--

General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Access to adjoining property must be maintained at all times.

Control: 0915-45-056

Sheet 5C

County: Medina

Highway: CR 2615

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

Lane Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--

An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

Control: 0915-45-056

County: Medina

Highway: CR 2615

--Item 540--

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) leave-out in the concrete as shown in the state standard for MBGF Mow Strip. After the posts are installed, fill the leave-outs with a Grout mixture as shown in the state standard for MBGF Mow Strip.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding 1/2" from the edge of the hole.

--Item 542--

Salvage all undamaged/acceptable radius guardrail and deliver to the TxDOT maintenance section yard.

--Item 644--

The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.

--Item 666--

Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--

Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 3076, 3077, 3079, 3080, 3081, & 3082 --

1. Table 10 in Item 3076 and Table 11 in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.
2. Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Control: 0915-45-056

Sheet 5D

County: Medina

Highway: CR 2615

3. Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided
4. Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.
5. Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.
6. No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 4171--

Install bridge identification numbers shown below for each of the following listed bridges in accordance with the special specification and San Antonio District Standard. Install the bridge identification number on two locations as shown on the plans, or as directed. For bridges in a two-way condition, install the bridge identification number on each outside beam on the upstream side of traffic. For bridges in a one-way condition, install the bridge identification number on each side, opposite corners on each outside beam. For culverts less than 5 ft. in height, install the bridge identification number on the headwall on upstream and downstream location. For culverts greater than 5 ft. in height, install the bridge identification number inside the first barrel on the upstream side of traffic and inside the last barrel on the opposite corner in the direction of traffic.

CR 2615 at Medina River – NBI # 15-163-0-AA04-65-005



CONTROLLING PROJECT ID 0915-45-056

DISTRICT San Antonio
HIGHWAY CR 2615

COUNTY Medina

Estimate & Quantity Sheet

CONTROL SECTION JOB				0915-45-056		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00065871			
COUNTY				Medina			
HIGHWAY				CR 2615			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	4.000		4.000	
	104-6001	REMOVING CONC (PAV)	SY	451.000		451.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	218.000		218.000	
	104-6021	REMOVING CONC (CURB)	LF	174.000		174.000	
	104-6028	REMOVING CONC (MISC)	SY	3.000		3.000	
	105-6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	300.000		300.000	
	110-6001	EXCAVATION (ROADWAY)	CY	210.000		210.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	160.000		160.000	
	164-6021	CELL FBR MLCH SEED(PERM)(RURAL)(SANDY)	SY	538.000		538.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	134.500		134.500	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)	SY	134.500		134.500	
	168-6001	VEGETATIVE WATERING	MG	9.000		9.000	
	360-6001	CONC PVMT (CONT REINF - CRCP) (7")	SY	806.000		806.000	
	403-6006	TEMPORARY SPL SHORING (COFFERDAM)	SF	840.000		840.000	
	416-6003	DRILL SHAFT (30 IN)	LF	207.000		207.000	
	420-6013	CL C CONC (ABUT)	CY	18.900		18.900	
	420-6029	CL C CONC (CAP)	CY	8.700		8.700	
	420-6037	CL C CONC (COLUMN)	CY	2.200		2.200	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	1,820.000		1,820.000	
	422-6015	APPROACH SLAB	CY	38.500		38.500	
	425-6010	PRESTR CONC SLAB BEAM (5SB12)	LF	345.000		345.000	
	432-6010	RIPRAP (CONC)(CL B)(5 IN)	CY	67.100		67.100	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	50.600		50.600	
	442-6007	STR STEEL (MISC NON - BRIDGE)	LB	135.000		135.000	
	450-6006	RAIL (TY T223)	LF	164.000		164.000	
	454-6004	ARMOR JOINT (SEALED)	LF	44.000		44.000	
	481-6024	PIPE (PVC) (SCH 80) (8 IN)	LF	25.000		25.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	657.000		657.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	657.000		657.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	650.000		650.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	190.000		190.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1.000		1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-45-056

DISTRICT San Antonio

COUNTY Medina

HIGHWAY CR 2615

CONTROL SECTION JOB				0915-45-056		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00065871			
COUNTY				Medina			
HIGHWAY				CR 2615			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	11.000		11.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	8.000		8.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	2.000		2.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	2.000		2.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	14.000		14.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	746.000		746.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	8.000		8.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	186.000		186.000	
	3076-6035	D-GR HMA TY-D PG64-22	TON	36.000		36.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	

ROADWAY SUMMARY

ITEM	0100-6002	0110-6001	0132-6003	0360-6001	0432-6010	0432-6045	0481-6024	0540-6001	0540-6007	0544-6001	0644-6001
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CONC PVMT (CONT REINF - CRCP) (7")	RIPRAP (CONC) (CL B) (5 IN)	RIPRAP (MOW STRIP) (4 IN)	PIPE (PVC) (SCH 80) (8 IN)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (TL2)	GUARDRAIL END TREATMENT (INSTALL)	IN SM RD SN SUP&AM TY10BWG (1) SA (P)
	STA	CY	CY	SY	CY	CY	LF	LF	EA	EA	EA
TOTALS	4.0	210.0	160.0	806	67.1	50.6	25	650	4	4	11

ITEM	0644-6004	0658-6014	0658-6062	0666-6321	0672-6009	3076-6001	3076-6035
	IN SM RD SN SUP&AM TY10BWG (1) SA (T)	INSTR DEL ASSM (D-SW) SZ (BRF) CTB (B1)	INSTR DEL ASSM (D-SW) SZ 1 (BRF) GF2 (B1)	RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)	REFL PAV MRKR TY 11-A-A	D-GR HMA TY-B PG64-22	D-GR HMA TY-D PG64-22
	EA	EA	EA	LF	EA	TON	TON
TOTALS	2	2	14	746	8	186.0	36.0

REMOVAL SUMMARY

ITEM	0104-6001	0104-6009	0104-6021	0104-6028	0105-6046	0542-6001	0542-6002	0644-6076	0658-6060
	REMOVING CONC (PAV)	REMOVING CONC (RIPRAP)	REMOVING CONC (CURB)	REMOVING CONC (MISC)	REMOVING STAB BASE & ASPH PAV (0"-10")	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS
	SY	SY	LF	SY	SY	LF	EA	EA	EA
TOTALS	451	218	174	3	300	190	1	8	2


SW3P SUMMARY

ITEM	0164-6021	0164-6029	0164-6031	0168-6001	0506-6038	0506-6039
	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	CELL FBR MLCH SEED (TEMP) (WARM)	CELL FBR MLCH SEED (TEMP) (COOL)	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	MG	LF	LF
TOTALS	538	135	135	9.00	657	657

TCP SUMMARY


ITEM	0500-6001	0502-6001	6001-6002
	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN
	LS	MO	EA
NO SHEET	1.0	8	2
TOTALS	1.0	8	2

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



Texas Department of Transportation
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CR 2615 AT MEDINA RIVER

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	7

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Summaries\1179906SUM01.dgn

SUMMARY OF SMALL SIGNS

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION	
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"	
29	1-1	I-3		36x18	✓		10BWG	1	SA	T	
29	1-2	I-3		36x18	✓		10BWG	1	SA	T	
29	1-3	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-4	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-5	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-6	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-7	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-8	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-9	W1-8L W1-8R		18x24	✓		10BWG	1	SA	P	
29	1-10	W1-1L W1-13-1P		30x30 18x18	✓		10BWG	1	SA	P	
29	1-11	W1-1R W1-13-1P		30x30 18x18	✓		10BWG	1	SA	P	
29	1-12	W1-1R W1-13-1P		30x30 18x18	✓		10BWG	1	SA	P	
29	1-13	R8-3	EXISTING SIGN TO BE REUSED	24x30	✓		10BWG	1	SA	P	

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).



SUMMARY OF SMALL SIGNS

SOSS

FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	8	

DATE:
FILE:

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\TCP\1177906TCP_NOTES01.dgn

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

- (1) THIS PROJECT WILL BE CONSTRUCTED IN (1) PHASE. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
- (2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.
- (3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
- (4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES
- (5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1

- (1) PLACE DETOUR SIGNS AND BARRICADES UTILIZING BC(10)-21 AND TCP PLANS.
- (2) PLACE SW3P DEVICES. **BEGIN MILESTONE 1.**
- (3) REMOVE EXISTING STRUCTURE AND PAVEMENT.
- (4) CONSTRUCT DRILLED SHAFTS.
- (5) CONSTRUCT ABUTMENT AND BENT CONCRETE.
- (6) INSTALL STONE RIPRAP AT ABUTMENT FACES.
- (7) CONSTRUCT PRESTRESSED SLAB BEAMS.
- (8) CONSTRUCT REINFORCED CONCRETE SLAB AND BRIDGE APPROACH SLAB.
- (9) CONSTRUCT T223 BRIDGE RAIL.
- (10) PERFORM ROADWAY EXCAVATION & EMBANKMENT.
- (11) INSTALL RIPRAP AND SLOPE STABILIZATION AS SHOWN IN THE PLANS.
- (12) CONSTRUCT FLEX BASE.
- (13) CONSTRUCT CONCRETE PAVEMENT.
- (14) CONSTRUCT MBGF AND ELEMENTS.
- (15) INSTALL PERMANENT SIGNING AND STRIPING. **END MILESTONE 1.**
- (16) REMOVE SW3P DEVICES.
- (17) PERFORM FINAL CLEANUP.
- (18) REMOVE DETOUR SIGNS AND BARRICADES.

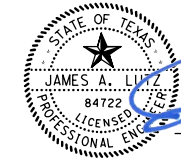
DESIGN



Handwritten signature of Luke Reed
 LUKE REED, P.E.
 DATE

2/24/2023

APPROVAL



Handwritten signature of James A. Lutz
 JAMES A. LUTZ, P.E.
 DATE

2/24/2023

REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 <small>TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #1002800</small>			
 © 2023			
CR 2615 AT MEDINA RIVER TCP SEQUENCE OF WORK			
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.	COUNTY	CONT. NO. SECT. NO. JOB NO.
CHK DWG:	SAT	MEDINA	0915 45 056
			HIGHWAY NO.
			CR 2615
			SHEET NO.
			9

Plotted on: 2/24/2023

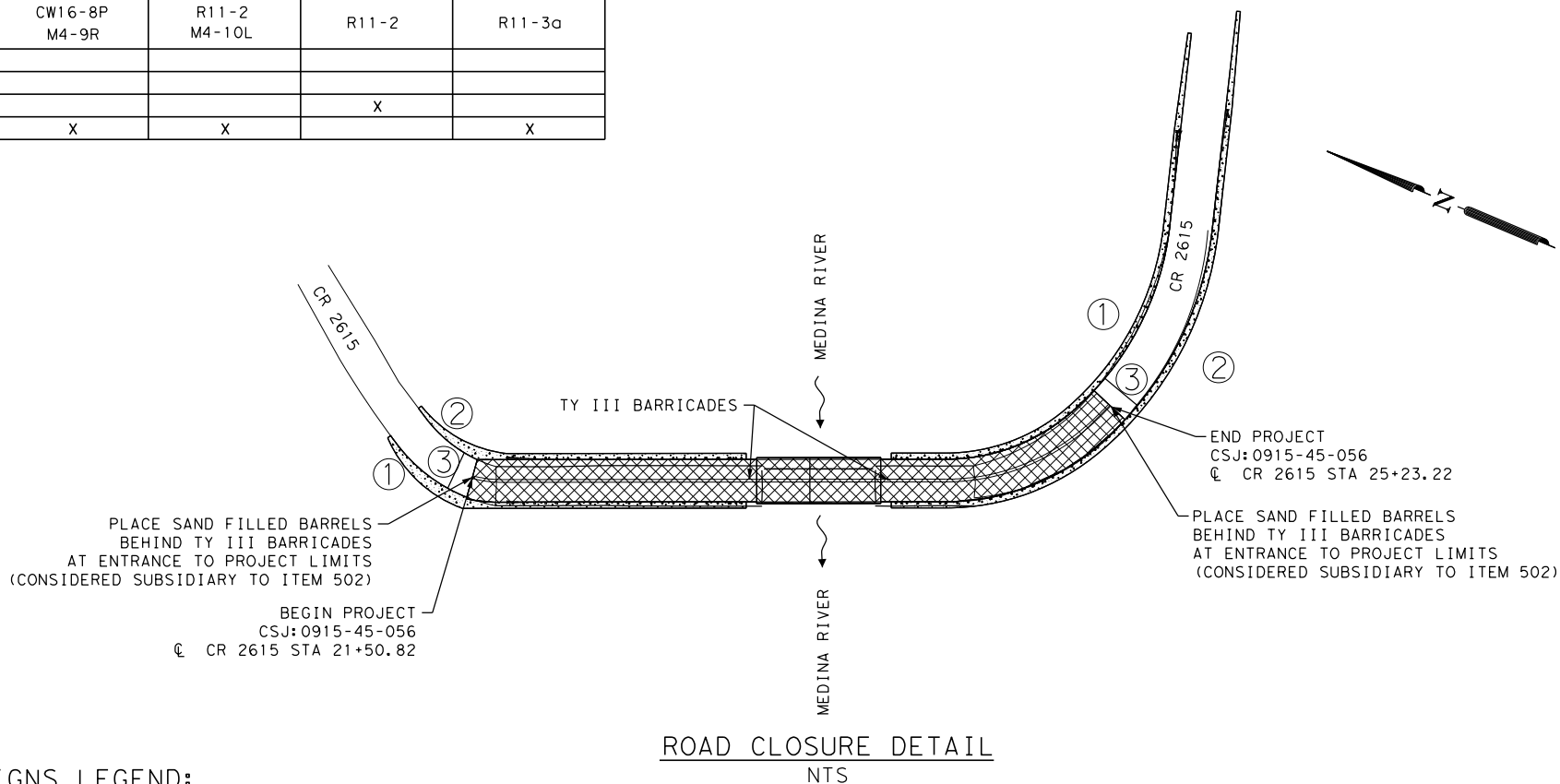
Design File name: P:\117\99\06\CR2615\Design\Civil\TCP\1179906TCP_Schedule1_Barricades.dgn

SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	TY III BARRICADE	END ROAD WORK	SPEED LIMIT XX	END WORK ZONE	DETOUR AHEAD	BEGIN ROAD WORK NEXT X MILES	NAME ADDRESS CITY STATE CONTRACTOR	BEGIN WORK ZONE	STAY ALERT TALK OR TEXT LATER	OBEY WARNING SIGNS STATE LAW	TRAFFIC FINES DOUBLE	WHEN WORKERS ARE PRESENT	ROAD CLOSED 500 FT	ROAD CLOSED 1000 FT	ROAD CLOSED 1500 FT
1		G20-2	R2-1	G20-2bT	CW20-2D	G20-5T	G20-6T	G20-9TP	G20-10T	R20-3T	R20-5T	R20-5aTP	CW20-3C	CW20-3B	CW20-3A
2		X	X	X				X	X	X	X	X	X	X	X
3	X					X	X								
4					X										

SCHEDULE OF TRAFFIC CONTROL DEVICES (CONTINUED)

LOCATION	CR 235 DETOUR	CR 235 DETOUR	CR 235 DETOUR	ROAD CLOSED	ROAD CLOSED	ROAD CLOSED BY MILES AHEAD LOCAL TRAFFIC ONLY
1						
2						
3						
4	X	X	X	X	X	X



LEGEND

WORK ZONE

DESIGN

LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
DATE 2/24/2023

APPROVAL

JAMES A. LUTZ
8472
LICENSED PROFESSIONAL ENGINEER
DATE 2/24/2023

ADVANCE WARNING SIGNS LEGEND:

- ① TO BE USED AT THE BEGINNING OF THE PROJECT AND ENTERING SIDE STREETS.
- ② TO BE USED AT THE END OF THE PROJECT LIMITS AND EXITING SIDE STREETS.
- ③ TO BE USED AT THE BEGINNING OF THE PROJECT LIMITS. BARRICADES TO BE PLACED BEFORE BEGINNING CONSTRUCTION OPERATIONS AND SHALL REMAIN FOR THE DURATION OF THE PROJECT.
- ④ TO BE USED ALONG THE LENGTH OF THE PROJECT PER THE DETOUR LAYOUT.

NOTES:

1. COUNTY ROAD 2615 WILL BE CLOSED TO THE THROUGH TRAFFIC DURING CONSTRUCTION.
2. LOCATIONS SHOWN FOR SIGNING ARE APPROXIMATE AND FOR VISUAL AID. EXACT LOCATIONS AND SIGN SPACING ARE TO BE ACCORDING TO TEXAS MUTCD, BARRICADE & TCP STANDARDS, OR AS DIRECTED. TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS AT ALL ITEMS.
3. ALL TRAFFIC CONTROL SETUP AND DEVICES ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TEXAS MUTCD) & TXDOT STANDARDS
4. ANY SIGNS LISTED ON THIS SHEET AND ANY ADDITIONAL SIGNS REQUIRED ARE TO BE SUPPLIED BY THE CONTRACTOR AND CONSIDERED SUBSIDIARY TO ITEM 502. ANY ADDITIONAL SIGNS REQUESTED BY THE ENGINEER WILL BE IN ACCORDANCE WITH THE "BC" STANDARD SHEETS, THE "TCP" STANDARD SHEETS AND/OR THE TEXAS MUTCD.
5. BARRICADES ARE NOT TO BE USED AS A SIGN SUPPORT. SUPPORT FOR SIGNS SHALL BE TEMPORARY, FIXED OR PORTABLE SIGN SUPPORTS, AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH THE "BC" STANDARD SHEETS AND THE TEXAS MUTCD.
6. ALL CONSTRUCTION TRAFFIC IS TO BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT TIMES WHEN IT IS NECESSARY FOR CONSTRUCTION EQUIPMENT OR TRUCKS TO STOP, UNLOAD, OR CROSS ROADWAYS UNDER TRAFFIC, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.
7. BARRICADES AND WARNING SIGNS ON THE SHEET ARE THE MINIMUM CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT "BC" STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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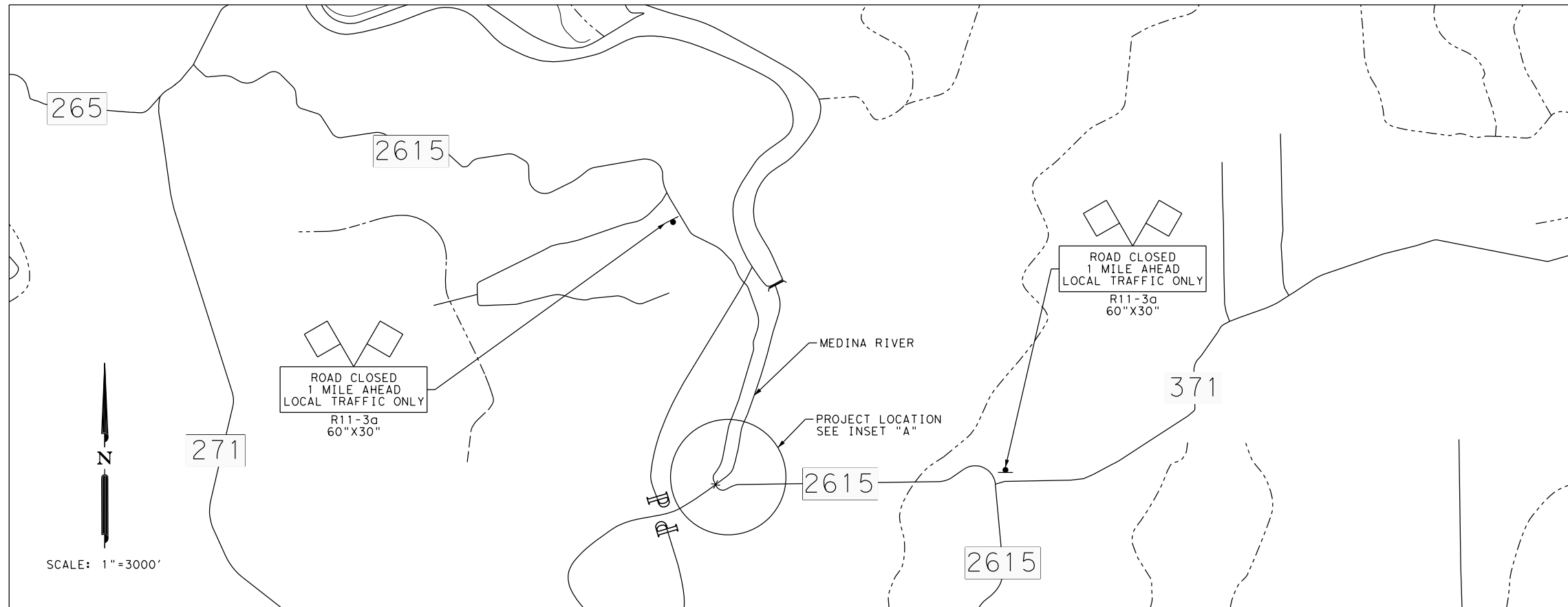
CR 2615 AT MEDINA RIVER

ADVANCE WARNING LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	10

Plotted on: 2/24/2023



LOCATION MAP

- NARRATIVE:
1. PROVIDE PORTABLE CHANGEABLE MESSAGE SIGN AT CR 2615 @ CR 271 AND AT CR 2615 @ CR 371 TO GIVE ADVANCE NOTICE.
 2. TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER TO ALLOW EGRESS AND INGRESS FOR THE LOCAL PROPERTY OWNERS.
 3. SEE BC SHEETS AND TMUCD FOR SIGN SPACINGS.
 4. CR 2615 WILL BE CLOSED TO THROUGH TRAFFIC UNTIL SUBSTANTIAL COMPLETION AS APPROVED BY THE ENGINEER.

DESIGN

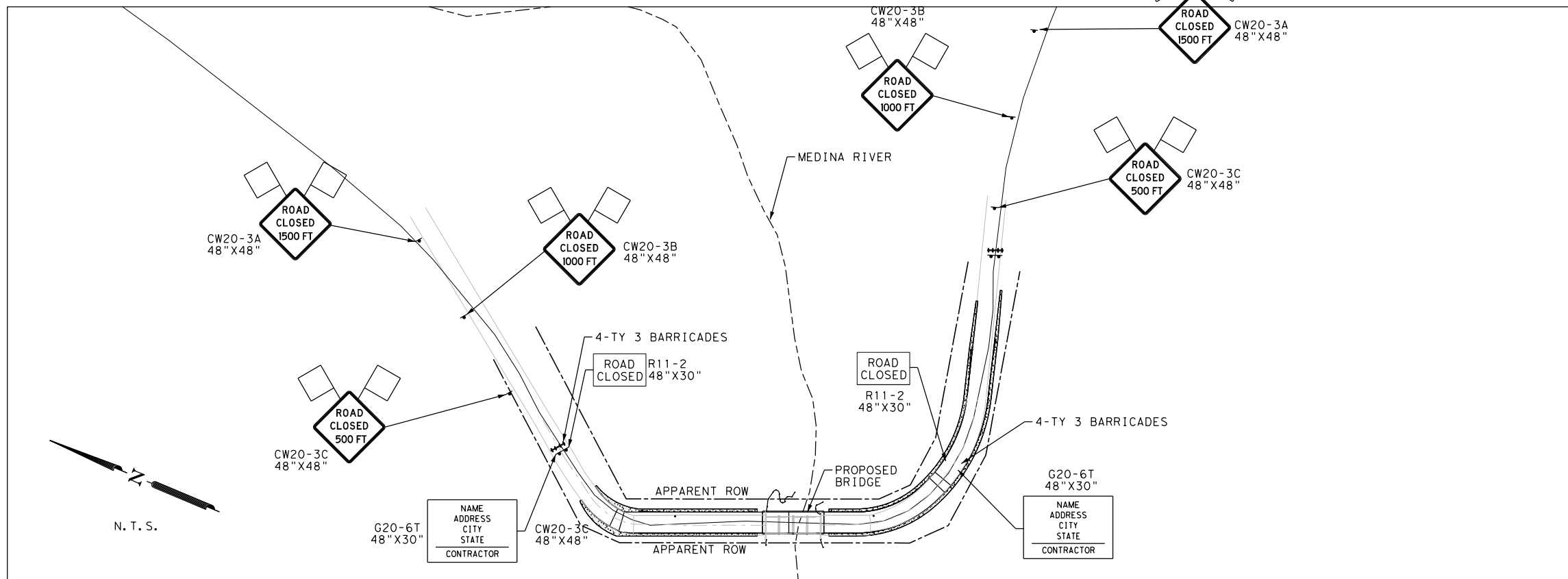


LUKE REED, P.E.
2/24/2023
DATE

APPROVAL



JAMES A. LUTZ, P.E.
2/24/2023
DATE



CONSTRUCTION SIGNING AT PROJECT LOCATION

INSET "A"

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CR 2615 AT MEDINA RIVER

TRAFFIC CONTROL PLAN

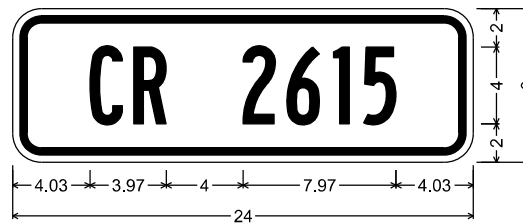
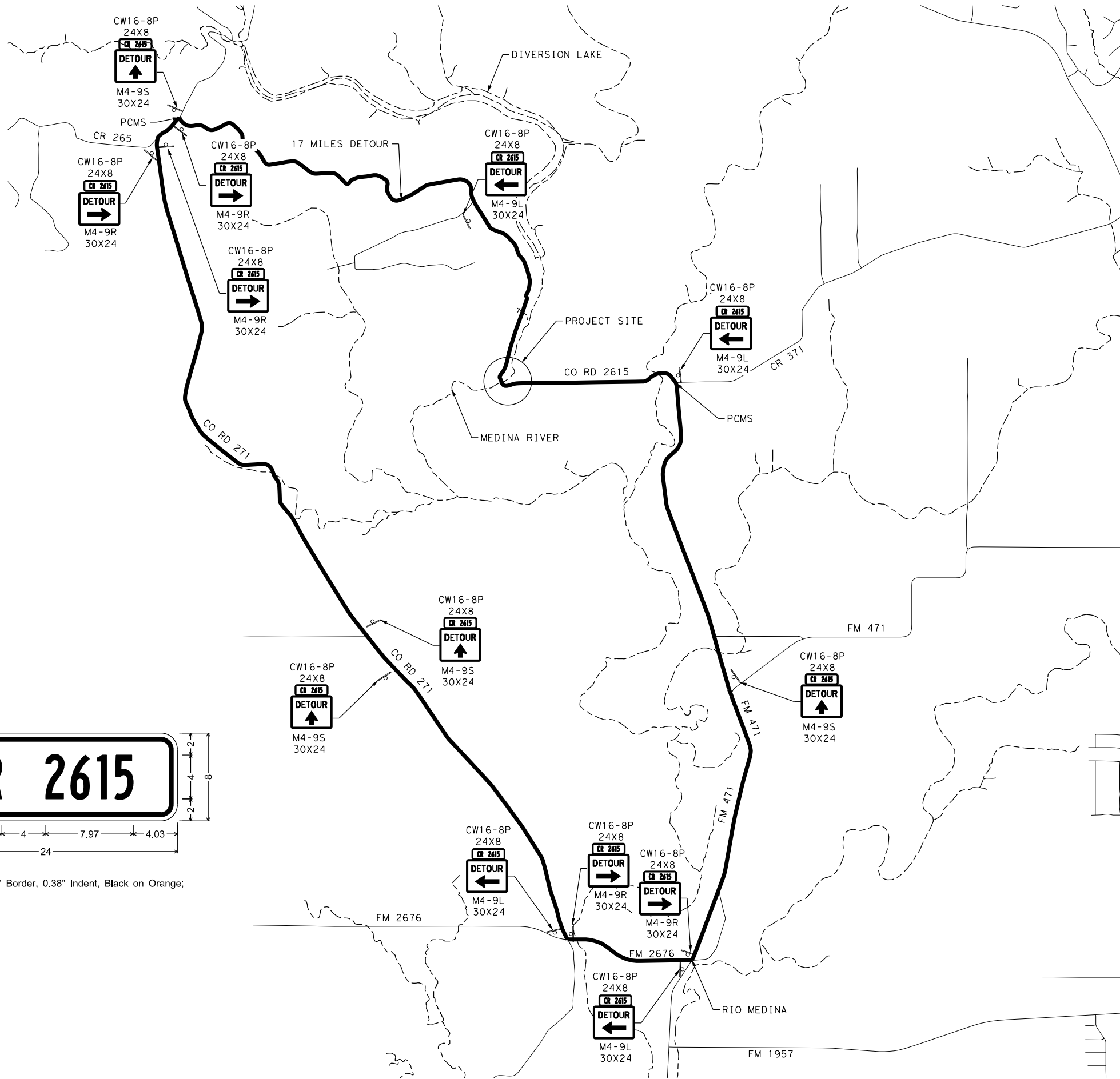
SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	11

Design File name: P:\11799\06\CR2615\Design\Civil\CP\1179906TCP01.dgn

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\CP\1179906_DETOUR.dgn



CW16-8P_VARx8;
1.50" Radius, 0.38" Border, 0.38" Indent, Black on Orange;
"CR 2615", B;



LEGEND

DETOUR ROUTE

90% SUBMITTAL
DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
LUKE REED
LUKE REED, P.E. 2/24/2023
DATE

APPROVAL

STATE OF TEXAS
JAMES A. LOTZ
8472
LICENSED PROFESSIONAL ENGINEER
JAMES A. LOTZ
JAMES A. LOTZ, P.E. 2/24/2023
DATE

SCALE: 1" = 4000'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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CR 2615 AT MEDINA RIVER
DETOUR LAYOUT

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	DGN:	SAT	MEDINA	0915	45	056	12

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:


1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.
2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

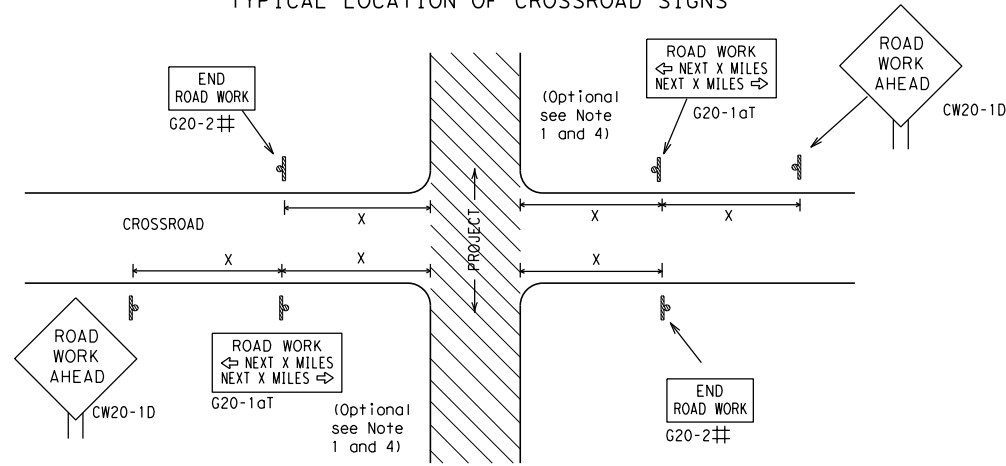
SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
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CONT	SECT	JOB	HIGHWAY
0915	45	056	CR 2615
REVISIONS		DIST	COUNTY
4-03	7-13		
9-07	8-14		
5-10	5-21	SAT	MEDINA
			SHEET NO.
			13

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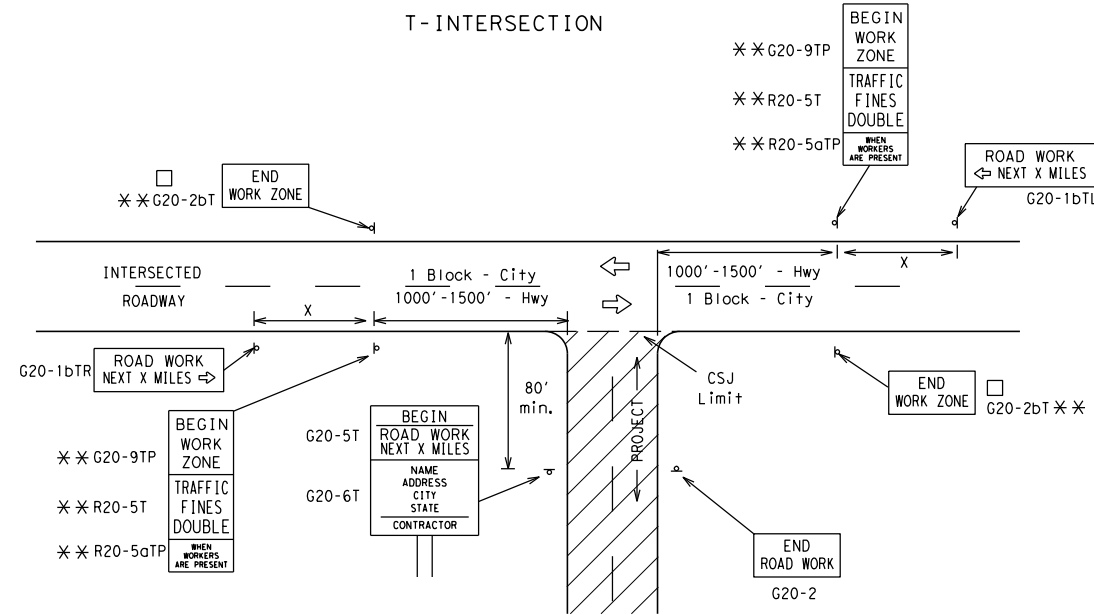
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
 - Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
 - The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12			60	600 ²
			65	700 ²
			70	800 ²
			80	1000 ²
*			*	* ³

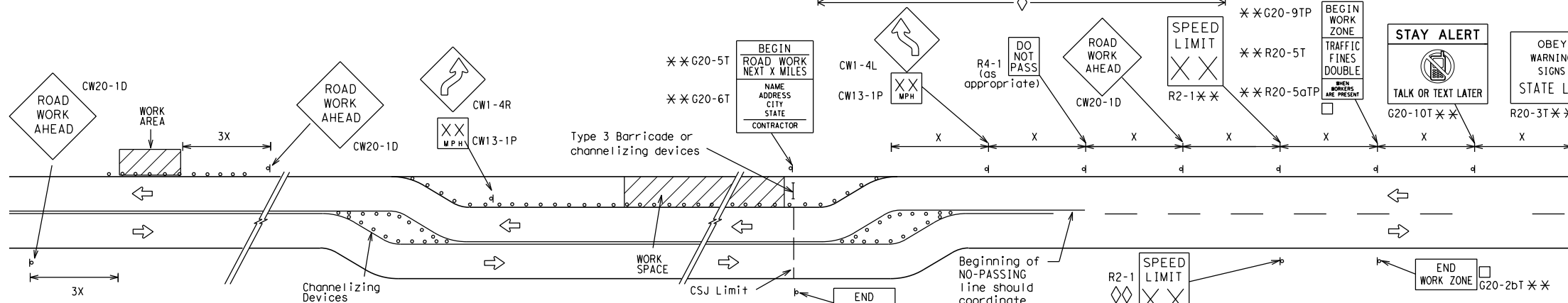
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

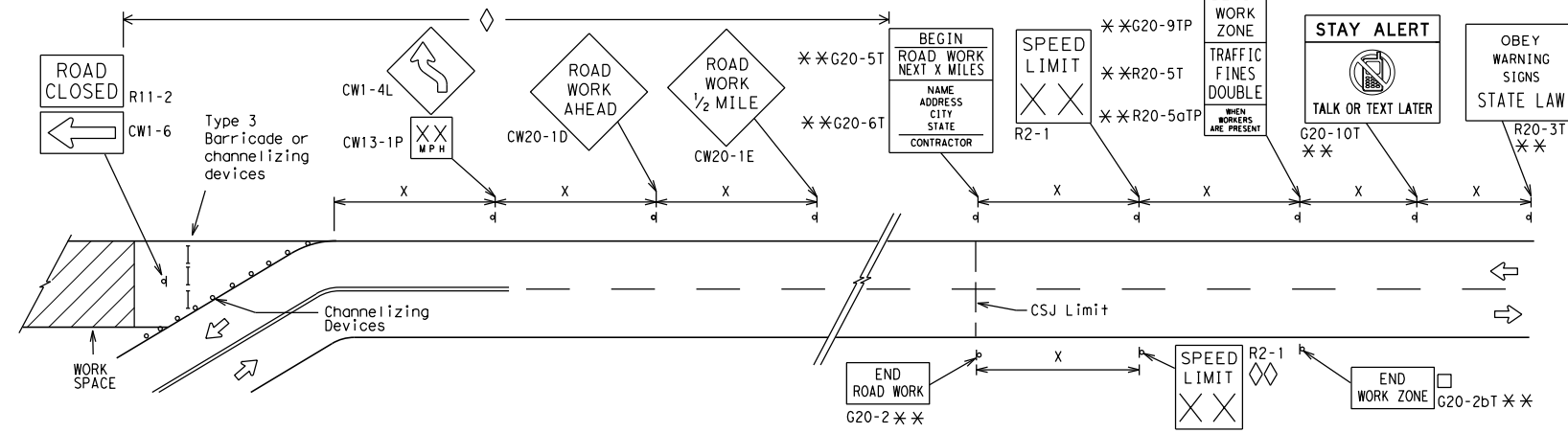
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

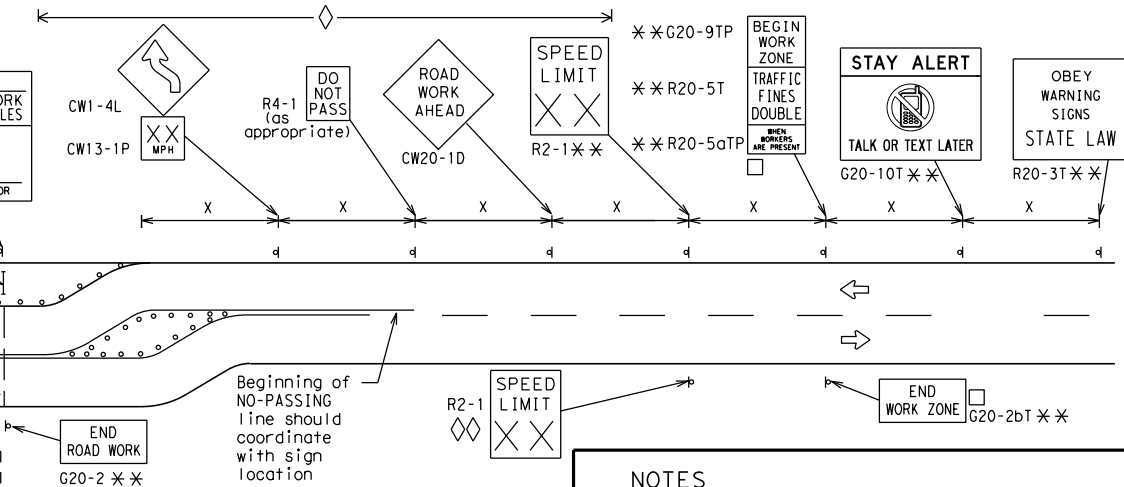


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
—	Type 3 Barricade
○ ○ ○	Channelizing Devices
■	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

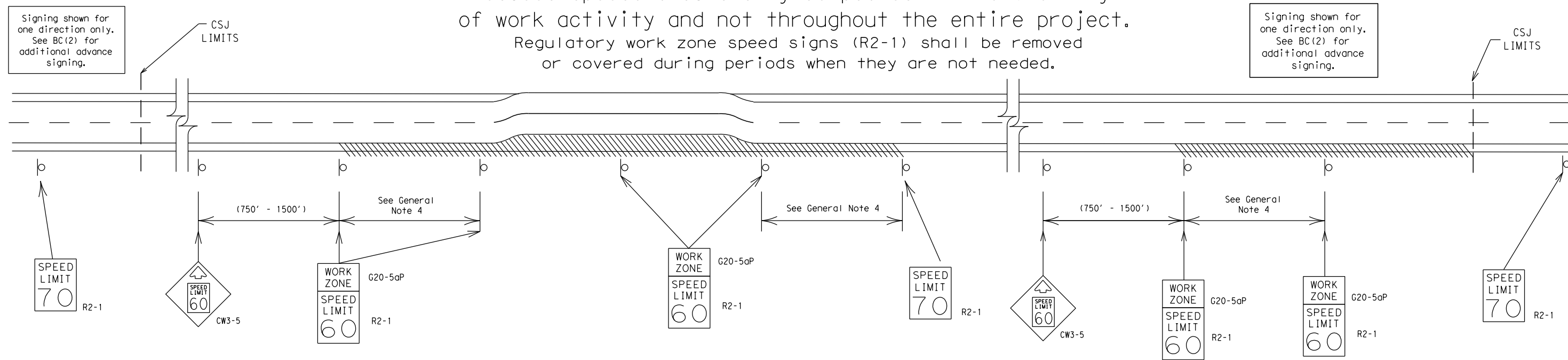
BC (2) - 21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	MEDINA	14	

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
 - 40 mph and greater 0.2 to 2 miles
 - 35 mph and less 0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

SHEET 3 OF 12



BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

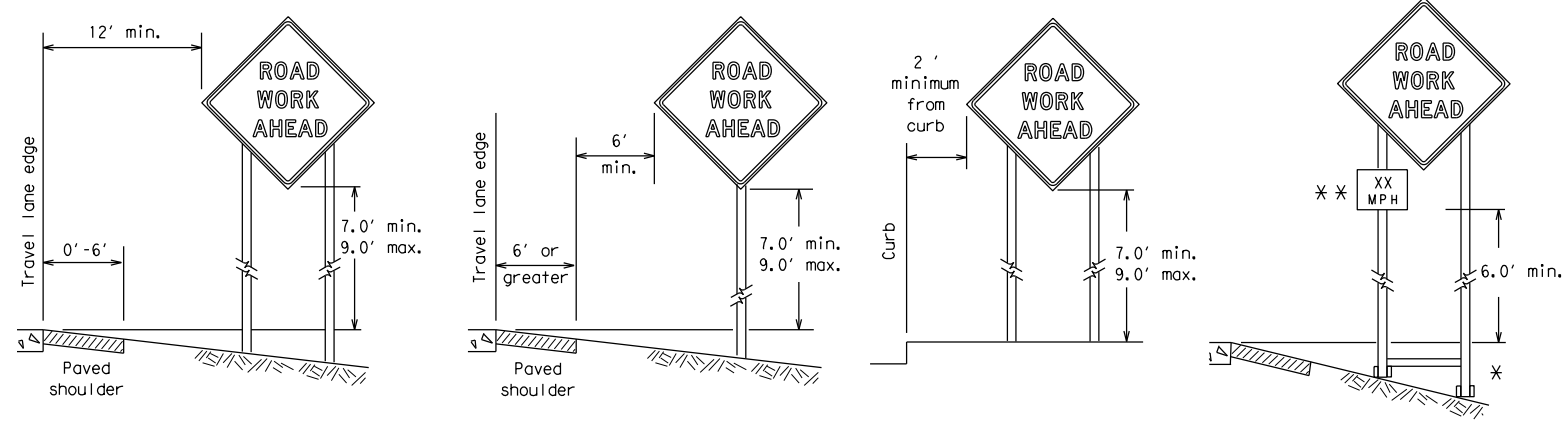
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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0915	45	056	CR 2615				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	SAT	MEDINA	15					

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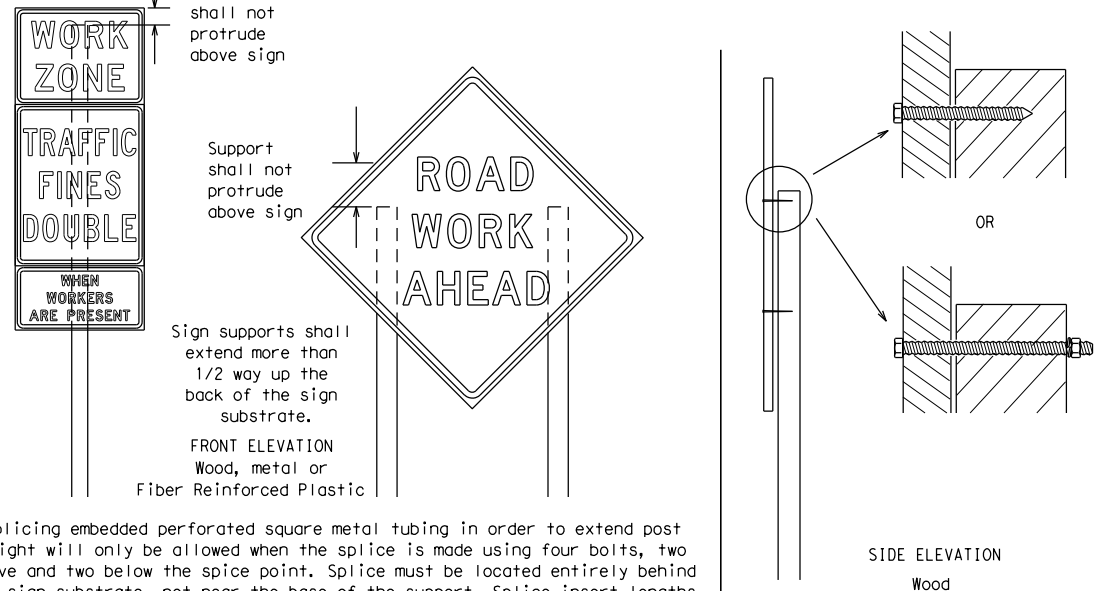
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TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.
 ** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS

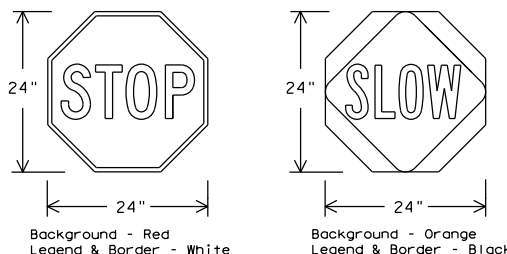


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports.
Nails shall NOT be allowed.
 Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRs standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.



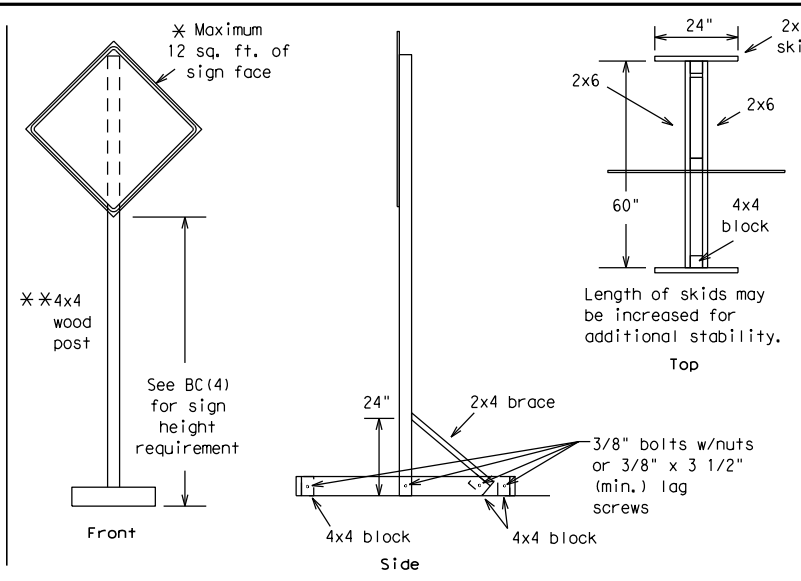
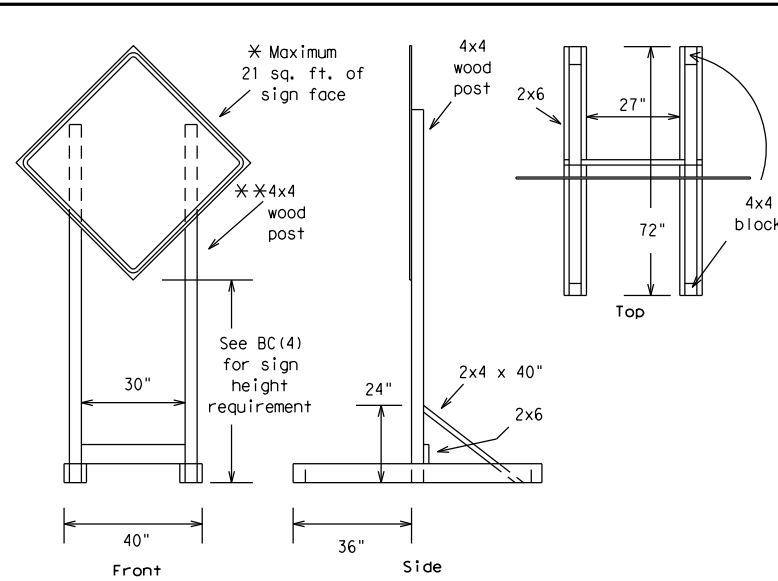
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13 5-21	SAT	MEDINA	16	

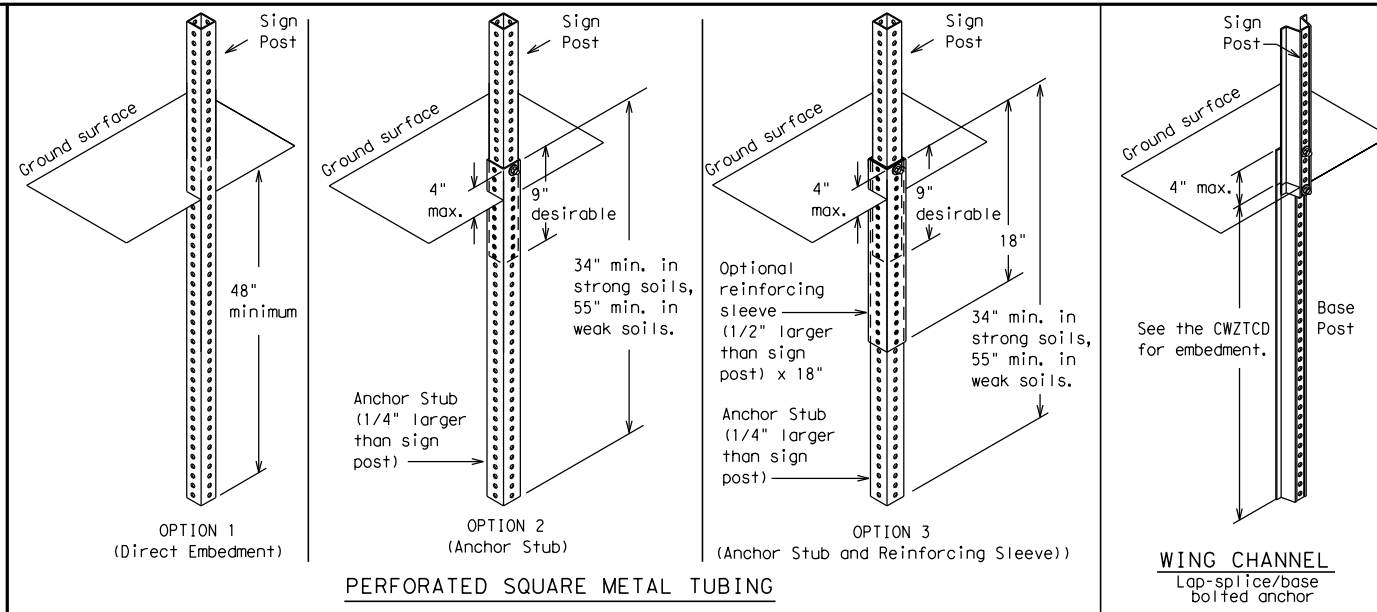
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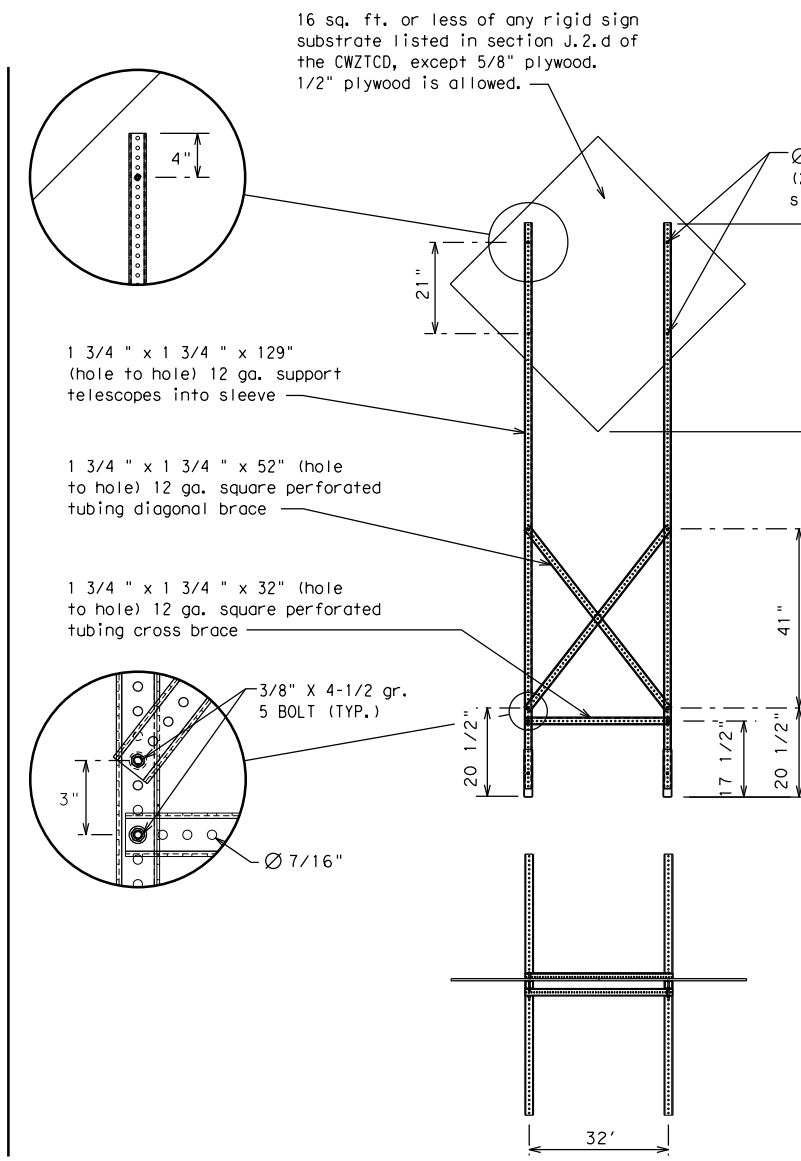
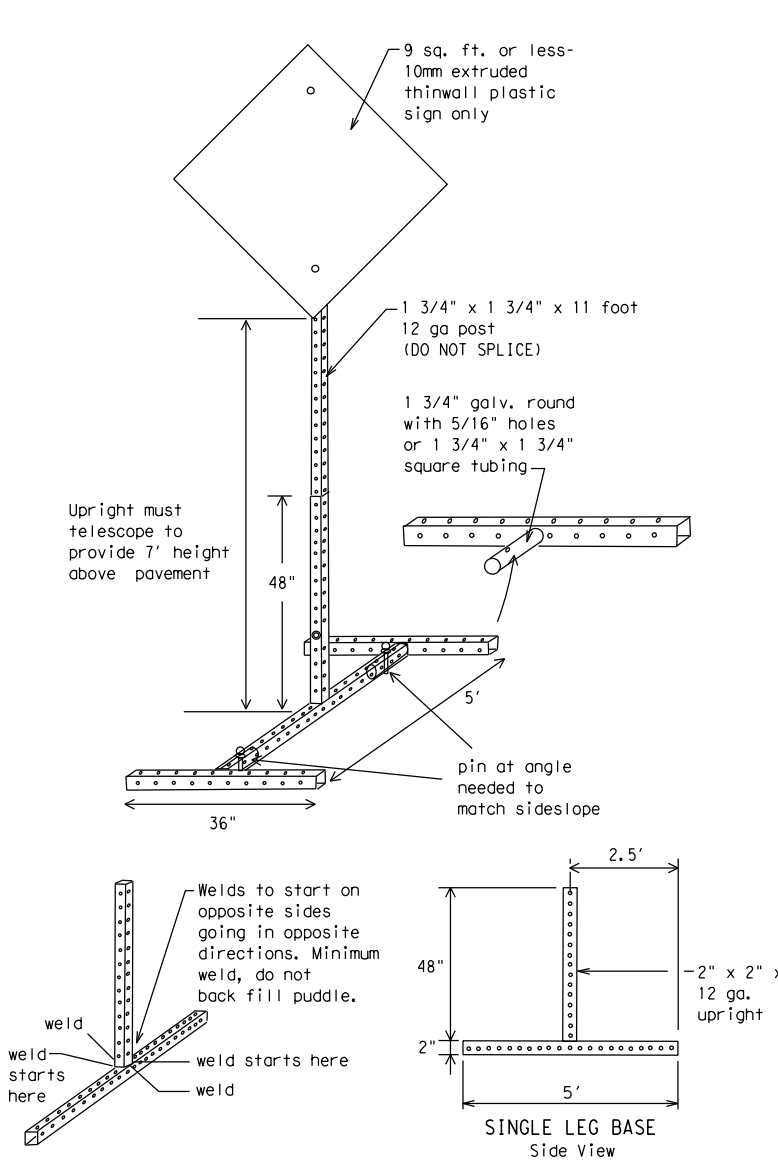
SKID MOUNTED WOOD SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS
Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS
MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

- GENERAL NOTES**
- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
 - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
 - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.
- * See BC(4) for definition of "Work Duration."
** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
□ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM - X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

SHEET 6 OF 12



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

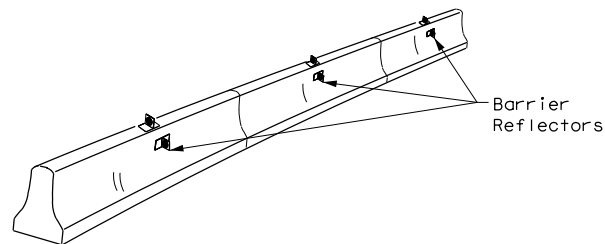
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	MEDINA	18	

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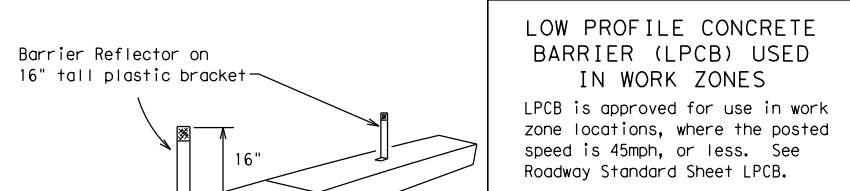
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

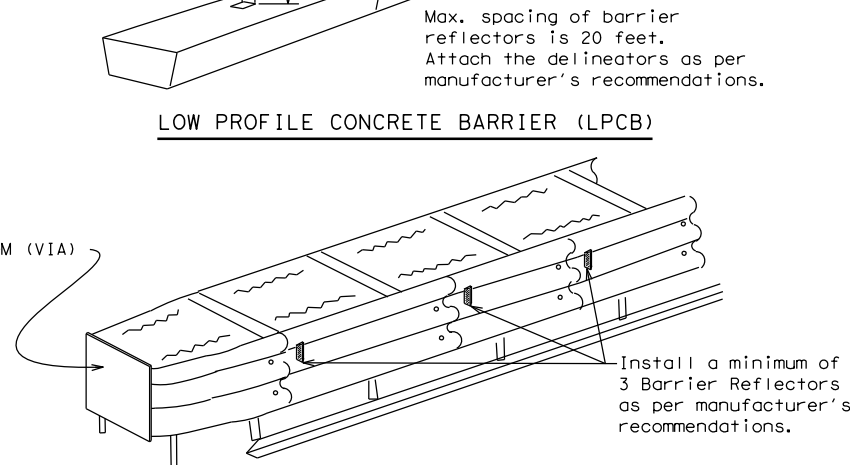


CONCRETE TRAFFIC BARRIER (CTB)

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.



DELINEATION OF END TREATMENTS
 END TREATMENTS FOR CTB'S USED IN WORK ZONES
 End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

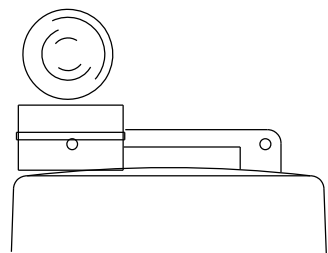
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

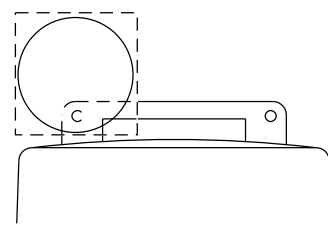
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



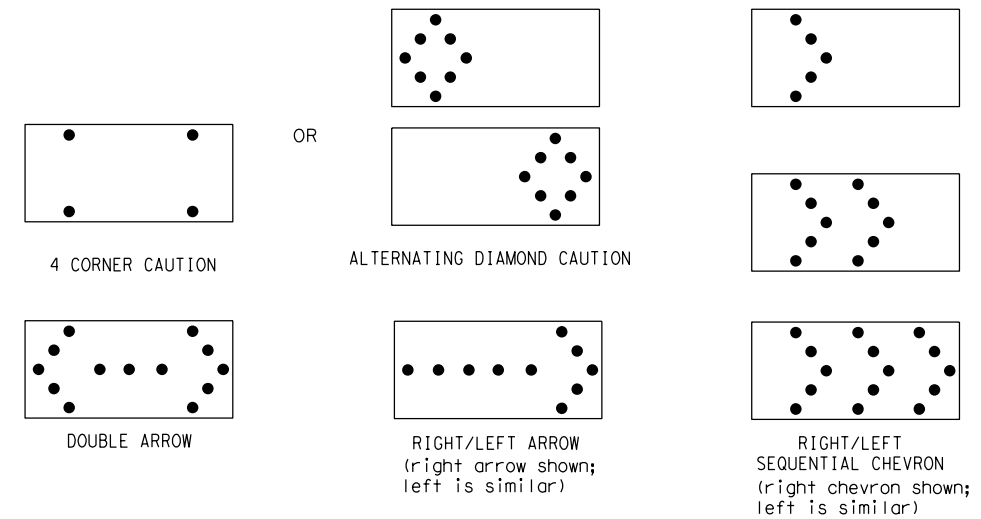
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC (7) - 21

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

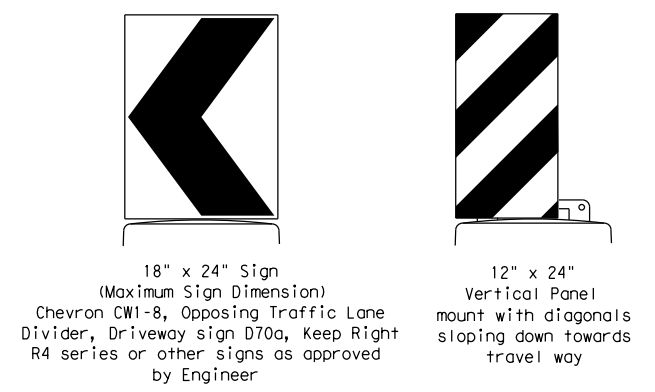
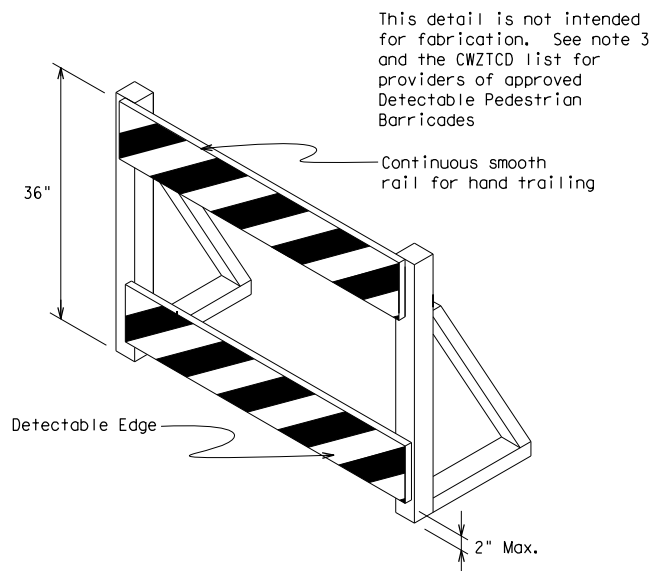
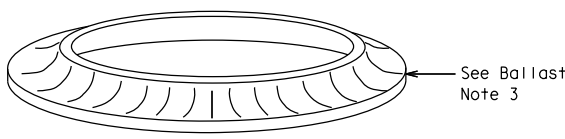
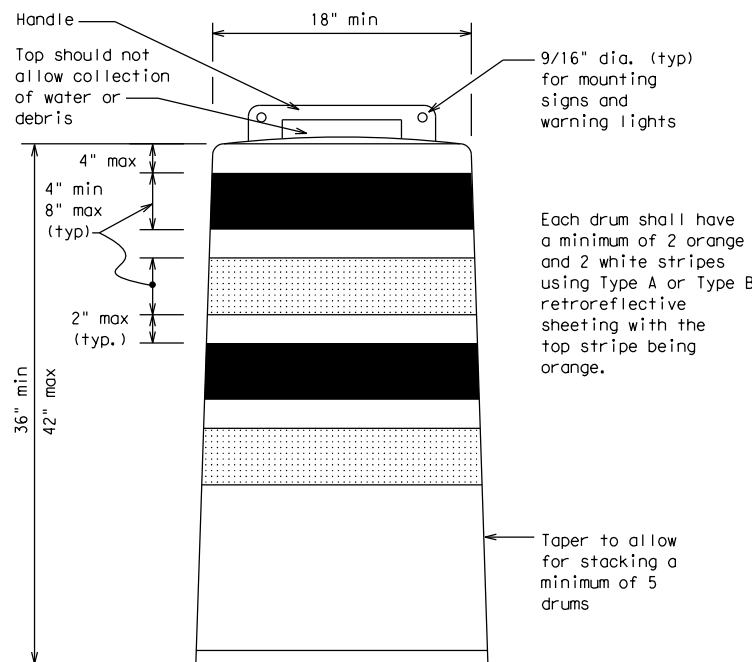
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



18" x 24" Sign (Maximum Sign Dimension)
 Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer
 12" x 24" Vertical Panel
 mount with diagonals sloping down towards travel way

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

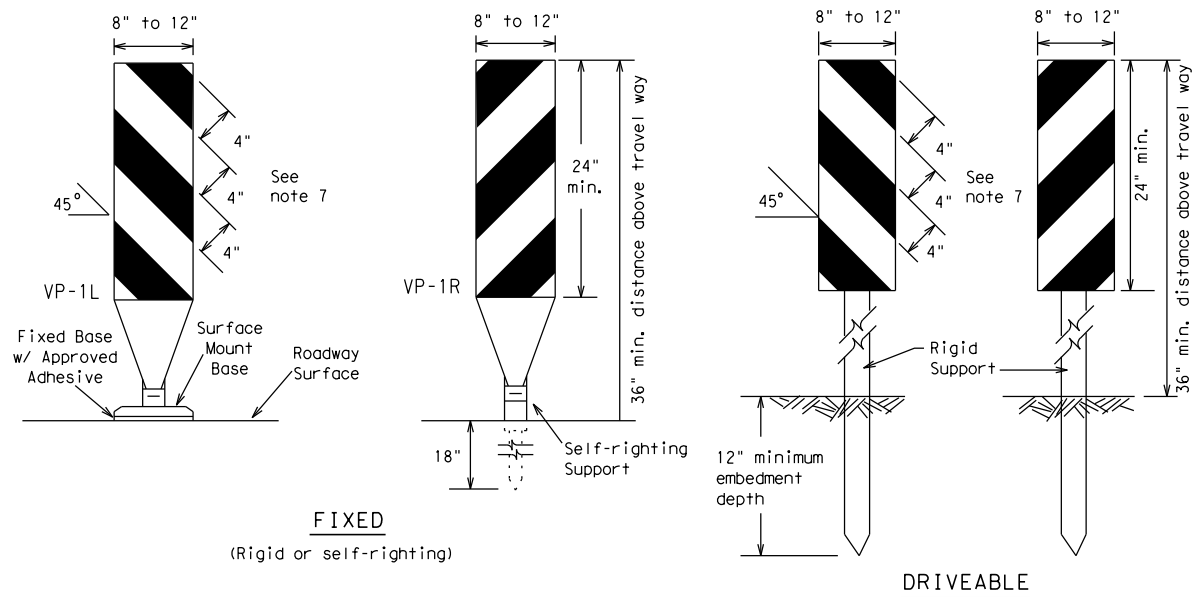
DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.

SHEET 8 OF 12

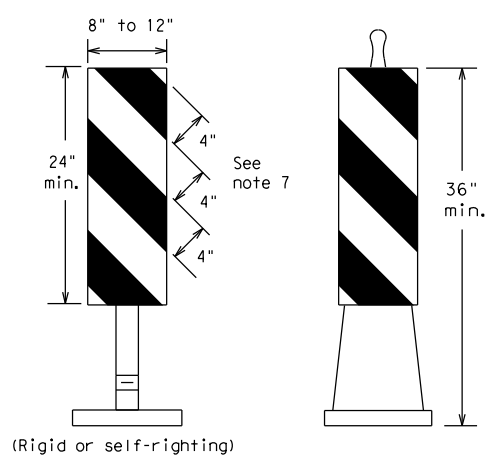
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES			
BC (8) - 21			
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FIXED
(Rigid or self-righting)

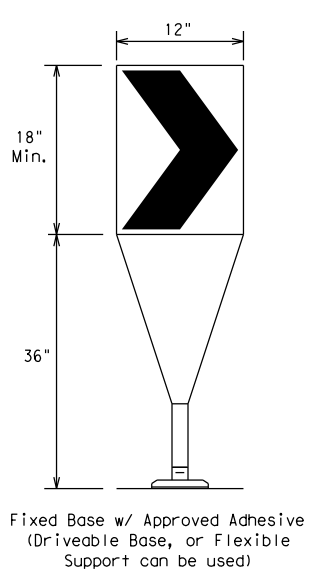
DRIVEABLE



PORTABLE

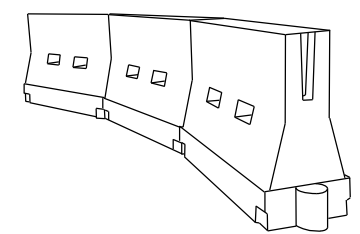
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers shall not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

*X Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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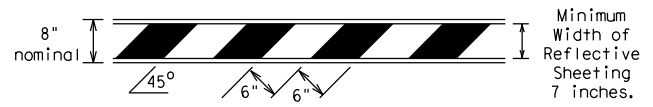
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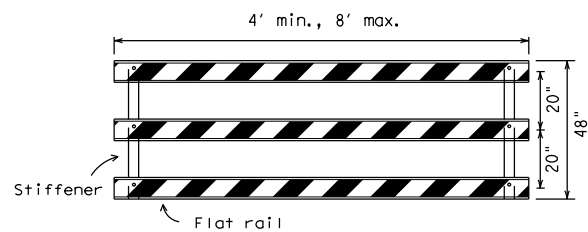
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



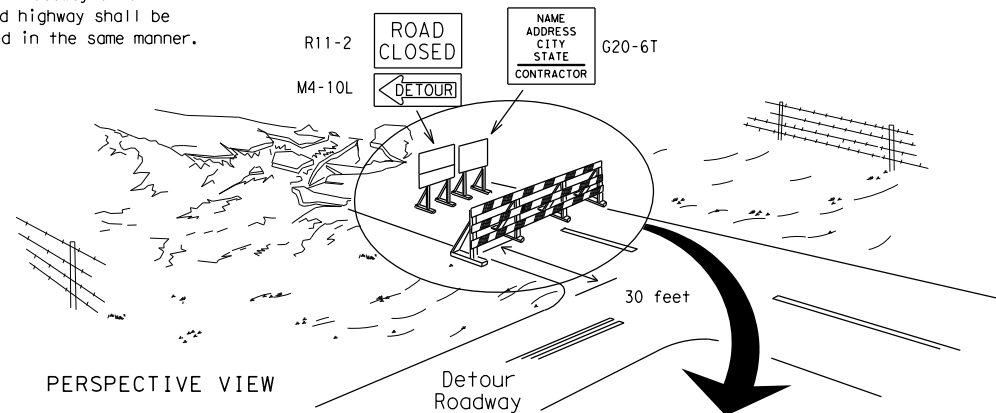
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

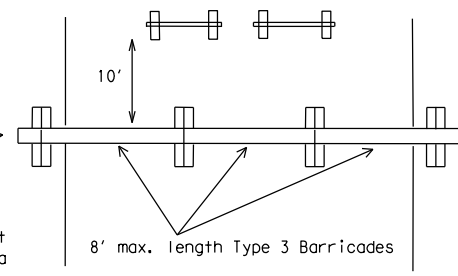
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

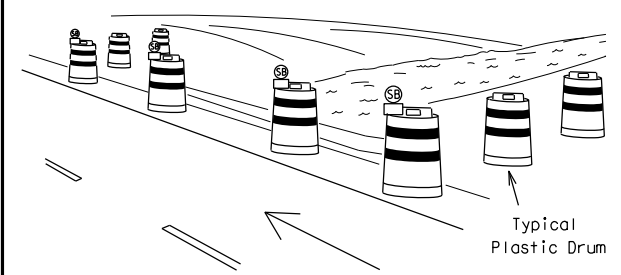
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



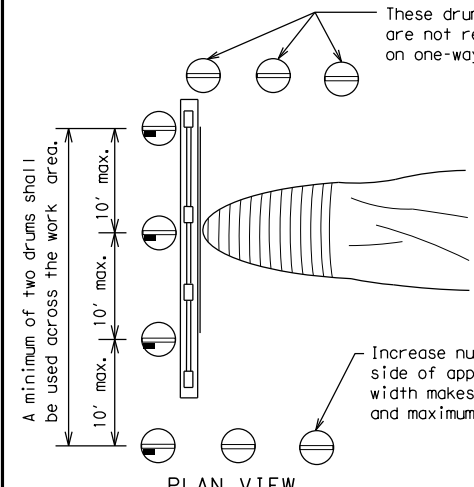
PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

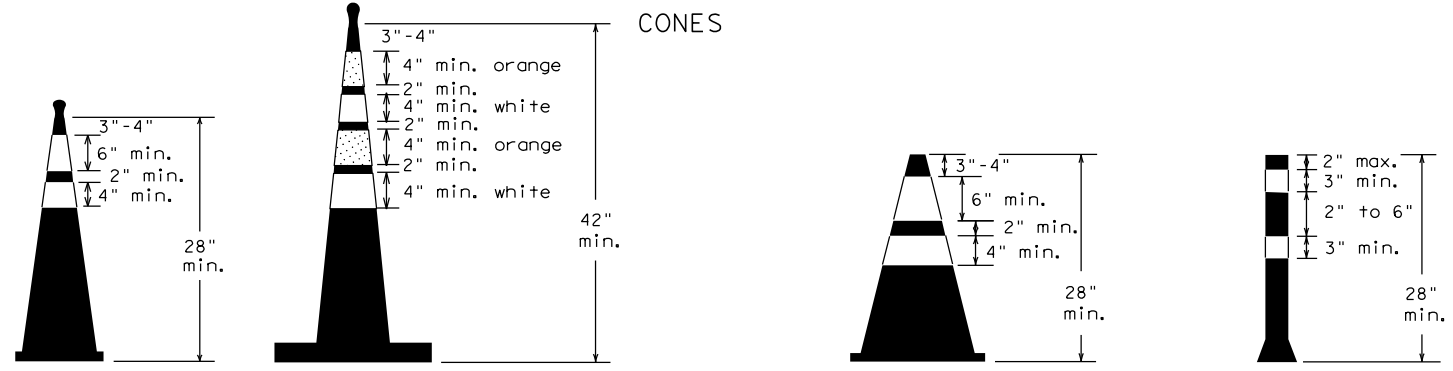


PLAN VIEW

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



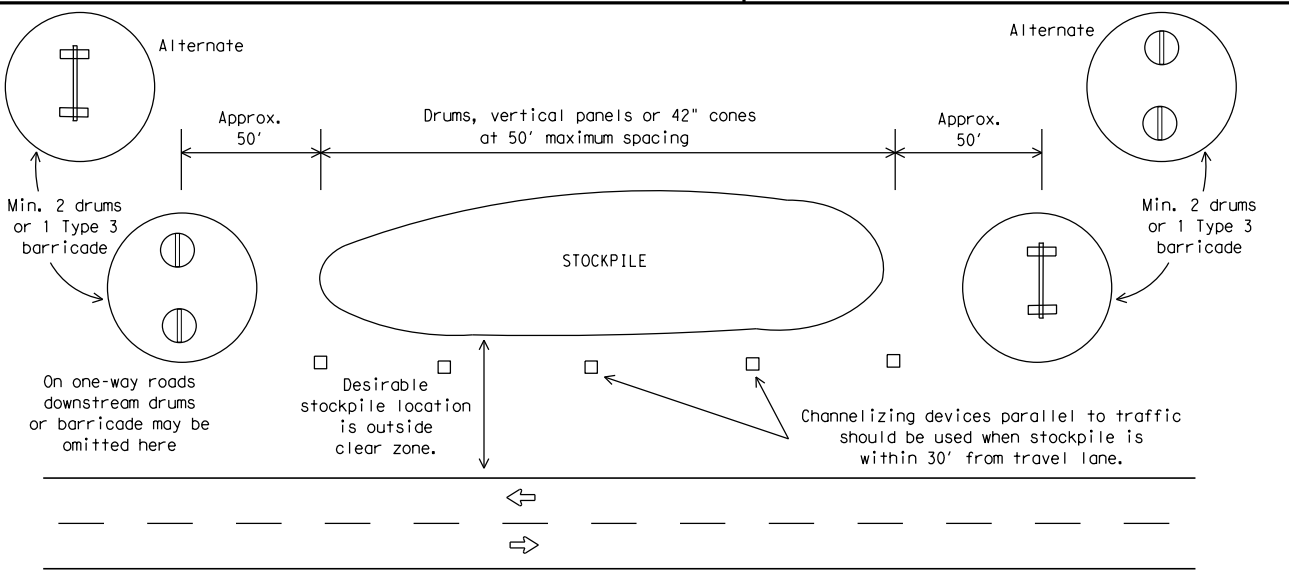
Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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7-13 5-21	SAT	MEDINA	22	

WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

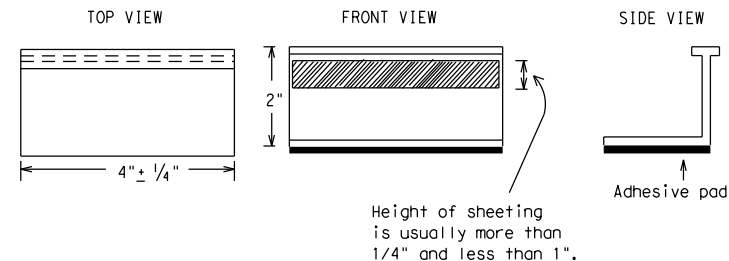
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

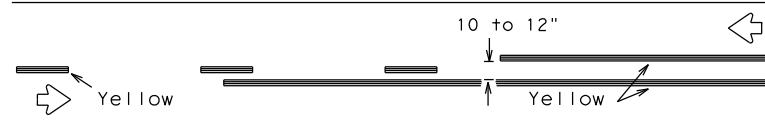
BC(11) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	SAT	MEDINA	23	
11-02 8-14				

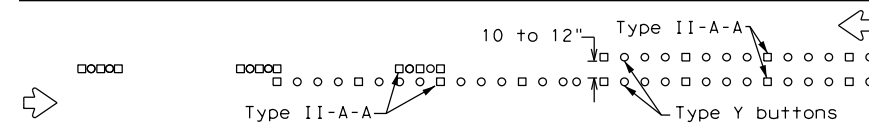
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 2/24/2023 3:31:14 PM
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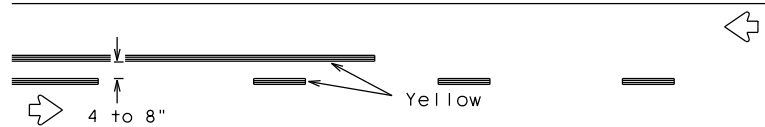
PAVEMENT MARKING PATTERNS



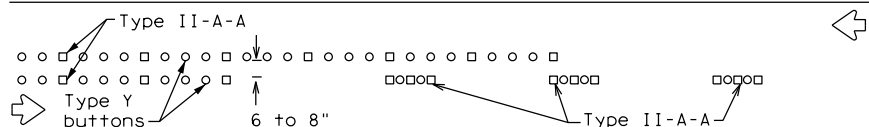
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



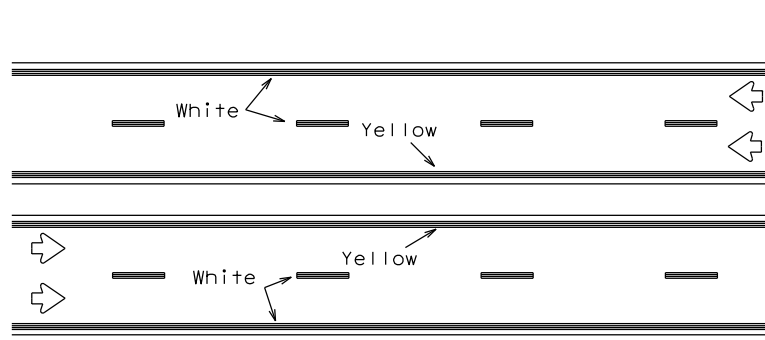
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



RAISED PAVEMENT MARKERS - PATTERN B

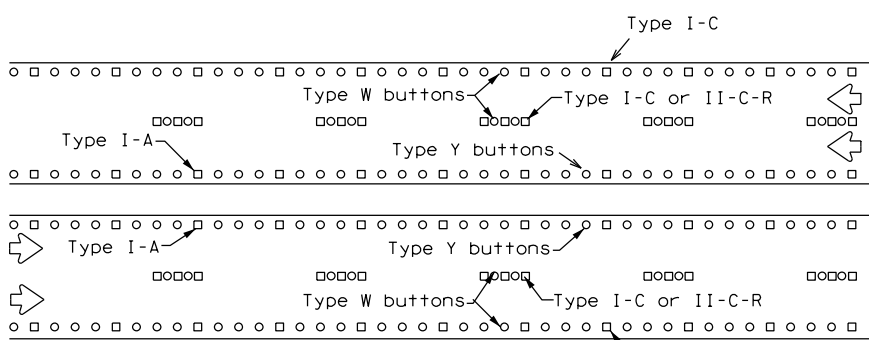
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



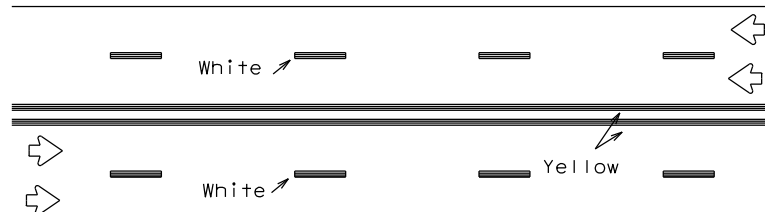
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



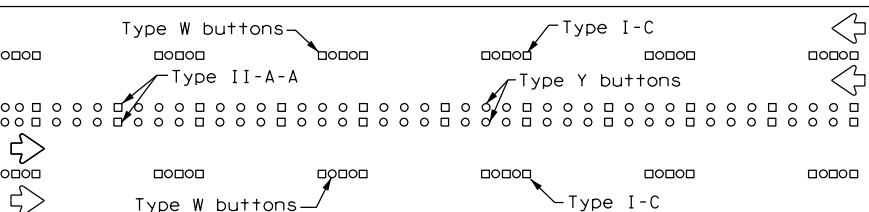
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



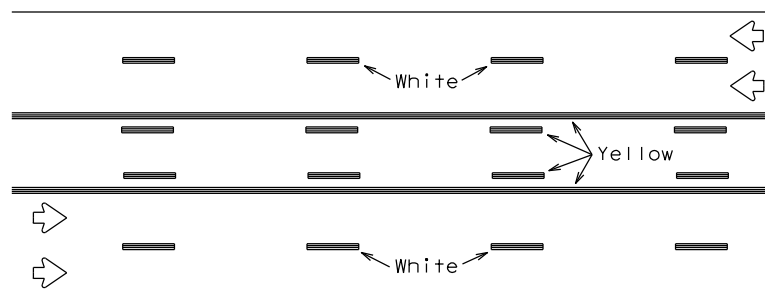
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



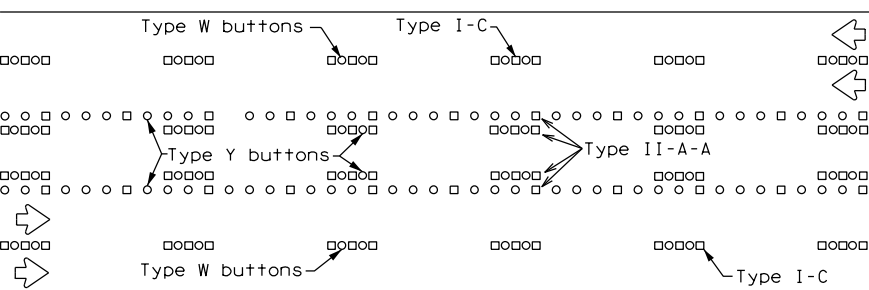
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

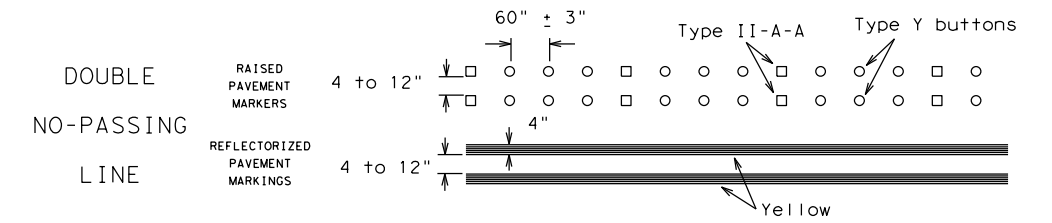
Prefabricated markings may be substituted for reflectorized pavement markings.



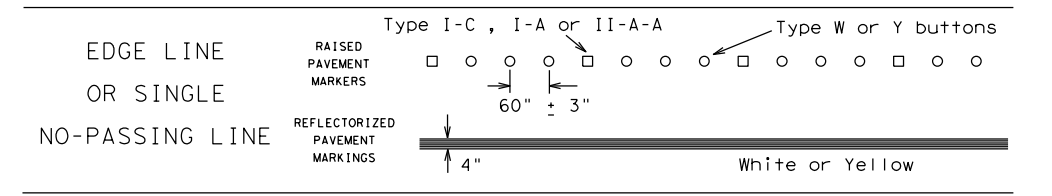
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

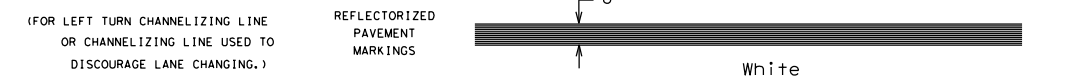
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



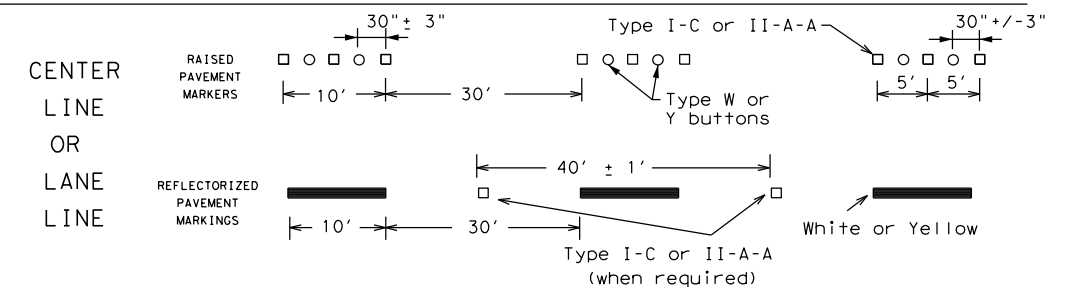
SOLID LINES



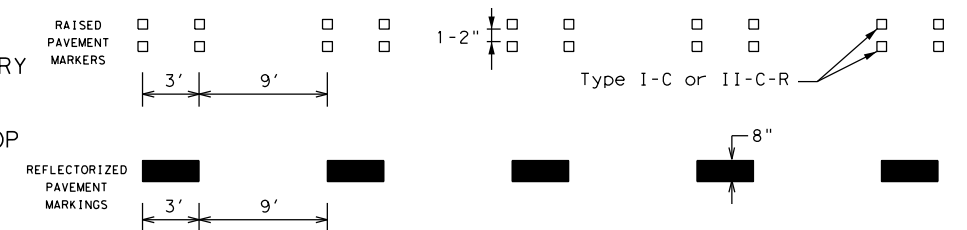
WIDE LINE



BROKEN LINES

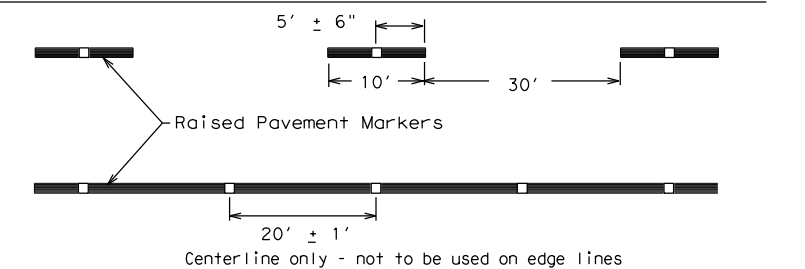


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	SAT	MEDINA	24	
11-02 8-14				

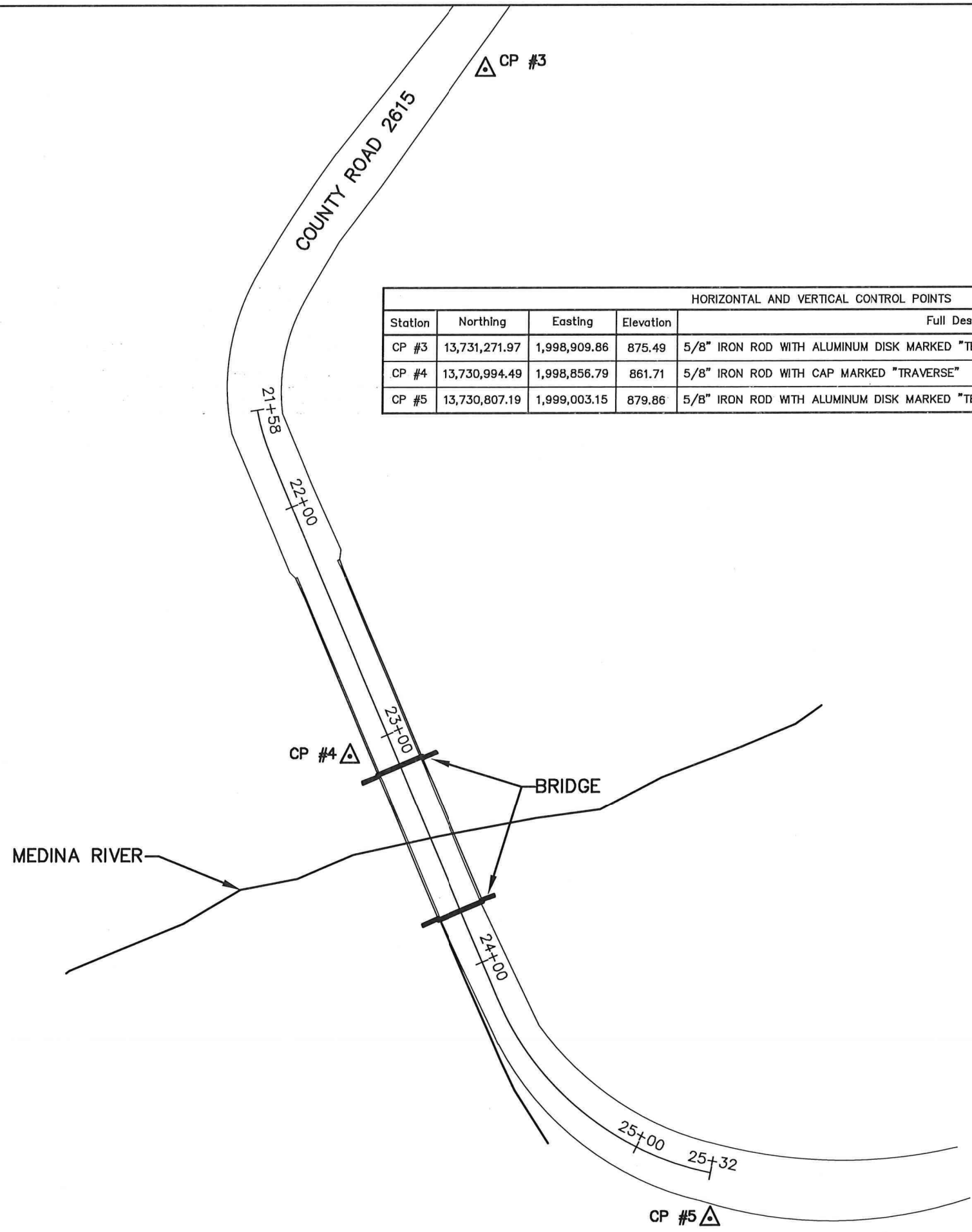
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 2/24/2023 3:31:14 PM
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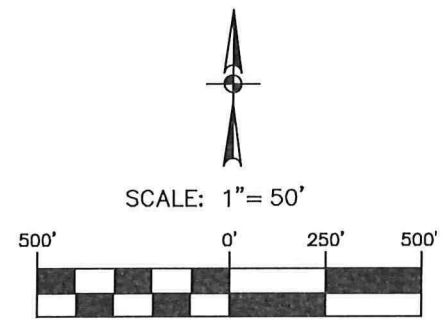
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Plotted on: MAY 13, 2022

Design Filename: N:\Transporto\Civil\11799-06\Task Xxx CSJ 0915-45-056 - CR 2615 @ Medina River\Control Sheets\CT 0915-45-056.dwg



HORIZONTAL AND VERTICAL CONTROL POINTS				
Station	Northing	Easting	Elevation	Full Description
CP #3	13,731,271.97	1,998,909.86	875.49	5/8" IRON ROD WITH ALUMINUM DISK MARKED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK"
CP #4	13,730,994.49	1,998,856.79	861.71	5/8" IRON ROD WITH CAP MARKED "TRAVERSE"
CP #5	13,730,807.19	1,999,003.15	879.86	5/8" IRON ROD WITH ALUMINUM DISK MARKED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK"



NOTES:
 1. COORDINATES SHOWN ARE DISPLAYED AS SURFACE VALUES IN US SURVEY FEET, BASED ON THE NORTH AMERICAN DATUM OF 1983 (2011) EPOCH 2010.00 FROM THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017 APPLIED, AS OBTAINED FROM RTK OBSERVATIONS USING THE TXDOT VRS NETWORK.
 2. ELEVATIONS SHOWN ARE BASED ON NAVD88 (GEOID 18), OBTAINED BY RTK METHODS USING THE TXDOT VRS NETWORK, AND FINALIZED BY BALANCING A CLOSED DOUBLE RUN DIGITAL LEVEL LOOP.

LEGEND
 ▲ CONTROL POINT
 CP CONTROL POINT
 CR COUNTY ROAD



Angela Marie Weller
 04/25/2022

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
 © 2023

CR 2615 AT MEDINA RIVER

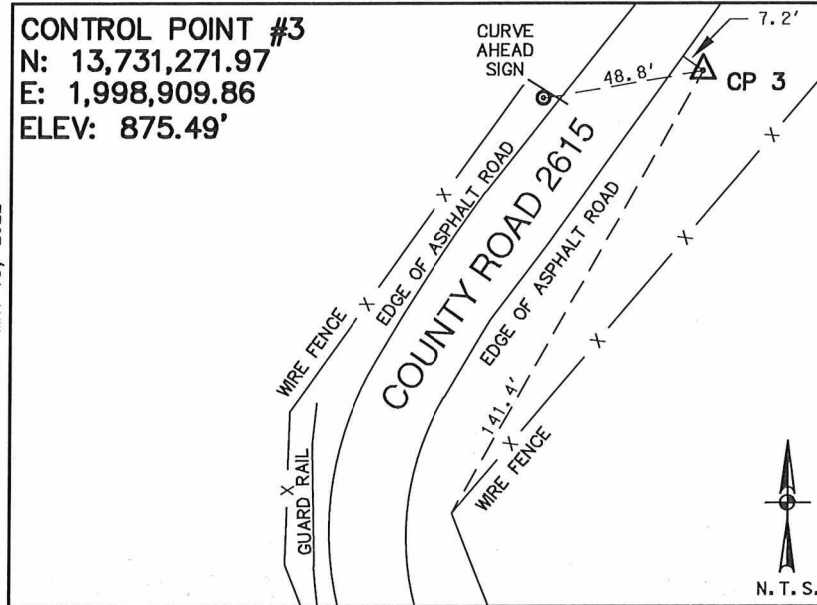
HORIZONTAL AND VERTICAL CONTROL

SHEET 1 OF 2

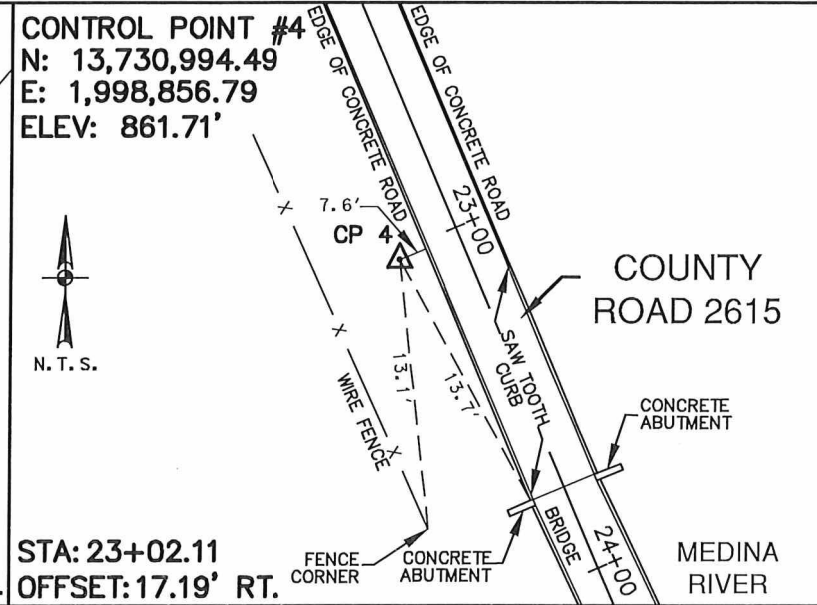
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CHK	AMW	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG	JPE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	AMW	15	MEDINA	0915	45	056	25

Plotted on: MAY 13, 2022

Design Filename: N:\Transport\11799-06\Task Xxx CSJ 0915-45-056 - CR 2615 @ Medina River\Control Sheets\CT 0915-45-056.dwg

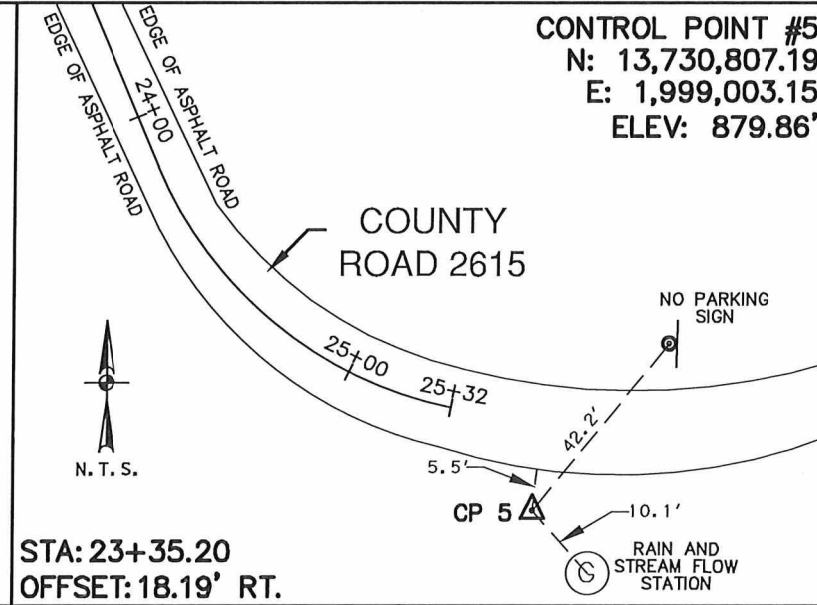


CONTROL POINT #3
 N: 13,731,271.97
 E: 1,998,909.86
 ELEV: 875.49'



CONTROL POINT #4
 N: 13,730,994.49
 E: 1,998,856.79
 ELEV: 861.71'

STA: 23+02.11
 OFFSET: 17.19' RT.



CONTROL POINT #5
 N: 13,730,807.19
 E: 1,999,003.15
 ELEV: 879.86'

STA: 23+35.20
 OFFSET: 18.19' RT.

5/8" IRON ROD WITH ALUMINUM DISK MARKED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" ON THE EAST SIDE OF COUNTY ROAD 2615 APPROXIMATELY 322' NORTH OF THE BRIDGE OVER MEDINA RIVER.

5/8" IRON ROD WITH CAP MARKED "TRAVERSE" ON THE WEST SIDE OF COUNTY ROAD 2615 APPROXIMATELY 12' NORTH OF THE BRIDGE OVER MEDINA RIVER.

5/8" IRON ROD WITH ALUMINUM DISK MARKED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" ON THE SOUTH SIDE OF COUNTY ROAD 2615 APPROXIMATELY 165' SOUTH OF THE BRIDGE OVER MEDINA RIVER.

NOTES:
 1. COORDINATES SHOWN ARE DISPLAYED AS SURFACE VALUES IN US SURVEY FEET, BASED ON THE NORTH AMERICAN DATUM OF 1983 (2011) EPOCH 2010.00 FROM THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017 APPLIED, AS OBTAINED FROM RTK OBSERVATIONS USING THE TXDOT VRS NETWORK.
 2. ELEVATIONS SHOWN ARE BASED ON NAVD88 (GEOID 18), OBTAINED BY RTK METHODS USING THE TXDOT VRS NETWORK AND FINALIZED BY BALANCING A CLOSED DOUBLE RUN DIGITAL LEVEL LOOP.

LEGEND
 ▲ CONTROL POINT
 CP CONTROL POINT
 N.T.S. NOT TO SCALE
 STA STATION
 N: NORTHING
 E: EASTING
 ELEV: ELEVATION
 CR COUNTY ROAD



Angela Marie Weller
 04/25/2022

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CR 2615 AT MEDINA RIVER

HORIZONTAL AND VERTICAL CONTROL

SHEET 2 OF 2

CHK	DWG	JPE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	DWG	AMW	6	TEXAS	SEE TITLE SHEET	CR 2615		
CHK	DWG	JPE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	DWG	AMW	15	MEDINA	0915	45	056	26

CR 2615 @ ALIGNMENT

Beginning chain CR2615 description

Point G1000 N 13,731,270.7837 E 1,998,888.2382 Sta 20+02.12
 Course from G1000 to PC G7001 S 35° 04' 25.29" W Dist 104.1951

Curve Data

Curve G7001
 P.I. Station = 21+39.62 N 13,731,158.2501 E 1,998,809.2254
 Delta = 58° 04' 15.04" (LT)
 Degree = 95° 29' 34.68"
 Tangent = 33.3071
 Length = 60.8116
 Radius = 60.0000
 External = 8.6248
 Long Chord = 58.2420
 Mid. Ord. = 7.5408
 P.C. Station = 21+06.31 N 13,731,185.5090 E 1,998,828.3647
 P.T. Station = 21+67.12 N 13,731,127.5902 E 1,998,822.2380
 C.C. = N 13,731,151.0313 E 1,998,877.4695
 Back = S 35° 04' 25.29" W
 Ahead = S 22° 59' 49.75" E
 Chord Bear = S 6° 02' 17.77" W

Course from PT G7001 to PC G7002 S 22° 59' 49.75" E Dist 251.3761

Curve Data

Curve G7002
 P.I. Station = 24+62.41 N 13,730,855.7713 E 1,998,937.6023
 Delta = 40° 11' 51.25" (LT)
 Degree = 47° 44' 47.34"
 Tangent = 43.9109
 Length = 84.1896
 Radius = 120.0000
 External = 7.7817
 Long Chord = 82.4735
 Mid. Ord. = 7.3078
 P.C. Station = 24+18.50 N 13,730,896.1924 E 1,998,920.4470
 P.T. Station = 25+02.69 N 13,730,835.9693 E 1,998,976.7947
 C.C. = N 13,730,943.0746 E 1,999,030.9099
 Back = S 22° 59' 49.75" E
 Ahead = S 63° 11' 40.99" E
 Chord Bear = S 43° 05' 45.37" E

Curve Data

Curve G7003
 P.I. Station = 25+72.20 N 13,730,804.6215 E 1,999,038.8386
 Delta = 43° 19' 40.58" (LT)
 Degree = 32° 44' 25.60"
 Tangent = 69.5135
 Length = 132.3377
 Radius = 175.0000
 External = 13.3006
 Long Chord = 129.2068
 Mid. Ord. = 12.3611
 P.C. Station = 25+02.69 N 13,730,835.9693 E 1,998,976.7947
 P.T. Station = 26+35.03 N 13,730,824.3908 E 1,999,105.4817
 C.C. = N 13,730,992.1645 E 1,999,055.7127
 Back = S 63° 11' 40.99" E
 Ahead = N 73° 28' 38.42" E
 Chord Bear = S 84° 51' 31.29" E

Course from PT G7003 to G1003 N 73° 28' 38.42" E Dist 274.9313

Point G1003 N 13,730,902.5797 E 1,999,369.0604 Sta 29+09.96


Ending chain CR2615 description

Plotted on: 2/24/2023

Design Filename: P:\117\99\06\CR2615\Design\Civil\General\1179906HAD01.dgn

DESIGN

 LUKE REED, P.E. 2/24/2023
 DATE

APPROVAL

 JAMES A. LUTZ, P.E. 2/24/2023
 DATE

REV. NO.	DATE	DESCRIPTION	BY



CR 2615 AT MEDINA RIVER
 HORIZONTAL ALIGNMENT
 DATA

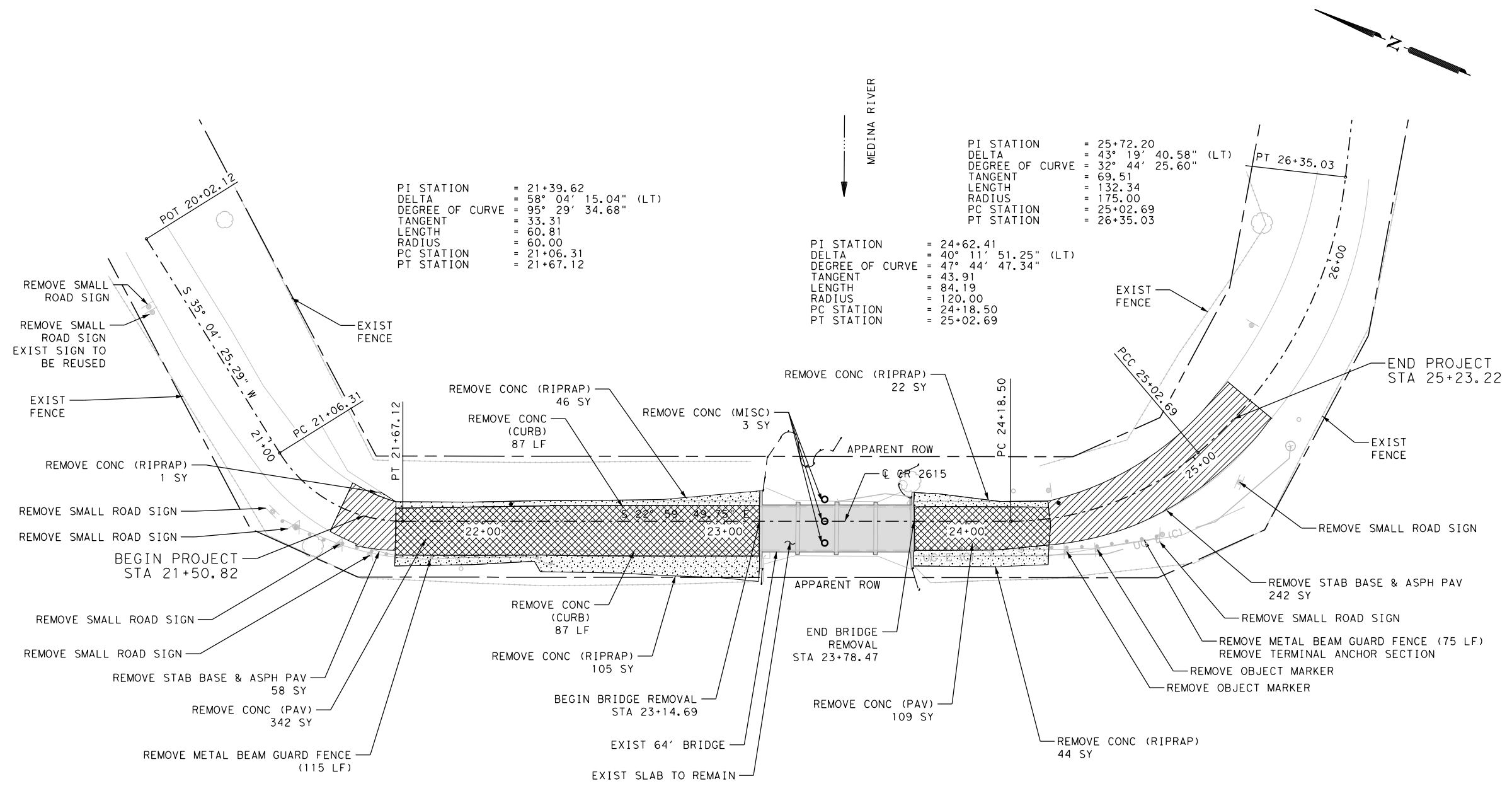
SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	0915	45
			JOB NO.:	SHEET NO.:
			056	27

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Roadway\1179906RMV01.dgn

ITEM	DESCRIPTION	UNIT	QTY
0104-6001	REMOVING CONC (PAV)	SY	451
0104-6009	REMOVING CONC (RIPRAP)	SY	218
0104-6021	REMOVING CONC (CURB)	LF	174
0104-6028	REMOVING CONC (MISC)	SY	3
0105-6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	300
0542-6001	REMOVE METAL BEAM GUARD FENCE	LF	190
0542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1
0644-6076	REMOVE SM RD SN SUP&AM	EA	8
0658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	2



LEGEND

- REMOVE STAB BASE & ASPH PAV
- REMOVE CONCRETE (RIPRAP)
- REMOVE CONCRETE (APPR SLAB)
- REMOVE STR (BRIDGE 0-99 FT LENGTH)

NOTES

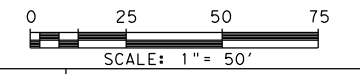
1. ITEMS MARKED WITH * ARE SUBSIDIARY TO ITEM 100 "PREPARING ROW"
2. EXISTING MBBG AND SIGNS TO BE SALVAGED AND DELIVERED TO MEDINA COUNTY YARD.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 2/24/2023
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 8472
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 2/24/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



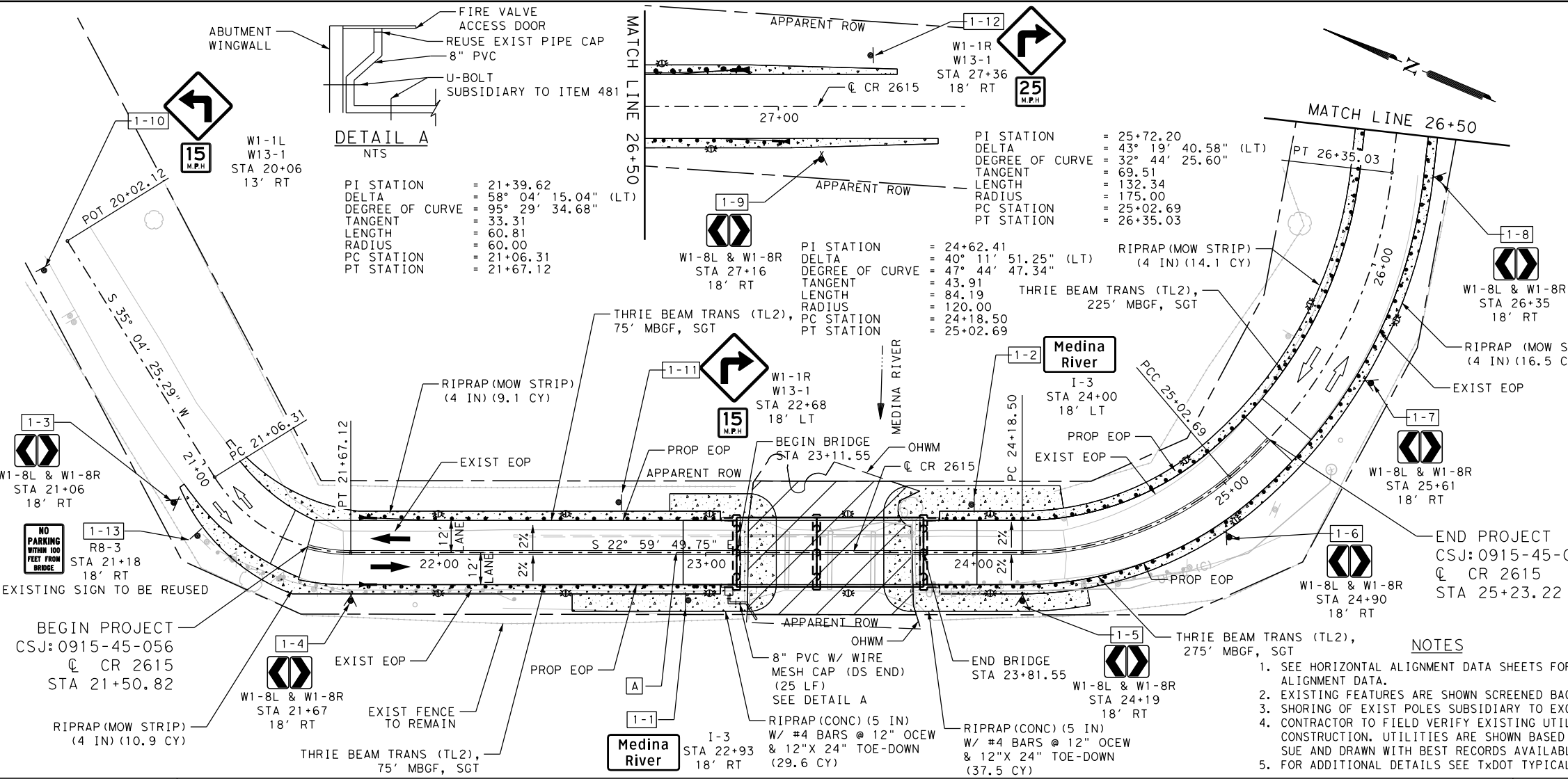
CR 2615 AT MEDINA RIVER

REMOVAL LAYOUT

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	28

Plotted on: 2/24/2023

Design File name: P:\11799\06\CR2615\Design\Civil\Roadway\1179906PP01.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	4.0
0110-6001	EXCAVATION (ROADWAY)	CY	210.0
0132-6003	EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	160.0
0360-6001	CONC PVMT (CONT REINF - CRCP) (7")	SY	806
0432-6010	RIPRAP (CONC) (CL B) (5 IN)	CY	67.1
0432-6045	RIPRAP (MOW STRIP) (4 IN)	CY	50.6
0481-6024	PIPE (PVC) (SCH 80) (8 IN)	LF	25
0540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	650
0540-6007	MTL BEAM GD FEN TRANS (TL2)	EA	4
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	11
0644-6004	IN SM RD SN SUP&M TY10BWG(1)SA(T)	EA	2
0658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	2
0658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	14
0666-6321	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	LF	746
0672-6009	REFL PAV MRKR TY II-A-A	EA	8
3076-6001	D-GR HMA TY-B PG64-22	TON	186.0
3076-6035	D-GR HMA TY-D PG64-22	TON	36.0

LEGEND

- CONCRETE RIPRAP
- OHWM DISTURBED
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC
- UG E(C) USGS UNDERGROUND ELECTRIC (QL-C)
- 6" Y SLD DBL STRIPE
- OBJECT MARKER
- PROPOSED SIGN
- EXIST SIGN

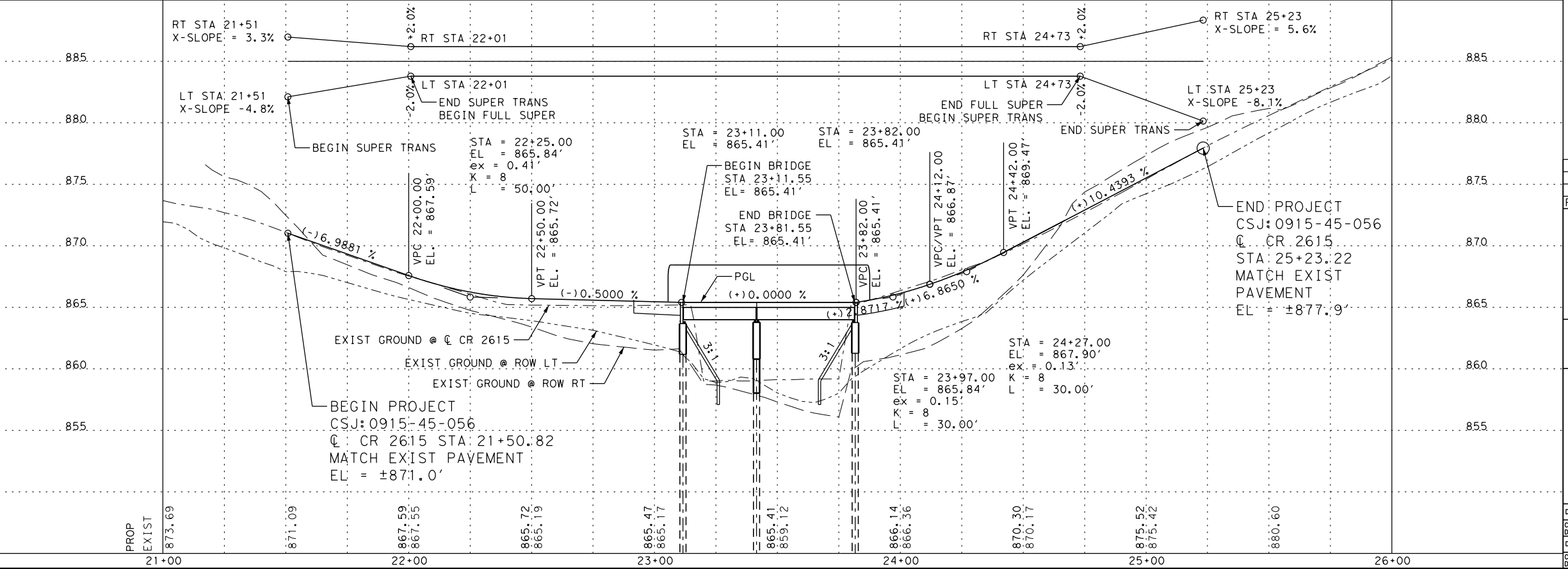
- NOTES**
- SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
 - EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
 - SHORING OF EXIST POLES SUBSIDIARY TO EXCAVATION ITEMS.
 - CONTRACTOR TO FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE SHOWN BASED ON LEVEL B,C/D SUE AND DRAWN WITH BEST RECORDS AVAILABLE DURING DESIGN.
 - FOR ADDITIONAL DETAILS SEE TXDOT TYPICAL STANDARD SHEETS.

DESIGN

APPROVAL

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
LUKE REED, P.E.
2/24/2023
DATE

STATE OF TEXAS
JAMES A. LUTZ
8472
LICENSED PROFESSIONAL ENGINEER
JAMES A. LUTZ, P.E.
2/24/2023
DATE



SCALE: PLAN 1" = 50' PROFILE 1" = 10'

REV. NO. DATE DESCRIPTION BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

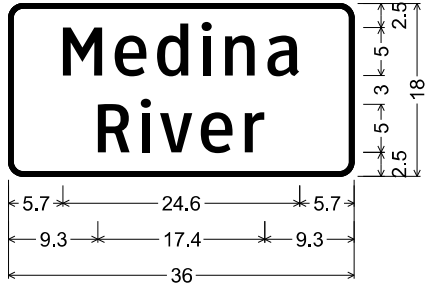
Texas Department of Transportation
©2023
CR 2615 AT MEDINA RIVER

PLAN AND PROFILE

DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SAT	MEDINA	0915	45	056	29

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Traffic\1179906SGN01.dgn



I-3_36x18;
 1.5" Radius, 0.5" Border, White on Green;
 "Medina", ClearviewHwy-3-W;
 "River", ClearviewHwy-3-W;

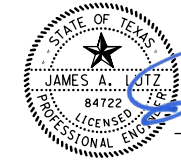
DESIGN



[Signature]
 LUKE REED, P.E.
 DATE

2/24/2023

APPROVAL



[Signature]
 JAMES A. LOTZ, P.E.
 DATE

2/24/2023

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



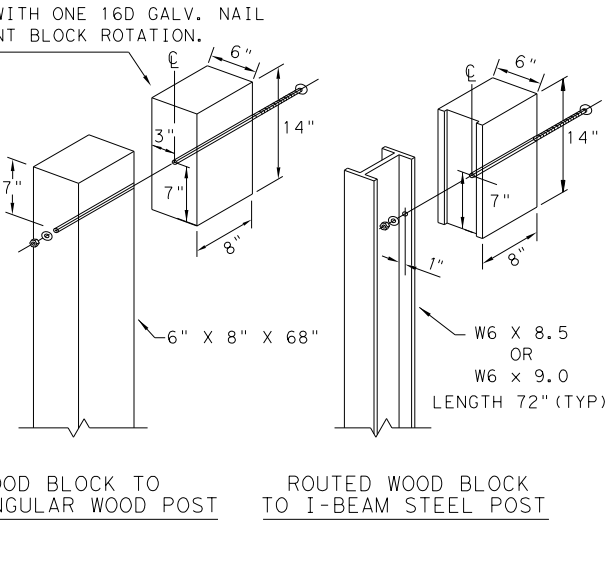
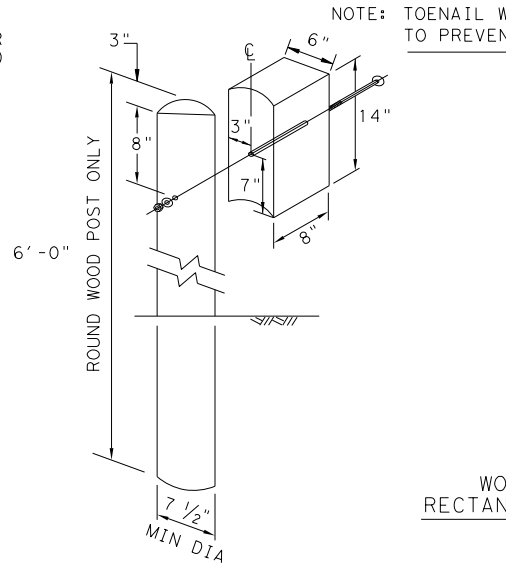
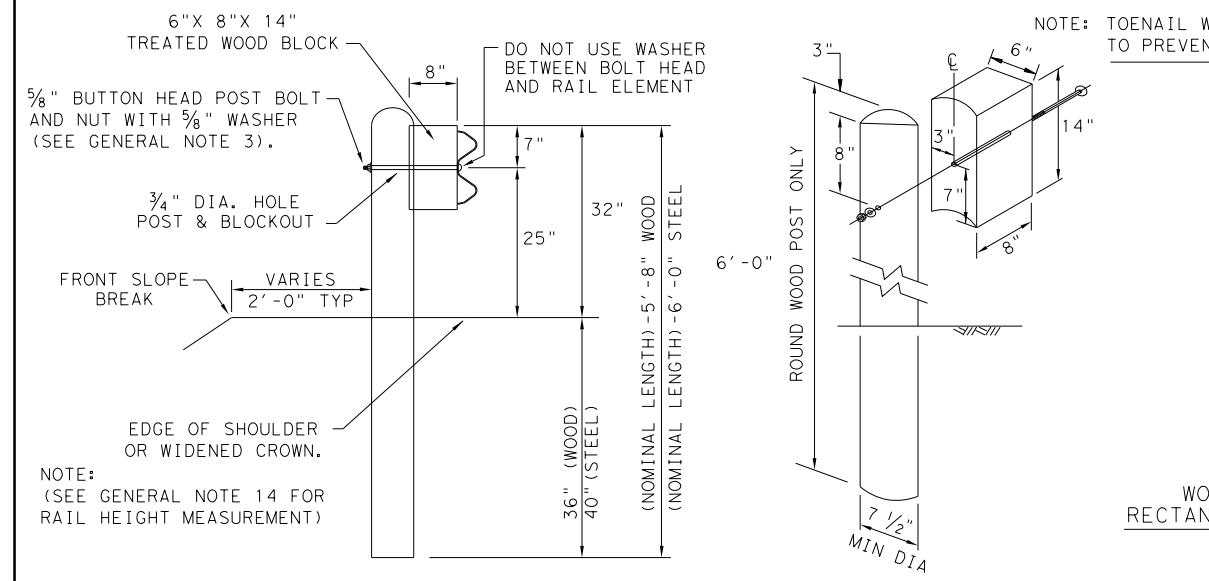
CR 2615 AT MEDINA RIVER

SIGN DETAILS

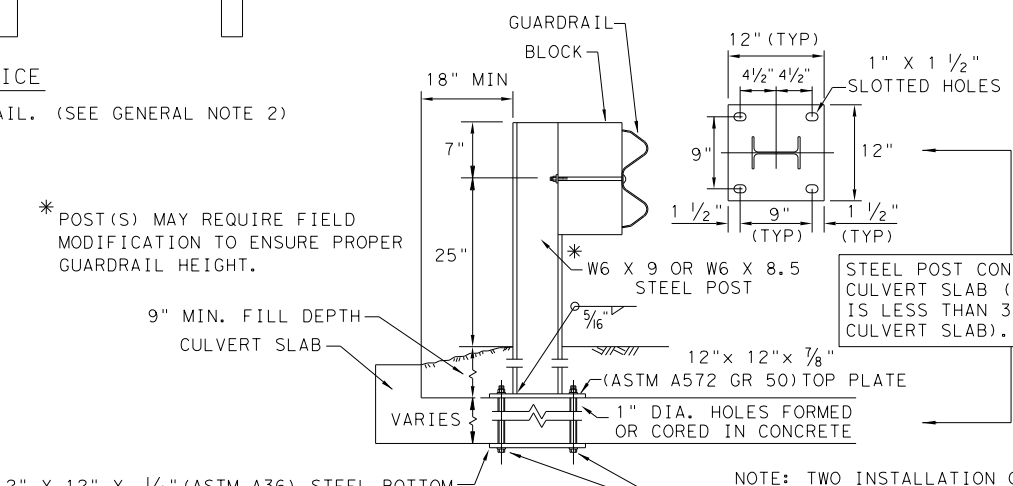
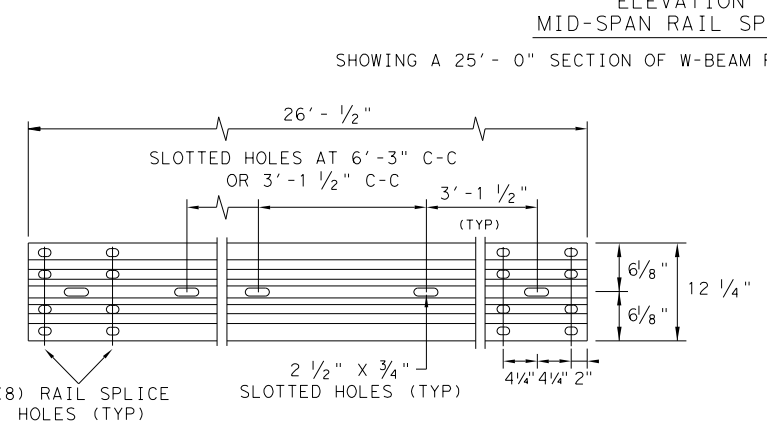
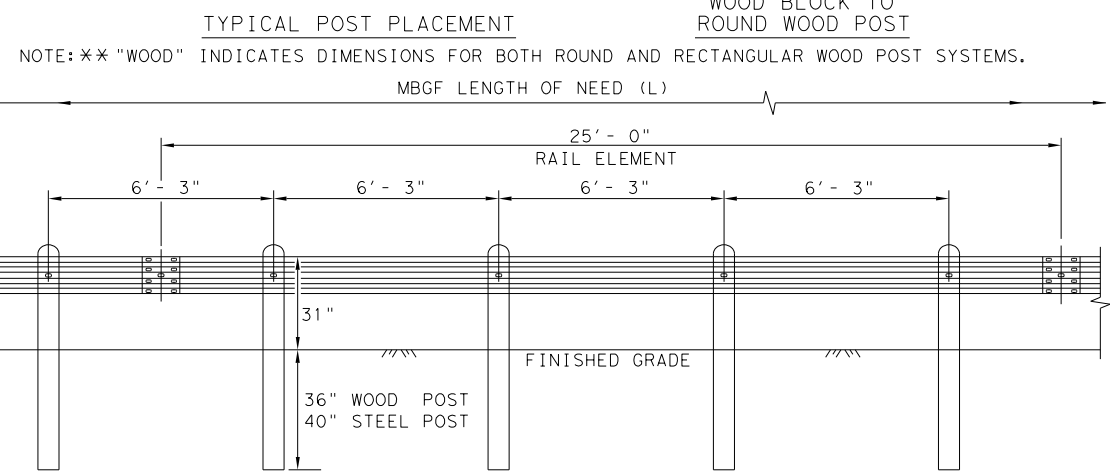
SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	0915	45	056	30

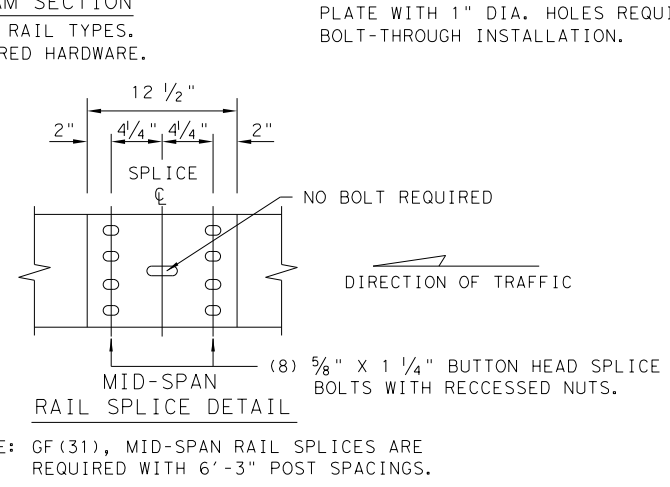
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 DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



- GENERAL NOTES**
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
 4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
 6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
 7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
 9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
 10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
 11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
 12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
 13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
 14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.



NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES. SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.
 NOTE: FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECESSED NUT.
 SPLICE BOLT LENGTH VARIES
 FBB01 = 1 1/4"
 FBB02 = 2"
 POST & BLOCK LENGTH
 FBB03 = 10"
 FBB04 = 18"
BUTTON HEAD BOLT
 NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.

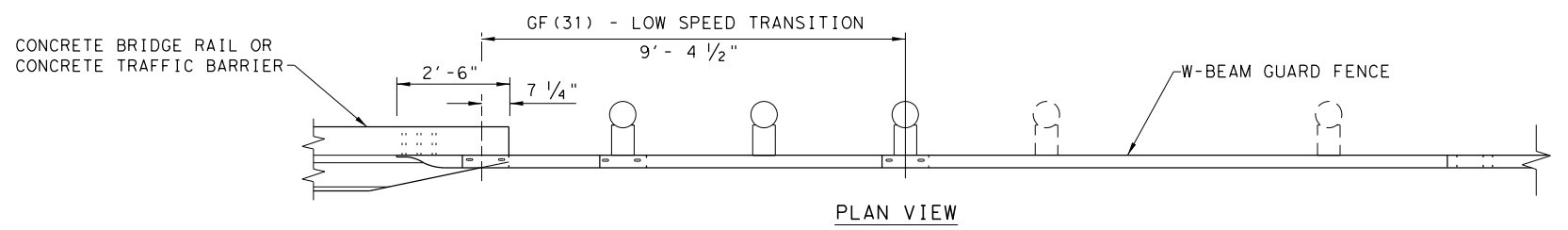


NOTE: TWO INSTALLATION OPTIONS.
 1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
 2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.
 NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

		Design Division Standard	
<h2>METAL BEAM GUARD FENCE</h2> <h3>TL-3 MASH COMPLIANT</h3> <h1>GF(31)-19</h1>			
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS		0915	056
DIST	COUNTY	SHEET NO.	
SAT	MEDINA	31	

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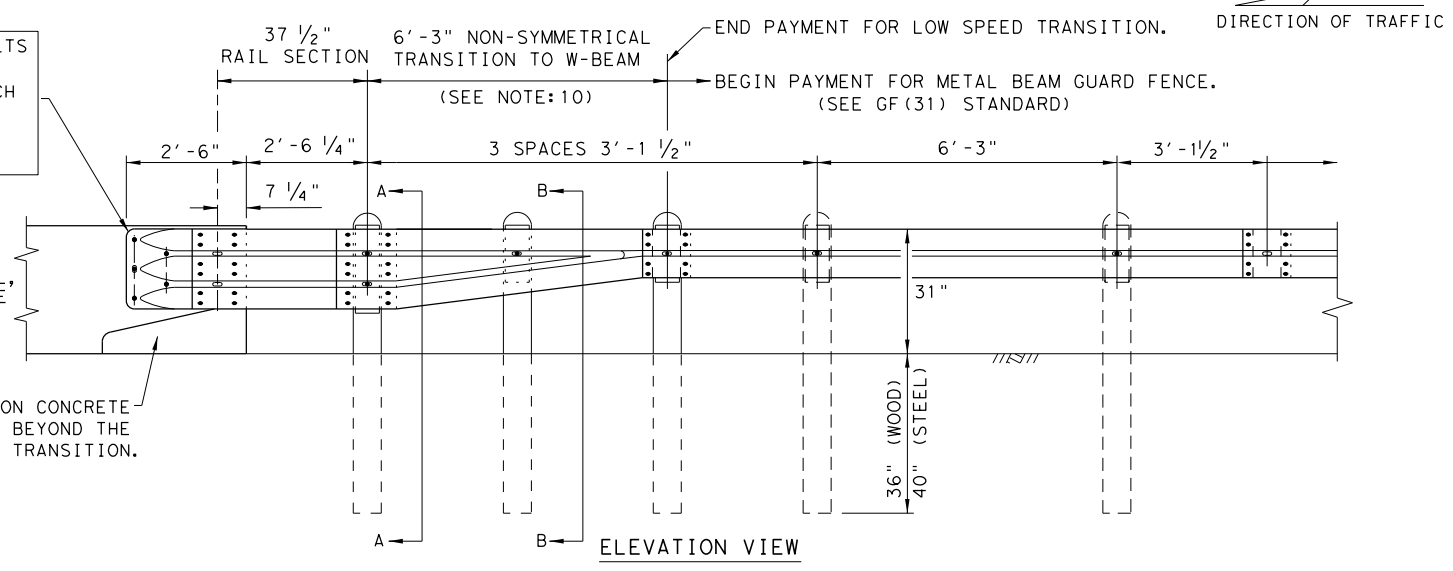
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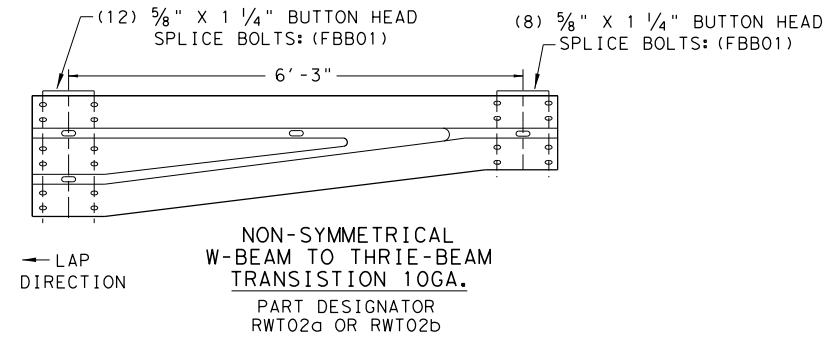
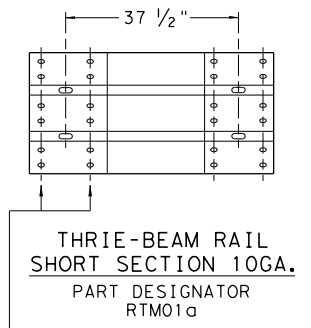
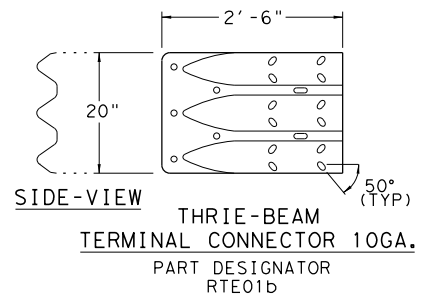
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (ASTM A325 OR A449)
 - (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
 - (5) 7/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563)
- THRIE-BEAM CONNECTOR TO CONCRETE RAIL

NOTE: HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

NOTE: CHAMFER REQUIRED ON CONCRETE RAILS THAT EXTEND BEYOND THE FACE OF GUARDRAIL TRANSITION.



- ### GENERAL NOTES
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31) STANDARD SHEET.
 2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
 3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
 4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC160) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
 5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
 6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
 7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
 9. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
 10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE TRANSITION.



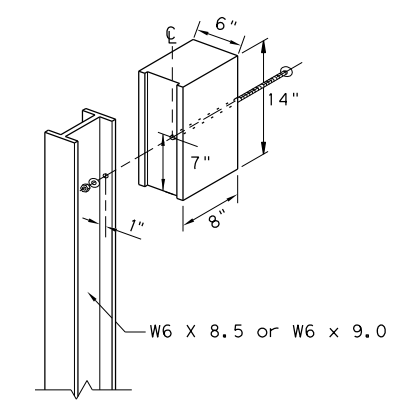
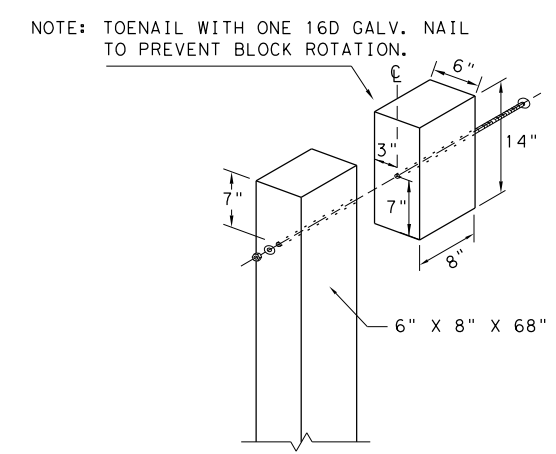
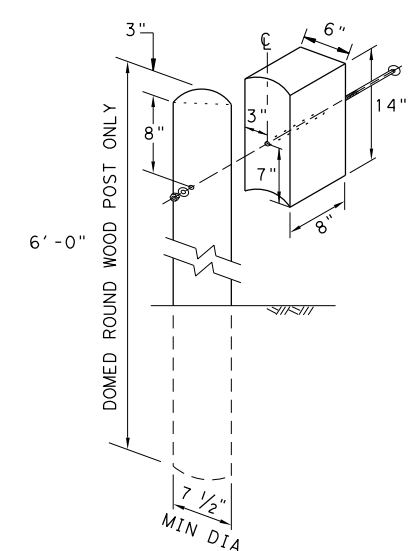
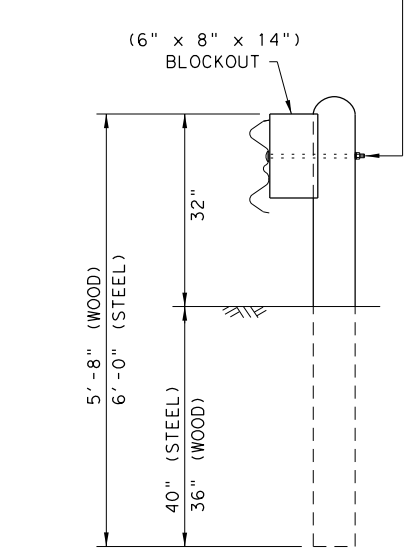
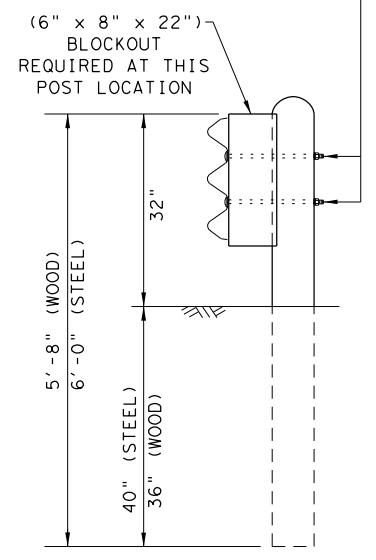
- (2) 5/8" BUTTON HEAD POST BOLTS & NUTS: (FBB04)
- (1) 5/8" FLAT WASHER: (FWC140) UNDER EACH NUT

- (1) 5/8" BUTTON HEAD POST BOLT & NUT: (FBB04)
- (1) 5/8" FLAT WASHER: (FWC140) UNDER EACH NUT

PLATE WASHER INSTRUCTIONS

- (12) 5/8" X 1 1/4" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB01)
- (12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
 BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

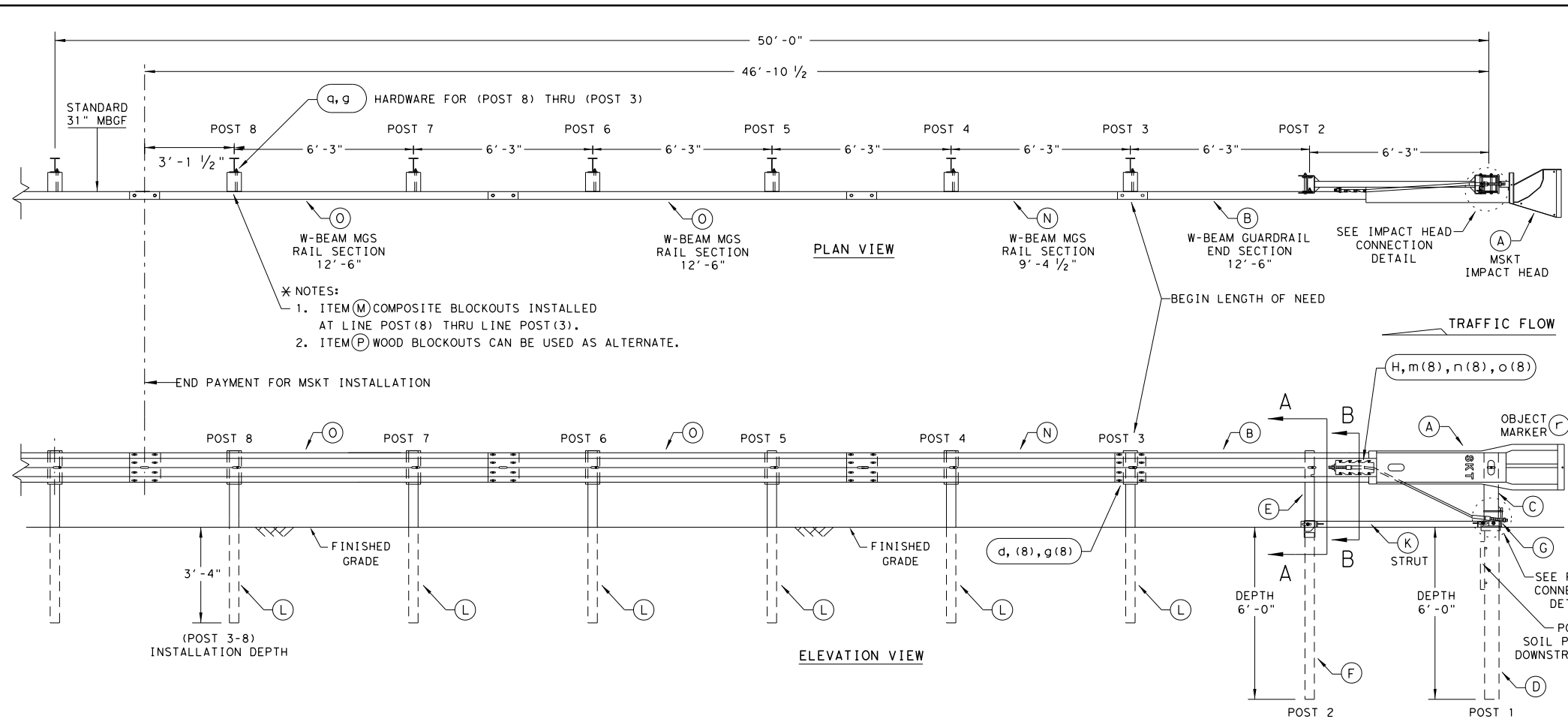
NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

LOW-SPEED TRANSITION

				<i>Design Division Standard</i>
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT GF(31)TR TL2-19				
FILE: gf31tr+1219.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	32	

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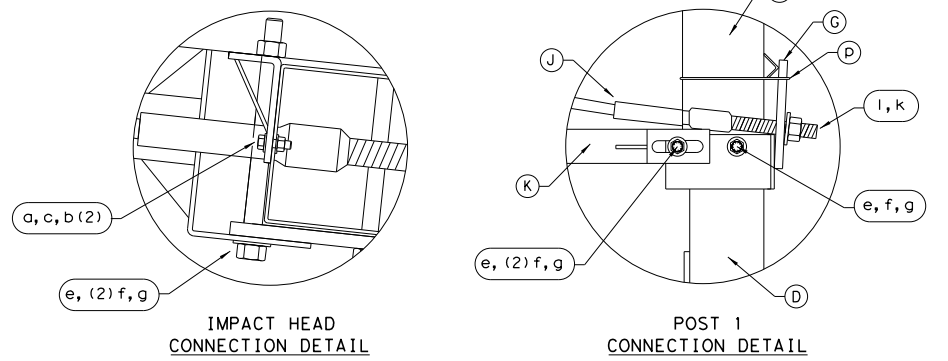
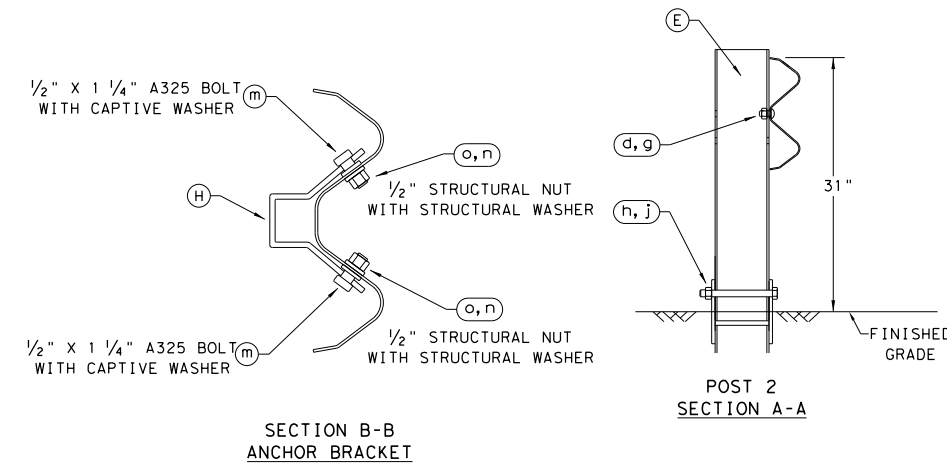
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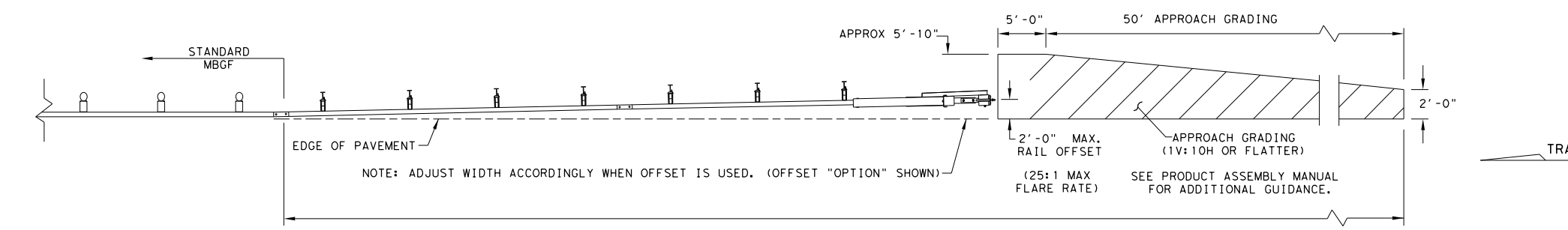
- NOTES:
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
 - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

- GENERAL NOTES
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
 - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
 - A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
 - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRANCHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
 - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN ITS PLACE.
 - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



ALTERNATIVE ITEMS NOT SHOWN. * *
 * ITEM (P) 8" WOOD-BLOCKOUT
 * * ITEM (Q) 25' GUARD FENCE PANEL



NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation
 Design Division Standard

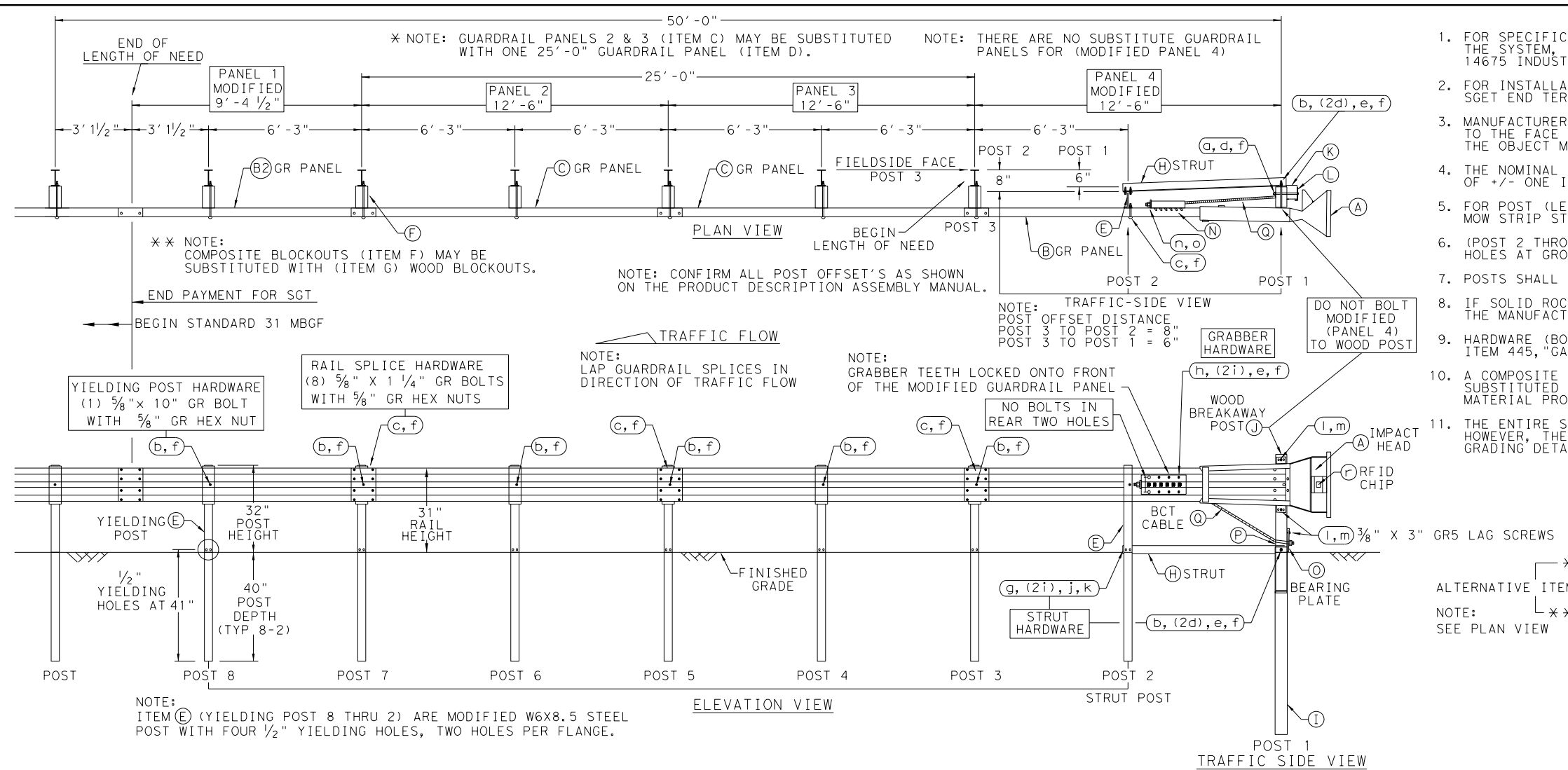
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT (12S) 31-18

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© TXDOT: APRIL 2018	CONT SECT	JOB	HIGHWAY	
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	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	33	

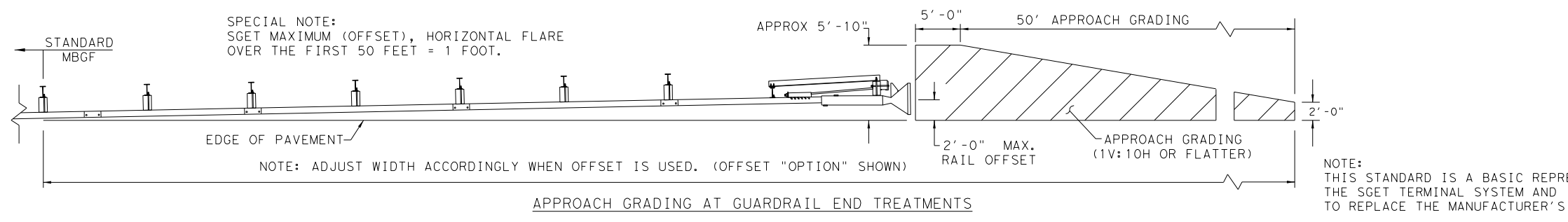
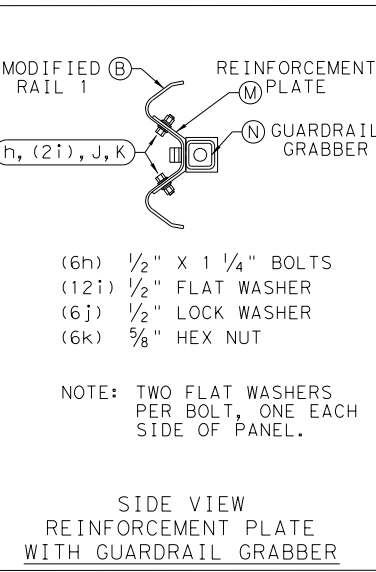
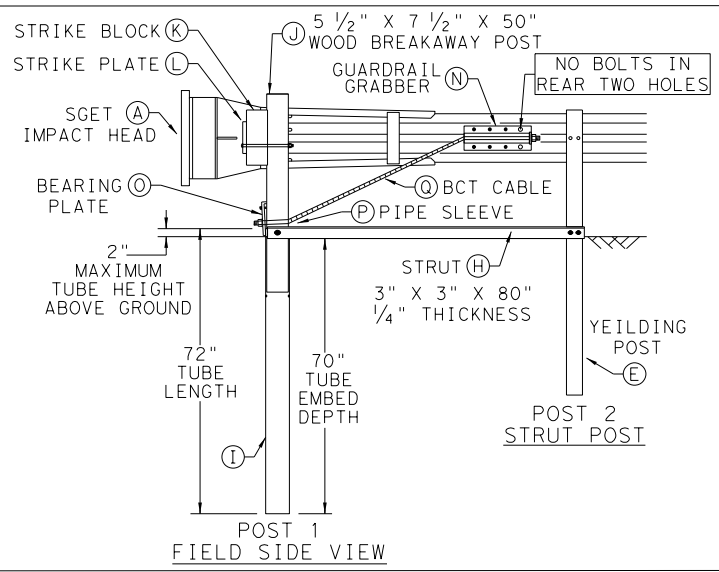
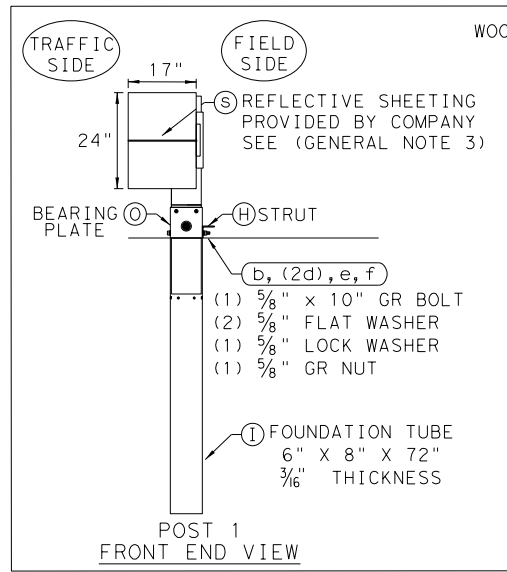
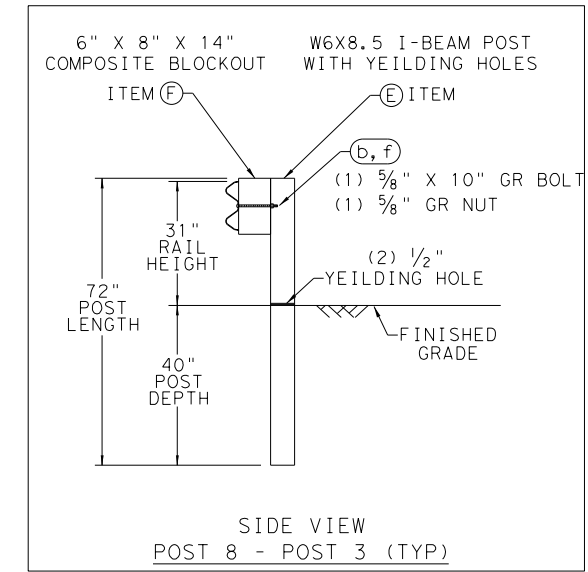
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 DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
 - MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81

SMALL HARDWARE			
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M



Texas Department of Transportation

Design Division Standard

SPIG INDUSTRY, LLC

SINGLE GUARDRAIL TERMINAL

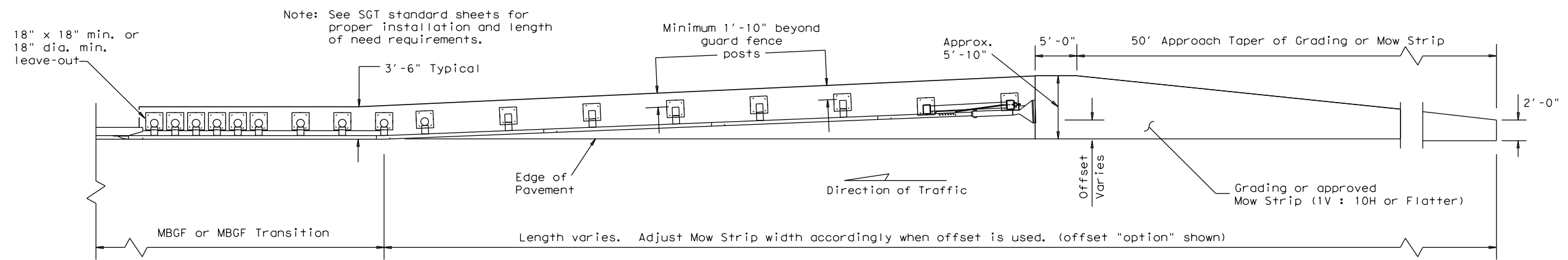
SGET - TL-3 - MASH

SGT (15) 31-20

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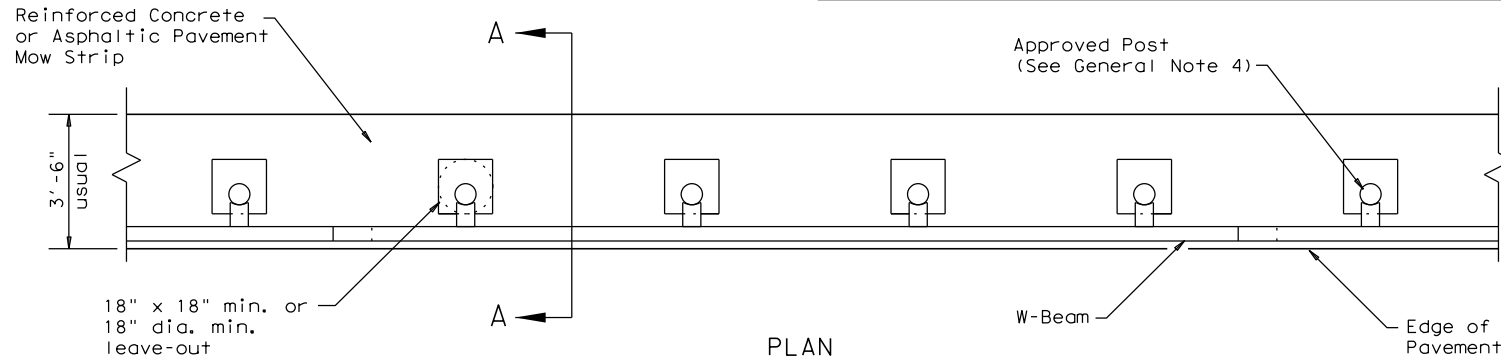
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DATE: 2/24/2023
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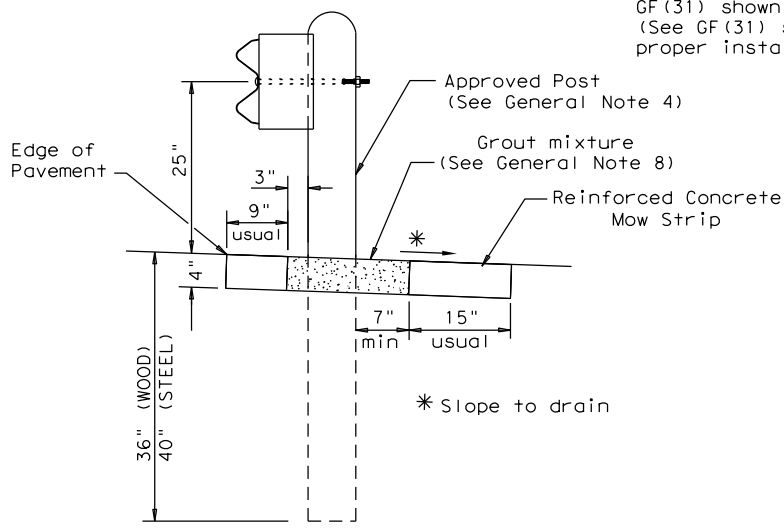
GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)
 Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.
 Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.



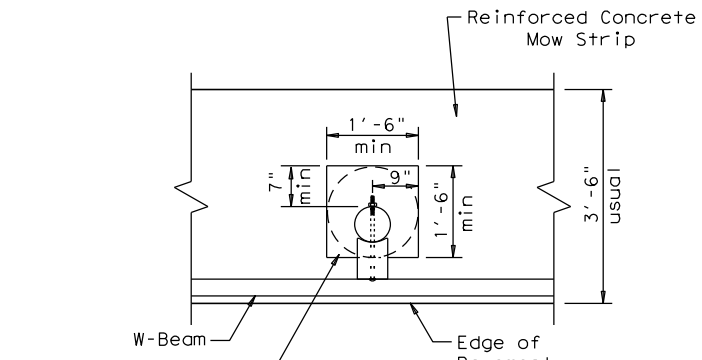
PLAN

GF(31) shown with Mow Strip
 (See GF(31) standard sheet for proper installation)



SECTION A-A

Typical

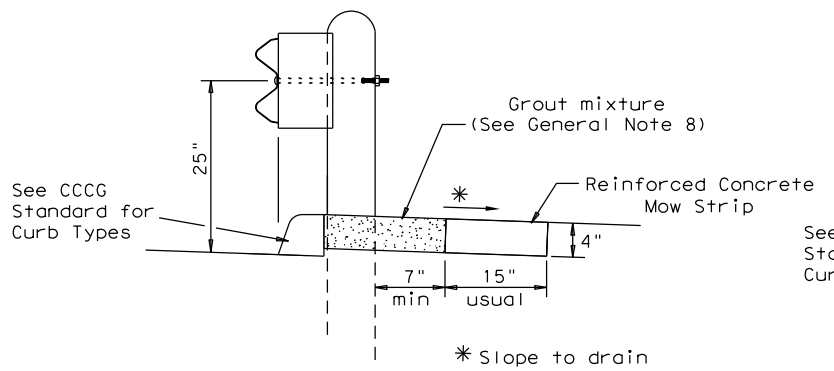


MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

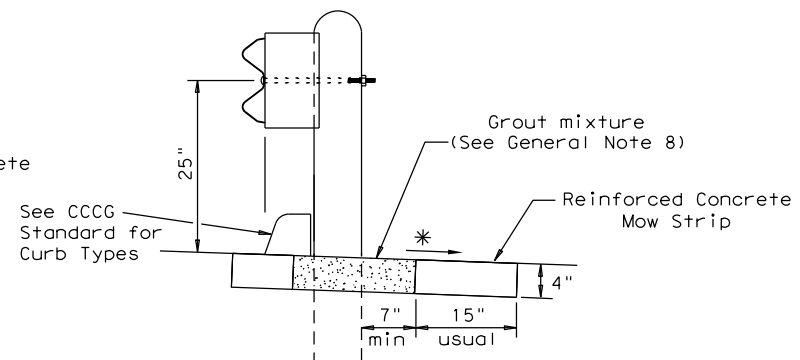
Fill leave-out with Grout mixture (See General Note 8)

- GENERAL NOTES**
- This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
 - Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
 - The leave-out behind the post shall be a minimum of 7".
 - Only steel (W6 x 8.5 or W6 x 9.0), or 7 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
 - Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
 - Thickness of the mow strip will be 4".
 - The limits of payment for reinforced concrete will include leave-outs for the posts.
 - The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



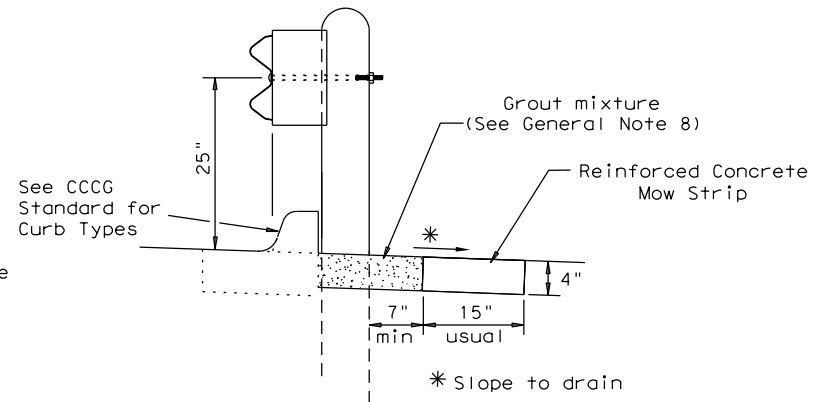
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

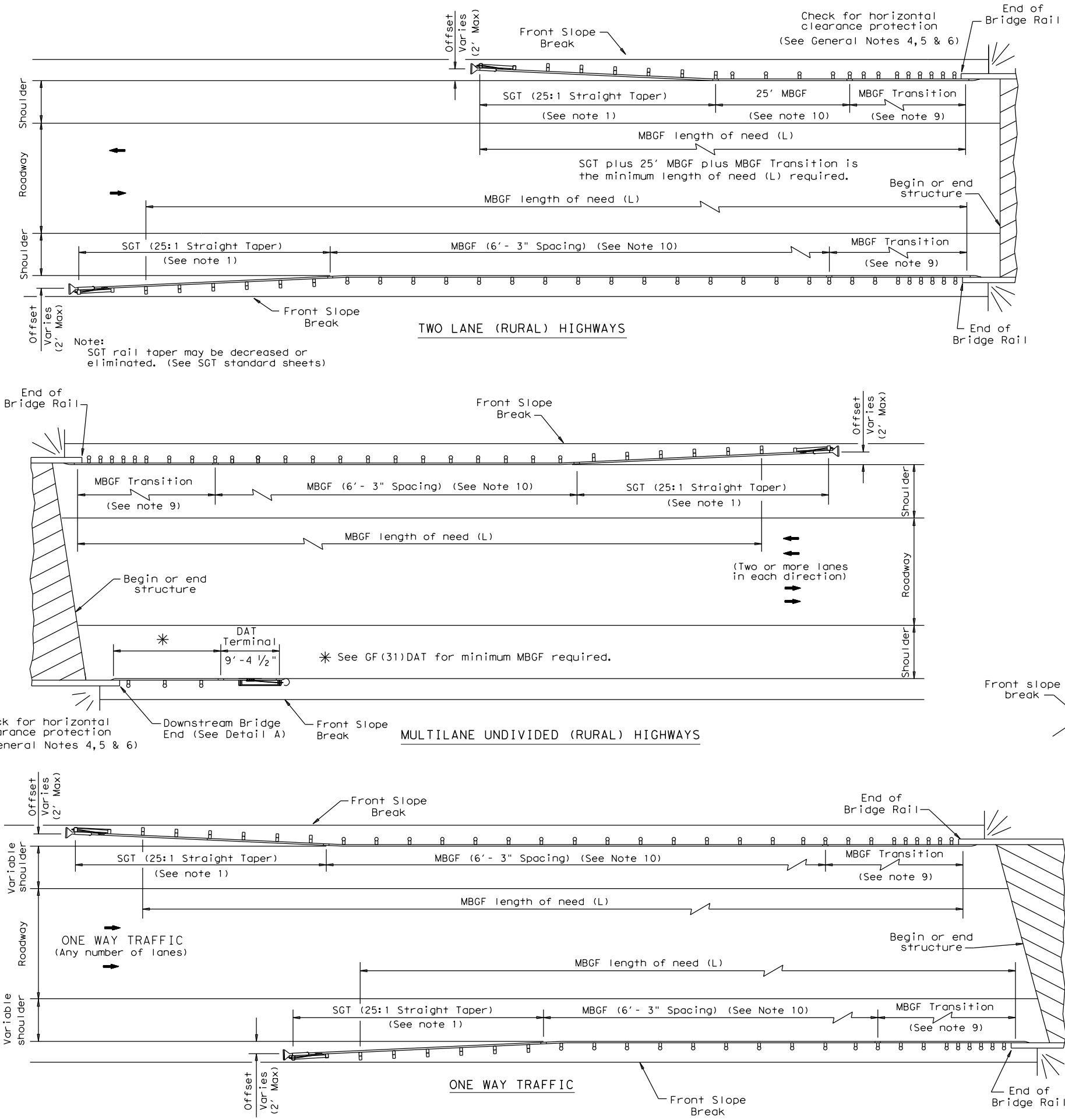


METAL BEAM GUARD FENCE (MOW STRIP)
TL-3 MASH COMPLIANT
GF(31)MS-19

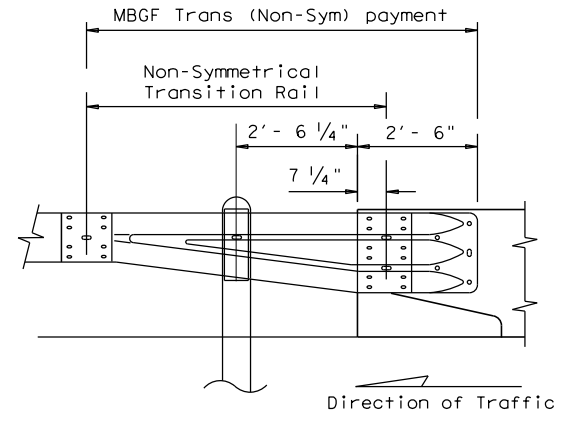
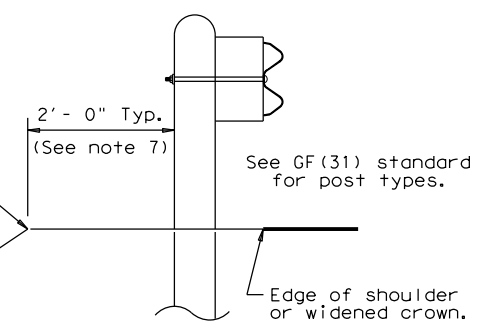
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DATE: 2/24/2023 3:31:45 PM
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- ### GENERAL NOTES
- For more detail: See GF(31), SGT()31, GF(31)TR, and GF(31)TL2 standard sheets.
 - Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
 - Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
 - MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
 - Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
 - Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
 - The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
 - For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge locations shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
 - Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
 - A minimum 25' length of MBGF will be required.



Texas Department of Transportation Design Division Standard

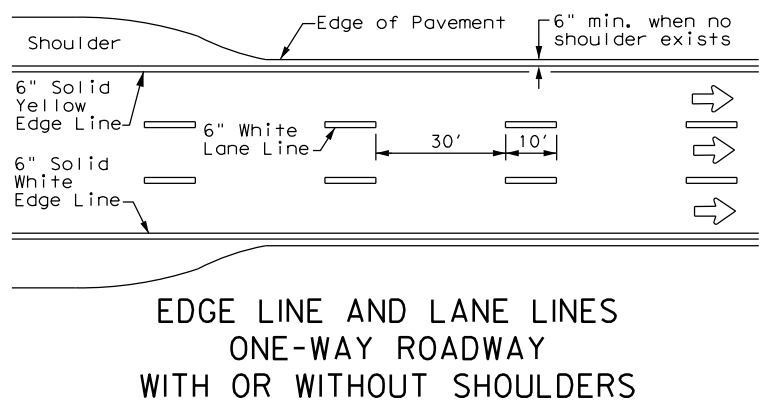
BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

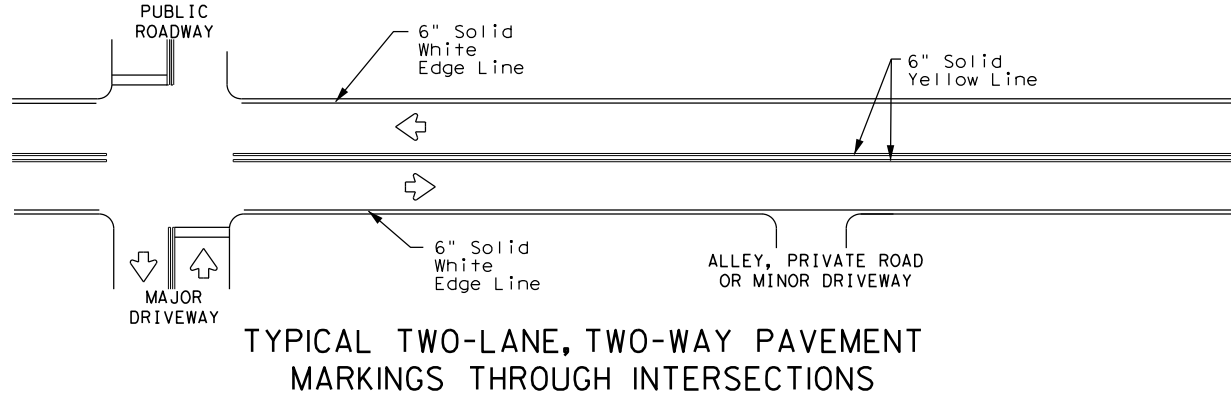
BED-14

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REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY	SHEET NO.	
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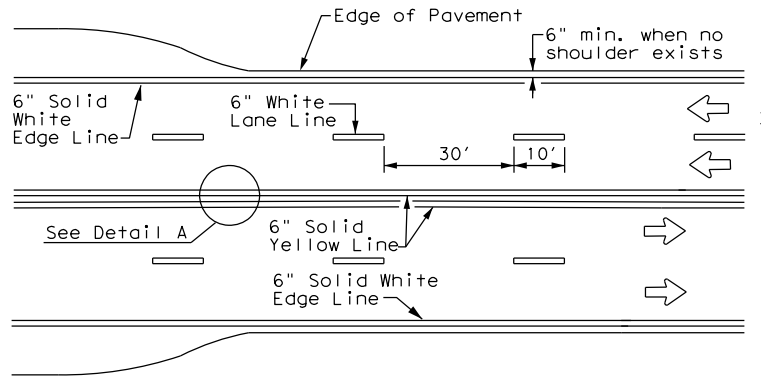
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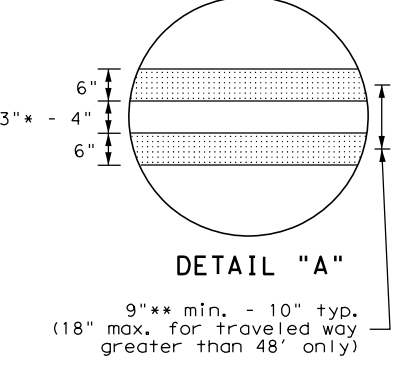
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**

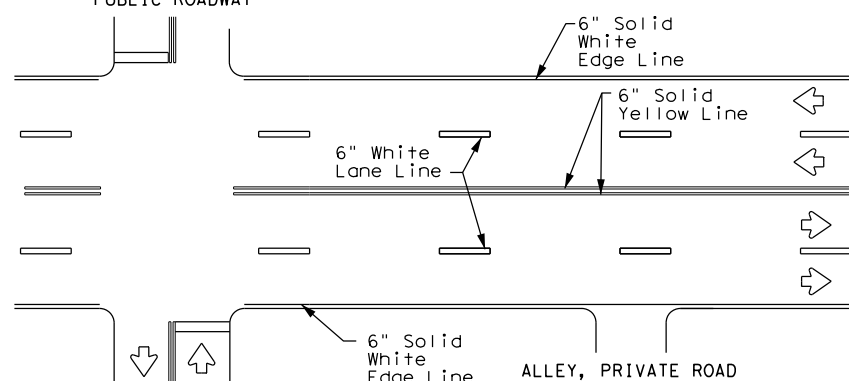


**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

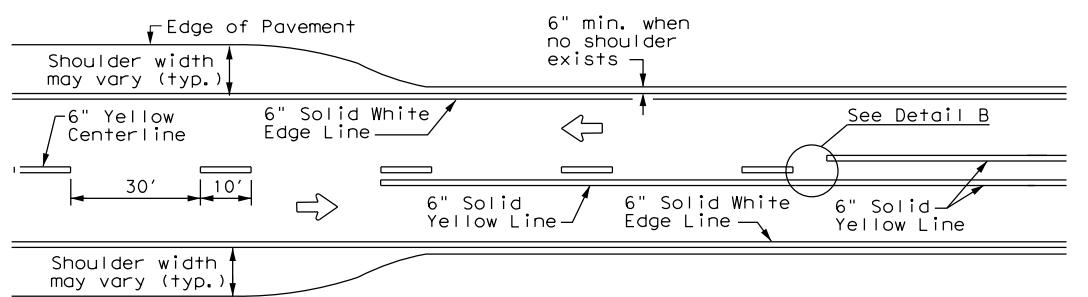


DETAIL "A"
 9" ** min. - 10" typ.
 (18" max. for traveled way greater than 48' only)

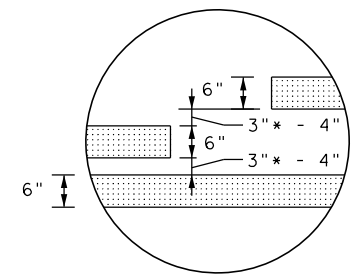
* 2" minimum for restripe projects when approved by the Engineer.
 ** 8" minimum for restripe projects when approved by the Engineer.



**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**

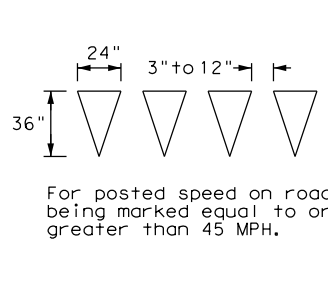


**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

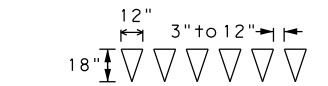


DETAIL "B"
 18" min. - 20" max.
 (16" minimum for restripe projects when approved by the Engineer.)

* 2" minimum for restripe projects when approved by the Engineer.



YIELD LINES



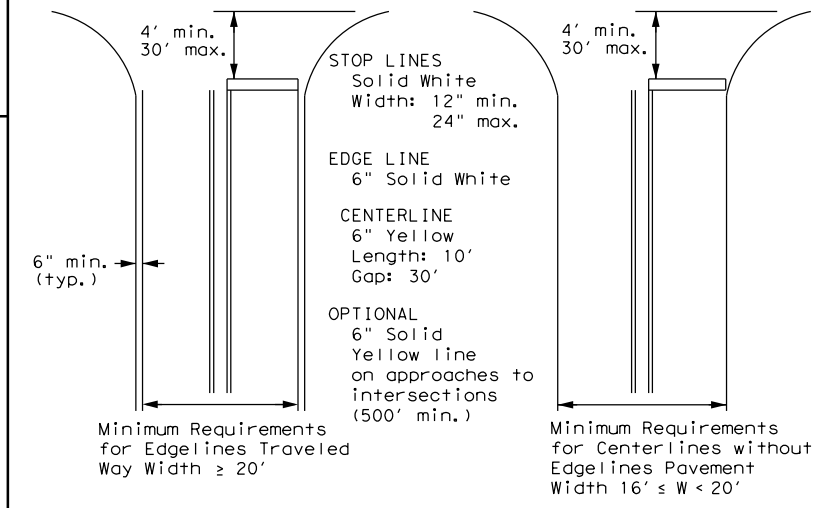
For posted speed on road being marked equal to or less than 40 MPH.

GENERAL NOTES

- Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

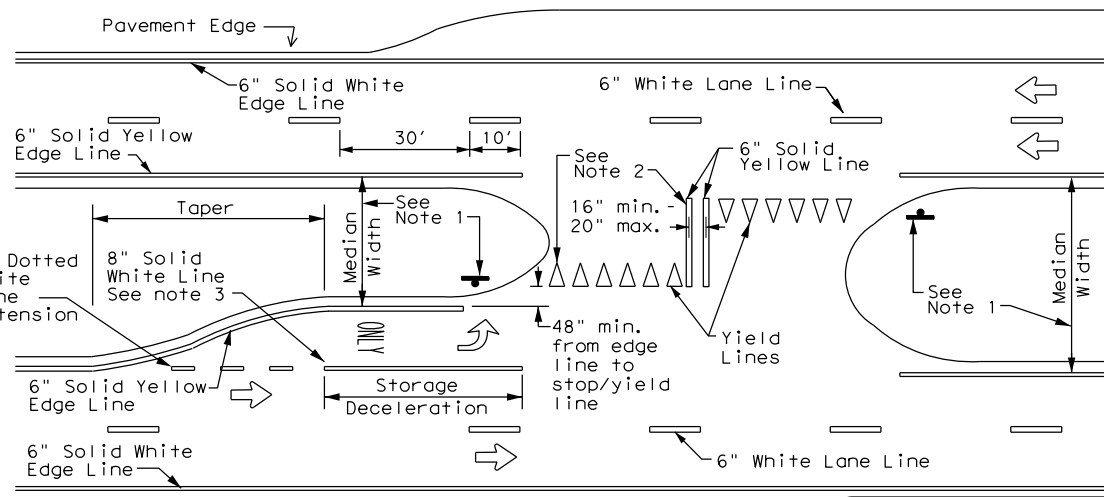


NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**
 Based on Traveled Way and Pavement Widths for Undivided Roadways

NOTES

- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.



FOUR LANE DIVIDED ROADWAY CROSSOVERS



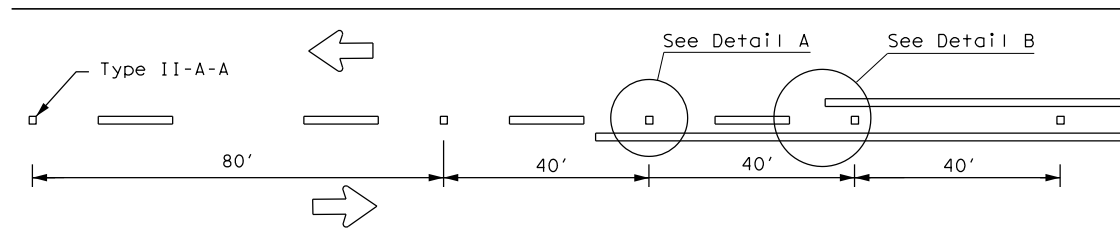
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 22

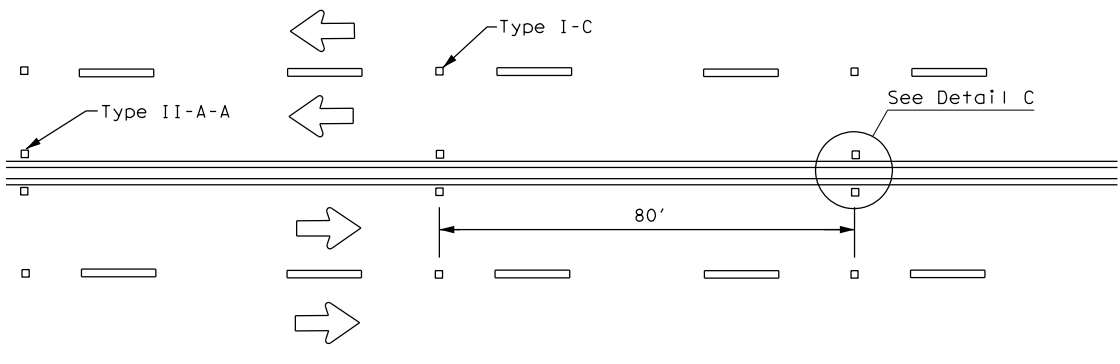
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11-78 8-00 6-20	DIST	COUNTY	SHEET NO.	
8-95 3-03 12-22	SAT	MEDINA	37	
5-00 2-12				

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

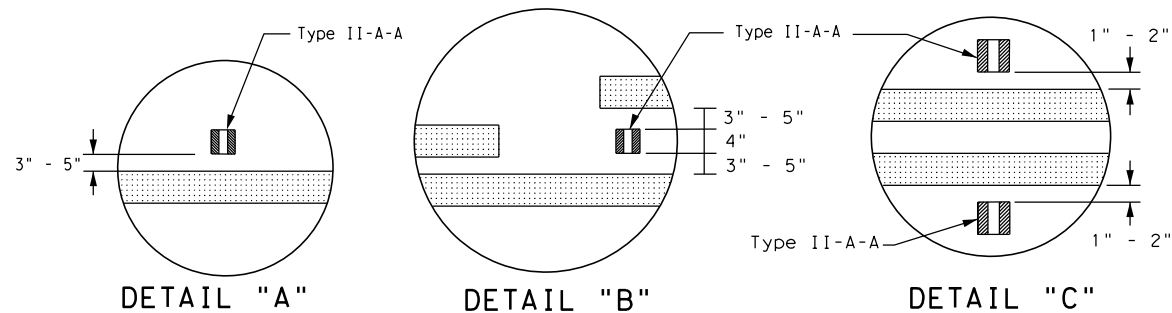
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CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



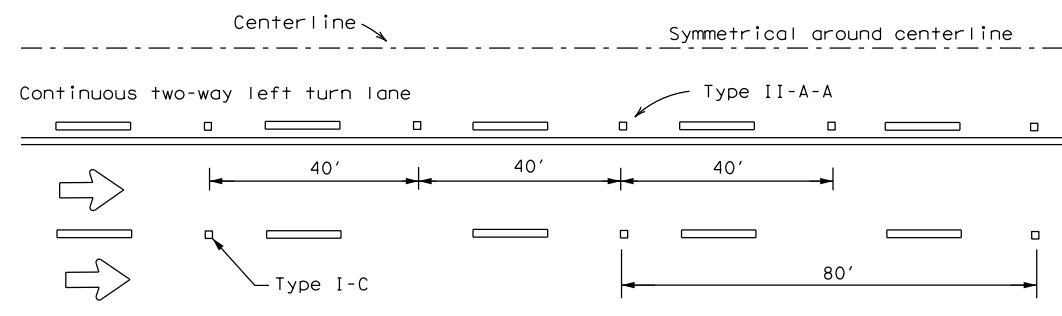
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS



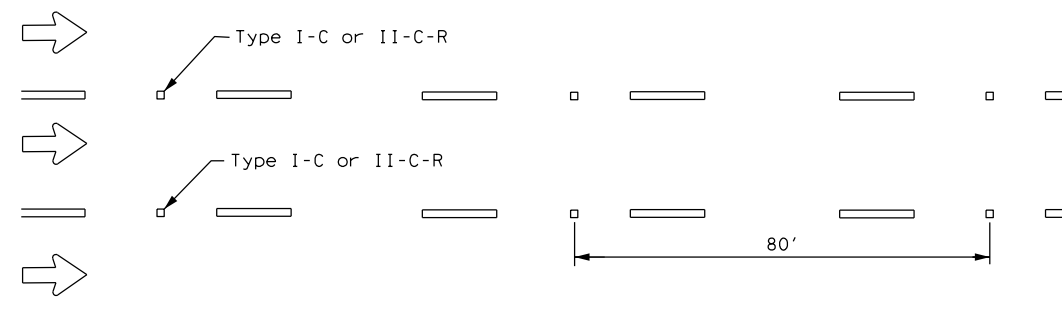
DETAIL "A"

DETAIL "B"

DETAIL "C"

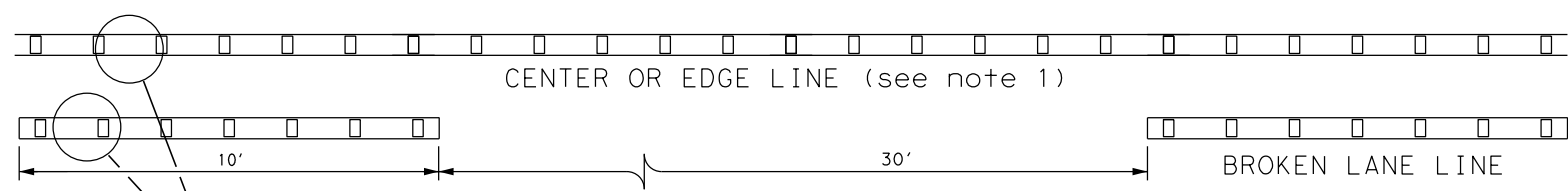


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



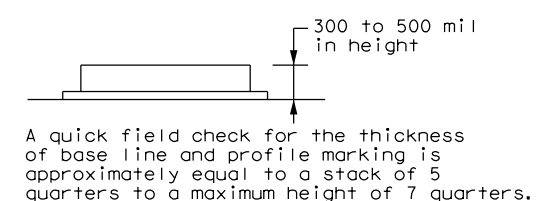
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
 See Note 3.



REFLECTORIZED PROFILE
PATTERN DETAIL
USING REFLECTIVE PROFILE PAVEMENT MARKINGS

6" EDGE LINE, 6" CENTERLINE
OR 6" LANE LINE



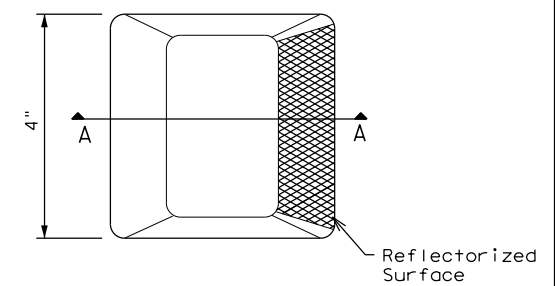
- NOTES**
- Edge lines should typically be 6" wide and the materials shall be specified in the plans.
 - Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

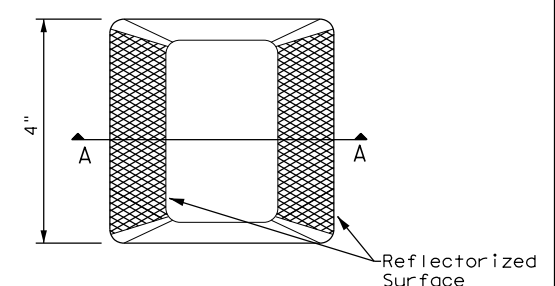
- All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
- Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

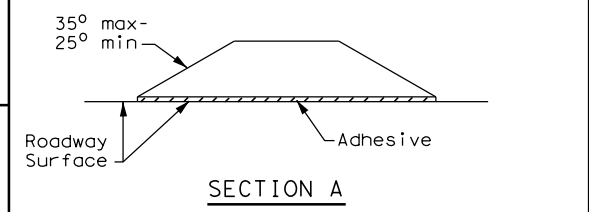
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



RAISED PAVEMENT MARKERS



POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
	0915	45	056	CR 2615
REVISIONS	DIST	COUNTY	SHEET NO.	
4-77 8-00 6-20	SAT	MEDINA	38	
4-92 2-10 12-22				
5-00 2-12				

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

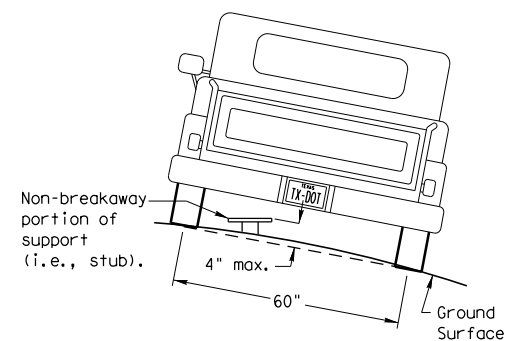
SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

Post Type _____
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2) _____
 Anchor Type _____
 UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD(TWT))
 WP = Wedge Anchor Plastic (see SMD(TWT))
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

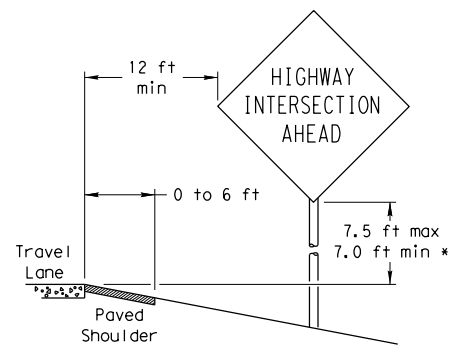
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

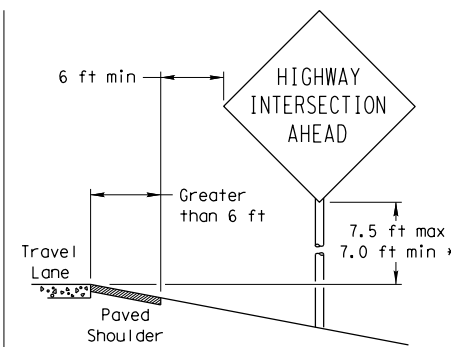
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

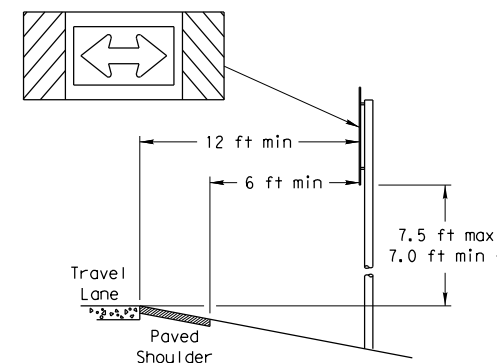
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

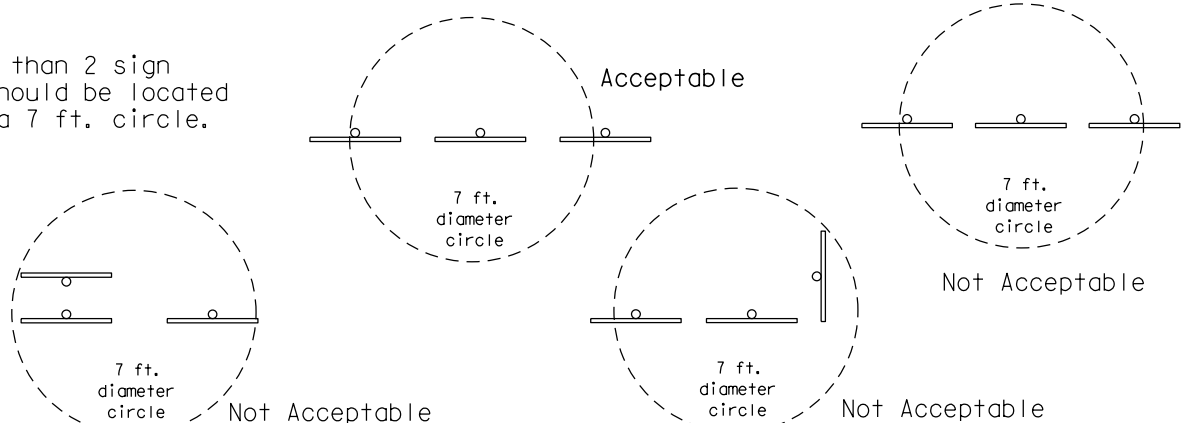
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

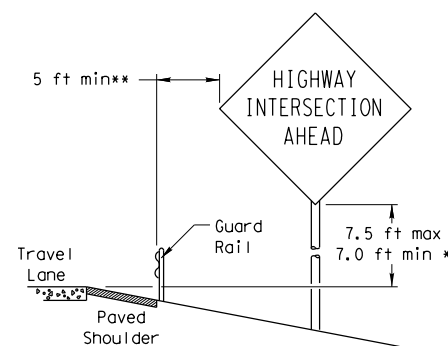


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

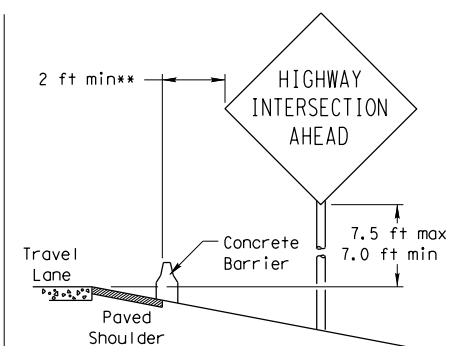
No more than 2 sign posts should be located within a 7 ft. circle.



BEHIND BARRIER

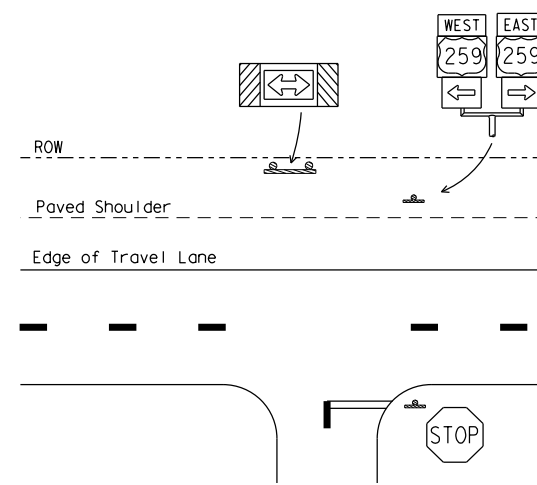


BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

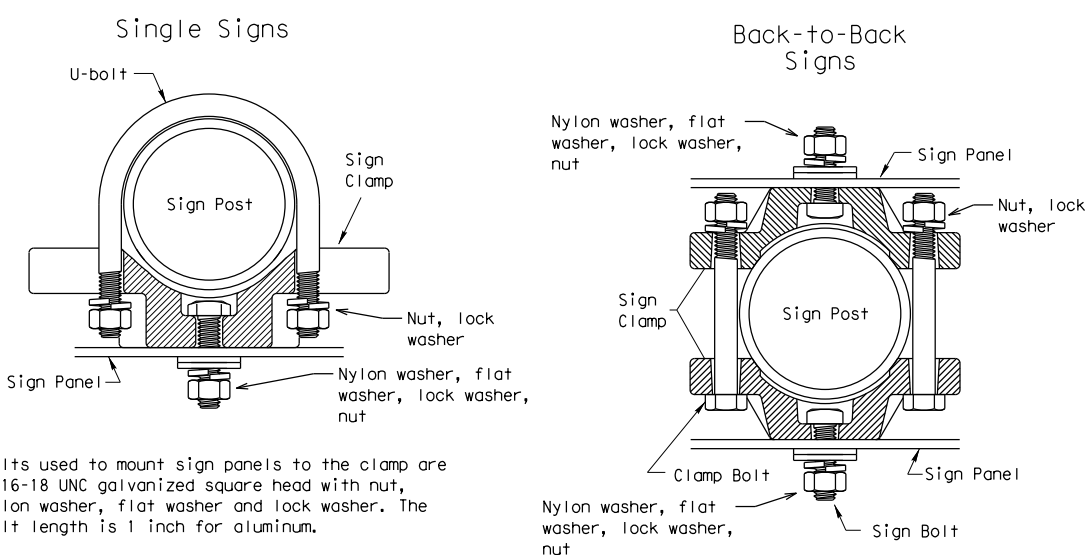
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



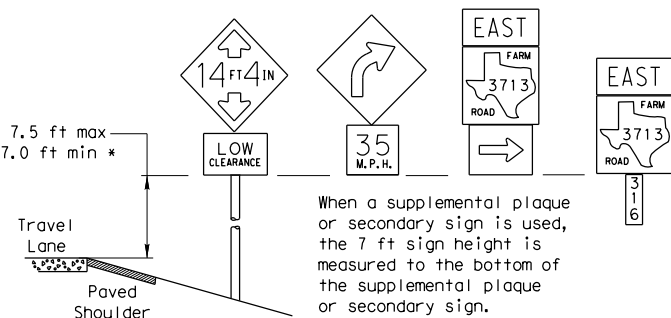
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

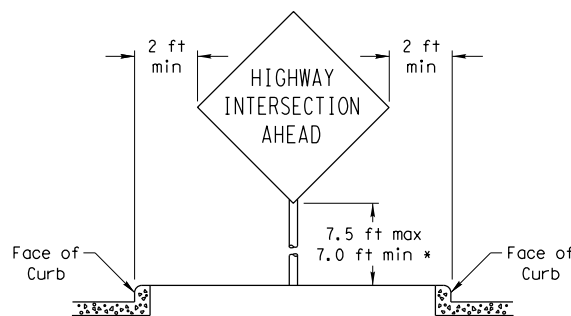
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

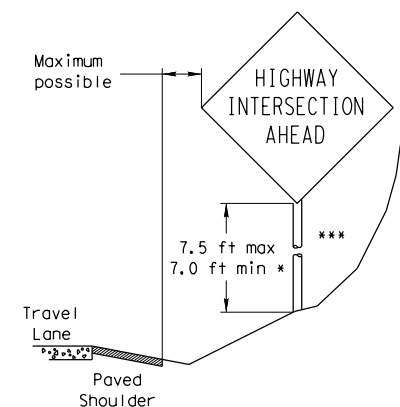


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN)-08

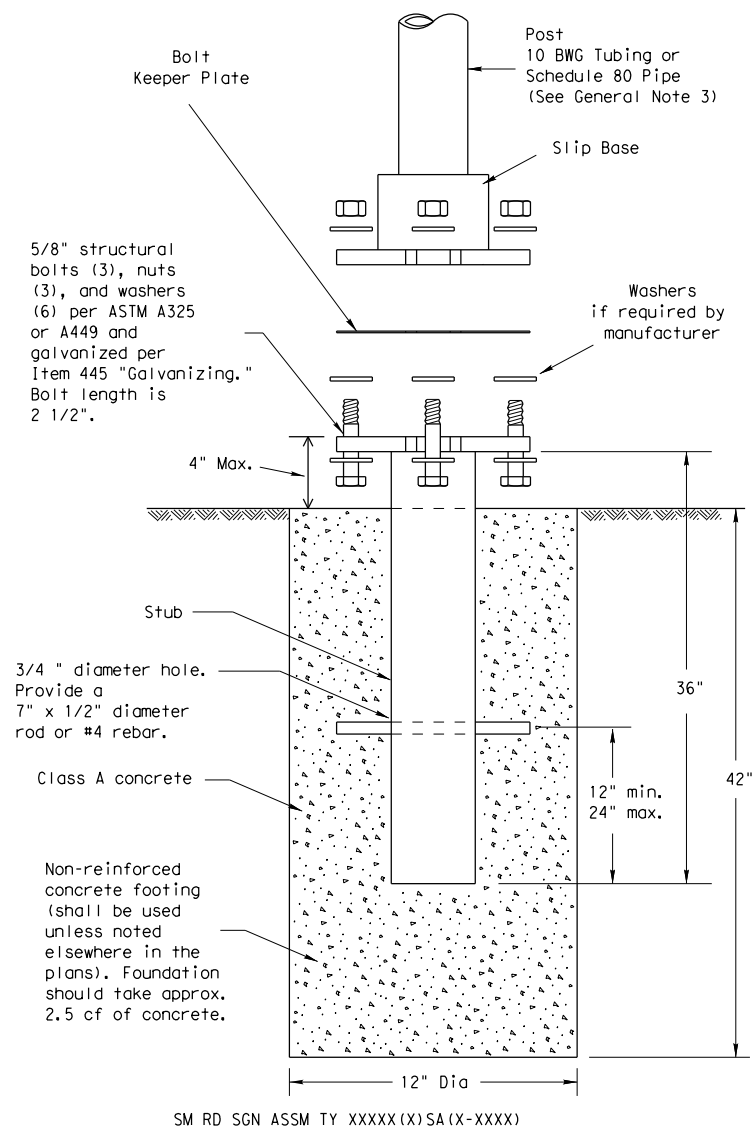
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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
 - 10 BWG Tubing (2.875" outside diameter)
 - 0.134" nominal wall thickness
 - Seamless or electric-resistance welded steel tubing or pipe
 - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
 - Other steels may be used if they meet the following:
 - 55,000 PSI minimum yield strength
 - 70,000 PSI minimum tensile strength
 - 20% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
 - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
 - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
 - Schedule 80 Pipe (2.875" outside diameter)
 - 0.276" nominal wall thickness
 - Steel tubing per ASTM A500 Gr C
 - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
 - 46,000 PSI minimum yield strength
 - 62,000 PSI minimum tensile strength
 - 21% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
 - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
 - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

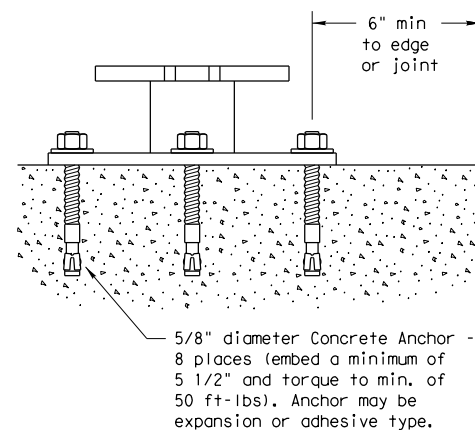
Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
 Traffic Operations Division

SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM

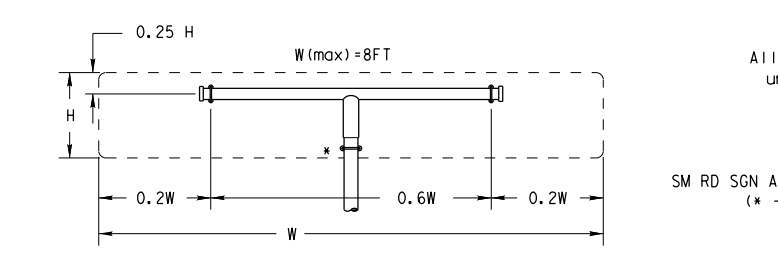
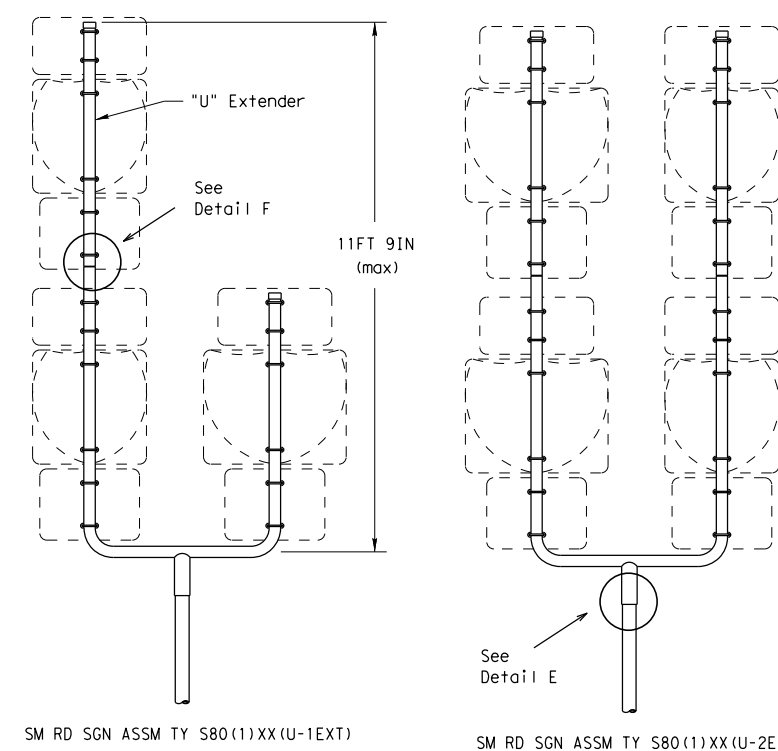
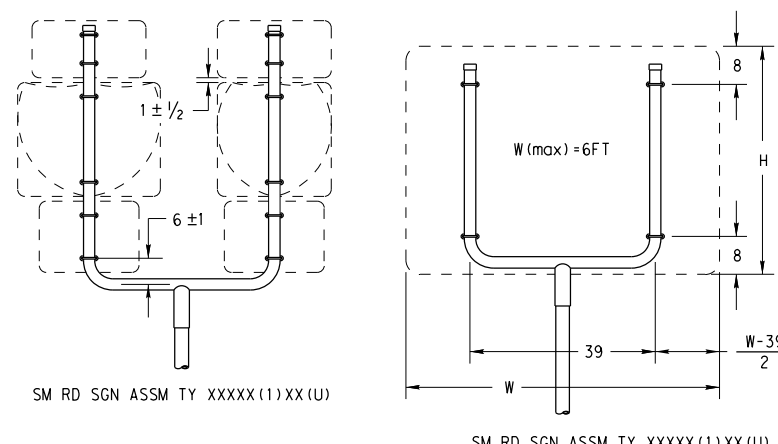
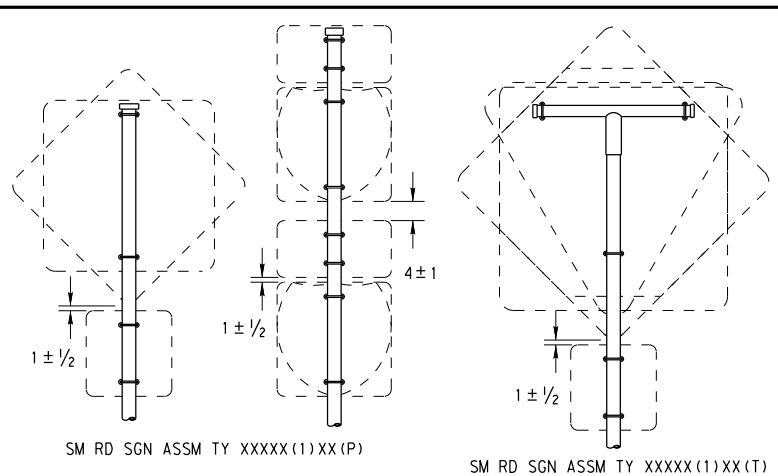
SMD(SLIP-1)-08

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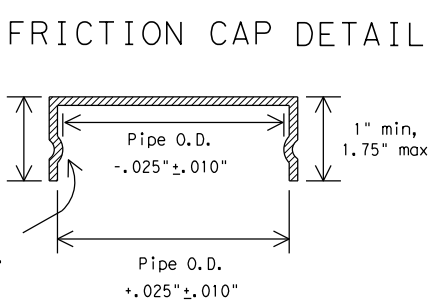
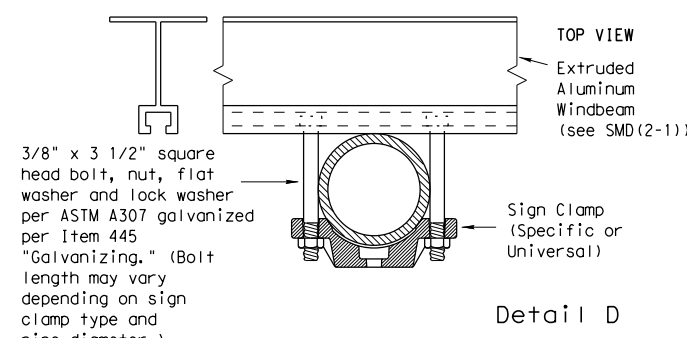
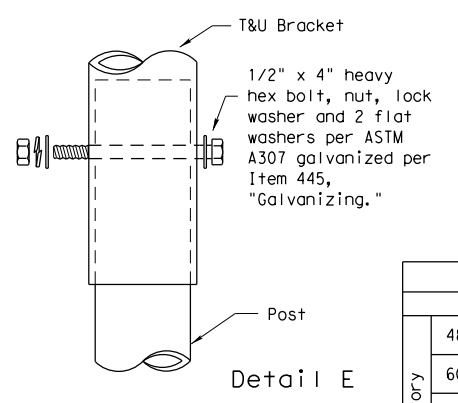
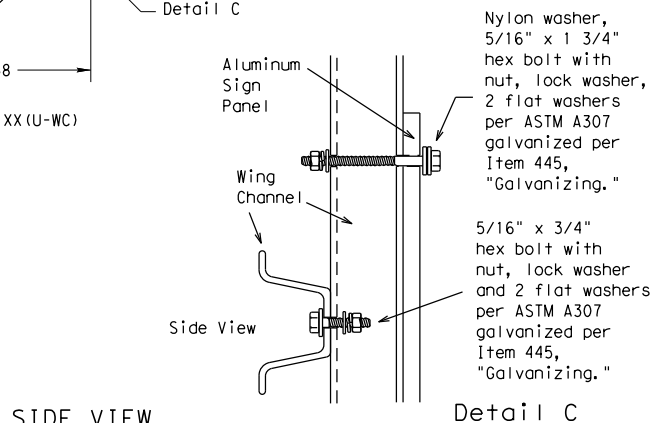
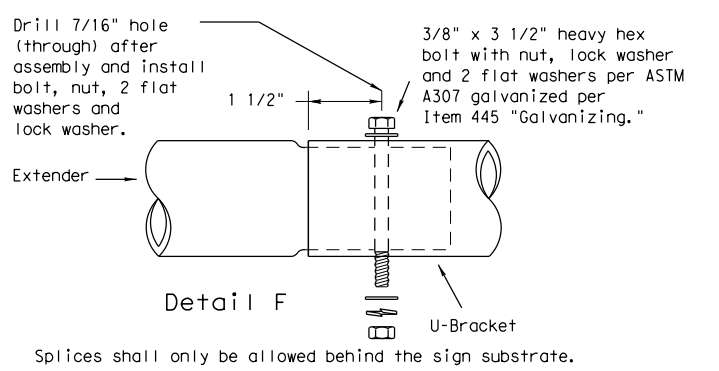
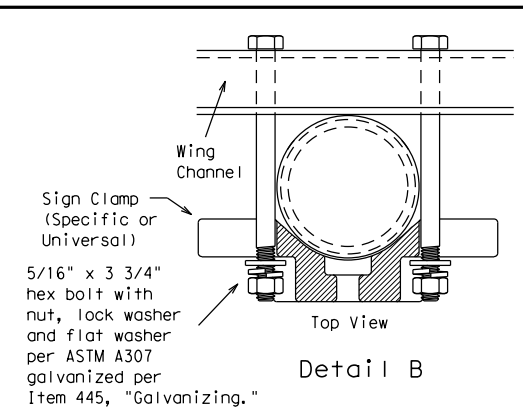
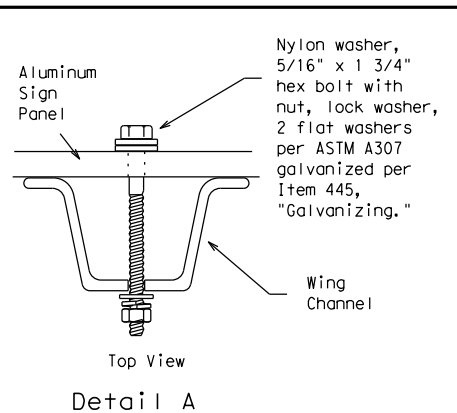
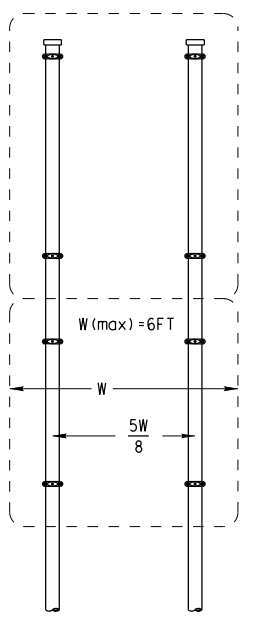
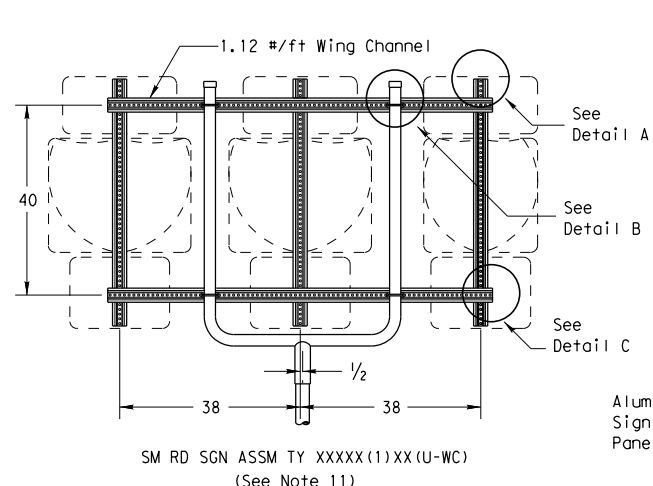
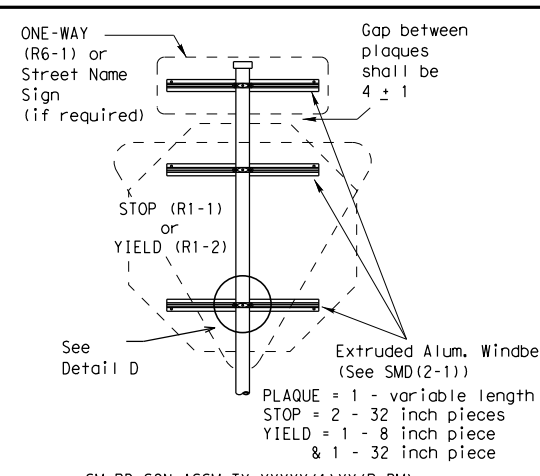
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All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T) (* - See Note 12)



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Warning	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)	
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	

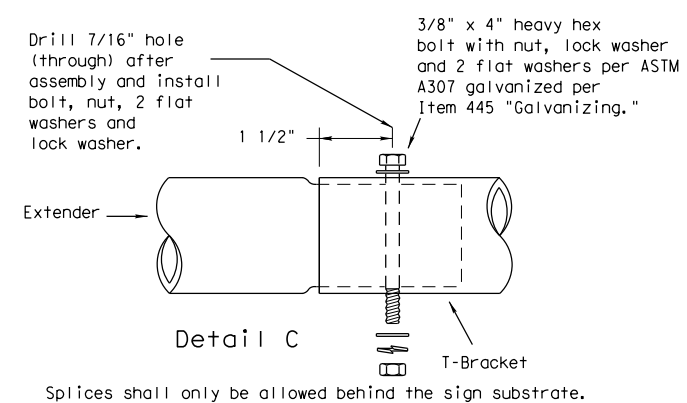
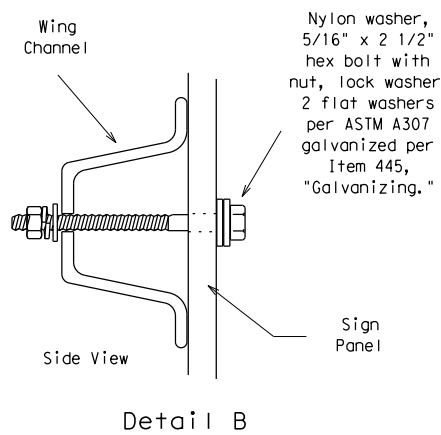
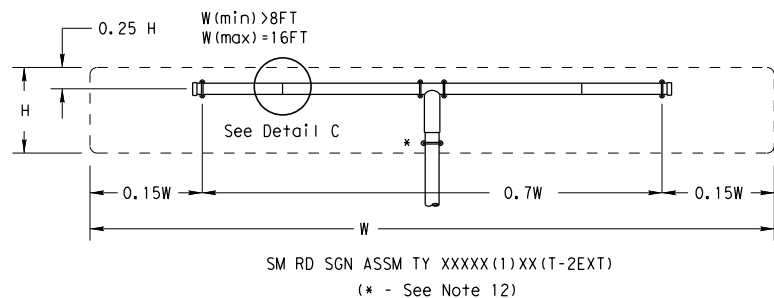


SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08

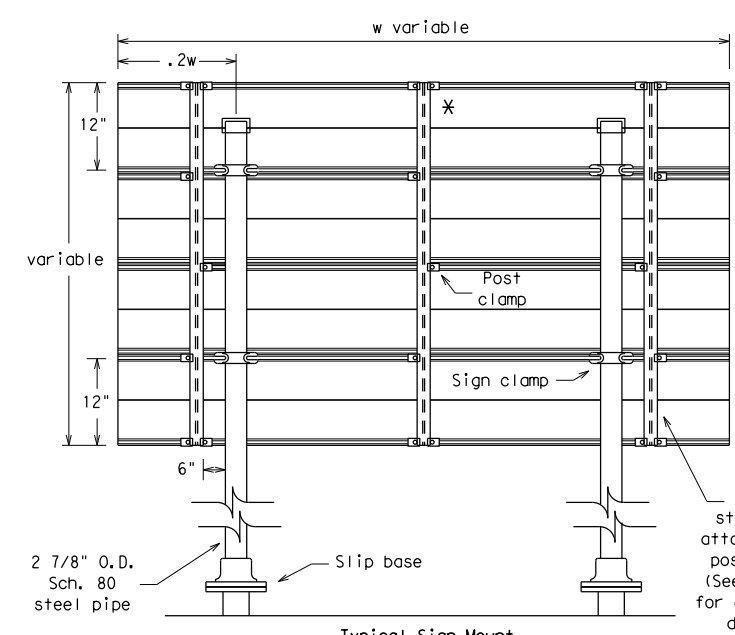
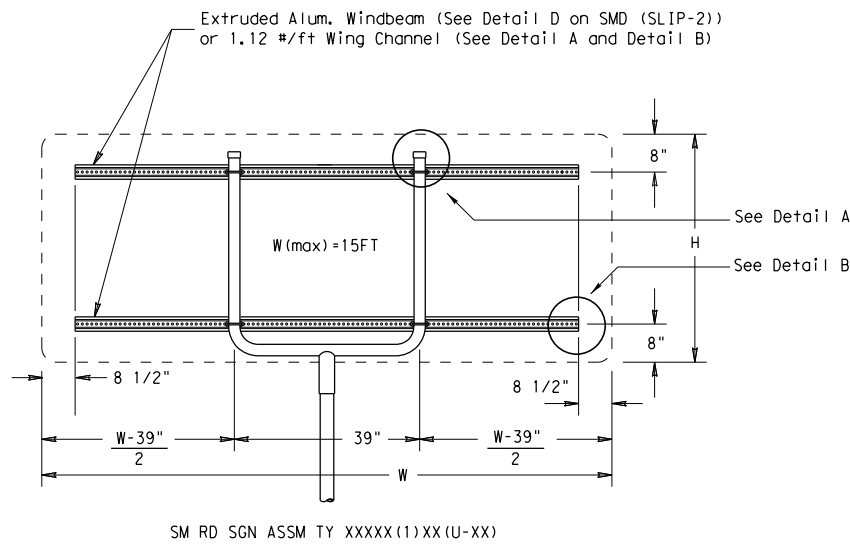
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		DIST	COUNTY	SHEET NO.
		SAT	MEDINA	41

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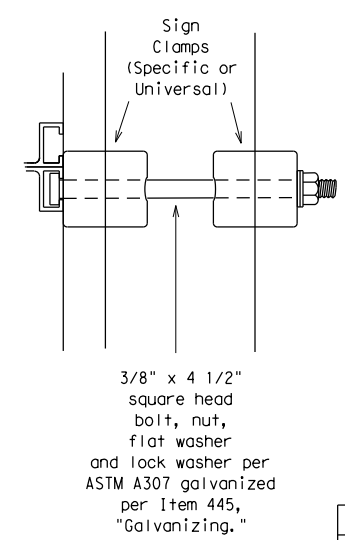
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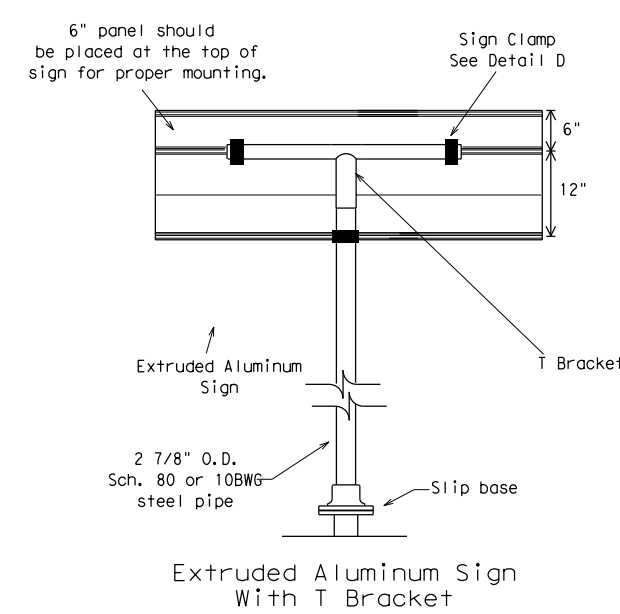
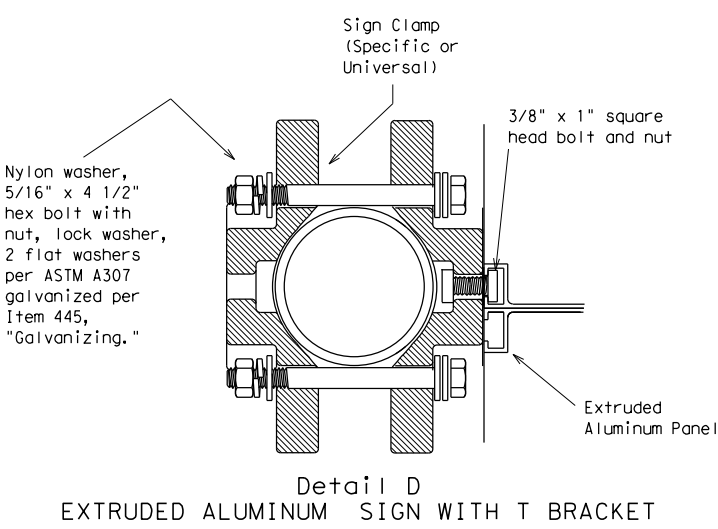
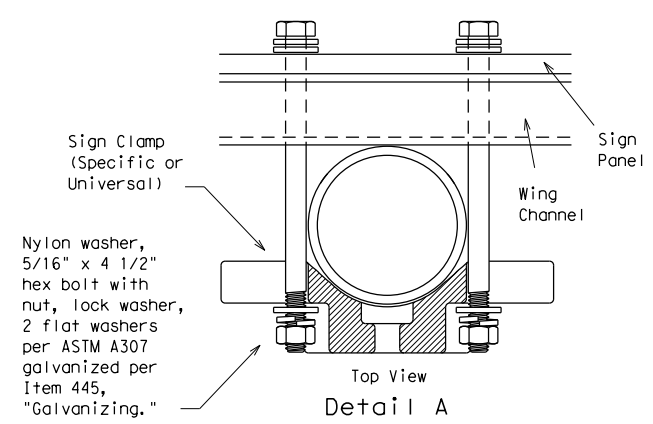
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount
 SM RD SGN ASSM TY S80(2)XX(IP-EXAL)
 * Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Detail E



Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details
 See Detail E for clamp installation

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-3) -08

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9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0915	45	056	CR 2615
		DIST	COUNTY		SHEET NO.
		SAT	MEDINA		42

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS					DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	SINGLE		DOUBLE		INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX) NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount	
	SHEETING Yellow, White or Red Type B or C reflective sheeting					1-Size 2 reflector unit		2-Size 2 reflector units		
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				SHEETING Yellow, White or Red Type B or C Reflective Sheeting		POST TYPE WC YFLX, WFLX WC YFLX, WFLX		MOUNT TYPE GND GND, SRF GND GND, SRF	

OBJECT MARKERS										D & OM DESCRIPTIVE CODES		
DEVICE	Type 1 (OM-1)		Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)		INSTL OM ASSM (OM-XX) (XXXX)XXX(XX) TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional	
	OM-1		OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4			
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting		Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			Red -Type B _{FL} or C _{FL} Sheeting		DEPARTMENTAL MATERIAL SPECIFICATIONS	
POST TYPE	TWT		WC	WC	WFLX	TWT			TWT		FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) DMS-4400	
MOUNT TYPE	WAS, WAP		GND	GND	GND, SRF	WAS, WAP			WAS, WAP		SIGN FACE MATERIALS DMS-8300	
										DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS DMS-8600		

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE:		
DEVICE	GF1	GF2	CTB	 W1-8				 W1-6		Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.	
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.			SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)		48" x 24" (Conventional)
SHEETING	Yellow, White, Red			MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).							

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

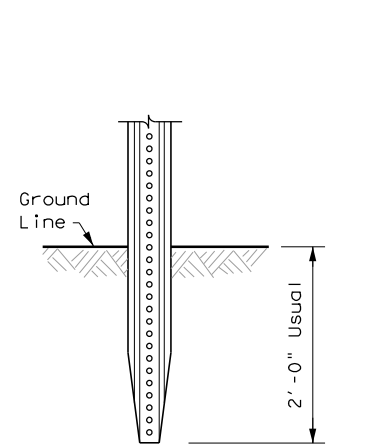
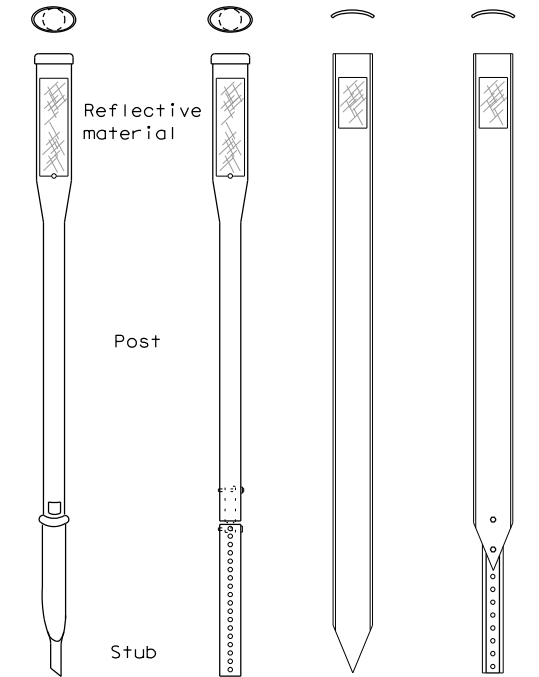
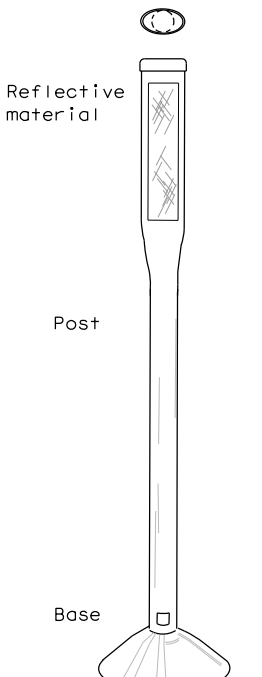
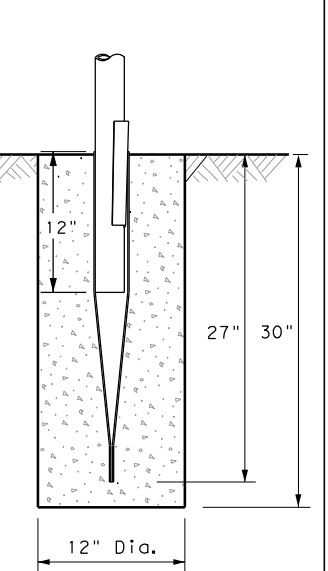
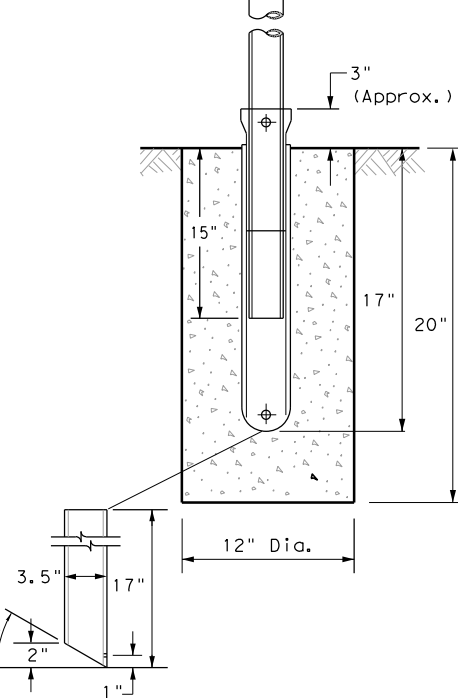
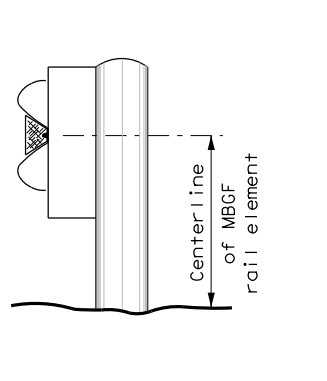
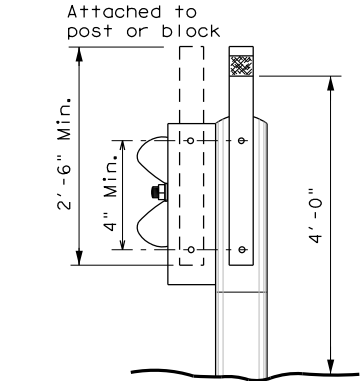
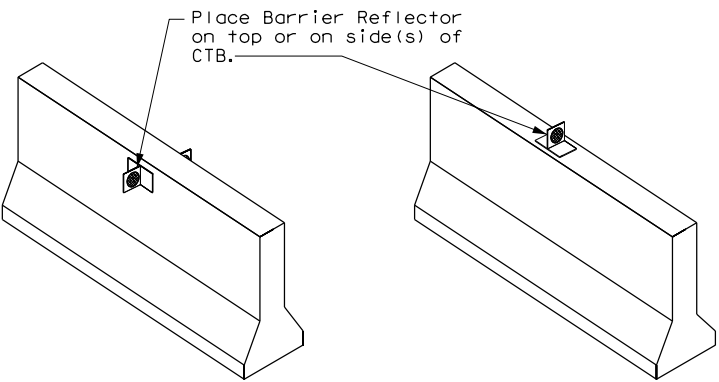
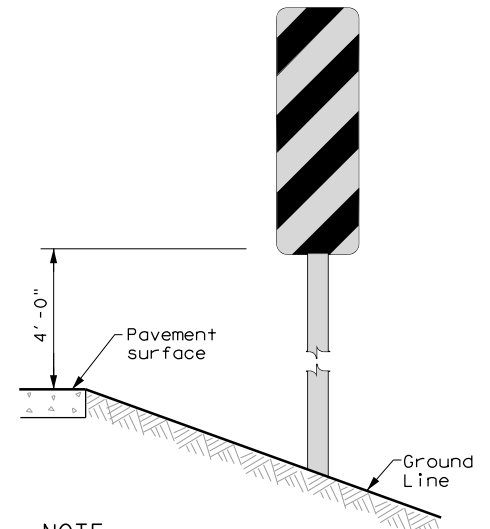
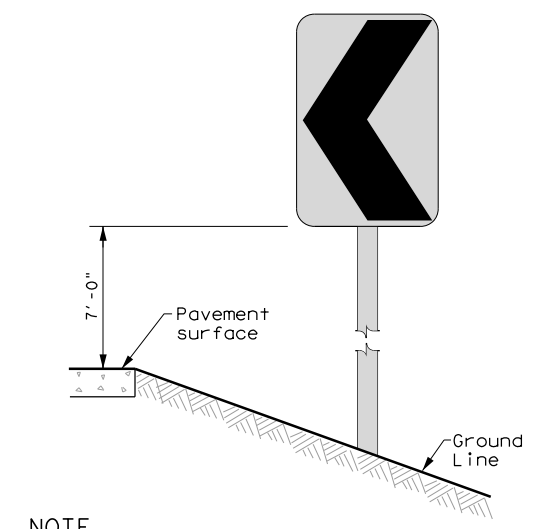
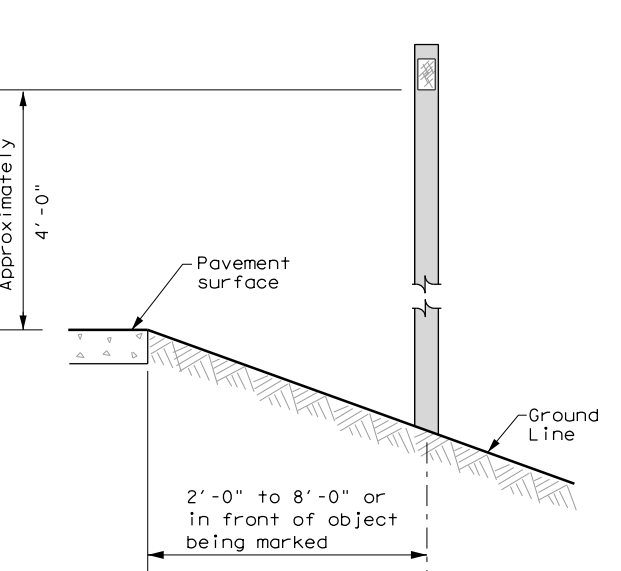

D & OM(1)-20

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© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	SAT	MEDINA	43	

20A

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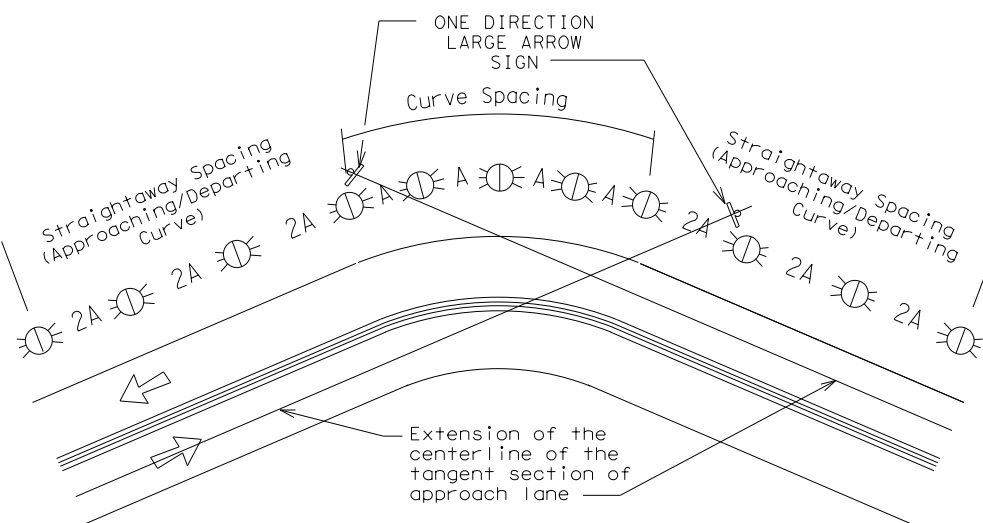
POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS					
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT				
GND	GND	SRF	WAS	WAP	GF 1				
									
	EMBEDDED	SURFACE MOUNT	STEEL	PLASTIC	CONCRETE TRAFFIC BARRIER (CTB)				
<p>NOTES</p> <ol style="list-style-type: none"> 1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only. 2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499. 			<p>NOTES</p> <ol style="list-style-type: none"> 1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices. 2. Install per manufacturer's recommendations. 3. Post length may vary to meet field conditions. 4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow. 			<p>NOTE</p> <ol style="list-style-type: none"> 1. Install per manufacturer's recommendations. 			
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS					
									
<p>NOTE</p> <p>Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)</p>		<p>NOTE</p> <p>Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.</p>		<p>See general notes 1, 2 and 3.</p>					
<p>GENERAL NOTES</p> <ol style="list-style-type: none"> 1. Place delineators on a section of roadway at a consistent distance from the edge of pavement. 2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction. 3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible. 4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation. 5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface. 6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane. 									
 <p style="text-align: right;">Texas Department of Transportation Traffic Safety Division Standard</p>									
<p>DELINEATOR & OBJECT MARKER INSTALLATION</p> <p>D & OM(2)-20</p>									
<p>FILE: dom2-20.dgn</p>		<p>DN: TxDOT</p>		<p>CK: TxDOT</p>					
<p>© TxDOT August 2004</p>		<p>CON: 0915</p>		<p>SECT: 45</p>					
<p>10-09 3-15</p>		<p>DIST: 056</p>		<p>JOB: CR 2615</p>					
<p>4-10 7-20</p>		<p>SAT</p>		<p>COUNTY: MEDINA</p>					
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	● RPMs	● RPMs
15 MPH & 20 MPH	● RPMs and One Direction Large Arrow sign	● RPMs and Chevrons; or ● RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	● RPMs and Chevrons; or ● RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	● RPMs and Chevrons

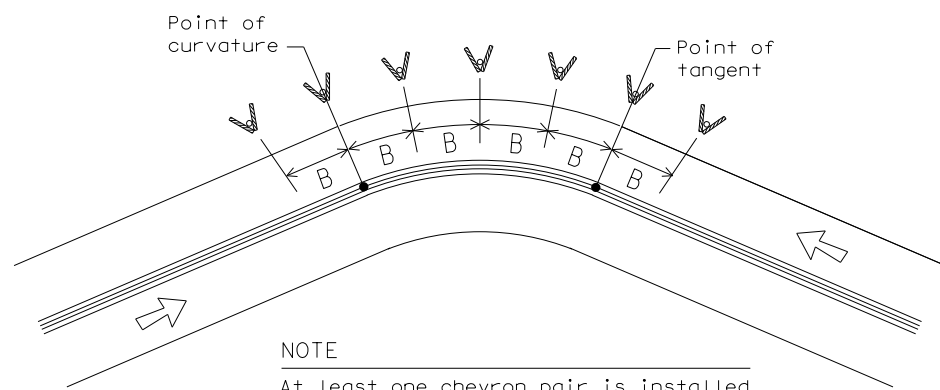
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN				
Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete) and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100' max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100' max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

- Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

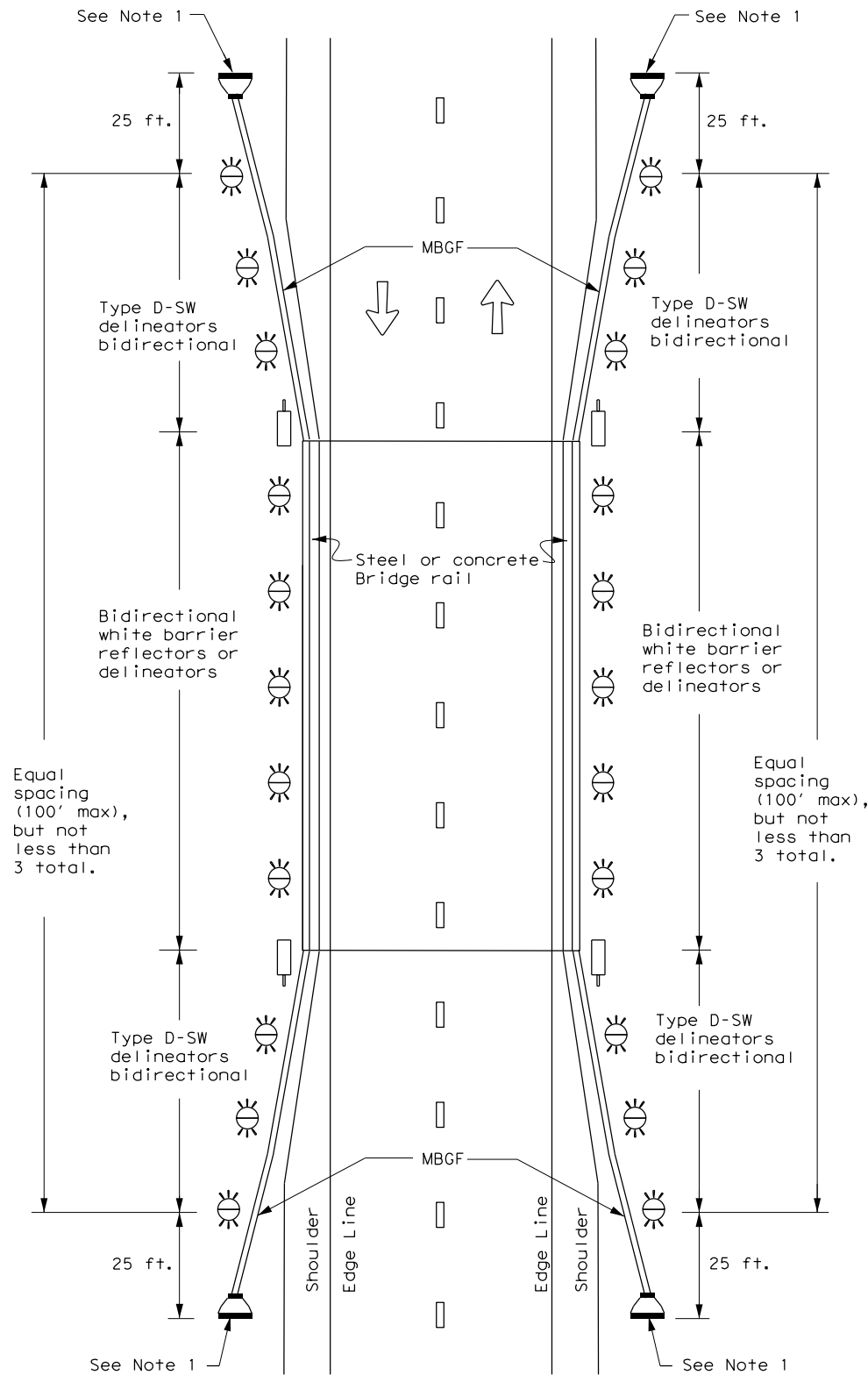


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3) - 20

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3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	SAT	MEDINA	45	

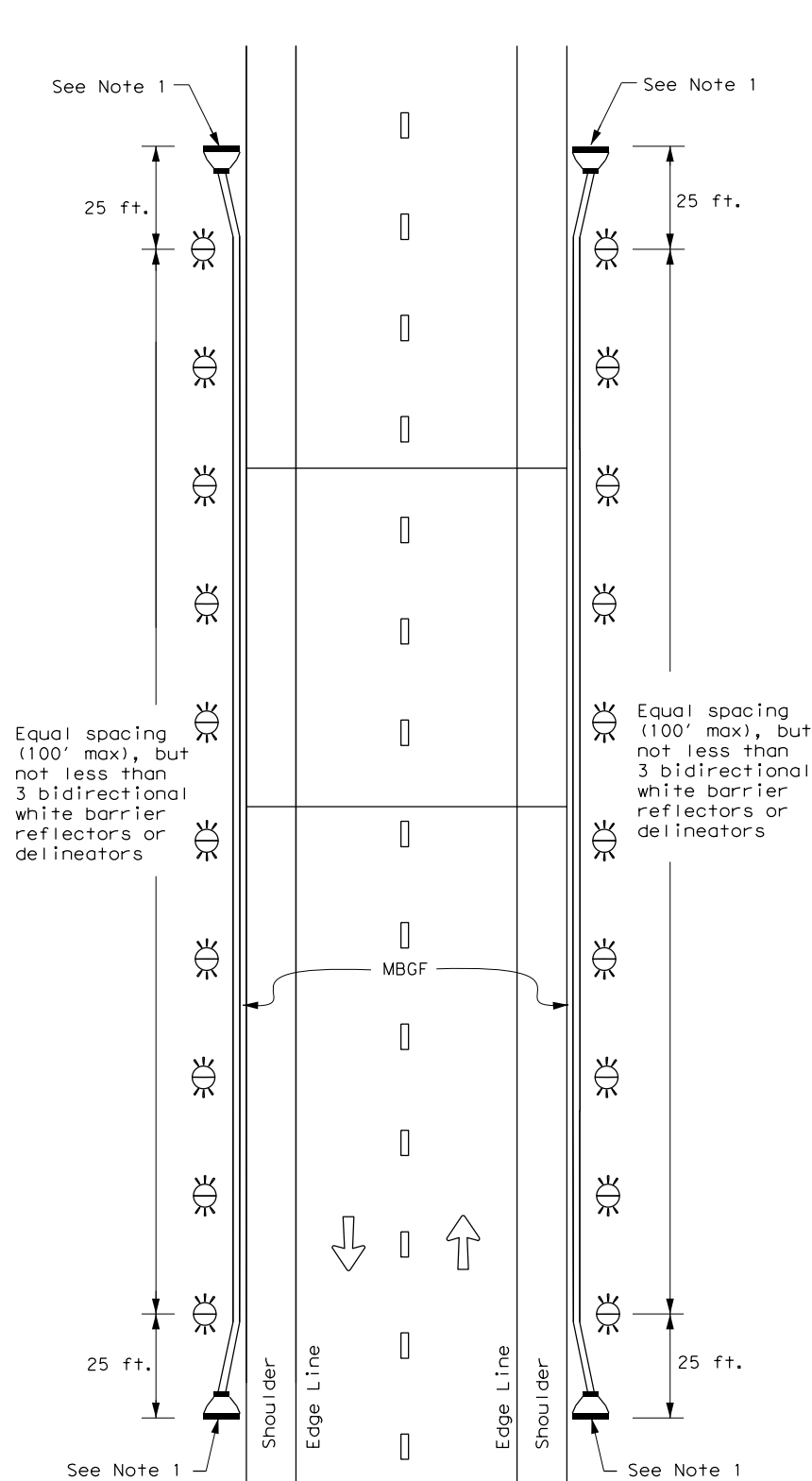
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

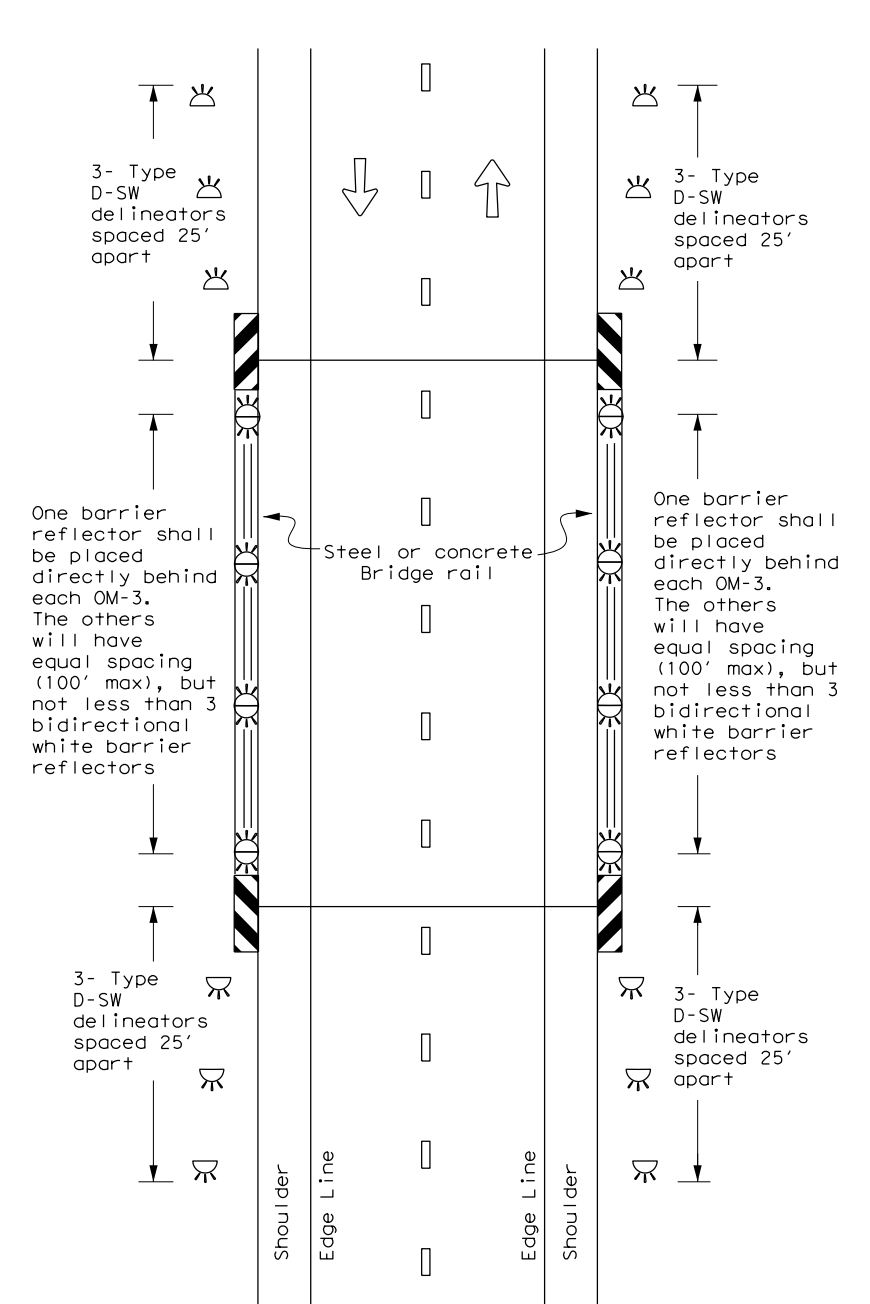
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

**TWO-WAY, TWO LANE ROADWAY
BRIDGE WITH NO APPROACH RAIL**



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow



**DELINEATOR &
OBJECT MARKER
PLACEMENT DETAILS**

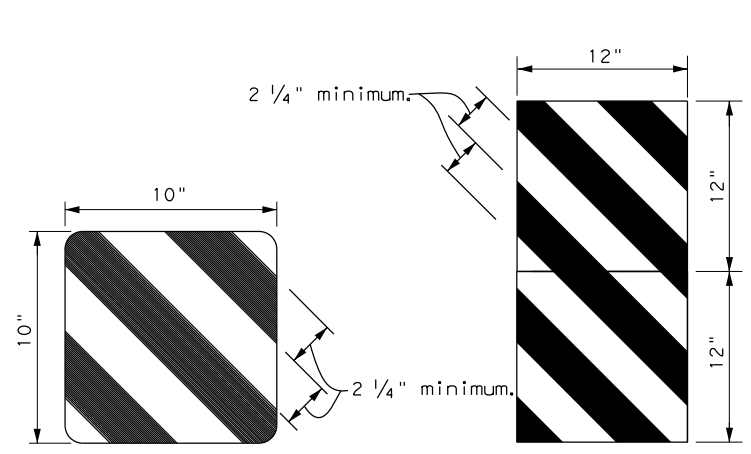
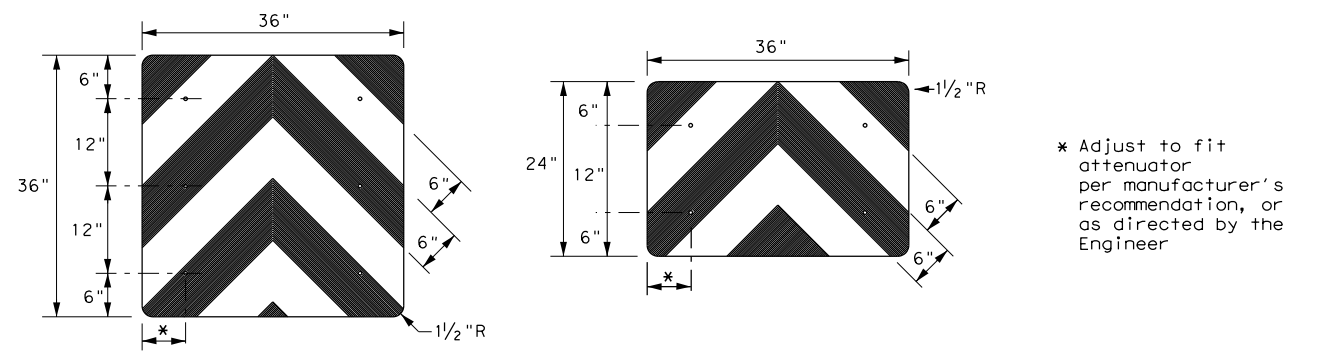
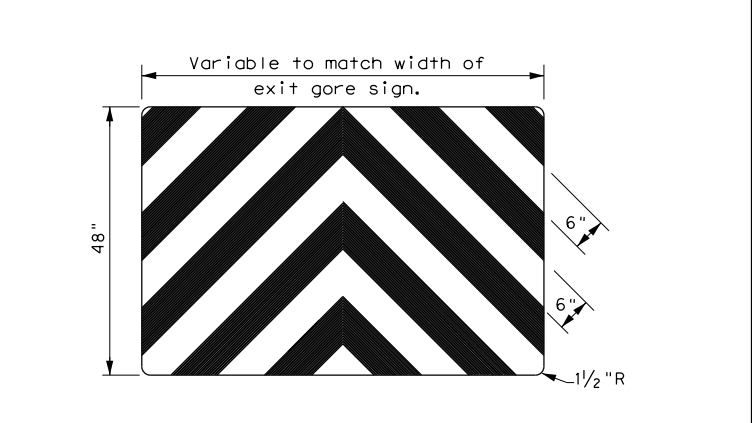
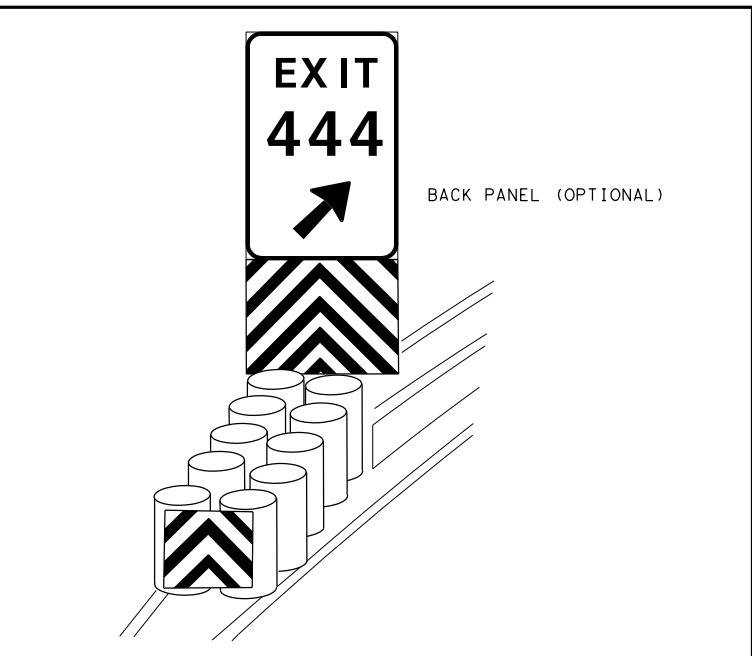
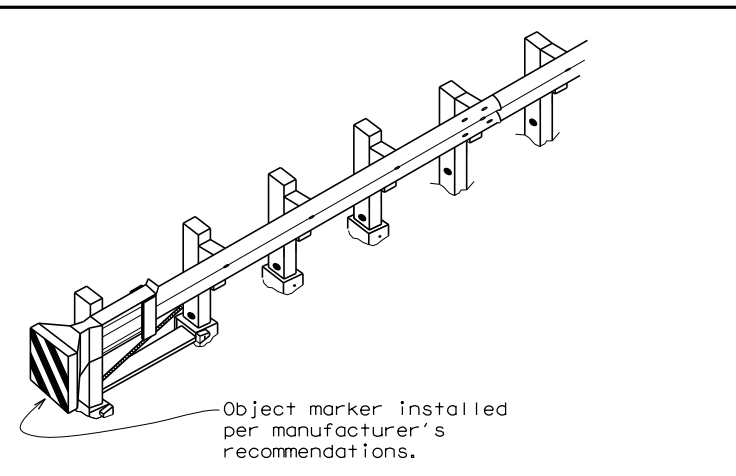
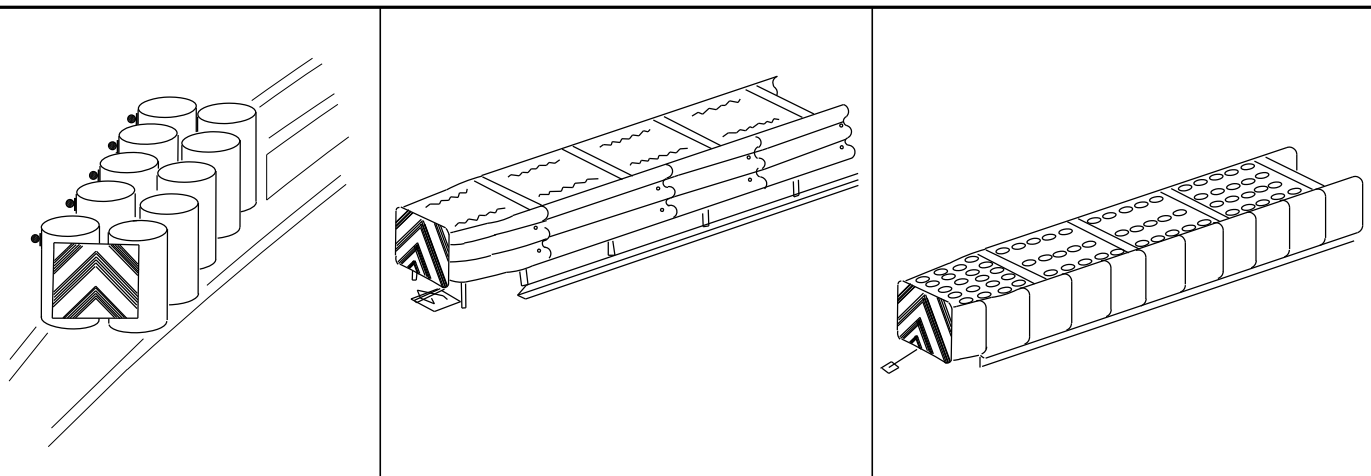
D & OM(5) - 20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CON: 0915	SECT: 45	JOB: 056	HIGHWAY: CR 2615
7-20	DIST: SAT	COUNTY: MEDINA	SHEET NO. 46	

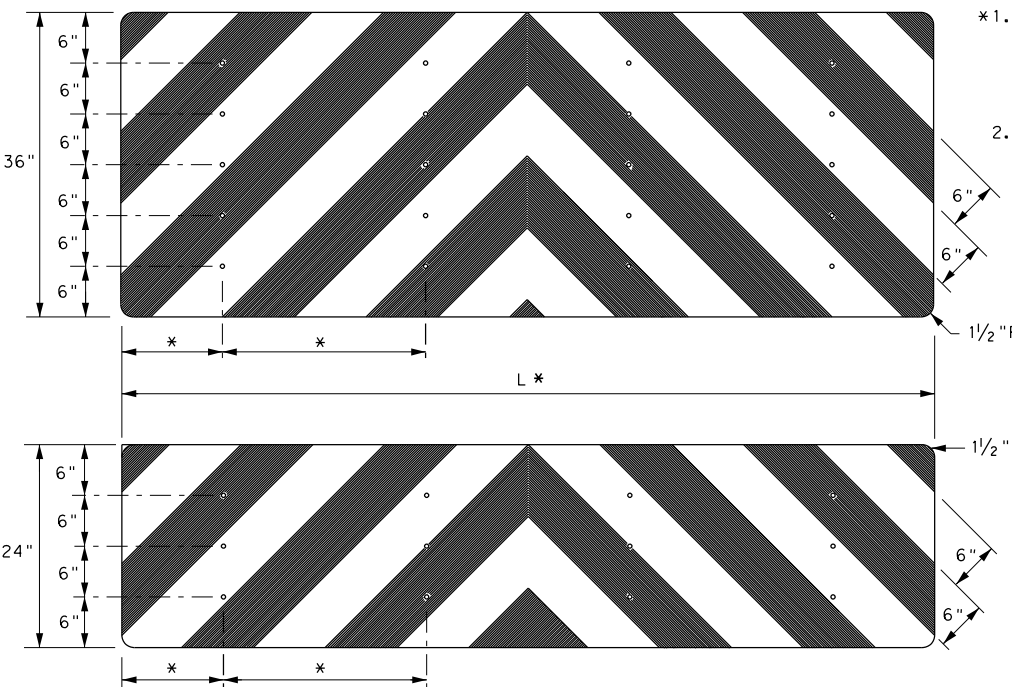
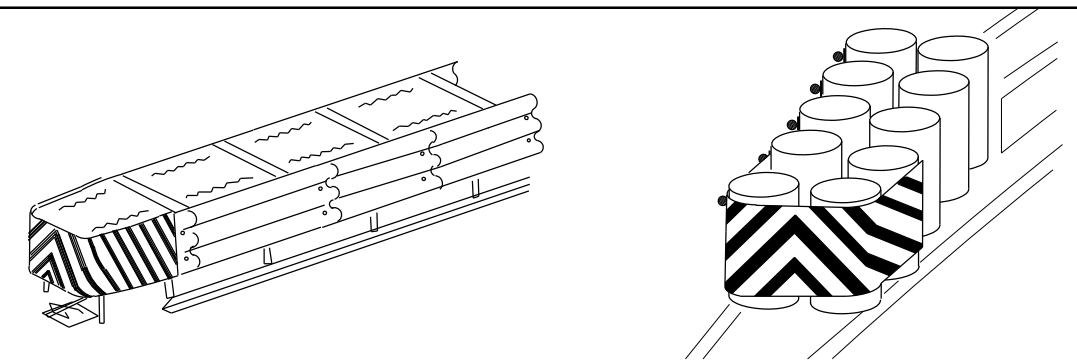
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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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DATE: 2/24/2023 3:31:55 PM
 FILE: P:\11799\06\CR2615\Design\Civil\Standards\PavementMarkers\domvia-20.dgn



OBJECT MARKERS SMALLER THAN 3 FT²



- NOTES**
1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
 2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.
3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".
4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
5. Object Marker at nose of attenuator is subsidiary to the attenuator.
6. See D & OM (1-4) for required barrier reflectors.

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) - 20			
FILE: domvia20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT December 1989	CONT	SECT	JOB
REVISIONS		0915 45	056 CR 2615
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	SAT	MEDINA	47
4-98 7-20			
20G			

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Drainage\1179906DA01.dgn

COMPUTATION POINT	FLOODING SOURCE AND LOCATION	Drainage Area (sq mi)	2-Year Discharge (cfs)	5-Year Discharge (cfs)	10-Year Discharge (cfs)	25-Year Discharge (cfs)	50-Year Discharge (cfs)	100-Year Discharge (cfs)	500-Year Discharge (cfs)
1	Medina Lake Reservoir	633.3	2,731	9,447	19,209	39,005	59,895	87,100	172,840
0	Diversion Lake Reservoir	648.6	2,685	9,540	19,387	39,303	60,282	87,620	173,896
SITE	CR2615 - Medina River	649.6	2,673	9,536	19,398	39,321	60,303	87,649	173,964

Rainfall Depth (NOAA ATLAS 14, VOLUME 11)	
Profile	* Depth (in)
2 yr	2.64
5 yr	3.51
10 yr	4.37
25 yr	5.70
50 yr	6.83
100 yr	8.17
500 yr	12.02
* 24-hr Event	

Hydrologic Element	Drainage Area (sq mi)	Lag Time (min)	CN
A-1	633.3	500	54
A-0	15.2	55	58
A-2	1.1	21	56

AREA WEIGHTED COMPOSITE CURVE NUMBER CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL. CLIMATIC ADJUSTMENT OF -20 APPLIED TO CURVE NUMBER PER TXDOT HDM FIGURE 4-20

RAINFALL DEPTHS OBTAINED AT CROSSING USING NATIONAL WEATHER SERVICE PRECIPITATION FREQUENCY DATA SERVER (PFDS). AN AREAL REDUCTION FACTOR OF 0.61 HAS BEEN APPLIED TO RAINFALL DEPTHS PER TXDOT HYDRAULIC DESIGN MANUAL.

NOTE:

1. DRAINAGE AREAS DELINEATED USING USGS LIDAR DATA.
2. FLOWS WERE CALCULATED USING NRCS HYDROGRAPH METHOD AND REGRESSION EQUATIONS.
3. HEC-HMS VERSION 4.7.1 AND FREQUENCY STORM USED FOR NRCS HYDROGRAPH CALCULATIONS.
3. NRCS HYDROGRAPH WAS SELECTED AS THE PREFERRED METHOD. SEE SHEET 49 FOR REGRESSION EQUATIONS.

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW ARROW
- DRAINAGE AREA
- EXISTING 100' CONTOURS
- STREAM



SUMMARY - PROP VS EXIST CAPACITY AT BRIDGE		
	EXISTING BRIDGE	PROPOSED BRIDGE
ROADWAY OVERTOP ELEV (FT)	865.74	865.41
LOW CHORD ELEVATION (FT)	864.16	863.73
Q (EXIST PASSING) (CFS)	2500	2500
WSEL (FT)	864.17	863.73
Q (PROPOSED PASSING) (CFS)	3000	3000
WSEL (FT)	866.55	863.73
Q (100) (CFS)	87649	87649
WSEL (FT)	889.48	889.52

DESIGN

LUKE REED, P.E.

2/24/2023
DATE

APPROVAL

JAMES A. LUTZ, P.E.

2/24/2023
DATE

SCALE: 1" = 30,000'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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CR 2615 AT MEDINA RIVER

DRAINAGE AREA MAP

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	48

Land Cover	TxDOT Classification	Soil Type	CN	Area	CN*Area
Deciduous Forest	WOODS, GOOD	B	55	23838.3	1311107.6
Deciduous Forest	WOODS, GOOD	C	70	107201.3	7504088.9
Deciduous Forest	WOODS, GOOD	D	77	249089.5	19179890.0
Developed, High Intensity	1/8 ACRE	B	85	1.7	147.9
Developed, High Intensity	1/8 ACRE	C	90	29.2	2623.5
Developed, High Intensity	1/8 ACRE	D	92	10.1	930.1
Developed, Low Intensity	1/2 ACRE	B	70	214.3	15003.8
Developed, Low Intensity	1/2 ACRE	C	80	936.3	74902.4
Developed, Low Intensity	1/2 ACRE	D	85	636.9	54134.0
Developed, Medium Intensity	1/4 ACRE	B	75	109.0	8173.5
Developed, Medium Intensity	1/4 ACRE	C	83	684.0	56768.7
Developed, Medium Intensity	1/4 ACRE	D	87	901.8	78454.0
Open Water	WATER	B	98	1.1	107.8
Open Water	WATER	C	98	3.7	359.7
Open Water	WATER	D	98	5693.2	557929.7
Industrial	INDUSTRIAL	B	88	97.5	8580.0
Industrial	INDUSTRIAL	C	91	51.9	4718.4
Industrial	INDUSTRIAL	D	93	408.7	38004.5
Dispersed (Residential)	1 ACRE	B	68	501.2	34078.9
Dispersed (Residential)	1 ACRE	C	79	5782.1	456786.7
Dispersed (Residential)	1 ACRE	D	84	8633.4	725205.6
Developed, Commercial	COMMERCIAL & BUSINESS	B	92	311.7	28678.2
Developed, Commercial	COMMERCIAL & BUSINESS	C	94	92.7	8712.9
Developed, Commercial	COMMERCIAL & BUSINESS	D	95	118.4	11245.2
A-1			Sum	405347.7	30160631.7

CN	74
Climatic Adjustment	-20
CN Adjusted	54

Land Cover	TxDOT Classification	Soil Type	CN	Area	CN*Area
Deciduous Forest	WOODS, GOOD	C	70	132.7	9289.0
Deciduous Forest	WOODS, GOOD	D	77	8744.3	673313.4
Developed, Low Intensity	1/2 ACRE	C	80	1.0	77.6
Developed, Low Intensity	1/2 ACRE	D	85	302.4	25706.6
Open Water	WATER	C	98	0.3	28.4
Open Water	WATER	D	98	186.4	18269.2
Dispersed (Residential)	1 ACRE	D	84	320.8	26944.7
Transportation	PAVED; CURBS & DRAINS	D	98	52.8	5170.5
A-0			Sum	9740.7	758799.3

CN	78
Climatic Adjustment	-20
CN Adjusted	58

Land Cover	TxDOT Classification	Soil Type	CN	Area	CN*Area
Deciduous Forest	WOODS, GOOD	A	30	59.8	1795.2
Deciduous Forest	WOODS, GOOD	B	55	2.9	159.5
Deciduous Forest	WOODS, GOOD	C	70	48.6	3400.6
Deciduous Forest	WOODS, GOOD	D	77	287.3	22121.3
Open Water	WATER	A	98	0.3	29.4
Open Water	WATER	D	98	24.5	2400.0
Industrial	INDUSTRIAL	A	81	13.3	1074.9
Industrial	INDUSTRIAL	B	88	0.8	71.3
Dispersed (Residential)	1 ACRE	D	84	244.7	20554.0
A-2			Sum	682.2	51606.2

CN	76
Climatic Adjustment	-20
CN Adjusted	56

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR26\5\Design\Civil\Drainage\1179906HYD01.dgn

REGRESSION EQUATIONS METHOD

OMEGA EM REGRESSION EQUATIONS FOR NATURAL BASINS WERE PERFORMED TO ESTIMATE PEAK FLOWS FOR EVENTS WITH DIFFERENT ANNUAL PROBABILITY OF EXCEEDANCE.

EQUATION PARAMETERS

OMEGAEM = 0.330 (HDM FIGURE 4-5)
P = 31 IN (HDM FIGURE 4-6)
A = 649.63 MI²
S = 0.003 FT/FT

FLOW RESULTS

STORM EVENT	FLOW (CFS)
2-YR	15,639
5-YR	39,408
10-YR	59,368
25-YR	93,327
50-YR	125,194
100-YR	163,978
500-YR	280,406

HDM TABLE 4-4: REGRESSION EQUATIONS

NOTES

1. NRCS HYDROGRAPH WAS SELECTED AS THE PREFERRED METHOD FOR PEAK FLOWS TO BE USED IN HYDRAULIC ANALYSIS.

DESIGN



[Signature]
LUKE REED, P.E.
DATE

2/24/2023
DATE


APPROVAL



[Signature]
JAMES A. LUTZ, P.E.
DATE


2/24/2023
DATE

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



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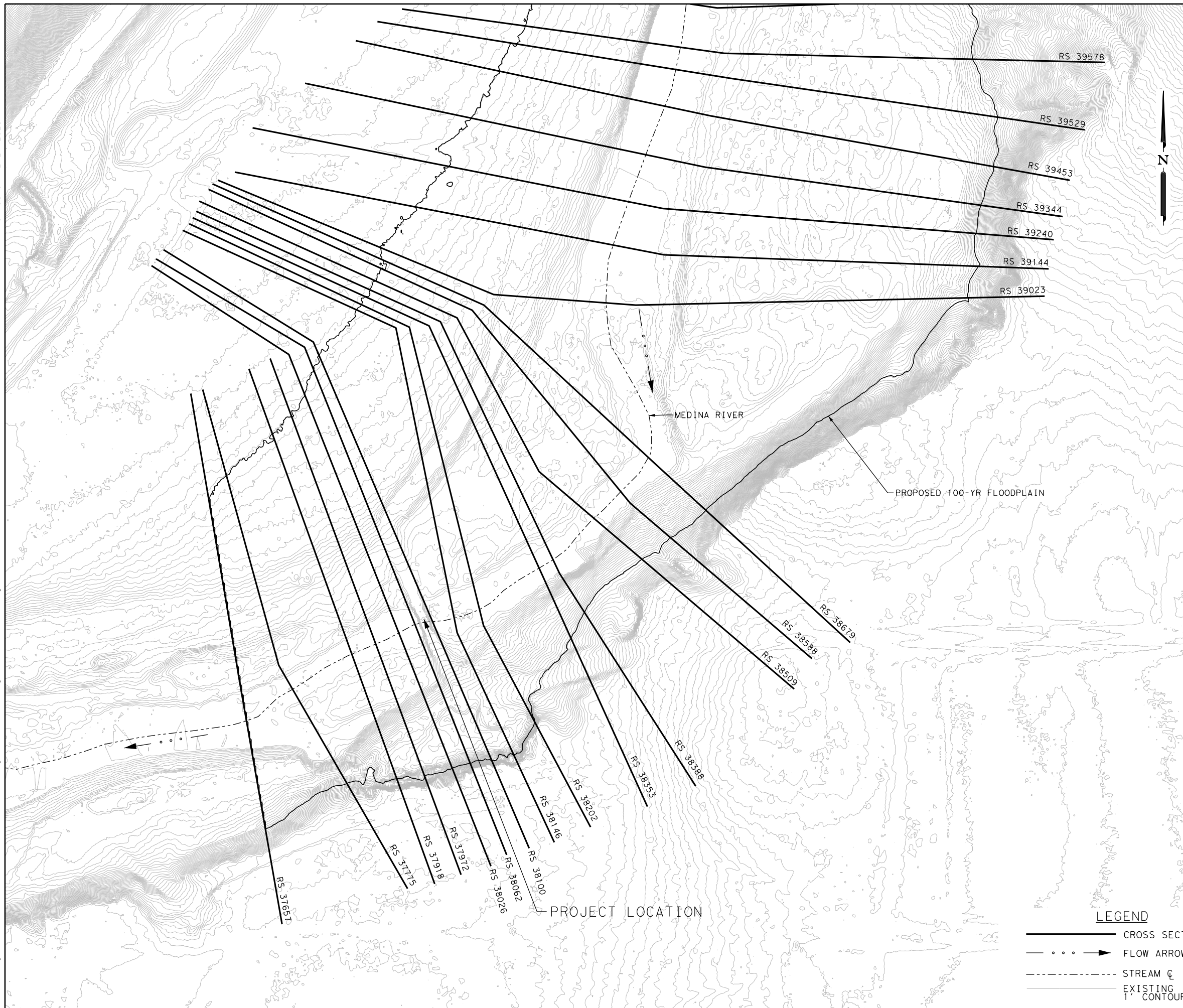
HYDROLOGY DATA SHEET

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	0915	45
				JOB NO.:
				056
				SHEET NO.:
				49

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Drawings\1179906HDS01.dgn



MEDINA COUNTY FLOODPLAIN ADMIN CONTACTED
 DATE: PENDING
 HYDRAULIC METHOD
 WATER SURFACE ELEVATIONS COMPUTED USING HEC-RAS (V.5.0.7). THE PROJECT HEC-RAS MODEL WAS DEVELOPED USING SURVEYED CROSS-SECTIONS, USGS LIDAR, FIELD INVESTIGATION, AND PROPOSED ROADWAY & BRIDGE LAYOUT.
 FLOOD HAZARD AREA
 MEDINA RIVER IS IDENTIFIED ON FEMA FIRM PANEL 48325C0375D, DATED 05/15/20 AS A SPECIAL FLOOD HAZARD AREA WITH A ZONE A DESIGNATION AT THE CR 2615 BRIDGE CROSSING. PROPOSED 100 YR FLOODPLAIN WAS GENERATED WITH HEC-RAS MAPPER AND IS SHOWN IN CROSS SECTION LAYOUT.
 NOTES:
 1. PROP BRIDGE LOCATED AT RIVER STATION 38081
 2. UPSTREAM CROSS SECTION LOCATED AT RIVER STATION 38100
 3. DOWNSTREAM CROSS SECTION LOCATED AT RIVER STATION 38062
 4. THE DOWNSTREAM WATER SURFACE ELEVATION WAS BASED ON NORMAL DEPTH AT A CHANNEL SLOPE OF 0.0015 FT/FT
 5. PROPOSED HYDRAULIC DESIGN TO BE THE SAME OR SLIGHTLY BETTER THAN EXISTING. THE 100-YR STORM EVENT WAS EVALUATED AS A CHECK FLOOD. 100-YR WSE RISE LIMITED TO 1.0'
 6. 2 EXISTING DAMS UPSTREAM OF PROJECT LOCATION HAVE BEEN IGNORED TO COMPUTE CONSERVATIVE FLOWS.

DESIGN

 LUKE REED, P.E. 2/24/2023
 DATE
 APPROVAL

 JAMES A. LUTZ, P.E. 2/24/2023
 DATE

SCALE: 1" = 200'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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CR 2615 AT MEDINA RIVER

HYDRAULIC DATA SHEET

SHEET 1 OF 6

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	50

LEGEND
 ———— CROSS SECTIONS
 - - - - -> FLOW ARROW
 - - - - - STREAM Q
 - - - - - EXISTING 1' CONTOURS

Plotted on: 2/24/2023

Design File name: P:\11799\06\CR2615\Design\Civil\Drawings\1179906HDS02.dgn

HEC-RAS BRIDGE OUTPUT - EXIST PASSING

Plan: Existing_Passing Medina River Reach 1 RS: 38081 Profile: EX_PASS

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	866.32			
W.S. US. (ft)	866.05	E.G. Elev (ft)	866.33	864.85
Q Total (cfs)	2500.00	W.S. Elev (ft)	864.17	864.17
Q Bridge (cfs)	2500.00	Crit W.S. (ft)	863.18	863.07
Q Weir (cfs)		Max Chl Dpth (ft)	5.18	5.18
Weir Sta Lft (ft)		Vel Total (ft/s)	8.95	8.82
Weir Sta Rgt (ft)		Flow Area (sq ft)	279.24	283.46
Weir Submerg		Froude # Chl	0.70	0.68
Weir Max Depth (ft)		Specif Force (cu ft)	1393.36	1404.45
Min El Weir Flow (ft)	866.50	Hydr Depth (ft)		
Min El Prs (ft)	864.17	W.P. Total (ft)	152.82	151.80
Delta EG (ft)	1.47	Conv. Total (cfs)	41779.4	42580.4
Delta WS (ft)	1.67	Top Width (ft)		
BR Open Area (sq ft)	279.24	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.95	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)	0.41	0.40
BR Sel Method	Press Only	Power Total (lb/ft s)	3.66	3.54

HEC-RAS BRIDGE OUTPUT - PROP PASSING

Plan: Proposed_Passing Medina River Reach 1 RS: 38081 Profile: PR_PASS

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	868.29			
W.S. US. (ft)	867.98	E.G. Elev (ft)	868.28	865.35
Q Total (cfs)	3000.00	W.S. Elev (ft)	863.73	863.73
Q Bridge (cfs)	3000.00	Crit W.S. (ft)	869.02	868.95
Q Weir (cfs)		Max Chl Dpth (ft)	4.74	4.74
Weir Sta Lft (ft)		Vel Total (ft/s)	11.91	11.91
Weir Sta Rgt (ft)		Flow Area (sq ft)	251.83	251.85
Weir Submerg		Froude # Chl	0.96	0.96
Weir Max Depth (ft)		Specif Force (cu ft)	1646.94	1646.93
Min El Weir Flow (ft)	868.35	Hydr Depth (ft)		
Min El Prs (ft)	863.73	W.P. Total (ft)	153.93	152.59
Delta EG (ft)	2.94	Conv. Total (cfs)	28523.5	34842.8
Delta WS (ft)	3.13	Top Width (ft)		
BR Open Area (sq ft)	251.83	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.91	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)	1.13	0.76
BR Sel Method	Press Only	Power Total (lb/ft s)	13.46	9.10

HEC-RAS BRIDGE OUTPUT - EXIST 100-YR

Plan: EX Medina River Reach 1 RS: 38081 Profile: 100 YR

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	890.69			
W.S. US. (ft)	889.48	E.G. Elev (ft)	890.69	890.69
Q Total (cfs)	87649.00	W.S. Elev (ft)	889.48	889.32
Q Bridge (cfs)	2098.08	Crit W.S. (ft)	882.08	882.55
Q Weir (cfs)	85550.91	Max Chl Dpth (ft)	30.49	30.33
Weir Sta Lft (ft)	205.43	Vel Total (ft/s)	7.20	7.36
Weir Sta Rgt (ft)	1163.49	Flow Area (sq ft)	12176.44	11903.07
Weir Submerg	0.95	Froude # Chl	0.32	0.32
Weir Max Depth (ft)	24.95	Specif Force (cu ft)	135764.50	133518.50
Min El Weir Flow (ft)	866.50	Hydr Depth (ft)	13.45	13.56
Min El Prs (ft)	864.17	W.P. Total (ft)	1071.29	1041.39
Delta EG (ft)	0.29	Conv. Total (cfs)		
Delta WS (ft)	0.16	Top Width (ft)	905.08	877.86
BR Open Area (sq ft)	279.24	Frctn Loss (ft)		
BR Open Vel (ft/s)	7.51	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

HEC-RAS BRIDGE OUTPUT - PROP 100-YR

Plan: PR Medina River Reach 1 RS: 38081 Profile: 100 YR

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	890.72			
W.S. US. (ft)	889.52	E.G. Elev (ft)	890.72	890.72
Q Total (cfs)	87649.00	W.S. Elev (ft)	889.52	889.32
Q Bridge (cfs)	1908.96	Crit W.S. (ft)	883.93	885.05
Q Weir (cfs)	85740.04	Max Chl Dpth (ft)	30.53	30.33
Weir Sta Lft (ft)	205.39	Vel Total (ft/s)	7.77	8.03
Weir Sta Rgt (ft)	1164.46	Flow Area (sq ft)	11283.17	10919.59
Weir Submerg	0.94	Froude # Chl	0.30	0.35
Weir Max Depth (ft)	22.38	Specif Force (cu ft)	118634.10	117792.70
Min El Weir Flow (ft)	868.35	Hydr Depth (ft)	12.39	12.44
Min El Prs (ft)	863.73	W.P. Total (ft)	1076.34	1041.96
Delta EG (ft)	0.32	Conv. Total (cfs)		
Delta WS (ft)	0.19	Top Width (ft)	910.41	877.86
BR Open Area (sq ft)	251.83	Frctn Loss (ft)		
BR Open Vel (ft/s)	7.58	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

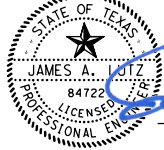
- NOTES:
1. THE BRIDGE MODELING APPROACH FOR THE EX PASSING WAS PRESSURE ONLY.
 2. THE BRIDGE MODELING APPROACH FOR THE PR PASSING WAS PRESSURE ONLY.
 3. THE BRIDGE MODELING APPROACH FOR THE 100 YEAR STORM EVENTS WAS PRESSURE AND/OR WEIR.

DESIGN



LUKE REED, P.E. 2/24/2023
DATE

APPROVAL



JAMES A. LUTZ, P.E. 2/24/2023
DATE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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CR 2615 AT MEDINA RIVER

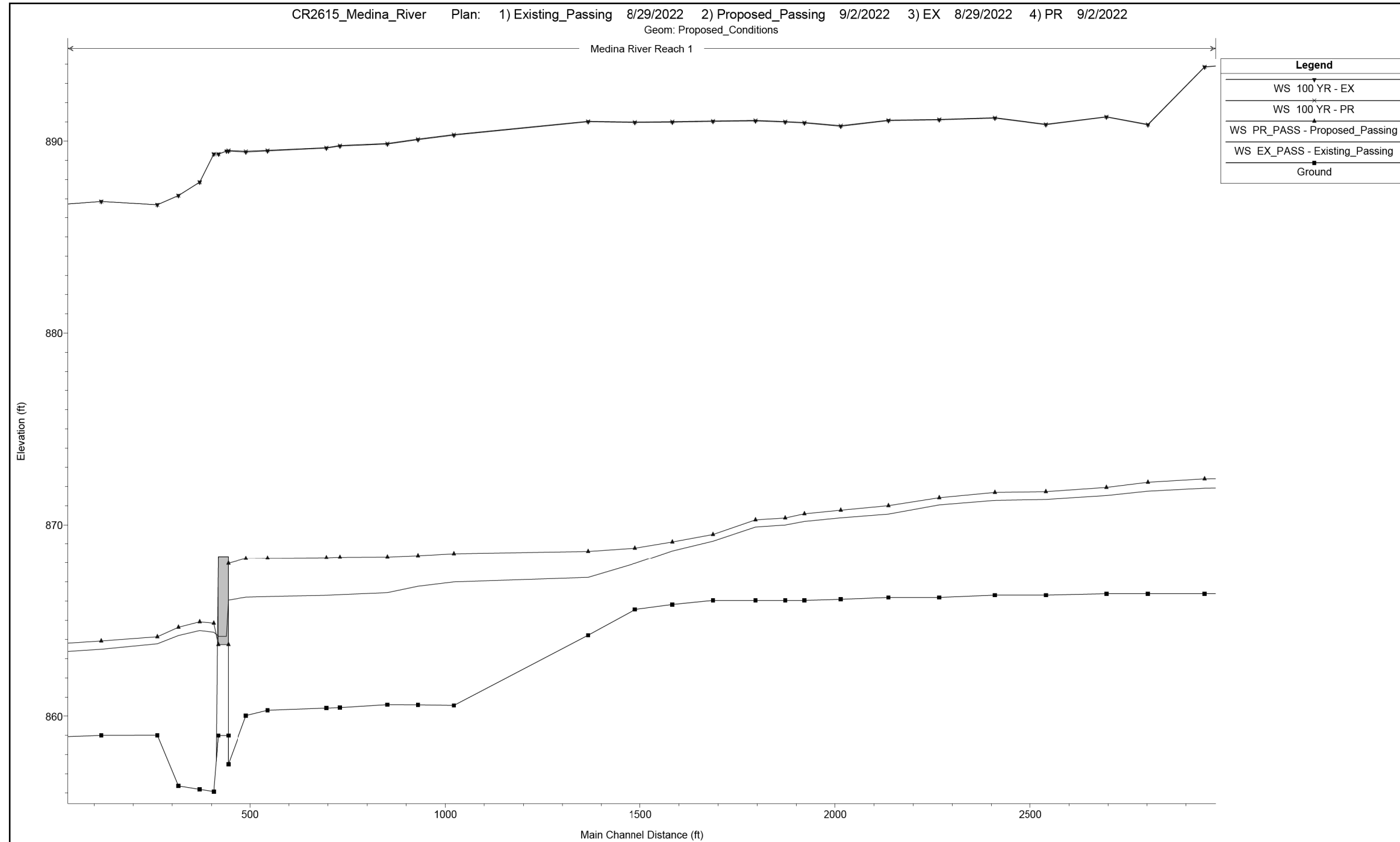
HYDRAULIC DATA SHEET

SHEET 2 OF 6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	0915	45	056	51

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Drawings\1179906HDS03.dgn



HEC-RAS PROFILE OUTPUT

DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER

APPROVAL

STATE OF TEXAS
JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E. DATE 2/24/2023

JAMES A. LUTZ, P.E. DATE 2/24/2023

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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CR 2615 AT MEDINA RIVER

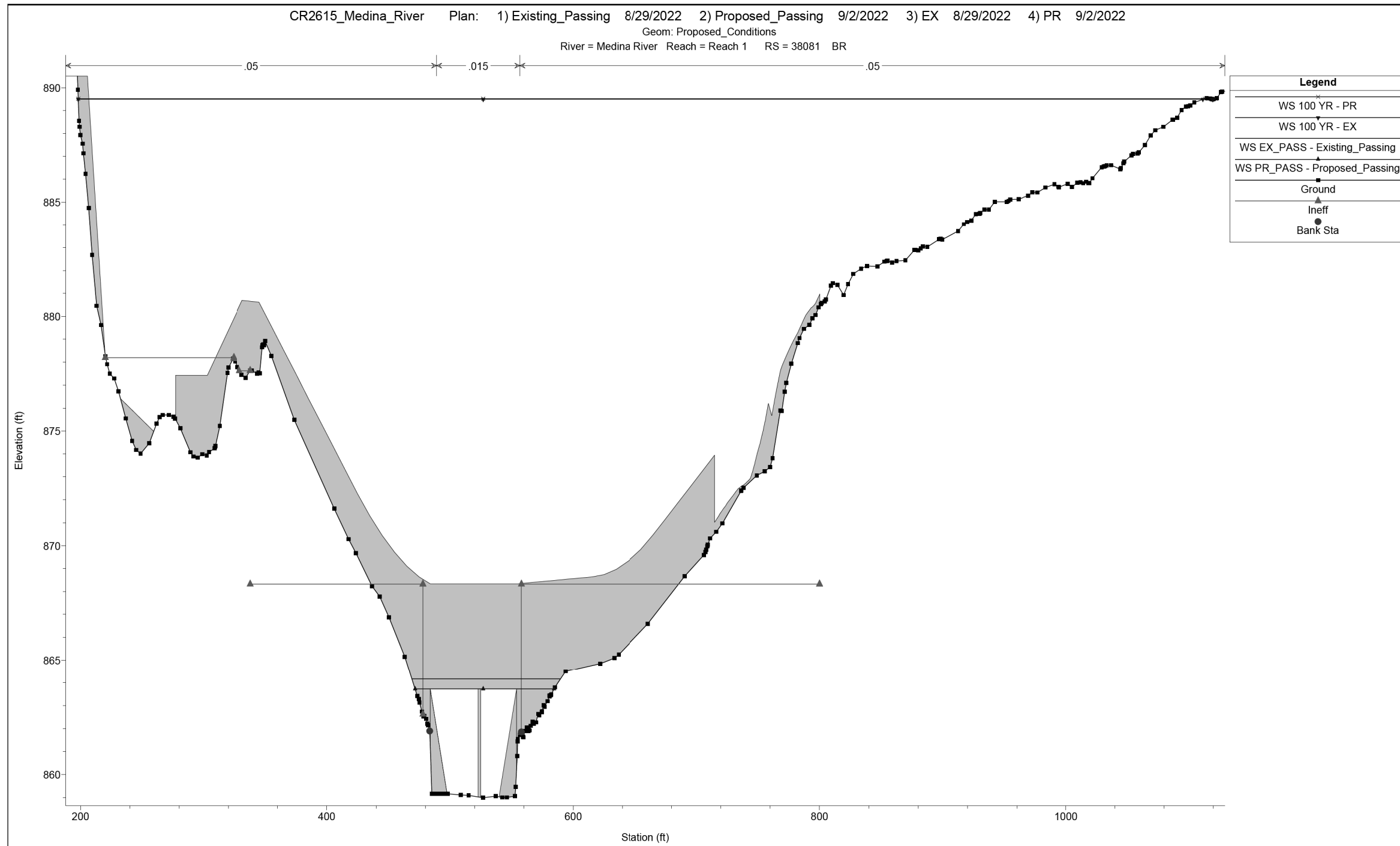
HYDRAULIC DATA SHEET

SHEET 3 OF 6

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	52


Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\Drainage\1179906HDS04.dgn



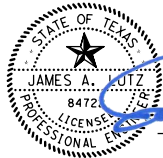
HEC-RAS CROSS SECTION OUTPUT

DESIGN



 LUKE REED, P.E. 2/24/2023 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 2/24/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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CR 2615 AT MEDINA RIVER

HYDRAULIC DATA SHEET

SHEET 4 OF 6

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	0915	45	056	53


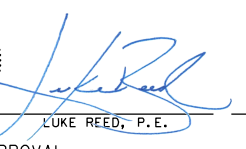
HEC-RAS OUTPUT

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	41372	EX_PASS	Existing_Passing	2500.00	866.50	872.10	868.66	872.21	0.000491	2.69	928.56	195.24	0.22
Reach 1	41372	PR_PASS	Proposed_Passing	3000.00	866.50	872.59	868.94	872.73	0.000512	2.93	1027.31	202.85	0.22
Reach 1	41372	100 YR	EX	87649.00	866.50	893.74	886.17	896.84	0.001606	15.07	7827.83	407.75	0.52
Reach 1	41372	100 YR	PR	87649.00	866.50	893.75	886.17	896.84	0.001604	15.06	7831.99	407.77	0.52
Reach 1	41305	EX_PASS	Existing_Passing	2500.00	866.45	872.08	868.36	872.18	0.000352	2.44	1033.26	198.32	0.19
Reach 1	41305	PR_PASS	Proposed_Passing	3000.00	866.45	872.58	868.60	872.69	0.000378	2.68	1132.01	200.10	0.19
Reach 1	41305	100 YR	EX	87649.00	866.45	893.51	886.14	896.72	0.001616	15.23	7732.23	415.90	0.52
Reach 1	41305	100 YR	PR	87649.00	866.45	893.52	886.14	896.72	0.001614	15.22	7736.67	415.92	0.52
Reach 1	41168	EX_PASS	Existing_Passing	2500.00	866.38	872.04	868.34	872.13	0.000324	2.30	1092.29	214.49	0.18
Reach 1	41168	PR_PASS	Proposed_Passing	3000.00	866.38	872.54	868.58	872.64	0.000345	2.52	1198.87	216.85	0.19
Reach 1	41168	100 YR	EX	87649.00	866.38	893.62	884.98	896.38	0.001374	14.04	8145.39	427.34	0.48
Reach 1	41168	100 YR	PR	87649.00	866.38	893.63	884.98	896.38	0.001372	14.04	8149.90	427.36	0.48
Reach 1	41026	EX_PASS	Existing_Passing	2500.00	866.38	871.99	868.30	872.08	0.000336	2.40	1068.20	209.00	0.18
Reach 1	41026	PR_PASS	Proposed_Passing	3000.00	866.38	872.48	868.54	872.59	0.000362	2.63	1170.90	211.24	0.19
Reach 1	41026	100 YR	EX	87649.00	866.38	893.43	885.11	896.17	0.001431	14.38	8801.08	502.51	0.49
Reach 1	41026	100 YR	PR	87649.00	866.38	893.44	885.11	896.18	0.001429	14.37	8806.69	502.56	0.49
Reach 1	40895	EX_PASS	Existing_Passing	2500.00	866.38	871.96	868.50	872.03	0.000306	2.18	1217.75	266.88	0.17
Reach 1	40895	PR_PASS	Proposed_Passing	3000.00	866.38	872.45	868.71	872.54	0.000322	2.38	1349.92	273.19	0.18
Reach 1	40895	100 YR	EX	87649.00	866.38	893.94	883.24	895.74	0.000961	11.83	10711.77	558.65	0.40
Reach 1	40895	100 YR	PR	87649.00	866.38	893.95	883.24	895.75	0.000960	11.83	10717.60	558.70	0.40
Reach 1	40720	EX_PASS	Existing_Passing	2500.00	866.38	871.93	867.92	871.98	0.000197	1.83	1390.58	285.95	0.14
Reach 1	40720	PR_PASS	Proposed_Passing	3000.00	866.38	872.42	868.10	872.48	0.000211	2.01	1533.72	297.56	0.15
Reach 1	40720	100 YR	EX	87649.00	866.38	894.03	882.10	895.49	0.000746	10.54	11918.64	757.04	0.35
Reach 1	40720	100 YR	PR	87649.00	866.38	894.04	882.10	895.50	0.000745	10.53	11925.34	757.31	0.35
Reach 1	40604	EX_PASS	Existing_Passing	2500.00	866.38	871.91	867.88	871.96	0.000179	1.73	1453.09	278.42	0.13
Reach 1	40604	PR_PASS	Proposed_Passing	3000.00	866.38	872.40	868.08	872.46	0.000193	1.90	1589.30	280.18	0.14
Reach 1	40604	100 YR	EX	87649.00	866.38	893.86	881.80	895.39	0.000752	10.50	11474.93	703.44	0.35
Reach 1	40604	100 YR	PR	87649.00	866.38	893.87	881.80	895.40	0.000751	10.50	11482.49	703.59	0.35
Reach 1	40459	EX_PASS	Existing_Passing	2500.00	866.38	871.76	868.10	871.91	0.000636	3.25	1044.94	262.18	0.25
Reach 1	40459	PR_PASS	Proposed_Passing	3000.00	866.38	872.22	868.24	872.40	0.000677	3.54	1167.91	265.66	0.26
Reach 1	40459	100 YR	EX	87649.00	866.38	890.85	884.95	894.95	0.002884	19.14	9354.68	690.16	0.68
Reach 1	40459	100 YR	PR	87649.00	866.38	890.87	884.95	894.96	0.002874	19.12	9369.35	690.93	0.68
Reach 1	40353	EX_PASS	Existing_Passing	2500.00	866.38	871.53	869.06	871.80	0.001212	4.29	630.68	172.08	0.34
Reach 1	40353	PR_PASS	Proposed_Passing	3000.00	866.38	871.95	869.38	872.28	0.001324	4.73	695.80	211.63	0.36
Reach 1	40353	100 YR	EX	87649.00	866.38	891.25	886.96	894.37	0.002477	17.86	8922.29	695.06	0.63
Reach 1	40353	100 YR	PR	87649.00	866.38	891.27	886.96	894.38	0.002468	17.84	8936.73	696.50	0.63
Reach 1	40198	EX_PASS	Existing_Passing	2500.00	866.31	871.33	868.85	871.61	0.001303	4.25	590.77	132.06	0.35
Reach 1	40198	PR_PASS	Proposed_Passing	3000.00	866.31	871.73	869.18	872.07	0.001422	4.69	645.91	142.76	0.37
Reach 1	40198	100 YR	EX	87649.00	866.31	890.86	886.87	893.99	0.002454	17.45	8730.11	655.79	0.63
Reach 1	40198	100 YR	PR	87649.00	866.31	890.88	886.87	894.00	0.002443	17.42	8746.17	656.09	0.62
Reach 1	40066	EX_PASS	Existing_Passing	2500.00	866.31	871.28	868.53	871.44	0.000766	3.37	842.08	226.31	0.27
Reach 1	40066	PR_PASS	Proposed_Passing	3000.00	866.31	871.69	868.81	871.89	0.000826	3.69	931.29	246.58	0.28
Reach 1	40066	100 YR	EX	87649.00	866.31	891.20	884.28	893.46	0.001696	14.80	9818.09	665.07	0.52
Reach 1	40066	100 YR	PR	87649.00	866.31	891.22	884.28	893.48	0.001690	14.79	9832.67	665.60	0.52
Reach 1	39923	EX_PASS	Existing_Passing	2500.00	866.19	871.04	868.70	871.30	0.001222	4.09	638.60	198.67	0.34
Reach 1	39923	PR_PASS	Proposed_Passing	3000.00	866.19	871.42	868.98	871.73	0.001345	4.52	697.86	214.97	0.36
Reach 1	39923	100 YR	EX	87649.00	866.19	891.11	884.87	893.16	0.001675	14.68	10622.50	740.92	0.52
Reach 1	39923	100 YR	PR	87649.00	866.19	891.13	884.87	893.17	0.001668	14.66	10639.64	741.45	0.52
Reach 1	39793	EX_PASS	Existing_Passing	2500.00	866.19	870.56	869.05	871.04	0.002892	5.56	451.16	187.53	0.50
Reach 1	39793	PR_PASS	Proposed_Passing	3000.00	866.19	871.00	869.39	871.47	0.002619	5.68	608.53	206.80	0.48
Reach 1	39793	100 YR	EX	87649.00	866.19	891.07	884.71	892.97	0.001650	14.39	11208.05	819.10	0.51
Reach 1	39793	100 YR	PR	87649.00	866.19	891.09	884.71	892.88	0.001643	14.37	11227.61	819.76	0.51
Reach 1	39672	EX_PASS	Existing_Passing	2500.00	866.09	870.37	868.73	870.71	0.002039	4.78	579.13	188.47	0.42
Reach 1	39672	PR_PASS	Proposed_Passing	3000.00	866.09	870.77	869.03	871.16	0.002103	5.18	658.02	200.34	0.44
Reach 1	39672	100 YR	EX	87649.00	866.09	890.78	884.98	892.66	0.001648	14.46	11404.27	888.52	0.52
Reach 1	39672	100 YR	PR	87649.00	866.09	890.80	884.98	892.68	0.001639	14.44	11427.97	889.09	0.52
Reach 1	39578	EX_PASS	Existing_Passing	2500.00	866.03	870.18	868.51	870.52	0.001987	4.71	579.04	178.04	0.42
Reach 1	39578	PR_PASS	Proposed_Passing	3000.00	866.03	870.58	868.80	870.97	0.002054	5.10	651.30	188.95	0.43
Reach 1	39578	100 YR	EX	87649.00	866.03	890.95	884.76	892.39	0.001294	12.92	12750.09	932.63	0.46
Reach 1	39578	100 YR	PR	87649.00	866.03	890.97	884.76	892.41	0.001288	12.89	12774.23	933.02	0.46
Reach 1	39529	EX_PASS	Existing_Passing	2500.00	866.03	869.99	868.51	870.39	0.002745	5.50	556.76	168.57	0.49
Reach 1	39529	PR_PASS	Proposed_Passing	3000.00	866.03	870.36	868.82	870.84	0.002906	6.01	620.46	176.63	0.51
Reach 1	39529	100 YR	EX	87649.00	866.03	890.99	884.80	892.28	0.001375	13.35	13476.23	1008.97	0.47
Reach 1	39529	100 YR	PR	87649.00	866.03	891.02	884.80	892.30	0.001368	13.32	13502.59	1009.40	0.47
Reach 1	39453	EX_PASS	Existing_Passing	2500.00	866.03	869.89	868.20	870.19	0.001921	4.41	568.51	158.12	0.41
Reach 1	39453	PR_PASS	Proposed_Passing	3000.00	866.03	870.26	868.46	870.62	0.002000	4.80	628.67	171.67	0.42
Reach 1	39453	100 YR	EX	87649.00	866.03	891.05	883.79	892.13	0.000945	11.05	14676.01	1045.73	0.39
Reach 1	39453	100 YR	PR	87649.00	866.03	891.08	883.79	892.15	0.000940	11.03	14702.70	1046.02	0.39

Plotted on: 2/24/2023

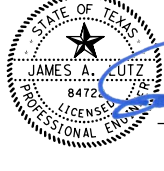
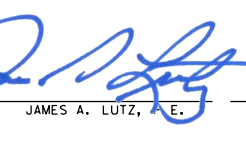
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DESIGN


LUKE REED, P.E. 2/24/2023
DATE

APPROVAL


JAMES A. LUTZ, P.E. 2/24/2023
DATE

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



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CR 2615 AT MEDINA RIVER

HYDRAULIC DATA SHEET

SHEET 5 OF 6

DIST:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
DWG:	6	TEXAS	SEE TITLE SHEET	CR 2615
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	0915	45
			JOB NO.:	SHEET NO.:
			056	54


HEC-RAS OUTPUT

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	39344	EX_PASS	Existing_Passing	2500.00	866.03	869.14	868.45	869.81	0.005881	6.78	423.32	175.55	0.69
Reach 1	39344	PR_PASS	Proposed_Passing	3000.00	866.03	869.49	868.91	870.24	0.005707	7.19	485.24	178.79	0.69
Reach 1	39344	100 YR	EX	87649.00	866.03	891.03	883.56	891.99	0.000996	11.41	15364.81	1073.88	0.40
Reach 1	39344	100 YR	PR	87649.00	866.03	891.05	883.56	892.01	0.000991	11.39	15392.54	1074.31	0.40
Reach 1	39240	EX_PASS	Existing_Passing	2500.00	865.82	868.64	868.05	869.18	0.005622	5.97	436.24	191.23	0.66
Reach 1	39240	PR_PASS	Proposed_Passing	3000.00	865.82	869.10	868.30	869.65	0.004564	6.02	526.79	195.58	0.61
Reach 1	39240	100 YR	EX	87649.00	865.82	890.99	882.78	891.87	0.000789	10.16	16109.55	1104.15	0.36
Reach 1	39240	100 YR	PR	87649.00	865.82	891.02	882.78	891.90	0.000785	10.15	16138.19	1104.59	0.36
Reach 1	39144	EX_PASS	Existing_Passing	2500.00	865.56	867.97	867.57	868.57	0.007224	6.24	412.38	198.01	0.73
Reach 1	39144	PR_PASS	Proposed_Passing	3000.00	865.56	868.78	867.81	869.23	0.003684	5.46	575.73	205.01	0.55
Reach 1	39144	100 YR	EX	87649.00	865.56	890.97	881.80	891.78	0.000695	9.63	16996.02	1178.59	0.34
Reach 1	39144	100 YR	PR	87649.00	865.56	890.99	881.80	891.80	0.000692	9.61	17026.74	1179.16	0.34
Reach 1	39023	EX_PASS	Existing_Passing	2500.00	864.22	867.24	866.66	867.75	0.005933	5.73	438.17	207.26	0.66
Reach 1	39023	PR_PASS	Proposed_Passing	3000.00	864.22	868.61	866.91	868.88	0.001747	4.23	758.46	271.20	0.39
Reach 1	39023	100 YR	EX	87649.00	864.22	891.01	880.21	891.66	0.000531	8.60	18955.46	1240.46	0.30
Reach 1	39023	100 YR	PR	87649.00	864.22	891.04	880.21	891.68	0.000529	8.58	18987.49	1240.97	0.30
Reach 1	38679	EX_PASS	Existing_Passing	2500.00	860.56	867.00	863.61	867.16	0.000614	3.51	944.42	292.94	0.25
Reach 1	38679	PR_PASS	Proposed_Passing	3000.00	860.56	868.49	863.92	868.60	0.000347	3.06	1539.92	410.05	0.20
Reach 1	38679	100 YR	EX	87649.00	860.56	890.31	877.97	891.39	0.000859	11.85	14148.72	854.98	0.39
Reach 1	38679	100 YR	PR	87649.00	860.56	890.34	877.97	891.41	0.000857	11.84	14171.65	856.65	0.38
Reach 1	38588	EX_PASS	Existing_Passing	2500.00	860.59	866.77	864.24	867.07	0.001317	4.62	696.29	264.72	0.35
Reach 1	38588	PR_PASS	Proposed_Passing	3000.00	860.59	868.39	864.66	868.56	0.000599	3.72	1170.07	360.59	0.25
Reach 1	38588	100 YR	EX	87649.00	860.59	890.07	879.16	891.28	0.001035	12.62	13085.25	829.64	0.42
Reach 1	38588	100 YR	PR	87649.00	860.59	890.10	879.16	891.31	0.001031	12.60	13109.71	833.28	0.42
Reach 1	38509	EX_PASS	Existing_Passing	2500.00	860.60	866.44	864.55	866.92	0.002279	5.57	470.99	244.20	0.46
Reach 1	38509	PR_PASS	Proposed_Passing	3000.00	860.60	868.32	864.94	868.50	0.000682	3.83	1070.32	351.51	0.26
Reach 1	38509	100 YR	EX	87649.00	860.60	889.85	879.19	891.19	0.001119	13.00	12535.66	826.72	0.43
Reach 1	38509	100 YR	PR	87649.00	860.60	889.88	879.19	891.21	0.001113	12.98	12561.82	827.70	0.43
Reach 1	38388	EX_PASS	Existing_Passing	2500.00	860.45	866.33	863.80	866.65	0.001496	4.52	556.09	249.00	0.37
Reach 1	38388	PR_PASS	Proposed_Passing	3000.00	860.45	868.30	864.16	868.42	0.000432	3.07	1330.90	359.02	0.21
Reach 1	38388	100 YR	EX	87649.00	860.45	889.74	878.57	891.05	0.000990	12.21	12735.11	834.34	0.41
Reach 1	38388	100 YR	PR	87649.00	860.45	889.78	878.57	891.07	0.000985	12.18	12762.07	835.27	0.41
Reach 1	38353	EX_PASS	Existing_Passing	2500.00	860.42	866.30	863.70	866.59	0.001293	4.33	628.57	259.57	0.35
Reach 1	38353	PR_PASS	Proposed_Passing	3000.00	860.42	868.28	864.07	868.40	0.000425	3.12	1306.33	350.43	0.21
Reach 1	38353	100 YR	EX	87649.00	860.42	889.63	878.78	891.01	0.001032	12.54	12715.40	857.25	0.42
Reach 1	38353	100 YR	PR	87649.00	860.42	889.66	878.78	891.03	0.001027	12.52	12742.49	858.96	0.42
Reach 1	38202	EX_PASS	Existing_Passing	2500.00	860.31	866.24	863.43	866.41	0.000755	3.57	893.76	299.55	0.27
Reach 1	38202	PR_PASS	Proposed_Passing	3000.00	860.31	868.25	863.82	868.34	0.000294	2.75	1583.38	360.02	0.18
Reach 1	38202	100 YR	EX	87649.00	860.31	889.49	878.38	890.84	0.001043	12.79	13621.46	973.21	0.42
Reach 1	38202	100 YR	PR	87649.00	860.31	889.52	878.38	890.87	0.001037	12.76	13654.14	973.97	0.42
Reach 1	38146	EX_PASS	Existing_Passing	2500.00	860.03	866.20	863.16	866.38	0.000718	3.64	987.14	307.63	0.27
Reach 1	38146	PR_PASS	Proposed_Passing	3000.00	860.03	868.24	863.51	868.32	0.000276	2.76	1672.60	355.03	0.17
Reach 1	38146	100 YR	EX	87649.00	860.03	889.44	878.56	890.78	0.001081	13.13	14444.30	1014.29	0.43
Reach 1	38146	100 YR	PR	87649.00	860.03	889.47	878.56	890.81	0.001074	13.10	14479.03	1014.99	0.43
Reach 1	38100	EX_PASS	Existing_Passing	2500.00	857.50	866.05	862.27	866.32	0.000821	4.48	694.20	194.58	0.29
Reach 1	38100	PR_PASS	Proposed_Passing	3000.00	857.50	867.98	862.78	868.29	0.000609	4.52	697.39	240.64	0.26
Reach 1	38100	100 YR	EX	87649.00	857.50	889.48	880.90	890.69	0.001071	13.38	13105.53	913.84	0.43
Reach 1	38100	100 YR	PR	87649.00	857.50	889.52	880.90	890.72	0.001065	13.35	13136.03	919.16	0.42
Reach 1	38081		Bridge										
Reach 1	38062	EX_PASS	Existing_Passing	2500.00	856.07	864.38	861.14	864.85	0.001383	5.55	453.43	210.46	0.38
Reach 1	38062	PR_PASS	Proposed_Passing	3000.00	856.07	864.85	861.54	865.35	0.001426	5.76	537.02	222.13	0.38
Reach 1	38062	100 YR	EX	87649.00	856.07	889.32	877.36	890.40	0.000905	12.42	13570.55	880.45	0.39
Reach 1	38062	100 YR	PR	87649.00	856.07	889.32	877.37	890.40	0.000905	12.42	13570.55	880.45	0.39
Reach 1	38026	EX_PASS	Existing_Passing	2500.00	856.19	864.46	861.04	864.69	0.000782	3.95	781.34	220.40	0.28
Reach 1	38026	PR_PASS	Proposed_Passing	3000.00	856.19	864.92	861.41	865.19	0.000856	4.33	884.07	226.46	0.30
Reach 1	38026	100 YR	EX	87649.00	856.19	887.87	880.05	890.03	0.001527	15.71	12202.55	832.46	0.51
Reach 1	38026	100 YR	PR	87649.00	856.19	887.87	880.05	890.03	0.001527	15.71	12202.55	832.46	0.51
Reach 1	37972	EX_PASS	Existing_Passing	2500.00	856.37	864.20	861.63	864.62	0.001522	5.22	554.98	193.77	0.39
Reach 1	37972	PR_PASS	Proposed_Passing	3000.00	856.37	864.63	862.04	865.11	0.001637	5.68	690.27	210.30	0.41
Reach 1	37972	100 YR	EX	87649.00	856.37	887.16	879.11	889.88	0.002103	18.08	11143.81	796.56	0.60
Reach 1	37972	100 YR	PR	87649.00	856.37	887.16	879.11	889.88	0.002103	18.08	11143.81	796.56	0.60

Plotted on: 2/24/2023


Design File name: P:\117\99\06\CR2615\Design\Civil\Drawings\179906HDS06.dgn

DESIGN



LUKE REED, P.E.

APPROVAL



JAMES A. LUTZ, P.E.

REV. NO.	DATE	DESCRIPTION	BY



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CR 2615 AT MEDINA RIVER

HYDRAULIC DATA SHEET

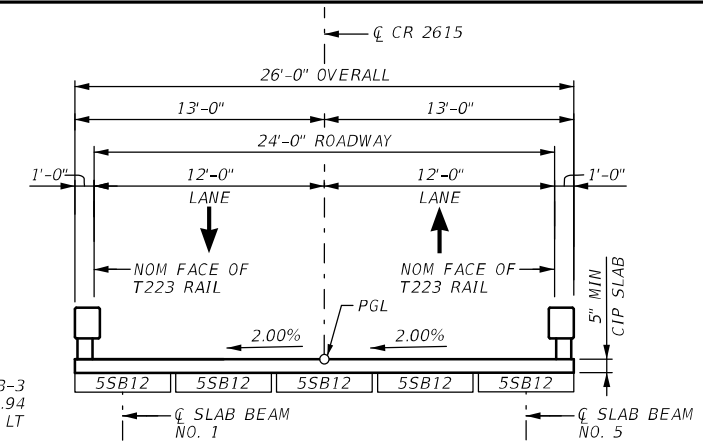
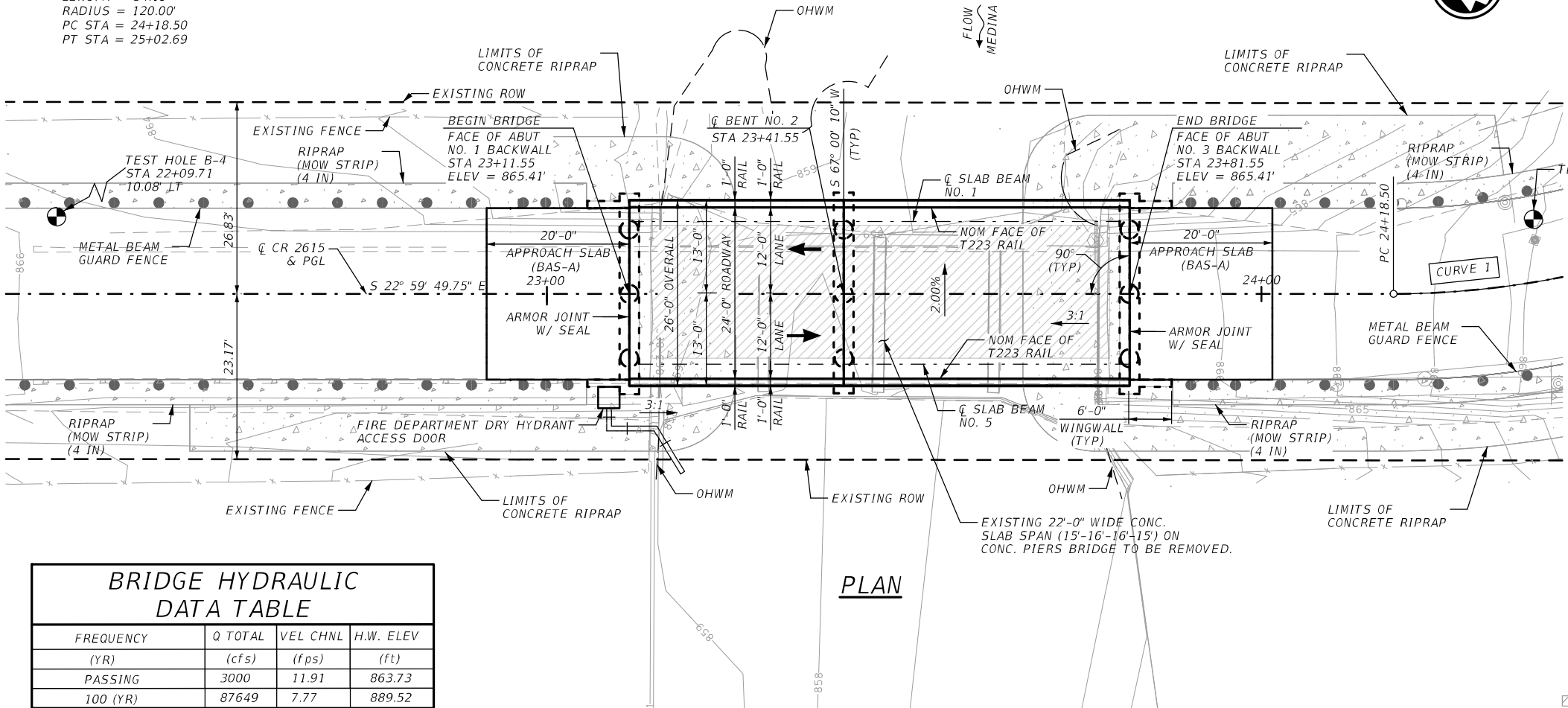
SHEET 6 OF 6

DIST.	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
SAT	6	TEXAS	SEE TITLE SHEET			CR 2615
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.	
SAT	MEDINA	0915	45	056	55	

Plotted on: 1/25/2023

CURVE 1

PI STA = 24+62.41
 DELTA = 40° 11' 51.25" (LT)
 DEGREE OF CURVE = 47° 44' 47.34"
 TANGENT = 43.91'
 LENGTH = 84.19'
 RADIUS = 120.00'
 PC STA = 24+18.50
 PT STA = 25+02.69



TYPICAL SECTION
(NOT TO SCALE)

GENERAL NOTES:

- BRIDGE DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).
- HORIZONTAL AND VERTICAL DIMENSIONS ARE SHOWN. LENGTHS MUST BE CORRECTED FOR GRADE OR CROSS SLOPE WHERE APPROPRIATE.
- CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- SEE TxDOT CONCRETE RIPRAP (CRR) STANDARD FOR RIPRAP DETAILS.
- THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE FOR CALCULATING ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS. COLUMNS MAY BE FORMED AND CAST WITH DRILL SHAFTS FOR "H" = 6' OR LESS. SEE FD STANDARD FOR DETAILS.
- SEE TEST HOLE ELEVATION SHEET FOR SOIL STRATA, TCP TEST DATA, AND FOUNDATION NOTES.
- BRIDGE NOT DESIGNED FOR FUTURE OVERLAY.
- REMOVE EXISTING BRIDGE FOUNDATIONS 2' MINIMUM BELOW FINAL GRADE.
- FUNCTIONAL CLASS = LOCAL
 AADT(2022) = 250
 AADT(2042) = 350
 DESIGN SPEED = MEETS EXISTING
 EXISTING NBI NO. = 15-163-AA04-65-001

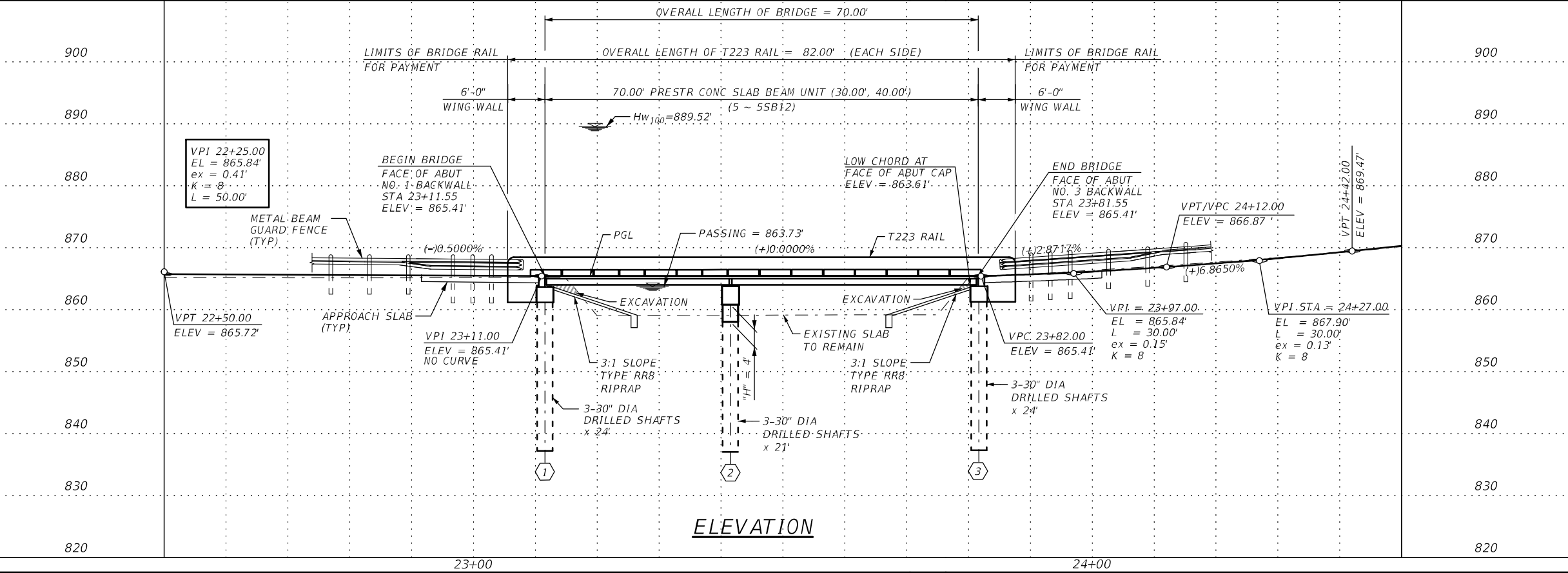
LEGEND:

- BOREHOLE LOCATION
- EXISTING BRIDGE TO BE REMOVED



1/25/2023
 SCALE: 1" = 20'

FREQUENCY (YR)	Q TOTAL (cfs)	VEL CHNL (fps)	H.W. ELEV (ft)
PASSING	3000	11.91	863.73
100 (YR)	87649	7.77	889.52



HL 93 LOADING
 SUPERSTRUCTURE INV/OPR RATINGS: 1.08/1.63

REV. NO.	DATE	DESCRIPTION	BY

SEA STRUCTURAL ENGINEERING ASSOCIATES
 TEXAS REGISTERED ENGINEERING FIRM F-199

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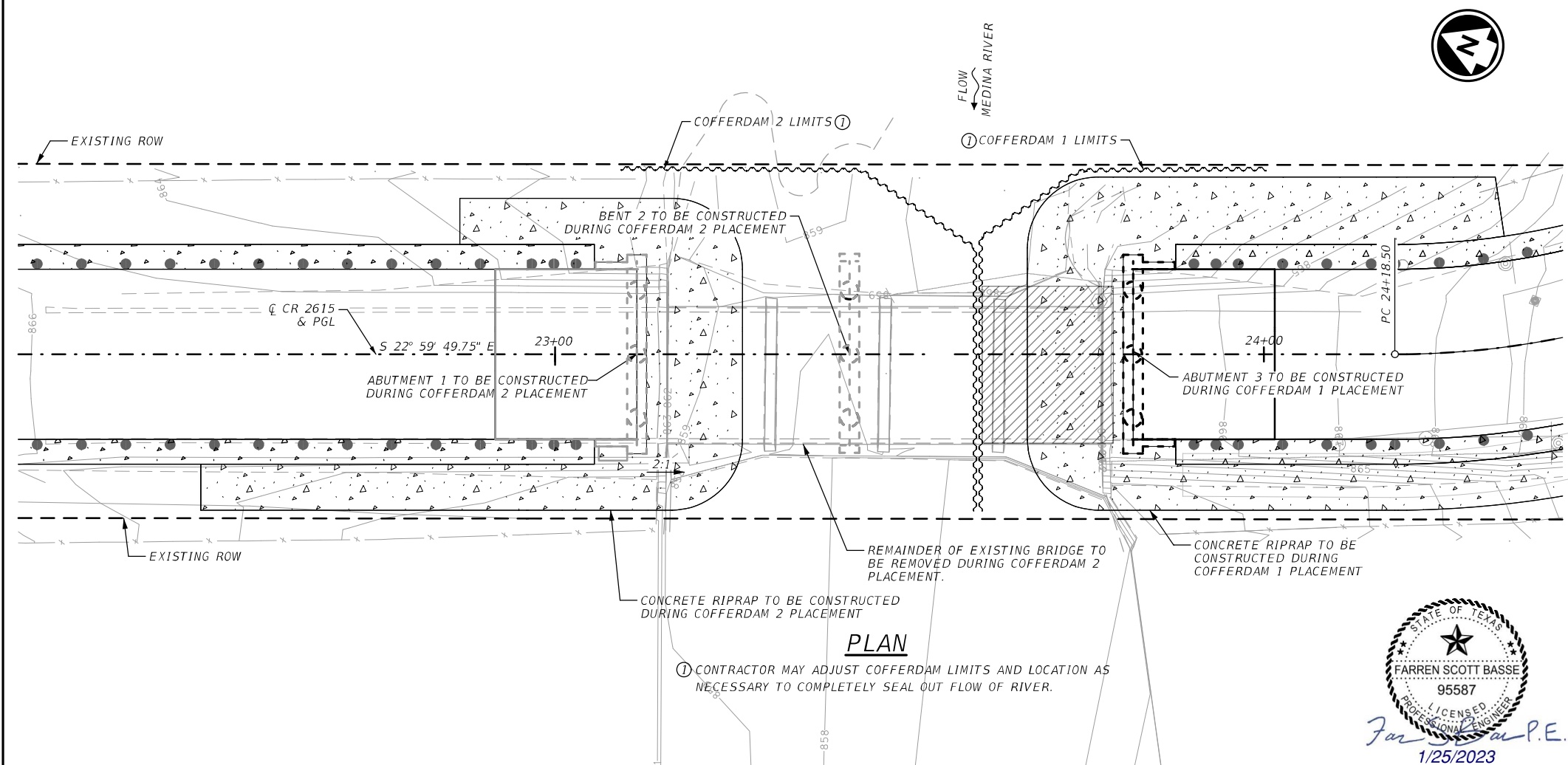
BRIDGE LAYOUT
 NBI NO. 15-163-0-AA04-65-005
 CR 2615 MEDINA RIVER BRIDGE

DGN:	MAG	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	FSB	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	EE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	FSB	SAT	MEDINA	0915	45	056	56

Design File name: CR2615_117906_SEA_BRG01.dgn

Plotted on: 1/25/2023

Design File name: CR2615_117906_SEA_CC.dgn



NOTES:

CONTRACTOR SHALL DETERMINE IF COFFERDAM IS REQUIRED FOR EXISTING BRIDGE REMOVAL AND SUBSTRUCTURE CONSTRUCTION.

PAYMENT FOR COFFERDAM WILL BE BY SF PER ITEM 403-6006 TEMPORARY SPL SHORING (COFFERDAM).

IF COFFERDAMS ARE USED SUBMIT DESIGN CALCULATIONS AND DETAIL SHEETS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER FOR THE COFFERDAMS. SUBMIT THIS INFORMATION A MINIMUM OF 30 DAYS PRIOR TO SCHEDULED COMMENCEMENT OF WORK ON THE COFFERDAMS. DO NOT BEGIN WORK UNTIL THE DESIGN CALCULATIONS AND DETAIL SHEETS HAVE BEEN APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DESIGN, FABRICATION, INSTALLATION, MAINTENANCE IN SERVICE, AND REMOVAL OF COFFERDAMS USED.

DESIGN CALCULATIONS SHALL COVER THE RANGE OF HEIGHTS, WATER DEPTHS, AND LOADING CONDITIONS ON THE PROJECT. INCLUDE A SUMMARY OF ALL DESIGN PARAMETERS USED; MATERIAL TYPES, STRENGTH VALUES, AND ASSUMED ALLOWABLE LOADS AND LOADING COMBINATIONS INCLUDING CONSTRUCTION STAGES, CONNECTION DESIGNS, FACTOR-OF-SAFETY PARAMETERS, AND ALL OTHER INFORMATION NECESSARY TO PROVIDE A COMPLETE DESIGN.

DETAIL SHEETS SHALL INCLUDE COMPLETE DETAILS FOR EACH CONSTRUCTION PHASE INCLUDING WATER ELEVATION AND ELEVATION OF DREDGE LINE INSIDE OF THE COFFERDAM; SECTION TYPE, LENGTH AND STEEL GRADE FOR SHEET PILE SECTIONS, ELEVATION, LOCATION, SECTION TYPE AND STEEL GRADE FOR ALL WALE BEAMS AND STRUTS; DETAILS OF ALL CONNECTIONS, AND ALL OTHER INFORMATION NECESSARY TO PROVIDE A COMPLETE SET OF DETAILS.

CONTRACTOR TO SECURE ALL REQUIRED PERMITS.

COFFERDAM 1 PLACEMENT

STEP 1: ERECT COFFERDAM 1.

STEP 2: REMOVE EXISTING HATCHED BRIDGE ELEMENTS WITHIN COFFERDAM 1 LIMITS. (MAX. EXISTING SLAB OVERHANG TO REMAIN MAY NOT EXCEED 2'. USE OF EXISTING BRIDGE IS NOT ALLOWED AFTER REMOVAL.)

STEP 3: CONSTRUCT ABUTMENT 3 AND CONCRETE RIPRAP ALONG ABUTMENT 3

STEP 4: REMOVE COFFERDAM 1.

COFFERDAM 2 PLACEMENT

STEP 1: ERECT COFFERDAM 2.

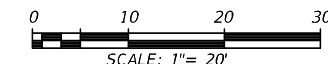
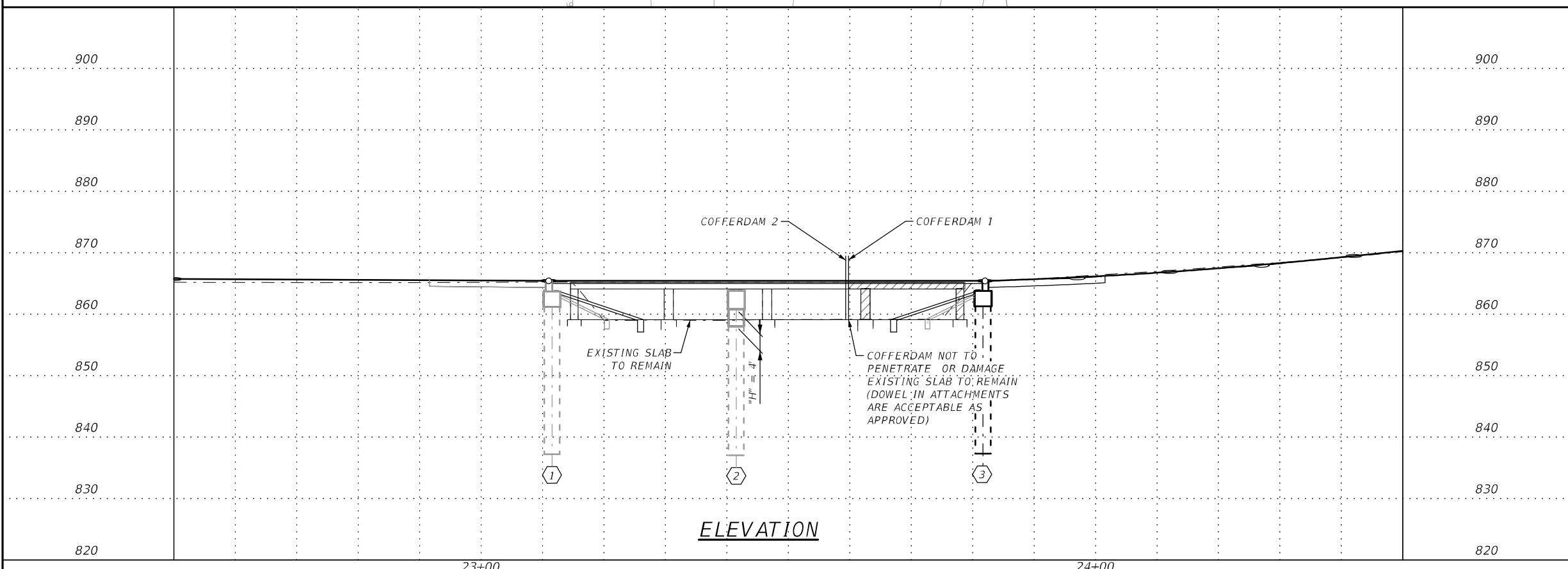
STEP 2: REMOVE REMAINING EXISTING BRIDGE ELEMENTS.

STEP 3: CONSTRUCT ABUTMENT 1, CONCRETE RIPRAP ALONG ABUTMENT 1, AND INTERIOR BENT 2.

STEP 4: REMOVE COFFERDAM 2.

LEGEND:

REMOVAL OF EXISTING BRIDGE DURING COFFERDAM 1 PLACEMENT



REV. NO.	DATE	DESCRIPTION	BY

SEA STRUCTURAL ENGINEERING ASSOCIATES
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COFFERDAM CONSTRUCTION SEQUENCE

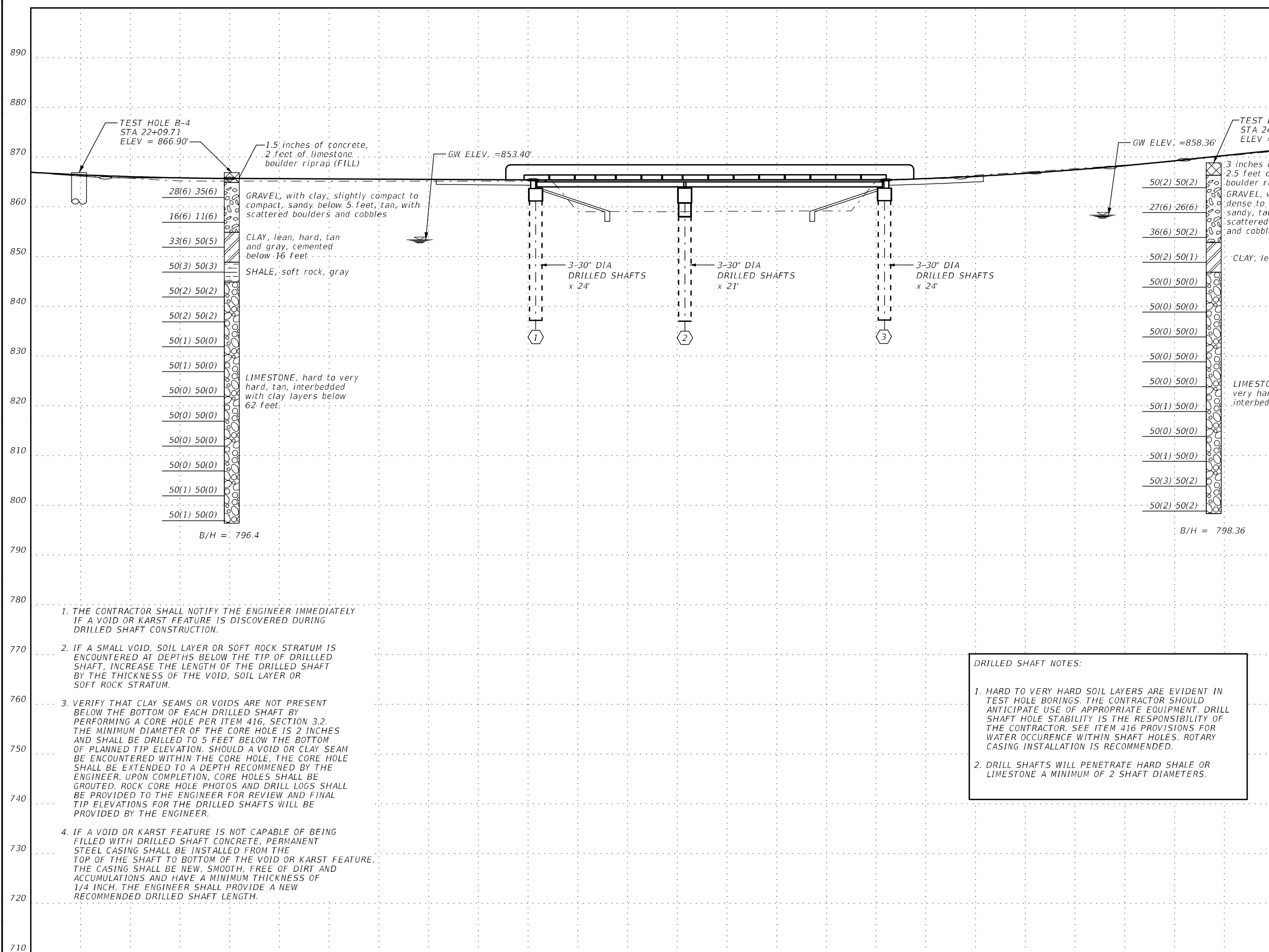
CR 2615 MEDINA RIVER BRIDGE

DGN:	MAG	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	FSB	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	EE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	FSB	SAT	MEDINA	0915	45	056	57

SEE BRIDGE LAYOUT FOR VERTICAL CONTROL AND DETAILS NOT SHOWN.

Plotted on: 1/25/2023

Design File name: CR2615_1179906_SEA_Bor-ing.dgn



1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF A VOID OR KARST FEATURE IS DISCOVERED DURING DRILLED SHAFT CONSTRUCTION.
2. IF A SMALL VOID, SOIL LAYER OR SOFT ROCK STRATUM IS ENCOUNTERED AT DEPTHS BELOW THE TIP OF DRILLED SHAFT, INCREASE THE LENGTH OF THE DRILLED SHAFT BY THE THICKNESS OF THE VOID, SOIL LAYER OR SOFT ROCK STRATUM.
3. VERIFY THAT CLAY SEAMS OR VOIDS ARE NOT PRESENT BELOW THE BOTTOM OF EACH DRILLED SHAFT BY PERFORMING A CORE HOLE PER ITEM 416, SECTION 3.2. THE MINIMUM DIAMETER OF THE CORE HOLE IS 2 INCHES AND SHALL BE DRILLED TO 5 FEET BELOW THE BOTTOM OF PLANNED TIP ELEVATION. SHOULD A VOID OR CLAY SEAM BE ENCOUNTERED WITHIN THE CORE HOLE, THE CORE HOLE SHALL BE EXTENDED TO A DEPTH RECOMMENDED BY THE ENGINEER. UPON COMPLETION, CORE HOLES SHALL BE GROUTED. ROCK CORE HOLE PHOTOS AND DRILL LOGS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND FINAL TIP ELEVATIONS FOR THE DRILLED SHAFTS WILL BE PROVIDED BY THE ENGINEER.
4. IF A VOID OR KARST FEATURE IS NOT CAPABLE OF BEING FILLED WITH DRILLED SHAFT CONCRETE, PERMANENT STEEL CASING SHALL BE INSTALLED FROM THE TOP OF THE SHAFT TO BOTTOM OF THE VOID OR KARST FEATURE. THE CASING SHALL BE NEW, SMOOTH, FREE OF DIRT AND ACCUMULATIONS AND HAVE A MINIMUM THICKNESS OF 1/4 INCH. THE ENGINEER SHALL PROVIDE A NEW RECOMMENDED DRILLED SHAFT LENGTH.

DRILLED SHAFT NOTES:

1. HARD TO VERY HARD SOIL LAYERS ARE EVIDENT IN TEST HOLE BORINGS. THE CONTRACTOR SHOULD ANTICIPATE USE OF APPROPRIATE EQUIPMENT. DRILL SHAFT HOLE STABILITY IS THE RESPONSIBILITY OF THE CONTRACTOR. SEE ITEM 416 PROVISIONS FOR WATER OCCURENCE WITHIN SHAFT HOLES. ROTARY CASING INSTALLATION IS RECOMMENDED.
2. DRILL SHAFTS WILL PENETRATE HARD SHALE OR LIMESTONE A MINIMUM OF 2 SHAFT DIAMETERS.



REV. NO.	DATE	DESCRIPTION	BY

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TEST HOLE ELEVATION
CR 2615 MEDINA RIVER BRIDGE

DGN: MAG	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO. SEE TITLE SHEET	HIGHWAY NO. CR 2615
CHK DGN: FSB	DIST. SAT	COUNTY MEDINA	CONT. NO. 0915	SECT. NO. 45
DWG: EE			JOB NO. 056	SHEET NO. 58

23+00

24+00

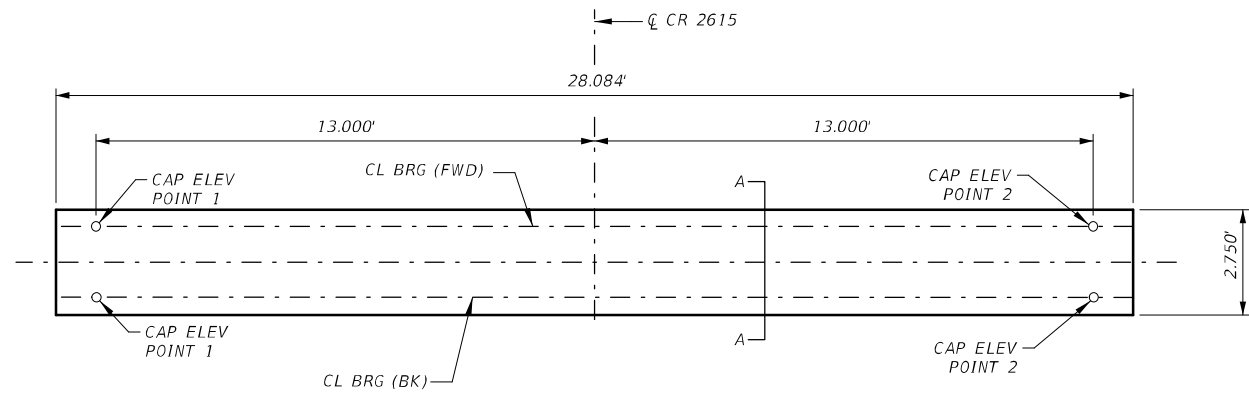
Plotted on: 1/25/2023

SUMMARY OF ESTIMATED QUANTITIES

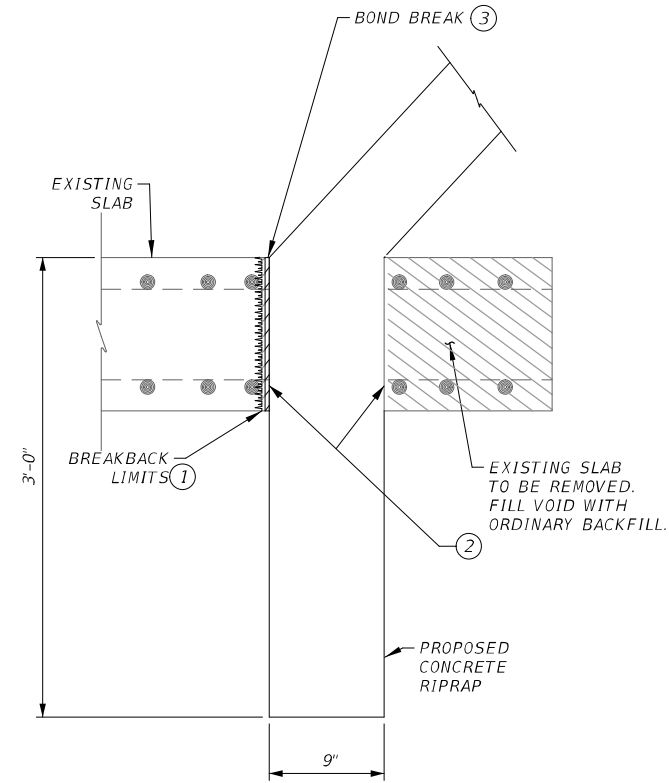
BRIDGE ELEMENT	0403-6006		0416-6003	0420-6013			0420-6029	0420-6037	0422-6007	0422-6015	0425-6010	0442-6007	0450-6006	0454-6004	0496-6009
	TEMPORARY SPL SHORING (COFFERDAM)	DRILL SHAFT (30 IN)	CL C CONC	(ABUT)	(CAP)	(COLUMN)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM 55B12	STR STEEL (MISC NON-BRIDGE)	RAIL (TY T223)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 0-99 FT LENGTH)		
				SF	LF	CY								CY	CY
2 - ABUTMENTS		144	18.9						38.5						
1 - INTERIOR BENT		63		8.7	2.2										
1 - 70.000' PRESTR CONC SLAB BEAM UNIT							1,820		345.00		164.0	44			
TOTAL	840	207	18.9	8.7	2.2	1,820	38.5	345.00	135	164.0	44	1			

CAP ELEVATIONS ①		
LOCATION	POINT 1	POINT 2
ABUT 1 (FWD)	863.525	864.045
BENT 2 (BK)	863.525	864.045
BENT 2 (FWD)	863.442	863.962
ABUT 3 (BK)	863.442	863.962

① TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTHS SHOWN ON SLAB BEAM UNIT SHEET.



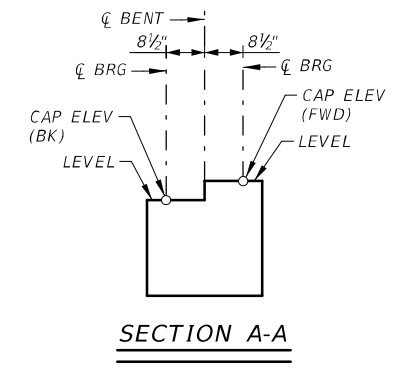
PLAN AT CAP ELEVATION POINTS
(LOOKING FORWARD STATION)



RIPRAP TOEWALL MODIFICATION

RIPRAP REINFORCEMENT NOT SHOWN, SEE CONCRETE RIPRAP STANDARD FOR RRB DETAILS AND NOTES. REMOVE AND DISPOSE OF EXISTING CONCRETE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS. PAYMENT FOR SAWCUT, CONCRETE REMOVAL, ORDINARY BACKFILL, AND EXISTING REINFORCEMENT PREPARATION WILL BE SUBSIDIARY TO THE CONCRETE RRB BID ITEM.

- ① SAWCUT 1/2" MINIMUM DEPTH ALONG THE LAYOUT LINE. PROTECT EXISTING REINFORCING STEEL FROM DAMAGE DURING CONCRETE SAWCUT, BREAKBACK, AND REMOVAL OPERATIONS.
- ② USE DMS 6100 WHERE EXISTING REINFORCEMENT IS EXPOSED TO PROTECT AGAINST CORROSION.
- ③ BOND TO EXISTING SLAB WITH AN APPROVED ADHESIVE.



SECTION A-A



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



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ESTIMATED QUANTITIES & CAP ELEVATIONS

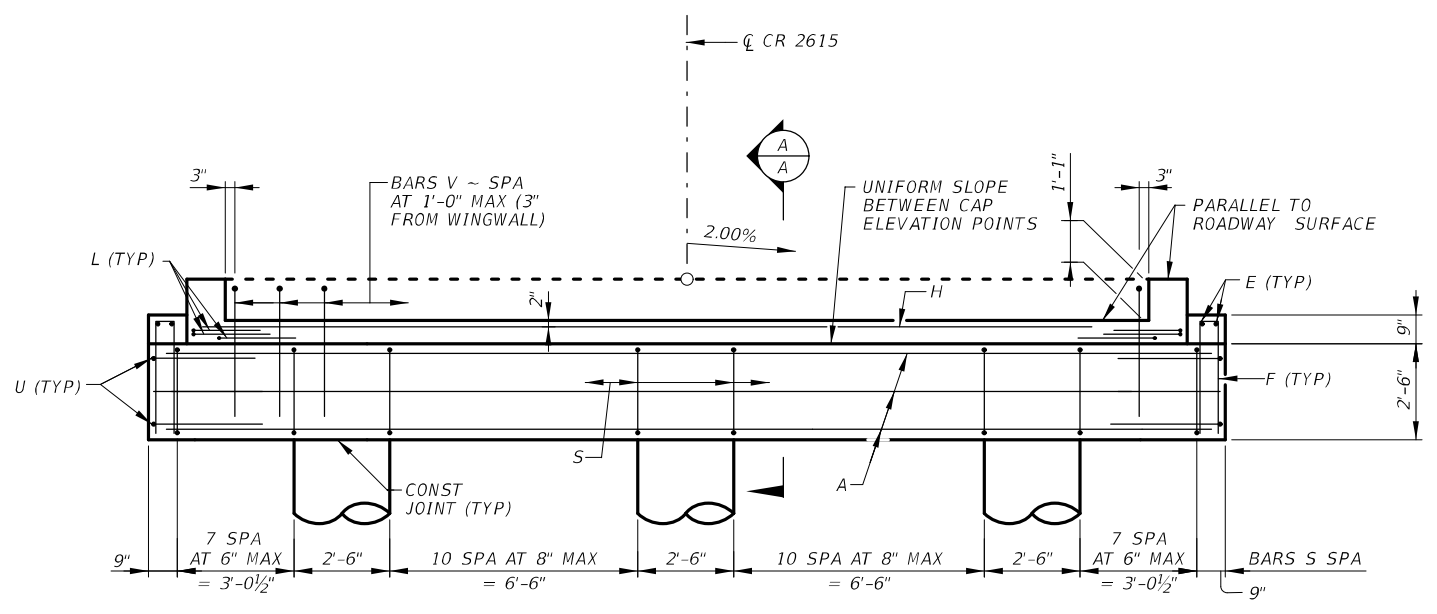
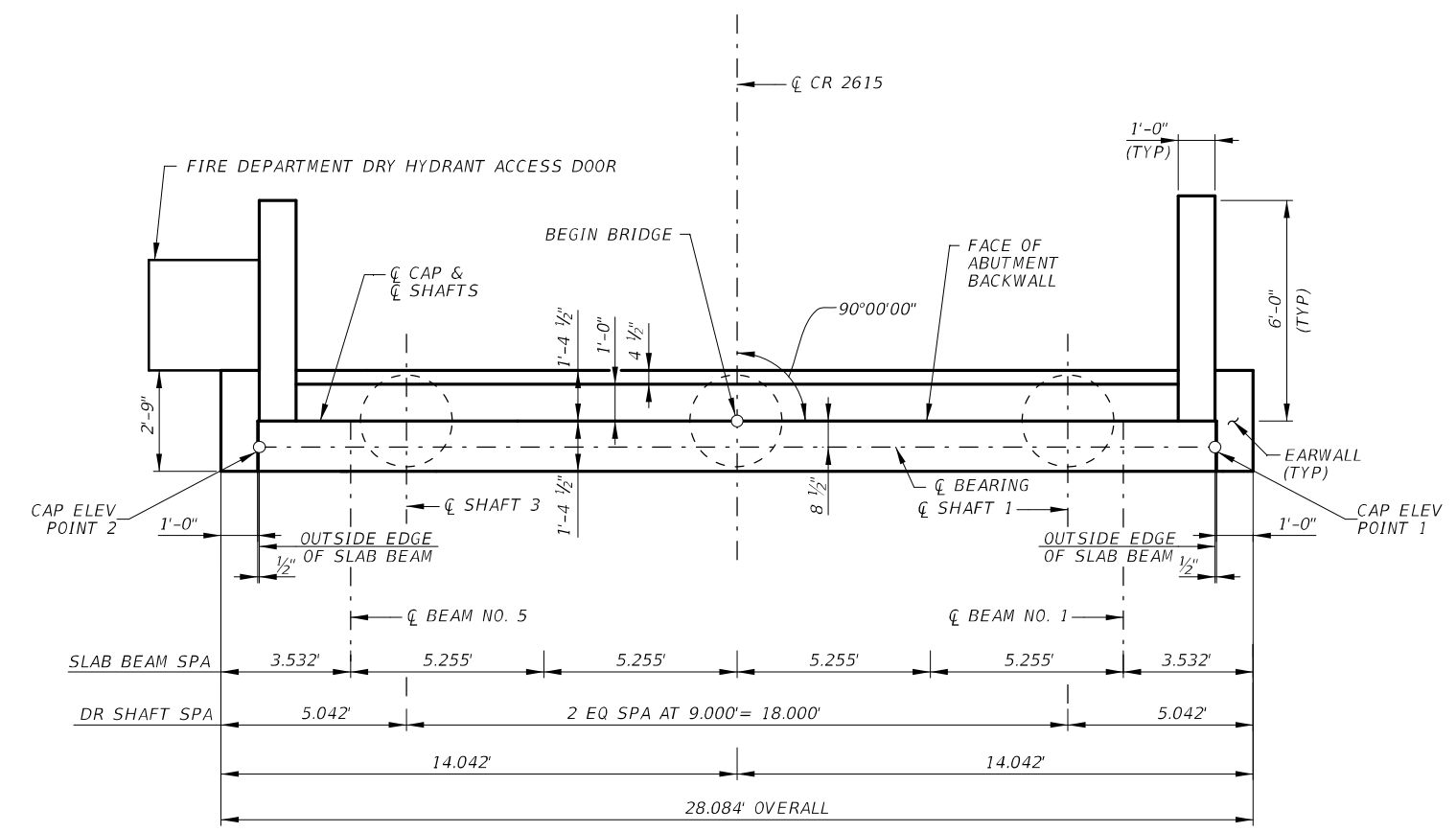
CR 2615 MEDINA RIVER BRIDGE

DGN:	MAG	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	FSB	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	EE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	FSB	SAT	MEDINA	0915	45	056	59

Des.i gn: File name: CR2615_1179906_SEA_EQY01.dgn

Plotted on: 1/25/2023

Des:gn File name: CR2615_1179906_SEA_ABUT01.dgn



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE CONCRETE RIPRAP (CRR) STANDARD AND ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEETS FOR RIPRAP DETAILS AND NOTES.

SEE RAILING STANDARDS FOR RAIL ANCHORAGE IN WINGWALLS.

SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET, FOR TOP OF CAP ELEVATIONS.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

SEE ARMOR JOINT (AJ) STANDARD FOR JOINT DETAILS.

SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.

CALCULATED FOUNDATION LOAD = 49 TONS/SHAFT

CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

MATERIAL NOTES:

PROVIDE CLASS C CONCRETE ($f'_c = 3,600$ PSI).

PROVIDE GRADE 60 REINFORCING STEEL.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY

SEA STRUCTURAL ENGINEERING ASSOCIATES
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ABUTMENT NO. 1

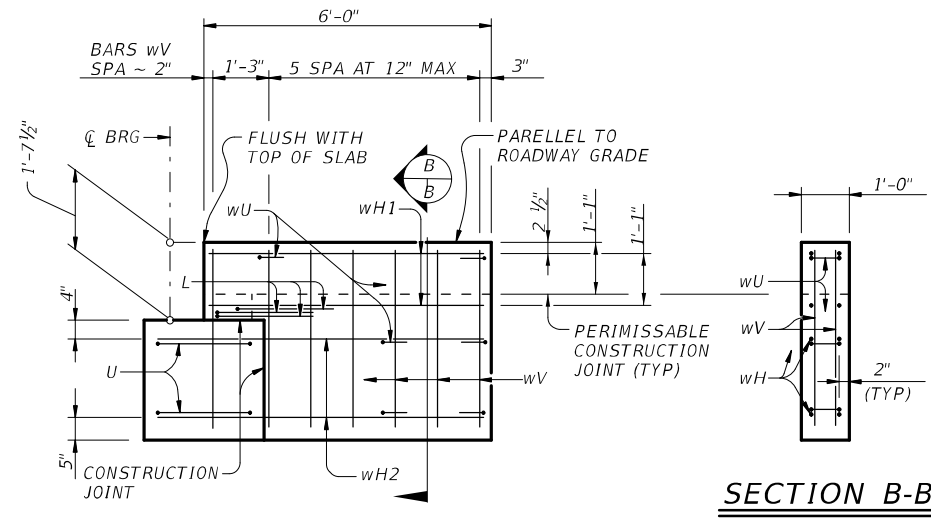
CR 2615 MEDINA RIVER BRIDGE

SHEET 1 OF 2

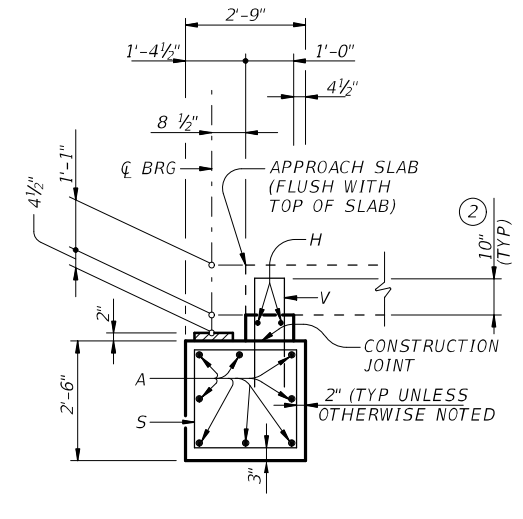
DGN:	FED. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
MAG	6	TEXAS	SEE TITLE SHEET	CR 2615

CHK:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
FSB	SAT	MEDINA	0915	45	056	60

Plotted on: 1/25/2023

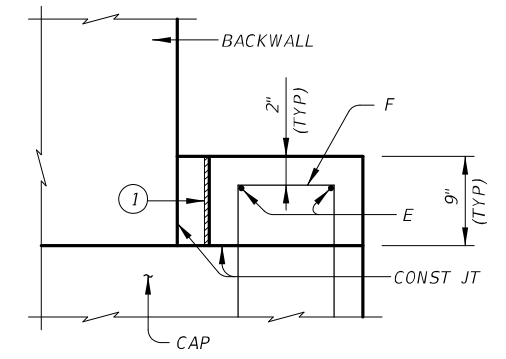


WINGWALL ELEVATION
(EARWALL NOT SHOWN FOR CLARITY.)



SECTION A-A
NOTE: AT CONTRACTOR'S OPTION, BACKWALL MAY BE CAST WITH APPROACH SLAB.

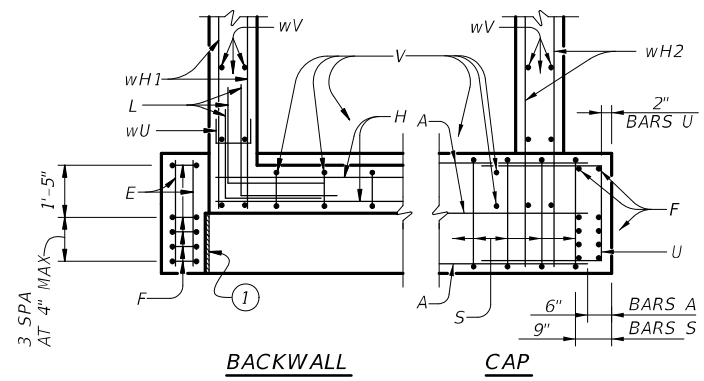
- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. CAST INSIDE FACE OF EARWALL PERPENDICULAR TO CAP. (TYP)
- ② INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.
- ④ STEEL PLATES AND SQUARE TUBES SHALL BE ASTM A-36 AND GALVANIZED PER TxDOT ITEM 445.
- ⑤ STEEL PLATES SHALL BE FLUSH MOUNTED.
- ⑥ GALVANIZE PER TxDOT ITEM 445.



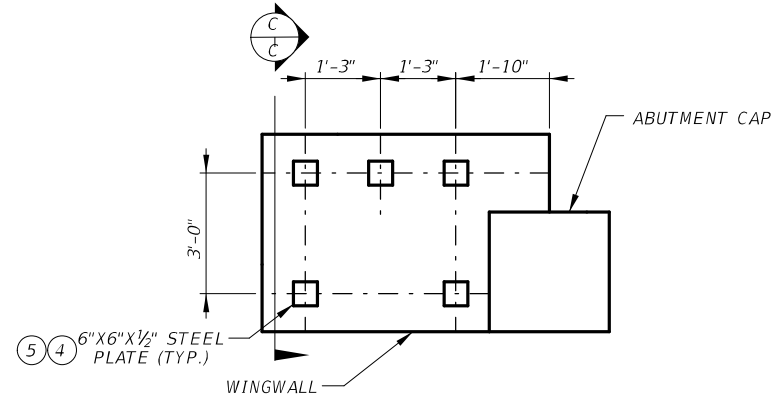
EARWALL ELEVATION DETAIL
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)

TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	27'-1"	1,151
E	4	#4	2'-5"	6
F	10	#4	6'-4"	42
H	2	#5	25'-8"	54
L	6	#6	4'-0"	36
S	38	#4	9'-10"	250
U	4	#6	7'-4"	44
V	25	#5	7'-4"	191
wH1	8	#6	5'-8"	68
wH2	8	#6	6'-11"	83
wU	12	#4	1'-8"	13
wV	28	#5	3'-10"	112
REINFORCING STEEL (3)			Lb	2,050
CLASS "C" CONCRETE (ABUT)			CY	9.4

③ FOR CONTRACTORS INFORMATION ONLY.

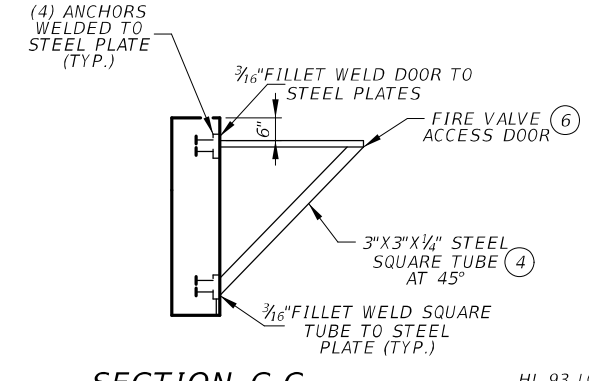


CORNER DETAILS

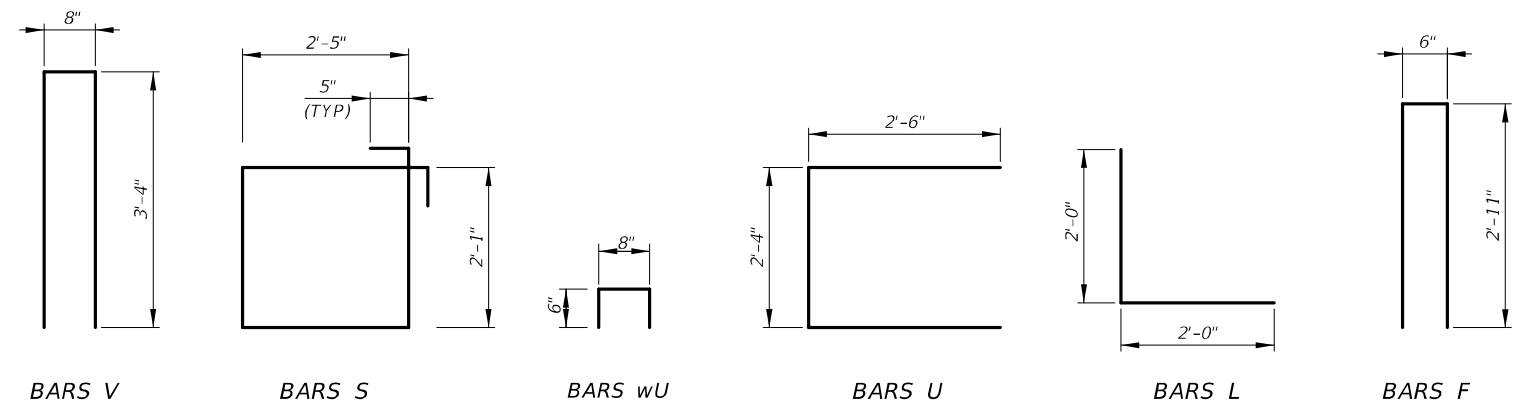


STEEL ANCHOR PLATE LAYOUT

SEE BRIDGE LAYOUT AND ABUTMENT 1 PLAN & ELEVATION SHEET FOR FIRE VALVE ACCESS DOOR LOCATION.
CONTRACTOR TO FIELD VERIFY FIRE ACCESS DOOR AND ALL OTHER DIMENSIONS IN FIELD PRIOR TO ORDERING MATERIALS. ADJUST PLATE LOCATIONS AND DIMENSIONS AS NEEDED.
ALL MATERIAL, LABOR, EQUIPMENT, AND INCIDENTALS WILL BE CONSIDERED SUBSIDIARY FOR PAYMENT TO ITEM 0442-6007.



SECTION C-C



STEEL PLATE ELEVATION AND PLAN

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



ABUTMENT NO. 1 DETAILS

CR 2615 MEDINA RIVER BRIDGE

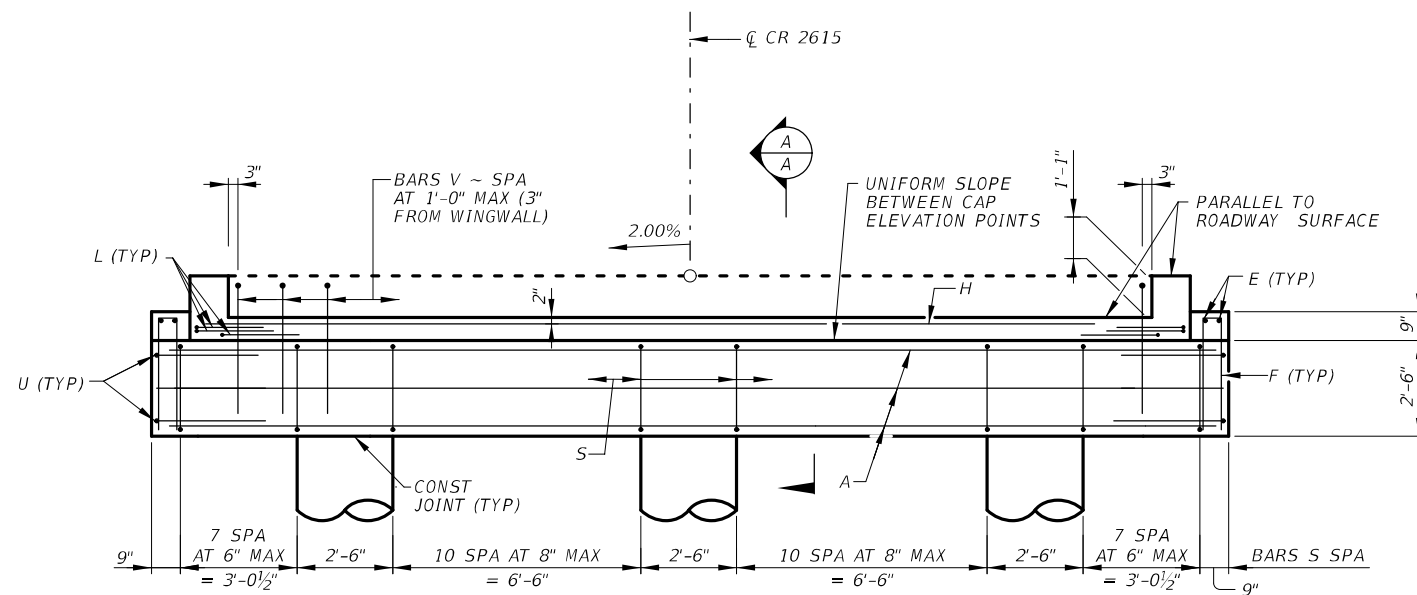
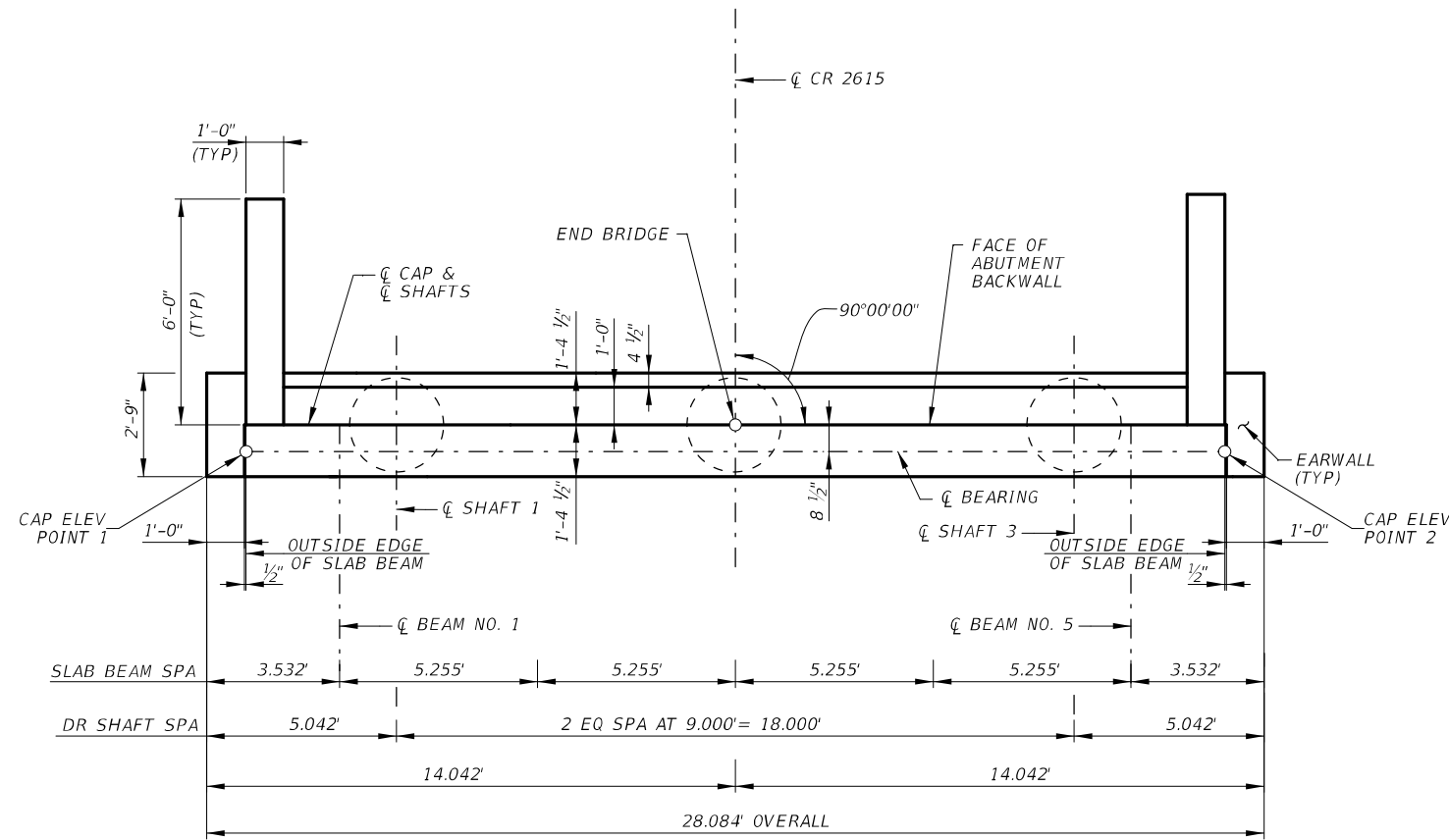
SHEET 2 OF 2

DGN:	FED. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
MAG	6	TEXAS	SEE TITLE SHEET	CR 2615		
CHK DGN:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
FSB	SAT	MEDINA	0915	45	056	61

Desi.gn File name: CR2615_1179906_SEA_ABUT02.dgn

Plotted on: 1/25/2023

Des:gn File name: CR2615_1179906_SEA_ABUT03.dgn



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE CONCRETE RIPRAP (CRR) STANDARD AND ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEETS FOR RIPRAP DETAILS AND NOTES.

SEE RAILING STANDARDS FOR RAIL ANCHORAGE IN WINGWALLS.

SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET, FOR TOP OF CAP ELEVATIONS.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

SEE ARMOR JOINT (AJ) STANDARD FOR JOINT DETAILS.

SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.

CALCULATED FOUNDATION LOAD = 58 TONS/SHAFT

CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

MATERIAL NOTES:

PROVIDE CLASS C CONCRETE (f'c = 3,600 PSI).

PROVIDE GRADE 60 REINFORCING STEEL.



Farren Scott Basse P.E.
1/25/2023

HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



ABUTMENT NO. 3

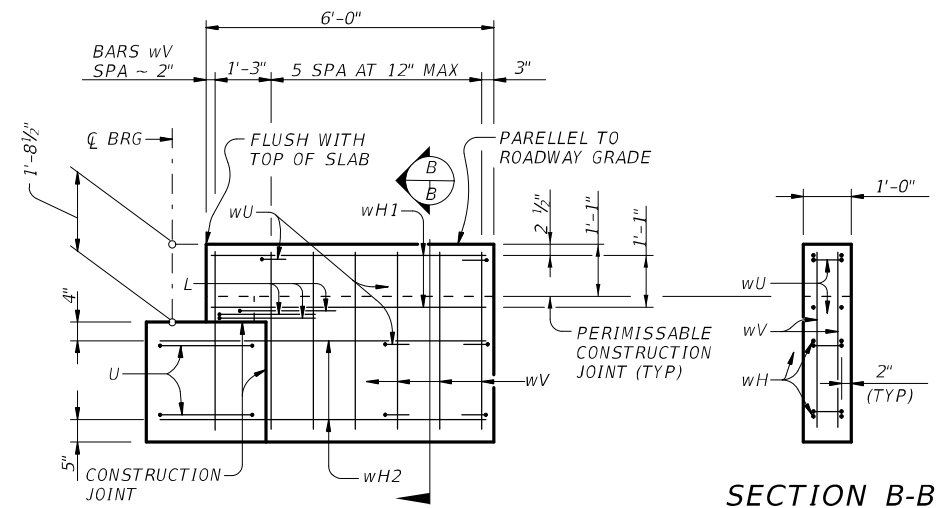
CR 2615 MEDINA RIVER BRIDGE

SHEET 1 OF 2

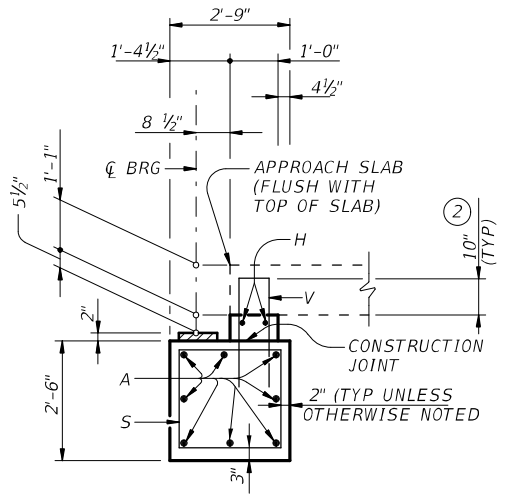
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CHK DGN:	FSB	DIST. COUNTY:	SAT MEDINA	CONT. NO. SECT. NO.:	0915 45	JOB NO.:	056	SHEET NO.:	62

Plotted on: 1/25/2023

Des:gn File name: CR2615_1179906_SEA_ABUT04.dgn

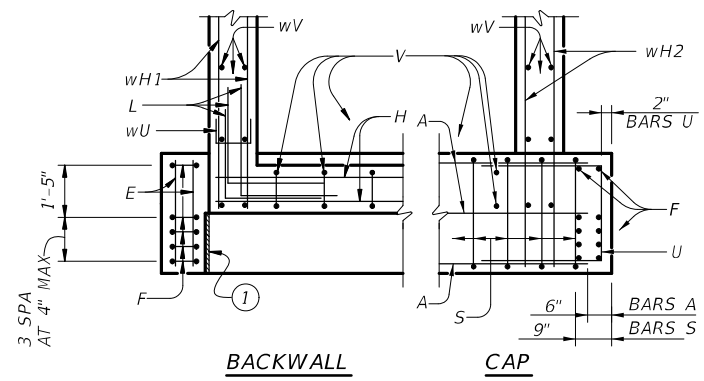


WINGWALL ELEVATION
(EARWALL NOT SHOWN FOR CLARITY.)

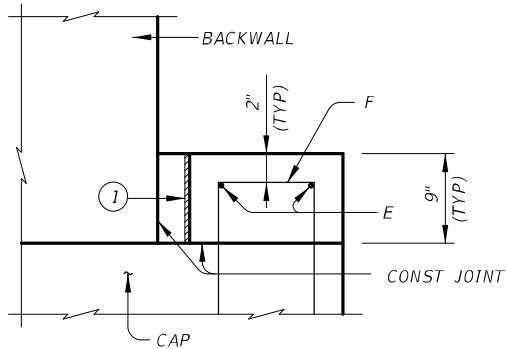


SECTION A-A

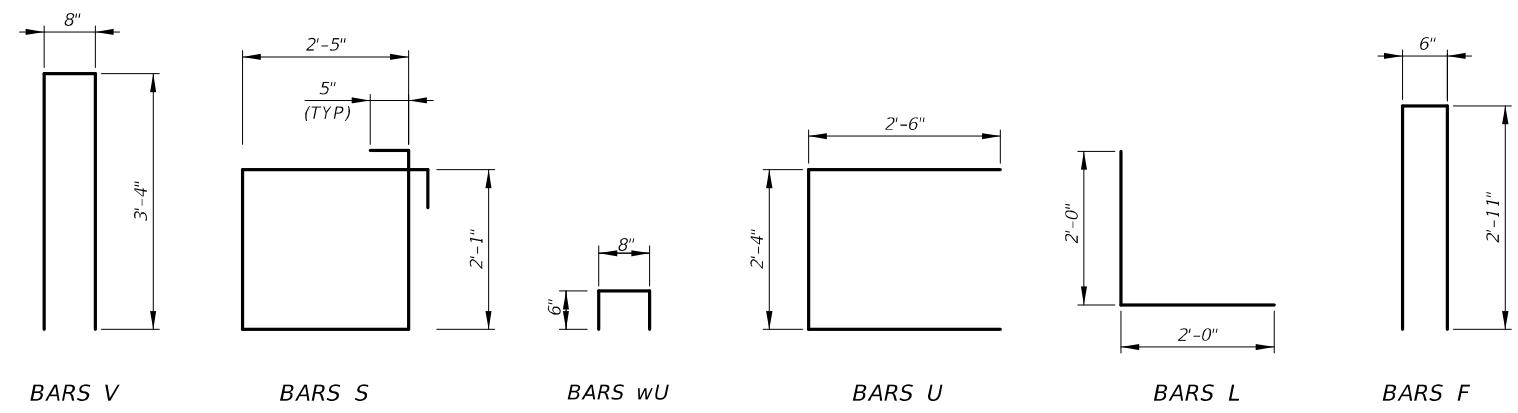
NOTE: AT CONTRACTOR'S OPTION, BACKWALL MAY BE CAST WITH APPROACH SLAB.



CORNER DETAILS



EARWALL ELEVATION DETAIL
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



BARS V BARS S BARS wU BARS U BARS L BARS F

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. CAST INSIDE FACE OF EARWALL PERPENDICULAR TO CAP. (TYP)
- ② INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	#11	27'-1"	1,151	
E	4	#4	2'-5"	6	
F	10	#4	6'-4"	42	
H	2	#5	25'-8"	54	
L	6	#6	4'-0"	36	
S	38	#4	9'-10"	250	
U	4	#6	7'-4"	44	
V	25	#5	7'-4"	191	
wH1	8	#6	5'-8"	68	
wH2	8	#6	6'-11"	83	
wU	12	#4	1'-8"	13	
wV	28	#5	3'-10"	112	
REINFORCING STEEL (3)				Lb	2,050
CLASS "C" CONCRETE (ABUT)				CY	9.5

③ FOR CONTRACTORS INFORMATION ONLY.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



ABUTMENT NO. 3 DETAILS

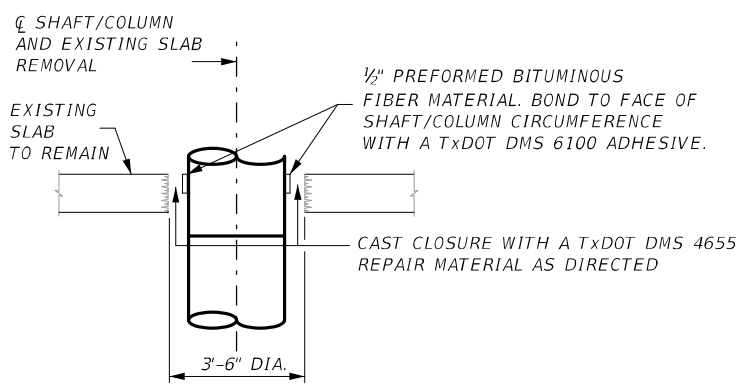
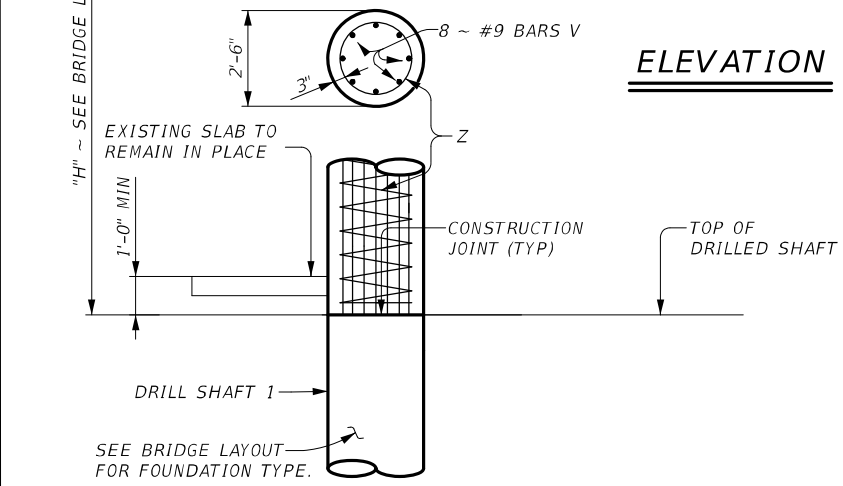
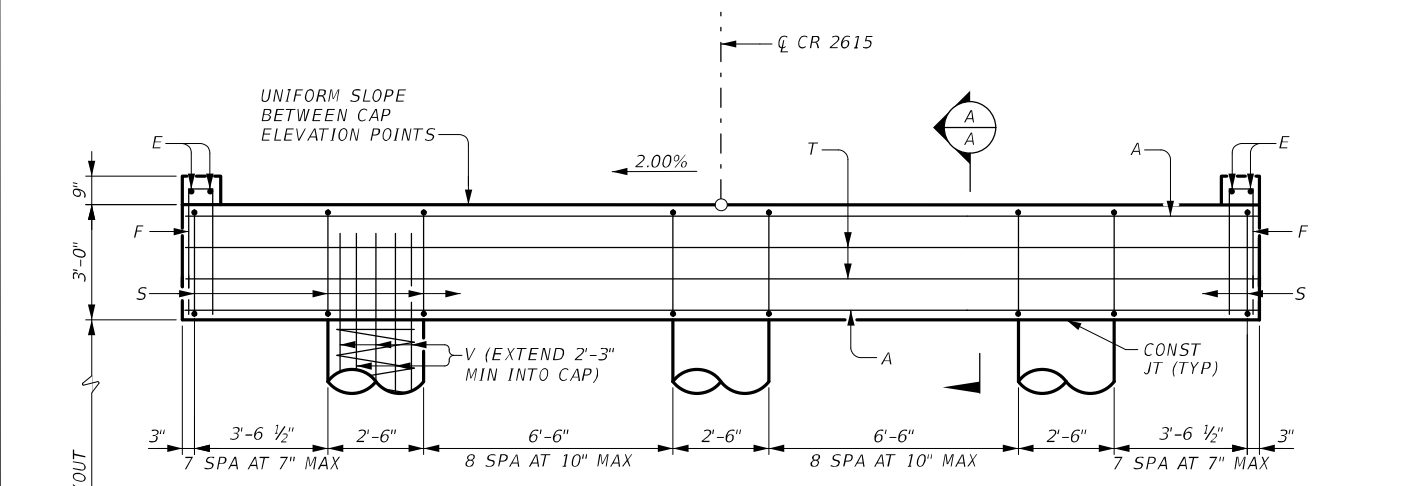
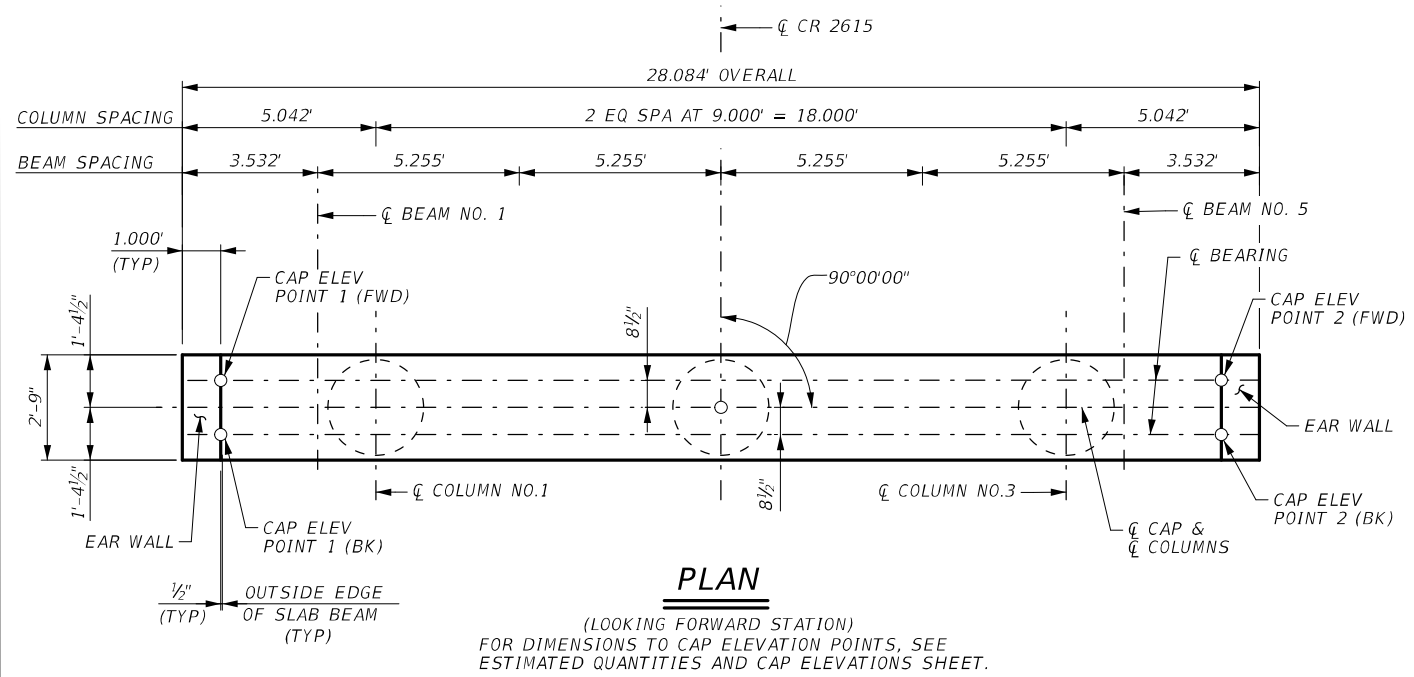
CR 2615 MEDINA RIVER BRIDGE

SHEET 2 OF 2

DGN:	MAG	FED. NO. DIV:	NO. 6	STATE	TEXAS	FEDERAL AID PROJECT NO.	SEE TITLE SHEET	HIGHWAY NO.	CR 2615
CHK DGN:	FSB	DIST. COUNTY:	SAT MEDINA	CONT. NO. SECT. NO.:	0915 45	JOB NO.:	056	SHEET NO.:	63

Plotted on: 1/25/2023

Des.ign. File name: CR2615_1179906_SEA_BENT01.dgn



EXISTING SLAB REMOVAL
SAWCUT EXISTING SLAB AT 1" DEPTH x 42" DIAMETER. BREAK BACK AND REMOVE THE EXISTING CONCRETE AT 42" DIAMETER FOR FULL DEPTH OF SLAB. CUT AND REMOVE REINFORCING STEEL FOR A CLEAR DIAMETER OF 3' TO FACILITATE DRILL SHAFT/COLUMN CONSTRUCTION. EXISTING REINFORCING STEEL TO PROJECT 3" INTO DMS 4655 REPAIR MATERIAL. SEE REMOVAL SHEETS ELSEWHERE IN PLANS FOR PAYMENT.



- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. CAST INSIDE FACE OF EARWALL PERPENDICULAR TO CAP. (TYP)
- ② FOR CONTRACTOR'S INFORMATION ONLY.

TABLE OF ESTIMATED QUANTITIES (3 COLUMNS)

BENT	"H"	CLASS "C" CONC (COL)	BARS V 24 ~ #9	BARS Z 3 ~ #3		
NO.	FT.	CY	LENGTH ④	WEIGHT ②⑤	LENGTH ④	WEIGHT ②⑤
2	4	2.2	6'-3"	510	69'-2"	78

- ④ ADJUST BARS V LENGTH BY 1'-0" AND BARS Z LENGTH BY 12'-7" FOR EACH LINEAR FOOT OF VARIATION IN "H" VALUE.
- ⑤ ADJUST REINFORCING STEEL TOTAL BY 96 LBS AND CLASS "C" CONC. BY 0.55 CY FOR EACH LINEAR FOOT OF VARIATION IN "H" VALUE.

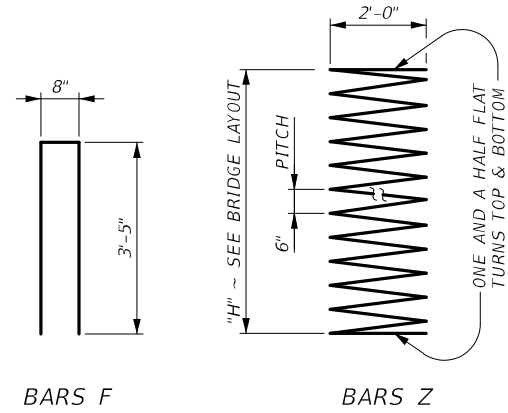
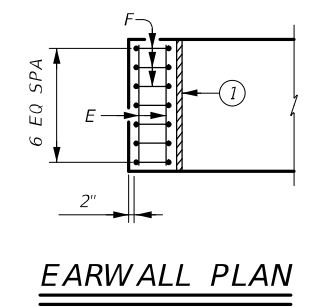
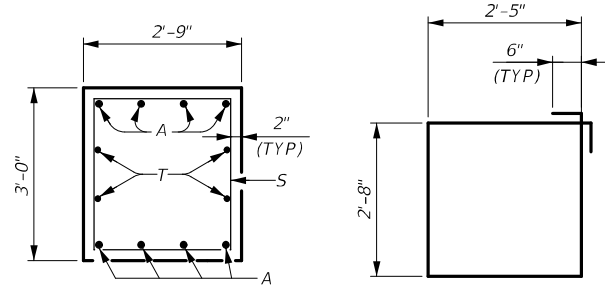


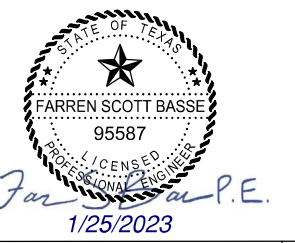
TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	#11	27'-9"	1,179	
E	4	#4	2'-5"	6	
F	14	#4	7'-6"	70	
S	34	#5	11'-2"	396	
T	4	#5	27'-9"	116	
REINFORCING STEEL ②				Lb	1,767
CLASS "C" CONCRETE (CAP)				CY	8.7

GENERAL NOTES:
DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).
SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE AND LENGTH.
SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.
CALCULATED FOUNDATION LOAD = 80 TONS/SHAFT
CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

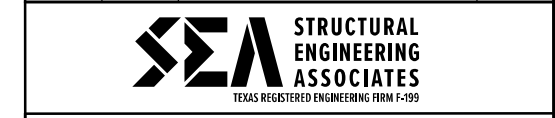
COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

MATERIAL NOTES:
PROVIDE CLASS C CONCRETE (f'c = 3,600 PSI).
PROVIDE GRADE 60 REINFORCING STEEL.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY

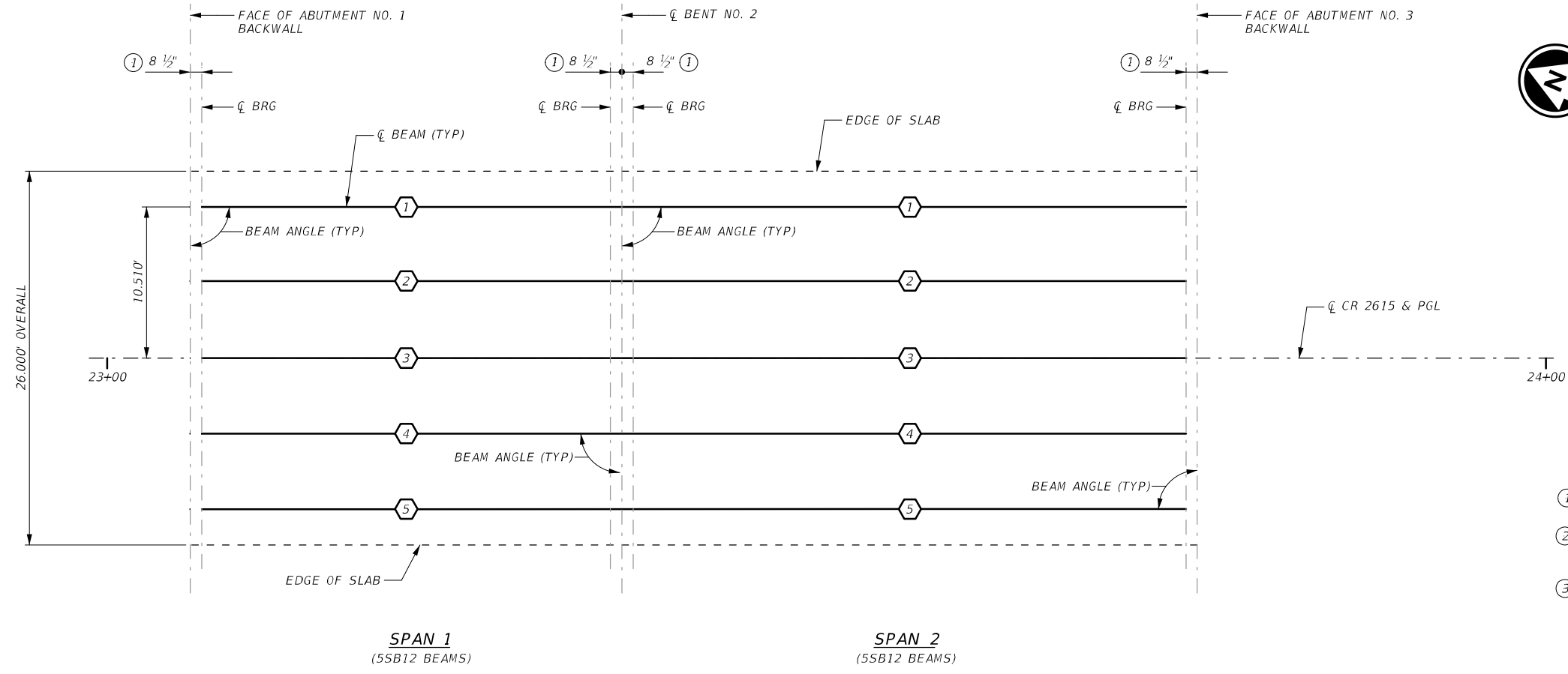


BENT NO. 2
CR 2615 MEDINA RIVER BRIDGE

DGN:	FED. NO.:	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN: FSB	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG: FSB	SAT	MEDINA	0915	45	056	64

Plotted on: 1/25/2023

Desi.gn File name: CR2615_1179906_SEA_FRM01.dgn



- ① SEE PSBEB STANDARD FOR ORIENTATION OF DIMENSIONS.
 - ② BEAM LENGTHS SHOWN ARE BOTTOM SLAB BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.
 - ③ DIMENSIONS SHOWN REPRESENT SPACING BETWEEN ACTUAL BEAM CENTERLINES.
- DIM IN FEET UNLESS NOTED OTHERWISE.

BEAM LAYOUT

BENT REPORT

ABUTMENT NO. 1 (S 67° 00' 10" W)				BENT NO. 2 (S 67° 00' 10" W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1, 10.510L				DISTANCE BETWEEN STATION LINE AND BEAM 1, 10.510L			
		BEAM SPAC. ③ (FACE OF BKWL)	BEAM ANGLE D M S			BEAM SPAC. ③ (C.L. BENT)	BEAM ANGLE D M S
SPAN 1	BEAM 1	0.000	90 00 00	SPAN 2	BEAM 1	0.000	90 00 00
	BEAM 2	5.255	90 00 00		BEAM 2	5.255	90 00 00
	BEAM 3	5.255	90 00 00		BEAM 3	5.255	90 00 00
	BEAM 4	5.255	90 00 00		BEAM 4	5.255	90 00 00
	BEAM 5	5.255	90 00 00		BEAM 5	5.255	90 00 00
TOTAL		21.021		TOTAL		21.021	

BENT NO. 2 (S 67° 00' 10" W)				ABUTMENT NO. 3 (S 67° 00' 10" W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1, 10.510L				DISTANCE BETWEEN STATION LINE AND BEAM 1, 10.510L			
		BEAM SPAC. ③ (C.L. BENT)	BEAM ANGLE D M S			BEAM SPAC. ③ (FACE OF BKWL)	BEAM ANGLE D M S
SPAN 1	BEAM 1	0.000	90 00 00	SPAN 2	BEAM 1	0.000	90 00 00
	BEAM 2	5.255	90 00 00		BEAM 2	5.255	90 00 00
	BEAM 3	5.255	90 00 00		BEAM 3	5.255	90 00 00
	BEAM 4	5.255	90 00 00		BEAM 4	5.255	90 00 00
	BEAM 5	5.255	90 00 00		BEAM 5	5.255	90 00 00
TOTAL		21.021		TOTAL		21.021	

BEAM REPORT

BEAM REPORT, SPAN 1				
	HORIZONTAL DISTANCE C-C BENT	TRUE DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM ②	BEAM SLOPE
BEAM 1	30.000	28.583	29.50	-0.000
BEAM 2	30.000	28.583	29.50	-0.000
BEAM 3	30.000	28.583	29.50	-0.000
BEAM 4	30.000	28.583	29.50	-0.000
BEAM 5	30.000	28.583	29.50	-0.000

BEAM REPORT, SPAN 2				
	HORIZONTAL DISTANCE C-C BENT	TRUE DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM ②	BEAM SLOPE
BEAM 1	40.000	38.583	39.50	-0.000
BEAM 2	40.000	38.583	39.50	-0.000
BEAM 3	40.000	38.583	39.50	-0.000
BEAM 4	40.000	38.583	39.50	-0.000
BEAM 5	40.000	38.583	39.50	-0.000



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



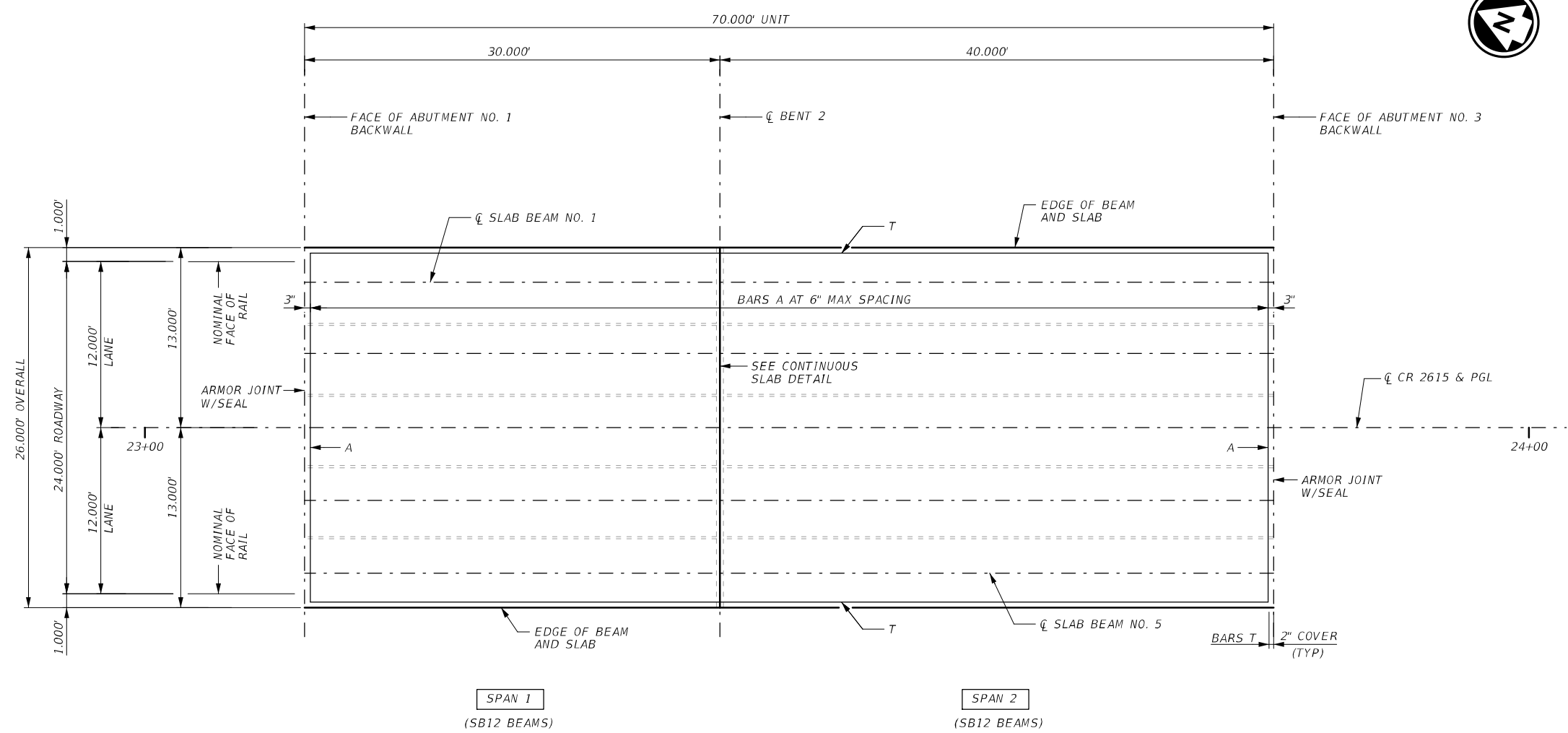
BEAM LAYOUT

CR 2615 MEDINA
RIVER BRIDGE

DGN: MAG	FED. NO. DIV: NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN: FSB	6	TEXAS	SEE TITLE SHEET	CR 2615
DWG: FE	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG: FSB	SAT	MEDINA	0915	45
			JOB NO.	SHEET NO.
			056	65

Plotted on: 1/25/2023

Des:ign File name: CR2615_1179906_SEA_PSU01.dgn



PLAN



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).
 SEE SLAB BEAM RAIL ANCHORAGE DETAILS (PSBRA) STANDARD SHEET FOR RAIL ANCHORAGE DETAILS.
 CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
 SEE ARMOR JOINT STANDARD FOR JOINT DETAILS.
 CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS 5 CONCRETE (F'c = 4,000 PSI)
 PROVIDE GRADE 60 REINFORCING STEEL
 PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
 UNCOATED-#4 = 1'-7"
 #5 = 2'-0"
 DEFORMED WLD ED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A & T UNLESS OTHERWISE NOTED.



HL 93 LOADING 1/25/2023

REV. NO.	DATE	DESCRIPTION	BY



70.00' PRESTR CONC SLAB BEAM UNIT

CR 2615 MEDINA RIVER BRIDGE

SHEET 1 OF 2

BAR TABLE

BAR	SIZE
A	#5
T	#4

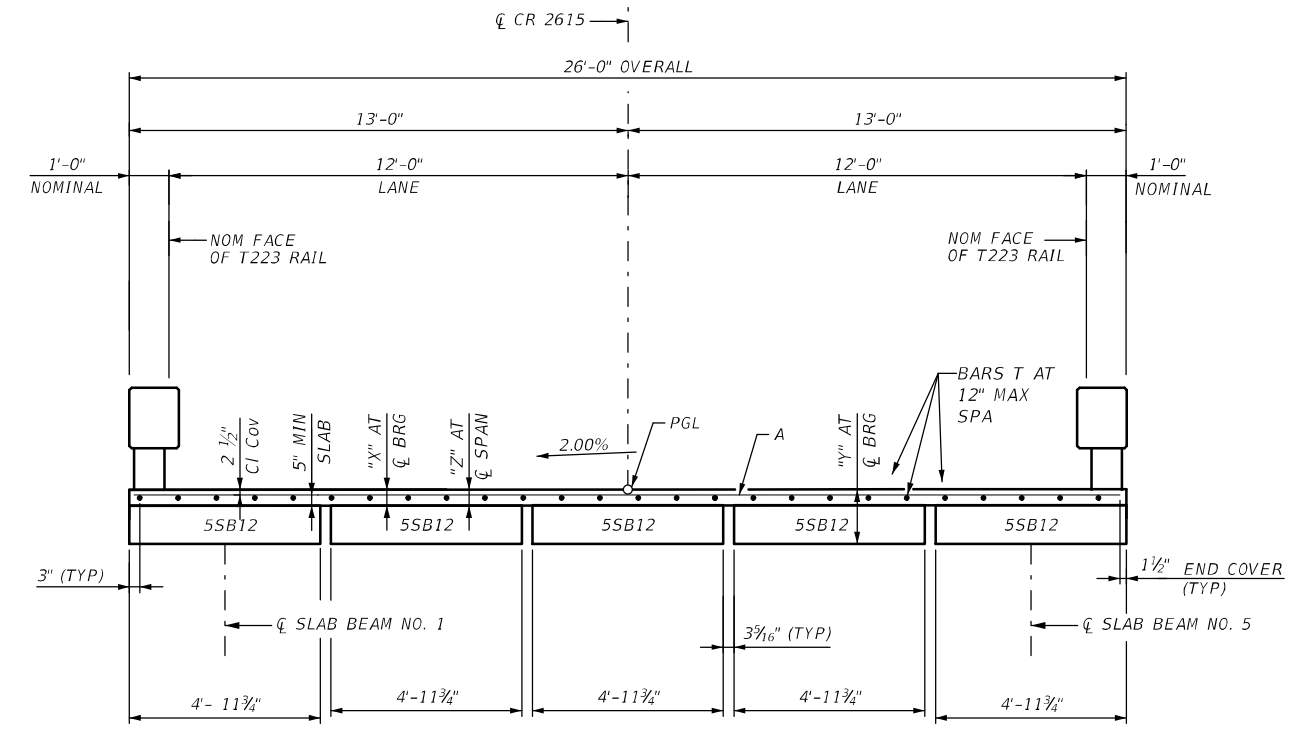
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MAG	6	TEXAS	SEE TITLE SHEET	CR 2615		
CHK:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
FSB	SAT	MEDINA	0915	45	056	66

Plotted on: 1/25/2023

Des:gn File name: CR2615_1179906_SEA_PSU02.dgn

TABLE OF ESTIMATED QUANTITIES			
SPAN	REINF CONC SLAB (SLAB BEAM)	PRESTR CONCRETE SLAB BEAM (TY 5SB12) ①	TOTAL REINF STEEL ②③
NO.	SF	LF	LB
1	780	147.50	2,184
2	1,040	197.50	2,912

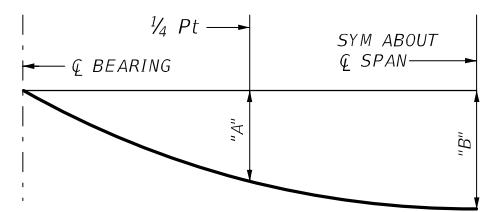
- ① LENGTH SHOWN IS BOTTOM OF BEAM LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPE. SEE BEAM LAYOUT FOR BEAM LENGTH.
- ② FOR CONTRACTORS INFORMATION ONLY.
- ③ REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.8 LBS/SF.



TYPICAL TRANSVERSE SECTION

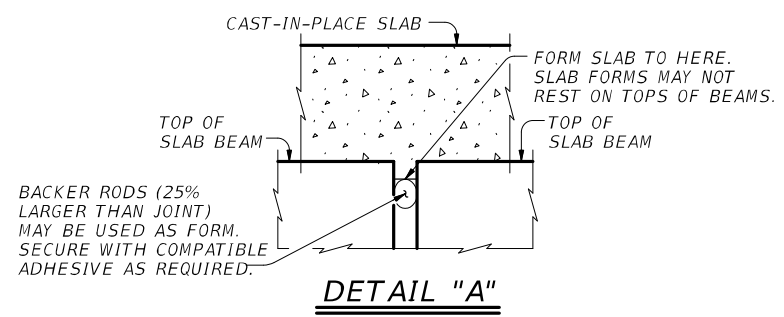
TABLE OF DEAD LOAD DEFLECTIONS AND SECTION DEPTHS					
SPAN NO.	BEAM NO.	DEAD LOAD DEFLECTION (FT)		④ SECTION DEPTHS	
		"A"	"B"	"X"	"Y"
1	1 & 5	0.006	0.009	5 1/2"	1'-5 1/2"
	2 - 4	0.007	0.010	5 1/2"	1'-5 1/2"
2	1 & 5	0.024	0.034	6 1/2"	1'-6 1/2"
	2 - 4	0.025	0.035	6 1/2"	1'-6 1/2"

④ BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS FROM A 5" CAST-IN-PLACE CONCRETE SLAB, AND A CONSTANT GRADE.

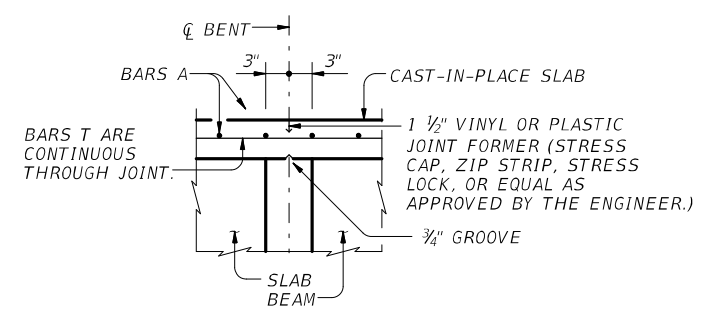


DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO CONCRETE SLAB ONLY (E_c = 5,000 KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSIONS MAY VARY. ADJUST BASED ON FIELD VERIFICATION.



DETAIL "A"



CONTINUOUS SLAB DETAIL



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



70.00' PRESTR CONC SLAB BEAM UNIT

CR 2615 MEDINA RIVER BRIDGE

SHEET 2 OF 2

DGN:	MAG	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	FSB	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	FE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	FSB	SAT	MEDINA	0915	45	056	67

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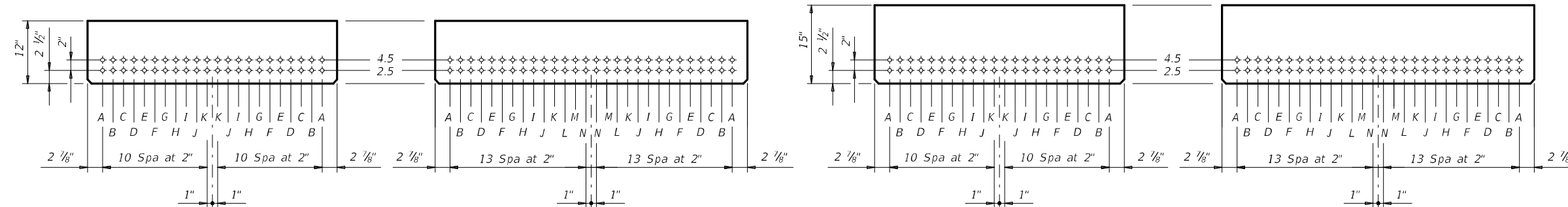
STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)																	OPTIONAL DESIGN					LOAD RATING FACTORS			NON-STANDARD STRAND PATTERNS		
	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS							DEBONDED STRANDS PER ROW					CONCRETE		DESIGN LOAD COMP STRESS (TOP $\bar{\epsilon}$) (SERVICE I) fct (ksi)	DESIGN LOAD TENSILE STRESS (BOTT $\bar{\epsilon}$) (SERVICE III) fcb (ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR		STRENGTH I			SERVICE III		
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" $\bar{\epsilon}$ (in)	"e" END (in)	TOT NO. DEB	DIST FROM BOTTOM (in)	NO. OF STRANDS		NUMBER OF STRANDS DEBONDED TO (ft from end)							RELEASE STRGTH $\bar{\epsilon}$ (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	Moment	Shear	Inv	Opr	Inv	
												TOTAL	DE-BONDED	3	6	9	12											15
CR 2615 AT MEDINA RIVER	1	1-5	5SB12		10	0.6	270	3.50	3.50										4.000	5.000	1.297	-1.686	529	0.448	0.448	1.26	1.63	1.29
	2	1-5	5SB12		18	0.6	270	3.50	3.50										4.000	5.000	2.260	-2.838	828	0.443	0.443	1.32	1.72	1.08

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.
 Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
 Provide Class H concrete.
 Provide Grade 60 reinforcing steel.
 Use low relaxation strands, each pretensioned to 75 percent of fpu.
 Full-length debonded strands are not permitted in positions "A" and "B".
 Strand debonding must comply with Item 424.4.2.2.4.
 When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.
 Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:
 1) Locate a strand in each "A" position.
 2) Place strand symmetrically about vertical centerline of beam.
 3) Space strands as equally as possible across the entire width.
 Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

① Based on the following allowable stresses (ksi):
 Compression = 0.65 f'ci
 Tension = 0.24 $\sqrt{f'ci}$
 Optional designs must likewise conform.

② Portion of full HL93.



TxDOT 4SB12 SLAB BEAM

TxDOT 5SB12 SLAB BEAM

TxDOT 4SB15 SLAB BEAM

TxDOT 5SB15 SLAB BEAM



HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DESIGNS (NON-STANDARD SPANS)

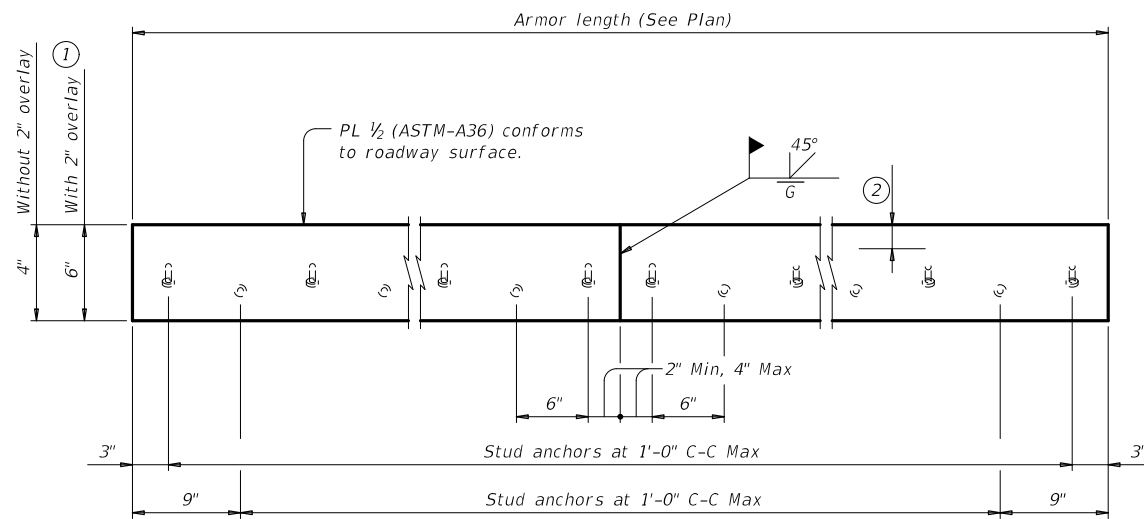
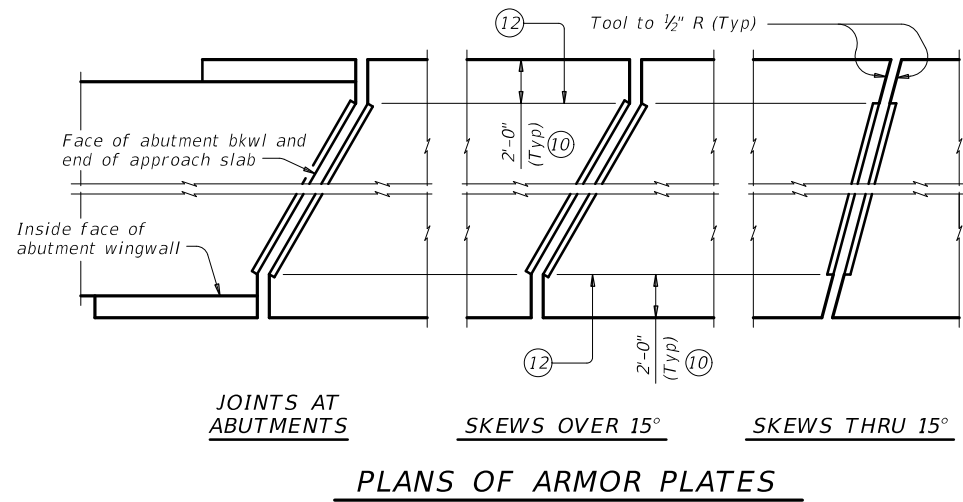
PSBND

FILE: psbsts05-22.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONV	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
3-22: Added Load Rating.	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	68	

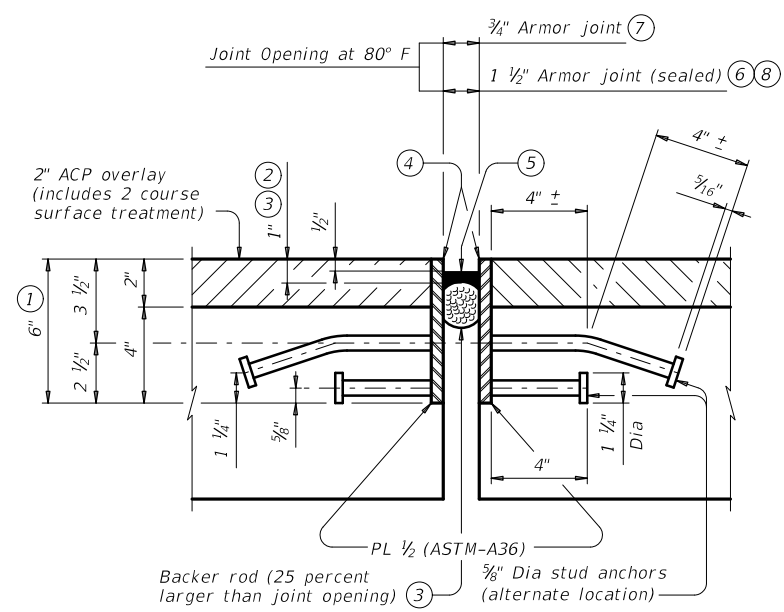
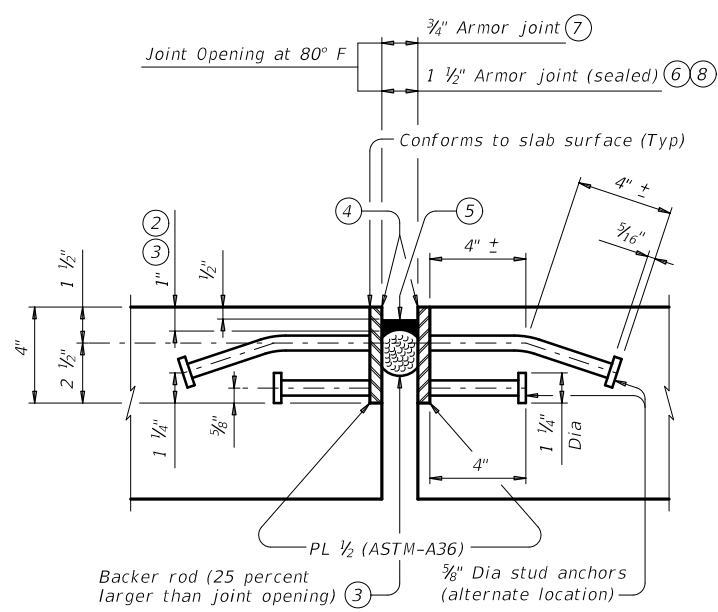
DATE: 1/25/2023
 FILE: CR2615_1179906_SEA_IGND01.dgn

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PCX
DATE: 10/31/2022
FILE: ajstd01-19 (1).dgn



- ① Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each 1/2" variation in thickness.
- ② Do not paint top 1/2" of plate if using sealed armor joint.
- ③ Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ④ Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
- ⑤ Use Class 7 joint sealant that conforms to DMS-6310.
- ⑥ Place sealant while ambient temperature is between 55°F and 80°F and is rising.
- ⑦ Armor joint does not include joint sealant or backer rod.
- ⑧ Armor joint (sealed) includes Class 7 joint sealant and backer rod.
- ⑨ Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
- ⑩ Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
- ⑪ See "Plans of Armor Plates".
- ⑫ At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
- ⑬ Align shipping angle perpendicular to joint.

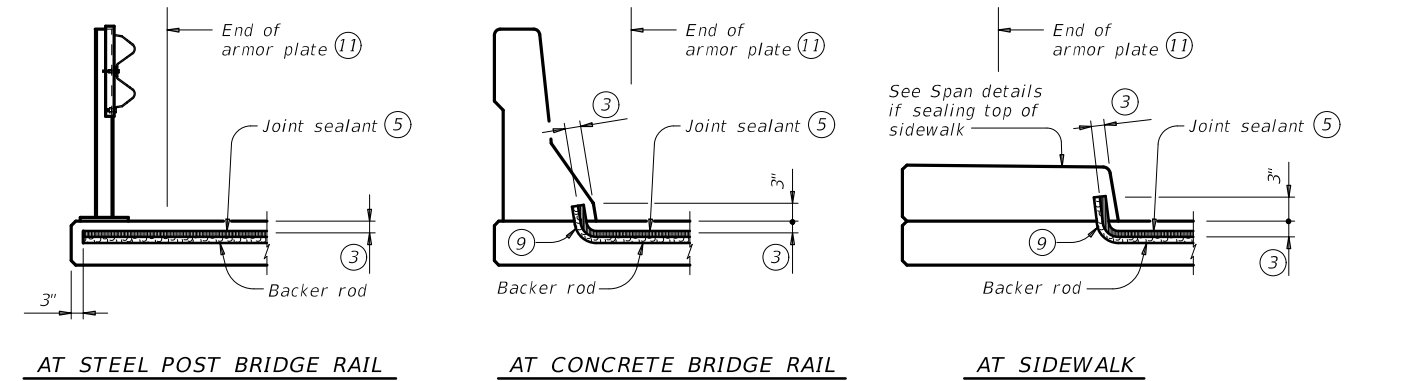


ARMOR JOINT SECTIONS
Showing Armor Joint (Sealed)

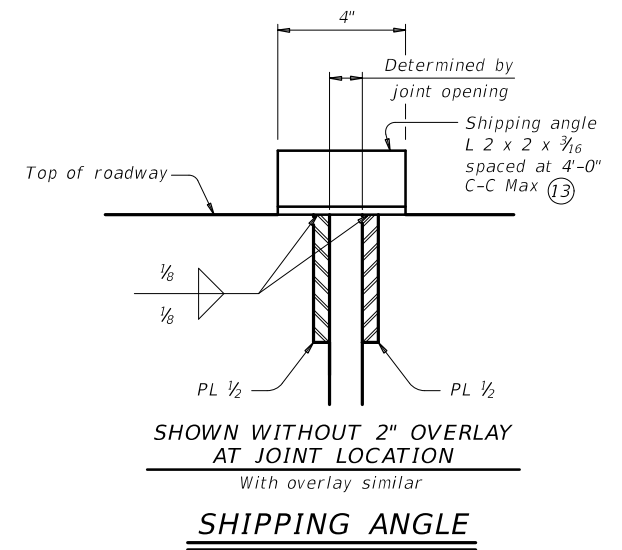
FABRICATION NOTES:
Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts. Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max. Weld studs in accordance with AWS D1.1. Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop. Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4. Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:
Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

GENERAL NOTES:
Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 3/8" (3/4" opening movement and 5/8" closure movement). Payment for armor joint, with or without seal, is based on length of armor plate.



JOINT SEALANT TERMINATION DETAILS
Armor joint (sealed) only. Armor plate is not shown for clarity.

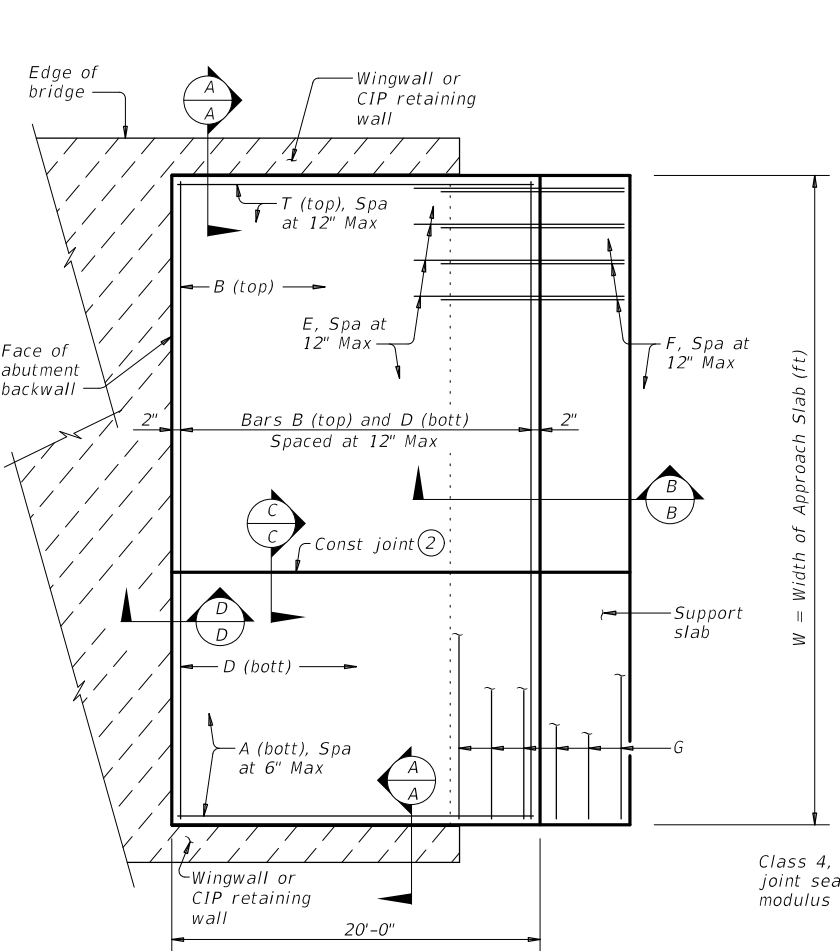


WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY ①	22.90 plf

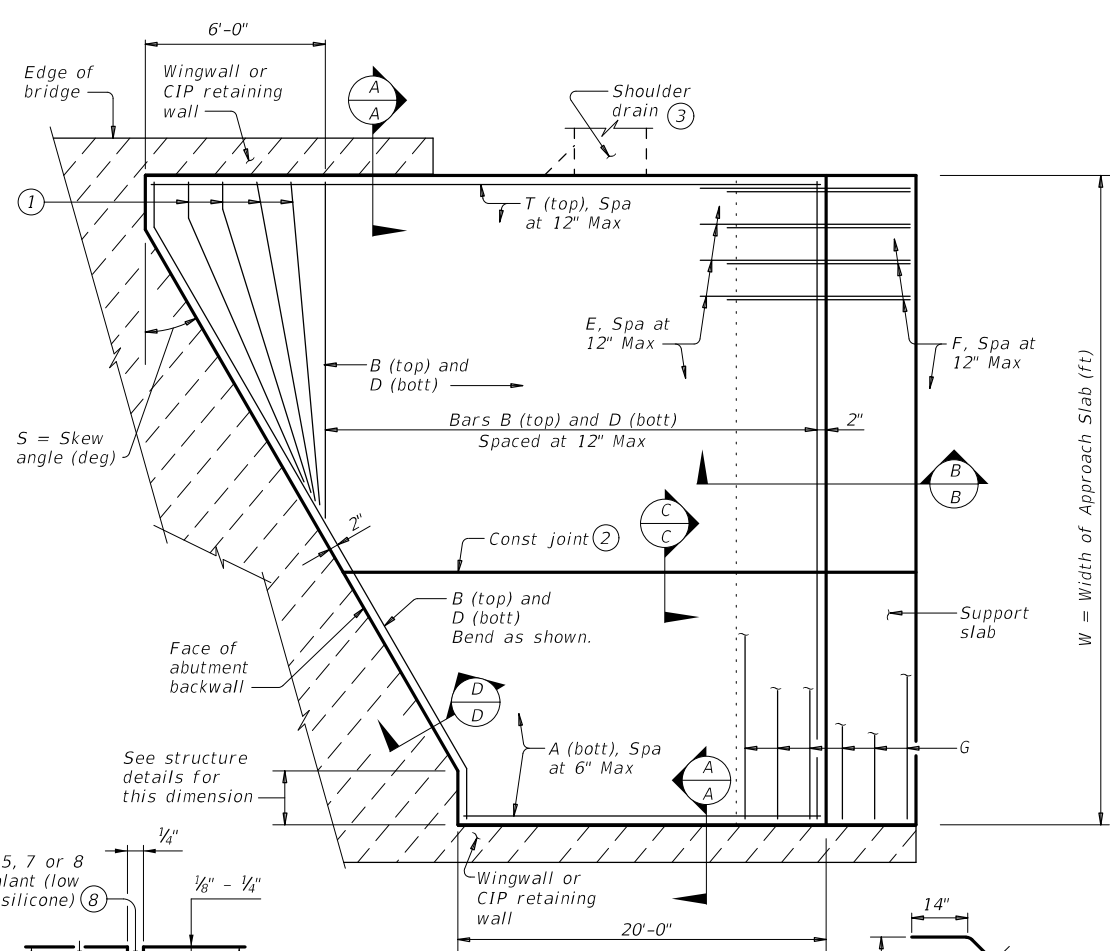
				Bridge Division Standard	
<h2>ARMOR JOINT DETAILS</h2>					
AJ					
FILE: ajstd01-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT	REVISIONS	CONTRACT NO. 0915	SECTION 45	JOB NO. 056	HIGHWAY CR 2615
		DIST. SAT	COUNTY MEDINA	SHEET NO.	69

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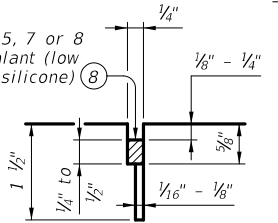
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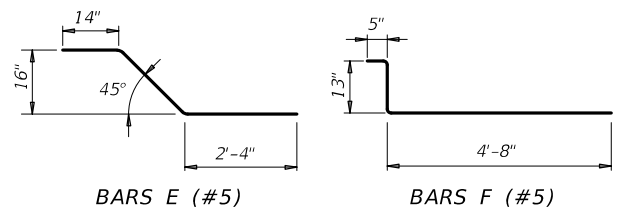
PLAN
(Showing non-skewed approach slab.)



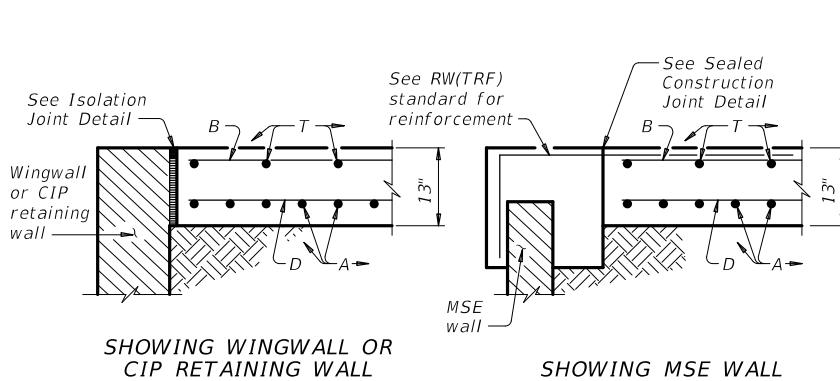
PLAN
(Showing skewed approach slab.)



LONGITUDINAL SAW CUT JOINT DETAIL

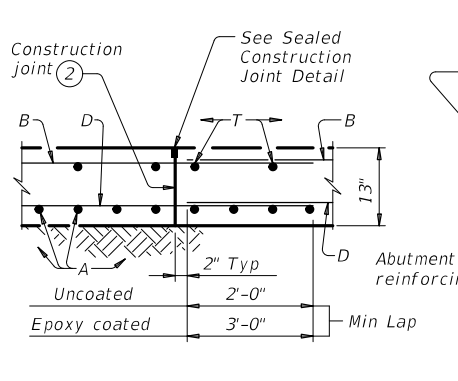
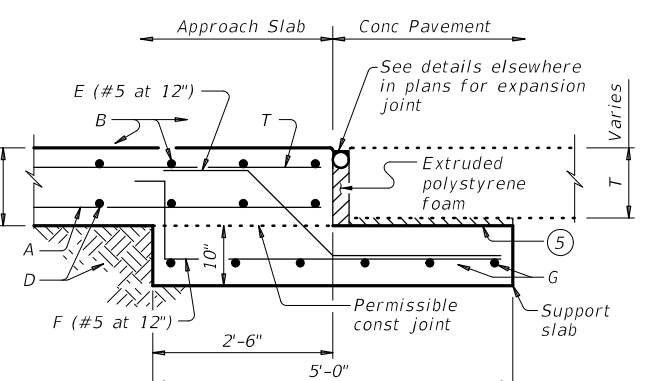


BARS E (#5) BARS F (#5)

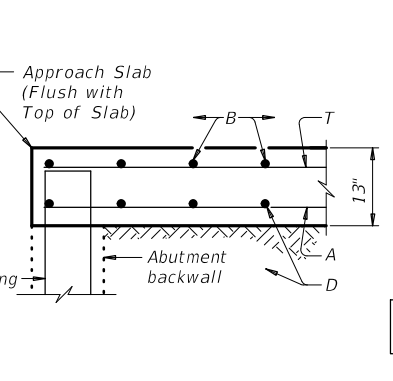


SECTION A-A

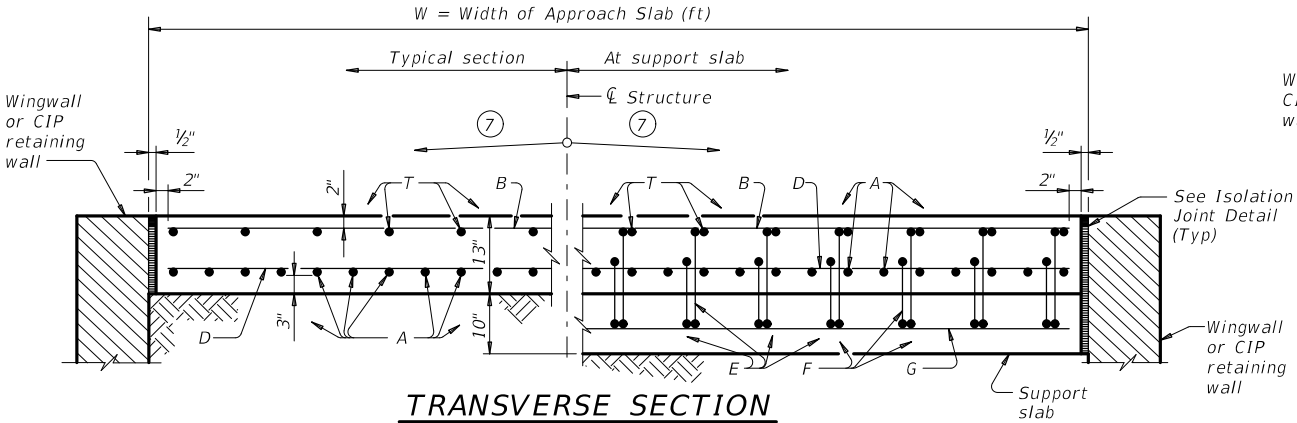
SECTION B-B



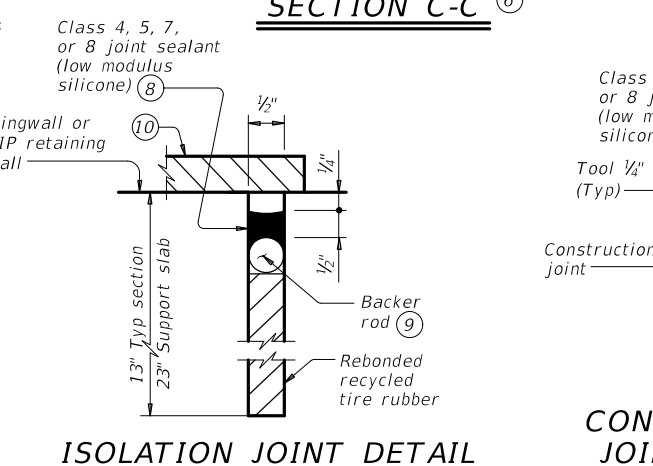
SECTION C-C



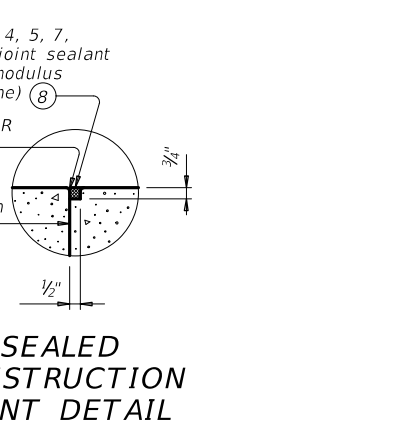
SECTION D-D



TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

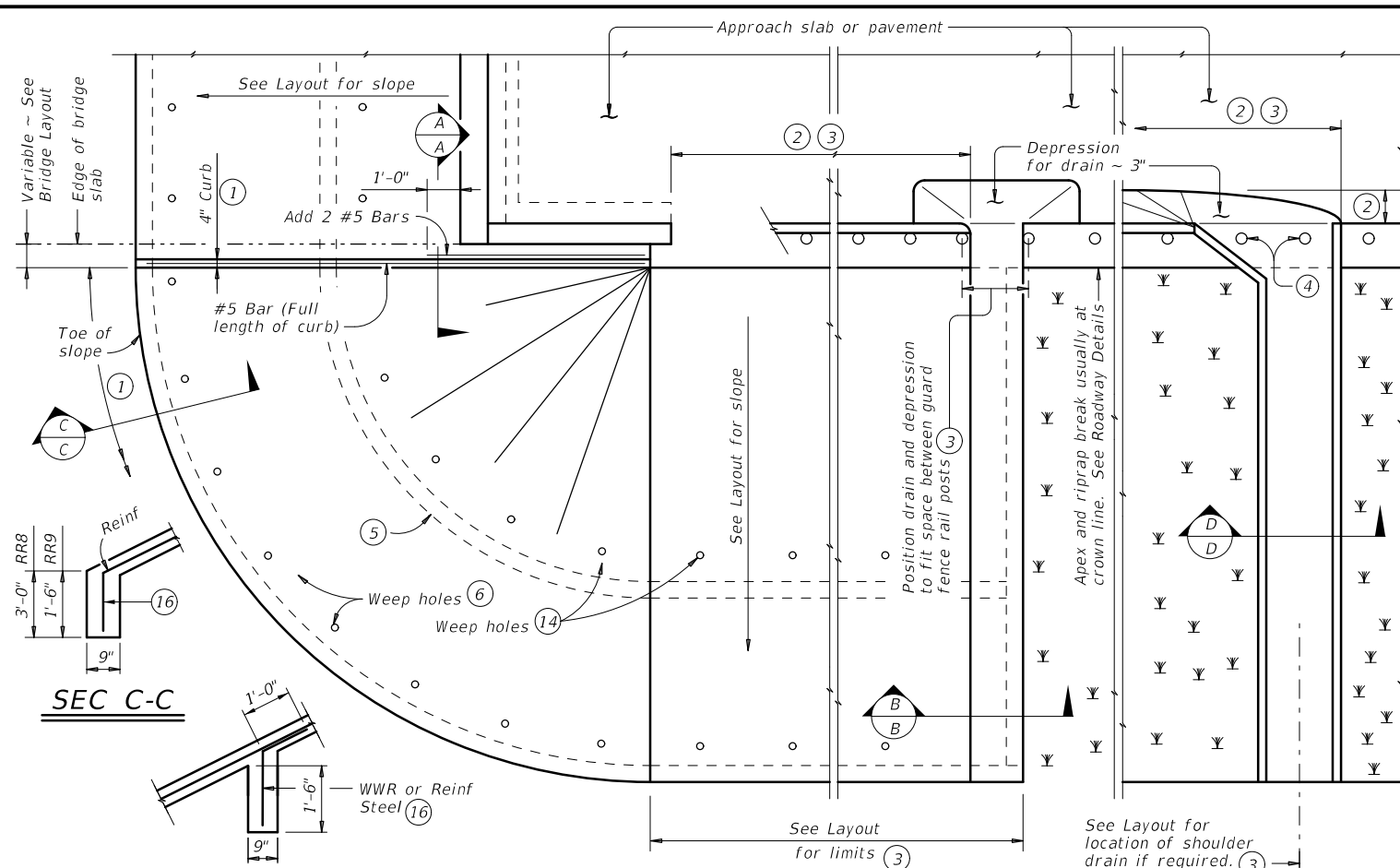
APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight = 8.5 Lbs/SF of Approach Slab = 18.4 Lbs/LF of Support Slab	
Vol of Appr Slab Conc (CY) = 1.057W - 0.008W x T + 0.02W ² Tan S (Includes Support Slab)	
W = Width of Approach Slab (ft)	
T = Conc Pavement Thickness (in)	
S = Skew Angle (deg)	

- Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.
- See details elsewhere in plans for shoulder drain location and details.
- For Contractor's information only. Quantities shown are for one approach slab only.
- On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.
- Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
- See details elsewhere in plans for required cross-slope.
- Place in accordance with Item 438.
- Provide backer rod that is 25% larger than joint opening and compatible with the sealant.
- If bridge rail is present at the wingwall or CIP retaining wall, place 1/2" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 1/2" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 1/2" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
 Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."
 Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
 Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
 Cure for 4 days using water or membrane curing per Item 422. All details shown herein are subsidiary to bridge approach slab.
 Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

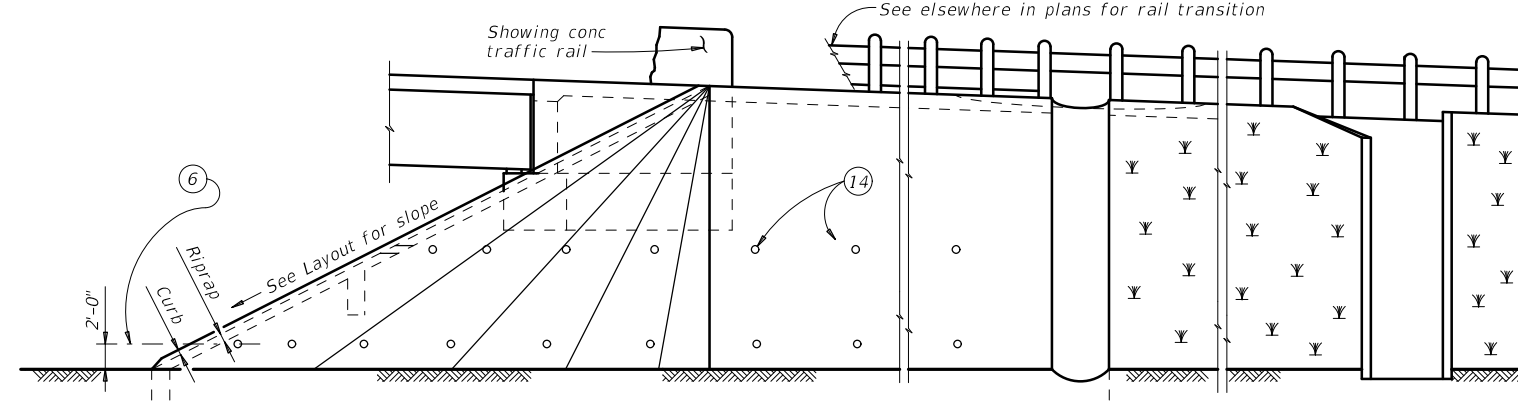
		Bridge Division Standard	
BRIDGE APPROACH SLAB CONCRETE PAVEMENT			
BAS-C			
FILE: bascste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CON: 0915	SECT: 45	JOB: 056
REVISIONS	SAT		COUNTY: MEDINA
02-20: Removed stress relieving pad.	SHEET NO. 70		HIGHWAY: CR 2615

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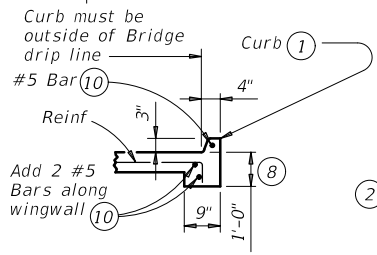


INTERMEDIATE TOEWALL 5

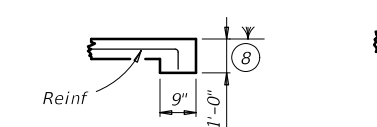
PLAN



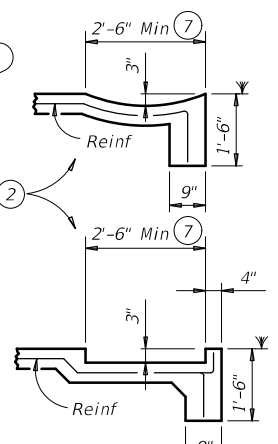
ELEVATION



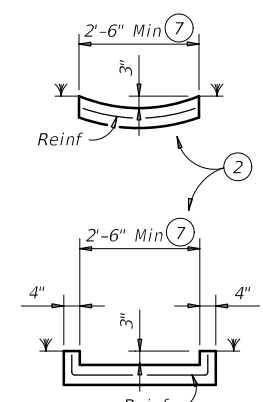
SEC A-A



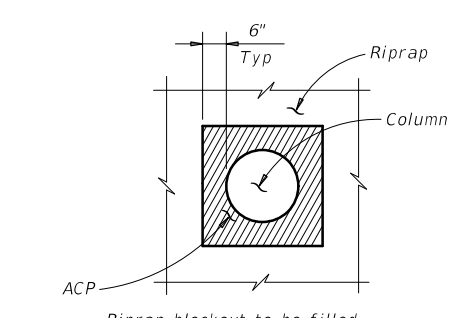
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

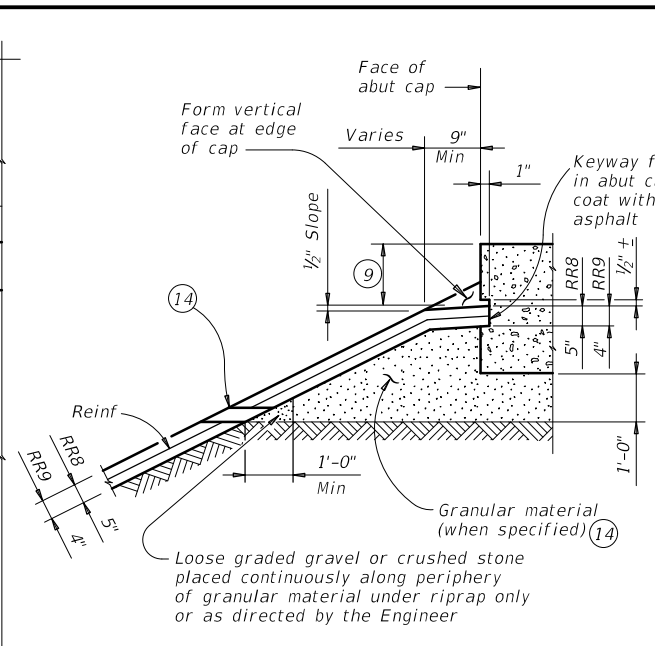


SEC D-D
(Shoulder drain)

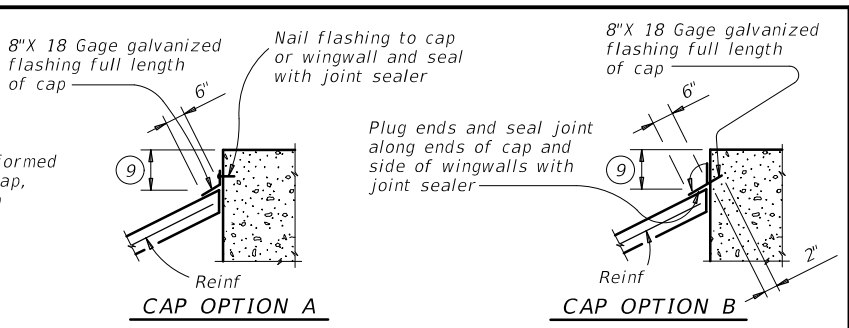


RIPRAP DETAIL AT COLUMNS

(As directed by the Engineer)

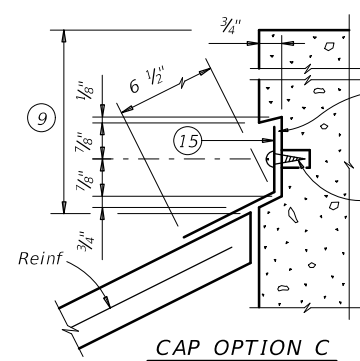


SHOWING KEYWAY OPTION

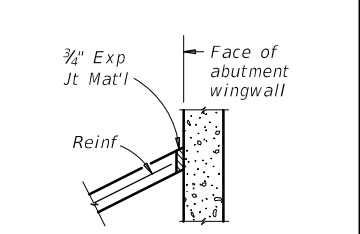


CAP OPTION A

CAP OPTION B

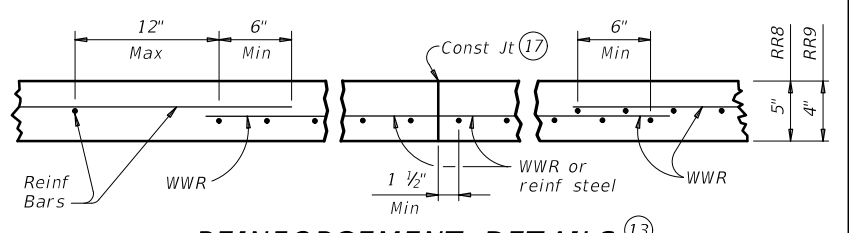


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL 12

SECTIONS THRU RIPRAP AT CAP 11



REINFORCEMENT DETAILS 13

See General Notes for optional synthetic fiber reinforcement.

- 1 When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
- 2 Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
- 3 Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
- 4 See details elsewhere in plans for installation of guard fence posts through concrete riprap.
- 5 Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
- 6 Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
- 7 Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
- 8 Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
- 9 Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
- 10 #5 bars shown are required even when synthetic fiber reinforcing option is selected.
- 11 Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
- 12 Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
- 13 Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
- 14 If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
- 15 8" x 18 Gage Galv Sheet Metal
- 16 Provide WWR or #3 bars, with 1'-0" extension into slope.
- 17 WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

GENERAL NOTES:

- Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
- Provide Grade 60 reinforcing steel.
- Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
- Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
- Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
- Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
- Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap". See Layout for limits of riprap.
- RR8 is to be used on stream crossings.
- RR9 is to be used on other embankments.

FOR CONTRACTOR'S INFORMATION ONLY:

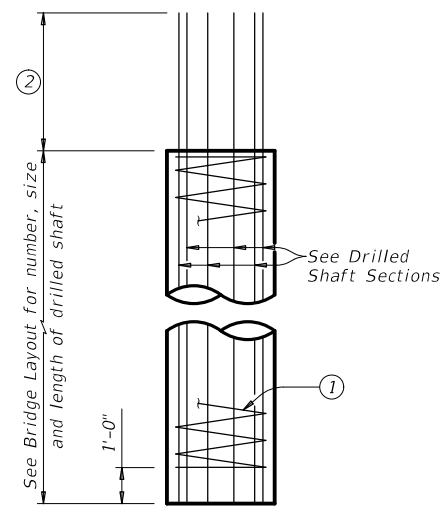
5" of RR8	= 0.015 CY/SF
4" of RR9	= 0.012 CY/SF
#3 Reinf at 18" c-c	= 0.501 Lbs/SF
6x6-D3xD3	= 0.408 Lbs/SF

		Bridge Division Standard	
CONCRETE RIPRAP AND SHOULDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)			
CRR			
FILE: crrside1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT NO. 0915	SECTION 45	JOB NO. 056
REVISIONS	COUNTY		SHEET NO.
	MEDINA		71

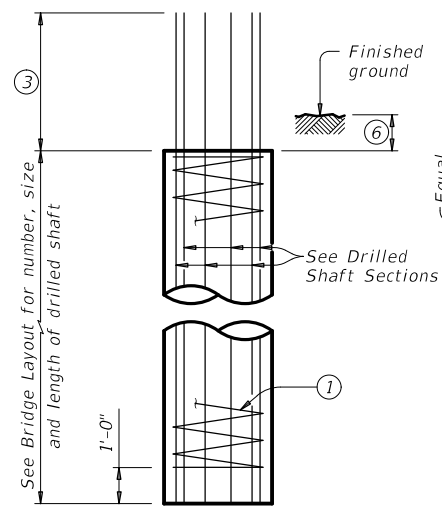
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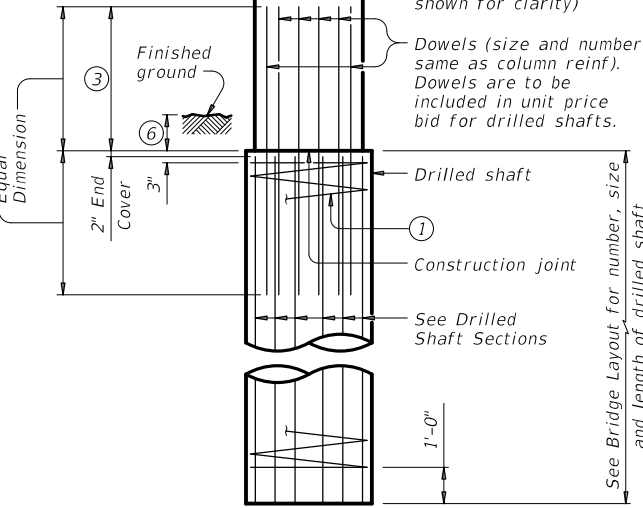
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FILE: fdstd01-20 (2).dgn



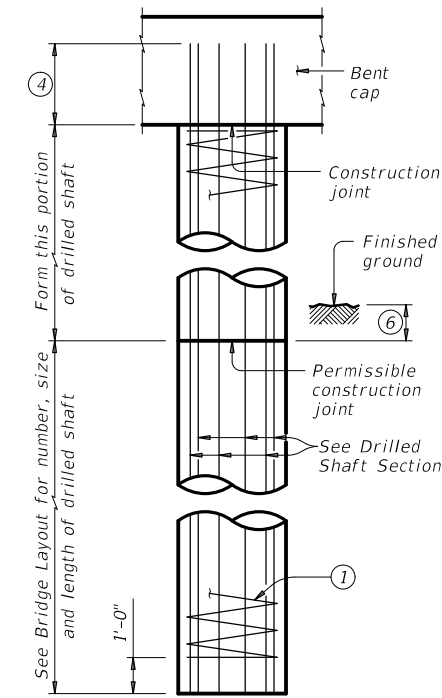
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



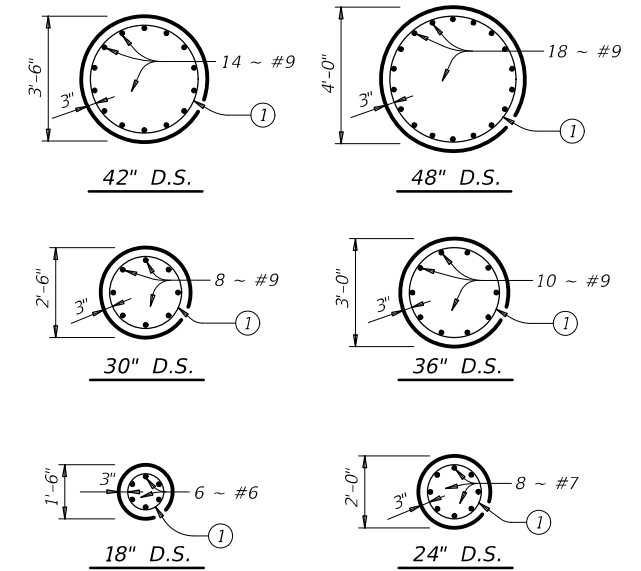
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL 5



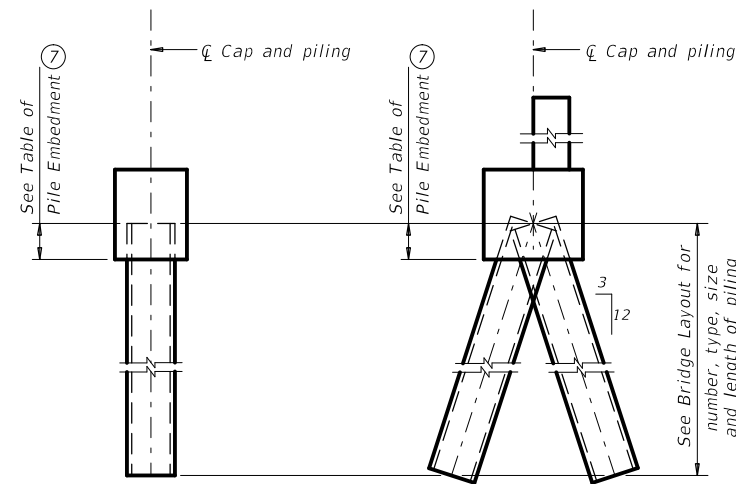
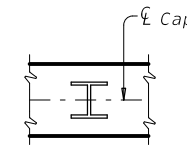
DRILLED SHAFT SECTIONS

DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.

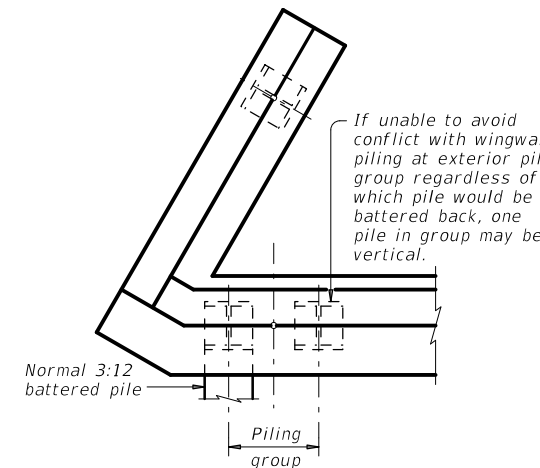
ORIENTATION OF STEEL H-PILING



VERTICAL PILE

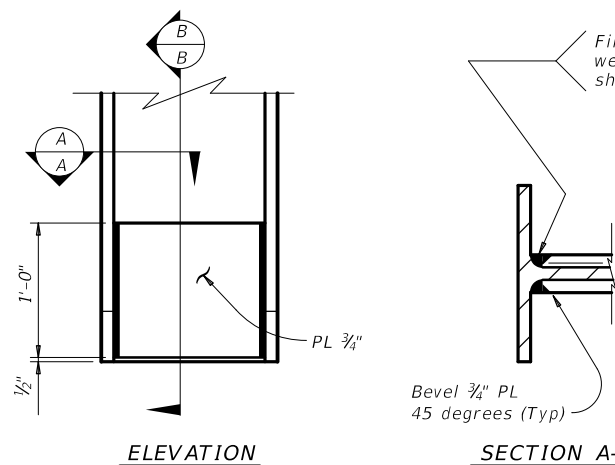
BATTERED PILE

PILING DETAILS
(Concrete or steel H)



DETAIL "A"

(Showing plan view of a 30° skewed abutment)

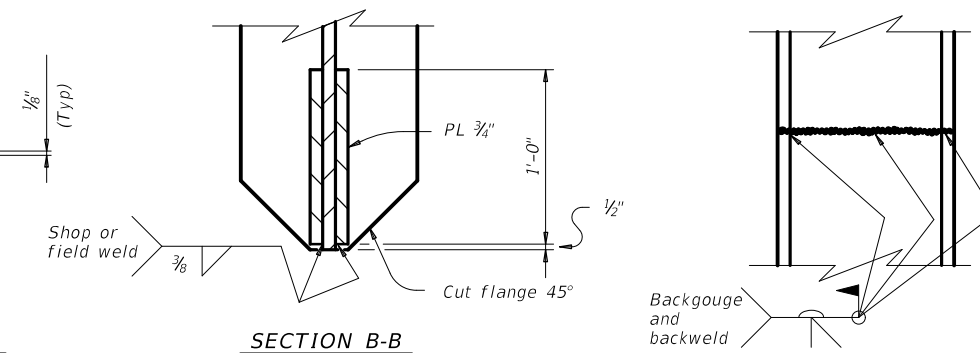


ELEVATION

SECTION A-A

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



SECTION B-B

SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

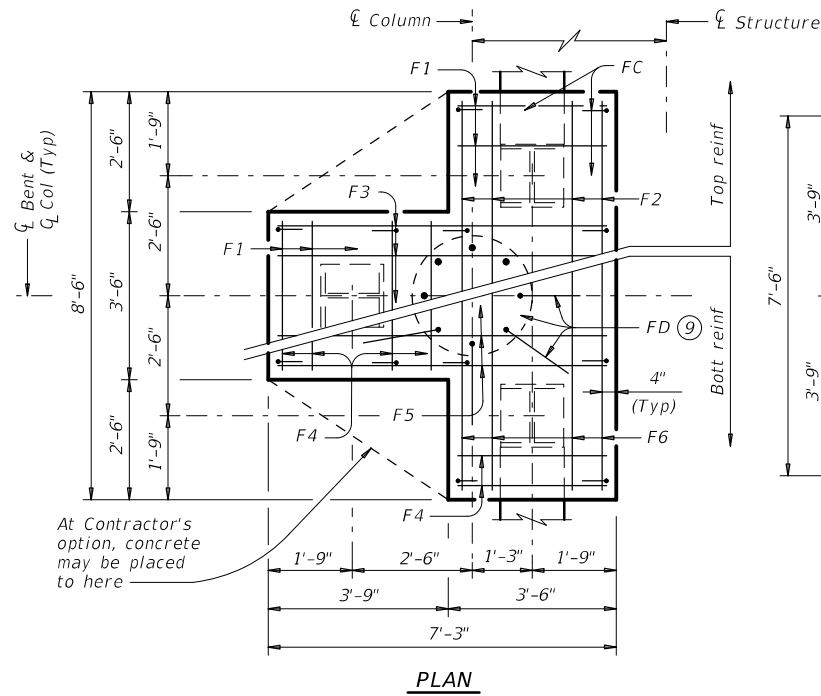
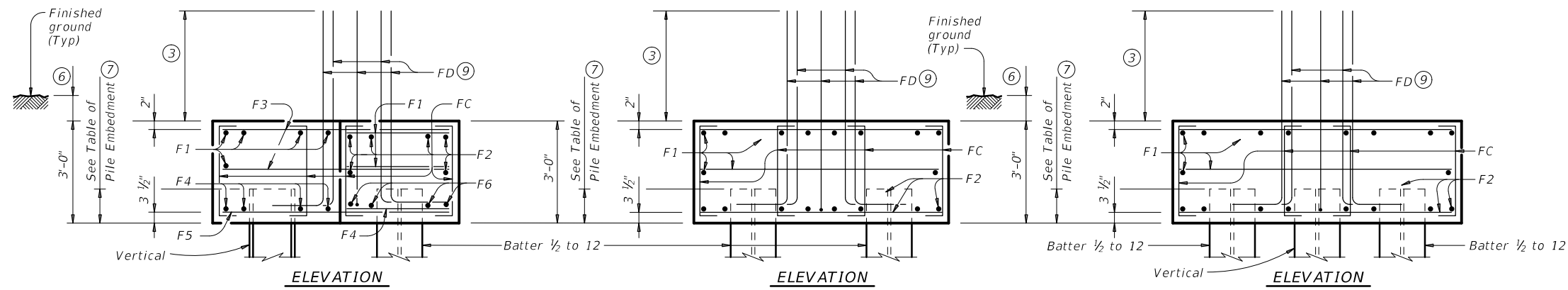
- 1 #3 spiral at 6" pitch (one and a half flat turns top and bottom).
- 2 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"
- 3 Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- 4 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"
- 5 Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- 6 1'-0" Min, unless shown otherwise on plans.
- 7 Or as shown on plans.

SHEET 1 OF 2

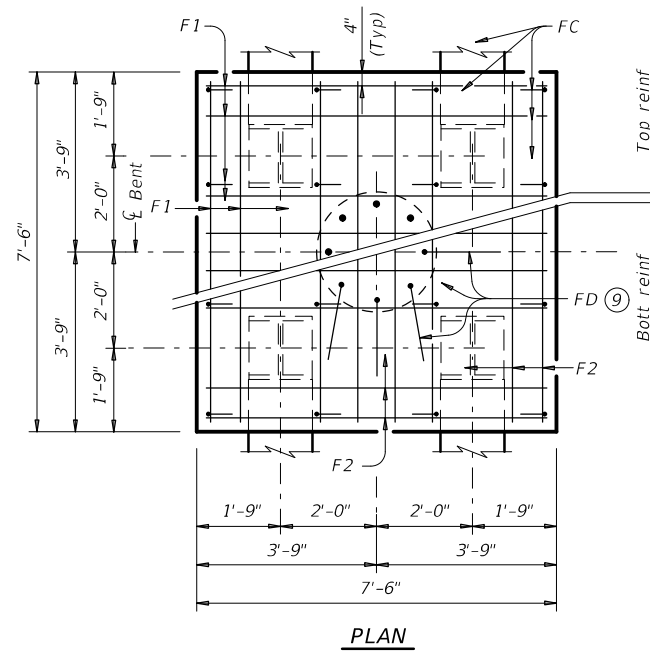
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COMMON FOUNDATION DETAILS			
FD			
FILE: fdstd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB
0915	45	056	CR 2615
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.
SAT	MEDINA		72

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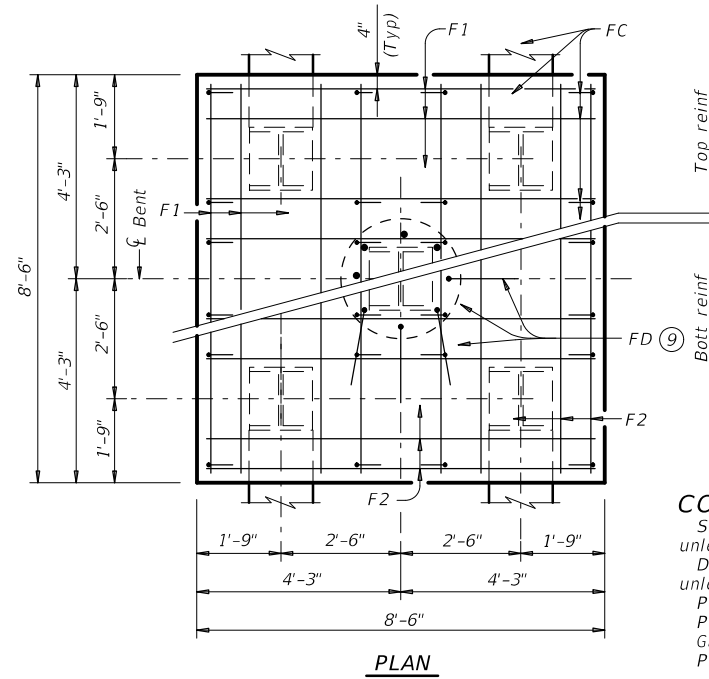
PCX
DATE: 10/31/2022
FILE: fdstd01-20 (2).dgn



THREE PILE FOOTING^⑧
For 36" Dia and smaller columns.

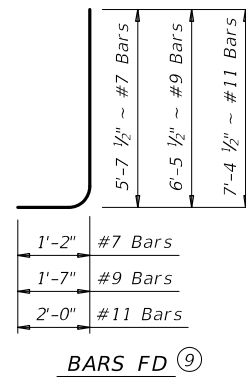
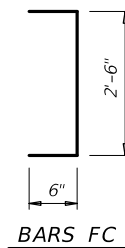


FOUR PILE FOOTING^⑧
For 42" Dia and smaller columns.



FIVE PILE FOOTING^⑧
For 42" Dia and smaller columns.

At Contractor's option, concrete may be placed to here



- ③ Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.
- ⑧ See Bridge Layout for type, size and length of piling.
- ⑨ Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8
ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3
ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
 Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.
 Provide Class C Concrete ($f'_c = 3,600$ psi), unless shown otherwise.
 Provide Grade 60 reinforcing steel.
 Galvanize reinforcing if shown elsewhere in the plans.
 Provide bar laps for drilled shaft reinforcing, where required, as follows:
 Uncoated or galvanized (#6) ~ 2'-6"
 Uncoated or galvanized (#7) ~ 2'-11"
 Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
 Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.
 Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
 Maximum allowable pile loads for the footings shown are:
 72 Tons/Pile with 24" Dia Columns
 80 Tons/Pile with 30" Dia Columns
 100 Tons/Pile with 36" Dia Columns
 120 Tons/Pile with 42" Dia Columns

SHEET 2 OF 2



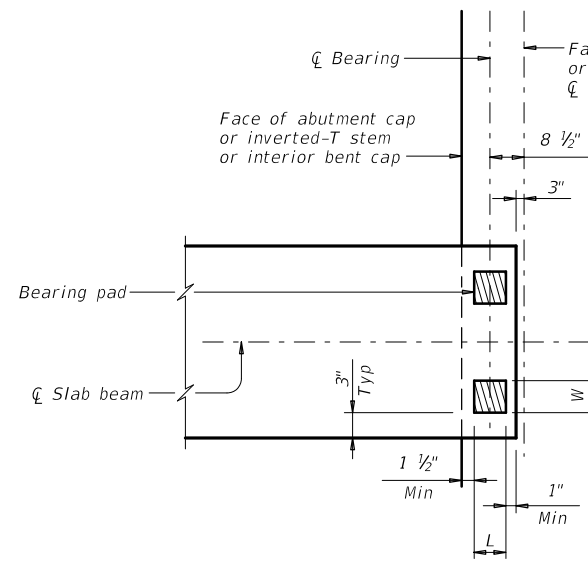
COMMON FOUNDATION DETAILS

FD

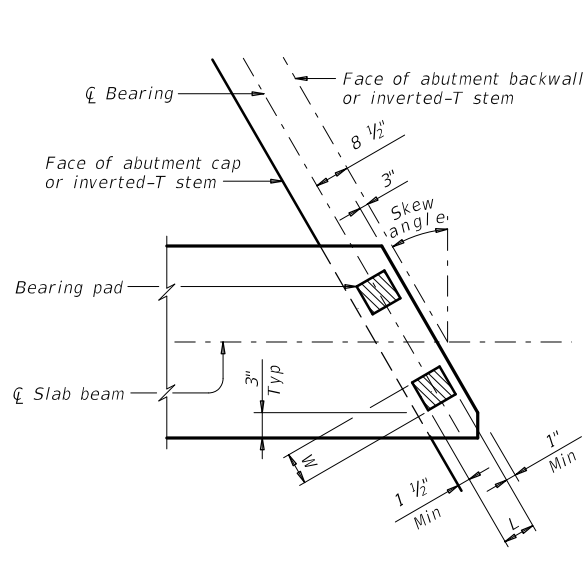
FILE: fdstd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONTRACT	SECTION	JOB	HIGHWAY
01-20: Added #11 bars to the FD bars.	0915	45	056	CR 2615
DIST	COUNTY	SHEET NO.		
SAT	MEDINA	73		

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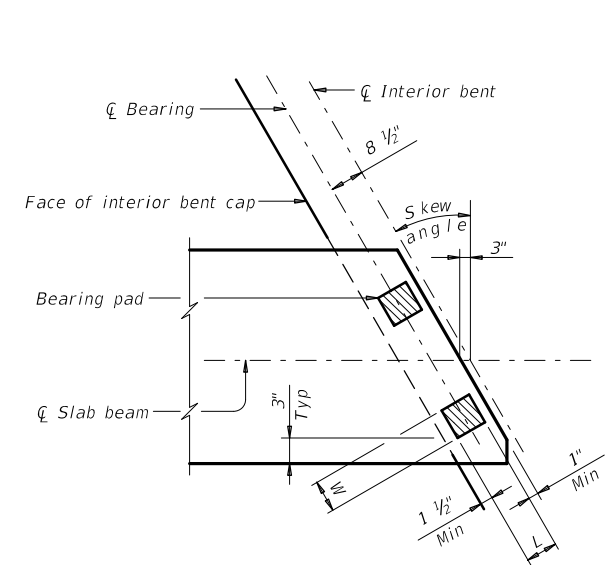
PCX
DATE: 10/31/2022
FILE: psbste06-17 (2).dgn



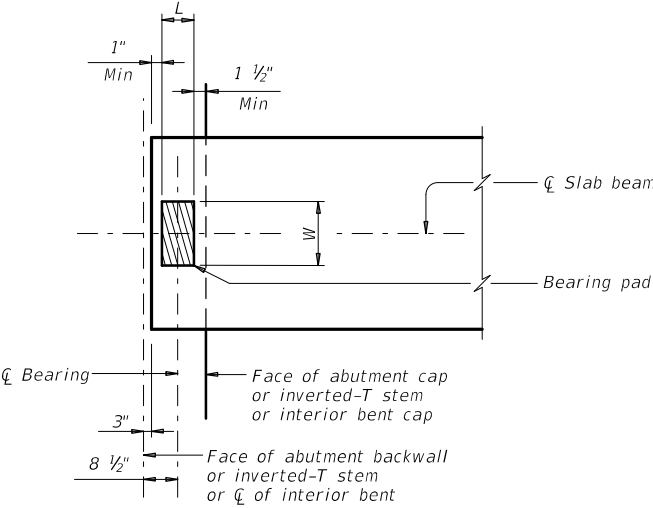
TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



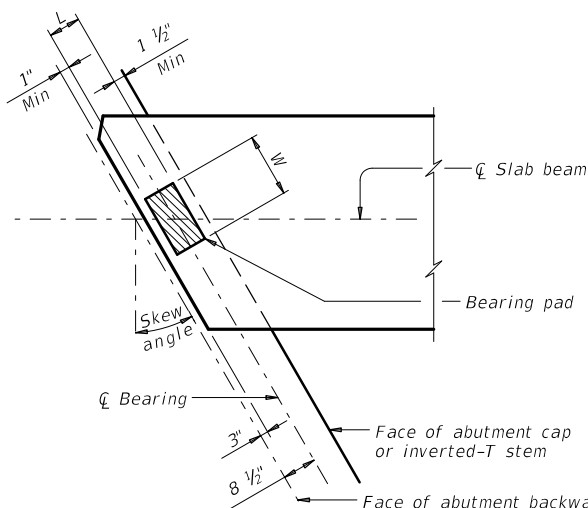
TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



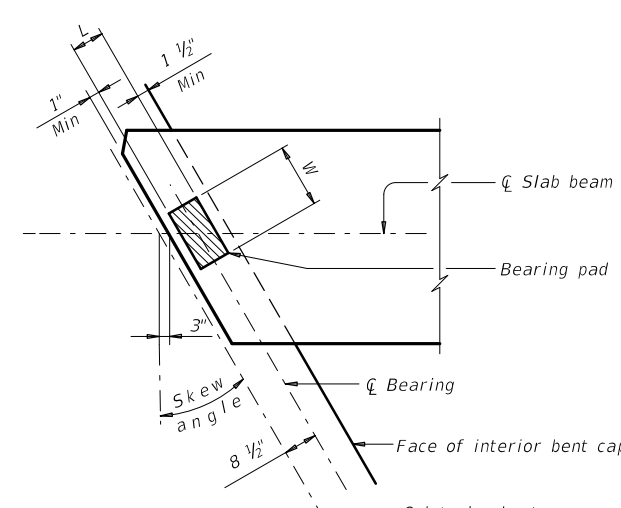
TWO-PAD DETAIL SKEW PLAN
(At interior bent)



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



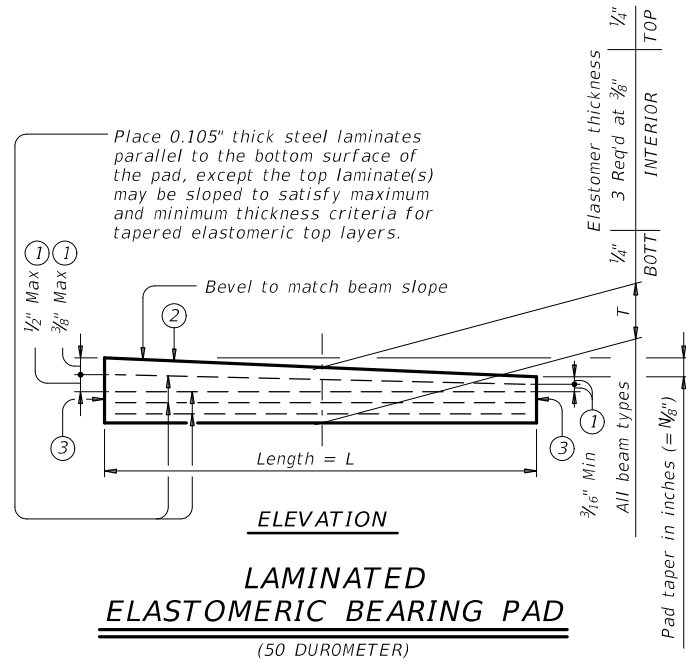
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.



- Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than (0.0625" / Length) IN/IN.
- Locate permanent mark here.

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

- All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
- Skews less than or equal to 30°.

GENERAL NOTES:

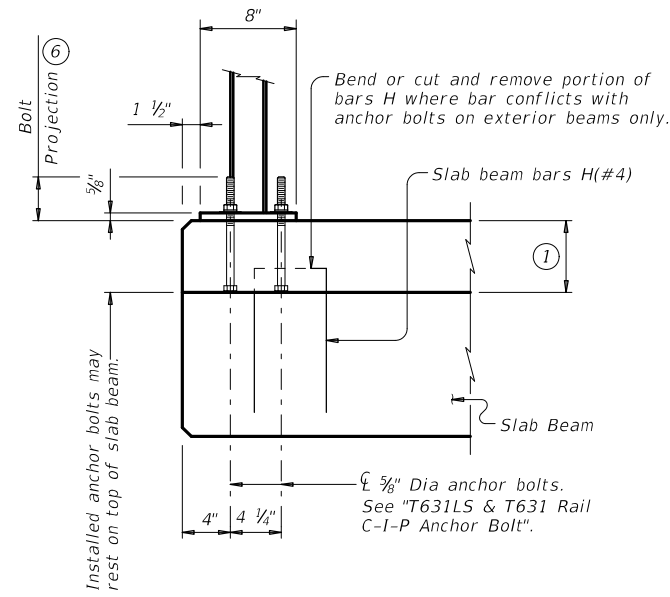
These details accommodate skew angles up to 30°. Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer. Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".

HL93 LOADING

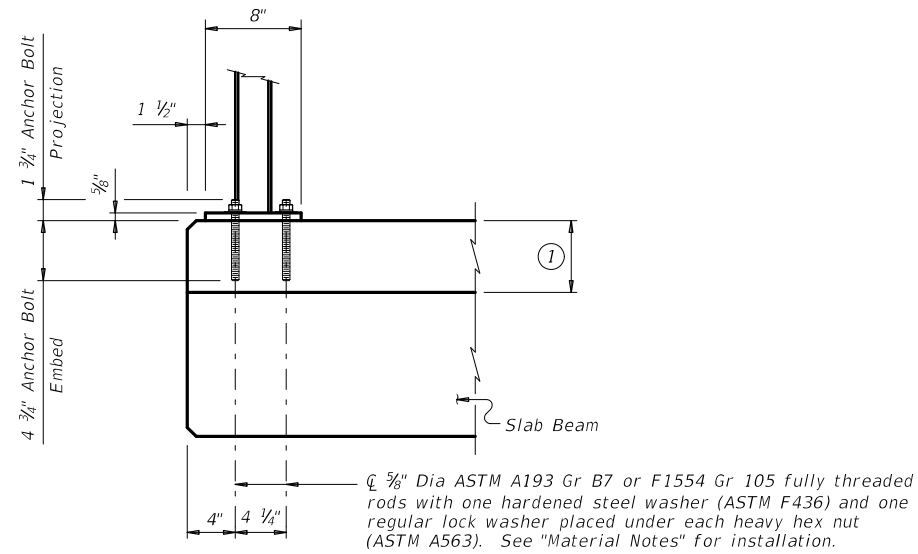
		Bridge Division Standard	
ELASTOMERIC BEARING AND BEAM END DETAILS			
PRESTR CONCRETE SLAB BEAM			
PSBEB			
FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
©TxDOT January 2017	CONT SECT	JOB	HIGHWAY
REVISIONS	0915 45	056	CR 2615
DIST	COUNTY	SHEET NO.	
SAT	MEDINA	74	

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DATE: 10/31/2022
FILE: psbste07-18 (2).dgn

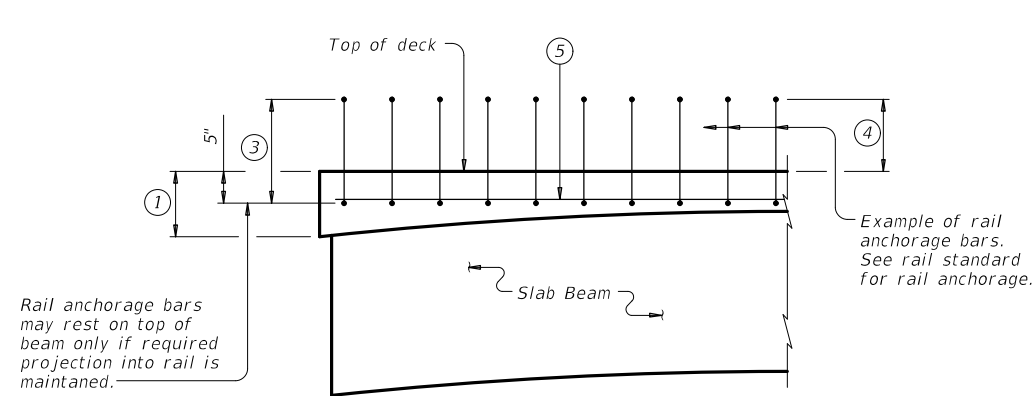


CAST-IN-PLACE ANCHORAGE OPTION

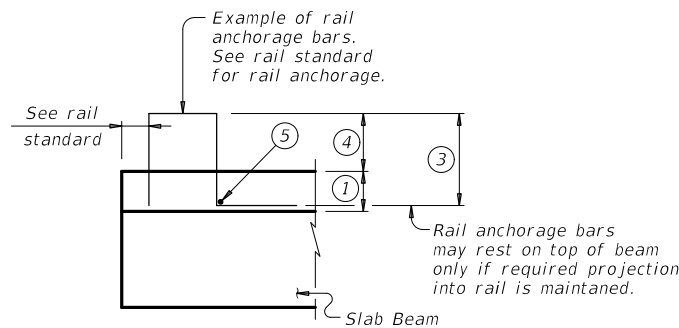


ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2) (7)



PART SPAN ELEVATION

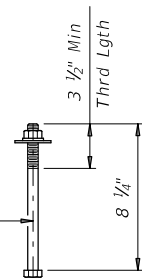


SECTION

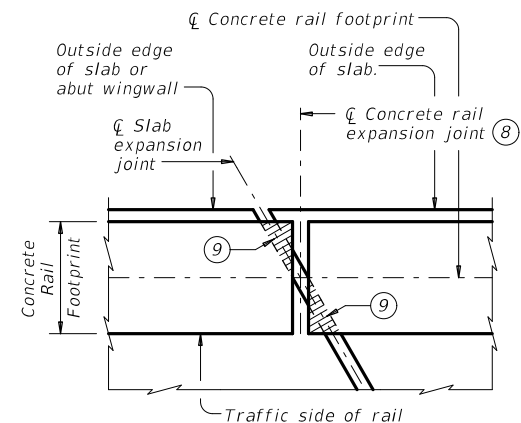
TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563).



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

- ① Cast-in-place slab thickness varies due to beam camber (5" minimum).
- ② Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
- ③ Bar length shown on rail standard, minus 1 1/4". Adjust bar length for a raised sidewalk.
- ④ See rail standard for projection from finished grade or top of sidewalk.
- ⑤ Place additional (#5) longitudinal bar.
- ⑥ Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than 1/2" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
- ⑦ Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
30° Skew: 1'-3" (acute corner only)
- ⑧ Location of rail expansion joint must be at the intersection of slab expansion joint, rail footprint and perpendicular to slab outside edge.
- ⑨ Cross-hatched area must have 1/2" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.
Provide Grade 60 reinforcing steel.
Cast-in-place anchorage system for T631LS and T631 Rail must be 5/8" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 1/2" minimum.
Adhesive anchors for T631LS and T631 Rail must be 5/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 3/4". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

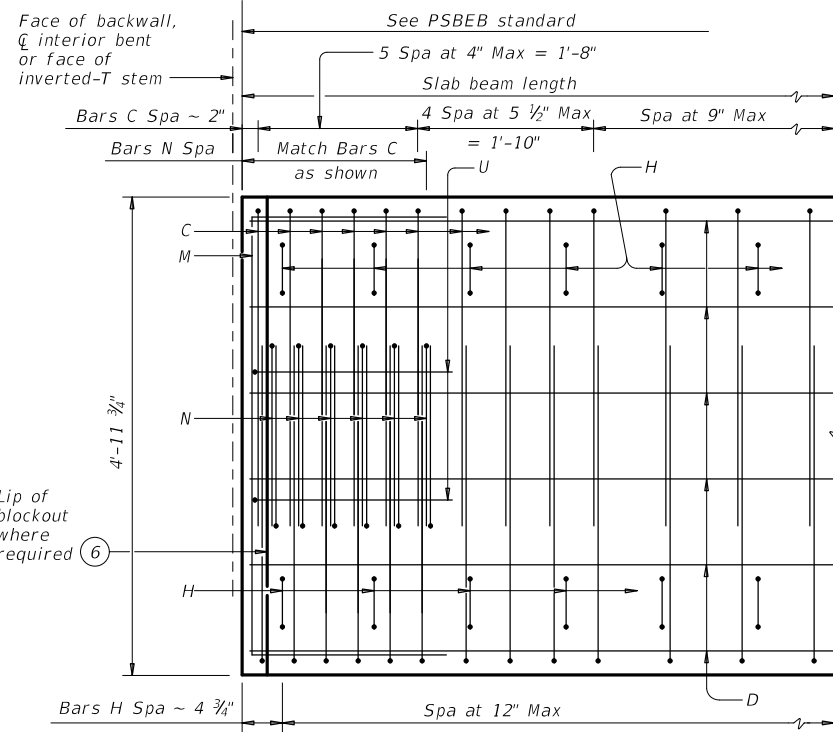
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
This standard is for use with structures with a 5" minimum cast-in-place concrete slab.
This standard may require modification for interior rails. This standard does not apply to median barriers.
This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.
See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

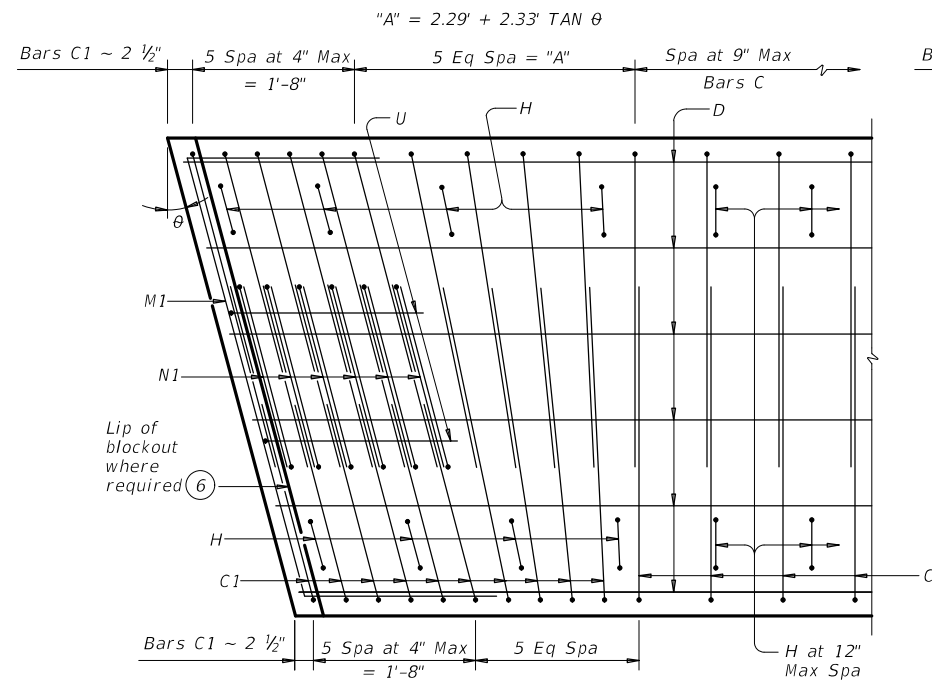
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RAIL ANCHORAGE DETAILS					
PRESTR CONCRETE SLAB BEAMS					
PSBRA					
FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH	
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	45	056	CR 2615	
03-18: Updated adhesive anchor notes.	DIST	COUNTY	SHEET NO.		
	SAT	MEDINA	75		

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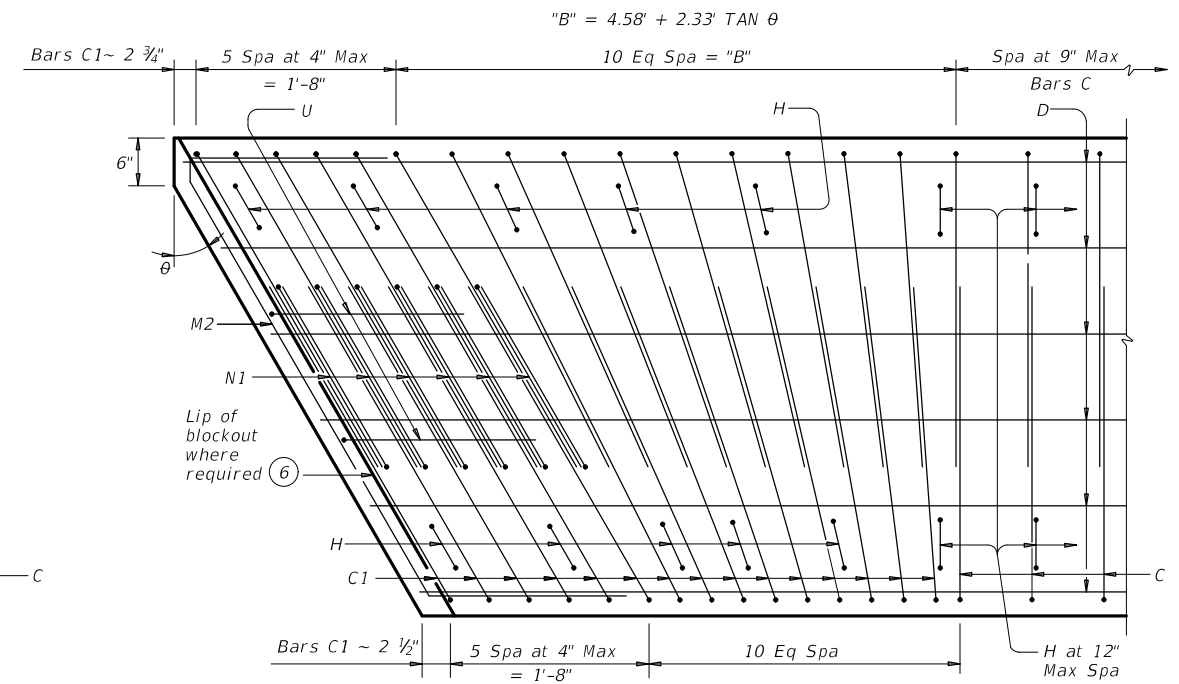
PCX
DATE: 10/31/2022
FILE: psbsts03-17 (1).dgn



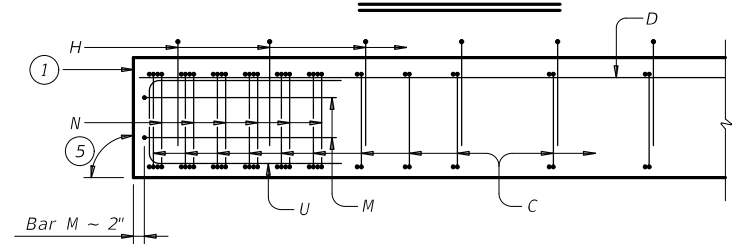
PART PLAN



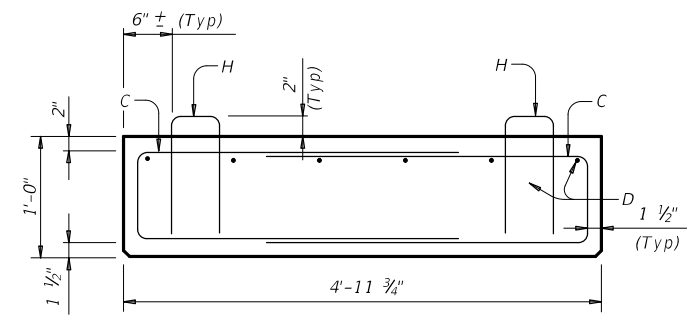
PART SKEW PLAN
(Showing θ over 0° to 15° Skew)



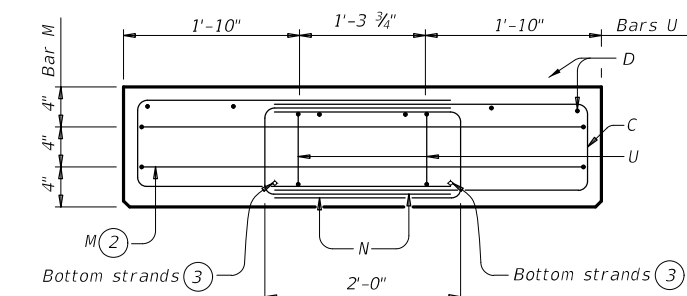
PART SKEW PLAN
(Showing θ over 15° to 30° Skew)



ELEVATION

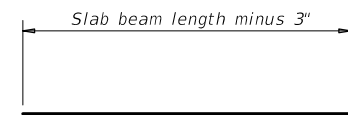


SECTION

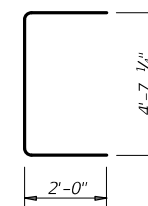


END MAT REINFORCING

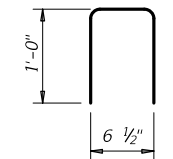
Bars H not shown for clarity.



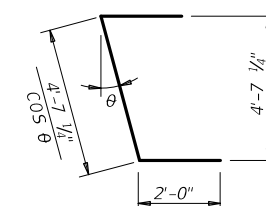
BARS D(#6)



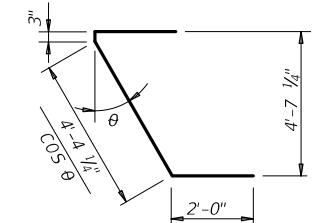
BARS M(#4)



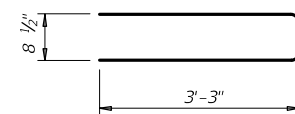
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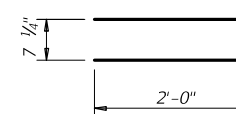
BARS M1(#4)



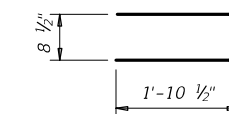
BARS M2(#4)



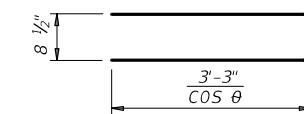
BARS C(#4)



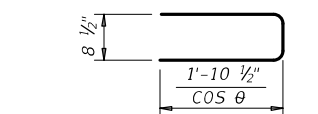
BARS U(#5)



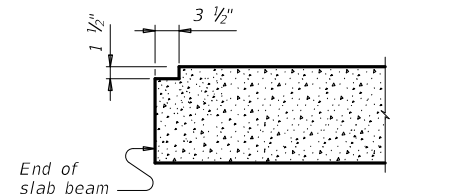
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT

BEAM PROPERTIES		
Area	in ²	717.0
Y top	in	6.00
Y bolt	in	6.00
I	in ⁴	8,604
Weight	lb/ft	747

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications. Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
- Provide Grade 60 reinforcing steel.
- An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
- These details can be used for any skew angle up to a maximum of 30 degrees.
- Chamfer all exposed corners 3/4" or round to a 3/4" radius.
- Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

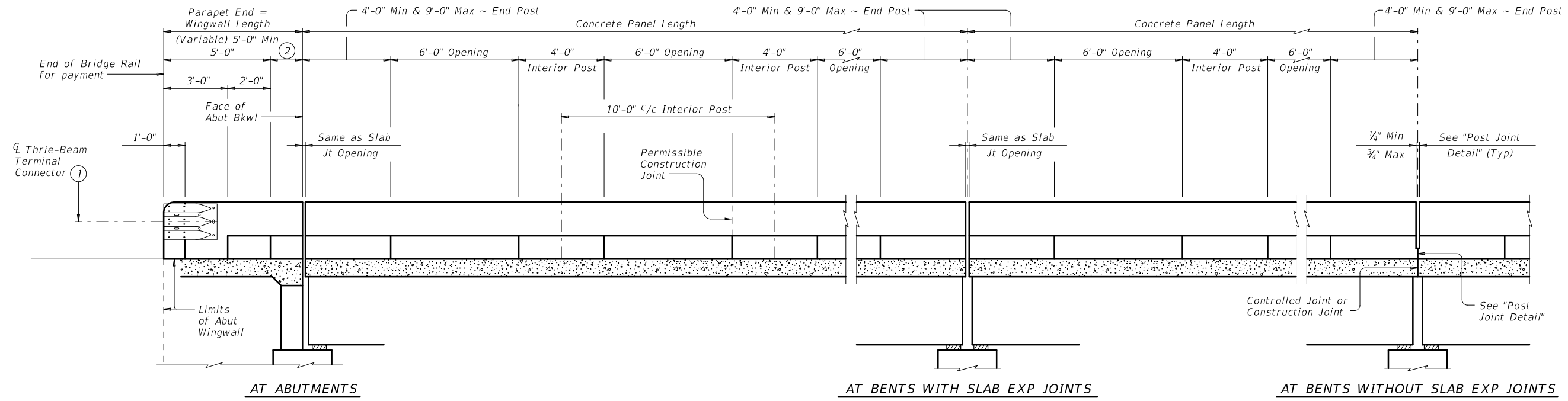
- ① See End Mat Reinforcing detail.
- ② Adjust bars M vertically to avoid strands.
- ③ See sheet PSBND or PSBSD for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
- ⑥ Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

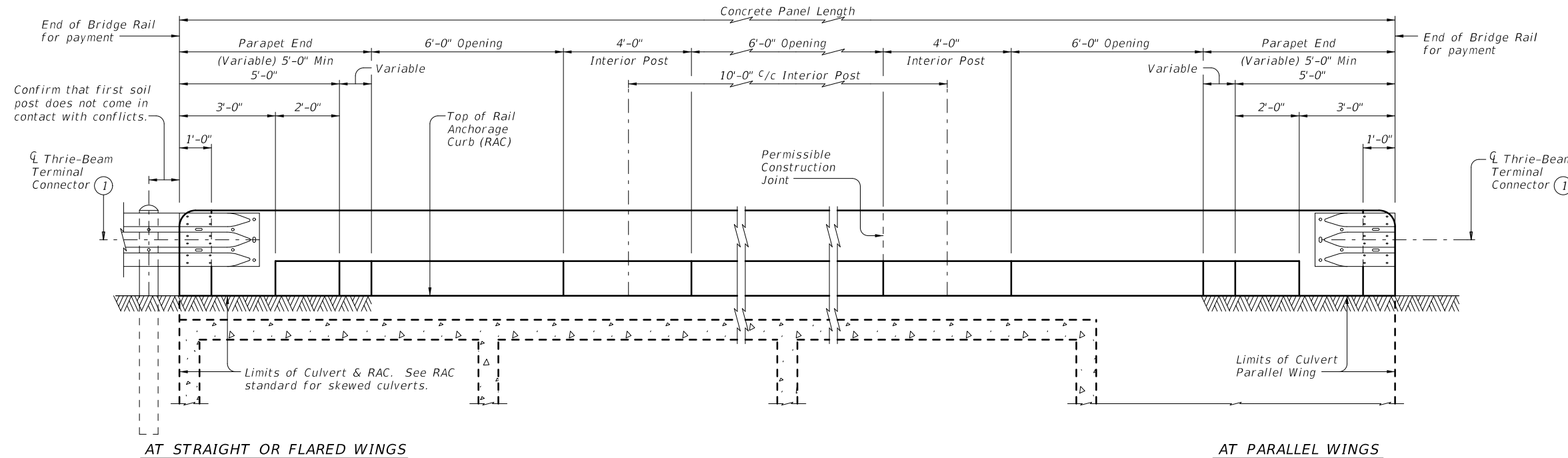
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PRESTRESSED CONCRETE SLAB BEAM DETAILS (TYPE 5SB12)			
PSB-5SB12			
FILE: psbsts03-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT January 2017	CONT	SECT	JOB
REVISIONS	0915	45	056
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	76

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DATE: 10/31/2022
FILE: r1std005-19 (2).dgn



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

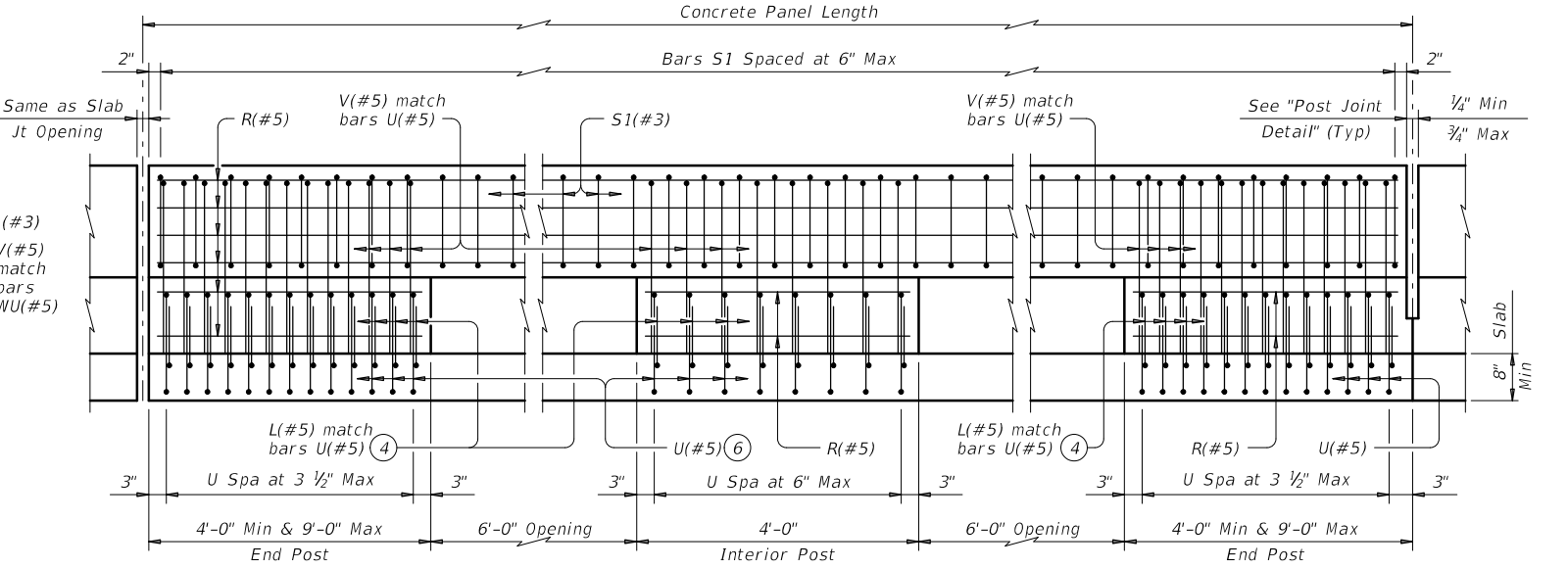
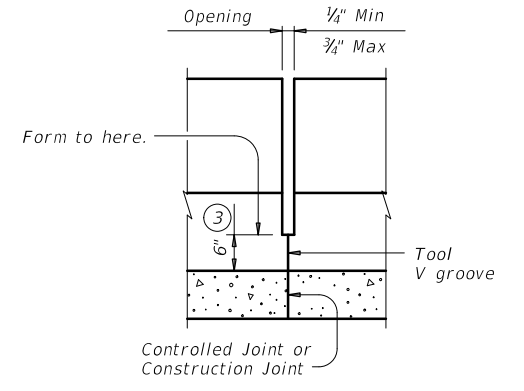
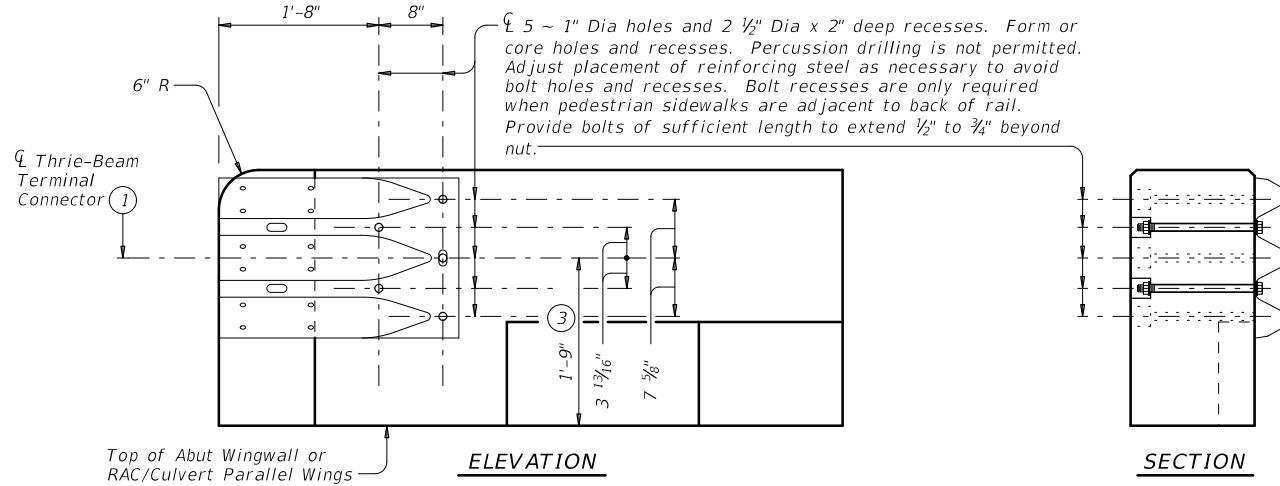
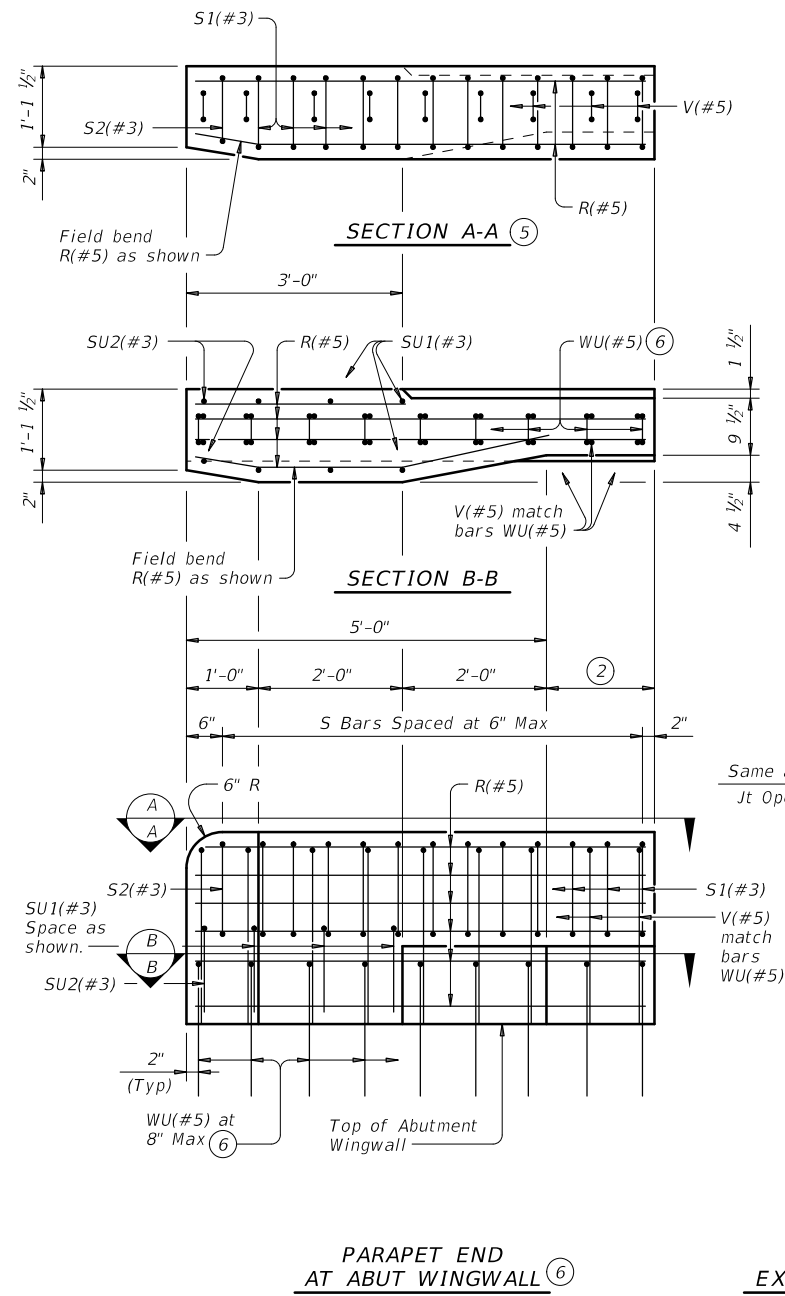
Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)

				Bridge Division Standard	
<h2>TRAFFIC RAIL</h2>					
<h3>TYPE T223</h3>					
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES	
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	45	056	CR 2615	
	DIST	COUNTY	SHEET NO.		
	SAT	MEDINA	77		

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PCX
DATE: 10/31/2022
FILE: r1std005-19 (2).dgn



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT
Showing rail on slab. Rail on box culvert similar.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑤ Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.



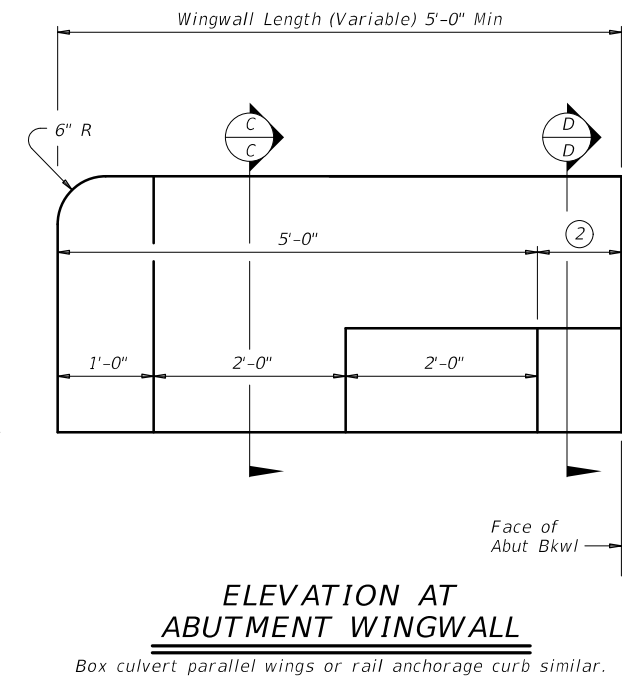
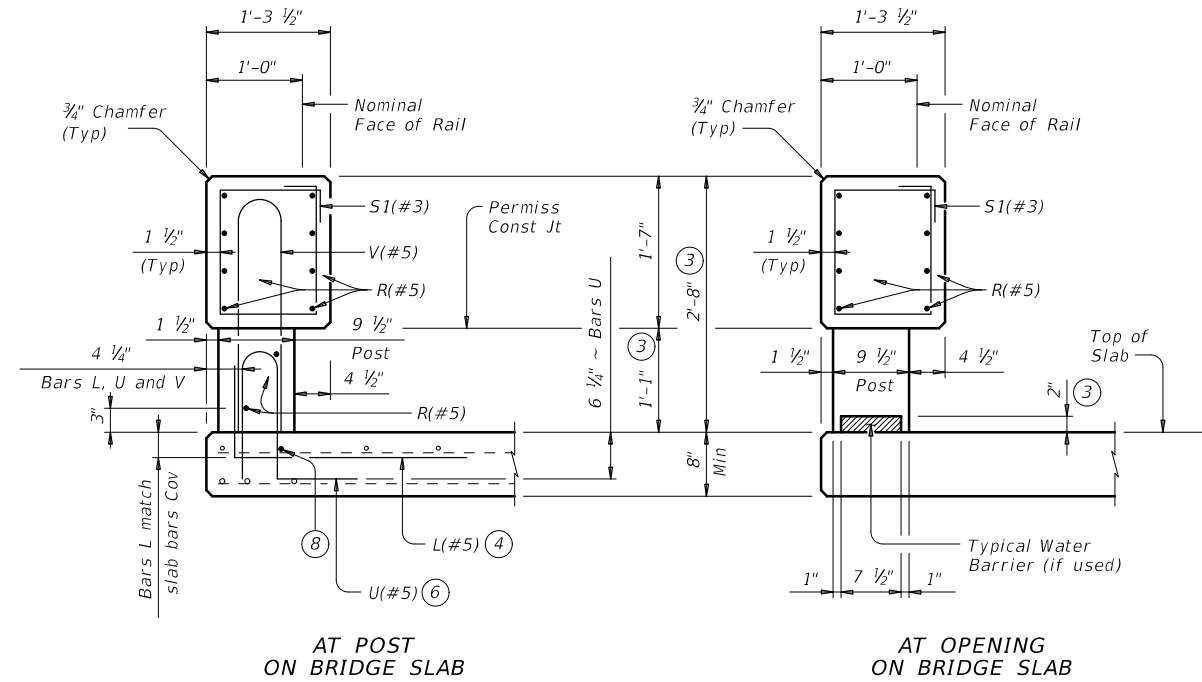
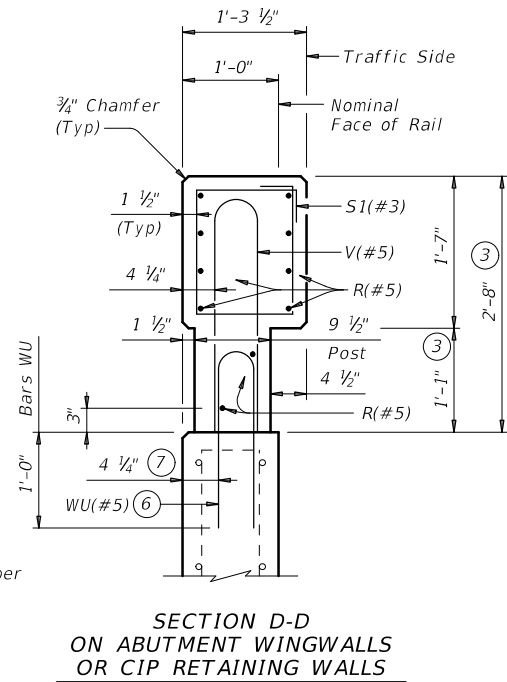
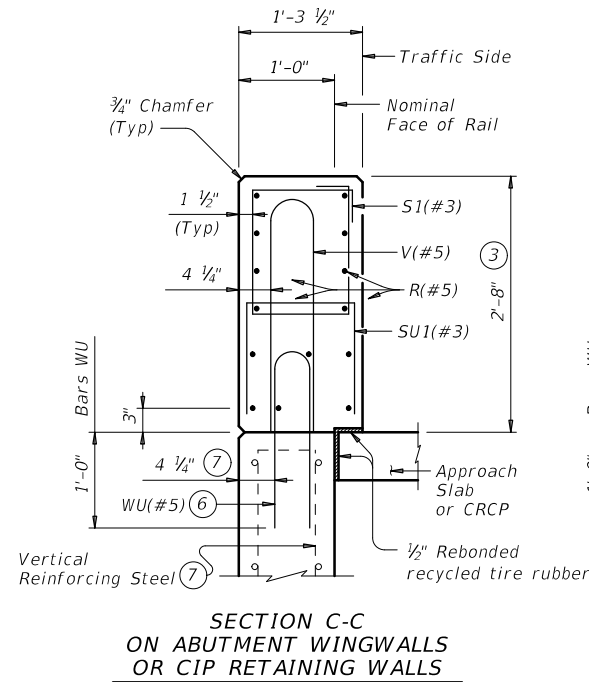
TRAFFIC RAIL

TYPE T223

FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	78	

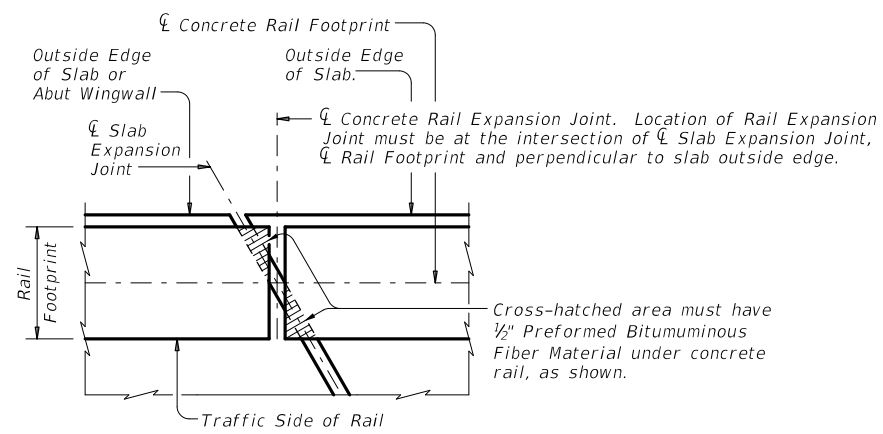
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

PCX
DATE: 10/31/2022
FILE: r1std005-19 (2).dgn



SECTIONS THRU RAIL
Sections on box culverts similar.

- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.
- ⑦ When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.
- ⑧ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑨ At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 1/4" above the roadway surface without overlay.



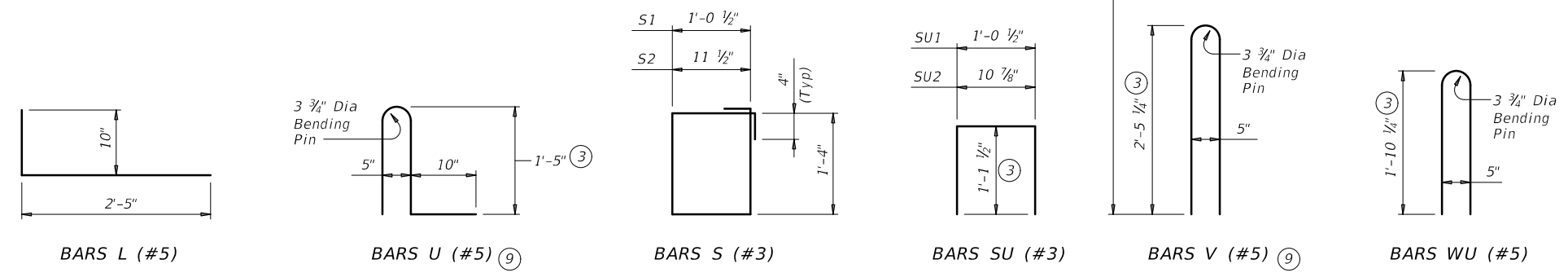
PLAN OF RAIL AT EXPANSION JOINTS
Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:
Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.
Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.
Chamfer all exposed corners.

MATERIAL NOTES:
Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:
This rail has been evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
Do not use this railing on bridges with expansion joints providing more than 5" movement.
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
Shop drawings are not required for this rail.
Average weight of railing with no overlay is 358 plf.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



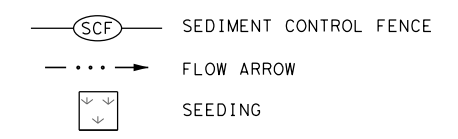
		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
0915	056	056	CR 2615
SAT	MEDINA	SHEET NO. 79	

Plotted on: 2/24/2023

Design File name: P:\117\99\06\CR2615\Design\Civil\SW3P\1179906SWP01.dgn

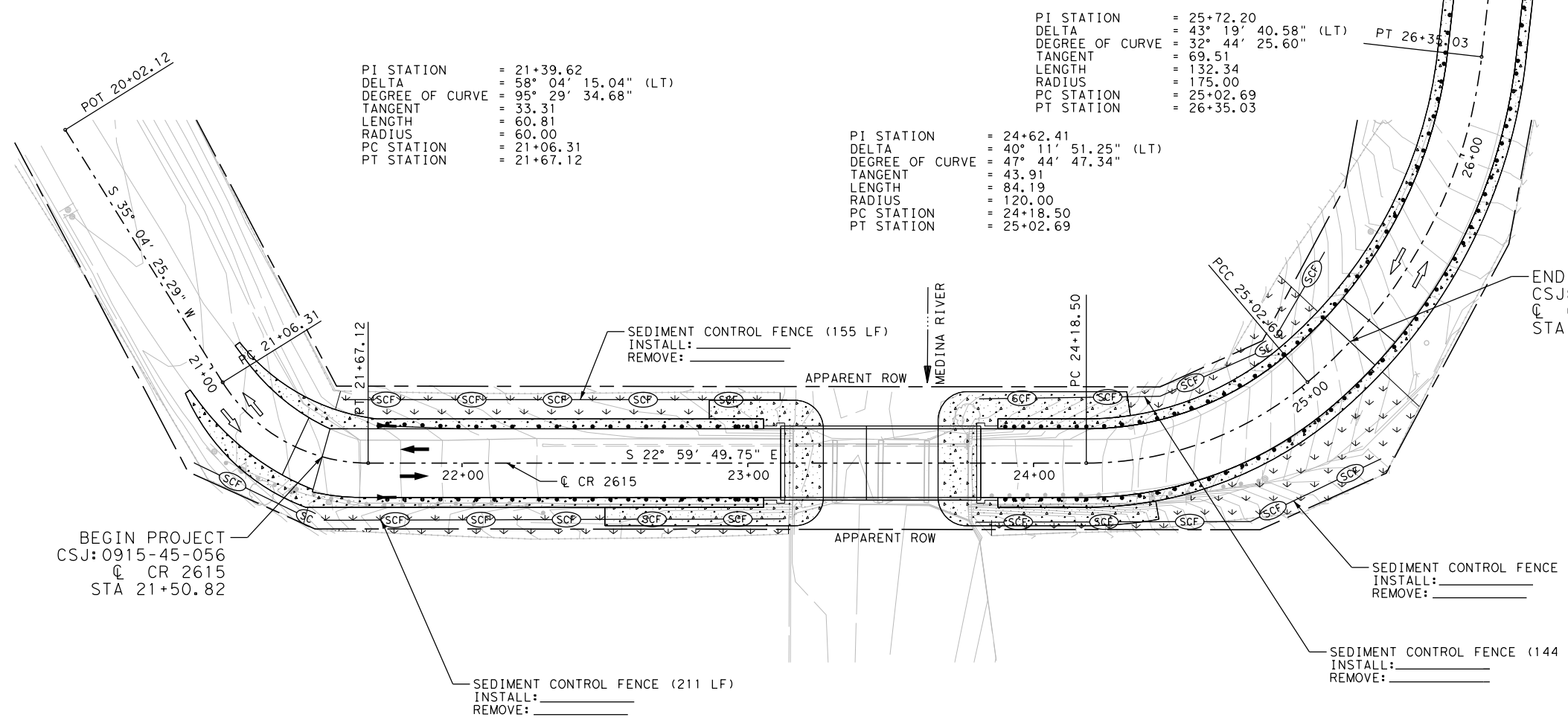
ITEM	DESCRIPTION	UNIT	QTY
0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	538
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	135
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	135
0168-6001	VEGETATIVE WATERING	MG	9.00
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	657
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	657

SW3P LEGEND



- NOTES:
- REFER TO TEMPORARY EROSION CONTROL MEASURE STANDARDS FOR MORE INFORMATION.
 - SW3P CONTROL MEASURES INSTALLED DURING CONSTRUCTION ARE TO REMAIN IN PLACE UNTIL GRASS COVER IS ACHIEVED OR AS APPROVED BY THE ENGINEER.
 - SW3P CONTROL MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED AFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS SHEET AND SIGNED BY THE RESPONSIBLE PARTY.
 - ALL SW3P CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITION AT ALL TIMES.

TEMPORARY SEDIMENT CONTROL FENCE SHOULD BE PLACED ON CONSTRUCTION EASEMENT LIMIT LINE WHENEVER PRESENT. IF NO CONSTRUCTION EASEMENT EXISTS IN AREA THEN PLACE ON RIGHT-OF-WAY LINE. TEMPORARY SEDIMENT CONTROL FENCE IS PURPOSELY SHOWN OFF-SET FROM SAID LINES FOR VISUAL CLARITY.

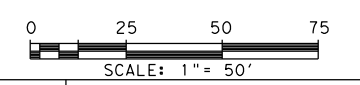


DESIGN

LUKE REED, P.E.
2/24/2023 DATE

APPROVAL

JAMES A. LUTZ, P.E.
2/24/2023 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CR 2615 AT MEDINA RIVER

SW3P LAYOUT

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	CR 2615		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	0915	45	056	80

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION Bridge Replacement

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0915-14-056

1.2 PROJECT LIMITS:

From: Medina River STR #15-163-0-AA04-65-001

To: _____

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29.49887500° N, (Long) 98.90554167° W

END: (Lat) 29.49778889° N, (Long) 98.90431389° W

1.4 TOTAL PROJECT AREA (Acres): 0.5 Acres

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.5 Acres

1.6 NATURE OF CONSTRUCTION ACTIVITY:

REPLACE BRIDGE AND APPROACHES

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CLAYEY GRAVEL	TAN, LOW PLASTICITY, SLIGHTLY COMPACT TO VERY DENSE, WITH SCATTERED BOULDERS AND COBBLES
LEAN CLAY	TAN AND GRAY, MODERATE PLASTICITY, HARD
SHALE	GRAY, SOFT ROCK
LIMESTONE	LIGHT BROWN TO TAN

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- PSLs determined during preconstruction meeting
- PSLs determined during construction
- No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- Mobilization
- Install sediment and erosion controls
- Blade existing topsoil into windrows, prep ROW, clear and grub
- Remove existing pavement
- Grading operations, excavation, and embankment
- Excavate and prepare subgrade for proposed pavement widening
- Remove existing culverts, safety end treatments (SETs)
- Remove existing metal beam guard fence (MBGF), bridge rail
- Install proposed pavement per plans
- Install culverts, culvert extensions, SETs
- Install mow strip, MBGF, bridge rail
- Place flex base
- Rework slopes, grade ditches
- Blade windrowed material back across slopes
- Revegetation of unpaved areas
- Achieve site stabilization and remove sediment and erosion control measures

- Other: _____
- Other: _____
- Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- Sediment laden stormwater from stormwater conveyance over disturbed area
- Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- Solvents, paints, adhesives, etc. from various construction activities
- Transported soils from offsite vehicle tracking
- Construction debris and waste from various construction activities
- Contaminated water from excavation or dewatering pump-out water
- Sanitary waste from onsite restroom facilities
- Trash from various construction activities/receptacles
- Long-term stockpiles of material and waste
- Other: _____
- Other: _____
- Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- Development of plans and specifications
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Other: _____
- Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- Day To Day Operational Control
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Other: _____
- Other: _____

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		81
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	MEDINA	
CONT.	SECT.	JOB	HI GHWAY NO.
0915	45	056	CR 2615

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- Protection of Existing Vegetation
- Vegetated Buffer Zones
- Soil Retention Blankets
- Geotextiles
- Mulching/ Hydromulching
- Soil Surface Treatments
- Temporary Seeding
- Permanent Planting, Sodding or Seeding
- Biodegradable Erosion Control Logs
- Rock Filter Dams/ Rock Check Dams
- Vertical Tracking
- Interceptor Swale
- Riprap
- Diversion Dike
- Temporary Pipe Slope Drain
- Embankment for Erosion Control
- Paved Flumes
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- Biodegradable Erosion Control Logs
- Dewatering Controls
- Inlet Protection
- Rock Filter Dams/ Rock Check Dams
- Sandbag Berms
- Sediment Control Fence
- Stabilized Construction Exit
- Floating Turbidity Barrier
- Vegetated Buffer Zones
- Vegetated Filter Strips
- Other: _____
- Other: _____
- Other: _____
- Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- Excess dirt/mud on road removed daily
- Haul roads dampened for dust control
- Loaded haul trucks to be covered with tarpaulin
- Stabilized construction exit
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- Fire hydrant flushings
- Irrigation drainage
- Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- Potable water sources
- Springs
- Uncontaminated groundwater
- Water used to wash vehicles or control dust
- Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		81A
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	MEDINA	
CONT.	SECT.	JOB	HI GHWAY NO.
0915	45	056	CR 2615

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DATE: 2/24/2023
 FILE: P:\11799\06\CR2615\Design\Civil\Standards\SW3P\epic.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

- 1.
2. No Action Required Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- No Permit Required
- Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1. Medina River. STA 23+11.55
- 2.
- 3.
- 4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
<input checked="" type="checkbox"/> Temporary Vegetation	<input checked="" type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input checked="" type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

- No Action Required Required Action

Action No.

- 1.
- 2.
- 3.
- 4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

- No Action Required Required Action

Action No.

- 1.
- 2.
- 3.
- 4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

- No Action Required Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

- A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.
- B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP: Best Management Practice	SPCC: Spill Prevention Control and Countermeasure
CGP: Construction General Permit	SW3P: Storm Water Pollution Prevention Plan
DSHS: Texas Department of State Health Services	PCN: Pre-Construction Notification
FHWA: Federal Highway Administration	PSL: Project Specific Location
MOA: Memorandum of Agreement	TCEQ: Texas Commission on Environmental Quality
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
MBTA: Migratory Bird Treaty Act	TxDOT: Texas Department of Transportation
NOT: Notice of Termination	T&E: Threatened and Endangered Species
NWP: Nationwide Permit	USACE: U.S. Army Corps of Engineers
NOI: Notice of Intent	USFWS: U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- * Dead or distressed vegetation (not identified as normal)
- * Trash piles, drums, canister, barrels, etc.
- * Undesirable smells or odors
- * Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

- Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

- Yes No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

- No Action Required Required Action

Action No.

- 1.
- 2.
- 3.


VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

- No Action Required Required Action

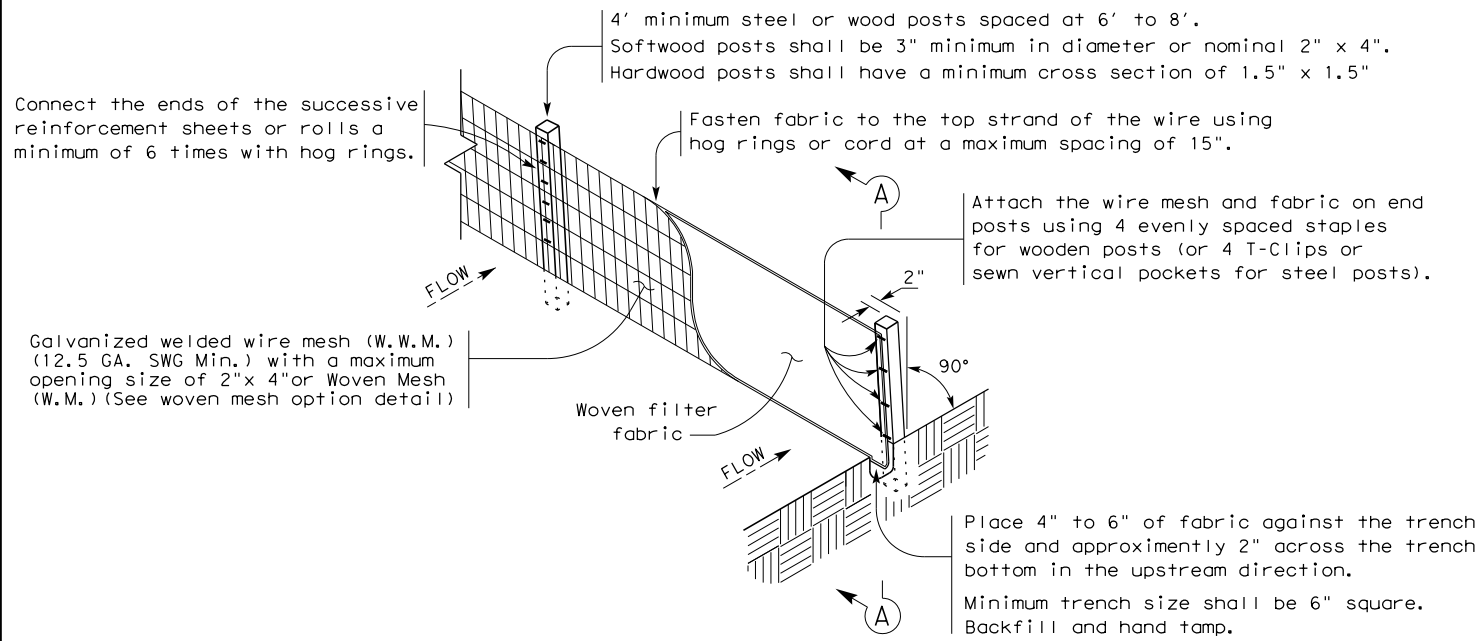
Action No.

- 1.
- 2.
- 3.

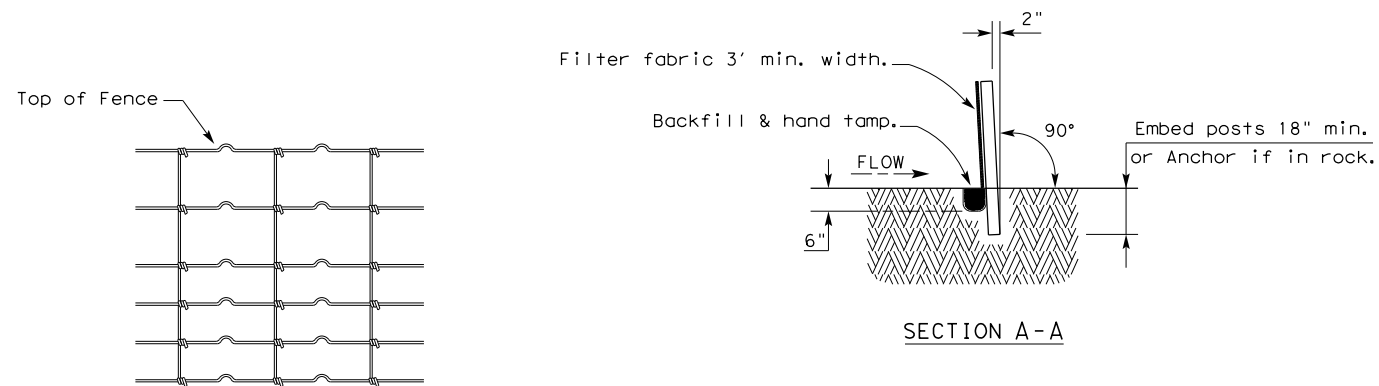
		Design Division Standard		
<p>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC</p>				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0915	45	056	CR 2615
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I. CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	SAT	MEDINA	82	

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TEMPORARY SEDIMENT CONTROL FENCE



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

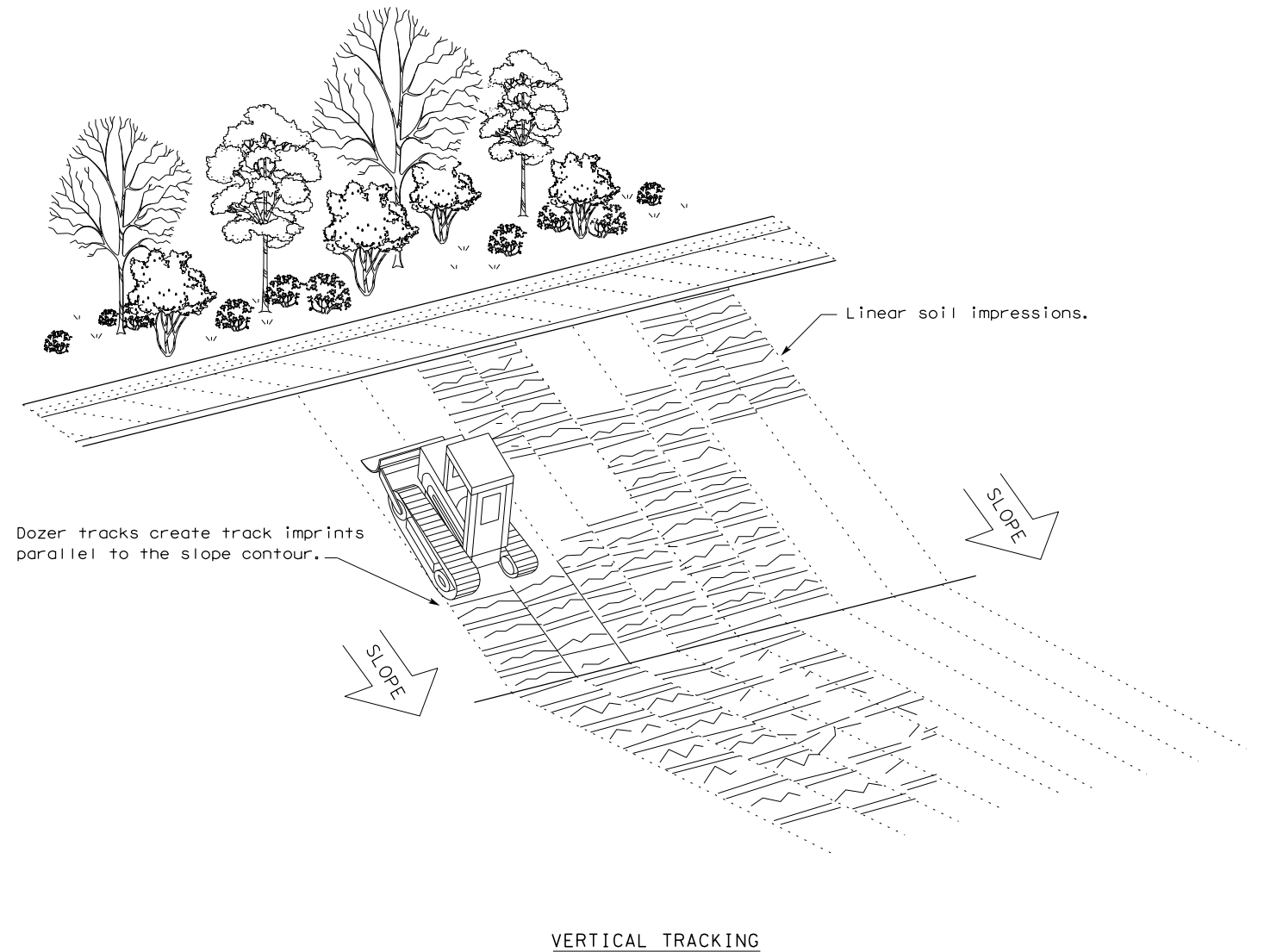
LEGEND

Sediment Control Fence



GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1) - 16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	45	056	CR 2615
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	83	